Members

Sen. James Merritt, Co-Chairperson
Sen. Jean Leising
Sen. Beverly Gard
Sen. Dennis Kruse
Sen. Scott Schneider
Sen. James Tomes
Sen. Carlin Yoder
Sen. Lonnie Randolph
Sen. Jean Breaux
Sen. Richard Young
Rep. Jack Lutz, Co-Chairperson
Rep. Heath VanNatter
Rep. Robert Behning
Rep. David Frizzell
Rep. Eric Koch
Rep. Timothy Neese
Rep. Edmond Soliday
Rep. David Yarde
Rep. Dan Stevenson
Rep. Kreg Battles
Rep. Ryan Dvorak
Rep. Charles Moseley
Rep. Matthew Pierce

LSA Staff:

Sarah Burkman, Attorney for the Committee
Sarah Freeman, Attorney for the Committee
Heath Holloway, Fiscal Analyst for the Committee

Authority: IC 8-1-2.5-9

REGULATORY FLEXIBILITY COMMITTEE

Legislative Services Agency
200 West Washington Street, Suite 301
Indianapolis, Indiana 46204-2789
Tel: (317) 233-0696 Fax: (317) 232-2554

MEETING MINUTES[1]

Meeting Date:	**September 6, 2012**
Meeting Time:	**10:00 A.M.**
Meeting Place:	**State House, 200 W. Washington St., Senate Chambers**
Meeting City:	**Indianapolis, Indiana**
Meeting Number:	**1**

Members Present: **Sen. James Merritt, Co-Chairperson; Sen. Jean Leising; Sen. Beverly Gard; Sen. Dennis Kruse; Sen. James Tomes; Sen. Jean Breaux; Rep. Jack Lutz, Co-Chairperson; Rep. Heath VanNatter; Rep. Robert Behning; Rep. David Frizzell; Rep. Eric Koch; Rep. Dan Stevenson; Rep. Kreg Battles; Rep. Ryan Dvorak; Rep. Charles Moseley; Rep. Matthew Pierce.**

Members Absent: **Sen. Scott Schneider; Sen. Carlin Yoder; Sen. Lonnie Randolph; Sen. Richard Young; Rep. Timothy Neese; Rep. Edmond Soliday; Rep. David Yarde.**

Call to Order

Co-chairperson Merritt called the meeting to order at 10:04 a.m.

[1] These minutes, exhibits, and other materials referenced in the minutes can be viewed electronically at http://www.in.gov/legislative Hard copies can be obtained in the Legislative Information Center in Room 230 of the State House in Indianapolis, Indiana. Requests for hard copies may be mailed to the Legislative Information Center, Legislative Services Agency, West Washington Street, Indianapolis, IN 46204-2789. A fee of $0.15 per page and mailing costs will be charged for hard copies.

Clean Energy and the Indiana Voluntary Clean Energy Portfolio Standard Program

Tony Samuel of Samuel Solutions Group introduced members of the Indiana Power of Wind Coalition. See Exhibit A. Brad Lystra of the American Wind Energy Association discussed wind development in Indiana. In 2011, 2.7% of Indiana power was generated by wind. There are currently 1,342 megawatts (MW) of wind-generated power online in Indiana, with an additional 201 MW under construction. Connie Neininger, executive director of White County Economic Development, talked about wind development in White and Benton counties. White County is home to 303 wind turbines generating 501 MW, and Benton County houses 495 turbines generating 838 MW. Ms. Neininger also discussed the financial investments and lower property taxes resulting from wind development. Senator Leising asked how the wind developers had dealt with pushback from owners of residential property located next to the wind farms. Ms. Neininger stated that there was a lengthy education process with property owners resulting in few complaints.

Curtis Crum advocated for an independent, binding request for proposal (RFP) process to improve energy procurement in Indiana. Jason Minalga with Invenergy discussed the absence of a free market in energy procurement and the imbalance between ratepayer costs and shareholder returns. He also described energy procurement processes in Colorado and Michigan. Senator Breaux requested an explanation of the barriers to competition in the energy market. Mr. Minalga stated that the integrated resource plans (IRP) used by investor owned utilities are unreliable. Representative Pierce asked if a feed-in tariff (FIT) would be more efficient. Mr. Minalga answered that the FIT model used by utilities generally looks at small scale projects, unlike Invenergy's larger wind, solar, and natural gas projects. Nick Muller, founder of Colorado Independent Energy Association, talked in more detail about competitive energy procurement in Colorado. The Colorado Public Utility Commission requires all projects of 30 MW or to be bid out in an IRP driven RFP process.

Renewable Energy Transmission

Clean Line Energy (Clean Line) develops high voltage direct current (HVDC) transmission lines to move large amounts of power over long distances. See Exhibit B. Diana Coggins, project development manager for the Grain Belt Express project, showed a video about the Grain Belt Express. Ms. Coggins stated that HVDC technology is more efficient, has a smaller footprint, and costs less than other transmission technologies. Clean Line uses a merchant model to fund the costs of its transmission projects. The Grain Belt Express is a 7,000 mile HVDC transmission line that, once completed, will deliver wind energy from Kansas to midwestern and eastern states, including Indiana. Clean Line is seeking utility status in the states in which it operates in order to acquire property for its transmission routes through the exercise of eminent domain. Ms. Coggins testified that the Grain Belt Express will result in economic, health, and environmental benefits for Indiana.

Ms..Coggins told Representative Koch that Clean Line hopes to work with property owners to avoid the use of eminent domain. Representative Frizzell thanked Clean Line for its investment in Indiana. Senator Tomes asked for suggestions on how to address concerns of constituents who do not want transmission lines on their property. Ms. Coggins reiterated Clean Line's intent to minimize its use of privately owned land. Senator Gard questioned whether Clean Line is relying on federal subsidies to fund its projects; Ms. Coggins replied that the transmission lines are fully funded through private investment, but that the wind project will benefit from federal tax credits.

Representative Moseley and Ms. Coggins discussed the use of Indiana contractors and suppliers, including steel companies, in the portion of the Grain Belt Express located in

Indiana. Ms. Coggins told Senator Breaux that the Grain Belt Express will primarily rely on existing transmission lines to delivery wind energy throughout Indiana. Ms. Coggins explained to Senator Leising that most funding for the project will come from private investors through capacity contracts. Representative Behning asked how much it will cost to build the transmission line; Ms. Coggins stated that it will cost approximately $0.022 per kilowatt hour.

Annual Report of the Indiana Utility Regulatory Commission (IURC)

Chairman Jim Atterholt presented the annual report of the IURC to the Committee. See Exhibit C. Chairman Atterholt and Commissioners Carolene Mays and Larry Landis spoke in turn to the Committee about current IURC events, water and wastewater utilities, and communications services and providers. See Exhibit D. Chairman Atterholt discussed current and future plans for electricity generation in Indiana, including increasing demands and aging coal fired plants. He also spoke about the IURC's net metering and tree trimming rules, as well as natural gas consumption and pricing.

Commissioner Mays spoke about the regulated water and wastewater utilities, an ongoing inventory of Indiana's water resources, and increasing costs associated in part with compliance with federal environmental regulations. She noted that water and wastewater rates are rising more rapidly than other utility rates, and that the IURC provides assistance to smaller utilities that have opted out of IURC jurisdiction. Commissioner Landis discussed the intercarrier compensation and universal service revenue model and stated that the prevalent market-based business model does not translate well in rural areas. Commissioner Landis also provided a brief history of area codes in Indiana and discussed potential solutions to the predicted 2015 exhaustion of the 812 area code.

Senator Leising and Commissioner Landis discussed how to best address the 812 area code exhaustion issue with the Indiana congressional delegation. Senator Breaux asked how the IURC plans to implement its tree trimming rules; Chairman Atterholt replied that the IURC will educate utilities, and that utilities will be required to include information for customers in trimming notices. Senator Leising asked if natural gas service will be expanding to rural areas currently served by propane. Chairman Atterholt stated that utilities may pursue legislation to expand their natural gas infrastructure. Representative Frizzell asked whether utilities are abandoning carbon capture and sequestration (CCS) technologies given low natural gas prices. Chairman Atterholt indicated that coal will still be used in Indiana, including at the Edwardsport CCS plant, but that new plants likely will not invest in CCS.

Annual Report of the State Utility Forecasting Group (SUFG)

Doug Gotham, SUFG Director, presented to the Committee the 2012 Indiana Renewable Energy Resources Study prepared by the SUFG. Mr. Gotham provided updates on the renewables share of both national and state energy consumption. See Exhibit F. Mr. Gotham noted that the major barrier to renewable energy resources is cost, followed by limited availability and intermittency. He also described the Indiana markets for wind, energy crops, organic waste biomass, solar, photovoltaics, and hydroelectric power. In response to a question from Senator Gard, Mr. Gotham indicated that wind accounts for most of the growth seen in Indiana's renewable resources market.

Update from the Office of Utility Consumer Counselor (OUCC)

David Stippler, Consumer Counselor, spoke to the Committee about the impact of federal mandates, and in particular environmental regulations, on Indiana's utilities. He stated that compliance costs associated with the regulations will likely result in increased electricity rates. Counselor Stippler touted the OUCC's advocacy and problem solving roles in recent cases before the IURC involving Duke Energy, Indiana American Water, and Citizens Thermal Energy. Senator Breaux inquired as to the OUCC's involvement with ongoing sewer upgrades in Marion County. Counselor Stippler stated that a gradualized rate increase was approved as part of the transfer of Indianapolis Water to Citizens Energy; the final increase will take effect in 2013. Counselor Stippler told Representative Dvorak that the OUCC currently has 54 staff members handling over 200 cases.

Adjournment

The meeting was adjourned at 1:15 p.m.

INDIANA POWER OF WIND COALITION

Regulatory Flexibility Committee

Indiana's Future: Affordable, Cleaner Energy

September 6, 2012

Indiana's Future: Cleaner and Low Cost Energy

- Impact of Wind Development on Indiana
- Improvements to Voluntary Clean Energy Portfolio Standard
- Affordable Electricity through Improvements to Energy Procurement Process

RFSC 9/6/12
EXHIBIT A

INDIANA POWER OF WIND COALITION

Impact of Wind Development on Indiana

INDIANA POWER OF WIND COALITION

WIND DEVELOPMENT IN INDIANA

WIND PROJECTS

Currently online:	1,342 megawatts (MW)
Added YTD 2012:	2 MW
Under Construction:	201 MW
Wind projects in queue	11,366 MW

GENERATION AND POTENTIAL

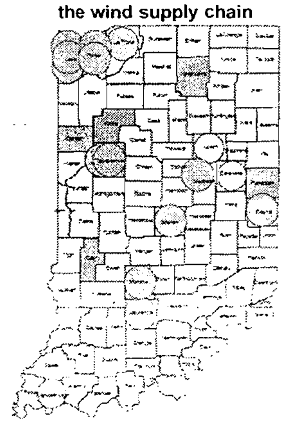
Percentage of Indiana power provided by wind in 2011 2.7%

Equivalent number of homes Indiana wind farms now power 325,000

State wind resource 148,228 MW (at 80 meters)

Indiana's wind resource is ranked 15th in the US and according to resource assessment from the National Renewable Energy Lab, Indiana's wind resource could provide over 400 percent of the state's current electricity needs

16 Indiana companies feed the wind supply chain



SOURCE: American Wind Energy Association, Fact Sheet on Indiana

INDIANA POWER OF WIND COALITION

Wind and Transmission Result in . . .

Lower LMPs		Lower Rates
Illinois found wind energy lowered LMPs in IL by $1.30/MWh	→	Lower LMPs saved Illinois ratepayers approx. $177 M in 2011
If amount of wind in MISO was tripled, LMPs would drop approx. $14/MWh	→	. . . which results in avg residential customer saving $63 to $147 per year

SOURCES: Illinois Power Agency. "Annual Report: The Costs and Benefits if Renewable Resource Procurement in Illinois" (2012); Synapse. "The Potential Effects of Wind Energy and Transmission in the MISO Region" (2012)

The Economic Benefits of Wind In Indiana

Rural Resources

Benton County

260,038 acres

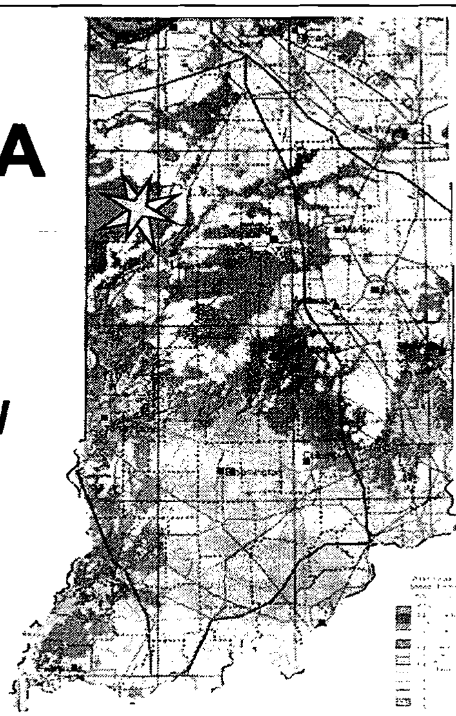
Population
8,854

White County

323,351 acres

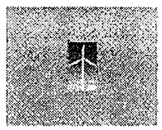
Population
24,643

INDIANA Wind

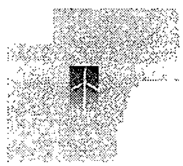


1,339 MW
Installed
Capacity

Indiana Wind Development



Benton County
495 Turbines/838 MW



White County
303 Turbines/501 MW

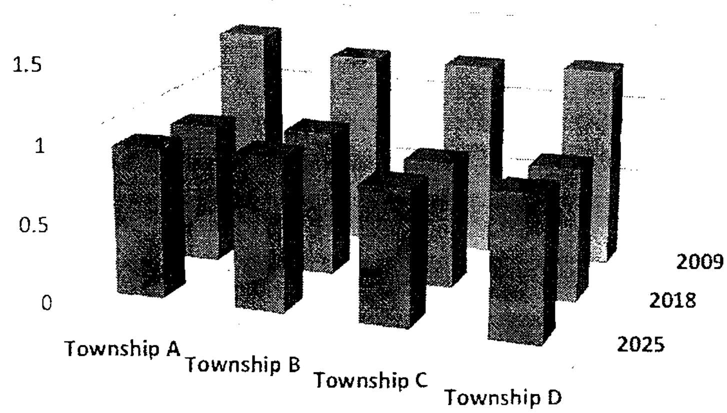
Land Use

	County Acres	Wind Farm	Acreage Claimed
BENTON County	260,038	63,500	280
WHITE County	323,351	68,264	259

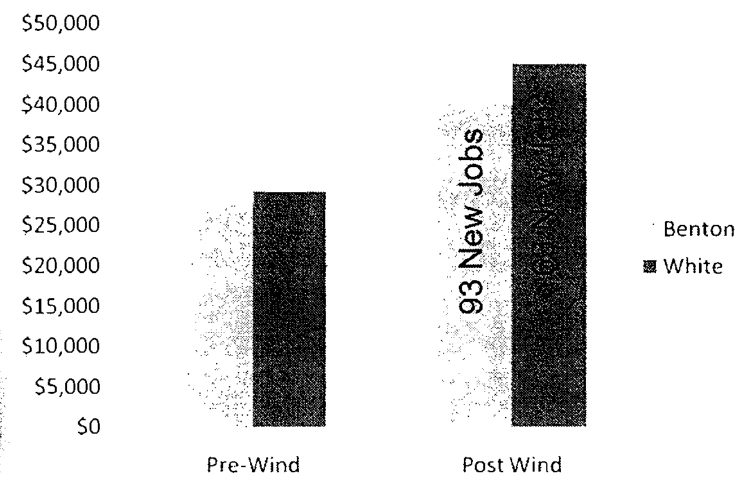
Wind Investment

	Capital	ED Payment
BENTON County	$1.5 Billion	$18 Million
WHITE County	$1.1 Billion	$10.7 Million

Property Tax Impact



Workforce Earnings



Thank You

Kelly Kepner
Benton County Economic Development
kkepner@bentoncounty.in.gov
PH: (765) 884-2080

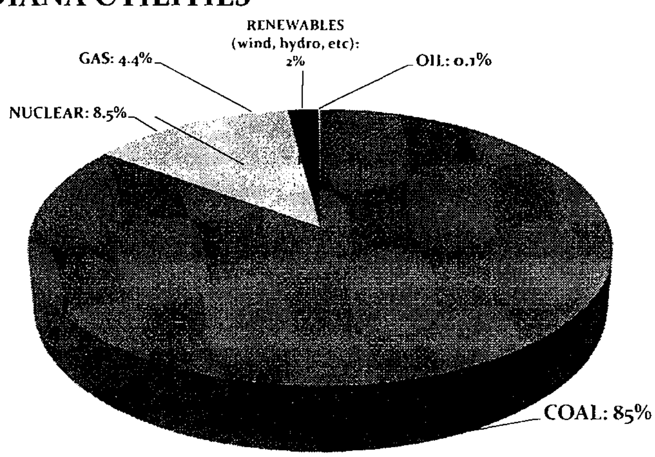
Connie M. Neininger
White County Economic Development
ledo@whitecountyindiana.us
PH: (574) 583-6557

INDIANA POWER OF WIND COALITION

Improvements to the Voluntary Clean Energy Portfolio Standard

INDIANA POWER OF WIND COALITION

ENERGY GENERATED FOR HOOSIER CUSTOMERS by INDIANA UTILITIES



SOURCE: 2011 IURC REPORT TO REG FLEX COMMITTEE

INDIANA POWER OF WIND COALITION

CHANGES to the VOLUNTARY CLEAN ENERGY PORTFOLIO STANDARD

To increase the development of local and cleaner energy sources the following changes should be made to VCEPS:

- Only clean energy procured after the effective date of Clean Energy Portfolio Standard can qualify
- 70% of Clean Energy Portfolio to come from Renewable Resources

INDIANA POWER OF WIND COALITION

VCEPS – The Following Resources Should Receive Greater Emphasis to Foster Local, Cleaner Energy

- Wind
- Solar
- Photovoltaic cells & panels
- Crops for energy production
- Geothermal
- Organic waste biomass
- Waste Heat recovery -- used for heating or generating electrical or mechanical work

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Alternative Energy Sources whose use in VCEPS should be limited

- Existing hydropower → Already part of utilities existing energy portfolio
- Fuel Cells, energy storage → Should be limited to storage of energy from a renewable resource
- Solid waste conversion
- Coal bed methane
- Industrial byproducts

  → Emissions from burning
- Demand Response and Energy Efficiency → Only EE & DR that isn't already mandated by IURC should count toward goal

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Clean Energy Credits

ISSUE

VCEPS allows a utility to use clean energy credits (CECs) affiliated with energy produced prior to start of VCEPS.

- Thus creating no change in a provider's operation or generation portfolio, nor reduction of regulated emissions and effluent.

SOLUTION

Limit qualifying CECs to clean energy generated after the start date of the Clean Energy Portfolio Standard – 1/1/2012.

INDIANA POWER OF WIND COALITION

Affordable Electricity through Improvements to the Energy Procurement Process

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INDIANA ELECTRIC UTILITIES

- Approx. 95% of all electricity comes from generation owned by the IOUs

Utility	Total Resources (MW)	Owned Resources (MW)	PPA Resources (MW)	% Owned Resources
AEP	5,279	5,012	267	94.9%
Duke	6,830	6,722	108	98.4%
IPL	3,353	3,053	300	91.1%
NIPSCO	3,422	3,322	100	97.1%
Vectren	1,498	1,288	210	86.0%

SOURCE: 2011 Utilities IRPs

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INDIANA REGULATORY PROCESS

- Indiana currently has a high barrier to entry for the competitive generation sector.
- Currently there is no "free market" for procurement of energy and resources.
- An independent, binding request for proposal process would help balance the conflict between providing lowest cost resources to the ratepayer and profits for the shareholder.
- Currently, utilities develop integrated resource plans which identify supply needs for customers. A balance needs to be struck between the shareholder returns and the impact on ratepayers.
- Utilities fulfill capacity shortfall through request for proposals and the utility typically choose themselves
  - Self build options don't always take into account all transmission and interconnection costs.
  - Risk of cost construction delay and cost overruns are not accounted for in self build options.

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RATEPAYER COSTS BETTER BALANCED WITH SHAREHOLDER RETURNS

Utility Self-Build – approx. 600 MW Thermal Plant (excludes operating costs)	
$2,980,000,000	Resource Investment
8%	Rate of Return
$3,218,400,000	Revenue Requirement
$238,400,000	**Total Return**

Current structure leads to inefficient outcomes

Power Purchase Agreement – 600 MW Plant - $48/MWh Levelized Cost of Energy for 20 years (40% capacity)	
$2,018,304,000	Purchase Agreement Cost
0%	Rate of Return
$2,018,304,000	Revenue Requirement
$0	**Total Return**

Alternative Procurement – Utilized Wind PPA	
$2,018,304,000	Resource Investment
8%	Rate of Return
$2,179,768,320	Revenue Requirement
$161,464,320	**Total Return**

Ratepayer Savings: $1,038,631,680

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ENERGY PROCUREMENT

Colorado	Michigan	Alternative Option
Acquire NEW utility resources (i.e., energy contracts or building new facilities) through a competitive bidding process that compares **all new resources** to determine a cost-effective resource plan.	Acquire Renewable Energy through competitive bidding: • building a utility owned facility; • purchasing an existing renewable energy facility; • purchasing renewable energy from third party At least 50% of renewable energy to come from third party producers	Acquire NEW utility resources (i.e., energy contracts or building new facilities not in IRP) through competitive bid process that compares **all resources** • Selection based on bid price • Cost overruns assumed by bid winner • Energy purchased from third parties can be included in rate base as if a utility asset

INDIANA POWER OF WIND COALITION

COLORADO PROCUREMENT METHODOLOGY

Colorado has two procurement processes. The most common is a **competitive bidding process** (all-source solicitation). The utility may also propose an **alternative plan** for acquiring and meeting a portion of its resource need.

- All-Source Plan: A utility's competitive bidding process meets resource need by comparing **all new resources** to determine a cost-effective resource plan.
  - The all-source plan affords all resources an opportunity to bid, and all new resources will be compared to determine the most cost-effective resource planning available.

- Alternative Plan: If a utility proposes to meet a portion of its need through an alternative plan, it must:
  - Identify specific resources to be procured and
  - Identify why those resources could not be acquired through the all-source plan
  - Provide a cost-benefit analysis of how the alternative plan serves the public interest
- If the alternative plan includes new renewable or supply-side resource:
  - The utility will simultaneously file a CPCN application
  - File detailed cost of proposed facility, alternatives studied, costs of alternatives, and criteria used to eliminate those alternatives

Source: Code of CO Regulation: 4 CCR 723-3

CIEA

September 6, 2012

Competitive Procurement Lessons Learned in Colorado

Presentation of

Nicholas G. Muller, founder of the Colorado Independent Energy Association

CIEA

- CIEA was formed in 1991 to represent non-utility power producers of all types, and soon after that the Colorado PUC put in place a mandatory IRP-driven RFP process. CIEA members now include most IPPs who have PPAs in Colorado.
- IPPs provide most of the renewable generation and much of the gas-fired generation for electricity delivered by Xcel to its Colorado ratepayers, as a result of this competitive procurement process.

- IPPs are able to deliver power on a very cost effective basis by engaging in competitive bidding all over the country and providing innovative and creative energy solutions.
- IPPs have been operating reliably in Colorado for 25 years, and have contributed to the dependability of the regional electric system.
- Under the current bidding rules at the Colorado PUC, plants that are 30MW or more must be bid out in an IRP/ERP driven RFP process.

- An IPP includes in its bid the interconnection costs with the utility and the cost of any new transmission needed for its project.
- The interconnection and transmission costs attributed to the bid by the utility handling the RFP, and the bid price inputted into the utility's model (such as Strategist) can sometimes be manipulated by the utility to favor its competing self-build bid.

- To help assure fairness in the bidding process in Colorado, CIEA recently got legislation passed (HB1262) that required the Colorado PUC to implement bidding rule changes to improve transparency in the bidding process.

- It is important to have open, transparent bidding at the wholesale level to help assure a robust bidding process, which helps hold down costs for the ratepayer.

- CIEA is fuel-neutral and has members that provide generation with all types of renewable and non-renewable energy projects, both large and small. So CIEA advocates generation and transmission policies that are non-partisan and non-discriminatory.

- Energy legislation passed in recent years in Colorado, such as SB100, HB1150, HB1001, HB1262 and HB1365 provided support for renewables and also for competitive procurement managed by the Colorado PUC.

- The Colorado PUC's bidding rules require an independent evaluator, and focus on the need for the ratepayers to have cost-effective, environmentally-sensitive generation and transmission.
- Colorado investor-owned utilities cannot collect their 10.5% return on PPAs that they can collect on the equity they put into self-build projects, so there is a built-in bias against PPAs that the Colorado PUC and the independent evaluator must be prepared to counter.

- Robust competition at the wholesale level depends on a careful handling of the RFP process, including with potential bids from the utility or its affiliates. If handled properly this process helps hold down costs for ratepayers.
- It is helpful if bids from the utility or its affiliates are required to have a cost cap to protect the ratepayers, just as IPPs provide fixed prices under PPAs.
- IPPs don't want preferential treatment, just to be held equal on a level playing field.

INDIANA POWER OF WIND COALITION

MICHIGAN PROCUREMENT METHODOLOGY

Michigan requires every energy provider to comply with the renewable energy standard. Every energy provider submits a renewable energy procurement plan to the Public Service Commission and that plan is reviewed every two years. Progress is monitored through submission of annual reports.

Utility Compliance with Renewable Energy Standard:

- A utility can either [a] use renewable energy from a facility they build and own; [b] use renewable energy from a facility they buy; [c] procure renewable energy from a third party; or [d] procure renewable energy credits.

Utility Procurement:

- The utility uses a competitive bidding process for:
  - Contracts to build a facility.
  - buying a renewable energy facility.
  - procuring renewable energy from a third party.
- The Public Service Commission is to review and determine whether credits without the associated energy is reasonable and prudent.

Source: 2008 Act 295 Sec. 21 to 51

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ALTERNATIVE PROCUREMENT METHODOLOGY

- Lowest cost selection would be performed by successful bidder at the fixed offer, any budget overage would be the risk of the successful bidder.
- Lowest cost resource would lead to more efficient price to ratepayer and incent selection of most prudent resource to meet needs.
- A third party, non-utility proposal is successfully selected by the independent entity through the process. In order to balance the savings to ratepayers and perceived reduction in utility rate base/return, a purchase power agreement with a third party would be treated similar to a utility self-build in order to avoid the bias toward utility self-build outcome to maximize shareholder return.
- The utility would be allowed to treat the agreement as though it were an asset and receive a return on the agreement.
- This practice should allow for a level playing field between the competitive generation community and incumbent utilities.

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CONCLUSION

- We are seeking an alternative procurement method which will focus on competition to align shareholder returns and the impact on ratepayers.
- We are NOT restructuring the regulatory process; we are asking to increase competition and market diversity.
- We are not looking for preferential treatment, just an opportunity to compete on a level playing field to develop energy resources for Hoosier ratepayers.
- We look forward to coordinating with the utility sector to balance the utility shareholder interests with the ratepayer's desire for low cost energy.
- We propose increasing the amount of electricity from cleaner generating resources by reducing the use of alternative resources that have emissions and effluent and only allow utilities to meet the VCEPS goals with clean energy or clean energy credits generated after the start of the energy portfolio standard on 1/1/2012.

INDIANA POWER OF WIND COALITION

THANK YOU

Speakers:

Jason Minalga
Manager, Regulatory Affairs
Invenergy
312-582-1500
jminalga@invenergyllc.com

Brad Lystra
Manager of State Campaigns
American Wind Energy Association
202-249-7352
blystra@awea.org

Consultants:

Tony Samuel
President
Samuel Solutions
317-403-2329
tsamuel@samuelsolutionsgroup.com

Nicholas Muller
Founder, Colorado Independent Energy Assocation
303-297-1970
ngmuller1@gmail.com

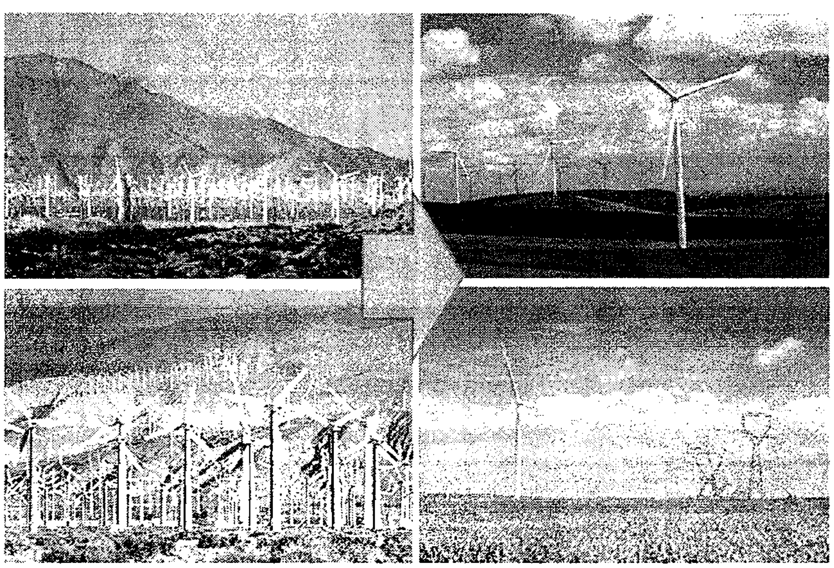
Curtis Crum
clcrum@frontier.com

Grain Belt Express Clean Line

Clean Energy. Delivered.

CLEAN LINE
ENERGY PARTNERS

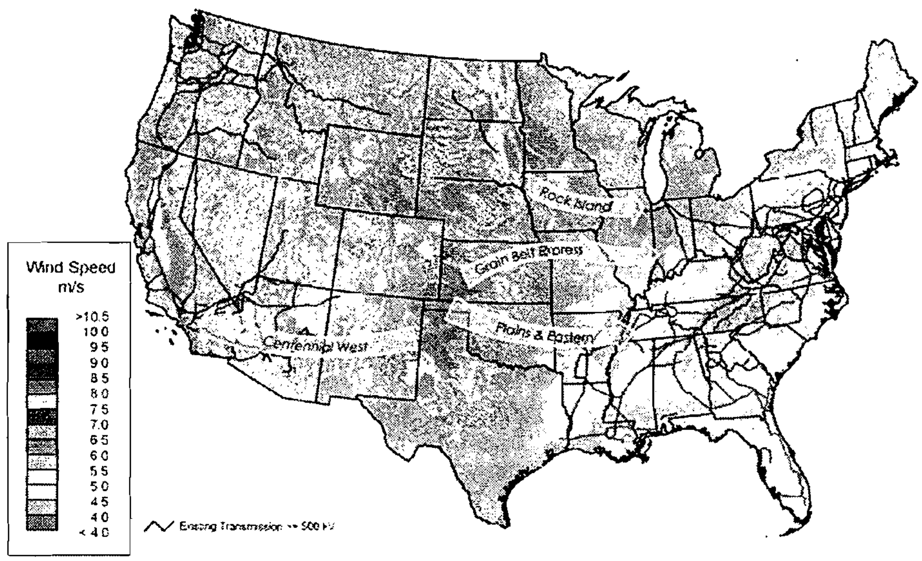
Wind power has evolved and costs have come down



CLEAN LINE ENERGY PARTNERS 2

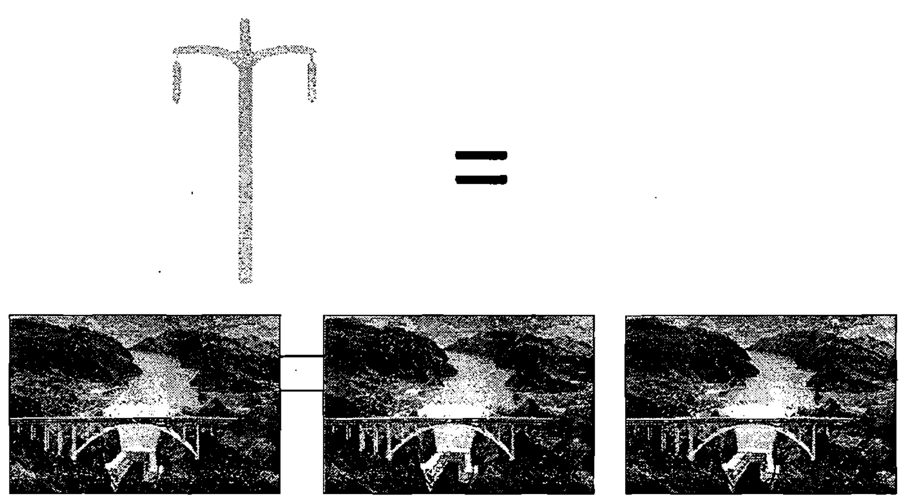
RFSC 9/6/12
EXHIBIT B

Clean Line Energy is developing HVDC transmission lines to bring low-cost renewable energy to market



CLEAN LINE ENERGY PARTNERS 3

Each of Clean Line's projects will deliver the same amount of power as three Hoover Dams



CLEAN LINE ENERGY PARTNERS 4

HVDC is the ideal technology to move large amounts of power over long distances

More efficient – Over long distances, DC transfers more power with lower line losses than comparable AC lines

Smaller footprint – DC requires a narrower right of way to move an equivalent amount of power over AC lines

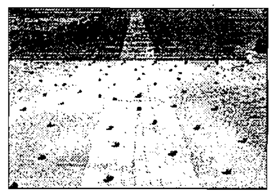
Lower cost – Less infrastructure and lower line losses result in lower cost transmission and lower prices for renewable energy

Improved reliability – DC gives power operators complete control over energy flow

Merchant model – Clean Line will fund the costs of the transmission projects and sell transmission capacity to wind generators and load serving entities

AC **3000-4000 MW Capacity** **DC**

Three 500 kV lines
600 foot ROW

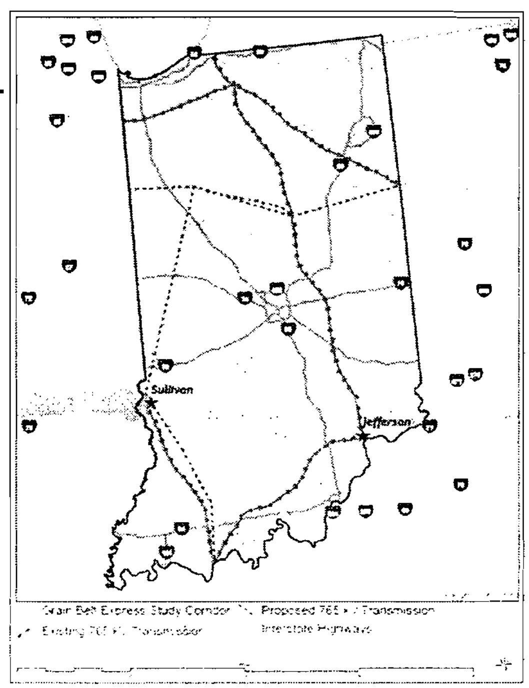


One ± 500 kV bipole
150-200 foot ROW

CLEAN LINE ENERGY PARTNERS 5

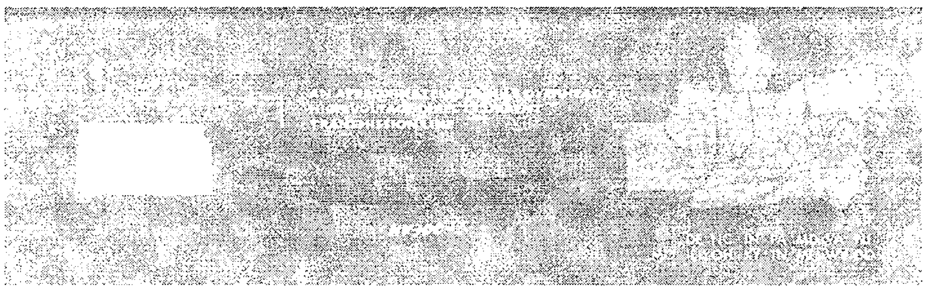
"Crossroads of America" for renewable energy

- Indiana's existing high voltage transmission lines make it an attractive hub for wind power from the Great Plains
- Interconnection studies are underway with PJM and AEP at the Sullivan substation
- Proposed "Pioneer" projects would further strengthen Indiana's grid



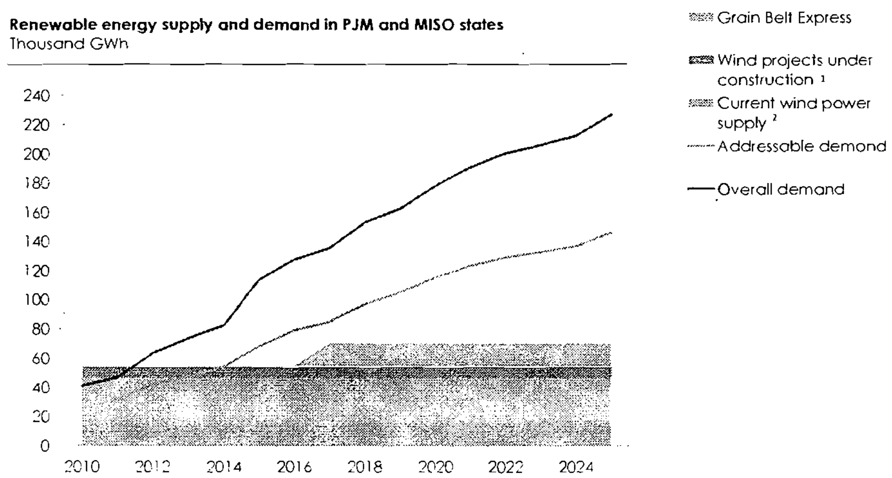
CLEAN LINE ENERGY PARTNERS 6

Grain Belt Express will deliver wind energy from Kansas to Missouri, Illinois, Indiana, and states farther east



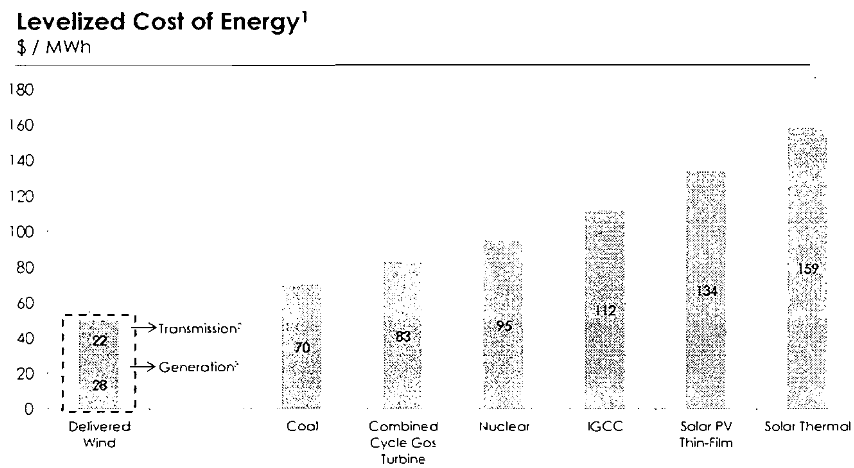
- 700-mile overhead, high-voltage direct current (HVDC) transmission line
- $2 billion project that will enable $7 billion investment in new wind farms
- 1.4 million homes powered per year

Demand for clean energy is large enough for both in-state and out-of-state resources



1 Wind projects currently under construction within the PJM and Midwest ISO states
2 Energy from existing wind projects within the PJM and Midwest ISO states
3 Demand for renewable energy credits within PJM and MISO states for which imported wind delivered by Grain Belt Express would be eligible

Clean Line's delivered cost of energy is competitive with other sources of new generation



1 Cost of other sources of generation based on mid-point of Lazard's LCOE estimates in 2011$, except for lower-end for coal (no carbon capture)
2 Assumes ~[illegible] miles of transmission at $2 MM per mile, endpoint converter cost of $250 MM each, mid-converter cost of $150 MM, & development cost of ~$[illegible]
3 Assumes capex costs of $[illegible]/kW, O&M costs of $10/MWh, wind Production Tax Credit, cost of capital of 9%

Source: Lazard, Clean Line Energy

CLEAN LINE ENERGY PARTNERS 9

Indiana and Kansas wind are complementary

Correlation of 10-Minute Wind Power Output

	KS	MO	IL	IN
KS			0.10	0.05
MO				0.19
IL	0.10			
IN	0.05	0.19	[illegible]	

Low correlation
Medium correlation
High correlation

- Wind blows at different times in different places
- Geographic diversity of wind resources helps to reduce overall variability and facilitates wind integration
- Kansas and Indiana wind power output are not correlated

Low correlation is between 0.0 and 0.25; Medium correlation is between [illegible]; High correlation is between [illegible]

Source: Eastern Wind Integration and Transmission Study, National Renewable Energy Laboratory (2010); Clean Line analysis

CLEAN LINE ENERGY PARTNERS 10

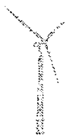
Grain Belt Express Clean Line will result in significant economic benefits

CONSUMER BENEFITS

INCREASED MARKET COMPETITION

CONSTRUCTION JOBS

5,000+



FIXED PRICE ENEGY

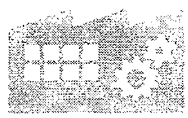
HEDGE AGAINST FUEL PRICE VOLATILITY

LOCAL CONTRACTORS

LOCAL BUSINESS PARTNERSHIPS

PROPERTY TAX REVENUE

INCOME FOR COMMUNITIES



LOCAL VENDORS

MANUFACTURING JOBS

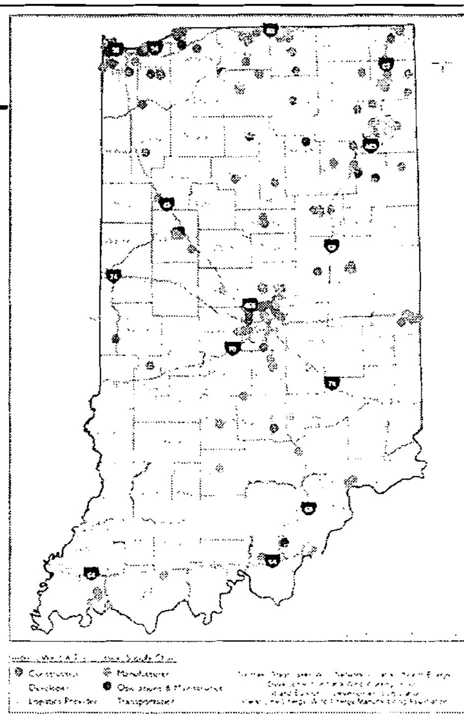
CLEAN LINE ENERGY PARTNERS 11

Opportunities for Indiana businesses

200 businesses in Indiana are involved in the wind energy and transmission supply chains

Examples:

- Brevini Wind
- General Cable
- Coleman Cable
- Leeco Steel
- Ambassador Steel
- Universal Steel
- ATI Castings



CLEAN LINE ENERGY PARTNERS

Wind energy delivered by the Grain Belt Express will result in health and environmental benefits

EMISSIONS REDUCTIONS PER YEAR

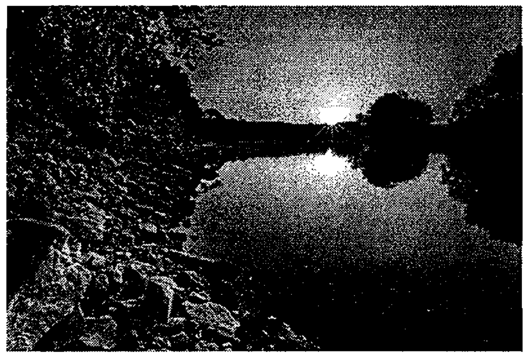
CO_2 — 10 MILLION TONS
CARBON DIOXIDE

SO_2 — 14,000 TONS
SULFUR DIOXIDE

NO_x — 10,000 TONS
NITROGEN OXIDE

WATER WITHDRAWAL REDUCTION PER YEAR

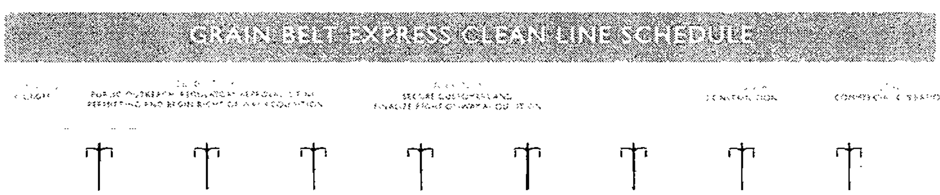
H_2O — 4 BILLION GALLONS



Sunrise on the Wabash River - Chris Harnish Photography, Lafayette, IN

CLEAN LINE ENERGY PARTNERS 13

A methodical and transparent development process is underway

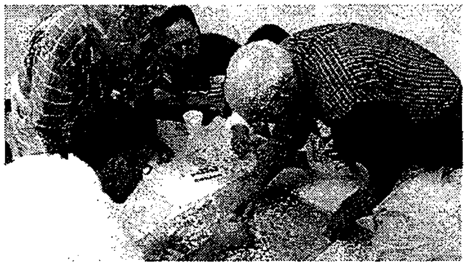


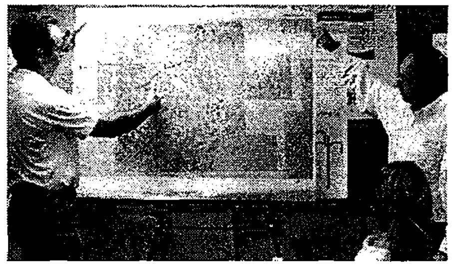
Progress to date

- Granted public utility status by the Kansas Corporation Commission
- Received hundreds of support letters
- Met with nearly 800 community representatives to seek routing input
- Narrowed project study area from 107 counties to 51 counties

CLEAN LINE ENERGY PARTNERS 14

What's next?





- **File application to IURC to become an Indiana utility**
- **Continue interconnection studies at Sullivan substation**
- Conduct public meetings across project area and identify proposed route
- Seek route approval and authority to construct in Kansas, Missouri, and Illinois
- Obtain permits from federal and state agencies
- Advance discussions of transmission capacity agreements with potential customers

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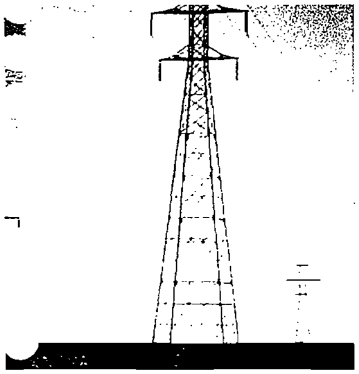
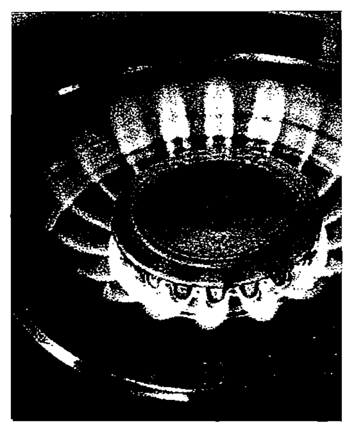
@cleanlineenergy

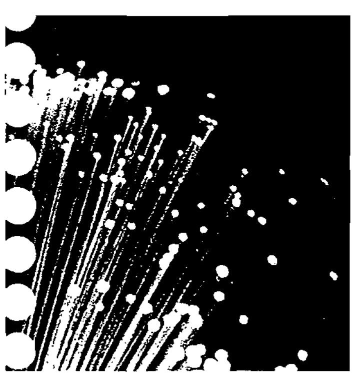
September 2012



Annual Report to the Regulatory Flexibility Committee of the Indiana General Assembly

RFSC
9/6/12
EXHIBIT C





Indiana Utility Regulatory Commission

Annual Report to the Regulatory Flexibility Committee

The Indiana Utility Regulatory Commission (Commission or IURC) is an administrative court that hears evidence in cases filed before it and makes decisions based on the evidence presented in those cases. An advocate of neither the public nor the utilities, the IURC is required by state statute to make decisions that weigh the interests of all parties to ensure the utilities provide adequate and reliable service at reasonable prices.

Agency Accomplishments

Over the course of the last year, the IURC handled a number of high-profile cases, made the regulatory process more transparent, and issued decisions with immediate and direct benefits to utility customers. The graphic below details a sampling of these accomplishments.

Caseload	Transparency	Advancement
316 Orders issued by the Commission	Hearings are now live streamed over the Web	3 new rules: tree trimming, clean energy, & net metering
New metric aimed at closing docketed cases within 90 days of the last filing	Indiana Utility Regulatory Commission IURC	$68 million will be saved by the end of September 2012 due to the approved utility transfer from Indianapolis Water Company to Citizens Energy Group
13 field hearings held throughout the state for pending cases	Web redesign more content, less clutter	

Dedication to Public Service

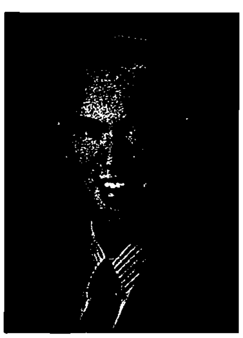
In terms of collective years of experience for utility commissioners, the IURC ranks 5th out of 60 federal and state public utility regulatory agencies in the United States, according to the Institute of Public Utilities at Michigan State University.[1] Indiana's high ranking is bolstered by the experience of Commissioner David Ziegner, who with nearly 22 years of service, is the 4th longest serving utility regulatory commissioner in the nation.

> ***A number of IURC staff members have more than 25 years' experience in the utility industry. Many others have advanced degrees and/or are members of state and federal committees.***

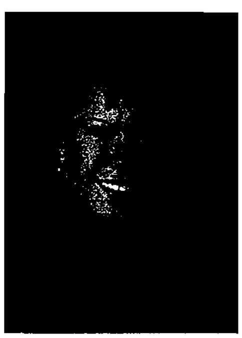
The IURC also has a dedicated, professional staff of 73 people, many of whom are attorneys, accountants, economists, or engineers who advise the Commission about utility regulatory matters affecting the state. A number of these staff members have more than 25 years' experience in the utility industry. Many others have advanced degrees and/or are members of state and federal committees. Among the executive team, there is more than 73 years of collective experience.

Leadership

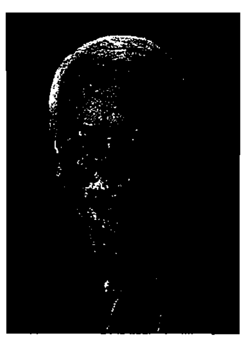
The Commissioners



Chairman
Jim Atterholt



Commissioner
Kari Bennett



Commissioner
Larry Landis

Commissioner
Carolene Mays

Commissioner
David Ziegner

1 www.ipu.msu.edu/research/pdfs/IPU-Commissioner-Demographics-2012.pdf

Jim Atterholt
Chairman

Chairman Atterholt was appointed by Governor Mitch Daniels on June 22, 2009, and on October 5, 2010, he was named chairman. Prior to joining the Commission, he was the State Insurance Commissioner for more than four years, where he also served as a member of the Governor's Cabinet. Atterholt has dedicated much of his life to public service. He was elected and served two terms as a member of the Indiana General Assembly from 1998 to 2002. As a State Representative, he served on the House Commerce, Economic Development and Technology Committee, which had jurisdiction over all utility-related legislation. Atterholt was ranking member of the Environmental Affairs Committee, as well as a member of the Labor Committee. Before returning to public service as the State Insurance Commissioner, Atterholt worked as Director of Government Affairs for AT&T-Indiana from 2003 to 2004. A native of Fort Wayne, Indiana, Atterholt received his bachelor's degree from the University of Wisconsin in 1986. He has also worked as Chief of Staff in Washington D.C. and later as District Director in Indiana for a member of the United States Congress where his responsibilities included energy issues. Atterholt is a member of the National Association of Regulatory Utility Commissioners where he serves on the Committee on Gas. Atterholt has served as a member of the board of directors for the Organization of MISO States and currently serves on the board of directors for the Organization of PJM States. He also serves on the board of directors of the Saint Florian Center for at-risk children. Married for 25 years to his wife, Brenda, they are blessed with three children and currently reside in Indianapolis.

Kari Bennett
Commissioner

Commissioner Bennett was appointed by Governor Mitch Daniels on January 13, 2011. She currently serves as Vice President of the Organization of MISO States and is a member of the National Association of Regulatory Utility Commissioners' Committee on Energy Resources and the Environment, as well as the Task Force on Environmental Regulation and Generation. Prior to joining the Commission, she was the Chief Legal Counsel of the Indiana Department of Natural Resources, where she was involved in all aspects of the agency's mission, including protection and enforcement of natural resources, land acquisition, and agency management and administration. From 2005 to 2007, Bennett was Policy Director for Environment and Natural

Resources for Indiana Governor Mitch Daniels. She developed and advocated policy on significant national, regional, and state issues, including air quality standards and attainment designations, mercury emission reduction requirements for electric utilities, and Great Lakes issues. Bennett also practiced law at Barnes & Thornburg LLP, focusing on environmental law and government services, and served in various positions at the Indiana Department of Environmental Management before and after law school. She graduated from Miami University of Ohio with a degree in environmental science, and received her J.D. from the University of Minnesota.

Larry Landis
Commissioner

After 30 years in the private sector, Commissioner Landis was appointed 9½ years ago by the late Governor Frank O'Bannon, and to subsequent full terms by former Governor Joe Kernan and Governor Mitch Daniels. At the national level, he has advocated for Indiana's light regulatory touch, for even-handed regulation, for technological neutrality, and for pro-competitive policies in communications. He served two, three-year terms on the Federal-State Joint Board on Universal Service and has also served on the Federal-State Joint Conference on Advanced Telecommunications Services since 2005, of which he is currently State Chair. Landis is also a member of the Federal-State Joint Board on Jurisdictional Separations. He was recently reappointed to a second term as an at-large member of the NARUC Board of Directors. Landis also focuses on financial issues. He co-chairs the IURC's Financial Taskforce, created in the wake of the market collapse in 2008-09, and is immediate past Vice Chair (2009-2010) and Chair (2010-2011) and member of the Advisory Board of the Financial Research Institute at the University of Missouri's Trulaske School of Business. He is also a member of the Society of Utility and Regulatory Financial Analysts and the IEEE Computer Society. He and his wife Carol recently celebrated their 37th anniversary. Their son and daughter-in-law, Chris and Heather, are the parents of three daughters, Lauren, Anna, and Emily.

Carolene Mays
Commissioner

Commissioner Mays was appointed by Governor Mitch Daniels in February 2010. She is appointed to the National Association of Regulatory Utility Commissioners Water and

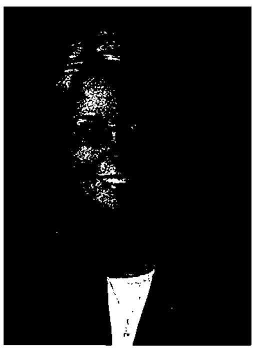
Washington Action committees and as Co-Vice Chair of the Critical Infrastructure Committee. She was also elected Vice President of the Mid-America Regulatory Conference, an association of regional organizations of utility and energy regulatory agencies. Prior to joining the Commission, she was Publisher and President of the *Indianapolis Recorder Newspaper* and the *Indiana Minority Business Magazine.* She was also a finalist for an appointment by President Barack Obama as the Midwest Regional Director of Housing and Urban Development; however, Mays withdrew her name upon receiving her appointment to the IURC. She served in the Indiana House of Representatives from 2002 to 2008 and sat on the committees for Ways and Means, Small Business and Economic Development, and Public Health. She also served on committees with the National Black Caucus of State Legislators, the National Conference of State Legislators, and Women in Government. During her terms, Mays received several Legislator of the Year awards, was listed by Roll Call (a Washington D.C. publication) as a "Rising Star in Indiana Politics," and was named one of "Indiana's Most Influential Women" by the *Indianapolis Business Journal.* Mays currently serves on the Indianapolis Capital Improvement Board, the Indiana Sports Corporation Board Executive Committee, and Peyton Manning's PeyBack Foundation, among others. She was chairperson for the NCAA Women's Final Four in 2006 and 2011, and the 2012 Indianapolis Super Bowl Division Chairperson of Administration. An Indiana State University Distinguished Alumni, Mays holds a B.S. in business management and marketing. She is a member of Eastern Star Church, Alpha Kappa Alpha Sorority, and the Indianapolis Chapter of the Links and Northeasterners. Mays is married to Fred Medley and has one daughter, Jada, and three step-sons, Frederick II, Niles, and Chase.

David Ziegner
Commissioner

Commissioner Ziegner was appointed in 1990 by Governor Evan Bayh and reappointed to full, four-year terms in 1991 and 1995. He was reappointed once again by the late Governor Frank O'Bannon in 1999 and 2003 and then by Governor Mitch Daniels in 2007 and 2011. Commissioner Ziegner is the Treasurer of the National Association of Regulatory Utility Commissioners and Vice Chair of its Committee on Electricity, as well as the former Chairman of its Clean Coal and Carbon Sequestration Subcommittee. He is also a member of the Mid-America Regulatory Conference and the Consortium for Electric Reliability Technology Solutions Industry Advisory Board. Additionally, Ziegner was the former Chairman of the

Advisory Council of the Center for Public Utilities at New Mexico State University and a member of the Advisory Council of the Electric Power Research Institute. He earned his B.A. in history and journalism from Indiana University in 1976 and his J.D. degree from the Indiana University School of Law in Indianapolis in 1979, during which time he was also admitted to the Indiana Bar and U.S. District Court. Prior to joining the Commission, Ziegner served as a staff attorney for the Legislative Services Agency, where he developed his background in both utility and regulatory issues. Ziegner, his wife, Barbara, and their daughter, Jennifer, reside in Greenwood and are members of the Northminster Presbyterian Church.

Executive Team

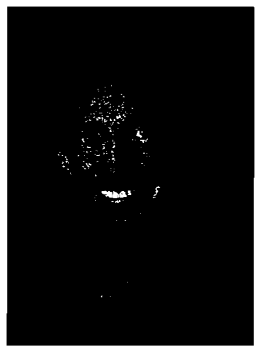


Chief Administrative Law Judge

Loraine Seyfried

Executive Director of External Affairs

Joseph Sutherland



Executive Director of Technical Operations

Robert Veneck

General Counsel

Doug Webber

Loraine Seyfried
Chief Administrative Law Judge

Chief Administrative Law Judge Loraine Seyfried leads the Commission's staff of administrative law judges who, along with the commissioners, preside over docketed proceedings before the Commission. She assists in the management of the Commission's hearing docket by making initial recommendations on case assignments and procedure, overseeing the hearing process, and providing advice in the preparation and review of Commission Orders.

Joseph Sutherland
Executive Director of External Affairs

Executive Director Joseph Sutherland leads the Commission's governmental affairs group and serves as the chief liaison for legislative issues. He is also the senior supervisory authority over the Consumer Affairs Division. In addition, Sutherland oversees internal operations, including oversight of various ancillary functions such as information technology and public information, as well as the Commission's financial affairs and budget.

Robert Veneck
Executive Director of Technical Operations

Executive Director Robert Veneck Jr. leads the technical operations group and is the senior supervisory authority over the Commission's electricity, natural gas, water, sewer, communications, pipeline safety, and energy policy divisions. In addition, Veneck is the liaison to the State Utility Forecasting Group at Purdue University for matters requested by the Commission.

Doug Webber
General Counsel

General Counsel Doug Webber serves as the chief legal advisor to the Commission, including acting as the Commission's Ethics Officer. Attorneys under General Counsel Webber provide complete legal support for all aspects of the Commission's operation. Additionally, they conduct legal research on a wide range of issues, participate in matters before the Federal Energy Regulatory Commission, and preside over Commission rulemakings.

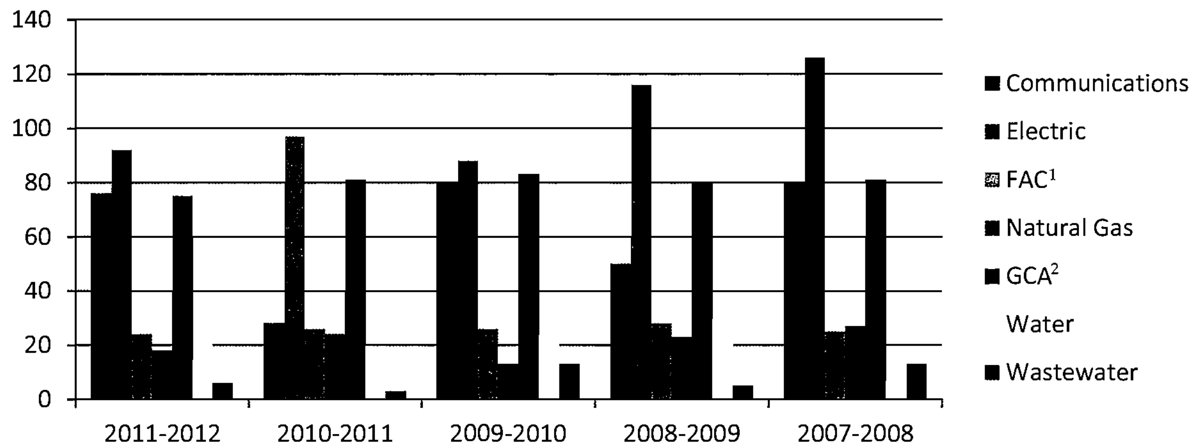
Legal Division

Docketed Cases

During fiscal year 2011-2012, 318 petitions were filed with the Commission, which are detailed in Chart 1. Petitions are given a docket number upon receipt and assigned an administrative law judge and a commissioner, who serve as the presiding officers. To access information pertaining to a docketed case, please visit our Electronic Document System at: https://myweb.in.gov/IURC/eds/. Here, you can search for a case by entering the docket number, industry, petition date, petition type, party or order date, and clicking "search." To watch hearings that are live streamed, please visit: www.in.gov/iurc/2624.htm.

Chart 1

Petitions Filed by Industry
Five-Year Comparison



[1]FAC = Fuel Adjustment Clause
[2]GCA = Gas Cost Adjustment

Rulemakings

Before the IURC may add or make changes to its existing rules, it must follow the formal rulemaking process. By doing so, it ensures the opportunity for public comment and allows the issues at hand to be fully vetted. In addition to the formal process dictated by state procedures, it is the practice of the IURC to hold numerous informal workshops and discussions with stakeholders prior to initiating a formal rulemaking. For example, in the recently passed rule on tree trimming, the Commission conducted six field hearings all around the state in order to allow the public even greater input into the process. Although the rule development process can extend the time the rule is discussed, it also helps achieve common ground between stakeholders before the formal process begins.

In order to make it easier for interested parties to follow the rulemaking process, the IURC redesigned its rulemaking webpage. Readers can now browse emergency, pending, and effective rules, such as the significant ones listed on the following page, in a more streamlined manner. For more information or to access documents and public comments related to these rulemakings, please visit: www.in.gov/iurc/2658.htm.

Emergency Rules	IURC RM #	LSA Doc #	Effective Date
Municipal Procedures for Outside City Rates (HEA 1126)	**12-06**	**12-433 (E)**	**7/11/12**
Scope of Rule: This rulemaking establishes procedures by which a municipality or users of the works whose property is located outside the corporate boundaries of the municipality may file a petition regarding certain rates and charges.			
Voluntary Clean Energy Portfolio Standard Program (SEA 251)	**11-05**	**11-781 (E)**	**1/1/12**
Scope of Rule: This rulemaking implements Indiana's Voluntary Clean Energy Portfolio Standard Program, which allows utilities to qualify for financial incentives if they meet targets for including clean energy resources in their supply portfolio.			

Pending Rules	IURC RM #	LSA Doc #	Status
Attorney Appearances in Commission Proceedings	**11-08**	**11-590**	**State Review**
Scope of Rule: This rulemaking outlines requirements out-of-state attorneys must adhere to when practicing before the Commission.			
Revisions to Integrated Resource Planning	**11-07**	**TBD**	**Rule Development**
Scope of Rule: Integrated resource planning is a process used by electric utilities to evaluate all supply and demand-side alternatives available to meet future electricity requirements. This rulemaking stems from the IURC's Order in Cause No. 43643 to update the integrated resource planning rules based on the current utility industry standards since the rule was first published.			
Voluntary Clean Energy Portfolio Standard Program (SEA 251)	**11-05**	**12-97**	**State Review**
Scope of Rule: This rulemaking implements Indiana's Voluntary Clean Energy Portfolio Standard Program, which allows utilities to qualify for financial incentives if they meet targets for including clean energy resources in their supply portfolio.			
Tree Trimming	**10-04**	**12-42**	**Pending State Approval**
Scope of Rule: The subject matter of this rulemaking is tree trimming by certain electric utilities. The rulemaking stems from an IURC investigation and subsequent Order in Cause No. 43663. The rule considers notice requirements, dispute resolution, customer education, and a tree replacement program.			

External Affairs

As a governmental agency whose operations affect the public, the Indiana Utility Regulatory Commission welcomes requests from legislators on matters affecting the utility industry. Below is the general contact information for the agency; however, if you or your constituents have specific questions or concerns, please contact Joseph Sutherland, our Executive Director of External Affairs, at 317-233-4723.

Phone: (317) 232-2701 | **Consumer Affairs Division:** 1-800-851-4268 | **Web:** www.in.gov/iurc

Consumer Affairs Division

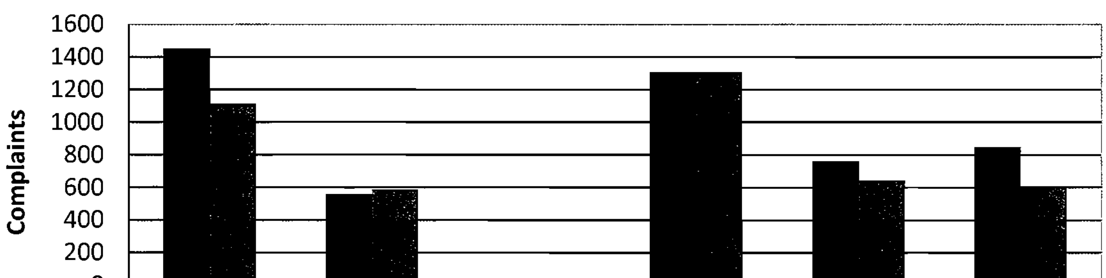
In Indiana, there are two separate state agencies that deal with utility-related issues – the IURC and the Indiana Office of Utility Consumer Counselor (OUCC). The IURC regulates rates, charges, and service quality for most Indiana utilities, whereas the OUCC represents consumer interests in all cases before the IURC. Starting in September 2011, our agencies streamlined the dispute resolution process, directing all customer complaints about regulated utilities (e.g., disconnections, billing disputes, and metering concerns) to the IURC's Consumer Affairs Division. This means that the IURC is the best agency to contact if one of your constituents has a complaint against a regulated utility. For comments on pending cases or problems concerning a non-jurisdictional utility, please contact the OUCC. As the state's utility consumer advocate, it is best positioned to assist with these issues. The OUCC's Consumer Affairs Division can be reached at 1-888-441-2494.

> ***Contact Us***
>
> *Front desk:*
> 317-232-2701
>
> *Legislative inquiries:*
> 317-233-4723
>
> *Consumer Affairs Division:*
> 1-800-851-4268

This past year the IURC's Consumer Affairs Division saw a slight decrease in the number of complaints it received. Chart 2 shows the breakdown of complaints for the past two fiscal years. These numbers show customer complaints have remained fairly stable and that no one industry experienced a spike in the number of complaints.

Chart 2

Consumer Complaints by Industry
Fiscal year 2010-2011 and 2011-2012



	Electric	Gas	Pipeline	Telecom	Video	Water/Sewer
■ 2010-11	1451	557	0	1307	761	848
■ 2011-12	1114	588	1	1306	644	608

The most frequently received calls by the Consumer Affairs Division involve questions about billing. Typically, the questions are about rates, deposits, payment arrangements, or estimates. When an analyst from the Consumer Affairs Division is assigned to a case, he or she investigates the matter to make sure the customer is being billed correctly and that the utility is in compliance with the IURC's rules and regulations. If a problem is identified, the analyst works with the consumer to make sure the situation is remedied. In some cases, this may result in a refund for the customer, which is called an adjustment. The graphic below highlights the operations of the Consumer Affairs Division and the results it has achieved this past fiscal year.

Workload

11,895 calls received by Consumer Affairs

Increased participation in rulemakings & field hearings to assist customers with questions

131 = average number of open complaints on any given day

5 staff members

Results

Consistently reaching decisions on 90% of complaints within 20 days of their receipt

$285,449.50 returned by utilities to customers who filed complaints with the Consumer Affairs Division

Hot Topics

Lower natural gas bills raised questions about rates and charges

Low water pressure prompted the IURC to require an independent audit of Aqua Indiana's system in Fort Wayne & underground explosions prompted an independent audit of Indianpolis Power & Light

The IURC and energy utilities warned customers about a payment scam

Technical Divisions

Electricity

Electricity Division Director Dr. Brad Borum and his division monitor and evaluate regulatory and policy initiatives affecting the state's electric industry. Brad has been with the

Commission for 26 years and has a doctorate in economics. The division reviews and advises the Commission on regulatory proceedings initiated by Indiana electric utilities involving increases in rates, environmental compliance plans, permission to build or purchase power generation plants, energy efficiency programs, and other matters. It also monitors electric utility performance for reliability and service quality. The Electricity Division's staff examines information from Commission-initiated investigations and assists the Commission in developing potential rulemakings. The division is responsible for monitoring actions by regional transmission organizations (RTO) and the Federal Energy Regulatory Commission (FERC) that may affect Indiana's electric utilities. Staff also maintains the collection of annual reports for all jurisdictional electric utilities, including the periodic earnings review of each provider with more than 5,000 customers.

Due to the growing impact of regional and federal energy policies on Indiana, the IURC organized an intra-agency RTO/FERC team that has been charged with monitoring, evaluating and recommending policy and positions to the IURC executive team and commissioners. The team actively monitors the activity of the two RTOs that operate in Indiana: the Midwest Independent Transmission System Operator, Inc. (MISO) and the PJM Interconnection, LLC (PJM). The team also represents the IURC at committee meetings and participates in FERC regulatory proceedings that affect Indiana utilities and consumers. In addition to the responsibilities listed above, the RTO/FERC team provides counsel on docketed activities dealing with regional and federal energy issues that come before the Commission and works with the Integrated Resource Planning team to coordinate on matters affecting electric utilities' long-term resource plans.

Natural Gas

Natural Gas Division Director Jane Steinhauer manages her staff in monitoring and evaluating regulatory and policy initiatives affecting the natural gas utility industry. Jane has been with the Commission for 27 years and has a master's degree in business administration. The division is responsible for examining and evaluating proceedings involving gas cost adjustments, rates, service territories, Commission-initiated investigations and industry-related rulemakings. This includes analyzing various forms of alternative regulatory proposals.

Additionally, the division's responsibilities include advising the Commission on policy-related matters (e.g., gas procurement practices) and financial matters that are directly related to utility proposals requesting authority to adjust current rates and charges. The division verifies the accuracy of filings from utilities and other parties as a result of cases or regulatory compliance mandates. Staff also maintains the collection of annual reports for all jurisdictional natural gas utilities, including the periodic earnings review of each provider with more than 5,000 customers. The division also coordinates with the Pipeline Safety Division, which administers federal and state pipeline safety standards that apply to all intrastate natural gas and hazardous liquid pipeline operators, regardless of whether they have withdrawn from the Commission's jurisdiction.

Pipeline Safety engineers enforce the safety standards established by the U.S. Department of Transportation as they apply to the design, installation, inspection, testing, construction, extension, operation, replacement and maintenance of the pipeline facilities. The division also enforces the U.S. Department of Transportation's anti-drug program for gas operators within Indiana, as well as integrity management, operator qualification, and damage prevention regulations. In addition, the division is responsible for investigating possible violations of the "Call Before You Dig" law.

Communications

Communications Director Pamela Taber and her staff manage Indiana-specific issues related to video and telecommunications services. Pamela has been with the Commission for 29 years and has a bachelor's degree in accounting. She is also a Certified Public Accountant. The division executes IURC oversight as the sole video franchise authority in Indiana and provides policy advice on telecommunications issues, such as numbering and area code issues; slamming and cramming; telecommunications providers of last resort; and disputes between carriers. The division also oversees the certification of communications service providers and monitors competition in the communications industry by gathering, tracking and storing information about all types of communications providers and the areas where they offer their services.

Communications issues under consideration at the federal level are also an important concern of the Communications Division. Because it is essential to identify and when appropriate, act upon the many federal policy matters that have the potential to affect Indiana's economy, the division monitors, reviews, and provides analysis and recommendations to the commissioners regarding possible Commission participation in federal rulemakings and cases. This assures that the concerns and needs of Indiana are heard by agencies such as the Federal Communications Commission, the National Telecommunications and Information Administration, the Rural Utilities Service, and others, including vigorous opposition to proposals and policies which would preempt state statutory jurisdiction or put Indiana's communications environment at risk.

Water and Wastewater

Water and Wastewater Director Curt Gassert and his team develop, monitor, and evaluate regulatory and policy issues affecting the water and wastewater industries. Curt has been with the Commission for 6 years and has a bachelor's degree in accounting. Prior to this position, he was with the OUCC for 11 years. He is also a Certified Public Accountant. The majority of the division's time is spent advising the Commission on technical matters, as well as reviewing pending rate cases.

The Water and Wastewater Division staff also provides assistance with utility investigations, Commission rulemakings, and complaints submitted to the Consumer Affairs Division. Billing disputes and the disconnection of service are the most common type of consumer complaint. The Commission's investigations, both formal and informal, frequently involve the resolution of problems created by small troubled water or wastewater utilities. Typical rulemakings include developing policies for water meter testing standards and criteria for processing differing types of utility requests for rate increases.

The division also processes requests by water and wastewater utilities to change rates and charges through the 30-day filing process. The 30-day filing process is designed to allow certain types of requests, such as changes to reconnect fees and adjustable rate mechanisms (trackers), to be reviewed and approved by the Commission in a more expeditious and less costly manner than a formal docketed case. Additionally, staff maintains the collection of annual reports for all jurisdictional water and wastewater utilities, including the periodic earnings review of each provider with more than 5,000 customers.

2012 Electricity Report

Table of Contents

I. Executive Summary

The Electricity section of the Regulatory Flexibility Report discusses key issues facing the industry. These topics include competitive pricing, proposed environmental regulations, integrated resource planning, and energy efficiency programs. It also highlights actions taken by the Commission to address specific challenges associated with these topics.

Competitive Pricing

Indiana's annual ranking for average total customer retail rates from 2000 to 2011 ranged from 9th lowest in 2000 to 4th lowest in 2002 to 13th lowest in 2011. Neighboring states' total customer retail rates for 2011 rank as follows: Kentucky 4th, Illinois 26th, Ohio 27th, and Michigan 35th. Comparatively speaking, Indiana's average retail prices for electricity have been and are presently very competitive both nationally and regionally. However, this could change should new environmental regulations go into effect.

Proposed Environmental Regulations

Based on preliminary analysis, recent environmental decisions being made at the federal level have the potential to seriously impact the state of Indiana. Given the number of new requirements, the tight timeframes to comply with the regulations, and Indiana's reliance on coal, costs are expected to be significant. According to the State Utility Forecasting Group (SUFG), new federal clean air regulations are projected to raise Indiana electricity rates about 14% by 2020, which is in addition to the 20% increase projected over the next six years by analysts. The impact is greater here than in other states because coal-fired power plants targeted by the U.S. Environmental Protection Agency for environmental modifications generate about 82% of the electricity used in Indiana (down from 85% in 2010), compared with 45% nationwide.

Integrated Resource Planning

According to the SUFG's 2011 forecast, the state will need approximately 2,600 MW of additional resources by 2020 to meet expected demand growth and maintain a 15.8% reserve margin. The forecast also projects that electricity usage will grow at an annual rate of 1.30% over the 20-year forecast and that peak demand will grow at an annual rate of 1.28%. To address growing demand, each utility creates an integrated resource plan (IRP) and submits it to the Commission every two years. In order to make the process more transparent and inclusive, the Commission is soliciting input from stakeholders and is in the process of drafting a new IRP rule.

Energy Efficiency Programs

In order to improve efficiency and reduce demand, the Commission issued a decision in 2009 that required the utilities to achieve annual energy savings goals through the implementation of demand side management (DSM) or energy efficiency programs. DSM programs benefit consumers by saving energy, which is the most cost-effective way of meeting future energy supply needs. In response to the Commission's decision, a statewide program called Energizing Indiana was launched in January 2012. Energizing Indiana is a united effort by the Indiana Office of Utility Consumer Counselor, participating utilities, and consumer organizations to offer consistent energy efficiency programs across the state. According to the third-party administrator, GoodCents, the program reached 6,663 Indiana homeowners within 6 months, saving more than 7,119,144 kWh.

II. Overview

Industry Structure

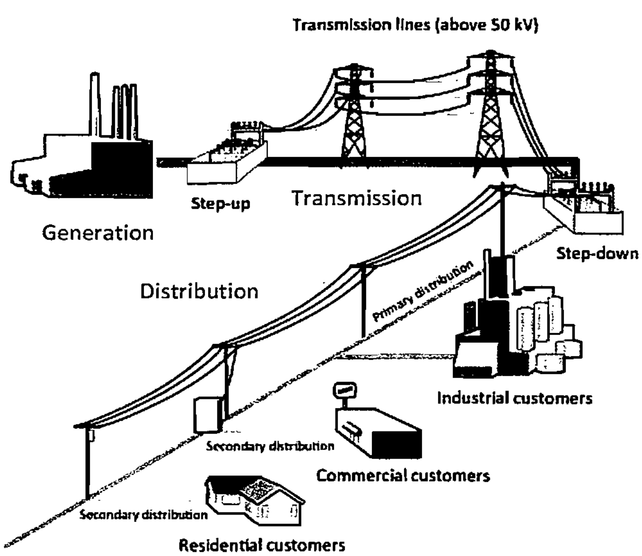
The Indiana Utility Regulatory Commission (Commission or IURC) regulates Indiana's electric utilities due to the monopolistic nature of the industry. This relationship is often described as the "regulatory compact," which means that in return for government regulators granting exclusive service territories and setting rates in a manner that provides an opportunity (but not a guarantee) for a reasonable return on investment, investor-owned utilities (IOUs) are obligated to provide adequate service to customers. Other types of electric utilities, rural electric membership cooperatives (REMCs), and municipal electric utilities, also have exclusive service territories, but may withdraw from the Commission's jurisdiction. In 2011, more than $8.4 billion in revenue was generated and more than 2.6 million electric customers were served by the 18 electric utilities under Commission rate jurisdiction.

The Commission has jurisdiction over the electric service provided to approximately 2.6 million customers in Indiana. In 2011, Indiana's average retail rates were the 13th lowest in the nation.

Regulatory Structure

Indiana's electric utilities operate under a traditional vertically-integrated structure, whereby they own and operate generation, transmission, and/or distribution facilities that provide electric retail service to customers. As shown in Figure 1, electricity goes through a series of steps before it is available for consumption. During this process, the electricity voltage is stepped-up (increased) or stepped-down (decreased) depending on the level of voltage required to provide service.

Figure 1



There are two types of electric utility customers: retail and wholesale. Retail customers include residential, commercial, and industrial customers who are billed for service based on studies analyzing the costs associated with providing service for each class. For IOUs, a reasonable rate of return on investment for the company is added to the cost of service. Wholesale customers, on the other hand, include other electric utilities, cooperatives, and municipalities that resell energy to retail consumers.

In addition to setting rates for retail customer classes, the Commission reviews and approves long-term financing for IOUs, the Indiana Municipal Power Agency (IMPA), and Wabash Valley Power Association (WVPA). Additionally, all Indiana electric utilities wanting to build, buy, or lease new generation facilities must first have their proposals reviewed and approved by the Commission. This process is further discussed on page 32.

- Investor-Owned Utilities -

Five major IOUs operate in Indiana in exclusive service territories with other portions of the state similarly assigned to municipal utilities and REMCs.[1] IOUs are for-profit enterprises funded by debt (bonds) and equity (stock). Indiana's IOUs are vertically integrated, which means they own facilities for the generation, transmission, and distribution of electricity. Map 3 on page 25 shows the IOUs' service territories.

Duke Energy Indiana, Inc. (DEI), a subsidiary of Duke Energy Corporation, is headquartered in Charlotte, NC and based in Plainfield, IN. The utility serves 783,000 customers in 79 of the 92 counties throughout central and southern Indiana, excluding the cities of Indianapolis and Evansville. DEI just celebrated its 100th anniversary as a company.

Indiana Michigan Power Company (I&M), a subsidiary of American Electric Power Company, Inc. (AEP), is headquartered in Columbus, OH and based in Ft. Wayne, IN. The utility serves 458,000 customers in two, noncontiguous parts of northeast and north central Indiana.

A unit of American Electric Power

[1]IC § 8-1-2.3-3

Indianapolis Power and Light Company (IPL), a subsidiary of the AES Corporation, is headquartered in Arlington, VA and based in Indianapolis, IN. The utility serves 468,000 customers in the greater Indianapolis area.

Northern Indiana Public Service Company (NIPSCO), a subsidiary of NiSource Inc., is headquartered and based in Merrillville, IN. The electric utility serves 457,000 electric customers in the northern part of Indiana. NIPSCO just celebrated its 100th anniversary as a company.

Southern Indiana Gas & Electric Company (SIGECO), a subsidiary of Vectren Corporation, is headquartered and based in Evansville, IN. The electric utility serves 146,000 customers in a small part of southwestern Indiana.

- Municipally-Owned Utilities -

State law allows municipal utilities to remove themselves or "opt out" of the Commission's jurisdiction.[2] Under certain circumstances, the Commission may review financing arrangements for individual municipal electric utilities, but this typically occurs through rate cases. As of the printing of this report, 11 of the 72 municipally-owned utilities operating in Indiana remained under the Commission's jurisdiction for rate regulation. For a complete list of the regulated municipal utilities and those that have opted out, please see Appendix B. Of these 72 municipally-owned electric utilities, 51 are members of the IMPA, including 9 of the 11 utilities regulated by the Commission.

When a utility opts out of the IURC's jurisdiction, the agency no longer oversees its rates and charges or rules and regulations.

In 1980, a group of municipalities created the IMPA to jointly finance and operate generation and transmission facilities, as well as purchase wholesale power and meet members' needs through a combination of member-owned generating facilities, member-dedicated generation, and purchased power. Map 1 shows the locations of these member utilities.

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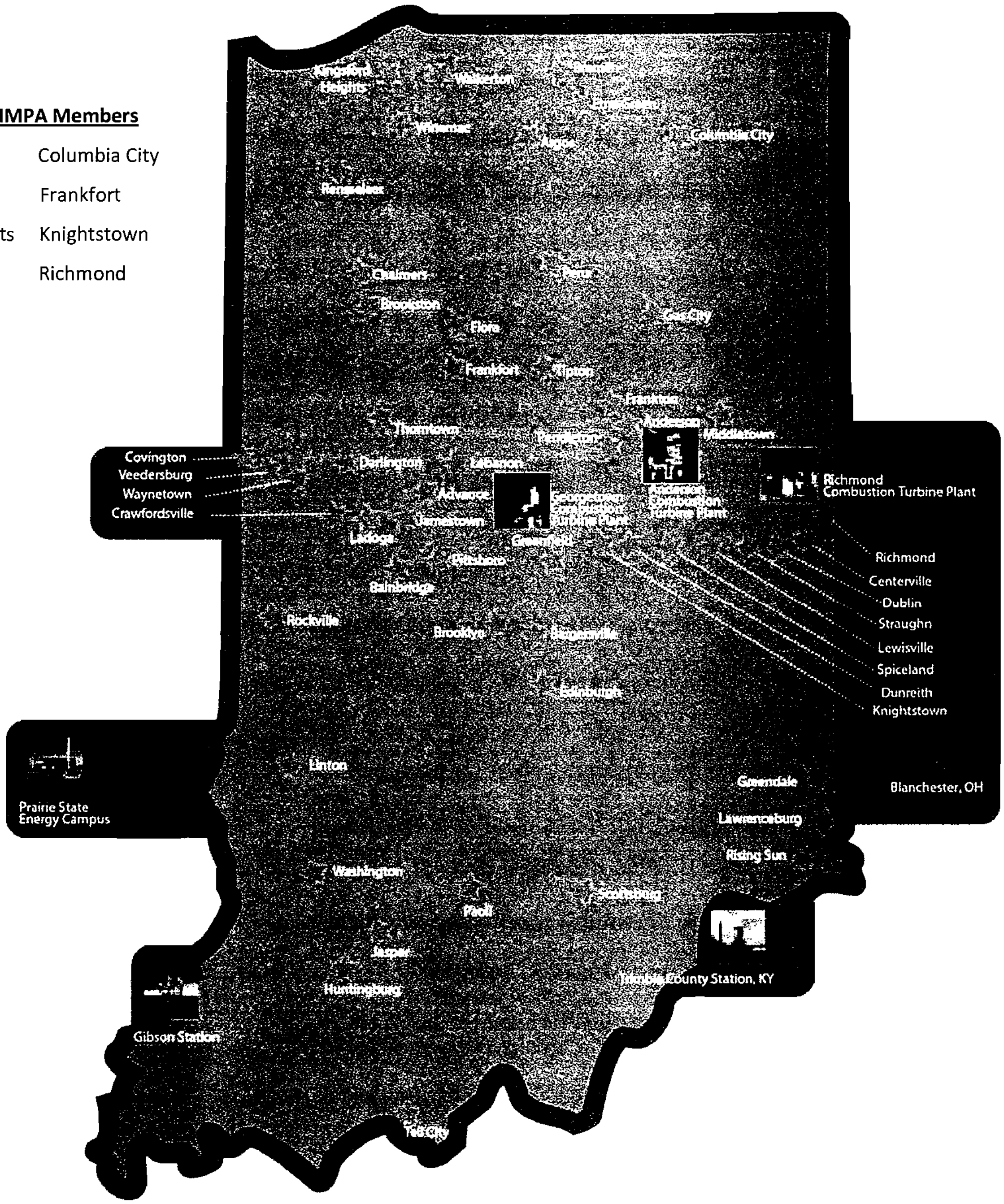
[2]IC § 8-1.5-3-9

Map 1

Statewide Map of Indiana Municipal Power Agency Members

Jurisdictional IMPA Members

Anderson
Columbia City
Crawfordsville
Frankfort
Kingsford Heights
Knightstown
Lebanon
Richmond
Tipton



Source: Indiana Municipal Power Agency

- Rural Electric Membership Cooperatives -

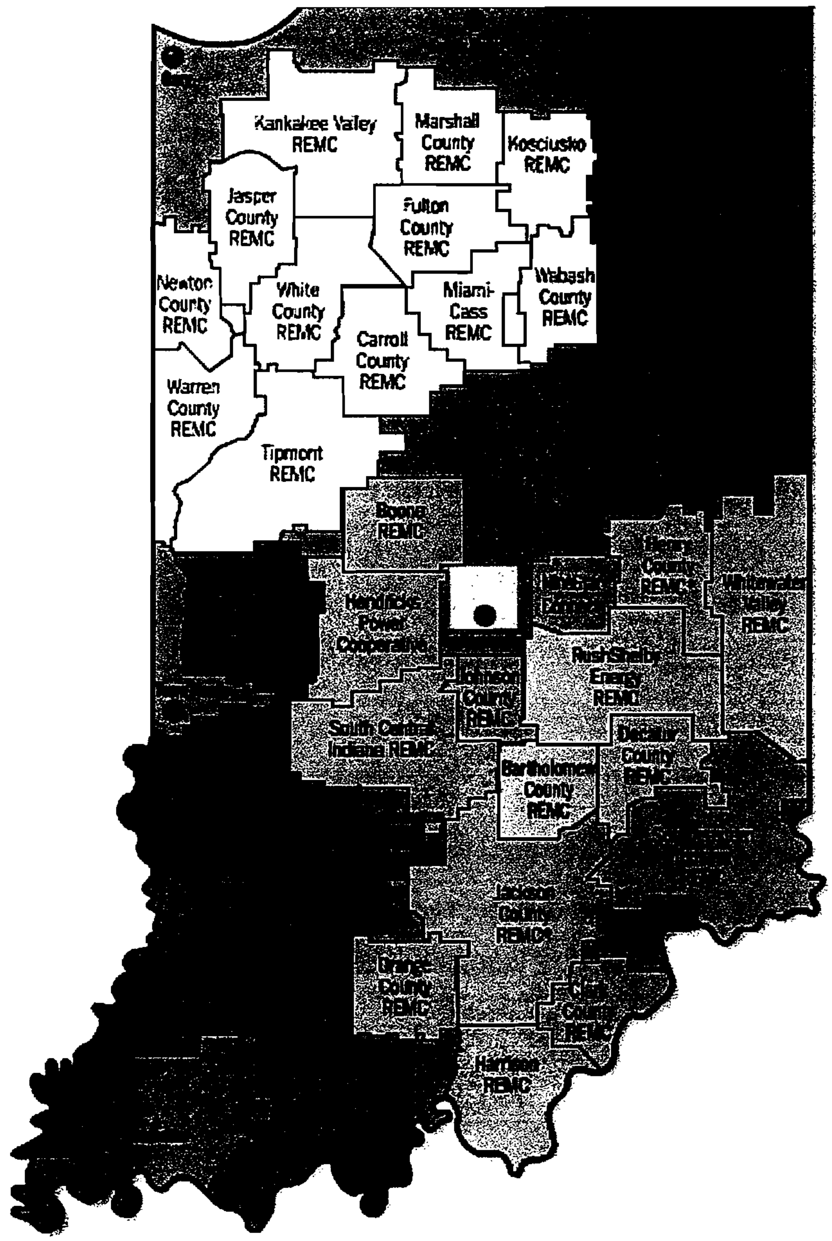
Rural electric membership cooperatives (REMCs) are customer-owned utilities, all of which are members of either Hoosier Energy located in the southern part of the state or WVPA located in the northern part of the state. Map 2 shows the location of these member utilities.

Hoosier Energy and WVPA are power generating and transmission cooperatives formed to supply power to the REMCs. The Commission's regulation of Hoosier Energy and WVPA is primarily limited to decisions to purchase, build, or lease generation facilities. In addition, the Commission retains jurisdiction over WVPA's long-term financing.

REMCs, like municipalities, have the ability to remove themselves or "opt out" of the Commission's jurisdiction.[3] As of the printing of this report, only Northeastern REMC remained under the Commission's jurisdiction for rate regulation.

Map 2

Statewide Map of the Association of Rural Electric Cooperatives



Source: Indiana Statewide Association of Rural Electric Cooperatives

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[3] IC § 8-1-13-18.5

How Indiana Compares

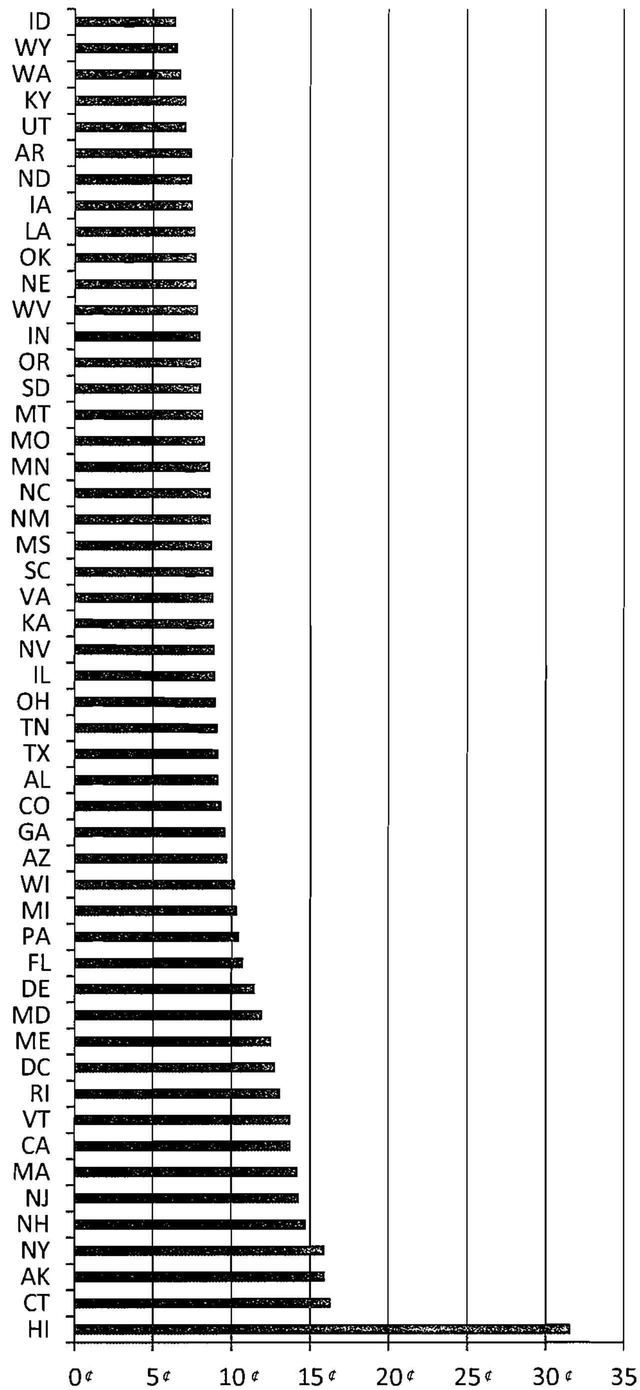
Indiana's average retail prices for electricity have been and are presently competitive both nationally and regionally. Retail prices are the average price for all rate classes, including residential, commercial, and industrial customers.

Indiana's annual ranking for average total customer retail rates from 2000 to 2011 ranged from 9th lowest in 2000 to 4th lowest in 2002 to 13th lowest in 2011. The variability in ranking is the result of many factors, including the timing of rate cases both in and out of state and fluctuations in the cost of fuel. Chart 1 shows how Indiana compares to other states for 2011 average electricity prices.

Neighboring states' total customer retail rates for 2011 rank as follows: Kentucky 4th, Illinois 26th, Ohio 27th, and Michigan 35th. Chart 2 shows Indiana's national rankings over the past 20 years and how they have fluctuated.

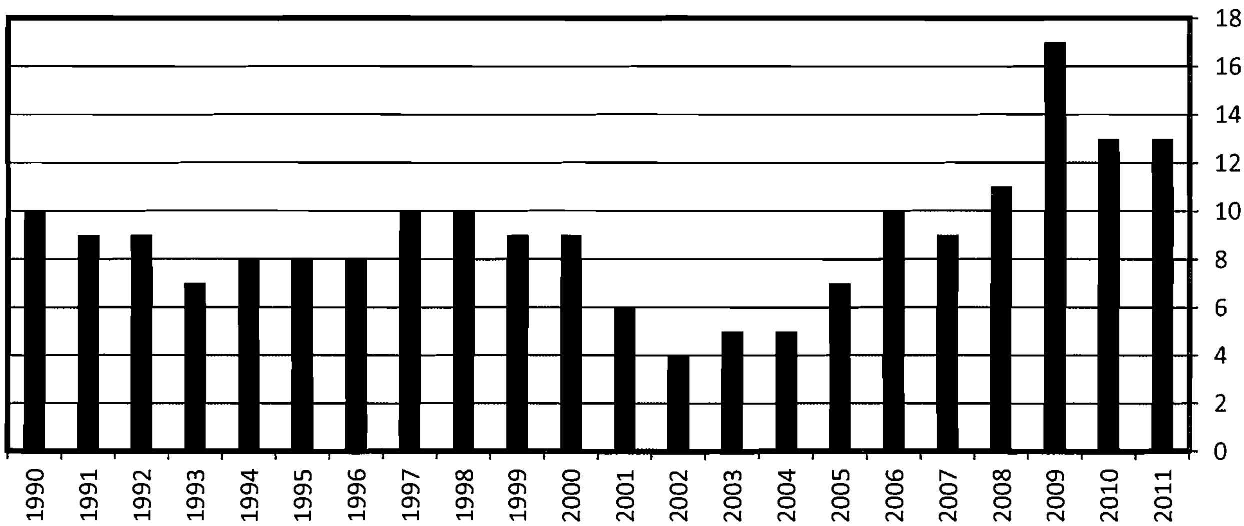
Chart 1

2011 State Average Electricity Prices (cents/kWh)



Source: Energy Information Administration

Chart 2
Indiana Total Retail Customer Rate National Ranking



Historically, Indiana's use of coal as a fuel source for electricity generation has contributed to the state's relatively low-cost electricity. However, the general trend of increased coal prices observed since 2003 has reduced Indiana's relative price advantage. Some of the factors driving the coal cost increases are as follows:

- Increasingly difficult permitting requirements; and
- International competition for domestic supply.

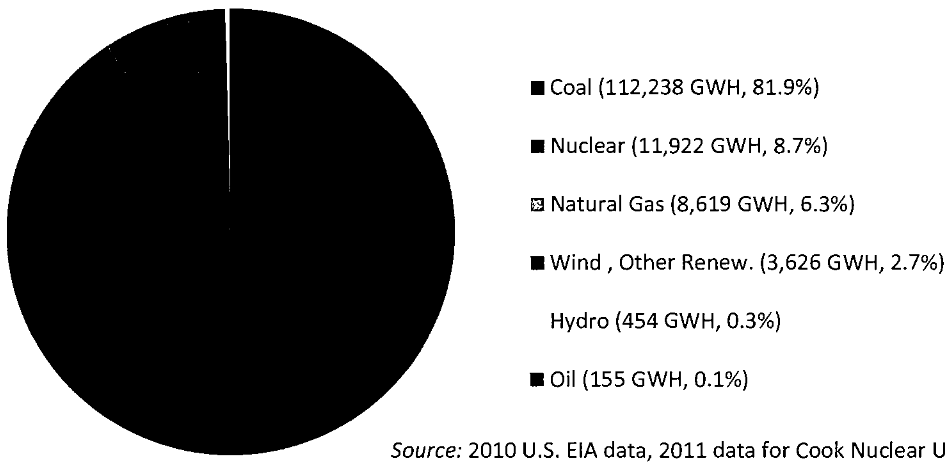
Because of the extensive use of coal in Indiana, these factors have led to an increase in utility fuel costs and in customer rates.

Historically, Indiana's use of coal has contributed to its relatively low-cost electricity; however, costs have increased in recent years due to a number of factors. Coal-fired generation accounts for about 82% of the projected 2011 energy production for Indiana customers, which is down from 85% in 2010.

Existing Generation Portfolio

Coal-fired generation accounts for about 82% of the projected 2011 energy production for Indiana customers, as shown in Chart 3. The second highest is nuclear generation at 8.7%. Although Indiana does not have a nuclear plant within the state, customers in the northeastern portion of Indiana are served by I&M's Cook Nuclear Generation Station located in Bridgman, Michigan. Each year the amount of coal used for electric generation has steadily decreased and will likely continue to do so because of a significant decline in natural gas prices in the past 18 months, which is more fully discussed in the Natural Gas section of this report.

Chart 3
Projected Generation Of Electricity By Fuel Type For Indiana Consumers (2011)



Source: 2010 U.S. EIA data, 2011 data for Cook Nuclear Units

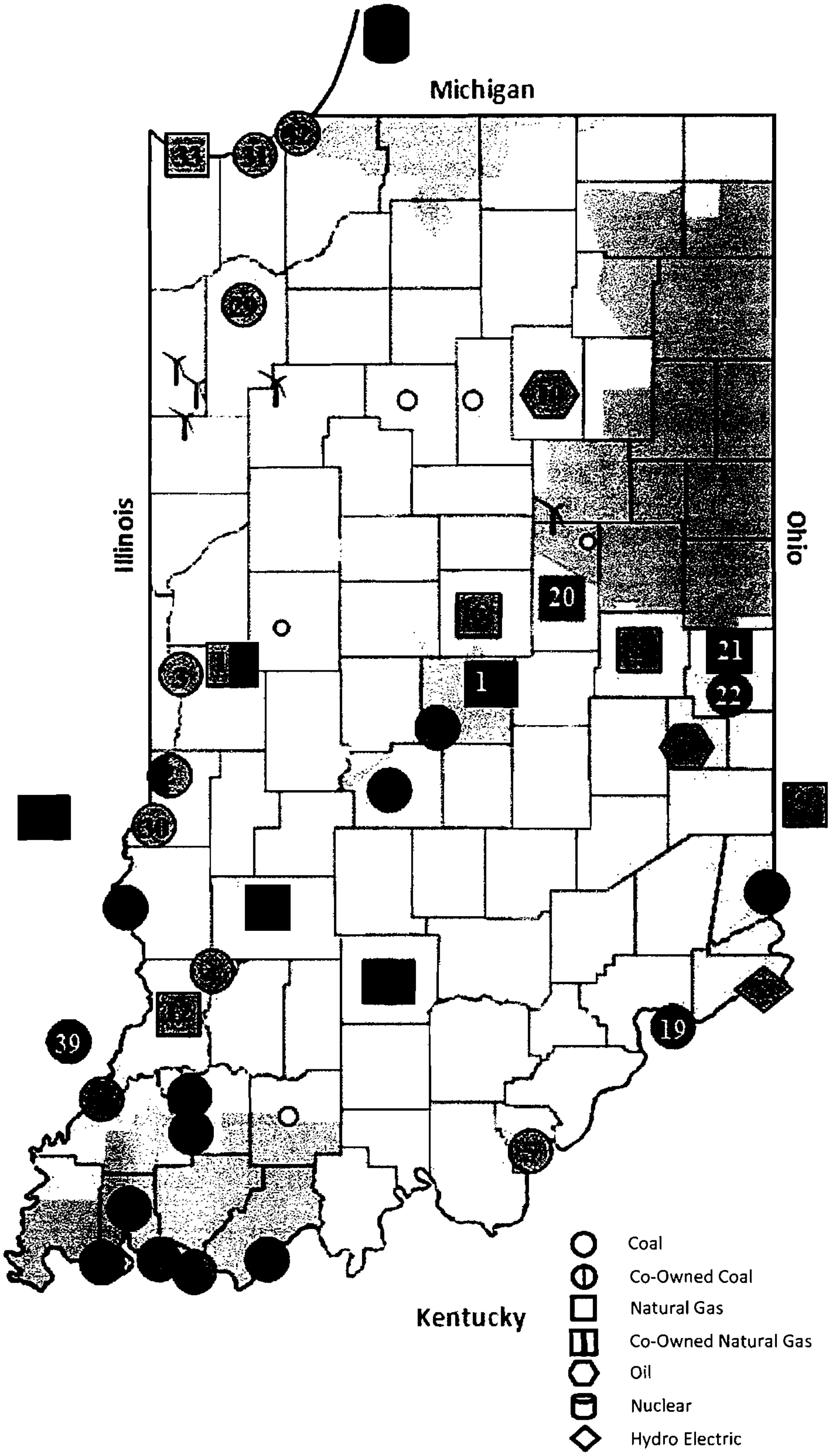
Over time, it is normal for power plants to produce less than what they could produce if run at full capacity. This ratio of actual energy output to potential output is referred to as a capacity factor. The capacity factors of power plants vary depending on technology, resource, and purpose. Nationally, capacity factors are typically more than 90% of the potential output for nuclear, 70-90% for large coal units, 20-40% for wind, and 10-15% for solar photovoltaics. When considering the makeup of a generation portfolio, a utility takes capacity factors into account in order to maximize efficiency and the total output of its investments. The following map shows the location, size, and fuel type of the largest sources producing electricity for Indiana's customers.

Fuel Type Comparison 2010 vs. 2011

	2010		2011
Coal:	85.0%	↓	81.9%
Nuclear:	8.5%	↑	8.7%
Natural Gas:	4.4%	↑	6.3%
Wind, Other Renew.:	1.6%	↑	2.7%
Hydro:	0.4%	↓	0.3%
Oil:	0.1%	↔	0.1%

Map 3

Statewide Map of Electric Generation Serving Indiana



Summer MW Ratings

Duke Energy Indiana

1	Gibson	3,132
2	Wabash River	668
3	Cayuga	1094
4	Edwardsport	618
5	Gallagher	280
6	Noblesville	285
7	Connersville	86
8	Henry County	129
9	Madison (OH)	576
10	Miami Wabash	80
11	Vermillion 1-5	355
12	Wheatland	460
38	Markland	52

Hoosier Energy

13	Merom	998
14	Holland (IL)	314
15	Ratts	241
16	Lawrence	176
17	Worthington	172

Indiana Municipal Power Agency

18	Georgetown 2&3	158
19	Trimble County (KY)	66
20	Anderson	167
21	Richmond	181
22	Whitewater Valley	99
39	Prairie State	100
O	Other Cities	

Indiana Michigan Power

23	Rockport	2,600
24	Cook (MI)	2,223
25	Tanners Creek	980

Indianapolis Power & Light

26	Petersburg	1,747
27	Harding Street	1,091
28	Eagle Valley	338
18	Georgetown 1&4	158

Northern Indiana Public Service Co.

29	Schahfer	1,780
30	Sugar Creek	535
31	Bailly	511
32	Michigan City	469
33	Mitchell	17

Southern Indiana Gas & Electric Co.

34	Warrick	150
35	Brown	640
36	Culley	360
37	Broadway/Northeast	135

Wabash Valley Power

2	Wabash River 1 IGCC	210
11	Vermilion 6-8	213
14	Holland (IL)	314
16	Lawrence	86

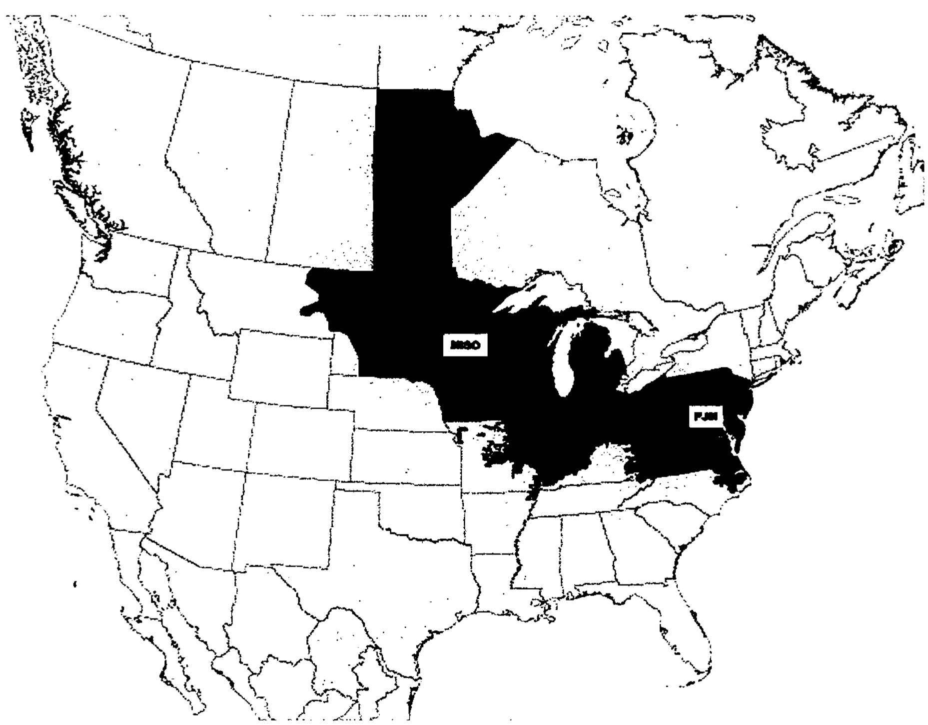
Regional Transmission Organizations

Two regional transmission organizations (RTOs) operate in Indiana: the Midwest Independent Transmission System Operator, Inc. (MISO) and PJM Interconnection, LLC (PJM). These organizations are regulated by the Federal Energy Regulatory Commission (FERC). In addition to operating the regional transmission facilities in a reliable and non-discriminatory manner, MISO and PJM direct the operation (in real time) of all generating facilities in their respective regions to ensure that the lowest-cost combination of generation resources is being used at any given moment. Additionally, RTOs engage in long-term transmission planning in conjunction with their transmission-owner utilities, some of which are under the IURC's jurisdiction. Further detail is provided in Table 1.

> ***There are two regional transmission organizations operating in Indiana: MISO and PJM. These entities dispatch all of the generating facilities in their regions to ensure that the lowest-cost combination of resources is used at any given moment.***

Map 4

MISO (red) and PJM (blue) Reliability Coordination Area



Source: www.miso-pjm.com

Table 1

Characteristics of the Regional Transmission Organizations

Midwest Independent System Operator and PJM Interconnection, LLC

RTO Characteristics	MISO	PJM
Participating Indiana Utilities	DEI, NIPSCO, IPL, SIGECO, Hoosier Energy, IMPA, and WVPA	AEP (including its Indiana subsidiary I&M), IMPA, and WVPA
Transmission Lines	49,641 miles	65,441 miles
Generation Capacity	131,178 MW	185,600 MW
Headquarters	Carmel, Indiana	Valley Forge, Pennsylvania

Participation in RTOs provides a number of benefits for Indiana's electric consumers. In addition to greater reliability, RTOs provide lower costs through more efficient regional transmission planning than is possible when individual utilities act alone. The vast regional scope of the RTOs allows Indiana's customers to experience the financial and operational benefits of a diverse resource mix and variations in customer demand. For example, Indiana might experience peak demand due to hot weather while Montana may have more moderate weather, which allows Indiana's demand to be satisfied with relatively lower-cost Montana resources.

RTO Net Benefits in 2011

In 2011, the MISO region realized net benefits of $2.2 to $2.7 billion, while the PJM region realized net benefits of $2.2 billion. During the next 10 years, MISO anticipates that the region will realize between $6.1 billion and $8.1 billion in benefits on a net present value basis.

Source: www.midwestiso.org/WhatWeDo/ValueProposition/Pages/ValueProposition.aspx

Source: www.pjm.com/~/media/documents/presentations/pjm-value-proposition.ashx

Additionally, because the reliability risk is diversified over the entirety of the RTOs' footprints – from the Rocky Mountains to the Atlantic Ocean – reserve margin needs are reduced. A reserve margin is the amount of extra capacity available to serve customer loads in the event of a system contingency, such as the planned or unplanned outage of a generation plant or a high-capacity transmission line. The electric industry has historically maintained planning reserve margins in the 15% to 20% range.[4] However, with the development of RTOs, the necessary level reserve margins has fallen, reflecting the benefits of more efficient regional coordination. For example, Indiana utilities participating in the MISO have an 11% reserve requirement for 2012-13.

While participation in RTOs provides benefits to Indiana's end-use customers, it is challenging to translate the costs and revenues associated with RTO participation into the traditional cost-of-service model used to set rates in Indiana. To better ensure that Indiana customers and utilities receive the benefits of participating in RTOs, the Commission has staff dedicated to participating in the RTOs' processes. Because of the important and pervasive impact of the RTOs on Indiana's utilities and their customers, the Commission's involvement with the FERC has also increased dramatically to ensure that Indiana's utilities are providing safe, reliable energy at reasonable prices.

Age Profile

Aging infrastructure is a concern across all utility sectors. For the electric industry, an aging generation fleet is particularly concerning due to the potential risk to system reliability and the rising costs associated with the construction of new power plants. Although generation plants are designed to last decades, it is important for the utilities to monitor their condition, as the last coal-fired generation unit constructed in Indiana was completed in 1989. The IMPA recently added two new coal-fired units to its portfolio to serve Indiana customers. One unit is a 96 MW share of Trimble County Unit 2, located in Trimble County, KY. It was completed in 2011. The other unit is a 100 MW share of

Aging Coal-Fired Generating Units

This past year the number of coal-based units greater than 50 years old increased by 6. In 2010, there were 21 units, and in 2011, there were 27 units out of 64 units total.

[4]Planning reserve is the amount of forecasted dependable resource (i.e., generation, demand-response) capacity required to meet the forecasted demand for electricity and reasonable contingencies (e.g., loss of a major generating unit). Operating reserve is the generating capability (spinning and non-spinning reserve) above firm system demand needed to provide for regulation, load forecasting errors, scheduled and unplanned equipment outages and local area protection.

Prairie State Unit 1 in Southwestern Illinois that went into commercial operation on June 6, 2012. It is the newest coal-fired unit serving Indiana customers.

In recent years, Indiana's utilities have purchased incremental electricity from other sources rather than building their own power plants to maintain required power reserves. Because it takes approximately three years to construct new gas-fired peaking generation, five to ten years to construct new conventional coal-fired generation, and still longer to bring new nuclear generation online, long-term planning is critical. Table 2 shows the age profile for the coal and natural gas-fired fleets owned by Indiana's utilities.

Table 2

Age Profile of Generating Units Owned by Indiana Utilities

Separated by Coal-Based Units and Gas Generation Units

Years Old	Number of Coal-Based Units	MW of Generation (Summer Rating)	Percent of Total Coal-Based Generation
Over 50	27	1,995.7	13.0%
40-50	14	3,144.9	20.5%
30-40	14	6,533.1	42.5%
20 -30	8	3,595.7	23.4%
10-20	0	0	0
0-10	1	96.0	0.6
Total	64	15,365.4	100%

Years Old	Gas Units (Peaking)	MW of Generation (Summer Rating)	Percent of Total Gas Generation (Peaking)
Over 50	2	4.0	0.1%
40-50	7	95.2	2.7%
30-40	3	220.0	6.2%
20 -30	5	224.0	6.3%
10-20	34	2,738.7	77.4%
0-10	3	255.4	7.2%
Total	54	3,537.3	100%

Coal units commonly become candidates for retirement past the age of 40, with most retiring by age 60. As demonstrated in Table 2, more than 30% of the total coal-fired generation is greater than 40 years old, and about 75% of the total coal-fired generation is greater than 30 years old. Natural gas-fired generation is much newer; only 15% of that fleet is greater than 20 years old. However, because gas-fired combustion turbines generally have higher marginal operating costs than coal-fired units, they typically operate only during periods of peak demand. With regard to nuclear generation, Cook Units 1 and 2 became operational in the 1970s and were re-licensed for commercial operation until 2034 for Unit 1 and 2037 for Unit 2.

Legal and Policy Foundations

Because electricity cannot be effectively stored on a large scale, generation resources owned by utilities must be economically dispatched such that generation matches customer demand. This means the lowest-cost generation resources are used first, with successively more expensive units coming online until total customer demand is met at any given point in time. Consequently, Indiana's utilities are responsible for short-term planning. They are also responsible for long-term resource planning to meet customer demand at the lowest reasonable cost, while providing safe, adequate, and reliable service. In order to help the utilities meet their charge, policies such as allowance for funds used during construction (AFUDC) and construction work in progress (CWIP) have been enacted by the General Assembly. These policies provide cost recovery for utilities building new generation.

CWIP and AFUDC provide cost recovery for utilities building new generation. Depending how these mechanisms are applied, costs can vary for consumers.

Allowance for Funds Used During Construction

AFUDC is an accounting procedure that tracks the estimated composite interest incurred from using borrowed and internal funds during a construction project. AFUDC is accrued until the plant is placed in service or otherwise allowed recovery through an approved CWIP tracker. Depending on the construction project, the amount of AFUDC can be considerable.

Construction Work in Progress

CWIP deals with the timing and cost recovery of capital projects during the construction phase. It provides the funds to pay the financing costs for capital expenditures during construction and is funded by the ratepayers through a tracker, which is further discussed on page 37. Often referred to as "pay as you go" financing, CWIP provides a utility with positive cash flows. By allowing construction projects to be tracked periodically, the eventual cost of the plant is less because the AFUDC stops, thereby saving ratepayers from paying for the recovery of these additional costs.

> ***Construction work in progress is often referred to as "pay as you go" financing.***

However, one of the concerns is that ratepayers incur the financing costs of construction on a plant that is not yet "used and useful." In other words, ratepayers theoretically are paying for a plant without a guarantee it will ever go into service. Another concern rests with utilities avoiding full rate cases, which is where all expenses are reviewed, including those associated with the plant. By recovering costs related to the construction of the new plant or capital project outside of a full rate case, the need for utilities to have periodic full review of their rates can be significantly decreased. Many costs incurred by utilities increase and decrease over time, so without periodic full rate cases customers can be subject to certain increases through the use of trackers for large capital expenditures without the balance created from other costs decreasing.

This concept became a point of controversy in the 1970s because of the extraordinary costs and long timelines involved in major nuclear construction projects. Therefore, in the 1980s, the General Assembly enacted several statutes that permitted the Commission to apply this special regulatory treatment to certain projects. These projects include those deemed to be clean coal, as well as existing nuclear generation facilities that serve Indiana, the latter of which was signed into law during the 2011 legislative session.

Utilities assert that if CWIP were employed more frequently, consumers would benefit over the long term because the costs of construction would actually be put into rate base as they occur, rather than being delayed until a utility's next rate proceeding. By adding expenditures as they occur, shareholders receive their rate of return sooner, which theoretically reduces the cost of the project over the long term, because a utility would require less revenue to support the project on a going forward basis. Additionally, the use of CWIP spreads the rate impact of a large construction project over several years so that ratepayers are not exposed to a single large rate increase.

III. Landscape

Infrastructure

In order to bring new generation online, the law requires utilities to receive approval from the Commission through the certificate of need process. This process provides the IURC and interested parties with an opportunity to evaluate the merits of a project before it is undertaken. If the Commission approves the project, the utility is granted a certificate of public convenience and necessity (CPCN); only utilities that intend to own or lease a generation facility must seek a CPCN. In cases where the utility just wishes to enter into a purchase power agreement (i.e., a long-term contract between two parties), a separate review process is conducted by the IURC.[5] Like the CPCN process, a utility must file a petition with the Commission seeking approval in order to determine prudency for the purposes of future cost recovery.

A CPCN provides the IURC and interested parties with an opportunity to evaluate the merits of a project before it is undertaken.

Project Approval and Integrated Resource Planning

To obtain a CPCN, a utility must provide supporting analysis demonstrating that the proposed project meets criteria in IC § 8-1-8.5-5(b). Therefore, the CPCN application must be consistent with the utility's resource planning, thoroughly analyzing various risks and uncertainties, to ensure adequate planning for the future. In order to assess future plans, each utility is required to file an integrated resource plan (IRP) with the IURC every two years. The goal of the IRP process is to evaluate all supply and demand-side alternatives reasonably available to meet a utility's future electricity requirements.

[5]Purchase power agreements are generally filed under IC § 8-1-2-42(a) or IC ch. 8-1-8.8.

Because many changes have occurred since the IRP rule was finalized in 1995, the IURC initiated a rulemaking in 2010 to update it. The rulemaking process included a two-day technical conference in September 2011 to solicit input from stakeholders, including consumer groups, the Indiana Office of Utility Consumer Counselor (OUCC), and the utilities. At the conference, stakeholders discussed numerous issues such as objectives, treatment of uncertainty, the review process, and how to foster public participation. The IURC circulated a Strawman Draft Proposed Rule to stakeholders for comment in January 2012. Then in August 2012, the IURC circulated a Draft Proposed Rule for comment. The IURC expects to issue its Notice of Intent in the fall of this year, with spring of 2013 as the anticipated date for completion.

Types of Generation

Over the next 15 years, the state's electricity demand is forecasted to steadily increase, while many aging coal-fired units will be facing retirement or premature shutdown due to tightening environmental regulations. Consequently, this era is expected to have far greater build-out of new generation than either of the past two decades. At the same time, lifetime cost assessments of new generation units are expected to be increasingly difficult to estimate, due in large part to federal regulatory uncertainty and upward pressure on the prices of inputs like materials, construction, and fuel. Therefore, the Indiana power sector is entering into a period of unprecedented planning difficultly at a time when resource planning is increasingly necessary, especially over the next few years.

Based on the current direction of the U.S. EPA, by around 2015 Indiana will need to retrofit or retire an unprecedented wave of coal-fired generation units and replace them with a combination of new resources, due to likely environmental regulations and a large number of older coal units lacking sufficient controls. This will require the utilities to make substantial capital investments in order to meet U.S. EPA mandates, which will likely result in significant electric rate increases for Hoosier customers. The primary replacement fuel, based on current information, is expected to be natural gas, with wind and demand side management also expected to play key roles. Nuclear, integrated gasification combined cycle technology, and other alternative resources could also play a role in meeting Indiana's resource requirements.

- Edwardsport IGCC -

In an Order issued on November 20, 2007, the Commission granted a CPCN and approved the construction of DEI's Edwardsport Integrated Gasification Combined Cycle (IGCC) generating facility, which will have a capacity of 618 MW. Once complete, the Edwardsport IGCC facility will be the first commercial-scale clean coal plant of its kind built in the United States.[6] The facility is located on approximately 220 acres adjacent to DEI's existing Edwardsport Generating Station in Knox County. The project is nearly complete. Commercial operation is expected to begin in the 1st quarter of 2013.

The Commission initially approved a cost estimate for the plant at $1.985 billion in 2007. However, in 2009 the figure was revised by the company and approved by the Commission at $2.35 billion.[7] DEI has since filed a second request with the IURC to revise the cost estimate again, under Cause No. 43114 IGCC 4-S1. Due to the complexity of this case, it has since been expanded by the Commission to include two phases. Phase I addresses Commission review of the utility's progress reports, the proposed cost estimate increase, and the reasonableness of going forward with the project. Phase II, on the other hand, addresses allegations made by intervening parties of fraud, concealment, and/or gross mismanagement associated with the project. Public hearings in this case spanned 25 days throughout October 2011 and January 2012.

On April 30, 2012, a proposed settlement agreement, reached by less than all of the parties,[8] was filed in this case. The proposed settlement states the construction costs of the project will be subject to a $2.595 billion hard cost cap. This excludes additional AFUDC and any force majeure events.[9] The proposed settlement also contains certain provisions that lessen the project's rate impact on customers[10] and pledges there will not be any increases to base rates and charges prior to April 1, 2014. Public hearings on the settlement agreement spanned four days in

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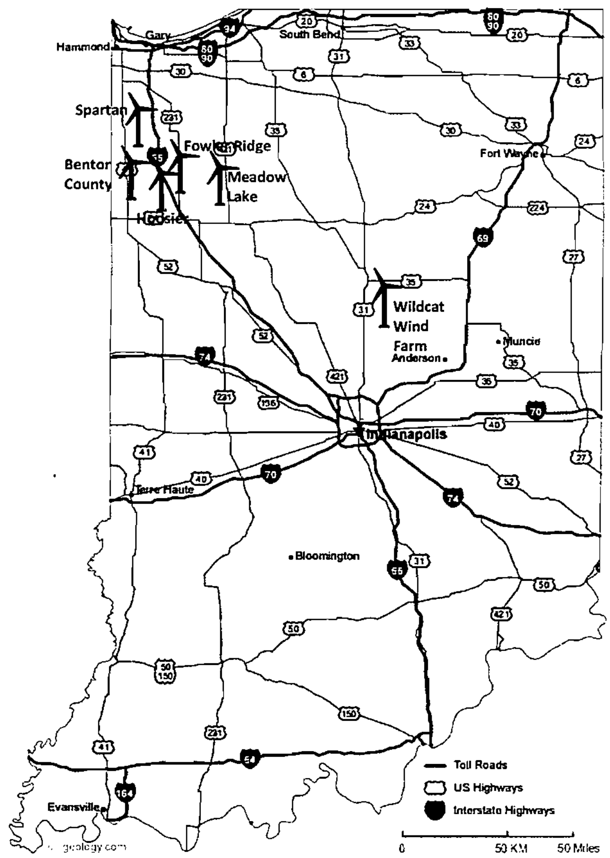
[6]The plant will also be able to run on natural gas, though doing so reduces capacity by approximately 128 MW.
[7]Cause No. 43114 IGCC 1
[8]The proposed settlement was entered into by DEI, the OUCC, the Duke Energy Indiana Industrial Group, and Nucor Steel-Indiana.
[9]The total estimated cost of the project is now approximately $3.3 billion or approximately $700 million more than the hard cap agreed to in the proposed settlement agreement.
[10]If the settlement is approved, DEI estimates that the average peak year retail rate impact will be approximately 14.5%, when compared with 2009 actual retail revenues. Through the IGCC rider, 4.9% of the 14.5% estimated increase is already being recovered.

July. With the completion of the procedural schedule, the Commission expects to render a decision in this case before the end of the year.

- Wind Generation -

Indiana has become one of the fastest growing states for the development of wind farms, many of which are currently located in Benton, Newton, and White counties. The most recently announced wind farm is the Wildcat Wind Farm in Madison, Grant, Howard, and Tipton counties, an outgrowth of I&M adding another 100 MW of wind power to its generation portfolio as part of a 20-year power purchase agreement with E.ON Climate and Renewables.



With more and more wind generation coming online, the MISO recently created a centralized wind forecasting system, which has helped it better predict available wind resources on an hour-to-hour basis. Forecasting accuracy is improving significantly and will allow grid operators to more efficiently integrate wind projects onto the grid. For example, the MISO's increased use of wind forecasting has enabled dependency on wind during peak times to increase from 8% for 2010 to 12% for 2011 and now to 14.7% for 2012.

The MISO's increased use of wind forecasting has enabled dependency on wind during peak times to increase from 8% to 14.7% in recent years.

Unlike conventional power resources, wind power is weather-driven and intermittent, meaning it cannot be dispatched to match increases in demand; however, it can be taken offline very quickly.[11] This function is valuable during times of grid congestion and during minimum demand. Using the capacity credit, a 100 MW wind farm would typically have

[11]Dispatchability is the ability of a power plant to alter its output quickly to a desired level.

an expected output of 14.7 MW (14.7% of its nameplate capacity[12]) during the summer peak periods. The limited ability of wind to reliably meet demand at times of highest need puts it at a disadvantage when compared to conventional generation technologies. However, there are means of compensating for the intermittent nature of wind. For instance, when wind output drops, natural gas units can be dispatched to fill the void, because they can start up quickly. As a result, the MISO announced in 2011that wind can be designated a "dispatchable intermittent resource" and can, therefore, fully participate in its real-time energy market. As shown in Table 3, Indiana wind is projected to provide 196.6 MW of generation during these peak periods.

Table 3

Specifications of Indiana Wind Farms

Wind Projects	County	Nameplate Capacity (MW)	Estimated Generation at Indiana Peak Hour (MW) (See note 1)	Completion Date
Benton County Wind Farm	Benton	130.5	19.2	2008
Fowler Ridge Wind Farm I	Benton	301.3	44.3	2009
Fowler Ridge Wind Farm II-A	Benton	199.5	29.3	2009
Fowler Ridge Wind Farm II-B	Benton	150.0	0	See note 2
Fowler Ridge Wind Farm III	Benton	99.0	14.6	2009
Hoosier Wind Farm	Benton	106.0	15.6	2009
Meadow Lake Wind Farm I	White	199.7	29.4	2009
Meadow Lake Wind Farm II	White	99.0	14.6	2010
Meadow Lake Wind Farm III	White	103.5	15.2	2010
Meadow Lake Wind Farm IV	White	98.7	14.5	2010
Meadow Lake Wind Farm V	White	100.8	0	See note 3
Spartan Wind Farm	Newton	101.0	0	See note 2
Wildcat Wind Farm I	Madison/Tipton	100.0	0	See note 4
TOTAL		1,789.0	196.6	

Note 1: Assumes 14.7% of nameplate capacity (Midwest ISO wind capacity credit) will be available during summer peak.
Note 2: Construction has not begun.
Note 3: Approximately one mile of access roads have been completed. Construction is currently suspended.
Note 4: Construction has begun and the expected completion date for the wind farm is December 31, 2012.

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[12]Nameplate capacity is the intended full–load sustained output of a facility.

- Biomass Generation -

Biomass generally consists of: 1) woody residues from forest management activities and the pulp and paper industry; 2) municipal solid waste such as waste paper, cardboard, wood waste and yard cuttings; and 3) agriculture crop residues and animal waste. The decomposition of biomass is what produces fuel, such as landfill gas and coal bed methane. Landfill gas is the primary biomass fuel used to generate electricity in Indiana and is more fully discussed in the Natural Gas section of this report. According to IURC data, the current total operating generation capacity from Indiana's landfills for use by Indiana consumers is 47 MW.

- Nuclear Generation -

I&M utilizes the Cook Nuclear Generation Station located in Bridgman, Michigan to serve customers in Indiana and Michigan. Approximately 65% of the Cook plant costs and power generated are allocated to Indiana retail customers. This facility has two pressurized water reactors: Unit 1, which has a nameplate capacity of 1,048 MW and Unit 2, which has a nameplate capacity of 1,107 MW. To extend the life of these units, I&M will need to implement a systematic replacement plan involving many of the plant's parts, some of which are no longer commercially available. To begin this process, I&M filed a petition with the Commission on April 13, 2012 requesting approval for its Life Cycle Management Project.[13] The cost estimate for the project is $1.17 billion, with an estimated completion date in 2018. Hearings on the project are set to begin mid-October.

Pricing and Economics

Indiana's regulatory statutes include adjustable rate mechanisms (trackers) for certain expenses and capital investments. Tracking mechanisms provide timely recovery of specifically-defined costs, compared to recovery as the result of a rate case.

Adjustable Rate Mechanisms (Trackers)

An expense tracker allows retail rates to be adjusted outside the context of a base rate case to reflect changes in operating expenses excluding a return on such expenses. Recovery of expenses

[13]Cause No. 44182

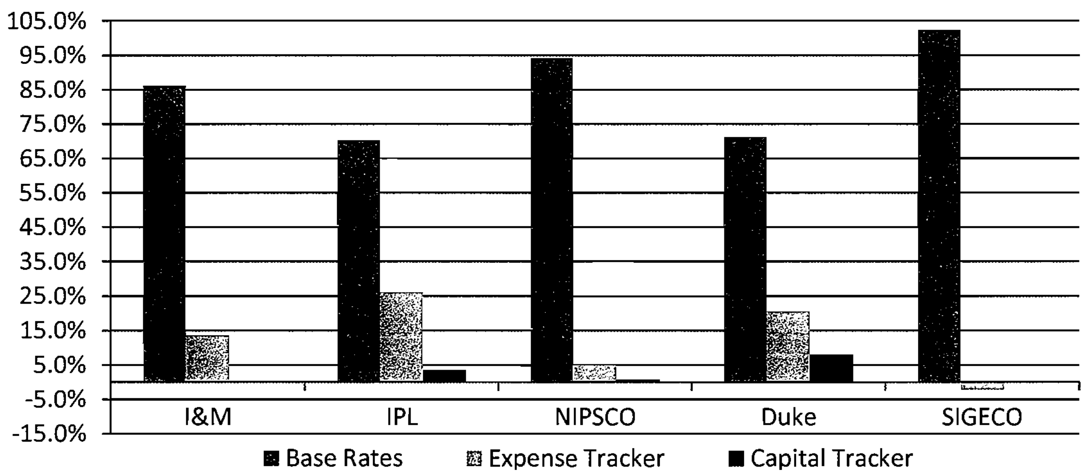
that are characterized as largely outside the utility's control, variable, and materially significant is the intended goal of such trackers. Examples of expense trackers include fuel adjustment and RTO charges. By comparison, a capital investment tracker allows a utility to reflect certain clean coal and energy generation capital costs in its rate base and to reflect the associated return on such investment in retail rates outside a base rate case. A capital investment tracker reduces the lag time between when capital expenditures are made and cost recovery for the utility begins. Credit rating agencies typically view such trackers favorably. Capital trackers have most commonly been utilized by utilities to support major investments in upgrading coal generation plants to comply with increasingly stringent environmental regulations.

Indiana's regulatory statutes include adjustable rate mechanisms (trackers) as an integral part of regulation. Expenses that are characterized as largely outside the utility's control, variable, and materially significant are the intended goals of such trackers.

Chart 4 shows a breakdown of how base rates, expense adjustments, and capital adjustments contribute to a residential customer's bill for each of Indiana's electric IOUs. The relative weighting of these elements varies in part due to the magnitude of a company's construction program and how much time has elapsed since its last base rate case.

Chart 4

Residential Bill Components for the Investor-Owned Utilities



The fuel adjustment clause (FAC) has existed in Indiana for more than three decades and tracks a utility's largest variable operating expense, which is fuel. Other expenses tracked have expanded in recent years to include demand-side management programs; emission allowances; purchased power capacity; clean coal technology operation and maintenance; and MISO/PJM management expenses. Direct pass-through of expense or revenue reflects current conditions in retail rates in a more timely manner than traditional base rate case regulation. The pass-through of unpredictable revenues and expenses to ratepayers also reduces volatility in the utility's earnings and may enhance the utility's credit rating. Expense trackers have historically been accepted as fair and reasonable adjustments to utility base rates by most stakeholders, largely serving as a protection against variable cost fluctuations for extremely volatile expenses. Capital trackers are more controversial and have enabled rates to increase, sometimes substantially, outside a full rate review of all expenses.

Modernization and Efficiency

Even though the majority of Indiana's electric needs are met through coal-fired generation owned by the utilities, renewable initiatives, energy efficiency, and demand response programs are also being developed to enhance the value of Indiana's energy services.[14]

Net Metering

Net metering is a service offering that allows customers to supplement their electric usage and cut costs by installing renewable energy facilities such as wind turbines or solar panels, while relying on the electric utility as a back-up provider. If the amount of electricity the customer receives from the utility is greater than the amount delivered to the utility, the difference is charged to the customer. If the amount the customer received from the utility is less than the amount delivered to the utility, the customer receives a credit on the next bill for the difference.

Making the Grade in 2011

Freeing the Grid, an annual report published by the Network for New Energy Choices and The Vote Solar Initiative, highlighted the recent rulemaking by awarding the IURC a "B" grade. From 2007 to 2009, the grade was an "F," and in 2010, it was a "D." The grade improvement ultimately earned Indiana the title of "Most Improved," according to the news release issued by the report's publishers.

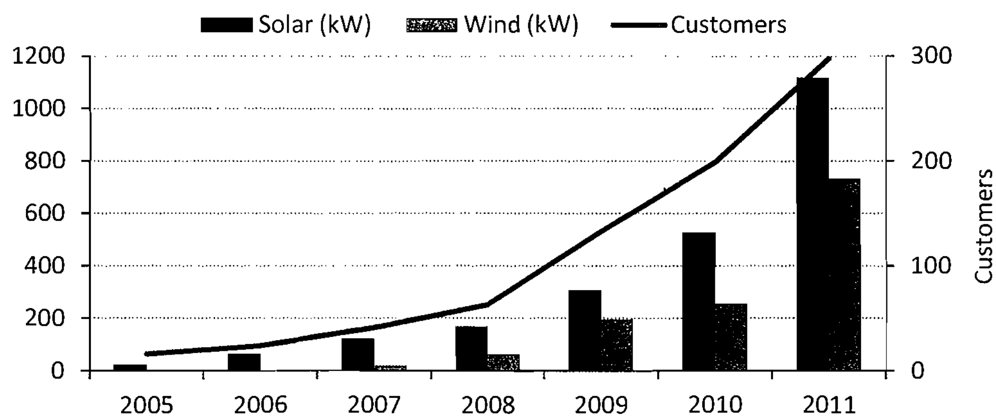
Source:
www.newenergychoices.org/index.php?page=nm_release2011&sd=nm

[14] Energy efficiency refers to measures or technologies that reduce the consumption of energy while demand response resources refer to measures, technologies, or incentives and pricing programs that reduce or curtail load during peak periods.

Two years ago, the Commission started the formal rulemaking process to update the net metering rule, which became effective in July 2011. As a result, net metering is now available to all customer classes, and energy production facilities have a maximum capacity of 1 MW. Additionally, a utility may limit the total capacity under the net metering tariff to 1% of its most recent summer peak load. In 2011, participation in net metering grew 50%, from 199 net metering customers in 2010 to 298 customers last year. Total capacity increased as well by 130% in that same period. This growth is illustrated in Chart 5.

Chart 5

Net Metering Capacity (kW) and Participation in Indiana
2005 to 2011



Feed-in Tariffs

Small scale renewable energy technologies often initially require subsidies to compete with traditional generation resources that burn coal or gas. Therefore, many utilities, with the support of their regulators, are encouraging the development of renewable technologies that use solar, wind, and/or biomass to produce energy by offering to buy energy generated by customer-owned facilities at prices that make the projects economically viable.

Unlike a traditional utility tariff, which specifies the price at which a ratepayer may purchase energy, a feed-in tariff specifies the price at which a utility will purchase energy generated from qualified, customer-owned facilities. Feed-in rates differentiate between technologies and unit size so as to not encourage one renewable technology to the detriment of another. The cost of the energy purchased under a feed-in tariff is recovered from the utility's ratepayers in a manner similar to how fuel expenses are recovered. By setting an appropriate purchase price for feed-in technologies, a balance can be struck between the need for renewables and cost increases to customers.

IPL[15] and NIPSCO[16] currently offer feed-in tariffs at rates up to 30¢ per kWh for solar power and up to 17¢ per kWh for wind power. Both programs specify a minimum individual project size (capacity), a maximum aggregate capacity available under the tariffs, and a maximum contract term of 15 years. IPL's feed-in tariff offer expires in early 2013, and NIPSCO's offer expires at the end of 2013. However, based on recent correspondence with the Commission, IPL plans to discontinue its feed-in tariff program. A sampling of the contracts approved by or pending before the Commission are shown in Table 4.

Table 4

Feed-In Renewable Power Production Contracts

Customer	Year	Location	Utility	Source	Capacity (kW)	Est. Production (Annual MWh)
The Time Factory	2010	Indianapolis	IPL	Wind	50	14
U.S. GSA (Fort Harrison)	2011	Indianapolis	IPL	Solar	2,012	2,289
Bio Town Ag	2011	N. Indiana	NIPSCO	Biomass	NA	NA
Energy Solutions	2011	Indianapolis	IPL	Solar	90	124
L&R Housing	2011	Indianapolis	IPL	Solar	58	76
Various Individuals	2011	N. Indiana	NIPSCO	Sm. Solar	93	122
Melloh Enterprises	2012	Indianapolis	IPL	Solar	39	47
Indianapolis Airport Authority	Pending	Indianapolis	IPL	Solar	9,800	18,320

Plug-in Electric Vehicle Development

Widespread deployment of plug-in electric vehicles[17] (PEVs) can offer significant energy security, environmental, and economic benefits. However, PEVs can pose potential challenges

[15]Cause No. 44018
[16]Cause No. 43922
[17]A plug-in electric vehicle refers to plug-in hybrid electric vehicle, as well as a fully-electric vehicle.

to the grid, utilities, and ultimately ratepayers, which will become clearer as national and local pilot programs advance.

Pilot programs are already underway in Indiana for NIPSCO, IPL, and DEI. NIPSCO is offering 250 of its residential customers an instant credit of up to $1,650 toward the installation of PEV charging equipment. It is also offering free charging between 10:00 p.m. and 6:00 a.m. daily as part of its "IN-Charge Electric Vehicle Program."

IPL, on the other hand, began offering a time-of-use rate to PEV owners in 2011. The rate on a summer weekday afternoon is five times greater than the rate at night, to encourage customers to charge their PEVs during non-peak hours.[18] IPL is providing 150 residential customers with free charging equipment at their homes, which 30 customers took advantage of in 2011. The company also installed 14 public charging stations at four locations in Indianapolis in the last year. These stations allow customers to charge their PEVs for an unlimited amount of time for $2.50.

DEI's "Project Plug-In" is available to customers in Indiana who are purchasing PEVs to upgrade to a 240-volt, Level 2 charging station, enabling them to charge their vehicles faster. The programs provides up to $1,000 in installation costs for residential customers and up to $1,500 for commercial customers.

Energy Efficiency Programs

Implementation of the Commission's demand side management (DSM) directives swung into high gear this past year. The commercial operation of Energizing Indiana launched in January 2012. According to GoodCents, the third-party administrator for the programs, more than 6,663 home energy assessments have been conducted thus far, which has amounted to more than 7,119,144 kWh saved in Indiana.[19]

ENERGIZING INDIANA
Together we'll do powerful things.

The collaborative marketing effort among the utilities creates efficiencies and gives a consistent look and feel to the individual utility programs. The Demand Side Management Coordination Committee (DSMCC) oversees the implementation of

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[18] 75% of the electricity demanded by IPL's residential EV customers in 2011 occurred during off-peak hours.
[19] www.in.gov/oucc/files/EI_6monthupdate_release_7-23-12.pdf

the five DSM Core programs, which are shown in Table 5. DSMCC members include: the utilities, the Citizens Action Coalition of Indiana, the Indiana Industrial Group, and the OUCC.

Supplementing the Core programs are service territory-specific Core Plus programs. These programs differ from Core programs in that they are utility-led but monitored by oversight boards similar to the DSMCC. The Core Plus programs complement and supplement the Core programs to help the utilities achieve the annual and long-term energy savings targets mandated by the Commission. In order to monitor the effectiveness of the programs and the progress of the utilities in achieving the specified goals, the utilities are required to file three-year plans and annual progress reports discussing the statewide savings goals. The next three-year plan is anticipated by July 1, 2013.

Table 5

DSM Core Programs Offered by Indiana Electric Utilities

Program Description	Target Audience	How does the program save customers money?
Home Energy Assessment	Residential	Delivers an energy advisor to the home to educate the customer on areas that would benefit from conservation practices (e.g., heating, ventilation, air conditioning) and recommend appropriate measures to produce long-term, cost-effective energy savings.
Lighting	Residential	Replaces traditional light bulbs in the home with high-efficiency light bulbs by working directly with local retailers to offer discounts on qualified ENERGY STAR® lighting.
Home Weatherization	Income qualified residential	Delivers an energy advisor to the home who completes an energy savings assessment to pinpoint where the facility is losing the most energy. The advisor uses a scientific approach to determine a wide range of improvements so that energy is used more efficiently and effectively.
Schools Program	Community schools	Students at participating schools receive classroom curriculum education and take-home efficiency kits that include energy saving devices designed to open students' and parents' eyes to the energy-saving potential of simple, easy-to-implement conservation practices.
Prescriptive Rebates	Commercial and industrial businesses	Provides rebates for businesses to lower electricity use and decrease their overall energy costs. It also encourages vendors and contractors to actively promote and install energy-efficient technologies for their business customers.

As of 2011, all five IOUs have Core Plus programs, which include, but are not limited to, custom incentive programs for new construction and technical assistance for industrial process improvements that aid energy efficient operations. An example of a non-residential Core Plus program is Vectren's Commercial and Industrial New Construction Program. This program promotes energy efficient designs with the goal of developing projects that are 30% more efficient than current Indiana building code. An example of a residential Core Plus program is IPL's Residential Multi-Family Direct Install offering, which is designed to reduce the consumption of electricity by installing compact fluorescent lights and low-flow water devices to reduce hot water usage. This program is delivered in partnership with Citizens Gas.

Demand Response Programs

Demand response programs have a long history in the electric industry, and the types of programs available have expanded in recent years. The U.S. Department of Energy defines demand response, in part, as "changes in electric usage by end-use customers from their normal consumption patterns in response to changes in the price of electricity over time."

Traditionally, Indiana utilities have relied upon interruptible load contracts with large industrial customers to reduce the need for utility-owned generation capacity. In other words, if the customer agrees to reduce its demand during peak use times, it will get a better overall rate. This arrangement is often called demand response. In response to utility requests, increased use has also been made of appliance demand response programs, with emphasis on the control of air conditioners during times of peak load. Indiana utilities have 1,275 MW of load reduction via demand response available for the summer 2012, with a large majority of this coming from interruptible load contracts with large industrial customers. Demand response programs emphasize the relationship between customer consumption patterns during peak periods in response to high wholesale market prices or when system reliability is at risk. Indiana is among many states working to increase cost-effective customer participation in demand response programs.

Indiana utilities have 1,010 MW of interruptible load and 103 MW of air conditioner load control. Having these contracts allows them to manage load on peak demand days.

On July 28, 2010, the Commission issued a decision in Cause No. 43566, an investigation into the benefits of customer participation in demand response programs offered by PJM and the MISO. In the decision, the Commission expressed support for efforts to increase demand response at the wholesale level and stated that RTO demand response programs must work in tandem with and not in contravention to Indiana's utility regulatory framework. Consequently, all five IOUs put programs in place to enable customer participation in the demand response programs offered by the RTOs. In order to track the effectiveness of these programs, each utility must file a report with Commission describing its experience, the costs and expenses associated with the tariffs, and the administrative charges being collected.

Indiana Electricity Outlook

The State Utility Forecasting Group (SUFG), an independent research entity based at Purdue University, has been tasked with identifying and forecasting Indiana's resource needs. According to the SUFG's 2011 forecast,[20] the state will need approximately 2,600 MW of additional resources (all types of generating capacity, demand response, efficiency, and transmission to import power) by 2020 to meet expected load growth and maintain a 15.8% reserve margin.[21] The forecast also projects that electricity usage will grow at an annual rate of 1.30% over the 20-year forecast and that peak demand will grow at an annual rate of 1.28%.[22] This means that utilities must start considering how to meet demand in the short term.

Although the recession may have temporarily slowed the growth of energy and demand, the expectation is that the projected growth rates will resume over the forecast horizon. These projections provide a reasonable basis for estimating future electricity prices for planning purposes, but they do not ensure resource plans obtained at least cost. These projections also do not yet address the effects of potential U.S. EPA environmental regulations, which are expected to require additional environmental controls or the retirement of certain plants where retrofitting is not feasible or economical.

[20] www.purdue.edu/discoverypark/energy/pdfs/SUFG/2009SUFGforecast.pdf
[21] The SUFG used individual utility reserve margins that reflect the planning reserve requirements of the utility's RTO to determine the reserve requirements in the forecast.
[22] Peak demand is the maximum level of electric demand in a specified period.

U.S. EPA Environmental Regulations

Based on preliminary analysis, recent environmental decisions being made at the federal level have the potential to considerably impact the state of Indiana. Given the number of new requirements, the tight timeframes to comply with the regulations, and Indiana's reliance on coal, costs are expected to be significant.

Numerous studies have been conducted on the potential impacts. For example, the SUFG released a study entitled "The Impacts of Federal Environmental Regulations on Indiana Electric Prices" in January 2012. The study analyzed how the Cross State Air Pollution Rule (CSAPR), Mercury and Air Toxics Standards Rule (MATS), greenhouse gas, cooling water, and coal ash regulations would affect Indiana. The SUFG projected that prices would be about 14% higher than a scenario absent U.S. EPA regulations.[23] Another projection is from the MISO, which announced this summer that capital investment of $33 billion will be required to retrofit and/or replace units. It also stated that average energy prices could increase by $5/MWh.[24]

In addition to being concerned about the impact on rates, the Commission is strongly opposed to the U.S. EPA's proposed three-year compliance timeline in the MACT rule. In an August 2011 letter to U.S. EPA Administrator Lisa Jackson, the IURC stated:

> "It would be extremely difficult, if not impossible, for any single utility to complete these requirements within even a four-year timeline. Additionally, the compressed timeline will force utilities to compete against each other for scarce resources further driving up costs that will ultimately be borne by consumers. Our Indiana utilities project that the compressed timeline proposed will inflate costs to twice that of a more reasonable 6-8 year implementation."

[23]Due to the timing and stringency of the regulations, as well as the complexity of modeling the various factors affecting the production, delivery, and consumption of electricity, the SUFG stresses there is considerable uncertainty regarding the exact impact of the regulations.
[24]"Impact of EPA Regulations on Coal-Fired Capacity," Ryan Westphal, Midwest ISO, July 24, 2012

Further detail is provided below about the rules pending at or finalized by the U.S. EPA:

- **Cross State Air Pollution Rule**
  - *Impact:* CSAPR requires power plants in 28 states (including Indiana) to reduce emissions of SO_2 and NOx, to assist states in attaining fine particle National Ambient Air Quality Standards. CSAPR was to replace the Clean Air Interstate Rule (CAIR) on January 1, 2012. CSAPR emission limits and emission allowance trading are more stringent than those in CAIR. However, the U.S. Court of Appeals for the D.C. Circuit stayed CSAPR on December 30, 2011, pending judicial review. Therefore, as of now, CAIR remains in effect.

- **Mercury and Air Toxics Standards Rule**
  - *Impact:* MATS limits mercury, acid gasses, and other toxic pollution emissions from electric generating units with a nameplate capacity greater than 25 MW that burn coal or oil. The rule requires installation of maximum achievable control technology (MACT) and does not include any emission allowance trading mechanism. Compliance with MATS is to begin in March 2015. A one-year extension can be granted by state authorities for units working to install emission controls, and a two-year extension can be granted to units determined to be reliability-critical.

- **Carbon Pollution Standard for New Power Plants Rule** | *Proposed on March 27, 2012*
  - *Impact:* This rule does not apply to plants currently operating or newly permitted plants set to begin construction within 12 months of March 27, 2012. The U.S. EPA has stated the CO_2 emission standard can be met with new natural gas combined cycle plants or carbon reducing technologies on new coal plants.

- **Cooling Water Intake Rule** | *Proposed on April 20, 2011*
  - *Impact:* Pursuant to standards under 316(b) of the Clean Water Act, this rule would cover thermal discharges from power plants. The U.S. EPA is required to finalize this rule by July 27, 2013.

- **Coal Combustion Residual (CCR) Rule** | *Proposed on June 21, 2010*
    - *Impact:* This rule would regulate the handling of coal ash. The primary difference between the CCR rules proposed is whether to regulate coal ash as a hazardous or non-hazardous waste under the Resource Conservation and Recovery Act. A final rule is expected in 2013.

Stricter ambient air quality standards for ozone and particulate matter, which are implemented at the state level, could also result in tighter limits under CSAPR and through compliance enforcement. The U.S. EPA has stated it will need until at least August 15, 2013 to finalize new standards for particulate matter, and that it will complete its on-going five-year review in 2013.

Reactions to U.S. EPA Regulations

Before any of the rules were finalized or proposed, Indiana's electric IOUs already had environmental compliance plans in place and clean coal technology installed on their power plants to comply with existing U.S. EPA regulations. However, the new rules (especially MATS) are causing several IOUs to seek approval for additional clean coal technology in order to comply with the extremely tight timeframes associated with the implementation. The following table summarizes the impact of the new rules thus far on the IOUs and the actions they plan to take. The table also notes pollution control technology plans alluded to in the IOUs' 2011 IRPs.[25]

Table 6

Indiana IOUs' Recent Clean Coal Technology Actions, Announcements, and Scheduled Retirements Through 2020

Utility	Pollution Control Property	Retirements
Duke Energy	Cause No. 43873 – In September 2010, a CPCN was granted for dry sorbent injection technology at Gallagher Units 2 and 4, estimated to cost approximately $16 million. 2011 IRP contains major environmental control upgrades in 2015 (Gibson Units 3-5) and 2017 (Cayuga Units 1-2 and Gallagher Units 2 and 4).	2012 - Gallagher Units 1 and 3 (280 MW) 2015 – Wabash River Units 2-6 (668 MW)

[25]Much of the clean coal technology referenced in the 2011 IRPs has not been filed for yet, and plans could change. Cost recovery from customers related to clean coal technology is only permitted if approved through a docketed proceeding by the Commission. Also, retirements listed are not necessarily due to new environmental regulations.

I&M	Cause No. 44033 (pending) – CPCN request for flue gas desulfurization and selective catalytic reduction systems at one of the Rockport units, estimated to cost approximately $1.4 billion. 2011 IRP indicated additional environmental controls will likely be needed at the other Rockport unit and at Tanners Creek Unit 4 between 2013 and 2016.	2014/15-Tanners Creek Units 1-3 (485 MW)
IPL	2011 IRP indicated multiple controls will be needed at Petersburg Units 1-4 and Harding St. Unit 7.	2014 – Eagle Valley Unit 3 (43 MW) 2015 – Eagle Valley Units 1, 2, 4-6 (298 MW) and Harding St. Units 3-6 (282 MW)
NIPSCO	Cause No. 44012 (some requests still pending) – CPCN request for environmental controls at Schahfer Units 14, 15, 17, and 18, Michigan City Unit 12, and Bailly Units 7 and 8, estimated to cost approximately $789 million. 2011 IRP indicates additional environmental controls will likely be needed at multiple coal units.	2013 – Mitchell 9A (17 MW)
SIGECO	No additional environmental controls are currently planned for.	None currently planned

Source: Utility filings and 2011 Integrated Resource Plans (IRP)

Regulatory Development

Independent Audit due to Manhole Explosions

Following a series of manhole explosions in early 2011, the IURC held several meetings with IPL to address public concerns about the safety of the downtown underground network. After hearing from the utility, the Commission determined additional analysis was necessary and proceeded with selecting a consultant (at IPL shareholders' expense) to audit the electrical network. The audit revealed that while the underground network is well designed, the condition of the system is in need of improvement. At the request of the Commission, the auditor made a number of recommendations to improve the maintenance of the underground system. The utility worked with the auditor to develop a plan to implement the auditor's recommendations last year. Regular reports are submitted to the agency on the status, as well as any incidents involving the electrical network.

Voluntary Clean Energy Portfolio Standards Program

Senate Enrolled Act 251 (P.L. 150-2011) required the Commission to conduct a rulemaking to implement the state's Voluntary Clean Energy Portfolio Standard Program and allowed for an emergency rule in order to meet the required effective date of January 1, 2012. An extensive stakeholder process resulted in a proposed rule, which was approved as an emergency rule by the Commission on December 22, 2011, and which has been made permanent through a final rulemaking, effective August 8, 2012. The CHOICE (Comprehensive Hoosier Option to Incentivize Cleaner Energy) Rule implements the statutory program designed to encourage a participating utility to reach a clean energy target of 10% of its total electricity supply by 2025. There are also interim targets of 4% for the period 2013 through 2018 and then 7% for 2019 through 2024. The rule recognizes historical efforts in meeting the goal while limiting the incentive of an enhanced return only to efforts in direct response to the legislation.

Tree-Trimming Rule

Since the IURC issued a decision in 2010 related to its tree-trimming investigation, the agency has undertaken a rulemaking to formulate new rules regarding issues such as customer notification, education, dispute resolution, and tree replacement, all of which are detailed below. The rule provides a framework for utilities' tree and vegetation management programs that balances their need to ensure reliability of service with the interests of their customers in preserving their landscapes. Rather than having each utility create its own set of guidelines, the rule standardizes the tree trimming process for DEI, I&M, IPL, NIPSCO, and Vectren.

Issue	Changes due to the rule
Trimming Standards	Utilities must abide by nationally recognized best practices, such as the ANSI A300 standards.
Notification	Customers will receive two notices at least two weeks before trimming is scheduled; notice will also be given 60 days prior to line upgrades.
Education	By providing details about the tree trimming process and why it is needed, concerns can be addressed before trimming takes place.
Dispute Resolution	If a customer objects to the proposed plan within five days of receiving notice, the utility must hold off on trimming until the issue is addressed by the utility or the IURC's Consumer Affairs Division.
Property Rights	The rule did not change existing property rights; however, it reiterated utilities cannot trim outside an easement or right-of-way without customer consent.
Tree Replacement	In cases where a tree must be removed, an agreement may be reached in which the customer is compensated.

When drafting the rules, the IURC incorporated comments from a variety of stakeholders, including consumer groups like the Indiana Tree Alliance, private citizens, the OUCC, and the utility companies. Additionally, the IURC traveled to six locations during the investigation in order to collect testimony from customers in the different service territories. The locations visited included: Evansville, Fort Wayne, Indianapolis, Merrillville, Muncie, and Seymour. This rule has been submitted to the Indiana Attorney General and the Governor for approval. Thereafter, it will be submitted to the Indiana Legislative Services Agency (LSA) for publication in the Indiana Register. It will take effect 30 days after being filed with the LSA.

IV. Appendices

Appendix A – Revenues for Jurisdictional Electric Utilities

Rank	Utility Name	Operating Revenues*	% of Total Revenue
1	Duke Energy Indiana, Inc.	$ 2,618,717,655	31.14%
2	Indiana Michigan Power Co.	2,128,984,087	25.31%
3	Northern Indiana Public Service Co.	1,428,474,288	16.98%
4	Indianapolis Power & Light Co.	1,171,921,385	13.93%
5	So. Indiana Gas & Electric Co. d/b/a Vectren	636,114,606	7.56%
6	Northeastern REMC	90,582,100	1.08%
7	Richmond Municipal	85,125,858	1.01%
8	Anderson Municipal	73,287,311	0.87%
9	Mishawaka Municipal	50,153,709	0.60%
10	Crawfordsville Municipal	32,188,258	0.38%
11	Auburn Municipal	27,910,441	0.33%
12	Frankfort Municipal	26,762,193	0.32%
13	Lebanon Municipal	17,561,955	0.21%
14	Columbia City Municipal	10,158,777	0.12%
15	Tipton Municipal	9,819,224	0.12%
16	Knightstown Municipal	2,234,138	0.03%
17	Kingsford Heights Municipal	619,740	0.01%
18	Greenfield Mills, Inc. Power & Light	23,481	0.00%
	Total Revenue	$ 8,410,639,206	100.00%

*Year ending December 31, 2011

Appendix B – Jurisdiction over Municipal Electric Utilities

Municipal Utilities under the IURC's Jurisdiction		
Anderson	Frankfort	Mishawaka
Auburn	Kingsford-Heights	Richmond
Columbia City	Knightstown	Tipton
Crawfordsville	Lebanon	

Municipal Utilities Withdrawn from the IURC's Jurisdiction (IC § 8-1.5-3-9)		
Advance	Flora	Peru
Argos	Frankton	Pittsboro
Avilla	Garrett	Rensselaer
Bainbridge	Gas City	Rising Sun
Bargersville	Greendale	Rockville
Bluffton	Greenfield	Scottsburg
Boonville	Hagerstown	South Whitley
Bremen	Huntingburg	Spiceland
Brooklyn	Jamestown	Straughn
Brookston	Jasper	Tell City
Cannelton	Ladoga	Thorntown
Centerville	Lawrenceburg	Troy
Chalmers	Lewisville	Veedersburg
Coatesville	Linton	Walkerton
Covington	Logansport	Warren
Darlington	Middletown	Washington
Dublin	Montezuma	Waynetown
Dunreith	New Carlisle	Williamsport
Edinburgh	New Ross	Winamac
Etna Green	Paoli	
Ferdinand	Pendleton	

Appendix C – Jurisdiction over Rural Electric Membership Cooperatives

REMCs under the IURC's Jurisdiction		
Northeastern REMC		

REMCs Withdrawn from the IURC's Jurisdiction (IC § 8-1-13-18.5)		
Bartholomew County REMC	Jasper County REMC	South Central Indiana REMC
Boone County REMC	Jay County REMC	Southeastern Indiana REMC
Carroll County REMC	Johnson County REMC	Southern Indiana REC
Ninestar Connect	Kankakee Valley REMC	Steuben County REMC
Clark County REMC	Kosciusko County REMC	Tipmont REMC
Daviess-Martin County REMC	Lagrange County REMC	United REMC
Decatur County REMC	Marshall County REMC	Utilities District of W. Indiana
Dubois REC	Miami-Cass REMC	Wabash County REMC
Fulton County REMC	Newton County REMC	Warren County REMC
Harrison County REMC	Noble County REMC	White County REMC
Hendricks County REMC	Orange Co. REMC	Whitewater Valley REMC
Henry County REMC	Parke County REMC	WIN Energy REMC
Jackson County REMC	Rush Shelby County REMC	

Appendix D – Residential Electric Bill Survey (July 1, 2012 Billings)

	← kWh Consumption →			
Municipal Utilities	**500**	**1000**	**1500**	**2000**
Anderson Municipal	$53.97	$98.10	$142.22	$184.14
Auburn Municipal	$37.29	$69.58	$101.87	$134.16
Columbia City Municipal	$54.03	$100.01	$145.98	$191.96
Crawfordsville Municipal	$55.76	$96.51	$137.27	$178.02
Frankfort Municipal	$48.46	$86.64	$124.82	$158.71
Kingsford Heights Municipal	$49.80	$96.10	$142.40	$188.70
Knightstown Municipal	$51.34	$98.06	$140.49	$182.92
Lebanon Municipal	$48.16	$89.54	$127.13	$164.71
Mishawaka Municipal	$46.21	$82.42	$118.64	$154.85
Richmond Municipal	$60.21	$104.88	$149.54	$192.48
Tipton Municipal	$48.46	$90.92	$131.09	$171.26
Cooperative Utilities	**500**	**1000**	**1500**	**2000**
Jackson County REMC	$66.63	$115.26	$163.89	$212.53
Northeastern REMC	$66.75	$115.04	$163.34	$206.13
Investor-Owned Utilities	**500**	**1000**	**1500**	**2000**
Duke Energy Indiana	$63.20	$105.38	$142.69	$180.00
Indiana Michigan Power d/b/a AEP	$46.11	$85.41	$124.72	$164.03
Indianapolis Power & Light Co.	$58.61	$94.73	$130.84	$166.95
Northern Indiana Public Service Co.	$63.09	$115.17	$167.26	$219.34
So. Indiana Gas & Electric Co. d/b/a Vectren	$80.14	$149.28	$218.42	$287.56
Average for 2012 Survey	$55.45	$99.61	$142.92	$185.47
Average for 2011 Survey	$53.96	$96.86	$138.91	$180.21
% Change	2.77%	2.84%	2.89%	2.92%

Appendix E – Residential Electric Bill Survey (July 1, 2012 Billings)

Year-to-Year Comparison for 1000 kWh

Municipal Utilities	2011	2012	% Change
Anderson Municipal	$98.10	$93.92	4.45%
Auburn Municipal	$69.58	$67.63	2.87%
Columbia City Municipal	$100.01	$98.41	1.62%
Crawfordsville Municipal	$96.51	$90.95	6.12%
Frankfort Municipal	$86.64	$82.79	4.66%
Kingsford Heights Municipal	$96.10	$94.82	1.35%
Knightstown Municipal	$98.06	$94.25	4.05%
Lebanon Municipal	$89.54	$88.18	1.54%
Mishawaka Municipal	$82.42	$84.45	-2.40%
Richmond Municipal	$104.88	$89.16	17.63%
Tipton Municipal	$90.92	$88.32	2.95%
Municipal Averages	$92.07	$88.44	4.10%

Cooperative Utilities	2011	2012	% Change
Jackson County REMC	$115.26	$113.02	1.99%
Northeastern REMC	$115.04	$114.06	0.86%
Cooperative Averages	$115.15	$113.54	1.42%

Investor-Owned Utilities	2011	2012	% Change
Duke Energy Indiana	$105.38	$104.61	0.74%
Indiana Michigan Power d/b/a AEP	$85.41	$84.65	0.90%
Indianapolis Power & Light Co.	$94.73	$88.86	6.61%
Northern Indiana Public Service Co.	$115.17	$110.37	4.35%
So. Indiana Gas & Electric Co. d/b/a Vectren	$149.28	$155.10	-3.75%
Investor-Owned Averages	$109.99	$108.72	1.18%

Appendix F – Residential Electric Bill Comparison (July 1, 2012 Billings)

5-Year and 10-Year Comparisons for 1000 kWh

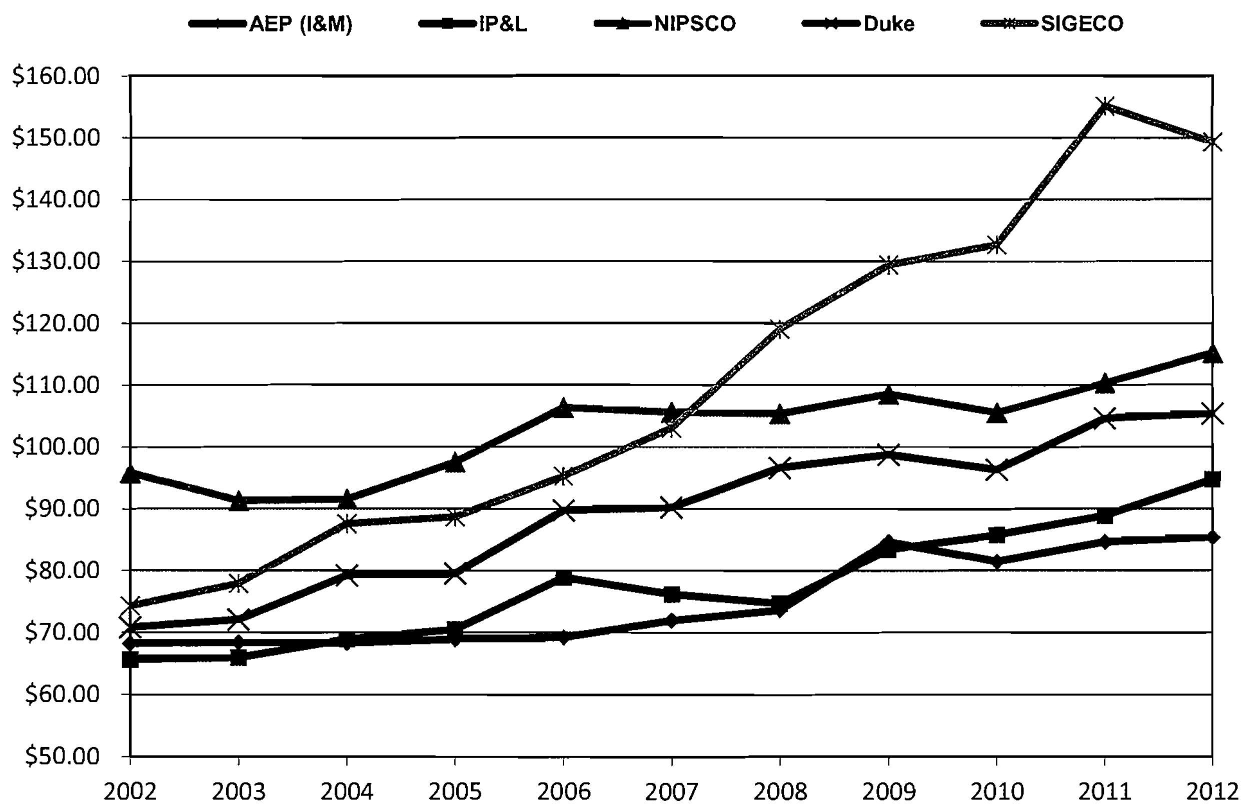
Utility	5-Year Change		10-Year Change	
American Electric Power Co. (I&M)	$13.45	18.7%	$17.18	25.2%
Indianapolis Power & Light (IP&L)	$18.53	24.3%	$29.11	44.4%
Northern Indiana Public Service Co. (NIPSCO)	$9.56	9.1%	$19.32	20.2%
Duke Energy Indiana (DEI)	$15.18	16.8%	$34.57	48.8%
Southern Indiana Gas & Electric Co. (SIGECO)	$46.26	44.9%	$75.01	101.0%

Note:

Individual company increases for rates and charges vary widely due to different levels of capital investments for environmental compliance, in addition to the timing of rate cases.

10-Year Comparison

Investor-Owned Utility Residential Electric Bills at 1,000 kWh



2012 Natural Gas Report

Table of Contents

I. Executive Summary

The Natural Gas section of the Regulatory Flexibility Report discusses key issues facing the industry. These topics include market volatility, the discovery and extraction of shale gas, and pipeline safety programs at both the federal and state level. It also highlights actions taken by the Commission to address specific challenges associated with these topics.

Market Volatility

The commodity cost of natural gas continues to fluctuate, although prices have decreased dramatically since their peak in 2009. Residential customers in Indiana on average experienced a decrease in their bills in 2012. In 2011, a residential customer using 200 therms would have received a bill for $189.11. In 2012, this bill would have decreased to $174.37. Both the 2011 and 2012 bills are lower than the five-year industry average of $211.69, which shows how much the cost of natural gas has decreased. This is because supply and demand are the primary drivers affecting pricing. So, with abundant supply and stable demand, the commodity cost of natural gas has decreased in the U.S.; however, it is uncertain how long it will last.

Pricing is also dependent on weather, advancements in technology, and other factors that are difficult to quantify or predict, such as government actions and regulations. During this past winter, temperature levels were higher than normal, which resulted in customers using less natural gas. Less use contributed to the existing supply glut, which further drove down prices. However, the market could adjust if low prices lead to an increase in demand. For example, electric utilities are now able to take advantage of the low cost of natural gas as an alternative to coal. Depending on the extent to which plants are converted, this may decrease high supply levels and create upward price pressures.

Shale Gas

The discovery and extraction of shale gas is the chief reason for the increase in supply. Shale is recovered through a process called hydraulic fracturing or fracking, which is a technique used to create fractures that extend from the well bore into rock or coal formations so that the gas may travel more easily from the rock pores to the production well. According to the Energy Information Administration, there is enough natural gas to last 90 years at the current U.S.

consumption rate. However, environmental concerns about fracking have led to increased oversight and new regulations. Depending on how these regulations evolve over time and whether they become more stringent, the price of natural gas may increase. A U.S. Environmental Protection Agency report on the environmental impacts of fracking is scheduled for release in 2014. It is expected to provide additional insight into the concerns raised and may potentially shape future policy.

Pipeline Safety Programs

Although pricing has dominated the natural gas conversation in recent years, pipeline safety is now also at the forefront given the findings from the San Bruno pipeline explosion that occurred in 2009. The findings state that the California Public Utilities Commission failed to identify inadequacies in the pipeline operator's integrity managements plans. While Indiana has historically received high marks for its pipeline safety program, the IURC's Pipeline Safety Division responded to these findings by reviewing records and pipeline integrity procedures. However, the single greatest threat to the pipeline system is still third-party damage. Since the "Call Before You Dig" law was passed in 2009, there have been more than 2,600 possible violations reported. The law requires anyone undertaking a digging project to call 811 in order to have the utility lines marked. If a homeowner, excavator, or operator fails to do so and hits a line, they can be held responsible if a violation is found.

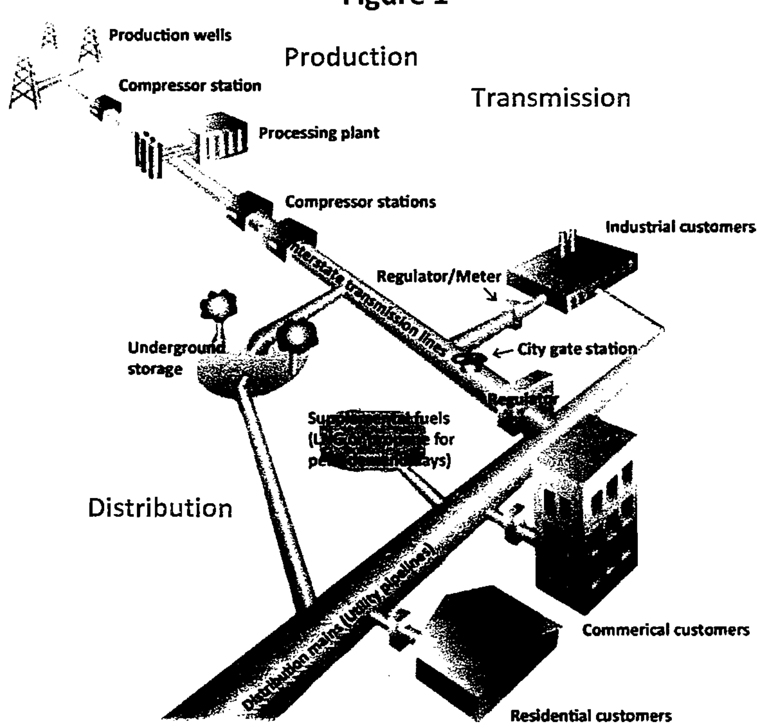
II. Overview

Industry Structure

The natural gas industry consists of three systems: producers (the gathering system), interstate and intrastate pipelines (the transmission system), and local distribution companies or LDCs (the distribution system), all of which are illustrated in Figure 1. Interstate pipelines, regulated by the Federal Energy Regulatory Commission (FERC), carry natural gas across state boundaries; intrastate pipelines, regulated by state commissions, carry natural gas within state boundaries. States, including Indiana, that have certified pipeline safety programs are delegated federal authority by the U.S. Department of Transportation to conduct inspections, investigate incidents, and enforce state and federal safety regulations.

In Indiana, the Indiana Utility Regulatory Commission (Commission or IURC) regulates the rates, charges, and terms of service for intrastate pipelines and LDCs. Through its Pipeline Safety Division, the Commission enforces state and federal safety regulations for all intrastate natural gas facilities. Additionally, the Commission reviews gas cost adjustments (GCAs), financial arrangements, service territory requests, and conducts investigatory proceedings. It also analyzes various forms of alternative regulatory proposals, such as rate decoupling, trackers, and customer choice initiatives.

Figure 1



Production Overview

As shown in Figure 1, the production of natural gas begins with raw natural gas extracted at the wellhead, where initial purification occurs before entering the low-pressure, small diameter pipelines of the gathering system. The natural gas is then repurified at a processing plant. Purified natural gas consists of approximately 90% methane, compared to raw natural gas that is generally 70% methane combined with a variety of other compounds. Quality and safety reasons require natural gas to meet certain standards before it is released into the pipeline system.

Transmission System

The transmission system includes interstate and intrastate pipelines that carry gas from producing regions throughout the U.S. to LDCs, industrial consumers, and power generation customers. The vast majority of natural gas consumed in Indiana is from out-of-state production, primarily the Gulf of Mexico. In 2011, approximately 626.7 million dekatherms (Dth)[1] of natural gas was delivered to consumers within the state. Only a small portion of that is produced in Indiana. This illustrates Indiana's dependence on the transmission system to carry natural gas from the gas producing regions of the country into the state.[2]

The vast majority of natural gas consumed in Indiana is from out-of-state production, predominantly the Gulf of Mexico. This illustrates Indiana's dependence on the transmission system to carry natural gas from the gas producing regions of the country into the state.

In Indiana, Heartland Pipeline (Heartland) and the Ohio Valley Hub (OVH) Pipeline are the two intrastate pipelines under the Commission's jurisdiction. The Commission governs these pipelines' operations, services, and rates. Heartland is a 25-mile pipeline running west to east connecting the Midwestern Gas Transmission (MGT) interstate pipeline in Sullivan, Indiana to Citizens Gas' underground storage facility in Greene County. OVH is a 9.2-mile pipeline located in Knox County. It provides connections for

Map 1
U.S. Transmission Lines

[2]www.eia.gov/dnav/ng/ng_sum_lsum_dcu_SIN_a.htm

two interstate pipelines (Texas Gas Transmission and MGT) to the Monroe City Gas Storage Field owned by Vectren.

Distribution System

Gas moves through the transmission system and enters the distribution system, where LDCs deliver gas to their customers on either a bundled basis (i.e., commodity and transportation) or unbundled basis (i.e., the customer buys gas from a producer or marketer and pays the LDC to transport the gas from the city gate[3] to the customer's facilities).

LDCs serve three customer classes: residential, commercial, and industrial. The residential customer class consists of single-family homes and small multi-family dwellings that generally use the LDCs for bundled services. The commercial customer class typically consists of office, retail, and wholesale facilities in addition to larger residential complexes. The industrial customer class consists of large manufacturers and processors who typically use the highest volumes of gas both individually and collectively. Both commercial and industrial customers may receive bundled service from an LDC or they may purchase gas supplies from independent suppliers and pay the LDCs for transportation service.

The Commission has regulatory authority over 19 natural gas distribution utilities in Indiana with operating revenues totaling $1.8 billion. These utilities maintain plant in service of approximately $4.7 billion and serve roughly 1.7 million customers. Of the regulated utilities, one is a not-for-profit, two are municipalities, and sixteen are IOUs.

The Commission has regulatory authority over 19 natural gas distribution utilities in Indiana with operating revenues totaling $1.8 billion (Appendix A).[4] These utilities maintain plant in service of approximately $4.7 billion and serve roughly 1.7 million customers. Of the regulated utilities, one is a not-for-profit, two are municipalities, and sixteen are investor-owned utilities (IOUs). Citizens Gas (Citizens) and three IOUs, detailed on the following page, represent the four largest natural gas utilities in the state and collectively serve 95% of the gas customers by count. Map 2 shows the service territories of these utilities, as well as other jurisdictional natural gas utilities in Indiana.

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[3]The city gate is the delivery point where the natural gas is transferred from a transmission pipeline to the LDC.
[4]2011 Annual Reports filed with the Commission

- Investor-Owned Utilities -

The three largest IOUs providing gas service in Indiana are Northern Indiana Public Service Company (NIPSCO), Vectren North, and Vectren South. IOUs are for-profit enterprises funded by debt (bonds) and equity (stock).

NIPSCO, a subsidiary of NiSource Inc., is headquartered and based in Merrillville, IN. The natural gas utility serves 691,000 customers in northern Indiana.

Vectren Corporation is headquartered and based in Evansville, IN. The natural gas utility serves 570,000 customers in central and southern Indiana through Vectren North and an additional 110,000 customers in southwestern Indiana through Vectren South.

- Municipally-Owned Utilities -

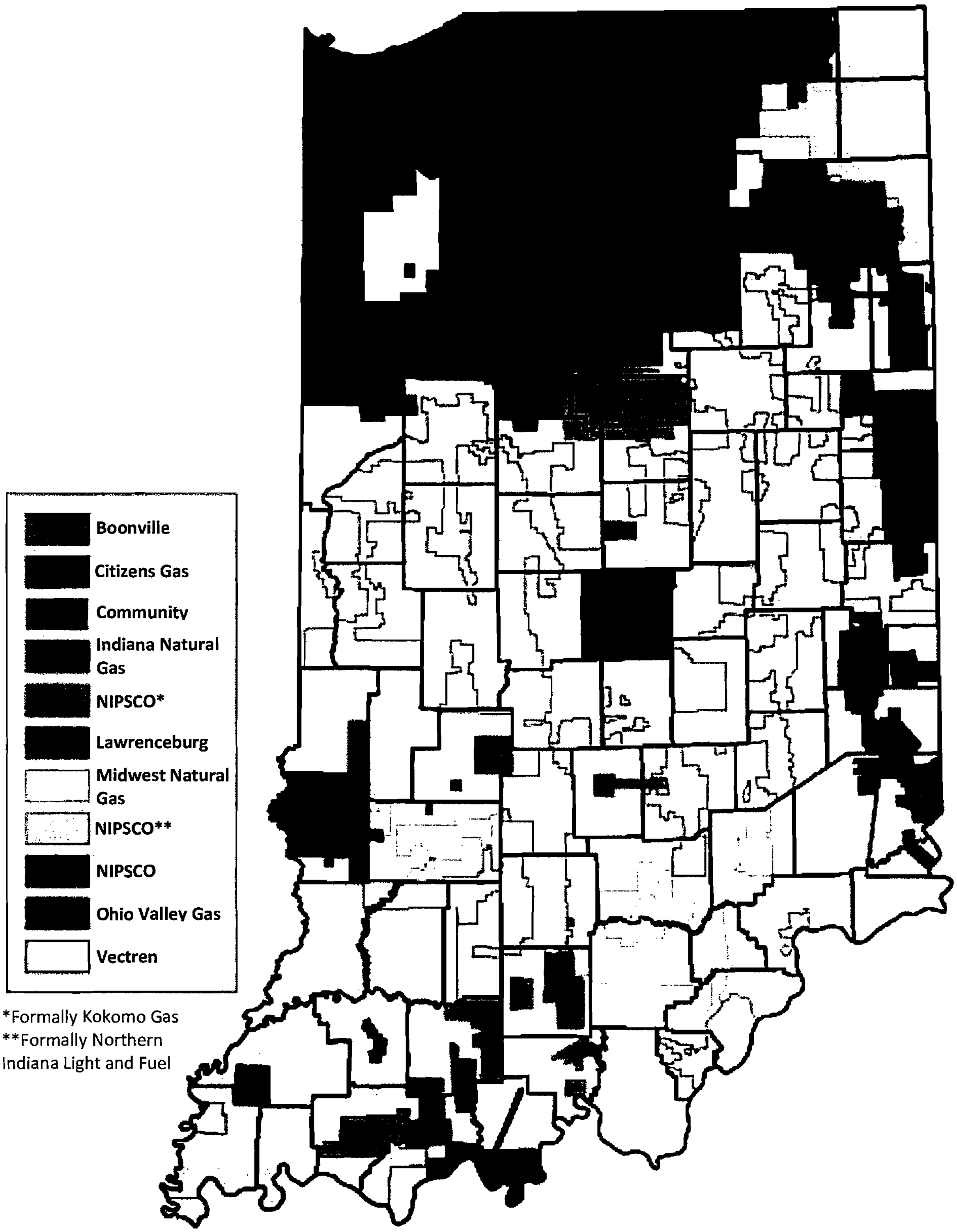
Citizens is a public charitable trust (treated as a municipal utility for regulatory purposes), serving 261,000 customers primarily in the Indianapolis metropolitan area.

Pursuant to statute, municipal utilities, excluding Citizens, may "opt out" of the Commission's jurisdiction for rates and charges in favor of local control in determining rates. However, utilities that choose to opt out still remain under the jurisdiction of the Commission's Pipeline Safety Division.[5] Of the state's 19 municipal gas utilities, 17 have elected to withdraw from the Commission's oversight. To view a list of the withdrawn utilities, please see Appendix B.

[5] IC § 8-1.5-3-9

Map 2

Natural Gas Service Territories



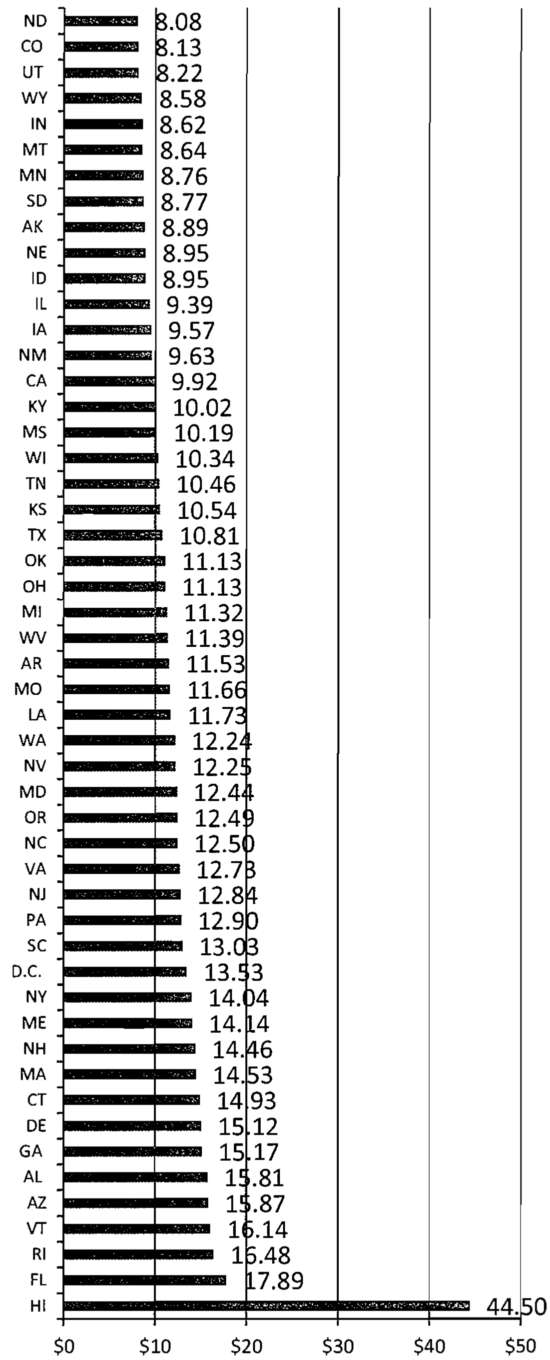
How Indiana Compares with Other States

Over the last 10 years, Indiana has consistently compared well with other states for residential and commercial delivered (bundled) gas prices. Bundled prices include all utility costs to deliver the product, including pipeline and LDC operator charges.

As shown in Chart 1, Indiana ranked 5th lowest nationally and 2nd lowest in the Midwest region[6] for the 2010 average residential gas prices. The average residential gas price has fallen each of the last two years from $12.65 per thousand cubic feet in 2008 to $8.62 per thousand cubic feet in 2010. These numbers are higher than the commonly referenced commodity cost of approximately $4.50/Mcf, because they are bundled prices. Neighboring states' average residential retail rates for 2010 are as follows: Illinois $9.39, Kentucky $10.02, Ohio $11.13, and Michigan $11.32.[7]

Indiana ranked 7th lowest nationally and 4th lowest in the Midwest for 2010 average commercial gas prices. Indiana's 2010 average commercial price was $7.54 per thousand cubic feet, less than the 2009 average price of $9.18 per thousand cubic feet. Neighboring states' average commercial retail rates for 2010 were as follows: Kentucky $8.61, Illinois $8.76, Michigan $8.95, and Ohio $9.25 per thousand cubic feet.[8]

Chart 1
2010 State Residential Gas Prices
($/thousand cubic ft)



Source: U.S. Energy Information Administration

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[6]The Midwest region includes Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.
[7]www.eia.doe.gov/dnav/ng/ng_pri_sum_a_EPG0_PRS_DMcf_a.htm
[8]www.eia.doe.gov/dnav/ng/ng_pri_sum_a_EPG0_PCS_DMcf_a.htm

Over the last five years, Indiana has also performed well with industrial gas prices. As Table 1 demonstrates, Indiana maintains a strong competitive advantage based on 2010 data, as compared to other states.[9] This is due to a variety of factors, including the timing of rate cases both in and out of state. Indiana ranked 11th lowest nationally and 4th lowest of the Midwest states for 2010 average industrial gas prices. The average industrial price fell from $6.91 per thousand cubic feet in 2009 to $5.65 per thousand cubic feet in 2010. Although Indiana industrial customers pay slightly more than the national average of $5.49 per thousand cubic feet, of the four neighboring states, only Kentucky had a lower average industrial gas price of $5.57 per thousand cubic feet. The other three states' average industrial retail rates for 2010 are as follows: Illinois $7.13, Ohio $7.40, and Michigan $9.25 per thousand cubic feet.[10]

Table 1

Comparison between Indiana and the U.S. Average Price for Delivered Gas

2008 (peak year) vs. 2010

Customer Category	Indiana Price ($/Mcf)**		U.S. Average Price ($/Mcf)	
	2008	**2010**	**2008**	**2010**
Residential	12.65	8.62	13.89	11.39
Commercial	11.14	7.54	12.23	9.47
Industrial	10.48	5.65	9.65	5.49

* Higher ranking denotes lower rates
**Dollars per thousand cubic feet

Age Profile

Indiana's natural gas infrastructure consists of more than 75,000 miles of intrastate pipelines, placed in service over the past 80-plus years. Included in this total are more than 40,000 miles of distribution mains, which transport gas within a given service area to points of connection with pipes serving individual customers. More than 60% of the state's distribution mains are at least 30 years old. Also included in the state's infrastructure are approximately 2,000 miles of transmission mains, which transport gas from a source or sources of supply to one or more distribution centers, large volume customers, or other pipelines that interconnect sources of supply. Typically, transmission lines differ from gas mains in that they operate at higher pressures, are longer, and have a greater distance between the connections. More than 60% of the state's transmission mains are at least 40 years old.

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9 The Energy Information Administration did not release 2011 data this year. Publication is expected in 2013.
10 www.eia.doe.gov/dnav/ng/ng_pri_sum_a_EPG0_PIN_DMcf_a.htm

Table 2

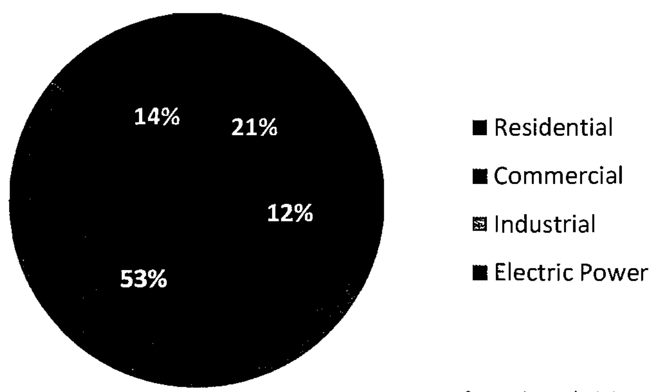
Age Profile of Jurisdictional Transmission and Distribution Mains in Indiana

	Transmission Mains		Distribution Mains	
Years Old	Number of Main Miles	% of Total Main Miles	Number of Main Miles	% of Total Main Miles
80+	-	-	531	1.31%
70-80	3	0.15%	341	0.84%
60-70	301	15.03%	3,018	7.43%
50-60	713	35.59%	9,531	23.46%
40-50	252	12.58%	5,016	12.35%
30-40	173	8.64%	7,028	17.30%
20-30	258	12.90%	8,265	20.35%
10-20	179	8.93%	5,665	13.94%
0-10	5	.24%	459	1.13%
Unknown	119	5.94%	766	1.89%
Total	2003	100.00%	40,620	100.00%

Federal guidelines for integrity management require that operators (including LDCs and pipeline companies) make every effort to assess threats to their pipelines.[11] The replacement of aging infrastructure continues to be an ongoing focus as demand for service connections continues to increase. These issues are discussed later in the report.

Chart 2

Consumption by Sector in Indiana (2011)



Source: Energy Information Administration

Demand and Supply

As previously mentioned, Indiana's LDCs serve three different types of customers: residential, commercial, and industrial.

In 2011, Indiana's residential customers consumed approximately 133 million Dth of natural gas, which accounts for 21% of the state's total volumes delivered to consumers.[12] Also in 2011,

[11]Integrity management is a risk-based approach to pipeline safety resulting from the Pipeline Safety Acts of 2002 and 2006.

[12]http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_SIN_a.htm

Indiana's commercial customers consumed approximately 12% of the state's total volumes delivered to consumers or 76 million Dth of natural gas.[13]

Industrial customers accounted for 53% of the state's total volumes delivered to consumers with roughly 333 million Dth, making Indiana the 4th highest state for industrial natural gas consumption in the U.S.[14] Chart 3 shows the other states within the top 10. Electric power consumers accounted for approximately 85 million Dth or 14% of Indiana's total consumption, which is an increase from 11% used by this sector in 2010.[15]

Chart 3

Top 10 States for Industrial Consumption

% of total national industrial consumption

Texas	19.26%
Louisiana	12.91%
California	10.52%
Indiana	4.94%
Ohio	3.91%
Illinois	3.84%
Oklahoma	2.86%
Pennsylvania	2.75%
Iowa	2.47%
Minnesota	2.41%

Source: U.S. Energy Information Administration

Drivers of Demand

Environmental factors, economic growth, and weather are the primary factors driving demand for natural gas. Because natural gas is a cleaner burning fuel than coal, it is often used as an alternative fuel source for electric generation, especially in light of the low gas prices and recently approved or proposed U.S. Environmental Protection Agency (U.S. EPA) regulations. Although the magnitude of the increase has yet to be determined, demand is expected to increase.

As for weather, when it is colder than normal during the heating season, demand for natural gas increases. The 2011-2012 heating season was the warmest in 60 years,[16] which decreased demand for natural gas in an already over-supplied market and contributed to low natural gas prices. In 2011, natural gas prices decreased roughly 9% from 2010 prices at the Henry Hub, which is a distribution center in Louisiana that connects to nine interstate and four intrastate

[13] http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_SIN_a.htm
[14] http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_a_EPG0_vin_mmcf_a.htm
[15] http://tonto.eia.doe.gov/dnav/ng/ng_cons_sum_dcu_SIN_a.htm
[16] *State of the Markets Report-2011* U.S. Dept. of Energy-Federal Energy Regulatory Commission-Office of Enforcement 2012

pipelines. This decrease resulted in a drop from about $4/MMBtu at the beginning of the year to under $3/MMBtu by December.[17]

Demand also increases, albeit to a lesser extent, when weather is hotter-than-normal during the summer cooling season, as natural gas is often used to generate electricity at times of peak demand. Since gas consumption is lower in the summer, gas utilities historically have replenished their stored natural gas supplies at this time, in preparation for the upcoming winter heating season. More often than not, utilities are able to purchase these supplies at lower, more favorable prices outside the winter heating season. However, as gas becomes more popular as a fuel source for electric generation, the price differential may diminish.

Supply Side Factors

New technology and lower extraction costs have led to increased drilling for non-conventional gas supplies (e.g., coal bed methane, shale gas, and tight sands). Tapping formerly unrecoverable sources of gas has contributed significantly to the supply, which continues to overwhelm swings in demand. The main factors influencing supply include:

1. Variations in natural gas production;
2. Net imports; and
3. Storage levels.[18]

> ***Tapping formerly unrecoverable sources of gas has contributed significantly to the supply and continues to overwhelm swings in demand.***

Domestically, the winter heating season (2011-2012) ended with working gas in underground storage at historically high levels. As of July 2012, the lower 48 states had 3,163 Bcf in storage compared to the five-year average of 2,693 Bcf.[19] Another development affecting supply in the long-term is the April 2012 FERC approval of the first natural gas liquefaction and export terminal in Sabine Pass, LA.

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[17] *State of the Markets Report – 2011,* Federal Energy Regulatory Commission-Office of Enforcement 2012
[18] www.eia.gov/energyexplained/index.cfm?page=natural_gas_factors_affecting_prices
[19] http://ir.eia.gov/ngs/ngs.html

Additionally, natural gas producers have shifted their drilling efforts to more liquid rich plays due to depressed prices in the natural gas market and higher prices in the liquids market (i.e., petroleum). To date, natural gas production volume has remained consistent, so it is unlikely a rapid contraction in supply will be experienced in the short term; however, expanded use of natural gas for electric generation could significantly alter supply projections over the medium and long term Increased production efficiencies and the associated gas often found in the liquid rich plays help to maintain current drilling and supply levels. Associated gas is raw natural gas found in crude oil wells, either dissolved in the oil or as a cap of free gas above the oil.[20] Recent NYMEX future pricing has suggested that the market anticipates prices at Henry Hub will remain under $4/MMBtu through 2014.[21]

Challenges of Long-Term Projections

Natural gas pricing has been volatile in the past due to fluctuations in supply and demand, which has caused long-term projections to vary widely among industry stakeholders. Given that demand and supply are heavily dependent on the weather, advancements in technology, and other factors that are difficult to quantify or predict, long-term projections are simply best guess estimates based on the information available at the time and can therefore be unreliable. Additionally, government actions and regulations regarding the energy sector and environment may shape the future economics of natural gas. Consequently, while natural gas demand and supply projections are common and necessary industry practices, they are not foolproof and may yield skewed assumptions. Absent a consistent, reliable source of data, entities such as the IURC are left to adjudicate drastically different viewpoints with regard to the future of natural gas, which can present challenges.

Legal and Policy Foundations

Pipeline Safety Act of 1968

The Pipeline Safety Act of 1968 established the federal pipeline safety program. This federal program establishes a framework and organizational structure for a federal/state partnership

[20]www.oilandgasiq.com/glossary/associated-gas/
[21]*State of the Markets Report-2011,* Federal Energy Regulatory Commission's Office of Enforcement 2012

regarding pipeline safety.[22] This framework promotes pipeline safety through exclusive federal authority for the regulation of interstate pipeline facilities and federal delegation to the states for all or part of the responsibility for intrastate pipeline facilities.

The federal/state partnership is the cornerstone for ensuring uniform implementation of the pipeline safety program nationwide. It also authorizes federal grants to help defray a state agency's personnel, equipment, and activity costs. Grants are determined primarily on the annual evaluation of the state's program. Indiana's program, as established by statute, has historically received high marks from the annual federal evaluations.[23]

Indiana's Pipeline Safety Program

The Pipeline Safety Division is responsible for enforcing state and federal safety regulations for Indiana's intrastate gas pipeline facilities and is established under IC ch. 8-1-22.5. The division operates in partnership with the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) under a certification agreement.

The Pipeline Safety Division's mission is to ensure the safe and reliable operation of Indiana's intrastate pipeline transportation system. It is accomplished largely through inspections, as well as training, outreach programs, enforcement through injunctions and monetary sanctions, and investigations of pipeline accidents. In 2011, the division conducted 709 inspections of 91 operators and 217 associated inspection units, safely resolving 137 probable violations.

Assessing Pipeline Operator Risk

Pipeline safety programs nationwide are developing risk-based methods and approaches to help evaluate a pipeline operator's overall risk. Doing so will help identify riskier pipeline operators, resulting in greater scrutiny and enhanced public safety. In addition to these initiatives at the regulator level, the Commission is also requiring pipeline operators to develop data-driven, risk-based inspection plans of their own, which will enable them to assess risks in their operations and take appropriate action to minimize or eliminate them.

[22] 49 U.S.C. Chapter 601
[23] IC ch. 8-1-22.5

The Pipeline Safety Division is also responsible for the prevention of damage to underground facilities and the education of public and emergency officials and responders to recognize, report, and respond to gas-related emergencies. Recognizing the significance of pipeline safety, the General Assembly passed Senate Enrolled Act 487 in 2009, which is known as the "Call Before You Dig" law. It requires homeowners, excavators, and operators[24] to call 811 two days or more before digging, to ensure compliance with state and federal laws and prevent damage to underground infrastructure. If damage occurs, the Pipeline Safety Division serves as the investigative unit.

III. Landscape

Infrastructure

Although age is one factor in considering whether a pipeline may need to be replaced, the type of material used (bare steel, cast iron, plastic), its location, and relative risk to public safety are also considered. In accordance with pipeline safety standards, utilities perform inspections of their pipeline facilities on a regular basis to help identify areas at risk. Based on the results of these inspections, corrective actions are initiated. In some cases, this may include implementing replacement programs for existing bare steel, cast iron, or wrought iron systems. Many of these pipes need to be replaced because older pipelines of this nature were not coated or cathodically protected when they were installed years ago. Consequently, corrosion and leaks have developed over time. To enhance reliability and safety, many utilities now use plastic pipe for their distribution systems.

Many bare steel, cast iron, or wrought iron systems need to be replaced, because older pipelines of this nature were not coated or cathodically protected when they were installed years ago. Consequently, corrosion and leaks have developed over time.

Investments

Depending on a utility's maintenance plan and the layout of its service territory, some utilities have fared better than others when it comes to replacing outdated steel and iron systems. For example, NIPSCO's distribution system consists of 99.5% plastic or cathodically protected steel; whereas, the industry average is 87%. Bare steel comprises only 0.4% of NIPSCO's system, compared to

[24] P.L. 62-2009

the national average of 13%.[25] Due to more stringent pipeline safety standards, utilities are implementing replacement programs, if they haven't already done so. For example, Vectren North, Vectren South, and Citizens Gas have all implemented replacement programs to rid their systems of at-risk pipe.

In the last rate cases of Vectren North[26] and South,[27] the utilities requested permission to replace all remaining bare steel and cast iron infrastructure in order to enhance service reliability and safety. The accelerated program is intended to replace the utilities' poorest performing infrastructure over a 20-year period. To date, no other Indiana natural gas utility has approval for an accelerated replacement program and only 14 gas utilities in other states have utilized similar programs. Over the 20-year period, Vectren North projects a program cost of about $345 million or an annual capital requirement of $17.25 million. Vectren South, on the other hand, projects a program cost of about $90 million or an annual capital requirement of $4.5 million.

In Citizens Gas' prior two rate cases, it requested recovery for annual extensions and replacements (E&R) to its system. The utility has a policy requiring planned replacement of cast iron, wrought iron, and bare steel, as well as poor condition service pipe. In Cause No. 42767, the total two-year average revenue requirement for E&R was $23.8 million, which includes an allowance for the pipeline integrity management program. In Cause No. 43463, Citizens requested a three-year average revenue requirement of $23.1 million in addition to $927,000 for pipeline integrity management expenses.

Roachdale

When the Pipeline Safety Division identifies an at-risk system, it may file a request with the IURC to conduct an investigation. In the case of Roachdale Municipal Gas Utility, the Pipeline Safety Division took such action, which lead to the IURC opening an investigation on April 5, 2011.[28] The purpose of the investigation was to assess whether the utility was in compliance with pipeline safety standards and whether a hazardous conditions order should be issued due to aging and corroding mains and service connections.

[25] 2011 Winter Natural Gas Forum
[26] Cause No. 43298
[27] Cause No. 43112
[28] Cause No. 44014

To remedy the situation, the IURC issued a decision requiring the utility to make the necessary investments needed to replace its existing gas distribution system and place a new system into service by October 1, 2012. Additionally, the IURC instructed the utility to comply with certain measures in the interim, such as:

1. Replacing the odorizer;
2. Conducting leak surveys;
3. Retaining an outside contractor;
4. Filing monthly reports with the IURC; and
5. Holding public meetings with stakeholders to increase awareness.

The Commission approved Roachdale's request on July 31, 2012 to extend the completion date to December 1, 2012 for placing its new gas distribution system into service. In the meantime, Roachdale Municipal Gas Utility must fulfill the IURC's requirements in order to become compliant with pipeline safety standards.

Modernization and Efficiency

Recent advancements in technology have allowed the natural gas industry to modernize itself in terms of natural gas resources and the development of more efficient uses of natural gas. New sources of gas (such as shale), which were not previously commercially viable to pursue now represent a large percentage of the recent increases in the country's proven or identified natural gas supplies, as well as incremental production. Other technological advancements in gas appliances provide consumers with the opportunity to become more efficient and reduce their overall energy consumption.

According to the Energy Information Administration's Annual Energy Outlook 2012, the U.S. possesses 2,203 trillion cubic feet of technically recoverable natural gas. At the current U.S. consumption rate, this is enough natural gas to last 90 years.

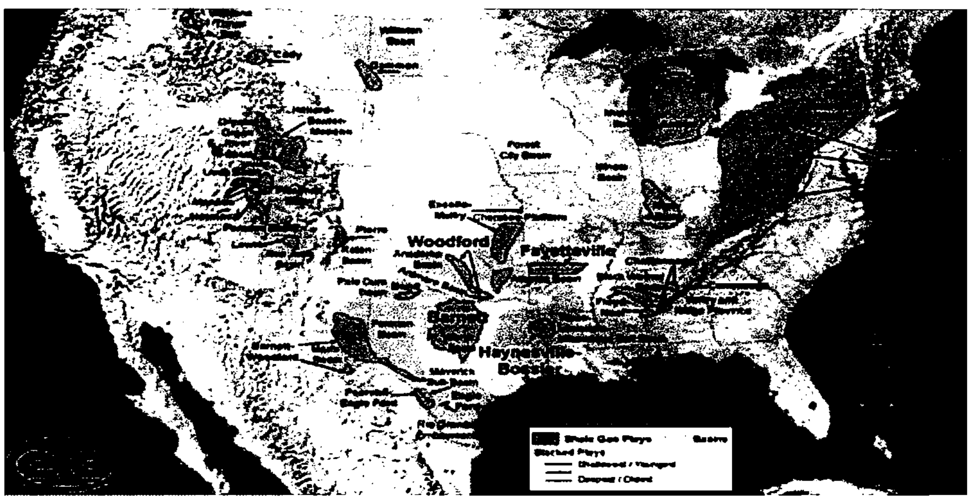
Shale Gas

The emergence of unconventional sources of natural gas has affected the overall supply in our country. Whereas, liquefied natural gas (LNG) was looked to as the answer to America's high gas prices in 2009, the focus has now changed primarily to shale gas supply. Where there was once a conversation about the need for imports, the focus has now turned to exports and the profits that can be made overseas.[29] This reversal seen since 2009 demonstrates how quickly the natural gas industry can change and the potential risks associated with overemphasizing a single source of supply. The industry views shale gas as the most recent game changer; however, we must be aware of environmental concerns and monitor them accordingly.

Shale gas production is expected to increase from 5.0 trillion cubic feet (TCF) in 2010 to 13.6 TCF in 2035.[30] According to the Energy Information Administration's Annual Energy Outlook 2012, the U.S. possesses 2,203 TCF of technically recoverable natural gas.[31] At the current U.S. consumption rate, this is enough natural gas to last 90 years.[32] Map 3 shows the locations of shale plays in the U.S.

Map 3

Shale Gas Plays in the Continental U.S.



Source: U.S. Energy Information Administration

Recently, consumer and environmental groups have raised concerns about the drilling techniques employed to extract shale gas. Studies have also suggested a correlation between drilling and environmental harm, and some states where drilling has occurred have reported concerns with air pollution and contaminated drinking wells. As a result, the federal government

[29] "The economic impact of LNG exports from the United States," Deloitte Center for Energy Solutions. www.deloitte.com/view/en_US/us/Industries/oil-gas/9f70dd1cc932431 0VgnVCM1000001a56f00aRCRD.htm
[30] www.eia.gov/forecasts/aeo/er/executive_summary.cfm
[31] www.eia.gov/forecasts/aeo/
[32] www.eia.gov/energy_in_brief/about_shale_gas.cfm

launched a review of the commonly-used drilling technique known as hydraulic fracturing or fracking.[33] The U.S. EPA expects to release its initial findings on the environmental impacts of fracking in late 2014.[34]

Legislation has also been filed at the state and federal levels. In 2012, Indiana passed House Enrolled Act 1107 requiring the state to adopt rules for reporting and disclosing information about fracking operations, including: the volume and source of base fluid used; a description of each additive product; the volume of each additive expressed as a percentage of the total fracturing fluid volume; the maximum surface treating pressure and the injection treating pressure; and any other information deemed necessary. On the federal side, House Resolution 1084 "Fracturing Responsibility and Awareness of Chemicals Act of 2011" seeks to repeal the exemption of hydraulic fracturing from the Safe Drinking Water Act. This bill and a Senate version[35] were assigned to committees on March 15, 2011 with no further action being taken.

The U.S. EPA expects to release its initial findings on the environmental impacts of fracking in late 2014, which should provide more insight on possible future regulation of this industry.

While it appears the industry is making strides to enhance transparency through disclosure, some remain skeptical. The results of the U.S. EPA study should provide the industry and the public with a better understanding of its view of fracking and the environmental impacts. With that being said, if new federal regulations are imposed or if restrictive legislation is passed regarding drilling techniques and practices, the price of natural gas could increase.

Coal Bed Methane

Coal bed methane (CBM) is another source of natural gas extracted from coal beds, which are un-mined coal seams a few hundred feet below the surface. It is recovered by drilling into the coal seam using water and sand at high pressure, thus fracturing the seam. This drilling process is similar in nature to shale fracturing. Currently, CBM accounts for approximately 8% of natural

[33]Hydraulic fracturing is a technique used to create fractures that extend from the well bore into rock or coal formations so that the gas may travel more easily from the rock pores to the production well.
[34]http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/index.cfm
[35]S. 587: FRAC Act

gas production in the United States.[36] One operational CBM project is located in Sullivan County. Jericho, LLC received a certificate of public convenience and necessity from the IURC in December 2008 to construct, own, and operate a CBM gathering system as a public utility. Jericho is producing roughly 1.6 million cubic feet of CBM on a daily basis, with forecasts of up to approximately 2 million cubic feet in the future. All of Jericho's CBM gas production is purchased by ProLiance Energy[37] and transported via the Heartland Pipeline.[38]

Renewables

Interest in agricultural, organic, and human-generated waste may lead to alternatives to conventional fuels such as natural gas, fuel oil, and coal. Since sustainable sources of natural gas provide economic and environmental benefits, continued success of these types of projects is important to Indiana's energy future. An example is the use of methane gas or renewable natural gas (RNG) from the anaerobic digestion of waste from livestock. One of the more well-known facilities utilizing this technology is the Fair Oaks Farms dairy in Jasper County. Its anaerobic digester powers a 1 megawatt generator.[39]

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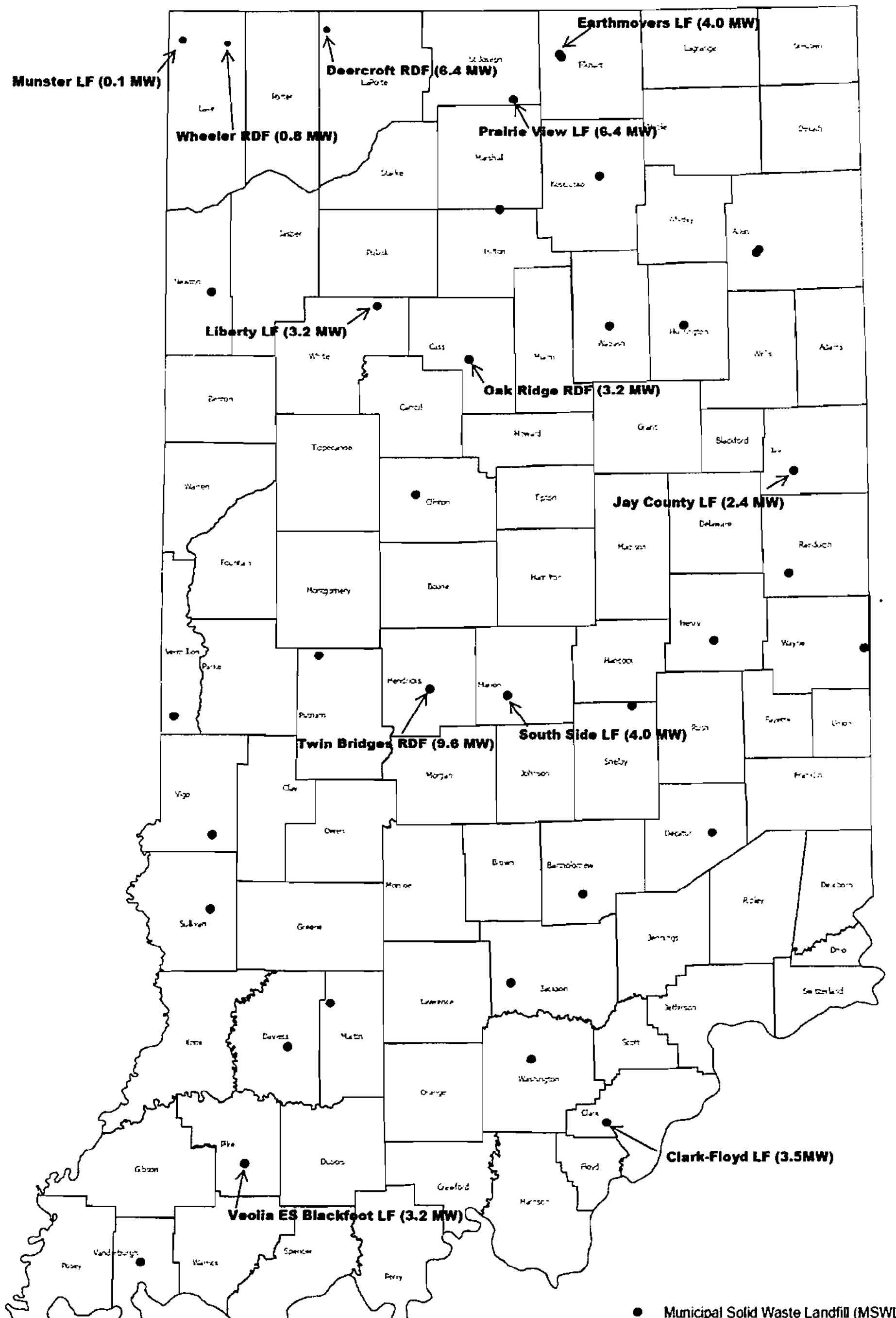
Another form of renewable energy is landfill methane gas (LMG). Since landfills are the largest human-generated source of methane emissions in the United States, the ability to capture and use this gas has allowed it to grow as a renewable energy resource. Currently, there are 22 operational LMG utilization projects in Indiana, with the potential to develop additional facilities in the future.[40] Map 4 identifies these facilities.

[36]www.natgas.info/html/coalbedmethane.html
[37]ProLiance Energy is an Indianapolis-based natural gas marketing and supply company.
[38]Order in Cause No. 43500, approved on December 17, 2008
[39]www.nwitimes.com/business/local/fair-oaks-farms-dairy-fleet-to-run-solely-on-renewable/article_8a8c9674-e202-5056-9391-4e6a5c7541a2.html
[40]www.epa.gov/lmop/

Map 4

Operational Landfill Methane Gas Utilization Proiects



Notes:

1. **Munster, Wheeler, and Deercroft are closed landfills, but still produce electricity from the methane gas generated.**
2. **Unmarked symbols are operational landfills that could be used for LMG power plants, but are currently not.**

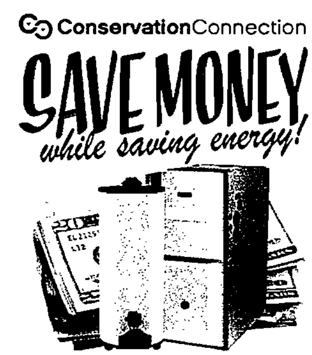
Source: Indiana Department of Environmental Management

Energy Efficiency

As of the printing of this report, four natural gas LDCs (Vectren North, Vectren South, NIPSCO and Citizens Gas) offer energy efficiency programs in Indiana. Eight additional small gas utilities received approval to implement energy efficiency programs similar to those being offered by Vectren, contingent upon the authorization of new rates.[41]

- Conservation Connection by Vectren -

In Cause No. 44019, the IURC approved a settlement agreement reached between the Indiana Office of Utility Consumer Counselor (OUCC) and Vectren to extend Vectren North and Vectren South's energy efficiency programs, known as "Conservation Connection." Vectren's Conservation Connection offers residential and small business natural gas customers energy-saving opportunities in the form of appliance rebates, custom programs for businesses, and online tools to perform energy audits and bill analysis.[42] Originally approved in 2006, the program has helped save nearly 25 million therms of natural gas since its inception, which is enough energy to heat more than 30,000 homes for a year.[43] Additionally, Vectren's customers have utilized more than 100,000 rebates (totaling $12.3 million) and energy-saving measures, which have led to $20 million in cumulative avoided natural gas costs to date.[44] The most popular rebates issued include nearly 35,000 high-efficiency furnace rebates, 18,000 programmable thermostat rebates, and 7,500 high efficiency water heater rebates.



- Citizens Energy Savers by Citizens Gas -

Citizens Energy Savers provides a comprehensive set of tools to help conserve energy, including cash rebates toward the purchase of high efficiency natural gas appliances. From September 1, 2008 through August 31, 2010, the energy efficiency program has achieved combined estimated savings of 5,054,886 net therms. On November 29, 2011, Citizens filed for an extension of the program, which is pending under Cause No. 44124.

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[41] Cause No. 43995
[42] www.in.gov/oucc/2661.htm
[43] Id.
[44] Id.

- Save Energy Program by NIPSCO -

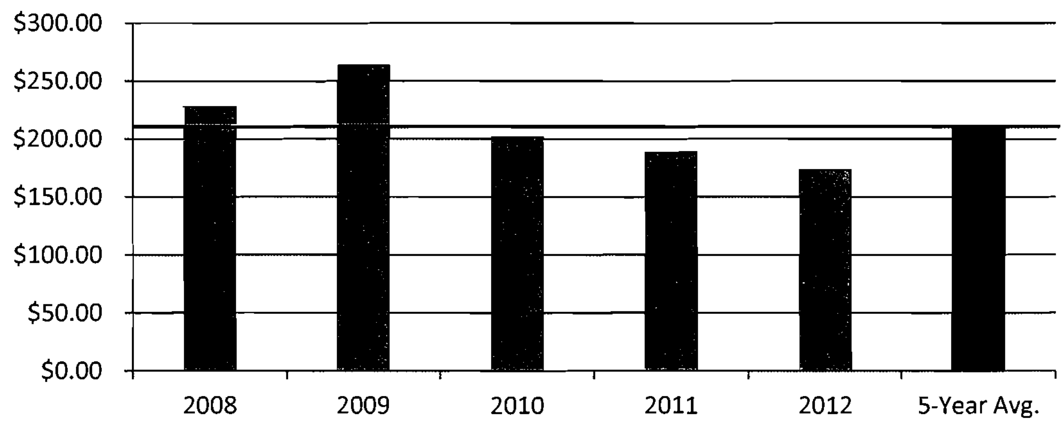
On December 28, 2011, the Commission approved the expansion of NIPSCO's natural gas energy efficiency program. One continuing element of the program is a cash rebate offer for residential customers who invest in energy efficient equipment. Since the rebate program began in 2008, more than $8 million in rebates has been issued to customers. Commercial and industrial customers also have access to additional incentives. By introducing the new Custom Incentive Program and Prescriptive Incentive Program, eligible businesses could receive more than $1 million per year for upgrading existing equipment or systems.[45]

Pricing and Economics

Due to lower commodity costs associated with natural gas, residential customers on average experienced a decrease in their bills in 2012. In 2011, a residential customer using 200 therms would have received a bill for $189.11. In 2012, this bill would have decreased to $174.37. As shown in Table 3, both the 2011 and 2012 bills are lower than the five-year industry average of $211.69, which shows how much the cost of natural gas has decreased from its peak in 2009.[46]

Table 3

Residential Gas Bill Comparison for 2008 to 2012



Source: IURC data

[45]www.nwitimes.com/business/local/nipsco-expands-energy-efficiency-programs/article_d6fc4fd8-86d3-50ec-b303-b118b0f55f3d.html

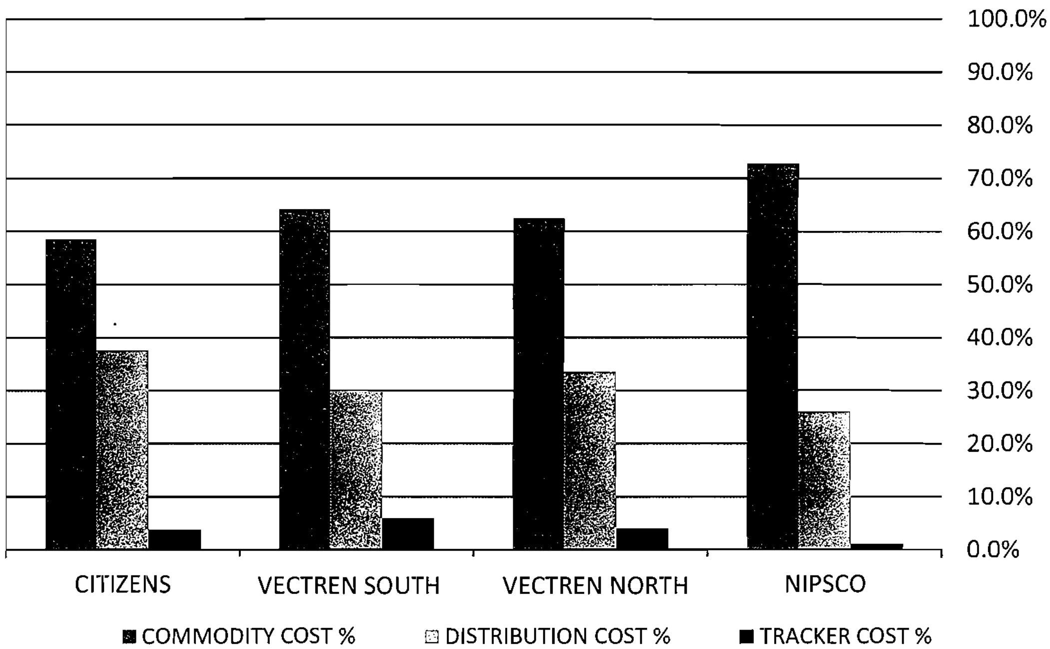
[46]"Residential Bill Gas Bills as of January 1, 2012," IURC's Natural Gas Division

Bill Composition

The cost of the actual natural gas commodity accounts for a majority of a customer's bill. On average, gas usage (i.e., commodity cost) accounts for approximately 64%, while operating costs account for approximately 32%. All other trackers approved by the Commission account for less than 4% of a customer's monthly gas bill. The following table demonstrates this cost analysis.

Table 4

Breakdown of Residential Billing Components for the Four Largest Indiana Gas Utilities



Source: December 2011 Utility Flex

Utilities do not profit from the gas commodity portion of consumers' bills, because the GCA tracker involves a dollar-for-dollar pass-through of gas costs. The overall weighted cost of gas and a utility's purchasing practices are reviewed by the OUCC before approval by the Commission. For costs to be approved, each utility must demonstrate its purchases were prudent. This means utilities must make reasonable efforts to mitigate price volatility, which includes having a program that considers current and forecasted market conditions and the price of natural gas. One way to achieve this is by having a diversified portfolio mix (i.e., a balance of purchases such as fixed, sport market, and storage gas).

Adjustable Rate Mechanisms

When natural gas utilities incur costs beyond their control (e.g., federal regulations and market price volatility), such costs usually fall outside the context of a rate case. In order for natural gas utilities to recover these costs, state law allows them to petition the Commission for approval of an adjustable rate mechanism or tracker. A tracker assists in the timely recovery of costs, which improves the financial health of the utility. Before costs are passed along to customers, the OUCC reviews the underlying support for the requested rate adjustment and may provide evidence supporting or contesting the request in proceedings. The Commission also reviews the tracked costs before rendering a decision.

The following examples describe authorized trackers available for consideration:

- *Gas Cost Adjustment (GCA)* – Pursuant to statute, the GCA allows a gas utility to recover the commodity cost of gas not recovered through rates established during a rate case.[47] Most regulated natural gas utilities use this mechanism.[48]

- *Pipeline Safety Adjustment (PSA)* – The PSA allows the gas utility to recover prudently incurred, incremental non-capital expenses necessary in order to meet the requirements of the Federal Pipeline Safety Improvement Act of 2002, which imposed many new requirements on pipeline operators. Three natural gas utilities use the PSA.

- *Energy Efficiency Funding Component (EEFC) & Sales Reconciliation Component (SRC)* – The EEFC funds the promotion of energy efficiency, and the SRC allows recovery of expenses from residential and commercial ratepayers that would otherwise be lost due to reductions in revenue caused by energy efficiency programs. Four natural gas utilities use these mechanisms.

- *Normal Temperature Adjustment (NTA)* – The NTA reduces the risk of a gas utility not recovering its approved margin due to warmer-than-normal temperatures and mitigates

[47] IC § 8-1-2-42(g)

[48] Snow & Ogden is the only regulated natural gas utility that does not utilize the GCA tracker. Snow & Ogden is a small natural gas utility that receives natural gas from wells it owns and operates within the state. Therefore, its gas costs are stable and are built into its base rates.

the possibility of over-earning due to colder than normal temperatures during the heating season. Sixteen natural gas utilities use the NTA.

As previously mentioned, the winter of 2011-2012 was warmer than normal. Since the NTA stabilizes a utility's cash flow based on weather "normalized" margins, a warmer than normal winter causes a utility to under-recover. Therefore, the NTA charge on customer bills was higher than usual this winter, especially in March, which was unseasonably warm. Again, the NTA methodology is revenue neutral and designed to normalize or stabilize costs over the winter months.

Financial Assistance

For Hoosiers in need of assistance with their heating bills, there are programs that can help at the state and federal levels. The Commission's Order in Cause No. 43669 authorized Citizens Gas, NIPSCO, Vectren North, and Vectren South to reinstate their respective bill assistance programs, providing qualifying Hoosiers assistance during the winter heating season. The Commission categorizes the individual utility programs under the term "Universal Service Programs" (USP).

History of USP

Vectren North, Vectren South, and Citizens Gas received Commission approval on August 18, 2004 in Cause No. 42590 to implement the first natural gas Universal Service Programs in Indiana.

In order for these programs to continue beyond October 31, 2012, each utility had to file a base rate case requesting approval of the assistance program. Both Citizens and NIPSCO filed rate cases,[49] which included requests to continue the USP. Given an anticipated shortfall in federal funding, the utilities filed petitions seeking approval of temporary adjustments in 2011. In a consolidated proceeding,[50] the IURC granted the utilities approval to extend each of their USPs and allowed Vectren North and Vectren South to extend their USPs without initiating a base rate case until September 30, 2014.

[49]Citizens' Order in Cause No. 43975 approved on August 31, 2011; NIPSCO's Order in Cause No. 43894 approved on November 4, 2010
[50]Cause No. 44094 approved on December 7, 2011

In addition to the individual utility programs, federal funds are appropriated by Congress on an annual basis and are available through the Low Income Home Energy Assistance Program (LIHEAP), a social service program established in 1981. LIHEAP's mission is to help low-income households meet the costs of their home energy needs, as they pay a higher percentage of their household income for it. An eligible applicant's household income must not exceed 150% of the poverty level or 60% of the state's median income. In Indiana, a family of four at the 150% poverty level has a household income not exceeding $33,525.[51]

> ***LIHEAP Funding***
>
> *There are two forms of LIHEAP assistance funding available. States can apply for a block grant, which is a formula, established by Congress that determines the amount of money distributed to a State based on weather and its low-income population.*
>
> *States are also eligible to receive contingency funds, which is money the President releases, to help with energy needs based on an emergency. Usually, an emergency is related to extreme weather or dramatic energy price spikes.*

During fiscal year 2011, Congress appropriated $4.51 billion for LIHEAP funding; however, a 0.20% rescission reduction decreased this amount to $4.5 billion in block grants and approximately $200 million in emergency funds.[52] Of this, Indiana received approximately $107.6 million in LIHEAP funding. This total consisted of approximately $102.7 million in block grant funds and $4.8 million in emergency funds.[53] Indiana had approximately 730,000 households eligible for LIHEAP financial assistance in fiscal year 2011, of which about 197,800 households received assistance. The average assistance to eligible Indiana households was roughly $420. [54]

After implementing a 0.189% rescission reduction in fiscal year 2012, Congress appropriated about $3.5 billion to the LIHEAP program assigning the entire sum to the base grants. Of this $3.5 billion, Indiana received $80 million.[55] For fiscal year 2013, which will cover the 2012-2013 heating season, the President proposed cutting authorized LIHEAP funding from $5.1 billion to $3 billion.[56] In response, many members of the House of Representatives petitioned the Chairman and Ranking Member on the Committee of Appropriations in March 2012 to consider

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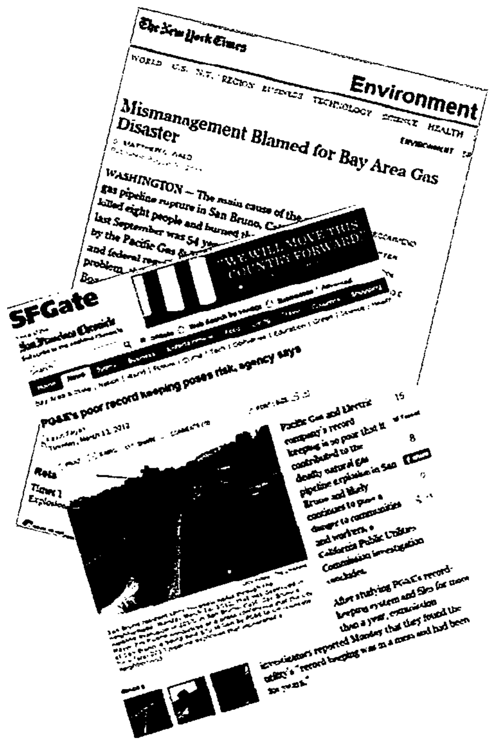
[51]Indiana Fact Sheet: www.liheap.org/?page_id=460
[52]www.liheap.ncat.org/Funding/funding.htm
[53]www.acf.hhs.gov/programs/ocs/liheap/funding/fund.html
[54]Indiana Fact Sheet: www.liheap.org/?page_id=460
[55]www.liheap.ncat.org/Funding/funding.htm
[56]Indiana Fact Sheet: www.liheap.org/?page_id=460

funding the LIHEAP program at the authorized amount of $5.1 billion due to continued high unemployment and energy costs.[57]

Regulatory Development

San Bruno Report

Despite the nation's overall excellent pipeline safety record, recent pipeline incidents in California, Michigan, Pennsylvania, and other locations have elevated the awareness of stakeholders and the public to the potential dangers of natural gas and hazardous liquid pipelines across the country. It has also prompted the IURC's Pipeline Safety Division to closely study the findings of the incidents, especially the one in San Bruno, California for lessons to be learned.



On August 30, 2011, the National Transportation Safety Board (NTSB) issued a report regarding the San Bruno, California incident in September 2009.[58] The NTSB determined that the California Public Service Commission failed to detect inadequacies in PG&E's integrity management program and PHSMA's integrity management inspection protocols needed improvement.

In response to this finding, the IURC's pipeline safety engineers began reviewing historical records to verify that pipeline system segments were pressure tested prior to being placed in service. Starting in 2009, the Pipeline Safety Division also started to review and verify operators' written pipeline integrity procedures, including operations and maintenance. Follow-up integrity program inspections are also being conducted for all transmission operators to determine how an operator identifies high consequence areas. This is required to be completed by December 2012.

[57]http://liheap.org/?attachment_id=1080
[58]www.ntsb.gov/investigations/2010/sanbruno_ca.html

Indiana's Risk-Based Assessments

The IURC's Pipeline Safety Division has moved to risk-based assessment of the intrastate natural gas operators to identify, prioritize, and correct any vulnerable pipelines. Indiana's assessment is data driven, not calendar driven (i.e., the physical characteristics of the pipe and its surroundings are assessed, rather than solely assessing how long the pipe has been in the ground).

The assessment of threats to an operator's pipeline (transmission or distribution) includes an analysis of the type and age of pipe in the system; inspection of installation/operation procedures; inspection of material or welds; and analysis of any leaks due to corrosion, natural forces, excavation, or other damage from outside forces. An operator may be subject to more frequent inspections due its heightened risk based on the data gathered. Should an infraction of state or federal pipeline safety law be discovered, the operator can expect the violation to be dealt with firmly but fairly by the IURC.

Depth Study

In 2009, the General Assembly mandated a report for best practices concerning the vertical location of underground facilities for purposes of IC ch. 8-1-26. This section of the report addresses legislative intent, looking at the viability and economic feasibility of technologies used to locate underground facilities.

The Common Ground Alliance (CGA) is a member-driven association dedicated to public and environmental safety and to the prevention of damage to underground facilities. In March 2011, the CGA completed a study sponsored by the U.S. Department of Transportation identifying the best practices regarding damage prevention. Generally, the CGA recommends hand digging or soft digging within a 24-inch tolerance on each side of underground facilities as the safest practice. Vacuum digging, the use of high-pressure water or air that breaks up the soil, accompanied by a powerful vacuum that removes the loosened soil, is also an acceptable alternative identified by CGA.[59]

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[59]www.commongroundalliance.com/Content/NavigationMenu/Best_Practices/Common_Ground_Study/Common_Ground_Study.htm

The CGA, equipment manufacturers, and the IURC's Pipeline Safety Division all strongly recommend hand-digging, air cutting, or vacuum excavation to expose underground pipe for visual verification. These are the safest means to accurately determine the true depth and location of underground facilities. Further, they comply with IC ch. 8-1-26. The Pipeline Safety Division recommends that lawmakers consider requiring all operators of locate equipment to be certified by an accredited organization in order to better protect underground facilities.

Know What's Below

When underground facilities are installed, there are depth requirements; however, due to factors outside of the companies' control, there is no guarantee that the lines will still be located in the same place after that date. Over time, underground facilities can relocate due to soil erosion, settling, etc.

IV. Appendices

Appendix A – Revenues for Jurisdictional Gas Utilities

Rank	Utility Name	Operating Revenues*	% of Total Revenues
1	Northern Indiana Public Service Company	$ 686,112,289	41.34%
2	Vectren North	584,151,553	35.20%
3	Citizens Gas (Municipal)	292,987,055	17.65%
4	Vectren South	96,383,904	5.49%
5	Ohio Valley Gas Corporation	28,568,405	1.63%
6	Midwest Natural Gas Corporation	15,073,464	0.86%
7	Sycamore Gas Company (f/k/a Lawrenceburg Gas Co.)	9,513,059	0.54%
8	Indiana Natural Gas Corp.	7,947,935	0.45%
9	Community Natural Gas Co., Inc.	6,782,680	0.39%
10	Boonville Natural Gas Corporation	4,889,652	0.28%
11	Indiana Utilities Corporation	4,767,334	0.27%
12	Ohio Valley Gas, Inc.	4,383,055	0.25%
13	Citizens Gas of Westfield	4,351,397	0.25%
14	Fountaintown Gas Co., Inc.	4,238,269	0.24%
15	Aurora Municipal Gas (Municipal)	2,470,993	0.14%
16	South Eastern Indiana Natural Gas Company, Inc.	1,720,714	0.10%
17	Switzerland County Natural Gas Co., Inc.	1,383,709	0.08%
18	Valley Rural Utility (Not for profit)	317,125	0.02%
19	Snow & Ogden	14,641	<0.01%
	Total Revenue	$ 1,756,057,233	100.00%

*Year ending December 31, 2011

Appendix B – Jurisdiction over Municipal Gas Utilities

Municipal Utilities under the IURC's Jurisdiction		
Aurora	Citizens Gas	

Municipal Utilities Withdrawn from the IURC's Jurisdiction (IC § 8-1.5-3-9)		
Bainbridge	Jasper	Osgood
Batesville	Lapel	Pittsboro
Chrisney	Linton	Poseyville
Grandview	Montezuma	Rensselaer
Huntingburg	Napoleon	Roachdale
Jasonville	New Harmony	

Appendix C – Jurisdiction over Investor-Owned Gas Utilities

Investor-Owned Utilities under the IURC's Jurisdiction	
Boonville Natural Gas Corporation	Ohio Valley Gas, Inc.
Community Natural Gas Company, Inc.	Snow and Ogden Gas Company, Inc.
Citizens Gas of Westfield	South Eastern Indiana Natural Gas Company, Inc.
Fountaintown Gas Company, Inc.	Switzerland County Natural Gas Company
Indiana Natural Gas Corporation	Sycamore Gas Company
Indiana Utilities Corporation	Valley Rural Utility Company
Midwest Natural Gas Corporation	Vectren North
Northern Indiana Public Service Company	Vectren South
Ohio Valley Gas Corporation	

Appendix D – Residential Natural Gas Bill Survey (January 1, 2012 Billing)

Comparison by Therm Usage

← Consumption →

Utilities	Ownership	Last Rate Case	Order Date	150 Therms	200 Therms	250 Therms
Aurora Municipal Gas	MUN	43527	1/30/09	$130.41	$172.72	$215.03
Boonville Natural Gas	IOU	43342	8/27/08	$153.38	$199.23	$245.09
Citizens Gas	MUN	43463	9/17/08	$134.52	$173.86	$213.20
Citizens Gas of Westfield	IOU	43624	3/10/10	$161.81	$207.23	$252.65
Community Natural Gas	IOU	43377	8/27/08	$115.27	$146.91	$178.55
Fountaintown Gas	IOU	43753-U	3/17/10	$142.17	$183.99	$225.82
Indiana Gas Company (Vectren North)	IOU	43298	2/13/08	$124.86	$161.55	$198.23
Indiana Natural Gas	IOU	43434	10/8/08	$131.69	$171.17	$210.64
Indiana Utilities	IOU	43520	1/21/09	$168.16	$218.64	$269.12
Midwest Natural Gas	IOU	43229	11/20/07	$125.17	$160.57	$195.97
Northern Indiana Public Service Co. (NIPSCO)	IOU	43894	11/04/10	$104.54	$135.74	$166.93
Ohio Valley Gas Corp. (ANR)	IOU	43209	10/10/07	$145.59	$189.28	$232.98
Ohio Valley Gas Corp. (TXG)	IOU	43209	10/10/07	$155.38	$202.34	$249.30
Ohio Valley Gas, Inc.	IOU	43208	10/10/07	$131.11	$169.98	$208.85
Snow & Ogden Gas	IOU	42821-U	11/22/05	$109.19	$145.49	$181.79
South Eastern Indiana Natural Gas Co.	IOU	43318-U	1/16/08	$131.71	$170.56	$209.40
Southern Indiana Gas and Electric Co. (Vectren South)	IOU	43112	8/01/07	$114.48	$148.39	$182.30
Switzerland County Natural Gas	IOU	42844	8/31/05	$132.33	$171.08	$209.83
Sycamore Gas Company	IOU	43090	6/20/07	$157.04	$200.36	$243.69
Valley Rural Utility Company *(1)*	NFP	42115	5/08/02	$161.19	$210.64	$260.09
Industry Average				$136.50	$176.99	$217.47

(1) Applicable to bills at September 1, 2011

Note:

Drawing conclusions about a utility's performance is difficult due to many factors such as utility size and resources, period from the last rate case, storage options, geographic location, base rates, customer density and gas cost adjustment in effect at the time of the bill calculations.

Rates do not include normal temperature adjustment (NTA).

For purposes of this comparison: 100 Therms = 100 Ccf = 10 Dth = 10 Mcf

Appendix E – Residential Natural Gas Bill Survey (January 1, 2012 Billing)

Bill Comparison by 200 Therms

Utilities	5-Year Average	2012	2011	2010	2009	2008
Aurora Municipal Gas	$202.24	$172.72	$172.72	$189.37	$247.85	$228.55
Boonville Natural Gas	$268.57	$199.23	$262.49	$299.18	$328.66	$253.30
Chandler Natural Gas (**)	$261.96	$199.23	$262.49	$299.18	$328.66	$220.26
Citizens Gas	$199.28	$173.86	$178.20	$189.56	$253.20	$201.60
Citizens Gas of Westfield	$212.71	$207.23	$200.61	$182.19	$249.89	$223.61
Community Natural Gas	$190.30	$146.91	$160.73	$150.84	$279.20	$213.84
Fountaintown Gas	$198.15	$183.99	$189.88	$166.37	$223.31	$227.18
Indiana Gas Company (Vectren North)	$189.52	$161.55	$166.67	$175.67	$236.02	$207.68
Indiana Natural Gas	$211.71	$171.17	$183.17	$200.03	$272.51	$231.69
Indiana Utilities	$275.73	$218.64	$269.00	$324.29	$317.56	$249.16
Kokomo Gas and Fuel **	$178.71	$135.74	$156.46	$171.10	$232.83	$197.42
Midwest Natural Gas	$207.90	$160.57	$181.67	$202.95	$261.88	$232.43
Northern Indiana Fuel & Light (NIFL)**	$173.19	$135.74	$151.94	$138.25	$238.63	$201.39
Northern Indiana Public Service Co. (NIPSCO)**	$186.48	$135.74	$150.89	***73.48	$254.20	$205.10
Ohio Valley Gas Corp. (ANR) *	$220.36	$189.28	$200.50	$198.44	$249.50	$264.06
Ohio Valley Gas Corp. (TXG) *	$246.18	$202.34	$221.02	$216.40	$309.02	$282.10
Ohio Valley Gas, Inc. *	$213.30	$169.98	$194.02	$176.72	$274.18	$251.58
Snow & Ogden Gas	$145.49	$145.49	$145.49	$145.49	$145.49	$145.49
South Eastern Indiana Natural Gas Co.	$205.01	$170.56	$179.08	$176.35	$276.97	$222.08
Southern Indiana Gas and Electric Co. (Vectren South)	$190.82	$148.39	$153.56	$173.57	$257.01	$221.57
Switzerland County Natural Gas	$197.00	$171.08	$171.53	$164.60	$259.78	$218.00
Sycamore Gas Company	$230.25	$200.36	$193.22	$211.98	$283.06	$262.64
Valley Rural Utility Company (1)	$260.85	$210.64	$204.26	$298.94	$298.60	$291.80
Industry Average	$211.69	$174.37	$189.11	$202.34	$264.26	$228.37

(1) Valley Rural Utility Company began natural gas service in July 2003; therefore, it is not included in the 10-year average.
(*) See last page for Areas Served
(**)Chandler Natural Gas merged with Boonville Natural Gas on August 27, 2008 in Cause No. 43342. NIFL and Kokomo officially merged operations with NIPSCO on May 31, 2011 in Cause Nos. 43941, 43942, and 43943.
(***) NIPSCO refunded dollars to consumers due to a change in its GCA filing frequency and regulatory authorized refunds that resulted in a lower overall billable amount.

Note:

Drawing conclusions about a utility's performance is difficult due to many factors such as utility size and resources, period from the last rate case, storage options, geographic location, base rates, customer density and gas cost adjustment in effect at the time of the bill calculations.

Rates do not include normal temperature adjustment (NTA).

For purposes of this comparison: 100 Therms = 100 Ccf = 10 Dth = 10 Mcf

NPA 812 Rate Center Map

Alternative #1
All Services Distributed Overlay

NEUSTAR

ALTERNATIVE_#1	PROJECTED_LIVES
Area "A"	25 Years

NPA 812 Map Legend

- NPA Boundaries
- Rate Center Boundaries

Produced by CDS Business Mapping 01/2006

NPA 812 Rate Center Map

Alternative #2 NPA Split

NEUSTAR

ALTERNATIVE_#2	PROJECTED_LIVES
Area "A"	21 Years
Area "B"	29 Years

NPA 812 Map Legend

- NPA Boundaries
- Rate Center Boundaries
- Split Line

Produced by CDS Business Mapping 01/2006

NPA 812 Rate Center Map

Alternative #3 NPA Split

NEUSTAR

ALTERNATIVE_#3	PROJECTED_LIVES
Area "A"	22 Years
Area "B"	28 Years

NPA 812 Map Legend

- NPA Boundaries
- Rate Center Boundaries
- Split Line

Produced by CDS Business Mapping 01/2006

NPA 812 Rate Center Map

Alternative #4 NPA Split

NEUSTAR

ALTERNATIVE_#4	PROJECTED_LIVES
Area "A"	23 Years
Area "B"	26 Years

NPA 812 Map Legend

- NPA Boundaries
- Rate Center Boundaries
- Split Line

Produced by CDS Business Mapping 01/2006

NPA 812 Rate Center Map

Alternative #5 Concentrated Overlay

NEUSTAR

PROJECTED_EXHAUST
25 years

3.5 years before Overlay Expansion

NPA 812 Map Legend

- NPA Boundaries
- Rate Center Boundaries
- Split Line

Produced by CDS Business Mapping 02/2006

NPA 812 Rate Center Map

Alternative #6 Concentrated Overlay

NEUSTAR

Produced by CDS Business Mapping 04/2006

NPA 812 Rate Center Map

Alternative #7 Concentrated Overlay

PROJECTED_EXHAUST
25 years

4.7 years before Overlay Expansion

NPA 812 Map Legend

- NPA Boundaries
- Rate Center Boundaries
- Split Line

Produced by CDS Business Mapping 04/2006

2012 Communications Report

Table of Contents

I. Executive Summary

The Communications section of the Regulatory Flexibility Report discusses key issues facing the industry, both in Indiana and at the federal level. These topics include participation by the IURC in the development of changes to federal policies such as universal service and intercarrier compensation, as well as broadband and video service pricing. Additionally, the Report shows how Commission policies such as area code relief, numbering, and the certification of prepaid wireless eligible telecommunications carriers (ETCs) affect the economy of the state. It also highlights actions taken by the Commission to address specific challenges associated with these topics.

Universal Service

Universal service has been a key factor in the rapid development of today's telecommunications network. While originally focused on ensuring access to telephone service, the Federal Communications Commission (FCC) recently developed a National Broadband Plan to help connect Americans to the Internet. According to the National Broadband Plan, 5% of households in the United States do not have access to the Internet (a large portion of these households being low income). As a result of this new focus, resources previously designated for telephone service through the Lifeline/Link-Up programs will be reallocated to reduce waste, fraud, and abuse and add broadband as a supported service.

As the FCC considered the reform of its Universal Service Fund, it also looked at intercarrier compensation policy. The FCC has proposed several changes to the system, including eliminating access charges paid for completing long-distance calls. Because a significant percentage of smaller rural carriers' revenue is directly tied to access charges, federal high-cost support, and Indiana Universal Service Fund revenues (in some cases as high as 60%), the proposed changes may put them at risk of defaulting on loans, filings bankruptcy, or undergoing reorganization.

Prepaid Wireless ETCs

Historically, it has been challenging for Indiana, along with many other states, to raise awareness among eligible low-income households of the availability of the Lifeline/Link-Up discount. However, since the IURC approved a number of prepaid wireless "Lifeline-only"

ETCs, Lifeline subscribership has increased. Prior to the market entry of the Lifeline-only prepaid wireless providers,[1] Indiana's Lifeline subscribership had peaked at 59,065 households in 2006. By 2010, subscribership had declined to total of 47,821 households.[2] Based upon the latest data[3] from the Universal Service Administrative Company, Indiana now has 145,562 Lifeline subscribers representing an increase of more than 300% in two years.

Broadband Pricing

Broadband pricing heavily influences the adoption rate of the service. According to the Pew Research Center, fewer than 45% of all adults with household income less than $30,000 had broadband at home, compared to 87% of all adults with household incomes over $75,000. Consequently, the FCC has created the Connect America Fund to increase broadband availability and adoption. Additionally, several carriers have also begun voluntarily offering Internet service plans for $9.95 to lower-income households.

Video Pricing

The price of video service has been greatly impacted by the rising costs of programming content. With some companies citing content price increases in excess of 70% this year, the effects of competition in the marketplace may not offset these increased costs. Consequently, customers are experiencing higher costs for video service. This is especially true for smaller companies as programming costs are significant and cited as a growing problem.

Area Code Relief

Current forecasting reports from the North American Numbering Plan Administrator (NANPA) indicate that area code 812, serving southern Indiana, has the shortest remaining life of the Indiana area codes. The forecast released in April 2012 projects that 812 will exhaust in the second quarter of 2015. The NANPA convened a conference call for the Indiana Telecommunications Industry Group on June 13, 2012, and the group voted to file a petition for relief. The IURC received the petition on August 3, 2012. The next step is for a procedural schedule to be set, which will include multiple field hearings in various towns throughout the

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[1]The first prepaid wireless Lifeline-only provider was approved in November 2010 (Cause No. 41052 ETC 55, Virgin Mobile)
[2]Universal Service Monitoring Report, Federal Communications Commission, Released December 2011, Table 2.4
[3]Universal Service Administrative Company disbursement data for March 2012

southern part of the state. The projected exhaust date of area code 317, which serves the Indianapolis area, is not far behind.

II. Overview

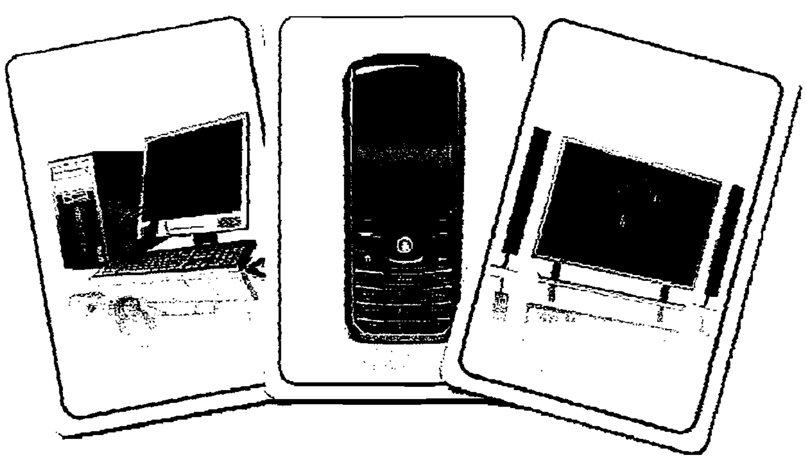
Industry Structure

Indiana was one of the first states in the nation to take advantage of the benefits of reduced regulation for its communications services industry, realizing $2 billion of private incremental investment in broadband and video build out by telecommunications and cable providers since the passage of House Enrolled Act 1279[4] (HEA 1279) in 2006. The central purpose of the statute was to facilitate a competitive market for both telecommunications and video services, while maintaining a "light touch" regulatory model.

Commission involvement remains necessary in areas where competition alone may not provide solutions.

Regulatory Structure

There are currently 660 communications service providers (CSPs) that hold a certificate of territorial authority (CTA) to provide telecommunications, information, or video services in Indiana. In 2011, Indiana-generated revenues for services provided by CSPs doing business in the state totaled $2.75 billion.[5] This is approximately 23% of the total intrastate revenues for all Indiana public utilities.



During the years following the passage of HEA 1279, the Indiana Utility Regulatory Commission (IURC or Commission) worked to modify processes and policies and to eliminate those no longer required under the new regulatory structure. At the same time, the IURC implemented procedures to address new statutory responsibilities related to video franchising and the certification of CSPs. Although the role of

[4]P.L. 27-2006
[5]2011 Annual IURC Fee Billing Report

the IURC has changed, the agency continues to serve as a monitor of the new market environment and play a significant role in protecting Indiana's interests in federal matters.

The IURC is also involved in areas of the communications industry where competition alone may not provide solutions. For example, the Commission resolves carrier-to-carrier disputes, manages policies regarding telephone numbering resources (pursuant to federal law), and works to implement streamlined certification processes to facilitate competition by reducing barriers to entry. The Commission also protects consumers from unauthorized changes to their service and ensures continued access to basic telecommunications services in high-cost areas of the state.[6]

Changes in the Marketplace

The communications industry in Indiana continues to transition from the historical model of a regulated market where monopoly or near-monopoly carriers provided single communications services to customers whom often had no choice of provider. In today's market, CSPs offer multiple services, utilizing different technologies in order to compete with companies that once operated in separate and distinct industries. For example, many telephone companies provide video service, cable companies provide voice service, and both provide high-speed Internet service.

Widespread adoption of "triple play" (voice service, Internet service, and video service) or even "quadruple play" (triple play, plus mobile wireless service) has resulted in multiple providers offering packages of services to consumers, which has led to competition, lower prices, and increased customer choice. Many companies also offer bundles or packages at a discount over stand-alone pricing. In areas of the state where "triple play" is not available, consumers are wondering why.

Legal and Policy Foundations

As Indiana's communications industry continues to evolve toward a competitive market, the continued monitoring of federal communications issues is essential to identify and, when appropriate, actively participate in federal policy developments that may have the potential to

[6]IC § 8-1-2.6-0.1

affect Indiana's economy. The IURC monitors, reviews, and provides analysis and recommendations regarding issues under consideration at the federal level. As federal policies are implemented through the Federal Communications Commission (FCC) rulemakings and Orders, the IURC must pay close attention to ensure that Indiana's interests and concerns , as well as those of customers and providers, are addressed.

Federal Policies

The FCC recently modified or is reviewing many important issues under the IURC's authority. For example, the FCC modified the requirements for the types of services that are eligible to receive federal support.[7] It also mandated stricter designation criteria for ETCs seeking to offer only the Lifeline program.[8] Under consideration are also changes to federal numbering policies regarding the types of carriers that have access to numbering resources[9] and 911 safety issues,[10] which could also directly affect Indiana customers. Consequently, the IURC has filed comments on many of these matters, including the following topics:

- Universal service fund (USF) and intercarrier compensation (ICC)
    - USF is the mechanism to support widespread and affordable telephone service in high-cost rural areas. ICC is the mechanism which governs how carriers compensate each other for traffic exchanged between their respective networks. More information about the Universal Service reform can be found on page 108.
- 3G and 4G networks build out (Mobility Fund)
    - The Mobility Fund is a new federal fund that will allocate money to subsidize the build out of wireless infrastructure in unserved, primarily rural areas of the nation. To read more about the Mobility Fund, please see page 110.
- Lifeline/Link-up reform
    - These programs were initially designed to increase the rate of telephone subscribership in low income households, but now reforms to reduce waste,

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7 USF-ICC Order, Released November 6, 2011, FCC 11-161, ¶ 78
8 Lifeline and Link-up Reform and Modernization Order, FCC 12-11, Released February 6, 2012
9 Vonage Holding Company's Request for Waiver in Order to Obtain Direct Access to Numbering Resources, CC Docket 99-200
10 Facilitating the Deployment of Text-to-911 and Other Next Generation 911 Applications; Framework for Next Generation 911 Deployment, PS Docket Nos. 11-153, 10-255

fraud, and abuse and add broadband as a supported service are underway. For more information about Lifeline/Link-Up reform, please see page 105.

- Programming costs
  - Programming (content) costs vary among the different providers, with smaller phone and cable companies being charged more per customer for content. This hurts smaller video providers and has the potential to ultimately decrease competition within the marketplace and impede broadband buildout. Programming costs are further discussed on page 113.
- Anti-cramming rules
  - This problem involves third-party billing agents putting fraudulent charges on the customers' telephone bills. More information about anti-cramming rules can be found in Appendix B.

Important Federal Policy Changes and Initiatives in 2012

Several federal policy changes and initiatives impacting Indiana's consumers and CSPs were announced this spring. The IURC has worked hard this year to prepare for their impact and has provided a summary of each one below.

Connect America Fund | *Released on April 25, 2012*

Impact: The FCC launched the first phase of the Connect America Fund (CAF-1), which is intended to connect Americans who do not presently have broadband available to high-speed Internet service by the end of the decade. CAF-1 was established to fund broadband buildout in areas where traditional telephone service is offered by price cap companies (i.e., primarily larger, publicly-traded companies) not yet served by broadband. Approximately $300 million was allocated to CAF-1 by the FCC to extend broadband to up to 400,000 previously unserved homes, businesses, and anchor institutions in rural America. Due in part to conditions attached to this funding by the FCC, some companies declined to accept the funds the FCC had tentatively allocated to them for this purpose. As a result, only slightly more than one-third ($115 million) of the anticipated funds will be deployed under CAF-1.

Carriers had 90 days in which to accept or decline funding in areas designated for support, with aggressive buildout requirements that had to be commenced in a matter of months. On July 24, 2012, the price cap carriers announced their decisions regarding acceptance of CAF-1 allocations. Two Indiana companies accepted funding to deploy broadband in parts of three counties in areas covering approximately 39 census blocks. According to the FCC, the funds allocated to Indiana will assist with building out broadband to approximately 178 customers out of an estimated 120,000 currently without broadband service available. These allocations are detailed in the chart above.

Connect America Fund			
	National Allocations	National Allocations Accepted	Indiana Allocations Accepted
AT&T	$ 47.8 million	$ 0	$ 0
CenturyLink	$ 89.9 million	$ 35.1 million	$ 41,075
Frontier Communications	$ 71.9 million	$ 71.9 million	$ 96,800

Broadband Adoption Lifeline Pilot Program | *Announced April 30, 2012*

Impact: The FCC announced the criteria it will be looking for in applicants chosen to receive $25 million of federal funding through the Broadband Adoption Lifeline Pilot Program. This is the first program offered by the FCC to evaluate the best ways to increase broadband adoption rates among low-income Americans, a group with notably low adoption rates. Applications were due by July 2, 2012. The FCC received 24 applications representing proposed pilot programs in 25 states, the U.S. Virgin Islands, and Puerto Rico; however, no Indiana companies submitted proposals for pilots in Indiana.[11] Winners will begin their year-long projects this fall.

Mobility Fund Auction | *Announced on May 2, 2012*

Impact: The FCC launched Phase I of its Mobility Fund Auction and established a window for filing short form applications, which opened on June 27, 2012 and closed on July 11, 2012. In order to be eligible, winning bidders must provide 3G or 4G wireless service within three years of the award. Each winning bidder must also provide coverage to a minimum of 75% of the road miles in each census tract for which it wins support. The FCC declined to offer additional spectrum that would have permitted new entrants to compete for Mobility Fund dollars, thereby restricting funds to existing wireless providers and precluding rural companies from bidding on

[11] www.fcc.gov/blog/charting-broadband-opportunities-low-income-americans

spectrum and competing for wireless business. The Mobility Fund Auction is scheduled for September 27, 2012.

State Policies

The rules and policies currently in place ensure that the Commission can fulfill its responsibilities outlined in state statute. These include:

- Issuing CTAs, which are licenses required to operate in specific Indiana communities, to all CSPs;[12]
- Enforcing rules to prevent unauthorized switching of telecommunications providers or unauthorized charges added to customers bills (i.e., slamming or cramming);[13]
- Performing duties concerning the provision of dual-party relay services to speech and hearing impaired persons in Indiana;[14]
- Performing duties concerning the administration of 211, a hotline for consumers to obtain information about health and human services;[15]
- Fulfilling the obligations under the Telecommunications Act of 1996 (TA-96) concerning universal service and access to telecommunications services and equipment, including designation of eligible telecommunications carriers (ETCs);[16]
- Fulfilling the obligations under Section 706 of TA-96 requiring the FCC and each state commission to encourage the reasonable and timely deployment of advanced telecommunications capability to all Americans.
    - "The Commission and each State Commission with regulatory jurisdiction over telecommunications services shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans . . . by utilizing, in a manner consistent with the public interest, convenience, and necessity, price cap regulation, regulatory forbearance, measures that promote competition in

[12]IC ch. 8-1-32.5
[13]IC § 8-1-2.6-13(d)(4)
[14]IC § 8-1-2.6-13(d)(2)
[15]IC § 8-12.6-13(d)(3)
[16]IC § 8-1-2.6-13(d)(5)

the local telecommunications market, or other regulating methods that remove barriers to infrastructure investment." – 47 U.S.C. § 706

  - This provision has added importance in light of recent FCC actions, including currently contemplated changes to ICC/USF policy, that could not only limit the ability of rural carriers to continue to invest in advanced technologies but threaten the future viability of the rural carrier business model.

- Mediating the disconnection of one carrier by another carrier to protect end-user customers from losing their service with no advance notice, pursuant to Section 251 of the TA-96;[17]

- Arbitrating and resolving interconnection disputes between telecommunications carriers, pursuant to Section 252 of TA-96;[18]

- Implementing the authority granted by state or federal law, such as numbering administration, area code relief, and federal truth-in-billing requirements for common carriers;[19]

- Overseeing the Indiana Universal Service Fund, which provides cost recovery so that companies in high-cost areas[20] may continue to offer services at rates that are "just, reasonable, and affordable."

  - "Consumers in all regions of the Nation, including . . . those in rural, insular, and high cost areas, should have access to telecommunications and information services . . . that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas." – Section 254(b)(3) of TA-96
  - The ability of the Commission to ensure that all citizens, particularly those in rural areas, have access to services in accordance with this provision of TA-96 is directly tied to the continued financial health of Indiana's rural service providers.

- Issuing certificates of franchise authority (CFAs), which are licenses required to operate in specific Indiana communities, to video service providers;[21]

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[17]IC § 8-1-2.6-1.5(a)
[18]IC § 8-1-2.6-1.5(b)
[19]IC § 8-1-2.6-13(f)
[20]High-cost service areas are designated by the federal government due to the high fixed costs of building and maintaining a telecom network in rural areas with low population densities or rugged terrain; 47 U.S.C. 254(b)(3) requires the availability of comparable service at a comparable price.
[21]IC § 8-1-34-16(a)

- Enforcing video service standards, as the designated franchise authority, regarding statutory reporting requirements; public, educational, and governmental (PEG) channels; and customer service standards for video service providers, pursuant to FCC rules in 47 C.F.R. 76.309;[22]
- Participating in federal matters concerning Indiana (e.g., ICC); and
- Reporting requirements to the General Assembly.[23]

III. Landscape

Service for All

The IURC is charged with analyzing the effects of competition and technological change on universal service and the pricing of all telecommunications services offered in Indiana.[24] In this section, the programs dedicated to expanding broadband and telephone service are discussed.

Broadband Service

Lack of broadband in rural areas is an important issue facing both Indiana and the nation today. Affordable broadband can be an important driver of economic development and improve the opportunities of low-income and at-risk populations. Broadband deployment and adoption brings about new economic possibilities for both businesses and consumers.

Broadband Investment

Since deregulation in Indiana occurred in 2006, there has been an estimated $2 billion of private incremental investment in broadband and video build out by telecommunications and cable providers.

The "Start up Savings: Boosting Entrepreneurship Through Broadband Internet" report by the Internet Innovation Alliance and the Small Business & Entrepreneurship Council shows how broadband is lowering the costs and barriers to entry for new businesses.[25] According to the report, businesses can save roughly $16,550 in the first year. The

[22]General Administrative Order 2007-2
[23]IC § 8-1-2.6-4(c)
[24]IC § 8-1-2.6-4(c)

report also noted that savings may be greater for businesses that use broadband in ways not included in the report, such as purchasing equipment and furniture or marketing products and services.

However, not all areas of the state are able to reap benefits like these due to two factors: 1) technological limitations facing broadband providers (e.g., distance from central office/wire center or loop length, lack of wireless coverage or congestion in a particular location) and 2) economics (i.e., no business case for deploying broadband in a particular location or a business decision to deploy broadband someplace else due to lower costs or higher revenue).

National Broadband Plan Goals

1. Establish competitive broadband policies.
2. Reform laws and policies to maximize the benefits of broadband in public education, health care, and government operations.
3. Ensure efficient allocation of broadband assets such as wireless spectrum, poles, and right-of-way.
4. Reform universal service mechanisms to support broadband in high-cost areas.

To address the lack of broadband, Congress directed the FCC to develop a National Broadband Plan (NBP), along with a detailed strategy for achieving affordability in order to maximize its benefits. On March 16, 2010, the FCC released the NBP, which found 95% of all households had access to high-speed Internet as of 2010; whereas, the other 5% remained unserved and tended to be concentrated in rural areas.

Telephone Service

The number of Indiana households with voice service is a fundamental barometer of the universality and affordability of telecommunications services. High telephone subscribership increases the value and functionality of the communications network for everyone by providing a reliable and instant means of communication to employers, schools, government agencies, and emergency services. According to the FCC's Universal Service Monitoring Report, Indiana tends to be below the national average in telephone penetration or "take rates."[26]

[25]http://Internetinnovation.org/small-biz/Start-Up-Savings-IIA-SBE-documentation.pdf
[26]Universal Service Monitoring Report, Federal Communications Commission, Released December 2010

- Federal Universal Service -

The IURC is required to "fulfill its obligations under TA-96 and IC ch. 20-20-16 concerning universal service and access to telecommunications service and equipment, including the designation of ETCs."[27] One such obligation is to evaluate telecommunications carriers' petitions for ETC designation, which permits a carrier to receive support from the federal USF. The federal USF supports telecommunications companies that provide service in high-cost areas and offer assistance to low-income consumers, schools, libraries and rural health care providers.

Indiana Universal Service Fund

In 2007, the IURC implemented a state universal service fund to provide cost recovery to companies in high-cost areas so they may continue offering services at rates that are "just, reasonable, and affordable."

Absent this subsidy, companies serving these areas would struggle to earn a reasonable profit and therefore lack an adequate incentive to continue operation.

- Lifeline and Link-Up -

Lifeline is a federal program designed to increase the rate of telephone subscribership among low-income citizens.[28] The program was recently streamlined to provide a uniform monthly discount to eligible low-income customers to offset the cost of maintaining voice telephony service. Link-Up, the one-time discount towards the costs of setting up service, was eliminated in non-tribal areas by the FCC to reduce the costs of the program. All ETCs are required to offer the Lifeline program, which reimburses ETCs for the discounts they provide to low-income households.

- Prepaid Wireless ETCs -

Prepaid service allows customers to purchase an amount of minutes for use on their mobile device without signing a contract. Since the service is prepaid and there is no risk of nonpayment, credit is not a barrier to obtaining the service. In recent years, some prepaid

[27]IC § 8-1-2.6-13(d)(5)

[28]To be eligible, consumers must either have a total household income that does not exceed 135% of the Federal Poverty Guidelines or participate in one of the following programs: Medicaid, Food Stamps, Supplemental Security Income, Low-Income Home Energy Assistance Program, Temporary Assistance to Needy Families, or the National School Lunch Programs Free Lunch Program.

wireless carriers have received approval from the FCC to seek designation from states as ETCs for the limited purpose of offering Lifeline benefits. The prepaid wireless carriers use the federal subsidy to provide free minutes each month, and they often provide a free basic wireless phone. Many states have approved the designation of prepaid wireless ETCs, finding they may increase the take rate among Lifeline-eligible consumers. Other states, however, have concerns that prepaid wireless carriers cannot properly verify that only one discount is being applied per household per month, as required by federal rules.

Map 1

Wireless Lifeline-Only ETC Coverage

To address this issue, the FCC released the Lifeline Reform and Modernization Order on February 6, 2012. The Order overhauls the federal Lifeline rules to eliminate waste and inefficiency, increase accountability, and transition the program from supporting stand-alone telephone service to broadband.[29] Funding mechanisms for the program include eliminating Link-up support[30] on non-tribal lands; providing a phase down and elimination of toll limitation support;[31] and replacing a tiered support system on an interim basis with a flat $9.25 per customer per month reimbursement. The Order also announces two initiatives: 1) the creation

[29]Lifeline and Link Up Reform and Modernization Order, ¶2
[30]Link-up support reimbursed ETCs for discounting up to $30 or half of the customary charges for commencing telephone service.
[31]Toll Limitation support reimburses ETCs for the cost of blocking or limiting toll calls at no charge to Lifeline customers so the customer can avoid large long distance bills.

of a national database of Lifeline customers; 2) a broadband pilot program.[32]

Changes at the federal level affect Indiana policies. In 2006, the General Assembly required the IURC to undertake a rulemaking and create a state Lifeline program structured upon federal law known as the Indiana Lifeline Assistance Program (ILAP).[33] The IURC has made two attempts to fulfill this legislative mandate, once in 2008 and again in 2010, but neither rule has been approved by the State Budget Agency, and both proposed rules have now expired. The FCC's new federal Lifeline rules eliminated the federal match for state Lifeline programs so eligible low-income customers will not receive as great an increased discount as anticipated.[34] This increases the cost of the program in relation to the benefit customers will receive which was a concern expressed by the State Budget Agency.

Historically, it has been challenging for Indiana, along with many other states, to raise awareness among eligible low-income households about the availability of the Lifeline/Link-Up discounts. However, since the IURC approved a number of prepaid wireless "Lifeline-only" ETCs, subscribership has increased. Prior to the market entry of the Lifeline-only prepaid wireless providers, Indiana's Lifeline subscribership had peaked at 59,065 households in 2006.[35] By 2010, subscribership had declined to a total of 47,821 households.[36] Based upon the latest data[37] from the Universal Service Administrative Company (USAC), Indiana now has 145,562 Lifeline subscribers representing an increase of more than 300% in two years.

Thus far, the IURC has designated five prepaid wireless Lifeline providers as eligible to receive the federal subsidy with conditions intended to prevent misuse of the program. These providers include: Virgin Mobile (d/b/a Assurance Wireless); TracFone (d/b/a SafeLink Wireless), i-wireless; TerraCom, Inc.; and Telrite Corporation (d/b/a Life Wireless). Map 1 on

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[32]In an effort to address the problem of duplicative support, the USAC is establishing a National Accountability Database to detect and prevent duplicative support in the Lifeline program. The database will contain information on the Lifeline subscribers, including the name, address, and phone number of each subscriber, as well as other unique identifiers. The FCC expects this database to be operational no later than February 2013. Another project is underway to study the effects of directly funding stand-alone broadband services for low-income consumers. Up to $25 million will be dispersed to ETCs for their respective 18-month pilot programs.

[33]IC ch. 8-1-36

[34]The former federal Lifeline rules provided a 50% match of state funds.

[35]The first prepaid wireless Lifeline-only provider was approved in November 2010 (Cause No. 41052 ETC 55, Virgin Mobile).

[36]Universal Service Monitoring Report, FCC, Released December 2011, Table 2.4

[37]USAC disbursement data for March 2012

page 106 shows the wireless coverage provided by these five carriers largely through leased facilities. Five additional Lifeline-only wireless carriers' ETC petitions are pending.

Universal Service and Intercarrier Compensation Reform

On November 18, 2011, the FCC announced major changes to the federal USF and Intercarrier Compensation (USF/ICC) regimes, which it claims will improve efficiencies and speed up the development of broadband service in rural areas of the United States, both of which are goals of the NBP. In the Order, the FCC proposes slashing existing high-cost support and repurposing the money to support voice telephony services (e.g., traditional service and Voice over Internet Protocol (VoIP) service) and networks capable of providing both voice and broadband services. Further, the FCC proposes to gradually phase out access charges paid for completing long-distance calls. The end result will be what is known as "bill-and-keep," in which companies would be paid nothing for terminating calls (whether local, long distance, wireless, or VoIP). All costs for terminating those calls would be paid directly by the customers, in the form of explicit bills with higher charges.

In the USF/ICC Order, the FCC proposes slashing existing high-cost support and repurposing the money to support voice telephony services (e.g., traditional service and VoIP service) and networks capable of providing both voice and broadband services. Further, the FCC proposes to gradually phase out access charges paid for completing long-distance calls.

The FCC's changes raise concerns that some rural local exchange carriers (RLECs) might be at risk as a result of federally-mandated reductions in two of their most important revenue streams – access charges and universal service/high-cost revenue – with no certainty of offsetting revenue increases. Concern is even greater for companies that have incurred loans or other fixed debt obligations often in order to build out broadband over the past decade. Consequently, reductions in revenues, if large enough, would jeopardize the ability of some companies to repay their debt on a timely basis and may put their business models at risk.

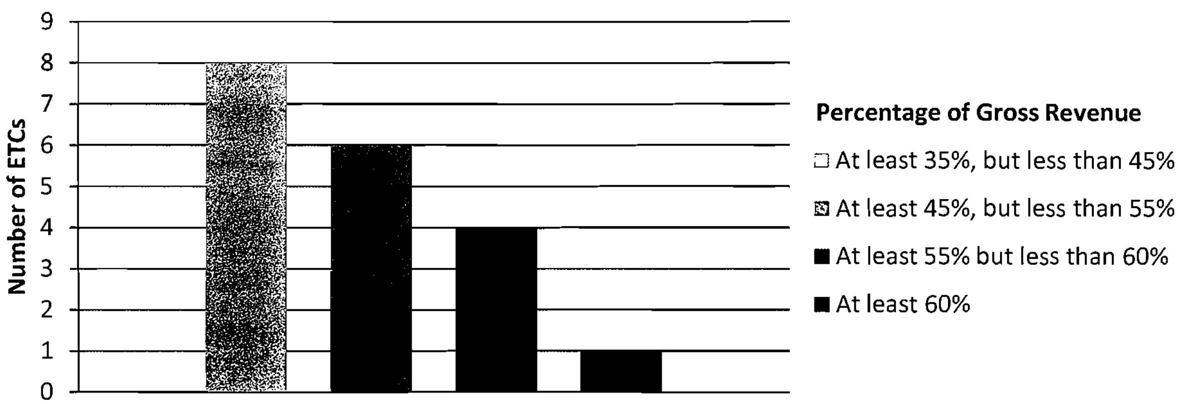
In order to assess the number of companies that could be adversely affected, a request for information[38] was sent to all ETCs, excluding pre-paid wireless carriers. Our review reveals a

[38]In addition to requesting financial information and information about current debt loads, IURC staff also asked a number of questions about broadband availability and accessibility.

mixed result for Indiana companies. Of the 42 ETC respondents, 19 indicated the ratios of their switched access, federal high-cost support, and Indiana Universal Service Fund (IUSF) revenues when added together made up more than 35% of their annual gross revenues; whereas, 23 respondents indicated these ratios, in the aggregate, accounted for 35% or less of their respective annual gross revenues. The percentages are detailed in Chart 1.

Chart 1

ETC Dependence on Revenue from Sources other than End User Charges[39]



Source: Responses to ETC information request

Also found through the information request is that a majority of respondents have no debt, and for those with outstanding debt or notes, there may be mitigating factors that would lessen the potential harm for some companies (e.g., the term of the debt, low interest rates, and/or a low ratio of annual debt service payments to annual gross revenues). Some Indiana local exchange carriers, however, may still be at risk of defaulting on their debt service payments or other fixed obligations, filing bankruptcy, or undergoing reorganization.

- Changes to ETC Requirements -

The FCC's order also changed which communications services are supported by federal universal service funds and high-cost support.[40] The former definition favored traditional local exchange service providers as ETCs; whereas, the current definition redefines supported services as "voice telephony services." This allows CSPs that offer VoIP to now become ETCs, which

[39]Revenue sources other than end-user revenue consist of switched access revenue, federal high-cost support, and IUSF support.
[40]USF-ICC Order, Released November 6, 2011, FCC 11-161, ¶ 78

means they are eligible to receive universal service support for build out, maintenance, or the provision of services in high cost or underserved areas. Prior to this change, only telecommunications carriers were designated as ETCs. As a condition of receiving federal high-cost universal service support, all ETCs are required to offer broadband service in their supported area that meets certain basic performance requirements at rates comparable to offerings of broadband services in urban areas.[41]

- Mobility Fund -

Stemming from the FCC's USF/ICC reform order is the creation of a program known as the Mobility Fund, which was developed to subsidize the cost of building wireless networks for voice and broadband services to underserved and unserved areas. The program consists of two phases. Phase I is designed to fund capital improvements, and Phase II is designed to provide ongoing support for operation and maintenance expenses. The first step of Phase I was to identify the census blocks where financial support should be available.

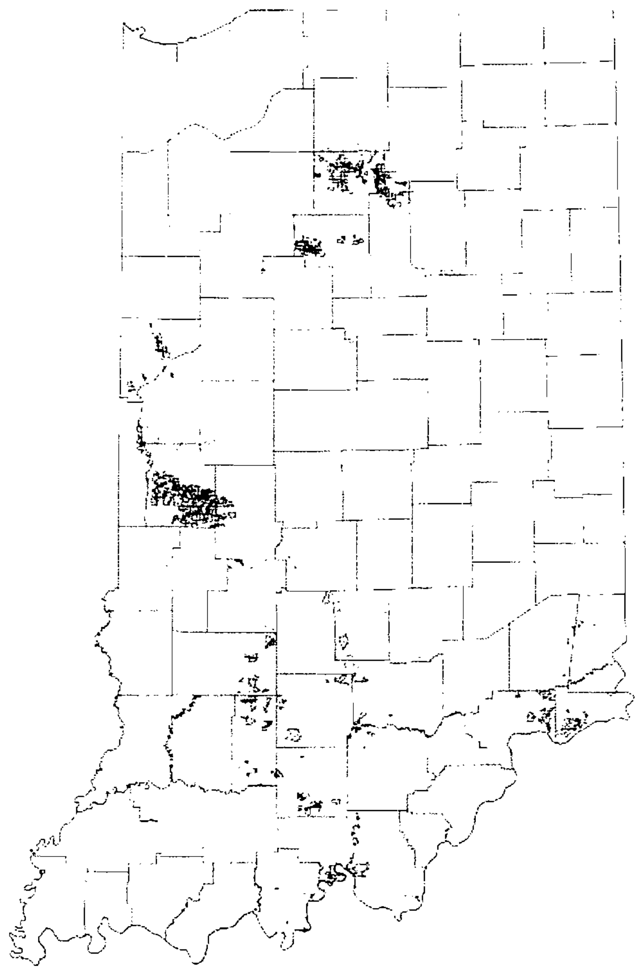
After reviewing the FCC's list of eligible census blocks for Mobility Fund support, the IURC identified an additional 1,416 census blocks in Indiana that may qualify.

After reviewing the FCC's list of eligible census blocks, the IURC identified additional census blocks in Indiana that may qualify for Mobility Fund support. In comments filed with the FCC, the IURC identified an additional 1,416 census blocks that were underserved or unserved, according to the broadband availability data maintained by Indiana Office of Technology. The accuracy of this data is important for Indiana because inclusion on the FCC's list of eligible census blocks determines whether Mobility Fund support is available in a particular area.

[41]USF-ICC Order ¶86

Map 2

Census Blocks without Coverage at the Centroid*



Legend

Census Blocks without Wireless Coverage at Centroid not in American Roamer Data

Census Blocks Eligible for Mobility Fund - American Roamer Data

Wireless Coverage – Indiana Office of Technology (IOT) data

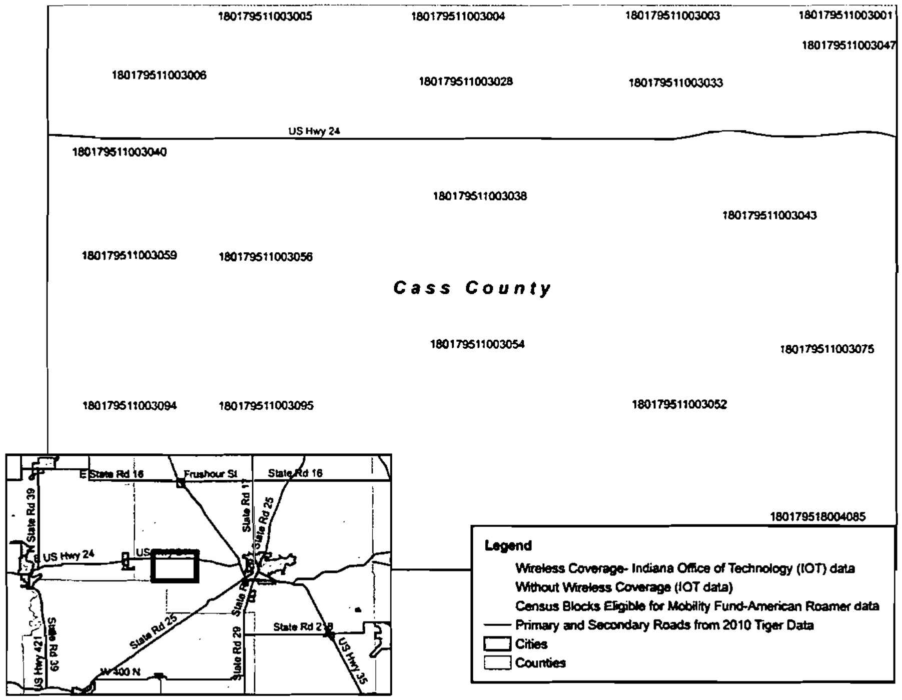
Counties

*Census Block Centroid: A point that is located at the geographic center of a census block.

The Commission filed these comments with the hope that the FCC will add additional Indiana unserved census blocks to the list, which increases the likelihood carriers will bid for support to enable the deployment of wireless service in areas that are currently unserved. The FCC has yet to rule on this issue. Map 3 shows an example of census blocks without coverage.

Map 3

Example of Census Blocks in Indiana without Wireless Coverage



Pricing and Economics

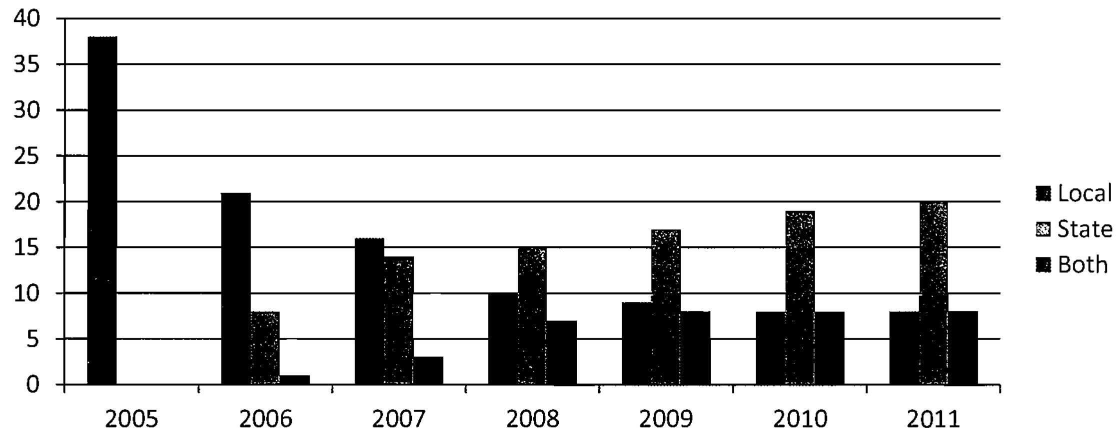
Video Pricing

Increasingly, video service is being offered by providers under state-issued franchises. As of December 31, 2011, 28 of the 36 video service providers (VSPs) serving in Indiana held state-issued video service franchises, while the other 8 continued to provide service under local franchises. In the case of incumbent cable providers, a company that chose not to terminate its local franchise agreement with its respective communities in 2006 is able to keep the existing agreements until they expire. Upon expiration, the provider must file for a state franchise. Chart 2 shows how providers have transitioned from local to state over the years.

As of December 31, 2011, 28 of the 36 video service providers serving in Indiana held state-issued video service franchises, while the other 8 continued to provide service under local franchises.

Chart 2

Number of Video Franchises by Year



Source: Video Data Requests

Analyzing the benefits of competition in the video market is complicated by a number of factors. For example, most providers offer multiple video packages, ranging from a basic package with a relatively small number of channels to larger packages with more channels. In addition, an increasing number of providers offer optional on demand services and programming offered at incremental a la carte pricing. National content providers tend to bundle their offerings, requiring providers wanting to offer the most popular channels to take other channels as well, often with significantly smaller audiences, for a package price.

- Cost of Content -

Video programming content consists of traditional broadcast network stations, as well as specialty channels, like the sports channel ESPN. The cost of video programming content is a factor in the prices consumers pay for video service. Many VSPs attribute price increases to the rising cost of programming content, which varies based on decisions made by the various VSPs. For smaller companies, programming costs are significant and cited as a growing problem. In fact, some VSPs cite annual content cost increases in excess of 70%. While some VSPs are confronted with a take it or leave it proposition, others report they have often been forced to carry less desirable channels in order to include the "must have" content or programming. VSPs also indicate content providers threaten

Many video service providers attribute the need to increase prices to the rising cost of programming content, which varies among the different video service providers.

to (and sometimes do) pull their content just prior to programs with high viewer interest[42] in order to force VSPs to accept terms and pricing.

Although not a new issue, the IURC raised concerns about content cost in comments filed last year with the FCC in its Notice of Proposed Rulemaking related to Retransmission Consent. The concerns focused on the national players that enjoy a content monopoly, not the traditional, over-the-air provider. In its comments, the IURC pointed out that, "Discrimination in the pricing of content does occur, and it is detrimental not only to the small network providers (cable companies and local exchange companies) involved and to their customers, but also to competition in the video market and the build out of broadband, particularly in rural, unserved and high cost areas."[43] Unless the FCC addresses this issue, it is likely some smaller VSPs will cease providing video services and that the rates of remaining providers will likely increase.

Bundled Pricing

For consumers, package prices are typically lower than the sum of the stand-alone prices. However, it is important to note that packages and bundles may feature limited-term promotional pricing. Thus, comparisons between package prices and standalone prices that are valid today may not be valid comparisons in the future, as existing promotions expire and new promotions are introduced.

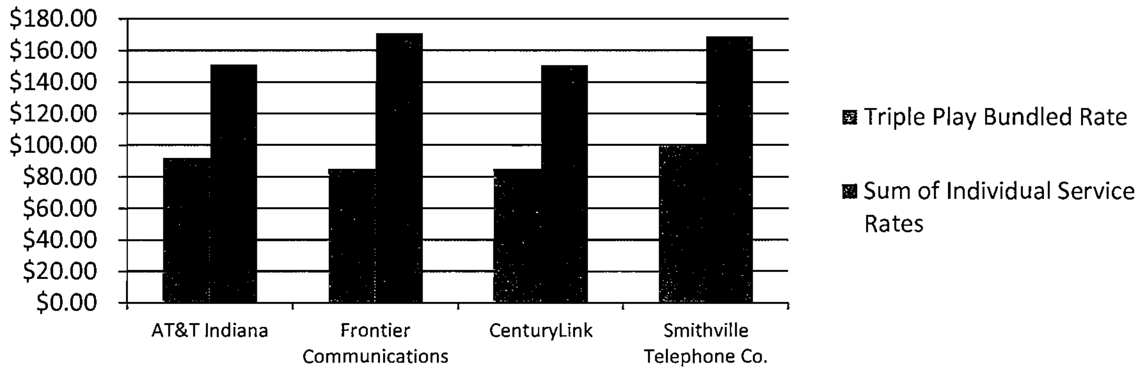
Companies attempt to retain existing customers and attract new customers by offering packages at a significant discount.

Of course, some customers receive more benefits than others, and some customers may perceive a diminished benefit if they purchase a bundle containing services they would not ordinarily purchase in order to obtain services they want. In response to this concern, companies have begun offering "build your own" packages and bundles. Chart 3 on the following page includes prices for select triple-play bundles and compares them with separately priced components of those bundles.

[42] Super Bowl, World Series, the Oscars, Olympics, etc.
[43] Initial comments of the Indiana Utility Regulatory Commission, MB Docket No. 10-71(FCC 11-31, Rel. March 3, 2011)

Chart 3

Comparison of Bundled Rates to Sum of Individual Service Rates



Source: Company information

The significant consolidation in the communications industry over the last few years, primarily in the wireless industry, has continued the trend toward obtaining packages and bundles from a single provider. Therefore, it will become increasingly more difficult for customers to obtain multiple services on a stand-alone basis from multiple providers.

Broadband Pricing

In most situations, as goods and services become more widespread, the unit cost decreases, and it becomes easier to expand production and sales due to economies of scale. Such is not the case with broadband. The more widely dispersed the population, the more challenging the geography and terrain, and the greater the distance customers are from the equipment, the greater the cost. Consequently, the cost of providing service to remote rural areas is usually much greater than the cost of providing otherwise identical service in the small towns and cities that are the hubs of typical rural communities. Included in this report (Appendix A) are stories from three rural broadband providers about this issue and their unique perspectives.

Benefits of Price Shopping

A recent study conducted by Miami-based Broadband Expert suggests that where multiple broadband providers offer service, the typical American family may be able to easily save $60 per year by switching Internet service providers.

Broadband pricing that is considered "too high" or "unaffordable" is a deterrent to customers subscribing to broadband. This is true regardless of a person's income; however, the impact can be especially significant for low-income households. According to the Pew Research Center, fewer than 45% of all adults with household income less than $30,000 had broadband at home, compared to 87% of all adults with household incomes over $75,000.[44] In response, a number of different programs are underway to make broadband more readily available to low-income households.

- Broadband Availability -

Broadband availability has been determined by analyzing mapping projects, stemming from National Telecommunications & Information Administration (NTIA) grants, and data reflected in the National Broadband Map. The IURC has also supplemented the picture of Indiana's broadband availability with data acquired from various other sources. According to this data, broadband is widely available in urban areas and rural areas served by small incumbent local exchange carriers (ILECs). The portions of Indiana lacking broadband tend to be rural areas served by the large ILECs.

There are at least two possible explanations for this discrepancy. Subsidies, such as the federal USF, have not historically been available to the large ILECs in Indiana. While broadband is not a USF supported service, some small and mid-sized companies have received USF for supported services which then allowed the use of other internal funds for deploying broadband. In addition, it has been difficult if not impossible to build a business case for build-out to the most hard-to-reach areas.

In any event, the FCC contends that changes to the federal USF program will address the lack of broadband in areas that have not been the recipients of USF support in the past. Last November, for example, the FCC adopted a seventh "principle" for universal service, in addition to the six that Congress previously established in 1996.[45] This new principle states that: "Support for Advanced Services – Universal service support should be directed where possible to networks that provide advanced services, as well as voice services."[46] At a more concrete

[44]*Home Broadband 2010*, Table, p. 8 (Aug. 11, 2010) www.pewinternet.org/Reports/2010/Home-Broadband-2010.aspx (visited Aug. 9, 2012)

[45]47 U.S.C. § 254(b). Section 254(b)(7) permits the FCC and the Universal Service Joint Board to establish additional principles, beyond the six set by statute.

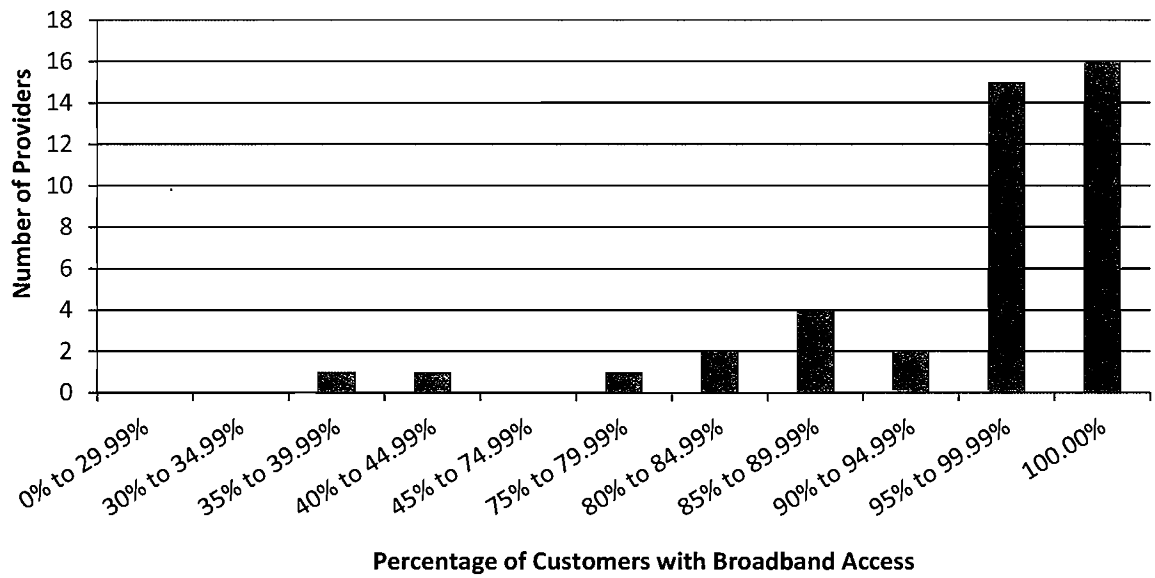
[46]USF-ICC Order, para. 45

level, while the FCC has declined to add broadband to the list of supported services[47], nevertheless, the regulatory paradigm has shifted to "extending federal support to carriers deploying broadband networks in high-cost areas" (emphasis added).[48]

In our ETC information request, we asked, "What percent of your customers have access to broadband service?" The 42 responding companies reported percentages ranging from 38% to 100%. The median response was 99%. Chart 4 shows the frequency distribution for this range and that 31 of the 42 respondents has made broadband available to at least 95% of their customers.

Chart 4

Percentage of Customers with Broadband Available



A survey of the National Telecommunications Cooperative Association (NTCA) members[49] found that 71% of its members' customers have service with download speeds of at least 4 Megabits per second (Mbps).[50] Based upon data collected by the IURC, it appears there are at least seven companies offering broadband service in Indiana at a maximum download speed of

[47]USF-ICC Order, para. 65
[48]USF-ICC Order, para. 67 (*See, e.g.*, 47 C.F.R. § 54.7(b))
[49]NTCA in 2009 had 580 member telcos: 258 cooperatives and 322 locally owned and controlled commercial companies. In addition, the association has 385 associate member suppliers, equipment manufacturers, and other companies providing financial, legal, engineering, accounting, billing, and other essential services to rural telephone systems, 99 subsidiary members, and 10 international telco members, 61 statewide and regional telephone associations bring NTCA's total membership to 1,135. www.ntca.org/about-ntca/who-we-are.html
[50]*NTCA 2011 Broadband/Internet Availability Survey Report (March 2012)*

less than 4 Mbps, at a maximum upload speed of less than 1 Mbps, or both. Based upon preliminary analysis, these companies are likely ineligible for federal broadband support, which presupposes actual speeds of at least 4 Mbps downstream and at least 1 Mbps upstream. In order to understand the long-term implications for Indiana and to know which Indiana companies would be eligible for federal broadband support, staff would need to confirm the accuracy of these responses as well as verify the companies' future broadband deployment plans.

- Adoption -

To realize its benefits, broadband must be adopted or purchased by customers in areas where it is available. If adoption does not occur, it represents a missed opportunity for the economic and social benefits that broadband can offer and presents a substantial risk to providers that have invested in expensive and capital-intensive infrastructure. Insufficient subscription rates for broadband service jeopardize the provider's ability to recover costs and endanger their viability.

At least two companies with Indiana operations have voluntarily begun offering, or will soon offer, broadband services to eligible low-income customers for $9.95 per month (plus tax). Internet Basics service[51] offers eligible low-income homes download speeds of up to 1.5 Mbps and has been available from CenturyLink since October 2011. The City of Franklin was in the first group of communities nationwide to receive this offer. Comcast offers download speeds up to 3 Mbps and upload speeds up to 768 Kbps through its Internet Essentials service.[52] CenturyLink and Comcast also offer netbook computers for a discounted price of $150, as well as training in certain computer and Internet skills. Comcast service is determined by eligibility for the federal school lunch program (both free and reduced price lunches). CenturyLink ties eligibility to qualification for the Lifeline low-income telephone service program, which is based on eligibility for a broader range of federal programs.

When asked in the IURC's ETC information request "Of your customers who have broadband available to them, what percent subscribe to the service?," responding companies reported subscription rates ranging from 5% to 92%, with the median response being 62%. Chart 5 shows the responses we received.

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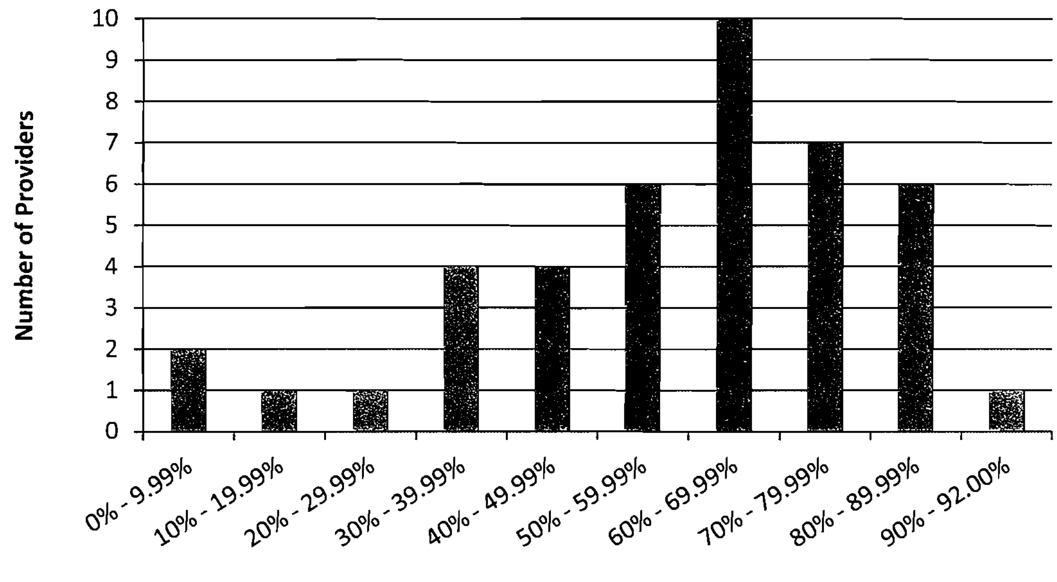
[51]CenturyLink Internet Basics: www.centurylink.com/home/Internetbasics/?rid=Internetbasics (visited May 31, 2012)
[52]Comcast Internet Essentials: www.Internetessentials.com/faq/default.aspx (visited May 31, 2012)

Chart 5

Broadband Availability and Subscribership



Source: Responses to ETC Information Request

- Why do some customers say no to broadband? -

Based upon feedback received from their customers, companies cite cost or price as the most common reason for lack of broadband adoption. The second most common reason is that customers simply don't need or don't want broadband. Other reasons given were lack of a computer and/or computer skills. These were also the top three reasons in the Pew Research Center's study, which is shown in Chart 6.

Adoption rates are heavily influenced by the characteristics of the broadband service available for purchase. Broadband service pricing and available speeds affect potential customers' desire, need, and ability to purchase broadband service. Potential customers' favorable perceptions of broadband service are also influenced by potential customers' understanding of its possible benefits, uses and applications.

Broadband service, like all communications services, requires some form of equipment, such as a personal computer, smart phone, or tablet, to utilize the service. Such equipment is often not included in the cost of broadband service and represents an additional cost to potential customers who might wish to subscribe. Additionally, potential customers need skills to use a computer and available service applications and/or access to training to acquire such skills. All of these factors can affect potential customers' ability, willingness, and desire to subscribe to broadband service.

Chart 6

Reasons Non-Internet Users Don't Use the Internet

In May 2010, 21% of American adults age 18+ did not use the Internet (as of April 2012, the number is 18%). When asked the main reason they do not go online (in their own words), they cited these factors.

Reason for not using the Internet	% of offline adults
Just not interested	31%
Don't have a computer	12%
Too expensive	10%
Too difficult	9%
It's a waste of time	7%
Don't have access	6%
Don't have time to learn	6%
Too old to learn	4%
Don't want/need it	4%
Just don't know how	2%
Physically unable	2%
Worried about viruses/spyware/spam	1%
Other	6%

Source: Pew Research Center's Internet & American Life Project, April 29-May 30, 2010 Tracking Survey

Regulatory Development

Number Request Streamlining

The FCC has authority over the distribution of numbering resources so that CSPs can provide telephone numbers to their customers. Federal rules determine the appropriate quantity of telephone numbers allocated to each CSP in order to prevent hoarding of telephone numbers and to forestall area code exhaust. However, the FCC acknowledged that situations will arise when a carrier will not be able to comply with federal allocation rules, yet will have a legitimate need for additional numbering resources, such as when a new hospital or commercial enterprise requests large blocks of numbers from their carrier of choice.[53] The FCC set up a waiver process (called the safety valve process) and delegated to state commissions the responsibility to approve or

[53]In the Matter of Numbering Resource Optimization, *Third Report and Order and Second Order on Reconsideration* in CC Docket No. 96-98 and CC Docket 99-2000, dated December 2001

deny such waivers based upon a determination that the carrier has demonstrated a verifiable need for numbering resources and has exhausted all other available remedies.[54]

On May 13, 2011, Governor Daniels signed into law Senate Enrolled Act 480, which added IC § 8-1-2.6-17 and allowed the IURC to delegate authority to its staff to grant requests for numbering resources submitted through the waiver process established by the FCC. On November 9, 2011, the IURC issued a General Administrative Order (GAO) streamlining the safety valve process.[55] A public hearing can be omitted if the petitioner provides all the documentation enumerated in the GAO, and there are no requests for a hearing from an interested party or the IURC within 10 days of the petition being filed. This reduces the timeline by two weeks or more. The IURC is considering how to further streamline this process.

Area Code Relief

Numbering administration rules, which are overseen by the FCC and partially delegated to the states, have evolved since the development of the North American Numbering Plan (NANP) in 1947. This system accommodates direct dialing of long-distance calls to the 19 countries in the NANP.[56] After this system was created, some area codes gradually exhausted. In other words, they ran out of unused or unallocated ten-digit telephone numbers.

The most recent exhaust of an Indiana area code was area code 219 in 2001, which covered northern Indiana. The Commission conducted numerous field hearings in affected communities throughout the area and gathered testimony from industry representatives and citizens.

After the passage of TA-96, competition among multiple local exchange and wireless carriers placed additional demands upon numbering resources. As a result, state utility commissions and the FCC have implemented policies to conserve blocks of telephone numbers to postpone area code exhaust dates. When an area code is three years from its projected exhaust date, the North American Numbering Plan Administrator (NANPA) files a petition on behalf of the Indiana telecommunications industry with the IURC. The petition usually proposes different scenarios for relief of the area code, such as whether to split the area code into two or three areas or

[54] 47 C.F.R. 52.15 (g)(4)
[55] GAO 2011-3
[56] www.nanpa.com/about_us/abt_nanp.html (visited April 29, 2011)

implement an "area code overlay," which requires new number holders to receive a new area code but allows existing customers to keep their existing phone number(s). In the end, the IURC will determine how the area code will be relieved.

Pros and Cons of an Area Code Split or Overlay

	Pro	Con
Area Code Split	• When an area code is split some people get to keep their phone numbers and dial as usual. • Seven-digit dialing for local calls continues for everyone.	• Some consumers are inconvenienced by the need to notify others of their new area code. • Business customers face significant expenses related to changing marketing materials
Area Code Overlay	**Pro**	**Con**
	• Customers do not have to change their telephone numbers. • Existing number holders keep the same area code. • It is easy to implement another area code when necessary.	• All residents living within an area code overlay need to become accustomed to dialing ten digits for all local calls. • Slow growth areas that are not driving area code relief also have to dial ten digits.

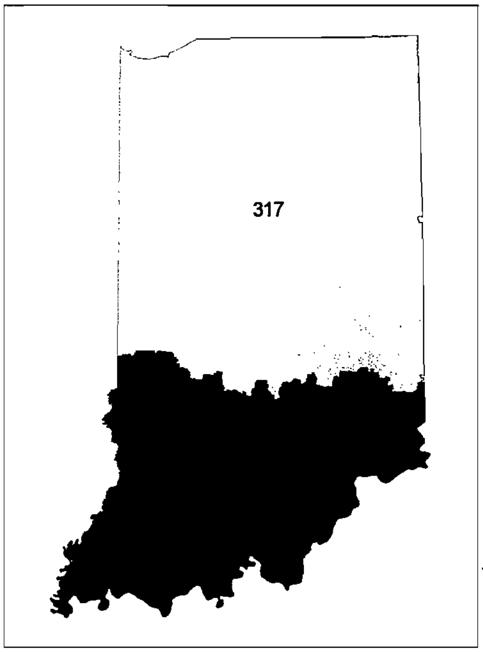
The most recent exhaust of an Indiana area code was area code 219 in 2001, which covered northern Indiana. The Commission conducted numerous field hearings in affected communities throughout the area and gathered testimony from industry representatives and citizens. In that instance, the IURC determined that an area code split was the best solution. Consequently, the area was split into three area codes: 219, 260, and 574.[57] Map 4 on the following page shows the evolution of area code relief in Indiana from 1947 to the present.

[57]Cause No. 41535, Final Order, June 14, 2001

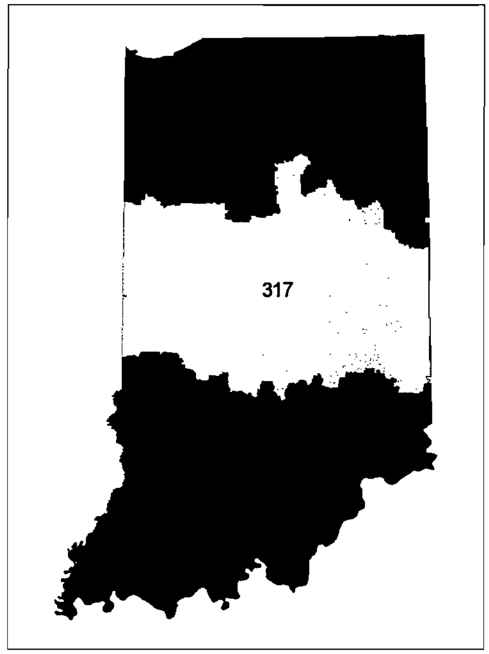
Map 4

Area Code Relief from 1947 to 2012

Indiana Area Codes (1947)

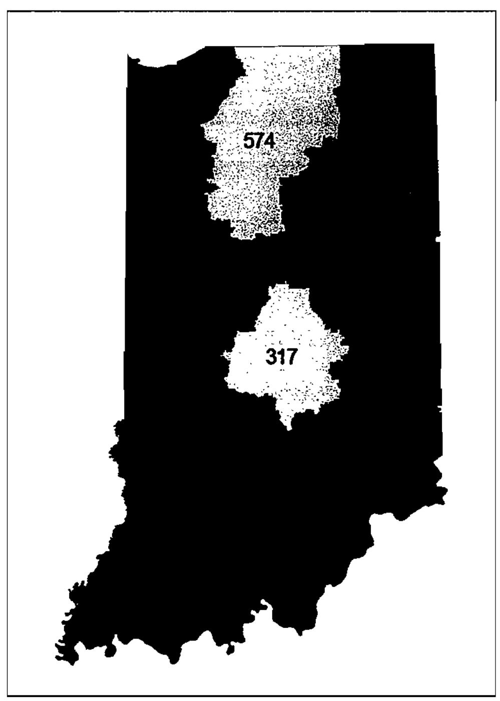


Indiana Area Codes (Post 1947-Pre 1997)



Indiana Area Codes (1997-2002)

Indiana Area Codes (2002-2011)



- Relief Pending in Area Code 812 -

Current forecasting reports from the NANPA indicate that area code 812, serving southern Indiana, has the shortest remaining life of the Indiana area codes. The forecast released in April 2012 projects that 812 will exhaust in the second quarter of 2015. Exhaust projections for 812 have been extended several times. In the 2008 report to this committee, the IURC stated the 812 area code would exhaust in the 3rd quarter of 2011. That date has been pushed back to 2015 due, in part, to conservation efforts by the IURC and the Indiana telecommunications industry.

A relief petition for area code 812 was filed with the IURC on August 3, 2012 in Cause No. 44233. The petition recommends that the Commission approve an all services distributed overlay as the preferred form of relief for area code 812.

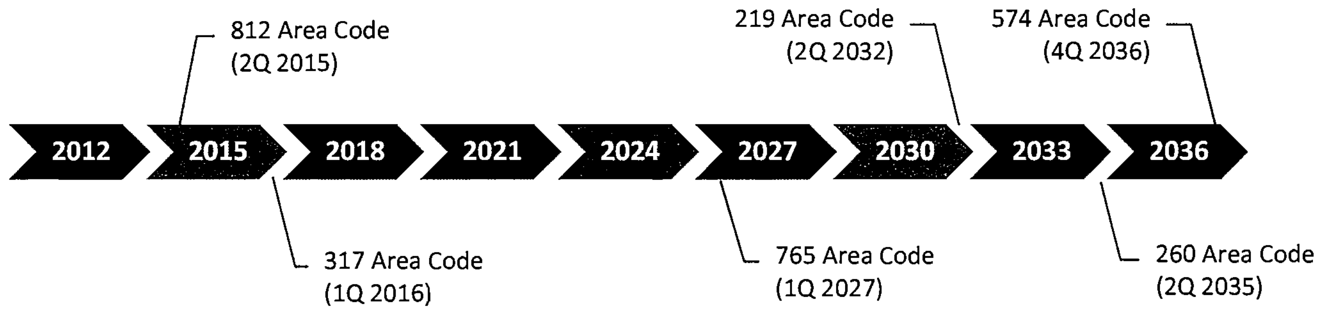
The NANPA convened a conference call for the Indiana Telecommunications Industry Group on June 13, 2012, and the group voted to file a petition for relief. A relief petition was filed on August 3, 2012 in Cause No. 44233. The petition recommends that the Commission approve an all services distributed overlay as the preferred form of relief for area code 812. The next step is for a procedural schedule to be set, which will include multiple field hearings in communities throughout the southern part of the state.

The projected exhaust date of area code 317, which serves the Indianapolis area, is not far behind area code 812. According to the latest forecasting report, area code 317 is projected to exhaust in the first quarter of 2016 – a two year decrease in its projected life when compared with the forecasting report released in 2011.[58] The decrease is due to increased demand for telephone numbers in this area code. If the exhaust date remains the same or moves forward in the next Numbering Resource Utilization/Forecast (NRUF) report released in October 2012, the NANPA will conduct an area code relief planning meeting to consider filing an area code relief petition with the IURC. The current life projections for Indiana's six area codes are reflected in the following timeline.

[58] 2011-2 NRUF and NPA Exhaust Analysis, North American Numbering Plan Administrator, October 2011

Chart 7

Projected Area Code Exhaust Dates



Source: North American Number Plan Administration, 2012-1 NRUF and NPA Exhaust Analysis, released April 2012

Provider of Last Resort Obligations

The IURC is committed to ensuring that all areas of the state have coverage by at least one carrier that is obligated to: 1) provide access to voice services (including 911 emergency response services) on a stand-alone basis and 2) offer a Lifeline discount to eligible customers. Building on the streamlined regulatory scheme set out in P.L. 27-2006, the General Assembly recently passed House Enrolled Act 1112 to allow an ILEC to opt-out of the state's provider of last resort (POLR) obligations, which require them to offer local exchange service throughout a defined geographic area.[59]

Starting July 1, 2012, a POLR can be relieved of its obligation in areas where there are at least two providers that offer supported services under federal law. After June 30, 2014, a POLR may be relieved of its state POLR obligation in any part of its service area that it selects. However, before doing so, the carrier must identify and provide notice of these areas to the IURC. This does not mean customers will lose service but does mean the traditional monopoly provider, because other providers are now available, is no longer obligated to serve all customers. The IURC has the necessary authority to ensure all customers have access to voice service, including 911 emergency services for public safety.

[59]IC § 8-1-32.4-9

POLR requirements are similar to the ETC concept found in United States Code Title 47. One of the primary requirements for obtaining an ETC designation is the provider's acceptance of the obligation to provide all customers in its service area with access to voice service. The combination of federal and state regulations helps ensure that all Hoosiers continue to have access to voice telephony services. As changes are discussed at the federal level, the IURC and its staff will continue to monitor these actions and serve as a resource for the General Assembly and the industry.

IV. Appendices

Appendix A – Issues, Risks, and Benefits of Rural Deployment

In addition to gathering and reviewing quantitative data and maps, IURC staff also met with representatives and/or held conference calls with representatives of several companies. The goal was to give providers an opportunity to "tell their stories" and to assemble a more qualitative portrait of broadband availability (and adoption) in Indiana. Following are stories for Endeavor Communications; Citizens Telephone Corporation; and Craigville Telephone Company, Inc.

Broadband and Video Availability and Adoption in Rural Indiana

- Clay County Rural Telephone Cooperative -

Clay County Rural Telephone Cooperative serves 9,700 access lines in nine exchanges in eight counties (Clay, Hamilton, Hendricks, Morgan, Owen, Parke, Putnam, and Tipton) doing business as Endeavor Communications (Endeavor). Endeavor began a fiber build-out project in 2003 and to date has completed fiber-to-the-home (FTTH) networks in five of its exchanges with plans to complete the sixth by the end of 2012. Endeavor hired 60 to 70 new employees to deploy its fiber when company management determined that it could save money using its own crews rather than contractors.

Endeavor offers its customers voice, high-speed Internet and 260 channels over IPTV (Internet Protocol TV); it is also diversifying into providing home security/monitoring and smart home services, as well as computer tech support. Over 75% of Endeavor's rural co-op members subscribe to its high-speed Internet service but only about 33% of those living in communities where Endeavor has deployed the IPTV facilities currently subscribe to that service. Endeavor's IPTV service competes with DISH Networks and DirecTV.

From a business standpoint, Endeavor indicated that video programming costs make up approximately 75% of the total costs associated with the provision of video service. A sizeable portion of the usage of Endeavor's Internet customers is due to Netflix; however, it is unclear how many subscribers rely on it as a replacement for the IPTV service. From an economic development perspective, Endeavor hopes that state and local economic development efforts will be able to leverage the availability of broadband in their attempts to bring new businesses into its service territory.

- Citizens Telephone Corporation -

Citizens Telephone Corporation has approximately 2,000 telephone customers in two exchanges (Liberty Center and Warren), plus about 600 cable customers within the towns it serves. The territory Citizens serves is about 200 square miles or about half the area of Marion County/ Indianapolis.

Broadband is provided through DSL and all customers have access to broadband speeds of at least 10 Mbps and many have access to higher speeds, up to 20 Mbps. The broadband adoption rate is around 65%. Citizens has noticed a substantial decrease in its traditional landline telephone service subscribership due to movement to wireless and Internet service. Citizens provides fiber backhaul to five cell towers in the area using either fiber or high-speed T1 copper lines. Citizens offers a triple play package for $110.

Citizens indicates that it already meets the FCC requirements for broadband deployment to be eligible for federal USF support for broadband. The company does not believe that the recent FCC-mandated changes to the USF and ICC regimes will affect its ability to make debt service payments in the future.

- Craigville Telephone Company -

Craigville Telephone Company has between 800 and 900 landline telephone customers in its ILEC service territory in Adams and Wells counties. It also formed a competitive LEC, Adams-Wells Communications, to provide high-speed Internet service to the City of Bluffton by connecting to the Indiana Fiber Network and building fiber out into Bluffton. More than 95% of Craigville's ILEC customers have access to broadband over DSL of 1 -2 Mbps. With the addition of a remote, customers will be upgraded to 8 Mbps by the end of the summer. The company enjoys a 70% adoption rate.

In the Bluffton area, where Adams Wells competes with AT&T and Mediacom, they have attained a 50% adoption rate for high-speed Internet and have added 450 video subscribers in the area. While company representatives indicate that video service is not, on its own, contributing to margins, they believe that by providing video as part of a triple play, the company is able to attract new customers.

Appendix B – Summary of IURC Comments Filed with the FCC

Section XV Rulemaking on USF Reform Intercarrier Compensation: Initial Comments (Filed March 25, 2011) - The IURC applauded the FCC's efforts to address areas where there is gaming of the intercarrier compensation system resulting in the improper boosting or reduction of payments received by carriers resulting from: 1) artificially stimulating telecommunications traffic (traffic pumping), 2) hiding the identity of an originator of telecommunications traffic (phantom traffic) and 3) uncertainty about the compensation associated with VoIP enabled services.

USF/ICC NPRM: Initial Comments (Filed April 18, 2011) - The IURC urged the FCC to proceed cautiously with reform of the USF/ICC systems to ensure that rural carriers are not unnecessarily negatively impacted and that state commissions continue to have a meaningful role to play in implementing changes in policy that are within their jurisdictions.

Lifeline and Link Up NPRM: Comments (Filed April 21, 2011) - The IURC commended the FCC on addressing reform issues and problems associated with the federal USF programs for low-income customers but identified a number of areas where the FCC should identify and develop metrics for determining when the programs have achieved success in solving those issues and problems.

Retransmission Consent NPRM: Initial Comments (Filed May 27, 2011) - The IURC urged the FCC to address the fact that small rural video service providers often face unfavorable pricing for video content in comparison to larger video service providers and that such discriminatory pricing inhibits the wider deployment of video service and broadband service in underserved rural areas.

Retransmission Consent NPRM: Supplemental Reply Comments (Filed July 5, 2011) - The IURC clarified that its concern regarding the difficulty faced by small video providers in pricing of video content involved national content providers and not the local over-the-air content providers.

USF/ICC Further Inquiry: Initial Comments (Filed August 26, 2011) - The IURC urged the FCC to adopt the USF/ICC reform plan crafted by the State Members of the Federal-State Board on Universal Service, citing the need to preserve state-federal cooperation as new USF/ICC policies are adopted to promote the deployment of broadband.

Cramming NPRM: Comments (Filed October 24, 2011) - The IURC expressed support for the FCC's proposed cramming rules that would provide for better notification of customers regarding third party charges for services being placed on telephone bills, and the IURC suggested additional policies based on its extensive experience in assisting Indiana customers with their cramming complaints.

Final USF/ICC FNPRM: Comments (Filed January 18, 2012) - The IURC urged the FCC to move cautiously in implementing changes to its policies on comparable rates for broadband, support for carriers with overlap by unsubsidized competitors, and penalties meant to ensure accountability of USF recipients, in order to ensure that factually based, custom-tailored policy mechanisms are applied to carriers.

Final Phase II USF/ICC FNPRM: Comments (Filed February 24, 2012) - The IURC urged the FCC to cautiously proceed with implementing the access charge reforms to guard against the occurrence of unintended negative financial consequences to rural carriers and to allow state commissions flexibility in implementing the changes.

Mobility Fund Phase I Auction: Comments (Filed March 16, 2012) - The IURC provided information to the FCC regarding Indiana census blocks that were not included in the FCC's list of census blocks unserved by wireless telephone service. Using data compiled by the Indiana Office of Technology, the IURC identified additional census blocks that may not have wireless service at their geographic centers.

Mobility Fund Census Blocks: Reply Comments (Filed March 26, 2012) - The IURC provided supplemental information on census blocks potentially unserved by wireless coverage in Indiana.

USTelecom Forbearance Petition: Comments (Filed April 9, 2012) - Commissioner Larry Landis urged the FCC to refer the USTelecom's February 12, 2012 petition for forbearance from legacy telecommunication regulations to the Federal-State Joint Board on Separations in order to assess the impacts and interrelationship with other federal rules.

Appendix C – Communications Industry Statistics

New Communications Service Provider CTA Petitions Filed			
Type of Service	**2009-2010**	**2010-2011**	**2011-2012**
Information Service	27	10	23
Telecommunications Service	15	11	14
Video Service	12	0	0
Telecommunications & Information Services	2	6	8
Telecommunications & Video Services	0	0	0
Information & Video Services	5	1	1
Total	61	28	46

New Types of Service in Notices Filed by Existing Providers Since 7/1/09			
Type of Service	**2009-2010**	**2010-2011**	**2011-2012**
Information Service	31	7	2
Telecommunications Service	13	12	2
Video Service	6	1	2
Total	50	20	6

State-Issued Video Franchise Authority	
Number of State-Issued Franchises since 7/1/06	33
- Number of Existing Providers as of 7/1/06	15
- Number of New Franchises since 7/1/06	18
Number of Franchises Issued from 7/1/11 to 6/30/12	6
Number of Franchise Petitions Pending as of 7/1/12	0

2012 Water and Wastewater Report

Table of Contents

I. Executive Summary

The Water and Wastewater section of the Regulatory Flexibility Report discusses key issues facing the industry. These topics include increasing costs due to significant infrastructure needs, related cost recovery mechanisms, water efficiency efforts taking place at state and federal levels, and steps being taken to assist small utilities. It also highlights actions taken by the Commission to address specific challenges associated with these topics.

Infrastructure Needs

According to the U.S. Environmental Protection Agency's (U.S. EPA) "2007 Drinking Water Infrastructure Needs Survey and Assessment" and its "2008 Clean Watersheds Needs Survey," Indiana's water and wastewater infrastructure needs total $13 billion over the next 20 years, which will likely result in significant rate increases. According to the U.S. Bureau of Labor Statistics, water rates are rising more than electricity or natural gas rates and rising much faster than the overall consumer price index (CPI). For example, from 2002 to 2011 water and wastewater rates rose 5.56% per year while the CPI only rose 2.43% per year. The primary drivers of these rate increases include: 1) replacement of aging infrastructure; 2) compliance with U.S. EPA standards such as water quality and wastewater effluent; 3) growing demand; and 4) the relocation of facilities for city and state road projects.

Recovery Mechanisms

In order to encourage investment and limit the rate impact on customers, state law allows for certain expenses to be recovered outside of a base rate case. Indiana was the second state to approve the use of a capital recovery mechanism, called the distribution system improvement charge (DSIC). The DSIC allows water utilities to recover the costs of improvements to existing distribution systems without a rate case when investments are made. This results in rate increases that tend to be more gradual over time. Utilities may also use the minimum standard filing requirements process to update their rate base for capital investments incurred up until the final hearing. This can be an incentive to invest in capital improvements, as the utility does not need to wait until a later rate case to earn a return on the investment.

Water Efficiency Efforts

Another way to stave off rate increases is to reduce demand and ensure water is being used efficiently. However, with increased conservation comes decreased consumption, which may lead to a decline in revenue. The challenge then becomes implementing conservation programs without negatively impacting the financial viability of the utility. Conservation and more efficient water use can also help during periods of drought and high temperatures like Indiana experienced this summer, during which time a number of municipalities restricted water use for residential customers.

Lack of rain, high temperatures, main breaks, and unaccounted-for-water, can result in low water pressure or supply shortages. To address these issues, the Commission, the Indiana Department of Environmental Management, and the Indiana Department of Natural Resources enforce rules designed to promote service quality. Actions through the Legislature are also addressing water issues. For example, Senate Enrolled Act 132 charged the IURC with aggregating information about water resources within the state in order to identify how financial resources are being used; what the infrastructure investment needs are statewide; and how to minimize impact on customer rates and charges through recommended actions.

Assistance for Small Utilities

Small water and wastewater utilities are prevalent in Indiana. While not all small utilities are troubled, they are more prone to it because of their size and lack of management expertise. When a utility becomes troubled, it may experience environmental liabilities, infrastructure breakdown due to a lack of investment, or financial mismanagement. Although most small utilities have withdrawn from the Commission's jurisdiction, the agency has proactively taken steps to improve the management and operations of regulated utilities by offering training workshops, assisting with rate application filings, proposing alternative regulatory procedures, and plans to develop a utility accounting manual.

II. Overview

Industry Structure

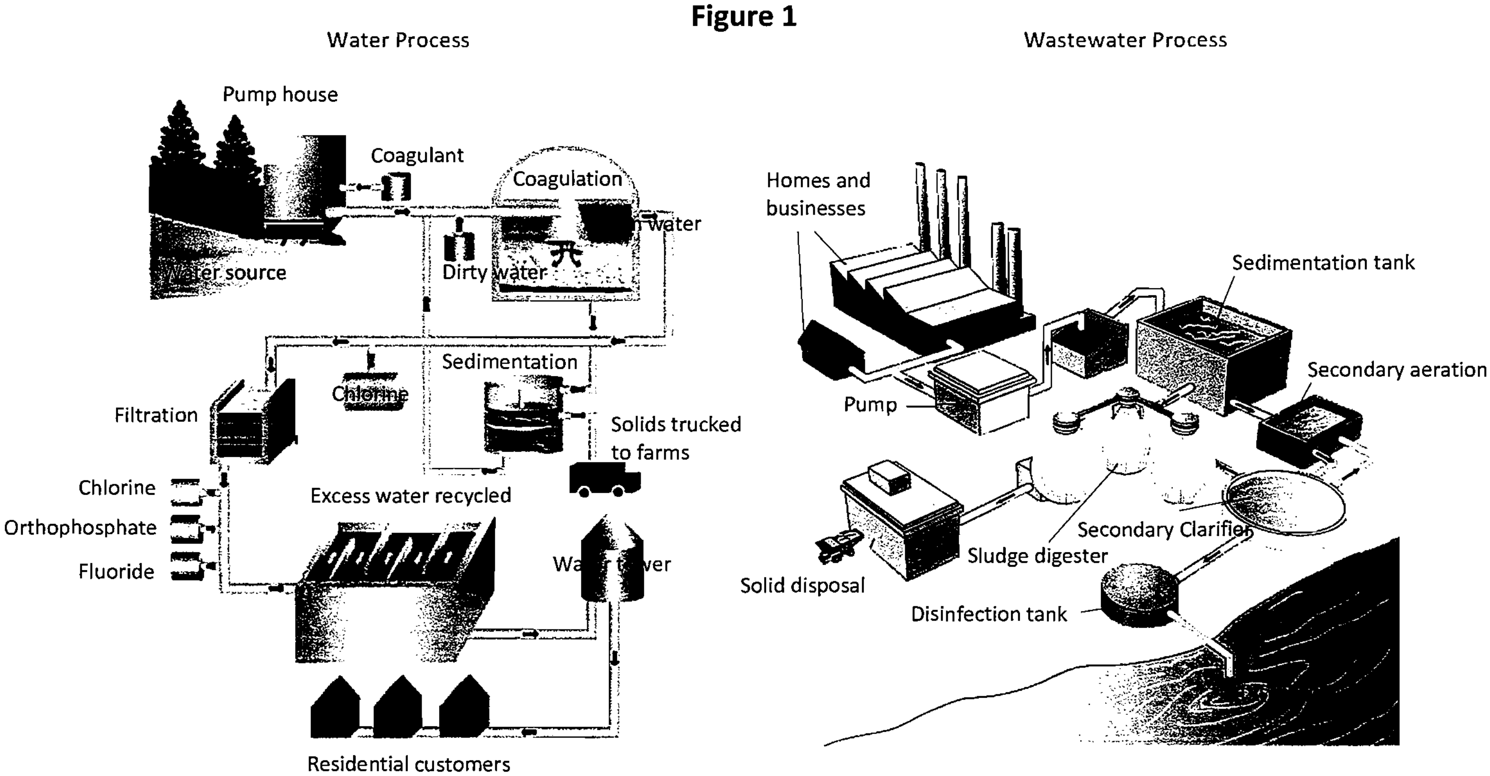
There are many utilities providing water and wastewater service to Hoosiers, organized in various legal forms: investor-owned utilities, municipal utilities, not-for-profit utilities, regional water/wastewater districts, water authorities, and conservancy districts. The Indiana Utility Regulatory Commission (Commission or IURC) is the economic regulator over certain types of these entities, while the Indiana Department of Environmental Management (IDEM) regulates water quality and the Indiana Department of Natural Resources (DNR) oversees the state's water resources.

> ***The legal form of a utility determines whether the utility is subject to the Commission's jurisdiction and the extent of the Commission's regulatory oversight.***

Process

Before water is ready for retail use, it usually must be treated to make it drinkable. Similarly, wastewater must be treated before it can be released back into a water source. Both processes are shown in Figure 1.

Figure 1



Regulatory Structure

The legal form of a utility determines the existence and extent of the Commission's jurisdiction. While many water and wastewater utilities were regulated initially, state statute allows certain utility types to withdraw from jurisdiction. Table 1 shows the number of regulated utilities and those that have withdrawn (Appendices C, D, and E list the utilities by name). For other water and/or wastewater utilities, the IURC has limited or no oversight. Table 2 breaks down which utilities the agency regulates and generally does not regulate with regard to rates and charges or rules and regulations.

Table 1

Jurisdictional and Withdrawn Water and Wastewater Utilities

Type of Utility	Number of Jurisdictional Utilities	Number of Withdrawn Utilities
Municipal Water	34	359
Not-For-Profit Water	37	56
Investor-Owned Water	9	1
Conservancy District Water	9	0
Not-For-Profit Wastewater	6	11
Investor-Owned Wastewater	23	9
Not-For-Profit Water/Wastewater	2	4
Investor-Owned Water/Wastewater	12	2

Table 2

Commission Jurisdiction Based on Utility Type

Type of Utility	Rates and Charges	Rules and Regulations	Ability to Withdraw from Jurisdiction	No Jurisdiction	CTA
Investor-Owned Water*	✓	✓	✓		
Investor-Owned Wastewater*	✓	✓	✓		✓
Not-for-Profit Water	✓	✓	✓		
Not-for-Profit Wastewater	✓	✓	✓		✓
Municipal Water	✓		✓		
Municipal Wastewater				✓	
Regional Water District				✓	
Regional Sewer District**				✓	
Conservancy Water District***	✓		✓		
Conservancy Sewer District				✓	

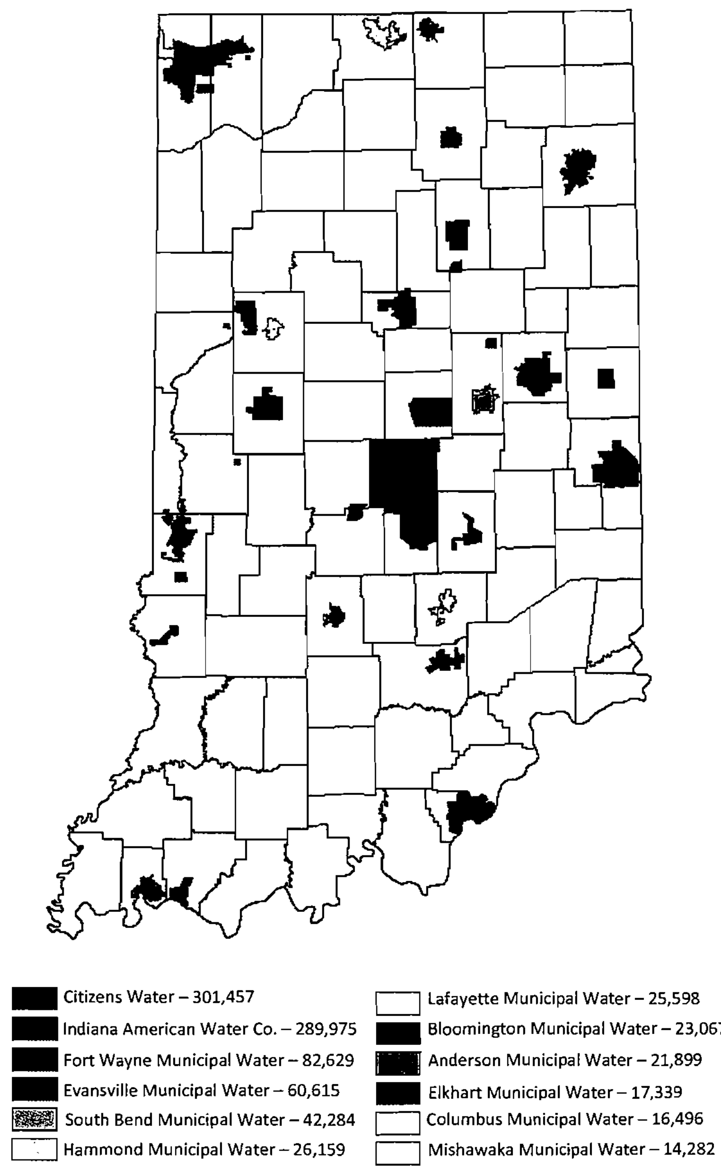
* Investor-owned water and sewer utilities with 300 customers or less can opt out of the IURC's jurisdiction, per IC § 8-1-2.7-1.3.
**Campgrounds served by regional sewer districts have the ability to appeal to the Commission's Consumer Affairs Division for an informal review of a disputed matter, per IC §13-26-11-2.1.
*** Water conservancy districts with fewer than 2,000 customers can opt out of the IURC's jurisdiction, per IC § 8-1-2.7-1.3.

The Commission regulates 103 of the 824 water utilities and 43 of the 544 wastewater utilities. Regulated water systems have $3.8 billion of utility plant in service, annual revenues of $543 million, and a total rate base of $2.3 billion, while regulated wastewater utilities have $424.2 million of utility plant in service, annual revenues of $54.0 million, and a total rate base of $33.9 million. Although the Commission only regulates a fraction of the water utilities, these entities serve approximately 53% of Indiana's water consumers. This is because numerous water systems withdrawn from the IURC's jurisdiction only serve a small number of customers; whereas, the largest regulated water utilities provide service to primarily urban areas that are more densely populated, as shown in Map 1.

With regard to wastewater, the majority of customers are served by non-jurisdictional utilities due to the fact that the Commission does not regulate municipal wastewater systems. Based on 2010 data, only three regulated utilities serve more than 5,000 customers: Sanitary District of Hammond (33,383 customers); Hamilton Southeastern Utilities, Inc. (18,169 customers); and Utility Center, Inc. (11,922 customers).[1]

Map 1

Largest Regulated Water Utilities and the Number of Customers



Source: 2010 Commission Annual Reports
Note: Fire protection customers and interdepartmental sales have been removed; municipal systems are based on city boundaries and may not represent the actual service territory.

[1]The CWA Authority, which serves Indianapolis sewer customers, was not under Commission jurisdiction until July 2011.

Age Profile

Aging infrastructure is one of the most critical problems in the water and wastewater industry. This is because it is costly to replace infrastructure that is largely underground, which is further discussed on page 144. For example, water systems are comprised of wells (for groundwater), treatment facilities, water tanks, and distribution systems. The distribution systems, composed of the pipes, valves, and pumps, move water from the treatment plant or water tanks to end users. Throughout Indiana, pipes range widely in age and material. Many older systems built during the turn of the last century consist of cast iron (CI) and even wood piping that would not be used today.

> ***Capital Improvements***
>
> *In 2009, the City of Indianapolis Department of Waterworks submitted to the Commission a Capital Improvement Program for its water distribution system (now owned and operated by Citizens Water) totaling approximately $112 million for 2010 and 2011. That program budgeted a total of $6 million or $3 million per year to replace and/or rehabilitate older CI water mains. This amounted to more than 5% of the total capital budget.*

Due to the age of their water systems, Indiana's oldest communities are experiencing an increase in water main breaks made of CI pipe. Distribution system piping manufactured and installed during the growth periods of the 1940s and early 1950s is particularly vulnerable due to the common use of a thinner pipe wall and gray iron. This particular generation of CI has become more brittle with age and is beginning to fail. Further, deterioration can worsen in piping that was installed in highly corrosive soils. As this generation of piping requires replacement, our oldest and largest communities bear the greatest burden financially, because these pipes constitute the majority of the distribution system.

Newer systems rely on polyvinyl chloride (PVC), high-density polyethylene (HDPE), and ductile iron (DI) piping. Although the materials used in modern pipe manufacturing often have superior corrosion resistance, some materials are unquestionably thinner and cheaper than their alternatives. This requires greater emphasis on alteration to ground conditions and proper installation to achieve the desired longevity of the infrastructure. Modern plastic pipes such as PVC and HDPE have strong corrosion resistance properties but generally have weaker structural properties. In many cases, utilities may prefer a structurally stronger pipe such as DI at a greater material cost to mitigate the risk associated with installation errors.

Supply

While often a topic in the arid Southwest, and more recently in the Southeast, water supply issues are now being more frequently discussed in the Midwest. In fact, the Indiana Department of Homeland Security and the DNR issued a Water Shortage Warning for the entire state this summer. The goal of the warning declaration was to reduce water use by 10% to 15% through voluntary conservation measures to avoid shortages, relieve stressed sources, and to prevent the need for mandatory water use restrictions. The City of Indianapolis and several of the surrounding municipalities also called for conservation, but in this case it was mandatory for residential customers due to lower-than-normal supply levels for Citizens Water. Upon implementing the watering ban, usage decreased by 20% or more than 40 million gallons of water per day.[2] Factors that can lead to inadequate supply levels or service are detailed below.

> ***Response to Drought Conditions***
>
> *To determine the extent of the challenges facing the industry, the Commission issued a survey to all regulated water utilities. The survey requested information about supply levels, main breaks, and the continued ability of the utilities to serve their customers should the drought last through the fall.*

- Lack of Rain and High Temperatures -

One issue related to water efficiency planning is summer watering and the shortages it may cause. The lack of rain and high temperatures may stimulate increased summer watering, which can strain the capacity of a water system. Summer watering costs utilities millions of dollars as they are required to meet peak demand by finding or building additional water supply and expanding water treatment plant capacity.

- Low Water Pressure -

In severe cases of drought, water shortages can lead to low water pressure, which adversely affects fire protection and increases the potential for water contamination. Municipal utilities have recently taken action to control water usage during periods of low supply. Steps taken include adding new sources of supply and/or augmenting existing supplies through purchase agreements with neighboring utilities. While some municipalities have passed ordinances that

[2] www.theindychannel.com/news/31277190/detail.html

levy fines on customers when they irrigate on restricted days, other utility initiatives, mainly outside of Indiana, include rate structures that provide price incentives to conserve water and reduce consumption.

- Unaccounted-for-Water -

Unaccounted-for-water or non-revenue water (NRW) is simply the difference between the quantity of water pumped at the source or purchased from a wholesaler and the quantity actually sold (metered sales). The difference is lost at some point due to circumstances such as leaks in the system, unauthorized use, or firefighting. According to the World Bank, "the total cost to water utilities caused by NRW worldwide can be conservatively estimated at $14 billion per year, with a third of it occurring in the developing world."[3]

Such water losses typically represent a loss to the bottom line for the utility and ultimately represent a cost to ratepayers since this water could have been sold. Typical water losses for regulated utilities in Indiana range between 5% and 45%. Historically, the Commission has considered 15% as the threshold at which a utility should be taking action to address the problem. Many utilities employ sophisticated water audits in an attempt to identify the sources of water loss and create effective mitigation plans. By doing so, utilities can reduce the need to develop new sources of supply. Some water loss, however, is necessary for activities such as main flushings, maintenance of the treatment plant, and fire suppression. The IDEM considers a system deficient if it has greater than 25% water loss based on a one-year average.[4]

Sources of Supply/Enhanced Reliability

Not every water utility in Indiana has its own source of supply. Based on the Commission's Annual Reports, 15% of the Commission-regulated water utilities share source of supply infrastructure through wholesale purchase agreements. Much of Indiana's water supply comes from underground rock formations called aquifers, which utilities tap into by drilling wells. Reservoirs increase the reliability of water from rivers and play an important role in water treatment by allowing time for particles to settle and providing early-stage natural biological treatment. Water tanks also play an important role for water utilities, by serving as a source of

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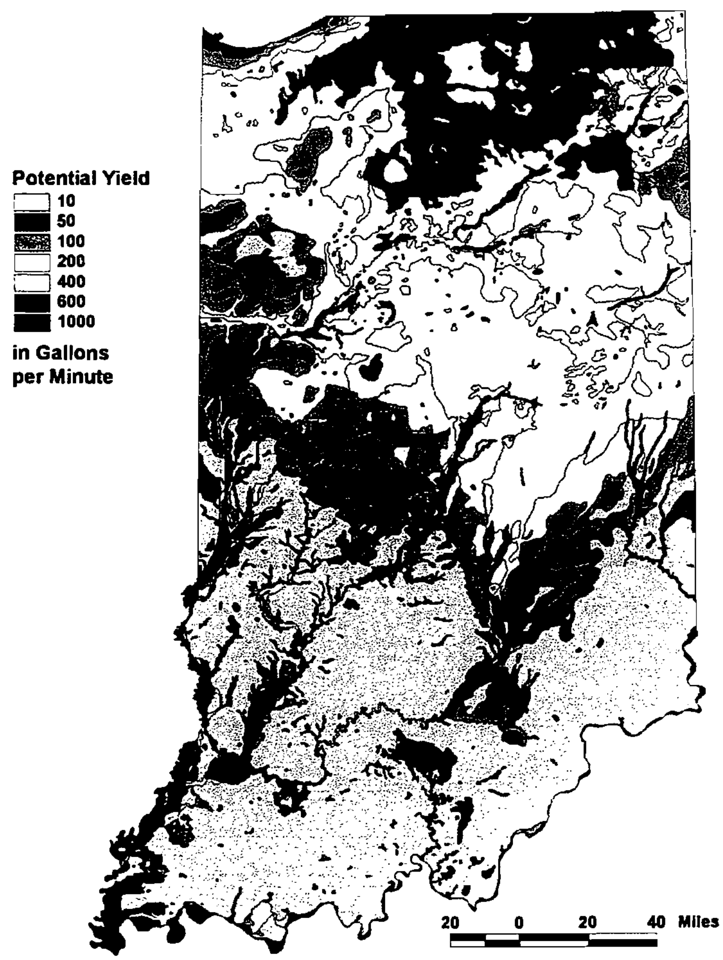
[3]http://siteresources.worldbank.org/INTWSS/Resources/WSS8fin4.pdf
[4]327 IAC 8-2-8.2(3)(d)

back-up supply. By helping to maintain sufficient water pressure, water tanks ensure the reliability of potable water and fire suppression systems.

While supply management strategies are consistent among the different regions, securing new sources of supply in southern Indiana is much more difficult. This is because glacial flow stopped around the mid-southern region. The consequences of this glacial movement millennia ago are evident when comparing generalized groundwater availability between northern and southern Indiana, as shown in Map 2. Whereas northern Indiana has an adequate supply of water, southern Indiana is more limited in its supply.

Map 2

Generalized Groundwater Availability



Source: Indiana Department of Natural Resources

Water Utility Resource Data

During the 2012 Legislative Session, the General Assembly passed Senate Enrolled Act 132,[5] which provides a means to aggregate information about water resources within the state. According to the law, the IURC is to collect and analyze six data collection points from all system operators, both jurisdictional and non-jurisdictional:

1. The number of Indiana customers served;
2. A description of the utility's service territory;
3. Total utility plant in service for the utility's Indiana customers;
4. Amount and location of water resources used to provide water service to Indiana customers;
5. The availability and location of additional water resources that could be used, if necessary, to provide service to Indiana customers; and

[5]P.L. 87-2012

6. The amount of funding received, including the purpose of the funding, from various sources.

Beginning in 2013, the Commission will start reporting to the Regulatory Flexibility Committee on its findings, specifically how financial resources are being used statewide; the need for infrastructure investment; and recommended actions designed to minimize impact on customer rates and charges. To establish the procedures for data collection, the IURC plans to issue a General Administrative Order later this year.

Legal and Policy Foundations

Utilities that provide drinking water and treat wastewater are subject to federal regulations. Water quality regulation falls under the Safe Drinking Water Act (SDWA), passed in 1974 and amended in 1986 and 1996.[6] Wastewater regulation falls under the Federal Water Pollution Control Act or Clean Water Act (CWA), most recently amended in 1987.[7] The U.S. Environmental Protection Agency (U.S. EPA) is the primary federal agency that implements these regulations, while the IDEM is delegated enforcement and has some implementation authority.[8]

Water and Wastewater Quality

Water quality standards are two-fold: 1) health-related (focusing on inorganic and organic chemicals and microorganisms) and 2) aesthetic (focusing on taste, odor, and appearance). These standards are developed by setting a maximum contaminant level and a maximum contaminant level goal, both of which are periodically updated. For example, based on the U.S. EPA's Groundwater Rule, the IDEM now requires increased monitoring to detect viral and bacterial contamination in groundwater sources of drinking water.

The water quality standards are two-fold: health-related, focusing on inorganic and organic chemicals and microorganisms; and aesthetics, focusing on taste, odor, and appearance.

In recent years, Indiana utilities have incurred costs associated with maintaining and improving their systems, and these costs are expected to increase

[6] 42 U.S.C. §§ 300f to 300j-26
[7] 33 U.S.C. §§ 1251-1387
[8] To the extent that wastewater treatment is provided by a septic system or constructed wetland, the Indiana State Department of Health is the jurisdictional agency.

as new rules are approved. For example, to comply with the U.S. EPA's Long Term 2 Enhanced Surface Water Treatment Rule, several utilities have installed ultraviolet disinfection systems at their treatment plants and have sought cost recovery for those investments. Examples of other new or pending U.S. EPA rules are provided below:

U.S. EPA Rule	Scope of Rule	Effective Date
New Clean Water Act Analytical Methods	The U.S. EPA publishes laboratory analytical methods or test procedures that are used by industries and municipalities to analyze the chemical, physical, and biological components of wastewater and other environmental samples that are required by regulations under the authority of the CWA.	Approved in April 2012
Total Coliform Rule	Establishes a maximum contaminant level based on the presence or absence of total coliforms, modifies monitoring requirements including testing for fecal coliforms for E. coli, requires use of a sample siting plan, and also requires sanitary surveys for systems collecting fewer than five samples per month.	Final revisions expected in 2012
Unregulated Contaminant Monitoring Rule 2	The U.S. EPA uses the Unregulated Contaminant Monitoring program to collect data for contaminants suspected to be present in drinking water, but do not have health-based standards set under the SDWA. Every five years the U.S. EPA reviews the list of contaminants, largely based on its Contaminant Candidate List.	Final determination expected by 2013
Perchlorate Rule	The U.S. EPA has determined that perchlorate meets SDWA's criteria for regulating a contaminant--that is, perchlorate may have an adverse effect on the health of persons. Therefore, the U.S. EPA will initiate the process of proposing a national primary drinking water regulation for perchlorate.	Final rule expected by 2015

Several regulated wastewater utilities have invested in their systems as required by consent decrees, due to violations of the CWA. Because infrastructure improvements may be required, customer rates could be impacted. However, before the costs can be passed on to consumers, projects are subject to review by the Indiana Office of Utility Consumer Counselor (OUCC) and IURC approval.

III. Landscape

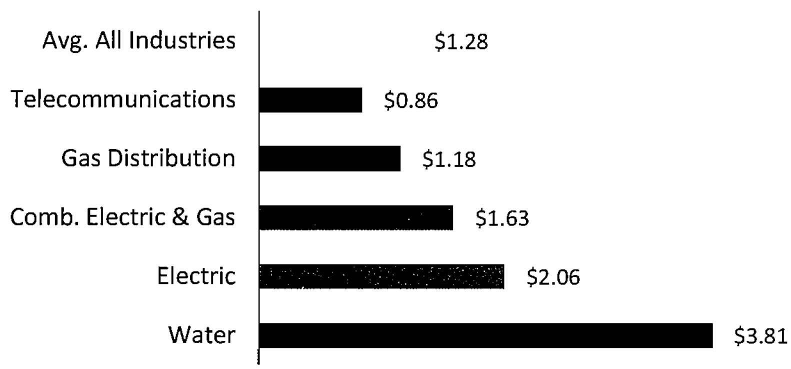
To prosper economically, Indiana communities need safe, reliable, and affordable water and wastewater systems. However, a funding shortfall in Indiana exists due to the need to replace aging infrastructure and its attendant high capital requirements, as much of the United States' drinking water and wastewater infrastructure was built prior to or shortly after World War II.

Infrastructure

A significant portion of our nation's infrastructure has aged and will need full-scale replacement over the next few decades. This is problematic, because the water sector remains extremely capital intensive, investing more capital per dollar of revenue generated than any other industry, as demonstrated in Chart 1. The need for such large investment is due to high capital costs and relatively low revenues. Consequently, water utilities are increasing general rates.

Chart 1

Capital Invested per Dollar of Revenue



Source: AUS Utility Reports - 2010

Projected Infrastructure Costs

According to the U.S. EPA's "2007 Drinking Water Infrastructure Needs Survey and Assessment" and its "2008 Clean Watersheds Needs Survey," Indiana's water and wastewater infrastructure needs total $13 billion over the next 20 years. In terms of wastewater needs, Indiana reported one of the highest increases in need among all states since 2004, led by pipe repairs and replacement (up 233%), wastewater treatment (up 224%), and nonpoint source pollution control (up 91%). Additionally, Indiana was one of the states with the highest reported need for combined sewer overflow (CSO) remediation ($5.0 billion).[9] For drinking water infrastructure, Indiana's projected needs more than doubled since 1995, from $2.4 billion to $5.9

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[9]Other states with high needs for CSO corrections were: Illinois ($10.9 billion), New Jersey ($9.3 billion), Pennsylvania ($8.7 billion), Ohio ($7.5 billion), New York ($6.6 billion), and Indiana ($5.0 billion). Together, these states comprised 74 percent of the CSO needs reported in the Clean Water Needs Survey.

billion in 2007. As shown in Table 3, 64% of this need can be attributed to transmission and distribution projects.

Table 3

Indiana's Infrastructure Needs for Water and Wastewater

Year 2000 to 2020

Water		
Millions of January 2007 Dollars	% of Total Needs	Project Type
$ 3,814.2	64.16%	**Transmission/ Distribution**
$ 353.8	5.95%	**Source**
$ 1,096.1	18.44%	**Treatment**
$ 648.5	10.91%	**Storage**
$ 31.8	0.53%	**Other**
$5,944.4	100%	**Total**

Wastewater		
Millions of January 2008 Dollars	% of Total Needs	Project Type
$ 335	4.71%	**Secondary Wastewater Treatment**
$ 478	6.71%	**Advanced Wastewater Treatment**
$ 21	0.29%	**Infiltration/Inflow Correction**
$ 359	5.04%	**Sewer Replacement/Rehabilitation**
$ 506	7.11%	**New Collector Sewers And Appurtenances**
$ 227	3.19%	**New Interceptor Sewers And Appurtenances**
$ 5,041	70.80%	**Combined Sewer Overflow Correction**
$ 153	2.15%	**Stormwater Management**
$ 7,120	100%	**Total**

Source: U.S. EPA "2007 Drinking Water Infrastructure Needs Survey and Assessment"

Source: U.S. EPA "2008 Clean Watersheds Needs Survey"

Funding Programs

Numerous federal and state funding options are available for infrastructure investment. Grants from the U.S. EPA are leveraged in bond markets to generate State Revolving Loan Fund (SRF) proceeds. The Indiana Finance Authority (IFA) then administers these funds through low-interest loans at 20-year terms to investor-owned, municipal, and not-for-profit utilities. Based on the Drinking Water and Clean Water 2011 Annual Reports, the Drinking Water SRF (DWSRF) Loan Program closed 13 loans for Indiana utilities, totaling approximately $39 million, in state fiscal year 2011. Treatment infrastructure projects accounted for more than 50% of the projects, while transmission and distribution infrastructure projects accounted for about 40%. The Clean Water SRF Loan Program in Indiana closed 21 loans totaling more than $128 million.

U.S. Department of Agriculture Rural Development Loans and Grants are also available to assist rural areas and towns serving a population of less than 10,000. Extended 40-year terms are available at or below market interest rates, depending on community demographics. As part of this program, Indiana water and wastewater utilities received approximately $26 million in loans and $9 million in grants, of which approximately $2.1 million in loans were made to Commission-regulated utilities.

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Grants for planning and up to 90% of eligible project costs are another option. These planning and construction grants are available to non-entitlement cities,[10] towns, or counties through the Community Focus Fund, which is administered through the Indiana Office of Community and Rural Affairs (OCRA). Out of the more than 90 grant issuances made by OCRA during 2011, two Commission-regulated systems were beneficiaries of approximately $2.6 million of the approximate $57 million granted by this state agency.

The OCRA also administers federal disaster recovery funds for Indiana. In July 2008, Congress appropriated $438 million in supplemental funding to Indiana for emergency disaster assistance. Last year, over three-fourths of all funds issued by the OCRA were the result of this federal funding. Additionally, the total disaster relief funding administered by the OCRA in 2011 for water and wastewater infrastructure dropped considerably. This decline reflects the fact that available funding from the 2008 emergency congressional appropriation is almost gone.

Loans and grants are available for utility infrastructure investment through the State Revolving Loan Fund, Rural Development Loans and Grants, and the Community Focus Fund.

Although the amount of SRF funding to investor-owned and not-for-profit utilities is limited, other options are available. For example, another avenue to obtain low-interest rate loans is private activity bonds, municipal bonds issued to finance facilities for investor-owned or not-for-

[10]Non-entitlement cities must go through a state-funding program instead of receiving funds directly from the federal government.

profit water utilities.[11] The benefits of reduced financing costs go directly to utility customers, rather than to the shareholders, owners, or parent companies. The federal government sets the overall loan volume cap for each state and then allocates that amount based on a formula.[12]

Under current federal rules applicable to the funding process, investor-owned and not-for-profit utilities are disadvantaged, because they have limited access to low-cost debt. Without access to low-cost debt, costs to serve those customers increase, despite the fact that all customers pay federal income tax to support the funding programs. To gain access to additional SRF funding, several not-for-profit utilities have converted to water authorities to avoid the volume cap for private activity bonds. The National Association of Regulatory Utility Commissioners and the National Association of Water Companies support federal legislation to lift the ban on wastewater utilities and to remove water projects from the volume cap. In 2012, the U.S. Senate passed S. 1813, a surface transportation reauthorization bill, containing such language. However, the U.S. House of Representative's version did not contain such a provision, and the final bill passed by Congress and signed into law did not contain it either.

Under the current funding regime, investor-owned and not-for-profit utilities are discriminated against, because they have limited access to low-cost debt.

Pricing and Economics

Nationally, water and wastewater rates are outpacing inflation. Indiana is similarly situated. Due to a number of factors, water and wastewater utilities are experiencing cost increases. The primary drivers include the replacement of aging infrastructure, compliance with U.S. EPA standards (e.g., water quality and wastewater effluent), increases in expenses (e.g., labor, chemical, and power), growing demand, and the relocation of facilities.

Rate Increases

Overall, the number of rate increase requests has declined since 2010. In 2011, nine water utilities were approved for general rate increases averaging 25.84%, and three wastewater utilities were approved for general rate increases averaging 37.82%. The average percent

[11]Private activity bonds are not available to private wastewater utilities.
[12]IC ch. 4-4-11.5

increase granted by the Commission is often significant, because the requests are related to U.S. EPA requirements, infrastructure improvements, and maintenance projects to uphold the quality of service. However, these percentages can sometimes be misleading, due to average water and wastewater rates regulated by IURC being relatively low at $25.19 per 5,000 gallons and $47.75 per 5,000 gallons on average, respectively.

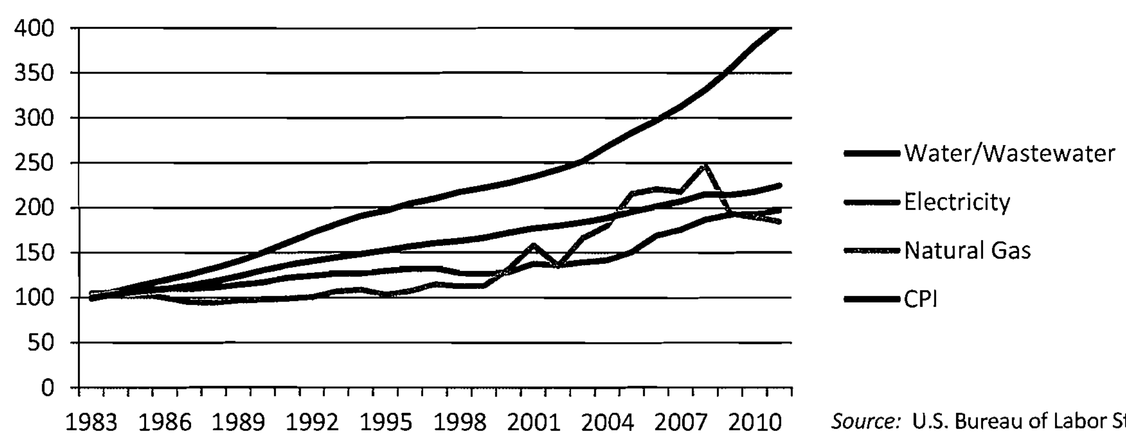
There are areas of the state where customers pay significantly more than in other areas. In fact, of all the industries, water and wastewater utilities have the greatest disparity in rates. This is because rates are largely dependent on the length of time between rate cases, the condition of the infrastructure, and the number of customers served. For smaller systems, rates tend to be significantly higher due to the costs being spread over a smaller number of households. This is why, when large projects are part of a rate case, the Commission has granted phase-in rates, which help mitigate bill shock.

Of all the industries in the utility sector, utilities within the water and wastewater industries have the greatest disparity in rates.

Chart 2 shows the price index by utility type, including water and wastewater rates. They are rising more rapidly than electricity or natural gas rates and much faster than the overall consumer price index (CPI). For example, from 2002 to 2011 water and wastewater rates rose 5.56% per year, while the CPI only rose 2.43% per year.

Chart 2

Comparison of Utility Prices from 1983 to 2011
Index is set to 100 for 1982-1984



Source: U.S. Bureau of Labor Statistics

Recovery of Infrastructure Costs within a Rate Case or Tracker

The Commission has several mechanisms within a rate case that allow utilities to recover costs associated with infrastructure projects. Municipal and not-for-profit utilities are allowed to include costs for some types of projects, typically referred to as extensions and replacements, in customer rates. This allows utilities to include future infrastructure projects in rates without relying entirely on debt. In addition, post-in-service allowance for funds used during construction (AFUDC) and deferred depreciation, if approved, allow investor-owned utilities to defer the capital costs and depreciation expense of a project to the utility's next rate case. This practice helps to reduce the utility's earnings erosion.

All utilities can use the Minimum Standard Filing Requirements process that allows a utility to update its rate base for capital investments incurred up until the final hearing.[13] This can be an incentive to invest in capital improvements, as the utility does not need to wait until a later rate case to earn a return on capital investments. Indiana American Water recently took advantage of this option, increasing its test year rate base by $53,566,185 to include a general rate base cutoff update ($28,516,680) and an update for a major project ($25,049,505) identified in the utility's petition, the Warsaw treatment plant.[14]

In 2000, the Indiana General Assembly enacted legislation that created a capital recovery mechanism, called the Distribution System Improvement Charge (DSIC).[15] Indiana was the second state in the nation to enact such a mechanism. The DSIC allows water utilities to recover the costs of improvements to existing distribution systems with a simplified proceeding rather than a full rate case when the investment is made. This results in rate increases that tend to be more gradual over time. The DSIC only applies to water utilities, and the Commission believes that making the DSIC mechanism available to wastewater utilities would encourage investments in necessary infrastructure replacements and upgrades. This useful mechanism avoids the added costs of a rate case and encourages

The Distribution System Improvement Charge is a useful mechanism to encourage needed infrastructure improvements before having to react to a costly disaster. As of May 2012, the Commission approved close to $138 million in utility distribution plant placed in service through the DSIC.

[13]170 IAC 1-5
[14]Cause No. 44022
[15]IC ch. 8-1-31

needed infrastructure improvements to be made before having to react to a costly disaster. As of May 2012, the Commission approved close to $138 million in utility distribution plant placed in service through the DSIC.

Customer Rate Disparity

Due to ongoing concerns about rate differentials between inside and outside-city customers, the General Assembly passed House Enrolled Act 1126 in the 2012 session. This law provides outside-city customers, under certain circumstances, an option other than the court system to determine whether the rates they are being charged are nondiscriminatory, reasonable, and just. In the past, when municipal utilities opted out of the Commission's jurisdiction, citizen-customers (i.e., city residents) of that municipality still had a voice in how the utility was operated when voting for local leaders. Since non-resident customers (i.e., suburban) do not participate in local municipal elections, they had no such voice.

In order to address this problem, the law provides that the lesser of 10% of all customers or 25 customers may file a petition with the Commission requesting review; however, the petition must be filed no more than 14 days after the date on which the new rates are established through an ordinance. Other specific conditions that must be met include:

- A municipal water or wastewater utility must have withdrawn from the IURC's jurisdiction;
- The utility must have customers outside its corporate boundary; and
- Outside-city customers must be charged rates greater than 15% above the rates charged to inside-city customers.

Rather than resorting to the court system, HEA 1126 provides that outside-city customers may petition the Commission to determine whether the rates they are being charged are nondiscriminatory, reasonable, and just.

For utilities with rate differentials already in effect by March 31, 2012, the municipality may petition the IURC to grandfather the percentage difference. The request must be received by September 30, 2012. In order for the grandfathering provision to apply, the outside-city rates and charges must be between 15% and 50% higher than the inside rates. In May 2012, the IURC issued a General Administrative Order outlining the procedure for utilities wishing to be grandfathered in at their existing rates.

Increasing Rates and Declining Demand

The balancing act of encouraging conservation practices and accounting for lost revenue results in a complicated paradox forcing utilities and the Commission to carefully consider the impacts. If not offset by an increase in customer growth, conservation can lead to the utility seeking a rate increase. This is because the utility may earn less revenue, but still incurs fixed costs to maintain the system. If rates increase, this could then lead to further declines in demand, with the cycle repeating itself. Therefore, the Commission is faced with the challenge of ensuring cost recovery for the utility, yet maintaining fair and reasonable rates.

Acquisition and Consolidation

Acquisitions and consolidations can take many forms, but the most prevalent are investor-owned utilities buying smaller investor-owned utilities; investor-owned utilities buying municipal systems; and municipalities buying investor-owned systems. Over the last 10 years, the pace of mergers and acquisitions by investor-owned utilities has slowed significantly as many of the most attractive and available utilities have been acquired; however, transaction proposals are still taking place. When transactions are brought to the IURC for approval, the Commission must ensure customers are not overpaying and that the utility is being assessed at fair value. In cases where a utility's service area is expanded, questions also arise about who should pay and how much. The following sections further detail these issues.

- Privatization -

Recent utility transfers have highlighted several issues of particular concern for the Commission. One issue is determining the fair value of the property to effect a change in ownership. Without accurate accounting records of the municipality's assets, it is difficult to accurately determine the fair value of the assets. Even when the accounting records are accurate, there may be a conflict between Indiana statutes that govern how the price is determined for the assets and what the Commission sets as the fair value. Under IC § 8-1.5-2-6(b), municipal assets may not be sold for less than their full appraised value; however, the Commission must adhere to IC § 8-1-2-6, which disallows contributions in aid of construction (CIAC) in determining the fair value.[16] In some cases, appraisers do not eliminate utility plant that has been contributed by developers or was funded by a government grant.

Two recent acquisition cases involving Indiana American Water acquiring municipal water utilities (Town of New Whiteland and Town of Riley) illustrate the issue. In the Town of New Whiteland case, the municipality had difficulty documenting assets that were CIAC. Therefore, the Commission ordered the parties to research the origin of its assets in order to identify it. Upon completion of its research, additional CIAC was found, and the Commission issued an order approving a settlement agreement between the OUCC and Indiana American Water. In the Town of Riley case, the appraisers included assets that were funded with CIAC in their appraised values. In accordance with IC § 8-1-2-6, the Commission approved the acquisition but did not allow Indiana American Water to earn a return on the amounts that were identified as CIAC. As a result of this order, the acquisition did not close. Indiana American Water and the Town of Riley have filed a second acquisition case that is pending.

Another issue rests with the determination of whether the customers acquired through the condemnation process should be required to pay more for water than existing customers. Although there is a general lack of consensus on these issues among policymakers, the Indiana General Assembly remedied one aspect of the condemnation matter. Going forward, when a municipality condemns the property of a public utility, all customers bear the costs associated with the condemnation process through their normal rates and charges.[17]

- Unique Transfer: City of Indianapolis to Citizens Energy Group -

On July 13, 2011, the IURC approved a settlement agreement that allowed the transfer of the City of Indianapolis's water and wastewater utilities to Citizens Energy Group. The settlement agreement addressed many issues, such as the Commission's authority over water and wastewater rates, adhering to conditions set in the last rate case for Indianapolis Water, accounting issues, adhering to

In February 2012, Citizens Energy Group announced that at least $68 million will be saved by the end of September 2012, which is two years ahead of schedule.

[16]CIAC is utility plant that was not funded by the utility, such as plant contributed by a developer or obtained as part of a government grant.
[17]IC § 8-1.5-3-8

prior intergovernmental agreements, and the development of conservation and drought response plans. One of the cornerstones of the transfer is the savings produced by consolidating the gas, steam, water, and wastewater utilities. In February 2012, Citizens Energy Group announced that at least $68 million will be saved by the end of September 2012, two years ahead of schedule.[18] Prior to the transfer of the community's water and wastewater utilities, Citizens committed to achieving an annual savings of $60 million by 2014. The approximate amount saved is split between savings on pensions/health benefits of $49 million, the elimination of certain capital projects at $1 million, and a reduction in operation and maintenance expenses by $26 million. The cost to achieve those savings was approximately $8 million.

Regulatory Development

Small water and wastewater utilities are prevalent in Indiana, many of which serve fewer than 300 customers and were constructed by a developer as part of a development.[19] While not all small utilities are troubled, they are more prone to it because of their size and lack of management expertise. To determine whether a utility is troubled, the Commission may examine several key factors including: technical, financial, and managerial capacity; the physical condition and capacity of the plant; the utility's compliance with state and federal laws and/or the Commission's orders; and provision of service to customers.[20]

Many troubled systems fail to maintain and invest in their infrastructure, forgo necessary rate increases and do not retain the expertise necessary to efficiently manage their systems. In fact, the Commission has seen many examples of owners circumventing Indiana statutes by securing a line of credit (short-term debt) that the utility has insufficient cash flow to repay within a 12-month period. Affiliated contracts are not filed with the Commission, making it more difficult to detect funds

Assistance for Small Utilities

The Commission is taking proactive steps to improve the management and operations of small utilities in the water industry, including developing a small utility accounting manual to assist utilities in improving their financial books and records.

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[18]www.citizensgas.com/news.aspx?nid=222

[19]The Commission can only monitor utilities under its jurisdiction. Once withdrawal occurs, the Commission is no longer able to proactively monitor the progress and development of those systems that are historically most likely to become troubled.

[20]IC § 8-1-30-3

being siphoned from the utility to an affiliated company. The Commission has also seen systems deteriorate to a point where asset longevity erodes due to lack of maintenance and sewer back-ups occur in homes. Unfortunately, these issues directly impact the utility's customers. If a utility has continued violations, even after the Commission orders it to remedy the deficiencies, the Commission can order the acquisition of the utility by a new owner or appoint a receiver to operate the utility and work to find a new owner.[21] On a practical basis, neither is an ideal option.

Strategic Plan

Fortunately, the Commission has addressed many of the worst actors in the last decade and its primary goal is to prevent utilities from becoming troubled in the first place. The Water and Wastewater Division completed a Strategic Plan in December 2011, which includes 11 Action Plans that will assist small utilities with managing costs and improving their financial, managerial, and technical capabilities. The key concepts addressed within the Action Plans include:

- Create an Alternative Regulatory Procedure (ARP) for small water and wastewater utilities.
- Assist small utilities with cost control, including wholesale water purchase arrangements, equipment sharing and cooperative purchasing.
- Focus on water loss and consumer education.
- Develop a Small Utility Accounting Manual to assist utility personnel in the proper recording of financial transactions.
- Require performance measures to be developed and incorporated into the IURC Annual Report to provide utility management and the Commission with a tool to evaluate utility performance relative to peers.

[21] IC § 8-1-30-5

- Alternative Regulatory Procedure -

On June 6, 2012, the Commission commenced an investigation in Cause No. 44203 into the adoption of an ARP for small water and wastewater utilities. The ARP, as proposed by the Water and Wastewater Division, would provide an eligible utility with annual rate increases without the need to file a rate petition or incur the associated costs. For small systems serving fewer than 3,000 customers, the proposed ARP would authorize a utility to increase rates on an annual basis for five years after its most recent rate proceeding. The rate increases would be based on an annual cost index, including employment cost, power cost, chemical cost, and consumer cost.

Alternative Regulatory Procedure Requirements

- ✓ Asset management plan
- ✓ Standard operating procedures
- ✓ Vulnerability assessment and emergency response plan
- ✓ Written maintenance records
- ✓ Water system self-evaluation questionnaire
- ✓ Map of utility system assets
- ✓ Written financial policies and procedures
- ✓ Financial budgets

According to prefiled testimony in the case, the Water and Wastewater Division designed the proposed ARP to motivate utilities to improve financial, managerial, and technical capabilities by requiring participants to meet annual requirements focused on improving these capabilities in return for an automatic annual rate increase. The annual requirements consist of mandatory and elective program elements. Under the proposed ARP, a utility must complete a specified number of elective program items for each of the five years, which were developed based on utility best practices. An evidentiary hearing is scheduled for October 5, 2012.

- Education -

Since many small utilities rely extensively on outside contractors and consultants, one action plan requires the development of a guide to enhance small utilities' ability to hire and manage consultants and outside contractors. Based on the success of earlier workshops, the Commission continues to hold annual workshops on topics such as how to complete the Commission's small utility rate application and annual report; the basics of utility accounting; and tools for planning and asset management. In order to make educational materials more accessible, the Commission also plans to enhance its website by providing documents useful to utilities, such as standard operating procedures, generic maintenance plans and forms, best practice guides, emergency response, conservation, and board training. Early efforts to educate water utilities appear to have proven to be successful. Based on staff's 2010 Annual Report analysis, overall water loss has improved from 2006 reporting from 26.9% to 12.4%. Also, the IURC has seen an approximate 12.7% increase in the number of utilities implementing an asset management program.

- Regulatory Changes -

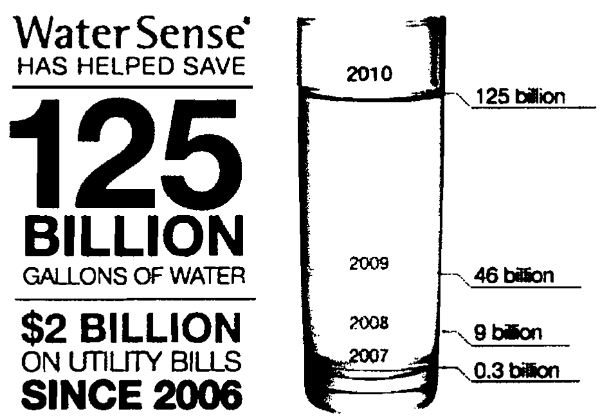
The IURC continually strives to ensure its regulations are effectively applied. Over time, the IURC has noticed that some rules and regulations may no longer be needed, while others need to be updated to account for changes in the industry. The IURC has identified two areas where regulatory changes are needed. First, the Commission will study the effectiveness of its existing main extension rules to determine if the provisions that require a three-year revenue allowance should be eliminated. Under this rule, an applicant will receive a free main extension if the sum of three years' revenues is greater than the cost of the main extension. Many utilities have implemented system development charges because they have adopted the notion that growth should pay for growth, and the rule conflicts with this notion. Also, the water industry is already the most capital intensive of all utilities, and this rule requires additional capital.

In addition to the water main extension rules, the IURC will also evaluate rules and regulations regarding the proliferation of small utilities. As previously discussed in the report, small utilities are often the most likely to become troubled. Consequently, the IURC is evaluating the requirements for new utilities. In doing so, the IURC will examine whether adopting more stringent requirements (such as placing greater emphasis on evidence that an existing utility cannot serve the territory) will reduce the proliferation of small utilities.

Modernization and Efficiency

Water Efficiency

Water efficiency programs are being developed by individual utilities and at state and national levels in an effort to manage customer usage. At the state level, the DNR has developed water conservation goals and objectives, as



required by the Great Lakes Compact.[22] At the national level, the U.S. EPA has developed the WaterSense® program that labels water efficient appliances, products, services, and practices (e.g., low-flow shower heads, low water washing machines, and low flow irrigation systems). This program is similar to the Energy Star program, which identifies energy efficient appliances. The amount of money saved with these efficient appliances varies based on use and water rates. However, savings can add up. For example, if a household can save 40,000 gallons per year and water rates are $3.00 per 1,000 gallons, the savings amount to $120 per year.[23]

Water-Energy Nexus

Water efficiency not only protects the supply of an important natural resource, it also conserves energy. Energy efficiency campaigns usually include information on how to save water, and provide efficiency kits containing water-saving devices such as low-flow shower heads. According to the U.S. EPA, energy costs for water and wastewater utilities can be a third of a municipality's total energy bill. For example, every 1,000 gallons of water delivered by a utility represents 8,350 pounds. A utility delivers nearly 21 tons of water to a household using 5,000 gallons of water per month, using pumps powered by electricity.

Energy Savings

Water efficiency not only reduces the amount of water consumed, it also saves energy. According to the U.S. EPA, if drinking water and wastewater systems reduce energy use by just 10% through cost-effective investments, collectively they could save approximately $400 million and 5 billion kWh annually.

The federal government and universities are developing programs to educate water and wastewater utilities on ways to conserve and improve upon their existing energy consumption. By reducing energy consumption, expenses decrease, which lessens the need for rate increases. For example, in September 2012, the U.S. EPA published the "Evaluation of Energy Conservation Measures for Wastewater Treatment Facilities." Purdue University created the Energy Efficiency & Sustainability program, which is a best practices awareness, training, and implementation

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[22]P.L. 90-419 (90th Congress, S 660) The Great Lakes Compact includes rules and regulations to protect the Great Lakes and the tributary waters of several states and Canadian provinces. Economic development will be balanced with sustainable water use to ensure Great Lakes waters are managed responsibly.

[23]Estimated using a family of four and changing toilet (3.5 gallons to 1.6 gallons), washing machine (48 gallons to 28 gallons), and shower head (5 gallons/minute to 2.5 gallons/minute).

assistance program funded through a fee for service work, the U.S. Department of Energy, and the U.S. EPA.

IV. Appendices

Appendix A – Revenues for Jurisdictional Water Utilities

Rank	Utility Name	Operating Revenues	% of Total Revenues
1	Indiana-American Water Company, Inc.	$181,344,517	33.77%
2	Citizens Water	143,230,900	26.67%
3	Fort Wayne Municipal Water Utility	31,329,409	5.83%
4	Evansville Municipal Water Works Dept.	18,503,094	3.45%
5	South Bend Municipal Water	14,128,867	2.63%
6	Bloomington Municipal Water	10,650,808	1.98%
7	Hammond Municipal Water Works	9,007,381	1.68%
8	Elkhart Municipal Water Works	7,975,511	1.49%
9	Anderson Municipal Water Works	7,493,233	1.40%
10	Lafayette Municipal Water Works	7,359,490	1.37%
11	Mishawaka Municipal Utilities - Water	7,240,447	1.35%
12	Michigan City Municipal Water Works	6,394,802	1.19%
13	Utility Center, Inc.	6,272,423	1.17%
14	East Chicago Municipal Water Dept.	5,687,507	1.06%
15	Schererville Municipal Water Works	5,164,565	0.96%
16	Columbus Municipal Water Utility	4,672,433	0.87%
17	Marion Municipal Water Works	4,438,095	0.83%
18	Stucker Fork Conservancy District	3,338,160	0.62%
19	Jackson County Water Utility, Inc.	2,976,986	0.55%
20	Chandler Municipal Water Works	2,930,155	0.55%
21	Brown County Water Utility, Inc.	2,900,346	0.54%
22	Silver Creek Water Corporation	2,489,789	0.46%
23	New Castle Municipal Water Works	2,455,126	0.46%
24	Auburn Municipal Water Utility	2,140,683	0.40%
25	Eastern Heights Utilities, Inc.	2,076,603	0.39%
26	North Lawrence Water Authority	2,044,107	0.38%
27	Edwardsville Water Corporation	1,916,686	0.36%
28	Morgan County Rural Water Corporation	1,837,989	0.34%
29	Princeton Municipal Water	1,812,318	0.34%
30	Mishawaka-Clay Municipal Utilities - Water	1,748,717	0.33%
31	Martinsville Municipal Water Utility	1,730,457	0.32%
32	Eastern Bartholomew Water Corporation	1,654,080	0.31%
33	German Township Water District, Inc.	1,640,169	0.31%
34	East Lawrence Water Authority	1,584,002	0.29%
35	Boonville Municipal Water Works	1,579,428	0.29%

Rank	Utility Name	Operating Revenues	% of Total Revenues
36	Ellettsville Municipal Water Utility	1,460,042	0.27%
37	Columbia City Municipal Water Utility	1,434,548	0.27%
38	Southwestern Bartholomew Water Corporation	1,403,850	0.26%
39	South Harrison Water Corporation	1,396,586	0.26%
40	Pike-Gibson Water, Inc.	1,349,890	0.25%
41	Gibson Water, Inc.	1,233,586	0.23%
42	Tri-Township Water Corporation	1,024,015	0.19%
43	Corydon Municipal Water Works	1,005,664	0.19%
44	Twin Lakes Utilities, Inc.	911,972	0.17%
45	Floyds Knobs Water Company, Inc.	898,591	0.17%
46	Southern Monroe Water Corporation	879,154	0.16%
47	Charlestown Municipal Water Dept.	807,389	0.15%
48	North Dearborn Water Corporation	801,173	0.15%
49	Fortville Municipal Water Works	744,138	0.14%
50	Marysville Otisco Nabb Water Corporation	736,472	0.14%
51	Valparaiso Lakes Area Conservancy District	690,954	0.13%
52	Petersburg Municipal Water Works	677,595	0.13%
53	LMS Townships Conservancy District	610,941	0.11%
54	Van Buren Water, Inc.	579,382	0.11%
55	Town of Cedar Lake Utilities	571,986	0.11%
56	Sullivan-Vigo Rural Water Corp.	557,573	0.10%
57	Washington Township Water Corporation of Monroe County	524,007	0.10%
58	B & B Water Project, Inc.	487,122	0.09%
59	Cataract Lake Water Corporation	470,339	0.09%
60	Posey Township Water Corporation	469,681	0.09%
61	Clinton Township Water Company	467,163	0.09%
62	Indiana Water Service, Inc.	441,696	0.08%
63	Tri-County Conservancy District	390,621	0.07%
64	Riverside Water Company, Inc.	355,118	0.07%
65	Knightstown Municipal Water Utility	331,886	0.06%
66	St. Anthony Water Utilities, Inc.	309,069	0.06%
67	Everton Water Corporation	287,793	0.05%
68	Kingsford Heights Municipal Water Utility	269,557	0.05%
69	Battle Ground Conservancy District	257,229	0.05%
70	Ogden Dunes Municipal Water	247,922	0.05%
71	Darlington Waterworks Company	231,619	0.04%
72	Painted Hills Utilities Corporation	231,548	0.04%
73	Consumers Indiana Water Company, Inc.	225,491	0.04%
74	Mapleturn Utilities, Inc.	200,861	0.04%
75	Pioneer Water, LLC	177,771	0.03%

Rank	Utility Name	Operating Revenues	% of Total Revenues
76	South 43 Water Association, Inc.	174,486	0.03%
77	Kingsbury Utility Corporation	136,964	0.03%
78	Oak Park Conservancy District	121,616	0.02%
79	Rhorer Harrel & Schacht Roads Water Corp	103,488	0.02%
80	Waldron Conservancy District	82,907	0.02%
81	Hillsdale Water Corporation	77,667	0.01%
82	Water Service Company of Indiana, Inc.	73,367	0.01%
83	Apple Valley Utilities, Inc.	64,032	0.01%
84	Wedgewood Park Water Co., Inc.	63,564	0.01%
85	Pleasantview Utilities, Inc.	59,195	0.01%
86	American Suburban Utilities, Inc.	39,245	0.01%
87	J.B. Waterworks, Inc.	31,662	0.01%
88	Wastewater One d/b/a River's Edge Utility, Inc.	16,754	<0.01%
89	Wells Homeowners Association, Inc.	12,069	<0.01%
90	Shady Side Drive Water Corporation	11,458	<0.01%
91	Hessen Utilities, Inc.	7,275	<0.01%
92	Bluffs Basin Utility Company, LLC	6,319	<0.01%
	Total Revenue	$36,983,345	100.00%

*Year ending December 31, 2010. Several utilities did not complete an Annual Report, so the total number does not equal the number of utilities under IURC jurisdiction.

Appendix B – Revenues for Jurisdictional Wastewater Utilities

Rank	Utility Name	Operating Revenues	% of Total Revenue
1	Sanitary District of Hammond	$23,084,159	43.23%
2	Hamilton Southeastern Utilities, Inc.	9,435,927	17.67%
3	Utility Center, Inc.	7,344,233	13.75%
4	Aqua Indiana South Haven	3,484,603	6.53%
5	American Suburban Utilities, Inc.	2,630,057	4.93%
6	Twin Lakes Utilities, Inc.	1,617,971	3.03%
7	Eastern Richland Sewer Corporation	1,046,363	1.96%
8	L.M.H. Utilities Corporation	797,626	1.49%
9	Driftwood Utilities, Inc.	603,472	1.13%
10	Wymberley Sanitary Works, Inc.	517,640	0.97%
11	Indiana-American Water Company, Inc.	356,852	0.67%
12	Mapleturn Utilities, Inc.	318,848	0.60%
13	Kingsbury Utility Corporation	317,394	0.59%
14	Consumers Indiana Water Company, Inc.	271,510	0.51%
15	Doe Creek Sewer Utility, Inc.	234,317	0.44%
16	Apple Valley Utilities, Inc.	221,119	0.41%
17	Northern Richland Sewer Corporation	141,346	0.26%
18	Eastern Hendricks County Utility, Inc.	139,416	0.26%
19	Water Service Company of Indiana, Inc.	133,604	0.25%
20	Wildwood Shores Utility Corp., Inc.	115,957	0.22%
21	Old State Utility Corporation	104,021	0.19%
22	Sani Tech, Inc.	98,469	0.18%
23	Southeastern Utilities, Inc.	69,798	0.13%
24	Centurian Corporation	65,400	0.12%
25	Pleasantview Utilities, Inc.	50,601	0.09%
26	Heir Industries, Inc.	44,482	0.08%
27	JLB Development, Inc.	41,830	0.08%
28	Hillview Estates Subdivision, Inc.	29,451	0.06%
29	Galena Wastewater Treatment Plant	27,147	0.05%
30	Wastewater One d/b/a River's Edge Utility, Inc.	12,257	0.02%
31	Bluffs Basin Utility Company, LLC	11,482	0.02%
32	Brushy Hollow Utilities, Inc.	10,738	0.02%
33	Anderson Lakes Estates Homeowners Association, Inc.	8,216	0.02%
34	Lakeland Lagoon Corp.	7,144	0.01%
35	Hessen Utilities, Inc.	4,850	0.01%
36	Webster Development, LLC	1,165	<0.01%
37	Aldrich Environmental, LLC	600	<0.01%
	Total Revenue	$ 3,400,065	100.00%

*Year ending December 31, 2010. Several utilities did not complete an Annual Report, so the total number does not equal the number of utilities under IURC jurisdiction.

Appendix C – Withdrawn Water Utilities

Utility Name	
Aberdeen-Pate Water Co.	Burns City
Advance	Burnt Pines Water Association
Akron	Butler
Albany	Cambridge City
Albion	Camden
Alexandria	Campbellsburg
Alfordsville	Canaan Water Utility
Ambia	Cannelton
Andrews	Carbon
And-Tro, Inc.	Carlisle
Angola	Carmel
Arcadia	Carthage
Argos	Cayuga
Ashley	Center Point
Atlanta	Centerville
Attica	Chalmers
Avilla	Chesterfield
Bainbridge	Chesterton
Bargersville	Chrisney
Batesville	Churubusco
Bean Blossom - Patricksburg Water Corp.	Cicero
Bedford	Clarks Hill
Berne	Clay City
Bethany	Claypool
Beverly Shores	Clinton
Bicknell	Cloverdale
Big Walnut Company, Inc.	Colfax
Birdseye	Connersville
Bloomingdale	Converse
Bluffton	Covington
Boswell	Crane
Bourbon	Crawford County Water Company
Brazil	Cromwell
Bremen	Crothersville
Bristol	Crown Point
Brook	Culver
Brooklyn	Cumberland
Brookston	Cynthiana
Brookville	Dale
Brownsburg	Daleville
Bruceville	Dana
Bunker Hill	Danville

Utility Name	
Daviess County Rural Water System, Inc.	Francesville
Dayton	Francisco
Decatur	Frankfort
Decatur County Rural Water Corporation	Franklin County Water Association, Inc.
Decker	Frankton
Delphi	Freelandville Water Association
Dillsboro	Fremont
Dublin	Galveston
Dubois Water Utilities, Inc.	Garrett
Duff Water Corporation	Gas City
Dugger	Gaston
Dune Acres	Gem Water, Inc.
Dunkirk	Geneva
Dupont Water Company, Inc.	Gentryville
Dyer	Georgetown
Earl Park	Georgetown, IL
East Fork Water, Inc.	Glenwood
East Monroe Water Corporation	Goodland
East Washington Rural Water Corporation	Goshen
Eaton	Gosport
Edgewood	Grabill
Edinburgh	Grandview
Edwardsport	Grantsburg Rural Water, Inc.
Elberfeld	Greencastle
Elizabeth	Greendale
Ellis Water Company	Greenfield
Elnora	Greensburg
Elrod Water Company, Inc.	Greentown
Elwood	Greenville
English	Griffith
Etna Green	Hagerstown
Fairmount	Hamilton
Fairview Park	Hamlet
Farmersburg	Hanover
Farmland	Hartford City
Fayette Township Water Association, Inc.	Haubstadt
Ferdinand	Hayden Water Association, Inc.
Finch Newton Water, Inc.	Haysville Water Utilities, Inc.
Flora	Hazleton
Fort Branch	Hebron
Fountain City	Highland
Fowler	Hill Water Corp.

Utility Name	
Hillsboro	Lewisville
Hogan Water Corp.	Liberty
Holland	Ligonier
Holton Community Water Corp.	Linden
Hope	Linton
Hudson	Logansport
Huntertown	Long Beach
Huntingburg	Loogootee
Huntington	Lowell
Hymera	Lyford Waterworks, Inc.
Ingalls	Lynn
Ireland Utilities, Inc.	Lynnville
Jamestown	Lyons
Jasonville	Madison
Jasper	Markle
Jennings Water, Inc.	Marshall
Jonesboro	Mecca
Kendallville	Medaryville
Kent Water Company, Inc.	Medora
Kentland	Mentone
Kewanna	Merom
Kingman	Middlebury
Kirklin	Middletown
Knightsville	Milan
Knox	Milford
Knox County Water, Inc.	Millersburg
Kouts	Milltown
LaCrosse	Milton
Ladoga	Mitchell
LaFontaine	Monon
LaGrange	Monroe
Lagro	Monroe City
Lake Station	Monroeville
Lakeville	Montezuma
Lanesville	Montgomery
Lapel	Monticello
LaPorte	Montpelier
Laurel	Morgantown
Lawrence	Morocco
Lawrenceburg	Morristown
Leavenworth	Mount Summit
Lebanon	Mount Vernon

Utility Name	
Mulberry	Paxton Water Corporation
Munster	Pendleton
Napoleon Community Water	Pennville
Nappanee	Perry Water System, Inc.
Nashville	Perrysville
New Carlisle	Peru
New Chicago	Pierceton
New Harmony	Pittsboro
New Haven	Plainfield
New Market	Pleasantville Water Co.
New Pekin	Plymouth
New Richmond	Portland
New Whiteland	Poseyville
Newberry	Prince's Lakes
Newport	Ramsey Water
North Brown Water	Redkey
North Judson	Reelsville Water Authority
North Liberty	Remington
North Manchester	Rensselaer
North Salem	REO Water Corp.
North Vernon	Reynolds
Oakland City	Ridgeville
Oaktown	Riley
Odon	Rising Sun
Oldenburg	Roachdale
Oolitic	Roann
Orestes	Roanoke
Orland	Rochester
Orleans	Rockport
Osgood	Rockville
Ossian	Rosedale
Otterbein	Rossville
Otwell Water Corporation	Royal Center
Owensville	Rural Membership Water Corporation
Oxford	Rushville
Palmyra	Russellville
Paoli	Russiaville
Paragon	Rykers Ridge Water Co.
Parker City	Salem
Patoka	Sandborn
Patoka Water Company, Inc.	Santa Claus
Patriot	Santa La Hill, Inc.

Utility Name	
Schneider	Valparaiso
Scottsburg	Van Buren
Seelyville	Veedersburg
Sellersburg	Vernon
Sharpsville	Versailles
Shelburn	Vevay
Sheridan	Vincennes
Shipshewana	Wakarusa
Shirley	Walkerton
Shoals	Walton
Silver Lake	Wanatah
Slygo Water Corp.	Warren
South Whitley	Washington
Southern Madison Utilities, LLC	Washington Township Water Corp.
Speedway	Waterloo
Spiceland	Watson Rural Water Co., Inc.
Spurgeon	Waveland
St. Bernice Water	Waynetown
St. Henry Water Corporation	West College Corner
St. Joe	West Lebanon
St. John	West Terre Haute
St. Jude Village Water Corp.	Westfield
St. Paul	Westport
Staunton	Westville
Sunman	Westwood Water Co., Inc.
Swayzee	Wheatland
Switz City	Whiteland
Syracuse	Whitestown
Tell City	Whiting
Tennyson	Wilfred Water Corporation
Thorntown	Williamsport
Tipton	Winamac
Topeka	Windfall
Trafalgar	Wingate
Troy	Winslow
Troy Township Water Association, Inc.	Wolcott
Union City	Wolcottville
Universal	Woodburn
Upland	Yankeetown Water Authority
Valley Rural	Yorktown

Appendix D – Withdrawn Wastewater Utilities

Utility Name	
Canyonlands Homeowners, Inc.	Henryville Membership Sanitation
Deerwood Environmental, Inc.	Lakeview Estates of Wabash County, Inc.
East Shore Corp.	M.E.K.A. Inc.
Evanston Utility, Inc.	Mt. Pleasant Utilities, LLC
Forest Ridge Utilities, Inc.	Shorewood Forest Utilities, Inc.
Gem Utilities, Inc.	Tamerix Lake Wastewater Treatment Plant
Golfview Partners, LLC	Thieneman Environmental, LLC
Grandview Lot Owners Association, Inc.	Thrall's Station, Inc.
Hardin Monroe, Inc.	West Boggs Sewer District, Inc.
Harrison Lake Town Meeting, Inc.	Western Hancock Utilities, LLC

Appendix E – Withdrawn Combined Water & Wastewater Utilities

Utility Name	
C & M Utility, Inc.	Shady Hills Utility Company
Hoosier Land Vistas	St. Meinrad Utilities
Salt Creek Services, Inc.	Valley Rural Water & Sewer Utility

Appendix F – Residential Water Bill Survey (January 1, 2012 Billing)

Comparison by Gallon Usage

Utility	Ownership	Last Rate Case	Effective Date	5,000 gal.	7,500 gal.
American Suburban	IOU	38936	6/21/90	$51.78	$51.78
Anderson Municipal	MUN	42194	12/20/06	$17.14	$22.59
Apple Valley	IOU	39889	3/8/95	$21.02	$21.02
Auburn*	MUN	41414	9/22/99	$22.31	$28.54
Aurora, inside city	MUN	42786	9/14/05	$15.50	$22.63
Aurora, outside city	MUN	42786	9/14/05	$18.50	$27.00
B&B Water Project	NFP	39107	5/22/91	$29.29	$42.14
Battleground	C.D.	43088	3/7/07	$24.70	$32.10
Bloomington, inside city*	MUN	43939	3/9/11	$22.09	$29.87
Bloomington, outside city*	MUN	43939	3/9/11	$23.19	$30.97
Bluffs Basin	IOU	42188	3/5/03	$28.15	$38.15
Boonville*	MUN	43477	4/8/09	$35.48	$51.38
Brown County	NFP	43203	10/17/07	$55.83	$82.59
Cataract Lake Water Corporation	NFP	43742-U	12/22/09	$36.78	$51.40
Cedar Lake	MUN	43655	4/29/09	$43.55	$62.33
Cedar Lake - Robins Nest	MUN	No Order	--	$26.31	$37.44
Cedar Lake - Robins Nest - Krystal Oak		No Order	--	$35.50	$53.00
Chandler, Town*	MUN	43658	1/6/10	$28.72	$37.67
Charlestown	MUN	42878	8/16/06	$18.30	$27.45
Citizens Waterworks	MUN	43645	6/30/09	$27.80	$36.89
Clinton Township	NFP	43696	10/14/09	$38.59	$49.15
Columbia City*	MUN	42983	10/11/06	$23.70	$32.08
Columbus*	MUN	39425	3/29/94	$10.69	$14.72
Consumers Indiana, Lake County Indiana	IOU	43962	7/27/11	$34.99	$47.99
Cordry Sweetwater - outside district	C.D.	--	5/20/71	$18.65	$22.99
Corydon*	MUN	40591	4/9/97	$16.90	$23.75
Country Acres	NFP	36972	12/8/82	$6.00	$6.00
Damon Run**	C.D.	43966	10/19/11	$53.50	$65.52
Darlington - Aqua	IOU	43609	6/10/09	$49.82	$66.77
East Chicago	MUN	42680	11/8/06	$12.05	$15.03

Utility	Ownership	Last Rate Case	Effective Date	5,000 gal.	7,500 gal.
East Lawrence Water	NFP	43630	9/16/09	$43.60	$60.95
Eastern Bartholomew	NFP	43392	9/24/08	$23.21	$33.39
Eastern Heights	NFP	42839	4/20/06	$21.59	$30.02
Edwardsville Water	NFP	43869	3/8/11	$38.19	$54.07
Elkhart	MUN	43191	7/11/07	$12.84	$16.13
Ellettsville, outside town*	MUN	43582-U	6/3/09	$28.74	$41.69
Ellettsville, inside*	MUN	43582-U	6/3/09	$23.36	$33.64
Evansville, Inside City*	MUN	43190	9/26/07	$12.65	$17.03
Evansville, Outside City*	MUN	43190	9/26/07	$14.03	$18.41
Everton	NFP	43312	12/5/07	$33.70	$47.04
Floyds Knobs	NFP	36297	4/1/81	$28.30	$40.35
Fort Wayne, inside City	MUN	42979	8/23/06	$9.96	$14.94
Fort Wayne, outside City	MUN	42979	8/23/06	$11.43	$17.14
Fortville	MUN	43551-U	10/7/09	$27.15	$37.42
German Township	NFP	42282	3/26/03	$22.10	$32.55
German Township Stewartsville	NFP	42282	3/26/03	$22.10	$32.55
German Township, Marrs Division	NFP	42282	3/26/03	$50.46	$74.31
Gibson Water	NFP	43918	11/4/10	$29.93	$44.46
Hammond	MUN	37653	6/5/85	$2.20	$3.28
Hessen Utilities	IOU	30805	7/30/65	$6.00	$6.00
Hillsdale Water	NFP	43970-U	9/7/11	$31.60	$45.63
Indiana American Water	**IOU**				
*Burns Harbor, Chesterton, Porter, South Haven**	IOU	44022	6/6/12	$33.61	$44.86
*Crawfordsville**	IOU	44022	6/6/12	$41.15	$52.39
*Gary **	IOU	44022	6/6/12	$37.73	$48.98
*Hobart**	IOU	44022	6/6/12	$37.73	$48.98
*Johnson County - Greenwood, So. Indiana (Jeffersonville, New Albany), Newburgh**	IOU	44022	6/6/12	$41.15	$52.39
*Kokomo**	IOU	44022	6/6/12	$41.15	$52.39
*Merrillville**	IOU	44022	6/6/12	$37.73	$48.98
Mooresville	IOU	44022	6/6/12	$37.45	$46.85
Muncie, Johnson Co. - Franklin, Shelbyville, Clarksville	IOU	44022	6/6/12	$37.03	$48.27
*Noblesville**	IOU	44022	6/6/12	$41.15	$52.39

Utility	Ownership	Last Rate Case	Effective Date	5,000 gal.	7,500 gal.
*Portage**	IOU	44022	6/6/12	$37.73	$48.98
*Richmond, Wabash Valley**	IOU	44022	6/6/12	$41.15	$52.39
Seymour, Somerset, Summitville	IOU	44022	6/6/12	$37.03	$48.27
*Wabash**	IOU	44022	6/6/12	$37.45	$46.85
*Warsaw**	IOU	44022	6/6/12	$41.15	$52.39
West Lafayette	IOU	44022	6/6/12	$37.03	$48.27
Winchester	IOU	44022	6/6/12	$37.45	$46.85
Sullivan	IOU	44022	6/6/12	$41.15	$52.39
Wabash Valley (Terre Haute & Farmersburg)	IOU	44022	6/6/12	$41.15	$52.39
Waveland	IOU	44022	6/6/12	$41.15	$52.39
Indiana Water Service, Inc.	IOU	41710-U	3/21/01	$17.44	$24.64
J.B. Waterworks	IOU	39231-U	5/1/92	$18.26	$26.56
Jackson County	NFP	43289	1/4/08	$42.83	$63.48
Kingsbury	IOU	43297	1/16/08	$18.75	$26.80
Kingsford Heights	MUN	43502-U	3/4/09	$35.35	$44.25
Knightstown*	MUN	43440	7/30/08	$30.25	$40.33
Lafayette	MUN	41845	5/9/01	$12.13	$17.13
Lafayette- rural	MUN	41845	5/9/01	$12.67	$17.67
LMS Townships	C.D.	40991-U	7/15/99	$18.94	$26.87
Libertytree Campground	NFP	41662	12/22/04	$8.58	$8.58
Mapleturn	NFP	37039	9/28/03	$22.15	$24.05
Marion*	MUN	42720	3/30/05	$27.02	$33.63
Martinsville*	MUN	42676	8/16/06	$26.74	$33.84
Martinsville, Morgan-Monroe Forest*	MUN	42676	1/5/05	$31.87	$38.97
Marysville-Otisco-Nabb	NFP	42476-U	1/14/04	$36.60	$48.75
Michigan City*	MUN	42517	3/31/04	$20.92	$27.64
Mishawaka, City*	MUN	41395	6/14/00	$15.14	$21.05
Mishawaka, Clay	MUN	41395	6/14/00	$30.12	$30.16
Morgan County Rural	NFP	42993	5/14/08	$52.53	$78.28
Morgan County Rural, Western Exp.	NFP	42993	5/14/08	$60.92	$85.99
New Castle	MUN	42984	9/13/06	$27.14	$34.33
North Dearborn	NFP	43736	10/1/09	$34.25	$55.20
North Lawrence	NFP	43716	8/11/10	$50.66	$67.26

Utility	Ownership	Last Rate Case	Effective Date	5,000 gal.	7,500 gal.
Ogden Dunes	MUN	43295	1/16/08	$38.51	$51.19
Painted Hills	IOU	37017	10/17/83	$27.75	$37.00
Pence	NFP			$25.00	$25.00
Petersburg	MUN	43757	5/11/10	$23.35	$32.58
Pike-Gibson	NFP	43528	1/21/09	$34.23	$50.86
Pioneer	IOU	41089	8/26/98	$35.00	$40.00
Wells Homeowners Association	NFP	40056	4/12/95	$30.00	$30.00
Pleasant View	IOU	41591-U	4/12/00	$33.30	$49.95
Posey Township	NFP	43875	12/7/10	$38.63	$52.88
Princeton	MUN	43652	3/3/10	$35.98	$50.71
Rhorer, Harrell & Schacht	NFP	43934-U	3/2/11	$33.93	$48.62
Riverside	IOU	42122	2/19/03	$18.87	$25.05
Schererville*	MUN	42872	12/14/05	$21.16	$29.71
Shady Side Drive	NFP	38869	7/18/90	$21.96	$32.76
Silver Creek	NFP	37734	6/5/85	$25.10	$37.65
South 43	NFP	43909	10/27/10	$25.33	$37.55
South Bend, inside*	MUN	43979	11/9/11	$15.34	$20.32
South Harrison	NFP	43850	9/8/10	$44.14	$62.52
Southern Monroe	NFP	43952	5/11/11	$32.15	$46.40
St. Anthony	NFP	39193	10/19/91	$38.50	$56.08
Stucker Fork Conservancy Dist. (City of Austin customers)	C.D.	43780	4/14/10	$28.59	$37.89
Stucker Fork Conservancy Dist.	C.D.	43780	4/14/10	$24.40	$33.70
Sugar Creek Utility Company	IOU	43579	9/8/10	$18.36	$18.36
Southwestern Bartholomew	NFP	43329	3/5/08	$39.36	$58.04
Sullivan-Vigo	NFP	42599	6/23/04	$67.20	$97.98
Tri-County	CD	Conference Minutes	6/11/08	$35.40	$46.03
Tri-Township	NFP	40327	4/17/96	$19.85	$27.61
Twin Lakes	IOU	43128	1/16/08	$21.85	$28.78
Town of Cedar Lake	MUN	43655	4/29/09	$43.55	$62.33
Utility Center - Aqua	IOU	43874	4/13/11	$35.09	$49.23
Valparaiso Lakes*	C.D.	38556	12/22/84	$37.69	$48.35

Utility	Ownership	Last Rate Case	Effective Date	5,000 gal.	7,500 gal.
Van Bibber Lake	C.D.	42549-U	11/18/04	$23.40	$23.40
Van Buren Water	NFP	43948	3/2/11	$28.05	$40.55
Waldron	C.D.	42376	2/11/04	$25.98	$37.93
Washington Twp. Of Monroe	NFP	42672	7/28/04	$35.51	$48.46
Wastewater One, LLC d/b/a River's Edge	IOU	42234	2/5/03	$22.55	$33.83
Water Service Co. of IN	IOU	42969	8/30/06	$22.24	$32.49
Wedgewood Park	IOU	42769	3/7/07	$23.26	$31.18

Note:

This bill analysis should be construed as an informative guideline as a snapshot in time. Do not use this analysis to draw conclusions about performance since many factors (such as size, resources and customer density, etc.) affect the bill calculations.

* Fire protection surcharge for 5/8 inch meter included
** Fire protection charge for a 5/8 inch meter included in base charge
*** The location of these customers determines whether the fire protection surcharge applies.

Appendix F – Residential Wastewater Bill Survey (January 1, 2012 Billing)

Comparison by Gallon Usage (5,000 gallons or 668.4028 cu. ft.)

Ownership Key
MUN- Municipally Owned Utility
IOU – Investor-Owned Utility
NFP – Not-for-Profit Utility
CD – Conservancy District

Utility	Ownership	Last Rate Case	Effective Date	Average Monthly Bill
Aldrich Environmental, LLC	IOU	42805	9/28/05	$50.00
American Suburban Utilities, Inc.	IOU	41254	4/14/99	$47.50
Anderson Lake Estates Homeowners Association Inc.	NFP	42478	7/7/04	$42.35
Apple Valley Utilities, Inc.	IOU	40191	8/2/95	$48.58
Bluffs Basin Utility Company, LLC	IOU	42188	3/5/03	$46.88
Brushy Hollow Utilities, Inc .	IOU	41285	1/27/99	$27.10
Centurian Corporation	IOU	40157	8/30/95	$65.00
Creekside Utilities, Inc.	NFP	43853	10/7/11	$41.00
Consumers Indiana Water Company	IOU	42190	6/19/02	$45.07
Country Acres Property Owners Association	NFP	36972	12/16/82	$6.00
CWA Authority, Inc.	NFP	43936	7/13/11	$25.59
Damon Run Conservancy District	CD	43966	10/19/11	$38.10
Devon Woods Utilities, Inc.	IOU	40234-U	1/31/96	$41.88
Doe Creek Sewer Utility	IOU	43530-U	6/10/09	$48.00
Driftwood Utilities, Inc.	NFP	43790-U	6/3/10	$38.10
Eastern Hendricks County Utility, Inc.	IOU	43795-U	4/30/10	$42.89
Eastern Richland Sewer Corporation	NFP	37900	10/4/85	$42.46
Eastern Richland Sewer Corporation (Northern District)	NFP	43791-U	7/28/10	$48.53
Hamilton Southeastern Utilities, Inc.	IOU	43761	8/18/10	$34.63
Harbortown Sanitary Sewage Corporation	IOU	35455	6/3/87	$18.00
Heir Industries, Inc	IOU	43949	7/27/11	$70.11
Hessen Utilities, Inc.	IOU	30805	7/30/65	$4.00
Hillview Estates Subdivision Utilities, Inc.	IOU	38737-U	5/31/89	$30.00
Howard County Utilities, Inc.	IOU	43294	1/23/08	$45.38
Indiana American Water Company-Muncie & Somerset	IOU	43680	4/30/10	$61.29
JLB Development, Inc.	IOU	39868	4/28/95	$65.53

Utility	Ownership	Last Rate Case	Effective Date	Average Monthly Bill
Kingsbury Utility Corporation	IOU	43296-U	1/16/08	$33.15
Lakeland Lagoon Corp.	NFP	41597-U	2/2/00	$77.22
LMH Utilities Corporation	IOU	43431	1/21/09	$46.59
Mapleturn Utilities, Inc.	NFP	43777-U	3/24/10	$46.45
Old State Utility Corporation	IOU	43627	5/11/10	$80.14
Pleasantview Utilities, Inc.	IOU	43313-U	4/23/08	$24.38
Sani Tech, Inc.	IOU	43793-U	9/8/10	$76.00
Sanitary District of Hammond	NFP	43307	1/4/08	$13.38
South County Utilities, Inc.	IOU	43799-U	6/16/10	$64.85
South Haven	IOU	43974	10/19/11	$76.86
Southeastern Utilities, Inc.	IOU	43794-U	4/7/10	$61.71
Sugar Creek Utility Company, Inc.	IOU	43579	9/8/10	$48.27
Twin Lakes Utilities, Inc.	IOU	43128-S1	11/12/09	$42.48
Utility Center, Inc. (metered)	IOU	43874	4/13/11	$46.98
Utility Center, Inc. (unmetered)	IOU	43874	4/13/11	$59.21
Wastewater One, LLC d/b/a Rivers Edge	IOU	43115	8/25/10	$39.85
Wastewater One, LLC (Galena WW Treatment Plant)	IOU	43779	6/16/10	$84.79
Water Service Company of Indiana, Inc.	IOU	41486	1/19/00	$44.28
Webster Development, LLC	IOU	42232	2/19/03	$36.81
Wildwood Shores	IOU	43699-U	5/19/10	$80.00
Wymberly Sanitary Works, Inc.	IOU	42877-U	3/22/06	$80.00

Note:

This bill analysis should be construed as an informative guideline as a snapshot in time. Do not use this analysis to draw conclusions about performance since many factors (such as size, resources and customer density, etc.) affect the bill calculations.

Annual Budget

Fiscal Year 2011-2012

Expenses	Allotments	Expenditures
Personnel	$6,468,771.33	$6,468,771.33
Utilities	$142,769.39	$142,769.39
Contracts and External Services[1]	$1,115,763.99	$755,627.81
Supplies and Materials	$85,994.44	$85,994.44
Capital and Equipment	$2,353.95	$2,353.95
Payments to other Government Units	$0	$0
Social Service Payments	$8,634.29	$8,634.29
Administrative Operating Expenses[2]	$1,027,748.79	$1,026,890.79
Total	$8,852,036.18	$8,491,042.00

[1] $360,136.18 is an encumbrance not spent as of the end of fiscal year 2012.
[2] $858.00 is an encumbrance not spent as of the end of fiscal year 2012.

Public Utility Fee

Billable Portion of the Budget

2012-2013 Budget		
Utility Regulatory Commission	$8,342,105	
Utility Consumer Counselor	$5,425,868	
Expert Witness Fund	$852,000	
	Total 2011-2012 Budget	$14,619,973
2011-2012 Budget Augmentations		
Utility Regulatory Commission		$436,271
Utility Consumer Counselor	--	--
2010-2011 Reversions		
Utility Regulatory Commission	$274,406.31	
Utility Consumer Counselor	$173,658.99	
Expert Witness Fund	$16,820.97	
	Total 2010-2011 Reversions	$464,886.27
	Billable Portion of the 2012-2013 Budget	$14,591,357.73
2011 Utility Intra-State Revenues		
Electric Utilities	$7,619,712,888.38	
Gas Utilities	$1,505,422,686.50	
Wastewater Utilities	$31,184,571.91	
Telecommunications Utilities	$2,747,760,014.36	
Water Utilities	$223,761,346.04	
	Total Intra-State Revenues	$12,127,841,507.19
2012-2013 Public Utility Fee Billing Rate		
Billable Portion of the 2011-2012 Budget	$14,591,357.73	
Divide By: Total 2010 Utility Intra-State Revenues	$12,127,841,507.19	
	2011-2012 Public Utility Fee Billing Rate	.00120313

Acronyms

A

ADSL – Asynchronous Digital Subscriber Line

AEP – American Electric Power

AFUDC – Allowance for Funds Used During Construction

AGA – American Gas Association

AOS – Alternative Operator Service

ARP – Alternative Regulatory Plan

AWWA – American Water Works Association

B

Bcf – Billion cubic feet

BPL – Broadband over Power Lines

BTS – Basic Telecommunications Service

Btu – British thermal unit

C

CAIR – Clean Air Interstate Rule

CalWaRN – California Water/Wastewater Agency Response Network

CAMR – Clean Air Mercury Rule

CCT – Clean Coal Technology

CETCs – Competitive Eligible Telecommunications Carriers

CGA – Common Ground Alliance

CLEC – Competitive Local Exchange Carrier

CPCN – Certificate of Public Convenience and Necessity

CT – Combustion Turbine

CTA – Certificate of Territorial Authority

CWA – Communications Workers of America

D

DIMP – Distribution Integrity Management Program

DNR – Indiana Department of Natural Resources

DSA – Designated Service Area

DSIC – Distribution System Improvement Charge

DSL – Digital Subscriber Line

DVR – Digital Video Recorder

E

EEFC – Energy Efficiency Funding Component

EIA – Energy Information Administration

EPA – U.S. Environmental Protection Agency

EPAct – Energy Policy Act of 2005

ERO – Electric Reliability Organization

ETC – Eligible Telecommunications Carrier

F

FAC – Fuel Adjustment Clause

FCC – Federal Communications Commission

FERC – Federal Energy Regulatory Commission

FT – Firm Transportation

FTR – Financial Transmission Rights

FTTH – Fiber-to-the-Home

H

HEA – House Enrolled Act

I

ICTA – Indiana Cable Telecommunications Association

IDEM – Indiana Department of Environmental Management

IEDC – Indiana Economic Development Corporation

IGCC – Integrated Gasification Combined Cycle

ILAP – Indiana Lifeline Assistance Program

ILEC – Incumbent Local Exchange Carrier

I&M – Indiana Michigan Power Company, subsidiary of AEP

IMP – Integrity Management Program

IMPA – Indiana Municipal Power Agency

INWARN – Indiana Water/Wastewater Agency Response Network

IOU – Investor-owned utility, financed by the sale of securities

IPTV – Internet Protocol Television

IPL – Indianapolis Power and Light

ISDH – Indiana State Department of Health

ISO – Independent System Operator

ISP – Internet Service Provider

IT – Interruptible Transportation

ITU – International Telecommunication Union

IUPPS – Indiana Underground Plant Protection Service

IURC – Indiana Utility Regulatory Commission

IUSF – Indiana Universal Service Fund

L

LDC – Local Distribution Company

LFA – Local Franchise Authority

LMG – Landfill Methane Gas

LMOP – Landfill Methane Outreach Program

LNG – Liquefied Natural Gas

M

Mcf – Million cubic feet

MGT – Midwestern Gas Transmission

Midwest ISO – Midwest Independent Transmission System Operator

MMBtu – One million British thermal units, rough equivalent to an Mcf

MMcf – One million cubic feet

MMTCE – Million metric tons of carbon equivalent

MS4 – Municipal Separate Storm Sewer System

MSW – Municipal Solid Waste

MTEP – Midwest ISO Transmission Expansion Plan

MVPD – Multichannel Video Programming Distributor

MW – Megawatts

MWH – Megawatt hour

N

NANPA – North American Numbering Plan Administrator

NAPSR – National Association of Pipeline Safety Representatives

NARUC – National Association of Regulatory Utility Commissioners

NCTA – National Cable and Telecommunications Association

NERC – North American Electric Reliability Council

NIPSCO – Northern Indiana Public Service Company

NO_x – Nitrogen Oxides

NOAA – National Oceanic and Atmospheric Administration

NOPR – Notice of Proposed Rulemaking

NPDES – National Pollutant Discharge Elimination System

NPMS – National Pipeline Mapping System

NRRI – National Regulatory Research Institute

NTA – Normal Temperature Adjustment

O

OECD – Organization for Economic Cooperation and Development

OMS – Organization of Midwest ISO States

OPS – Office of Pipeline Safety

OQ – Operator Qualification

OUCC – Office of Utility Consumer Counselor

P

PHMSA - Pipeline Hazardous Materials Safety Administration

PIPES – Pipeline Integrity, Protection, Enforcement, and Safety

PJM – The PJM Interconnection

POLR – Provider of Last Resort

PPA – Purchase Power Agreement

PPTT – Purchased Power and Transmission Tracker

PSA – Pipeline Safety Adjustment

PSAPs – Public Safety Answering Points

PSI – PSI Energy

PSTN – Public Switched Telephone Network

PUHCA – Public Utility Holding Company Act of 1935

PUHCA 2005 – Public Utility Holding Company Act of 2005

PURPA – Public Utility Regulatory Policies Act of 1978

R

RFP – Request for proposals

RLECs – Rural Incumbent Local Exchange Carriers

RSD – Regional Sewer District

RSG – Revenue Sufficiency Guarantee

RTO – Regional Transmission Organization

S

SDC – System Development Charge

SIGECO – Southern Indiana Gas & Electric Company

SNG – Synthetic Natural Gas

SO2 - Sulfur Dioxide

SOHO – Small Office Home Office

SRC – Sales Reconciliation Component

SUFG – State Utility Forecasting Group

T

TA-96 –Telecommunications Act of 1996

U

UGS – Underground storage

UNEs – Unbundled Network Elements

USAC – Universal Service Administrative Company

USF – Universal Service Fund

V

VoIP – Voice over Internet Protocol

W

Wi-Fi – Wireless Fidelity

Wi-Max – Worldwide Interoperability for Microwave Access

Glossary

A

Access Charges: Charges designed to compensate local exchange carriers for the maintenance and operation of the local exchange network after the break up AT&T in 1984 in the Modified Final Judgment. Access charges take two forms: 1) an end user access charge, also known as Subscriber Line Charge that appears on the customer's bill as a separate line item; 2) carrier access charges paid by interexchange carriers to local exchange carriers when they connect to their local networks. Such charges are determined by tariffs subject to state or federal approval depending upon the intrastate or interstate nature of the call.

Alternative Fuels: Any non-traditional energy source.

Alternate Ratemaking for Pipelines: In a series of orders in February 1996, the Federal Energy Regulatory Commission opened the door to non-cost-based rates for pipeline services, including transmission and storage, provided that a pipeline could show: 1) it did not have market power or that the power was mitigated; and (2) cost-based recourse rates were available for customers who might be disadvantaged under the new system. Pipelines are also required to show the quality of service was maintained and that market-based, incentive or negotiated rates did not shift costs to captive customers.

American Gas Association (AGA): Trade group representing natural gas distributors and pipelines. The AGA also operates a laboratory for appliance certification.

Aquifer: Water bearing permeable rock formation that is capable of storing natural gas.

Area Code Overlay: A method used to relieve area code exhaust. A new three-digit area code is associated with the same geographic boundaries of an existing area code. Because the same seven-digit telephone numbers could then be assigned out of each area code, local calls are required to be dialed with 10-digits.

Area Code Split: A method used to relieve area code exhaust. The geographic area that uses the area code is split in two and a different area code is assigned to part of the geographic area while the other area keeps the existing area code.

Asynchronous Digital Subscriber Line (ADSL): A DSL designed to deliver more bandwidth downstream (from the central office to the customer's site) than upstream. Downstream rates range from 1.5 to 9 million bits per second. See also Digital Subscriber Line.

B

Base Gas: Gas required in a storage pool to maintain sufficient pressure to keep the working gas recoverable. Also called "cushion" gas.

Basic Telecommunications Service (BTS): A term used in House Enrolled Act 1279 to distinguish between telecommunication services regulated until June 30, 2009 and services that were unregulated on or before March 27, 2006. BTS is defined as standalone telephone exchange service that is provided to a residential customer through the customer's primary line; is the sole service purchased by the customer; is not a part of a package, promotion, or contract; and, not otherwise offered at a discounted price.

British Thermal Unit (Btu): The quantity of heat required to raise one pound of water (about one pint) one degree Fahrenheit at or near its point of maximum density. A common unit of measurement for gas prices. 1,034 Btus = 1 cubic foot.

Broadband: Advanced communications systems capable of providing high-speed transmission of services such as data, voice, and video over the Internet and other networks. Transmission is provided by a wide range of technologies, including digital subscriber line and fiber optic cable, coaxial cable, wireless technology, and satellite. Broadband platforms make possible the convergence of voice, video and data services onto a single network.

Bundled Resale of Local Exchange: Competitive local exchange carriers can compete by reselling the services of the incumbent local exchange carrier (ILEC) in this form. They purchase the services of the ILEC at wholesale rates hoping to resell them to retail customers at a profit. Each of Indiana's three large ILECs offer wholesale discounts to competitive carriers.

Bundled Service: Gas utility that operates as both the supplier and distributor of natural gas.

C

Capacity: The size of a plant (not its output). Electric utilities measure size in kilowatts or megawatts and gas utilities measure size in cubic feet of delivery capability.

Carbon Capture: The process of capturing carbon dioxide produced in the combustion of fuel to facilitate its disposal.

Carbon Sequestration: The storage of carbon dioxide in geological formations to prevent its release into the atmosphere.

Certificate of Public Convenience and Necessity (CPCN): A special permit commonly issued by a state commission that authorizes a utility to engage in business, construct facilities or perform some other service. Also a permit issued by the Federal Energy Regulatory Commission to engage in the transportation or sale for resale of natural gas in interstate commerce, or to construct or acquire and operate any facilities necessary.

City Gate: The physical location where gas is delivered by a pipeline to a local distribution company.

Coal Gasification: The controlled process of placing coal, steam, and oxygen under pressure to produce a low Btu gas.

Coal Bed Methane: Any gas produced from a coal seam.

Commodity Charge: The charge that covers the pipeline's variable costs in a Straight Fixed Variable rate design. Also referred to as a "usage charge."

Communications Service Provider: A term used in House Enrolled Act 1279 that means a person or entity offering communications services to customers in Indiana, without regard to the technology or medium used by the person or entity to provide the communications service.

Condemnation Action: A legal proceeding whereby a municipality exercises its power of eminent domain and condemns utility property that results in the transfer of utility property to the municipality.

Conditional Congestion Area: As designated by the U.S. Department of Energy, as areas where electric utilities have planned generation, and while some transmission congestion is present, significant congestion would result if transmission is not built in conjunction with the new generation resources.

Cooperative: A business entity similar to a corporation, except that ownership is vested in members rather than stockholders and benefits are in the form of products or services rather than profits.

Cost-of-Service Rates: Rates based on prudently incurred costs of doing business, plus a reasonable rate of return on investment in plant and equipment, and throughput projections. This is the rate development methodology commonly used by state or federal regulators.

Cramming: A practice in which customers are billed for unexpected and unauthorized telephone charges or services. Refers to the fact that the charges are crammed into the telephone bill in an inconspicuous place so the charges go unnoticed by the customer.

Customer Charge: A fixed amount to be paid periodically by a customer without regard to demand or energy actually used. The customer charge recovers the cost of meters and other administrative costs of billing.

D

Decoupling: Alternative rate design theory that separates the recovery of a utility's fixed costs from the volume of natural gas sold.

Dekatherm (Dth): A unit of heating value equal to 10 therms or one million Btus (1MMBtu). Roughly, 1Mcf = 1, MMBtu = 1 Dth

Demand Response: Reducing the use of electricity to meet local or regional power system needs rather than increasing the output of electricity.

Digital Subscriber Line (DSL): A generic term for digital lines provided by incumbent or competitive local exchange carriers that allows the customer to use the same subscriber line for voice and data simultaneously without subscribing to a second line for Internet access.

Distribution: The component of a gas, electric or water system that delivers gas, electricity, or water from the transmission component of the system to the end-user. Usually the commodity has been altered from a high pressure or voltage level at the transmission level to a level that is usable by the consumer. Distribution is also used to describe the facilities used in this process.

Distribution System Improvement Charge: A mechanism available to water utilities to pass the costs of infrastructure replacement onto their customers between rate cases on a more expedited basis.

E

Effluent: The water that is discharged after being treated at a sewage plant.

Eligible Telecommunications Carrier (ETC): A common carrier eligible to receive universal service support. An ETC is required to offer services that are supported by the federal universal support mechanisms either using their own facilities or a combination of its own facilities and resale of another carrier's services. State commissions are responsible for the designation of ETCs.

End Use: The final use to which gas or electricity is put by the ultimate consumer.

Energy Information Administration: Statistical information collection and analysis branch of the Department of Energy.

Energy Independence & Security Act of 2007: A comprehensive energy law that focuses on improved efficiency standards, and the research and development of energy technologies and infrastructure.

Energy Policy Act of 1992: This act authorized the Federal Energy Regulatory Commission to order wholesale wheeling of electricity while explicitly restraining its power to order retail wheeling. The Act also created a new legal category of electricity generating and sales companies, referred to as "Exempt Wholesale Generators," that are free from the Public Utility Holding Company Act of 1935 restrictions.

Energy Policy Act of 2005: Major provisions regarding the electricity industry included the creation of the Public Utility Holding Company Act of 2005, clean coal, nuclear, wind, and alternative energy initiatives, establishment of an Electric Reliability Organization, incentive rates for transmission investment, transmission siting, smart metering, net metering, utility interconnection with distributed generation, increased efficiency of fossil-fuel power plants, and the increased diversity of fuel sources to generate electricity.

Environmental Protection Agency: A federal agency created in 1970 to execute federal research, monitoring, standard setting and enforcement actions related to protecting the environment.

F

Facilities-based Interexchange: A carrier that offers facilities-based interexchange deploys their own tandems and/or trunks as opposed to purchasing blocks of time from other interexchange carriers and reselling the services to retail customers.

Facilities-based Local Exchange: A carrier that offers facilities-based local exchange may construct and deploy its own networks or it may rely on unbundled network elements from incumbent local exchange carriers or a combination of the two.

Federal Energy Regulatory Commission (FERC): The U.S. federal agency with jurisdiction over interstate electricity sales, wholesale electric rates, hydroelectric licensing, natural gas pricing, and oil pipeline rates. The FERC also authorizes liquefied natural gas terminals, interstate natural gas pipelines and non-federal hydropower projects.

FiOS: Verizon's broadband initiative featuring fiber to the premise that is being deployed in several areas throughout the U.S.

Firm Service: The highest quality sales or transmission service that is offered to customers under a filed rate schedule that anticipates no planned interruption.

Fixed Costs: All costs included in the cost of service that do not fluctuate with the volume of the commodity passing through the system (e.g., labor, maintenance, and taxes).

G

Gigabit: A unit of measurement for the amount of data that is transferred in a second between two telecommunication points. One gigabit per second (Gbps) equals one billion bps.

Gasification: 1) The conversion of carbonaceous material into gas or the extraction of gas from another fuel. 2) The process during which liquefied natural gas is returned to its vapor or gaseous state through an increase in temperature and a decrease in pressure.

Gathering System: Pipelines and other equipment installed to collect, process, and deliver natural gas from the field, where it is produced, to the trunk or main transmission lines of pipeline systems.

Generation: The process of producing electricity. Also refers to the assets used to produce electricity for transmission and distribution.

H

Heartland: Heartland Gas Pipeline, LLC

Hedging: A method by which a purchaser or producer of natural gas or electricity uses a derivative position to protect against adverse price movements in the cash market by "locking in" a price for future delivery.

Holding Company: A corporate structure where one company holds the stock (ownership) of one or more other companies but does not directly engage in the operation of any of its business.

I

Indiana Lifeline Assistance Program (ILAP): A state program required by House Enrolled Act 1279 for the purpose of offering reduced charges for basic telecommunications services to eligible customers (customers with income that falls within 150 percent of the Federal Poverty Guidelines or participates in certain assistance programs, such as Medicaid, food stamps, etc).

Independence Hub: A large natural gas production platform in the Gulf of Mexico.

Independent System Operator (ISO): An independent organization or institution that controls the electric transmission system in a particular region.

Indiana Utility Regulatory Commission: An independent fact-finding body that hears evidence in cases filed before it and makes decisions based on the evidence presented in those cases. An advocate of neither the public nor the utilities, the Commission is required by state statute to make decisions that balance the interests of all parties to ensure the utilities provide adequate and reliable service at reasonable prices.

Integrated Gasification Combined Cycle (IGCC) Facility: A power plant using synthetic gas as a source of clean fuel. Syngas is produced from coal (or other fuels) in a gasification unit. Steam generated by waste heat boilers of the gasification process is utilized to help power steam turbines.

Integrity Management: Specifies how pipeline operators must identify, prioritize, assess, evaluate, repair and validate - through comprehensive analyses - the integrity of gas pipelines that, in the event of a leak or failure, could affect High Consequence Areas.

Internet Protocol Television (IPTV): A system where a digital television service is delivered by using Internet Protocol over a network infrastructure that may include delivery by a broadband connection.

Interruptible Transportation Service: Conditional gas service interrupted at the option of the pipeline. Also, referred to as "best efforts." Tariffs for interruptible service are cheaper than firm service. Electric providers may offer a similar service.

Interstate Gas: Gas transported through interstate pipelines to be sold and consumed in states other than the one in which it was produced. Also, refers to gas produced in the federal domain of the Outer Continental Shelf.

Intrastate Gas: Gas sold and consumed in the state in which it was produced and not transported in interstate pipelines.

Investor-Owned Utility: A utility financed by the sale of securities.

J

Joint Board: Also known as the Federal-State Joint Board, instituted by the Federal Communications Commission to recommend changes of any of its regulations in order to implement section 214(e) of the Telecommunications Act of 1996, including the definition of services that are supported by the Federal universal service support mechanisms.

K

Kilobit: A unit of measurement for the amount of data that is transferred in a second between two telecommunication points. One kilobit per second (Kbps) equals 1000 bit per second (bps).

Kilowatt (kW): A basic unit of measurement; 1kW = 1,000 watts.

Kilowatt-Hour (kWh): One kilowatt of power supplied to or taken from an electric circuit steadily for one hour.

L

Landfill Gas: Gas produced by aerobic and anaerobic decomposition of a landfill generally composed of approximately 55% methane and 45% carbon dioxide, sometimes refined with membrane methods to eliminate the carbon dioxide.

Liquefied Natural Gas (LNG): Natural gas converted to a liquid state by pressure and severe cooling, and then returned to a gaseous state to be used as a fuel. It is stored by many distributors for peak season use.

M

Mandatory Number Pooling: Requires carriers to share a pool of numbers with the same exchange. Without number pooling each competitive local exchange carrier is assigned an entire exchange or 10,000 block of phone numbers, which may not all be needed. With number pooling, exchanges can be broken down into blocks of 1,000, as known as "thousand block number pooling."

Megabit: A unit of measurement for the amount of data that is transferred in a second between two telecommunication points. One megabit per second (Mbps) equals one million bps.

Megawatt (MW): One thousand kilowatts or one million watts.

Megawatt-Hour (MWh): One megawatt of power supplied to or taken from an electric circuit steadily for one hour.

Merchant Plant: A power plant that is funded by investors and sells electricity in the competitive wholesale market.

Methane: The main component of natural gas.

Midwest ISO: The Midwest ISO was formed by transmission owners in 1996, and is based in Carmel, Indiana. The Midwest ISO's main responsibility is to ensure the safe and reliable transfer of electricity in the Midwest and ensure fair access to the transmission system.

Multi-Association Group Order (MAG Order): A Federal Communications Commission Report and Order adopted October, 2001 which prescribed access charge reform measures that affected small, rural incumbent local exchange carriers.

Municipalization: When a municipally-owned utility acquires an investor-owned utility serving a city or town.

Municipal Utility: A utility that is owned and operated by a municipal government. These utilities are organized as nonprofit local government agencies and pay no taxes or dividends; they raise capital through the issuance of tax-free bonds.

N

National Interest Electric Transmission Corridor: As established in the Energy Policy Act of 2005, any geographic area experiencing electric energy transmission capacity constraints or congestion that adversely affects consumers.

Normal Temperature Adjustment (NTA): A decoupling mechanism that reduces the risk of the gas utility not recovering margin due to warmer-than-normal (vice versa) during the heating season.

Not-for-profit Utility: A utility that does not distribute its surplus funds to owners or shareholders but uses them to pursue its goals.

NPDES Permits: Permits that allow utilities to discharge wastewater effluent into waterways.

O

Order 436: A Federal Energy Regulatory Commission rule promulgated in October 1985, establishing a voluntary, open-access system of natural gas transportation.

Order 500: An interim natural gas rule on open-access transportation, replacing Order 436. Order 500 embodied all the elements of Order 436 with three additions: forcing producers to credit transportation volumes against accruing take-or-pay (cross-crediting); allowing pipelines to direct bill customers for part of past take-or-pay charges; and allowing pipelines to fashion gas inventory charges (or supply reservation fees) to take care of future take-or-pay.

Order 636: Commonly known as the "Restructuring Rule," Order 636 provides for pipeline companies to change from being merchants of natural gas to being transporters of natural gas and allows open-access transportation services regardless of who owns the gas.

Order 712: Revised regulations governing interstate natural gas pipelines to reflect changes in the market for short-term transportation services on pipelines and to improve the efficiency of the capacity release program.

Organization of Midwest ISO States (OMS): A group of state utility commissions in the Midwest ISO footprint that acts as an adviser on some Midwest ISO functions.

P

Peak Shaving: Supply of fuel gas for distribution systems from an auxiliary source of limited supply and higher cost (e.g., propane, liquefied natural gas) during periods of maximum demand when the primary source is not adequate. Electricity providers may also use peak shaving to reduce demand at peak periods. Service interruptions and customer-owned generation are methods electricity providers use for peak shaving.

PJM Interconnection: The PJM Interconnection is the regional transmission organization (RTO) responsible for the operation and control of the bulk power system throughout all or portions of Delaware, Indiana, Illinois, Kentucky, Maryland, Michigan, New Jersey, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and the District of Columbia. PJM became the first fully functioning RTO in 1997.

Point-to-Point Transmission: The reservation and/or transmission of electricity on either a firm basis and/or a non-firm basis from point(s) of receipt to points(s) of delivery, under a tariff, including any ancillary services that are provided by the transmission provider.

Private Activity Bonds: Municipal bonds that are issued to finance facilities for investor-owned or not-for-profit water utilities.

Privatization: When an investor-owned utility acquires a municipally-owned utility.

Public Utility Holding Company Act of 1935 (PUHCA): A federal law to facilitate the regulation of electric utilities, by either limiting their operations to a single state, and thus subjecting them to effective state regulation, or forcing divestitures so that each became a single integrated system servicing a limited geographic area. Another purpose of the PUHCA was to keep utility holding companies engaged in regulated businesses from engaging in unregulated businesses. The PUHCA required Securities and Exchange Commission approval prior to a holding company engaging in a non-utility business and that such businesses be kept separate from the regulated business. The PUHCA was repealed by the Energy Policy Act of 2005, and replaced by what is known as the Public Utility Holding Company Act of 2005.

Public Utility Regulatory Policies Act (PURPA): A federal law passed in 1978 as part of the National Energy Act. It was meant to promote greater use of renewable energy. Implementation of the act was left to the states. The PURPA was amended in 2005 by the Energy Policy Act of 2005 sections 1251 through 1254.

Pulverized Coal: Coal that is ground into dust using a powdered coal mill and used as the fuel in a power plant to generate electricity.

Purchasing Cooperative: A type of cooperative arrangement, often among businesses, to agree to aggregate demand to get lower prices from selected suppliers.

Q

Quadruple Play: A service bundle that includes high-speed data, telephony, television and wireless communications services.

R

Rate Base: The investment value established by a regulatory authority upon which a utility is permitted to earn a specified rate of return.

Rate Design: The method of classifying fixed and variable costs between demand and commodity components.

Rate of Return: The percentage that a company earns on its investment.

Raw Natural Gas: Natural gas brought from underground up to the wellhead. Natural gas found at the wellhead is not as pure as processed or pipeline quality natural gas used by consumers. Raw natural gas comes from three types of wells: oil wells, gas wells, and condensate wells.

Reclaimed Water: Wastewater that has been treated to remove solids and certain impurities, and used for irrigation or recharging aquifers.

Reliability: A term used in both the electric and gas industry to describe the utility's ability to provide uninterrupted service of gas or electricity. Reliability of service can be compromised at any level of service: generation or production, transmission or distribution.

Renewable Portfolio Standard: A requirement that a specified portion of a utility's electricity be supplied by energy sources defined as renewable.

S

Service Territory: Under the current regulatory environment, an electric utility is granted a franchise to provide energy to a specified geographical territory, designated as a service territory.

Slamming: The practice of switching a telephone customer's long distance or local service provider without obtaining permission from the customer.

Smart Grid: An electricity delivery system that encompasses devices and technologies designed to improve the efficiency of energy use and the transfer of energy across it.

Small Utility Filing: A process where a utility, which serves under 5,000 customers, primarily residential, and does not serve extensively another utility, can increase its rates without a formal public hearing.

Spot Market: A market characterized by short-term, typically interruptible, or best efforts contracts for specified volumes. The bulk of natural gas spot market trades on a monthly basis, while power marketers sell spot supplies on an hourly basis.

Storage: Facilities used to store natural gas that is transferred from its original location. Usually consists of natural geological reservoirs like depleted oil or gas fields, waterbearing sands sealed on top by impermeable cap rock, underground salt domes, bedded salt formations, or in rare cases, abandoned mines.

Straight-Fixed Variable Rate Design: Rate design methodology that allocates all fixed costs to the demand component and allocates all variable costs to the commodity, or volumetric, component. Also called "Fixed Variable."

Supply Side Management: The systematic development of a gas supply plan or an electric resource plan.

Synthetic Natural Gas: Energy-rich vapors manufactured from coal.

System Development Charge: A one-time charge assessed by water and wastewater utilities to new customers to finance development of utility systems necessary to serve those new customers. The purpose is to impose a portion of the cost of capital improvements upon those developments that create the need for, or increase demand for capital improvements.

Sub-metering/Sub-billing: The practice where a consumer of utility service, usually an apartment complex or a mobile home park, passes along the cost of water or electric service to the tenants of the complex or park through a separate utility bill.

T

Take-and-Pay: Clause that requires a minimum quantity of natural gas to be physically taken and paid for, usually in association with oil, or wells, that will be damaged by failure to produce.

Tariff: Compilation of all effective rate schedules for a company, along with general terms and conditions of service.

Therm: Unit of heating value equivalent to 100,000 Btus.

Transmission: The process of transferring energy (either gas or electricity) or water from the production or generation source to the point of distribution. Also refers to the facilities used for this process.

Triple Play: A service bundle that includes telephone, high-speed Internet access and television.

U

Unaccounted for Gas: The difference between the total gas available from all sources and the total gas accounted for as sales, net interchange, and company use. This difference includes leakage or other actual losses, discrepancies due to meter inaccuracies, variations of temperature and/or pressure, and other variants, particularly billing lag.

Unbundled Network Elements: The Telecommunications Act of 1996 required that independent local exchange carriers unbundled their network elements to make them available to competitive local exchange carriers on the basis of incremental costs.

Universal Service: A policy to keep local rates low and encourage every household to have a telephone.

Unserved Energy: Electricity demand that the utility is unable to supply. In the electric utility planning process, unserved energy helps identify when and what type of new resources may be needed in the future.

V

Volatility: The market's price and movement within that range. The direction of the price move, whether up or down, is not relevant. Historic volatility indicates how much prices have changed in the past and is derived by using daily settlement prices for futures. Implied volatility measures how much the market thinks prices will change in the future, obtained from daily settlement prices for options.

Voltage: The rate at which energy is drawn from a source that produces a flow of electricity in a circuit; expressed in volts.

Voice over Internet Protocol (VoIP): Technology used to transmit voice conversations over a data network using the Internet Protocol. Such data network may be the Internet or a corporate Intranet.

W

Weatherization: Any change made to a home or building that is designed to conserve energy.

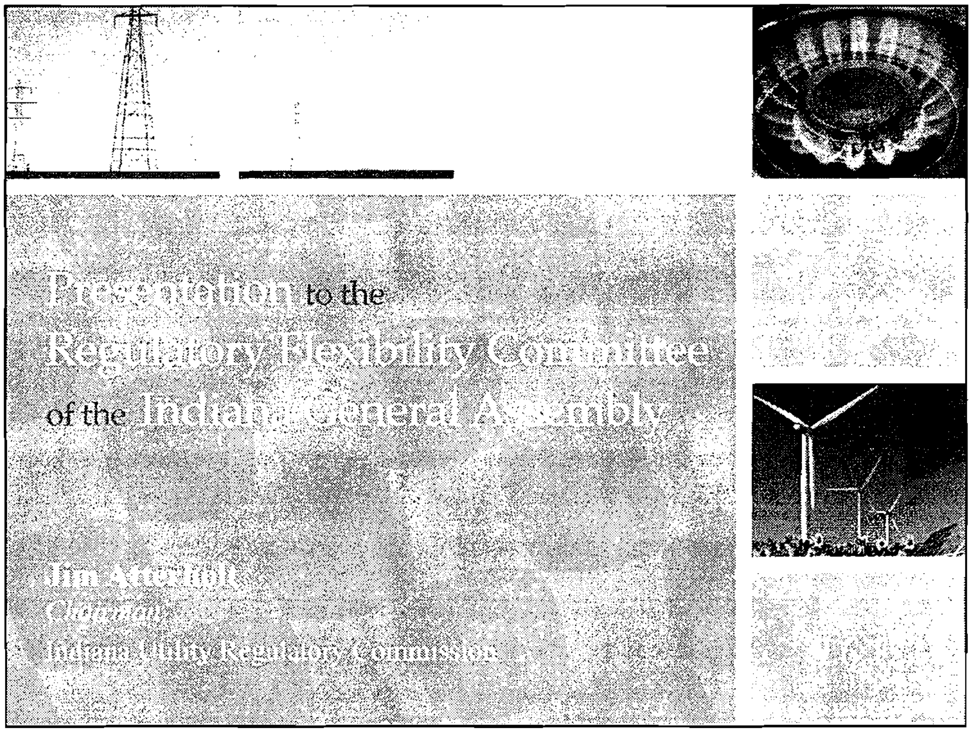
Well: A well that produces at surface conditions the contents of a gas reservoir.

Wellhead: The assembly of fittings, valves, and controls located at the surface and connected to the flow lines, tubing, and casing of the well as to control the flow from the reservoir.

Wireless Fidelity (Wi-Fi): Wi-Fi was originally a brand licensed by the Wi-Fi Alliance to describe the embedded technology of wireless local area networks (WLAN) based on the IEEE 802.11 standard. As of 2007, common use of the term Wi-Fi has broadened to describe the generic wireless interface of mobile computing devices, such as laptops in local area networks.

Withdrawal: Those uses of water that involve the physical removal of water from the ground or surface source.

Worldwide Interoperability for Microwave Access (Wi-Max): Wi-Max is a telecommunications technology aimed at providing wireless data over long distances in a variety of ways, from point-to-point links to full mobile cellular type access. Wi-MAX allows a user, for example, to browse the Internet on a laptop computer without physically connecting the laptop to a wall jack.



Agency Overview

316 Orders issued by the Commission

Hearings are now ... over the Web

3 new rules:

New ... aimed at closing docketed cases within 90 days of the last filing

$68 million will be saved by the end of September 2012 due to the approved utility transfer from Indianapolis Water Company to Citizens Energy Group

13 ... held throughout the state for pending cases

... more content, less clutter

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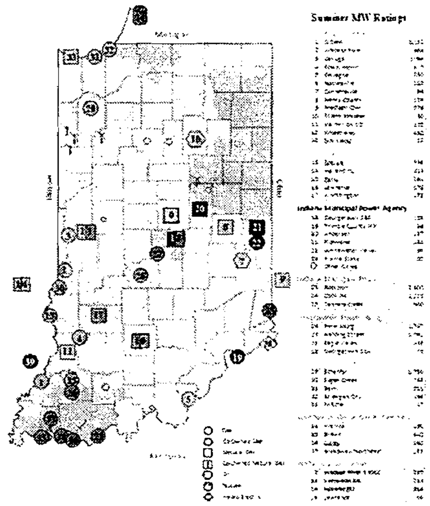
RFSC 9/6/12

EXHIBIT D

Electric Generation



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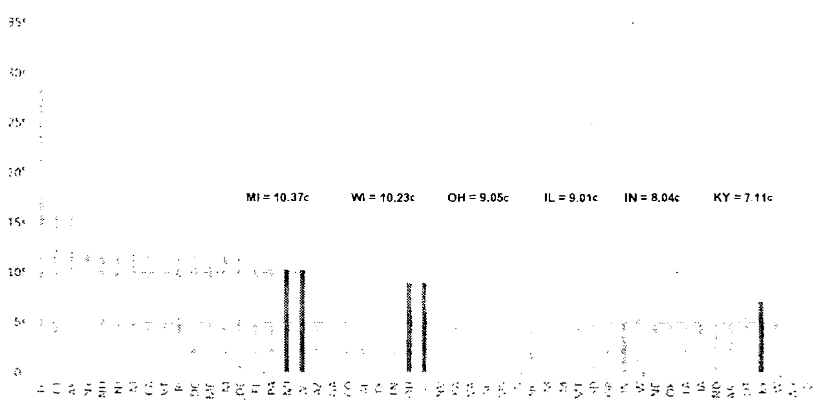
2011 State Average Electricity Prices
(cents/kWh)



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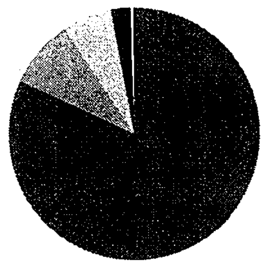
Fuel Type Comparison



	2010		2011
Coal (112,238 GWH, 81.9%)	85.0%	↓	81.9%
Nuclear (11,922 GWH, 8.7%)	8.5%	↑	8.7%
Natural Gas (8,619 GWH, 6.3%)	4.4%	↑	6.3%
Wind , Other Renew. (3,626 GWH, 2.7%)	1.6%	↑	2.7%
Hydro (454 GWH, 0.3%)	0.4%	↓	0.3%
Oil (155 GWH, 0.1%)	0.1%	↔	0.1%

Source: 2010 U.S. EIA data, 2011 data for Cook Nuclear Units

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Planning for the Future

- Long-term planning is critically important, because it takes approximately three years to construct new gas-fired peaking generation, five to ten years to construct new conventional coal-fired generation, and even longer to bring new nuclear generation online.
- Coal units are candidates for retirement past the age of 40, with most retiring by age 60.
- In Indiana, more than 30% of the total coal-fired generation is more than 40 years old, and about 75% of the total coal-fired generation is more than 30 years old.

IURC I 6

Aging Generation

This past year the number of coal-fired units greater than 50 years old increased by 6.

Years Old	Number of Coal-Based Units	MW of Generation (Summer Rating)	Percent of Total Coal-Based Generation
Over 50	27	1,995.7	13.0%
40-50	14	3,144.9	20.5%
30-40	14	6,533.1	42.5%
20-30	8	3,595.7	23.4%
10-20	0	0	0
0-10	1	96.0	0.6
Total	64	15,365.4	100%

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Indiana Energy Needs

"The State Utility Forecasting Group's (SUFG) most recent forecast projected electricity usage to grow at a rate of 1.30% per year over the 20-year forecast, which corresponds to about 275 MW of increased demand per year. That would require the building of a large power plant (1,000 MW) at least every four years. To put that into perspective, the Duke Energy Edwardsport generating facility that has been under construction a number of years is rated 630 MW."

- Indiana Chamber of Commerce
Indiana Vision 2025: A Plan for Hoosier Prosperity

No New U.S. Coal Plants?

In March 2012, the U.S. EPA proposed the first Clean Air Act standard for carbon emissions from new power plants.

What does it mean?

"What it means in the near term is that no one is going to propose another coal plant for quite a while because you can't meet the standard without some kind of carbon capture. The economics of that right now, even absent a requirement like this, are not favorable."

– John McManus, Electric Power Research Institute
Power Engineering, July 2012

Generation Transition

"If you look at the 500-megawatt class, that's on the border. Anything below that is going to go. It's just going to go in its normal course."

"In the United States, it's clear that coal is going to bow to combined–cycle natural gas when you look at new installations."

- Michael Morris
Chairman, American Electric Power
Wall Street Journal, March 7, 2011

U.S. Coal Exports Surge

- According to the U.S. Department of Energy, U.S. coal exports reached their highest level in two decades last year as strong exports to Asia and Europe offered an outlet for the surplus.
- U.S. coal exports topped 107 million tons of fuel worth $16 billion in 2011.
  - That's the highest level since 1991 and more than double the volume from 2006.

- "Coal Exports Surge to Highest Level Since 1991"
The Associated Press, April 10, 2012

Net Metering Rule

The net metering rulemaking, initiated by the IURC in June 2010, went into effect in July 2011. Significant changes stemming from the rulemaking include:

1. A 9,900% increase in the maximum size of an eligible facility from 10 kW to 1 MW;
2. Expanded eligibility to all customer classes (industrial, commercial, and residential) from just K-12 schools and residential customers; and
3. A 900% increase in the aggregate sales level under each utility's net metering tariff from 0.1% to 1% of annual kWh sales.

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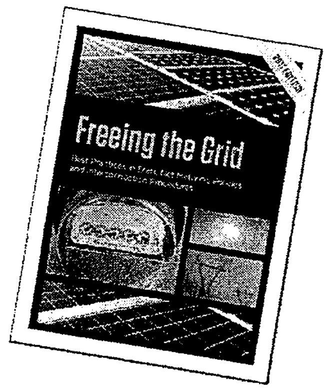
Making the Grade

Indiana was named "Most Improved" in the 2011 edition of *Freeing the Grid.*



"Indiana made impressive year-over-year improvements, from a 'D' in net metering and 'C' in interconnection in 2010 to solid 'B's in both categories this year."

**Freeing the Grid* is produced annually by Network for New Energy Choices in partnership with Vote Solar, Interstate Renewable Energy Council, and the North Carolina Solar Center.

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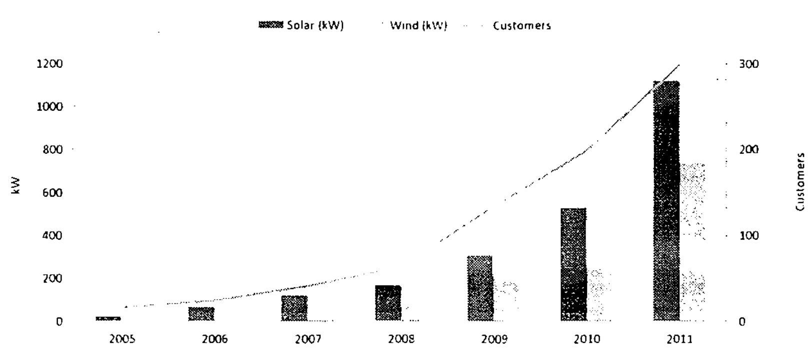
Increase in Net Metering

Net Metering Capacity (kW) and Participation in Indiana from 2005 to 2011



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Tree Trimming Rule

- The IURC issued a decision in 2010 related to its tree-trimming investigation and initiated a rulemaking shortly thereafter.
- Rather than having each utility create its own set of guidelines, the rule standardizes the tree trimming process for Duke Energy, I&M, IPL, NIPSCO, and Vectren.
- The rule provides a framework for utilities' tree and vegetation management programs that balances their need to ensure reliability of service with the interests of their customers in preserving their landscapes.

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Rulemaking Process

- The rulemaking was needed to further address issues such as customer notification and education, the dispute resolution process, and tree replacement.
  - The IURC incorporated comments from a variety of stakeholders, including consumer groups like the Indiana Tree Alliance, private citizens, the OUCC, and the utility companies.
  - Additionally, the IURC traveled to six locations during the investigation in order to collect testimony from customers in the different service territories.
    - Evansville, Fort Wayne, Indianapolis, Merrillville, Muncie, and Seymour

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Elements of the Rule

Issue	Changes
Trimming Standards	Utilities must abide by nationally recognized best practices, such as the ANSI A300 standards.
Notification	Customers will receive two notices at least two weeks before trimming is scheduled; notice will also be given 60 days prior to line upgrades.
Education	By providing details about the tree trimming process and why it is needed, concerns can be addressed before trimming takes place.
Dispute Resolution	If a customer objects to the proposed plan within five days of receiving notice, the utility must hold off on trimming until the issue is addressed by the utility or the IURC's Consumer Affairs Division.
Property Rights	The rule did not change existing property rights; however, it reiterated utilities cannot trim outside an easement or right-of-way without customer consent.
Tree Replacement	In cases where a tree must be removed, an agreement may be reached in which the customer is compensated.

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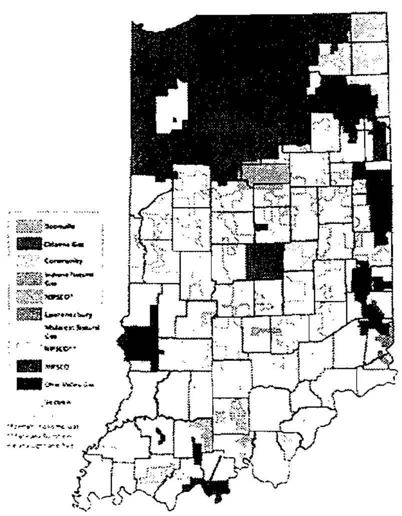
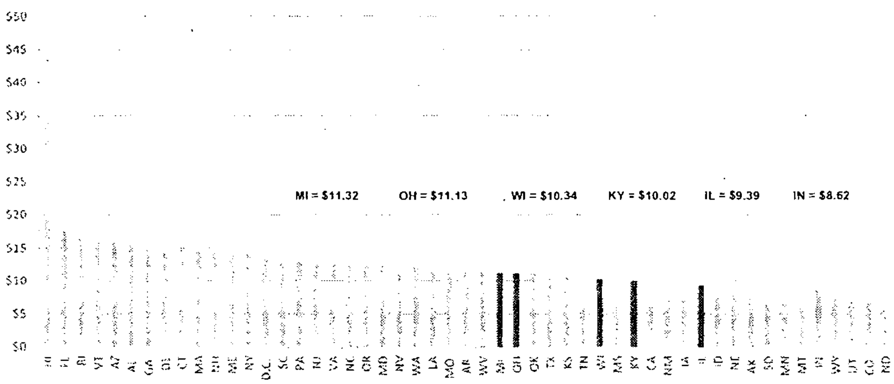
Natural Gas



2010 State Residential Gas Prices
($/thousand cubic feet)



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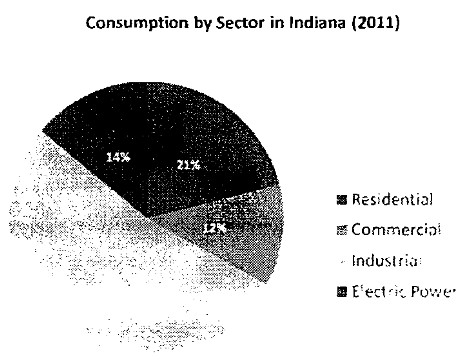
Natural Gas Consumption



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State Industrial Consumption

Top 10 States for Industrial Consumption % of total national industrial consumption	
Texas	19.26%
Louisiana	12.91%
California	10.52%
Indiana	4.94%
Ohio	3.91%
Illinois	3.84%
Oklahoma	2.86%
Pennsylvania	2.75%
Iowa	2.47%
Minnesota	2.41%

Source: U.S. Energy Information Administration

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Natural Gas Price Impact

- U.S. natural gas prices are down nearly 90% since 2003.
- "The biggest part of the benefit is lower utility costs because natural gas is so much cheaper in the U.S. than the world average. That has saved U.S. companies and consumers an average of $566 million a day for the last year." - Francisco Blanch, chief of commodities research for Bank of America Merrill Lynch

- "Domestic Energy Supplies Boost U.S. Economy"
USA Today, July 12, 2012

Manufacturing Boom?

- A 2011 PricewaterhouseCoopers (PwC) study estimates that high rates of shale gas recovery could result in a million new manufacturing jobs by 2025.
- According to Robert McCutcheon, United States industrial products leader at PwC, "[shale gas] has the potential to spark a manufacturing renaissance in the U.S., including billions in cost savings, a significant number of new jobs and a great investment in U.S. plants."

- "Natural Gas Signals a 'Manufacturing Renaissance'"
The New York Times, April 10, 2012

Price Fluctuations

- While the cost of generation at coal and gas fired power plants (CCGT) was roughly equal in the first half of 2011, by the first half of 2012 the cost of generation at CCGTs was, on average, 28% below that of coal plants.
  - In mid-April, when gas prices briefly dropped below $1.90/MMBtu, the operating cost advantage of CCGTs over power plants burning Appalachian coal approached 40%.
  - In the last week of July, when spot gas prices broke $3.10/MMBtu, the operating cost advantage decreased to about 15%.

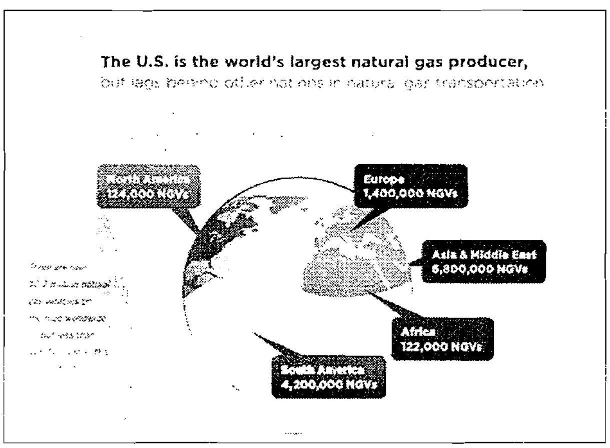
- *Bernstein Research*, August 10, 2012

Switching Lowers CO_2 Levels

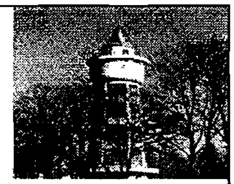
- "In a surprising turnaround, the amount of carbon dioxide being released into the atmosphere in the U.S. has fallen dramatically to it lowest level in 20 years."
  - The switch from coal to natural gas has had an impact on CO_2 emissions, due to gas being a cleaner burning fuel source.
  - According to a report released by the U.S. Energy Information Agency, total U.S. CO_2 emissions for the first four months of this year fell to around 1992 levels.

- "Switch to Natural Gas Lowers CO_2 Levels"
The Associated Press, August 17, 2012

Natural Gas Vehicles



American Gas Association's
Playbook 2012

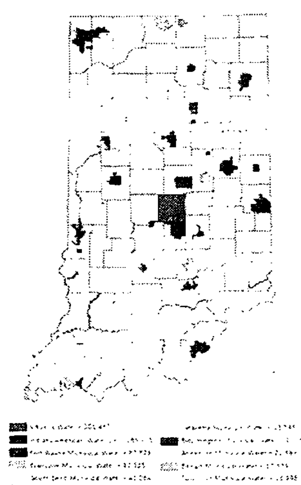
Presentation to the Regulatory Flexibility Committee of the Indiana General Assembly

Carolene Mays
Commissioner
Indiana Utility Regulatory Commission

9-6-12

Regulatory Oversight

- The IURC regulates 103 of the 824 water utilities.
- The IURC also regulates 43 of the 544 wastewater utilities.



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Regulatory Oversight

- Many water and wastewater systems have withdrawn from the IURC's jurisdiction or are exempt from regulation.

Type of Utility	Number of Jurisdictional Utilities	Number of Withdrawn Utilities
Municipal Water	34	359
Not-For-Profit Water	37	56
Investor-Owned Water	9	1
Conservancy District Water	9	0
Not-For-Profit Wastewater	6	11
Investor-Owned Wastewater	23	9
Not-For-Profit Water/Wastewater	2	4
Investor-Owned Water/Wastewater	12	2

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2011 Water Resources Study Committee Findings

"While Indiana has been doing research and mapping of water resources, the institutional infrastructure that regulates and manages water resources may not be prepared to manage the serious economic effects of regional shortages."

Recommendations

- Recommendations included: taking an inventory of water resources, identifying best practices, and developing alternatives to reform and restructure how water is used and regulated (paying attention to the value of a regional approach).
- In order to implement these recommendations, Senate Enrolled Act 132 was signed into law during the last legislative session.

Gathering the Data

1. The number of Indiana customers served
2. A description of the utility's service territory
3. Total utility plant in service for the utility's Indiana customers
4. Amount and location of water resources used to provide water service to Indiana customers
5. The availability and location of additional water resources that could be used, if necessary, to provide service to Indiana customers
6. The amount of funding received, including the purpose of the funding, from various sources

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Increasing Costs

- The most frequently cited reasons for cost increases include: compliance with increases in expenses (e.g., labor, chemical, and power), growing demand, the relocation of facilities, U.S. EPA standards (e.g., water quality and wastewater effluent), and the replacement of aging infrastructure.

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U.S. EPA Rules

U.S. EPA Rule	Scope of Rule	Effective Date
New Clean Water Act Analytical Methods	The U.S. EPA publishes laboratory analytical methods or test procedures that are used by industries and municipalities to analyze the chemical, physical, and biological components of wastewater and other environmental samples that are required by regulations under the authority of the CWA.	Approved in April 2012
Total Coliform Rule	Establishes a maximum contaminant level based on the presence or absence of total coliforms, modifies monitoring requirements including testing for fecal coliforms for E. coli, requires use of a sample siting plan, and also requires sanitary surveys for systems collecting fewer than five samples per month.	Final revisions expected in 2012
Unregulated Contaminant Monitoring Rule 2	The U.S. EPA uses the Unregulated Contaminant Monitoring program to collect data for contaminants suspected to be present in drinking water, but do not have health-based standards set under the SDWA. Every five years the U.S. EPA reviews the list of contaminants, largely based on its Contaminant Candidate List.	Final determination expected by 2013
Perchlorate Rule	The U.S. EPA has determined that perchlorate meets SDWA's criteria for regulating a contaminant--that is, perchlorate may have an adverse effect on the health of persons. Therefore, the U.S. EPA will initiate the process of proposing a national primary drinking water regulation for perchlorate.	Final rule expected by 2015

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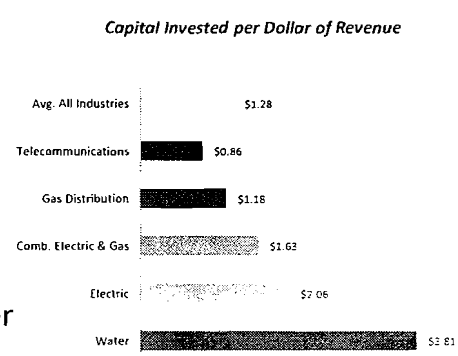
Aging Infrastructure

- Throughout Indiana, pipes range widely in age and material. Many older systems built during the turn of the last century consist of cast iron and even wood piping that would not be used today.
- As this generation of piping requires replacement, our oldest and largest communities bear the greatest burden financially, because these pipes constitute the majority of the distribution system.

High Capital Investment

- The water industry invests more capital per dollar of revenue generated than any other industry.
- According to the U.S. EPA, Indiana's water and wastewater infrastructure needs total $13 billion over the next 20 years.



[Page 144]

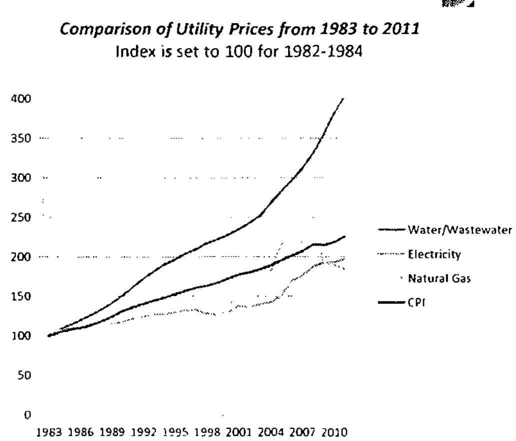
Rate Increases

- In 2011, nine water utilities were approved for general rate increases averaging 25.84%, and three wastewater utilities were approved for general rate increases averaging 37.82%.
- For smaller systems, rates tend to be significantly higher due to the costs being spread over a smaller number of households.
- Rates are expected to continue rising across the nation due to the water and wastewater industries being the most capital intensive.

[Page 147]

Rate Trends

- Water and wastewater rates are rising more rapidly than electricity or natural gas rates and much faster than the overall consumer price index.



[Page 148]

Inside and Outside-City Rates

- House Enrolled Act (HEA) 1126
  - Involves situations where a water or sewer rate differential exists between outside-city and inside-city customers of a withdrawn municipal utility.
  - If a municipal entity has an existing differential between 15% and 50%, the differential can be grandfathered if a filing is made with the IURC by September 30, 2012.
  - In May 2012, the IURC issued a General Administrative Order outlining the procedure for utilities wishing to be grandfathered in at their existing rates.

[Page 150]

Troubled Utilities

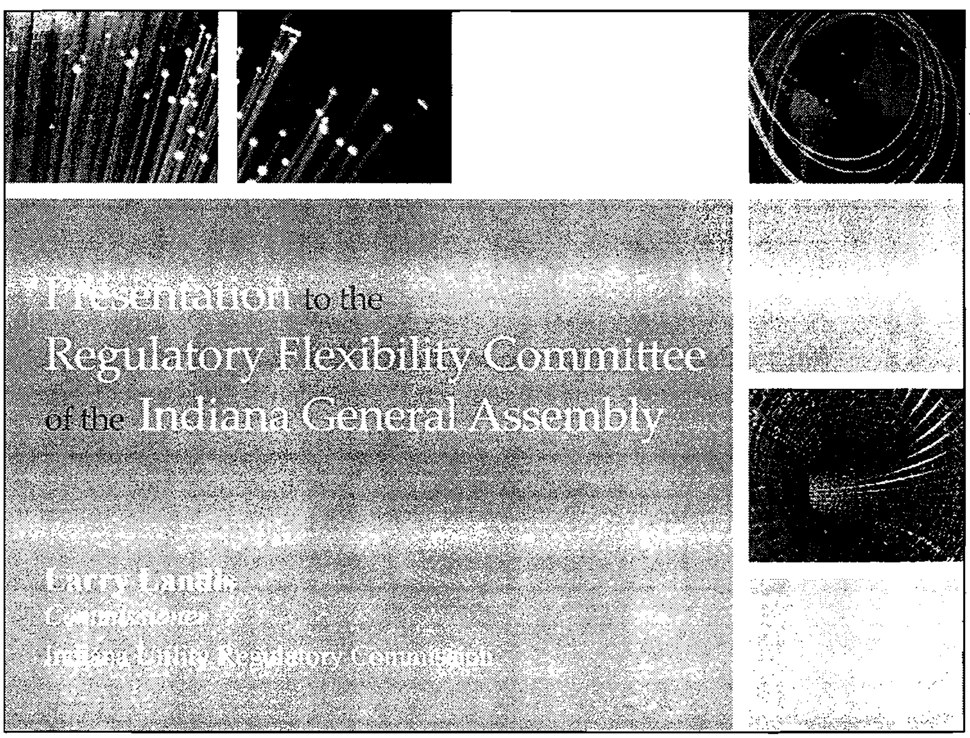
- While not all small utilities are troubled, they are more prone to it because of their size and lack of management expertise.
- Many troubled systems fail to maintain and invest in their infrastructure, forgo necessary rate increases, and do not retain the expertise necessary to efficiently manage their systems.
  - This can result in even higher rate increases down the line.

[Page 153]

Assistance for Small Utilities

- Although most small utilities have withdrawn from the Commission's jurisdiction, the agency has proactively taken steps to improve the management and operations of regulated utilities by:
  - Offering training workshops;
  - Assisting with rate application filings;
  - Proposing alternative regulatory procedures; and
  - Planning to develop a utility accounting manual.

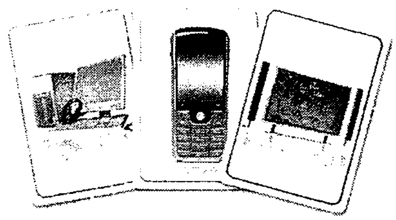
[Page 153]



Two Topics

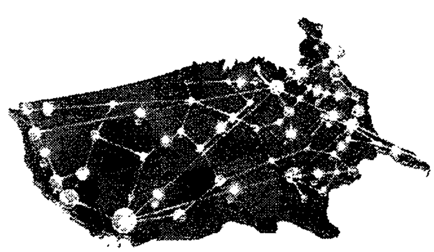
Intercarrier Compensation/Universal Service
(FCC Transformation Order)

812 Area Code Exhaust



Universal Service

- Universal service (service for all) for much of the 20th century
  - Supported by a monopoly/regulated model
  - The problem of remote, insular and rural high cost areas



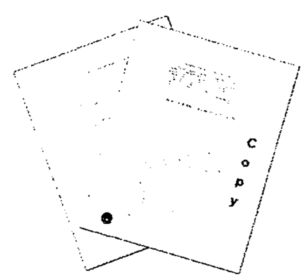
ICC Origins

Judge Harold H. Greene's order (divestiture)
breaking up AT&T leads to
establishment of intercarrier compensation (ICC)

"the impossibly complex intercarrier compensation system"

Federal and State Laws

- Bipartisan passage of the Telecommunications Act of 1996 (TA 96)
  - Primarily market-based, competitive model
- House Enrolled Act 1279 further opens competition, adopts "light regulatory touch"



High Cost Support

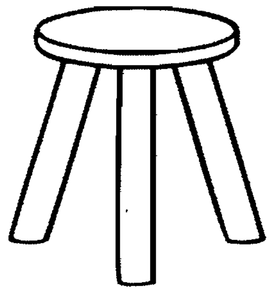
What about rural, insular high cost areas where there is no workable market-based business model?

Congress explicitly strengthens Universal Service, Section 254 (b)(3).

Section 254 (b)(3)

"Consumers in ***all regions*** of the Nation, ***including low-income consumers and those in rural, insular, and high cost areas***, should have access to telecommunications and information services, ***including interexchange services and advanced telecommunications and information services***, that are ***reasonably comparable to those services provided in urban areas*** and that are ***available at rates that are reasonably comparable*** to rates charged for similar services in urban areas."

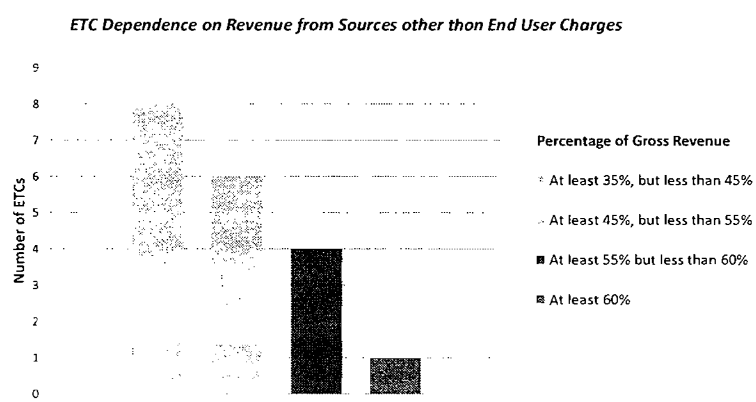
Rural Companies' Revenue Model



Earned revenue (customers, fees)

Universal Service support   Intercarrier compensation

Rural Companies' Revenue Model

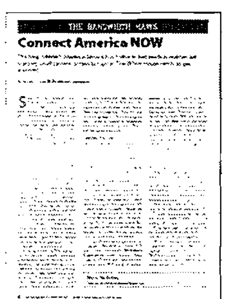


ICC/USF Revenue Model

Currently >$3 billion per year

Estimated at $2 billion per year under FCC's Transformation Order

>$3 billion doesn't go into $2 billion ...



"Connect America NOW"
By: Steven S. Ross
Broadband Communities
July 2012

"'The long-needed Universal Service Fund reform and political realities are starving small carriers' access to capital. The White House needs to get involved."

"Connect America NOW"

National Broadband Plan

FCC's USF/ICC Transformational Order

Quantile Regression Analysis

"Connect America NOW"

"The FCC has a history of flawed modeling on flawed data. The network cost model it used to justify part of the National Broadband Plan overestimated total costs for deploying first-mile FTTH by a factor of four – in part by averaging in the hardest 5 percent of deployments and in part because the proprietary, secret model was simply inaccurate."

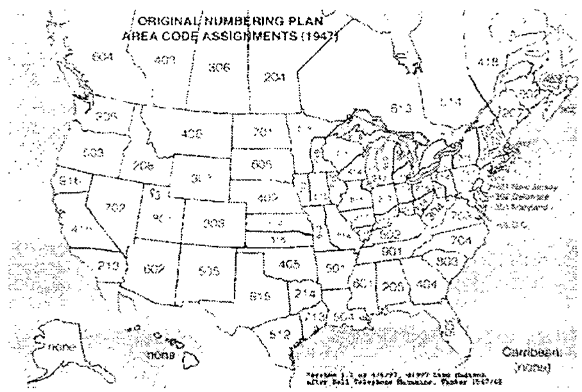
"Connect America NOW"

"Now the FCC is using its own statistical model to determine whether rate of return carriers' expenditures are justified. Already, the commission's magic computer has tagged about 100 carriers' costs as 'excessive,' despite the fact that many of them received Rural Utilities Service loans after exhaustive review [of their applications]. The FCC has already told the Rural Broadband Alliance that reform 'will require some carriers that are spending much more than their peers to adjust.'"

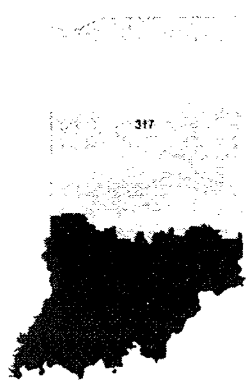
"Connect America NOW"

"Even worse, RUS and FCC don't seem to be talking to each other. The FCC model, for instance, does not take into account carriers' ability to pay off existing RUS loans [many of which were taken out to expand the companies' broadband offerings]. The uber-careful RUS has never had a loan default, but any future defaults would further tarnish the image of rural broadband."

Area Code History

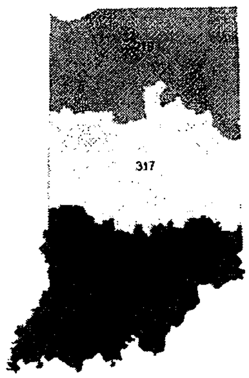


Area Code History



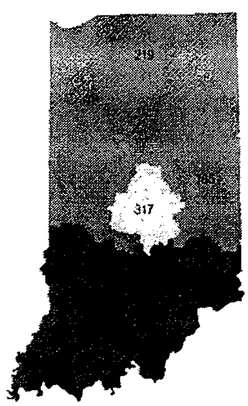
1947

Area Code History



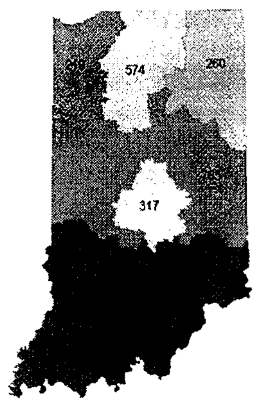
Post 1947 - Pre 1997

Area Code History



1997 - 2002

Area Code History



2002 - 2011

Area Code 812 Exhaust

- Projected to occur the first quarter of 2015
- NANPA petition filed August 3, 2012
- Cause No. 44233 opened; prehearing conference to be held on September 10, 2012 at 2:30 p.m.

Area Code 812 Exhaust

- Extensive outreach, information program
- Multiple field hearings across Southern Indiana, late winter, early spring (late February/March)
- Evidentiary hearing date(s) will be set at the September 10, 2012 prehearing conference.

Area Code 812 Exhaust

Two ways to spell relief:

1. Geographic split into two area codes
2. Overlay (second area code on top of first)

The Industry recommends an All Services Distributed Overlay.

- Three additional geographic split options
- Three concentrated overlay options

Area Code 812 Exhaust

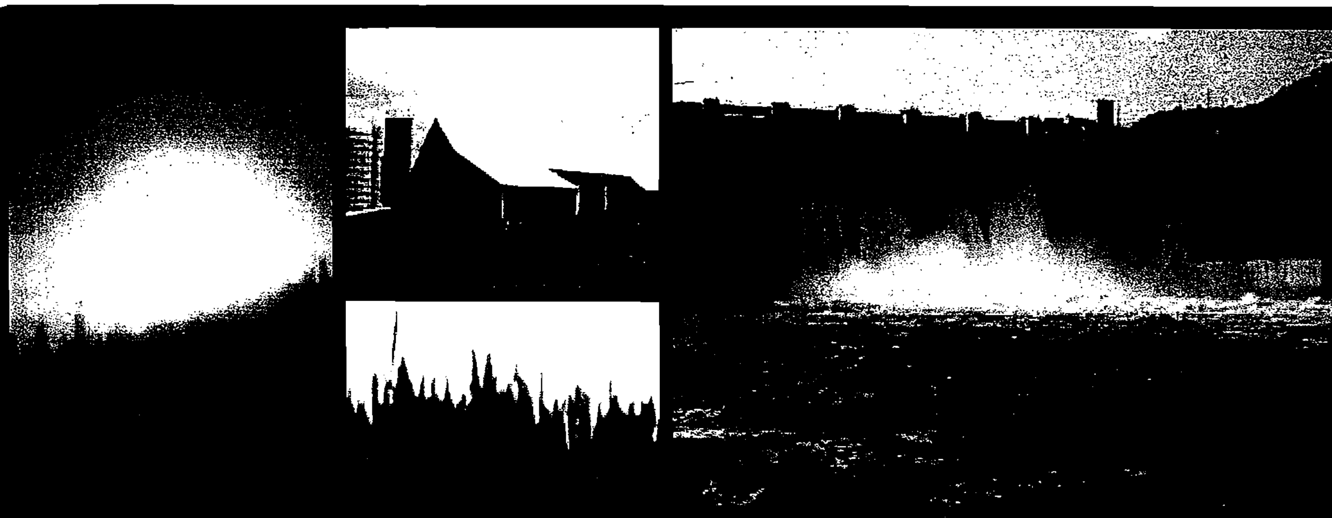
Expect a final order from the Commission sometime between mid-to-late summer and the end of 2013

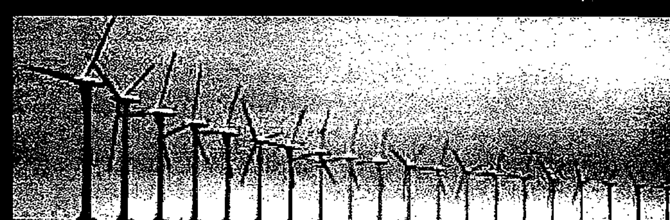
Questions?

PURDUE UNIVERSITY

Discovery Park Energy Center

September 2012





2012 INDIANA RENEWABLE ENERGY RESOURCES STUDY

Prepared for:
Indiana Utility Regulatory Commission and Regulatory Flexibility Committee of the Indiana General Assembly Indianapolis, Indiana

State Utility Forecasting Group | Energy Center at Discovery Park | Purdue University | West Lafayette, Indiana

RFSC 9/6/12
EXHIBIT E

2012 INDIANA RENEWABLE ENERGY RESOURCES STUDY

State Utility Forecasting Group

Energy Center

Purdue University

West Lafayette, Indiana

David Nderitu

Emrah Ozkaya

Douglas Gotham

Paul Preckel

Darla Mize

Marco Velastegui

Tim Phillips

September 2012

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Acronyms and Abbreviations

ARRA	American recovery and reinvestment act
AMP	American Municipal Power
AWEA	American Wind Energy Association
Btu	British thermal unit
CO_2	Carbon dioxide
CPV	Concentrating photovoltaic
CREB	Clean renewable energy bonds
CSP	Concentrating solar power
DC	District of Columbia
DOE	U.S. Department of Energy
DOI	U.S. Department of the Interior
DSIRE	Database of state incentives for renewables and efficiency
EDP	Energias de Portugal energy corporation
EERE	Office of Energy Efficiency and Renewable Energy, U.S. Department of Energy
EIA	Energy Information Administration, U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
FHA	Federal Housing Authority
FY	Financial year
GW	Gigawatt
GWh	Gigawatthour
IEA	International Energy Agency
IMPA	Indiana Municipal Power Agency
INL	Idaho National Laboratory, U.S. Department of Energy
IPL	Indianapolis Power and Light Company
IREC	Interstate Renewable Energy Council

ISDA	Indiana State Department of Agriculture
ITC	Business energy investment tax credit
IURC	Indiana Utility Regulatory Commission
kW	Kilowatt
kWh	Kilowatthour
LMOP	Landfill Methane Outreach Program, Energy Information Administration, U.S. Department of Energy
m/s	Meters per second
MACRS	Modified accelerated cost-recovery system
MGY	Million gallons per year
mmscfd	Million standard cubic feet per day
MMTCE	Million metric tons of carbon equivalent
mph	Miles per hour
MSW	Municipal solid waste
MTBE	Methyl tertiary butyl ether – a gasoline oxygenating additive
MW	Megawatt
MW_{th}	Thermal megawatt
MWh	Megawatthour
NIPSCO	Northern Indiana Public Service Company
NO_x	Nitrogen oxide
NREL	National Renewable Energy Laboratory, U.S. Department of Energy
O&M	Operation and maintenance
OED	Indiana Office of Energy Development
ORNL	Oak Ridge National Laboratory, U.S. Department of Energy
POLYSYS	Policy analysis system
PTC	Production tax credit
PV	Photovoltaic
REAP	Rural Energy for America Program, U.S. Department of Agriculture
REP	Renewable energy production – Indianapolis Power & Light feed-in tariff for renewable energy

REPI	Renewable energy production incentive
RPS	Renewable portfolio standard
QECB	Qualified energy conservation bonds
SEDS	State Energy Data System, Energy Information Administration, U.S. Department of Energy
SEGS	Solar Electric Generation System
SEIA	Solar Energy Industries Association
SOx	Sulfur oxides
SUFG	State Utility Forecasting Group
USDA	U.S. Department of Agriculture
VA	U.S. Department of Veterans Affairs
VEETC	Volumetric ethanol tax credit
W	Watts
W/m^2	Watts per square meter
WVPA	Wabash Valley Power Association

Foreword

This report represents the tenth annual study of renewable resources in Indiana performed by the State Utility Forecasting Group. It was prepared to fulfill SUFG's obligation under Indiana Code 8-1-8.8 (added in 2002) to "conduct an annual study on the use, availability, and economics of using renewable energy resources in Indiana." The code was further amended in 2011, clarifying the topics to be covered in the report. In accordance with this change, fuel cells are no longer included and energy from algae is incorporated in the section on organic waste biomass.

The report consists of seven sections. Section one provides an overview of the renewable energy industry in the United States and in Indiana. It includes a discussion of trends in penetration of renewable energy into the energy supply, both nationally and in Indiana. The other six sections are each devoted to a specific renewable resource: energy from wind, dedicated crops grown for energy production, organic biomass waste, solar energy, photovoltaic cells, and hydropower. They are arranged to maintain the format in the previous reports as follows:

- Introduction: This section gives an overview of the technology and briefly explains how the technology works.
- Economics of the renewable resource technology: This section covers the capital and operating costs of the technology.
- State of the renewable resource technology nationally: This section reviews the general level of usage of the technology throughout the country and the potential for increased usage.
- Renewable resource technology in Indiana: This section examines the existing and potential future usage for the technology in Indiana in terms of economics and availability of the resource.
- Incentives for the renewable resource technology: This section contains incentives currently in place to promote the development of the technology and recommendations that have been made in regards to how to encourage the use of the renewable resource.
- References: This section contains references that can be used for a more detailed examination of the particular renewable resource.

This report was prepared by the State Utility Forecasting Group. The information contained in it should not be construed as advocating or reflecting any other organization's views or policy position. For further information, contact SUFG at:

State Utility Forecasting Group
203 South Martin Jischke Drive
Mann Hall, Suite 154
West Lafayette, IN 47907-1971
Phone: 765-494-4223
e-mail: sufg@ecn.purdue.edu
https://www.purdue.edu/dp/energy/SUFG/

1. Overview

This first section of the 2012 Indiana Renewable Energy Resources Report presents an overview of the trends in renewable energy consumption in the U.S. and in Indiana.

1.1 Trends in renewable energy consumption in the United States

Figure 1-1 shows the amounts of renewable energy in quadrillion British thermal units (Btu) consumed in the U.S. from 1949 to 2011. Until the early 2000s hydroelectricity and woody biomass were the dominant sources of renewable energy consumed in the U.S. The last decade has seen a rapid increase in biofuels (mainly corn-based ethanol) and wind sources of renewable energy. The rapid increase in corn-ethanol has been driven by two factors: first as a replacement of the oxygenating additive MTBE in gasoline which started being phased out in 2000, then due to the Federal Renewable Fuel Standard first authorized in the 2005 Energy Policy Act and then expanded in 2007. Similarly the rapid increase in wind energy started with the introduction of the Federal Production Tax Credit in 1992, and continued with the proliferation of renewable portfolio standards in a number of states.

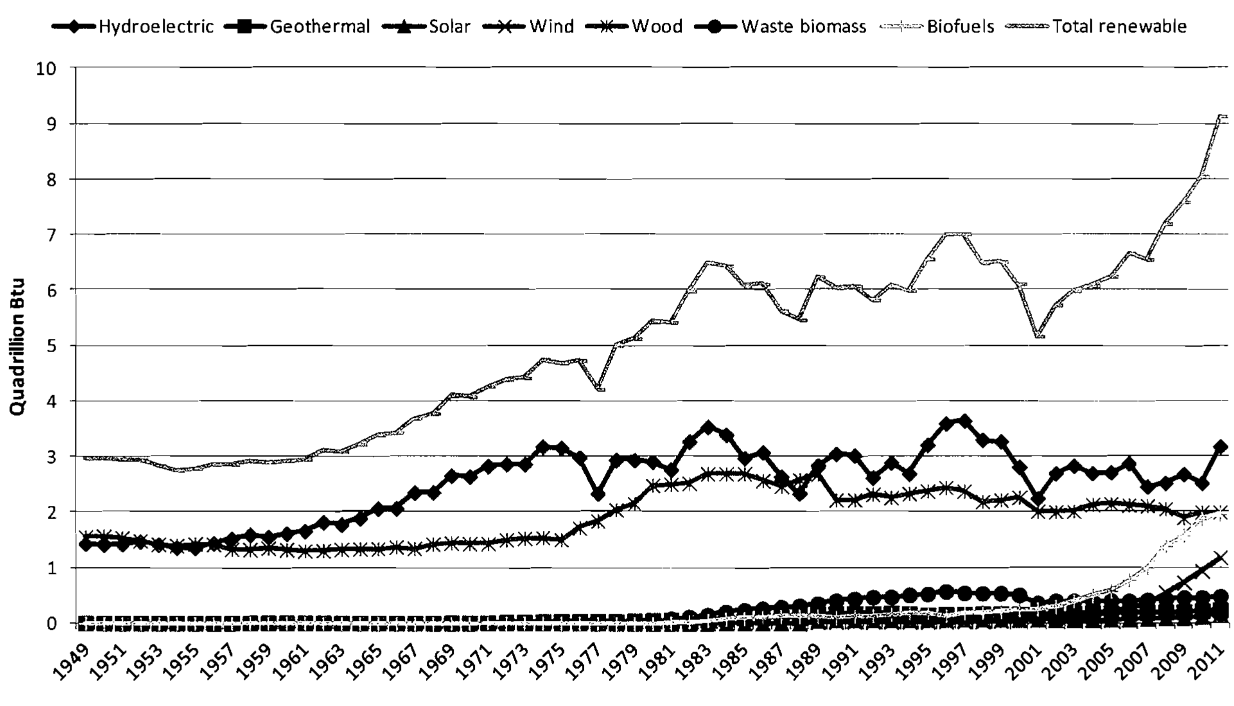

Figure 1-1: Renewable energy consumption in the U.S. (1949-2011) (Data source: EIA [1, 2])

Despite the growth shown in Figure 1-1, renewable energy's share of the total energy consumed in the U.S. remains modest at less than 10 percent. Fossil fuels supply over 80 percent of the energy consumed, while nuclear energy supplies the remainder. Figure 1-2 shows the sources of total energy consumed in the U.S. from 1949 to 2011.

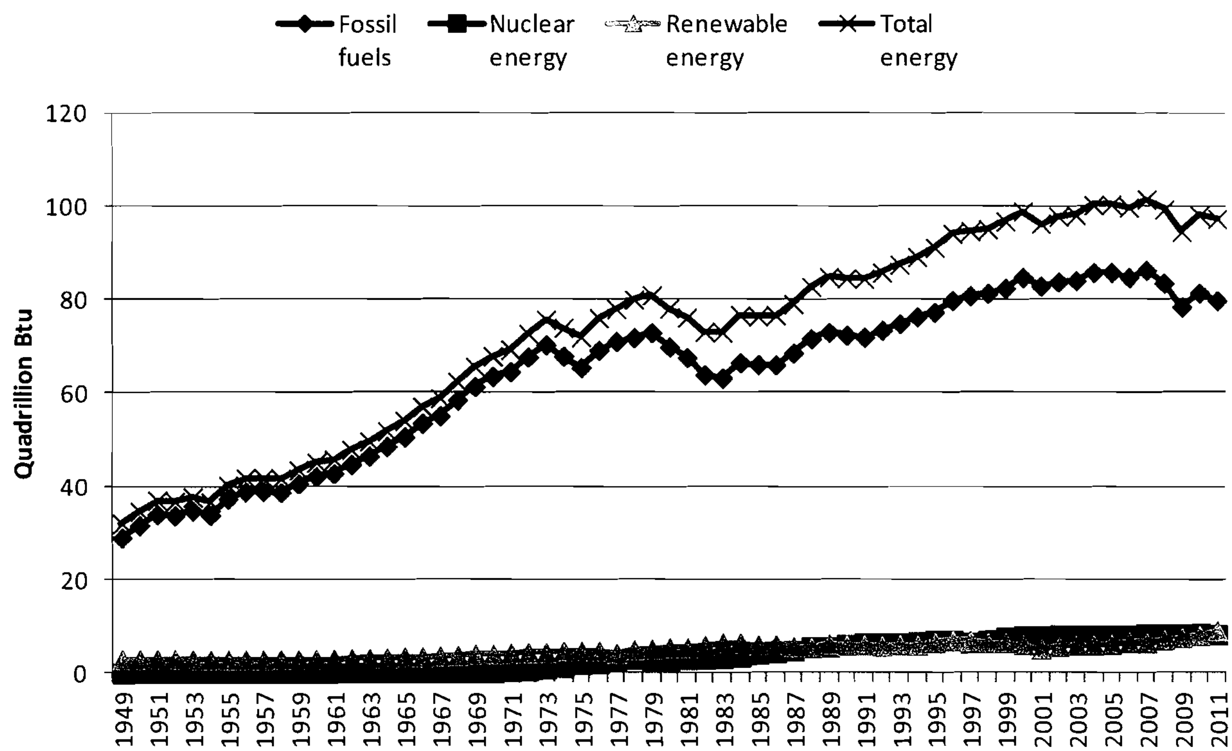

Figure 1-2: U.S. energy consumption by source (1949-2011) (Data source: EIA [3, 4])

Figure 1-3 shows the contribution of the various energy sources to total energy consumed in the U.S. in 2011. Petroleum continues to be the dominant energy source supplying 36 percent, followed by natural gas at 26 percent and coal at 20 percent. Among the renewable resources, biomass (including wood, biofuels, municipal solid waste, landfill gas and others) comprised nearly half of the total renewable energy, followed by hydroelectricity at 35 percent. Wind power's contribution increased to 13 percent from 11 percent in 2010, geothermal dropped from 3 percent in 2009 to 2 percent, and solar rose from 1 percent in 2010 to 2 percent in 2011.

When one considers renewable resources in electricity generation (Figure 1-4), hydroelectricity plays a dominant role, exceeding all other renewable resources combined. Hydroelectricity makes up 60 percent of the renewable electricity generated. Wind energy takes second place at 22 percent of the renewable electricity and woody biomass takes third place at 9 percent. Waste biomass and geothermal each contributed 4 percent of the electricity generation in 2010 and solar contributes just 0.3 percent despite its recent rapid growth. As expected, pumped hydroelectricity's net energy contribution was negative.[1]

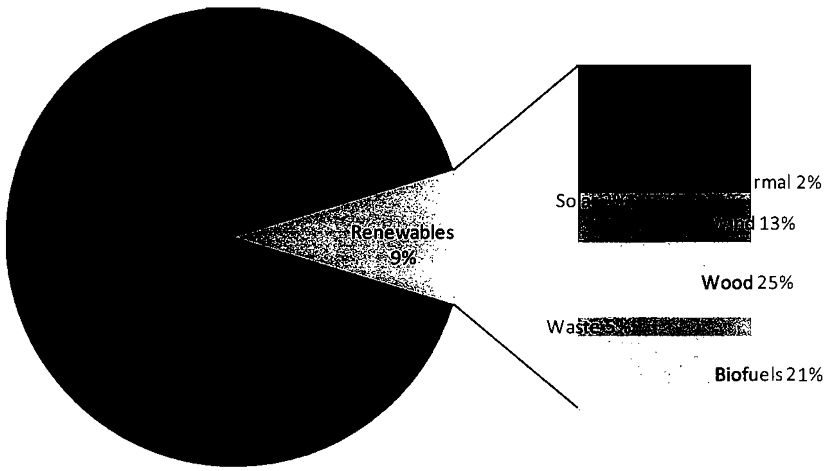

Figure 1-3: U.S. total energy consumption by energy source in 2011 (Data source: EIA [1, 5])

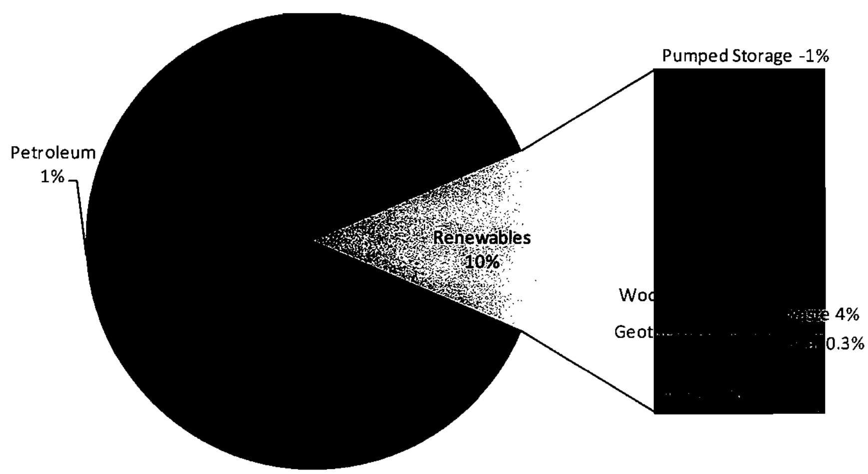

Figure 1-4: Net U.S. electricity generation by energy source in 2011 (Data source: EIA [6])

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[1] Pumped hydroelectric facilities use electricity from the grid during periods of low demand and price to pump water from a lower reservoir to a higher one. That water is then available to generate electricity during high demand and price periods. Due to evaporation and inefficiencies in the pumping and generating processes, less energy is generated than is used. However, the value of the lost energy is more than compensated because low cost, off-peak electricity is converted to high cost, on-peak electricity.

1.2 Trends in renewable energy consumption in Indiana

Figure 1-5 shows renewable energy consumption in Indiana from 1960 to 2010. In the 1980s, renewable resources contributed over 3 percent of total energy consumed in Indiana. In the 1990s the share fell to below 2 percent, before the recent increase in ethanol and wind increased it to over 4.9 percent. Woody biomass had been the main source of renewable energy in Indiana, contributing over 80 percent of the total renewable energy until the recent rise of corn-based ethanol.

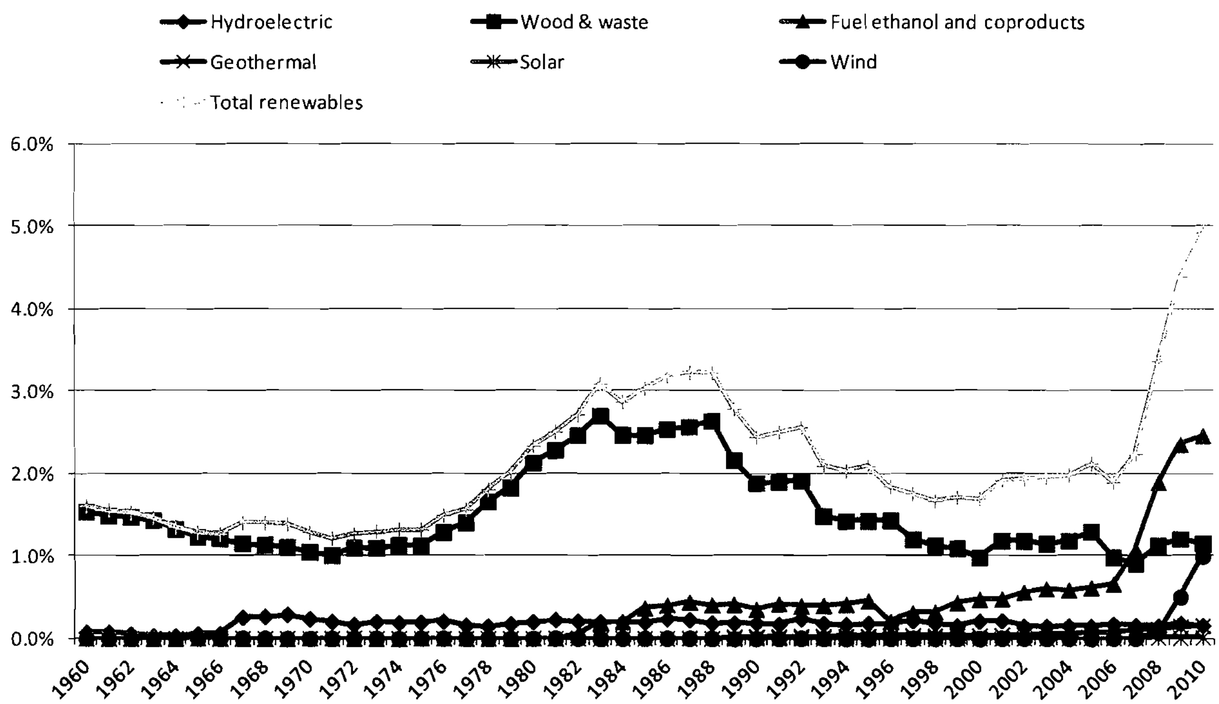

Figure 1-5: Renewables share of Indiana total energy consumption (1960-2010) (Data source: EIA [7])

Figure 1-6 shows the contribution of renewable energy to Indiana's electricity generation from 1990 to 2010. The arrival of utility-scale wind energy projects in 2007 caused a rapid increase in renewable energy's share of Indiana's electricity generation. The share changed from a low of 0.5 percent in 2006 to 1.9 percent in 2009. Wind energy's share of the annual generation was 1.5 percent in 2009 and 2.4 percent in 2010 [8]. Hydroelectricity, which until 2007 was the dominant source of renewable electricity, has maintained its share at approximately 0.4 percent of total generation.

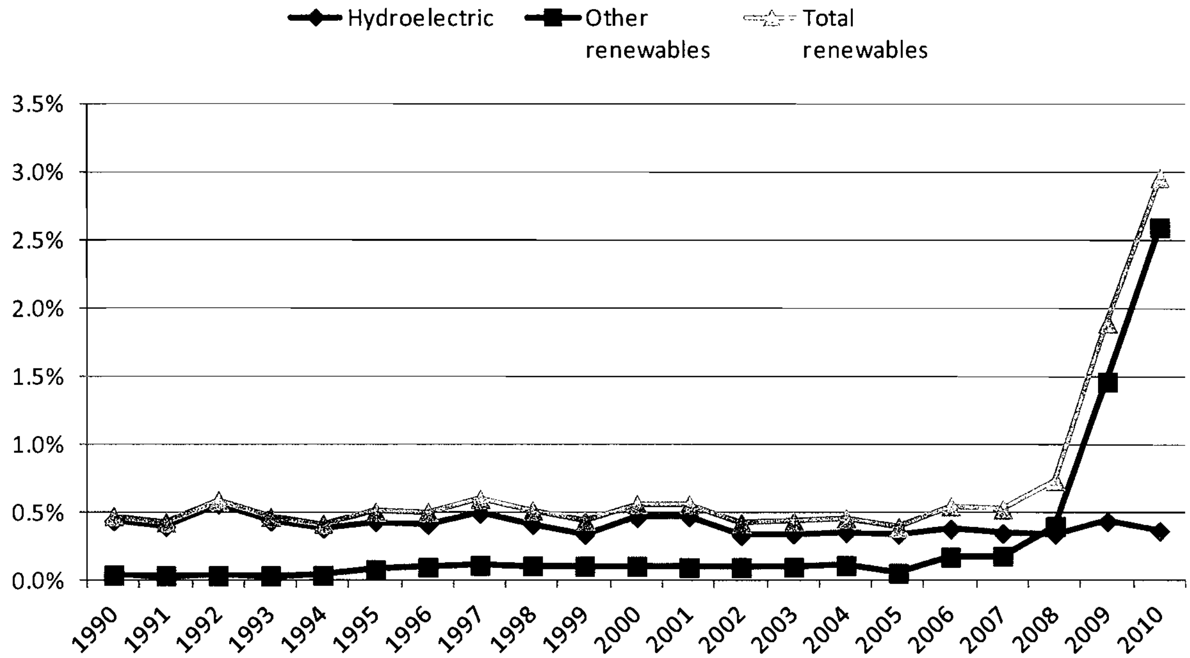

Figure 1-6: Renewables share of Indiana net electricity generation (1990-2010) (Data source: EIA [9])

In keeping with the national trend, the rapid rise in wind energy capacity installation in 2008 and 2009 slowed in 2010 and 2011, dropping from 907 MW installed in 2009 to 301 MW installed in 2010 and no utility scale wind capacity installed in Indiana in 2011. The industry has recovered somewhat with the ongoing construction of the 200 MW Wildcat Wind Farm in Madison and Tipton counties. Figure 1-7 shows the annual and cumulative installed wind energy capacity in Indiana. The extent of recovery will be influenced by the decision on whether or not to extend the 2.2 cents/kWh federal production tax credit, which is set to expire at the end of 2012. Utilities in Indiana have a total of 831 MW of wind contracted in power purchase agreements, 426 from Indiana wind farms and 405 MW from wind farms in Illinois, Iowa, Minnesota and South Dakota.

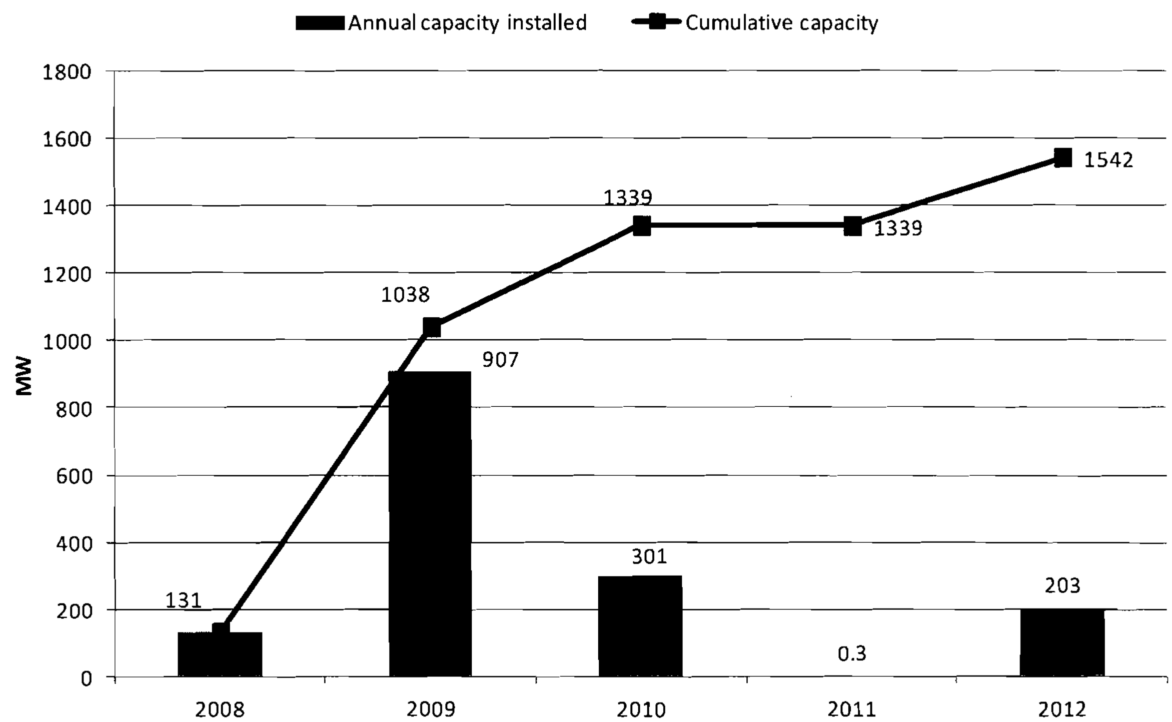

Figure 1-7: Wind energy installed capacity in Indiana (Data sources: IURC, DOE [10-13]).

1.3 References

1. Energy Information Administration (EIA). 2011 Annual Energy Review Table 10.1. http://www.eia.gov/totalenergy/data/annual/#renewable
2. EIA. May 2012 Monthly Energy Review Table 10.1 http://www.eia.gov/totalenergy/data/monthly/index.cfm#renewable http://205.254.135.7/totalenergy/data/monthly/#renewable
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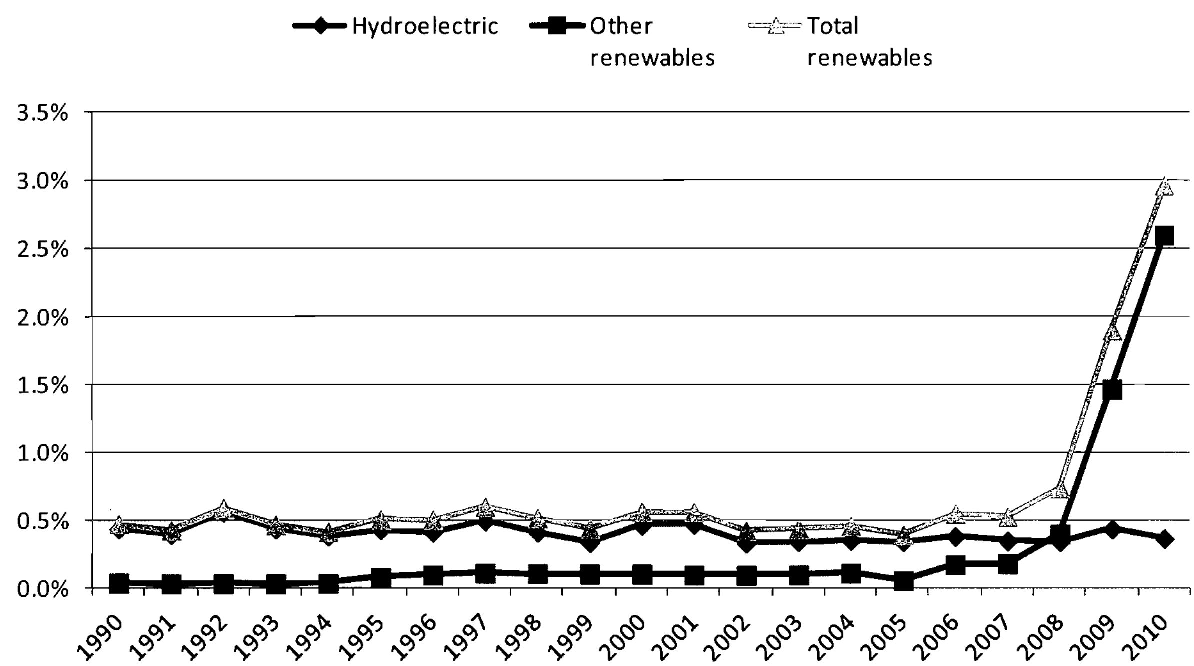

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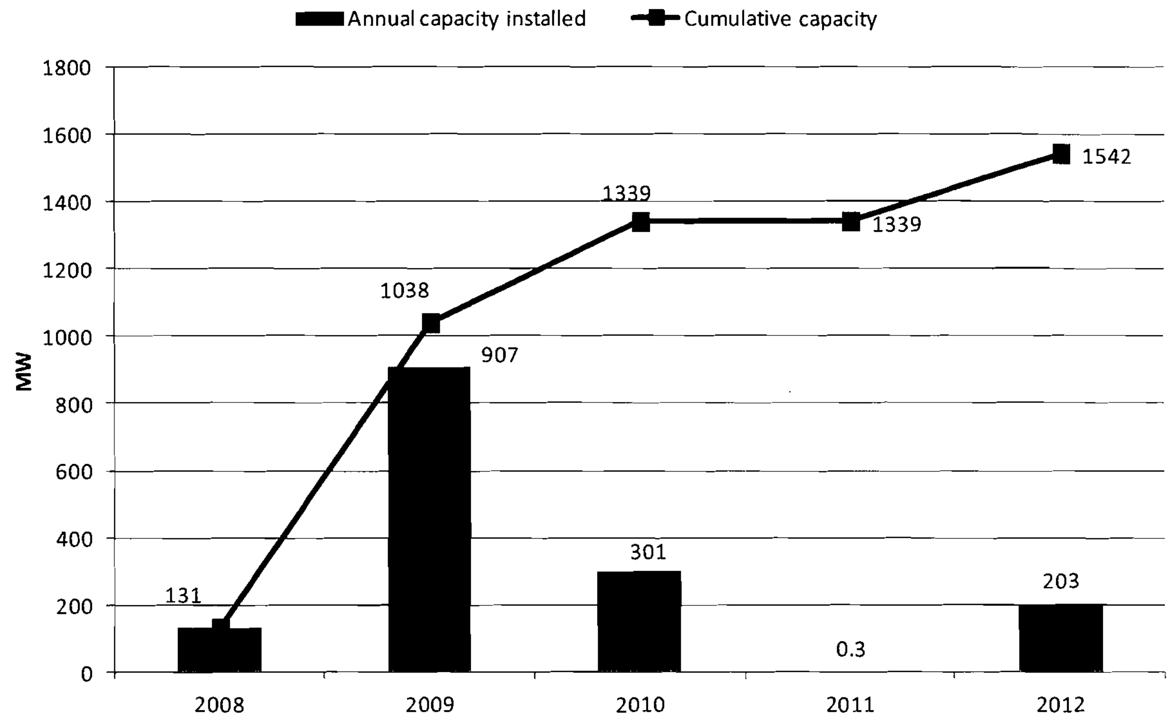

Figure 1-7: Wind energy installed capacity in Indiana (Data sources: IURC, DOE [10-13]).

1.3 References

1. Energy Information Administration (EIA). 2011 Annual Energy Review Table 10.1. http://www.eia.gov/totalenergy/data/annual/#renewable
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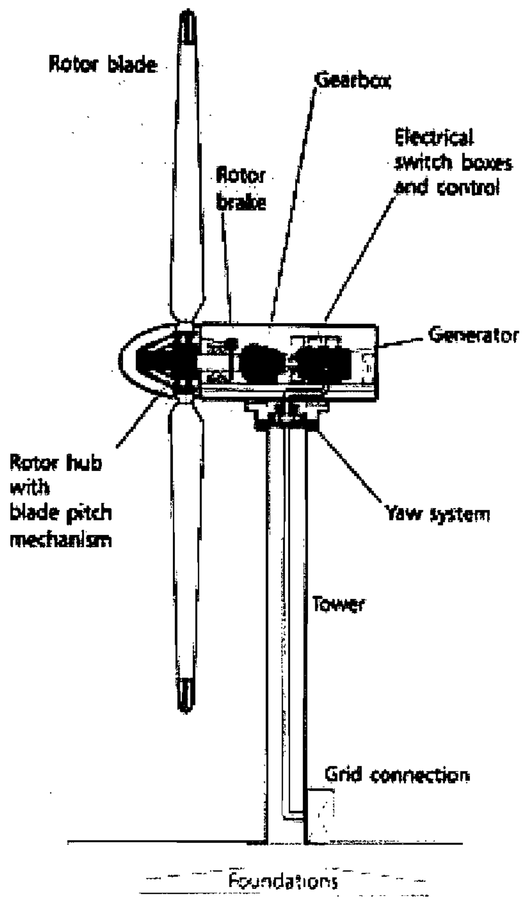
2. Energy from Wind

2.1 Introduction

Wind turbines convert the kinetic energy in wind into mechanical energy and then into electricity by turning a generator. There are two main types of wind turbines, vertical and horizontal axis. The horizontal axis turbine with three blades facing into the wind is the most common configuration in modern wind turbines. Figure 2-1 shows the basic parts of a modern wind turbine used for electricity generation.



<u>Figure 2-1:</u> <u>Horizontal wind turbine configuration</u> (Source: South Ayrshire Council [1])

Utility-scale wind farms in the U.S. began in California in the 1980s, with individual wind turbines on the order of 50 – 100 kilowatt (kW) of rated capacity. Turbine capacity has grown steadily to the point where the 1.5 megawatt (MW) wind turbine is common in modern day wind farms [2]. Despite this dramatic increase in size and capacity, a wind farm's generating capacity is still small compared to coal and nuclear power plants. The largest wind farm in the U.S. is the Alta Wind Energy Center in California with an active capacity of 1,020 MW [3], while the largest coal power plant in Indiana is composed of five units with capacities greater than 620 MW for a total plant capacity of 3,257 MW. Furthermore the capacity factor of a wind farm is typically far less than that of a baseload power plant.[2] A baseload coal or nuclear power plant in the U.S. will typically have an annual capacity factor of over 80 percent while the capacity factors of wind farms are estimated to range between 20 and 40 percent, depending on the average annual wind speeds at their location [4].

Wind speeds are important in determining a turbine's performance. Generally, annual average wind speeds of greater than 7 miles per hour (mph), or 3 meters per second (m/s), are required for small electric wind turbines not connected to the grid, whereas utility-scale wind plants require a minimum wind speed of 11 mph (5 m/s). The power available to drive wind turbines is proportional to the cube of the speed of the wind. This implies that a doubling in wind speed leads to an eight-fold increase in power output. A measurement called the wind power density measured in watts per square meter (W/m^2), calculated from annual observed wind speeds and the density of air, is used to classify sites into "wind power classes" [5]. Table 2-1 lists the class distinctions currently used.

	10 m (33 ft) Elevation		**50 m (164 ft) Elevation**	
Wind Power Class	Wind Power Density (W/m^2)	Speed m/s (mph)	Wind Power Density (W/m^2)	Speed m/s (mph)
1	< 100	< 4.4 (9.8)	< 200	< 5.6 (12.5)
2	100 – 150	4.4 – 5.1 (9.8 – 11.5)	200 – 300	5.6 – 6.4 (12.5 – 14.3)
3	150 – 200	5.1 – 5.6 (11.5 – 12.5)	300 – 400	6.4 – 7.0 (14.3 – 15.7)
4	200 – 250	5.6 – 6.0 (12.5 – 13.4)	400 – 500	7.0 – 7.5 (15.7 – 16.8)
5	250 – 300	6.0 – 6.4 (13.4 – 14.3)	500 – 600	7.5 – 8.0 (16.8 – 17.9)
6	300 – 400	6.4 – 7.0 (14.3 – 15.7)	600 – 800	8.0 – 8.8 (17.9 – 19.7)
7	> 400	> 7.0 (15.7)	> 800	> 8.8 (19.7)

Table 2-1: Wind resource classification (Source: NREL [6])

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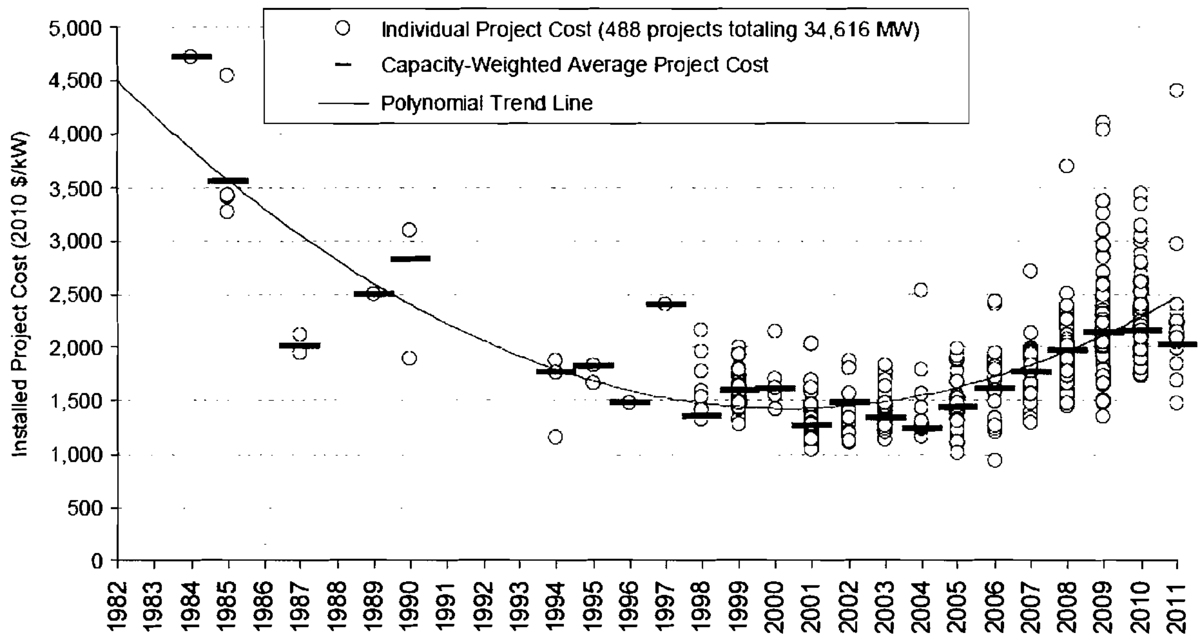
[2] $$\text{Annual capacity factor} = \frac{\text{Actual amount of energy produced in a year}}{\text{Energy that would have been produced if plant operated at full rated capacity all year}}$$

In addition to being a virtually inexhaustible renewable resource, wind energy has the advantage of being modular; that is a wind farm's size can be adjusted by simply adjusting the number of turbines on the farm. A major disadvantage of wind is that the amount of energy available from the generator at any given time is dependent on the intensity of the wind resource at the time. Therefore the electric system operator's range of control of its output is restricted to an ability to curtail. This reduces the wind generator's value both at the operational level and also at system capacity planning level where the system planner needs information about how much energy they can count on from a generator at a future planning date. Another disadvantage of wind energy is that good wind sites tend to be located far from main load centers and transmission lines. Concerns have also been raised about the death of birds and bats flying into wind turbines, the possibility of turbines causing radar interference, and potential adverse effects of the shadow flicker on people living in close proximity.

2.2 Economics of wind energy

Through 2010, the installed cost of wind energy projects continued to follow an upward trend that started in the early 2000s. The $2,155/kW capacity-weighted average costs of projects installed in 2010 was 65 percent higher than the average cost of projects installed from 2001 through 2004. Figure 2-2 shows the trends in the installed projects' costs from 1982 to 2010. Nevertheless, the $2,155/kW capacity-weighted average installed cost in 2010 was essentially unchanged from the $2,144/kW in 2009; it is also expected that average installed costs may decline in 2011 [7].

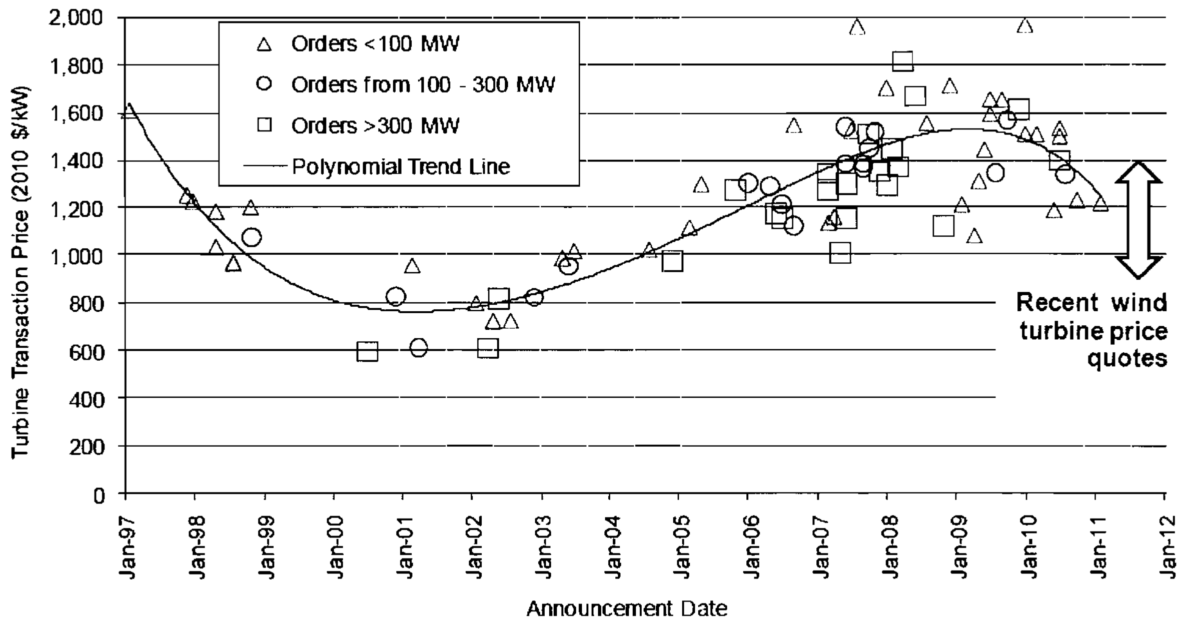


Note: 2011 data represent preliminary cost estimates for a sample of 17 projects totaling 1.1 GW that have either already been or will be built in 2011, and for which reliable cost estimates were available.

Source: Berkeley Lab (some data points suppressed to protect confidentiality)

Figure 2-2: Installed wind project costs over time (Source: EERE [7])

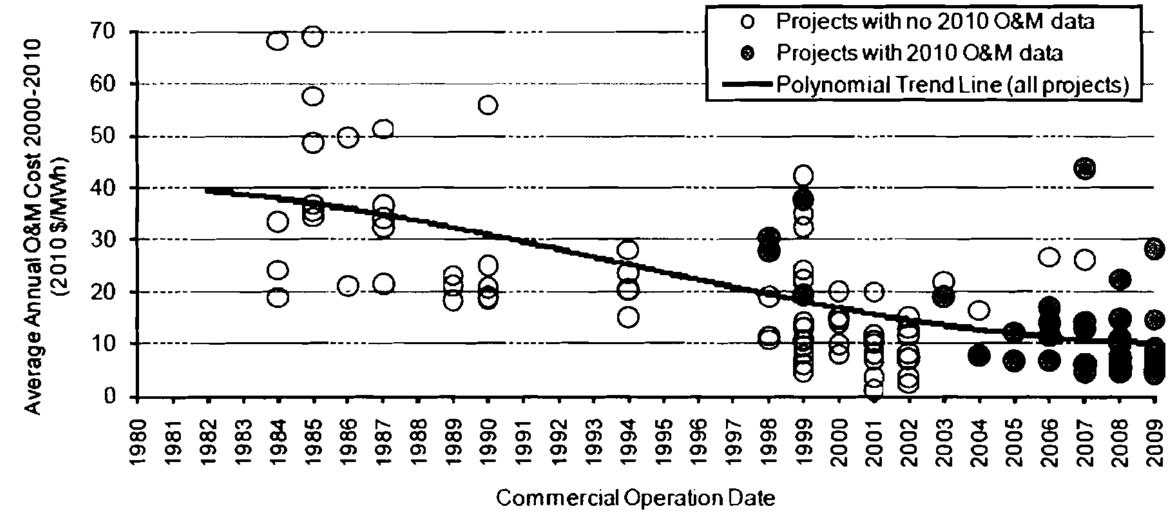
The expected decline in wind farm project costs is already being reflected by a reduction in prices of turbines in the beginning months of 2011. Figure 2-3 shows wind turbine costs over time as calculated for the projects included in the Lawrence Berkeley National Laboratory dataset used in the *2010 Wind Technologies Market Report* [7]. As illustrated in the diagram, turbine prices peaked in 2008 and have steadily decreased since. This decline reflects similar declines in energy and commodity prices, and a shift in the supply-demand balance for turbines towards a buyer's market. These price reductions are expected to drive down total project costs and wind power prices.



Source: Berkeley Lab

Figure 2-3: Reported U.S. wind turbine prices over time (Source: EERE [7])

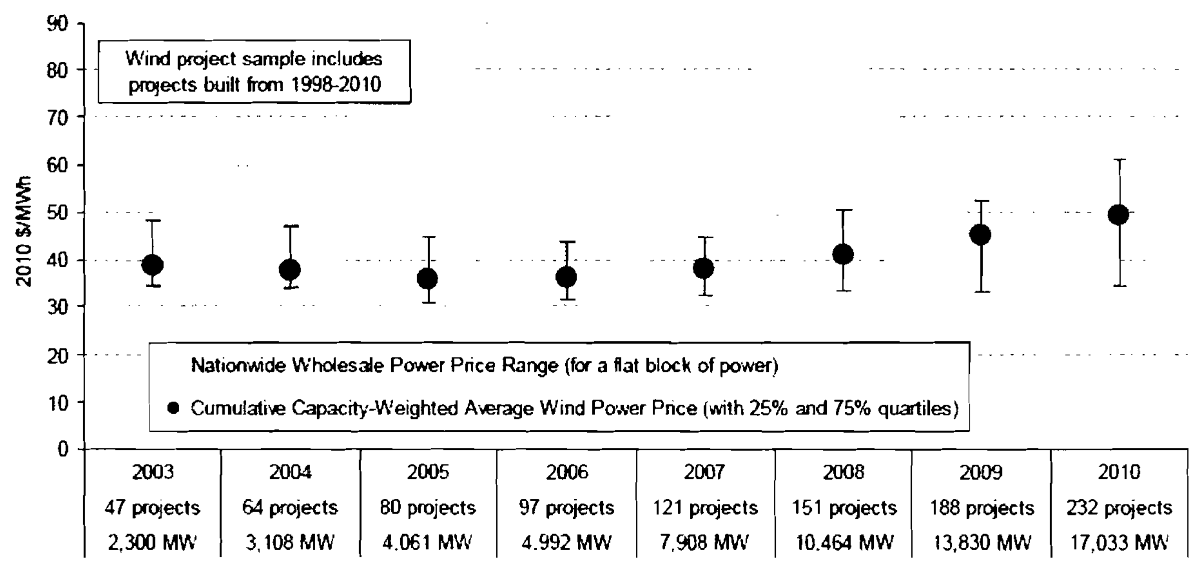
Operation and maintenance (O&M) costs can vary substantially among projects. Figure 2-4 shows O&M costs using data compiled by Berkeley Lab for 126 wind projects installed between 1982 and 2009 with a total capacity of 7,502 MW. It suggests that projects installed recently have incurred lower average O&M costs. Specifically, capacity-weighted average O&M costs for the 24 sampled projects constructed in the 1980s were $33/MWh, which dropped to $22/MWh for the 37 projects installed in the 1990s, and to $10/MWh for the 65 projects installed since 2000 [7].



Source: Berkeley Lab; seven data points suppressed to protect confidentiality

Figure 2-4: Reported U.S. wind turbine O&M costs over time (Source: EERE [7])

Figure 2-5 shows the range of average annual wholesale electricity prices for a flat block of power and the cumulative capacity-weighted average price received by wind power projects in each year from 2003 to 2010. On a cumulative basis, average wind power prices compared favorably to wholesale electricity prices from 2003 through 2008. However, increasing wind power prices combined with a sharp drop in wholesale electricity prices in 2009 (driven by lower natural gas prices and reduced electricity demand), decreased the competitiveness of wind power. Low wholesale electricity prices continued to challenge the relative economics of wind power in 2010 [7].



Source: Berkeley Lab, FERC, Ventyx, ICE

Figure 2-5: Average cumulative wind and wholesale electricity prices (Source: EERE [7])

2.3 State of wind energy nationally

After a big drop in wind capacity annual installations from 10,000 MW in 2009 to 5,203 MW in 2010, the annual installed capacity increased to 6,651MW 2011. According to the American Wind Energy Association (AWEA), the total cumulative installed capacity at the end of March 2012 was 48,611 MW [8]. Figure 2-6 shows the capacity installation from 2001 to the first quarter of 2012. Although the rate of capacity installation has recovered somewhat from the big drop in 2010, it has not recovered to the levels in the 2008-2009 period. The combined effect of the reduced electricity demand growth due to the recession and the abundance of natural gas from shale formations have kept wholesale electricity prices at a level with which it is difficult for wind to compete.

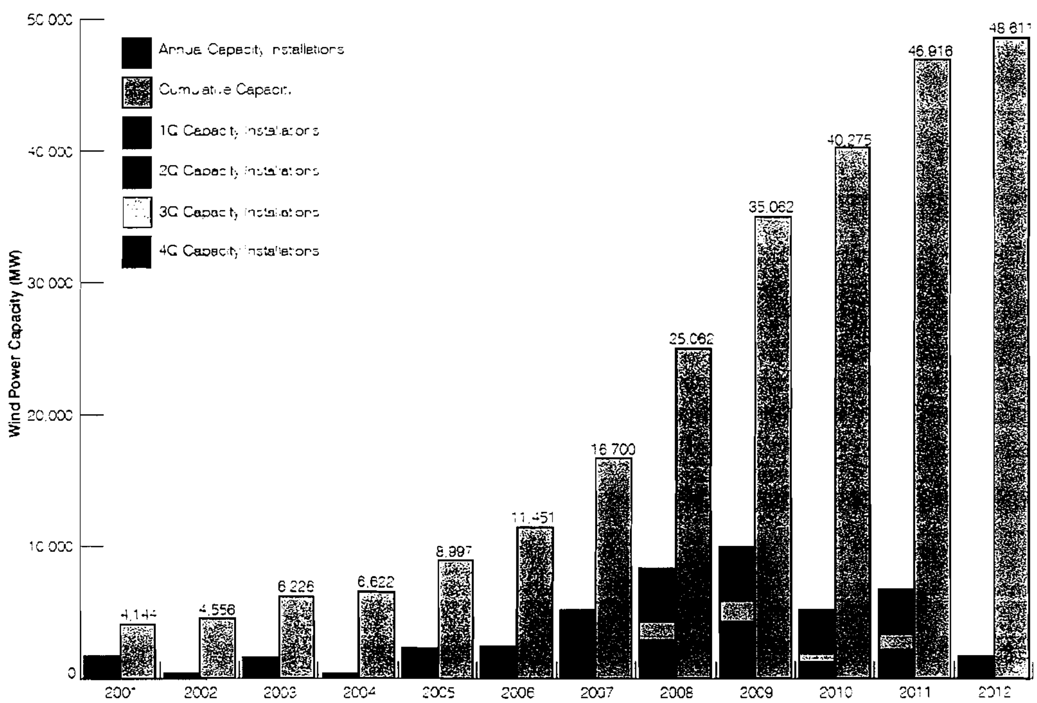


Figure 2-6: U.S. wind capacity growth (Source: AWEA [8])

Federal and state incentives and state renewable portfolio standards continued to play key roles in the growth in the wind industry. The provisions in the 2009 American Recovery and Reinvestment Act to allow investors to convert the federal production tax credit into a treasury cash grant has been a significant source of capital for the wind industry, offsetting the capital shortage caused by the 2008 financial crisis. Figure 2-7 is a map showing the states that have enacted some form of renewable portfolio standard or set a non-binding goal.

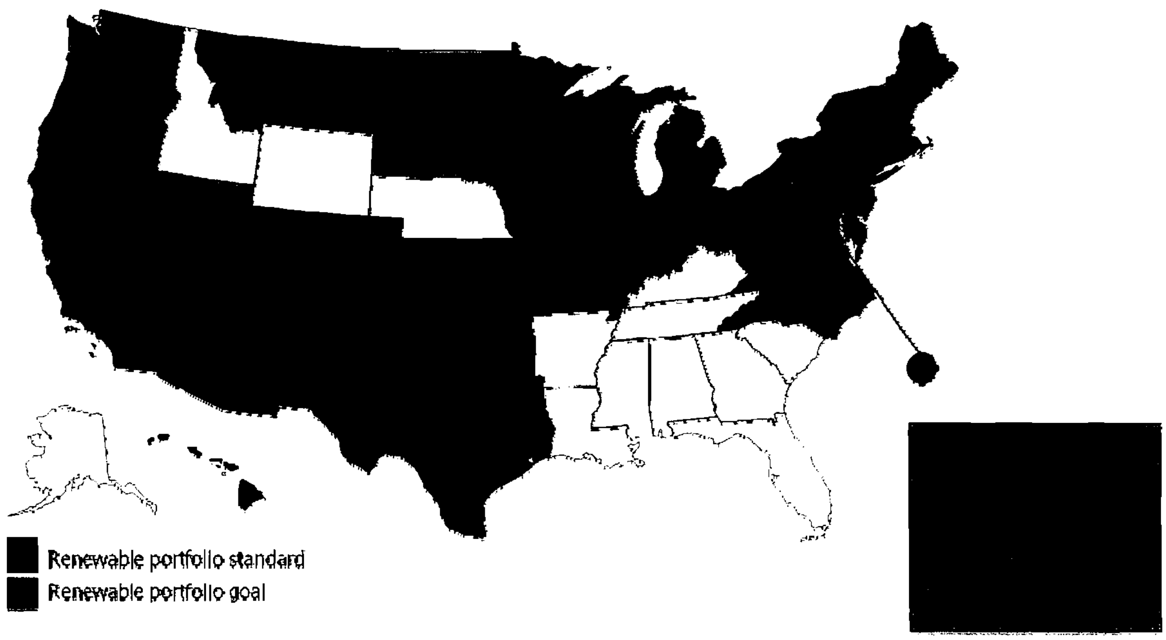


Figure 2-7: Renewable portfolio standards across the U.S. (Source: DSIRE [9])

Figure 2-8 shows the cumulative capacity of wind energy installed in states as of the end of 2011. Texas continued to lead with a total capacity of 10,377 MW installed followed by Iowa with 4,322 MW of cumulative capacity installed. Indiana ranked 19th overall with 1,339 MW of cumulative installed capacity at the end of 2011. In terms of wind capacity added in 2011, Illinois led with 698 MW followed by California with 674 MW added and Iowa with 647 MW added. Indiana had no utility-scale wind energy capacity added.

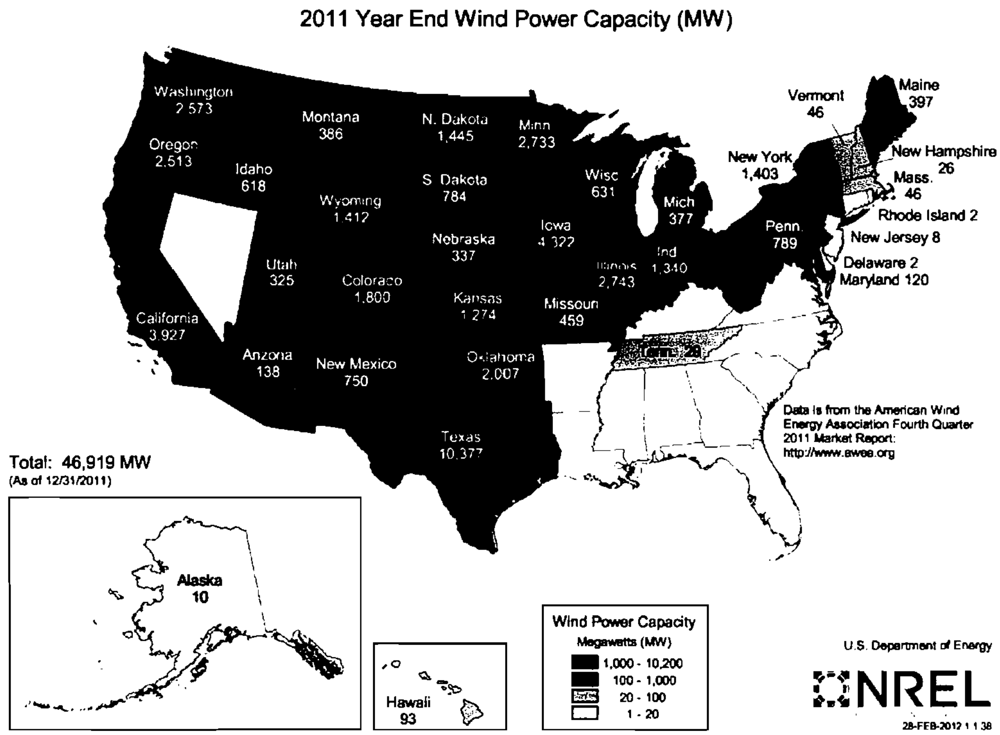


Figure 2-8: Wind power capacity by state at the end of 2011 (MW) (Source: EERE [7])

With regard to the penetration of wind energy as a percent of the total electricity generated in 2010, the leading five states in wind energy penetration in 2010 are Iowa –15.4 percent; North Dakota – 12 percent; Minnesota – 9.7 percent; South Dakota – 8.3 percent; and Kansas – 7.1 percent. Data on wind penetration was not available for 2011 at the writing of this the report. Table 2-2 shows the top twenty states in capacity added in 2010, total cumulative capacity, actual and estimated penetration of wind energy in 2010. Indiana's wind penetration ranks 17th nationally at 2.4 percent of total in-state electricity generation, which was slightly above the U.S. average of 2.3 percent.

Capacity (MW)				Percentage of In-State Generation			
Annual (2010)		**Cumulative (end of 2010)**		**Actual (2010)***		**Estimated (end of 2010)****	
Texas	680	Texas	10,089	Iowa	15.4%	South Dakota	23.2%
Illinois	498	Iowa	3,675	North Dakota	12.0%	Iowa	16.9%
California	455	California	3,253	Minnesota	9.7%	North Dakota	13.5%
South Dakota	396	Minnesota	2,205	South Dakota	8.3%	Minnesota	12.3%
Minnesota	396	Washington	2,104	Kansas	7.1%	Oregon	9.8%
Oklahoma	352	Oregon	2,104	Oregon	7.1%	Wyoming	8.2%
Wyoming	311	Illinois	2,045	Wyoming	6.7%	Colorado	7.8%
Indiana	303	Oklahoma	1,482	Colorado	6.6%	Kansas	7.6%
Oregon	283	North Dakota	1,424	Texas	6.4%	Idaho	7.3%
North Dakota	221	Wyoming	1,412	Oklahoma	5.1%	Oklahoma	6.9%
Idaho	206	Indiana	1,339	New Mexico	5.0%	Texas	6.7%
Washington	196	Colorado	1,299	Washington	4.6%	New Mexico	6.0%
Missouri	149	New York	1,274	Idaho	4.0%	Washington	5.2%
New Mexico	102	Kansas	1,074	California	3.3%	Maine	4.4%
West Virginia	101	Pennsylvania	748	Montana	3.1%	Montana	3.9%
Maine	92	South Dakota	709	Maine	2.9%	California	3.9%
Maryland	70	New Mexico	700	Indiana	2.4%	Indiana	3.0%
Arizona	65	Wisconsin	469	Hawaii	2.3%	Illinois	2.8%
Kansas	61	Missouri	457	Illinois	2.2%	Hawaii	2.3%
Nebraska	60	West Virginia	431	New York	2.0%	New York	2.0%
Rest of U.S.	118	*Rest of U.S.*	1,974	*Rest of U.S.*	0.3%	*Rest of U.S.*	0.3%
TOTAL	**5,113**	**TOTAL**	**40,267**	**TOTAL**	**2.3%**	**TOTAL**	**2.6%**

* Based on 2010 wind and total generation by state from EIA's *Electric Power Monthly*.

** Based on a projection of wind electricity generation from end-of-2010 wind power capacity, divided by total in-state electricity generation in 2010.

Source: AWEA project database, EIA, Berkeley Lab estimates

Table 2-2: U.S. wind power rankings: Top 20 states (Source: EERE [7])

The U.S. has significant wind energy potential. National Renewable Energy Laboratory (NREL) estimates that the potential rated capacity that could be installed on available windy land areas across U.S. is 10,956,912 MW, and the annual wind energy that could be generated from these potential installed capacities is 38,552,706 GWh. This is approximately 9 times the amount of electricity generated in the U.S. in 2011 from all energy sources. Figure 2-9 shows the distribution of the wind resource.

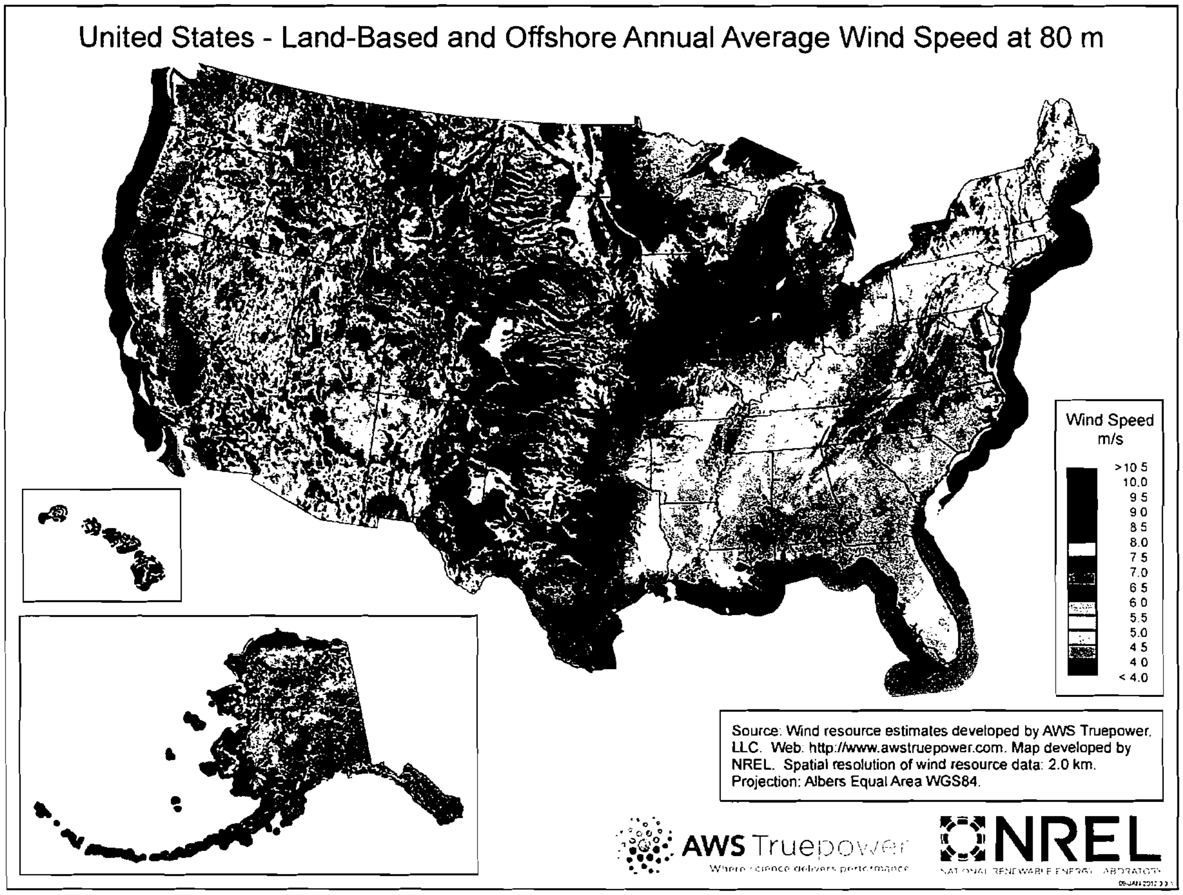


Figure 2-9: 80-meter U.S. wind resource map (Source: NREL [10])

As can be seen in Figure 2-9 there is an abundance of wind energy resource along the U.S. coast lines and in the Great Lakes. In addition to offshore wind being typically of higher speed than on land, they also tend to be steadier with less ground interference. So far there has been no offshore wind energy project established in the U.S. The proposed Cape Wind project, the closest to construction among proposed projects, has only recently obtained the necessary federal and state pre-construction permits in a process that has taken over ten years. In addition to resistance from local communities as demonstrated by the vigorous opposition to Cape Wind, the other factors hindering the development of offshore wind energy include its relatively higher cost, the technical challenges associated with installing wind turbines in a marine environment, and challenges associated with connecting the electricity to the on-shore power grid.

The federal government, in a combined effort between DOE and the U.S. Department of the Interior, has launched an effort to lower these barriers and expedite the deployment of substantial offshore wind generation capacity. This effort is explained in a document titled *A National*

Offshore Wind Strategy: Creating an Offshore Wind Energy Industry in the United States released in February 2012 [11]. The national strategy aims to help overcome the barriers by investment technology development, market barrier removal, advanced technology demonstration, and the development of a less cumbersome regulatory framework.

2.4 Wind energy in Indiana

Like the rest of the U.S., Indiana experienced rapid growth of wind generation capacity in 2008 and 2009. The 907 MW annual capacity addition in 2009 was reduced to 300 MW added in 2010 and virtually no capacity added in 2011 outside small, stand-alone community wind turbines. Figure 2-10 shows the annual and cumulative capacity additions in Indiana. The 200 MW shown for 2012 is the expected completion of the Wildcat Wind Farm currently under construction in Madison and Tipton counties.

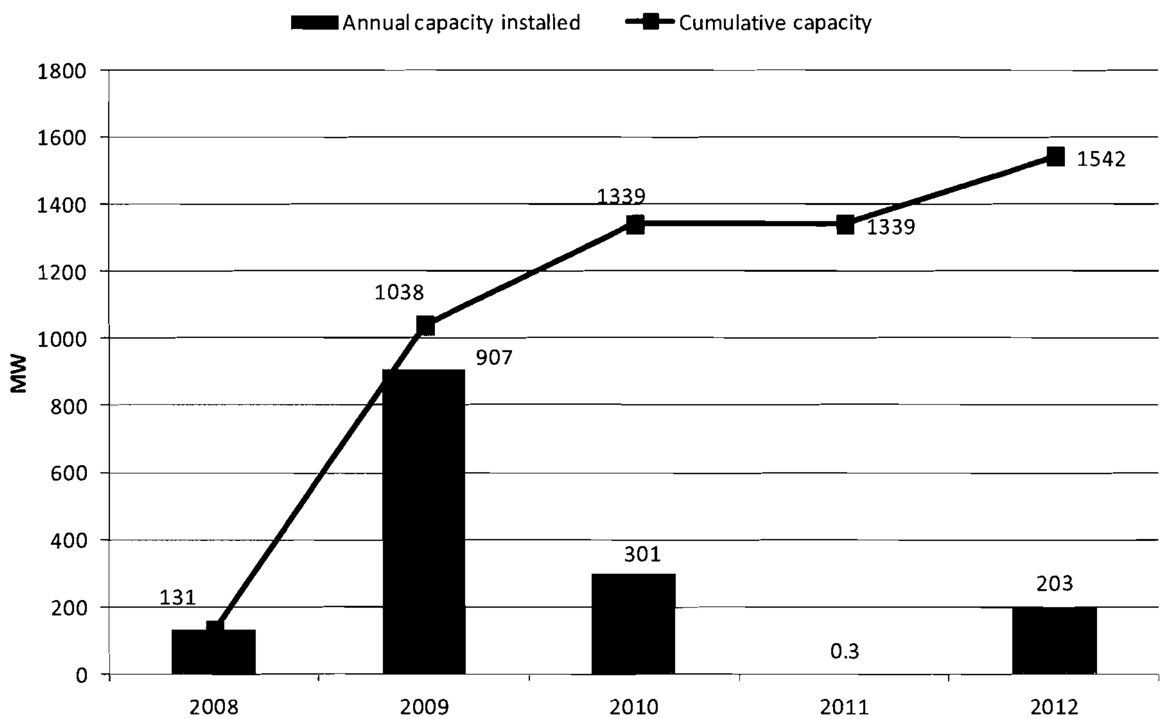


Figure 2-10: Annual wind energy capacity installation in Indiana (Data source: IURC, DOE [12-15]

Table 2-3 shows a list of utility scale wind farms in Indiana. It includes the nine operational wind farms with a combined capacity of 1,337 MW, the 200 MW currently under construction and the 352 MW of proposed capacity that have been approved for construction by the Indiana Utility Regulatory Commission.

Project Name	County	Capacity (MW)	Developer	Date Completed	Power Purchaser
Benton County Wind Farm	Benton	131	Orion	2008	Duke (101 MW) Vectren (30 MW)
Fowler Ridge Wind Farm 1	Benton	301	BP / Dominion	2009	I&M (100 MW), Dominion (201 MW)
Fowler Ridge Wind Farm IIA	Benton	200	BP/Sempra	2009	AEP (50x3 MW), Vectren (50 MW)
Fowler Ridge Wind Farm III	Benton	99	BP/Sempra	2009	AEP Appalachian (99 MW)
Hoosier Wind Project	Benton	106	enXco	2009	IPL (106 MW)
Meadow Lake I	White	200	Horizon (EDP)	2009	Wholesale market COMED (50 MW)
Meadow Lake II	White	99	Horizon (EDP)	2010	Wholesale market COMED (25 MW) Ameren (25 MW)
Meadow Lake III	White	104	Horizon (EDP)	2010	Wholesale market Ameren (25 MW)
Meadow Lake IV	White	99	Horizon (EDP)	2010	Wholesale market Ameren (25 MW)

Under construction

Wildcat Wind Farm 1	Tipton & Madison	200	E.ON	December 2012	Wholesale market I&M (100 MW)

Approved by Indiana Utility Regulatory Commission

Spartan Wind Farm 1	Newton	101	Duke Generation Services		Wholesale market
Meadow Lake Phase V	White	101	Horizon (EDP)		Wholesale market
Fowler Ridge IIB	Benton	150	Dominion / BP		Wholesale market

Table 2-3: Status of wind generation projects in Indiana (Data source: IURC [12])

In addition to the utility scale wind farms, community wind projects have been gaining popularity, especially in schools. Table 2-4 is a list of the community wind projects of which SUFG was aware at the writing of this report.

Project Name	County	Capacity (MW)	Developer	Date Completed
Randolph Eastern School Corporation/Union City	Randolph	2	Performance Services	2009
Tippecanoe Valley Schools	Kosciusko	0.9	Performance Services	2010
Lafayette CityBus Headquarters	Tippecanoe	0.3	Cascade Renewable Energy	2011
North Newton School Corporation	Newton	0.9	Performance Services	2012
West Central School Corporation	Pulaski	0.9	Performance Services	2012
Northwestern School Corporation	Howard	0.9	Performance Services	2012
Taylor University	Upland/Grant	0.1	ECI Wind and Solar	

Table 2-4: Community wind projects in Indiana (Data source: [13-15])

Indiana utilities have a total 831 MW contracted on power purchase agreements, 426 MW from wind farms in Indiana and 405 MW from out of state wind farms in Illinois, Iowa, Minnesota and South Dakota. Table 2-5 shows the capacity contracted to Indiana utilities.

Utility	**Project**	**State**	**Power Purchase Agreement (MW)**
Duke Energy	Benton County Wind Farm	Indiana	101
Vectren	Benton County Wind Farm	Indiana	30
Vectren	Fowler Ridge Wind Farm II	Indiana	50
Indiana Michigan	Fowler Ridge Wind Farm I	Indiana	100
Indiana Michigan	Wildcat Wind Farm	Indiana	40
IPL	Hoosier Wind Farm	Indiana	106
IPL	Lakefield Wind Project	Minnesota	201
NIPSCO	Buffalo Ridge Wind FArm	South Dakota	50
NIPSCO	Barton Windpower	Iowa	50
WVPA	AgriWind	Illinois	8
WVPA	Storey County Wind Farm	Illinois	21
IMPA	Hancock County Wind Farm	Iowa	50
Hoosier Energy	Storey County Wind Farm	Illinois	25

Table 2-5: Wind energy purchase agreements by Indiana utilities (Data source: IURC [12])

Figure 2-11 shows the distribution of wind energy resources at 100 meters and the location of major transmission lines, the two main factors influencing the location of utility scale wind farms while Figure 2-12 shows the distribution of the wind resource at 50m, a height at which smaller scale community wind projects operate.

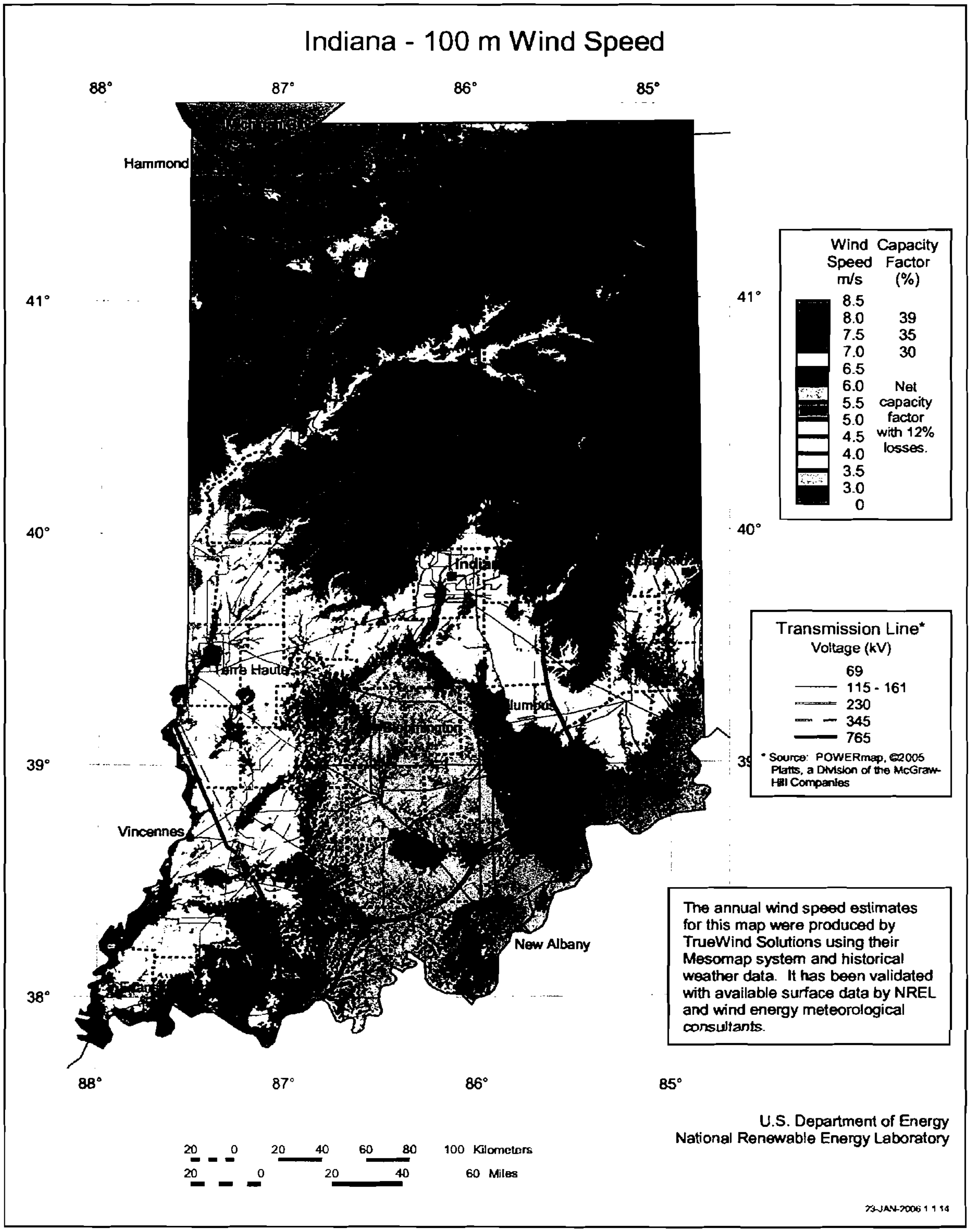


Figure 2-11: Indiana wind speed at 100 meters height (Source: OED/NREL [16])

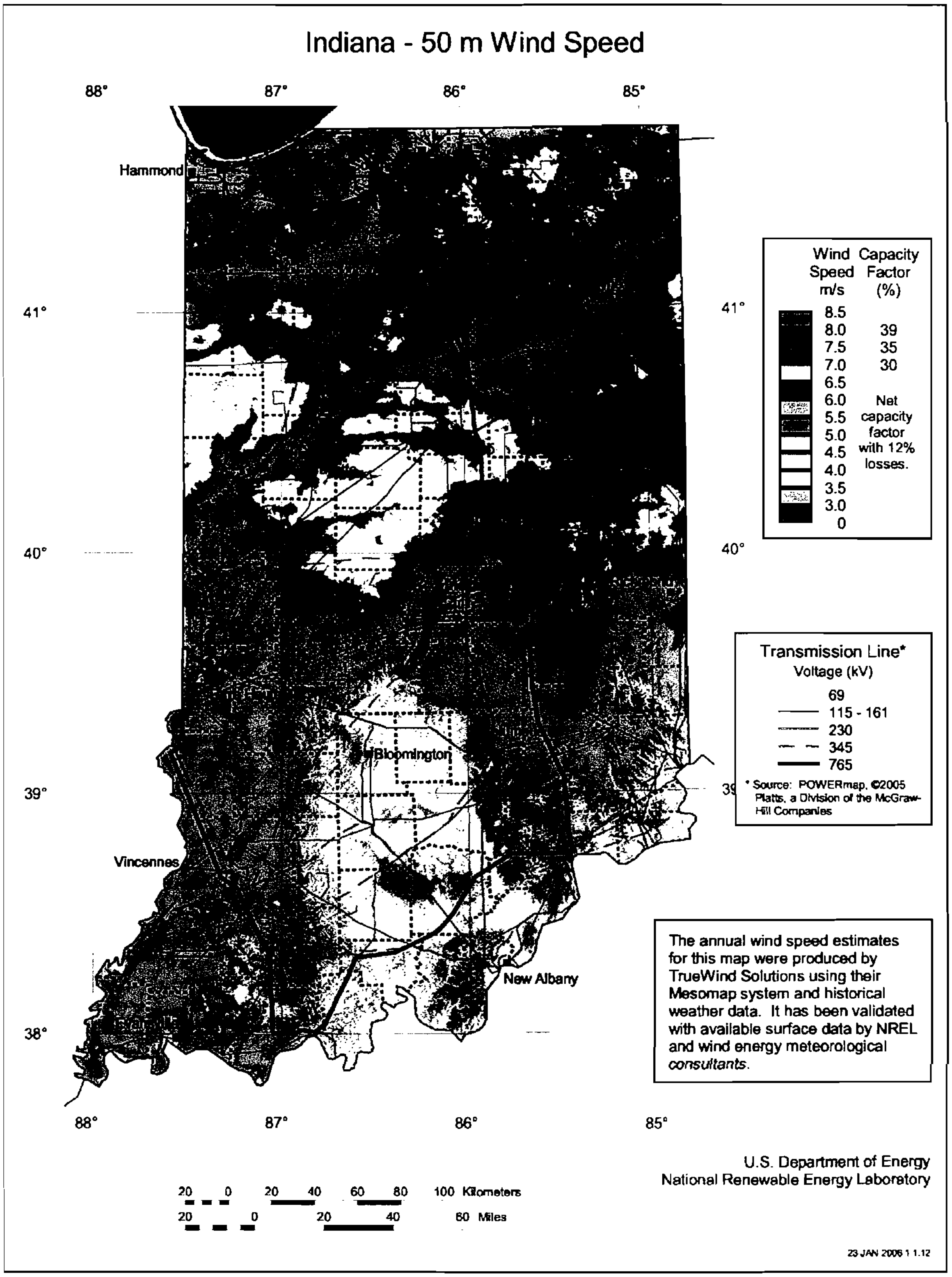


Figure 2-12: Indiana wind speed at 50 meters height (Source: OED/NREL [16])

2.5 Incentives for wind energy

The following federal and state incentives are available for wind energy projects.

Federal Incentives

- Renewable Electricity Production Tax Credit (PTC) credits wind energy producers with 2.2 cents/kWh during the first ten years of operation. The PTC was modified in the February 2009 American Recovery and Reinvestment Act to allow producers who would qualify for the PTC to opt to take the federal business energy investment tax credit (ITC) or equivalent cash grant from the U.S. Department of Treasury (Renewable Energy Grants: 30 percent of property that is part of a qualified small wind property). The PTC is available for projects with an in-service deadline of December 31, 2012 [9].

- Business Energy Investment Tax Credit (ITC) credits up to 30 percent of expenditures, with no maximum credit, on qualifying wind energy installations (small wind turbines placed in service after December 31, 2008). Eligible small wind property includes wind turbines up to 100 kW in capacity with an in-service deadline of December 31, 2016 [9].

- Renewable Energy Production Incentive (REPI) provides financial incentives similar to the Production Tax Credit to wind generators owned by not-for-profit groups, public-owned utilities and other such organizations. REPI payments are subject to availability of annual appropriations by Congress [18].

- Residential Renewable Energy Tax Credit allows taxpayers to claim 30 percent of their qualifying expenditures on installation of small wind-energy systems for the dwelling in which they reside. The maximum credit is $500 per 0.5 kW, not to exceed $4,000, for systems placed in service in 2008; there is no maximum credit for systems placed in service after 2008. Systems must be placed in service on or before December 31, 2016 [9].

- Modified Accelerated Cost-Recovery System (MACRS) allows businesses to recover investments in qualified solar, wind and geothermal property through depreciation deductions. For property acquired and placed in service after September 8, 2010 and before January 1, 2012, the allowable first year deduction was 100 percent of the adjusted basis. For property placed in service from 2008 to 2012, for which the placed in service date does not fall within this window, the allowable first-year deduction is 50 percent of the adjusted basis [9].

- Qualified Energy Conservation Bonds (QECBs) are tax credit bonds to qualified energy conservation projects, which are not subject to the U.S. Department of Treasury application process and instead are allocated to each state based upon its percentage of the U.S. population as of July 1, 2008. The states are then required to allocate a certain percentage to "large local governments (i.e., municipalities and counties with populations of 100,000 or more)." Qualified energy conservation projects include energy efficiency capital expenditures in public buildings; green community programs; renewable energy production; various research and development applications; mass commuting facilities that reduce energy consumption; several types of energy related demonstration projects; and public energy efficiency education campaigns [9].

- Energy Efficiency Mortgage can be used by homeowners to finance a variety of energy efficiency measures, including renewable energy technologies, in a new or existing home. The federal government supports these loans by insuring them through FHA or VA programs. This allows borrowers who might otherwise be denied loans to pursue energy efficient improvements [9].

- Rural Energy for America Program (REAP) promotes energy efficiency and renewable energy for agricultural producers and rural small businesses through the use of (1) grants and loan guarantees for energy efficiency improvements and renewable energy systems, and (2) grants for energy audits and renewable energy development assistance. The program covers up to 25 percent of costs. Congress allocated funding for the new program in the following amounts: $60 million for FY 2010, $70 million for FY 2011, and $70 million for FY 2012 [9].

- High Energy Cost Grant Program administered by the U.S. Department of Agriculture (USDA) is aimed at improving the electricity supply infrastructure in rural areas having home energy costs exceeding 275 percent of the national average. Eligible infrastructure includes renewable resources generation. The USDA has allocated $21 million for the 2011 funding cycle. The individual grants range from $75,000 to $5 million [19].

Indiana Incentives

- Net Metering Rule allows utility customers with renewable resource facilities having a maximum capacity of 1 MW to receive a credit for net excess generation in the next billing cycle [9].

- Renewable Energy Property Tax Exemption provides property tax exemptions for solar thermal, PV, wind, hydroelectric and geothermal systems [9].

- Emissions Credits make electricity generators that do not emit nitrogen oxides (NO_x) and that displace utility generation eligible to receive NO_x emissions credits under the Indiana Clean Energy Credit Program [20].

- Clean Energy Portfolio Goal sets a voluntary goal of obtaining 4 percent between 2013 and 2018, 7 percent between 2019 and 2024, and 10 percent by 2025, of electricity from clean energy sources based on 2010 retail sales. Participation in the goal makes utilities eligible for incentives that can be used to pay for the compliance projects [21].

- Indianapolis Power & Light Co. – Rate REP Renewable Energy Production offers a "feed-in tariff" to facilities that produce renewable energy. IPL can purchase renewable energy and contract the production for up to 15 years. Compensation for small wind facilities is $0.14/kWh and for large wind facilities is $0.075/kWh. REP is a pilot rate and no new contracts will be negotiated after March 30, 2013 [9, 22].

- Northern Indiana Public Service Company offers feed-in tariff incentive rates for electricity generated from renewable resources for up to 15 years. The payments for electricity from wind generating facilities are $0.17/kWh for facilities with a capacity less than or equal to 100 kW and $0.10/kW for facilities with capacities between 101 and 2,000 kW. The renewable tariff is experimental and slated to run until December 31, 2013. The generating unit size allowed under the tariff is between 5 and 5,000 kW while the total allowed system-wide capacity is 30 MW. Five hundred kilowatts of the system-wide cap are reserved for wind projects of capacity less than 10 kW, and 500 kW for solar projects of capacity less than 10 kW [9, 23].

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3. Dedicated Energy Crops

3.1 Introduction

This section discusses biomass in the form of crops grown exclusively for use as a source of energy. Biomass in the form of organic wastes and residues as sources of energy is presented in the section that follows (Section 4).

Unlike the use of organic wastes as an energy source, the dedicated energy crop industry in the U.S. is still in its infancy. A substantial federally-driven research and development effort is under way as part of the national effort to reduce dependence on imported oil. This research effort is detailed in the recently updated report from DOE titled *U.S. Billion-Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry* [1]. Among the renewable resources, biomass including energy crops has the advantage in that they can be converted to transportation fuels. The crops being considered and developed as dedicated energy crops can be grouped into three main categories – perennial grasses, woody crops and annual crops.

Perennial grasses include switchgrass, big bluestem, indian grass, miscanthus and sugarcane. Switchgrass, big bluestem, indian grass are perennial grasses that are native to North America. They are already grown in a wide range of habitats and climates for pasture, hay production, soil and water conservation, and for wildlife habitat. With proper management they can remain productive for as long as ten years. Figure 3-1 shows switchgrass on a farm in Tennessee.

The Giant Miscanthus hybrid was developed in Japan and introduced to the U.S. as a landscape plant. The main attraction of Giant Miscanthus as an energy crop is its high level of biomass production. While a great deal of research has been done establishing its potential as an energy crop, there are still barriers to overcome before it can enter large scale commercial production. They include the development of low-cost reliable propagation methods since it is a seedless sterile hybrid. In addition there is still work to be done to identify types suited to given regions of the country.

Figure 3-1: Switchgrass (Source: University of Tennessee [2])

Sugarcane has attraction as an energy crop primarily due to its ability to store sugar (sucrose) in its stem. In addition, sugarcane ethanol is used as a fuel and is recognized to cut green house gas emissions more than any other biofuel. However, sugarcane is a tropical crop and significant research work is still to be done to develop varieties that do well in temperate climates.

Woody crops being developed as energy crops include poplars, willows, eucalyptus and southern pines. Poplars are well established trees native to North America. There are already commercial plantations of hybrid poplars (cottonwood) for the production of fiber, biofuels and for environmental remediation. High rates of biomass productivity, ease of propagation and management are given as factors that make poplar attractive as an energy crop. The characteristics that make willows desirable as energy crops include high yields, ease of propagation and high energy content. Eucalyptus is being developed for the Southern United States where it is grown for lumber. It has been grown commercially for lumber in Florida since the 1960s.

Southern pines are already one of the main contributors to bioenergy in the United States. Their barks and the paper processing byproduct *black liquor* are used to produce energy in pulp and paper mills. Their ability to grow rapidly in a wide range of sites have made the southern pine the most important and widely cultivated timber species in the U.S., mainly for lumber and pulpwood.

The one annual crop being developed as an energy crop is sorghum. According to the DOE Biomass Program, although perennial crops are considered better than annual crops for energy production sustainability purposes, an annual crop serves well as a bridge for a new bioenergy processing facility as it awaits the establishment and full productivity of perennial crops. The factors that make sorghum attractive as an energy crop include its composition and high yield potential, drought resistance, water use efficiency, having established production systems, and its potential for genetic improvement [1].

Biomass, including energy crops, can be converted into energy in the following ways:

- In direct combustion the biomass is burned directly in a boiler to produce steam that can then be used to drive a turbine to generate electricity. Combustion can be done either in a dedicated biomass-only boiler or cofired with other fuels such as coal. Cofiring of biomass in coal boilers has the advantage of lowering the emission of sulfur oxides (SOx), nitrogen oxides (NOx) and net lifecycle carbon. However, the widespread application of cofiring with coal has been hindered by the occurrence of alkali deposits that cause slag and corrosion in boiler heat transfer surfaces in the coal boilers [3].

- In biochemical conversion processes the biomass material is broken down into sugars using either enzymes or chemical processes. These sugars are then fermented to make ethanol [4].

- In thermochemical conversion heat is used to break down the biomass material into intermediate products (synthetic gas) which can then be converted into fuels using heat, pressure and catalysts. Two common thermochemical processes are gasification and pyrolysis. Gasification is a high temperature conversion of solids into a flammable mixture of gases. Pyrolysis is a process of thermal decomposition of biomass at high temperatures in the absence of oxygen into charcoal, bio-oil and synthetic gas [5].

To take full advantage of the strengths of the different biomass-to-energy conversion processes, the DOE Biomass Program is funding the construction of integrated biorefineries that combine all processes in one plant and produces multiple products. By producing multiple products, the integrated biorefineries, like refineries in the petroleum industry, will be able to take advantage of the differences in feedstocks and intermediate products to maximize the value obtained from the biomass feedstock.

There are currently 27 such DOE funded integrated biorefinery projects spread across the United States. Twelve of these are small scale pilot projects with a capacity of one dry ton of biomass per day. These pilot plants screen and validate promising bio-processing technologies. Nine of the biorefineries are demonstration plants where the technologies validated at the pilot plants are scaled up to produce at the scale of at least 50 dry tons of feedstock a day. In the six commercial-scale projects currently under construction the bio-processing technologies are scaled up to process at least 700 dry tons of feedstock a day. Table 3-1 is list of DOE funded integrated biorefinery projects [6].

Project	Location	Scale	Conversion Technology
Abengoa	Hugoton, KS	Commercial	Biochemical
Bluefire LLC	Fulton, MS	Commercial	Biochemical
Flambeau	Park Falls, WI	Commercial	Thermo - Gasification
Mascoma	Kinross, MI	Commercial	Biochemical
POET	Emmetsburg, IA	Commercial	Biochemical
Rangefuels	Soperton, GA	Commercial	Thermo - Gasification
Enerkem	Pontotoc, MS	Demonstration	Thermo - Gasification
INEOS New Planet Bioenergy LLC	Vero Beach, FL	Demonstration	Hybrid
Lignol	Washington	Demonstration	Biochemical
New Page	Wisconsin Rapids, WI	Demonstration	Thermo - Gasification
Pacific Ethanol	Boardman, OR	Demonstration	Biochemical
RSA	Old Town, ME	Demonstration	Biochemical
Sapphire Energy Inc.	Columbus, NM	Demonstration	Algae/CO_2
Verenium	Jennings, LA	Demonstration	Biochemical
Myriant	Lake Providence, LA	Demonstration	Biochemical
Algenol Biofuels Inc	Fort Myers, FL	Pilot	Algae/CO_2
American Process Inc.	Alpena, MI	Pilot	Biochemical
Amyris Biotechnologies Inc.	Emeryville, CA	Pilot	Biochemical
Archer Daniels Midland	Decatur, IL	Pilot	Biochemical
ClearFuels Technology	Commerce City, CO	Pilot	Thermo - Gasification
Haldor Topsoe Inc.	Des Plaines, IL	Pilot	Thermo - Gasification
ICM Inc.	St. Joseph, MO	Pilot	Biochemical
Logos Technologies	Visalia, CA	Pilot	Biochemical
Renewable Energy Institute International	Toledo, OH	Pilot	Thermo - Gasification
Solazyme Inc.	Riverside, PA	Pilot	Algae/Sugar
UOP LLC	Kapolei, HI	Pilot	Thermo - Pyrolysis
ZeaChem Inc.	Boardman, OR	Pilot	Hybrid

Table 3-1: DOE funded integrated biorefinery projects (Source: DOE [6])

3.2 Economics of energy crops

For large scale production of dedicated energy crops to occur, the price and profitability of the energy crops will have to be competitive with the current crops and other cropland uses. DOE, in the *Billion-Ton Update* report, used the U.S. agricultural sector simulation model (POLYSYS) to estimate the quantities of the various energy crops that would be produced at various prices. The POLYSYS model is a detailed model of the U.S. agricultural sector that includes crop supply at the county level, national crop demand and prices, national livestock demand and prices, and agricultural income.

Three types of energy crops are modeled in the POLYSYS simulation for the results presented in the *Billion-Ton Update* report – a perennial grass, an annual energy crop and two types of short rotation woody crops, one which is rotated by coppicing[3] (e.g. willows) and one by other non-coppicing methods (e.g. poplars). The perennial grass and the non-coppicing woody crop were modeled for 10 year rotations and the coppicing wood for 20 year rotations with cuttings every 4 years.

Figure 3-2 shows the quantities of the three energy crops expected to be produced at farmgate prices $40, $50 and $60 per dry ton in 2017, 2022 and 2030. Figure 3-3 shows the supply curves for total quantity of energy crop, i.e. all energy crops combined, expected to be produced in 2017, 2022, and 2030. According to the *Billion-Ton Update* report the projected total biomass production (energy crops, agricultural and forest residues, and dual use crops) at $60 per dry ton is adequate to meet both the mandate of the Renewable Fuel Standard (36 billion gallons of biofuels by 2022) and the "billion-ton" goal of replacing 30 percent of US petroleum consumption by 2030.

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[3] Coppicing is a method of woody crop management that takes advantage of the property that some plants such as willows have where new growth occurs from the stump or roots when the plant is cut down.

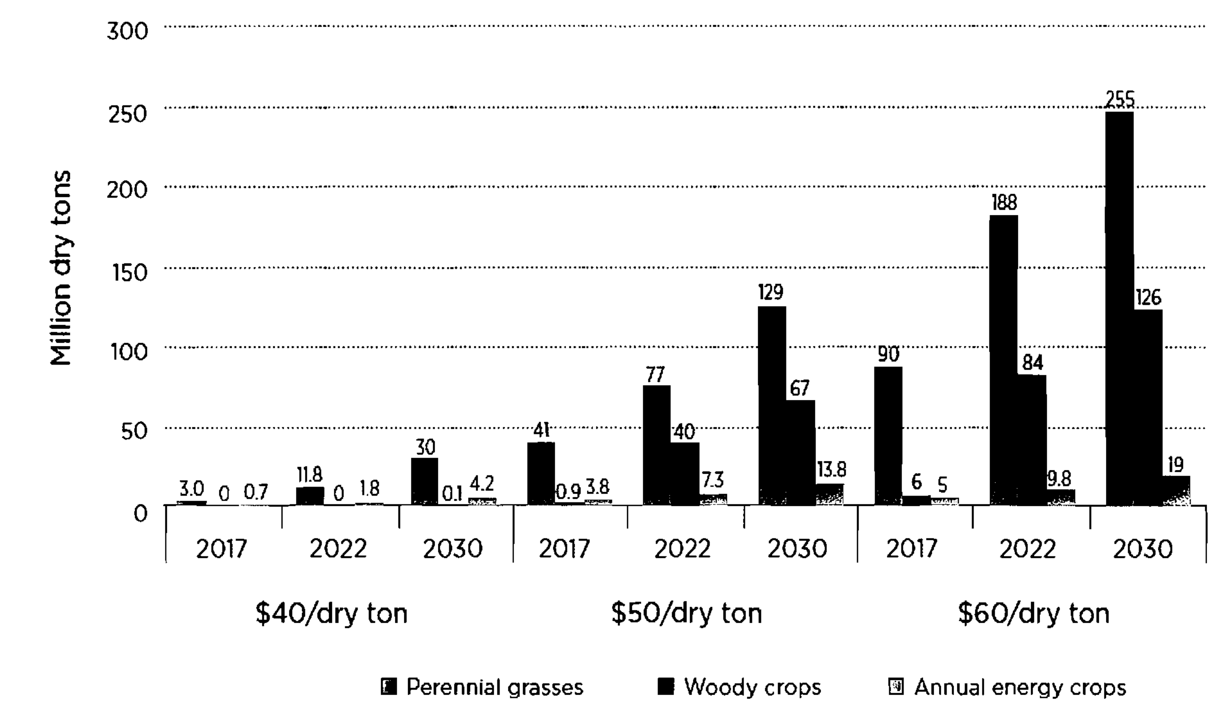

Figure 3-2: Potential production of energy crops at various years and farmgate prices (Source: DOE [1])

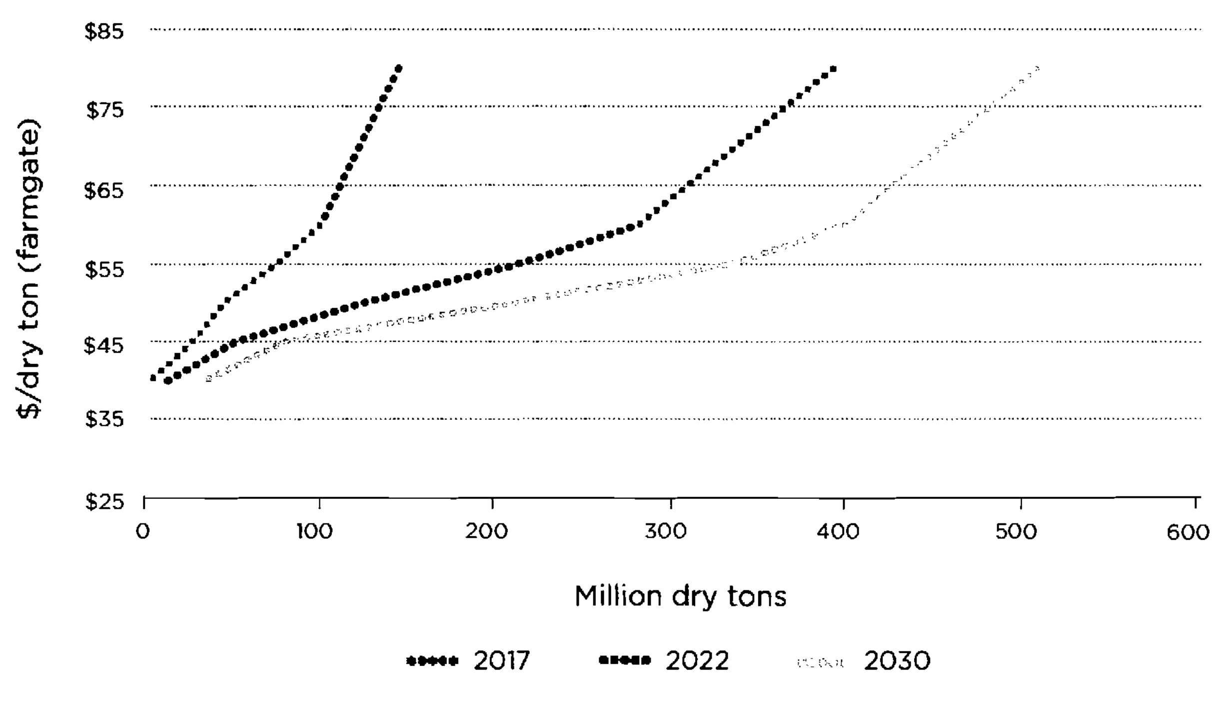

Figure 3-3: Supply curves for all energy crops at selected years (Source: DOE [1])

Corn and soybean use for biofuel production

Although corn and soybeans do not meet the strict definition of dedicated energy crops, they are included in this section in recognition of the rapid growth of corn and soybean biofuel plants in Indiana since the mid-2000s. Before 2007 Indiana's ethanol production capacity consisted of one plant with a capacity of 100 million gallons per year (MGY). Since then twelve corn-ethanol plants with a combined capacity of 1,088 MGY have been constructed, bringing the total corn-ethanol capacity to 1,188 MGY. Table 3-2 shows the location and capacities of ethanol plants in Indiana. The first two soybean biodiesel plants in Indiana, with a combined capacity of 10 MGY, were commissioned in 2006. Since then two more soybean biodiesel and one waste oils based biodiesel plants have been constructed bringing the total biodiesel capacity to 118 MGY. Two of these biodiesel plants – the Evergreens Renewables plant in Hammond and the Xenerga waste oils plant in Kingsbury have since shut down. Table 3-3 shows the location and capacities of the three operating biodiesel plants.

The following factors account for the biofuel plant construction in the U.S. since 2005.

- The use of corn-ethanol as an oxygenating additive in gasoline in place of the chemical MTBE. The shift from MTBE was due to its being associated with ground water pollution. The replacement of MTBE was mandated both by states and the 2005 Energy Policy Act [7].

- The enactment of the renewable fuel standard under the 2005 Energy Policy Act that required that 7.5 billion gallons of renewable fuel must be blended into gasoline by 2012. This has since been expanded to a requirement of 36 billion gallons of renewable fuel by 2022 (15 billion gallons from corn-ethanol and the balance from advanced biofuels) [8].

- The enactment of the volumetric ethanol excise tax credit (VEETC) in 2004 improved the cost competitiveness of corn-ethanol with gasoline and provided long-term protection for corn-ethanol producers against price volatility in the transportation fuel market. The VEETC allowed for a 45 cents/gallon tax credit to be given to individuals who produce the mixture of gasoline and ethanol. This tax credit expired at the end of 2011.

Company	Year	Town/County	Current Capacity (MGY*)
New Energy Corp	1985	South Bend/St. Joseph	100
Central Indiana Ethanol	2007	Marion/Grant	40
Iroquois Bio-Energy Co.	2007	Rensselaer/Jasper	40
POET Biorefining	2007	Portland/Jay	65
The Andersons	2007	Clymers/Cass	110
Valero Energy	2007	Linden/Montgomery	100
(formerly Alta) POET Biorefining	2008 reopened 2011	Cloverdale/Putman	90
Cardinal Ethanol	2008	Harrisville/Randolph	100
Indiana Bio-Energy	2008	Bluffton/Wells	110
POET Energy	2008	Alexandria/Madison	60
POET Energy	2008	North Manchester/Wabash	65
Abengoa Bioenergy Indiana	2009	Mt. Vernon/Posey	88
Aventine	2011	Mt. Vernon/Posey	220

*MGY denotes million gallons per year.

Table 3-2: Ethanol plants in Indiana (Source: Indiana State Department of Agriculture (ISDA) [9])

Biodiesel plant Name	Year	Town/County	Estimated Capacity (MGY)
Integrity Biofuels	2006	Morristown/Shelby	5
E-biofuels (not producing)	2007	Middletown/Henry	10
Louis Dreyfus	2007	Claypool/Kosciusko	88

Table 3-3: Biodiesel plants in Indiana (Source: ISDA [9])

3.3 State of energy crops nationally

As discussed previously, the energy crop industry is still in its infancy with a substantial research and development effort under way to establish a sustainable supply of biomass to satisfy the Renewable Fuel Standard mandate of 36 billion gallons of biofuels for the transportation industry per year by 2022 and also increase electricity generation from biomass. As part of this research, DOE has partnered with universities, national laboratories and the U.S. Department of Agriculture to establish a *Regional Biomass Feedstock Partnership* to conduct research, development and outreach at the regional level to address the barriers that associated with the effort to establish a sustainable bioenergy industry. Figure 3-4 shows the biomass feedstock field trial locations established by the *Regional Biomass Feedstock Partnership.*

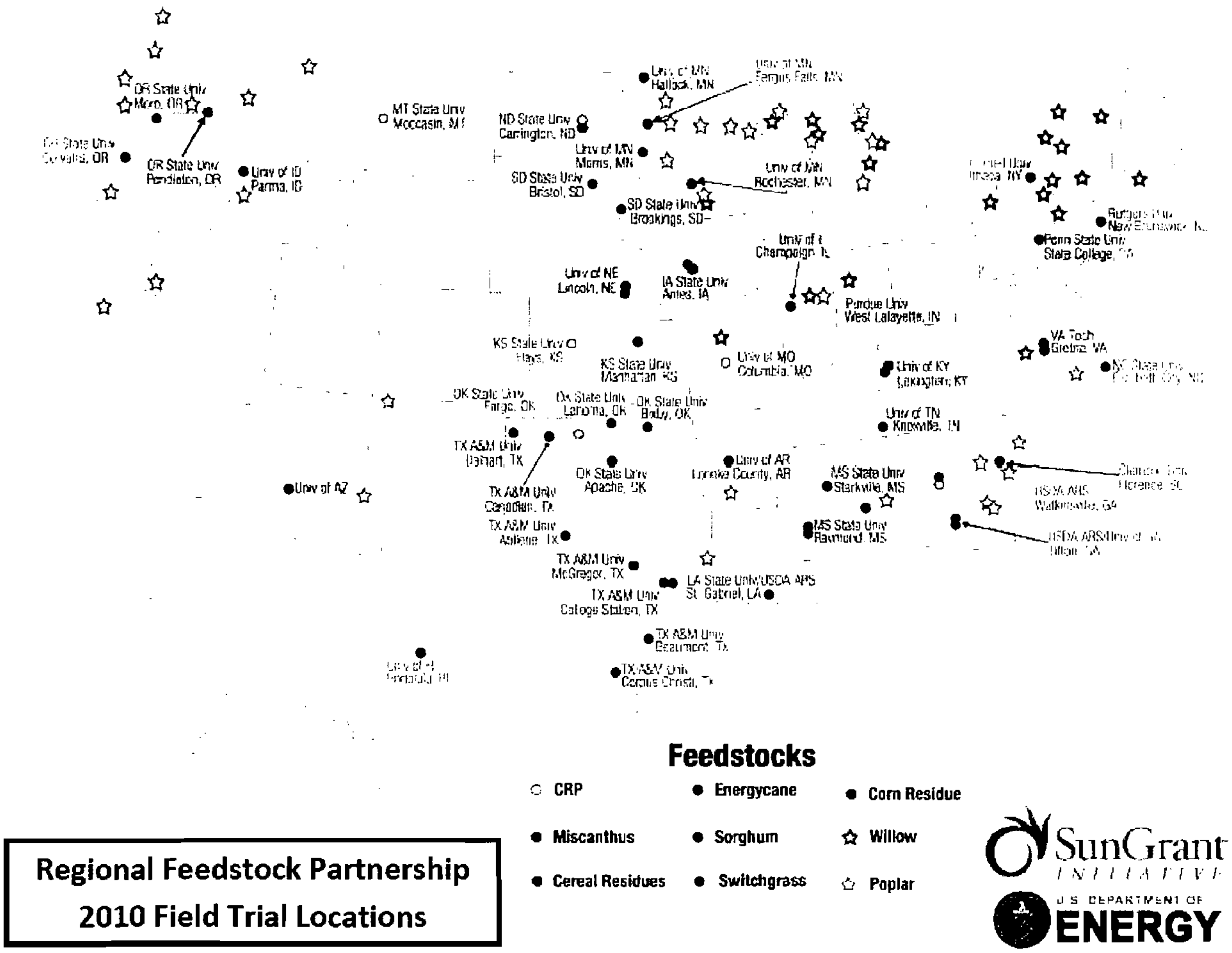

Figure 3-4: 2010 energy crop test stations (Source DOE [10])

In addition to the field test sites the *Regional Biomass Feedstock Partnership* is also involved in education and outreach efforts to farmers and other stakeholders to prepare them for a future where energy crops are a substantial portion of the agricultural industry. The lead institutions for the five regions in the program are: South Dakota State University in North Central, Oregon State University in the Western region, Oklahoma State University in South Central, Cornell University in the Northeast, and University of Tennessee in the Southeast region [11].

3.4 Energy crops in Indiana

The results from the DOE *Billion-Ton* model show Indiana and other corn-belt states such as Iowa and Illinois being major producers of agricultural crop residues such as corn stover and only a limited amount of energy crops. Figure 3-5 shows the projected pattern of biomass feedstock production by the year 2030 at biomass farmgate price of $60 per dry ton.

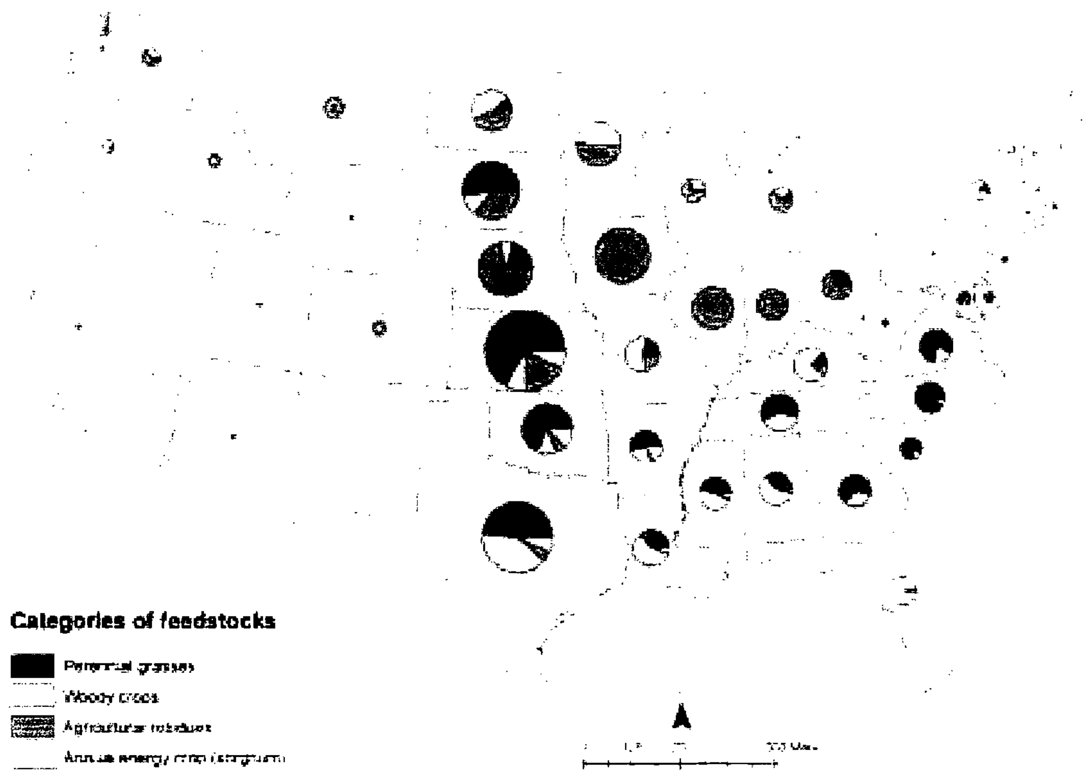

Figure 3-5: Estimated shares of energy crops and agricultural residues supplied at $60 per dry ton in 2030 (Source: DOE [1])

Figure 3-6 shows the quantities of energy crops projected to be produced in Indiana in 2030 at a biomass farmgate price of $50, $60, $70 and $80 per dry ton. At a biomass price of $60 per dry ton, Indiana's projected production of all energy crops combined is 1.5 million dry tons. In comparison, the amount of agricultural residue biomass produced at $60 per dry ton in 2030 is projected to be 9 million dry tons. As can be seen in the figure, perennial grasses are the preferred energy crop in Indiana, followed by woody crops. At prices above $70 per dry ton some annual crops (e.g., sorghum) enter into the crop mix.

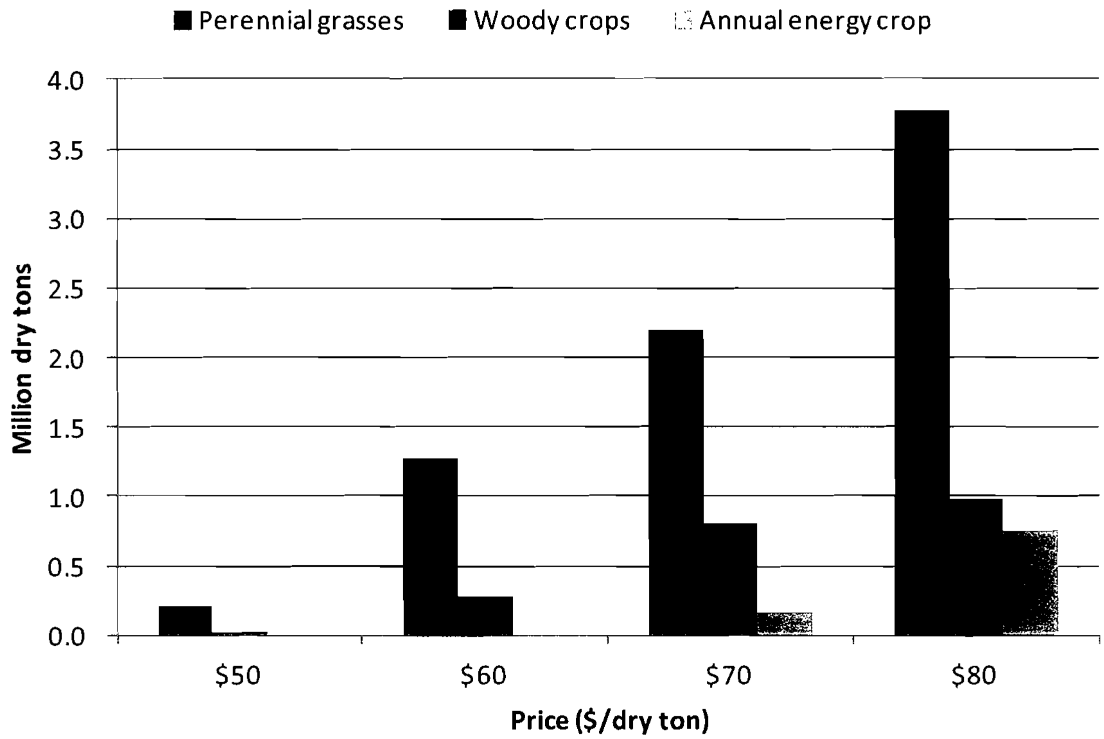

Figure 3-6: Projected production of energy crops in Indiana in 2030 (Data source: DOE [12])

In an April 2008 working paper, Brechbill and Tyner of Purdue's Agricultural Economics Department did an extensive study of the estimated cost of producing switchgrass and harvesting corn stover for the energy industry. Table 3-4 shows the average cost of producing switchgrass given in this study [13]. The table includes the farmer's choice to either: purchase and own the harvesting equipment or hire the services of a specialized custom operator.

	500 acre farm	**1,000 acre farm**	**1,500 Acre farm**	**2,000 acre farm**
Custom hired equipment	$53.23	$53.23	$53.23	$53.23
Owned equipment	$54.54	$52.43	$51.73	$51.38

Table 3-4: Average cost ($/ton) for producing switchgrass in Indiana (Data source: Brechbill & Tyner [13])

3.5 Incentives for energy crops

The following incentives have been available to assist in the use of energy crops.

Federal Incentives

- Renewable Electricity Production Tax Credit (PTC) provides a 2.2 cents/kWh tax credit for closed-loop biomass and 1.1 cents/kWh for open-loop biomass, landfill gas municipal solid waste energy technologies. As part of the February 2009 American Recovery and Reinvestment Act the PTC was modified to provide the option for qualified producers to take the federal business energy investment tax credit (ITC) or an equivalent cash grant from the U.S. Department of Treasury. Dedicated energy crops fall under the closed loop biomass category [14]. The PTC for biomass energy systems expires at the end of 2013.

- Business Energy Investment Tax Credit (ITC) credits up to 30 percent of expenditures on qualified renewable energy systems [14].

- Renewable Energy Production Incentive (REPI) provides financial incentive payments for electricity produced and sold by new qualifying renewable energy generation facilities. Qualifying facilities are eligible for annual incentive payments of 2.1 cents/kWh for the first ten years of production, subject to the availability of annual appropriations in each federal fiscal year of operation. The Energy Policy Act of 2005 expanded the list of eligible technologies and facilities owners, and reauthorized the payment for fiscal years 2005 through 2026 [14].

- Rural Energy for America Program promotes energy efficiency and renewable energy for agricultural producers and rural small businesses through the use of (1) grants and loan guarantees for energy efficiency improvements and renewable energy systems, and (2) grants for energy audits and renewable energy development assistance. The program covers up to 25 percent of costs [14].

- Qualified Energy Conservation Bonds (QECBs) are qualified tax credit bonds that are allocated to each state based upon their state's percentage of the U.S. population. The states are then required to allocate a certain percentage to "large local governments." In February 2009, these funds were expanded to $3.2 billion [14].

- Value-Added Producer Grants are available to independent producers, agricultural producer groups, farmer or rancher cooperatives, and majority-controlled producer-based business ventures seeking funding. Previously awarded grants supported energy generated on-farm through the use of agricultural commodities, wind power, water power, or solar power. The maximum award per grant was $300,000 [15].

- High Energy Cost Grant Program administered by the U.S. Department of Agriculture (USDA) is aimed at improving the electricity supply infrastructure in rural areas having home energy costs exceeding 275 percent of the national average. Eligible infrastructure includes renewable resources generation. The USDA has allocated $21 million for the 2011 funding cycle. The individual grants range from $75,000 to $5 million [16].

Indiana Incentives

- Net Metering Rule allows utility customers with renewable resource facilities with a maximum capacity of 1 MW to receive a credit for net excess generation in the next billing cycle [14].

- Emissions Credits make electricity generators that do not emit NO_x and that displace utility generation are eligible to receive NO_x emissions credits under the Indiana Clean Energy Credit Program [17]. These credits can be sold on the national market.

- Clean Energy Portfolio Goal sets a voluntary goal of obtaining 4 percent between 2013 and 2018, 7 percent between 2019 and 2024, and 10 percent by 2025, of electricity from clean energy sources based on 2010 retail sales. Participation in the goal makes utilities eligible for incentives that can be used to pay for the compliance projects [14].

- Indianapolis Power & Light Co. – Rate REP Renewable Energy Production offers a "feed-in tariff" to facilities that produce renewable energy. IPL can purchase renewable energy and contract the production for up to 15 years. Biomass compensation is $6.18/kW per month plus $0.085/kWh. REP is a pilot rate and no new contracts will be negotiated after March 30, 2013 [14, 18].

- Northern Indiana Public Service Company offers feed-in tariff incentive rates for electricity generated from renewable resources on 15 year contracts. Payment for biomass facilities is $0.106/kWh. The tariff is experimental and slated to run until December 31, 2013. The generating unit size allowed under the tariff is between 5 and 5,000 kW while the total allowed system-wide cap is 30 MW. Five hundred kW of the total system-wide cap are reserved for solar projects of capacity less than 10 kW, and 500 kW for wind projects of capacity less than 10 kW [14, 19].

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4. Organic Waste Biomass

4.1 Introduction

The previous section (Section 3) presented the use of organic biomass in the form of dedicated energy crops. In this section the use of biomass in the form of organic wastes and residues as a source of renewable energy is discussed. The organic waste biomass in this section is separated into two main categories: that which is in use currently as an energy source and that which is being considered for use in the future as an energy source in an effort to increase the proportion of renewable energy in the nation's energy mix. The types of organic waste biomass already in use as energy sources include:

- Residues from the forestry and wood products industry, including material left from logging, residues from the paper and pulp industry and residues from primary wood milling;
- Municipal solid waste (MSW), which is the organic portion of the post-consumer waste collected in community garbage collection services;
- Gas extracted from landfills, which is naturally occurring gas resulting from decomposition of landfill material;
- Livestock manure, mainly from large swine and dairy farms where it is used to produce gas in biodigesters; and
- Municipal wastewater, or sewage, which is used to produce gas in biodigesters.

Organic waste biomass resources that are not yet in large-scale use as energy sources but are being considered for future use include:

- Agricultural crops residues, such as stalks, leaves and other material left in the fields when conventional crops such as corn are harvested; and
- Aquatic plants, such as algae that have high oil content that can be converted to biodiesel.

Residues from the forestry and wood products industry and municipal solid waste are typically used to produce electricity and heat. These feedstocks are burned directly in a boiler to produce steam that is used to drive a turbine to generate electricity and/or the steam that is used directly for heat.

The other sources of organic waste based energy that are currently in use all take advantage of the fact that as the waste breaks down through either natural or managed decay processes, they produce a biogas that contains a significant percentage of methane. This is the case for landfill gas, livestock manure or municipal waste water that is processed through an anaerobic digester.

Anaerobic digestion of biomass waste consists of a breakdown of organic wastes by microorganisms in an oxygen deficient environment that produces biogas that can be burned as an energy source. The biogas is then burned in a boiler to produce steam that is used to drive a turbine and generate electricity. An additional benefit to generation of electricity from biogas is that it prevents the methane from being emitted into the atmosphere. Because methane is 21 times more potent than carbon dioxide as a heat trapping greenhouse gas, its conversion to energy provides an added environmental benefit [1].

Biomass, including agricultural crop residues, is expected to play a significant role in the energy supply portfolio in the U.S. in the future. One of the characteristics that makes biomass a very attractive source of renewable energy is its ability to be converted both to electricity and to liquid fuels for the transportation industry. Studies have shown that substantial energy resources in the form of biomass from crop residues could be harvested under appropriate economic conditions.

Large scale farming of algae is another area being considered as a potential source of bioenergy. Algae are simple organisms, ranging from microscopic-sized algae to seaweeds that grow to over 100 feet. Like other plants, they utilize energy from the sun through photosynthesis to convert carbon dioxide from the air into biomass usable for energy production. Algae have several advantages over other biomass as a source of energy and especially in the production of biodiesel. These advantages include [2, 3]:

- Algae grows more rapidly and has higher photosynthetic efficiency than other biomass;
- It has a much higher oil content than other biomass (20 to 80 times more than soybeans);
- It is not a food crop;
- It can be grown in water with very high salt concentration that is not usable for other agriculture;
- It can be grown in otherwise non-arable land such as deserts;
- It has the potential for recycling of CO_2 from fossil fueled power plants; and
- Both biofuels and valuable co-products can be produced from algae.

Algae can be grown in either open ponds or in enclosed bioreactors. Although open pond algae farms are much more cost competitive, they have the disadvantages of being vulnerable to contamination by faster growing native algae, water loss through evaporation and exposure to extreme weather variations. Enclosed bioreactors overcome these drawbacks by growing the algae entirely enclosed in transparent containers of various forms. Not surprisingly, the enclosed bioreactors' main disadvantage is cost; bioreactors are much more expensive to build than open ponds. One potential application for the use of algae is the coupling of an algae bioreactor with a coal power plant to allow the power plant to provide the carbon dioxide needed for algae growth. In this way a combined benefit of producing bioenergy while reducing carbon dioxide emission is achieved. Such an experiment was conducted at the Arizona Public Service Red Hawk power plant in 2006 and 2007 [4].

The production of algae for energy is still in the development stage. According to the DOE algae research program there are major technical hurdles to be overcome before commercial scale energy production from algae is a reality and energy from algae is more of a long term goal [2, 3].

4.2 Economics of organic waste biomass

Most of the current waste biomass energy is generated and consumed in the paper and pulp industry where the paper and pulp making byproducts are combusted in combined heat and power plants to supplement the electricity and steam supply of the paper and pulp mills. Several factors have combined to make the use of these residues and byproducts as an energy source economically attractive at pulp and paper mills. They include:

- The burning of the pulp making residue (black liquor) serves not only to generate energy, but also to recover process chemicals,
- The co-location of electricity and steam demand in the mills greatly increases the efficiency of the energy conversion process, and
- The ability to sell excess generation through either the favorable provisions of Public Utility Regulatory Policies Act of 1978 or more recently through the open transmission access associated with wholesale electricity markets provides a market for times when the plant's generation exceeds internal demand.

In the case of municipal solid waste, the need to reduce the amount of material going into landfills is the main motivation for building MSW based energy conversion facilities. Without this motivation MSW Power plants would be hard to justify financially since they are some of the most expensive plants to build and operate [5]. In the November 2010 Energy Information Administration (EIA) plant cost estimates, the MSW power plant was listed as having the highest capital cost at over $8,000/kW among the technologies considered and the highest fixed O&M cost at over $370/kW [6].

Similarly, other organic waste streams such as animal waste, wastewater treatment and landfills generate methane-rich biogas, and greenhouse gas emissions reduction is an added benefit to its conversion to energy. Further, the energy conversion efficiency, and therefore economics, can be improved by co-location of both heat and electricity demand. The anaerobic digesters used to produce the biogas in all cases except landfill gas provide a demand for the heat to maintain optimum temperatures for the microorganisms.

Agricultural crop residues are not currently being collected for use as bioenergy feedstock because it is not yet profitable for farmers. In 2005 the U.S. Department of Agriculture (USDA) and the U.S. Department of Energy (DOE) issued a joint report from a study investigating the viability of using energy from biomass to replace 30 percent of U.S. petroleum consumption by the year 2030, titled *Biomass Feedstock for a Bioenergy and Bioproducts Industry: the Technical Feasibility of a Billion-Ton Annual Supply* [7], and in 2011 an update to that report was released.

In a 2011 update to this *billion-ton* study the amount of crop residue that would be produced at various farmgate prices was estimated using the agricultural sector model (POLYSYS). Residue production is estimated in conjunction with energy crop production and other cropland uses to account for the competition between uses for the available cropland. Figure 4-1 shows the total crop residue that would be supplied from 2012 to 2030 at six different farmgate prices ranging from $40 to $60 per dry ton. Figure 4-2 shows the supplies with corn stover separated from other residues.

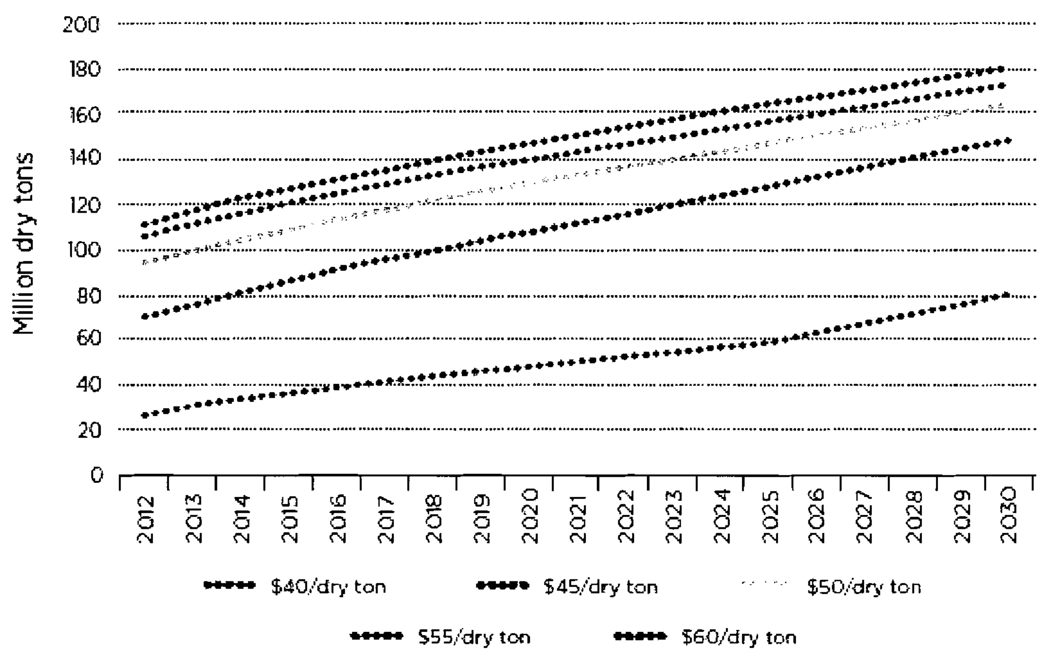

Figure 4-1: Supply of crop residues at various prices under DOE base-case assumptions
(Source: DOE [8])

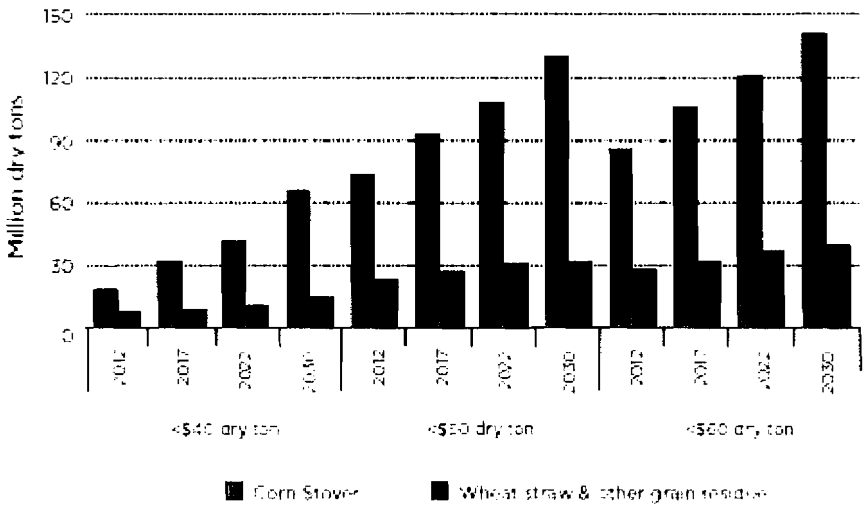

Figure 4-2: Corn stover and grain residue at selected prices in 2012, 2017, 2022 and 2030 under DOE base-case assumptions (Source: DOE [8])

Although the concept of using algae for energy production has been proven at the laboratory level, no commercial scale sustainable production facility has been established. According to the 2010 DOE National Algal Biofuels Technology Roadmap document there was not yet a credible estimate of the cost of algal biofuel [3].

4.3 State of organic waste biomass nationally

Historically organic waste biomass, and in particular residues from the wood products industry, has been one of the main sources of renewable energy in the U.S. As can be seen in Figure 4-3, wood and wood-derived fuels have been second only to hydroelectricity as a source of renewable energy in the U.S. Until the increase in wind and biofuels in the last decade, wood and wood-derived fuels comprised nearly half of the renewable energy consumed in the U.S.

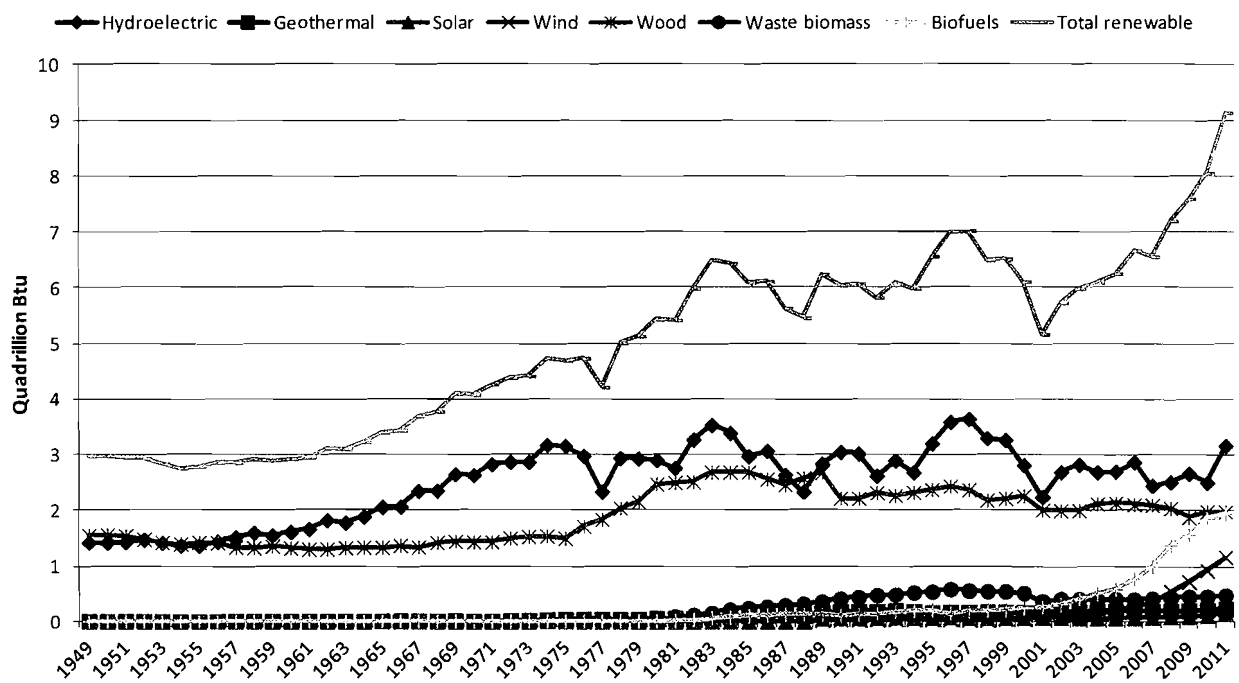

Figure 4-3: U.S. renewable energy consumption 1949-2011 (Source: EIA [9, 10])

Although not as large a source as wood and wood-derived fuels, municipal solid waste has also been a significant contributor to the nation's renewable energy mix. According to the U.S. Environmental Protection Agency (EPA), there are 86 municipal solid waste burning power plants operating in 24 states with a combined electricity generating capacity of 2,720 MW. Livestock manure is in use currently as an energy source with 160 anaerobic digester biogas recovery systems in operation on livestock farms in the U.S. as of the end of 2010. EPA estimates that 8,200 swine and dairy farms in the U.S. have the capability to support biogas recovery systems producing enough biogas to supply 1,600 MW of electricity generating capacity [11].

Municipal wastewater is yet another waste stream that is being used as a source of energy and that has potential for substantial expansion. According to EPA out of the approximately 1,000 wastewater treatment facilities nationwide that had enough inflow to support anaerobic digesters at the end of 2006, only about 500 of them had digesters installed. Out of these 500 that had installed anaerobic digesters only 106 capture the biogas for energy conversion resulting in a combined 220 MW electricity generating capacity. EPA estimated that if all the 500 wastewater treatment plants that had anaerobic digesters in place captured the biogas for energy conversion, they could support a further 340 MW of electricity generating capacity [12].

As indicated in previous sections and illustrated in Figure 4-3, organic biomass has historically been one of the main sources of renewable energy in the U.S., second only to hydroelectricity. Thirty percent of the 8 quadrillion Btu of renewable energy consumed in the U.S. in 2010 was from organic waste biomass. Wood contributed 25 percent, and other organic wastes together contributed 6 percent. Figure 4-4 shows the contribution of renewable resources to the total energy consumed in the U.S. in 2010.

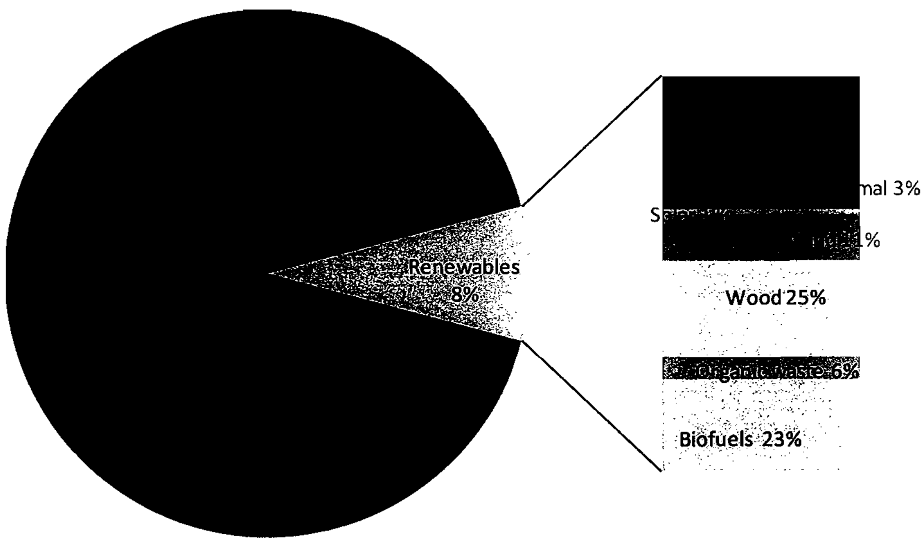

Figure 4-4: Summary of U.S. energy consumption in 2011 (Data source: EIA [9, 13])

Organic waste biomass is also a significant source of electricity generation, ranking third after hydroelectricity and wind for renewable electricity generation in the U.S. in 2010. Figure 4-5 shows net electricity generation in the U.S. in 2010 by fuel type. Among the biomass resources, wood is the dominant source of renewable electricity, contributing 9 percent of total renewable electricity, followed by municipal solid waste and landfill gas (organic waste in Figure 4-5), which together contributed 4 percent of the renewable electricity.

Table 4-2 shows the top states with the potential for electricity generation from livestock farms. Biogas is more readily recovered from swine and dairy farms because the manure is handled in the wet slurry state that is hospitable to the waste-digesting microorganisms.

	Number of Candidate Farms	Methane Emissions Reductions (Thousand Tons)	Methane Production Potential (billion ft3/ year)	Energy Generation Potential (Thousand MMBtu/ year)	Electricity Generation Potential (Thousand MWh/year)
Swine Farms					
Iowa	1,997	301	21.5	6,243	1,829
North Carolina	939	203	13.2	3,826	1,121
Minnesota	707	63	7.3	2,119	621
Illinois	350	39	4.3	1,240	363
Missouri	154	34	3.5	1,028	301
Indiana	296	31	3.5	1,011	296
Oklahoma	56	51	3.4	997	292
Nebraska	177	27	3.2	927	272
Kansas	80	22	2.3	681	199
Texas	10	25	1.6	477	140
Remaining 40 States	830	109	10.6	3,096	907
Sub Total	5,596	905	74.4	21,645	6,341
Dairy Farms					
California	889	341	27.9	8,104	2,375
Idaho	203	99	8.9	2,601	762
New Mexico	110	64	5.3	1,553	455
Texas	155	66	5.0	1,463	429
Wisconsin	251	41	4.5	1,316	386
Washington	125	35	3.4	1,003	294
Arizona	54	44	3.1	898	263
Michigan	107	26	2.9	838	246
New York	111	18	2.1	603	177
Colorado	54	22	2.0	595	174
Remaining 40 States	588	152	14.6	4,244	1,243
Sub Total	2,647	908	79.7	23,218	6,804
U.S. Total	**8,243**	**1,813**	**154.1**	**44,863**	**13,145**

Table 4-2: Top ten states for potential electricity generation from swine and dairy farms (Data source: AgStar [11])

According to the EPA Combined Heat and Power Partnership Program there were 76 combined heat and power plants in U.S. wastewater treatment facilities at the end of 2006 with total electricity generating capacity of 220 MW. Table 4-3 shows the location and capacities these plants.

According to the EPA, this capacity could be increased by a further 340 MW if all the wastewater treatment plants that used anaerobic digestion technology to process their waste would capture the biogas and use it to generate electricity and heat. Out of the approximately 500 wastewater treatment facilities that utilized anaerobic digestion technology only 106 of them convert the biogas to energy. In addition to the 76 units listed in Table 4-3 SUFG is aware of electricity generating plants in two locations in Indiana with a total capacity of 195 kW. More information about these plants is given in Section 4.4.

State	**Number of Sites**	**Capacity (MW)**
Arkansas	1	1.7
Arizona	1	4.2
California	23	38.1
Colorado	2	7.9
Connecticut	1	0.2
Florida	1	6.0
Iowa	2	3.4
Idaho	2	0.5
Illinois	2	4.3
Massachusetts	1	76.0
Minnesota	2	5.1
Montana	3	1.1
Nebraska	3	5.4
New Hampshire	1	0.4
New Jersey	3	4.6
New York	5	13.3
Ohio	1	0.1
Oregon	10	5.9
Pennsylvania	3	22.4
Utah	2	2.6
Virginia	1	3.0
Washington	3	13.6
Wisconsin	2	0.5
Wyoming	1	0.03
Total	**76**	**220.1**

Table 4-3: Wastewater treatment combined heat and power systems in the U.S. (Data source: EPA [12])

Although crop residues are not in use today as a source of energy, it is the most readily available biomass feedstock. According to the USDA/DOE billion-ton study referred to in Section 4.2 corn stover is the most abundant untapped source of biomass currently available from croplands. Corn stover is the material left in the field after the corn grain is harvested and consists of the stalks, leaves, husks and cobs. The USDA/DOE report estimates that 75 million dry tons per year of corn stover can be sustainably removed from U.S. croplands under current farming conditions. All other crops can together contribute 38 million tons a year under current farming practices [7]. In the 2011 update of the billion ton study, the total amount agricultural residues produced at a farmgate price of $60 per dry ton is estimated at – 140 million tons of corn stover, 36 million tons of wheat straw and 4 tons of other types of grain crop residues [8].

Table 4-4 shows total agricultural residue biomass projected by the POLYSYS model to be available in the U.S. at prices of $40, $50 and $60 per dry ton in the 2011 update of the Billion-Ton report [8]. As can be seen in the table corn stover is the dominant residue available. At a price of $60 per dry ton of biomass for energy, 140 million dry tons out of the total 265 million dry tons of agricultural residue collected for sale to the energy industry in the DOE baseline case would be corn stover. Animal manure would be the second largest source of biomass feedstock for energy with 59 million tons collected in 2030 at a price of $60 per dry ton.

Feedstock	<$40 per dry ton 2012	2017	2022	2030	<$50 per dry ton 2012	2017	2022	2030	<$60 per dry ton 2012	2017	2022	2030
							Million dry tons					
Baseline												
Corn	19	32	42	65	73	93	108	129	85	106	120	140
Wheat	6.7	7.8	9.1	12	18	22	26	31	23	26	31	36
Barley, Oats, Sorghum	1.0	1.3	1.6	2.9	2.4	2.5	2.4	3.6	2.8	2.7	2.6	3.7
Total primary residue	**27**	**41**	**52**	**80**	**94**	**117**	**136**	**164**	**111**	**135**	**154**	**180**
Secondary residues & wastes												
Rice field residue	6.5	6.9	7.4	8	6.5	6.9	7.4	8	6.5	6.9	7.4	8
Rice hulls	1.5	1.6	1.7	1.7	1.5	1.6	1.7	1.7	1.5	1.6	1.7	1.7
Cotton field residue	4.2	5.3	5.9	6.7	4.2	5.3	5.9	6.7	4.2	5.3	5.9	6.7
Cotton gin trash	1.4	1.6	1.7	1.8	1.4	1.6	1.7	1.8	1.4	1.6	1.7	1.8
Sugarcane residue	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Orchard and vineyard prunings	5.7	5.6	5.5	5.5	5.7	5.6	5.5	5.5	5.7	5.6	5.5	5.5
Wheat dust	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Animal manures	12	13	16	20	29	34	41	56	30	35	43	59
Animal fats	0	0	0	0	0	0	0	0	0	0	0	0
Total secondary residues & wastes	**33**	**35**	**40**	**46**	**50**	**56**	**65**	**82**	**51**	**58**	**67**	**84**
High-yield scenario												
Corn stover	71	132	157	221	143	200	228	264	153	209	234	271
Wheat Straw	9.8	12	13	16	60	35	38	42	35	39	42	46
Barley, Oats, Sorghum	1.5	1.5	1.4	1.7	3.6	3.4	2.8	3.1	4.0	3.6	2.9	3.0
Total primary residue	**83**	**146**	**171**	**238**	**176**	**239**	**269**	**309**	**193**	**252**	**279**	**320**

Notes: High-yield estimates for corn, wheat, barley, oats, and sorghum assume a 1% annual growth in energy crop yields. Increasing the assumed energy crop yield growth rate (e.g. 2 to 4% annually) will slightly change the estimated high-yield resource estimates above.

Table 4-4: Agricultural residues and waste resources produced at various prices in 2012, 2017, 2022 and 2030 (Source: DOE [8])

4.4 Organic waste biomass in Indiana

Organic waste biomass, in particular wood residue and byproducts, has historically been the main source of renewable energy in Indiana. Figure 4-7 shows the contribution of the various renewable resources to the total annual energy consumed in Indiana since 1960. It was not until the rapid growth in corn ethanol production starting in 2007 that woody biomass energy's contribution was overtaken by ethanol as the primary source of renewable energy consumed in Indiana. The types of industries using wood residue and byproducts include the paper and pulp industry that has traditionally used the paper-making byproducts for cogeneration of electricity and process heat.

Municipal solid waste is the other major source of energy from woody biomass, for example the Covanta Energy Corporation's Indianapolis facility uses municipal solid waste to generate steam used for district heating in downtown Indianapolis. The plant has capacity to process 2,175 tons of solid waste per day to produce at least 4,500 tons of steam per ton of solid waste [16].

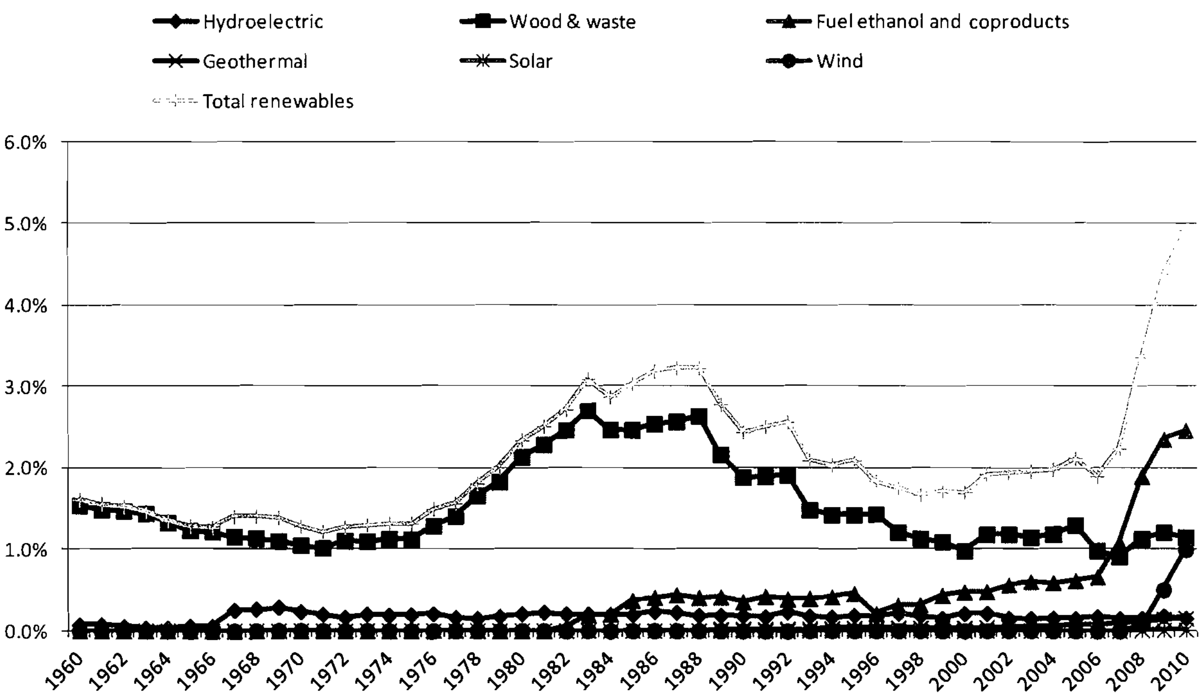

Figure 4-7: Renewables share of Indiana total energy consumption (Source EIA [17])

The other organic waste biomass that is a significant source of energy in Indiana is landfill gas. The most active user of landfill gas is Wabash Valley Power Association which has a total of 42.4 MW of electricity generating capacity from fourteen power plants on 8 landfills. Other major users of landfill energy include Hoosier Energy with 3.5 MW electricity generating capacity in a Clark County landfill and Granger Energy that has several energy conversion projects in the Southside landfill in Indianapolis. The Granger Energy project in the Southside Indianapolis landfill includes 4 MW of electricity generating capacity and supplies landfill gas to various area businesses for heating and steam generation. The total electricity generating capacity installed in Indiana landfills is 53.3 MW. Other operators of landfill electricity generating projects include Energy Systems LLC and the town of Munster [18].

Another source of biomass fuel use for electricity generation in Indiana is the anaerobic digestion of animal manure at three dairy farms in Northwest Indiana. The three dairies are the Boss Dairy No. 4, the Fair Oaks Dairy, and the Herrema Dairy. Each of these dairies has over 600 kW of generating capacity [19]. The Fair Oaks Farm is in the process of expanding its biogas production to include purification and compression of the biogas to pipeline quality methane to fuel 42 milk delivery trucks and a 1 MW electricity generator to power the methane cleaning and compression equipment [20]. The potential to expand biogas production from livestock farms is substantial. Indiana is ranked among the top ten with potential for producing 3.5 billion cubic feet of biogas per year from biodigesters fed livestock manure on 296 farms [11].

In addition, SUFG is aware of a total of 195 kW of electricity generating capacity in wastewater treatment facilities in the cities of Jasper (65 kW) and West Lafayette (130 kW). The West Lafayette facility is also equipped to take in food related waste from Purdue University and other local businesses [21].

Figure 4-8 shows the amount of agricultural and forest biomass residue potentially available for energy production in Indiana at various bioenergy feedstock prices. As can be seen in the figure, the most abundant residue available is corn stover increasing from approximately 3 million dry tons per year at $40 per dry ton to slightly over 8 million dry tons per year at $60 per dry ton.

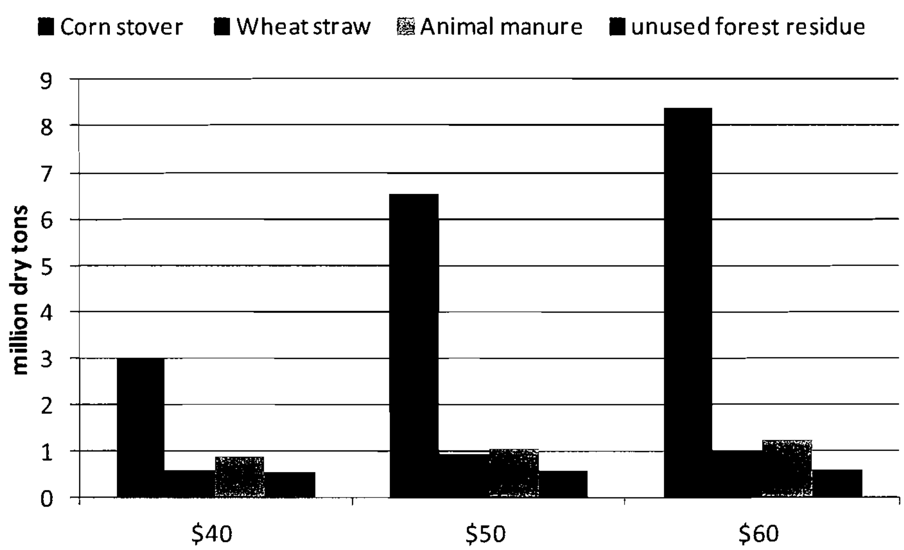

Figure 4-8: Estimated biomass production potential in Indiana (Data source: DOE [8])

Assuming an energy content of 7,500 Btu/lb for agricultural residues (corn stover and wheat straw), 9,000 Btu/lb for wood, and 8,500 for manure the total energy available from the residues collected when the price is $60 per dry ton would be 170 trillion Btu. This is approximately 6 percent of Indiana's annual energy consumption of 2,800 trillion Btu. If this energy was converted to electricity in a power plant operating at 21 percent efficiency it would result in 11,000 GWh of electric energy, approximately 8 percent of Indiana's 125,000 GWh annual electricity generation.

Two Indiana companies (Algaewheel and Stellarwind Bio Energy) are involved in algal biofuels development. In 2010 Algaewheel installed an algae based wastewater treatment system at the city of Reynolds as part of the Biotown USA initiative intended to make Reynolds energy self-sufficient by supplying all its needs from local renewable resources. Algaewheel Corporation has also carried out Indiana pilot projects in Seymour, Whitestown and at Purdue University's swine research facility [22]. In 2009 Stellarwind Bio Energy LLC established a corporate headquarters and a small scale production facility to manufacture algal oil that can be refined to produce liquid transportation fuels [23].

4.5 Incentives for organic waste biomass

The following incentives have been available to assist in the use of organic waste biomass.

Federal Incentives

- Renewable Electricity Production Tax Credit (PTC) provides a 2.2 cents/kWh tax credit for closed-loop biomass and 1.1 cents/kWh for open-loop biomass, landfill gas municipal solid waste energy technologies. Organic waste biomass falls under the open-loop category. As part of the February 2009 American Recovery and Reinvestment Act the PTC was modified to provide the option for qualified producers to take the federal business energy investment credit (ITC) or an equivalent cash grant from the U.S. Department of Treasury [24].

- Business Energy Investment Tax Credit (ITC) credits up to 30 percent of expenditures on qualifying renewable energy systems [24].

- Renewable Energy Production Incentive (REPI) provides financial incentive payments for electricity produced and sold by new qualifying renewable energy generation facilities. Qualifying facilities are eligible for annual incentive payments of 2.1 cents/kWh for the first ten years of production, subject to the availability of annual appropriations in each federal fiscal year of operation. The Energy Policy Act of 2005 expanded the list of eligible technologies and facilities owners, and reauthorized the payment for fiscal years 2005 through 2026 [24].

- Rural Energy for America Program (REAP) covers up to 25 percent of costs for eligible projects at certain types of institutions. Eligible renewable energy projects include wind, solar, biomass and geothermal; and hydrogen derived from biomass or water using wind, solar or geothermal energy sources. REAP incentives are generally available to state government entities, local governments, tribal governments, land-grant colleges and universities, rural electric cooperatives and public power entities, and other entities, as determined by USDA [24].

- Qualified Energy Conservation Bonds (QECBs) are qualified tax credit bonds that state, local and tribal governments may use to finance renewable energy projects and other energy conservation measures. Unlike the Clean Renewable Energy Bonds (CREBS) QECBs are not subject to U.S. Department of Treasury approval. The volume of the bonds is allocated to states in proportion to a state's percentage of the U.S. population [24].

- High Energy Cost Grant Program administered by the USDA is aimed at improving the electricity supply infrastructure in rural areas having home energy costs exceeding 275 percent of the national average. Eligible infrastructure includes renewable resources generation. The USDA has allocated $21 million for the 2011 funding cycle. The individual grants range from $75,000 to $5 million [25]

Indiana Incentives

- Clean Energy Portfolio Goal sets a voluntary goal of obtaining 4 percent between 2013 and 2018, 7 percent between 2019 and 2024, and 10 percent by 2025, of electricity from clean energy sources based on 2010 retail sales. Participation in the goal makes utilities eligible for incentives that can be used to pay for the compliance projects [24].

- Indianapolis Power & Light Co. – Rate REP Renewable Energy Production offers a "feed-in tariff" to facilities that produce renewable energy. IPL can purchase renewable energy and contract the production for up to 15 years. Biomass compensation is $6.18/kW per month plus $0.085/kWh. REP is a pilot rate and no new contracts will be negotiated after March 30, 2013 [24, 26].

- Northern Indiana Public Service Company (NIPSCO) offers feed-in tariff incentive rates for electricity generated from renewable resources for up to 15 years. The payment for biomass facilities is $0.106/kWh. The tariff is an experimental one running until December 31, 2013. The total system-wide renewable capacity allowed under the tariff is 30 MW with 500 kW of the cap reserved for solar projects of capacity less than 10 kW and 500 kW for wind projects of capacity less than 10 kW [24, 27].

- Emissions Credits are received by electricity generators that do not emit NO_x and that displace utility generation. They are eligible to receive NO_x emissions credits under the Indiana Clean Energy Credit Program. These credits can be sold on the national market. [28].

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5. Solar Energy

5.1 Introduction

Solar energy is captured and converted into various forms of energy in two main ways: directly into electricity using photovoltaic cells and indirectly using solar thermal conversion technologies. The two conversion methods and associated technologies are presented in this report, starting with solar thermal conversion technologies in this section followed by photovoltaic cells in Section 6.

Solar thermal energy is captured using solar collectors, of which there are two main types: concentrating and non-concentrating collectors. Concentrating collectors use mirrors of various configurations to focus the solar energy onto a receiver containing a working fluid that is used to transfer the heat to a conversion engine. Concentrating collectors are typically used for electricity generating projects while non-concentrating collectors are typically used for applications such as water and space heating.

The most commonly used non-concentrating collectors are flat-plate designs. Flat-plate collectors consist of a flat-plate absorber, a transparent cover that allows solar energy to pass through while reducing heat loss, a heat-transport fluid flowing through tubes, and a heat insulating backing. Figure 5-1 shows the basic components of a flat-plate collector. Other non-concentrating collectors include evacuated-tube collectors and integral collector-storage systems [1].

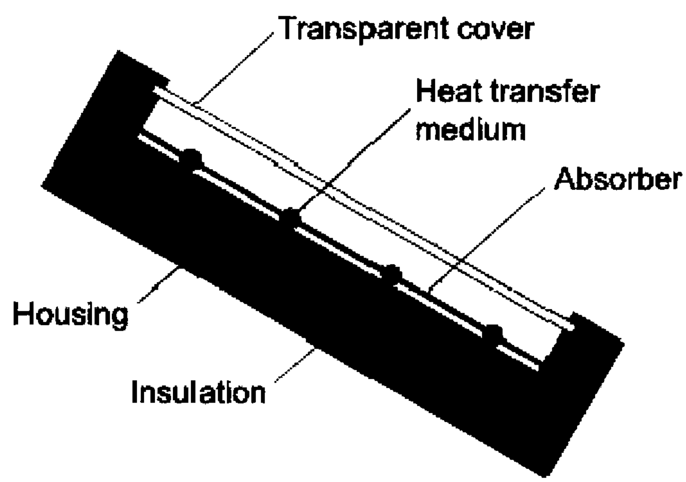


Figure 5-1: Cross-section layout of a flat-plate collector (Source: SolarServer [2])

The four main types of thermal concentrating solar power (CSP) systems are parabolic trough, linear Fresnel, solar power tower, and solar dish/engine system.

The trough CSP system has trough shaped collectors with a parabolic cross section and a receiver (or absorber) tube located at the focal line of the trough as shown in Figure 5-2. A working fluid is used to transport the heat from the receivers to heat exchangers. Trough CSP systems in use for utility scale electricity generation are typically coupled with a fossil-fuel fired boiler to supplement the supply of heat when the solar energy collected is not adequate. Trough systems can also be coupled with facilities to store the hot working fluid, thereby providing the ability for the plant to be dispatched to match system demand. The parabolic trough system is the most developed and widely used CSP technology in the U.S. and worldwide, with 496 MW out of the total 509 MW of installed CSP capacity in the U.S. being parabolic trough based.

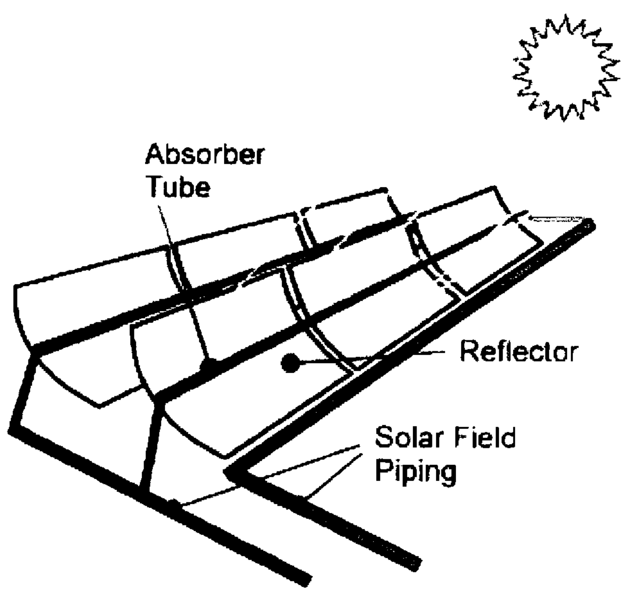


Figure 5-2: A parabolic trough CSP system (Source: NREL [3])

The linear Fresnel CSP system functions a lot like the parabolic trough system except for the collectors where the parabolic trough is replaced with a series of flat or slightly curved mirrors that focus the radiation onto a receiver tube as shown in Figure 5-3. There is only one linear Fresnel CSP plant operating in the U.S. It is the 5 MW Kimberlina plant in Bakersfield, California commissioned in 2009.

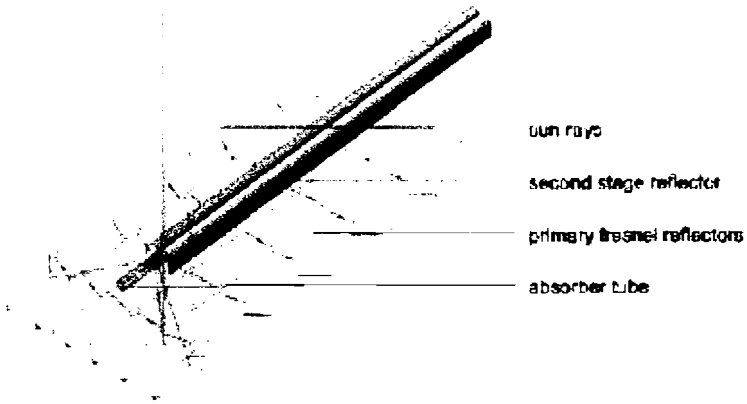


Figure 5-3: A linear Fresnel CSP System (Source: IEA [4])

The power tower CSP system utilizes thousands of flat sun-tracking mirrors that concentrate the solar energy on a tower-mounted heat exchanger as shown in Figure 5-4. This system avoids the heat lost during transportation of the working fluid to the central heat exchanger in a trough-based CSP system. Power tower CSP systems are typically equipped with molten salt energy storage tanks at the base of the towers that enable them to store energy for several hours [5]. This system provides higher efficiency than the trough system because all sunlight is concentrated on a single point [3]. The only power tower CSP power plant operating in the U.S. currently is the 5 MW Sierra SunTower in Lancaster, California.

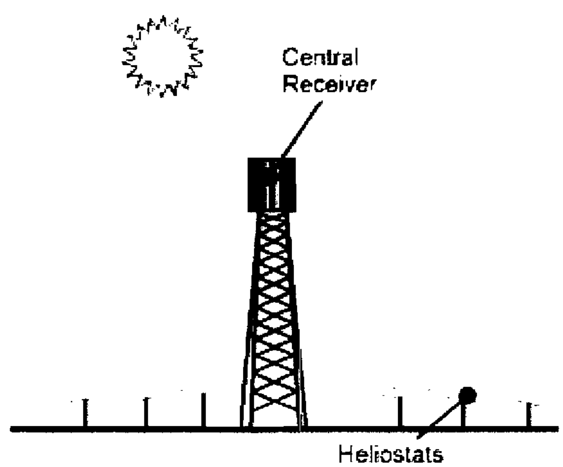


Figure 5-4: A power tower CSP system (Source: NREL [3])

The dish/engine system utilizes a parabolic shaped dish that focuses the sun's rays to a receiver at the focal point of the dish as shown in Figure 5-5. An engine/generator located at the focal point of the dish converts the absorbed heat into electricity. Individual dish/engine units currently range from 3-25 kW [6]. Many of these dish systems may be combined to make a utility-scale power plant. The dish/engine design results in the highest efficiency of the solar thermal designs [3]. The dish/engine system does not use any cooling water which puts it at an advantage over the other two systems. However, it is the least developed of the three CSP technologies with several challenges to be overcome in the design of the reflectors and the solar collectors. A 1.5 MW dish/engine based power plant, the Maricopa Solar Project, commissioned in Phoenix, Arizona in 2010 is the only dish/engine based power plant in the U.S.

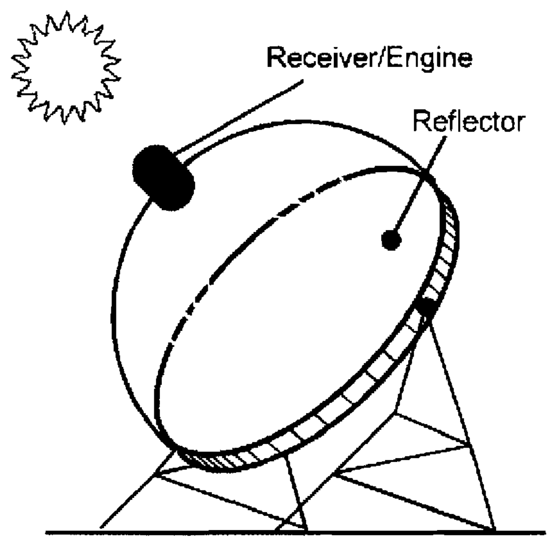


Figure 5-5: A dish/engine CSP system (Source: NREL [3])

5.2 Economics of solar technologies

Table 5-1 shows the overnight capital cost[4] estimates for CSP power plants provided by the National Renewable Energy Laboratory (NREL) [7] arranged in increasing capital cost ($/kW). The plant with the lowest capital cost, the Colorado integrated Solar Project (Cameo), is not a stand-alone generating station, but rather a solar preheat of boiler feed water in a coal fired

[4] Overnight capital cost "*is an estimate of the cost at which a plant could be constructed assuming that the entire process from planning through completion could be accomplished in a single day*" [8]. The overnight cost concept is used to avoid the impact of the differences in financing methods chosen by project developers on the estimated costs.

power plant. The plant with the highest cost is a power tower CSP plant. The other five plants are parabolic trough based CSP plants with capital costs ranging from 4,000 $/kW to over 7,000 $/kW.

Project Name	Developer, Owner	Location	Capacity (MW)	Technology	Status	Online Date	Total cost (million $)	Capital cost ($/kW)
Colarado Intergated Solar Project (Cameo)	Abengoa, Xcel	Palisades, Colorado	2	Parabolic Trough	Operational	2010	4.5	2,250
NextEra Beacon Solar Energy Project	Nextra	California City, California	250	Parabolic Trough	Under development	2014	1,000	4,000
Nevada Solar One	Acciona	Boulder City, Nevada	64	Parabolic Trough	Operational	2007	266	4,156
Ibersol Ciudad Real	Iberdrola Renewables	Puertollano, Spain	50	Parabolic Trough	Operational	2009	254*	5,080
Shams 1	Abengoa, Masdar, Total	Madinat Zayed, United Arab Emirates	100	Parabolic Trough	Under development	2012	600	6,000
Solana Generating Station	Abengoa	Phoenix, Arizona	280	Parabolic Trough	Under development	2013	2,000	7,143
Gemasolar Thermosolar Plant	Torresol, Masdar, Sener	Andalucía, Spain	20	Power Tower	Operational	2011	292*	14,678

*cost converted from Euros (€) at 1.27 $ per €

Table 5-1: Estimated overnight capital cost of CSP plants (Sources NREL [7])

Figure 5-6 shows the overnight capital cost estimates of utility scale electricity generating technologies given in the November 2010 EIA update of generating plant costs [8]. The solar thermal technology's capital cost of approximately $4,700 /kW is in the mid-range among the renewable technologies between the low end of wind generation at $2,400/kW and the high end $8,200/kW for municipal solid waste based generation technology.

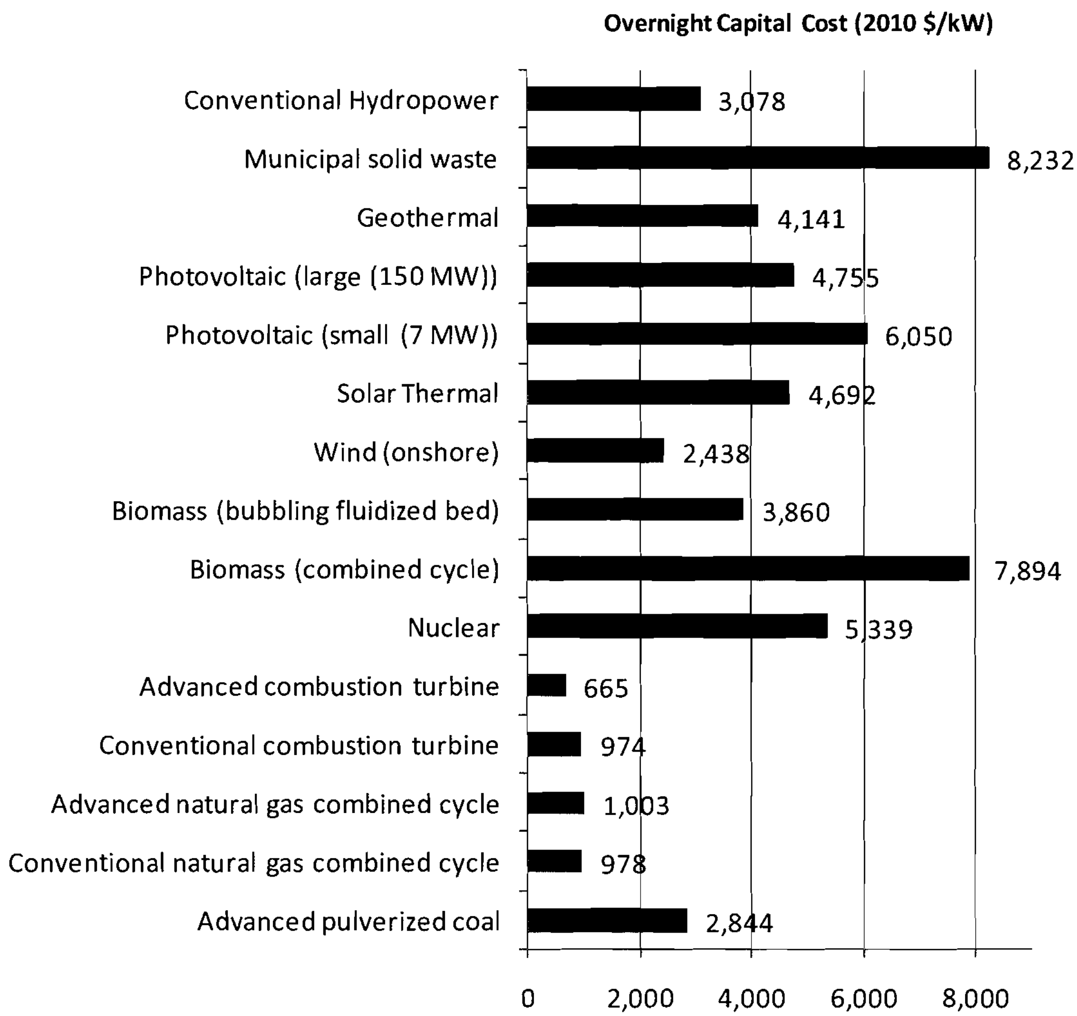


Figure 5-6: Capital cost of generating technologies (Data source: EIA [8])

Figure 5-7 shows the estimate of the fixed and variable operating and maintenance (O&M) costs. As can be seen in Figure 5-7 solar thermal technology has moderate O&M cost, with a zero variable O&M cost and a fixed annual O&M cost of $64 /kW. This fixed annual O&M cost is higher than that of photovoltaic technologies which is estimated at $17 /kW for large scale photovoltaic plants and $26 /kW for small utility scale photovoltaic systems.

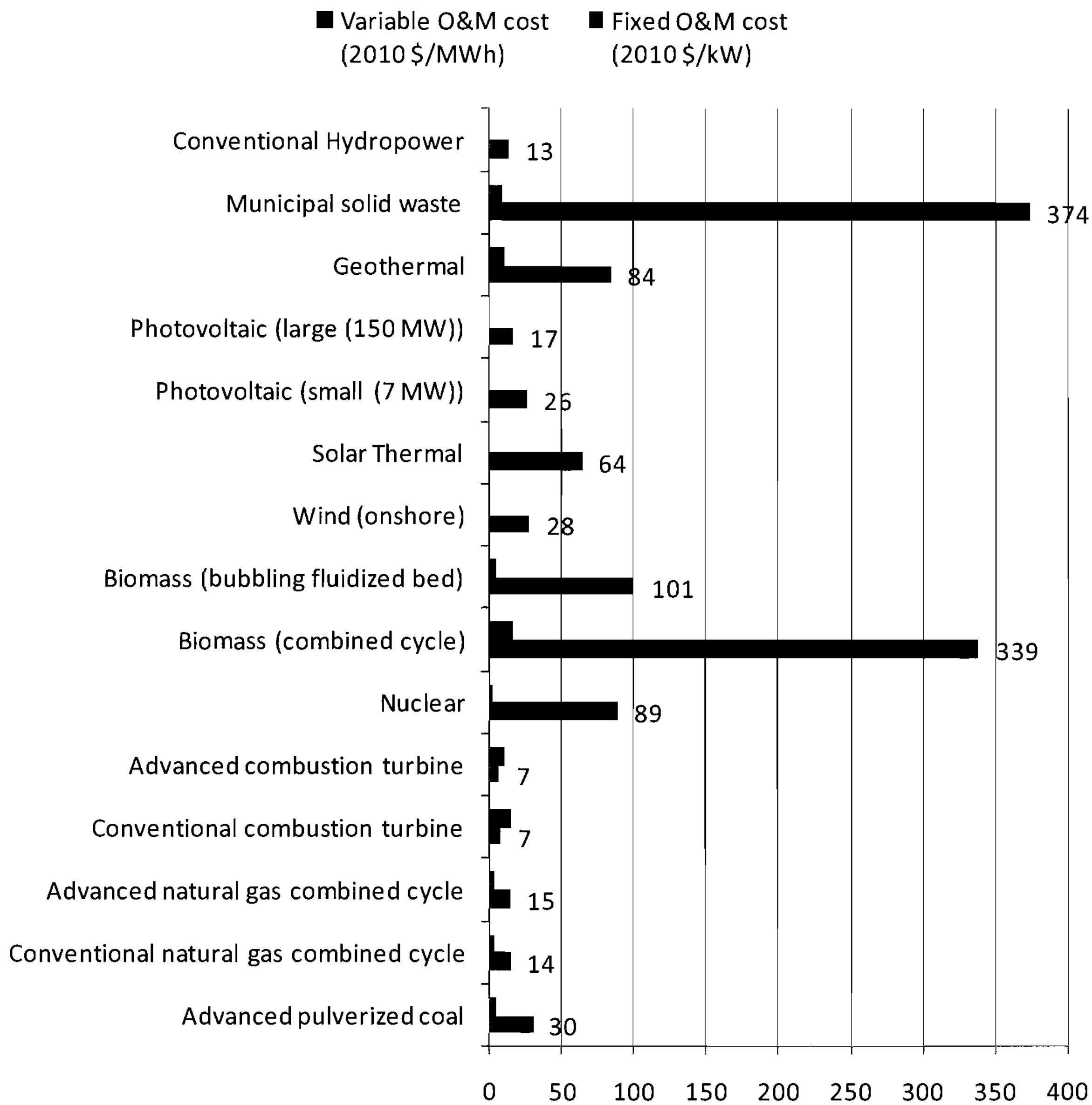


Figure 5-7: Operating and maintenance cost of generating technologies (Data source: EIA [8])

5.3 State of solar energy nationally

As can be seen in Figures 5-8 and 5-9, there are substantial solar resources available in the U.S., especially in the southwestern region. Figure 5-8 shows the solar resources available to a stationary concentrating collector, and Figure 5-9 shows the solar resource available to a concentrating collector that tracks the sun throughout the day.

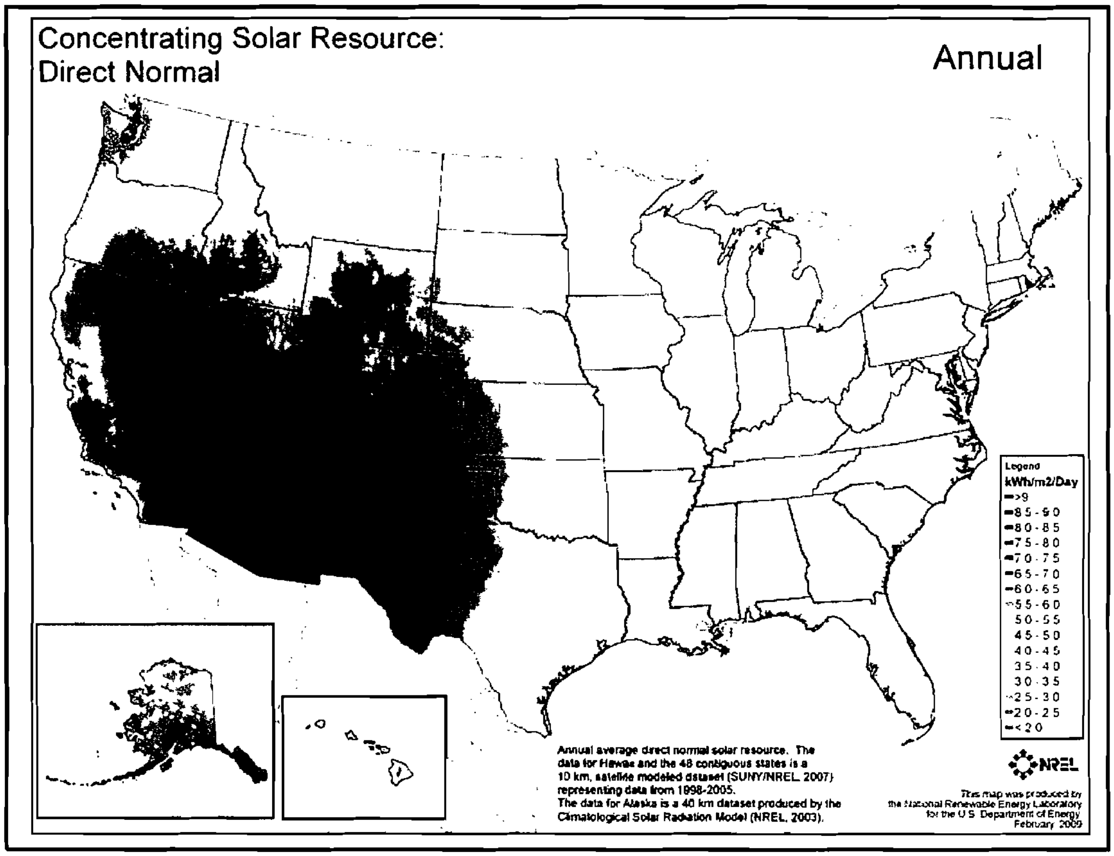


Figure 5-8: Concentrating solar power resource in the U.S. (Source: NREL [9])

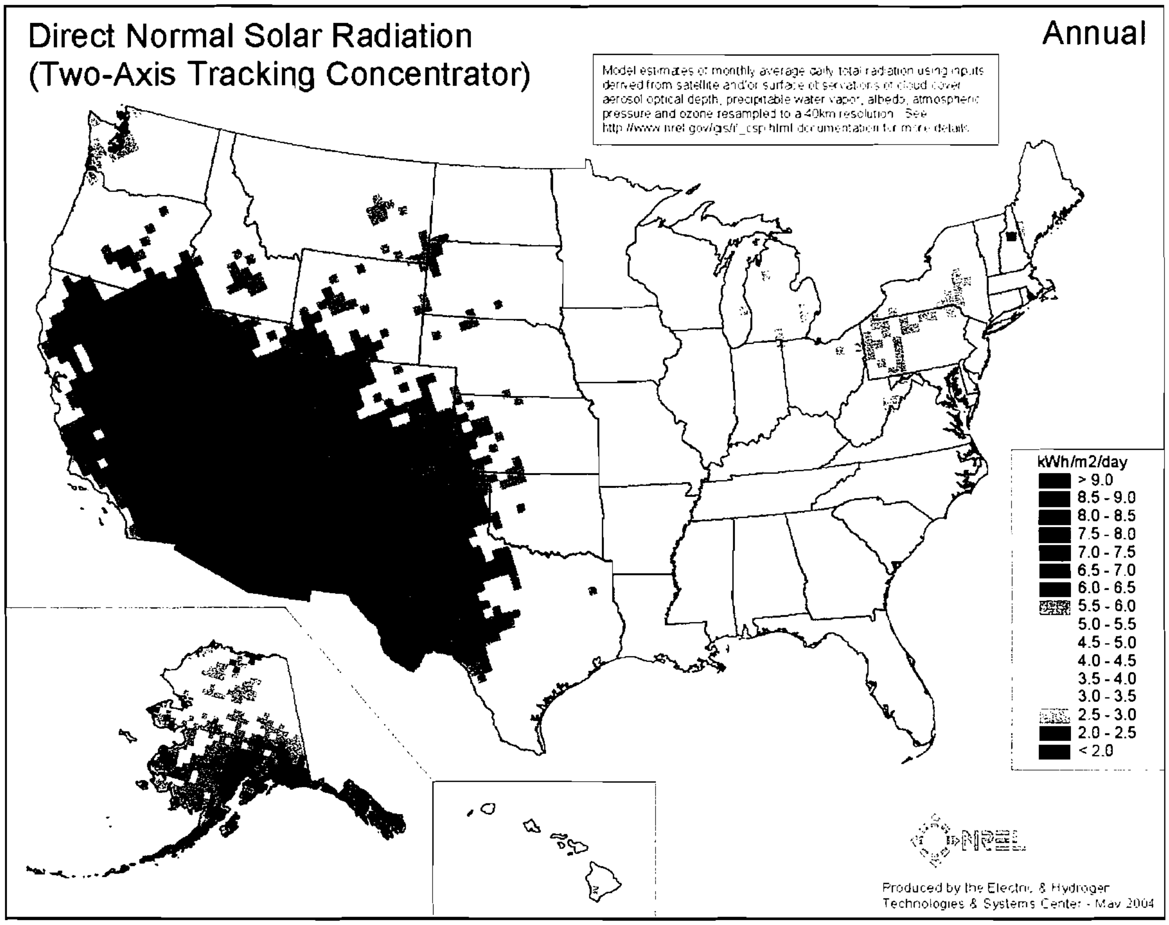


Figure 5-9: Solar resource available to a tracking concentrator (Source: NREL [9])

Like the PV systems presented in Section 6, there has been a surge in the installation of CSP capacity in the U.S. in the last 5 years. After a period of approximately 25 years when no new CSP capacity was built in the U.S. the first major project, the 64 MW Nevada Solar One CSP project in Boulder City, Nevada was commissioned in 2007. The next major project commissioned was the 75 MW Martin Next Generation Solar Project in Martin County, Florida. According to the Solar Energy Association there were over 1,000 MW of CSP capacity under construction at the end of 2011. These include Abengoa Energy's two 280 MW projects in Gila Bend, California and the 392 MW three phase Ivanpah Solar Project in Barstow, California. Figure 5-10 shows the annual net CSP capacity installations in the U.S. up to the end of 2010. The negative 10 MW net capacity addition in 1999 represents the retirement of the DOE funded 10 MW *Solar Two* Power Tower demonstration plant in Barstow, California built in 1996 and retired 1999.

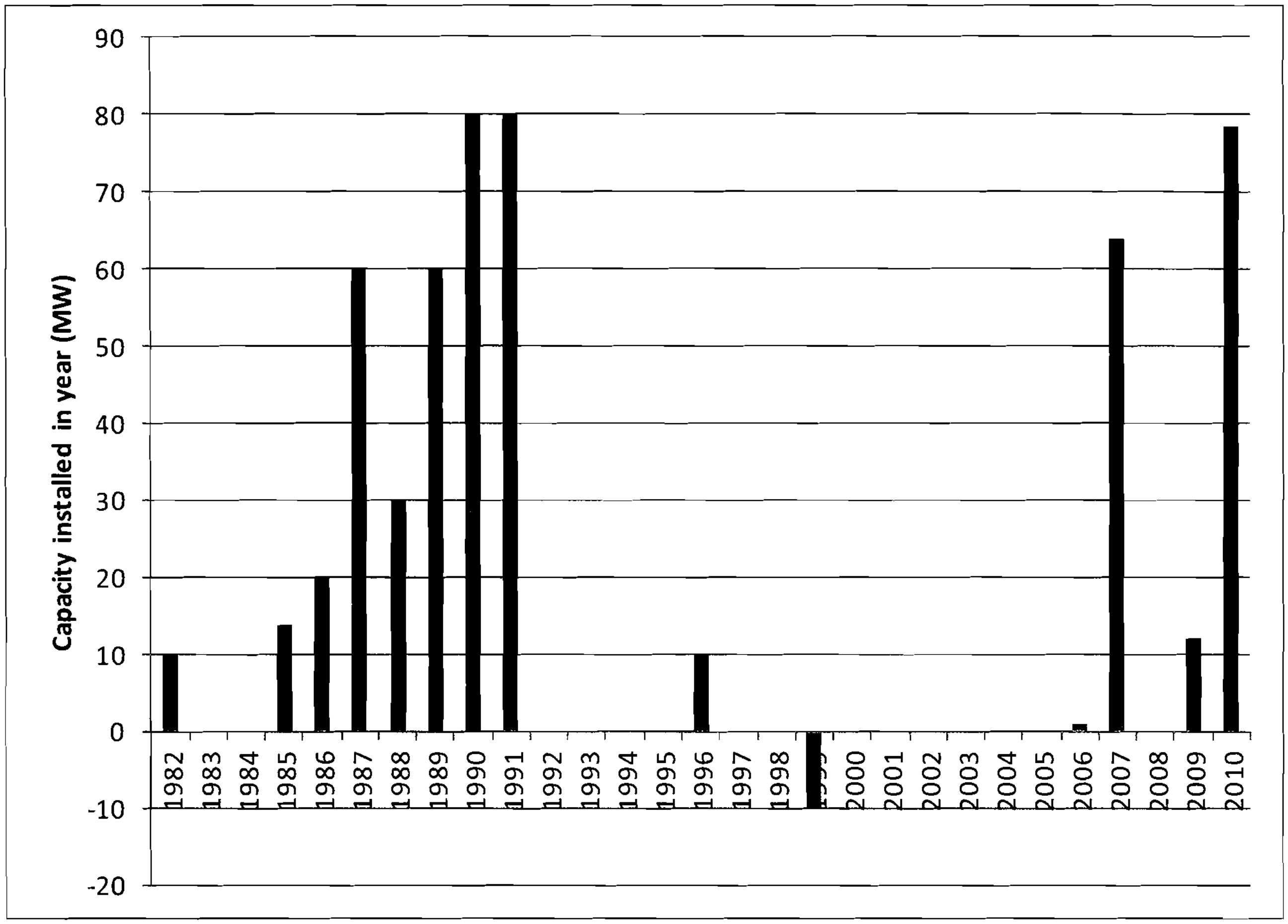


Figure 5-10: U.S. annual net CSP capacity installation (Data source SEIA [10], GoSolar California [11])

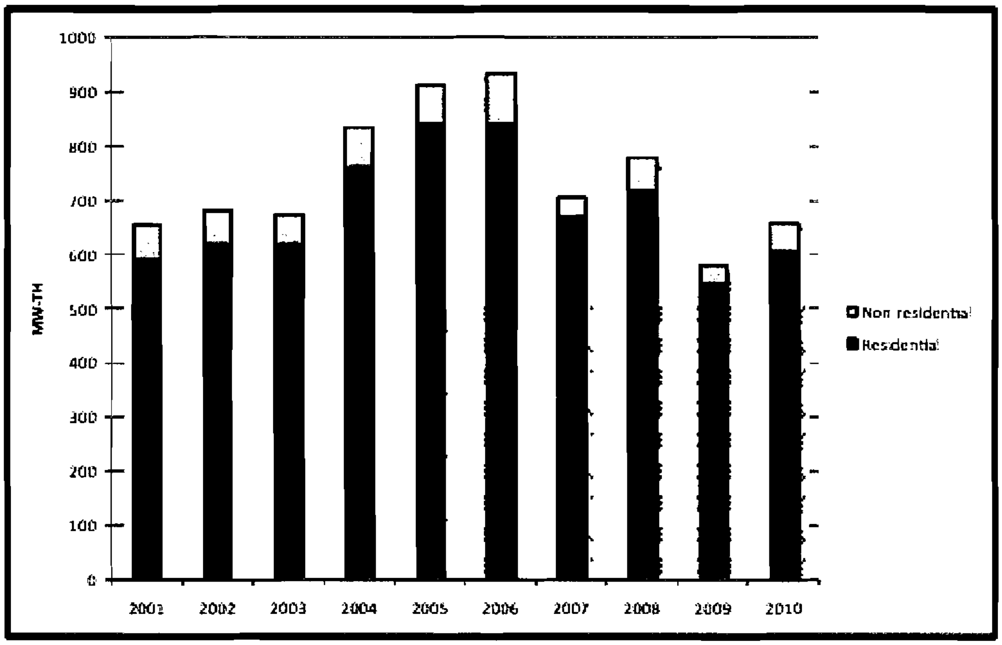
At the end of 2011 there were a total of 509 MW of solar thermal CSP capacity installed in the U.S., compared to 3,959 MW of PV capacity. Table 5-2 is a list of CSP power plants in the U.S. at the end of 2011.

Project Name	Developer/ Owner	City/County	State	Capacity (MW)	Technology	Online Date
Solar Energy Generating System (SEGS) I	Luz/Nextra	Dagett	CA	13.8	Parabolic Trough	1985
SEGS II	Luz/Nextra	Dagett	CA	30	Parabolic Trough	1986
SEGS III	Luz/Nextra	Kramer Junction	CA	30	Parabolic Trough	1987
SEGS IV	Luz/Nextra	Kramer Junction	CA	30	Parabolic Trough	1987
SEGS V	Luz/Nextra	Kramer Junction	CA	30	Parabolic Trough	1988
SEGS VI	Luz/Nextra	Kramer Junction	CA	30	Parabolic Trough	1989
SEGS VII	Luz/Nextra	Kramer Junction	CA	30	Parabolic Trough	1989
SEGS VIII	Luz/Nextra	Harper Lake	CA	80	Parabolic Trough	1990
SEGS IX	Luz	Harper Lake	CA	80	Parabolic Trough	1991
Saguaro Solar Power Plant	Solargenix	Red Rock	AZ	1	Parabolic Trough	2005
Nevada Solar One	Acciona	Boulder City	NV	64	Parabolic Trough	2007
Kimberlina	Ausra	Bakersfield	CA	5	Linear Fresnel	2009
Sierra SunTower	eSolar	Lancaster /Antelope Valley	CA	5	Tower	2009
Holaniku at Keyhole Point	Sopogy	Kona	HI	2	MicroCSP	2009
Martin Next Generation Solar Energy Center	Florida Power & Light	Martin County	FL	75	Parabolic Trough	2010
Maricopa Solar Power Plant	Tessera Solar	Phoenix	AZ	1.5	Dish-engine	2010
Colorado Integrated Solar Project (Cameo)*	Abengoa/Xcel	Palisades	CO	2	Parabolic Trough	2010

*Colorado Integrated Solar Project uses solar energy to preheat water boiler feed water in a coal fired plant

Table 5-2: CSP plants in the U.S. (Data sources NREL [7], SEIA [12], CSPtoday[13])

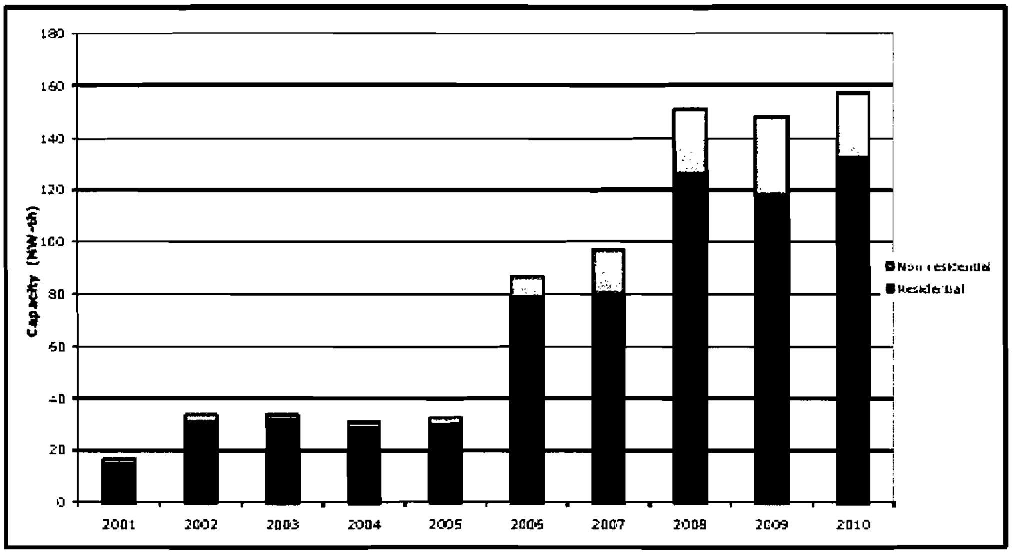
One of the most common applications for solar thermal energy in the U.S. is for heating of swimming pools. These solar pool heating systems can either be standalone units or in parallel with a conventional heater [14]. Figure 5-11 shows the capacity installed annually, in thermal megawatts (MW_{th}), of solar thermal systems used for heating swimming pools.



*Capacity in thermal megawatts (MW_{th})

Figure 5-11: Annual installed U.S. capacity for solar pool heating (2001-2010) (Source: IREC [10])

The other major users of solar thermal energy are water heating and space heating/cooling. Figure 5-12 shows the annual installed capacity of solar thermal systems used for water heating and space heating/cooling from 2002 to 2010.



*Capacity in thermal megawatts (MW_{th})

<u>**Figure 5-12:** Annual installed U.S. capacity for solar heating and cooling (2002-2010)</u>
(Source: IREC [10])

5.4 Solar energy in Indiana

As can be seen in the U.S. solar radiation maps (Figures 5-5 and 5-6) Indiana is in a region of the country that has the lowest annual average solar radiation. It is therefore unlikely that it would be the location of choice for multi-megawatt electricity generating plants such as the 354 MW SEGS facility in California or the 64 MW Nevada Solar One plant referred to in Section 5.3. However there is some potential for water heating applications of solar thermal technologies. According to the EIA 2011 solar thermal collector manufacturing report, Indiana was the 20^{th} top destination for solar thermal collectors in 2009 [15].

Figure 5-13 shows the solar radiation available to a flat collector facing south in Indiana. Flat plate collectors are typically used for water heating applications. As can be seen in the figure, the southern half of the state has more radiation available.

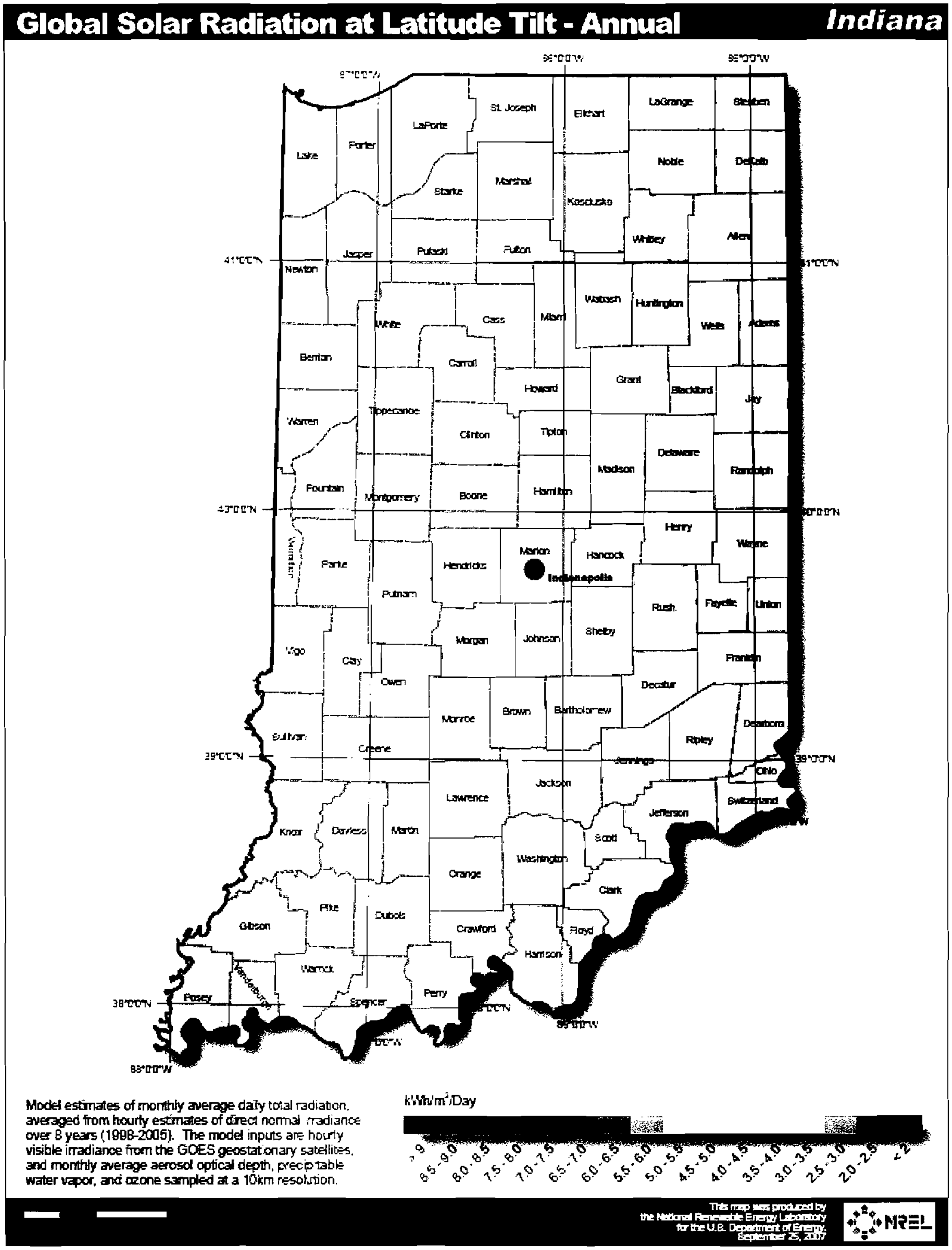


Figure 5-13: Direct normal solar radiation (flat-plate collector) (Source: NREL [16])

5.5 Incentives for solar energy

The following available incentives are available for solar thermal energy projects:

Federal Incentives

- Business Energy Investment Tax Credit (ITC) credits up to 30 percent of expenditures on solar systems. The 2009 American Recovery and Reinvestment Act provided for treasury cash grant in lieu of the ITC [17].

- Energy Efficiency Mortgage can be used by homeowners to finance a variety of energy efficiency measures, including renewable energy technologies, in a new or existing home. The federal government supports these loans by insuring them through FHA or VA programs. This allows borrowers who might otherwise be denied loans to pursue energy efficient improvements, and it secures lenders against loan default, providing them confidence in lending to customers who would usually have been denied credit [17].

- Modified Accelerated Cost-Recovery System (MACRS) allows businesses to recover investments in qualified solar, wind and geothermal property through depreciation deductions. The MACRS establishes a set of class lives for various types of property, ranging from three to fifty years, over which the property may be depreciated. For solar, wind and geothermal property placed in service after 1986, the current MACRS property class life is five years [17].

- Qualified Energy Conservation Bonds (QECBs) are qualified tax credit bonds that are allocated to each state based upon their state's percentage of the U.S. population. The states are then required to allocate a certain percentage to "large local governments." In February 2009, these funds were expanded to $3.2 billion [17].

- Renewable Energy Production Incentive (REPI) provides financial incentive payments for electricity produced and sold by renewable energy generation facilities owned by non-profit groups, public utilities, or state governments [17].

- Residential Energy Conservation Subsidy Exclusion established by Section 136 of the IRS Code, makes direct and indirect energy conservation subsidies provided by public utilities nontaxable [17].

- Rural Energy for America Program (REAP) covers up to 25 percent of costs for eligible projects at certain types of institutions. Eligible renewable energy projects include wind, solar, biomass and geothermal; and hydrogen derived from biomass or water using wind, solar or geothermal energy sources. REAP incentives are generally available to state government entities, local governments, tribal governments, land-grant colleges and universities, rural electric cooperatives and public power entities, and other entities, as determined by USDA [17].

- Value-Added Producer Grant Program supports planning activities and provides working capital for farm-based renewable energy projects. Independent producers, agricultural producer groups, farmer or rancher cooperatives, and majority-controlled producer-based business ventures are eligible for the program. Previously awarded grants supported energy generated on-farm through the use of agricultural commodities, wind power, water power, or solar power [18].

- High Energy Cost Grant Program administered by USDA is aimed at improving the electricity supply infrastructure in rural areas having home energy costs exceeding 275 percent of the national average. Eligible infrastructure includes renewable resources generation [19].

Indiana Incentives

- Net Metering Rule qualifies renewable resource facilities with a maximum capacity of 1 MW for net metering. The net excess generation is credited to the customer in the next billing cycle [17].

- Renewable Energy Property Tax Exemption provides property tax exemptions for solar thermal, PV, wind, hydroelectric and geothermal systems [17].

- Solar Access Laws prevent planning and zoning authorities from prohibiting or unreasonably restricting the use of solar energy. Indiana's solar-easement provisions do not create an automatic right to sunlight, though they allow parties to voluntarily enter into solar-easement contracts which are enforceable by law [17].

- Clean Energy Portfolio Goal sets a voluntary goal of obtaining 4 percent between 2013 and 2018, 7 percent between 2019 and 2024, and 10 percent by 2025, of electricity from clean energy sources based on 2010 retail sales. Participation in the goal makes utilities eligible for incentives that can be used to pay for the compliance projects [17].

- Emissions Credits are available by electricity generators that do not emit NO_x and that displace utility generation under the Indiana Clean Energy Credit Program. These credits can be sold on the national market [20].

- Northern Indiana Public Service Company offers feed-in tariff incentive rates for electricity generated from renewable resources for up to 15 years. The payments for solar facilities are $0.30/kW for solar facilities with a capacity below 10 kW and $0.26/kW for facilities up to 2 MW. The tariff is experimental and slated to run until December 31, 2013. The allowable generator generating unit size under the tariff is between 5 and 5,000 kW and the total system-wide capacity allowed is 30 MW. Five hundred kW of the total system-wide cap are reserved for solar projects of capacity less than 10 kW, and 500 kW for wind projects of capacity less than 10 kW [17, 21].

5.6 References

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6. Photovoltaic Cells

6.1 Introduction

Unlike solar thermal systems discussed in Section 5 of this report, photovoltaic (PV) cells convert solar energy directly into electricity without having to first convert it to heat. In addition, since PV cells use both direct and indirect sunlight, their use is more geographically widespread than solar thermal systems that require access to direct solar radiation. Figure 6-1 shows the layout and functioning of a PV cell [1, 2]. When the photons in sunlight strike the surface of a photovoltaic cell, some of them are absorbed. The absorbed photons cause free electrons to migrate in the cell, thus causing "holes." The resulting imbalance of charge between the cell's front and back surfaces creates a voltage potential like the negative and positive terminals of a battery. When these two surfaces are connected through an external load, electricity flows.

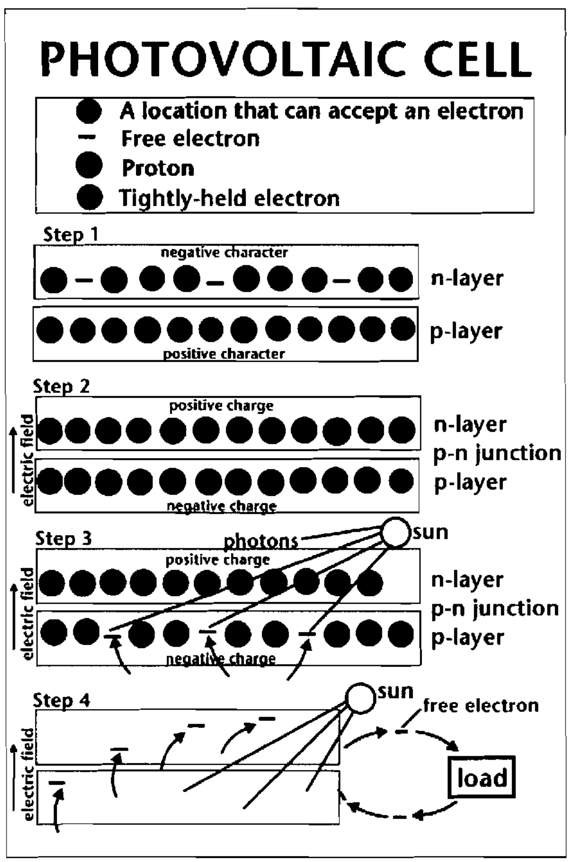


Figure 6-1: Photovoltaic cell operation (Source: EIA [1])

The photovoltaic cell is the basic building block of a PV system. Individual cells range in size from 0.5 to 4 inches across with a power output of 1 to 2 watts (W). To increase the power output of the PV unit, the cells are interconnected into a packaged, weather-tight module, typically with a 50-100 W power output as shown in Figure 6-2. Several PV modules are then connected to form an array. A complete PV system will include other components such inverters and mounting systems [2, 3].

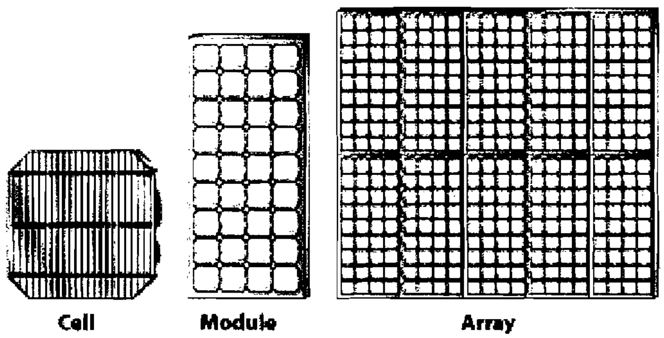


Figure 6-2: Illustration of a cell, module and array of a PV system (Source: EERE [3])

There are currently three main types of PV cell technologies in commercial use: crystalline silicon, thin-film and concentrating PV cells. Other PV silicon cells still in the development phase include advanced thin-films and organic cells. The crystalline silicon cell is the most common PV cell technology and was the first PV technology to be developed. It was developed in the 1950s and was initially used to power satellites and smaller items like watches and electronic calculators. As the prices of PV systems declined their use spread to other areas such as highway signs and other facilities remote from the electricity grid. In more recent years PV power systems have gained more widespread application as grid-connected generating resources with over 3,900 MW of grid-connected PV systems installed in the US since 2000 [4, 5].

Unlike crystalline silicon cells, thin-film cells are made by depositing thin layers of non-crystalline (amorphous) silicon or other photovoltaic material on low-cost substrate material. As a result, thin-film PV cells have a lower cost per unit of area than crystalline silicon cells. However, since they have a lower energy conversion efficiency this cost advantage is reduced by the required larger surface area relative to a crystalline silicon PV system with the same power rating. One of the main advantages of thin-film PV cells is that they can be made into flexible panels that are easily fitted onto building structures such as roofing shingles, facades and glazing on sky lights. Although a much newer technology, thin-film based PV systems have gained widespread use in the U.S. with 170 MW of grid-connected thin-film PV capacity having been installed in the last ten years [4, 5].

The third category of photovoltaic cell technology in commercial use is the concentrating photovoltaic cell (CPV) technology. CPV systems use optical lenses to focus the sun's rays onto small, high efficiency PV cells thus reducing the amount of photovoltaic material needed. Unlike the other photovoltaic technologies, CPV systems require direct sunlight and therefore their viability is restricted to sunny locations. At the writing of this report there were three grid-connected CPV systems with a total capacity of 7 MW in operation in the U.S. [5, 6]. Figure 6-3 shows the layout of a CPV cell.

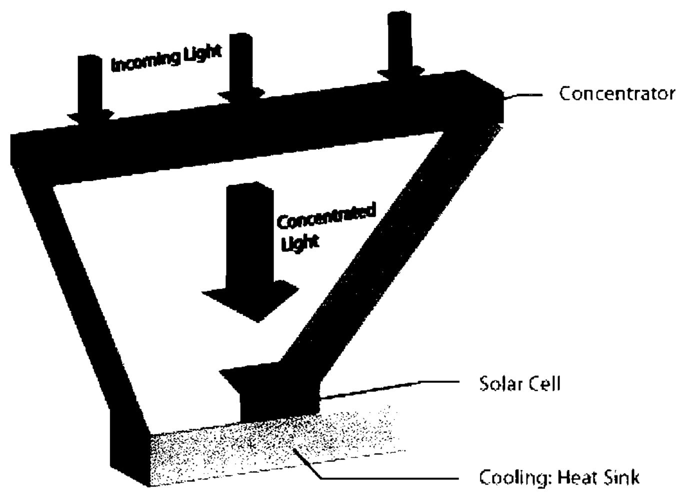
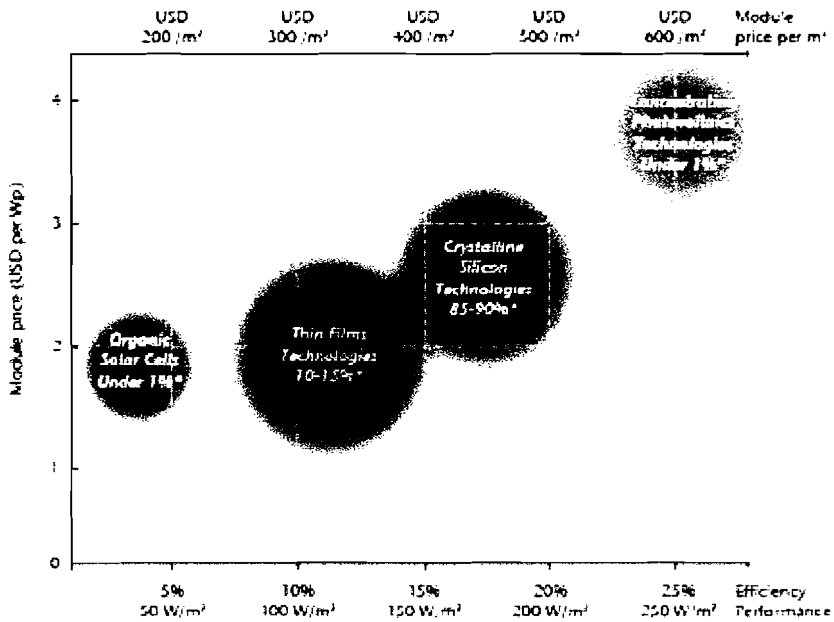


Figure 6-3: Illustration of concentrating photovoltaic cell (Source: Green Rhino Energy [6])

Figure 6-4 shows an overview of the costs, efficiencies, and energy output per unit of surface area of various PV cell technologies given by the International Energy Agency in their 2010 roadmap. As can be seen in the figure, the crystalline silicon technology occupies a mid-range in the cost/efficiency continuum, thin-film technology's lower cost comes with a lower efficiency and the CPV technology's higher efficiency is coupled with proportionally higher cost. (Figure 6-4 also shows the costs and efficiency of organic cells; however, this technology is still in the development phase.)



*percentage share of 2008 global market

<u>**Figure 6-4**: Performance and price of different PV technologies</u> (Source IEA [2])

6.2 Economics of PV systems

Figure 6-5 shows EIA's estimates of the overnight capital cost[5] of a utility scale photovoltaic electricity generating plant alongside other utility scale electricity generating technologies. As can be seen in the figure, the photovoltaic capital cost is one of the highest. The smaller of the two systems (7 MW) considered by EIA has a capital cost of $6,050 /kW, which is third highest after municipal solid waste's estimated cost of $8,232/kW and biomass combined cycle's estimated cost of $7,894 /kW. The larger of the two PV systems (150 MW) considered by EIA has a lower estimated capital cost of $4,755/kW, which is still among the highest, ranking fourth after municipal solid waste, biomass combined cycle, small PV and nuclear, with nuclear power's estimated cost at $5,339 /kW.

[5] Overnight capital cost "*is an estimate of the cost at which a plant could be constructed assuming that the entire process from planning through completion could be accomplished in a single day*" [7]. The overnight cost concept is used to avoid the impact of the differences in financing methods chosen by project developers on the estimated costs.

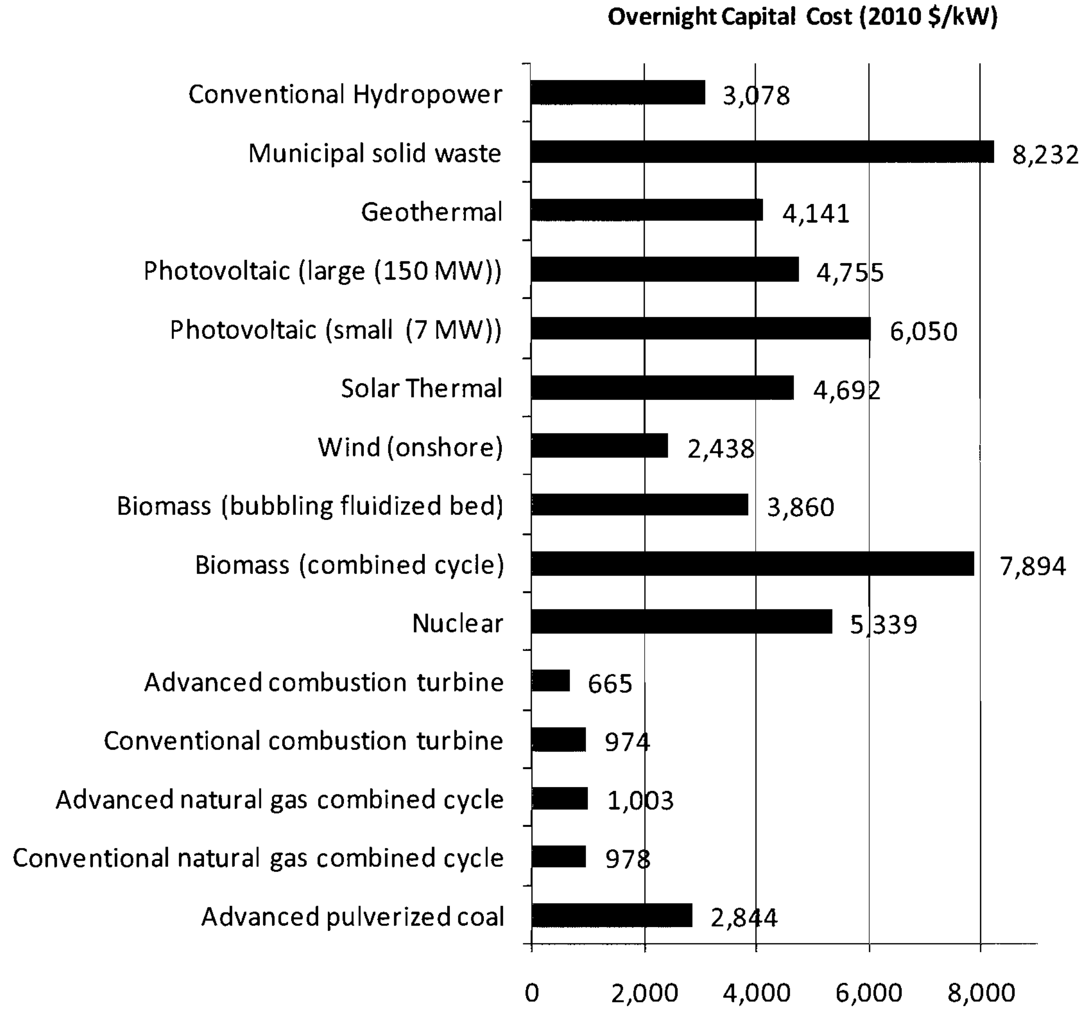


Figure 6-5: Capital cost of generating technologies (Data source: EIA [7])

Figure 6-6 shows the capacity-weighted average costs of actual systems installed in the U.S. between 1998 and 2009 compiled by the Lawrence Berkeley National Laboratory [8]. According to the Berkeley report, the approximately 78,000 PV systems in the dataset represent 70 percent of all grid-connected PV systems installed in the U.S. through 2009. The size of the systems in the dataset range from as small as 100 watts to as large as 2.3 MW with approximately 90 percent of the systems in the dataset having a capacity of 10 kW or less. As can be seen from the Figure, the capacity-weighted average installed cost prior to any financial incentives has been dropping steadily from $11.0/W in 1998 to $6.2/W in 2010.

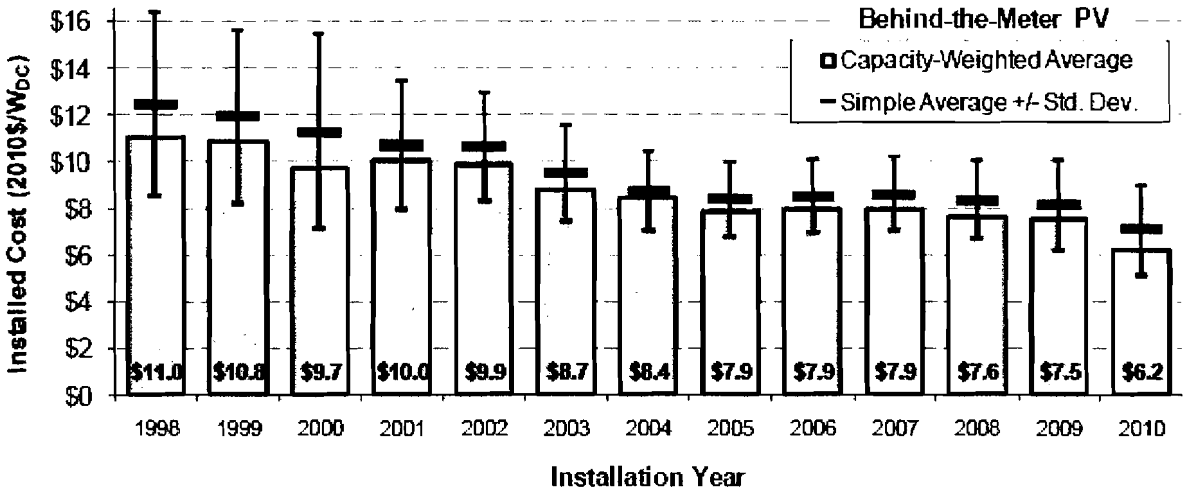


Figure 6-6: Average installed cost trends over time for behind-the-meter PV systems (Source: Berkeley [8])

Figure 6-7 shows the trend in component level cost for those PV systems in the Berkeley sample set that reported costs at the component level. Since component level cost was not reported for the whole Berkeley sample the total costs (capacity-weighted average) in Figure 6-7 differ slightly from those in Figure 6-6. Between 2007 and 2010 the system installation cost expressed in 2010 dollars dropped 21 percent from 8 $/W in 2007 to 6.3 $/W in 2010. 76 percent of this 1.7 $/W reduction was in the PV module cost while 24 percent was from the other non-module, non-inverter cost. The cost of the inverter remained flat.

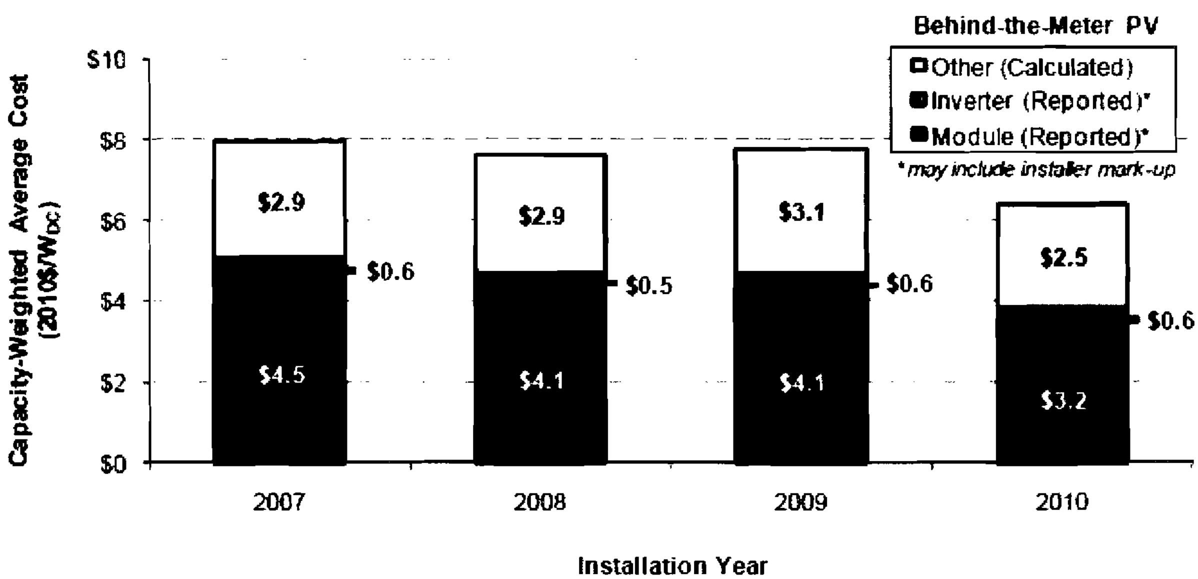


Figure 6-7: Installer-reported component costs over time for behind-the-meter PV (Source: Berkeley [8])

6.3 State of PV systems nationally

PV installed capacity in the U.S. has been increasing rapidly in the last decade growing from a mere 4 MW in 2000 to over 3,900 MW at the end of 2011. Figure 6-8 shows the annual and the cumulative installed capacity of grid-connected PV in the U.S.

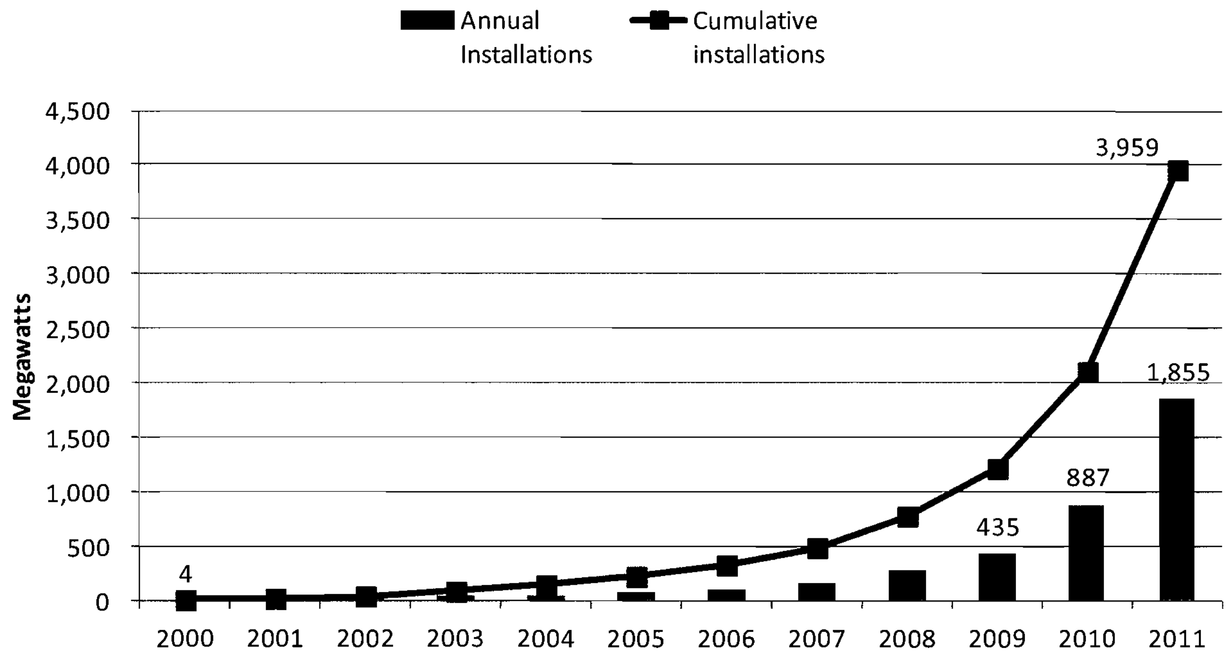


Figure 6-8: Grid-connected U.S. PV installed 2000 to 2011 (Data source SEIA [9, 10, 11])

The main factors behind this rapid expansion have been state and federal financial incentives and state renewable portfolio standards (RPS) with specific provision for solar technologies. At the state level, sixteen states and the District of Columbia (DC) have a RPS with specific quota for solar or for customer-side distributed generation. PV systems are the most common renewable energy technologies in use for residential customer-side distributed generation. Figure 6-9 shows the various forms of solar provisions in state RPSs. Fourteen states and the District of Columbia offer rebates for PV projects and all but 4 states offer some form of financial incentive for PV projects. Figure 6-10 shows the various types of financial incentives offered by states for solar projects [9, 12, 13].

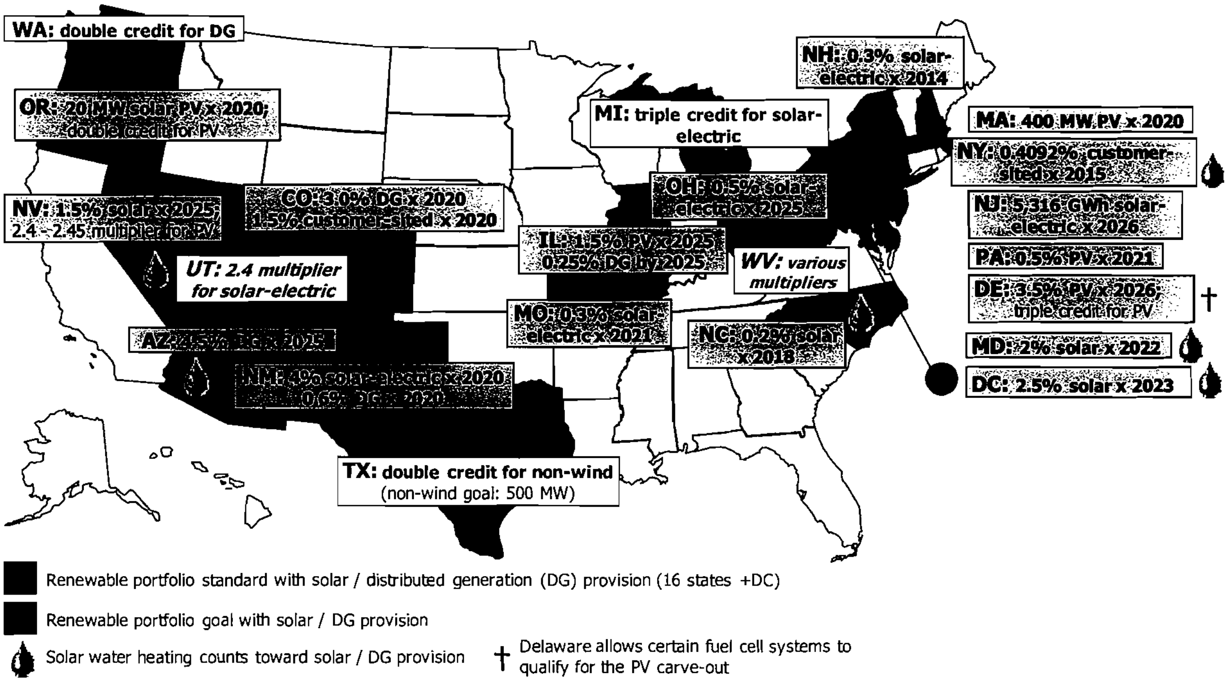


Figure 6-9: Renewable portfolio standards with solar carve-outs (Source DSIRE [13])

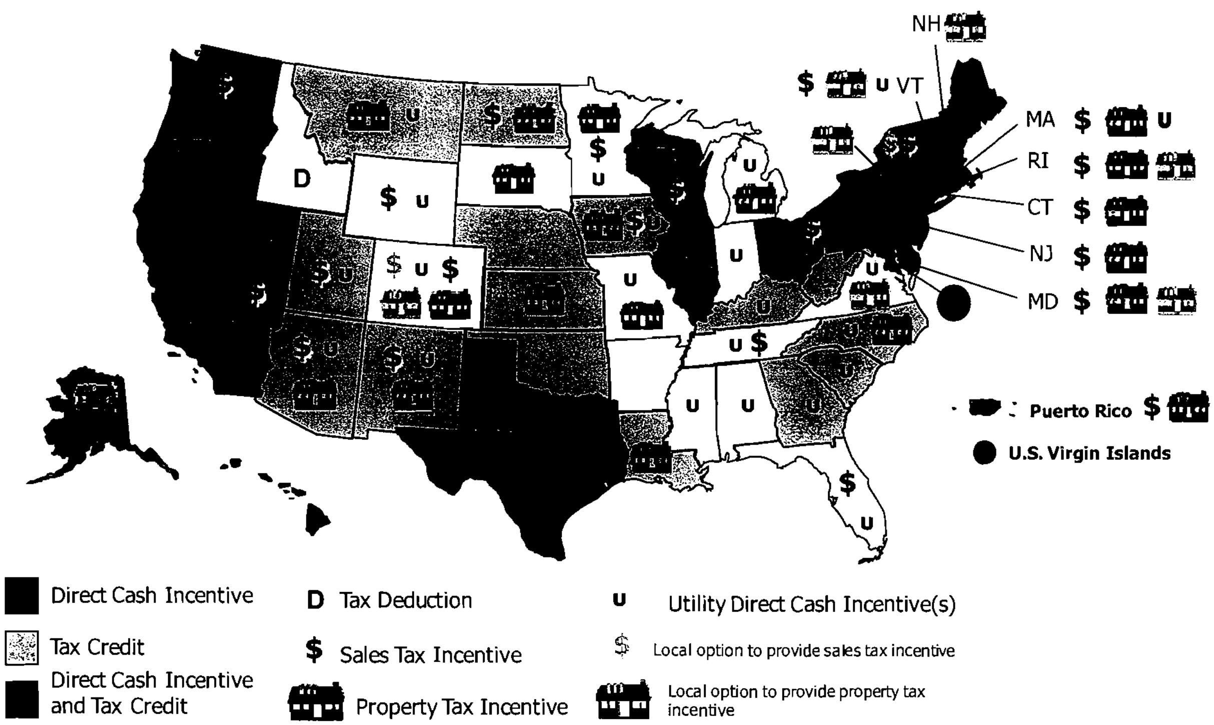


Figure 6-10: Financial incentives for solar-photovoltaic systems (Source DSIRE [13])

Federal financial incentives introduced in 2008 and 2009 have added to the accelerated growth, especially in multi-megawatt utility scale projects. These federal incentives are:

- The extension and modification of the 30 percent investment tax credit (ITC) to remove the $2,000 cap on personal ITC and to allow electric utilities access to the ITC;
- The provision by the American Recovery and Reinvestment Act (ARRA) for a 30 percent cash grant in lieu of the ITC and the production tax credit; and
- The provision in ARRA for funds for a U.S. Department of Energy (DOE) loan guarantee program targeted towards renewable energy resources (and transmission projects).

These federal incentives are credited with the rapid rise in multi-megawatt utility scale projects that have been constructed since then. Table 6-1 lists PV projects in the U.S. having a capacity of 10 MW and above, all of which have been constructed since 2009. The two federal programs enacted under ARRA, the loan guarantee and the 30 percent cash grant program, expired in September of 2011 and December 2011, respectively.

Project Name	Developer	Capacity (MW)	Online Date	Electricity Purchaser	State
Copper Mountain Solar	First Solar/Sempra	55	2010	Pacific Gas & Electric	NV
Mesquite Solar Phase 1	Sempra Generation	43	2011	Pacific Gas & Electric	AZ
Long Island Solar Farm	BP Solar	38	2011	Long Island Power Authority	NY
Austin Energy PV Project	SunEdison	34	2011	Austin Energy	TX
Cimarron I Solar Project	First Solar	30	2010	Tri-State G&T Cooperative	NM
San Luis Valley Solar Ranch	SunPower/Iberdrola	30	2011	Xcel Energy	CO
DeSoto Solar Energy Center	SunPower	25	2009	Florida Power & Light	FL
Stroud Solar Station	Cupertino Electric	25	2011	Pacific Gas & Electric	CA
Sun City Project	Eurus	23	2011	Pacific Gas & Electric	CA
Copper Crossing	SunPower/Iberdrola	23	2011	Salt River Project	AZ
Sand Drag Solar Project	Eurus	22	2011	Pacific Gas & Electric	CA
FSE Blythe	First Solar	21	2009	Southern California Edison	CA
	ConEdison/Panda	20	2010	Atlantic City Electric	NJ
Westside Solar Station	Cupertino Electric	20	2011	Pacific Gas & Electric	CA
Greater Sandhill Solar Plant	SunPower	19	2011	Xcel Energy	CO
Kammerer	Recurrent Energy	19	2012	Sacramento Municipal Utility	CA
Bruceville	Recurrent Energy	18	2011	Sacramento Municipal Utility	CA
Cotton Center	Solon	17	2011	Arizona Public Service	AZ
Davidson County Solar	SunEdison	17	2011	Duke Energy	NC
Paloma Solar Plant	First Solar	17	2011	Arizona Public Service	AZ
Blue Wing Solar Project	juwi Solar Inc.	16	2010	CPS Energy	TX
Jacksonville Solar	juwi Solar Inc.	15	2010	Jacksonville Electric Auth.	FL
Bagdad Solar Project	Recurrent Energy	15	2011	Arizona Public Service	AZ
Five Points Solar Station	Solon	15	2011	Pacific Gas & Electric	CA
Nellis Airforce Base	SunPower/MMA Renewable Ventures	14	2007	Nellis Airforce Base	NV
McGraw-Hill Solar Farm	NJR Clean Energy Ventures	14	2011	McGraw-Hill	NJ
Wyandot Solar facility	juwi Solar Inc.	12	2010	American Electric Power	OH
Dillard	Recurrent Energy	12	2012	Sacramento Municipal Utility	CA
Hyder Solar Plant Phase 1	SunEdison	11	2011	Arizona Public Service	AZ
Space Coast Solar Center	SunPower	10	2010	Florida Power & Light	FL
West Pullman Industrial Redevelopment Area	SunPower	10	2010	Exelon Generation LLC	IL
Rinehart Solar Farm Ph1	BlueChip Energy	10	2011	Progress Energy Florida	FL
NJ Oak Solar Farm	Lincoln Renewable Energy	10	2011	Atlantic City Electric	NJ
Prescott	SunEdison	10	2011	Arizona Public Service	AZ
SunEdison NM Solar 5	SunEdison	10	2011	Southwestern Public Service	NM
SunEdison NM Solar 4	SunEdison	10	2011	Southwestern Public Service	NM
SunEdison NM Solar 1	SunEdison	10	2011	Southwestern Public Service	NM
SunEdison NM Solar 2	SunEdison	10	2011	Southwestern Public Service	NM
SunEdison NM Solar 3	SunEdison	10	2011	Southwestern Public Service	NM
Dover SUN Park	SunPower/LS Power	10	2011	Delmarva Power	DE

Table 6-1: PV systems of 10 MW and above installed in the U.S. (Data source: SEIA [5])

6.4 PV systems in Indiana

Similar to the nation, Indiana has seen a rapid growth in the amount of PV capacity installed. According to the *Open PV Project* database maintained by the National Renewable Energy Laboratory (NREL) [14], there were 188 PV installations in Indiana totaling 3,530 kW at the time this report was written. Nearly 80 percent of that capacity was installed in 2011. Figure 6-11 shows the annual and cumulative PV capacity installations as reported to the NREL *Open PV Project* database.

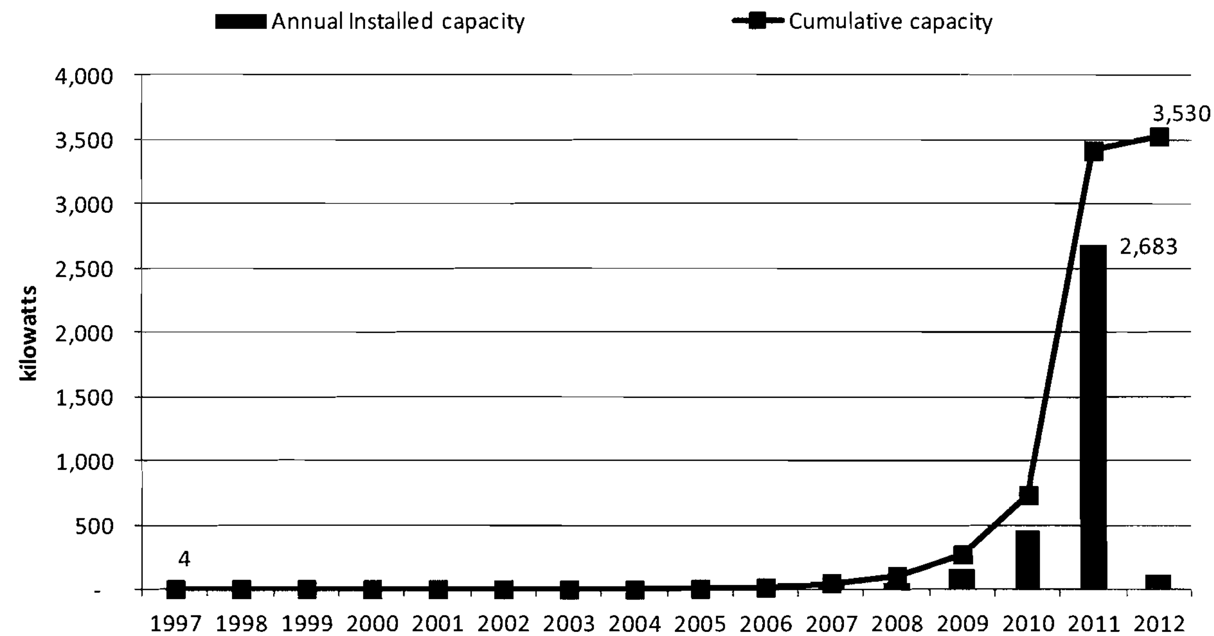


Figure 6-11: Indiana installed PV capacity in NREL *Open PV Project* database (Data source NREL [14]

The largest PV installation is the 2,010 kW project at the Fort Harrison Federal Compound in Indianapolis. This single project constitutes nearly 60 percent of Indiana's total installed capacity. The second largest PV installation in Indiana is a 186 kW project at the Metal Pro Roofing Corporation of Franklin City in Johnson County, followed by a 100 kW installation at the Johnson Melloh renewable energy demonstration laboratory in Indianapolis. A proposed 10 MW PV project at the Indianapolis airport will increase Indiana's PV capacity fourfold when it is completed. Table 6-2 lists the 30 PV installations with a capacity of 10 kW and above.

Owner /Developer	Rated Capacity (kW)	Location	Date Installed	Cost ($/Watt)
US General Services Administration	2010	Fort Benjamin Harrison, Indianapolis	2011	3.94
Metal Pro Roofing	186	Franklin, Johnson County	2011	n/a
Johnson Melloh Solutions Demonstration Lab	100	Indianapolis	2011	n/a
Transpo Bus Station	93	South Bend	2010	n/a
Lakestation Indiana City Hall	73	Lakestation, Lake County	2011	
Indianapolis Housing Authority	60	Laurelwood Apartments Indianapolis	2011	n/a
Laurelwood Apartments	59	Indianapolis	4/2012	5.93
Telamon Corporation, Carmel	50	Carmel	2/2012	n/a
University of Notre Dame	50	Stinson-Remick Hall, Notre Dame	2010	10.00
Goshen Family Physicians	19	Goshen, Elkhart County	2011	n/a
Residential	19	Mentone, Kosciusko County	2010	n/a
Residential	17	Marklevilley, Hancock County	2011	n/a
Cool Creek Park	16	Carmel, Hamilton County	2010	8.35
Nusun Solar	15	Columbus, Bartholomew County	2011	4.50
IBEW Local Union 725	14	Terre Haute	2010	6.04
Commercial Establishment	14	Connersville, Fayette County	2007	14.25
Residential	13	Terre Haute	2009	7.76
McCormick Motors	13	Nappanee, Elkhart County	2011	n/a
Hope Builders	13	Elkhart	2010	n/a
Residential	11	Memphis, Clark County	2011	n/a
Merry Lea Learning Center Goshen College	11	Albion, Noble County	2011	n/a
Educational	11	Newburgh, Warrick County	2007	10.00
Educational	11	Evansville	2010	7.94
Educational	11	Evansville	2010	7.94
Commercial	11	Kokomo	2009	7.93
Residential	11	Angola, Steuben County	2009	5.32
Big Fish'n Campground	10	Lafayette	2011	n/a
University of Notre Dame	10	Fitzpatrick Hall , Notre Dame	2011	n/a
Residential	10	New Harmony, Posey County	2010	8.13
Residential	10	New Harmony, Posey County	2010	8.32

Table 6-2: PV systems in Indiana of 10kW and above capacity (Data source: NREL [14])

As explained previously, the factors being credited with the rapid growth in the PV market in the last few years include federal, state and utility incentives. The federal incentives include the renewal and expansion of the investment tax credit to remove the $2,000 cap on personal tax credit and to allow electric utilities access to the investment tax credit. In addition the 2009

American Recovery and Reinvestment Act provided for an alternative 30 percent cash grant in lieu of the investment tax credit and provided additional funds for renewable energy projects in the DOE loan guarantee program. The recently enacted expansion of the Indiana net metering rule to include all customer classes and systems up to 1 MW is expected to improve the financial viability of customer side PV systems. In addition, two Indiana utilities, Indianapolis Power and Light (IPL) and Northern Indiana Public Service Company (NIPSCO), offer feed-in tariffs for electricity generated from renewable resources. IPL offers a feed-in tariff of $0.24/kWh for PV systems between 20 and 100 kW and $0.20/kWh for systems greater than 100kW up to 10 MW and NIPSCO offers $0.30/kWh for electricity and the associated renewable credits for units less than 10 kW and $0.26 for solar facilities up to 2 MW.

6.5 Incentives for PV systems

Federal Incentives

- Business Energy Investment Tax Credit (ITC) credits up to 30 percent of expenditures on solar systems. The 2009 American Recovery and Reinvestment Act provided for treasury cash grants in lieu of the ITC [13].

- Energy Efficiency Mortgage program provides mortgages that can be used by homeowners to finance a variety of energy efficiency measures, including renewable energy technologies, in a new or existing home. The federal government supports these loans by insuring them through FHA or VA programs. This allows borrowers who might otherwise be denied loans to pursue energy efficient improvements, and it secures lenders against loan default, providing them confidence in lending to customers whom they would deny without the federal insurance [13].

- Modified Accelerated Cost-Recovery System (MACRS) allows businesses to recover investments in qualified solar, wind and geothermal property through depreciation deductions. The MACRS establishes a set of class lives for various types of property, ranging from three to fifty years, over which the property may be depreciated. For solar, wind and geothermal property placed in service after 1986, the current MACRS property class life is five years [13].

- Qualified Energy Conservation Bonds (QECBs) are qualified tax credit bonds that are allocated to each state based upon their state's percentage of the U.S. population. The states are then required to allocate a certain percentage to "large local governments." In February 2009, these funds were expanded to $3.2 billion [13].

- Renewable Energy Production Incentive (REPI) provides financial incentive payments for electricity produced and sold by renewable energy generation facilities owned by non-profit groups, public utilities, or state governments [13].

- Residential Energy Conservation Subsidy Exclusion established by Section 136 of the IRS Code, makes direct and indirect energy conservation subsidies provided by public utilities nontaxable [10].

- Rural Energy for America Program (REAP) covers up to 25 percent of costs for eligible projects at certain types of institutions. Eligible renewable energy projects include wind, solar, biomass and geothermal; and hydrogen derived from biomass or water using wind, solar or geothermal energy sources. REAP incentives are generally available to state government entities, local governments, tribal governments, land-grant colleges and universities, rural electric cooperatives and public power entities, and other entities, as determined by USDA [13].

- Value-Added Producer Grant Program supports planning activities and provides working capital for farm-based renewable energy projects. Independent producers, agricultural producer groups, farmer or rancher cooperatives, and majority-controlled producer-based business ventures are eligible for the program. Previously awarded grants supported energy generated on-farm through the use of agricultural commodities, wind power, water power, or solar power. The maximum award per grant is $300,000 [15].

- High Energy Cost Grant Program administered by USDA is aimed at improving the electricity supply infrastructure in rural areas having home energy costs exceeding 275 percent of the national average. Eligible infrastructure includes renewable resources generation. USDA has allocated $21 million for the 2011 funding cycle [16].

Indiana Incentives

- Emissions Credits are available to electricity generators that do not emit NO_x and that displace utility generation under the Indiana Clean Energy Credit Program. These credits can be sold on the national market [17]

- Net Metering Rule qualifies renewable resources with a maximum capacity of 1 MW for net metering in Indiana. The net excess generation is credited to the customer in the next billing cycle [13].

- Renewable Energy Systems Property Tax Exemption provides property tax exemptions for the entire renewable energy device and affiliated equipment. In March 2012 solar PV was added to the list of technologies eligible for property tax exemption. The exemption applies to both real property and mobile homes equipped with renewable energy systems and may only be claimed by property owners [13].

- Solar Access Laws prevent planning and zoning authorities from prohibiting or unreasonably restricting the use of solar energy. Indiana's solar-easement provisions do not create an automatic right to sunlight, though they allow parties to voluntarily enter into solar-easement contracts which are enforceable by law [13].

- Clean Energy Portfolio Goal sets a voluntary goal of obtaining 4 percent between 2013 and 2018, 7 percent between 2019 and 2024, and 10 percent by 2025, of electricity from clean energy sources based on 2010 retail sales. Participation in the goal makes utilities eligible for incentives that can be used to pay for the compliance projects [13].

- Indianapolis Power & Light Co. – Rate REP (Renewable Energy Production) offers a "feed-in tariff" to solar, wind and biomass electricity generating facilities located in their service territory. IPL will purchase renewable energy and contract the production for up to 15 years. Solar compensation is $0.24/kWh for systems between 20 and 100 kW and $0.20/kWh for systems greater than 100 kW up to 10 MW. This rate expires in March 2013 after which no new contracts will be negotiated [13, 18].

- Indianapolis Power & Light Co. – Small Scale Renewable Energy Incentives Program offers compensation for new photovoltaic installations for residential and small-business customers. The compensation for solar is $2 per watt up to $4,000. Eligible solar systems are between 1kW and 19.9 kW [13, 19].

- Northern Indiana Public Service Company offers feed-in tariff incentive rates for electricity generated from renewable resources for up to 15 years. The payments for solar facilities are $0.30/kW for solar facilities with a capacity below 10 kW and $0.26/kW for facilities up to 2 MW. The tariff is experimental and slated to run until December 31, 2013. The maximum allowed generating unit size is 5 MW and the total system-wide capacity allowed under the tariff is 30 MW. Five hundred kW of the system-wide cap are reserved for solar projects of capacity less than 10 kW, and 500 kW for wind projects of capacity less than 10 kW [13, 20].

6.6 References

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7. Hydropower

7.1 Introduction

Hydroelectric energy is produced by converting the kinetic energy of falling water into electrical energy. The moving water rotates a turbine, which in turn spins a generator to produce electricity. There are several different types of hydropower facilities, including [1]:

- Impoundment hydropower: This facility uses a dam to store water. Water is then released through the turbines to meet electricity demand or to maintain a desired reservoir level. Figure 7-1 shows a schematic of this type of facility.
- Pumped storage: When electricity demand and price is low, excess electricity is used to pump water from a lower reservoir to an upper reservoir. The water is released through the turbines to generate electricity when electricity demand and price is higher.
- Diversion projects: This facility channels some of the water through a canal or penstock. It may require a dam but is less obtrusive than that required for impoundment facilities.
- Run-of-river projects: This facility utilizes the flow of water of the river and requires little to no impoundment. Run-of-river plants can be designed for large flow rates with low head[6] or small flow rates with high head.
- Microhydro projects: These facilities are small in size (about 100 kW or less) and can utilize both low and high heads. These are typically be used in remote locations to satisfy a single, nearby home or business.

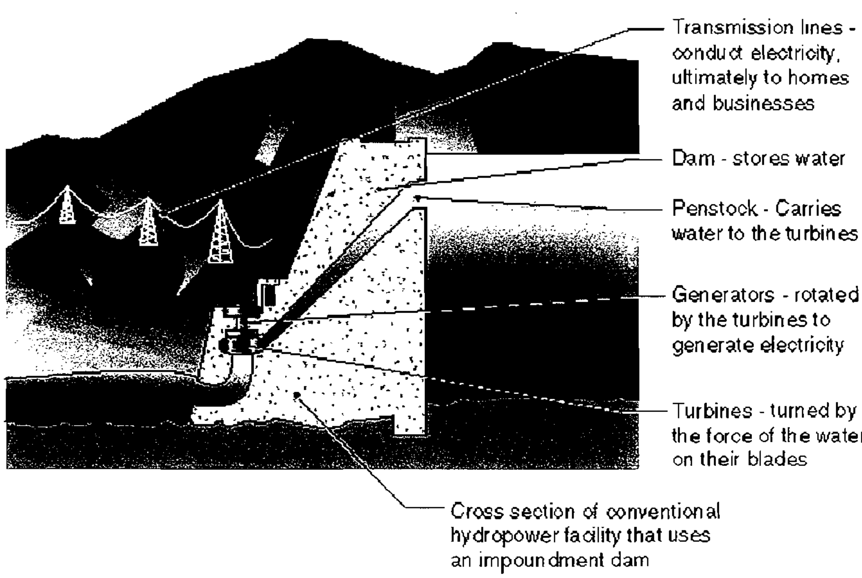

Figure 7-1: Schematic of impoundment hydropower facility (Source: INL [1])

[6] Head is the elevation difference between the water level above the turbine and the turbine itself. Higher head results in greater potential energy.

In addition, there are a variety of turbine technologies that are utilized for hydropower production. The type of turbine is chosen based on its particular application and the height of standing water. There are two main groups of turbines used in hydro power projects – the impulse and the reaction turbine types. The impulse turbine type uses the velocity of the water while the reaction turbine uses both the velocity of the water and the pressure drop as the water passes through the turbine. The impulse turbine is more suited to a high head, low flow application while the reaction turbine is more suited to a lower head, faster flow situation [2].

Hydropower is a renewable resource that has many benefits, including [3]:

- Hydropower is a domestic energy resource and does not require the transportation of fuels;
- Current hydropower turbines are capable of converting 90 percent of available energy to electricity, which is more efficient than any other form of generation;
- Hydroelectric facilities have quick startup and shutdown times, making them an operationally flexible asset, which is desirable in competitive and fluctuating electricity markets; and
- Hydroelectric facilities with impoundment can be used as a means of energy storage when combined with a pumped storage system.

Hydropower facilities also provide recreational opportunities for the community such as fishing, swimming, and boating in its reservoirs. Other benefits may include water supply and flood control. It has been estimated that of the 82,000 U.S. dams, only 3 percent have electricity production as their primary function [4].

One of the main limitations of hydroelectricity is that the amount of electricity that a facility can produce is very sensitive to the amount of precipitation in the watershed feeding the facility. Prolonged periods of below-normal rainfall can significantly cut hydropower production potential. Other unfavorable environmental impacts of hydroelectric facilities include:

- Blockage of upstream fish passage;
- Fish injury and mortality from passage through the turbine; and
- Changes in the quality and quantity of water released below dams and diversions, including low dissolved oxygen levels [5].

Other factors may also act as deterrents to potential hydropower projects, including the increasingly costly and uncertain process of licensing or relicensing. About 300 hydroelectric facilities will have to be relicensed through 2017 [6]. Though the Energy Policy Act of 2005 helped reform the licensing procedure, many still consider the process to be burdensome and complicated [7]. Obtaining a license for a new facility, or renewing the license of an older facility, can take 8-10 years or longer [6].

7.2 Economics of hydropower

Hydropower projects are very capital intensive and the cost is very site specific. Table 7-1 shows the capital costs estimates from various sources. The capital cost estimates range from as low as $1,700/kW in 1996 dollars done by Idaho National Laboratory (INL) to nearly $14,000/kW cost estimate for the Susitna project in Alaska in 2008. Once constructed, a hydroelectric project has a major cost advantage since the fuel (water) is virtually free and also because hydroelectric plants have very low O&M costs.

Project		**Time**[*]	**Initial Capital Costs ($/kW)**
Idaho National Lab estimates		1996	1,700-2,300
EIA estimates	Hydroelectric	2010	3,076
	Pumped Storage	2010	5,595
Hawaii Pumped Storage Hydroelectric Project (Maui Electric Co.)	Umauma	2005	1,966
	East/WestWailuaiki		3,011
	Big Island		2,432-2,842
	Maui		3,477
Susitna Project (Alaska)		2008	7,713-13,833
American Municipal Power (AMP)	Belleville	1999	2,857
	Cannelton	2009	4,951
	Smithland	2010	6,226
	Meldahl	2010	4,504
	Willow Island	2011	7,889
	Robert C. Byrd	2015	6,250
	Pike Island	2016	7,414

[a] Time the project's cost estimate was made or the project's expected start date

Table 7-1: Initial capital costs of hydropower projects (Data sources: [8-13])

According to the EIA November 2010 updated plant costs [10], hydroelectric plants have one of the lowest O&M costs among electricity generating technologies. Figure 7-2 shows the variable and fixed O&M costs of various generating technologies. As can be seen in the Figure 7-2, hydroelectricity's variable O&M costs are estimated at zero and the fixed O&M cost of $13/kW is the second lowest after natural gas combustion turbines.

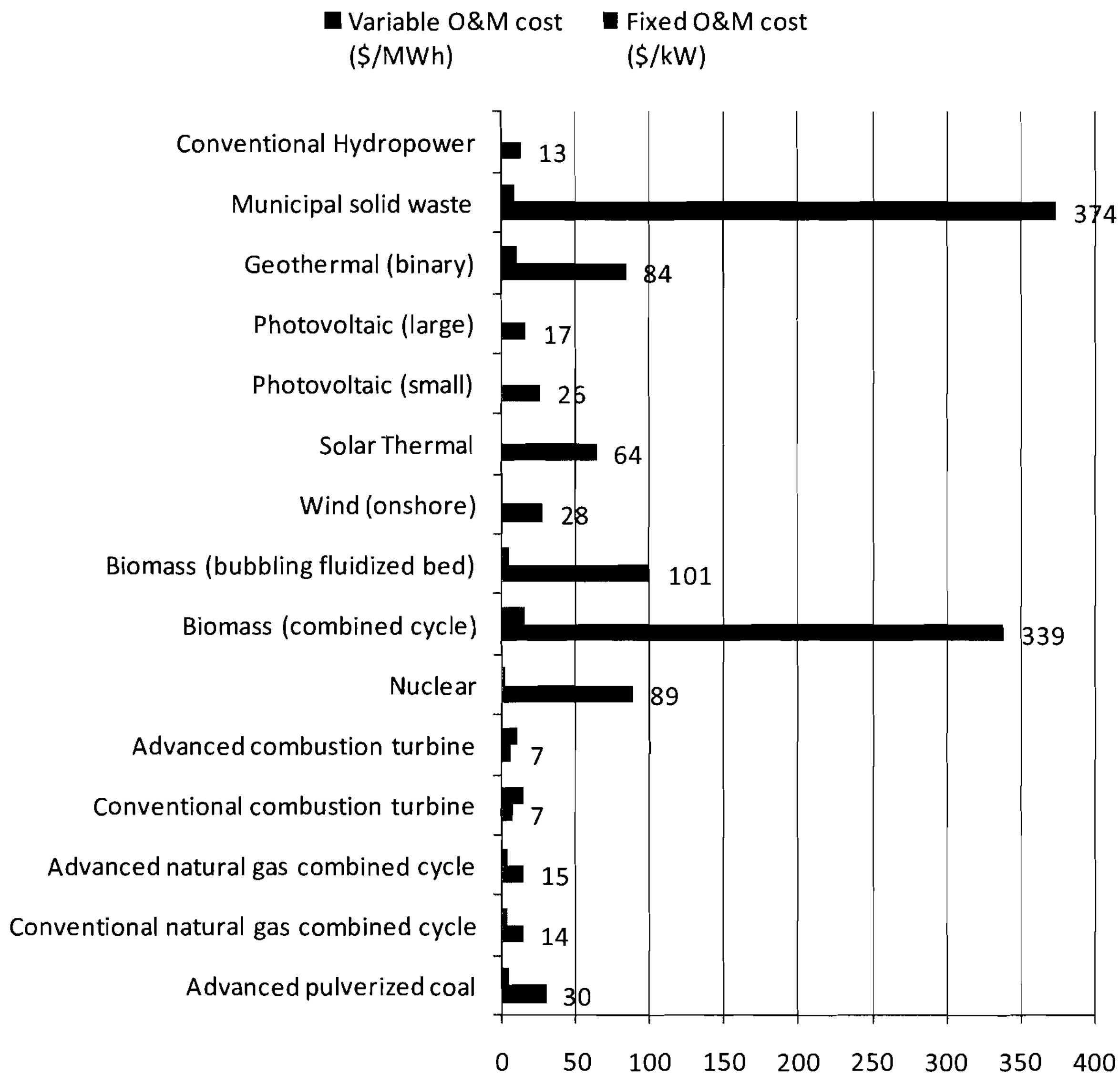

Figure 7-2: Variable and fixed O&M costs of generating technologies (Data source: EIA [10])

7.3 State of hydropower nationally

In 2010, hydroelectricity accounted for 2.5 (31 percent) of the 8 quads of renewable energy consumed in the U.S. and 6 percent of the total electricity generated. In 2009 the total conventional hydropower generation in the U.S. was 273,445,095 MWh. The states of Washington, Oregon, and California account for 49 percent of total hydropower capacity in the country [14].

1.Washington	72,932,704		6.Idaho	10,434,264
2.Oregon	33,033,513		7.Tennessee	10,211,962
3.California	27,888,036		8.Montana	9,505,940
4.New York	27,615,016		9.Arizona	6,427,345
5.Alabama	12,535,373		10.North Carolina	5,171,257

Table 7-2: Top ten U.S. hydropower generating states in 2009 (MWh) (Data source: National Hydropower Association [14])

The Idaho National Laboratory launched an effort to catalogue untapped hydropower potential in the U.S. in 1989. The U.S. Hydropower Resource Assessment Final Report was issued in 1998 with subsequent revisions in 2004 and 2006. At the heart of this assessment effort is a computer model known as the Hydropower Evaluation Software, which identified 5,677 sites with a total undeveloped capacity of 30 GW. Of this capacity, 57 percent (17.0 GW) is at sites with some type of existing dam or impoundment but with no power generation. Another 14 percent (4.3 GW) exists at projects that already have hydropower generation but are not developed to their full potential; only 28 percent (8.5 GW) of the potential would require the construction of new facilities. Therefore the potential for hydropower from existing dams is about 21.4 GW [15]. The breakdown of the state-by-state contribution to the total 30 GW identified is shown in Figure 7-3 [16].

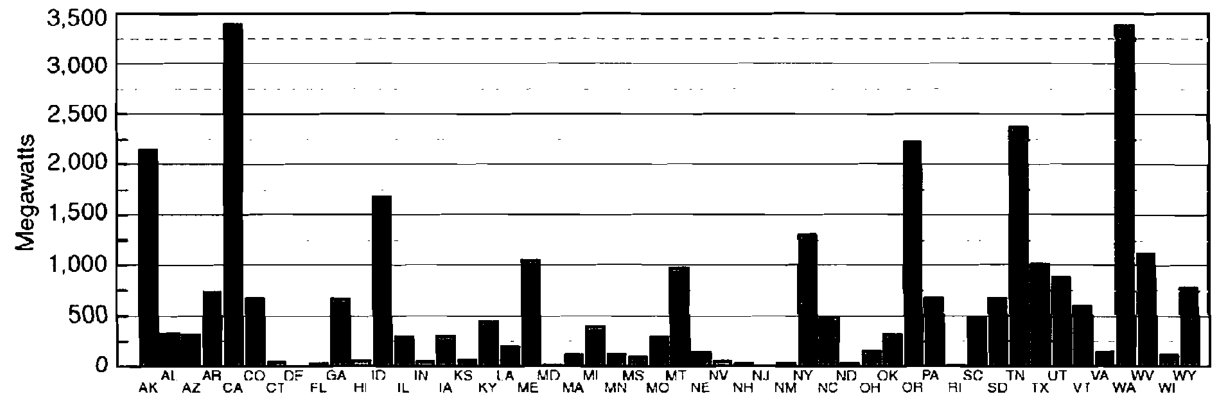

Figure 7-3: State breakdown of potential hydropower capacity (Source: INL [16])

The National Hydropower Association estimates that more than 4,300 MW of additional or "incremental" hydropower capacity could be brought on line by upgrading or augmenting existing facilities [17]. Oak Ridge National Laboratory (ORNL) is updating hydropower potential assessments based on INL's study. ORNL's assessment concentrates on existing, non-powered dams, predicting that 54,000 such dams could supply 12.6 GW of power. Of this total power, 3,000 MW would come from 10 large dams on the following rivers: 4 Ohio River Dams, 1 Mississippi River Facility, 1 Alabama River Facility, 2 Tombigbee River Facilities, and 2 Arkansas-Red River Facilities [18]. Figure 7-4 shows the distribution of non-powered dams in the U.S.

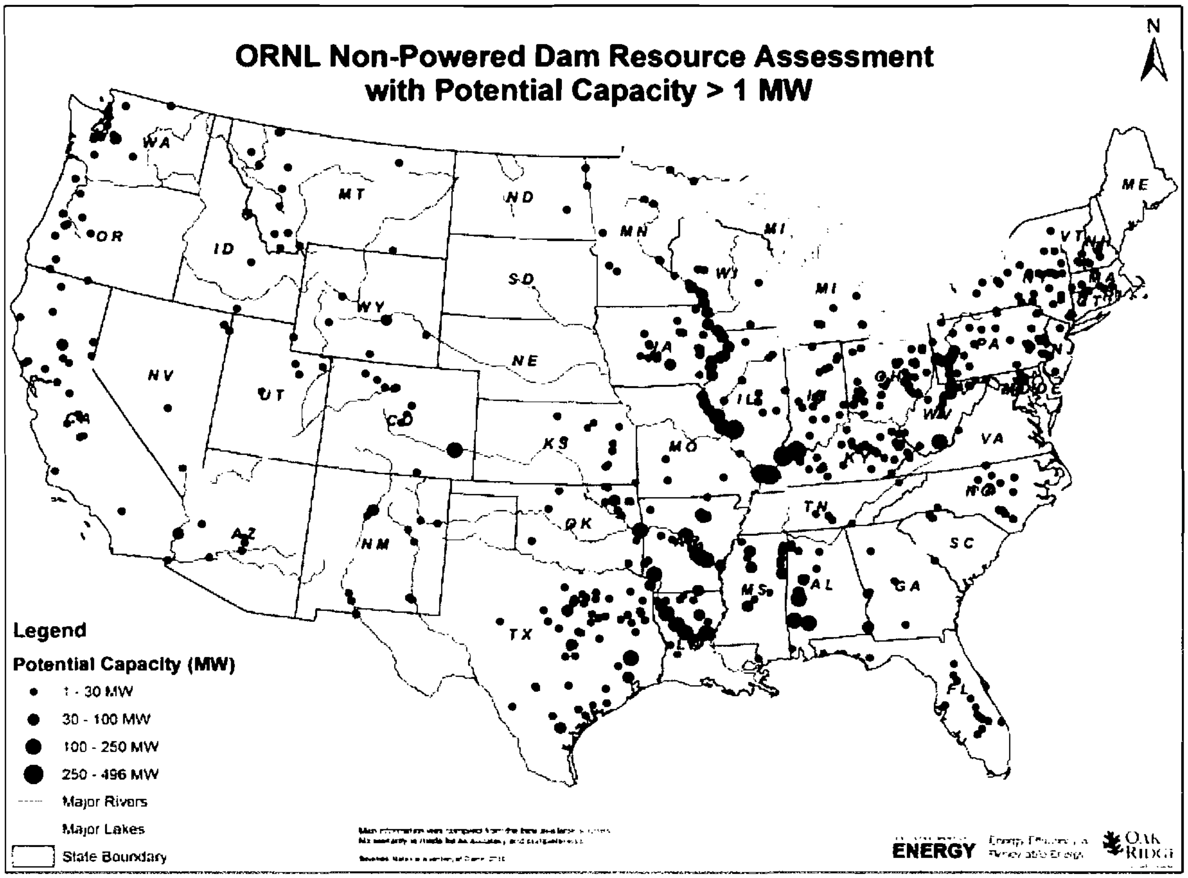

Figure 7-4: Non-powered dams with potential capacity over 1 MW (Source: ORNL [18])

Although there are substantial undeveloped resources for hydropower, its share of the nation's total electricity production is predicted to decline through 2020, with minimal capacity increases, due to a combination of environmental issues, regulatory complexities and pressures, and changes in economics [5]. The most viable hydropower capacity addition in the coming years will be the 4.3 GW of "incremental" capacity available at existing facilities. Improvements in turbine design to minimize environmental impacts and federal and state government incentives could help further develop potential hydropower projects at existing dams.

Currently, DOE is researching technologies that will enable existing hydropower projects to generate more electricity with less environmental impact. The main objectives are to develop new turbine systems with improved overall performance, develop new methods to optimize hydropower operations, and conduct research to improve the effectiveness of the environmental mitigation practices required at hydropower projects. Together, these advances in hydropower technology should reduce the cost of implementation and help smooth the hydropower integration process [19]. In April 2011, DOE and U.S. Department of the Interior (DOI) announced $26.6 million in funding to develop advanced hydropower technologies. The funding would concentrate on four areas; sustainable small hydropower, environmental mitigation technologies for conventional hydropower, sustainable pumped storage hydropower, and advanced conventional hydropower system testing at a Bureau of Reclamation facility [20].

7.4 Hydropower in Indiana

Until the commissioning of the first wind farm in Indiana in 2008, hydroelectricity was the main source of renewable electricity in Indiana as shown in Figure 7-5. With over 1,340 MW of installed wind capacity compared to 73 MW of hydroelectricity in Indiana, wind is now the dominant source of renewable electricity. This is a significant change from the situation in 2008 when only 20 kW of grid-connected wind capacity was in operation in Indiana.

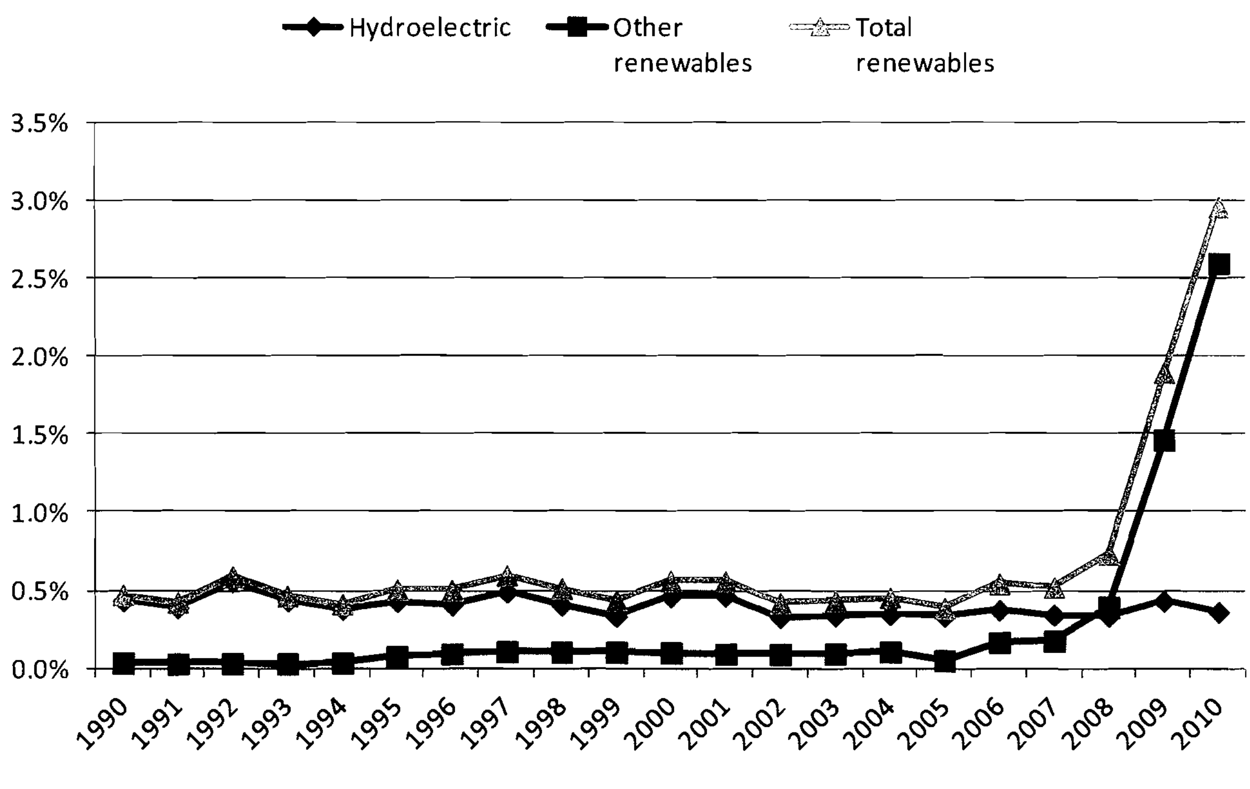

Figure 7-5: Renewables share of Indiana net electricity generation (1990-2009) (Data source: EIA [21])

However when one considers total Indiana energy consumption, wood and more recently ethanol dominate as sources of renewable energy consumed in Indiana as shown in Figure 7-6.

Hydroelectricity comes in third contributing less 0.2 percent of the total energy consumed in Indiana.

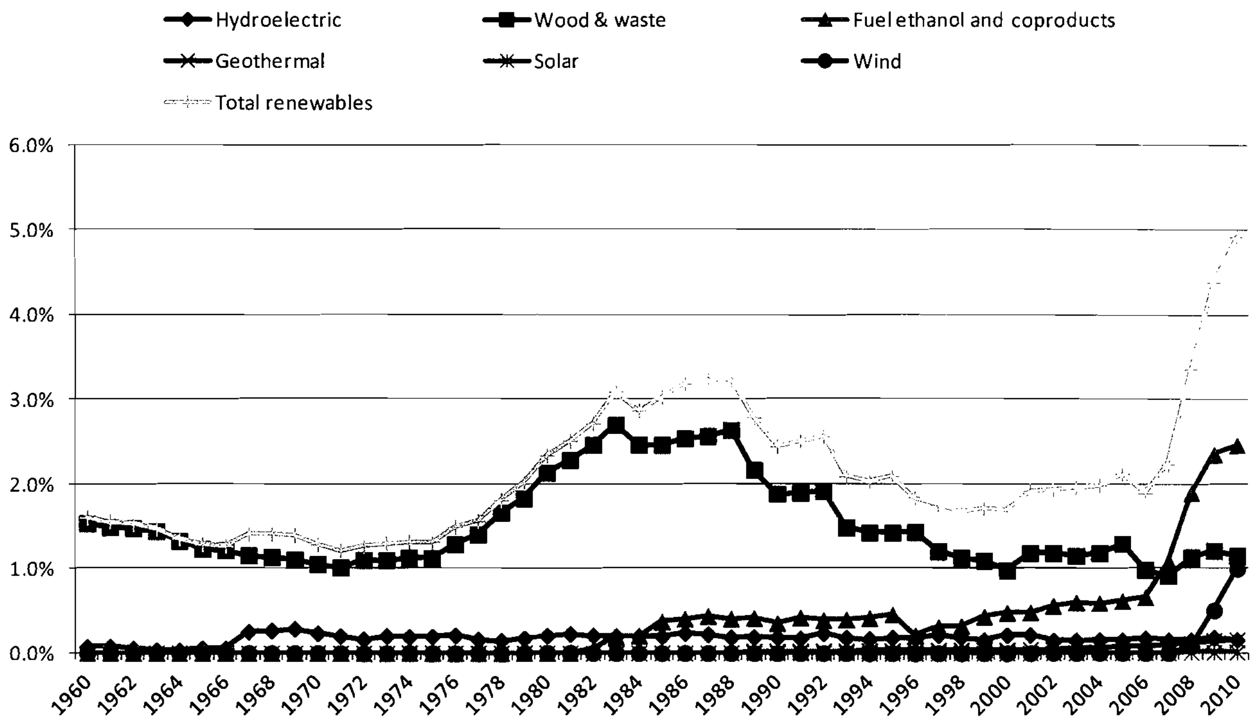

Figure 7-6: Renewables share of Indiana total energy consumption (1960-2010) (Data source: EIA [22])

A 1995 national hydro-potential study conducted by DOE estimated Indiana to have the potential for approximately 43 MW of exploitable capacity on 5 of Indiana's river basins as shown in Table 7-3 [23].

	Exploitable hydro potential (MW)	Number of sites	Number of sites with existing power generation	Number of sites without existing power generation	Number of un-developed sites
Wabash river basin	22.73	12	0	11	1
St. Joseph river basin	10.32	12	3	9	0
Ohio main stream	9.23	3	0	2	0
Maumee river basin	1.08	2	0	2	0
Cumberland River basin	0.0045	1	0	0	1
Total	**43.4**	**30**	**3**	**24**	**2**

Table 7-3: Hydropower potential in Indiana (Source: INL [23])

The 43 MW shown in Table 7-3 is the net capacity that could be exploited after screening out capacity deemed unsuitable for development due to environmental factors. The gross total capacity before the screening was assessed at 84 MW.

American Municipal Power, a wholesale electricity supplier to municipal utilities in Ohio, Pennsylvania, Michigan, Virginia, Kentucky and West Virginia is in the process of developing six run-of-the-river hydroelectric projects on existing dams along the Ohio River. Four of these projects – Cannelton, Melhahl, Smithland and Willow Island are already under construction while two projects, Robert Byrd and Pike Island, are undergoing the licensing process at the Federal Energy Regulatory Commission (FERC). One of the projects under construction, the 84 MW Cannelton project, is in the Indiana/Kentucky section of the river. Table 7-4 shows the estimated capital cost and expected commissioning dates of the projects.

Project	Capacity (MW)	Estimated capital cost (million $)	Estimated capital cost ($/kW)	Construction start date	Expected commissioning date
Cannelton	84	415.9	4,951	2009	2014
Meldahl	105	472.9	4,504	2010	2014
Smithland	72	448.3	6,226	2010	2015
Willow Island	35	276.1	7,889	2011	2014
Robert C. Byrd	48	300	6,250	2015	2017
Pike Island	49.5	367	7,414	2016	2019

Table 7-4: AMP hydropower projects along Ohio River (Source: AMP [12, 13, 24])

7.5 Incentives for hydropower

Federal Incentives

- Renewable Electricity Production Tax Credit (PTC) provides a 1.1 cents/kWh tax credit for qualified small hydroelectric and marine energy technologies. As part of the February 2009 American Recovery and Reinvestment Act the PTC was modified to provide the option for qualified producers to take the federal business energy investment credit (ITC) or an equivalent cash grant from the U.S. Department of Treasury. The PTC for hydroelectric facilities expires in December 2012 [25].

- Rural Energy for America Program (REAP) was converted by the Food, Conservation, and Energy Act of 2008 from the USDA Renewable Energy Systems and Energy Efficiency Improvements Program to the Rural Energy for America Program (REAP). Hydroelectric facilities are eligible for grants of up to 25 percent of the cost of the system, and loans for another 50 percent of the cost [25].

- High Energy Cost Grant Program administered by the USDA is aimed at improving the electricity supply infrastructure in rural areas having home energy costs exceeding 275 percent of the national average. Eligible infrastructure includes renewable resources generation. The USDA has allocated a total of $15.5 million for the 2010 funding cycle. The individual grants range from $75,000 to $5 million [26].

Indiana Incentives

- Net Metering Rule qualifies renewable resource facilities with a maximum capacity of 1 MW for net metering. The net excess generation is credited to the customer in the next billing cycle [25].

- Renewable Energy Property Tax Exemption provides property tax exemptions for solar, wind, hydroelectric and geothermal systems [25].

- Clean Energy Portfolio Goal sets a voluntary goal of obtaining 4 percent between 2013 and 2018, 7 percent between 2019 and 2024, and 10 percent by 2025, of electricity from clean energy sources based on 2010 retail sales. Participation in the goal makes utilities eligible for incentives that can be used to pay for the compliance projects [25].

- Emissions Credits are earmarked for electricity generators that do not emit NO_x and that displace utility generation. Qualified generators are eligible to receive NO_x emissions credits under the Indiana Clean Energy Credit Program. These credits can be sold on the national market [27].

- Northern Indiana Public Service Company offers feed-in tariff incentive rates for electricity generated from renewable resources for up to 10 years. The payment for hydroelectric facilities is $0.12/kWh for new hydroelectric facilities with a capacity no more than 1 MW. The tariff is experimental and slated to run until December 31, 2013. The total system-wide renewable capacity allowed under the tariff is 30 MW with 500 kW of the cap reserved for solar projects of capacity less than 10 kW, and 500 kW reserved for wind projects of capacity less than 10 kW [25, 28].

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Discovery Park

ENERGY CENTER
State Utility Forecasting Group (SUFG)

PURDUE

2012 Indiana Renewable Resources Study

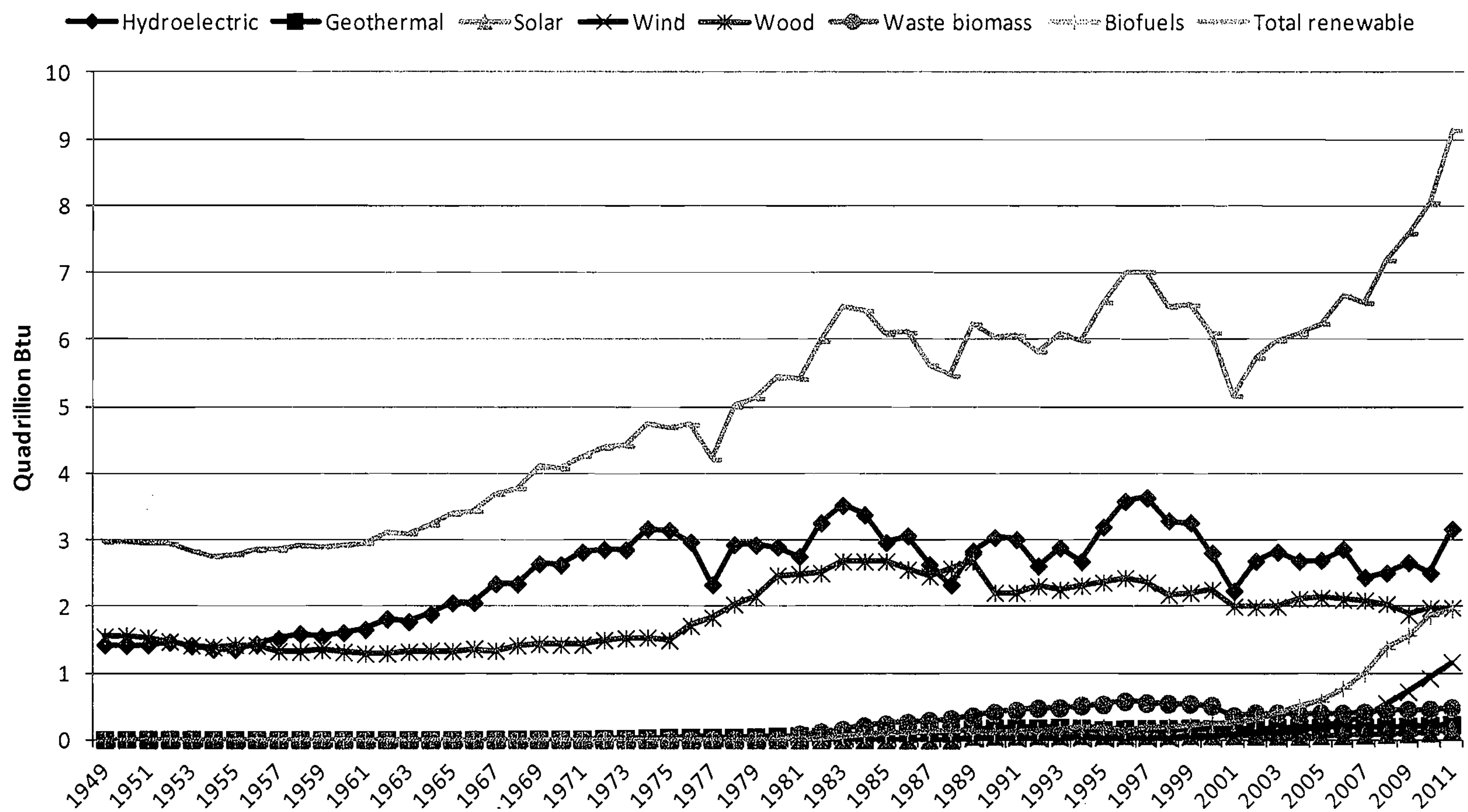
Presented by:
Douglas J. Gotham, Director
State Utility Forecasting Group
Purdue University

Presented to:
Regulatory Flexibility Committee
Indiana General Assembly

September 6, 2012

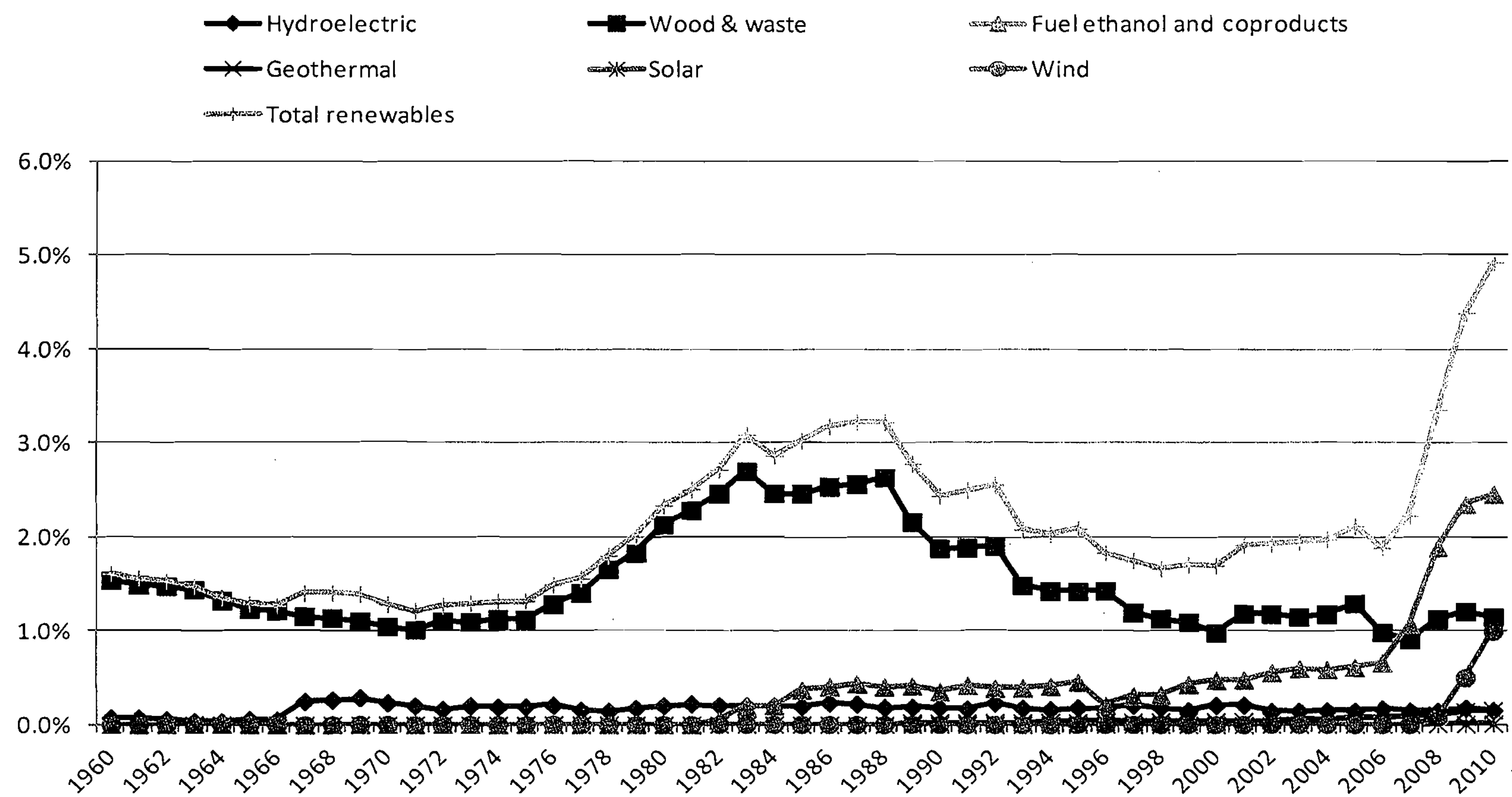
RFSC 9/6/12
EXHIBIT F

Renewables Share of U.S. Energy Consumption



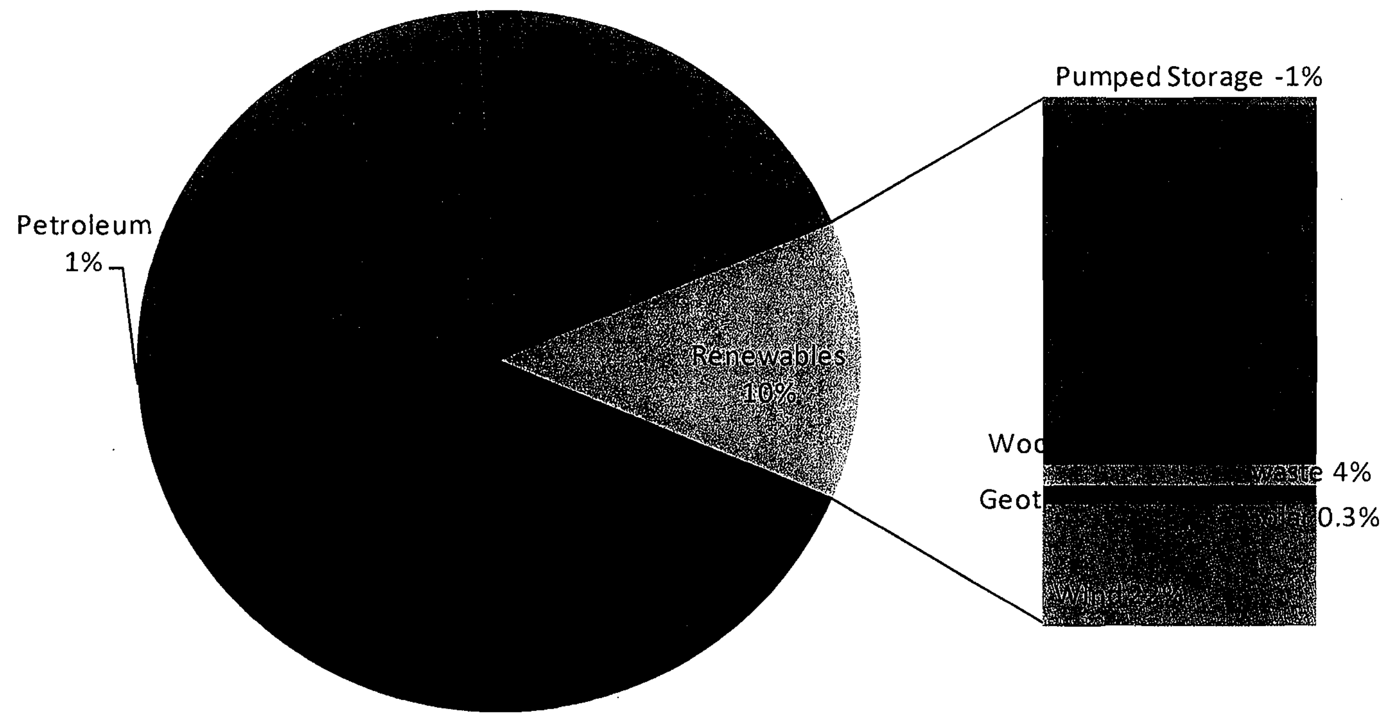
Source: Energy Information Administration (EIA)

Renewables Share of Indiana Energy Consumption



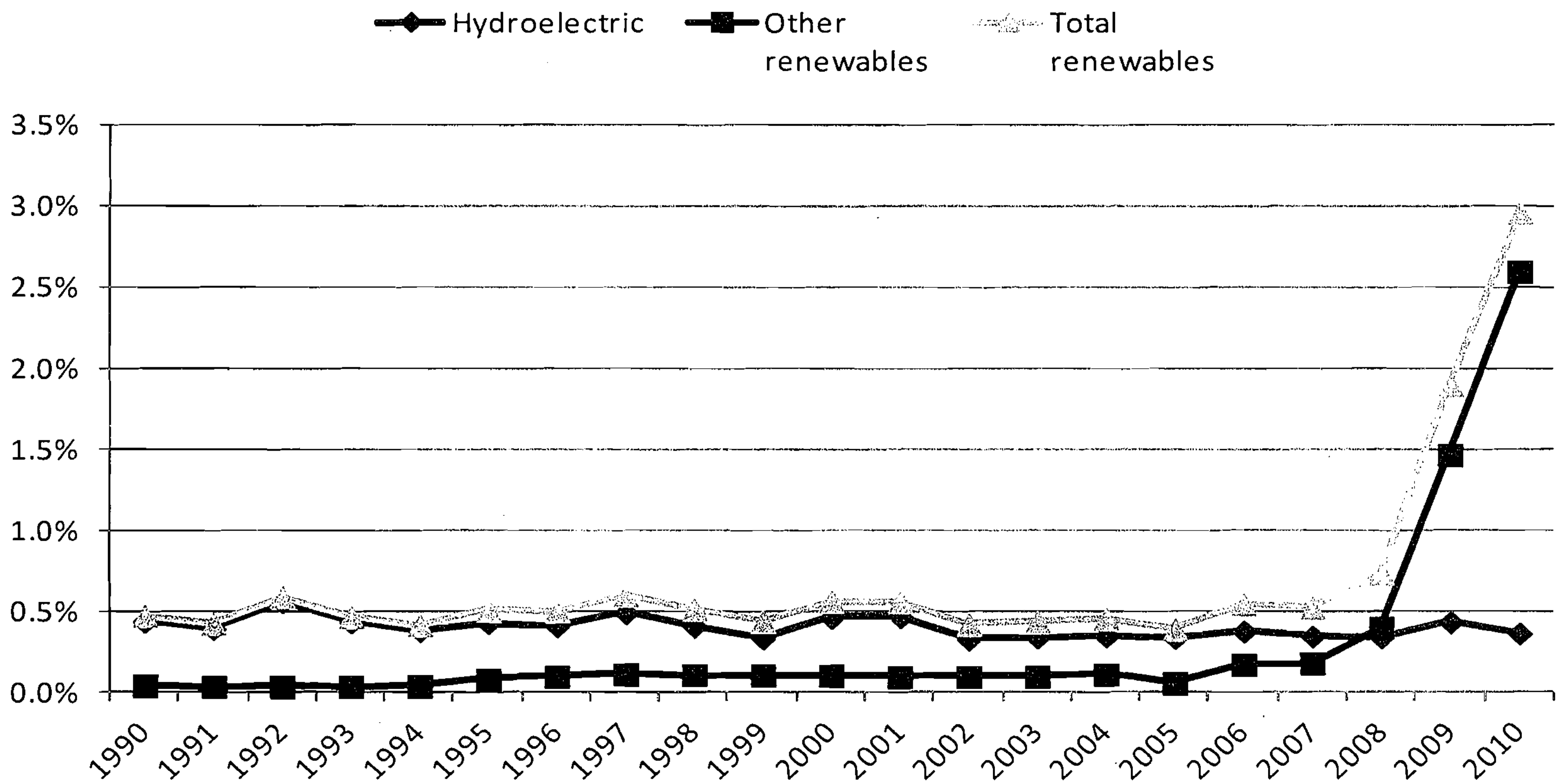
Source: EIA

2011 U.S. Electricity Generation by Energy Source



Source: EIA

Renewables Share of Indiana Electricity Generation

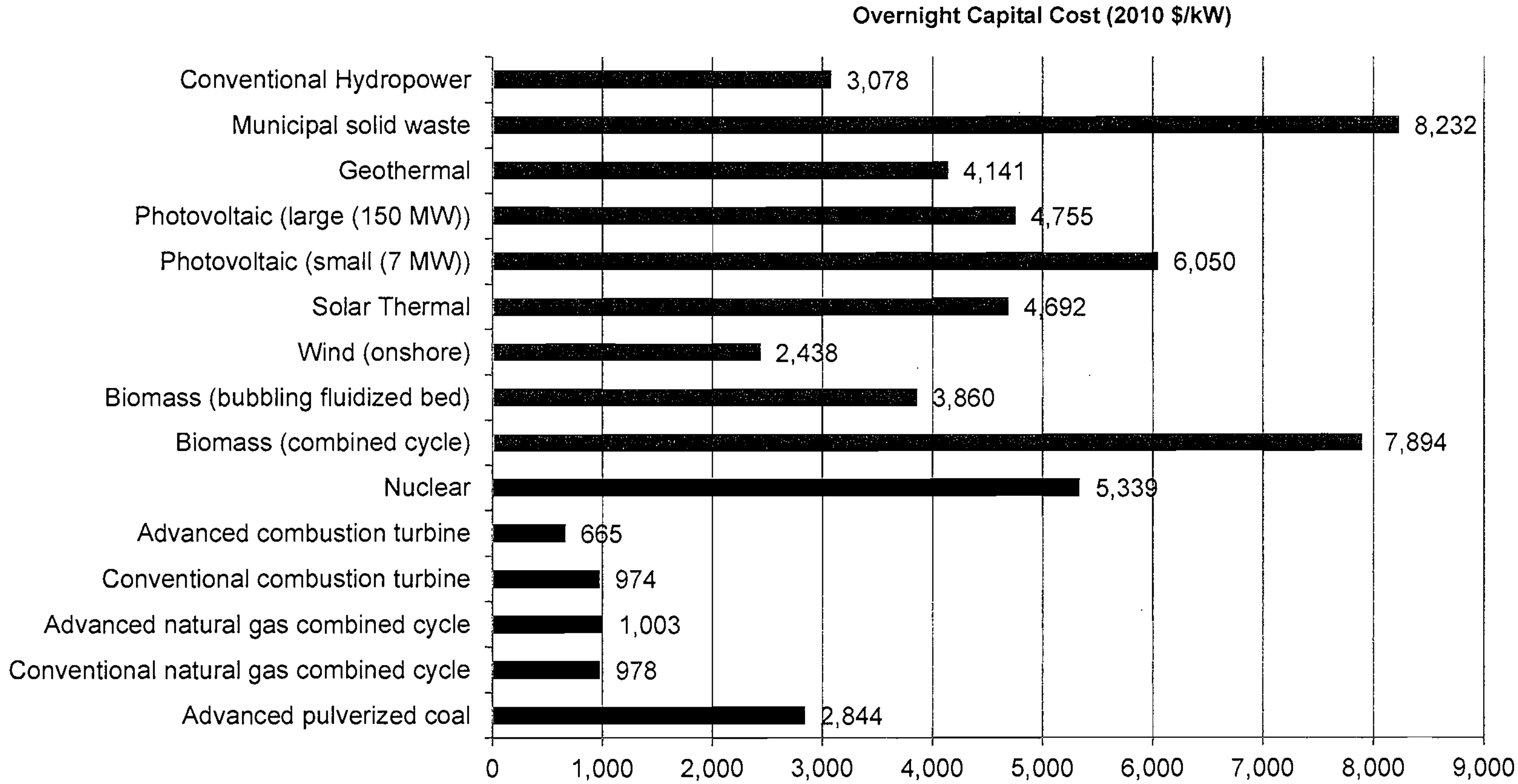


Source: EIA

Barriers to Renewables

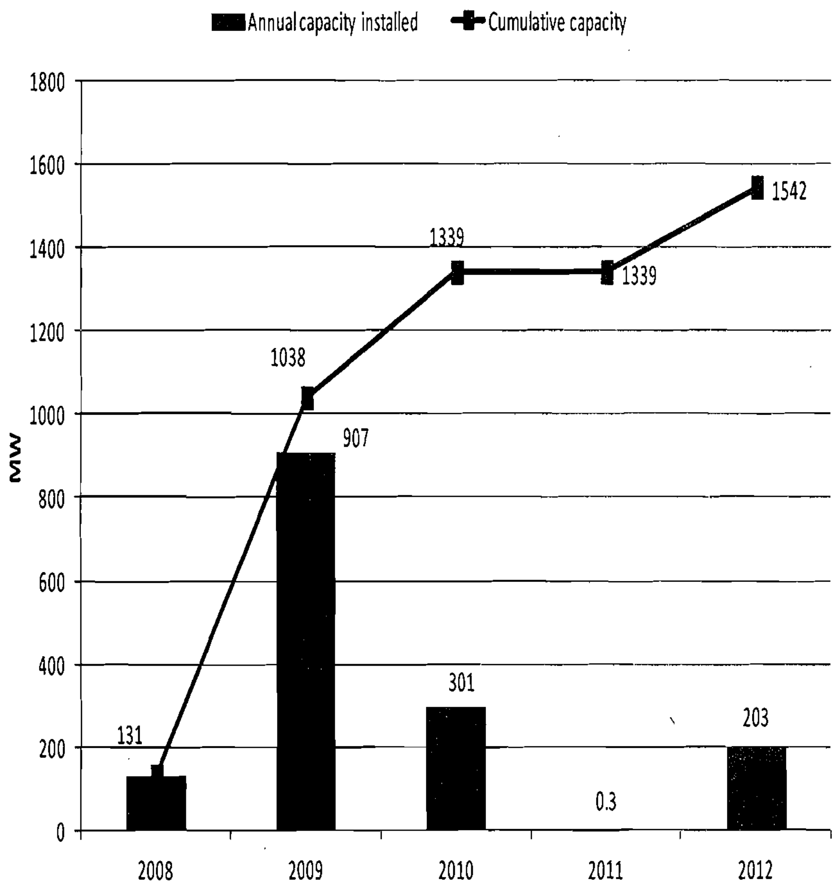
- Major barrier is cost
  - Most renewable technologies have high capital costs
  - According to EIA Indiana's average electric rate in 2010 was 7.67 cents/kWh vs. the national average of 9.83 cents/kWh
- Limited availability for some resources
  - Solar/photovoltaics, hydropower
- Intermittency for some resources
  - Solar/photovoltaics, wind

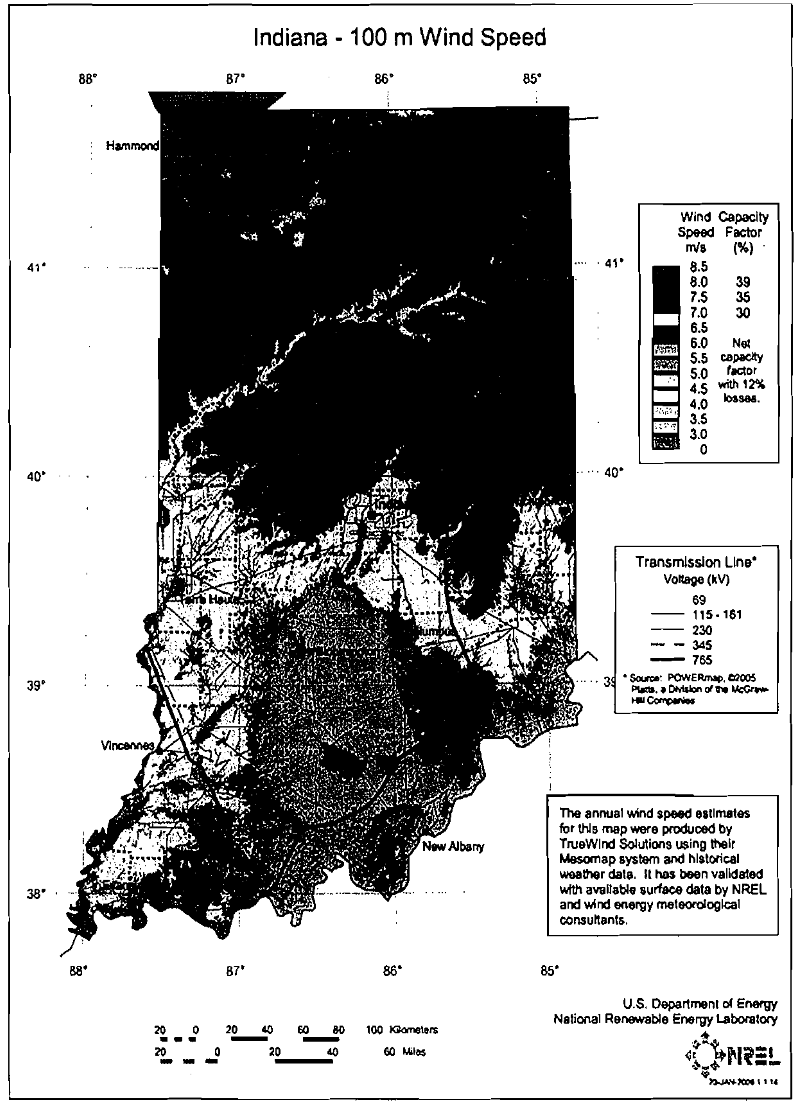
Capital Costs for Various Generation Sources



Data source: EIA

Wind


Annual capacity installed
Cumulative capacity
MW
1800
1600
1400
1200
1000
800
600
400
200
0
131
907
1038
301
1339
1339
0.3
203
1542
2008
2009
2010
2011
2012


Indiana - 100 m Wind Speed
88°
87°
86°
85°
41°
40°
39°
38°
Hammond
Vincennes
New Albany
Wind Speed m/s
Capacity Factor (%)
8.5
8.0 39
7.5 35
7.0 30
6.5
6.0
5.5
5.0
4.5
4.0
3.5
3.0
0
Net capacity factor with 12% losses.
Transmission Line*
Voltage (kV)
69
115 - 161
230
345
765
The annual wind speed estimates for this map were produced by TrueWind Solutions using their Mesomap system and historical weather data. It has been validated with available surface data by NREL and wind energy meteorological consultants.
U.S. Department of Energy
National Renewable Energy Laboratory
100 Kilometers
60 Miles
NREL

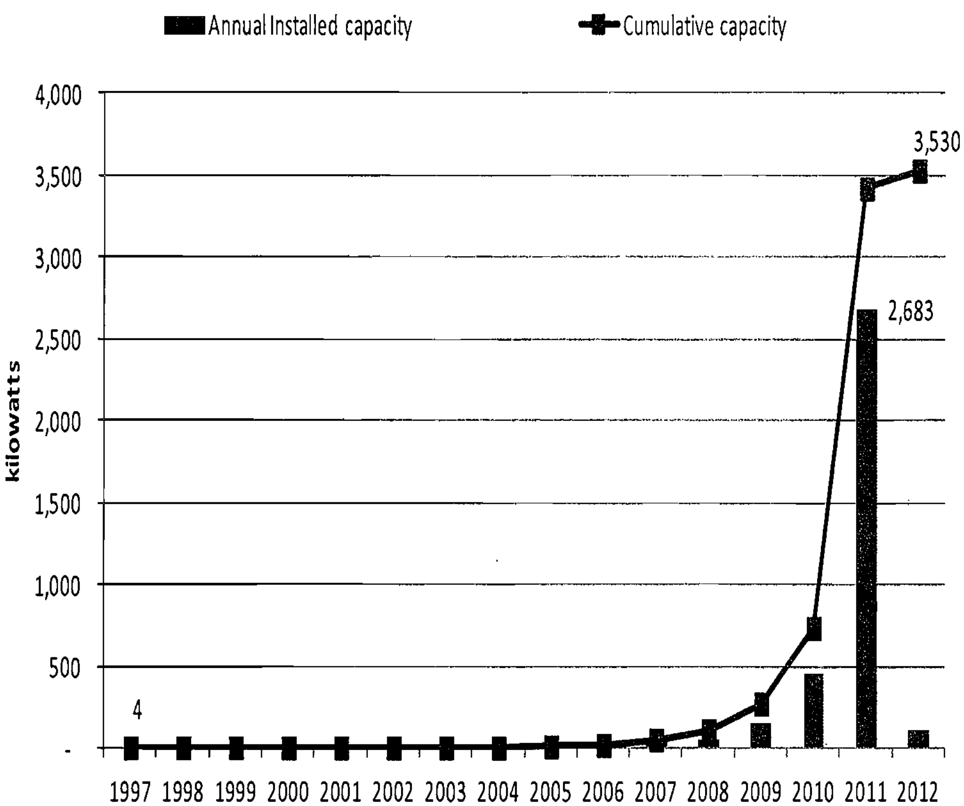
Energy Crops

- Transportation fuels
  - Ethanol
  - Biodiesel
- Other possibilities
  - Fast growing hardwood trees (hybrid poplar/willow)
  - Grasses (switchgrass)
- Barriers to be overcome
  - Other high-value uses for the land
  - Price of competing fossil fuels
  - Harvesting and transportation costs

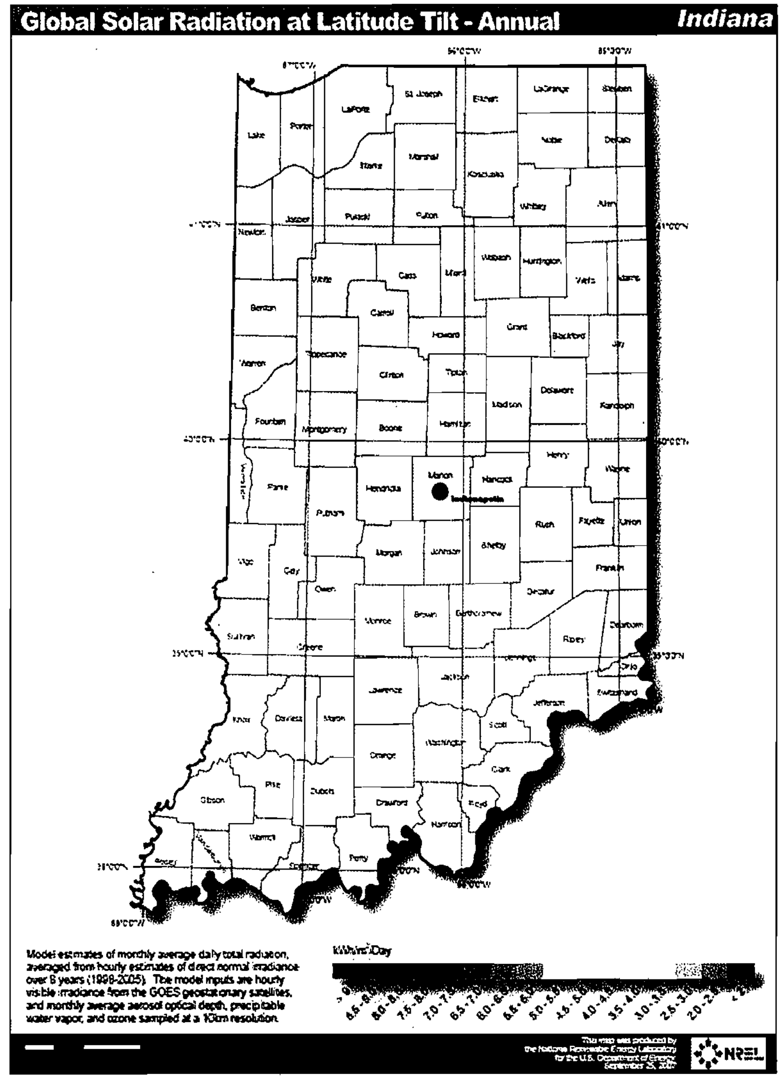
Organic Waste Biomass

- Until the recent increase in ethanol production, this resource was the largest source of renewable energy in Indiana
  - Primarily due to the use of wood waste
- It is the 3rd largest source of renewable electricity generation in the state
  - Landfill gas
  - Municipal solid waste
  - Animal waste biogas
  - Wastewater treatment

Solar Energy



Photovoltaic capacity in Indiana



Source: National Renewable Energy Laboratory

Photovoltaics

- Growing rapidly in Indiana, but still a small contributor overall
- 188 installations totaling over 3.5 MW of capacity
  - Fort Harrison Federal Compound
  - Metal Pro Roofing
  - Johnson Melloh
- 10 MW project proposed at Indianapolis airport

Hydroelectric Power

- Indiana has 73 MW of hydroelectric generating capacity.
  - mostly run-of-the-river (no dam)
  - 2nd largest source of renewable electricity
- American Municipal Power is constructing an 84 MW facility at the Cannelton Locks on the Ohio River
  - expected to be operational in 2014

Further Information

State Utility Forecasting Group

765-494-4223

sufg@ecn.purdue.edu

http://www.purdue.edu/discoverypark/energy/SUFG/

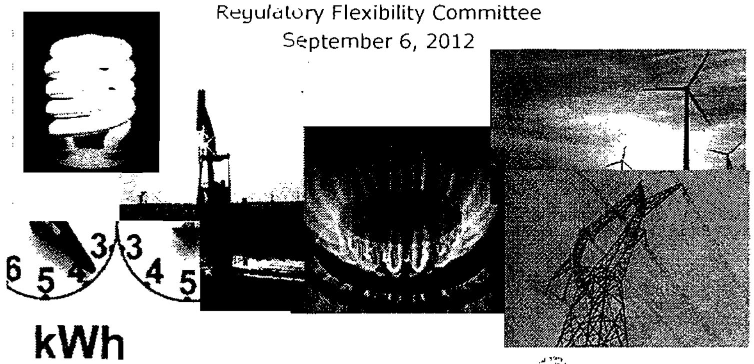
Douglas Gotham

765-494-0851

gotham@purdue.edu

Office of Utility Consumer Counselor

A. David Stippler, Indiana Utility Consumer Counselor
Remarks
to the
Regulatory Flexibility Committee
September 6, 2012



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Overview

- Challenges Ahead
  - Growing Federal Mandates
  - Compliance Costs and Consequences
  - Implications of Indiana Legislative Responses-Growth of Complex Regulatory Proceedings
- OUCC's Mission Effectiveness
  - Dedicated Advocacy
  - Creative Problem Solving
  - Consumer Education

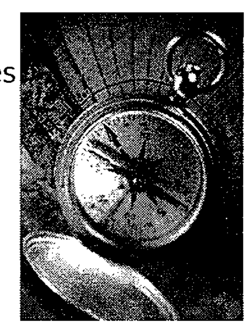

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EXHIBIT G

Growing Federal Mandates

- Environmental
  - Mercury and Air Toxic Standards (MATS) Rule (finalized December 21, 2012)
  - Cross-State Air Pollution Rule (CSAPR) (vacated by D.C. Circuit decision on August 21, 2012)
  - Proposed Cooling Water Intake Structures Rule-Sec.316(b) of Clean Water Act (published April 20, 2011)
  - Coal Combustion Residuals Rule (CCR) (late 2012-expected final rule date)
  - Proposed Greenhouse Gas (GHG) New Source Performance Standards (published April, 2012)

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Growing Federal Mandates

- Other
  - FERC-required Critical Infrastructure Protection (CIP) Standards
  - Developed by North American Electric Reliability Corporation (NERC)
  - Objective: protect "critical" assets (physical/cyber security measures) to maintain the security of the Bulk Electric System and its reliability

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Compliance Costs and Consequences

- Estimates by the Indiana Energy Association (IEA) for Indiana's 5 largest IOUs to comply with environmental mandates may exceed $11.5B.
- Impact of capital costs to meet mandates in terms of increased revenue requirements on Indiana alone would be in range of $1.7B annually, or an overall rate increase of 22 per cent over time.
- SUFG projections earlier this year of impact of EPA regulations over next decade estimated the price of electricity to rise another 14 per cent.

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Compliance Costs and Consequences

- The IEA's and SUFG's estimates portend a significant rise in electricity prices for Indiana consumers in the near future.
- Coupling the IEA's estimate as to the impact of EPA regulations with the SUFG's construction cost estimates would equate to an increased residential monthly bill of about $160/month for 1,000 k Whs of consumption or about another $570/year for electricity.

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Implications of Indiana Legislative Responses to Federal Mandates

- Actions by federal regulatory bodies and state legislative responses to those actions are resulting in the growth of complex regulatory proceedings being filed before the IURC

Dan Goldblatt (WFIU News) Legislative Wrap Up. Noon 4/29/11,Web,6/15/11,[http://indianapublicmedia.org/noonedition/legislative-wrapAddition]

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OUCC Mission

- "To represent all Indiana Consumers to ensure quality, reliable utility services at the most reasonable prices possible through dedicated advocacy, consumer education and creative problem solving."
- Demonstrating value for all Indiana Ratepayers.

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Dedicated Advocacy

- Duke Energy (IGCC)
  (Cause No. 43114 IGCC 4S1)
  - Over $700M in ratepayer savings
- Indiana American Water Rate Case
  (Cause No. 44022)
  - Nearly $15M in annual ratepayer savings

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Creative Problem Solving

- Citizens Thermal Energy
  (Cause No. 44149)
  - Conversion from coal and oil fuel sources for boilers to natural gas
  - Expected cost savings to be passed back to ratepayers through tracker mechanism
- "Energizing Indiana"
  - Promotion of Demand Side Management (DSM) Initiatives to improve energy efficiency

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Consumer Education

- Website (www.IN.gov/OUCC)
- Twitter (@IndianaOUCC)
- Facebook (Coming soon)
- Outreach
- Resource for legislators and other government officials

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Contact Information

David Stippler
Utility Consumer Counselor
www.in.gov/oucc
Phone: 317.232.2494
Direct: 317.233.3232
Toll Free: 1.888.441.2494

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