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Hoosier Energy REC
2011 Integrated Resource Plan
Volume III: Assessment of Supply Side Resources

Redacted Version

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Section 5: Resource Integration

5 Resource Integration

Pursuant to 170 IAC 4-7 Section 8, this section presents Hoosier Energy's preferred integrated resource plan (IRP). This section is divided into five subsections. The first subsection describes the Hoosier Energy IRP (or the preferred resource plan). The second subsection describes the development of the preferred resource plan. The third subsection describes certain risks and uncertainties associated with the preferred resource plan. The fourth subsection shows the financial impacts of the preferred resource plan. The final subsection discusses the flexibility of the preferred resource plan.

5.1 Preferred Plan Based on Hoosier Energy Resource Planning Criteria

As discussed in Section 1.3, Hoosier Energy's Integrated Resource Plan was developed based on three critical resource planning criteria.

1. The plan is low cost among supply alternatives.
2. The plan assures high reliability with respect to generation and delivery of wholesale power; and
3. The plan is consistent with maintaining a profile of low market and business risks.

Hoosier Energy's capacity expansion plan, as shown in Table 13, demonstrates sufficient capacity resources for the planning horizon.

Since 2002, Hoosier Energy has made a number of changes to its resource portfolio including:

- Acquisition of the 174 MW Worthington peaking power plant.
- Construction of the 172 MW Lawrence peaking power plant, which began commercial operations in May of 2005.
- Negotiation of two long-term power purchases of 100 MW each from Duke Energy Indiana, with an additional 50 MW long-term purchase beginning in 2016.
- Renegotiation of a long-term sale with WVPA converting a firm power sale to a unit contingent sale.
- Development and then subsequent expansion of the Clark-Floyd Landfill methane gas facility.
- Purchase of 25 MW of wind generation from the Story County facility in central Iowa.
- Acquisition of 50% ownership interest in the Holland combined-cycle generation facility.
- Implementation of new wholesale tariff options.
- Completion of an extensive analysis of energy efficiency and demand-side management programs.
- Purchase of 3.6 MW of generation from Dayton Hydro facility in Dayton, IL through a PPA.

The above resource changes have not only reduced Hoosier Energy's future capacity and energy needs but also diversified Hoosier Energy's resource mix. The addition of the Holland Facility has continued this process as it allowed Hoosier Energy to add an intermediate, gas-fired resource. The Holland Facility has reduced reliance on market purchases and provides diversity for intermediate and peaking needs. The Holland Facility may also serve as a baseload resource if legislation and/or regulations limiting carbon emissions are implemented.

cooperatives, has defined franchised service territories. Taken together, Hoosier Energy's higher financial risk profile has been balanced by its overall lower business risk.

On the other hand, market risk, reflecting price volatility, can be significant. Hoosier Energy's preferred plan lessens risk associated with the market using a strategy of owned resources, long-term purchases and sales and short-term purchased power market contracts as illustrated below:

1. Unit Power Sales - Hoosier Energy has historically balanced a portion of its operating risk through Unit Contingent power sales to various counterparties. These sales provide Hoosier Energy with the ability to balance its generating resources and forecasted member sales and also provides revenue which can lower member rates. As discussed later, Hoosier Energy will continue to explore Unit Contingent sales in the future.
2. Wholesale Market Purchases and Sales -- The wholesale market provides short-term opportunities for both purchases and sales of power. Optionality exists to the extent Hoosier Energy staggers various purchased power contracts with differing expiration terms and conditions.
3. Joint Ventures -- Development of the Lawrence County facility in 2005 and acquisition of the Holland Facility in 2009 demonstrates Hoosier Energy's willingness to partner with neighboring utilities. These joint ventures allow for the sharing of risks and reduce overall costs. Hoosier Energy will continue to review such opportunities as they become available.

Hoosier Energy recognizes that a resource plan is inherently uncertain and major cost categories require risk management. The following is a list of these major cost categories:

- Fuel costs
- Interest rates
- Future environmental regulations
- LMP market changes
- Regional power requirements
- Member system growth
- Industrial growth
- Inflation rates
- Transmission pricing
- New technologies

Hoosier Energy recognizes that it faces a changing environment. The primary goal for this IRP was to develop a plan that would provide the best service and price, using technologies currently available. Whenever possible, the Hoosier Energy resource screening process recognized these effects and evaluated their impact through various scenario analyses.

5.1.4 Flexibility

Where practical and reasonably available, Hoosier Energy maintains some optionality to preserve planning flexibility in order to serve its members at a reasonable cost. The ability to pursue alternative strategies depending upon the market environment is an important component of the preferred plan. As stated above, Hoosier Energy's plan of using a mix of owned resources, long-term purchases and sales and short-term purchased power market contracts not only reduces risk, but also provides the flexibility necessary to respond to changing market conditions. The

Energy has added wind power, increased the capacity of the Clark-Floyd landfill generation project and entered into a PPA with a hydro facility.

In addition, Hoosier Energy is pursuing additional landfill generation projects as well as biomass, hydro and coalbed methane facilities. Hoosier Energy was issued a Certificate of Public Convenience and Necessity (CPCN) by the IURC to construct up to 40 MW of landfill gas-fired generation in Cause No. 43987, dated July 27, 2011. In addition, Hoosier Energy was issued a CPCN to construct up to 30 MW of Coalbed Methane Gas generating facilities in the Order in Cause No. 43893, dated October 14, 2010.

With respect to energy efficiency and demand response, the Energy Efficiency and Demand Response Potential Study details the demand-side programs that Hoosier Energy plans to pursue.

5.2 Development of the Preferred Plan

Hoosier Energy's goals in developing its IRP were to enable the Company to achieve the lowest power supply cost for its member systems while maintaining a low market and business risk profile and ensuring a high degree of reliability. This IRP considered a variety of generation options (supply-side) and incorporates consumer usage modification (demand-side) alternatives to develop an appropriate blend of resources to minimize overall system cost.

An assessment of Hoosier Energy's current generation capacity and scheduled power transactions is found in Section 3.1 Existing Resource Assessment. This section also provides additional detail on environmental, transmission and commodity forecasts. Sections 3.2 Future DSM Resource Assessment and 3.3 Future Supply-Side Resource Assessment outline the demand and supply-side options that are available to Hoosier Energy to meet future demand. Section 4 includes the resource screening analysis for demand and supply-side options. Based on this analysis, the most economical sources of supply-side resources were considered in the Hoosier Energy plan.

5.3 Financial Impacts

5.3.1 Effects of the Preferred Plan on Costs and Rates

The Preferred Plan is not forecast to materially change Hoosier Energy's wholesale rates to members in the long-term. The near-term impact to Hoosier Energy's rates from the reduction in Ratts' generation levels will be no significant impact in 2012 and 2013 and a reduction of about \$.50/MWh in the period from 2014 through 2016.

5.3.2 Hoosier Energy's Ability to Finance New Resources

Hoosier Energy's current investment grade credit status allows ready access to public and private capital markets at market-based rates. Hoosier Energy anticipates maintaining this credit quality and feels that adequate capital resources are available to finance the acquisition of a required resource.

5.4 The Preferred Plan's Flexibility

As stated, the primary goal of the IRP is to develop a plan that is low risk, reliable and cost effective. A secondary goal of the IRP is to develop a plan that is flexible to enable cost effective responsiveness to changing business circumstances. The preferred plan will enable Hoosier

Section 6: Integrated Resource Plan

6 Assessment of Resource Options

6.1 Introduction

In order to plan a portfolio of resources that will serve its members at the lowest possible cost while ensuring adequate reliability and minimizing risk, Hoosier Energy has prepared an assessment of resource options. This assessment identifies the list of resources and associated cost and operational parameters that will be included in Hoosier Energy's integrated system modeling process. The integrated system modeling process will be performed using PA Consulting's Generation Portfolio Optimization Model (GPOM). The GPOM is an internally-developed integrated planning model and will define the optimal resource portfolios that constitute Hoosier Energy's Integrated Resource Plan ("IRP"). The GPOM is a traditional screening model that selects the best resources given a particular set of parameters and facilitates the selection of optimal expansion plans by considering capital costs as well as operational characteristics and associated costs of new resources when integrated with existing Hoosier Energy resources.

Cost and performance data contained in this portion of the IRP report will be used to assemble a set of base case assumptions for use in the modeling process. Supply related assumptions that may vary between the Base Case and sensitivity cases include: (1) fuel prices, (2) load growth, (3) capital costs, (4) emission costs, (5) presence of CO₂ emission costs, (6) presence of ash regulations and (7) presence of Clean Water Act Section 316(a) and 316(b) regulations.

6.2 Hoosier Energy's Existing Supply-Side Resources

Hoosier Energy's existing owned generating resources include two coal-fired plants (Ratts and Merom), three gas-fired plants (Worthington, Lawrence and Holland), and one landfill gas facility (Clark-Floyd). Ratts is a two unit plant capable of producing approximately 250 MW. The Merom plant also consists of two units; these units have a combined capacity of approximately 1,000 MW. The Worthington plant consists of four combustion turbine units with total capability of 184 MW. The Lawrence plant consists of six combustion turbine units; Hoosier Energy owns 4 and Wabash Valley Power Association ("WVPA") owns 2. The Hoosier Energy-owned Lawrence units are capable of producing a total of 190 MW. In addition to these resources, Hoosier Energy purchased a 50 percent interest in the Holland facility in 2009. The Holland facility is a 652 MW combined cycle unit located in Shelby County, Illinois, which is jointly owned by Hoosier Energy and WVPA. Clark-Floyd is a 3.5 MW landfill methane gas facility.

Tables 1 and 2 list characteristics associated with each of the existing Hoosier Energy generating resources, including its existing renewable resource – the Clark-Floyd Methane Gas facility.

Combustion Turbines	Resources typically used to serve peak load needs. These resources are characterized by relatively high operating costs and relatively low capital costs.
Combined Cycle Units	These resources are used to serve intermediate needs. All-in cost levels (costs including both operating and capital) have historically characterized these resources as the economic choice for dispatch over a mid-range of capacity factors.
Coal Units	Relatively high capital costs are balanced by relatively low operating costs for these baseload resources. Operating at high capacity factors facilitates spreading capital costs over large generation amounts making these units attractive for serving baseload requirements.

As detailed below, the supply-side resources considered in Hoosier Energy’s IRP were produced through a collaborative effort between Hoosier Energy and Burns & McDonnell. These resources were deemed to be the best options available to potentially enhance or replace the generation traditionally provided by the Ratts units. Once these resources were identified, they were incorporated, as potential expansion options, into the integrated system modeling that will define the optimal portfolio of supply and demand side alternatives over the IRP horizon.

Hoosier Energy’s participation in the MISO market also defines another supply-side alternative. In the integrated modeling portion of the IRP development, market capacity and market energy will be included as potential resources. Market prices will be discussed later in this report. The cost and performance characteristics for each of these potential supply-side alternatives are included in Appendix K to the IRP.

6.3.1 Risks Associated with Supply-Side Resources

Each supply-side alternative is vulnerable to a number of risk factors. Cost risk factors include resource capital cost, resource fuel cost, resource emissions cost, resource financing cost, and market cost. Other risks include technology (*i.e.* reliability), load and energy growth, and types of products available in the MISO market (*e.g.* uncertainty surrounding the development and availability of market capacity). Risks will be addressed through sensitivity cases in the IRP modeling process. Additionally, the incorporation of different resource alternatives with varying emission rates into the modeling process will consider emission cost risk in all IRP modeling scenarios. Resource selection reaction to load and energy growth will be analyzed through a load and energy forecast sensitivity.

6.3.2 Fuel Price Assumptions

Hoosier Energy provided estimates of coal prices for existing and potential new coal units for the term of the IRP. Natural gas forward curve assumptions were provided by PA Consulting. The following table shows fuel price projections that will be used in the modeling process. Coal prices are assumed to remain constant during all months of each year. Gas prices vary; prices shown below are simple averages of projected monthly prices.

planning period. These resources have been included in Hoosier Energy's Board-approved five-year Business Plan and were considered along with traditional resources in the resource selection process. These resources will be added to Hoosier Energy's portfolio at a cost lower than that of the other baseload resource options that were considered. With the addition of these resources, and the additional 30 MW expected to be added in 2017 – 2019 Hoosier Energy expects to have 108 MW of renewable resources in its portfolio by 2020.

Table 7
Renewable Resource Parameters
(\$/MWh)

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6.5 Demand-Side Resources

Appropriate demand-side resource options have been selected and developed as part of the GDS energy efficiency and demand response study, which has been included as Appendix A1 of this IRP. The demand-side resource options have been incorporated into the load forecast employed by Hoosier Energy in this IRP.

Section 7: Screening Results

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Appendix K: Potential Resource Alternatives – Cost and
Performance Data
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Appendix L: Ratts Strategy Study Methodology and
Approach
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