

Economic Trends Influencing Future Load Growth

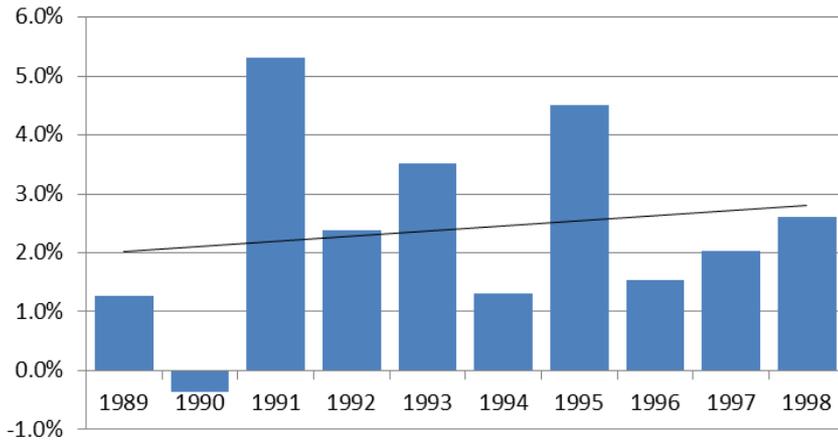
Chad Burnett

Director of Economic Forecasting
October 23, 2014

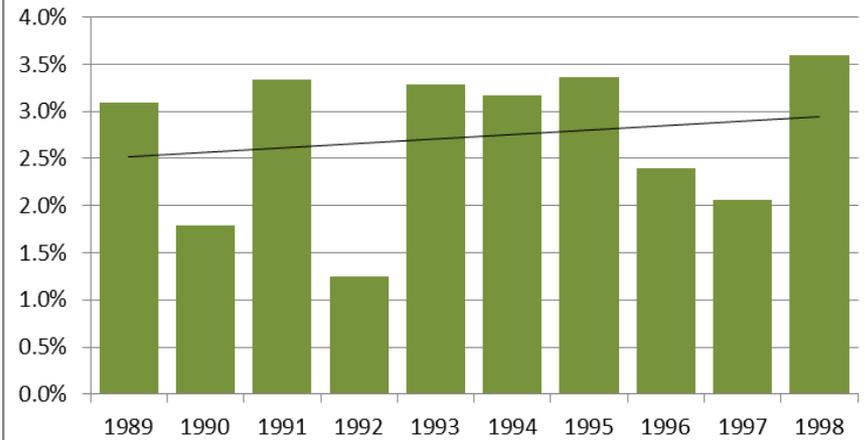


Load Growth in the 90s

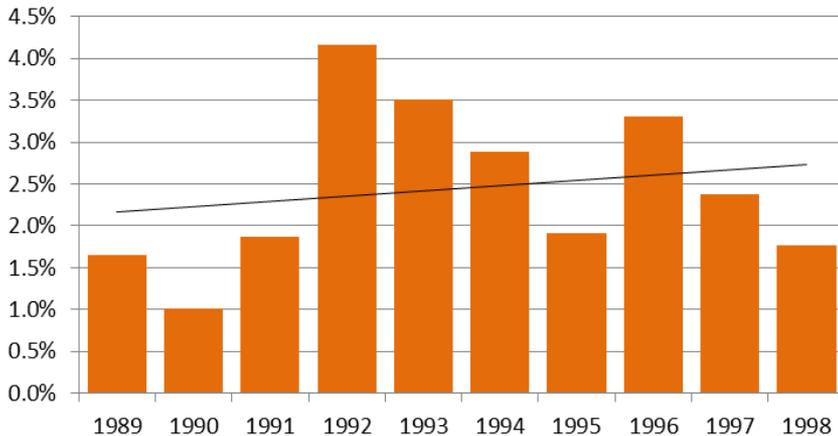
Normalized Residential Sales Growth



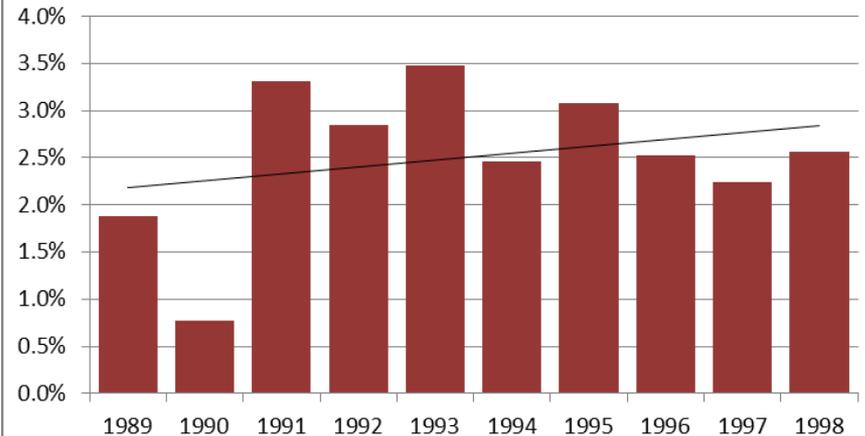
Normalized Commercial Sales Growth



Industrial Sales Growth



Normalized Retail Sales Growth

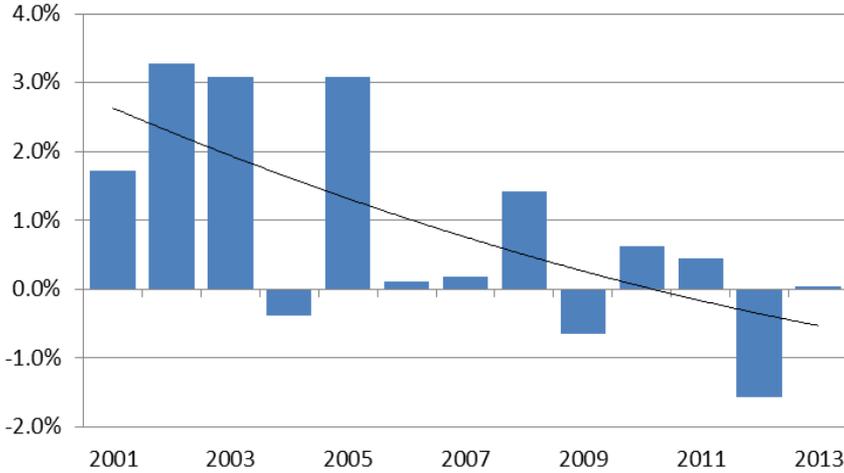


In the 90s, normalized load was growing at an accelerating pace in all major classes.

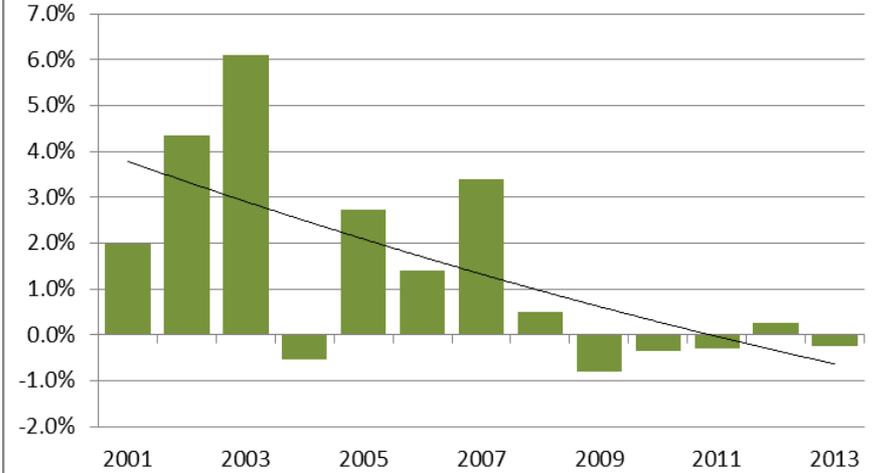


Declining Sales Trends Over Past Decade

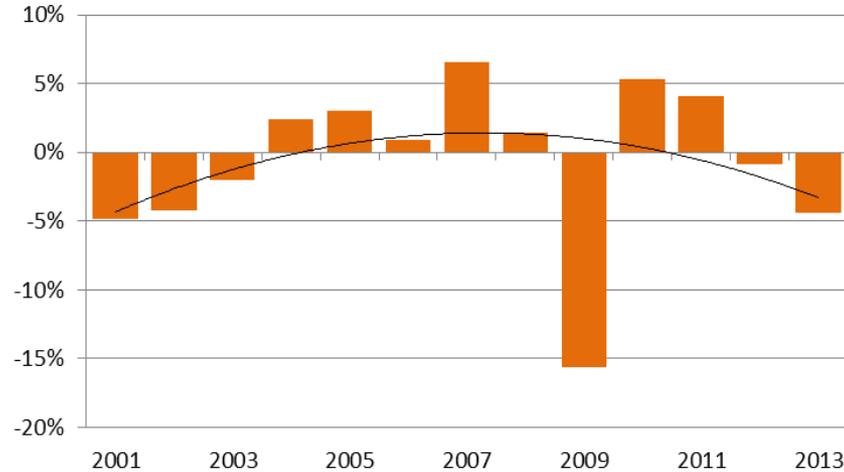
Normalized Residential Sales Growth



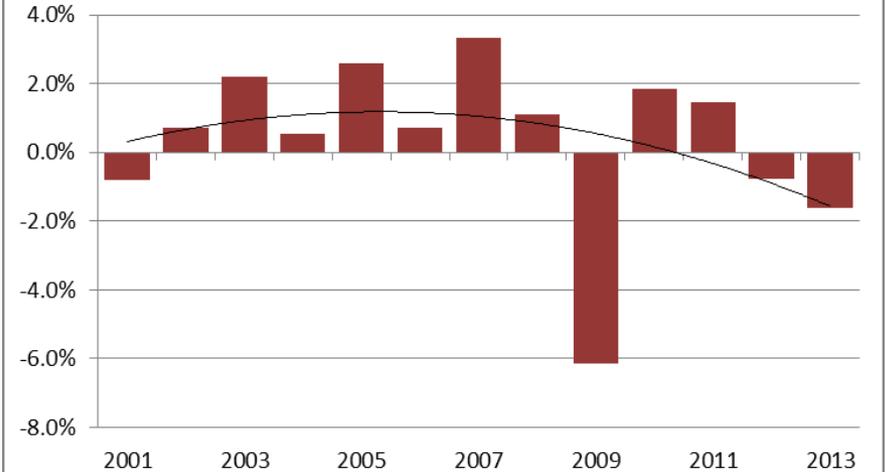
Normalized Commercial Sales Growth



Industrial Sales Growth



Normalized Retail Sales Growth

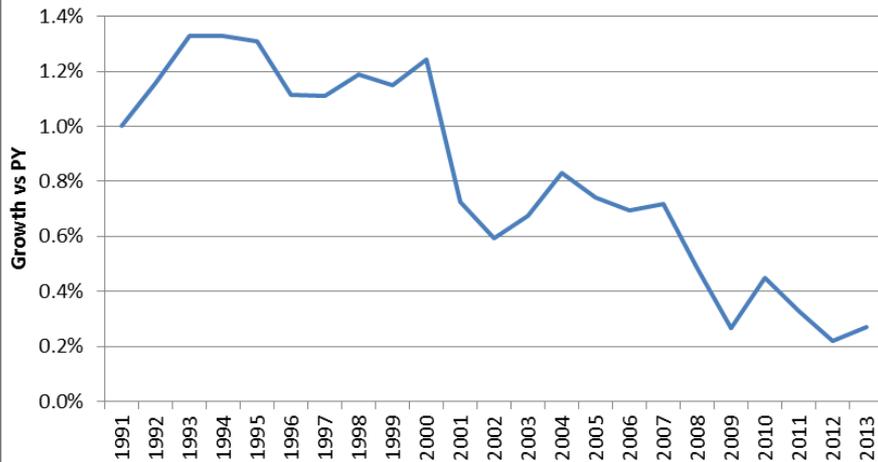


Over the past decade, load growth has slowed dramatically.



Declining Customer and Usage Growth

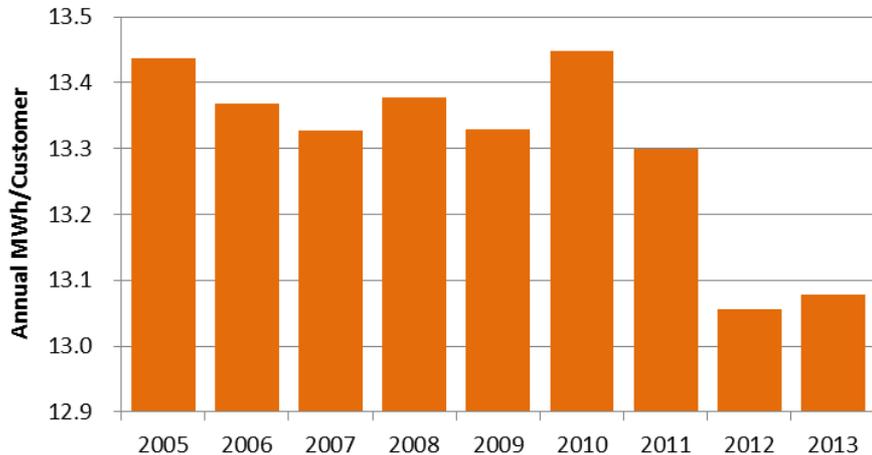
AEP Residential Customer Growth



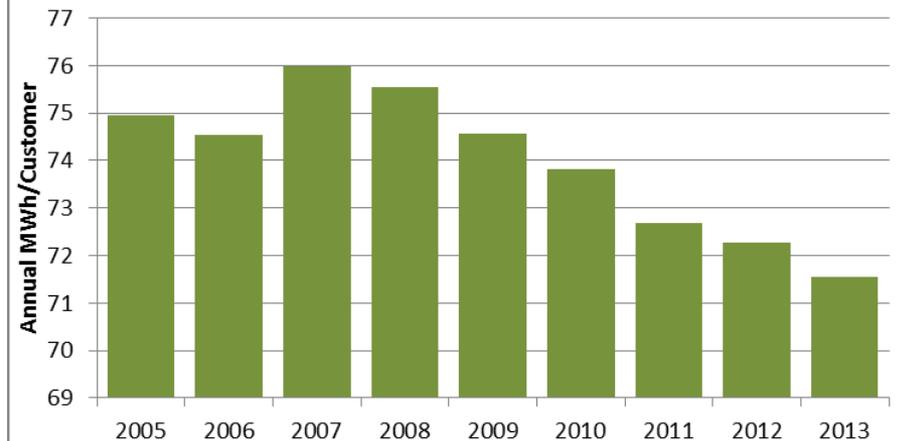
AEP Commercial Customer Growth



AEP Normalized Residential Usage



AEP Normalized Commercial Usage



The decline over the past decade is happening in both customer counts and usage per customer.

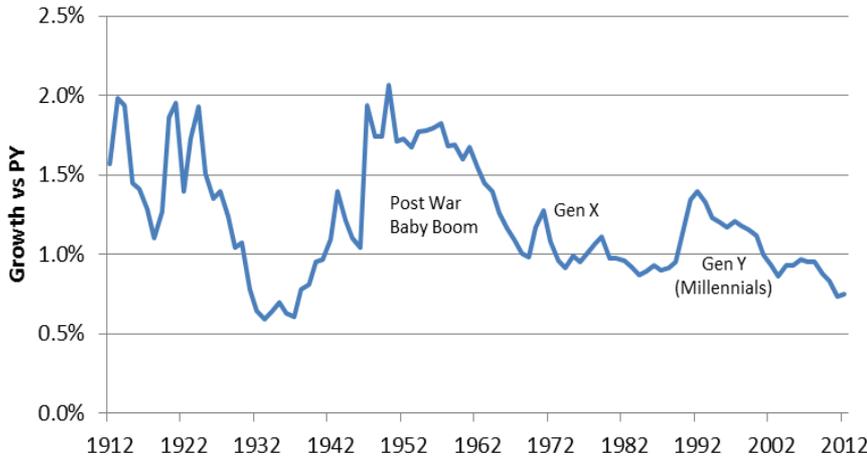
- Demographics
- Economy
- Energy Efficiency



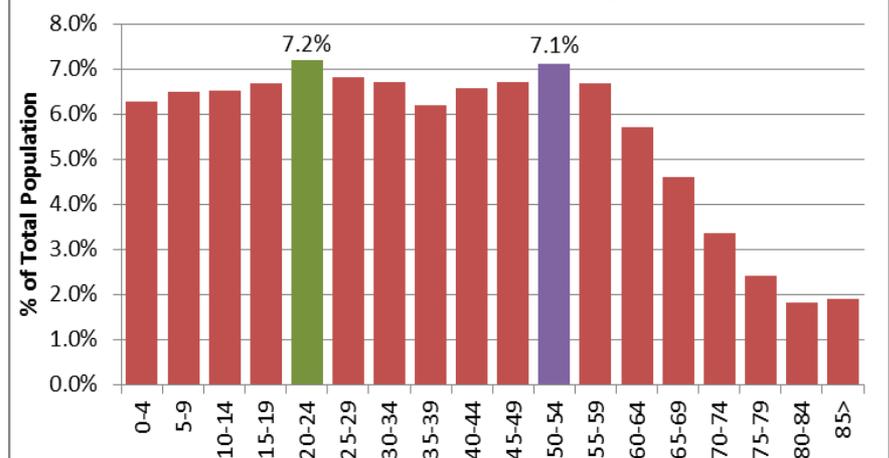


Changing Demographics Impact Customer Growth

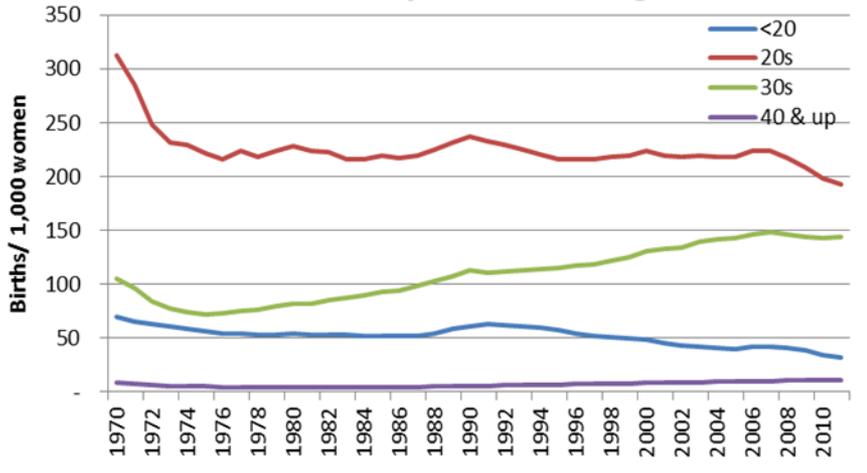
US Population Growth



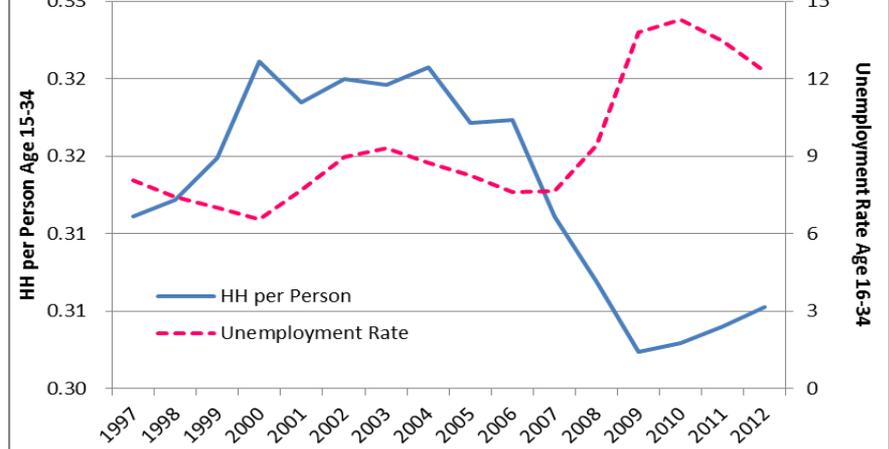
US Population by Age



Birth Rate by Mother's Age



Weak Job Market Affecting Millennial Household Formation



The economy appears to have impacted household formation by Millennials.

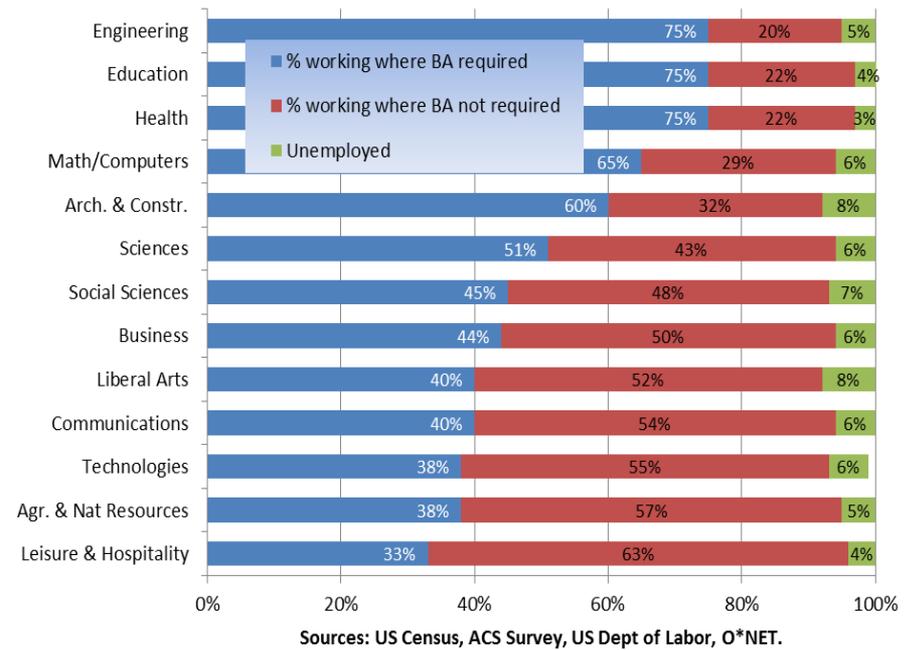


Millennials Struggle to Find High Paying Jobs...But Wait

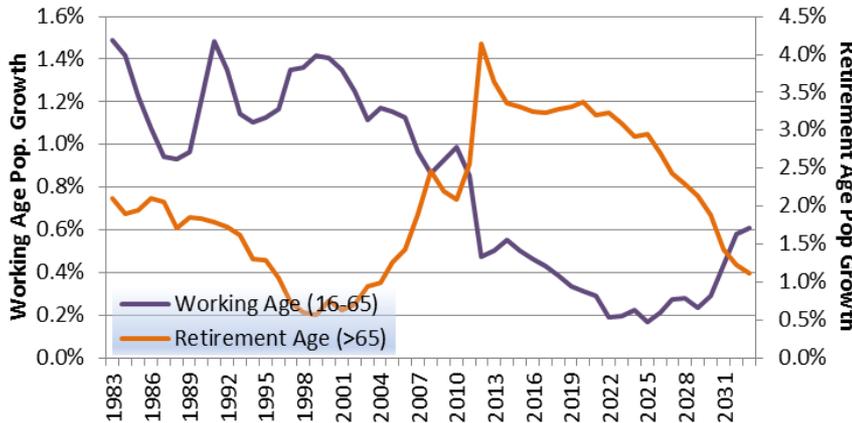
Unemployment Rate for Millennials



Recent College Grads by Major (2009-11)



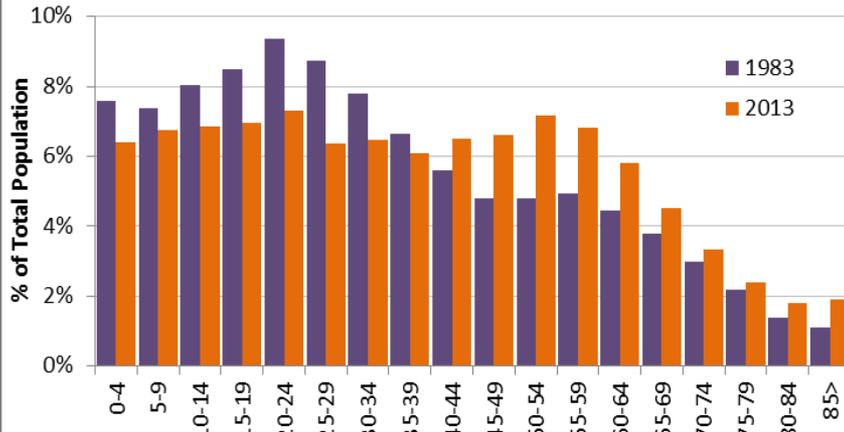
Boomer Retirements Will Increase Demand for Workers



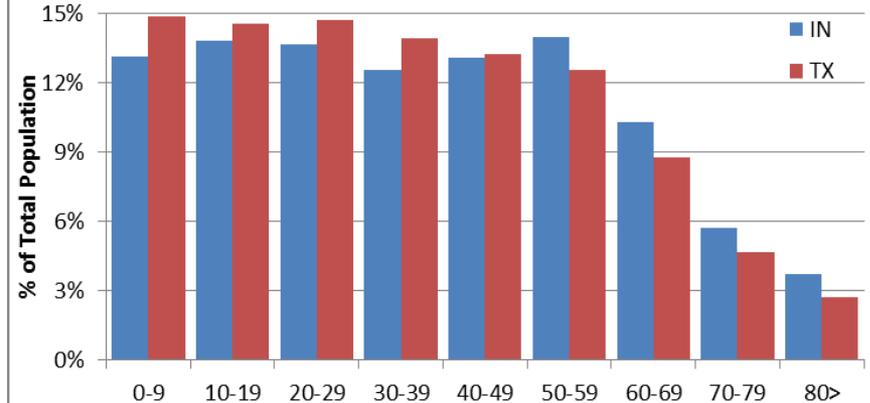
- The job market is improving for Millennials, but many have accepted jobs for which they are over-qualified.
- Lower paying jobs will make it more challenging for Millennials to save for a down payment on a home purchase.
- As more Boomers retire, it should free up more higher paying jobs for Millennials to fill over the next decade.

Eventually, Millennials will fill higher paying jobs made available by Boomer retirements.

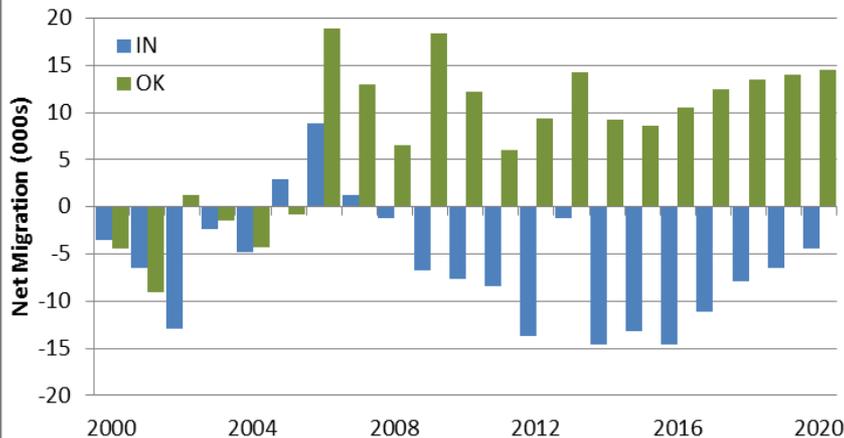
Indiana Population by Age



IN More Challenged for Long Term Customer Growth

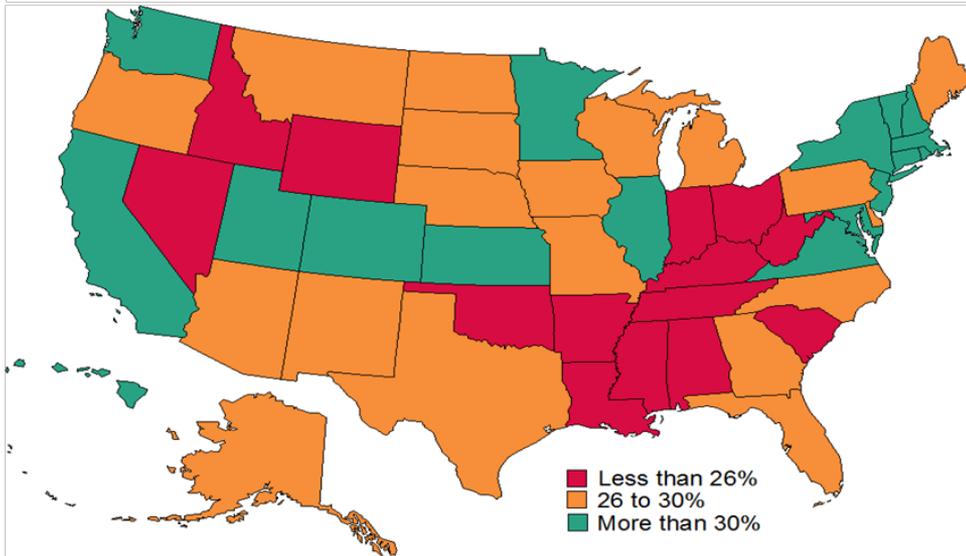


Domestic Net Migration Comparison



- The state of Indiana has a much older population than it had just 30 years ago.
- In 1983, 50% of IN's population was under age 30. Today only 40% are that young.
- Compared to other states (like TX and OK), Indiana's long term customer growth projections will be limited due to the shifting demographics.
- Since the recession, more people are leaving the state of IN than are moving in and it appears they are moving to states where the job markets are better.

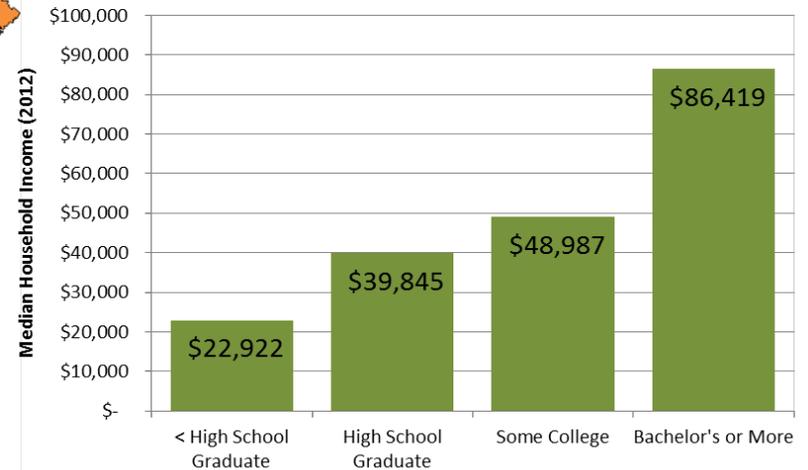
Share of adults 25 and older with a college degree, %, 2012



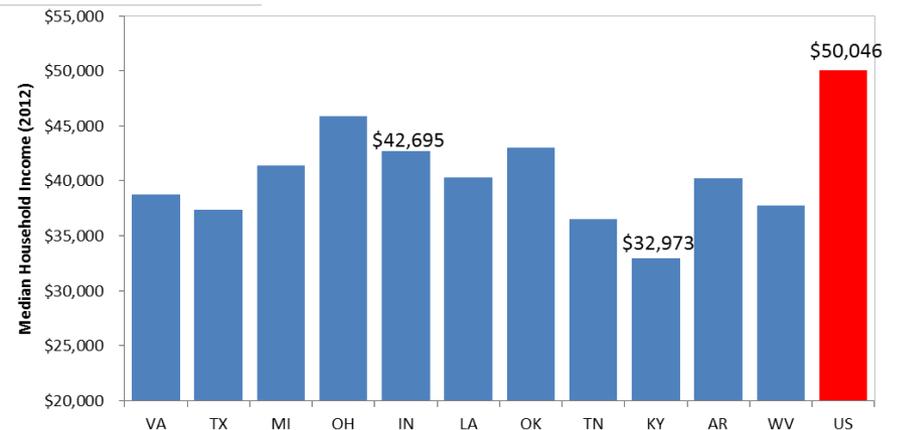
Sources: ACS, Moody's Analytics

- Most of the states in AEP's territory have relatively fewer college educated adults.
- A college degree has a significant impact on household income.
- The average median household income in AEP's service territory is almost \$9,000 below the US average (IN territory is over \$7,300 less than the US).

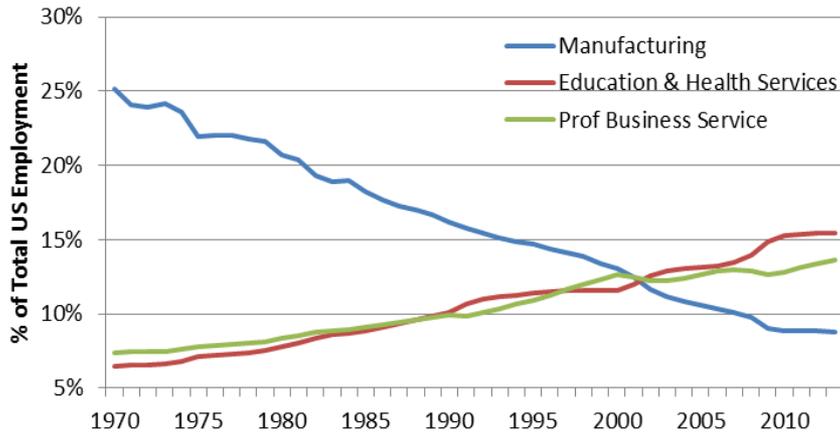
The Value of Education



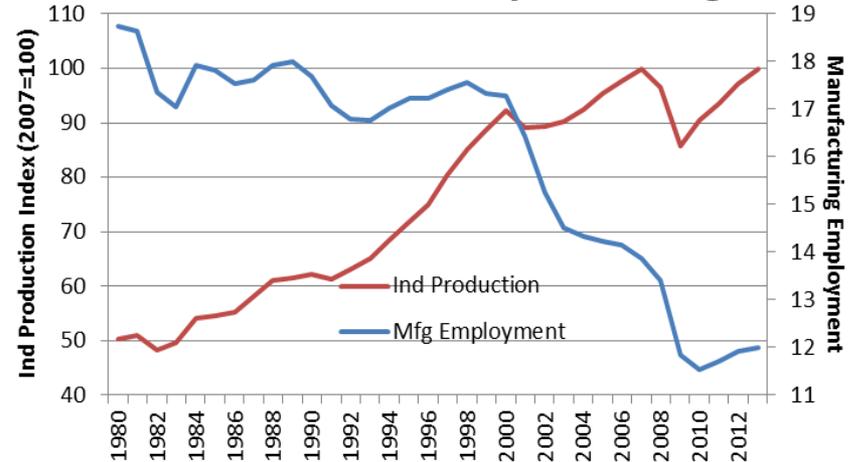
Household Incomes in AEP Territory Lower Than US



Economic Shift in Employment



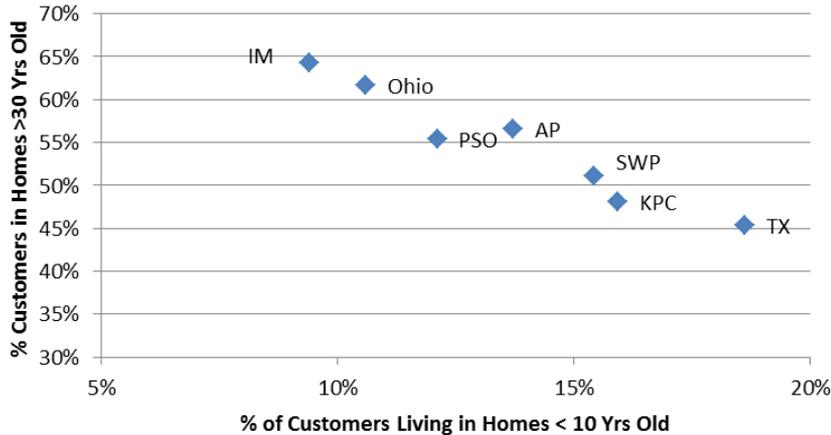
Industrial Productivity Increasing



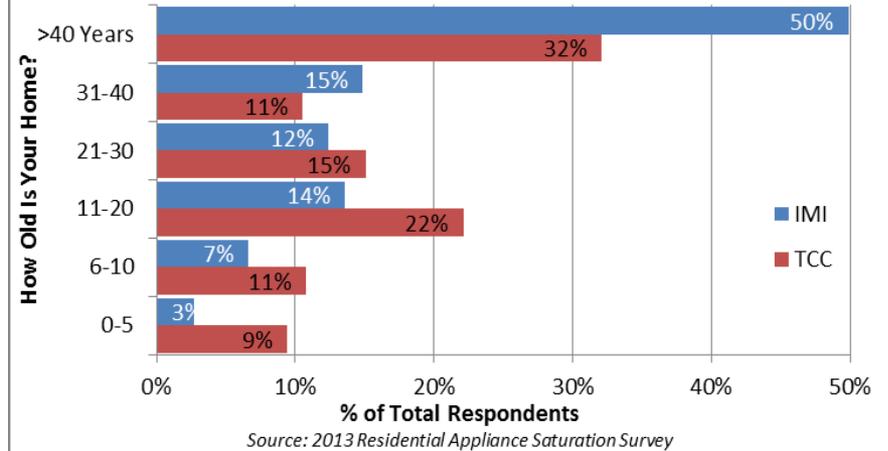
- Over the past 40 years, the US economy has dramatically shifted away from manufacturing towards service based industries.
- Today, the share of employment in Manufacturing is about 1/3 of what it was in 1970, while the share for Professional & Business Services has doubled and the share for Education & Health Services has tripled during the same period.
- At the same time, US Manufacturers have dramatically increased their productivity through efficiency. Manufacturers today are producing more with less.

AEP Indiana Has Older Homes That Have Not Appreciated in Value

AEP Housing Age

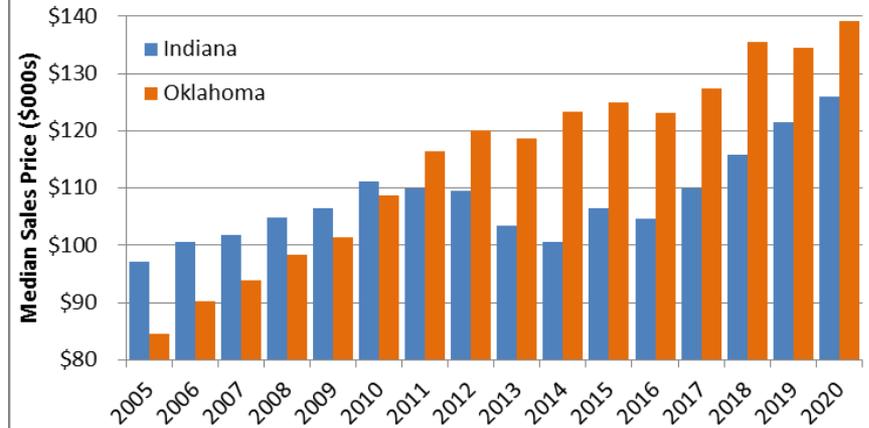


IN Has More Older Homes Than TX



- I&M has more older homes (>30 years old) and fewer newer homes (<10 years old) than any other AEP operating company territory.
- Home prices in Indiana have not appreciated in value like those in other states.

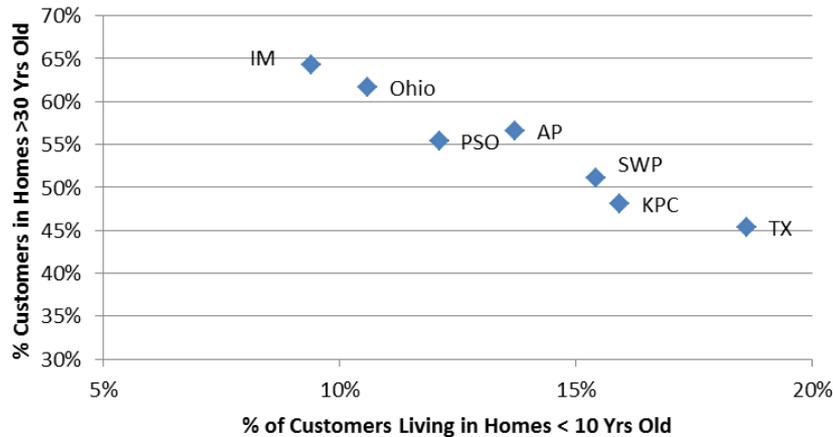
IN Homes Not Appreciating in Value Like OK





Chicken and Egg for EE Policy Makers

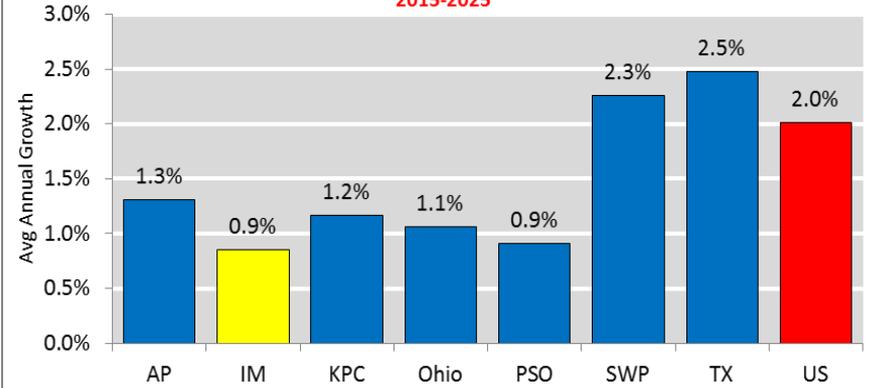
AEP Housing Age



- Historically, the AEP states with the most aggressive EE mandates (IN, MI, & OH) have also been among the states with the oldest housing stock and the weakest economic projections.

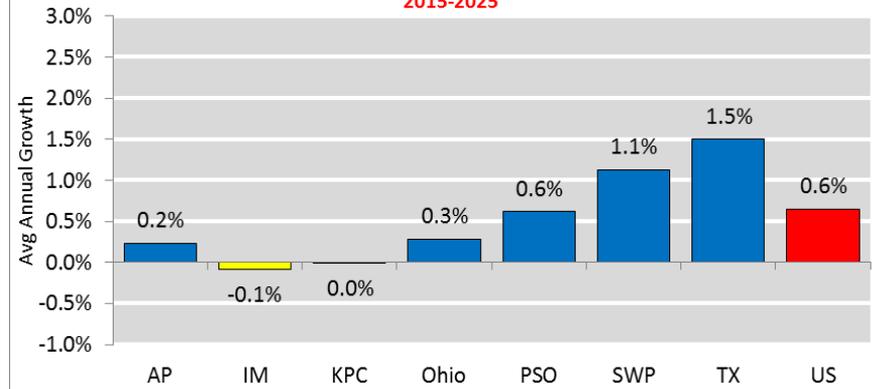
Gross Domestic Product (GDP)

2015-2025



Non-farm Employment

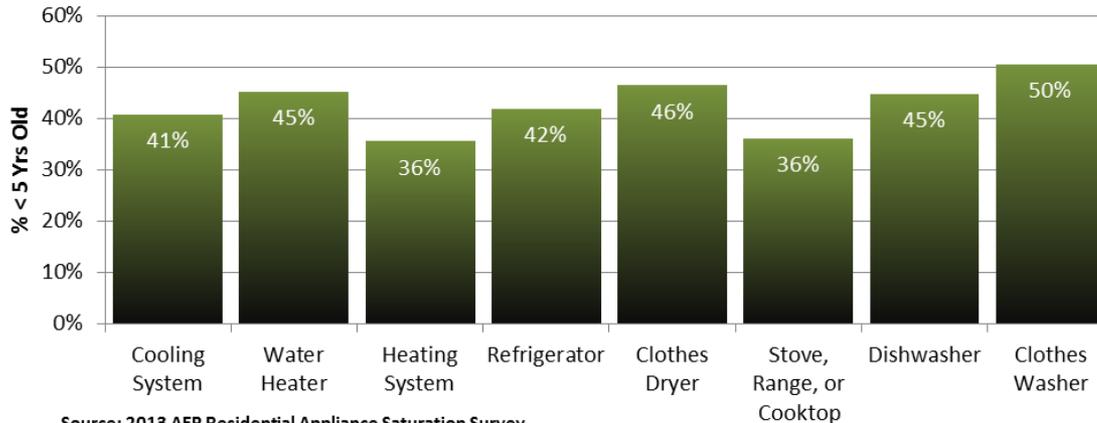
2015-2025



Saturation of Efficient Appliances

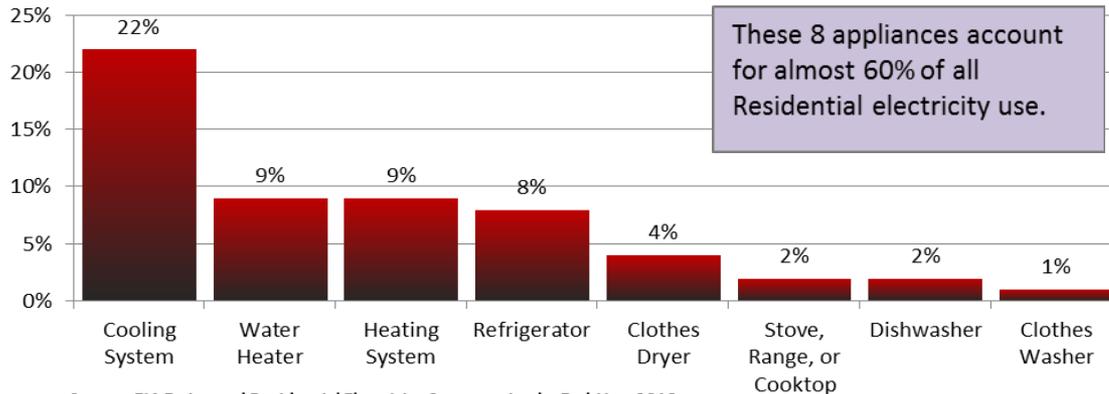
Customers With Newer Appliances

< 5 Years Old



Source: 2013 AEP Residential Appliance Saturation Survey

Appliance Share of Residential Electricity Consumption



These 8 appliances account for almost 60% of all Residential electricity use.

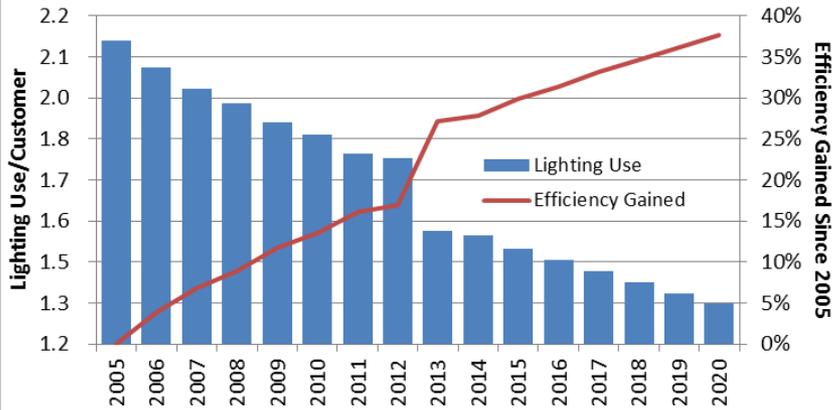
Source: EIA Estimated Residential Electricity Consumption by End-Use, 2010

- According to our 2013 Residential survey, just under half of our customers replaced many of their major appliances within the last 5 years.
- Most appliances that are sold in the market today are more energy efficient than they were 10-20 years ago, due to legislated standards and customer preferences.
- In addition to these major appliances, lighting standards from EISA 2007 are also having an impact on lower Residential usage growth.

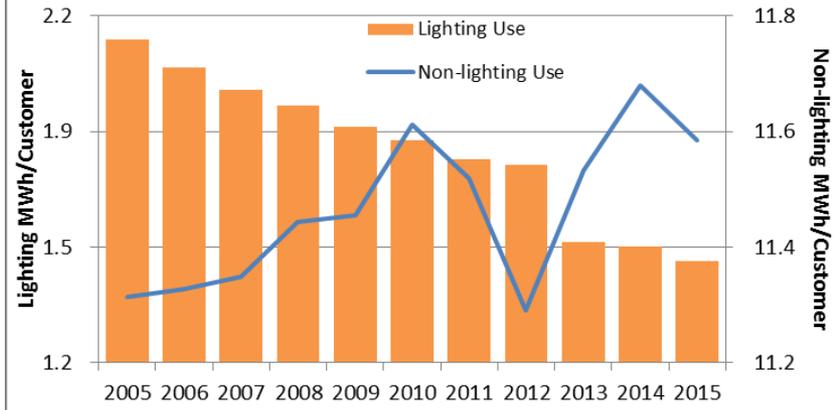


Impact of Efficient Lighting

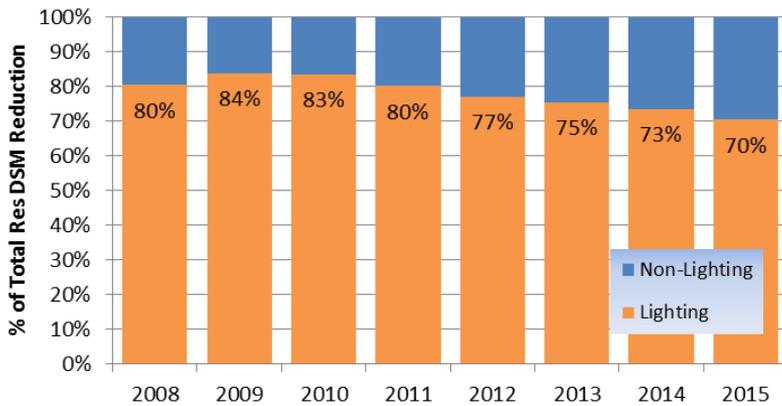
AEP Residential Lighting Efficiency



AEP Residential Use by End-Use



Residential DSM Programs



- Residential usage has been declining for most of the past decade. Most of the decline is due to increased lighting efficiency from federal standards and company sponsored EE/DSM programs.
- Usage in non-lighting end-uses has actually been trending upwards.
- Going forward, there is less efficiency to be gained in lighting and effective EE/DSM programs will have to focus on non-lighting end-uses.

- Forecasts of future load growth are lower than historical averages due to the shifting demographics, a weaker economic outlook, and higher saturations of energy efficient appliances/technologies.
- Policy makers should consider the economy and the underlying demographic trends when developing future energy efficiency targets and mandates.
- Many customers have already adopted more energy efficient technologies in their homes which will make additional incremental energy efficiency savings more challenging to achieve.