2016 Indiana Renewables Study & 2015 Forecast

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Presented to:
Interim Study Committee on Energy, Utilities, and Telecommunications
Indiana General Assembly

September 29, 2016
2016 Renewable Resources Study

- Renewable energy trends
- Individual renewable resources
  - Wind
  - Energy crops
  - Organic waste
  - Solar/photovoltaics
  - Fuel cells
  - Hydropower
  - Algae
Historical Renewable Energy in the U.S.

Source: EIA
2015 U.S. Energy Consumption by Source

- Petroleum (Excluding Biofuels): 36%
- Natural Gas: 29%
- Coal: 16%
- Renewables: 10%
- Nuclear: 9%

- Renewable Energy Sources:
  - Wood: 21%
  - Waste: 5%
  - Geothermal: 2%
  - Solar: 6%
  - Wind: 19%
  - Biofuels: 22%
  - Hydro: 25%
2015 U.S. Electricity Generation by Energy Source

Source: EIA
Renewables Share of Indiana Total Energy Consumption

Source: EIA
Renewables Share of Indiana Electricity Generation

Source: EIA
Energy from Wind

Sources: IURC, EIA
Wind

- 1,894 MW of utility scale wind in Indiana
- 100 MW under construction
- 317 MW proposed but not started
- Indiana utilities have agreements to purchase 1,111 MW of wind power
  - 697 MW from in-state
  - 414 MW from out-of-state
Energy Crops

• Transportation fuels
  – Ethanol
  – Biodiesel

• Other possibilities
  – Fast growing trees (hybrid poplar/southern pine/willow/eucalyptus)
  – Grasses (switchgrass/sugar cane)

• Barriers to be overcome
  – Other high-value uses for the land
  – Harvesting and transportation costs
  – Price of competing fossil fuels
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 2nd largest source of renewable electricity generation in the state
  - Landfill gas (67 MW)
  - Animal waste biogas (16 MW)
  - Wastewater treatment (195 kW)
Solar Energy / Photovoltaics

Source: DOE
Photovoltaics

Sources: IURC, NREL
Photovoltaics

- Continued growth is expected with about 100 MW of planned additions over the next 5 years by Indiana utilities.
- Growth has been driven by lowering costs, utility feed-in tariffs, expanded eligibility rules for net metering, and tax incentives.
Hydroelectric Power

• Until expansion of wind energy beginning in 2008, hydro was the largest source of renewable electricity in Indiana
  – 73 MW, mostly run-of-the-river (no dam)
  – Now 3rd largest source of renewable electricity

• The 88 MW project at the Cannelton Locks on the Ohio River is expected to be fully commissioned in 2016
  – Most of the output will go to utilities outside Indiana
Indiana Electricity Projections: The 2015 Forecast

• The 2015 forecast shows little growth through 2020 and stronger growth thereafter

• Real (inflation-adjusted) prices increase in the first few years before leveling off
Indiana Electricity Requirements

- Retail sales by investor owned and not-for-profit utilities
- Includes estimated transmission and distribution losses
- Growth rates
  - 2015 forecast: 1.17%
  - 2013 forecast: 0.74%
  - 2011 forecast: 1.30%
Indiana Resource Requirements

- Resources may be provided by conservation measures, contractual purchases, purchases of existing assets, or new construction.
- Existing resources are adjusted into the future for retirements, contract expirations, and IURC approved new resources.
Indiana Real Price Projections (2013 $)

- Effect of inflation removed
- Includes the cost of new resources
- Due to timing of the release of the final version of the EPA Clean Power Plan, it is not included
- Other finalized rules (e.g., MATS) are included
Further Information

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