

Indiana Electricity Projections and Renewable Energy

Presented by:

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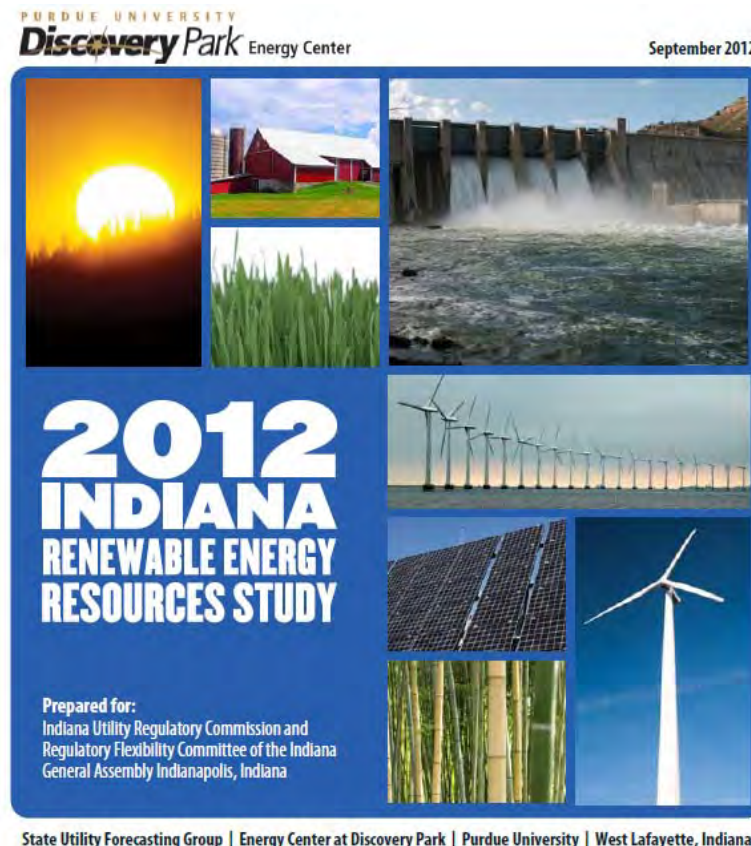
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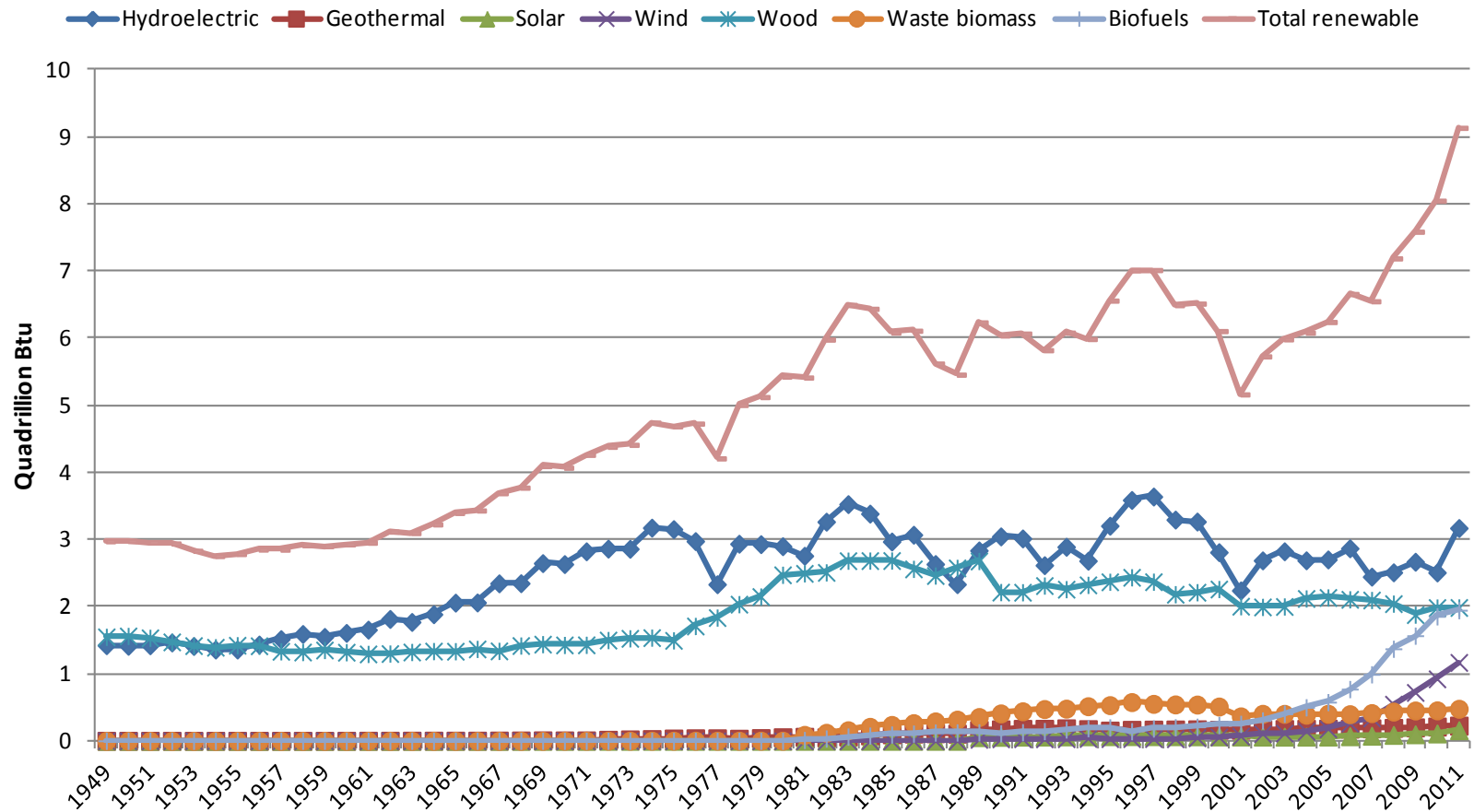
December 3, 2012

2012 Renewable Resources Study

- Renewable energy trends
- Barriers to development
- Individual renewable resources
 - Wind
 - Energy crops
 - Organic waste
 - Solar thermal
 - Photovoltaics
 - Hydropower

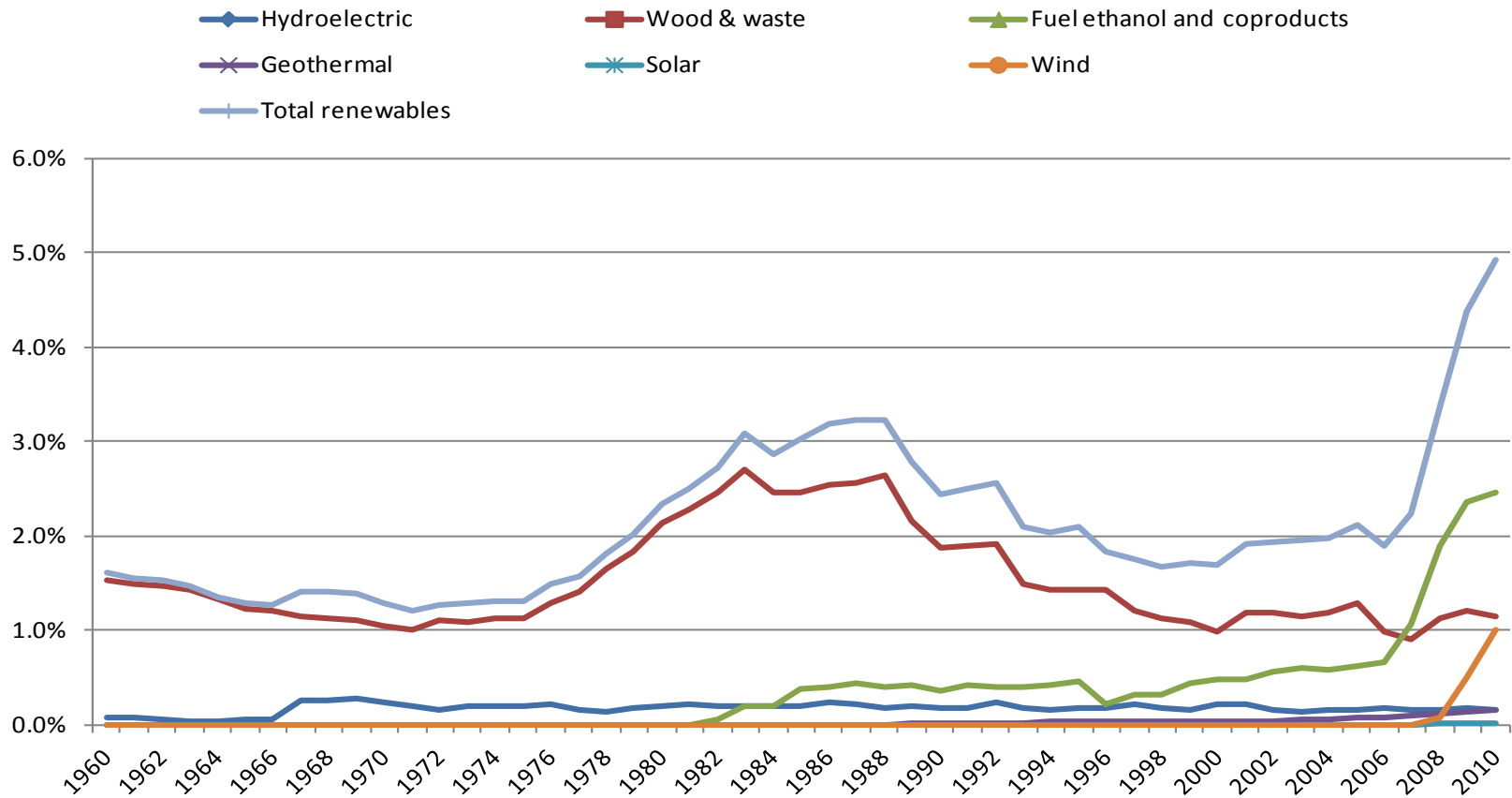


Renewables Share of U.S. Energy Consumption



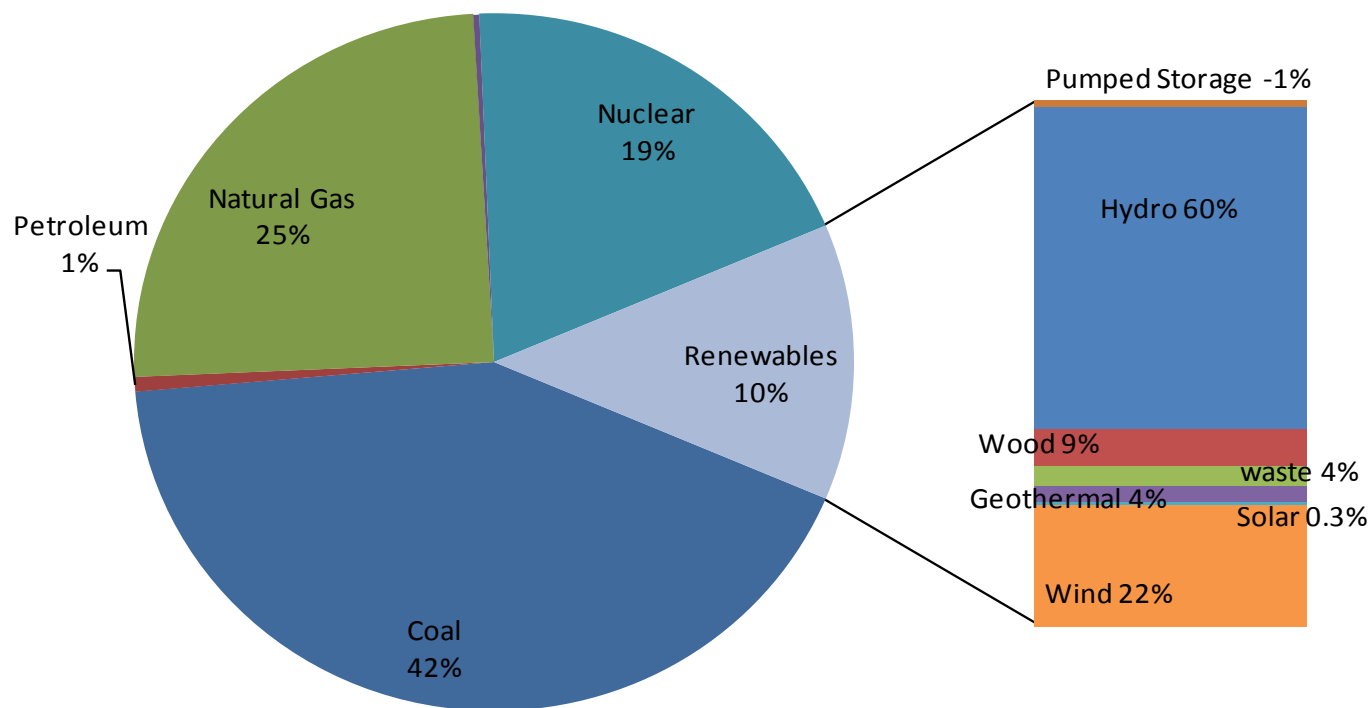
Source: Energy Information Administration (EIA)

Renewables Share of Indiana Energy Consumption

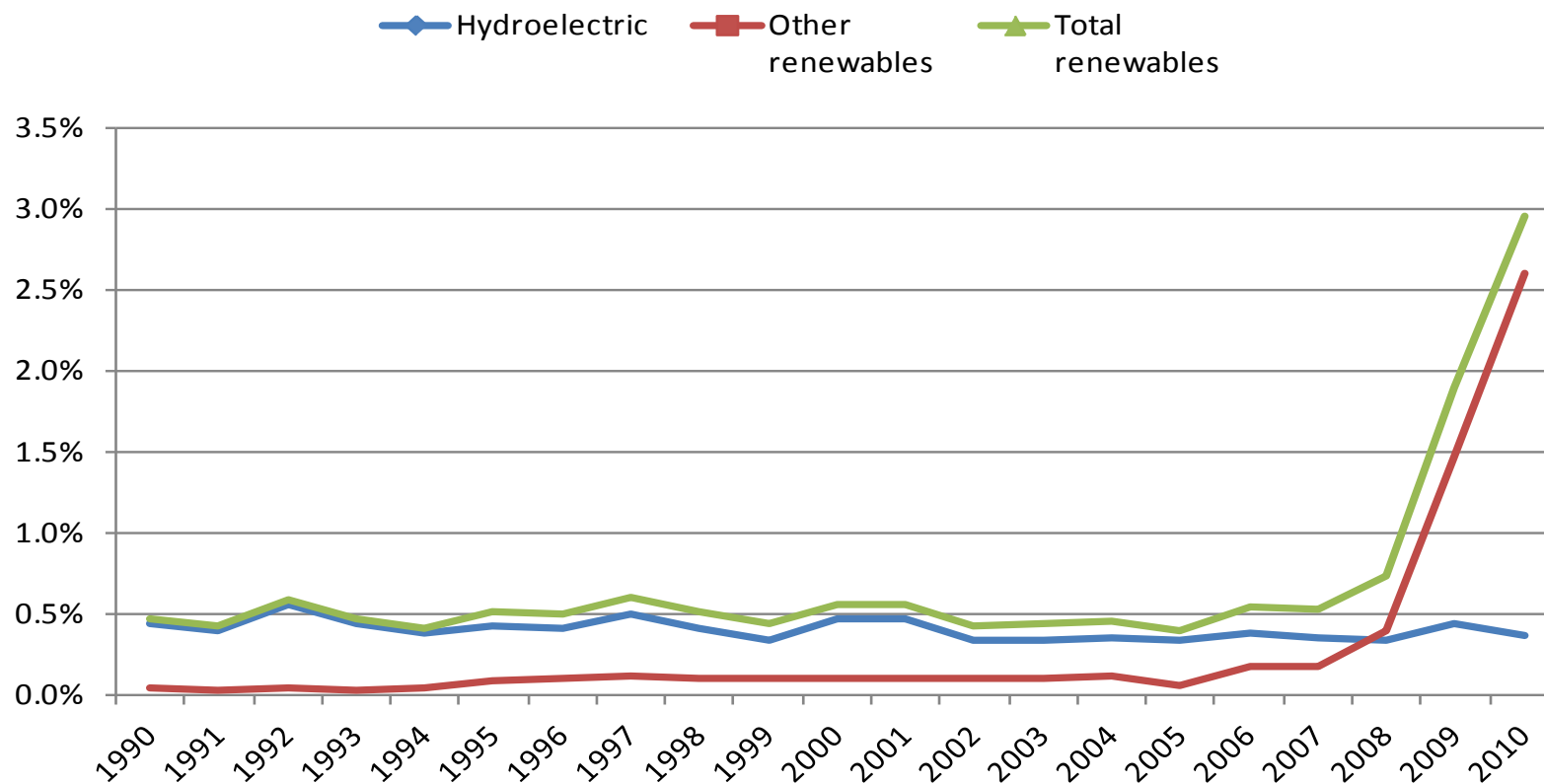


Source: EIA

2011 U.S. Electricity Generation by Energy Source



Renewables Share of Indiana Electricity Generation

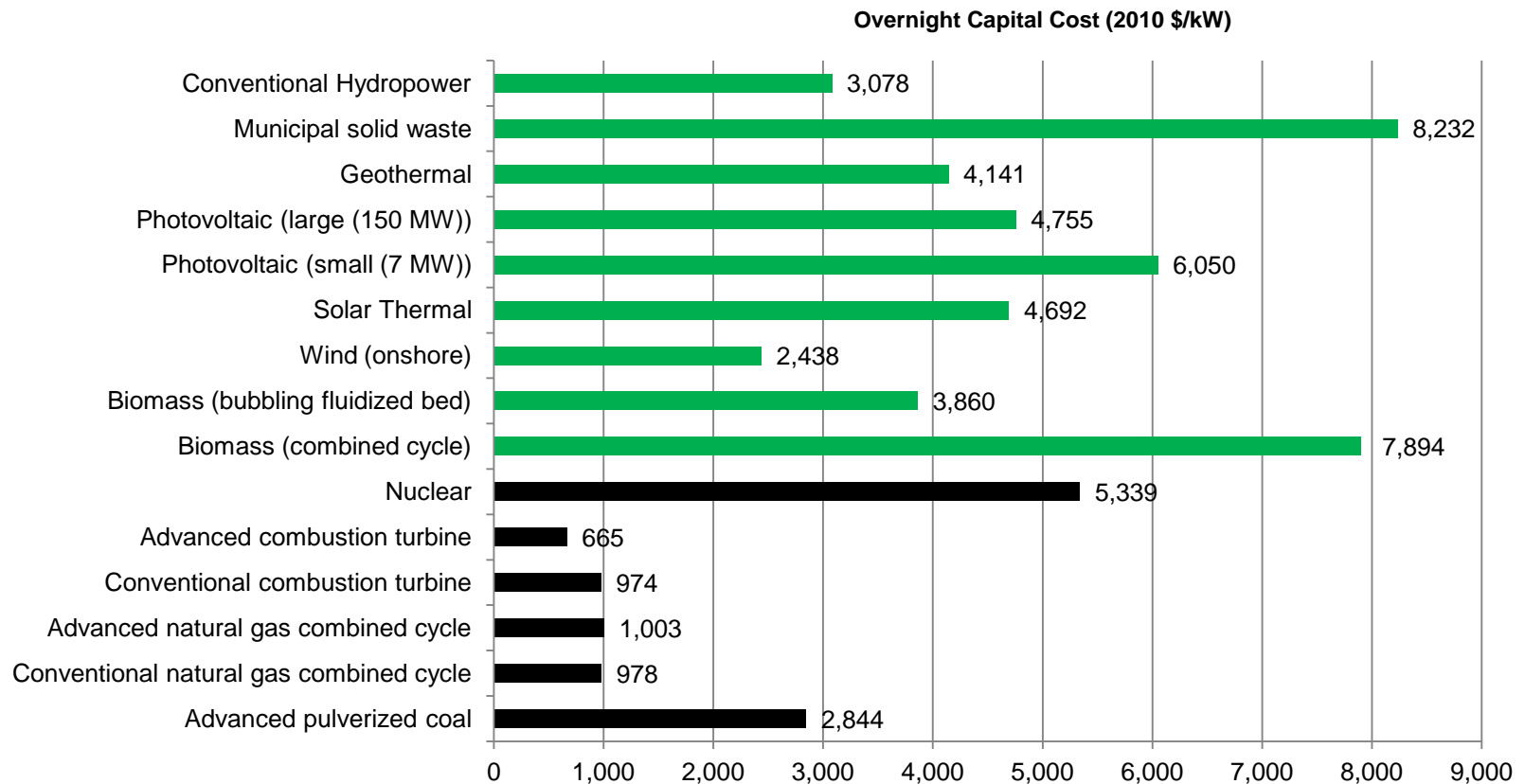


Source: EIA

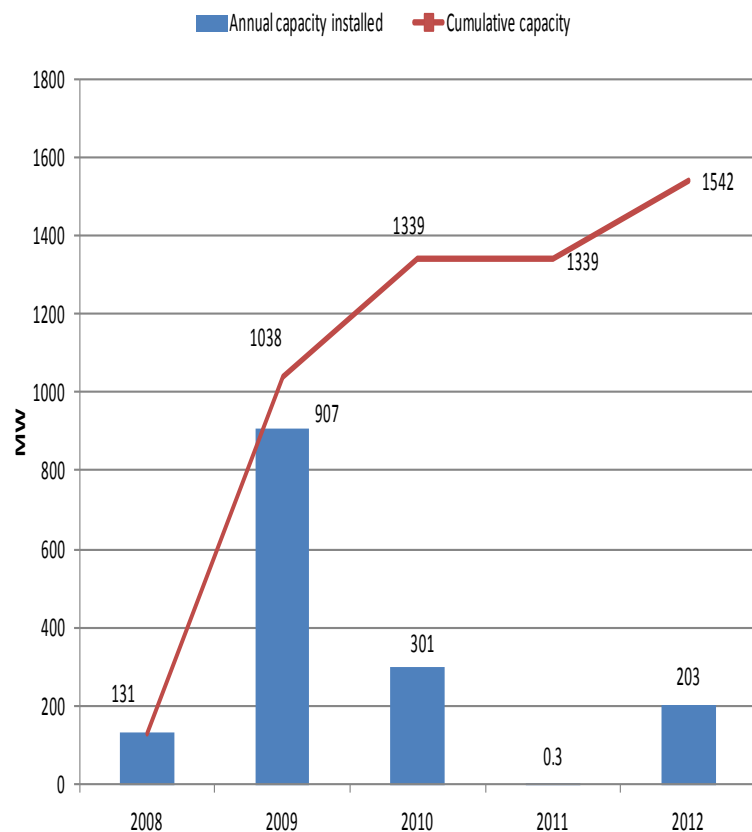
Barriers to Renewables

- 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

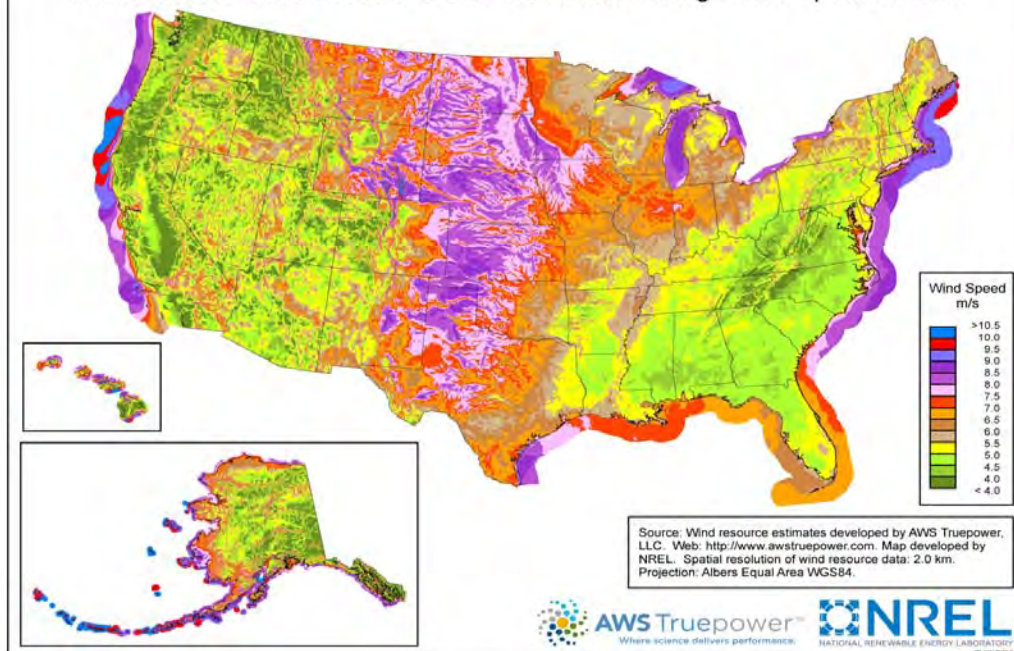


Wind

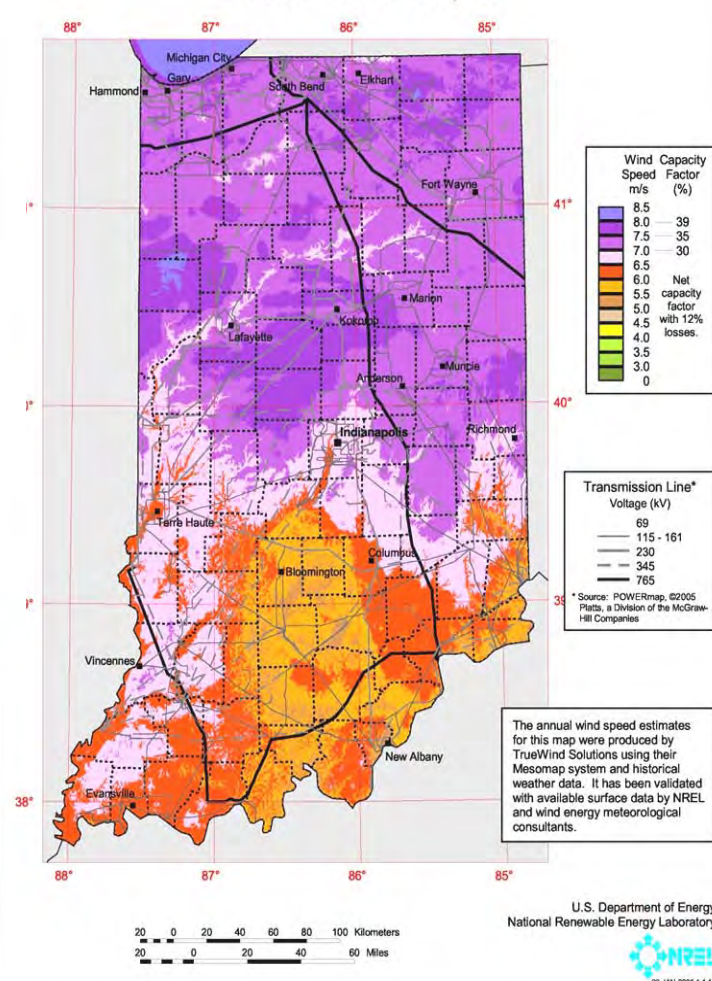


Win Farm	MW	County	Year	Owner
Fowler Ridge	600	Benton	2009	BP, Sempra, Dominion
Meadow Lake	501	White	2009 2010	Horizon (EDP)
Wildcat	200	Tipton, Madison	2012	E.ON
Benton County	131	Benton	2008	Orion
Hoosier	106	Benton	2009	enXco

United States - Land-Based and Offshore Annual Average Wind Speed at 80 m



Indiana - 100 m Wind Speed



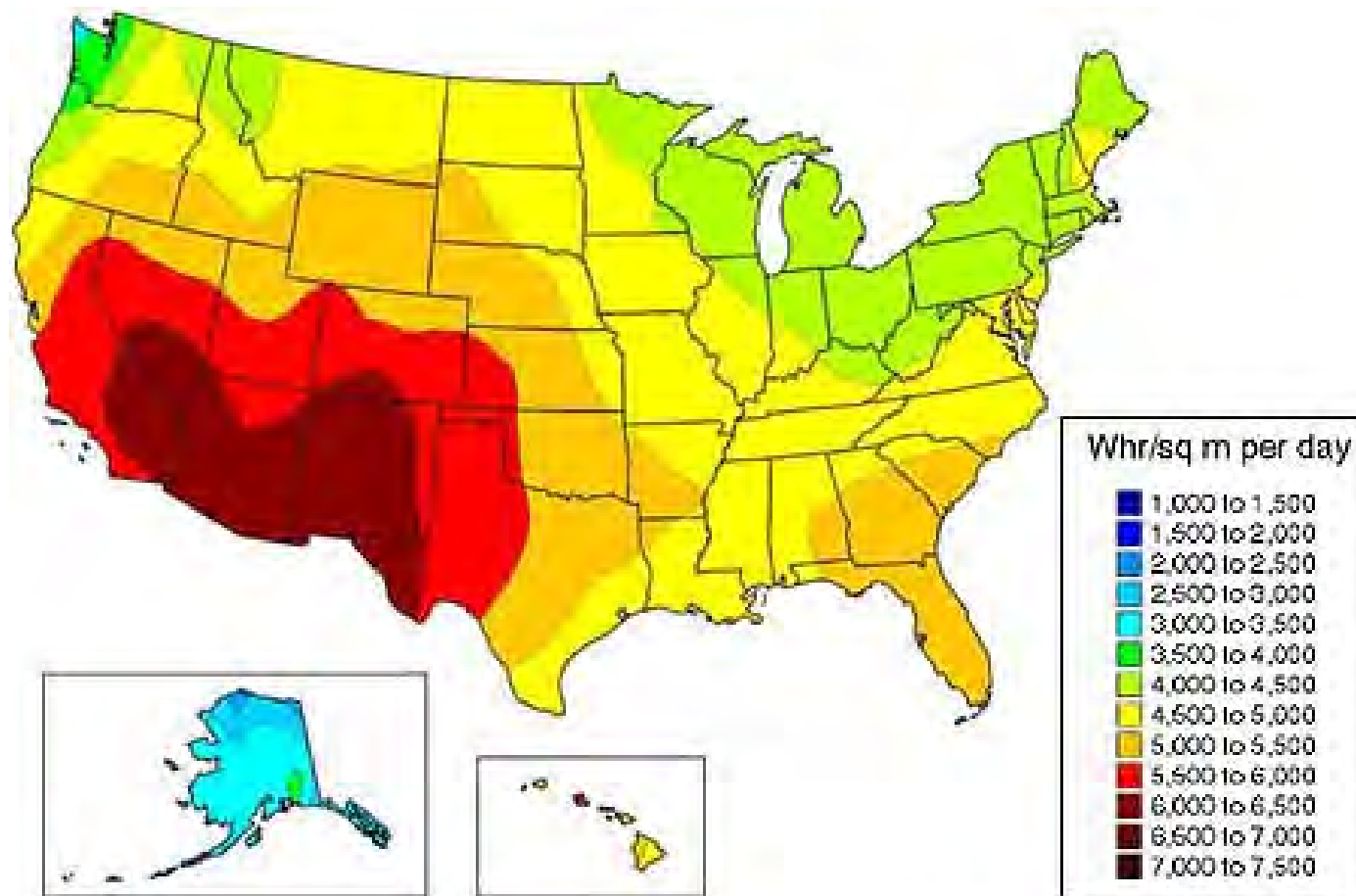
Energy Crops

- 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
 - Harvesting and transportation costs
 - Price of competing fossil fuels

Organic Waste Biomass

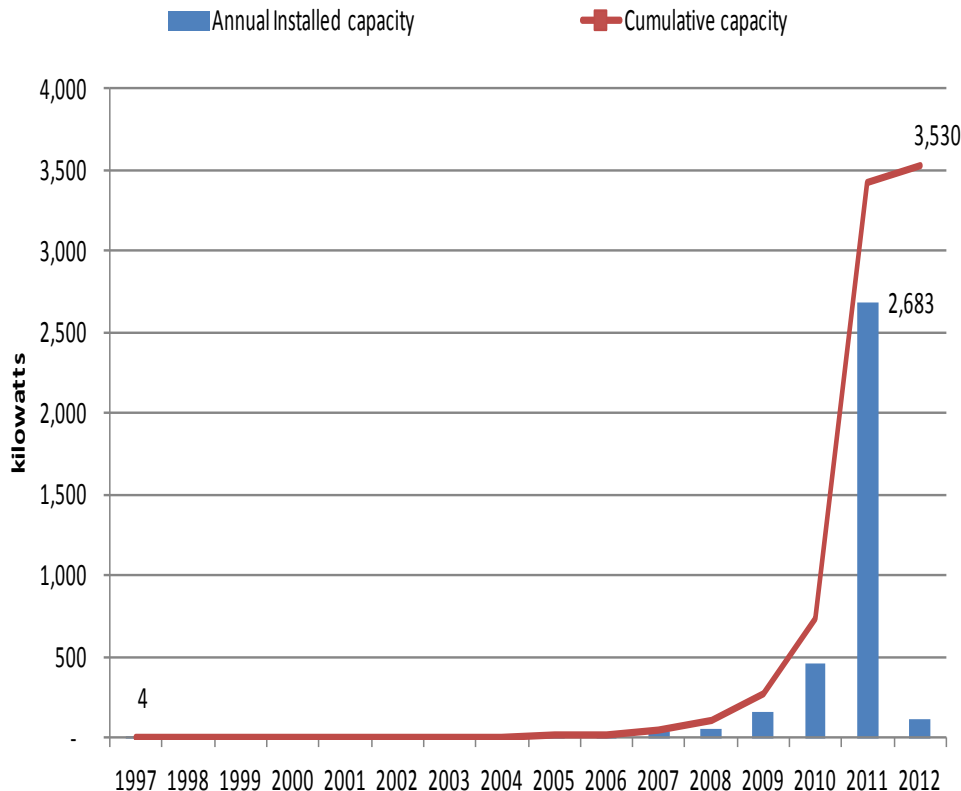
- Until the recent increase in ethanol production, this resource was the largest source of renewable energy in Indiana
 - Primarily due to the use of wood waste
- It is the 3rd largest source of renewable electricity generation in the state
 - Landfill gas
 - Municipal solid waste
 - Animal waste biogas
 - Wastewater treatment

Solar Thermal



Solar resource for a flat-plate collector

Photovoltaic



**188 installations
(total 3.5 MW)**

- Fort Harrison (2 MW)
- Metal Pro Roofing (186 kW)
- Johnson Melloh (100 kW)
- Proposed at Indy airport (10 MW)

Photovoltaic capacity in Indiana

Source: National Renewable Energy Laboratory

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 Fall 2014

Further Information

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