

2020 RENEWABLE RESOURCES REPORT & COVID IMPACTS ON ELECTRIC LOADS

Douglas J. Gotham, SUFG Director

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Utilities, and Telecommunications of the Indiana
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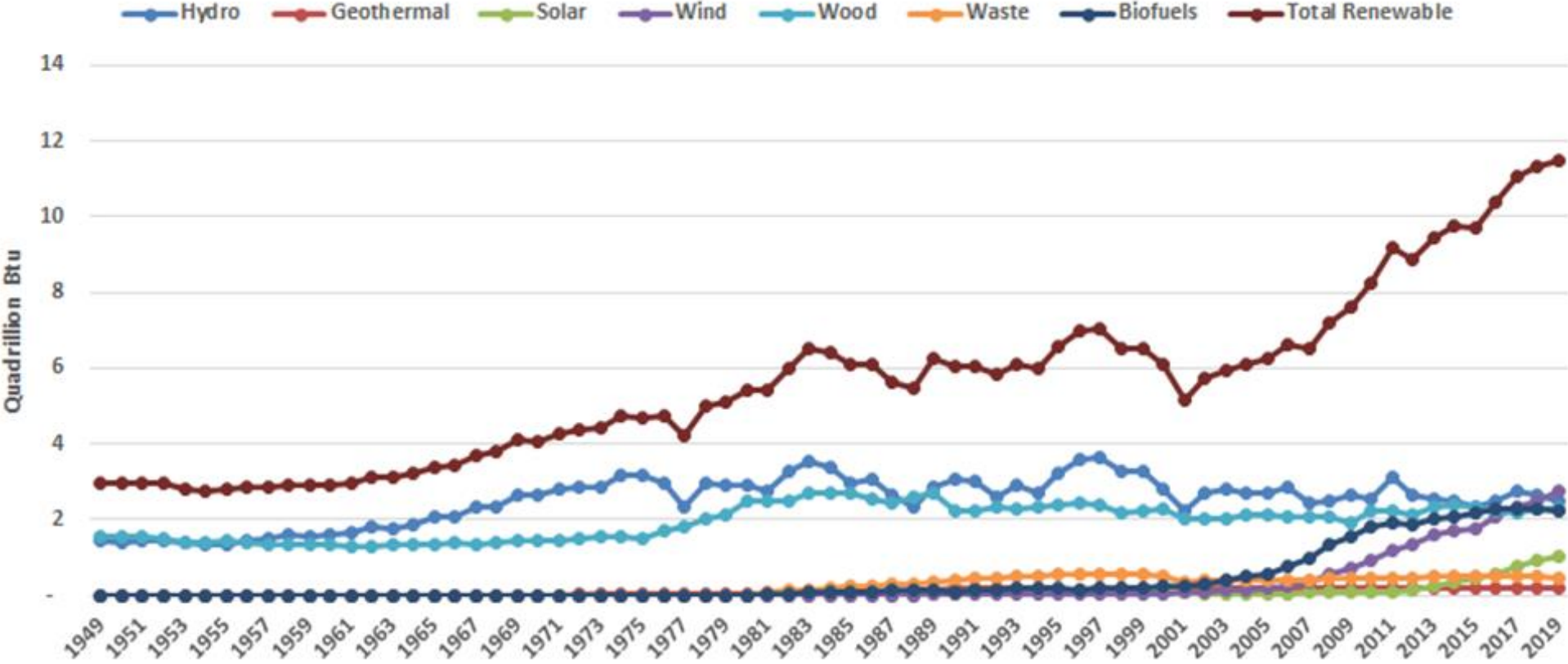


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2020 Renewable Resources Report

Historical Renewable Energy in the U.S.

Wind is the largest source for the first time ever; solar is increasing

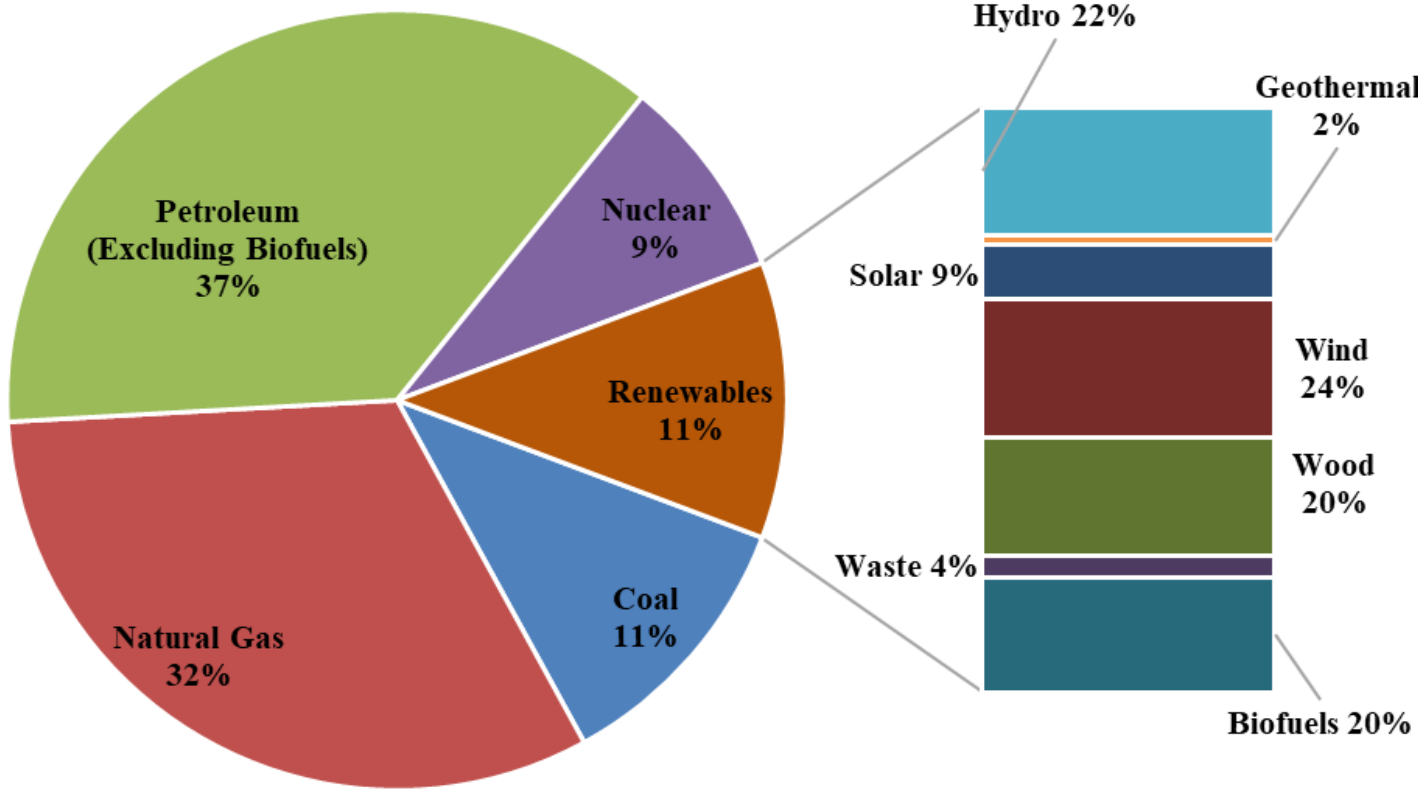


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Data source: EIA

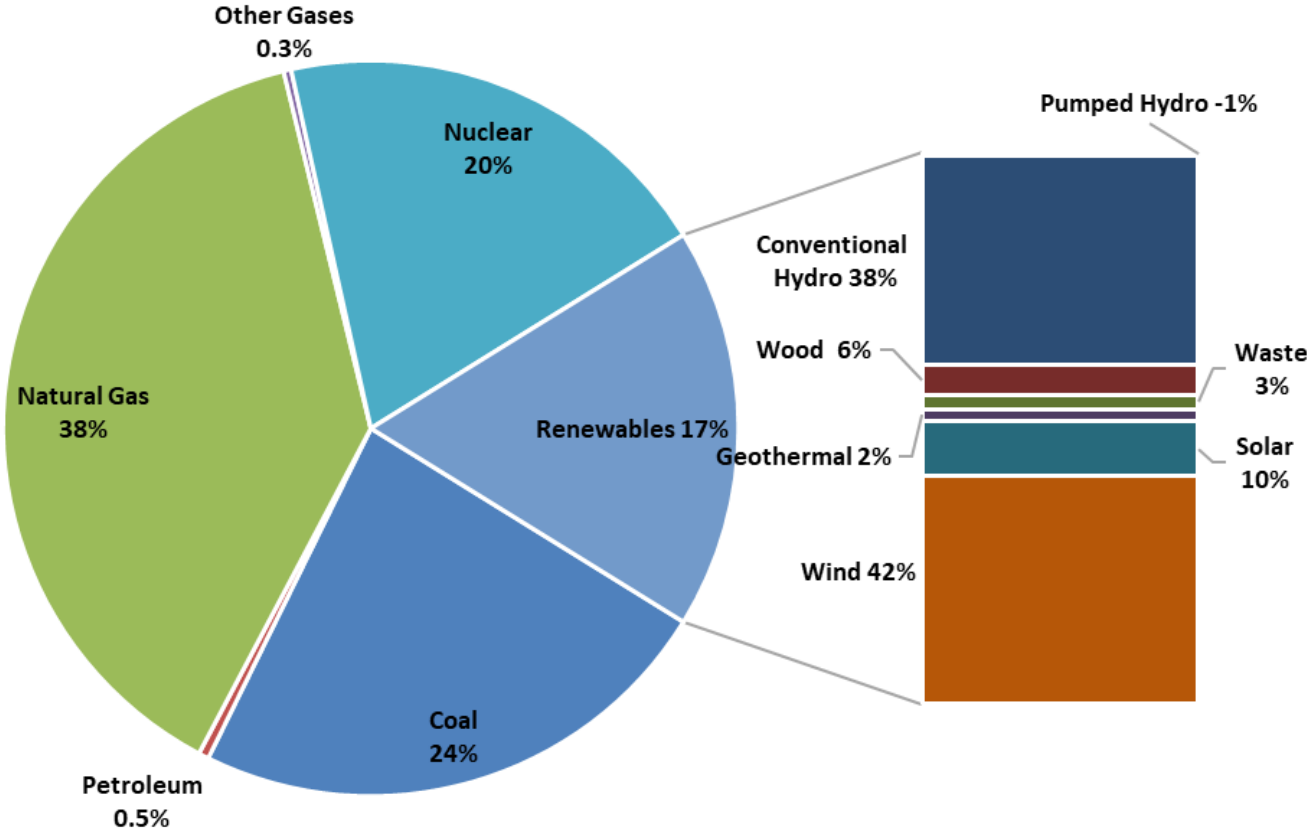
2019 U.S. Energy Consumption by Source

Major renewable contributors: hydro, wind, wood, biofuels



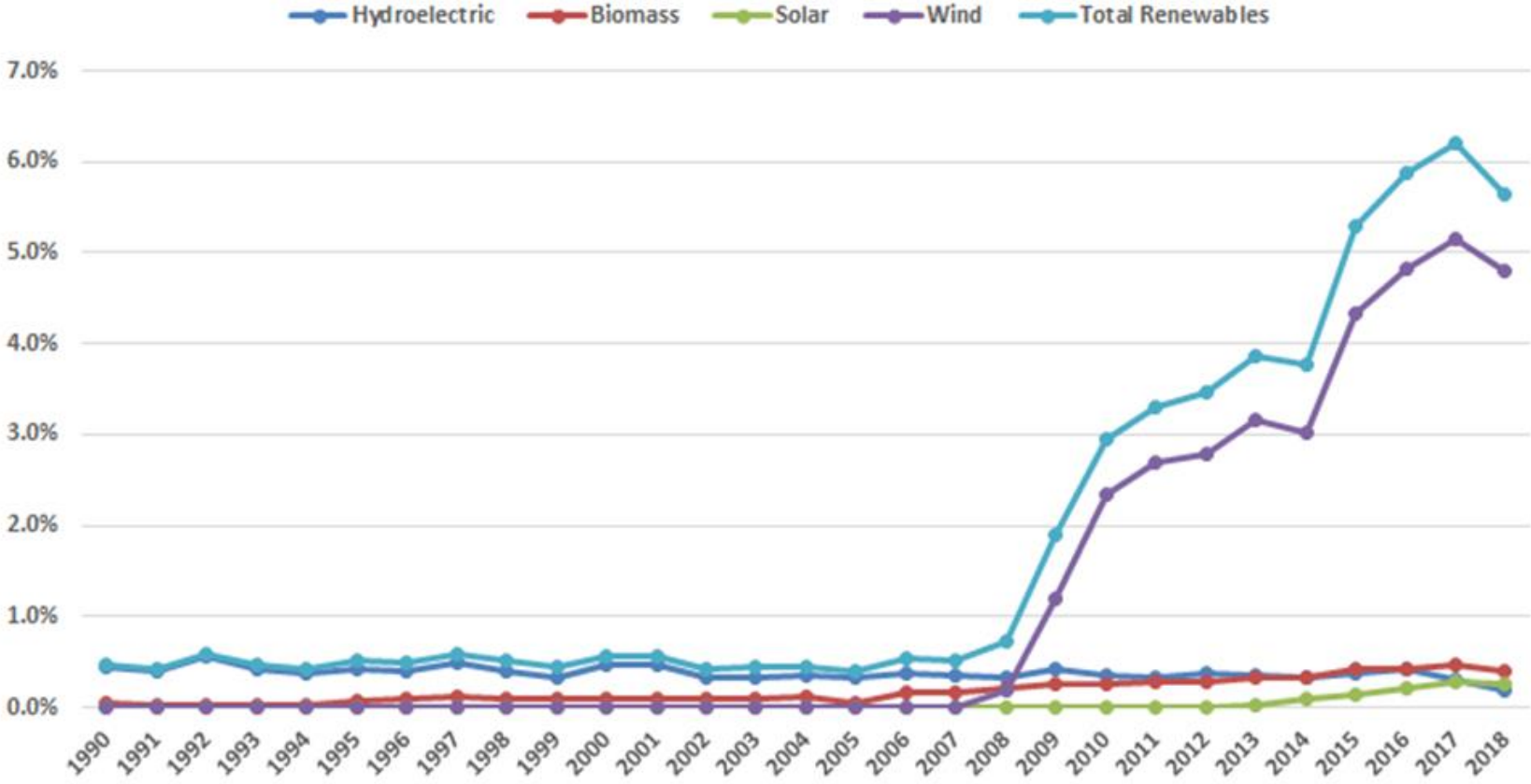
2019 U.S. Electricity Generation by Energy Source

Wind and hydro combined produce 80% of renewable electricity



Renewables Share of Indiana Electricity Generation

Wind provides 85% of renewable electricity in Indiana



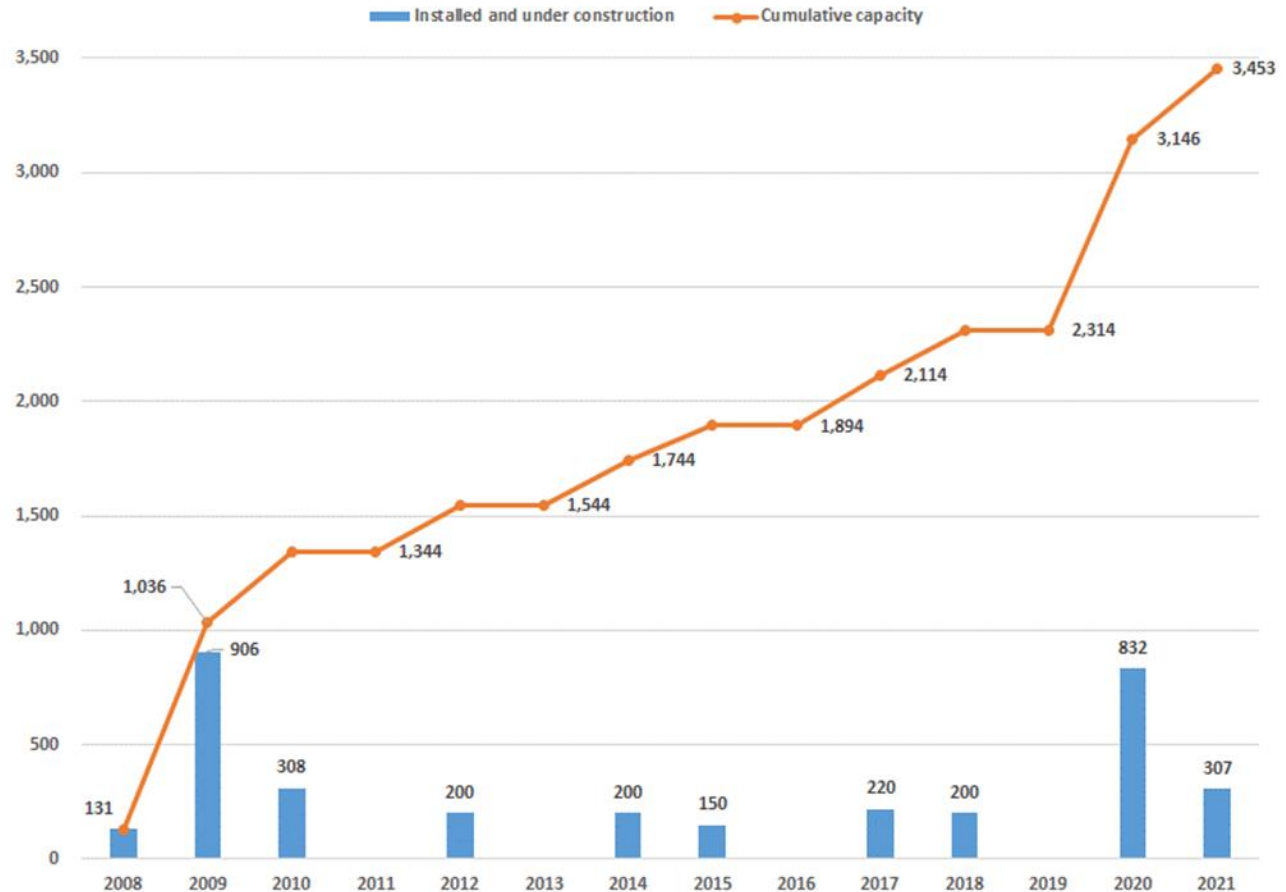
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Data source: EIA

Indiana Wind Generating Capacity

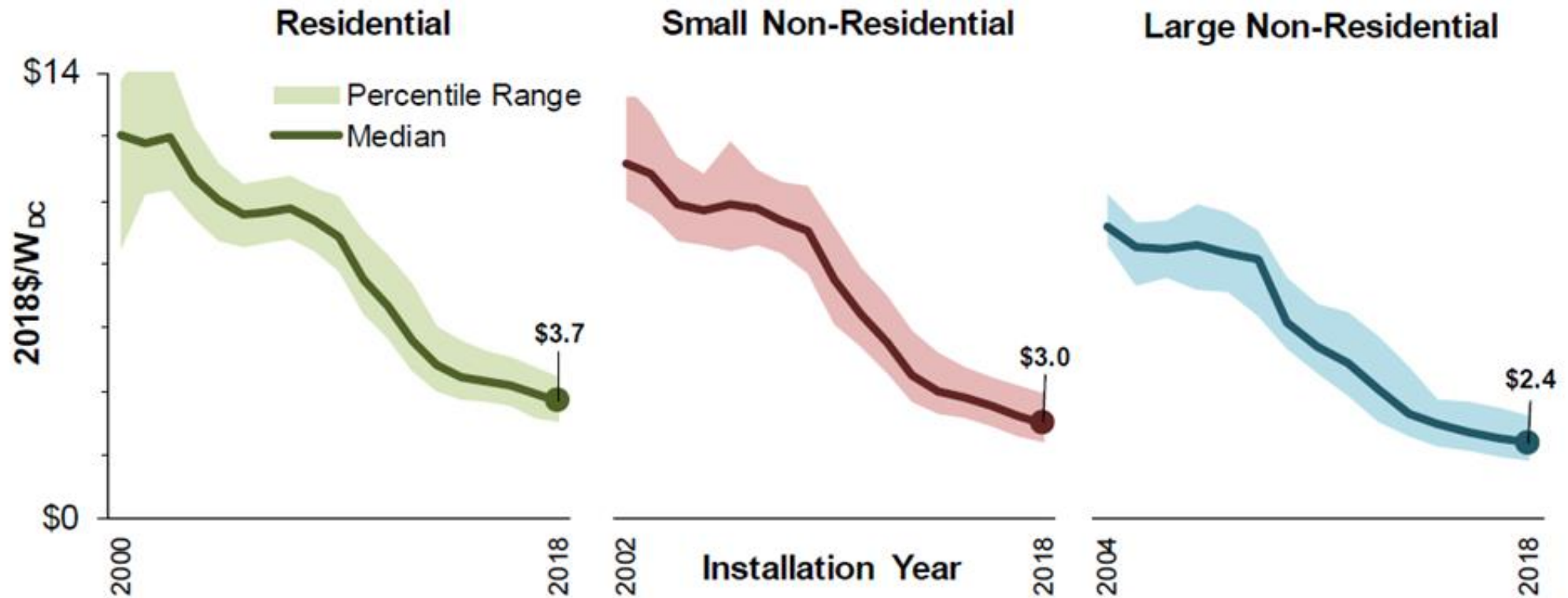
Indiana ranks 13th in the country for wind capacity

- Over 3.1 GW of capacity online by the end of the year
- Indiana utilities have purchased power agreements for over 2.2 GW of wind
- Wind turbine prices have been declining since 2008



Photovoltaics

PV costs have decreased by more than a factor of 3 since 2000



Photovoltaics in Indiana

PV is expected to grow significantly

- There was 335 MW of PV in Indiana as of July
 - the largest solar farm is 20 MW
- There are 1,505 MW of proposed projects for installation by 2024
 - 8 projects are 100 MW or larger
 - 4 projects are 200 MW or larger

Organic Waste Biomass in Indiana

2nd largest source of renewable electricity

- Landfill gas
 - 21 landfills can generate 78 MW

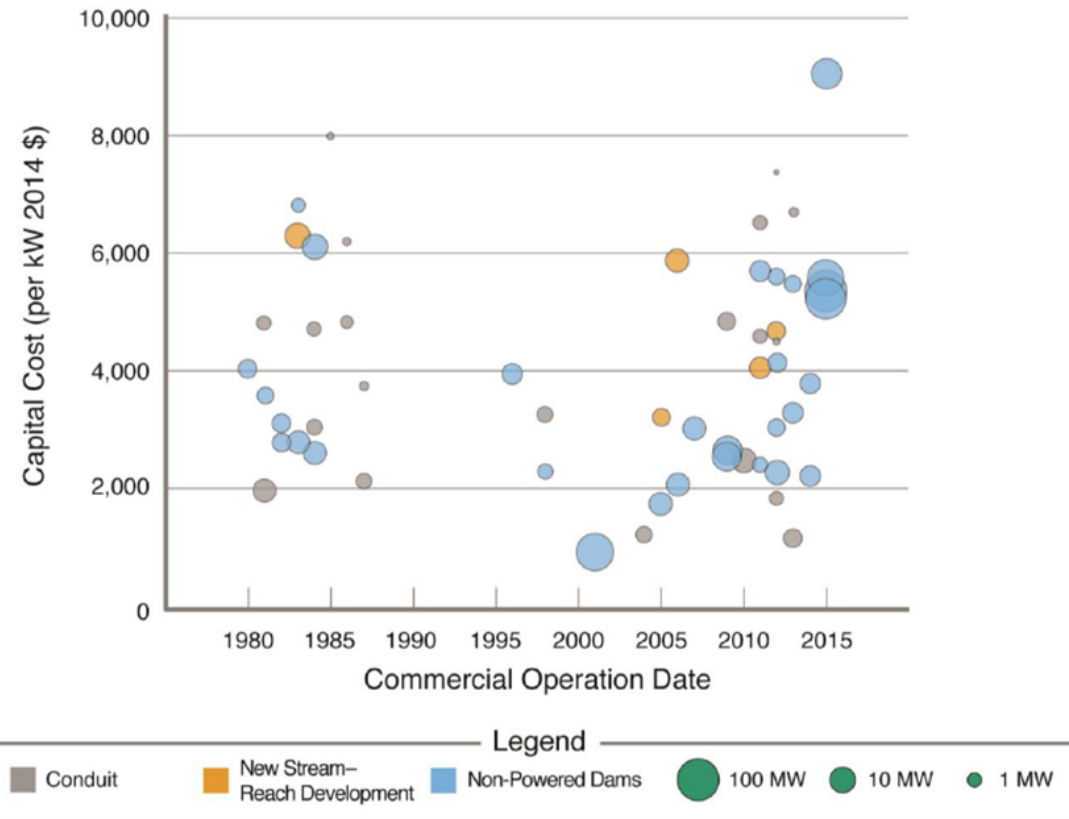
- Animal waste biogas
 - 6 digesters produce about 120,000 MWh annually
 - 5 digesters produce compressed natural gas for transportation use

- Wastewater treatment
 - Cities of West Lafayette and Jasper

- Wood and wood waste

Capital intensive; cost is very site specific

- 69 MW of existing hydropower in Indiana
- DOE estimates there is the potential for 454 MW of additional capacity at existing dams
 - 2/3 of that is at the Myers and Newburgh locks



Covid Impacts on Electric Load

We do not have access to short-term data

- Our focus is on long-term forecasting for resource planning
 - We rely primarily on data provided annually or biennially
- We follow what is reported by others with great interest
- We subscribe to multiple economic forecasts
 - The economic recovery will be a major driver of electricity use
- I can speak in generalities rather than specifics

RTO & EIA Observations

~10% load reductions in spring, smaller now

- MISO and PJM have short-term forecasting models that can be used to compare expected load to actual loads
 - PJM average load reduction between late March and end of July was around 7%; more recent period had smaller impact
 - MISO average load reduction between mid-March and mid-August was around 5%; July and August around 1.5%

- EIA projects electricity consumption in the U. S. will be 2.4% less this year than last year (does not account for weather differences)
 - Commercial sector down 6.4%
 - Industrial sector down 6.0%
 - Residential sector up 3.5%

Economic activity is the largest determinant of electric load

- Obviously, the economy has taken a big hit
 - Even without government restrictions, the economy will not fully recover until the virus is under control
 - Some consumers will not fully participate if they perceive a threat

- There will be some permanent damage, or scarring, to both capital stock and labor
 - Businesses not coming back
 - People have left the work force and will not return

Economic Recovery

The shape of the recovery has yet to be determined

- V – characterized by a sharp decline and quick recovery
- U (or bathtub) – longer lasting with slower recovery
- W – recovery is interrupted with another decline
 - We could see this if a major resurgence of the virus causes additional shut downs
- L – very long lasting with a sustained period of little growth
- Reverse radical (or inverted square root) – V-shaped recovery is cut short
 - The recovery (so far) has resembled this



Long-Term Economic Output

Return to pre-pandemic levels not expected until 2022

- We use long-term projections from both local and global experts
- They expect a return to pre-pandemic levels ranging from the end of 2021 to 3rd quarter of 2022
- Long-term projections show growth but do not reach previous forecasts
 - Economic scarring
- I would expect our 2021 forecast to show a similar pattern
 - It will be based on the February 2021 projections from IU's Center for Econometric Model Research

Doug Gotham
gotham@purdue.edu
765-494-0851
<https://www.purdue.edu/discoverypark/sufg/>



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