Pathways to Decarbonization Conference

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

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Office of Energy Efficiency and Renewable Energy

EERE Vision

A strong and prosperous America powered by clean, affordable, and secure energy

EERE Mission

To create and sustain American leadership in the transition to a global clean energy economy

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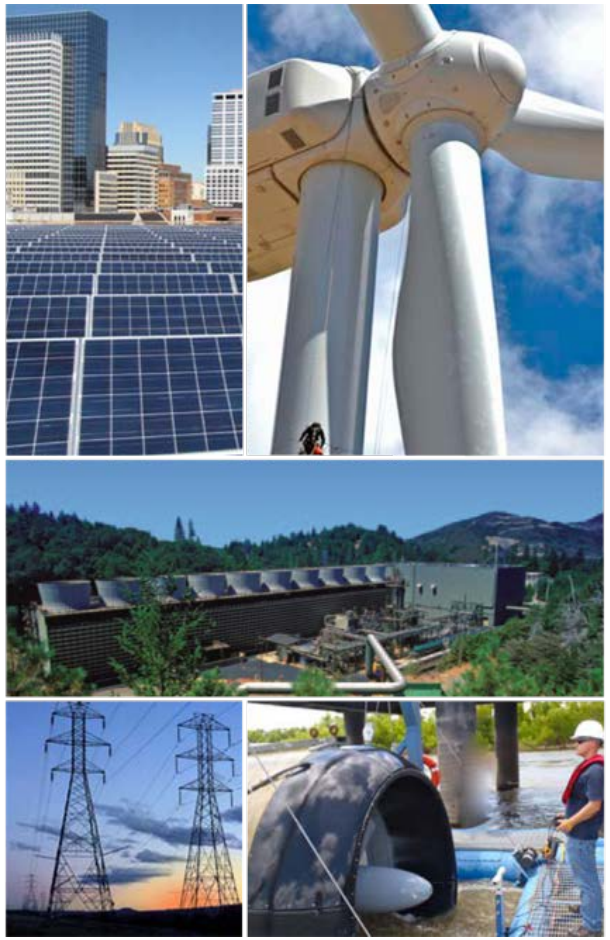
Sustainable
TRANSPORTATION

Renewable
ELECTRICITY GENERATION

Energy Saving
HOMES, BUILDINGS, & MANUFACTURING



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Climate Action Plan

"When our children's children look us in the eye and ask if we did all we could to leave them a safer, more stable world, with new sources of energy, I want us to be able to say ***yes, we did***."

– President Barack Obama

Jan. 28, 2014

The Climate Action Plan has three pillars:

1) Mitigation: Cut Carbon Pollution in America
2) Adaptation: Prepare the U.S. for the Impacts of Climate Change
3) International Cooperation: Lead International Efforts to Address Global Climate Change

How EERE Creates a Clean Energy Future

Cost reduction and performance improvement (RD&D)

- Hardware costs reduction
- Increase capacity factors
- Understand and address reliability issues
- Improved resource characterization

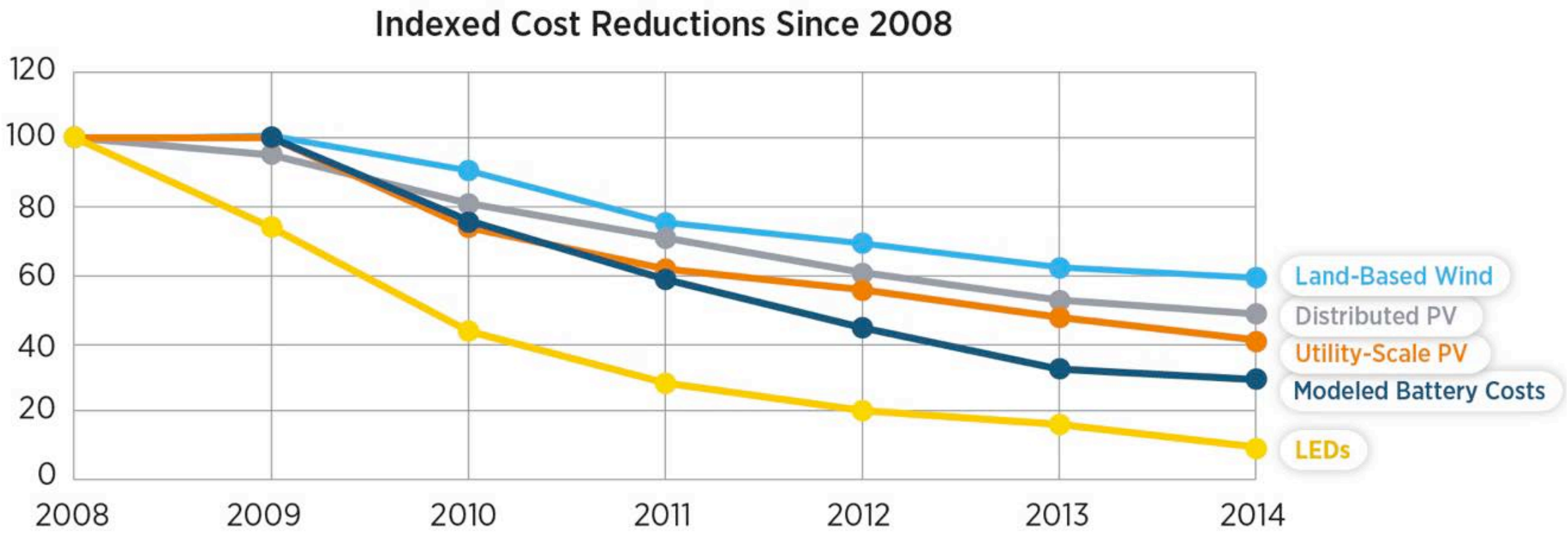
Technology demonstration and risk reduction

- Testing and simulation capability
- Support pilot & first-of-a-kind demonstrations

Market barrier reduction

- Reduce costs of finance
- Streamline regulatory & permitting processes
- Identify & mitigate environmental & other barriers
- Development of codes and standards

Dramatic cost reductions for key EERE technologies



Cost of critical clean energy technologies such as land-based wind power, distributed and utility scale PV, batteries, and LEDS have fallen 40-90% since 2008, while deployment has similarly increased drastically.

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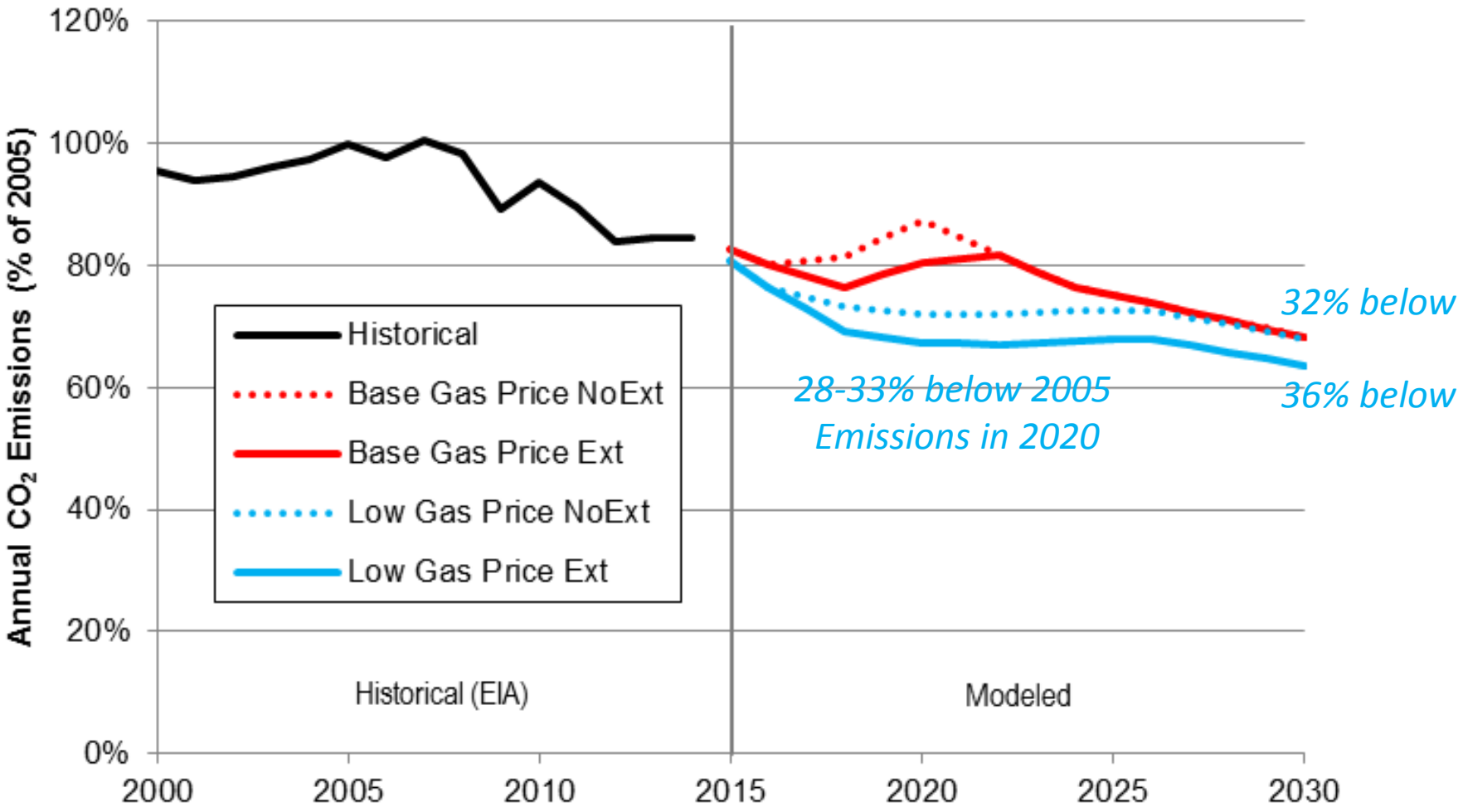
Projected continued reductions in power sector GHG emissions



RE tax credit extensions help drive even lower emissions and with longer lasting avoided emissions
Under low gas prices, incremental RE displaces a greater share of coal compared with base gas prices

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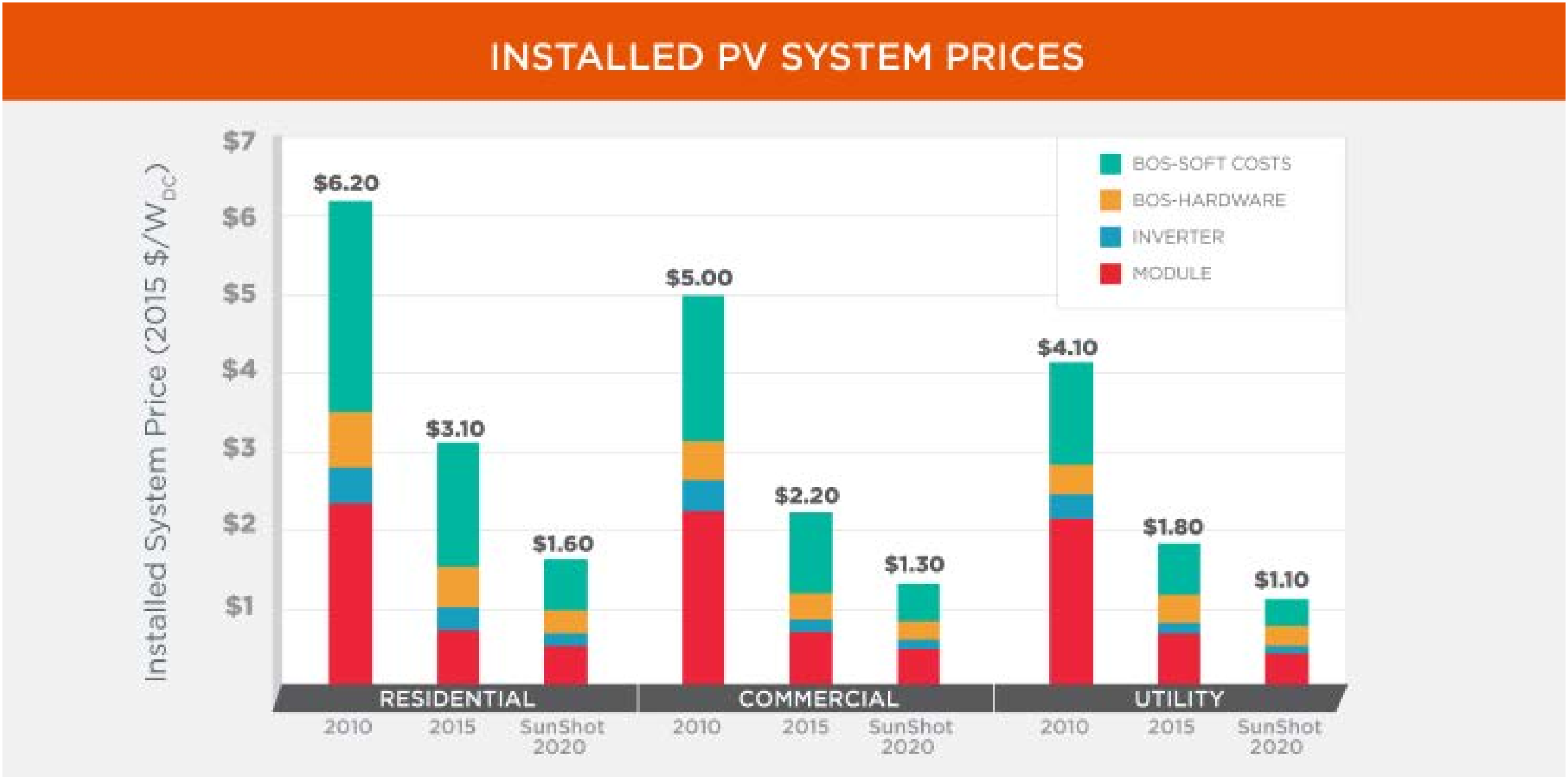
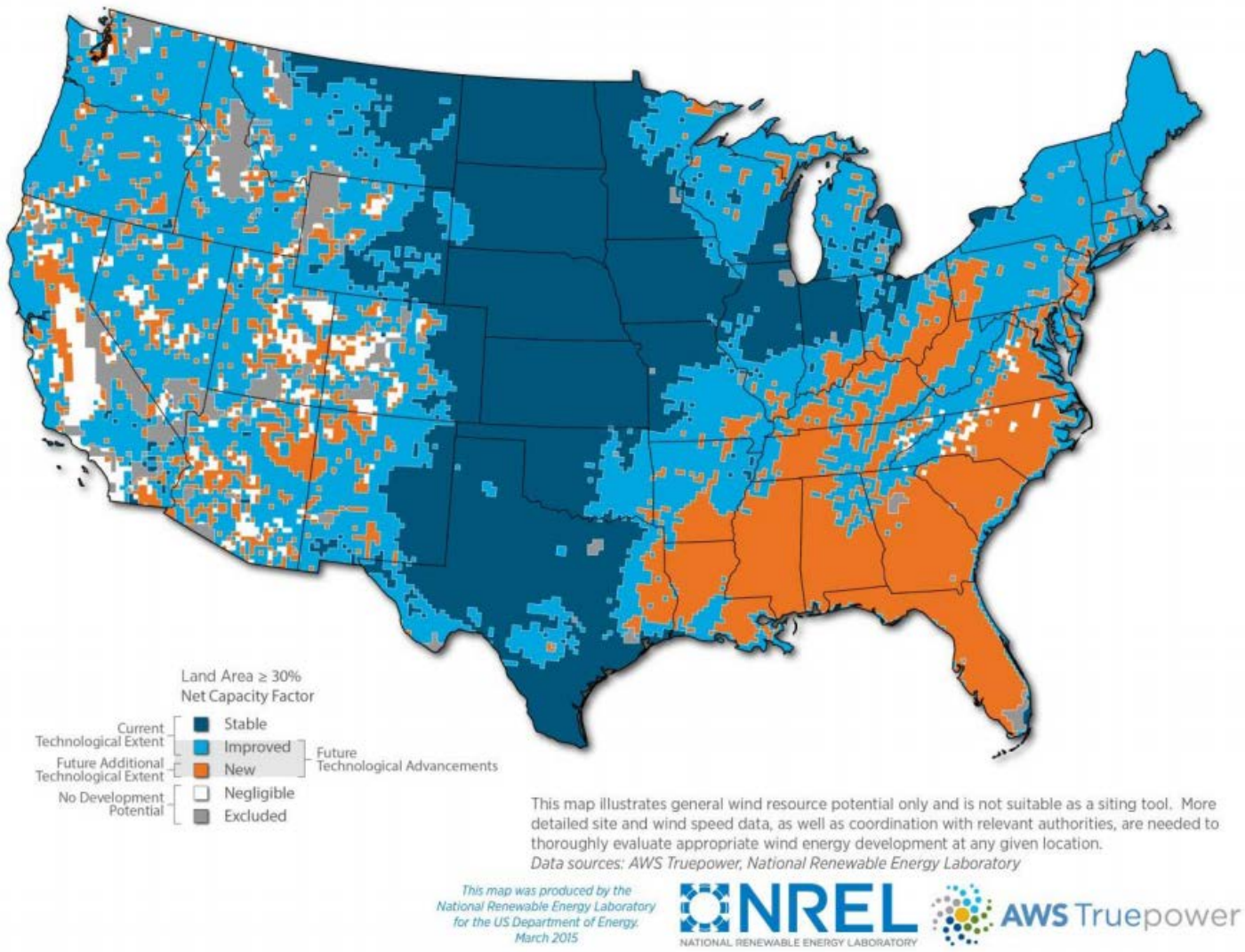
On the Path to Sunshot



Enabling Wind Power Nationwide



Land area achieving a minimum 30% net capacity factor based on current technology, larger rotor designs and a 140-m hub height

- Current technology trends of higher hub heights and larger blades have already contributed to increase wind generation
- Higher hub heights of 110 and 140 meters increase the technical wind potential 54% – 67%.
- The geographic distribution of potentially economic wind sites expands to include new areas like the southeast United States.

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Grid Modernization Initiative

- This new crosscutting effort will build on past successes and current activities to help the nation achieve at least three key outcomes within the next ten years:
  - 10% reduction in the societal costs of power outages
  - 33% decrease in cost of reserve margins while maintaining reliability
  - > 50% cut in the costs of wind and solar and other DG integration
- If achieved, these three key outcomes would yield more than $7 billion in annual benefit to the U.S. economy

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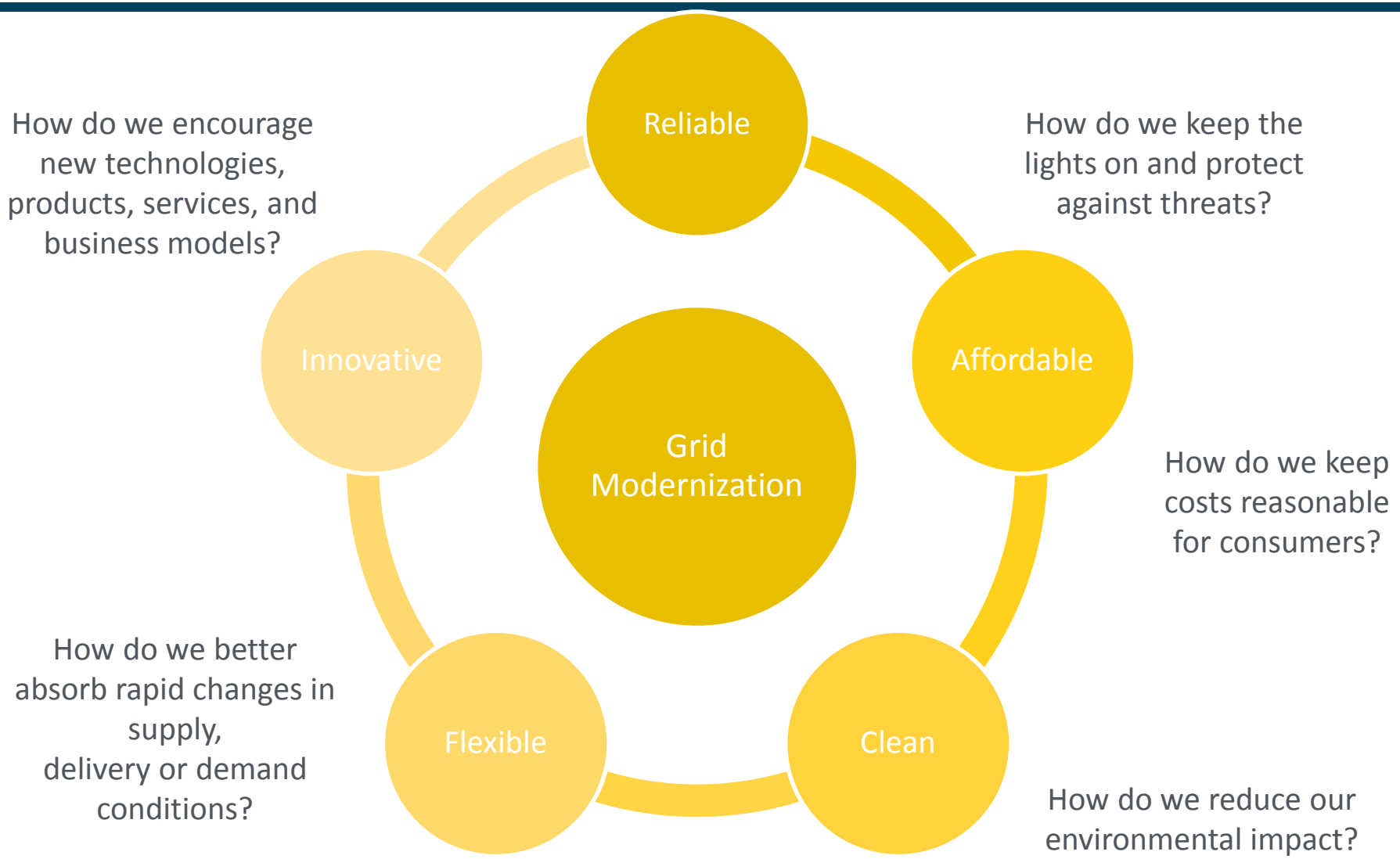
Key Attributes of a Modernized Grid



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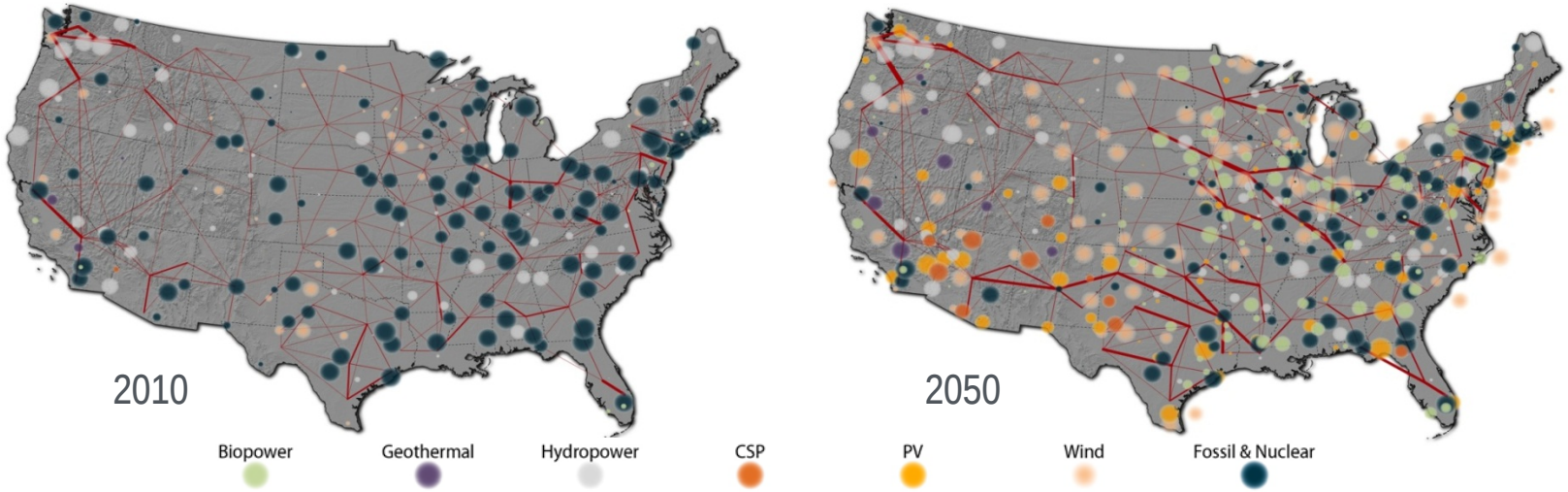
The Renewable Electricity Futures Study

Is 80% renewable electricity generation technical feasible?



- Renewable electricity generation from technologies that are commercially available today, in combination with a more flexible electric system, is more than adequate to supply 80% of total U.S. electricity generation in 2050 while meeting electricity demand on an hourly basis in every region of the country.
- Increased electric system flexibility, needed to enable electricity supply and demand balance with high levels of renewable generation, can come from a portfolio of supply- and demand-side options, including flexible generation, storage, new transmission, more responsive loads, and changes in power system operations.
- The direct incremental cost associated with high renewable generation is comparable to published cost estimates of other clean energy scenarios. Improvement in the cost and performance of renewable technologies is the most impactful lever for reducing this incremental cost.

The abundance and diversity of U.S. renewable energy resources can support multiple combinations for deep reductions in electric sector greenhouse gas emissions and water use.

URL: nrel.gov/analysis/re_futures/

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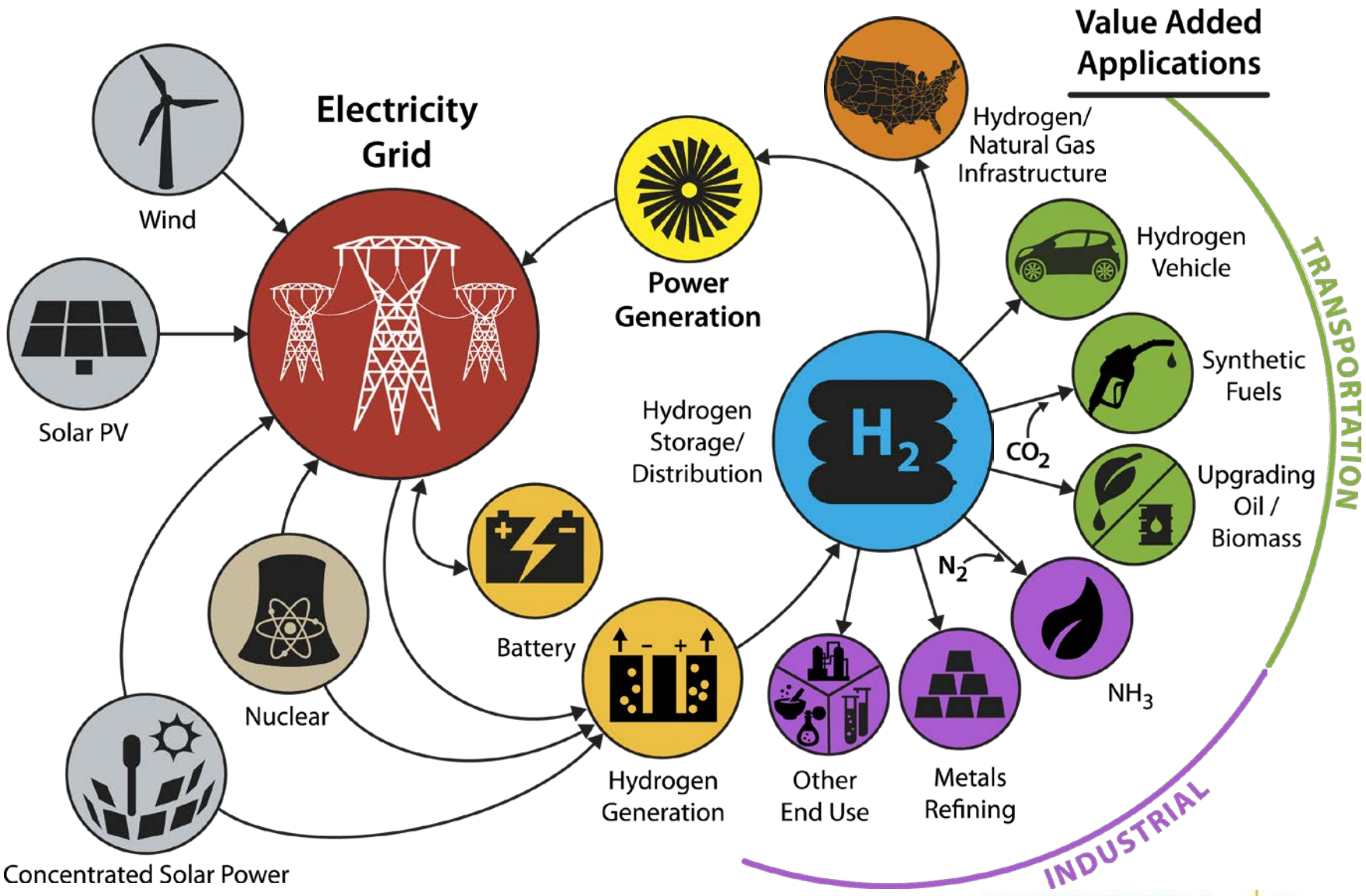
Conceptual H_2 at Scale Energy System



*Illustrative example, not comprehensive

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THANK YOU!

Q & A