Pathways to the Future: Sources and Technologies

NCAC-USAEE/GEORGETOWN UNIVERSITY
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38 north SOLUTIONS

What are we aiming for?

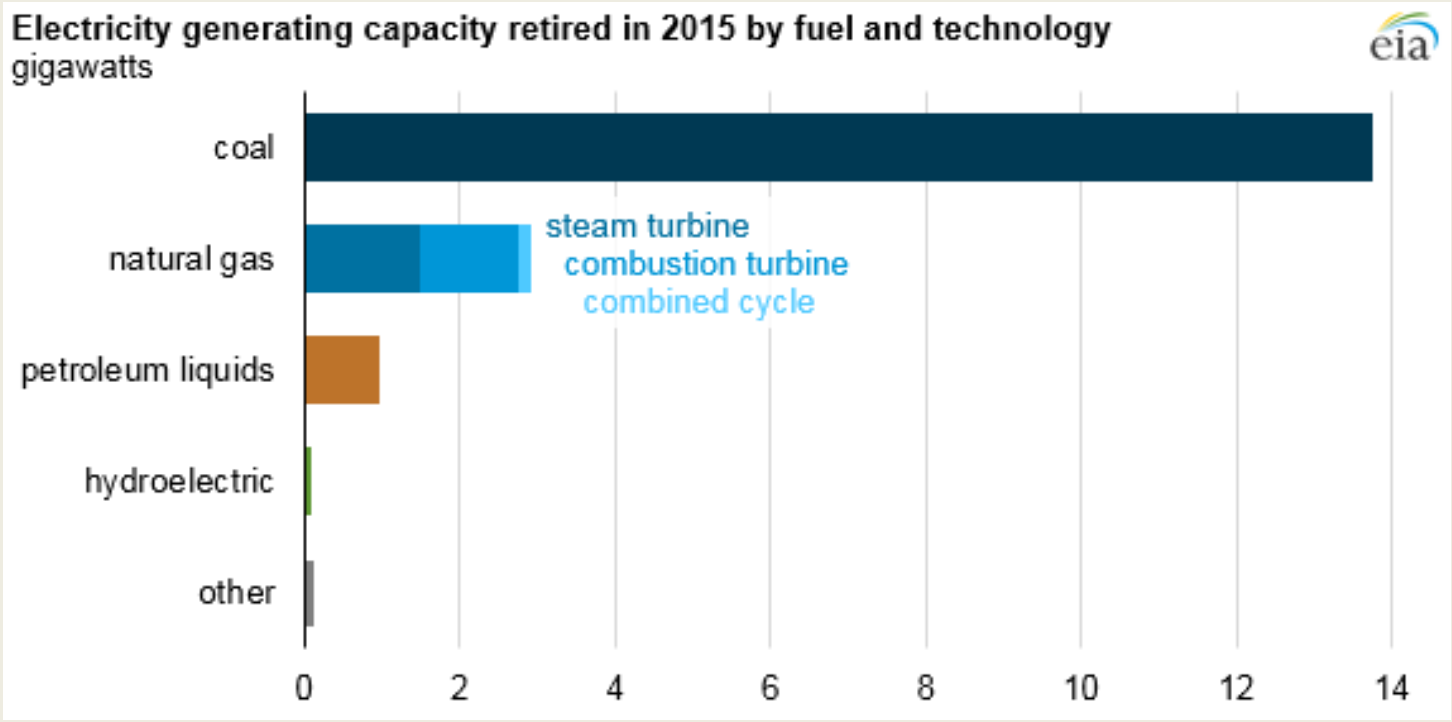
Keep earth's temperature increase below 2 degrees C.

How do we get there?

Deploy cleaner electricity resources that are also more flexible, reliable, resilient, and cost-effective.

U.S. generation context: coal

Coal plants are retiring: 80% of retirements in 2015



Source: U.S. Energy Information Administration, *Preliminary Monthly Electric Generator Inventory*

U.S. generation context: nuclear

Nuclear plants are shutting down

The Diablo Canyon nuclear power plant on the coast outside San Luis Obispo, California
Michael A. Mariant/AP

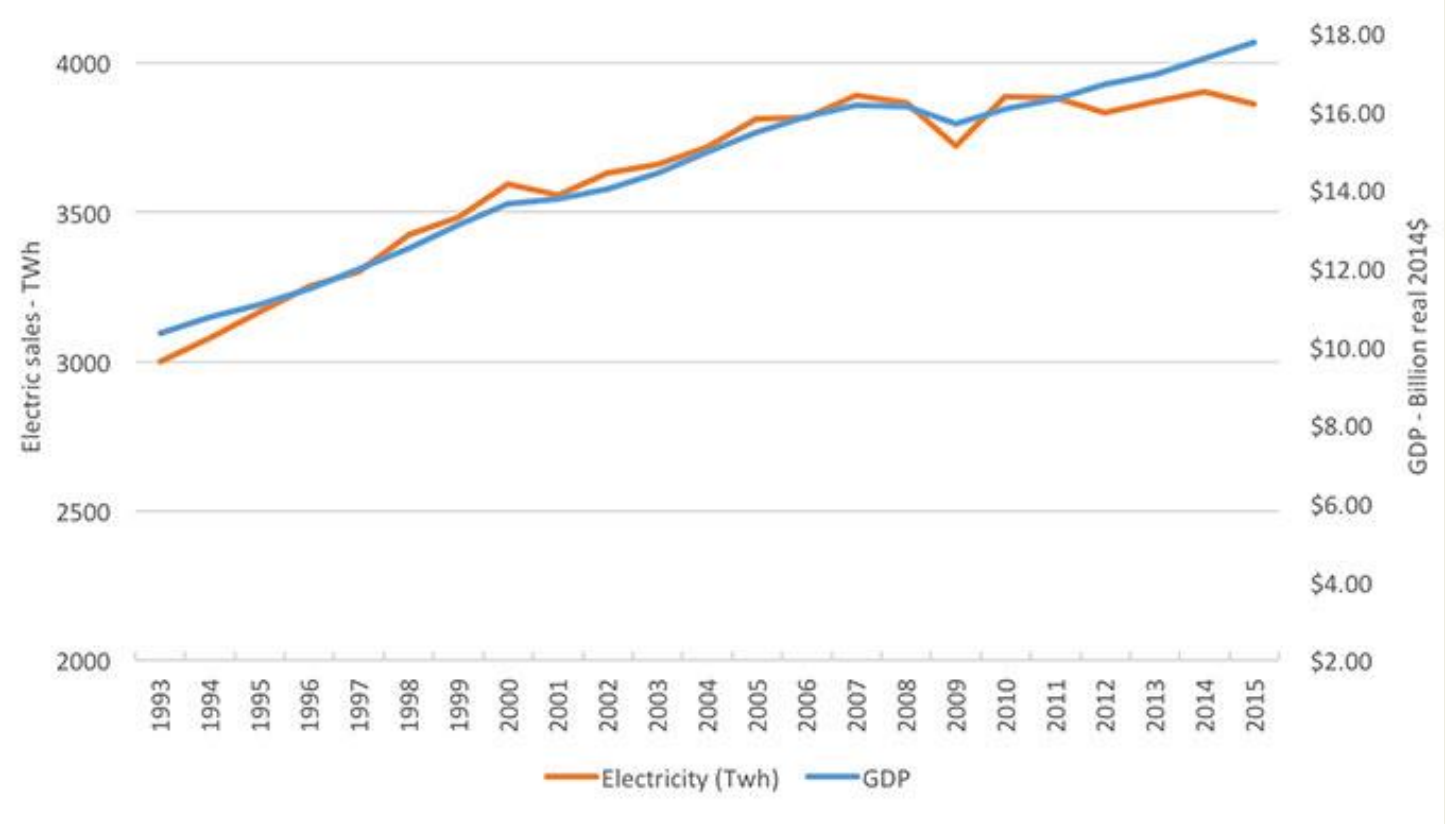
U.S. generation context: natural gas

Gas plants may be at risk

Aerial infrared imaging shows methane leaking at a SoCal Gas storage facility. Courtesy *New York Times*.

U.S. energy consumption is flat

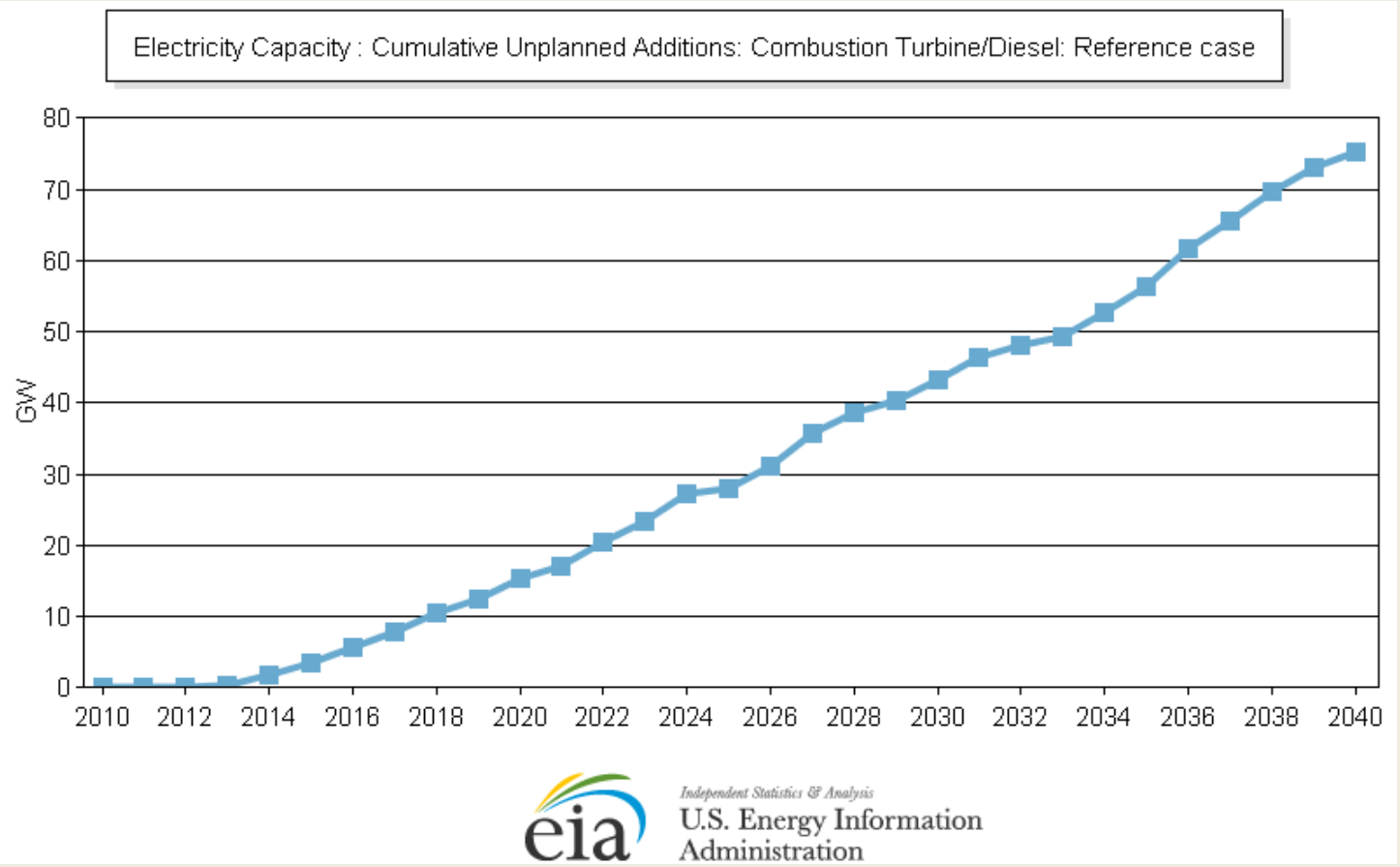
Downward trend in load growth in spite of GDP growth



Source: Energy Information Administration, *Monthly Energy Review. 2015 GDP from Bureau of Economic Analysis.*

U.S. peak demand is still on the rise

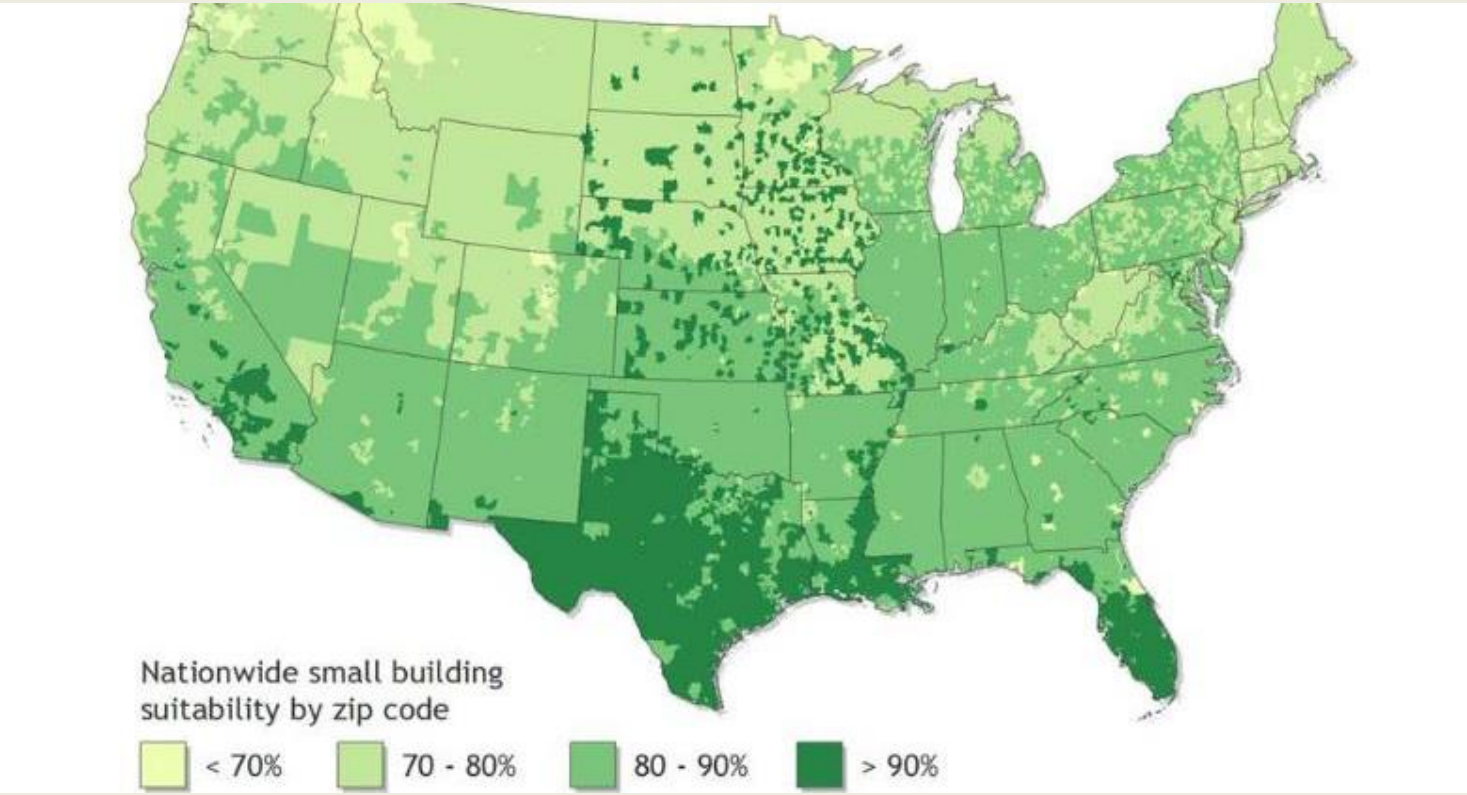
40 GW peak generation is needed in next 15 years



What solutions are possible?

What solutions are possible?

U.S. rooftop solar potential



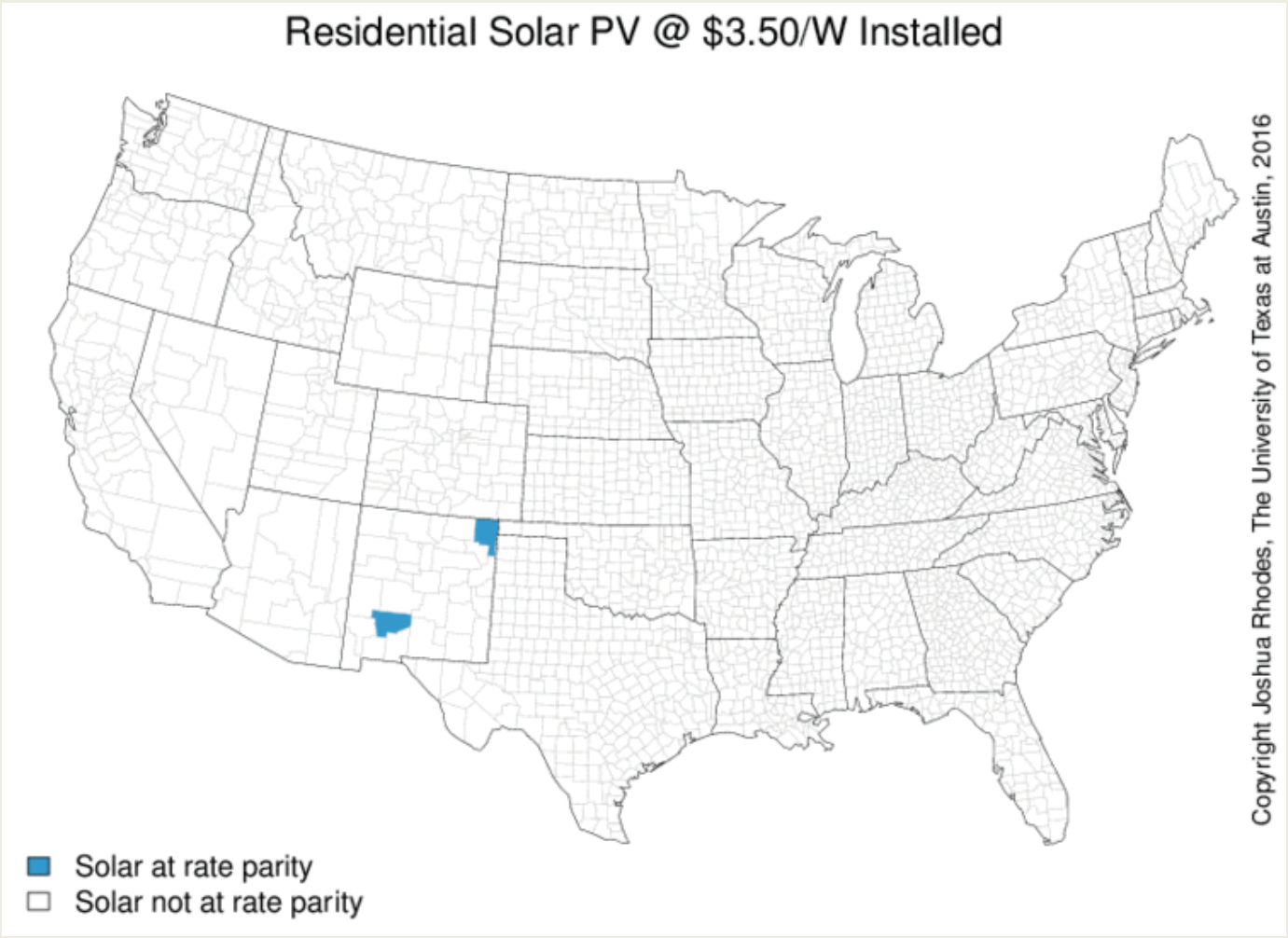
Courtesy NREL: Percentage of buildings suitable for PV in each zip code.

NREL Report: U.S. Rooftop PV potential

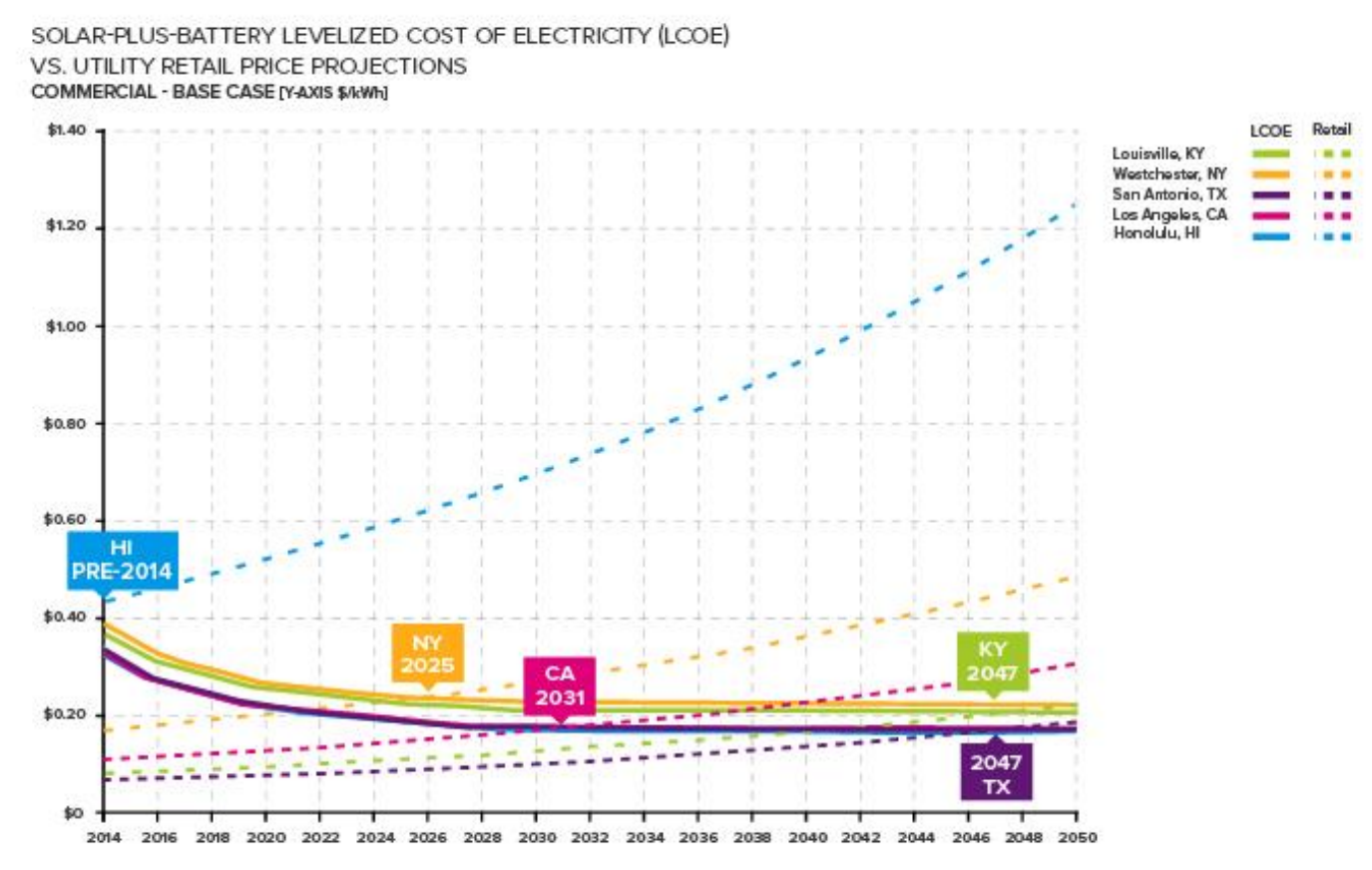
- Total national technical potential of rooftop PV is 1,118 GW of installed capacity and 1,432 TWh of annual energy generation-- 39% of total national electric-sector sales.
- Small buildings could provide up to 65% of rooftop solar; large buildings 35%.
- These results indicate enormous potential for cities to take leadership role in developing rooftop PV.

NREL: Rooftop Solar Photovoltaic Technical Potential in the United States: A Detailed Assessment

U.S. potential for cost-effective solar



Grid defection cost curve



Courtesy RMI Report *Economics of Grid Defection*

Energy storage value increasing

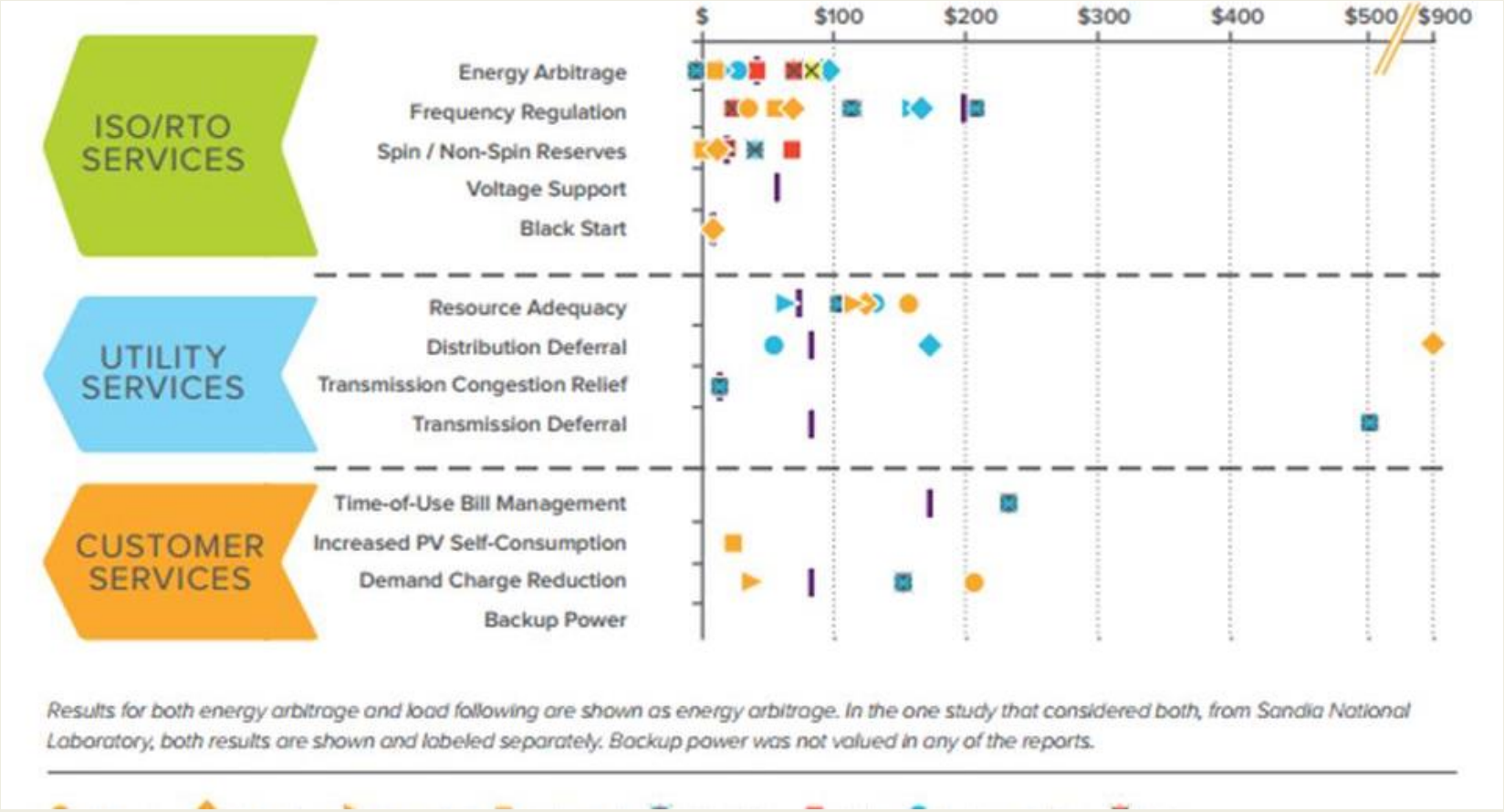


Chart courtesy RMI, *Economics of Battery Energy Storage*.

Energy storage costs declining

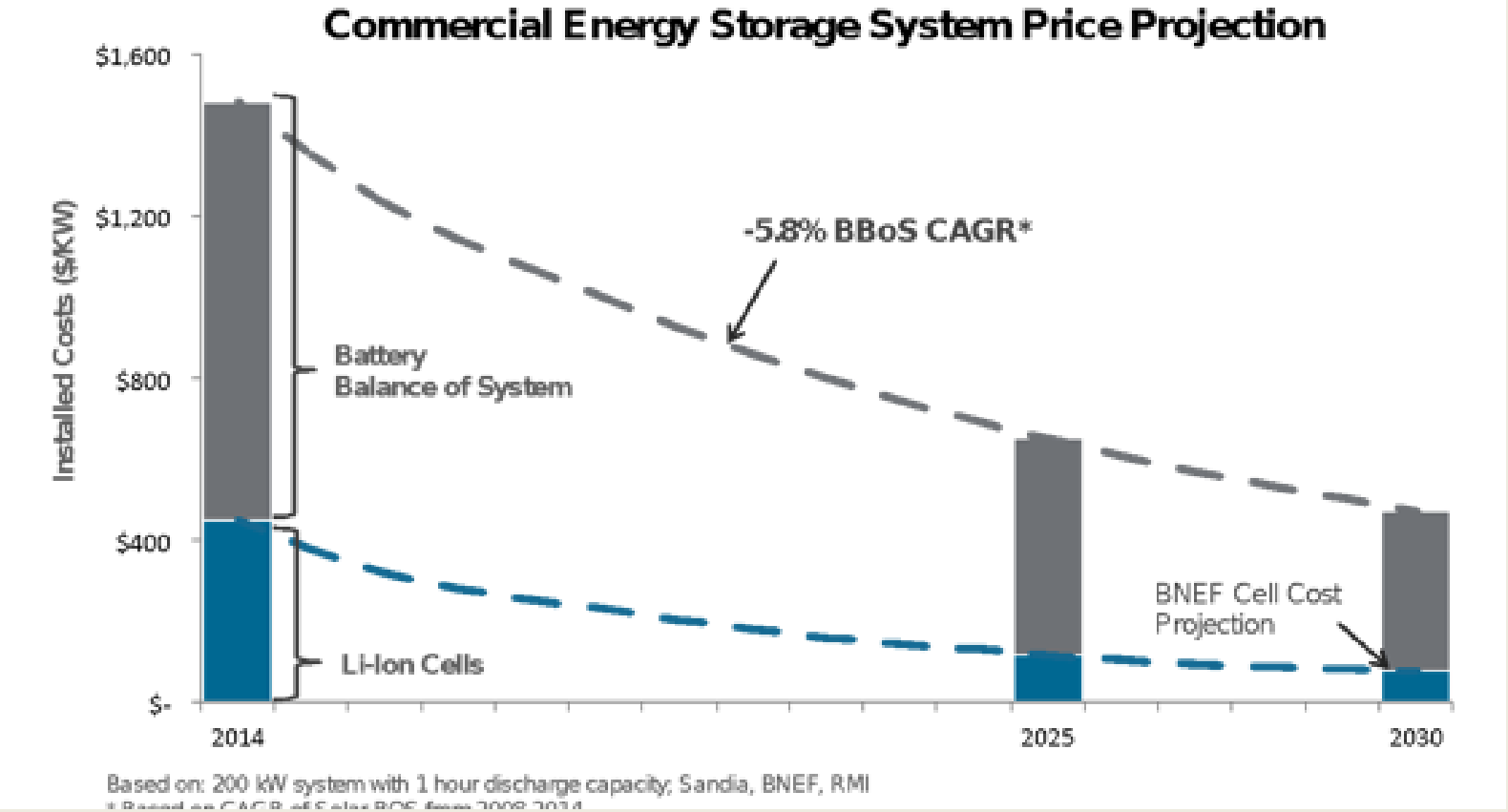
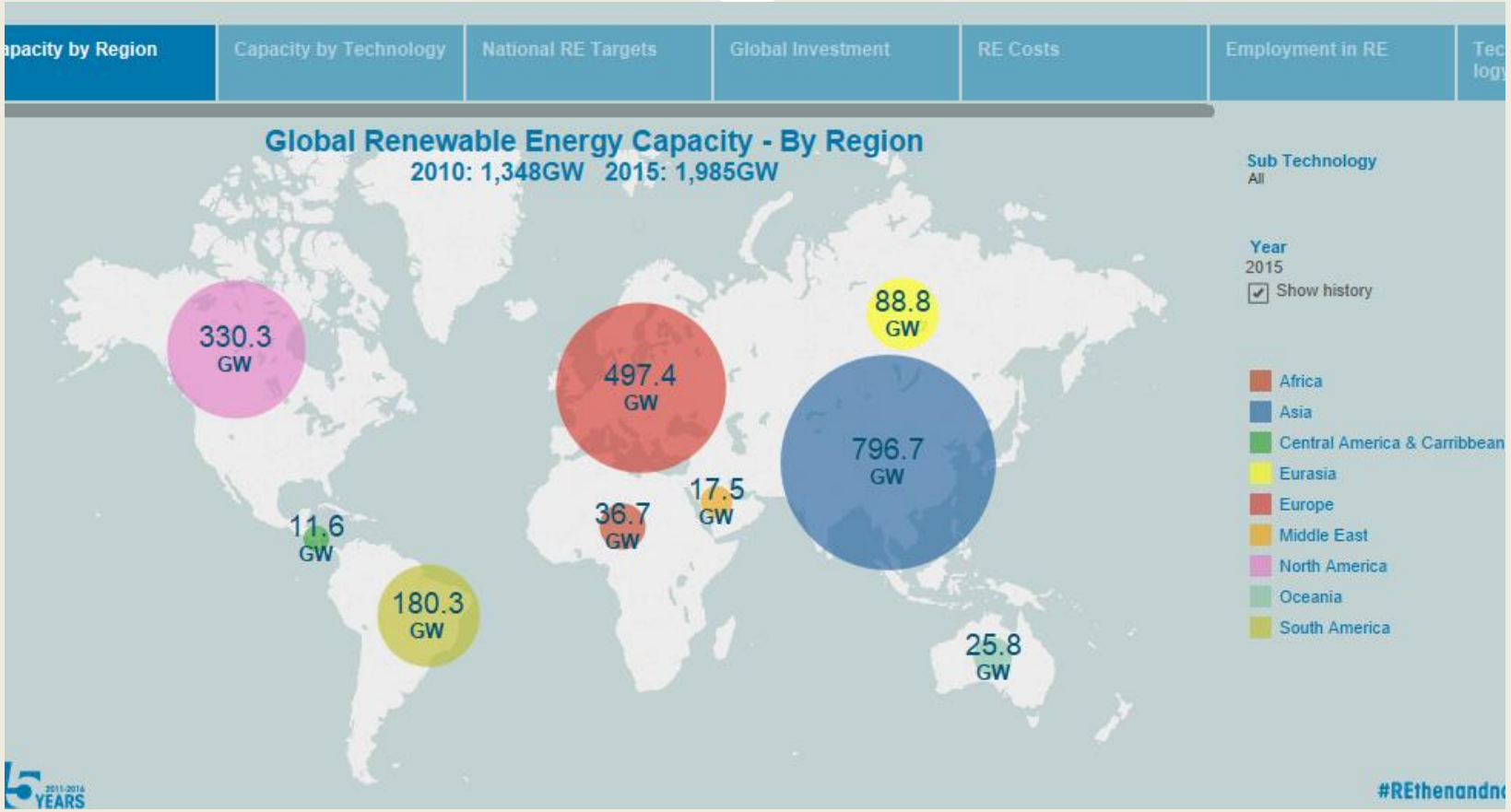


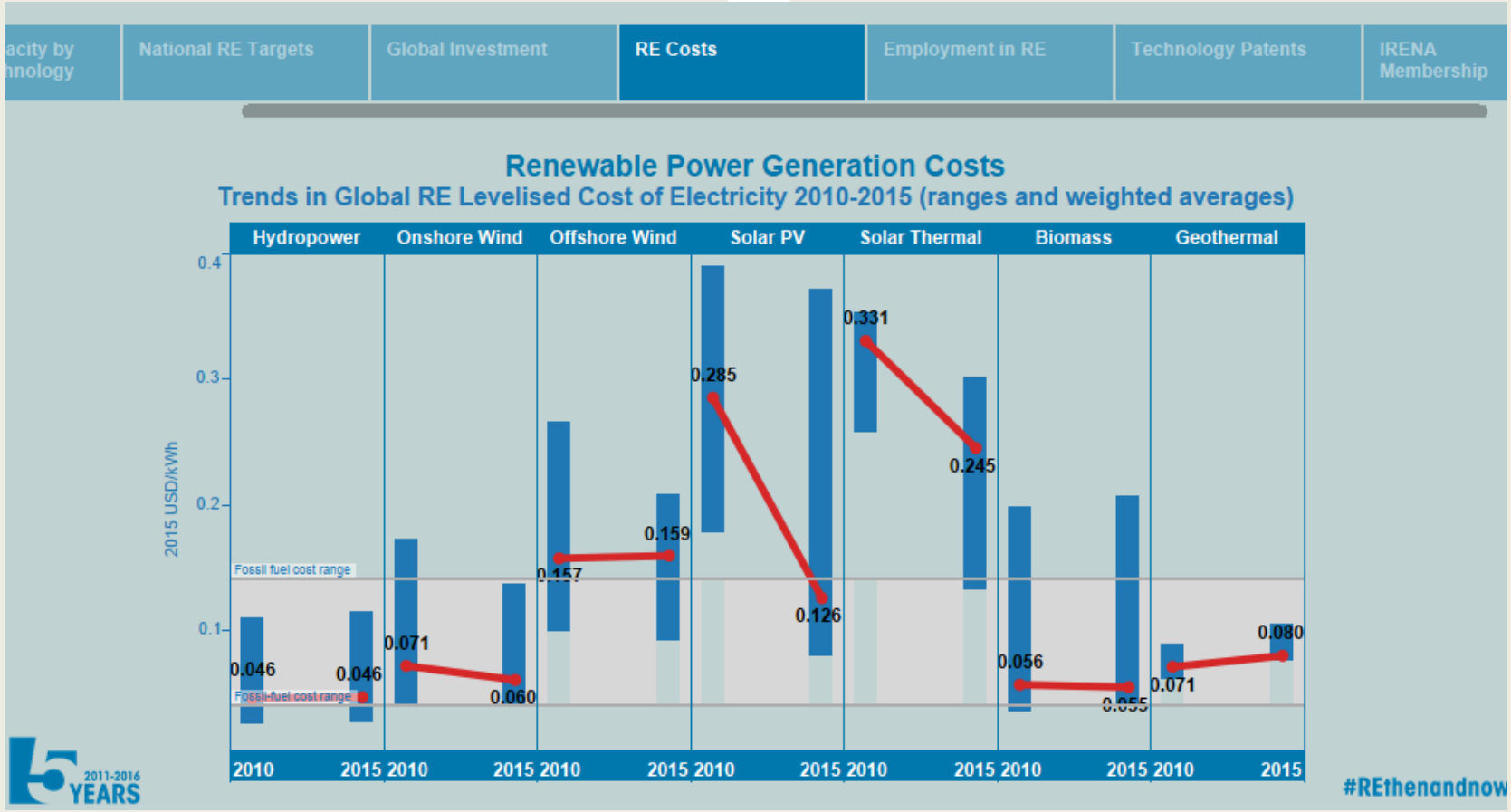
Chart courtesy RMI, using Bloomberg projections.

Global renewable energy deployment



Courtesy International Renewable Energy Agency Dashboard

Global renewable energy LCOE



Courtesy International Renewable Energy Agency Dashboard

World Economic Forum: Future of Electricity

By 2030, we can live in a world that is significantly more electrified, more connected, more efficient, more consumer-driven, more decarbonized--and one that has a material impact on other systems and sectors.

Questions?

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