

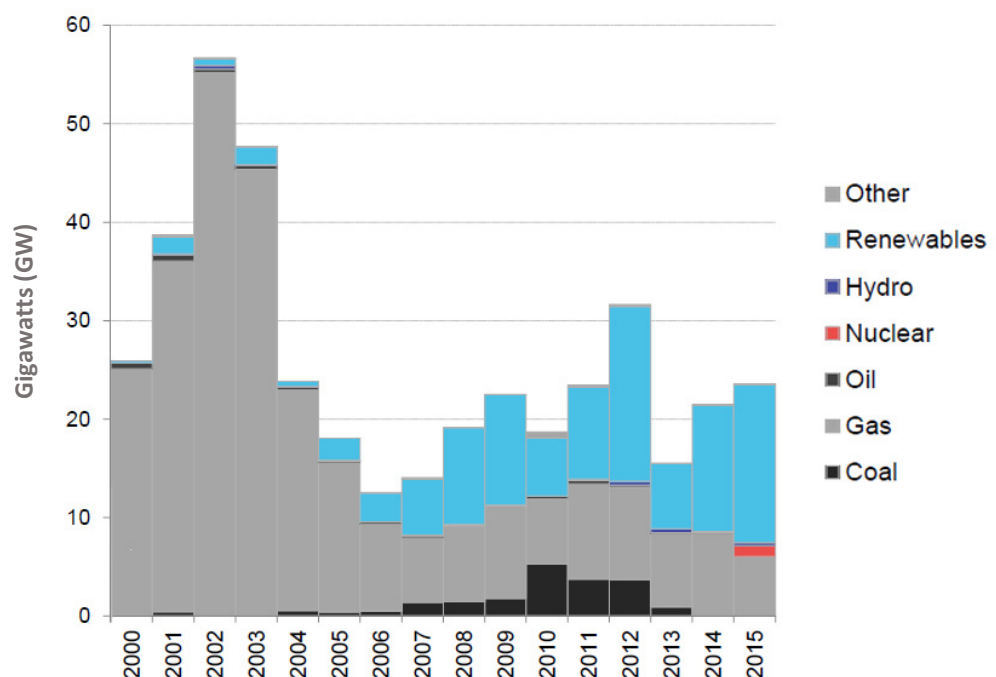
# A PROFILE OF THE NATION'S RENEWABLE ENERGY SECTOR POWERING 21<sup>ST</sup> CENTURY AMERICA

*As the nation's electricity infrastructure ages and older power plants retire, renewable energy is becoming the option of choice to power 21<sup>st</sup> Century America. Since 2008, renewables have made up more than half of all new power generation capacity in the U.S., outcompeting fossil sources of electricity and delivering tangible economic benefits throughout the country. Continued support of renewable energy is important to sustain our economic growth and maintain America's leadership and competitiveness in one of the world's fastest growing economic sectors.*

## Already Mainstream

Renewable energy already constitutes nearly 20% of U.S. electricity capacity across both red and blue states. Cumulative renewable capacity in the U.S. now totals nearly 222 gigawatts, with more than 17 gigawatts added to the grid just last year.

### ELECTRIC GENERATION CAPACITY BUILD BY FUEL TYPE



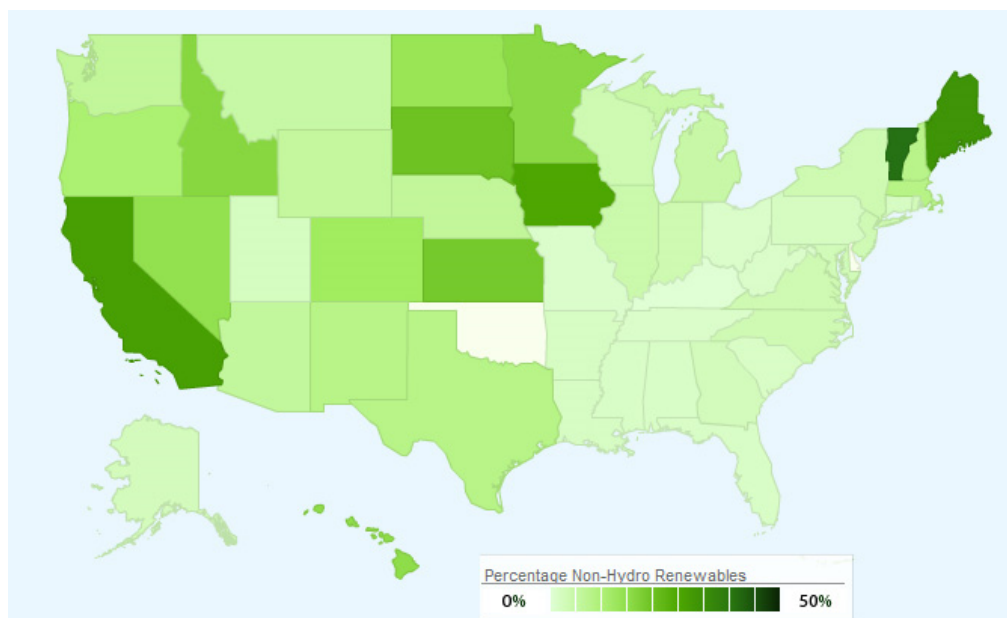
Source: Bloomberg New Energy Finance, Business Council for Sustainable Energy

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## SHARE OF TOTAL ELECTRIC POWER GENERATED BY NON-HYDRO RENEWABLE ENERGY SOURCES, BY STATE (2015)

Wind, solar, biomass, and geothermal power now make up 32% of all electricity generated in Iowa, 33% in California, 24% in Kansas, and 25% in South Dakota.



Source: U.S. Energy Information Agency

## An Important Source of American Economic Growth

With more than \$380 billion in private sector investment since 2004, including over \$44 billion in 2015 alone, renewable energy is an important source of American economic growth and job creation.

### U.S. TOTAL RENEWABLE ENERGY INVESTMENT (\$US BILLION)



Source: Bloomberg New Energy Finance, United Nations Environment Programme

## Boosts Local and Rural Economies

This immense investment has important multiplicative effects. Renewable energy facilities provide significant tax revenue to state and local governments, supporting schools and local services, often in rural areas, and boosting state budgets. In addition, renewable facilities make \$222 million in annual lease payments to farmers, ranchers and other landowners providing them with a significant supplement to their income.

- ▶ Oklahoma wind farms, for example, return over a \$1 billion dollars in property taxes to counties and local schools over their lifetimes
- ▶ In one Ohio county, local school officials report that a single wind farm adds \$400,000 a year in new revenue

## Supports More Jobs than Other Electric Power Sectors

In fact, with hundreds of manufacturing facilities and nearly 300,000 American workers, employment in just the wind and solar industries now surpasses jobs in coal mining and oil and gas extraction.

### RENEWABLE ENERGY JOB CREATION

**Solar:** 208,900 Jobs

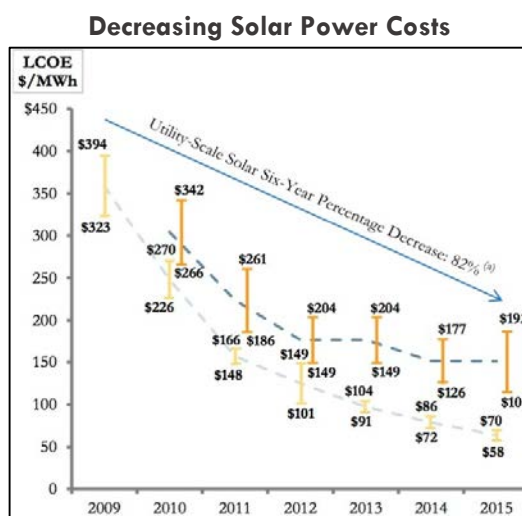
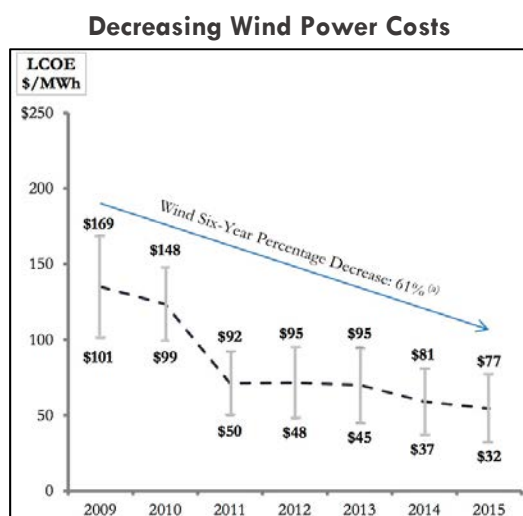
**Wind:** 88,000 Jobs

Sources: *Solar Foundation, American Wind Energy Association*

## Renewable Costs Continue to Steeply Decline

A central reason for this dramatic growth is the steep decline in the cost of renewable energy over the past several years as a result of improvements in technology and greater economies of scale. Since 2009, the cost of wind energy has declined by more than 60% and the cost of solar power has declined by more than 80%.

### THE LEVELIZED COSTS OF WIND AND SOLAR ENERGY

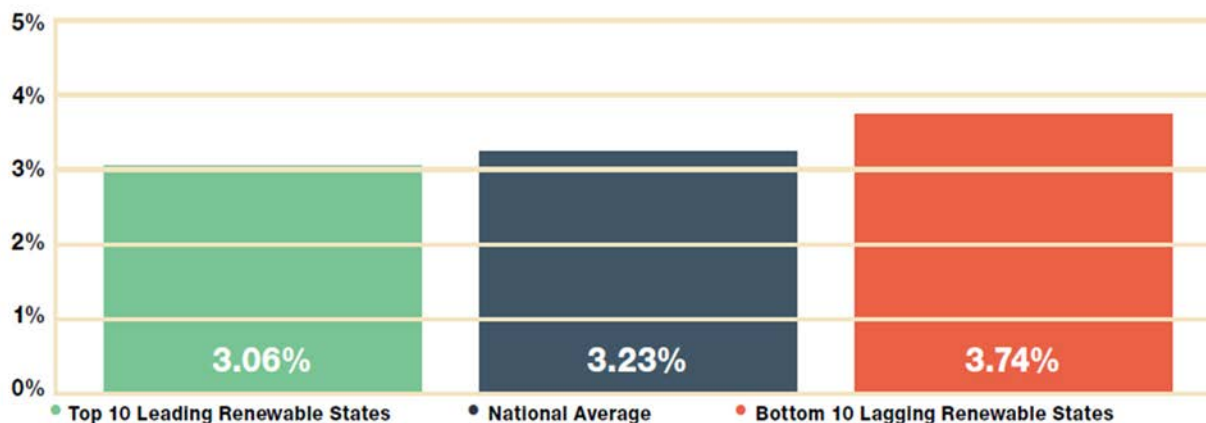


Source: Lazard

## Electricity Prices Are Rising More Slowly in States with the Most Renewables

It is therefore no surprise that electric power prices are rising most slowly in the states with the most renewable energy, and most rapidly in the states with the least renewable power.

### AVERAGE ANNUAL INCREASES IN RETAIL ELECTRICITY PRICES, 2002-2013

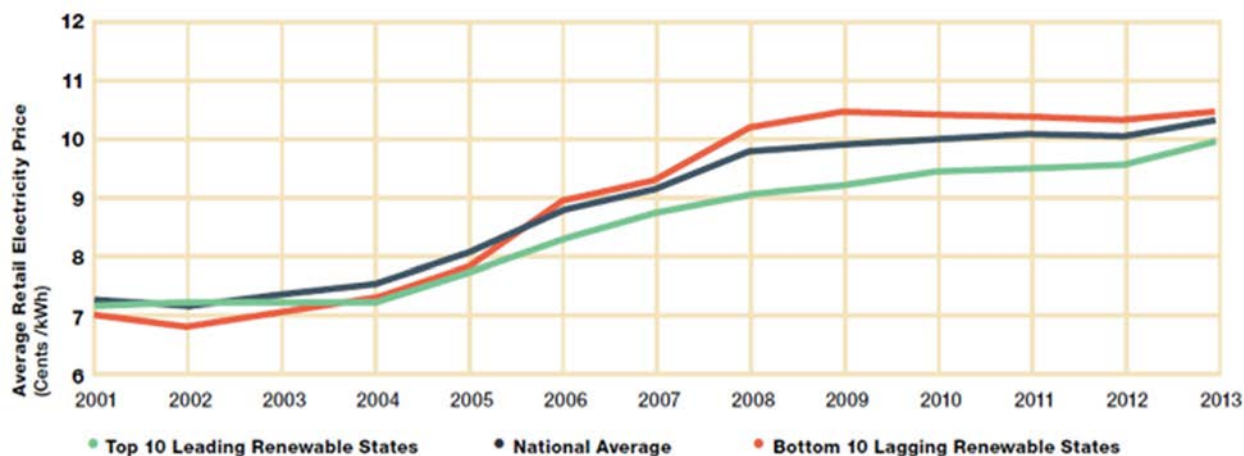


Source: DBL Investors

Reduced and less variable utility costs are particularly important for low and moderate income households that spend a greater percentage of household income on energy than other market segments.

With little to no fuel costs, renewable sources allow for long-term predictable pricing where electric power rates can be locked in for 20-30 years, and are not subject to the unpredictable price variability that can plague international fuel markets.

### AVERAGE RETAIL ELECTRICITY PRICES, 2001-2013



Source: U.S. Energy Information Administration

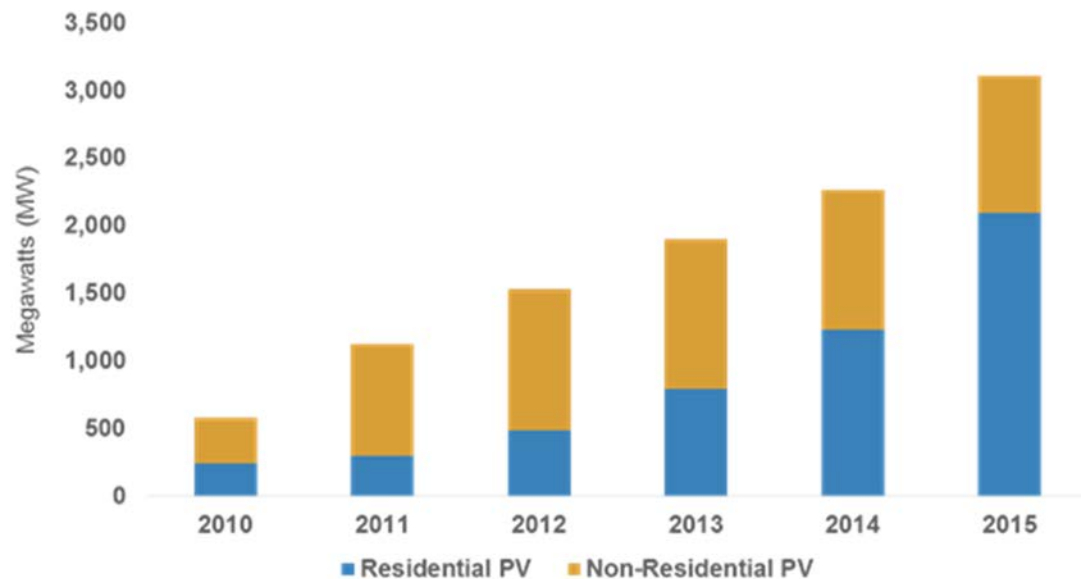
\* The Top 10 Renewable States have experienced low retail prices for a variety of reasons, including, in many cases, abundant wind resources.

Source: DBL Investors

## The Consumers' Choice

Consumers and American companies are choosing renewable energy not just because of sustainability, but also based on economics. This is reflected in part by the dramatic increase in the deployment of rooftop solar at residences and businesses.

### ANNUAL U.S. DISTRIBUTED SOLAR PV INSTALLATIONS



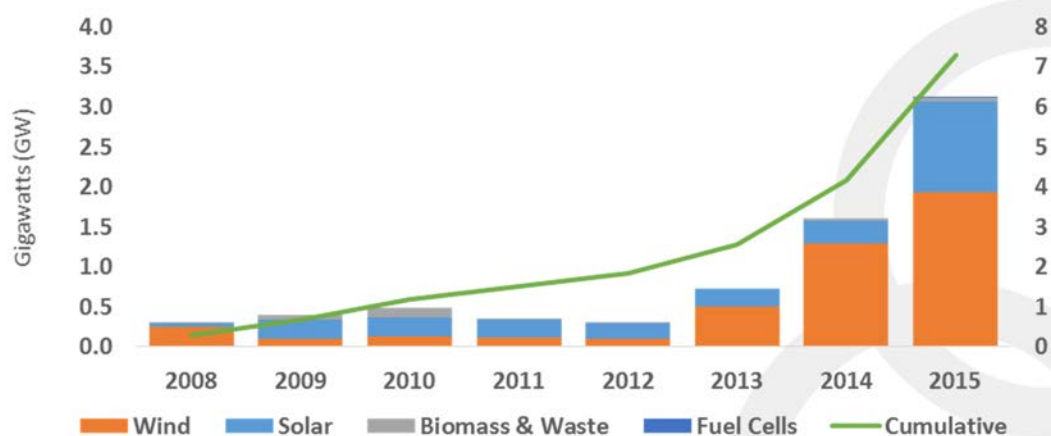
Source: GTM Research, Solar Energy Industries Association

The trend is even more pronounced in the commercial and industrial sector, where companies are increasingly acknowledging that renewable energy makes good business sense. Nearly half of Fortune 500 companies now have renewable energy targets. Businesses are moving to renewable energy to better control electric power costs and enhance resilience of electricity supply.

Corporate procurement of renewables is now increasing by 60% annually, and totaled more than 3.4 gigawatts in 2015.

State governments and economic development offices are rethinking their clean energy policies in order to attract commercial and industrial companies that are prioritizing receptivity to renewable energy investment.

### CORPORATE DEMAND FOR RENEWABLE ENERGY: NEW MARKET ENTRANTS



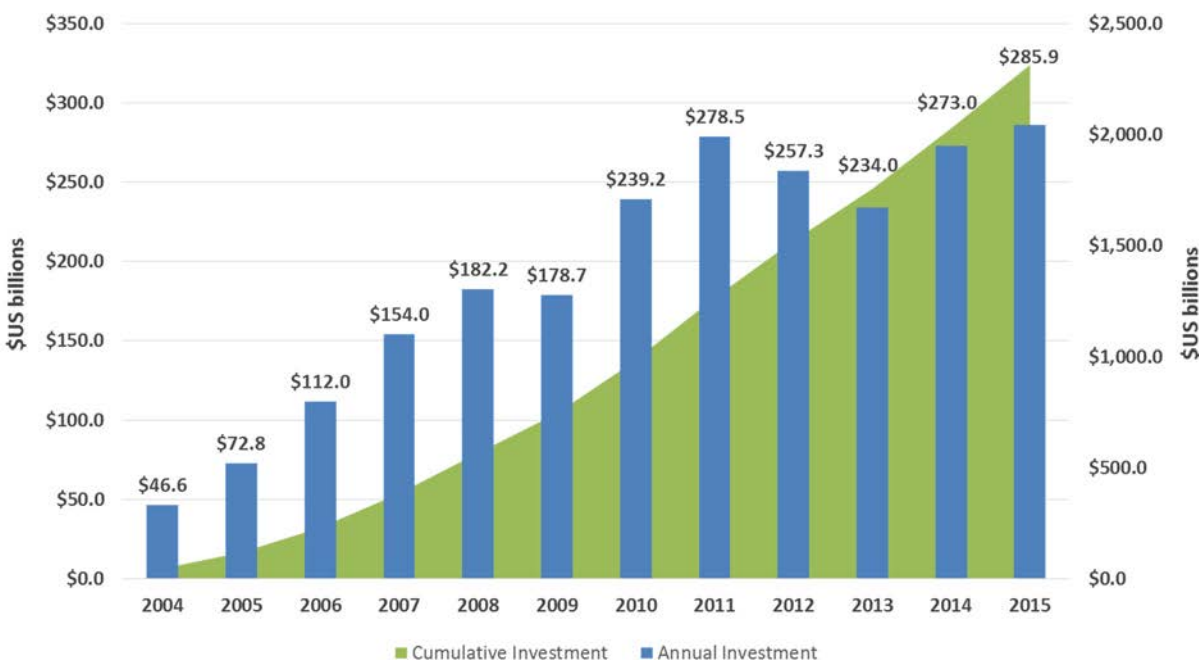
Source: Bloomberg New Energy Finance



## A Booming Global Industry

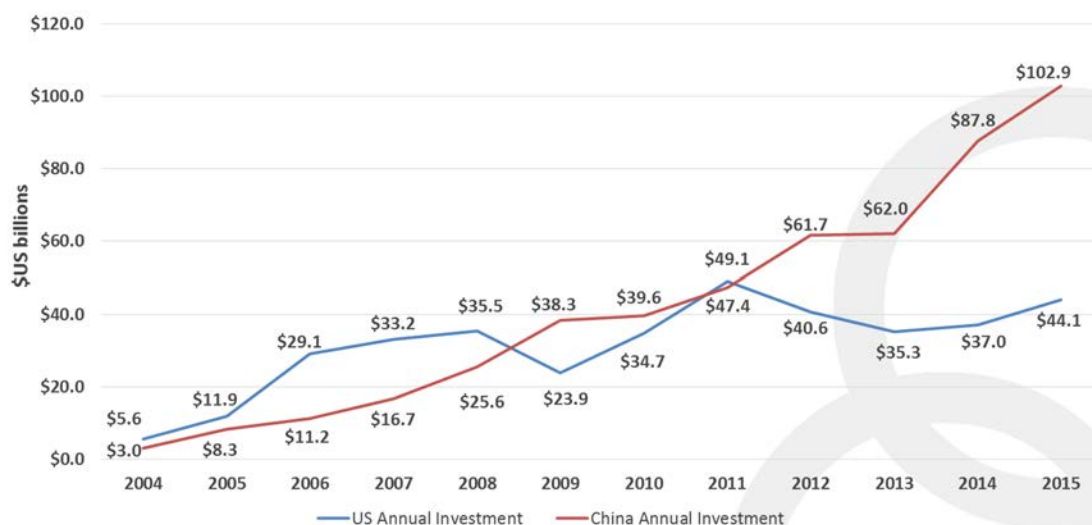
Renewable power is a growing global industry that attracted \$286 billion in private investment in 2015 alone, and over \$2.4 trillion since 2004. Sustained support of renewable energy enhances America's international economic competitiveness, and increasing U.S. investment is important to maintaining our leadership role in a vital industry sector that was pioneered by American scientists and engineers.

### GLOBAL RENEWABLE ENERGY INVESTMENT



### U.S. IS BEING OUTPACED IN RENEWABLE ENERGY INVESTMENT

While the U.S. renewable sector is booming, investment has grown at an even steeper pace in China.



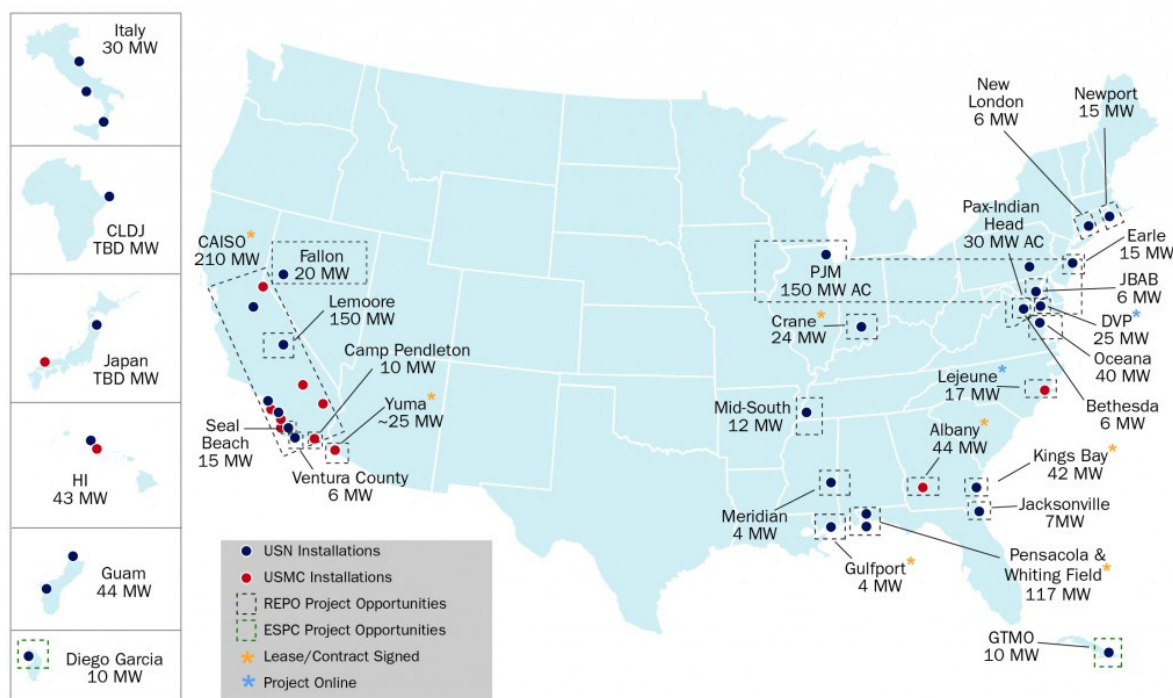
Source: Bloomberg New Energy Finance, United Nations Environment Programme

# An Important National Security Asset

*America has among the best renewable power resources in the world. The effort to harness these abundant domestic resources promotes the nation's energy independence and security by reducing our reliance on global fossil fuel markets, enhancing the resilience of our power grid, and increasing the long-term reliability of our electricity supply.*

The Department of Defense is increasingly relying on renewable energy to improve its energy security, enhance readiness and ensure reliable and resilient power for critical domestic functions and forward operations. The ability to reduce and, where possible eliminate, fuel supply lines – which can be costly and dangerous to maintain – is an important objective for the armed services.

## DEPARTMENT OF THE NAVY RENEWABLE ENERGY PROJECT OPPORTUNITIES (1.2 GW CONTRACTED)



Source: U.S. Department of the Navy

***Diversifying our energy sources arms us with operational flexibility and strengthens our ability to provide presence, turning the tables on those who would use energy as a weapon against us.***

– Secretary of the Navy Ray Mabus

# Policies Important to Maintain Renewable Energy Growth & International Competitiveness

*Federal and state policies have always had an important impact on the U.S. electric power market. There are several key areas important to continued renewable energy growth, including energy and tax policies and policies governing distribution and transmission.*

## A Level Playing Field

Incentives in the Federal tax code have long played an important role in the power industry in the U.S. Renewable tax incentives are on a schedule to be phased down and, in most cases, eliminated even as incentives for other power sectors continue indefinitely. Looking ahead, a technology-neutral tax policy that provides long-term incentives for energy technologies that meet U.S. economic and environmental goals would be an important step forward.

## Clean Power Plan

Investment in renewable energy technology is expected to accelerate substantially with implementation of the Clean Power Plan, creating a range of important economic benefits. In joint comments on the Clean Power Plan, Amazon, Apple, Google and Microsoft, the “Tech Amici”, cite their own experiences in concluding that the level of renewable energy contemplated by the Plan is consistent with market trends, achievable in the time contemplated, and economically sustainable.

***The Plan promises to promote greater use of increasingly affordable, stable sources of renewable energy that appeal to investors and customers alike. Tech Amici’s experience suggests that the Clean Power Plan will provide considerable benefits to electricity purchasers and that the Plan will not only be good for the environment, it will be good for business.***

– Amicus brief filed by Amazon, Apple, Google and Microsoft in April 2016 in support of EPA’s Clean Power Plan

## Grid Modernization

Modernization of the nation’s power grid is critically important to improve the efficiency and resiliency of our electricity supply system and also facilitate the integration of greater levels of renewable energy. Key elements of modernization include:

1. Greater grid flexibility and use of smart grid technologies that allow for two-way communication between electricity suppliers and consumers and more efficient management of the electricity load
2. Expansion of regional markets that balance supply and demand for electricity and increase the economic efficiency of the power system, especially in the Western U.S. where interstate electricity management has historically been unaligned and incongruous
3. Enhanced market design to better value the contribution of renewable energy, energy storage, and smart grid technologies



## Workable Permitting and Timely Decision Making

Inefficiencies in the federal permitting process complicate development for many renewable energy and related infrastructure projects, adding significant administrative and overhead costs, constraining project financing, and using taxpayer dollars ineffectively. Lengthy decision timeframes for permitting routinely bar project development where qualifications for short term tax incentives is a critical element of financing.

All parties would benefit from better alignment of Agency permitting requirements and improvements to program design to encourage more timely decision making.

### For further information:

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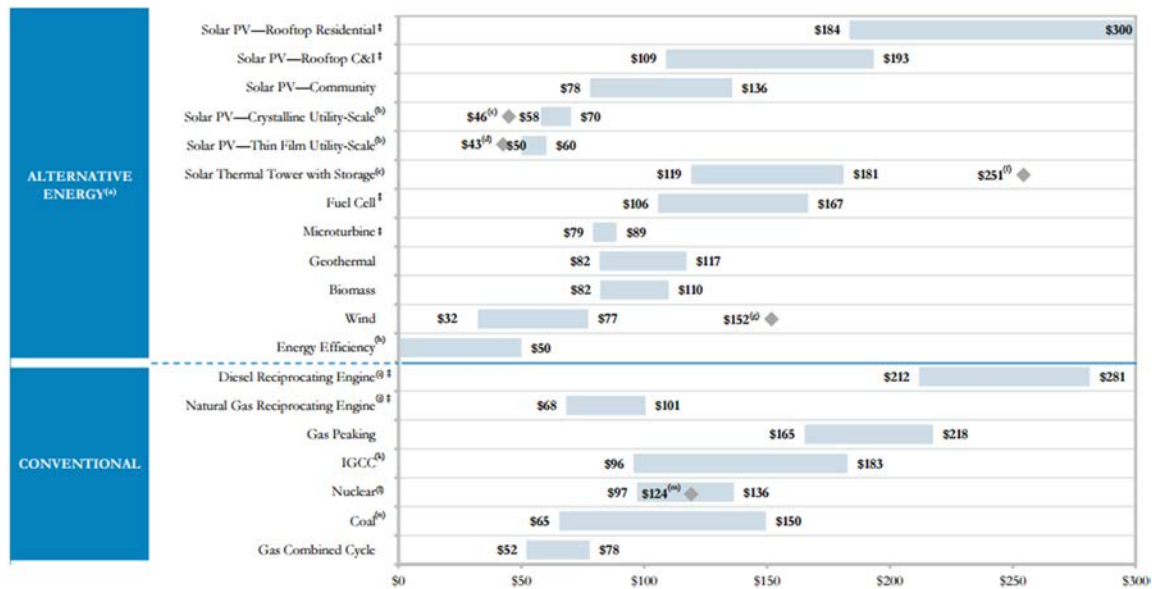
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# Appendix

## Unsubsidized Levelized Cost of Electricity

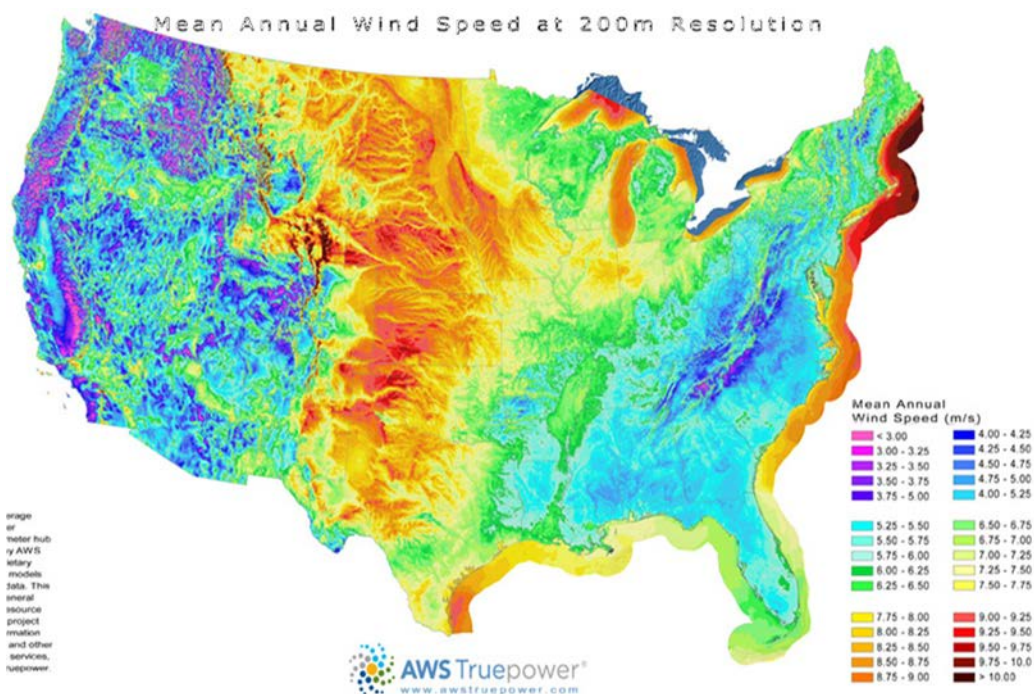
*Renewable Energy Technologies are Competitive with Fossil Fuel Sources of Electricity*



Source: Lazard

## U.S. Wind Resource Map

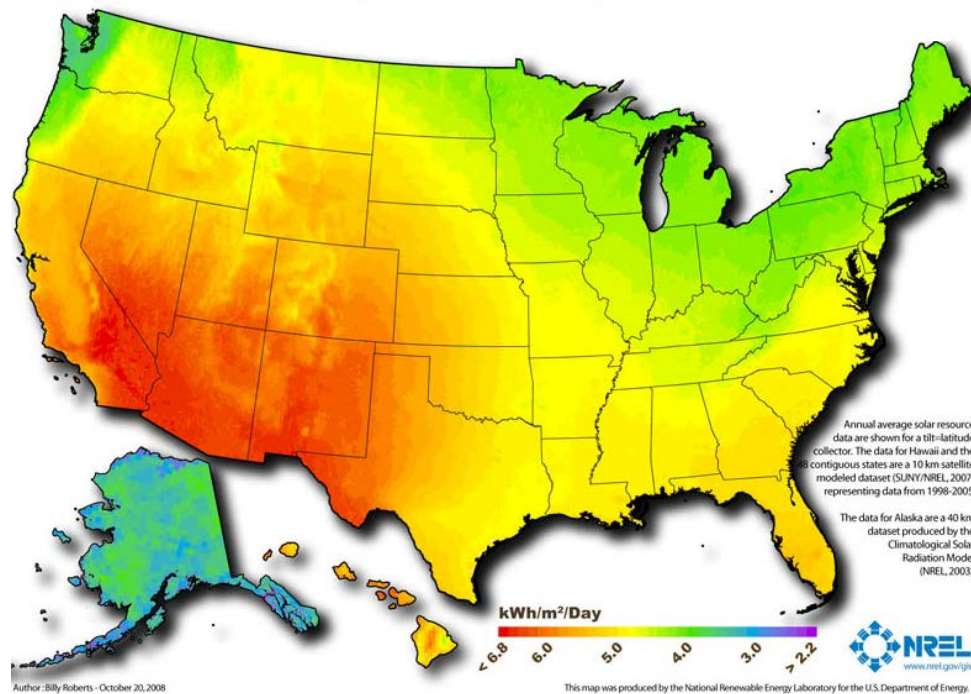
*The U.S. Benefits from Some of the Best Wind Resources in the World*



Source: AWS True Power

## U.S. Solar Resource Map

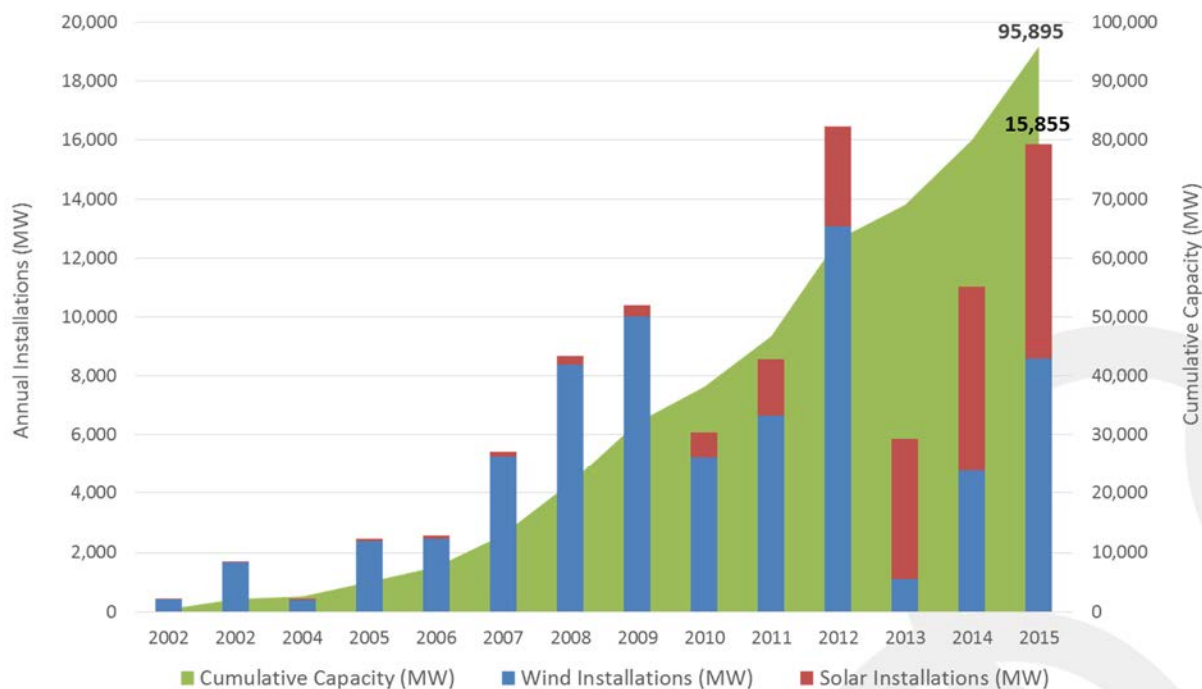
*America's Strong Solar Resources Support Solar Power Generation in Every State*



Source: NREL

## U.S. Wind and Solar Installations 2002 – 2016

*Wind and Solar Power Industries Have Grown to Nearly 100 GW of Power Capacity in a Decade*



Sources: AWEA, SEIA, GTM Research