

Increasing Renewable Energy Generation in Kansas

**The Feasibility and Economic
Impacts of Achieving 50%
Renewable Energy Generation**

June 2016

Executive Summary

Increasing wind and solar development would attract almost \$5.2 billion in investment and economic activity to Kansas

- Kansas is among the top five states in both wind and solar generation potential according to the National Renewable Energy Laboratory and already generates 23.9% of its electricity from renewable energy, predominantly wind
- Achieving 50% renewable generation requires the development of 2,650 megawatts (MW) of generation, 850 MW of which are now under construction or development. Development of 2,650 MW of wind power would attract \$4.528 billion in investment and economic activity to Kansas projects
- Solar power is an untapped and undeveloped resource in Kansas, which has some of the best solar resources in the country. Developing 110 MW of solar generation in Kansas would attract an additional \$645.2 million in investment and economic activity
- In order to develop these resources, Kansas needs to invest in additional transmission to bring power from the best resource areas in the west to load centers in the east. Investment in transmission has proven to provide economic benefits far in excess of the cost
- Kansas should also allow third-party sales of electricity to allow individuals and businesses to purchase renewable energy directly from developers. This will help Kansas maintain lowest possible electric rates and attract economic development, including Fortune 100 corporations who are committed to becoming 100% renewably powered
- Kansas should also consider other pro-renewable policies to increase its competitiveness with surrounding states with similar renewable resources

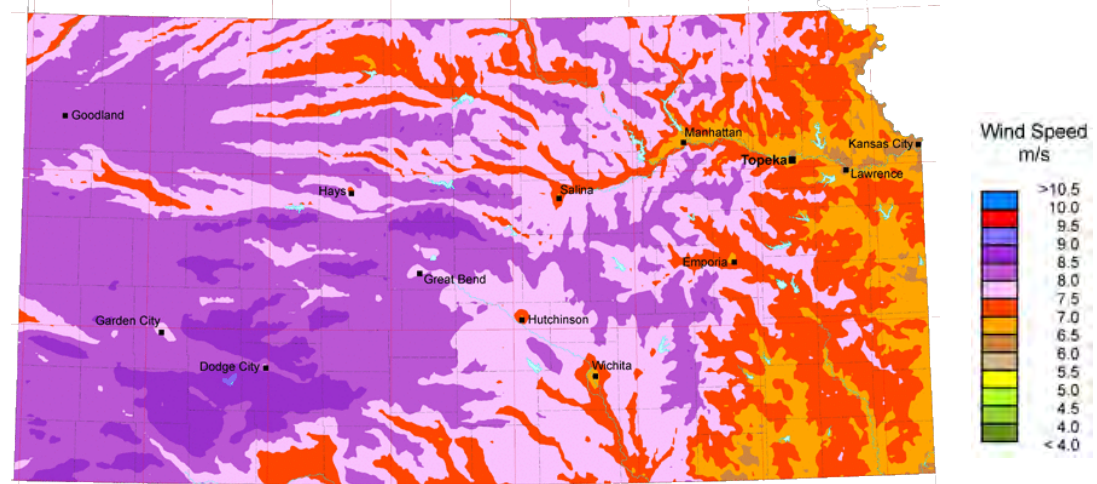
Kansas' Wind and Solar Generation Potential

Kansas ranks in the top five among all states for both wind and solar

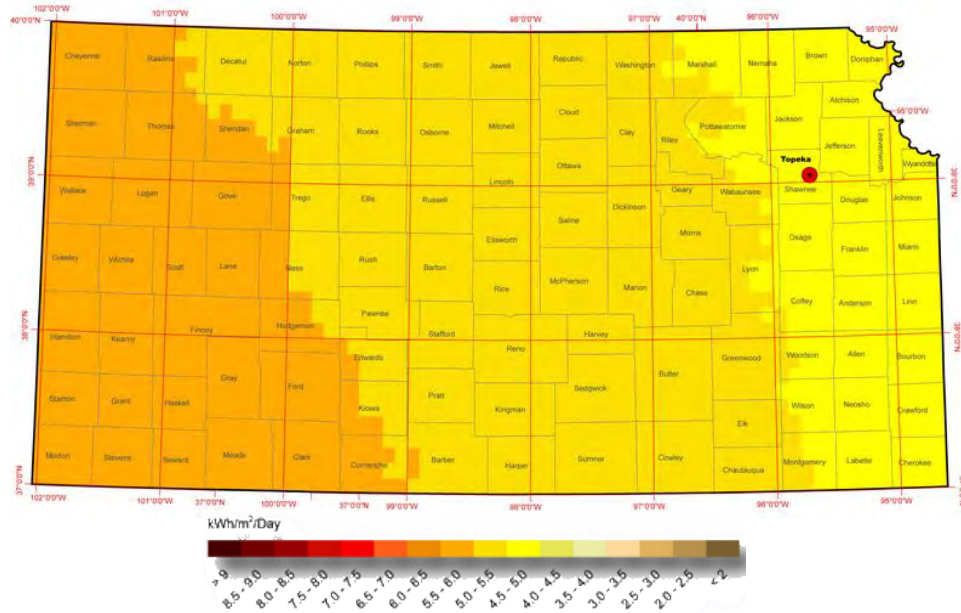
Wind potential = 952 GW

Solar PV potential = 6,982 GW

Annual Average Wind Speed at 80 Meter Hub Height



Annual Estimated Solar Radiation



Maps Courtesy of NREL

Development Needed to Achieve 50% Renewable Generation

Existing Renewable Energy Profile

- Kansas now generates 23.9% of its electricity from renewable sources
- Wind constitutes almost all of Kansas' renewable generation with 3,764 MW of installed capacity
- In addition to wind, Kansas also has 67 MW of biomass and 7 MW of solar generation capacity
- Electricity demand in Kansas is forecast to remain relatively flat, increasing at 0.6% per year¹

Getting to 50% and Beyond

- Assuming new wind projects have an average capacity factor of 40%, it would take 2,650 MW of new wind capacity to achieve 50% generation based on projected demand in 2030
- An additional 110 MW of solar capacity (1/5 the capacity of neighboring Colorado) would help push generation slightly above 50%, and bring additional investment to the state

Economic Impacts of Increasing Wind Generation

Based on 2,650 MW of development

Impact Category	Amount of Impact
Total Investment and Economic Activity	\$4.528 billion
Total Project Finance	\$3.378 billion
Local Spending During Construction	\$783.6 million
Local Spending During Operation (annually)	\$12.6 million
Sales Taxes During Construction	\$229.2 million
Sales Taxes During Operation (annually)	\$1.97 million
Property Taxes (annually)	\$5.22 million
Lease Payments (annually)	\$5.4 million
Wages During Construction	\$375.6 million
Wages During Operation (annually)	\$13.2 million
Jobs During Construction	6,630
Permanent Jobs During Operation	234

Economic impacts were calculated using the Jobs and Economic Development Impact Model (JEDI) model developed by the National Renewable Energy Laboratory. The modeling is based upon the projects under construction (850 MW) and the amount of additional capacity beyond what is being constructed needed to achieve 50% renewable energy generation (1,800 MW). Modeling assumes 300 MW would be built annually from 2018-2023. Modeling further assumes a turbine size of 3 MW and an average capacity factor of 40%. Total investment and economic activity number includes one-time impacts and annual impacts extrapolated over 30-year period. Dollar values are in 2016 dollars.

Leading the transition to a renewable energy economy.

Economic Impacts of Increasing Solar Generation

Based on 110 MW of development

Impact Category	Amount of Impact
Total Investment and Economic Activity	\$645.2 million
Total Project Finance	\$524.6 million
Local Spending During Construction	\$273.6 million
Local Spending During Operation (annually)	\$2.13 million
Sales Taxes During Construction	\$16.2 million
Sales Taxes During Operation (annually)	\$59,592
Wages During Construction	\$196.9 million
Wages During Operation (annually)	\$1.83 million
Jobs During Construction	3,686
Permanent Jobs During Operation	32

Economic impacts were calculated using the Jobs and Economic Development Impact Model (JEDI) model developed by the National Renewable Energy Laboratory. The modeling assumes 110 megawatts (MW) will be constructed by 2023. Modeling assumes 100 MW will be utility-scale projects using thin-film cells on a fixed axis with 10 projects of 10 MW each. Modeling also assumes 10 MW of residential solar using crystalline silicon cells with an average system size of 10 kilowatts. Total investment and economic activity number includes one-time impacts and annual impacts extrapolated over 30-year period. Dollar values are in 2016 dollars.

Transmission Constraints Could Prevent Increasing Renewable Generation

Southwest Power Pool (SPP), the regional transmission grid operator, has identified a number of transmission overloads in Western Kansas as well as in Central and Eastern Kansas that impede West-East power flows during periods of strong wind generation



Maps courtesy of South West Power Pool

Strategies for Achieving 50% Renewable Goal

Build transmission to attract development

- Kansas should designate renewable energy zones where the best wind and solar resources are located
- Kansas should next plan and build the necessary transmission to bring the power to load centers in Eastern Kansas (and for potential export to other states)
- Experience shows that anticipatory planning and construction of transmission results in more investment and attracts additional development to resource-rich areas
- The economic gains from the construction of transmission and the subsequent development of renewable energy projects far exceed the cost of transmission projects
- For example, Texas' Competitive Renewable Energy Zones (CREZ) project, cost approximately \$6.9 billion and returned an estimated \$30 billion in economic gains.¹ Similarly, an analysis by SPP found that a \$16.6 billion investment in transmission resulted in \$43.4 billion in quantifiable benefits²

(1) Perryman Group, *The Winds of Prosperity*, 2010

(2) Southwest Power Pool, *The Value of Transmission*, 2016

Strategies for Achieving 50% Renewable Goal

Allow third-party electricity
sales

- Corporate purchasing of renewable energy is the fastest growing segment of the renewable energy sector
- In 2015, corporations procured 3.44 GW of renewable power, more than double the amount procured in 2014 (see appendix)
- Increasingly, corporations are making siting and investment decisions based upon their ability to access renewable energy to hedge against rising power costs, secure reliable power and meet sustainability objectives
- Legislation (HB 2036) has been introduced to allow for third-party sales of electricity to allow corporations to procure renewable energy, but artificially limits sales to 80 MW. This cap should be removed to allow large-scale purchases of renewable power
- Allowing third-party sales of electricity encourages competition, provides customer choice and is supported by the Kansas Chamber of Commerce
- Third-Party sales will also make Kansas attractive to corporations who are committed to purchasing renewable energy (see appendix)

Strategies for Achieving 50% Renewable Goal

Enact additional pro-renewable policies

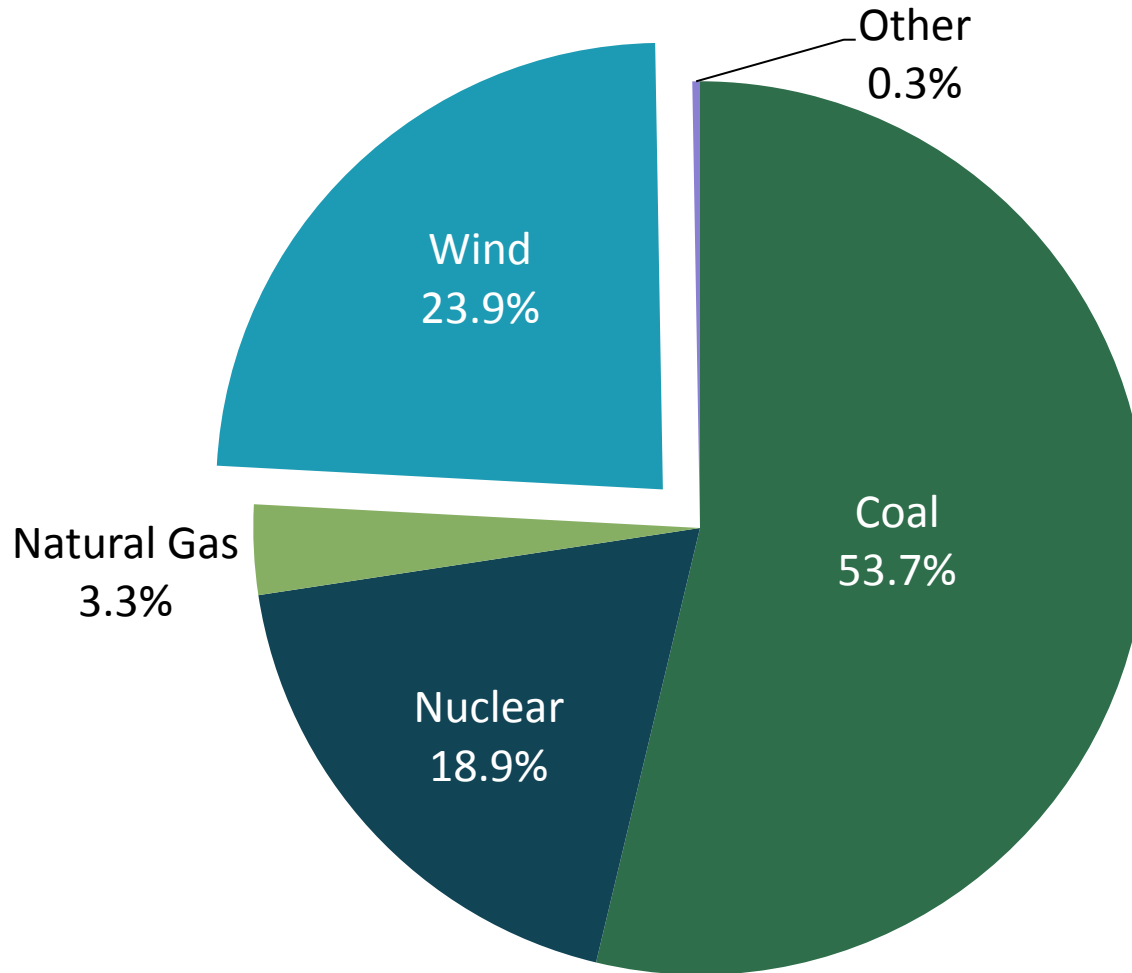
Potential Policies	Rationale
Renewable Portfolio Goal	Increasing the goal from 20% to 50% sends a strong market signal; set a carve out for solar generation to encourage development
Commercial PACE (Property Assessed Clean Energy) Financing	Allows commercial properties to access low cost loans to install clean energy and energy efficiency upgrades at little to no cost to the government
Regulatory Reforms to Expedite Approvals of Renewable Energy and Transmission Projects	Reduces the time needed to plan projects lowering the project's overall costs
Authorize Community Solar	Allows customers who rent or have unsuitable roofs to access and purchase solar power

Appendix

Existing Renewable Energy Policies in Kansas

Policy	Description
Renewable Portfolio Goal	State-wide goal for electric utilities and cooperatives to generate or purchase 20% of peak demand from renewable sources
Property Tax Incentive	Exemption for renewable energy property from property taxes, limited to the first 10 years
Net Energy Metering	All investor owned utilities are required to offer net metering to their customers (some co-ops have voluntarily adopted net metering policies). For systems installed before July 1, 2014, net excess generation is credited at the full retail rate. For systems installed after July 1, 2014, net excess generation is credited at the utility's monthly system average cost of energy
Solar Easements	Parties may voluntarily enter into solar easements to ensure adequate exposure for a solar energy system

In 2015, Wind Generated Nearly 24% Of All Electricity in Kansas

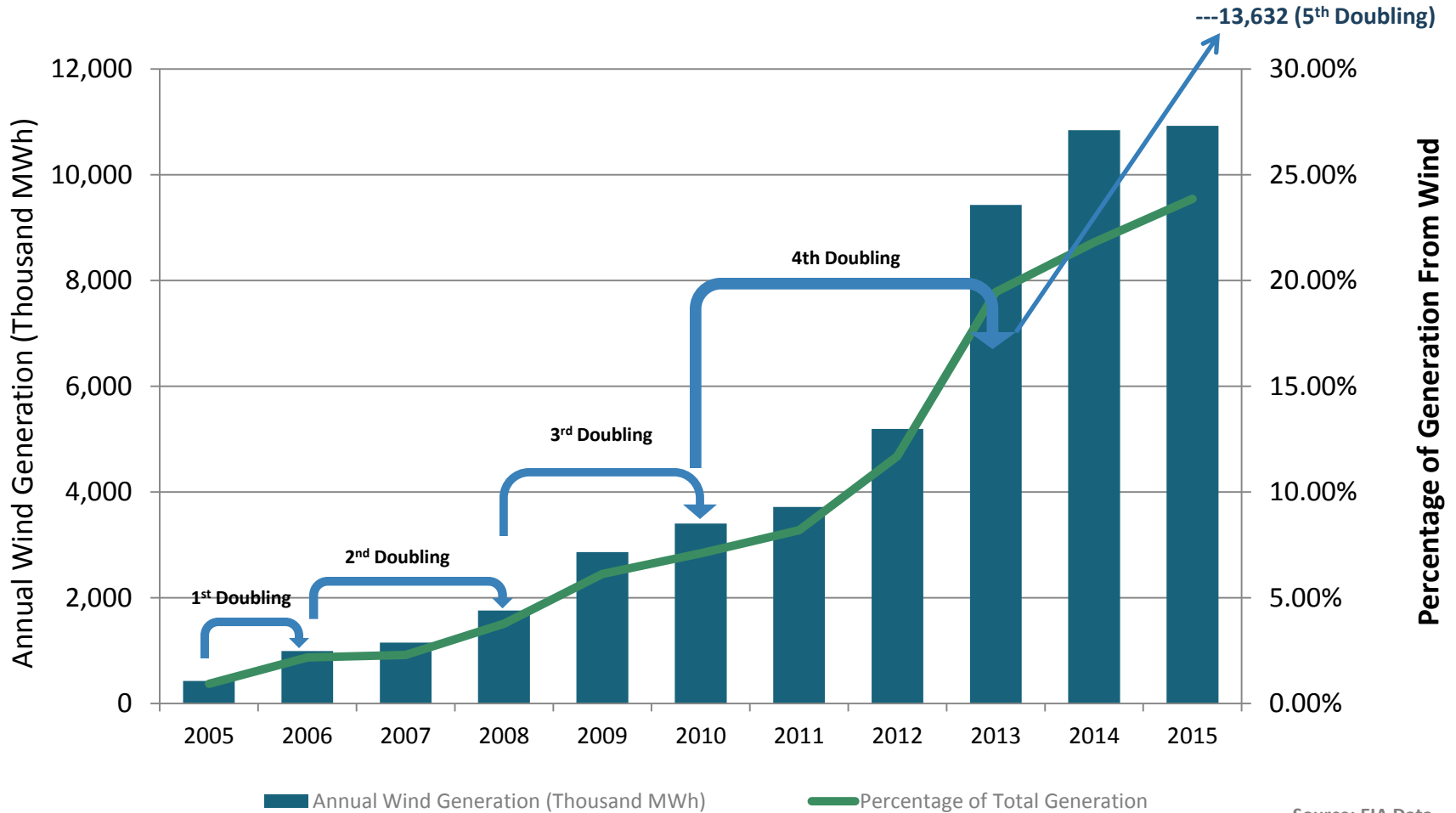


Source: EIA Data

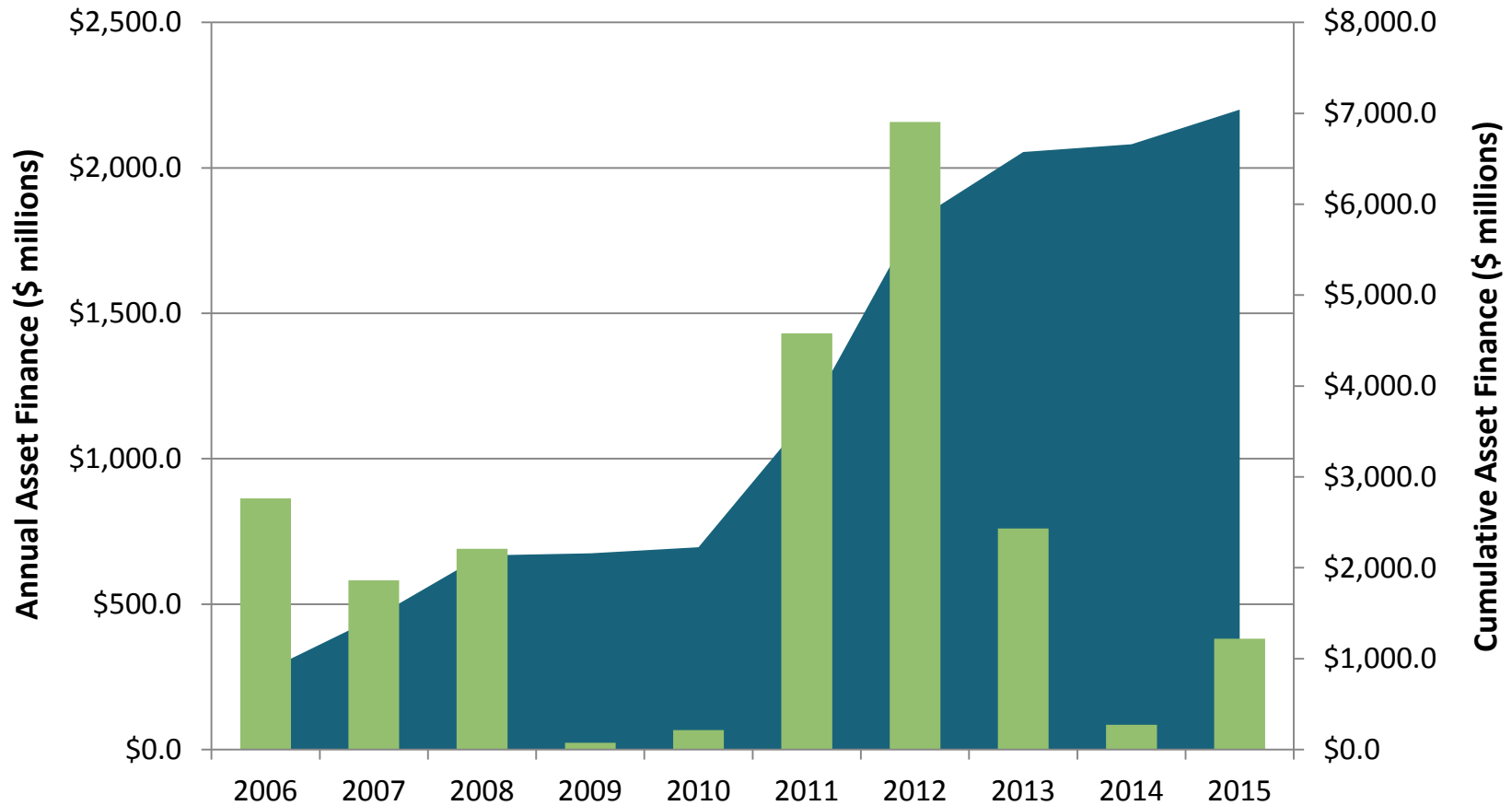
"Other" includes petroleum liquids, biomass and solar generation.

Kansas Wind Generation Has Doubled Four Times in Just 10 Years

...And is about to double for the fifth time



Kansas Has Attracted Over \$7 billion in Renewable Energy Asset Finance Since 2006

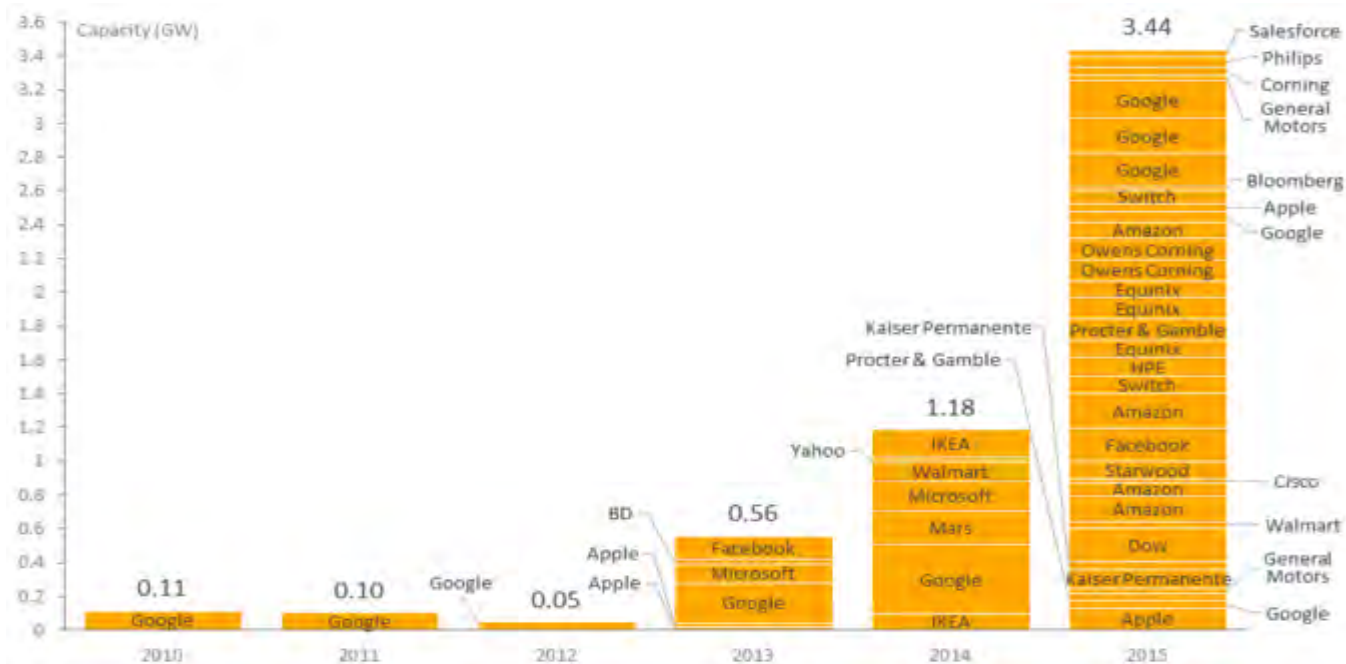


Source: Bloomberg New Energy Finance Data

Growing Corporate Purchasing of Renewables

Corporations are increasingly driving the demand for renewable energy to provide reliable power, hedge against rising electricity prices, and satisfy sustainability goals

Corporate Renewable Energy Purchases 2010-2015



Source: RMI, BRC

65 Corporations Are Committed to Going 100% Renewable



Source: Bloomberg New Energy Finance Data



ABOUT US PREF

[US PREF](#) is a coalition of senior level officials with companies that finance, develop, manufacturer and use renewable energy. US PREF members focus on increasing capital formation and investment in renewable energy and educating the public sector to ensure that policy impacts the market as efficiently and effectively as possible. US PREF is a program of the American Council On Renewable Energy (ACORE), a Washington, DC - based non-profit organization that unites business, policy and finance to accelerate the transition to a renewable energy economy.

For more information please contact Todd Foley, Senior Vice President, Strategy, Policy & Government Relations at foley@acore.org, or Scott Clausen, Policy and Research Manager, at clausen@acore.org or visit www.uspref.org.

ABOUT ACORE

[ACORE](#) is a national non-profit organization dedicated to advancing the renewable energy sector through market development, policy changes, and financial innovation. With a savvy staff of experts, fifteen years of experience promoting renewable energy and hundreds of member companies, non-profits, and other organizations from across the spectrum of renewable energy technologies, consumers, and investors, ACORE is uniquely well-positioned to strategically promote the policies and financial structures essential to renewable energy growth. The organization's annual conferences in Washington, D.C., New York and San Francisco set the industry standard in providing important venues for key leaders to meet, discuss recent developments, and hear the latest from senior government officials and seasoned experts. Additional information is available at: www.acore.org.



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