

2016

SUSTAINABLE ENERGY IN AMERICA

Factbook

GROWTH SECTORS OF THE U.S. ENERGY ECONOMY



Energy —
— Efficiency



Natural —
— Gas



Renewable —
— Energy

Understanding the U.S. energy transformation

America is in the midst of a sweeping energy transformation, and 2015 will be remembered as a watershed year. Industry passed important milestones and the federal government finalized critical new policies that further bolster deployment of energy efficiency, natural gas and renewable energy.

The Business Council for Sustainable Energy (BCSE) represents industries that are at the forefront of this shift, from the energy efficiency, natural gas and renewable energy sectors. The Council has commissioned Bloomberg New Energy Finance (BNEF) to compile insights on the state of America's energy transformation.



What's unique about the Sustainable Energy in America Factbook?

FIRST, the report is quantitative and objective, intended to provide policymakers, journalists and industry professionals with up-to-date, accurate market intelligence.

SECOND, the report looks at clean energy broadly defined. The Factbook takes the pulse of the wide range of clean energy industries represented by the Council, including natural gas, renewable energy sources (including solar, wind, hydropower, geothermal, biomass, biogas and waste-to-energy—but excluding liquid biofuels), distributed power and energy efficiency.

THIRD, the report fills important data gaps. For example, data sources and economic models of the U.S. energy industry often fail to capture the full contributions of sectors such as distributed generation. This Factbook seeks to accurately quantify some sectors that currently are small but are growing rapidly.

GET THE FACTS

www.bcse.org

To view the Sustainable Energy in America 2016 Factbook, visit the link below

www.bcse.org/sustainableenergyfactbook.html

A cleaner, more secure and diverse energy mix

Today's energy mix in the United States is radically different from that of a generation ago. In 2015, the United States scored a triple play with carbon reductions, cost savings **and** economic growth—thanks in large part to the clean energy transformation that is under way.

The **Sustainable Energy in America Factbook** provides up-to-date, accurate market information about the broad range of industries—energy efficiency, renewable energy and natural gas—that are contributing to the country's move toward cleaner energy production and more-efficient energy usage.

A New Era Is Dawning for Clean Energy in the U.S.

Traditional energy sources are declining, while natural gas, renewable energy and energy efficiency are playing a larger role.

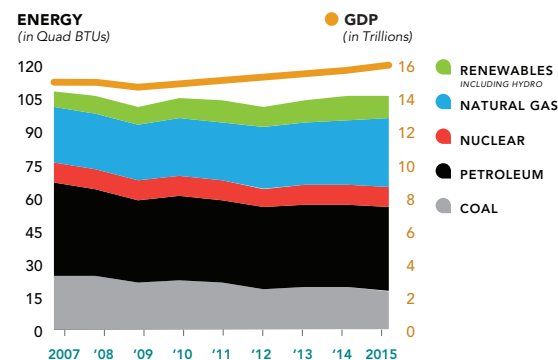
The energy productivity of the U.S. economy—the ratio of U.S. GDP to energy consumed—continues to grow, increasing by 57% since 1990. Between 2007 and 2015, total energy use fell 2%, while GDP grew 10%. It is estimated by ACEEE that as much as 60% of the energy intensity improvements seen since 1980 are due to efficiency gains, with only 40% the result of structural changes in the economy.

While energy demand has fallen more steeply than it has in at least 50 years, the use of natural gas and renewable energy has increased. Natural gas provided the United States with 29% of its total primary energy supply in 2015, and renewable energy is supplying 9.8% of U.S. energy.

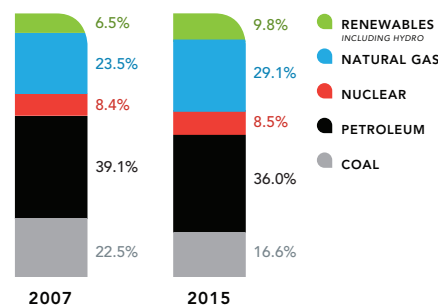
The U.S. power sector is gradually decarbonizing. From 2007 to 2015, natural gas increased from 22% to 32% of electricity generation, and renewables climbed from 8% to 13%. Coal's share slipped from 49% in 2007 to only 34% in 2015.

The energy productivity of the U.S. economy has increased by 13% from 2007 to 2015, and by 2.3% since 2014.

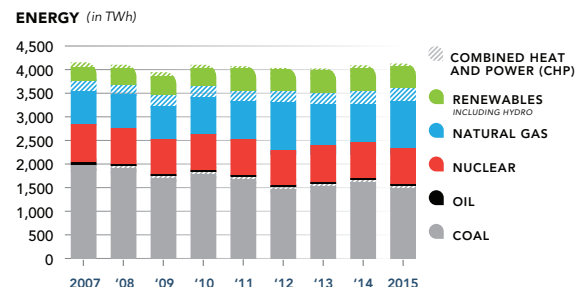
U.S. Primary Energy Consumption vs. GDP



U.S. Primary Energy Supply by Fuel Type



U.S. Electricity Mix by Fuel Type



Source: EIA Monthly Energy Review, Bureau of Economic Analysis. GDP is in chained-2009 dollars. All energy-related numbers are projections based on data through September 2015, annualized and accounting for seasonality. Electricity-related numbers are projections based on data through October 2015.

Corporations Buy In to Renewables

Large corporations—such as Google, Amazon, Facebook and Apple—contracted for 3.1GW of renewable energy capacity by year-end 2015, doubling the amount purchased in 2014. Most of this is wind and solar, but 2015 also saw commissions for new fuel cell capacity by IKEA, Hyatt, Johnson and Johnson, Morgan Stanley, Pepperidge Farm and others.

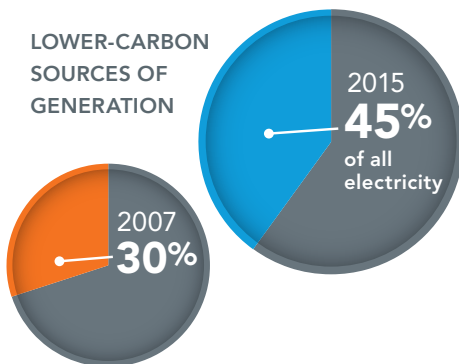
A Competitive Place to Do Business

The United States is one of the most attractive markets in the world for companies whose operations entail significant energy-related costs. At 7.1¢/kWh, the retail price of electricity for the industrial sector in the U.S. is lower than that in other major economies, such as Germany, China and India.

Notably, the clean energy transformation has not triggered a dramatic leap in retail power prices: on average, rates across the U.S. remain 5.5% below the recent peak in 2009.

Lower-carbon sources of generation, including renewables and natural gas, accounted for over 45% of all electricity generation in 2015, compared with 30% in 2007.

LOWER-CARBON SOURCES OF GENERATION



Clean Energy Investment Continues to Grow

Over the past eight years, total U.S. investment in the clean energy sector has topped \$445 billion (2007–2015). In 2015, U.S. investment in the clean energy sector was **\$56 billion**, up \$3.9 billion from 2014. That is an 8% increase from 2014 levels, and five times higher than in 2005. The U.S. finished the year as the second highest ranked country in terms of total new dollars attracted for clean energy investment; China was first.

Cost Reductions and Technology Innovations

The cost to deploy many clean energy technologies is falling. New business models for financing and technology innovation are accelerating deployment.

Energy Efficiency

The U.S. economy is becoming more energy-productive and less energy-intensive—with efficiency improvements in buildings and transportation breaking new ground. The amount of non-residential floor space certified by Energy Star has rocketed from just over half a billion square feet in 2006 to 4 billion square feet in 2015. Smart meters have been deployed to 38% of electricity consumers, increasing their ability to make decisions on when and how to use energy.

Natural Gas

The technology innovations in the natural gas sector that have opened up new supply from shale gas production have lowered natural gas prices and have resulted in 2015 being a record year for both natural gas consumption and production. Production has increased by 7% since 2014 alone and 26% from 2007.

Renewable Energy

Renewable energy is a prominent part (20%) of the U.S. power fleet, with 221GW of installed capacity across the country, a 57% increase over 2008 levels.

- Wind and solar have quadrupled in capacity since 2008 (from 26GW to 102GW).
- Hydropower is the largest source of U.S. renewable energy at 79GW (excluding pumped storage).
- Biogas, biomass, geothermal and waste-to-energy represent 17GW of U.S. capacity and can provide power 24/7. While these technologies have comparable economics in terms of unsubsidized costs, they have lacked access to the same incentives as the fast-growing sectors.

An Evolving Energy Infrastructure

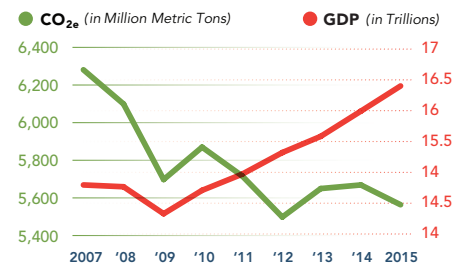
The U.S. energy sector is witnessing structural changes in its infrastructure that reflect its low-carbon transformation: the retirement of high-emitting power plants, the build-out of new natural gas pipelines, advances in a smarter grid and growing interest in distributed generation from rooftop photovoltaics (PV), fuel cells and combined heat and power (CHP). Gas utility construction expenditures for distribution infrastructure rose to \$9.7 billion in 2014. Rooftop PV added a record 2.9GW of new build in 2015, and CHP installations increased by 25% to 847MW in 2014.

Since 2000, 94% of new power capacity built in the U.S. has come from natural gas and renewable energy.

Clean Energy, Carbon Reductions and Economic Growth

The ascendancy of natural gas, influx of renewables, expansion of CHP and other distributed power forms, adoption of demand-side efficiency technologies, deployment of advanced vehicles and reductions in coal generation are all contributing to a long-term decline in overall U.S. greenhouse gas emissions. This general downward trend in emissions has been occurring while the U.S. economy has been growing.

In 2015, U.S. power sector carbon emissions fell to their lowest annual level since the mid-1990s, and at 1,985 million metric tons were 17.8% below 2005 levels. The EPA's Clean Power Plan aims to bring power sector emissions to 32% below 2005 levels by 2030.



Since 2007:
U.S. GDP increased 10%
Energy-related emissions have fallen 10.2%

Source: EPA, EIA, Bureau of Economic Analysis. GHG emissions are graphed in million metric tonnes of carbon-dioxide equivalents. GDP is in chained 2009 dollars. Assumes 2.4% growth in GDP in 2015 as per consensus of economic forecasts from Bloomberg as of January 2016.

2015 U.S. power sector carbon emissions fell to their lowest annual level since the mid-1990s.

2015 Policies Bolster Transition to Low-Carbon Energy

2015 was marked by significant milestones for U.S. clean energy policy, including the finalization of the Clean Power Plan to reduce power sector carbon emissions from existing units, the multi-year extension of several clean energy tax incentives and the adoption of the international Paris Agreement on climate change. However, more work needs to be done on U.S. tax and energy policy in 2016 to build on this progress.



About the Sustainable Energy in America Factbook

The **Sustainable Energy in America Factbook** was produced for the Business Council for Sustainable Energy (BCSE) by Bloomberg New Energy Finance (BNEF). BNEF compiled, wrote and edited this report and retained editorial independence and responsibility for its content throughout the process. BCSE members and partners provided additional data sets, and the project was commissioned with contributions from the following sponsors:

American Gas Association
Covanta Energy
First Solar
Ingersoll Rand
Johnson Controls

Kingspan Insulated Panels
National Hydropower Association
Polyisocyanurate Insulation
Manufacturers Association
Sempra Energy
Solar Energy Industries Association

The Business Council for
 **Sustainable
Energy**[®]

© Business Council for Sustainable Energy 2016

ABOUT THE Factbook Partners

The Business Council for Sustainable Energy (BCSE) is a coalition of companies and trade associations from the energy efficiency, natural gas and renewable energy sectors. The Council membership also includes independent electric power producers, investor-owned and public power utilities, commercial and industrial energy end-users, project developers and service providers for energy and environmental markets.

Bloomberg New Energy Finance (BNEF) provides unique analysis, tools and data for decision makers driving change in the energy system. With unrivaled depth and breadth, BNEF helps clients stay on top of developments across the energy spectrum from our comprehensive web-based platform. BNEF has 200 staff based in London, New York, Beijing, Cape Town, Hong Kong, Munich, New Delhi, San Francisco, São Paulo, Singapore, Sydney, Tokyo, Washington D.C. and Zurich. Visit about.bnef.com for more information.

GET THE FACTS

www.bcse.org

To view the **Sustainable Energy in America 2016 Factbook**, visit the link below

 [www.bcse.org/
sustainableenergyfactbook.html](http://www.bcse.org/sustainableenergyfactbook.html)