# Corporate Buyers of Renewable Energy

## *Business Perspectives*

*December 6, 2016*

# About the BCSE

- 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 advocates for policies at state, national and international levels that:
  - increase the use of commercially-available clean energy technologies, products and services
  - support an affordable, reliable power system
  - reduce air pollution & greenhouse gas emissions

# 2016 BCSE Members

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# SUSTAINABLE ENERGY IN AMERICA

## Factbook


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# SUSTAINABLE ENERGY IN AMERICA

## Factbook

*Understanding the U.S. Energy Transformation*

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**It is a new era for American energy. In 2015, increased use of sustainable energy set the stage for a U.S. triple play of carbon reductions, cost savings and economic growth.**

The 2016 edition of the Sustainable Energy in America Factbook – produced for the Business Council for Sustainable Energy by Bloomberg New Energy Finance, 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 towards cleaner energy production and more efficient energy usage.

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**See State Spotlight**

**THE SUSTAINABLE ENERGY TRANSFORMATION**


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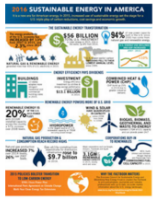
## Infographic



## Get the Facts

- American energy productivity has increased by 13% from 2007 to 2015.
- 2015 was a record year for natural gas production, consumption, flows to power generation and volumes into storage.
- Renewable energy is a prominent part (20%) of the U.S. 2015 capacity mix, with 221GW installed across the country, a 57% increase over 2008 levels.
- Total U.S. investment in clean energy topped $56 billion in 2015, the second highest level in the world.
- 2015 U.S. power sector carbon emissions fell to their lowest annual level since 1995.

## Executive Summary


**Industry Focus:** Energy Efficiency, Natural Gas, Renewable Energy

**Quick Facts On:** Alternative Fuel Vehicles, Biomass/ Waste-to-Energy, Carbon Capture & Storage, Combined Heat & Power, Fuel Cells, Hydropower

## State Spotlight

Learn about clean energy in the following states:

- Minnesota
- Nevada
- Pennsylvania
- Virginia
- See 2016 Factbook State & Regional Slides

## Previous Factbook Editions

Download previous editions of the Factbook here.

**2013**


**2014**


**2015**


## About the Factbook Partners

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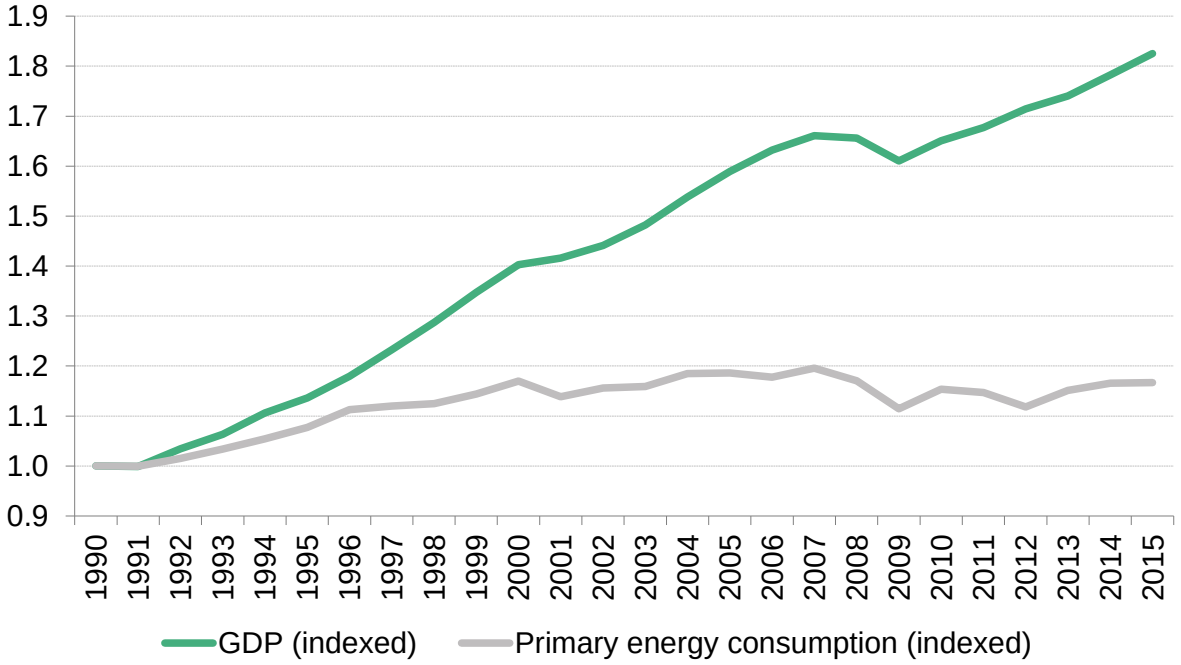
**Bloomberg New Energy Finance (BNEF)** provides unique analysis, tools and data for decision makers driving change in the energy system. With unrivalled depth and breadth, BNEF helps clients stay on top of developments across the energy spectrum from our comprehensive web-based platform.BNEF has 200 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.

The Business Council for Sustainable Energy®

**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 utilities, public power, commercial end-users and project developers and service providers for energy and environmental markets.

**For more information please contact Laura Tierney of BCSE at 202-785-0507**

# Economy's energy productivity: GDP and primary energy consumption (indexed to 1990 levels)

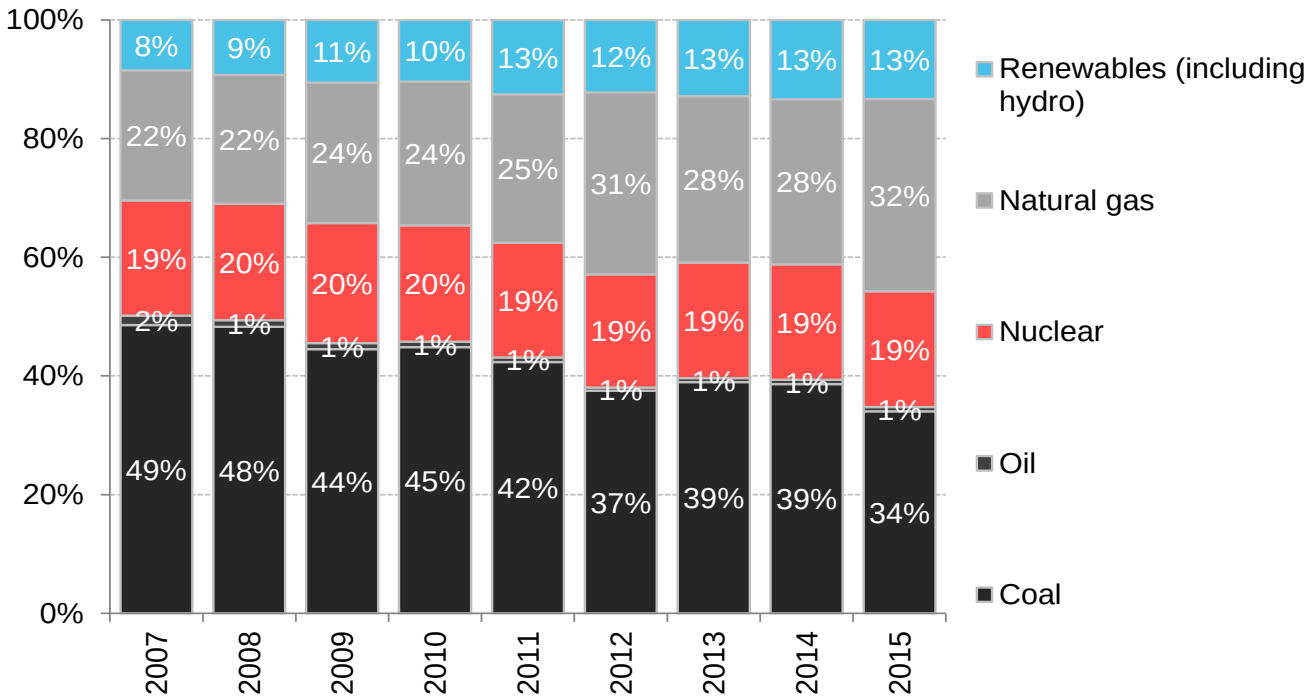



- The US economy is increasingly energy productive, resulting in a decoupling between growth in GDP and growth in energy consumption. As US GDP expanded 83% over the last 25 years, energy consumption only ticked up 17%.
- By one measure (US GDP per unit of energy consumed), productivity has improved 56% since 1990, 13% since 2007, and 2.3% between 2014 and 2015.

Source: US Energy Information Administration (EIA), Bureau of Economic Analysis, Bloomberg Terminal

Notes: Values for 2015 energy consumption are projected, accounting for seasonality, based on latest monthly values from EIA (data available through September 2015). GDP is real and chained (2009 dollars); annual growth rate for GDP for 2015 is based on consensus of economic forecasts gathered on the Bloomberg Terminal as of January 2016.

# US energy overview:
# US electricity generation by fuel type (%)



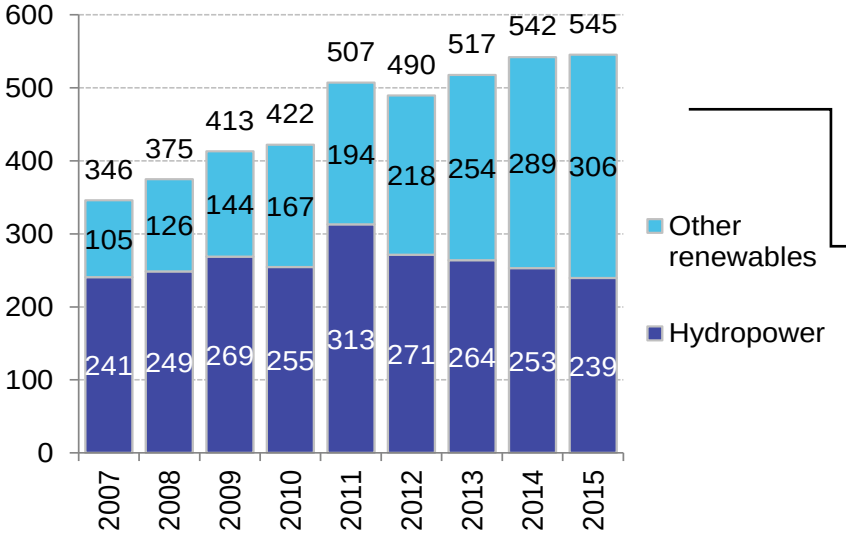

- Generation from natural gas plants increased by 17% from 2014 to 2015, while coal generation fell by 11%.
- The US power sector is gradually decarbonizing. From 2007 to 2015, natural gas increased from 22% to 32% of electricity generation, and renewables climbed from 8% to 13%. Coal's share slipped from 49% in 2007 to only 34% in 2015.

Source: EIA

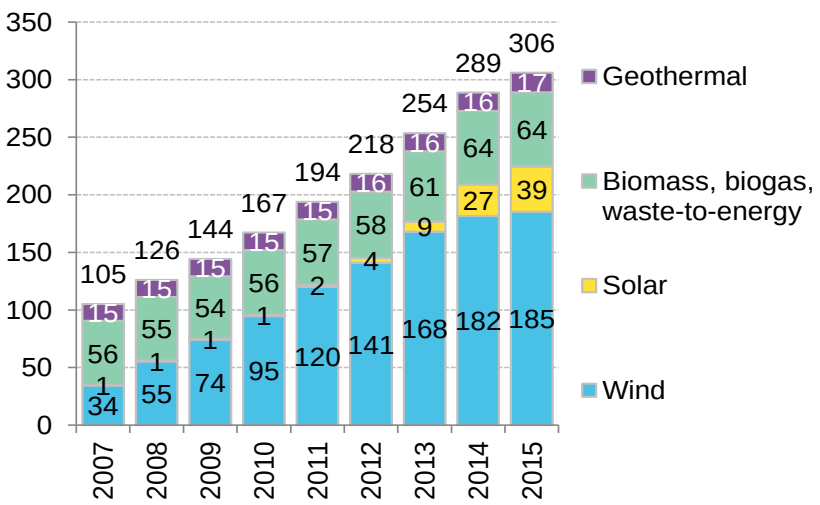
Notes: Values for 2015 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through October 2015). In chart at left, contribution from 'Other' is not shown; the amount is minimal and consists of miscellaneous technologies including hydrogen and non-renewable waste. The hydropower portion of 'Renewables' includes negative generation from pumped storage.

# US energy overview:
# Renewable energy generation by technology

## US renewable generation by technology (including hydropower) (TWh)




## US non-hydropower renewable generation by technology (TWh)




- Generation from non-hydropower renewables grew to 306TWh in 2015, up from 289TWh in 2014. Wind continues to make up the bulk of this generation (185TWh, or 61%) but the growth in 2015 came primarily from a 45% surge in generation from solar.
- Hydro generation has decreased since 2011 due to the ongoing droughts in the West Coast states.
- Non-hydropower renewables now account for 7.4% of US electricity, up from 7.0% the previous year. This figure has grown every year since 2005, when non-hydro renewables generated only 2.2% of US electricity.

Source: Bloomberg New Energy Finance, EIA

Notes: Values for 2015 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through October 2015). Includes net energy consumption by pumped hydropower storage facilities. Totals may not sum due to rounding. Beginning in 2014, numbers include estimated generation from distributed solar; generation from other distributed resources are not included.

# US energy overview:
# Retail and wholesale power prices

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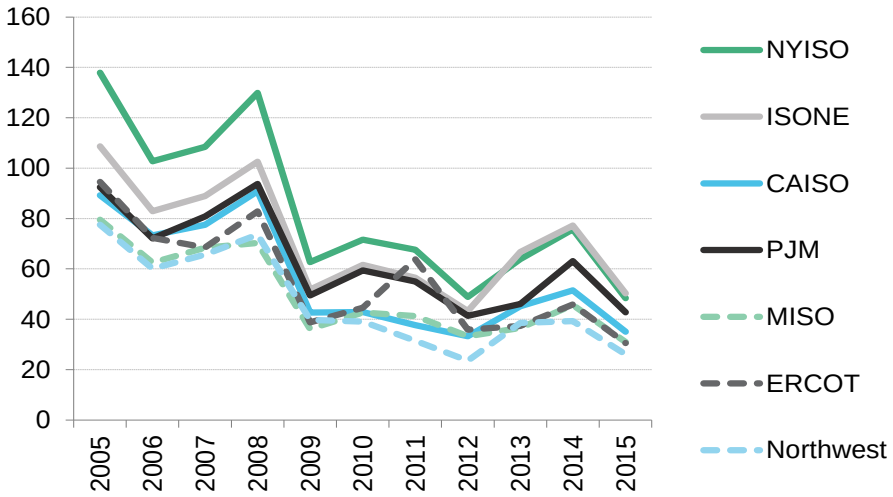
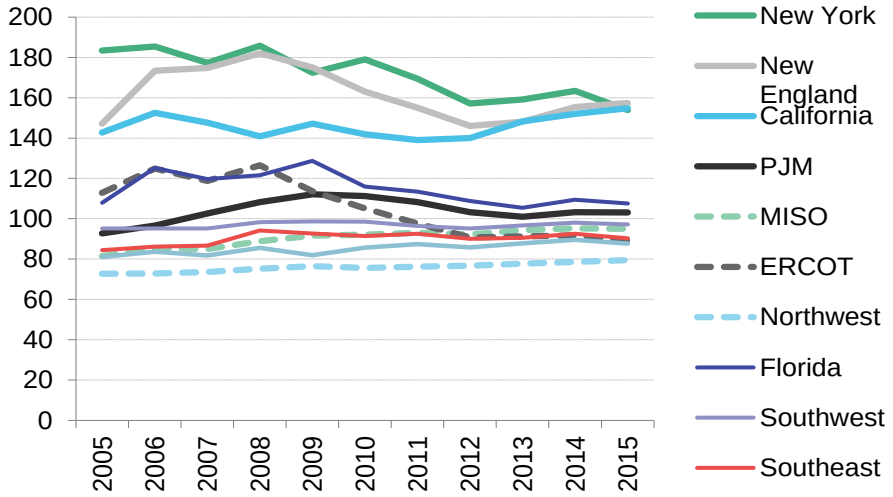
## Wholesale power prices ($/MWh)




## Average retail power prices ($/MWh)

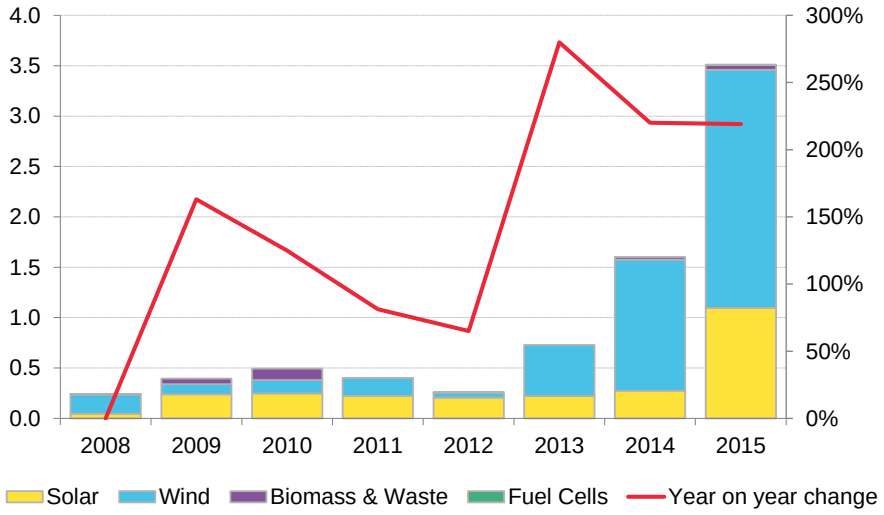



- Wholesale prices fell by about a third in 2015, as natural gas prices fell and more renewables connected to the grid.
- Retail power prices in most regions remain well below the peak prices seen in 2008-09.
- In 2015, retail electricity rates fell by 1.3% on average nationwide. New York (-5.8%) and Texas (-2.7%) saw the biggest year-on-year declines.
- Exceptions included California and New England where retail prices rose marginally (1.8% and 1.3%, respectively).

Source: Bloomberg New Energy Finance, EIA, Bloomberg Terminal Notes: Data through end-November 2015. Wholesale prices taken from proxy power hubs in each ISO. Prices are in real 2014 dollars.

# Finance: Corporate procurement of clean energy

## Renewable capacity contracted by corporations, by technology, 2008-15 (MW)




## Key players in corporate procurement


- Corporate procurement of clean energy doubled in 2014 and again in 2015, breaching 3.5GW.
- Wind and solar are the energy technologies of choice. When procurement levels were low between 2008 and 2012, solar generally made up the majority of MW. After corporate procurement took off in 2013, however, wind has made up the dominant portion of procurement.
- Google has been the largest player to date, procuring 71MW of solar and 1.6GW of wind. Amazon is second, with 80MW of solar and 458MW of wind contracted in 2015 alone. Large individual projects include Facebook's 202MW purchasing power agreement (PPA) with Shannon Wind Farm in Texas, and Apple's 153MW PPA with First Solar.

Source: Bloomberg New Energy Finance, company announcements  Note: this slide has been updated to reflect two late-reporting commitments from Google for 0.4GW of wind contracts.

2016

# STATE ENERGY FACTSHEET: MINNESOTA

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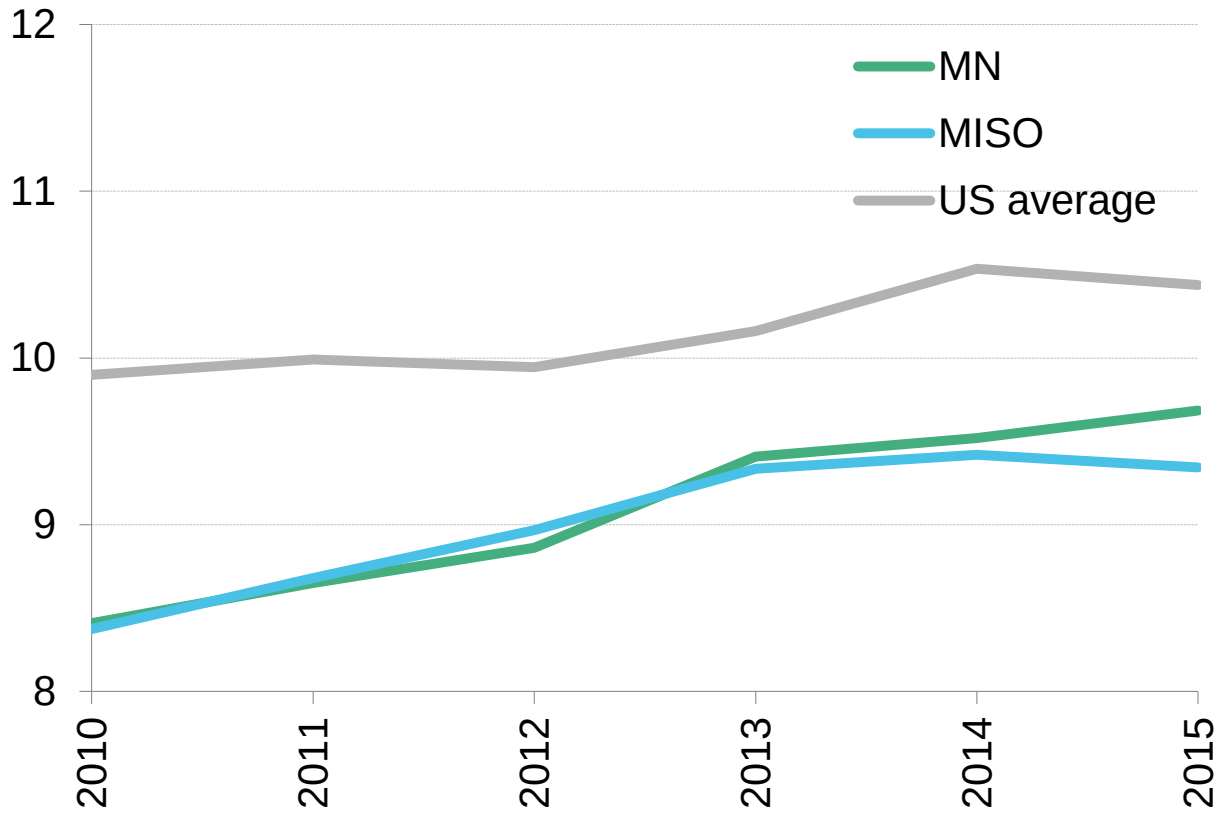
# MN ELECTRICITY PRICES RELATIVE TO REGIONAL (MISO) AND US AVERAGES, 2010-15 (¢/KWH)




Source: Bloomberg New Energy Finance, EIA  Note: MISO is MN's wholesale power market, composed of all or part of16 states.

# MN ELECTRICITY GENERATION MIX BY TECHNOLOGY, 2010-15 (%)

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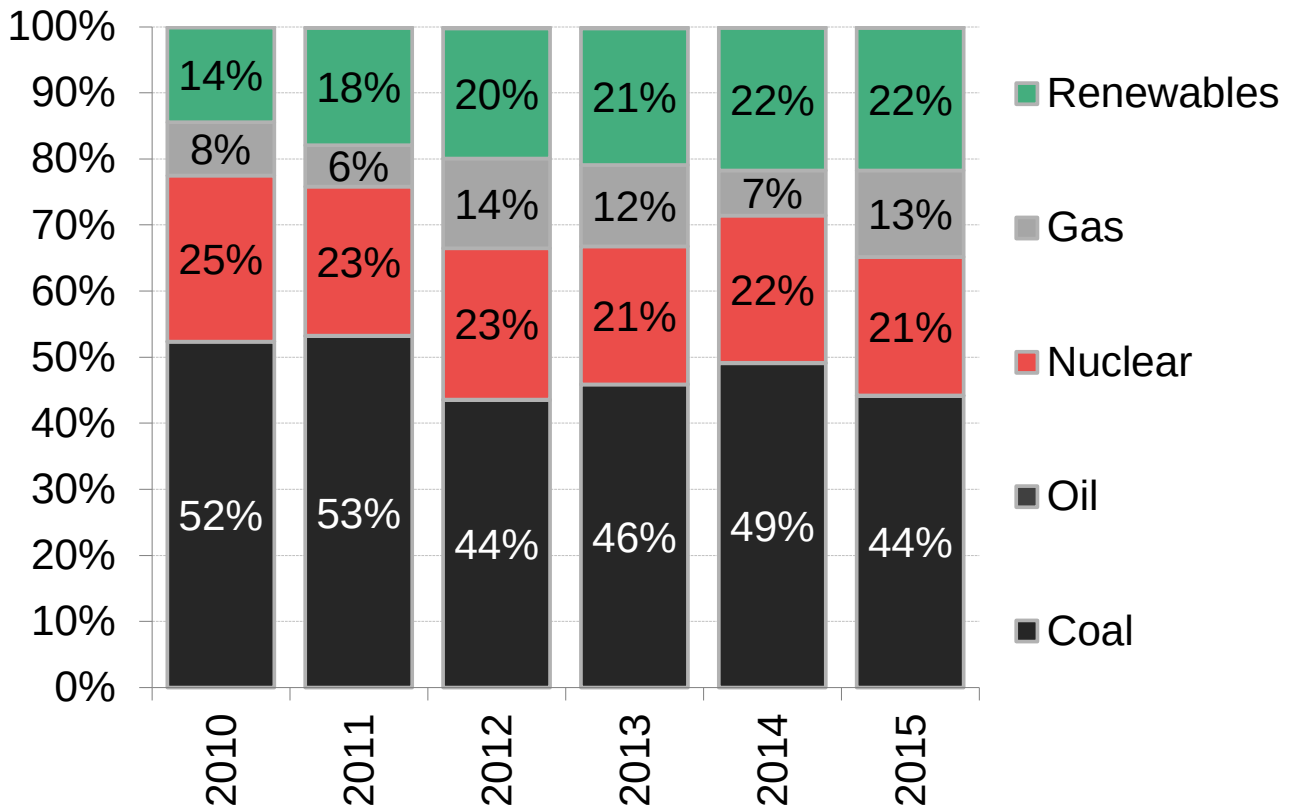
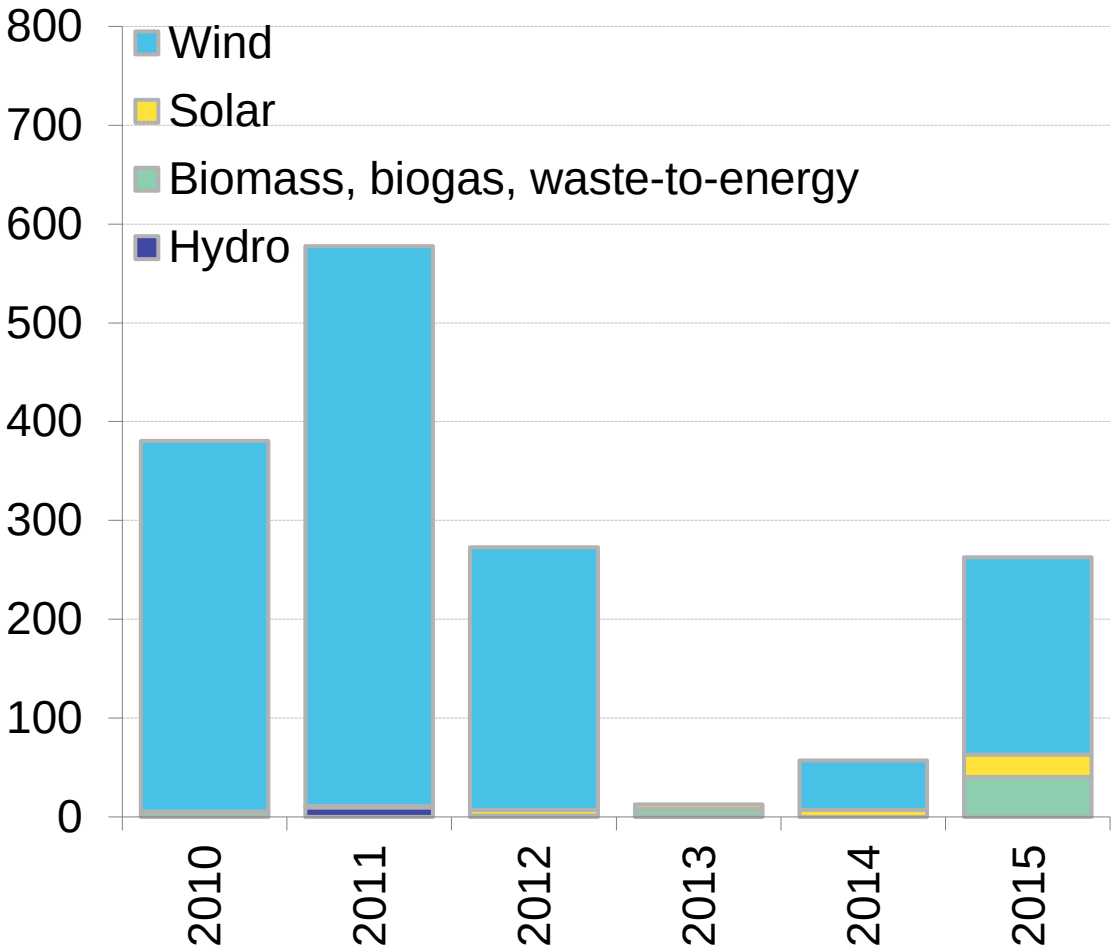


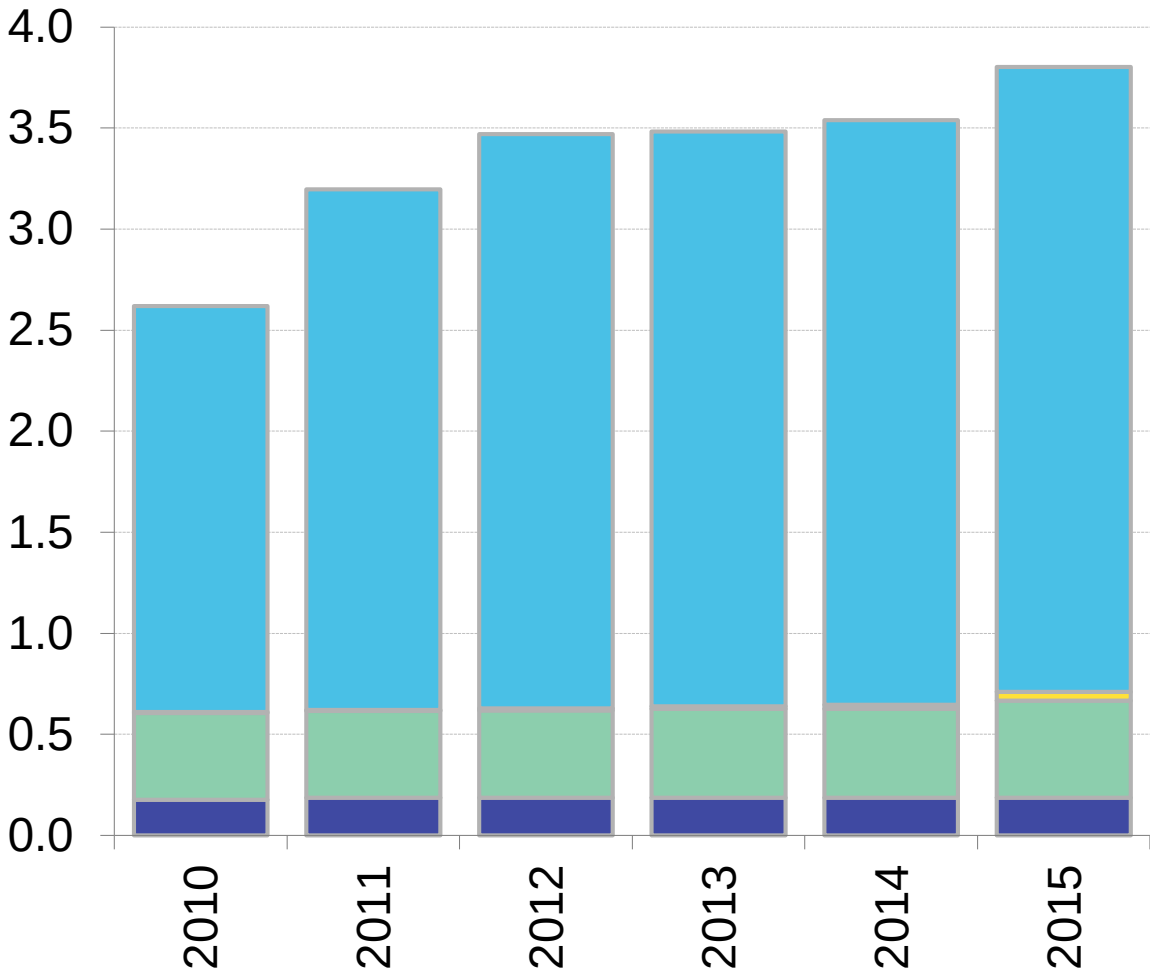

Source: Bloomberg New Energy Finance, EIA

# MN RENEWABLE CAPACITY ADDITIONS, 2010-15 (MW)




Source: Bloomberg New Energy Finance, EIA Note: includes BNEF data on distributed (ie, residential, commercial, and industrial) solar capacity.

# MN CUMULATIVE RENEWABLE CAPACITY, 2010-15 (GW)




Source: Bloomberg New Energy Finance, EIA Note: includes BNEF data on distributed (ie, residential, commercial, and industrial) solar capacity.

# MN CUMULATIVE INSTALLED RESIDENTIAL AND COMMERCIAL SOLAR CAPACITY, 2013-15 (MW)

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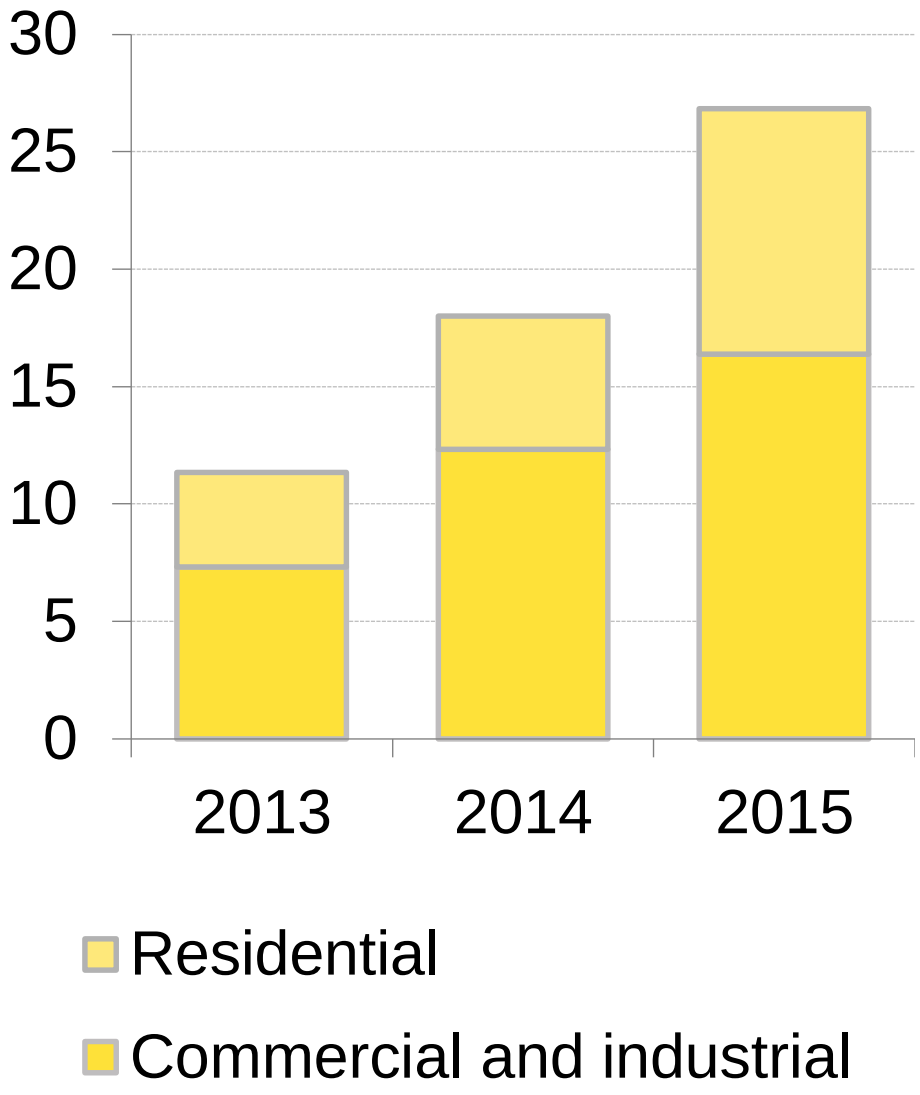


Source: Bloomberg New Energy Finance, EIA

# UNSUBSIDIZED LCOE OF SELECT TECHNOLOGIES IN THE US COMPARED TO SUBSIDIZED AND UNSUBSIDIZED LCOE OF ONSHORE WIND AND SOLAR PV IN MN, H1 2016 ($/MWH)

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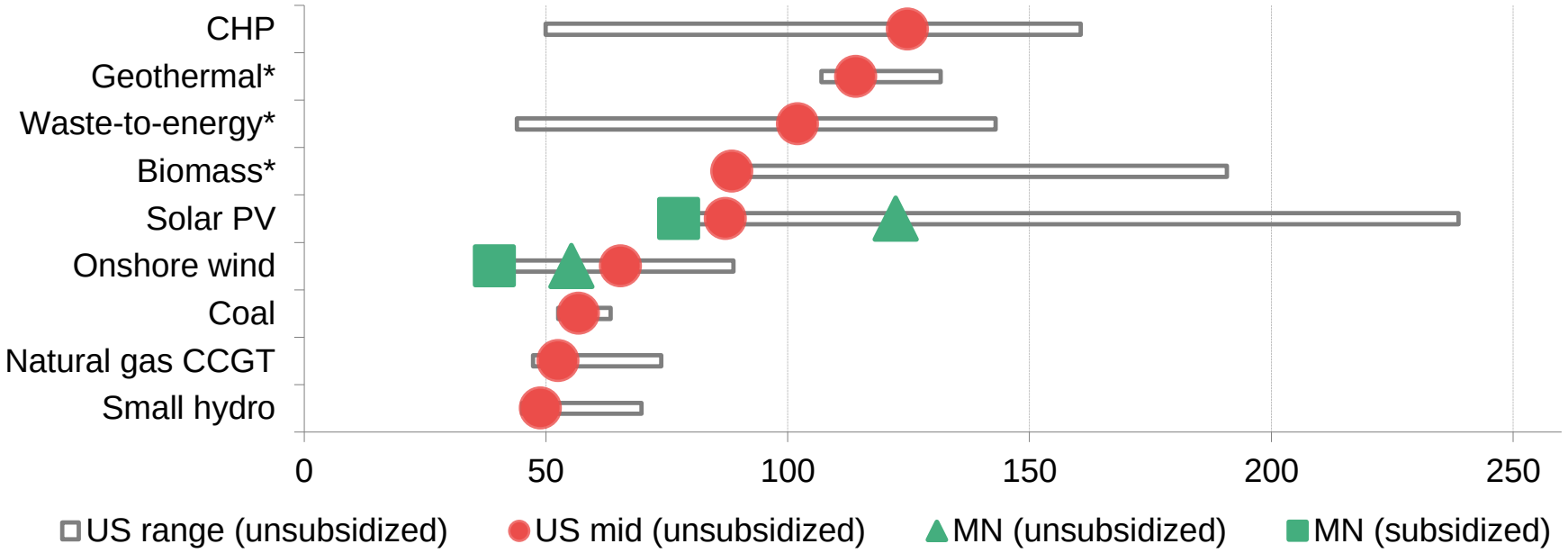
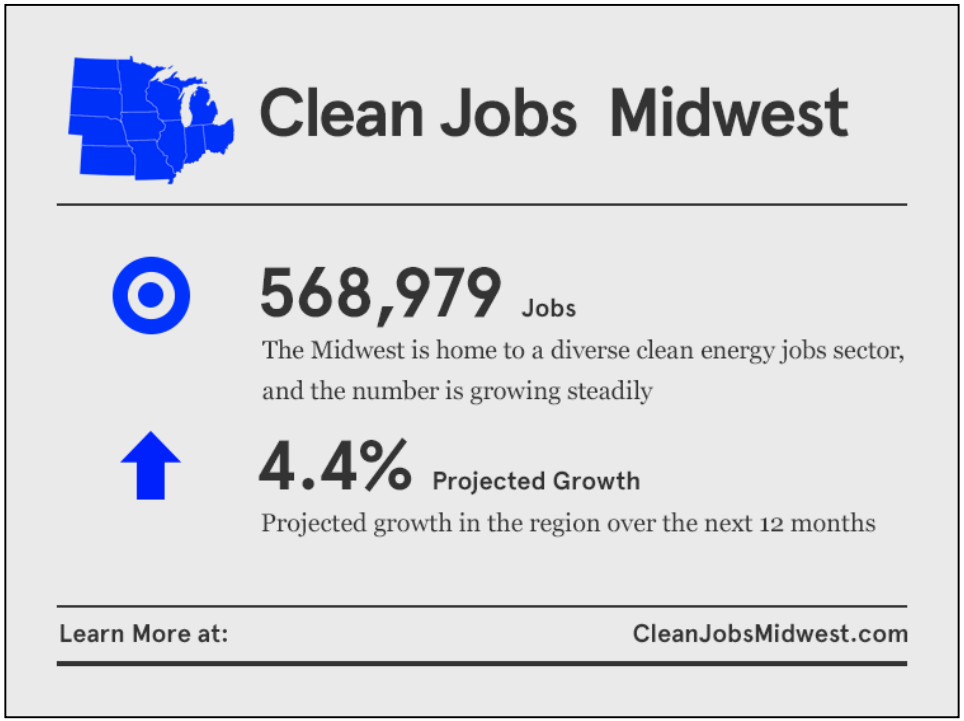



Source: Bloomberg New Energy Finance  Notes: *LCOE for waste-to-energy in this report is a global estimate; biomass and geothermal LCOEs are Americas region estimates; all other LCOEs in Figure 13 are either US or MN-specific. Variations in MN versus US average result from variations in capacity factor, capex and financing rates. Bars indicate the range of unsubsidized LCOE for each technology in the US. Key policies such as the $23/MWh Production Tax Credit (PTC) and accelerated depreciated (MACRS) bring down unsubsidized LCOEs to subsidized levels. LCOE for combined heat and power (CHP) is for reciprocating engines with CHP. LCOE for small hydro assumes 56% capacity factor, but this can vary significantly depending on annual rainfall conditions.

# 2016 Clean Jobs Midwest Survey

- In-depth look at clean energy employment in 12 Midwestern states
- Sectors included:
  - Energy efficiency
  - Renewable energy generation
  - Advanced transportation
  - Clean fuels
  - Advanced grid
- Survey illustrates the size and importance of the region's clean energy industry

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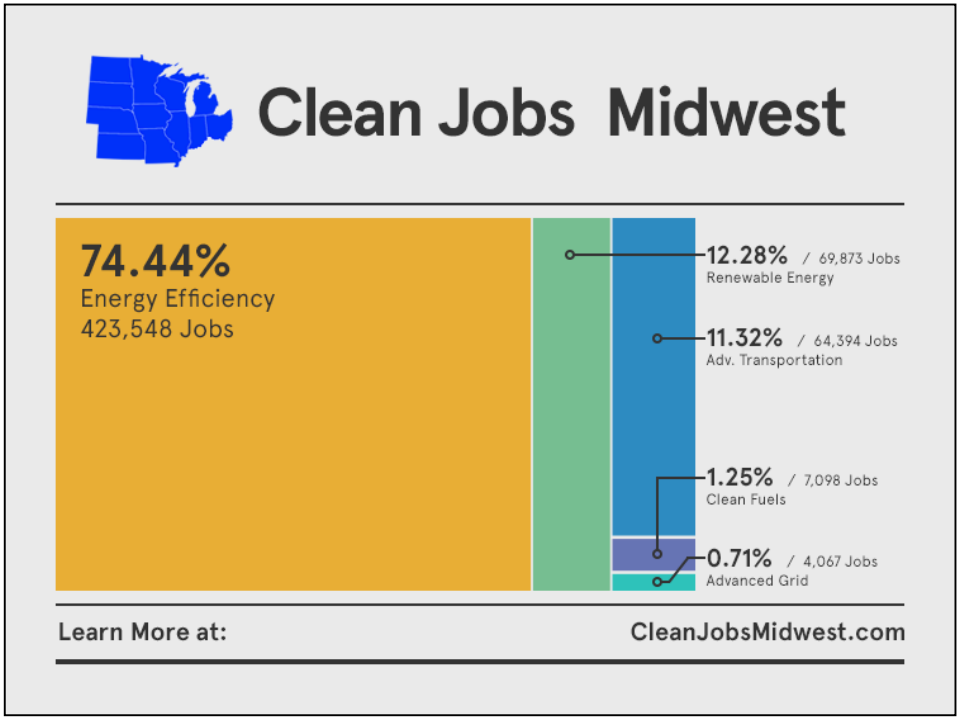
# 2016 Clean Jobs Midwest Survey (cont'd.)

- Clean energy employment is growing in every Midwestern state
- Energy efficiency is the region's largest clean energy sector (3 out of 4 workers)
- Noticeable shift in traditional industries, i.e., HVAC, automotive, towards increased energy efficiency and clean energy solutions
- Implementing smart public policy can create even more clean energy jobs across the region

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# Midwest Snapshot: Total Clean Energy Jobs

| State | Clean Energy Jobs | State Workforce | Clean Share Of Workforce |
|---|---|---|---|
| Illinois | 113,918 | 5,925,524 | 1.92% |
| Ohio | 100,782 | 5,308,099 | 1.90% |
| Michigan | 87,616 | 4,224,979 | 2.07% |
| **Minnesota** | **54,458** | **2,826,328** | **1.93%** |
| Missouri | 52,479 | 2,746,580 | 1.91% |
| Indiana | 44,133 | 2,966,013 | 1.49% |
| Iowa | 28,451 | 1,561,168 | 1.82% |
| Kansas | 27,005 | 1,382,069 | 1.95% |
| Wisconsin | 24,714 | 2,839,783 | 0.87% |
| Nebraska | 16,422 | 968,676 | 1.70% |
| North Dakota | 11,882 | 444,998 | 2.67% |
| South Dakota | 7,118 | 428,576 | 1.66% |

Source: Clean Jobs Midwest Survey, 2016

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# Contact Us

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