2023 Sustainable Energy in America Factbook

Wednesday, March 15, 2023

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The Energy Transition: Hardwired Into US Growth

Sustainable Energy in America Factbook presentation to EESI

Ethan Zindler

March 15, 2023
US energy overview: US natural gas pricing, wholesale and by end use

Natural gas wholesale prices at Henry Hub, LA

Natural gas prices to end users, US average

Source: BloombergNEF, EIA Short Term Energy Outlook
US energy overview: US natural gas pricing, wholesale and by end use

Natural gas wholesale prices at Henry Hub, LA

Natural gas prices to end users, US average

Source: BloombergNEF, EIA Short Term Energy Outlook
Economics: Commodity costs for wind/solar/batteries/other equipment

Price movements since January 2020

Source: 2H 2022 US Clean Energy Market Outlook, BloombergNEF, Bloomberg Terminal. Note: Data rebased to 1 on earliest available date in January 2020. Steel reflects North America costs, while aluminum and copper are China prices—more details as well as Bloomberg Terminal tickers available in the Excel attached to the report.
US energy overview: Retail and wholesale power prices

Wholesale power prices
$/MWh (real-2022)

Retail power prices
$/MWh (real-2022)

Source: BloombergNEF, EIA, Bloomberg Terminal. Notes: Wholesale prices are taken from proxy power hubs in each ISO. All prices are in real 2022 USD. Retail power prices shown here are not exact retail rates but weighted averages across all rate classes by state, as published by the EIA. Retail prices are updated through November 2022.
### Average vehicle fuel prices

$/gasoline gallon equivalent (GGE)


### US electric vehicle sales

Thousand

Economics: US levelized costs of electricity, 2014-22

$/MWh (2021 real)

Source: BloombergNEF. BNEF started collecting country-level LCOE inputs in 2014, prior to 2014 only global LCOE are available see LCOE report. LCOE displayed by financing date.
US energy overview: Renewable energy capacity build by technology

Source: BloombergNEF, EIA. Notes: All values are shown in AC except solar, which is included as DC capacity. Numbers include utility-scale (>1MW) projects of all types, rooftop solar, and small- and medium-sized wind. Includes installations or planned installations reported to the EIA through October 2021, as well as BloombergNEF projections.
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GW

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Projected annual US wind and solar capacity additions

Wind and solar additions would need to be in this range between 2021 and 2030 to hit a target of 80% clean power by 2030.

Source: BloombergNEF
Finance: Energy transition investment

Energy transition investment, by country

US energy transition investment, by sector

Source: BloombergNEF, "Energy Transition Investment Trends, 2022". Note: BNEF has updated and expanded its coverage of energy transition investment and slightly modified its methodology. For more see https://www.bnef.com/flagships/clean-energy-investment.
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US energy overview: Electricity generation mix

US electricity generation, by fuel type

- **Renewables (including hydro)**
- **Natural gas**
- **Nuclear**
- **Coal**

Source: EIA, BloombergNEF  Note: Values for 2022 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through October 2022)
Estimated 2022-31 energy transition spend in IRA and infrastructure law

Inflation Reduction Act
$260bn for energy transition
PASSED, August 2022

Bipartisan Infrastructure Bill
$80bn for energy transition
PASSED, November 2021

U.S. emissions

Agriculture, 10%
Buildings, 13%
Power, 24%
Industry, 24%
Transport, 28%

Residential efficiency improvements, $14bn
Residential energy improvements, $22bn
Wind, solar and storage tax credits, $128bn
Manufacturing tax credits, $37bn
Nuclear credits, $30bn
CCUS tax credit, $3.2bn
Clean hydrogen tax credit, $13bn
Clean vehicles, $12bn
Clean refueling/recharging, $1.7bn
Biofuels incentives, $6bn

Advanced reactor program, $3.2bn
Nuclear credits, $6bn
Grid enhancement, $28bn
CCUS demonstration & infrastructure, $11bn
Hydrogen hubs and demonstration, $9.5bn
Pugging orphaned wells, $4.7bn
Electric transit procurement, $7.5bn
Charging infrastructure, $7.5bn

Source: EIA, EPA, Joint Committee on Taxation, Inflation Reduction Act, BloombergNEF. Note: Left-hand chart only captures tax credits and incentives, not grant programs or loans. CCUS is carbon capture, utilization and storage.
US energy overview: Greenhouse gas (GHG) emissions

**Economy-wide and energy sector emissions**

- MMtCO2e
- Total (gross) GHG emissions
- GHG emissions from energy sector

**Emissions by sector**

- MMtCO2e
- Power
- Transport
- Industrial
- Buildings
- Agriculture

Source: BloombergNEF, EIA, EPA.
Policy: US progress toward emissions goals

US economy-wide emissions

Source: EIA, EPA, BloombergNEF
Policy: US progress toward emissions goals

US economy-wide emissions

Source: EIA, EPA, BloombergNEF
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Source: EIA, EPA, BloombergNEF
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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.

BCSE advocates for policies that promote clean, efficient, and sustainable energy products, technologies, and services.

BCSE supports business development, networking, and knowledge exchange among its members and networks.

BCSE provides a credible, broad-based business coalition on clean energy market trends and policy impacts.
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Amy Farrell

Senior Vice President, Government and Public Affairs

CRES Forum
Deployment: The role of heat in industrial processes

Share of energy supply for industrial process heat, 2018

Charles Bolden
Senior Director, Congressional Affairs
Solar Energy Industries Association
Deployment: Solar imports

US imports of PV modules by origin, January to November 2022

Source: BloombergNEF, Sinoimex. Note: Storage capacity uses two metrics: MW which signifies power output (based on the inverter capacity) and the MWh which specifies the energy storage capacity and relates to the duration the input/output can be sustained for (ie, a 10MW/40MWh system can sustain 10MW for 4 hours). The ITC is the federal investment tax credit.

US imports of PV modules, by month and origin

$ million

Source: BloombergNEF, Sinoimex. Note: Storage capacity uses two metrics: MW which signifies power output (based on the inverter capacity) and the MWh which specifies the energy storage capacity and relates to the duration the input/output can be sustained for (ie, a 10MW/40MWh system can sustain 10MW for 4 hours). The ITC is the federal investment tax credit.
Vincent Barnes

Senior Vice President, Policy and Research

Alliance to Save Energy
US energy overview: Energy efficiency

US states with Energy Efficiency Resource Standards (EERS)

Utility energy efficiency spending

Billie Kaumaya
Head of Federal Affairs
American Clean Power Association
## US energy overview: Cumulative renewable energy

### US cumulative renewable capacity

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<thead>
<tr>
<th>Year</th>
<th>GW</th>
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<td>2010</td>
<td>136</td>
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<tr>
<td>2012</td>
<td>146</td>
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<tr>
<td>2014</td>
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<td>2018</td>
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<tr>
<td>2020</td>
<td>199</td>
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<tr>
<td>2022e</td>
<td>221</td>
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### US renewable generation by technology

<table>
<thead>
<tr>
<th>Year</th>
<th>TWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
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<tr>
<td>2012</td>
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<td>2020</td>
<td>558</td>
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<tr>
<td>2022e</td>
<td>628</td>
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</tbody>
</table>

### Notes:
- All values are shown in AC except solar, which is included as DC capacity.
- Hydropower capacity and generation exclude pumped storage facilities (unlike in past Factbooks).
- Totals may not sum due to rounding.
- Values for 2021 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through October 2021).

Source: BloombergNEF, EIA
Yvonne McIntyre
Vice President, Federal Affairs
Pacific Gas & Electric
Policy: Infrastructure and resilience

US billion-dollar weather and climate disasters

[Chart showing the number of events and total cost for different types of disasters from 2010 to 2022. The x-axis represents the years, and the y-axis represents the number of events and total cost in billions of dollars.]

Quarterly residential energy storage systems installed in California

[Bar chart showing the number of systems installed in California from Q1 2018 to Q3 2022.]

Source: National Oceanic and Atmospheric Administration, BloombergNEF. Note: Portrays annual counts of drought, flooding, freeze, severe storm, tropical cyclone, wildfire and winter storm events in the US with losses of more than $1 billion each.
Jennifer Kane

Energy Policy Leader

Trane Technologies
Deployment: Statewide energy code adoption

Residential

Commercial

Source: EERE, ACEEE, BloombergNEF. Note: The maps represent EERE analysis of energy savings impacts from state code adoptions. Any code for which the Energy Index is not more than 1% higher than that of an IECC or Standard 90.1 edition is considered equivalent to that code edition. For more on the EERE methodology see link.
Sustainable Energy in America 2023 Factbook
Tracking Market & Policy Trends

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