
POWERING FORWARD
The Clean Energy Economy:
a Decade of Growth, a First Quarter Disrupted
May 20, 2020 | 2-3 pm ET
The Business Council for Sustainable Energy®
CLEAN ENERGY BUSINESS NETWORK

POWERING FORWARD

Examines the unique impacts facing clean energy industries during the COVID-19 epidemic, along with the vital role of our sectors in our future economic recovery

SPEAKERS

Lisa Jacobson
President, Business Council for Sustainable Energy

Lynn Abramson
President, Clean Energy Business Network

Bob Keefe
Executive Director, Environmental Entrepre

Ethan Zindler
Head of Americas, Bloomberg New Energy Finance

Phil Jordan
Vice President, BW Research

BUSINESS COUNCIL FOR SUSTAINABLE ENERGY

a coalition of companies and trade associations

Energy Efficiency

Natural Gas

Renewable Energy

BCSE MEMBERS

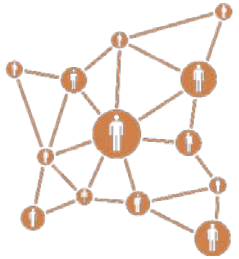
CLEAN ENERGY BUSINESS NETWORK

CLEAN ENERGY BUSINESS NETWORK

the small business voice for the clean energy economy

Policy Support

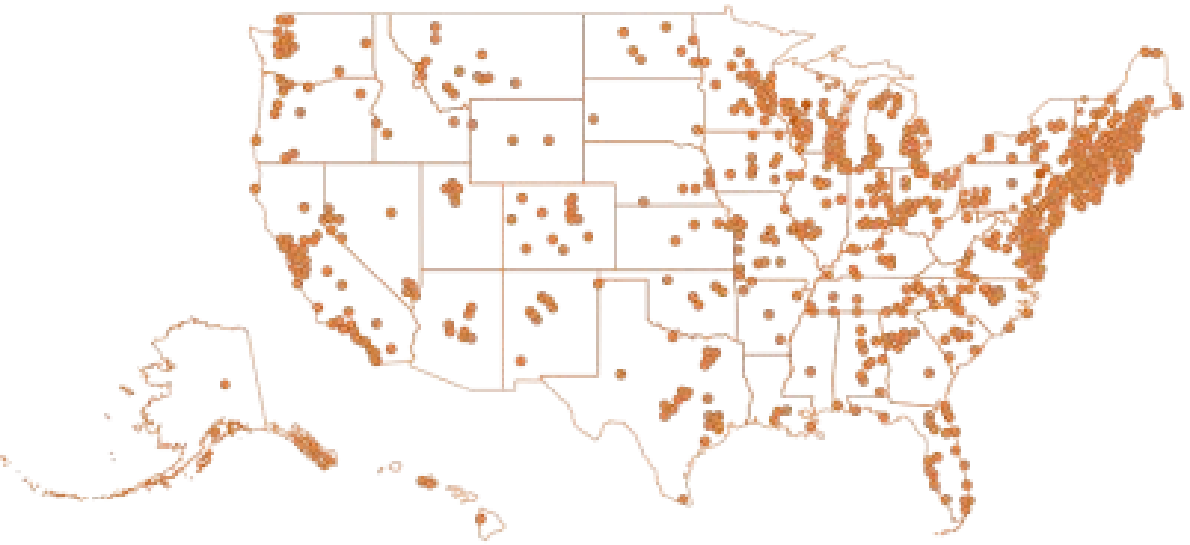
Market & Technology Education



Business Development Assistance

CEBN MEMBERS

4,000+ across all 50 U.S. states
representing diverse technologies



BCSE RESILIENCE & RELIABILITY DIALOGUE

- Readiness for Resilience -TX & PR
- Thought Leader Speaker Series
- External education and advocacy initiatives - Resilience Project Case Studies

Good for the Economy.
Good for the Environment.

Bob Keefe
E2 Executive director
bkeefe@e2.org

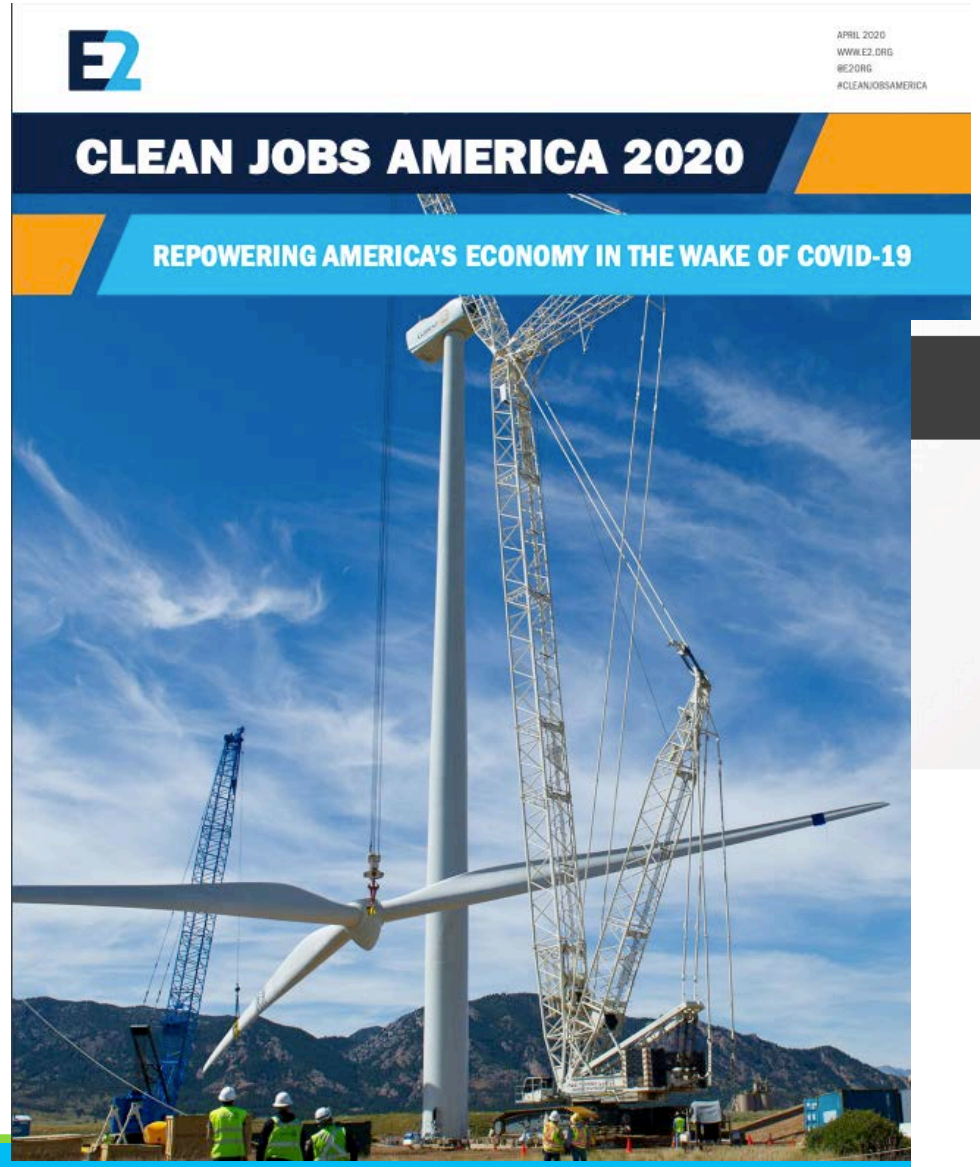
twitter @bkeefee2

What is E2?

- National network of business leaders, investors, professionals
- We advocate for policies that are good for the economy, good for the environment
- 8,000+ members and supporters nationwide
- Started in CA in 2000; nine US chapters

- E2 members:
  - Founded or funded more than 2,500 companies
  - Created 600,000+ jobs
  - Control $100 billion in private, venture capital

Good for the Economy.
Good for the Environment.



[bw] RESEARCH PARTNERSHIP

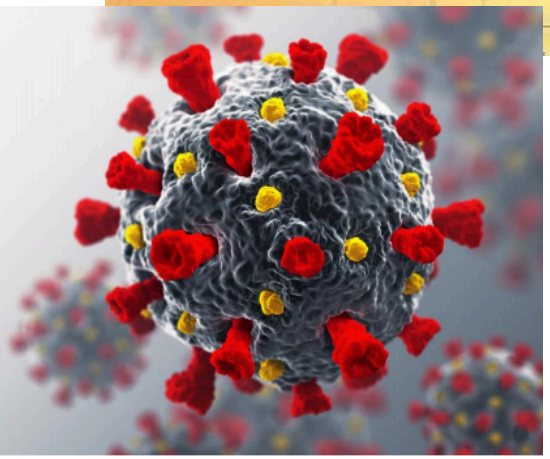
To: E2, E4TheFuture, and ACORE

From: Philip Jordan
Vice-President, BW Research Partnership

Date: May 13, 2020

MEMORANDUM

Clean Energy Employment Initial Impacts from the COVID-19 Economic Crisis, April 2020



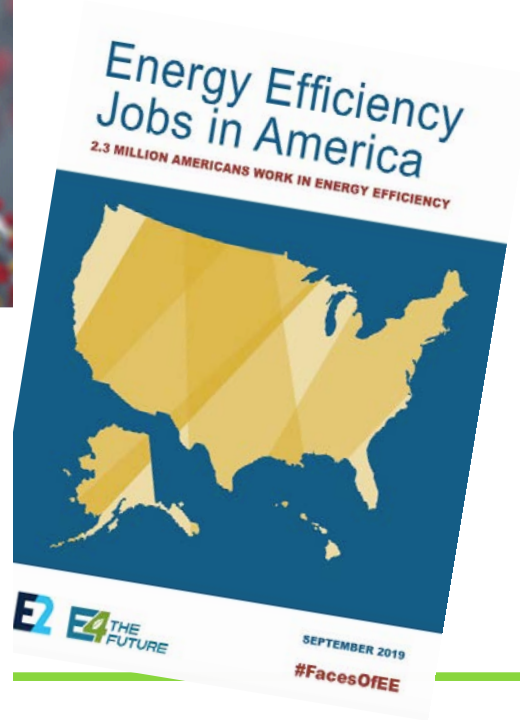
INTRODUCTION

The COVID-19 pandemic brought historic job losses over the month of March. In April, these losses doubled. Initial unemployment claims for April total 23.1 million, while the impact of the COVID-19 pandemic on the US workforce currently totals 33.7 million.

April brought clean energy job losses triple those seen in March, for an estimated 447,200 new clean energy jobs lost. This totals 594,300 clean energy jobs lost since the beginning of the pandemic, or a 17 percent drop in clean energy employment. The cumulative losses represent more than double the past 3 years of industry-wide clean energy employment growth, now erased. Due to updates in reported March employment statistics, the estimated 106,400 clean energy jobs lost during March has been revised up to 147,100 jobs (see Appendix B: State Clean Energy Job Losses in March 2020, Revised). Unfortunately, these impacts do not include many temporarily furloughed or underemployed workers. Dependent on back-to-work orders, job losses in clean energy will likely continue to grow into the coming months but at a decreasing rate.

IMPACTS

While the clean energy industry faced a significant initial drop in March and a staggering tripling of those declines in April, job losses will likely continue to increase. Now that stay-at-home orders have been extended and non-essential work has been shut down, job losses are being seen more comprehensively across the economy, in industries like healthcare services, manufacturing, and retail trade. Clean energy related manufacturing plants that produce everything from electric vehicles and batteries to ENERGY



Good for the Economy.
Good for the Environment.

A DECADE OF GROWTH

2020

Sustainable Energy in America

FACTBOOK

Growth Sectors of the U.S. Energy Economy

The Business Council for Sustainable Energy®

BloombergNEF

GET THE FACTS

www.bcse.org

cebn.org/faces-behind-the-facts/

10 years of Rapid Change, 3 Months of Major Disruption

Clean energy update for BCSE/E2/CEBN webinar

Ethan Zindler

May 20, 2020

BloombergNEF

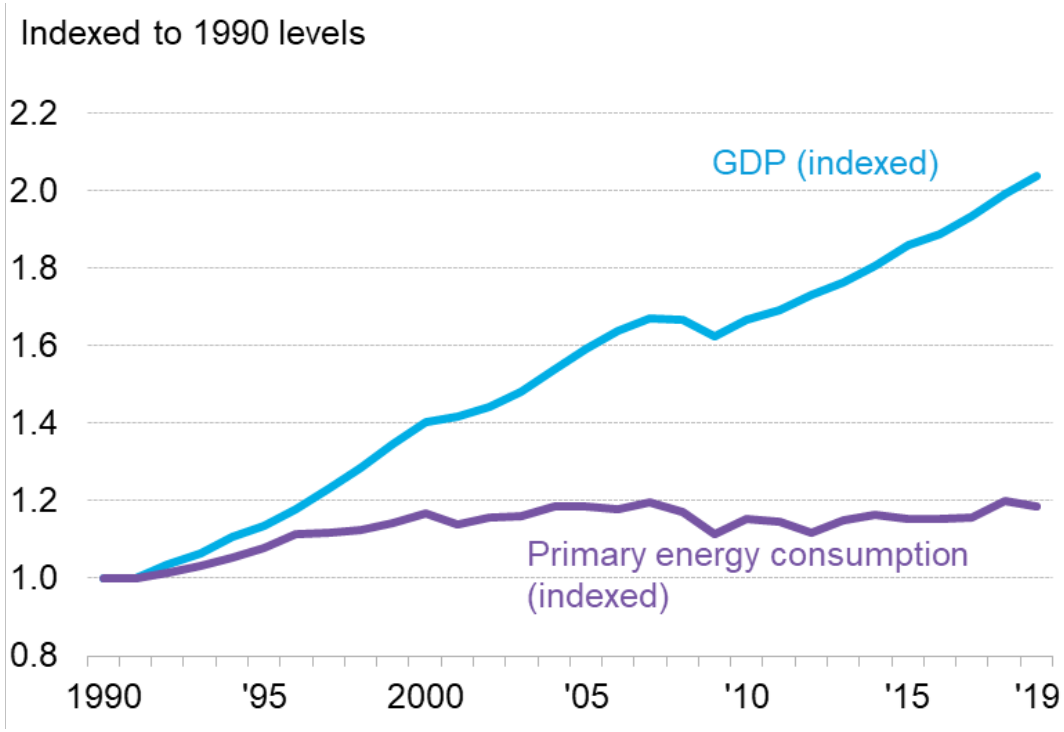
Contents

Sustainable Energy in America Factbook

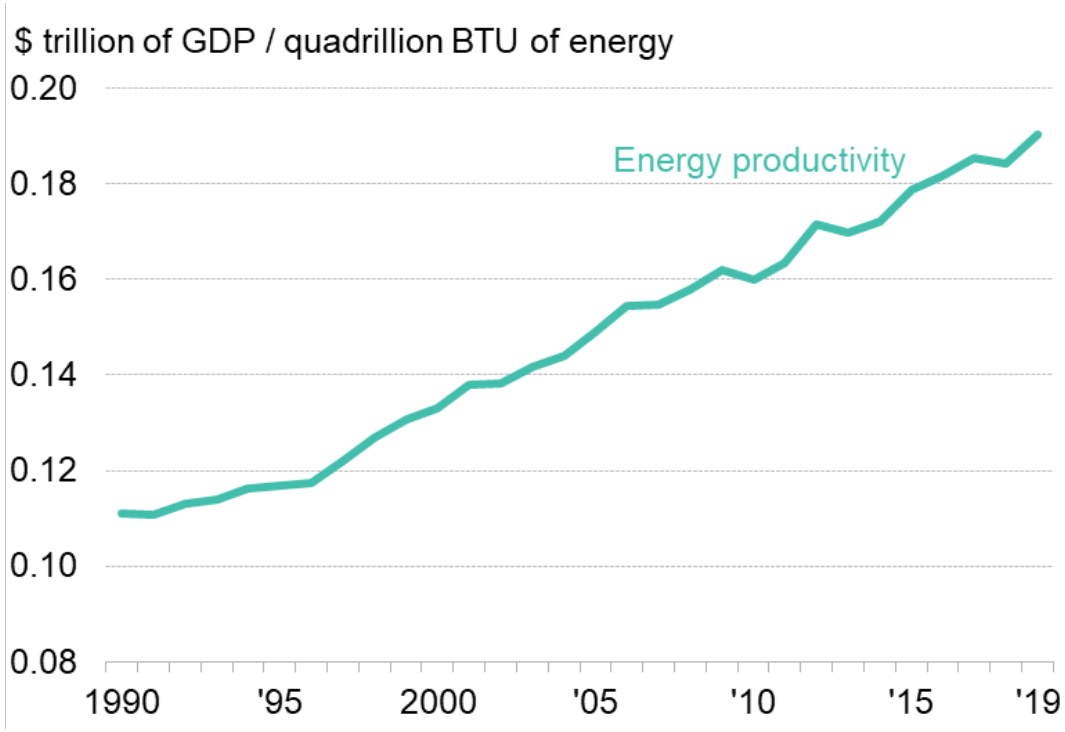
A momentous decade

U.S. energy overview: Productivity

U.S. GDP and primary energy consumption



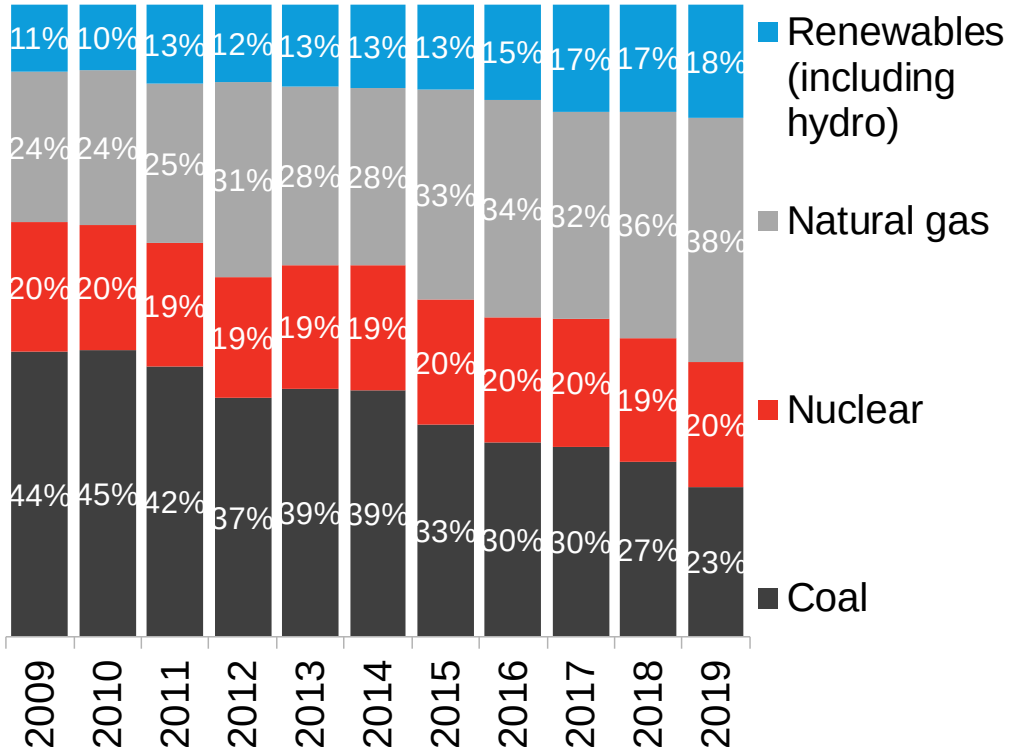
U.S. energy productivity



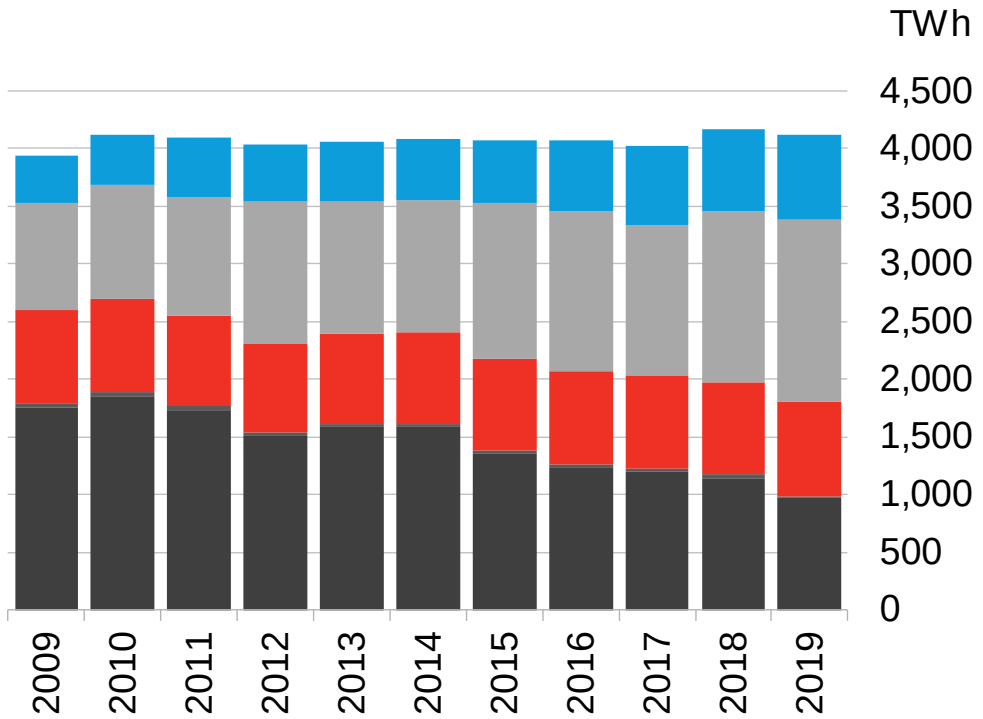
Source: BCSE Factbook, Bureau of Economic Analysis, EIA, BloombergNEF Notes: Values for 2019 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through September 2019). 2019 GDP estimate is a projection from economists compiled at ECFC <GO> on the Bloomberg Terminal.

U.S. power is de-carbonizing

U.S. electricity generation, by fuel type

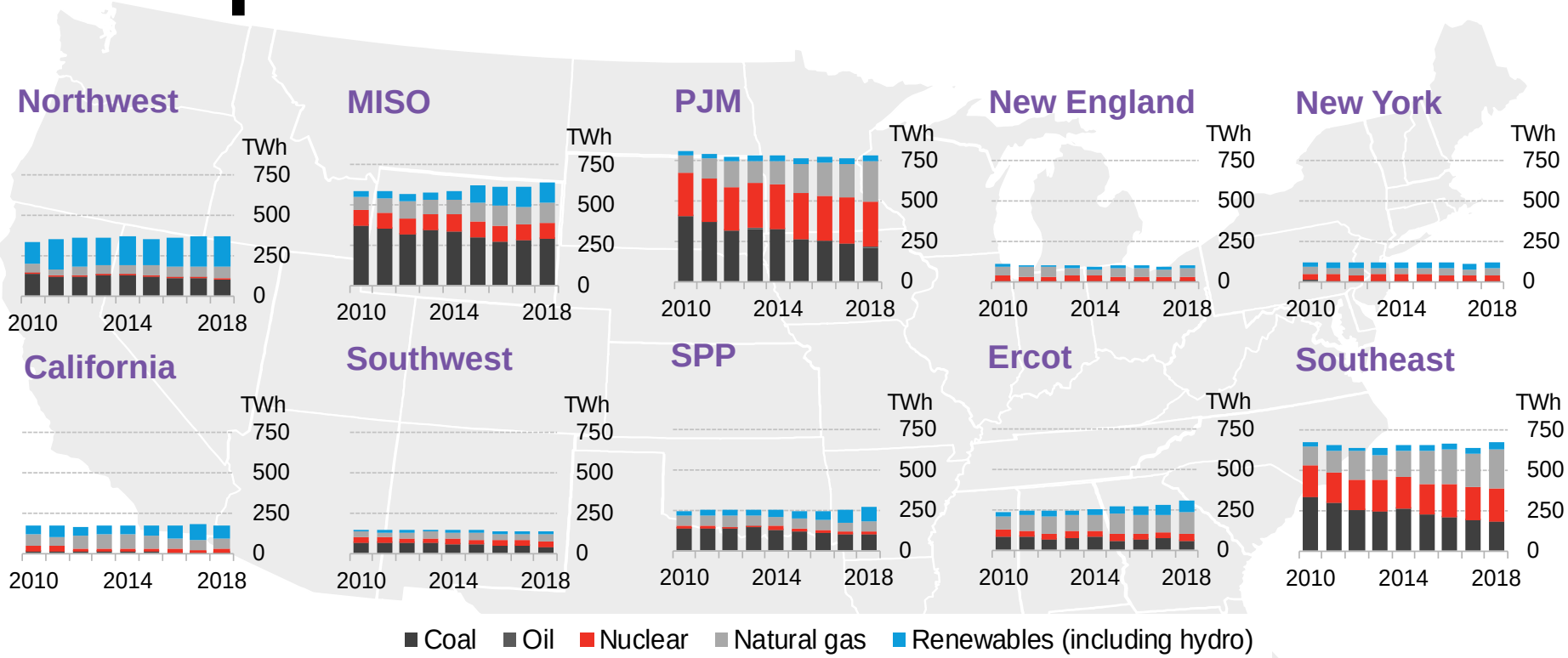


U.S. electricity generation, by fuel type



Source: EIA, BloombergNEF Note: Values for 2019 are projected, accounting for seasonality, based on latest monthly values from EIA (data available through October 2019)

Regions are moving at different speeds

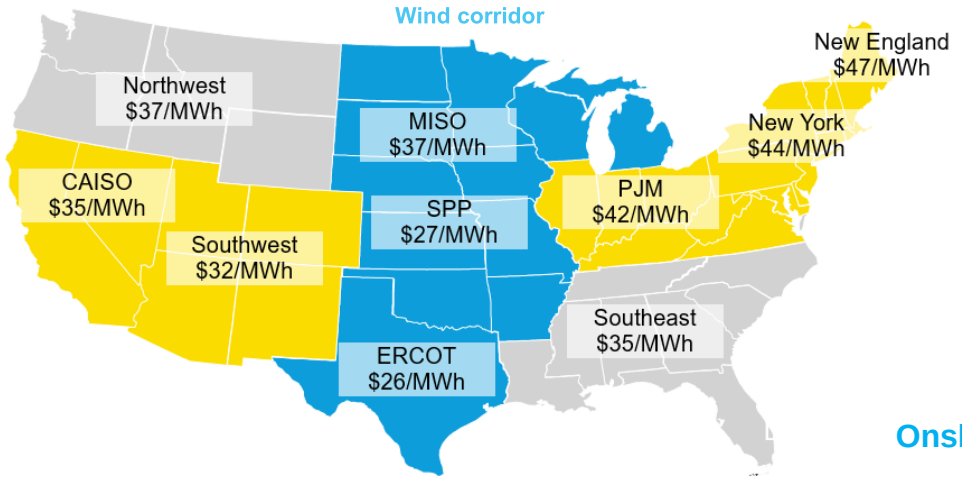


Source: EIA, BloombergNEF Notes: MISO is the Midwest region; PJM is the Mid-Atlantic region; SPP is the Southwest Power Pool which covers the central southern U.S.; Ercot covers most of Texas.

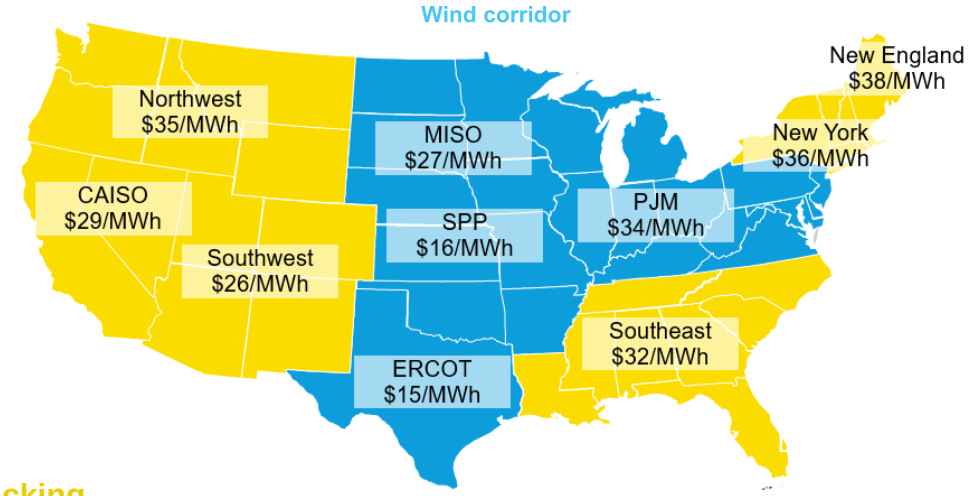
Renewables are generally the lowest-cost source of generation

Cheapest new bulk electricity on an LCOE basis, U.S. 1H 2020

Excluding tax credits



Including tax credits



Onshore wind

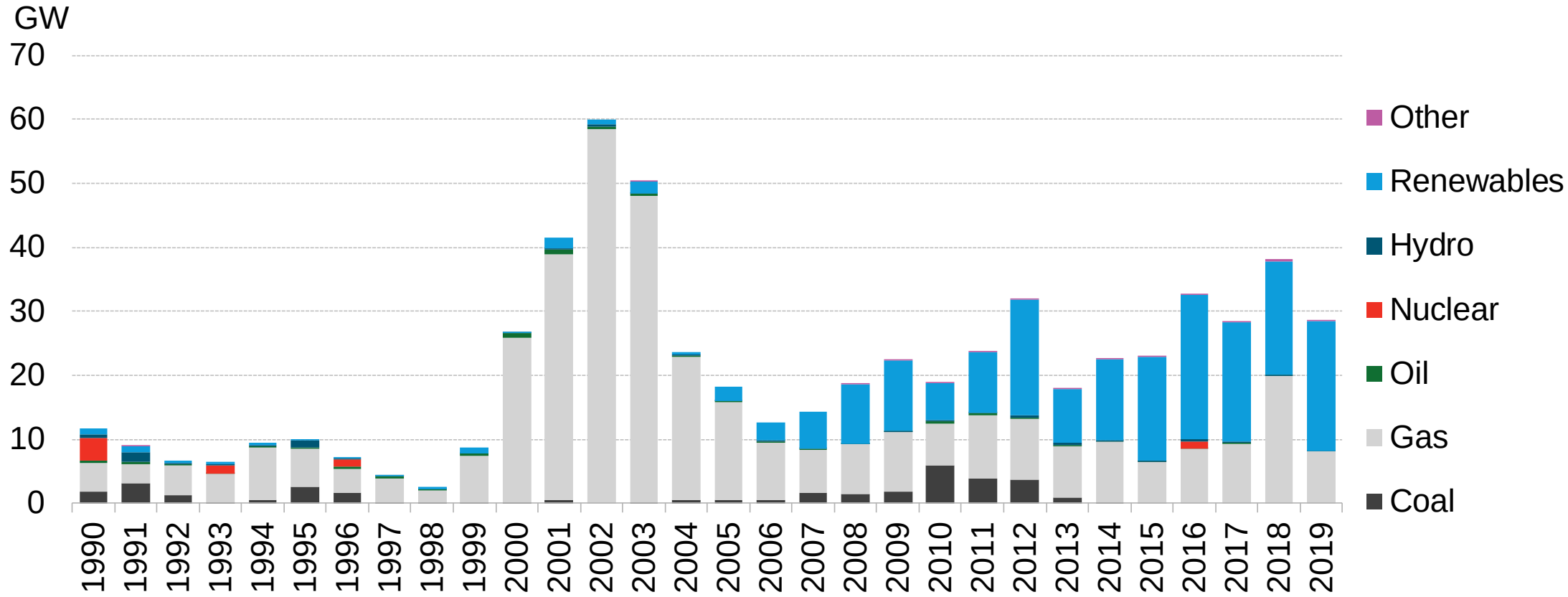
Utility PV – tracking

Gas – combined cycle

Source: BloombergNEF. Note: Independent System Operators (ISO) territories in this map follow state boundaries. The maps show the benchmark LCOE of the cheapest technology.

The U.S. only builds renewables and gas-fired capacity

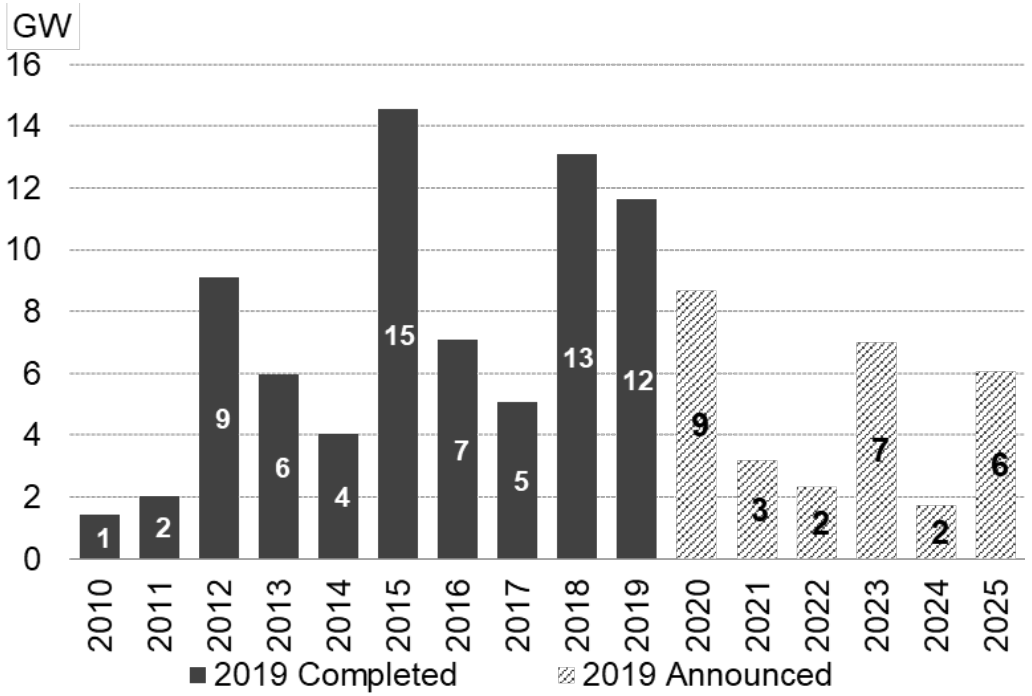
U.S. electric generating capacity build, by fuel type



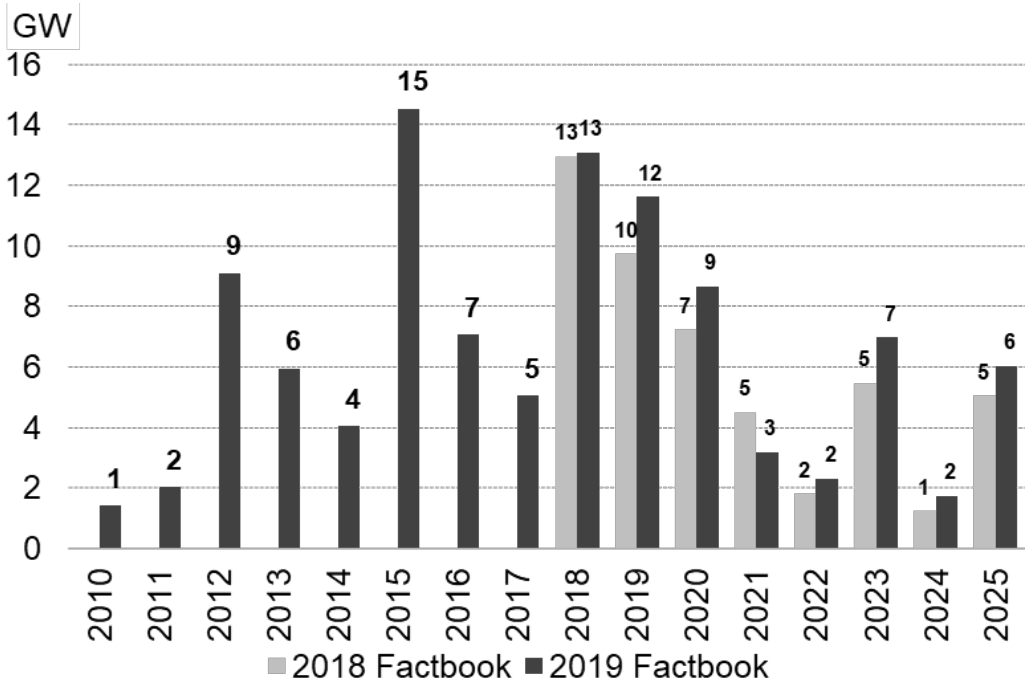
Source: EIA, BloombergNEF Note: All values are shown in AC except solar, which is included as DC capacity. "Renewables" here does not include hydro, which is shown separately. All capacity figures represent summer generating capacity. Includes installations or planned installations reported to the EIA through October 2019, as well as BloombergNEF projections.

Coal plants continue to retire

U.S. coal retirements, by type



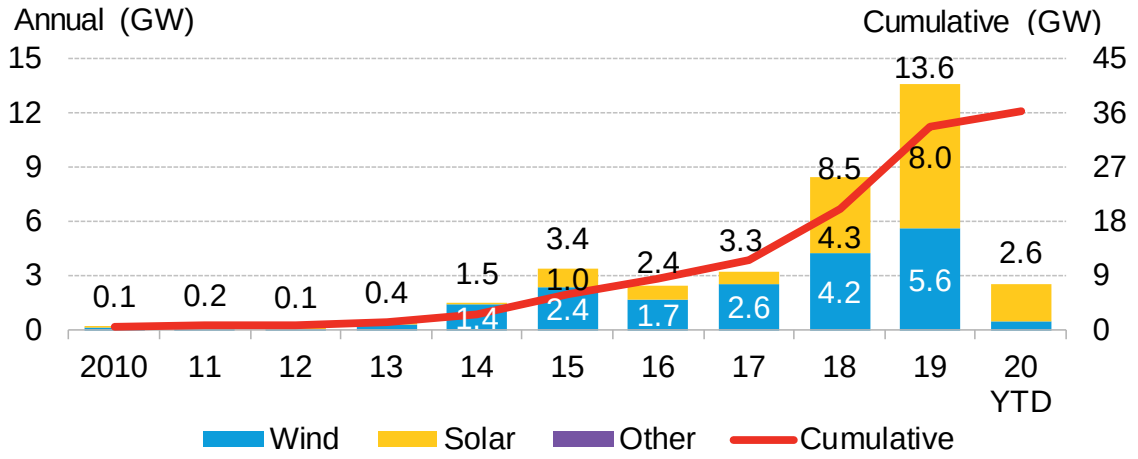
Total U.S. coal retirements, 2018 vs 2019



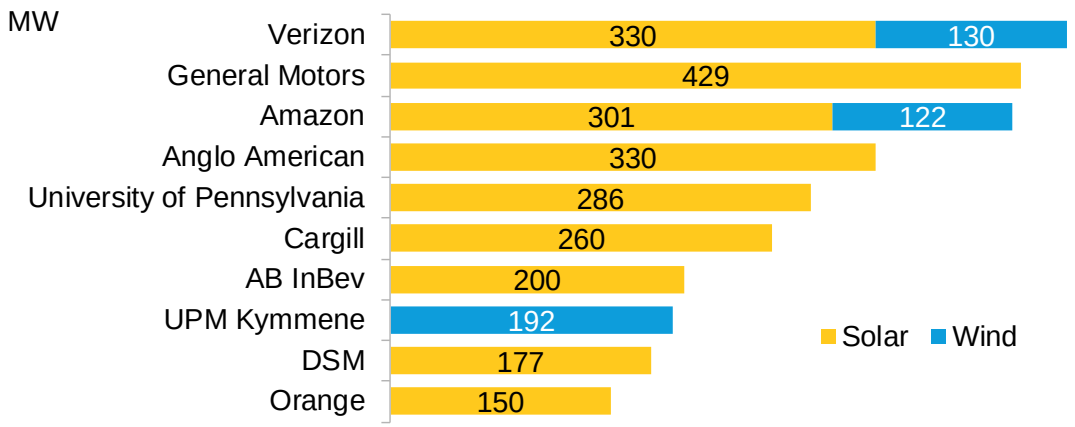
Source: EIA, company announcements, BloombergNEF Notes: "Retirements" does not include conversions from coal to natural gas or biomass; includes retirements or announced retirements reported to the EIA through October 2019. All capacity figures represent summer generating capacity.

Corporate procurement of renewable power keeps growing

U.S. corporate PPAs, by technology



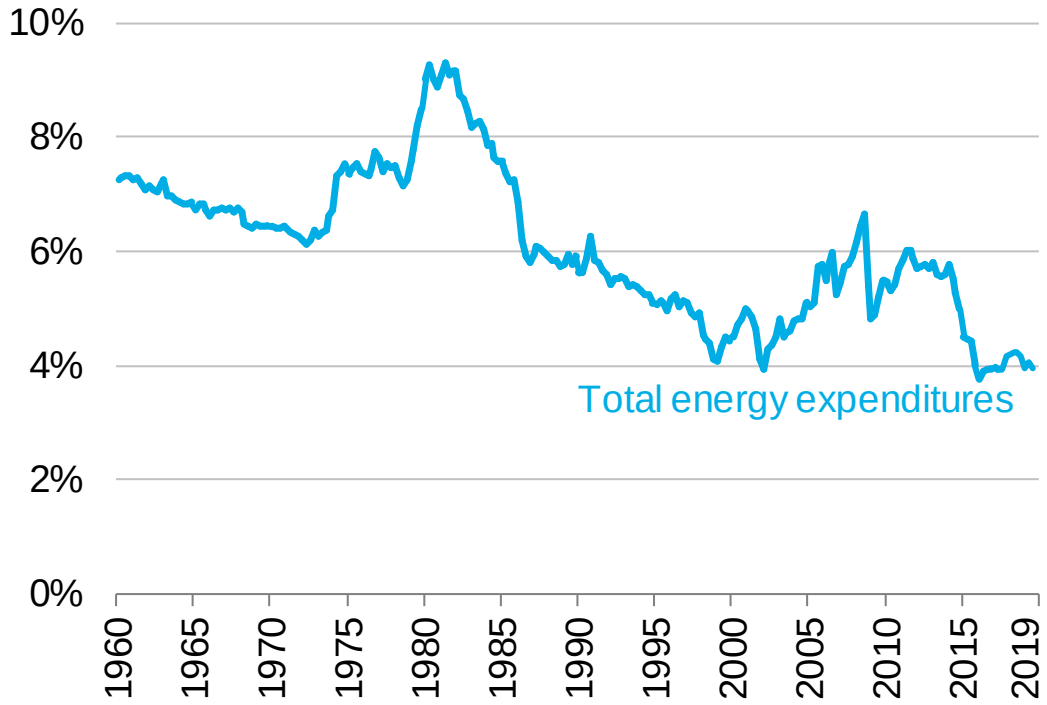
Largest global corporate offtakers, 2020



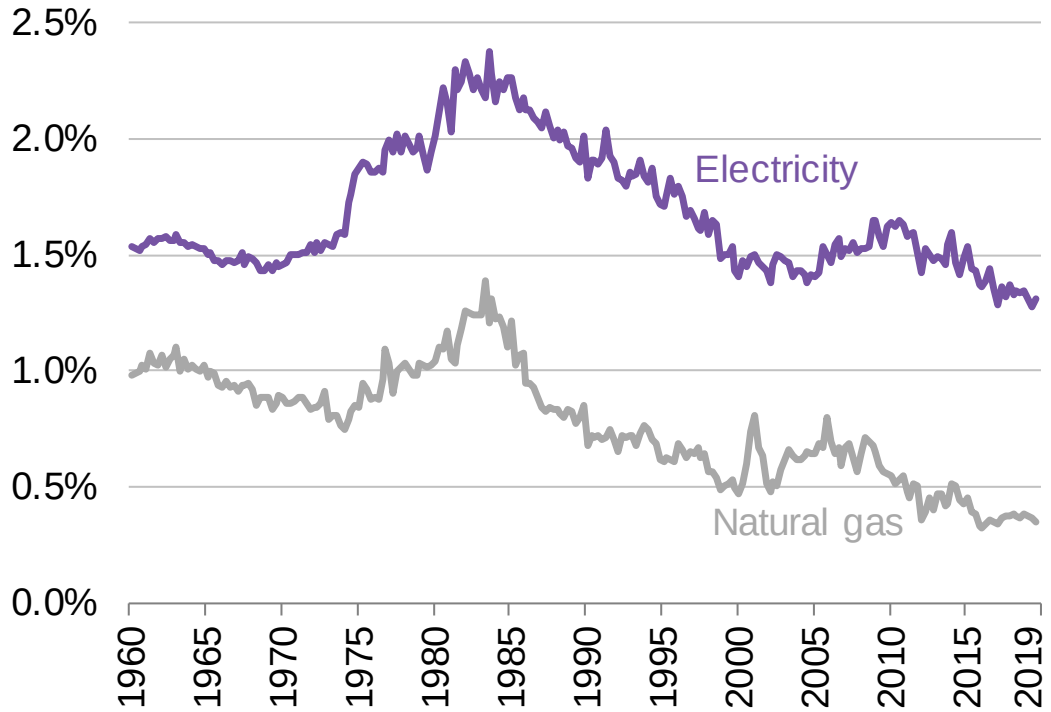
Source: BloombergNEF. Note: PPA's are power purchase agreements. Charts show offsite PPAs only. Figures here are current as of April 2020 and updated from those published in the 2020 BCSE Factbook.

Household spending on energy was at historically low levels entering 2020

Total energy goods and services as share of total consumption expenditure



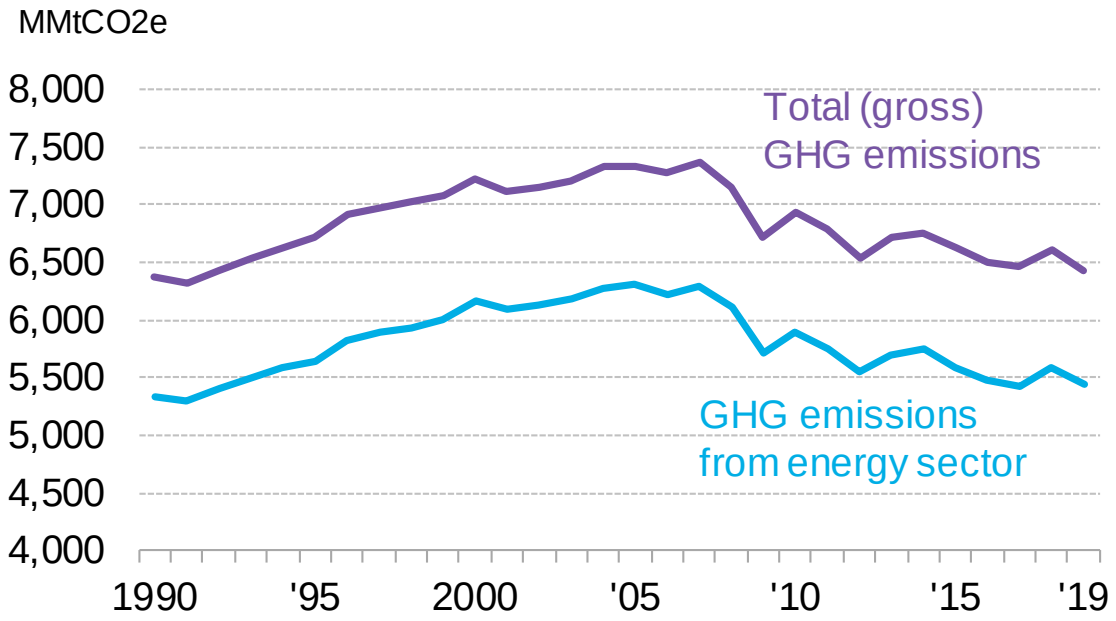
Electricity and natural gas as share of total consumption expenditure



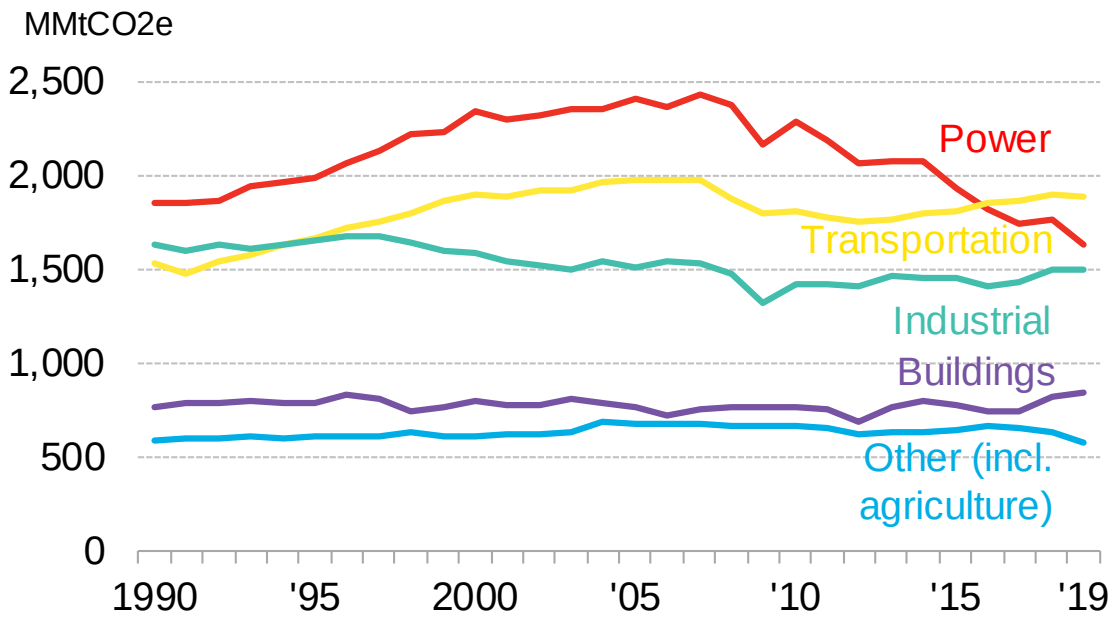
Source: Bureau of Economic Analysis, BloombergNEF, BCSE Factbook.

Greenhouse gas emissions have peaked, but must fall faster

Economy-wide and energy sector GHG emissions



GHG Emissions by sector



Source: BloombergNEF, EIA, EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016 Notes: "Sinks" refer to forests and green areas which absorb carbon dioxide. Values for 2019 are projected, accounting for seasonality, based on monthly values from EIA available through September 2019.

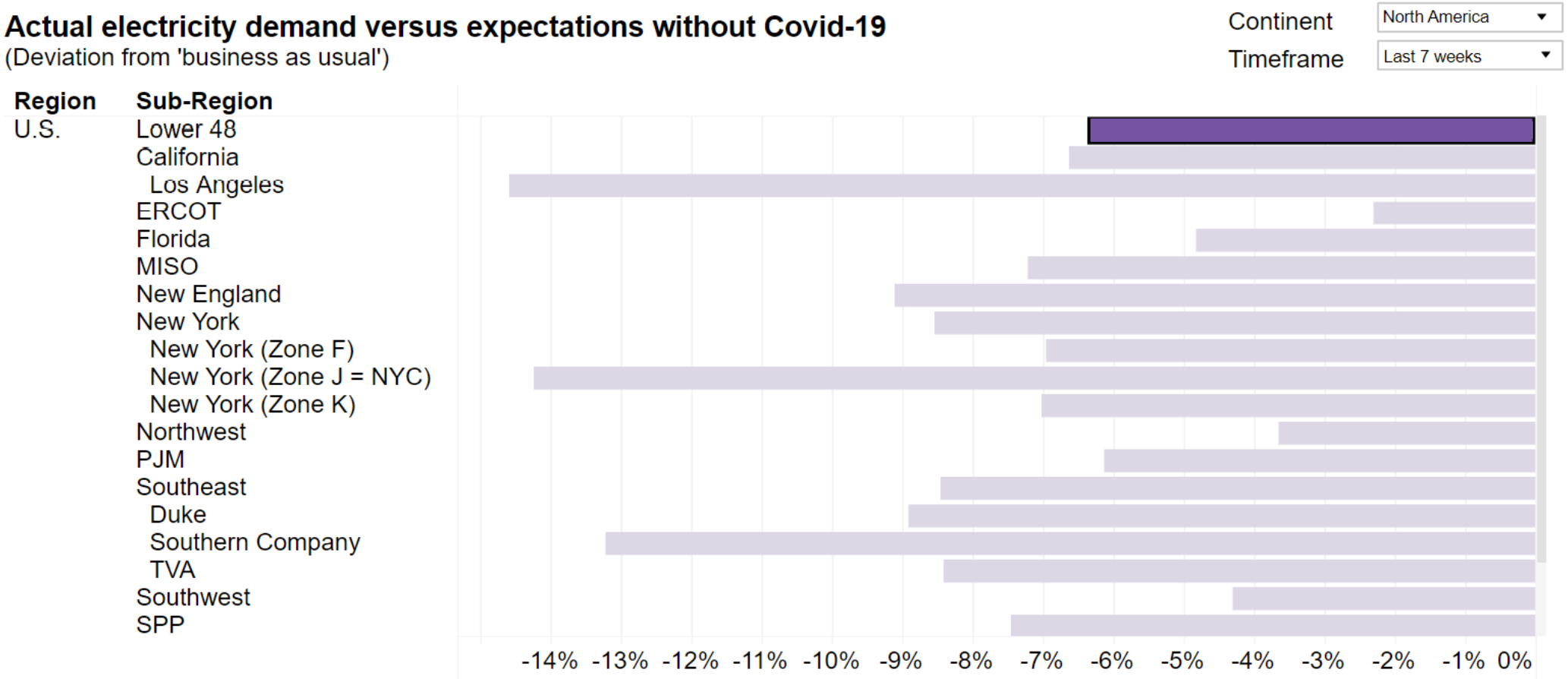
A FIRST QUARTER DISRUPTED

Covid-19

The early indicators

U.S. electricity demand has taken a hit…

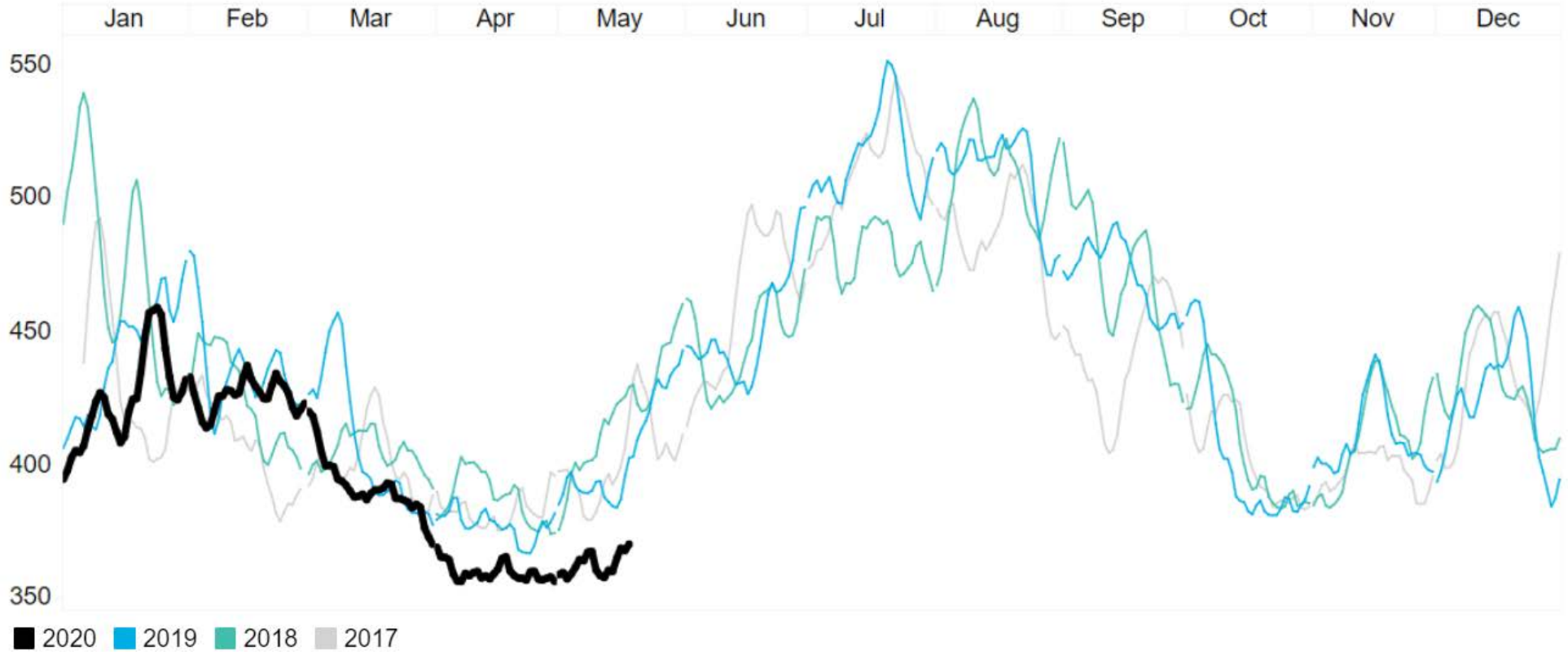
Actual electricity demand versus expectations without Covid-19
(Deviation from 'business as usual')



Source: BNEF.com Covid-19 electricity demand tracker.

Electricity demand trails prior years

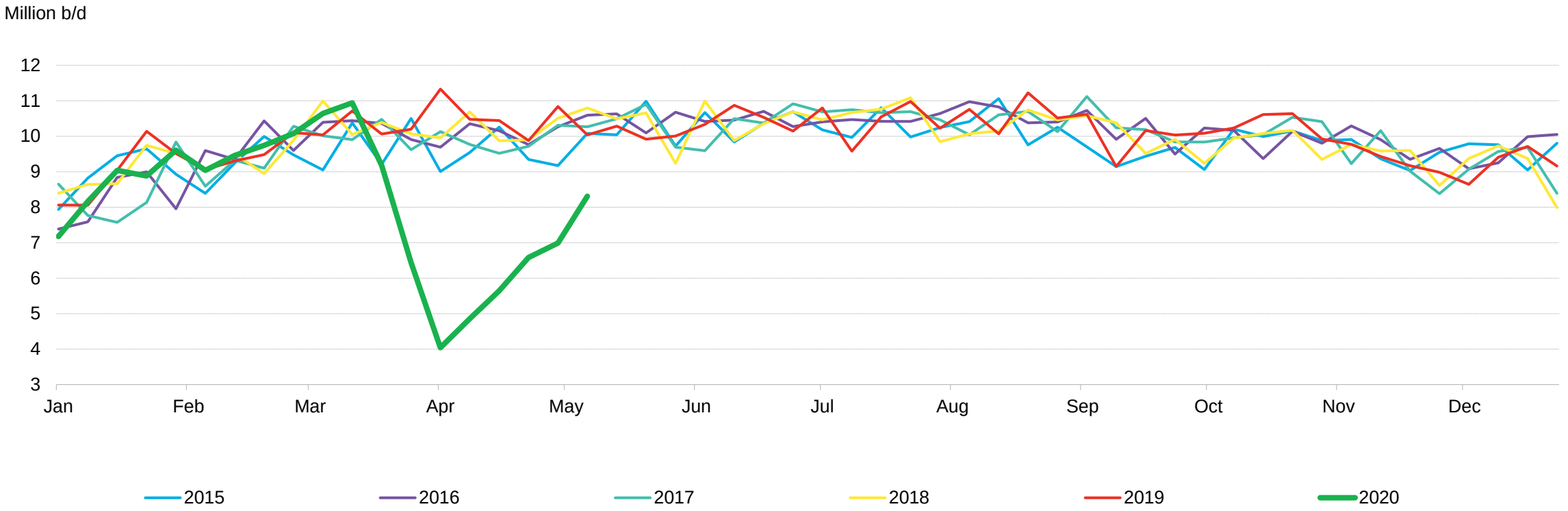
U.S. daily electricity demand (GW)



Source: BNEF.com Covid-19 tracker. Note: shows rolling seven-day demand.

But transport fuel demand declines have been deeper

U.S. gasoline consumption



Source: Energy Information Administration, BNEF.

Grand Forks Herald
GrandForksHerald.com

MANUFACTURING

UPDATED: LM Wind Power outbreak could 'overwhelm' Grand Forks health systems, hospital leader warns

Written By: Joe Bowen | Apr 18th 2020 - 9am.

Renewables Now

Virus crisis forces SunPower to idle factories, cut working hours

WINDPOWER MONTHLY

TPI forced to reduce production levels

Covid-19

Wind and solar construction, manufacturing and auctions as of mid-April

Country	Construction continuing?	Factories open?	Auctions going ahead?
Australia			
Belgium		n/a	n/a
Brazil			
China			
Denmark			
France			
Germany			
India			
Italy			
Japan			
Netherlands			
Norway		n/a	n/a
Poland			
Portugal			
South Korea			
Spain			n/a
Sweden		n/a	n/a
Thailand			n/a
Turkey			
U.K.*			n/a
U.S.			n/a
Vietnam			n/a

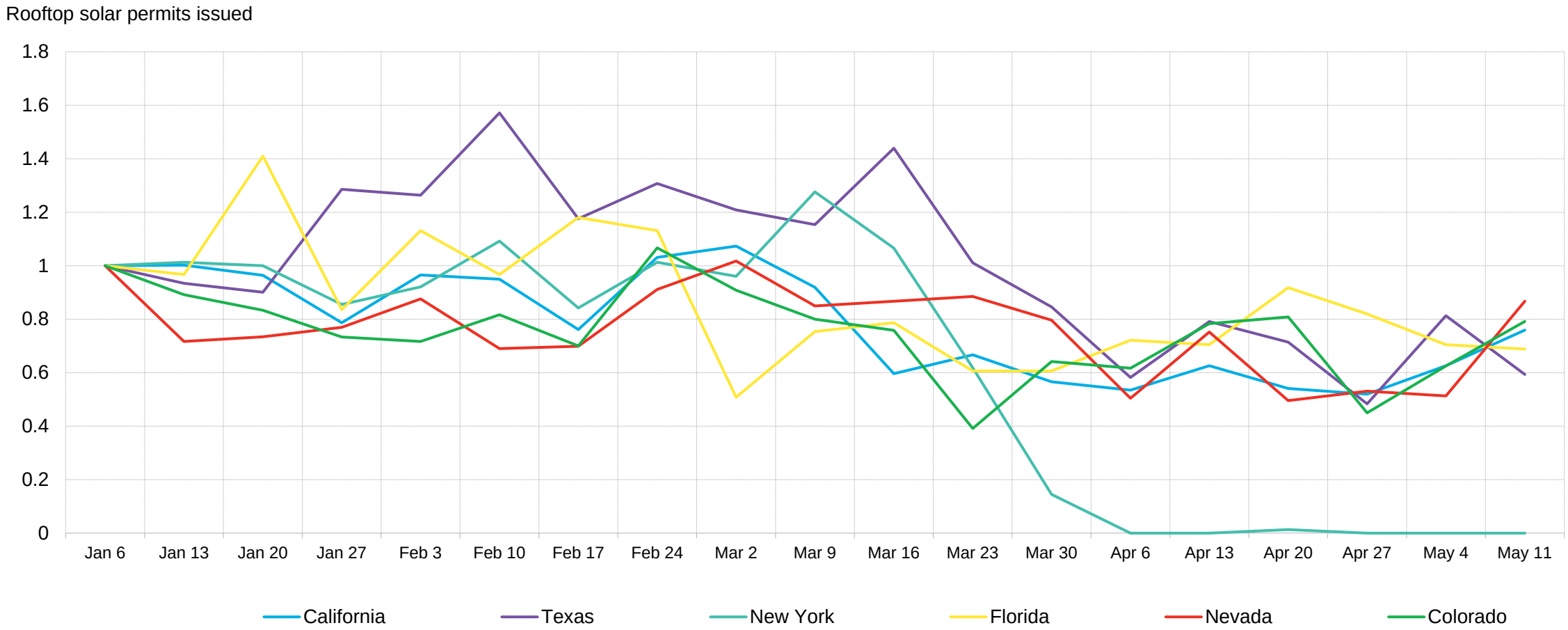
Yes, with disruptions | Partially banned/ Postponed | No

Source: BloombergNEF, Note: N/A refers to the absence of manufacturing or scheduled auctions. In the U.K. construction is halted in Scotland, but can go ahead in England and Wales. More voluntary shutdown measures in place in Japan.

Rooftop solar: U.S. snapshot

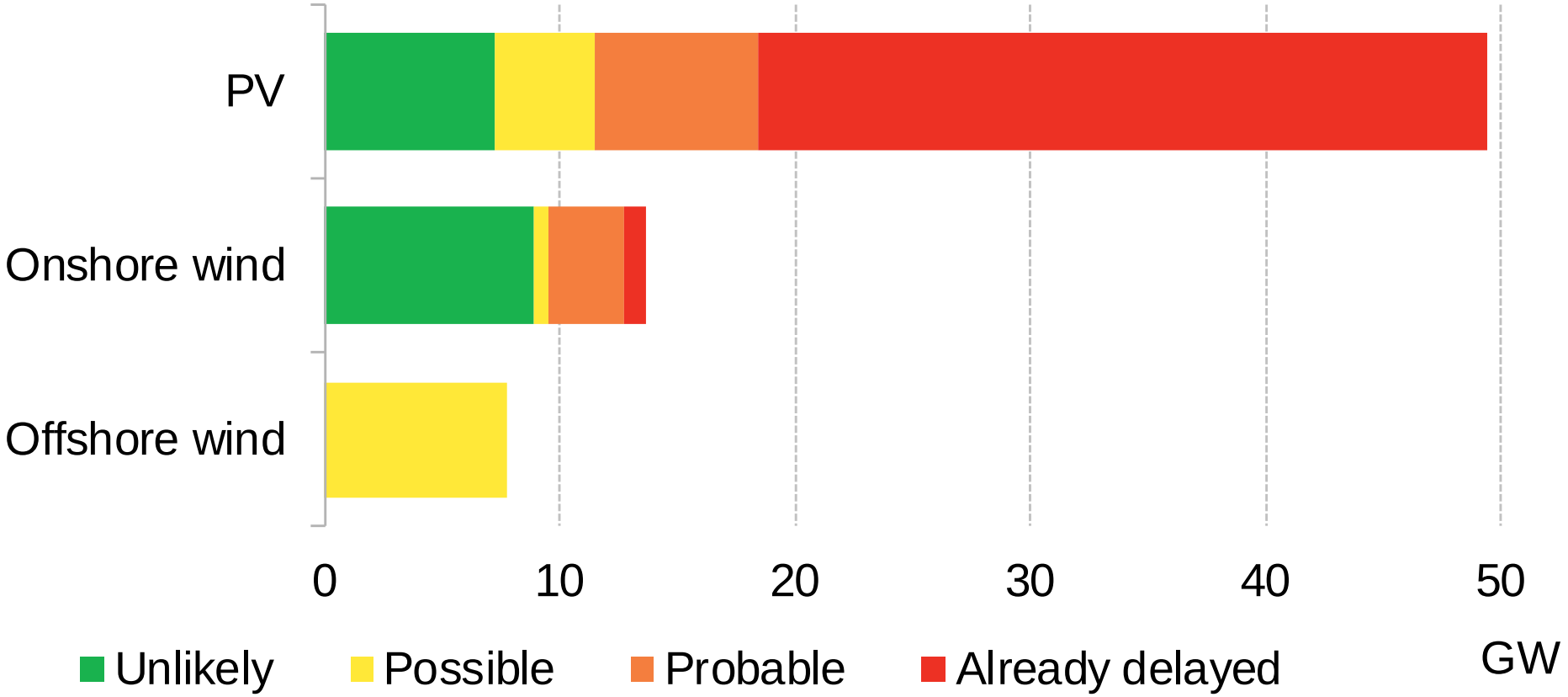
Weekly solar rooftop permits issued in a sample of U.S. cities, selected states

(rebased to 1 in the week of January 6, 2020)



Source: Ohm Analytics, BloombergNEF. Note: Data from select counties by state. New York data is for New York City only.

Wind and PV auctioned capacity scheduled for 2Q-4Q 2020



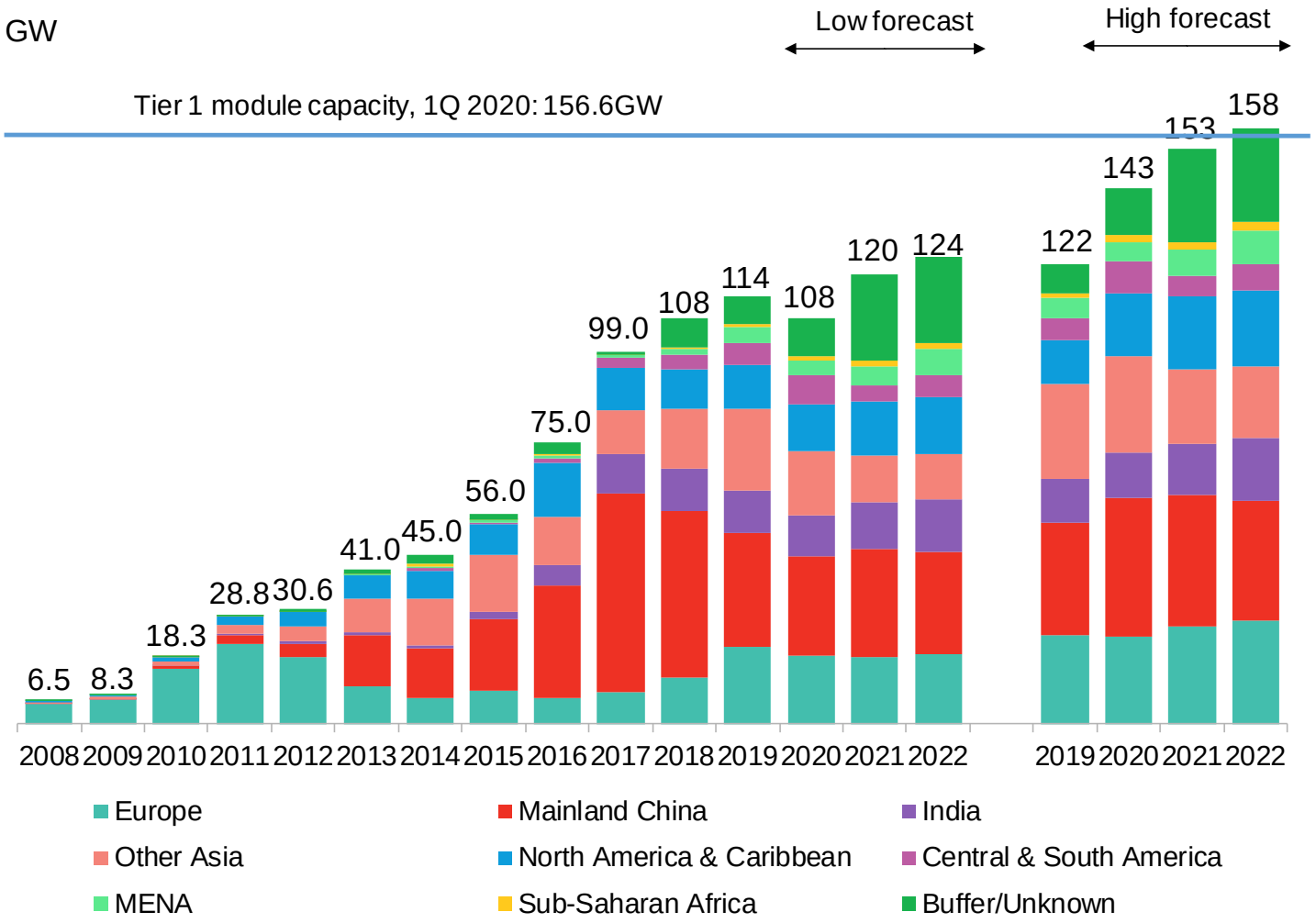
Source: BloombergNEF. Note: Includes rounds over 100MW with a target in capacity and for which application deadline has not yet passed. If target is a range, the maximum is used; and if a round is for multiple technologies, an equal split between PV and wind is assumed

Global solar PV new build

Change from previous version:

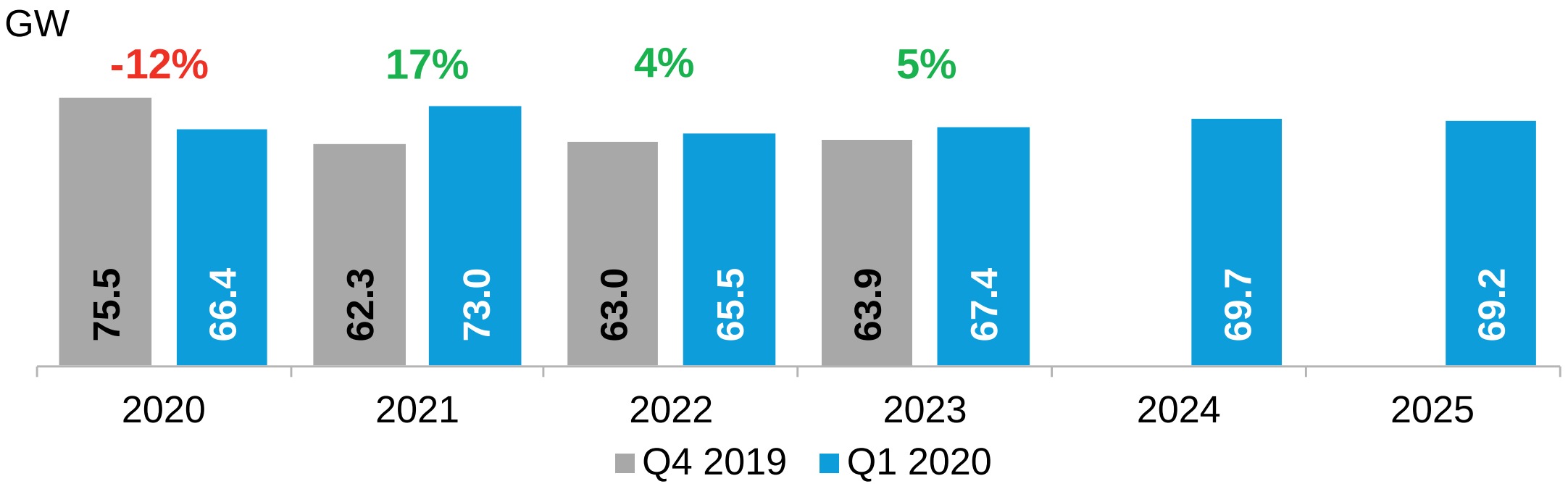
-6-11% revision for 2020

-3-5% revision for 2021



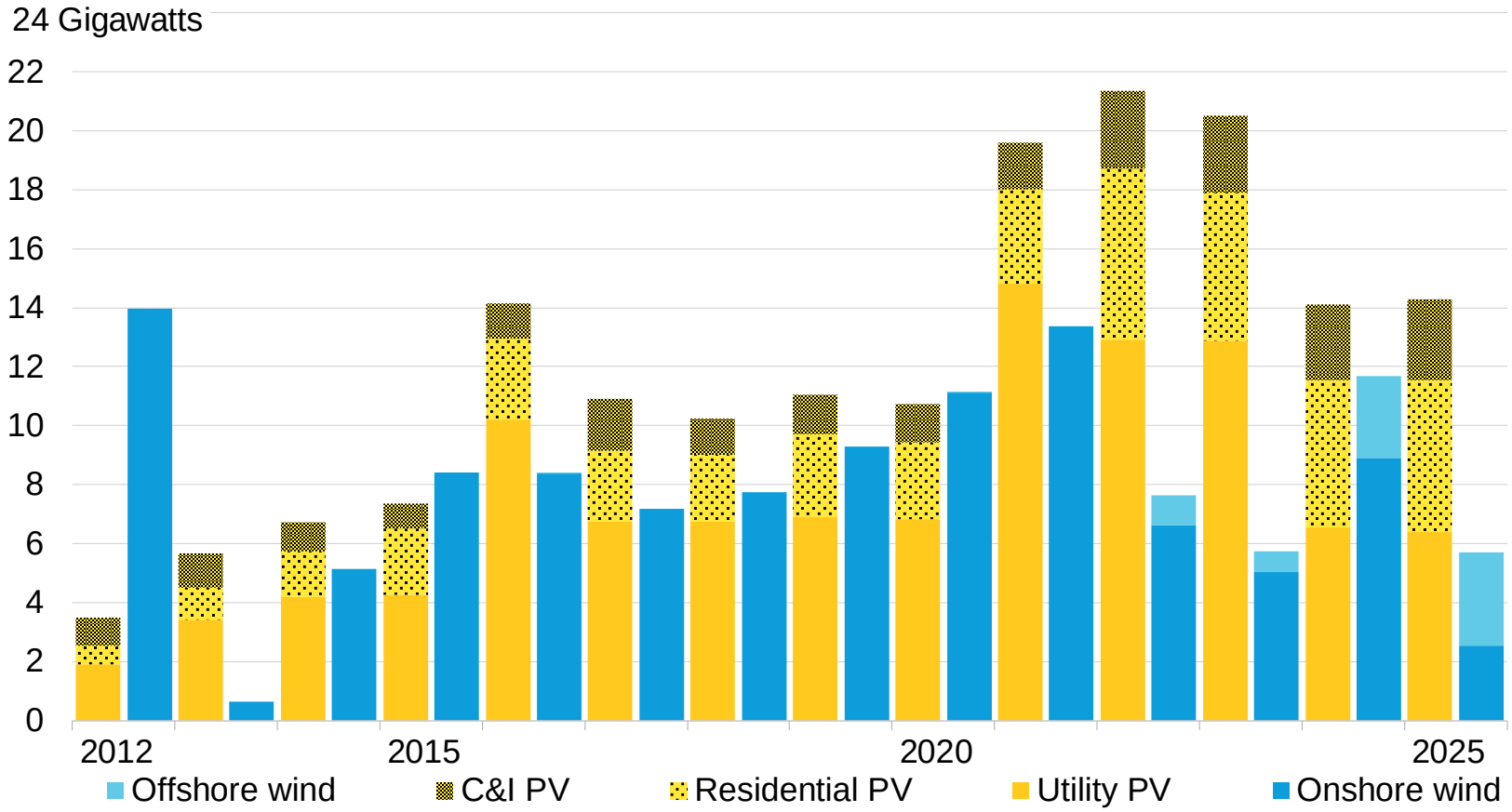
Source: BloombergNEF. Note: For full, updated short-term demand forecasts by country see BNEF's Capacity and Generation tool: web.

Quarter-on-quarter change to BNEF's global wind forecast



Note: Previous forecast only to 2023. Data is for onshore and offshore wind combined.

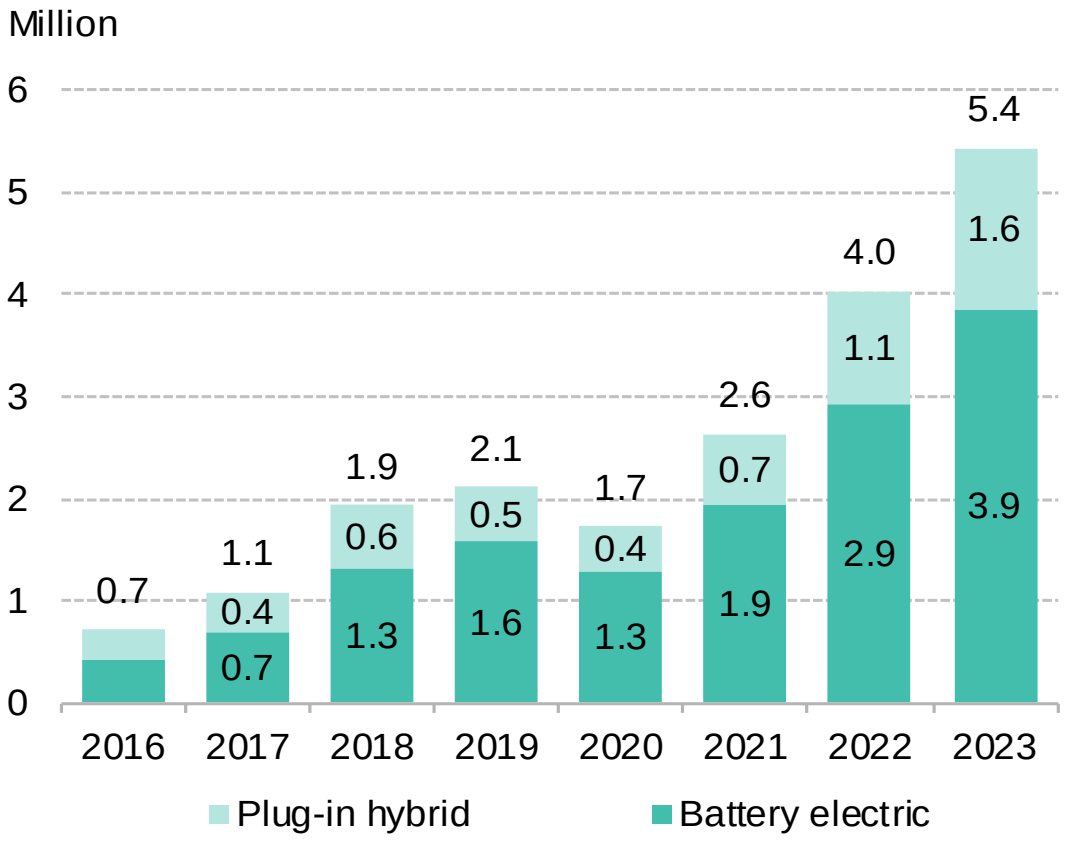
Annual U.S wind and solar capacity additions



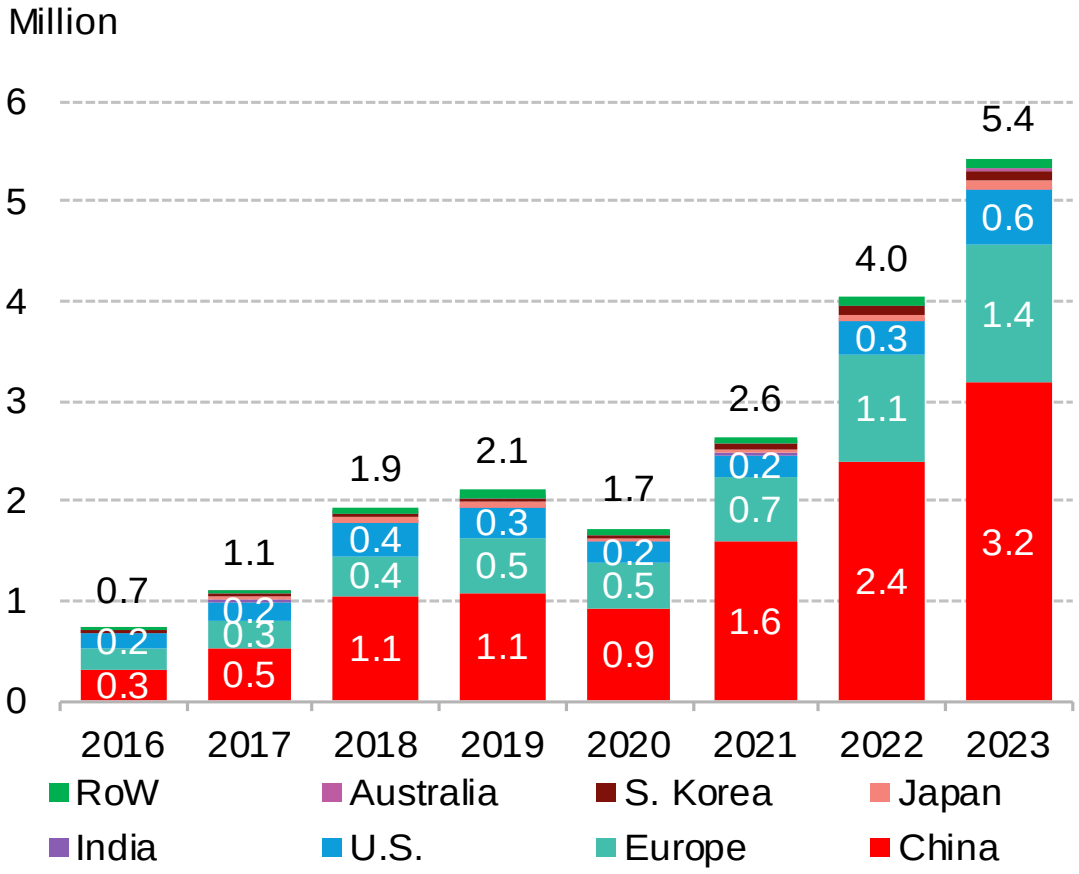
Source: BloombergNEF. Note: all solar capacities and costs noted within this report are denominated in the direct current (DC) capacity of the modules, unless otherwise stated

Updated short-term passenger EV sales forecast

By type

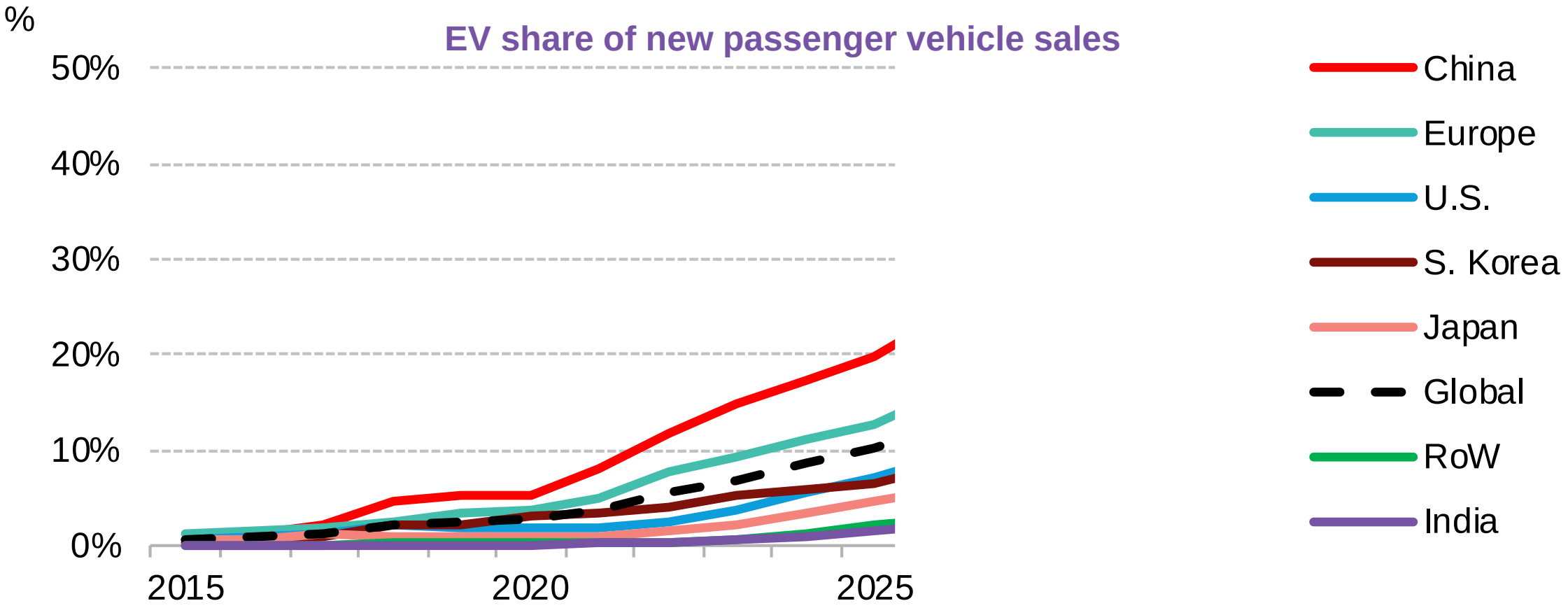


By region



Source: BlombergNEF. Note: Based on Covid-19 Scenario 2.

China and Europe pull further ahead of the U.S.

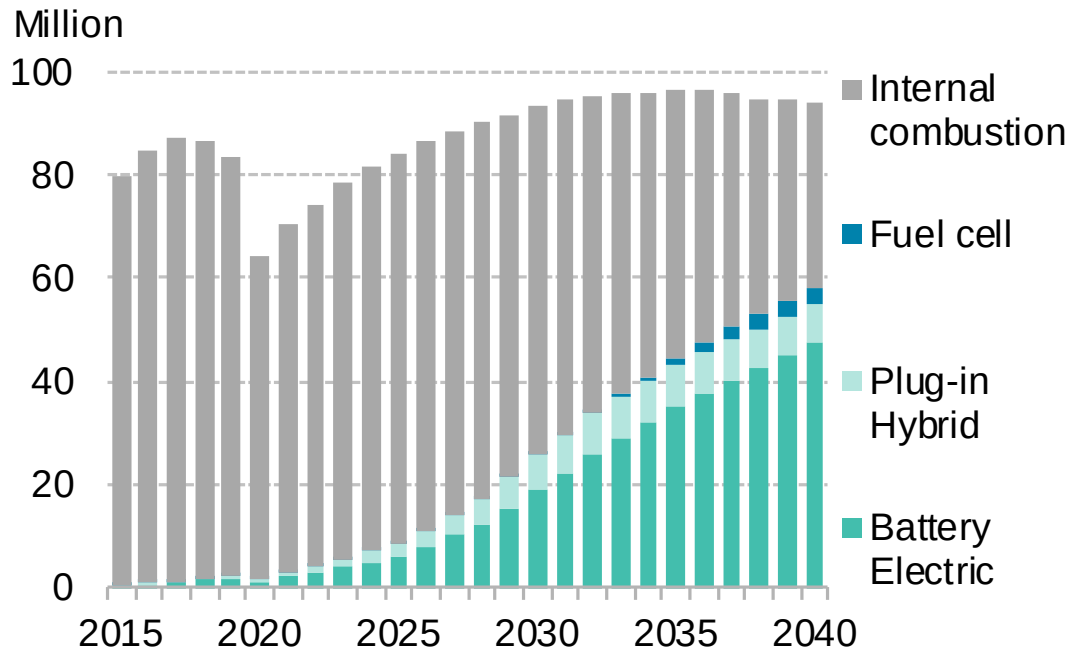


Source: BNEF. Includes battery electrics and plug-in hybrids

Two tipping points

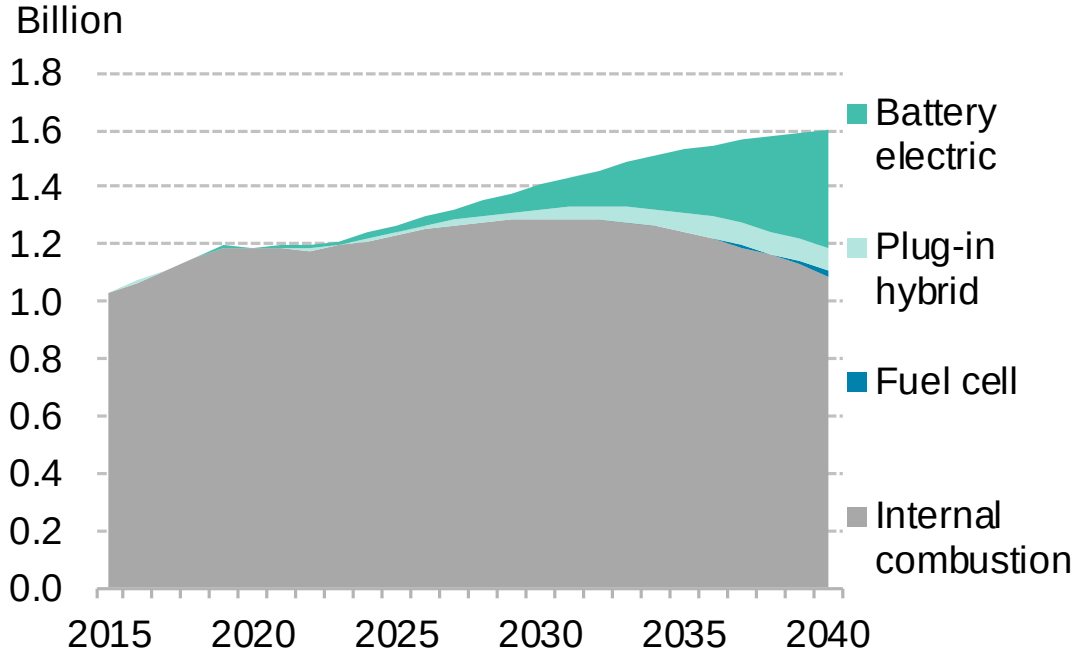
Global passenger vehicles by drivetrain

Sales



EV share of global sales in 2040 **58%**

Fleet



EV share of global fleet in 2040 **31%**

Source: BNEF

Covid-19 signposts – policies for climate transition

Indicator	Covid-19 impact to date
1. Green policy delays – eg, postponement of auctions, compliance deadlines or other key policy decisions	
2. Green legislation deceleration – eg, delay of progress on legislation to support green technologies or activities	
3. Green economic stimulus – eg, support to boost economic recovery while backing green technologies or activities	
4. Green targets and mandates – eg, zero-carbon goals, renewable portfolio standards	
5. Punitive policies for carbon-intensive technologies and activities – eg, landfill fees, carbon taxes	
6. Support for carbon-intensive technologies or activities – eg, expedited permitting for oil pipelines	
7. Retail fossil-fuel price subsidies – eg, subsidies for consumers to reduce electricity or gasoline costs	
8. Fossil-fuel taxes – eg, levies on gasoline at the point of purchase	
9. Electricity taxes – eg, levies on consumers for using power	
10. Trade barriers – eg, import tariffs on climate-friendly equipment and materials	

Source: BloombergNEF

Legend Negative; Somewhat negative; Neutral; Somewhat positive; Positive

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Bloomberg NEF (BNEF) is a leading provider of primary research on clean energy, advanced transport, digital industry, innovative materials, and commodities.

BNEF's global team leverages the world's most sophisticated data sets to create clear perspectives and in-depth forecasts that frame the financial, economic and policy implications of industry-transforming trends and technologies.

BNEF research and analysis is accessible via web and mobile platforms, as well as on the Bloomberg Terminal.

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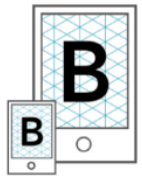

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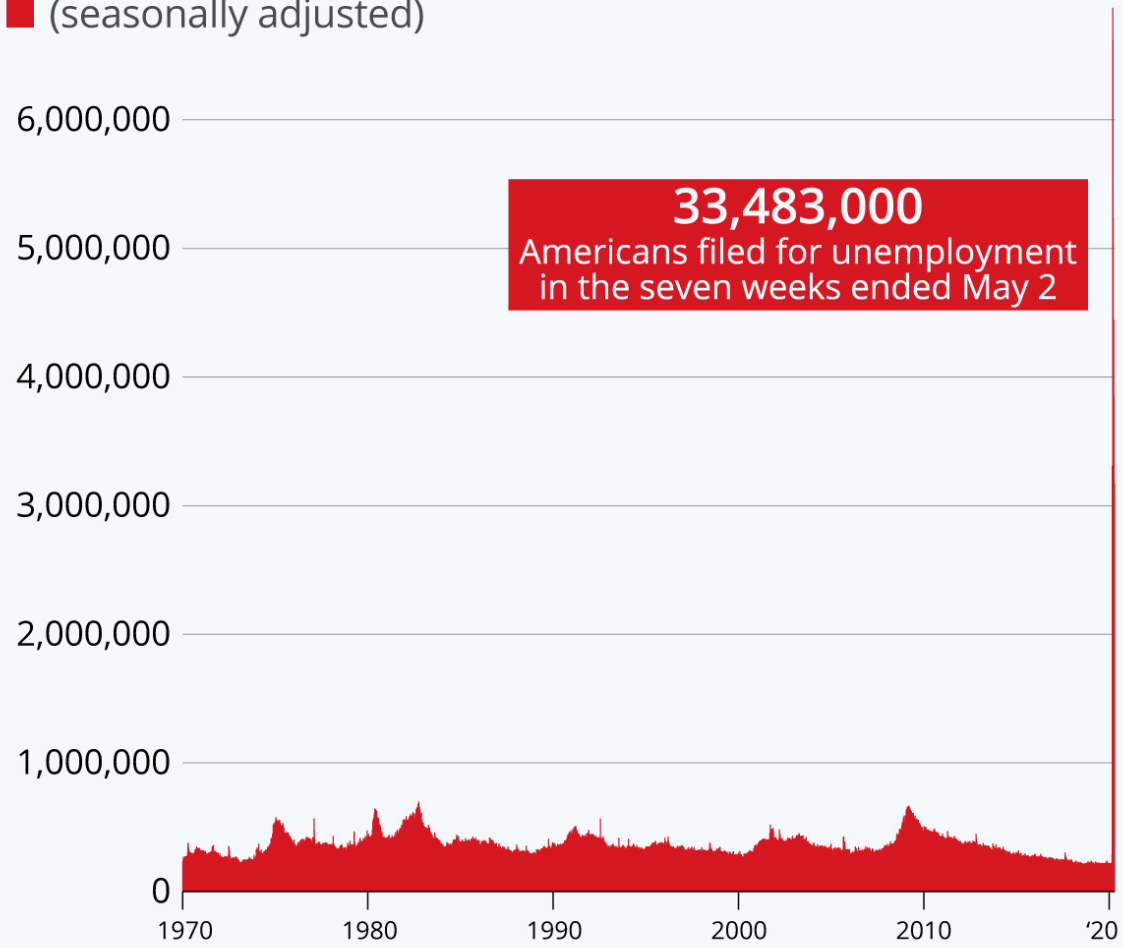
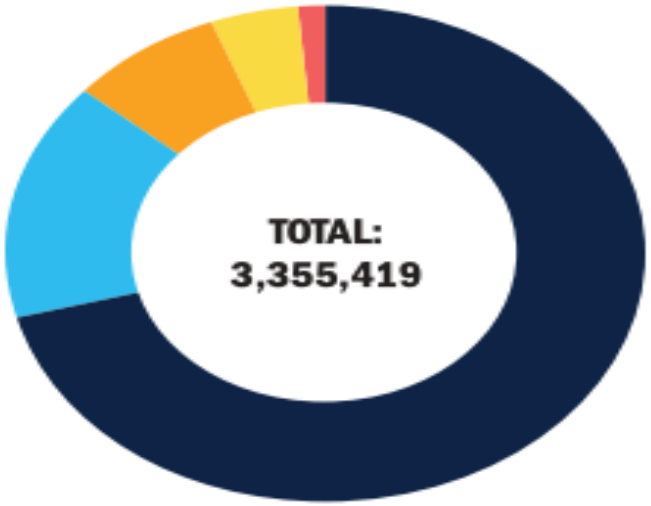
COVID-19 Causes Unprecedented Job Crisis

Weekly initial jobless claims in the United States (seasonally adjusted)



Source: U.S. Department of Labor

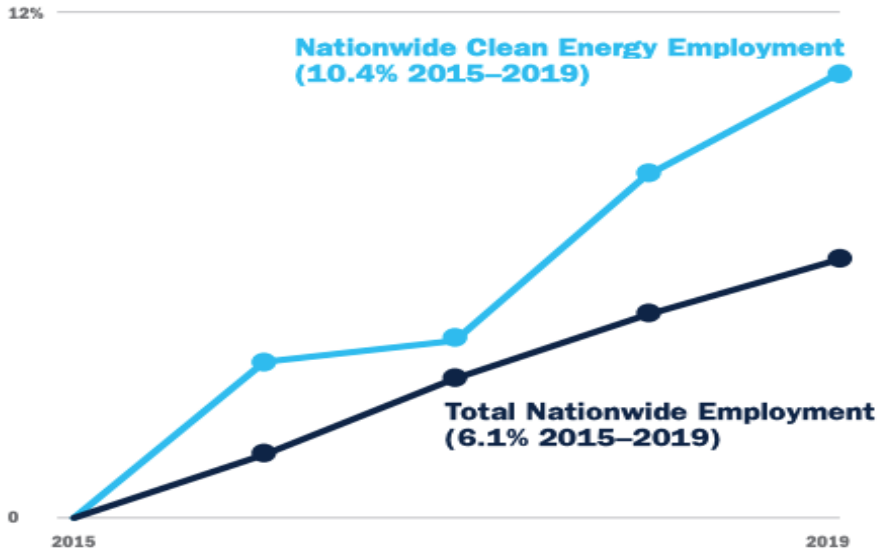
NATIONAL CLEAN ENERGY EMPLOYMENT
Q4 2019



- Energy Efficiency: 2,378,893
- Renewable Energy: 522,811
- Clean Vehicles: 266,368
- Grid & Storage: 147,644
- Fuels: 39,704

CLEAN ENERGY JOBS BEFORE COVID-19

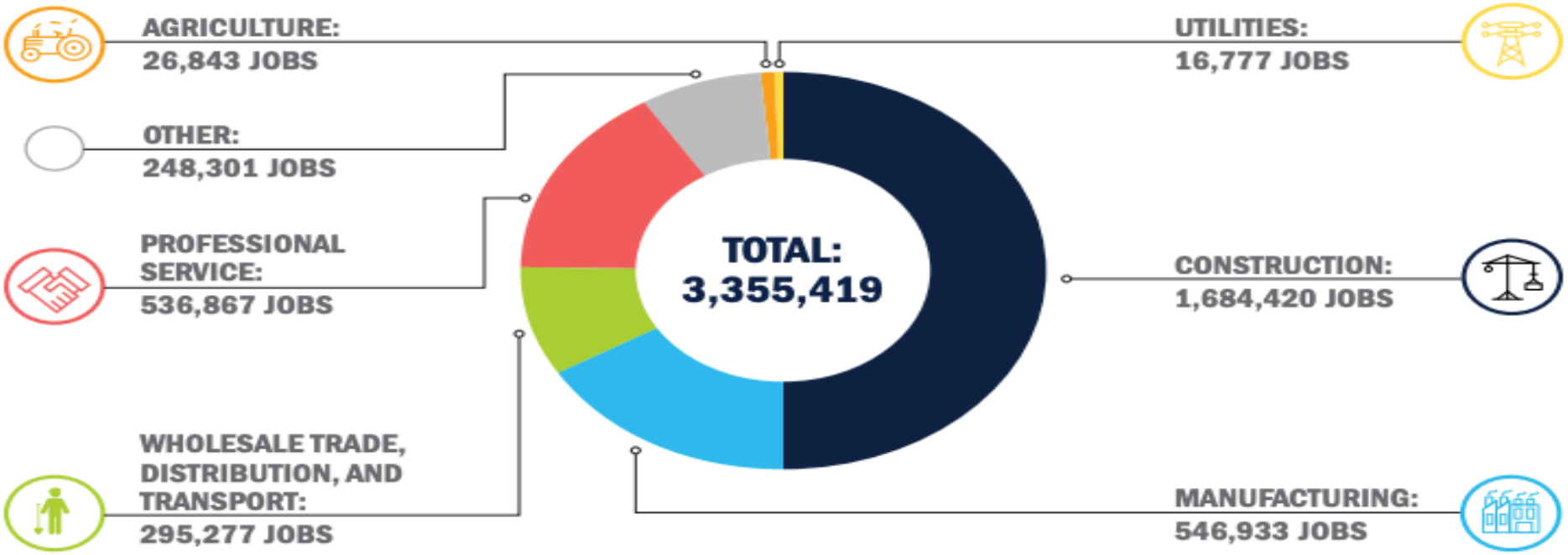
- Led economy in job growth
- Job growth outpaced rest of US economy by 70% (2015-2020)
- More clean energy workers than teachers, real estate agents, farmers
- BLS: Fastest-growing jobs – Solar installer, wind turbine technician



Good for the Economy.
Good for the Environment.

CLEAN JOBS: ACROSS THE SUPPLY CHAIN

While construction and manufacturing accounted for the most clean energy jobs in the U.S. economic value chain in 2019, more than 1.1 million other clean energy workers are employed across agriculture, trade, distribution and transportation, professional services and more. Those jobs alone employed as many workers as the entire fossil fuel sector in 2019.



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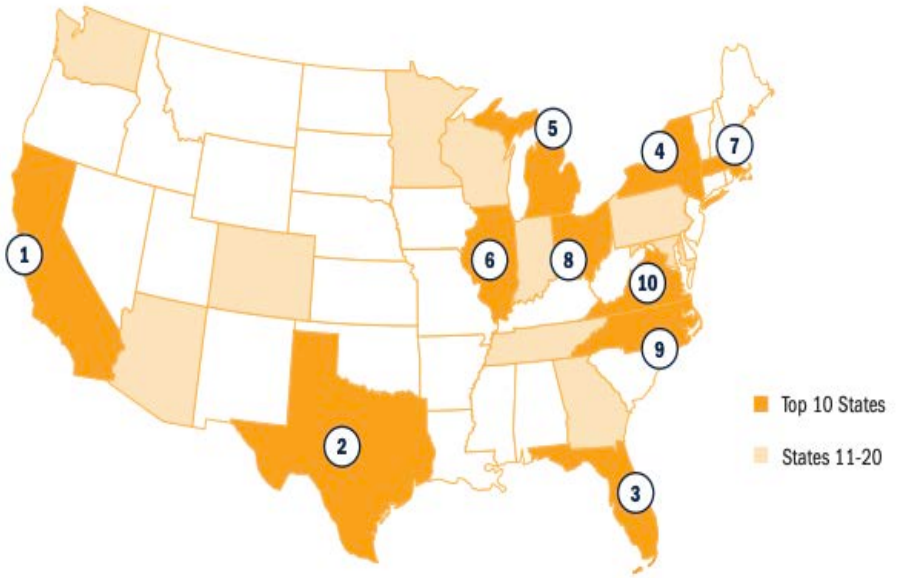
Rank	STATE	TOTAL*	Renewables	Grid & Storage	Energy Efficiency	Clean Fuels	Clean Vehicles
1	California	536,919	142,957	24,021	323,529	5,785	40,627
2	Texas	241,289	39,303	13,204	169,398	2,073	17,309
3	Florida	166,032	24,987	5,499	123,560	2,897	9,090
4	New York	159,337	18,049	4,290	126,739	1,680	8,579
5	Michigan	125,365	11,447	3,896	85,323	625	24,073
6	Illinois	125,364	17,707	5,077	91,024	1,468	10,088
7	Massachusetts	122,477	21,963	7,050	88,231	569	4,664
8	Ohio	114,388	10,607	3,135	83,165	1,353	16,129
9	North Carolina	112,720	12,349	3,727	88,001	1,538	7,105
10	Virginia	97,305	9,047	2,520	80,181	312	5,245
11	Pennsylvania	93,861	9,744	3,698	71,443	1,436	7,541
12	Indiana	86,892	10,975	3,107	55,663	779	16,369
13	Washington	85,035	11,189	3,628	64,930	1,936	3,351
14	Maryland	84,549	8,203	2,001	71,337	170	2,839
15	Georgia	83,806	8,751	4,241	62,924	467	7,423
16	Tennessee	79,626	5,763	8,778	53,916	1,198	9,971
17	Wisconsin	76,685	5,958	2,175	63,569	368	4,615
18	Colorado	62,420	17,924	3,072	36,092	2,120	3,212
19	Arizona	62,106	11,629	2,273	44,782	345	3,077
20	Minnesota	61,805	7,920	2,899	47,114	681	3,191

Jobs in every state

- Coastal, South, Midwest, Mountains
- Geography, geology, politics don't matter
- New opportunities in rural areas, inner cities



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March-April
Nearly 600,000 jobs lost

850,000 JOB LOSSES PROJECTED

Industry	Unemployment Claims
Energy Efficiency	413,486
Renewable Energy	95,574
Clean Vehicles	46,501
Grid & Storage	26,202
Clean Fuels	12,584
Total	**594,347**

Sections

Los Angeles Times

CLIMATE & ENVIRONMENT

Climate change is looming. But America has lost 600,000 clean energy jobs

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CLIMATE CHANGE

Clean Energy Lost More Workers in March Than the Entire Coal Industry Employs

Dharna Noor
4/15/20 6:00PM • Filed to: UNEMPLOYMENT

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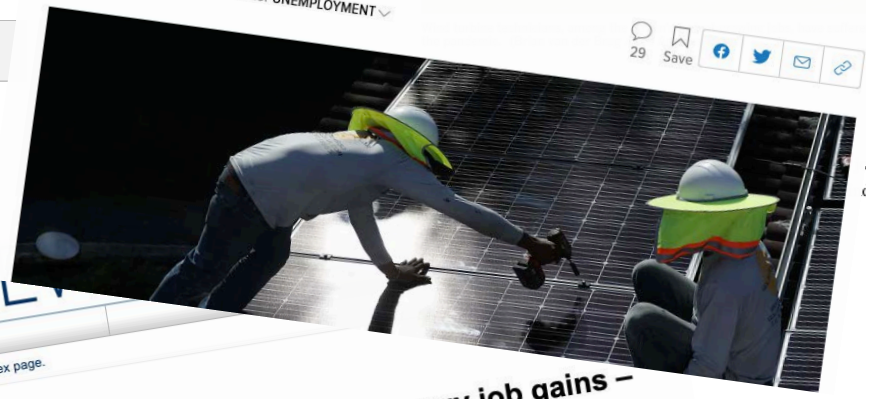

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PLAY THE CROSSWORD

Clean Energy Has Shed Nearly 600,000 U.S. Jobs Due to Pandemic: Report

By Reuters

May 13, 2020

(Reuters) - The U.S. clean energy sector has lost 17% of its work force, or nearly 600,000 jobs, as stay-at-home orders halt production of components from solar panels to electric cars and slow installations at homes and businesses, according to a report released on Wednesday.

The sector lost 447,200 jobs, about triple the 147,100 lost in March when states first began implementing lockdown orders to combat the spread of the new coronavirus, according to the analysis of U.S. unemployment data conducted by BW Research Partnership.

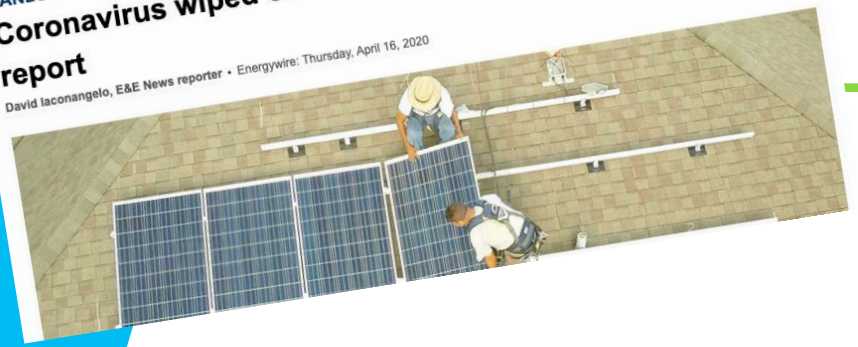
E&E NEWS

<< Back to E&E News index page.

PANDEMIC

Coronavirus wiped out 2019's clean energy job gains – report

David Iaconangelo, E&E News reporter • Energywire: Thursday, April 16, 2020



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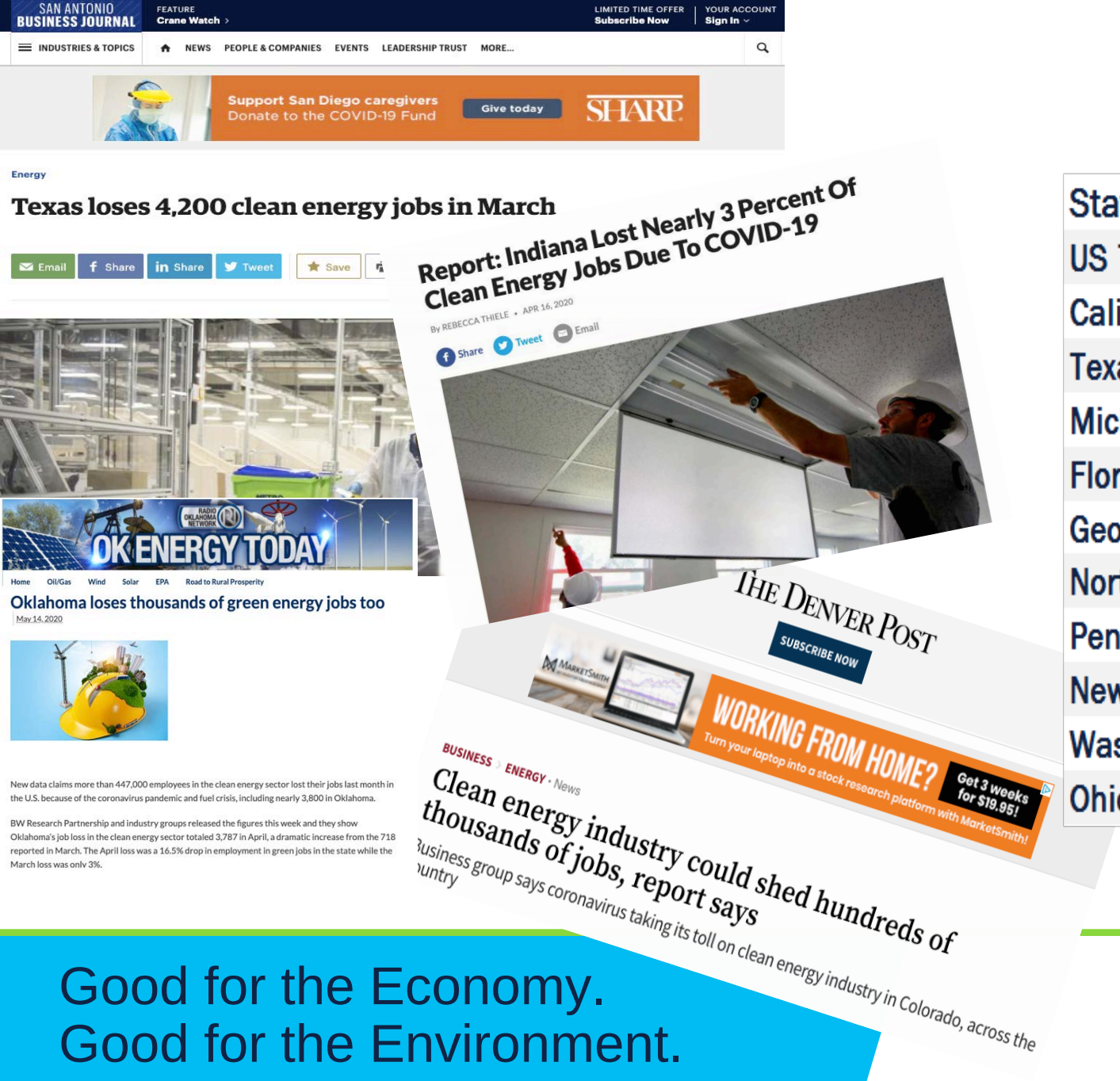
EVERY STATE IMPACTED

March-April claims

State	Unemployment Claims	Percent Decline
US TOTAL	594,347	17.16%
California	105,443	19.14%
Texas	31,192	12.67%
Michigan	30,150	22.67%
Florida	29,878	17.82%
Georgia	27,161	31.46%
North Carolina	26,417	23.04%
Pennsylvania	21,093	21.70%
New York	20,405	12.46%
Washington	20,239	22.73%
Ohio	19,798	17.06%



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A CLEAN ENERGY FUTURE

REPOWERING AMERICA

Let's Get America Back To Work

- **Clean Energy is proven economic catalyst**
- **After Great Recession:**
  - **100k+clean energy construction projects;**
  - **1million+ homes weatherized;**
  - **3.4 million jobs;**
  - **$100s of billions in investment**
- **Direct Payment/Incentive Refundability (1603)**
- **Tax extenders (PTC/ITC)**
- **Conservation Block Grants; SEP Program; Weatherization**
- **Clean Corridors; EV programs**
- **DOE programs**
- **Big, bold ideas: Grid modernization; EE in schools; electrify buildings**

Good for the Economy.
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www.e2.org

e2.org/reports/clean-jobs-america-2020/

e2.org/reports/clean-jobs-covid-economic-crisis-april2020

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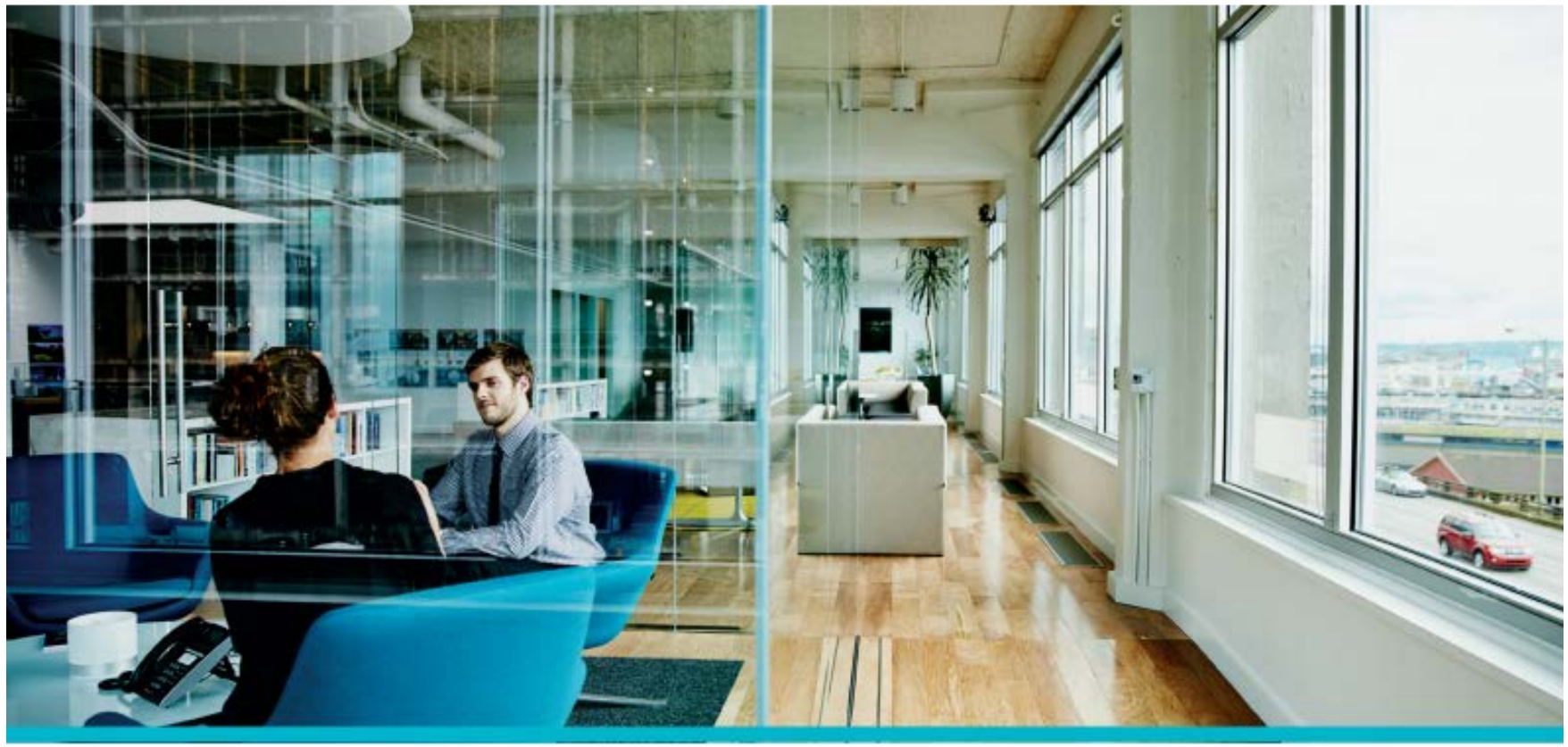
NATIXIS
INVESTMENT MANAGERS



MANAGING TALENT IN A CHANGING WORKPLACE

Natixis Future of Work Survey

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