



# Renewable Energy: Green Shoots for a Green Revolution

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## Fidelity Webcast

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# Welcome

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## Renewable Energy: Green Shoots for a Green Revolution



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# Agenda

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- 1 **Why Renewables Now?**
- 2 **Renewable Energy Today**
- 3 **Innovation: What are the Moonshots?**
- 4 **Lessons from the European Experience**
- 5 **Renewable Energy Growth Drivers**
- 6 **U.S. Utilities – Renewables Leaders & Laggards**
- 7 **Renewables Disruption to Fossil Fuels**

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## Why Renewables Now?

Stewart Glickman, CFA



# Renewables Have Momentum

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## A Few Years Changes A Lot

### IEA Medium-Term Report (October 2016)

*Renewables are expected to cover more than 60% of the increase in world electricity generation over the medium term, rapidly closing the gap with coal.*

### IEA Medium-Term Report (November 2020)

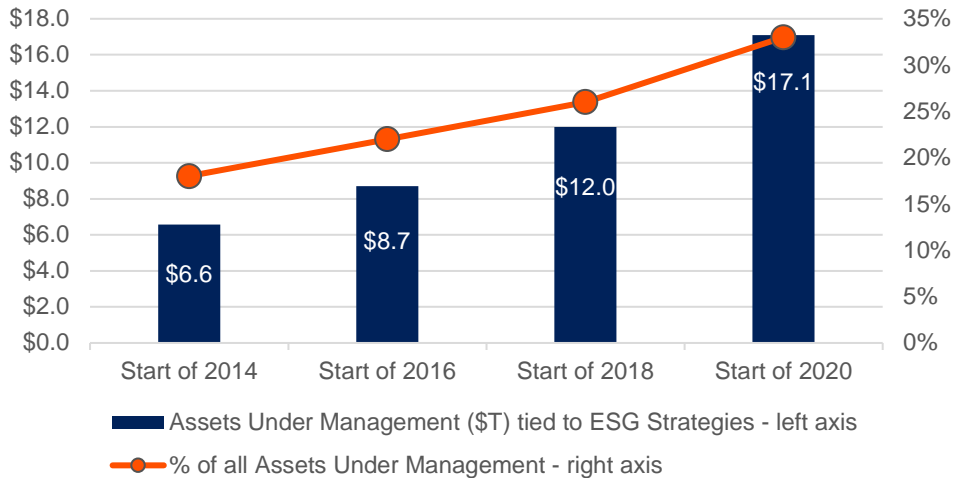
*Renewables are expected to meet 99% of the global electricity demand increase during 2020-25...By 2025, the share of renewables in total electricity generation is expected to be 33%, surpassing the coal-fired generation.*

Source: International Energy Agency (IEA)

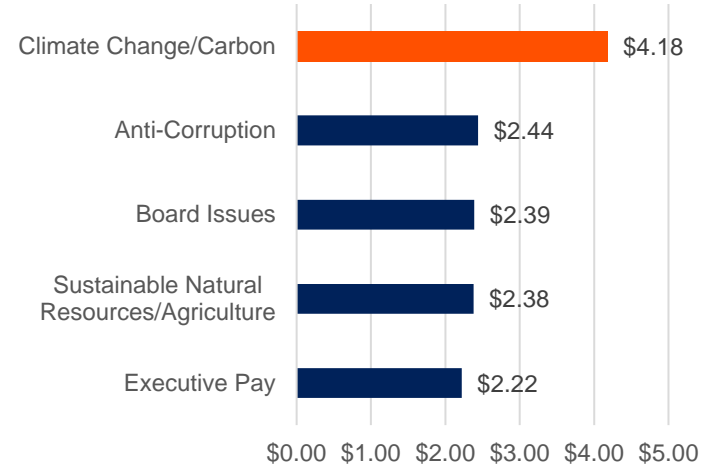
# ETF and Mutual Fund Managers are Paying More Attention

AUM tied to ESG factors is rising, especially to climate/carbon

### ESG Investing Trends, 2014-2020



### Top ESG Criteria AUM, 2020 (\$T)

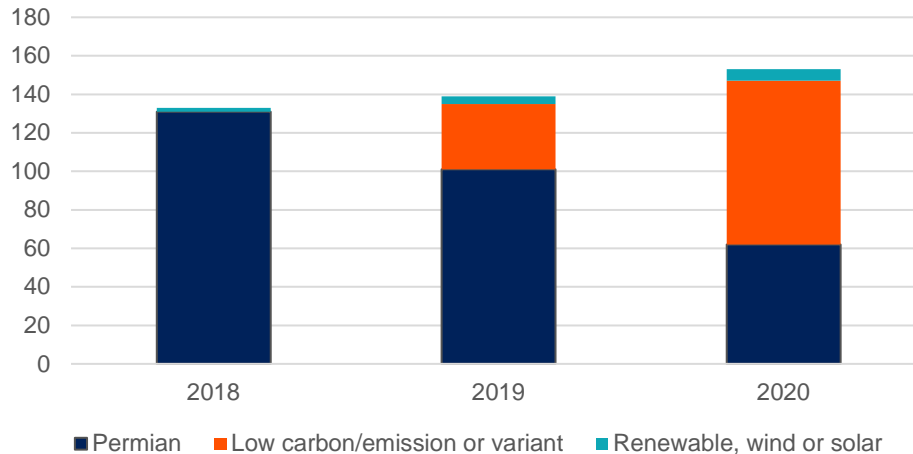


Source: US SIF

# Big Energy Companies are Paying More Attention Too

## Notice ExxonMobil's Abrupt Shift Starting in 2019

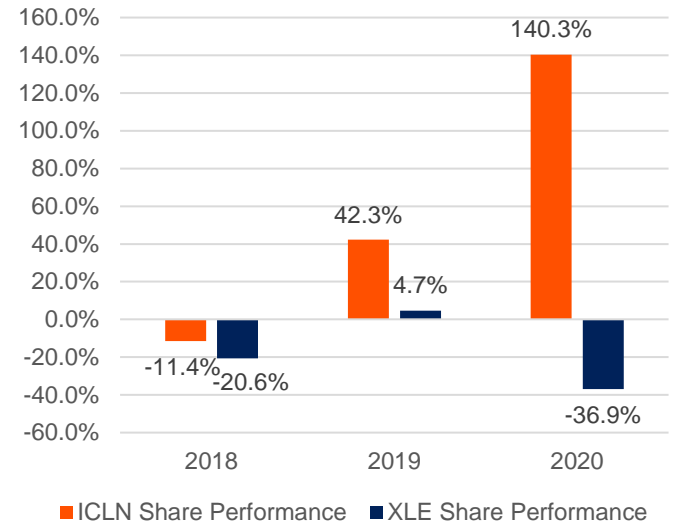
XOM Quarterly Earnings Calls  
No. of References to Key Terms, 2018-2020



Source: S&P Global Market Intelligence

Note: Low carbon/emission includes related terms such as carbon capture, low carbon, carbon tax

Energy ETF Comparison  
ICLN vs. XLE





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Renewable Energy  
Today

Andrzej Tomczyk



# Types of Renewable Energy

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Geothermal



Hydropower



Wind



Solar



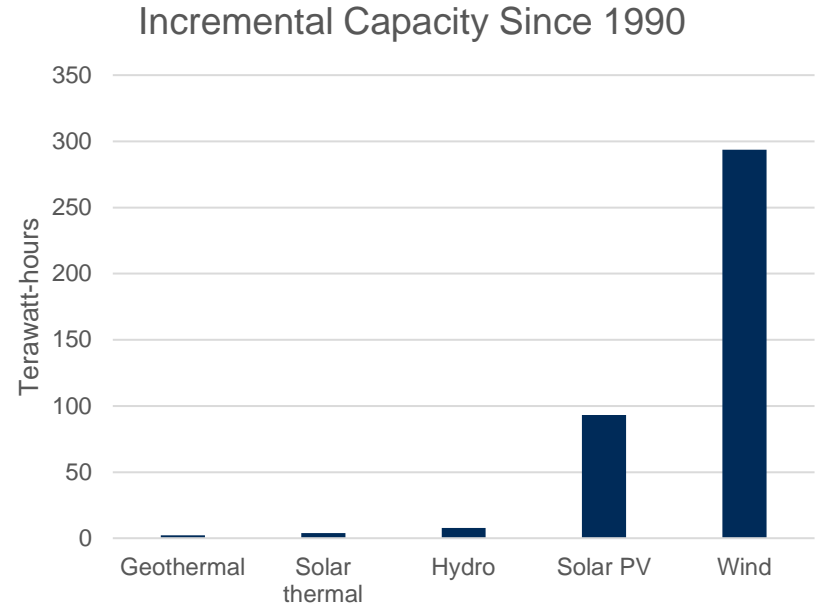
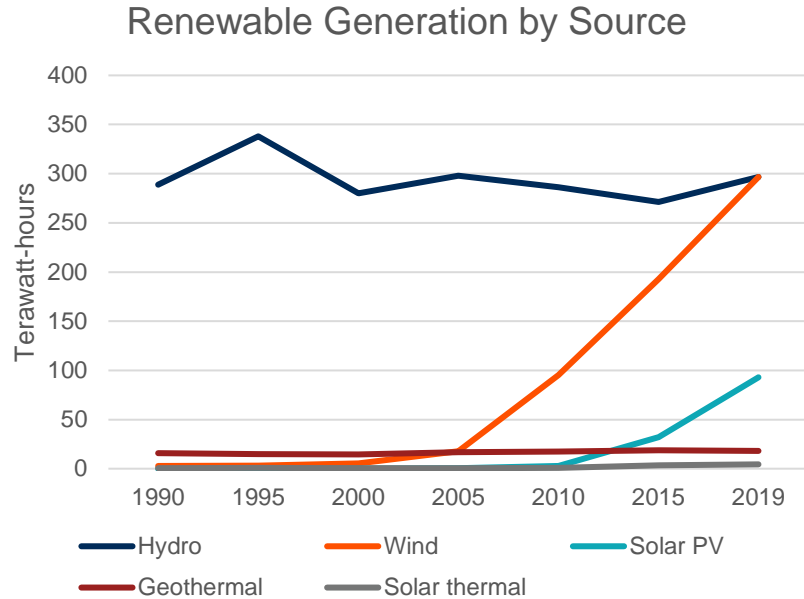
Biomass



Source: U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy

# Renewable Electricity Generation by Source

Hydropower, geothermal, and solar thermal are stagnant while wind and solar PV grow exponentially

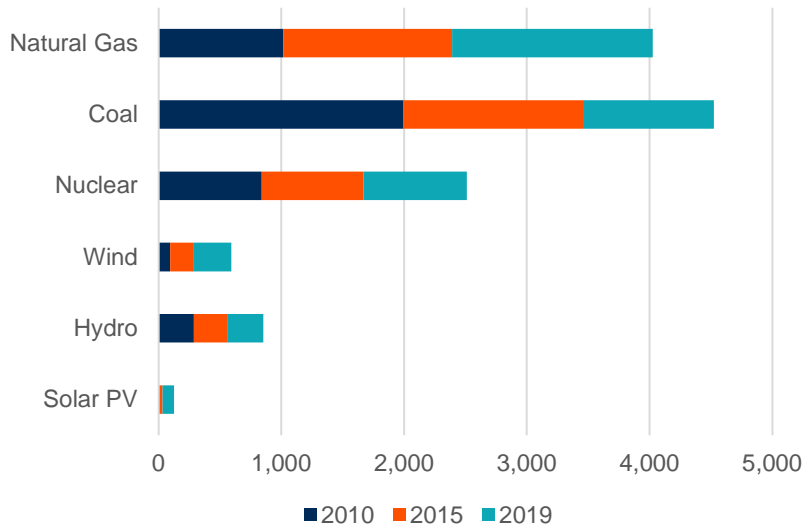


Source: CFRA, International Energy Agency (IEA)

# Renewable Energy vs. Other Fossil Fuels

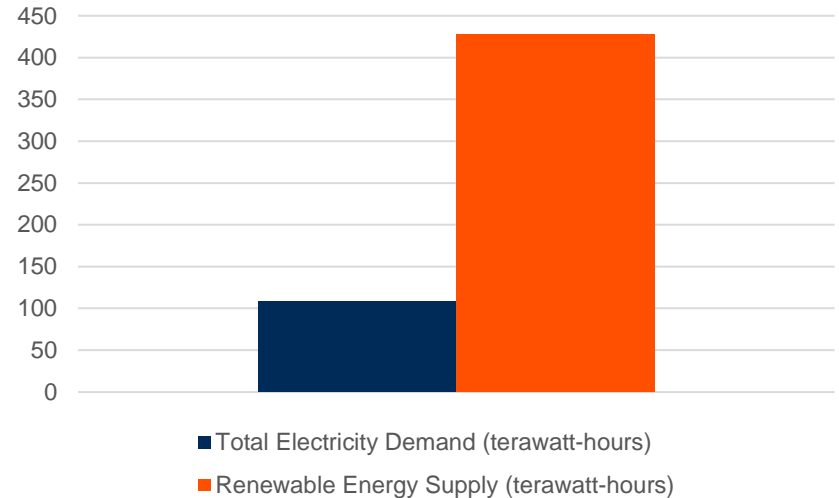
The U.S. still relies heavily on fossil fuels, but retiring coal will mean excess renewables' growth

### United States Electricity Generation by Source, Terawatt-hours



Source: CFRA, IEA

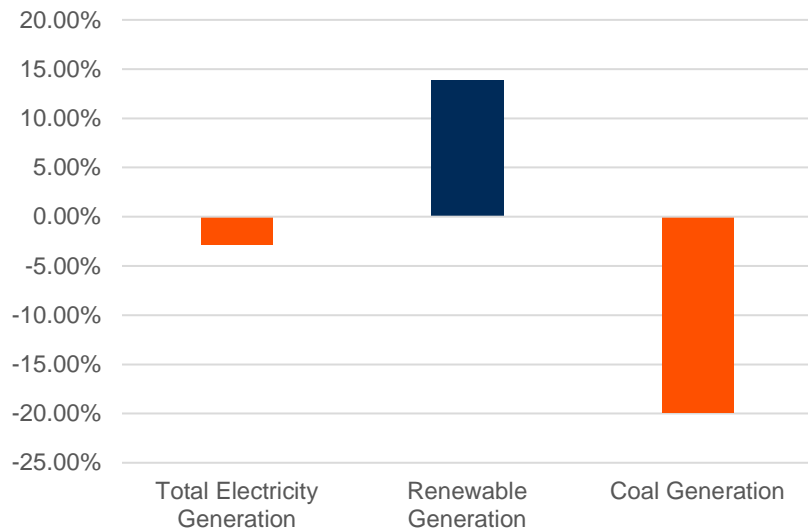
### U.S. Electricity Demand vs. Renewable Supply, 2019-2025



# Recent Trends

Renewable energy markets demonstrated their resiliency amid the Covid-19 pandemic

Generation Growth, 2019 to 2020



Source: CFRA, EIA

Index	1 Year Returns*
S&P 500	49%
S&P 500 Independent Power & Renewable Electricity Producers	93%
NASDAQ OMX Solar Index	175%
NASDAQ OMX Wind Index	70%

Source: CFRA, S&P Global Market Intelligence

\*March 25, 2020, 2020 through March 25, 2021



**CFRA**

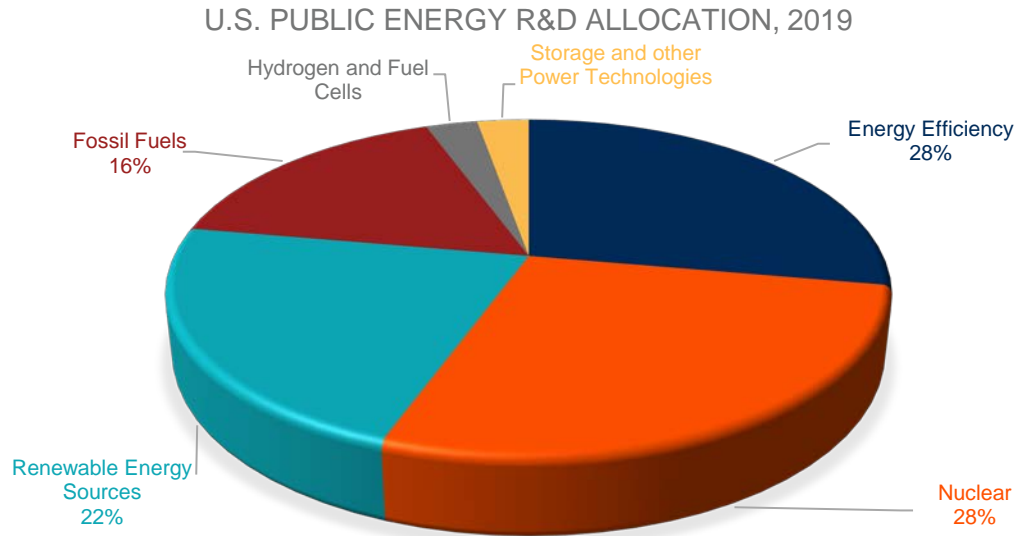
**Innovation:  
What are the Moonshots?**

Andrzej Tomczyk

# Renewable Energy - How do we get there?

Increasing R&D needed to enable innovations in clean energy technologies

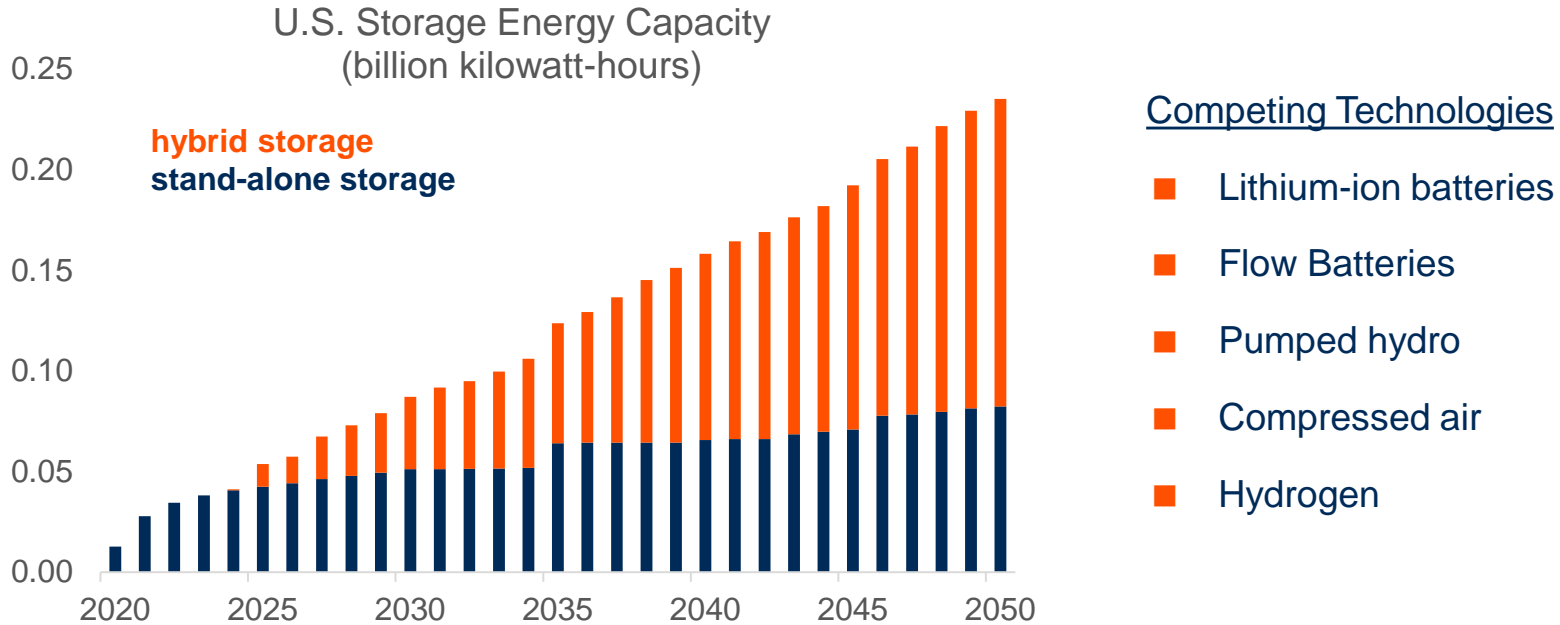
- 1 Energy Storage
- 2 Carbon Capture, Utilization, and Storage



Source: CFRA, IEA

# Energy Storage is Critical

If renewables are going to displace fossil fuels, efficient energy storage will play a large role

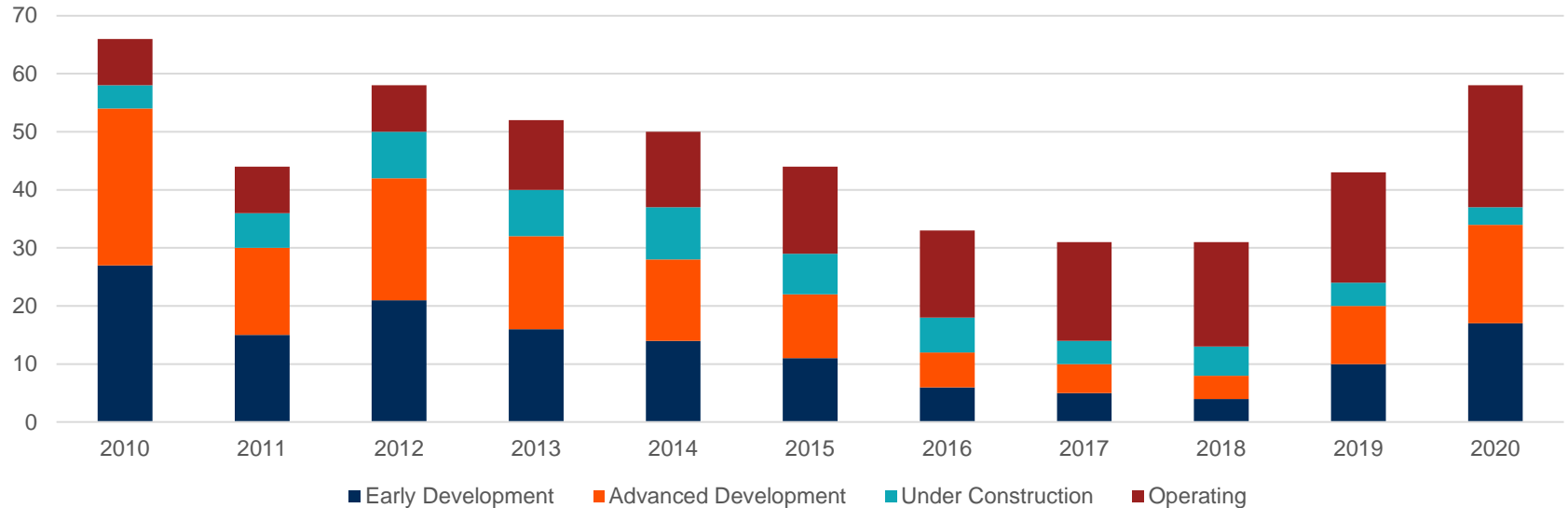


Source: EIA

# Carbon Capture, Utilization, and Storage (CCUS)

CCUS is largely considered too expensive, but project development has been on the rise since 2018

## Global CCUS Facilities Operating and in Development



Source: CFRA, IEA



# CFRA

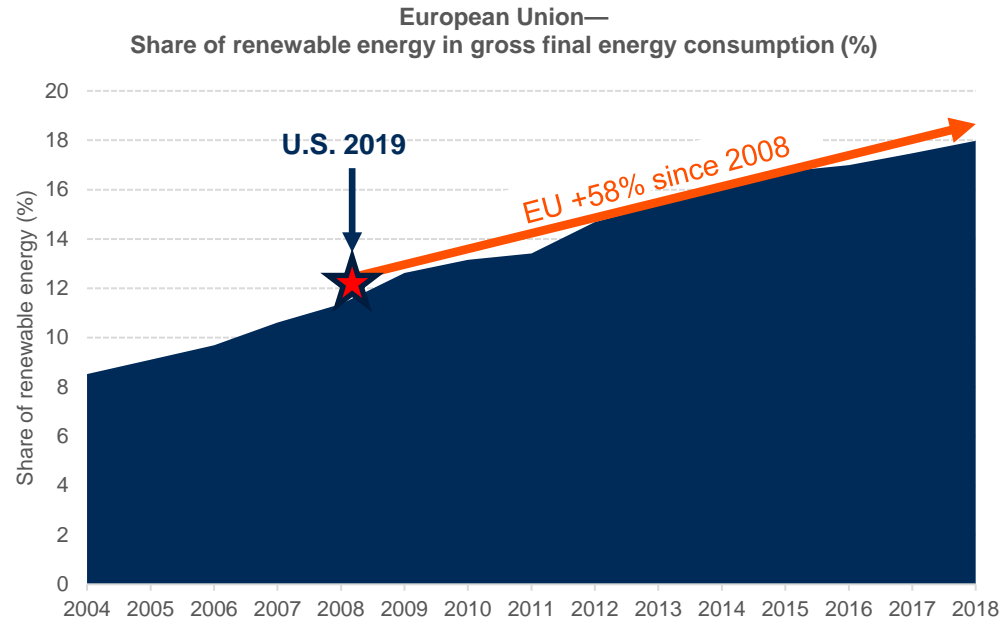
## Lessons from the European Experience

Paige Meyer



# Lessons from Europe

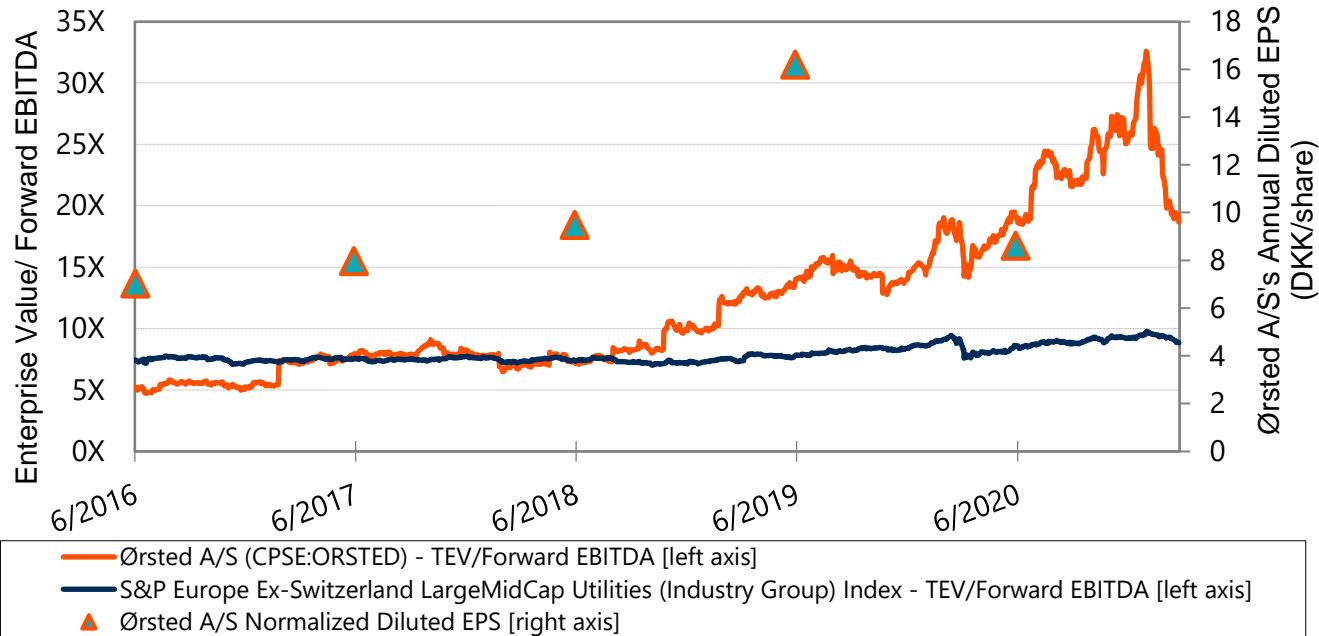
Europe is ~10 years ahead of the U.S. in the green energy transition



Source: CFRA, Eurostat, U.S. Energy Information Administration

# Lessons from Europe

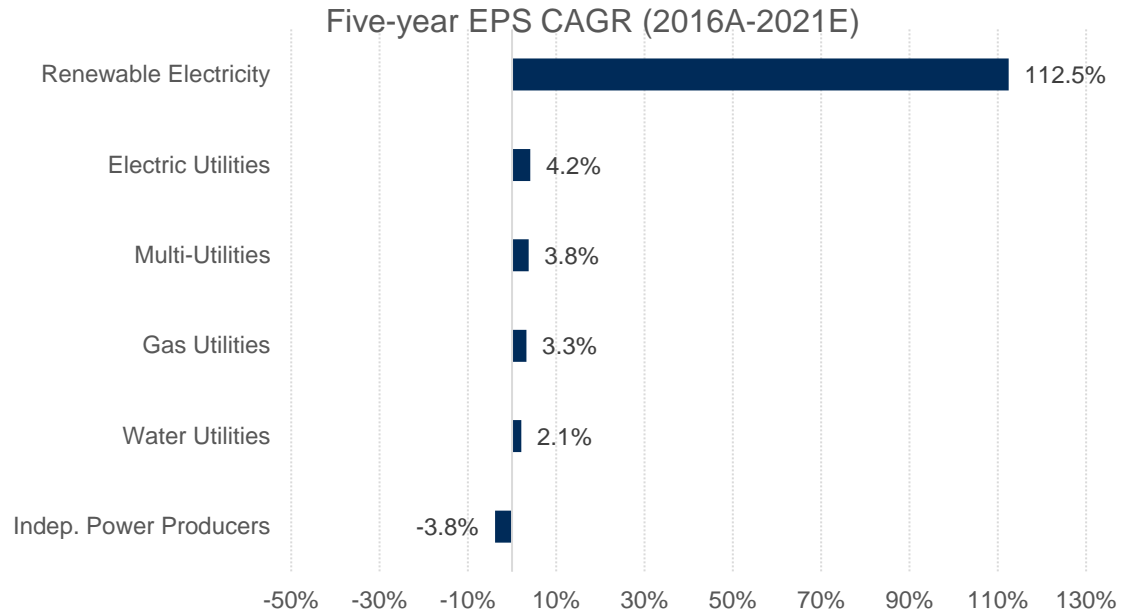
## Orsted A/S's valuation surges 255% since IPO in June 2016



Source: CFRA, S&P Global Market Intelligence

# Lessons from Europe

## Renewable electricity providers performance outpaces established utilities



Source: CFRA, S&P Global Market Intelligence. Data as of March 25, 2021.

# Lessons from Europe

Renewable electricity sub-industry is rewarded by the market, while Electric valuation widens

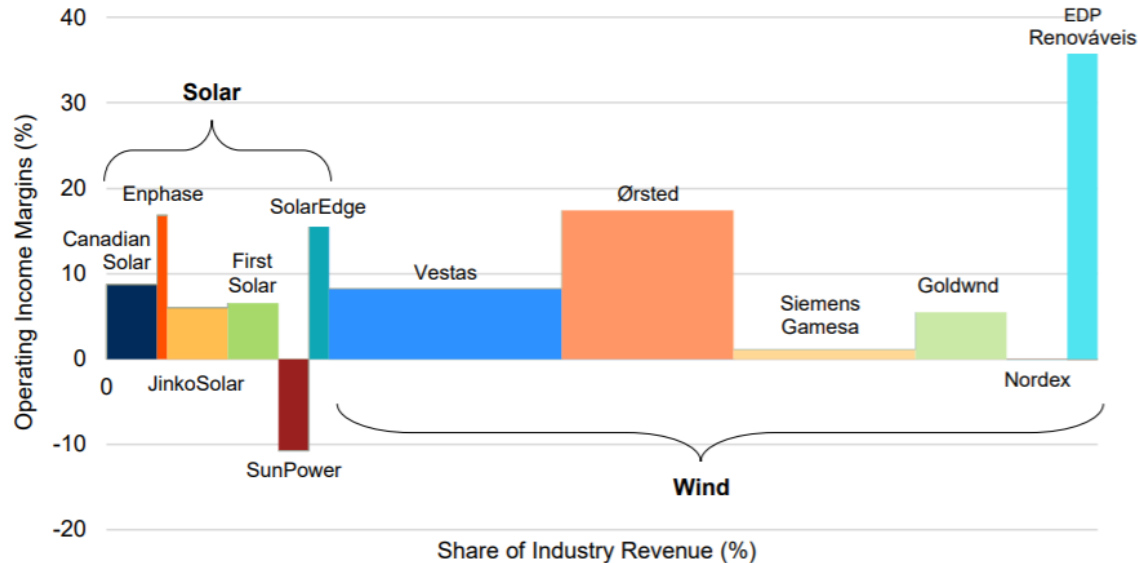
Sub-Industries	Current Median Price/ 2021 Earnings	Median Forward P/E Premium (Discount) vs. 10-Year Historical Forward Average
Renewable Electricity	36.5	25%
Electric Utilities	16.3	36%
Multi-Utilities	15.3	7%
Gas Utilities	15.5	17%
Water Utilities	19.4	5%
Independent Power Producers	17.1	22%
S&P Europe Ex-Switzerland LargeMidCap Utilities (Sector) Index Median	16.7	19%

Source: CFRA, S&P Global Market Intelligence. Data as of March 25, 2021.

# Global Renewables Scoreboard

## Leaders: Entities with the most renewables assets

PROFIT SHARE MAP OF MAJOR GLOBAL SOLAR AND WIND PLAYERS\*



Source: CFRA, S&P Global Market Intelligence. 2019 data.



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Renewable Energy  
Growth Drivers

Andrzej Tomczyk

# What's Driving Renewable Energy?

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**1** U.S. Public Policy

**2** ESG Investing Trends

**3** Better Economics



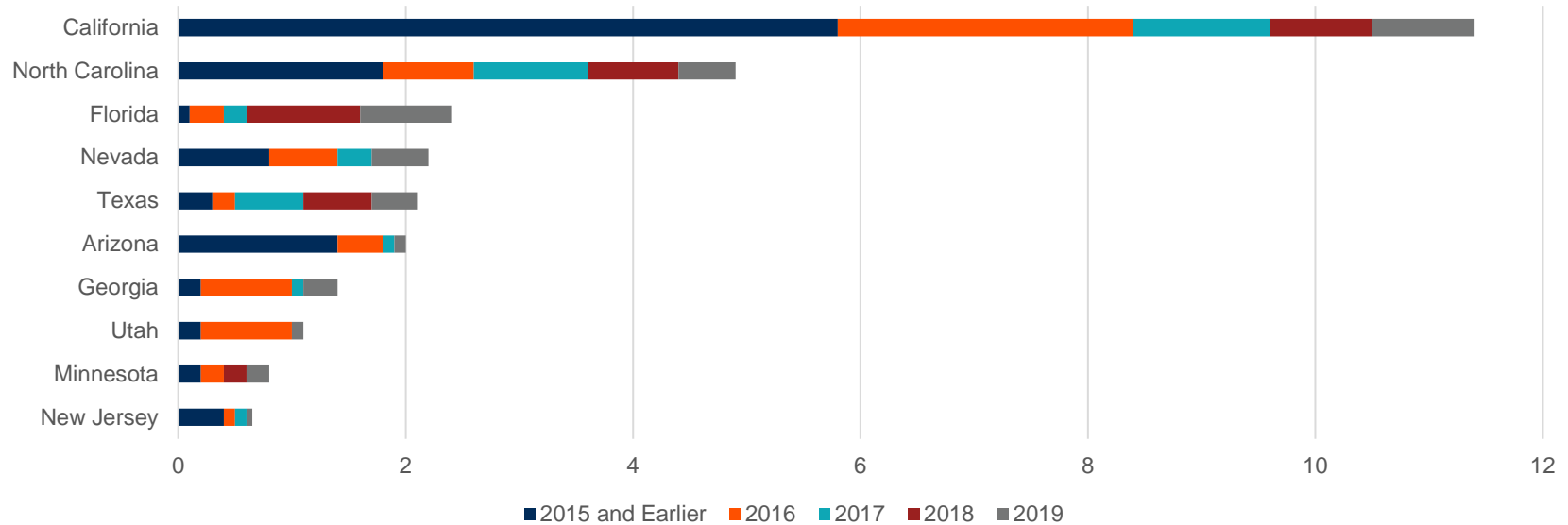
Source: CFRA



# Utility-Scale Policies & Programs

Some states have better clean-energy incentives than others; are we due for more federal policy?

Top 10 States for Utility-Scale Solar PV Capacity Additions (Gigawatts)



Source: CFRA, Energy Information Administration (EIA)

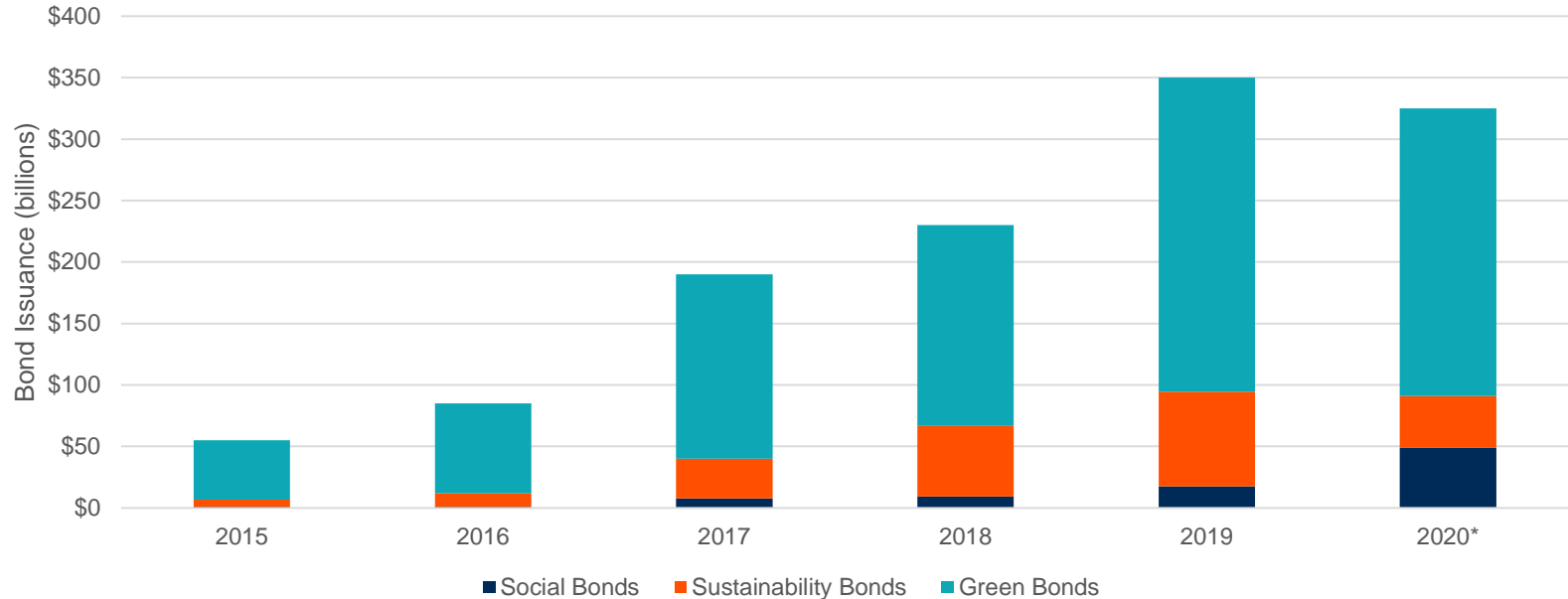
# Utilities Operating in Favorable Solar Jurisdictions

State	Utility Company	Solar Capacity / Total Capacity	Forward P/E*	Five-Year Average Forward P/E	Premium (Discount)
Florida	NextEra Energy (NEE)	17.8%	29.5x	23.9x	23.0%
Texas	PNM Resources (PNM)	10.0%	21.2x	21.4x	(0.01%)
Florida	Emera Incorporated (EMA)	6.7%	19.6x	18.0x	8.9%
North Carolina	Duke Energy (DUK)	5.1%	18.4x	17.6x	4.5%
Georgia	The Southern Company (SO)	3.3%	18.6x	17.3x	7.5%
Arizona	Pinnacle West Capital (PNW)	3.1%	16.1x	18.2x	(11.5%)
Minnesota	Xcel Energy (XEL)	1.9%	22.3x	20.7x	7.7%
California	Edison International (EIX)	1.9%	13.4x	15.5x	(13.5%)
Minnesota	ALLETE, Inc. (ALE)	1.0%	19.7x	20.3x	(3.0%)
<b>Median Solar Capacity</b>		<b>3.3%</b>	<b>Median Discount</b>		<b>(4.5%)</b>

Source: CFRA, S&P Global Market Intelligence, \*P/Es as of March 25.

# ESG Investing Boom

Socially responsible investing continues to be top-of-mind; accelerated ESG allocations anticipated



Source: CFRA, MSCI, \*Data through October 2020

# Better Economics

New solar and wind projects are now cheaper than traditional forms of energy generation

Power Plant Type	Levelized Cost of Electricity (LCOE)
Solar PV	\$29.04
Onshore Wind	\$31.45
Geothermal	\$34.16
Natural Gas	\$34.51
Offshore Wind	\$115.04
Battery Storage	\$121.84
Combustion Turbine	\$199.01

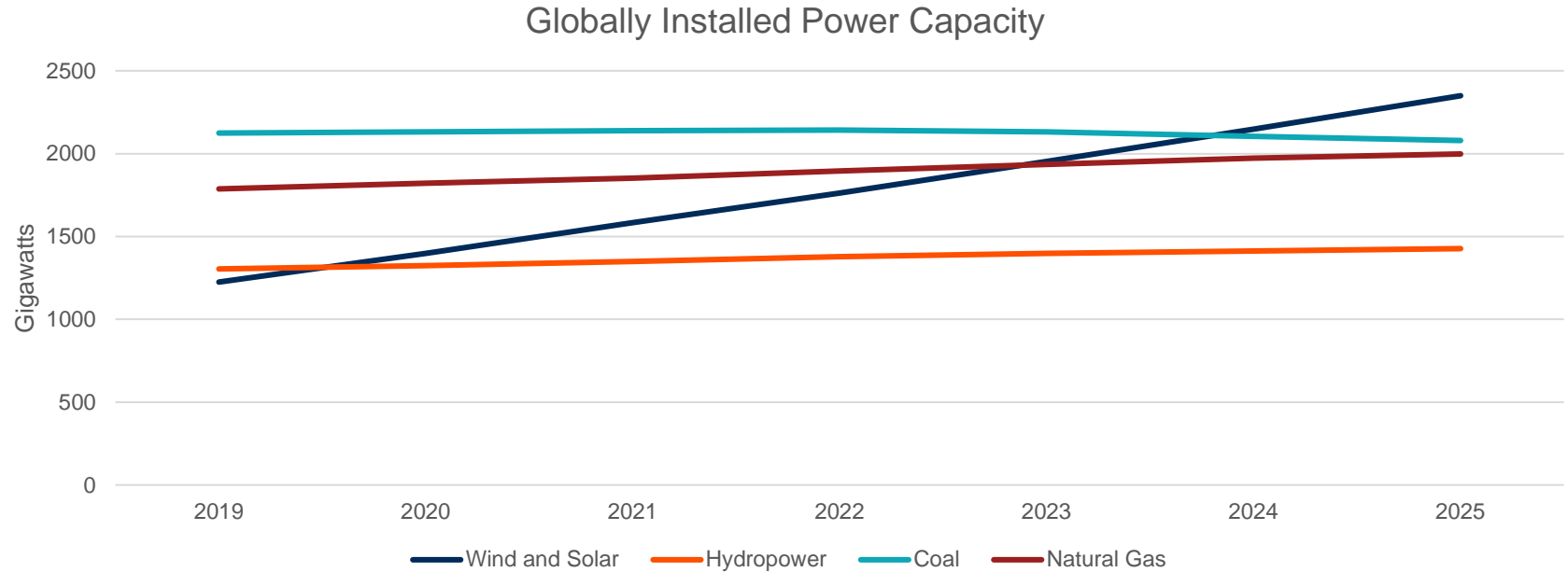
## Cost Declines from 2010 to 2020

- Solar PV -82%
- Onshore wind -40%
- Offshore wind -29%

Source: CFRA, Energy Information Administration (EIA)

# Projected Growth

Globally installed wind and solar projected to surpass natural gas and coal by 2023 and 2024, respectively



Source: CFRA, IEA



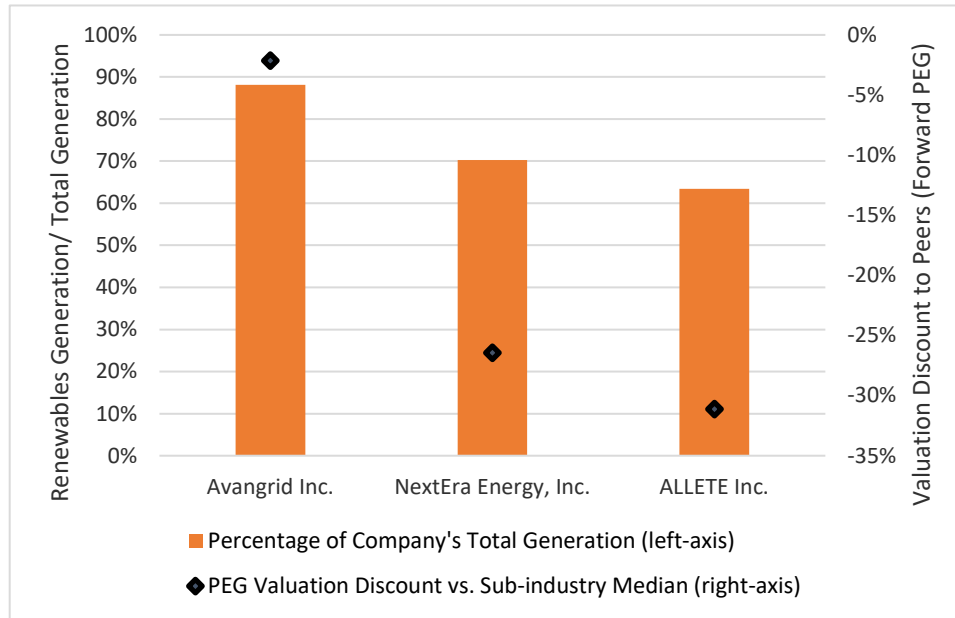
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**U.S. Utilities – Renewable  
Leaders & Laggards**

Paige Meyer

# U.S. Utilities Scoreboard

Leaders: Recommendations with high percentage of generation from renewables assets

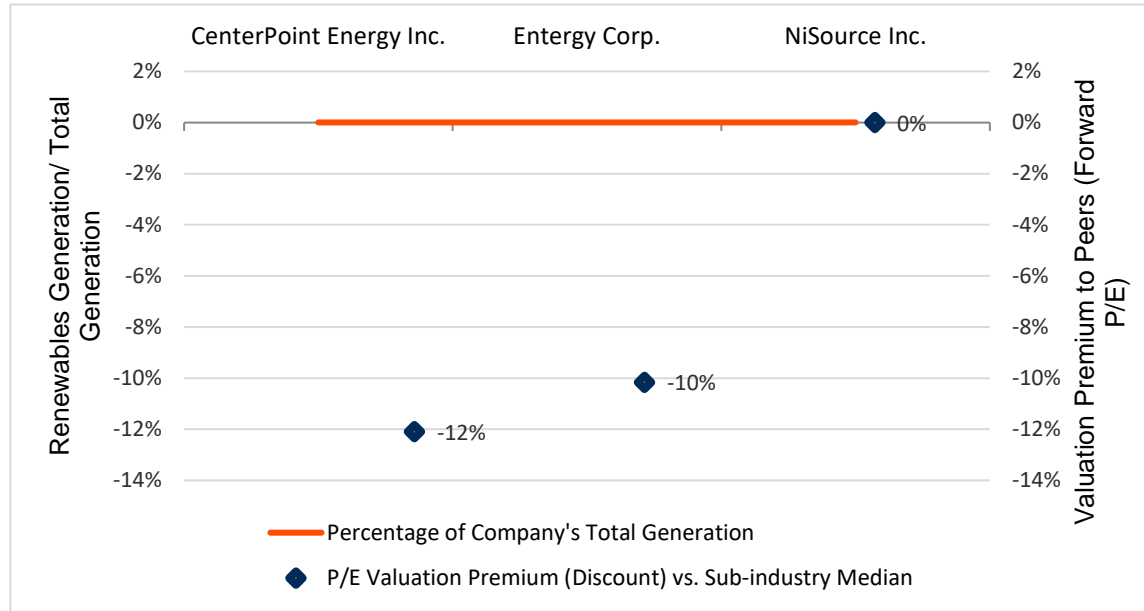


Source: CFRA, S&P Global Market Intelligence. Data as of March 25, 2021.

\*Includes utilities with more than 2,000 MW of total owned generation capacity

# U.S. Utilities Scoreboard

## Laggards: Lowest percentage of generation from renewables assets



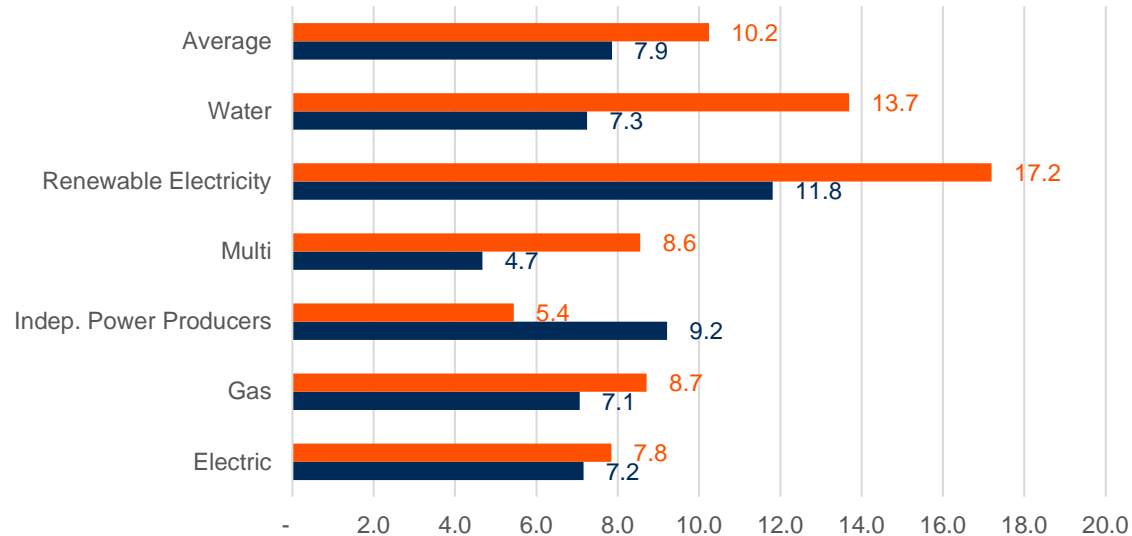
Source: CFRA, S&P Global Market Intelligence. Data as of March 25, 2021.  
 \*Includes utilities with more than 2,000 MW of total owned generation capacity  
 \*\*Uses Forward P/E due to negative values resulting in a not meaningful PEG



# U.S. Utility Valuations by Sub-industry

Renewable Electricity valuations have run up; look for opportunities within Electric Utilities and IPPs.

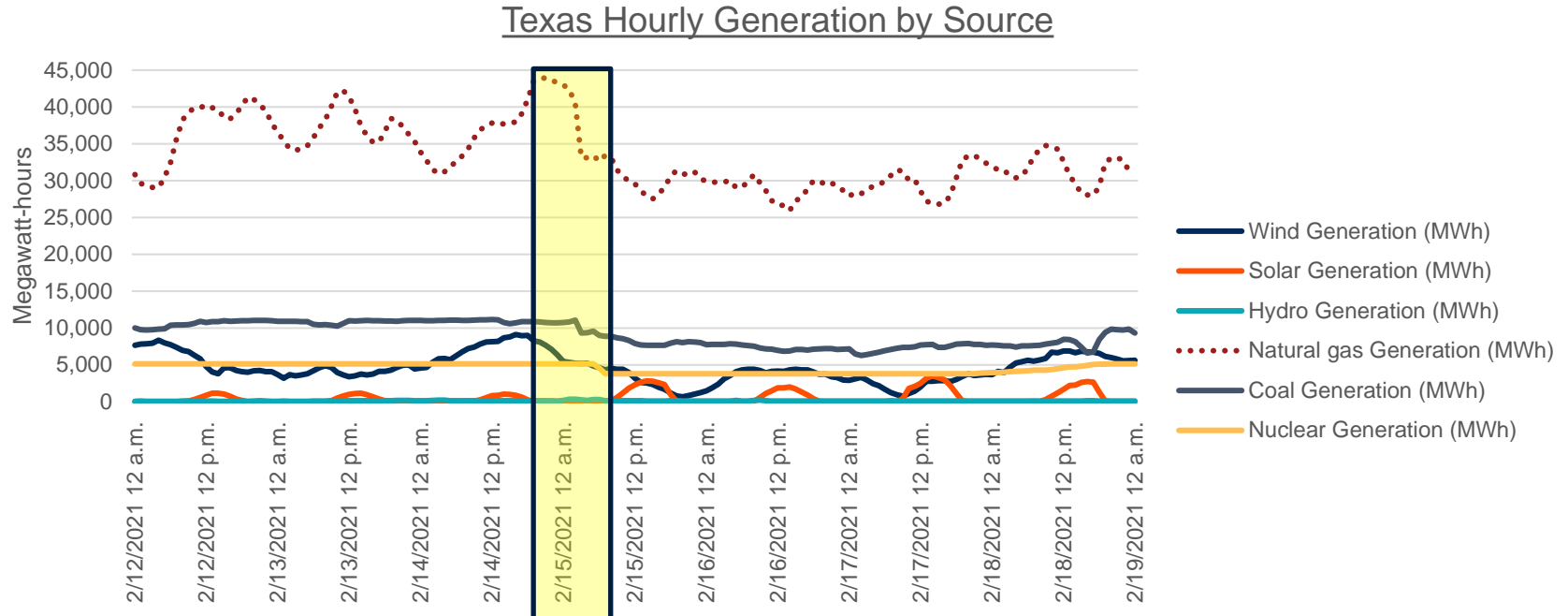
Current U.S. vs. Europe P/ 2021 CF



Source: CFRA, S&P Global Market Intelligence. Data as of March 25, 2021.

# Do the recent blackouts in Texas change the renewable energy outlook?

CFRA's view: No!



Source: CFRA, Energy Information Administration

# Precipitous generation decline at 3am on February 15th

Fossil fuel generation capacity contributes 98% of the peak drop

Generation Source	Total MW Decline	Percent Decline from Previous Hour	Percentage of Total 3am Decline
Natural Gas	(7,309)	-18%	-79%
Coal	(1,751)	-16%	-19%
Hydro	(96)	-28%	-1%
Wind	(51)	-1%	-1%
Other	(15)	-41%	0%
Solar	0	0%	0%
Nuclear	5	0%	0%
<b>Total</b>	<b>(9,217)</b>	<b>-15%</b>	<b>100%</b>

Source: CFRA, Energy Information Administration

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## Renewable Disruption to Fossil Fuels

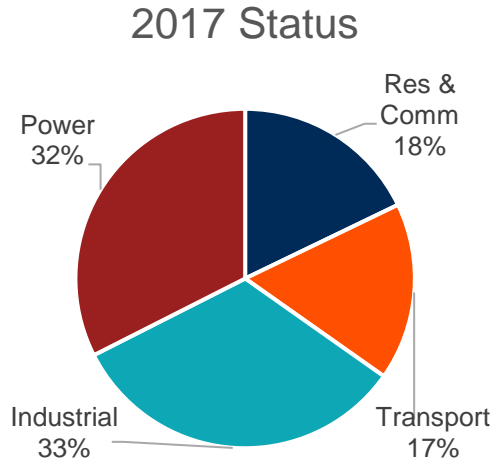
Stewart Glickman, CFA



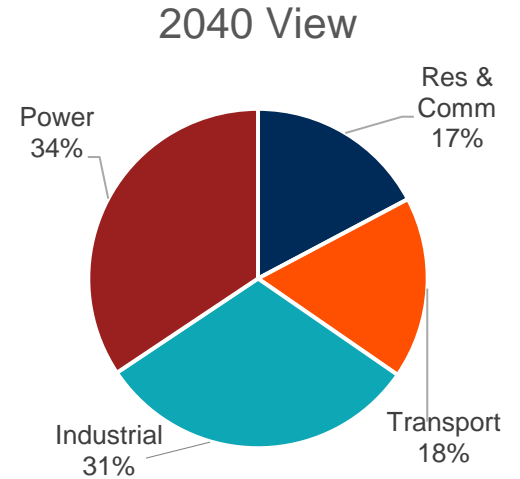
# Customer Demand: Major Sources

Power takes the reins, but Industrials remains a close #2, in XOM's View

In 2017, Power & Industrial are rivals for main source of demand



...but by 2040, Power is edging ahead



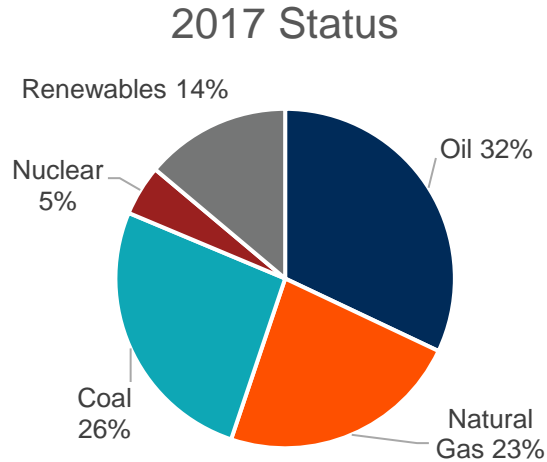
Exxon Mobil Data Book, March 2019

Note: Based on primary energy demand; 2017 data latest available

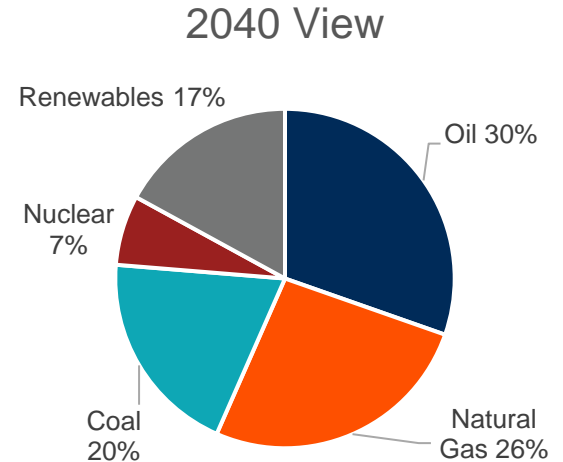
# Industry View: Energy Sources Needed to Meet Demand in 2040

Short Version: Coal Declines, Gas and Renewables Both Rise, in XOM's View

In 2017, Oil Dominates, With Coal Not Far Behind...



...but by 2040, Renewables are only three percentage points higher



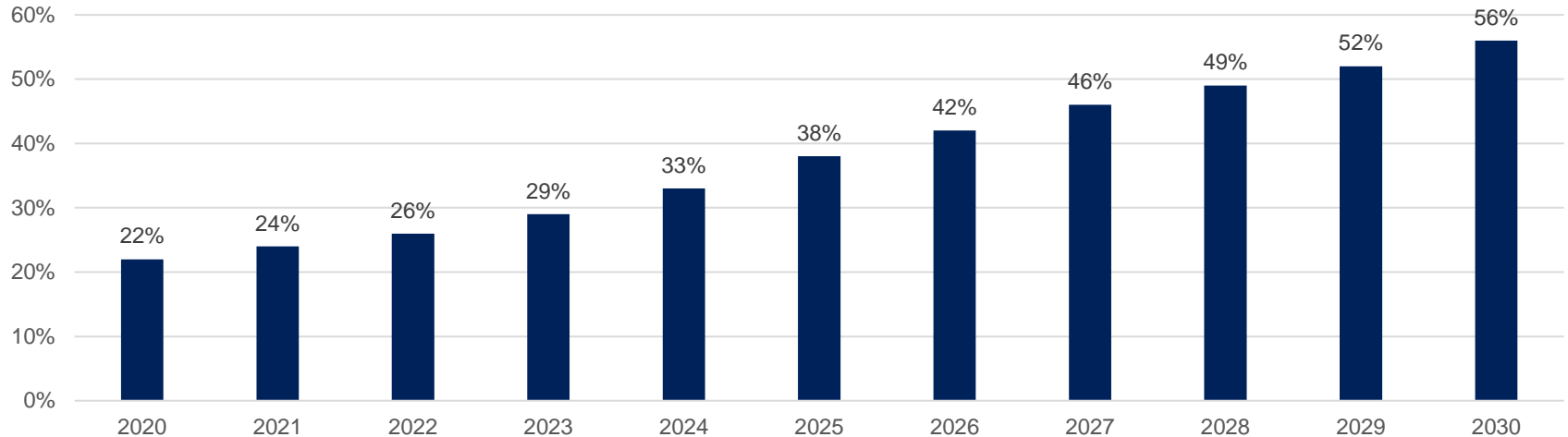
Exxon Mobil Data Book, March 2019

Note: Based on primary energy demand; 2017 data latest available

# How Much Can Renewables Disrupt Transportation End-Markets?

Non-ICE Vehicles Projected to Hit Global Majority of New Unit Sales by 2029

Global Car Sales – Projected Percentage of Units with Non-ICE Powertrains, 2020-2030



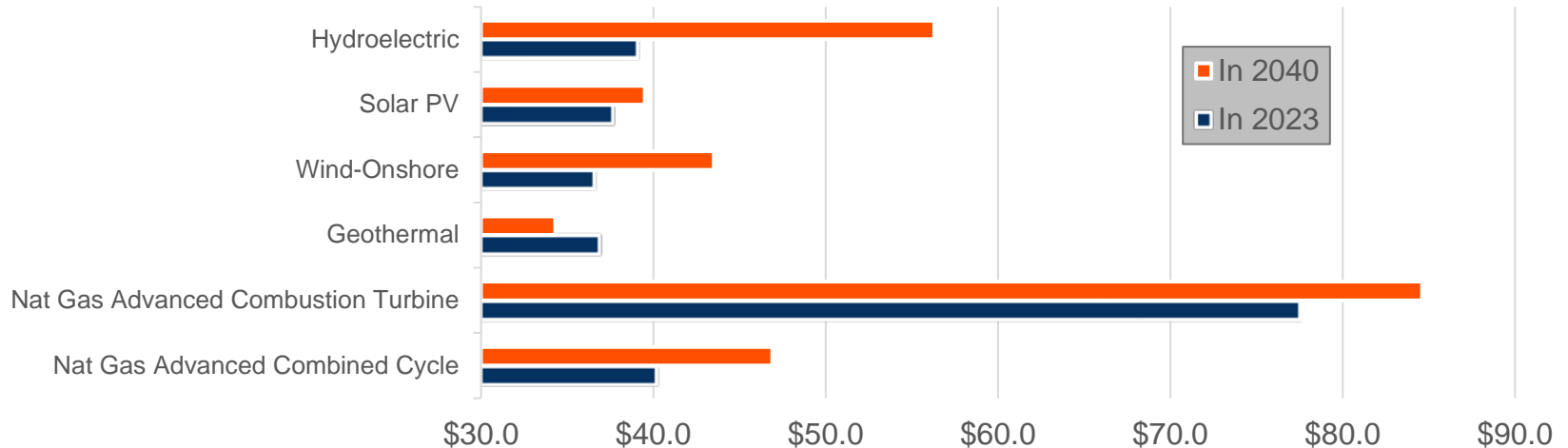
Source: BCG

Note: Non-ICE cars include battery electric vehicles and hybrid vehicles. ICE = internal combustion engine

# Competitive Threats to Fossil Fuels: Solar and Wind Power

In the power market, renewables likely to pose a threat

Estimated Levelized Cost of Electricity for New Generation Resources  
By Technology Type and Entry Year (in 2018 \$/MWh)



Source: U.S. EIA, Annual Energy Outlook 2019

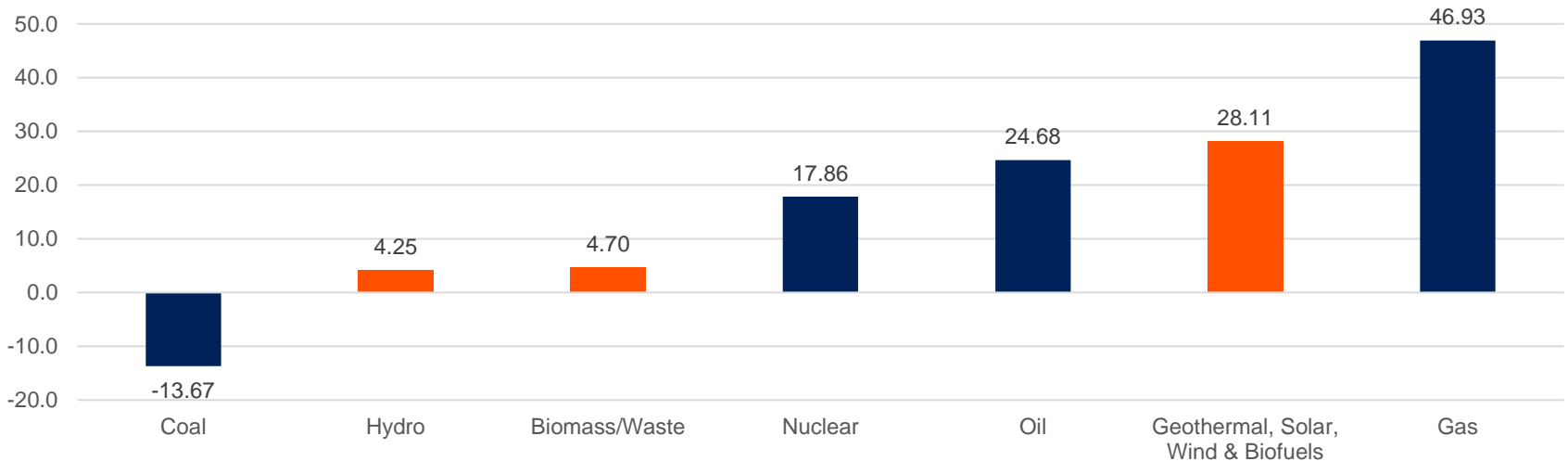
Note: Estimated costs are capacity-weighted



# Renewables Rising in Importance Over the Long Term

XOM: Renewables should be 2<sup>nd</sup> largest source of incremental energy demand through 2040

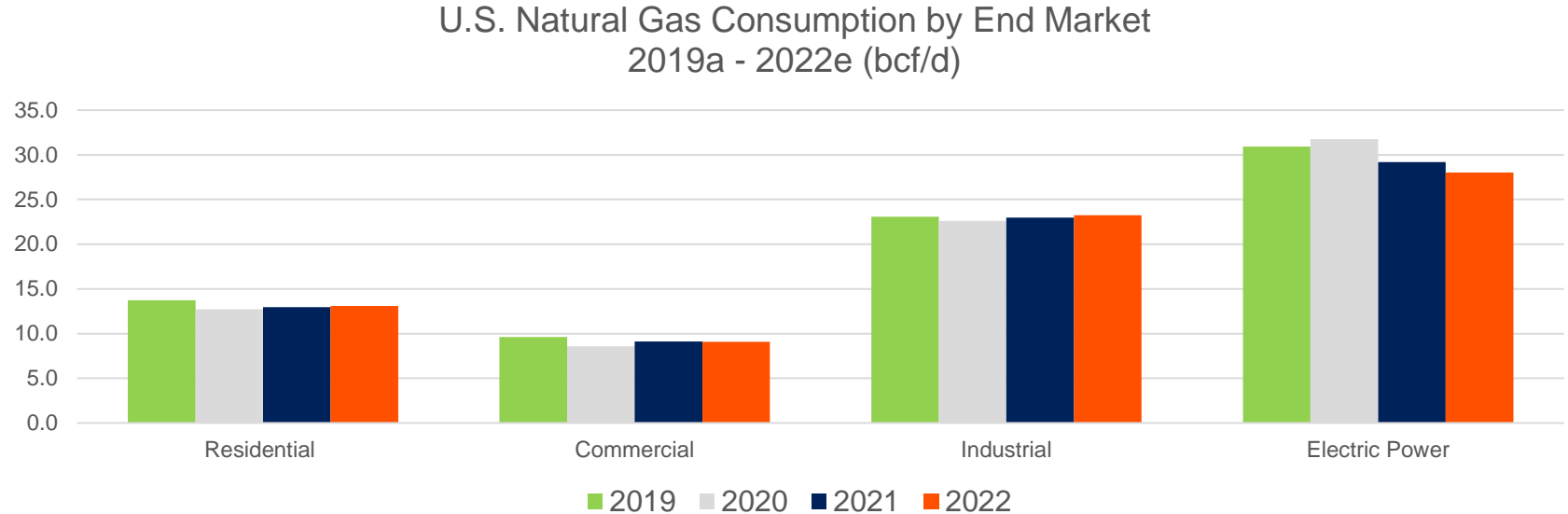
Incremental Global Demand for Energy by Source  
2040 vs. 2017 (quadrillion BTUs)



Source: Exxon Mobil Data Book 2019

# U.S. Natural Gas has High Exposure to Power Markets

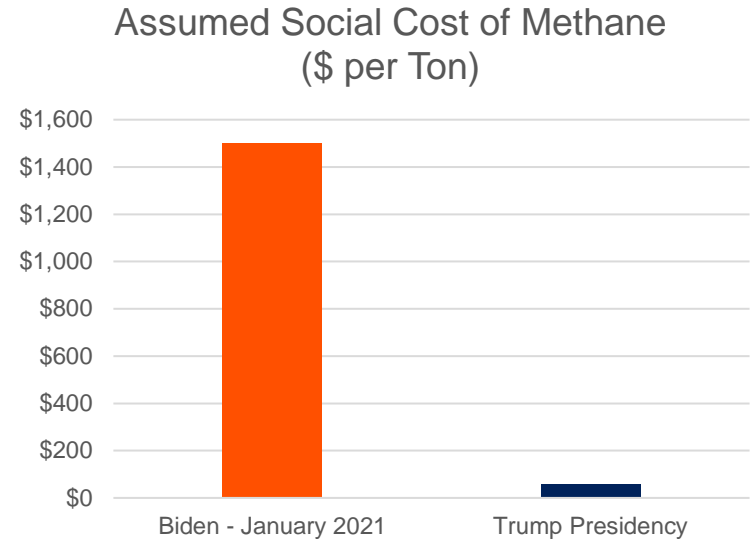
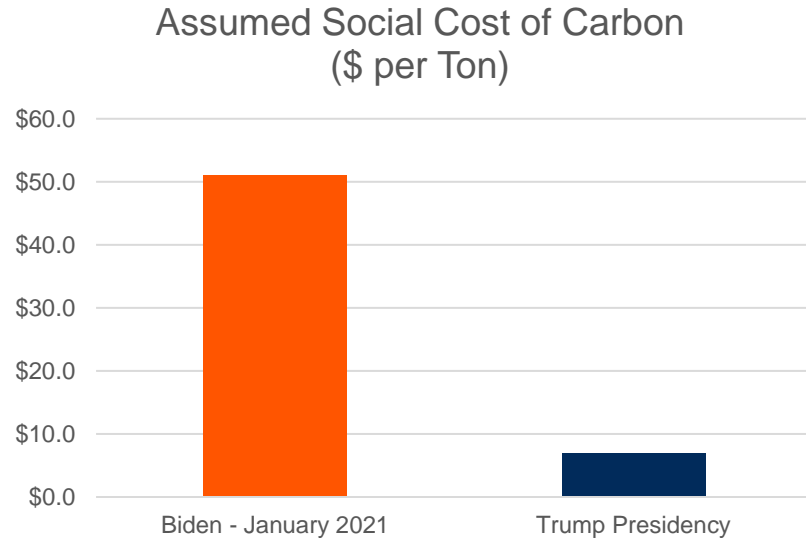
Power markets represent about 40% of annual demand for natural gas



Source: U.S. EIA, February 2021

# Putting a Price on Greenhouse Gases: Biden vs. Trump

## Biden Administration Taking Broader View of Climate Impact than Trump Administration



Source: Scientific American, March 2021

# Possible Federal Regulatory Actions Affecting Oil & Gas

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- Federal Carbon Tax
  - President Biden requested further review of social cost assessment
  - ExxonMobil already on record as stating it would welcome a carbon tax of \$40 per ton
- Enhanced Federal Regulations on Vented or Flared Methane
  - Dry gas is sometimes flared into the atmosphere by oil-focused producers
- Window of Opportunity...to 2022
  - Midterm elections could turn the Senate back to the GOP

Sources: Scientific American, Bloomberg News

# Renewables Impact on Fossil Fuels

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- **Upstream: Positive Short Term, Negative Long Term**
  - Near term, more investment to renewables coupled with less investment to fossil fuels sets up another shortage – and rising prices for fossil fuels
  - Longer term, renewables could be more disruptive to fossil fuels, depending on innovation
- **Midstream: Positive for Gas, Negative for Crude Oil**
  - More stringent regulations on flared natural gas would boost demand for gas infrastructure
- **Refining: Negative**
  - Federal taxes on greenhouse gases could adversely affect refiners
  - Refiners are boosting renewables (e.g., renewable diesel), but small part of their portfolio

Source: CFRA



Q&A

# Renewable Energy: Green Shoots for Green Revolution

# Thank you!



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