

# Trump is Not the Problem

New York Energy Forum

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# Headlines from Washington stoke fears

**Trump Victory Batters Solar and Wind Stocks, Bolsters Coal Shares**

Washington Post, 11/9/16

**Will a Trump Presidency Mean the End of America's Solar Energy Industry?**

GovTech.com, 11/10/16

**Trump May Be Bad News for Clean Energy**

Fox Business News, 11/14/16

**Trump May be Good for Oil, Trouble for Renewables**

USA Today, 1/1/17

**Trump's victory creates uncertainty for wind and solar power**

AP, 1/22/17

**Trump pumps brakes on Obama-era fuel efficiency standards**

Fox, 3/15/17

**For Clean Energy, a Hazy Path Ahead Under Trump**

San Jose Mercury News, 2/3/17

**Former Trump Aide Says Wind and Solar Research Will Be Cut**

TIME, 2/24/17

**Renewables missing from Trump's energy plan**

Computerworld, 2/8/17

**Trump's Budget Would Torpedo Obama's Investments in Climate Change and Clean Energy**

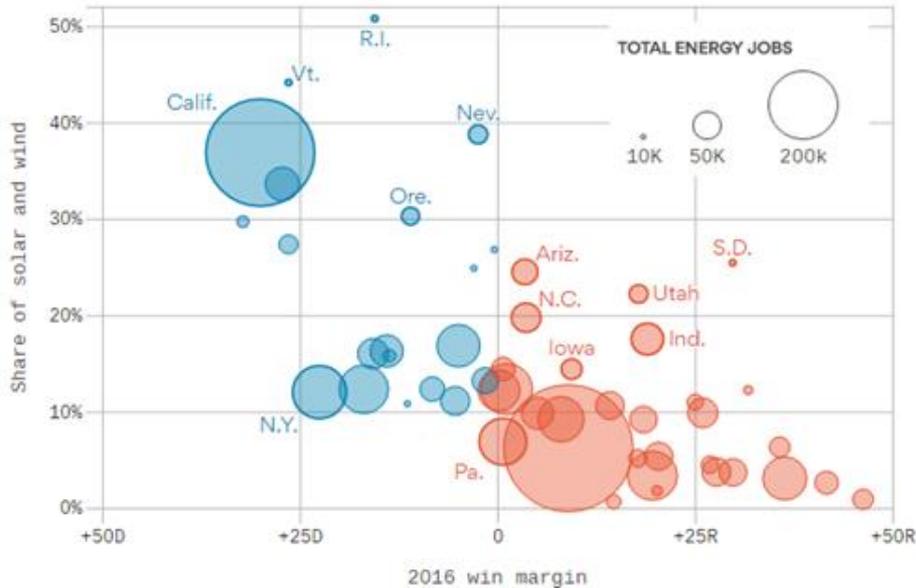
The Washington Post, 3/16/17

# Some measure of uncertainty is appropriate

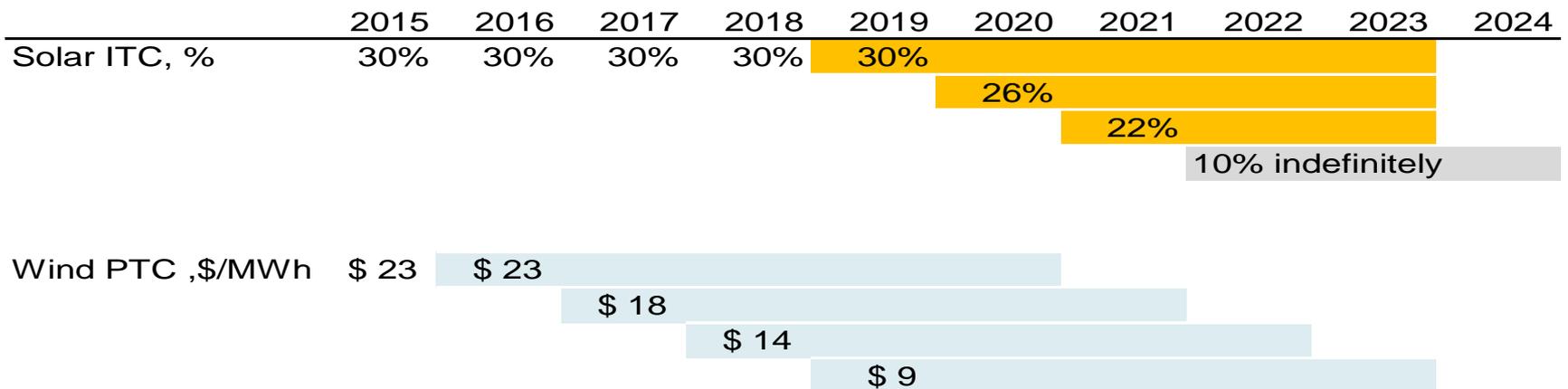
- Global climate commitments and national **carbon mitigation goals face greatest headwinds**
  - US appears likely to back out of Paris climate accord
  - Clean Power Plan will most likely not advance
  - EPA GHG endangerment finding remains a factor
  - Potential demand impacts 10-15+ years out
- Pathways exist to **rollback renewable tax credits**
  - 2015 bipartisan extension includes statutory phase-out
  - Easiest pathway to rollback is via budget reconciliation
  - Lower corporate tax rate could shrink pool of available tax equity supply
  - Solar ITC may face bigger headwinds on Fair Market Value challenge
- **Broader tax reform** impacts are a mixed bag
  - Some benefits, some penalties to project returns
  - Border adjustability an important question mark
  - Some impact to cost and availability of tax credit financing
- **Energy R&D** funding is at risk
- **FERC** commissioner changes on tap

# Political reality is less intimidating

Solar and wind jobs as share of all energy jobs by 2016 election result

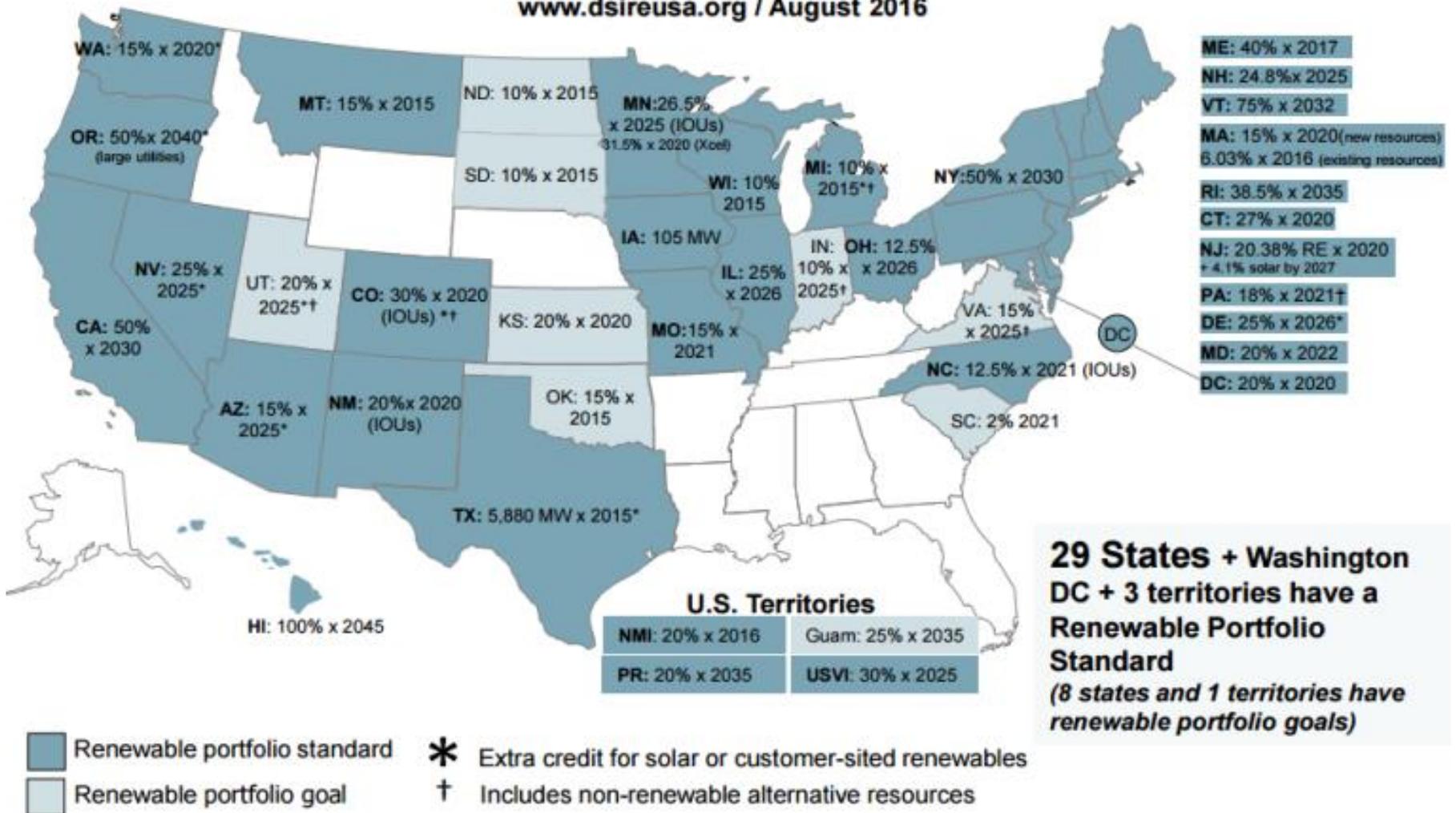


Trump Infra Priorities by Sector	# of projects
Highways and Bridges	11
Inland Waterways	8
<b>Electricity and Transmission</b>	<b>6</b>
Mass Transit	6
Water	4
Airports	3
Ports	3
National Initiative	2
Oil and Gas	2
Rail	2
Inland Waterways/Electricity	1
Mass Transit/Rail	1
Water/Inland Waterways	1



# States matter more

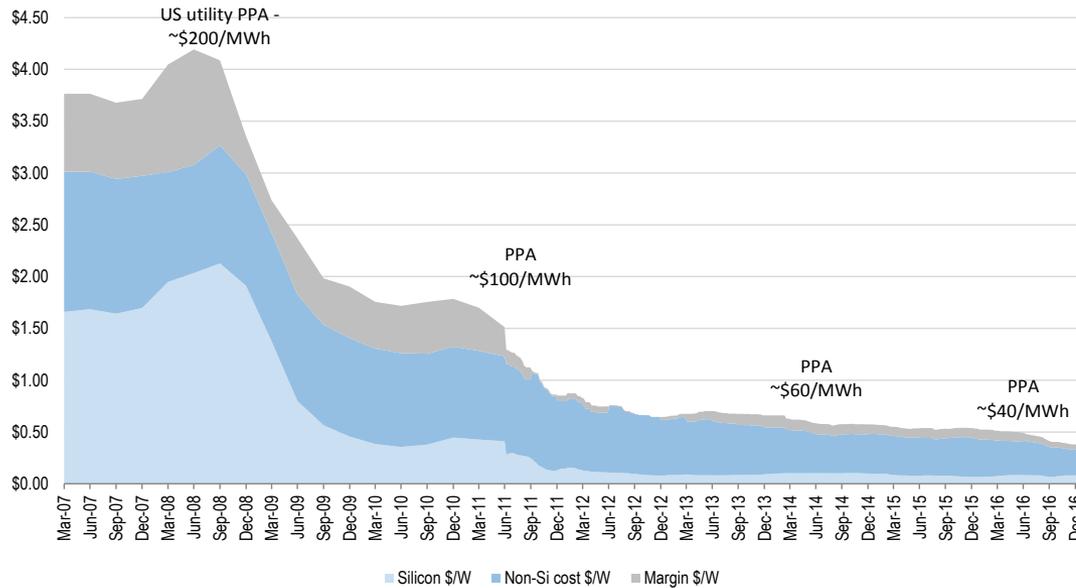
www.dsireusa.org / August 2016



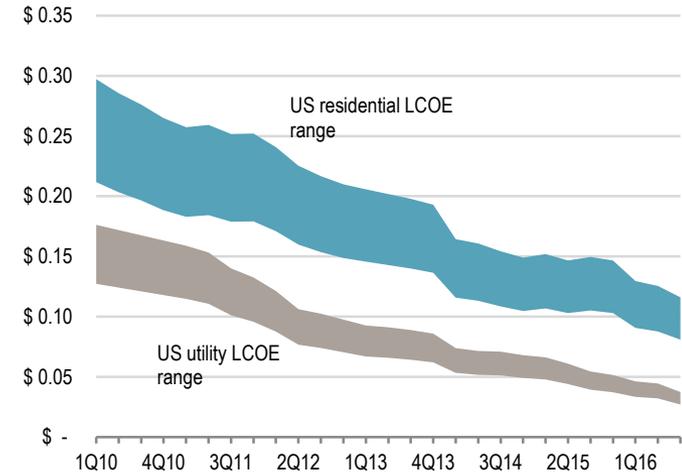
**29 States + Washington DC + 3 territories have a Renewable Portfolio Standard**  
*(8 states and 1 territories have renewable portfolio goals)*

# Lower input costs drive lower output costs

- Solar **panel prices have declined 84% over 5 years**, largely due to collapsing margins in upstream (overbuilt supply) and a correction in polysilicon prices (supply/demand now more balanced, poly troughed near cash cost)



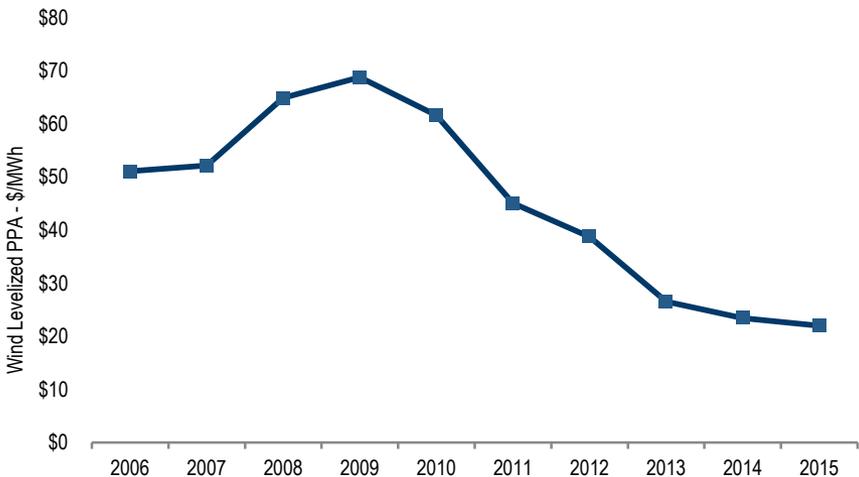
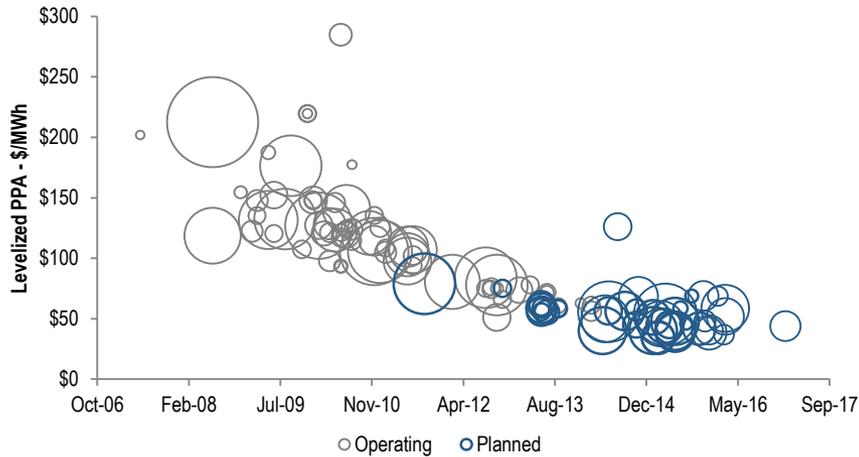
Note: PPA for US Utility scale project, includes 30% ITC



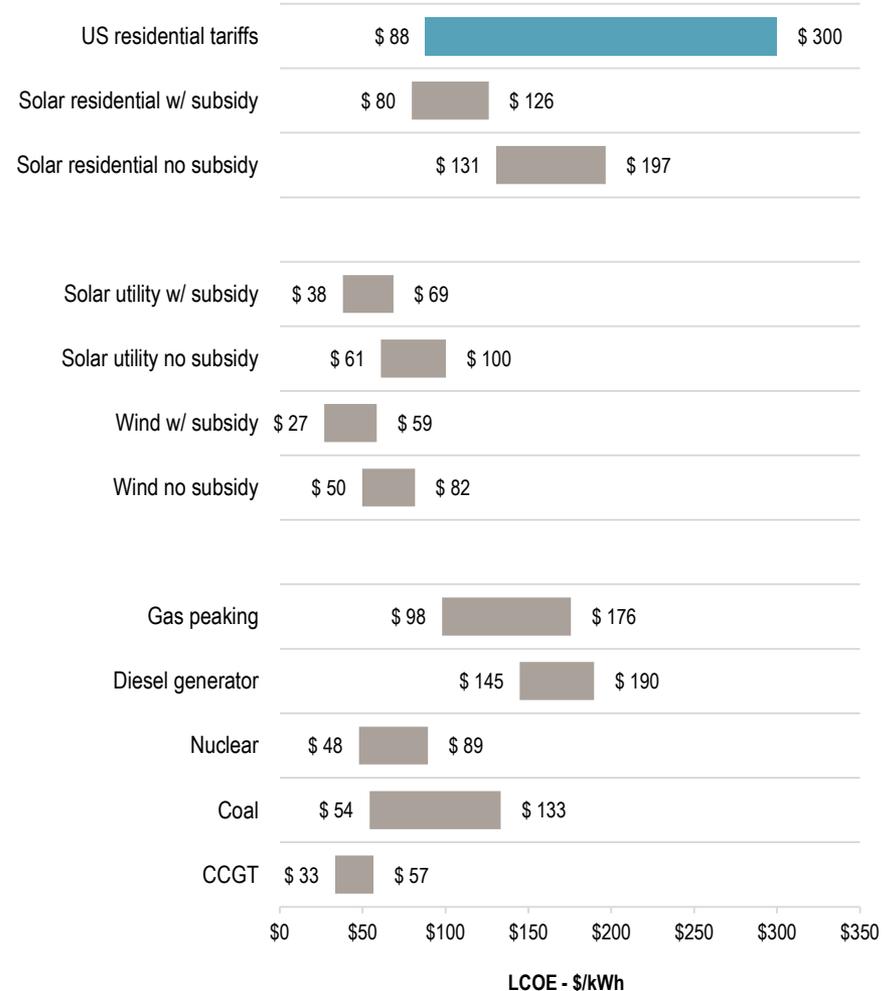
Range represents high and low sunshine areas

# Attractive economics increasingly drive demand

Contracted prices for solar (top) and wind (bottom) power have fallen dramatically in the US

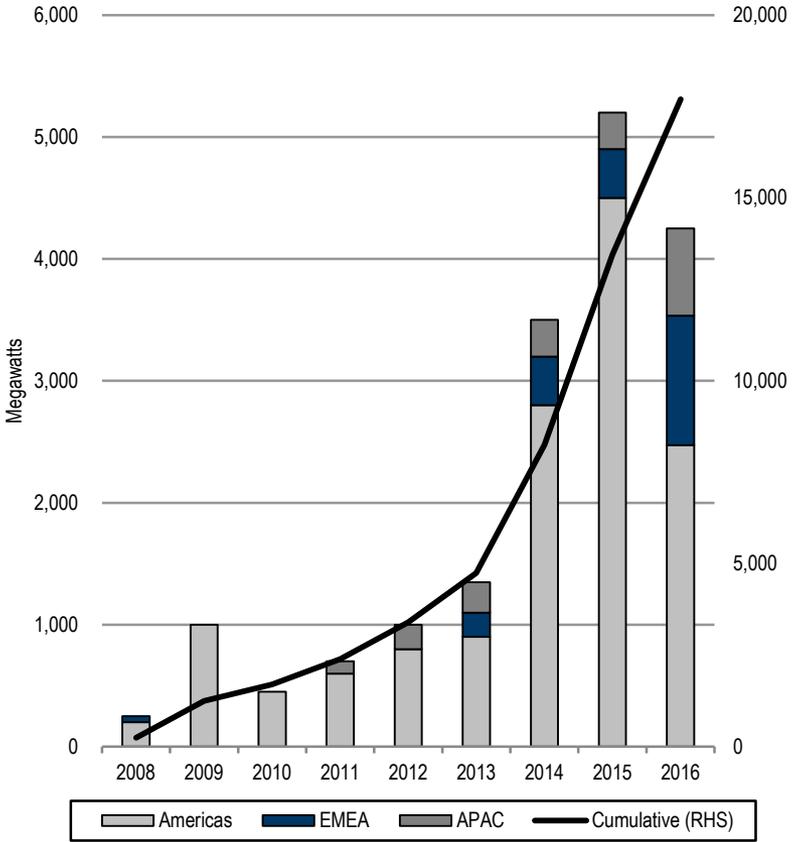


Renewable power is cost competitive on both a subsidized and unsubsidized basis

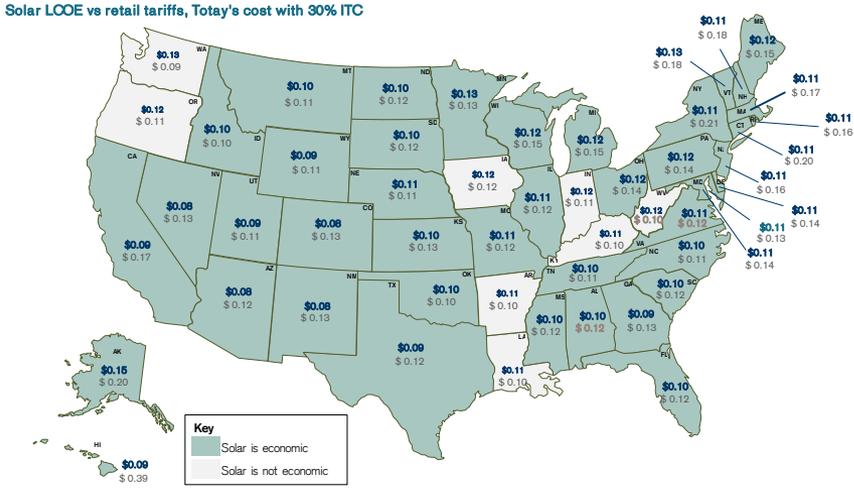


# New markets have emerged in the US as a result

US corporate procurement increased at a 37% CAGR 2008-2016



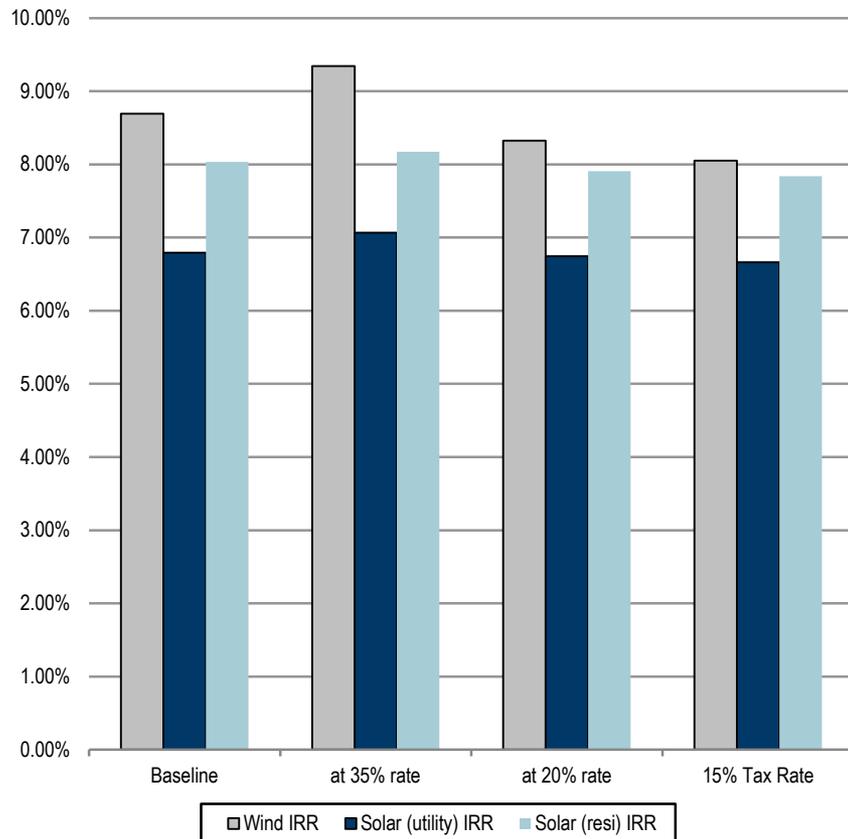
Residential solar at or below retail electricity rates in 43 states



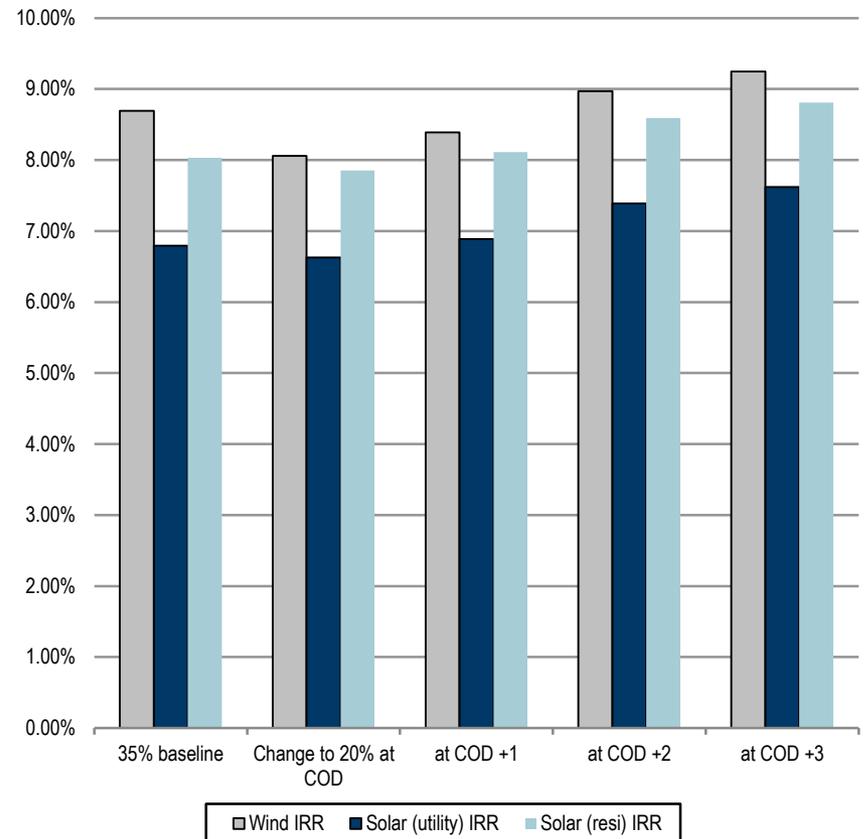
Source: Credit Suisse Clean Technology Equity Research

# Tax reform that does not rollback tax credits is unlikely to wipe out post-tax project returns

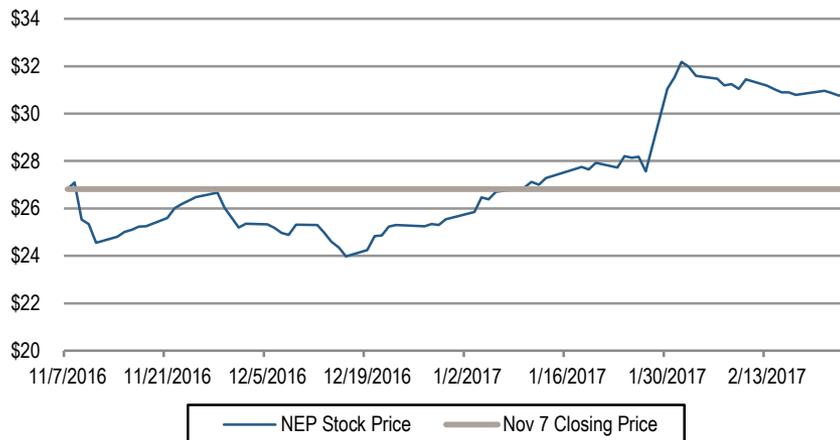
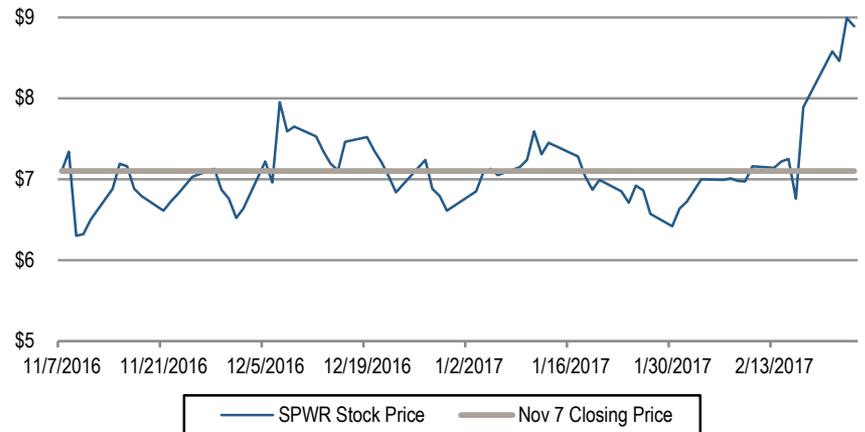
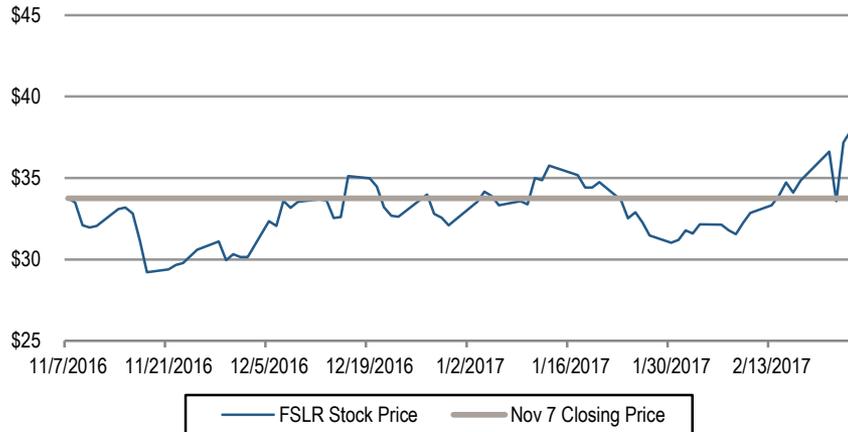
## Lower Rates + “1 Year MACRS” – Interest Deductibility



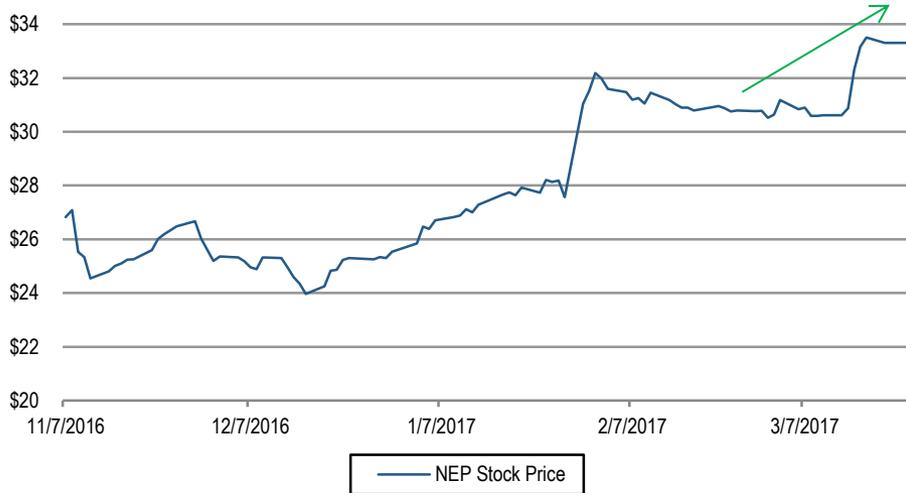
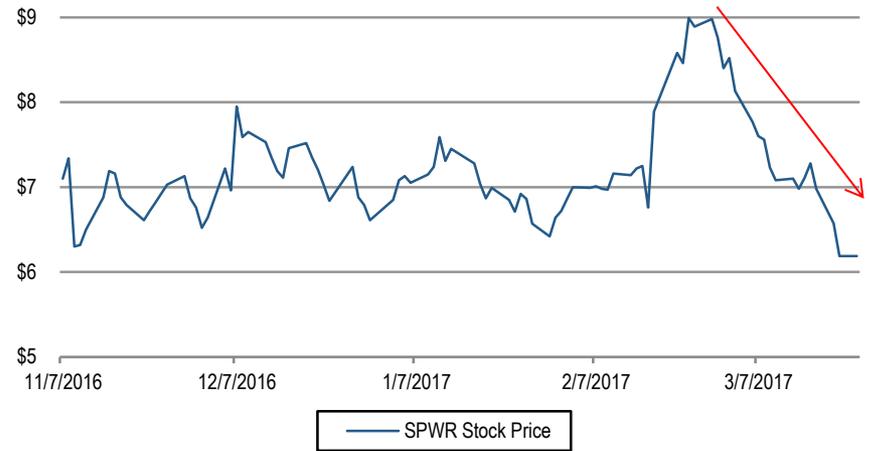
## Timing is Everything



# Stocks rebounded to reflect these realities in the weeks and months following the election (11/7/16 – 2/24/17)

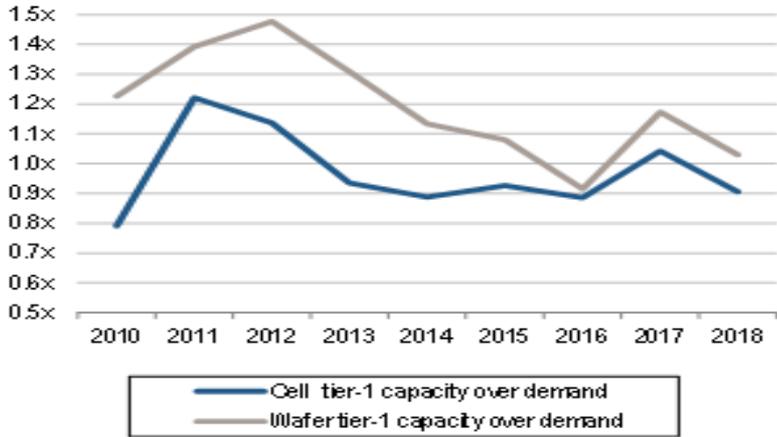


# The sell-off over the past month indicates that there are alternative forces at play

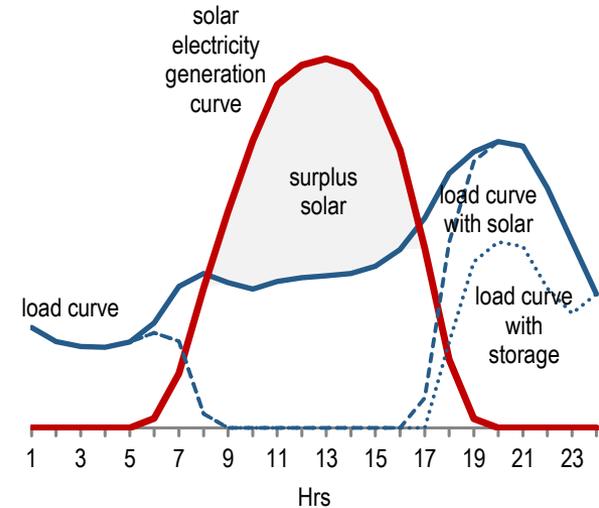
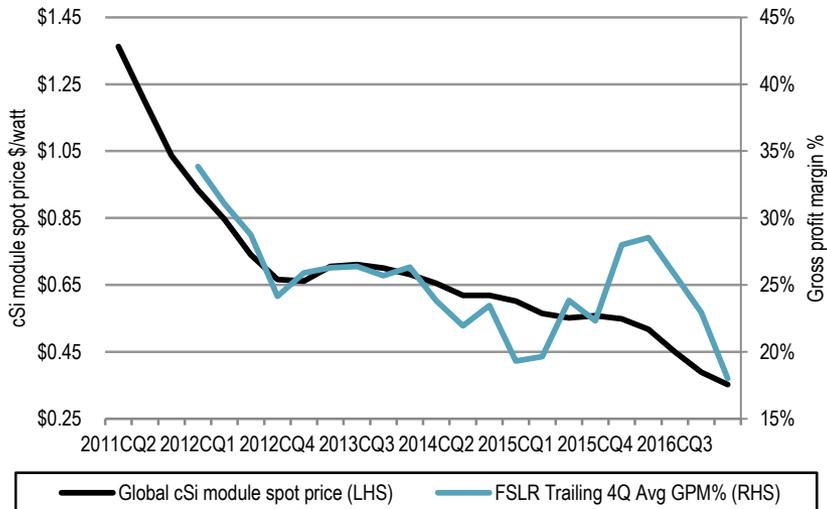
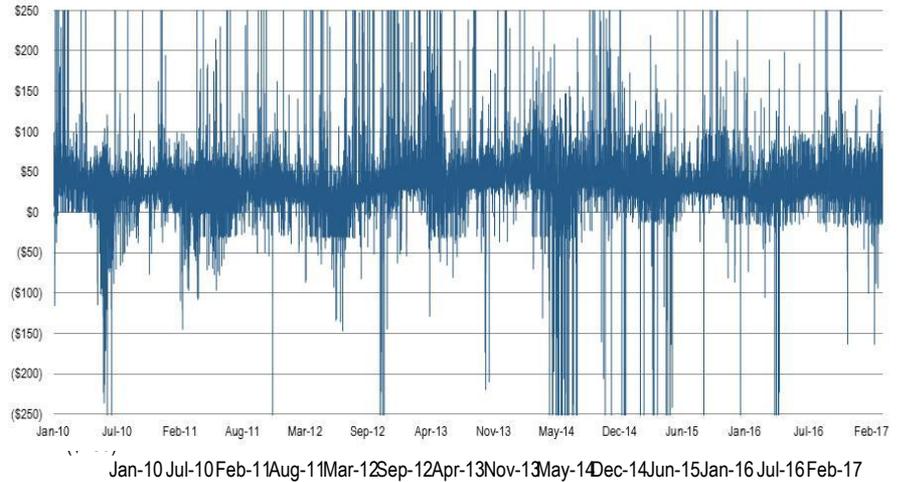


# Victim of its own success

## Oversupply hurts pricing and margins

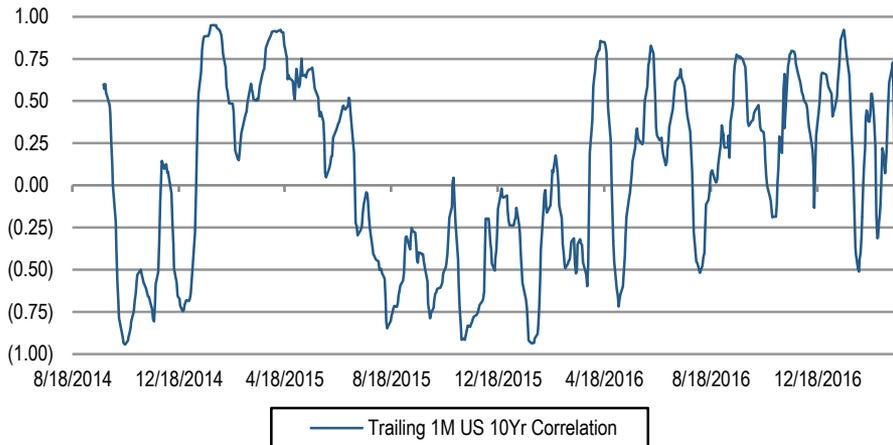


## Success challenges policy makers

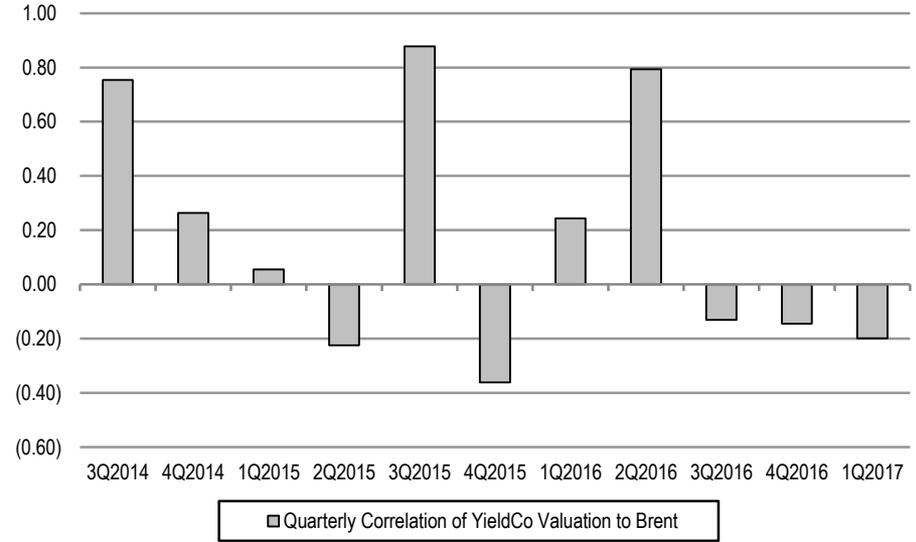
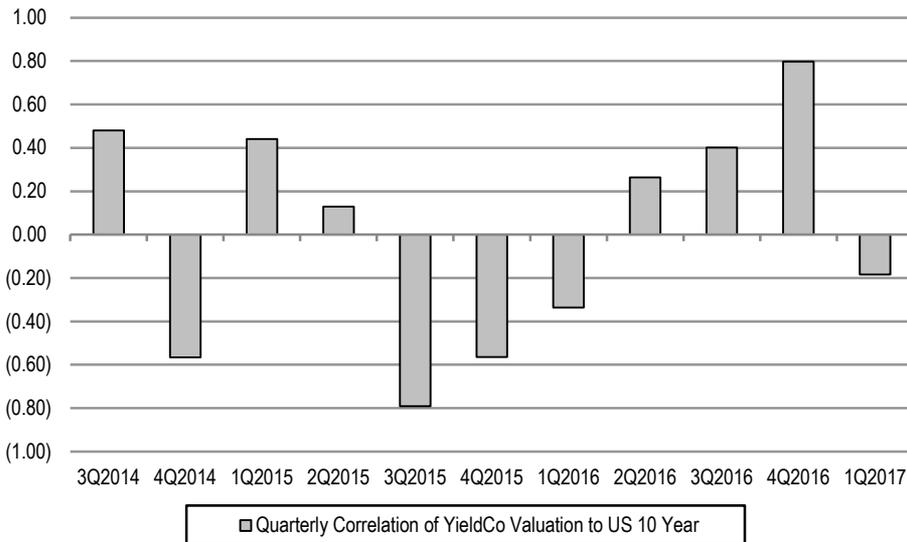
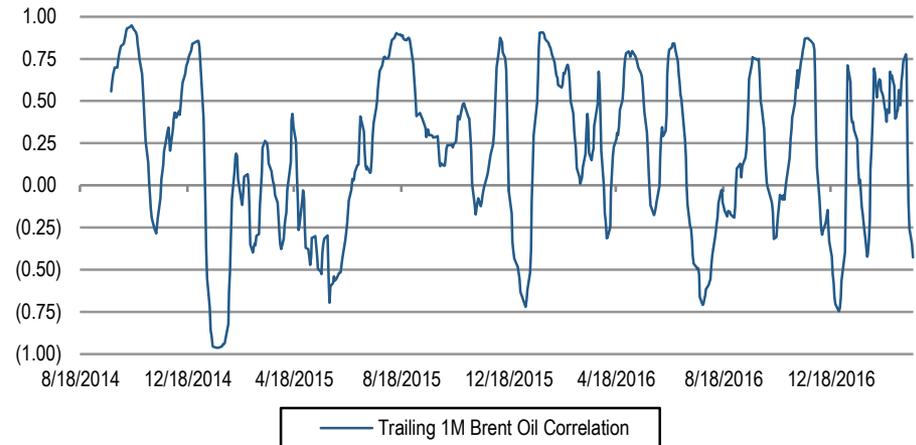


# Fundamental and technical factors

## YieldCo correlations with 10 Year Treasury yield (fundamental)

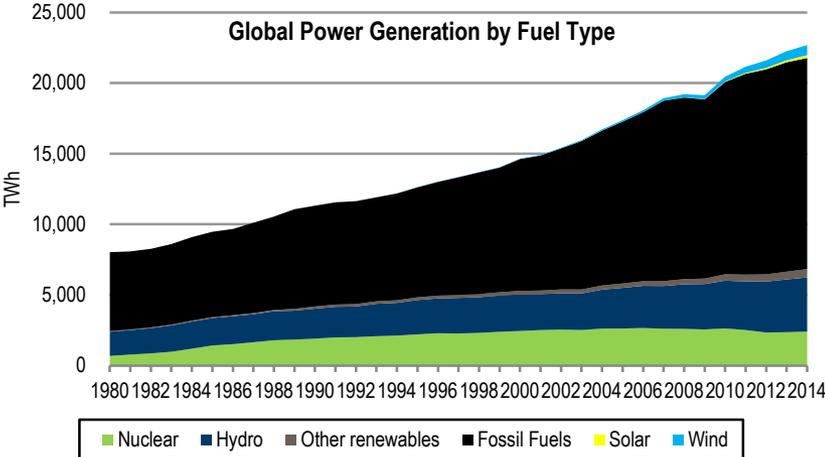


## YieldCo correlation with Brent oil price (technical)

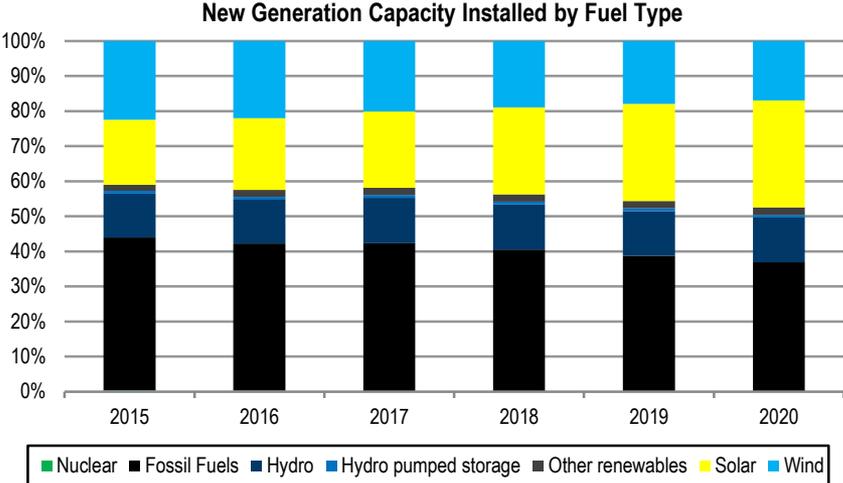


# Short-term selection, long-term disruption

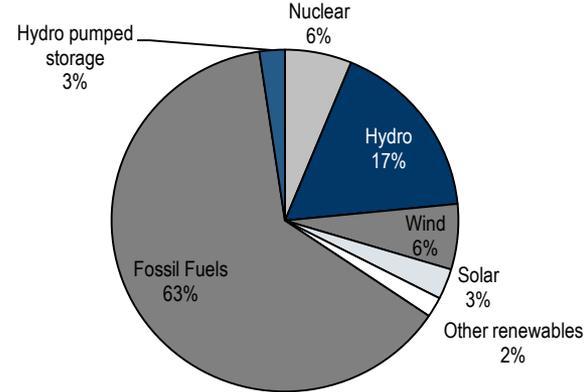
Fossil fuels dominate installed global power generation (top) and capacity (bottom) today



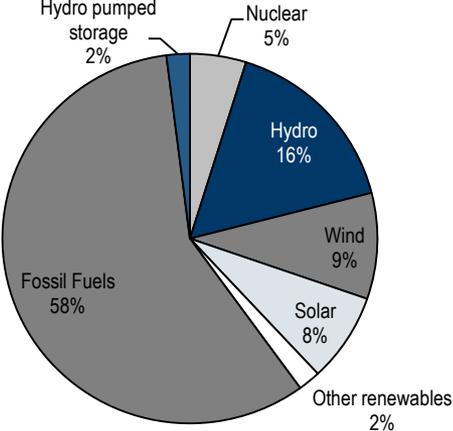
Renewables dominate new installed capacity (top) and will rapidly take share towards 2020 (bottom)



Global Installed Generation Capacity by Fuel Type (2014)



Global Installed Generation Capacity by Fuel Type (2020)

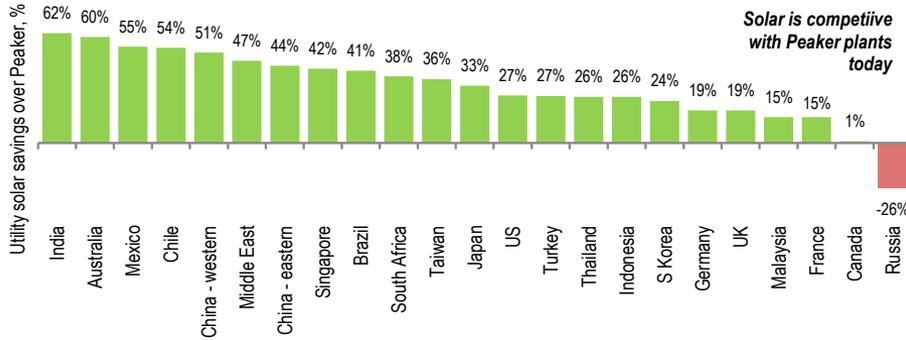


# Appendix

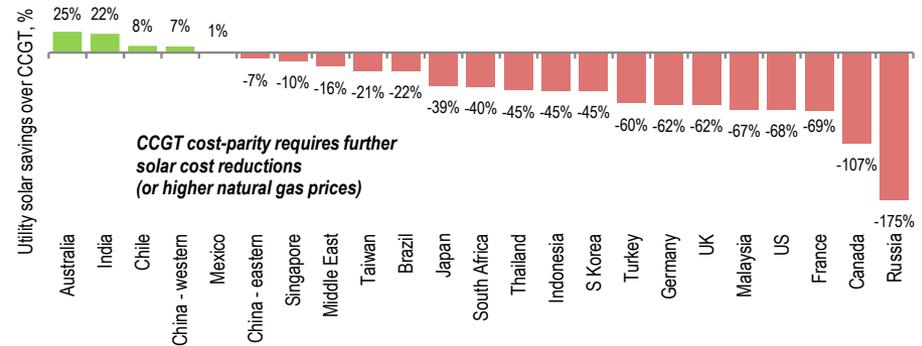
# Solar vs. Others Sources of Generation

Utility Solar is at Parity with New Gas Plants in Many Markets...

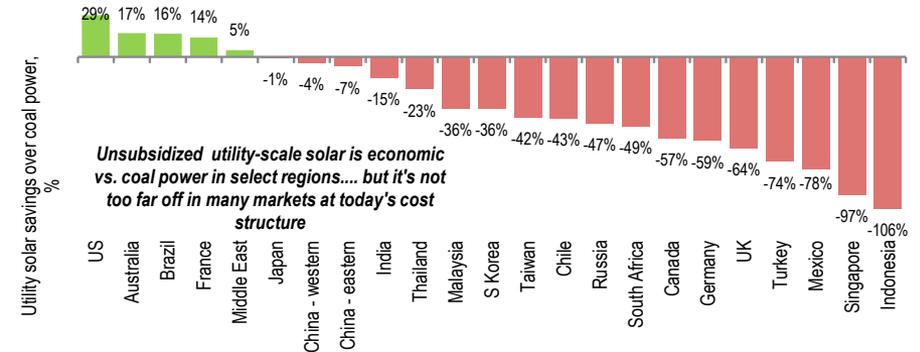
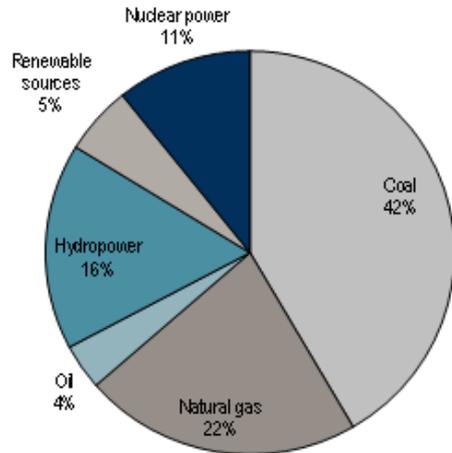
More markets are at parity today, without subsidies, when compared to new Natural Gas peakers



But parity with CCGT and coal would require further cost reductions or higher fuel costs



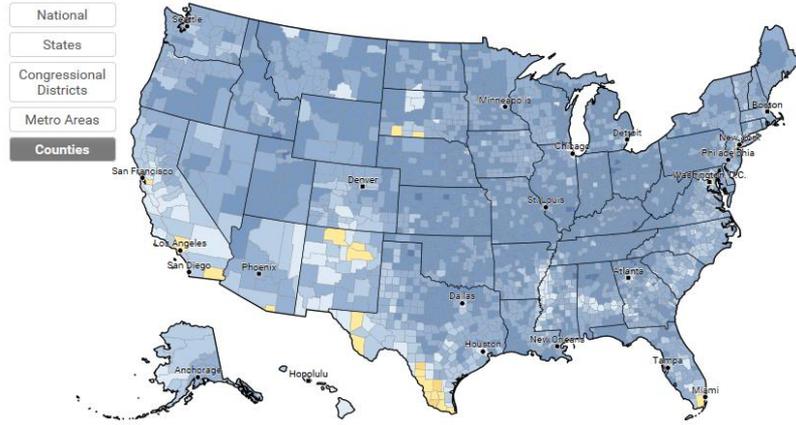
Oil constitutes less than 5% of electricity generation globally, and less than 1.5% in top 32 solar markets



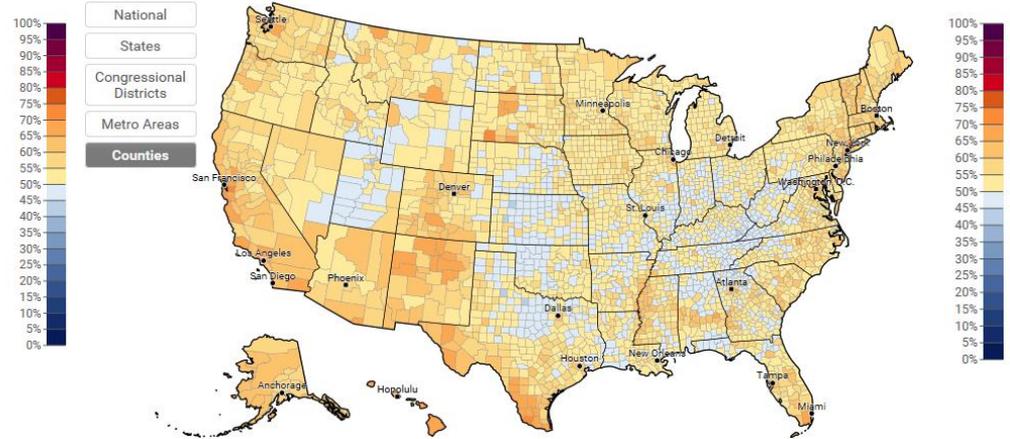
Note: **Solar assumptions:** region specific sunhours, system cost of ~\$1.50/w for developed nations and ~\$1-\$1.2/w for emerging countries, assumes no subsidy. For fixed mount systems, assumes no trackers. **Natural gas assumptions:** capex of \$1/W, natural gas delivered cost of ~\$3/MMBtu in US, ~\$5 in Europe, and ~\$7 in Asia. Capacity factor of 85% for CCGT, and 20% for peaker. **Coal plant assumptions:** Capex of \$5/w in US and \$3/w in most markets. 80% utilization, and \$2.5/mmBTU fuel cost. Cost of capital varies by region – 5%-6% for developed markets, and ~10%-12% for emerging markets.

# Survey says...

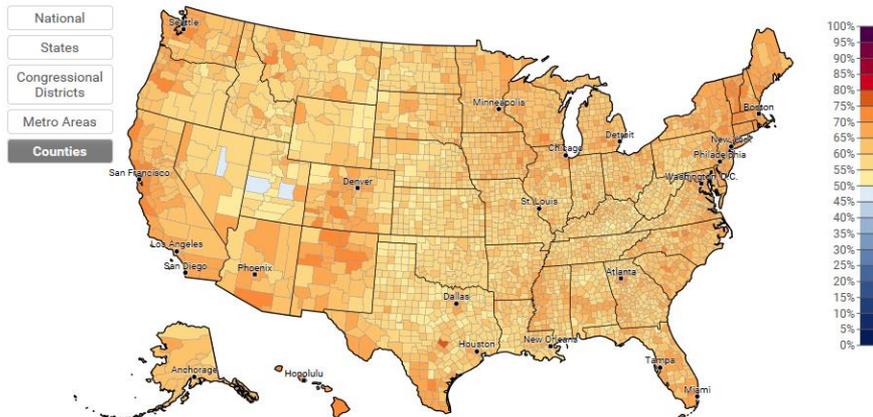
40% believe global warming will harm them



but 58% believe it will harm people in the US



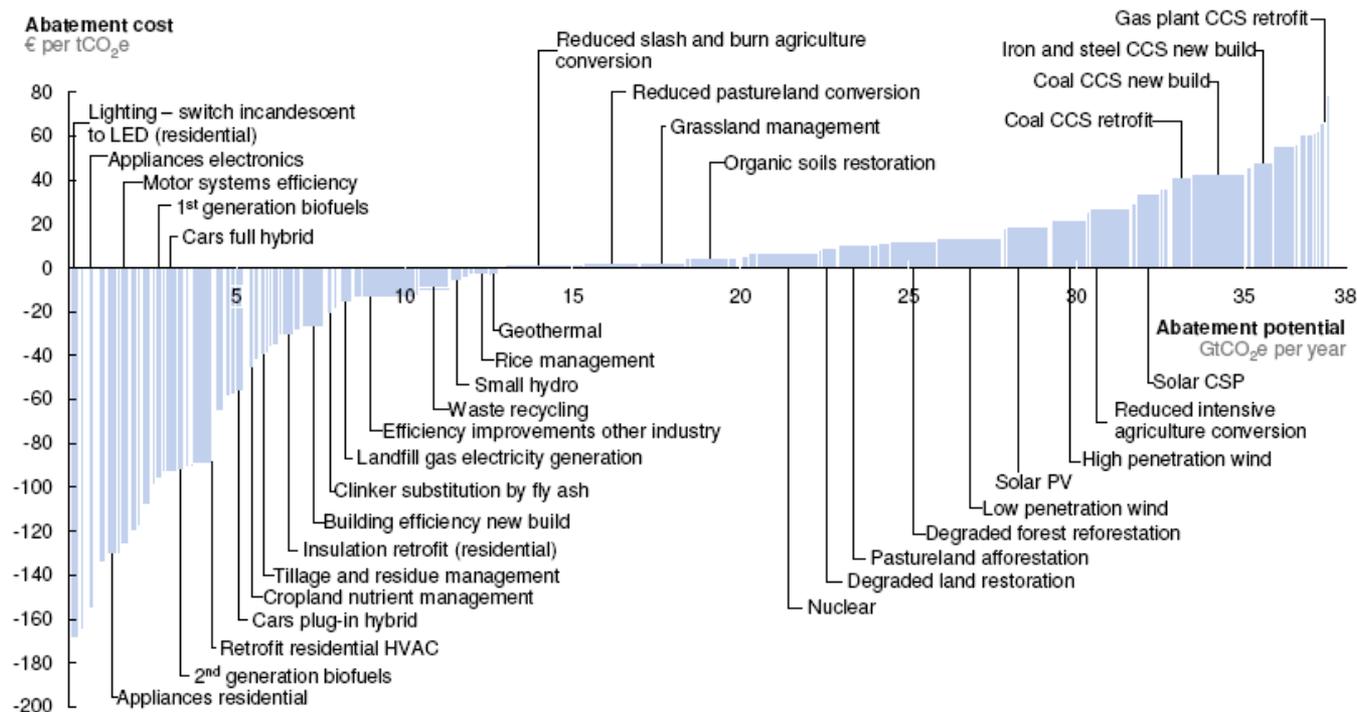
66% support a 20% national RPS



# Renewables & Alternative Energy Goal

## Carbon Reduction at an Economic Price

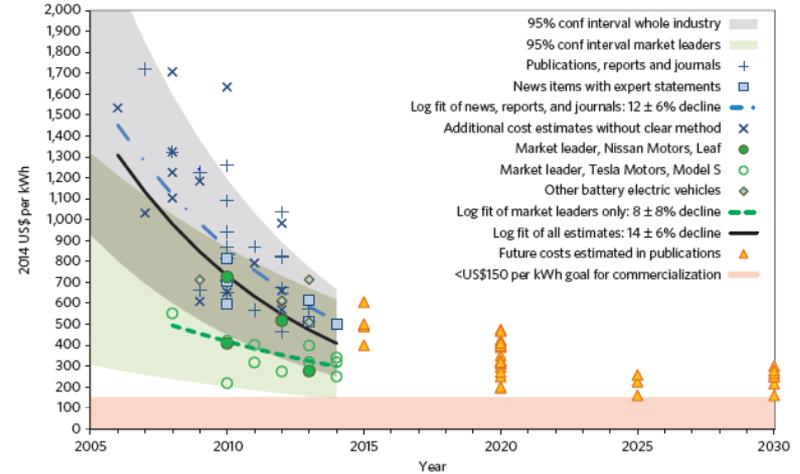
### McKinsey's Carbon Abatement Cost Curve: Many Solutions to Reduce Carbon Emissions



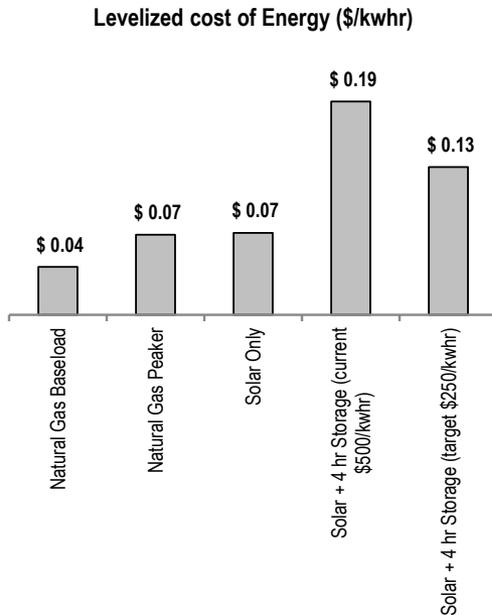
Note: The curve presents an estimate of the maximum potential of all technical GHG abatement measures below €80 per tCO<sub>2</sub>e if each lever was pursued aggressively. It is not a forecast of what role different abatement measures and technologies will play.  
 Source: Global GHG Abatement Cost Curve v2.1

# Solar + Storage Economics Not There Yet, but Close

- **Solar is not dispatchable.** This is problematic at higher levels of penetration as it cannot be depended upon during peak periods (if cloudy, etc) and traditional power plants must still be on “standby”.
- **Adding storage makes solar dispatchable.** The combined Solar + Storage resource could be compared to traditional power generation sources....
- Costs need to fall >50% for economics to be viable in most regions, save Hawaii where an \$11/MWh solar+storage contract was awarded in Dec 2016



**LCOE of Utility-scale Solar + Storage, Unsubsidized**



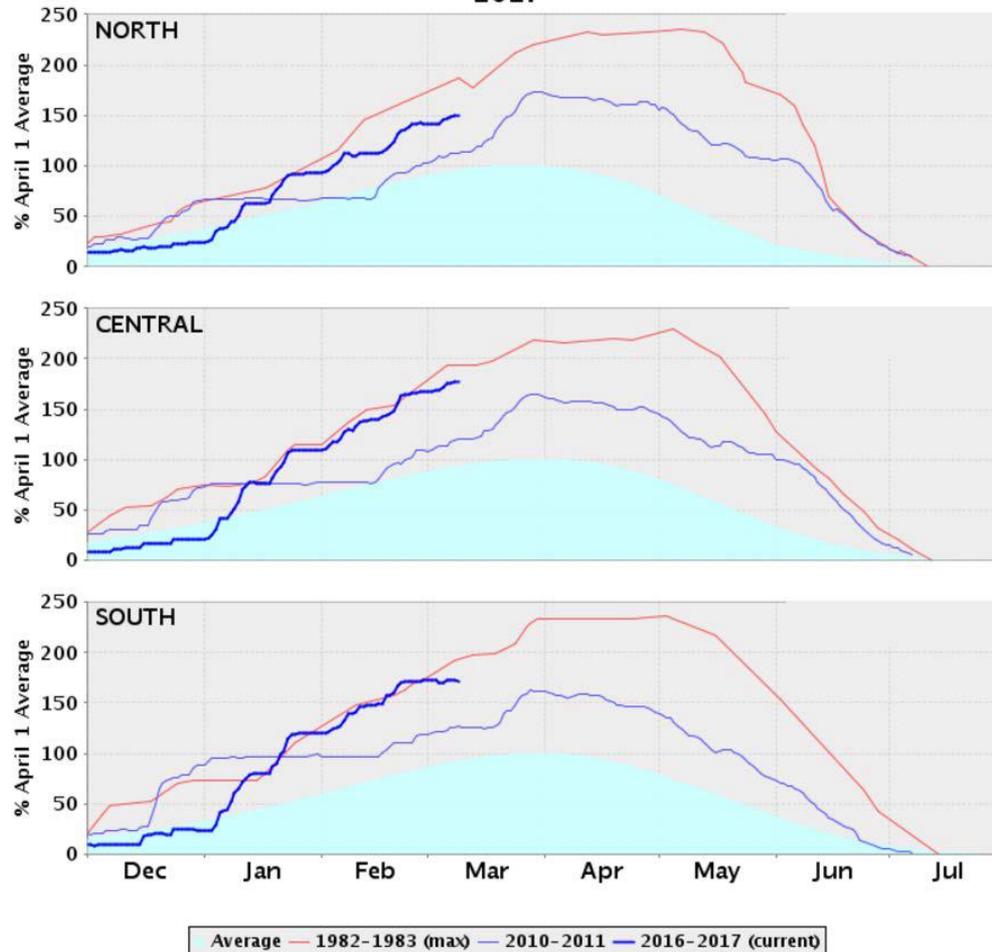
Hours of load shaping required

		Battery Cost (\$/kwhr)								
		Targets							Current	
		\$100	\$150	\$200	\$250	\$300	\$350	\$400	\$450	\$500
Hours of load shaping required	solar only	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07	\$ 0.07
	1 hrs	\$ 0.08	\$ 0.08	\$ 0.09	\$ 0.09	\$ 0.09	\$ 0.09	\$ 0.10	\$ 0.10	\$ 0.10
	2 hrs	\$ 0.09	\$ 0.09	\$ 0.10	\$ 0.10	\$ 0.11	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.13
	3 hrs	\$ 0.09	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.14	\$ 0.15	\$ 0.16
	4 hrs	\$ 0.10	\$ 0.11	\$ 0.12	\$ 0.13	\$ 0.14	\$ 0.16	\$ 0.17	\$ 0.18	\$ 0.19
	5 hrs	\$ 0.10	\$ 0.12	\$ 0.13	\$ 0.15	\$ 0.16	\$ 0.18	\$ 0.19	\$ 0.21	\$ 0.22
	6 hrs	\$ 0.11	\$ 0.13	\$ 0.14	\$ 0.16	\$ 0.18	\$ 0.20	\$ 0.22	\$ 0.23	\$ 0.25
	7 hrs	\$ 0.11	\$ 0.14	\$ 0.16	\$ 0.18	\$ 0.20	\$ 0.22	\$ 0.24	\$ 0.26	\$ 0.28
	8 hrs	\$ 0.12	\$ 0.14	\$ 0.17	\$ 0.19	\$ 0.22	\$ 0.24	\$ 0.26	\$ 0.29	\$ 0.31

- *Levelized Cost of Electricity (LCOE) for utility-scale solar without subsidies is \$0.074/kwhr vs. traditional energy sources of \$0.04/kwhr (Natural gas power plant for baseload) or \$0.072/kwhr (peaking power plant with 25% utilization). While economic parity has been reached for solar and natural gas peaking power plants, this does not penalize solar for it's intermittency....*
- *Solar + 4-hours of Storage = LCOE of \$0.19/kwhr. Battery costs would need to decline to under \$100/kwhr (80% decline) to be economic vs. new power plants (or combined with further reductions in the cost of solar).*

# Land o' plenty, for once

California Snow Water Content - Percent of April 1 Average For: 09-Mar-2017



## Companies Mentioned (Price as of 24-Mar-2017)

8Point3 Energy Partners (CAFD.OQ, \$13.04)  
Azure Power Global Limited (AZRE.N, \$17.46)  
First Solar (FSLR.OQ, \$28.31)  
JA Solar Holdings (JASO.OQ, \$5.72)  
Jinko Solar (JKS.N, \$16.19)  
NextEra Energy Partners (NEP.N, \$32.58)  
Pattern Energy (PEGI.OQ, \$20.41)  
ReneSola Ltd (SOL.N, \$2.42)  
SunPower Corp. (SPWR.OQ, \$6.07)  
Sunrun (RUN.OQ, \$4.91)  
Vivint Solar, Inc. (VSLR.N, \$2.7)  
Yingli Green Energy Holding (YGE.N, \$2.12)

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Underperform/Sell*	14%	(53% banking clients)
Restricted	2%	

*\*For purposes of the NYSE and FINRA ratings distribution disclosure requirements, our stock ratings of Outperform, Neutral, and Underperform most closely correspond to Buy, Hold, and Sell, respectively; however, the meanings are not the same, as our stock ratings are determined on a relative basis. (Please refer to definitions above.) An investor's decision to buy or sell a security should be based on investment objectives, current holdings, and other individual factors.*

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