



**Association de  
l'industrie  
électrique du  
Québec 2019**

**March 28, 2019**



# **Solar Trends in the United States**

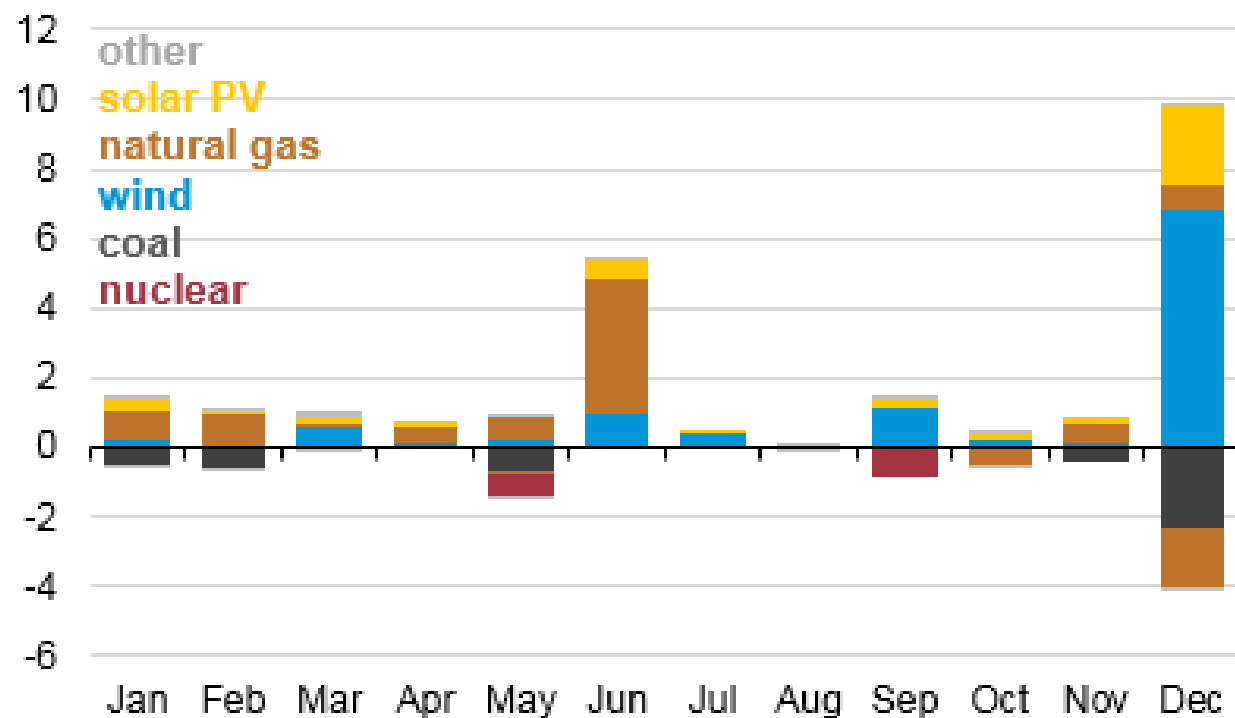
**Gretchen Dolson, HDR Inc.**

HDR Renewable Energy Program Lead

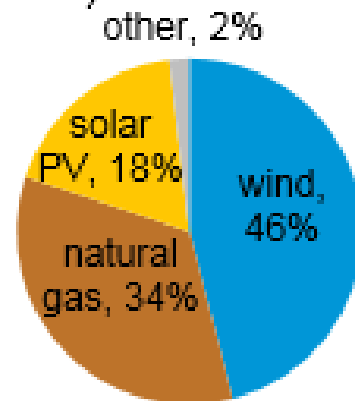
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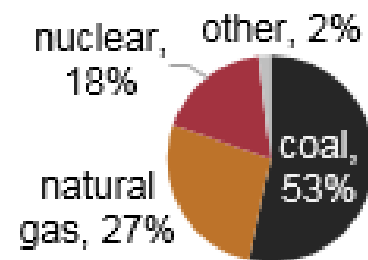
# U.S. electric capacity additions and retirements, 2019 gigawatts (GW)



## planned additions (24 GW)



## planned retirements (8 GW)



**4,300 MW Utility Scale Solar (CA, TX, NC)**

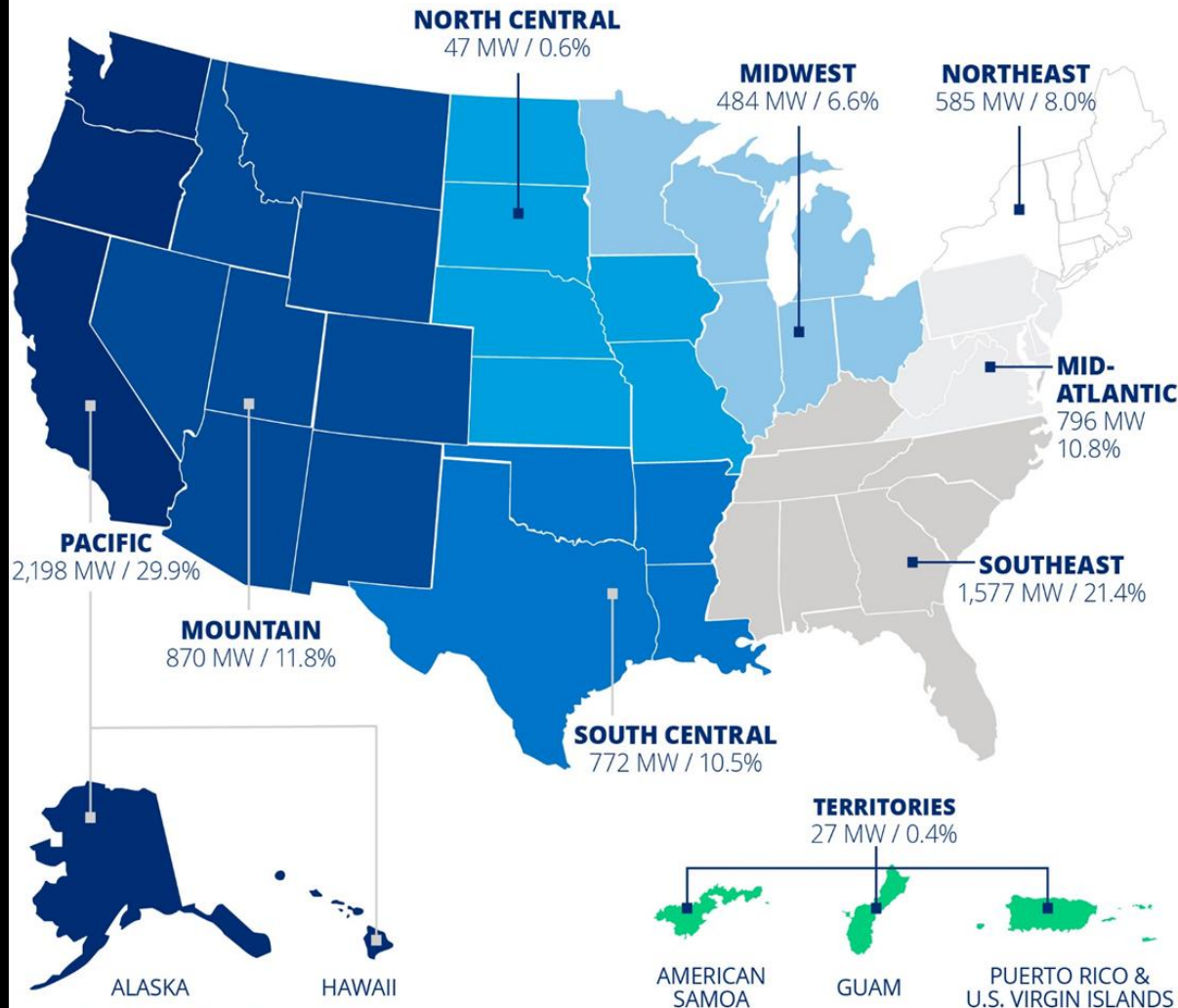
**3,900 MW Small Scale Solar**

Source: US Energy Information Administration, 2019



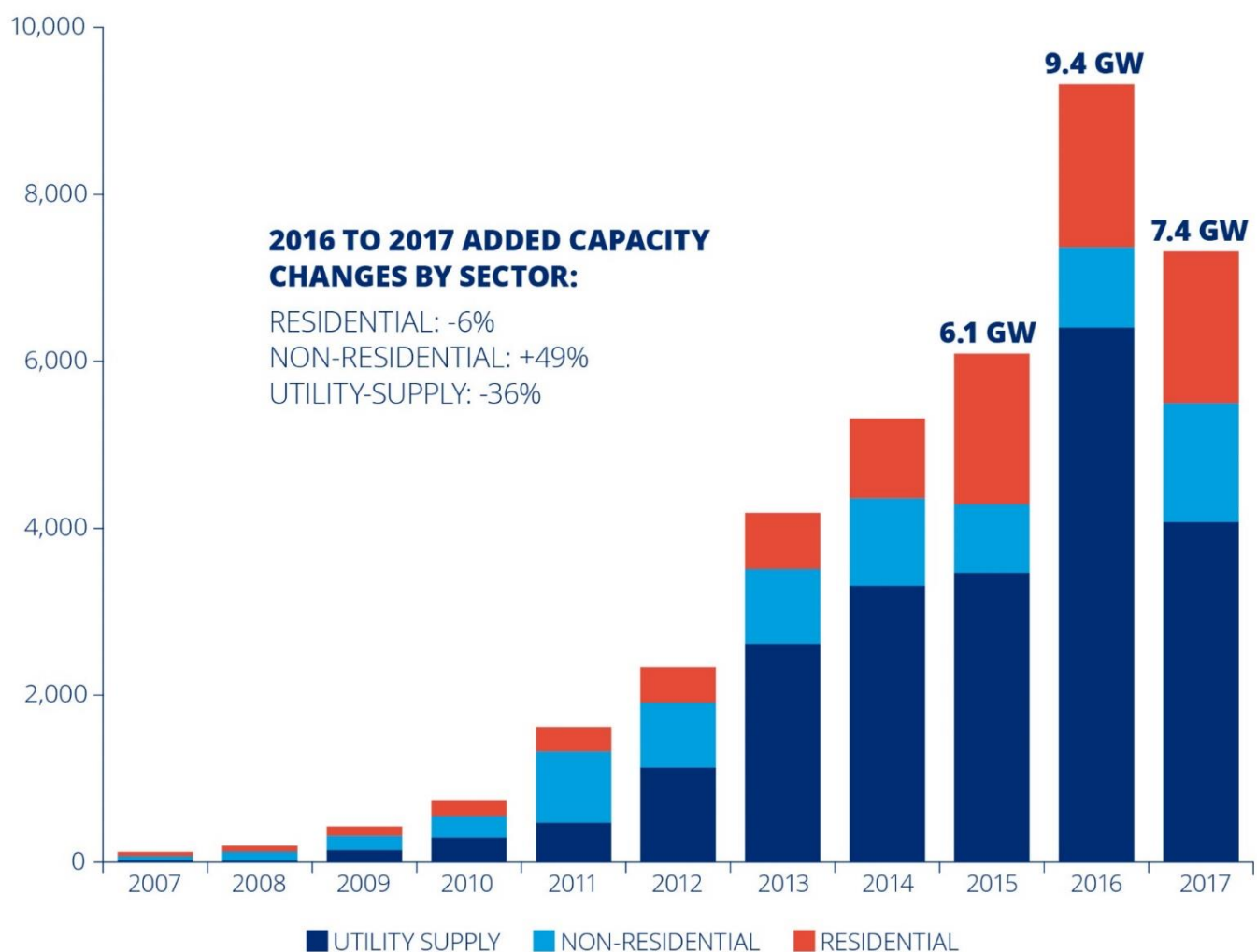
# 2017 Solar Capacity and Percentage, By Region

- Northeast: Dominated by Smaller Scale Solar (5MW and less)
- Pacific, Mountain, South Central: Dominated by Grid Tied, Large Scale Solar (50 MW and greater)
- Southeast, Mid-Atlantic: Blend of Large and Smaller Scale Solar



Source: Smart Electric Power Alliance, 2018

# Annual Solar Growth by Sector (MW-AC)





# What areas of the business are being supported by Solar in US?

- Regulatory Compliance & Resiliency
- Fuels Planning
- Revenue/Cost Forecasting
- Demand Side Management
- Power Generation Planning/Supply
- Load Balancing
- Power Delivery/Grid Stability

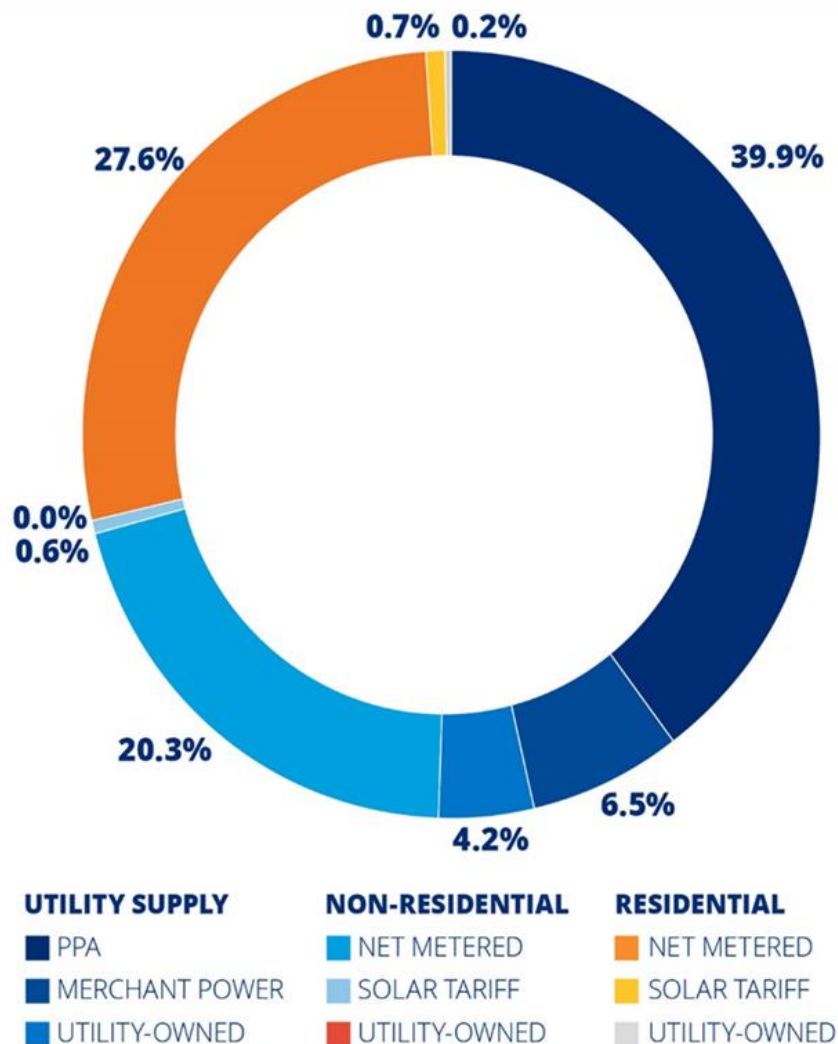
Customer Service



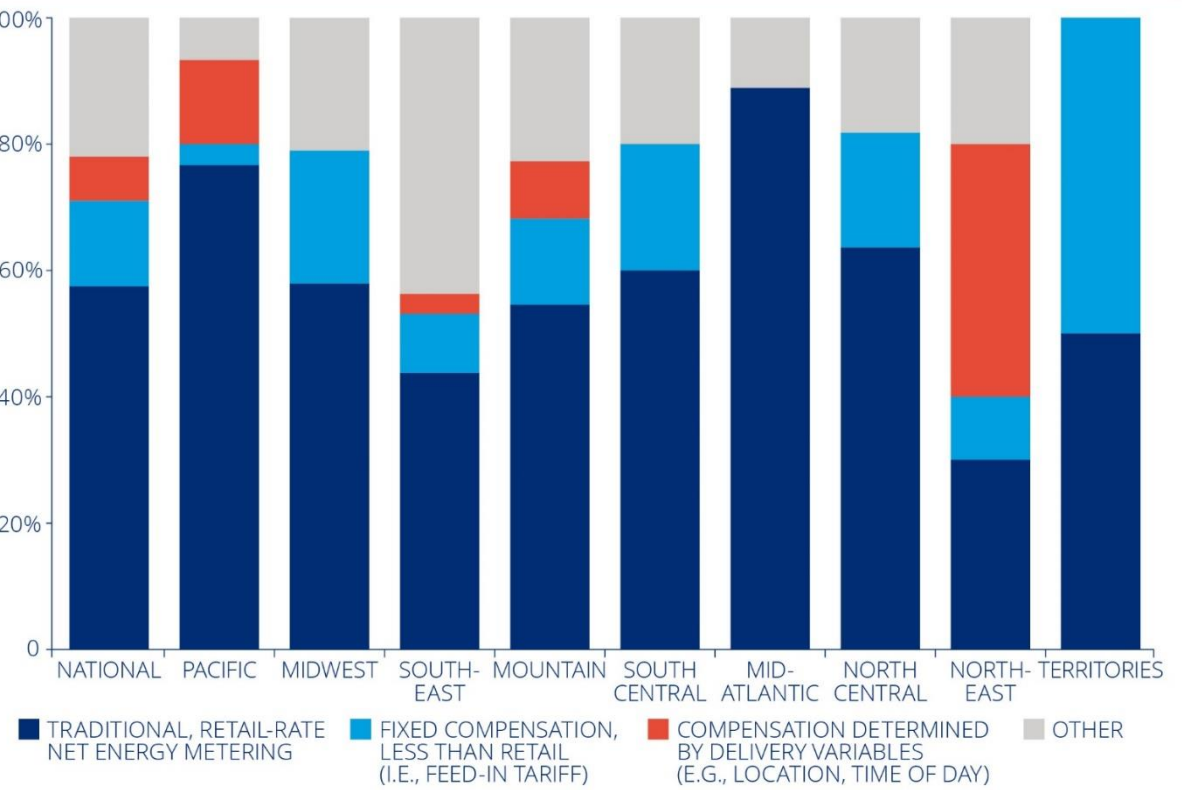
# Investor-Owned Utilities Composition of Solar Capacity

- Large Scale - Trend from Power Purchase Agreement (PPA) to asset ownership
- Smaller Scale – Large/Industrial customer driven
- Residential – Customer/State policy driven

Source: Smart Electric Power Alliance, 2018



# UTILITY CHOICE IN CUSTOMER-GENERATED SOLAR ENERGY COMPENSATION, 2018



Source: Smart Electric Power Alliance, 2018



- Facilities tend to be smaller scale and behind the meter focused.
- Land Use Limitations
- Limited/Constrained Transmission

Northeast



# Southeast

- Lack of Regional Transmission Authority
- Driven by individual state policies
- Large Scale Solar
  - Data center/large Industrial driven market
  - Large IOU market transition from PPA to Utility Ownership business models
- Distributed Solar
  - Smaller scale behind the meter commercial/industrial with Utilities





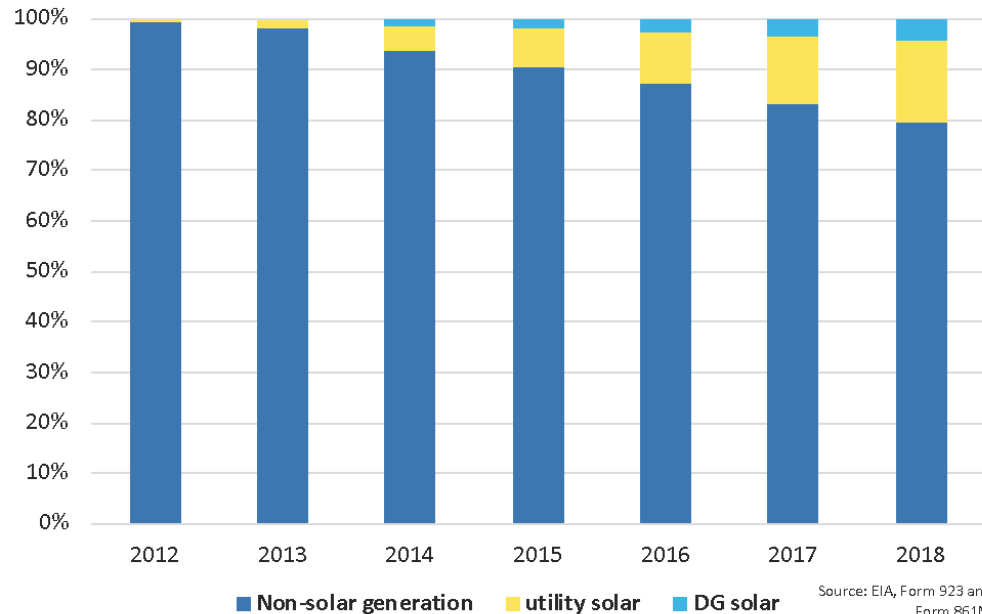
# California (Southwest)

- Solar generation in California now makes up nearly 21% of the state's electricity mix
  - 4% comes from distributed solar
  - 750 MW storage planned in California, 53% grid connected, 47% behind the meter.  
(Source: California Energy Storage Alliance, 2019)
- CAISO Impacts
- Community Choice Aggregation (CCA)
- California Rate Design Changes for Time of Use

Source: Solar Electric Industries Association, March 2019 (EIA, Form 923, Form 861M)



Share of California Electricity Generation by Source



	Ramp Control	Expanded Frequency And Voltage Ride Through	Randomized Reconnect	Curtailement	Voltage Support	Residential	Non- Residential
<b>No Interest</b>	49.8%	47.9%	52.1%	48.6%	41.3%	43.8%	43.3%
<b>Interested</b>	35.5%	32.7%	41.9%	34.4%	36.7%	39.4%	42.3%
<b>Planning</b>	10.1%	10.6%	2.8%	11.5%	12.8%	10.1%	8.2%
<b>Piloting</b>	2.3%	4.2%	0.9%	2.3%	5.5%	N/A	N/A
<b>Program Implemented</b>	2.3%	4.6%	2.3%	3.2%	3.7%	6.7%	6.3%

## Utility Interest in Advanced Inverter Functionality and Solar + Storage

Source: Smart Electric Power Alliance, 2018



# QUESTIONS?

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