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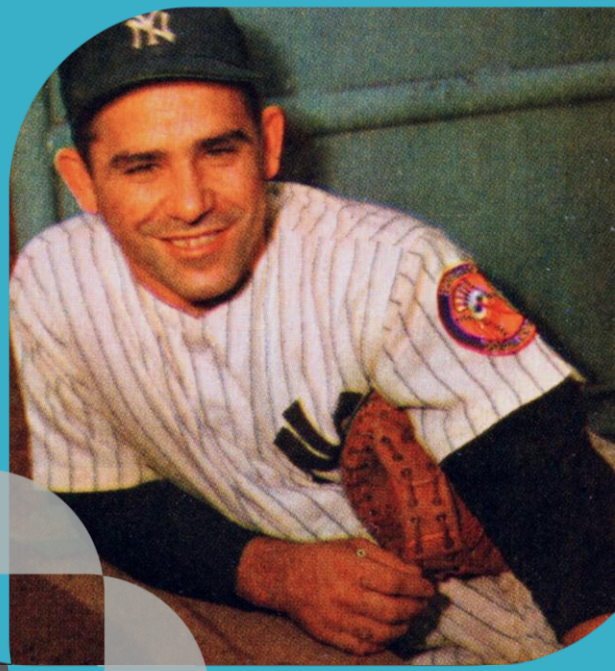
Power and Gas M&A Symposium



Interactive Strategic Issues Discussion: What Would Yogi Berra Say?

February 14, 2017

Discussion Outline

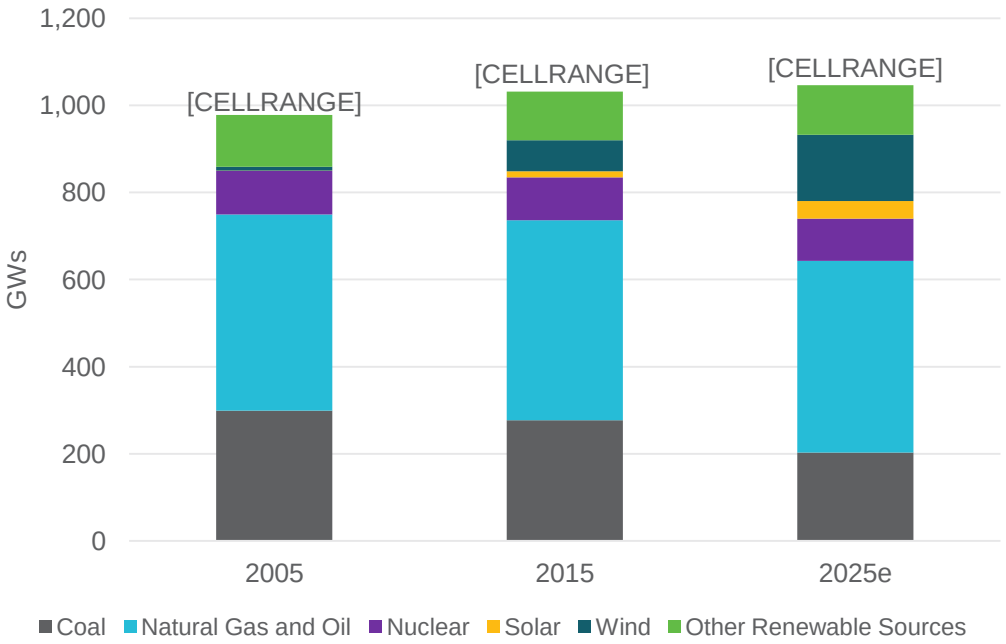
- Changing Supply and Demand Mix
- Technology Innovation
- Changing Regulatory Compact
- Adaptive Utility Strategies
- Impact of a New Administration

Changing Supply and Demand Mix

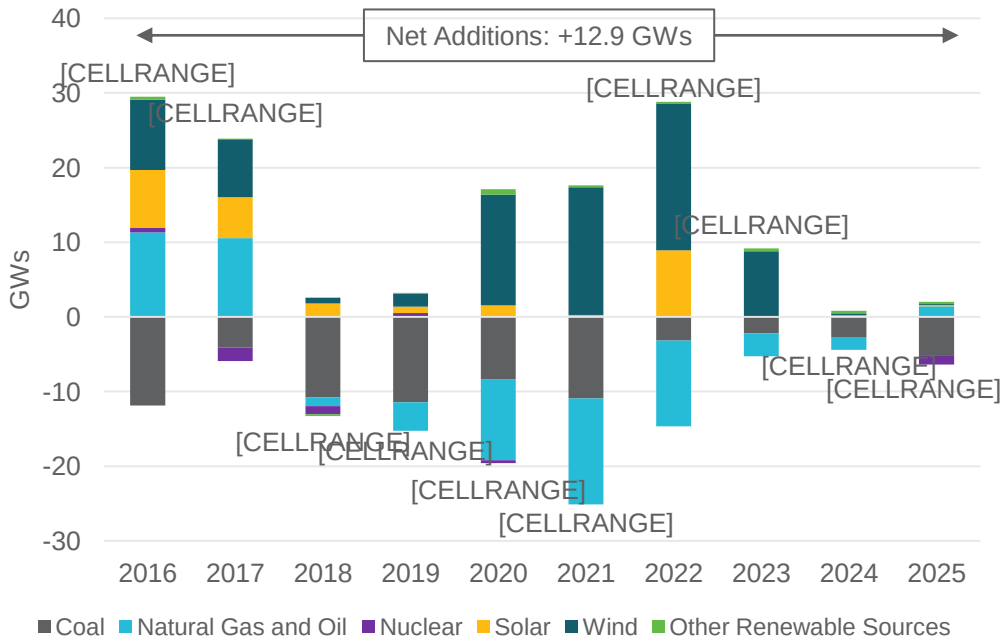
Capacity Outlook

New natural gas, wind, and solar-powered generation represent the majority of capacity added since 2005 and projected additions through 2025. In the same time frame, coal- and oil-fired generation will have declined and will continue to decline at a historic pace.

Historic and Future* Generation Capacity by Fuel Type



Future* Annual Net Additions/Retirements by Fuel Type



Different EIA forecasts show little variation in new renewables and natural gas combined cycle capacity additions through 2025.

Cumulative Growth by Select Generation Type	2005–2015 Actual	2015-2025e	
		CPP	No CPP
Solar and Wind	820%	126%	100%
Natural Gas CC	31.9%	7.6%	7.3%
Total	5.5%	1.5%	1.9%

NOTES:
*Charts reflect SNL/NERC data for actual capacity and EIA data for future capacity. Future capacity is based on both actual planned/under construction projects and unplanned additions/retirements according to EIA's AEO 2017 reference case
SOURCES:
SNL Financial; EIA; ScottMadden analysis

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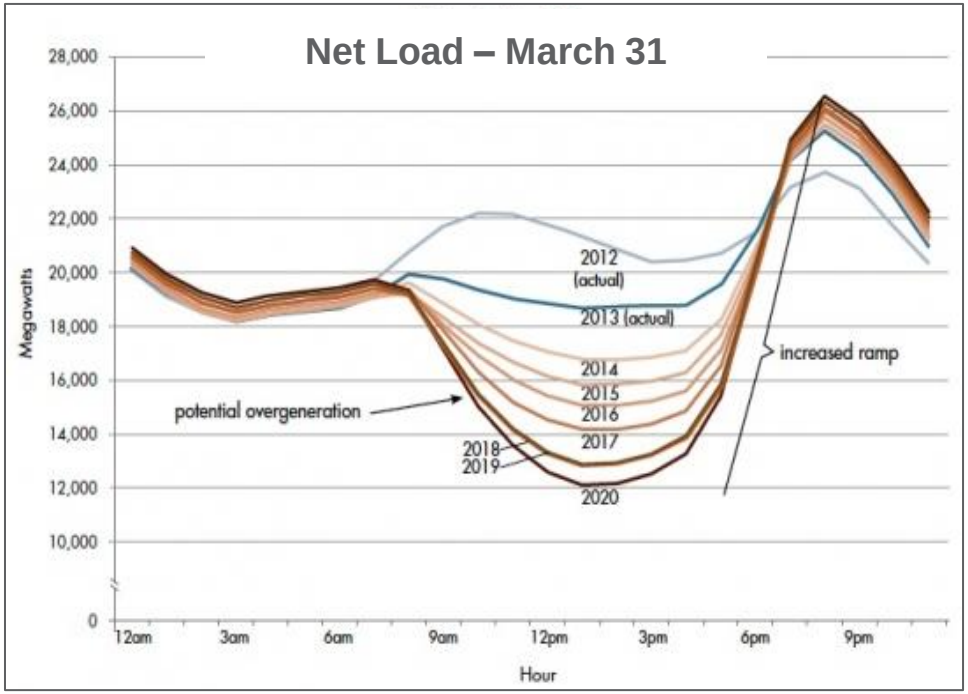
Duck Curve

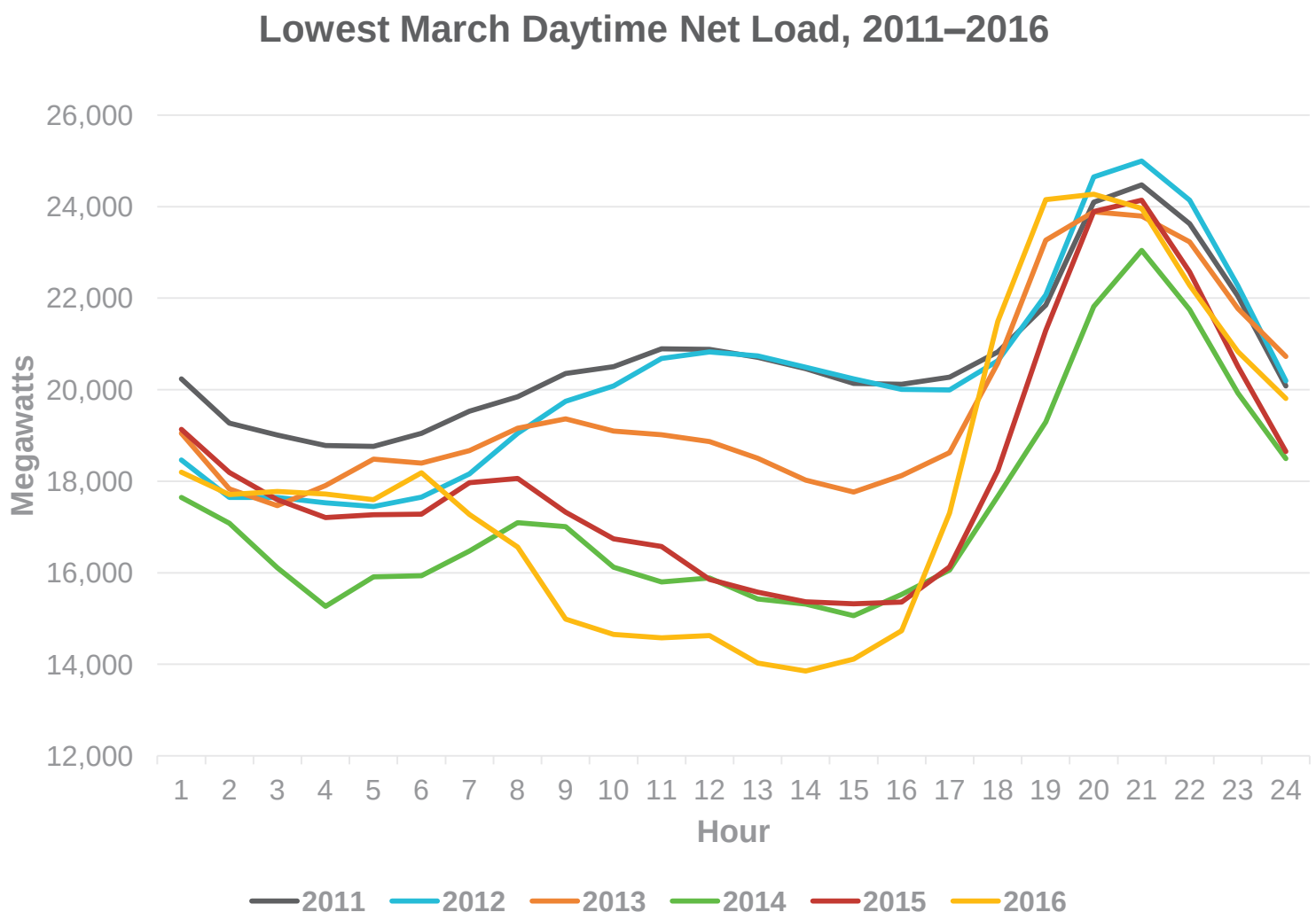
- 2013 California Independent System Operator (CAISO) produces analysis showing how renewable resources would impact grid conditions
  - Iconic “duck curve” is born, predicting as variable generation grows so too will the midday trough of load served by conventional supply
- ScottMadden analyzed average hourly production data from CAISO from January 2011 through June 2016 to understand: Is it what most people think it is?

The California Duck Curve Chart



SOURCE:
CAISO

Duck Curve Is Real – and Growing Faster than Expected



SOURCES:
CAISO; ScottMadden analysis

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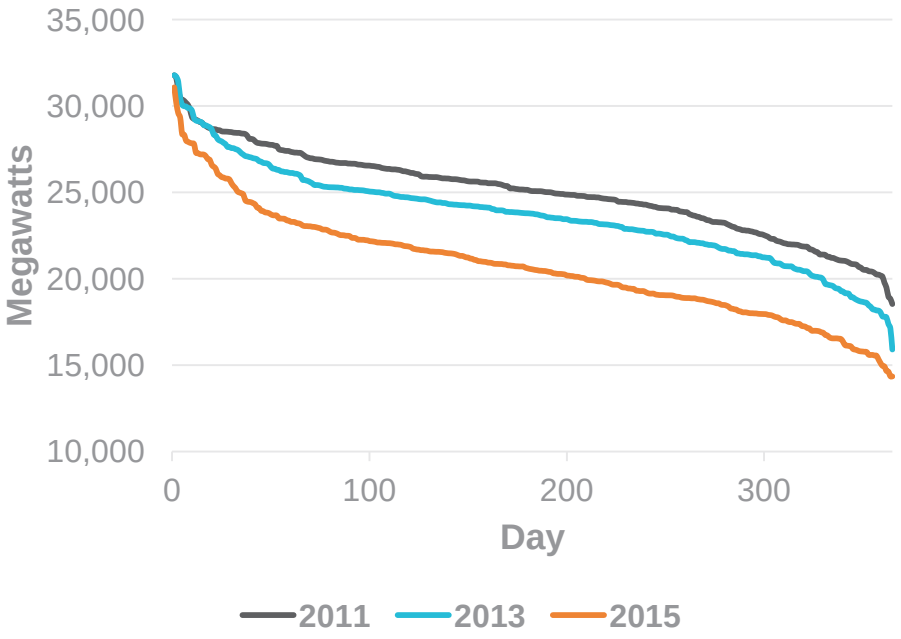
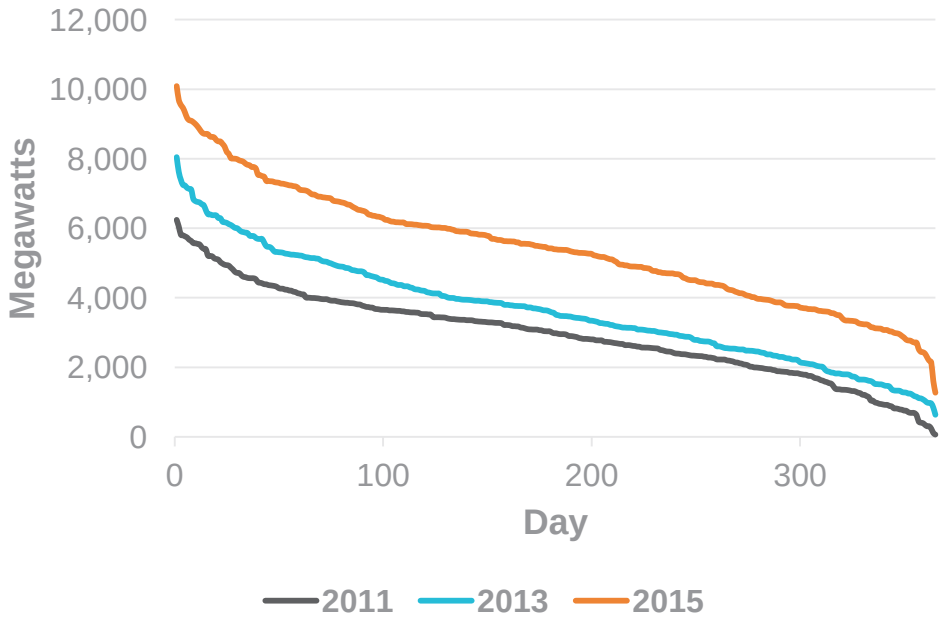
Net Loads Shrinking and Ramps Increasing (2011–2015)

Daily Daytime Minimum Net Load



Daily Late-Day Three-Hour Ramp



SOURCES:
CAISO; ScottMadden analysis

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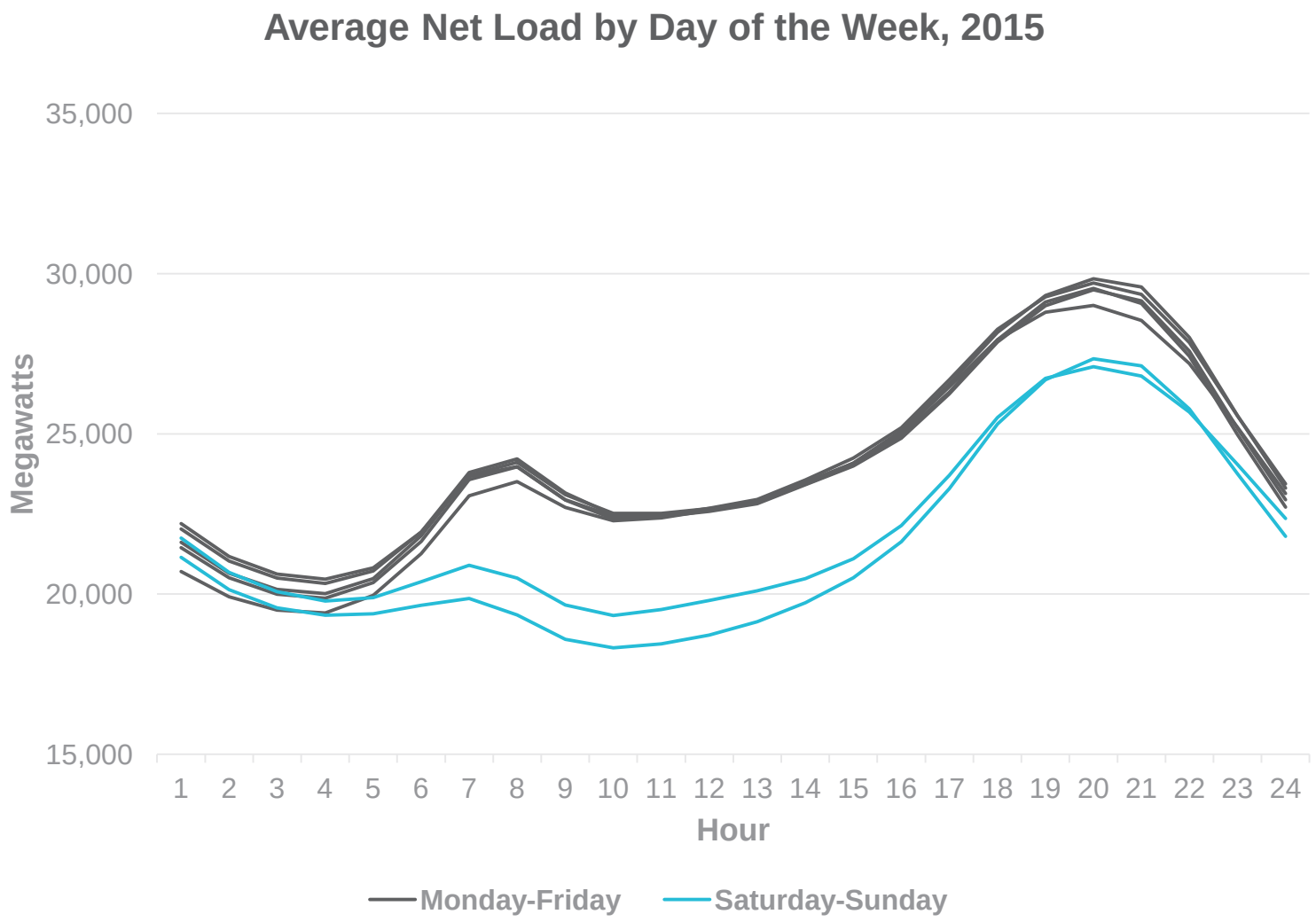
Most Severe on the Weekends



SOURCES:
CAISO; ScottMadden analysis

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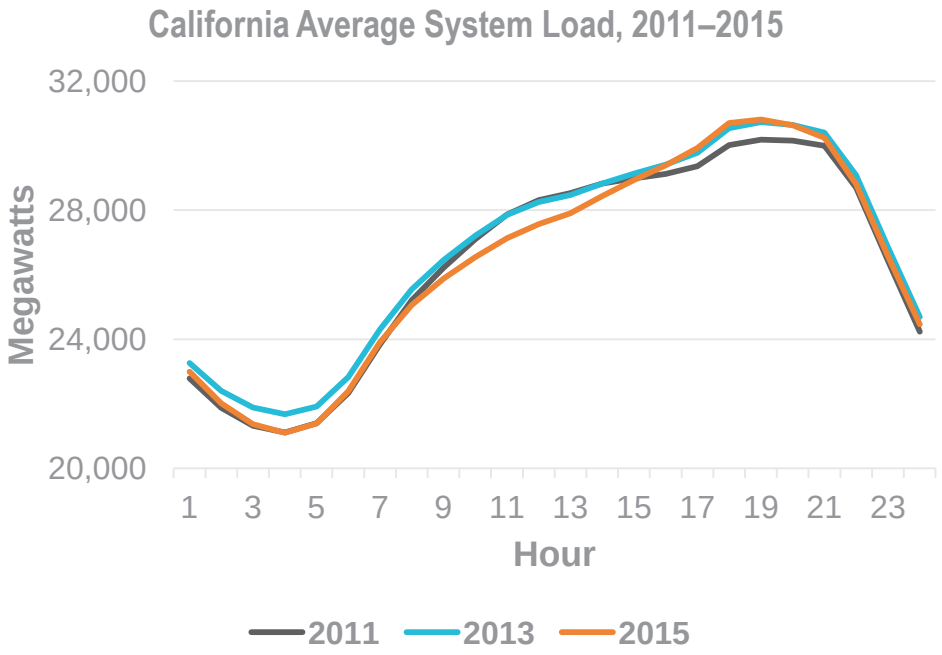
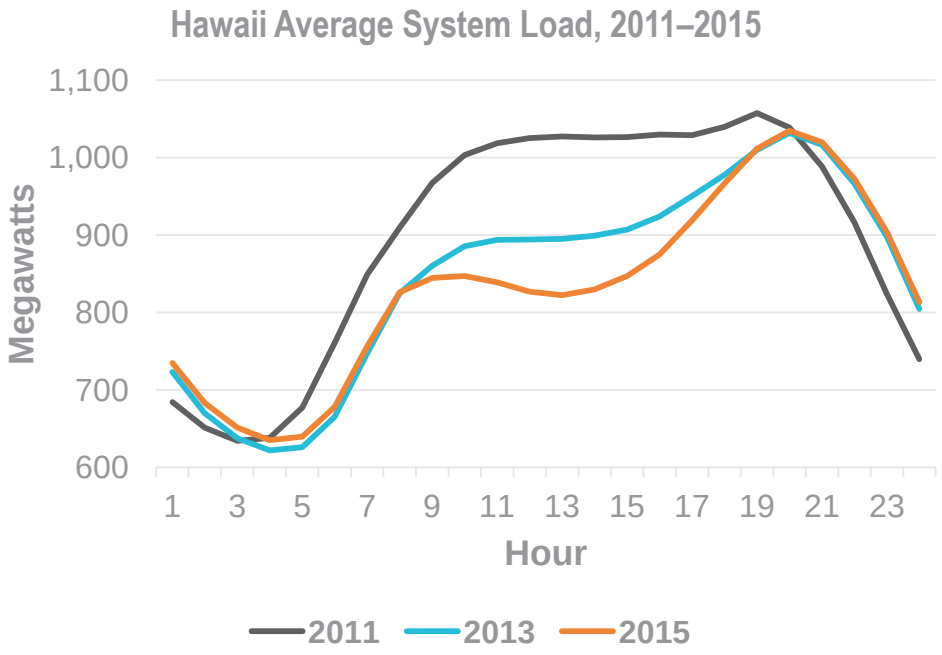
Driven by Utility-Scale Solar, Not Distributed Resources

California and Hawaii Average System Load, 2011–2015





SOURCES:
SNL Financial; ScottMadden analysis

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Duck Curve Key Takeaways

Operational data suggests that projections of the duck curve effect in California are real and in some cases occurring sooner than expected

- Lower net loads than forecast
- Increasing ramps throughout the year
- Most severe on the weekends
- Multiple seasons, not just spring months
- Driven by utility-scale solar in California, not rooftop solar

Understanding the unique causes and behavior can help inform mitigation strategies

- Mitigation strategies should recognize differing behavior depending on the day of the week and the time of the year
- Operational challenge associated with utility-scale solar present the potential for more targeted utility-scale solutions
- But, if you have a distributed solar issue like Hawaii, you will need a solution targeted to distributed resources

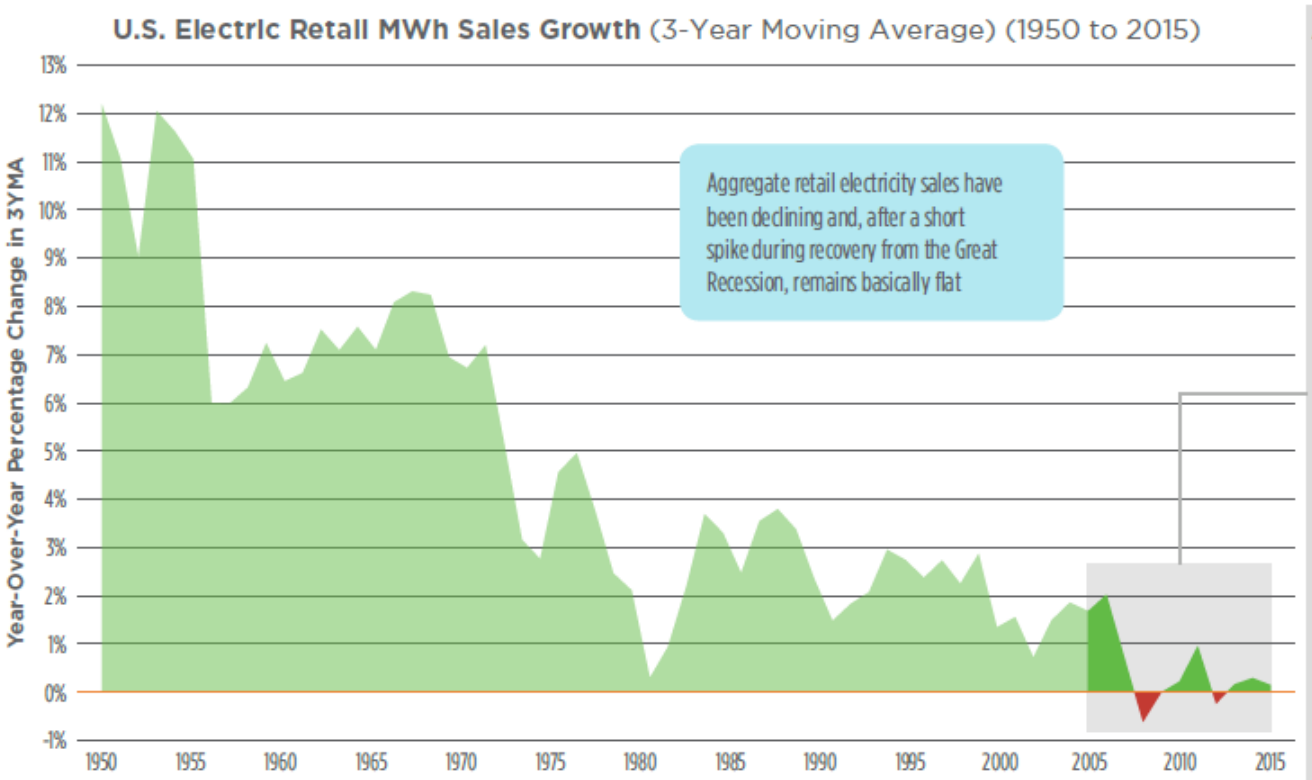
Lack of distributed solar does not make you immune: The duck curve may migrate to other regions sooner than expected

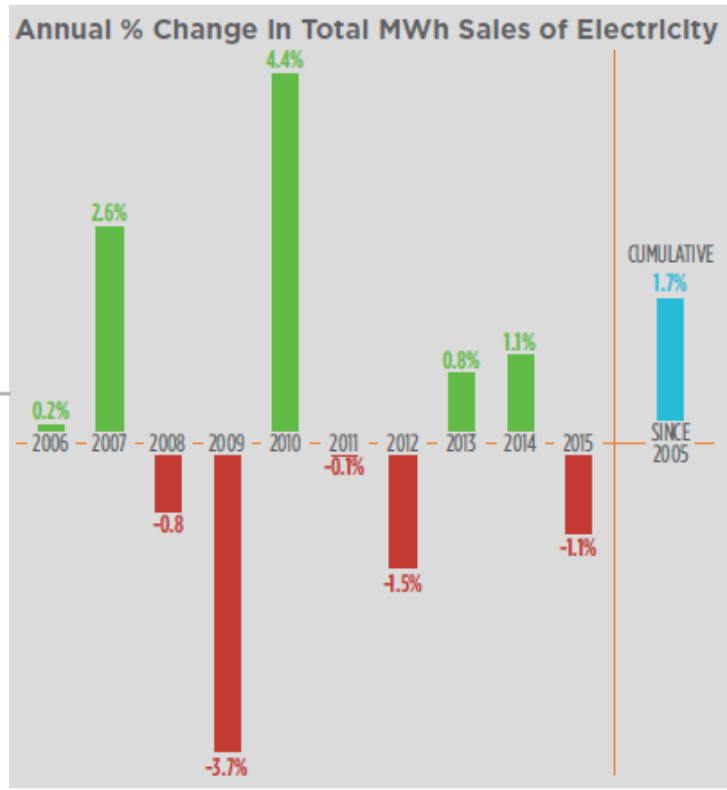
- States to watch in the near term include: Arizona, Georgia, Nevada, North Carolina and Texas
- Each of these states are forecasted to have >3,000 MWs of utility-scale solar by the end of 2021

Declining Demand Growth

Reading the Headlines: Where'd the Load Growth Go?

- U.S. MWH sales growth was only 1.7% cumulatively from 2005 to 2015
- Industry consensus forecasts continued sales growth decline
- Opinions of causes vary – de-industrialization, slow GDP growth, slowing population growth, efficiency
- The good news: revenues per MWh have grown





Source: EIA

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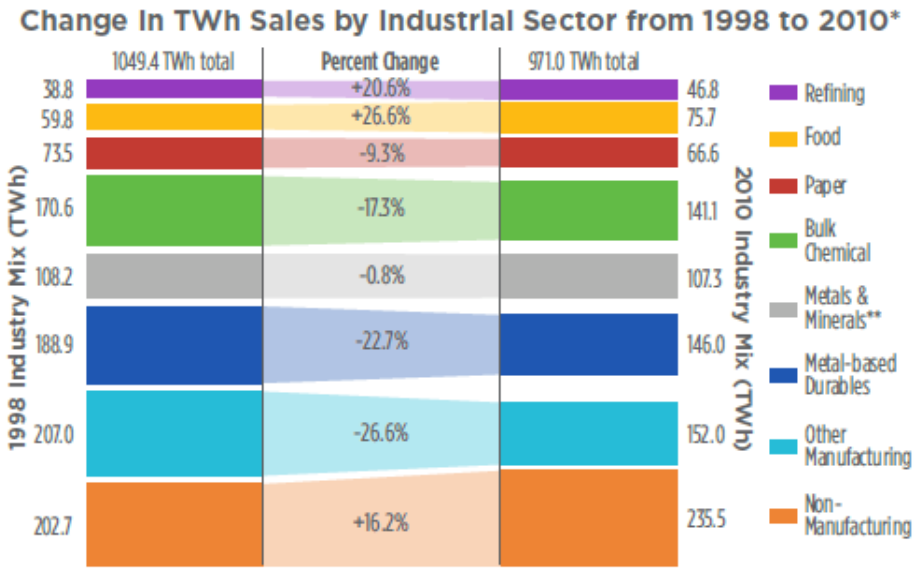
Declining Demand Growth (Cont'd)

Identifying the Culprit: Industrial Did It

- The reason is not de-industrialization—or declining numbers of industrial customers; in fact, industrial customer count has grown
- Instead, the industrial mix has changed to less energy-intensive industries: highly energy-intensive industries

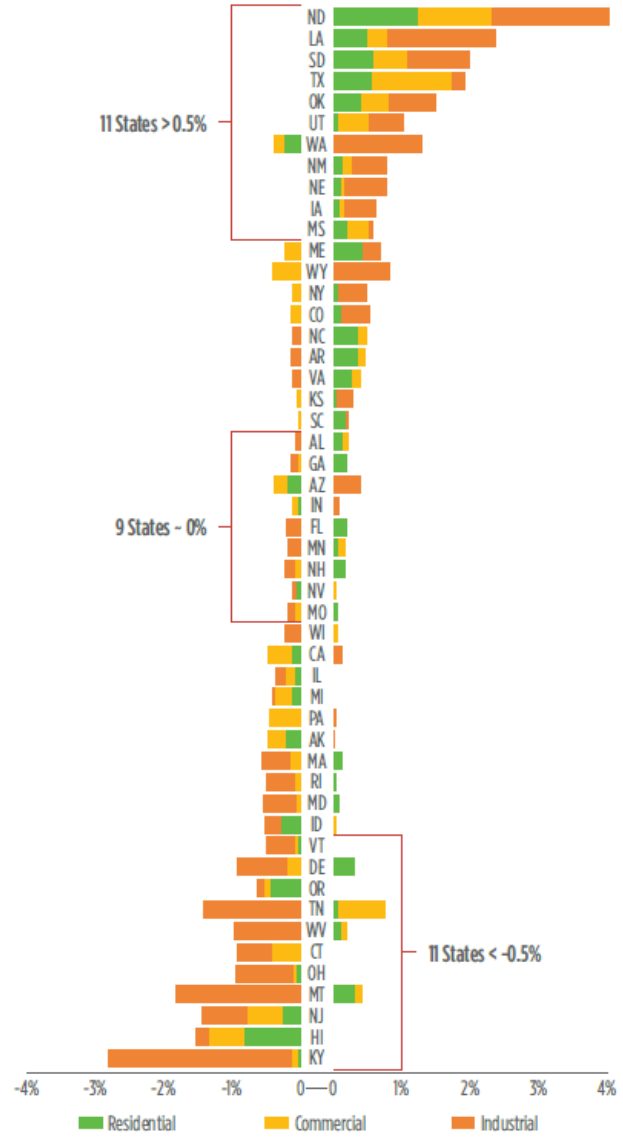


Sources: EIA; ScottMadden analysis

Growth Sightings: All Regions Are Not Created Equal

- Regions with significant oil and gas resources (e.g., around TX, OK, ND) averaged >0.5% annual sales growth since 2008
- 36 states averaged negative or no annual sales growth since 2008

Weighted Electric Retail Sales CAGR (2008 to 2014)



Source: EIA

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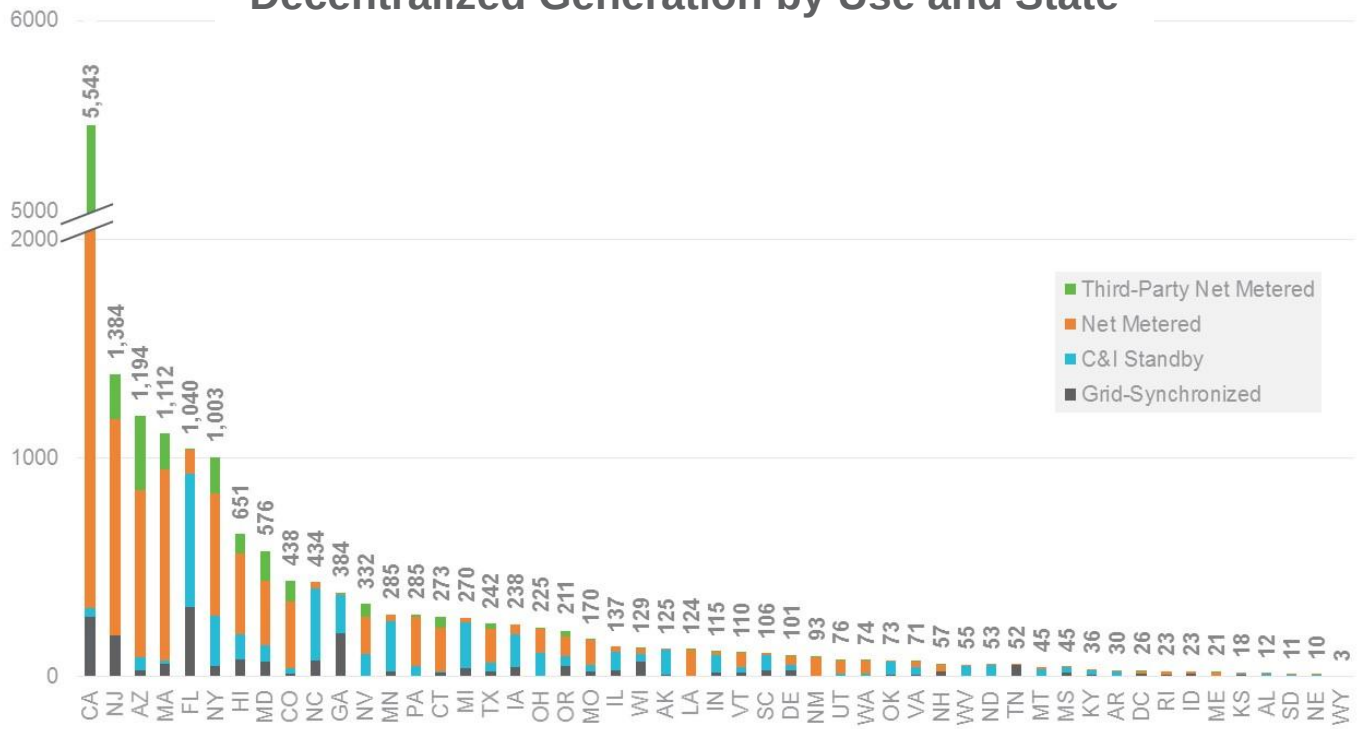
Technology Innovation

Distributed Energy Resources

Decentralized Generation (DG) Grew by 40% in 2015

- Solar Photovoltaic (PV) capacity is 2.7 times all other DG combined; 1.7% of total generation
  - ***How much:*** Year-end 2015 DG totaled nearly 18.2 GWs, nearly tripling since 2010
  - ***Where:*** Top five states—CA, NJ, AZ, MA, and FL—are nearly half of DG. CA is 31%

Decentralized Generation by Use and State



DG as % of Total Nameplate Capacity within State

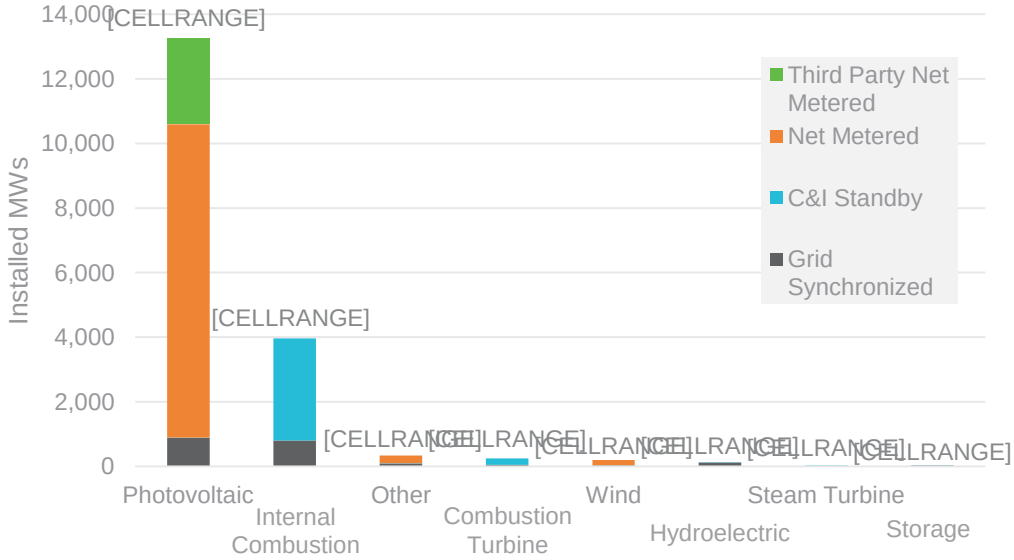
State	%DG
California	6.9
New Jersey	6.7
Arizona	3.8
Massachusetts	7.6
Florida	1.5
New York	2.3
Hawaii	22.3
Maryland	4.2
Colorado	2.5
North Carolina	1.3

NOTES:
The grid-synchronized category includes commercial and industrial generators less than 1 MW in capacity that are grid connected and grid synchronized. The C&I standby category includes commercial and industrial generators less than 1 MW in capacity that are not connected nor synchronized to the grid. The net metered category refers to residential, commercial, and industrial generators that are less than 2 MWs in capacity and maintain a net-metering agreement with the local utility. Due to the nature of the data, it is possible some systems may be double counted. Figures are from 2015, the most recent data available.

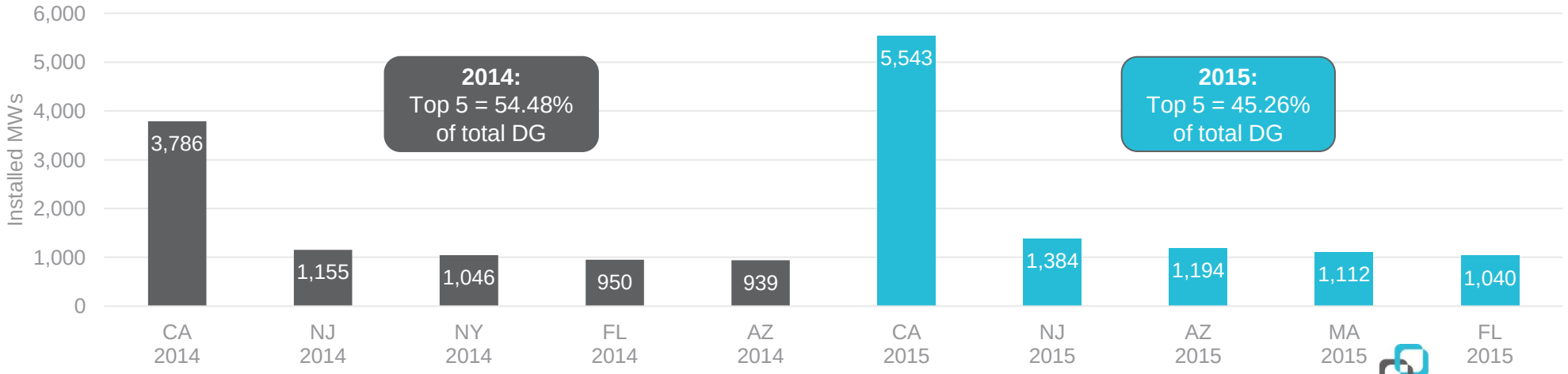
Distributed Energy Resources by State and Type

- DG making headway; solar PV dominating
- 3 main types
  - PV (73%)
  - Internal combustion standby at C&I sites
  - Grid-synchronized generation at C&I sites
- DG expansion drivers
  - Favorable policies (NJ, NY, MA)
  - Favorable (solar) resources (CA, AZ)
  - Declining PV costs
  - High residential electricity prices

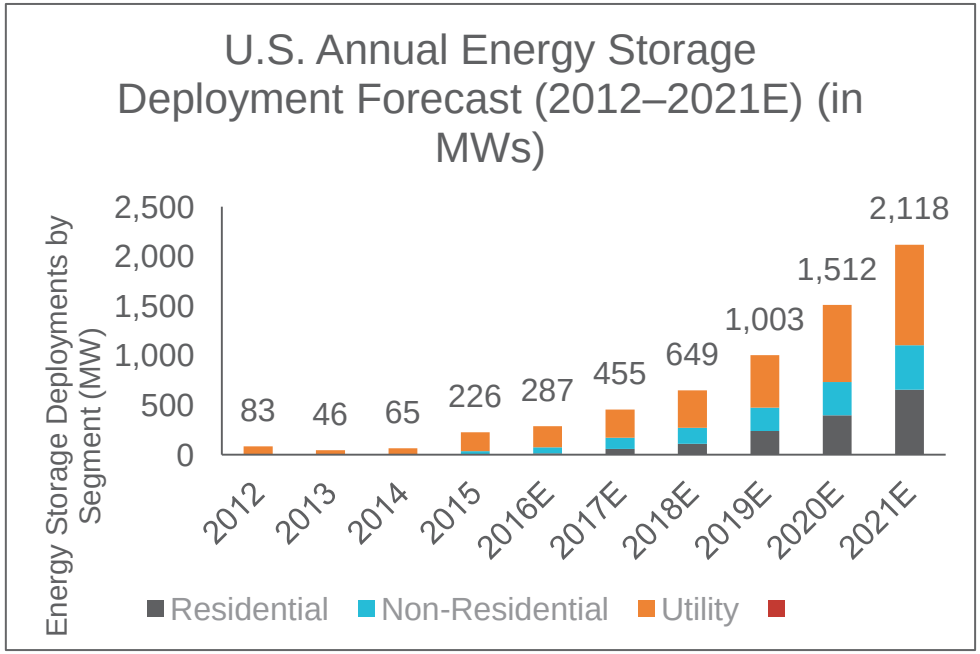
U.S. Decentralized Generation by Use and Resource Type
(Year-End 2015)

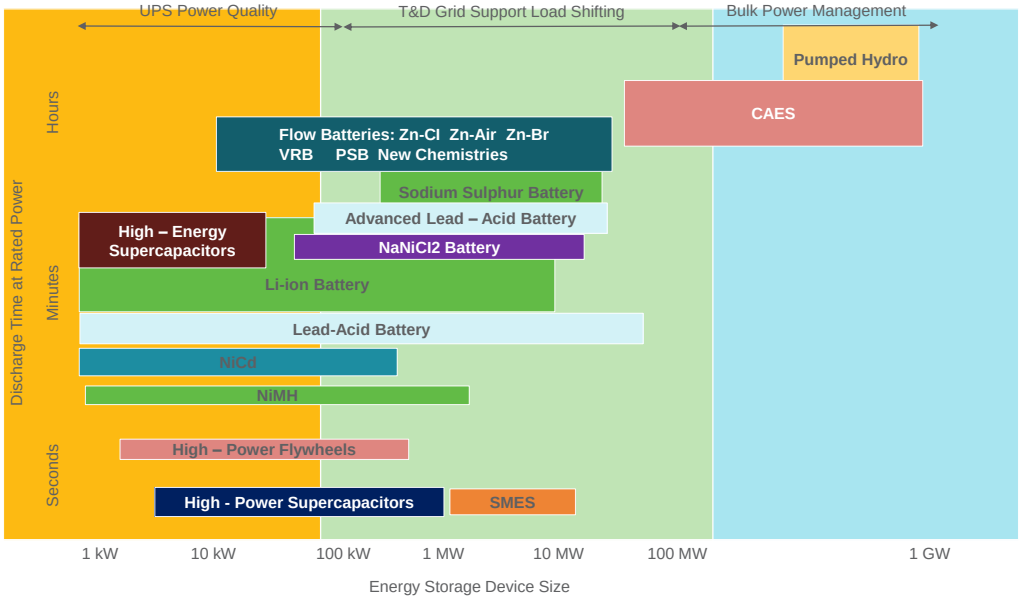


Top States for Cumulative Installed Decentralized Generation
(2014 and 2015)



Energy Storage





- Energy storage is growing but its penetration remains modest compared with traditional power supply resources
- Storage can play different roles depending upon scale and discharge duration – making classification difficult
  - Storage is a hybrid, part G, part T, part BTM

- Key to its value proposition is the ability to "stack" these roles without double-counting, e.g.,
  - Capacity
  - Variable supply smoothing
  - Ancillary services
  - Trans. congestion relief
  - Peak load shaving
  - Dist. voltage support

SOURCE:
DOE/ERPI Energy Storage Handbook in Collaboration with NRECA, February, 2015

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Electric Vehicles: Convergence of IoT, Autonomy, Ride-Sharing

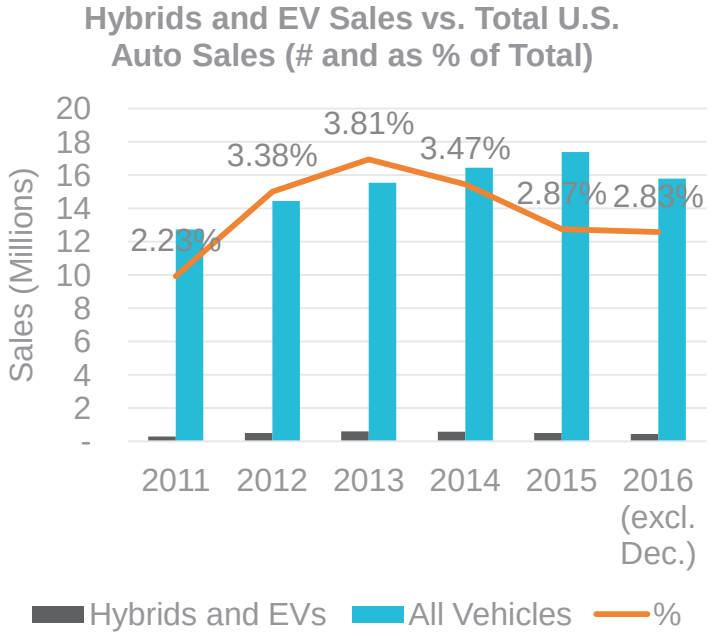
Big Money and Increasing Interest Coming out of the Shadows

Google spins off autonomous driving business into subsidiary Waymo; pursues battery technologies, charging infrastructure development, and wireless charging for its autonomous car concept

Project Titan officially recognized by Apple, sending a letter to NHTSA signaling commitment to self-driving cars, stating Apple is "investing heavily in the study of machine learning and automation, and is excited about the potential of automated systems in many areas, including transportation"

Ford indicates interest in developing truck, SUV Evs, moving beyond "compliance mind-set" – i.e., just to satisfy regulatory requirements;" announces that it will produce a high-volume, fully autonomous vehicle for operation in 2021 for commercial operation for ride-hailing, ride-sharing

But Enthusiasm May Need to Be Tempered



- EV development now focused on autonomy, sharing (utilization), and charging infrastructure
- With $2 to $3 gasoline and average passenger car age of over 11 years (compare 8.5 years in the mid-1990s), EV adoption will be a slow process

SOURCES:
Inside EVs; EDTA; industry news

Changing Regulatory Compact

State vs. Federal Jurisdiction

Making a Market…and Adjusting It…and Adjusting It

- FERC restructured the power industry in 1996 with Order 888 to unleash market forces and drive down prices
- Over time, "pure" wholesale electricity markets have been adjusted
  - Price caps and minimum offer price rules
  - Administratively drawn demand curves
  - Capacity markets/capacity performance products
- PJM has proposed a change in capacity auction design
  - Remove subsidized resources/commensurate load
  - Devise price administratively (nudges price upward)
  - Replace subsidized resources

States Are Pushing to Manage Outcomes

- Expanding and incentivizing renewables and distributed energy resources
- Suppressing price increases and spikes for state residents and businesses
- Encouraging generation development and retention of existing power plants
- Implementing their own environmental/carbon policies

- There is a range of options between "pure market" and "pure centrally planned"
- We are combining them in unanticipated ways, like putting pieces together from different puzzles
- This can produce unintended consequences

State vs. Federal Jurisdiction – Recent Battlegrounds

Area	Situation
PURPA and Community Solar Rates ▪ Pending at FERC	▪ Maryland implements pilot community solar (CS) regulations ▪ Local utility "must use" excess CS generation and pay retail rate. Utilities say: • They can only use excess CS by reselling to customers, thus it is a wholesale sale • CS generator must be a "qualified facility" under PURPA • So CS generation offtake, therefore, should be compensated at wholesale avoided cost rate, not retail rate per Maryland rule
Ohio Power Plant Income Guarantees ▪ Pending at FERC	▪ Ohio PUC approved a subsidy plan providing income guarantees to FirstEnergy's and AEP's Ohio utilities for their share of the output from certain "vital" power plants (largely aging coal plants) that face economic challenges ▪ Cost of the 8-year subsidies would be recovered through a non-bypassable distribution "rider charge" assessed to all end-use customers (including those with competitive energy suppliers) in the Ohio service territories ▪ Power suppliers said the guarantees will distort wholesale bids
New York Zero Emissions Credits (ZECs) ▪ Approved by NY ▪ Challenges at FERC	▪ New York has proposed awarding ZECs to certain nuclear plants, rewarding their carbon-free characteristics and incenting them to remain online ▪ ZECs are calculated using the federal estimate for social cost of carbon, carbon emissions credit values, and an avoided energy cost based upon a forecast $39/MWh reference price ▪ Some power suppliers and fossil fuel providers oppose the plan, claiming it will suppress prices in the New York ISO

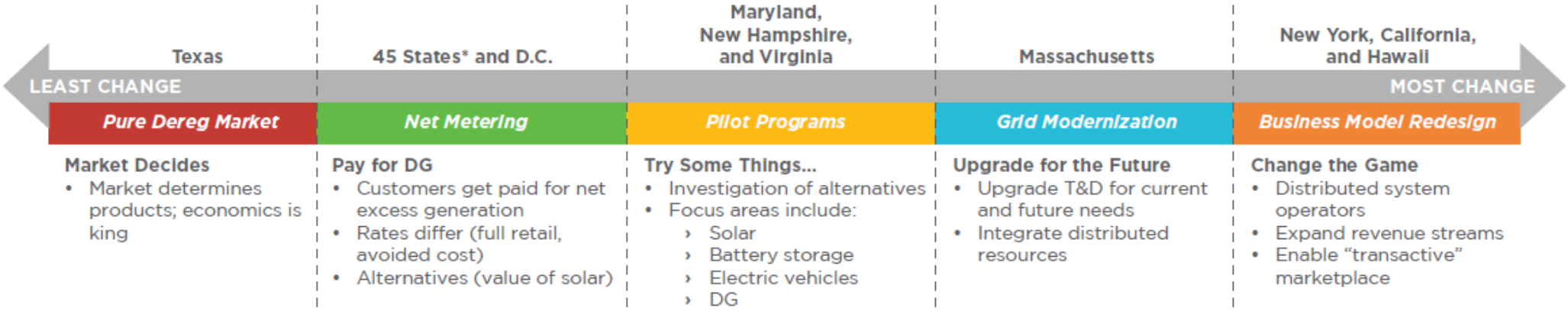
State vs. Federal Jurisdiction (Cont'd)

A Delicate, but Uncertain, Balance

- Recent Supreme Court decisions have been narrowly tailored to avoid categorically affording federal or state primacy
  - States can have measures to encourage new or clean generation
  - But these must be "untethered" from wholesale market participation
  - So what the hell does "untethered" mean?
- This makes the so called "bright line" between state and federal jurisdiction hard to see. This uncertainty could lengthen lead time and increase risk and related costs for generation investment
- The Energy & Commerce Subcommittee of the House Energy & Commerce Committee has begun hearings to examine the Federal Power Act in light of the evolution and jurisdictional conflicts in the organized wholesale electric markets

REV vs. California and a Continuum of Approaches

Laissez Faire to Radical Redesign: A Continuum of Responses



Key Questions

Area	Situation
Stakeholders	▪ Who gets a say? ▪ For what issues?
System Planning	▪ What resources will be where, when? ▪ How do I know it will be reliable?
Operations	▪ Who operates what, where, when, and how? ▪ What's actually out there anyway?
Pricing	▪ How do we price the products we offer? ▪ What are customers willing to pay?

Area	Situation
Regulatory	▪ What are the rules? ▪ How and when will they change?
Revenue Generation	▪ How doe the utility make money?
Customers	▪ What do they really want? ▪ What services? ▪ How much control? ▪ How much information?

NOTES:
*Includes four states with statewide DG compensation rules other than net metering.

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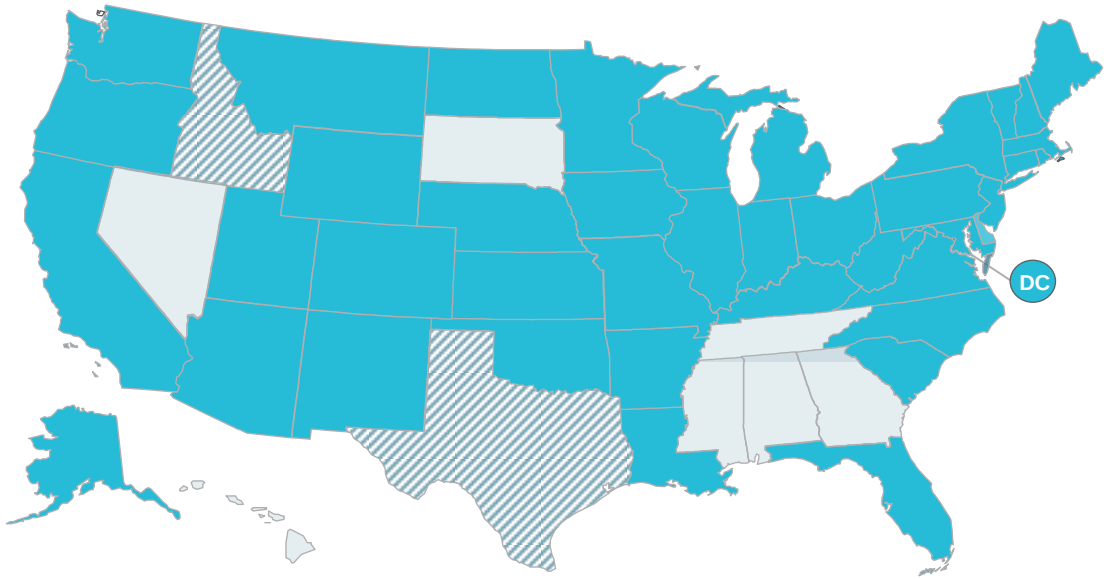
Net Metering

As of July 2016, 41 states, plus D.C., and three U.S. territories (American Somoa, U.S. Virgin Islands, and Puerto Rico) have mandatory net metering rules in place, but the state of the debate varies widely.

Net Metering Rules by State (July 2016)



U.S. Territories:

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KEY

- States with net metering policies(41 states + DC + 3 territories)
- States with voluntary utility policies (2 states)
- States with DG compensation rules other than net metering (4 states + 1 territory)

SOURCES:
DSIRE (www.dsire.org); SNL Financial; National Conference of State Legislatures (www.NCSL.org); ScottMadden analysis

Status	State	Recent Developments
Full Speed Ahead	CA	■ Sustaining net metering at retail rate
Proceeding Cautiously	MN	■ "Value of solar" tariff; voluntary alternatives to net metering
	AZ	■ Debate over demand charges; ends net metering, but grandfathers customers at lower comp.
Pumping the Brakes	HI	■ Net metering ended in 2015; now "grid-supply" or "self-supply"
	NV	■ Cap reached in 2015; grandfathered (pre-2016) customers paid retail after legal battle; reopens net metering in Sierra Pacific territory

Adaptive Utility Strategies

Strategy Comparisons

Shifting focus back to the core business, increasing grid investments, and testing expanded customer-centric offerings.

Strategy	Examples
"Reinforce Tried and True" *Continue regulated investments in core infrastructure*	▪ **Duke:** more than $18B by 2020, including generation, T&D, environmental, and other additions ▪ **Dominion:** nearly $16B in generation, T&D, LNG, and gas pipeline by 2020
"Build the Platform" *Accelerate investments in system digitization and automation*	▪ **Exelon:** $25 billion in critical infrastructure, smart grid technologies, reliability measures, and customer service programs in regulated utilities ▪ **Southern California Edison:** plans to invest $2.3B in DER-related upgrades
"Optimize Rate Structure" *Redesign rates to reflect the changing industry landscape*	▪ **Arizona Public Service:** rate reform for its residential customers with rooftop solar ▪ **SMUD:** optional time-of-use rates for customers with DERs, expanding to all customers
"Be (a Bit) Unconventional" *Expand into energy services*	▪ **Edison International:** launched Edison Energy ▪ **Southern Company:** acquired PowerSecure
"Consider Inorganic" *Assess growth opportunities through acquisitions and JVs*	▪ **NextEra Energy:** proposed $18.7B acquisition of Oncor ▪ **Dominion Resources, Duke Energy,** and **Southern Company:** recently announced major acquisitions of natural gas utilities and pipelines

NOTES:
DER means distributed energy resources
SOURCES:
SNL Financial; industry news; investor presentations; company annual reports; EIA; GTM; Rocky Mountain Institute

Mergers and Acquisitions

Gas and electric utilities continue to look for opportunistic acquisitions, especially in the rate-regulated utility and pipeline space.

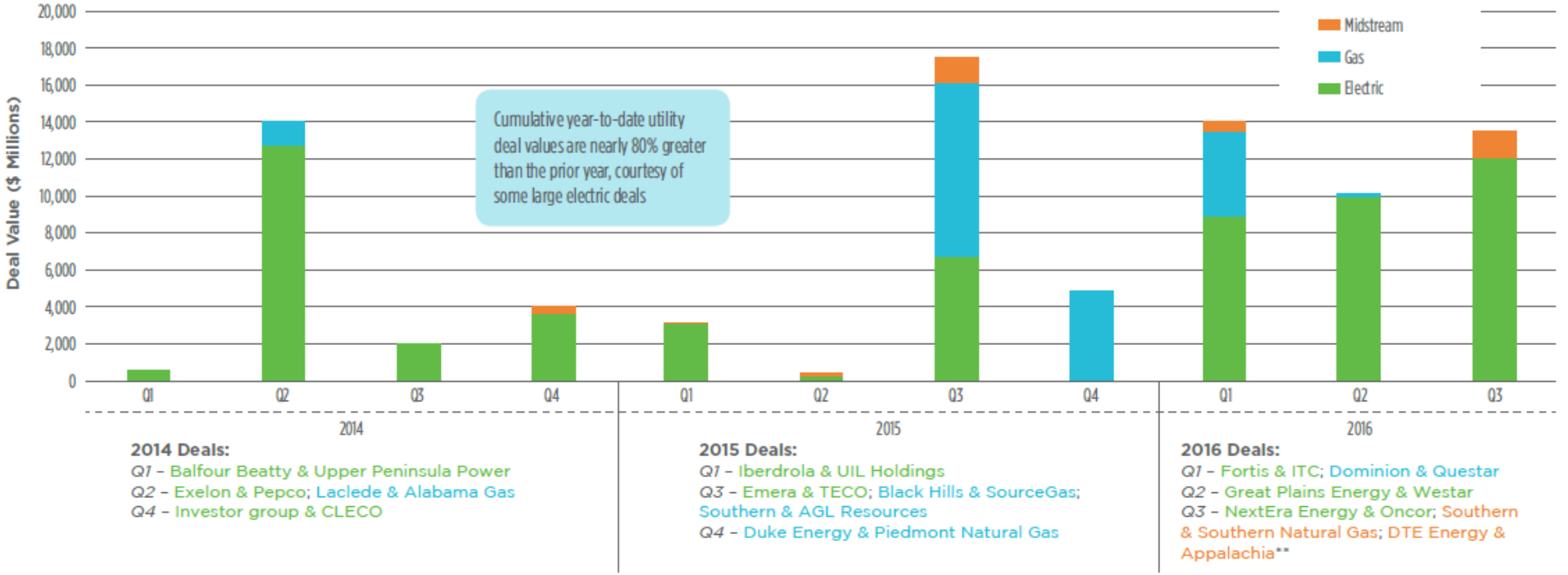
Many Strategies, One Rationale: Sustainable Growth

- 17 transactions totaling more than $37 billion announced through late September
- In Q2 and Q3, buyers shifted focus to peers in search of geographic adjacencies and economies of scale (Great Plains/Westar) and portfolio diversification (Algonquin/Empire District and NextEra/Oncor)
- Southern especially active in 2016
  - PowerSecure
  - 50% equity stake in Southern Natural Gas Pipeline
- Some continue to expand midstream gas capabilities as a core business (Dominion/Questar, DTE Energy/Appalachia) or as a continuation of a convergence play tied to increasing amounts of gas-fired generation and increased midstream participation (Southern)

> "…It's likely not a coincidence that vertically integrated electric utilities target T&D-only electric or gas utilities as prime acquisition targets. They have only one shot for a large acquisition using their balance sheet capacity, and as such they are likely to pick a utility with the most sustainable business model…"
>
> *-Angie Storozynski, Macquarie Research*

Mergers and Acquisitions (Cont'd)

U.S. Energy Utility and Selected Midstream Sector Deal Value by Announcement Date (Quarter) and by Target Sector Type (in $ Millions)*



Source: SNL Financial

Expect More of the Same, But What about Interest Rates?

- Vertically integrated utilities expected to seek out T&D (electric and/or gas) opportunities to achieve growth while limiting regulatory risk (vs. generation)
- Utilities to partner with unconventional energy services and emerging technology developers – complementary revenue streams and manages threats
- Increasing ratios could threaten earnings accretion and tilt scale toward organic growth strategies

NOTES:
*Includes sales of minority interests, deals announced but not closed, and joint venture investments (e.g., Southern and Kinder Morgan's Southern Natural Gas JV); deal value is equity portion of acquisition value, excluding debt assumption. **Not reflected in deal value summary
SOURCES:
SNL Financial; Macquarie Research; UBS; Morgan Stanley; J.P. Morgan; Barclays; ScottMadden analysis

Behind-the-Meter: Competition or Cooperation?

"Contestable" consumer services open to competition

Australian regulators mandate distribution network service providers (wirecos) to separate their regulated business activities, costs and revenues from other unregulated services, such as solar PV and battery installations

Behind to front: front-of-meter rooftop solar demonstrations

Arizona Public Service approved to offer solar PV on utility side of meter together with smart inverters to permit ramping; offering $30/month rooftop lease payment

BTM storage as a service offering

San Diego Gas & Electric plans new BTM storage: new CA law that allows utilities to own 500 MWs of BTM storage, using ratepayer money to finance the investments, so long as it does "not unreasonably limit or impair the ability of non-utility enterprises to market and deploy energy storage systems"

Building energy services presence

In March 2016, Edison International launched Edison Energy, merging four stand-alone service companies into one seamless offering for commercial and industrial customers

SOURCES:
Industry news

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Impact of a New Administration

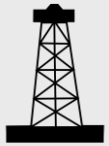
Pundits' Greatest Hits

The Early Prognostications for the Trump Administration	
Clean Power Plan (or CPP) 	■ Endangerment finding is still in effect, even if CPP is largely halted or slowed down under the new administration ■ Administration could moderate the CPP or halt or slow enforcement, potentially through Congressional funding and budget reconciliation process ■ Stated intent of new administration is to "return environmental leadership to the states"
Carbon regime 	■ Remains largely with states, so localized exposure to rules in places like California ■ Mixed opinion on how difficult it may be to exit
Nuclear power development 	■ A "clear bipartisan issue"

House Republicans have warned the Obama administration against rushing through controversial regulations and have threatened to use Congressional Review Act resolutions to nix major rules that are finalized at the end of Obama's term. Given that CRA procedures count back 60 legislative days, such actions potentially imperil a host of rules completed in recent months. – *Platt's (Nov. 23, 2016)*

SOURCES:
Morgan Stanley; Deutsche Bank; UBS; FitchRatings; SNL Financial; Van Ness Feldman

Pundits' Greatest Hits (Cont'd)

The Early Prognostications for the Trump Administration	
Renewables development 	■ Renewables subsidies – i.e., PTC and ITC – were extended by bipartisan agreement and are scheduled to sunset, so the new administration may not work to undo immediately ■ A domestic manufacturing supply chain is involved, particularly for wind in key Midwestern (red) states ■ State RPS's continue to be a key driver as well as declining installed costs ■ Administration can change IRS safe harbor rules on when construction begins to shorten up credit availability
Oil and gas development 	■ Federal policies, particularly oil and gas E&P on federal lands and waters, expected to favor continued abundant gas supply ■ The new administration could decline to defend rules challenged by industry aimed at curbing venting and flaring from oil and gas operations and limits on methane emission from new oil and gas infrastructure

SOURCES:
Morgan Stanley; Deutsche Bank; UBS; FitchRatings; SNL Financial; Van Ness Feldman

Pundits' Greatest Hits (Cont'd)

The Early Prognostications for the Trump Administration	
Coal Comeback 	■ Continued price pressure from gas (see hydrocarbons development above) will continue to challenge coal producers and generators; no announced plans to date to reconsider coal plant retirements ■ Unclear how coal-fired generation will fare until clarity on path forward for the Clean Power Plan
Tax Reform 	■ Republican plan of 100% expensing of capex, non-deductibility of interest, and lower corporate rates could lower rate base and cash flows (reduced revenue requirements), especially for utilities with a significant amount of leverage at the parent company level

SOURCES:
Morgan Stanley; Deutsche Bank; UBS; FitchRatings; SNL Financial; Van Ness Feldman

Thank You!

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