The Dawn of DER?

2016 CEE Annual Meeting

December 7, 2016

Enovation Partners and Cleantech Group

Launched in July 2013. Investors including Gas Technology Institute and West River Group (LPs include Kaiser Foundation, Tudor Investments, 2σ)

Focused on driving innovation to resources and infrastructure sectors

- Distributed Energy Resources
- Natural gas growth
- Open Innovation

Advisory services delivery model

- Leverage proprietary analytics, data
- Differentiated market insight
- Experienced team, senior industry relationships

Acquired **Cleantech Group** in Jan. ’16 to serve corporate, investor communities

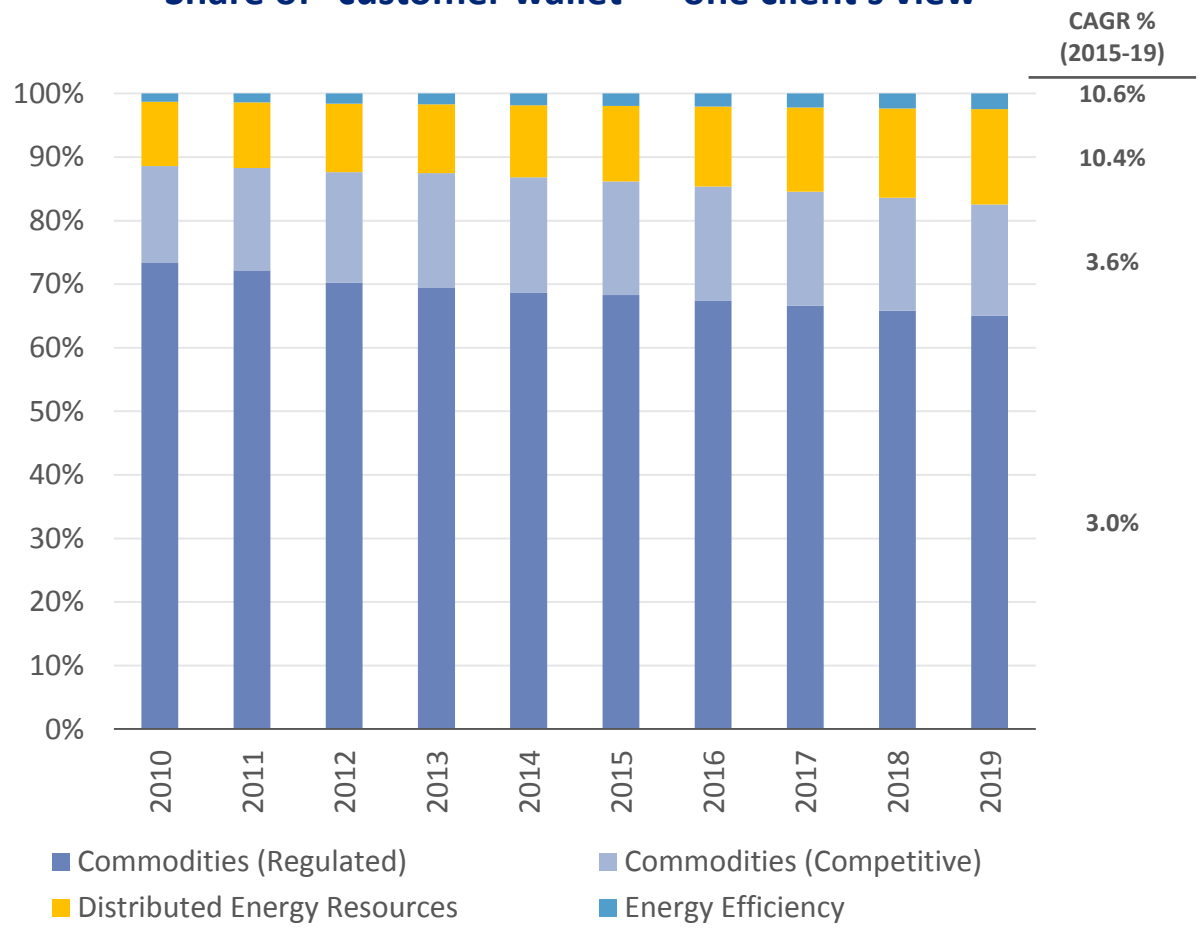
- Cleantech Forum, Roundtables
- I3 – online cleantech networking platform
- Proprietary, in-depth market insight and analysis

EP named one of “7 to Watch” in Feb ‘16 issue

EP’s capabilities and innovative model featured in Aug ’15 cover story

DERs are playing a growing role in US electricity supply

Share of "customer wallet" – one client's view



Observations

Potential impact on central station supply…

- DER gains share of additions over next decade (~50% to ~90%)
- Absolute growth in DER over 9%
- Diesel and gas reciprocating engines are dominant forms; Solar PV grows from 5% to 20%

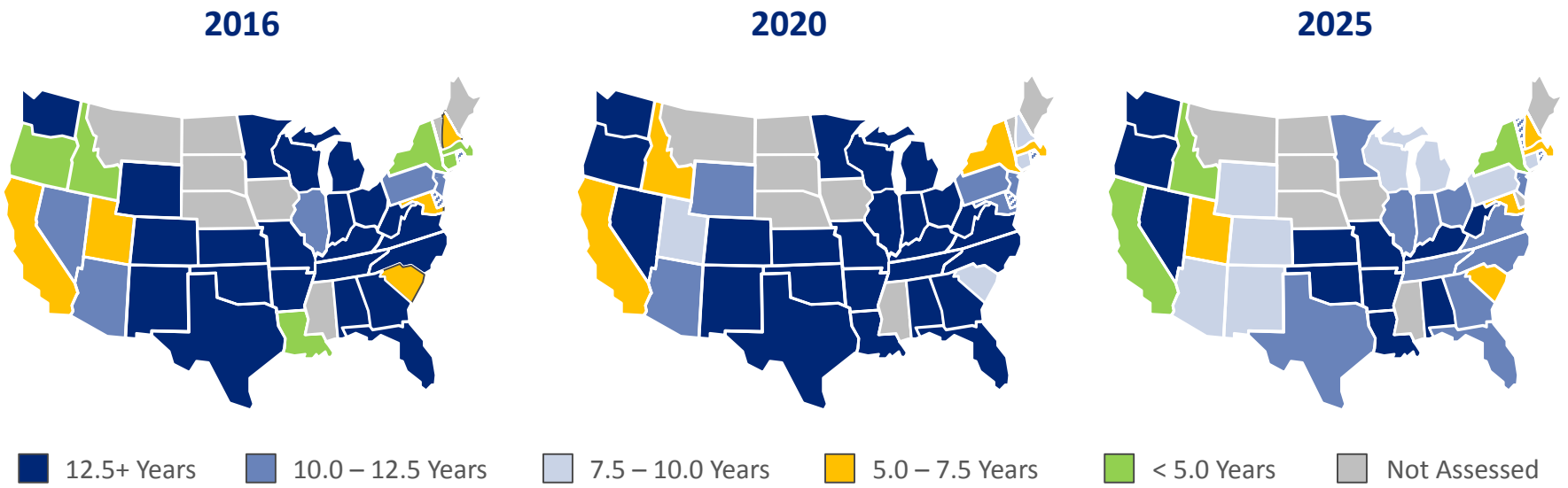
… and on serving the customer

- Reduced demand
- New margin sources, stickier customers when bundled with traditional offer
- New business models - DG and customer aggregator, via new software platforms

Distributed Generation includes: Boiler / steam turbines, Combined cycle, Combustion turbines, fuel cells, NG gensets, microturbines, solar PV, storage and NG reciprocating engines
Source: EIA, KEMA, SEIA, Lawrence Berkeley National Lab, NETL, Lazard, ICF, EGSA, EP analysis

The DER experiment is progressing - but in many different directions

Net Energy Metering – Residential Rooftop



- Even under conservative assumptions, residential PV should be economically attractive to a large share of US households by 2025
- Changes in tariff structures to will change customer adoption and the resultant DER mix
- Solar is not the only technology in the DER toolkit

Source: EIA, EP analysis

Multiple, mutually reinforcing factors are propelling this change

Technology

- Cost declines allow for rapid deployment
- New business models
- Finer demand control increases the value of load

Customer

- Secular decline in load growth
- Signs of increased affinity, awareness
- Control, convenience, predictability vs. complexity

Competition

- Explosion in data collection, control, analytics
- Many new/established players vying for share of DER
- Rents to whom – devices relationships, local labor

Regulation

- States lead – as always – in multiple directions
- Growing consensus on non-volumetric/CapEx incentives
- Balkanization of regulatory climate

Current rapid development of DER poses (potential) challenges to IOUs

Issues	Impact	Examples
"Excessive" DER adoption	• Higher cost • Relatively inefficient source of GHG reduction • Increased system costs and instability • Regressive cost shifting across consumer base	Hawaii
DER mis-located	• Increased system costs • Increased DER costs • Reduced system reliability	Southern California (PV facing south)
Lost demand = lost income	• "Death spiral" – lower demand, higher rates, more defection	European utilities
Lack of control over DER – planning, operations	• Higher system and DER costs • Reduced system reliability	Everywhere

Utilities are experimenting with multiple levers to address the threat

Issues	I. Revenue model: A. Decoupling (inc. PBR)	I. Revenue model: B. Rate structures	I. Revenue model: C. NEM reform	II. DER participation	III. DER integration
"Excessive" DER adoption	◐	●	●	◐	○
DER mis-located	○	○	○	◐	●
Lost demand = lost income	●	○	◐	●	○
DER control	○	○	○	●	●

Policy Lever Fit

● Primary ◐ Partial ○ Not applicable

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