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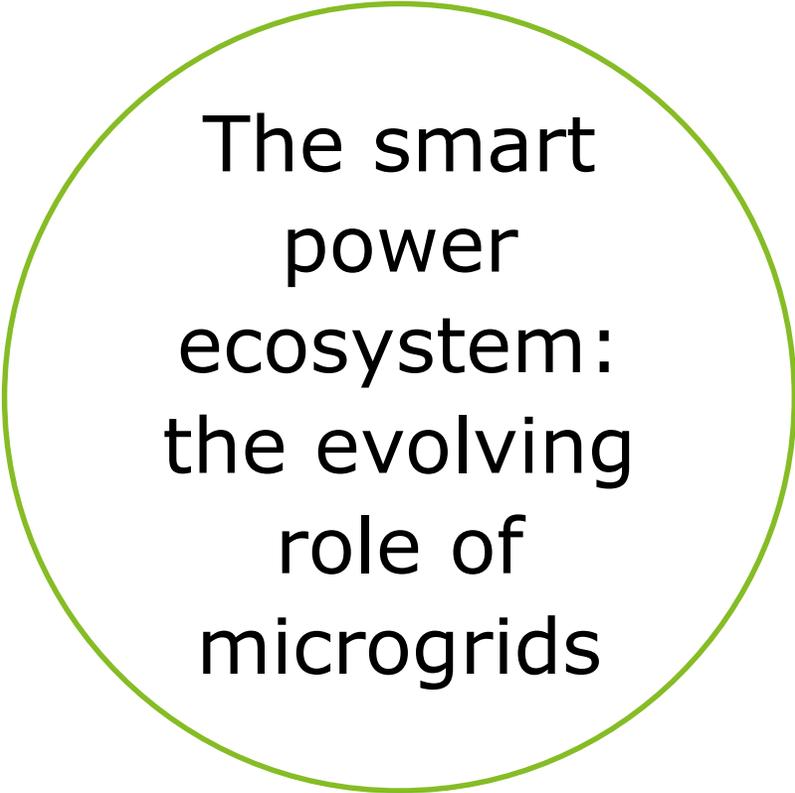


2016 Deloitte Alternative Energy Seminar

Setting new sights

November 14-16, 2016

Deloitte Center *for*
Energy Solutions



The smart
power
ecosystem:
the evolving
role of
microgrids

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Six trends are disrupting the energy market

More efficient, cost effective supply alternatives

Renewables (solar, wind) are increasing more cost effective and efficient

Storage technology (Li-Ni batteries) is evolving



New "Smart" enabling technologies (e.g. IoT)

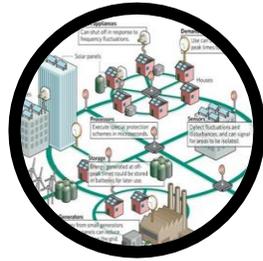
New sensors, meters, and other devices allow easy collection and monitoring of energy data

This technology facilitates both energy efficiency and customer choice

Shifts in customer expectations

Commercial/Industrial customers are increasingly more sophisticated and looking for most cost effective, greener and more reliable energy solutions

This demand is often driven bottom up - 32% of millennials say they definitely / probably will buy a smart energy appliance and strongly skew toward green 'consciousness'



Distributed power solutions (e.g. Microgrids, Smart Campuses)

Integrated multi-faceted solutions – with off-grid capability

Campuses and institutional customers are leading the way

"Greening" regulatory environment and subsidies

Regulation at the Federal/State level is driving conversion from fossil fuels and support of renewables development

Tax credits (ITC/PTC) extended

Distributed Energy Resources (DERs) initiatives expanding

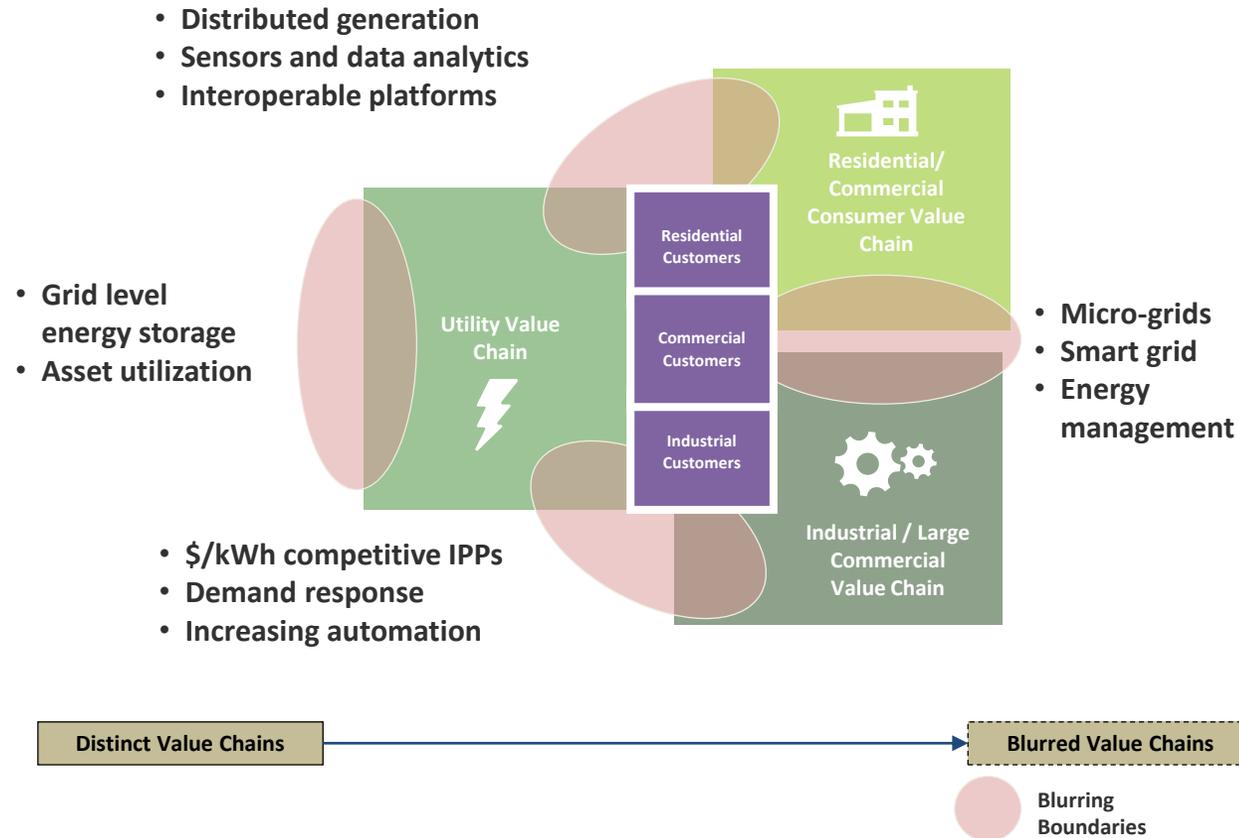


Sophistication of service providers

An increasing number of competitors are entering the market to provide energy solutions to companies

? *Trump administration impact*

These trends are blurring traditional boundaries



Evolving power market

Market size is > \$1T

Multiple interconnected ecosystems

Blurring interfaces between markets

Hybrid markets and solutions

Innovation and scale is accelerating

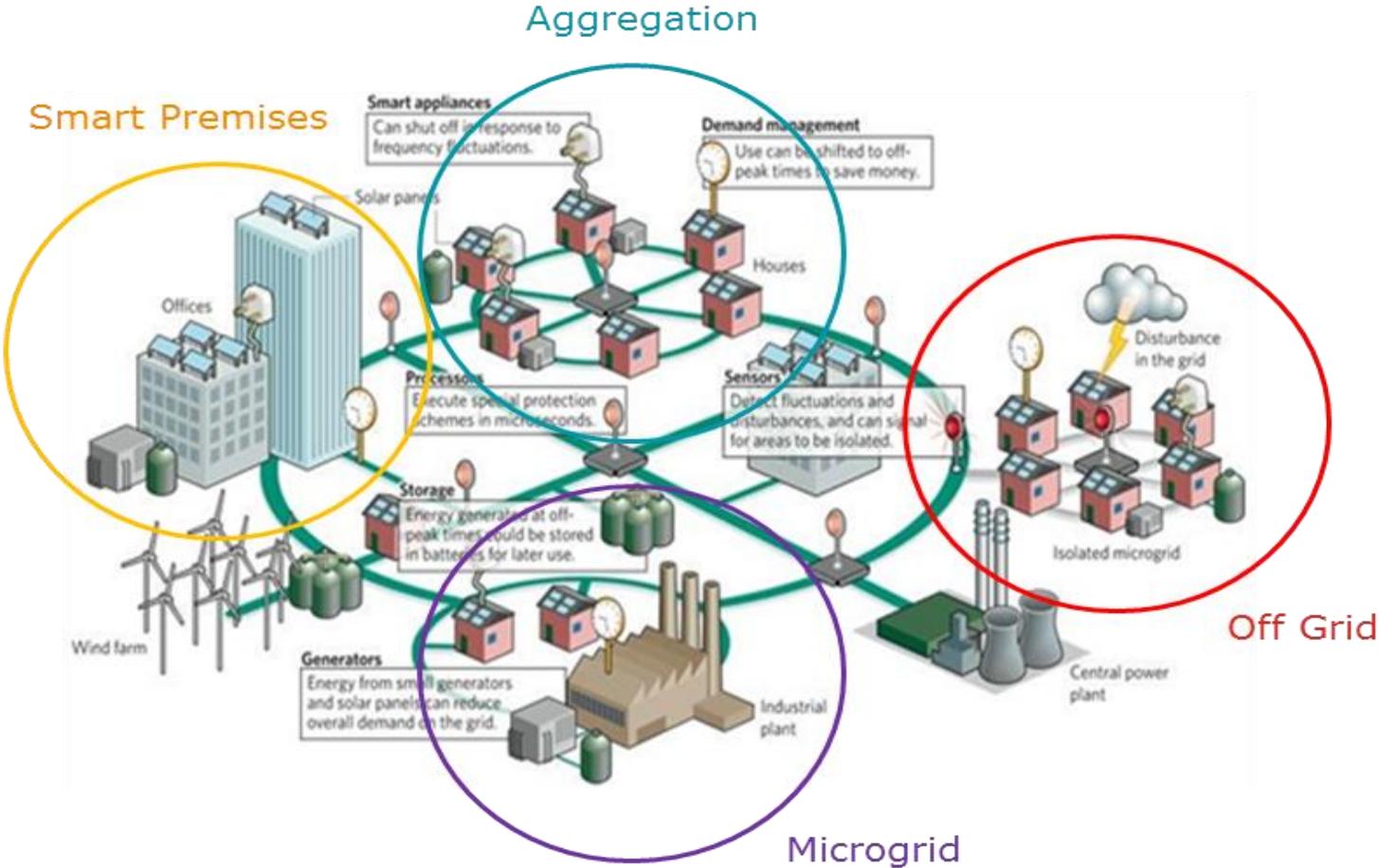
IoT development is critical – but is it differentiating long-term

Push/pull between central and edge solutions

Devices, data and connectivity gaps

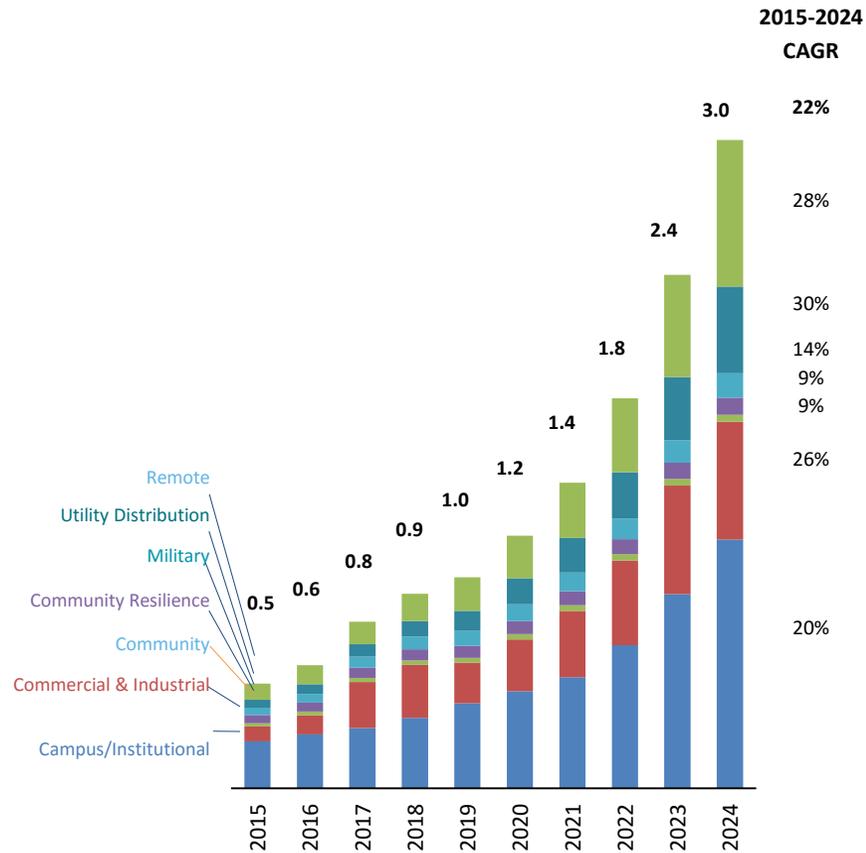
The end-game is likely a complex hybrid power market featuring multiple, often integrated intelligent solutions

Hybrid Power Market



Micro-grids are a key element – and interest is increasing

Cumulative Microgrid Capacity (GW, 2015-2024)



Examples



CPS Energy (San Antonio)

- Deployed smart grid to power 740,000 customers, leveraging advanced metering, automation, and demand reduction



State of Connecticut

- Building 9 microgrids for \$18 million to deliver more reliable power in the aftermath of Hurricane Sandy



San Diego Gas & Electric

- Building a microgrid in Borrego Springs, CA which is isolated by 6,000 foot mountains and a desert

Microgrids - Questions Across the Ecosystem

Market Potential – Hybrid Market Development? Share of Market? Complement the Grid? Off the Grid?

Value Creation – How Do We Create Value? Is There Significant Value – to Customer? To Providers?

Competitive Advantage – Who Is Positioned to Lead Market? Role of Incumbent Utilities?

Uncertainties – How Tied to ‘Green’ Mandates? Data? Emergent Technologies, e.g. Storage? Extension Into Community Power?

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