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**2016 Deloitte Alternative Energy Seminar**

Setting new sights

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**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)

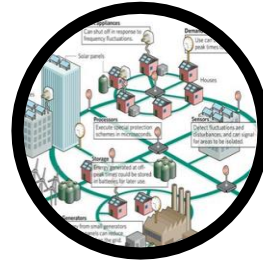
New sensors, meters, and other devices allow easy collection and monitoring of energy data

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

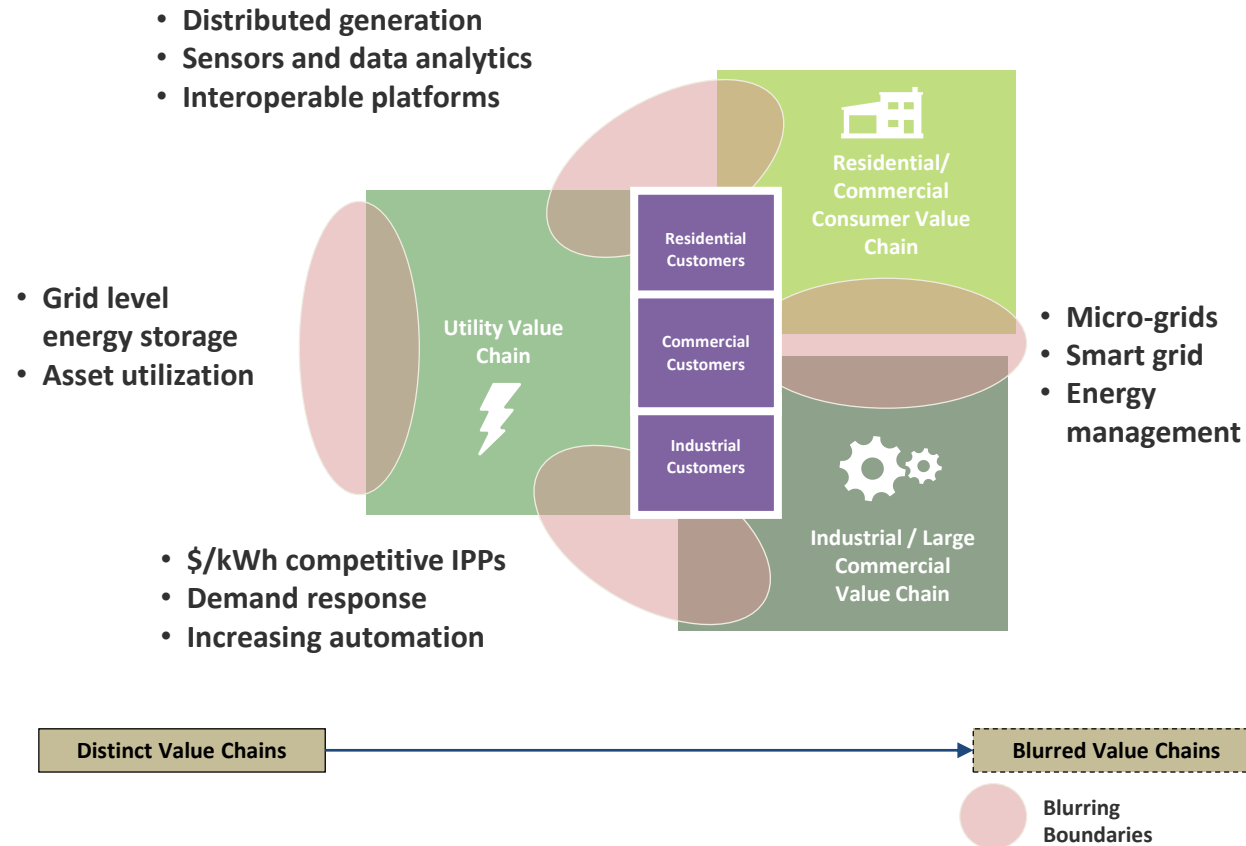


## Sophistication of service providers

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

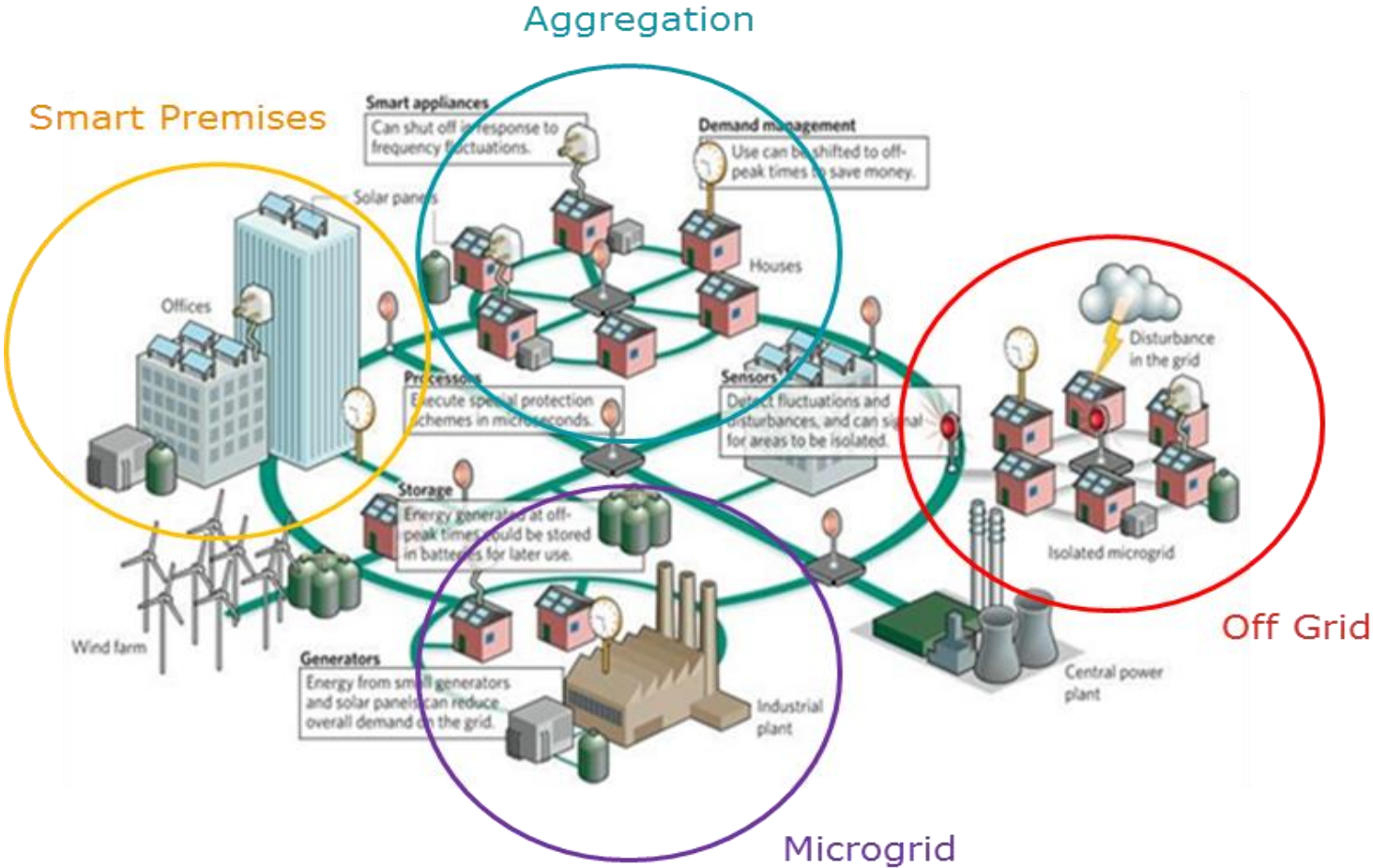
IoT development is critical – but is it differentiating long-term

Push/pull between central and edge solutions

Devices, data and connectivity gaps

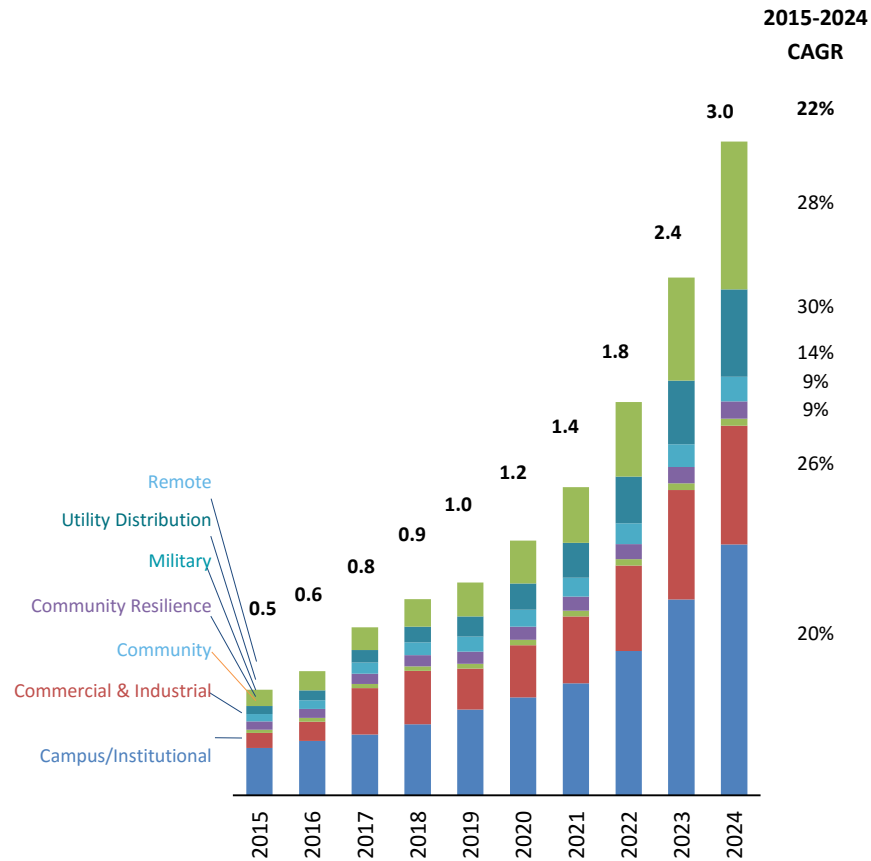
# The end-game is likely a complex hybrid power market featuring multiple, often integrated intelligent solutions

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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