



RESILIENT

Microgrids and the New Energy Landscape

Energy Infrastructure Alternatives that unlock better efficiency, sustainability, and resilience

Microgrid 2018 May 7-9, 2018

Don Wingate – Schneider Electric – Vice President – Strategic Accounts and Microgrid Solutions

Don.Wingate@Schneider-electric.com

Megatrends are provoking a rise in Energy Demand

URBANIZATION

+2.5B people in cities
by 2050

Source: United Nations, DESA



DIGITIZATION

50B connected things
by 2050

Source: Cisco



INDUSTRIALIZATION

+50% Energy consumption
by 2050

Source: IEA





We have an opportunity to co-create the future

More ELECTRIC

2X faster growth of electricity demand compared to energy demand by 2040

Source : IEA WEO 2014

More DIGITIZED

10X more incremental connected devices than connected people by 2020

Source : Cisco, Internet World Statistics

More DECARBONIZED

82% of the economic potential of energy efficiency in buildings and more than half in industry, remains untapped

Source : World Energy Outlook 2012, Internal Analysis

More DECENTRALIZED

70% of new capacity additions will be in Renewables by 2040

Source : BNEF

Life Is On

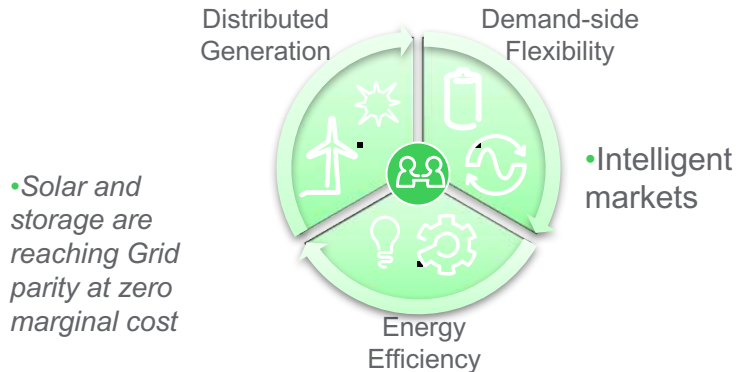
Schneider
Electric

... creating unprecedented change in the power industry

By 2025 traditional centralized model will be complemented by a world of distributed energy

Pressure on the Grid

- Tomorrow's grid integrating a multitude of DER (DG, storage and flexible loads)



Disrupting existing business models

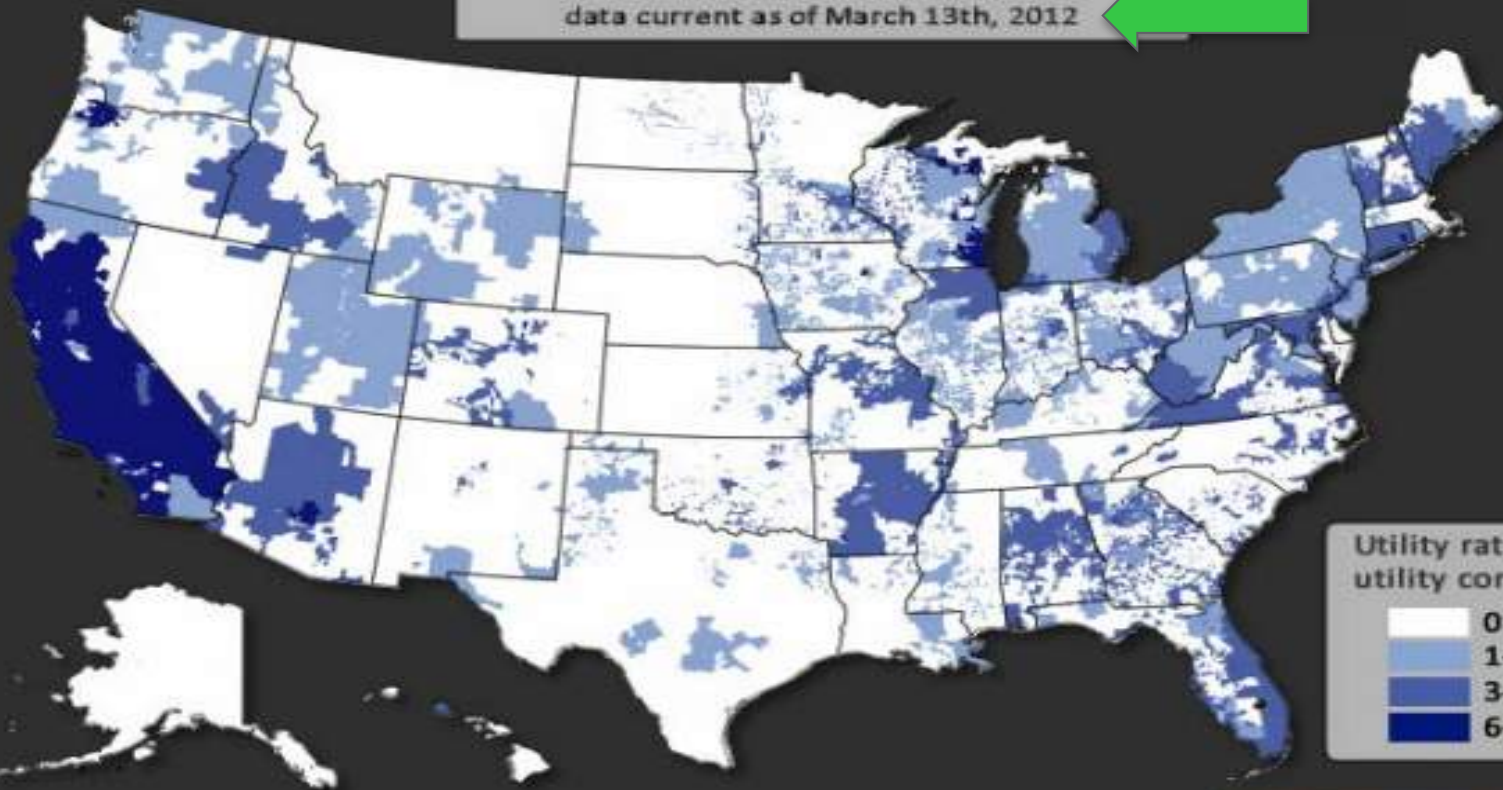
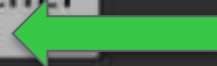
- Utility-scale generation model disruption (volatile wholesale market, and emerging capacity market)

New power grid design:

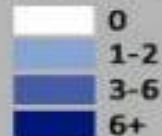
- National / Interco-regional
- Intermediate Microgrids (municipal, regional)
- Prosumers

New regulatory frameworks required

Utility rate coverage on OpenEI
data current as of March 13th, 2012



Utility rates per
utility company



OpenEI | OPENENERGYINFO

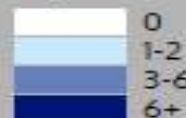
Fig. 1: This map shows utility rates entered into OpenEI as of March 13, 2012.

Utility Rate Database Visualization

Utility rate coverage on OpenEI
as of Oct 20, 2017



Utility rates per
utility company



**ILLINOIS STATE
UNIVERSITY**
Illinois' first public university

 **OpenEI**
Open Energy Information

...The industry is taking control of their energy spend/use

WASHINGTON BUSINESS JOURNAL
UNLIMITED... Nominates a young leader today! >
LIMITED TIME OFFER... Subscribe Now
SIGN UP... Your Account >
INDUSTRIES & TOPICS NEWS LISTS & AWARDS PEOPLE & COMPANIES EVENTS MORE... Q

From the Washington Business Journal:
<http://www.bizjournals.com/washington/news/2017/02/10/montgomery-county-is-taking-two-large-buildings.html>

Montgomery County is taking two large buildings off the energy grid

Feb 10, 2017, 1:48pm EST

Montgomery County is taking its correctional facility and public safety buildings off the grid.

The county has entered into a public-private partnership with **Schneider Electric** and **Duke Energy Renewables** to construct microgrid systems at the 300,000-square-foot jail in Clarksburg and the nearly 50-year-old, 408,000-square-foot police and fire headquarters in Gaithersburg.

It's a first-of-its-kind move for the county, bringing environmental and other benefits and protecting the county from power outages, said **Eric Coffman**, chief of the county's office of energy and sustainability. The microgrids will generate clean power using solar energy systems and natural gas generators. The public safety buildings will operate independent of the electrical grid, which will enable the county to replace aging equipment, install stiffer security measures and ensure uninterrupted service, Coffman said.

"This is the first advanced microgrid in this part of the state, to my knowledge," said Coffman. "Montgomery County's big power outages, and our facilities need to operate."

The buildings are expected to be on the microgrid by mid-2018, the county said. While the contract county will only pay for the energy it uses, which is expected to cost 12-13 cents a kilowatt hour — Peppco for its power now. The project emerged from a request for proposals issued by the county in which a dozen firms responded.

gtm:
A Wood Mackenzie Business

- SOLAR
- GRID EDGE
- ETC.
- Podcasts
- Webinars
- White Papers
- Videos
- About
- Advertising

Ohio State's Endowment Gets \$1 Billion With Campus Energy Deal

by **Janet Lorin** and **Brian Eckhouse**

Search Greentech Media



GTM RESEARCH

GTM EVENTS

UTILITIES

How MGM Prepared Itself to Leave Nevada's Biggest Utility



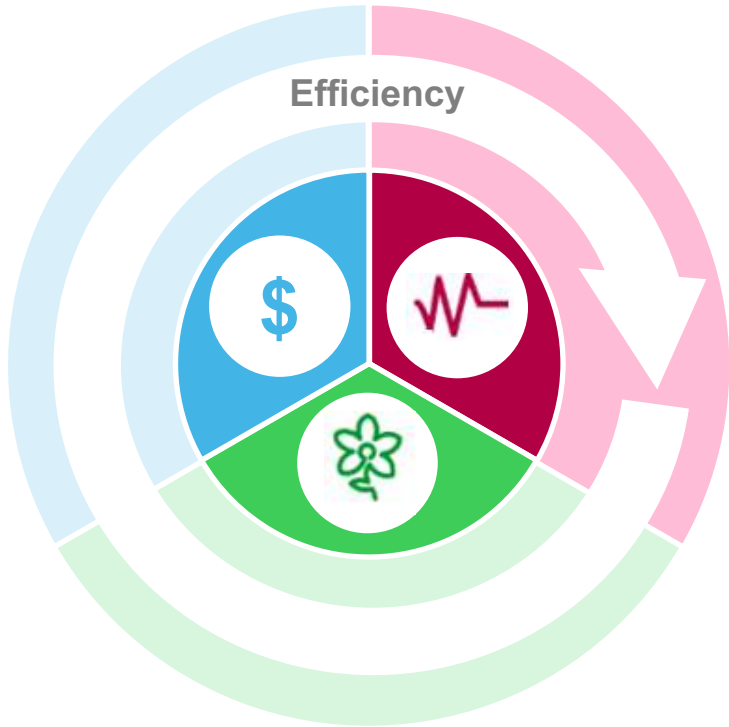
Photo Credit: NRG Energy

The casino conglomerate expects to double its use of renewable energy and earn payback within 7 years.

by **Julian Spector**
September 16, 2016

Integrated Energy Outcomes – Acquisition and Use

Historically Passive Consumers are Thinking About Energy in a New Way



Cost



- Lower / More Predictable Energy Costs
- Energy / Fuel Source Arbitrage
- Flexibility drives savings / incremental revenue

Resilience



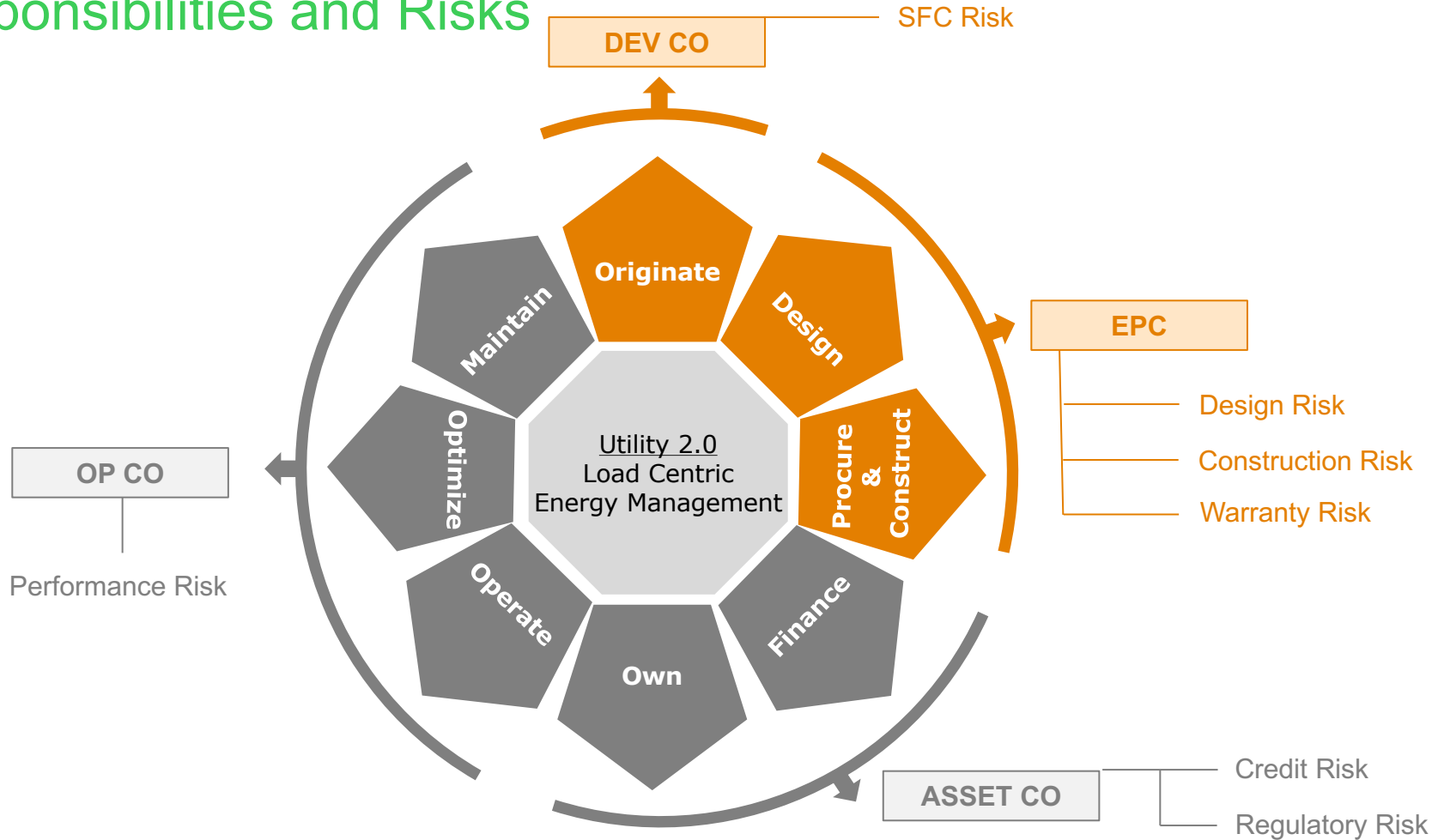
- Serve loads during times of grid stability
- Oasis for employees / customers – shelter in place
- Protect power sensitive / critical assets from poor power quality

Sustainability



- Reduce carbon footprint
- Improve brand image
- Attract / Service carbon sensitive customers

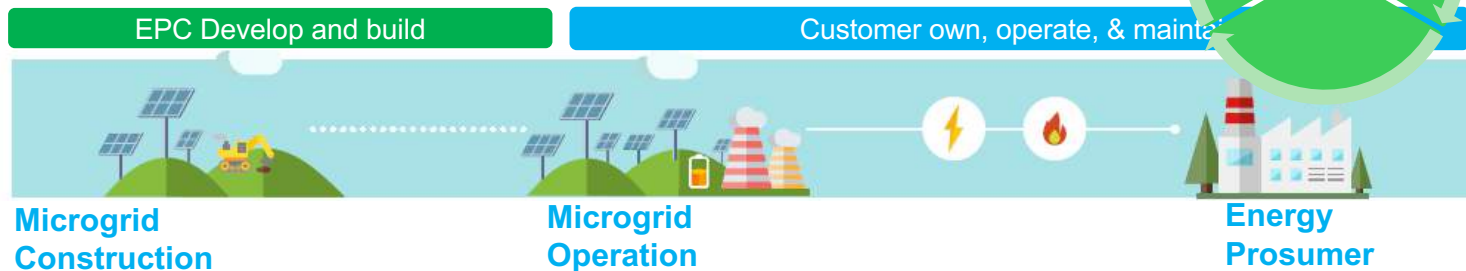
Responsibilities and Risks



Energy finance and service models evolve are a new opportunity

Traditional DER PPA model paves way for “Energy-as-a-Service”

Traditional Approach - CAPEX Business Model



- Capital Required
- Infrastructure Improvements Required
- ROI Considerations
- Higher reliability
- Better sustainability
- Self Service

Microgrid-as-a-Service - OPEX Business Model



- No Upfront Capital
- Infrastructure Improvements
- More predictable energy costs
- Higher reliability
- Better sustainability
- PPP Business Model

Transition Slide