

GFMI: Advanced Analysis and Valuation Energy Trading Conference Houston, Texas

January 28th 2014

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CEO / President

TKO Energy Capital, LLC.

TREIA

Utility Wind, Renewable Distribution Generation and Energy
Storage Committees



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AREAS We Fund & Activities We Do

Generation Stakeholders

- Wind, Solar, IOU, Muni. CCNG,

EPC Companies

- Jacobs, B&V, Fluor, etc.

Technology Vetting & Commercial Entry

Policy Advisement & Initiative

Business Modeling & Development

Capital Funding & Preparation

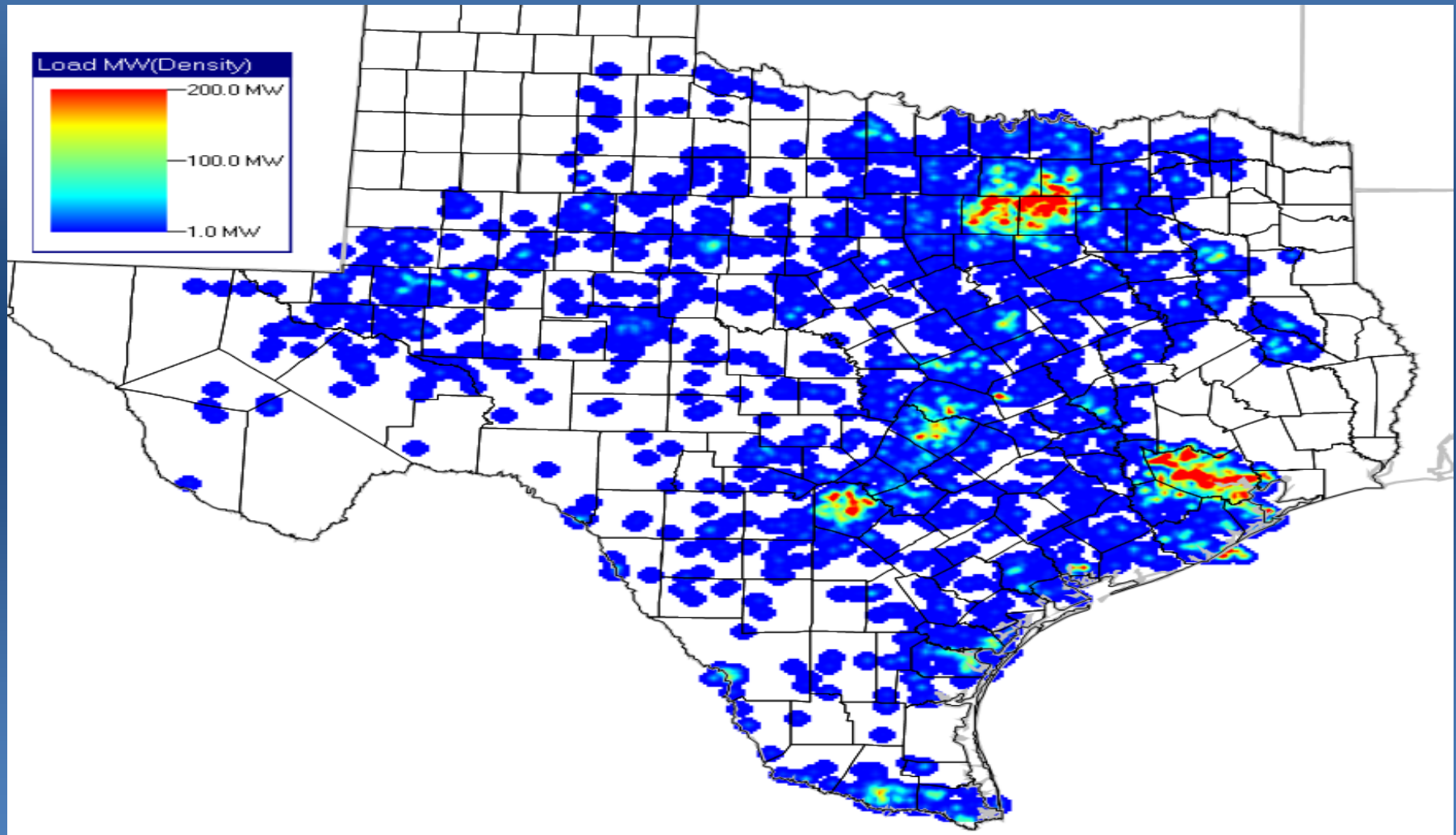
C&I, MUD, Stakeholders

- Fabs, Data Centers, Mfg. Retail centers etc.

ISO / RTO / PUC / FREC

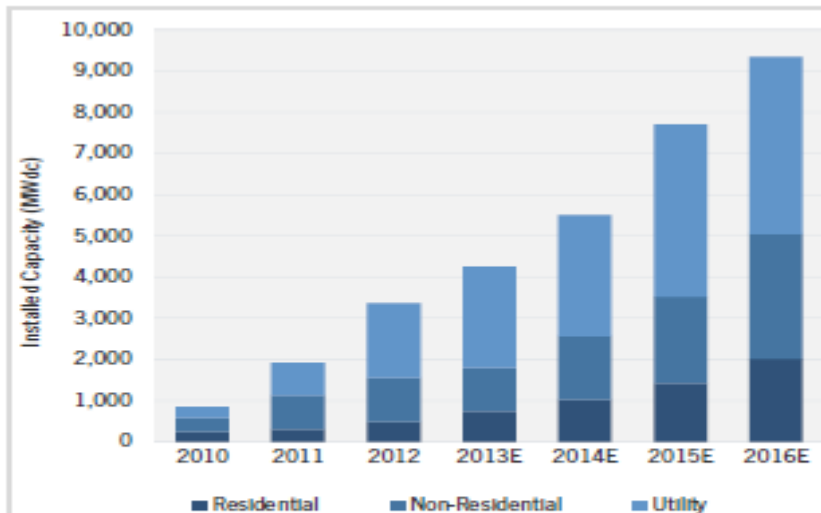
- PJM, ERCOT, MISO, CAISO, NEISO, etc.

(Texas) Sample of Load at 68 GW.
As a state, Texas is the largest load in
the US.



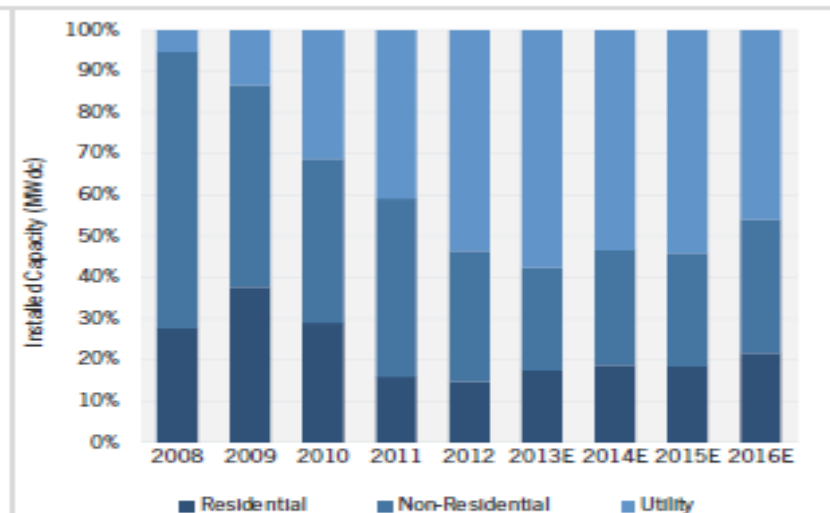
Anticipating the growth of the US renewable development market. Solar

Figure 2.11 U.S. PV Installation Forecast, 2010-2016E



Complete forecast by state and market segment available in the full report

Figure 2.12 PV Market Segmentation, 2008-2016E



© 2013

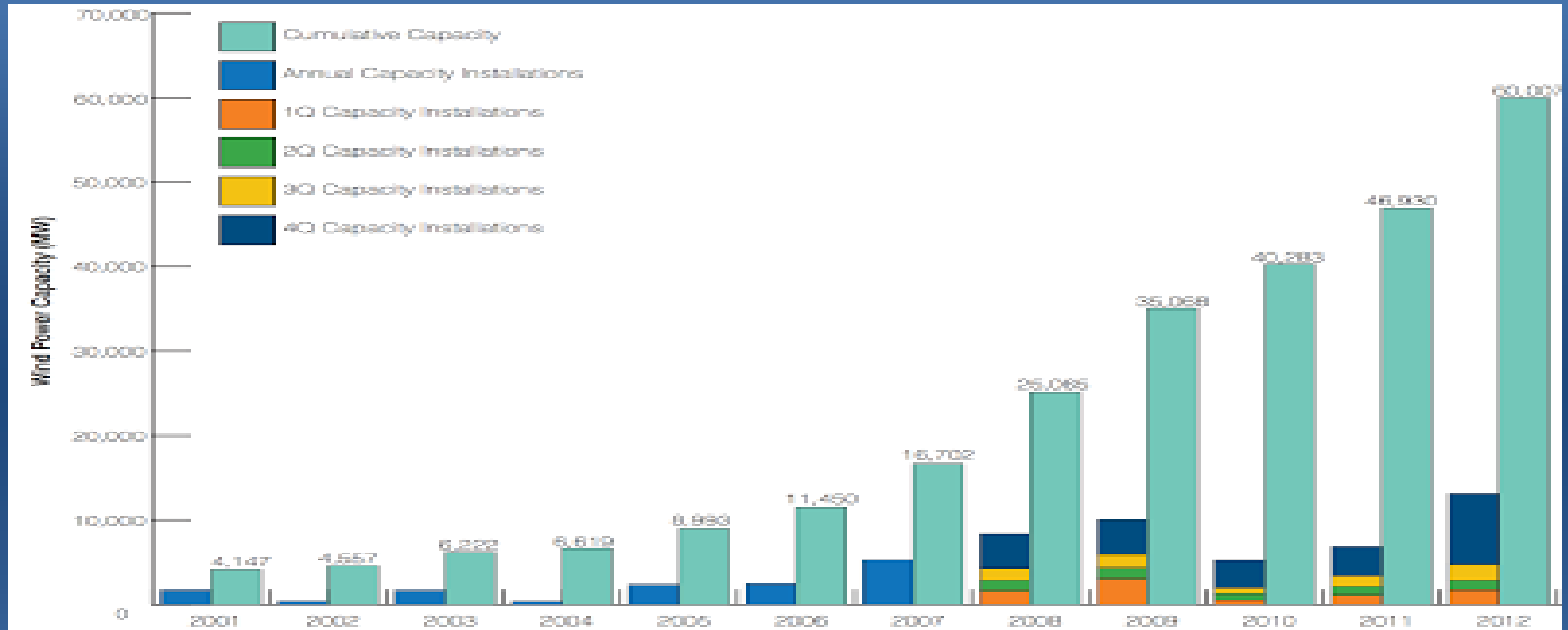


Global Solar installations are forecasted to be in the 43 GW range in 2014 from 38 GW in 2013. (Mercom Capital Group, LLC.)

U.S. Solar installations to reach approximately 15.7 GW in 2014 with an 5.5 GW forecasted to come on-line in 2014 from 10.2 GW in 2013 YoY growth of 50%. (SEIA, 2013)

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Anticipating the growth of the US renewable development market. Wind



Global Wind energy capacity for 2013 is approx. 322 GW and forecasted to grow to 365 GW in 2014. (GWEC, 2013)

U.S. current Wind energy capacity is approx. 60 GW with a forecast growth of approximately 9 GW for 2014. Texas leads at 12.2 GW of installed Wind. (GWEC, 2013)

Anticipating the growth of the US renewable development market. Biofuels

1. EPA revised its 2014 target for producing 100 million gallons of advanced biofuels down to 80 million gallons. Are we at the Blend Wall (E15 and Above)?

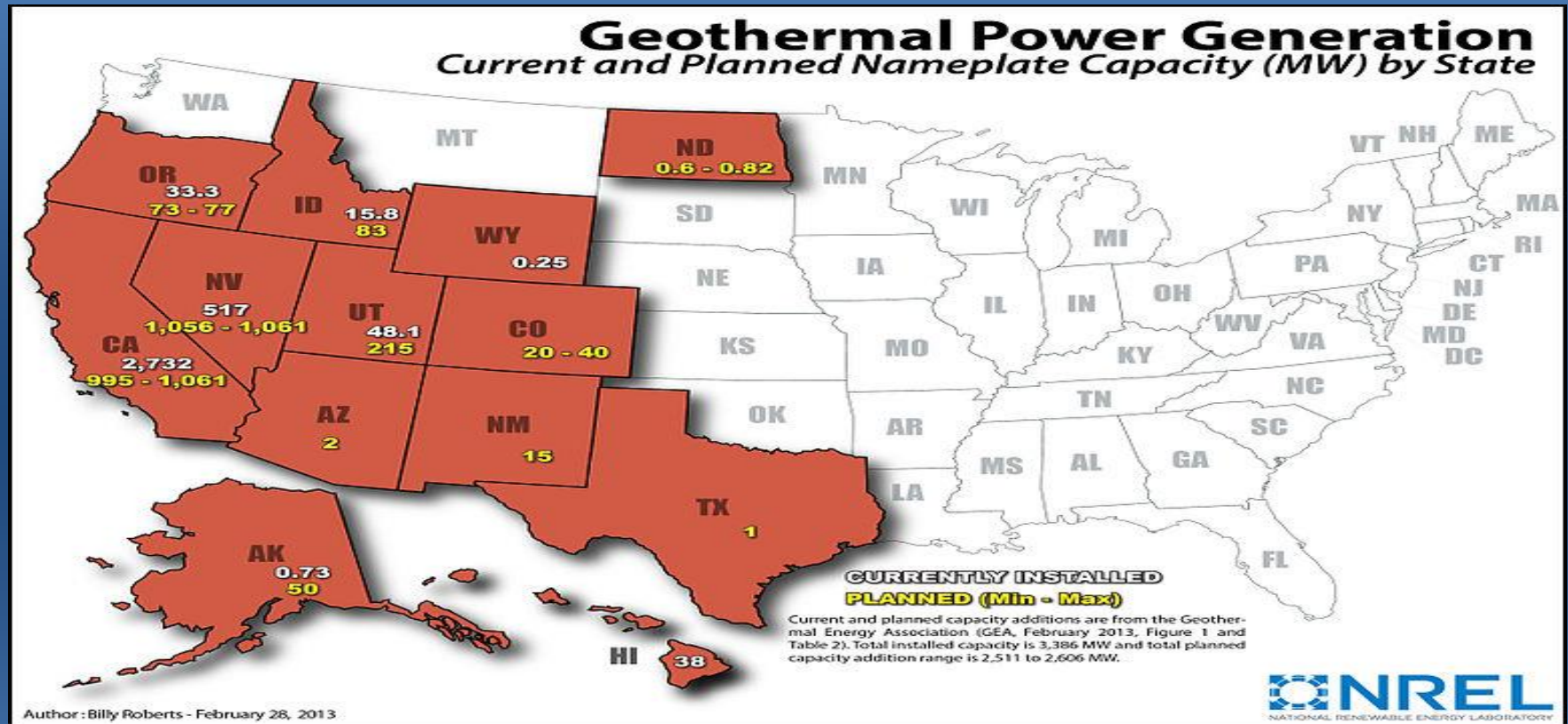
<http://farmdocdaily.illinois.edu/2013/11/proposed-rules-2014-rfs.html>

**Table 1: Mandate levels in proposed
2014 RFS proposed rule, in million
gallons**

Cellulosic	17
Biodiesel	1,920
Total Advanced	2,200
Total Renewable	15,210
Corn Ethanol Maximum Share	13,010

2. Total global Biodiesel market is expected to be worth US \$12.6 billion by 2014, out of which the European (\$7 Billion) and Americas (\$5.6 Billion) market.
3. Some Biodiesel technologies have shown production cost of \$1.70 - \$2.00 per gallon.
4. Commercial fleets have shown readiness for \$Billion dollar fuel contracts.

Anticipating the growth of the US renewable development market Geothermal



- 1) With 3 GW of installed geothermal capacity, the U.S. remains the world leader with 30% of capacity market share.
- 2) Conservative planned geothermal project is 2.5 GW of base power capability.

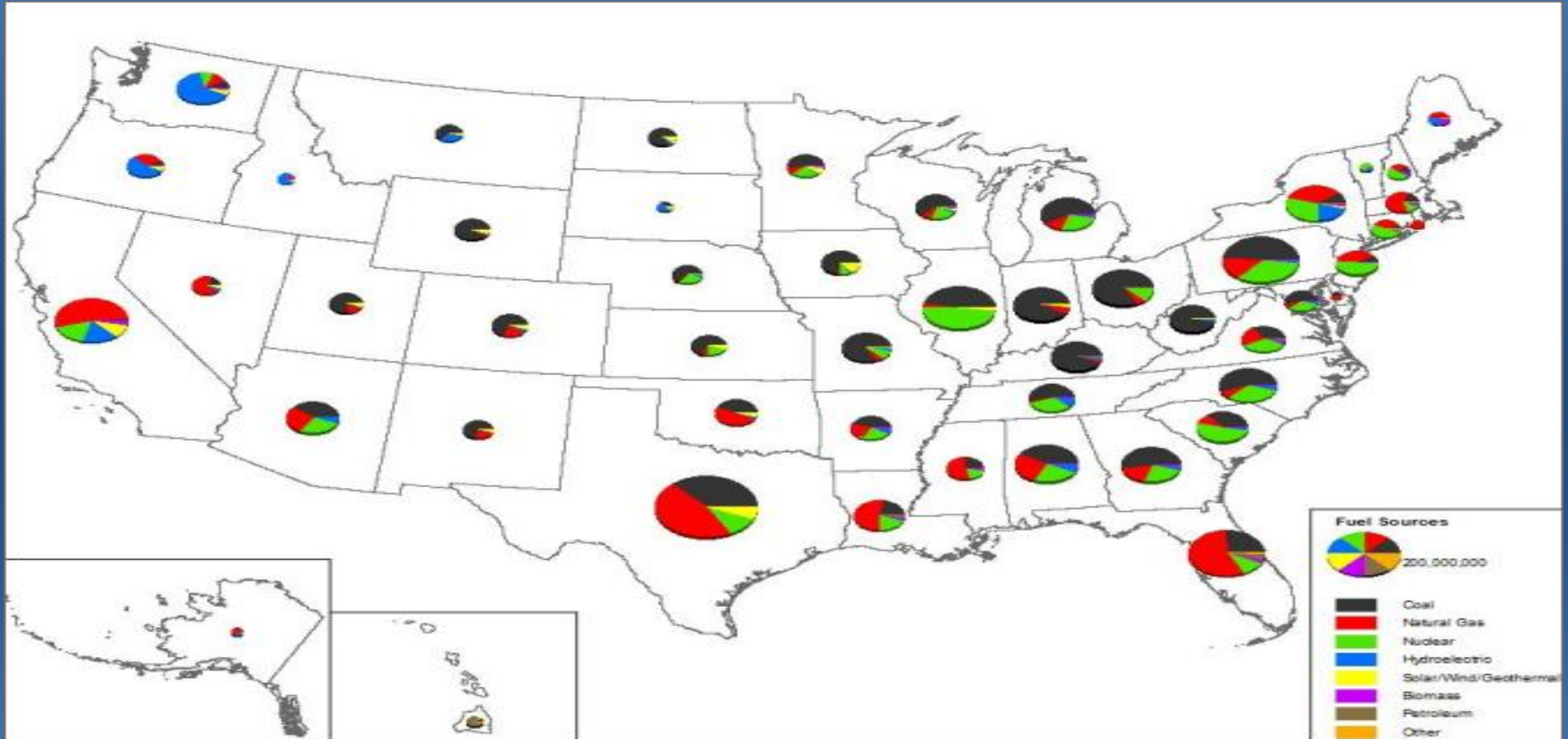
Understanding how renewable energy growth will affect peak demand:

Notable Foundation Points:

- 1) The U.S. electric power industry's total installed generating capacity was 1,152,183 megawatts (MW) as of December 31, 2011—a 1.3-percent increase from 2010. (Edison Electric Institute ,2012)**
- 2) In 2011, total U.S. electricity generation was 4,100,656 gigawatt-hours (GWh)—a 0.6 percent decrease from 2010. (Edison Electric Institute ,2012)**
- 3) In 2012, electric company energy efficiency programs saved 124.6 billion kWh of electricity—or enough to power nearly 11.5 million average U.S. homes for one year. (Edison Electric Institute ,2012)**
- 4) 27 GW of coal electric capacity set to retire by 2016. (senate gov, 2013)**

United States Grid / Generation Mix By State

NREL, 2012



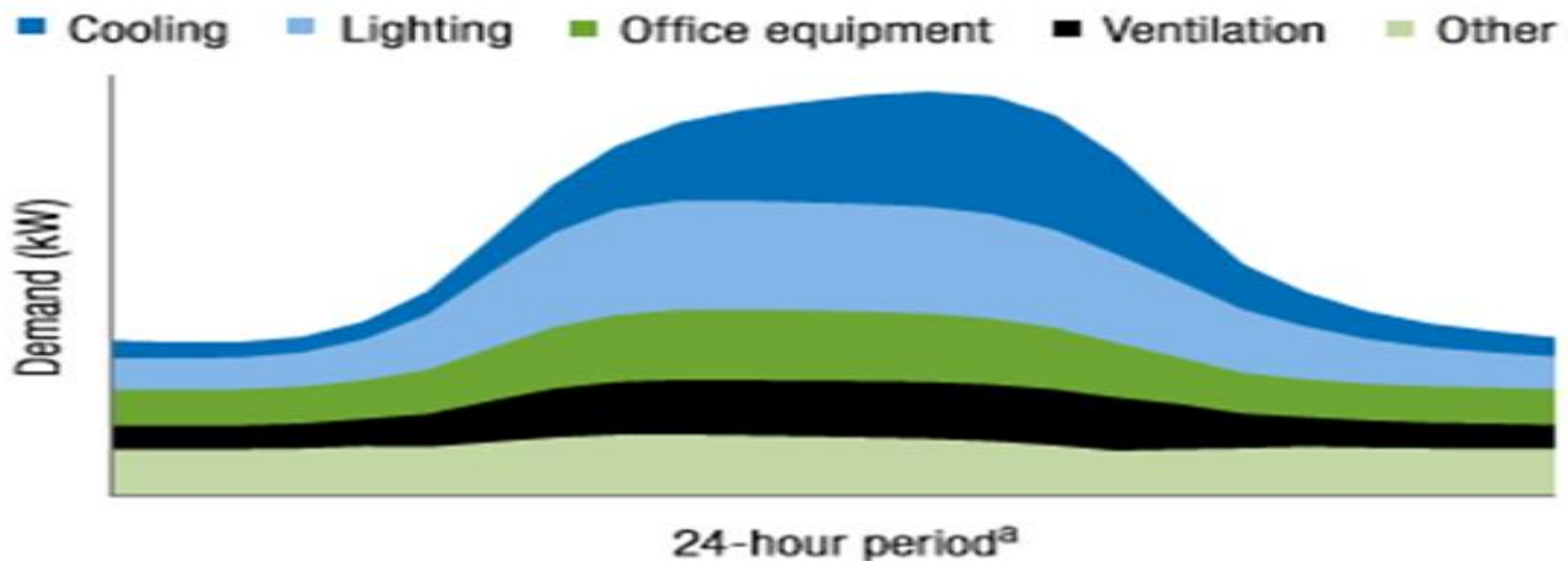
Represents 1,041.6 Terawatts (TW) of generation capacity and electricity consumption of over 4,354,000 TWh per year.

U.S. is trending to less capacity but more DGR & Renewables (EIA, 2013)

Understanding how renewable energy growth will affect peak demand:

Notable points:

- 1) Currently the renewable generation mix in the U.S. is 5% (EIA, 2012).
- 2) However, New generation in November 2013 install capacity was 100% renewable generation. Likewise, October 2013 install capacity was 99% renewable generation.



Notes: kW = kilowatt.

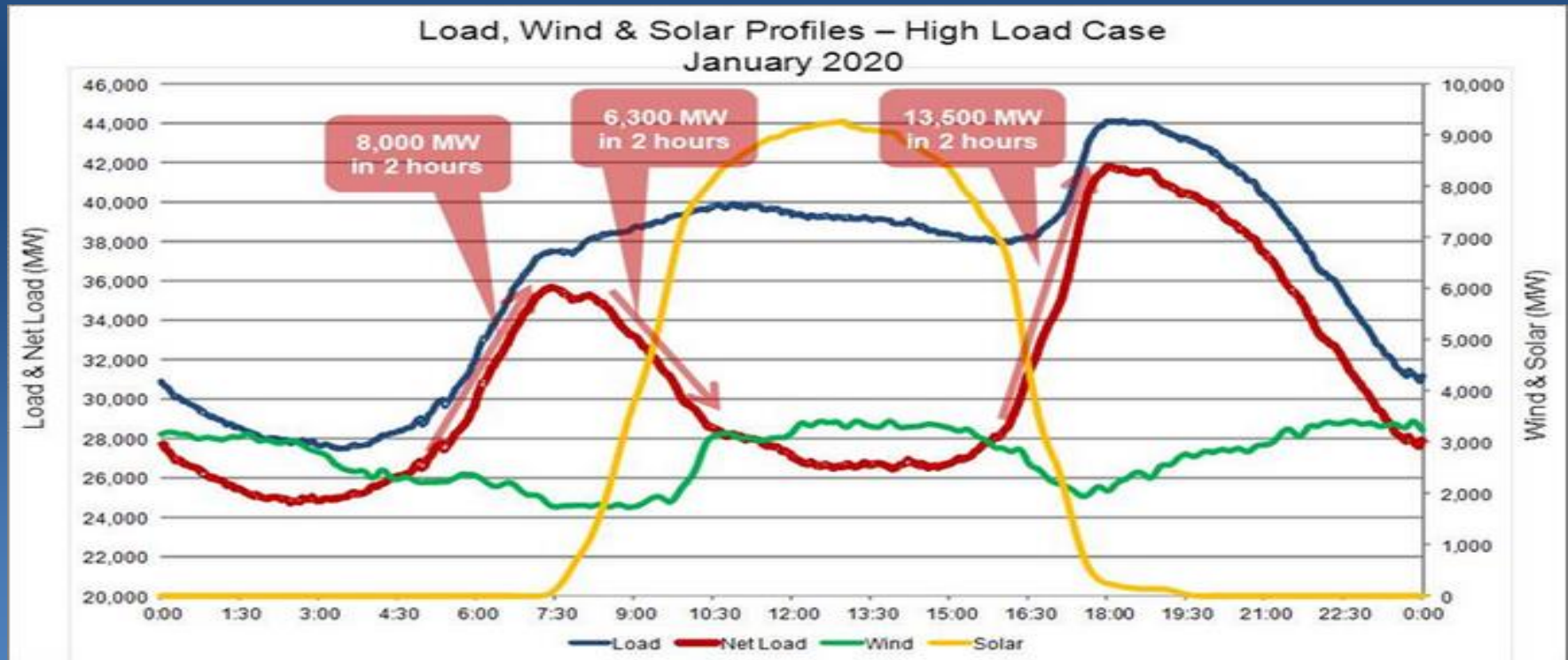
a. 24-hour period = midnight to midnight.

© E Source; data from ITRON

Understanding how renewable energy growth will affect peak demand:

The trending affect:

- 1) Utility Ancillary services are projected to grow from 100% to 10x of 2011 level (Example: Cal-ISO 390 MW to over 3000 MW).
- 2) Demand charges going up making up 30% to over 50% of commercial billing.

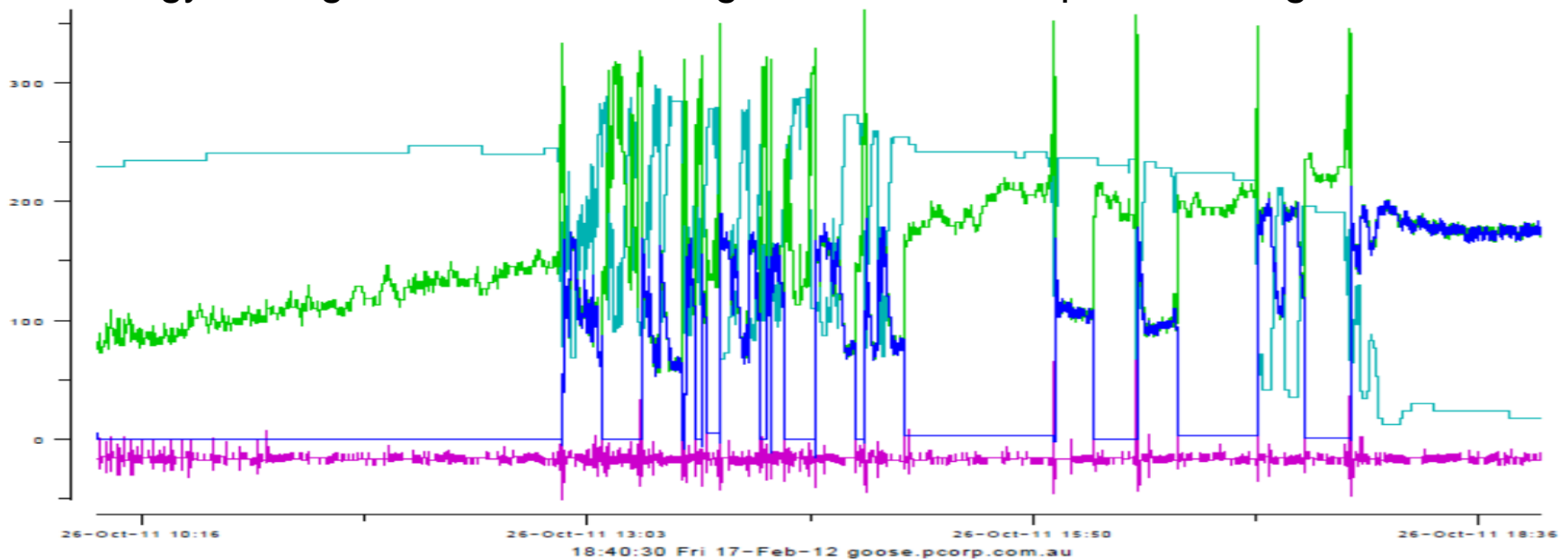


Understanding how renewable energy growth will affect peak demand:

The trending affect... the reality:

- 1) Higher tendency for dedicated CCGT Gas Turbines and Energy Storage policies.
- 2) Higher tendency for renewable interconnection service fees.

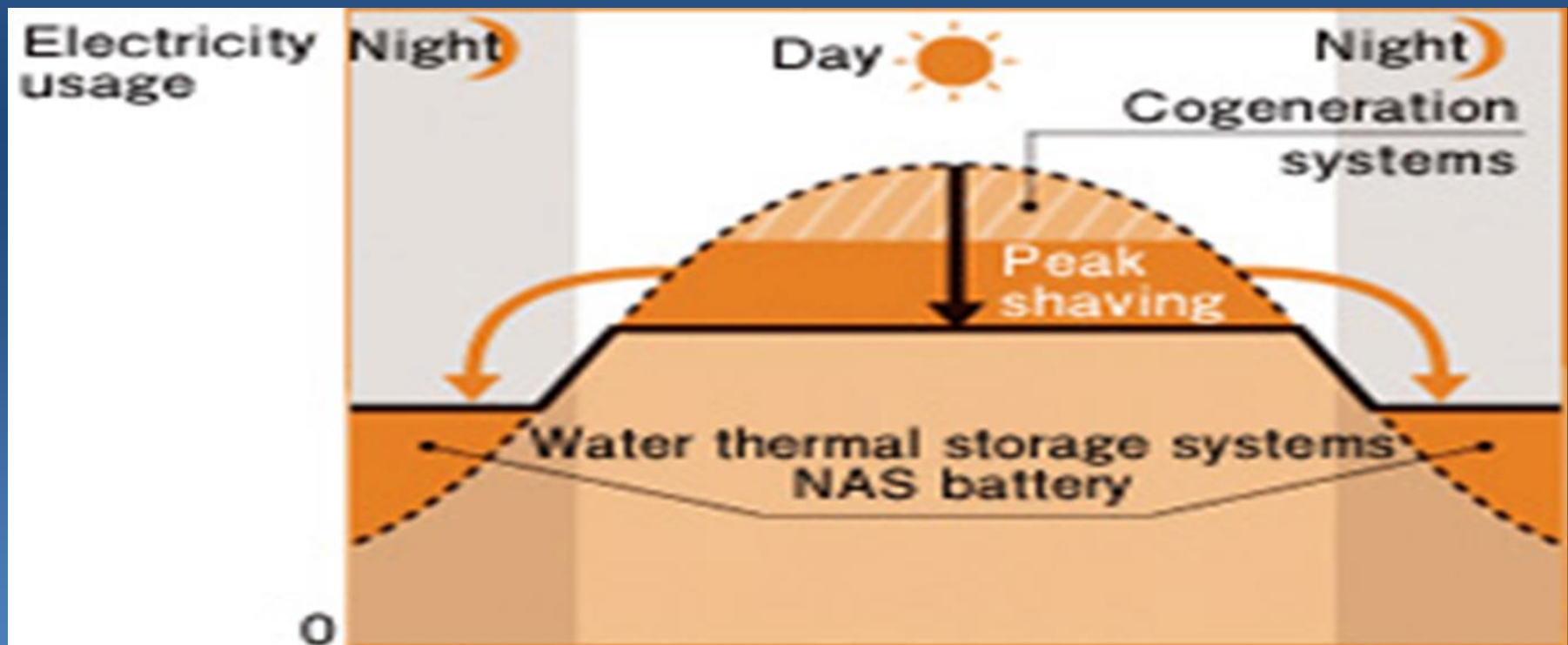
Energy Storage & Gen Set working to stabilize disruption of PV generation



Understanding how renewable energy growth will affect peak demand:

The trending affect for commercial customer:

- 1) On-site Demand Management Technologies (DMT).
- 2) Peak shaving technologies, Generation, Energy Storage.



Understanding how renewable energy growth will affect peak demand:

The trending affect; Utility point of view:

- **“If the cost of solar panels keeps coming down, installation costs come down and if they combine solar with battery technology and a power management system, then we [Utility] have someone just using [the grid] for backup.”**
(Duke Energy CEO Jim Roger, 2013)
- **Due to the variable nature of renewable there is a perception that customers will always need to remain on the grid. While we would expect customers to remain on the grid until a fully viable and economic distributed non-variable resource is available, one can imagine a day when battery storage technology or micro turbines could allow customers to be electric grid independent.** (Edison Electric Institute 2012)
- **David Crane, the CEO of NRG, said that thanks to distributed generation, “consumers are realizing they don't need the power industry at all.”** Bloomberg TV, 2013

Understanding how renewable energy growth will affect peak demand:

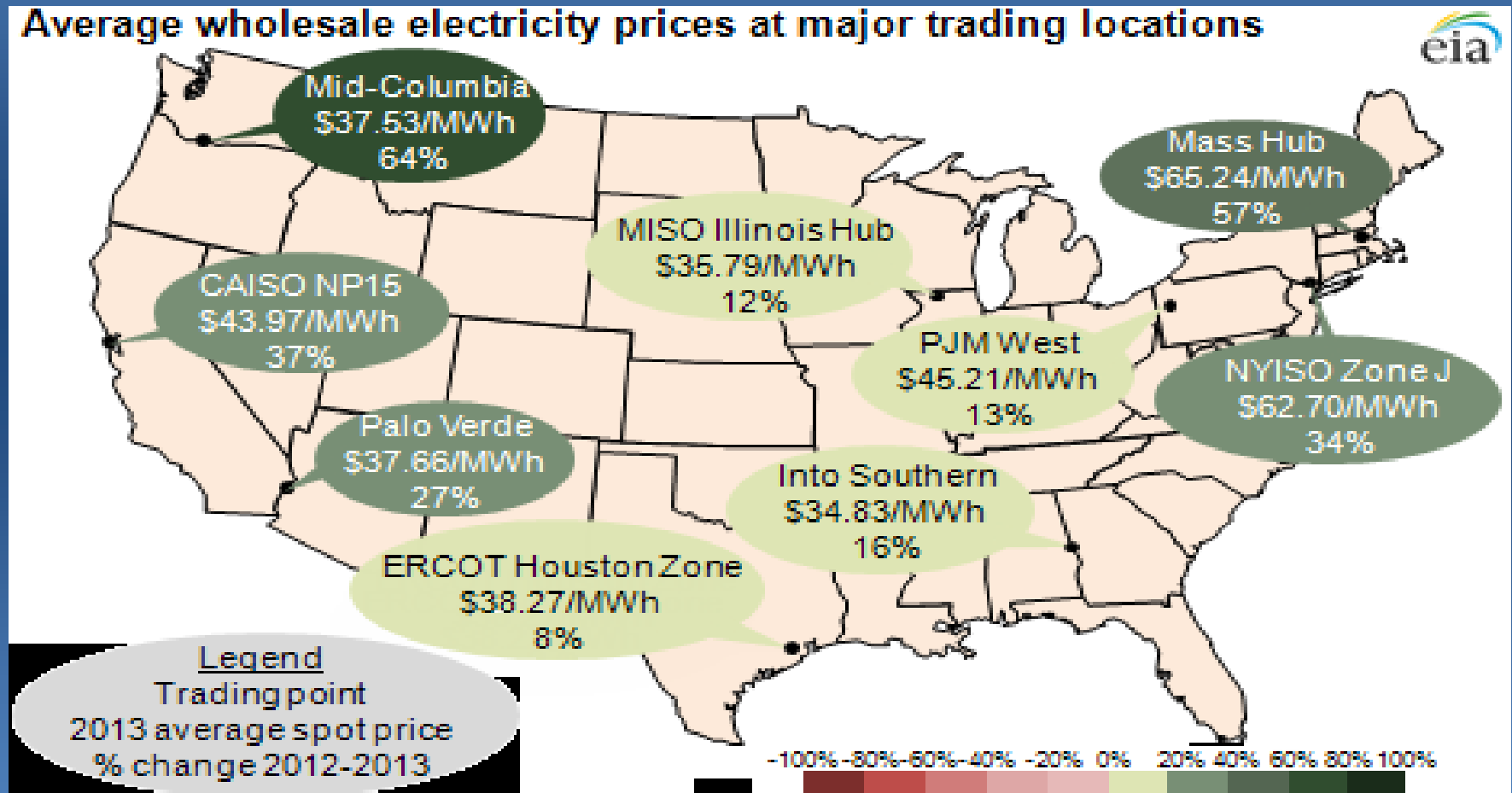
The trending concerns for Utility markets and its affect:

- 1) Increased cost of supporting a network capable of managing and integrating Distributed Generation Resources (DGR). (Edison Electric Institute 2012)
- 2) Decline in revenues attributed to KWh and Demand loss's from DGR assets.
- 3) Increased uncertainty and risk will not be welcomed by institutional investors.
- 4) Weakening of credit quality will lead to a higher cost of capital.
- 5) Raises costs on other rate payers who are not benefiting from advance energy / renewable solutions.

Understanding how renewable energy growth will affect peak demand:

The trending concerns for Utility markets and its affect:

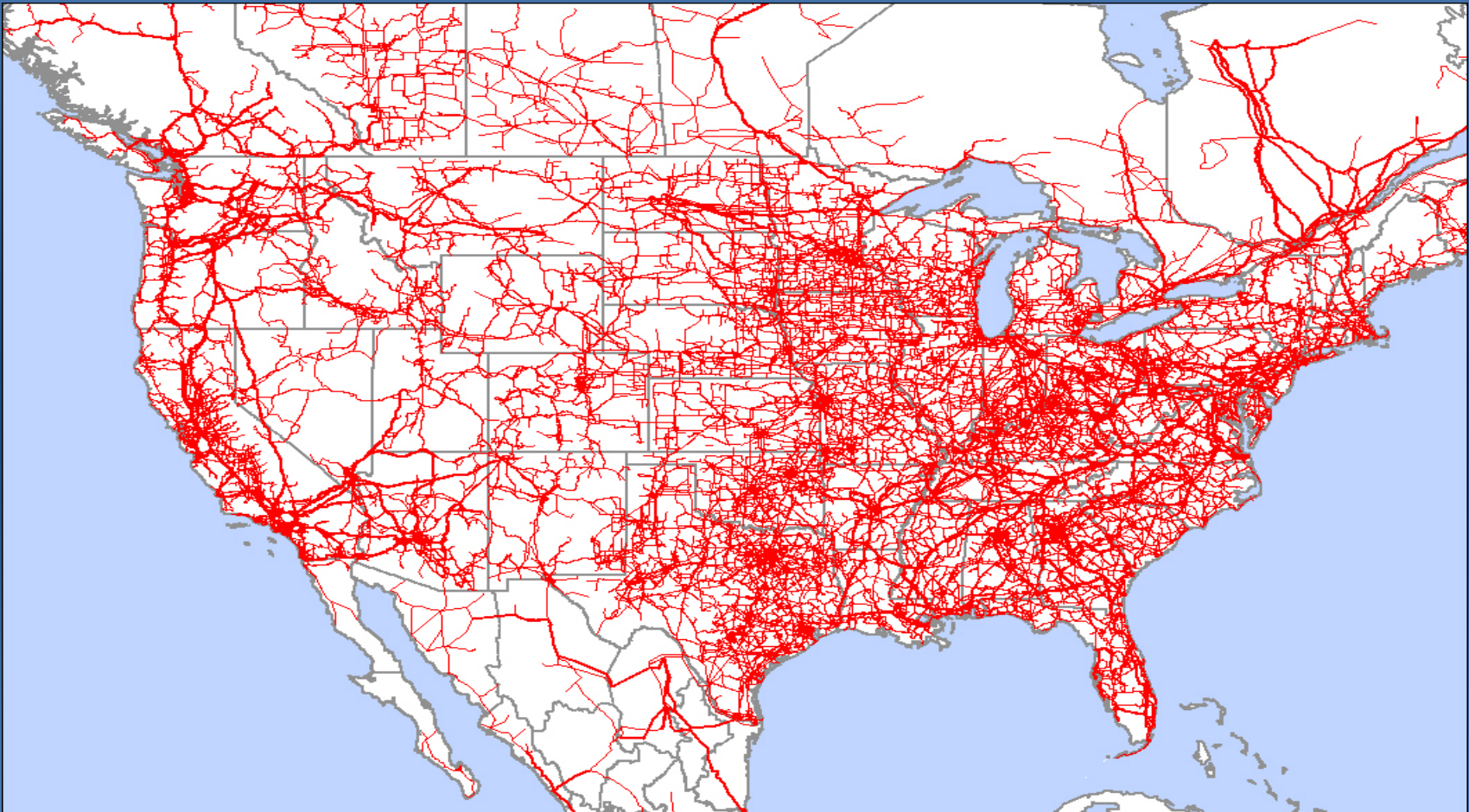
Average wholesale electricity prices at major trading locations



Notable Foundation Points; Cost & Internet:

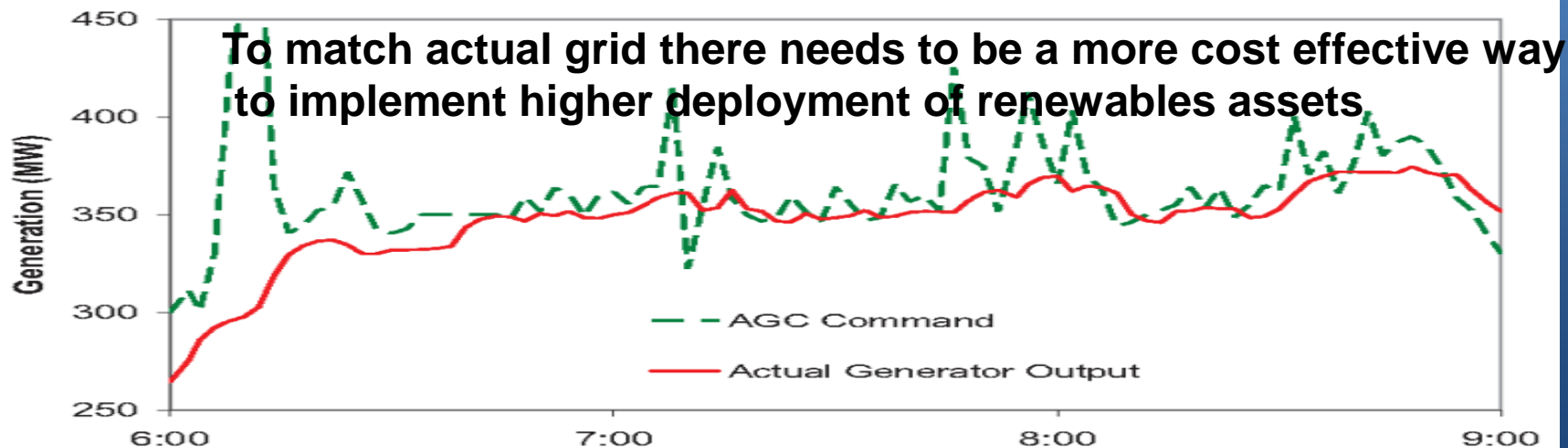
- 1) Shareholder-owned electric utilities are planning to invest more than \$64 billion on transmission construction between 2013 and 2016. (EEI 2012)**
- 2) Increase cost of Physical and Cyber security that are not rate based for cost recovery. (Zpryme, 2013)**
- 3) U.S. utilities will spend a cumulative \$7.25 billion in security from now until 2020. (Zpryme Research, 2012)**
- 4) There are 15 Billion devices connected to the internet, by 2020 there will be 50 Billion devices connected to the internet (Cisco IoT, 2013)**

North America Transmission
69 KV and up (Wires) (\$17 Billion
2013 in replacement & upgrade)



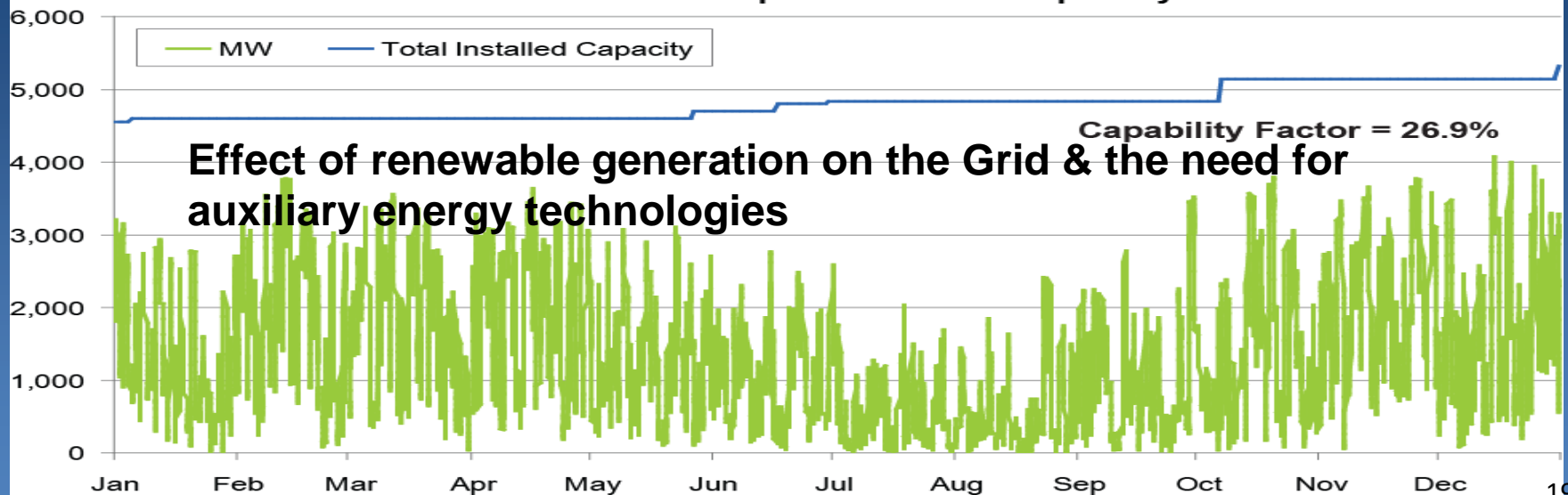
455,000 circuit-miles of transmission (Wires) (EEI, 2012)
Utilities presently monitor over a 150 million meters

Utility needs emerging technologies or gridlines will be challenged



ERCOT

PJM Wind Output vs Installed Capacity 2011



19

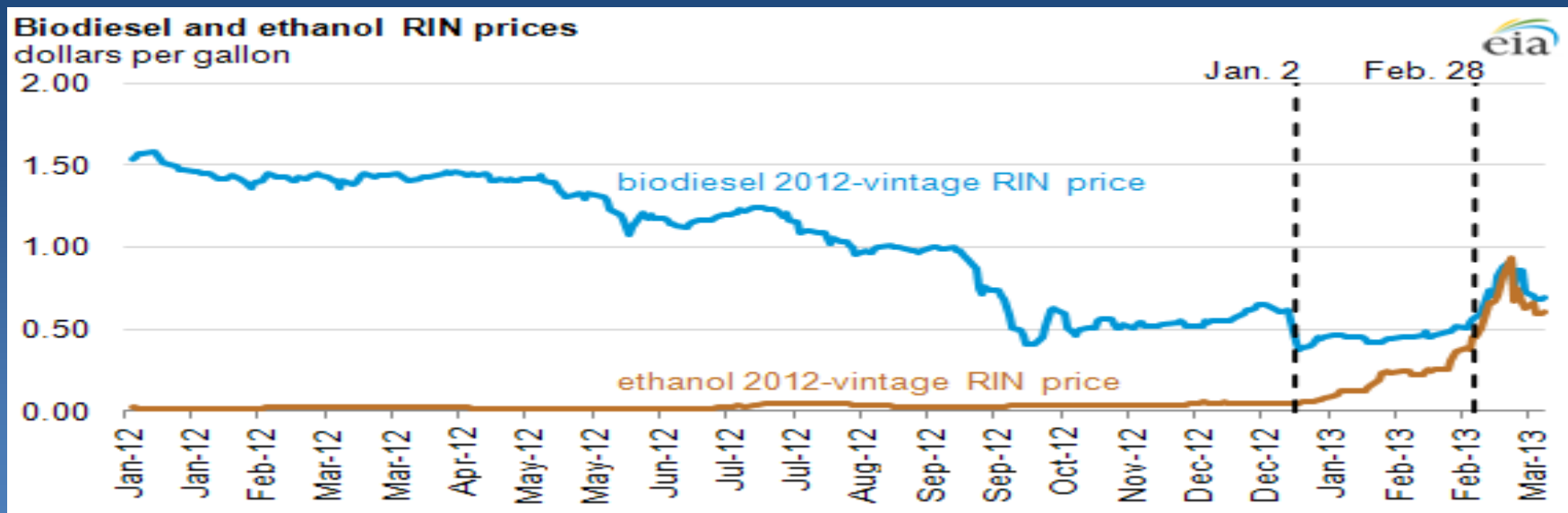
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PJM

Renewable Identification Number (RIN): Staying ahead of upcoming transparency initiatives

Renewable Identification Numbers (RINs):

These RIN's are used by petroleum refiners to demonstrate compliance with EPA renewable fuel standard obligations as a percent of a fuel mix i.e. E10, E15 using a EQ 9000 quality certification . After the sale or blend of the E-fuel the RIN becomes a tradable commodity like a Renewable Energy Credit (REC). (eia, 2012)





Renewable Identification Number (RIN): Staying ahead of upcoming transparency initiatives

Renewable Identification Numbers (RINs):

Driving Issues for Transparency:

- 1) Fraudulently generated RINs has led to inefficiencies , significant reduction in liquidity RIN and greater difficulty for smaller fuel producers to sell their RINs in the RIN market. (EPA, 2013)
- 2) EPA December 2013 report stated companies have generated more than 33.5 million invalid biomass-based diesel RINs. (EPA, 2013)

Example: 33.5 Million fraudulent RIN x \$0.80 average sale price equals \$26.8 Million dollar of distrust.



Renewable Identification Number (RIN): **Staying ahead of upcoming** **transparency initiatives**

Transparency Actions:

A voluntary audits of renewable fuel production conducted by independent third parties using quality assurance plans (QAPs). (EPA, 2013)

Why should a Refiner comply?

This would provide an affirmative defense for the transfer or use of invalid RINs that had been verified under an approved QAP (In otherwords, prevent jail time).

Further, third parties would be required to replace the invalid RIN's. Violations for 2010 & 2011 invalid RIN are cap at \$350,000 USD. EPA, 2013)

Example of Action:

The owner of Clean Green Fuels, LLC, was sentenced to more than 12 years in prison for selling about \$9 million in fraudulent Renewable Fuels Credits. He was also ordered to pay restitution of about \$42 million to over 20 companies and to forfeit \$9.1 million in proceeds from the sale of fraudulent RINs. (biodieselmagazine, 2011)



Advancing policy issues and strategies for deployment of capital for renewable assets & advance energy

Energy Efficiency Resource Standards (EERS)

25 states around the country, requiring a reduction in energy demand growth by a certain percentage each year, recommended to expand to all states. The current 25 states will have a saving of 236,000 GWh by 2020 (Equals States of MD, WA, MN, VT, RI).

2013 US Extended Production Tax Credit

For wind energy; special provision: Every wind farm that began construction in 2013 could qualify for the credit once it starts generating power.

Effect: Lead to a possible 9 GW of construction pipeline for \$18 Billion of revenue.



Advancing policy issues and strategies for deployment of capital for renewable assets & advance energy

Demand Response (DR) Policy

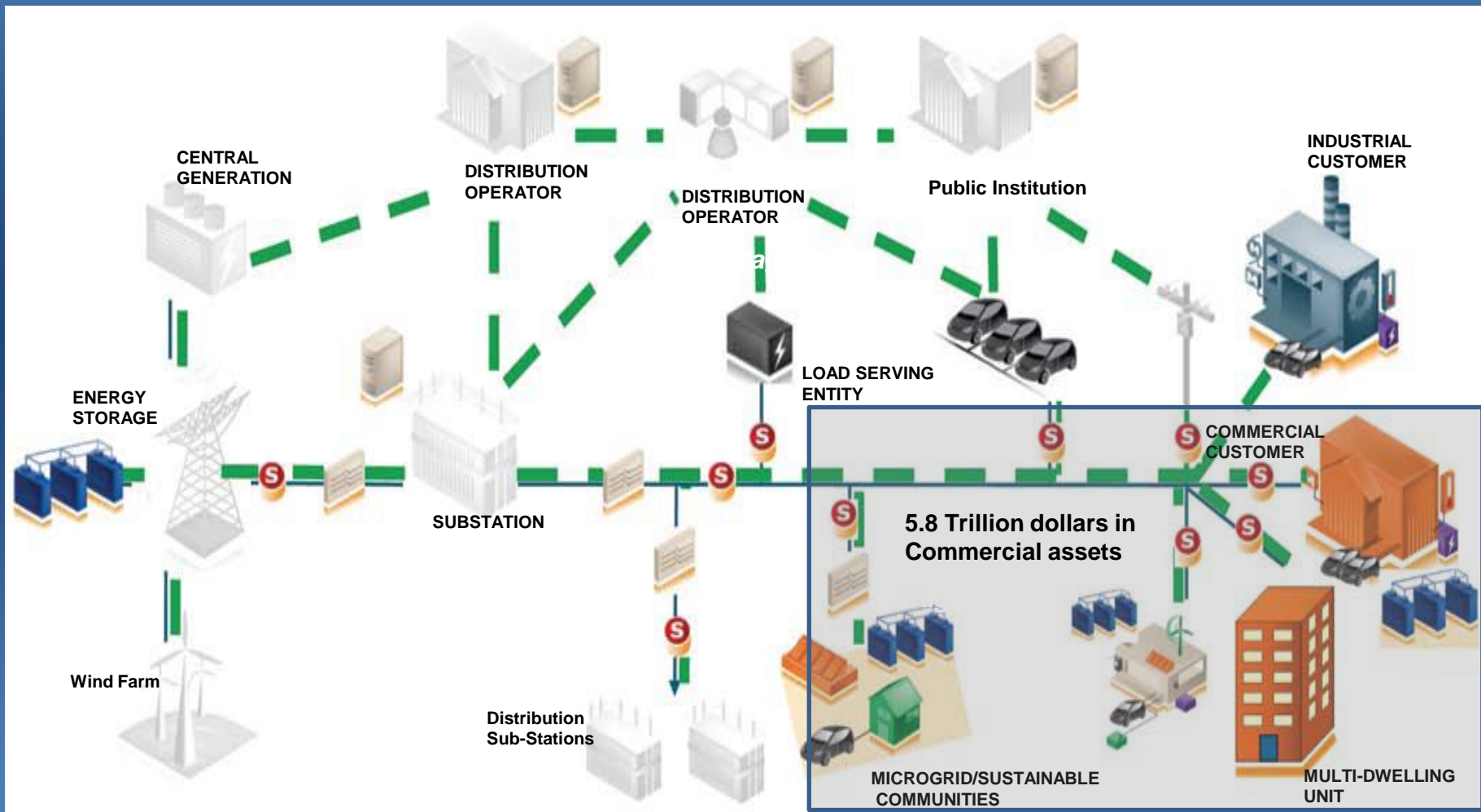
Is evolving as a two way communication platform between Grid / Utility and Loads (Customers). This leveraging of technology, infrastructure and property asset to deliver measurable value for both utilities / grid and customers that can lead to a \$6 Billion annual revenue in five years.

Property Assessed Clean Energy ("PACE")

Financing programs:

Enables owners of commercial and industrial properties to obtain low-cost, long-term loans for water conservation, energy-efficiency improvements, and renewable retrofits.

Incorporating performance and potential growth of renewable & advance energies & into long-term investment strategy





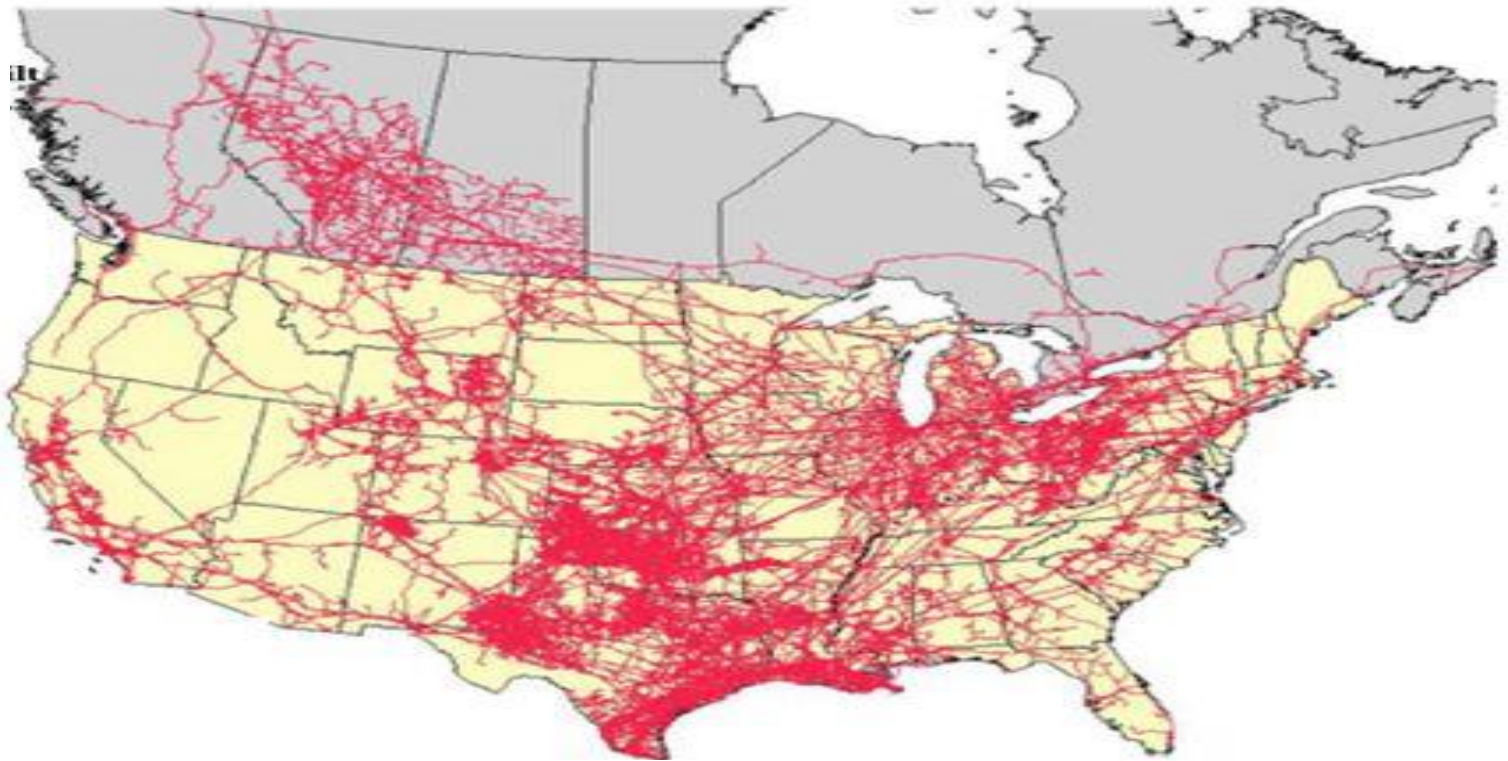
Incorporating performance and potential growth of renewable & advance energies into long-term investment strategy

Notable Points of View:

- **President and CEO of NRG David Crane on Dec. 12 stated “distributed generation is going to change the electric utility industry in a big way”. Crane believes, at least three sets of technology to do that will be on the market within the year. (SNL, 2013)**
- **Leonhard Birnbaum, member of the board of management — markets, services at E.ON SE. Stated: "No matter what the discussion is, decentralized generation will happen," (SNL, 2013)**
- **The cost estimate for distribution, transmission and generation in the U.S. by 2030 is \$1.83 trillion*. *Edison Electric Institute**

Incorporating performance and potential growth of renewable & advance energies into long-term investment strategy

Shown below is 305,000 miles of pipelines in the U.S. that are also connected to commercial loads (Properties) that can be diversified.



Source: The Globe & Mail, Feb. 19, 2011



Incorporating performance and potential growth of renewable energies into long-term investment strategy

Incorporating renewable and advance energy technologies into commercial real estate investment instruments: Why?

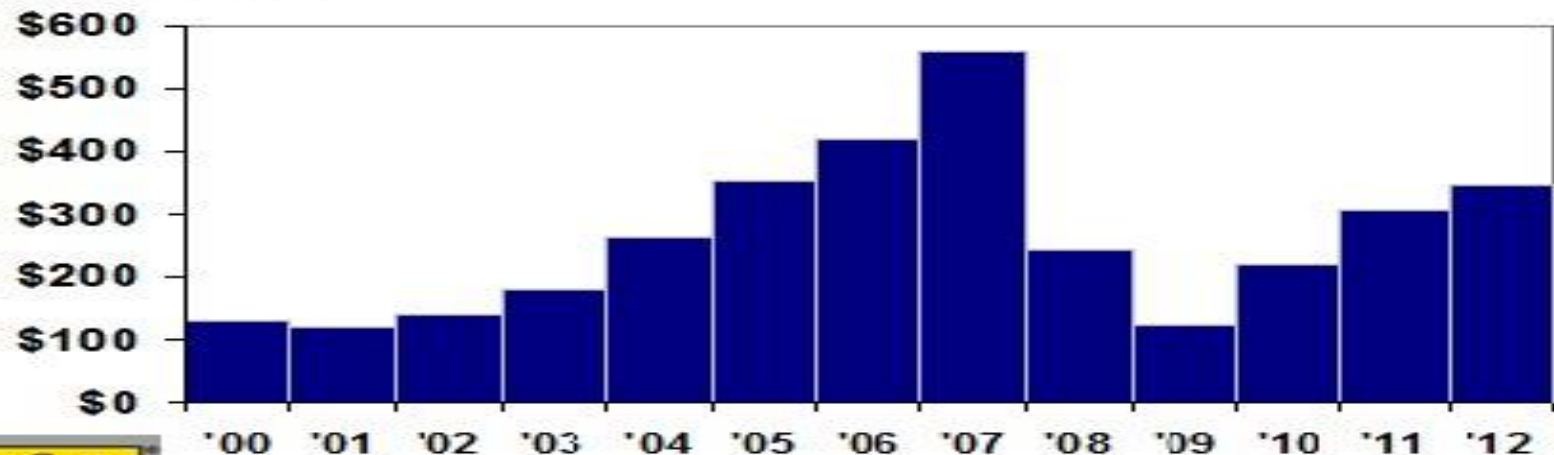
- 1) \$5.8 Trillion of Commercial Real Estate (CRE) assets in the U.S. which does not include industrial or residential assets.**
- 2) Commercial real estate consumed \$186.9 Billion dollars of energy in 2012 that is not captured by the CRE Industry.**
- 3) CRE asset transaction (sales) was \$306 Billion in 2011 and \$348 Billion in 2012 respectfully.**
- 4) CRE Owners / Investors are looking to reduce energy cost and find other sources / uses of revenue for their property portfolios to reduce caprates compression.**
- 5) With the next four years over \$1.5 Trillion of CRE debt will be maturing and CRE assets need revenue solutions that bring additional appraisal value.**
- 6) CRE Industry has a history of stainable & repeatable finance models.**

Incorporating performance and potential growth of renewable energies into long-term investment strategy

United States Commercial Real Estate (CRE) revenue transactions. Chart represent approximately \$3.2 Trillion dollars of CRE sales.

Commercial Real Estate Sales Volume

\$ Billions

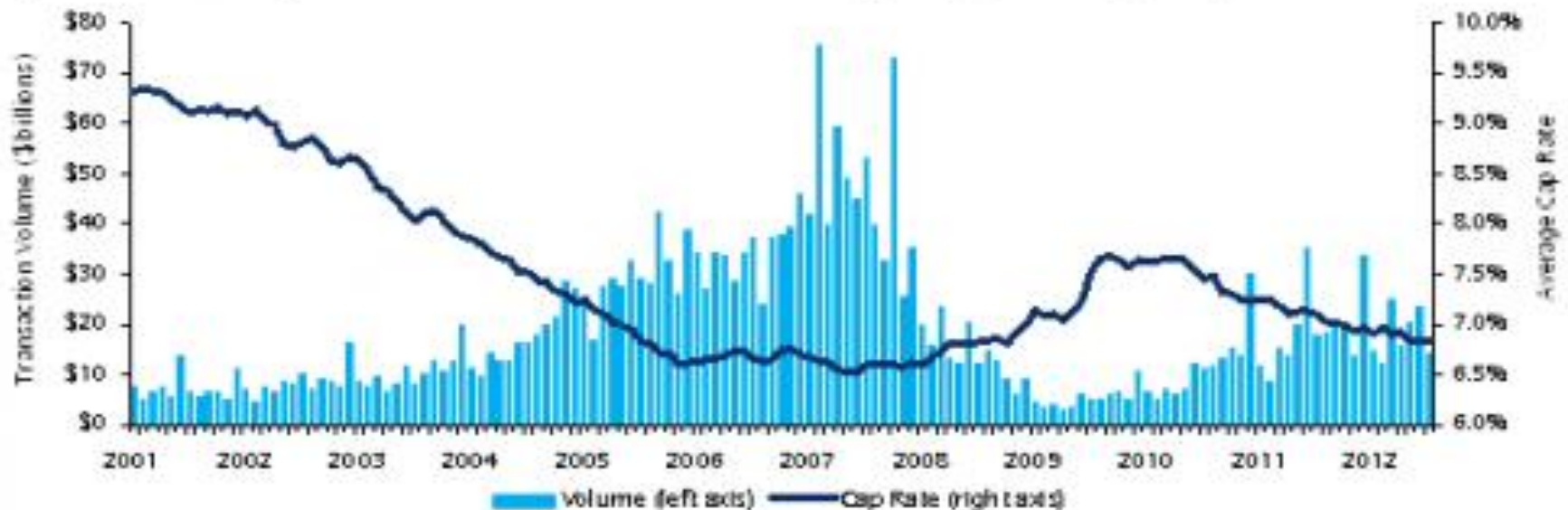


stewart

Incorporating performance and potential growth of renewable energies into long-term investment strategy

Commercial property Investors are seeing Caprate compression from 7.75% to 6.8% decrease. Looking for long term solutions.

Figure 1: Monthly U.S. CRE Transaction Volume (\$ bil.) and Avg. Cap Rate



Source: Real Capital Analytics; Barclays Research



Incorporating performance and potential growth of renewable energies into long-term investment strategy

The affect of Renewables and Advance Energy Technologies (RAET) on CRE assets:

- 1) IRR: Possible 17% and 9.8% cap rate with 5 year hold.
Returns On Invested Capital after 5 years hold: 194% (54% better than buildings without RAET) at a 7.7% resale cap rate.**
- 2) RAET Highlights:**
 - a) Commands better caprates.**
 - b) Improves operating income.**
 - c) Deploy Capital effectively in the \$Billions.**
 - d) Have warranties and guarantees from tier one supplies.**
 - e) Maximize the creation of Real Estate Investment Trust (REIT) or Master Partnership (MP).**
 - f) Use conventional CRE financial structures working with underwriters and examiners.**



Incorporating performance and potential growth of renewable & advance energies into long-term investment strategy

Other companion growth Markets that can effect the US renewable development market:

Stationary Energy Storage (ESS) Market:

Advanced batteries will roughly double each year over the next 5 years, reaching \$7.6 billion in 2017. Over the next half-decade, growth will level off to a compound annual growth rate of 31 percent, and revenues of \$29.8 billion in 2022 for 14GW*.

***Pike Research**

Microgrid Markets:

Grid-Tied Micro Grids in the North America market have grown from 900MW in December 2011 to 3.8 GW of planning ending December 2013. TKO expects this market to grow additional 2.7 GW of planning (Budgeting) in the next 18 months*. ***TKO Energy Capital**



Final Bold Thoughts for Scaling Renewables

- 1. Without energy storage there is no real smart grid (Think: Control without loss of consumption).**
- 2. Without energy efficiencies and demand power controls technologies, it will be difficult to make renewable sustainable and a reliable platform for market growth (Think: Reduce before you Produce).**
- 3. Finally, Do we, as a Industry, want to capture an additional \$100 billion per year in revenue on top of commercial revenues from CRE properties in which 40% will be open to refinanced in the next four years? (Think: M&A).**



Thank You



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