Dawn of a new era for utilities

• More intermittent generation resources
• Prices and carbon intensity matters
• Need to better manage the load curve

*It use to be that we managed generation to match the load, in the future we’ll manage the load to match the generation.*
The juggling act
## MISO Day-Ahead price variation

### Year 2017 MISO DA $/MWh

### Average of PRICE Column Labels

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**Grand Total:** $26.64 $20.17 $22.11 $23.50 $24.50 $23.47 $25.85 $22.61 $20.21 $20.64 $24.07 $25.11
Electric Thermal Storage
Interacting with the Grid

**MW** \(_{(\text{electric})}\)

*Charge Rate*

*Coupled to the real-time needs of grid*

**MW** \(_{(\text{thermal})}\)

*Discharge*

*Delivery of hot water*

**MWh** \(_{(\text{thermal})}\)

*State of Charge*
Community storage
Welcome

Sustainable and Efficient Electrification
The Integrated Energy Network - Efficient Electrification

product quality, and supporting emissions reduction, water savings, and...
Corporate Sustainability goals and customer engagement aligns.
Current customer energy solutions

- Electric Vehicles (EVs)
- Electric Truck Refrigeration units
- Electric Forklifts
- Workplace charging

Enabling technology adoption
Appendix
Electric truck refrigeration units make sense

Cleaner, healthier work environment
- Reduced emissions
- Improved air quality

Less noise, safer work environment
- Quieter operation
- Reduced disturbance to nearby communities

Lower costs of fuel maintenance
- Reduced fuel costs
- Increased fuel efficiency

What about the cold storage?

Electric trucks are designed to keep refrigerated goods cold for long periods.

Benefits:
- Reduced energy consumption
- Lower maintenance costs

Contact us for a quote and more information.

Alliant Energy

For more information, visit www.alliantenergy.com

1-800-292-9446

EPA SmartWay Vehicle Certification Number: 00124461

CARB Compliant

Federal Compliance Date: October 1, 2017

State Compliance Date: October 1, 2017

Class 8 HD Truck

Engine Manufacturer: Cummins

Engine Model: ISB 8.8

Transmission Manufacturer: Allison

Transmission Model: 4250

Tire Size: 11R24.5

Fuel Economy: 8.8 mpg
Lift it with electric

Maneuverability makes it smart. Rebates make it easy.

Did you know?

Electric-powered forklift technology has improved so much that Alliant Energy is now offering a rebate toward the purchase of or conversion to electric forklifts.

Electric Forklifts saving:

- Operate in narrower aisles than conventional forklifts
- Lift as much as conventional forklifts while being more responsive
BUILDING ELECTRIFICATION
WHEN IT MAKES SENSE AND HOW TO DO IT
DATA-DRIVEN INTELLIGENCE CAN ALSO FOCUS ELECTRIFICATION EFFORTS

Technical Fit

Grid Impacts

“IT” Makes Sense

Customer Benefits

Carbon Reductions
### Buildings with Technical Fit (n = 1300)

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<th>Building type</th>
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<th>Heating fuel use</th>
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#### Initial Filter

1,700 buildings de-selected based on...

- Building type
- Location
- Heating fuel use

#### Smaller Load vs. Larger Load
SOME ELECTRIFICATION WOULD HAVE HIGH GRID COSTS

Buildings with Technical Fit (n = 1300)

More Grid Impact

Less Grid Impact

Smaller Load Larger Load
SOME ELECTRIFICATION WOULD HAVE HIGH CARBON BENEFITS

Buildings with Technical Fit (n = 1300)

More Grid Impact

Less Grid Impact

Smaller Load  Larger Load
THANK YOU

Austin Whitman
Vice President, Energy Markets
FirstFuel Software

awhitman@firstfuel.com
857-498-0895
Power Sector is Changing

- Consumer Choice
- Tech Advances
  - Renewable Energy/Distributed Resources
  - Storage
  - Information Technology
- Grids
  - Designed for 1-way power flows
  - Now home to thousands of DERs
- Innovations are changing utilities’ formerly-predictable supply/demand relationship
Isn’t this really just about more load?

Isn’t all electrification beneficial?

No – Not all Electrification is Created Equal

Beneficial Electrification (BE)
Before That Horse Gets Out of the Barn…
And She Bolts on You…
Let’s Consider a few implementation points
BE Defined

• Electrification is beneficial if it meets one or more of three conditions, without adversely affecting the other two:
  
  • Saves consumers money over the long run;
  • Reduces environmental impacts; and
  • Enables better grid management.
A Lot of Electrification Load is Different

• It’s from **more efficient** end-uses:
  • End-uses that can be **less expensive** to operate, and
  • With the right rate design--**less expensive** to “fuel”
• Because it’s flexible, it’s **valuable**
Unlike this *Inflexible* Load

![Graph showing energy usage with Afternoon Peak High Usage highlighted]
BE Load Can Fill Valleys and Shave Peaks
Valuable for Reducing Curtailments
Rates Can Influence *When* We Charge

*Source: MJ Bradley, 2017*
What About Efficiency?
Augmented by Emissions Efficiency

- Efficiency Measures kWhs
- Emissions Efficiency Measures Joules
Conclusions

- Electrification can be beneficial if it reflects:
  - Tech. innovations,
  - Consumer interest, and
  - New value in the grid; and
- Coordinates consumers to help companies manage the grid by sharing that value with all consumers.
This is Avoidable
Electrification Can be Rolled Out for the Benefit of Everyone
* No Animals Were Injured in the Preparation of this Presentation
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org