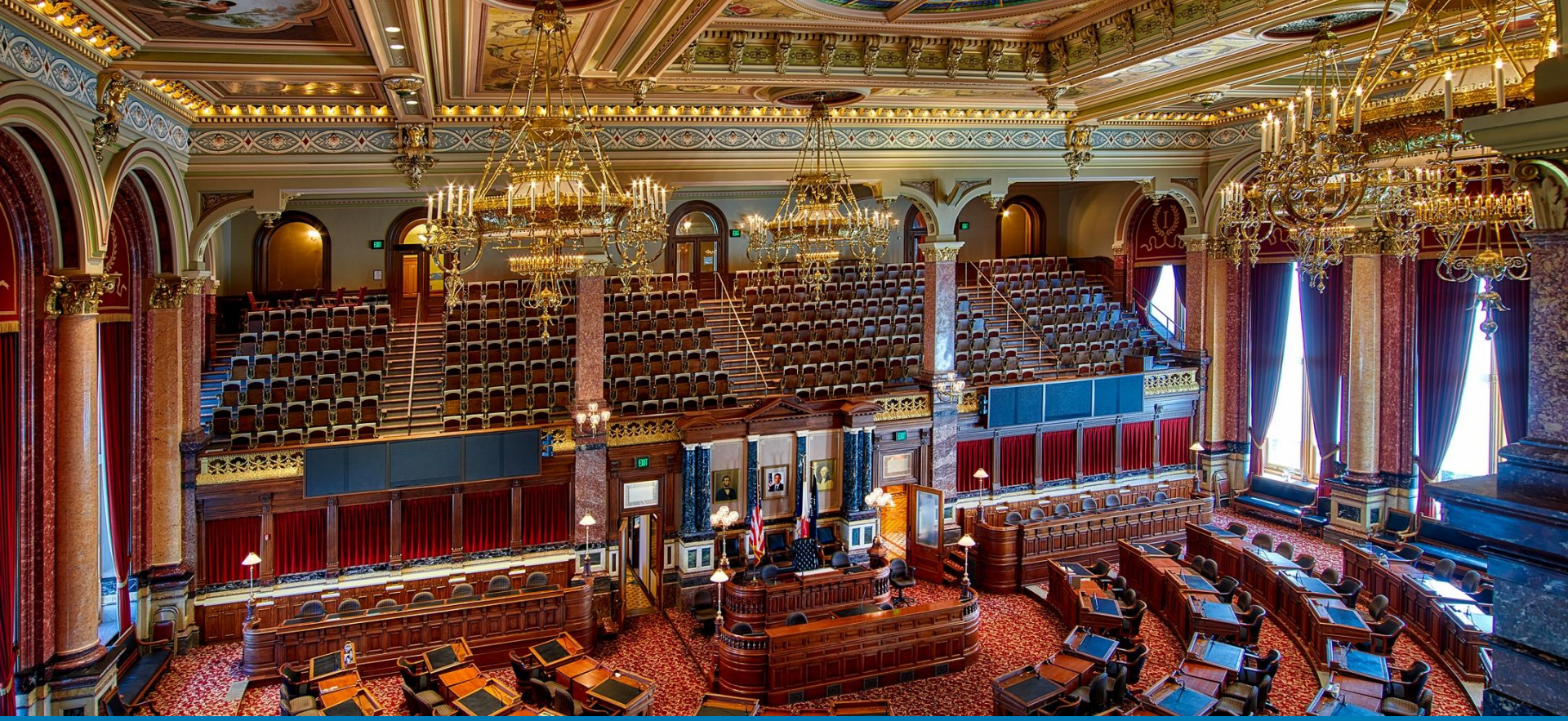


Policy Perspectives for an Evolving Energy Efficiency Landscape

Carmen Best, Director of Policy & Emerging Markets, Recurve

MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

Housekeeping

- Attendees are muted
- Webinar will be recorded and sent out after
- Questions? Enter them in the question box

MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

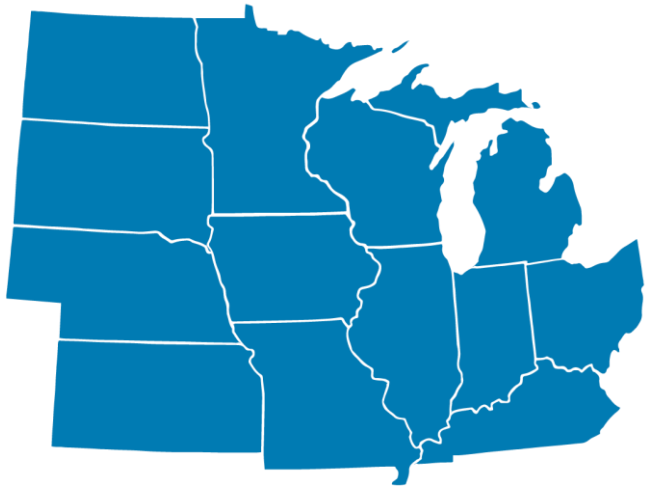
About MEEA

The Trusted Source on Energy Efficiency

We are a nonprofit membership organization with 160+ members, including:

- Utilities
- Research institutions
- State and local governments
- Energy efficiency-related businesses

As the key resource and champion for energy efficiency in the Midwest, MEEA helps a diverse range of stakeholders understand and implement cost-effective energy efficiency strategies that provide economic and environmental benefits.



MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

Carmen Best

Director of Policy & Emerging Markets

- Supports the growth of meter and performance-based energy efficiency across the country
- Prior to Recurve, spent several years at the California Public Utilities Commission
- Supported Recurve in the creation of transparent methods and open-source software to revolutionizes the way energy efficiency is measured, deployed and procured

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RECURVE
SHAPE THE FUTURE OF ENERGY

Policy Perspectives for an Evolving Energy Efficiency Landscape

Midwest Energy Efficiency Alliance

July 16, 2019

Carmen Best, Director of
Policy & Emerging Markets

Who am I?

- ✓ Evaluation consultant in Wisconsin
- ✓ California Public Utilities Commission staff for almost 10 years
- ✓ Managed large scale evaluation portfolios to inform resource planning & financial incentive payments for investor owned utilities
- ✓ Joined RECURVE in 2018 to support market solutions to scale energy efficiency and grid integration

RECURVE

What is RECURVE?

CALTRACK

- Standard M&V Calculation Methods
- Monthly, Daily, and Hourly
- Public Stakeholders Empirical Process
- www.CalTRACK.org

LFENERGY OPENEEMETER

- Python CalTRACK Engine
- Open Source Apache 2.0
- How It Works: https://goo.gl/mhny2s
- Code Repo: https://goo.gl/qFdW4P

LFENERGY

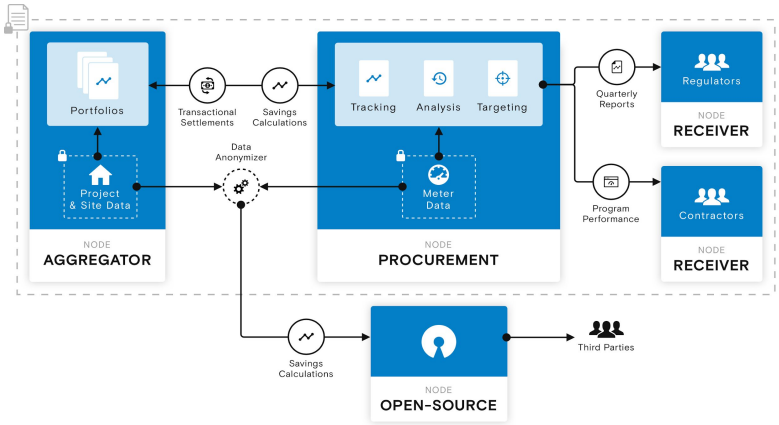
RECURVE

What is RECURVE?

Recurve SaaS Platform

- Program and Procurement Network
- Telemetry, Targeting, and Analytics
- CalTRACK Compliance
- SaaS "OpenEEmeter Inside"
- Data Pipeline (ETL)
- Encryption and Security
- Scalable to Millions of Meters

Distributed Nodes



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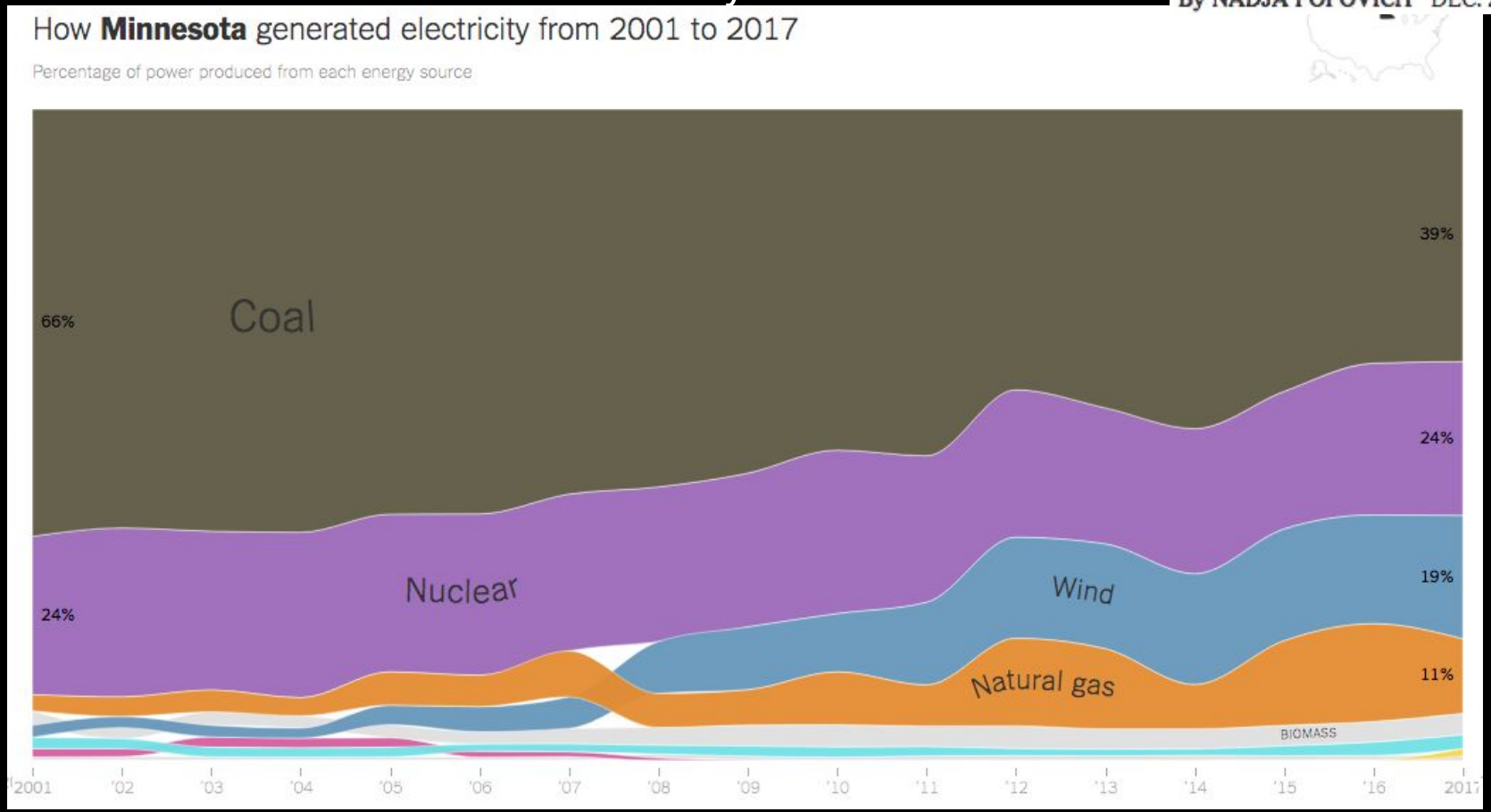
Change is inevitable.

RECURVE

How **The Midwest** Generated Electricity from 2001 to 2017

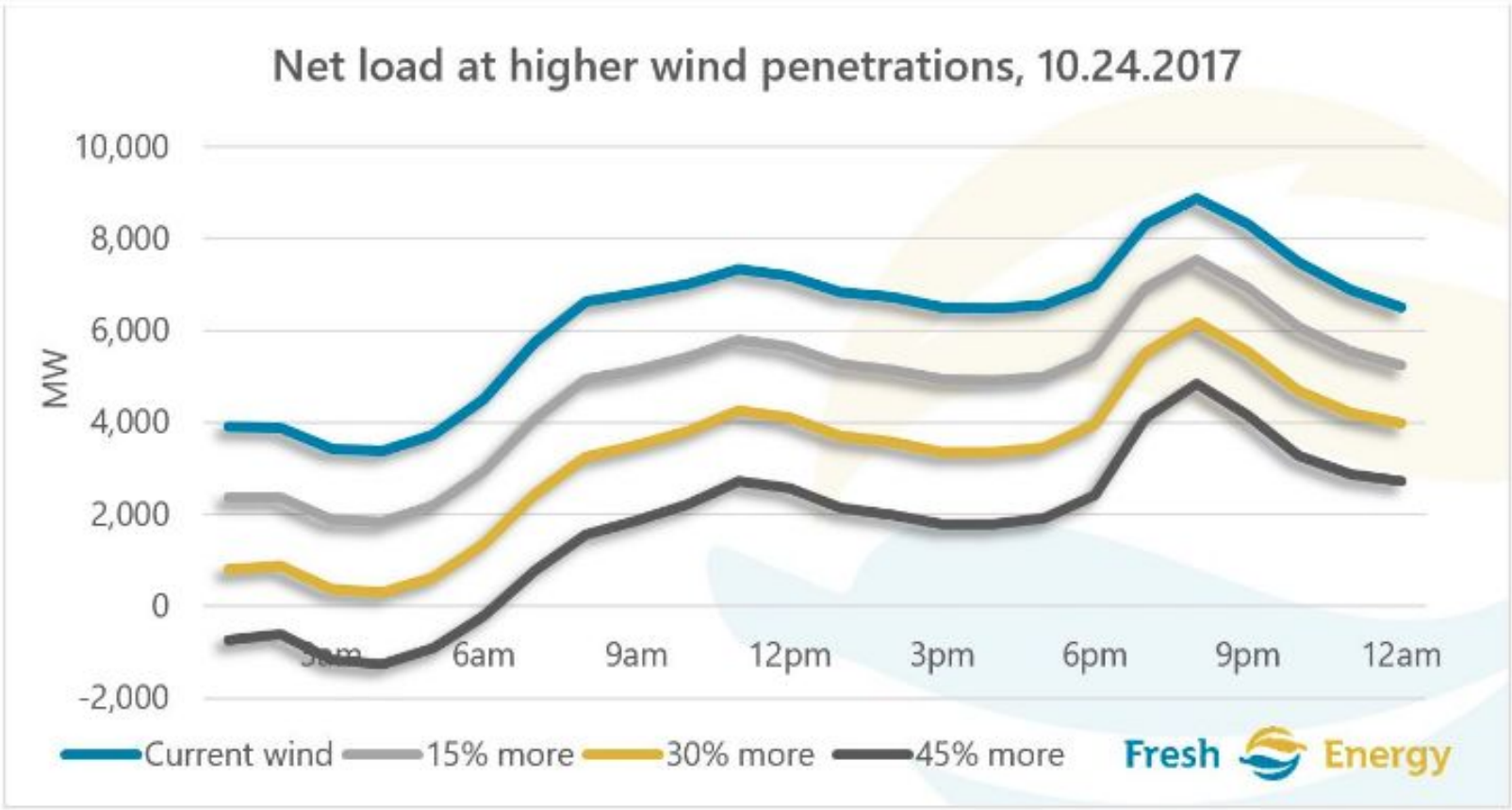
The New York Times

By NADJA POPOVICH DEC. 24, 2018



https://www.nytimes.com/interactive/2018/12/24/climate/how-electricity-generation-changed-in-your-state.html

Renewable Energy is Driving New Grid Dynamics



Many ways to manage & value

Non-Wires Alternatives
Local Capacity Markets
Beneficial Electrification

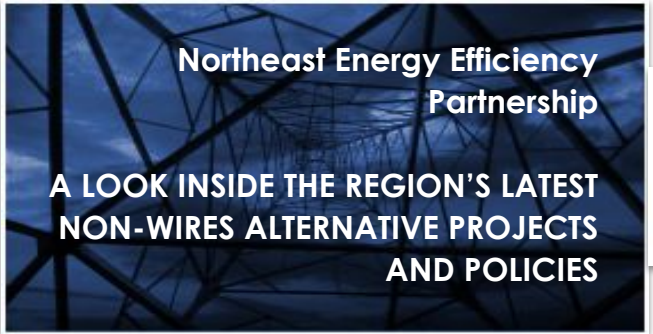
Non-Wires Alternatives

CASE STUDIES FROM LEADING U.S. PROJECTS

E4 THE FUTURE · PLMA Load Management Leadership · Smart Electric Power Alliance

Equitable Beneficial Electrification (EBE) for Rural Electric Cooperatives

ELECTRIFYING RESIDENTIAL SPACE AND WATER HEATING

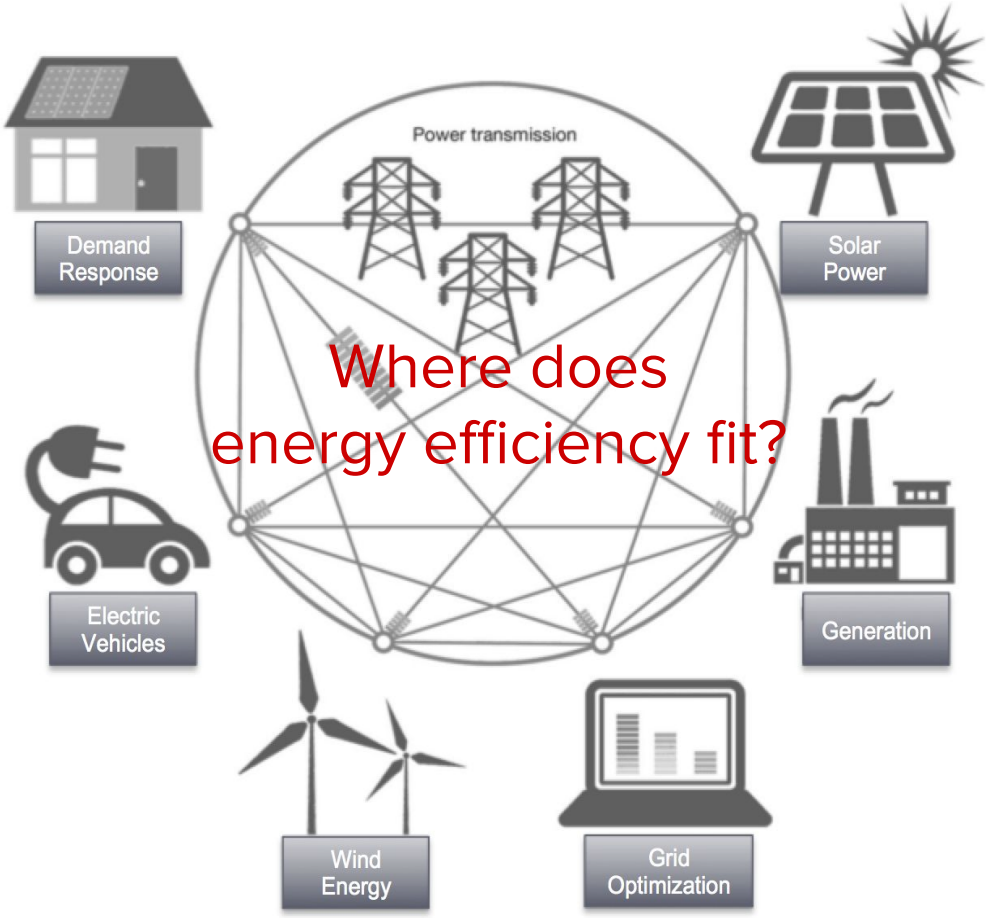


ACEEE
American Council for an Energy-Efficient Economy

Energy Efficiency in Capacity Auctions: A Historical Review of Value

Incredible Changes are Underway…

Distributed energy markets are the future of integrated grid management



Justifications of Energy Efficiency

Past		Future
First in the loading order, or fixed input to grid resources	→	Quantifiable, procurable, reliable grid resource
Meeting energy efficiency savings goals ~ carbon goals	→	Energy efficiency savings align with actual carbon offsets
Customer Bill Savings	→	Customer energy management and service

RECURVE

Three Key Components for Scale...

Meter-Based Quantification

- ✓ Transparent
- ✓ Consistent
- ✓ Accessible

Performance Payment

- ✓ Accountable
- ✓ Flexible
- ✓ Scalable

Competitive Procurement

- ✓ Comparable
- ✓ Integrated
- ✓ Responsive

RECURVE

Meter-Based Quantification

Policy Action	Market Opportunity
Track changes in consumption for targeting & participants	Improve cost effectiveness and enhance customer experience
AMI deployment and integration for all DER activities	Consistent, accessible data, and hourly impacts
Adopt definition of “savings” that considers change in consumption	Align incentives with carbon goals; and build confidence with forecasters

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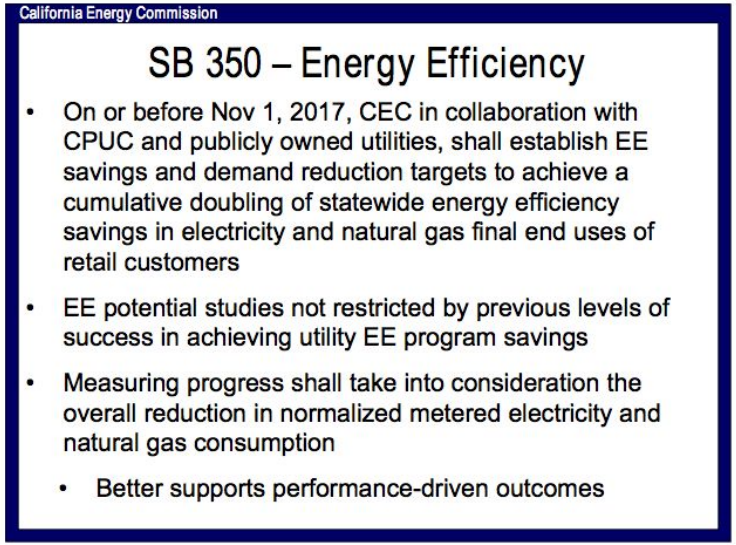
Normalized
Metered
Energy
Consumption

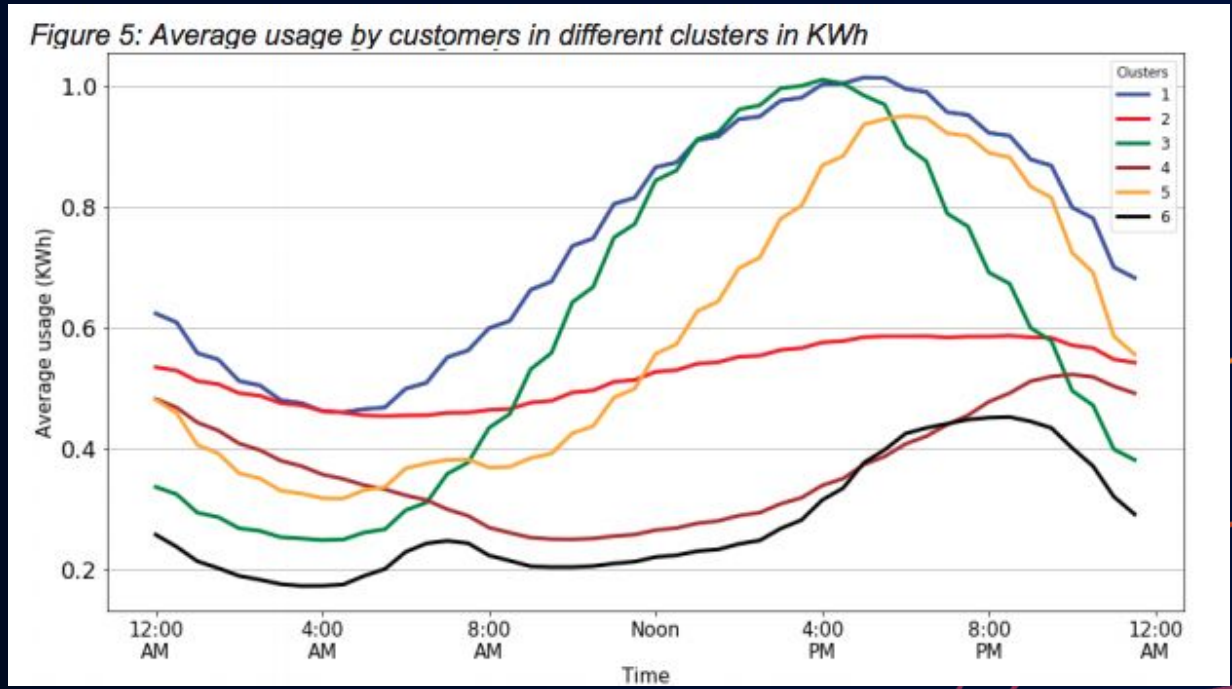
Is a Means To Streamline and Scale EE to Double Energy Efficiency in California



"The energy efficiency savings and demand reduction …. achieving the targets established pursuant to paragraph (doubling of EE by 2030) **shall** be measured taking into consideration the **overall reduction in normalized metered electricity and natural gas consumption** where these measurement techniques are feasible and cost effective." – SB 350

Six unique load shapes: A segmentation analysis of Illinois residential electricity consumers

"This information can be used to improve the effectiveness of energy efficiency programs and dynamic rate designs by helping to target those initiatives at those customers whose participation would have the biggest impact on the system, as well as those customers who would benefit from them the most."



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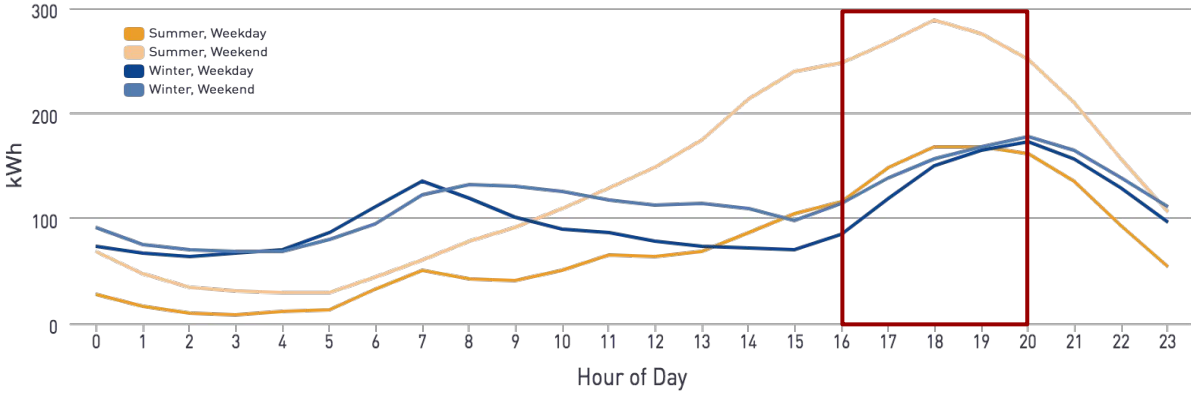
By Jeff Zethmayra, Ramandeep Singh Makhijaa, Citizens Utility Board
https://www.citizensutilityboard.org/wp-content/uploads/2019/06/ClusterAnalysisFinal.pdf

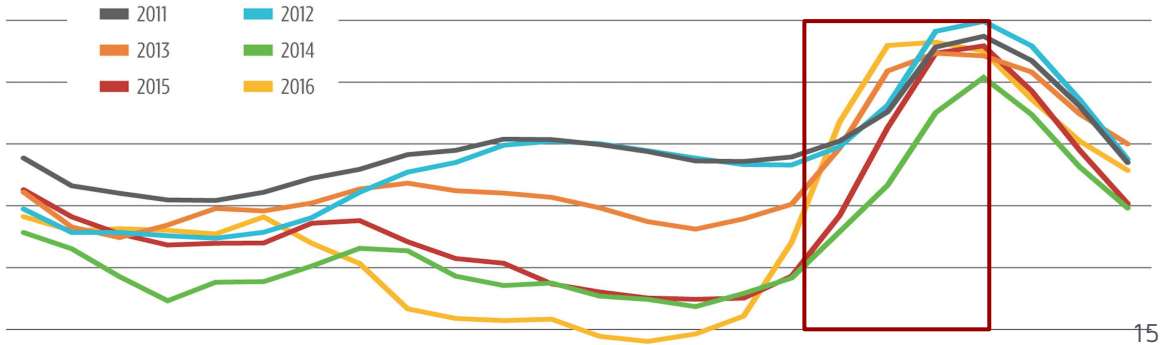
Sending the Right Price Signal

Resource Curve

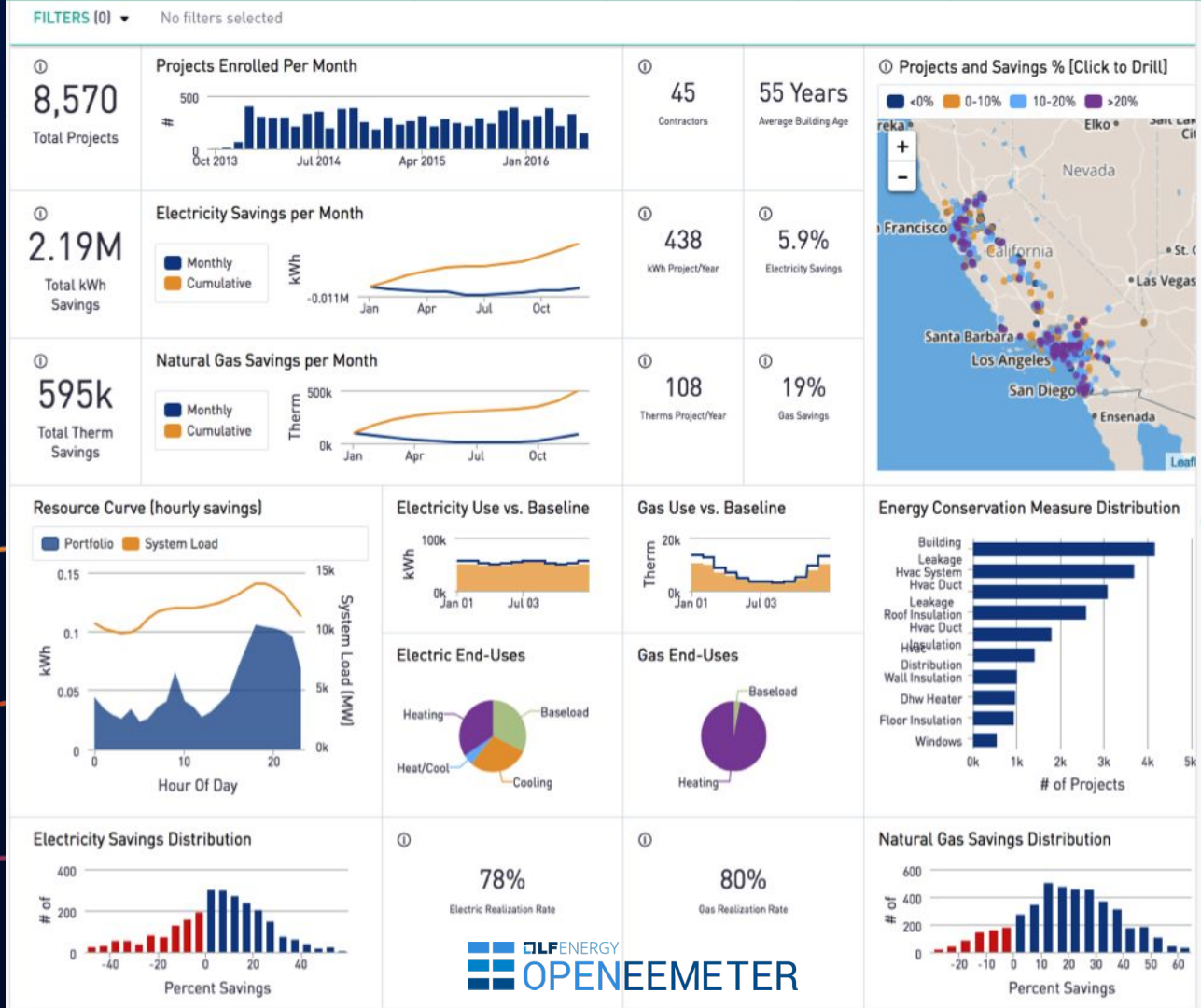
Resource Curve by Season and Weekend/Weekday



Duck Curve



Track Programs and Business Impacts in Real-Time



LFENERGY OPENEEMETER

Improve Cost Effectiveness and Customer Experience

RECURVE

Performance Payments

Policy Action	Market Opportunity
Default to performance oriented program designs	Outcome drives accountability
Eliminate technology specific requirements	Creative solutions for customers
Market support comes through training, data and risk management	Grow businesses around effective market solutions

RECURVE

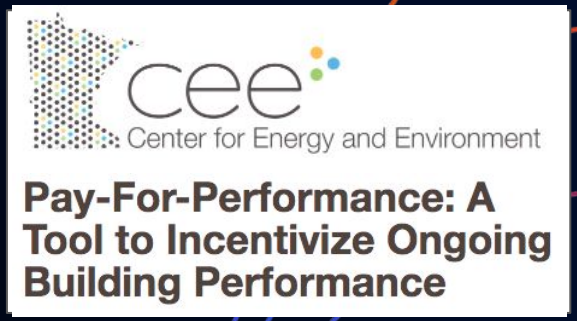
Statewide Policies on Performance

- Legislation
- Regulatory Reform
- Executive Order

California Public Utilities Commission

nyserda
Energy. Innovation. Solutions.

...the core of the P4P model is the design and alignment of the performance-based requirements between the program administrator and the service provider as well as the corresponding services/requirements between the service provider and the customer. (New Efficiency: New York)



EnergyTrust of Oregon

...expand meter-based savings pilot programs, including pay for performance pilot programs by January 1, 2019. (Executive Order No 17-20, Accelerating Energy Efficiency in Oregon's Built Environment)

CASE STUDY

PG&E P4P: Residential

- Performance payments made monthly based on OpenEEmeter running CalTRACK 2.0
- Four (4) Aggregators with varied business models
- $25M total payments based on kWh & Resource Curve (time based savings)

Unparalleled flexibility to pursue a range of improvements and activities over time to achieve residents' savings goals

Retrofit

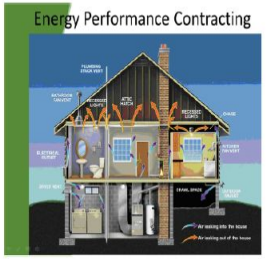
- Whole House
- HVAC
- Lighting
- Outdoor/Pool Deck

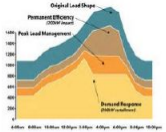
Operational

- Smart Thermostats
- Home Energy Management Systems
- Smart Appliances

Behavioral

- Homeowner Incentives
- Demand Response
- Other specially designed programs





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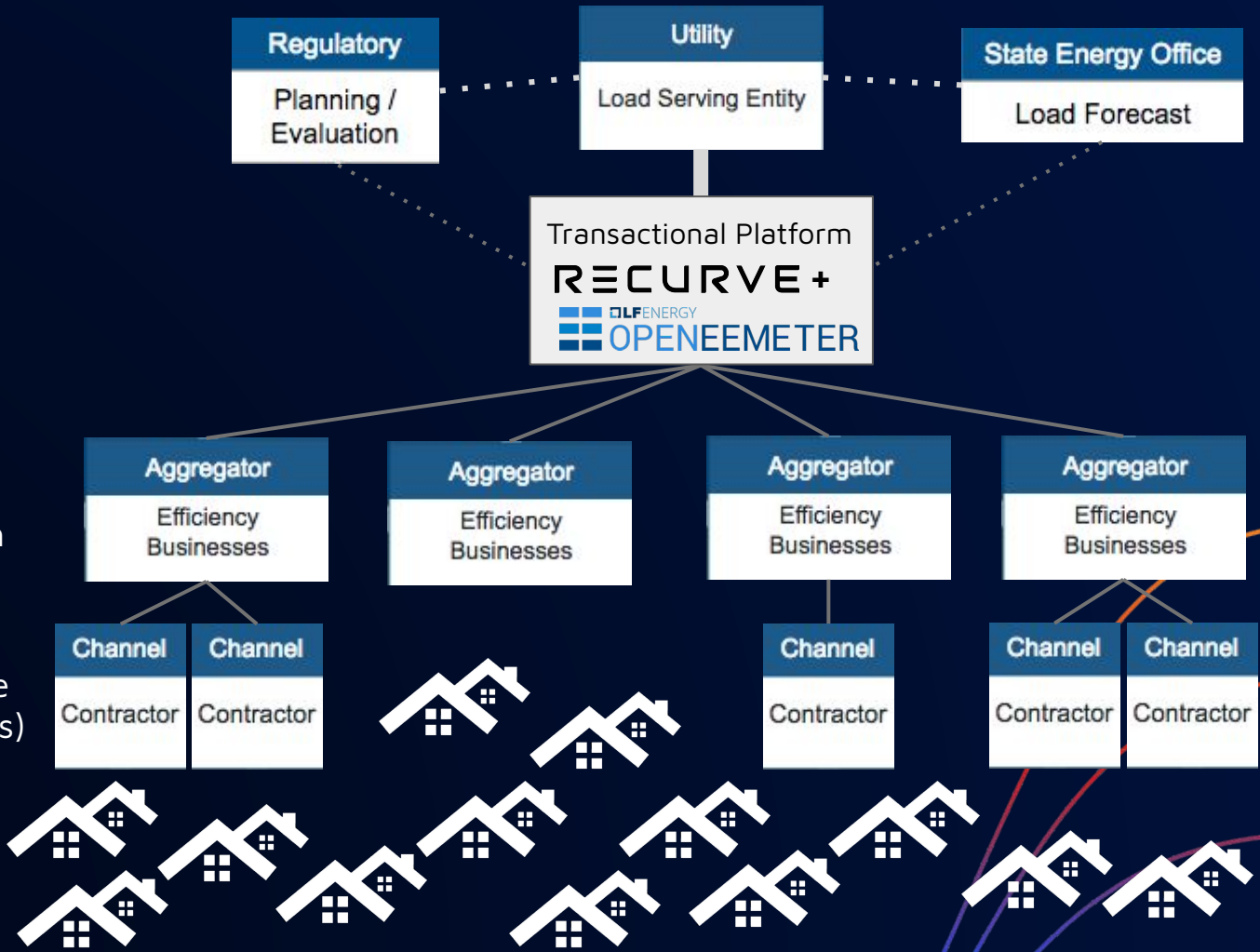

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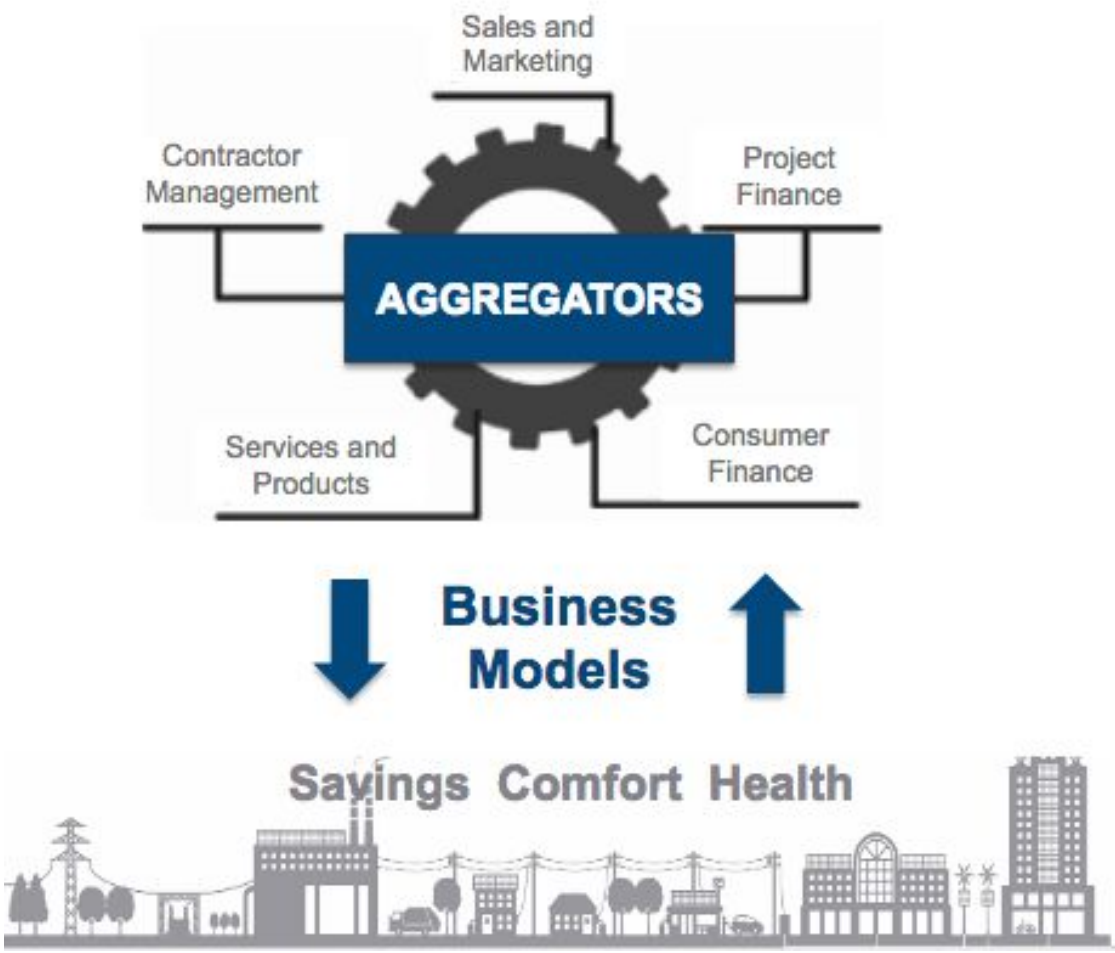
Performance Supports Market Innovation & Growth



Competitive Procurement

Policy Action	Market Opportunity
Adopt technology neutral solicitations	Offer comprehensive solutions that drive reduction in consumption
Use meter-based outcomes for payment / criteria	Compete with consistent metrics to demonstrate value
Fund more DERs via procurement funding & tied to grid planning	Expand funding sources and streamline rules and regulations

RECURVE

Clean Energy Portfolios Win on Price

https://rmi.org/insight/the-economics-of-clean-energy-portfolios/

Support Growth

"The 2012–2013 delivery year auction in 2009 was the first year efficiency was included in the auction; since that time, both the absolute amount and the amount of energy efficiency cleared as a percentage of total cleared capacity in the BRA have trended steadily upward."

https://aceee.org/sites/default/files/publications/researchreports/u1714.pdf

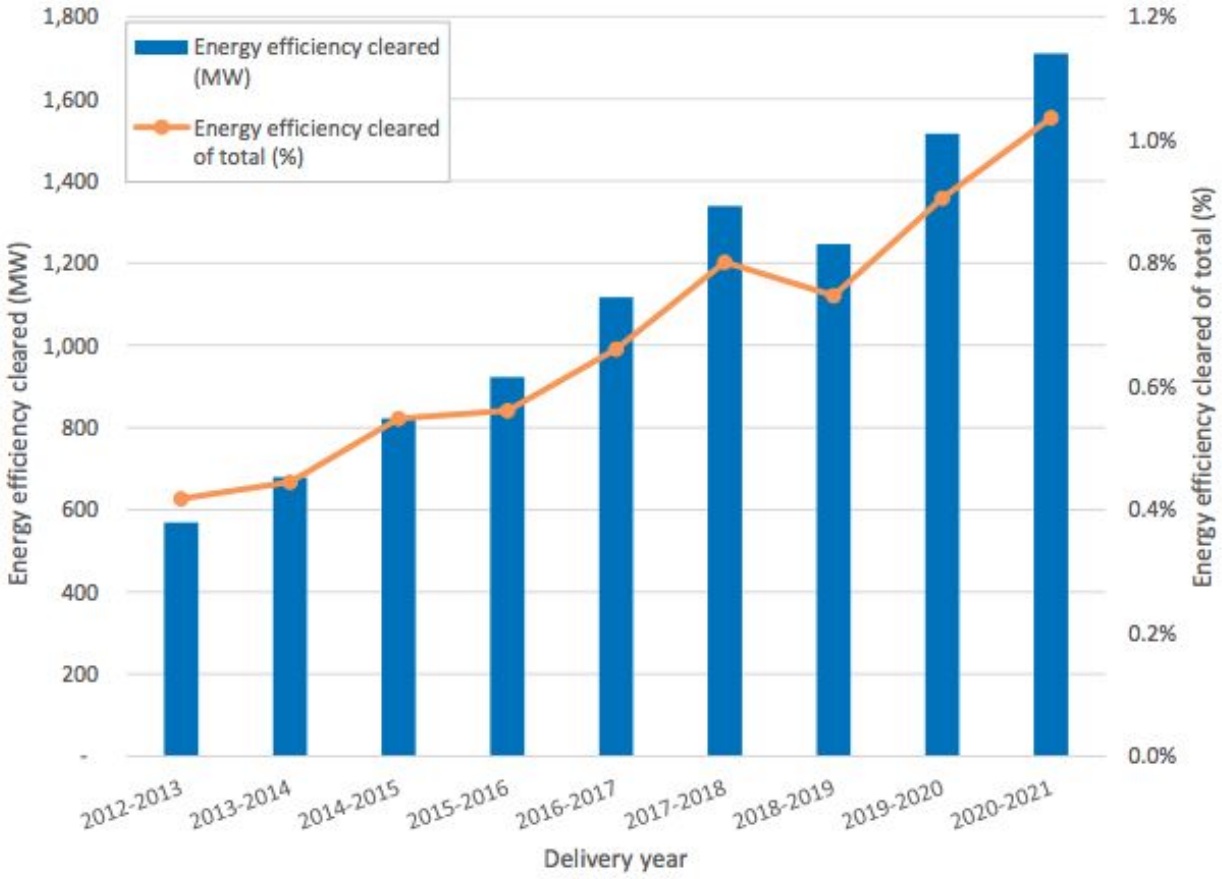
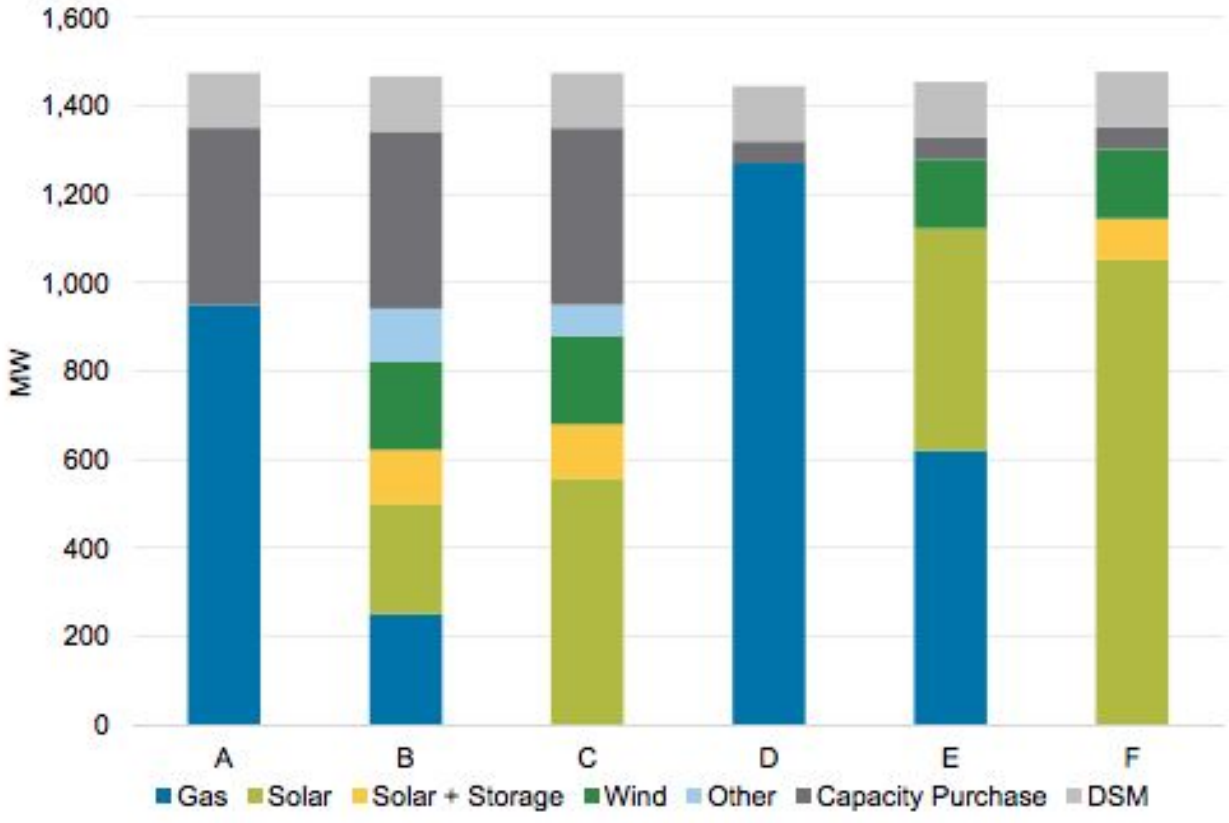


Figure 3. Energy efficiency cleared in the PJM RPM. *Source:* PJM 2017a.

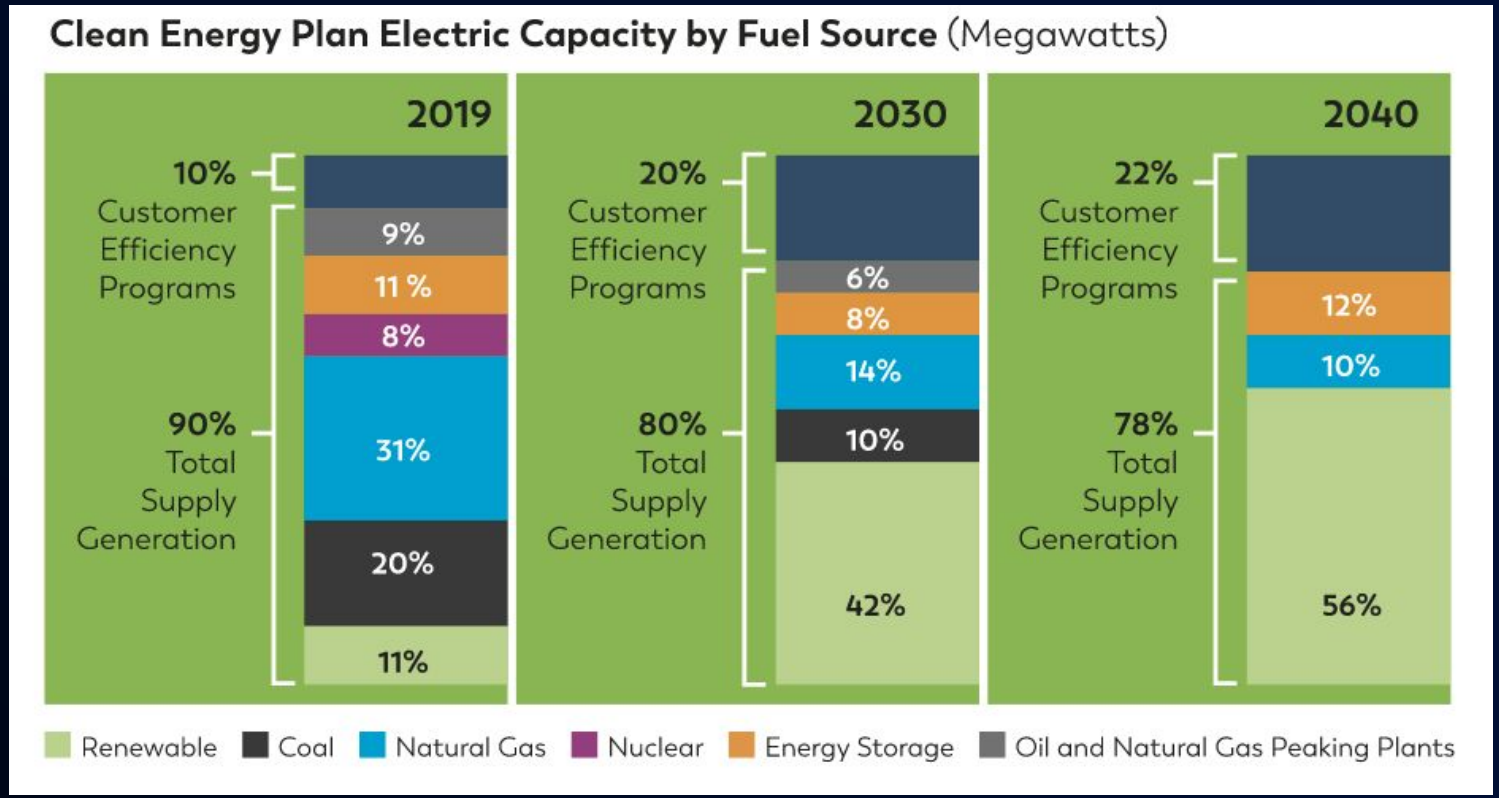
NIPSCO 2018 IRP

Figure 9-17: 2023 Incremental Replacement Resources by Portfolio (UCAP MW)



https://www.nipsco.com/docs/librariesprovider11/rates-and-tariffs/irp/2018-nipsco-irp.pdf?sfvrsn=15

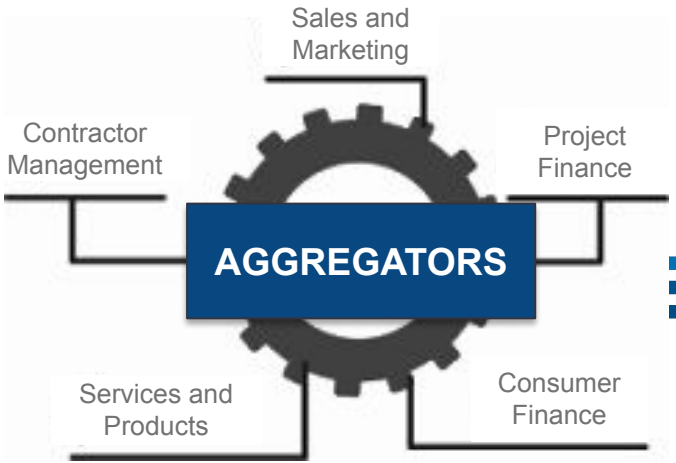
Consumers Clean Energy Plan



https://www.consumersenergy.com/community/sustainability/energy-mix/renewables/integrated-resource-plan?utm_campaign=sustainability&utm_medium=vanity-url&utm_source=cleanenergyplan&utm_content=cleanenergyplan

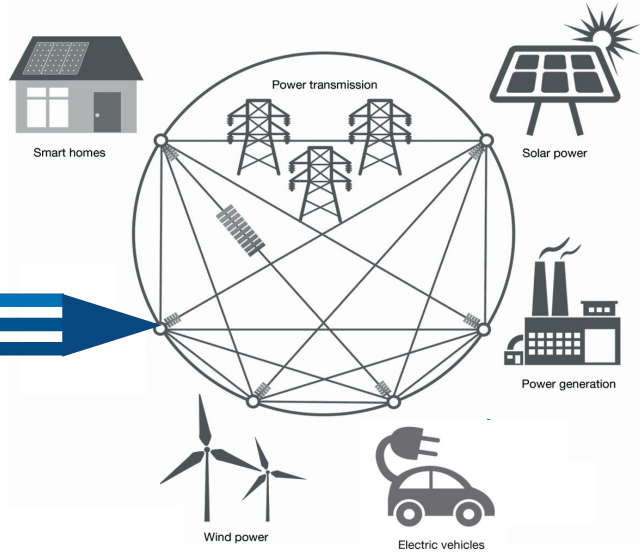
Project Finance: The long-term financing of projects based upon projected cash flows rather than the balance sheets of its sponsors.

Energy Efficiency fits a Future Full of Opportunity



DEMAND CAPACITY

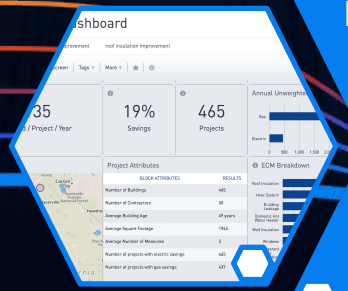
Grid Resource



Business Models

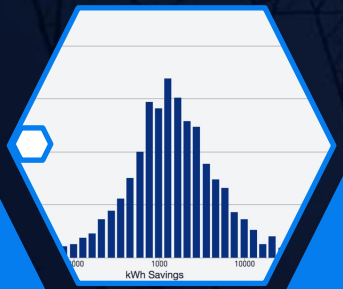
RECURVE

SHAPE THE FUTURE OF ENERGY



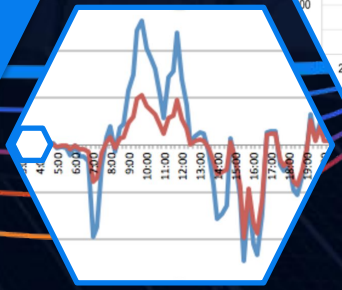
Pay for Performance

EEMeter

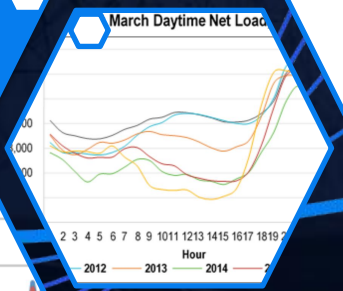


Resource Curve

Demand Capacity



Procurement



Carmen Best

Policy & Emerging Markets

carmen@recurve.com

Additional References from Q&A

Comparison Group Impact Evaluation - Energy Trust of Oregon

https://www.energytrust.org/wp-content/uploads/2018/11/OpenEE-Technical-Report-Comparison-group-identification-methods-FINAL-wSR.pdf

International Energy Program Evaluation Conference (IEPEC) Agenda for Denver August 2019 https://www.iepec.org/?p=14459

PAY FOR PERFORMANCE

Moderator: Jennifer Meissner, NYSERDA

- How to Evaluate Pay for Performance Programs: A Payday for Participants and Utilities – *Alexandra Czastkiewicz, EcoMetric Consulting* [abstract]
- Predictions with Restrictions: C&I Metered Energy Consumption – *Sarah Monohon, Evergreen Economics* [abstract]
- Policy Pathways to Meter-Based Pay for Performance – *Carmen Best, OpenEE* [abstract]
- We Say We Want a Revolution… What is it Going to Take to Get There with Pay for Performance? – *Hilary Polis, Opinion Dynamics* [abstract]

Thank you!

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