Getting to Yes: Scaling Comprehensive Efficiency in Commercial Buildings

Public Webinar

Northeast Energy Efficiency Partnerships

August 2nd, 2018, 1-2:30pm EST

Agenda

- Big Picture Context
- Market summary and emerging trends
- Emerging approaches to commercial efficiency
- Strategies to get to scale
- Looking out to the future

Today's Speakers

Claire Miziolek
Technology and Market Solutions Senior Manager

NEEP

Donald Drohan
Business Development Director

Metrus Energy

Matt Golden
CEO

OpenEE

Marcus Jones
Energy Consultant

Vermont Energy Investment Corporation

Housekeeping

- This webinar is being recorded
- The slides and recording will be posted online shortly and sent to you via gotowebinar
- All lines will remain on mute—please type in your questions at any time and we will answer during Q&A
  - if you have a question for a specific speaker, please include their name/company/description
- Please complete the survey which launches at the end of the webinar
- Polls: who are you?

Northeast Energy Efficiency Partnerships

"Assist the Northeast and Mid-Atlantic region to reduce building sector energy consumption 3% per year and carbon emissions 40% by 2030 (relative to 2001)"

Mission

We seek to accelerate regional collaboration to promote advanced energy efficiency and related solutions in homes, buildings, industry, and communities.

Vision

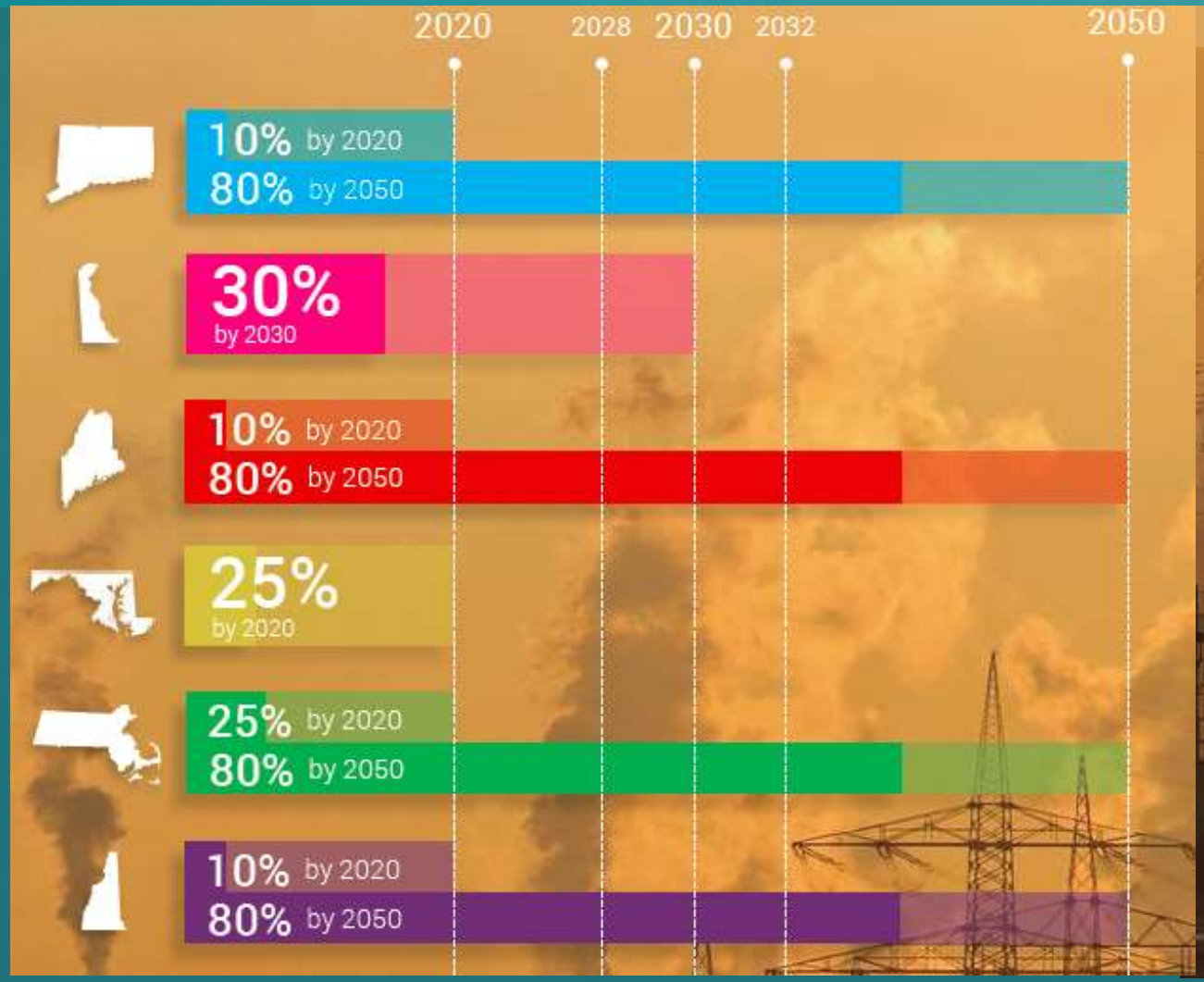
We envision the region's homes, buildings, and communities transformed into efficient, affordable, low-carbon, resilient places to live, work, and play.

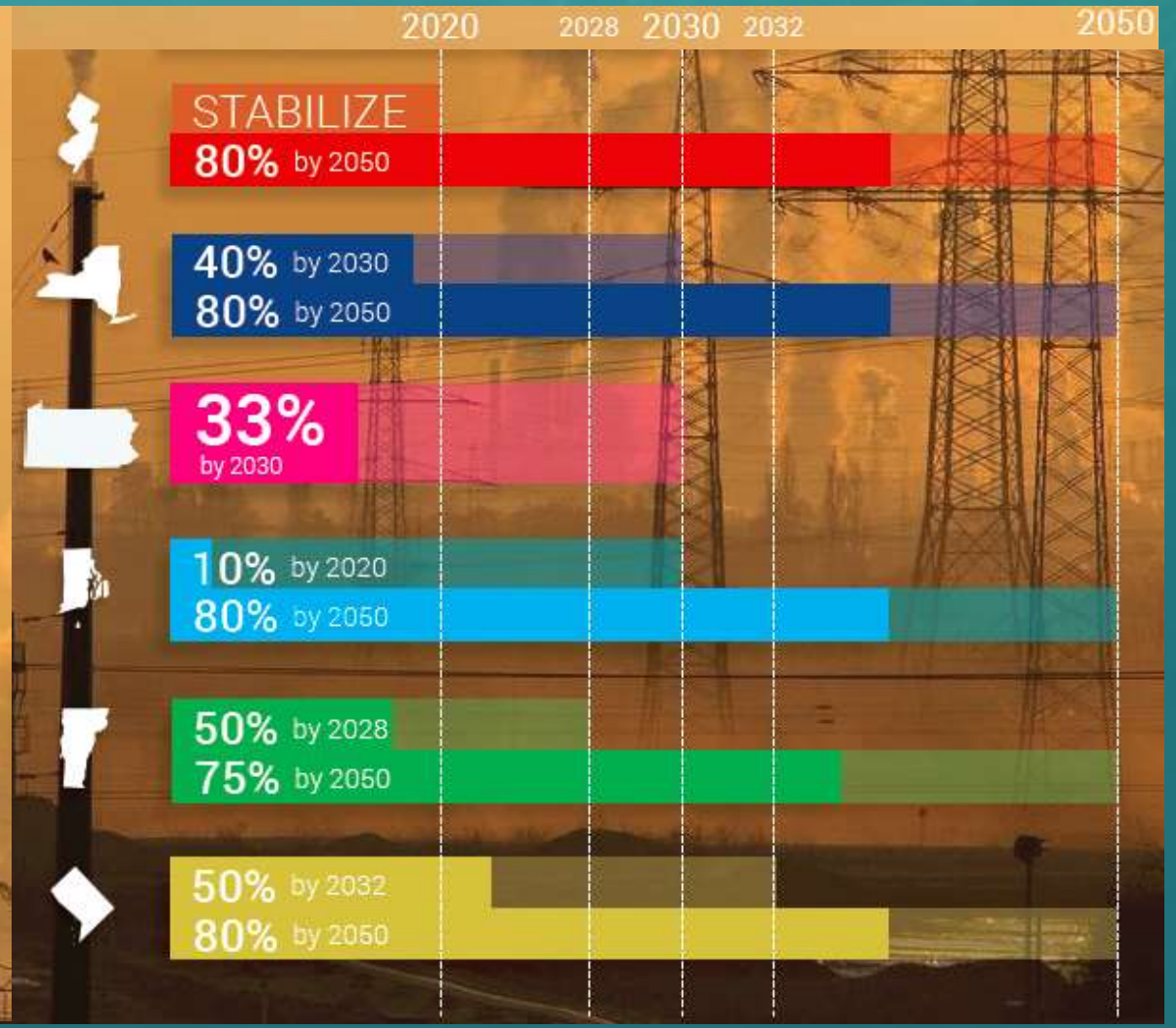
Approach

Drive market transformation regionally by fostering collaboration and innovation, developing tools, and disseminating knowledge

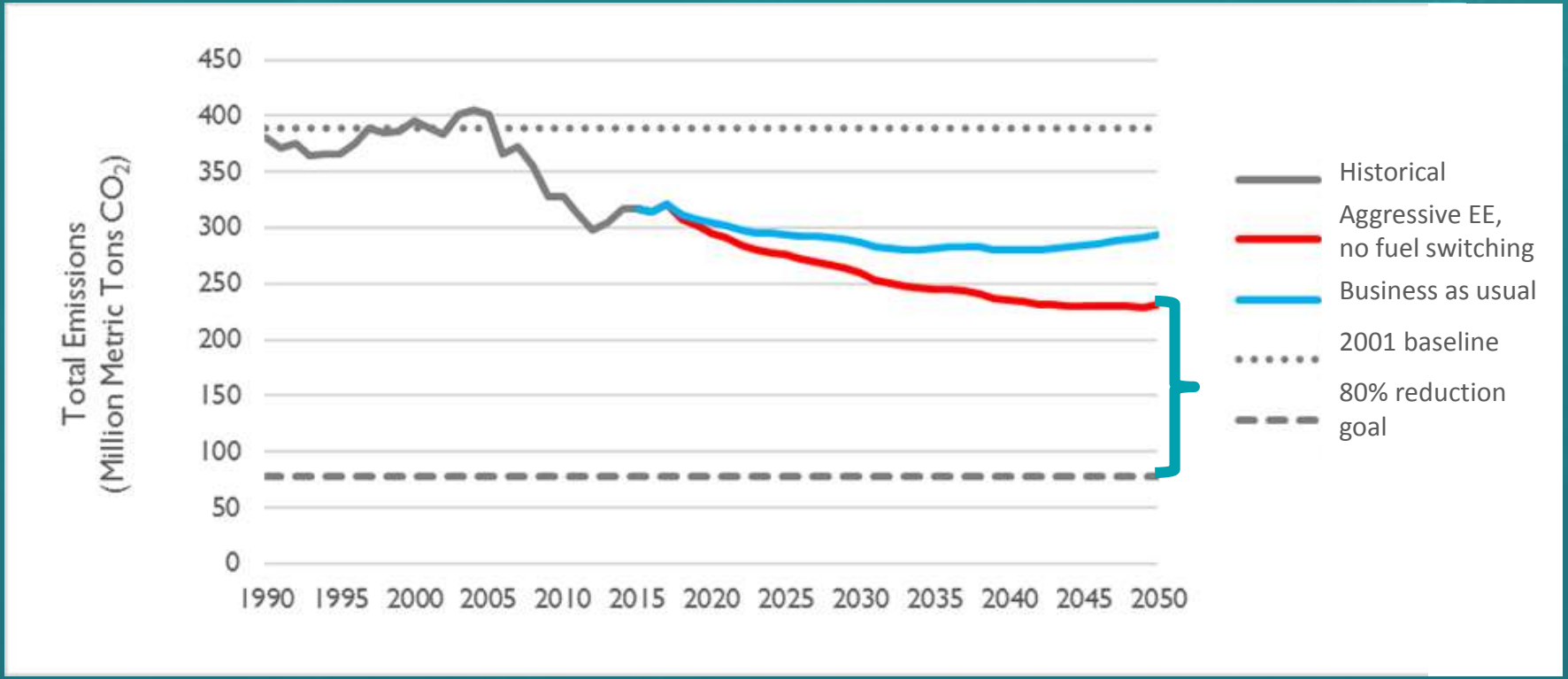
One of six REEOs funded in-part by U.S. DOE
to support state and local efficiency policies and programs.

Region's Aggressive Carbon Reduction Targets





Are we on the path to 80% CO2 reductions?



- Not yet…a ***lot*** of additional work needs to be done
- Emissions are nearly *triple* the goal of 80% reduction

In order to achieve our goals, need a 3 pronged strategy:

Use less energy

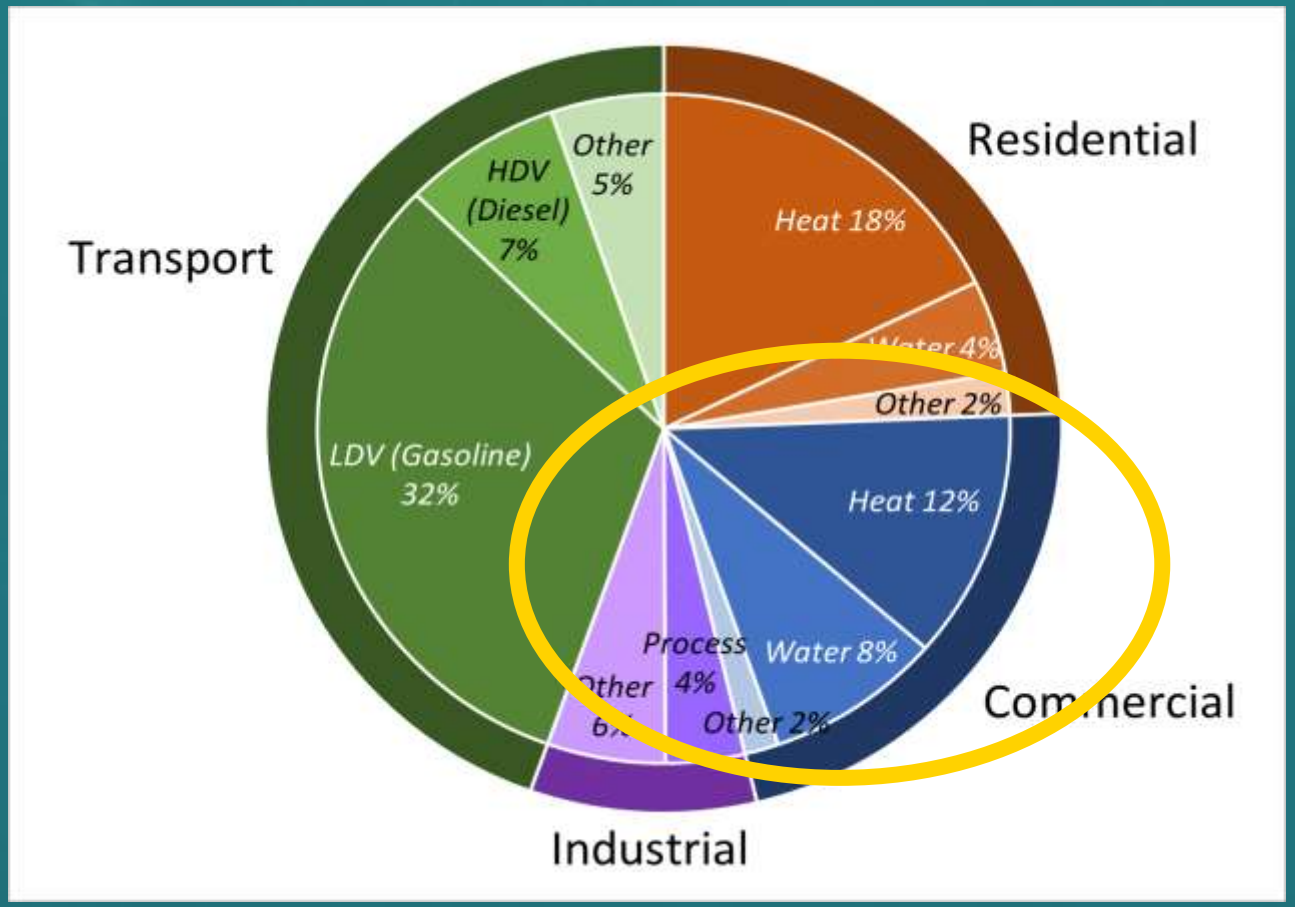
Have clean generation for electricity

Strategically shift energy use towards electricity

More information on this available at: http://www.neep.org/initiatives/strategic-electrification

How are we using fossil fuel now?
Direct Use in New York and New England

- In total, 4.2 Quadrillion BTUs per year of direct fossil fuel use
- The Commercial sector is a significant carbon contributor…and a significant opportunity for improvements!



How we're addressing this? New report!

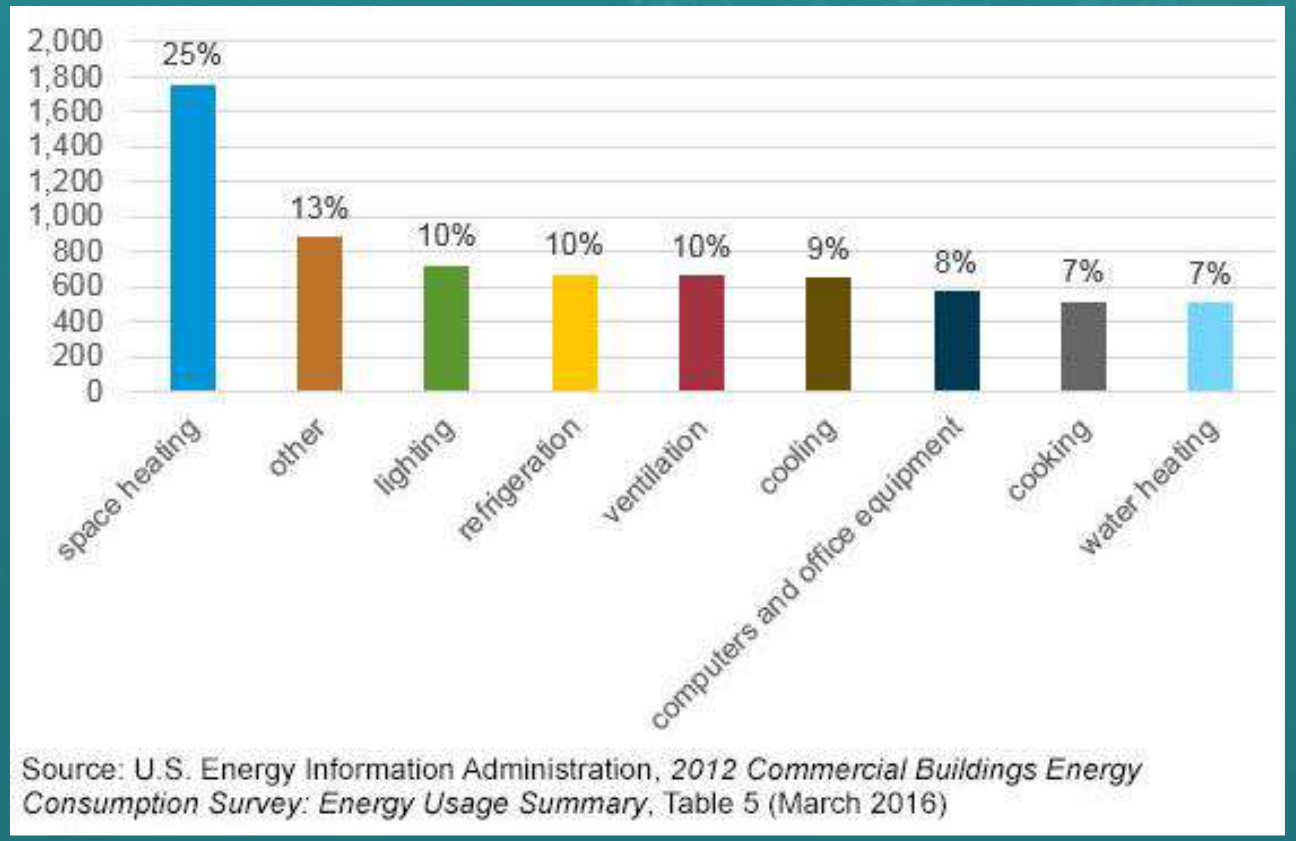
- Publically available at (linked in browser):
  http://www.neep.org/getting-yes-scaling-comprehensive-efficiency-commercial-buildings
- ~30 pages of content
  - The Market
  - Emerging Approaches
  - New strategies to get to scale
- "Choose your own adventure" model
  - If you are very familiar with parts of this report, skip 'em!
  - Goal is to bring everyone up to speed and present new strategies for success. Fill in info gaps, not repeat what you already know

Basic premise

- Energy Efficiency in Commercial buildings is not new
  - We've had many successes over decades
  - We've developed technologies, financing, and incentives to lower barriers to access
- So, the efficiency of the commercial sector has been transformed, right? RIGHT??
- Companies have evolved, so too have their energy needs and priorities
  - What was once a **compelling** package may no longer be enough
  - Many of the most willing customers have already been targeted for **lighting** upgrades
  - Newer energy considerations, from **renewables** to **grid integration**
  - *We are still challenged to bring comprehensive efficiency to the rest of the market.*
- How can we use all the tools in our toolbelts to move more commercial customers to "yes!"

Market Summary

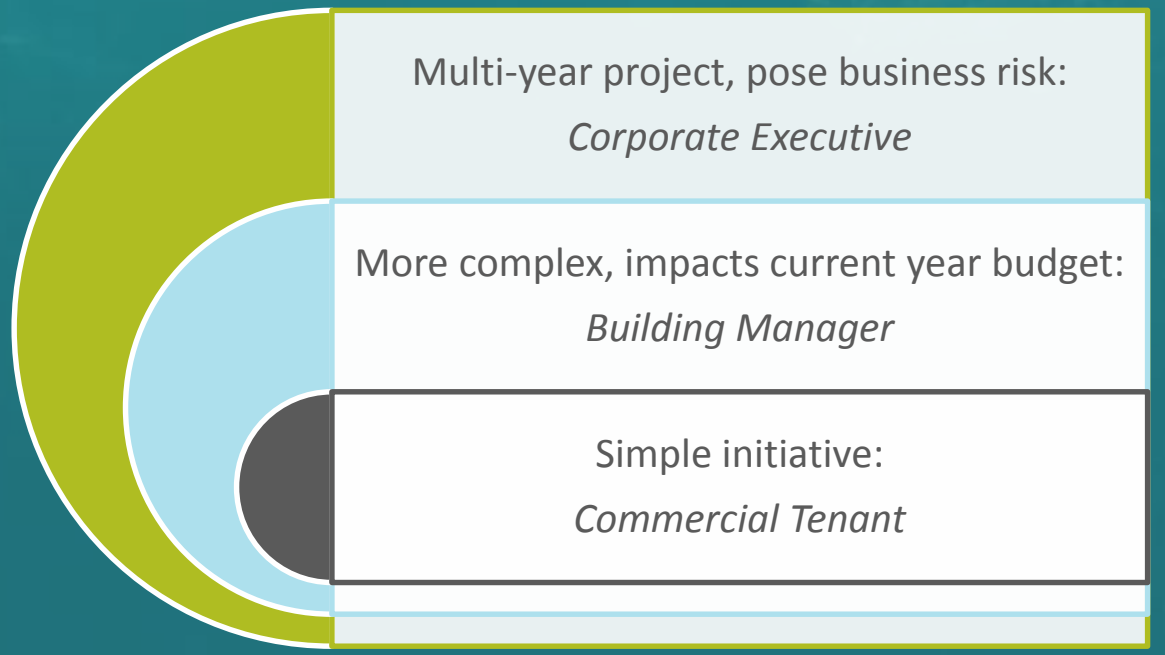
- You really ought to know…(read the report!)
- Highlights:
  - Across the region, could be saving 18-20% more in the commercial sector
  - Space heating is still the biggest end use
  - New technologies are emerging
    - advanced rooftop units
    - demand response enabled equipment
    - renewable heating and cooling
  - There is a healthy ecosystem already of ways to **finance** efficiency, ranging from leases to program incentives and performance contracting based on energy savings



Source: U.S. Energy Information Administration, *2012 Commercial Buildings Energy Consumption Survey: Energy Usage Summary*, Table 5 (March 2016)

Challenges with pushing this forward

- **Trust**
  - who is coming to the commercial customer with what message? Is it worth the risk?
- **Authority**
  - who are you talking to with your efficiency message?
- **Sales Activity**:
  - has this same customer just been pitched to with a renewable project? Or a heavy-handed new equipment pitch? Being overwhelmed often leads to inertia



Emerging Approaches to Commercial Energy Efficiency

Pay For Performance (P4P) Models

- Will elaborate further, but concept boils down to:

Payments are only made on efficiency projects that are actually yielding energy savings

- NEED: for clear measurement and verification of the pre- and post-intervention condition
  - Need data to show the **savings is from EE**, not non-routine event that could increase energy usage
  - M&V 2.0* using data to measure performance plays a big role here
- Within the region, NY and MA are leading efforts in commercial P4P

*More information available at: http://www.neep.org/initiatives/emv-forum

Green Banks and "Intermediaries"

- Green Banks are gaining popularity
  - Public financial institution that uses limited public dollars to leverage greater private investment into clean energy initiatives.
  - Green Banks have diverse rationales and goals:
    - lowering the cost of capital
    - lowering energy costs
    - emissions targets
    - developing green technology markets
    - supporting local community development
    - creating jobs.
  - Report summarizes 5 in our region and more in an appendix.
- Did you know?
  - There are now companies focused on connect the dots between utilities, contractors, financial agencies, and the commercial customers
  - Passing the buck…

Table 5: Emerging Efficiency Financial Intermediaries

Name of Company	Service Territory	Services Provided	Customers
Clean Energy Venture Group	New England	An investment group that provides seed capital and management expertise to early-stage clean energy companies	Clean energy companies
Harcourt Brown and Carey (HBC) Energy Capital	National	Works across capital providers and financing solutions for clean energy projects, specializing in commercial leasing, service agreements, C-PACE, and tax-exempt municipal leases	Contractors, project developers, utilities and utility program managers, property owners, and capital providers
Joule Assets	US and Europe	Facilitates the financing and implementation of energy efficiency solutions	Businesses, investors, and communities
L.E.K.	Global	A global strategy consulting firm that aids clients on developing key strategies to improve their company	Aviation & travel, biopharma & life sciences, healthcare services, MedTech, retail, technology, and energy and environment organizations
Metrus Energy	North America and EU	Develops and finances large-scale energy efficiency projects. Offers end-to-end services, from project development to no-first cost financing solutions.	Fortune 1000 C&I, healthcare and higher education
PFM Financial Advisors	National	Consulting and financial advising firm focused on finding the applicable financing structures to meet the funding needs of clients.	Environmental finance, public power companies, government, education, healthcare, transportation, sports, leisure & cultural facilities, housing authorities, charitable institutions, endowments & foundations, community banks, insurance and self-insurance companies

METRUS ENERGY

Delivering Efficiency as a Service: ESAs by Metrus Energy

August 2nd, 2018

Who is Metrus?

- Metrus develops, finances, owns, and operates large-scale efficiency projects for Fortune 500 companies and major institutional customers.
- Metrus partners with ESCOs, utilities and lending partners to design, finance, construct and maintain projects.
- We put our capital to work so our customers don’t have to.
- Metrus has operational energy and water efficiency projects in 20 states, resulting in savings over 1.1 billion kWh.

Origins of the Metrus ESA

Power Purchase Agreement

Traditional Performance Contract

Efficiency Services Agreement

- Funds 100% of total project costs
- Third-party ownership of energy and water efficiency assets
- Pay-for-performance structure
- Covers construction, O&M, M&V
- Off-balance sheet accounting

Bristol Hospital Innovation

History:

- ESCOs attempted a project for 15 years
- The hospital finished a ($1M) project through CT Healthcare Association
- PACE was tried but ultimately unworkable due to bond holder consent

Project:

- 11 Energy Efficiency Measures in the scope of work (energy, water and infrastructure).
- 47% reduction in water savings was achieved.
- Replacement of critical equipment that was 20 years past its useful life.

Structure:

- 12 year term on a pay for performance arrangement.
- Bond holders agreed to recognizing Metrus ownership of energy equipment.
- Eversource involvement and flexibility was key to getting the deal done.

METRUS ENERGY

CASE STUDY

Bristol Hospital

- LED lighting retrofit
- Energy management system
- Power factor correction
- Steam trap replacements
- HVAC and AHU replacement
- Water efficiency

Total investment:

$4.2

Million

Total annual savings:

$443,556

Annual CO_2 savings:

2,024

Tons

Thank You!

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Commercial PACE

- Property Assessed Clean Energy
- Growing number of C-PACE Programs in the region
  - some active
  - some with just enabled legislation
- Funding can be flexible, for EE, Renewables, and water conservation
- Another tool in the toolbox

Image from PACEnation.us

BRINGING CONFIDENCE TO EFFICIENCY

Efficiency, Demand Response, and Electrification

August 2nd, 2018

Investor Confidence Project

IREE is the logo in the lobby, like LEED but for a building retrofit project.

Pacific Gas & Electric (PG&E)

On-Bill Finance ICP Alternative Pathway

Problem:

- Complexity of Rebate Process Reduced Demand For Financing

Solution:

- Allow access to ICP Investor Ready Certified Projects
- Track Savings to Ensure Results

Results:

- Doubling of On Bill Financing Pipeline
- Increased Engagement from Trade Allies
- Lower overhead and transaction costs

Connecticut Green Bank

ICP and C-PACE

Problem:

- How do we approve market based financing?
- How do we protect taxpayers interests in clean energy?
- How do we ensure good outcomes for building owners?

Solution:

- Use ICP Certified Projects as a means to qualify for C-PACE

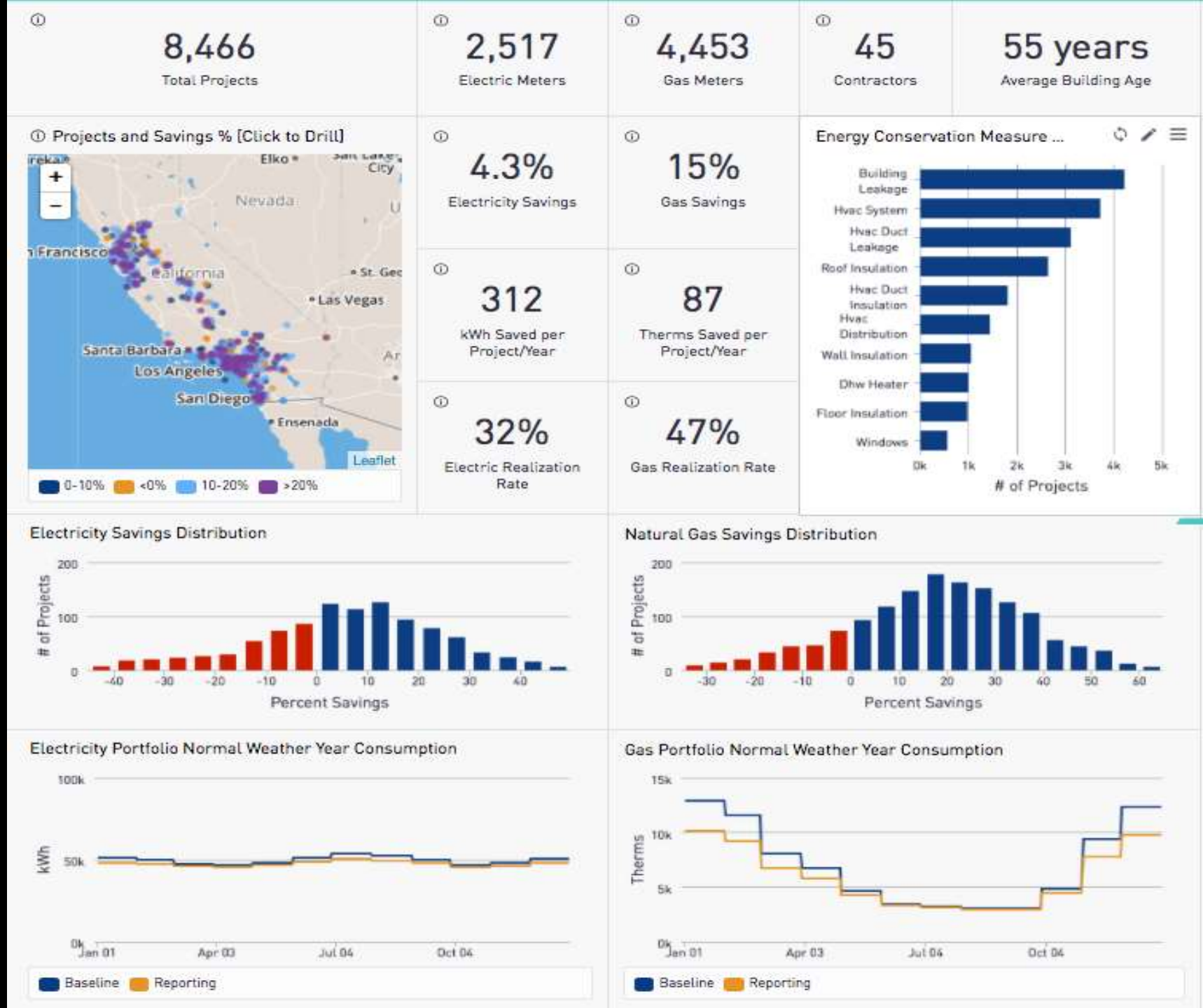
Results:

- Creates a common platform that is market-based
- Reduces internal CGB overhead
- Creates confidence in savings

cpace

SPARKED BY
CONNECTICUT GREEN BANK

Track Programs and Business Impacts in Real-Time

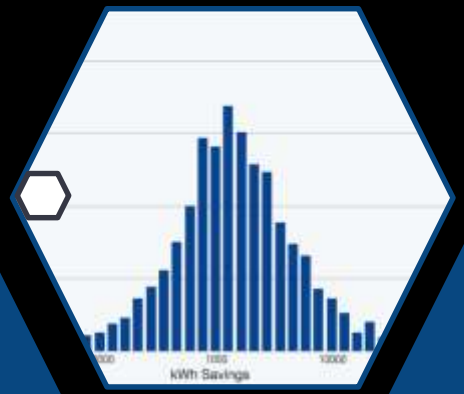


open source initiative

Metered Efficiency Performance Insurance

- Savings Performance Insurance based on OpenEEmeter Measurement
- Portfolio-level coverage of efficiency projects
- Underwritten based on actuarial data

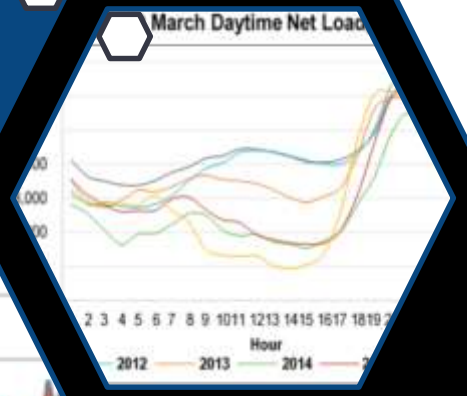
Pay for Performance



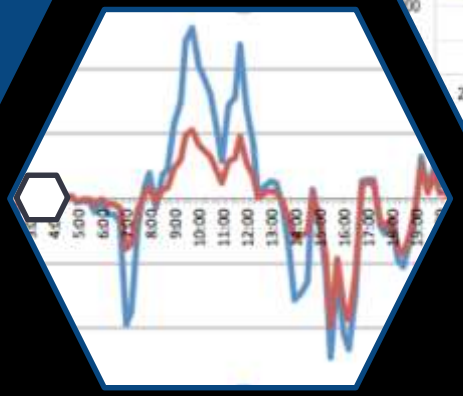
Resource Curve

Demand Capacity

Procurement



EEMeter



Matt Golden, CEO
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(More!) As A Service Models

- Equipment as a Service
  - Rooted in heavy equipment

  Q: How do you get commercial customers to replace expensive equipment before it dies?

  A: Have them subscribe to it!
  - A third-party energy service entity purchases, installs, and maintains the efficient equipment
  - the customer pays a regular service or subscription fee for the service that equipment is providing.
  - Example: Replace large HVAC, pay monthly for “conditioned air”
  - Encourages proper maintenance of equipment and avoids capital expenditure

- Also explored in report: Software as a Service, Energy as a Service

Strategies to get to Scale

Strategies

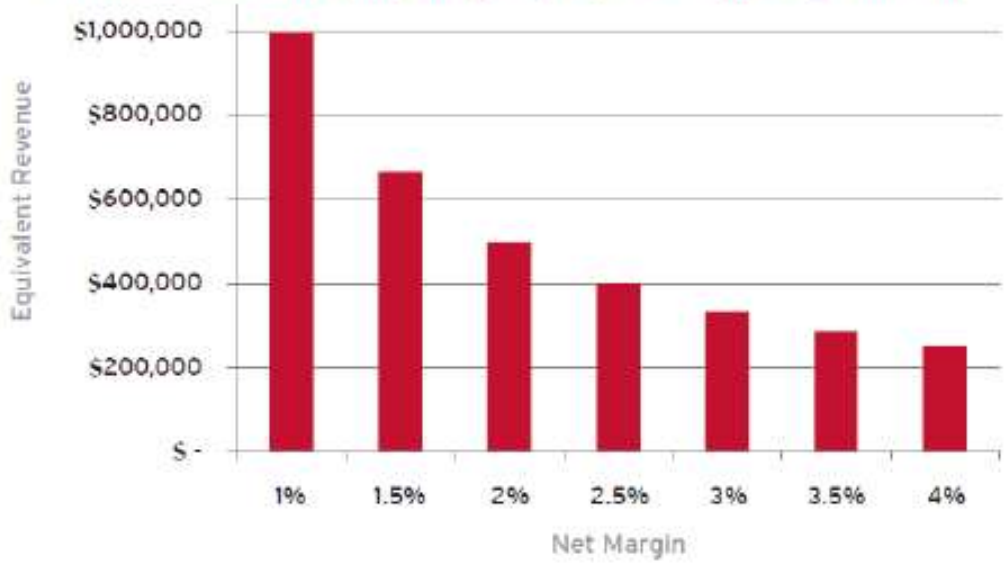
- We have so many good things to offer, but we still need to break through to commercial customers and get them to say YES! to this work
- Report identified four key strategies
  - Business school
  - Non-economic value stacking
  - Integrator model
  - Utility service provider

Strategies: The "Business School" Approach

Framing the conversation as a new opportunity to improve profit margins

- It's not about EE, or even DR or energy, it's a pitch of a new way for the business to make money.
- Reframe from "saving money" to "stop wasting money"
- Requires a level of understanding of their business model, profit margins, and customer goals
- "talking suit to suit"

Figure 3: Graphic Depiction of the equivalent of $10,000 in energy savings in Revenue across various profit margins (image credit: Efficiency Vermont)



Strategies: *Non-economic* Value Stacking

- Modern integrated energy efficiency offers so much more than just energy and money savings
- With this approach, emphasize to the prospective customer:
  - Non-Energy Benefits, including:
    - Worker productivity and satisfaction
    - Air quality and health
    - Less operation and maintenance, freeing up staff time for other uses
  - Data Analytics insights: pairs with P4P and M&V 2.0 needs
  - Social norming, tied to corporate goals (if have them)

Strategies: The “Integrator” Model

- When you have the right person in the room, why only offer one slice of the pie?
- Integrate your offerings with other related areas
- Forge partnerships to ensure you all can have success

Strategies: The Utility Service Provider Approach

- In some cases, it pays to take a more comprehensive approach with a customer
  - Account management
  - Attribution from actions other than incentives
  - Providing information, pass through services, and integration services (see model!)

Our final example incorporates many of these strategies

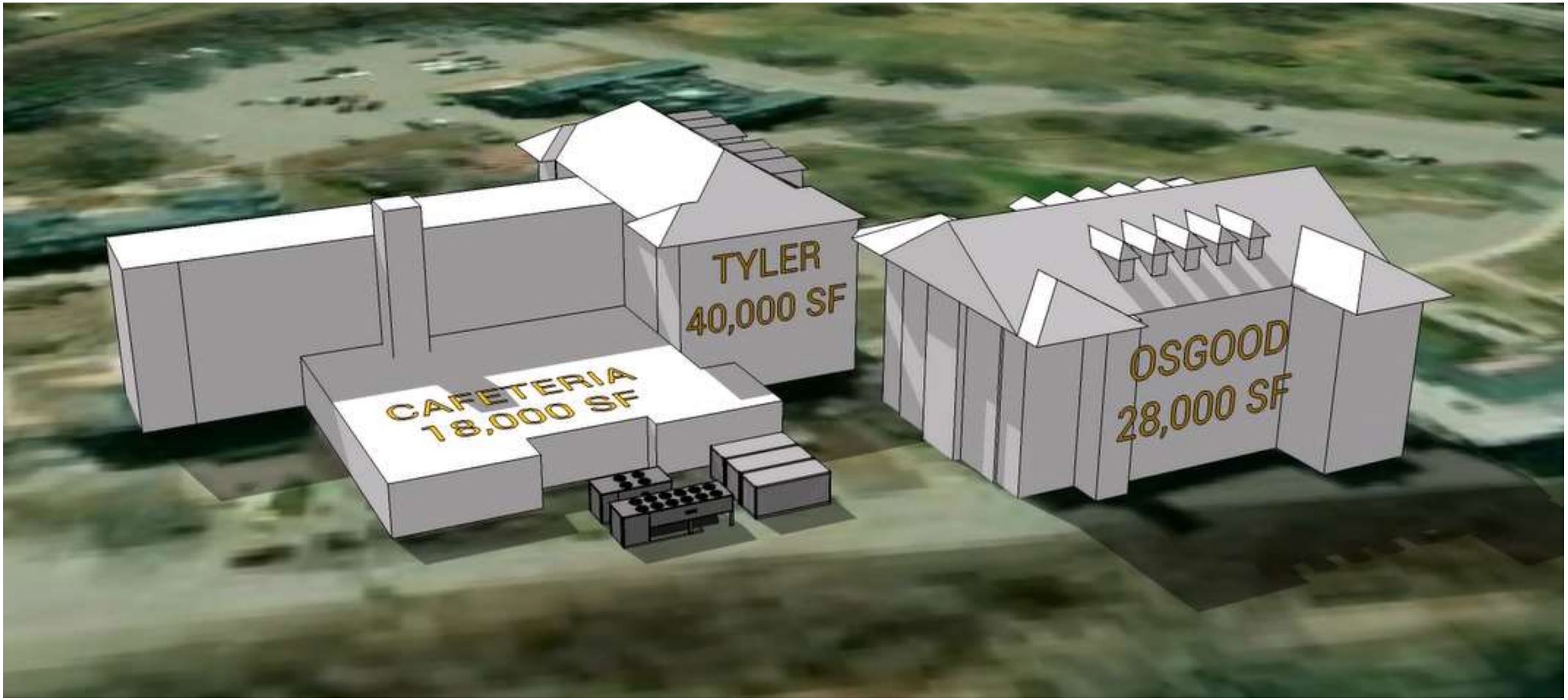
Ice storage as a grid resource

Brattleboro Retreat

MENTAL HEALTH AND ADDICTION CARE

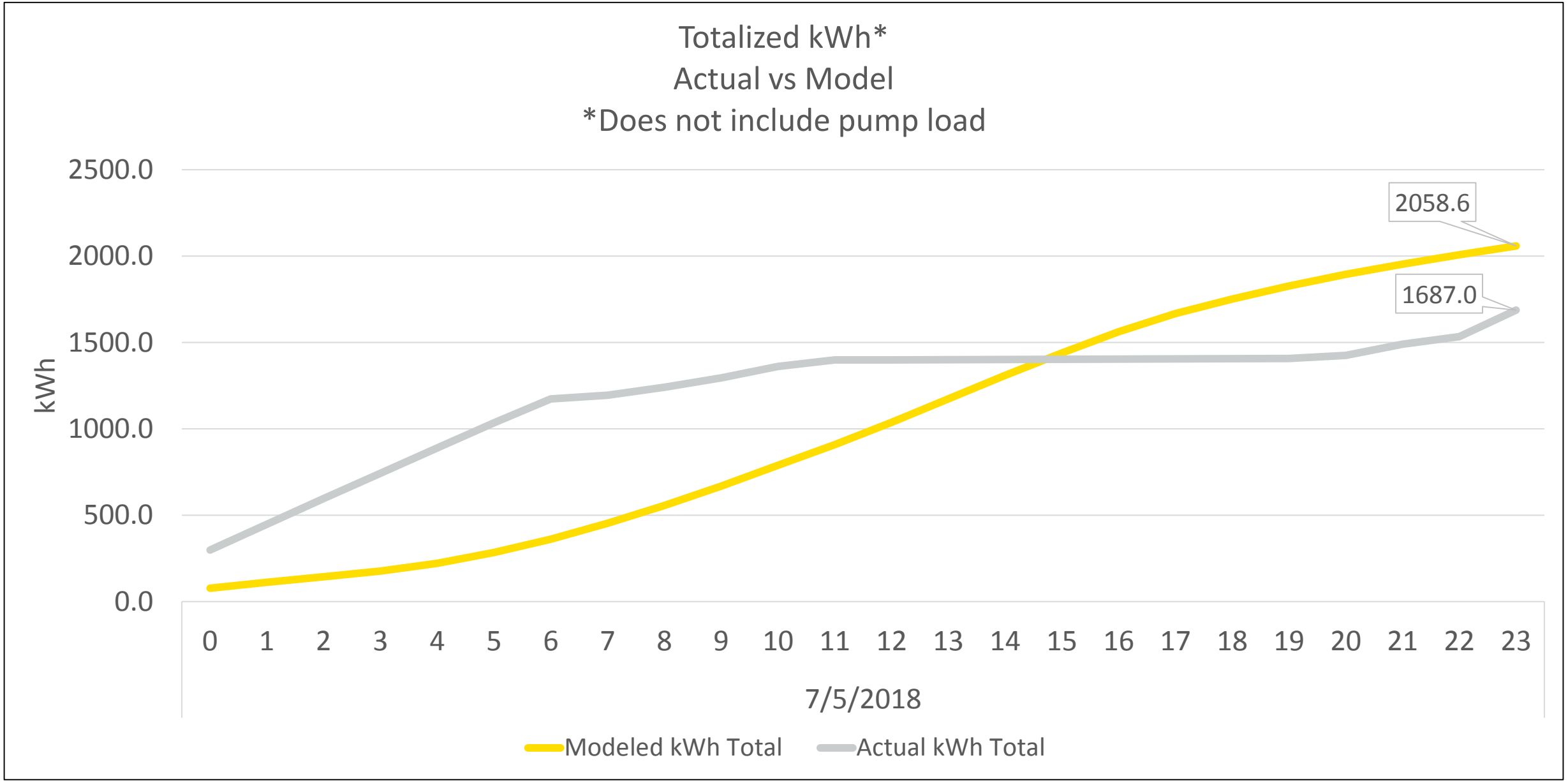
Background

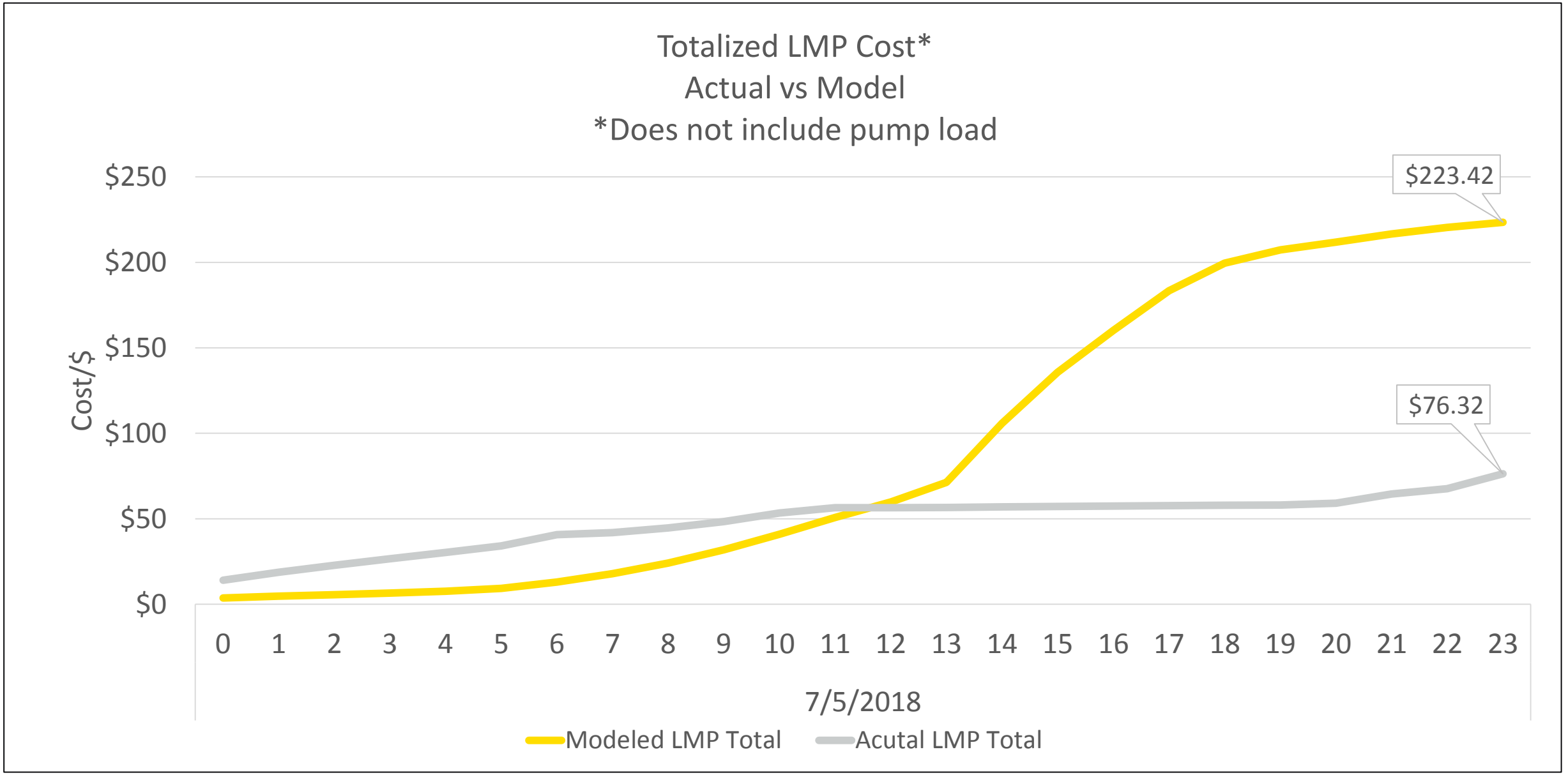
- Strong partnership with Efficiency Vermont
- Upgraded building management system in 2017
- Stranded ice storage asset
- Inadequate rate structures
- Customer willing to be the test case

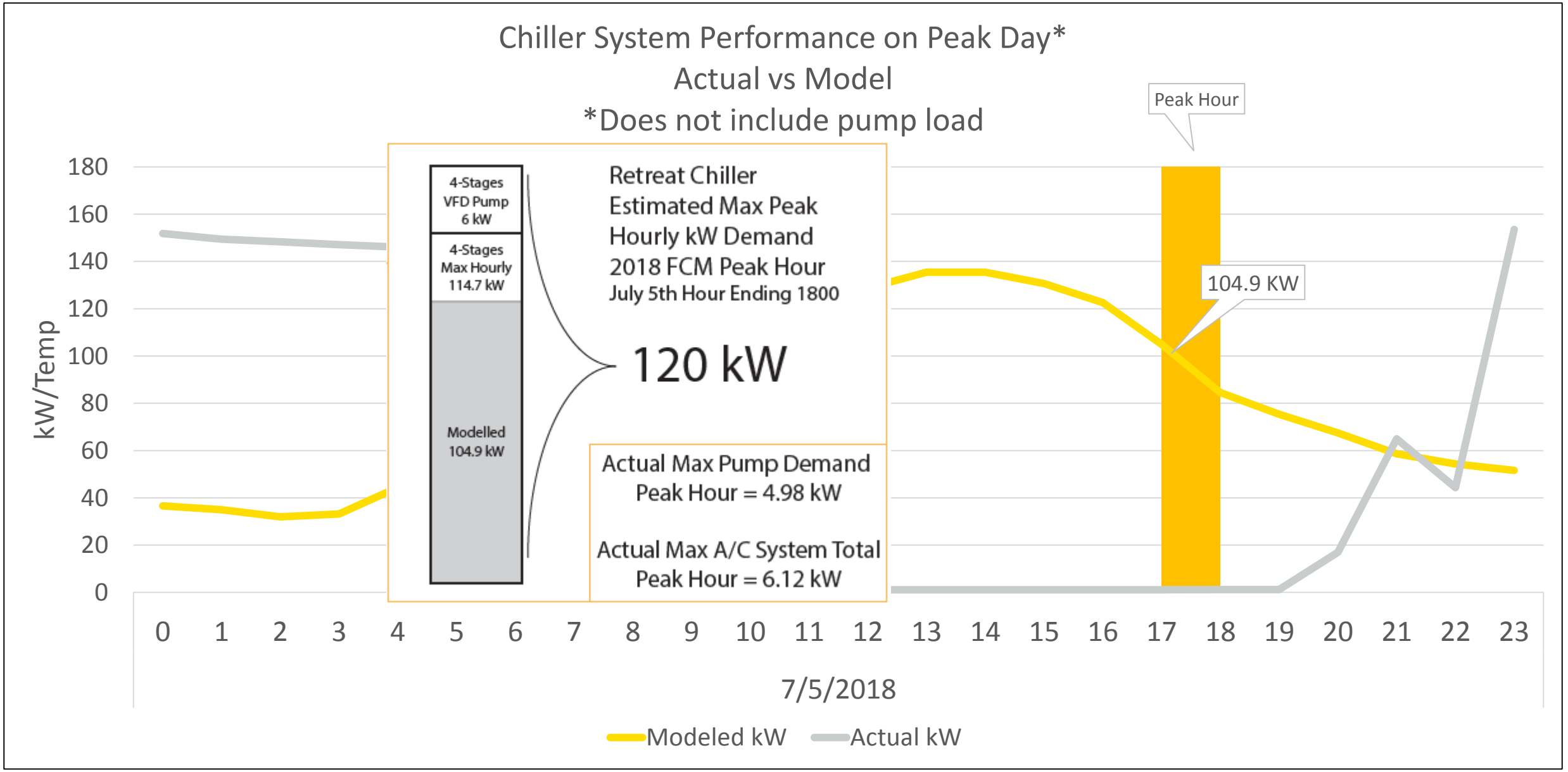

TYLER
40,000 SF
CAFETERIA
18,000 SF
OSGOOD
28,000 SF

Dynamic Organics

- Real time flexible asset controller
  - Forecast building load optimization
  - Control strategies:
    - Demand Forecast
    - Locational Marginal Pricing
    - Heat rate of the grid (CO_2 Emissions)


Totalized kWh*
Actual vs Model
*Does not include pump load
2500.0
2000.0
1500.0
1000.0
500.0
0.0
kWh
2058.6
1687.0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
7/5/2018
Modeled kWh Total
Actual kWh Total


Totalized LMP Cost*
Actual vs Model
*Does not include pump load
$250
$200
$150
$100
$50
$0
Cost/$
$223.42
$76.32
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
7/5/2018
Modeled LMP Total
Acutal LMP Total


Chiller System Performance on Peak Day*
Actual vs Model
*Does not include pump load
Peak Hour
104.9 KW
4-Stages VFD Pump 6 kW
4-Stages Max Hourly 114.7 kW
Modelled 104.9 kW
Retreat Chiller Estimated Max Peak Hourly kW Demand 2018 FCM Peak Hour
July 5th Hour Ending 1800
120 kW
Actual Max Pump Demand Peak Hour = 4.98 kW
Actual Max A/C System Total Peak Hour = 6.12 kW
kW/Temp
180
160
140
120
100
80
60
40
20
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23
7/5/2018
Modeled kW
Actual kW

Conclusion

- Collaboration is key to success
- Aligns building and grid efficiency
- Automated DR is the future of the Smart Grid

Thank you!

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VEIC

Conclusion

- We need all of this to come together to reach our collective decarbonization goals
- The commercial sector has a lot of remaining potential for market transformation
- Let’s work together to get this done
- Continue the conversation at…

Upcoming Events

- EISA 2020: Bringing Clarity to the Uncertainty (public webinar), September 14th, 1:00 p.m. EDT
- 2018 NEEP Summit, Oct 1-3 in Middletown, RI
  - Sponsorship opportunities exist! Contact Lucie Carriou: lcarriou@neep.org
- Northeast Strategic Energy Management Collaborative Workshop – Nov 6 in Burlington, VT
- M&V 2.0 Workshop – Nov 7 in Burlington, VT
- HELIX Summit – Dec 7 in Providence, RI

More information at http://www.neep.org/events

Questions?

- Please type your questions into the gotowebinar screen. If you have a question for a specific speaker, please include their name/company/description

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