7th Annual
Maine Natural Gas Conference

Forward Thinking

Moderator: Juliet Browne, Verrill

Panelists:

- Barry Hobbins, Public Advocate
- Lizzy Reinholt, Summit Utilities
- Michael Stoddard, Efficiency Maine Trust
- Chris Rauscher, Sunrun

PIERCE ATWOOD LLP

Verrill

Maine Office of the Public Advocate

Maine's Climate Goals and the Future of Natural Gas in Maine

Barry J. Hobbins, Public Advocate

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www.Maine.gov/meopa

Summary of Major Maine Energy Policy Goals

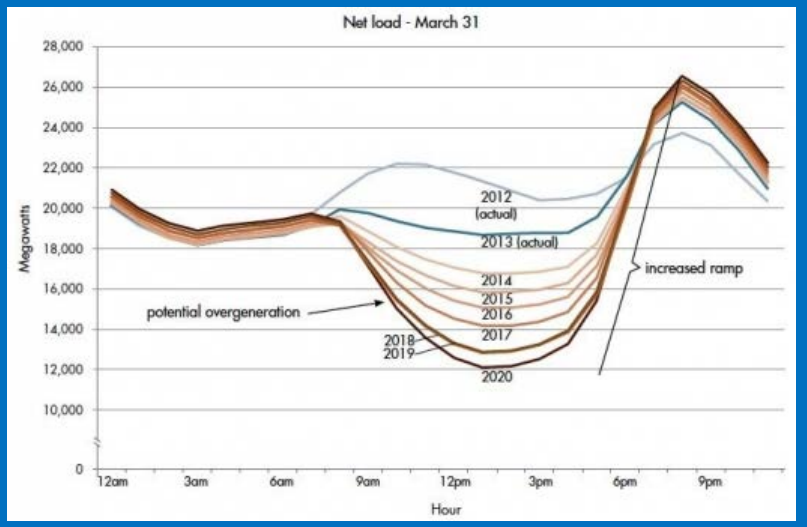
- Carbon Neutrality by 2045 – Gov. Mills to the U.N., September 23, 2019
- 80% GHG reduction vs. 1990 levels by 2050 – P.L. 2019, c. 476
- 50% RPS from "new" renewables (Class I and Class IA) for electricity consumed in the State by 2030 – P.L. 2019, c. 477
- 100,000 heat pump installations by 2025 – P.L. 2019, c. 306

What does it mean for Natural Gas?

- Will the State support continued expansion of Natural Gas for home heating?
- Will the State support use of Natural Gas as a lower carbon fuel for transportation?
- Does Natural Gas have a role in the electric generation market?
- What does it mean for pipeline expansion?

Potential Roles for Natural Gas

- As a "Swing Fuel" to support expansion of intermittent renewables
- As a "Bridge Fuel" while we wait for cost effective carbon neutral alternatives to emerge capable of supporting intermittent renewables
- As a "Gap Fuel" to reduce high electric prices during winter peak electric loads



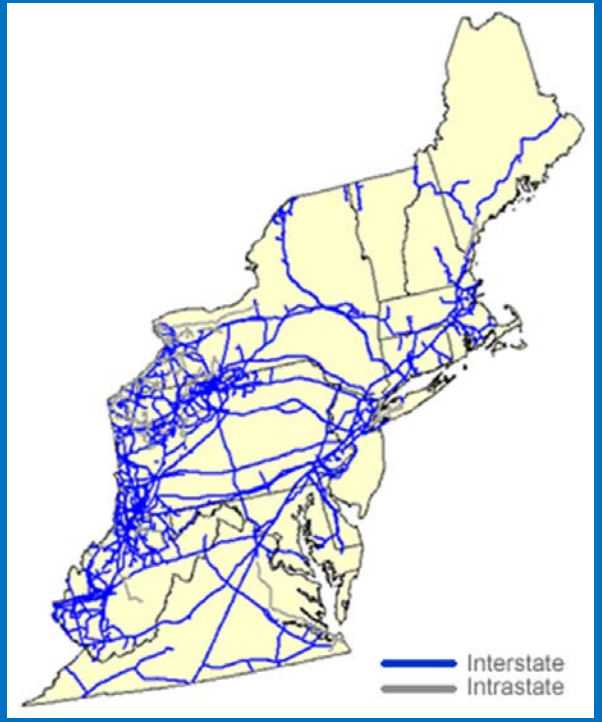
- As a "Bridge Fuel" for commercial transportation while we wait for cost effective electric vehicles
- As a lower carbon alternative to oil for home heating

How Should Local Natural Gas Distribution Companies Respond?

- How should gas utilities account for the effects of Beneficial Electrification in their forecasting and planning?
- Will the primary effect be to curtail gas system expansion, or will demand for gas, even from existing customers, decline significantly?

Availability of Gas Pipeline Capacity

- Interstate pipeline capacity has become more available in Maine over the past few years, and Maine gas utilities have been actively acquiring capacity pathways to source gas from trading hubs like Dawn in Ontario.
- PNGTS has two expansion projects moving ahead, the Portland Xpress and the Westbrook Xpress.
- With the Commission's relatively recent policy decision to grant approval of capacity precedent agreements, Maine gas utilities have filed several for review (see, e.g., Dockets 2016-229, 2018-40, 2019-101, 2019-105).



https://www.eia.gov/naturalgas/archive/analysis_publications/ngpipeline/northeast.html

Should the Trend to Acquire More Capacity Continue?

- Maine's gas utilities still have limited options for delivered gas supplies.
  - And the closest gas production, in Nova Scotia, has ceased operations.
- Acquiring pipeline capacity allows utilities to source gas at or closer to trading hubs, with the expectation that doing so will lead to lower and more stable prices for ratepayers.
- But capacity is a significant investment, typically contracted for on a long-term basis, and paid for by ratepayers.
- What is the danger that electrification decreases demand for gas such that Maine gas utilities are left with more pipeline capacity than is needed to serve their ratepayers, who would then be paying for unused resources?
- And how do we balance that danger with the need for reasonable gas prices now?

Questions?

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Summit Utilities

ONGOING COMMITMENT TO EFFICIENT NATURAL GAS INNOVATION

LOCATIONS

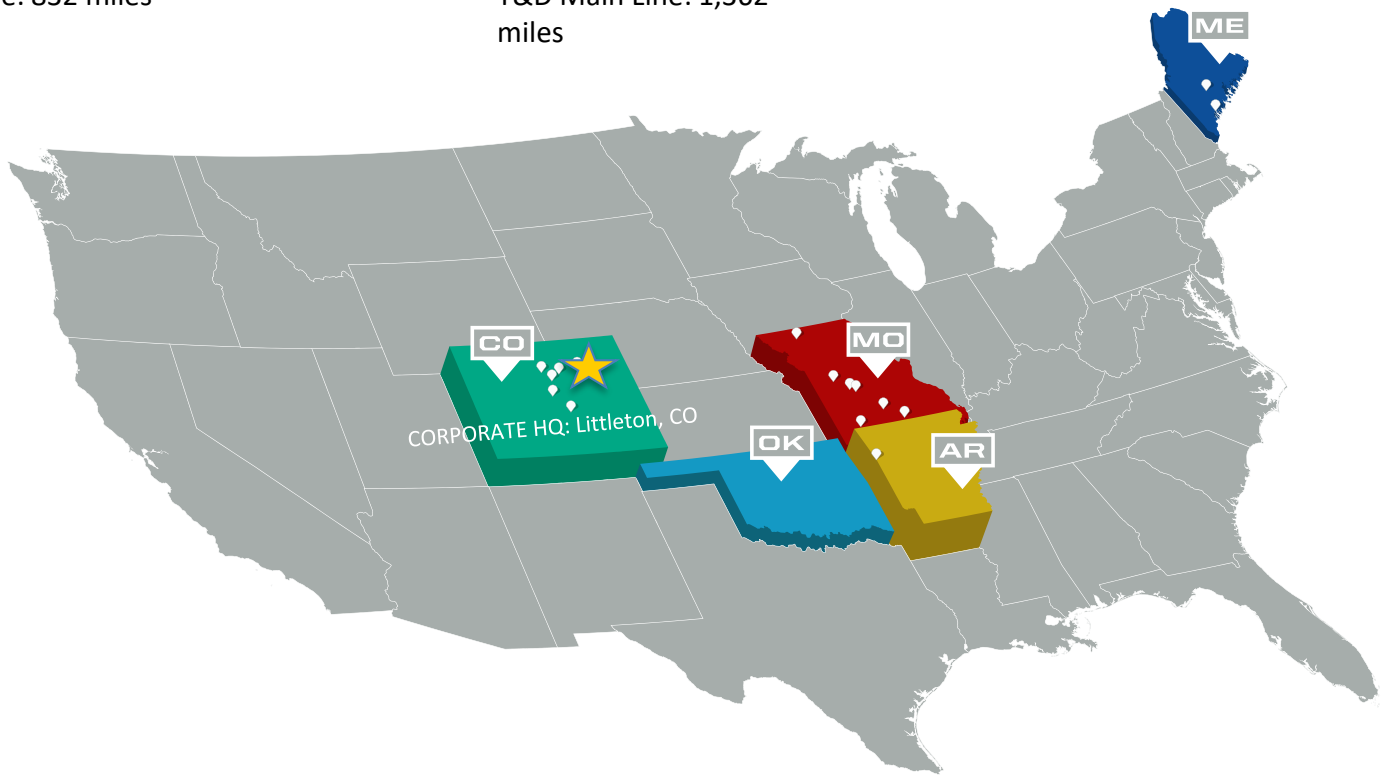
COLORADO (HQ)
Customers: 22,000
T&D Main Line: 1,258 miles

OKLAHOMA
Customers: 12,600
T&D Main Line: 832 miles

ARKANSAS
Customers: 45,600
T&D Main Line: 1,717 miles

MISSOURI
Customers: 18,900
T&D Main Line: 1,362 miles

MAINE
Customers: 3,800
T&D Main Line: 231 miles



The Environmental Benefits of Gas Expansion in Maine Are Greater than Most Achievable Environmental Policies.

SNGME is committed to building a sustainable energy future. By converting customers from oil and propane to natural gas and investing millions in energy efficiency rebates, SNGME has reduced carbon emissions by an estimated 69,000 metric tons a year in Maine.

Source: internal modeling with data provided by EPA and Efficiency Maine Trust

SNG-ME COMMITMENT TO REDUCING EMISSIONS

The Environmental Benefits of Gas Expansion in Maine Are Greater than Most Achievable Environmental Policies.

Summit Natural Gas of Maine is committed to building a sustainable energy future. By converting customers from oil and propane to natural gas and investing millions in energy efficiency rebates, Summit has reduced carbon emissions by an estimated 69,328 metric tons a year in Maine. That's equivalent to taking nearly 15,000 cars off the road. By adding renewable natural gas attributes to our portfolio, we're taking the next big step!

Converting ONE home to natural gas can be equivalent to putting solar panels on TWO homes!

Want to join Summits commitment to a cleaner Maine? By calling Summit to convert to natural gas you could reduce your home's carbon emissions by up to 38%.

Step 1: Converting from heating oil to natural gas can reduce your home's carbon emissions by 27%.

Upgrading your old heating equipment from oil to efficient natural gas you can reduce your home's carbon emissions by another 11%. That's an overall carbon emissions reduction of 38%, which is equivalent to installing solar panels systems on two Maine homes to meet their yearly electric needs!

Source: internal modeling with data provided by EPA and Efficiency Maine Trust

ENERGY SYSTEM CHALLENGES: COST

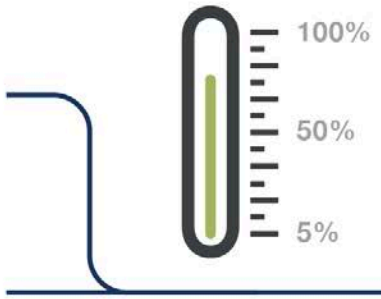
100% electrification is prohibitively expensive, requiring a doubling of generation and transmission in New England to achieve, especially in the context of planned shutdowns:

- Direct use of gas for residential heat is a very efficient use of fuel/emissions (~4% of US GHG emissions), and electrifying heat would result in only ~1.5% reduction in emissions, while adding significant costs
- Electrification would add >$2,000/year in consumer costs in New England
- Cost of electrification per ton of carbon is many times more expensive than coal retirements or energy efficiency

Source: IFC AGA Study on Residential Electrification, 2018

RENEWABLE ATTRIBUTES & CUSTOMER OPTION

The more people sign up...



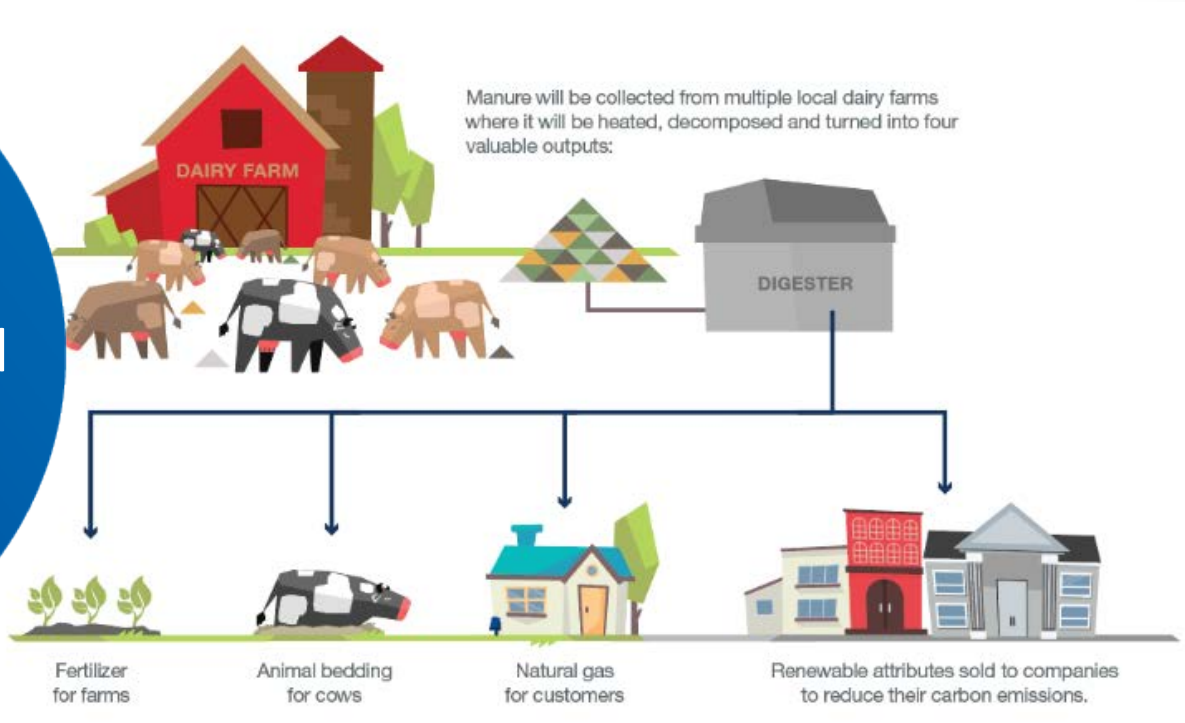
The larger the investment to support future RNG projects, and...

The larger the impact on reducing carbon emmissions for our customers in Maine

Summit is matching **5%** of its 2019 residential gas load with renewable attributes **at no cost to rate payers!**

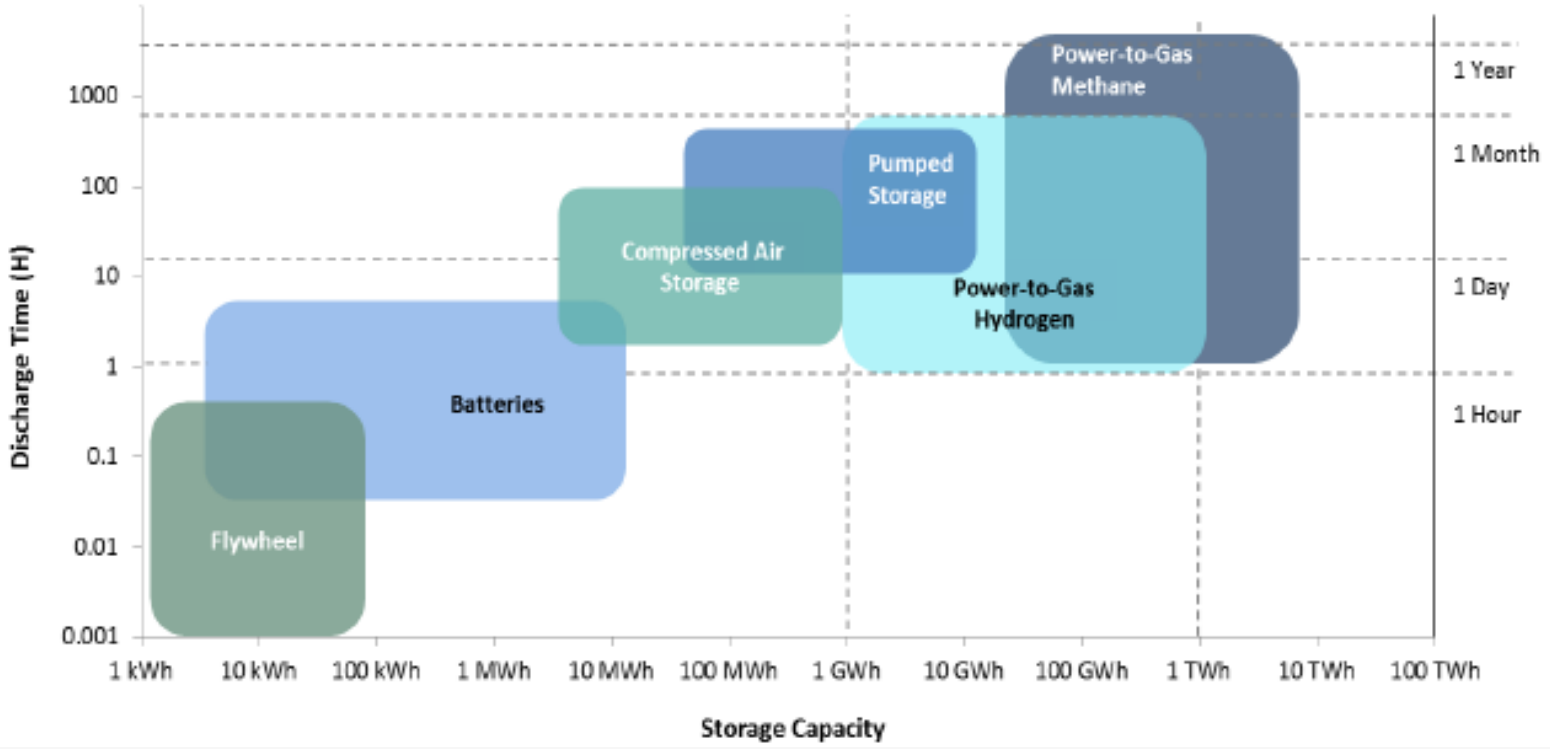
MAINE RNG DIGESTER

About 125,000 mmbtu/year of **carbon neutral** natural gas produced from manure from over **6,000 dairy cows**.

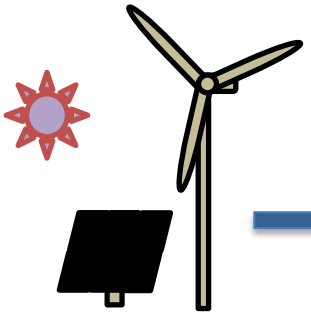


A SOLUTION FOR THE STORAGE CHALLENGE

- Most storage technologies are insufficient to support long duration high volume electricity
- Power to Gas (P2G) solution is the best of available storage technologies



P2G STORAGE SOLUTION: ELECTRONS INTO MOLECULES



Curtailed solar or wind energy

Water electrolysis

H_2

CO_2 (collected from other source)

Methane

Summit Utilities

THANK YOU

Triennial Plan IV
(Fiscal Years 2020-2022)

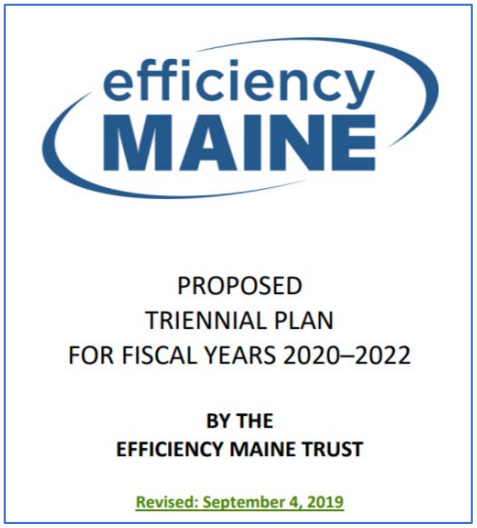
7th Annual Maine Natural Gas Conference
Falmouth, ME – 10/3/2019

Michael D. Stoddard
Executive Director, Efficiency Maine Trust

About Us

- The Efficiency Maine Trust:
  - an independent, quasi-state agency governed by a Board of Trustees with oversight from the Maine Public Utilities Commission
  - the independent administrator for programs to improve the efficiency of energy use and reduce greenhouse gases in Maine
  - delivers financial incentives for the purchase of high-efficiency equipment or changes to operations
  - provides consumer education, workforce training, measurement & verification, reporting

The Triennial Plan



- Provides integrated planning, program design and implementation strategies for all energy efficiency, alternative energy and conservation programs administered by the Trust
- Authorizes and governs implementation of energy efficiency and weatherization programs in the State
- For programs that will be implemented pursuant to the Electric Conservation Fund and the Natural Gas Conservation Fund
  - Identifies all maximum, achievable cost-effective ("MACE") savings
  - Identifies programs to achieve these savings
  - Describes the costs and benefits of such programs
  - Provides the basis and support for the costs and benefits

Natural Gas Conservation Program

- The PUC shall ensure that gas utilities procure through the trust the maximum achievable cost-effective (MACE) natural gas efficiency and conservation resources. 35-A MRSA Sec. 10111(2)
- The PUC may issue any appropriate order to the gas utilities to achieve the goals of [this Act], including the collection of funds for the procurement of cost-effective energy efficiency resources

- Exceptions
  - Wholesale electricity-generating facility with nameplate capacity of 3 megawatts or greater
  - For a large-volume user engaged in manufacturing or commercial growing or harvesting of plants or aquaculture, utilities shall collect the assessment only on the first 1,000,000 ccf of natural gas used annually

efficiency MAINE

Outline of Natural Gas Conservation Program

- Programs
  - C&I Custom
  - C&I Prescriptive
  - Distributor Initiatives
  - Home Energy Savings Program
  - Low Income Initiatives
  - Public Information; Innovation; Evaluation, Measurement & Verification (EM&V)
- Budget
  - FY2020: $1.0 million
  - FY2021: $1.1 million
  - FY2022: $1.1 million

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Recent Updates Proposed to Plan

1. Mid-size Furnaces and Boilers and Warm Air Heaters original estimated potential was found to be not achievable
   - Budget decrease in the Distribution Initiatives budget:

     2020: - $122,448
     2021: - $122,448
     2022: - $122,448
2. Air Sealing and Insulation is calculated to be NOT cost-effective for the average home improvement project due to low avoided costs and relatively good baseline insulation levels
   - Budget decrease in Home Energy Savings Program:

     2020: - $154,836
     2021: - $149,644
     2022: - $144,452
3. Combination Heating and Hot Water Condensing Boiler ("Combi Boilers") is cost-effective under new criteria of LD 1757
   - Budget increase in Distributor Initiatives:

     2020: + $147,059
     2021: + $235,294
     2022: + $235,294

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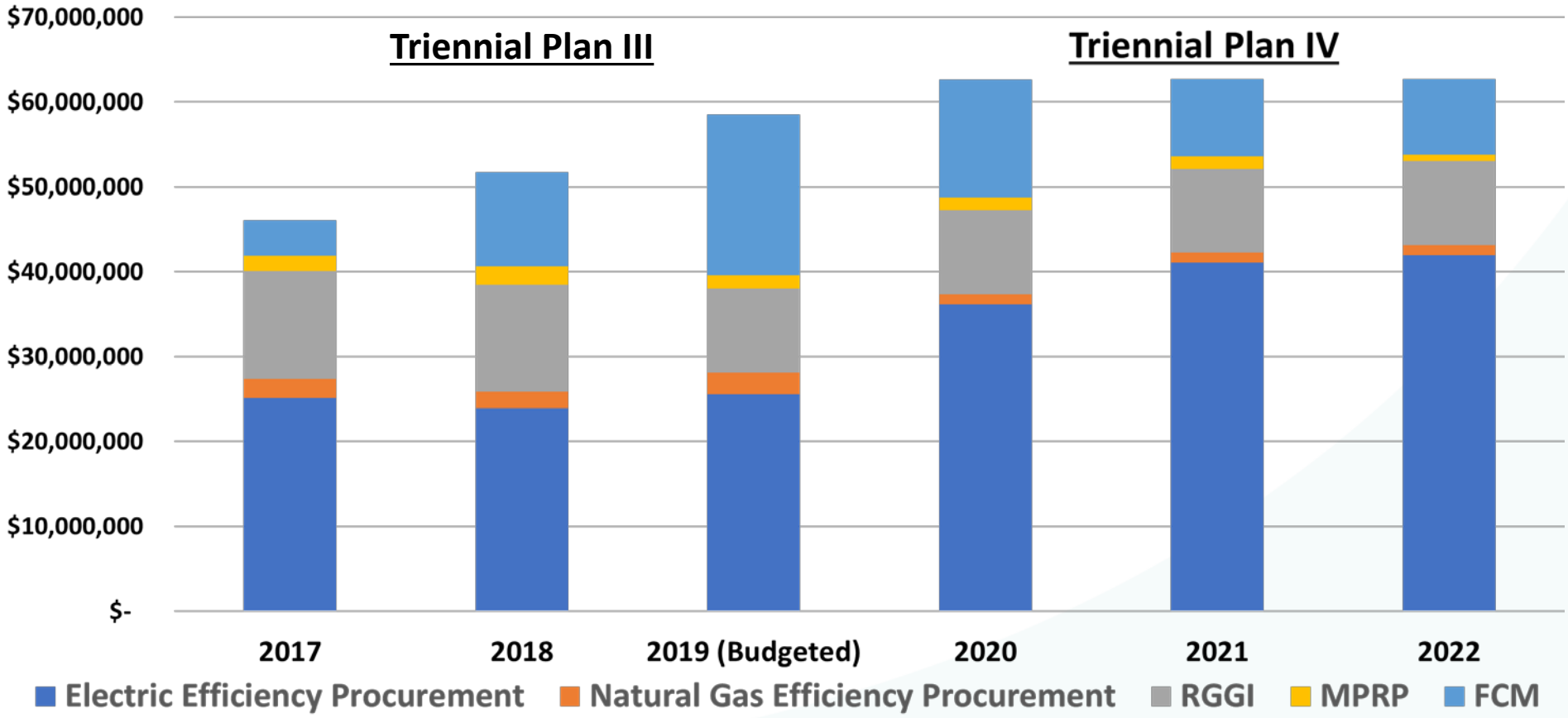
Triennial Plan IV Budget Overview (as originally filed*)



* Subsequent to the filing, several legislative amendments caused the Trust to submit a request for approval of a significant change including shifting the FCM revenues to advance heat pump goals in LD 1766 and "back-filling" this amount with Electric Efficiency Procurement.

sunrun

Chris Rauscher

Dir., Policy & Storage Market Strategy

ME Nat Gas Conference 2019

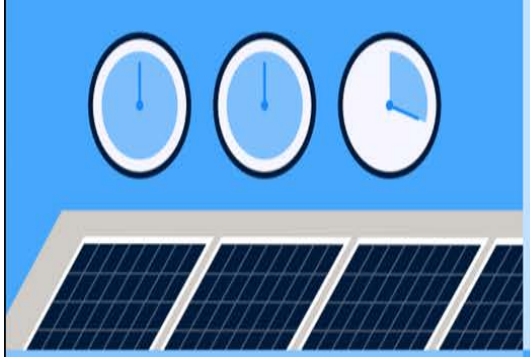
sunrun

The national leader in solar, storage, & home energy management.

22 states + DC & Puerto Rico

Active in policy throughout country.

More than a quarter million customers nationwide



On average, every
2.3 minutes
a new system is installed

Sunrun customers have saved over
$300 million
on electricity bills

And produced
5 billion
kWh of clean energy

More than
5,000

Brightbox home batteries are providing back up power during outages.

The solar installer is the fastest growing job in America.

Sunrun alone has created more than
4,000
jobs & thousands more through our partners.

Brightbox: Product and Markets

Brightbox meets needs of residential customer + grid at lowest cost.

Back-Up Power (Island during Outage)

Grid Services (Capacity, Voltage, Active/Passive)

Bill Management (TOU, CPP, Hourly)

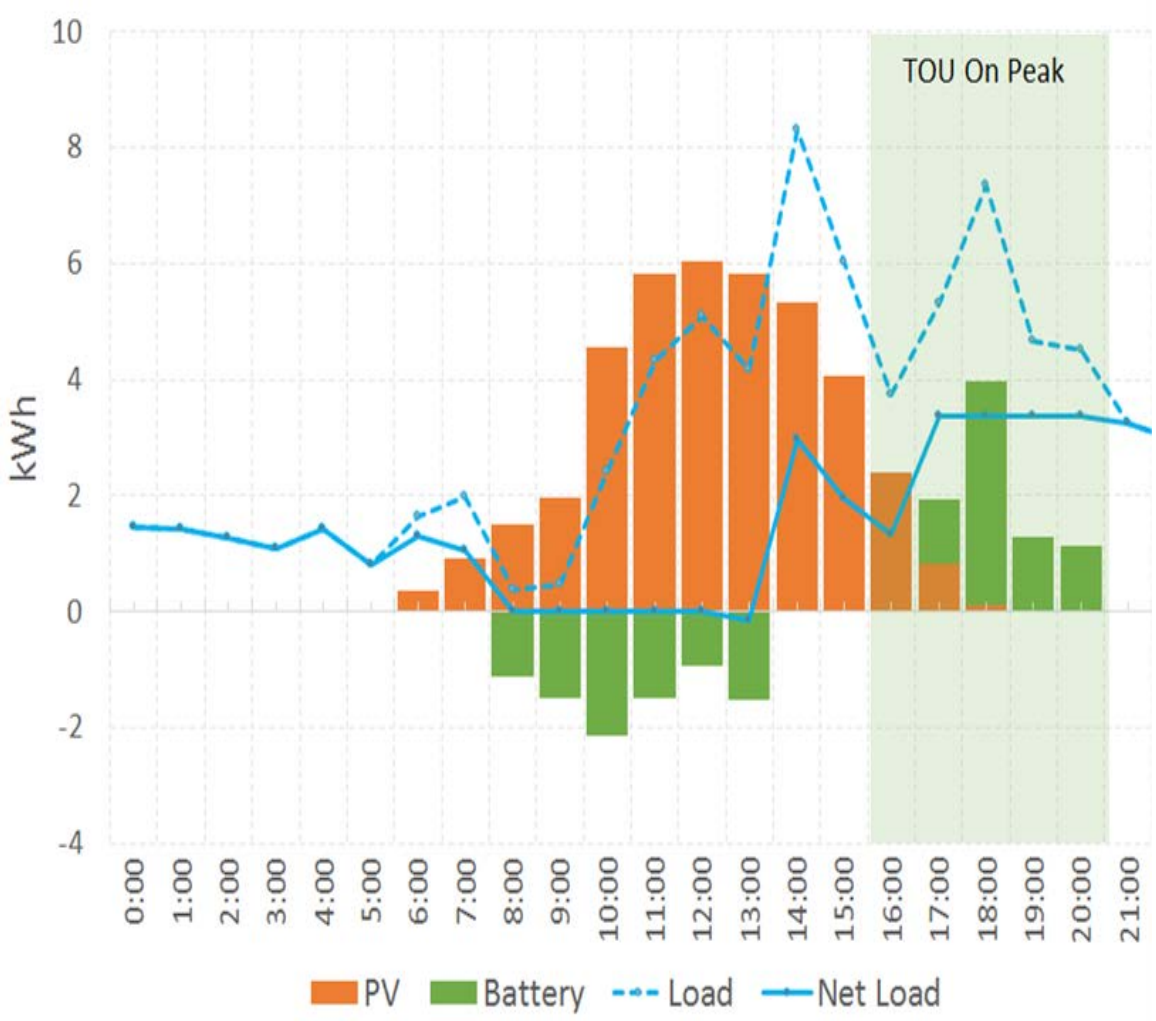
Energy Self-Supply

Now Available In: HI, CA, AZ, NY, MA, FL, PR, TX, VT, & NJ

Time Shifted Solar For Grid Needs

Illustrative Residential Solar+Storage & Load Curve

Brightbox manages residential load shift in CA - managed for TOU, to **minimize midday solar exports, and to flatten evening load** - with flexibility for DR or other targeted shift, while maintaining charge for backup.



Home Solar & Batteries: the power of distributed networks

Wholesale: e.g., ISO-NE

- 20 MW bid won in 2019 Forward Capacity Auction
- Spread through number of New England states & ~5,000 homes
- First in nation
- Still providing backup power!

Retail: e.g. BYOD

- Bring Your Own Device: reduce G, T&D costs
- Utility program reducing wholesale or utility costs
- MA, VT, NH, NY, & more
- Low risk, pay for performance
- Still providing backup power!

Utility: e.g. Aggregation

- Virtual Power Plant Procurement
- NWA - locational
- Peaker replacement
- Low-income/multifamily
- Still providing backup power!

Sunrun Lands Another Big Virtual Power Plant Deal, This Time in Hawaii

Aggregated residential solar-storage systems will be used to help meet Hawaii's unique grid challenges.

Big Win for Local Energy: First Virtual Power Plant Snags Contract in US Wholesale Capacity Auction

07.20.19 | WORLD CHANGING IDEAS

This "virtual power plant" made of solar and batteries means Oakland can stop burning jet fuel

The solar panels will power low-income housing—and then fill up batteries to use when demand peaks.

DEEP DIVE

Hollywood's next star could be virtual power plants as LADWP closes out natural gas

Sunrun's 295 MW residential solar-storage VPP proposal for Los Angeles could be proof-of-concept

Sunrun's participation in ISO-NE Forward Capacity Auction 13 shows the promise of distributed storage

- 20 MW across several New England states
- ~5,000 individual customer-sited solar+battery systems
- Typical installation today is 10 kWh / 5 KW paired with 5-10 kW solar, with expected larger future batteries
- Customers get **backup power**, optimization of **solar production** (e.g. Clean Peak), and share of **capacity revenue**
- ISO-NE most conducive wholesale market today

Sunrun Battery Sharing Economy

Solar as a Service

Hawaiian Electric

HI Self-Supply

SDGE · Sempra Energy utility · PG&E · EDISON

CA Time-of-Use

MP ENERGY · ercot

TX Virtual NEM

nationalgrid · PSEG LONG ISLAND · GREEN MOUNTAIN POWER

Bring Your Own Device
2018, 2019

ISO new england

Capacity Contract
2022: 5000 homes

EAST BAY COMMUNITY ENERGY

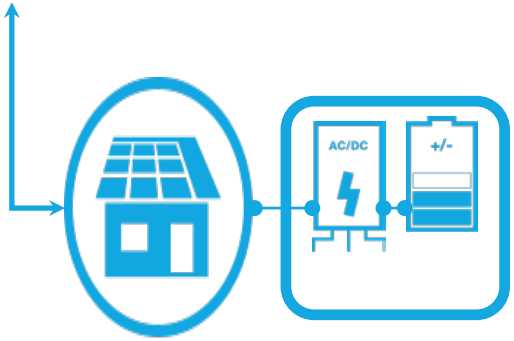
Long-term Capacity Contract
2022: Low-Income Multi-Family

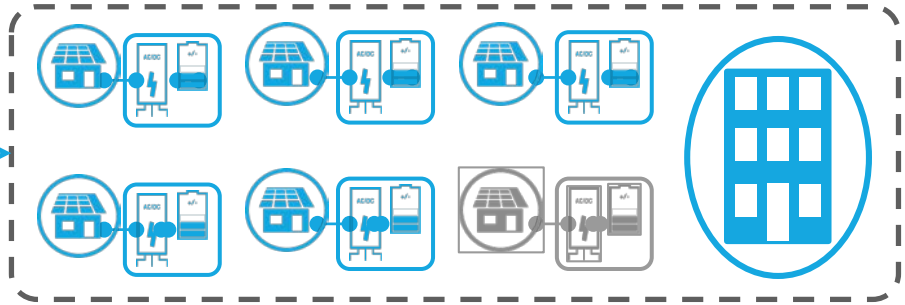
Hawaiian Electric · OATI

Capacity + Fast Frequency Response Trigger
2020: 1000 homes

Sunrun Energy Services Platform

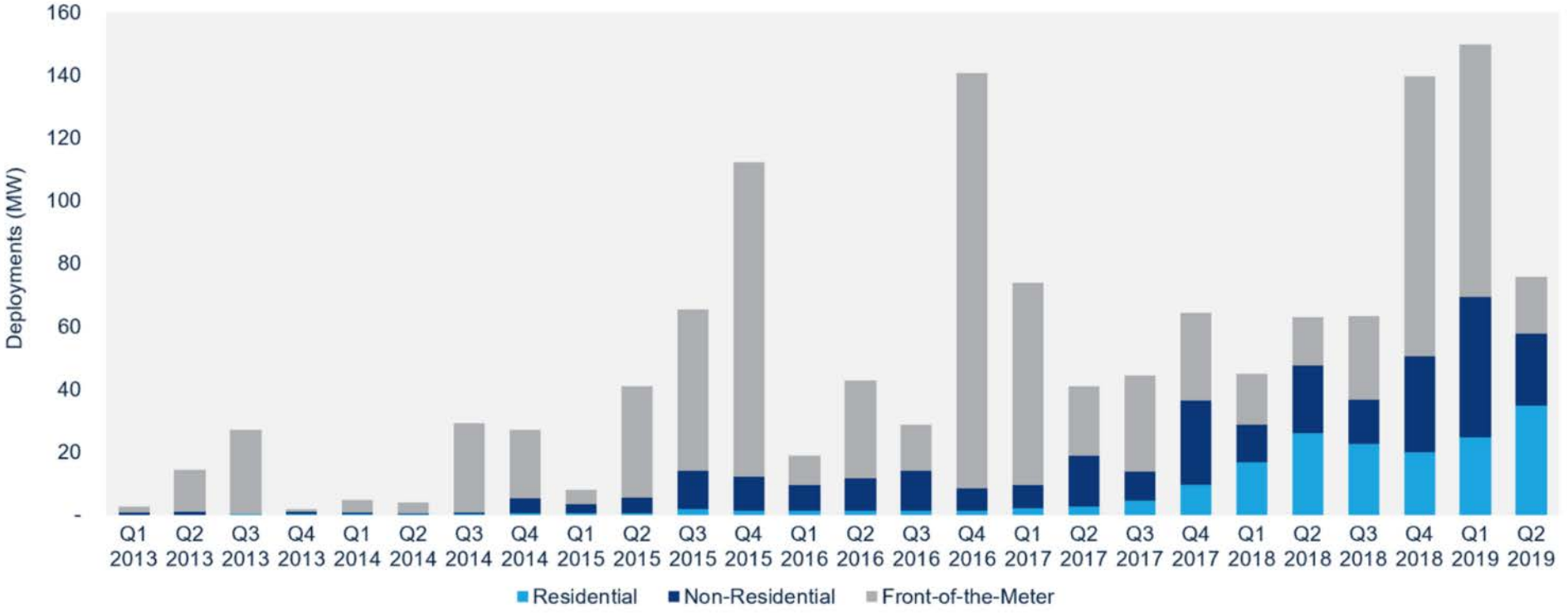
Back-up





“Autonomous Procurement” Will Not Stop. We’re Harnessing It.

Q2 2019 US Storage Installations
WoodMac, GTM



Thank You.