Roadmapping New York Buildings in a Decarbonizing Electric Power Sector

NESEA - New York City - September 26, 2019
Energy Efficiency – an ~$8 Billion Industry

Energy efficiency is a growing resource, with spending of more than $7.9 billion in 2017 and saving 27.3 million MWh of electricity.
It’s not your grandfather’s energy efficiency…….
It requires a revised vocabulary……………

DECARBONIZING BUILDINGS: A CHANGING LEXICON

June 12, 2019 / Codes And Policy
The Grid Menagerie

California: The Duck Curve

Midwest: The Gator Curve

Texas: The Armadillo Curve

Hawaii: The Nene Curve
As Hawaii goes, so goes………. 

Hawaiian PUC orders state utilities to take action

May 2, 2014 | By Barbara Vergetis Lundin

The Hawaiian Public Utilities Commission has made four major decisions and orders requiring the Hawaiian Electric Companies (HECO) to: develop and implement major improvement plans to aggressively pursue energy cost reductions, proactively respond to emerging renewable energy integration challenges, improve the interconnection process for customer-sited solar photovoltaic systems, and embrace customer demand response programs.

Hawaiian Electric Industries’ electric utilities, including Hawaiian Electric Company, Hawaii Electric Light Company and Maui Electric Company, are all affected by the four PUC decisions and orders.

The decisions and orders include Integrated Resource Planning, Reliability Standards

http://www.fierceenergy.com/
Designing for Grid Integration……

Permanent Efficiency
• Reduce building energy loads…

Peak Shifting
• Design to modify time of peak building energy use to adapt to grid…

Flexible Dynamic Response
• Actively reduce building energy use in response to short-term grid constraints…

Dispatchable Energy Storage
• Actively manage energy use patterns based on grid signals…
Policy driving electrification

• California AB 3232, SB 1477 (2018)
  • $200 million over 4-years for electrification
  • New Construction - 30% reserved for low-income new housing
  • CEC: Building sector GHGs 40% below 1990 by 2030
  • Low- to no-emitting heating technologies
  • Overall framework for building decarbonization policy – driving utility incentives to reducing carbon emissions

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<td>Docket Number: 19-IEPR-06</td>
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<td>Project Title: Energy Efficiency and Building Decarbonization</td>
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<td>TN #: 229496</td>
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<tr>
<td>Document Title: 2019 California Energy Efficiency Action Plan - Draft Staff Report</td>
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Three Prongs Don’t Make a Right

By Alison Seel  April 27, 2018

California PUC Addresses Barrier to Electrification
NY leads the NE in zero/low energy buildings

- 132 best-in-class commercial and multifamily buildings, 27 of which are net zero energy
- In New York, energy use of buildings is responsible for 56% of statewide GHG emissions from fuel combustion
- NY’s ambitious clean energy agenda:
  - 40% reduction in GHG by 2030, and
  - 80% GHG reduction by 2050 from 1990 levels
- New York set a target to reach 70% clean energy on the grid by 2030, and 100% by 2040.
New York’s NZE, high performance, and Passive House projects stretch from Western New York throughout Central New York, the Southern Tier, Hudson Valley, New York City, and Long Island, as shown in Figure 5.
JOIN US!

Join us at the premier global event dedicated to creating a zero energy, zero carbon future for the built environment.

GETTING TO ZERO FORUM 2019

October 9-11
OAKLAND MARRIOTT
Oakland, CA
gettingtozeroforum.org
Thank You!

Contact:
Jim Edelson
New Buildings Institute
jim@newbuildings.org
New York State Policy and Programs: A push towards carbon neutral buildings

Presentation by Zachary Zill, NYSERDA, redacted at speaker’s request

September 26, 2019
Questions?

Zachary.Zill@nyserda.ny.gov
RetrofitNY
An industrial approach to net zero and deep energy retrofits

September 26, 2019
NESEA 2019
NYS Climate Goals

*Net zero emissions is the target*

- 80x50
- NYC Climate Mobilization Act-2019
- NYS Climate Leadership and Community Protection Act-2019
Existing buildings vs new construction

The carbon reduction mission is in existing buildings
Productivity evolution, 1995–2015

Gross value added\(^1\) per hour worked

Index: 100 = 1995

Source: McKinsey Global Institute, Reinventing Construction: a Route to Higher Productivity, 2017
RetrofitNY: Supporting the Creation of Scalable Retrofit Solutions in NY

- Adapting the Energiesprong model to NYS
- Industry-designed, cost-effective, standardized solutions
- Drive industrialization and reduce costs
A New Model That Enables Scale

In place rehab
+ 
High performance components
+ 
High quality control
+ 
Aggressive cost compression

Energiesprong Model
A New Model That Enables Scale

All electric, net zero energy buildings at <50% of the cost of initial pilots

Precedent set by Netherlands:
• 4,500 retrofits completed
• 5,000 new construction projects completed
Improve onsite execution

Adapt the supply chain

Technology and innovation
Photo: courtesy of Energiesprong
Photo: courtesy of Energiesprong
Photo: courtesy of Factory Zero
NYC Design Pilots

**Project:** 439 W 125
**Owner:** Joe NYC
(21 units)

**incremental Cost/Unit**

- $65,496

**Project:** Casa Pasiva
**Owner:** RiseBoro
(46 units)

**incremental Cost/Unit**

- $43,766

**Project:** 300 E 162nd,
Bronx
**Owner:** Volmar
(42 units)

**incremental Cost/Unit**

- $48,668
Upstate New York Design Pilots

**Location: **Troy, NY  
**Project:** Two-stories (18 Units)  
**Owner:** Beacon Communities  
**Team:** ICAST

**Location: **Phoenix, NY  
**Project:** Two-stories (40 units)  
**Owner:** Rock Property  
**Team:** King + King Architects

**Location: **Portville, NY  
**Project:** Two-stories (24 units)  
**Owner:** Conifer Reality  
**Team:** SWBR

Incremental $34,890 Cost/Unit  
$61,341  
$90,639
Key Learnings from the First Phase

**Successes**
- 6 viable solutions
- Several projects anticipated to be built
- Very engaged owners
- Supply chain starting to innovate

**Challenges**
- Cost
- Electrification of hot water in larger buildings
- Supply chain
- Quantify market
Cost Compression is Key

Achievements of the Energiesprong program

- Cost reduction: Net Zero buildings at 40% of the cost of initial pilots
- The market is scaling up
  - 4,500 retrofits completed
  - 5,000 n/c projects completed
  - 20,000 projects in the pipeline
Components of Cost Compression

Time to Impact

Magnitude of Impact

**Component Costs**
- Developing and optimizing products & specs

**Competition**
- Non-competitive markets

**Risk mitigation**
- Uncertainty related to new products & process
RetrofitNY Program Models

Round 1
- Design
- Construction
- Owner

Process
- Facilitation
- Knowledge transfer
- Technical review

Pilots
- Uncontrolled costs
- Compromised performance
- Minimal engagement from manufacturers

Round 2
- Specifications & Price points:
  - Envelope
  - MEP
  - Integrated solar

Manufacturer engagement & support

Products
- Solution provider
- Pilots
Owner / developer

Architect

General contractor

Engineering company

Sub contractors

Energy consultant

Suppliers

Heating and cooling

Ventilation

Air barrier

Insulation

Hot water

Controls

Windows

Etc.
Manufacturing Scale Production Support

Support manufacturers by:

- Offsetting R&D costs
- Aggregating demand
- New product risk mitigation

Proof of concept

Early production ramp
NYSERDA Challenge: The Energy Pod

Integrated HVAC solution

- Heating
- Cooling
- Dehumidification
- Energy recovery ventilation
- Domestic Hot water
- Delivered & installed @ $8K/ dwelling unit
NYSERDA Challenge: Retrofit Panels

*Integrated low-cost envelope solution*

- High performance insulation and weather screen
- Air-sealing
- Light weight
- Integrated doors & windows

Photo: courtesy of RC Panels
NYSERDA Challenge: Solution Providers

Integrated multi-functional construction team

- Provide turn-key service to building owners
- Cross functional skills
- Specialized knowledge of integrated technologies
- Efficient operations
A Large Scale North American Market is Emerging

- California
- Ontario
- British Columbia
- Retrofits
- New Construction
- State University of New York
- NYS Homes and Community Renewal
- NYC Housing Authority
- NYC Housing Preservation and Development
- NYC Housing Development Corporation
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