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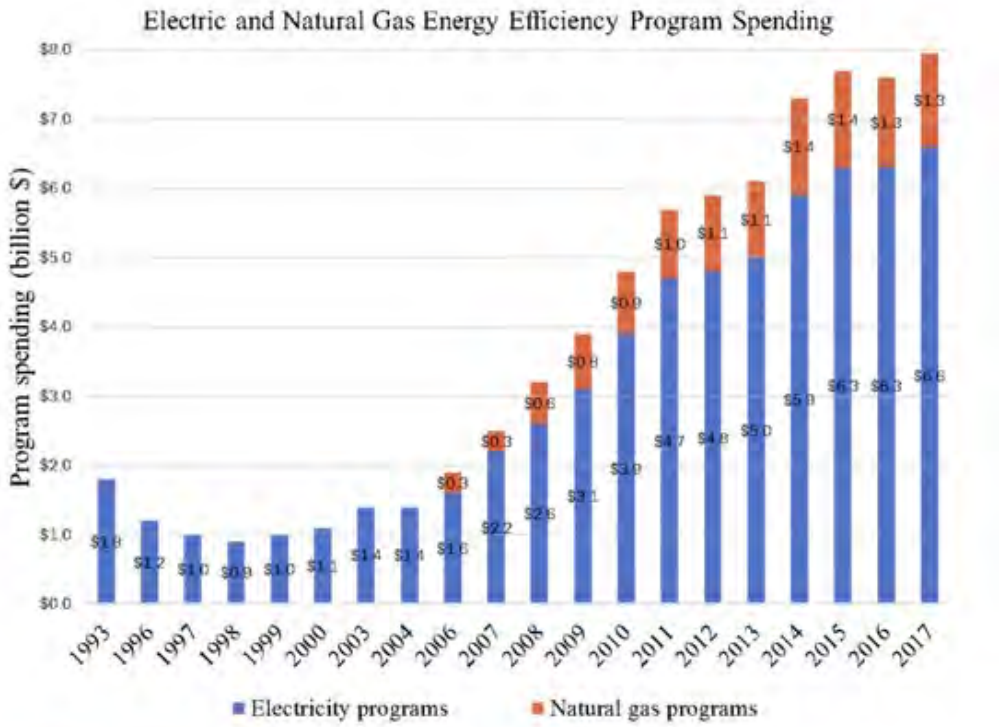
Roadmapping New York Buildings in a Decarbonizing Electric Power Sector

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.



Berg et al. 2017 (ACEEE)

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It’s not your grandfather’s energy efficiency…….

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It requires a revised vocabulary……

DECARBONIZING BUILDINGS: A CHANGING LEXICON

June 12, 2019 / Codes And Policy

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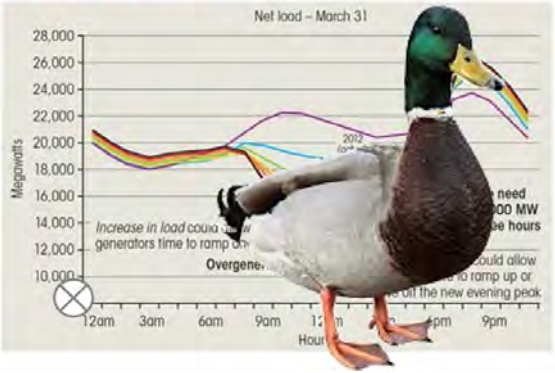
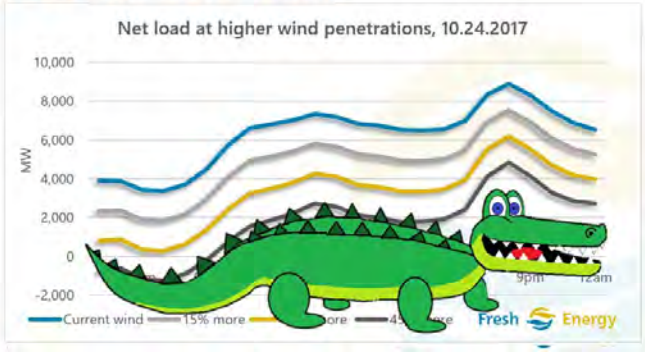
The Grid Menagerie

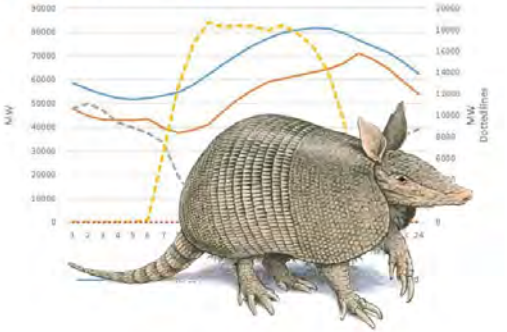
California: The Duck Curve



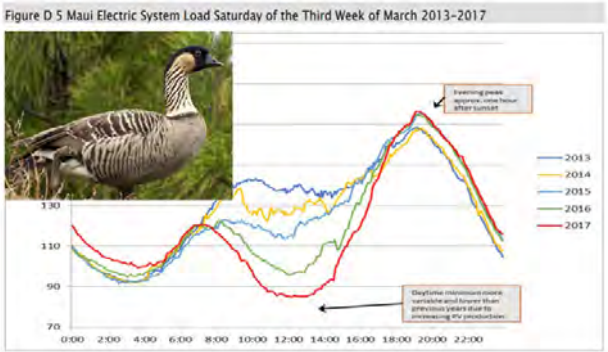
Midwest: The Gator Curve



Texas: The Armadillo Curve



Hawaii: The Nene Curve



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As Hawaii goes, so goes…….

Hawaiian PUC orders state utilities to take action

May 2, 2014 | By Barbara Vergetis Lundin

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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/

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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…

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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

DOCKETED	
Docket Number:	19-IEPR-06
Project Title:	Energy Efficiency and Building Decarbonization
TN #:	229496
Document Title:	2019 California Energy Efficiency Action Plan - Draft Staff Report

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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.

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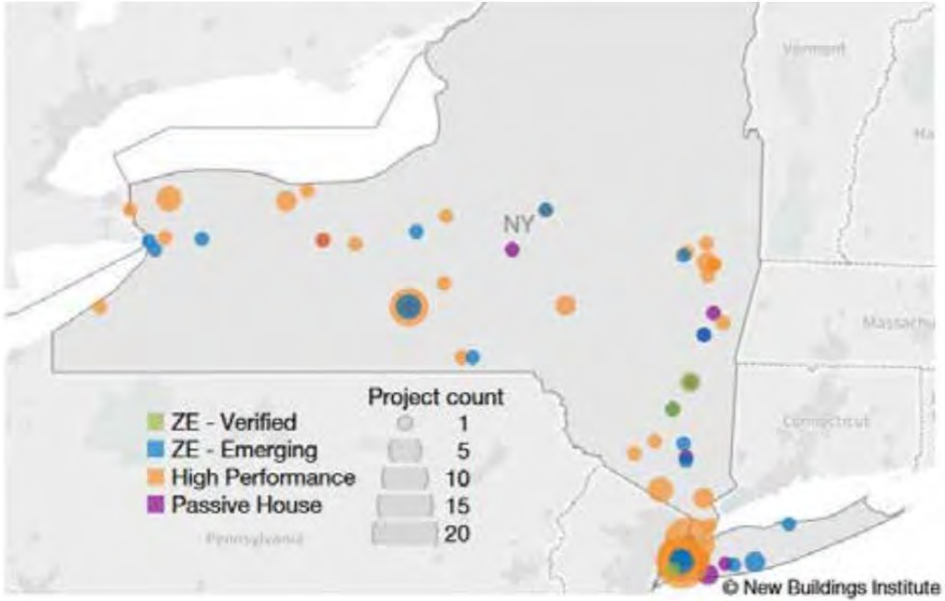
New York: Types and Geography

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.

Figure 5. NZE, high performance, and Passive House projects across the State of New York.



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JOIN US!
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ROCKY MOUNTAIN INSTITUTE
GETTING TO
zero
FORUM 2019
October 9-11
OAKLAND MARRIOTT
Oakland, CA
gettingtozeroforum.org

Thank You!

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New Buildings Institute

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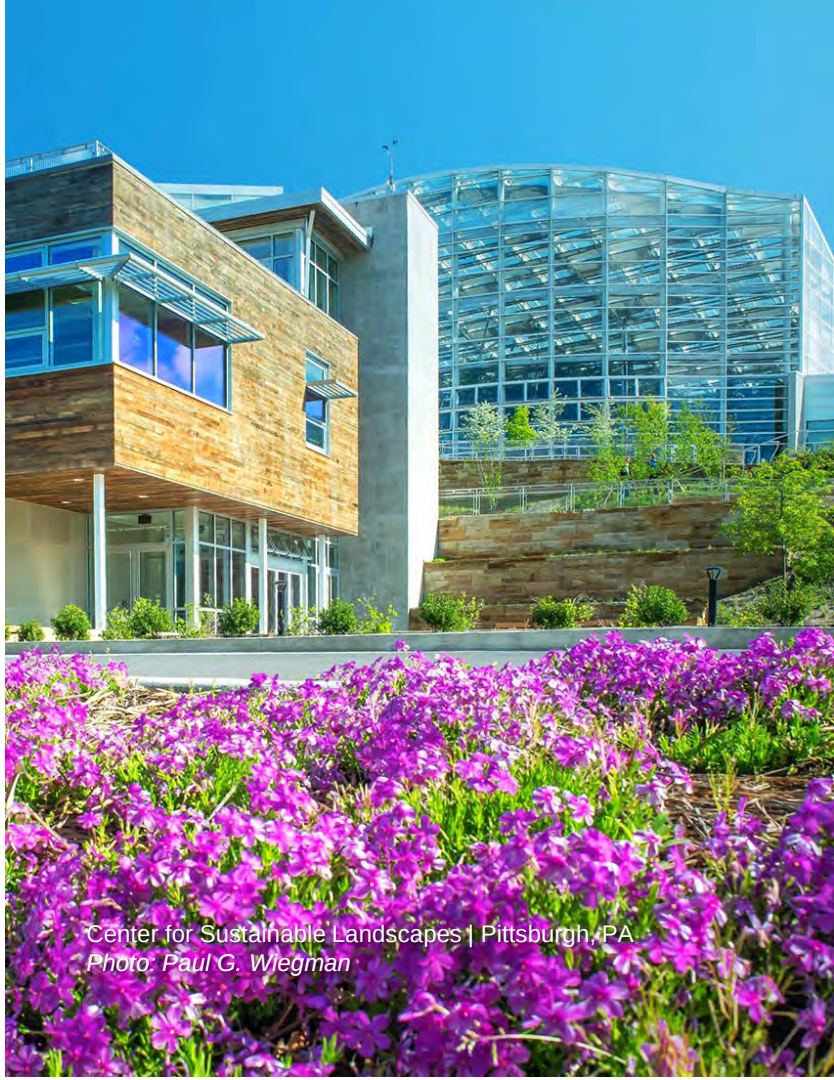


Center for Sustainable Landscapes | Pittsburgh, PA
Photo: Paul G. Wiegman

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

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

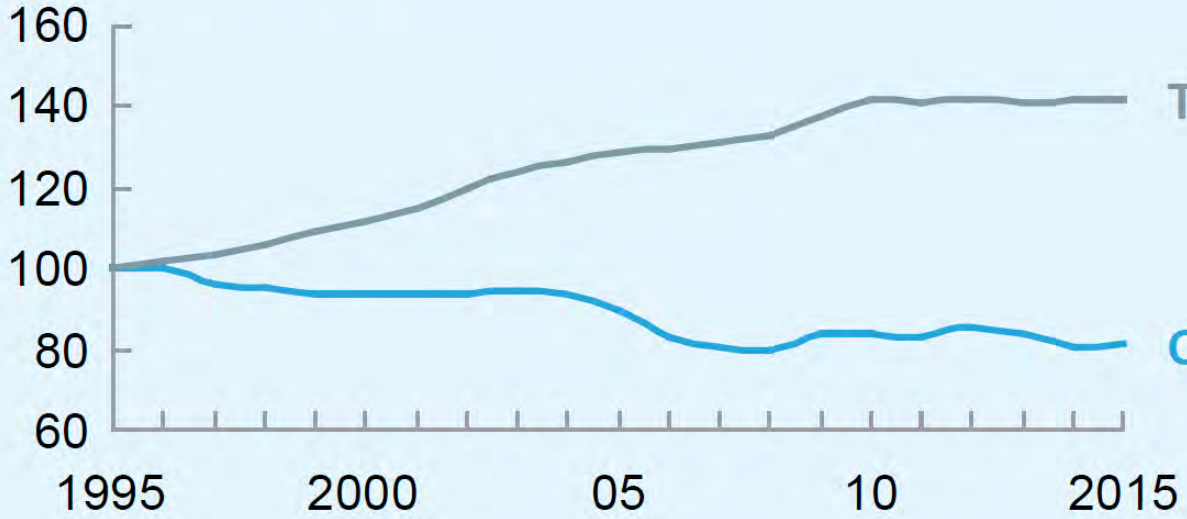
Existing buildings vs new construction

The carbon reduction mission is in existing buildings

Productivity evolution, 1995–2015

Gross value added[1] per hour worked

Index: 100 = 1995



Compound annual growth rate

%

Total	1.76
Construction	-1.04

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

NEW YORK STATE OF OPPORTUNITY. NYSERDA

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

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Improve onsite execution

Adapt the supply chain

Technology and innovation

Photo: courtesy of Energiesprong

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)

Project: Casa Pasiva
Owner: RiseBoro
(46 units)

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

Incremental Cost/Unit	**$65,496**	**$43,766**	**$48,668**

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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

Key Learnings from the First Phase

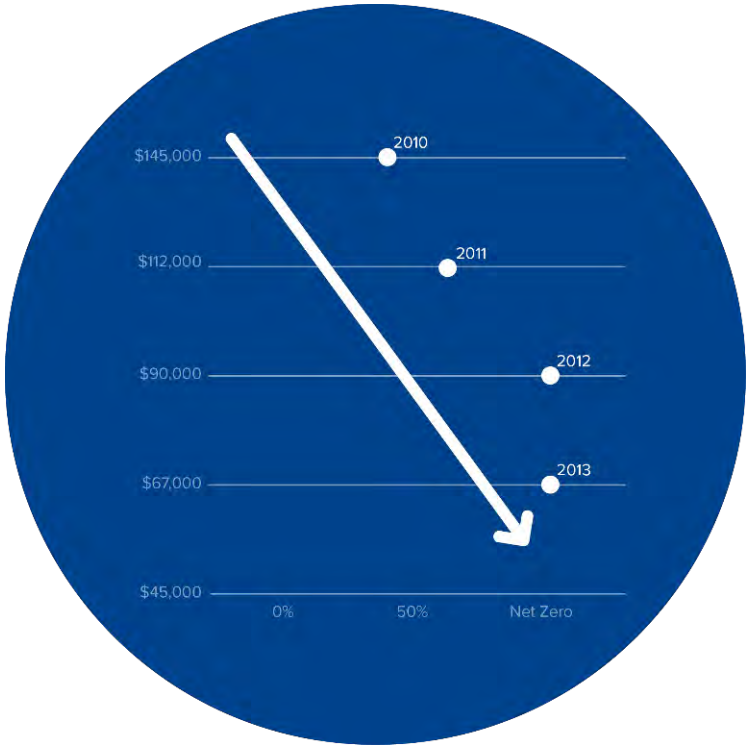
Successes

- 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

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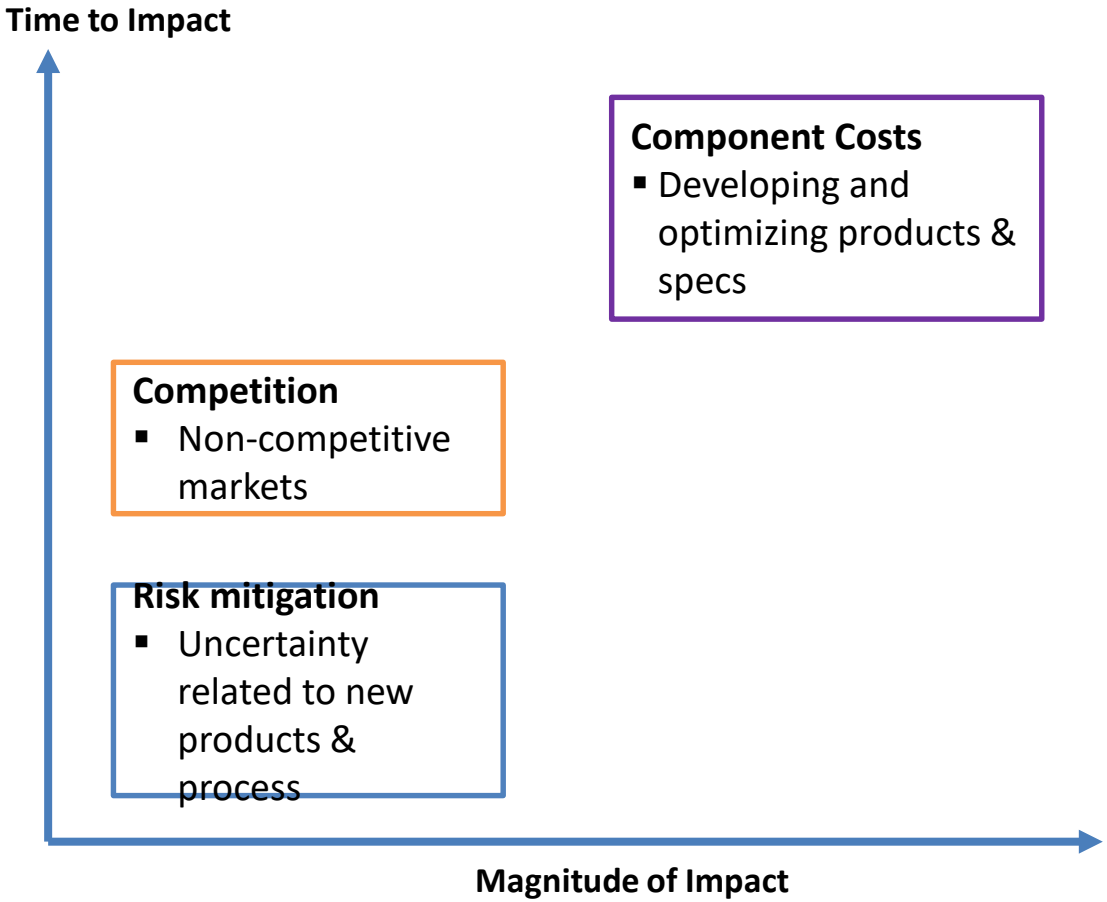
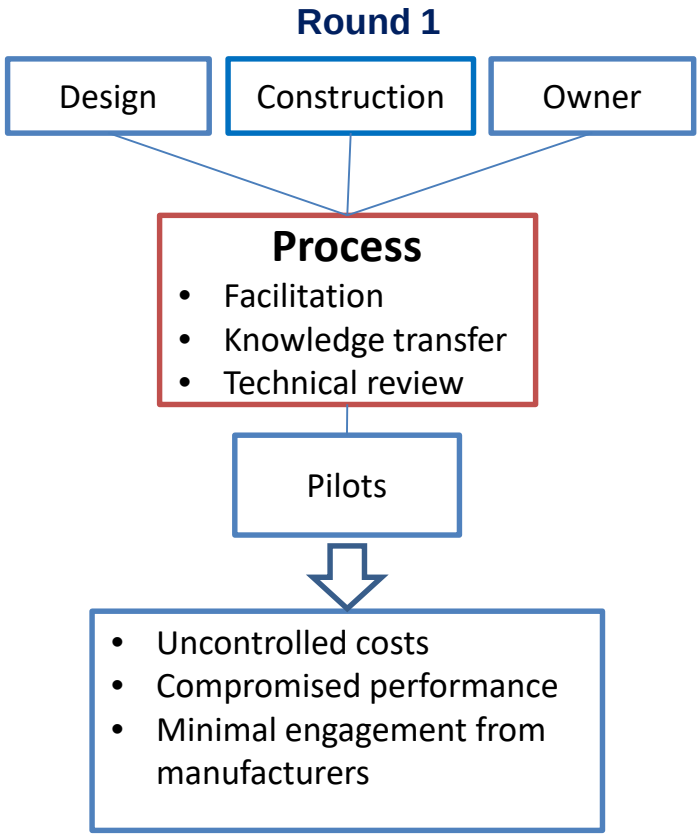
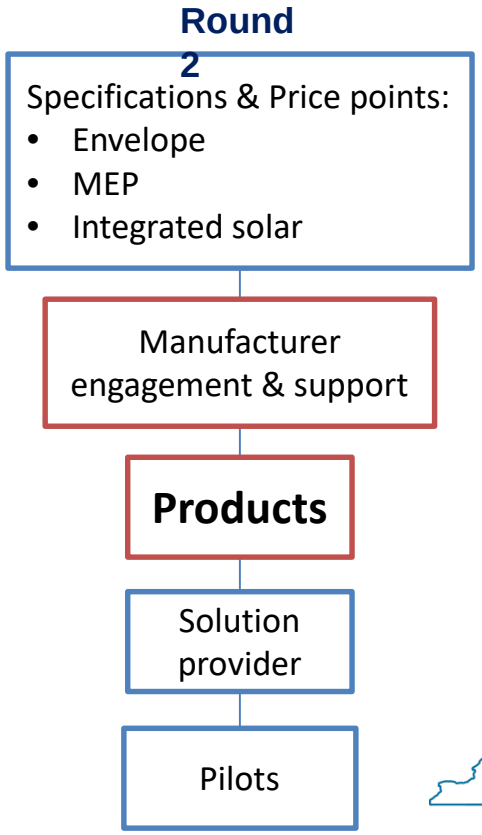
Components of Cost Compression



RetrofitNY Program Models





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Owner / developer

Architect

General contractor

Engineering company

Sub contractors

Energy consultant

Suppliers

Heating and cooling

Ventilation

Air barrier

Insulation

Hot water

Controls

Windows

Etc.

Owner / developer

Solution Provider

Component Suppliers

Mechanical pod

Integrated envelope solution

Integrated roof system

Suppliers

Heating and cooling

Ventilation

Air barrier

Insulation

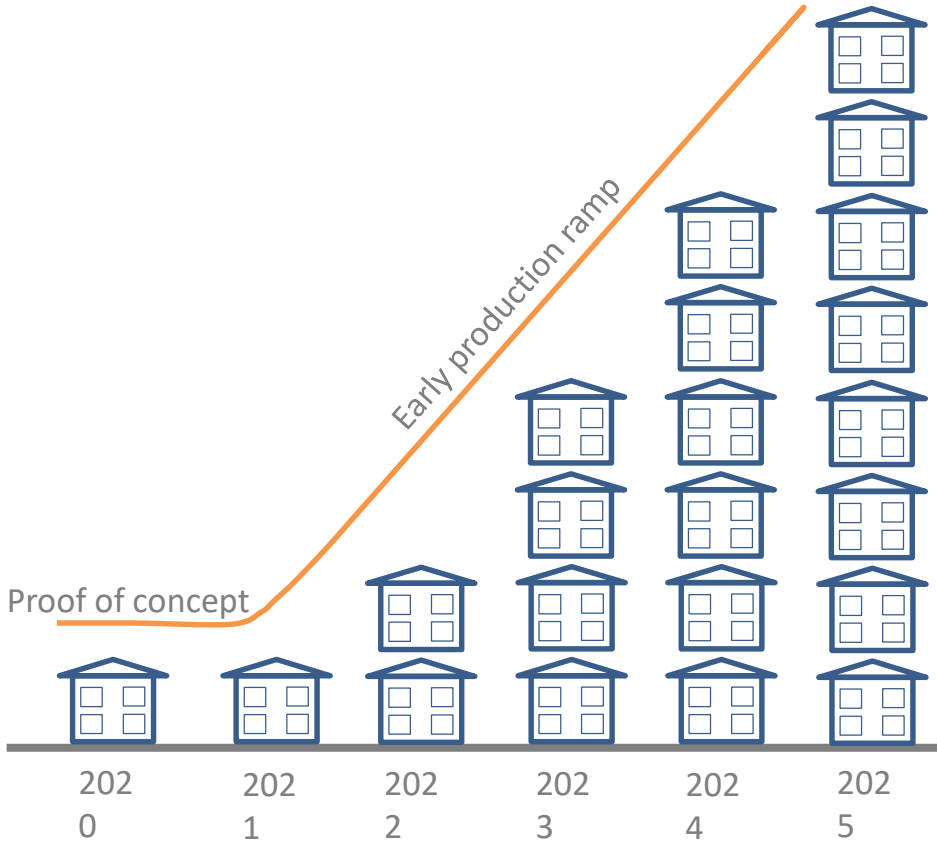
Hot water

Controls

Windows

Etc.

Manufacturing Scale Production Support



Support manufacturers by:

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

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NYSERDA Challenge: The Energy Pod

Integrated HVAC solution

Photo: courtesy of Factory Zero

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

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NYSERDA Challenge: Retrofit Panels

Integrated low-cost envelope solution

Photo: courtesy of RC Panels

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

NYSERDA Challenge: Solution Providers

Integrated multi-functional construction team

Photo: courtesy of Rocky Mountain Institute

- Provide turn-key service to building owners
- Cross functional skills
- Specialized knowledge of integrated technologies
- Efficient operations

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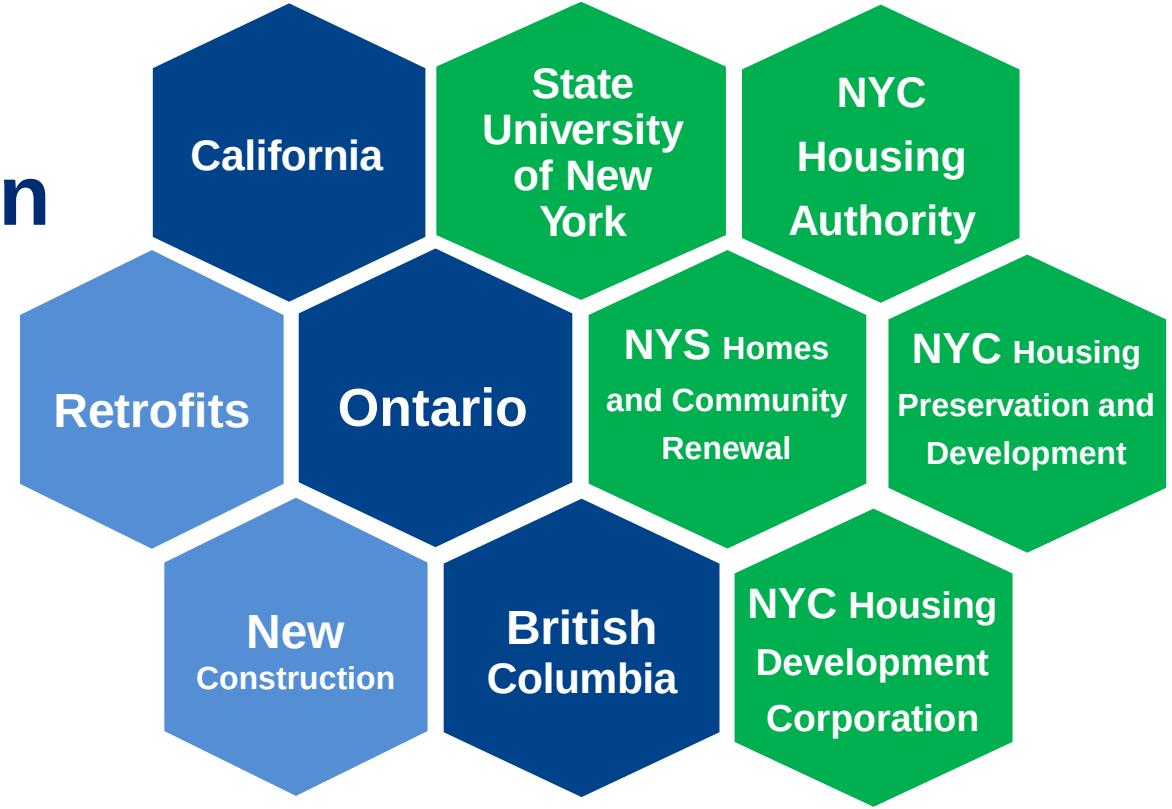
A Large Scale North American Market is Emerging



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