

DOCKETED

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New York State Activities Advancing Building Decarbonization



NYSERDA

John Williams

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05/25/2021

NYS Climate Action Council

Recommendations of the
Energy Efficiency and Housing Advisory Panel
for
Consideration in the Scoping Plan



**Climate Action
Council**

Beneficial Building Electrification and Energy Efficiency

100% zero-emissions electricity by 2040 under the Climate Act.

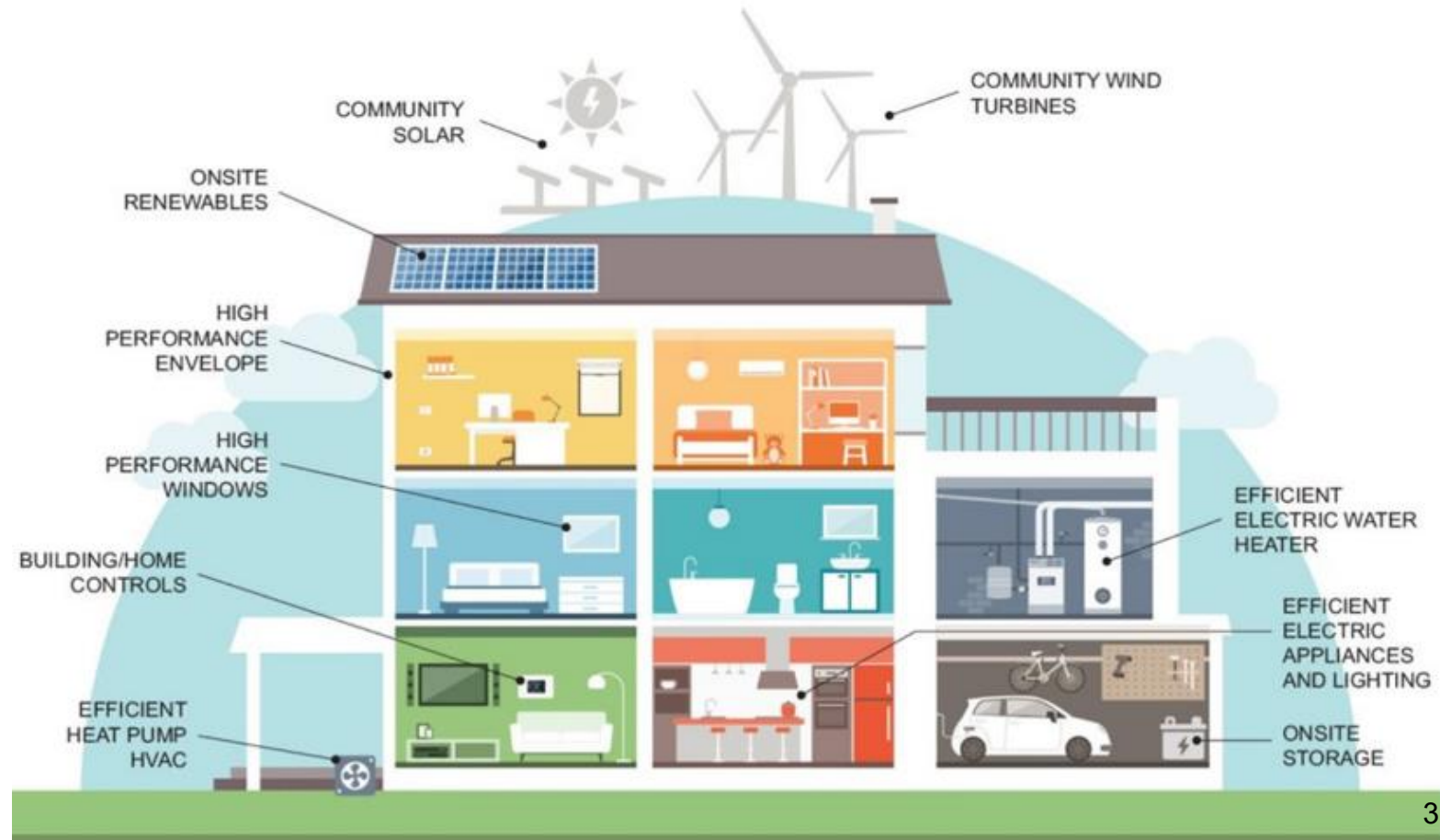
Electrification of heating and hot water systems is the key strategy for building decarbonization and **energy efficiency improvements** in all buildings.

Scope of Panel:

Eliminate on-site GHG emissions from the combustion of fossil fuels

- Residential
- Commercial and Institutional

The Panel adopted a building-level focus; further analysis is needed in campus and community thermal networks, and specialized uses in industry and critical care.



Scale of the Solution Demands New Resources

6.2 million buildings in the state

- 4.9m single family homes
- 250k multifamily buildings
- 370k commercial/institutional buildings

Eliminating GHG emissions from New York buildings by 2050 requires broad, systemic changes.

- By 2030, more than 200,000 homes per year upgraded to all-electric and energy efficient
- The 370,000 commercial/institutional buildings cut energy use in half and end fossil fuel use
- Behavior and practice change lead to decarbonization

Equitable transformation at this scale requires new resources.

- *Private capital investment* focused on highly efficient buildings
- *Public incentives* for early adoption
- *Public investments* in building efficiency and electrification in LMI homes, affordable and public housing, and disadvantaged communities

Mitigation Strategy Summary

	ACTION TYPE	EMISSIONS IMPACT BY 2050	EASE OF IMPLEMENTATION	COST*
1 Phase out fossil fuel use in buildings	Legislative, regulatory, programmatic	High	Medium/Hard	\$\$\$
2 Require benchmarking	Legislative, regulatory, programmatic	Low	Easy	\$
3 Shift reliance on fossil gas to a clean energy system	Legislative, regulatory	High	Hard	\$\$\$
4 Shift reliance on HFC use as refrigerants and in all products used in construction	Legislative, regulatory	High	Hard	\$\$

* Cost estimates for mitigation strategies reflect total resource costs statewide, expressed as an equivalent annualized cost.

The total resource cost approach measures costs to upgrade buildings and utility infrastructure net of energy savings, across all entities (public and private sector).

The categories used for **equivalent annualized total resource cost** are:

\$ (<\$250M, resources are already on hand), \$\$ (\$250M - \$1B, requires some new resources), and \$\$\$ (>\$1B, requires high degree of new resources).

Enabling Strategy Summary

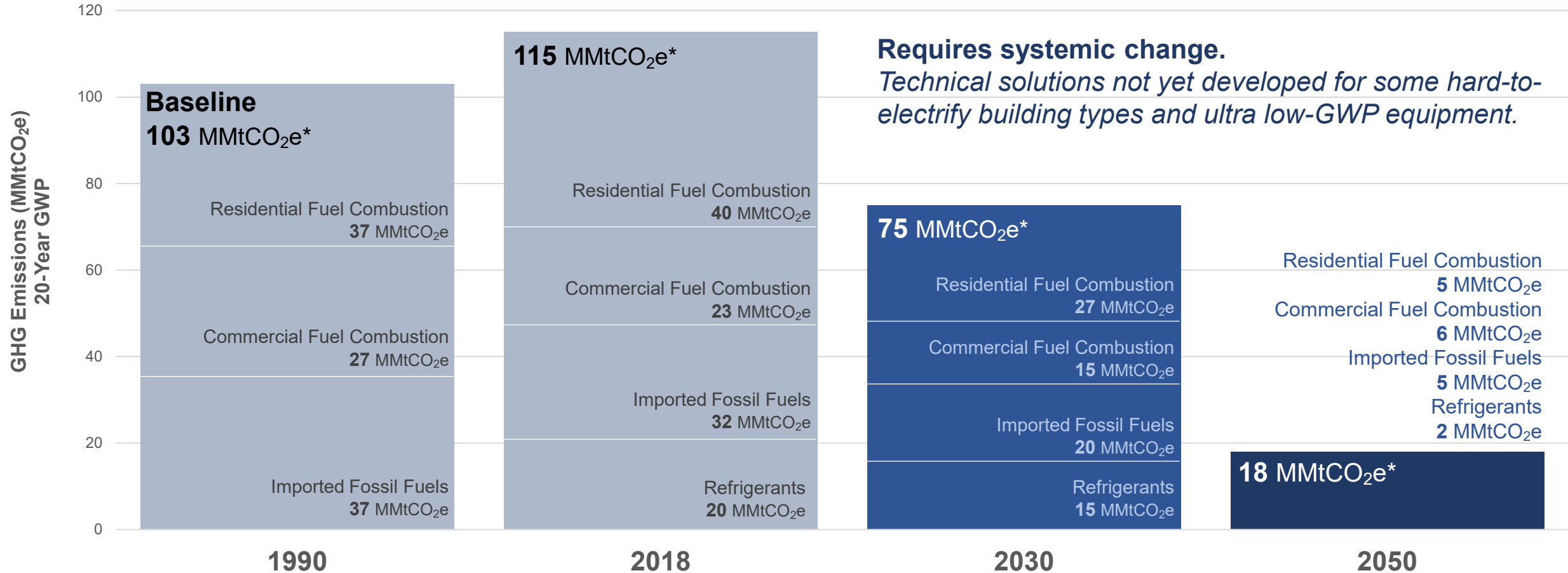
	ACTION TYPE	EASE OF IMPLEMENTATION	COST*
1 Public Financial Incentives	Financial, regulatory, programmatic	Hard (given scale)	\$\$\$
2 Public and Private Low-cost Financing	Financial	Hard (given scale)	\$\$\$ + mobilize private capital
3 Workforce	Financial, regulatory, programmatic	Medium	\$\$
4 Consumer Education	Programmatic	Medium	\$\$
5 Innovation	Financial, programmatic	Easy	\$\$
6 Embodied Carbon	Financial, regulatory, programmatic	Easy	\$

Cross-cutting recommendations also address identifying resources, federal support, energy prices, resilience, and the importance of energy efficiency.

** Cost estimates for enabling strategies reflect new State resources above current levels of investment, through 2030. State investments in market enabling strategies will be needed for at least the coming decade, with ongoing State resources thereafter to support LMI households and DACs. The categories used for **new State resources (through 2030)** are: \$ (<\$25M, resources are already on hand), \$\$ (\$25M - \$100M, requires some new resources), and \$\$\$ (>\$100M, requires high degree of new resources).*

Aggregate GHG Emissions Impact of Recommendations

Energy Efficiency and Housing Advisory Panel



* million metric tons carbon dioxide equivalent

Draft values subject to public review process for annual emissions accounting

Carbon Neutral Buildings Roadmap

Transforming the buildings market

New Construction

Design and deliver economic, zero emissions buildings.

Existing Buildings

Retrofits in existing buildings are critical to success.

Strategic Sector Focus

- Single-family residential
- Low- and mid-rise multifamily
- Office buildings
- Higher education

Collectively represent ~50% of building energy use in NYS

Roadmap scope

A **common definition** and understanding of carbon neutral buildings.

Studies to showcase **construction practice and technologies useable today.**

Modeled solutions focused on **building electrification** and **grid implications.**

Explains the **business case** for carbon neutrality.

Recommends **policy solutions** to ratchet down emissions and reduce cost.

Emphasis on **equity** and **environmental justice.**

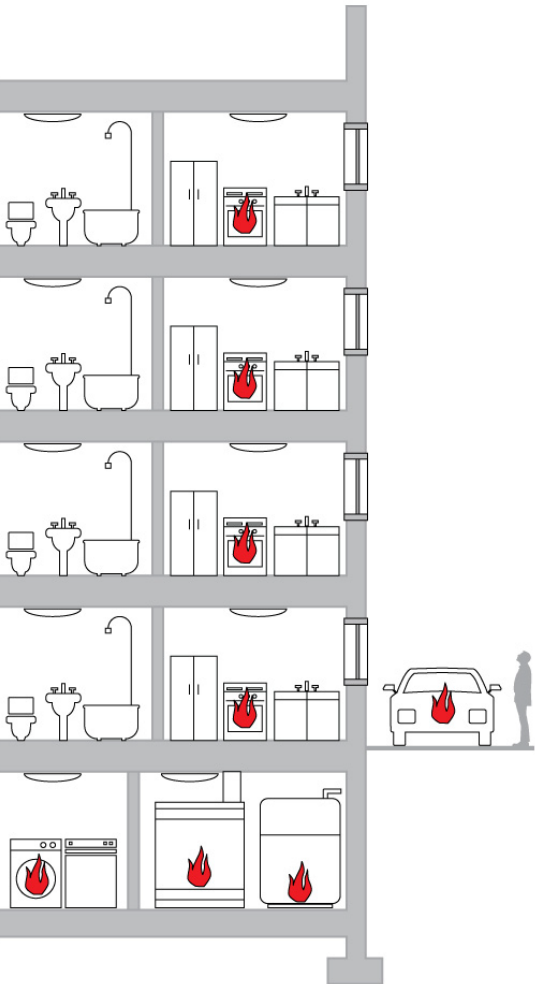
Carbon Neutral Buildings Roadmap: Components



* Priority sectors are SFR, low- and mid-rise MF and Office, and Higher Ed

CARBON NEUTRAL BUILDINGS - The General Solution Set

Existing Multi-family



Energy Efficiency (Load Reduction)

- High-performance building envelopes
- Energy recovery ventilation to optimize heating/cooling demand
- LED lighting with occupancy controls
- Smart electric appliances, minimized embodied carbon in construction materials

Building Electrification

- Cold climate air-source heat pumps (ASHP) or ground-source heat pumps (GSHP) for space heating and cooling
- Carbon-free thermal loops in campuses
- Heat pump water heaters with storage tanks and demand-flexible controls
- Electric induction cooktops and heat pump dryers
- Up-to-date electrical capacity and service

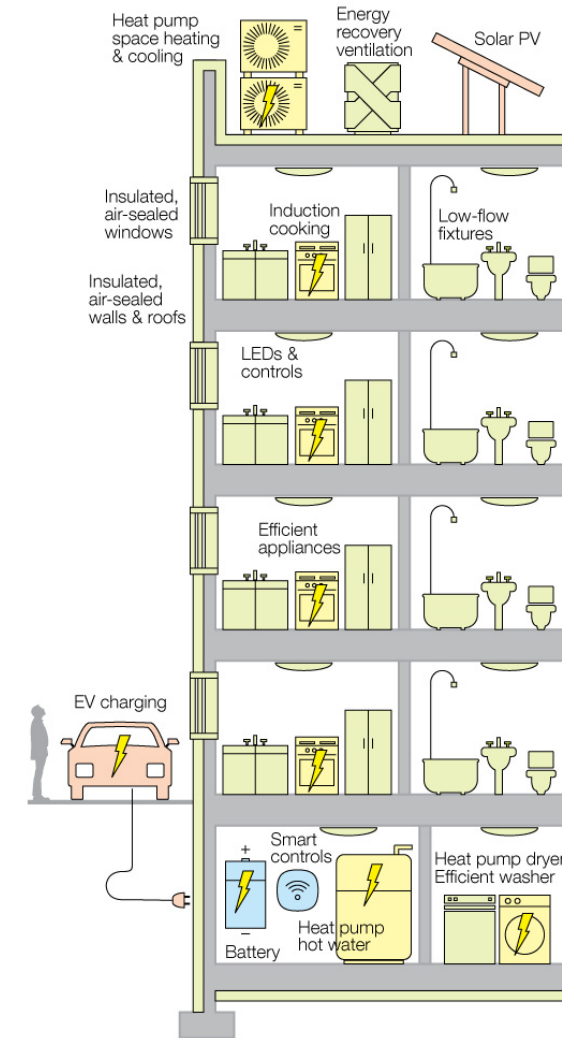
Advanced Controls

- Load flexibility and advanced controls of hot water, HVAC, and smart appliances

Distributed Energy Resources

- Solar PV integrated with battery
- Bi-directional EV charging equipment
- Batteries and thermal storage

New Construction & Carbon Neutral Retrofit



Building Electrification Roadmap

Building Electrification Roadmap

- > 10-year Roadmap outlining **market-development milestones** and **public policies & investments** to advance building electrification in NYS
- > Chart a path to **transform how New Yorkers heat and cool buildings** through the adoption of energy-efficient **heat pumps**
- > Pose a **2030 market vision** and **target**: cost-effective, attractive solutions across market segments and for most building types
- > **Engage the industry and stakeholders** to be relevant and customer-oriented

Release of first draft of Building Electrification Roadmap in Fall 2021

- Detailed slide deck as the first deliverable, for stakeholder input

Policy Analysis and Strategy Development

- > Increase consumer affordability and investment
 - Financial incentives to drive uptake of heat pumps and efficient shell upgrades; financing; rate design; funding mechanisms
- > Adopt codes, standards, and regulations
 - Regulations that phase out fossil fuel use in buildings, requiring energy-efficient electric heating and cooling, hot water heating, and appliances
- > Build market capacity, expand product availability, and reduce costs
- > Develop solutions that work for low-moderate income (LMI) households, affordable housing, and disadvantaged communities
- > Support grid readiness and electric readiness in buildings
- > Resilience considerations

RetrofitNY

Net Zero Energy Retrofits of Existing Buildings.

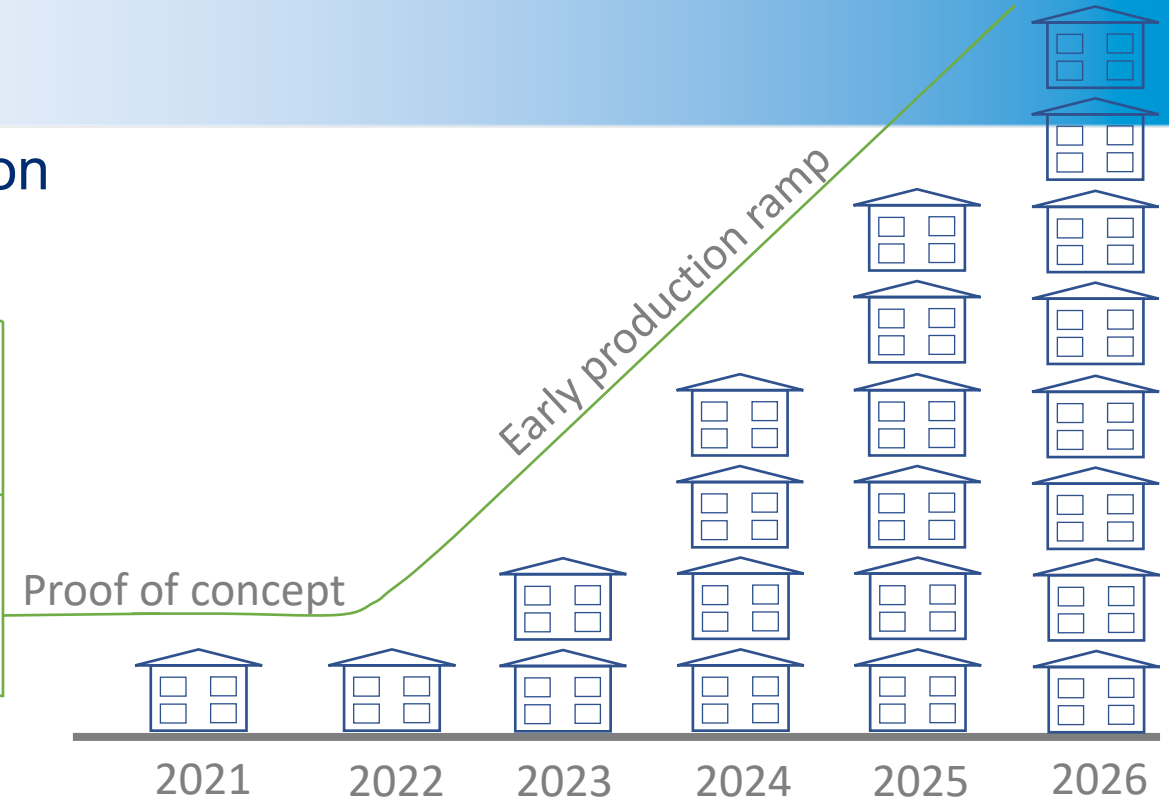
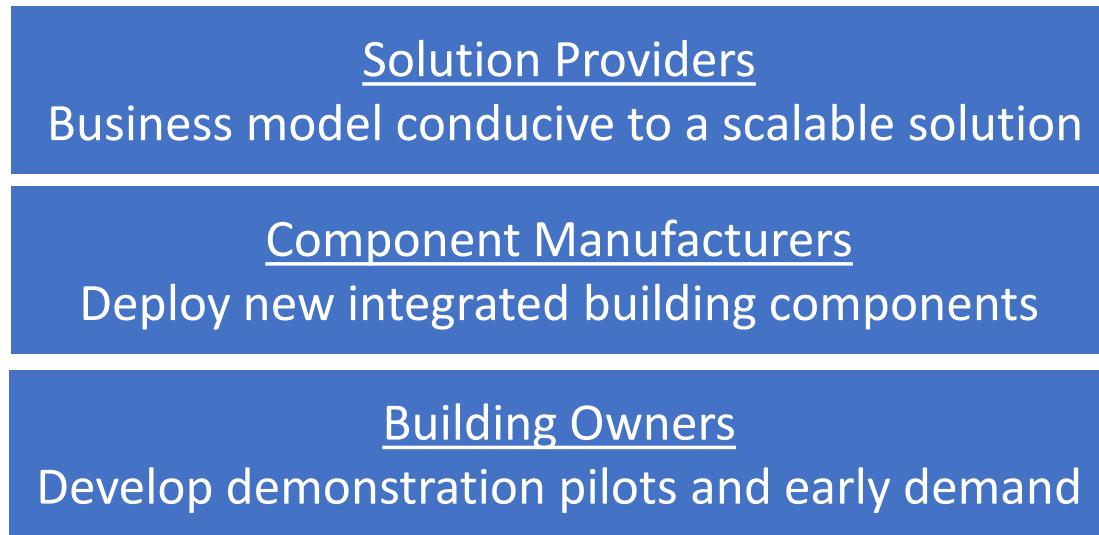
Elements

- Highly insulated building envelope
- New, downsized all-electric mechanical works
- [On-site] distributed generation
- Grid interactivity



RetrofitNY

Create open gateway to program participation



- Give manufacturers and solution providers incentives to collaborate on developing a cost effective NZE whole building solution
- Serve as a matchmaking vehicle between building owners and NZE solution providers
- Develop use cases of replicable whole building solutions to make adoption easier for building owners

Resources

Climate Action Council:
climate.ny.gov

EE/Housing Recommendations:
<https://climate.ny.gov/-/media/CLCPA/Files/2021-05-03-EE-and-Housing-Recommendations.pdf>

RetrofitNY:
<https://www.nyserda.ny.gov/All-Programs/Programs/RetrofitNY/Resources-and-Reports>



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