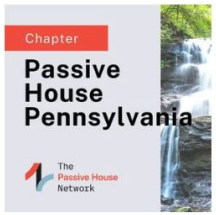
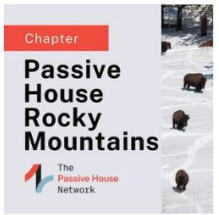
The Passive House Network

Policy that Works





Bronwyn Barry
PHN Policy Lead

www.passivehousenetwork.org

TODAY'S PATH

The Passive H Network

WE ARE HERE

1 **REPORT FINDINGS**

Brief recap of PHN's "POLICY THAT WORKS' report and the POLICY PATTERNS we found.

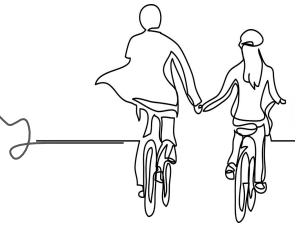
2 **QUILTING PATTERNS**

Looking at where and how best to intervene to build policies as systems.

3 **SPECIFIC EXAMPLES**

Real-world examples from across North America that we can replicate.

0 **Q&A - LET'S TALK?**



LET'S OPEN THE UMBRELLA

Ten key requirements for new buildings

By 2030 all new buildings must operate at net zero to meet our climate change targets. This means that by 2025 all new buildings will need to be designed to meet these targets. This page sets out the approach to operational carbon that will be necessary to deliver zero carbon buildings. For more information about any of these requirements and how to meet them, please refer to the: UKGBC - Net Zero Carbon Buildings Framework; BBP - Design for Performance initiative; RIBA - 2030 Climate Challenge; GHA - Net Zero Housing Project Map; CIBSE - Climate Action Plan; and, LETI - Climate Emergency Design Guide.

Low energy use

1. Total Energy Use Intensity (EUI) - Energy use measured at the meter should be equal to or less than:
   - **35 kWh/m²/yr** (GIA) for residential[1]

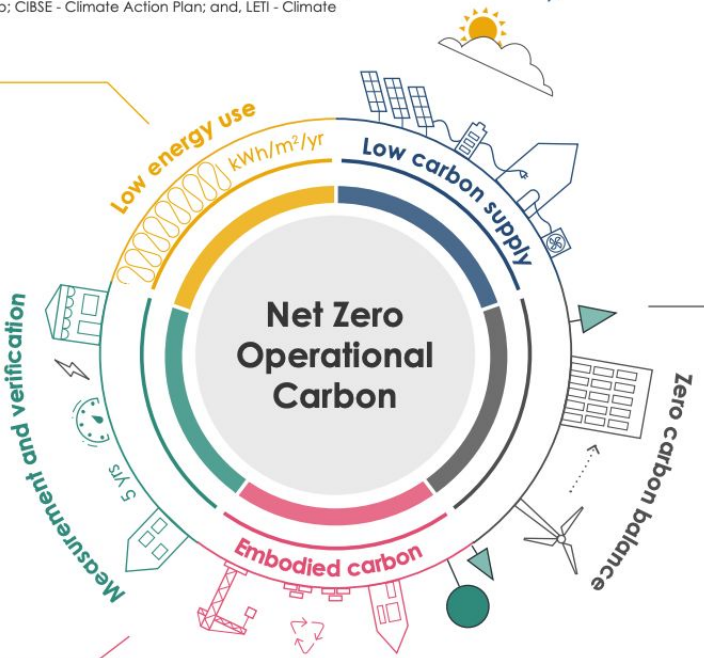
   For non-domestic buildings a minimum DEC B (40) rating should be achieved and/or an EUI equal or less than:
   - **65 kWh/m²/yr** (GIA) for schools[1]
   - **70 kWh/m²/yr** (NLA) or **55 kWh/m²/yr** (GIA) for commercial offices[1,2]
2. Building fabric is very important therefore space heating demand should be less than **15 kWh/m²/yr** for all building types.

Measurement and verification

3. Annual energy use and renewable energy generation on-site must be reported and independently verified in-use each year for the first 5 years. This can be done on an aggregated and anonymised basis for residential buildings.

Reducing construction impacts

4. Embodied carbon should be assessed, reduced and verified post-construction.[3]



Low carbon energy supply

5. **Heating and hot water should not be generated using fossil fuels.**
6. The average annual carbon content of the heat supplied (gCO_2/kWh) should be reported.
7. On-site renewable electricity should be maximised.
8. Energy demand response and storage measures should be incorporated and the building annual peak energy demand should be reported.

Zero carbon balance

9. A carbon balance calculation (on an annual basis) should be undertaken and it should be demonstrated that the building achieves a net zero carbon balance.
10. Any energy use not met by on-site renewables should be met by an investment into additional renewable energy capacity off-site OR a minimum 15 year renewable energy power purchase agreement (PPA). A green tariff is not robust enough and does not provide 'additional' renewables.

Developed in collaboration with: LETI London Energy Transformation Initiative; UKGBC; BBP Better Buildings Partnership

Developed with the support of: Good Homes Alliance; RIBA Architecture.com; CIBSE

Source: https://www.leti.london/one-pager

What's our SHARED end goal?

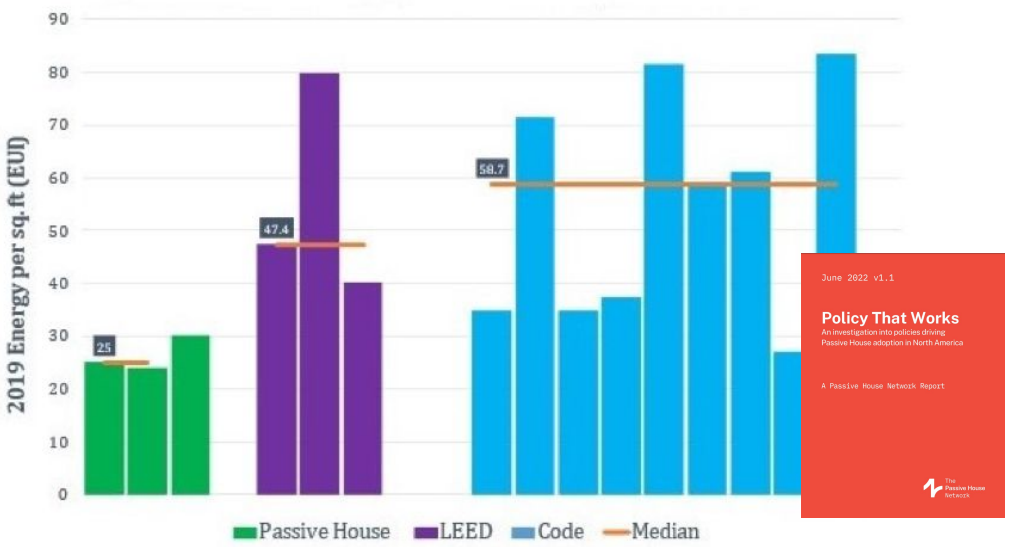
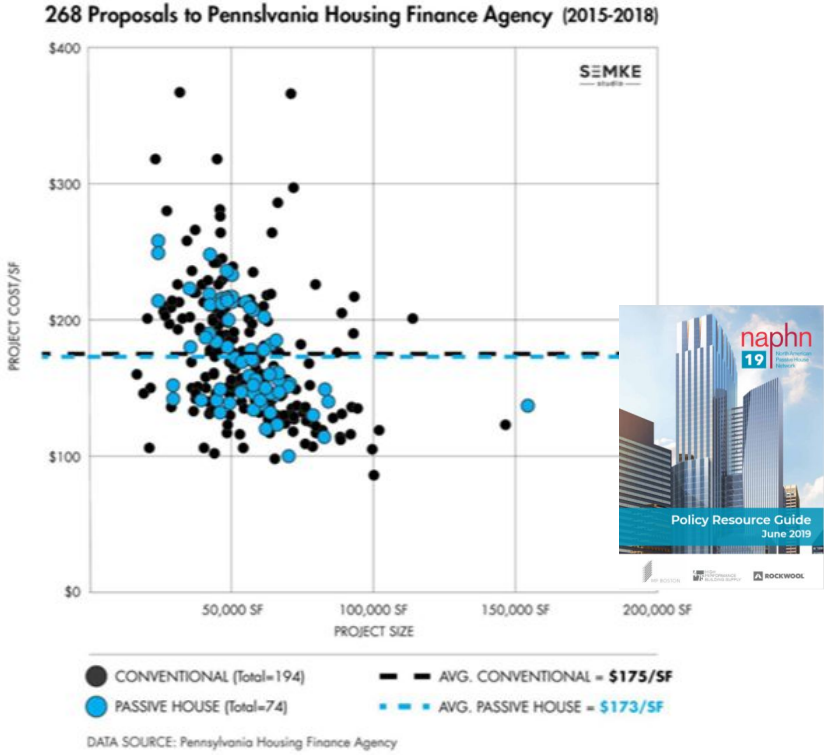
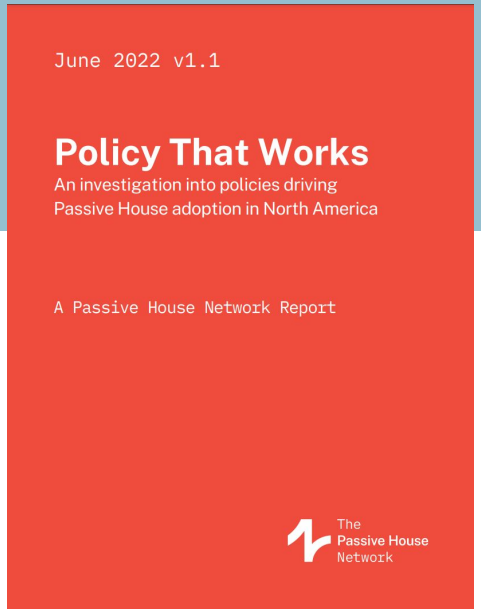


Figure 7. 2019 Measured Energy Use Intensity in kBtu per square foot per year (kBtu/sf/yr) for deed-restricted low-income multifamily buildings in Philadelphia, PA. Categorized by voluntary standards achieved. Source: MassCEC



BETTER PERFORMANCE for LOWER COSTS!

PHN'S REPORT:



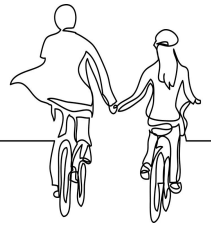
www.passivehousenetwork.org

Source: https://naphnetwork.org/news/policy-that-works-a-new-passive-house-policy-report-from-phn/

WHERE WE STARTED:

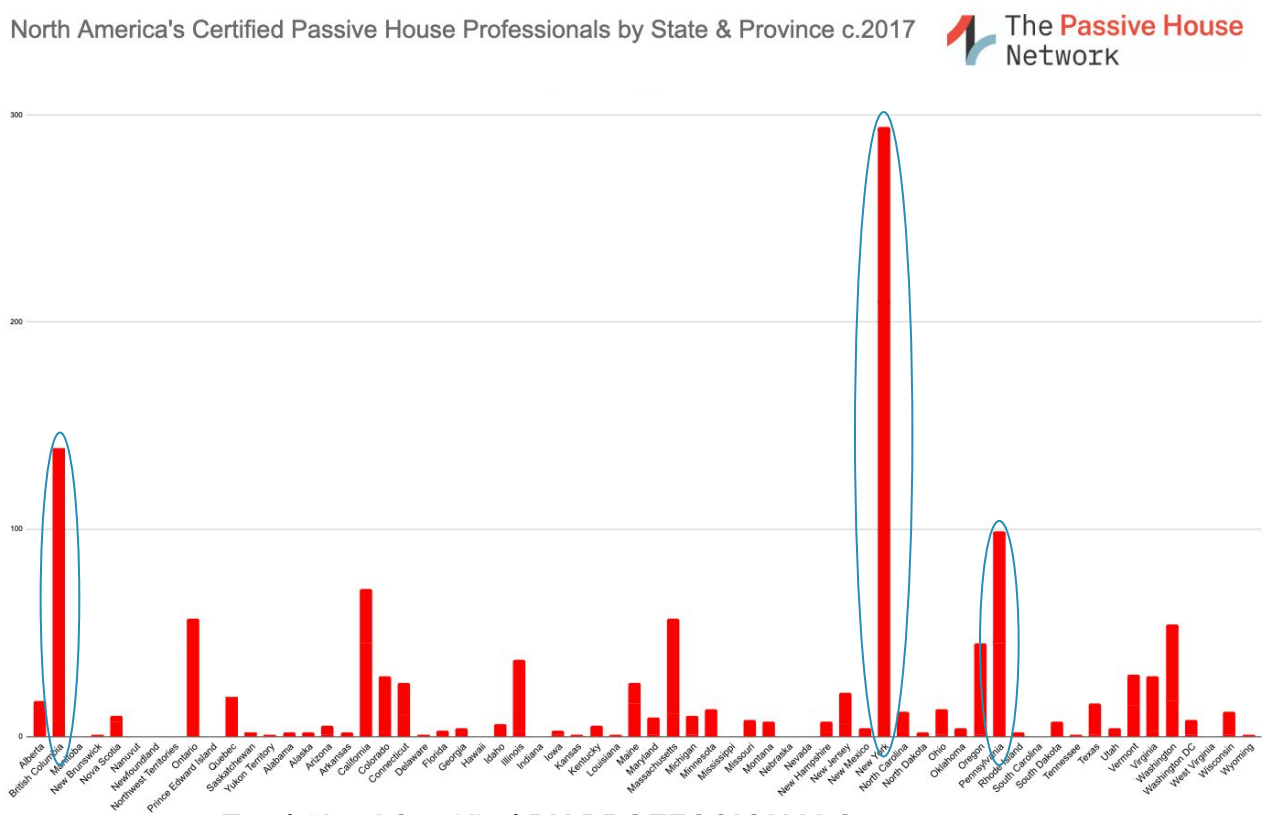
1. **Inventoried Current PH Policies**
   PHN convened a Roundtable of Chapters and Allied PH orgs to assess what PH policy is already in place, how it was implemented and who is moving PH policy forward.
2. **Reviewed Successful Policy Mechanisms & Toolkit**
   PHN surveyed the market of successful policies that were accelerating PH adoption.
3. **Analysed Policy Frameworks**
   We looked at how typical codes are developed, and how PH fits into (or doesn't) those frameworks to determine WHERE best to intervene in the system
4. **Brainstormed GOALS & IDEAS**
   Looked at where to intervene and best use of our existing capacity and resources.
5. **Craft an ACTION PLAN with Target Metrics for Success**
   Developed Goals & Actions into specific tasks for HQ, Chapters & Allied orgs. Set metrics for success. PLAN an annual review to assess impact and refine our Goals & Ideas.

WE ARE HERE



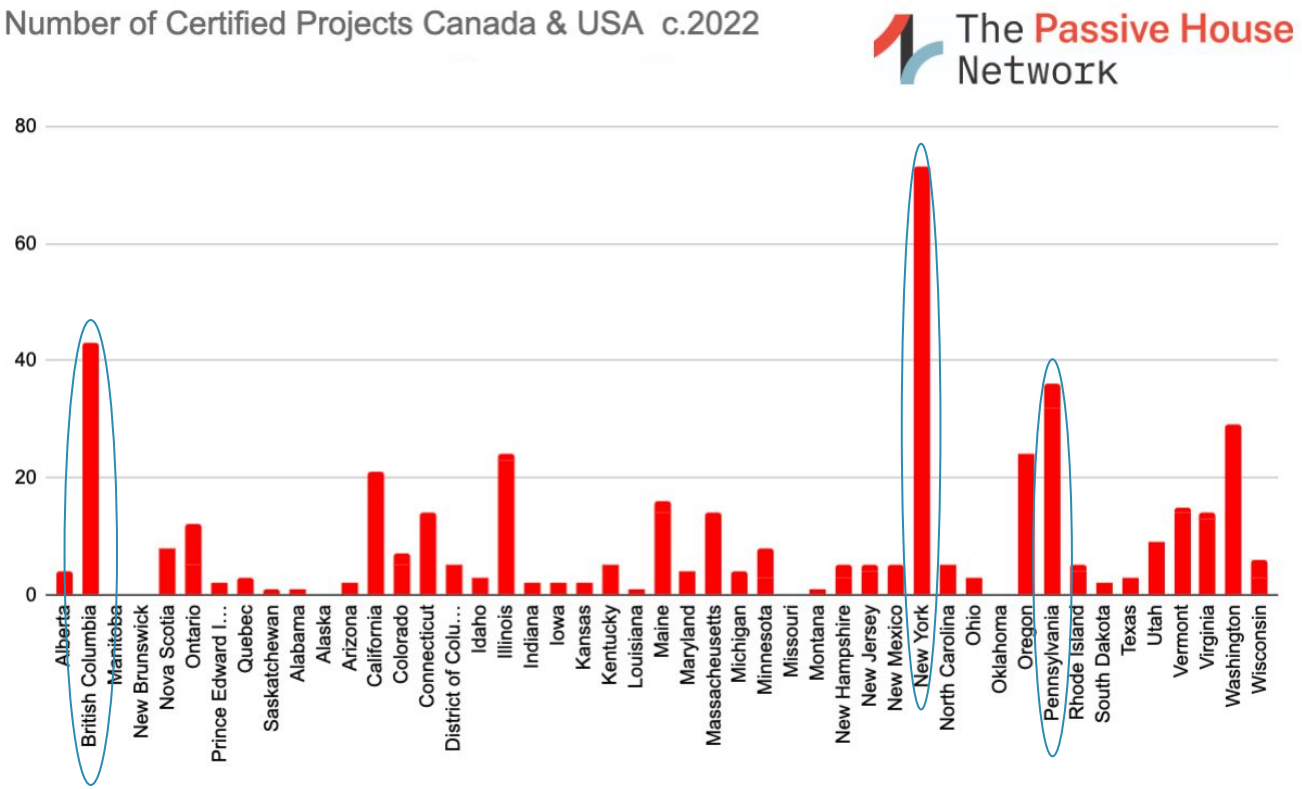
The Passive H Network

Mapping Professionals c.2017

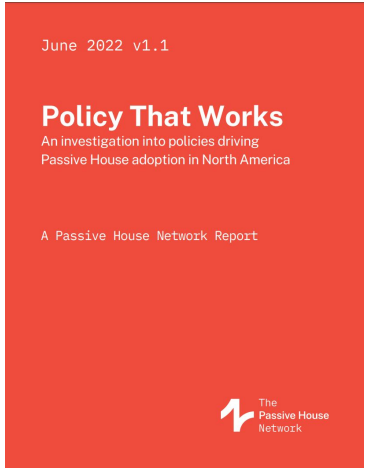


Total #'s of Certified **PH PROFESSIONALS** (c.2017)

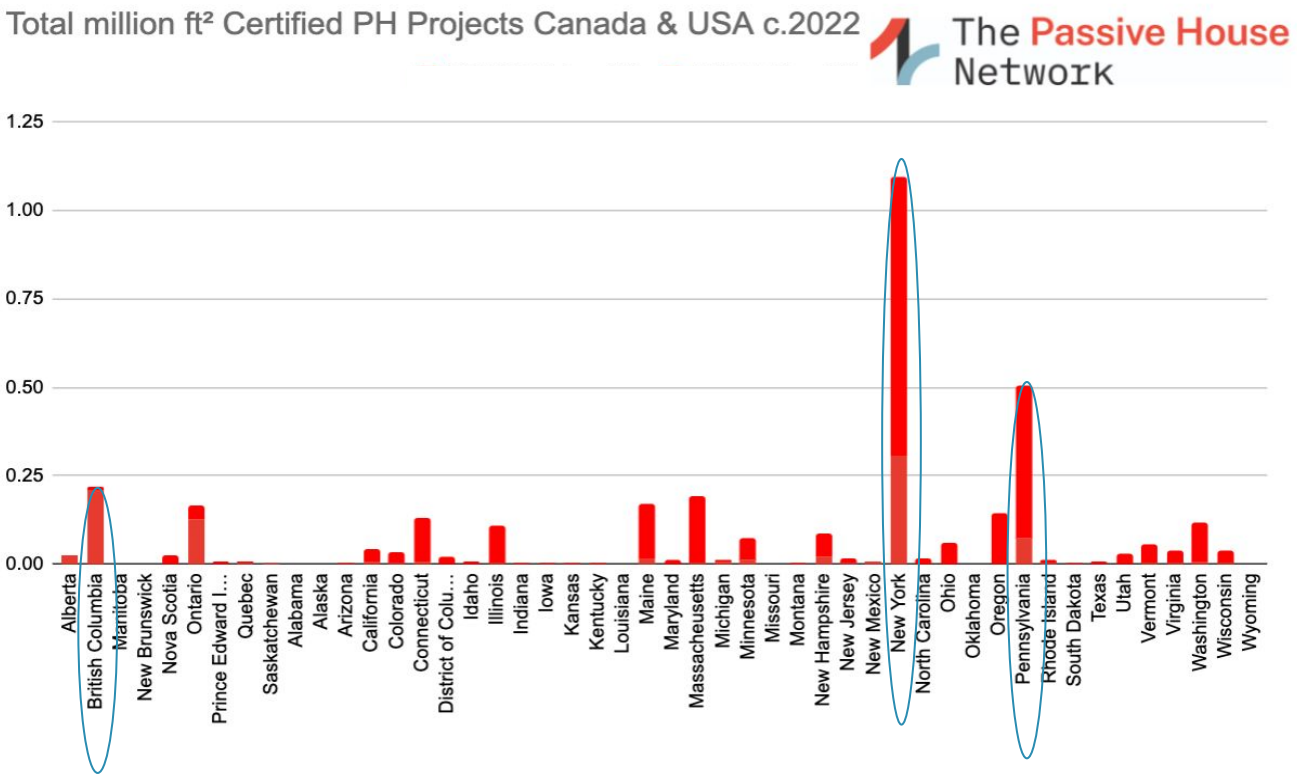
Mapping Certified Projects



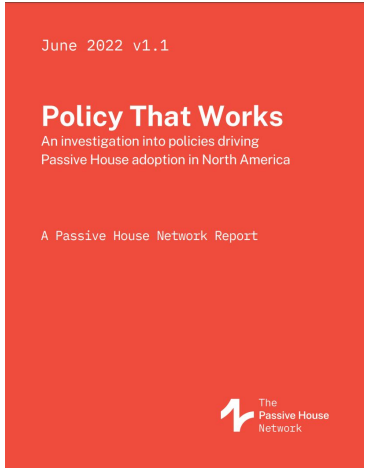
Total Number of Certified **PH PROJECTS** (c.2022)



Mapping TFA (ft^2) Certified Projects



Total SF of Certified **PH PROJECTS** (c.2022)



MAPPING DRIVERS OF PH

Entitlement & Prelim Design

Development & Construction

Occupation & Operation

CODE OVERLAYS

Zoning Code

Local Design Regs

Building Codes

Energy (& Reach) Codes

Benchmarking

INSIDE CODE

UP-ZONING, F.A.R & HEIGHT INCENTIVES FOR PH'S

ACCELERATED APPROVALS OR MINISTERIAL REVIEW FOR PH'S

BC ENERGY STEP OR REACH CODES

ALT. COMPLIANCE PATHWAYS USING PHPP

LL97 WITH GHG TARGETS

START

Des. Rev. Permit

Bldg. Permit

FINAL

FINISH

OUTSIDE CODE

CPHD/T TRAINING SUBSIDIES

TAX CREDITS (LIHTC & OTHER?)

PACE FINANCING MECHANISMS

INDIRECT $$$ SUBSIDIES

DIRECT $$$ SUBSIDIES

THREE KEY ENTITIES

1

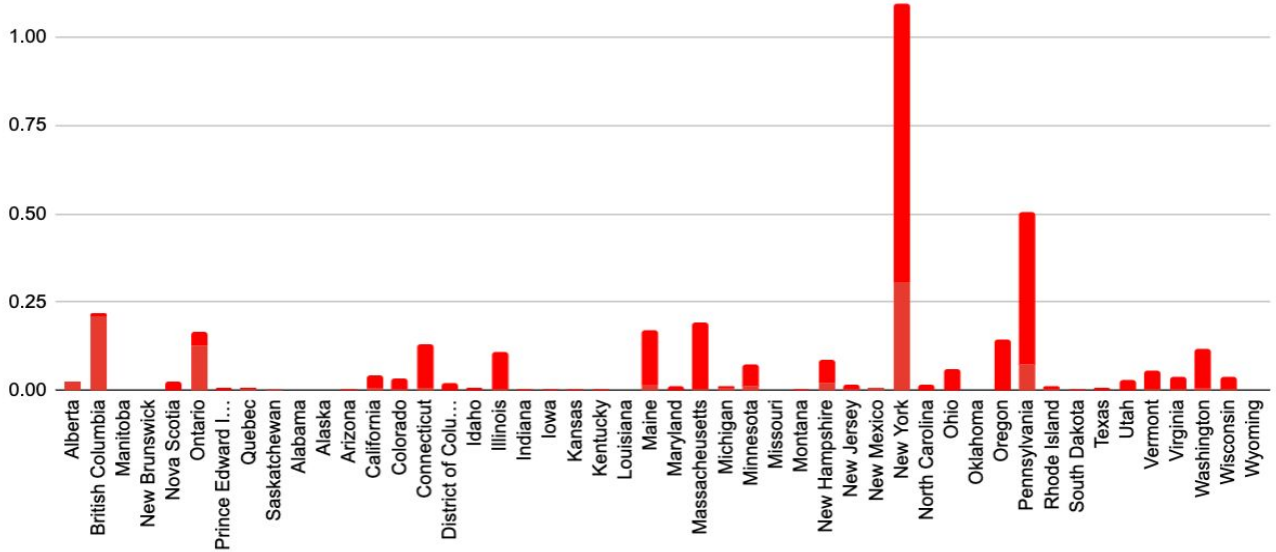
City-Led Initiatives with clear, ambitious TARGETS = 0$

2

State (& Utility)-Led WORKFORCE TRAINING & DEVELOPMENT = $$

3

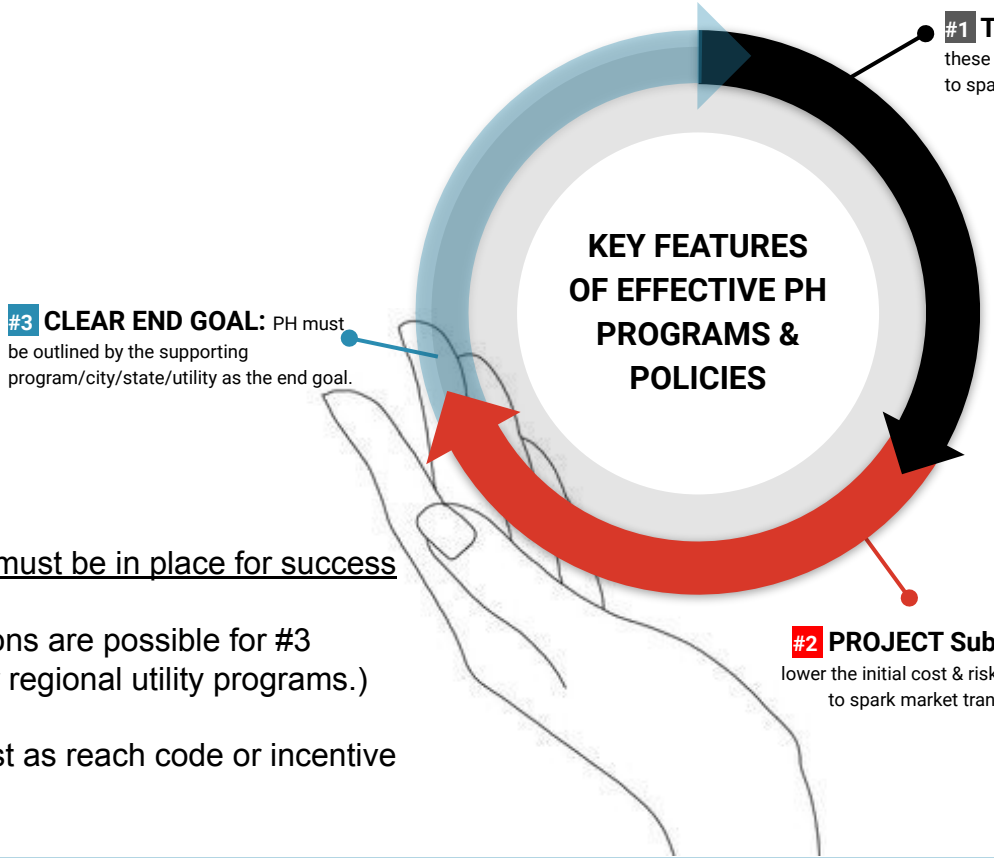
Utility (& State)-funded support for FRONT-RUNNER PROJECTS = $$$



Project incentives were:

- ❑ COMPETITIVE
- ❑ STEPPED
- ❑ REQUIRED REPORTING &/ MONITORING

THE KEY DRIVERS



#1 TRAINING Subsidies: these generate the critical mass required to spark market transformation.

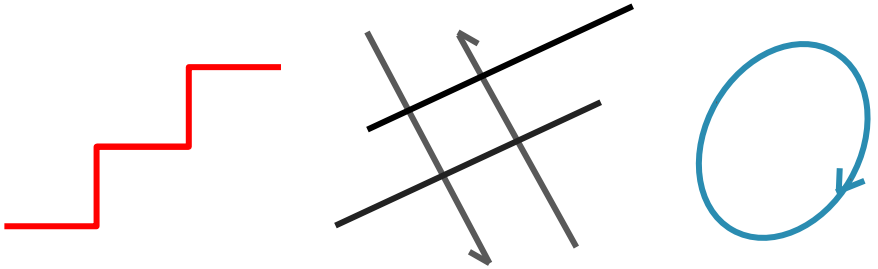
#2 PROJECT Subsidies: these lower the initial cost & risk barriers required to spark market transformation.

#3 CLEAR END GOAL: PH must be outlined by the supporting program/city/state/utility as the end goal.

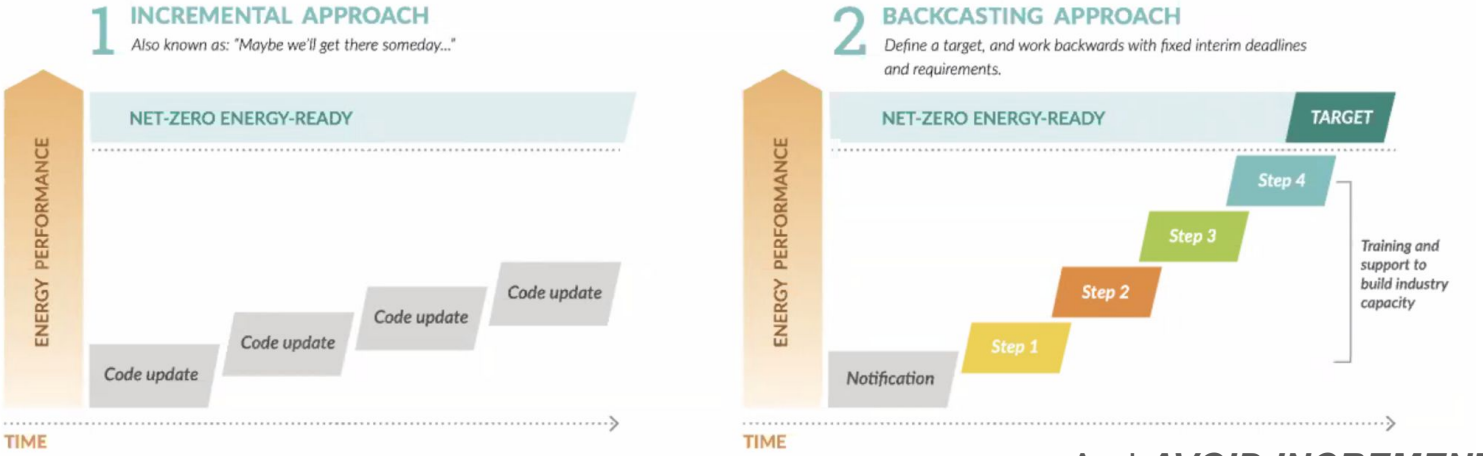
- ❑ <u>All *3 drivers* must be in place for success</u>
- ❑ Multiple options are possible for #3 (state, city or regional utility programs.)
- ❑ #3 works best as reach code or incentive program.

Quilting Policies

Replicate KEY PATTERNS



1. **STEPS:** Tiered programs with weighted incentives directly *TIED TO THE TARGET*
2. **CROSS HATCHES:** that <u>*connect*</u> different regulatory frameworks.
3. **CIRCULAR FEEDBACK LOOPS:** for reporting costs & outcomes



And ***AVOID INCREMENTALISM!***

SOURCE: https://energystepcode.ca/

HOW & WHERE the ACTION STARTED

01 CITIES

- Vancouver, NYC & Pittsburgh are **using PH for CITY-OWNED projects** to drive PH.
- **ACTIONS:**
  - PUBLISH CLEAR PLANS WITH **SPECIFIC TARGETS**
  - Implemented **ZONING & PLANNING INCENTIVES** to spur uptake
  - **REMOVED BARRIERS** - and provided staffing support to front runners.

02 STATES

- LOW INCOME HOUSING TAX CREDIT programs, or regional efficiency INCENTIVES work well, but ONLY when PH is identified as a stand-alone goal.
- **ACTIONS:**
  - a. Initiate PROFESSIONAL TRAINING SUBSIDIES
  - b. Support regional/state efforts that set PH apart from other programs. (eg. **NYSERDA** & **MassSAVE programs.**)
  - c. 2. Make these programs more **VISIBLE.**

03 UTILITIES

- Utilities have the strongest aligned interests with PH & PHN'S mission & focus.
- **ACTIONS:**
  - 2. Actively connect utilities to each other at events & conferences.
  - 3. Establish direct relationships between PHN & Utility Staffers.
  - 4. Build resources and reports that support utilities using PH.

01

City-Led Policies

Vancouver's BIG LEVER: Zoning Incentives

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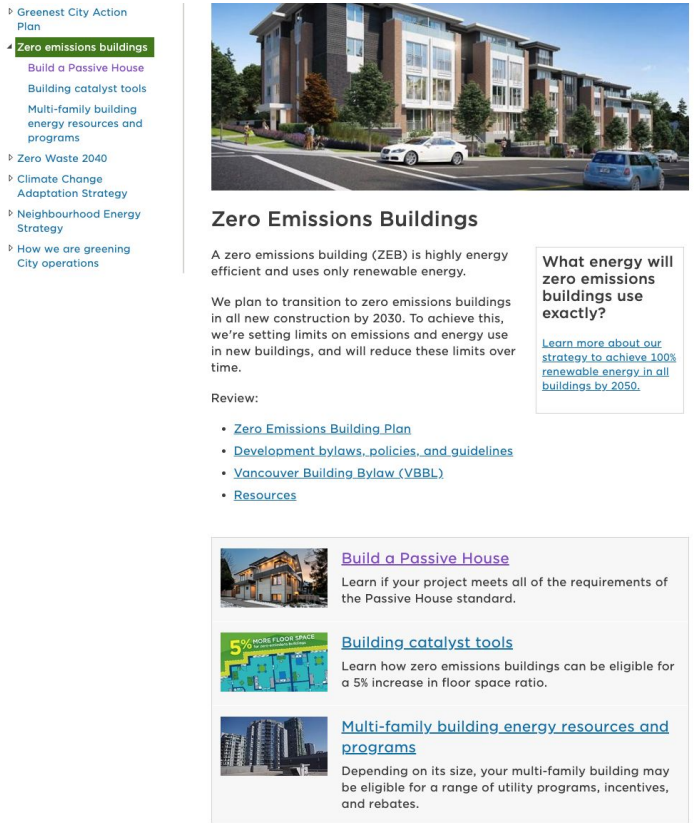
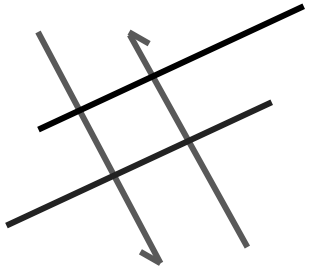


CODES & REGULATIONS

Vancouver's Zero Emissions Buildings

Accelerating Passive House Uptake

Sean Pander
City of Vancouver



1. Developed & adopted a **Zero Emissions Buildings Plan**

2. Trained 100 city staffers & SUBSIDIZED Passive House training for local professionals

3. Approved ZONING incentives to remove barriers for owners & developers to build PH's.

Zero Emissions Policy:
https://guidelines.vancouver.ca/Z001.pdf

Zoning Incentives Policy:
https://bylaws.vancouver.ca/bulletin/Z001.pdf

www.passivehousenetwork.org

Source: https://vancouver.ca/green-vancouver/zero-emissions-buildings.aspx#zero-emissions-building-plan

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New York City: Leading by EXAMPLE

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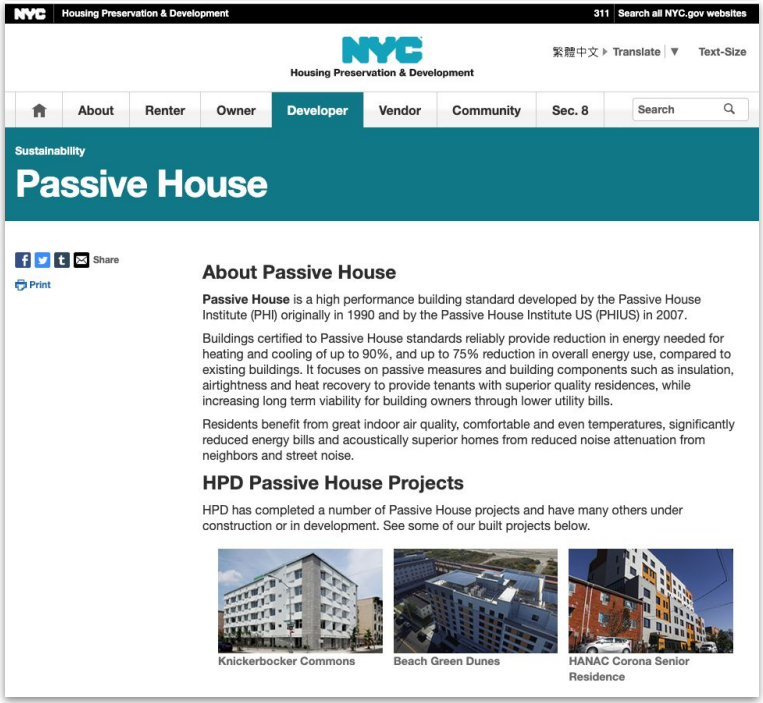

1. **Identified PH as a key TARGET** in their 2014 climate report: One City: Built to Last

2. Trained City staffers in core departments (100 staffers in Schools Construction Authority now PH trained.)

3. Issued **RFP's REQUIRING PH CERTIFICATION** for new city schools & Affordable Housing.

One City Built to Last:
https://www1.nyc.gov/assets/builttolast/downloads/OneCity.pdf

www.passivehousenetwork.org

Source: https://www1.nyc.gov/site/hpd/developers/passive-house.page

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New York's BIG LEVER: Benchmarking + LL97

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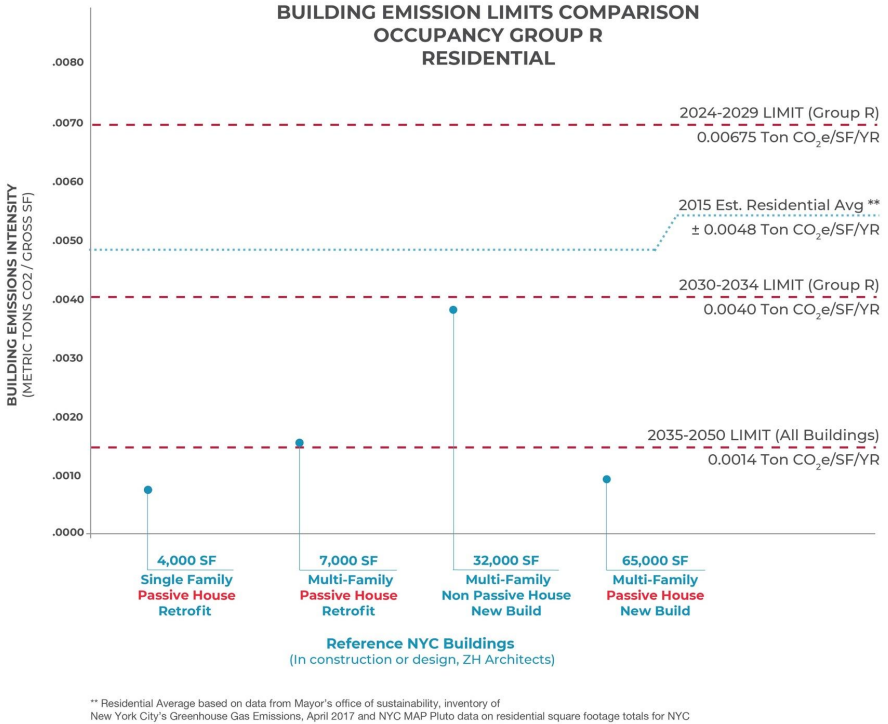


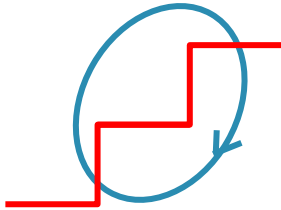
** Residential Average based on data from Mayor's office of sustainability, inventory of New York City's Greenhouse Gas Emissions, April 2017 and NYC MAP Pluto data on residential square footage totals for NYC

CODES & REGULATIONS

NYC's Climate Mobilization Act

A brief history

by Stas Zakrzewski
ZH Architects



1. Passed a 'Climate Mobilization Act' that requires large, **EXISTING buildings** meet specific GHG emissions targets
2. Targets **STEP DOWN over time**
3. **FINES OWNERS** whose buildings don't comply

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02

State-Led Policies

SIMPLIFIED REACH CODES

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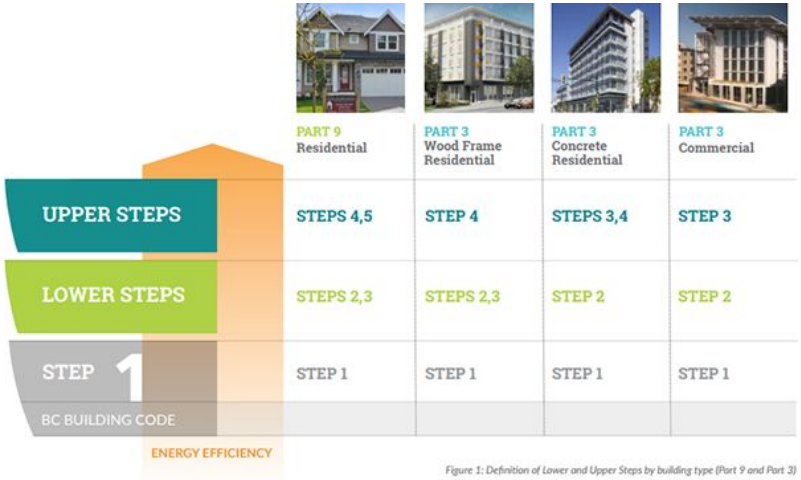
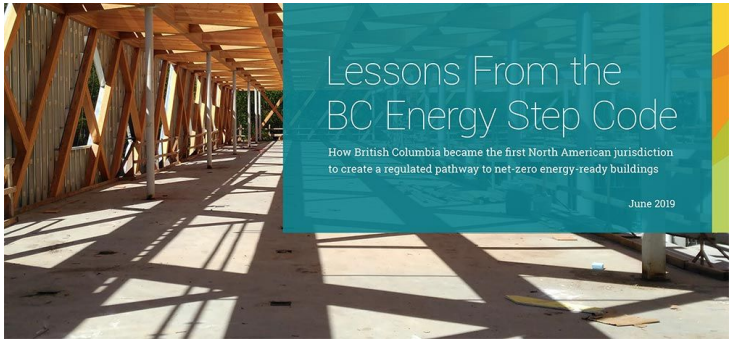
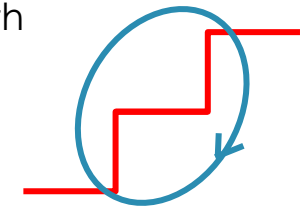


Figure 1: Definition of Lower and Upper Steps by building type (Part 9 and Part 3)



- Tiered REACH Codes with defined END GOAL

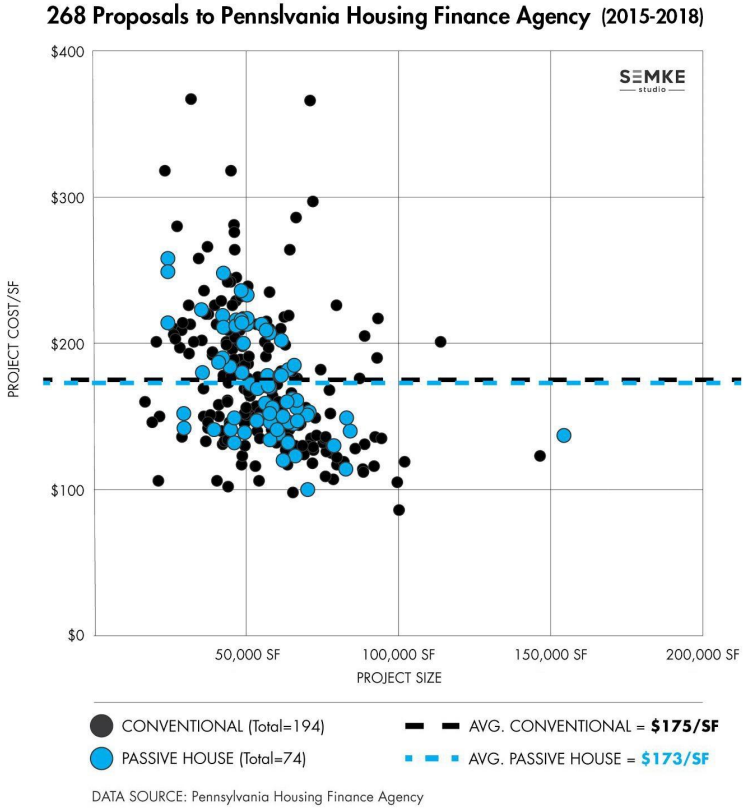


SOURCE: https://energystepcode.ca/

www.passivehousenetwork.org

Affordable Housing Tax Credits

The Passive House Network

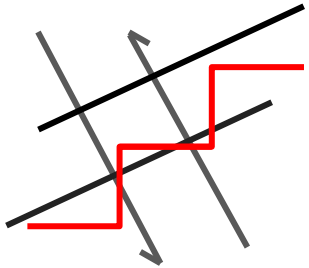


INCENTIVE PROGRAMS

Low Income Housing Tax Credits

The Sleeper Simulant Policy

by Zachary Semke
Semke Studio



- Granted 10 extra points for applicants willing to pursue Passive House
- Tracked the costs to build all projects over 3 years
- Found the Passive House projects came in LOWER $/SF

www.passivehousenetwork.org

Source: https://drive.google.com/file/d/1x49Xmey6qaqfG-XDhzvq4TfbdTqhvi0a/view

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NYSERDA's Buildings of Excellence Program

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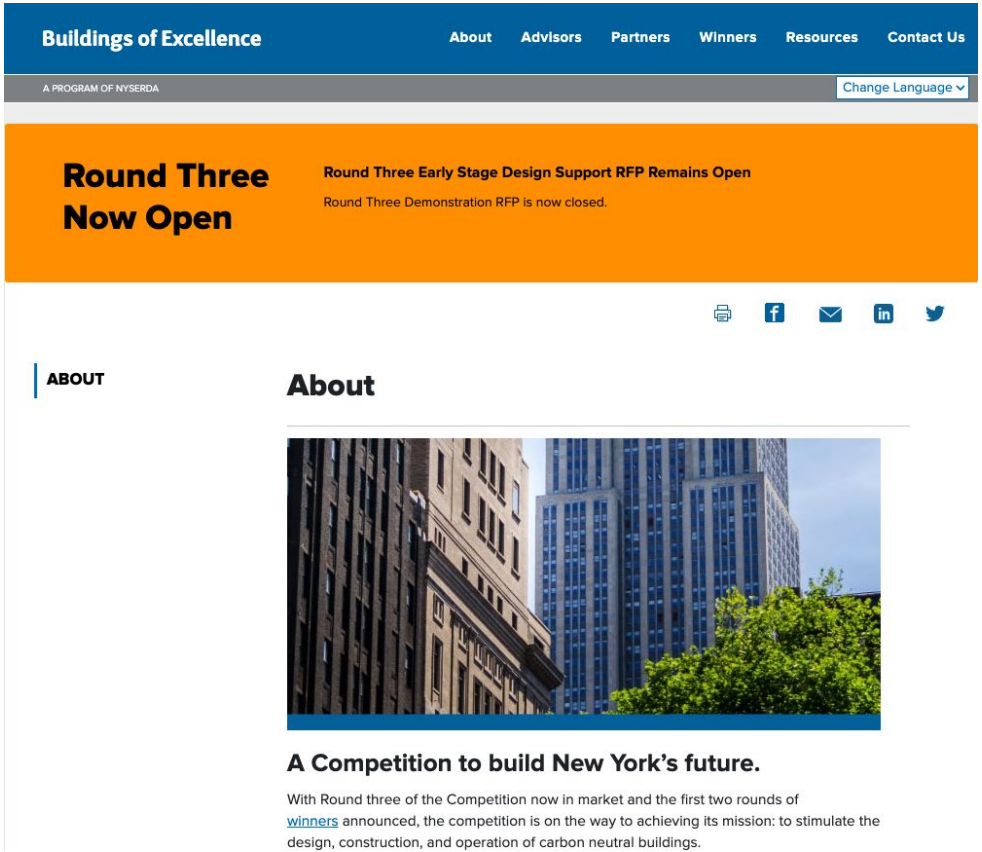


- **COMPETITIVE AWARD** open to all NY State projects seeking to build carbon neutral buildings (not specific to PH)
- **Provides $$$** for early design & construction in separate entries to spur innovative design & energy modeling
- **Repeats** Annually (currently in 3rd round)
- **Requires reporting** of Energy modeling, methodology & COSTS

Source: https://www.nyserda.ny.gov/All-Programs/Multifamily-Buildings-of-Excellence/About

Targeted Multi-Family Incentives

The Passive House Network

mass save
Savings through energy efficiency

Save ▾ Shop Learn ▾ Search MyENERGY

Passive House Incentive Structure for Multi-Family (5 units or more)

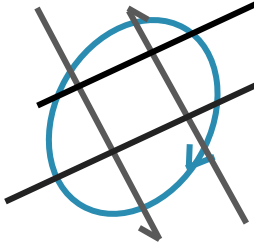
Incentive Timing	Activity	Incentive Amount	Max. Incentive
Pre-Construction	Feasibility Study	Up to 100% Feasibility costs	$5,000
	Energy Modeling	75% of Energy Modeling costs	$500/Unit, max. $20,000
	Pre-Certification	$500/unit	N/A
Post-Construction	Certification	$2,500/unit	
	Net Performance Bonus	$0.75/kWh	
		$7.50/therm	

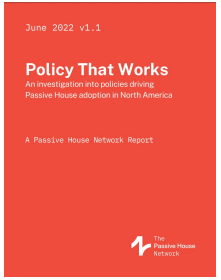
The Net Performance Bonus is calculated by determining the final pay for savings incentives and subtracting the pre- and final certification incentives. The result is the Net Performance Bonus.

Projects that pre-certify but do not achieve certification are eligible for the pre-certification incentive and Net Performance Bonus.

Projects over 100 units must be pre-approved by the applicable Sponsors of Mass Save.

- Created a program focused on **MULTIFAMILY BUILDINGS**
- Provides **$ subsidies** for:
  - Training
  - Preliminary Design
  - Construction
- **Bonus $** for post-occupancy performance





www.passivehousenetwork.org

Source: https://www.masssave.com/saving/residential-rebates/passive-house-incentives

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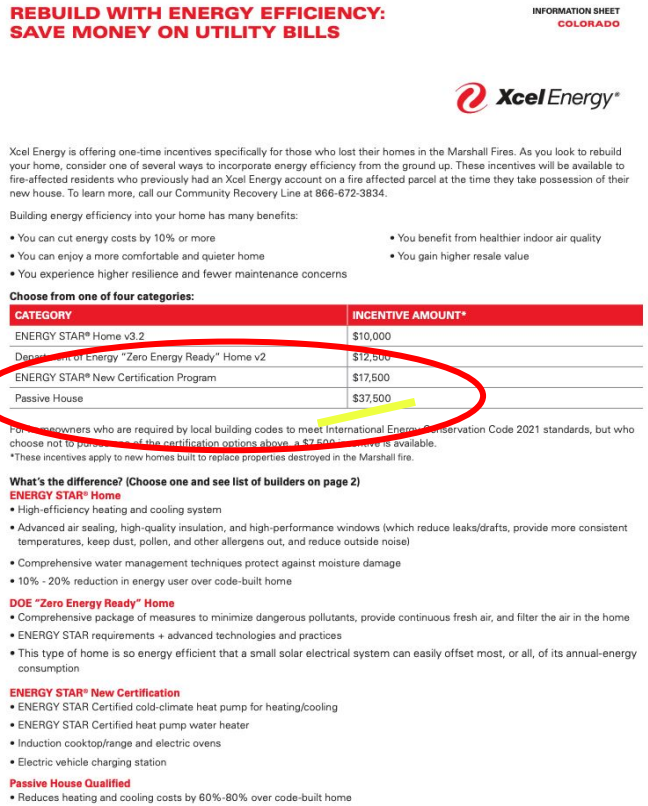
03

Utility-Led Programs

Colorado's Marshall Fire REBUILD incentives

The Passive House Network



REBUILD WITH ENERGY EFFICIENCY: SAVE MONEY ON UTILITY BILLS

INFORMATION SHEET
COLORADO

Xcel Energy®

Xcel Energy is offering one-time incentives specifically for those who lost their homes in the Marshall Fires. As you look to rebuild your home, consider one of several ways to incorporate energy efficiency from the ground up. These incentives will be available to fire-affected residents who previously had an Xcel Energy account on a fire affected parcel at the time they take possession of their new house. To learn more, call our Community Recovery Line at 866-672-3834.

Building energy efficiency into your home has many benefits:

- You can cut energy costs by 10% or more
- You can enjoy a more comfortable and quieter home
- You experience higher resilience and fewer maintenance concerns
- You benefit from healthier indoor air quality
- You gain higher resale value

Choose from one of four categories:

CATEGORY	INCENTIVE AMOUNT*
ENERGY STAR® Home v3.2	$10,000
Department of Energy "Zero Energy Ready" Home v2	$12,500
ENERGY STAR® New Certification Program	$17,500
Passive House	$37,500

For homeowners who are required by local building codes to meet International Energy Conservation Code 2021 standards, but who choose not to pursue one of the certification options above, a $7,500 incentive is available.
*These incentives apply to new homes built to replace properties destroyed in the Marshall fire.

What's the difference? (Choose one and see list of builders on page 2)

ENERGY STAR® Home
- High-efficiency heating and cooling system
- Advanced air sealing, high-quality insulation, and high-performance windows (which reduce leaks/drafts, provide more consistent temperatures, keep dust, pollen, and other allergens out, and reduce outside noise)
- Comprehensive water management techniques protect against moisture damage
- 10% - 20% reduction in energy user over code-built home

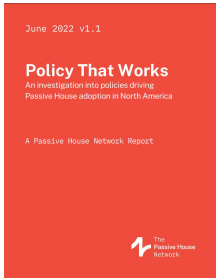
DOE "Zero Energy Ready" Home
- Comprehensive package of measures to minimize dangerous pollutants, provide continuous fresh air, and filter the air in the home
- ENERGY STAR requirements + advanced technologies and practices
- This type of home is so energy efficient that a small solar electrical system can easily offset most, or all, of its annual-energy consumption

ENERGY STAR® New Certification
- ENERGY STAR Certified cold-climate heat pump for heating/cooling
- ENERGY STAR Certified heat pump water heater
- Induction cooktop/range and electric ovens
- Electric vehicle charging station

Passive House Qualified
- Reduces heating and cooling costs by 60%-80% over code-built home

Provides a tiered incentive for owners rebuilding their homes:

1. 10K for Energy Star v.3.2
2. $12.5K for ZERH v.2
3. $17.5K for new Energy Start
4. $37.5K for Passive House



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Source: https://www.xcelenergy.com/staticfiles/xe-responsive/Outages/MarshallFireRebuildRebatesIS_web%20approved.pdf

BC Window Manufacturer Incentive

The Passive House Network

BRITISH COLUMBIA

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Energy, Mines and Low Carbon Innovation

Province helping B.C. companies make better windows

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News Release

Victoria
Wednesday, April 5, 2017 2:45 PM

Media Contacts

Suntanu Dalal
Media Relations
Ministry of Energy and Mines
250 952-0628

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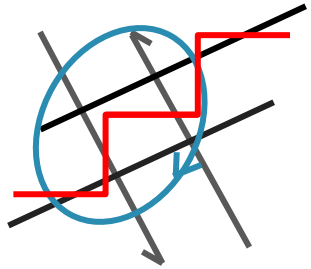
The Province is providing $500,000 to encourage the development and certification of high-performance windows that will help homeowners and businesses conserve energy and reduce heating costs, and stimulate the high-performance window manufacturing industry in British Columbia.

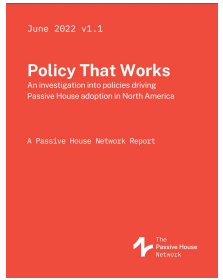
British Columbia window manufacturers will be eligible for total incentives of up to $80,000 to design, test, certify and build new window products that exceed the Province's current energy-efficiency requirements.

The windows supported by this program will move from double-pane to triple-pane glazing and greatly increased insulation in the window frames, dramatically improving the comfort inside a home or building during colder months.

The costs associated with creating new window products that exceed current B.C. energy-efficiency requirements, including research and development, lab testing and certification, can be prohibitive for a window manufacturer and are a barrier to the introduction of new high-performance windows into the market. By providing financial incentives this program aims to address this market barrier and stimulate the development of high-performance windows by B.C. manufacturers.

- 2016 **COMPETITIVE** Economic Stimulus award for BC window manufacturers
- **Stepped** incentive given for new window systems that met; Energy Star Most Efficient, or Passive House (PHI.)
- Resulted in 7 BC manufacturers developing **6 Passive House and 6 Energy Star Most Efficient new window systems.**





www.passivehousenetwork.org

SOURCE: https://news.gov.bc.ca/releases/2017MEM0015-001090

Local subsidies to drive local economies

The Passive House Network

Green Buildings Market Research

Demand for Building Products, Metro Vancouver 2019–2032

A $3.3 Billion Market Opportunity

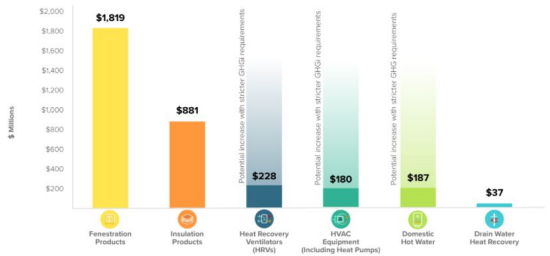
Rooted in Vancouver's pioneering approaches to planning and built forms, Vancouver's strong green building sector underpins its entire green economy — an innovative sector that employs one in 15 Vancouverites and contributes to Vancouver's $32 billion global brand. With the release of the VEC's **Green Building Market Forecast (2019–2032)**, a clearer, more robust picture emerges of just how powerful — and valuable — the green building sector really is.

Addressing the global climate crisis has the potential to create huge new market opportunities, and Metro Vancouver is well-positioned to capitalize on them. With Vancouver's suite of innovative green building policies, particularly the **Zero Emissions Building Plan**, and regional implementation of the **BC Energy Step Code** (ESC), local manufacturers, installers, and suppliers could benefit from the $3.3 billion market for green building materials.

The Opportunity by the Numbers

Demand for Building Products

Metro Vancouver, New Construction, 2019–2032 Forecast (cumulative)

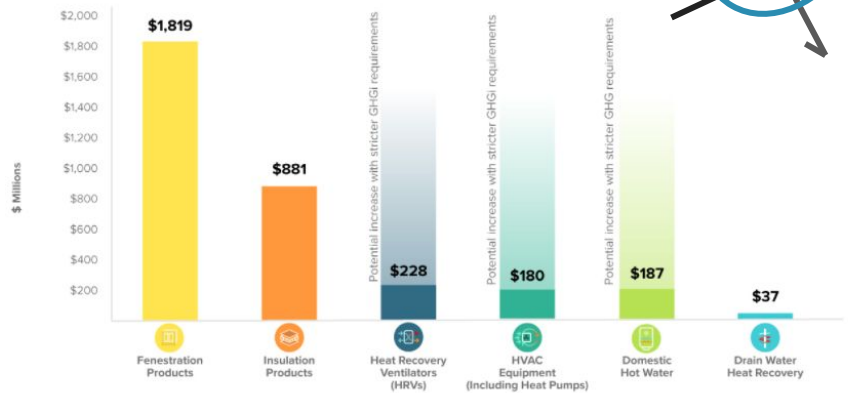


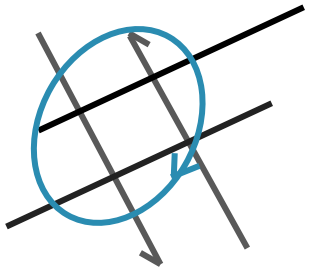
In addition to quantifying the BC Energy Step Code market demand, the **Green Building Market Forecast** is a must-read for anyone in the construction, development or manufacturing industries looking to understand and take advantage of upcoming trends in B.C.'s building sector.

The Opportunity by the Numbers

Demand for Building Products

Metro Vancouver, New Construction, 2019–2032 Forecast (cumulative)





Shouldn't we use State Incentives to drive our economic engine?

SOURCE: https://www.vancouvereconomic.com/research/green-buildings-market-research/

www.passivehousenetwork.org

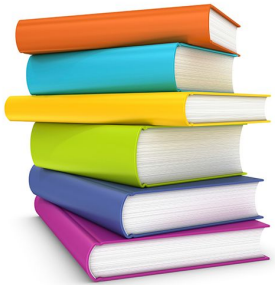
Where to begin?

Start with a PLAN… & then IMPLEMENT IT!

The Passive House Network

DEFINE AN END GOAL

- ❏ ENGAGE INDUSTRY (design, manufacturing and local communities)
- ❏ Establish clear targets and set SPECIFIC METRICS
- ❏ Set DATES for compliance
- ❏ Use structures/ mechanisms that support adoption



REPEAT & REFINE Incentives

- ❏ Use the REPORTING feedback from first projects to inform awards and choices in 2nd & 3rd round of subsidy programs
- ❏ CONTINUE TRAINING

1 2 3 4

PROMOTE, TRAIN & INCENTIVIZE

- ❏ Roll out TRAININGS across complete industry spectrum (design, build, code enforcement, engineering, etc.)
- ❏ Provide INCENTIVES from city, state and utilities
- ❏ Create PRODUCT incentive programs to manufacturers
- ❏ Create DEVELOPER subsidy programs
- ❏ Remove BARRIERS in code compliance process to

CODE UPDATES

- ❏ Use data collected in $ programs to feed into code
- ❏

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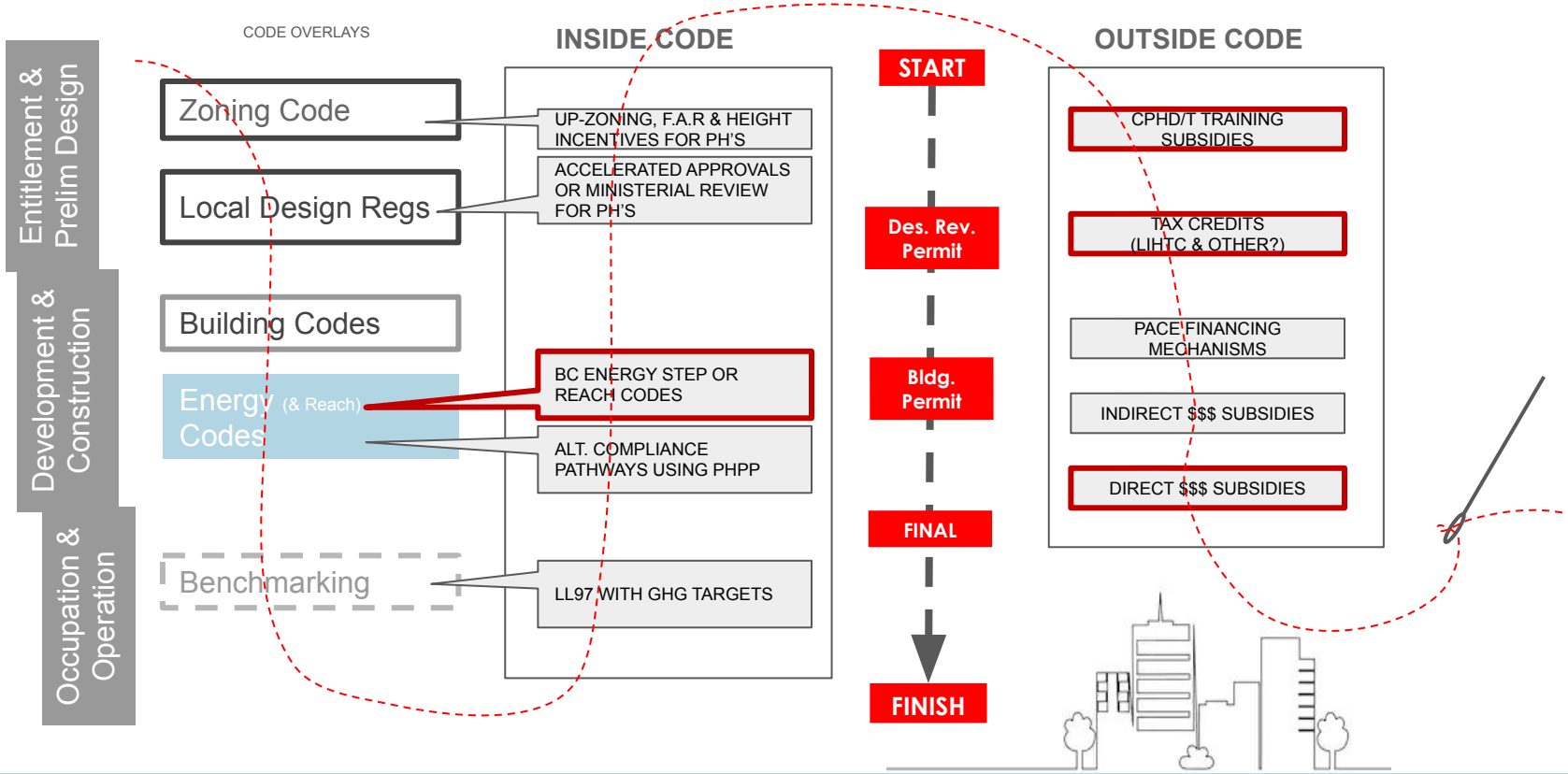
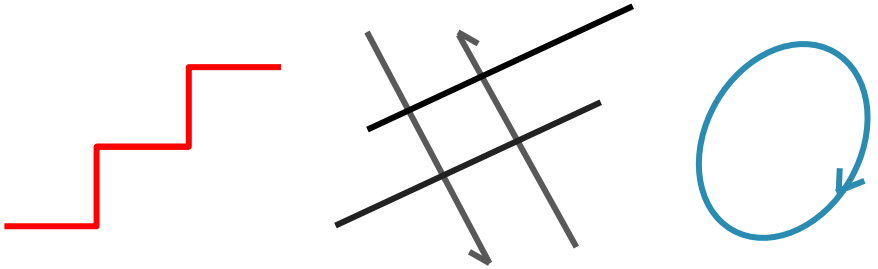
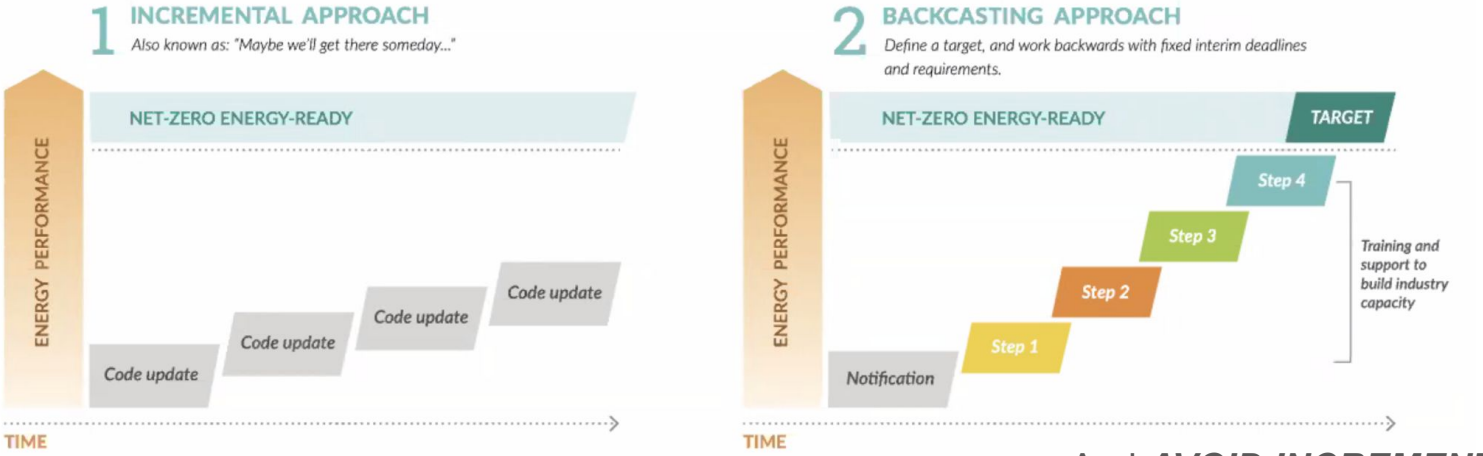
FIND YOUR BEST PLACE TO CONNECT!



Reviewing our KEY PATTERNS



1. **STEPS:** Tiered programs with weighted incentives directly *TIED TO THE TARGET*
2. **CROSS HATCHES:** that <u>*connect*</u> different regulatory frameworks.
3. **CIRCULAR FEEDBACK LOOPS:** for reporting costs & outcomes



And ***AVOID INCREMENTALISM!***

SOURCE: https://energystepcode.ca/

Closing thoughts...

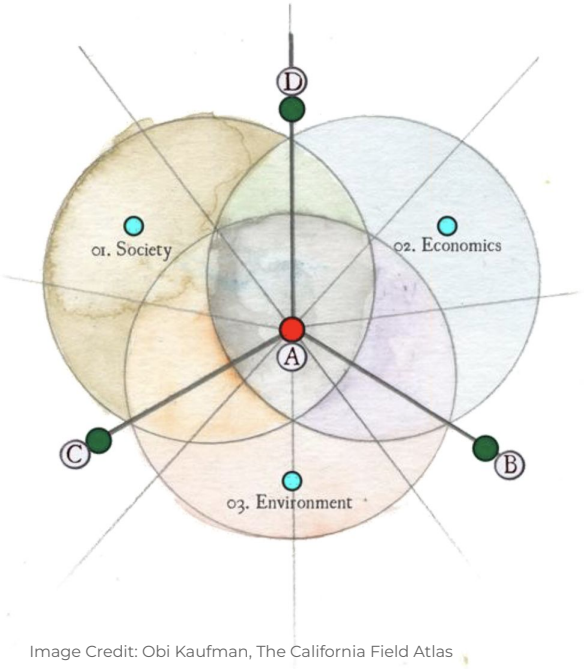


Image Credit: Obi Kaufman, The California Field Atlas

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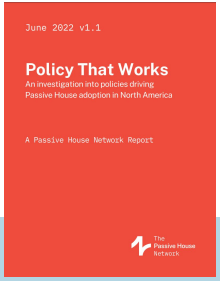

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Thank You