#UKPHC20

PASSIVE HOUSE IN NORTH AMERICA THROUGH THE NAPHN LENS

Bronwyn Barry

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Passive House Progress in North America

Through the NAPHN Lens

Projects
Policies
& Products

Bronwyn Barry, RA, CPHD

Nov, 2020

IN NEW YORK PASSIVE IS MASSIVE!

SOURCE: Images and info courtesy of Steven Winters Associates.

SUPER-SIZED PH! (UNDER CONSTRUCTION)

SOURCE: Images courtesy of NYPH and Steven Winters Associates.

WINTHROP CENTER - BOSTON RISING

Project Info:
Architects: Handel Architects
Clients: MP Boston
Renderings: Steep Blue
Certifier: Steven Winters Associates

SOURCE: Images courtesy of Brad Mahoney, MP Boston

PITTSBURGH RISING

SOURCE: Images courtesy of Auros Group, Pittsburgh.

OH CANADA! (THE QUIET CHAMPION of PH)

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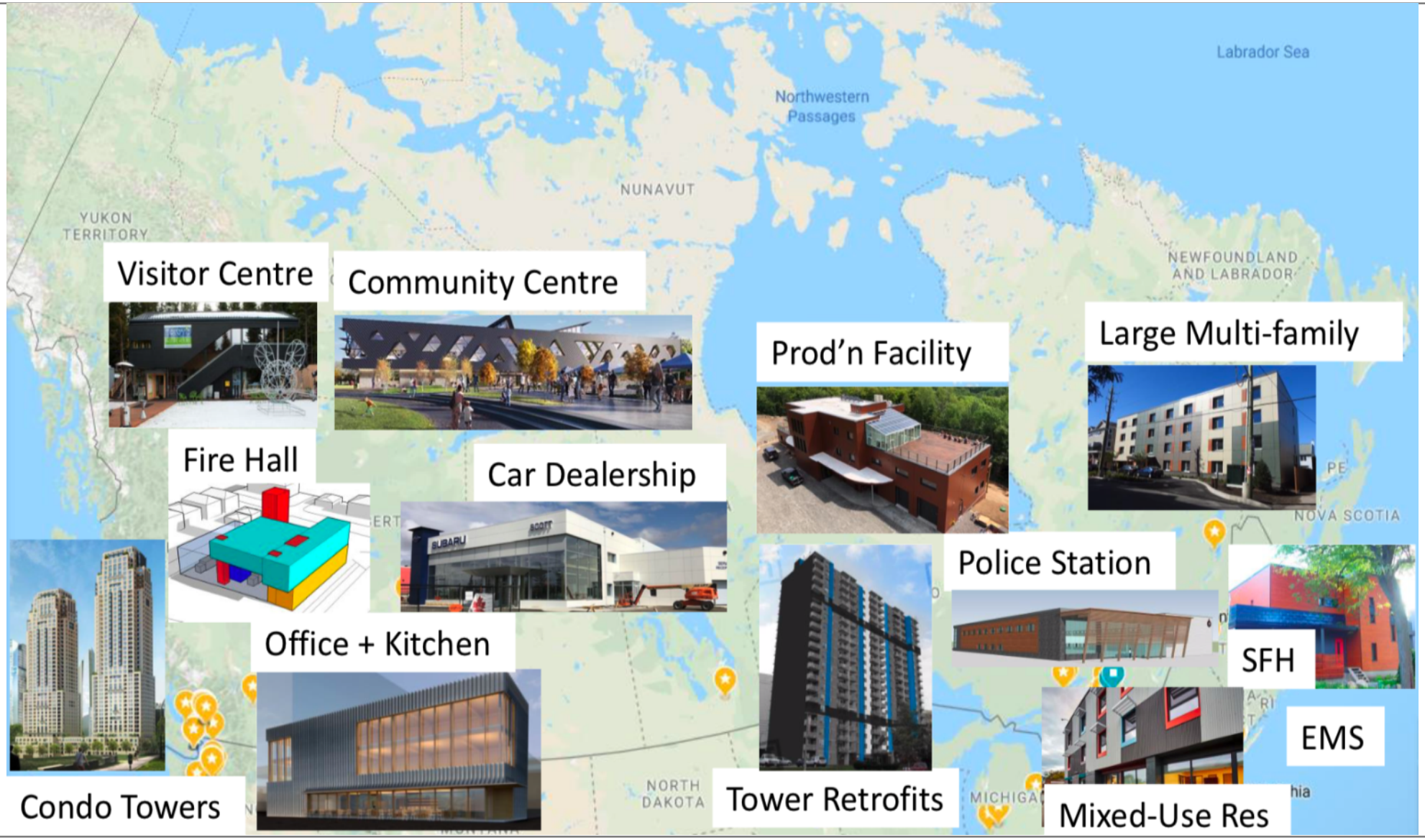
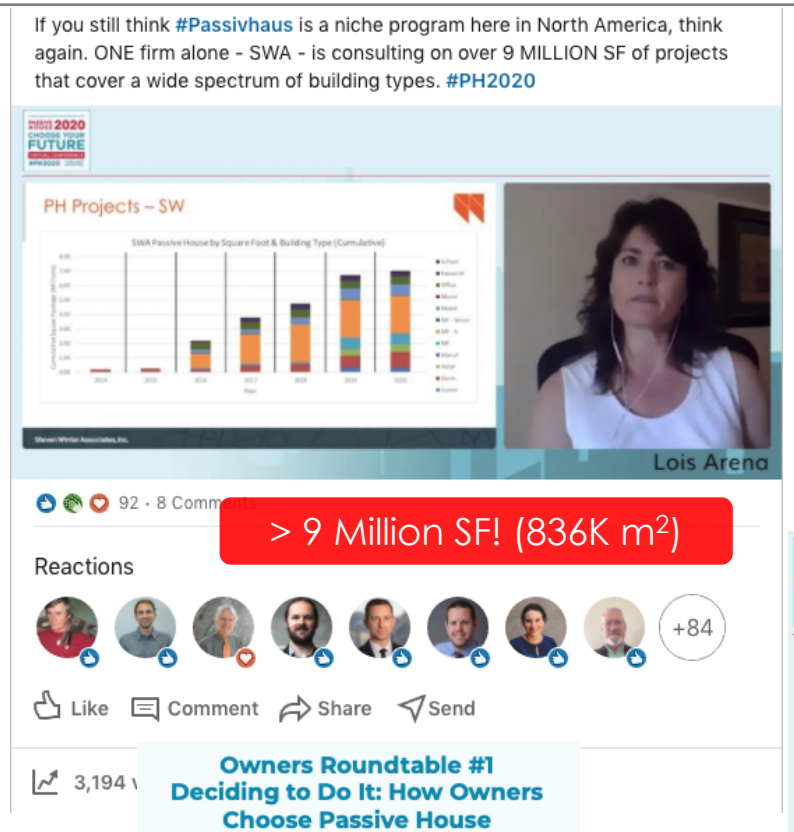


SOURCE: Peel Passive House Consulting, Ontario, Canada.

NAPHN CONFERENCE HIGHLIGHTS



> 9 Million SF! (836K m²)

Owners Roundtable #1
Deciding to Do It: How Owners Choose Passive House
Beth Eckenrode, Nikole Sheaffer, Derrick Tillman, Fran Coen, Kathleen MacNeil, Ben Ohebshalom

Owners Roundtable #3
Owners' Feedback Loop: Occupancy, Measurement, and Management
Beth Eckenrode, Emma Osmundsen, Alex Kaplan, Ryan Cassidy, Tom Shircliff , Tim McDonald

Owners Roundtable #2
How Owners Do it: Making Passive House Good Business
Beth Eckenrode, Alex Bernstein, Ed Kolic, Grant Ervin, Garret Scott , Emma Osmundsen

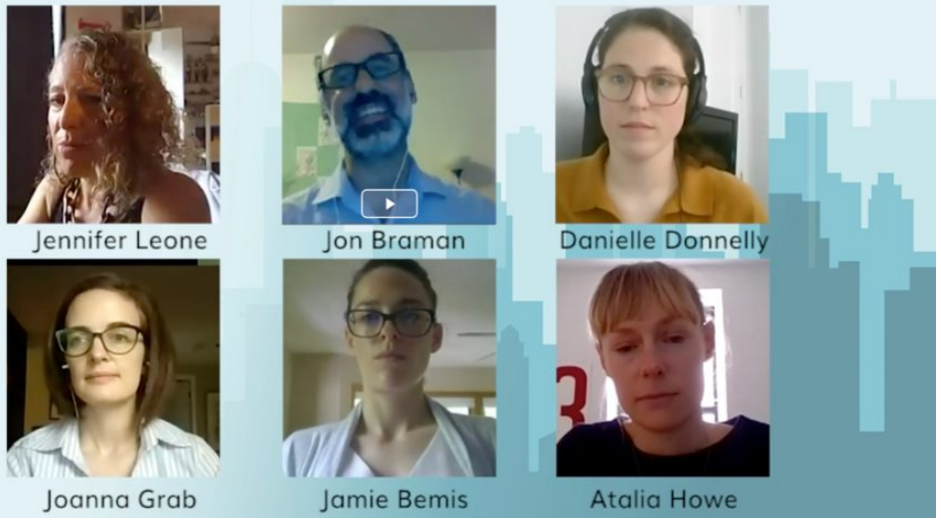
Stats – Project Characteristics & Costs

+ Costs: 1-8%

Sample Set – 16 Projects

Project	Size [# of units]	Floors	Ave Increase	Notes
Bld 6	Large	25	1%	Two or more team members experienced w/PH
Bld 1	Medium	6	2%	Two or more team members experienced w/PH
Bld 2	Large	9	2%	Two or more team members experienced w/PH
Bld 8	Large	11	2%	Two or more team members experienced w/PH
Bld 13	xt Large	9	3%	High base cost/ft2 already
Bld 4	Large	20	3%	Two or more team members experienced w/PH
Bld 11	xt Large	26	3%	Two or more team members experienced w/PH
Bld 10	Large	12	4%	Two or more team members experienced w/PH
Bld 9	xt Large	13	4%	Two or more team members experienced w/PH
Bld 12	xt Large	18	4%	Two or more team members experienced w/PH
Bld 15	xt Large	8	5%	High base cost/ft2 already
Bld 16	Large	21	5%	Two or more team members experienced w/PH
Bld 7	Large	8	5%	Two or more team members experienced w/PH
Bld 14	xt Large	37	7%	Inexp Builder wrt PH
Bld 5	xt Large	13	8%	Complex façade & volume to surface
Bld 3	Large	7	8%	Inexp team wrt PH

Passive Assets: Certified perform Better!



KEEN FOCUS ON:

- Embodied Carbon
- Ventilation (COVID Context)
- 750 attendees!

VERIFYING AFFORDABLE MULTIFAMILY PERFORMANCE

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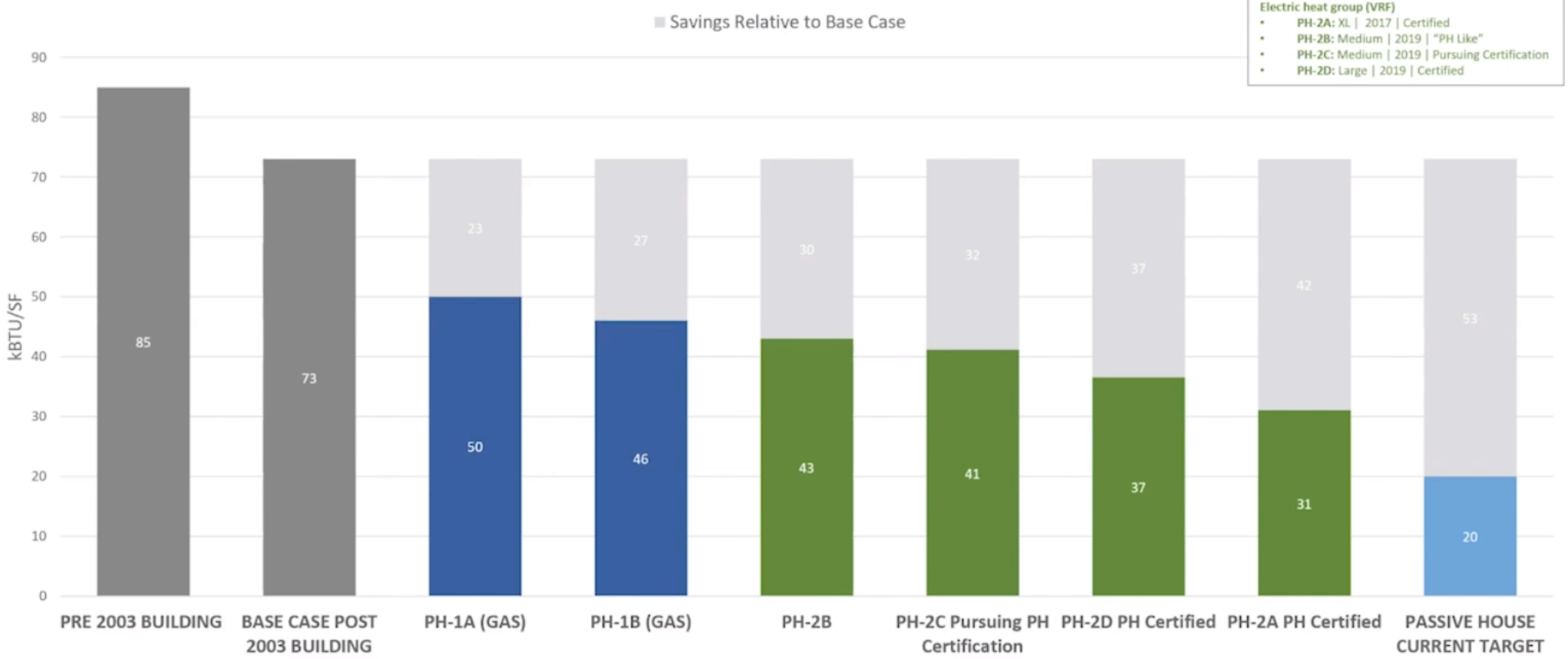
WHOLE BUILDING SITE EUI



1. Post 2003 Building sample is made up of NYC buildings with at least one full year of consumption data and includes approximately 94% buildings with gas heating, 6% with electric heating.
2. PH-1A & PH-1B have gas heating and hot water. The remaining projects have electric heating (VRF)
3. PH current target based on PHI standard 38 kBtu/sf/yr. Ranges from 20 (model) upper 20's-low 30s (25% gas + 75% electric fuel mix – typ. of gas DHW + elec heat) when building commissioned.

SOURCE: PH2020 - NAPHN conference Affordable Housing Financing presentation, Jamie Bemis, Bright Power, Inc.

PASSIVE HOUSE MULTIFAMILY INSIGHTS

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THE RISE OF THE AFFORDABLE PASSIVE HOUSE

SOURCE: Magnusson Architecture & Planning Presentation to NYPH – June 18, 2020.

POLICY & THE SHIFTING OF U.S. CODE TARGETS

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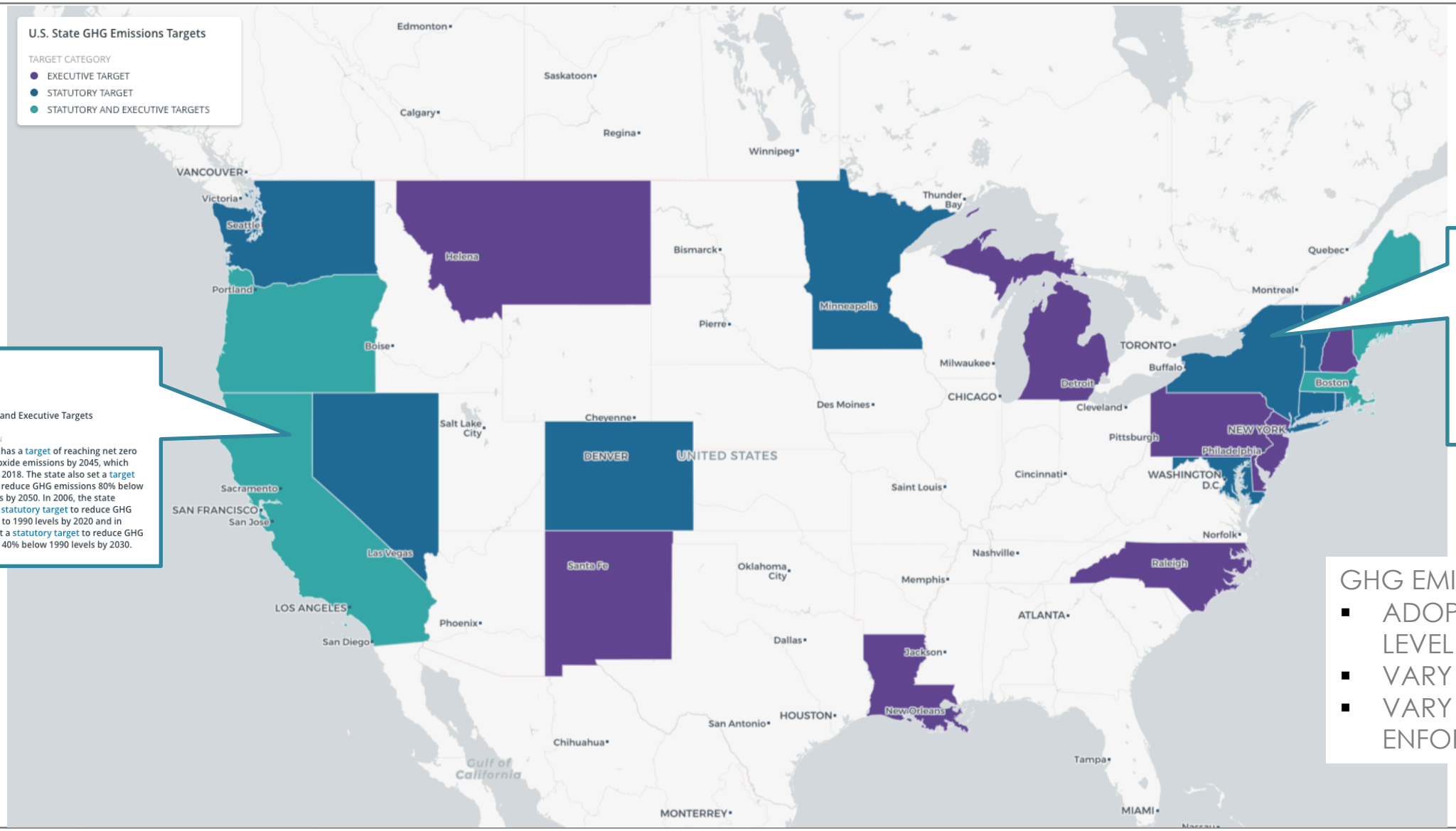

GHG EMISSIONS TARGETS:

- ADOPTED AT THE STATE LEVEL
- VARY BY DATE
- VARY BY LEVEL OF ENFORCEMENT

SOURCE: https://www.c2es.org/document/greenhouse-gas-emissions-targets/

DOING THE 'DANNY ZUCO!'

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U.S. STATES CLEAN ELECTRICITY COMMITMENTS

- Enacted Legislation
- Executive Order

2009

The IECC 2009 removes several loopholes, raising energy efficiency standards by more than 15% compared to the 2006 edition of the code

2012

The 2012 IECC raises energy efficiency standards by approximately 15% over the 2009 edition of the code

2015

IECC approves gains in energy efficiency of only 1% from the 2012 edition; however, it established a new Energy Rating Index (ERI) compliance pathway giving building professionals more flexibility to achieve energy efficiency

- **California** (50% by 2030)
- **Vermont** (75% by 2032)
- **Hawaii** (100% by 2045)

2016

- **District of Columbia** (50% by 2032)
- **New York** (50% by 2030)
- **Oregon** (50% by 2040)

2018

IECC approves gains in energy efficiency of ~2% from the 2015 edition

- **California** (100% by 2045)
- **New Jersey** (50% by 2030)

2019

California Title 24-2019 becomes the first state code in the country to require solar panels and nearly net zero levels of energy consumption in all new homes and multifamily buildings

- **Colorado** (100% by 2050*)
- **New York** (100% by 2040)
- **Maine** (100% by 2050)
- **Nevada** (100% by 2050)
- **Puerto Rico** (100% by 2050)
- **Maryland** (50% by 2030)
- **Washington** (100% by 2045)
- **New Mexico** (100% by 2045)
- **District of Columbia** (100% by 2032)
- **New Jersey** (100% by 2050)
- **Connecticut** (100% by 2040)
- **Virginia** (100% by 2050)
- **Wisconsin** (100% by 2050)

2020

NYSERDA develops NYStretch, an above-code standard providing savings of ~12% over the 2020 New York State Energy Conservation Construction Code (NYSECC)

New York City Energy Conservation Code brought up to date with the NYSECC and also aligns with NYSERDA's NYStretch

2021

IECC approves gains in energy efficiency of 10% from the 2018 edition – the second greatest improvement in a decade

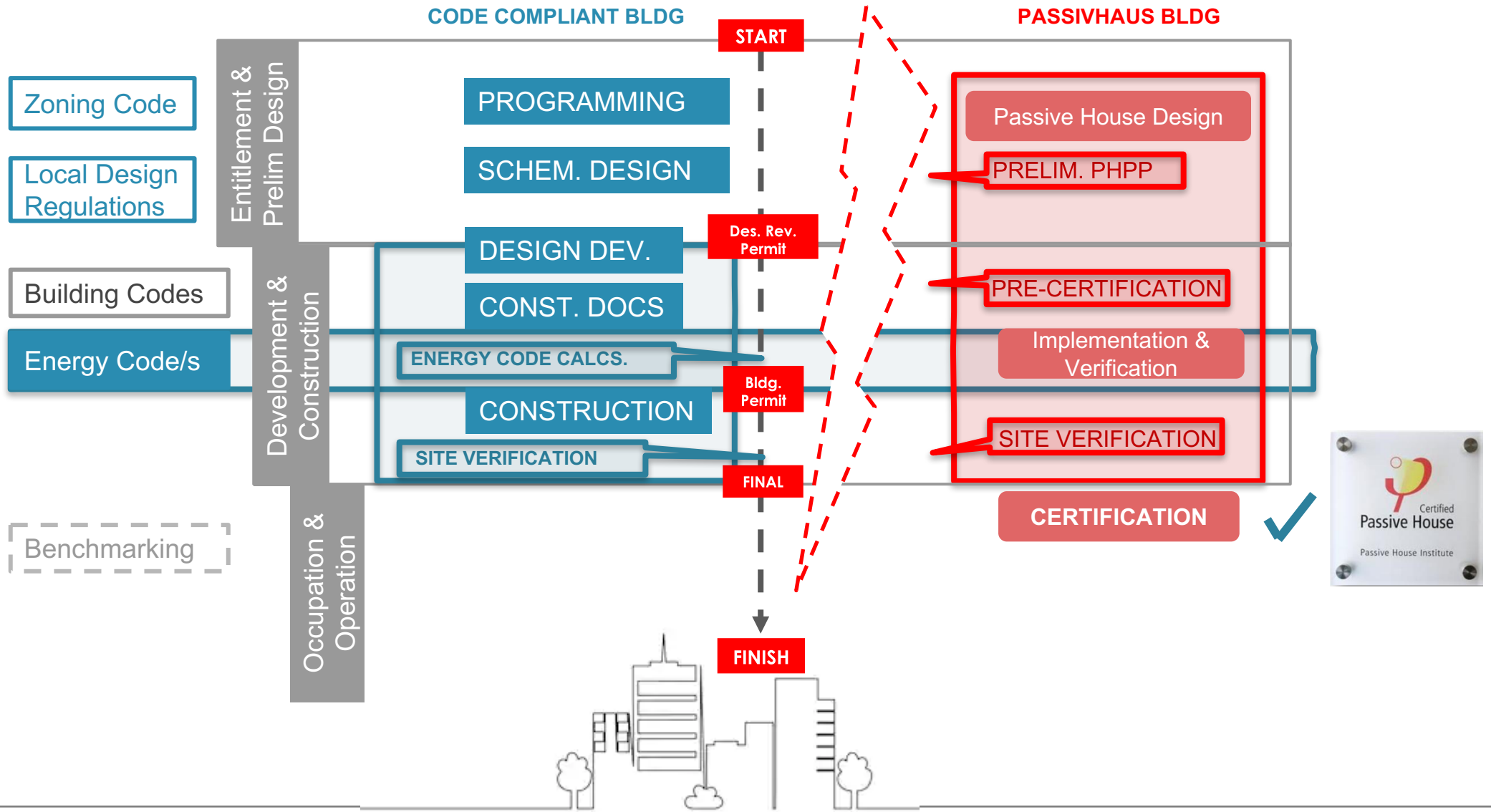
Carbon Neutral Buildings Roadmap

The New York State Energy Research and Development Authority (NYSERDA) is playing a key role in the transition to economy-wide carbon neutrality with the development of a Carbon Neutral Buildings Roadmap (Roadmap) that will be released in 2021. The Roadmap will assist the State in achieving its goal of a carbon neutral economy by mid-century. The Roadmap will provide direction to advance low-carbon buildings that are highly replicable, achieve superior energy performance, and are cost effective. One of the critical steps to a carbon neutral future is to achieve deep energy efficiency in buildings, with flexible and grid-responsive loads supplied by renewable electricity. The clearest path today is built on full electrification of building systems, though renewable fuels may also play a role.

The first iteration of the Roadmap will include a high-level review of the State's entire building stock, while focusing a deeper analysis on four building sectors: single-family homes, low- and mid-rise multifamily residential, low- and mid-rise commercial office, and higher education.

SOURCE: https://communityp.com/wp-content/uploads/2020/10/CPC_Financing_High-Performance_Guide_WEB_10_15_2020.pdf

POLICY & THE SHIFTING SANDS OF CODE TARGETS



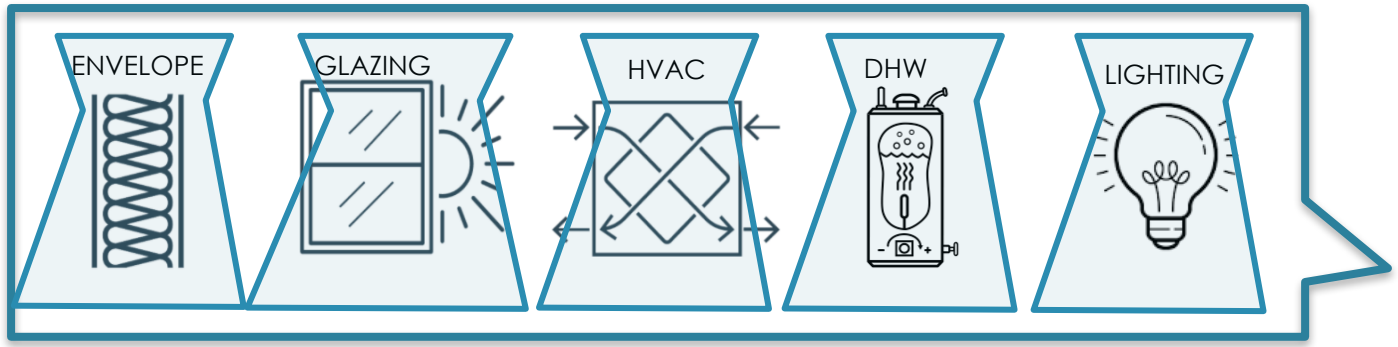
SOURCE: https://www.c2es.org/document/greenhouse-gas-emissions-targets/

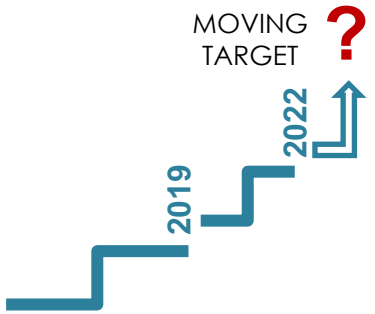
ENERGY CODE DEVELOPMENT STRUCTURE

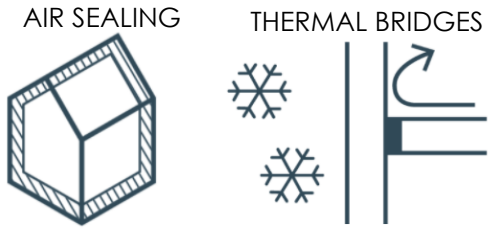
CALIFORNIA ENERGY COMMISSION

(ICC INTERNATIONAL CODE COUNCIL® ASHRAE®)

Goal : Cost Effective Energy Efficiency



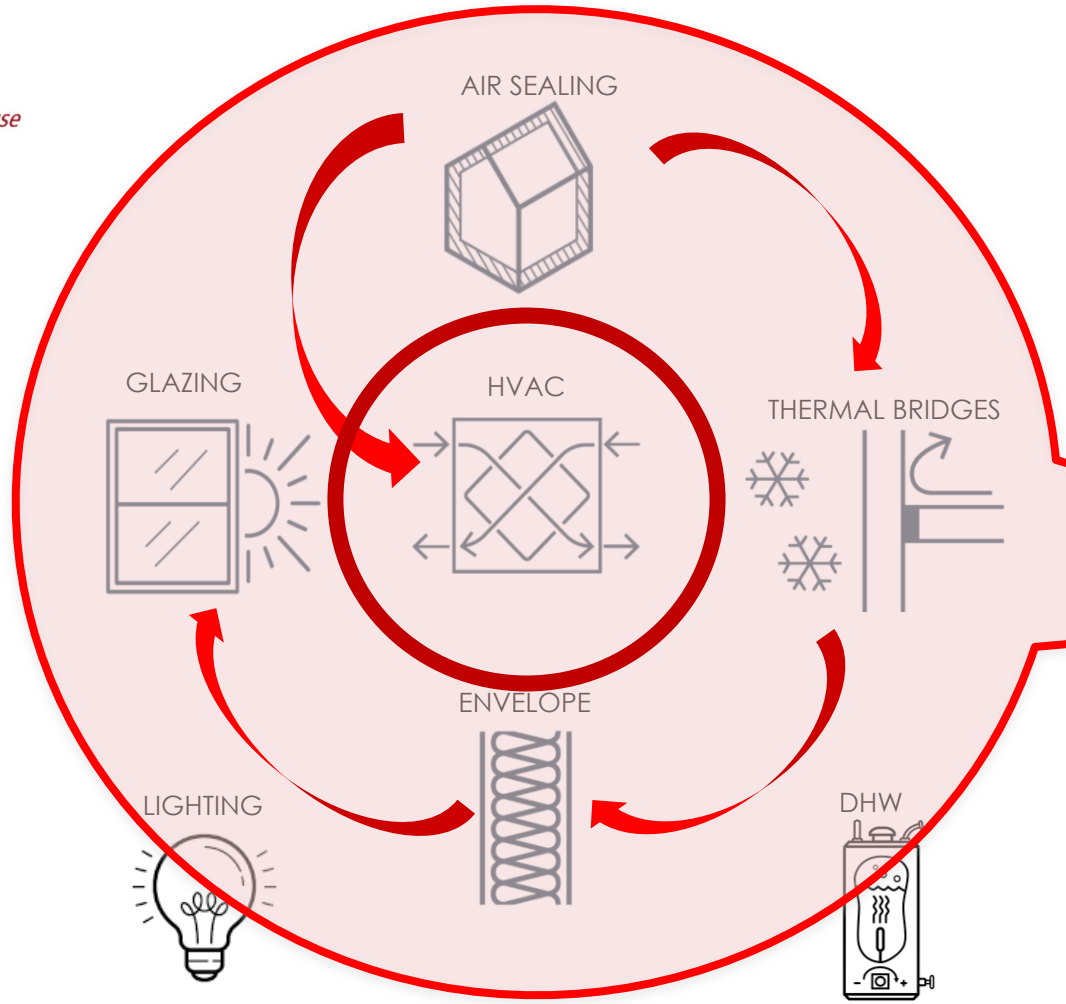




- ❑ % > Benchmark Building
- ❑ 3-year update cycle
- ❑ No finite end goal

PASSIVE HOUSE STANDARD STRUCTURE

Passive House Structure:



Goal : Hygiene Ventilation

"A Passive House is a building, for which thermal comfort (ISO 7730) can be achieved solely by post-heating or post-cooling of the fresh air mass, which is required to achieve sufficient indoor air quality conditions – without the need for additional recirculation of air."

- ❑ Specific to each Building
- ❑ Revised periodically
- ❑ Defined targets & goals

Source: https://passipedia.org/basics/the_passive_house_-_definition

CAN THESE FRAMEWORKS BE MERGED?

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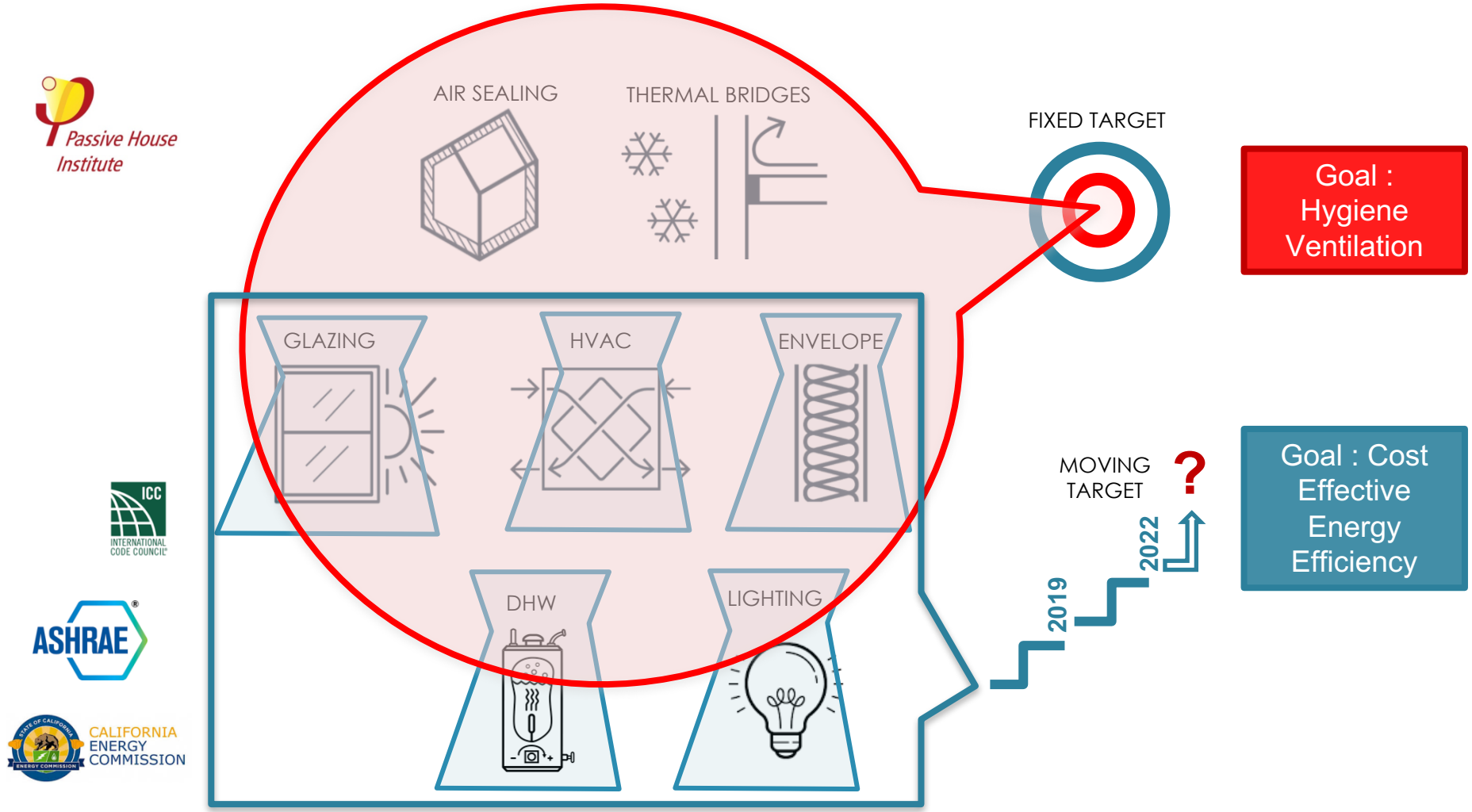
Passive House and Typical Benchmark Energy code overlay:



POLICY PATTERNS: FOLLOW THE LEADERS!

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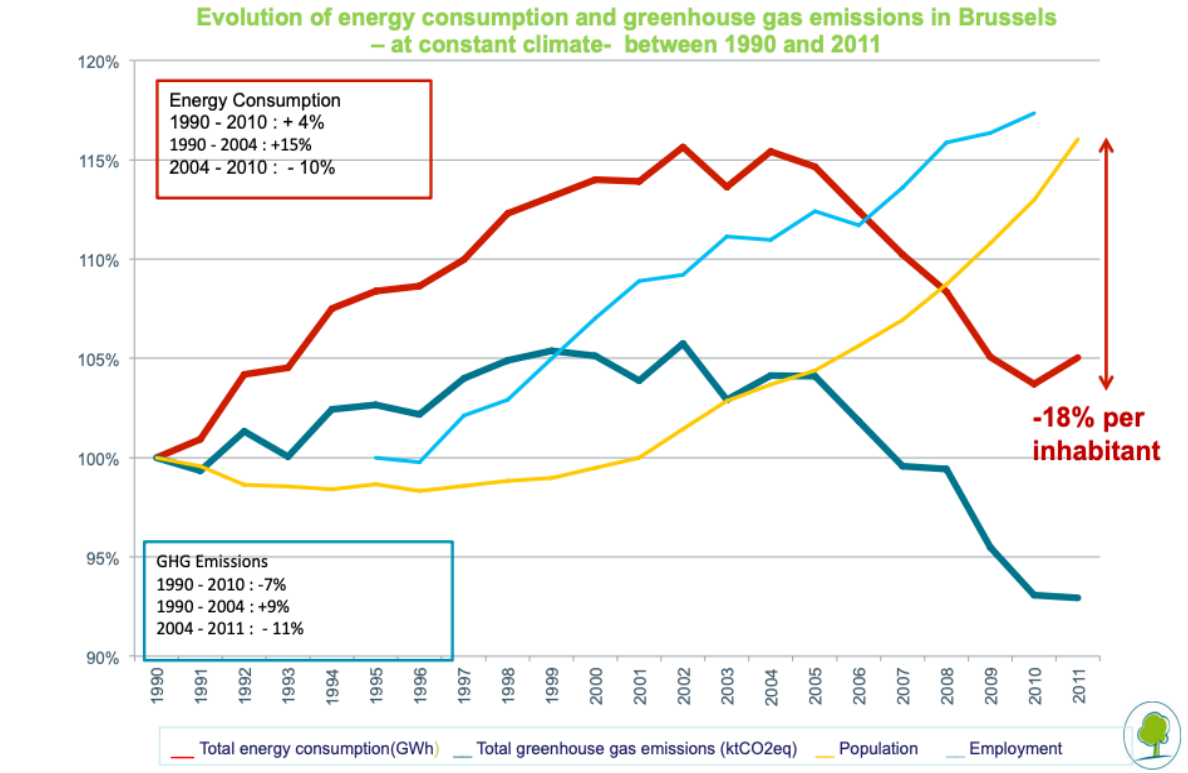
Near Zero Energy Building strategy:
a succes story started from scratch in 2004



1. Identified a clear end goal
2. Provided training & support to industry to aim for that goal
3. Promoted the front runners
4. Changed the code (once the market was ready.)

Source: Brussels Environment, Joke Dockx

IS THERE PASSIVE–CENTRIC POLICY IN NORTH AMERICA?

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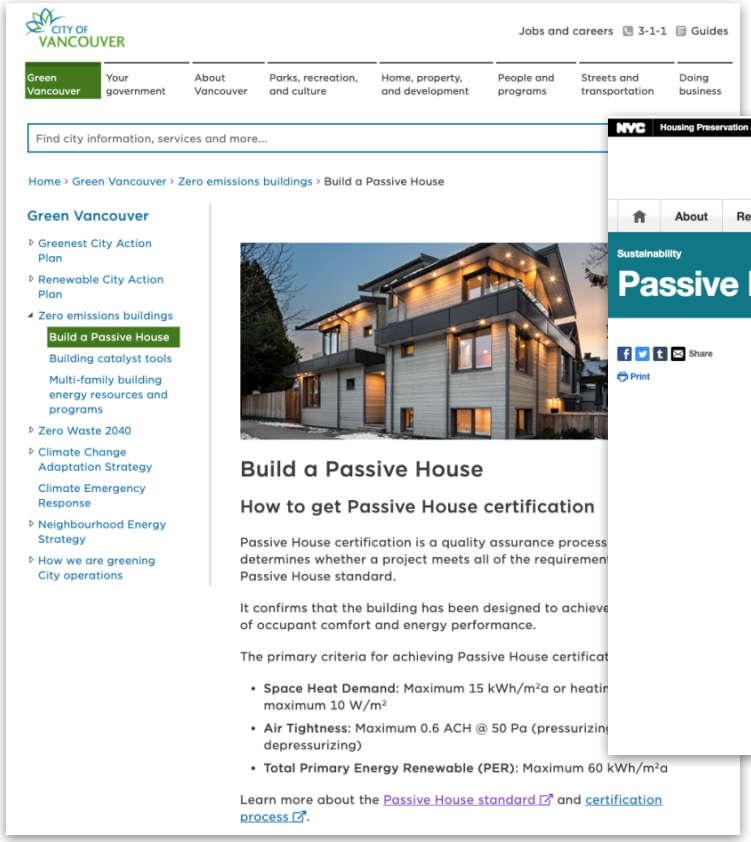
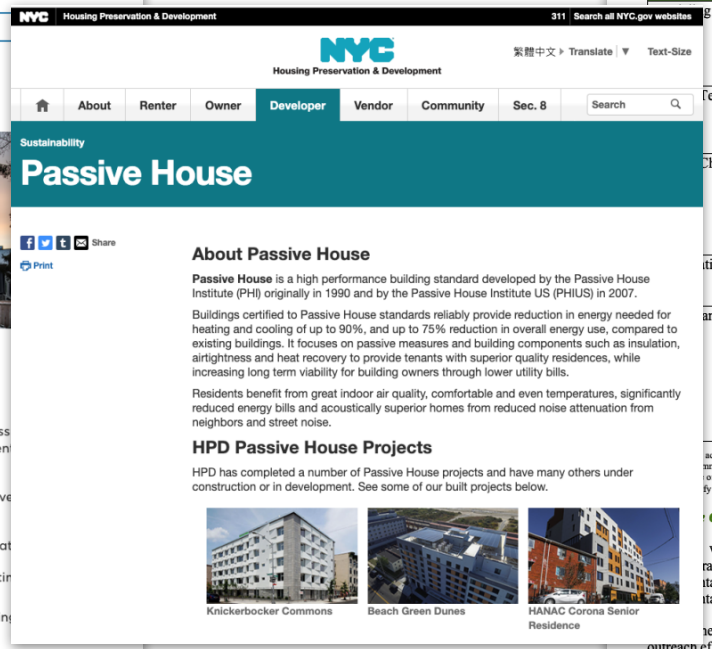


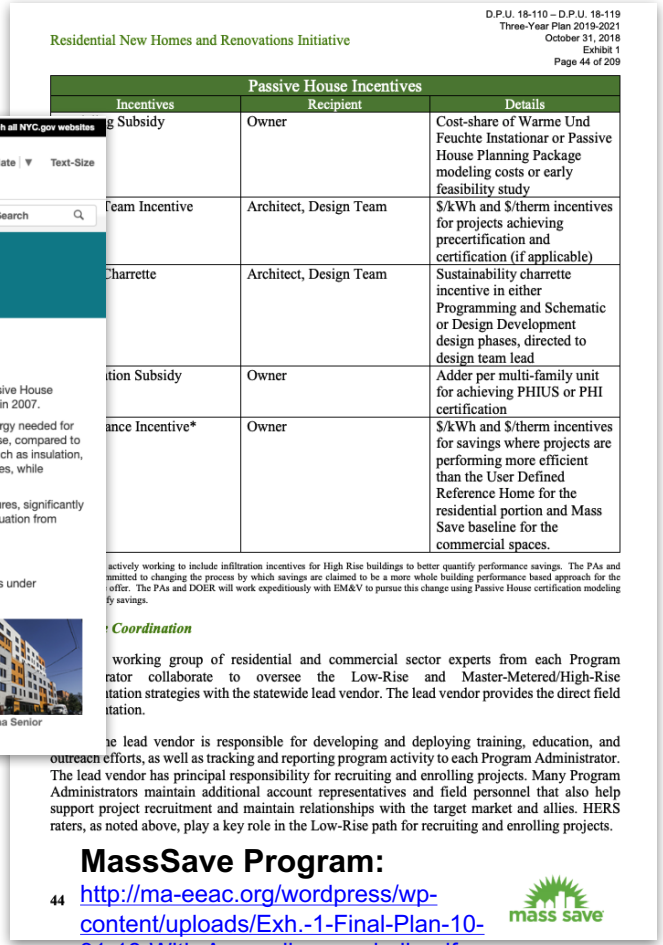
City of Vancouver General Info:
https://vancouver.ca/green-vancouver/build-a-passive-house.aspx

British Columbia, CANADA



NYC General Info:
https://www1.nyc.gov/site/hpd/developers/passive-house.page

NEW YORK STATE



MassSave Program:
http://ma-eeac.org/wordpress/wp-content/uploads/Exh.-1-Final-Plan-10-31-18-With-Appendices-no-bulk.pdf

MASSACHUSETTS

STATES:
- Washington State – accepts PHPP

CITIES:
- NYC includes Passive House city-owned affordable housing
- Minneapolis, MN dabbling…
- Monterey, CA dabbling…

HARNESS THE POWER OF PASSIVE HOUSE!

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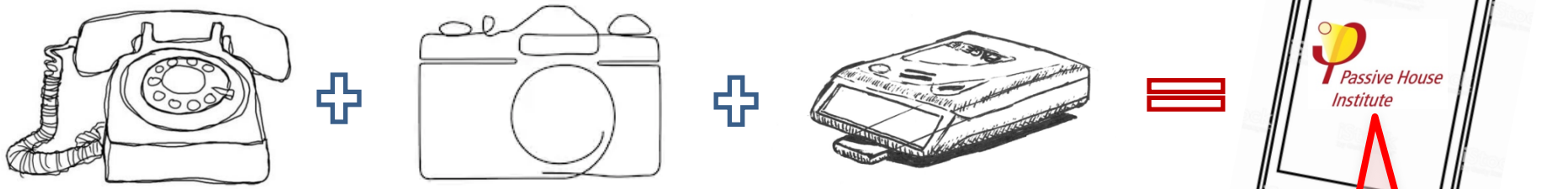
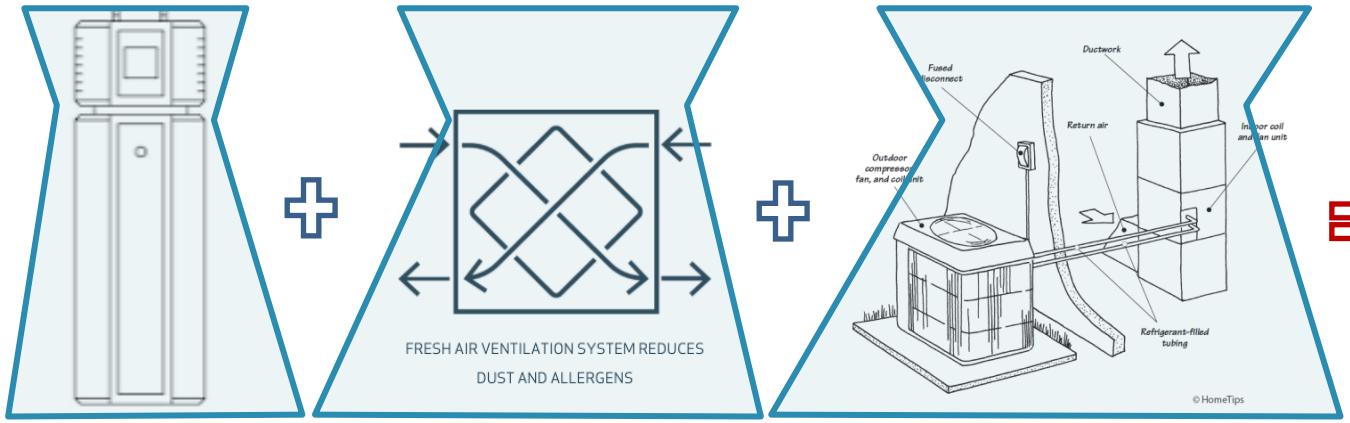
WHY NOT UTILIZE PH TO DRIVE HIGH PERFORMANCE BUILDING PRODUCTS…?
AND WHY NOT DO THE SAME FOR POLICY?!





hot climate phA CERTIFIED COMPONENT Passive House Institute

warm, temperate climate phA+ CERTIFIED COMPONENT Passive House Institute

cool, temperate climate phB CERTIFIED COMPONENT Passive House Institute

LEARN MORE: https://passivehouse.com/03_certification/01_certification_components/02_certification_criteria/02_certification_criteria.htm

NEW PASSIVHAUS PRODUCTS FROM NORTH AMERICA

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VENTACITYSYSTEMS
Making Buildings Healthy – Efficient – Smarter

Everything else we IMPORT!

NEW CONNECTOR SOFTWARE TOOLS

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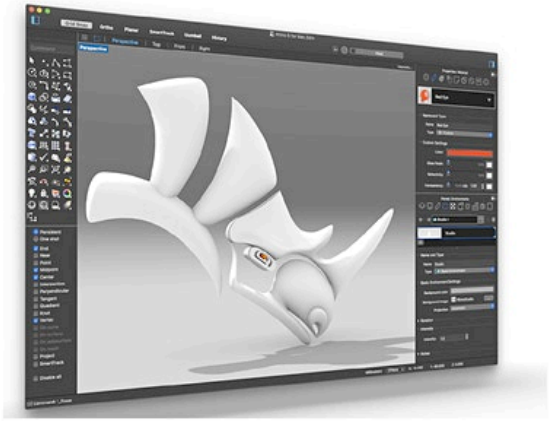
PHPP + RHINO
A Dynamic Energy Model
WEBINAR BY ED MAY

NEW SOFTWARE INTRODUCTION

NYPH
TRAINING



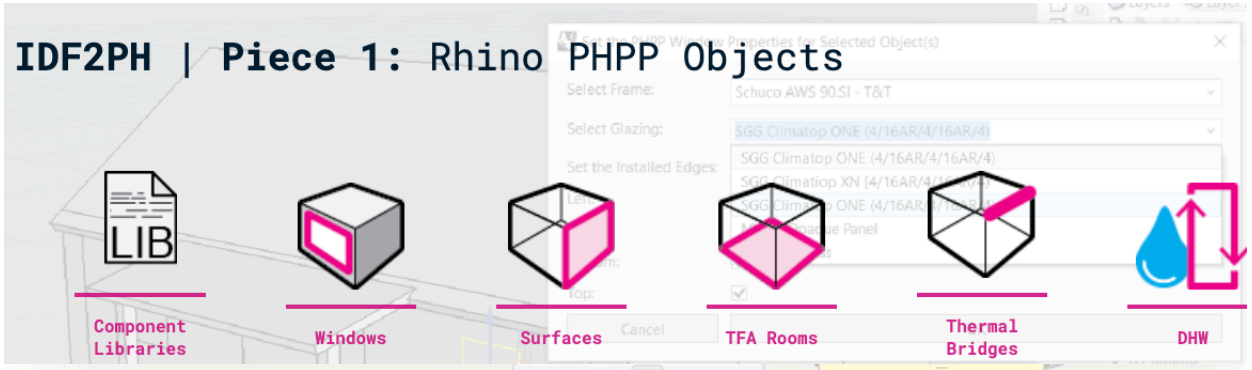
The IDF2PH toolkit is made of three main pieces:

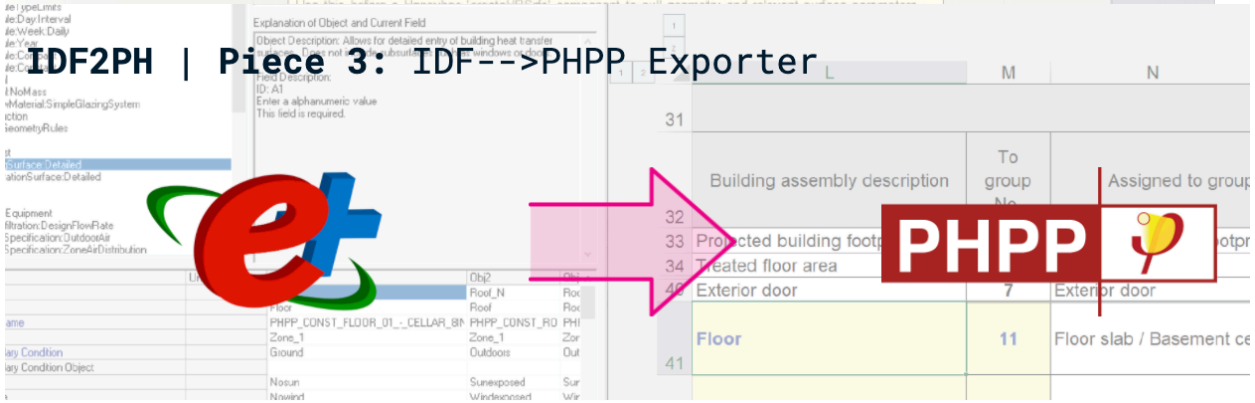
Rhinoceros
New PHPP Tools for Rhino

New PHPP Tools for Honeybee

PHPP
A New IDF->PHPP Exporter

Developer: Ed May, Bldgtyp, Inc.
Download at: http://www.idf2ph.com/





SUMMARY

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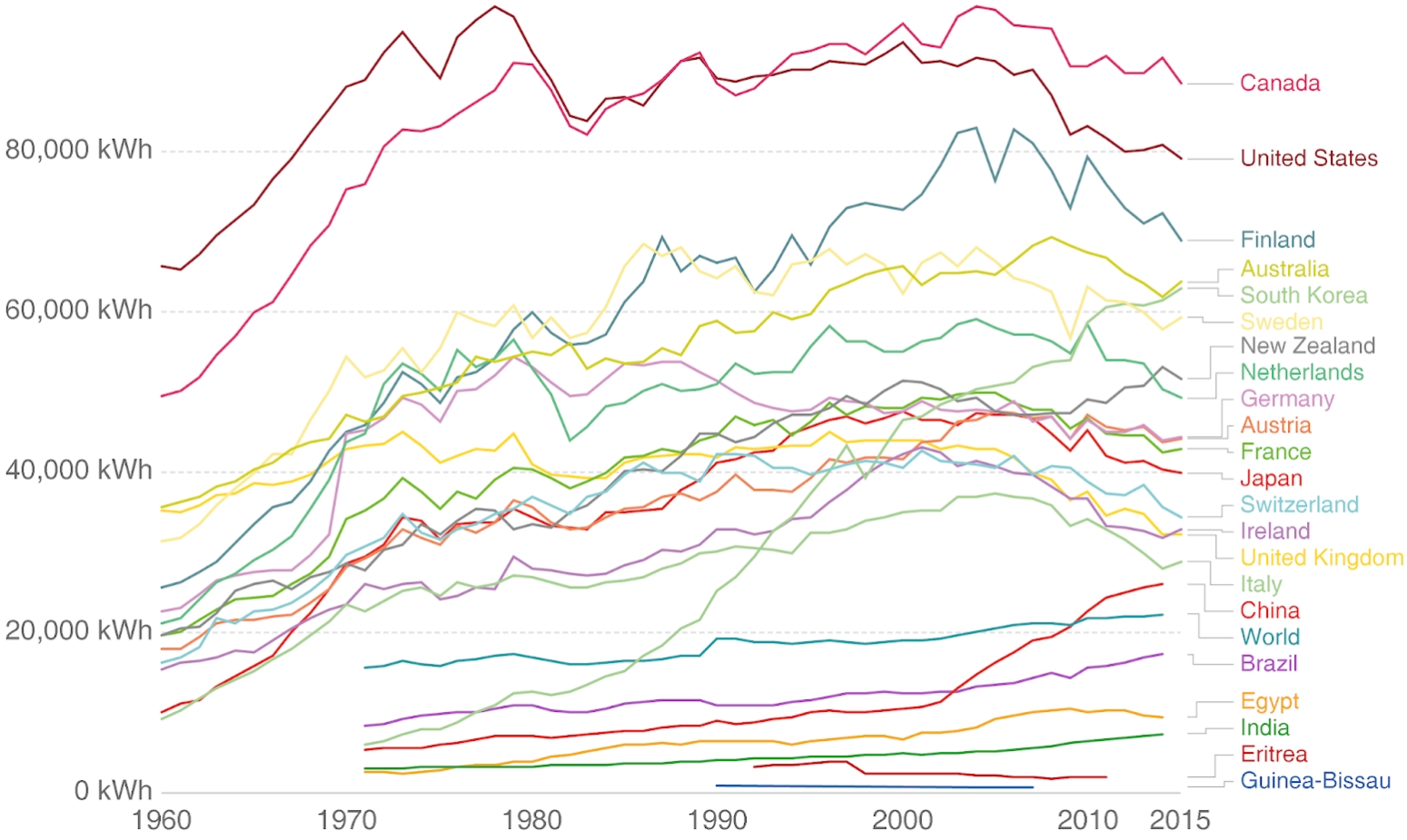
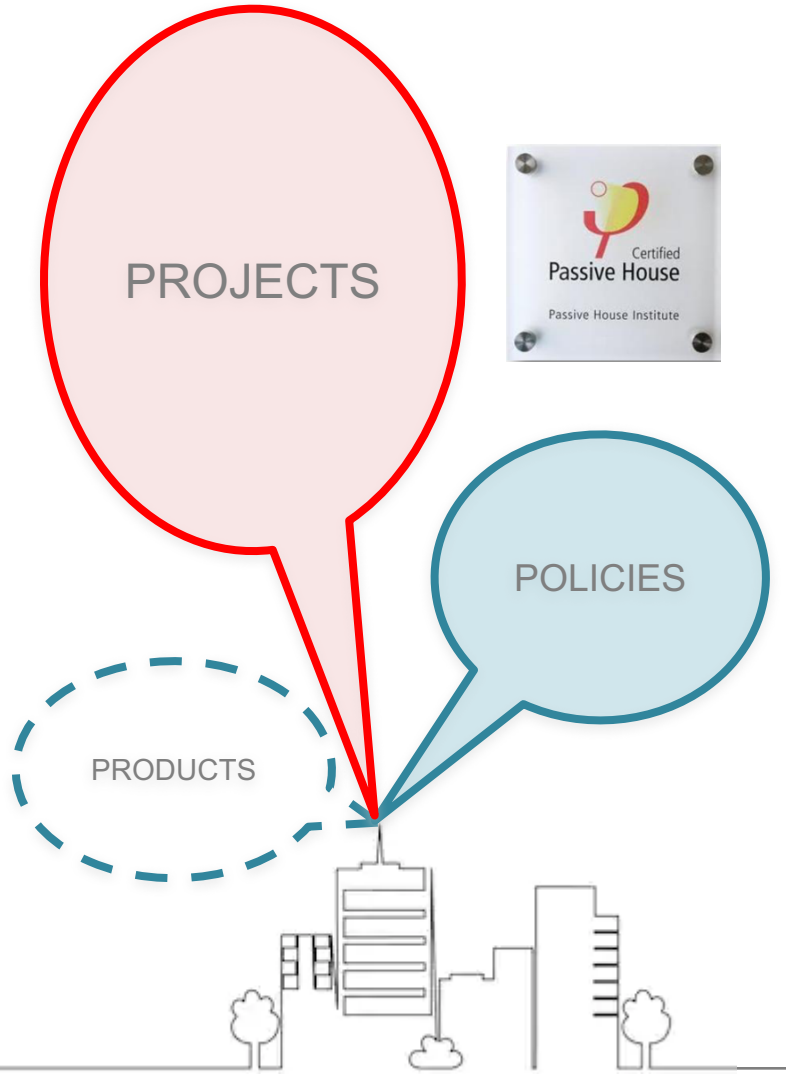
Energy use per capita

Annual average per capita energy consumption is measured in kilowatt-hours per person per year.

Our World in Data

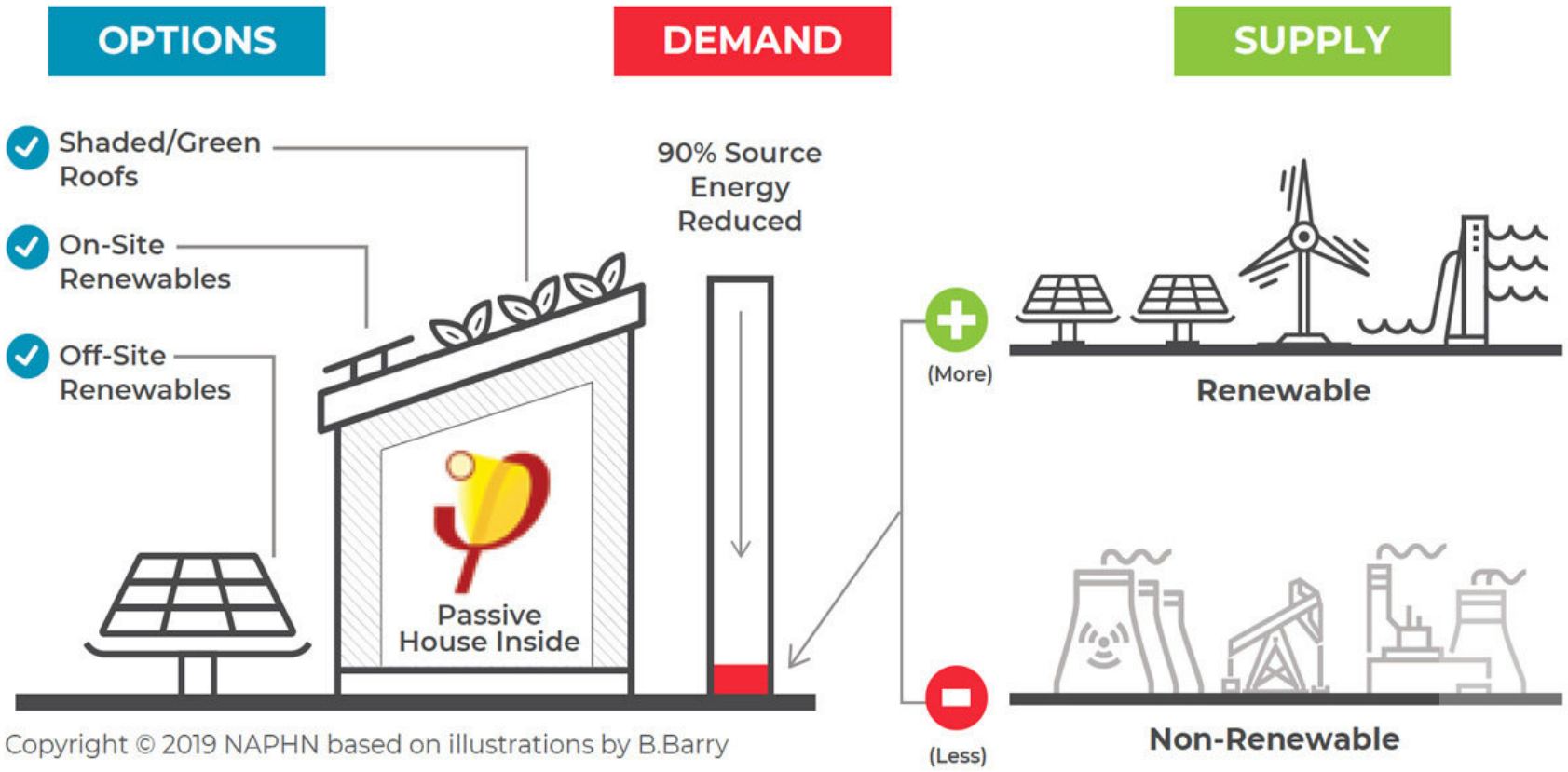


Source: International Energy Agency (IEA) via The World Bank OurWorldInData.org/energy-production-and-changing-energy-sources/ • CC BY



SOURCE: https://www.c2es.org/document/greenhouse-gas-emissions-targets/

CHOOSE YOUR FUTURE – WISELY!



Thank You

bronwyn@naphnetwork.org

UKpassivhaus conference 2020

A HEALTHY & GREEN FUTURE

THANK YOU

#UKPHC20

WWW.UKPHC.ORG.UK

ATTMA The Air Tightness Testing & Measurement Association

green building store

Kingspan.

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