

BUILDINGENERGY NYC

Resource Efficient Decarbonization: Lessons from the Empire Building Challenge

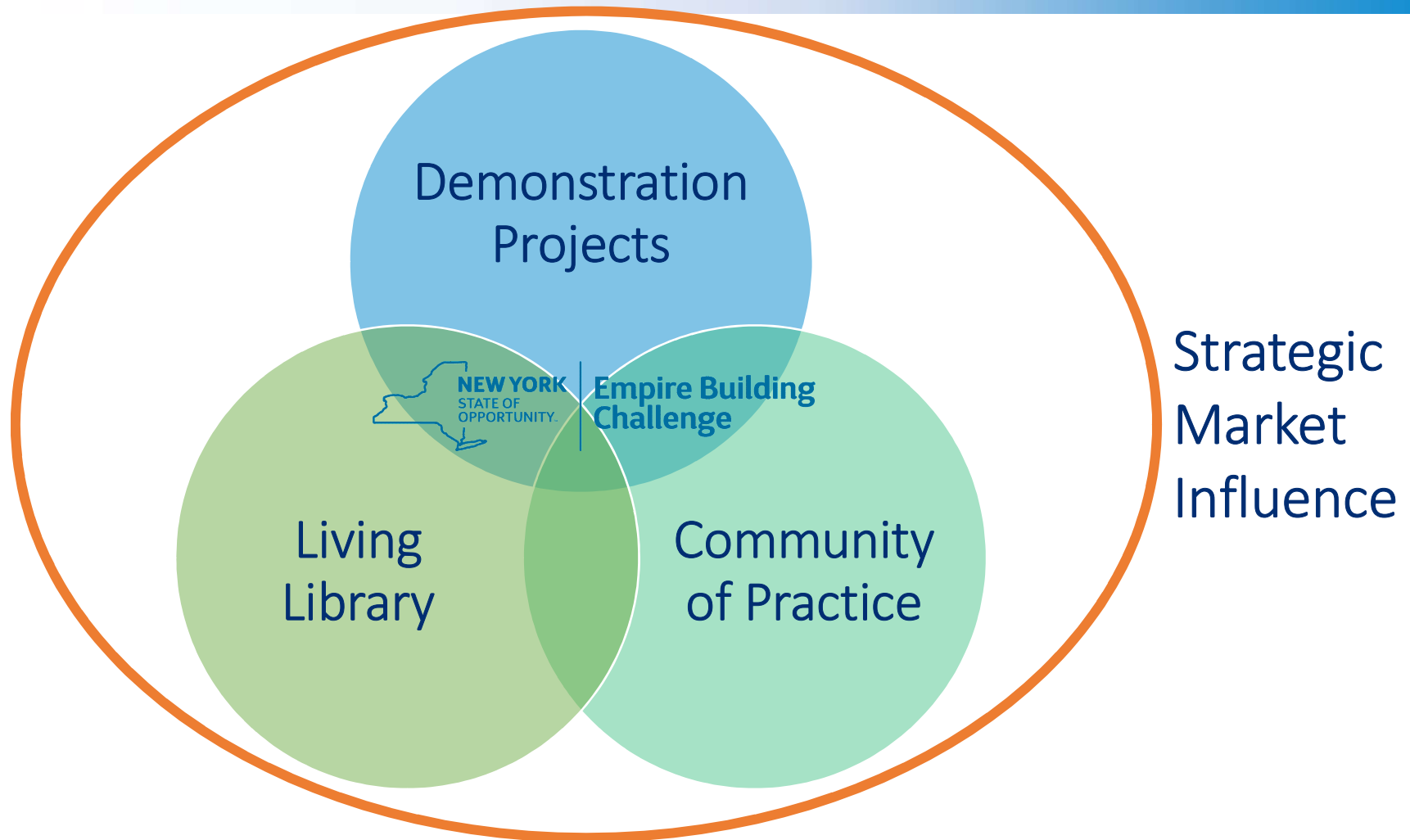
Michael Reed, NYSERDA

Jared Rodriguez, Emergent Urban Concepts

Curated by Lauren Hildebrand, Brightcore Energy

**Northeast Sustainable Energy Association (NESEA)
September 15, 2022**

What is the Empire Building Challenge (EBC)?



Resource Efficient Decarbonization (RED) is a heuristic emerging from Empire Building Challenge collaboration.

EBC Partners



Rudín

HUDSON SQUARE PROPERTIES



VORNADO REALTY TRUST



Jonathan Rose Companies

SILVERSTEIN PROPERTIES



Omni New York LLC

EMPIRE STATE REALTY TRUST

Consulting Engineers



BURO HAPPOLD



ecosystem



the GreyEdge group

VIDARIS



Steven Winter Associates, Inc.

EMBER STRATEGIES

Slide 3

RM(36

I think it's a mistake to not emphasize the MEP partners and would prefer that we add their logos to this slide. I would suggest we move "EBC team" to a new slide at end of presentation

Reed, Michael (NYSERDA), 11/2/2021

ja5

Did we capture them all?

jared.t.rodriquez@gmail.com, 11/4/2021

Local and State Policy Landscape: New York

- New York State Climate Leadership and Community Protection Act (CLCPA)
 - Mandated Grid Decarbonization by 2040
 - Economy-wide decarbonization by 2050
- New York City Climate Mobilization Act (NYC Local Law 97)
 - CO2 Emissions caps for buildings (80% reduction x 2050)
- Gas Ban for New Construction (NYC, State pending)
- Gas Transition Planning: Leak Prone Pipe, Moratoriums, Non-Pipe Alternatives; Thermal Utility Legislation

Promote Knowledge Share Between Technical and Real Estate Roles

- Successful decarb planning requires **information flow between technical focused team members and real estate focused team members** throughout the process.
- If your team is missing input needed for the development of an *integrated* Strategic Decarb Plan, please consider adding people who can fill in technical or implementation gaps within or outside your organization

Real Estate / Implementation

- What is in the existing capital plan?
- Upcoming major events:
 - Leases? Transactions? Regulatory compliance? Pandemic Repositioning?
- Investor goals/ESG requirements?



Technical / Engineering

- What types of technical solutions work for this building? HPWH? Enclosure upgrades?
- What building systems are nearing their end of useful life?
- What keystone equipment drives the order of ECMs?

Pathways to carbon neutrality are riddled with blind spots and misconceptions.

BLIND SPOT

SOLUTION

Simple Payback Measures → Strategic Decarb Assessment (SDA)

1:1 equipment swap → Resource Efficient Decarbonization (RED)

My Engineer says "No!" → RED (!)

Electrify everything...at once → Electrify everything... efficiently

Wait for better tech to come along → Enabling steps

Not a tenant priority → ESG, indoor comfort and IAQ benefits

Electricity Produces Emissions → CLCPA

Too disruptive → Decision tree

Slide 6

RM(39) I don't think "strategic decarbonization assessment" means anything to anyone yet. so, I think we should add a few slides that explains the SDA tool and provides a link. Then we can reference it like we do in this

Reed, Michael (NYSERDA), 11/2/2021

ja1 I usually walk people through this in giving the presentation, but sure we can make these items more explicit.

jared.t.rodriquez@gmail.com, 11/2/2021

RM(40) what are these non-energy benefits? would be better for us to articulate the specific values, as opposed to using this term

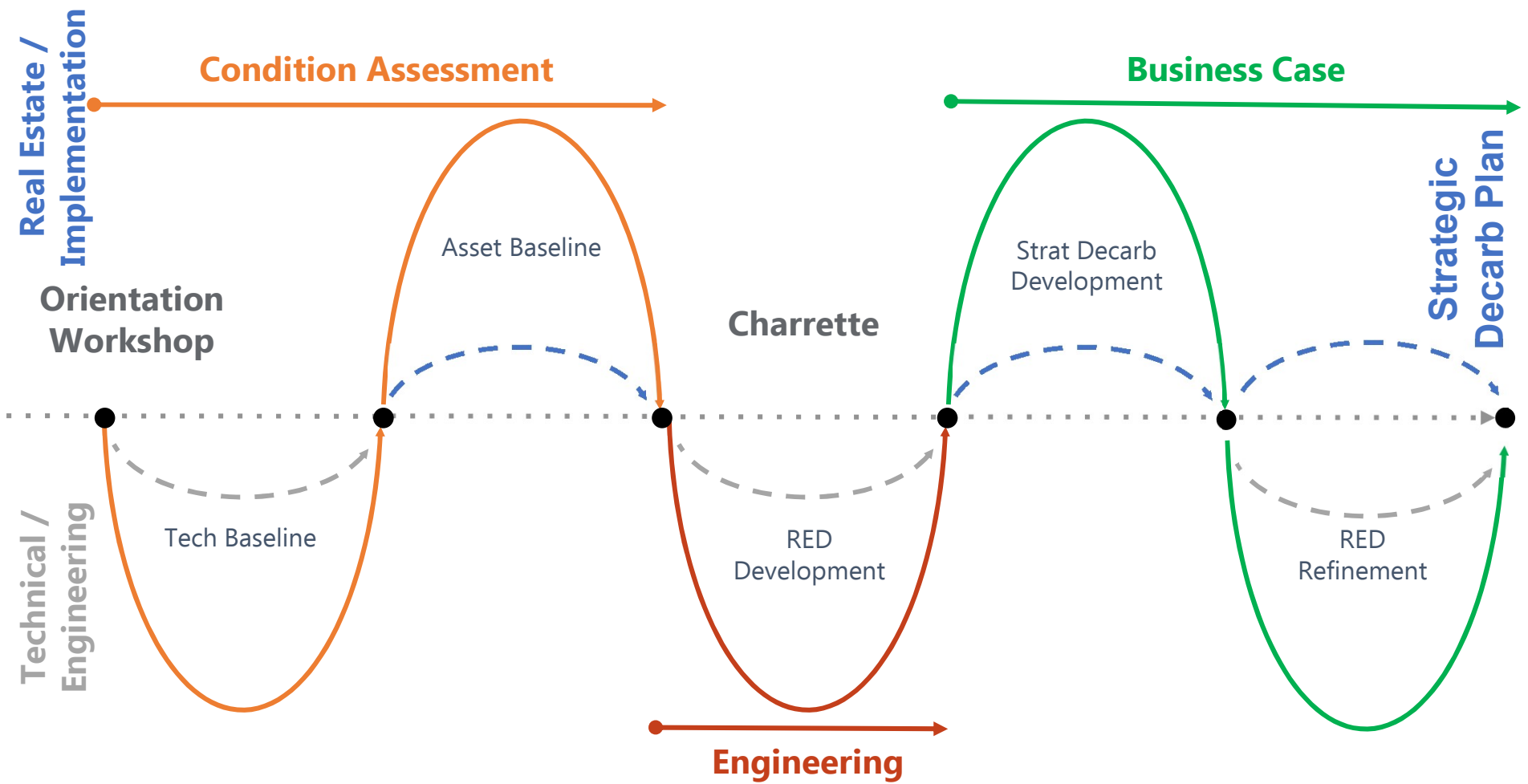
Reed, Michael (NYSERDA), 11/2/2021

A Strategic Decarbonization Assessment is a critical step in the process.

A Strategic Decarbonization Assessment (SDA) is a long-term financial planning tool for building owners to manage carbon emissions and energy use.

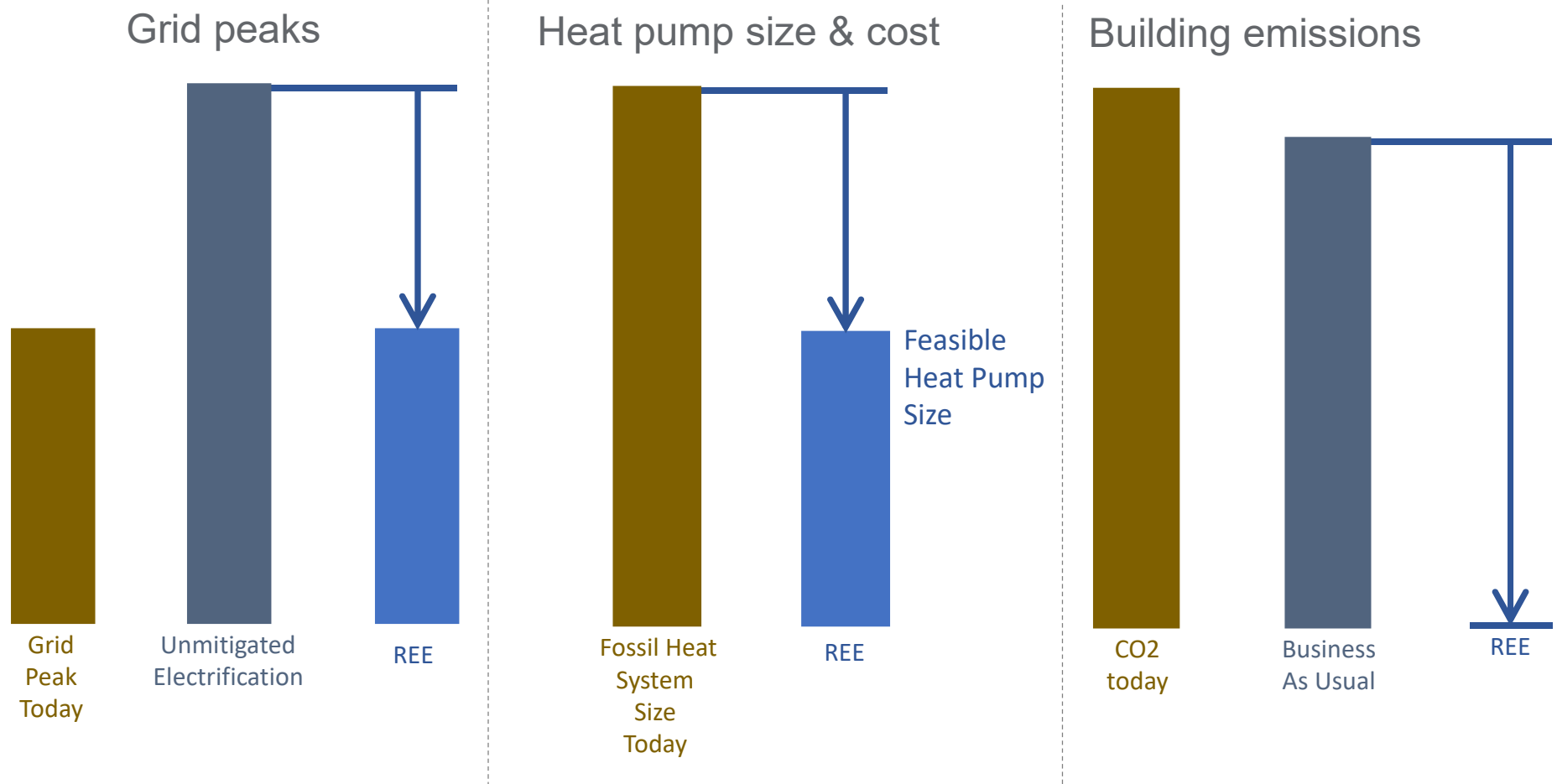


- Develop your decarbonization term (years)
- Feed in your baseline starting point
- Develop Discounted Cash Flow model of different investment scenarios with as much detail as possible
- Value non-energy benefits
- Near-term years require more accuracy and detail
- Long-term years are more directional
- Phase-in is critical; it's not "all or nothing"



EBC Roadmap

Tall building decarbonization requires a whole-systems approach to overcome barriers.

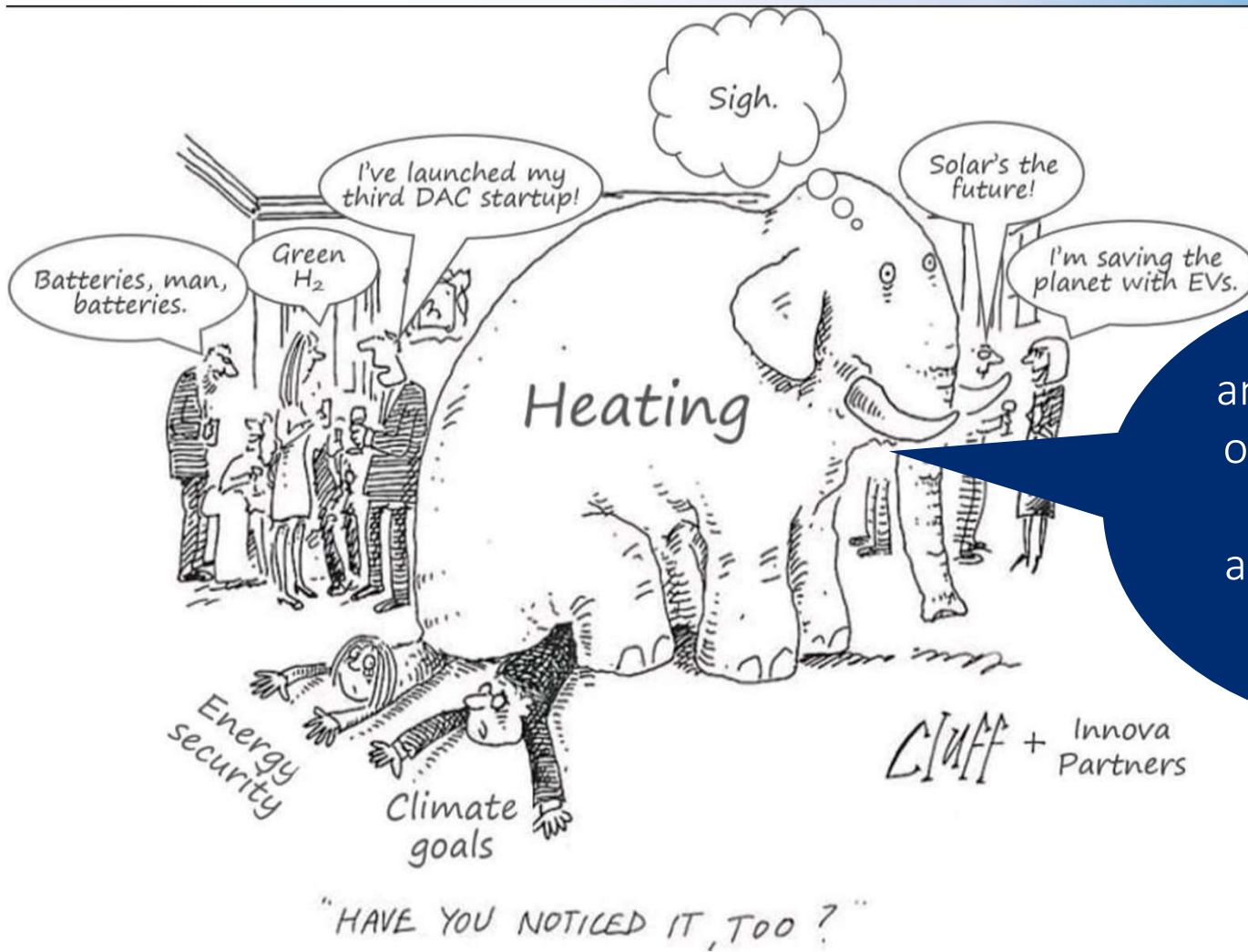


Slide 9

RM(41

Are we using the wrong title here? Do we mean "building emissions in 2030"?

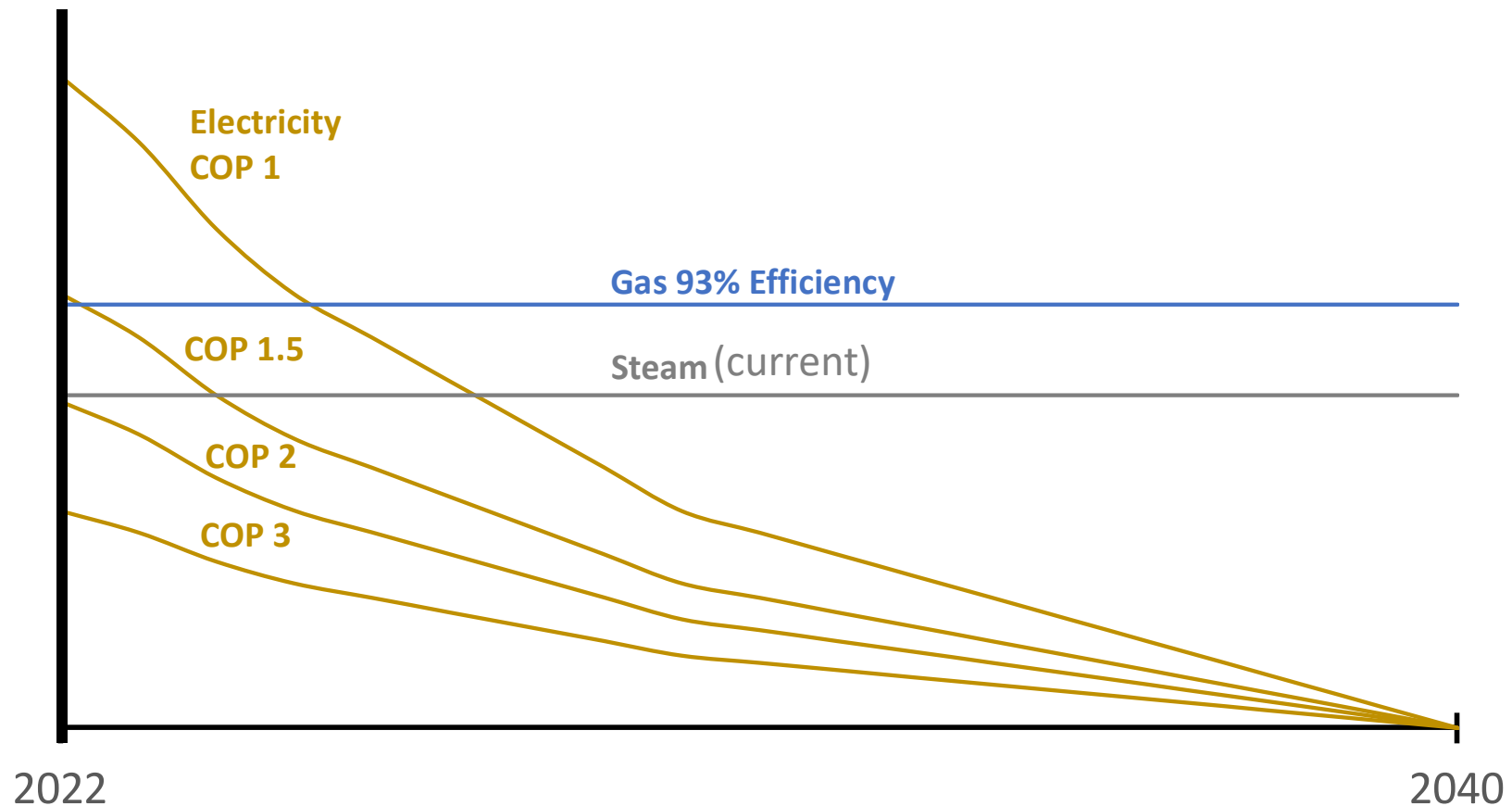
Reed, Michael (NYSERDA), 11/2/2021



and there are lots of different kinds of heat pumps and integrations, too...

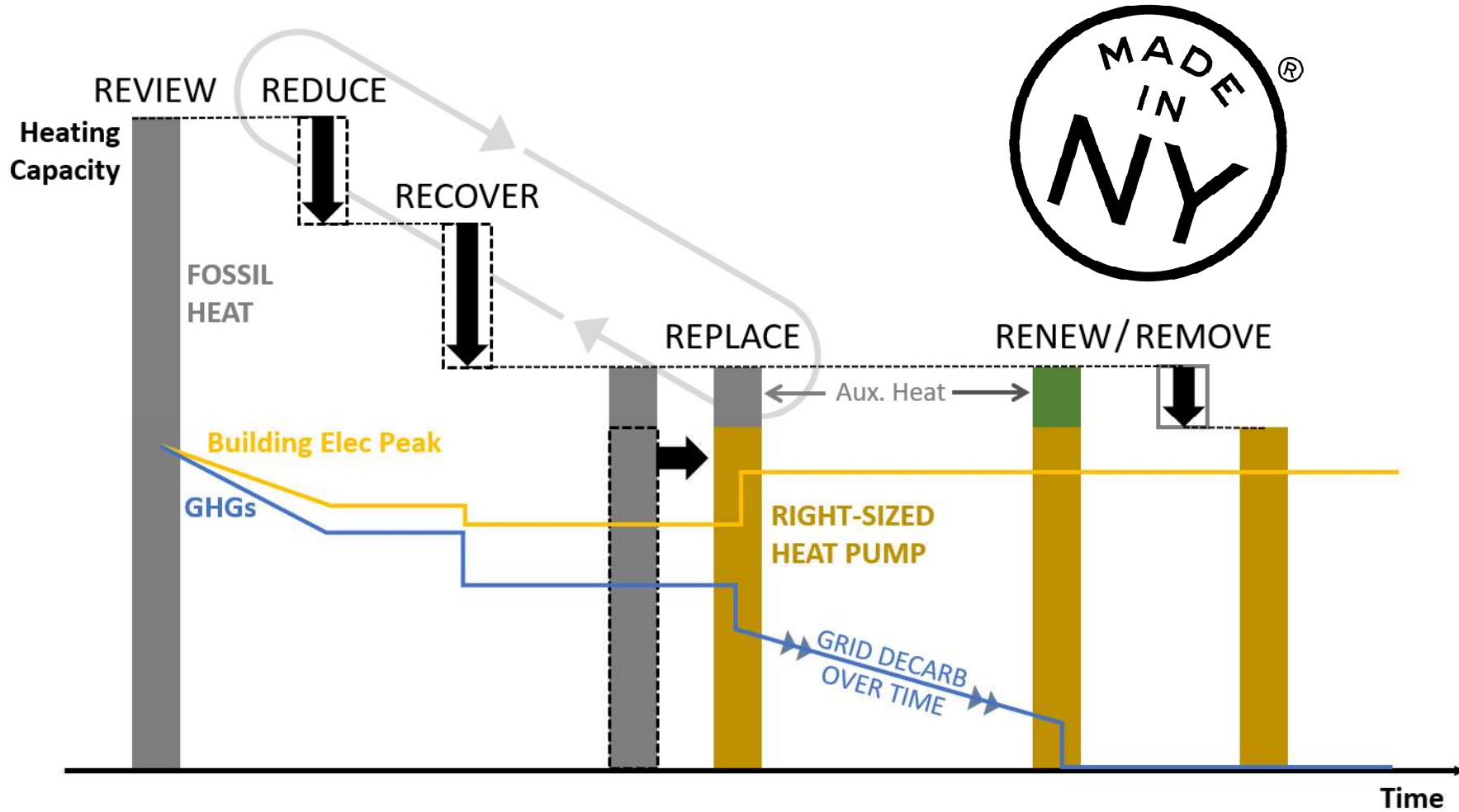
Efficient heat pumps reduce CO2 in tall buildings.
Electric resistance and inefficient heat pump operation may not today.

CO2 / unit of delivered heat



A Heuristic for Decarbonizing Buildings

Resource Efficient Decarbonization (RED): an incremental methodology and integrated design process combined with strategic capital planning creates a path towards carbon neutral buildings.



Enabling steps in tall buildings can overcome heat pump size and cost barriers.

Review

- Disaggregate time-of-use profiles to identify heat waste and recovery opportunities and to right-size equipment.
-

Reduce

- Repair, upgrade and refresh envelopes.
 - Optimize controls.
-

Reconfigure

- Eliminate or reduce inefficient steam and forced air distribution.
 - Create thermal networks and enable heat recovery.
 - Lower supply temperatures to ranges of optimal heat pump performance.
 - Segregate and cascade supply temperatures based on end-use.
-

Recover

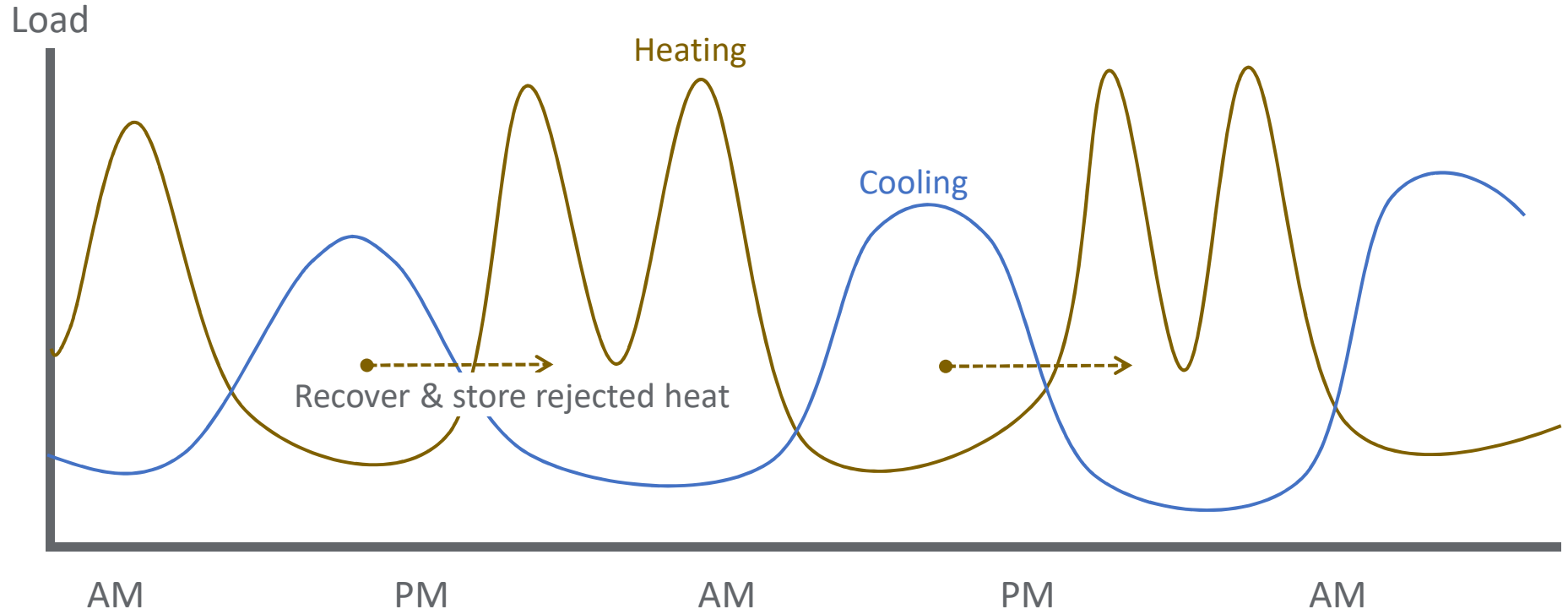
- Simultaneous heating & cooling in different zones of building
 - Eliminate “free cooling” economizer modes
 - Exhaust heat recovery; absorbent air cleaning
 - Building wastewater heat recovery
 - Municipal wastewater heat recovery
 - Steam condensate
 - Refrigeration heat rejection.
 - Other opportunistic heat recovery and heat networking.
-

Store

- Store rejected heat from daytime cooling, for overnight heating.
- Store generated heat— centrally, distributed, or in the building’s thermal inertia.
- Deploy advanced urban geothermal and other district thermal networking solutions.

Offices can heat themselves much of the year with heat recovery and storage.

OFFICE



Illustrative example. Actual time-of-use, disaggregated load profiles should be reviewed for waste, recovery and system sizing.

Slide 14

RM(42

are we out on phrase "the bat curve"?

Reed, Michael (NYSERDA), 11/2/2021

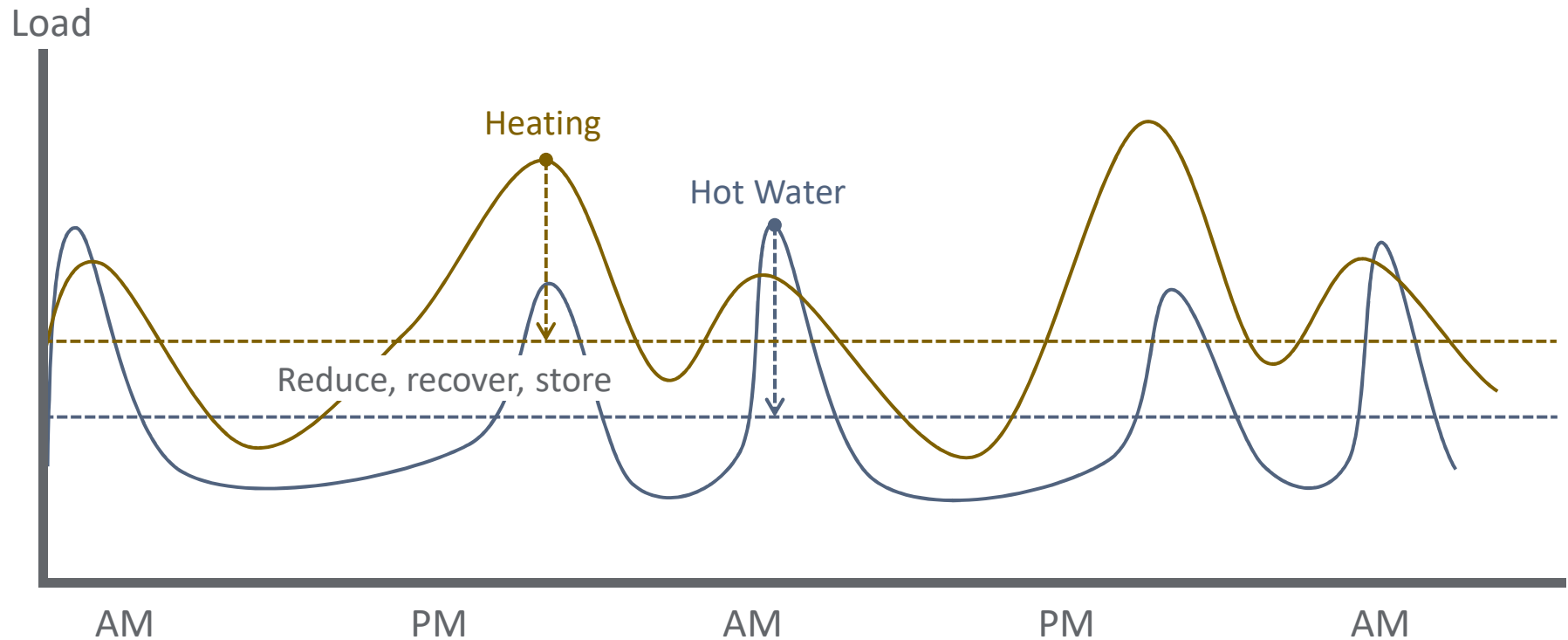
ja2

I'm sure we can add it in here!

jared.t.rodriquez@gmail.com, 11/2/2021

Multi-family can lower and flatten system peaks by a variety of reduce, recover and store strategies

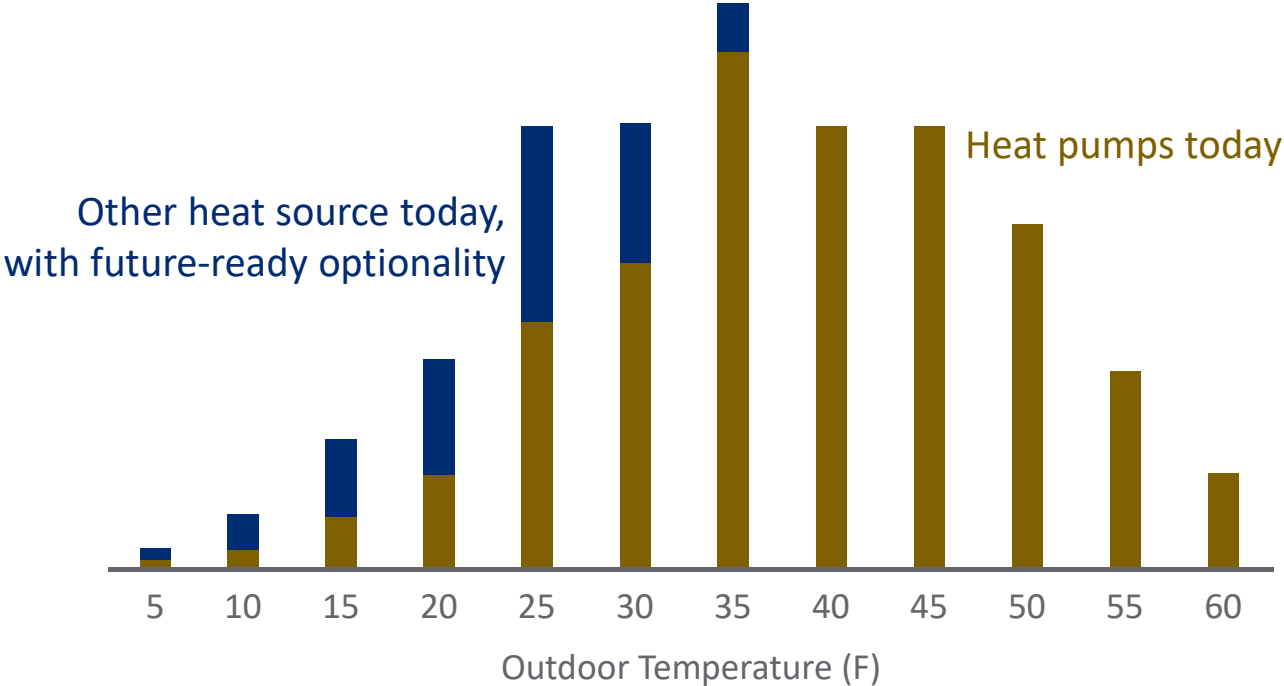
MULTI-FAMILY



Illustrative example. Actual time-of-use, disaggregated load profiles should be reviewed for waste, recovery and system sizing.

Meet a majority of heating with heat pumps today.
Solve difficult conditions separately, with future-ready optionality.

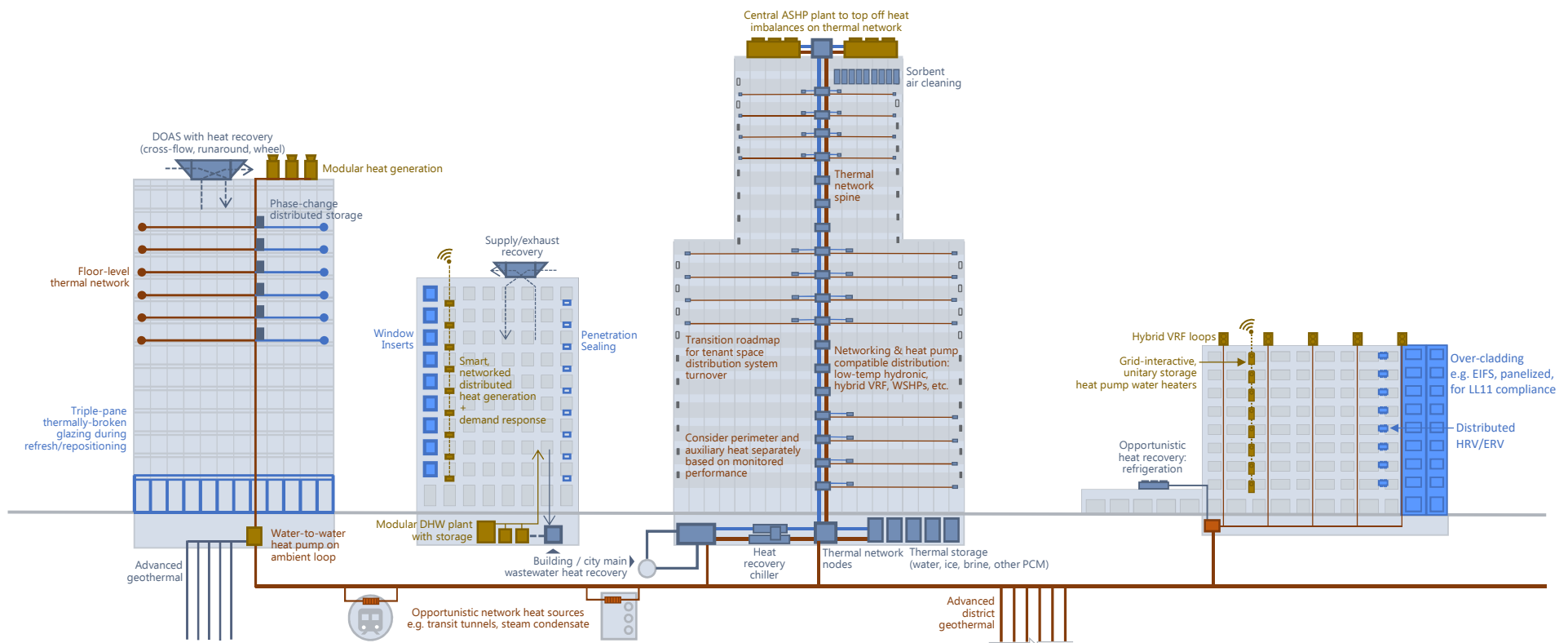
Annual Energy Usage by Temperature Bin



80+ %
HEAT PUMP

Source: Ecosystem Engineers

A whole-system, thermal network approach to clean heat in cold-climate tall buildings:



The Empire Building Challenge Process:

Developing a Holistic Decarbonization Strategy

- Assessing Existing Conditions
- Establishing a Decarbonization Goal and Timeline
- Build the Team
- Aligning on Objectives
- Adopting the Resource Efficient Electrification approach
- Design Charrette. . . Iterate.
- Strategic Decarbonization Assessment
- Project Prioritization
- Further Analysis plus Refinement . . . Iterate.

PM(38)
ja3

Slide 18

- RM(37)** are we trying to say: "here is the process for developing a decarb strategy for your building?" If so, let's say that in headline.
Reed, Michael (NYSERDA), 11/2/2021
- RM(38)** what about building the team?
Reed, Michael (NYSERDA), 11/2/2021
- ja3** Yes, but when? Insert before third bullet point?
jared.t.rodriquez@gmail.com, 11/2/2021

Key Takeaways

- Work together to develop a comprehensive techno-economic analysis of options
- Condition Assessments comprise technology and asset baselining
- Engineering starts qualitative and becomes more quantitative
- **Resource Efficient Decarbonization:**
Review, Reduce, Reconfigure, Recover, Store
- Take enabling steps now
- Strategic capital planning > Simple Payback
- Compare alternatives with business-as-usual
- Plan your pitch for each stakeholder

How you can help spread the word. . .

Share Examples → Release of Empire Building Challenge cohorts case studies Empire Building Playbooks and examples of work from our Strategic Partners

Shift the Paradigm → EBC events and webinars propagate the RED message

Develop the Market → Empire Technology Prize, cohort procurement support

Replicate and Scale → Strategic Influence Campaign, Policy, Training, Programs & Finance

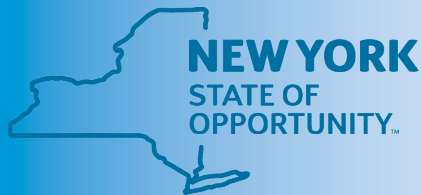
Slide 20

- RM(43)** I really like what this slide is trying to do but I feel like the "solutions" we are presenting here are kind of, inadequate to the need. This feels to program-centric and insufficiently bold
Reed, Michael (NYSERDA), 11/2/2021
- RM(44)** this also seems like the place for us to make our call to action. "EBC Needs You to Help Us Decarbonize"
Reed, Michael (NYSERDA), 11/2/2021
- ja4** I changed this to more action items
jared.t.rodriguez@gmail.com, 11/2/2021

Thank You

**Connect with the
Empire Building
Challenge**

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**Empire Building
Challenge**

