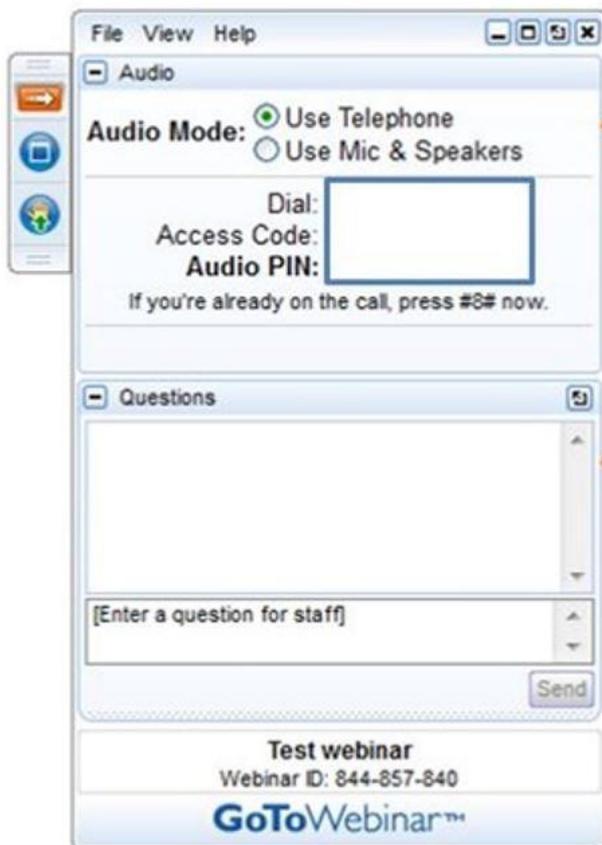


Clean Energy States Alliance Webinar

Renewable Heating and Cooling Policies for the Commercial Sector

Hosted by
Val Stori, Project Director, CESA
Thursday, July 16, 2015

Housekeeping



All participants are in “Listen-Only” mode. Select “Use Mic & Speakers” to avoid toll charges and use your computer’s VOIP capabilities. Or select “Use Telephone” and enter your PIN onto your phone key pad.

Submit your questions at any time by typing in the Question Box and hitting Send.

This webinar is being recorded.

You will find a recording of this webinar, as well as all previous CESA webcasts, archived on the CESA website at

www.cesa.org/webinars

About CESA

Clean Energy States Alliance (CESA) is a national nonprofit coalition of public agencies and organizations working together to advance clean energy. CESA members – mostly state agencies – include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

CESA Members



Renewable Thermal

- Technologies include: ASHPs, GSHPs, Biomass (woody), Solar Thermal
- Seeking to address: efficiency and emissions, standards and test methods, and best practices
- Common challenges include: thermal storage, performance data, standards, financing

Today's Guest Speaker

- **Neil Veilleux**, Meister Consultants Group





WAKING THE SLEEPING GIANT

NEXT GENERATION POLICY INSTRUMENTS FOR RENEWABLE HEATING AND COOLING IN COMMERCIAL BUILDINGS (RES-H-NEXT)

Presentation for Clean Energy States Alliance
Based on Report Prepared for IEA-RETD

Presentation Outline

Introduction to Renewable Heating and Cooling

Northeastern Markets and Policies

Next Generation Policy Options (International)

Discussion

Presentation Outline

Introduction to Renewable Heating and Cooling

Northeastern Markets and Policies

Next Generation Policy Options (International)

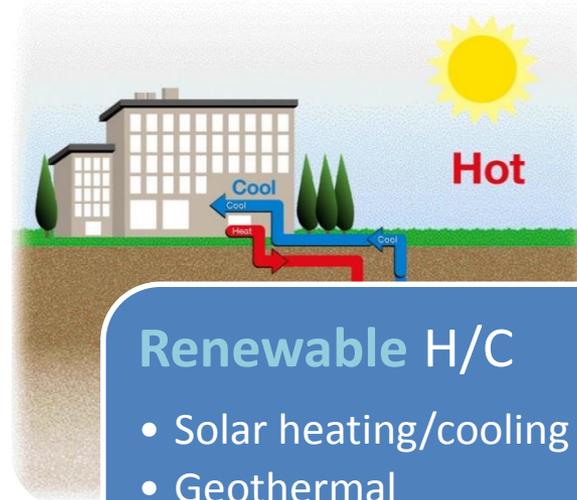
Discussion

What are Renewable Energy Sources for Heating and Cooling (RES-H/C)?



Conventional H/C

- Coal
- Heating oil
- Natural Gas
- Propane
- Electric resistance



Renewable H/C

- Solar heating/cooling
- Geothermal
- Heat pumps (air / ground source)
- Sustainable biomass
- Anaerobic digestion
- Combined heat + power

What are the applications for RES-H/C?

Application

- Space heating/cooling
- Hot water
- Process heat

Building Sector

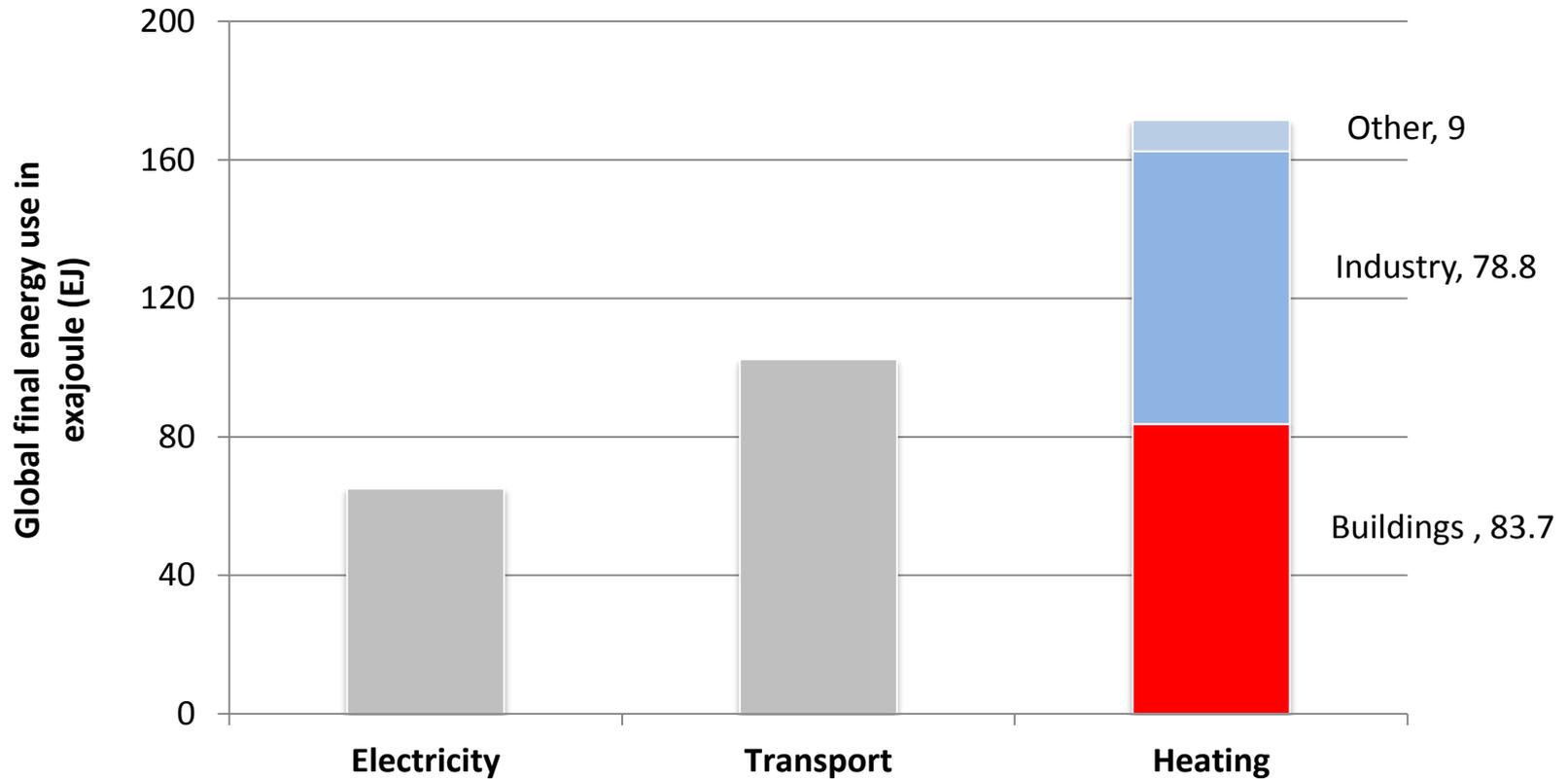
- Residential
- Commercial
- Industrial

Distribution

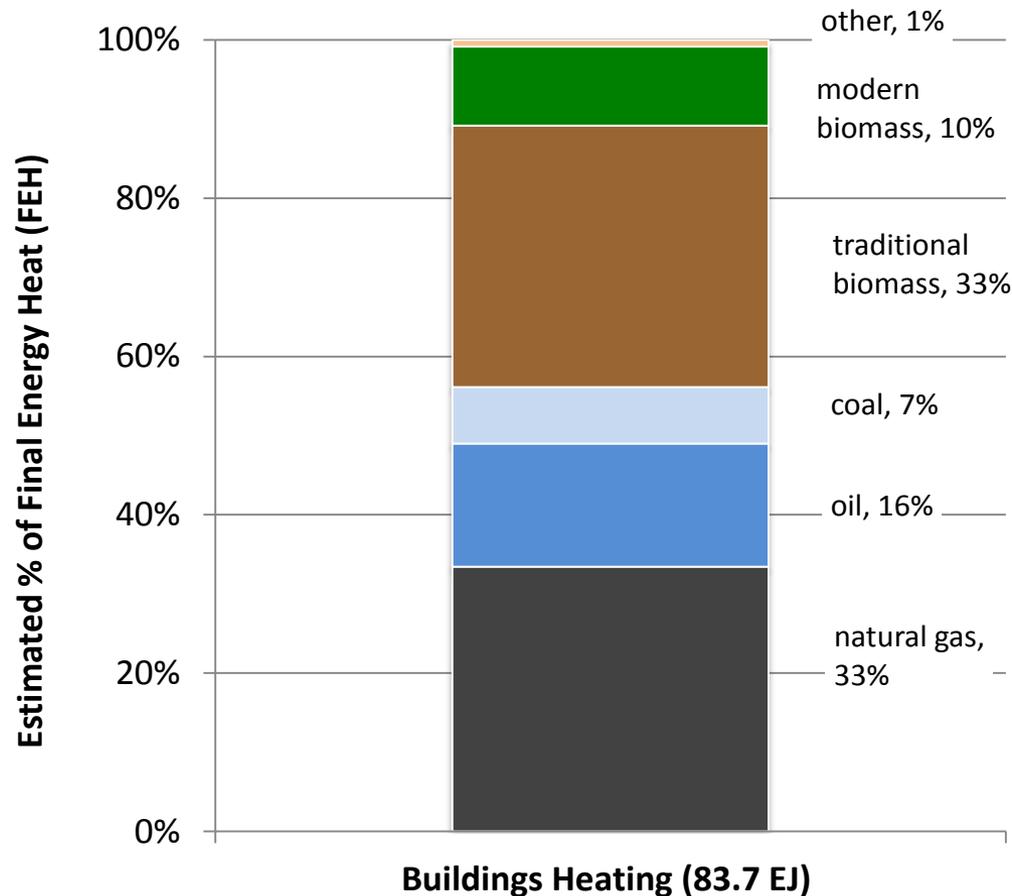
- On-site units
- District heating/cooling networks

What is the current market status for RES-H/C?

» The heating sector is the largest energy user across the globe

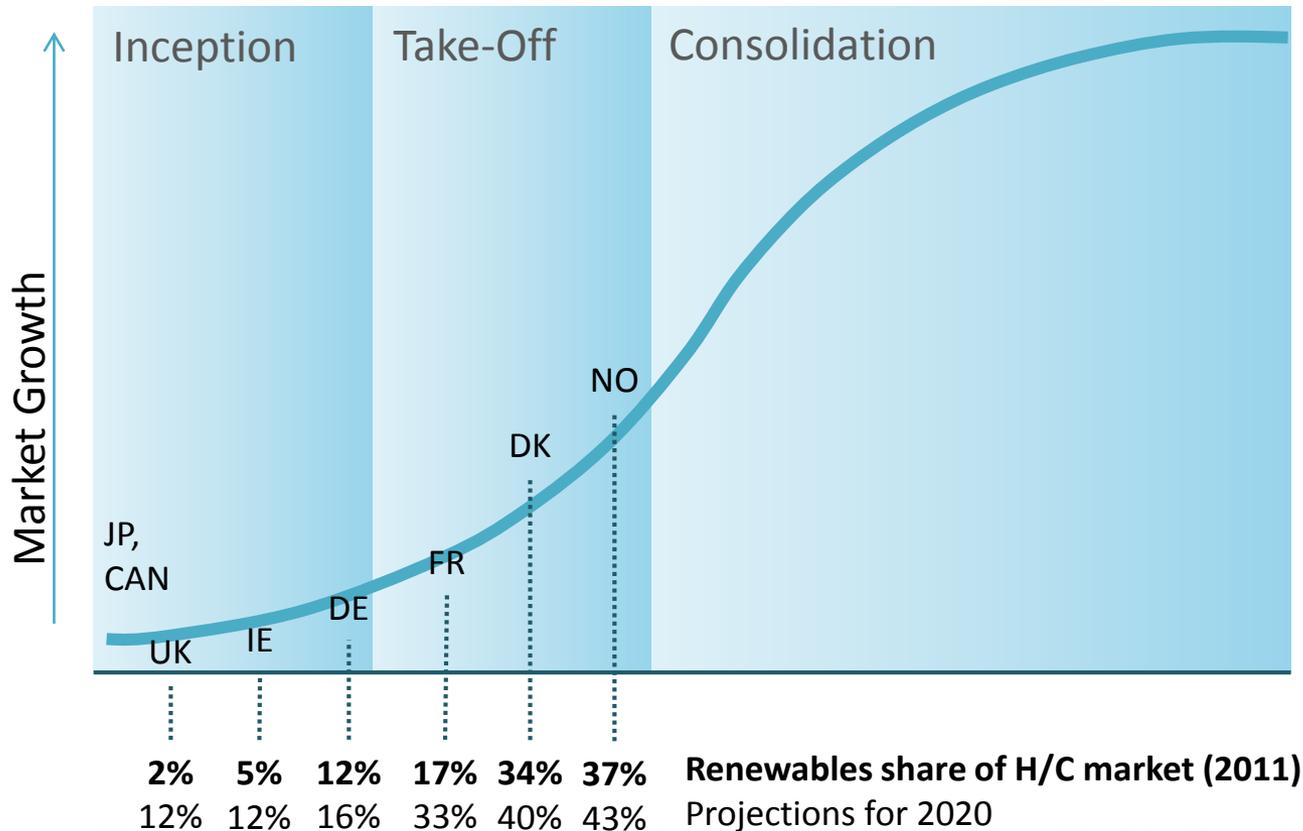


What is the current market status for heating across globe?



- » Building heated primarily with fossil fuels
- » Limited data on global RES-H markets (and even less on RES-C)
- » Modern (high efficiency, low emission) biomass estimated to meet 10% of heat demand globally
- » Other RES-H/C markets (SHW, heat pumps, etc.) provide small but growing share of global heat in buildings

RES-H/C is the sleeping giant of renewables



- » There has been a historic lack of innovation and commitment to RES-H/C policy
- » Policymakers must move RES-H/C markets along the curve to achieve energy and climate goals

RES-H/C is the sleeping giant of renewables



Policymakers

- Climate mitigation
- Climate adaptation
- Energy security
- Economic development



Consumers

- Cost savings
- Building comfort
- Price stability / hedging
- Green leadership / responsibility

A renewable heating transformation is necessary to achieve energy, climate, and economic goals

Presentation Outline

Introduction to Renewable Heating and Cooling

Northeastern Markets and Policies

Next Generation Policy Options

Discussion

What is the RES-H/C policy and program landscape in the Northeast?

New Hampshire

- Developed RPS carve out for RT (first in nation)
- Heat metering finalized as of Nov 2014 and accepting first applications
- SHW rebate but little demand
- Residential and C/I wood pellet boiler programs are popular

Maine

- 80% of households in Maine use oil heat
- Established state oil reduction targets:
 - 30% by 2030 (50% by 205)
- Efficiency Maine provides incentives & financing for variety of technologies

Vermont

- Established goal to obtain 90% of energy from renewables by 2050
- Necessitates use of renewable heat, esp. biomass and GSHP
- VT governor signed MOU with Upper Austria to promote biomass heating

Massachusetts

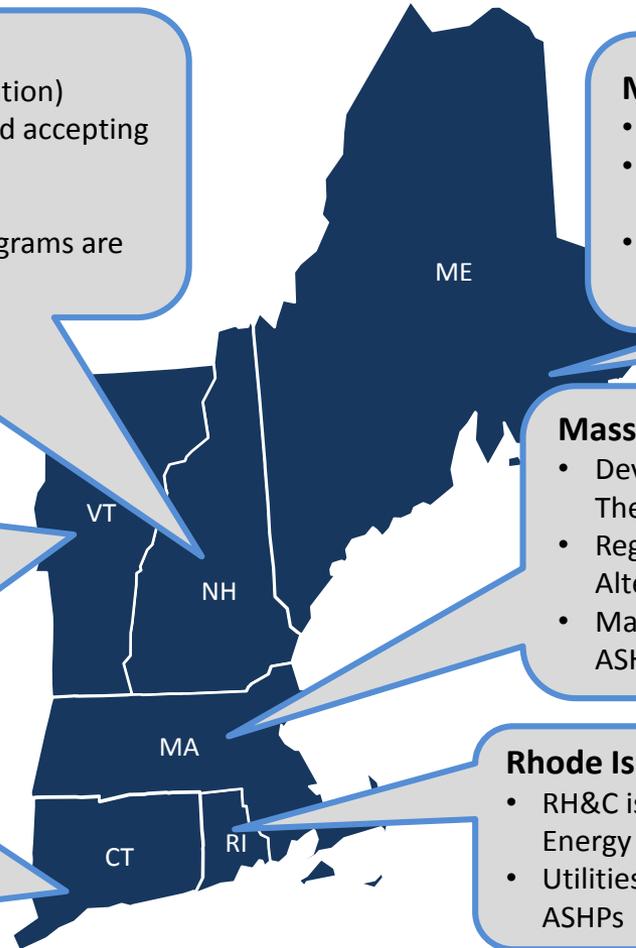
- Developed comprehensive Renewable Thermal Roadmap(CARTS)
- Regulations to integrate RH&C into the Alternative Portfolio Standard
- MassCEC pilot programs for biomass, GSHPs, ASHPs + ongoing SHW program

Connecticut

- CEFIA/DEEP supporting deployment of CHP and AD
- SHW and GSHP can receive financing, but no incentive programs available
- Some interest in metering and RPS thermal provisions

Rhode Island

- RH&C is “on the agenda” for Office of Energy Resources
- Utilities evaluating opportunities for ASHPs



Massachusetts: The Path to RES-H/C Policies and Programs

Renewable Heating and Cooling Opportunities and Impacts Study



- First integrated RES-H/C technology and market assessment in the US
- Analyzed technical, financial, economic, and climate impacts related of renewable thermal technologies

Heating and Cooling in the Massachusetts APS



- Legislative report to assess potential to integrate RES-H/C into the Alternative Portfolio Standard (APS)
- Developed detailed LCOE analysis of RH&C technologies

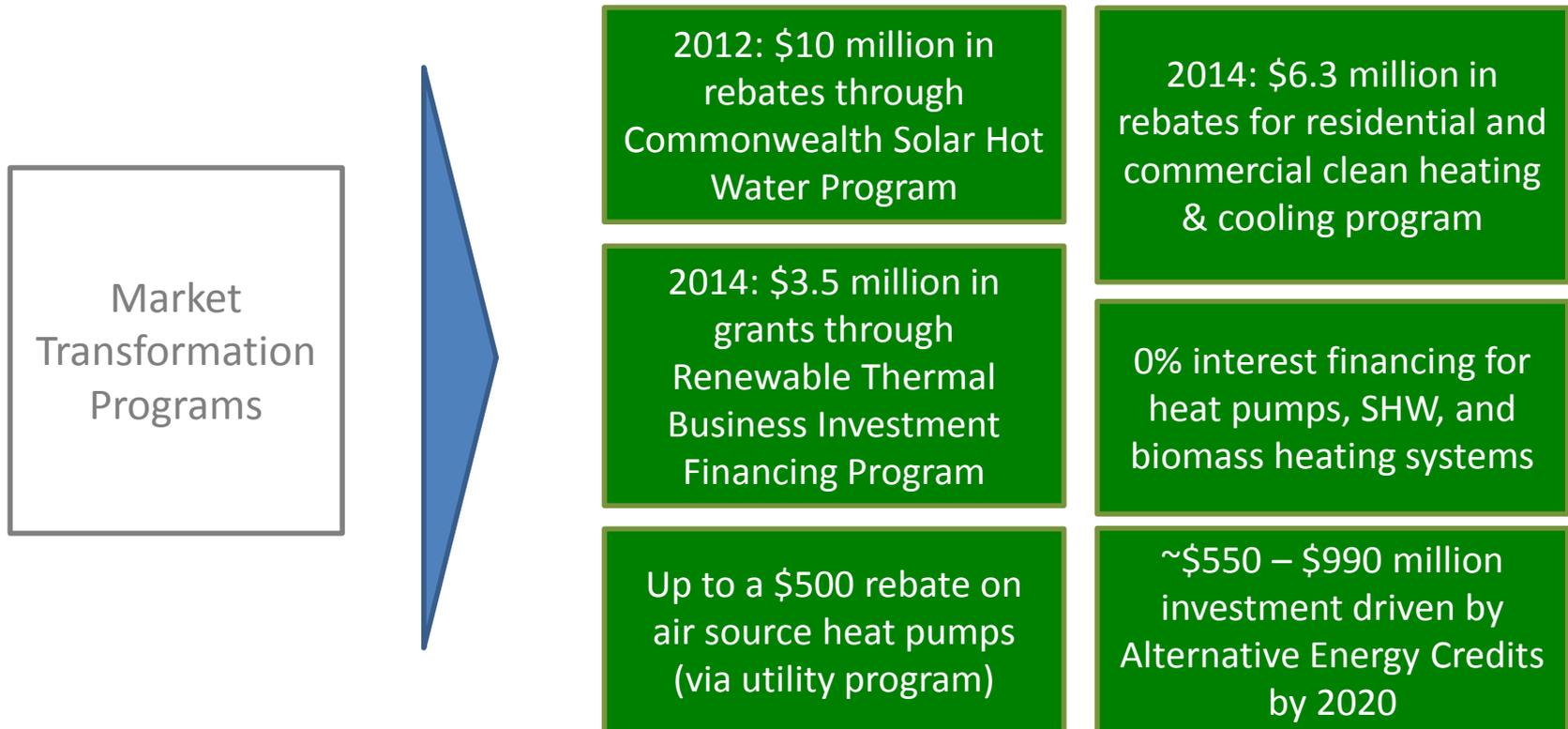
Commonwealth Accelerated Renewable Thermal Strategy



- Engaged industry/government leaders to create comprehensive RES-H/C roadmap
- Assess international policy best practices and develop recommendations / action plan for Mass industry

Market Transformation Programs

Massachusetts: The Path to RES-H/C Policies and Programs



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What are “next generation” policies for RES-H/C?

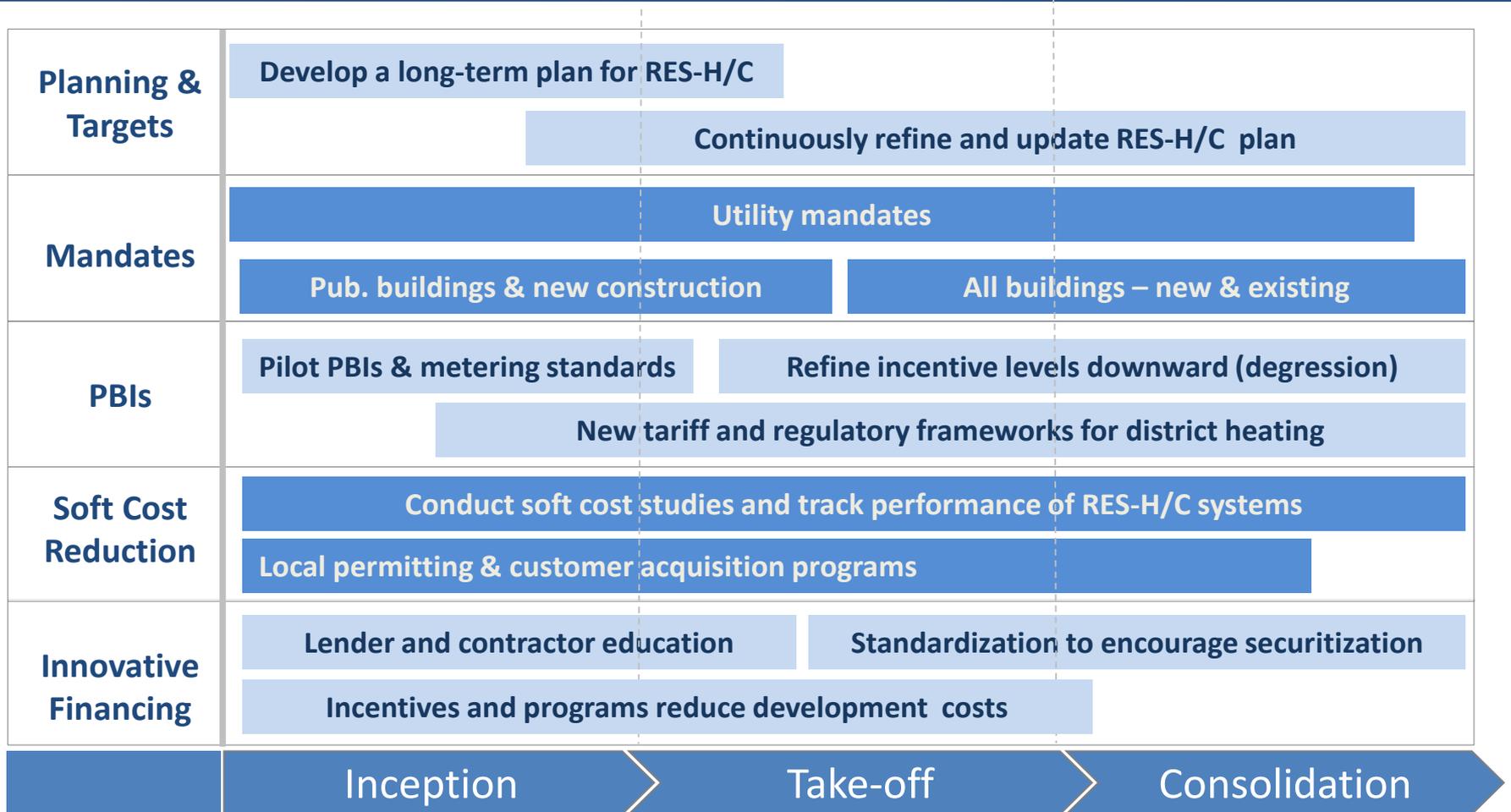
Next generation policies are new and innovative and have the potential to drive market development along the deployment curve, from the early-stage (i.e. inception) to mature (i.e. consolidated) market phases.

Next generation RES-H/C policies...

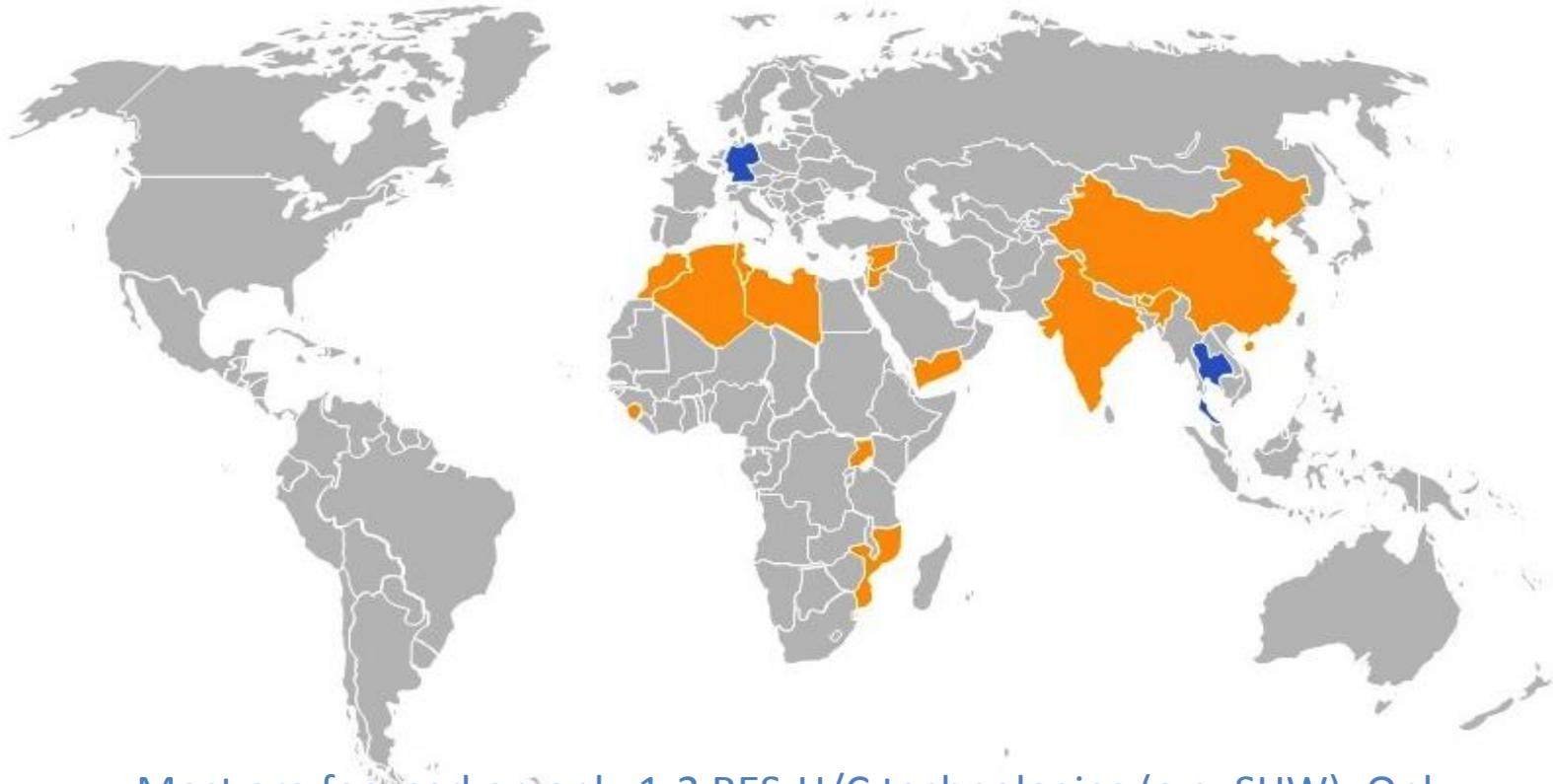
- Address one or more market barriers
- Could enable large-scale, cost-effective, and mainstream deployment
- Encourage improvements in product costs, efficiency, and reliability



Next generation policies move markets (and sleeping giants) along the deployment curve

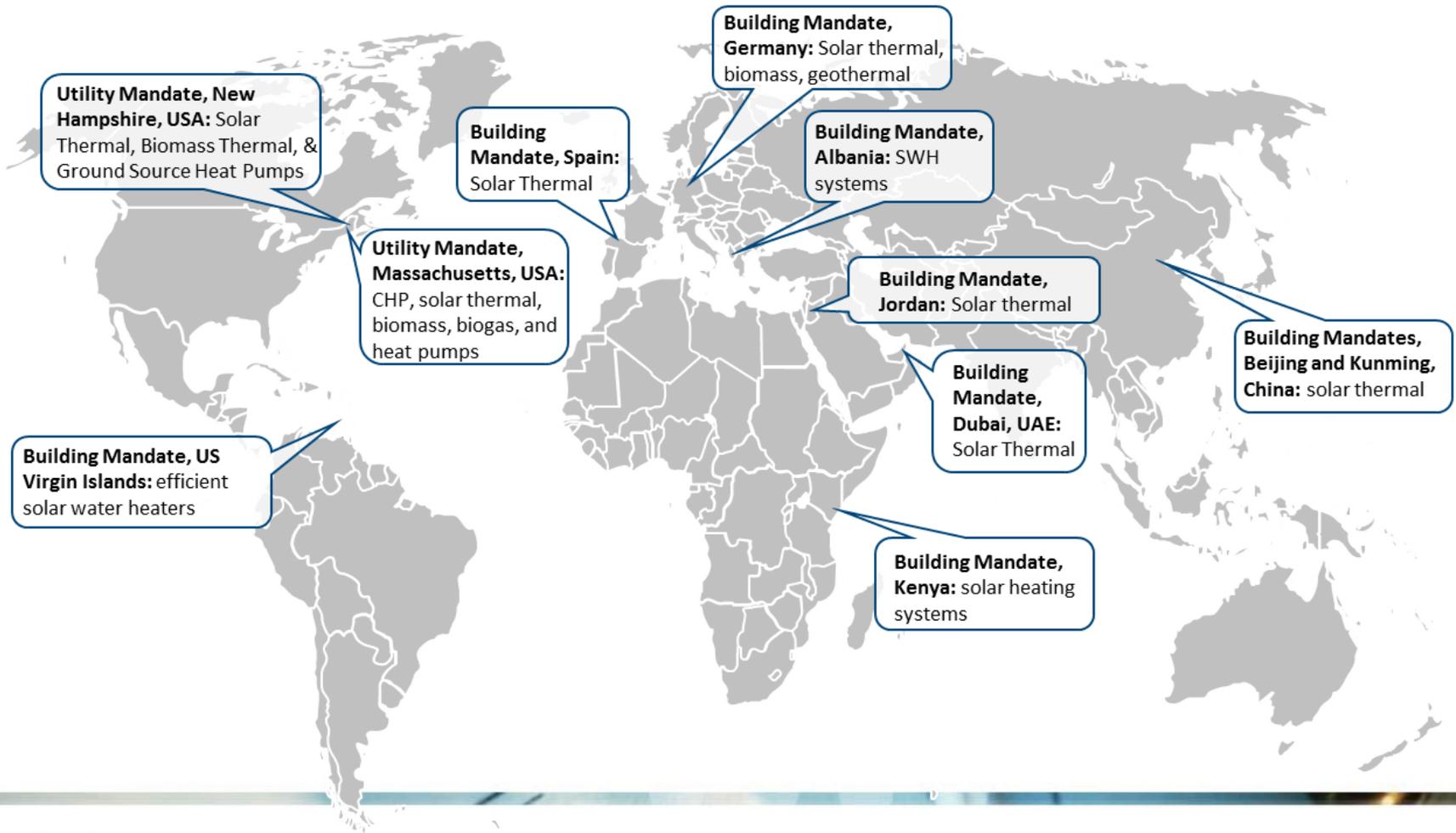


Planning & Targets: Only 17 countries have developed formal targets for RES-H/C



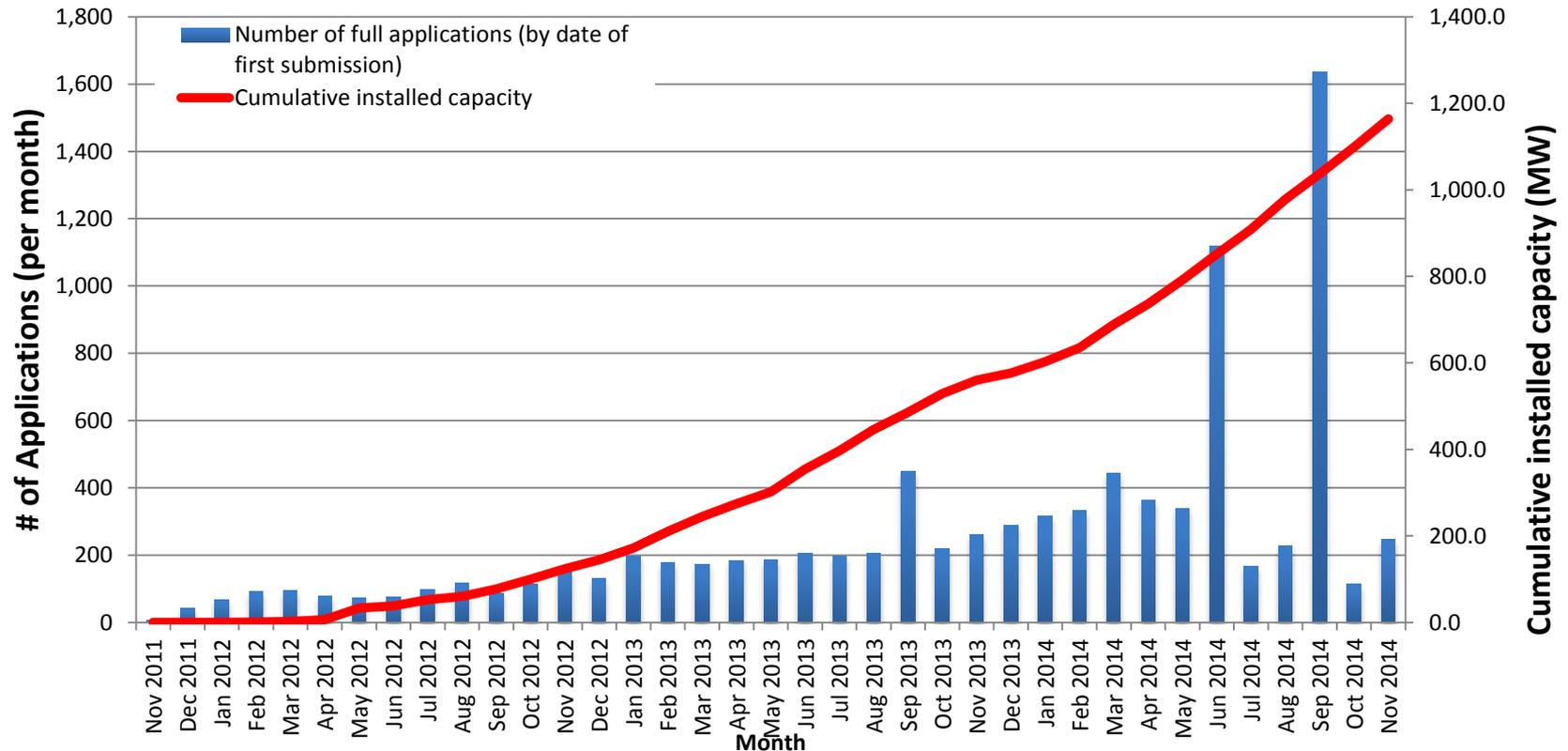
Most are focused on only 1-2 RES-H/C technologies (e.g. SHW). Only Germany and Thailand have broader RES-H/C targets.

Mandates: RES-H/C building mandates are somewhat more common than targets but mainly focus on new construction



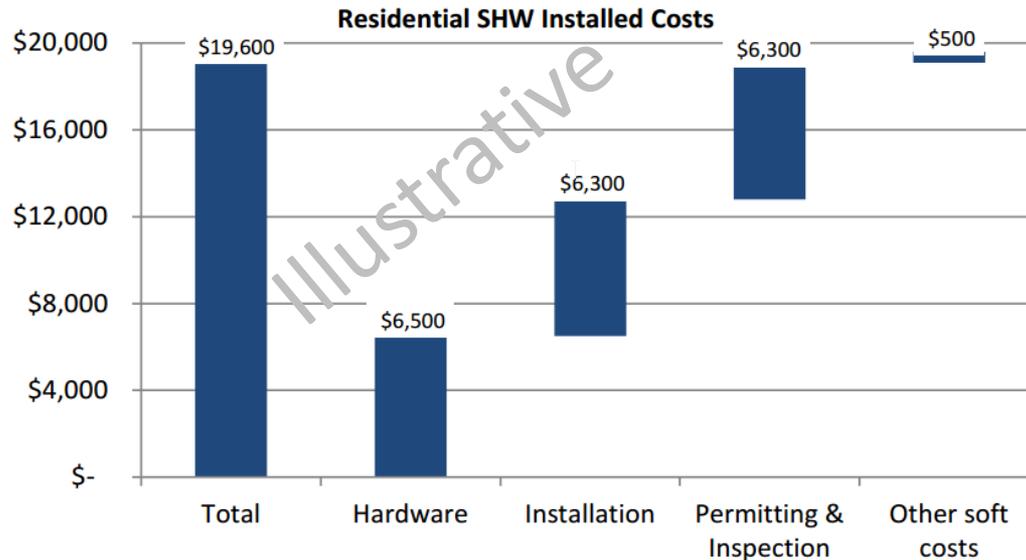
Performance-based Incentives: UK Renewable Heat Incentive (RHI) scheme

RHI pays a set tariff to residential, commercial, public, and industrial consumers for every unit of renewable heat generated on a pence per kWh basis.



Soft Costs: A significant barrier to adoption

- There is no comprehensive analysis of soft costs for RES-H/C technologies
- Industry interviews and (limited) analysis suggest that soft costs constitute 1/3 to 2/3 of the installed cost of a system.

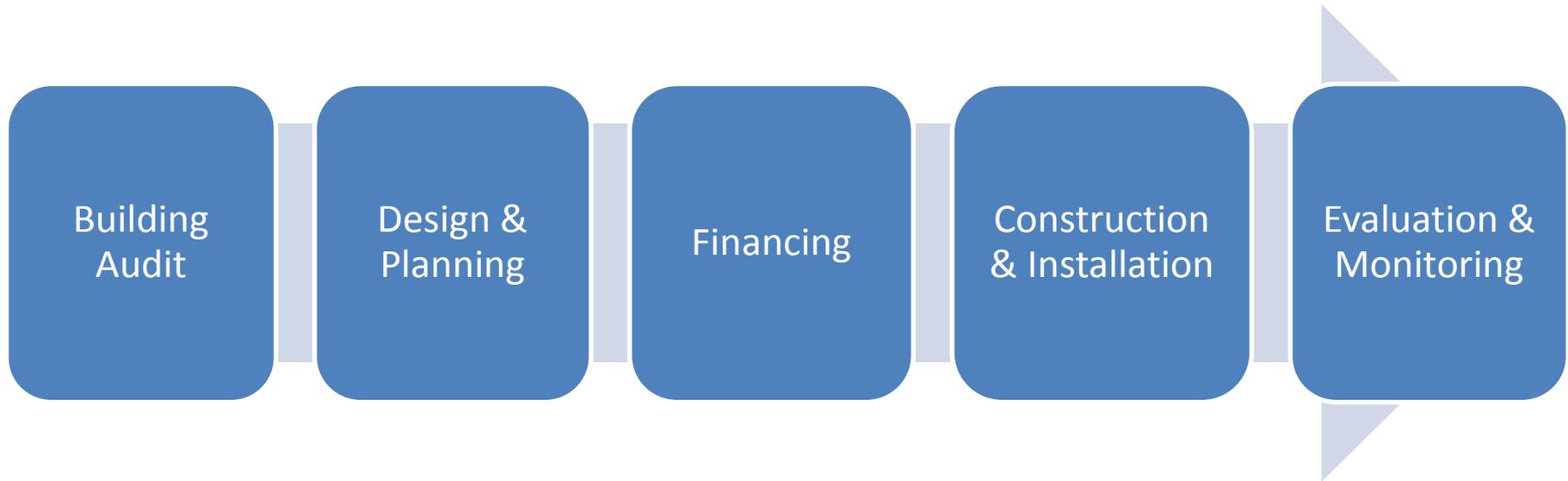


Estimated SHC cost breakdown.

Source: NYC Solar Water Heating Roadmap (2013).

Innovative Financing: Turnkey developers can provide building owners with a range of RES-H/C services

Third party ownership reduces risk, hassle, and operational risk of RES-H/C by providing “heat as a service”



Bornholm, Denmark: The Bright Green Island & Grid of the Future

**28,000 customers,
55 MW peak load**

36+ MW wind

16 MW CHP (biomass)

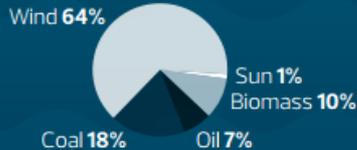
2 MW solar PV

2 MW biogas plant

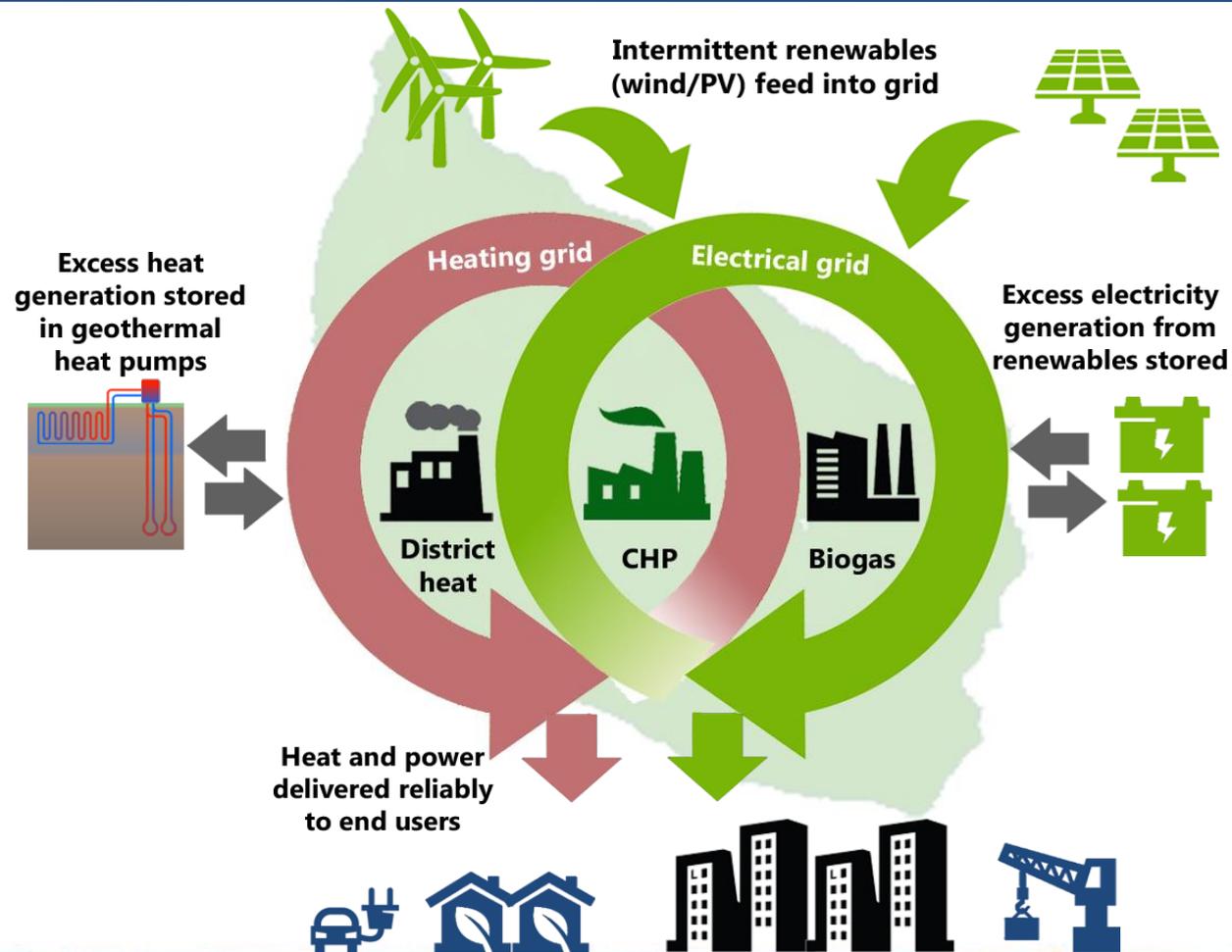
5 district heating plants

**Goal: 100% renewable
energy by 2025**

ENERGY PRODUCED AT BORNHOLM



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Waking the Sleeping Giant

Next Generation Policy Instruments for Renewable Heating and Cooling in Commercial Buildings (RES-H-NEXT)

Full report available at: <http://iea-retcd.org/wp-content/uploads/2015/02/RES-H-NEXT.pdf>

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