June 4, 2024

Simple Solutions for Complex Problems: Light Commercial HPWH

NEEA PRODUCT COUNCIL

cadeo

Agenda

- Northwest Water Heating Market Characterization
- Commercial Market Solutions
- Commercial Market Barriers and Opportunities

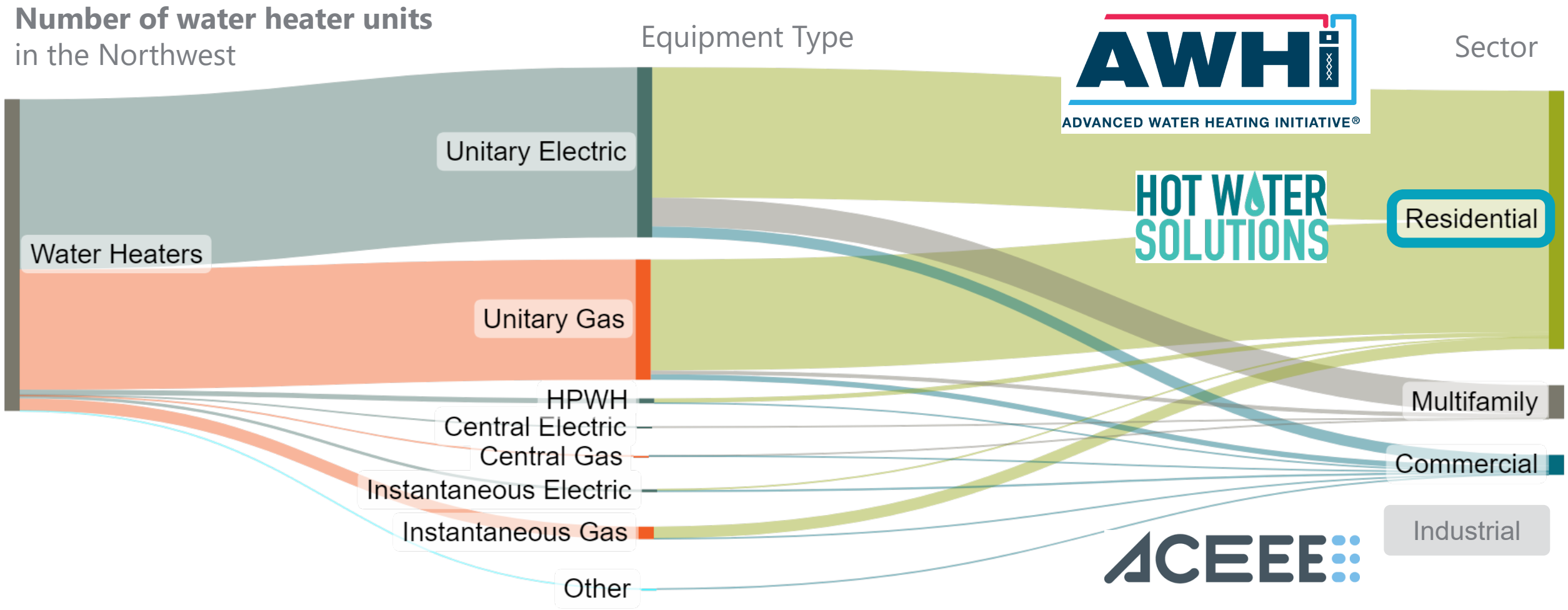
Learning Objectives

- Learn about the opportunities for residential-style and commercial HPWH up to 120 gallons in light commercial applications
- Understand how building characteristics, hot water use patterns, and existing water heater systems inform which HPWH system is the right fit for a commercial building
- Discuss the barriers and opportunities to HPWH in the light commercial applications

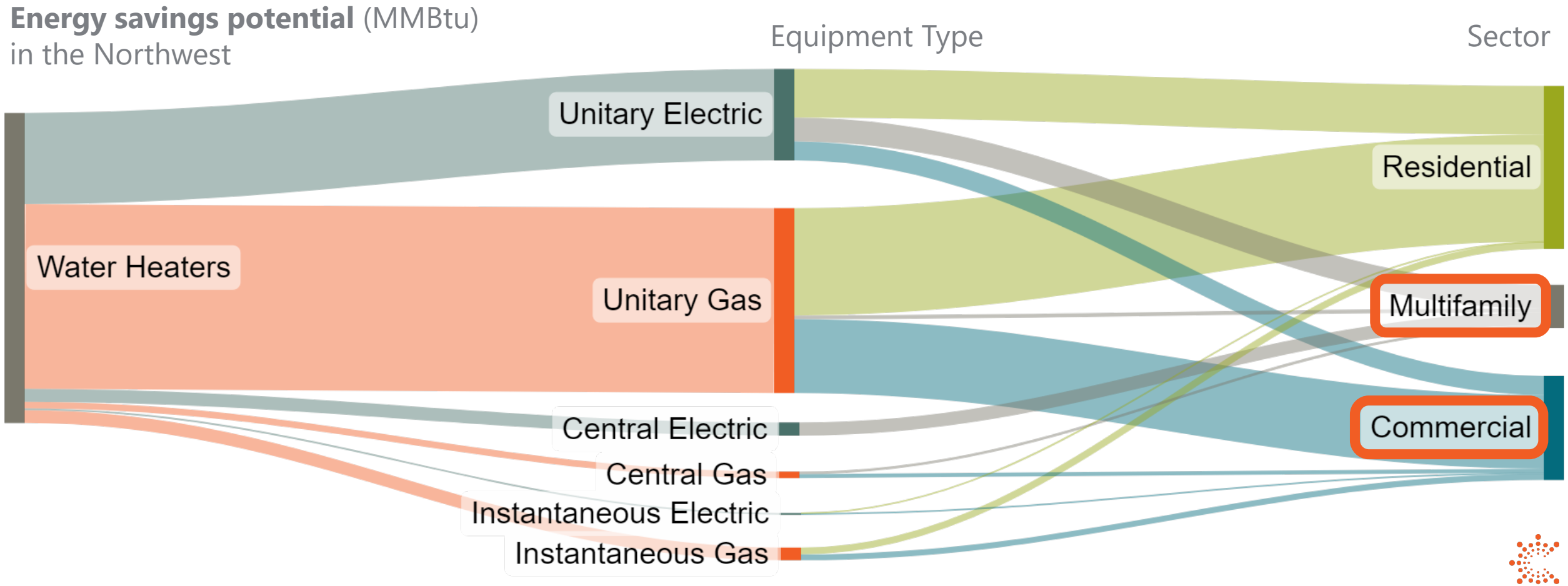
Northwest Water Heating Market Characterization

Improve understanding of the opportunities and gaps in residential, commercial and industrial market

The largest quantity of water heaters in the market are in single family homes.



But multifamily and commercial spaces have a significant portion of the total potential energy savings.



Commercial HPWH Terminology

Split System
Residential (Consumer)

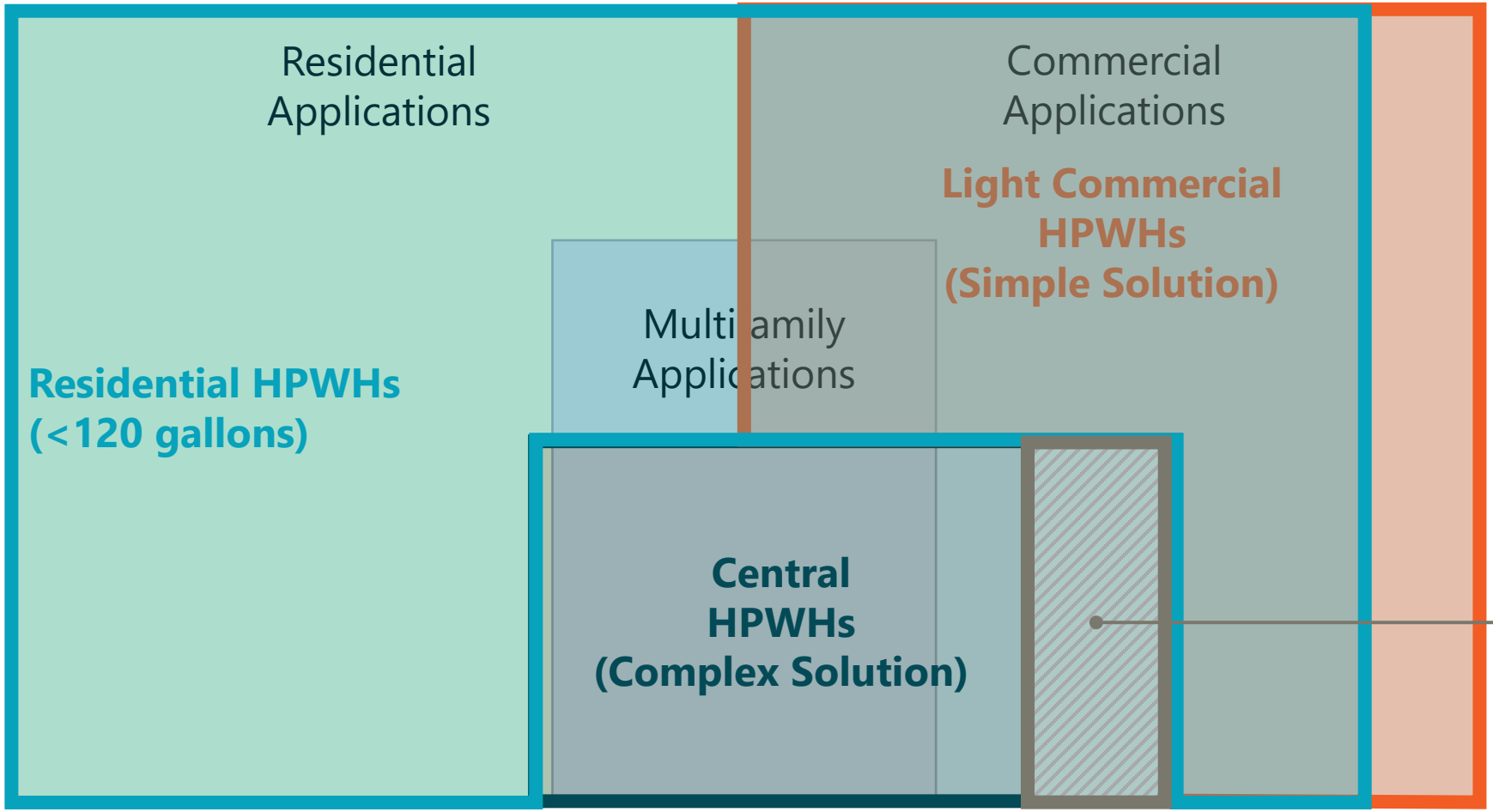
Integrated
Commercial

Light commercial HPWH
is either a residential-style water heater less than 120 gallons used in commercial applications or an integrated (or unitary) 120-gallon commercial water heater.

Commercial Split System
("Central HPWH" or "Built-Up")

Central HPWH
describes a commercial split system or built-up system that would typically replace a central domestic hot water boiler or water heater larger than 120 gallons.

Commercial HPWH Terminology is not mutually exclusive



Commercial Market Solutions

Opportunities outside of the multifamily, central HPWH market

Central HPWHs are an ideal solution for some but not all commercial applications.

Building Type	DHW Loads	Recirculation	Large Capacity	Multiple Tanks	Good Opportunity for Central?
Multifamily (NC)	**High**	☑	☑	☑	**Yes**
Lodging	**High**	☑	☑	☑	**Yes**
Grocery	**High**	☒	☑/☒	☒	**Better suited for unitary**
Restaurants	**High**	☒	☒	☒	**Better suited for unitary**
Residential Care	**High**	☑	☑	☑	**Yes**
Hospital	**Med**	☑	☑	☑	**Yes, but custom**
School	**Med**	☑	☑/☒	☑	**Maybe**
Office	**Low**	☒	☒	☑/☒	**No**
Retail/Service	**Low**	☒	☒	☒	**No**
Warehouse	**Low**	☒	☒	☒	**No**

Commercial HPWH Solutions Framework

	HPWH Solution	Smaller/Simpler/Easy Light Comm HPWH	Medium Size & Complexity Integrated or less complex Central HPWH	Larger/More Complex Central HPWH
Existing Bldg Characteristics	Existing WH Size	≤120 gallons ≤12 kW/75 kBtu	*A combination of:* >120 gallons / >12 kW/75 kBtu	>120 gallons >12 kW/75 kBtu
	# of WH	Single tank	Single tank or multiple tanks	Single tank or multiple tanks
	Plumbing Distribution	No recirc	With or without Recirc	Recirc
HPWH Selection	HPWH configurations	Integrated or simple split system* *WH + Storage sized together	Integrated or simple split system Could include a swing tank, larger storage tank	Split system, with or without swing tank, single or multi-pass
	HPWH Design	Doesn't require design/plumber	Could include some design	Are always designed systems
Target Markets	Target Building Types	Offices, retail, warehouse, schools, restaurant, grocery	Not building-type specific	Multifamily, lodging, residential care, hospitals
	Savings Opportunities	Medium hot water users, but *many* buildings	High hot water users but less complex systems	High hot water users

Recommendation: **Pursue low-hanging light commercial HPWH opportunities**

	HPWH Solution	Smaller/Simpler/Easy Light Comm HPWH	Medium Size & Complexity	Larger/More Complex Central HPWH
Existing Bldg Characteristics	Existing WH Size	≤120 gallons ≤12 kW/75 kBtu	/75 kBtu	>120 gallons >12 kW/75 kBtu
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Light Comm Solutions includes residential HPWH equipment

88% of existing commercial buildings have a heated tank that is ≤120 gallons and ≤12 kW or ≤ 75 kBtu

		Smaller/Simpler/Easy
	HPWH Solution	**Light Comm HPWH**
Existing Bldg Characteristics	**Existing WH Size**	**≤120 gallons ≤12 kW/75 kBtu**
	# of WH	Single tank
	Plumbing Distribution	No recirc
HPWH Selection	**HPWH configurations**	Integrated or simple split system* *WH + Storage sized together
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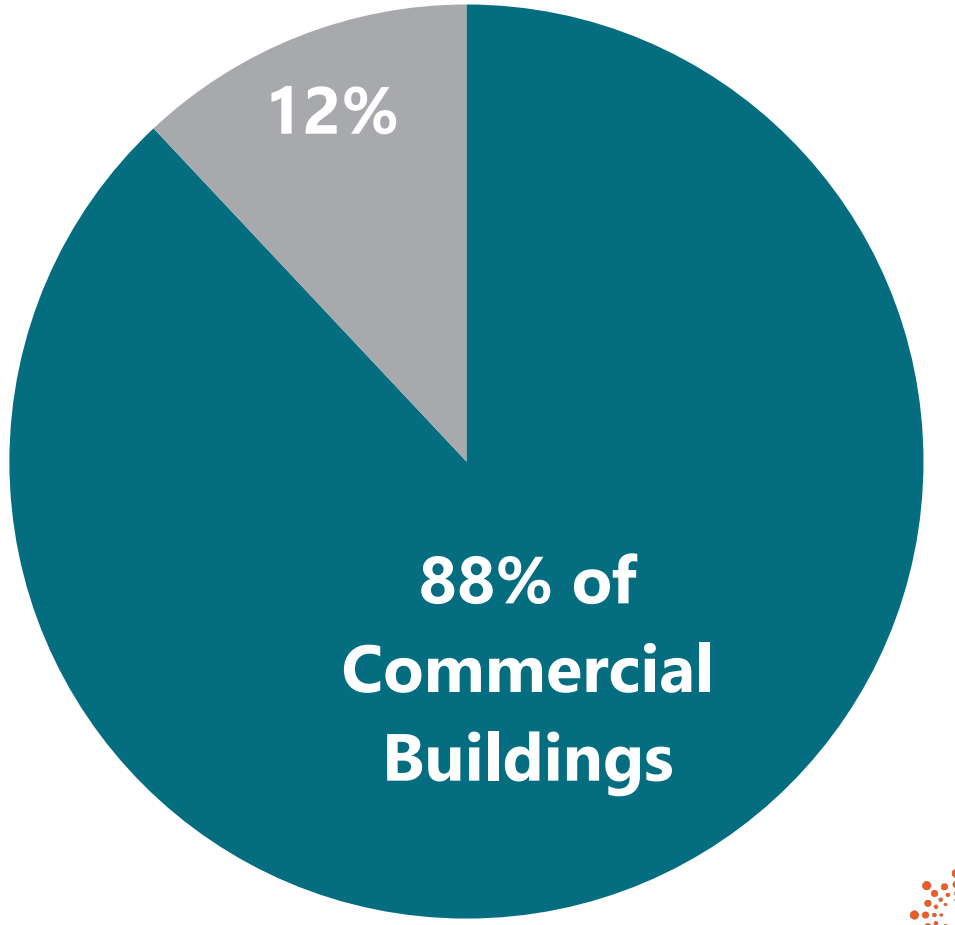

50% of the existing commercial buildings also only have a single tank with no recirculation

	HPWH Solution	Smaller/Simpler/Easy
		Light Comm HPWH
Existing Bldg Characteristics	Existing WH Size	≤120 gallons ≤12 kW/75 kBtu
	# of WH	Single tank
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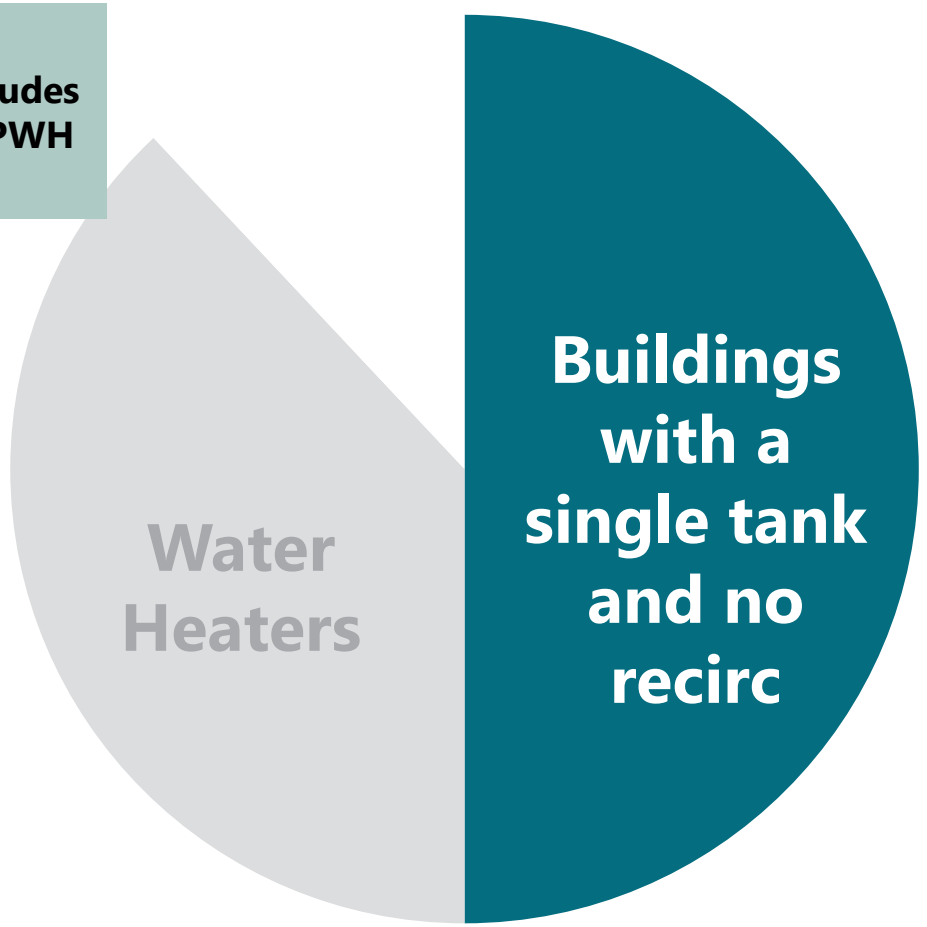

More than 60% of northwest commercial water usage could be met with a simple light commercial HPWH solutions

	HPWH Solution	Smaller/Simpler/Easy Light Comm HPWH
Existing Bldg Characteristics	Existing WH Size	≤120 gallons ≤12 kW/75 kBtu
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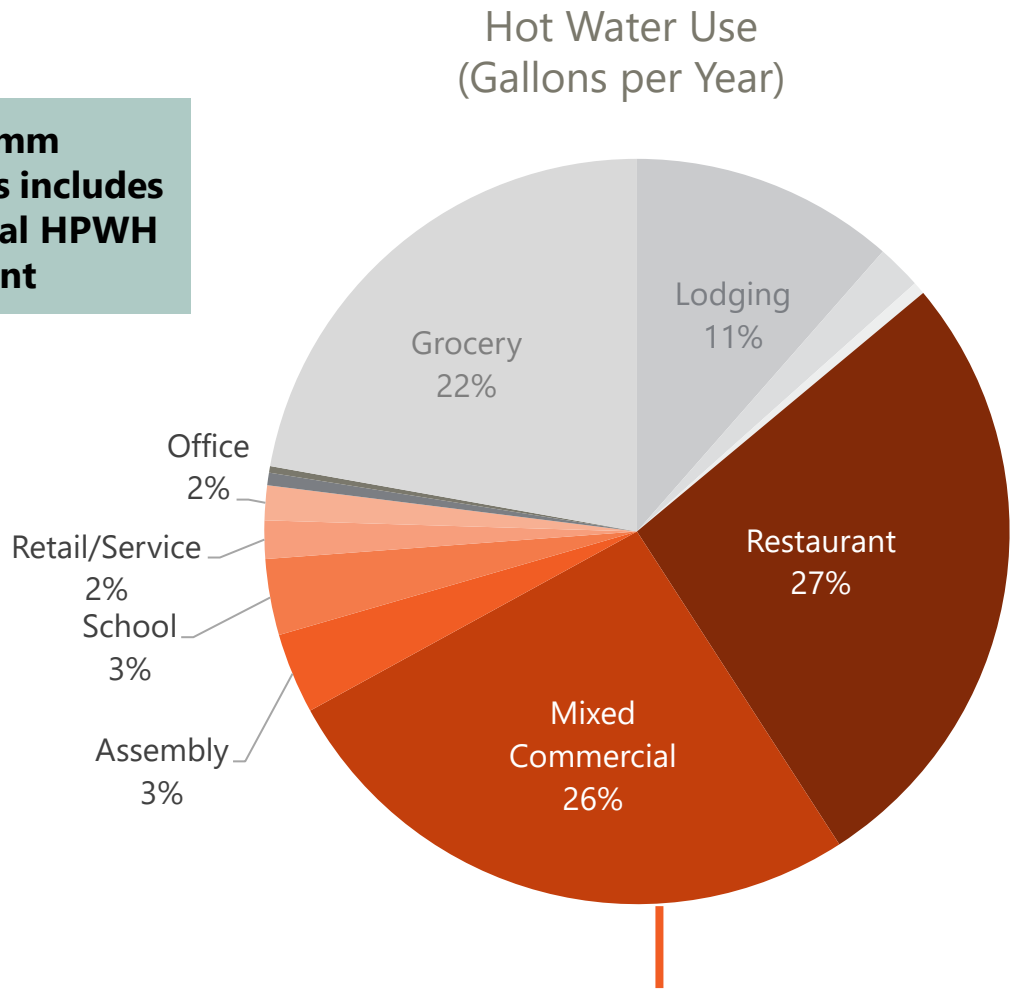
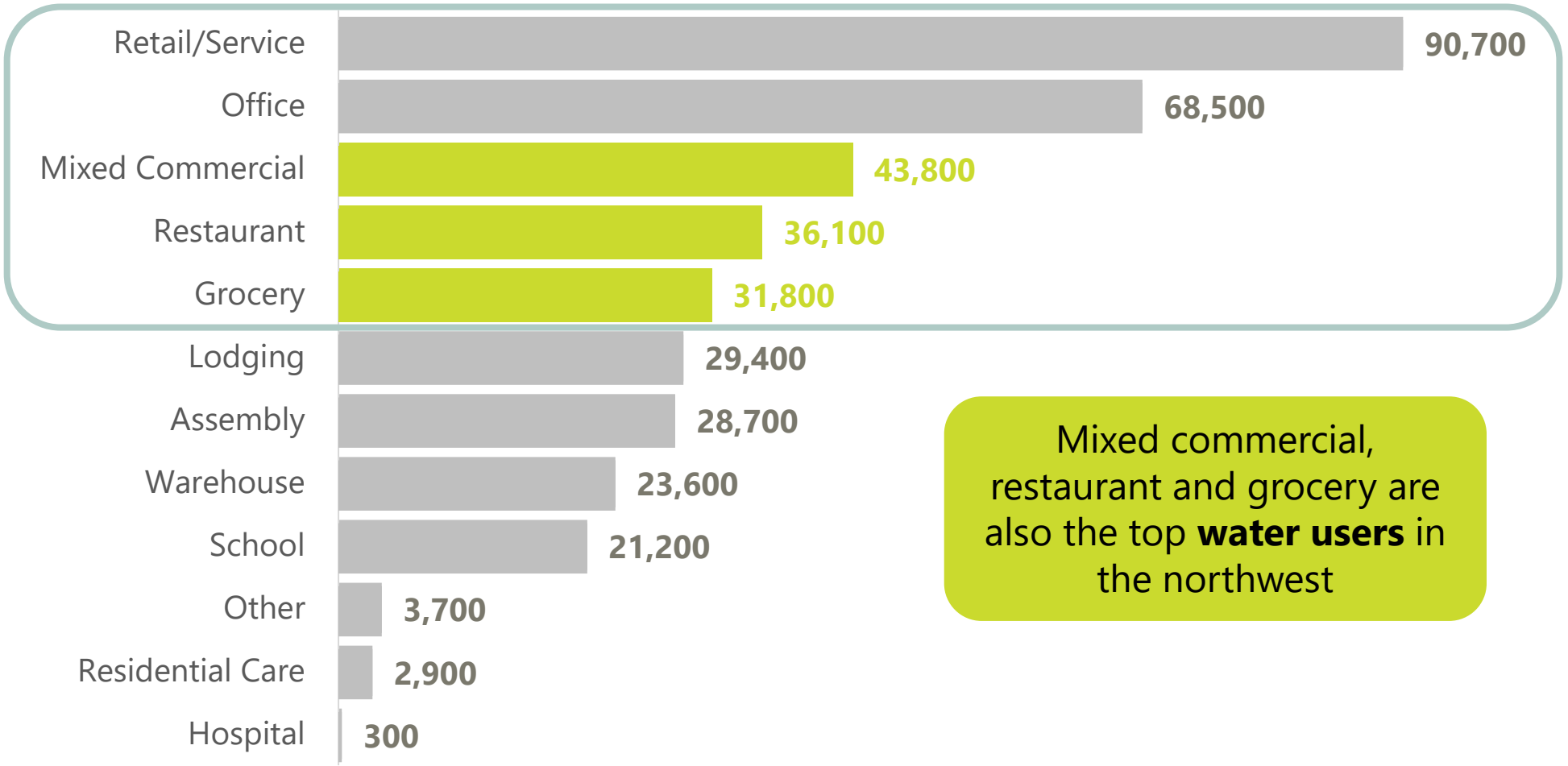


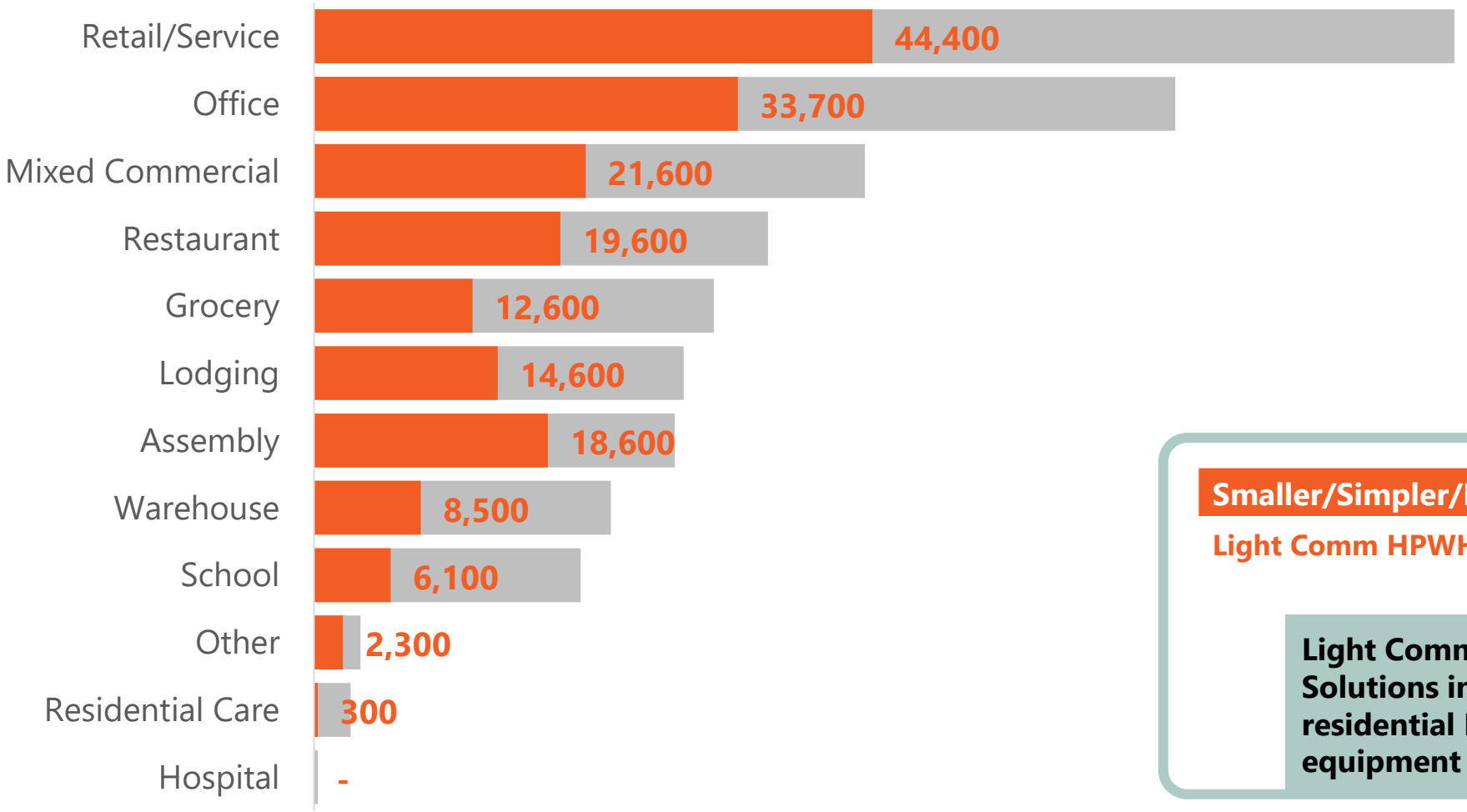
Light Commercial

Retail/Service, Office, Mixed Commercial, Restaurant, and Grocery buildings in the northwest have the most water heaters



Mixed commercial, restaurant and grocery are also the top **water users** in the northwest

Retail, Office, Mixed Commercial, Restaurants, and Assembly have the most opportunity for a simple/easy solution



Smaller/Simpler/Easy

Light Comm HPWH

Light Comm Solutions includes residential HPWH equipment

Commercial HPWH Barriers

Market barriers and considerations when selecting, sizing, and installing light commercial HPWH solutions

Barriers do exist for light commercial HPWH

Barriers include:

1. Building electrical service
2. Perceived that HPWH can't meet commercial loads
3. Commercial space constraints
4. System selection tools are limited to central HPWH applications
5. Limited installation resources

77% of the water heaters ≤120 gallons in existing northwest buildings are electric

Generally existing commercial water heating (and current design practice) is **oversized by 25% to 50%**

Recommendation: **Engage with HPWH manufacturers to demonstrate light commercial HPWH performance**

	HPWH Solution	Smaller/Simpler/Easy Light Comm HPWH
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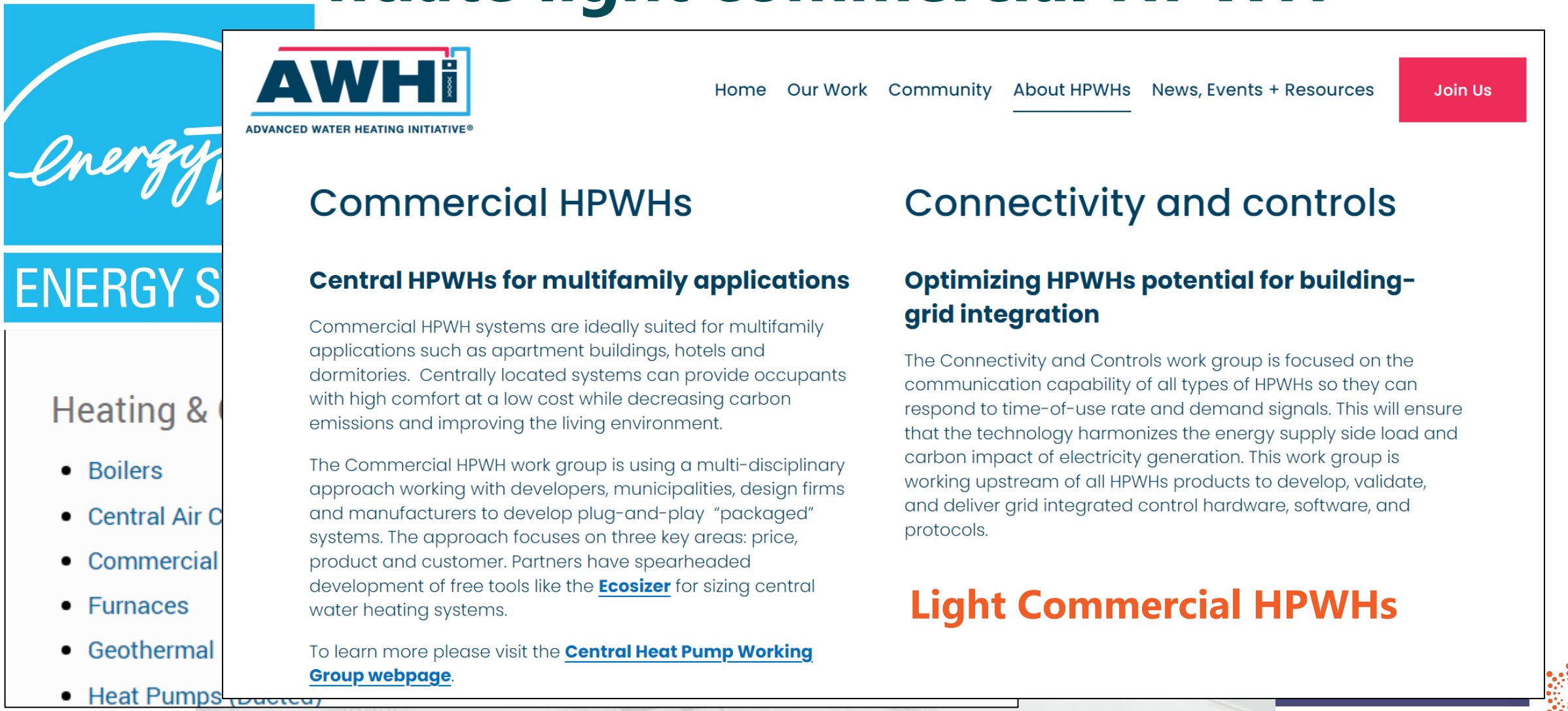
Light Comm Solutions includes residential HPWH equipment

- ❑ Conduct a field study
- ❑ Create commercial case studies
- ❑ Talk with residential HPWH manufacturers about commercial applications

Recommendation: **Update existing resources to differentiate light commercial HPWH**



There is a lot of opportunity for easy/simple water heater replacements with light commercial HPWH solutions

Light commercial HPWH barriers can be addressed. The industry needs to:

1. Demonstrate light commercial HPWH performance
2. Update existing resources to differentiate light commercial HPWH

Questions? Discussion?