OREGON HOUSING & COMMUNITY SERVICES

Multifamily Energy Program

EMERGING TECHNOLOGIES

Solar Thermal for Multifamily

Presenters: Nick Dirr, AEA

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ASSOCIATION FOR ENERGY AFFORDABILITY INC.

WHAT IS A SOLAR THERMAL SYSTEM?

- **Solar thermal systems** are **water heating systems** that use the **sun's energy to heat or preheat water for use within a building (showers, sinks, laundry, etc.).** They are generally designed for use with an electric, gas, or propane back-up heater.

- They are **different from** a **Solar Photovoltaic** (PV system), in that PV systems use solar energy to generate electricity, whereas **solar thermal systems** use solar energy to **capture heat**. Solar thermal systems do not generate electricity.

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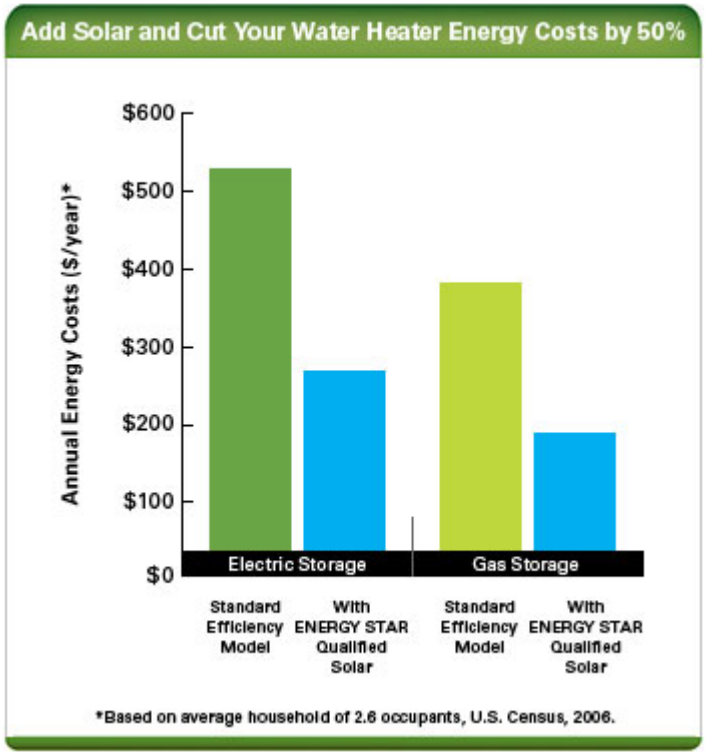
SOLAR THERMAL ENERGY SAVINGS

- **The energy savings come from the percentage of annual DHW energy (electric, propane, or gas) that is now covered by the solar thermal system.**
  - Known as the Solar Fraction %
- **Solar Fractions are typically between 25%-70% depending on building and site specific details.**
  - For example, a 60% solar fraction means that 60% of the property's hot water energy loads is covered by the solar thermal system. The remaining 40% comes from a backup water heater (i.e. electric, gas, or propane water heating system)



Source: US Department of Energy

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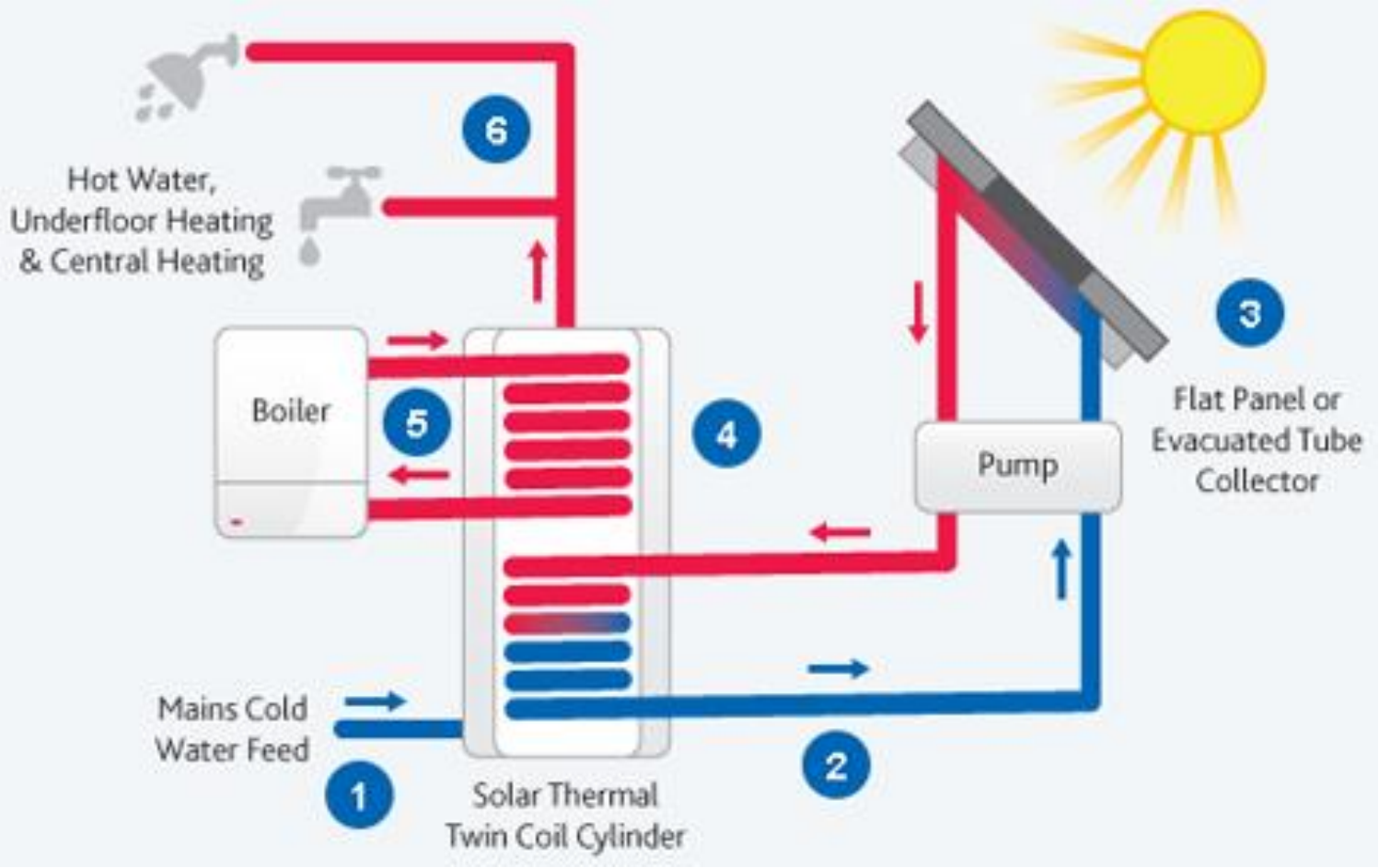
HOW IT WORKS



Source: https://www.npower.com/energy-efficiency/save-energy-products/solar-thermal/

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SITE SPECIFIC CONSIDERATIONS

1. **Need space to store tank**: Solar thermal systems need a large storage tank (usually 100-300+ gallons).
2. **Need pathways to connect plumbing**: Panels and storage tank are directly connected via water pipes. Piping design is especially important when storage tank and panels are in different locations.
3. **Need to minimize shading from trees and structures:** Panels can face south, east, or west. (East or west is only a 10% drop in production relative to south)
4. **Need to account for tie-downs and weight**: Pitched roof or flat roof results in different mounting structures.

Source: https://www.npower.com/energy-efficiency/save-energy-products/solar-thermal/

WHY IS SOLAR THERMAL A GOOD FIT FOR MULTIFAMILY?

Central DHW systems have larger hot water loads, which improves savings and payback.

Larger systems benefit from economy of scale pricing.

Onsite staff able to monitor system for peak performance.

Potential to align with larger rehab event (such as roof replacement).

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WHY CONSIDER SOLAR THERMAL NOW?

- Trained installers and companies are more wide- spread.
- Technology is mature locally and nationwide.
- When paired with more efficient water end uses, the system can have a higher solar fraction.
- Providers and installing are developing innovative financing mechanisms, such as “lease-to-own”.

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BEST PRACTICE CONSIDERATIONS

- ☑ **Consider remote monitored systems to identify performance and help with troubleshooting.**
- ☑ **Recommend entering into operations and preventative maintenance contracts to identify repairs before its to late.**
- ☑ **Educate onsite staff to monitor system performance.**

Source: https://www.npower.com/energy-efficiency/save-energy-products/solar-thermal/

INFLUENCE ON OR-MEP INCENTIVES

Tier	Savings Threshold	Incentive
Tier 1	≥ 20% kWh savings compared to baseline*	$0.80 / kWh saved
Tier 2	≥ 25% kWh savings compared to baseline*	$0.90 / kWh saved
Tier 3	≥ 30% kWh savings compared to baseline*	$1.00 / kWh saved

**baseline is code in New Construction and existing conditions for retrofits*

Incentives for Whole Building Path calculated as follows:

[% Savings Incentive Tier Rate ($/kWh)] X [Total kWh Modeled Savings]

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QUESTION BREAK

THANK YOU FOR ATTENDING

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www.oregonmultifamilyenergy.com

Email

OregonMultifamilyEnergy@trcsolutions.com

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