U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

# Hot Water Temperature Maintenance Efficiency Opportunities

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FEMP Federal Energy Management Program

# FEMP's Water Management Program

- FEMP aims to train energy managers to be water managers by providing them tools and resources to develop a comprehensive water management program.

- FEMP strives to help agencies establish priorities based on a thorough evaluation of current water consumption, efficiency measures, and alternative water opportunities.

- FEMP will continue to evolve and expand its water programming and services, including the development of new maps and tools, to meet the new Administration priorities around efficient water management, climate adaptation, and net zero design.

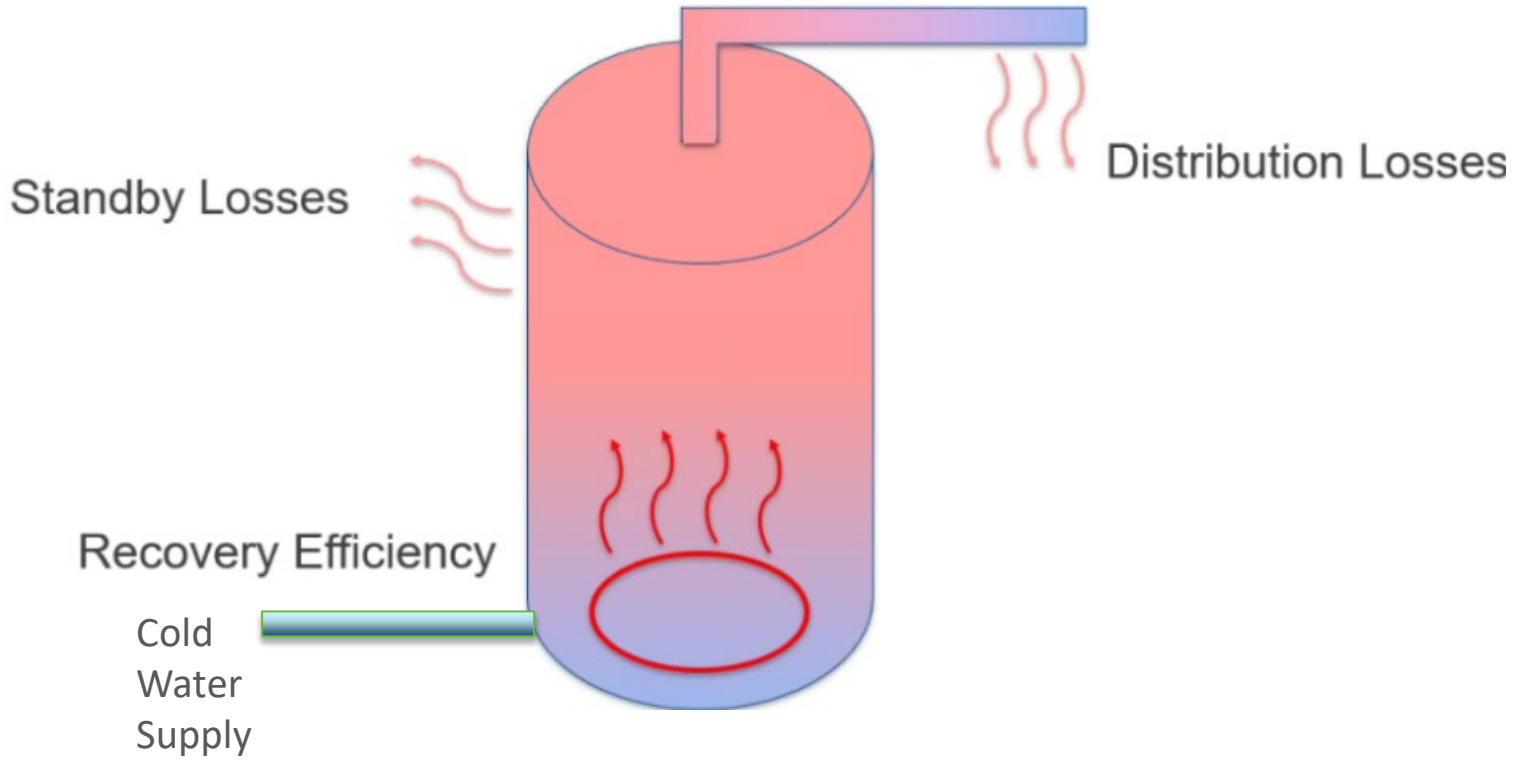
# Hot Water Temperature Maintenance (HWTM)

## What is HWTM?

System of pipes, valves, and pumps to maintain Hot Water at fixtures

## What is the GOAL of HWTM?

Provide reliable Hot Water with minimal wait time, saving both water & energy




***NOTE: This briefing focuses on HWTM systems, not domestic hot water (DHW) generation systems, which are the primary source of heating incoming cold water supply.***

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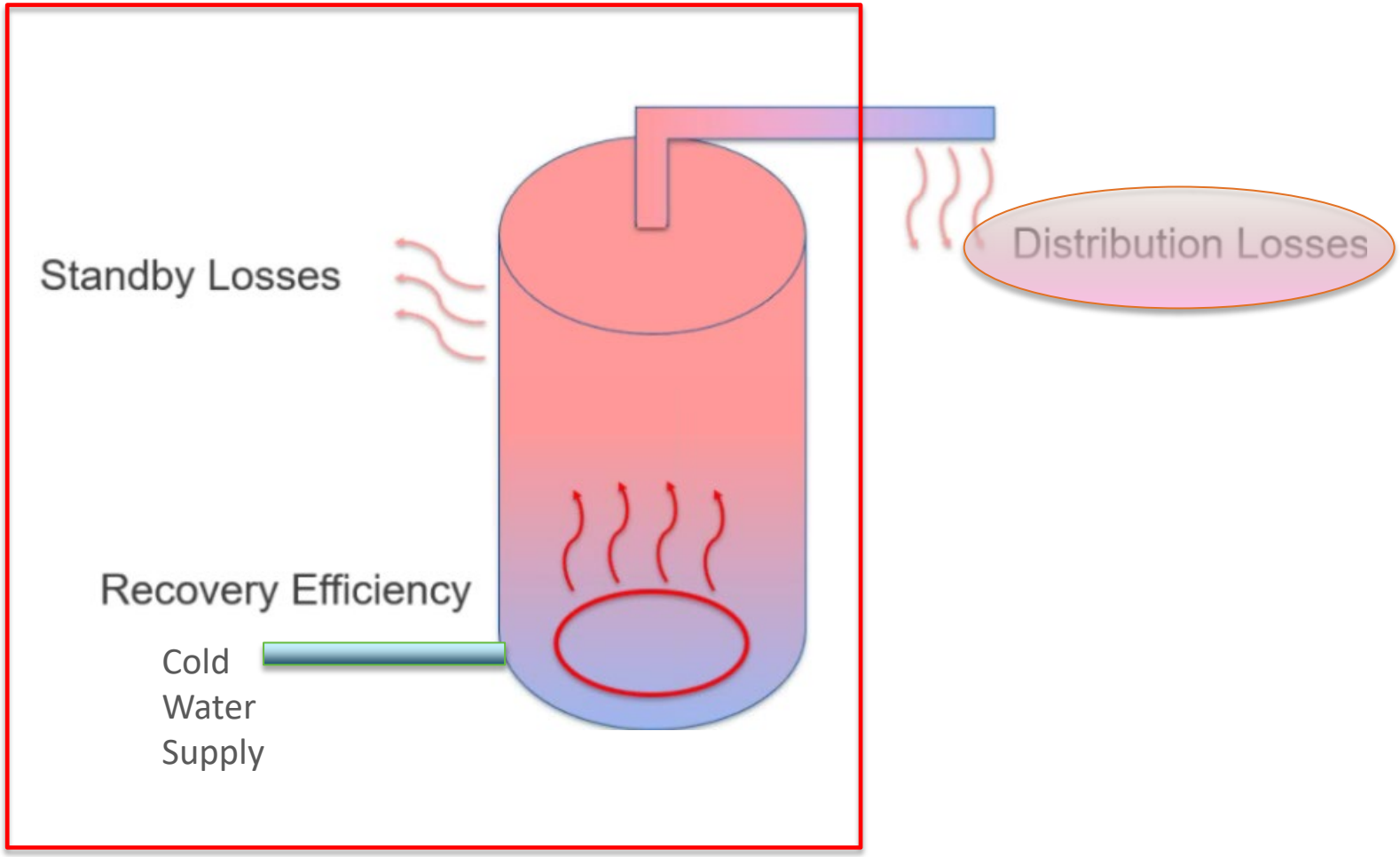


DHW Generation

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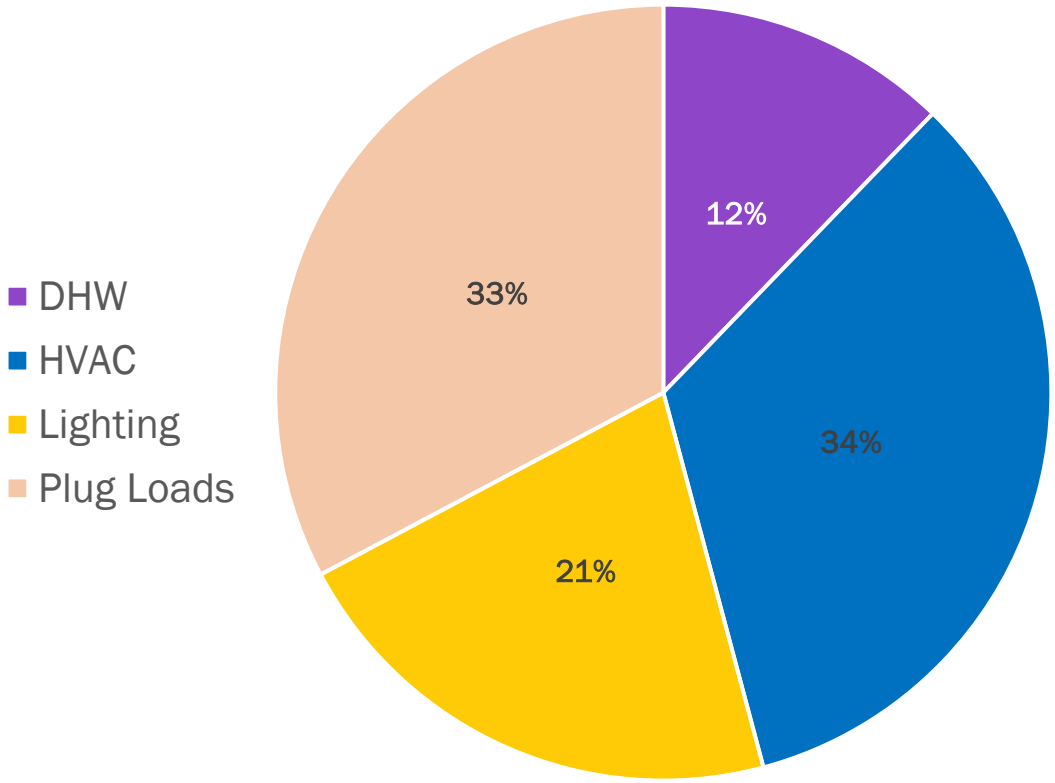
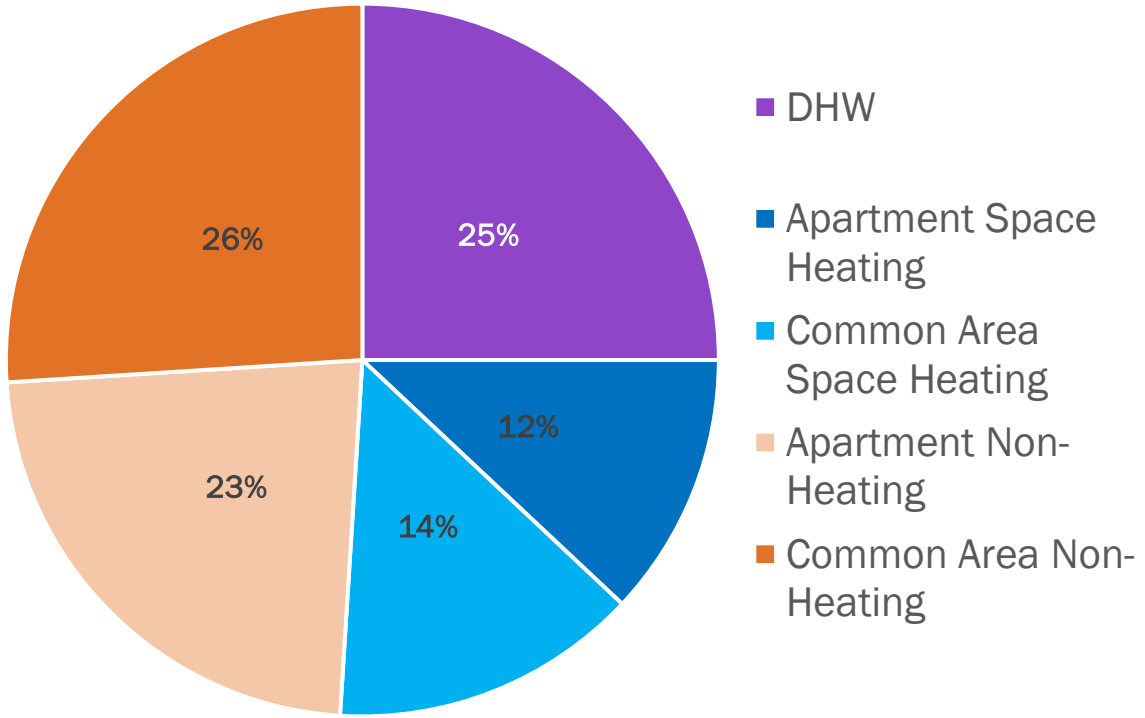
# Domestic Hot Water (DHW) Energy Use

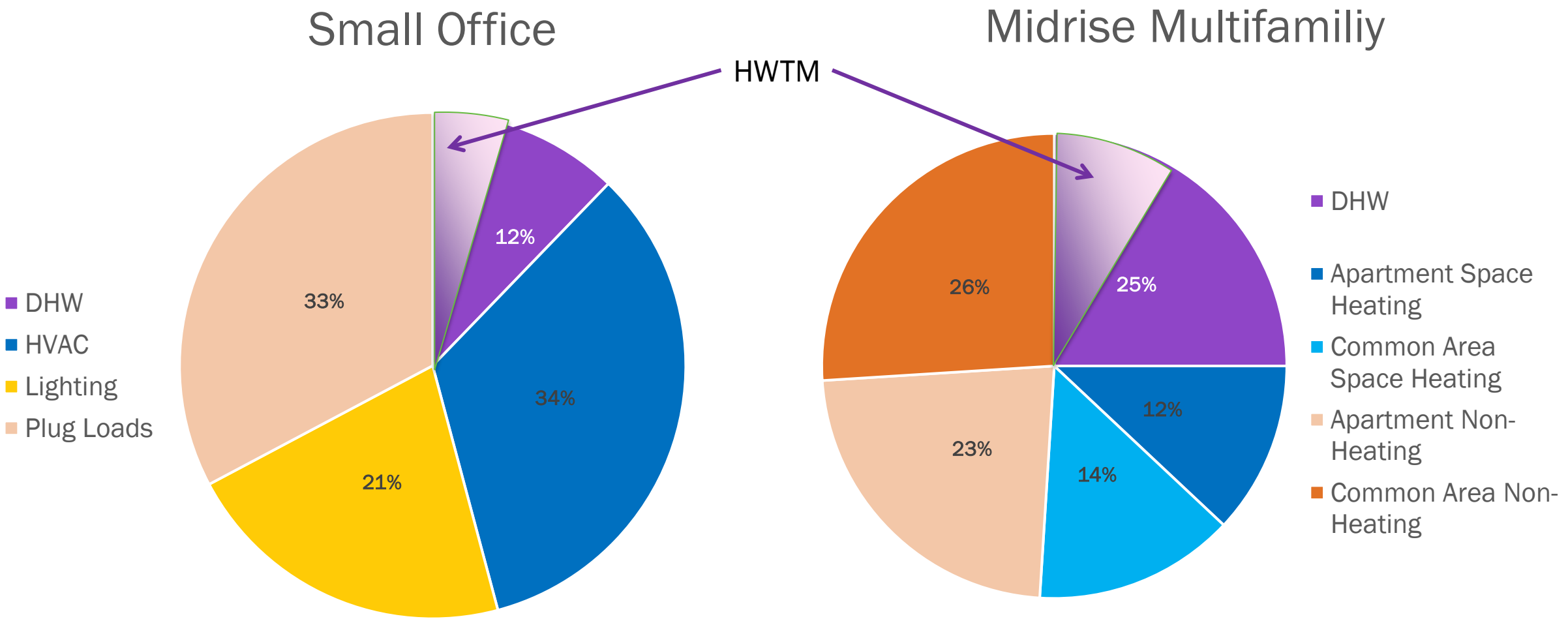
## Small Office



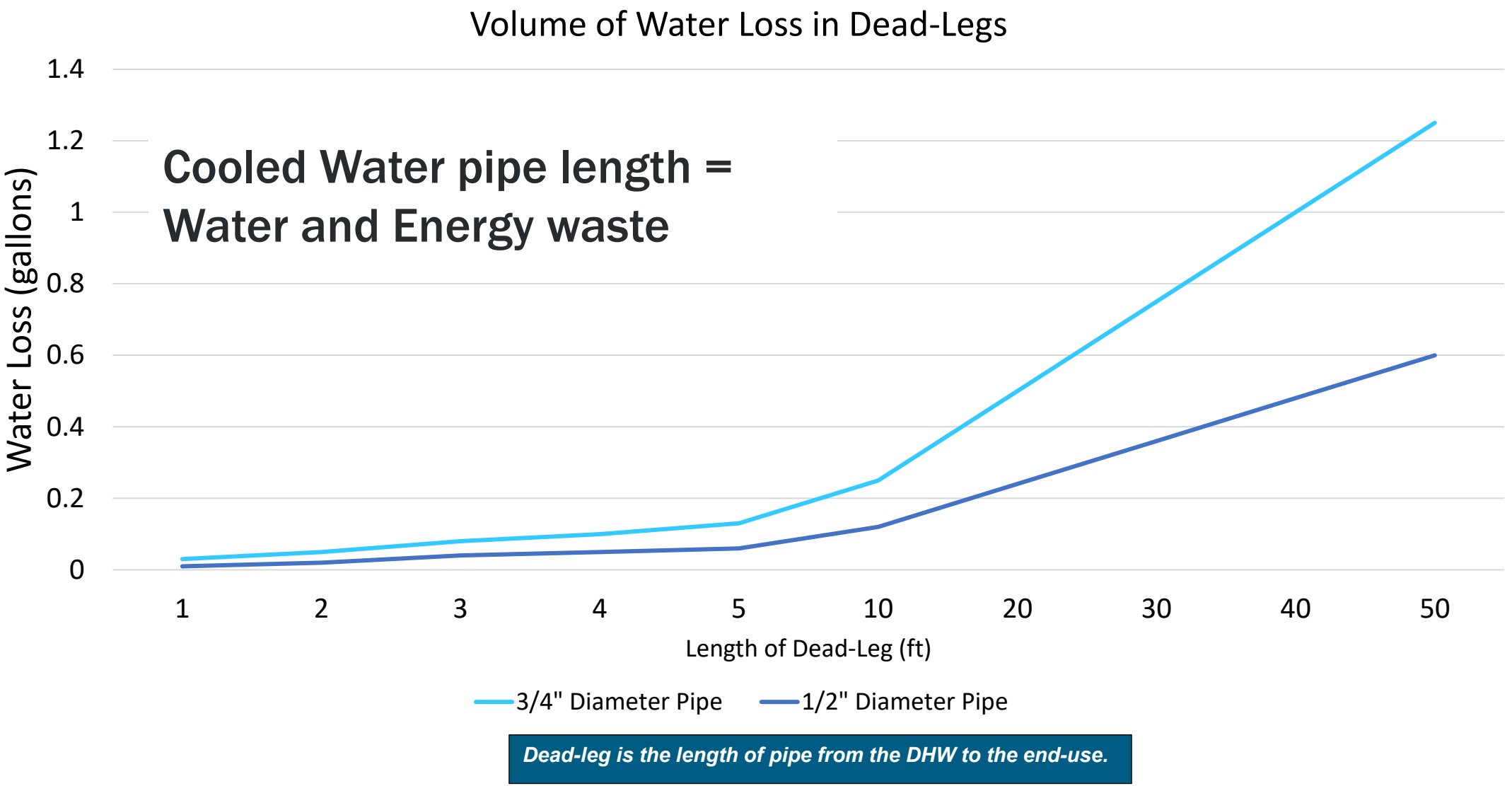

## Midrise Multifamiliy



# Domestic Hot Water (DHW) Energy Use



# Why good design matters!

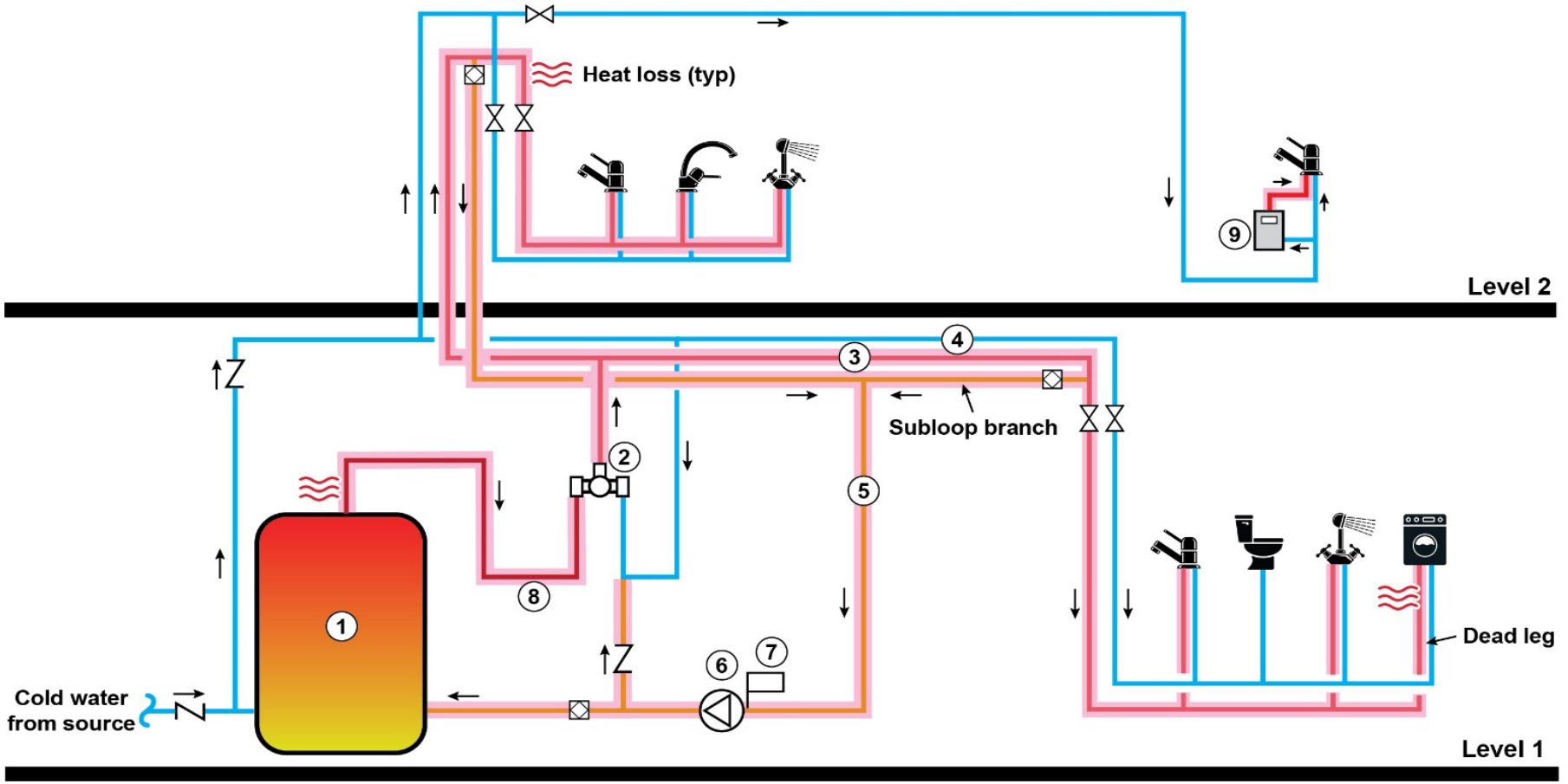



**Cooled Water pipe length = Water and Energy waste**

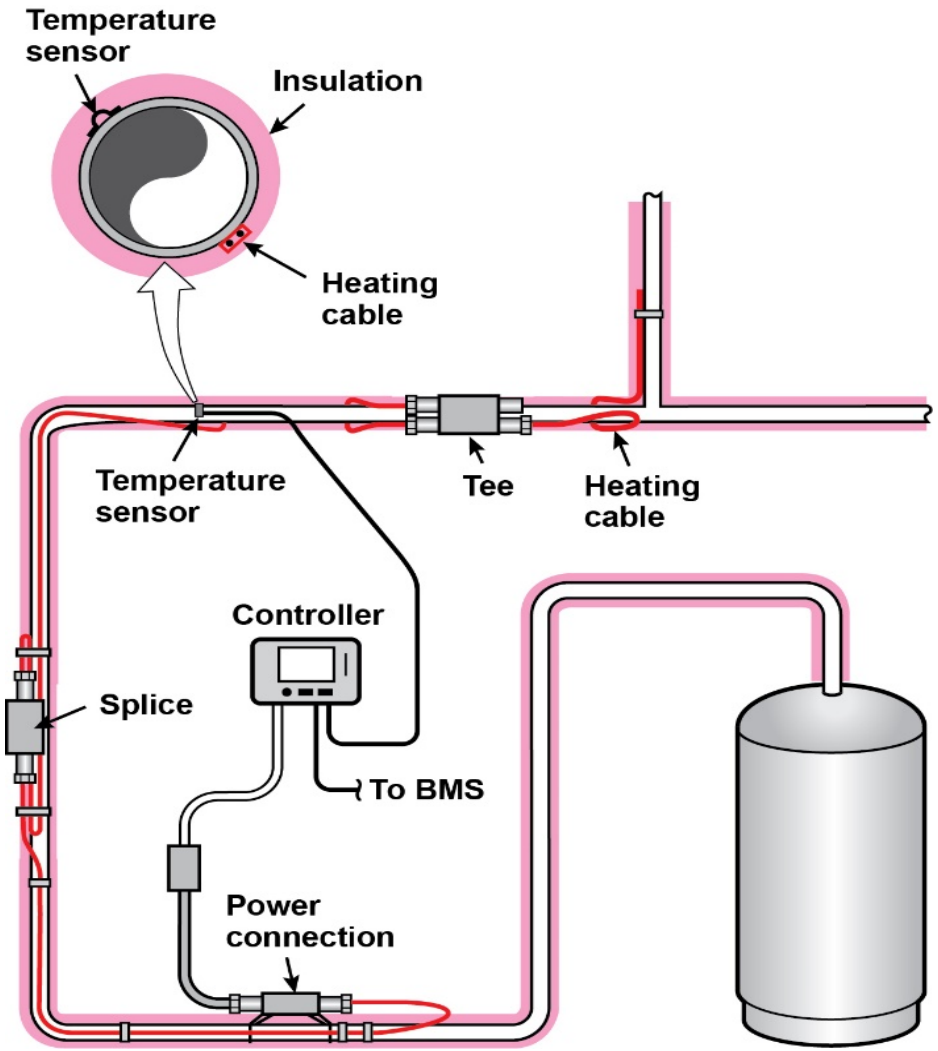
***Dead-leg is the length of pipe from the DHW to the end-use.***

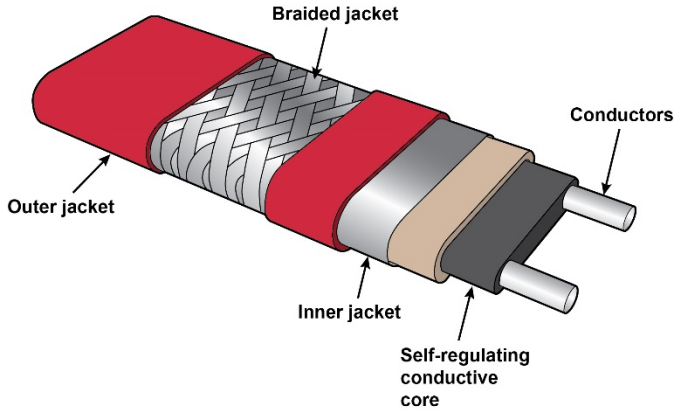
# Traditional Hot Water Recirculation System (HWR)

- Supply and Hot Water Return Loop
- Balancing Valves
- Pumps

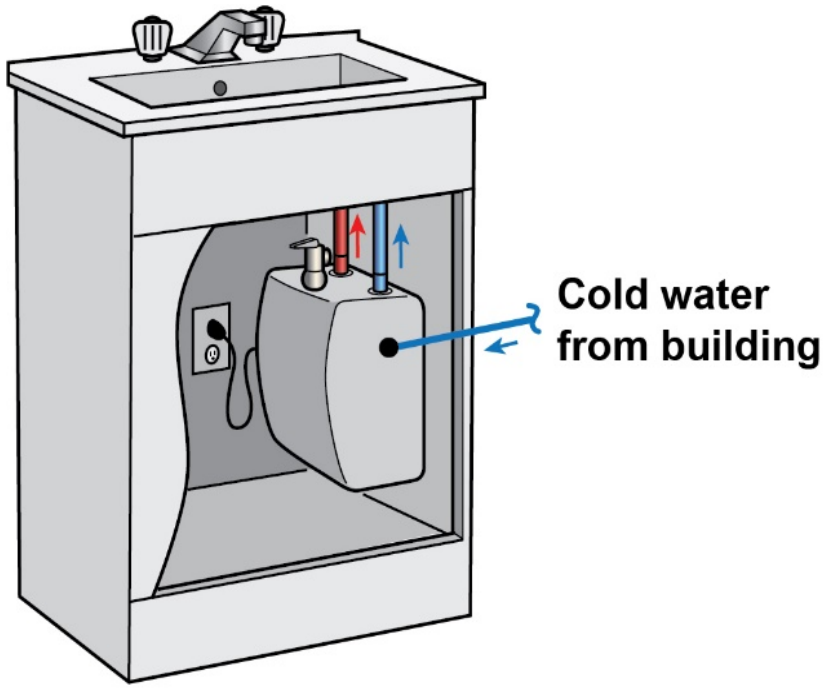


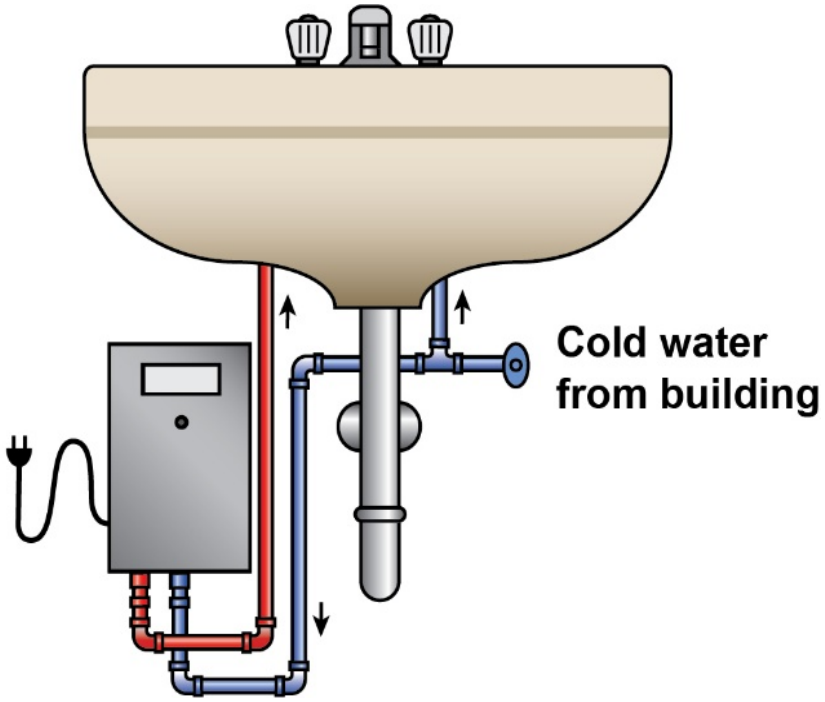
# Alternative HWTM Systems – Self-Regulating Heat Trace



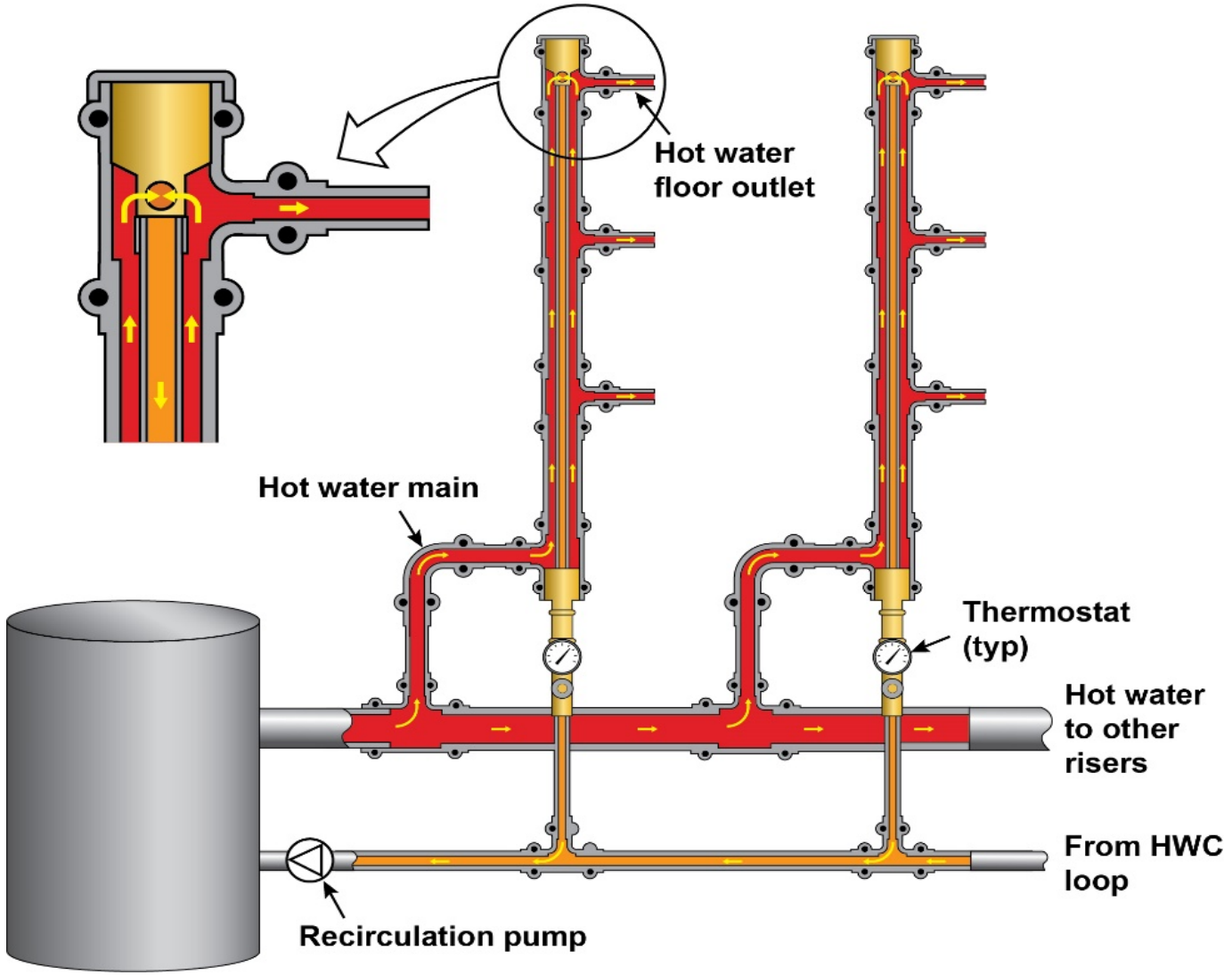



# Alternative HWTM Systems – Point-of-Use

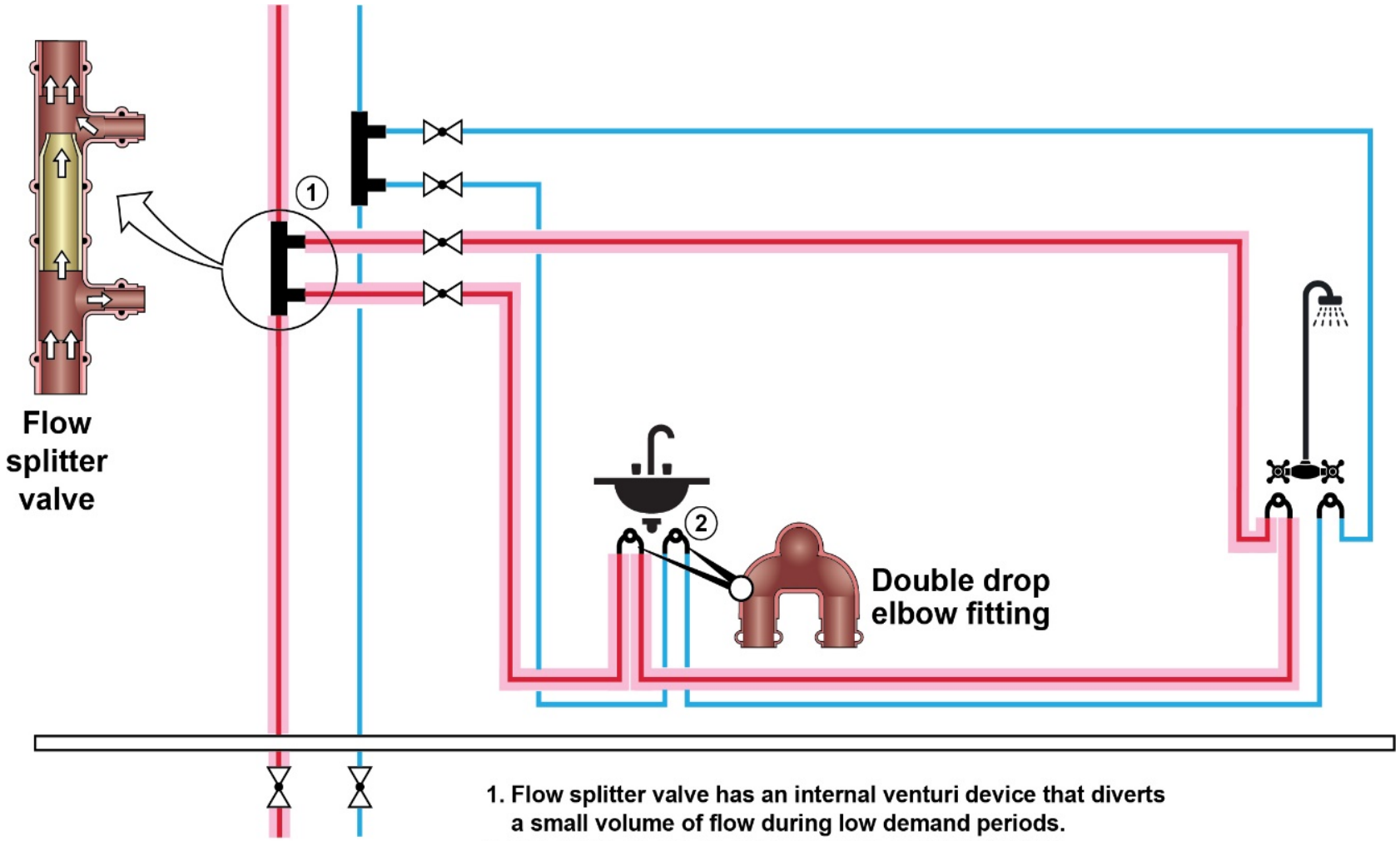


# Alternative HWTM Systems – Internal Recirculating System

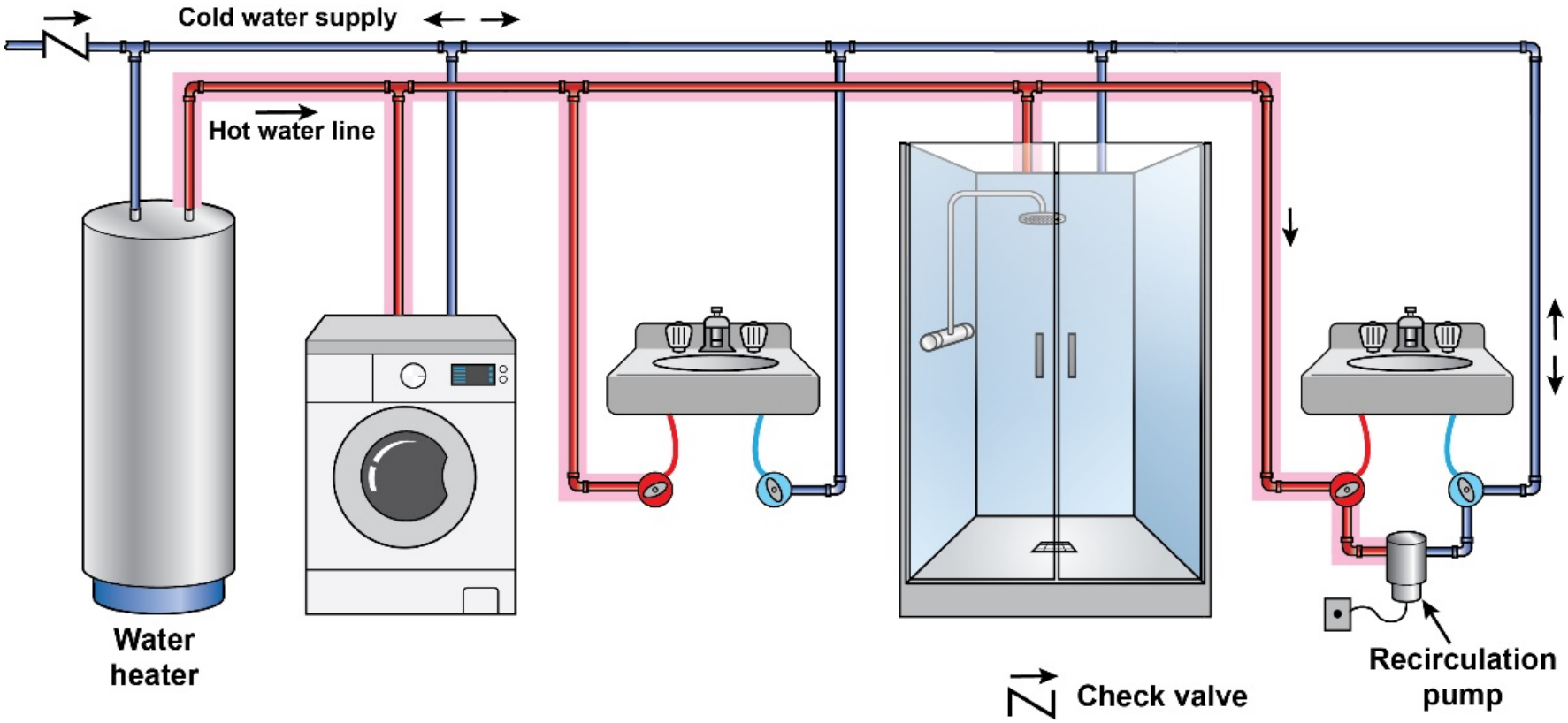


# Alternative HWTM Systems – Flow Splitter System




1. Flow splitter valve has an internal venturi device that diverts a small volume of flow during low demand periods.
2. The subloop can be connected via a typical t-fitting, or specialty double drop elbow to minimize dead legs.

# Alternative HWTM Systems – Demand Recirculation



# System Comparison to Traditional HWR Baseline

| Measure | Self-Regulating Heat Trace | Point-of-Use | Internal Recirculation System | Flow Splitter System | Demand Recirculation |
|---|---|---|---|---|---|
| Energy Use* | Lower | Lower | Comparable | Comparable | Lower |
| Water Use | Lower | Lower | Comparable | Comparable | Lower |
| Operating Costs | Lower | Lower | Comparable | Comparable | Lower |
| Installation First Cost | Comparable | Lower | Higher | Higher | Lower |
| Ease of Retrofit | Higher | Higher | Lower | Lower | Higher |
| Improved Legionella Control | Lower | Higher | Comparable | Higher | Lower |

* Does not include energy used to heat incoming cold water supply

# Thank you!

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