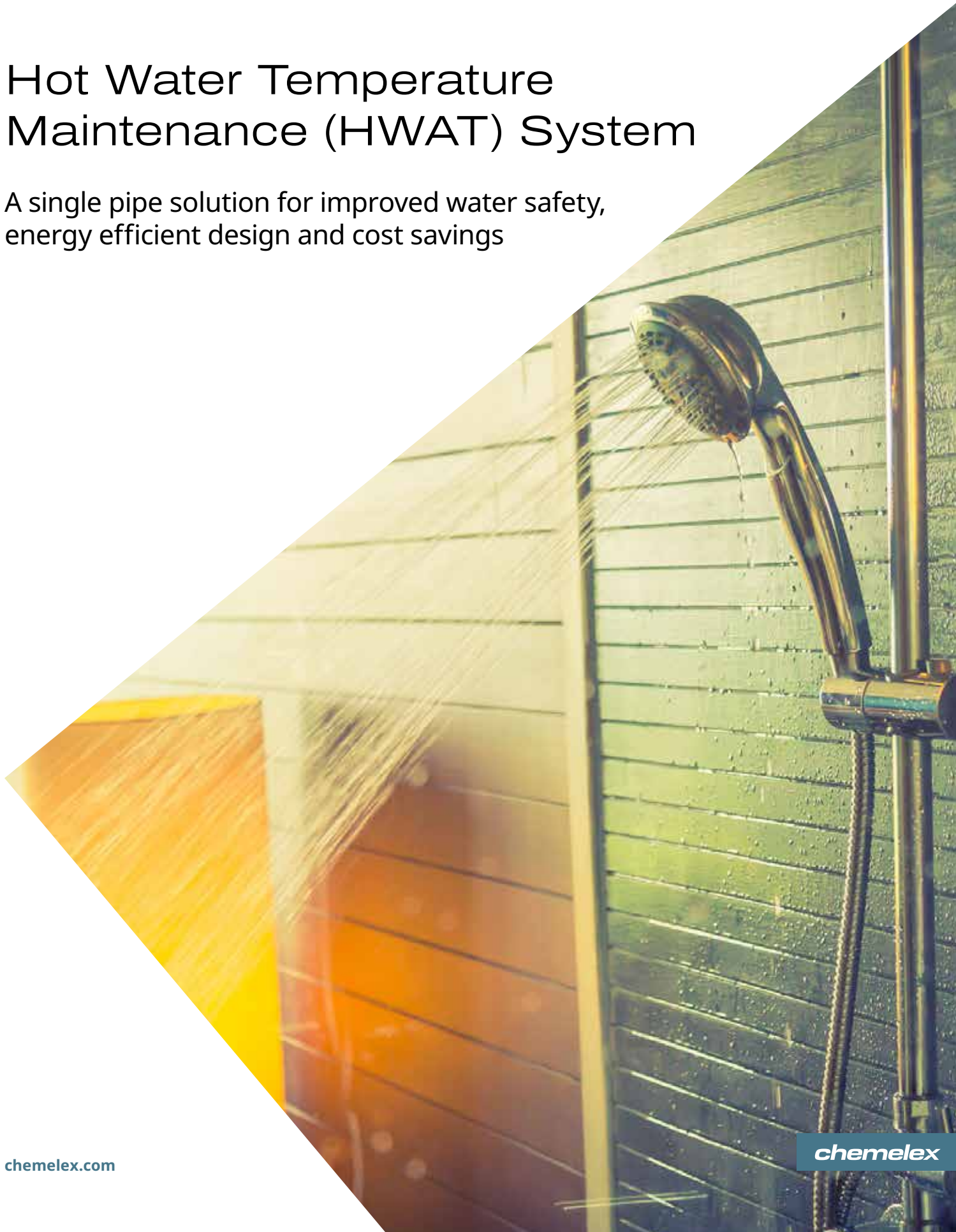


**Raychem**

*excellence is everything*

# Hot Water Temperature Maintenance (HWAT) System

A single pipe solution for improved water safety, energy efficient design and cost savings



# Make the Right Choice in Hot Water Supply Systems

Delivering hot water is the industry's greatest challenge. Customers increasingly demand safe and comfortable hot water delivery solutions that are also cost effective and easy to design.

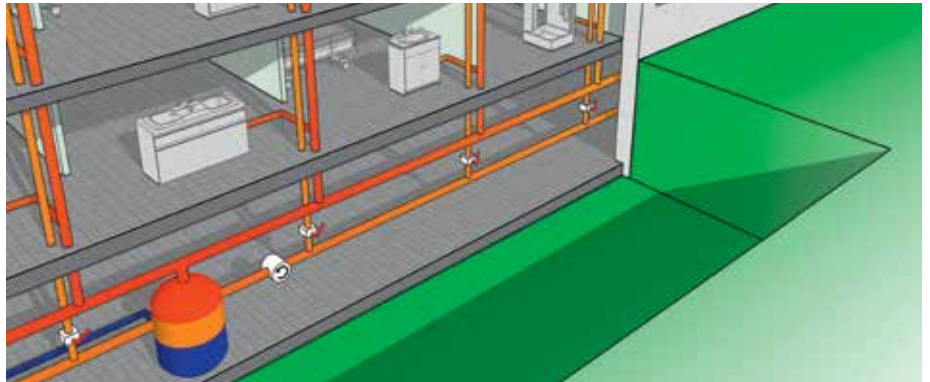
Water safety and the efficient use of water and energy resources has become increasingly important.

While delivering hot water without wasting water or power is a requirement of any modern hot water system, the system must also be easy to design, install and operate economically.

The Raychem Hot Water Temperature Maintenance System (HWAT) single pipe solution delivers these vital requirements.

## THE CONVENTIONAL SOLUTION: THE RECIRCULATION SYSTEM

- Heat losses from the hot water distribution pipes are compensated for by increased water temperature at the water heater.
- A pump circulates hot water continuously throughout the pipe network and returns unused water back to the heater.
- The hot water in the pipes nearest to point of use are typically not part of the circulation system and will gradually cool down during periods of non-use, resulting in water that is wasted while waiting for hot water to arrive.



## Requirements for Hot Water Systems



QUALITY & COMFORT



ECONOMICAL DESIGN



WATER & ENERGY SAVINGS

## BUILDING A MORE SUSTAINABLE AND ELECTRIFIED WORLD



### Energy Efficiency

Our solutions improve energy efficiency for our customers.



### Customer Productivity

Our solutions reduce labor cost in design and installation, improve utilization and reduce total cost of ownership.



### Safety

Our solutions improve end-user safety and help our customers enhance the safety of their operations.



### Resiliency and Protection

Our solutions add resiliency to critical systems by helping keep them safe from natural and manmade disruptions.



### Lifespan and Serviceability

Our solutions extend the lifespan of our customers' systems, reducing waste and lowering cost.



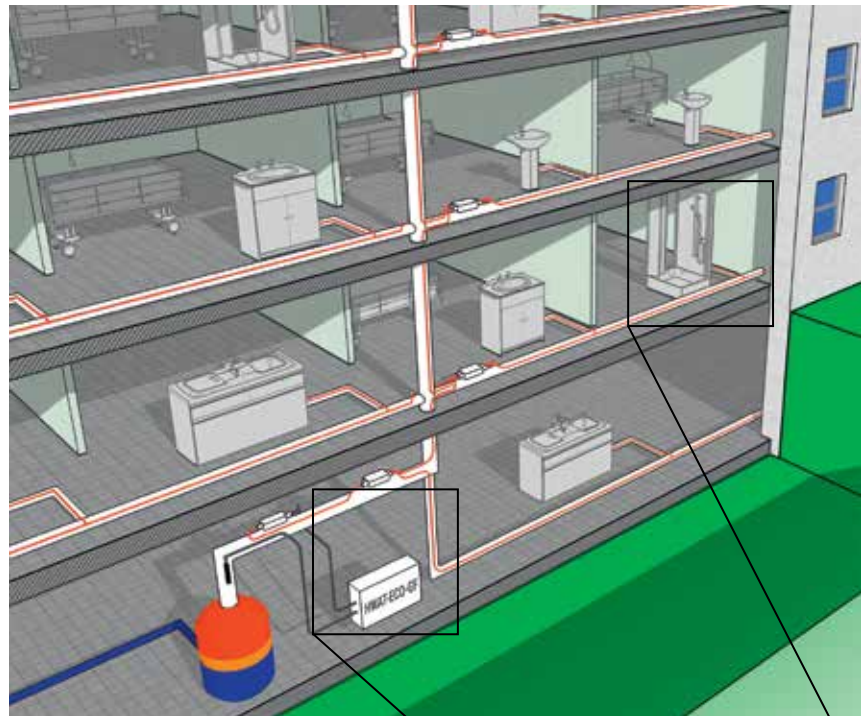
### Eco-Friendly

We support customers sustainability goals by developing environmentally friendly products and solutions.

# Make the Right Choice in Hot Water Supply Systems

## THE ALTERNATIVE: THE HWAT SINGLE PIPE SYSTEM - A SIMPLY BETTER SOLUTION!

- HWAT heating cables, using either 120 V or 208-277 V available power, are attached to a single hot water pipe beneath the insulation which keeps hot water at the specified temperature all the way to each point of use which virtually eliminates waiting for hot water. Having 120 V and 208-240 V HWAT system options facilitates easy integration into Commercial buildings electrical service infrastructure.
- Easy to program controllers monitor the boiler and pipe temperature and power the HWAT cable only as needed to maintain the desired hot water temperature.
- Maintaining hot water temperature to point of use improves water quality and user's comfort and satisfaction.
- HWAT systems are simple to design and install. Eliminating traditional recirculating system's return lines, pumps, and valves simplifies designs, decreases design time, and saves valuable space in buildings.
- HWAT systems save energy and reduce water consumption. HWAT also reduces water discharged to municipal sewers and simplifies pay for use metering and billing, which encourages further conservation.



## HOW DOES IT WORK?

### The key components of the smart HWAT hot water temperature maintenance system:



#### 1 The HWAT heating cable compensates for heat lost

The self-regulating heating cables compensate for heat lost when hot water is not flowing, keeping hot water at the specified temperature.



#### 2 Insulation reduces the heat loss

Pipes must be insulated with specified thermal insulation to maintain the desired pipe temperatures.

Proper thermal insulation means:

- Lower heat losses
- Lower operating costs

**All hot water supply systems require insulation whether recirculation or single pipe systems!**



#### 3 Smart controllers for safe and economical operation

Easy to program controllers optimize system performance. The Raychem HWAT-ECO-GF controller contains pre-installed programs for different building types with options to fine tune programming for each building's unique requirements.



#### 4 Easy Installation

Electrical connections are fast and easy with the Raychem RayClic connection system. Approved Heat Shrink connection kits are also available.

# Water Quality & Comfort

## HWAT SYSTEMS IMPROVE WATER QUALITY

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Studies show that *Legionella* bacteria grows in numbers in water with temperatures between 77-115°F (25-46°C). HWAT temperature control systems can effectively maintain the temperatures required for your building services *Legionella* risk management program. See ASHRAE 188-2018 and CIBSE TM13: 2013 for additional information for the proper design, installation, operation, maintenance and management of your building water systems to minimize the risk of *Legionella* disease. Agency Approved electrical heat trace systems, such as HWAT, are specifically approved by ASHRAE 188 Guideline 12 Addendum B as an effective *Legionella* control method.

Self-regulating HWAT heating cable is easy to install on all supply piping to point of use ensuring that instant hot water is available at every tap.



## HWAT IMPROVES USER COMFORT AND SATISFACTION

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By maintaining specified temperatures close to point of use, people no longer need to wait for hot water to arrive while watching precious water go needlessly down the drain. This improves satisfaction and hygiene while saving money and resources. HWAT also reduces water discharged to municipal systems and related treatment costs.



**WARNING:** Water temperature above 130°F (55°C) presents a significant risk of personal injury and/or death and requires that scald protection measures be implemented for safe use.

# Economical by Design!

## **FLEXIBILITY**

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### **Flexible and space-saving hot water delivery systems**

- The space needed for pipes is reduced, because no return pipes are needed. Risers, shafts and other openings can be reduced freeing space for other use.
- Existing building may be renovated or have extra stories or other spaces added. With the HWAT system, these new sections can be connected to the existing hot water temperature maintenance system easily, rapidly and economically.
- With smart single pipe solutions, it becomes easier and more cost-effective to monitor energy and water consumption. By monitoring at the individual unit or area, the ability to invoice by use is gained which encourages conservation.

## **LOW INVESTMENT COSTS**

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### **The system requires fewer components and simplifies installation**

- There are no pumps, control valves or double water meters to install, and the HWAT cable is easily attached directly to the hot water pipe under the thermal insulation.
- Time-consuming installations of return pipes is eliminated.
- Smart controls and RayClic connections further reduce time needed to program and install.

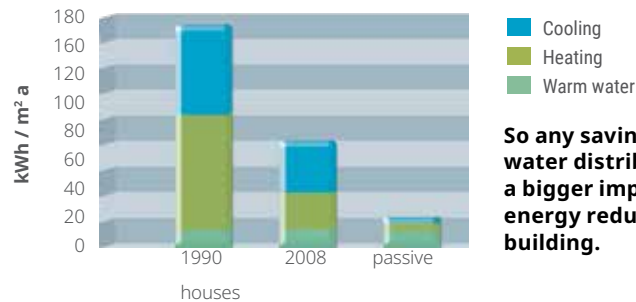


# Economical: Saving Energy & Money

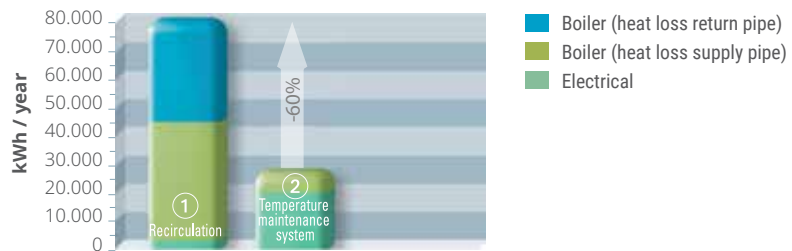
## MAXIMIZE BUILDING EFFICIENCY AND VALUE

HWAT systems improve building efficiency reducing total operating costs by as much as 16%. HWAT systems can also reduce water and energy waste.

The larger the building, the greater the savings. For instance, HWAT systems eliminate the need for recirculation plumbing and boilers every 10 floors in a high-rise building. Coupled with better temperature maintenance from less heat loss, self-regulating systems can also save an average of 5-6% in energy costs and reduce water waste in even a moderately-sized apartment by over 357,000 gal/year.



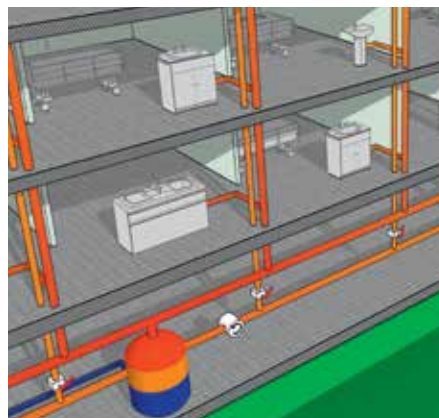
So any savings on the warm water distribution will have a bigger impact on the total energy reduction of the building.



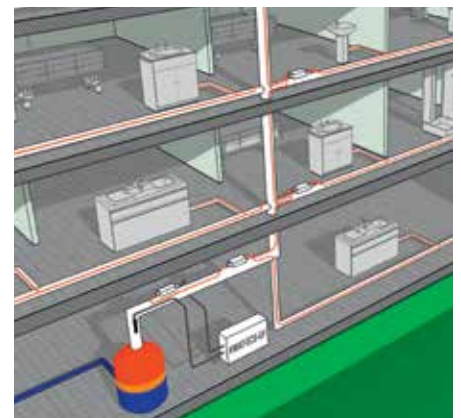
## HWAT - LEED POINT ELIGIBLE

The USGBC has proven that HWAT systems lower energy use. As a result, building owners may receive LEED credit points - an important distinction for many building owners. HWAT systems contribute 1 to 3 LEED points to Reduced Consumption of Source Energy, and 1-point credit for Innovation and Design. This is significant, particularly in regions where energy costs and consumption are high. LEED has proven to be a critical component in maximizing a building's future income potential, since the higher the LEED rating for a building, the higher the building's value!

Quite simply, the less energy consumption, water waste, and amount of materials needed to construct a building, the better the impact on embedded carbon reduction. HWAT systems deliver on all counts.



Traditional Recirculation System



Single-Pipe System

# Ecological: Saving Water

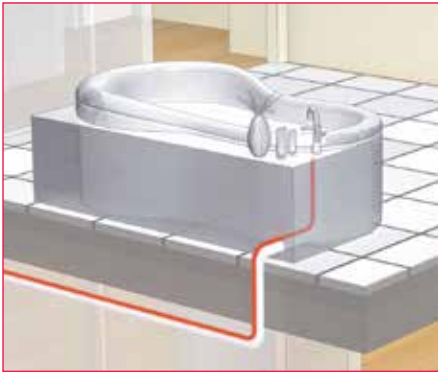
## SAVE WATER!

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There's no questioning the vast impact that warm water supply has on the environment.

5.5% of our total energy needs is consumed by hot water generation and this will increase during the coming years.

In addition to energy, buildings consume a significant amount of water. With these environmental impacts, hot water distribution systems are becoming increasingly considered for consumption-saving initiatives.



The HWAT single pipe system solution provides safer and more efficient hot water to each point of use that has a big impact on the environment and user's water and energy costs.

### Reduced Water Waste Example

Moderate income apt., 600 units, 2 tenants per apartment

- 2 showers/day, waste 0.4 gal per shower
- 2 washes/shaves/day, waste 0.42 gal per event

Total waste: 357,700 gal/year = 1,354,000 0.5 L bottles



# What Our Customers Say

## RESIDENTIAL COMMUNITIES IN MAJOR CITIES ARE CHOOSING HWAT SYSTEMS FOR THEIR PROPERTIES

While the needs of each property varies, HWAT systems have demonstrated the ability to save money and increase energy-efficiency in high-rises and sustainability-focused communities..

Bruce Jaffe, a principal at MG Engineering, rethought the standard potable domestic hot water generation and distribution by utilizing electric temperature maintenance hot water heat trace cable in lieu of the industry standby recirculation pump method for plumbing code compliance.

MG Engineering's innovative designs result in cost-efficient construction and reduced mechanical shaft requirements, mechanical and electrical room space, building fuel use and greenhouse gas emissions, and water waste—all while supplying instant hot water for building tenants.

According to Mr. Jaffe, electric temperature maintenance cable systems decouple the zone pressure from the water heater pressure. "This permits us to create a master hot water plant, which minimizes overall space and BTU requirements. The system is simplified by eliminating equipment and its associated installation requirements," he concluded.

Source: Electrification Improves High-Rise Hot Water Design, NEMA Magazine, January 2018, <https://blog.nema.org/2018/01/06/electrification-improves-high-rise-hot-water-design/>



## SUSTAINABILITY AND HEALTHY LIVING COMMUNITY

Grow Community is a new urban neighborhood on Bainbridge Island, just outside of Seattle. The homes are entirely solar-powered and designed with energy-efficiency at heart. In 2017, the energy performance of 3 different hot water maintenance systems in

3 similar 12 unit multi-family buildings were compared.

### Key Findings:

1. Adjusted for occupancy loads, the HWAT heat-traced single pipe building reduced energy lost to maintain hot water temperatures by 70% versus the traditional recirculation building.
2. Adjusted for actual hot water used, the HWAT heat-traced single pipe building reduced energy consumed to maintain hot water temperatures by 25% versus the traditional recirculation building



Source: 2017 Case Study, grow community, Bainbridge Island Washington State 2017, written by Shawn Oram, PE at Ecotope.

# Have Your Next Project Calculated & Compared

## CHEMELEX PROVIDES FREE CALCULATIONS TO BENCHMARK ENERGY CONSUMPTION AND LIFETIME COSTS

The SaveWatt calculation and design software compares the effectiveness of a hot water temperature maintenance system with that of a circulation system.

### Comparison of:

- Investment costs
- Energy consumption
- Operating costs
- Amortisation (lifetime cost)

The program contains modules with which the optimum temperature settings can be calculated. The software also creates a bill of materials for the project.

## SAVEWATT CALCULATION AND DESIGN SOFTWARE: COMPARISON BETWEEN A TYPICAL SINGLE PIPE SYSTEM AND RECIRCULATION

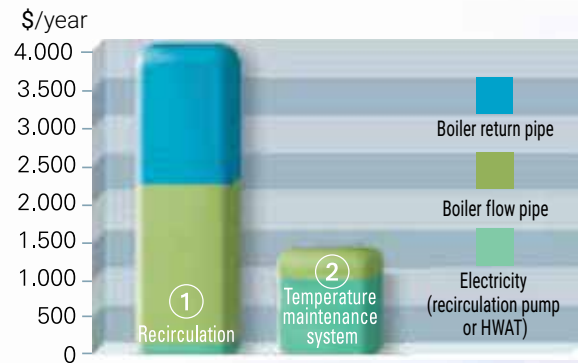
Example, illustrating potential savings versus a hospital equipped with recirculation (with 370 m of flow pipe).

### 1. Investment costs



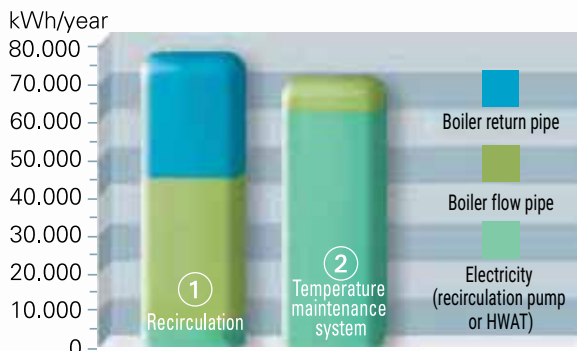
Investment costs:  
13% less than in a circulation system

### 3. Operating costs



Operating costs:  
10% lower operating costs

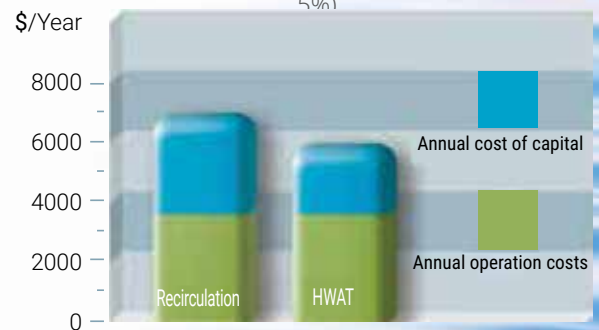
### 2. Energy demand



Only 36% energy demand

### 4. Depreciation

(period of use 20 years, rate of interest 5%)



Depreciation: 10% saving of the capital and operating costs per annum

# Hot Water Temperature Maintenance System

## **ECONOMICAL & ECOLOGICAL FROM THE GROUND UP!**

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### **1. Efficient use of water**

- Encourages conservation and reduces water wastage caused by waiting for cold water to clear and hot water to arrive
- Reduces water discharged to municipal sewers
- Simplifies pay for use metering and billing

### **2. A more hygienic and comfortable solution**

- ASHRAE 188 Guideline 12 approved Legionella control technology
- Can be an effective part of your building services Legionella risk management program
- No more waiting for hot water to arrive improves hygiene and user satisfaction

### **3. An energy-friendly and cost saving system**

- 120 V and 208-240 V system options easily integrate into Commercial buildings electrical service infrastructure
- HWAT can save as much as 60% on power when compared to a comparable recirculation system
- No return pipe, so lower heat loss from only one pipe
- USGBC Approved – LEED points eligible

### **4. A reliable and low maintenance solution**

- No recirculation pump – no parts to wear out
- Fewer pipes, no control valves or pumps
- No hydraulic compensation with occupancy changes
- Up to 40 year expected life and 10-year warranty on heating cables



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**chemelex**  
excellence is everything

**Raychem Tracer Pyrotenax Nuheat**