Domestic Hot Water

A guide to domestic hot water solutions that improve comfort, marketability, and energy efficiency.
The performance of domestic hot water systems is often contingent on the function of other building systems. Domestic hot water upgrade decisions should be made in the context of how other systems will impact hot water heating operation and performance.

Investing in operations and maintenance best practices ensures that building systems run optimally, enabling proper performance in existing equipment and maximizing return on investment in new systems. Best practices for domestic hot water systems include:

- Install low-flow fixtures and aerators.
- Insulate pipes and tanks.
- Monitor pipes and hot water heaters for leaks using leak-detection software or periodic field inspections.
- Repair leaks and clean pipes of buildup.
- Reduce set points to appropriately reflect building hot water needs.
- Conduct routine surveys and continual commissioning of equipment to ensure optimal system functioning.

Domestic hot water systems that rely on the same boiler used for heating the building waste considerable amounts of fuel during warmer months when heating is not required.
hot water efficiency measures

Installing high-efficiency heating equipment and implementing simple maintenance measures, such as installing pipe insulation and adjusting set points, reduces heat and water waste and reduces utility costs.

**Key**

<table>
<thead>
<tr>
<th>EASE OF IMPLEMENTATION</th>
<th>ADDED BENEFITS</th>
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<tr>
<td>EASE</td>
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<tr>
<td>not easy</td>
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<td>easy</td>
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**Ease of Implementation** reflects technical and financial feasibility.

Measures marked “not easy” are typically expensive, complex, highly disruptive, or pay back slowly, while “very easy” measures tend to be inexpensive, quick, and straightforward.

<table>
<thead>
<tr>
<th>PROJECT IMPACT</th>
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<tr>
<td>IMPACT</td>
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<td>moderate impact</td>
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<td>high impact</td>
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**Project Impact** reflects potential to reduce energy and emissions and to improve system performance.

“Low impact” measures typically yield minor savings and incremental improvements, while “high impact” measures achieve major savings and comprehensive improvements.

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**Reduce Water Loss**

Install Low Flow Fixtures & Appliances

Install low-flow fixtures that use far less water than conventional fixtures (e.g., WaterSense labeled models) and high-efficiency, ENERGY STAR-certified clothing and dish washers.

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**Clean & Repair Piping**

Clean and repair piping as needed. Old pipes are susceptible to leaks and miserable buildup that can reduce flow rates.

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**Reduce Water Loss, cont.**

Install Aerators

Install aerators to reduce the flow of water from faucets without reducing pressure.

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Install Leak Detection Sensors

Install sensors to identify when and where leaks occur.

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**RATING SYSTEM METHODOLOGY**

Ratings and benefits of energy conservation measures were assigned based on NYC energy audit data and analysis by industry experts. Actual results will vary by building type, use, and baseline conditions.
### Reduce Domestic Hot Water Heat Loss

<table>
<thead>
<tr>
<th>Insulate Pipes &amp; Tanks</th>
<th>Add Steam Condensate Heat Recovery</th>
<th>Install Recirculation Controls</th>
<th>Decrease DHW Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add insulation to reduce standby and distribution heat losses from hot water sitting in storage tanks and traveling through pipes to fixtures.</td>
<td>Install a heat exchanger and storage tank to recycle heat from steam condensate and use it to pre-heat DHW.</td>
<td>Install and program variable speed recirculation controls that respond to demand or time-of-day scheduling to reduced heat waste.</td>
<td>After taking measures to reduce heat loss, lower the DHW temperature set-point to save energy and reduce risks of scalding.</td>
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### Reduce Domestic Hot Water Heating Demand

<table>
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<tr>
<th>Separate DHW from Steam Boilers</th>
<th>Consider Tankless or Instantaneous DHW Heaters</th>
<th>Upgrade DHW Boiler</th>
<th>Convert to Air-To-Water Heat Pump</th>
</tr>
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<tbody>
<tr>
<td>Avoid running an over-sized boiler for DHW in the summer. Install a smaller, dedicated DHW boiler and/or storage tank.</td>
<td>Buildings with low DHW demand should consider installing tankless water heaters, which are more efficient and have a longer lifespans than systems that use a storage tank.</td>
<td>Choose a high-efficiency hot water boiler (e.g. condensing models) for fuel-fired systems.</td>
<td>Consider installing air-to-water heat pumps—a high efficiency electric system that transfers heat from air to water, even at low outdoor temperatures.</td>
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</tbody>
</table>
Further Reading

The BE-Ex solution packages cover the following building systems:

- Heating
- Cooling
- Ventilation
- Domestic Hot Water
- Lighting & Plug Loads
- Envelope

To access the suite of solution packages, visit: be-exchange.org/anatomy-solutions

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