Improving the Efficiency and Effectiveness of Delivering the Service of Hot Water

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What Do You Need from your Hot Water System?

- Clean clothes
- Clean hands
- Relaxation
- Clean dishes
- Clean body
- Enjoyment

The service of hot water
What Do You Expect from your Hot Water System?

**Safety**
- Not too hot
- Not too cold
- No harmful bacteria or particulates

**Reliability**
- Little or no maintenance
- Last forever

**Convenience**
- Adjustable temperature and flow
- Never run out
- Hot water now
- Quiet
The Hot Water System

• Treatment and Delivery to the Building
• Use in the Building
  – Water Heater – the source(s) of heat
  – Piping – the means of delivery
  – Fixtures and Appliances
  – Behaviors
  – Water Down the Drain
• Waste Water Removal and Treatment
Hot Water System 1

Diagram showing the flow of energy and water in a hot water system. Energy flows from a fuel source through a water heater to a fixture or appliance. Hot water and cold water are mixed, and the mixed temperature water is drained into a sewer.
Hot Water System 2

- **Fuel Source**
- **Hot Water Circulation Loop**
- **Boiler**
- **Hot Water Storage Tank**
- **Water Source**
- **Apartment, Fixture or Appliance**
- **Drain**
- **Sewer**

Flow of energy:
- Indoor Boundary
- Energy
  - Hot Water Circulation Loop
  - Boiler Loop
  - Mixed Temperature Water

Flow of water:
- Cold Water
- Hot Water

Connections:
- Energy flow from Indoor Boundary to Boiler Loop and back to Energy source.
- Water flow from Fuel Source, through Boiler, and to Apartment, Fixture or Appliance.
Guiding Principle

Provide people what they want...

The Service of Hot Water

with what they expect...

Safety, Reliability and Convenience

as efficiently as possible
Program Concepts

- Look at the system and increase structural efficiency by reducing waste
- Structured Plumbing designs improve material utilization efficiency and system performance
- Demand recirculation, pipe insulation, more water efficient fixtures and appliances and drain heat recovery reduce demand for hot water
- More efficient water heaters, boilers and boiler controls reduce the energy needed to meet this demand
Single Family-New Construction

- Potential reduction in water waste of 90%
- Savings are roughly double that of the clothes washers
- Plumbing design, pipe insulation, demand recirculation and drain heat recovery are part of the package
- Combination of training and incentives
- Go after all new homes in your service area, particularly larger, more spread out designs and those with planned recirculation systems
Single Family-Retrofit

- Potential reduction in water waste is somewhat limited because it is unlikely that the plumbing will be reconfigured.
- Savings are similar to the clothes washers.
- Install demand recirculation pumps and insulate all reachable hot water pipes.
- Combination of training and incentives.
- Focus on bigger, newer houses, also those with existing recirculation systems.
Multi-Family-New Construction

- Two types: with and without central water heaters
- Plumbing design, pipe insulation, demand recirculation and boiler controls must all be part of the package
- Combination of standards, training and incentives
- Go after all new multi-family developments in your service area
Multi-Family-Retrofit

- Potential reduction in water waste is somewhat limited because it is unlikely the plumbing will be reconfigured.
- Insulate all reachable plumbing, particularly in the loop.
- Demand recirculation will save 75-90% of the cost of operating standard recirculation pumps.
- Boiler controls will save energy by lowering the water temperature in periods of off-peak use.
- Work with large apartment management companies.
- Look for those apartments that have central water heaters and no recirculation system.
Suggested Next Steps

• Form a subcommittee to look at water heating as a system
• Develop one or more programs to comprehensively address this issue
• Bring those programs back to this group for a decision
• Do this in time for inclusion in the 2006-2008 plans