

COMMERCIAL/ MULTI-FAMILY BUILDINGS  
ACEEE HOT WATER FORUM FEB. 2016

“Designed for today  
Dedicated to the Future®”

PRESENTED BY:  
LARRY K. ACKER CEO  
ACT D'MAND KONTROLS SYSTEMS



[www.gothotwater.com](http://www.gothotwater.com)

# Research on Demand Controlled Recirculation

- Since 2005 the State of California has funded extensive research into the energy savings potential of demand controlled recirculation pumps in central domestic hot water systems for multifamily buildings
- Dozens of buildings have been monitored for energy savings during this time period
- A refined methodology for showing decreased gas usage by the water heater has been used
- As a result of these successful studies, demand controlled pumps have been added to the CA building energy codes as a baseline requirement



During 2006, Gary Klein and the California Energy Commission, hired the Heschong Mahone Group, Inc., a building efficiency consultant, to study various methods for saving energy in central hot water distribution systems, including the E-Pump.

The E-Pump outperformed the other methods tested on every multifamily building showing a significant reduction of natural gas.

According to HMG,  
“Recirculating hot water systems in multifamily buildings should have either temperature modulation controls or recirculation pump demand controls.”

# Why A Recirculation Pump is Required

- A recirculation pump is required to distribute hot water throughout a building to reduce wait time for DHW
- Without a recirculation pump, one would still get hot water but the wait time would depend on how far one is from the heating plant



# Types of Controllers

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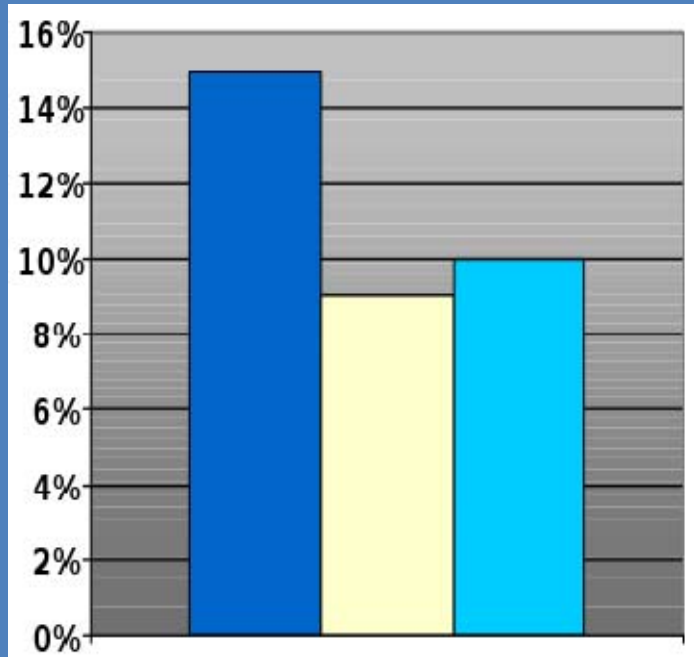
- Timer Controller
- Temperature Controller
- Temperature Modulation Controller
- Demand Controller
- Demand + Temperature Modulation Controller

# Context

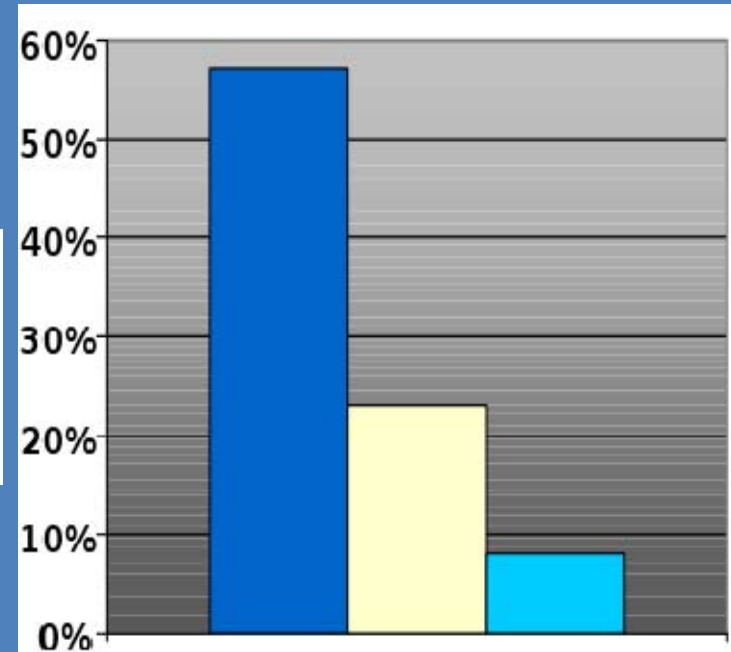
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- Central recirculating domestic hot water (CDHW) systems are common in commercial and multifamily buildings
- In buildings with intermittent hot water use, recirculation pumps associated with CDHW systems often run 24x7 increasing energy consumption because the pipes radiate heat continuously, even during periods when there is no demand for hot water.

# DHW System Performance Under Controls



Gas Consumption Reduction normalized by gallon of water



Recirculation Loop Losses Reduction normalized by gallon of water

Site #2 – SF, CA



# The Problem

## A Typical Central Water Heating System

1) City cold water supply

2) Is heated to Approximately 140°F

3) Hot water is continuously circulated throughout the building from the storage tank

D'MAND CIRC

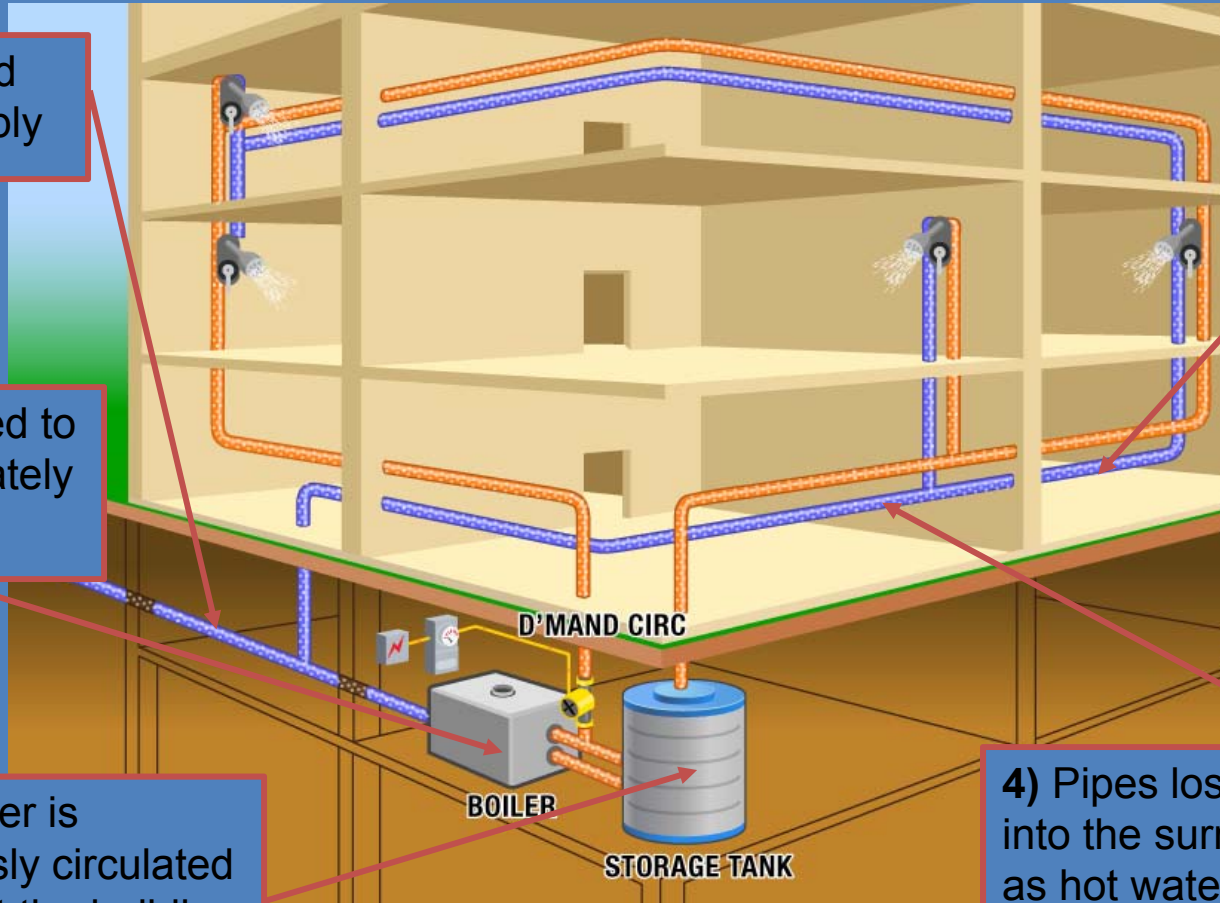
BOILER

STORAGE TANK

5) When water returns it is much cooler and the heat losses must be made up, resulting in excessive gas usage.

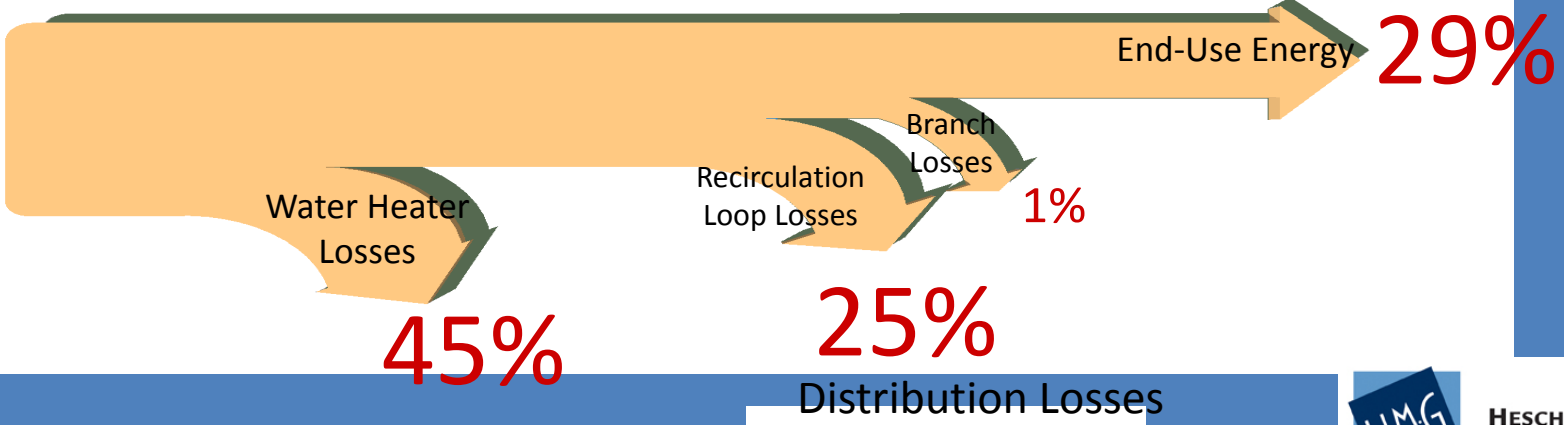
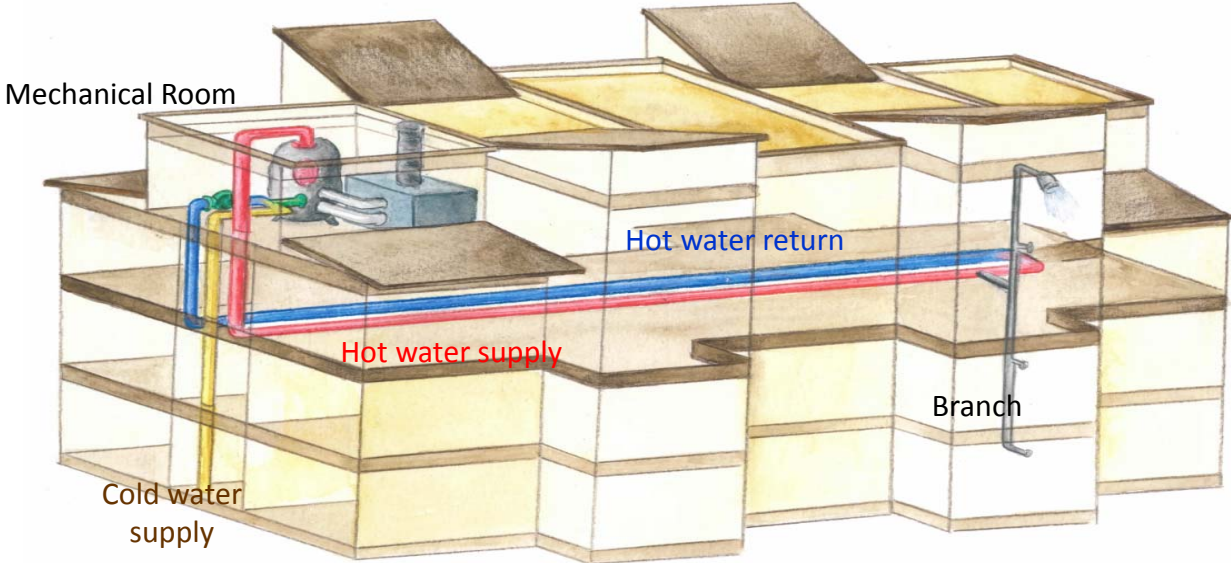
This is occurring 24/7 whether or not anyone is actually using hot water

4) Pipes lose significant heat into the surrounding environment as hot water is continuously circulating





# DHW System Energy Flow

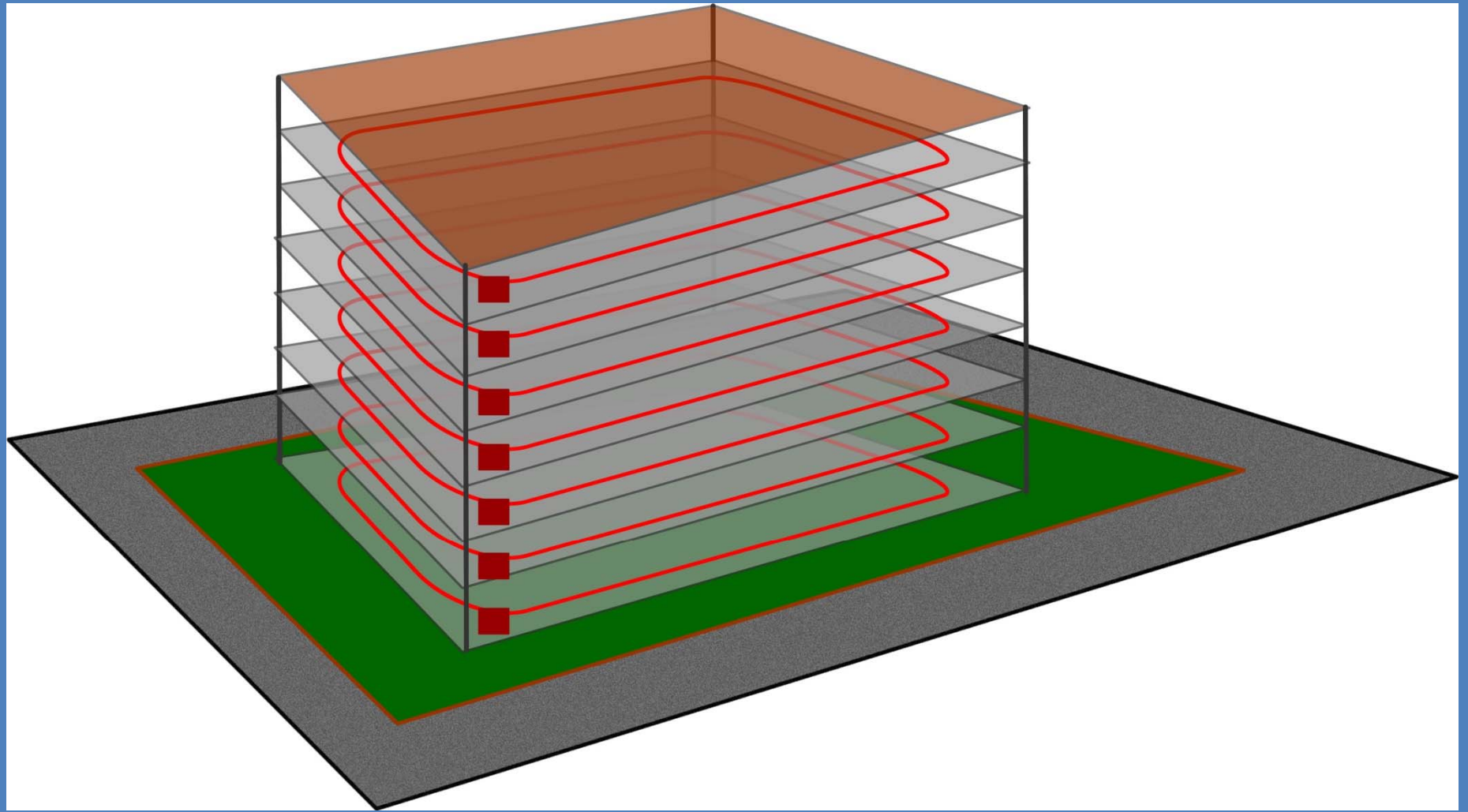












# D'MAND CIRC® is Cost Effective

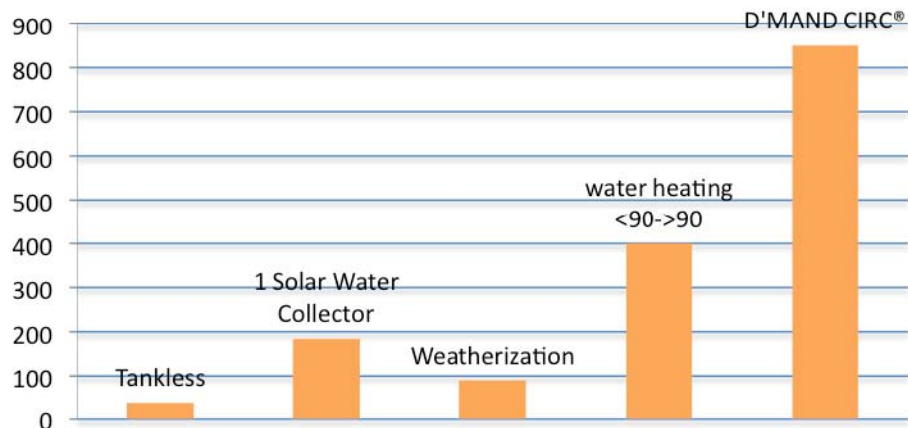
Studies conducted by the C.E.C. and So Cal Gas Co. confirm the energy saving effectiveness.

## The D'MAND Circ®

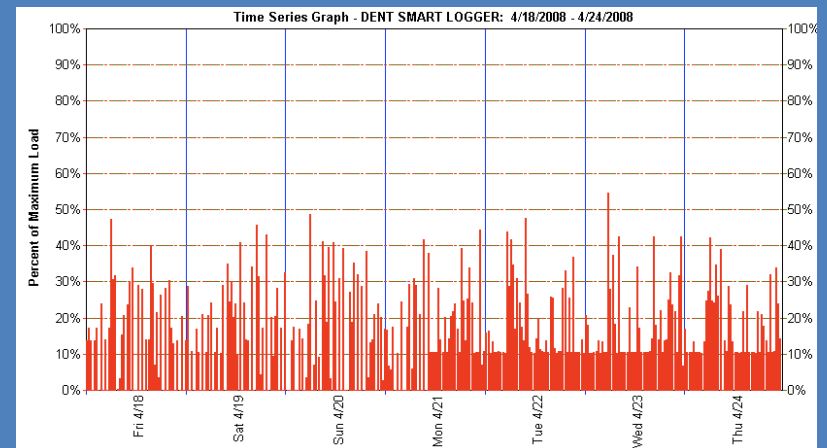
Provides greater gas savings than most other alternative measures

- ❖ Average gas savings: 800-1500 therms annually
- ❖ Average electricity savings: 700-1400 kWh annually
- ❖ Average payback: **8-18 months**

### Natural Gas Reduction Measures (Annual Savings in Therms)



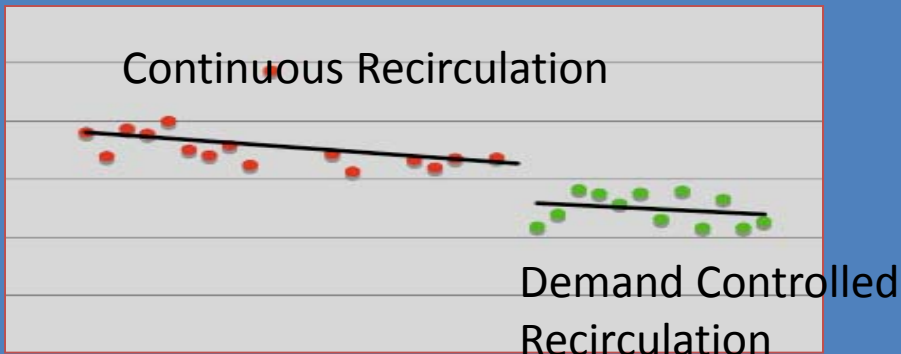
### Boiler Run Time



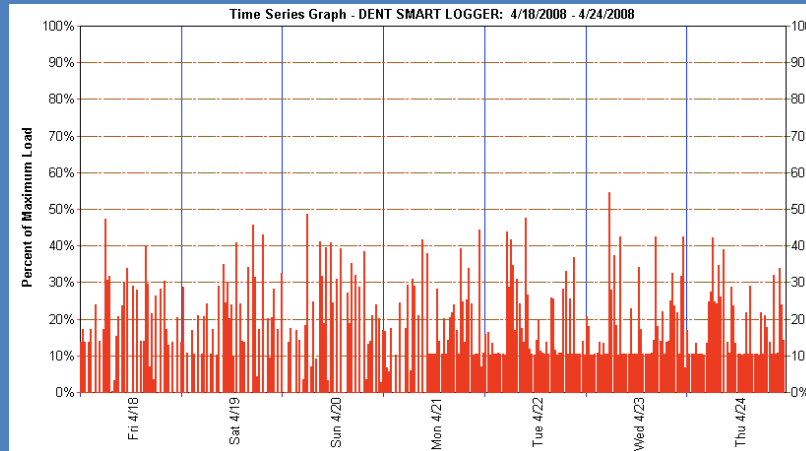
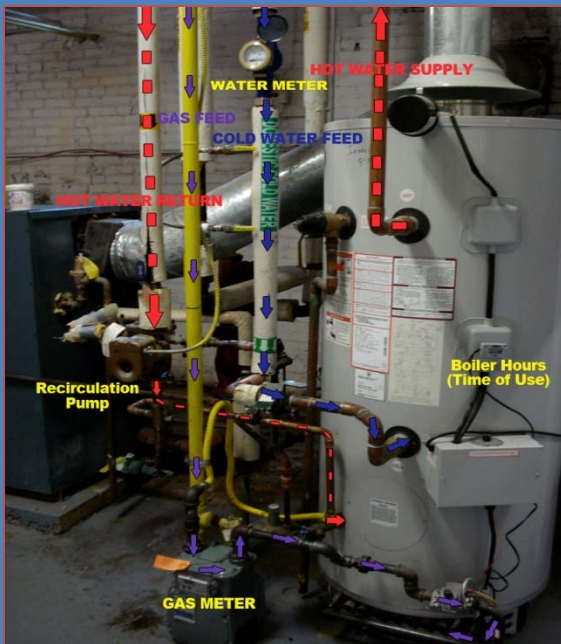
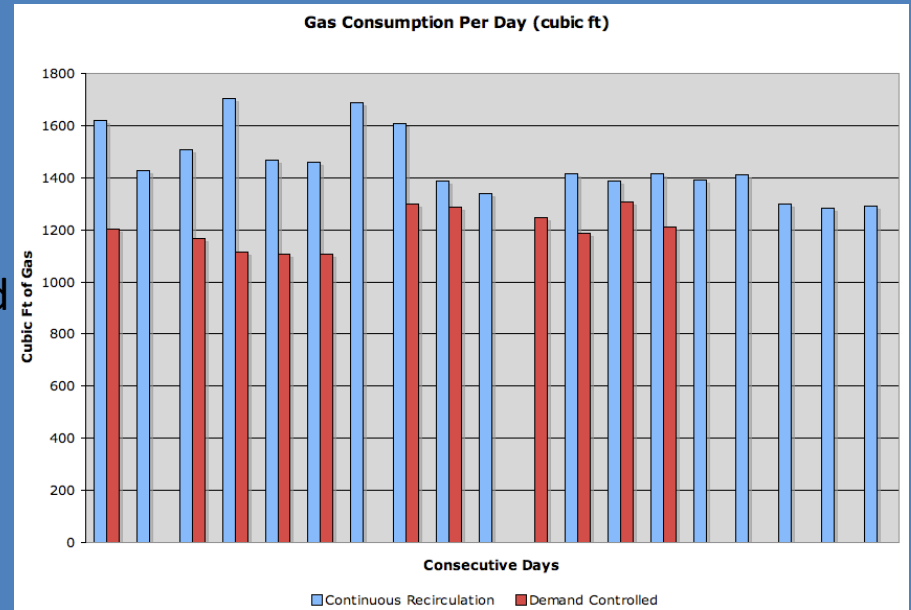
Before

After

# Data & Test Sites



## Boiler Gas Consumption





# MAGNA 3



- GRUNDFOS AUTOadapt®
- EC MOTOR
- ADJUSTS SPEED AND FLOW
- CONTROLS PRESSURE & TEMPERATURE
- MONITORING CAPABILITY



**Commercial Kontrol System with Alpha**



**Residential Alpha**

## **D'MAND Circ® with the Grundfos ALPHA**

- With the Grundfos ALPHA, you can stop worrying about complicated pump settings. Simply install the pump and leave it on the factory setting **AUTOADAPT**.
- The ALPHA will automatically analyze the heating system, find the optimum setting and continue to adjust its operation to changes in demand.
- With its permanent magnet motor design, this energy efficient circulator will reduce power consumption up to 80 %.
- Ensuring lowest possible energy consumption without sacrificing comfort.

# Hot Water on D'MAND<sup>®</sup>

- *D'MAND CIRC<sup>®</sup> 2013 Energy Code Requirements*

**We meet this code requirement with 3 Pump Schedules**

- ***KONTROLS CIRC 3***
  - » ACT Commercial Circ<sup>®</sup> Controller
  - » Grundfos 2699 Circulator
- ***KONTROLS CIRC 4***
  - » ACT Commercial Circ<sup>®</sup> Controller
  - » Grundfos Magna 3 40-120 F (N)
- ***KONTROLS CIRC 6***
  - » ACT Commercial Circ<sup>®</sup> Controller
  - » Grundfos Magna 3 65-120 F (N)

