Controlling and Monitoring

ACEEE – Portland Conference
Heat Pump Hot Water Systems
Large Applications - Hawaii

2/22/2016
Presenter Introduction

• Robert Cooley, CEM
  – Independent Consultant
  – Hawaii Energy Heat Pump Pilot
  – Contractor

• Dennis Ensminger
  – EDC Technologies, Inc.
  – Manufacturing and R&D Manager

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Who is EDC Technologies Inc.

- Efficiency, Diagnostic, Control = Energy Savings
- Established in 1984
- Primary market:
  - Multi family
  - Lodging
  - Commercial
Monitoring and Control

– Temp sensors on all aspects of the hot water system
  – Delivery, Returns, Hot water sources.. Etc..
– Monitor operational runtime for diagnosing hot water system
– Analysis of data as it comes in to apply logic to increase efficiency
  – System anomalies
  – System load analysis
– Optimizing system operation
Hawaii Highrise

- 33 story high-rise
- Completed in 1968
- 374 units
- Gas to heat pump conversion in 2000
- 4 - E-Tech WH160HTCBP heat pumps
- ~ 157 kbtu each
- 1200g storage tank
Initial Configuration

• 4 heat pumps controlled by a Honeywell control set for 135 degrees F
• Delta control was non-operational
• Almost continuous heat pump operation.
• No redundancy. When 1 heat pump went off line, cold water resulted.
• 1375 kWh/day, $385.61 daily electric cost
Monitoring Data - Before

Temperature profile without EDC setback

Controlling relay in bypass (without EDC setback)

Runtime Meter without EDC setback

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HP Repair - Before vs After

HP3 Outlet sensor data for 1350 Ala Moana (ID: 3418) Site ID: 9020 sensor #: 6

HP4 Outlet sensor data for 1350 Ala Moana (ID: 3418) Site ID: 9020 sensor #: 6

HP3 - Stage 1 meter data for 1350 Ala Moana (ID: 3418) Site ID: 9020 meter #: 3

HP4 - Stage 1 meter data for 1350 Ala Moana (ID: 3418) Site ID: 9020 meter #: 4

Heat Pump not functioning

Heat Pump reaired
Changes Made

- Temperature set points changed (lower)
- All heat pumps heat exchangers cleaned
- One heat pump recirculation pump replaced
- Storage tank connections modified
Storage Tank Repipe