Snohomish PUD

UTILITY ENERGY FORUM

CATALYST HVAC CONTROLLER –

IMPLEMENTATION AND EVALUATION

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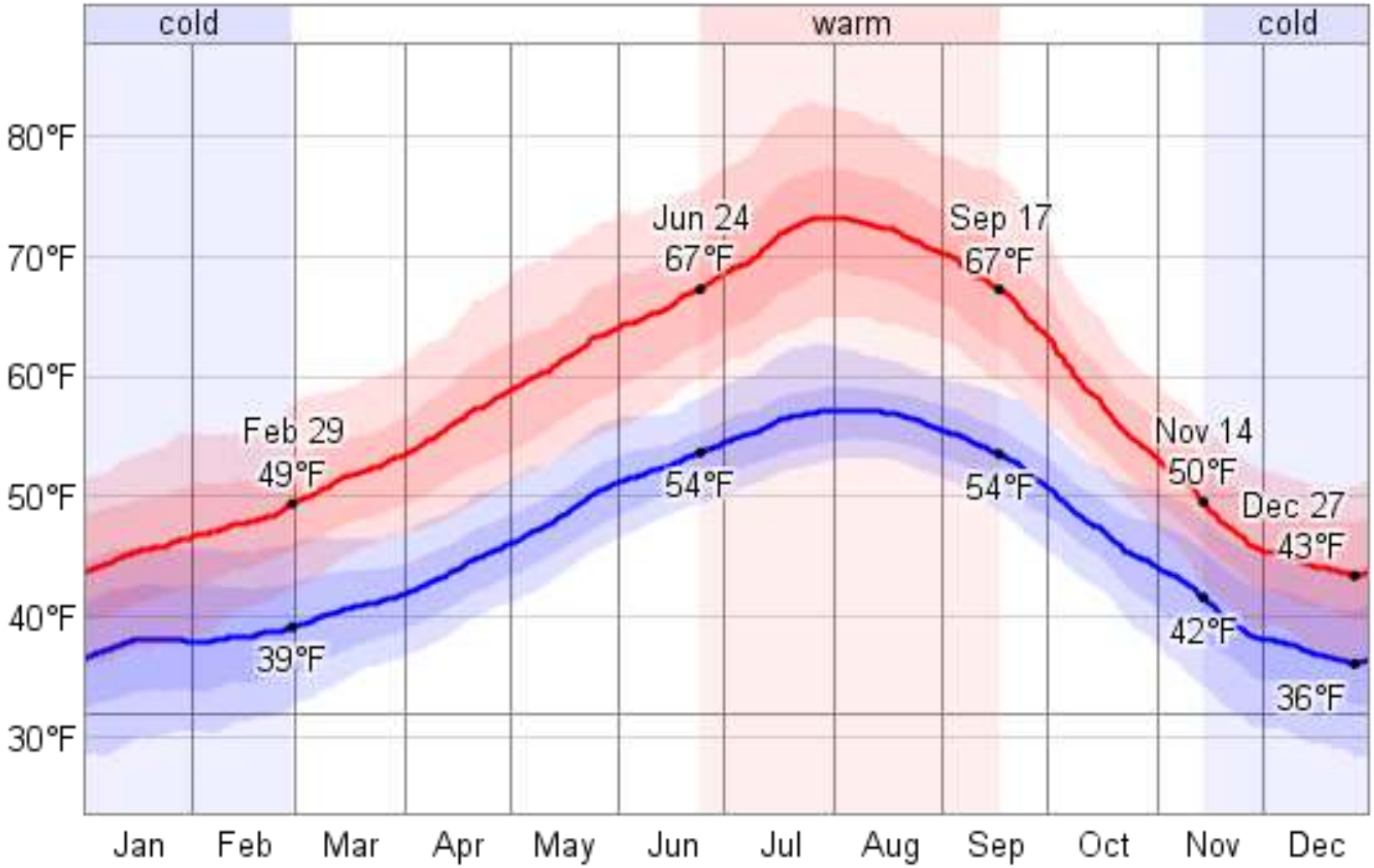
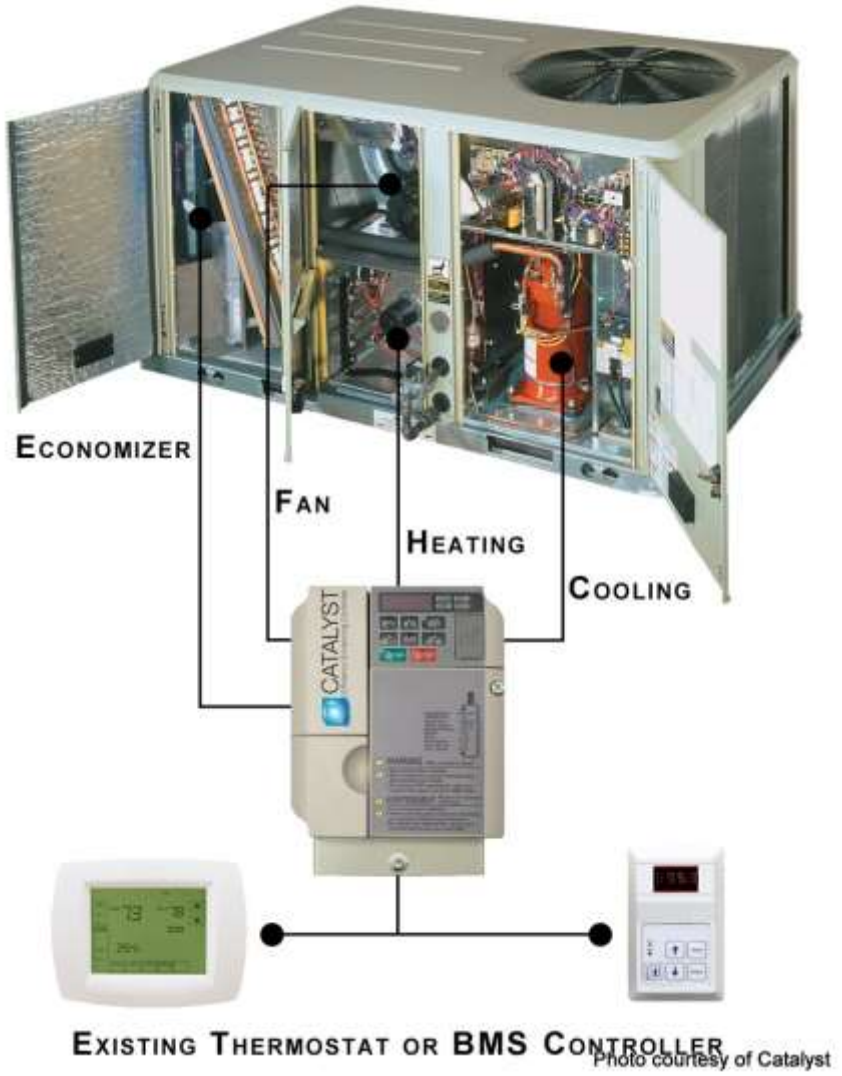
HVAC Controllers

Everett, WA - Average Temperatures



Technology Features

- Variable fan speed
  - Catalyst set points 40%/75%/90%
- Economizer control
  - Existing functional economizer
- Demand control ventilation
- Real time web based monitoring and control
- Features between controllers varies
  - Fan speed controls
  - Monitoring



Manufacturer Marketing

"Transformative Wave's CATALYST is an RTU solution that reduces HVAC energy usage by 25 – 50%."

"The CATALYST is more than a controller and more than a variable frequency drive (VFD)."

"The CATALYST assures proper ventilation, maximizes the use of outside air for free cooling beyond standard economizer logic, and reduces fan energy use by an average of 69%."

"More than a "black box," the full CATALYST application provides live interaction via the eIQ Platform, a completely wireless solution that allows real-time monitoring and control over the web with energy savings and historic behavior reporting."

Where have they been installed?

- Library
- Large Shopping Mall
- Restaurant
- Drug Stores
- Manufacturing
- Church
- Medical Clinic
- Thrift Store
- Office Building

Savings Methodology

- Custom Calculation with in house excel workbook/calculator
  - Labor Intense – analyzing significant amount of data
  - Rustrak metering vs. Equipment data recordings
  - Seasonal Effect
- BPA deemed value
- Identify deemed market
- Puget Sound effort to have one calculator and process

Incentive Changes

- Initial incentive at $0.30/kWh with a cap at 70% of project cost

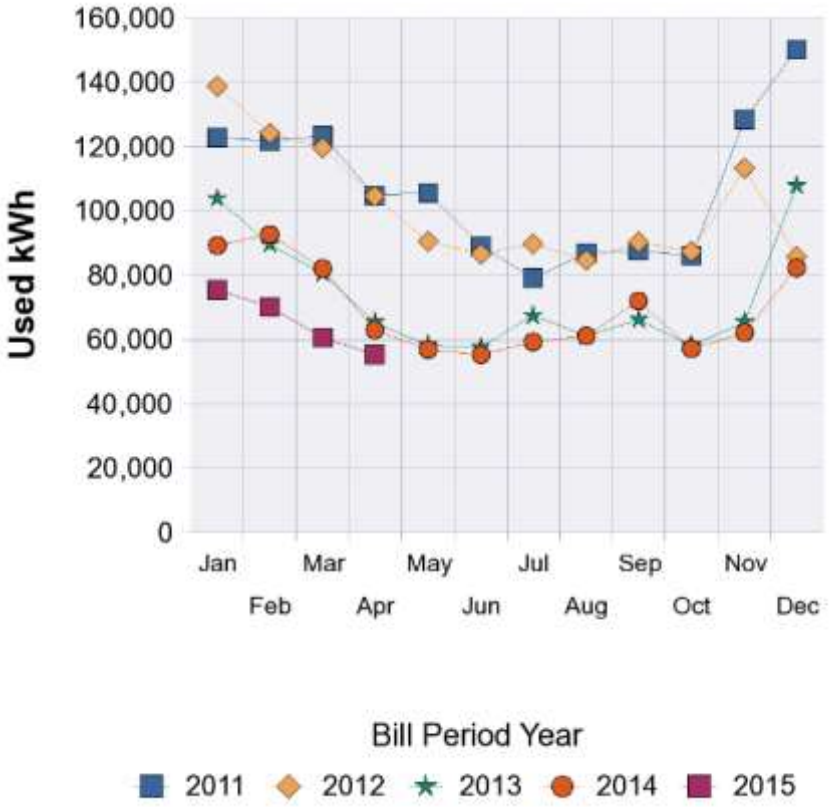
- Incentives reduced in June 2014 to $0.20/kWh

- Measure considered a combination of VSD and controls

What have been the results?

Advertised results of the Catalyst is 25 to 50% energy savings

- Eight Drug stores with ranges of 43 – 60% savings and an average of 51% savings
- Public Library with one 80 ton unit and 5 smaller units (7.5-25 tons) average savings of 44%
- Hospital Clinic savings of 72%
- Large Mall savings of 66%
- Medium Retail Store savings of 46%



- Project installed in December 2012

BPA Evaluation

- Library
  - Realization rate of 1.01
  - Largest Unit – 80 tons
- Shopping Mall
  - 76% savings realized
  - Increased Occupancy (economy)
  - Interaction with individual store HVAC units

Long Term Insights

- Maintenance Contractor un-installed Catalyst equipment
- High Demand if all units start at the same time
- Changes have been customer driven not system failures
- Has been difficult to follow-up to determine exact saving without extensive analysis.
- We will be following installation to see trends in customer segments

Current Activity

BPA Field Test - Advanced RTU Control (ARC) Lite version

- 30 Catalyst retrofits (NexRev, Lennox, and Trane did not submit proposals)
  - Addition of set speed vsd
  - Testing of a low cost meter
  - Aligns with DOE RTU Campaign

Puget Sound Working Group

- Single Calculator
- Deemed measures
- Process Consistency
- M and V

Resources

Advanced Rooftop Control (ARC) Retrofit: Field-Test Results

- PNNL-22656 prepared for US DOE July 2013

Program Readiness Report: Advanced Rooftop Unit Controllers

- CEE August 2014

A Dramatic Boost for Existing RTU's

- Research Brief TAS-RB-47 September 2011 E Source

The Most Promising Emerging Technologies for the C&I Sector

- Research Brief TAS-RB-86 April 2014 E Source

Questions?