

# BELMONT SECONDARY SCHOOL ENERGY REDUCTION

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December 2017

# Overview

- Belmont Secondary School
- System/design description
- Issues after initial commissioning
- Investigation and re-commissioning process
- Building system complexity
- Building system stability
- Energy usage reduction
- Cost savings

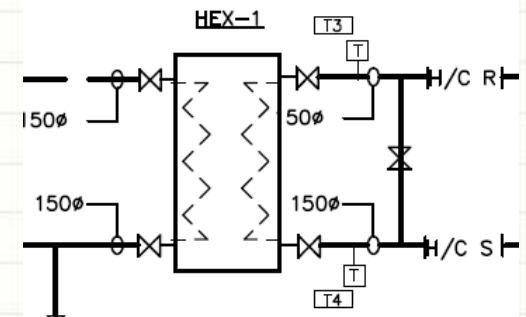
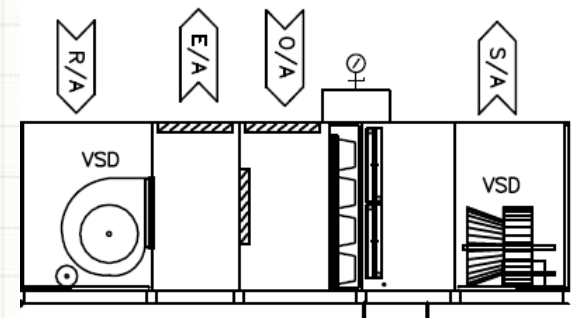
# Belmont Secondary School

- \$50.8 million LEED Gold facility
- Langford, BC (Vancouver Island)
- Constructed in 2015
- 1,200 student capacity
- Specialized classrooms
- Three gymnasiums
- Wellness centre
- Neighbourhood Learning Centre Spaces
- 13,650 m<sup>2</sup>



# Under the Hood

- 4 Stages of Heating
  - Server/Electrical room heat recovery
  - Exhaust heat recovery
  - Heat Pump
  - Boiler backup
- Domestic hot water pre-heat
- In-floor heating
- Displacement ventilation
- Occupancy and CO2 sensors
- Modern DDC control system
  - Remote user interface
  - Trend logging
  - Alarm logging
- Variable flow air systems
- High efficiency lighting on motion sensors



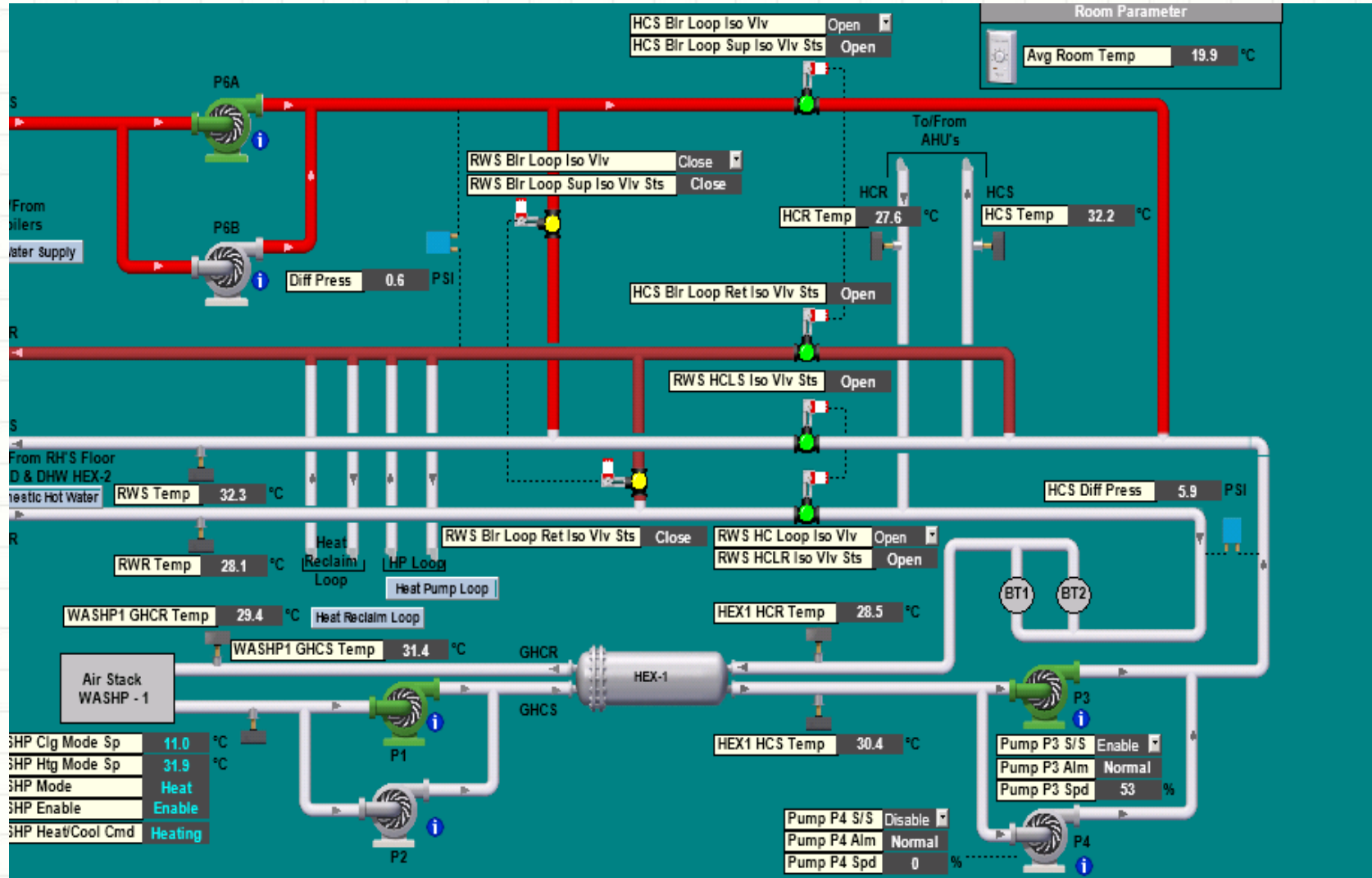
# Issues

- Higher than expected energy usage
- Occasional temperature complaints
- Occasional reports of equipment noise

# Investigation and Recommissioning

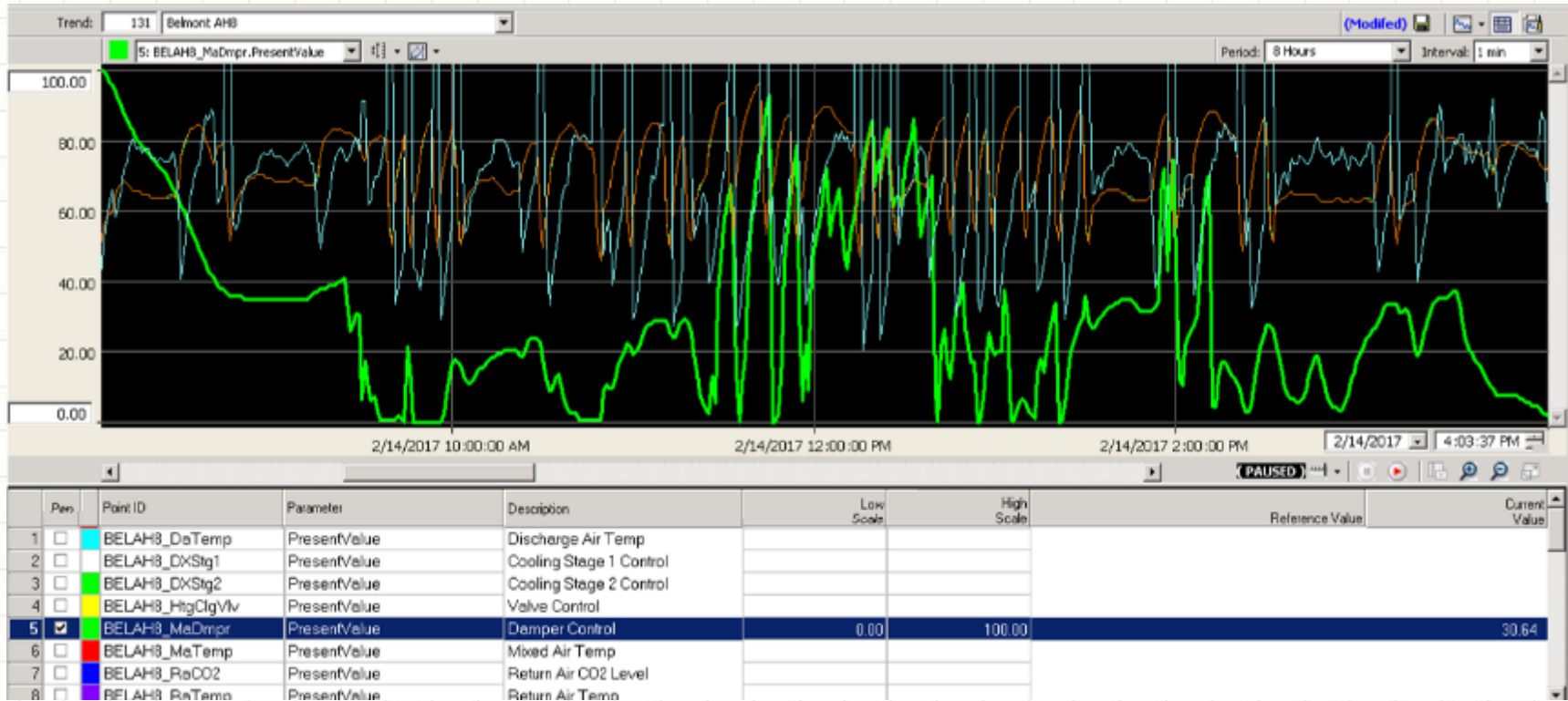
- Review building sequence of operation
- Consult engineers of record, balancing agent, controls contractor, building administrators
- Review major system performance
- Review minor system performance
- Adjust sequences of operation, set points, and schedules
- Set and review trend logs
- Repeat

# Modern Building System Complexity



Complexity ↔ Efficiency

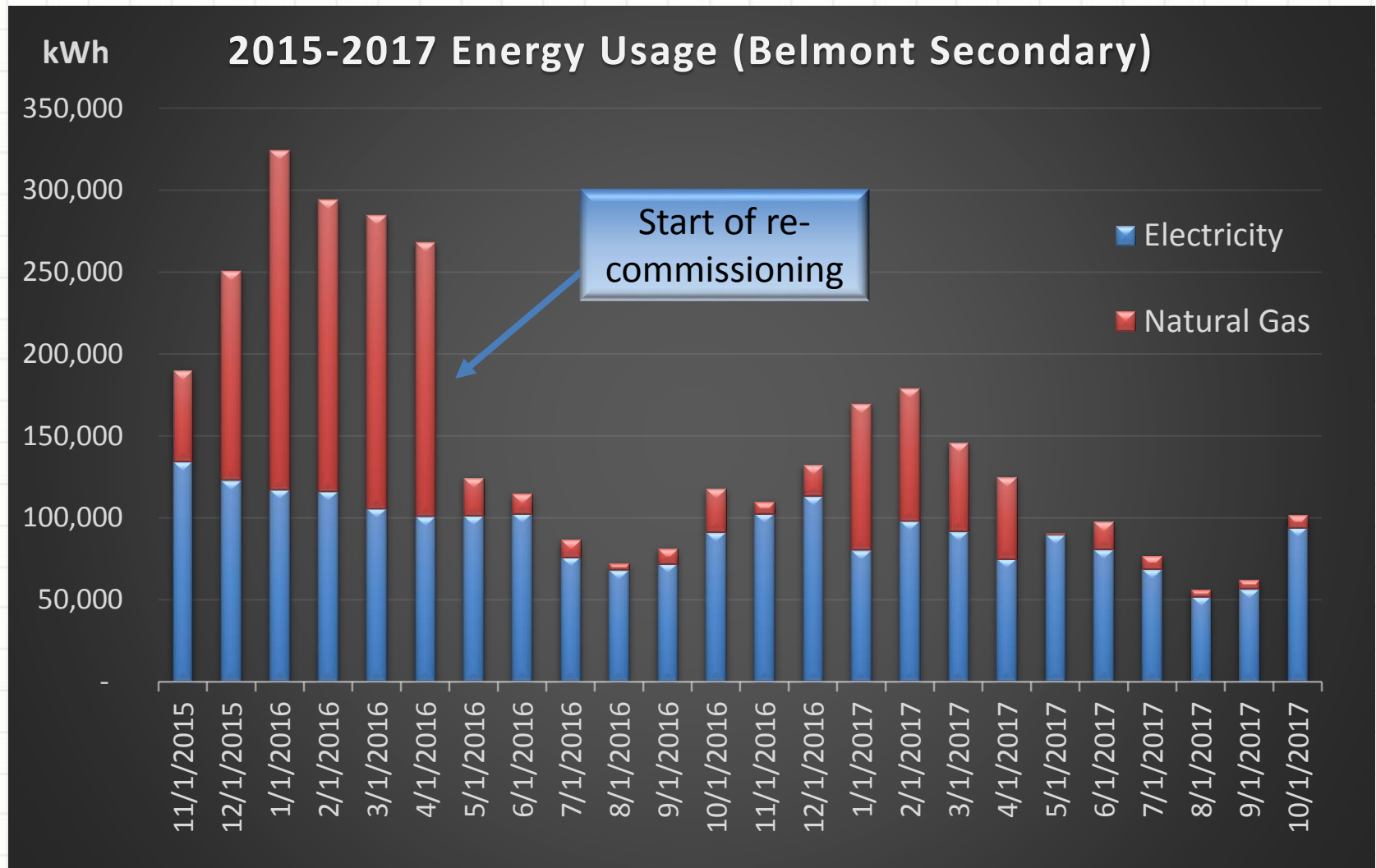
# Modern Building System Stability



- Inputs from occupancy/CO2 sensors
- Inputs from heating/cooling parameters
- Changing outdoor conditions
- Failed components
- Schedules

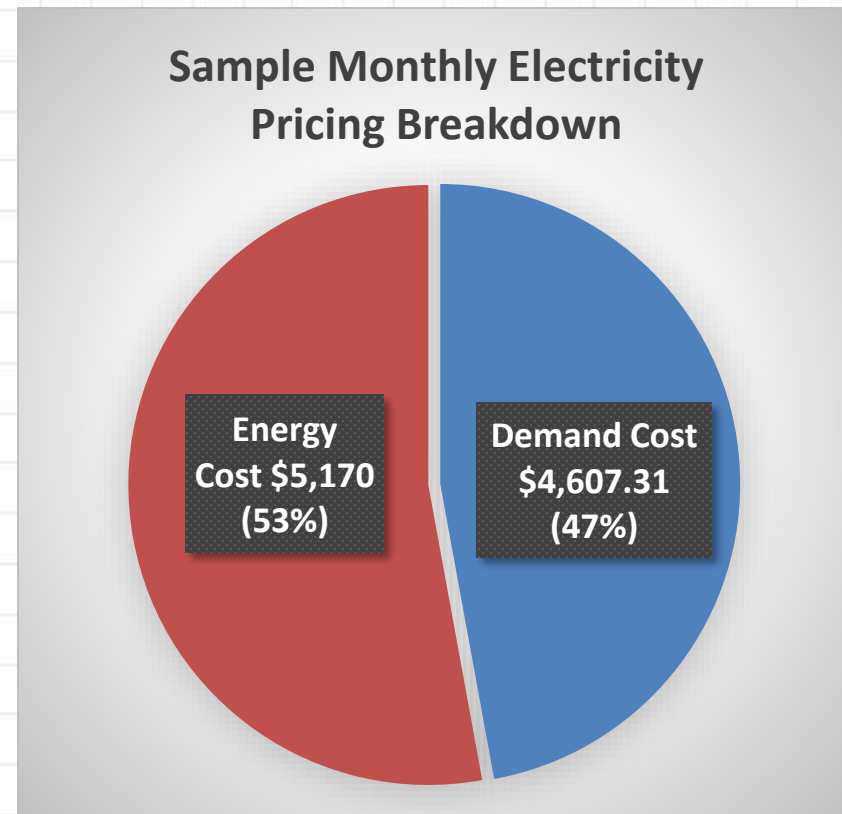


# Energy Usage Reduction



# Cost Savings

- Energy cost savings estimated at \$30k annually
- Recommendations
  - Review building system performance periodically
  - Reduce both energy usage and (peak) demand for maximum savings



# Lessons Learned

- Ensure your contract stipulates energy performance requirements and timelines to achieve targets
- Ensure commissioning agent and system programmers provide complete check of all systems and parameters (beyond Testing and Balancing [TAB] report) and provide trend logs
- Know what to look for: System stability, efficiency, and response
- Involve energy manager, commissioning agents, and engineers of record early in the commissioning process to review and verify energy targets
- Review system performance monthly for at least 1 year to verify seasonal performance
- Allow for additional training of maintenance staff to familiarize with new systems and technologies



**QUESTIONS?**