



Energy Management and Sustainable Development Challenges at the CSCHAH

Past, Present, and Future



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Canadian Science Centre for Human and Animal Health



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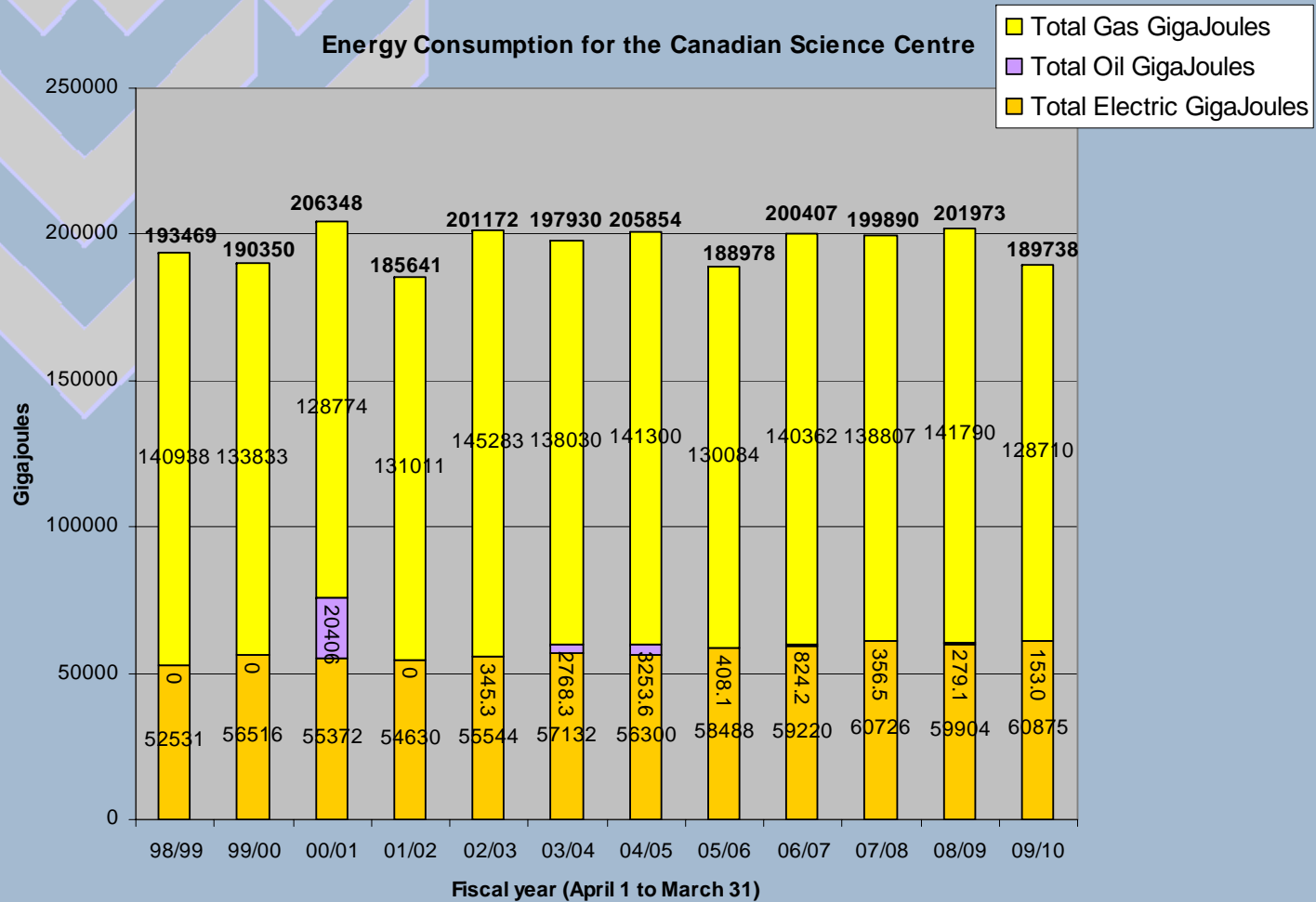
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Energy Use History

Energy Consumption for the Canadian Science Centre



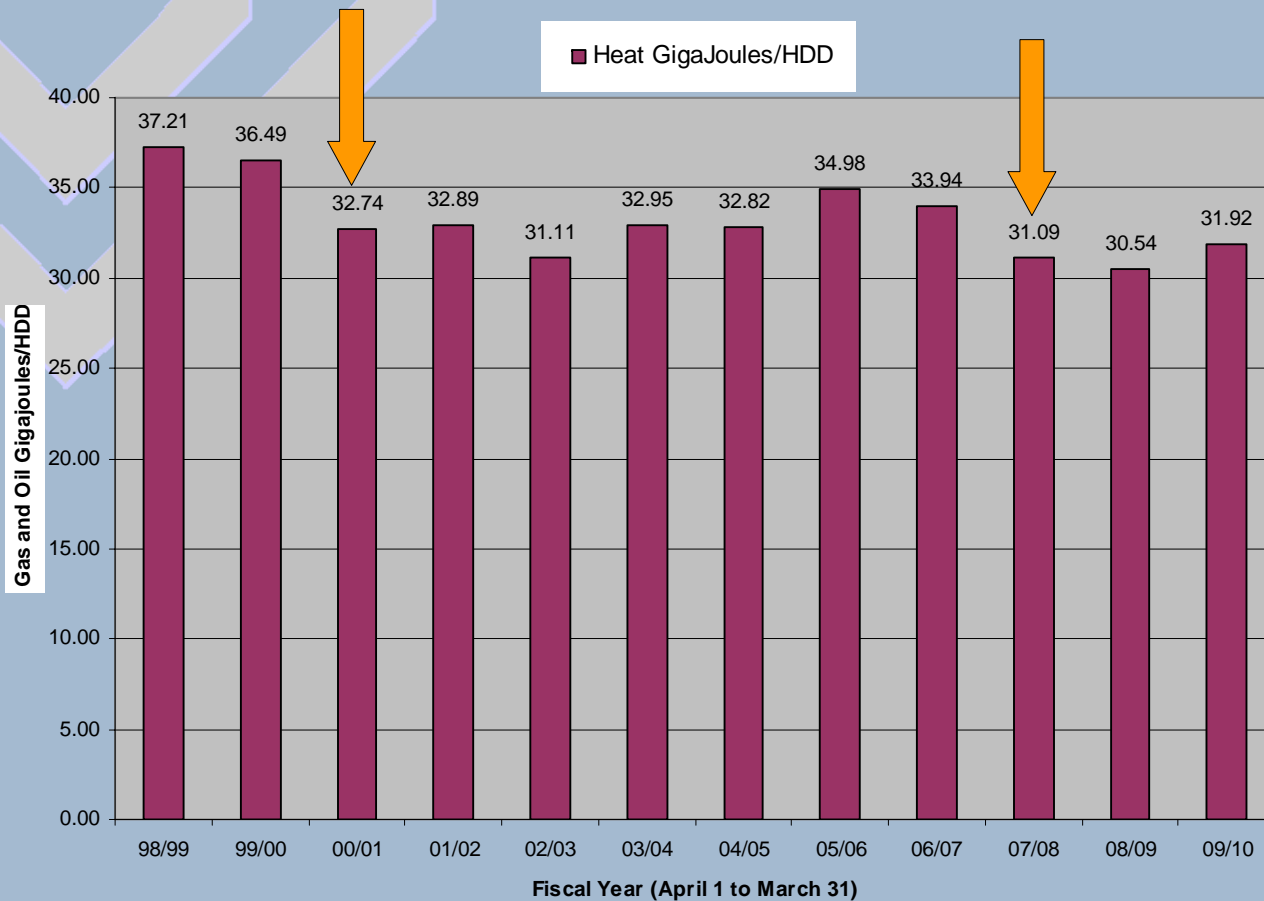
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Heat Energy Use History

Total Heat Energy adjusted for Heating Degree Days



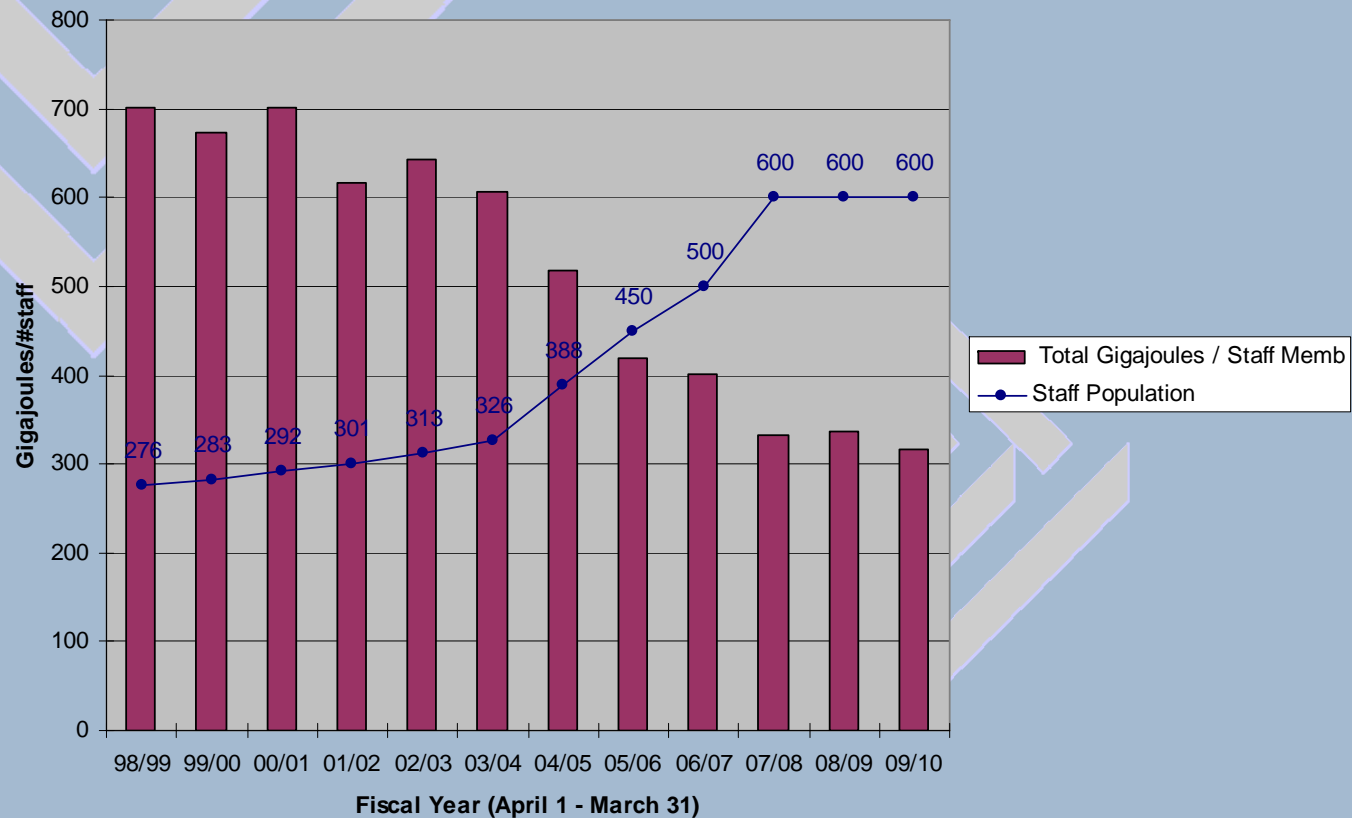
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Energy Use History per Person

Total Energy Adjusted per Staff Member



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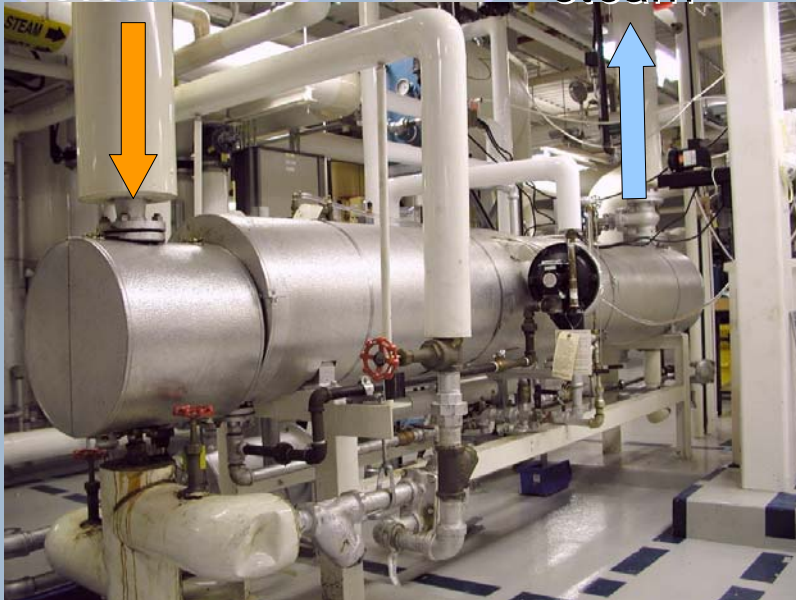
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Reboilers

60 PSI plant
steam

15 PSI
humidification
steam



- High Maintenance Costs
- Low water volume = difficult water treatment control
- Blowdown to sewer – poor heat recovery – required city water to cool further

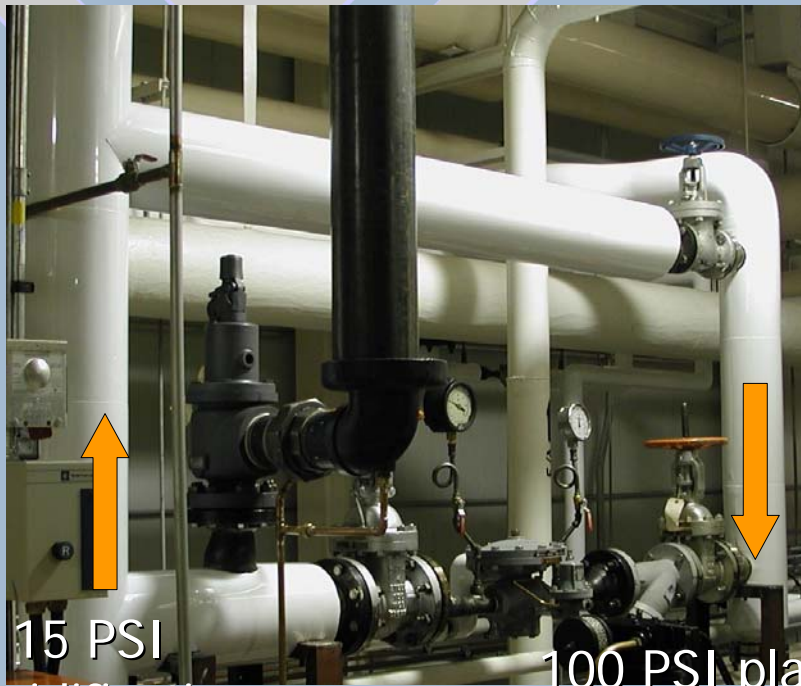


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Humidification Steam Pressure Reducing Station



15 PSI
humidification
steam

100 PSI plant
steam

- Negligible maintenance costs
- Large water volume steam plant incorporating large scale water treatment and monitoring
- Blowdown heat recovery utilized in Energy Centre



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Humidity Requirements

- **Facility designed for 40% return**
- **ASHRAE Standard 55**
- **Common Practice**
- **Written for Humid Climates**



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Load Requirements

- **Total Flow 61550 LPS**
- **Humidification for 212 days**
- **- 6.8 Deg C Average Temperature 67.5%**
- **Delivery Temperature 12.5 Deg C**



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Load Requirements

- **Using ASHRAE method**
- **3337 #/hr steam at 40% return**
- **2060 #/hr steam at 25% return**
- **Cost of steam 2006 \$0.013 /#**
- **\$84500 savings 38%**
- **Actual Measured 20 – 25%**
- **~145,000M3 gas or ~ 276 CO2e**



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Air Flow Set Backs

- **Limited Activity after hours**
- **Building Automation System**
- **Override Switch**
- **Fume hoods / BSC's**



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Air Flow Set Backs

- **Total Flow 61550 LPS**
- **Reduce by 70% 63 hours per week**
- **4.5 M litres per week**
- **75413 kWh savings (~ 1.4 CO₂e)**



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Duct Modification

- Reduce unintended loss
- Happy Coincidence

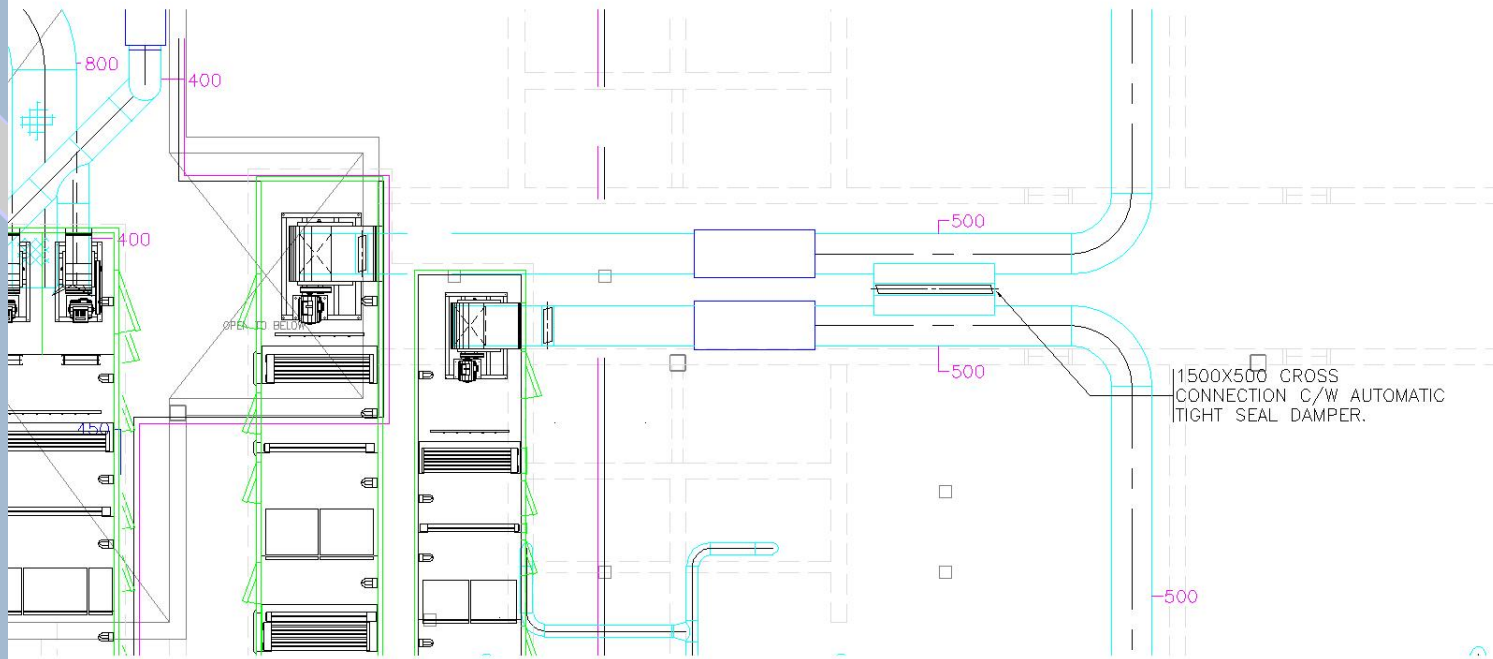


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Energy Saving Initiatives



- Lead/Lag pump operation
 - Numerous fluid systems incorporate dual pumps, each 100% capacity.
 - Original set up was to operate for maximum redundancy – both always on.
 - After discussion and review, flow testing, trial observation and logging Where one pump deemed sufficient, lead/lag operation programmed in BAS



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Energy Saving Initiatives

- Boiler Feed Water Make Up Heat Exchanger
 - R.O. unit uses soft water make up
 - Process cooling loop nearby
 - Threefold benefit (FW Preheat, efficient RO, less heat to reject in Process cooling system)
 - Approximately \$1000.00/yr in natural gas savings (~ 6.3 CO₂e)



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Approaches to Energy Management in Established Facilities

- Brainstorming sessions with Real Property staff
- Energy Management courses/training
- Engage local utility providers
- Network with experts - designers and Real Property/Operational staff
- Consultants



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Future

- Variable speed & liquid cooled air compressors
- Heat recovery from batch heat loads
- Supply / exhaust air heat recovery
- Metering
- Pressure / Temperature Resets
- Fume hood Usage



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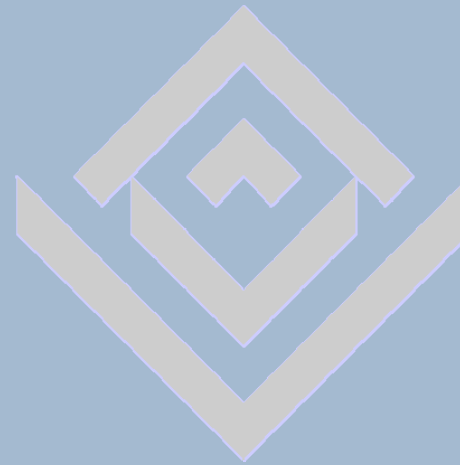
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Thank You!!

- Discussion
- Questions



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