



# NRCan Condensing Gas Rooftop Activities

## CEE PROGRAM MEETING 2010

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# OBJECTIVES

- **To demonstrate the technical feasibility of condensing packaged rooftop systems in the Canadian climate.**
- **To determine the economics of using a condensing packaged rooftop systems in the Canadian climate.**
- **To establish any unforeseen pitfalls associated with using a condensing rooftop system.**

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# APPROACH

- **Convert a non/part-condensing rooftop to a fully condensing system.**
  - Characterize rooftop as supplied (SS Eff., P.8 & Modified P.2)
  - Identify options for modification to improve efficiency
  - Make modifications and re-characterize.
- **Investigate building heating loads for Different Canadian cities.**
  - Utilize NRCan's EE4 building load analysis program together with the building specs provided in Dick Lord's presentation.
- **Field test a condensing rooftop, preferably as a retrofit.**
  - Identify potential test sites
  - Set up pre-retrofit monitoring of energy use (if possible)
  - Perform retrofit and conduct post-retrofit monitoring of energy use

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# PROGRESS

- Lab. conversion of a non/part - condensing rooftop unit



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# PROGRESS

- Rooftop installed and characterization has started.

## Preliminary CSA P8-09 Test Results:

Rated input, steady-state flue loss:	17.4	%
Rated input, steady-state (measured) jacket loss:	0.6	%
Rated input, outdoor corrected jacket loss:	1.8	%
Rated input, steady-state operating thermal efficiency:	82.1	%
Outdoor air correction factor:	1.13	
Rated input, outdoor steady-state operating thermal efficiency:	78.5	%
Reduced input steady-state flue loss:	12.3	%
Reduced input steady-state operating thermal efficiency:	87.7	%

## Rooftop Specifications:

Rated heat input:	150,000	BTUH
Turndown:	15:1	
Minimum (reduced) input:	10,000	BTUH
Airflow:	1600	CFM
Cooling capacity:	3.93	Tons

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# PROGRESS

- **Opportunities for improvement**
- Better Control of Excess Air
- Modify Heat Exchanger
- Use Brushless DC Combustion Blower
- Replace Belt Driven Circulating Air Blower with Direct Drive Brushless DC Motor/Blower
- Replace AC Condenser Blower with a Brushless DC Equivalent.

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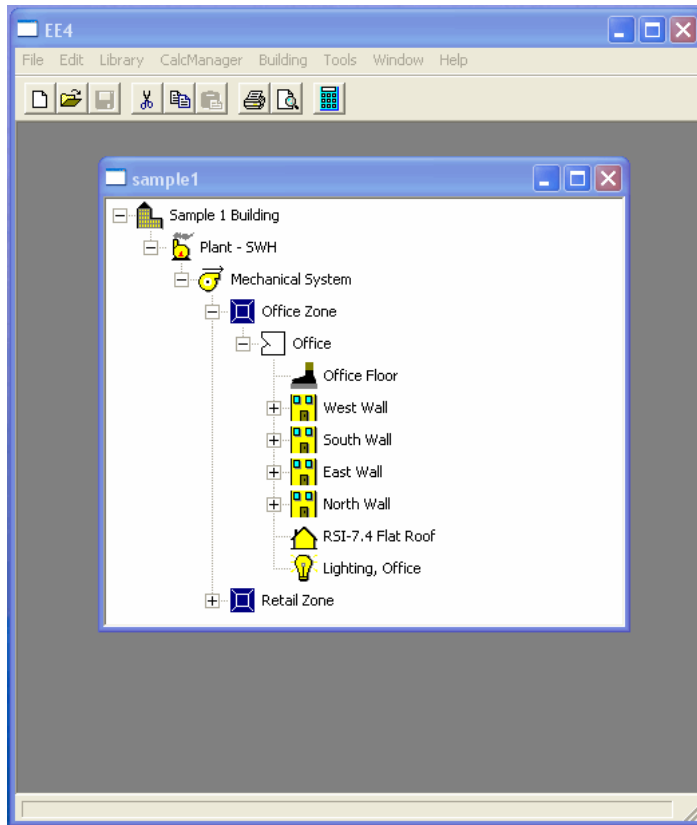


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# PROGRESS



- Investigate building heating loads for Different Canadian cities

- Currently Using EE4 to develop benchmark building heating loads.

- Looking at other analysis methods, e.g. Degree Day approach.

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# PROGRESS

- Still Trying To Identify Test Sites. There is a good lead for a new installation at a DND Shopping Mall Site.
- We have some NRCan on-site options for Possible Before & After Monitoring.

- **Field Testing**



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# END

## THANK YOU FOR LISTENING

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