

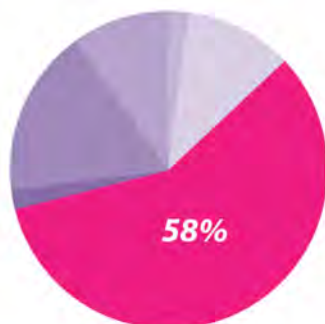
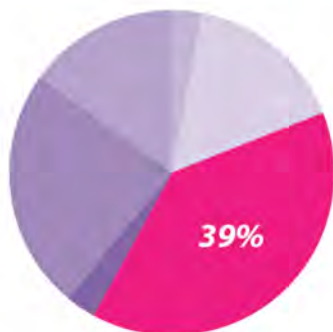


design [energy modeling]



Annual Heat Loss

■ Ceiling ■ Walls ■ Floors ■ Windows ■ Doors ■ Basement ■ Ventilation



Optimal windows

Base windows

Passive Solar Gains (MJ)

63000



Current Building Envelope Design

5400



6 ft Overhang (Rectangular Windows)

5300



10 ft Overhang (Rectangular Windows)

Hot2000

We used Hot2000 energy modeling software to analyze the predicted energy use of the Parkland Net-Zero home. All of the homes' physical attributes were modeled (windows, doors, overhangs, insulation, air tightness and dimensions) in the program. We were able to "play" with different parameters of the home and compare the results with some certainty.

In our quest for net-zero we used Hot2000 extensively to investigate the effects of our "occupant behaviors" and total energy used per year. By testing different variables such as thermal mass, lighting, appliances, hot water use, air leakage and air conditioning we determined the size of the PV array (number of solar panels) that would offset our energy consumption.

Hot2000 is free, fast, easy to use and the results have proven to be fairly accurate based on past projects. It is a bit quirky to use and there isn't an easy way to get the just the output values you want.

Thermal mass calculations are a bit weak as it only gives you 3 options to choose from with each varying greatly in effect on the overall output. By changing these 3 options (low, medium or high) for thermal mass the amount of heating energy changes by over 50%.

RETScreen

We did not use Hot2000 to model the solar PV generation as it did not allow us to export excess electricity to the grid. RETScreen is free software from the government of Canada designed specifically for the analysis of renewable energy systems.

The fulcrum exercise was balancing the Hot2000 total energy load with the total energy produced by the cheapest PV array possible.