Solar Powered Absorption Chiller

Throughout the Olympic Village, hydronic (pumped water) radiant energy systems are used for cooling as well as heating. At the Community Centre there's an added feature: the building is cooled using the sun.

"We're using solar hot water thermal collectors to generate cooling through an absorption chiller," says Vlad Mikler of Cobalt Engineering. "It requires very little electricity, only enough for a small circulating pump, so it uses a few orders of magnitude less electricity than conventional cooling equipment. But – it requires an input of hot water to power the cycle."

Absorption chillers use waste heat (usually steam or hot water – in this case, heated by the sun) to generate cooling. Inside the absorption chiller, this heat is transferred to a brine solution, causing evaporation. The resulting fresh water vapour is condensed and sprayed onto pipes holding water that will circulate inside the building, cooling it. Due to a strong affinity between the condensed brine and the fresh water spray, the brine attracts and reabsorbs the spray. This creates a vacuum, lowering the boiling point – meaning that heat from the sun is adequate to continue the cycle of evaporation and cooling.

Mikler says it's believed this is the first time a solar powered absorption chiller cooling system has been used in North America, especially at such a northern latitude. He points out that weak sunlight in the wintertime is not a problem – because that's when cooling isn't needed. "The demand for cooling is really proportional to the solar radiation intensity," he says. "So it's a perfect match."

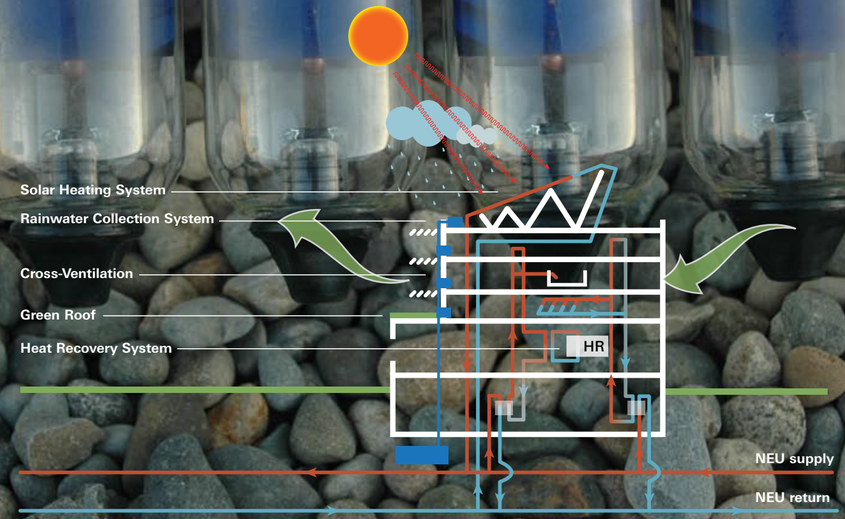
Weak sun energy in the winter is not a problem – the need for cooling only occurs when solar radiation (heat) is most intense.

Free solar energy warms the Community Centre's solar array, driving the building's cooling system.

Our Energy Future

Buildings at the Olympic Village are estimated to be 30–70% more energy efficient than comparative buildings designed to minimum codes. This demonstrates that passive design, district energy, radiant heating and efficient appliances and fixtures can make a significant difference in energy consumption.

However, in a world facing the serious challenges of climate change, peak oil and population growth, there is still room for improvement. For this reason, Parcel 9 includes a building that demonstrates the next step: Net Zero. A Net Zero building produces as much energy as it consumes. Chapter 8 of *The Challenge Series* will include a special focus on the Olympic Village Net Zero building.



Schematic of the Net Zero building showing the many integrated features that add up to a building that produces as much, if not more, energy than it consumes.