



Sustainable Communities....



...through excellence in Facility Design

TOROMONT

CIMCO

Hot Ideas in Refrigeration





Sustainable:

Fulfilling today's needs...



...without impacting the ability to meet the needs of the future.



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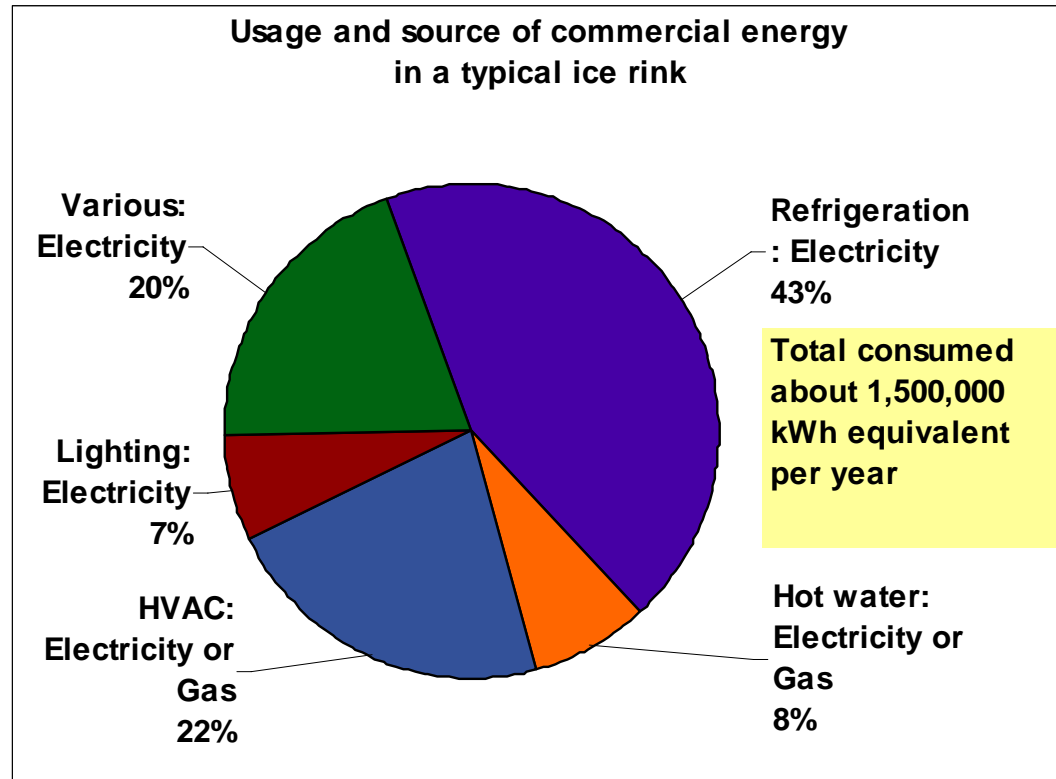
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Hot Ideas in Refrigeration





The Issues:

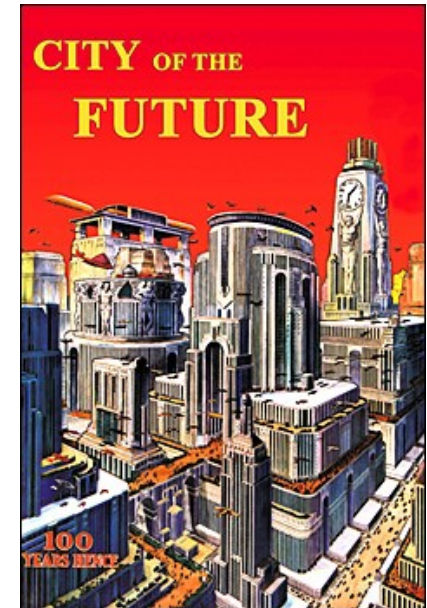
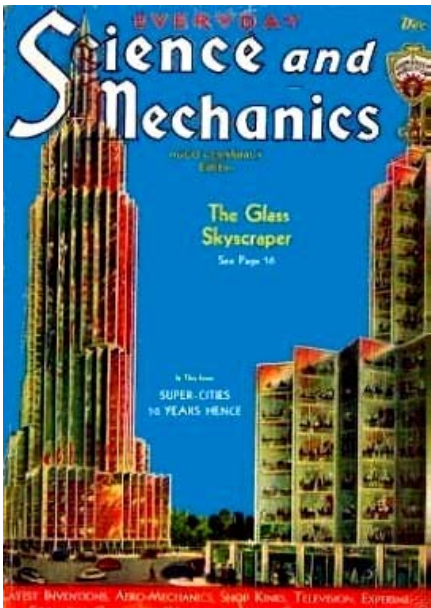


Ice rinks are energy-intensive by nature





The Issues:



Today's buildings will be operating in 2030 and beyond!





Fort Saskatchewan found the answer... with ECO Chill!



TEAM Sponsored Project



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And so have...

Quebec

- Town of LaPeche
- City of Sherbrooke

Ontario

- Napanee Centre
- Bell Sensplex, Ottawa
- Ray Friel Centre, Ottawa
- City of Aurora
- City of Barrie
- Carleton University
- City of Newmarket

Manitoba

- Dauphin
- Thompson

Yukon

- Teslin
- Whitehorse

British Columbia

- Kelowna Curling
- UBC Olympic Venue



Alberta

- Nose Creek
- Grimshaw
- Sun-Child Band
- Bonneyville
- St Albert
- Sylvan Lake
- Bonavista Lake
- Fahler





Building The Concept

- **Early in the conceptual stage CIMCO entered discussions with CANMET and alliance was formed to bring the concept to reality.**
- **TEAM became a partner in the three Projects highlighted in Fort Sask, AB, Dauphin, Manitoba and La Peche Quebec.**
- **A Power Smart process was established and the three facilities are currently under a monitoring program to confirm accurate energy savings and the contribution to GHG reductions, providing accurate publishable data through CANMET and Natural Resources Canada.**





Why ECO CHILL?

- *In 1992 energy use in arenas was over 1 million megawatts of power*
- *A large portion of this total energy is rejected as heat through the condenser*
- *There are many continuous heat loads we already handle with waste heat:*
 - *Ice Resurfacers water*
 - *Snow pit*
 - *Underfloor heating*
- *Why not handle building heat as well?*





***ECO CHILL is:
A Refrigeration and Heating System for Arenas
and Curling Rinks that is:***

Environmentally - Friendly

- *Energy Efficient*
- *Computer Controlled to Integrate Heating and Cooling Needs*
- *Designed by Selecting Components to Meet the Specific Facility Requirements*
- *Expandable*
- *Provide Air conditioning with out CFC's*



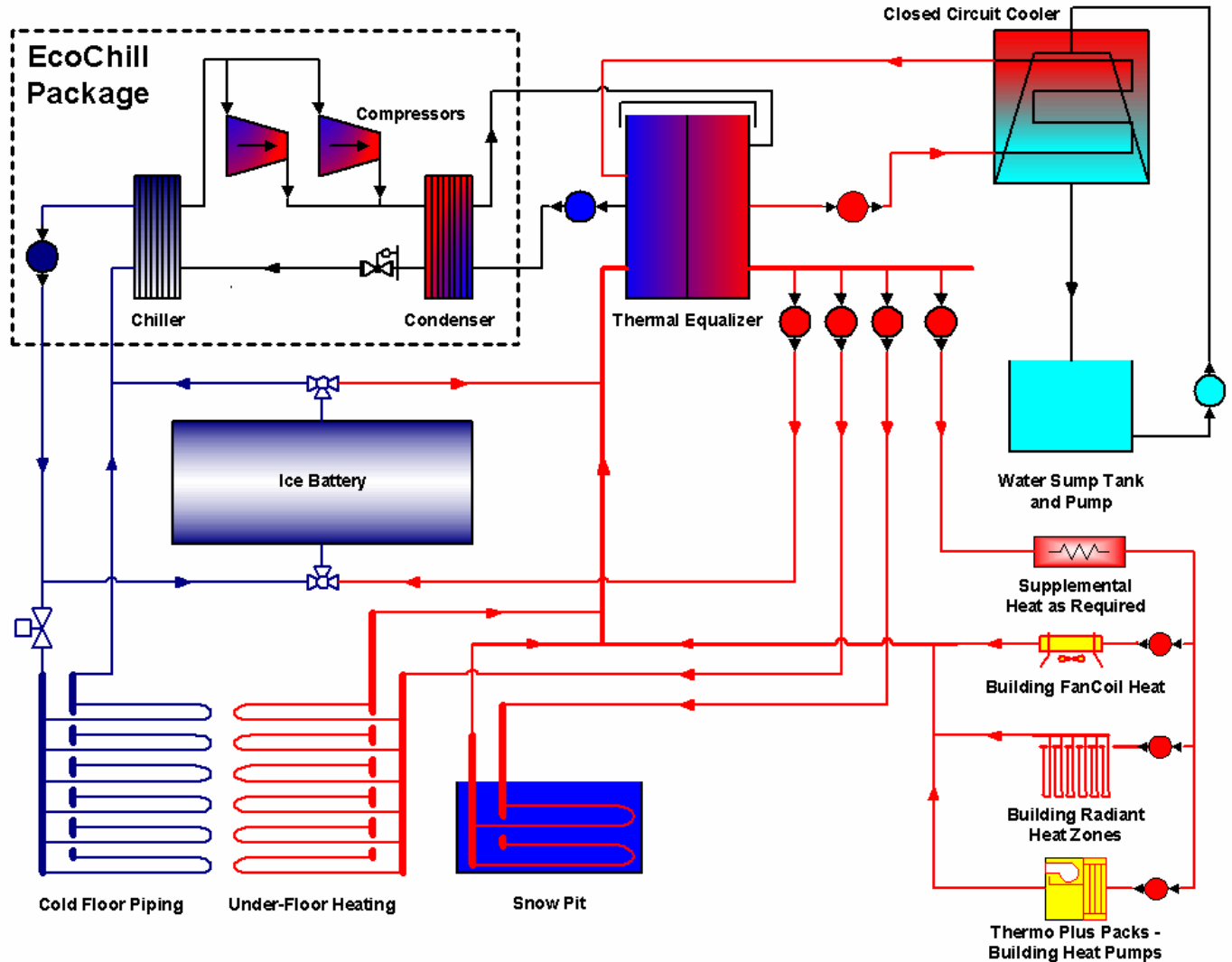


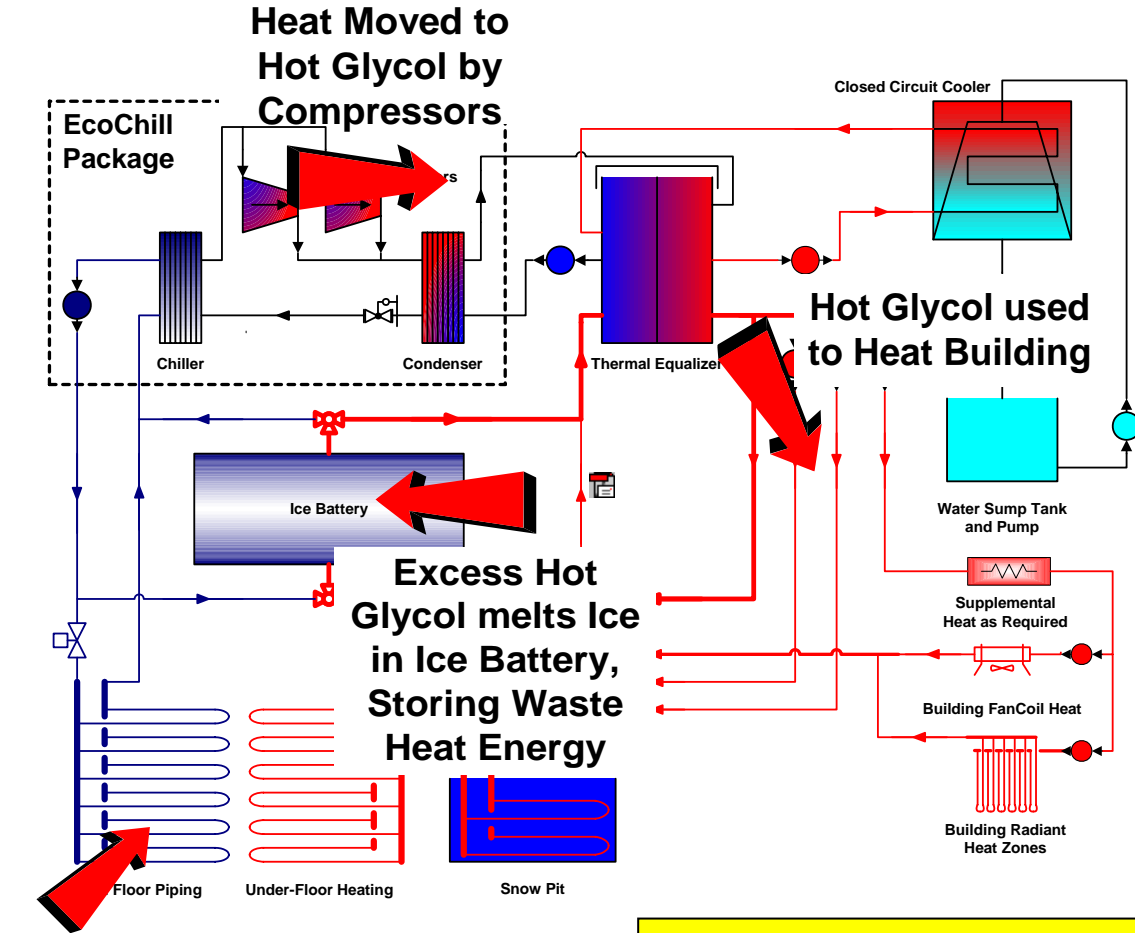
The Basic Design

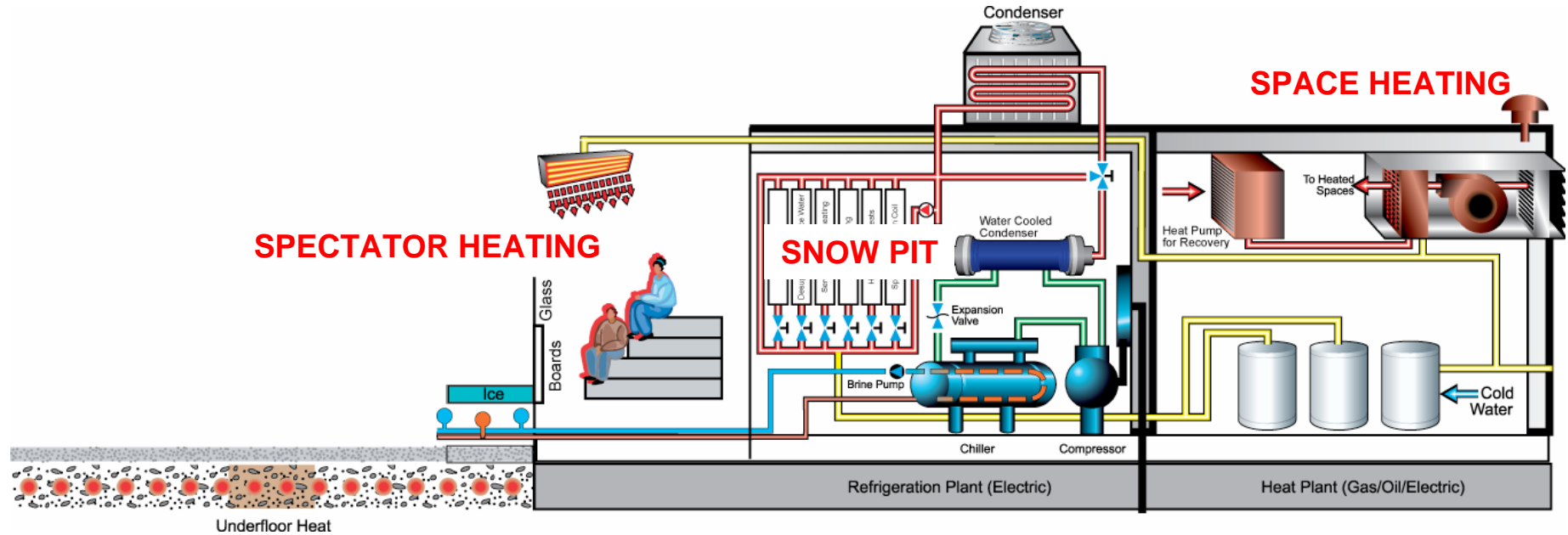




ECO CHILL: The Basic Design







SPECTATOR HEATING

SPACE HEATING

SNOW PIT

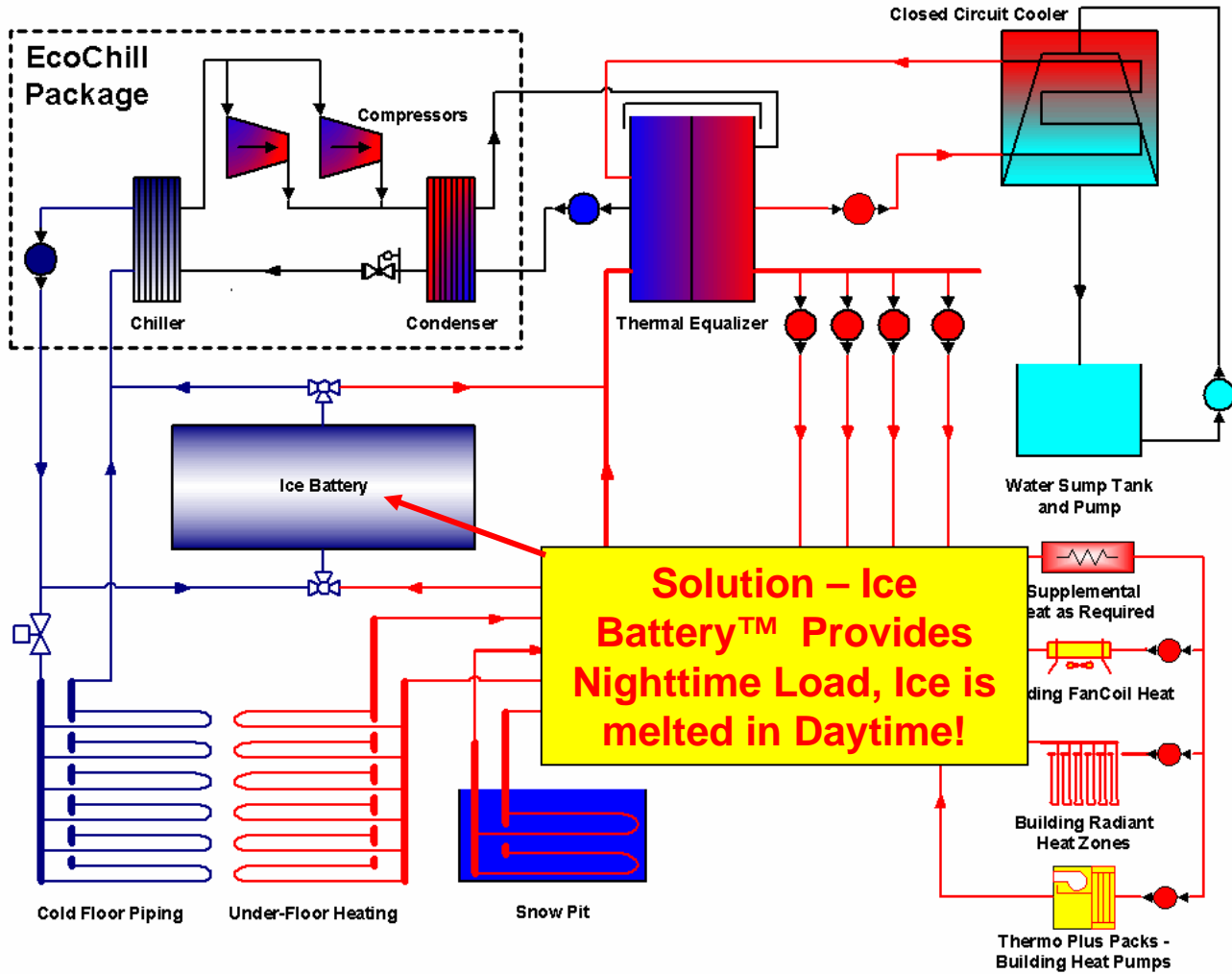
Underfloor Heat

UNDERFLOOR HEATING

WATER HEATING

HOW DO WE MAKE USE OF THE RECLAIMED HEAT?







DOW CENTER- Ice Battery



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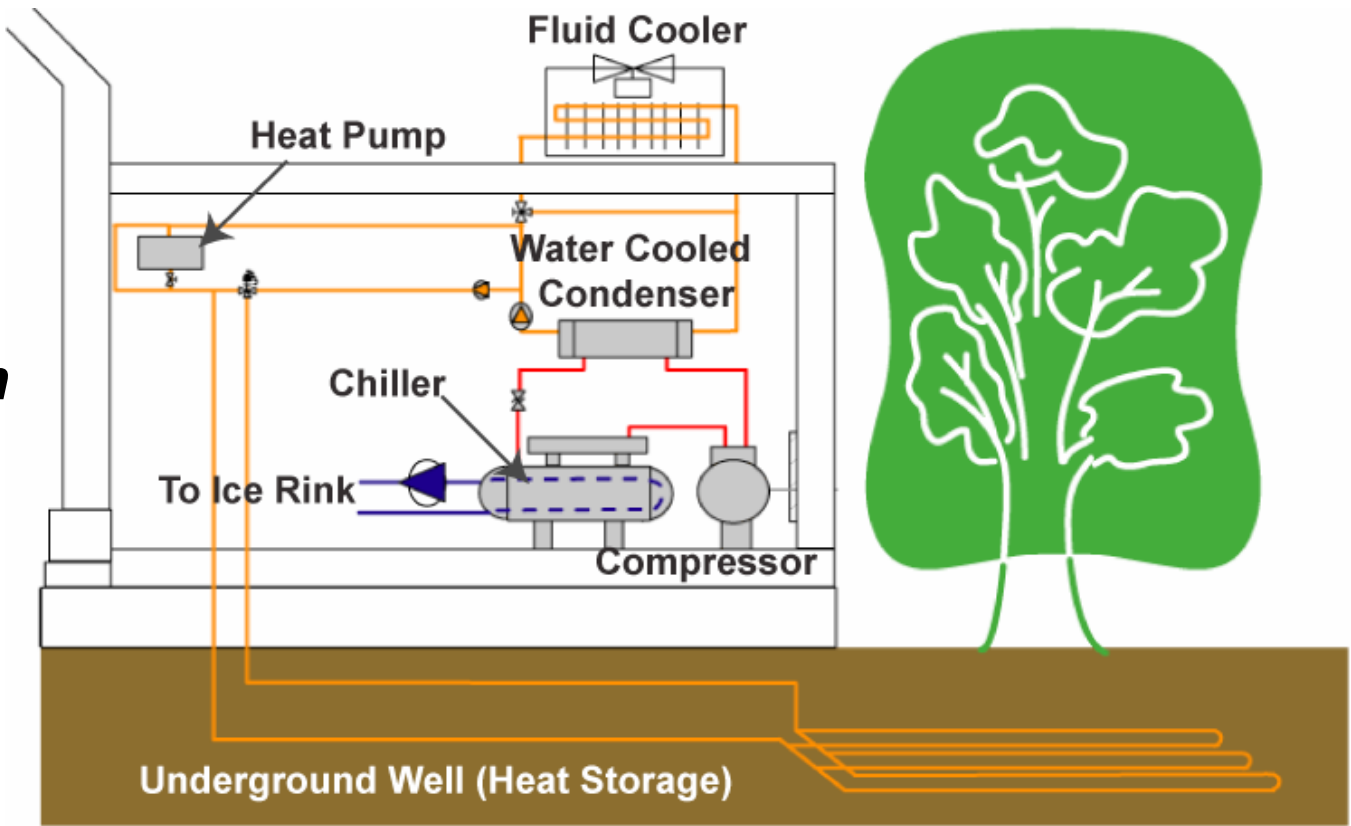
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GEOTHERMAL?
Yes, it can also
be integrated with
ECO CHILL...
If the economics
make sense!



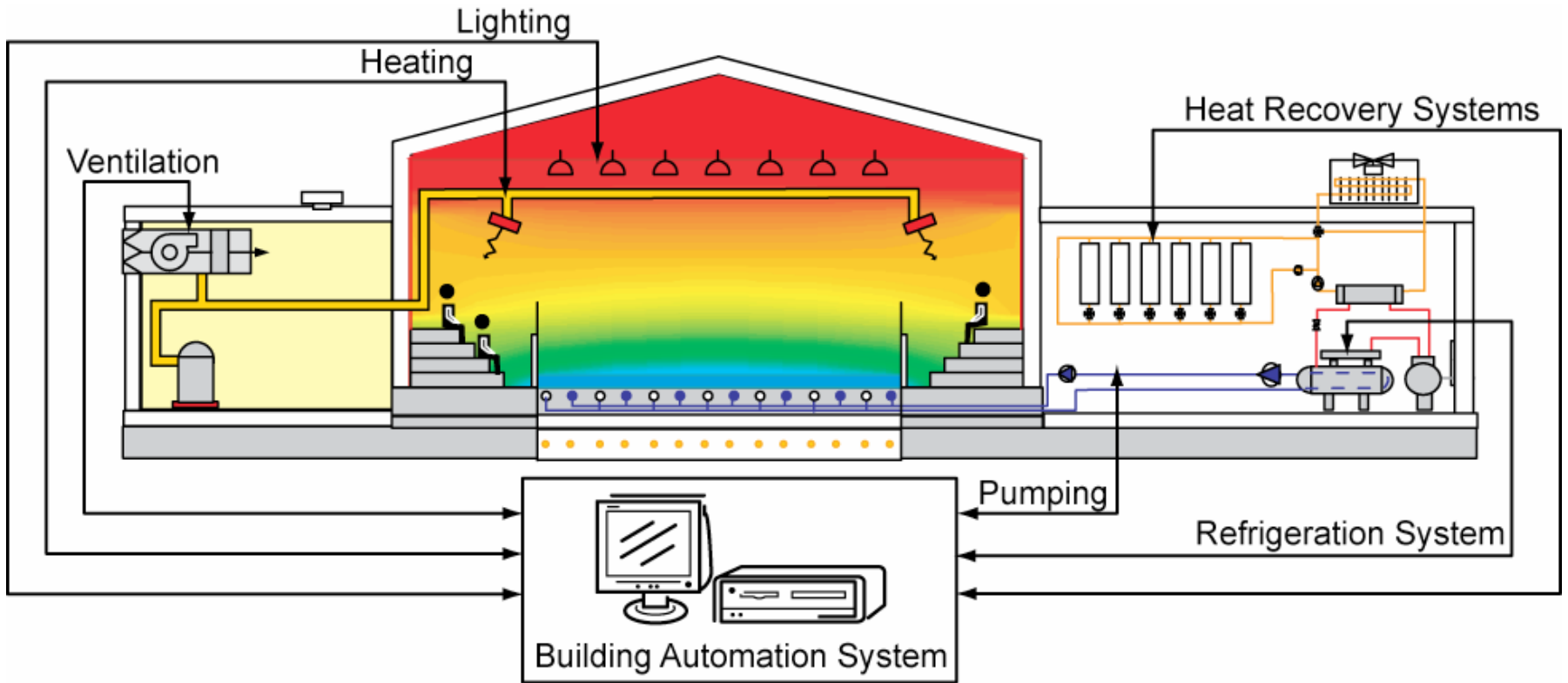


HVAC Integration

The system can be utilized for Air Conditioning as well using the Ice battery and off peak capacity

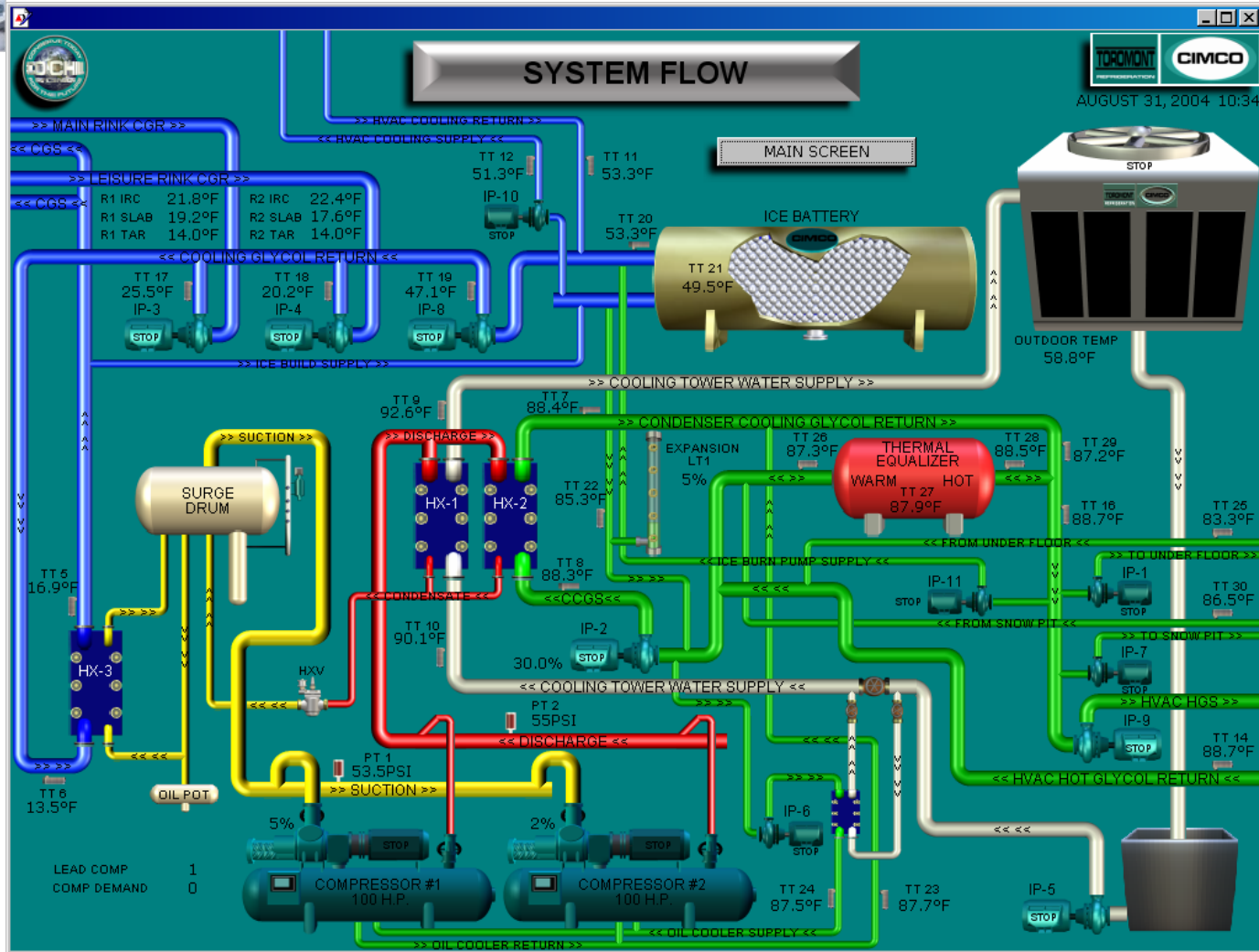
It is essential to integrate the building control system and mechanical design





INTEGRATED CONTROLS TO MANAGE ENERGY FLOW







DOW Payback Analysis

120 TR Eco Chill, Facility is 120,000 Ft Sq.

• <i>Net building heat recovered -</i>	<i>6,800,000MBTU</i>
• <i>Value of heat recovered -</i>	<i>\$ 75,000</i>
• <i>Eco Chill Plant added cost -</i>	<i>\$400,000</i>
• <i>_Natural gas/Giga Joule</i>	<i>\$9.00</i>
• <i>GHG Reductions/ Metric TR</i>	<i>800/annum</i>
• <i>Simple Payback -</i>	<i>5.3 Years</i>
• <i>20 year net savings -</i>	<i>\$1,100,000</i>

**Notes:*

- *Government Incentives not included in ROI Calculations*
- *Based on available 4500 hours run time per 12 months*





Government Programs

- *NRCan – Commercial Buildings Incentive Program now applicable to arenas*
- *Building must be 25% more energy efficient than 1997 energy code*
- *Pays twice the estimated annual energy savings to a maximum of \$60,000*
- *EE Wizard on NRC website allows you to calculate the energy savings for arenas*
- *NRCan Energy Retrofit Assistance - ERA (P) - pays 50% up to \$25,000 for engineering energy retrofits*
- *Local Hydro incentives may be available*
- *TEAM ?????*





MOVING FORWARD

- As we move Forward we will move into the Industrial Applications.
- Canada has more than 500,000 TR Of Ammonia Refrigeration with 95% of the Heat rejected to Atmosphere.
- This has a potential value of \$250,000,000 if it is converted to useable heat





BARRIERS

- Industrial applications currently are reviewed on 3 year pay back
- Many are retrofit applications that require extensive Engineering
- Resistance by Mechanical and owners as to viability
- Federal and local programs encouraging it in new construction





TARGETS

- Food processing that can use in excess of \$150,000 per month of Natural Gas to Heat Water
- Storage facilities that are conducive to load shifting using storage capability

**HIGH ENERGY COSTS ARE HERE
TO STAY**



KEEPING YOUR

TORONTO
REFRIGERATION

CIMCO
90 YEARS

WORLD COOL