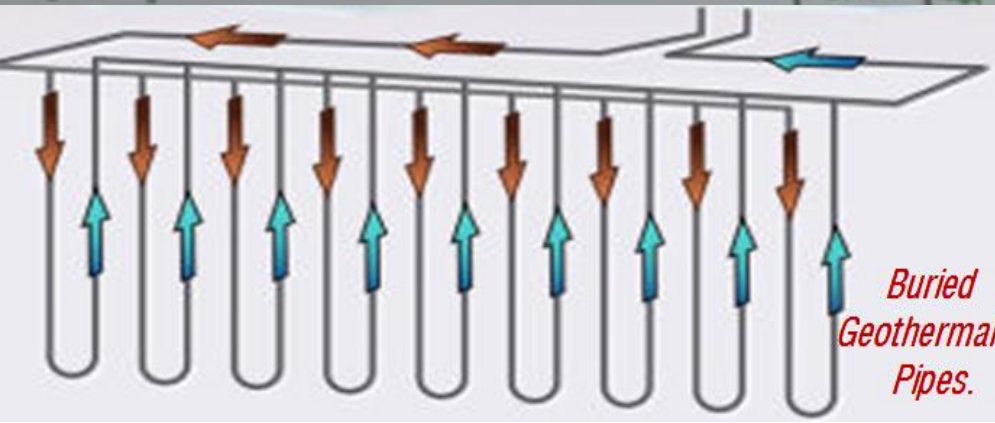


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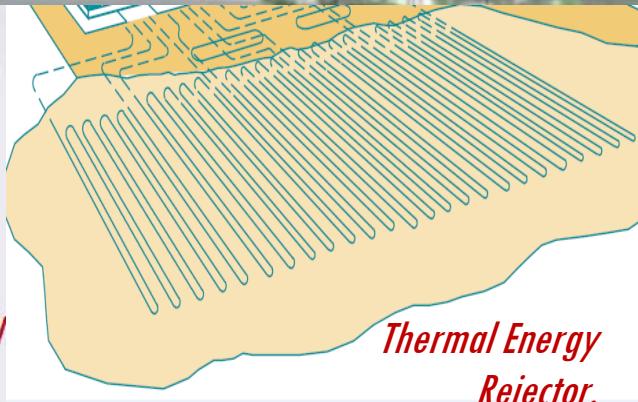
ALLIANCE

THE GREENEST
BUILDING IS
THE ONE THAT
ALREADY EXISTS

STRASHIN
DEVELOPMENTS



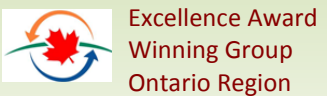
*Buried
Geothermal
Pipes.*



*Thermal Energy
Rejector.*



Unique **Hybrid Geothermal™** with
Innovative **Thermal Energy Rejector** using no
Fossil Fuel Green House Gas (GHG) Emitting Energy by
ABS Group of Companies.



Background

Since 1993 S. Strashin and Sons Limited has purchased, renovated and repositioned five existing beam and post, garment factory buildings in the downtown west, into office/loft space. In their latest project, through wholly owned subsidiary 501 Alliance Investments Inc., the company acquire the former Cooper Canada sporting goods factory, near Weston Road and Black Creek, is undergoing renovation and upgrading to commercial offices targeting LEED Gold Certification. Building municipal address is 501 Alliance, Toronto, with site area is approximately 15,579.5m².

The building is a 4 storey building with approximately 65,000 square feet per floor and 65,000 square foot underground parking garage, construction circa 1975, along with an attached 54,000 square foot single storey structure to the west, construction circa 1965.



Project HGE Team

ABS Group of companies has pioneered the design of innovative hybrid geothermal (HGE) system. The Group received 5th Canadian Geothermal Coalition (CGC) excellence award on "United Communities Credit Union Complex, Town of Amherstburg, Ontario. Geothermal technology is growing in Canada & ABS Group is among the leaders in promoting this industry.

On 501 Alliance project, "Polar Bear Water Source Heat Pump Mfg. Inc.", along with ABS Group engineering corporates "Advanced Building Solutions" and "ABS Green Inc", (www.absqoc.com) developed state of the art and cost effective hybrid geothermal based mechanical system utilizing Polar Bear Water to Geothermal Heat Pumps, Air Handlers (Fan coils) and third party Advanced Heat Recovery unit for 100% fresh air supply.

Pay for the Energy Retrofits & Monitor the Energy Savings. Client share the Savings.

No matter what materials you use, no matter how carbon neutral you attempt to be, you can never surpass the savings in carbon emissions generated by re-using and repurposing.

TARGETS LEED GOLD

HOW Hybrid Geothermal™ WORKS.

Hybrid Geothermal™ provides sustainable and renewable energy using ground & surfaces such as parking area, play ground or even building roof that can be used as energy absorber or energy rejector to either heat or cool the geothermal field to provide building heating and cooling without burning fossil fuels. Hybrid Geothermal™ system includes Thermal Energy Absorber™ or Thermal Energy Rejector™, Geothermal Reservoir™ and a Hybrid Geothermal Skid which incorporates heat pumps, circulators, valves, piping and a web based computer control system.

Thermal Energy Absorber™ collects sun heat using fluid circulating through an array of pipes embedded in the surface of the outdoor parking, roof or school playground and stores it in Geothermal Reservoir™ in the ground and releases it to heat buildings in winter. This increase the Coefficient of Performance (COP) by 25% of ground source heat pumps when operate in winter.

On the other hand, Thermal Energy Rejector™ rejects excess heat collected by the geothermal field during summer operation. System uses fluid circulating through an array of pipes embedded in the surface of the outdoor parking, roof or school playground when external temperatures are low - at night or in winter. This serve two purpose, first it provide passive snow melting and secondly it lower the temperature of a Geothermal Reservoir™ from its higher temperature state 75°F to 50°F or even lower over the course of the winter by just running the circulating pumps exchanging the heat energy via heat exchanger.

HYBRID GEOTHERMAL

WINTER SUMMER

BUILDING

THERMAL ENERGY REJECTOR

THERMAL ENERGY ABSORBER

GEOTHERMAL

COLD GROUND

WARM GROUND

Continue on Page 5





To meet these challenges an innovative solution was designed to satisfy 100% of the building's cooling & heating demands, snow melting, domestic hot water heating and fresh air heating & cooling requirements, year round, without using any natural gas.

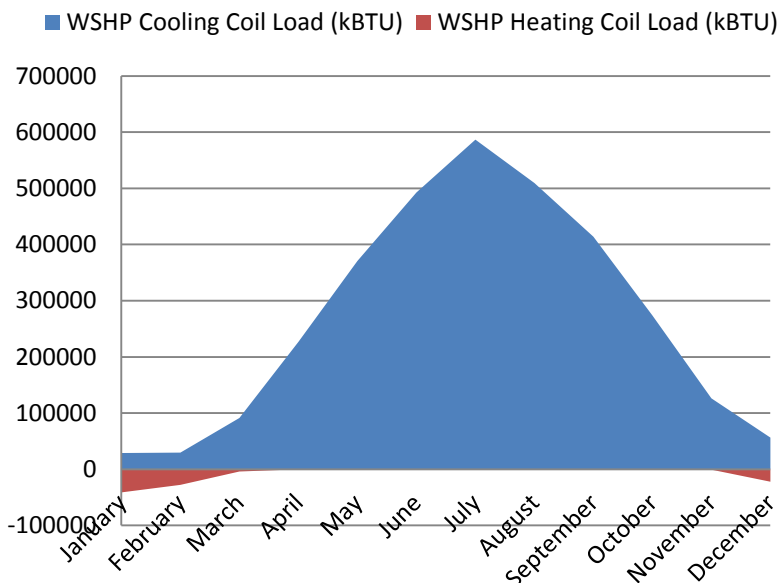
Challenges & Complexities

There is a tendency for modern buildings to have a high need for cooling. This is particularly significant for larger floor plate, high occupancy buildings with passive heat gains from people, lighting, computers & high solar gains from extensive use of glazing in the facade. Data Centres / Supermarkets have high cooling loads from server rooms & process cooling respectively.

Based on thermal load analysis the 501 Alliance Office building is a COOL DOMINANT building has annual cooling load which is larger than the heating load, even in the Winter months which is due to larger floor plate, high occupancy and high fresh air requirements.

Dr. Elliot Strashin, president of S. Strashin and Sons Limited, and his design team were looking for a modular approach to an HVAC system for this building and were inspired by the geothermal concept, when first presented to by the ABS Group of Companies & Polar Bear team in the summer of 2012. The challenges were to design a modular approach type HVAC solution that will be unique, innovative, energy efficient and environmentally friendly, for this 'Cool Dominant Building'. The system designed will not only be better than a Variable Refrigerant Volume system but also offers low operating costs, avoids costly maintenance contracts and allows for **zero (0)** use of fossil fuel such as natural gas. Other challenges were to renovate the entire building within budget, maintain building originality & aesthetics as planned by Kohn Shnier Architects.

ANNAUL ENERGY USAGE



The Innovation & technology Advancement

The integration of the "Hybrid Geothermal Energy" (HGE) system with other technologies in this building, addresses most of the challenges and most importantly meets the Company's green strategies & mandates. The HGE system was sized to accommodate the full load of the development and there will be no back-up system or boiler in place.

Besides the HGE system, this building will have many innovative design, material & energy features which will be required to achieve LEED Gold Certification, such as a Thermal Energy Rejector system, an Advanced Heat Recovery Unit for 100% Fresh Air (uses no energy component except fans), low-e Double glazed window, 20 year high SRI reflective roof, 250 KW solar farm, insulated roof and walls, storm water harvesting, low flow plumbing fixtures, high efficiency lighting and controls, geothermal heated parking lots, parking for bicycles and electric cars and fibre-optic connectivity.



The Advanced HVAC Solution

ABS Group of companies and Polar Bear have pioneered the design of the innovative HGE system, creating solutions with higher efficiencies than have previously been achieved, compared with the mechanical equipment using traditional geothermal systems, through design and use of unique, patented Polar Bear geothermal equipment. The energy efficient mechanical system of this building consists of (A) a water to water heat pumps based combined central heating & cooling plant, (B) a four pipe distribution piping system using distributed air handlers (fan coils) for each floor along with zone boxes and (C) a Hybrid Geothermal Energy Field with Thermal Energy Rejector System. Based on the thermal load analysis, the building is "Cool Dominant" and peak demand calls for a minimum of 270 Tons of Cooling when fully occupied. Heating requirements were insignificant as the central core of the building require cooling all year round.

The Advanced HVAC Solution (Cont'd)

Central plant: The Central Plant consists of 18 water to water heat pumps (2 per rack), chilled water loop, hot water loop, snow melting, DHW heating and main circulating pumps complete with VFD's. Polar Bear Geothermal will provide (18) Water to Water units each of 15 tons in capacity, with provisions to add two more 15 Ton units if needed. The Main Circulating Pumps will be equipped with integral VFD's, sensors and controllers which will precisely control the speed of the pump in the event of changes in a fluid pressure differential across the pump, resulting in impressive energy savings.

Air Handler (Fan Coil) & Zone Coil: The system is a 4 pipe HVAC system with air handlers (Fan Coils), each with a capacity of 5 tons & equipped with EC motors cooling coil, heating coil & controls. Air handlers will be distributed throughout the building to provide either heating or cooling & maintain the exact comfort required in every area of the building. Zone coils will be provided for perimeter zone areas to maintain comfort conditions. Insulated and acoustic lined sheet metal ductwork use in open ceiling spaces to distribute heated or cooled air from the air handlers (Fan Coil) & zone coils located throughout the building.

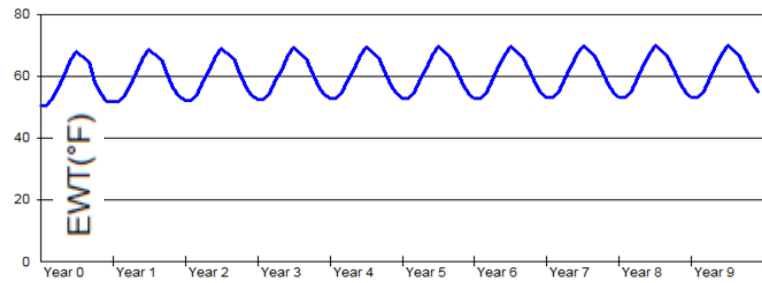


Chart-1: 10 years simulation results of balanced fluid temperatures produced by Geothermal Field.

By comparing our system to a traditional geothermal field, we anticipated that HGE system will increase the energy efficiency ratio (EER) by 30% to 40% and Coefficient of performance (COP) by 20 to 25% of Central Water to Water heat pumps.

This process allows a large volume of the Geothermal Reservoir to achieve a significantly lower temperature, which can be maintained over the winter till spring and used in summer for the building cooling. This permits natural cooling of the building at a fraction of the cost of traditional air conditioning during the summer.

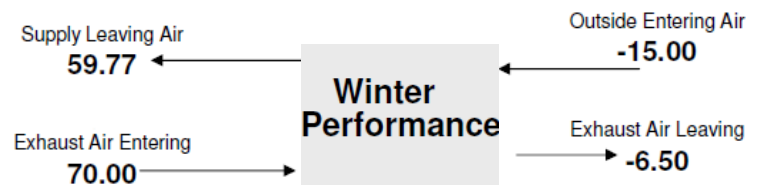


Hybrid Geothermal Energy ("HGE") System: Initially a traditional geothermal field was designed during the early stages of this project. Changes were made when it became apparent the building was in fact "Cool Dominant". There was a concern that over a long period of time the loop temperature of a traditional geothermal field might rise to unacceptable temperatures, making cooling inefficient. Instead of drilling more holes, the team has designed unique and innovative "Hybrid Geothermal Energy" system which includes a "Vertical Geothermal Reservoir" and "Thermal Energy Rejector" for the front (North) and rear (South) parking lots.

The Vertical Geothermal Reservoir consists of 72 holes drilled 620 feet deep, in the rear (South) parking lot. Boreholes near the south wall drilled at 10 degree and 5 degree angles along with directional angles. The Thermal Energy Rejector Field includes 3/4" tubing, which will be embedded in the ground near the parking lot surface, to provide a means to reject heat. Utilizing the HGE system and through monitored controls, the loop temperature can be adjusted to such a degree, that the temperatures needed to provide excellent efficiency for cooling would be maintained forever. The system rejects excess heat which will be collected by the geothermal reservoir during summer operations, in order to lower its temperature, when outdoor air temperatures are low, either at night or in winter, by just running the circulating pumps to circulate the thermal fluid through heat exchanger and running through the loops embedded in the parking lots. **See Chart-1.**

The by-product of the Thermal Energy Rejector is ice melt. Large areas of the front and rear parking lots will have passive ice melt. The front (North) sidewalks and rear (South) parking ramp will have active ice melt.

Advanced Heat Recovery System for Fresh air: The entire building's fresh air will be supplied by a roof mounted energy efficient heat recovery unit with a capacity of 22,500 CFM delivering 90% effectiveness in winter & 80% effectiveness in summer. This unit uses no compressor, burner, chilled water coil or hot water coil. The Supply air temperature in winter will be approximately 59°F and in summer approximately 79°F. The unit will be controlled with CO₂ controller with CO₂ sensors located in ducts to adjust the speed of the fans via VFD's. Any additional heating or cooling energy needed to bring fresh air to room temperature will be provided by building HGE system via distributed air handlers or zone coils.



Impressive Heat Recovery!

Domestic Hot Water Heating: The DHW heating will be provided by the HGE system as it will be essentially free. The system includes primary and secondary storage tanks, each of 175 gallons holding capacity. All (18) Polar Bear water to water heat pumps will be equipped with a desuperheater and an integrated circulating pump that can provide Supplemental Domestic hot Water (SDW). This is done by stripping heat from the superheated gas leaving the compressor. In addition on heating demand the central plant will operate one dedicated water to water heat pump in heating mode to increase the primary tank temperature to 120°F. Electric backup heating will be provided in the Primary and Secondary DHW tanks, which can be used when DHW delivery temperature falls below 120°F in primary tank and used twice a day (mid night & noon time) to maintain 140°F water temperature in both tanks, to prevent legionella pneumophila in the DHW system.



Continues from Page 2

Achievement in Efficiency

This unique, innovative HGE system replaces all fossil fuel which the building would have consumed and reduces the electricity consumption, offering significant energy savings while producing no emissions.

For 501 Alliance the anticipated energy savings will be 55 to 65% and carbon reduction of 60 to 70% compared with traditional HVAC systems, however an independent energy analysis is underway by a third party to evaluate the actual energy savings & reduction in carbon emissions. Toronto Atmospheric Fund will pay for the energy retrofits & monitor the energy savings. Client share the savings.

A Showcase for Hybrid Geothermal™ Systems

This commercial project will be a showcase project to help bring unique & innovative HGE & fresh air heat recovery system to the forefront of public attention, in an innovative application. Using these systems to heat & cool the building, eliminated the use of natural gas, allowing the building to reduce operating costs with impressive system efficiencies & maintain occupant comfort..

The elimination of natural gas to heat the building significantly reduces the associated greenhouse gas emissions which fits in line with Company's philosophy of being leader in Green Buildings.

Utilizing innovative systems, 501 Alliance building will be a state of the art building, of its kind in Toronto & encourage others to incorporate HGE systems in their buildings.

HOW Hybrid Geothermal™ WORKS.

No water to water heat pump energize to achieve this task besides they are satisfying building heating and cooling demands. This system runs on a temperature difference between geothermal filed and outdoor surfaces. This allows a large volume of Geothermal Reservoir™ to achieve significantly lower temperature which can be maintained over the spring and used in summer for the building to reject heat to – this permits natural cooling of the building at a fraction of the cost of air conditioning.

This increase the Energy Efficiency Ratio (EER) by 40% of ground source heat pumps when operate in summer.

HGE Application

With Respect To Building Energy Demands:

- Cool Dominant Building
- Heat Dominant Building
- Buildings with Balance Cooling and Heating loads

With Respect To Building Types:

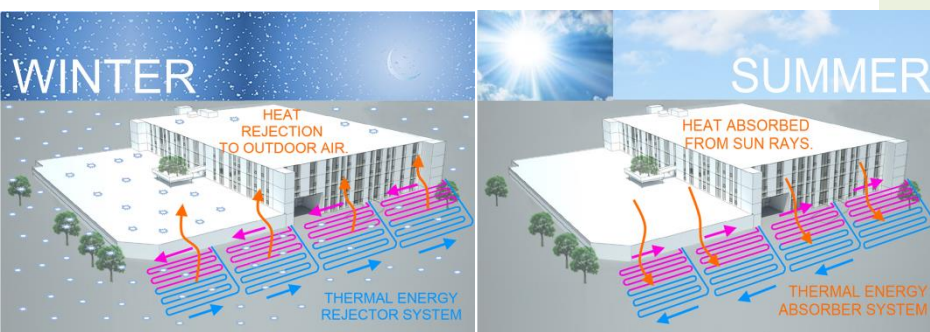
Industrial Buildings, Data Centers, Apartments, Hotels, Condominiums, Offices, Schools, Assisted Living, Health care, Retail stores, Restaurants, Conference facilities and may more...

HGE Flexibility

Every project is different! Each HGE is unique and tailored to meet the energy needs of the building while ensuring optimum system efficiency, sustainability and most importantly reliability.

HGE is so flexible that it can connect to any HVAC system such as:

- Water cooled Central Water to Water Heat Pump
- Water Cooled Central Chillers
- Water Cooled Central Heat Pumps (Heating Only)
- Integrated Piping System (IPS)
- Distributed Heat Pump System
- Fan Coil Systems
- Variable Refrigerant Volume System
- Industrial Spot Cooling & Heating System





2011 – CGC Top Prestigious Geothermal Excellence
Award Winning Group Ontario Region.



Our Market Sectors



COMMERCIAL



DATA CENTRES



EDUCATION



ENTERTAINMENT



HEALTH CARE



HOSPITAL



HOTEL



INDUSTRY



INSTITUTIONAL



LAB, RESEARCH
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