Campus Wide District Heating & Cooling System

The Energy Loop… Today and Tomorrow

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Presentation Order

1. Vision, Mandate & Objectives
2. Yesterday
3. Today
   - Decentralisation of the heating plant
   - Introduction of an Energy Loop
   - Geothermal
4. Results
5. Tomorrow
6. Questions

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Vision & Mandate

- The Vision of the Buildings and Grounds Dept. of Bishop's University is to be the Promoter and Guardian of our physical and natural environments.
- The Mandate of the Building and Grounds dept. is to provide our community with professional and durable services in the spirit of our Vision.

Energy Efficiency Objectives

- Put in place a concept that enables the utilisation of cost effective energy sources.
- Reduce our emissions of Green House Gases.
- Target 2016 as the year we can potentially be Carbon Neutral based on Direct GHG emissions.

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Bishop’s Campus

Yesterday

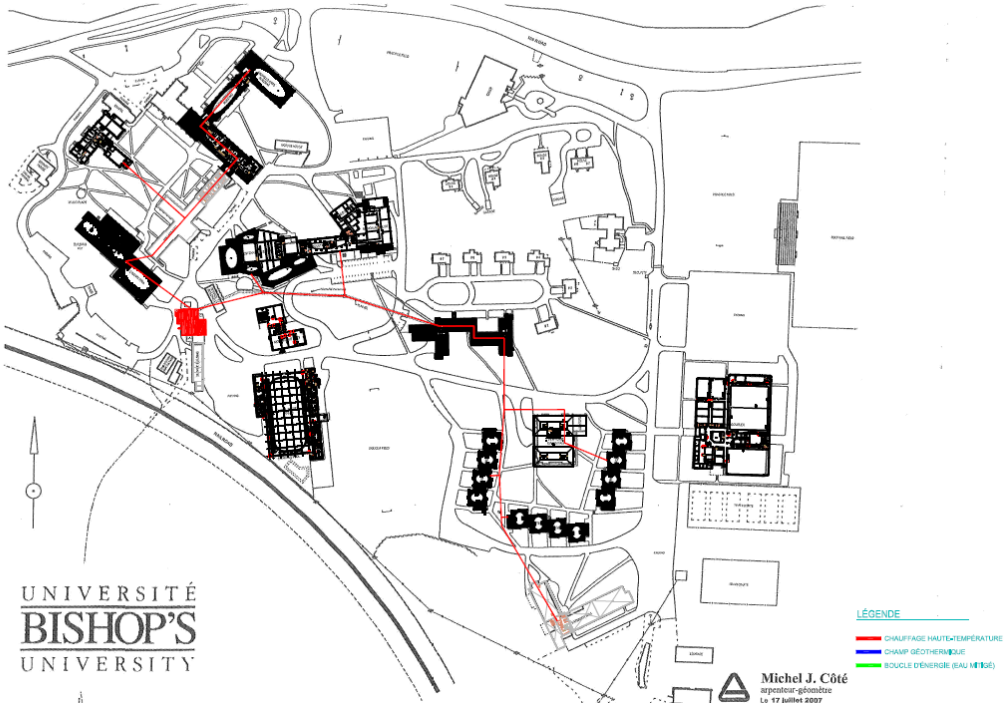
- 33 buildings
- 81 879 m2 (881,338 sq.ft)
- Heating: steam network at = 100 PSIG (328F)
- Approximitely 600m (2,000’) of buried lines

Central Plant

Yesterday

- Inefficient Distribution
- Steam traps
- Steam vents
- Purges
- Poorly insulated Steam lines in tunnels and buried
- Numerous leaks

GREEN LAWN IN JANUARY!



Central Plant

- Production of steam with all its inefficiencies

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Project

- Project implementation in 2 phases:
  1. 2010-2011: Eliminate steam distribution and decentralize the heating plant
  2. 2011-2012: Introduction of the Campus Energy Loop
     - Geothermal Heating
     - Energy Recovery

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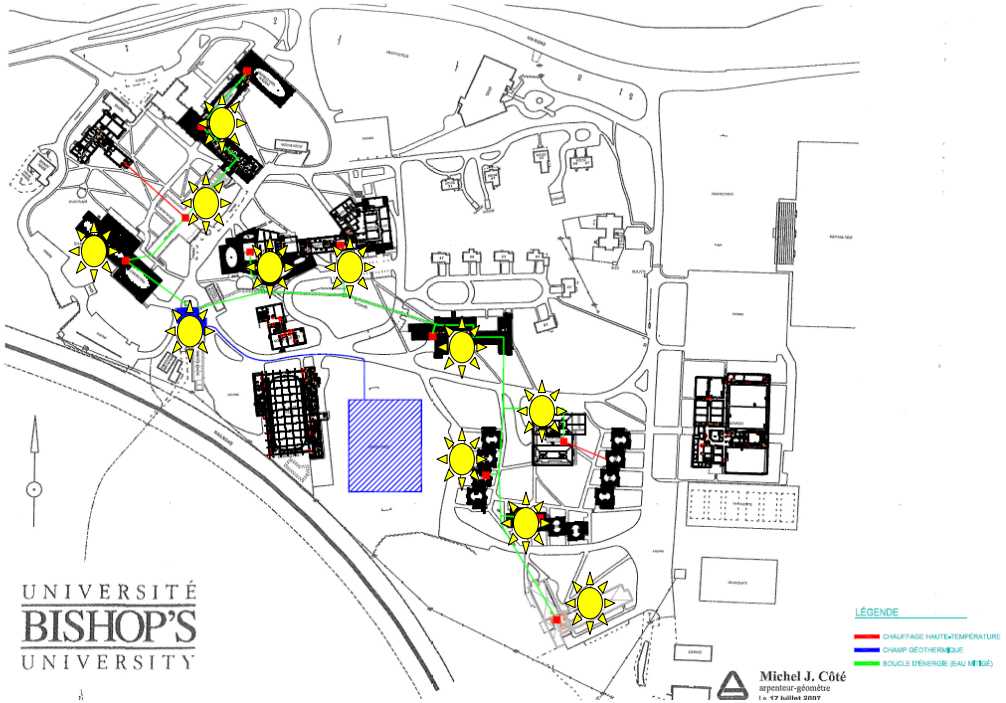
Decentralised Heating Plants

Today

- 11 Heating Plants(hot water)



Decentralisation

- Central Plant becomes Energy Plant
- 11 Mechanical Rooms (water heaters)
  - Heat recovery from the new condensing furnaces.

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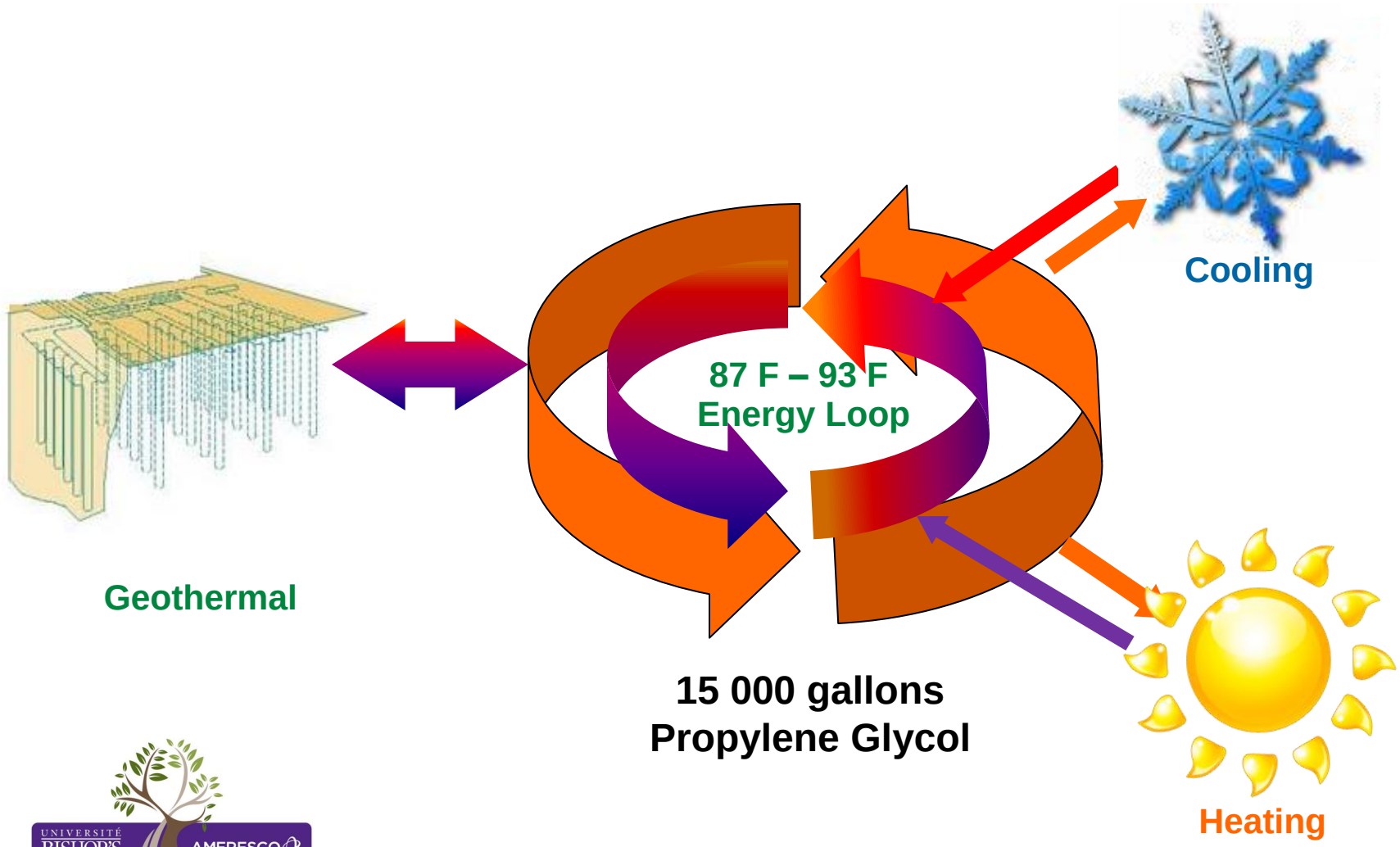
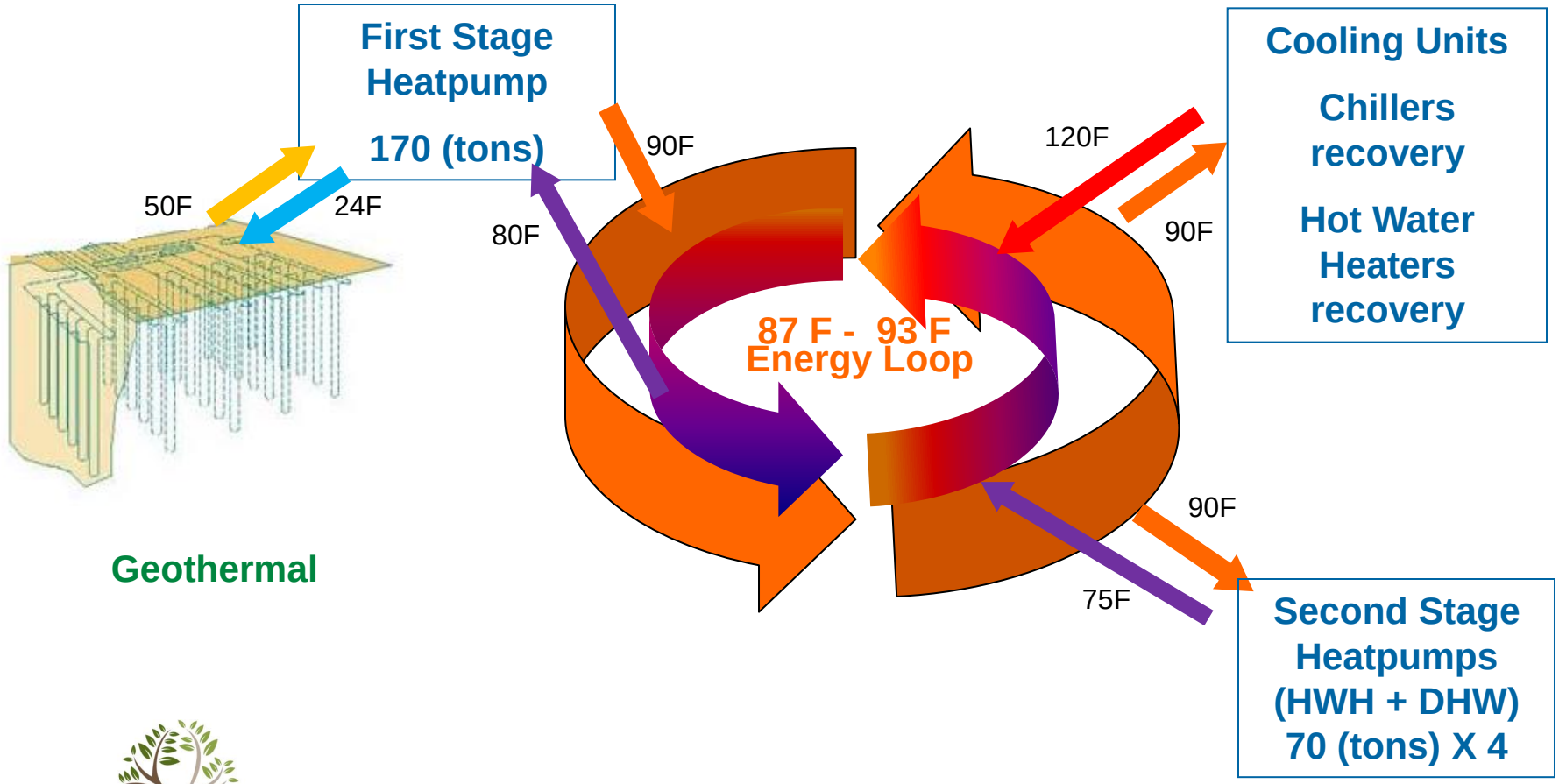
Energy Loop


Cooling
87 F – 93 F
Energy Loop
Geothermal
15 000 gallons
Propylene Glycol
Heating

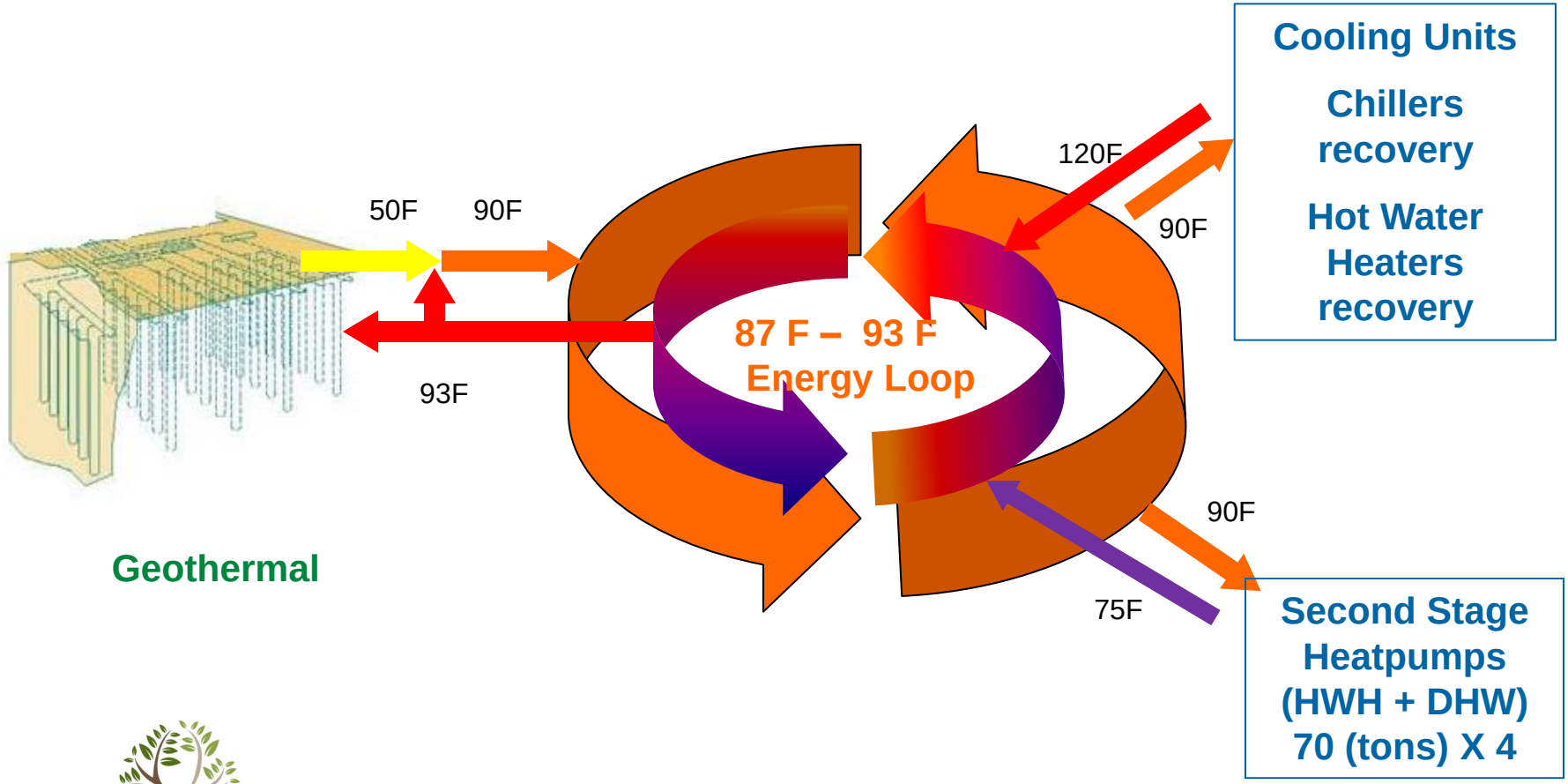
Energy Loop

Heatpump Mode



Energy Loop

Wells Regeneration Mode



Energy Plant *(old Central Plant)*

- First Stage Heatpump (Energy Loop)

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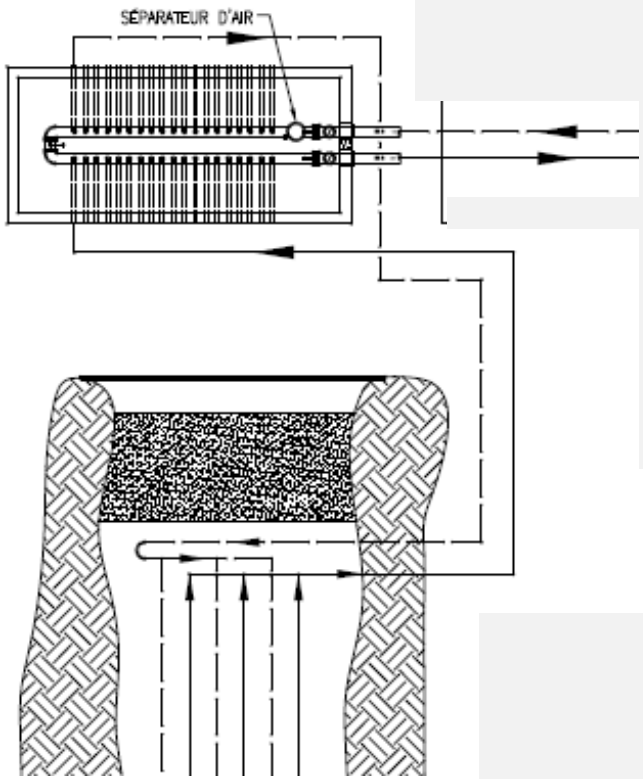
Geothermal

- 57 wells in closed loop
- 520’ – 530’ (158 m- 161 m) deep
- 3 tons - 4 tons / well (171 tons - 228 tons)
- 15,000 Gallons Propylene Glycol
- Design Min - Max
  - 24 F, 100 F (-4 C, 38 C)



Geothermal

Geothermal

Geothermal

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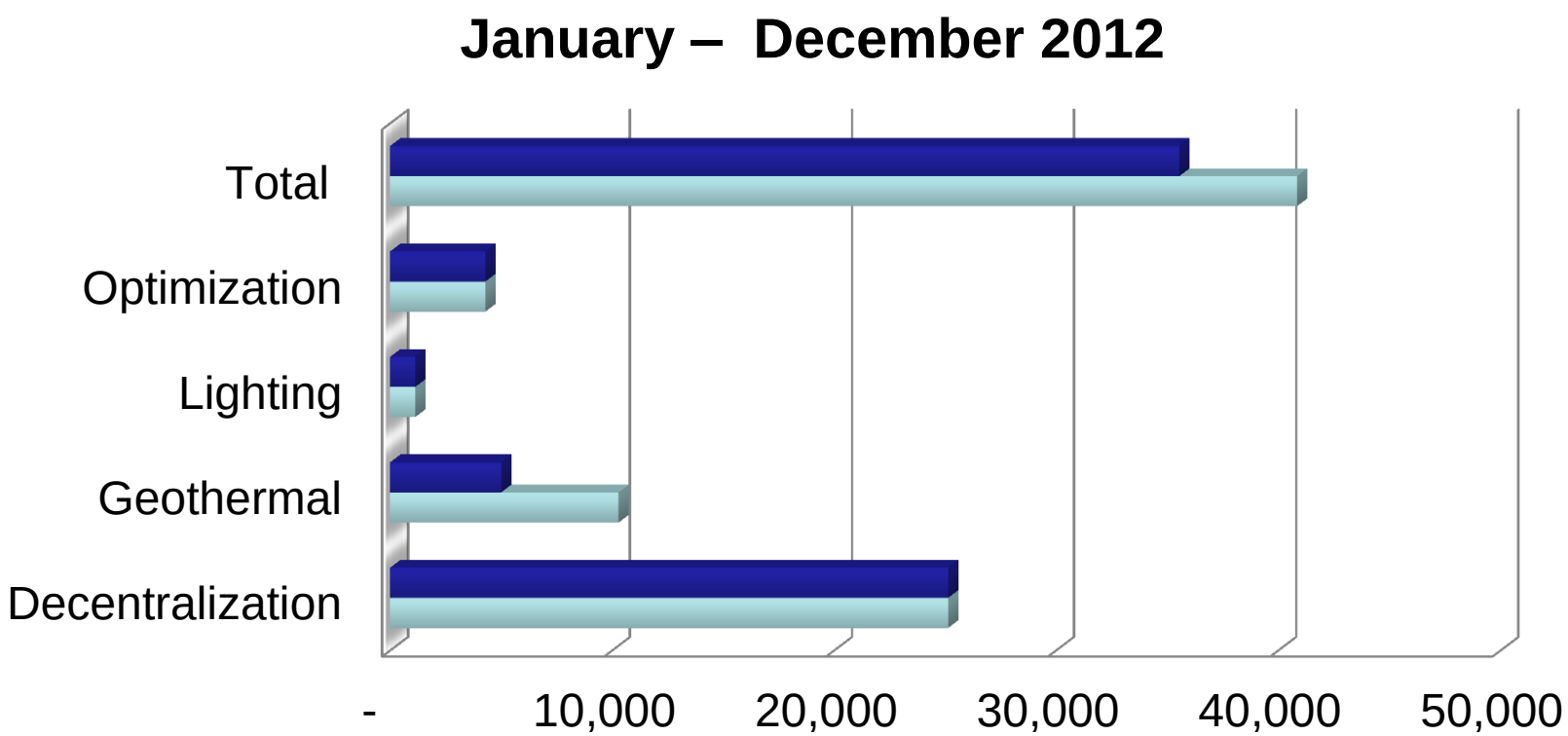
Solutions Provided

- Flexible System, can expand : New Sports Center with new Arena & new heatpumps.
- Redundancies

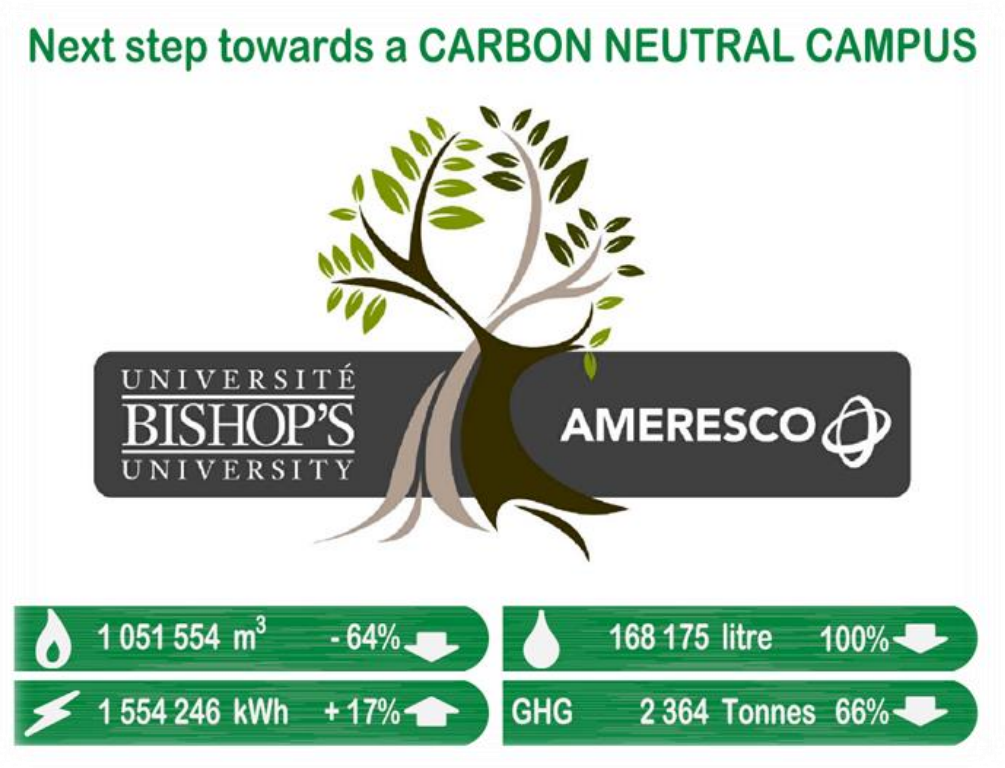
Results (Gj)



	Decentralization	Geothermal	Lighting	Optimization	Total
To Date (Gj)	25,140	5,000	1,128	4,288	35,556
Objectives(Gj)	25,140	10,294	1,128	4,288	40,850

Results

- Annual savings $472,000 (reference year 2006-07)
- Equivalent of 350 residences of 2,000 sq.ft.
- 2,364 tons of CO2, equivalent of 1,400 cars, 66% reduction



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Tomorrow

- Long Term Vision
- New Sports Center on the Energy Loop
- Gradual reduction in the remaining use of fossil fuels
  - Heating
  - Transportation
  - others
- Objective: Have a Carbon Neutral Campus in 2016 based on Direct GHG emissions

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Think Globally, Act Locally

Thank you !