Serving GOVERNMENT, serving CANADIANS.

Connecting to Ottawa's Emerging Downtown Districts

Presented by:

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Energy Services Acquisition Program
Public Services and Procurement Canada

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ESAP PASE

Program Overview

The **Energy Services Acquisition Program (ESAP)** is modernizing the District Energy System (DES) which provides heating services to over 80 buildings and cooling services to 67 buildings in the National Capital Region (>1.6M m^2 of floor space), accommodating 55,000+ occupants

There are **two stages** to ESAP:

- Stage 1: DES Modernization
- Stage 2: Deeper Greening

Where are the Plants?

National Printing Bureau

Cliff

Tunney's Pasture

New connections

NRC

Confederation Heights

Sneak Peak at the Design for Stage 1: Modernization

Cliff Plant – Historically

Architectural Design – Cliff Plant

View of the Cliff plant from Gatineau showing the exterior and the stainless steel stacks.

Aesthetic Design Overview - Cliff Plant

View of the Cliff CHCP from the NCC's multiuse pathway (MUP).

Architectural Design - Cliff Plant

View from the public meeting area. Notice the access from top to bottom by staircase and by elevator.

Architectural Design – Cliff Plant

View of the upper plateau blending walkways, seating areas, trees and plants and offering spectacular views.

Architectural Design – Tunney's Pasture Plant

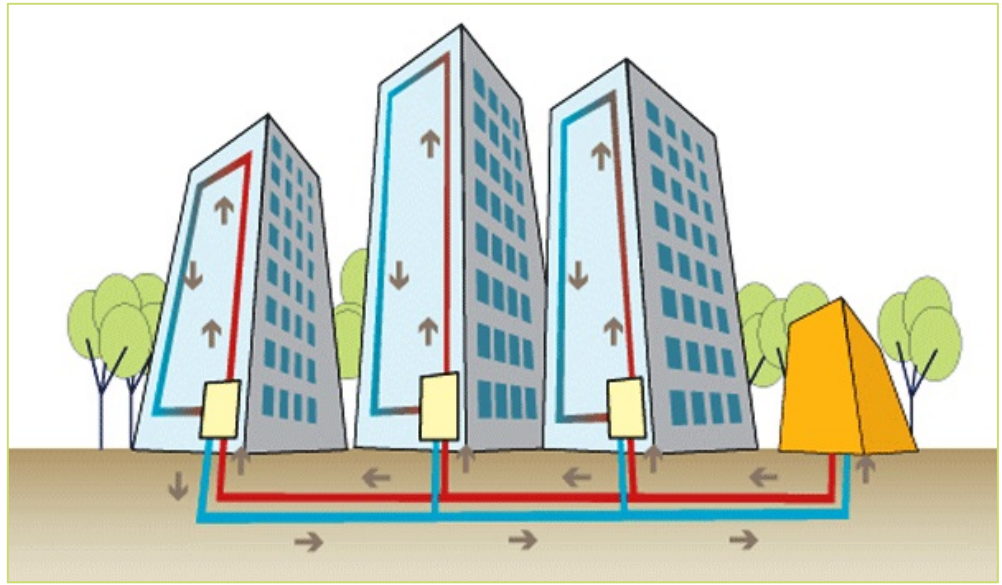
View of the Tunney's Pasture CHCP looking towards the Ottawa River.

Architectural Design – Tunney's Pasture Plant

View of the Tunney's Pasture CHCP from the street in front.

Stage 1: Creating a Thermal Grid

- In Stage 1: Modernization, one of the most important benefits will be the creation of a thermal grid
- It will be able to distribute hot and cold water as energy sources
- This will include not only delivering energy but also receiving energy from other plants, buildings and waste heat sources



Stage 2: Plan for Low Carbon Heating and Cooling

- By 2025 the DES in the National Capital Region will be modern and highly efficient
- Cooling will use 100% clean electricity and will be **carbon neutral**
- Studies and pilot projects are underway to examine carbon neutral energy sources and how they can be used for heating

Community Solar Panels in Ottawa (orec.ca)

Stage 2: Enabling Low Carbon Government

- Modernizing the DES is a GOC priority that will provide long term financial savings and greenhouse gas (GHG) emissions reductions
- It is part of a portfolio of solutions for GHG reduction:
  - Smart buildings and plants
  - Reducing building energy demand with efficient retrofits
  - New building construction to highest standards
  - Adding renewable energy generation capacity on site

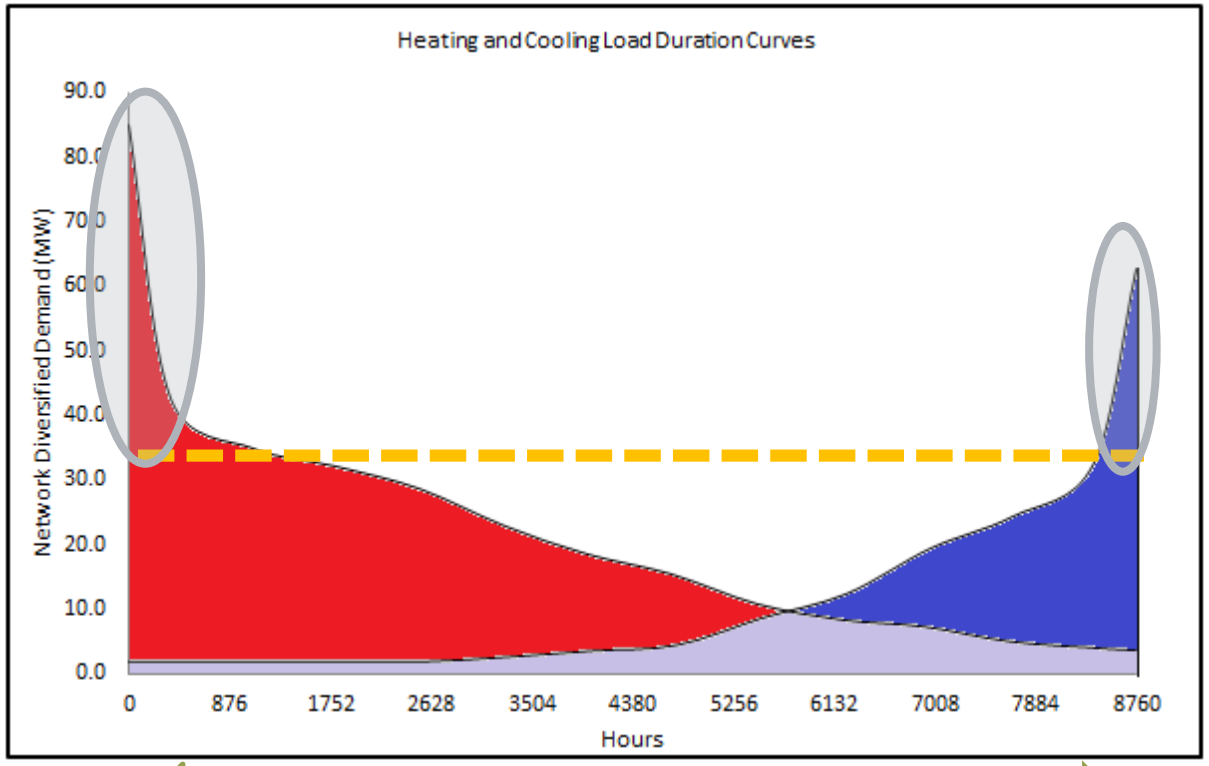
Geo-exchange well in Surrey, BC

Stage 2: Aligning with Net Zero Design

- Government of Canada direction is that "*all new buildings should be constructed to be net-zero carbon ready at the latest in 2022*"
- ESAP can help clients in the transition to Net Zero buildings
- We can act as thermal storage, accepting excess energy on sunny days for example, and being a source of heating on very cold days

Biomass Facility at UBC

Understanding Energy Demand



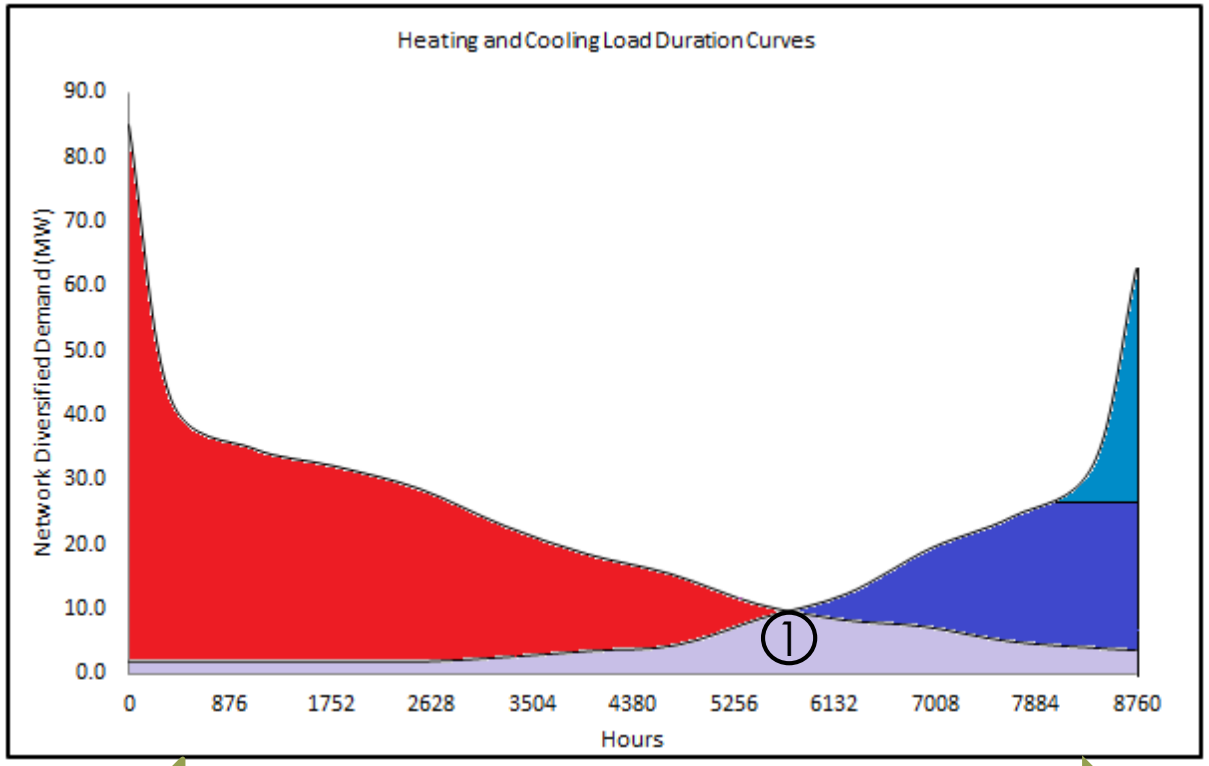
- The Load Duration Curve is the key to understanding energy demand
- Base Load produces the bulk of the annual energy use
  - ➢ Focus for low carbon sources
- Peak Demand is critical for customer comfort but is small % of total energy use
  - ➢ Focus for RNG, Offsets (ON elec.)

Heating

Cooling

Heating and Cooling

Energy From Renewables

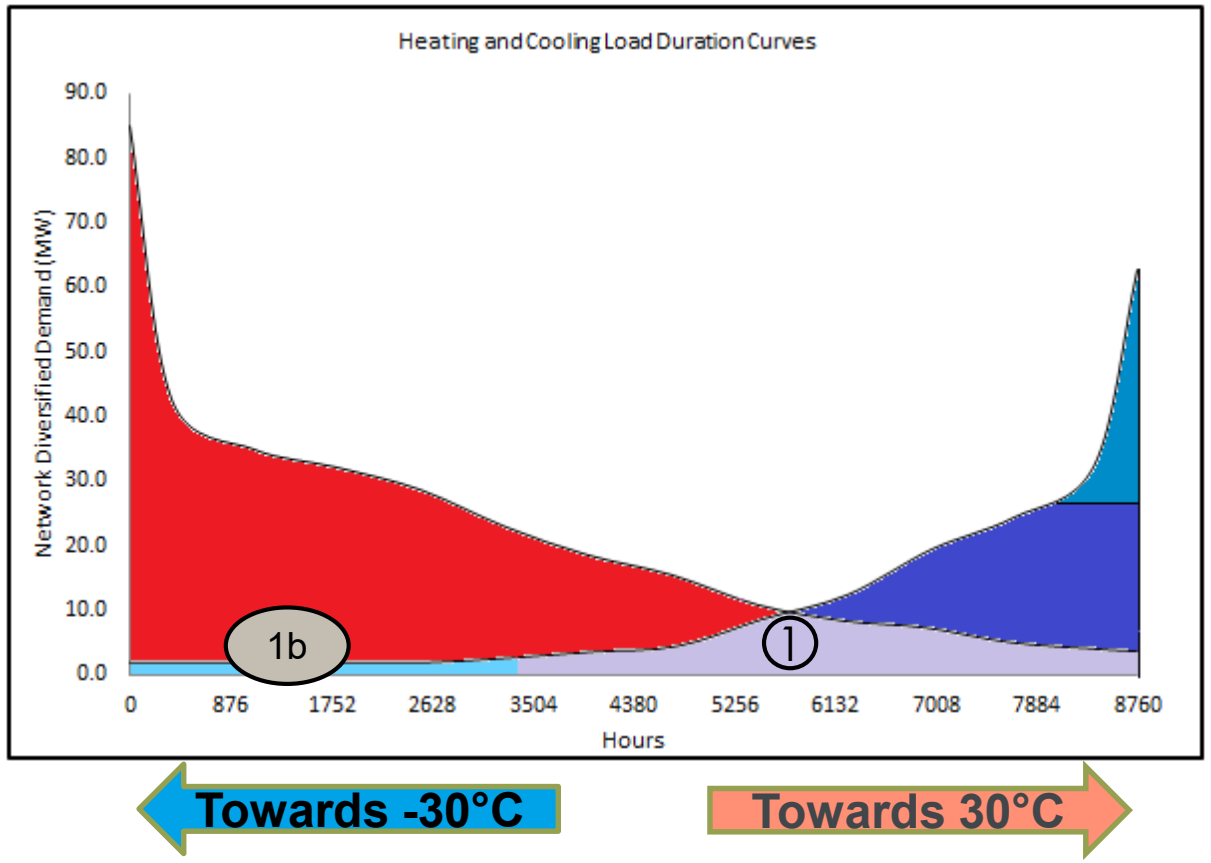


ESAP Stage I - Modernization

1. Chiller Heat Recovery (HPs)

- Natural Gas
- QC Electricity
- ON Electricity
- HR Heat Pumps

Energy From Renewables



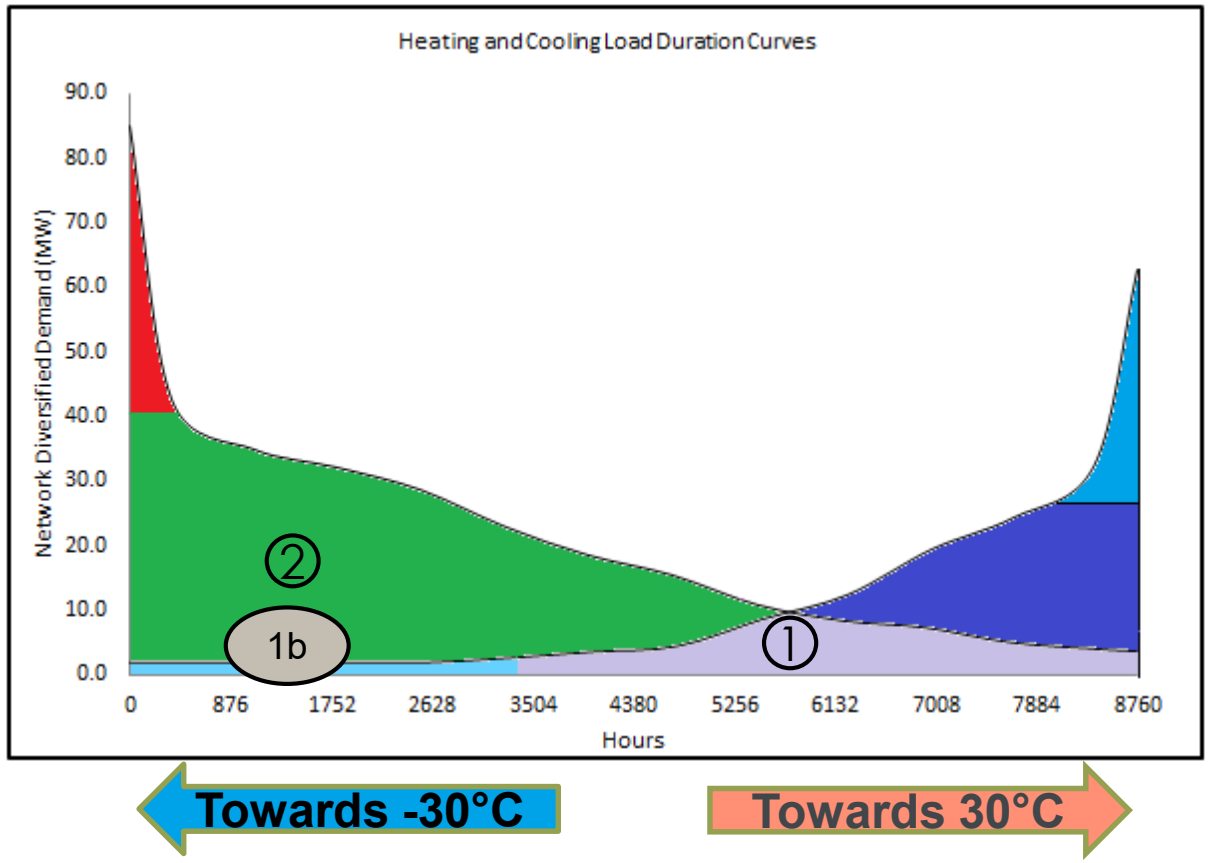
ESAP Stage I - Modernization

1. Chiller Heat Recovery (HPs)

1b. River water free cooling

- Natural Gas
- QC Electricity
- ON Electricity
- HR Heat Pumps
- River Water Cooling

Energy From Renewables



ESAP Stage I - Modernization

1. Chiller Heat Recovery (HPs)

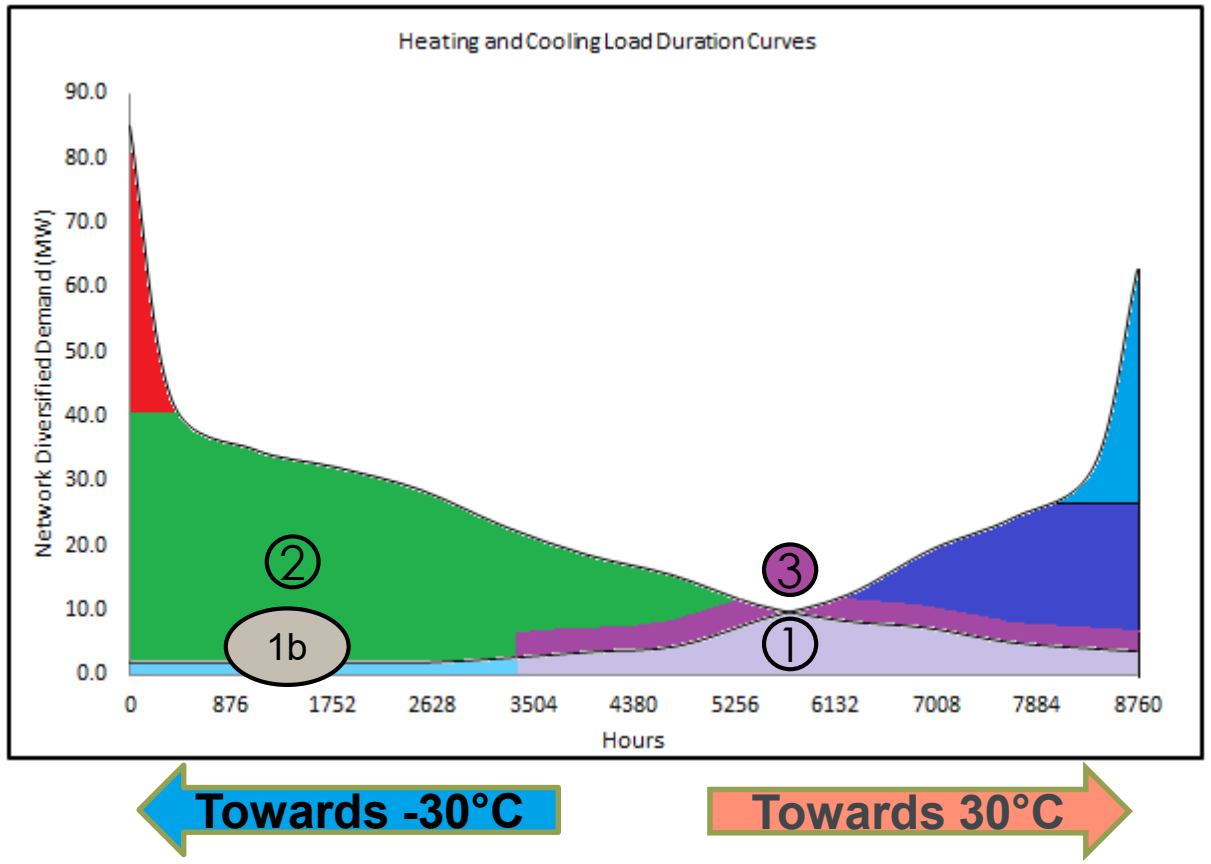
1b. River water free cooling

ESAP Stage II – Deeper Greening

2. Low Carbon (LC) Source (large)

- Natural Gas
- QC Electricity
- ON Electricity
- HR Heat Pumps
- River Water Cooling
- LC Source (large)

Energy From Renewables



ESAP Stage I - Modernization

1. Chiller Heat Recovery (HPs)

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ESAP Stage II – Deeper Greening

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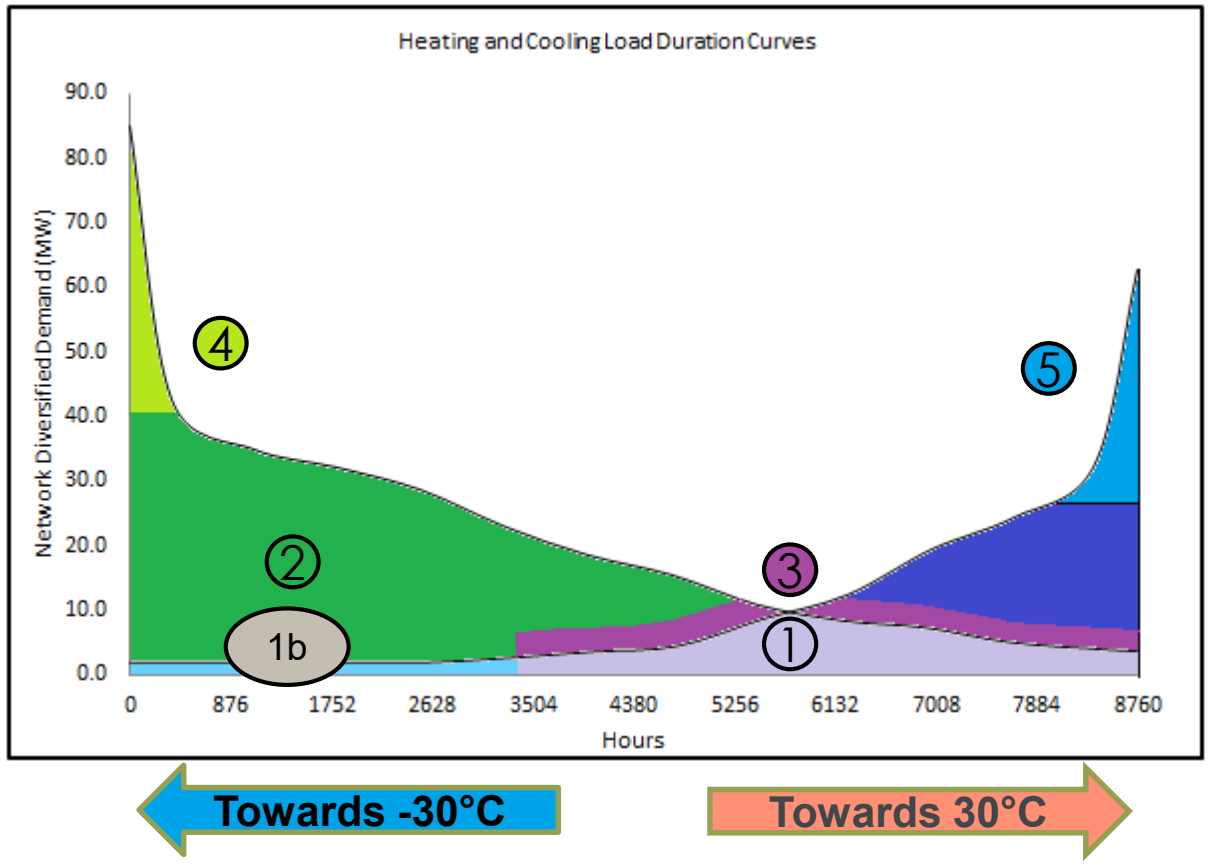
ESAP Stage III – Future Opportunities

3. Geoexchange (building scale)

- Natural Gas
- QU Electricity
- ON Electricity
- HR Heat Pumps
- River Water Cooling
- LC Source (large)
- Geoexchange

Energy from Renewables



ESAP Stage I - Modernization

1. Chiller Heat Recovery (HPs)

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ESAP Stage II – Deeper Greening

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ESAP Stage III – Future Opportunities

3. Geoexchange (building scale)
4. RNG
5. ON Elec Offsets

- QU Electricity
- ON Electricity
- HR Heat Pumps
- River Water Cooling
- LC Source (large)
- Geoexchange
- RNG

How ESAP Can Expand The Network

Supply new development at LeBreton Flats

Supply new development at Tunney's Pasture

Supply new Ottawa Hospital and Carleton University

We can expand to supply new customers with low carbon heating and cooling

- New connections
- Possible future connections

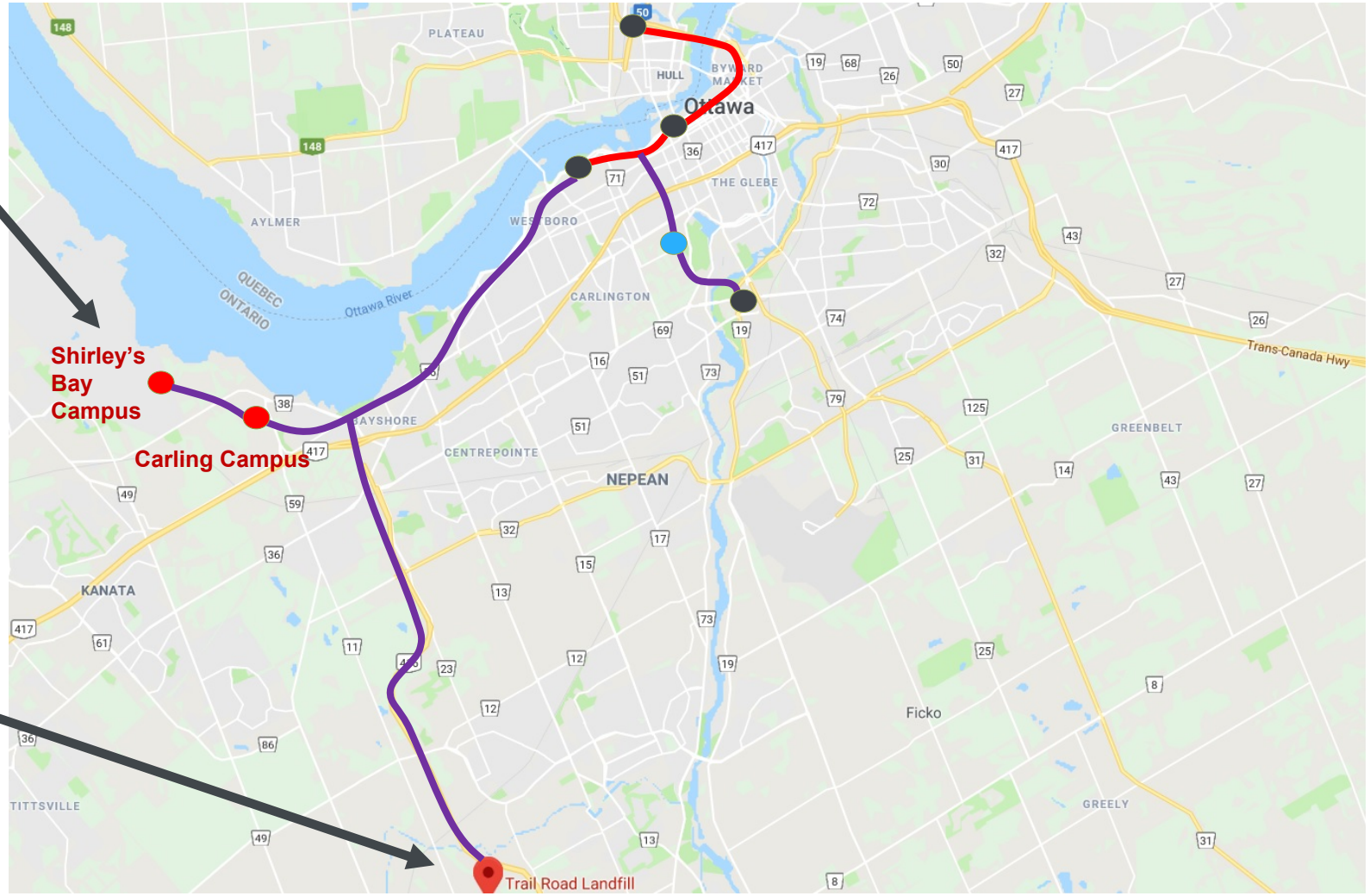
Connect to more buildings in the downtown core

Supply new development at Confederation Heights

- Existing PSPC DES locations
- Existing Plants
- Potential DES Growth and Expansion
- New Hospital

Ultimate Future DES Network

Connect to federal campuses in West End



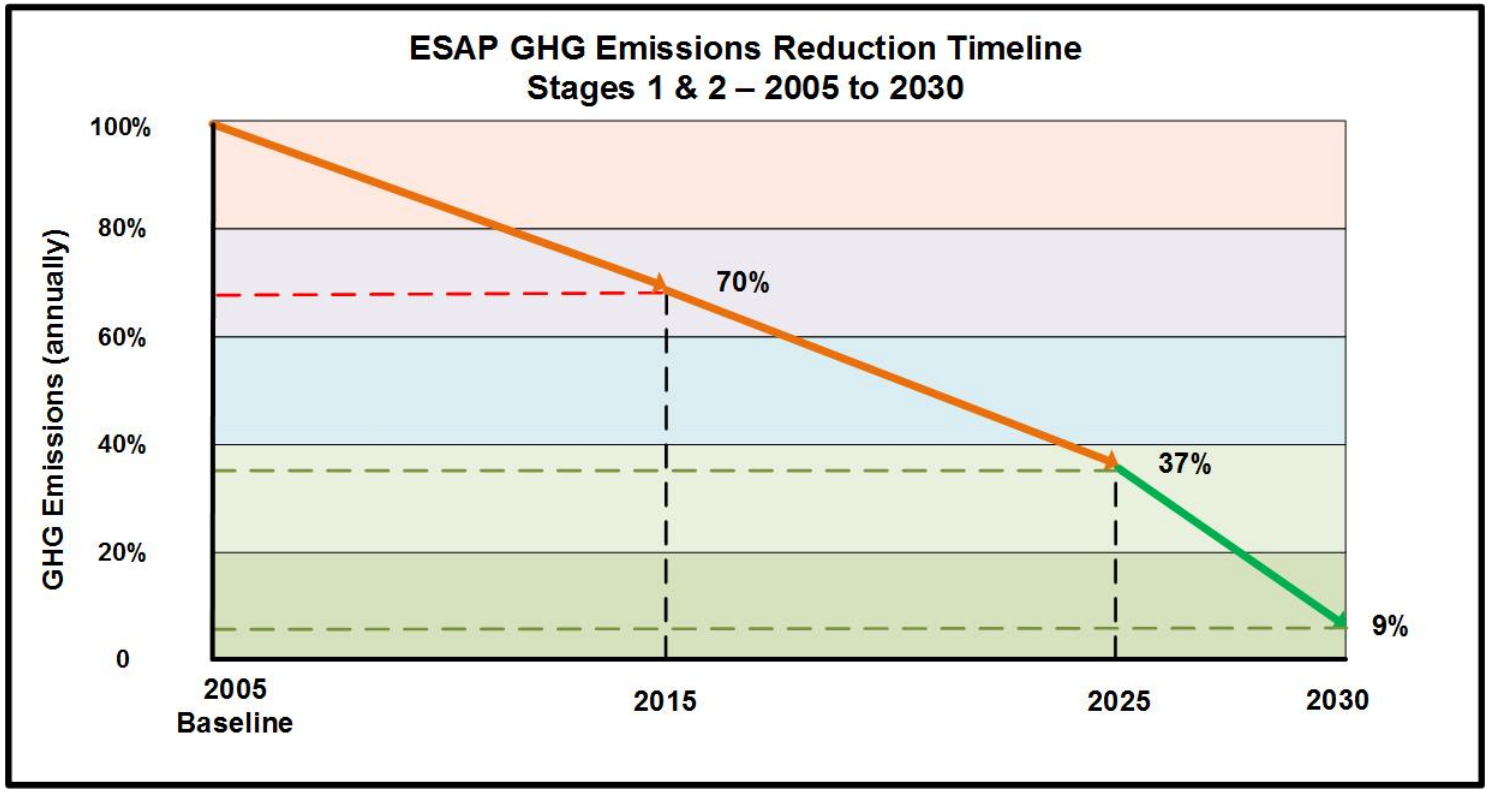
Connect to landfill if City moves to Energy from Waste

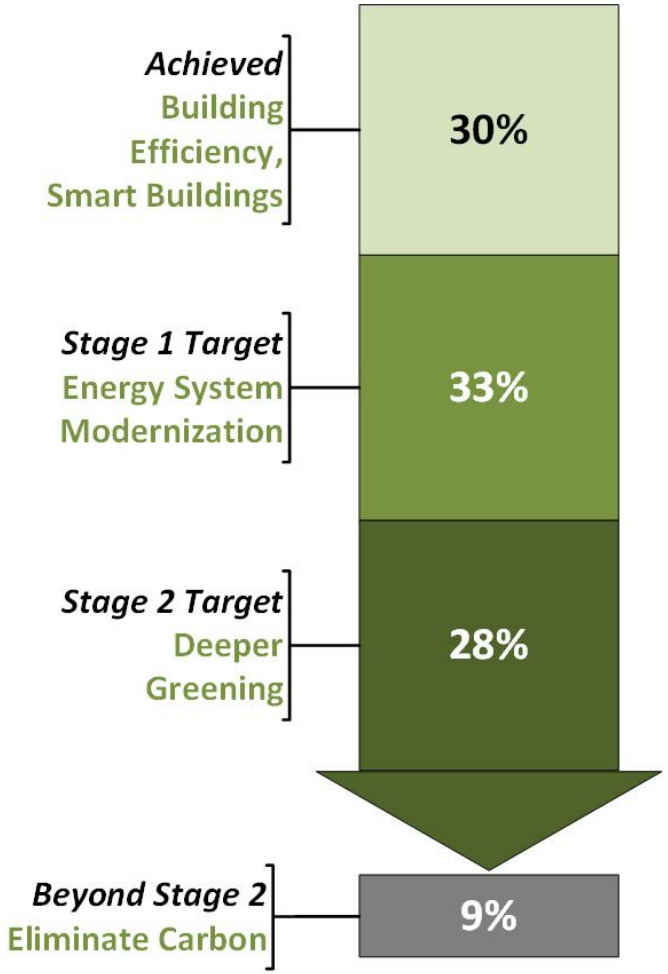
Ultimately we can connect to large federal campuses and our municipal landfill

- New connections
- Possible future connections

- Existing PSPC DES locations
- Existing Plants
- Potential DES Growth and Expansion
- New Hospital

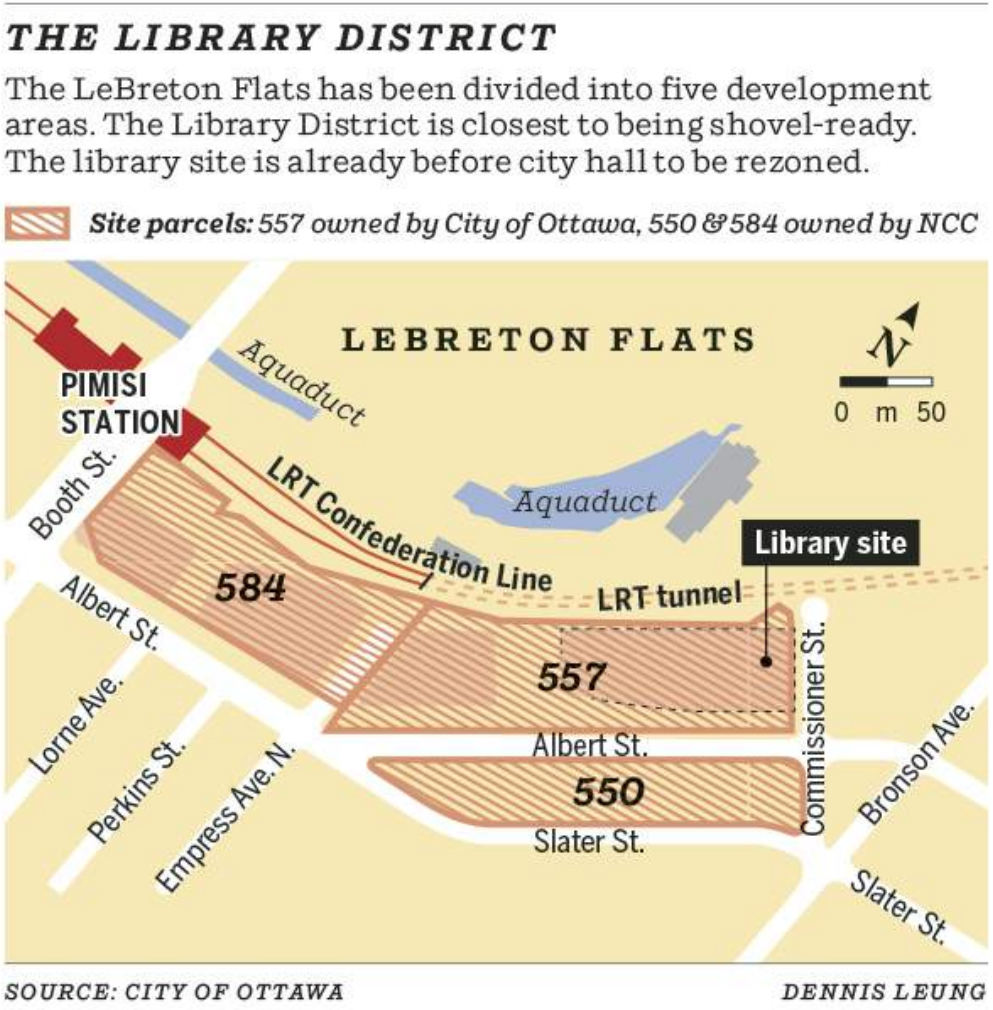
Expansion Makes Sense Because of GHG Reductions

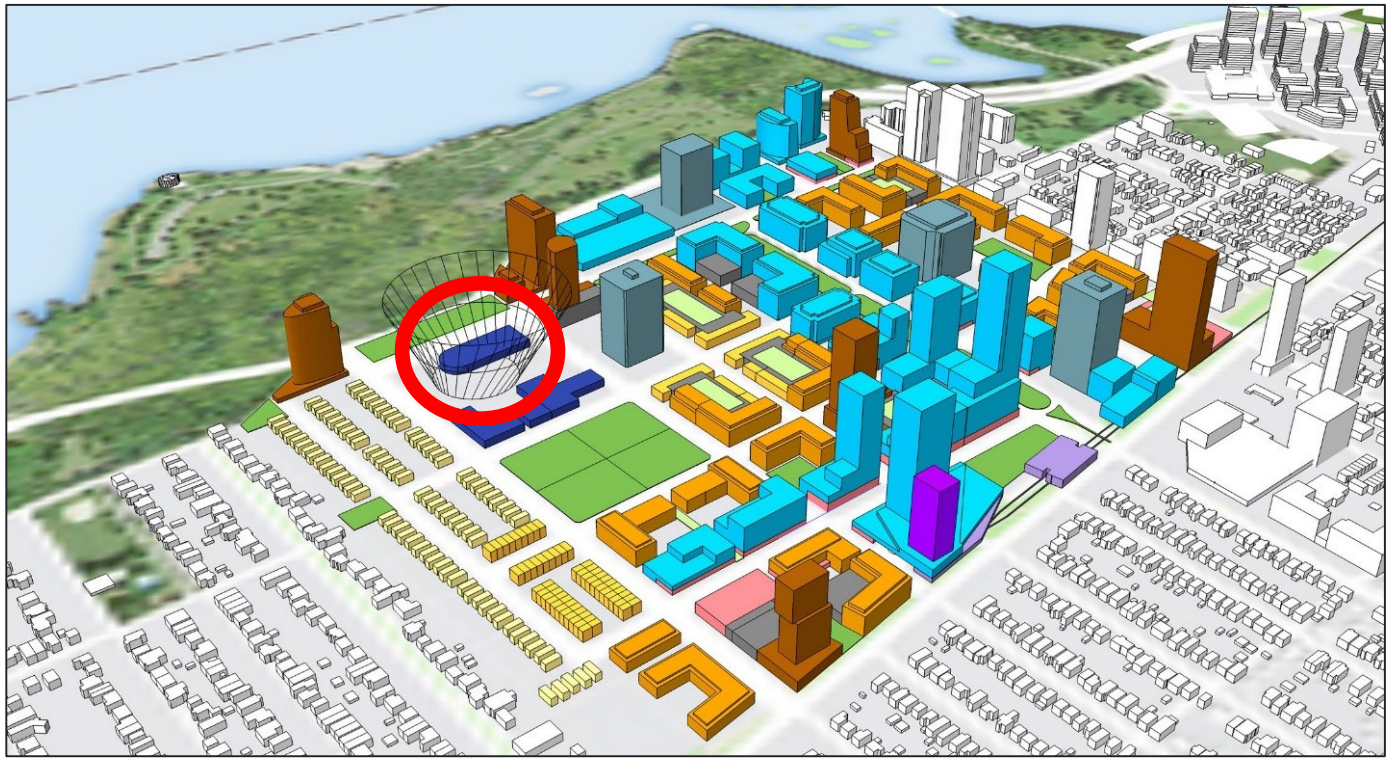




By 2030, GHG emissions will be reduced to less than 10% of 2005 baseline emissions if we complete Stage 2

Linking to LeBreton Flats and Tunney's Pasture





Tunney's Pasture Master Plan Visualization

Expansion Value Proposition

- Carbon free cooling and low carbon heating
- Cost of energy competes with ‘business as usual’ solutions
- Uses river water for ‘free’ cooling
- No heating/cooling generation equipment on-site
- Flexible, fuel agnostic, low carbon approach to heating
- Energy input flexibility – easier to change sources in centralized DES
- Resiliency, redundancy and back up in case of emergencies
- Ability to accept energy from individual buildings or campuses
- State of the art refrigerant equipment provides LEED credit

Thank You -> Any Questions ?

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