Introducing:
Energy Services Acquisition Program (ESAP)

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Strategic Sourcing Sector (SSS)

Public Services and Procurement Canada (PSPC)

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ESAP- Project Overview

WHO ARE WE?

Leading by example in the fight against climate change, the Government of Canada is fundamentally changing how it heats and cools federal buildings in the National Capital Region (NCR).

Through a program called the **Energy Services Acquisition Program (ESAP)**, the Government is leading one of North America's first conversions of a large public district energy network**. For heating** systems, we are transitioning from steam to a low-temperature hot water (LTHW). **For cooling** system, we are transitioning from steam driven chillers to electric chillers.

The **$3.4B investment** represents one of the federal government's most impactful climate change initiatives when it comes to reducing greenhouse gas (GHG) emissions from its own operations.

Rendering: Tunney's Pasture Energy Centre 2026

ESAP- Project Overview

WHO ARE WE?

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

There are **three stages** to ESAP:

- Stage 1: Energy Services Modernization (ESM) in conjunction with the User Building Conversion Plan (UBCP)
- Stage 2: Deeper Greening Project (DGP) with Expansion to Public Buildings
- Stage 3: Further Expansion to Public and Private Buildings and Technology Development

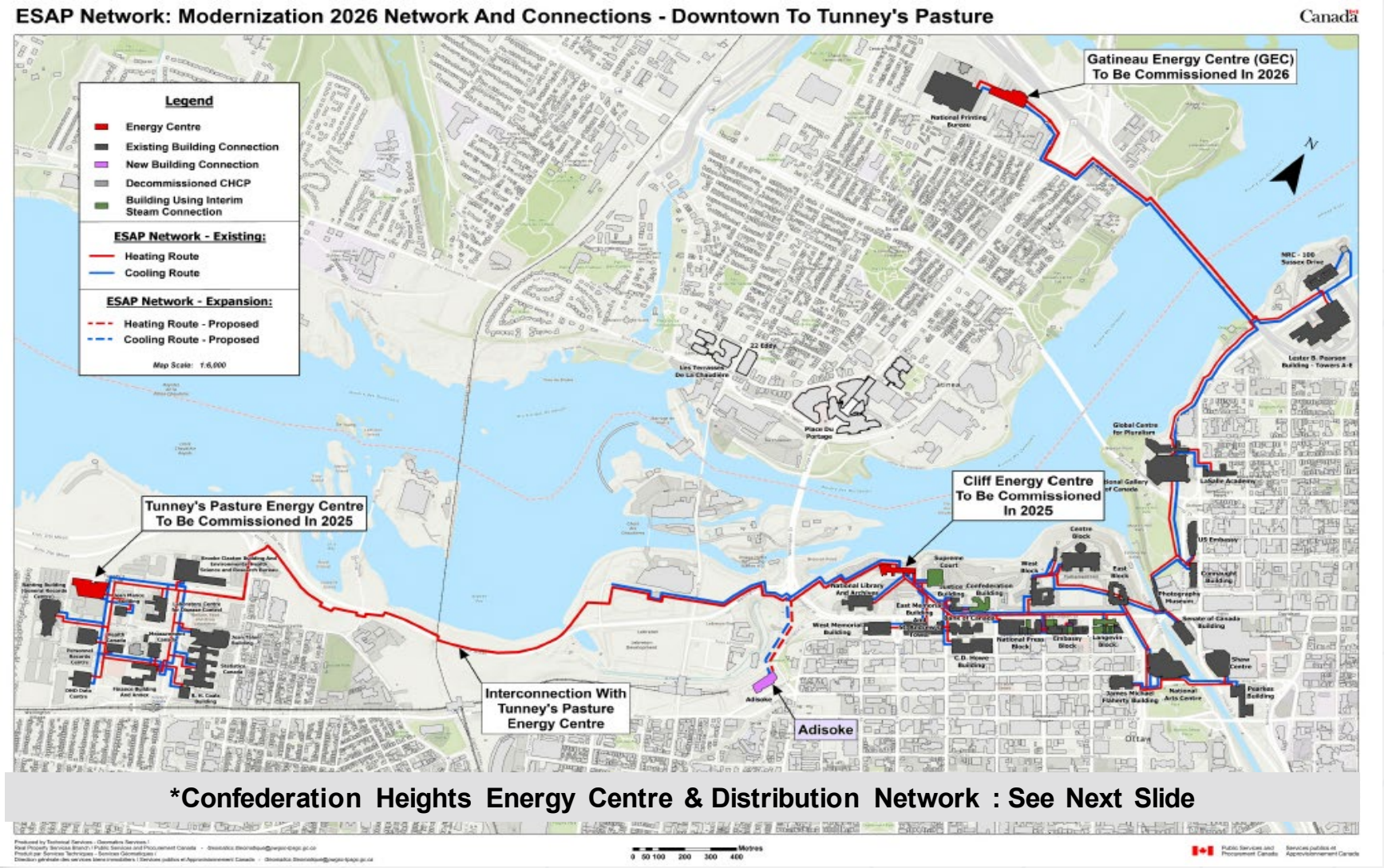
ESAP- Project Overview

CLIFF ENERGY CENTRES & DISTRIBUTION NETWORK

Gatineau Energy Centre (GEC)

Cliff Energy Centre

Tunney's Pasture Energy Centre

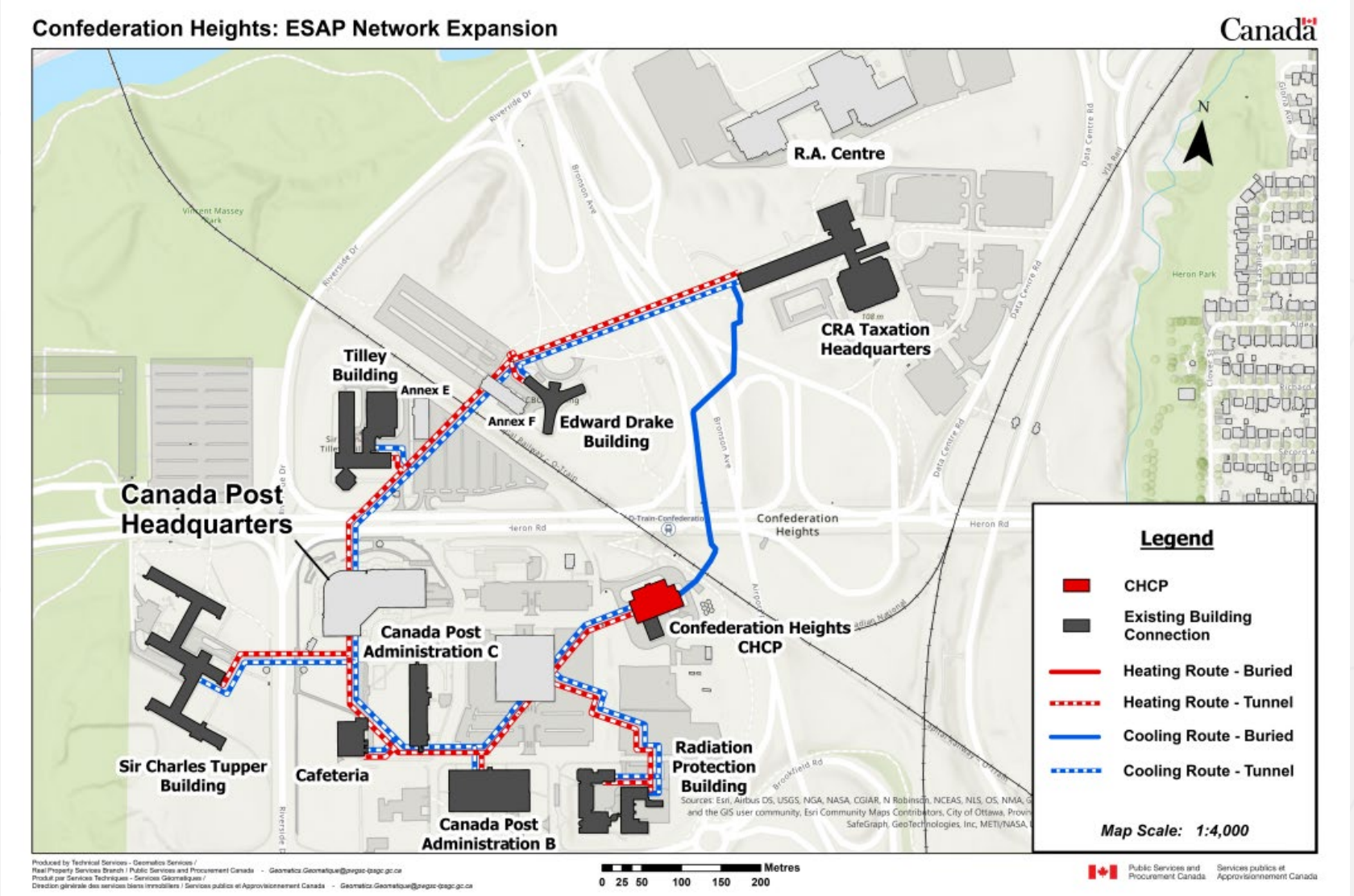


*Confederation Heights Energy Centre & Distribution Network : See Next Slide

ESAP- Project Overview

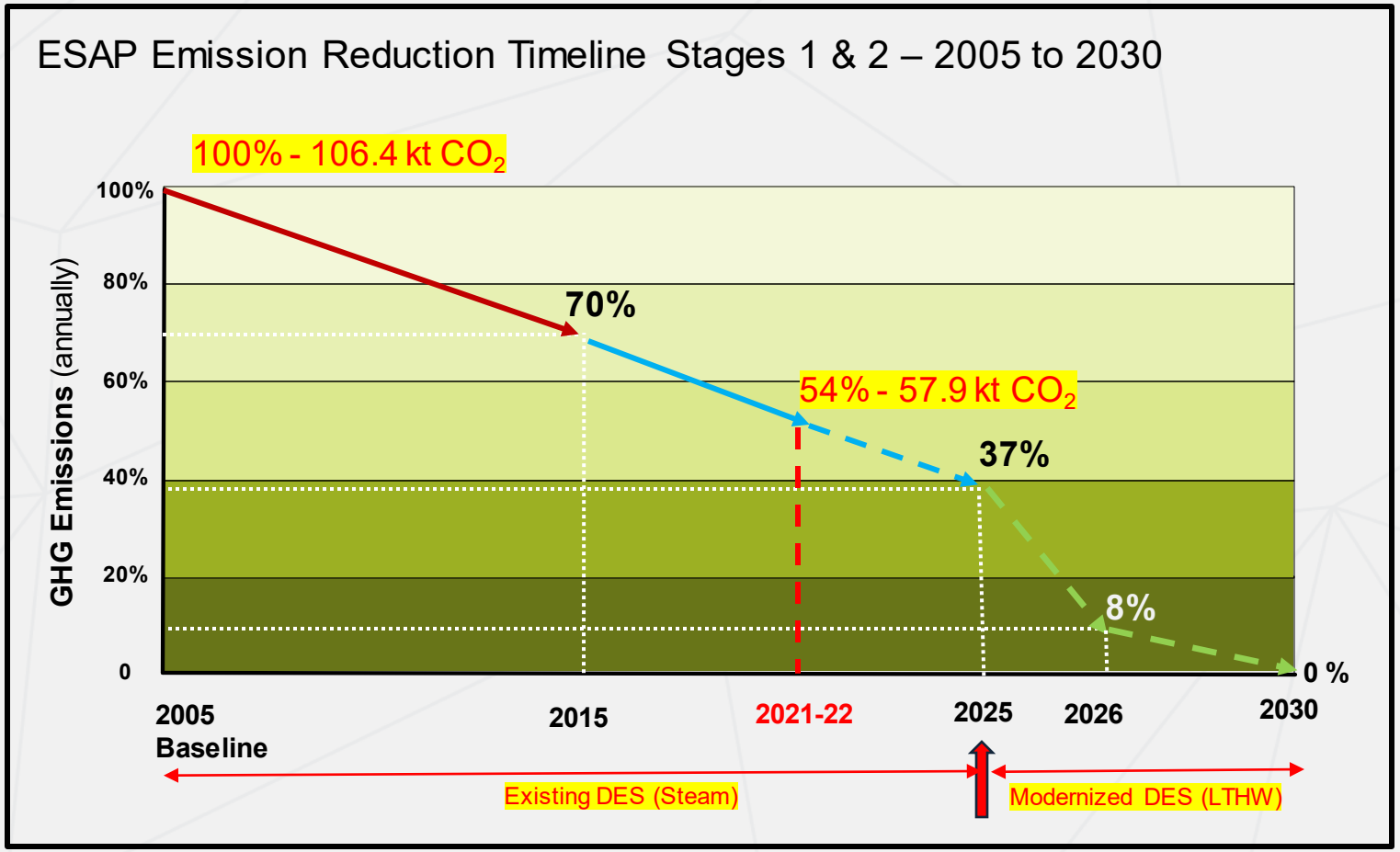
CONFEDERATION HEIGHTS ENERGY CENTRE & DISTRIBUTION NETWORK

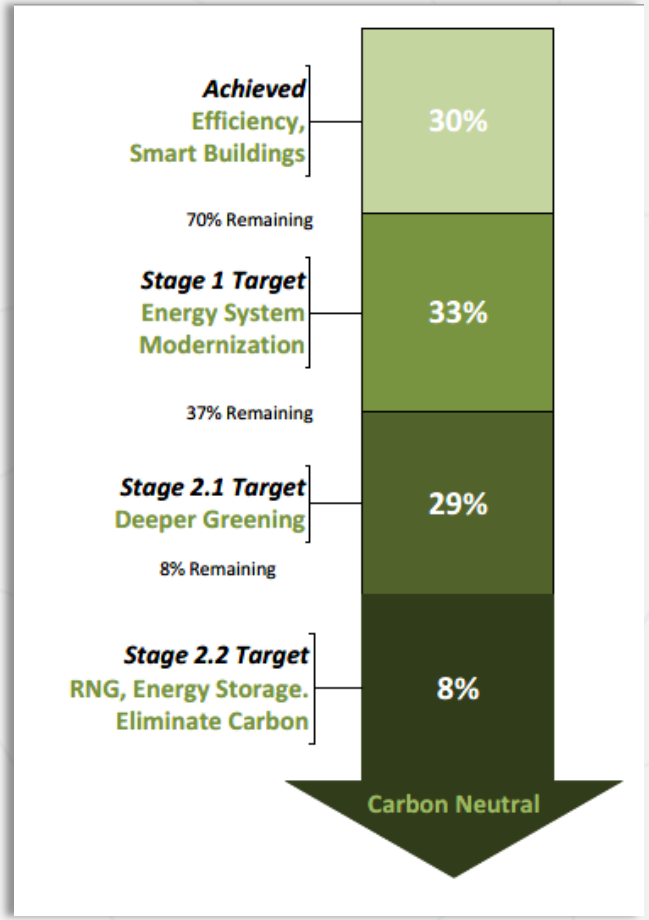
Confederation Heights Energy Centre



ESAP- Project Overview

ESAP GHG REDUCTION TARGETS– ROAD TO CARBON NEUTRALITY (2019-2030)





Note: Projection of the GHG reductions above may vary +/- 3%

By 2030, we **are in position to** achieve carbon neutral energy service operations.

ESAP Stage 1 – Modernization

ENERGY SERVICE MODERNIZATION (ESM)

(2019-2026)

OVERVIEW

One of North America's 1st conversion of a large public NCR DES from steam to LTHW for heating. For cooling we will transition from steam driven chillers to electric chillers. This will be a complete overhaul of the NCR DES built between 50 and 100 years ago. Many components are at the end of their service life.

Modernization entails the decommissioning of old power plants. It also includes the construction/modernization of clean energy centres and facilities:

- The new Cliff Energy Centre.
- The new Tunney's Pasture Energy Centre.
- The new Gatineau Energy Centre.
- The retrofitted Confederation Heights Energy Centre.
- The new NCR DES Pumphouse.

Underground Distribution (Piping) Network Construction 2022

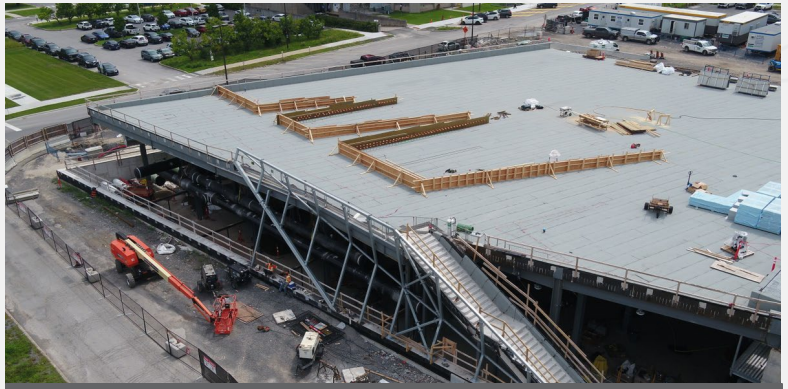
ESAP Stage 1 – Modernization

WHERE ARE WE TODAY (MODERNIZATION)

Three years into the construction period. Proceeding **on time, on scope, and on budget** despite disruptions such as the pandemic and a federal labour trade strike.

Over 1,800 construction workers involved; ranked the 23rd largest infrastructure project in Canada in 2021.

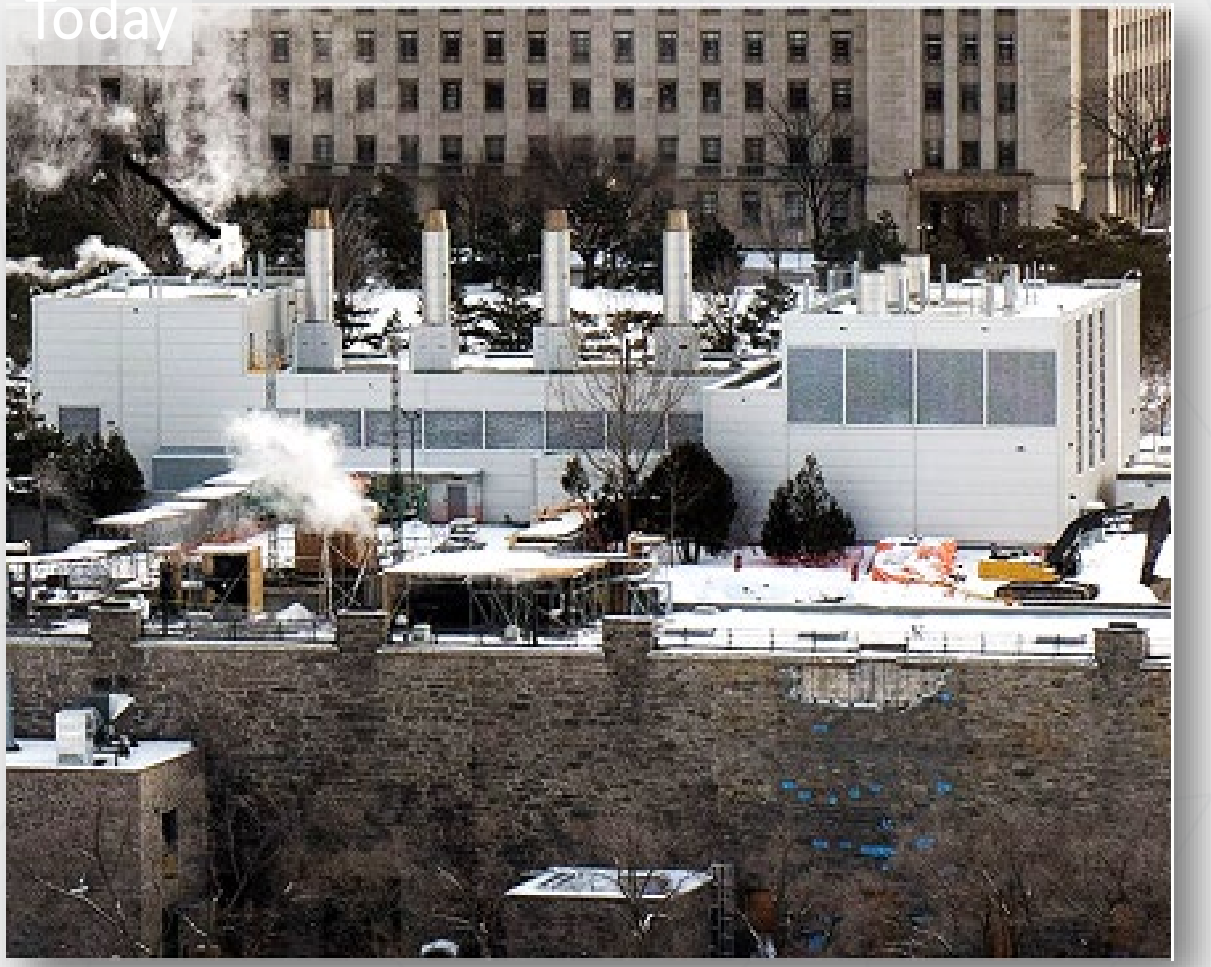
Cliff Energy Centre Construction – August 2023



Tunney's Pasture Energy Centre Construction – August 2023

ESAP Stage 1 - Modernization

EXISTING CLIFF PLANT



ESAP Stage 1 – Modernization

NEW CLIFF PLANT – CURTAIN WALL

View of the Cliff CHCP from Gatineau highlighting the curtain design and the stainless steel stacks.

ESAP Stage 1 - Modernization

NEW CLIFF PLANT – BELOW THE ESCARPMENT

View of the Cliff CHCP from the public meeting area.

Notice the 'Cliff Climb'– access from top to bottom by staircase and by elevator

ESAP Stage 1 - Modernization

NEW CLIFF PLANT – ABOVE THE ESCARPMENT

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

ESAP Stage 1 – Modernization

NEW TUNNEY'S PASTURE PLANT – AERIEL VIEW

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

ESAP Stage 1 – Modernization

USER BUILDING CONVERSIONS PROGRAM (UBCP) (2016-2024)

UBCP is approximately a $300M program of projects within ESAP involving the **replacement of existing heating and cooling components** in the federal buildings connected to the NCR DES. Each of the buildings is a separate 'project', each with its own set of unique considerations.

For cooling conversion, UBCP is responsible for the hydraulic separation of the building from the DES which also includes the renovation of the building's cooling system.

In general, a heating system conversion includes the installation of a new heating energy transfer system(s) (ETS(s)) and, the preparation of building systems to work with the modernized DES.

Thanks to UBCP, by 2024, all buildings connected to the NCR DES will be compatible with the modernized system.

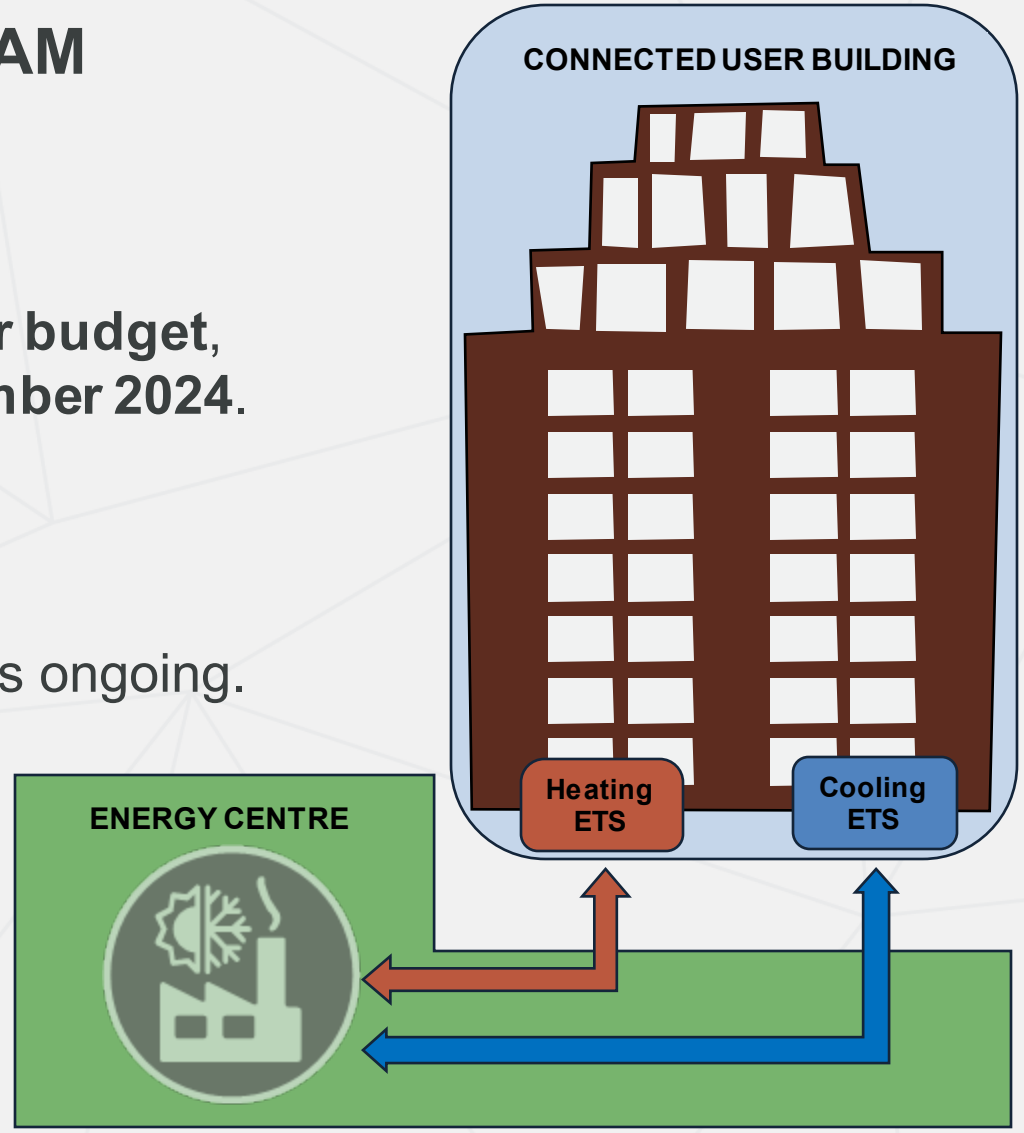
Steam to LTHW conversion at the National Arts Centre

ESAP Stage 1 – Modernization

USER BUILDING CONVERSIONS PROGRAM (UBCP) (2016-2024)

Where we are today (UBCP)

- ✓ The program is **ahead of schedule and under budget**, aiming for **conversion completion by September 2024**.
- ✓ No major risks or issues remaining.
- ✓ Collaboration with DES Modernization project is ongoing.



ESAP Stage 2 - Deeper Greening Program

SYSTEM CAPACITY & PATH TO CARBON NEUTRALITY

- ESAP is installing an extra 20% of natural gas-based production capacity. Each energy center is built with extra footprint for future production capacity.
- Outside of the coldest periods, ESAP's heating demand is provided by carbon neutral energy.
- 100% of cooling is provided by carbon neutral energy.
- ESAP cannot rely only on electrification for carbon neutral heating and cooling.
- ESAP is considering both nuclear and biomass as two fuel sources for the network and plans to recommend these as the best path forward to Treasury Board Secretariat (TBS).

Any expansion will require additional renewable energy resources and funding

ESAP Stage 2 - Deeper Greening Program

ESAP ASSESSES NEW ENERGY TECHNOLOGIES FOR DEPLOYMENT:

- **Electric Boilers** (under implementation at GEC).
- Air Source Heat Pumps.
- Geo-Exchange (including deep geo).
- Renewable Natural Gas (RNG).
- **Waste Biomass (recommended).**
- Biogas (locally produced).
- Bioliquids.
- River Heat Pump.
- Waste Heat Recovery.
- Chiller Heat Recovery.
- Industrial Heat Recovery.
- Solar Thermal Energy.
- Waste-to-Energy Central Heating Plant.
- **Nuclear (micro modular reactors = MMRs) (recommended).**

Deeper Greening Program will identify and deploy emerging low-carbon and carbon-neutral technologies to enable expansion and energy resiliency.

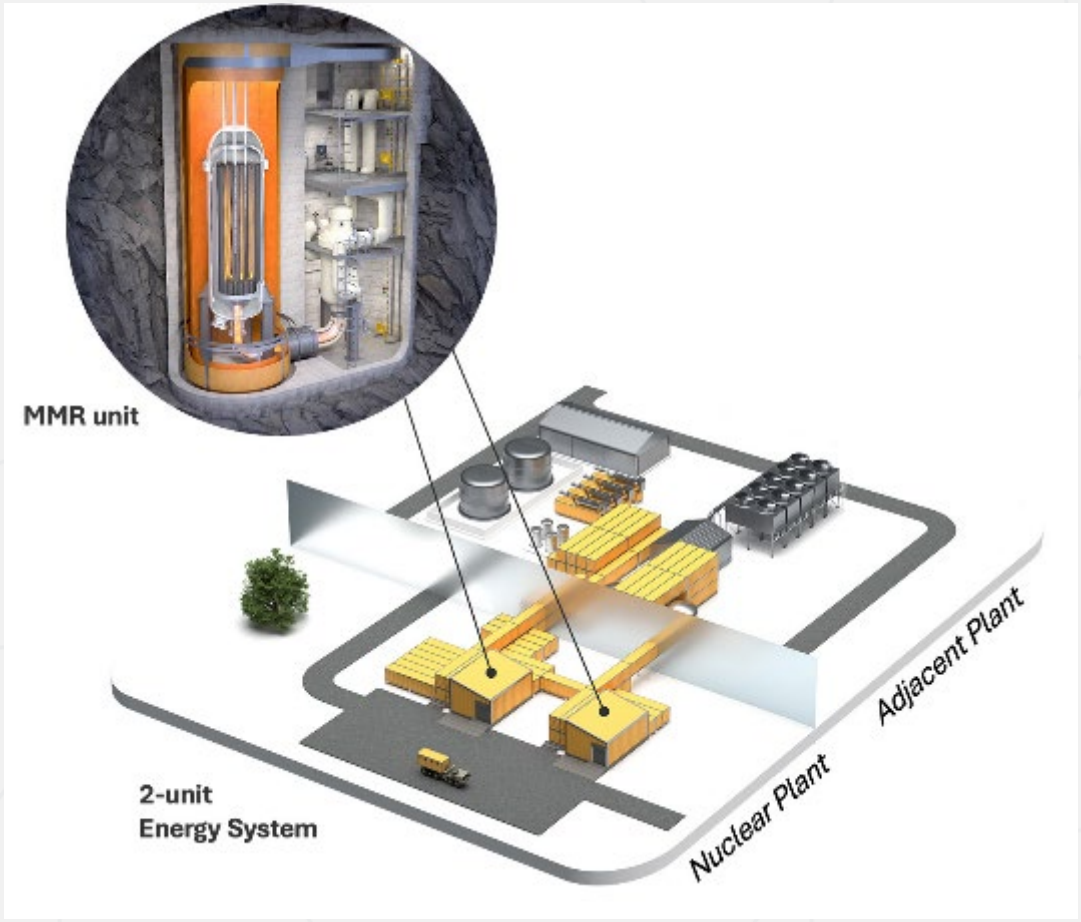
In discussions with Treasury Boards, ESAP is also considering purchasing carbon credits for peak load heating/cooling conditions.

ESAP Stage 2 - Deeper Greening Program

ENGAGING WITH TBS – BIOMASS & NUCLEAR TECHNOLOGY

Biomass

* 1.5 MW Pilot Installation Already Deployed at ESAP



Micro Modular Reactor (MMRs) Nuclear Technology

* Prototype installation at Chalk River facility (2028)

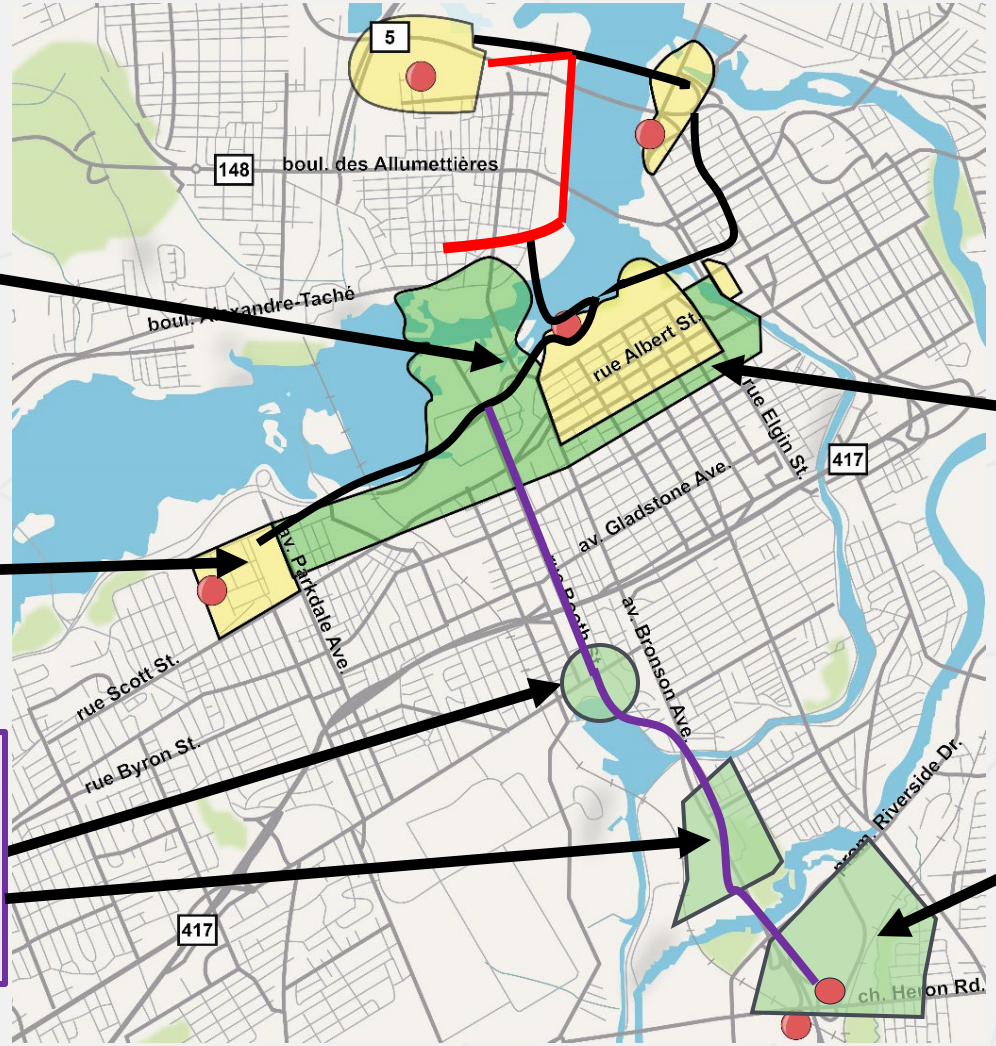
ESAP Stage 3 – Expanding a Resilient Network

ESAP POTENTIAL EXPANSION– NATIONAL CAPITAL REGION (2021-2030)

Supply new development at LeBreton Flats

Supply new development at Tunney's Pasture

Supply new Ottawa Hospital and Carleton University



Buildings can be connected to carbon-neutral heating and cooling from multiple, inter-connected locations

- Stage 1 connections
- Stage 2 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

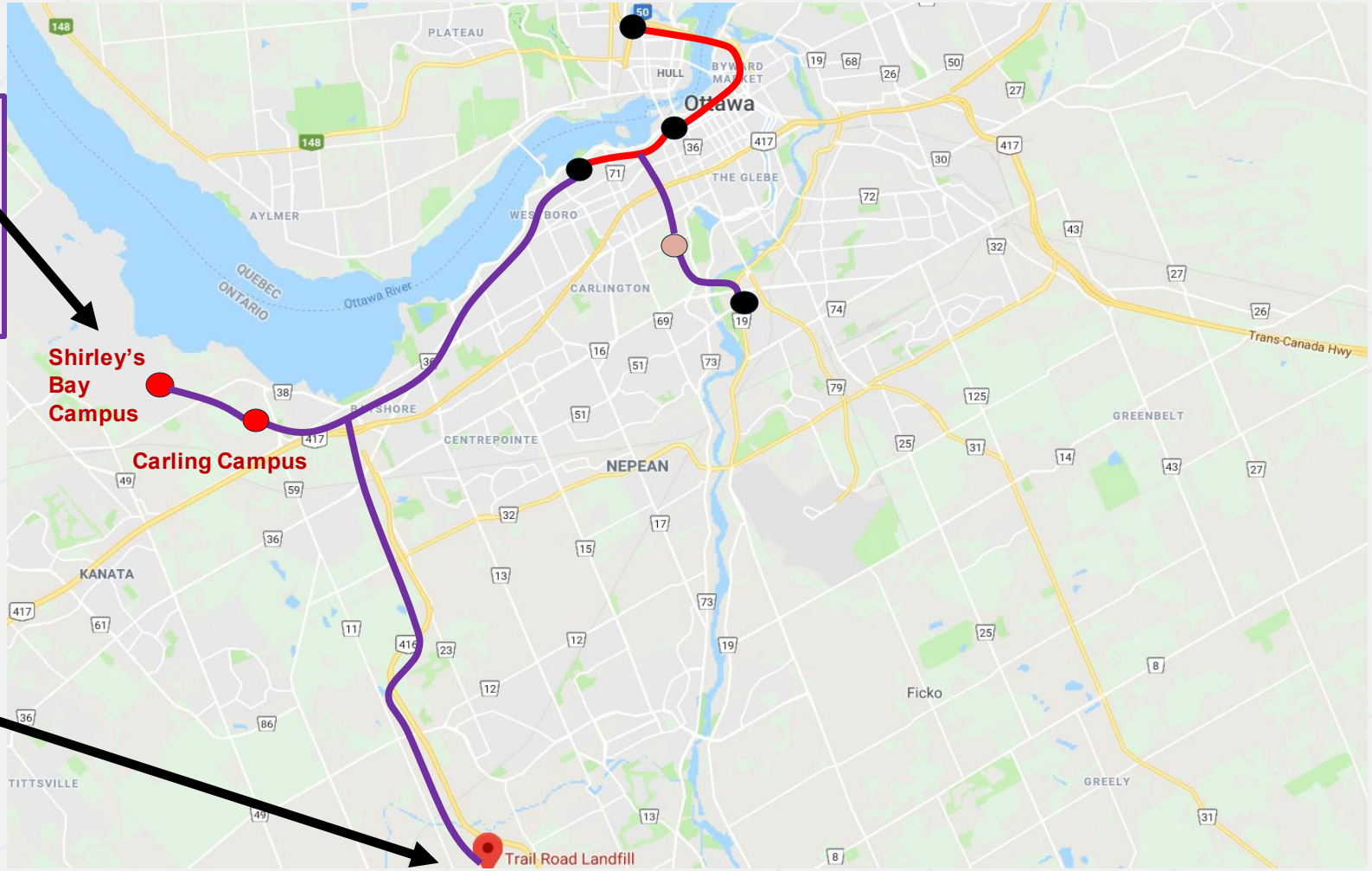
ESAP Stage 3 – Expanding a Resilient Network

ESAP POTENTIAL EXPANSION- NATIONAL CAPITAL REGION (2021-2030)

ESAP Stage 3 – Expanding a Resilient Network

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

- ESM connection
- Possible future connections
- Existing Plants
- Potential DES Growth and Expansion
- New Hospital

ESAP- Project Overview

NEXT STEPS

- ESAP Stage 1 must be completed before adding additional scope to the Project Agreement.
- Broad acceptance of proposed greening technology (Stage 2):
  - Nuclear
  - Biomass
- Continue with Project Development of the DNE for Gatineau Expansion (Stage 2).
- Initiate an ESAP Ottawa Expansion Project (Stage 2).
- Modernization of ESAP business model to allow ESAP to expand to private sector (Stage 3).

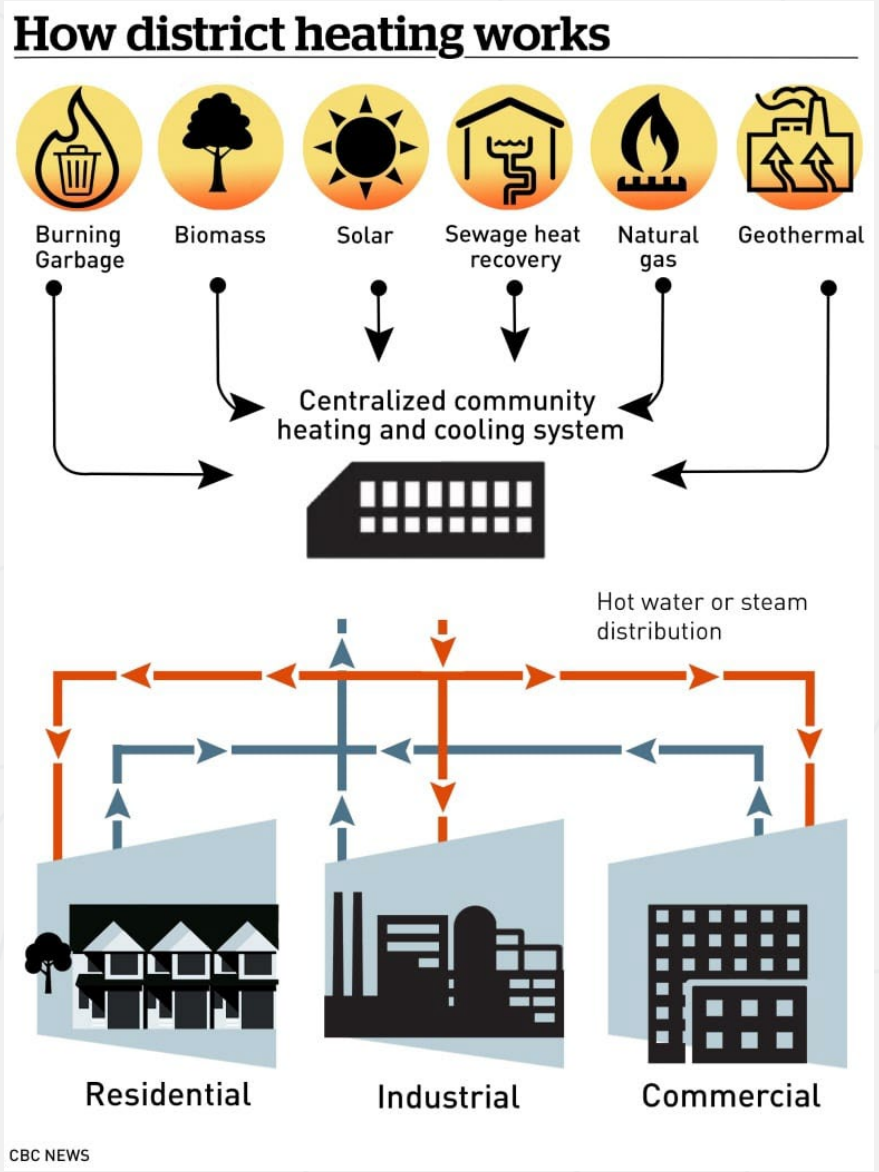
Tunney's Pasture Construction – May 2023

ESAP Learnings

- Key Governance takeaways:
  - Assets always owned by the Federal Government
  - P3 focused solely on doing the “work”
  - Ensuring the “lands” available
  - Expanding the “benefits” will require a more flexible governance
  - Although P3, owner oversight is critical to success – closely monitor the progress!
- Key Regulations takeaways
  - Support P3 in obtaining all approvals – a partnership
  - Ensure local municipalities understand DE network needs and ready to “assign” space
  - Technical regulations moving to using proven European standards/codes

ESAP Learnings

- Technology
  - Ensure platform (DE system) is fuel agnostic
    - Uncertainty to future low-carbon sources
    - Electrifying heat will be a challenge
    - Centralizing production will ensure greatest flexibility
  - Not all customers are the same so need flexibility to serve
    - Work with customers to improve performance



ESAP Learnings

- Key Barriers:
  - Capital – significant up-front needs
    - Approval process for ESAP is a disadvantage
    - Private equity becoming interested
  - Knowledgeable contractors – limited in Canada but growing
    - Large projects are at a disadvantage
    - Lack of experience to be realistic in planning
- Key Benefits:
  - Decarbonizing large parts of the City
  - Adding value by derisking energy supply
    - The network is a “Source” agnostic system
  - Visible infrastructure is a positive for the City
    - Architectural features
    - Learning centres

Thank you – Questions?

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Rendering of the new Cliff Energy Centre

ESAP Stage 1- Modernization

MODERNIZED NETWORK - DOWNTOWN INSTALLED PRODUCTION CAPACITY

Gatineau Energy Centre (GEC)

Modernized Capacities	Expansion	Energy Source
30 MW Green Heating 38 MW Green Cooling	45 MW 40 MW	Electric Boilers and Chillers Hydro Quebec Contracted Power

Cliff Energy Centre

60 MW Heating 46 MW Cooling	150 MW 135 MW	NG Boilers and Electric Chillers

Tunney's Pasture Energy Centre

60 MW Heating 46 MW Cooling	105 MW 80 MW	NG Boilers and Electric Chillers

ESAP's 30 MW of Green Energy covers the baseload of the current network demand. NG (or RNG) will provide the peak load coverage. Future Expansion, requires investment.