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Modernizing the DES in Canada's Capital Region

Presented by:

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Energy Services Acquisition Program and FVB Energy Inc.

Public Services and Procurement Canada

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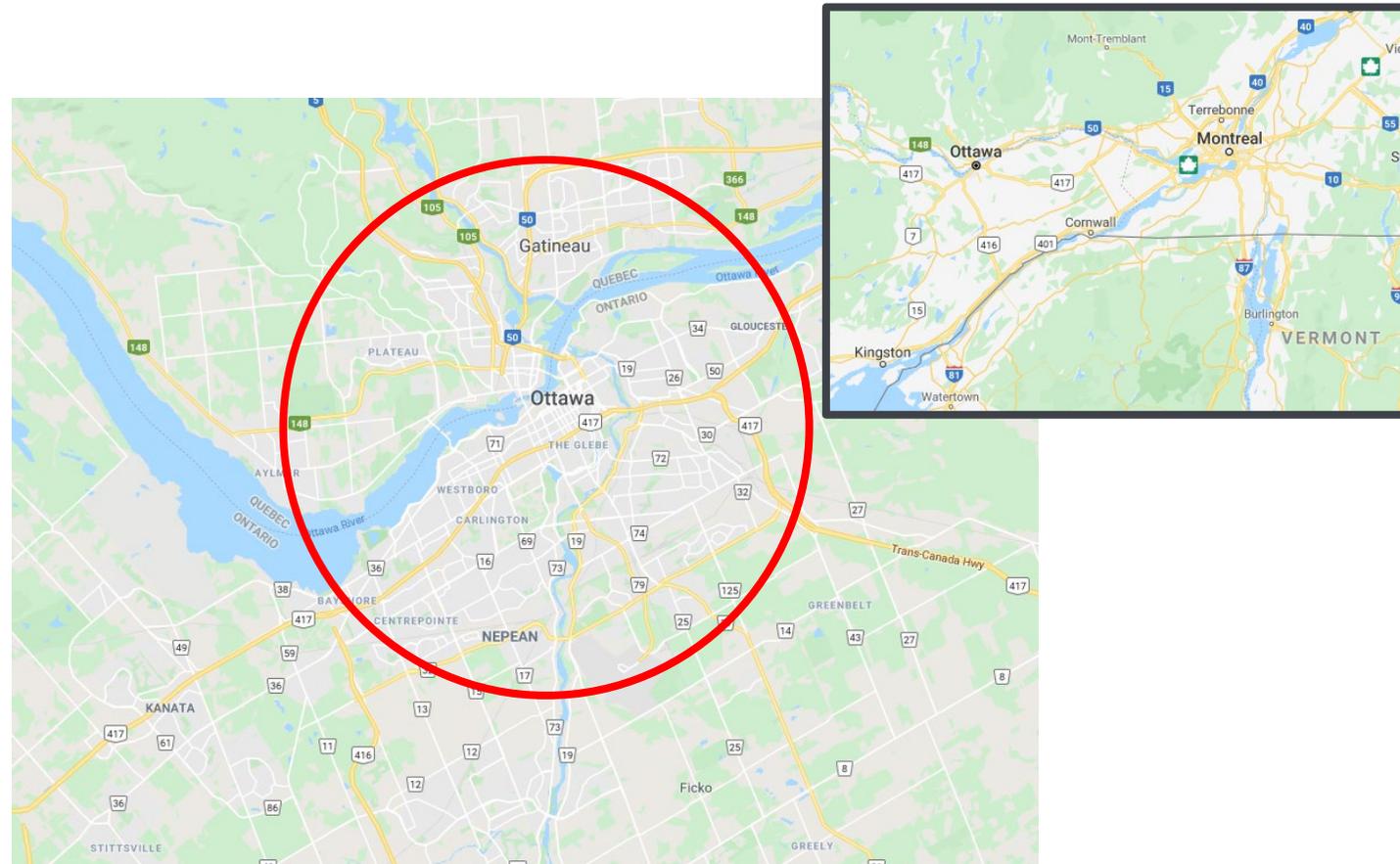
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What is Canada's National Capital Region?

- The National Capital Region is not just Ottawa, Ontario but Gatineau, Quebec as well
- While they are not 'twin cities' they are separated only by the Ottawa River
- So while Ottawa is the official capital of Canada, the federal government views the whole region as one 'area'
- The DES is in both cities



Recent Climate Events in the National Capital Region



In September 2018, six tornados touched down in Ottawa

One hit a power station and half of the urban area lost power



Recent Climate Events in the National Capital Region

- In 2019, Ottawa and Gatineau experienced once in 100 year flooding for the second time in three years
- Canada's climate is changing and temperatures in Canada have been increasing at **roughly double the global average**
- Climate change and extreme weather events can cause electrical failures and blackouts that impact existing facilities
- Now, more than ever, resiliency in the face of climate change has become a significant driver for expanding our DES in Ottawa and Gatineau



Sand bag operations in Ottawa during spring floods of 2019

Program Overview

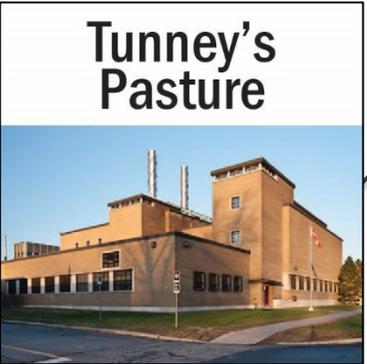
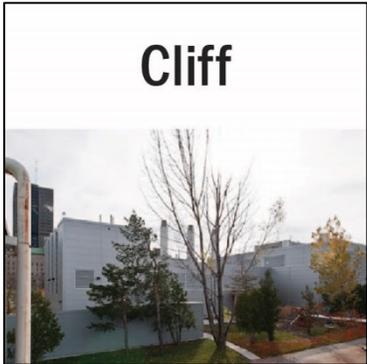
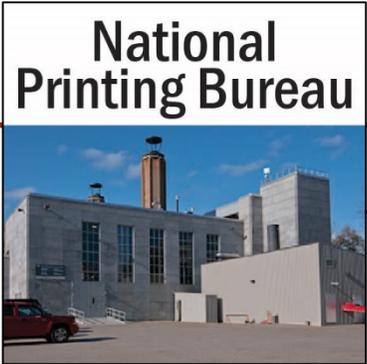
The **Energy Services Acquisition Program (ESAP)** is modernizing the District Energy System (DES) which provides heating services to 80 buildings and cooling services to 67 buildings in the National Capital Region (>1.6M m² of floor space), accommodating 55,000+ occupants.

There are **three stages** to ESAP:

- Stage 1: DES Modernization
- Stage 2: Deeper Greening
- Stage 3: Expansion



Stage 1: Modernization

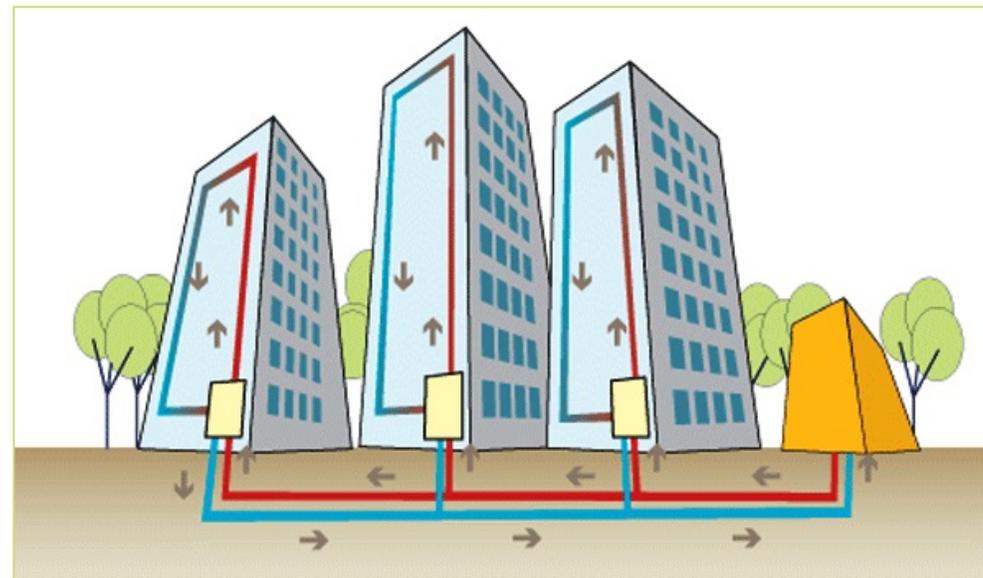


- Existing connections
- New connections



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
- Buildings in the downtown core will be connected to 3 plants in 2 provinces



**Sneak Peak at the
Design for Stage 1:
Modernization**

Cliff Plant – Historically

1920s



Today



Stage 1: Architectural Design – Cliff Plant



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



Stage 1: Aesthetic Design - Cliff Plant



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



Stage 1: Architectural Design - Cliff Plant



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



Stage 1: Architectural Design – Cliff Plant



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



Stage 1: Architectural Design – Tunney’s Pasture Plant



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



Stage 1: Architectural Design – Tunney’s Pasture Plant



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



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



2018 RPIC Tour of our biomass pilot project at Confederation Heights Plant

Stage 2: Enabling Low Carbon Government

Modernizing the DES will:

- Provide long term financial savings
- Reduce Greenhouse gas (GHG) emissions

It is part of a portfolio of solutions for GHG reduction:

- Using smart buildings and plants
- Reducing building energy demand with efficient retrofits
- Constructing new buildings to high energy standards
- Enabling distributed renewable energy generation capacity



*Geo-exchange well in
Surrey, BC*



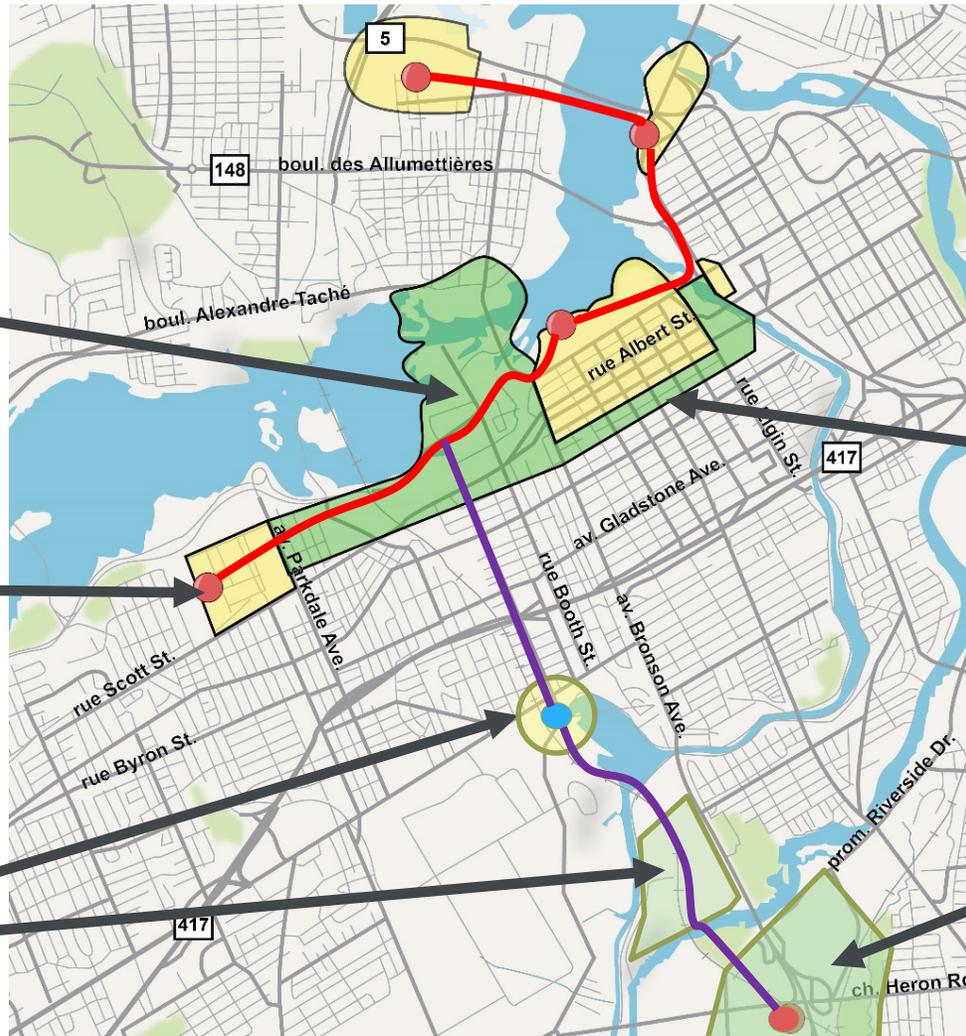
Stage 2: Aligning with Net Zero Design

- Government of Canada direction is that “*all new buildings should be constructed to be net-zero carbon ready at the latest in 2022*”
- Net zero buildings are more resilient as they require less backup energy
- ESAP can help clients in the transition to Net Zero buildings and can provide heating backup



Biomass Facility at UBC

Stage 3: Expanding a Resilient Network



Buildings can be connected to low carbon heating and cooling from three locations

- New connections
- Possible future connections

Supply new development at LeBreton Flats

Supply new development at Tunney's Pasture

Supply new Ottawa Hospital and Carleton University

Connect to more buildings in the downtown core

Supply new development at Confederation Heights

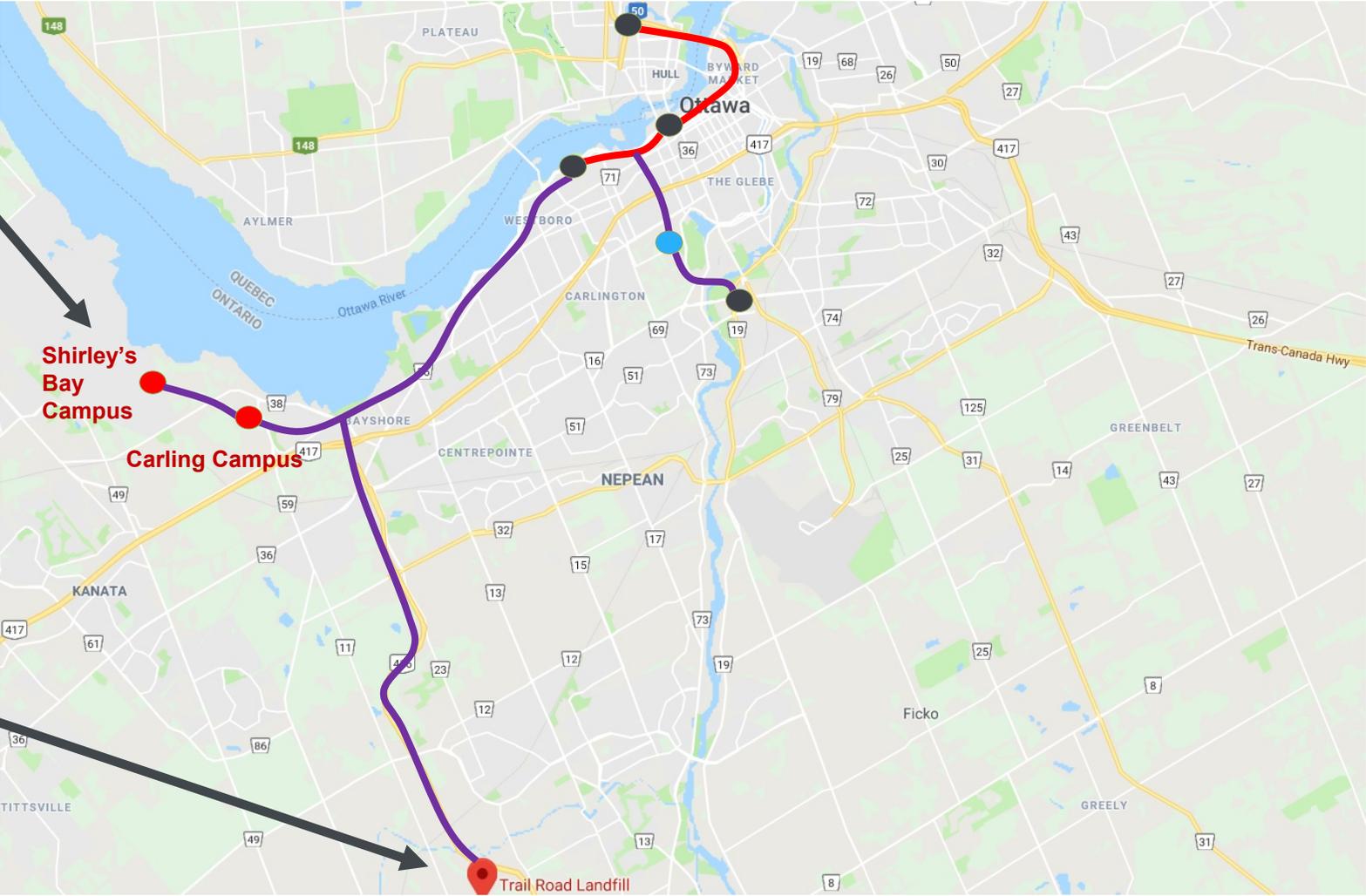
- Existing PSPC DES locations
- Existing Plants
- Potential DES Growth and Expansion
- New Hospital



Stage 3: Ultimate Future DES Network

Connect to federal campuses in West End

Connect to landfill if City moves to Energy from Waste

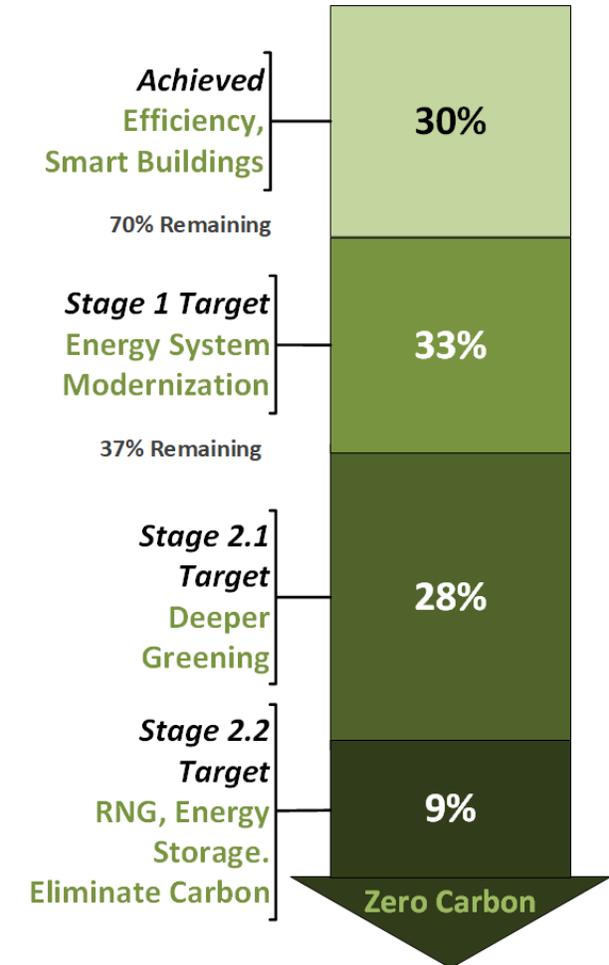
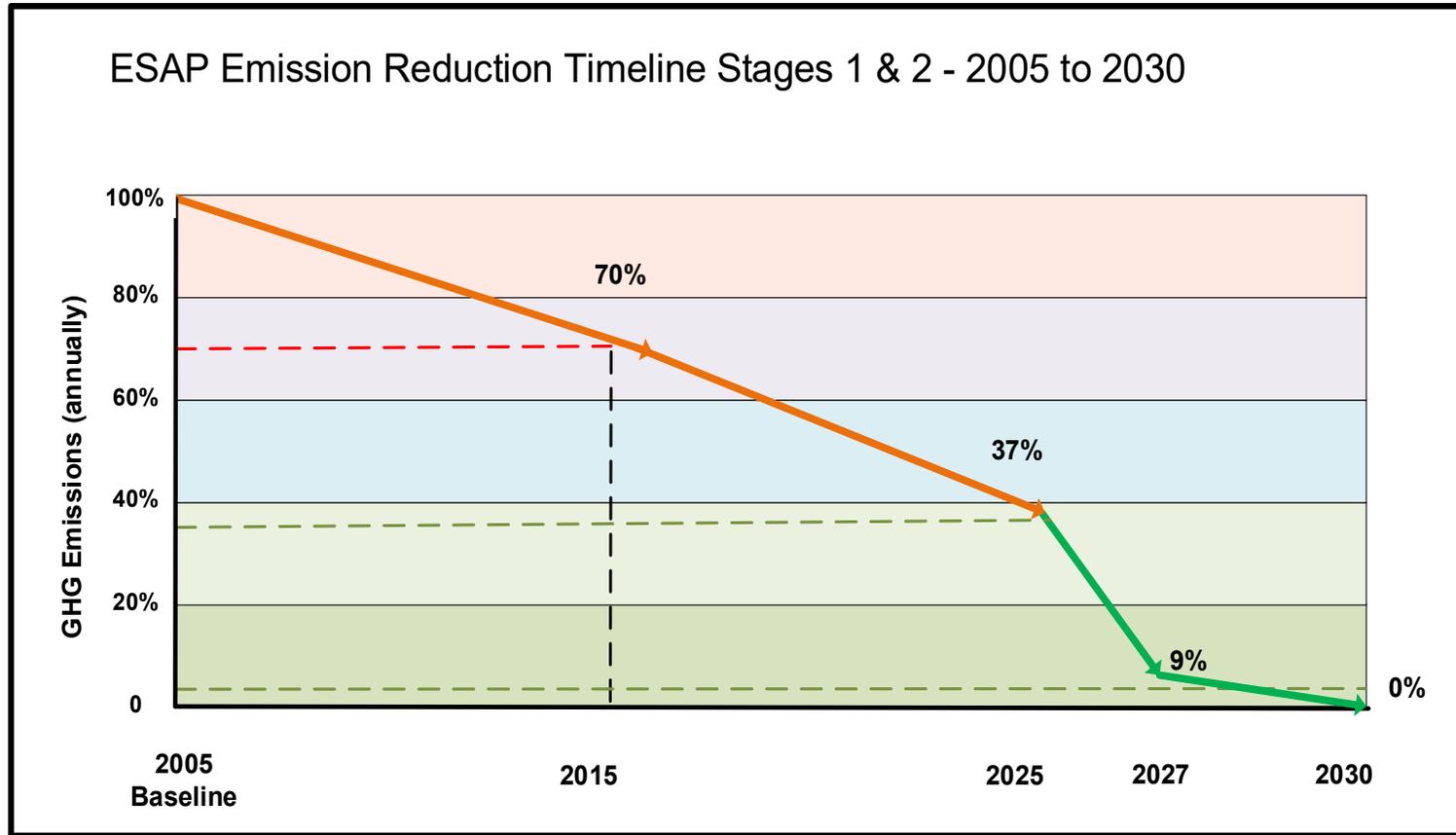


Ultimately we can connect to large federal campuses and our municipal landfill

— New connections
— Possible future connections

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

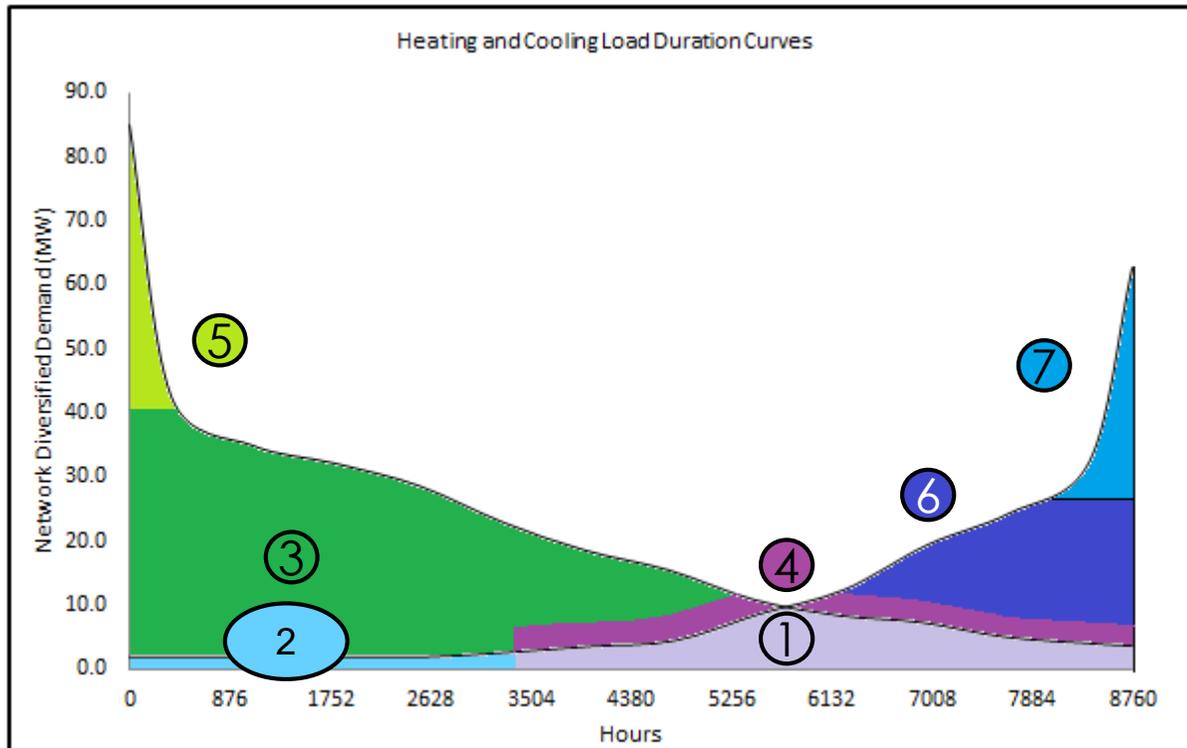
Summary of Stages: ESAP GHG Reductions



By 2030, we **will** achieve carbon net zero.



Summary of Stages: Energy Sources



← Towards -30°C

Towards 30°C →

ESAP Stage 1 – Modernization

1. Chiller Heat Recovery Heat Pumps
2. River water free cooling

ESAP Stage 2 – Deeper Greening

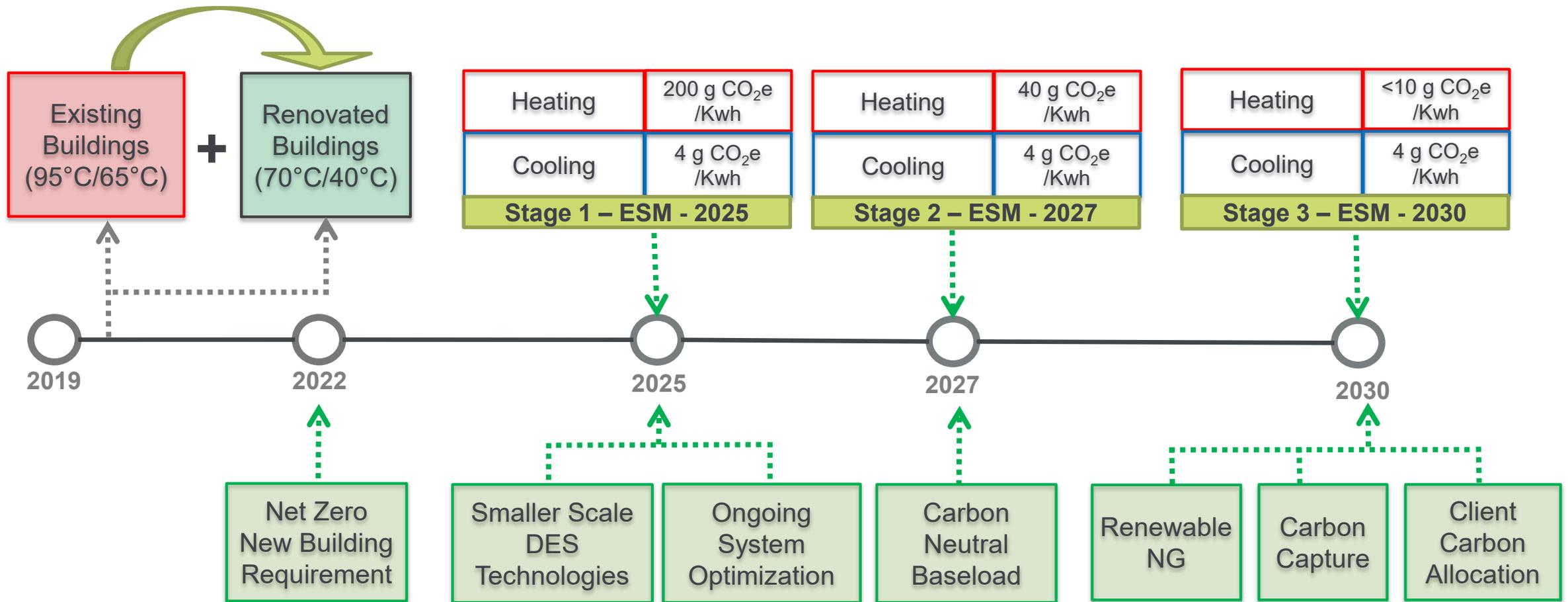
3. Low Carbon Energy Source (large)
4. Low Carbon Energy Source (building scale)
5. Renewable NG

ESAP Stage 3 – Future Opportunities

6. QC Electricity
7. ON Electricity



Summary of Stages: Pathway to Net Zero DES



Thank You -> Any Questions ?

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