Public Services and Procurement Canada
Services publics et Approvisionnement Canada

Cliff Street Temporary Boiler Plant

RPB

Presentation to – International District Energy Association (IDEA) Conference
St. Paul, Minnesota
June 2016

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Making the Impossible a Reality

Under extraordinary circumstances, people are sometimes called upon to perform seemingly impossible tasks

Building the Cliff Temporary Boiler Plant (TBP) was such a task!

The Cliff

- Original plant:
  - nominal 190 MW (650,000 PPH) heating capacity
  - 100 MW (28,000 tons) cooling
  - Canada's largest central heating and cooling plant
- Supply steam and chilled water through 15 kilometres of tunnels
- Serves 52 office buildings downtown Ottawa, including Parliament buildings
- On October 19, 2009, boiler #1 exploded
- Complete loss of steam production

Cliff Plant

Think Fast

- The day after the explosion, on October 20, 2009, a decision to increase immediately the capacity at an interconnected plant at the National Printing Bureau (NPB), located across the river in Gatineau, Quebec
- On October 23, 2009, a decision to construct the new heating plant on the parking lot behind the original Cliff Plant and next to the Supreme Court of Canada
- On November 2, 2009, Construction of the Temporary Boiler Plant (TBP) starts

After the explosion

Phase I – Provide Heating

Day 1: Monday, November 2, 2009 The Supreme Court parking lot becomes a construction site

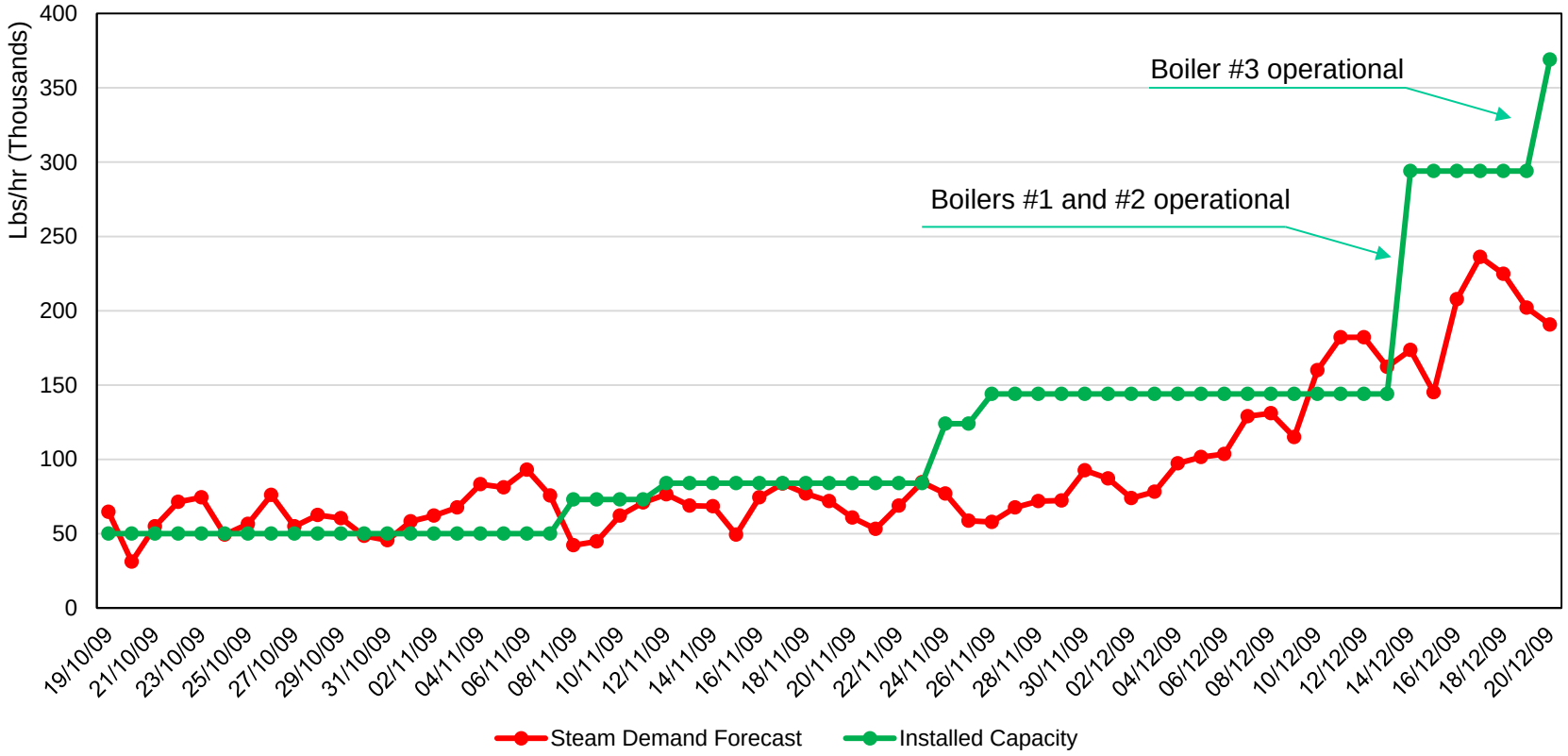
A lot to deal with!

While constructing the new Cliff TBP the project team dealt with many simultaneous, independent but related initiatives:

- Ensuring available steam capacity was shared appropriately between buildings;
- Tracking the weather forecasts and adjusting deadlines accordingly to meet the demand;
- Assisting the incident investigators to understand the Cliff operations and procedures;
- Abating of all accessible asbestos in the original Cliff Plant (boiler room and chiller room).

Cliff steam demand forecast

October – December 2009



* Each new boiler 26.5 MW or 75000 pph

Multiple challenges

- Three concurrent methods of production capacity increase at the same time
  - NPB installation of additional inside boilers
  - NPB installation of portable outside boilers
  - Cliff TBP construction
- Planning ahead for the superheated steam production:
  - Ensure that the additional boilers were in place for the cooling season (Phase II of the construction project)
  - Incorporate long-term plans to rehabilitate the entire Cliff Plant in the most economical way

Changes by the hour

Day 6: Four Saturated Steam Boilers arrive on site

Day 7: Installation of saturated steam boilers on the concrete slab while constructing the remaining portion of the plant

All boilers in place

Day 9: Foundation constructions in progress

Time: The Driver of all decisions

- Most decisions based on:
  - The availability of the material
  - The speed at which it could be delivered
  - The fastest method of installation

And the work goes on and on…

- Day 12: Feed water pumps arrive and piping installation starts
- Day 17: Connection to existing steam and condensate distribution within plant staircase

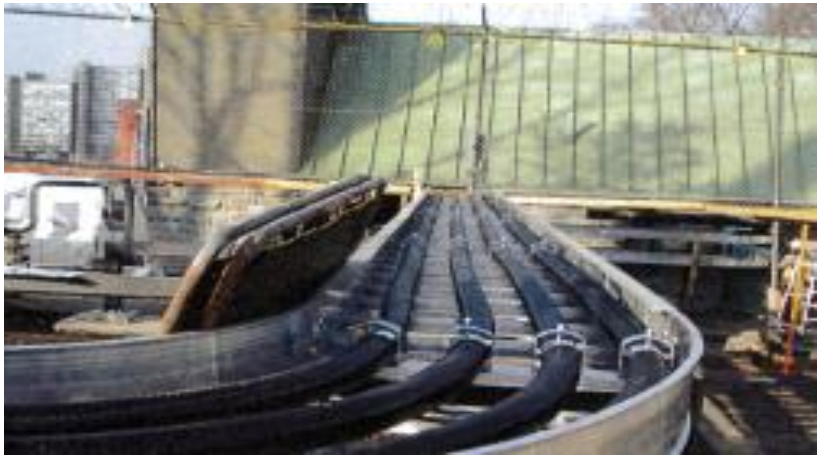
Day 12

Day 17

Work Continues

- Day 19: Main steam header installation
- Day 22: Electrical cable and piping installation linking the new plant and the old

Day 19



Day 22

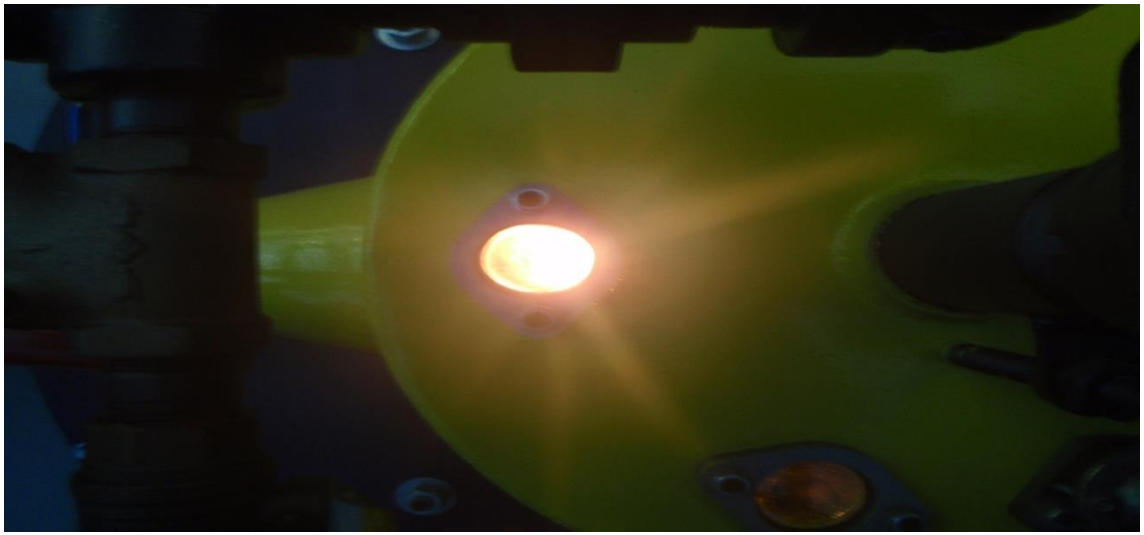
Building it from the inside out

Day 30

"Inside-out" because the project schedule needed to be inverted:
the boilers would be installed first and the building would be built around them

From ground to steam in 37 days

- No roof or walls but we had steam!
- On December 8, 2009, just 37 days after the shovel broke the ground, Boilers #1 and #2 started to produce steam. Six days later, steam was feeding the main network.



Day 37

Work continues in rain or shine (or sleet)…

Day 38

Phase II – Cooling

- Now that the heating capacity was restored, the team had to resolve the cooling capacity issue
- The chillers in the Cliff Chiller Plant, although still functional after the explosion, were driven by turbines that required superheated steam-producing boilers to operate
- Additional superheated steam boilers had to be installed prior to the cooling season; Phase II began

Restoration and construction continues

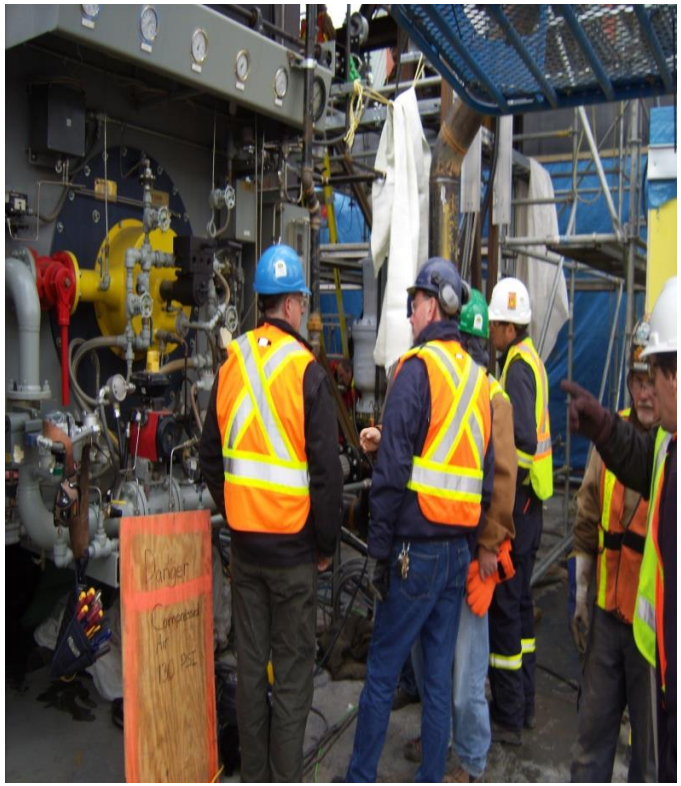
Phase II Progress

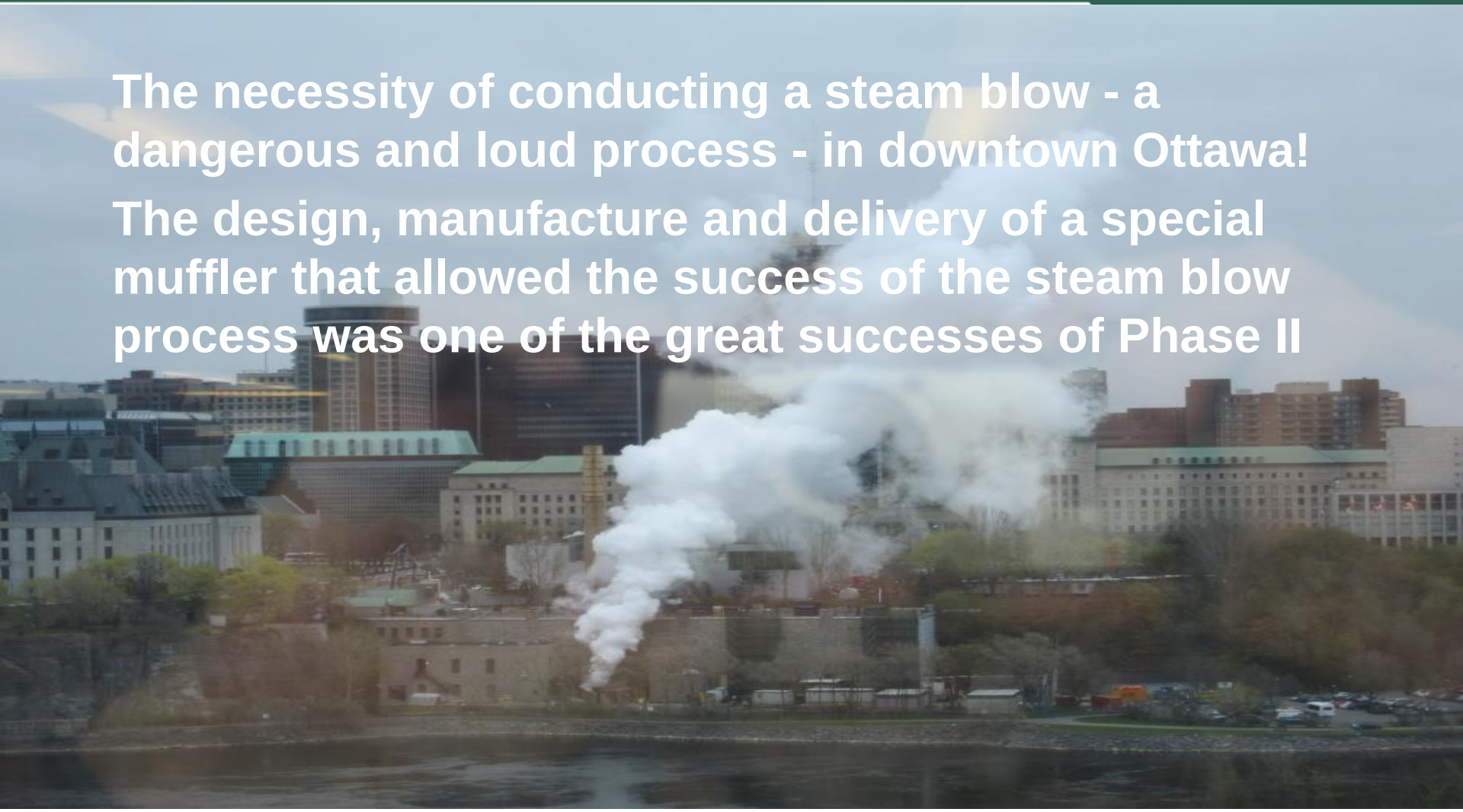
- On February 22, 2010, the floor slab of the Plant addition was completed
- By March 13, 2010, three Superheated Steam Boilers were installed
- On March 26, 2010, the steel frame of the addition was completed

Installation of the steam boilers

Phase II – The Challenges

- Multiple trades were constructing different building systems simultaneously, resulting in a jungle of scaffolding
- Adding to the project schedule the design and construction of a new condensate return system as the original one couldn't be used, it was in the asbestos contaminated building





The necessity of conducting a steam blow - a dangerous and loud process - in downtown Ottawa!

The design, manufacture and delivery of a special muffler that allowed the success of the steam blow process was one of the great successes of Phase II

Final Steps

New Plant, landscaping completed

- The chilled water production started on May 4, 2010
- By mid-May, the entire project was substantially completed

Completion

Final inspection

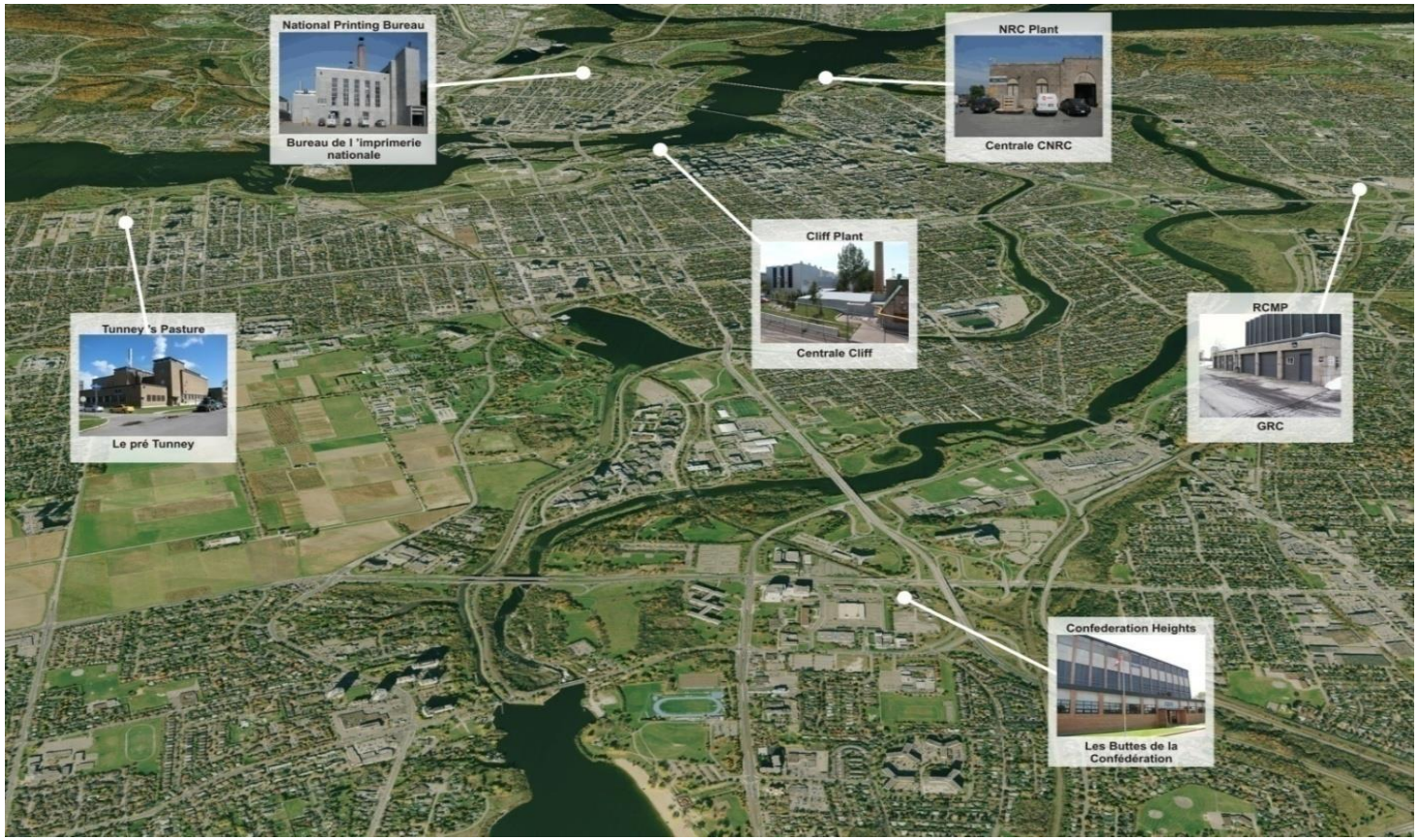
June 6 – final inspection

June 15 – the official completion date of the TBP

Energy Service Acquisition Project - ESAP

- The ESAP program is a Public Services and Procurement Canada (PSPC) initiative to modernize PSPC heating and cooling infrastructure within the National Capital Region (NCR)
- Within the NCR, PSPC owns and operates the six Central Heating and Cooling Plants (CHCP) that provide heating and/or cooling for more than 80 buildings in the NCR through five district heating and cooling systems

ESAP CHCP locations



Energy Service Acquisition Project - ESAP

- The ESAP program, initiated in 2009, is responsible for determining the best way to upgrade the District Energy Systems (DES) and to arrange for a transformation of the responsibility for the upgrade or modernization and ongoing operation
- With the launch of the ESAP in 2009, PSPC decided to take a holistic approach to its energy services infrastructure
- In response to this mandate, PSPC developed a proposal to fundamentally redefine and improve the delivery of heating and cooling services in the NCR

Energy Service Acquisition Project - ESAP

ESAP aims to:

- Reduce Greenhouse Gas Emissions to improve the Government of Canada's environmental performance
- Reduce the costs of heating and cooling services for the federal Government
- Increase the safety and reliability of heating and cooling operations
- Leverage the private sector's innovation, capacity, and expertise

Next Steps

- Fall 2016, Treasury Board Submission
- Spring 2017, Request For Qualification issued
- Fall 2017, Request for Proposal issued
- Summer 2019, contract signed
- Spring 2020, 5-year conversion period starts
- Spring 2055, contract ends

Questions?