Introduction to Energy Services Acquisition Program (ESAP) and Biomass Pilot Projects

The Economics of Wood-based Bioheat Workshop

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### Presentation Index

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

**Objectives:**
- Reduce Greenhouse Gas (GHG) emissions
- Reduce Costs
- Increase Safety & Reliability
- Leverage Private Sector’s Innovation & Expertise

There are **two stages** to ESAP:
- Stage 1: DES Modernization
- Stage 2: Deeper Greening
Supporting Government Priorities

The ESAP program will help the Government of Canada to meet the following commitments:

- **Paris Agreement** committing Canada to reducing GHG emissions by 30% by 2030;
- **Federal Sustainable Development Strategy** and **Greening Government** committing to lead by example by greening government operations and reducing emissions in government buildings and fleets by 40% by 2030 at the latest; and
- **Pan-Canadian Framework on Clean Growth and Climate Change** committing to move toward smart and sustainable buildings that use less energy and open the way for using renewable energy sources.
ESAP Consists of Two Stages

**Stage 1 – DES Modernization**
- Convert to industry-standard low temperature hot water technology (LTHW)
- Switch from steam to electric chillers
- Implement Smart Buildings data analysis to improve efficiency
- Test new carbon neutral fuels for deeper greening - pilot projects, feasibility studies

**Stage 2 – Deeper Greening**
- Convert base load to carbon neutral fuels – achieve low carbon government
- Increase the number of government buildings connected to the DES
- Expand and share carbon neutral energy with non-federal buildings in the community
Introduction

DES Plants

National Printing Bureau

Cliff

Tunney’s Pasture

GATINEAU

OTTAWA

NRC

Confederation Heights
Opportunity

Stage 1 will:
• Reduce GHG emissions by over 60% of the 2005 emissions baseline.
• Generate savings estimated at $750 million over 40 years.
• Meet a government commitment to eliminate use of ozone-depleting substances.
Financial Commitment in 2016

• Budget 2016 committed new funding to ESAP to:
  o upgrade the aging DES to use more efficient technologies (Stage 1); and
  o explore using renewable sources of energy (start of Stage 2)
• A Treasury Board (TB) Submission was approved in December 2016
TB Submission Approval

*December 2016*

- TB approved **Stage 1** – Project Approval for the modernization of the heating and cooling DES in the NCR, at a total estimated cost of $3.1B (including HST)

- TB also provided access to $250M in funding for:
  - The ESAP Team work necessary to get to contract award ($60M); and
  - The first four years of Building Conversion and Smart Buildings / Plants work ($190M)
Reduction of GHG Emissions by Component

- By 2025, GHG emissions will be reduced by over 60% of our 2005 baseline emissions as a result of Stage 1

### Impact on GHG Emissions

- **Smart Buildings**: 10%
- **Steam to Electric Chillers**: 21%
- **Steam to Low Temperature Hot Water**: 32%

**Total over 60%**
Impact on GHG Emissions

GHG Emissions Reduction Timeline – Stage 1 to 2025

- Baseline (2005)
- 2015: 70% reduction target
- 2025: 37% reduction target
- 2030: 0% reduction target

GHG Emissions (annually)
The Delivery Model

• For DES Modernization (Stage 1), it is a single Design-Build-Finance-Operating-Maintenance (DBFOM) contract
  – It is a P3 project agreement with a duration of 35+ years
  – **DB** = design build – this phase will take five years
  – **f** = finance of the construction phase for a seven year term
  – **OM** = operations and maintenance – 2020 to 2055
• For Smart Buildings/Plants, it is an Memorandum of Understanding (MOU) with National Research Council (NRC)
• For Building Conversion, it is several Design-Bid-Build (DBB) contracts
• For two Biomass Pilot Projects, it is a MOU with NRC and Natural Resources Canada (NRCan)
It is comprised of two principal stages:

**Request for Qualifications (RFQ)**
- Evaluates consortia based on experience in designing, constructing, short term financing, operating, and maintaining a project of similar size and complexity
- Selects the top three Qualified Respondents that will be invited to participate as Proponents in the Request for Proposals (RFP)

**Request for Proposal (RFP)**
- Sets out the conditions and specifications required to undertake the Project
- Invites proponents to submit binding technical and financial proposals
- Results in the selection of the successful Proponent and signature of the Project Agreement
# P3 Procurement Process Timeline

<table>
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<th>Date</th>
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<tr>
<td>RFQ Issued (RFP developed to 70%)</td>
<td>August 2017</td>
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<tr>
<td>RFQ Closed</td>
<td>November 2017</td>
</tr>
<tr>
<td>RFQ Short List Approved</td>
<td>January 2018</td>
</tr>
<tr>
<td>RFP Issued</td>
<td>February 2018</td>
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<tr>
<td>RFP Technical Submission</td>
<td>October 2018</td>
</tr>
<tr>
<td>RFP Financial Submission</td>
<td>January 2019</td>
</tr>
<tr>
<td>RFP Evaluation Completed, Preferred Proponent Identified</td>
<td>January 2019</td>
</tr>
<tr>
<td>Contract Award</td>
<td>April/May 2019</td>
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Exciting Models are an Inspiration for ESAP

New models are emerging across the world for heating and cooling – ESAP will be a model for others once completed.

Innovative design for incineration plant in Copenhagen, Denmark

Exciting public architecture
Spittelau waste incinerator in Vienna, Austria
Vision for Stage 2

The vision for Stage 2 consists of two components:

1. Switch from natural gas to carbon neutral fuels for base load; and
2. Expand the system gradually to grow from 80 to 600 buildings

Place du Portage Complex – a target for system expansion
Biomass Pilot Projects

- The first step of **Stage 2** is to assess the feasibility of various carbon neutral fuels
- In 2017/18, ESAP will be testing two fuel sources:
  - Wood chip, and
  - Bio-oil (renewable fuel oil) made from wood by-products
- The goal will be to better understand the benefits and costs of use

*Biomass samples that are being considered for testing at Confederation Heights Plant*
How ESAP Can Expand The Network

Using carbon neutral fuels would allow us to expand

- Existing PSPC DES locations
- Potential DES Growth and Expansion
GHG Emissions Reduction Stages 1 & 2

- By 2030, GHG emissions will be reduced to less than 10% of 2005 baseline emissions if we complete Stage 2
ESAP GHG Emissions Reduction Timeline
Stages 1 & 2 – 2005 to 2030

GHG Emissions (annually)

- 100%
- 80%
- 60%
- 40%
- 20%
- 0%

2005
Baseline

2015
70%

2025
37%

2030
9%
Thank you.

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Chilled Water Plant in Paris