

ENERGY AND CITY BUILDING: THE FUTURE OF DISTRICT ENERGY IN CANADA'S NATIONAL CAPITAL REGION



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UNIVERSITY'S SURP 824 PROJECT COURSE

WHY DISTRICT ENERGY NEEDS PLANNERS

Planners bring a unique perspective and toolset that is an invaluable resource in complex DE projects.

1. Our Project
2. What We Learned
3. Case Study Highlights
4. Land Use Analysis Highlights
5. Summary



PROJECT PURPOSE

- Evaluate existing planning policy and government context in the NCR and identify key stakeholders
- Create a list of “lessons learned” from successful and unsuccessful DES expansion in comparable places to the NCR
- Identify potential locations for expansion of DES in the NCR by analyzing supportive land-use policy conditions and potential users
- Recommend next steps for ESAP on how to achieve expansion of DES in the NCR



OUR PROJECT: ESAP'S DISTRICT ENERGY SYSTEM

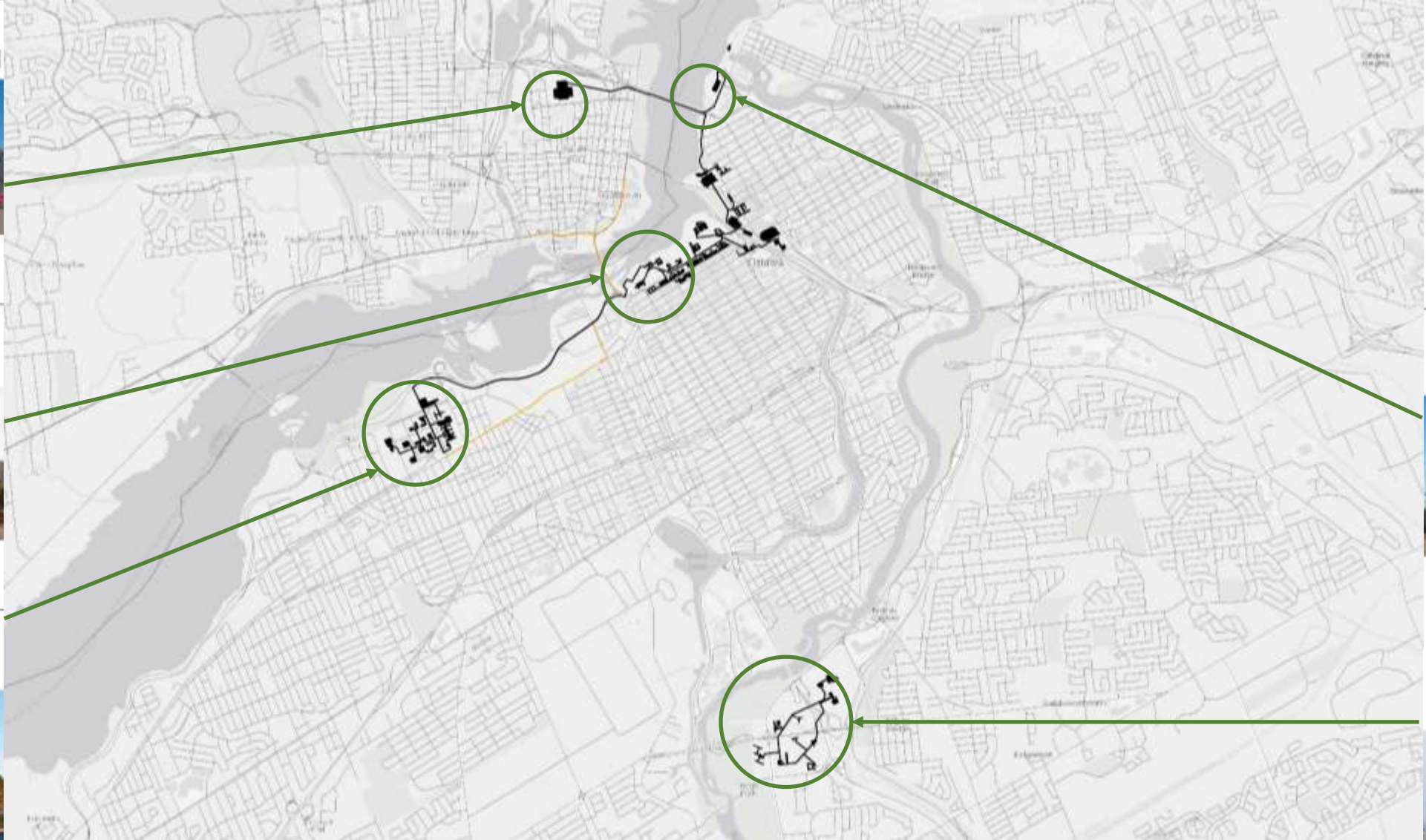
National
Printing Bureau



Cliff



Tunney's
Pasture



*The existing
DES network is
indicated with
black lines and
polygons.*

NRC



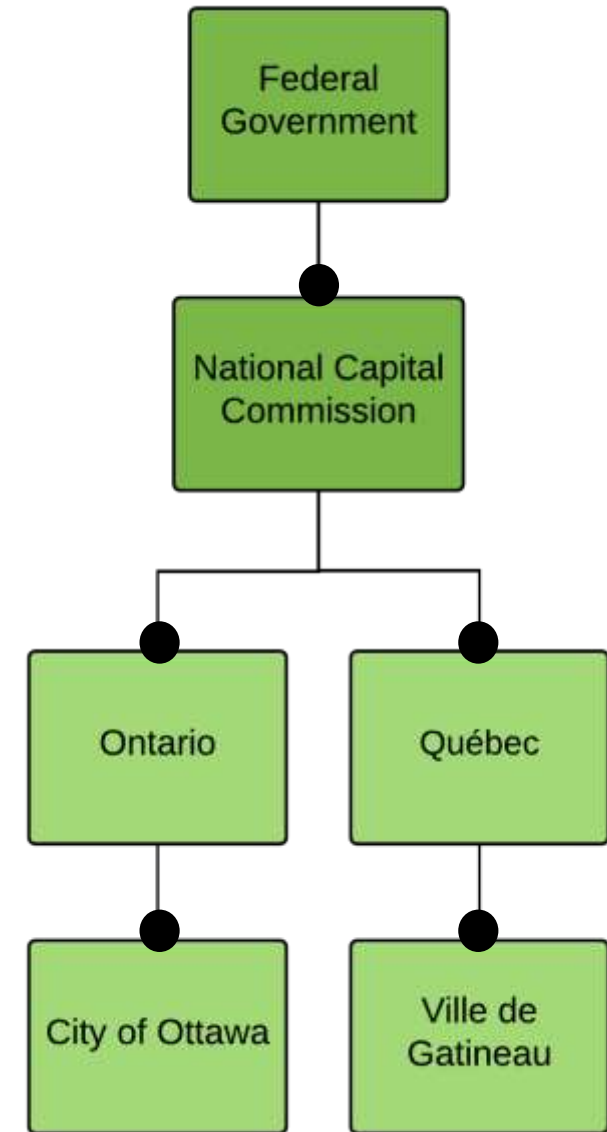
Confederation
Heights



GOVERNMENT CONTEXT – KEY PLAYERS

1

- Complex, with multiple key players
 - Government of Canada
 - NCC
 - Two provinces: Ontario and Québec
 - Two cities: Ottawa and Gatineau
- Each level of government has its own “greening” initiatives



WHAT WE OBSERVED

- ESAP functions in a particularly interesting place and system with many jurisdictional layers, all in need of collaboration
- Lack of engagement with stakeholders can bring missed opportunities
- Green policies can support or hinder DES projects
- Location of infrastructure can help build or restrict an expanding customer base



WHAT WE LEARNED

We learned through our project that the planning profession offers unique skills and tools that can be invaluable for developing a DES.

- 1 Planners are **collaborators** with extensive **intergovernmental** and **public engagement** experience.
- 2 Planners bring **innovative tools** and **development incentives**.
- 3 Planners navigate and implement **creative policy** to meet their objectives.



CASE STUDY HIGHLIGHTS



CASE STUDIES—St. Paul, MN

1

3



- Take advantage of your planners! (and their plans)
- St. Paul worked with transit agencies, city planners, and the energy sector to implement DES while expanding their light rail network.

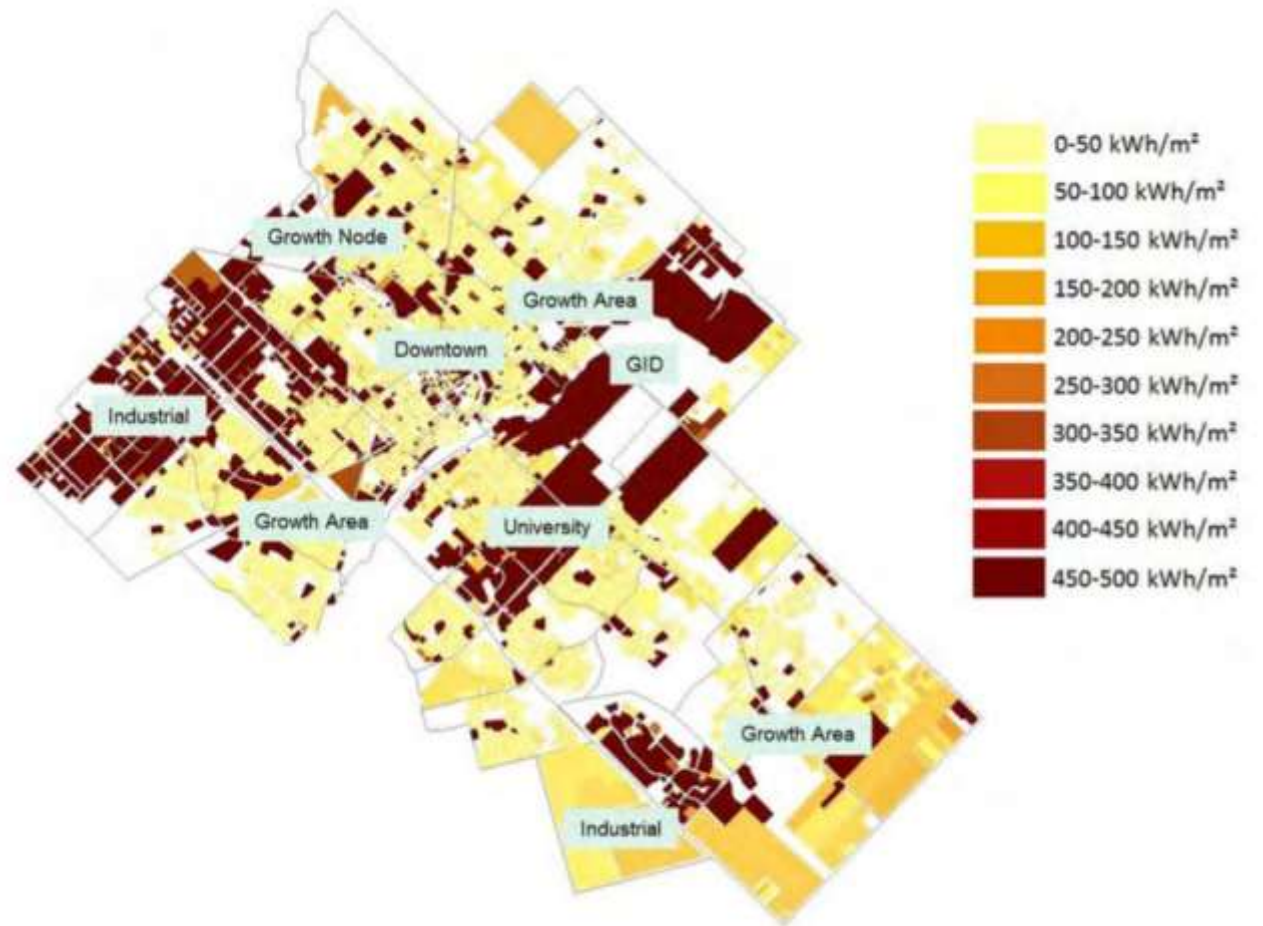
Source: St. Paul Pioneer Press



CASE STUDIES—Guelph, ON

3

- Looking at plans and mapping is not enough.
 - Guelph failed to consider whether highest-energy users would want to connect.
- Make a plan, too.
 - Plan for your network with easements, and act on them.



Source: Guelph Community Energy Plan



CASE STUDIES—Paris, France

2

- Use planning tools!
 - Density bonusing encourages connection without mandating.
 - “Urban Development Zones” mandate connection, but expansion is paid for by the City



Source: Paris 2012 Climate Plan

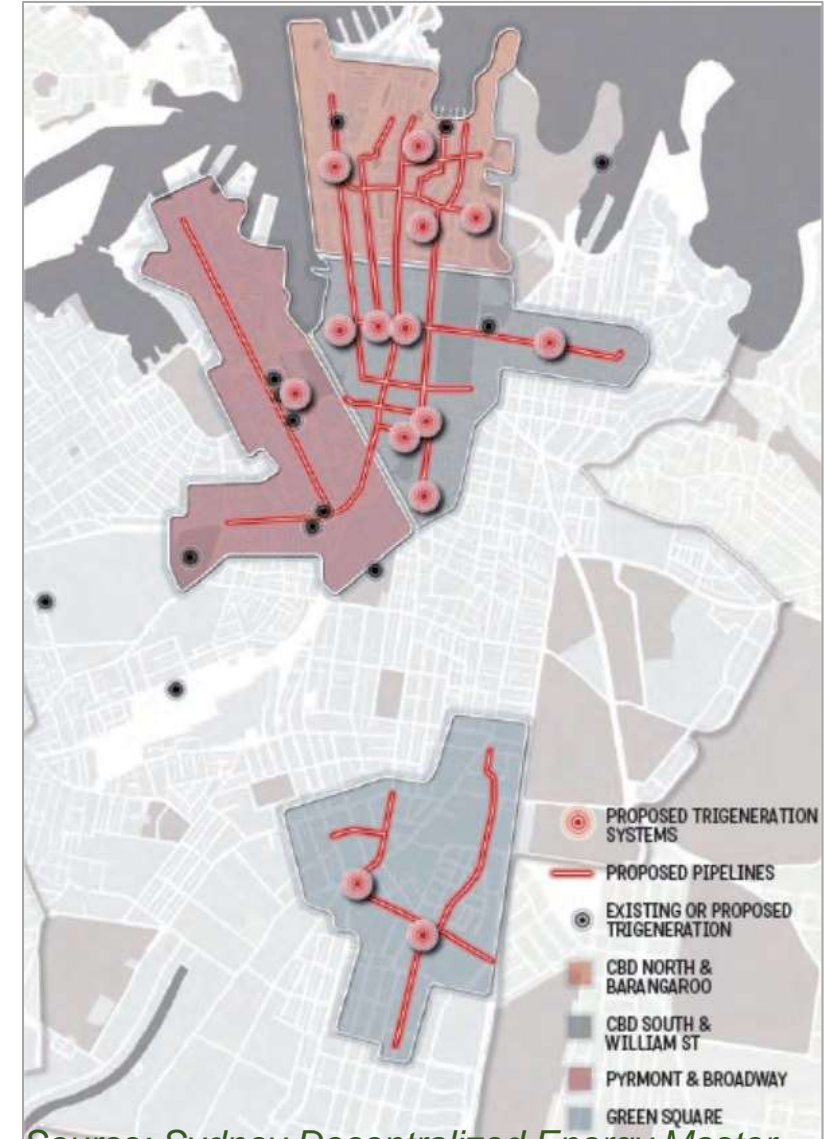


CASE STUDIES—Sydney, Australia

1

3

- Decentralized Energy Master Plan
 - Why not energy plan and urban plan at the same time? Marries planning and energy planning together
- Planning is how Sydney:
 - Meets GHG reduction goals;
 - Diversifies energy provision with private and public heating and cooling systems; and
 - Levels their energy demand curve



Source: Sydney Decentralized Energy Master Plan



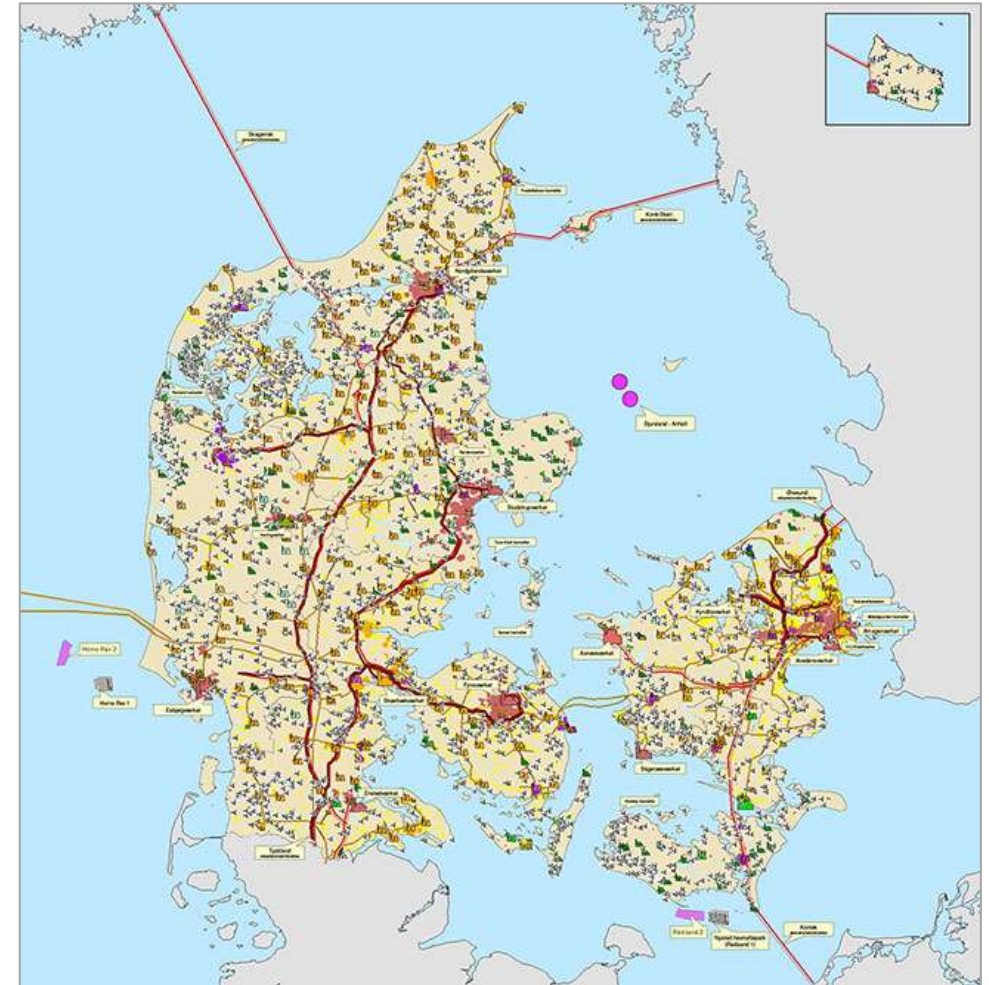
CASE STUDIES—Denmark

1

2

3

- Someone needs to foster cooperation and a united vision between stakeholders.
- In complex contexts, there needs to be a big vision.
 - The Danish federal government laid a strong framework for regional district energy development in the 1970s that did this.



Source: Danish Board of District Heating



LAND USE ANALYSIS HIGHLIGHTS

FACTORS FOR TARGETING DES CLIENTS:

OWNERS HIP

- Federal buildings first
- Early adopters and industry pioneers
- Private connections

PHASING

- 1st priority = new buildings
- 2nd priority = lifecycle heating/cooling replacements for existing buildings

LOCATION

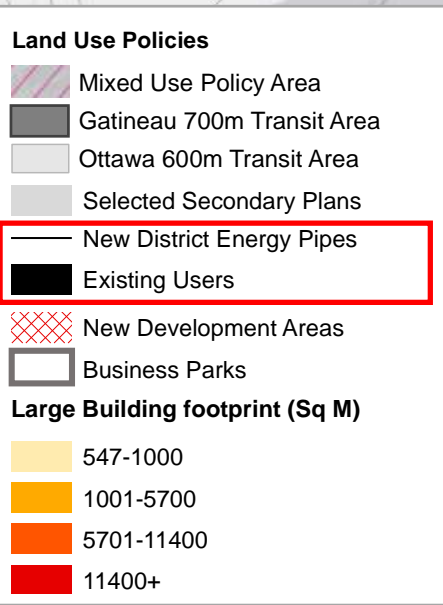
- Target buildings adjacent to existing DES first
- Expand to clusters of high energy users
- Fill in grid over time

ENERGY USAGE

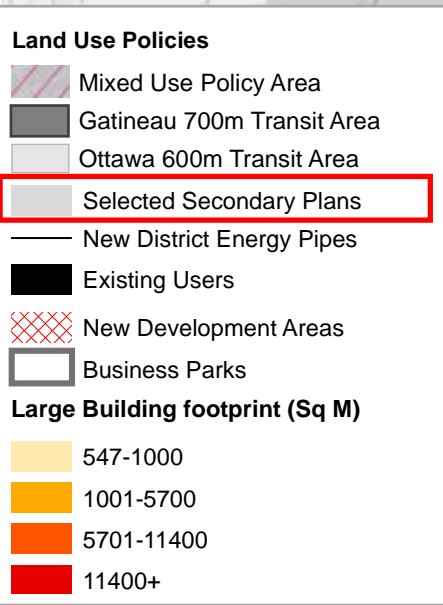
- Target high energy anchor users first
- Target a mix of uses to create more continuous energy demand profile



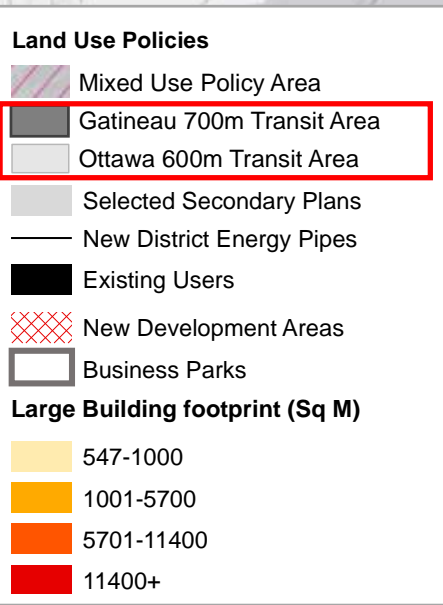
EXISTING SYSTEM & USERS



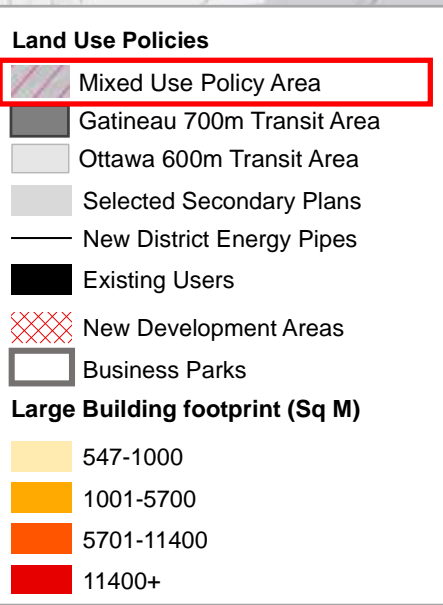
SELECTED SECONDARY PLANS



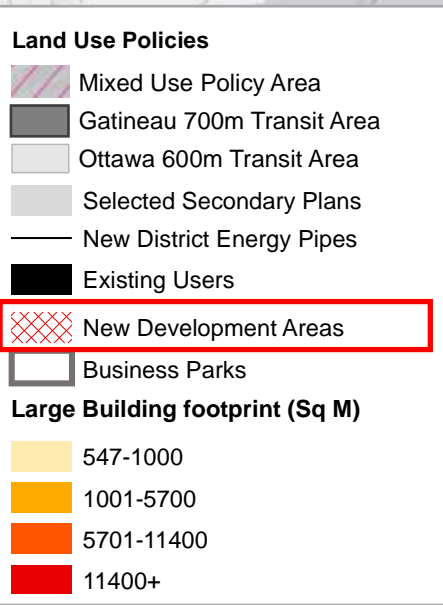
TRANSIT AREAS



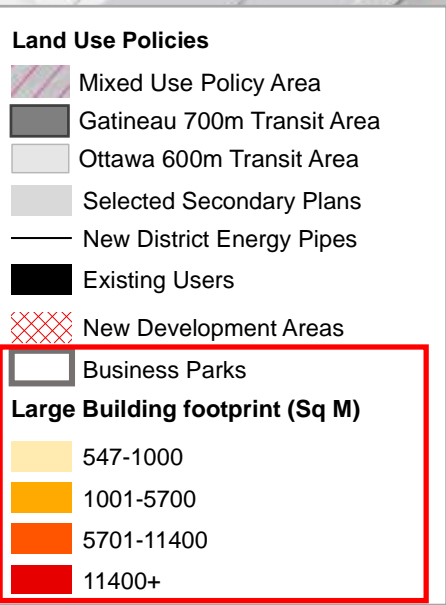
MIXED USE AREAS



NEW DEVELOPMENT AREAS

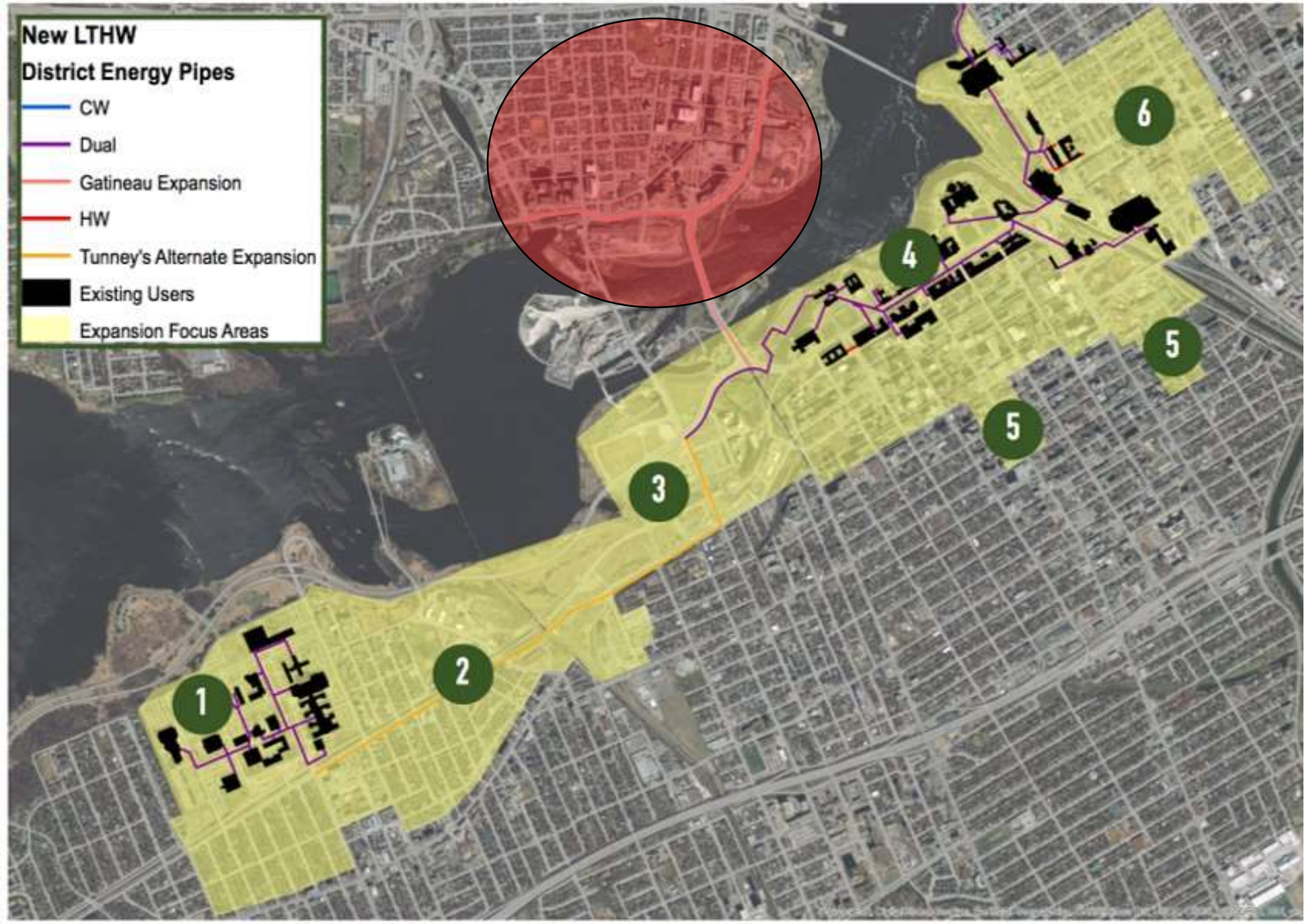


BUILDING FOOTPRINTS



New LTHW
District Energy Pipes

- CW
- Dual
- Gatineau Expansion
- HW
- Tunney's Alternate Expansion
- Existing Users
- Expansion Focus Areas



- 1 Tunney's Pasture
- 2 Scott Street
- 3 RendezVous LeBreton
- 4 Downtown
- 5 Centretown Spur
- 6 Byward Market
- Initial Priority Expansion Area

LESSONS LEARNED

1. Ensuring the commitment of customers is a vital support to land use feasibility studies
2. DES expansion and operation are most efficient in dense areas with mixed land uses
3. Anchor users are important for long-term DES feasibility
4. The power of valuable planning tools can be harnessed through strong partnerships with local authorities
5. Systematic and flexible expansion is most cost effective and efficient
6. Collaboration between multiple levels of government is key to ensure cohesive and supportive land use policies are implemented
7. Should integrate energy with infrastructure and land use planning



CONCLUDING REMARKS

There is opportunity for planners to contribute more to ensuring the success of District Energy Systems.

- 1 Planners are **collaborators** with extensive **intergovernmental** and **public engagement** experience.
- 2 Planners bring **innovative tools** and **development incentives**.
- 3 Planners navigate and implement **creative policy** to meet their objectives.



THANK YOU

SURP 824 - PROJECT
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