



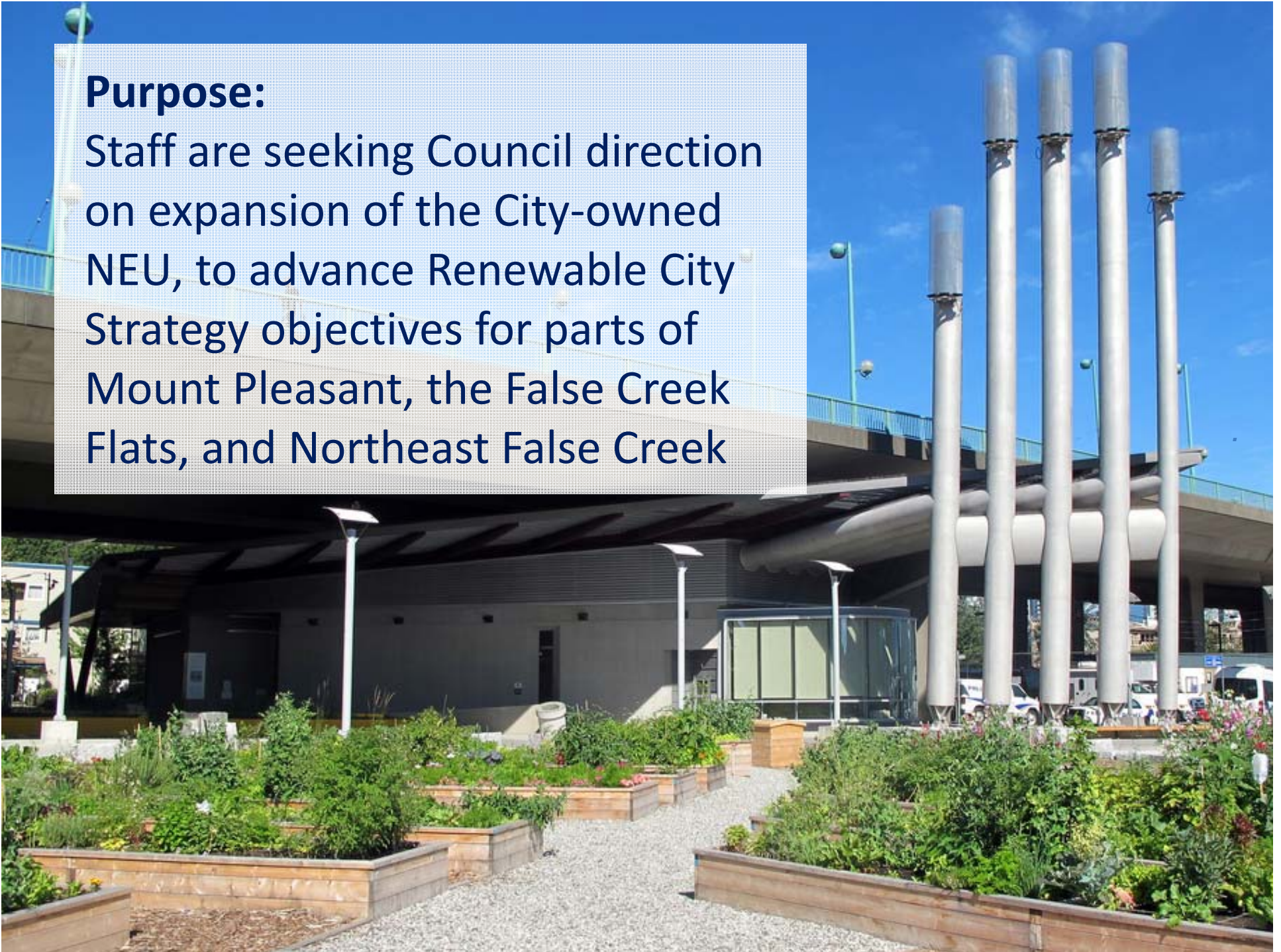
# Expansion of the False Creek Neighbourhood Energy Utility ("NEU")

RTS 12251  
February 21, 2018



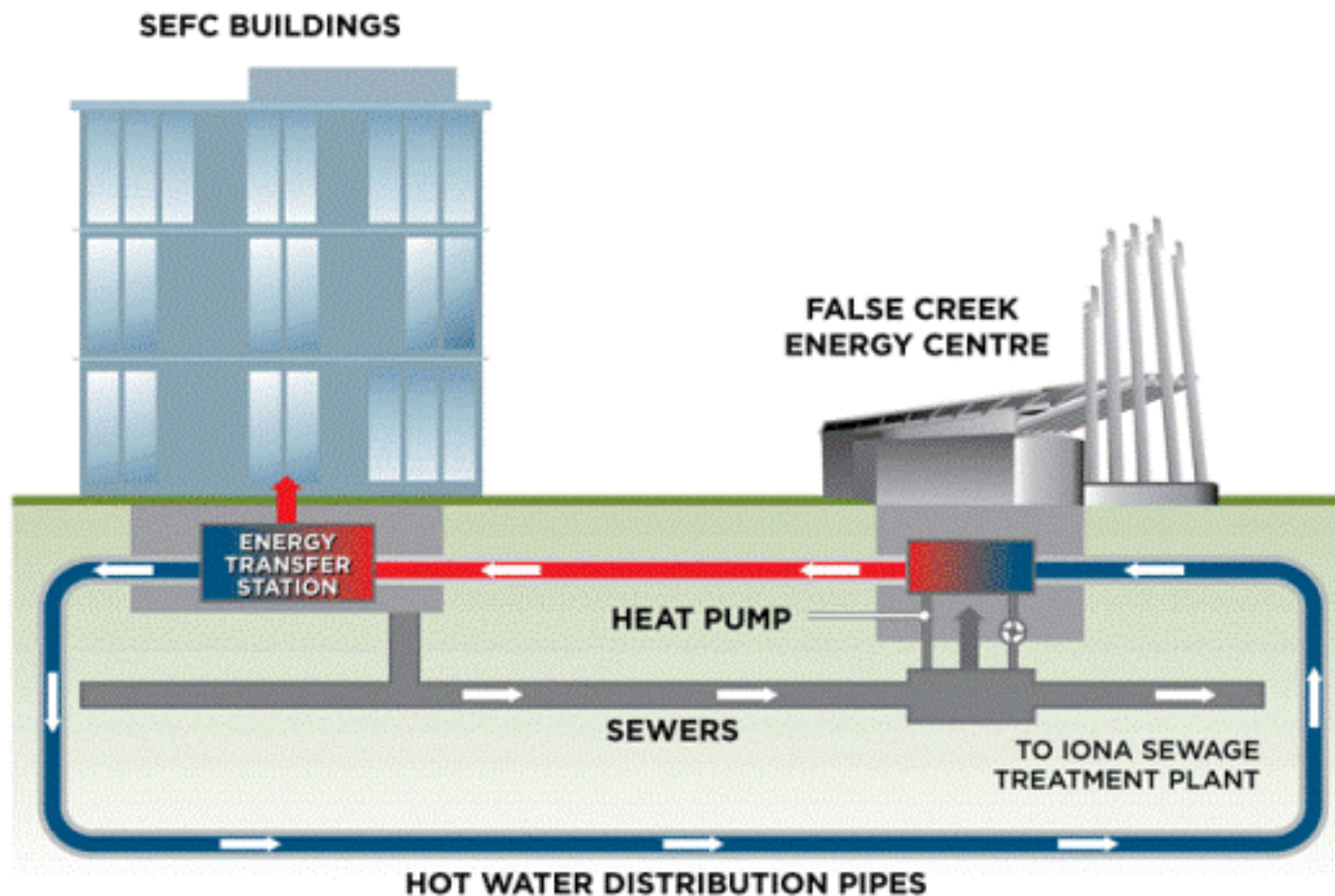
## **Purpose:**

Staff are seeking Council direction on expansion of the City-owned NEU, to advance Renewable City Strategy objectives for parts of Mount Pleasant, the False Creek Flats, and Northeast False Creek

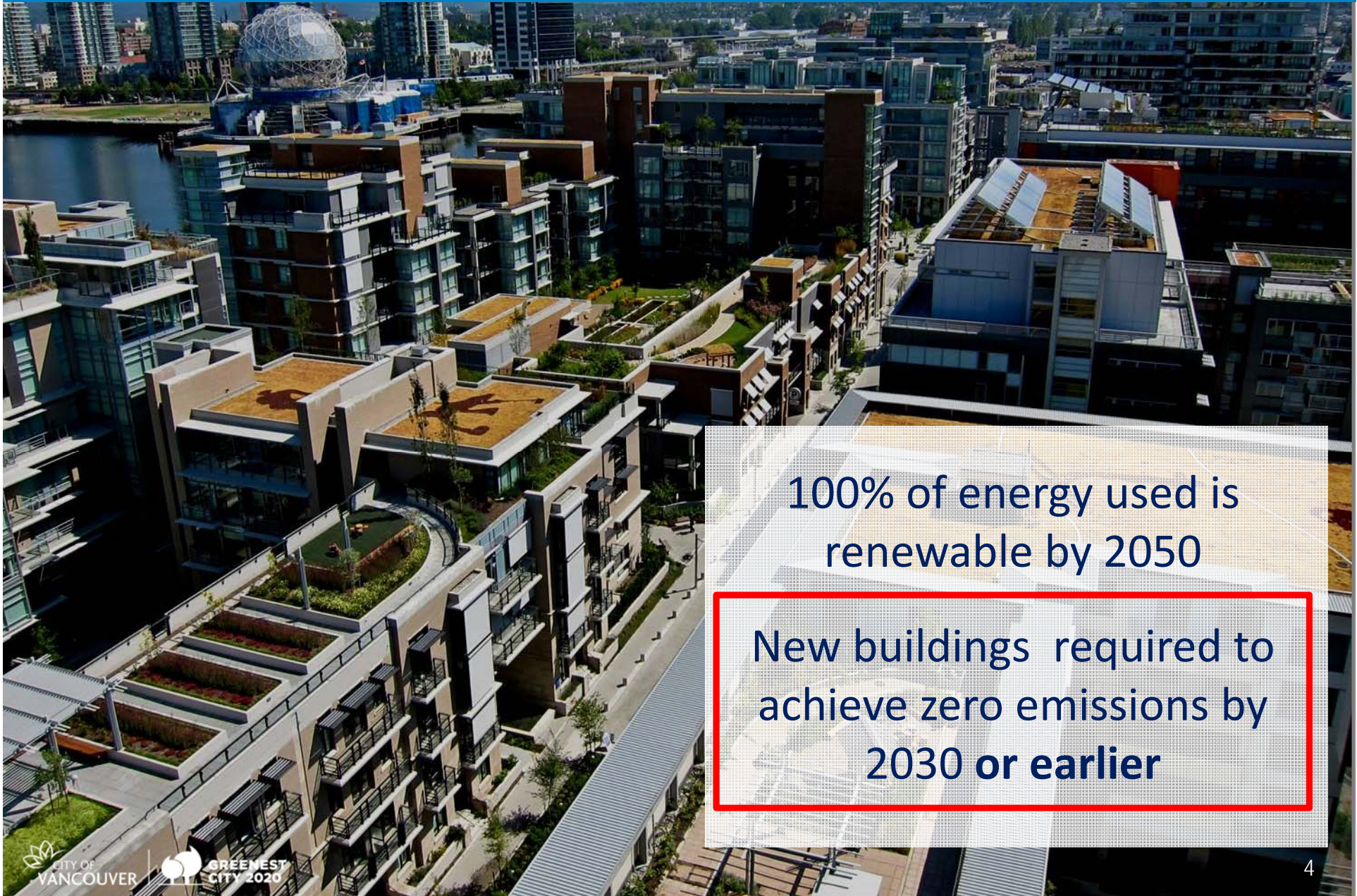


# What is Neighbourhood Energy?

Neighbourhood energy systems supply heating, hot water, and sometimes cooling for multiple buildings



# Renewable City Strategy – Approved in 2015



100% of energy used is renewable by 2050

New buildings required to achieve zero emissions by 2030 or earlier

# Zero Emissions Building Plan – Approved in 2016



## Two Pathways

### High Performance Building

- GHG limit achieved by minimizing heat loss
- Enables simple heating system design

### Low Carbon Energy System

- GHG limit achieved by combining efficiency with low carbon energy supply
- Uses advanced technologies



## **Neighbourhood Energy Strategy - Downtown Priorities**

*(approved by Council in 2012)*

1. Renewable fuel switch for Downtown steam heat system
2. New low carbon heating networks in high-growth areas

# Downtown Fuel Switch Project Status



- GHG reduction opportunity of ~70,000 tonnes CO<sub>2</sub>/yr
- A feasibility study concluded:
  - The Fuel Switch Project is a cost-effective approach for providing low carbon energy. However, at today's low natural gas and carbon prices, it would be significantly more expensive than natural gas fueled steam
  - Without government support, it is unlikely that enough customers would commit to buy energy from the project
- City entered into MOU with Creative Energy in Nov. 2017
- Creative Energy is now seeking support from senior levels of government

# Northeast False Creek Update

- Neighbourhood Energy Agreement between the City and Creative Energy was rejected by the BC Utilities Commission (“BCUC”), out of concerns regarding mandating connections to a private utility
- This BCUC decision provided clarity that the CoV should consider owning systems in areas where mandating developer connections is needed to establish new networks

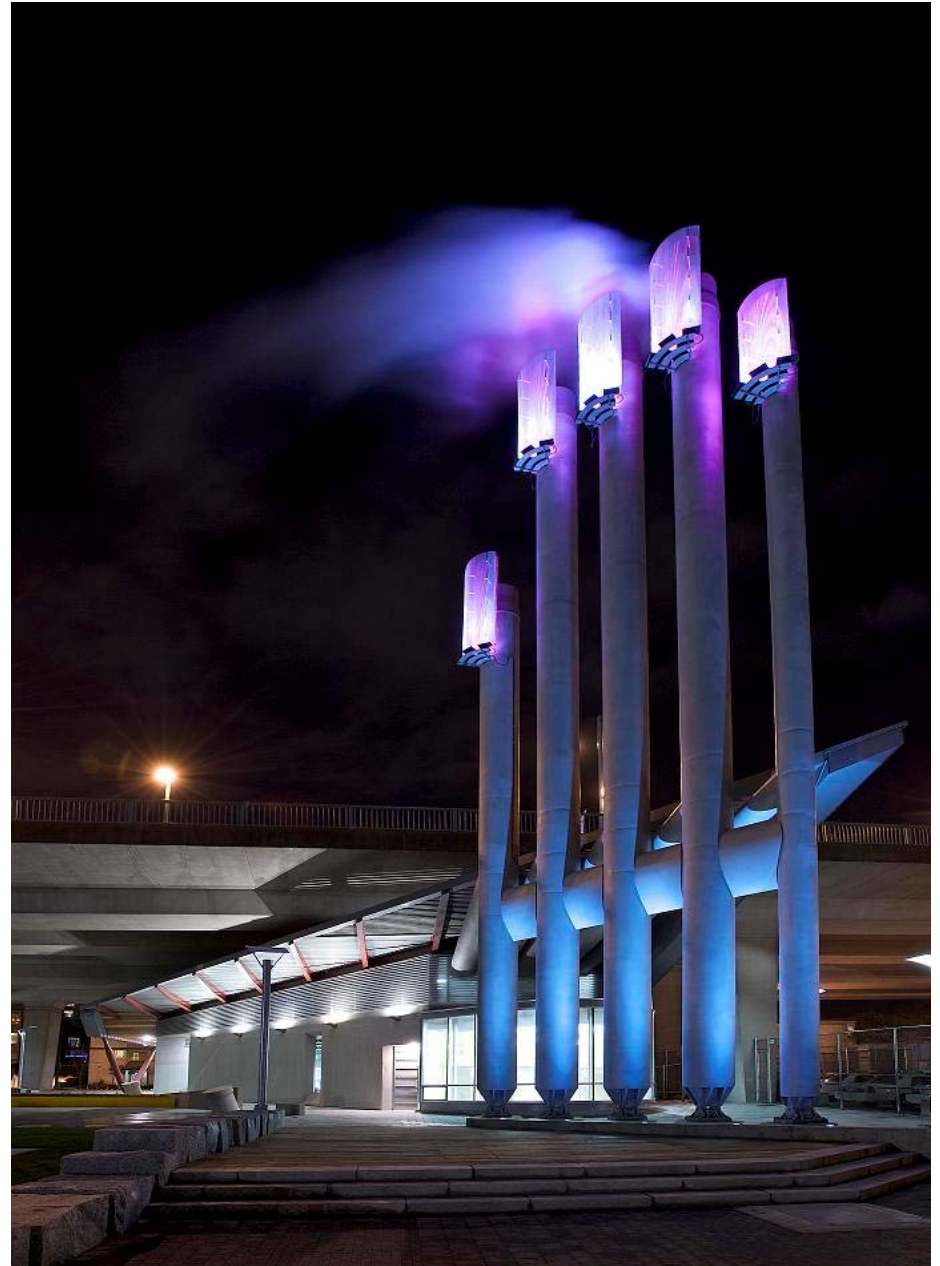




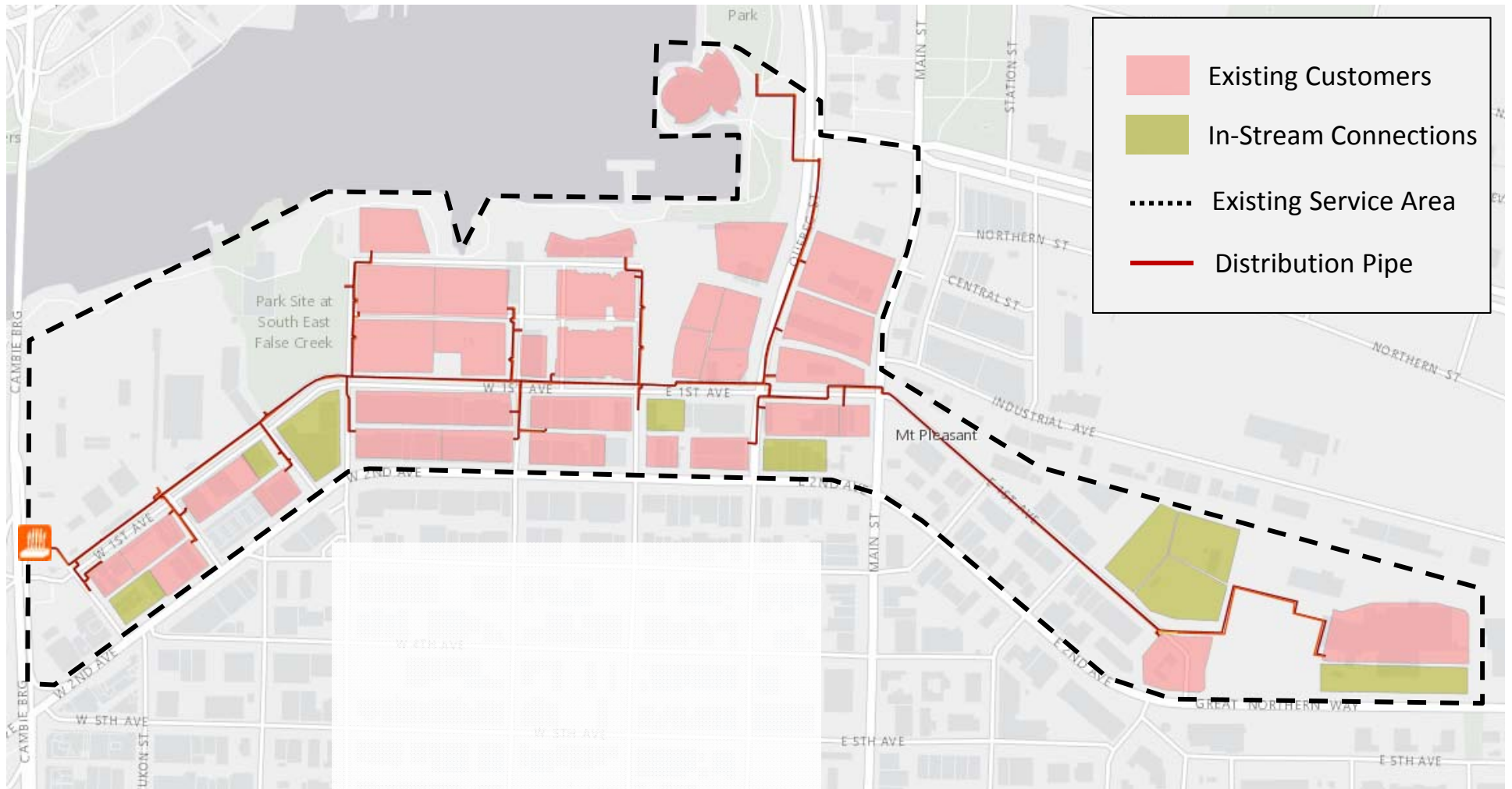
# Southeast False Creek NEU Status



- Operational since 2010
- Owned and operated by the City, with independent oversight by Expert Panel
- 70% of energy from renewable sources (e.g. sewage heat, renewable natural gas)
- Financially self-sustaining, delivering cost-effective renewable energy

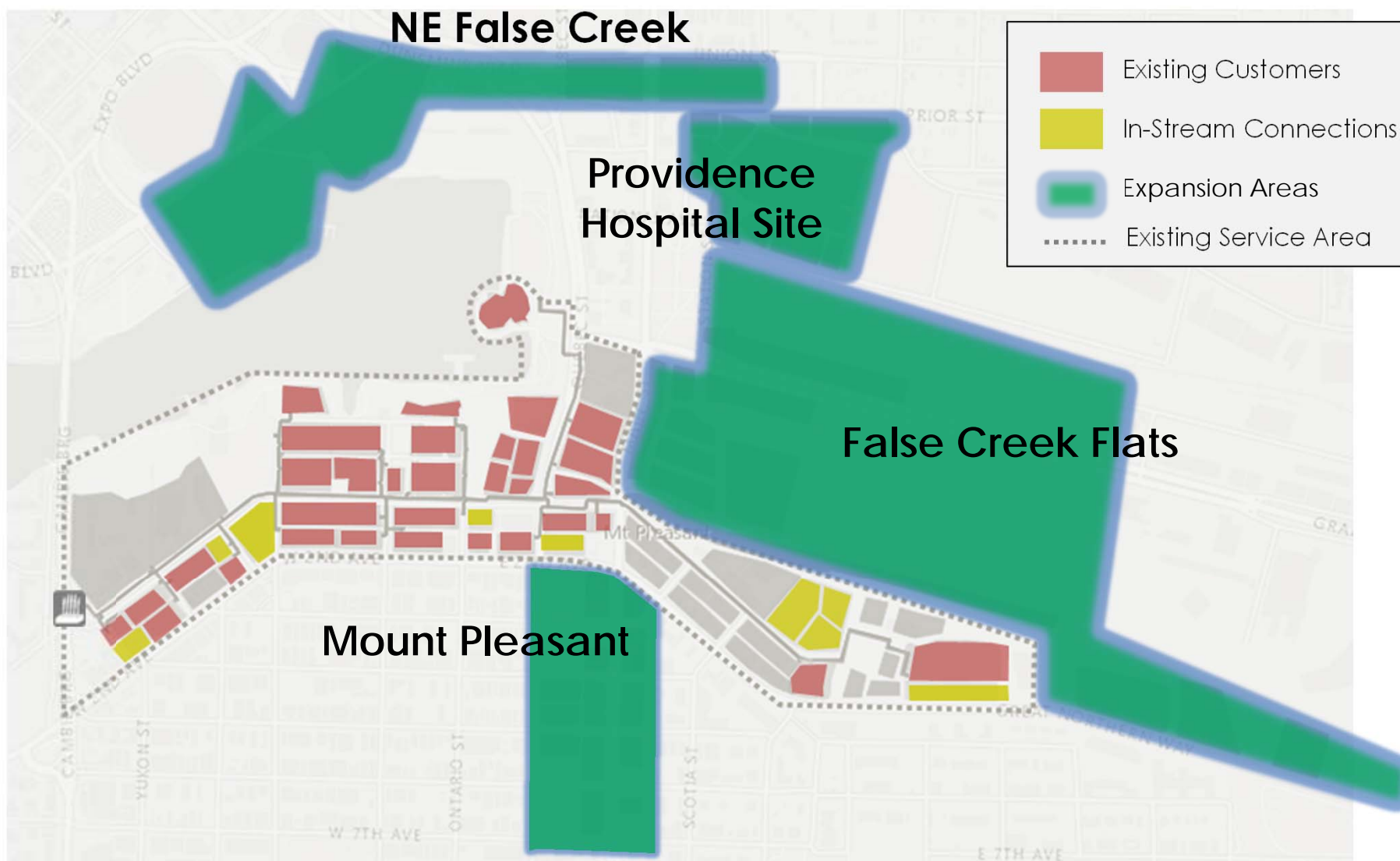


# Current Service Area



- **Customer base has grown by >300% since 2010**  
(~5.2 million square feet of buildings now connected)

# Expansion Areas\*



\* Area plans already include provisions for neighbourhood energy

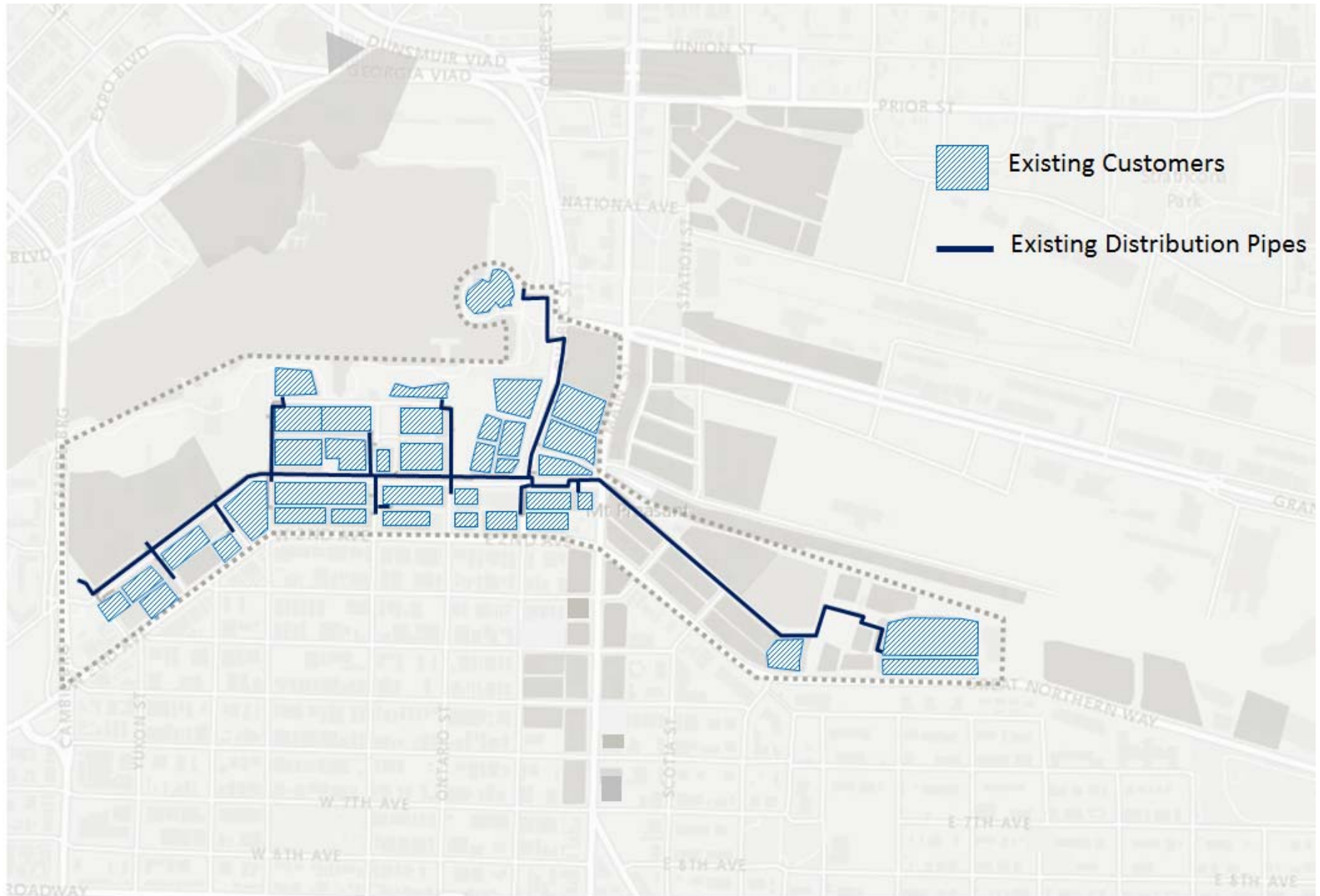
# Business Case Analysis Completed



- Business case evaluation has been completed to compare NEU expansion with alternative options for achieving low emissions buildings under the Zero Emissions Building Plan
  - Included external review by consultants and input from Expert Panel
- While non-NEU approaches do not require investment by the City, this evaluation identified the NEU as the preferred path to achieve Renewable City Strategy objectives within the defined expansion areas

- The expansion plan is based on City ownership of the NEU distribution pipe network, and the existing False Creek Energy Centre
- This approach maintains direct City control to achieve GHG performance targets, without the need for BCUC regulation
- The plan maintains flexibility for private sector investment in new energy centres, which provides the City with the future opportunity to reduce its direct investment & debt financing requirements and transfer technology risk

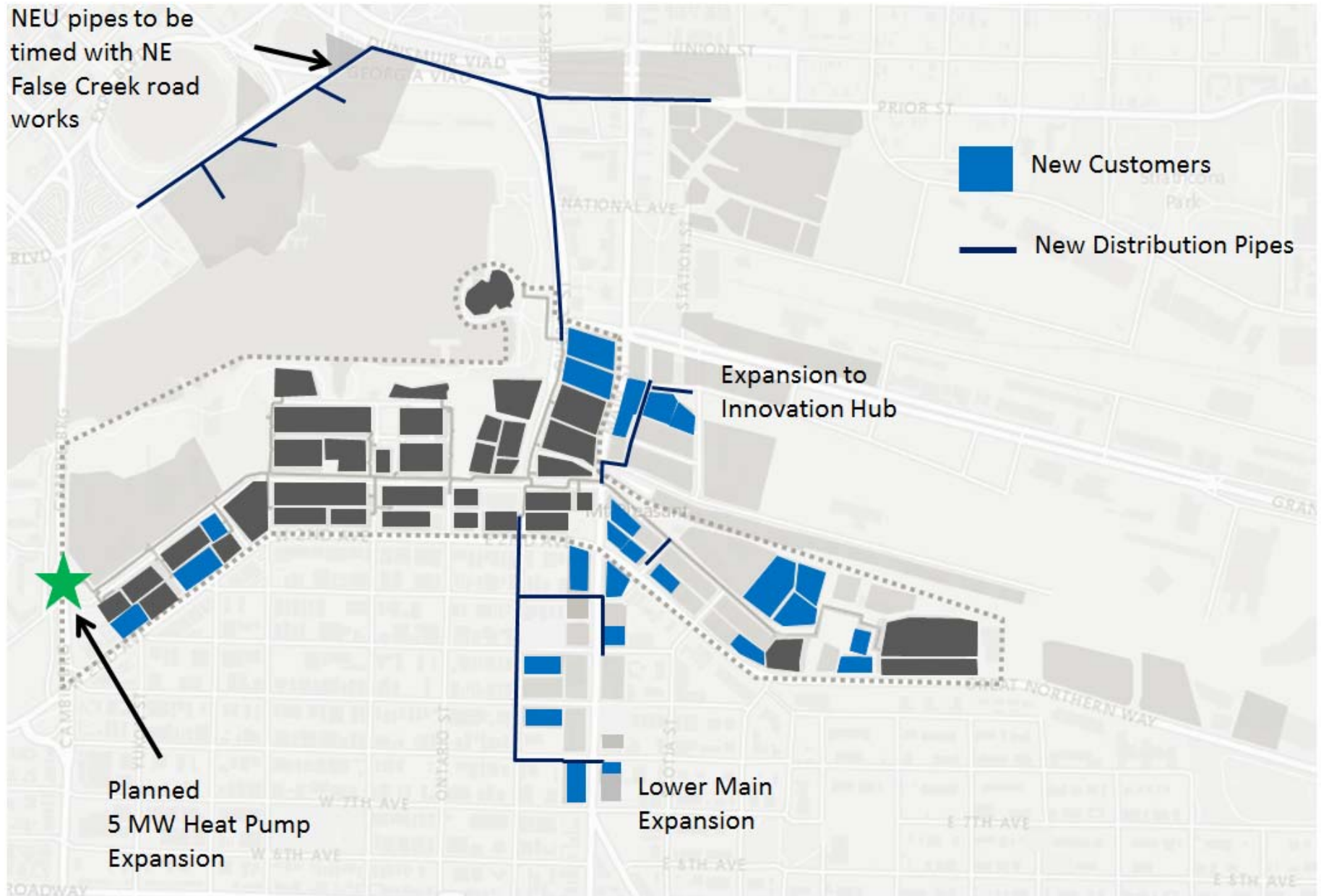
# NEU Phasing: Current Status (to 2018)



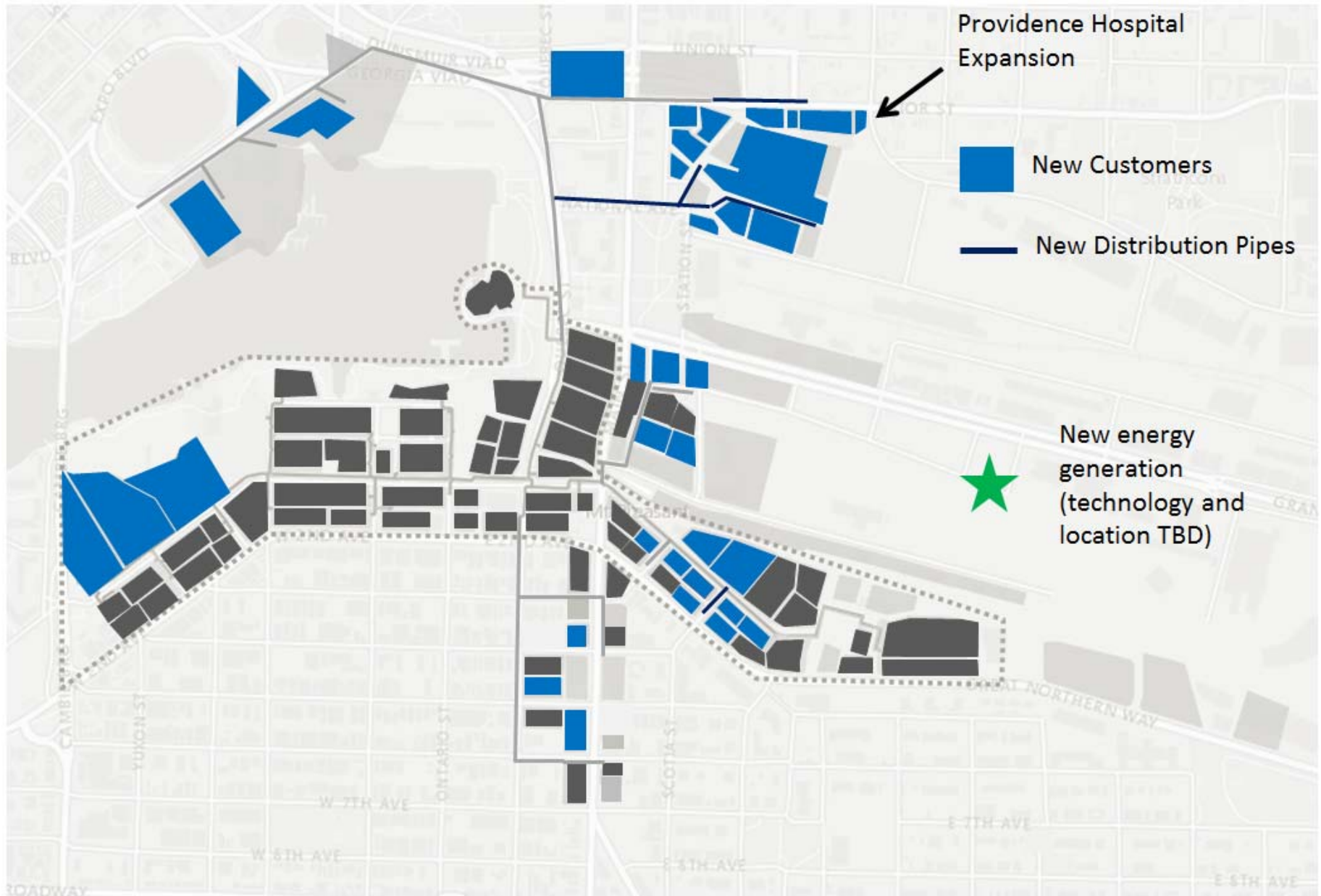
# 2019-2022 Capital Plan Forecast



NEU pipes to be  
timed with NE  
False Creek road  
works

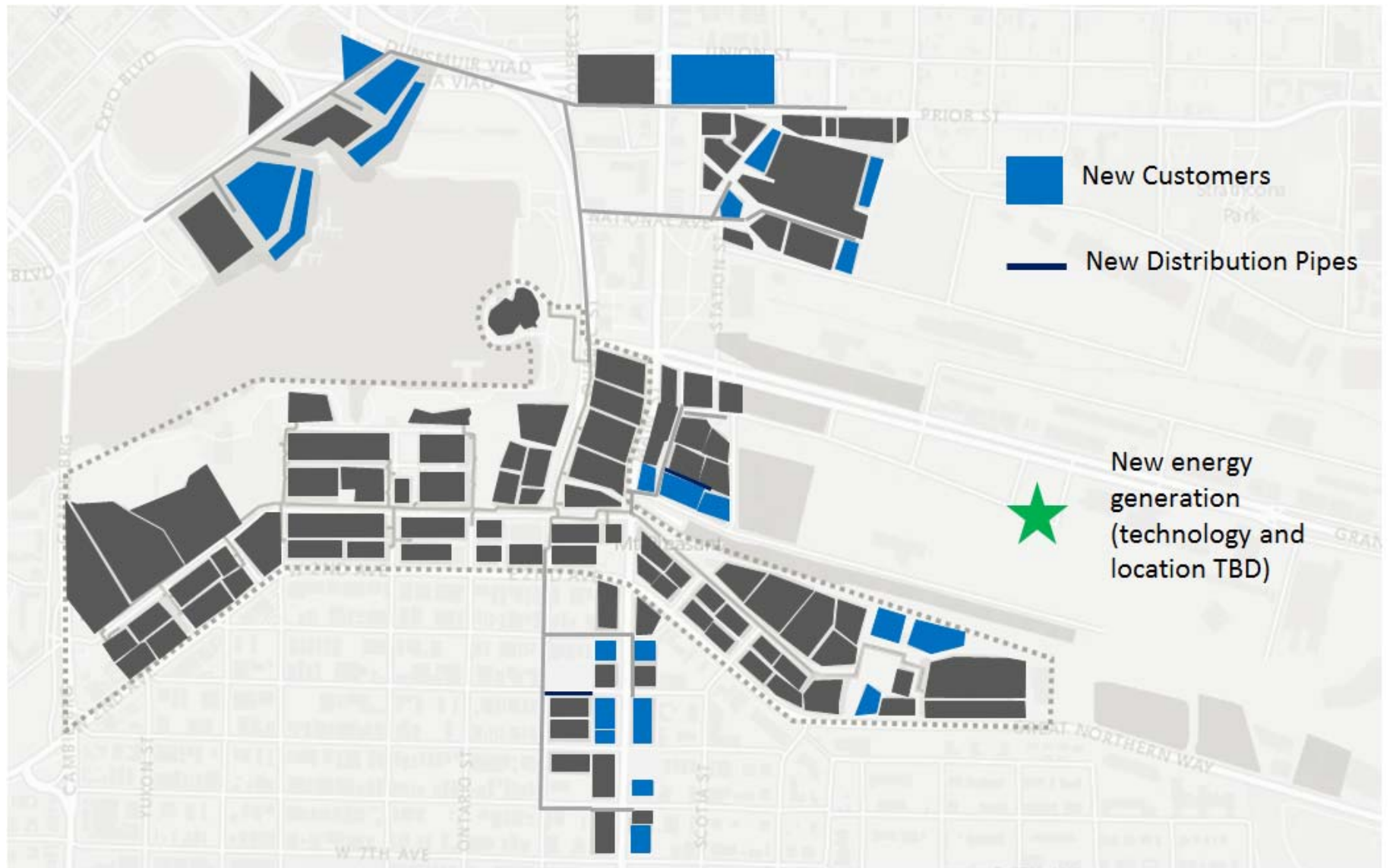


# 2023-2026 Capital Plan Forecast





# Forecast Growth Beyond 2026

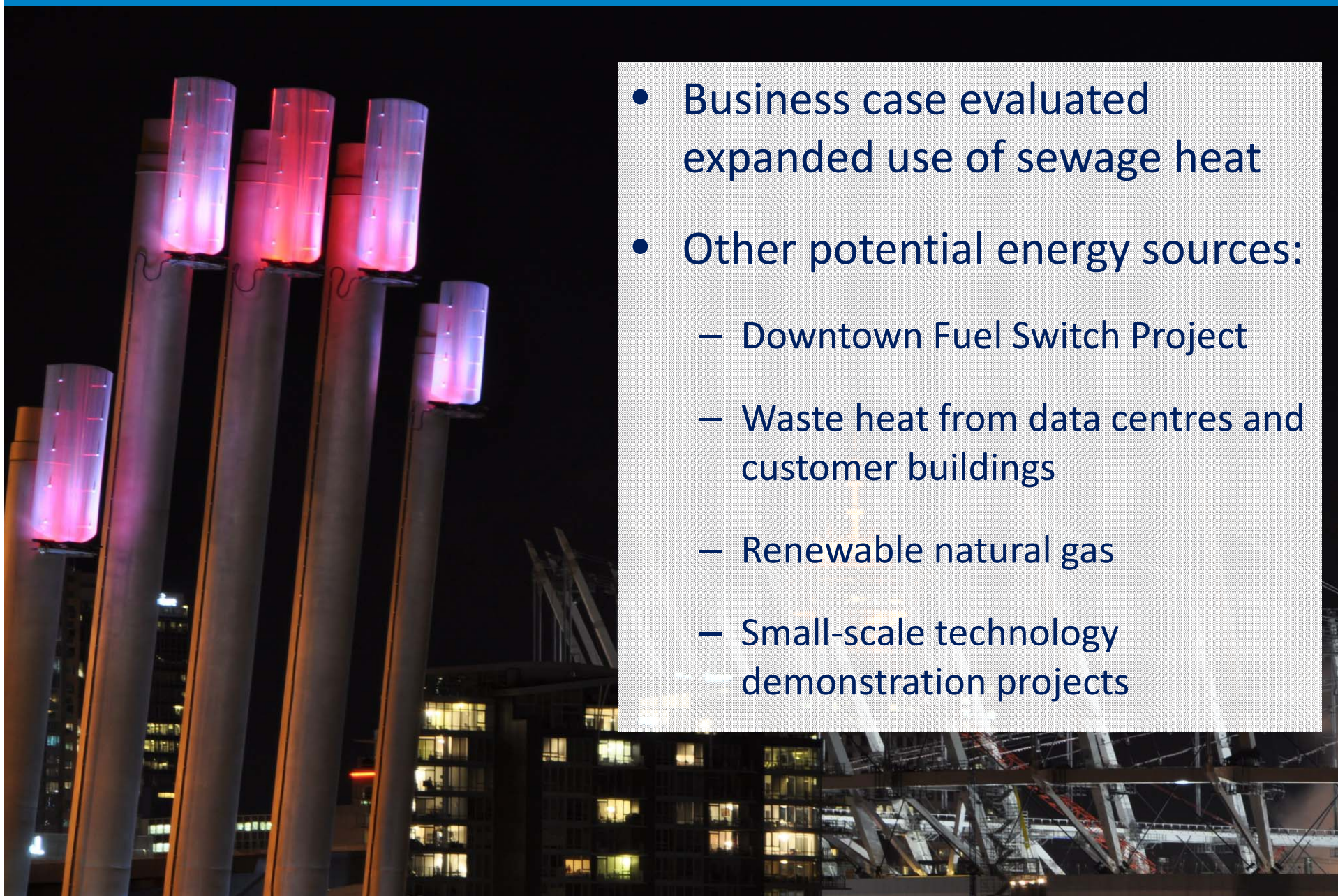


*NOTE: Sites that fall within expansion boundaries but not have not been included in phasing projections due to timing uncertainty will be assessed for connection on a case-by-case basis.*

# Energy Source Options for Expansions



- Business case evaluated expanded use of sewage heat
- Other potential energy sources:
  - Downtown Fuel Switch Project
  - Waste heat from data centres and customer buildings
  - Renewable natural gas
  - Small-scale technology demonstration projects

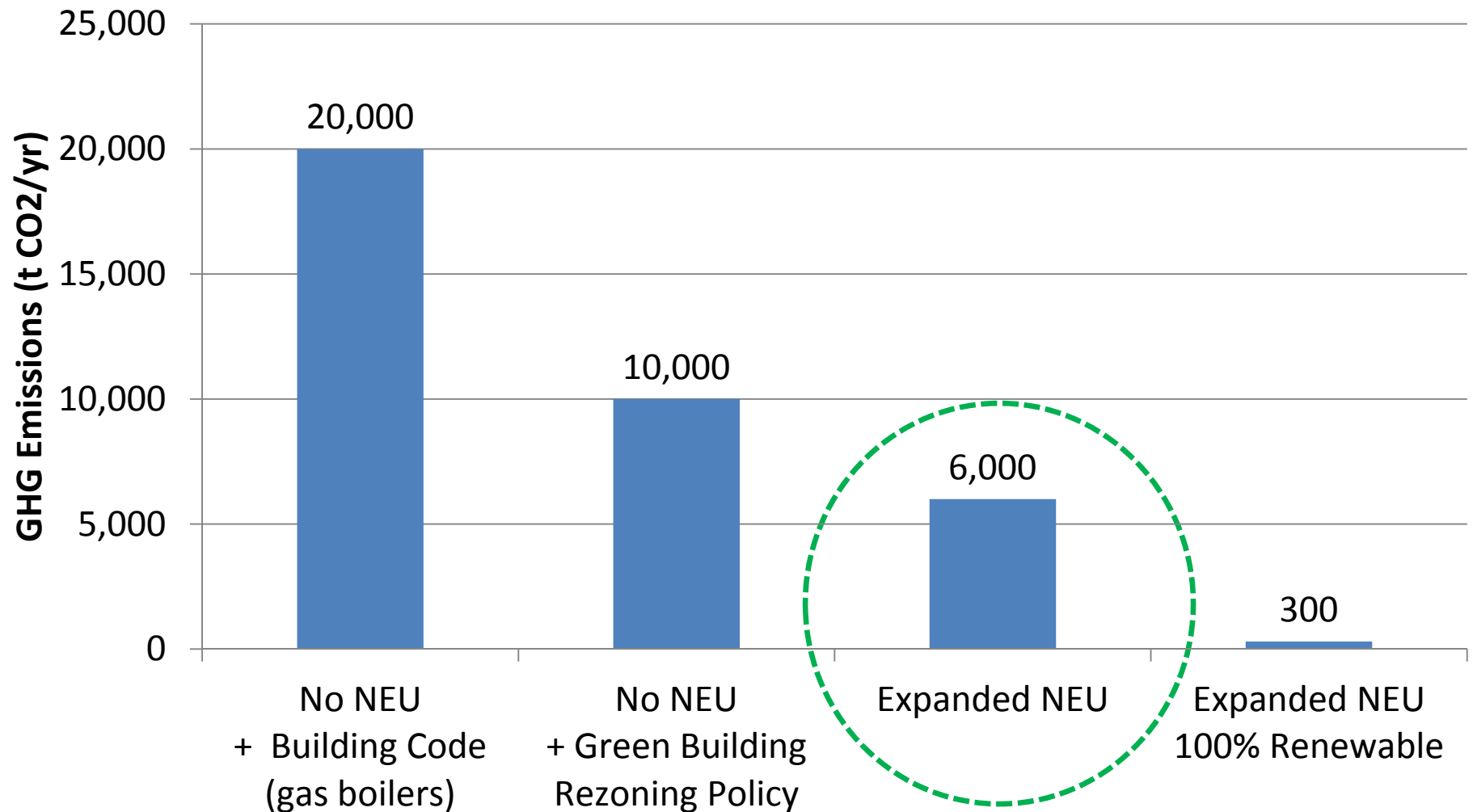


# Environmental Benefits

- NEU provides City with direct control to achieve 100% renewable energy outcomes for pre-2030 buildings
- Enables recycling of waste heat and increases local supply of renewable energy
- Provides long-term flexibility to adapt to new technologies



# GHG Forecast for Expansion Areas



*\* Additional GHG reductions from NEU as compared to rezoning policy largely attributed to proposed Providence Hospital energy demand*

# Developer Implications

- NEU provides simple approach to achieving green building policy GHG limits
- Construction cost and space savings, and increased architectural design flexibility
- Connecting to system is mandatory within designated area



# End-User Implications

- Slightly lower cost than other low GHG options
- NEU connection helps to maximize roof-top amenity space
- Customers do not need to maintain and replace costly heat generation equipment
- Some buildings can sell waste heat back to the NEU

# Potential Magnitude of Investment & End User Cost - Sensitivity Analysis

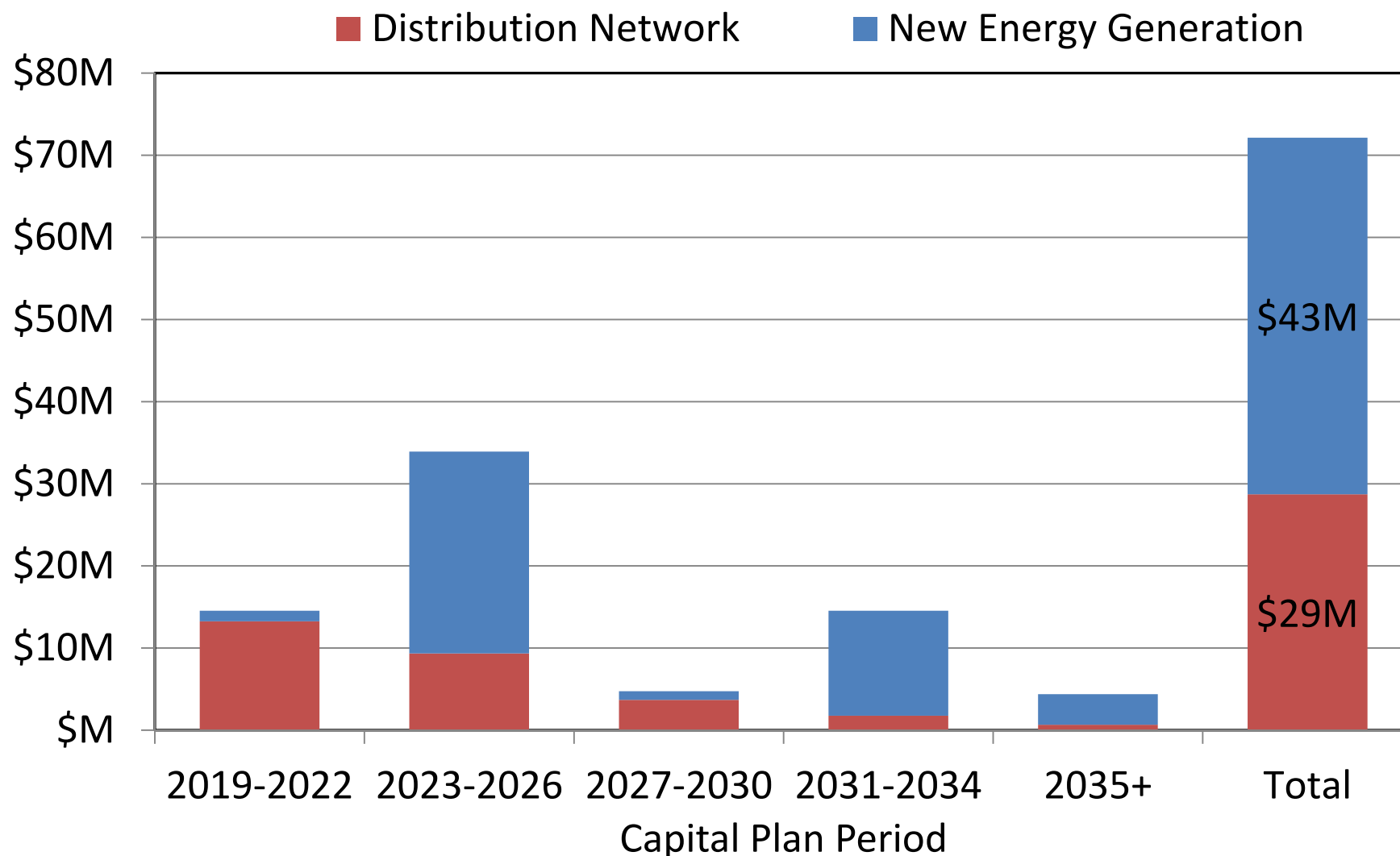


| Scenario   | Total Capital Requirements to 2038*<br>(2018 Dollars)              | Levelized Cost of Service **<br>(to End User) |
|--|--|---|
| <b>Base Case Scenario</b>  | \$29M – Distribution<br><u>\$43M – Generation</u><br>\$72M – Total | <b>\$135 per MW-hr</b>                        |
| <b>High Cost Scenario</b><br>(30% increase in capital costs, 3-yr development delay and 6% borrowing rate) | \$37M – Distribution<br><u>\$56M – Generation</u><br>\$93M – Total | <b>\$162 per MW-hr</b><br>(+20%)              |
| <b>Low Cost Scenario</b><br>(\$15M grant, \$200k connection fee and 4% borrowing rate)                     | \$13M – Distribution<br><u>\$32M – Generation</u><br>\$45M – Total | <b>\$116 per MW-hr</b><br>(-14%)              |

\*Costs are in addition to \$29M for growth within the current NEU by-law area

\*\*For comparison, the BC Hydro levelized cost is between \$155-190 per MW-hr, depending on assumptions, and the current SEFC levelized cost of service is \$135 per MW-hr

# Base Case Capital Cost Forecast for Expansion Areas\*



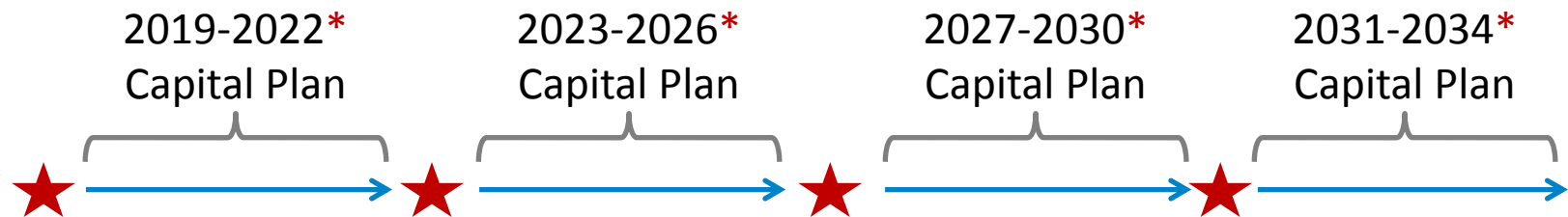
*\*potential opportunity for private sector investments in new energy generation*



# Phased Approach to Capital Investments



## Implementation Plan



Robust Decision Making Framework to be Applied  
Prior to Each Major Investment Decision

★ Council funding decisions

*\* Along this path, City will make commitments to developers to provide NEU service*

## To be completed prior to each major investment decision:

1. **Update the comparison between the City's NEU and alternative options** to achieve low GHG outcomes in buildings
2. **Analyze the financial and KPI implications** of continued NEU operations and expansion
3. **Re-evaluate the City's role** with respect to ownership of all or a portion of NEU infrastructure
4. **Update the analysis of risks and mitigation strategies** based on the City's standard risk framework

# Significant Investment Required



- Expansion plan would require a long-term investment of \$45 to \$93M for new infrastructure, with funding subject to future Capital Plans
- The impact to City debt capacity depends on other debt requirements in future years. Mitigation strategies:
  1. Phased approach to infrastructure investments
  2. Continue with commercial utility model, to preserve option for future divestment
  3. Pursue senior government funding opportunities and explore potential connection fee

# Risks and Mitigation Strategies



| Key Risks   | Existing Mitigation Strategies*   | Other Mitigation Opportunities   |
|---|---|--|
| <ul style="list-style-type: none"> <li>- Pre-building infrastructure in advance of customer revenues</li> <li>- Long-term utility investments and technology change</li> <li>- Changes in capital and operating costs</li> <li>- Operational risks</li> </ul> | <ul style="list-style-type: none"> <li>- Mandatory connection by-law to minimize revenue risk</li> <li>- NEU platform is adaptable to new technologies</li> <li>- Rates ensure cost recovery under commercial utility model</li> <li>- Preserve future opportunity to divest</li> </ul> | <ul style="list-style-type: none"> <li>- Structured framework for future investment decision making**</li> <li>- Preserve flexibility for private sector investment in new energy centres</li> <li>- Pursue senior government funding programs and explore potential connection fee</li> </ul> |


\* *Mitigation strategies are already in place for established NEU business*

\*\* *Evaluation of risks and mitigation strategies to occur prior to major capital investments*

- The Zero Emissions Building Plan significantly lowers GHG emissions in new buildings. However, **the NEU provides unique opportunities:**
  1. **High level of City control to achieve Renewable City Strategy objectives** for pre-2030 buildings
  2. **Ability to leverage resource recovery opportunities**, including sewage heat and other local waste sources
  3. **A highly adaptable and resilient energy solution** for buildings
- **NEU expansion requires a significant investment**, under a commercial utility model. Mitigation strategies are in place to manage risk.
- **Funding will be subject to future capital plans**, with a robust structured framework to be applied prior to major investments

# Staff Recommendations



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- An aerial photograph of Vancouver, British Columbia, Canada, taken during sunset. The city's dense urban core, including the downtown skyline with numerous high-rise buildings, is visible in the foreground and middle ground. The city is surrounded by water, with the harbor and False Creek visible. The sun is low on the horizon, casting a warm, golden glow over the water and the city. In the background, the mountains of the Pacific Northwest are visible under a clear sky. The overall scene is a panoramic view of the city and its natural surroundings.
- A) Adopt the NEU investment decision framework to guide expansions into parts of Mount Pleasant, NE False Creek and the False Creek Flats, with funding subject to future Capital Plans.
  - B) Direct staff to bring proposed amendments to the Energy Utility System By-law 9552 forward to Council for enactment, for expansion of the NEU service area.



# QUESTIONS