Community Energy And Emissions Reduction Plan

Task Force Meeting #2

Key Piece of The Mosaic

Brampton, Ontario
May 22th, 2019

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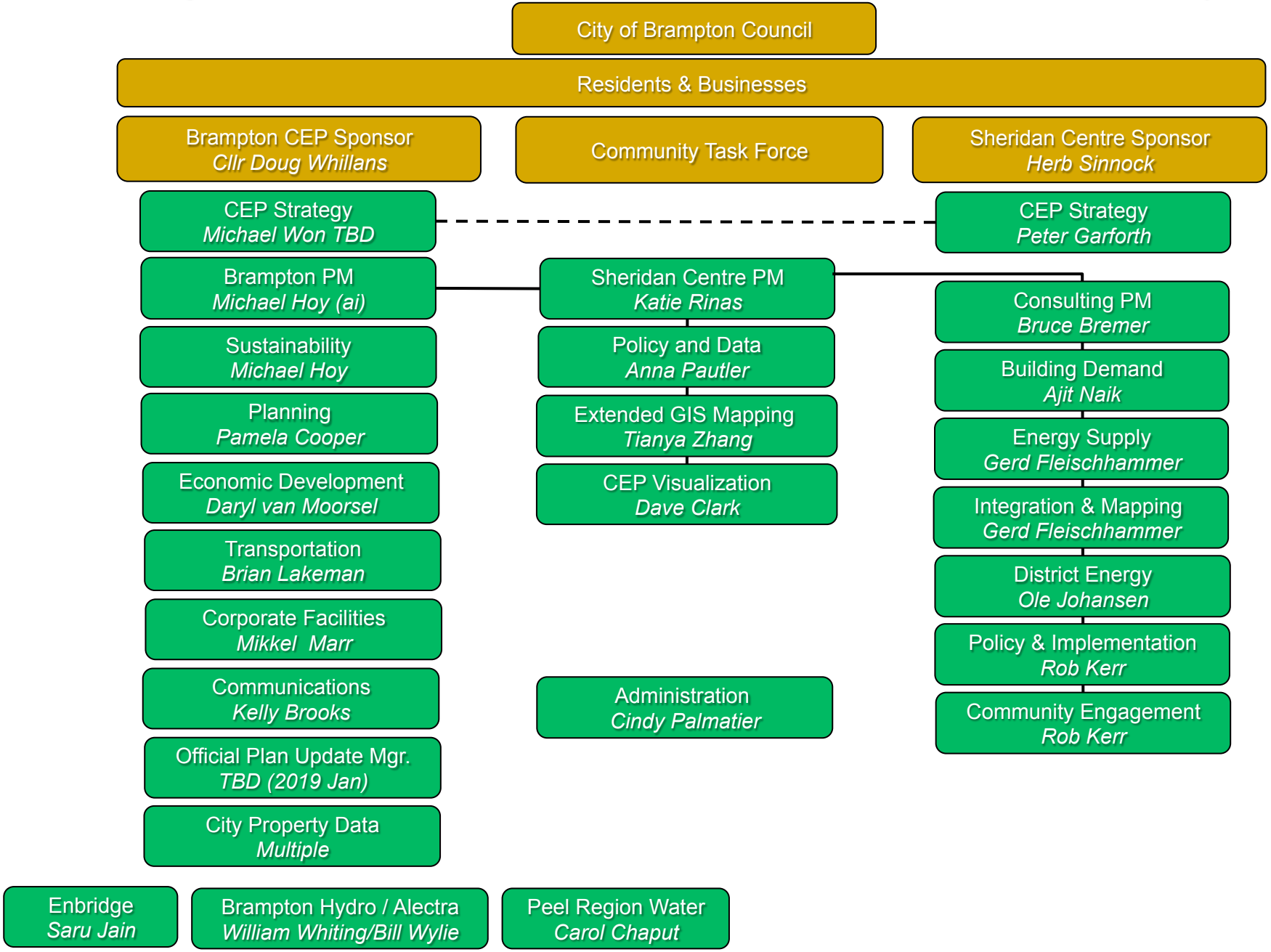
City of Brampton
Community Energy & Emissions Reduction Plan

1. Welcome and Opening Remarks

2. Introductions
   a) *Acting Chair*
   b) *Project Working Team (City & Sheridan-GIL)*
   c) *Task Force Members*

Project Work Team & Stakeholders (Status 19-05-22)



3. Agenda Review
   a) *Distribution/Confirmation of Meeting Package*
   b) *Approval of Agenda*

4. Task Force Business

a) Appointment of Co-Chairs

- *Michael Hoy - Acting Chair*

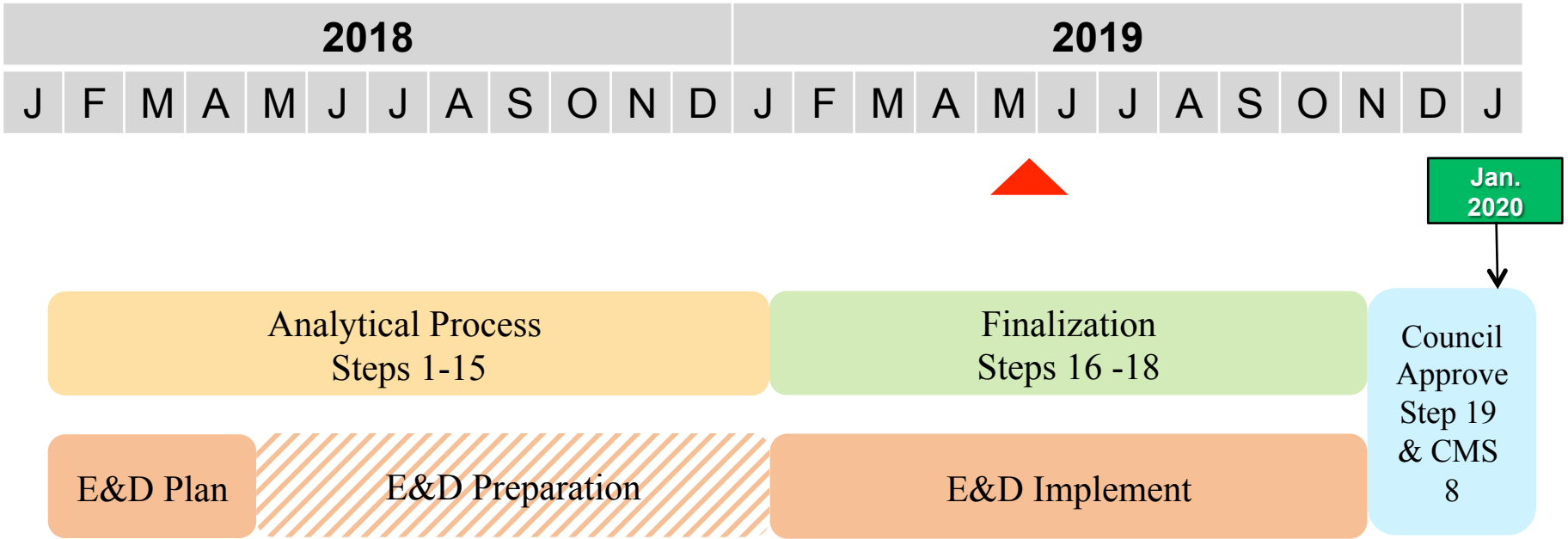
b) Introduction of Co-Chairs

- *Hassan Khan – JCI*
- *David Kapil – New Brampton*

City of Brampton
Community Energy & Emissions Reduction Plan

5. Project Overview
   - *a) Activity Update and Timeline Review*
     - *Katie Rinas – Project Manager*
     - *Rob Kerr – Engagement Lead*
   - *b) Nordic Cities Update*
     - *Herb Sinnock – Sheridan College*

Community Energy Plan
Timing Overview



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Optimize Timing & Resources

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**Updated Version 2019-05-22*

6. Analytical Process

a) *Baseline/Base Case Review*
b) *CEP Scenarios Overview*
c) *Scenarios Results and Framing Goals*

- *Peter Garforth – CEP Strategic Lead*

Community Energy Plan Schedule

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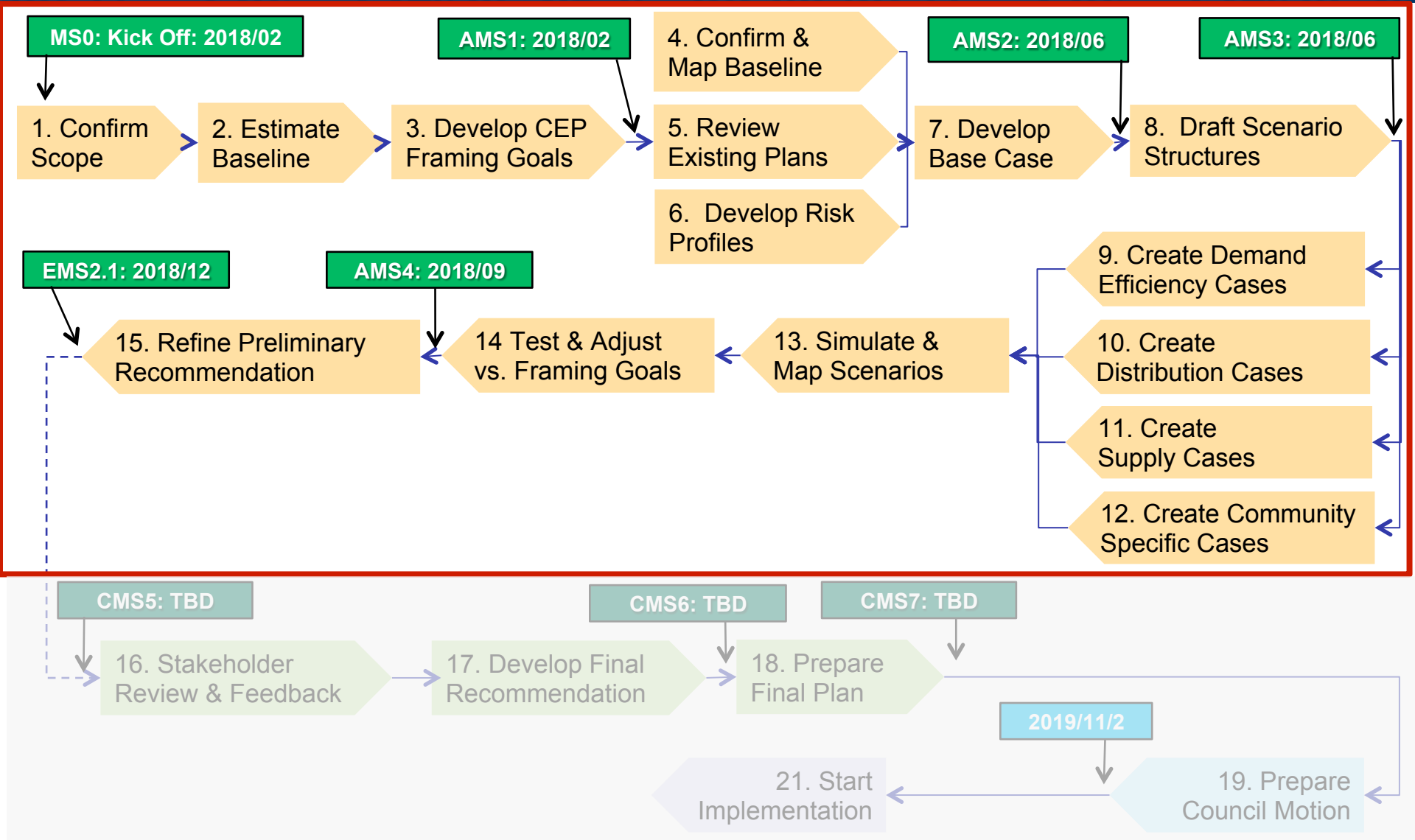
Brampton Community Energy Plan
Analytical Process Map

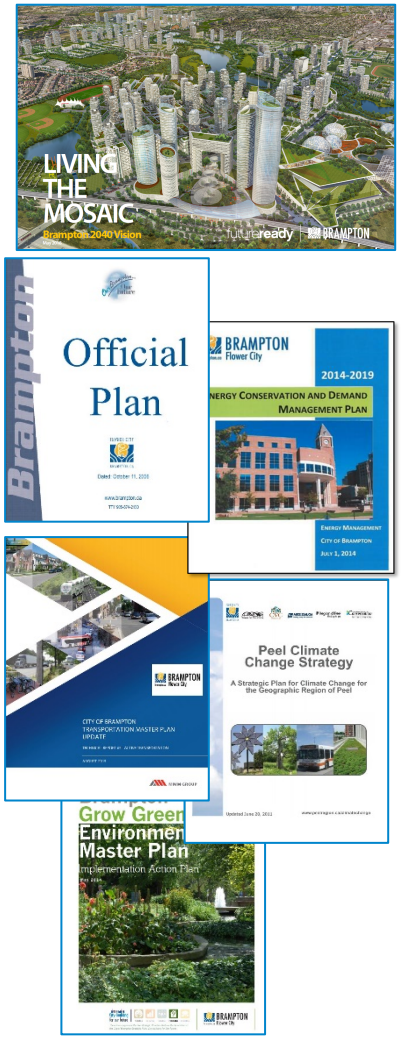


Community Energy Planning Background

Why Brampton Cares
New Energy Realities…

- Community Values and Image
- Investment and Green Jobs
- Energy affordability
- Supply quality and security
- Mitigate Energy & Climate Risks
- Support Federal climate goals

Community Energy Plan
Supports City Planning



- CEP aligns with Vision 2040 and other existing plans
- CEP is coherent energy framework for all City plans
- Embed CEP energy and climate targets and policies across all City Plans

Create Energy Layer of Many Plans

City of Brampton CEP
Gaining Visibility

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Respected and Well Received

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Community Energy Plan Goals

Community Energy Plan
Goals (Short Version)

- Support realization of “Brampton 2040 Vision”
- Economic
  - *Energy investments*
  - *Competitive energy cost*
  - *New high-quality employment*
- Greenhouse Gas
  - *Cut emissions 50% by 2041*
  - *Path to 80% cut in 2050*
- Energy Efficiency
  - *Global best-practice by 2041*
  - *At least 50% gain by 2041*
- Reliability / Resilience / Flexibility
  - *Adaptable to changing technology & user needs*
  - *Service quality will be at least 2016 levels*

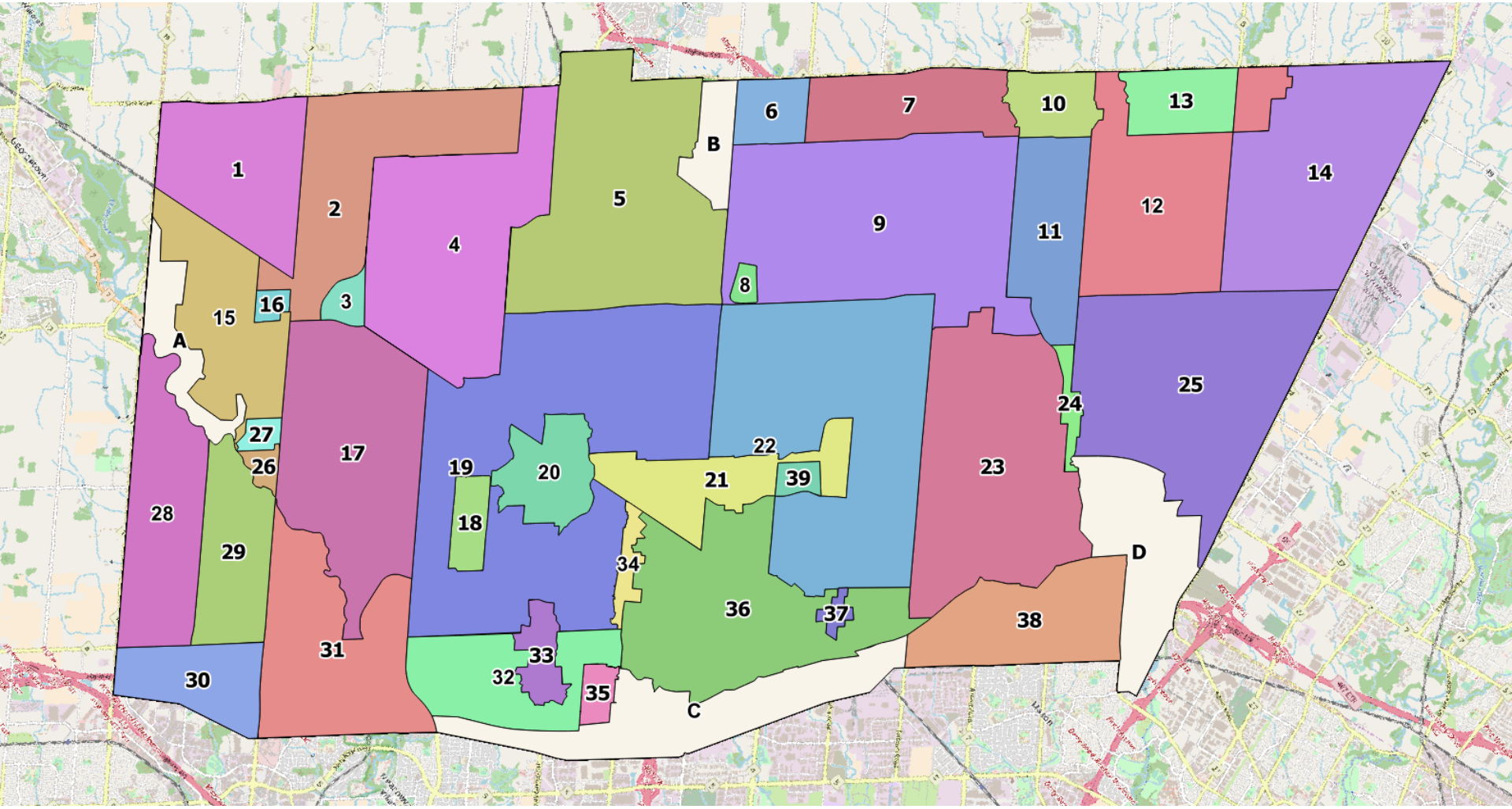
Brampton 2040 Vision
"Living the Mosaic"

Outstanding Plan – CEP Will Add Energy Layer

Baseline-Base Case Summary

The data and analyses in this presentation are based on sources and assumptions that could be refined and updated. They are all subject to revision in future versions.

Community Energy Plan
Energy Planning Districts



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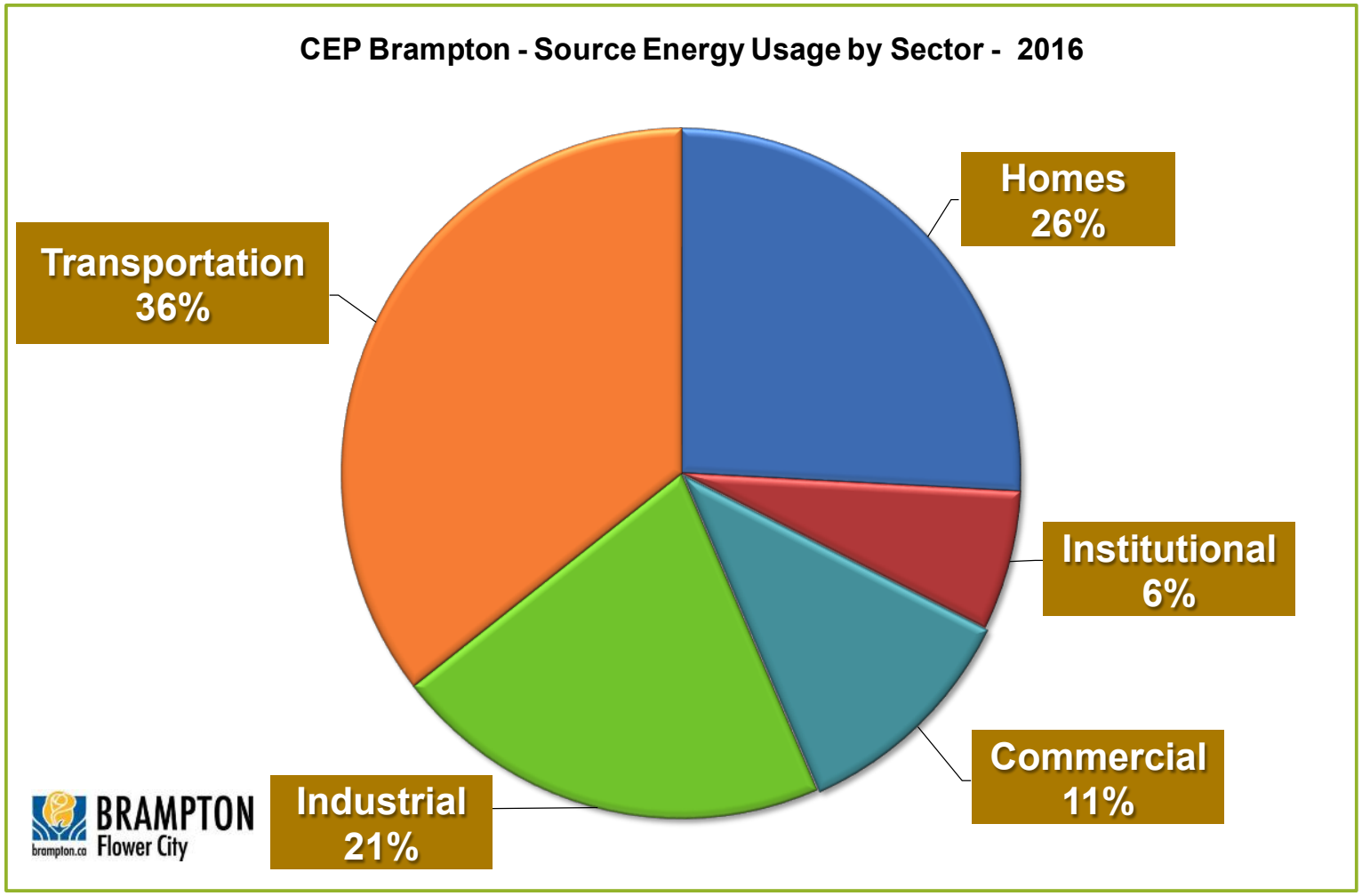
**Confirmed 2018-09-11 – "Brampton North" rendering*

Brampton
Growth Indicators

Indicator	2016	% y-t-y Growth	2031	% y-t-y Growth	2041	% y-t-y Growth	2050
Population	***614,100***	***2.2%***	***834,000***	***0.7%***	***886,700***	***0.5%***	***925,000***
Homes	169,304		234,600		250,500		261,000
Occ. / Home	3.63		3.56		3.54		3.54
Avg. Home m^2	160		149		146		143
Jobs	***194,927***	***2.4%***	***275,600***	***1.0%***	***303,700***	***1.1%***	***334,000***
Jobs/Pop	0.32		0.33		0.34		0.36
CII Area 1,000 m^2	14,728		19,638		20,948		22,000
Density m^2 / Job	76		71		69		66

City of Brampton CEP 2016 Baseline
Customer Energy – 92M GJ



~ 30% Conversion Loss

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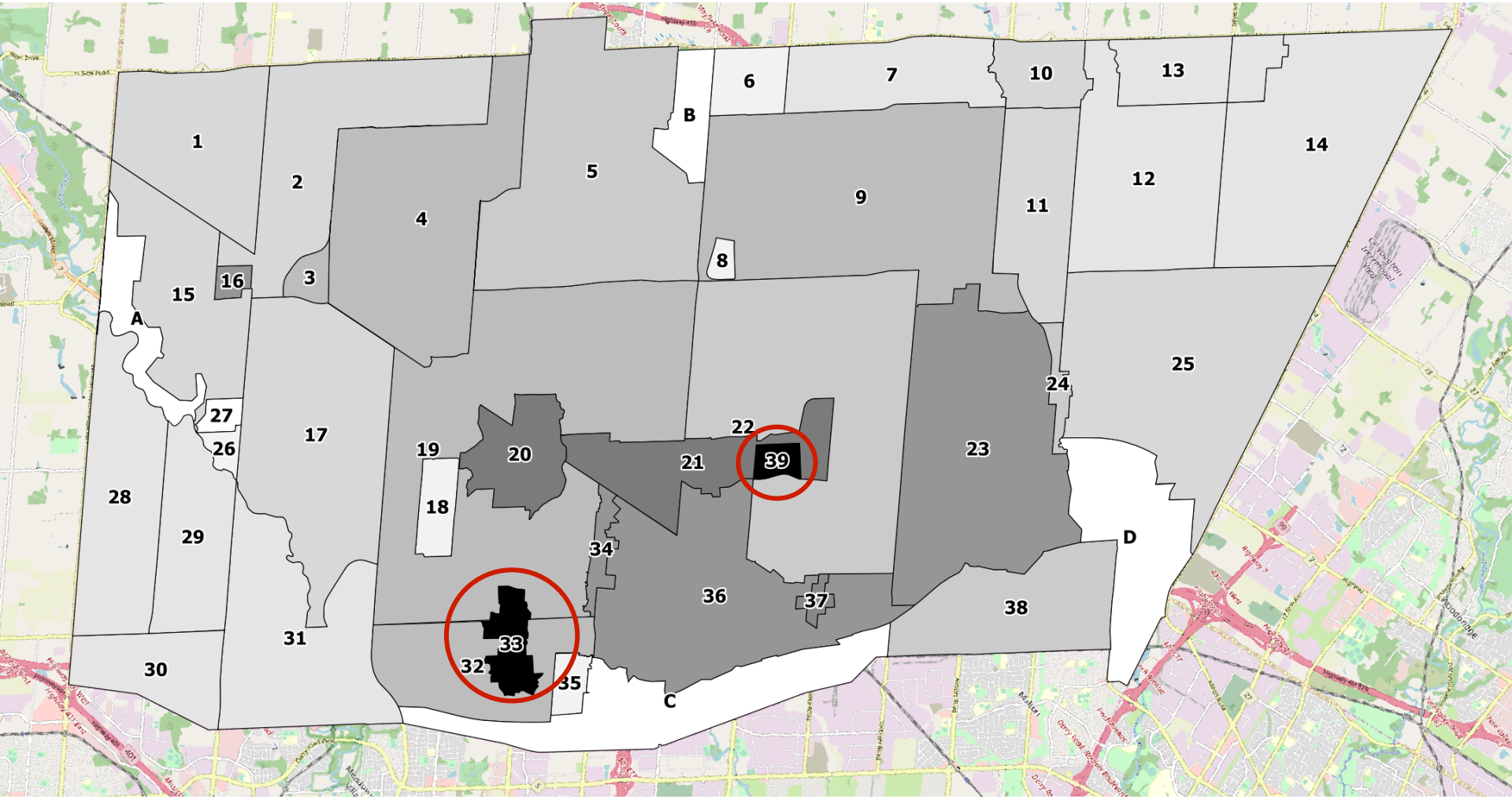
2050 – Base Case
Source Energy Intensity – GJ/km²*



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BRAMPTON Flower City

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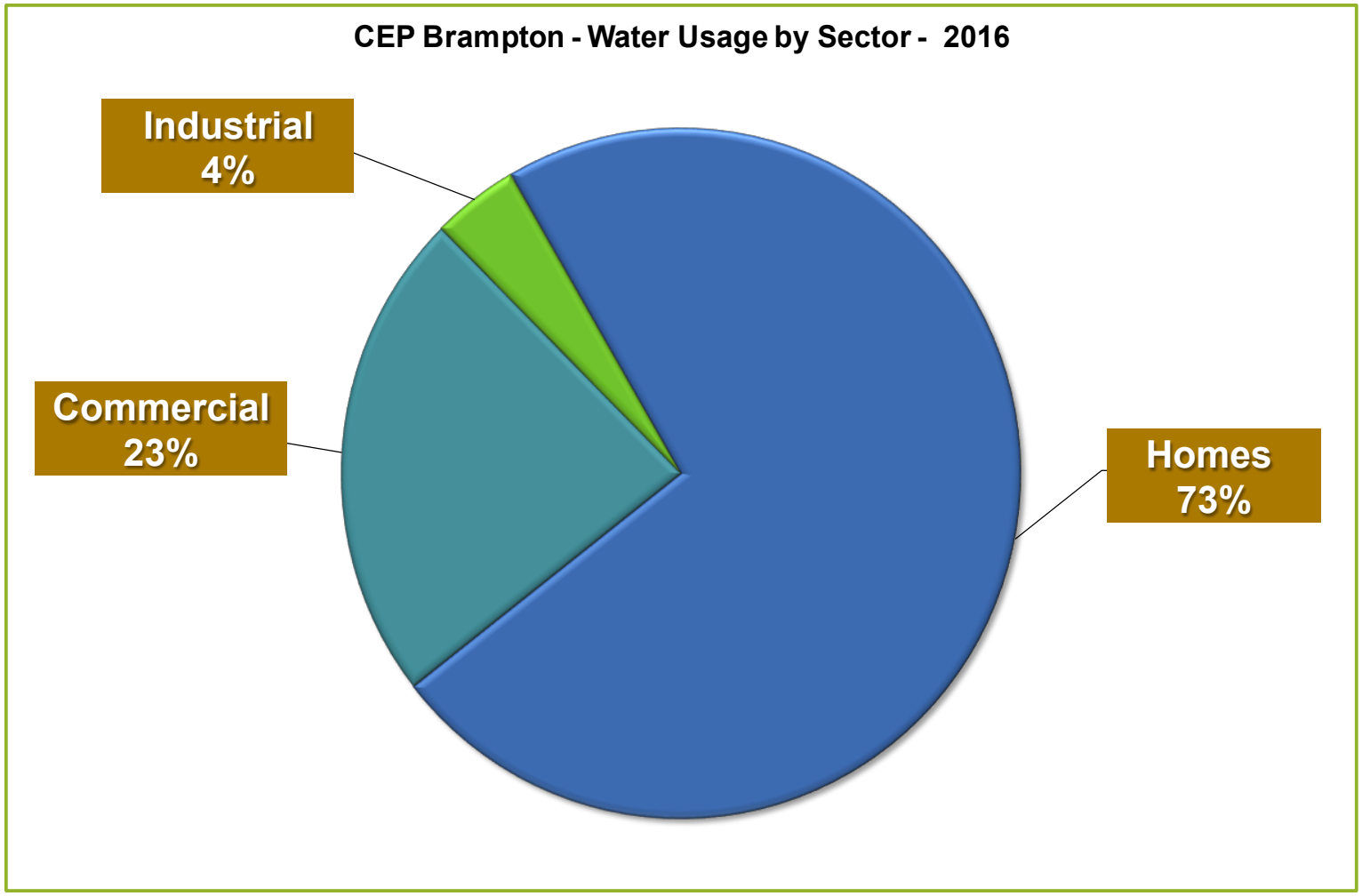
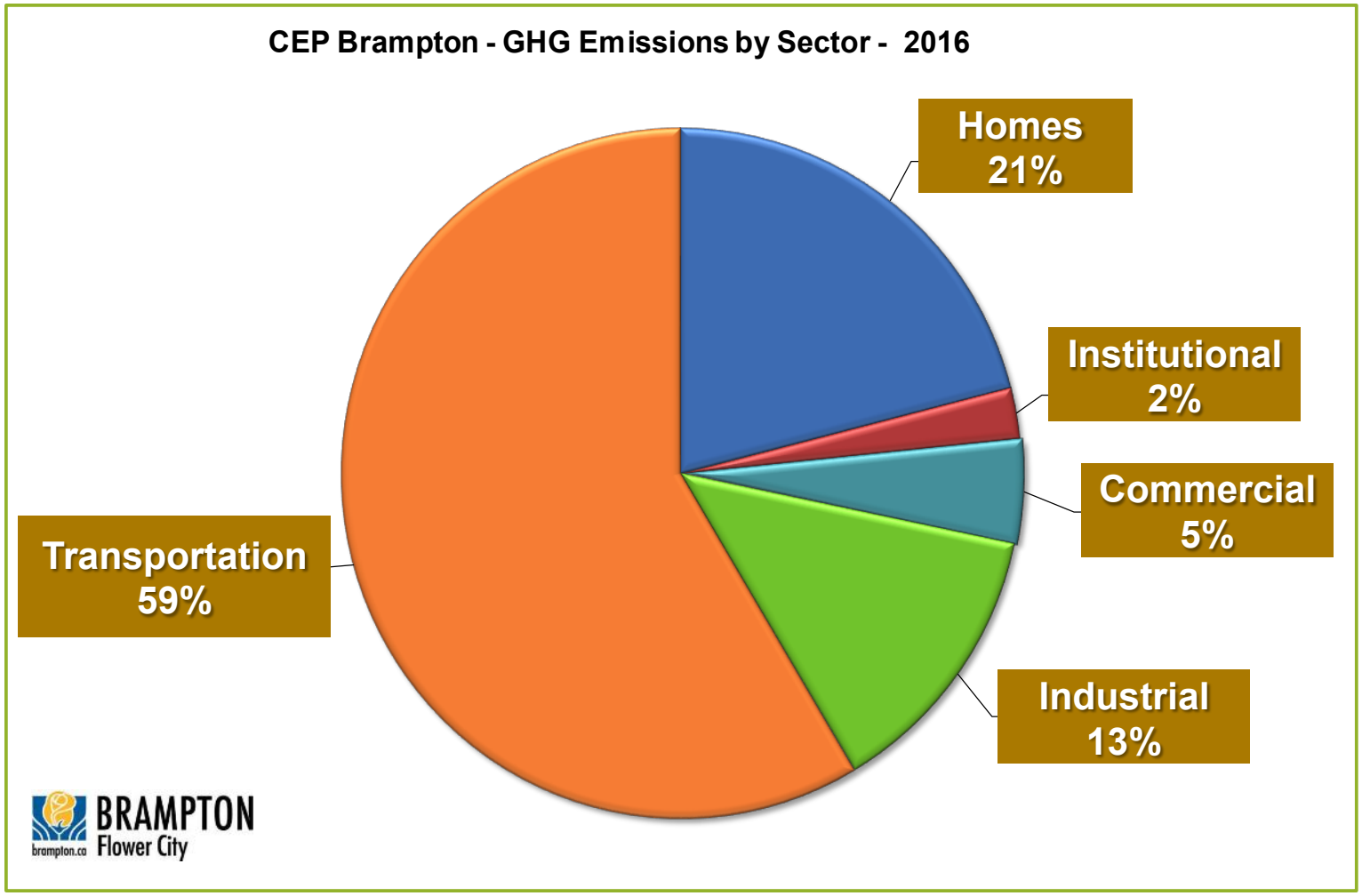
**Homes & Buildings Only* O *Bramalea & Uptown Urban Workshops March/May 2019*

City of Brampton CEP 2016 Baseline
Site Water Use by Sector – 64M m³



Residential Use 275 m³ per household

City of Brampton CEP 2016 Baseline
GHG Emissions ~ 3.5 M tonnes



5.6 tonnes CO_{2e} for every resident

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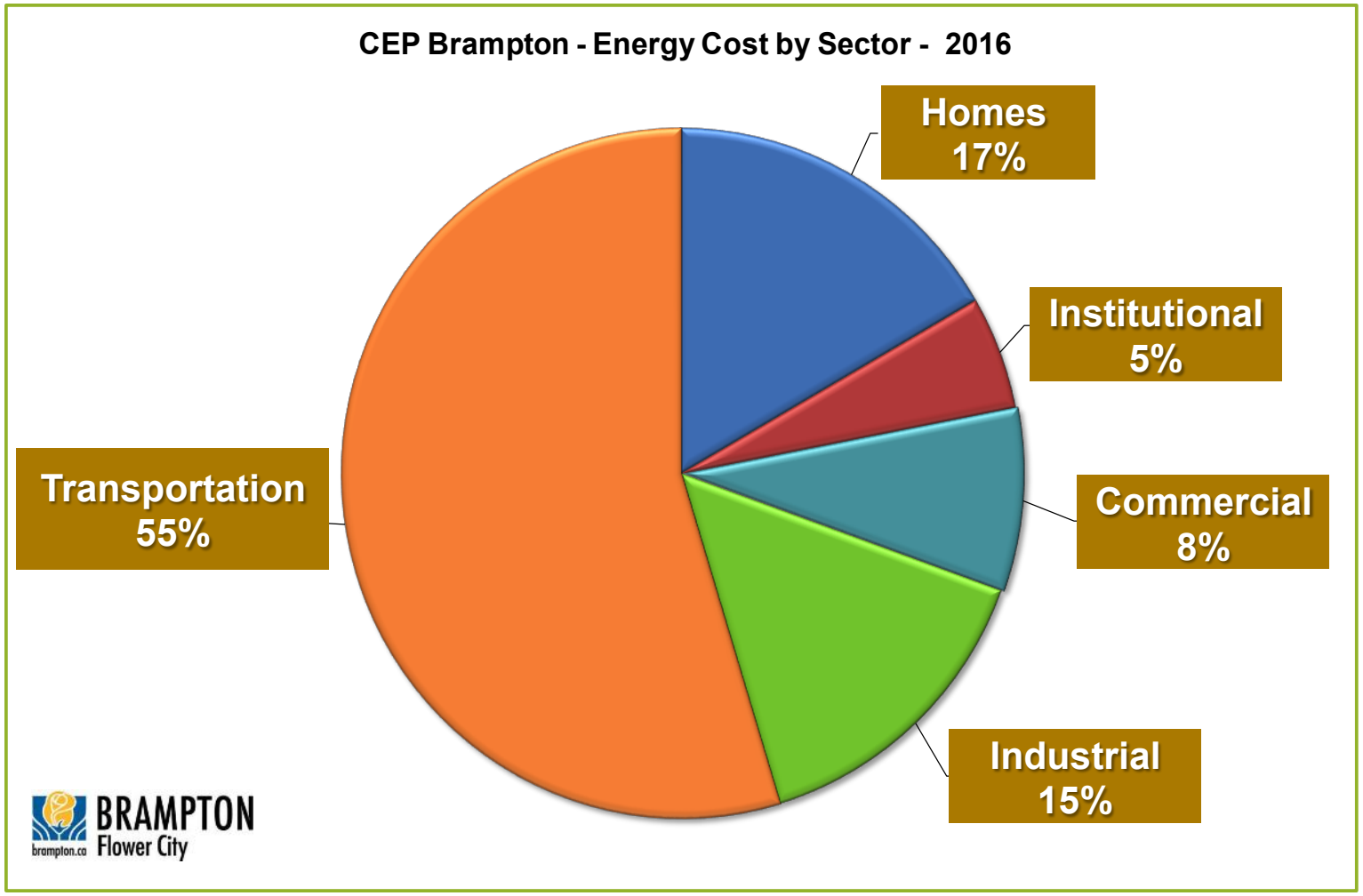
City of Brampton CEP 2016 Baseline
Energy-Water Cost ~ $1,800 Million



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Majority of Value Leaves City

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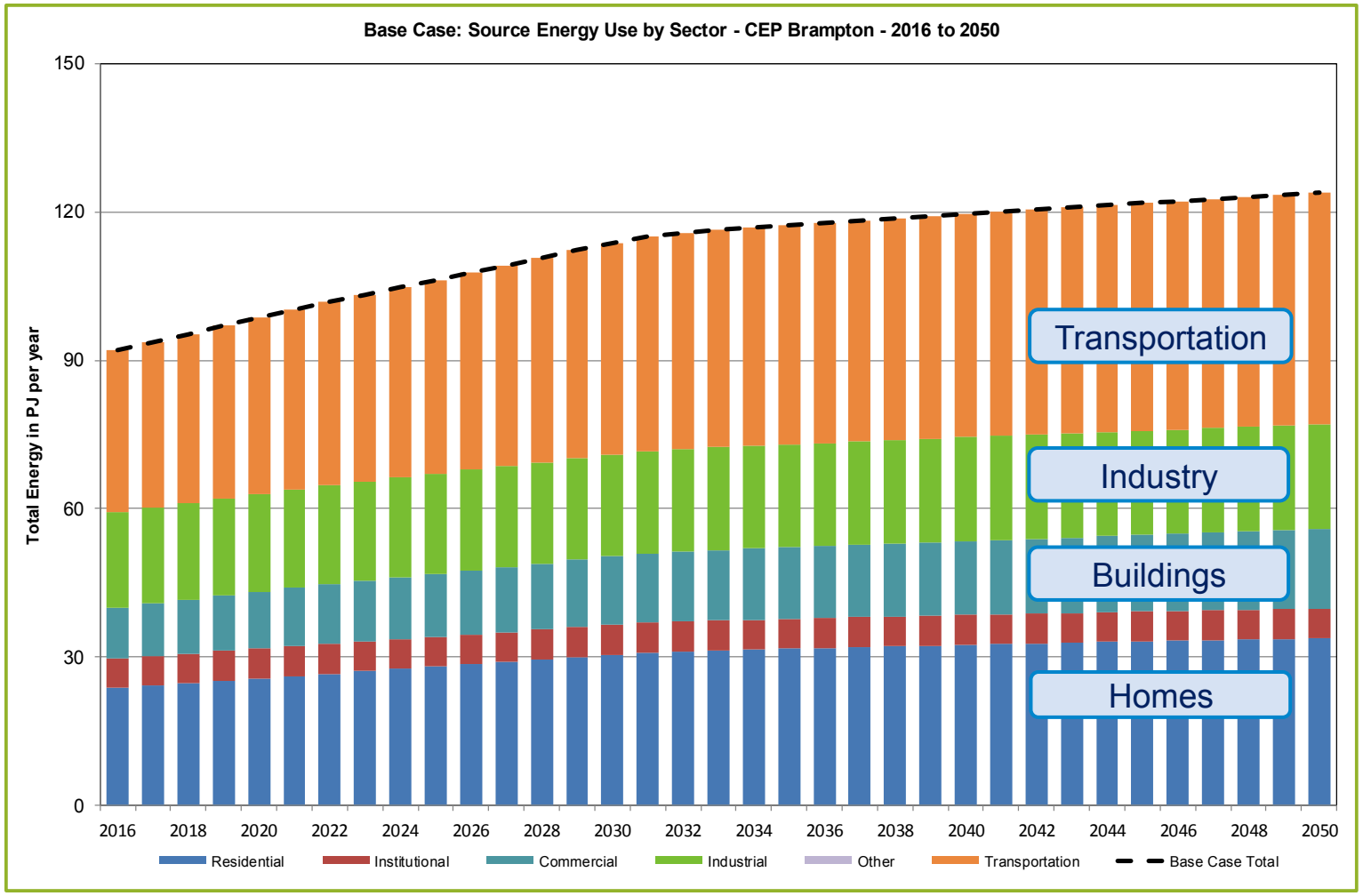
Brampton Base Case to 2050
Source Energy Use by Sector



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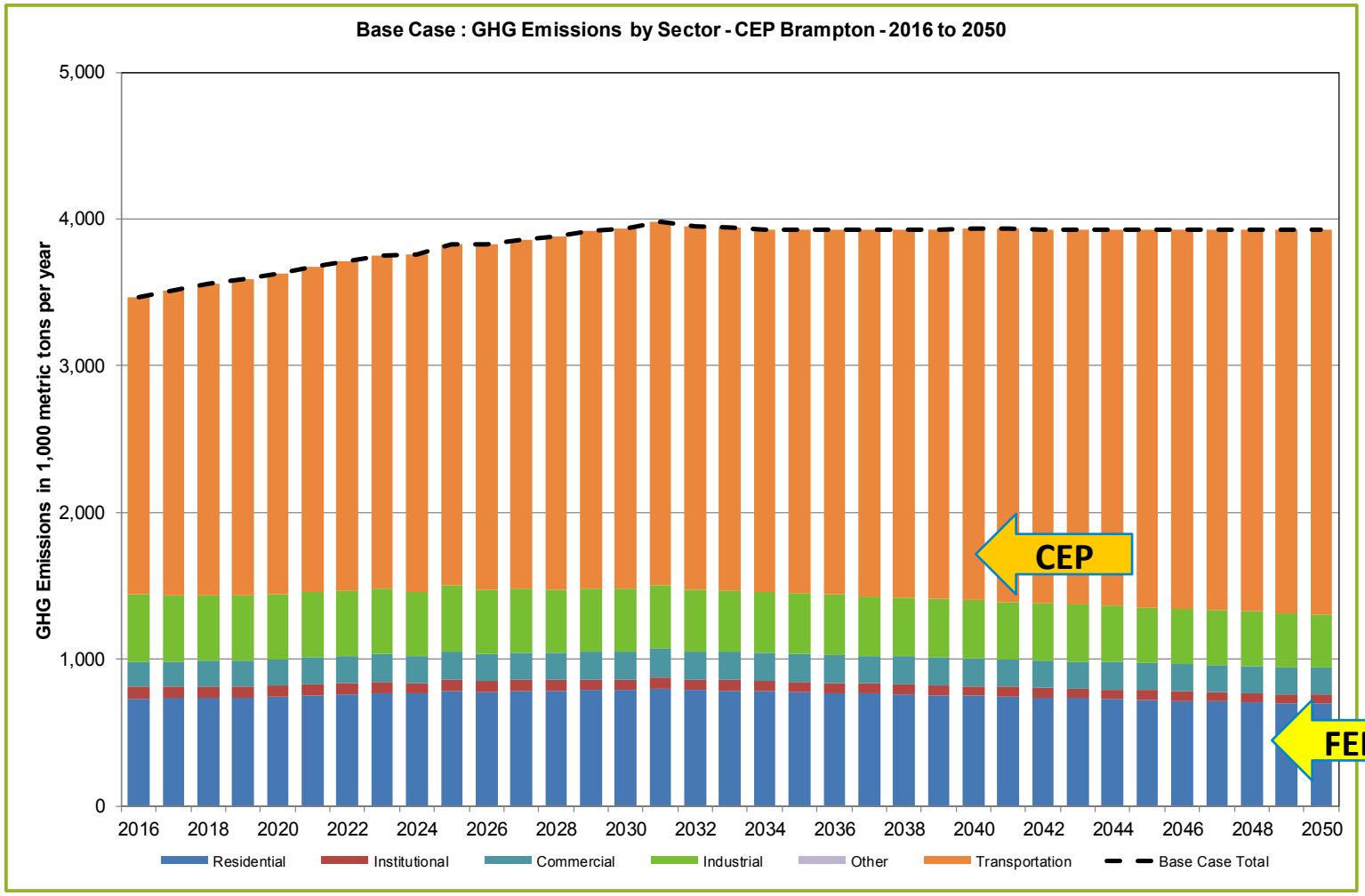
Business-as-Usual to 2050
Emissions Goals - CEP & Federal



Goals Demand Deep Transformation

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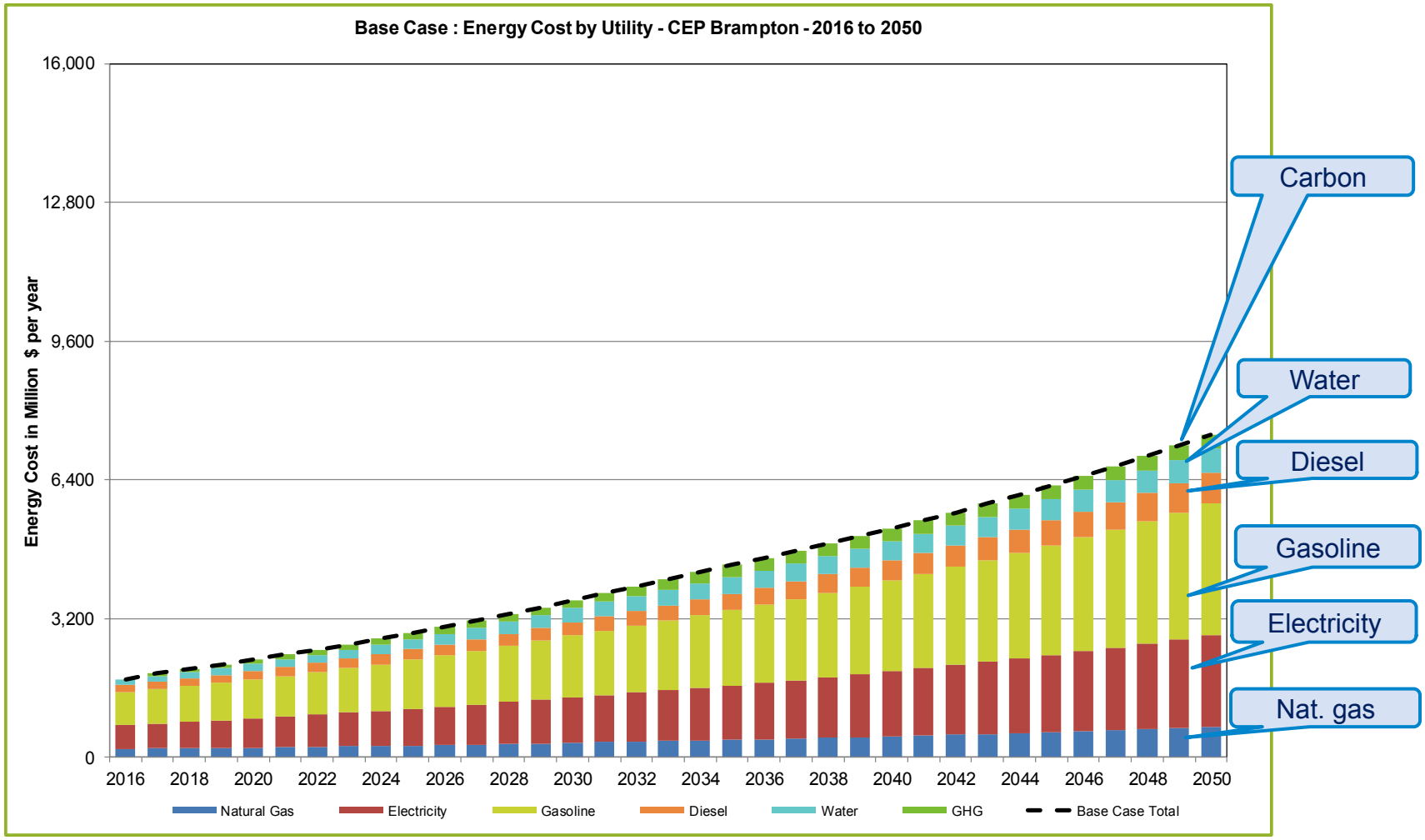
Brampton Base Case to 2050
Utility Cost – Lower Range



Annual Cost Increases to $7.5Bn

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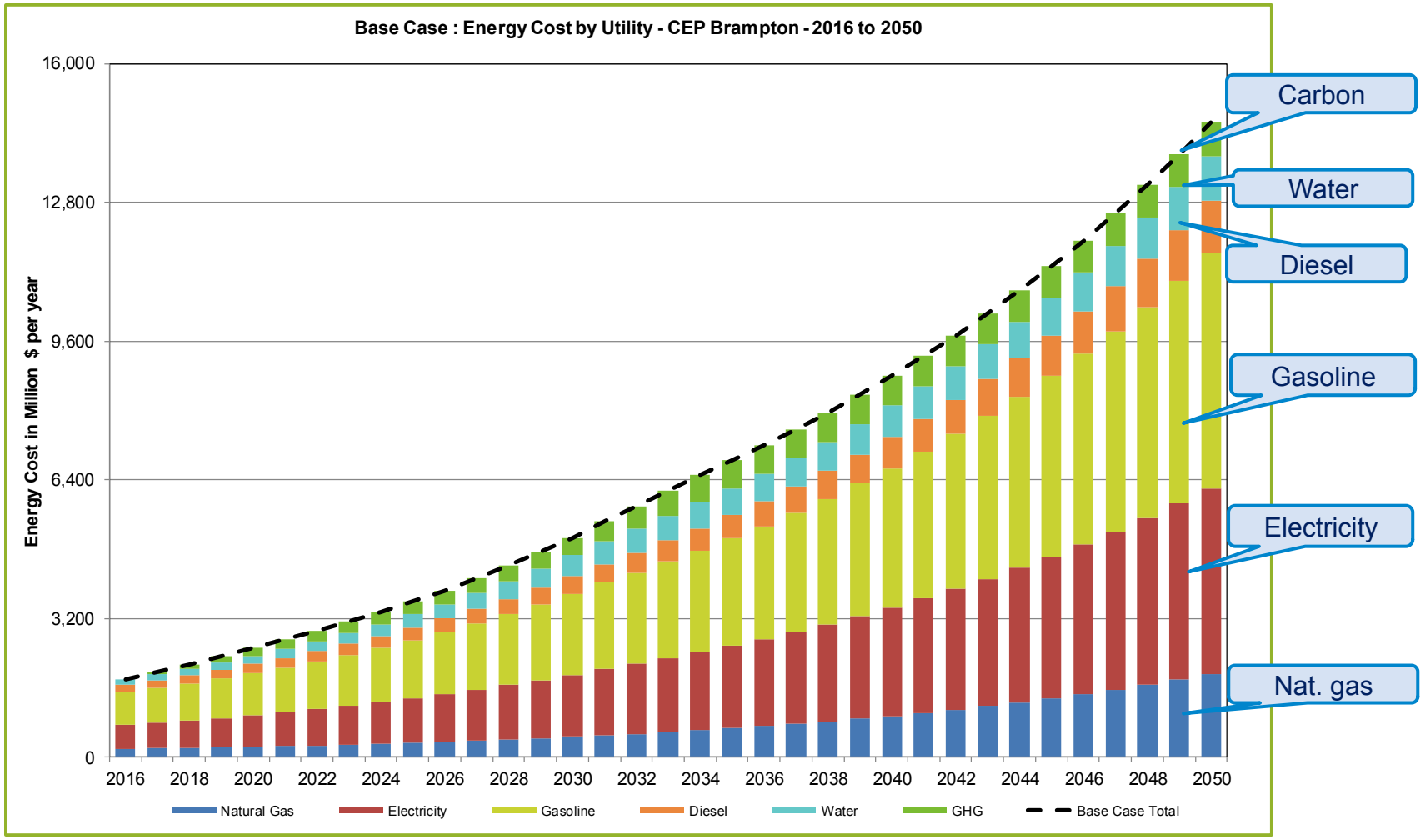
Brampton Base Case to 2050
Utility Cost – Higher Range



Annual Cost Increases to $14.7Bn

2016 and Business-as-Usual to 2050
Summary 1

- Current GHG per capita about twice best-practice community globally
- Current Homes & Buildings about 50% less efficient than global benchmarks
- Water use per home about 5% above Ontario, 40% higher than Newmarket and 75% higher than Germany
- Transportation more than half cost and emissions

2016 and Business-as-Usual to 2050
Summary 2

- Population increase about 51%
- Jobs increase by about 71%
- Energy cost increases between 315% and 720%
- 2050 emissions more than ten times Federal goals
- City leadership committed to sustainable & competitive growth
- Many sustainability elements in planning

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Flower City
brampton.ca

Community Energy Plan
Scenario Simulation

The data and analyses in this presentation are based on sources and assumptions that could be refined and updated. They are all subject to revision in future versions.

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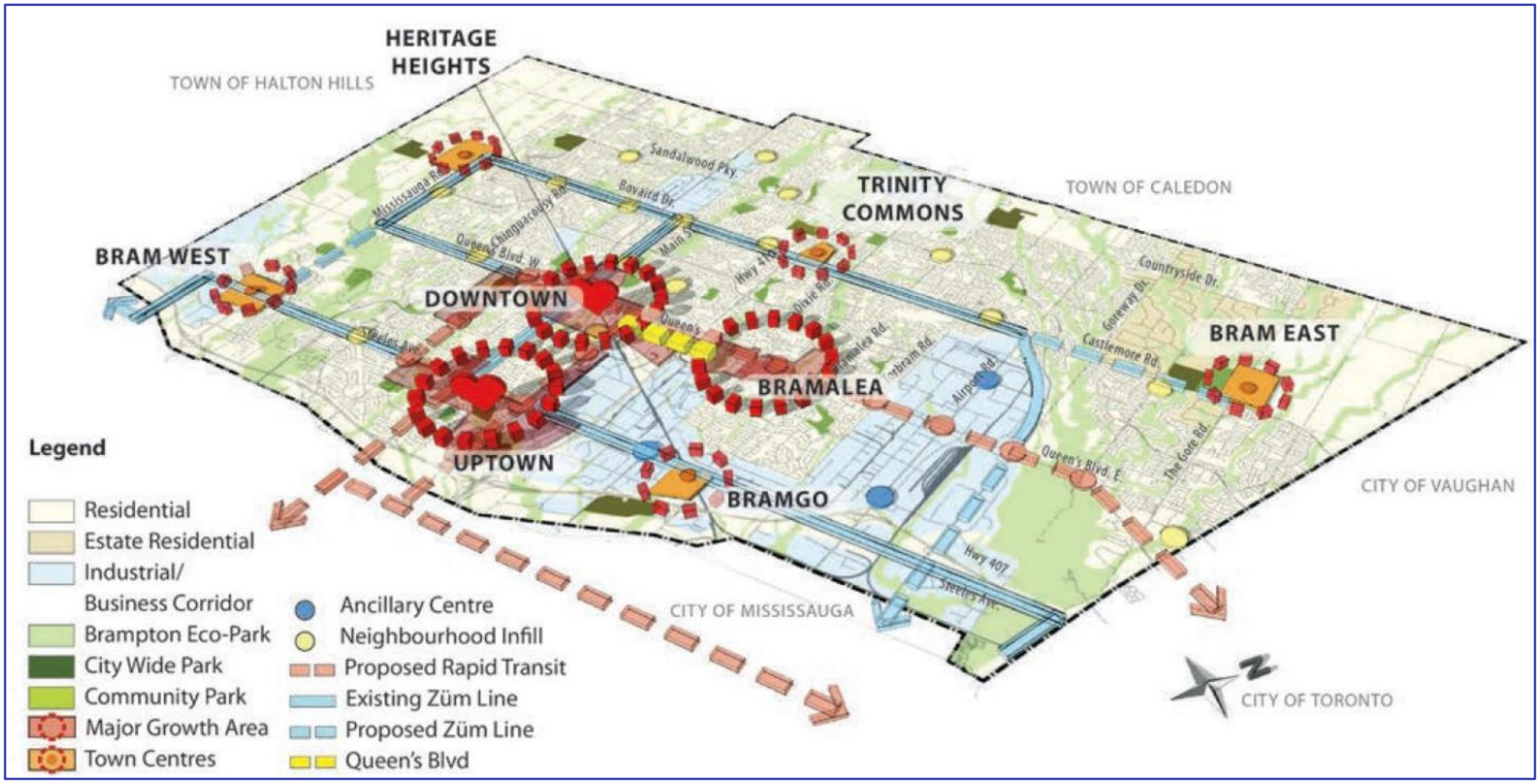
Cost-Effective Energy & Climate Mitigation
"Loading Order" Prioritization

- Increase Energy Efficiency
- Maximize Heat Recovery
- Extend and Integrate Energy Distribution
- Maximize Clean & Renewable Energy Supply

Developing Integrated CEP Scenarios
Elements for CEP Solution Simulation

- Efficiency of existing homes
- Efficiency of existing C&I buildings
- Efficiency of existing industry
- New construction efficiency
- Net-Zero Emissions Neighbourhoods
- Mixed-use Urban Densification
- District Energy areas
- Renewable electricity generation
- Transportation efficiency and mix

Brampton 20140 Vision
Town Centres

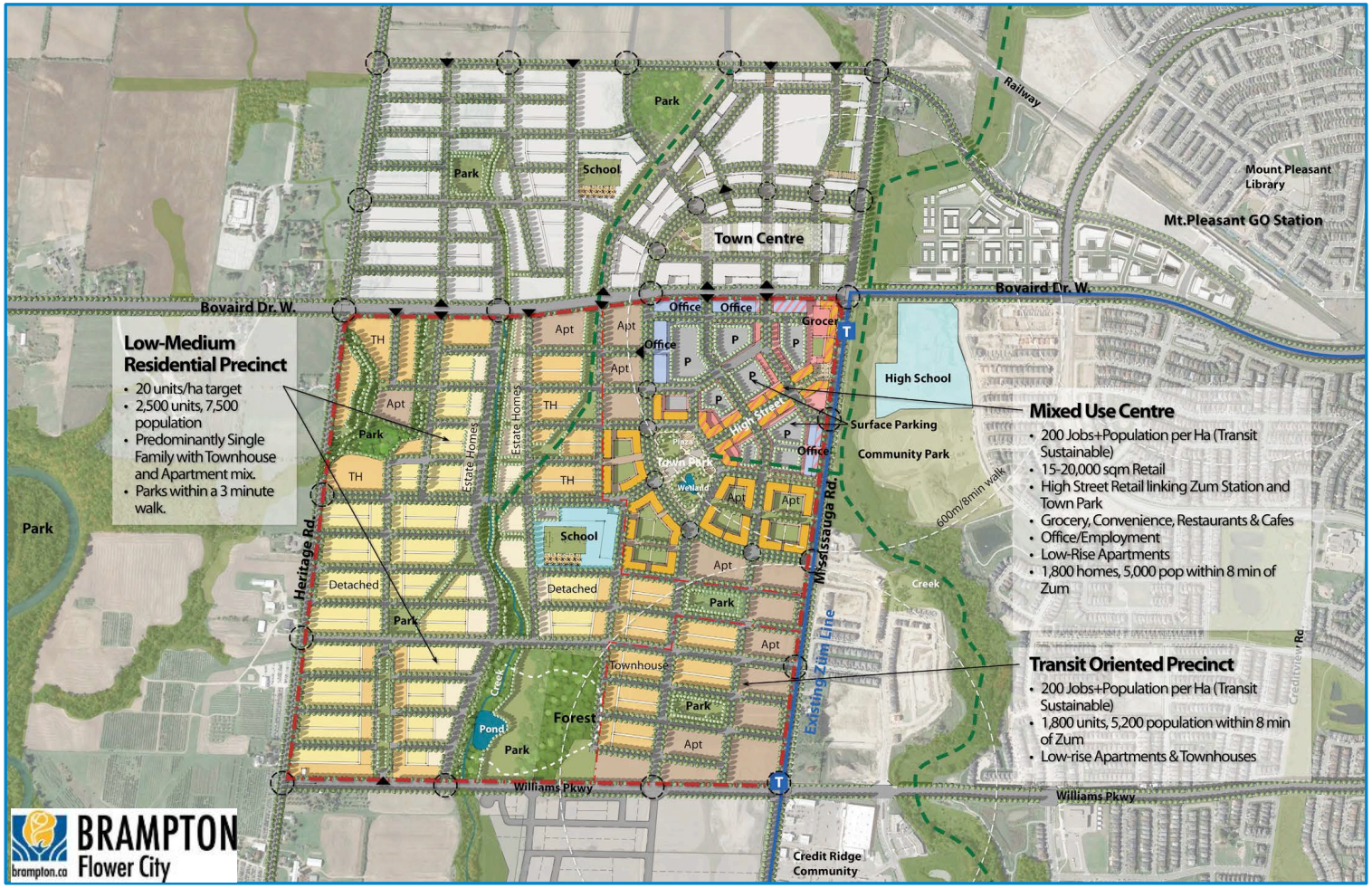


Scenario Simulation Element
Town Centres

Uptown Brampton

La Défense Paris

Brampton 2040 Vision
Greenfield Neighbourhood Concept



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Near Net-Zero Emissions

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Scenario Simulation Element
Renewable Power

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Include PV in Building & Landscape Planning

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Scenario Simulation Element
Transportation

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Include Energy & Emissions Targets

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Efficiency - Existing Homes & Buildings
Simulated Measures

- Most property to be retrofitted by 2041
- Efficiency packages by property type
- Reference Case
  - *80% of Homes*
  - *60% of Buildings*
  - *Efficiency gain ~33% / retrofit*
- Simulation variables
  - *Market share*
  - *Start and completion date*
  - *Up to 25% more efficient retrofits*
- Simulation Narratives
  - *Create Efficiency Entity*
  - *Quality controlled standardized retrofits*
  - *Standardized pricing*
  - *Payments: LIC or similar*
  - *Attractive for owner & contractor*
  - *EPLs when rented or sold*

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50% of Energy – 33% of GHG in 2016

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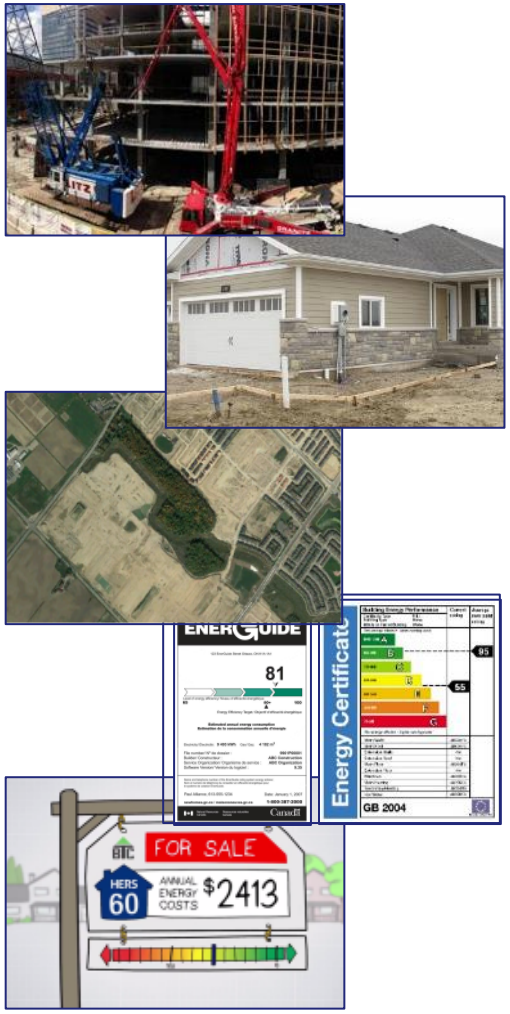
**Updated 2018-09-11*

Efficiency of New Homes & Buildings
Simulated Measures



- New property 100% OBC compliant
- Reference Case
  - *1% above code to ’21*
  - *Code increases 10% in 2022 and 2032*
- Simulation variables
  - *1% to 10% for each code change*
  - *Years of code changes*
- Simulation Narratives
  - *Builders challenged on quality*
  - *Current practice rarely meets code*
  - *Transparency & market advantage*
  - *Passivhaus codes being discussed*
  - *EPLs when rented or sold*
  - *Upside potential in Greenfield areas*

Growth Neighbourhoods
Efficient Heating Services

- Implement District Heating in target EPDs
- Reference Case
  - *70% of existing target property by 2041*
  - *80% for new target property in year built*
  - *DH start in 2022*
  - *CHP implemented in 2023*
  - *EPDs*
    - *18,19,20,21,23,32,33,34,35,36,37,39 (Densification)*
    - *1,2,6,7,14,15,16,25,26,27,28,29,30,38 (Greenfield)*
- Simulation variables
  - *Shares from 40% to 90%*
  - *DE and CHP start year from 2021 to 2027*
  - *EPD selection*
  - *Technical efficiencies - various*
- Simulation Narratives
  - *Create District Energy Utility*
  - *Competitive, reliable, comfortable services*
  - *Proven technology and investments*
  - *District Cooling on selective basis*
  - *Efficiency upside in Greenfield Neighbourhoods*
  - *Build resources with Sheridan*

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Heating & SHW 38% of GHG in 2016

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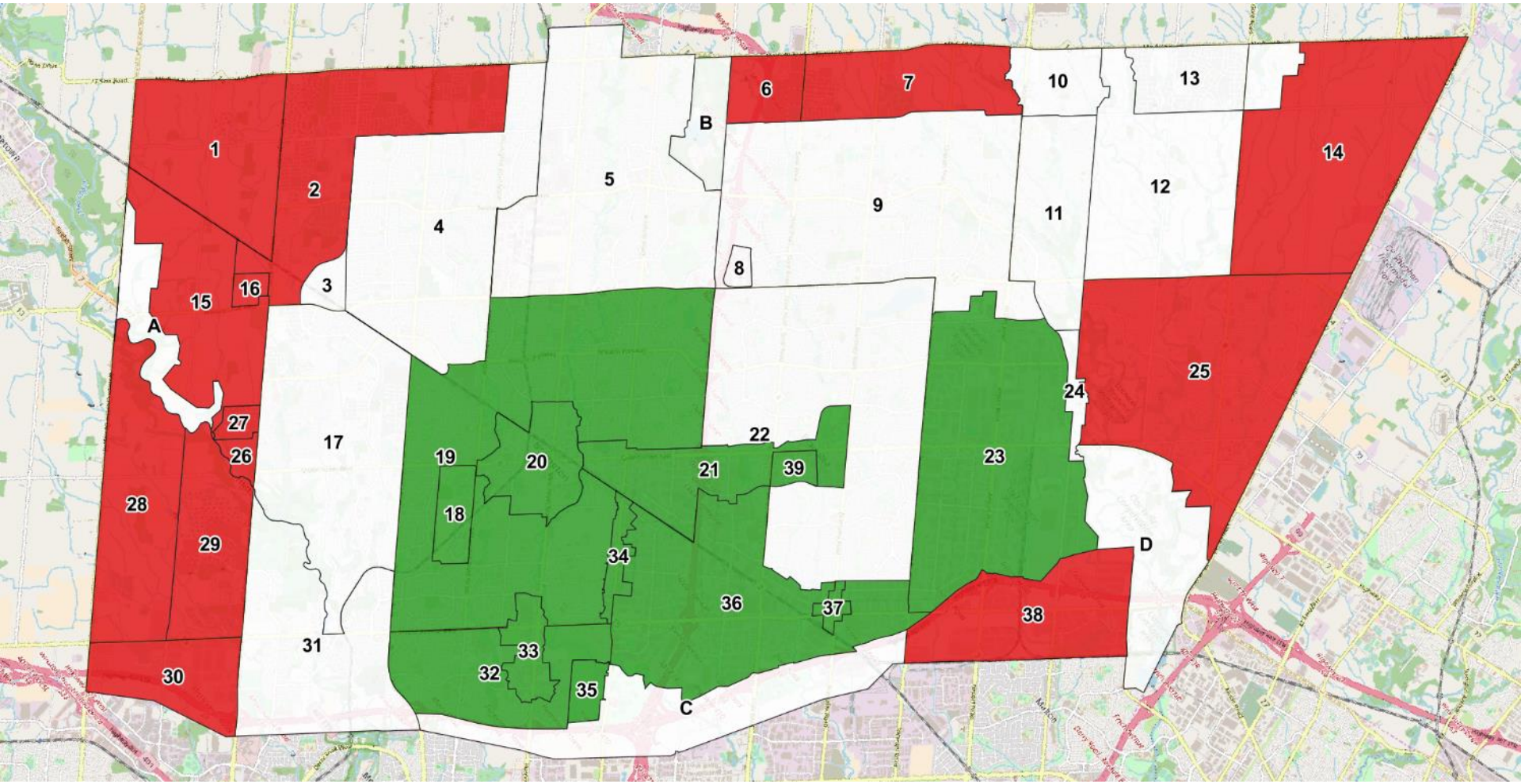
Growth Neighbourhoods
Efficient Heating Services



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Industry
Proliferate Efficiency Best-Practices

- World-class continuous improvement
- Reference Case
  - *1% per year*
- Simulation variables
  - *0% to 2% in 0.5% steps*
- Simulation Narratives
  - *Industry outperforms other sectors*
  - *FCA, Coca-Cola, Amazon examples of quality energy management*
  - *Community Best Practice Networks*
  - *Build resources with Sheridan*

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16% of Energy – 15% of GHG in 2016

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Renewable Solar Thermal
Supply Zero-GHG Hot Water & Heating

- Solar thermal on residential property not served by DE
- Reference Case
  - *10% share on target homes' heating & DHW by 2041*
- Simulation variables
  - *Share from 0% to 25%*
  - *Implementation year*
- Simulation Narratives
  - *Readily available materials*
  - *Attractive for consumer*
  - *Potential diversification for new entities*
  - *Simple integration to home systems*

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Heating & DHW 38% of GHG in 2016

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Renewable Supply – Solar Power
Supply Zero-GHG Electricity

- Solar PV on suitable rooftops and other locations
- Reference Case
  - *300 MW installed*
  - *Allocated by EPD power needs*
- Simulation variables
  - *Up to 400 MW in 50 MW steps*
- Simulation Narratives
  - *Significant GHG reduction*
  - *PV 8% of 2041 electricity needs*
  - *Coincides with peak summer needs*
  - *Local installation employment*
  - *Currently "friendly" regulation*
  - *Ambitious but with upside potential*
  - *Part of Smart Community Networks*

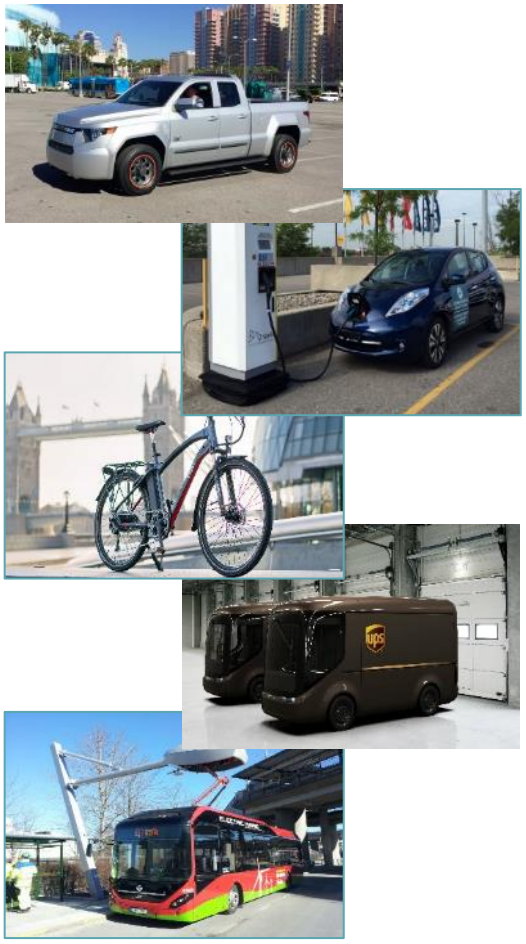
Transportation
Reduce Trip Lengths

- Reduce average trip length
- Reference Case
  - *7.5% LDV trip length reduction*
  - *Most impact in later years*
- Simulation variables
  - *Up to 15% trip length reduction*
  - *Vehicle category selectable*
- Simulation Narratives
  - *Ratio of local jobs to population*
  - *Mixed-use, compact urban design*
  - *Time to see tangible impact*

Transportation - Modality
Increase Transit & Active Journeys

- Increase active and shared transportation modes
- Reference Case
  - *GO Train 15% of PKT by 2050*
  - *Transit to 10%*
  - *Active transportation to 15%*
  - *Most impact in later years*
- Simulation variables
  - *Up to 20% mode share*
  - *Vehicle category selectable*
- Simulation Narratives
  - *Competitive alternative services*
  - *Shared transport pricing*
  - *Mixed-use, compact urban design*
  - *Multi-modal transport nodes*

Transportation – Fuel & Efficiency
Decrease Each Vehicle's Emissions



- Migrate to more efficient low-carbon vehicles
- Reference Case
  - *LDVs & transit: 30% electric by 2050*
  - *HDVs:10% electric by 2050*
  - *Liquid fuel vehicles 2% pa efficiency gain*
  - *Electric vehicles 1% pa efficiency gain*
  - *Linear year-to-year impact*
- Simulation variables
  - *Up to 60% electric share*
  - *Share selectable by major vehicle category*
  - *Efficiency gains by vehicle type/fuel*
- Simulation Narratives
  - *Driven by national policy and global markets*
  - *Local policy and engagement*
  - *Parking and access policies and norms*
  - *New construction charging codes and norms*

Gas-Diesel 98% of PKT in 2016

Electric Grid & Natural Gas Network
Simulated Measures

- Anticipate lower carbon utilities
- Reference Case
  - *Electric: TAF estimates*
  - *Natural Gas: 1% pa reduction*
- Simulation variables
  - *Electricity: None*
  - *Natural gas: Up to 2% pa reduction*
- Simulation Narratives
  - *Ontario Grid modest reduction*
  - *Enbridge exploring biogas strategy*
  - *Some countries already at ~10%*
  - *Renewable power can create gas*

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56% of Energy –41% of GHG in 2016

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Community Energy Plan Simulation Results

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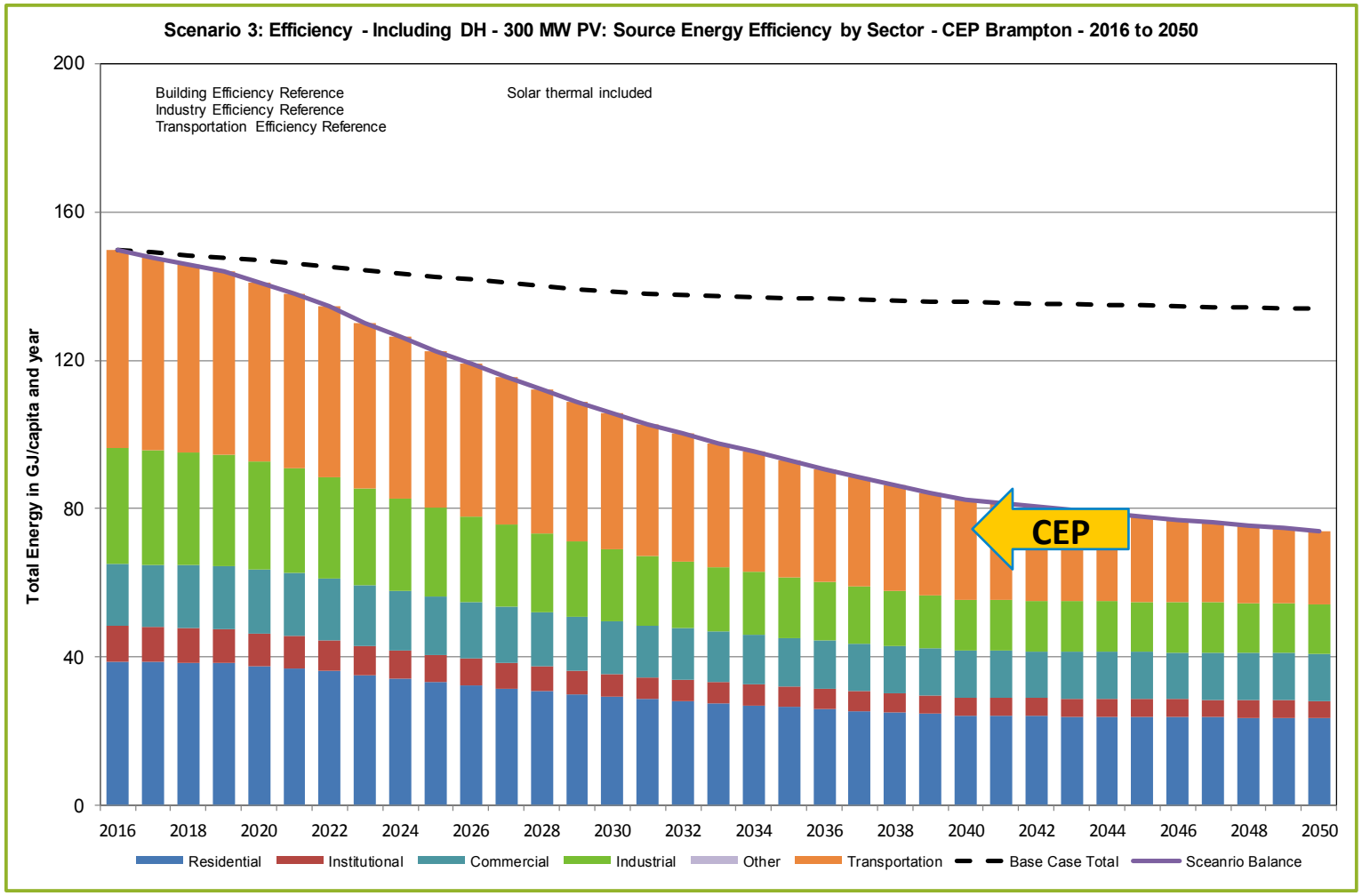
Brampton Simulation – Reference Case
Source Energy Efficiency by Sector



Falls 10% Short of CEP Goal

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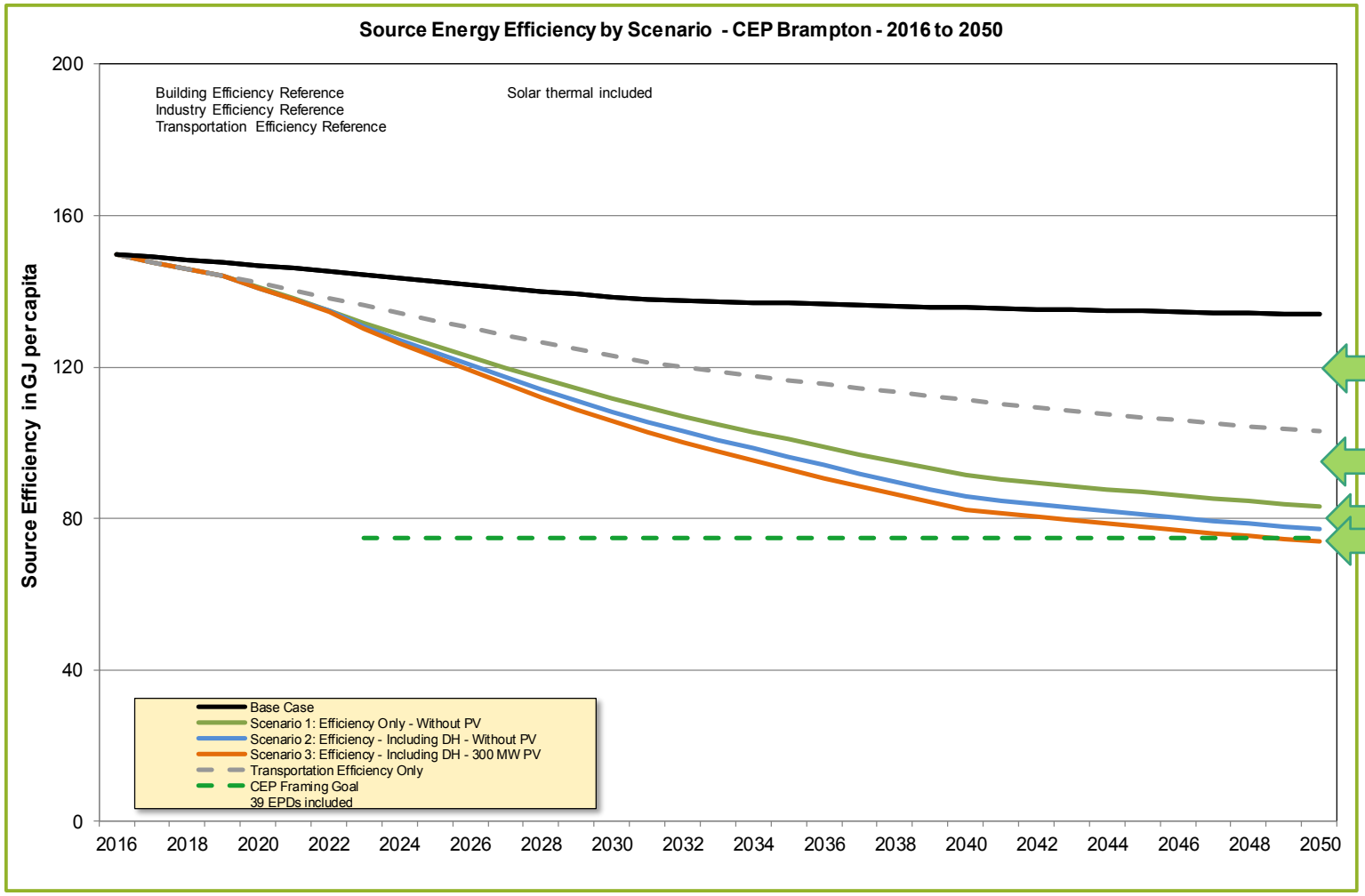
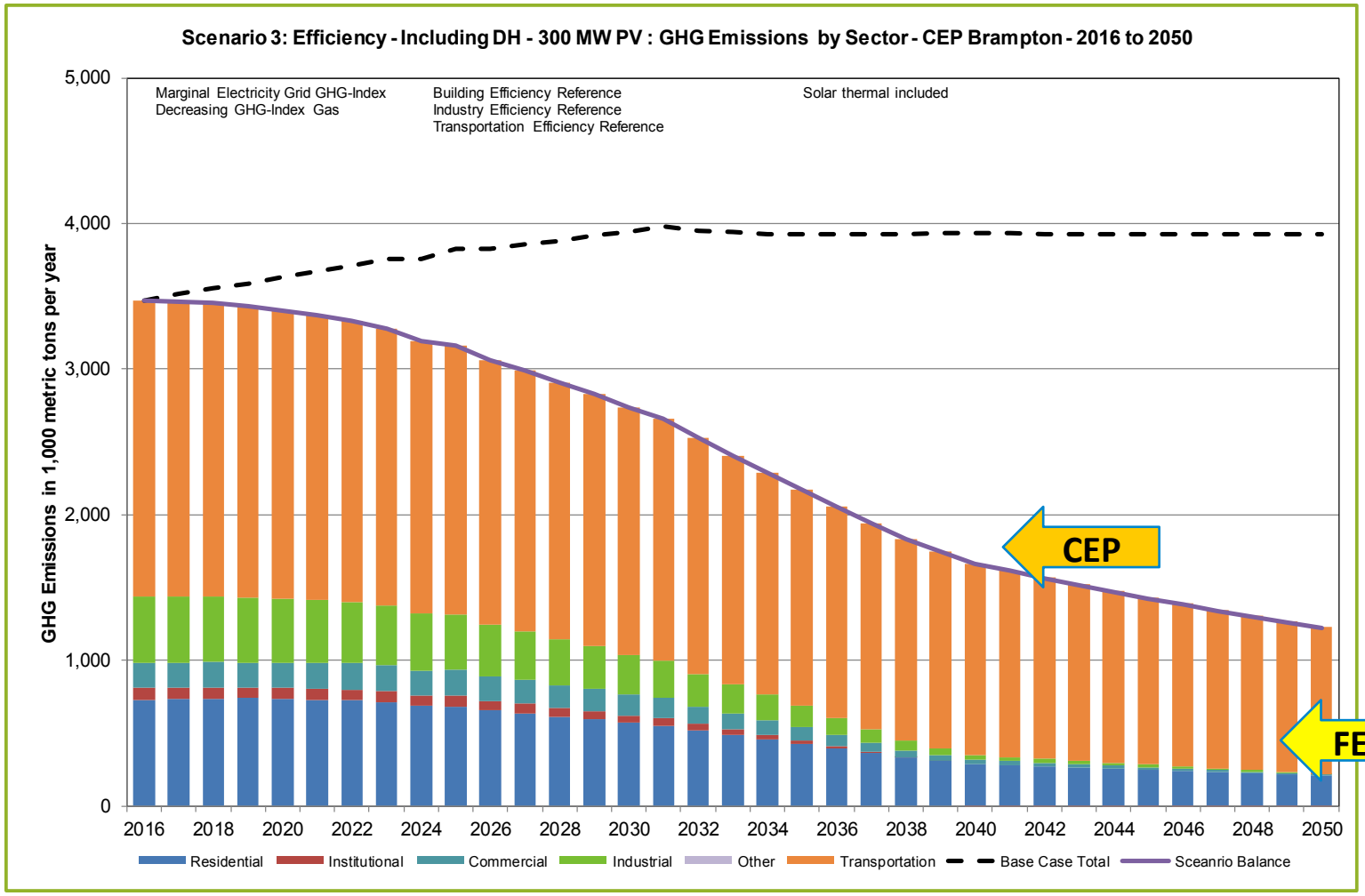
Brampton Simulation – Reference Case
Source Energy Efficiency by Measures



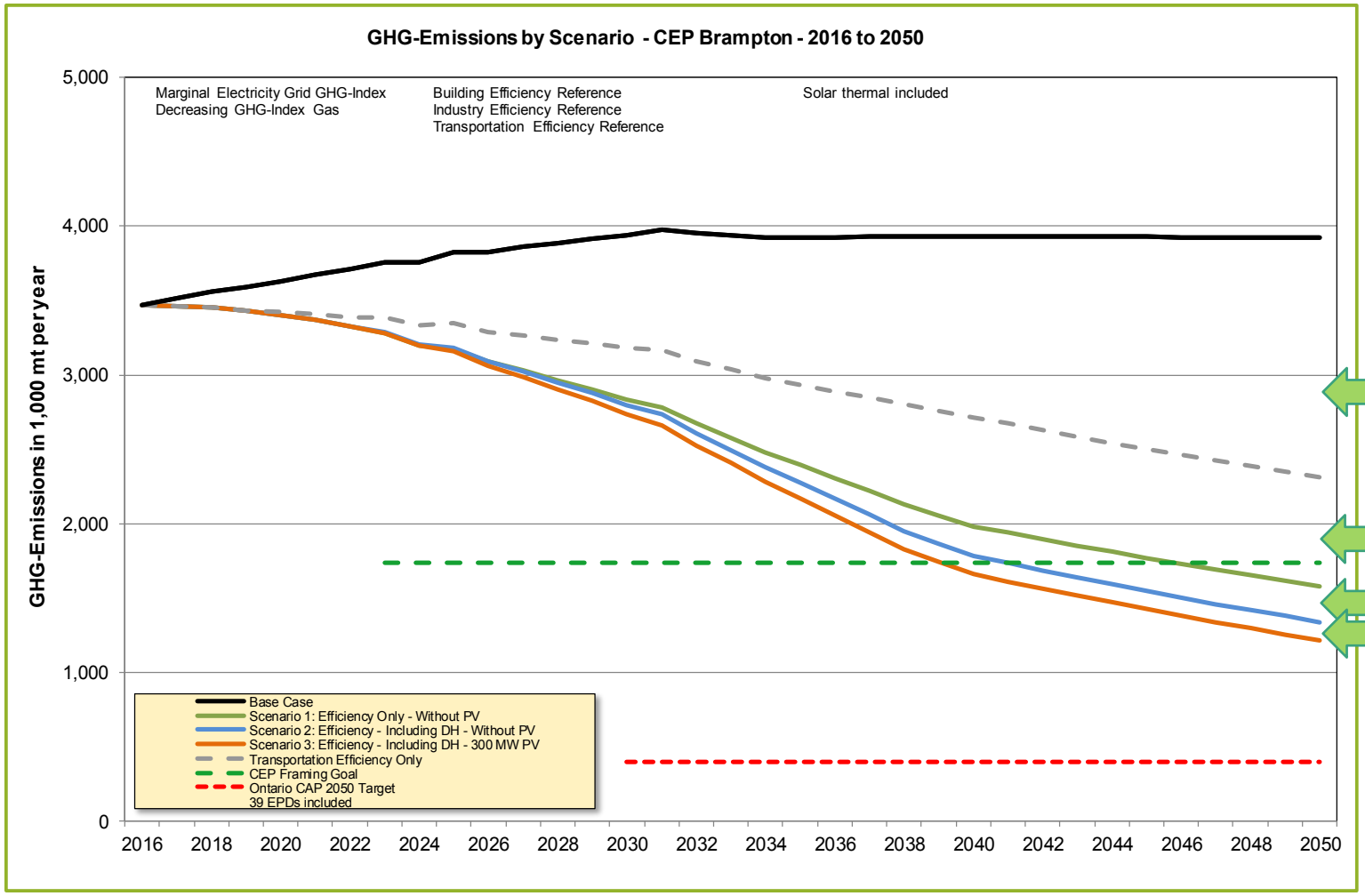
Falls 10% Short of CEP Goal

Brampton Simulation – Reference Case
GHG by Sector



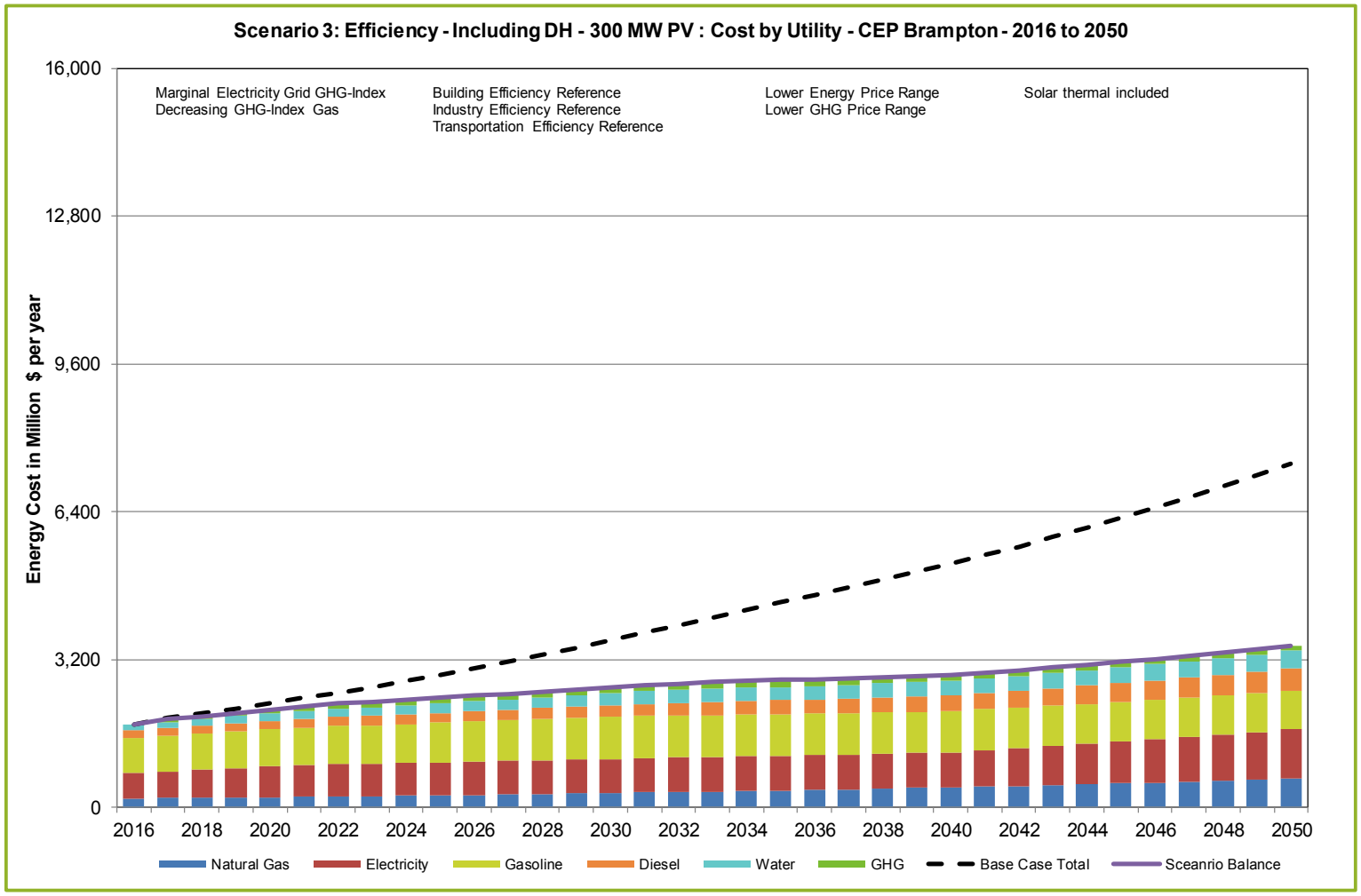
Misses Federal Targets

Brampton Simulation – Reference Case
GHG Emissions by Measure



Misses Federal Targets

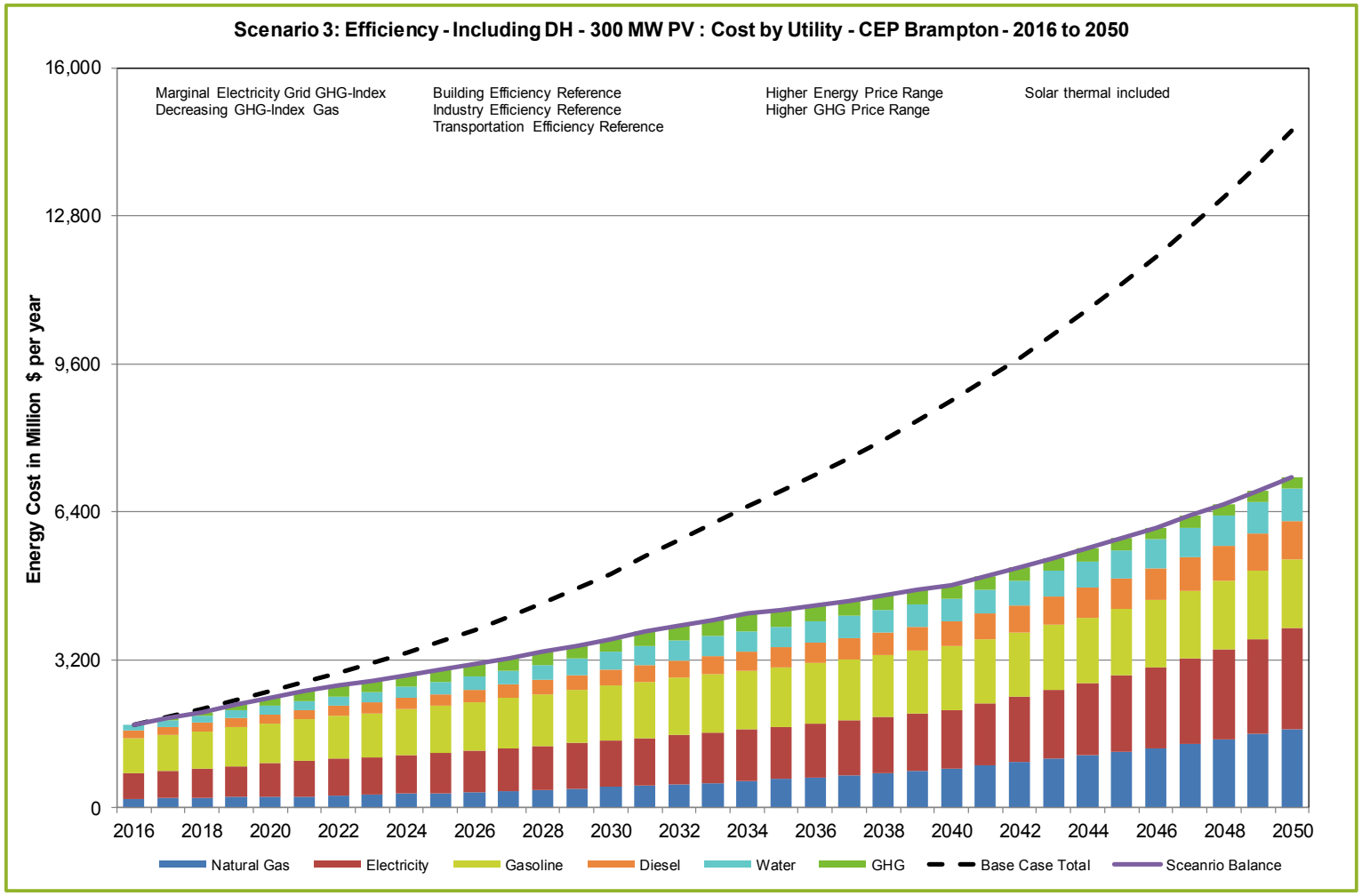
Brampton Simulation – Reference Case
Utility Cost – Lower Range



Cumulative Saving by 2050 of $56 Bn

*Updated 2018-09-11

Brampton Simulation – Reference Case
Utility Cost – Higher Range



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Cumulative Saving by 2050 of $93 Bn

**Updated 2018-09-11*

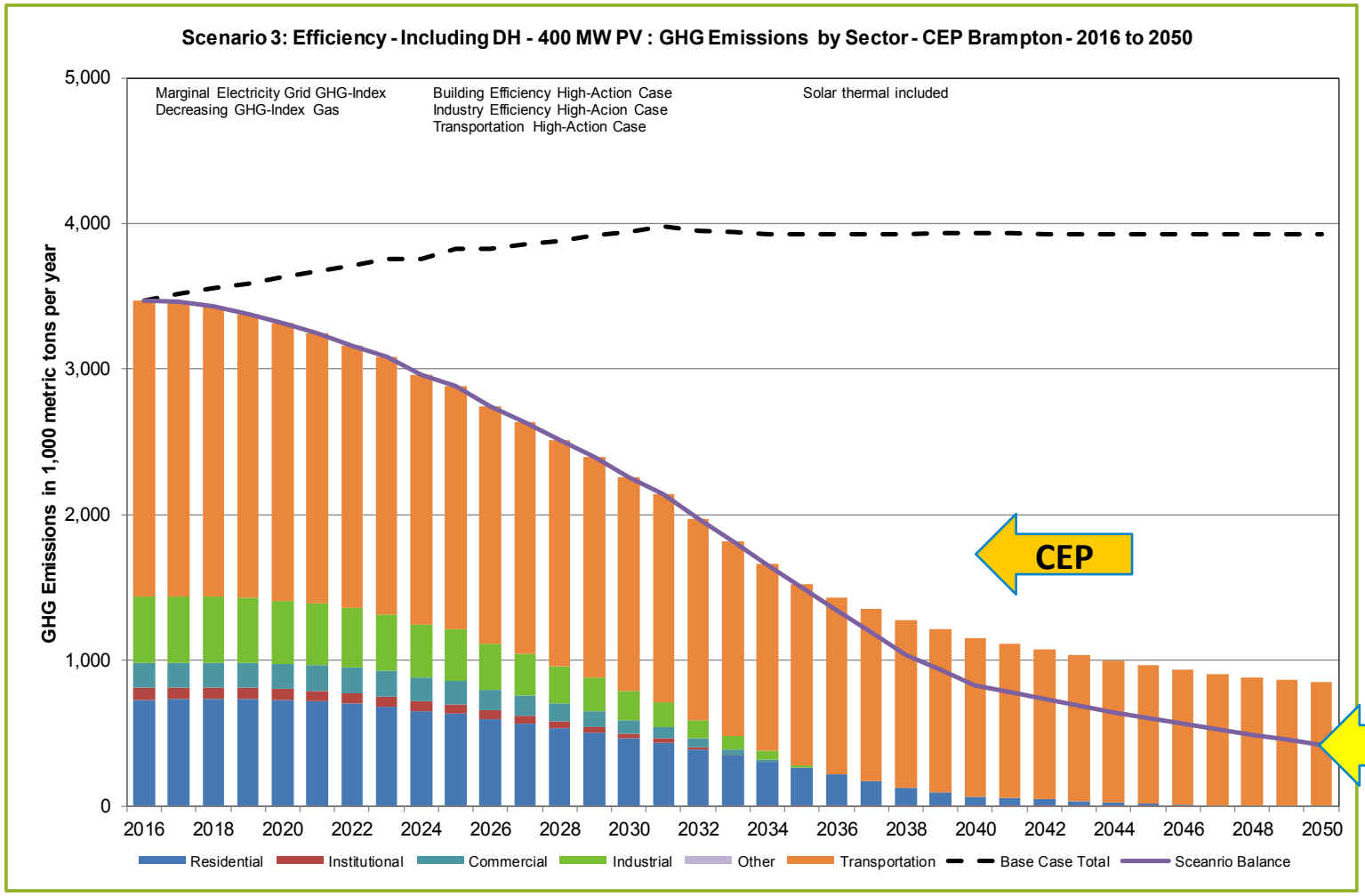
Brampton Simulation – Reference Case *Summary*

- Reference Case represents deep transformation across all sectors
- Generates between $56 Bn and $93 Bn cumulative savings by 2050
- Exceeds CEP GHG target by 7% by 2041
- Misses CEP Efficiency target by 9% by 2041
- Falls far short of Federal Emissions Goal

Brampton Simulation – High-Action Case
"Turn up the Volume…"

- Existing Home & Building Efficiency
  - *Retrofit shares 90% by 2041*
  - *Renovation packages 10% more efficient than Reference*
- New Home & Building Efficiency
  - *Exceeds relevant code by 5%*
- Industrial Efficiency
  - *Year-on-year improvement of 1.5%*
- District Heating
  - *90% shares in high-density and NZ EPDs*
  - *CHP electrical efficiency of 55% (CCGT or Fuel Cells)*
- Solar Thermal
  - *20% share with start accelerated to 2020*
- Solar PV
  - *Total installation of 400 MW*
- Transportation Energy
  - *Median Trip Length reduction 10%*
  - *Modality split – Train to 15% / Transit & active to 15% each*
  - *Drive train – LDC/Busses to 60% / HDV to 10%*
  - *Vehicle efficiency – 3% per year all vehicles except electric*
- Grid & Natural Gas GHG Index
  - *Power Grid unchanged relative to TAF forecast*
  - *Natural Gas reduced by 1.0% annually*

Brampton Simulation – High-Action Case
GHG Emissions by Sector



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Net Zero Built Environment

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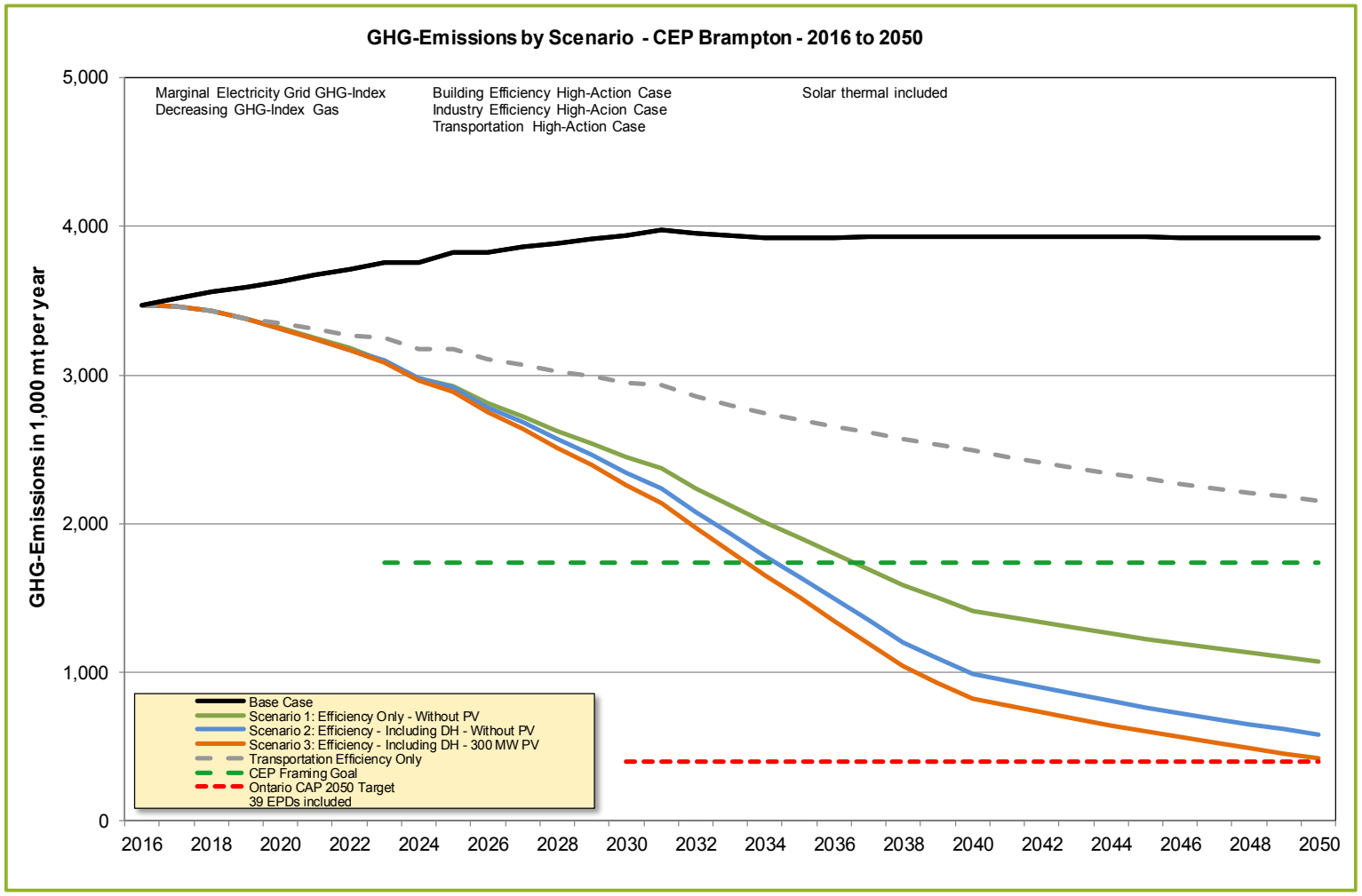
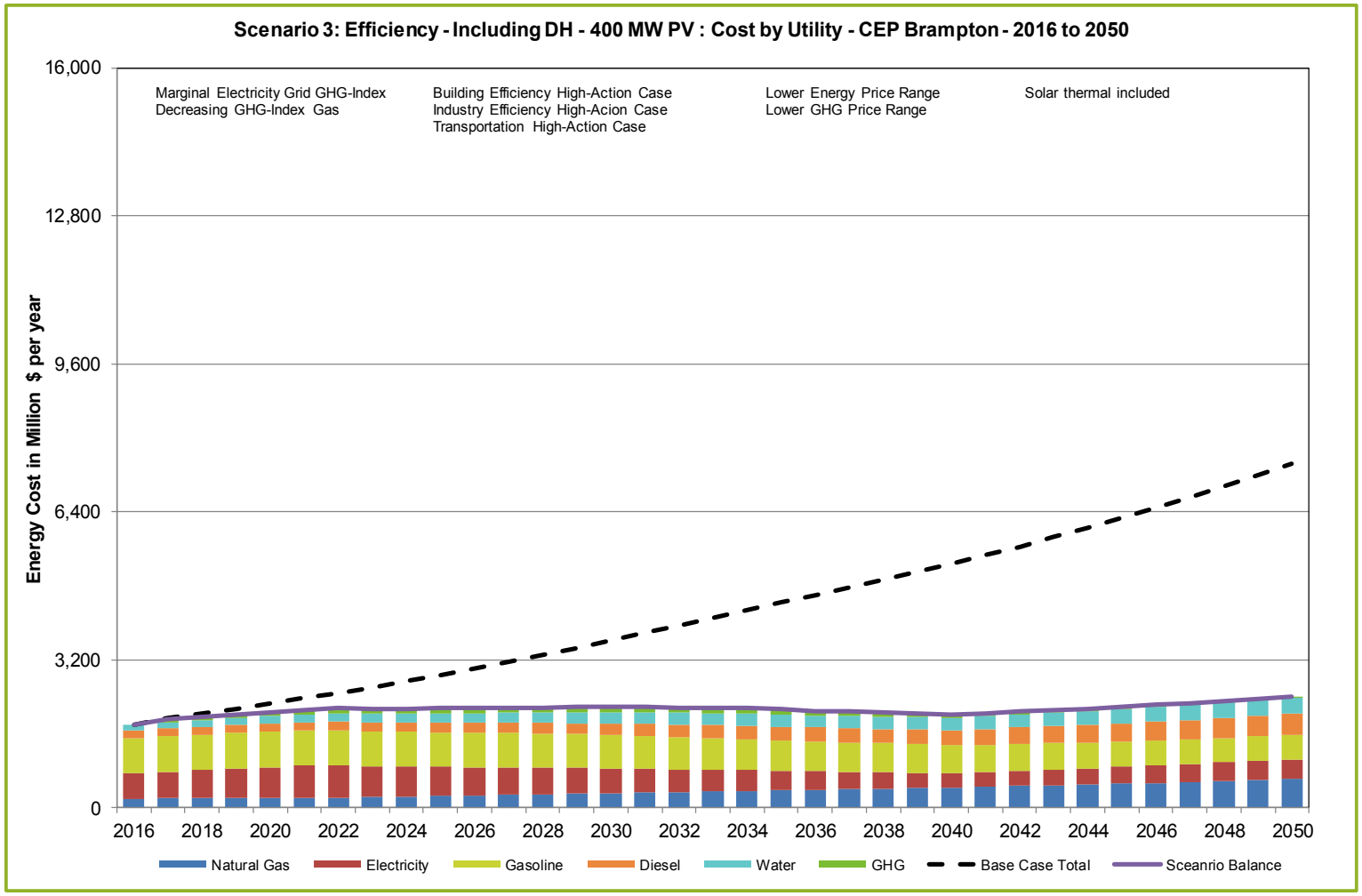
Brampton Simulation – High-Action Case
GHG Emissions by Measure



Meets Federal GHG Goal

Brampton Simulation – High-Action Case
Utility Cost – Lower Range



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Cumulative Saving by 2050 of $75 Bn

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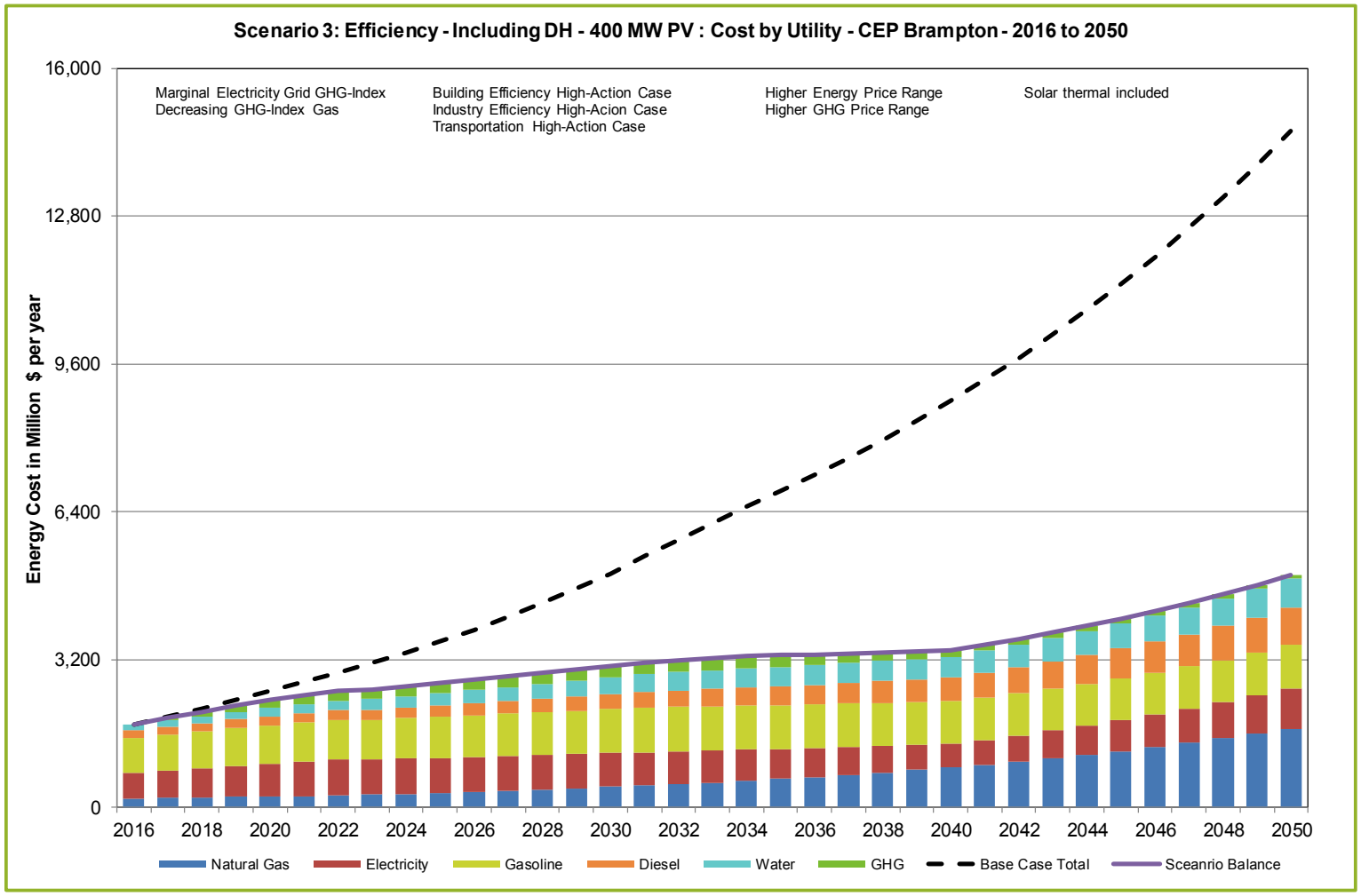
Brampton Simulation – High-Action Case
Utility Cost – Higher Range



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Cumulative Saving by 2050 of $124 Bn

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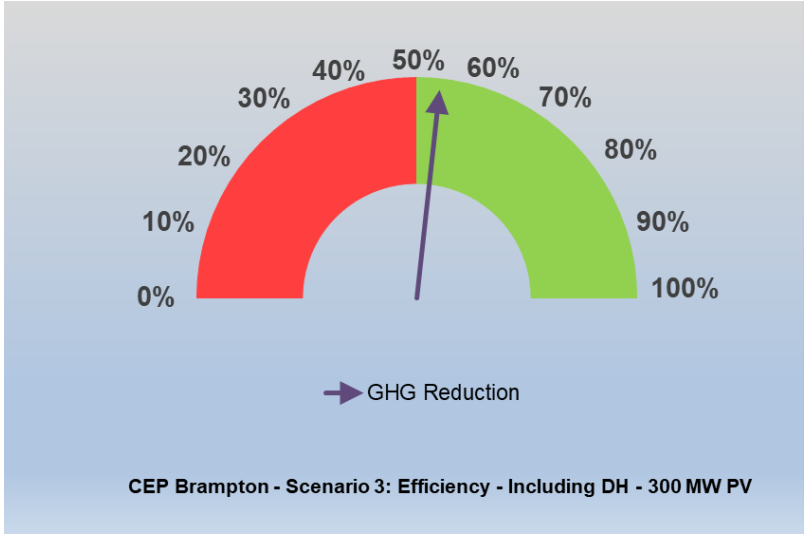
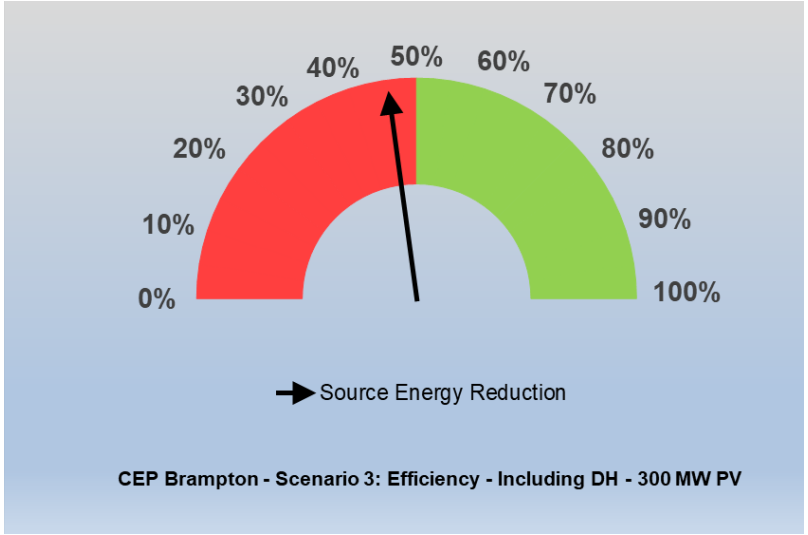
Brampton Simulation – Reference Case
Results by 2041

Carbon Emissions



Energy Efficiency



…and Economy

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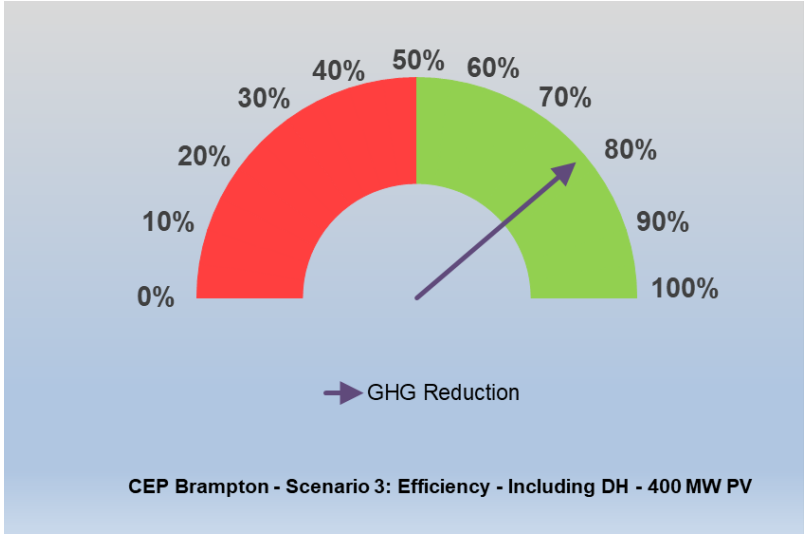
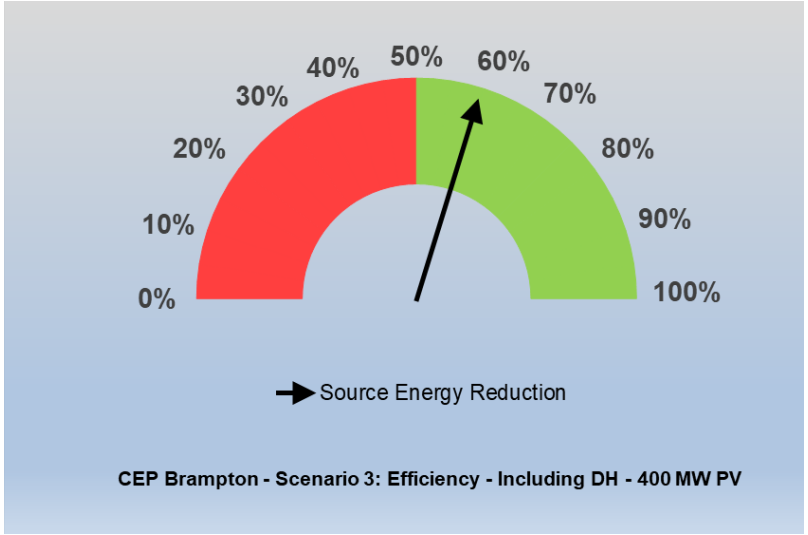
Brampton Simulation – High-Action Case
Results by 2041

Carbon Emissions



Energy Efficiency



…and Economy

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Simulation Results
Discussion…

- All simulations reviewed were disruptive
  - *Policy and practice*
  - *Market norms*
  - *Institutional and governance*
  - *Available resources*
  - *Local economic development*
- "Reference Case" meet CEP GHG Goal
- "High-Action Case" is basically "Reference Case" on steroids and meets Federal GHG Target
- All Lower-Action Cases were equally disruptive yet miss all goals

7. Engagement Process

a) Engagement Activity Summary

- *Rob Kerr*
- *Michael Hoy*

b) Results and Discussion of Community Survey Trial

- *Rob Kerr*

Engagement Plan
Update

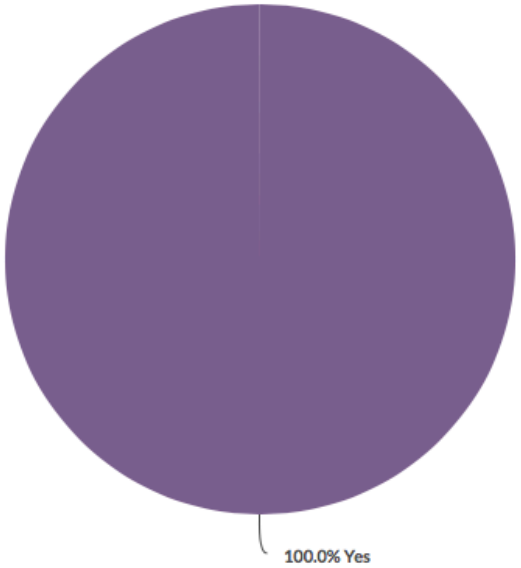
- Task Force
- Mayor and Council
  - *Previous Reports*
  - *Council Workshop – Fall 2019*
- Targeted Networks
  - *Nordic Cities*
  - *Peel District School Board*
- Municipal Departments
  - *Initial Meeting pre-Nordic Cities*
  - *MD2 late June*
- Public
  - ……..

Engagement Plan
Public Engagement Opportunities

- April 22 = Earth Day CP24
- April 27 = Earth Day Community Tree Plantings
- April 30 = Mayor's Faith Based Leaders Forum
- May 1 = Massey Street Public School Open House
- May 4 = Annual Scouts Tree Planting
- May 11 = Brampton Vision Celebration
- May 19 = National Public Works week
- June 8 = Heart Lake Plogging event
- June 15 = Farmers Markets Launch
- June 22 = Bike the Creek
- July 13 = Famers Market: tree talk
- July or August = Farmers Market: pollinator
- September 14 = Massey Park planting
- Late September = Jessie Park planting
- Fall = Dorchester Park planting
- Fall = County Court planting - aim for first weekend of October
- Fall = Fletchers Creek planting

Engagement Plan
Survey Results – Next Steps

1. Do you think that it is important for us to work towards world-class energy performance for our community, as described in the introduction above?



Value	Percent	Responses
Yes	100.0%	13
		Totals: 13

Engagement Plan
Survey Results – Next Steps

2. What matters to you? Below are some economic, social and environmental benefits of moving towards a world-class energy performance. Please rank the importance of these benefits to you by re-sorting them on the right side of the page with your highest (most important to you) to lowest (less important to you) choices.

Item	Overall Rank	Rank Distribution	Score	No. of Rankings
Reducing greenhouse gas pollution to fight climate change	1		79	13
Keeping more of our energy dollars in the local economy	2		73	13
Creating jobs in the green economy	3		59	13
Affordable energy services that I can always rely on	4		43	13
Brampton taking charge of its own energy future	5		42	13
Reducing my energy costs.	6		41	13
Generating my own energy	7		27	13

Engagement Plan
Survey Results – Next Steps

3. There are other ways moving towards world-class energy performance can enhance Brampton's livability. Please rank them by scoring each benefit from 1 (most important to you) through 7 (less important to you)

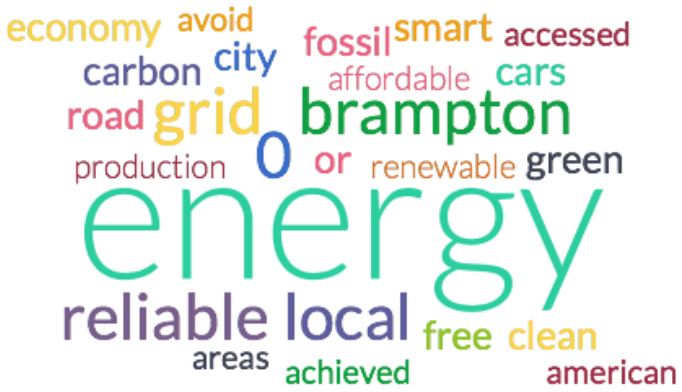
Item	Overall Rank	Rank Distribution	Score	No. of Rankings
Reducing energy poverty so no one must choose between buying food or keeping the lights on	1		63	13
Cleaner air	2		59	13
Protecting green space and urban trees	3		58	13
Making public transit more convenient	4		52	13
Less time stuck in traffic and more time with family and friends	5		50	13
Making it easier to walk and cycle in my community	6		45	13
Improving the comfort of my home or workplace	7		37	13

Engagement Plan
Survey Results – Next Steps

4. Did we miss any benefits in Questions 2 and 3 that matter to you?

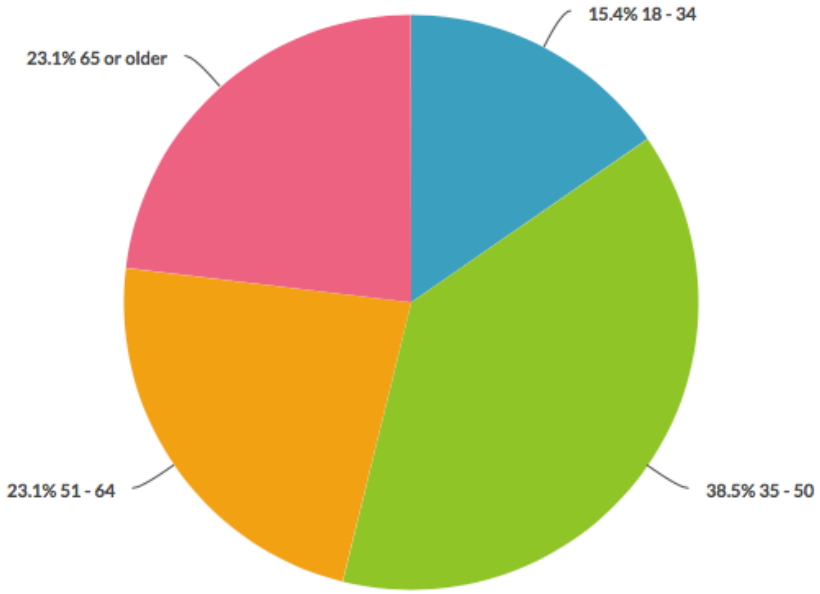
Engagement Plan
Survey Results – Next Steps

5. In your own words, what does Brampton's ideal energy future look like in 2050?



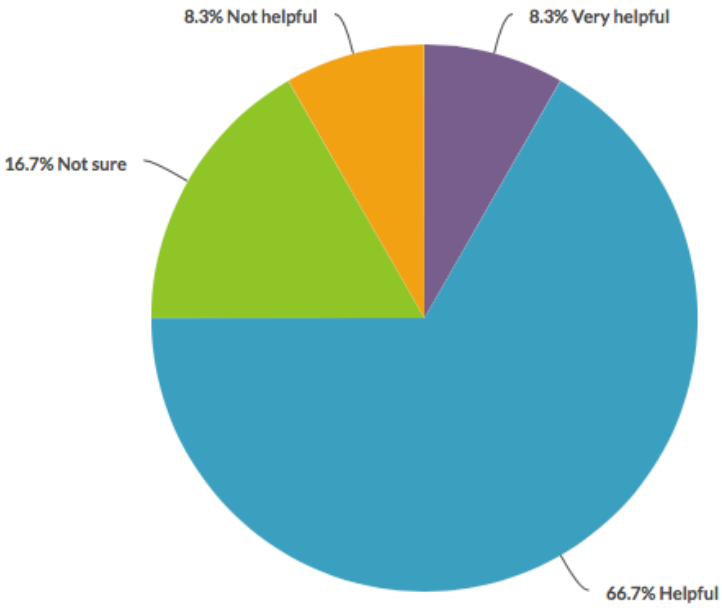
Engagement Plan
Survey Results – Next Steps

6. In which of the following age categories do you belong?



Engagement Plan
Survey Results – Next Steps

7. How did you find this survey in understanding the benefits of community energy planning?



8. Communication

a) *Community Communique #2*
b) *Review of Communication Messages*
c) *Communication Opportunity Review*

Communication
Resident Info Card

The City of Brampton, in partnership with Sheridan College, and the Community Task Force is developing a Community Energy & Emissions Reduction Plan (CEERP).

The CEERP will create a roadmap to:

- improve energy efficiency;
- reduce greenhouse gas emissions;
- ensure energy security;
- create economic advantage; and
- increase resilience to climate change.

@BramGrowGreen www.brampton.ca/CEERP BRAMPTON

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9. Next Meeting
   a) *Confirm Meeting #3*
   b) *Trial Dates for Meetings #4 and #5*

City of Brampton
Community Energy & Emissions Reduction Plan

Engagement	General Topics	Format/Tools	Provisional Date	
Task Force #1	Overview of CEERP process (scope), CEERP Relationship to Urban Planning, CTF Charter and Governance Role, Draft Framing Goals, Baseline, Base Case, Engagement Strategy	Presentation Q&A Working Meeting	March 28, 2019	✔
Task Force #2	Scenarios and Options	Mapping Charrette Working Meeting	May 22, 2019	✔
Task Force #3	Preliminary Recommendations	Presentation Q&A Working Meeting	June 24, 2019	**TBC**
Task Force #4	Final Draft Recommendations Ongoing Governance Role	Presentation Q&A Working Meeting	Week of September 9, 2019	
Task Force #5	Final Draft CEERP	Presentation Q&A	Week of October 21, 2019	

10. Adjourn

THANK YOU

And

GOOD DAY