Ann Arbor Community-Wide Greenhouse Gas Inventory

Prepared by the Office of Sustainability and Innovations

2019 Update

GHG Inventory Background
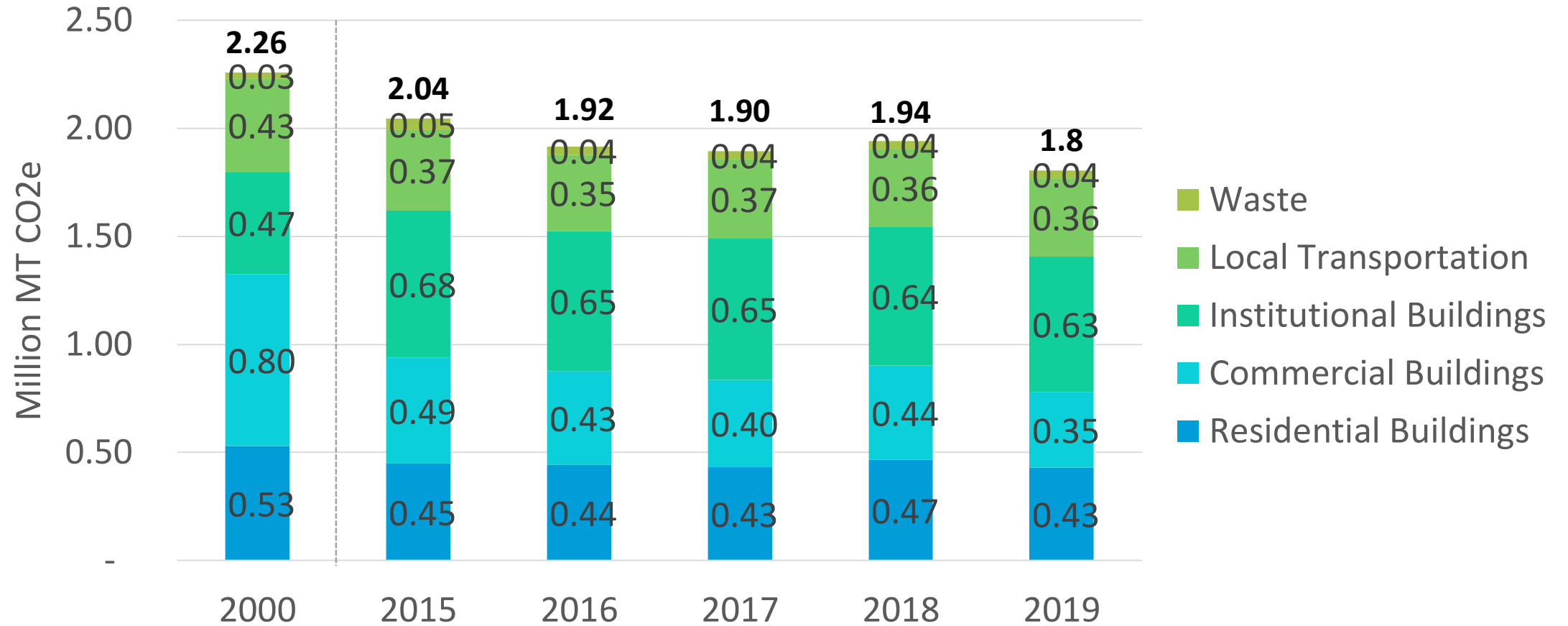
Based on aggregate, scaled, and/or modeled data

Estimated using ICLEI US Community Protocol

Greenhouse gases included:

1. CO_2
2. N_2O – 28x more potent
3. CH_4 – 265x more potent
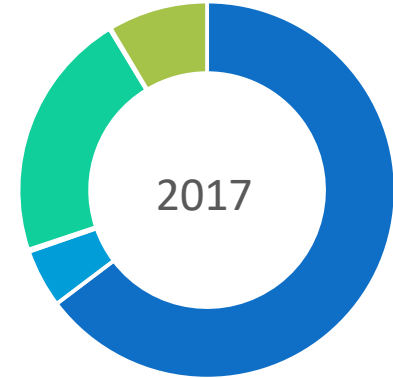
Simple Inventory Trend

Changes from 2000 to 2019

DTE Fuel Mix

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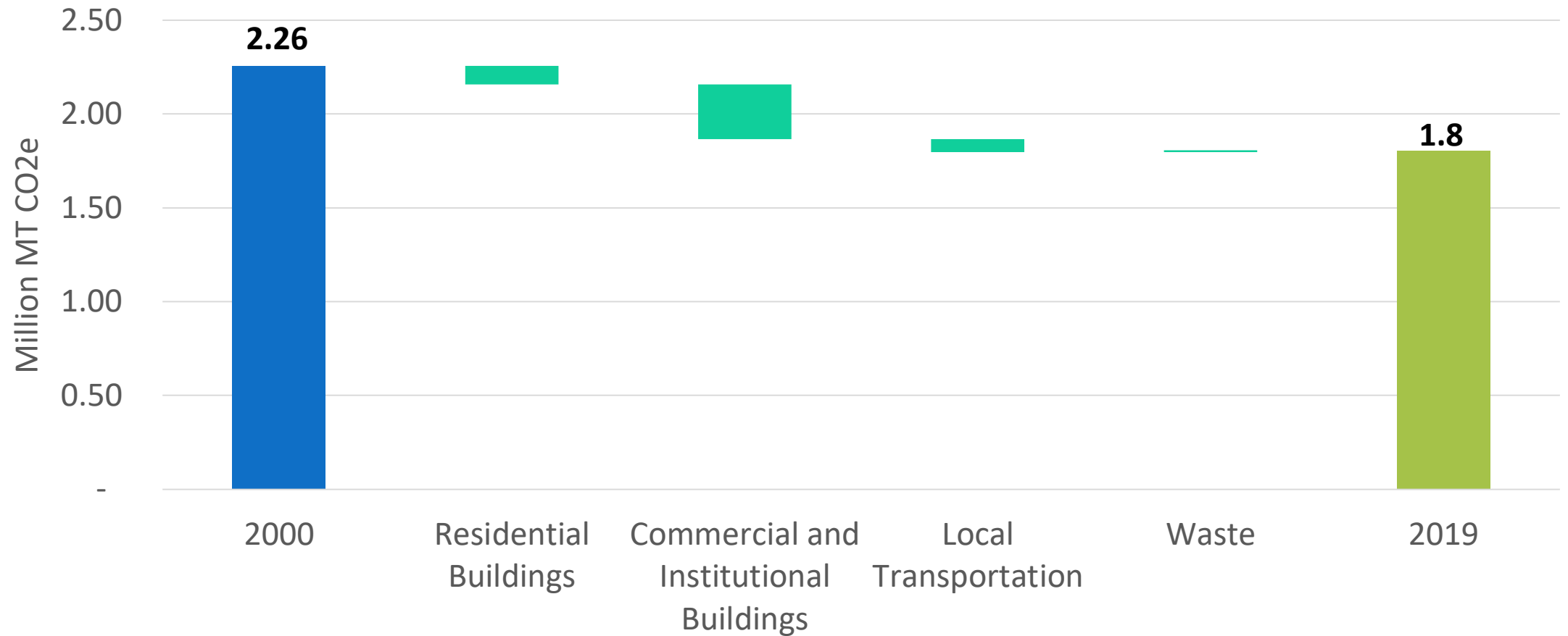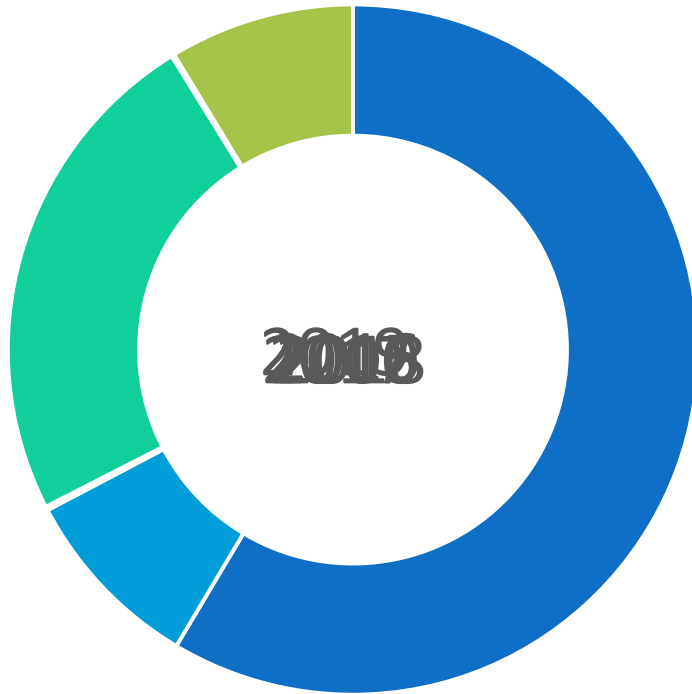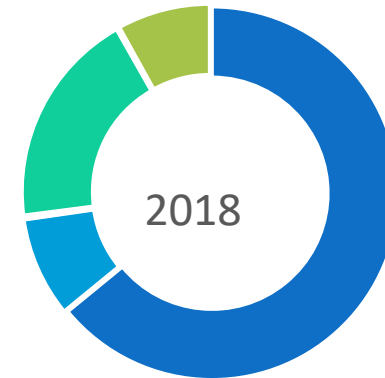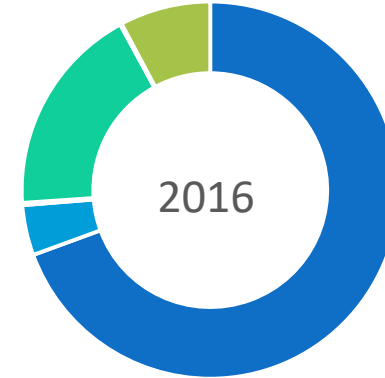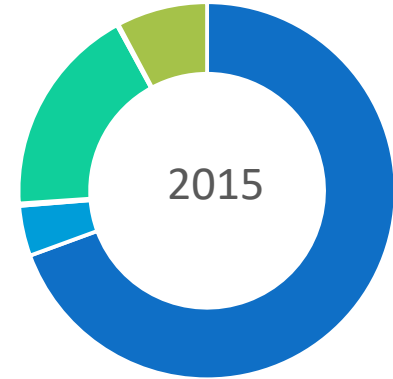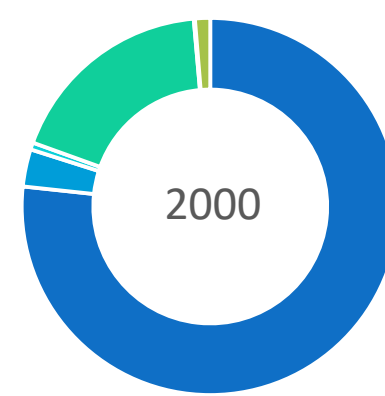
Emission Trends
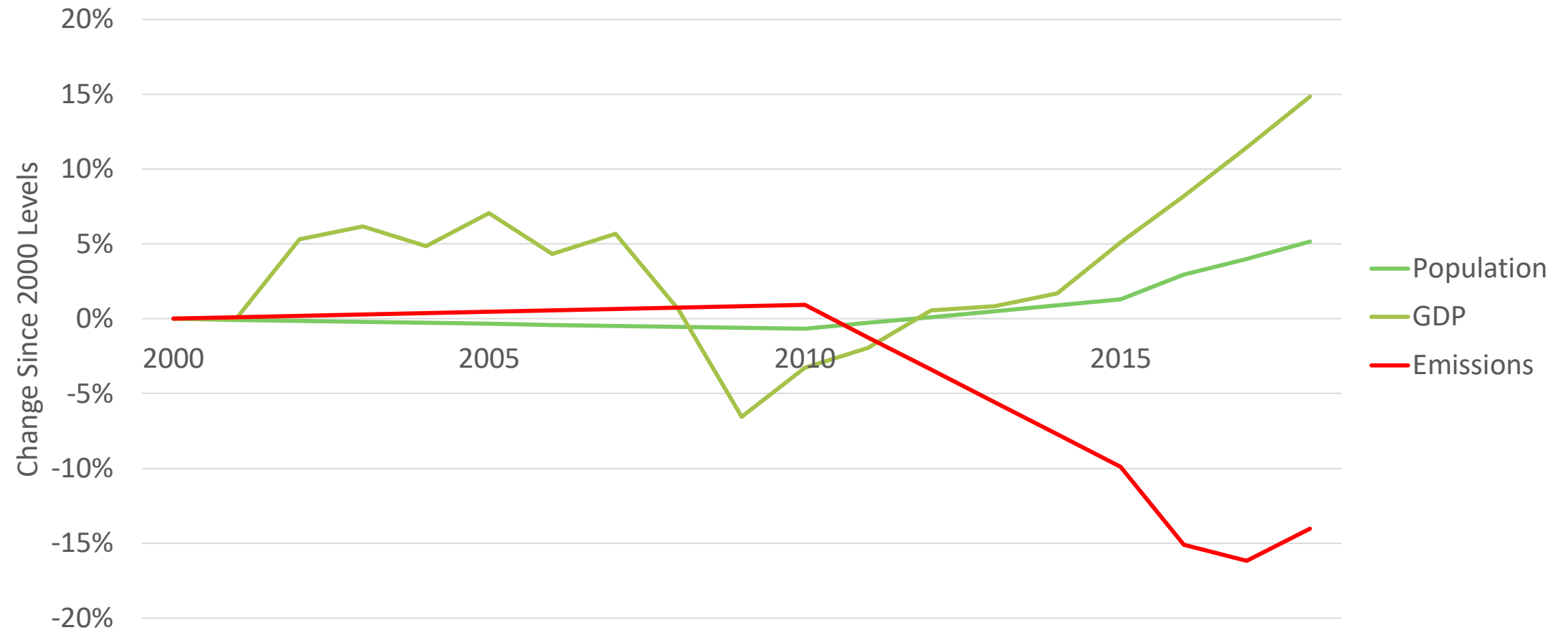
Simple and Expanded Inventory

Emission Source	Simple Inventory	Expanded Inventory
Electricity used in buildings	•	•
Transmission and distribution losses	•	•
Natural gas used in buildings	•	•
Local fugitive natural gas leaks		•
Additional stationary energy emission sources		•
Local passenger and commercial vehicles	•	•
Commuting passenger vehicles		•
Rail and aviation		•
Generated solid waste	•	•
Additional solid waste emission sources		•
Wastewater processing		•

Simple and Expanded Inventory Trends
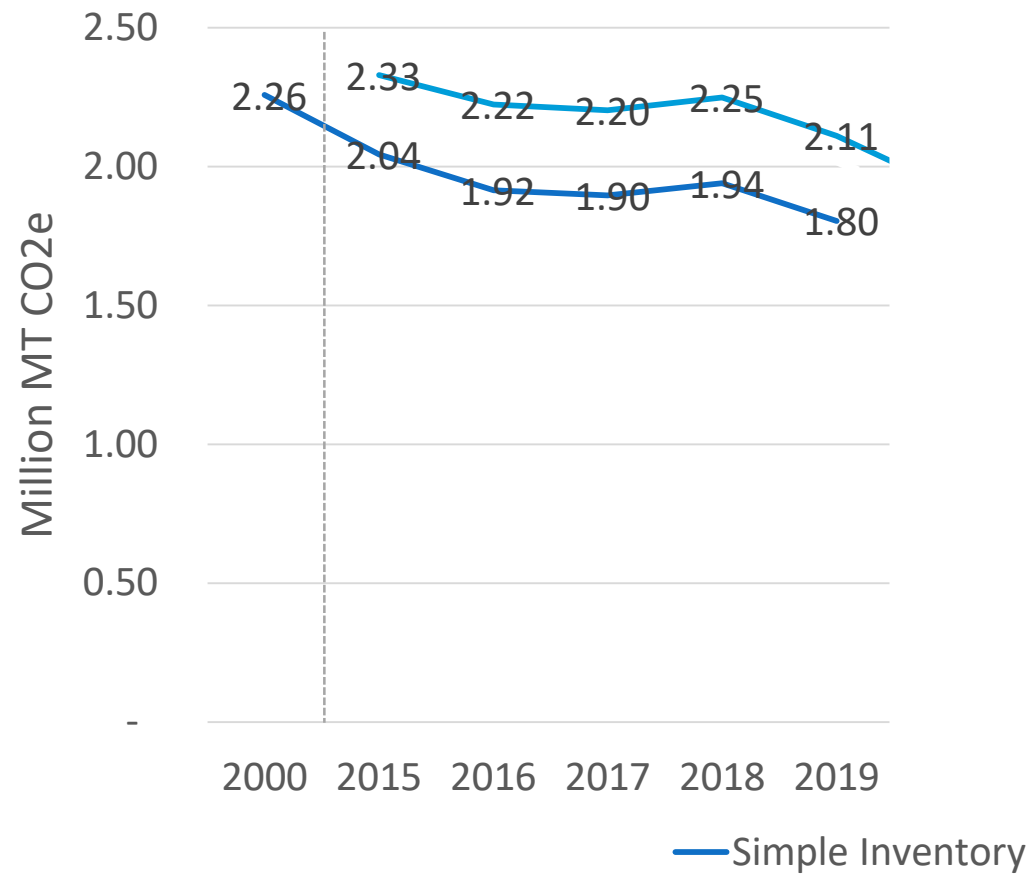
Expanded Inventory by Sector
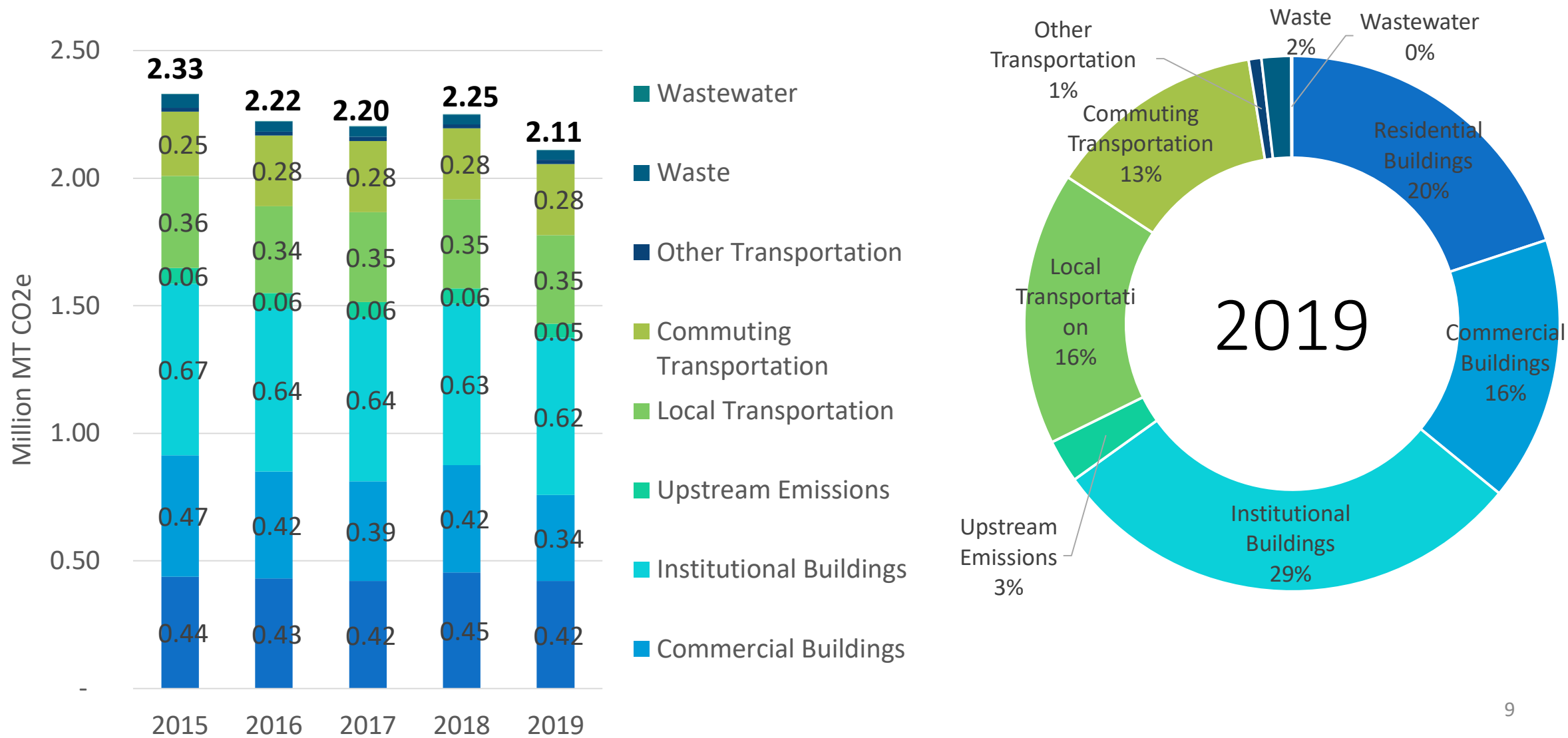
Expanded Inventory by Source

Stationary Energy Emissions

65% Emissions

Institutional Buildings 45%

Residential Buildings 31%

Commercial Buildings 24%

2019

Million MT CO2e

- Institutional Buildings
- Commercial Buildings
- Residential Buildings

Year	Institutional	Commercial	Residential	Total
2015	0.67	0.47	0.44	1.59
2016	0.64	0.42	0.43	1.49
2017	0.64	0.39	0.42	1.45
2018	0.63	0.42	0.45	1.51
2019	0.62	0.34	0.42	1.37
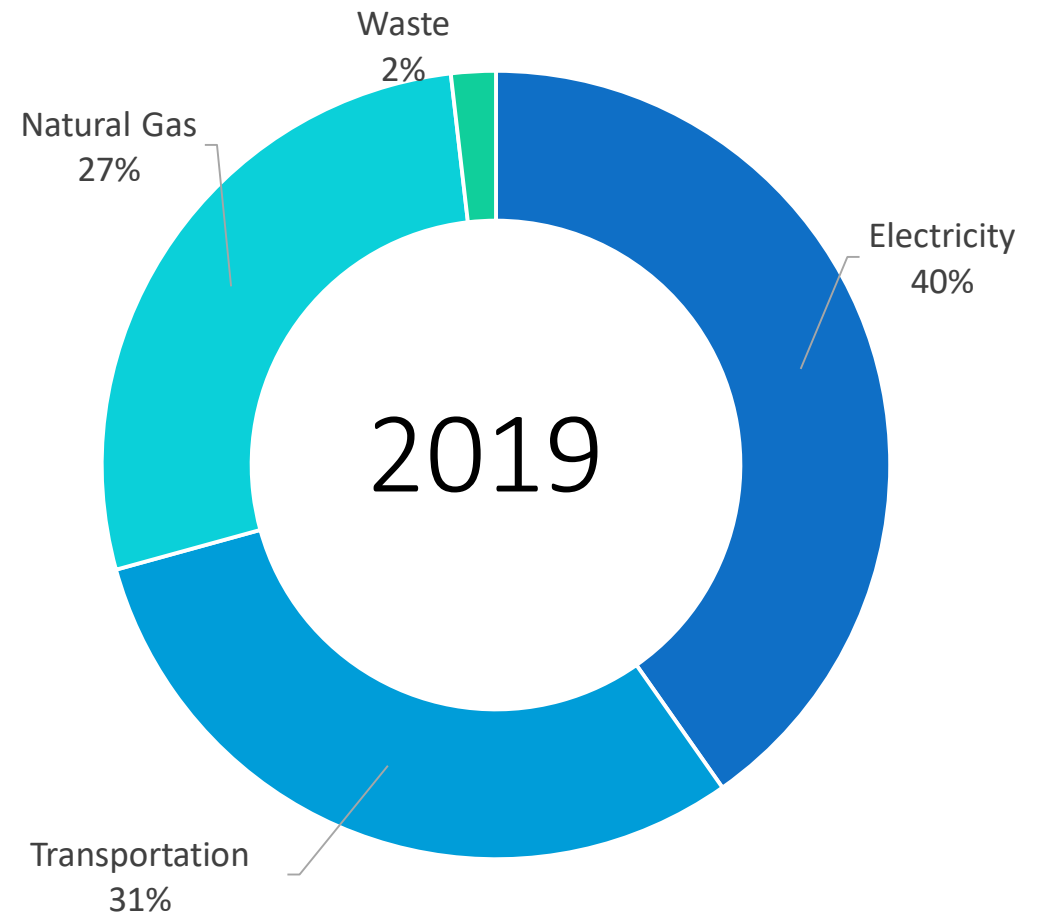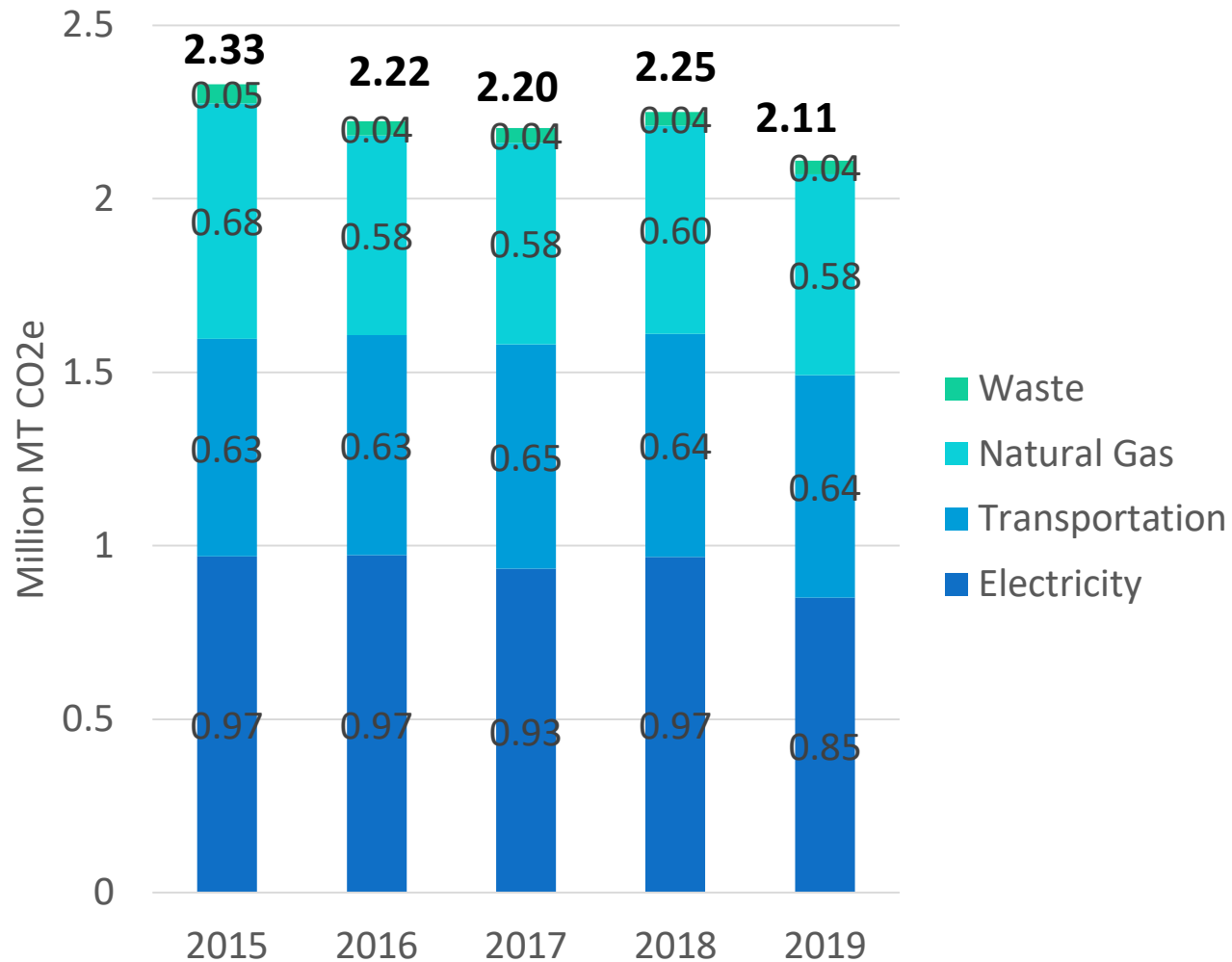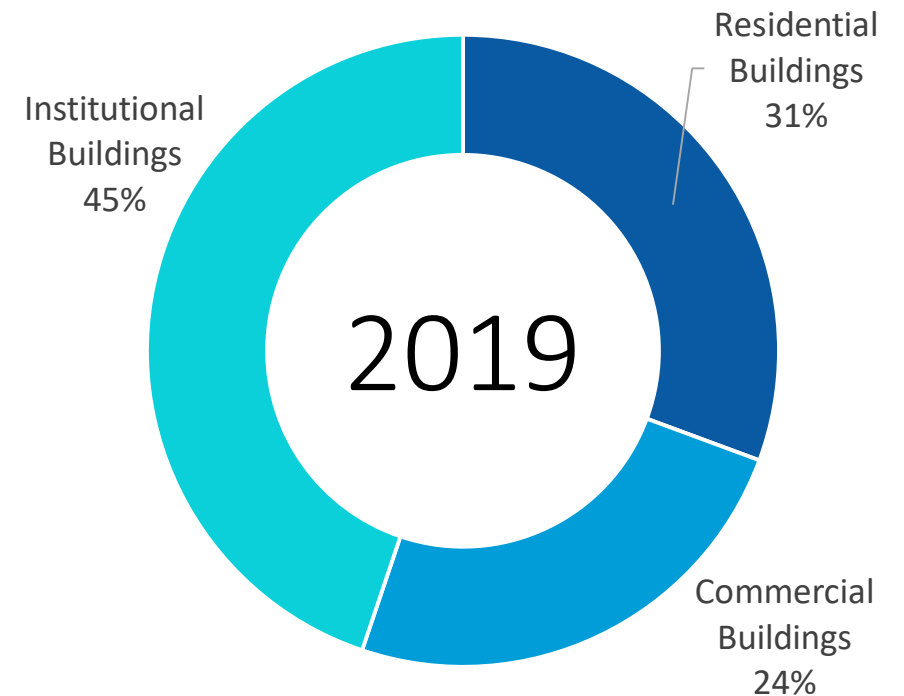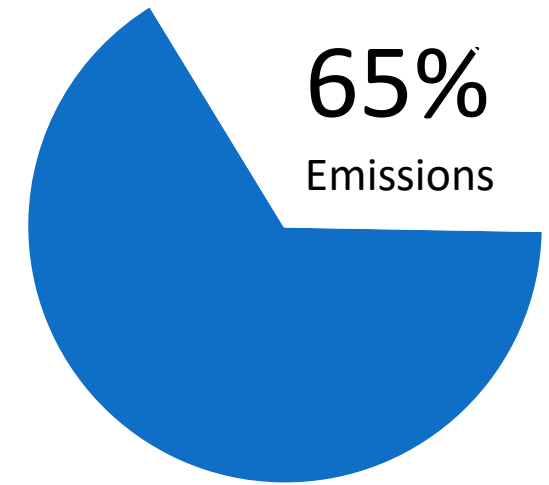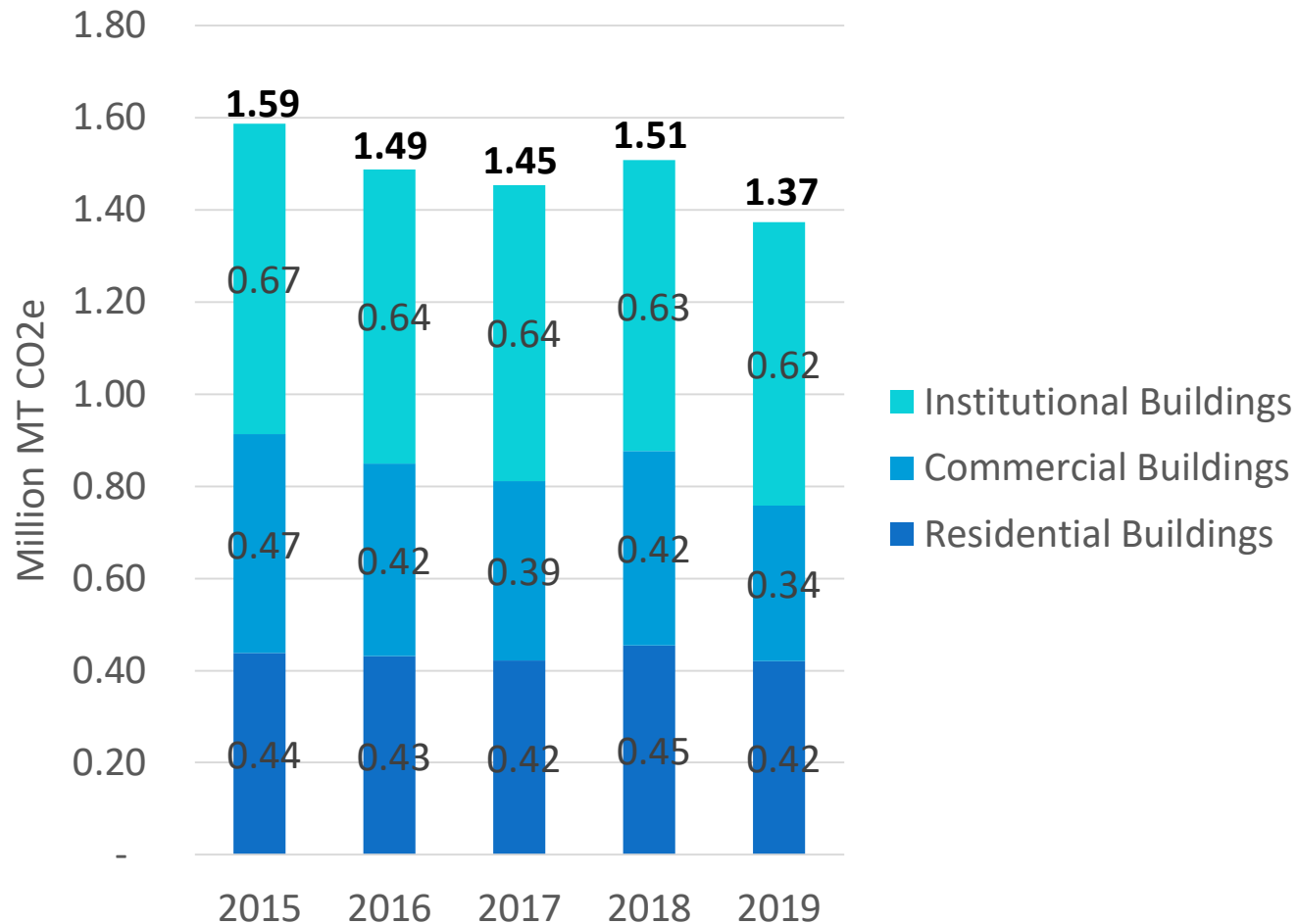
University of Michigan Buildings

Bar chart — Million MT CO_2e by year:

Year	Natural Gas (top, Propane/Fuel Oil)	Electricity (bottom)	Total
2015	0.32	0.35	0.67
2016	0.27	0.36	0.64
2017	0.28	0.36	0.64
2018	0.28	0.35	0.63
2019	0.27	0.34	0.62

Legend: Fuel Oil, Propane, Natural Gas, Electricity

29% Emissions

2019 donut chart:
- Natural Gas (Energy Production) 7%
- Propane 0%
- Fuel Oil 0%
- Electricity 56%
- Natural Gas (Buildings) 37%
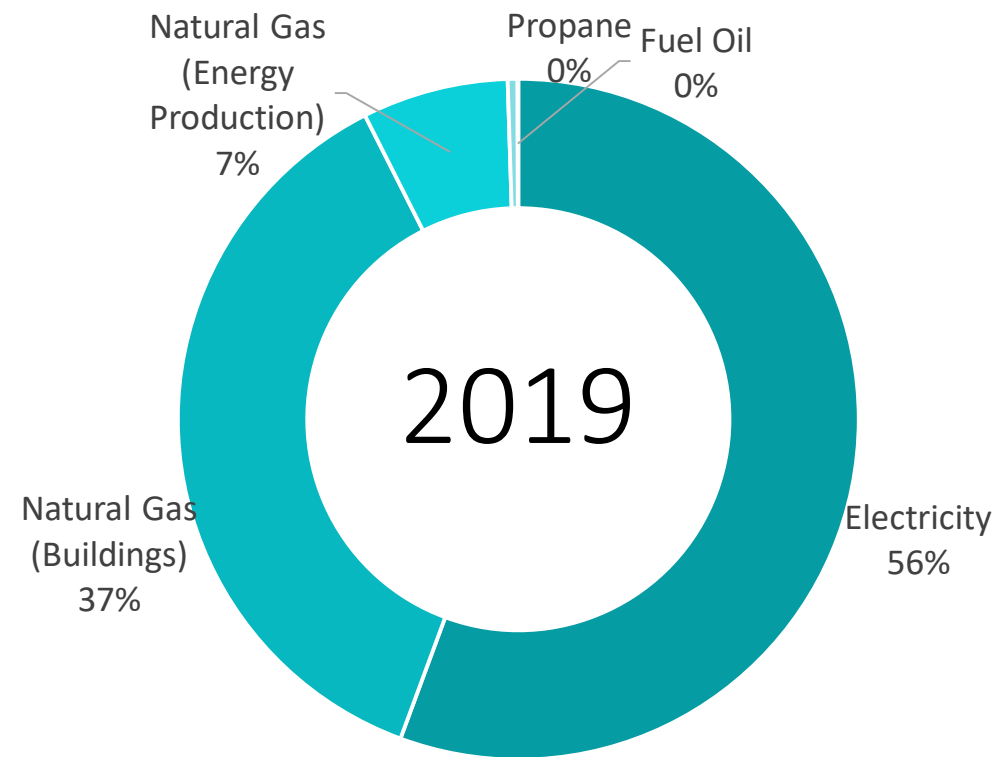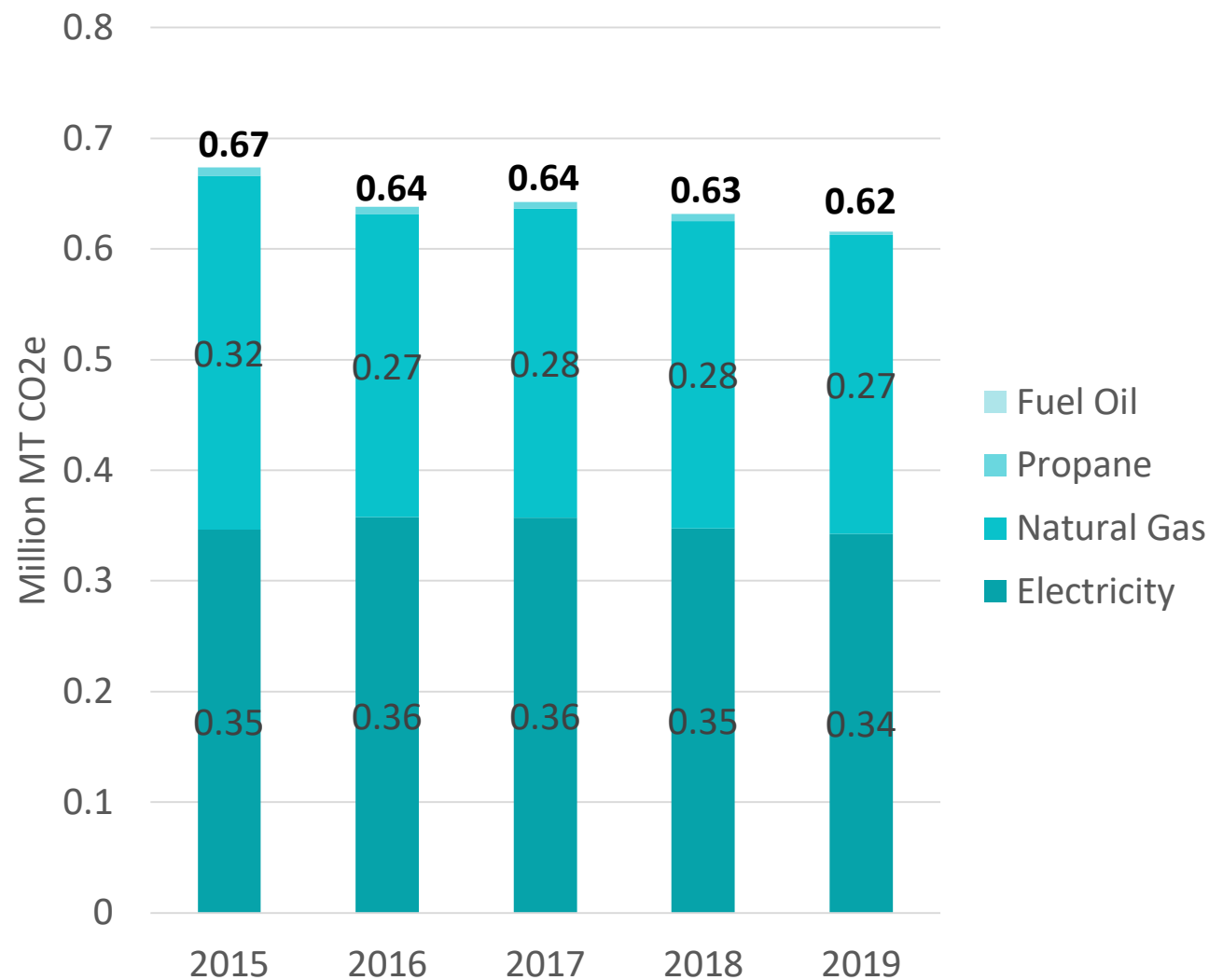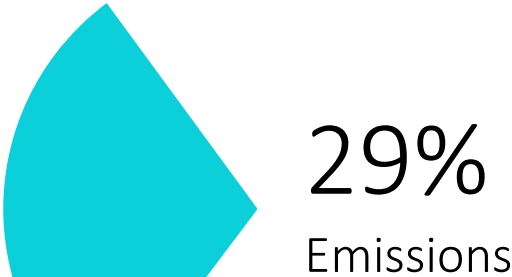
Institutional Building Notes

Emissions Per Ann Arbor Campus Capita
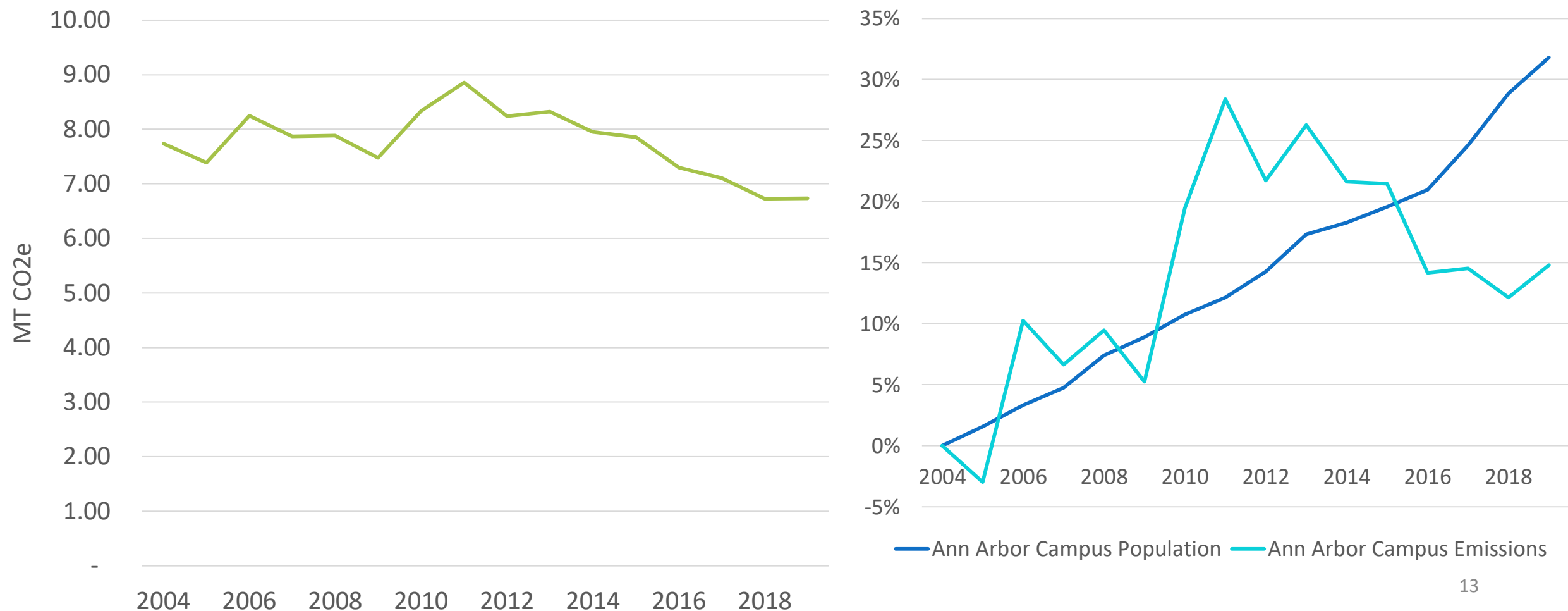
Residential Building Emissions
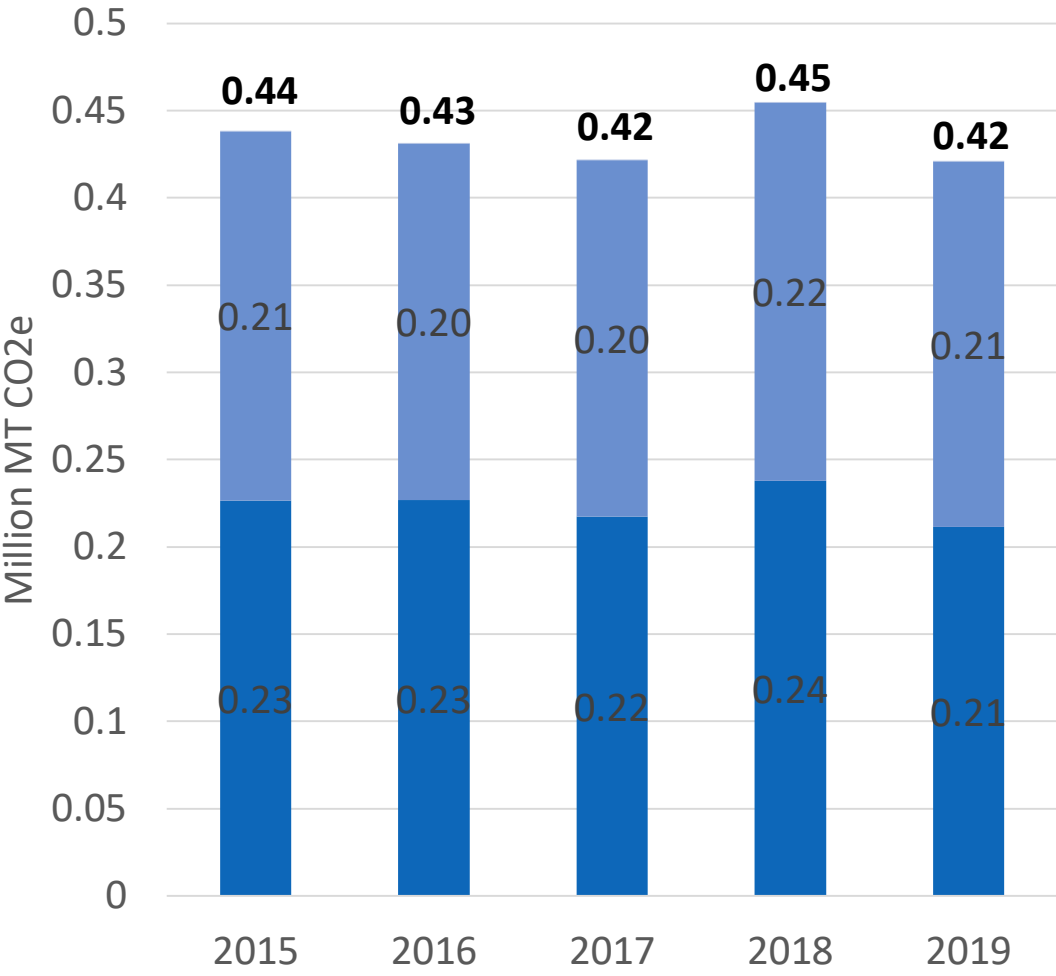
Residential Natural Gas Use Compared to Heating Degree Days

Commercial Buildings
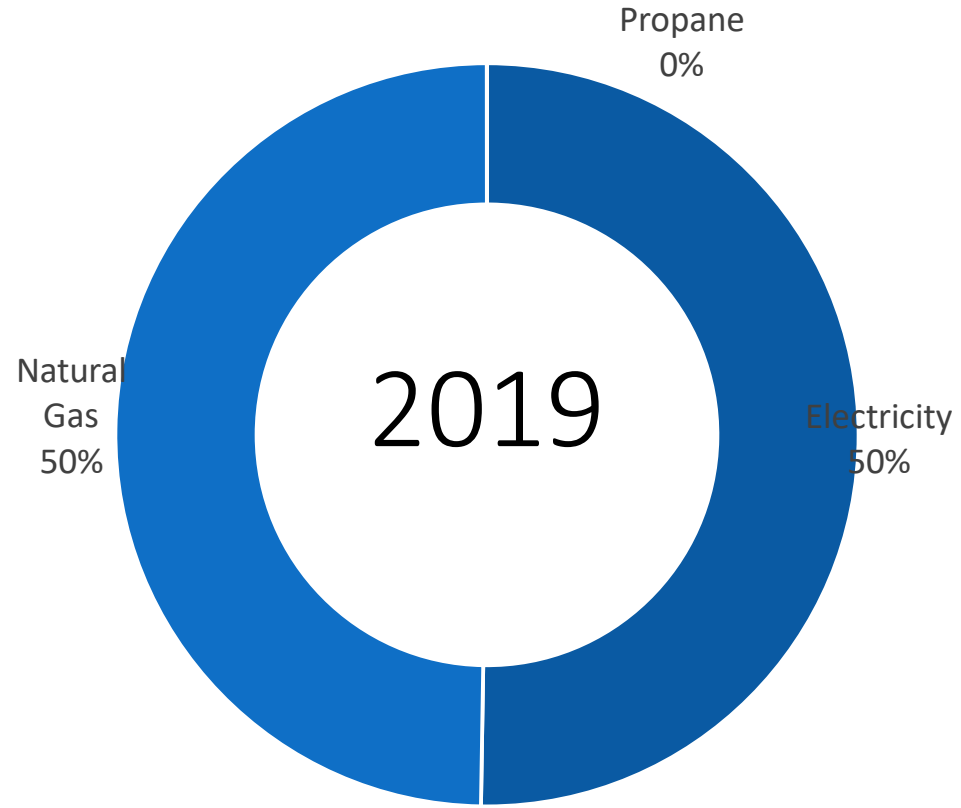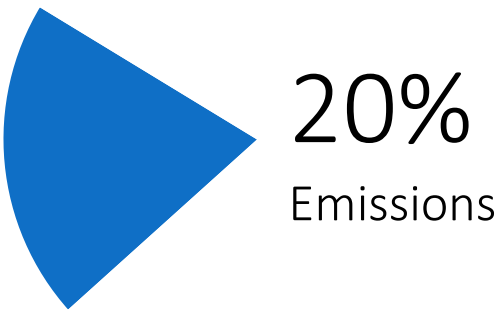
16% Emissions

Million MT CO2e

Year	Natural Gas	Electricity	Total
2015	0.12	0.36	**0.47**
2016	0.07	0.36	**0.42**
2017	0.07	0.32	**0.39**
2018	0.08	0.34	**0.42**
2019	0.08	0.26	**0.34**

- Natural Gas
- Electricity

2019

Natural Gas, 23%
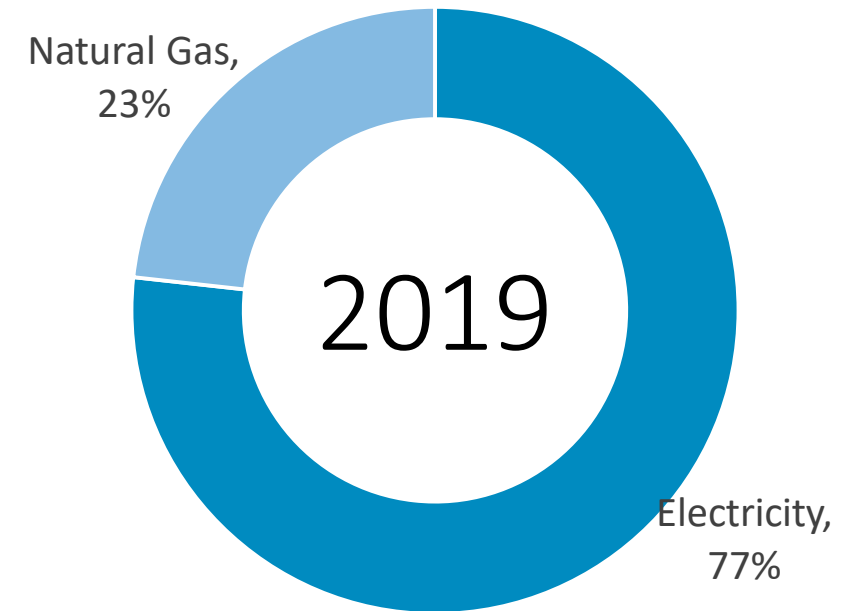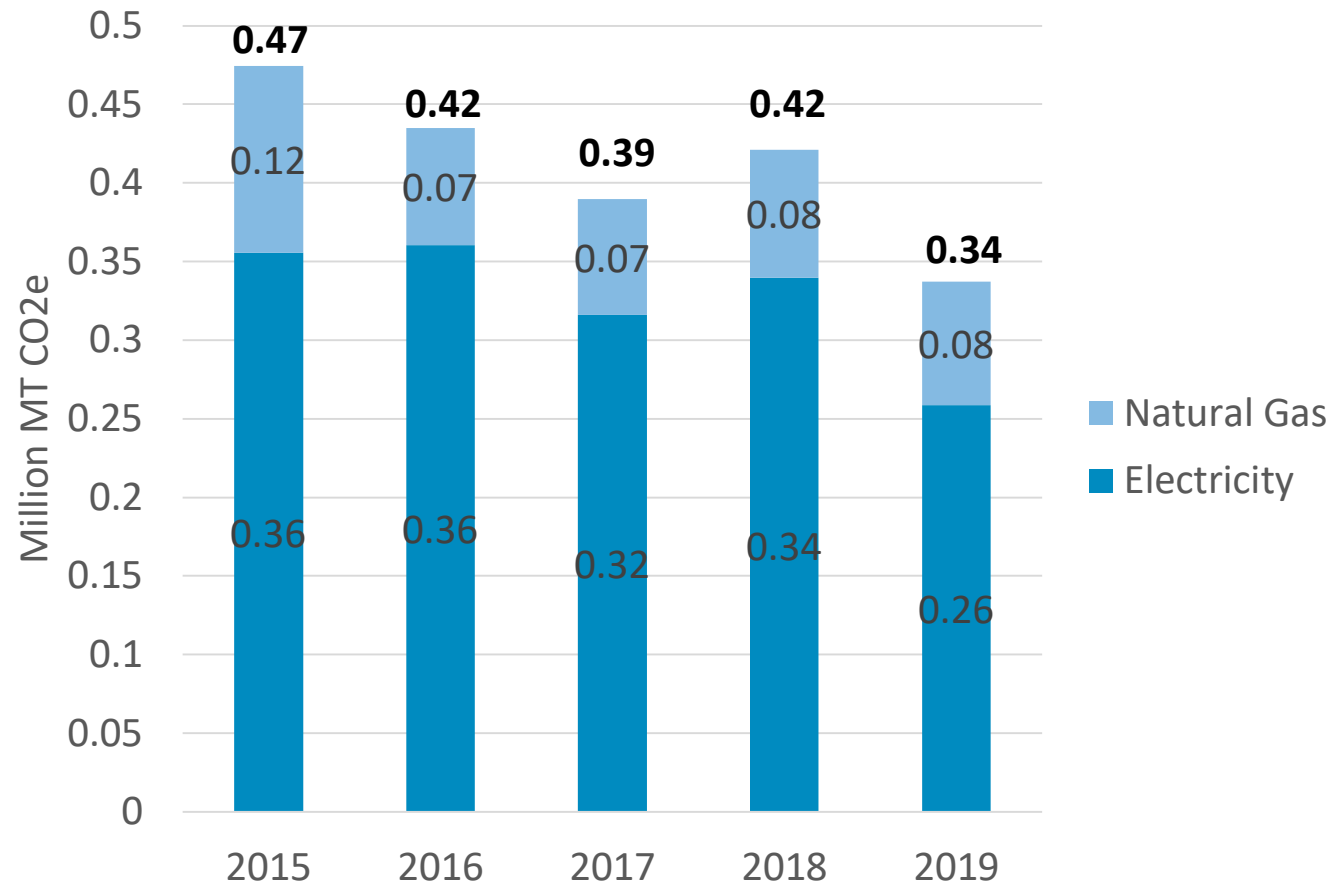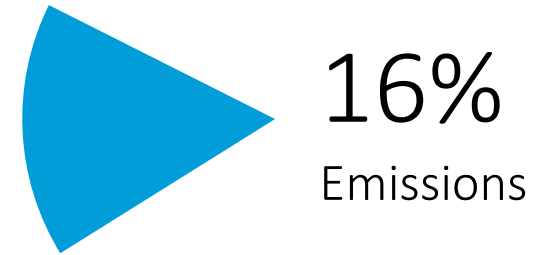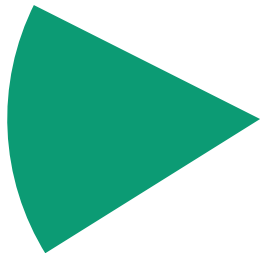
Electricity, 77%

Commercial Electricity Use Correlation to Cooling Degree Days

Transportation Emissions

30%
Emissions

2019

Buses 2%
Aviation 1%
Rail 0%
Commuting 43%
Local Transportation 54%

Million MT CO2e

Aviation
Rail
Buses
Commuting
Local Transportation

Year	Commuting	Local Transportation	Total
2015	0.25	0.36	0.63
2016	0.28	0.34	0.63
2017	0.28	0.35	0.65
2018	0.28	0.35	0.63
2019	0.28	0.35	0.62
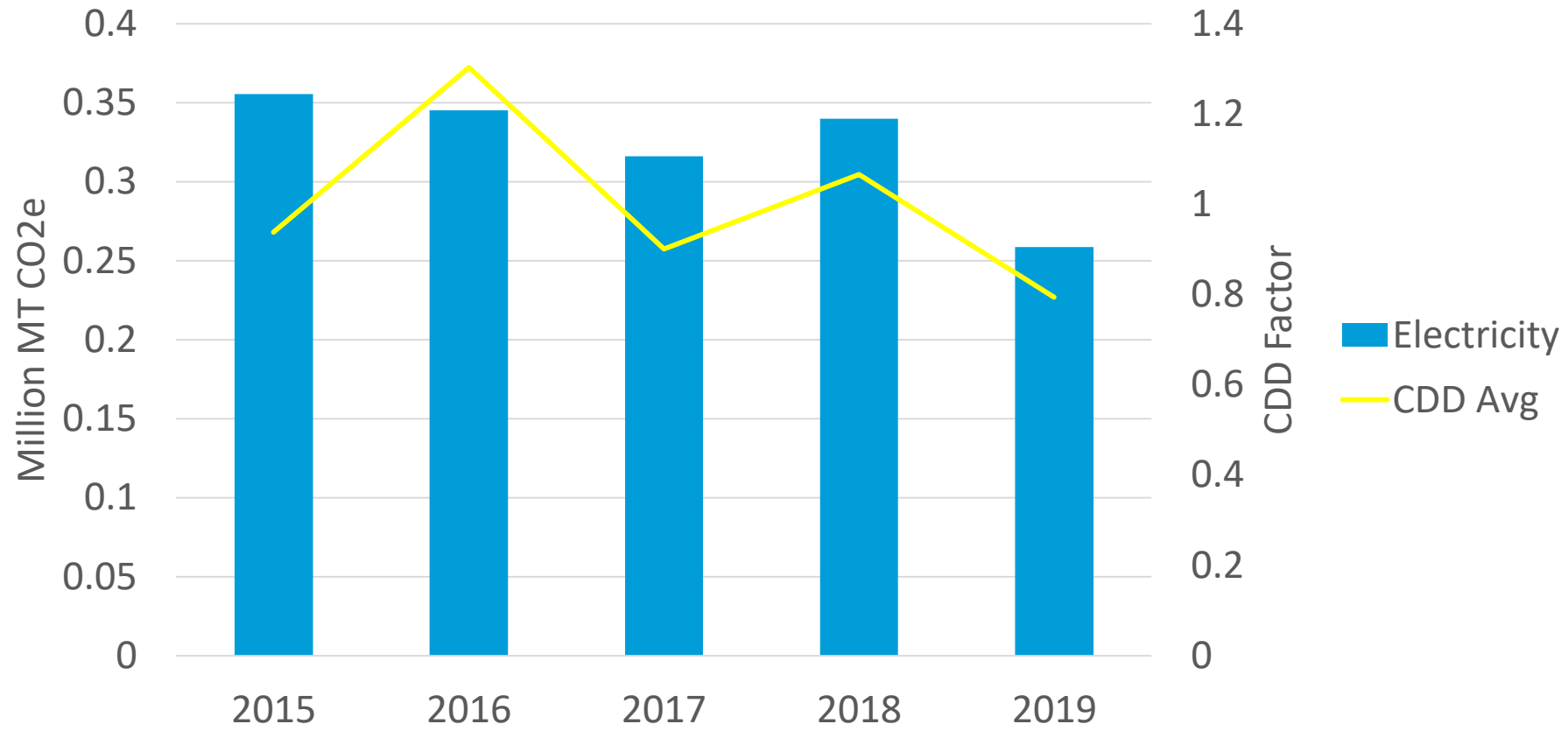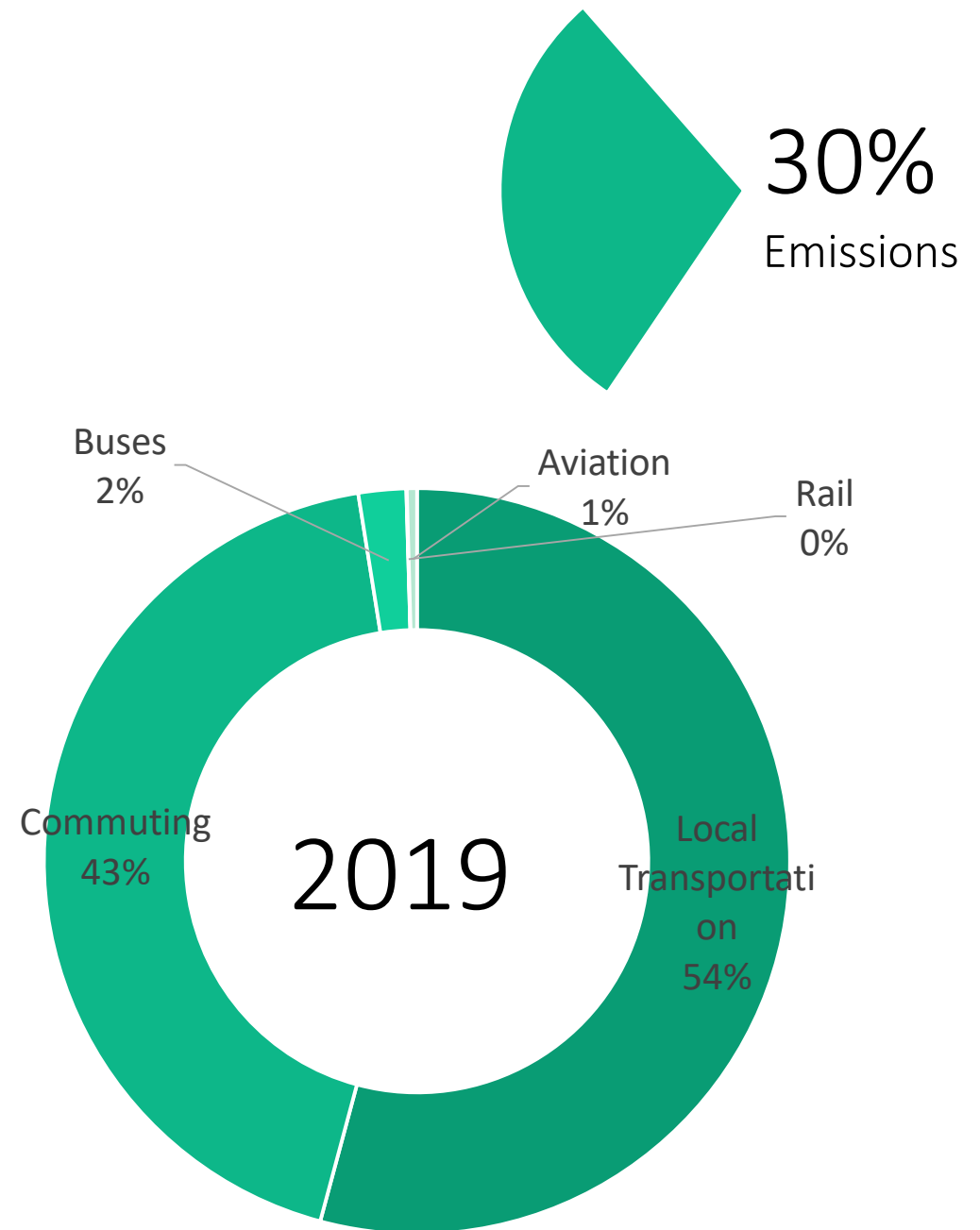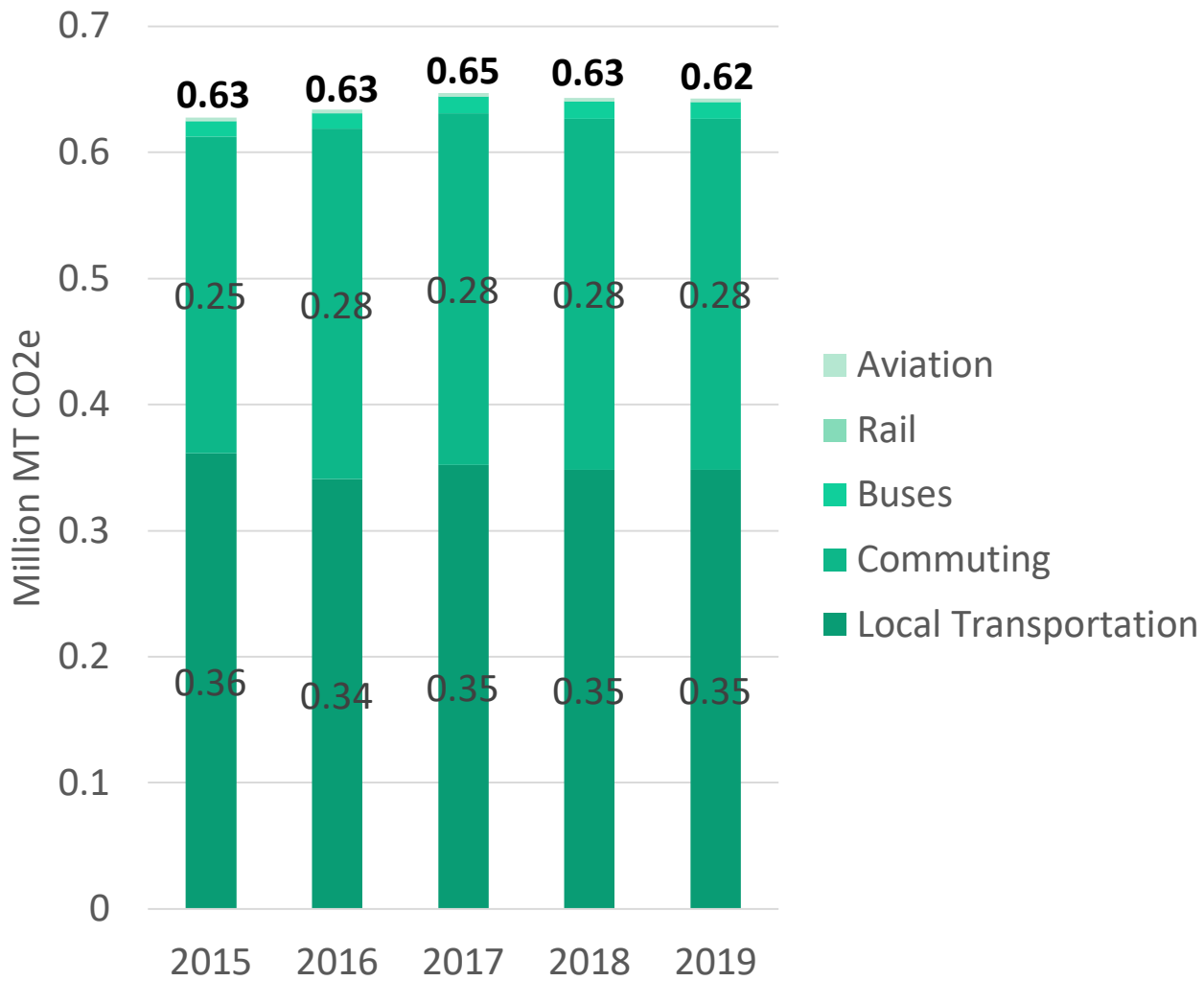
Local Transportation Emissions

16%
Emissions

Million MT CO2e

0.36	**0.34**	**0.35**		**0.35**
0.03	0.03	0.03	0.03	0.03
0.33	0.31	0.32	0.32	0.32
2015	2016	2017	2018	2019

Commercial

Passenger

Commercial
8%

2019

Passenger
92%

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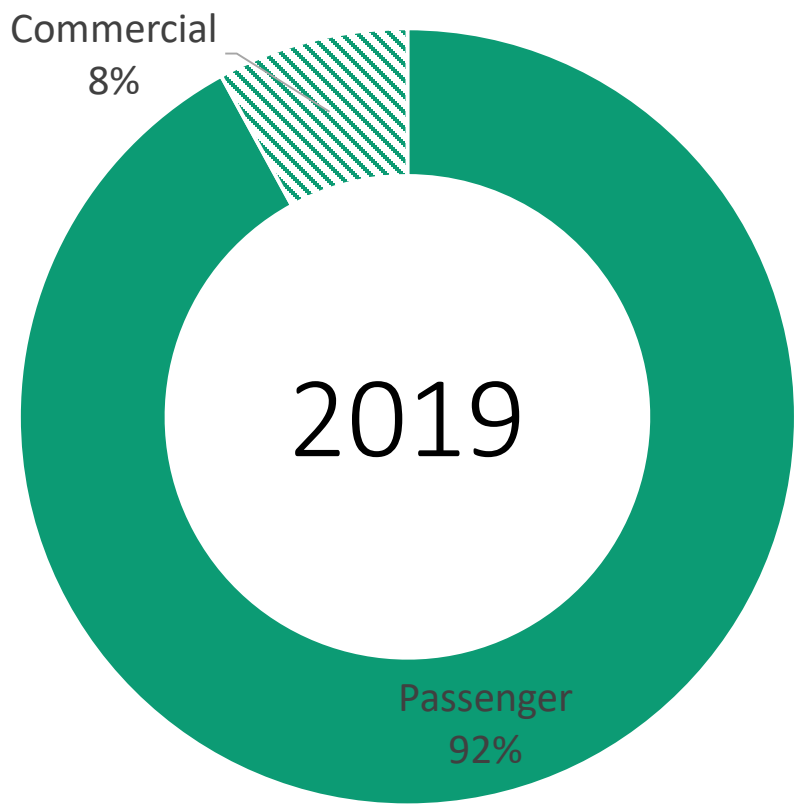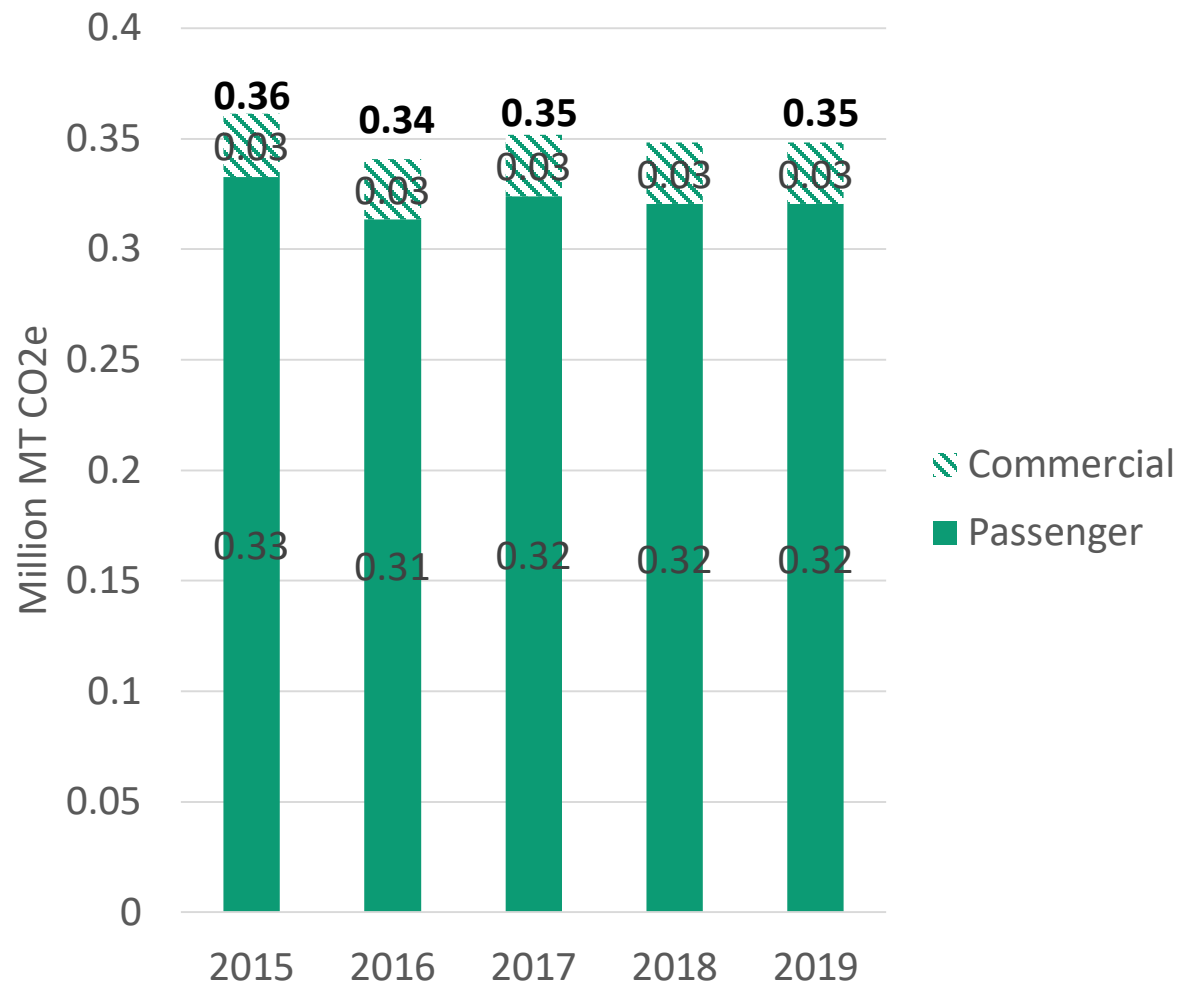
Upstream Emissions

3% Emissions

Chart — Million MT CO2e by year:

Year	Local Fugitive Gas Emissions	Transmission and Distribution Losses	Total
2015	0.021	0.040	0.061
2016	0.018	0.043	0.061
2017	0.018	0.043	0.061
2018	0.019	0.042	0.061
2019	0.018	0.037	0.055

Legend:
- Local Fugitive Gas Emissions
- Transmission and Distribution Losses

2019 donut:
- Local Fugitive Gas Emissions 33%
- Transmission and Distribution Losses 67%

Waste and Wastewater Emissions

2% Emissions

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Looking Forward

Simple Inventory → **Expanded Inventory** → **Expanded+ Inventory**

- Evaluate long-term progress

  - Next step:
    - Posting calculations, guide, and report for transparency

- A better understanding of where we are now

- **Next steps:** Include consumption-based emission sources
  - More transportation activities (flights)
  - Food, goods, and services
  - Embodied carbon in buildings
  - RECs and offsets

Thank You

Questions?