Edmonds CAP and GHG Inventory Update

January 2019 – Public Open House

Overview

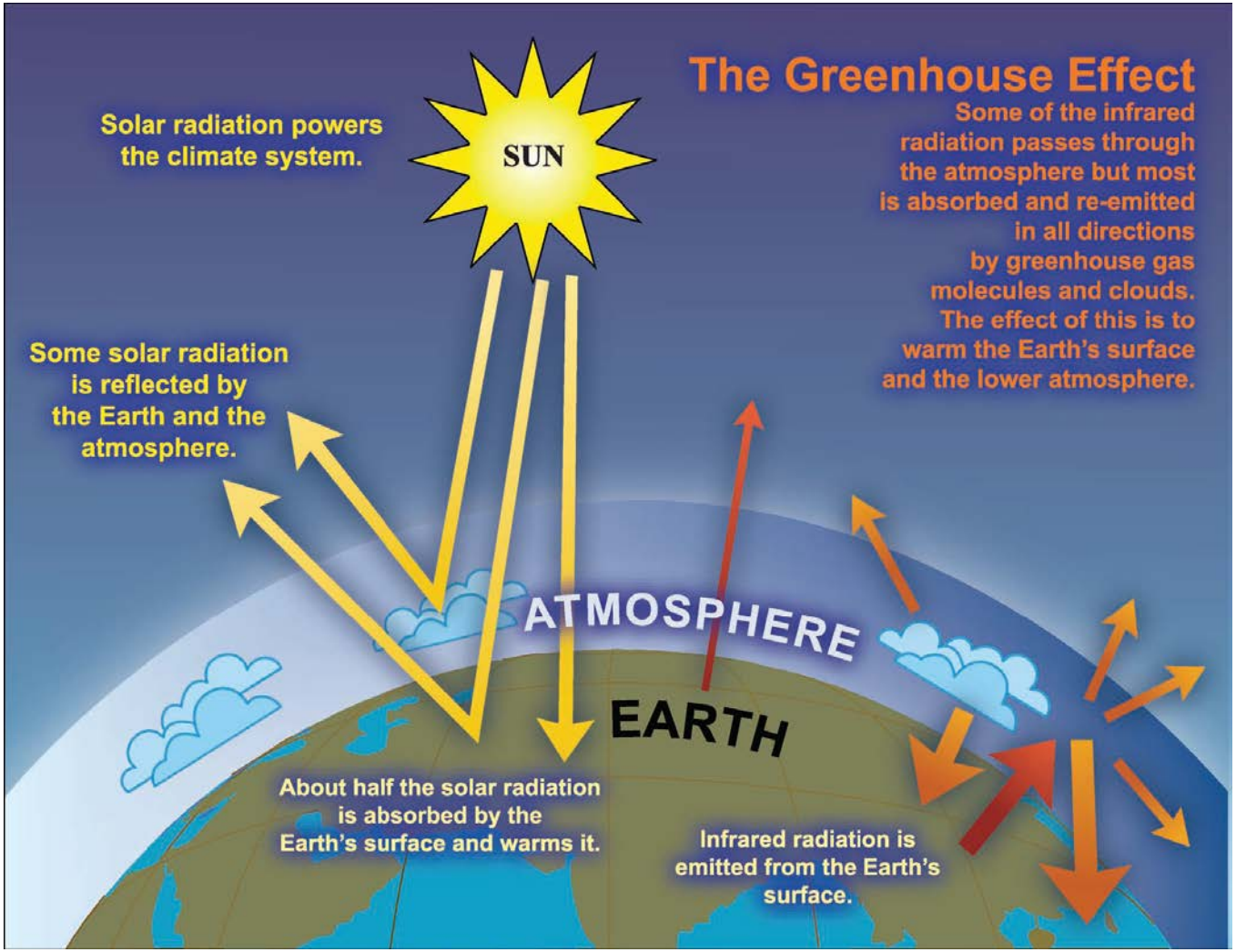
- Background
- GHG Inventory
- Targets
- Policy Gaps
- Next steps

Background

Edmonds 2009 GHG Inventory

and

2010 Climate Action Plan



Overview

- What are greenhouse gases (GHGs)?
  - Gases that trap heat in the atmosphere:
    - Carbon Dioxide
    - Methane
    - Nitrous Oxide
    - Fluorinated hydrocarbons

What does MT CO2e mean?

Metric tons of CO2 equivalent

GHG Inventory

- Fossil fuel inventory
  - Local fuel combustion

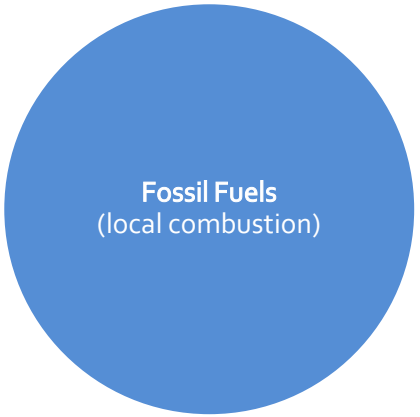
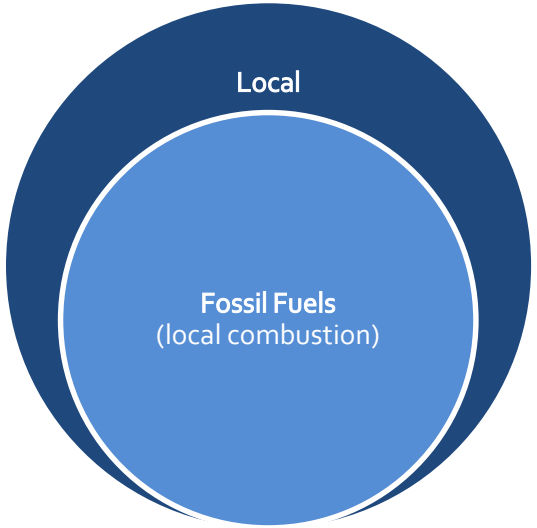


Figure 1: Visual representation of Edmonds' 2017 Community GHG Emissions.

GHG Inventory

- Fossil fuel inventory
  - Local fuel combustion
- "Local" inventory
  - Fossil fuel emissions
  - Imported electricity
  - Waste emissions
  - Fugitive emissions (refrigerant gases, local natural gas loss)



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  - Fossil fuel emissions
  - Imported electricity
  - Waste emissions
  - Fugitive emissions (refrigerant gases, local natural gas loss)
- Local + Household Consumption (local + imported)
  - Local emissions
  - Emissions from imported food, goods and use of services (fertilizers, production, transportation)
  - Upstream fuel production

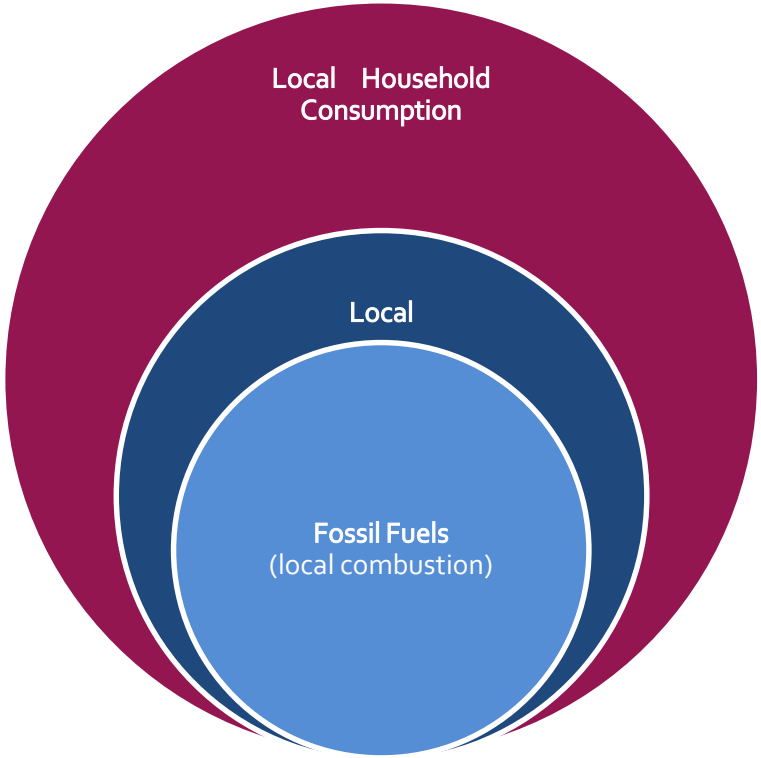

Figure 1: Visual representation of Edmonds' 2017 Community GHG Emissions.

What GHG emissions were measured?

- Emissions from sources located within the city boundary
- Emissions from grid-supplied electricity consumed within the city limits
- Emissions that occur outside the city boundary as a result of activities taking places within the City's geographic boundary

Emissions Sector / Sub-Sector	Included in Edmonds Inventory
Stationary Energy	
Residential Buildings	•
Commercial Buildings and Facilities	•
Industrial Facilities	•
Energy Generation Supplied to the Grid	•
Transportation	
On-Road Passenger and Commercial Vehicles	•
On-Road Freight Vehicles	•
On-Road Transit Vehicles	•
Off-Road Vehicles and Equipment	•
Waterborn Navigation	•
Waste	
Solid Waste Generated in City	•
Wastewater Generated in City	•
Biological Treatment of Waste Generated in City	*NO*
Incineration of Waste Generated in City	•
Industrial Process and Product Use	
Product Use (refrigerants)	•
Fugitive Emissions from Natural Gas Systems	•
Industrial Processes	*NO*
Agriculture, Forestry, and Land Use	
Livestock	*NO*
Land	*NE*
Other Agriculture	*NO*
Other Scope 3 Emissions Sources	
Household Consumption	•
Upstream Energy Production	•

Local emissions

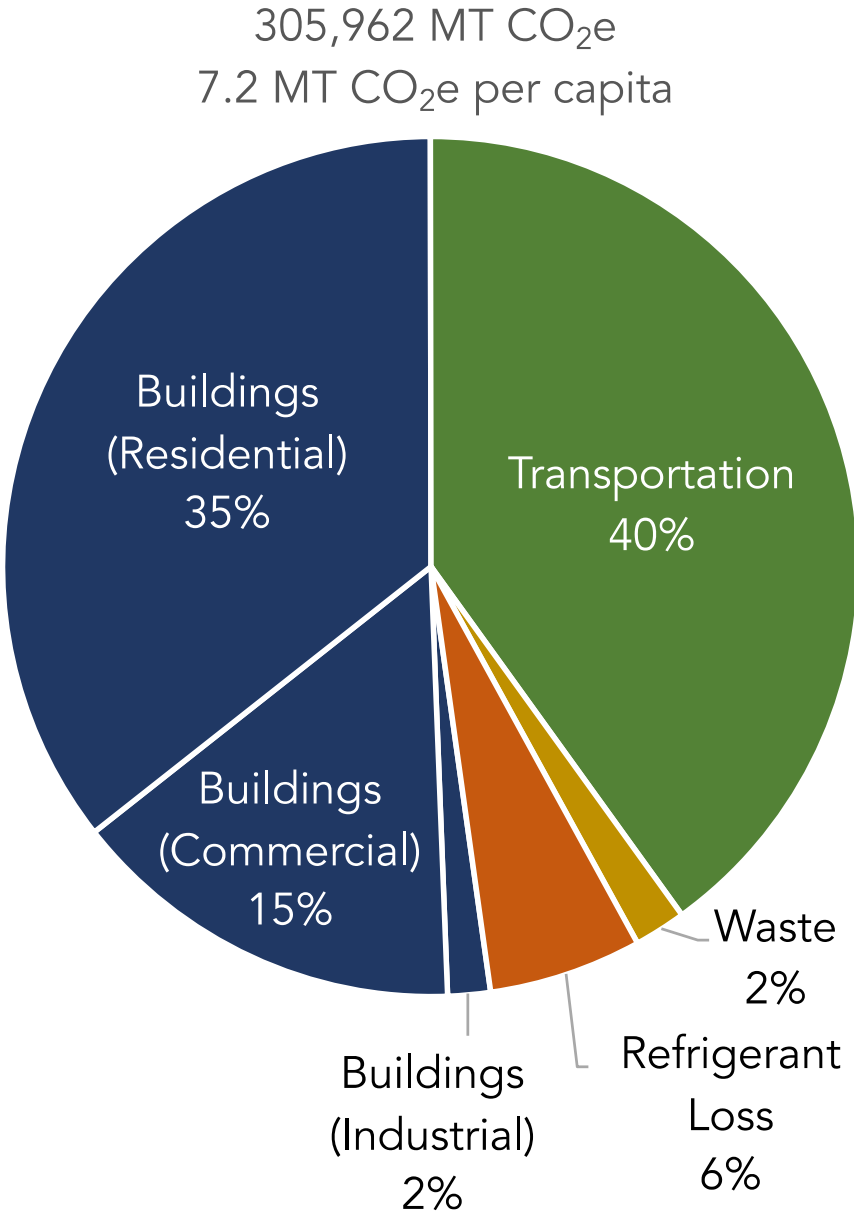

Figure 1: Edmonds 2017 Local GHG Emissions.

Note : **Figure 5** *presents location-based emissions for electricity.*

Local emissions + Household Consumption-related emissions (imported)

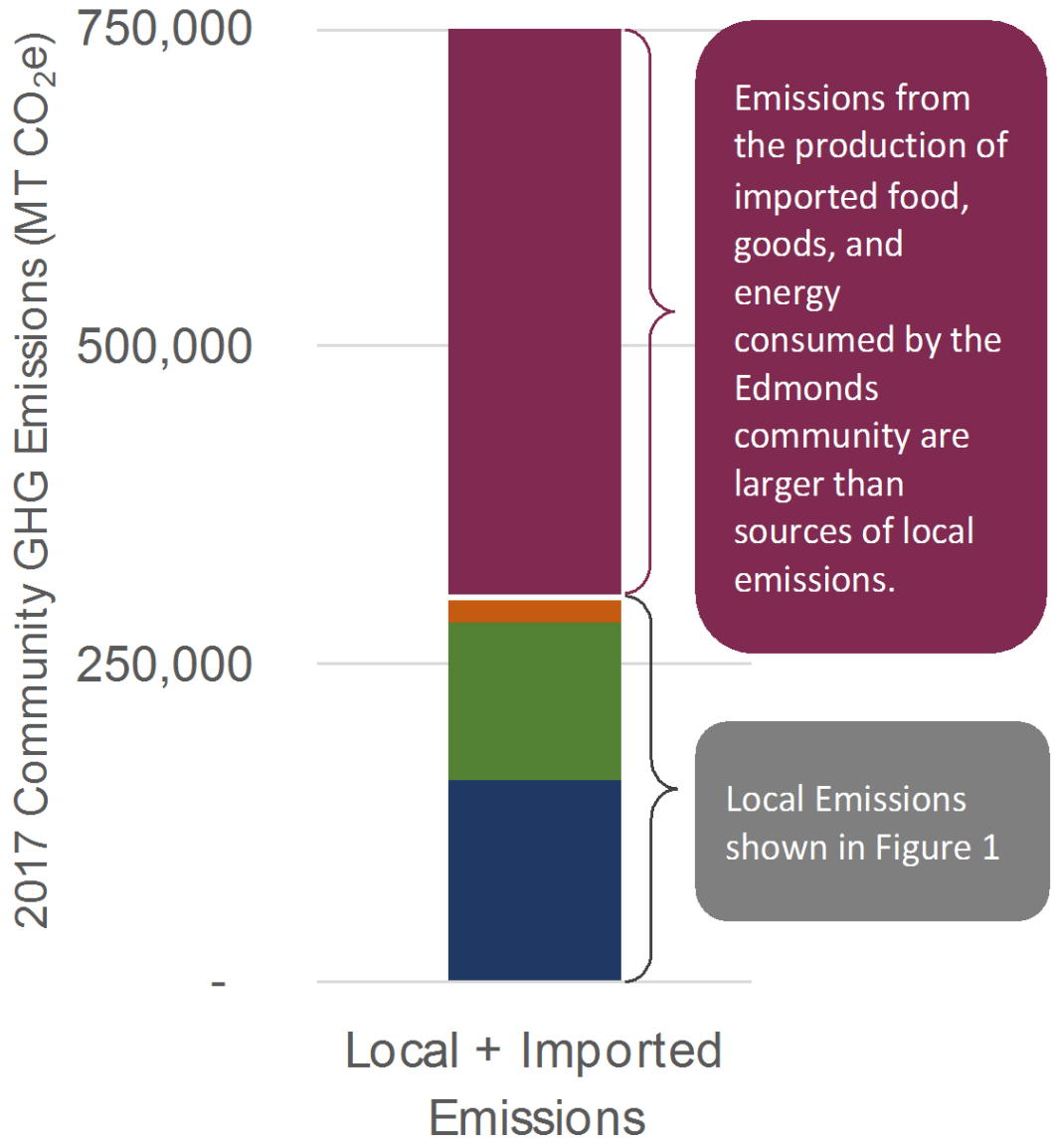

Figure 2: Total sector-based emissions compared to sector and consumption-based emissions.

GHG from Energy Consumed in Buildings

- Note share of GHG from Electricity vs Natural Gas
- Inventory uses a “location-based” approach for GHG from electricity

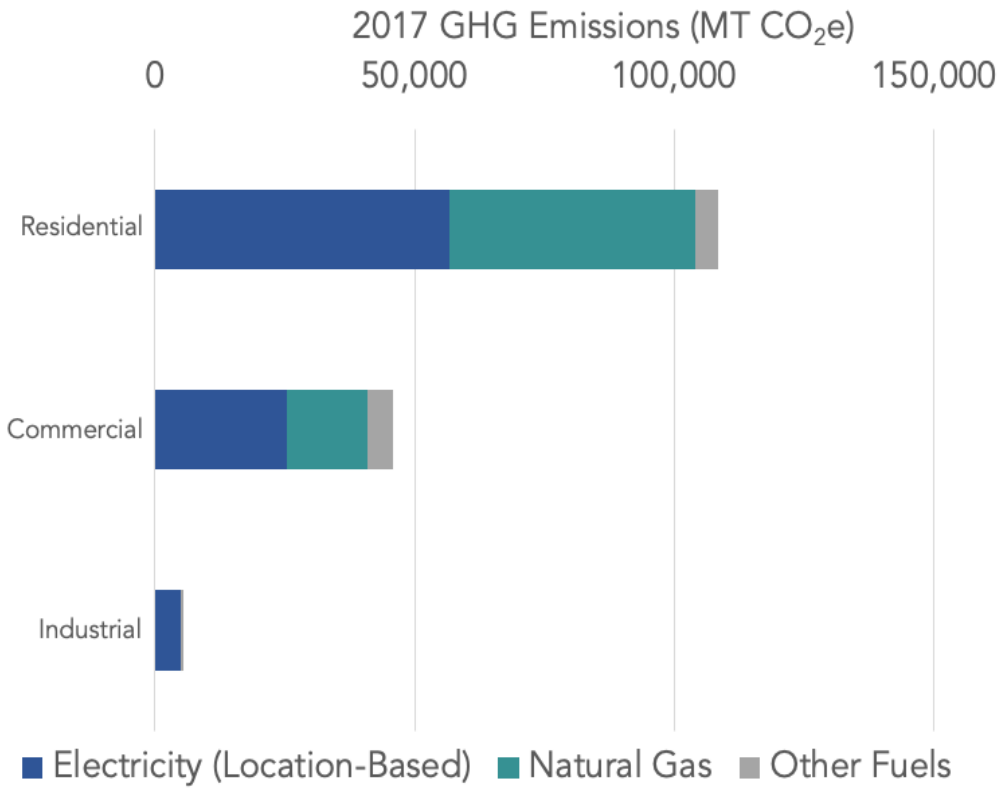

Figure 8: Comparison of stationary energy use, by sub-sector and energy type.

Electricity

- ***Location-based emissions*** are calculated using the regional electricity grid's GHG intensity and represent the average impacts of electricity use and efficiency efforts.
- ***Market-based emissions*** are based on the GHG intensity of electricity contracts with local utilities. Snohomish PUD's electricity generation from Bonneville Power Administration are largely served by low-GHG hydroelectric and nuclear power.

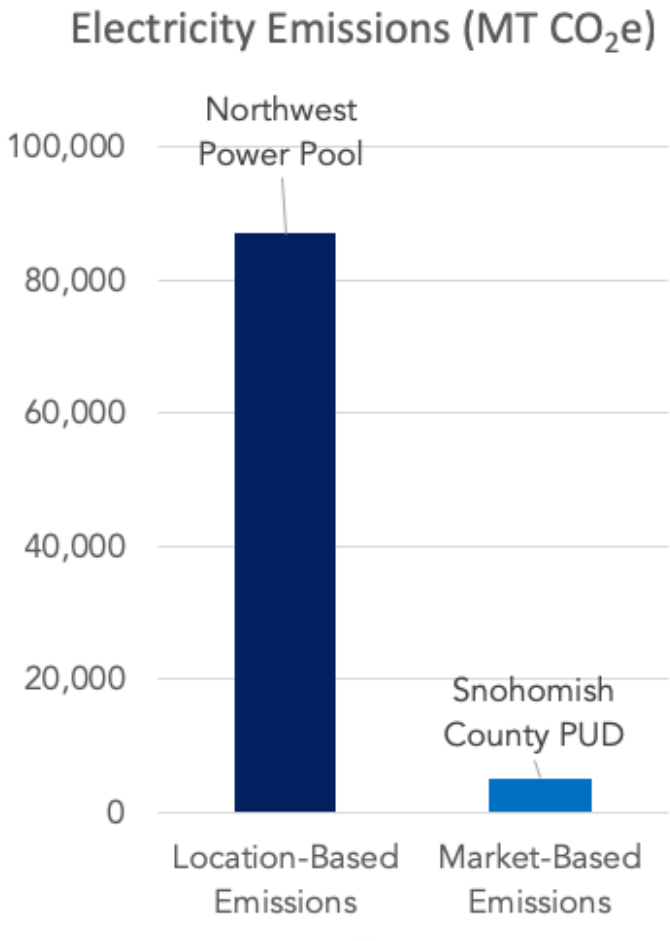

Figure 9: Comparison of electricity emissions.

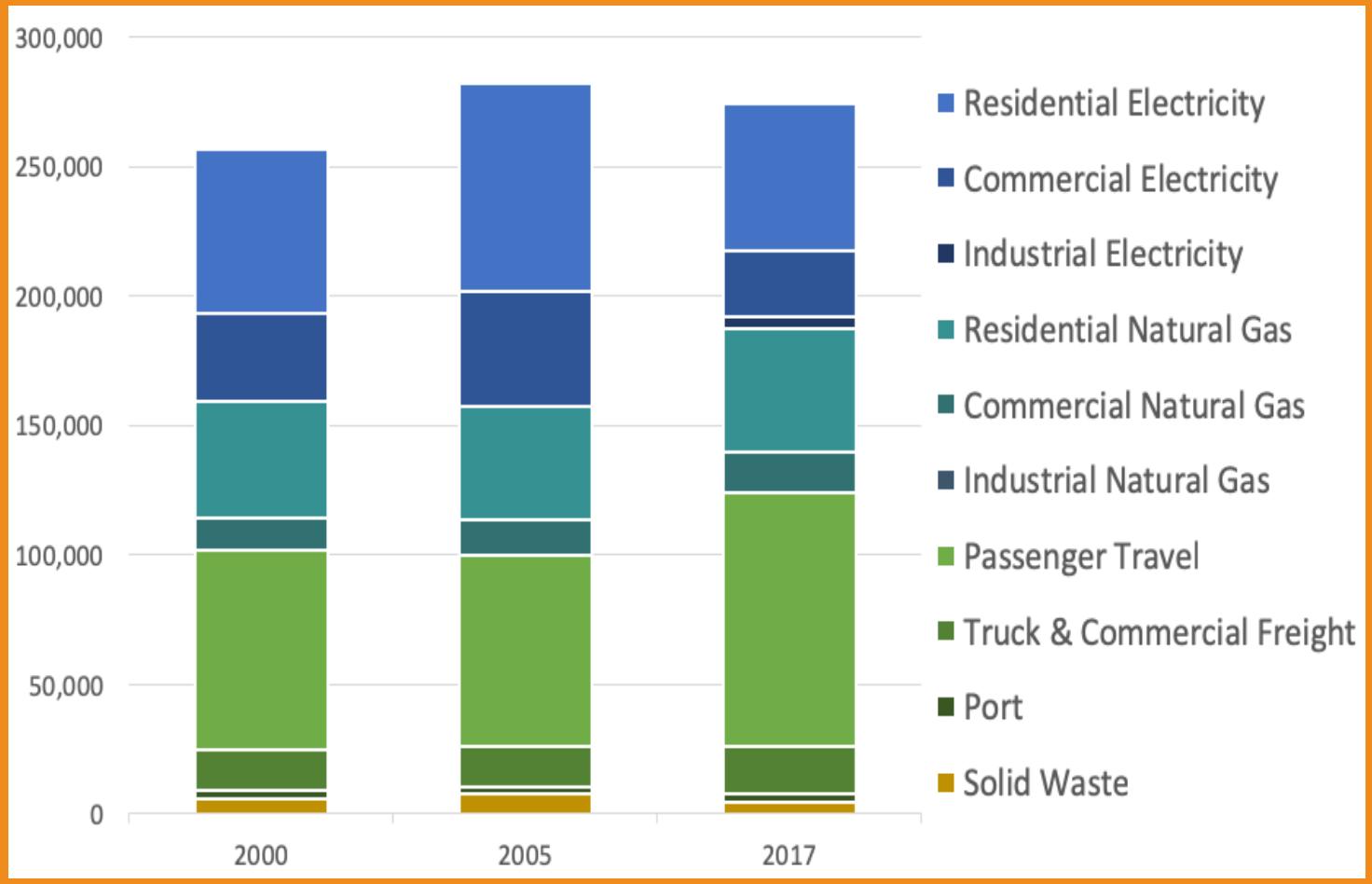

Figure 5: Comparison of Edmonds historical emissions (reported in MT CO_2e).

Targets

- Setting a Target
- Rates of GHG Reduction Needed
- How Urgent is Our Situation?

Setting a Science-Based Target

	Science-based targets		
Celsius	**1°**	**1.5°**	**2°**
Fahrenheit	**1.8°**	**2.7°**	**3.6°**

- *A science-based climate target sets a rate of climate action that is aligned with keeping average global temperature increases below a specified level of increase compared to pre-industrial temperatures.*

- Keeping global temperature increases below 2°C will allow the majority, but not all, of the global population to avoid the worst social and economic effects of climate change (Paris Agreement)

- **The average temperature of the earth is approximately 1.2°C higher today than at the beginning of the industrial revolution.**

What are the Options?
What Rates of GHG Reduction are Required?

Target			
+1.0°C 350 ppm		**+1.5°C 400 ppm**	**+2.0°C 450 ppm**
Average Annual Rate of Reduction to Meet Target (rounded)			
8%		5%	2%
Cumulative GHG Reduction compared to 2010 (values are rounded for simplicity)			
By 2020	15%	13%	10%
By 2030	70%	50%	35%
By 2050	100%	100%	80%

Table 2: Target options, associated rates of reduction, and other agencies using these temperatures.

How Urgent is Our Situation and What Can We Expect Moving Forward?

Existing international and domestic activities and policies remain inadequate to prevent a 2°C warming.

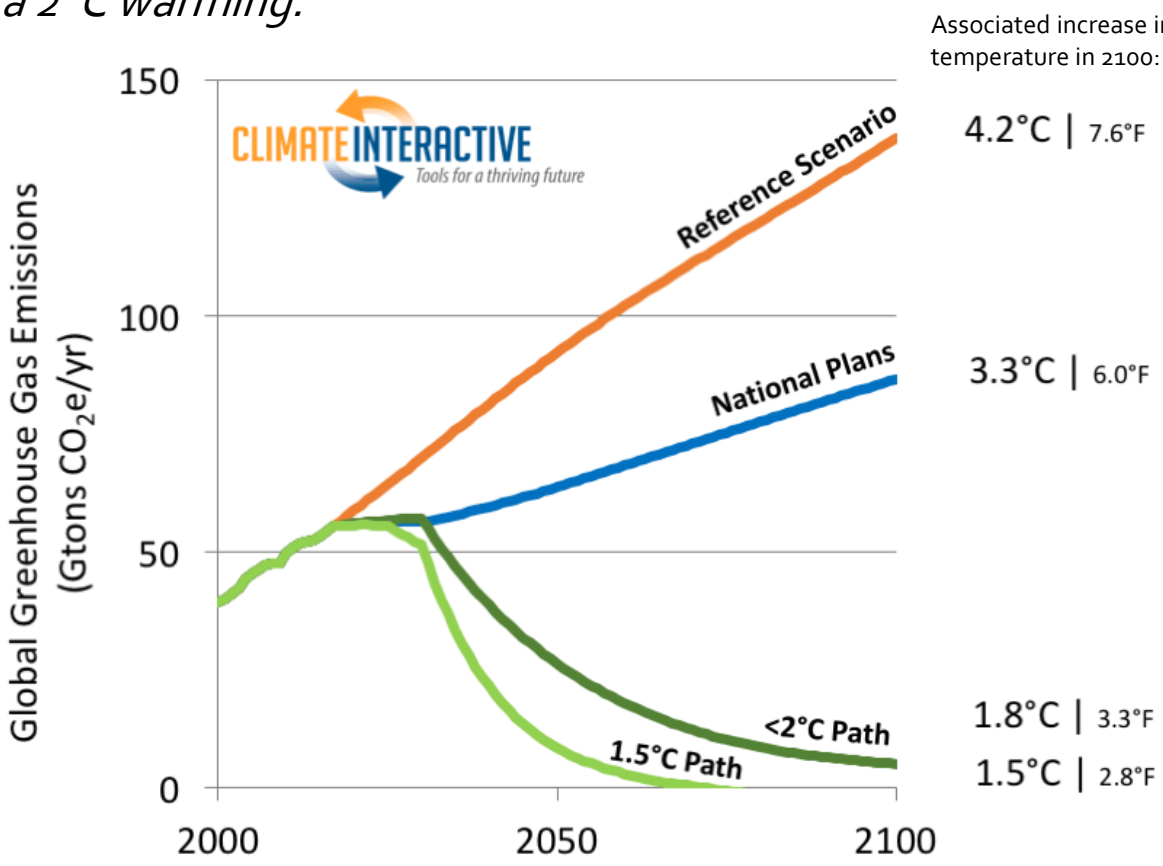

Figure 2: Climate Interactive estimated increase in temperature forecast based on UN modeling.

Physical Conditions: Global Sea Level Rise

+1°C	+1.5°C	+2.0°C
7-ft sea level rise globally	9.4-ft sea level rise globally	15-ft sea level rise globally

Climate Central *Surging Seas Seeing Choices* tool.

Physical Conditions: Global Sea Level Rise

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In Edmonds, The Washington Coastal Resilience Project places a greater than 50% likelihood of a 4-foot rise in sea level by 2150, with seas continuing to rise after that date, if there is little reduction in carbon emissions.

Climate Central *Surging Seas Seeing Choices* tool.

Physical Conditions – Global environment

Physical Conditions	+1.5°C	+2.0°C
	Ocean acidity increase **9%**	Ocean acidity increase **24%**
	Frequency of warm extremes over land (PNW) increase **131%**	Frequency of warm extremes over land (PNW) increase **350%**
	Extreme heat: **14%** of global population exposed to severe heat at least once every 5 years	Extreme heat: **37%** of global population exposed to severe heat at least once every 5 years
	Population exposed to water scarcity worldwide: **271 million**	Population exposed to water scarcity worldwide: **388 million**
	Sea-ice-free arctic: at least **1 summer** every 100 years	Sea-ice-free arctic: at least **10 summers** every 100 years
	Species loss: **4% of vertebrates** lose at least half of their range	Species loss: **8% of vertebrates** lose at least half of their range
	Species loss: **8% of plants** lose at least half of their range	Species loss: **16% of plants** lose at least half of their range
	Species loss: **6% of insects** lose at least half of their range	Species loss: **18% of insects** lose at least half of their range

References available from CarbonBrief.org.

Physical Conditions- Local Temperature

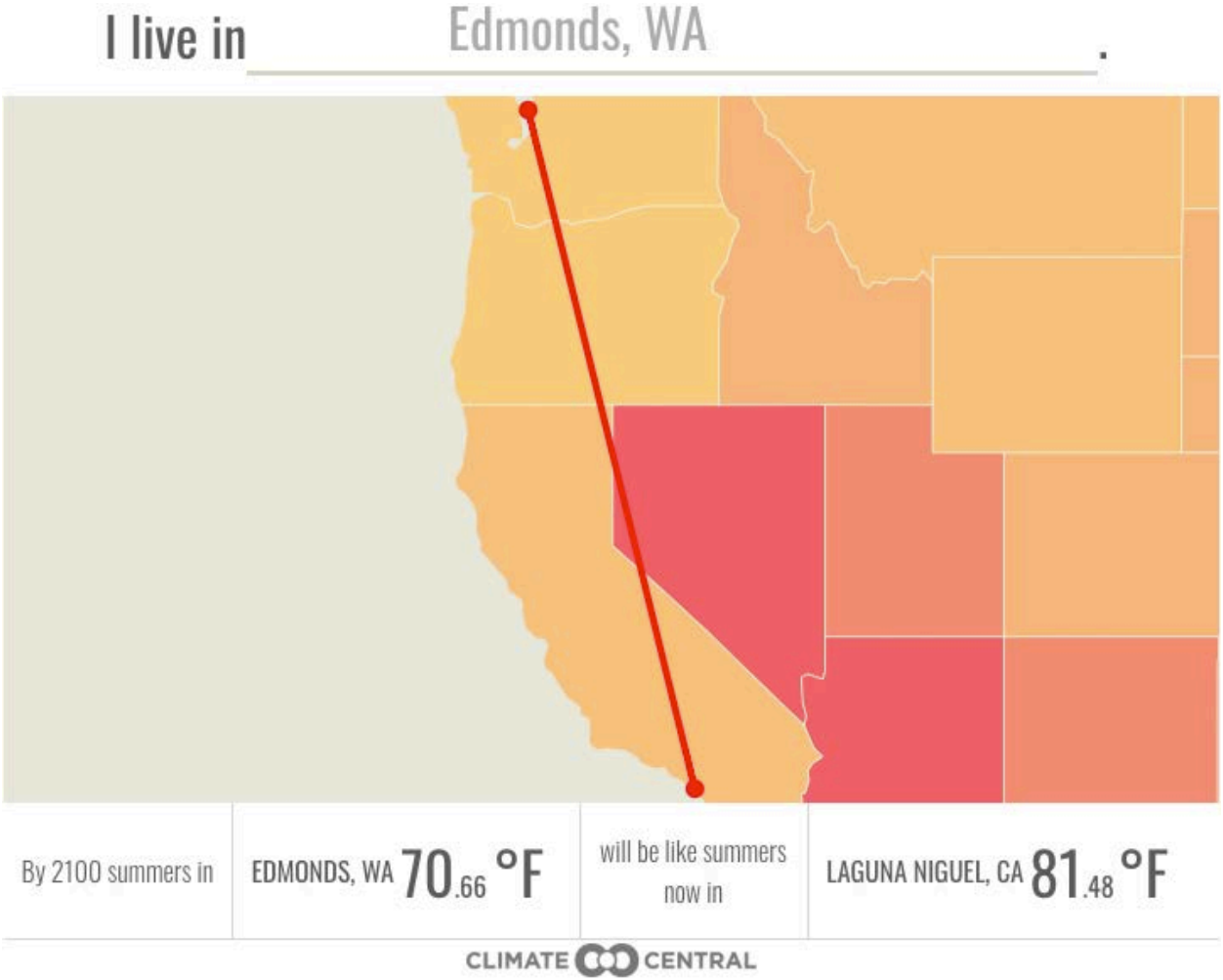

Figure 3: Summers in 2100, Climate Central tool.

Wealth, Consumption, and Responsibility

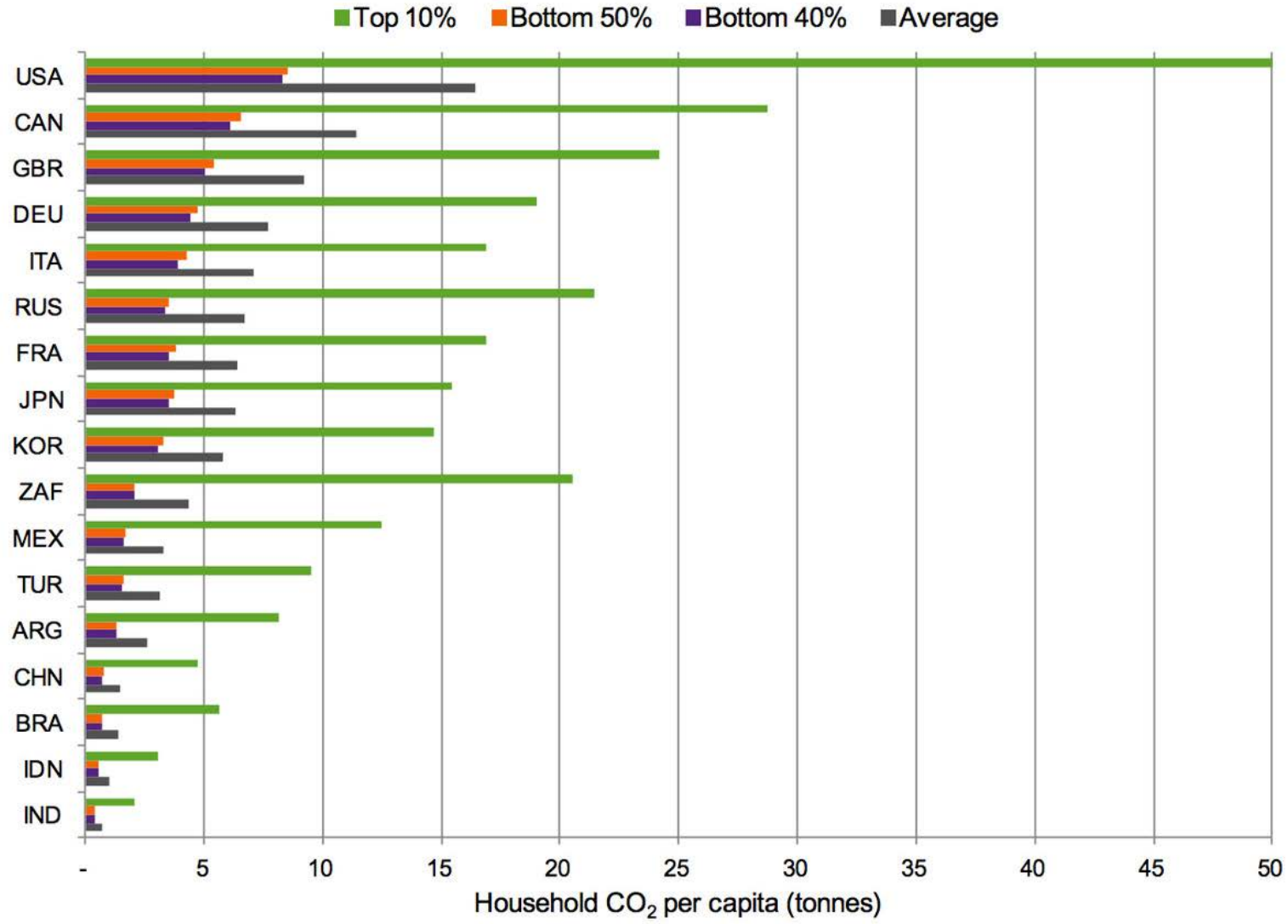

Figure 1: Per capita lifestyle consumption emissions in G20 countries for which data is available. Note: tonnes metric tons.

What Does Daily Life Look Like by 2050?

Less of this

More of this

What Does Daily Life Look Like by 2050?

Sample Community Changes – *Refer to the Edmonds 2017 Community Greenhouse Gas Inventory for details on Edmonds significant local and imported emissions sources and terminology.*

Impacted emissions source	***Change to:***	***Through:***
local local imported	• No fossil fuel combustion	• 100% renewable electricity and large-scale energy storage • Electrified transport
imported local	• Reduced consumption of goods, use of disposables, and subsequent waste	• Purchase of durable goods with a focus on reuse and repair
local local	• Reduced food waste	• Reduction of waste in processing and sales (pre-consumer) • Buying just what you need • Composting (post-consumer)
imported	• Reduction in GHG-intensive foods	• More vegetables, fruits, legumes, grains, and fish • Reduced meat and dairy
imported local local	• Decreased household consumption of goods and energy	• Family education
ALL	• Negative emissions actions	• Mass sequestration via forests and technology

Strategies and Policy Gaps

- Reviewed City planning and policy documents
- Found over 300 measures that pertain to climate action
- Recommended adding 6 measures under existing categories (Transportation, Land Use, and Buildings)
- Recommended a new category – Wastewater with 4 new measures

Next Steps

February

- Climate Protection Committee – Targets
- Select GHG measures for custom estimating tool

March

- Analyze cost-effectiveness of various GHG measures
- Develop GHG tracking tool

April

- Recommend updates to Climate Action Plan (CAP)
- Public open house on CAP recommendation
- Planning Board Meeting

May

Draft work plan for implementation of CAP

3Q 2019

- Council hearing and adoption of updated CAP

2020- ongoing

- Implement work plan

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Q&A