Genesee-Finger Lakes Regional Greenhouse Gas Emissions Inventory

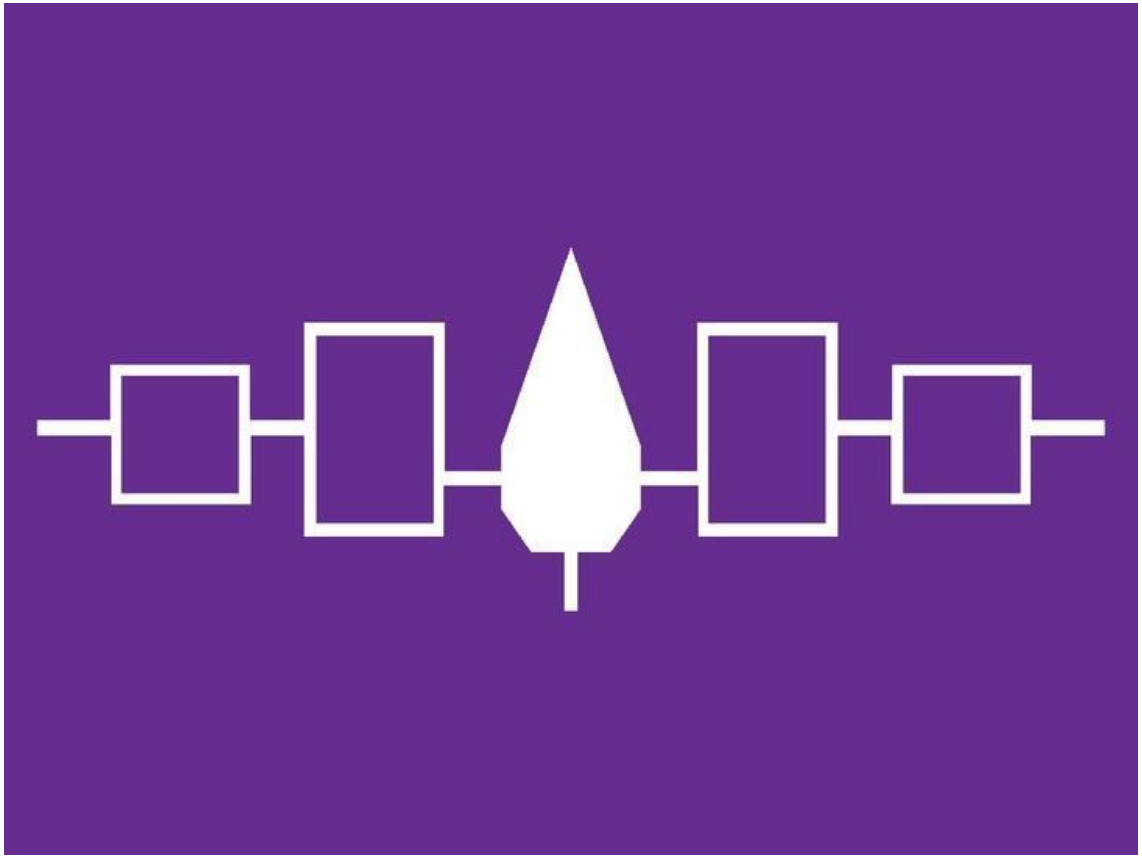
May 20, 2021

Climate Solutions Accelerator
of the Genesee-Finger Lakes Region

SEI Stockholm Environment Institute

AMG

Land Acknowledgement



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Climate Impacts in the Genesee-Finger Lakes Region

The cost of property and economic damages from Lake Ontario floods in 2017 and in 2019 was over $1 billion.

Warmer temperatures are affecting the growing season of Rochester's iconic lilacs.

In 2012, around 50% of New York's apple crop was destroyed from early budding, followed by hard freezes, resulting in millions of dollars of lost revenue.

In 2018, the town of Lodi was devasted by historic flash flooding, with 3 months of rain falling within 2 days.

Extreme heat warnings were issued in 2018 and 2019 across the Genesee-Finger Lakes Region

Tick-borne Lyme Disease cases are rising. Yates County had <1 case/yr before 2010. Now it has 15–20 cases/year.

An increase in algal blooms across all 11 Finger Lakes is threatening the water supply for 1 million people.

In vineyards across the Region, buds have been opening earlier due to warmer spring temperatures and occasional blasts of frigid air.

KV


Air Pollution & More Allergens
Cardiovascular and respiratory illnesses, premature death
Severe Weather Events
Flood damage, heat-related illness, injuries, fatalities, mental health impacts, climate refugees
Changes in Vector Ecology
Lyme disease, West Nile Virus, Eastern Equine Encephalitis
Climate Change in the Genesee-Finger Lakes
Rising CO_2 emissions
Higher temperatures
Unpredictable rain and snow patterns
Degraded Living Conditions
Exacerbation of health inequalities, conflict, forced migration
Food Quality and Supply Impacts
Diarrheal diseases from Increased rates of *Salmonella*, malnutrition
Water Quality and Supply Impacts
Harmful algal blooms, below average rainfall, abnormally dry conditions

KV

NYS Climate Leadership & Community Protection Act (CLCPA)

40% emissions reduction (from 1990 levels) by 2030

85% emissions reduction (from 1990 levels) by 2050

Net-zero economy by 2050

70% of the State's electricity from renewables by 2030

100% emissions free electricity by 2040

35-40% of benefits to environmental justice communities

KV

Climate change is a highly intersectional issue and an “injustice accelerator”

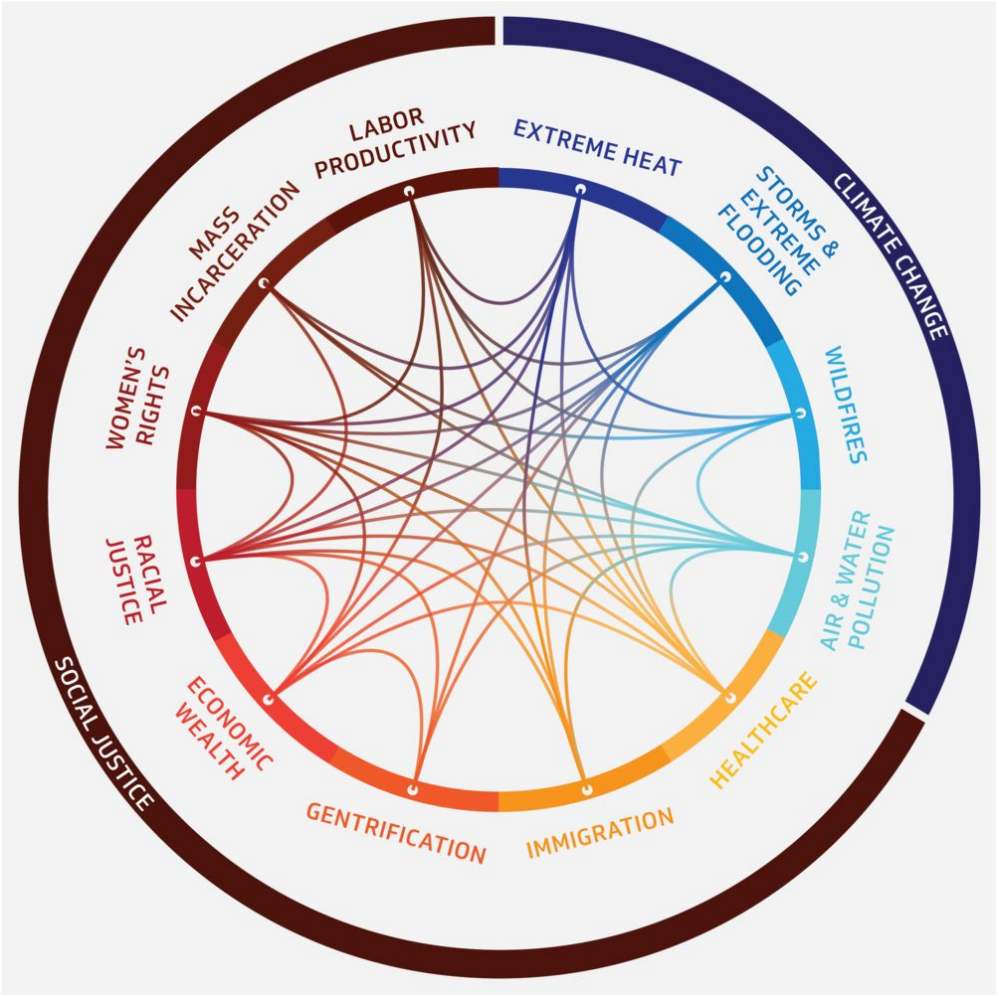
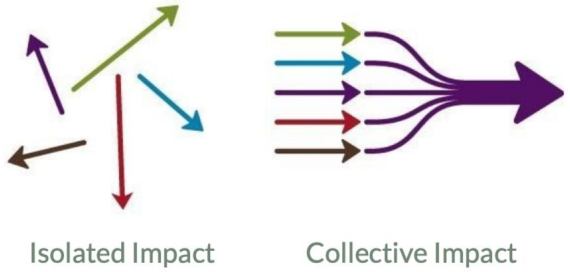


Image credit: Freedomtobreathe.org

Collective Impact for a Regional Climate Action Plan

- Climate change requires systemic solutions that reach across agencies, sectors, & organizations.
- Collective impact brings together cross-sector stakeholders to:
  - Develop a common understanding of the problem;
  - Develop a shared system of measurement and accountability;
  - Develop a regional climate action plan to encourage coordination, partnership and resource sharing across the region.



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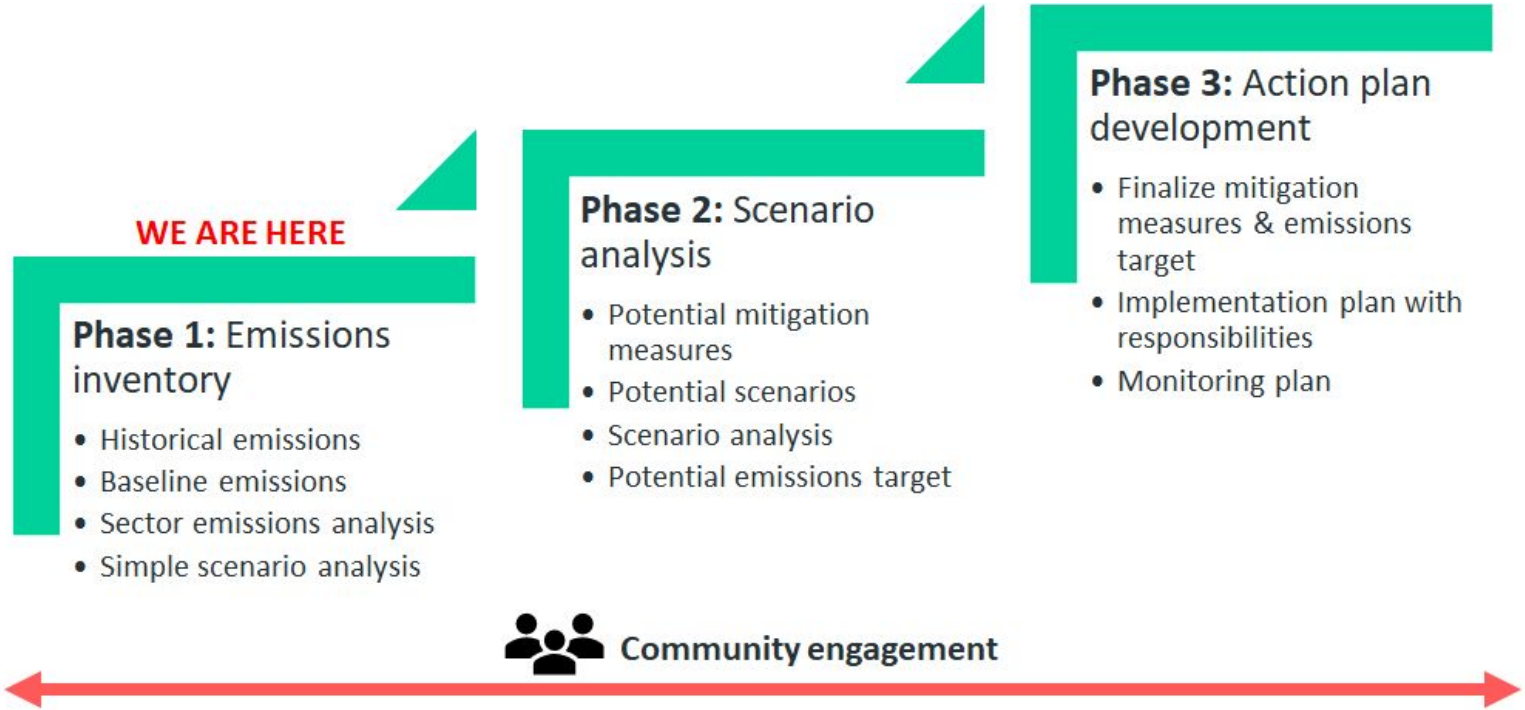
Developing the Regional Climate Action Plan



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Stockholm Environment Institute (SEI)

- SEI is a not-for-profit research organization.
- SEI's mission is to enable sustainable development by bridging science and policy.
- SEI was named the world's most influential environmental think tank in 2020[1].
- SEI is headquartered in Stockholm, Sweden, with 7 regional centers. This team originates from SEI's U.S. Center based in Somerville, MA.
- SEI is working on emissions reduction plans around the world and in the US, including Vermont, Rhode Island and Massachusetts and New York.

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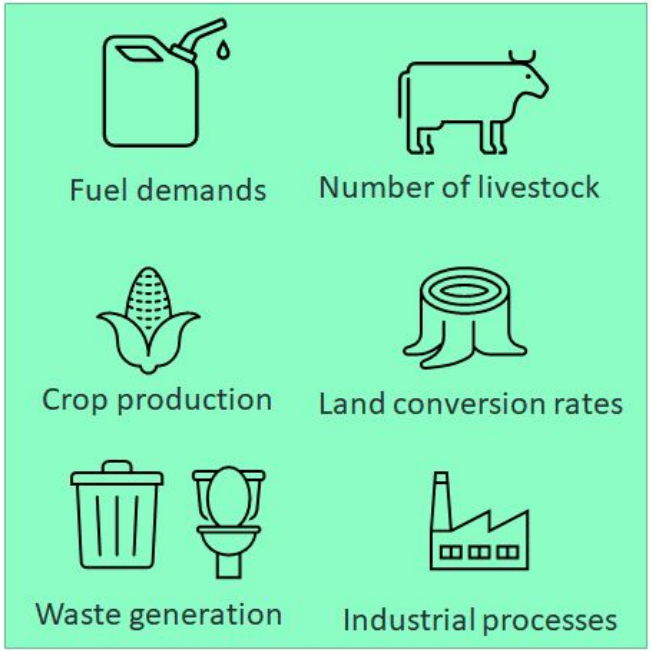
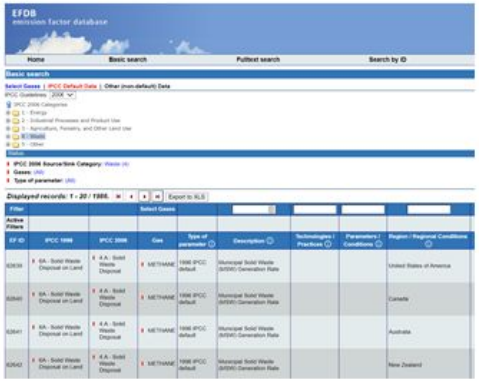
[1]Based on the University of Pennsylvania's Global Go To Think Tank Index (https://repository.upenn.edu/think_tanks/)

How do you develop an emissions inventory?





Source of Emissions x Emissions Factor = Emissions

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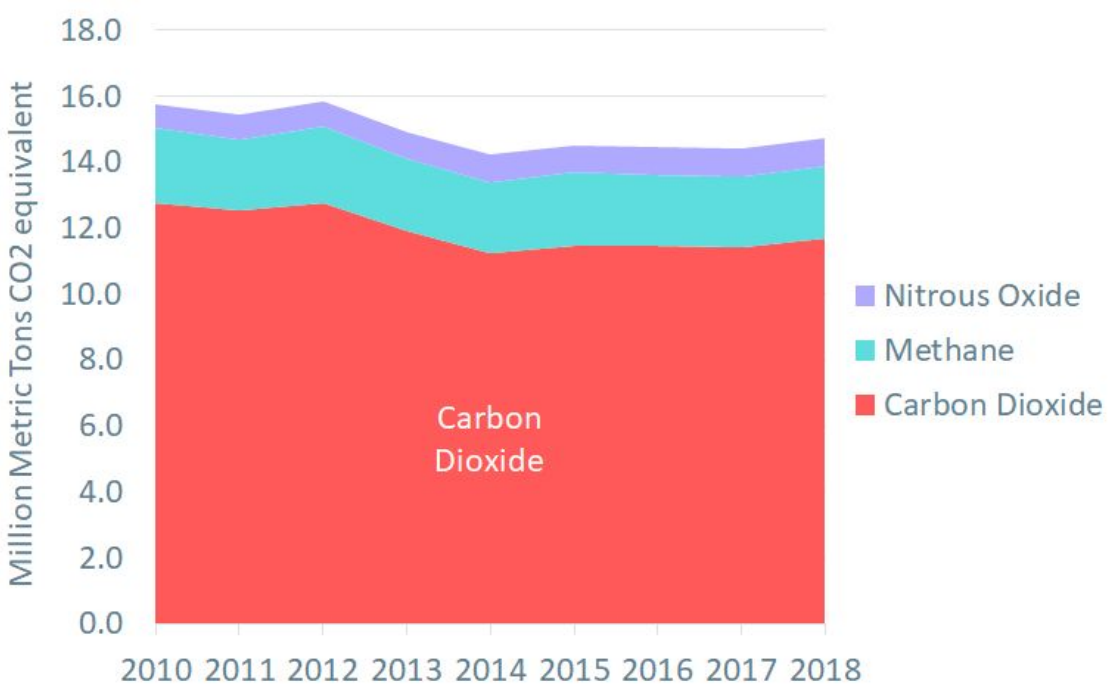
Which greenhouse gases are emitted the most?



STUDY IS ONGOING; RESULTS MAY CHANGE

Global Warming Potentials (GWPs) provide a common unit of measure

GHG	20-yr GWP	100-yr GWP
CO_2	1	1
CH_4	72	25
N_2O	289	298

Methane (CH4) is 72x more potent than CO_2 in the short-term or 25x in the long-run

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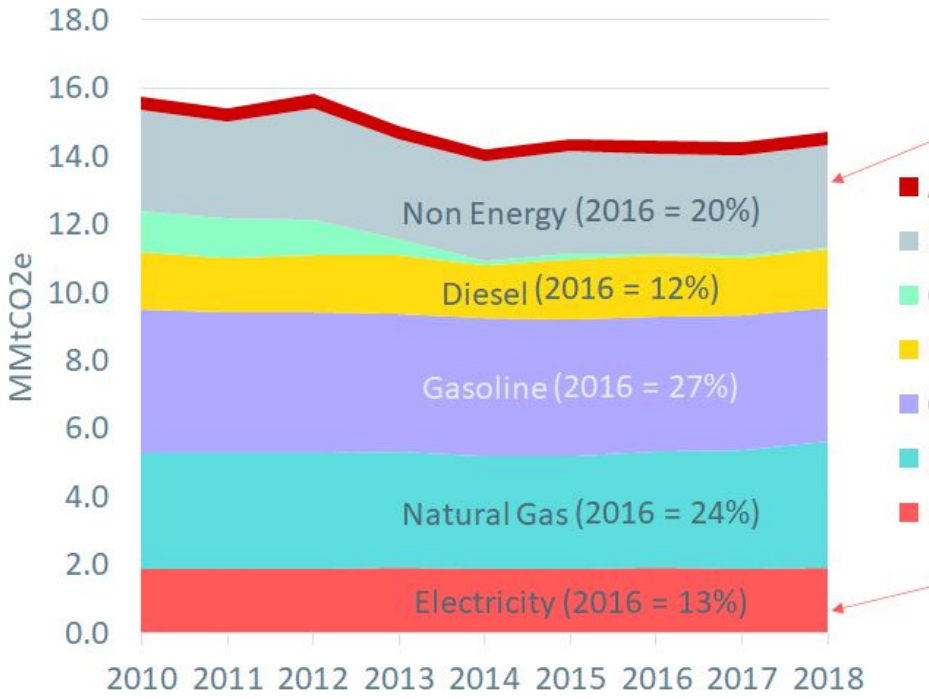
Which fuels are most responsible for emissions?



Emissions from **non-energy** sources includes land use changes (deforestation), livestock, waste-related emissions, industrial processes

Electricity is generated from both fossil fuel and renewable sources. CLCPA target is for a 100% carbon-free electricity grid by 2040.

STUDY IS ONGOING; RESULTS MAY CHANGE

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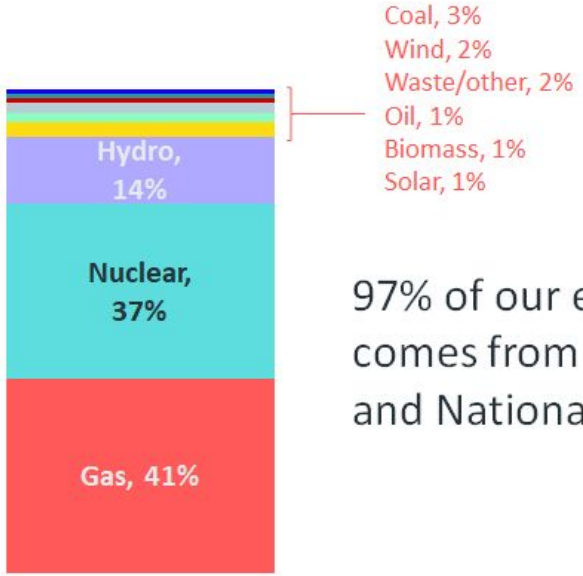
Majority of our electricity comes from gas and nuclear



Utility Electricity mix

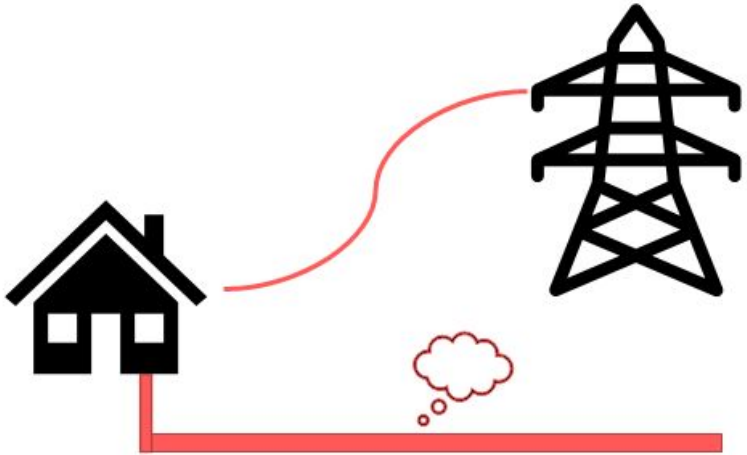
97% of our electricity comes from RG&E, NYSEG and National Grid

Municipal Electricity mix

3% of our electricity comes from municipal utilities

Source: NY Generation Attribute Tracking System

In 2016, transmission and distribution losses contributed to 3% of total emissions.



Transmission of power over long distances and different steps of transmission and distribution leads to leads to power losses.
Average loss rate of 5.5% in 2019 based on NY

Fugitive emissions (leakage) from natural gas pipelines.
Used a leakage rate of 3.6% based on NY

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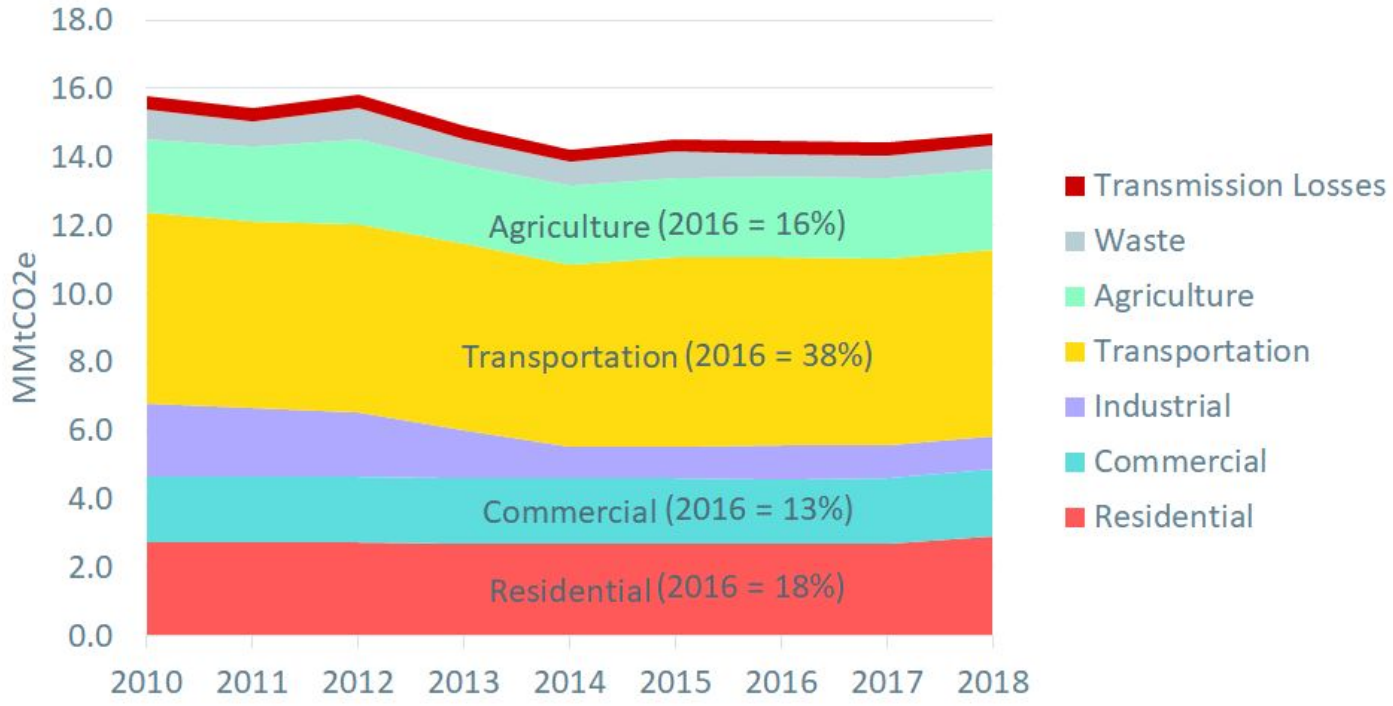
The transport sector has the most emissions



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STUDY IS ONGOING; RESULTS MAY CHANGE

Comparison of emissions

Region	Emissions (Million Metric Tons CO2 equivalent)	Population (Millions)
New Hampshire	13.8 (2016 value)	1.3
Nepal	13.9 (2019 value)	28.6
Genesee-Finger Lakes Region	**14.4 (2016 value)**	**1.2**
Ghana	14.9 (2019 value)	30.4
South Dakota	15.0 (2016 value)	0.8

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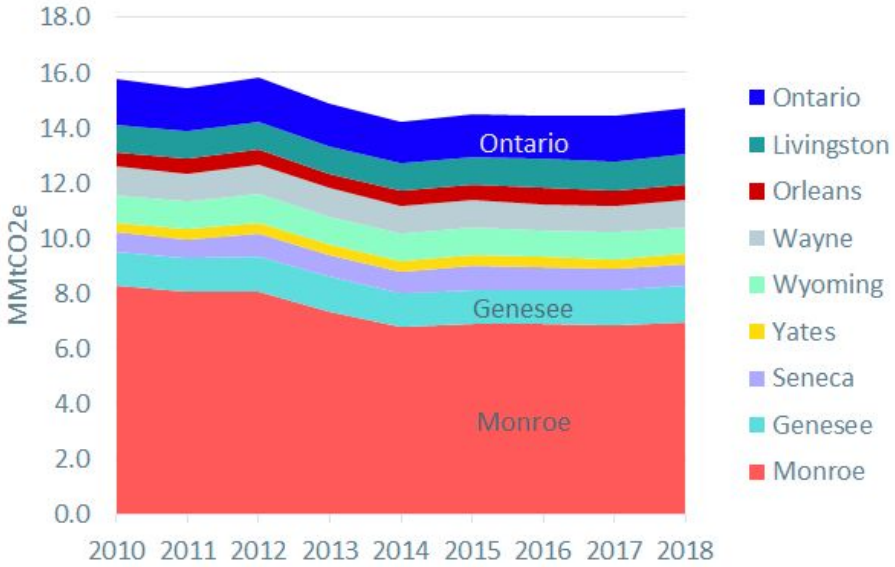
What is the emissions breakdown by county?



County	2016 Share of Emissions	MMtCO2e per person
Monroe	**47%**	9
Genesee	9%	22
Seneca	6%	23
Yates	3%	15
Wyoming	7%	**24**
Wayne	7%	11
Orleans	4%	14
Livingston	7%	16
Ontario	10%	15

STUDY IS ONGOING; RESULTS MAY CHANGE

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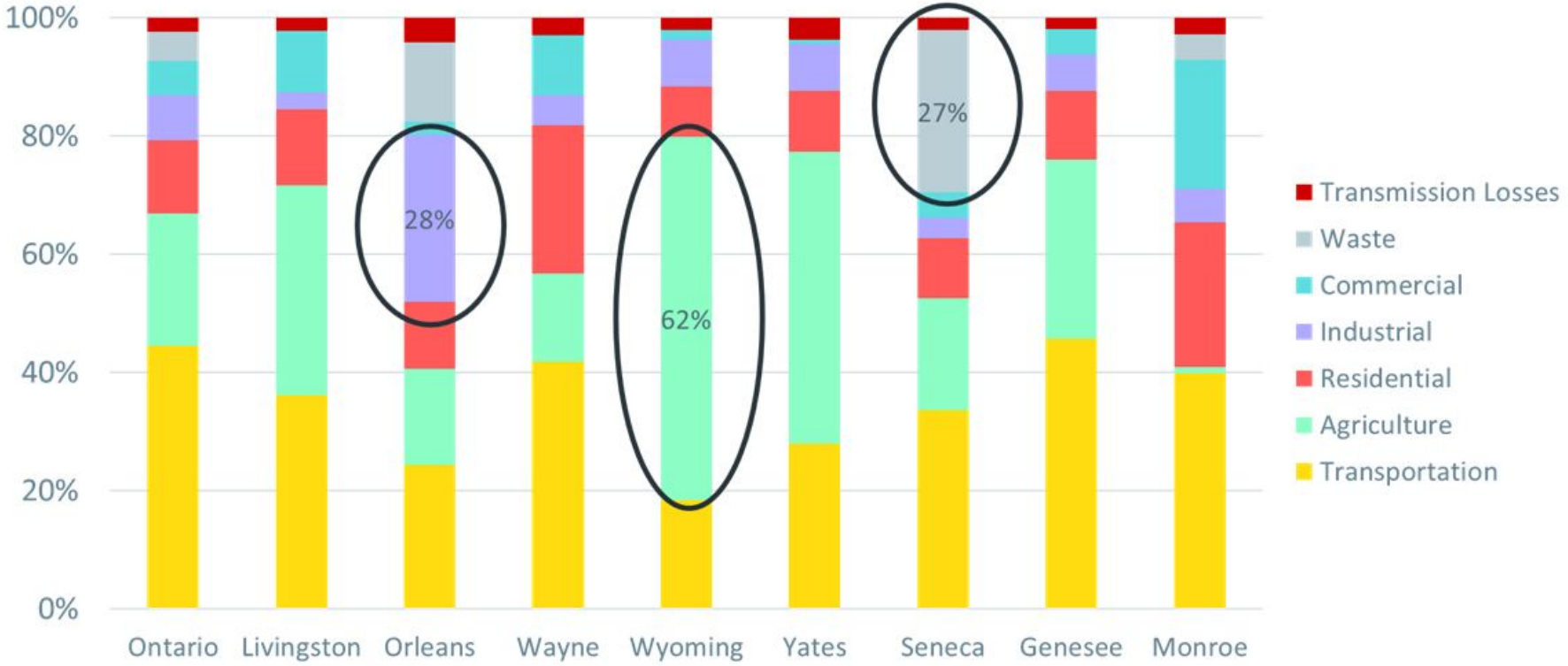
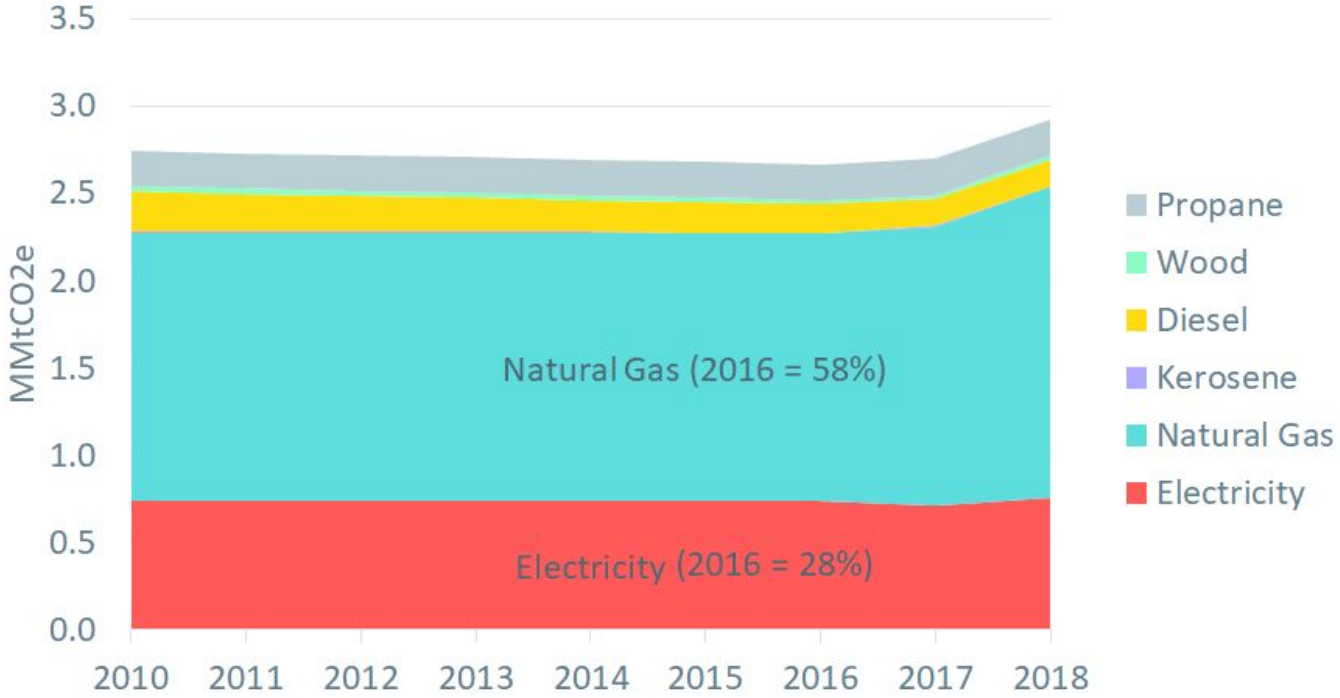
Which sectors have the biggest emissions by county?



STUDY IS ONGOING; RESULTS MAY CHANGE

Residential emissions primarily come from natural gas and electricity.



STUDY IS ONGOING; RESULTS MAY CHANGE

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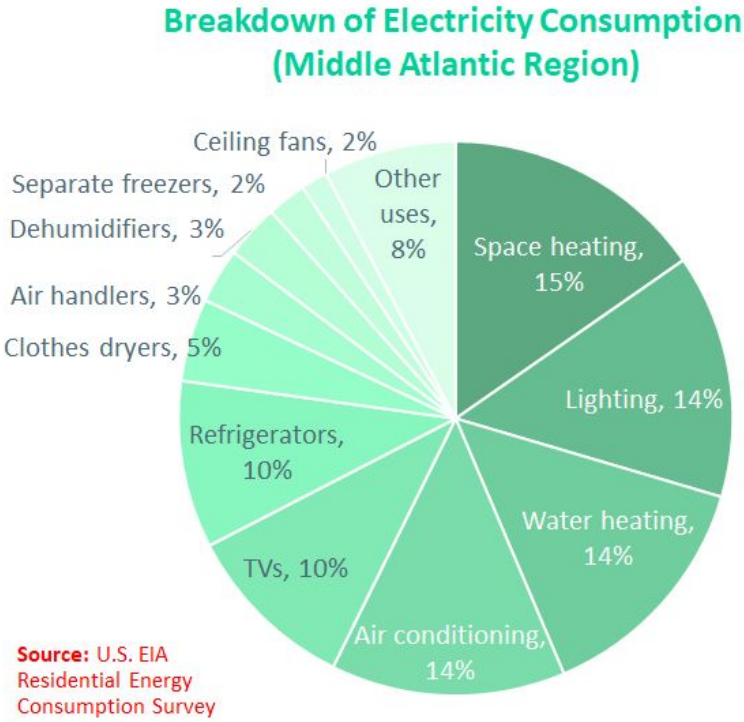
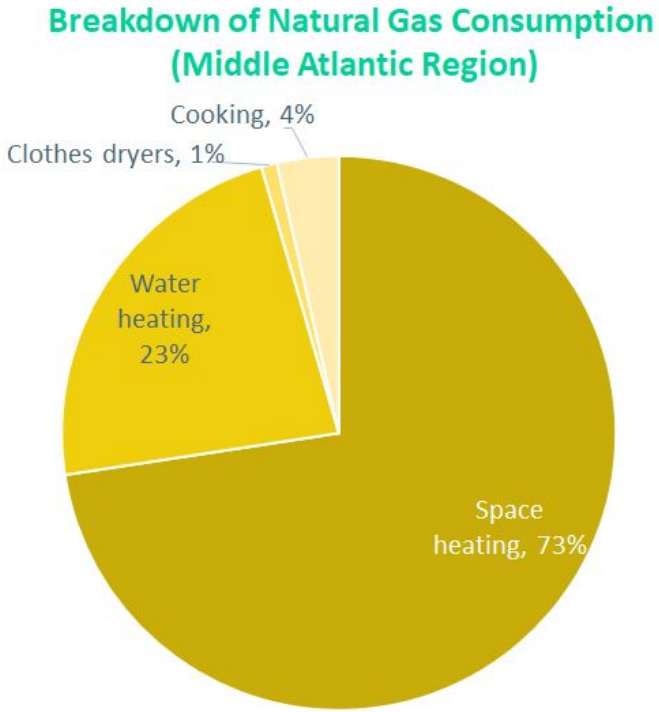
Residential energy use is driven by heating and cooling. These demands will increase with climate change.





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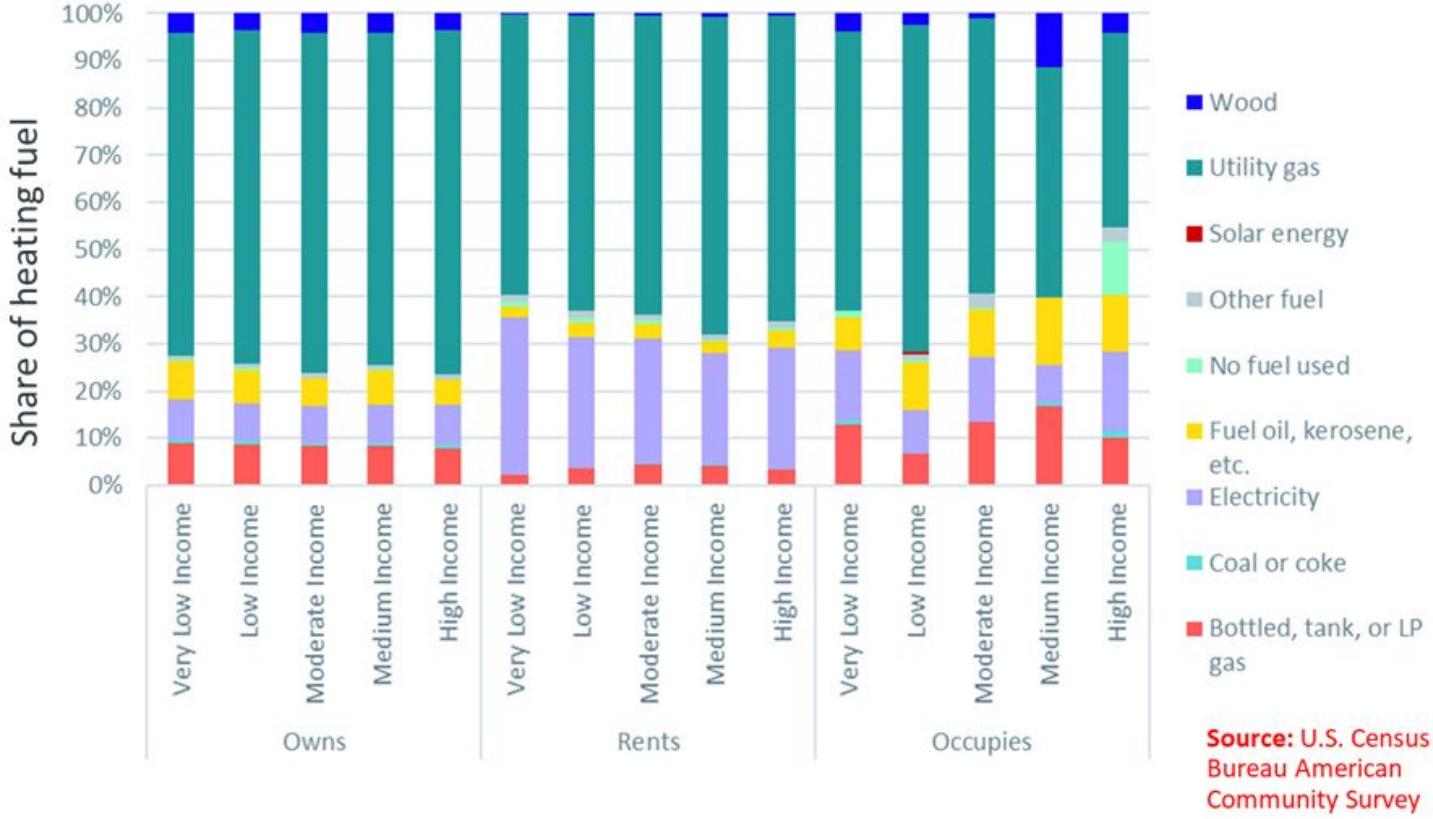
Rental units use much more electricity for space heating



Source: U.S. Census Bureau American Community Survey

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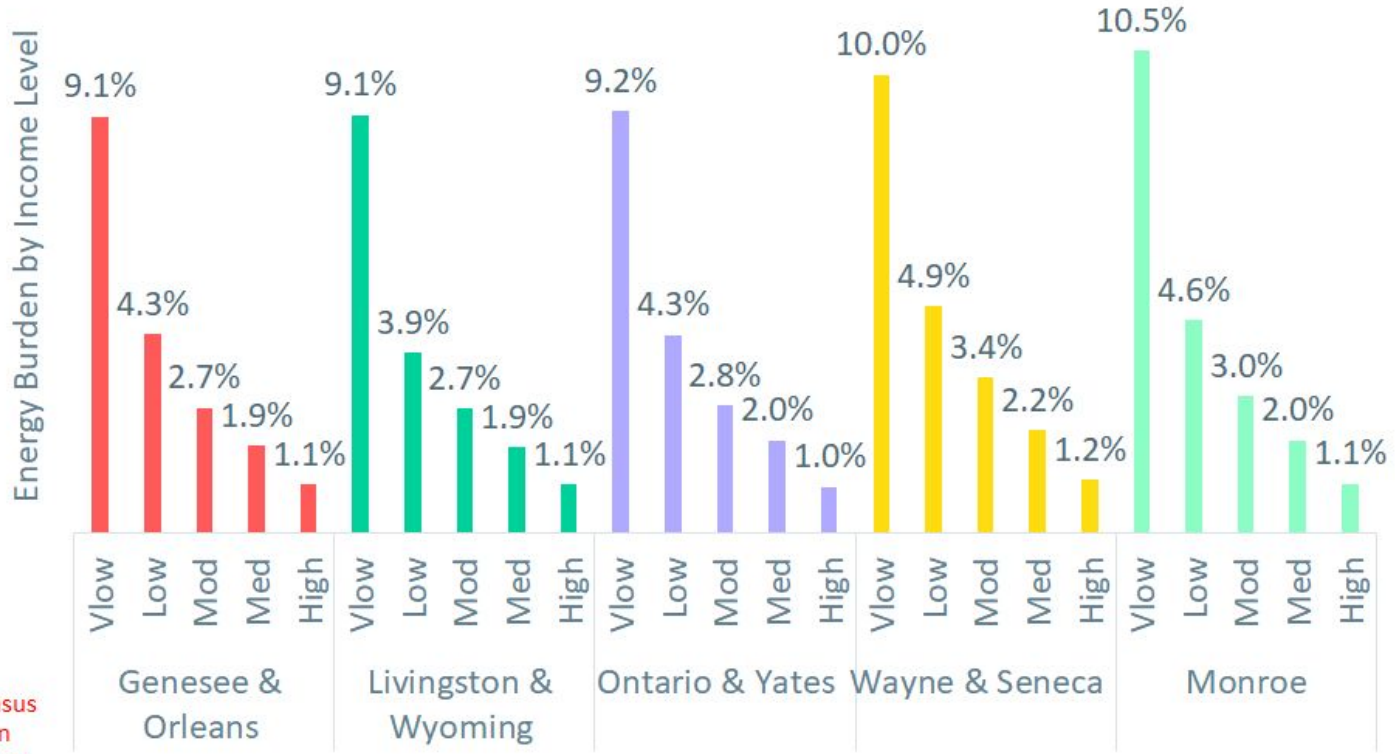
Very low-income households have an average energy burden of 10%.



Source: U.S. Census Bureau American Community Survey

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Office and retail have the largest number of businesses and energy use in Upstate NY

	Share of Businesses	Share of Electric Usage
Office	35%	35%
Retail	26%	13%
Food Service	11%	9%
Healthcare	9%	10%
Warehouse	7%	9%
Education	5%	12%
Grocery	4%	7%
Lodging	3%	4%

Source: NYSERDA and NYDPS Commercial Statewide Baseline Study of New York State

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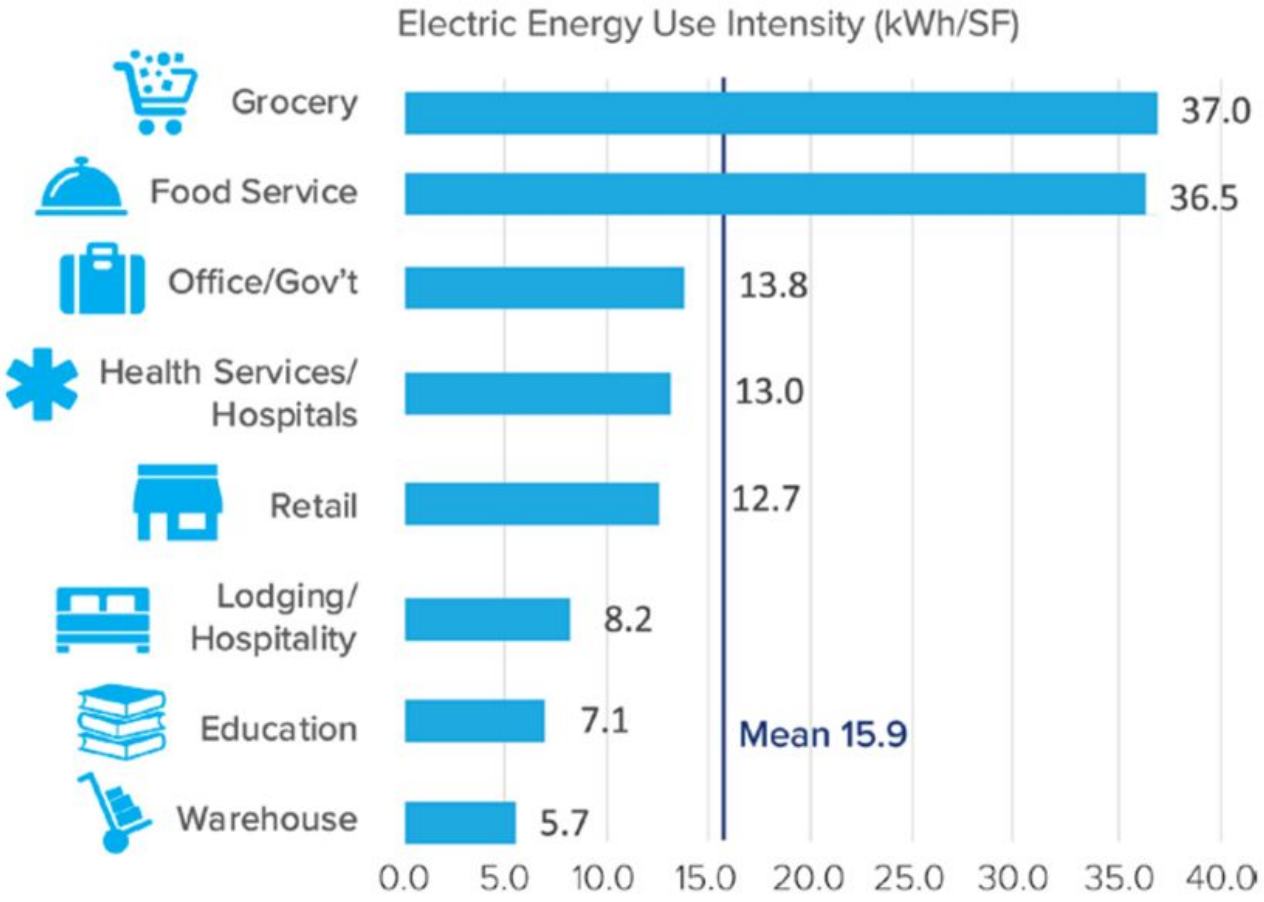
Grocery and food service are the most energy intensive.



Source: NYSERDA and NYDPS Commercial Statewide Baseline Study of New York State

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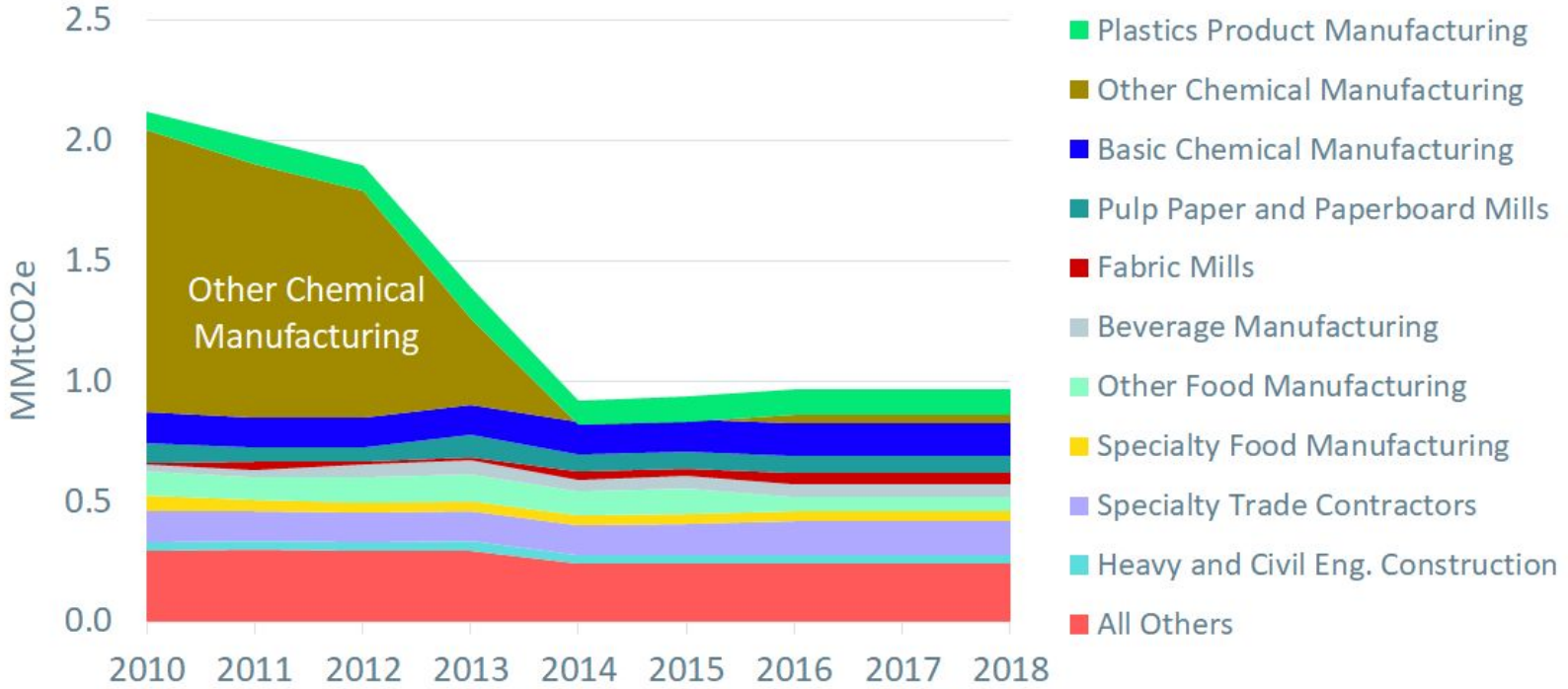
Significant reduction in chemical manufacturing between 2010 and 2015



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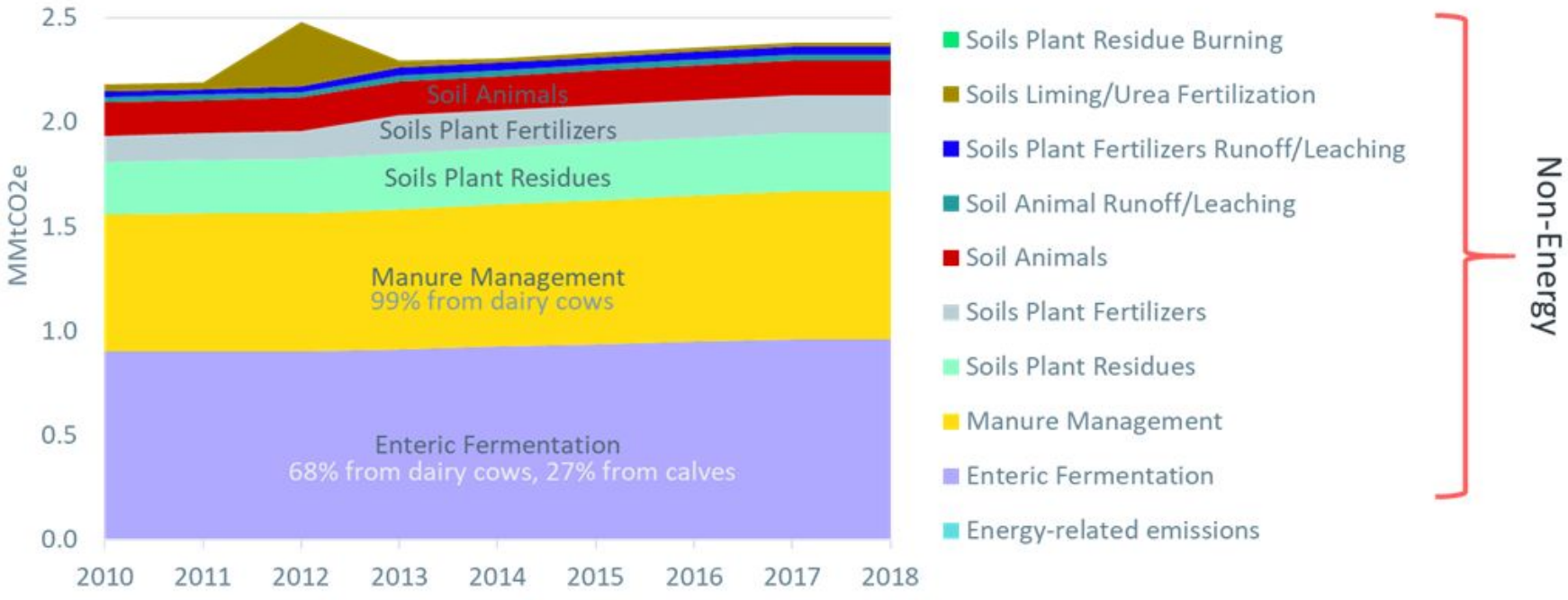
Agricultural emissions are dominated by non-energy related activities



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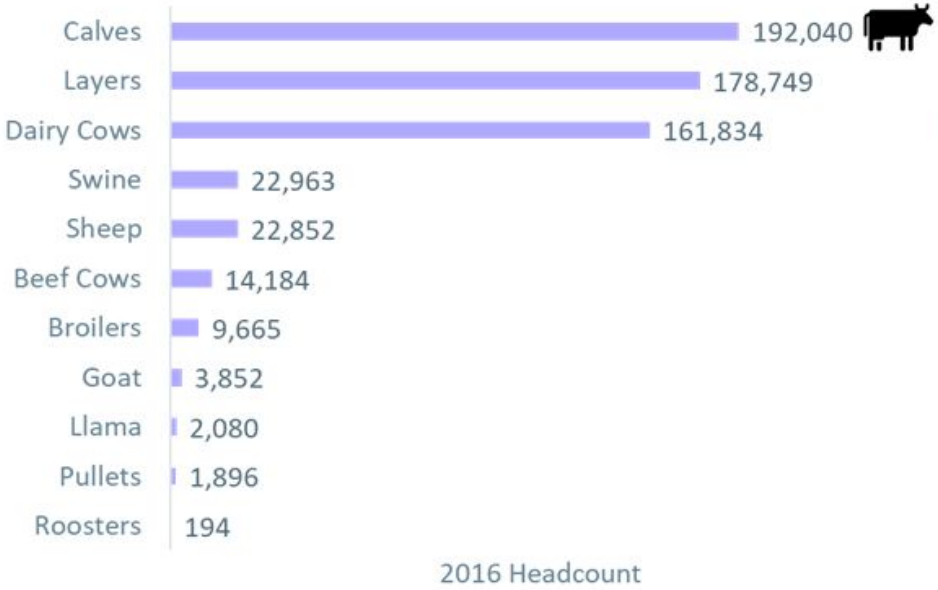
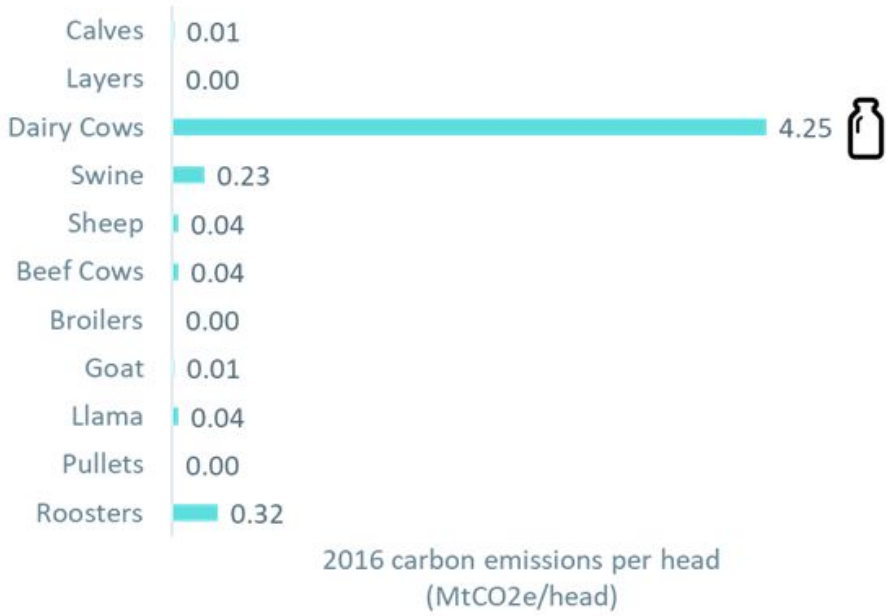
Dairy cows are a large source of emissions for manure management





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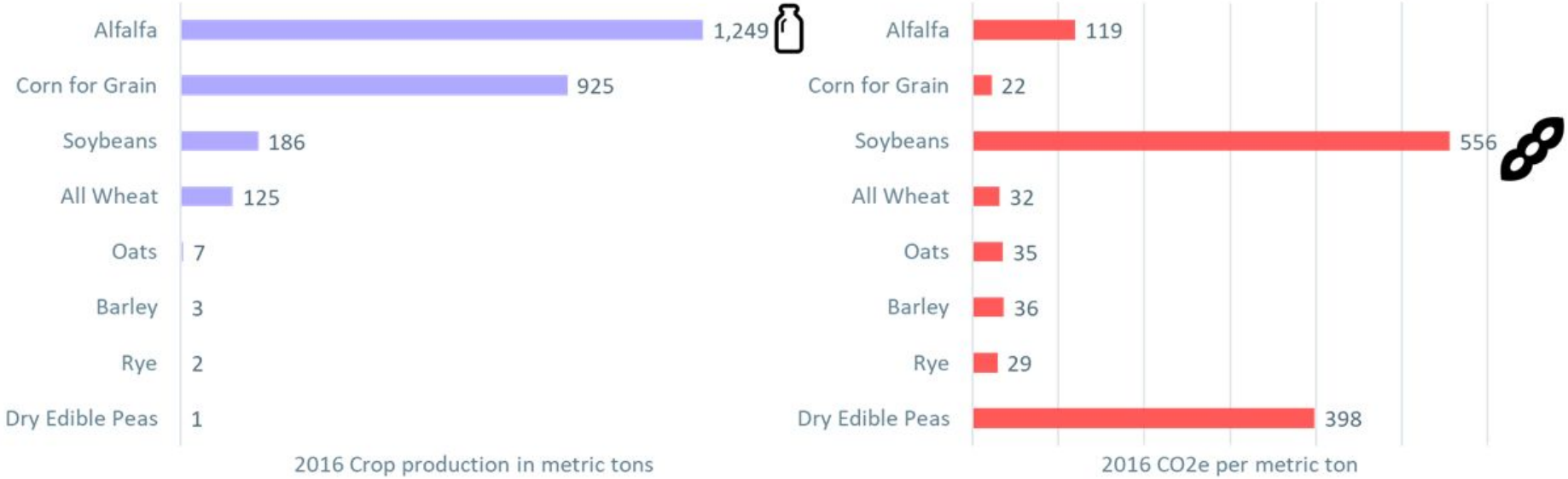
Soybeans and dry edible peas have a high emissions intensity



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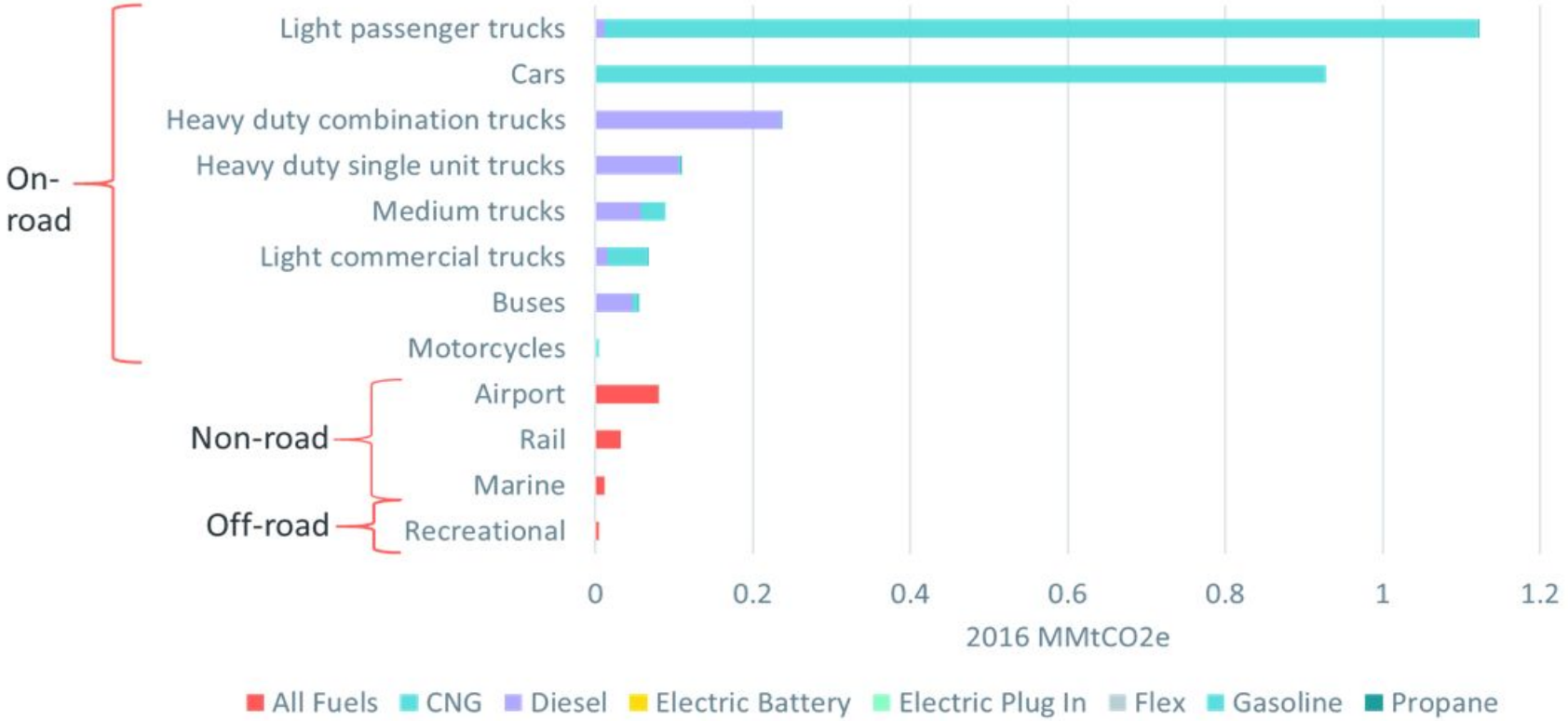
Majority of transport emissions are from cars and light passenger trucks



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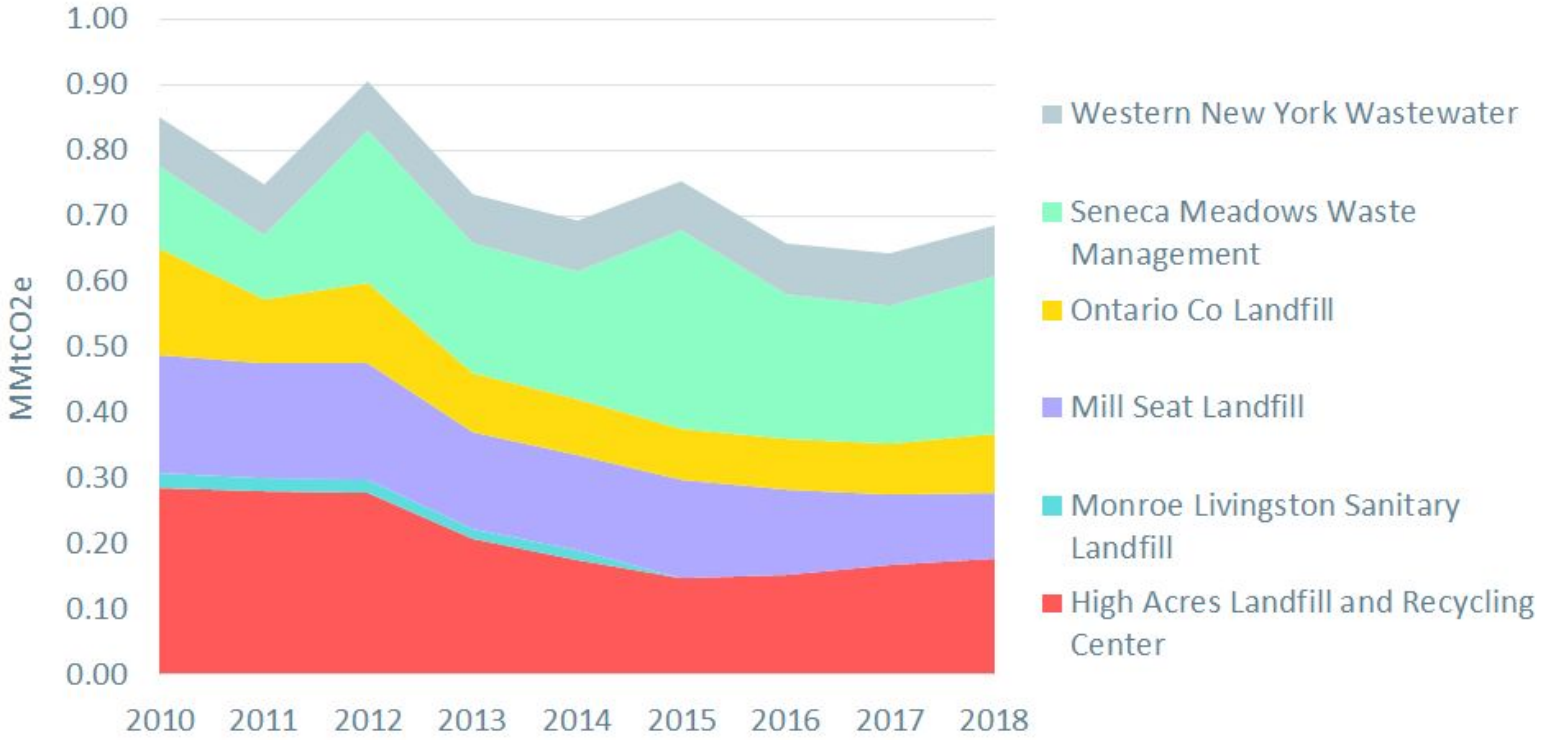
Solid waste and wastewater emissions from both energy (combustion) and non-energy (decomposition)



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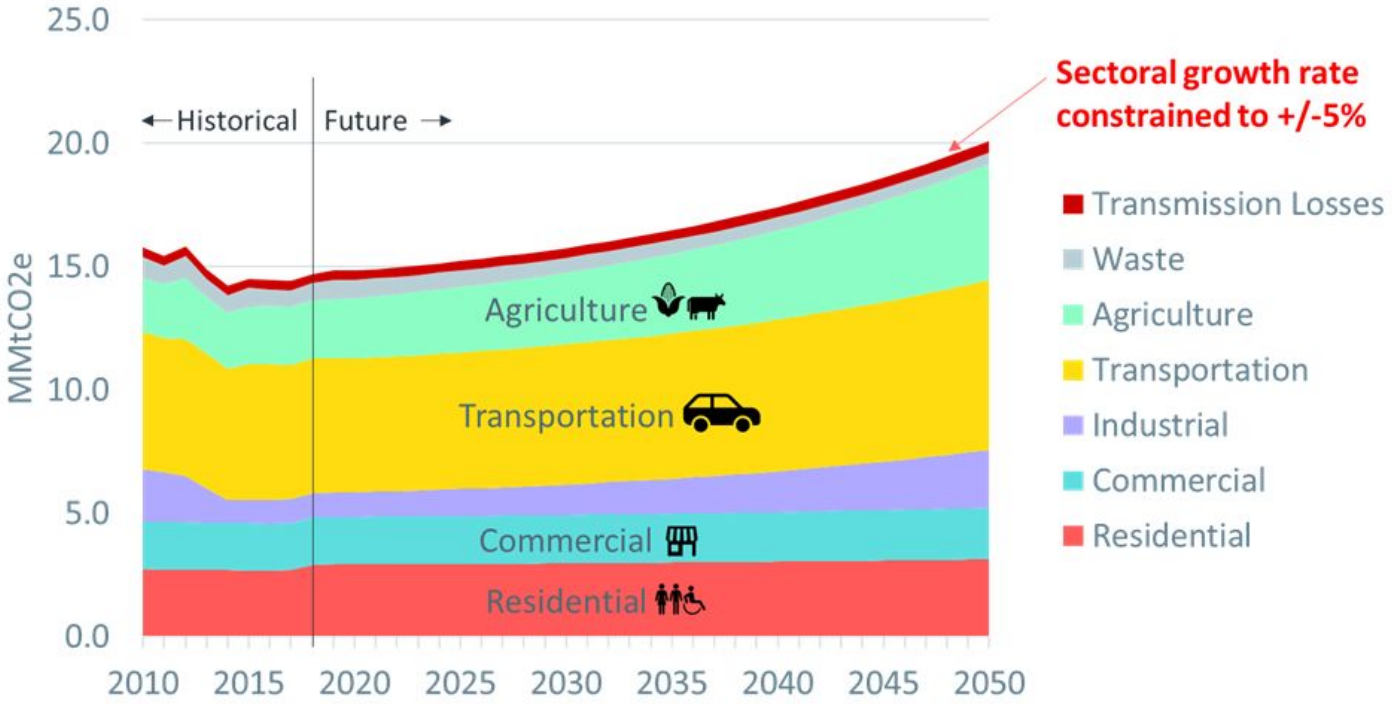
What might our future emissions look like?



STUDY IS ONGOING; RESULTS MAY CHANGE

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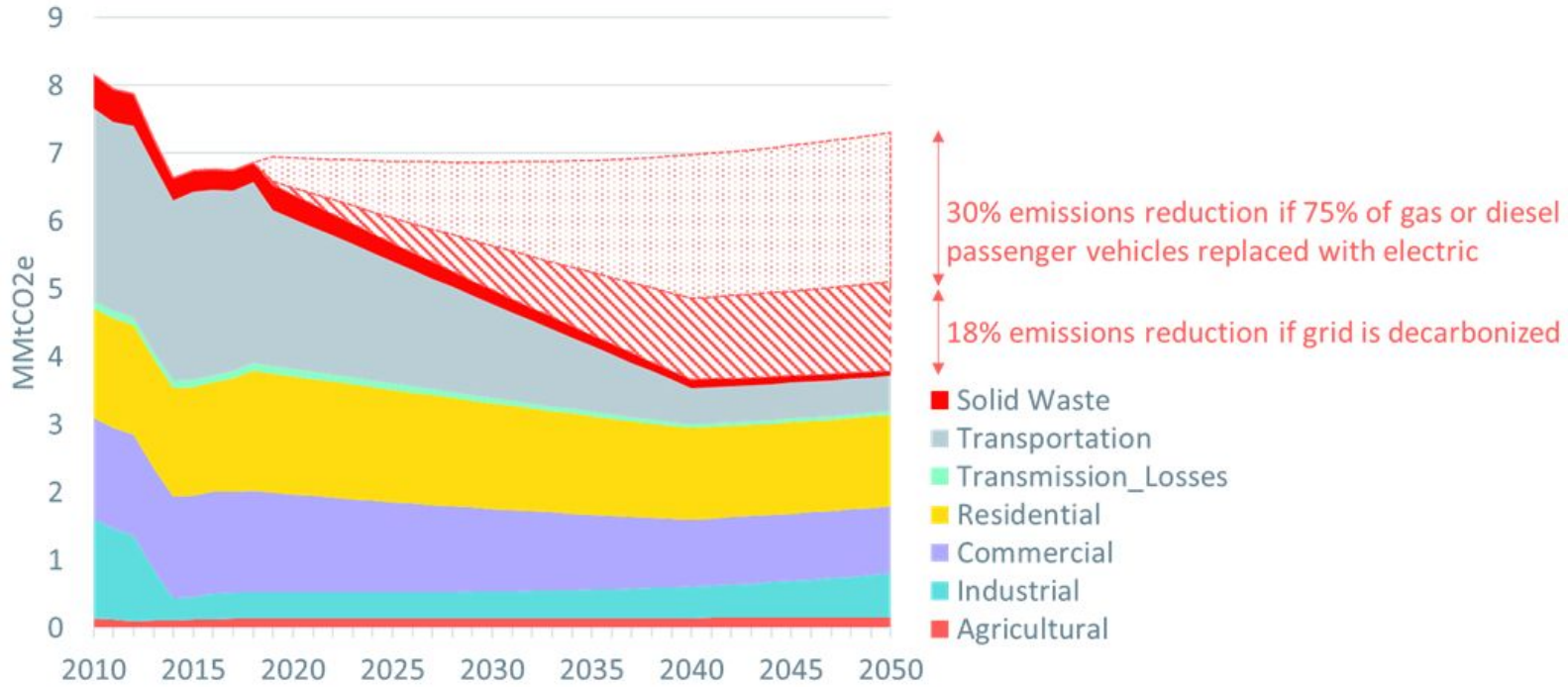
Increasing EVs and decarbonizing the grid by 2040 can lead to a 48% reduction in emissions



Note: this is for Monroe County only

Next steps for emissions inventory

ADD REMAINING DATA (REFRIGERANTS, LAND USE)

QUALITY CHECK RESULTS

PRESENT RESULTS (SUMMARY REPORT)

CONTINUE UPDATING WITH BETTER DATA

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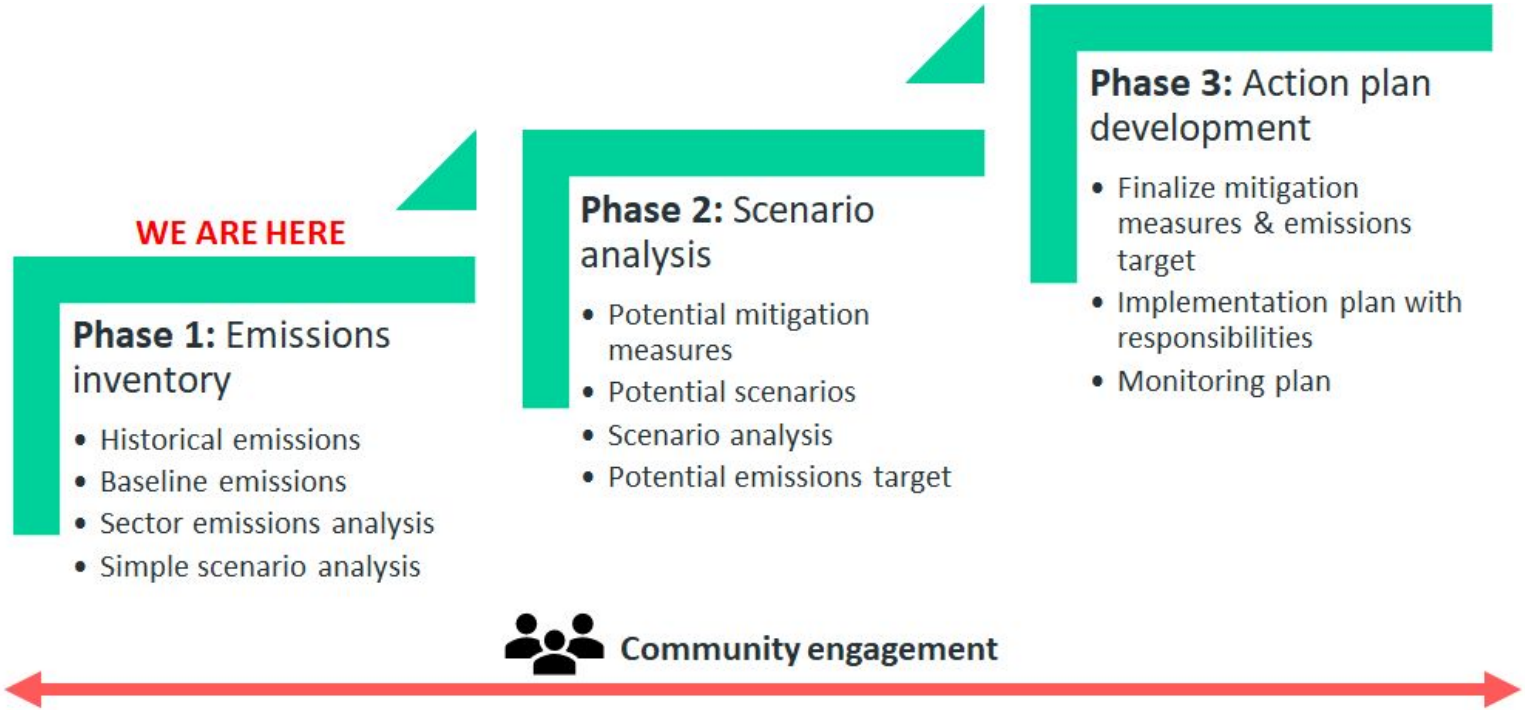
Questions?

Developing the Regional Climate Action Plan



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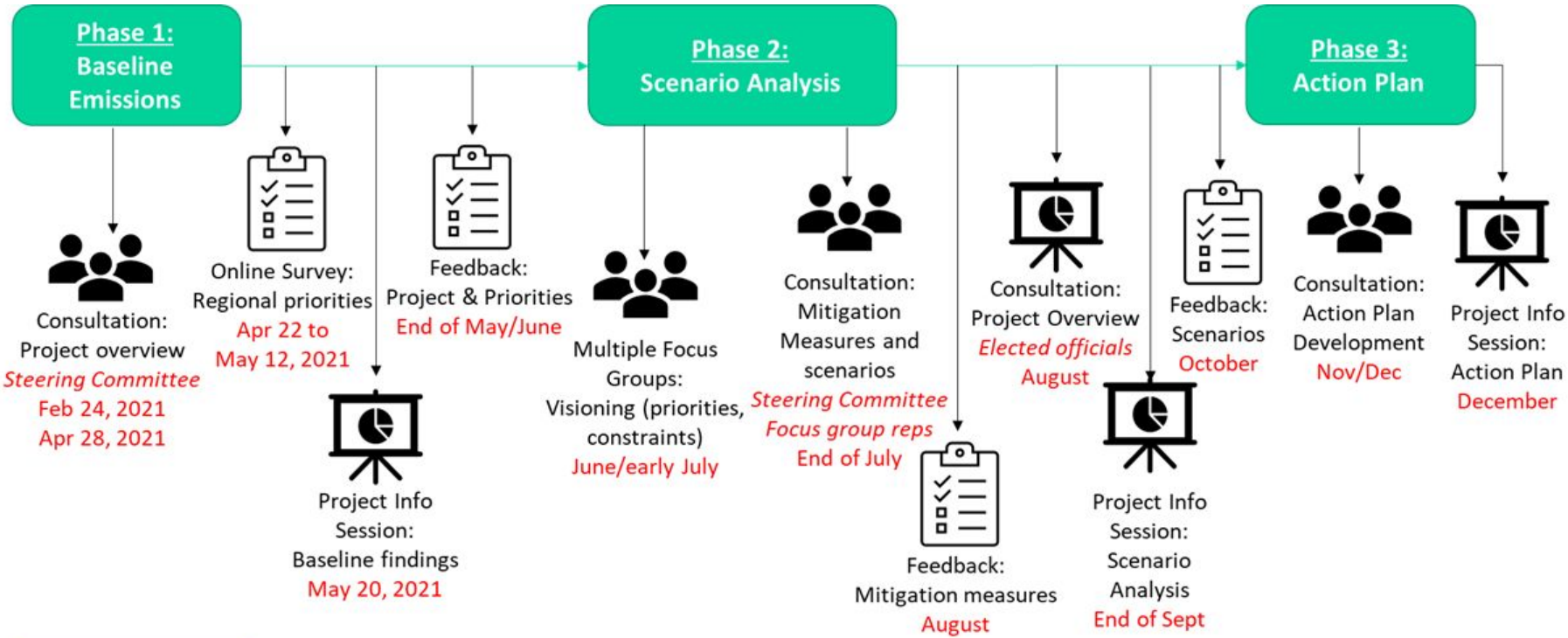
Stakeholder engagement process



Dates are tentative

Prioritizing mitigation measures

- Assess potential pathways for reducing emissions
- Define actions for each sector but go more in depth in a few. What are some regional priorities?
- Start to think about how actions would actually be implemented. What are other regional plans that we could create synergies with?

Poll: Regional Priorities

BF

Questions?

Discussion questions

- What other things are of interest that you think needs to be shown?
- Which sectors are important for climate equity and justice, and for maximizing co-benefits?
- What are some ongoing efforts and plans in the region and each county that we can synergize with?

Climate Solutions Accelerator

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Thank You!

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