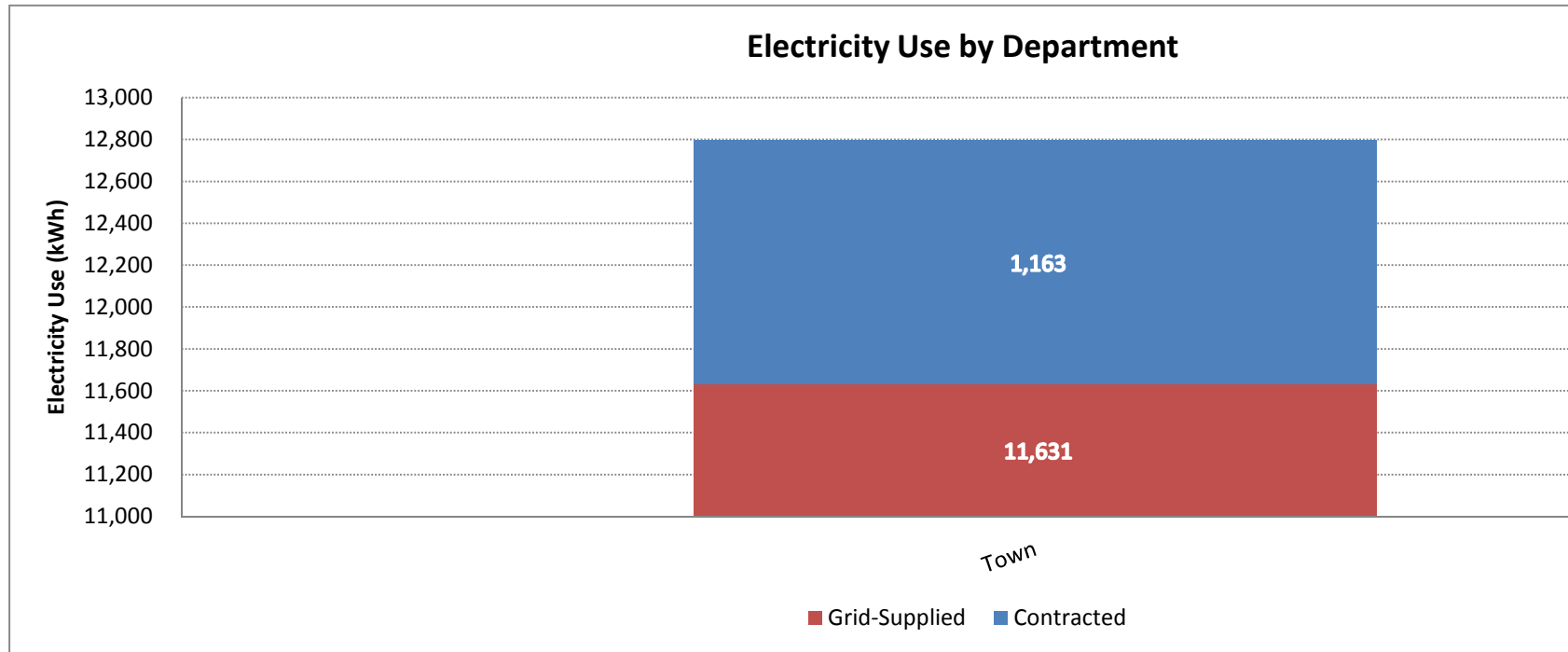


## Town of Roseboom Green House Gas Inventory

We completed a local government *Green House Gas (GHG) Inventory* in 2020 which tracked the Town's energy usage and produced CO<sub>2</sub> and other emissions. Climate Smart Communities are committed to reducing GHG emissions, which include Carbon Dioxide (CO<sub>2</sub>), Methane (CH<sub>4</sub>) and Nitrous Oxide (N<sub>2</sub>O). These gases build up in the atmosphere and contribute to global warming and climate change. By taking a Municipal GHG Inventory, we can see where changes can be made to lower our emissions. Even though our government GHG footprint is relatively small, every little bit we can do locally to minimize these emissions, helps the planet. Ironically, it is our employees commute back and forth to work, that produced the largest GHG emissions. We are currently experimenting with a four-day work week, with longer hour days, which may help. The "contracted" electricity data shown is NEXAMP's 10% Solar savings on our National Grid bill. We also converted the Town's streetlights to LEDs in 2017, greatly reducing our electricity usage.

## Electricity Summary

Electricity Use by Department (in kWh)				
Department	Grid-Supplied kWh	Contracted kWh	Total kWh	Market-Based kWh
Town	11,631	1,163	12,794	10,468
<b>Total Electricity Use</b>	<b>11,631</b>	<b>1,163</b>	<b>12,794</b>	<b>10,468</b>



## Background Calculations

### Market-Based Calculations

#### CO<sub>2</sub> Emissions by Contractual Instrument

$$\text{Emissions} = \text{Electricity Consumed (kWh)} \times \text{Emissions Factor (lb CO}_2\text{/MWh)} \times \text{MWh/kWh} \times \text{MT/lb} \times \text{CO}_2 \text{ GWP}$$

Contractual Instrument/Utility	kWh	EF (lb		MWh/kWh	MT/lb	MT CO <sub>2</sub>	× GWP =	MT CO <sub>2</sub> e
		CO <sub>2</sub> /MWh)						
NEXAMP solar	933	-		0.001	0.000454	-	1	-
NEXAMP	230	-		0.001	0.000454	-	1	-
NEXAMP	230	-		0.001	0.000454	-	1	-
-	-	-		0.001	0.000454	-	1	-
-	-	-		0.001	0.000454	-	1	-
-	-	-		0.001	0.000454	-	1	-

#### CH<sub>4</sub> Emissions by Contractual Instrument

*Emissions = Electricity Consumed (kWh) × Emissions Factor (lb CH<sub>4</sub>/MWh) × MWh/kWh × MT/lb × CH<sub>4</sub> GWP*

Contractual Instrument/Utility	kWh	EF (lb		MWh/kWh	MT/lb	MT CH <sub>4</sub>	× GWP =	MT CO <sub>2</sub> e
		CH <sub>4</sub> /MWh)						
NEXAMP solar	933	0.0000		0.001	0.000453592	-	25	-
NEXAMP	230	0.0000		0.001	0.000453592	-	25	-
NEXAMP	230	0.0000		0.001	0.000453592	-	25	-
-	-	-		0.001	0.000453592	-	25	-
-	-	-		0.001	0.000453592	-	25	-
-	-	-		0.001	0.000453592	-	25	-

#### N<sub>2</sub>O Emissions by Contractual Instrument

*Emissions = Electricity Consumed (kWh) × Emissions Factor (lb N<sub>2</sub>O/MWh) × MWh/kWh × MT/lb × N<sub>2</sub>O GWP*

Contractual Instrument/Utility	kWh	EF (lb		MWh/kWh	MT/lb	MT N <sub>2</sub> O	× GWP =	MT CO <sub>2</sub> e
		N <sub>2</sub> O/MWh)						
NEXAMP solar	933	0.00		0.001	0.000453592	-	298	-
NEXAMP	230	0.0000		0.001	0.000453592	-	298	-
NEXAMP	230	0.0000		0.001	0.000453592	-	298	-
-	-	-		0.001	0.000453592	-	298	-
-	-	-		0.001	0.000453592	-	298	-
-	-	-		0.001	0.000453592	-	298	-

#### Activity Data by Department and Contractual Instrument

*Electricity use data by department and fuel type (kWh)*

Department	NEXAMP solar	NEXAMP	NEXAMP	-	-	-	<b>TOTAL</b>
<b>Town</b>	933	230	230	-	-	-	1,393
Total	933	230	230	-	-	-	<b>1,393</b>

### CO<sub>2</sub> Emissions by Department and Contractual Instrument

*Emissions = Electricity Consumed (kWh) × Emissions Factor (lb CO<sub>2</sub>/MWh) × MWh/kWh × MT/lb × CO<sub>2</sub> GWP*

Department	NEXAMP solar	NEXAMP	NEXAMP	-	-	-	<b>TOTAL</b>
<b>Town</b>	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-

### CH<sub>4</sub> emissions by Department and Contractual Instrument

*Emissions = Electricity Consumed (kWh) × Emissions Factor (lb CH<sub>4</sub>/kWh) × MWh/kWh × MT/lb × CH<sub>4</sub> GWP*

Department	NEXAMP solar	NEXAMP	NEXAMP	-	-	-	<b>TOTAL</b>
<b>Town</b>	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-

### N<sub>2</sub>O emissions by Department and Contractual Instrument

*Emissions = Electricity Consumed (kWh) × Emissions Factor (lb N<sub>2</sub>O/kWh) × MWh/kWh × MT/lb × N<sub>2</sub>O GWP*

Department	NEXAMP solar	NEXAMP	NEXAMP	-	-	-	<b>TOTAL</b>
<b>Town</b>	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-

## Adjusted Location-Based Calculations

### Activity Data by Department and Utility

*Electricity use data by department and fuel type (kWh)*

Department	NYUP	-	-	-	-	-	<b>TOTAL</b>
<b>Town</b>	10,238	-	-	-	-	-	10,238
Total	10,238	-	-	-	-	-	<b>10,238</b>

### CO<sub>2</sub> Emissions by Department and Utility

# Mobile Combustion - Summary

## GHG Summary

Net Emissions by Department (MT CO <sub>2</sub> e)				
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	TOTAL
Town	112	0	0	113
Total Mobile Emissions	112	0	0	<b>113</b>

CO <sub>2</sub> Detail Emissions (MT)	
Gross CO <sub>2</sub>	- Biogenic =
112	-
112	-



## Energy Use Summary

Energy Use by Department and Fuel Type (MMBtu)								
	Gasoline	Diesel	Biodiesel (B5)	Biodiesel (B20)	Ethanol (E85)	CNG	LNG	LPG
Town	-	1,519	-	-	-	-	-	-
Total	-	1,519	-	-	-	-	-	-

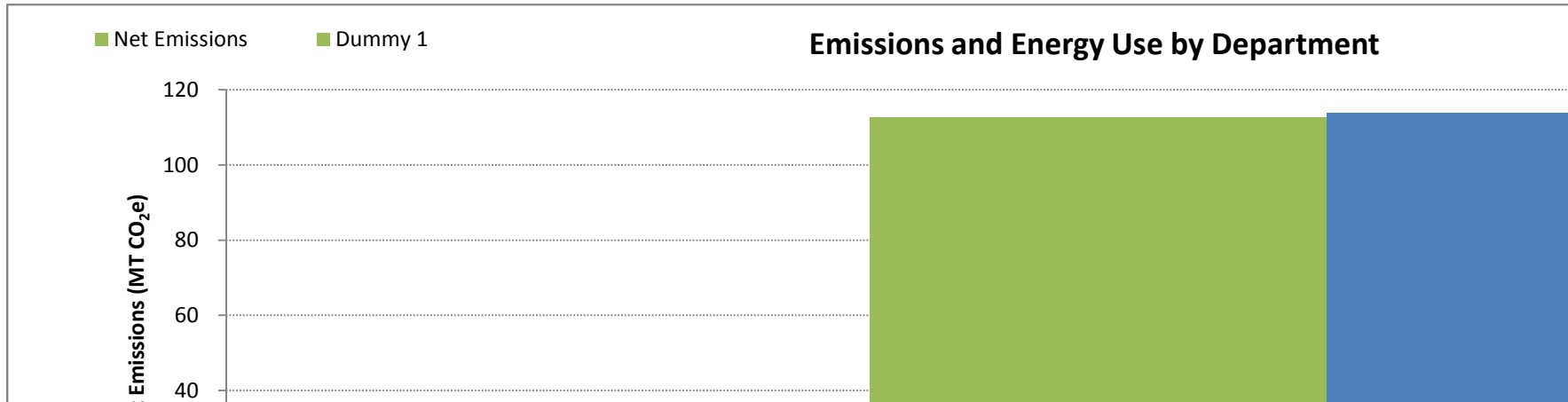
Check to display:



Emission



Energy Use

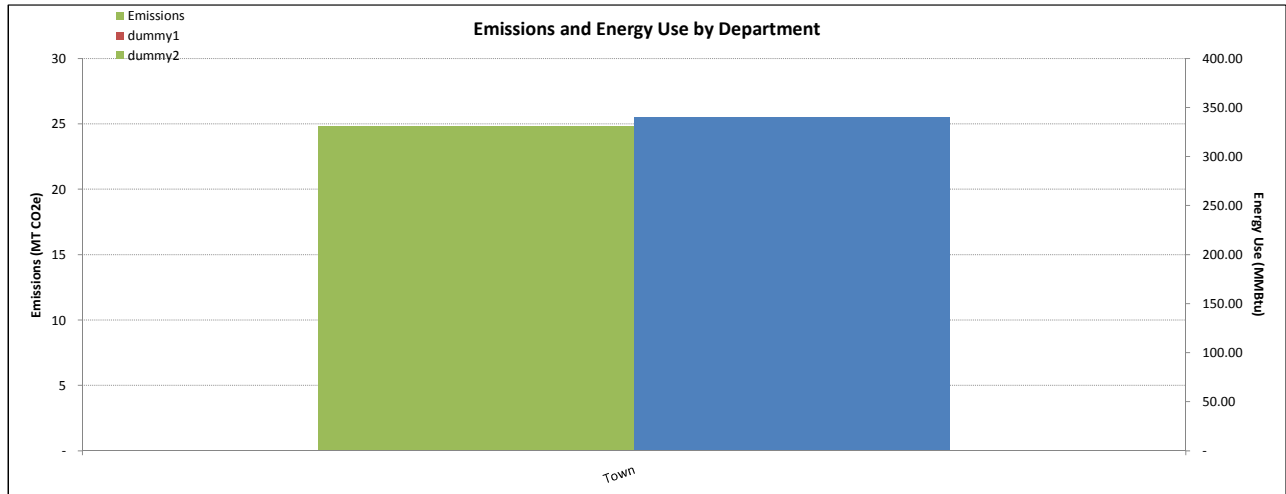


## Department Summary

Emissions by Department (MT CO <sub>2</sub> e)				
Department	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	Total
Town	25	0	0	25
<b>Total Stationary Combustion Emissions</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>25</b>

Fuel and Energy (MMBtu) Use by Department				
Department	mcf	gal	tons	Energy Use
Town	-	2,430	-	340
<b>Total Stationary Combustion Energy Use</b>	<b>-</b>	<b>2,430</b>	<b>-</b>	<b>340</b>

Check to display:  Emissions  Energy Use

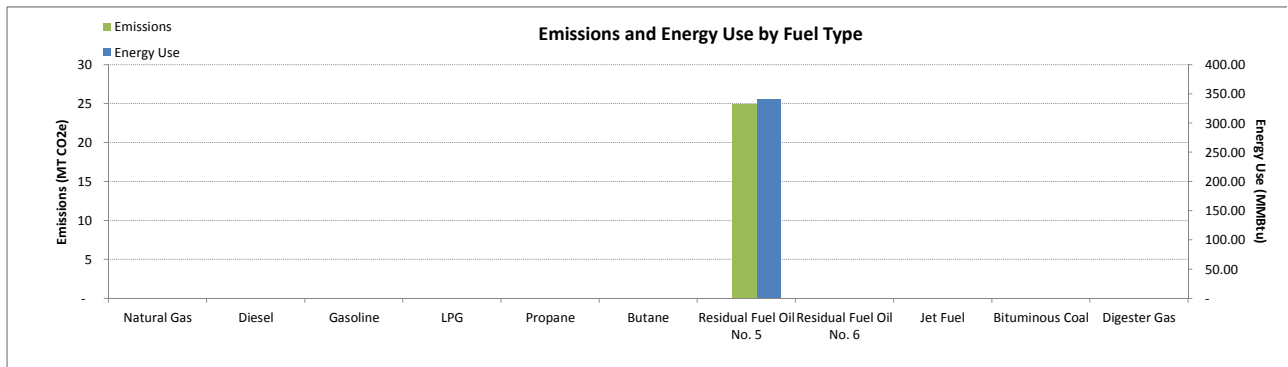


## Fuel Summary

Emissions by Fuel Type (MT CO <sub>2</sub> e)				
Fuel Type	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	TOTAL
Natural Gas	-	-	-	-
Diesel	-	-	-	-
Gasoline	-	-	-	-
LPG	-	-	-	-
Propane	-	-	-	-
Butane	-	-	-	-
Residual Fuel Oil No. 5	25	0	0	25
Residual Fuel Oil No. 6	-	-	-	-
Jet Fuel	-	-	-	-
Bituminous Coal	-	-	-	-
Digester Gas	-	-	-	-
<b>Total Emissions from Stationary Fuel Combustion</b>	<b>25</b>	<b>0</b>	<b>0</b>	<b>25</b>

Fuel and Energy Use by Type			
Fuel Type	Fuel Used		Energy Use (MMBtu)
Natural Gas	0	mcf	-
Diesel	0	gal	-
Gasoline	0	gal	-
LPG	0	gal	-
Propane	0	gal	-
Butane	0	gal	-
Residual Fuel Oil No. 5	2,430	gal	340.20
Residual Fuel Oil No. 6	0	gal	-
Jet Fuel	0	gal	-
Bituminous Coal	0	tons	-
Digester Gas	0	mcf	-
<b>Total Stationary Fuel Consumed</b>			<b>340.20</b>

Check to display:  Emissions  Energy Use



# Employee Commute

Jump to...

[Step 1. Enter employee data by department](#)

[Step 2. Enter mode of transportation proportions](#)

[Employee Commute Emissions Summary](#)

[Chart: Employee Commute Emissions](#)

[Background Calculations](#)

This sheet is where you will calculate

Please enter the number of employees using each mode of transportation to work. Default transportation mode proportions are provided.

Once you enter this information, the

## 1. Enter Employee Data

Please enter the number of employees in each department. This will be used to calculate the commute

Department	Number of employees
Town	4

## 2. Enter mode of transit proportions, commute length, and work days

Please enter what percentage of employees use each form of transportation to work. These values will be used to calculate the average commute length. Default values are from the American Communities Survey, and represent the average distribution of transportation mode from a travel survey of city employees.

Mode	Employees who use mode (%)	Default Values
Single Occupancy Vehicle	100%	76%
Carpool	0%	10%
Motorcycle	0%	0%
Transit	0%	5%
Bike	0%	1%
Walk	0%	3%
Work at home	0%	4%
Other	0%	1%
<b>Total</b>	<b>100%</b>	

Please enter the average one-way commute length for city employees. Default commute distance is 12.6 miles (<http://www.fhwa.dot.gov/policy/2010cpr/execsum.htm>).

This commute distance may be longer or shorter than the average commute for your city's employees.

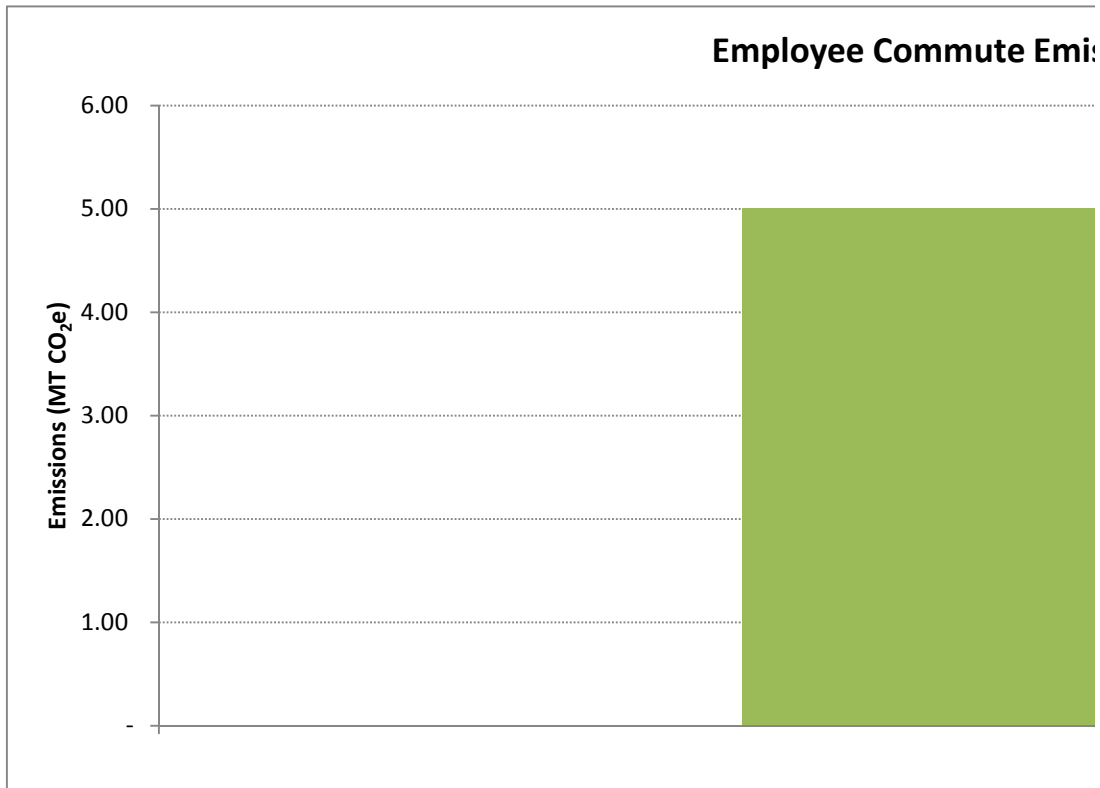
<b>Average One-Way Commute Length (miles)</b>	7.0	12.6
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Please enter the number of days each city employee works per year. This number will be multiplied by the number of work days per week, two weeks (10 days) of vacation, and 10 federal holidays.

<b>Workdays per year</b>	220	240
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## Employee Commute Emissions Summary

Emissions by Department (MT CO <sub>2</sub> e)	
	<b>CO<sub>2</sub></b>
<b>Town</b>	5.01
<b>Total</b>	1,382.17



## Background Calculations

### Employees by Department and Mode

Number of Employees who use mode = # of employees × percentage of employees who use each mode

	Single Occupancy		
	Vehicle	Carpool	Motorcycle
<b>Town</b>	4	0	0.0
<b>Total</b>	1104	0	0

### Daily CO<sub>2</sub> Emissions by Department and Mode

$CO_2 \text{ Emissions/Day} = \text{Employees traveling} \times \text{Trip Distance/day} \div \text{People/Mode} \div \text{miles per gallon} \times \text{MT CO}_2/\text{kg} \times \text{kg CO}_2/\text{gal} \times \text{MT/kg} = \text{MT CO}_2/\text{day}$

	Single Occupancy		
	Vehicle	Carpool	Motorcycle
CO <sub>2</sub> Emission Factor (kg/gal)	8.78	8.78	8.78
mpg	21.6	21.6	43.4
People/Mode	1	2	1



<b>Town</b>	0.02	-	-
<b>Total</b>	6.28	0.00	0.00

**Annual CO<sub>2</sub> Emissions by Department and Mode**

*Annual CO<sub>2</sub> Emissions (MT) = MT CO<sub>2</sub>/commute day × commute days/yr*

	Single Occupancy Vehicle	Carpool	Motorcycle
<b>Town</b>	5.01	-	-
<b>Total</b>	1,382.17	0.00	0.00



Local GHG Inventory Tool:

Total Town of Roseboom Emissions (MT CO <sub>2</sub> e)								
	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Total MT CO <sub>2</sub> e	Percent of Total
Scope 1	119.57	0.03	0.34	-	-	-	119.95	8%
Scope 2 - Location Based	-	-	-	-	-	-	-	0%
Scope 2 - Market Based (for informational purposes only)	-	-	-	-	-	-	-	
Scope 3	1,382.17	-	-	-	-	-	1,382.17	92%
<b>Total Gross Emissions</b>	<b>1,501.74</b>	<b>0.03</b>	<b>0.34</b>	-	-	-	<b>1,502.11</b>	<b>100%</b>
<b>Total Net Emissions</b>	<b>1,501.74</b>	<b>0.03</b>	<b>0.34</b>	-	-	-	<b>1,502.11</b>	<b>100%</b>

Emissions by Source (MT CO <sub>2</sub> e)								
Source	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	HFCs	PFCs	SF <sub>6</sub>	Total	Percent of Total
Stationary Combustion	16.84	0.00	0.00	-	-	-	16.84	1%
Mobile Combustion	102.73	0.03	0.34	-	-	-	103.11	7%
Solid Waste	-	-	-	-	-	-	-	0%
Wastewater Treatment	-	-	-	-	-	-	-	0%
Electricity - Location Based	-	-	-	-	-	-	-	0%
Electricity - Market Based (for informational purposes only)	-	-	-	-	-	-	-	
Employee Commute	1,382.17	-	-	-	-	-	1,382.17	92%
Water	-	-	-	-	-	-	-	0%
Ag & Land Management	-	-	-	-	-	-	-	0%
Urban Forestry	-	-	-	-	-	-	-	0%
Waste Generation	-	-	-	-	-	-	-	0%
<b>Total (Gross Emissions)</b>	<b>1,501.74</b>	<b>0.03</b>	<b>0.34</b>	-	-	-	<b>1,502.11</b>	<b>100%</b>
<b>Total (Net Emissions)</b>	<b>1,501.74</b>	<b>0.03</b>	<b>0.34</b>	-	-	-	<b>1,502.11</b>	<b>100%</b>

Gross Emissions by Department		
Department	Total (MT CO <sub>2</sub> e)	Percent of Total
Town	124.95	8%
<b>Total</b>	<b>20,657.15</b>	<b>1375%</b>

