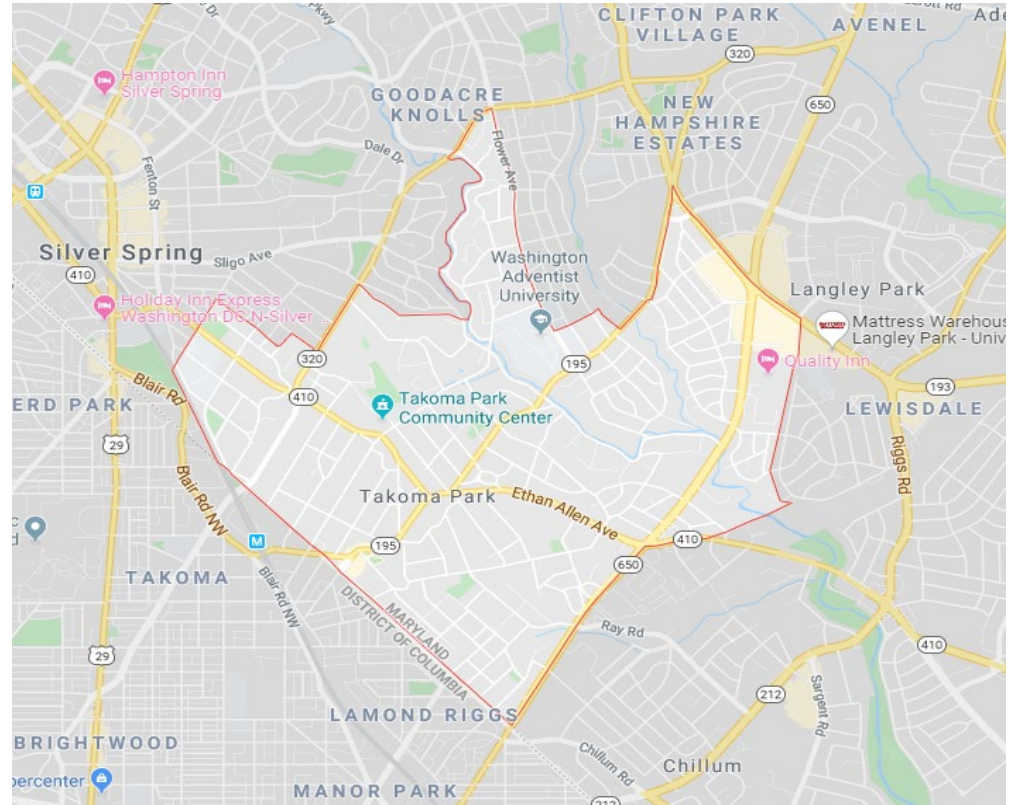


Boundary	Information
Name of City	Takoma Park, MD
Country	USA
Inventory Year	2017
Geographic Boundary	Administrative boundary of a local government
Land Area (sq. km)	5.41
Resident Population	17,885
GDP (USD)	487,638,000
Type of Economy	Services
Climate	Temperate, warm summer

Inventory	Information
GPC Reporting Level	BASIC
GHG Included	CO2, CH4, N2O
Global Warming Potential	IPCC Fourth Assessment Report

Acronym	Definition
NO	Not Occuring
IE	Included Elsewhere
NE	Not Estimated

Required for BASIC Reporting
Required for BASIC+ Reporting
Required for Territorial Total
Not Applicable



GHG Emissions Source (By Sector)	Total GHGs (MT CO2e)		
	Scope 1	Scope 2	Scope 3
Stationary Energy	32,360	34,871	1,639
Transportation	59,790	-	-
Waste	-	-	1,165
Total	92,150	34,871	2,804

Reference #	GHG Emissions Source (By Sector and Sub-Sector)	Total GHGs (MT CO2e)			
		Scope 1	Scope 2	Scope 3	Total
<b>I</b>	<b>Stationary Energy</b>				
I.1	Residential	21,540	12,675	596	34,811
I.2	Commerical and Institutional	9,910	22,196	1,043	33,149
I.3	Manufacturing and Construction	IE	IE	IE	-
I.4.1/2/3	Energy Industries	NO	NO	NO	-
I.4.4	Energy Generation Supplied to Grid	NO			-
I.5	Agriculture, Forestry and Fishing	IE	IE	IE	-
I.6	Non-Specified Sources	NO	NO	NO	-
I.7	Fugitive Emissions from Coal	NO			-
I.8	Fugitive Emissions from Oil and Natural Gas	910			910
<b>SUBTOTAL</b>		<b>32,360</b>	<b>34,871</b>	<b>1,639</b>	<b>68,870</b>

<b>II</b>	<b>Transportation</b>				
II.1	On-Road	59,790	IE	IE	59,790
II.2	Railways	NE	IE	NE	-
II.3	Waterborne Navigation	NO	NO	NO	-
II.4	Aviation	NO	NO	NO	-
II.5	Off-Road Transport	NO	NO	NO	-
<b>SUBTOTAL</b>		<b>59,790</b>	<b>-</b>	<b>-</b>	<b>59,790</b>

<b>III</b>	<b>Waste</b>				
III.1.1/2	Solid waste generated in the city	NO		1,104	1,104
III.2.1/2	Biological waste generated in the city	IE		IE	-
III.3.1/2	Incinerated and burned waste generated in the city	NO		NO	-
III.4.1/2	Wastewater generated in the city	NO		61	61
III.1.3	Solid waste generated outside the city	NO			-
III.2.3	Biological waste generated outside the city	NO			-
III.3.3	Incinerated and burned waste generated outside city	NO			-
III.4.3	Wastewater generated outside the city	NO			-
<b>SUBTOTAL</b>		<b>-</b>		<b>1,165</b>	<b>1,165</b>

<b>TOTAL</b>		<b>92,150</b>	<b>34,871</b>	<b>2,804</b>	<b>129,824</b>
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Emissions Type	Emissions Activity	Inventory Record	Activity	Unit	kg CO2	kg CH4	kg N2O	kg CO2e	MT CO2	MT CH4	MT N2O	MT CO2e	Data Source	Notes
Residential Energy	Grid Electricity	Electricity	36,664,792	kWh	12,609,515.27	831.54	149.68	12,674,907.80	12,609.52	0.83	0.15	12,674.91	Pepco Data (2018)	
Residential Energy	Stationary Fuel	Natural Gas	4,008,865	Therms	21,271,038	401	40	21,293,006	21,271	0	0	21,293	Washington Gas (2017)	
Residential Energy	Stationary Fuel	Fuel Oil	24,159	Gallons	246,667.67	9.91	1.93	247,491.27	247	0	0	247	ACS, EIA SEDS Table CT4	
Residential Energy	Grid Electricity	Grid Loss	1,723,641	kWh	592,783.20	39.09	7.04	595,857.36	592.78	0.04	0.01	595.86		
												34,811.26		
Commerical Energy	Grid Electricity	Electricity	64,206,152	kWh	22,081,359.53	1,456.17	262.11	22,195,872.72	22,081.36	1.46	0.26	22,195.87	Pepco Data (2018)	
Commerical Energy	Stationary Fuel	Natural Gas	1,865,679	Therms	9,899,293	187	19	9,909,517	9,899	0	0	9,910	Washington Gas (2017)	
Commerical Energy	Grid Electricity	Grid Loss	3,018,382	kWh	1,038,062.03	68.46	12.32	1,043,445.38	1,038.06	0.07	0.01	1,043.45		
												33,148.83		
Municipal Energy	Grid Electricity	Electricity	509,768	kWh	175,316.07	11.56	2.08	176,225.26	175.32	0.01	0.00	176.23	Takoma Park Municipal Building Energy Use 2014-2018	
Municipal Energy	Stationary Fuel	Natural Gas	16,612	Therms	88,143	2	0	88,234	88	0	0	88	Takoma Park Municipal Building Energy Use 2014-2018	Converted Mbtu to Therms

**136,184.65**

**Notes:**

Corn fuel excluded as it contributed 0.001% of emissions in previous inventories  
 Multifamily natural gas use reported as 90% residential, 10% commercial

98 homes in Takoma Park  
 1181000 barrels in MD  
 201205 homes in MD  
 246.5246888 gallons per household (2017)  
 24159.4195 gallons in Takoma Park

	2012	2015	2,017
# Homes (Takoma Park)	213	184	98
# MD Barrels Consumed	2310000	3365000	1181000
# Homes (MD)	239039	212903	201205
Gallons/Household	406	664	247
Gallons Takoma Park	86451	122144	24159
Emissions Takoma Park			

Emissions Type	Emissions Activity	Inventory Record	Activity	Unit	kg CO2	kg CH4	kg N2O	kg CO2e	MT CO2	MT CH4	MT N2O	MT CO2e	Data Source	Notes
Transportation	On-Road Transportation	On-Road Mobile Emissions	135,841,586	VMT	59,523,509	2,248	705	59,789,775	59,524	2	1	59,790		
Transportation	Municipal Diesel		22,093	gallons										Takoma Park I B20 fuel is used for diesel in the municipal fleet
Transportation	Municipal Gasoline		45,817	gallons										Takoma Park Municipal Fuel Data

County VMT	7,893,000,000	22,705,890
Takoma Park VMT (est)	135,841,586	
County Population	1,039,198	

**Vehicle Type**

Fuel	Type	Number	Percent	VMT	MPG	Fuel Use	kg CO2	kg CH4	kg N2O	kg CO2e	MT CO2	MT CH4	MT N2O	MT CO2e
Gasoline	Light Trucks	330,456	44.1%	59,839,885	17.4	3,439,074	30,195,068	975.4	394.9	30,337,146.0	30,195.1	1.0	0.4	30,337.1
Gasoline	Passenger Cars	371,709	49.6%	67,310,092	24.0	2,804,587	24,624,275	1,164.5	242.3	24,725,597.1	24,624.3	1.2	0.2	24,725.6
Gasoline	Buses	177	0.0%	32,052	4.8	6,677	58,628	1.1	0.4	58,782.5	58.6	0.0	0.0	58.8
Diesel	Heavy Trucks	4,889	0.7%	885,314	5.9	150,053	1,532,043	4.5	4.2	1,533,421.9	1,532.0	0.0	0.0	1,533.4
Diesel	Light Trucks	9,260	1.2%	1,676,826	19.0	88,254	901,074	16.8	2.5	902,242.3	901.1	0.0	0.0	902.2
Diesel	Passenger Cars	2,861	0.4%	518,078	25.9	20,003	204,231	0.3	0.5	204,391.5	204.2	0.0	0.0	204.4
Diesel	Buses	2,204	0.3%	399,106	5.0	79,821	814,975	2.0	1.9	815,597.0	815.0	0.0	0.0	815.6
CNG	Buses	76	0.0%	13,762	3.0	642,240	34,964	27.1	2.4	36,357.7	35.0	0.0	0.0	36.4
Hybrid	Light Trucks	3,417	0.5%	618,760	39.2	15,805	138,767	-	-	138,766.6	138.8	-	-	138.8
Hybrid	Passenger Cars	21,272	2.8%	3,851,992	54.0	71,333	626,305	-	-	626,305.4	626.3	-	-	626.3
Electric	All	1,053	0.1%	190,680				-	-			-	-	
Ethanol (E85)	Passenger Cars	454	0.1%	82,212	20.7	3,968	25,469	4.5	5.5	27,223.4	25.5	0.0	0.0	27.2
Ethanol (E85)	Light Trucks	1,221	0.2%	221,102	15.2	14,546	93,372	12.2	14.8	98,090.5	93.4	0.0	0.0	98.1
Ethanol (E85)	Heavy Trucks	1,114	0.1%	201,726	4.7	42,739	274,339	39.7	35.3	285,852.6	274.3	0.0	0.0	285.9
<b>Total</b>						<b>7,379,101</b>	<b>59,523,509</b>	<b>2,248</b>	<b>705</b>	<b>59,789,775</b>	<b>59,524</b>	<b>2</b>	<b>1</b>	<b>59,790</b>

Fuel Type	Vehicle Type	kg CO2/gallon	g CH4/mile	g N2O/mile
Gasoline	Light Trucks		0.0163	0.0066
Gasoline	Passenger Cars	8.78	0.0173	0.0036
Gasoline	Buses		0.0333	0.0134
Diesel	Heavy Trucks		0.0051	0.0048
Diesel	Light Trucks	10.21	0.01	0.0015
Diesel	Passenger Cars		0.0005	0.0001
Diesel	Buses		0.0051	0.0048
CNG	Buses	0.05444	1.966	0.175
Hybrid	Light Trucks	8.78		
Hybrid	Passenger Cars			
Electric	All		0	0
Ethanol (E85)	Passenger Cars		0.055	0.067
Ethanol (E85)	Light Trucks	6.419	0.055	0.067
Ethanol (E85)	Heavy Trucks		0.197	0.175

	2012	2015	2017	delta
Takoma Park	16,902	17,478	17,643	0.94%
Montgomery County	974,824	1,017,859	1,039,198	2.05%
VMT	7,328,000,000	7,507,000,000	#####	4.89%
Takoma Park VMT	127,056,634	128,905,228	134,003,529	3.80%
Takoma Park Emissions	72667.16499	69112.58887	68649.8856	
	0.000572	0.000536	0.000512	
VMT Increase 2012-2015	1.45%			
Emissions Increase 2012-2015	-4.89%			
Decrease Per Increase 2012-2015	-0.30			
VMT Increase 2015-2017	3.96%			

Emissions Type	Emissions Activity	Inventory Record	Activity	Unit	kg CO2	kg CH4	kg N2O	kg CO2e	MT CO2	MT CH4	MT N2O	MT CO2e	Data Source	Notes
Solid Waste	Waste Generation		3244	Tons	0	44,156	0	1,103,901	0	44	0	1,104		
Water and Wastewater	Process Emissions							42615.98056					43 WSSC 2017 GHG Action Plan Update	Only includes wastewater treatment process emissions (3% of total) to avoid double counting of electricity and transportation
Water and Wastewater	Effluent Discharge							18000					18 Estimate from 2015 values	

Solid Waste	3244	short tons		3231.5
Recycling	1306	short tons	1306	1329.47
Food Waste	241.15	short tons		212.49
Yard Waste	NR	short tons		4773.46
Emissions Factor	60.496	kg CH4/short ton waste		
Landfill Gas Collection Efficiency	0.75			
Oxidation Rate	0.1			

Waste Characterization - Montgomery County 2017

Paper	22.40%	0.104
Plastic	16.10%	0.000
Organics	40.70%	0.078
Yard Waste	2.70%	0.043
Wood	7%	0.062
Ferrous Metals	1.90%	0.000
Non-Ferrous Metals	0.90%	0.000
Glass	2%	0.000
Inorganic	5.90%	0.000
HHW	0.10%	0.000

Year Treatment Process Emissions WSSC Population Served TP Population Allocated Emissions

2010	3408	1,800,000	16,783	31.77581
2011	4512	1,800,000	17,195	43.10213
2012	4451	1,800,000	17,359	42.92495
2013	5026	1,800,000	17,480	48.80804
2014	5164	1,800,000	17,514	50.24572
2015	5199	1,800,000	17,624	50.90399
2016	5431	1,800,000	17,746	53.54363
2017	4289	1,800,000	17,885	42.61598

[https://www.wsscwater.com/files/live/sites/wssc/files/communityoutreach/WSSC\\_GHG%20Action%20Plan%20Update%202017\\_DRAFT%20062917.pdf](https://www.wsscwater.com/files/live/sites/wssc/files/communityoutreach/WSSC_GHG%20Action%20Plan%20Update%202017_DRAFT%20062917.pdf)  
[https://www.wsscwater.com/files/live/sites/wssc/files/communityoutreach/WSSC\\_GHG%20Action%20Plan%20Update%202017\\_DRAFT%20062917.pdf](https://www.wsscwater.com/files/live/sites/wssc/files/communityoutreach/WSSC_GHG%20Action%20Plan%20Update%202017_DRAFT%20062917.pdf)

US Community Protocol Wastewater Estimates

**N2O Emissions from Effluent Conversion, Equation WW.12 (alt) USCP**

Variable	Value	Units	Notes
Population	17885	people	10% of population (assume 20% of parcels = 20% of population)
F_indcom	1.25		
Total N-load	0.026	(kg N/person/day)	
N uptake	0.05	(kg N/kg BOD5)	Aerobic system
BOD5	0.09	kg BOD5/person/day	
EF	0.005	kgN2O-N/kg sewage-N disch	River/stream discharge
44/28	1.571428571		
Fplant	0		No nitrification/denitrification
Days per year	365.25		
Conversion from kg to metric tons	0.001		
GWP	298		
<b>N2O Emissions</b>	<b>411.0631591</b>	<b>tonnes CO2e</b>	

\*USCP WW.12

Emissions Type	Emissions Activity	Inventory Record	Activity	Unit	kg CO2	kg CH4	kg N2O	kg CO2e	MT CO2	MT CH4	MT N2O	MT CO2e	Data Source	Notes
Process and Fugitive	Fugitive Emissions from Natural Gas Distribution		5874544	Therms								910.0441038		

**Emissions Factors**

**Electricity: EPA eGrid (2016) - RFCE**

	CO2	CH4	N2O	CO2e
lbs/MWh	758.2	0.05	0.009	762.132
kg/MWh	343.9135	0.02268	0.004082	345.697
kg/kWh	0.343913	2.27E-05	4.08E-06	0.345697

Grid Loss % 4.49%

**Natural Gas**

	CO2	CH4	N2O	CO2e
kg/MMBtu	53.06	0.001	0.0001	53.1148
kg/Therm	5.306	0.0001	0.00001	5.31148

**Heating Oil (Fuel Oil #2)**

	CO2	CH4	N2O	CO2e
kg/gal	10.21	0.00041	0.00008	10.24409

**Motor Gasoline**

	CO2	CH4	N2O	CO2e
kg/gallon	8.78	0.00038	0.00008	8.81334

**Global Warming Potentials**

Emission	GWP (CO2e)
CO2	1
CH4	25
N2O	298

Taken from IPCC AR4

**Conversions**

*Multiply A to get B*

lb to kg	0.453592
ccf to therms	1.028
gal fuel oil #2 to MMBTU	0.14
kWh to GJ	0.0036
therm to GJ	0.105506
kWh to BTU	3412.141
gallons to liters	3.785412
miles to km	1.609344
scf to GJ	0.001085
short ton to metric ton	0.907185
kWh to MWh	0.001
MWh to GWh	0.001
short tons to lbs	2000
kg to metric tons	0.001
BTU to MMBTU	0.000001
therm to MMBTU	0.1
g to kg	0.001
mg to g	0.001
kg to tons	0.001
kBTU to MMBTU	0.001
MMBTU to GJ	1.055056
Mlbs to kBtu - steam	1194
MMBTU to Dth	1
therms to m3	2.776
days/year	365
scf to gallons	7.48
scf to BTU	1020.00
MMBTU to scf	0.001
GGE*/SCF	126.17
therms to kWh	29.3001
Mcf to MMBTU	1.03
Mcf to therms	10.2
MWh to MMBTU	3.409511
micrograms to g	0.000001
kwh/MMTBU	0.00341