



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Energy Programs Office



# **DRAFT 2019 Pennsylvania Greenhouse Gas Emission Inventory**

Climate Change Advisory Committee  
December 10, 2019

Tom Wolf, Governor

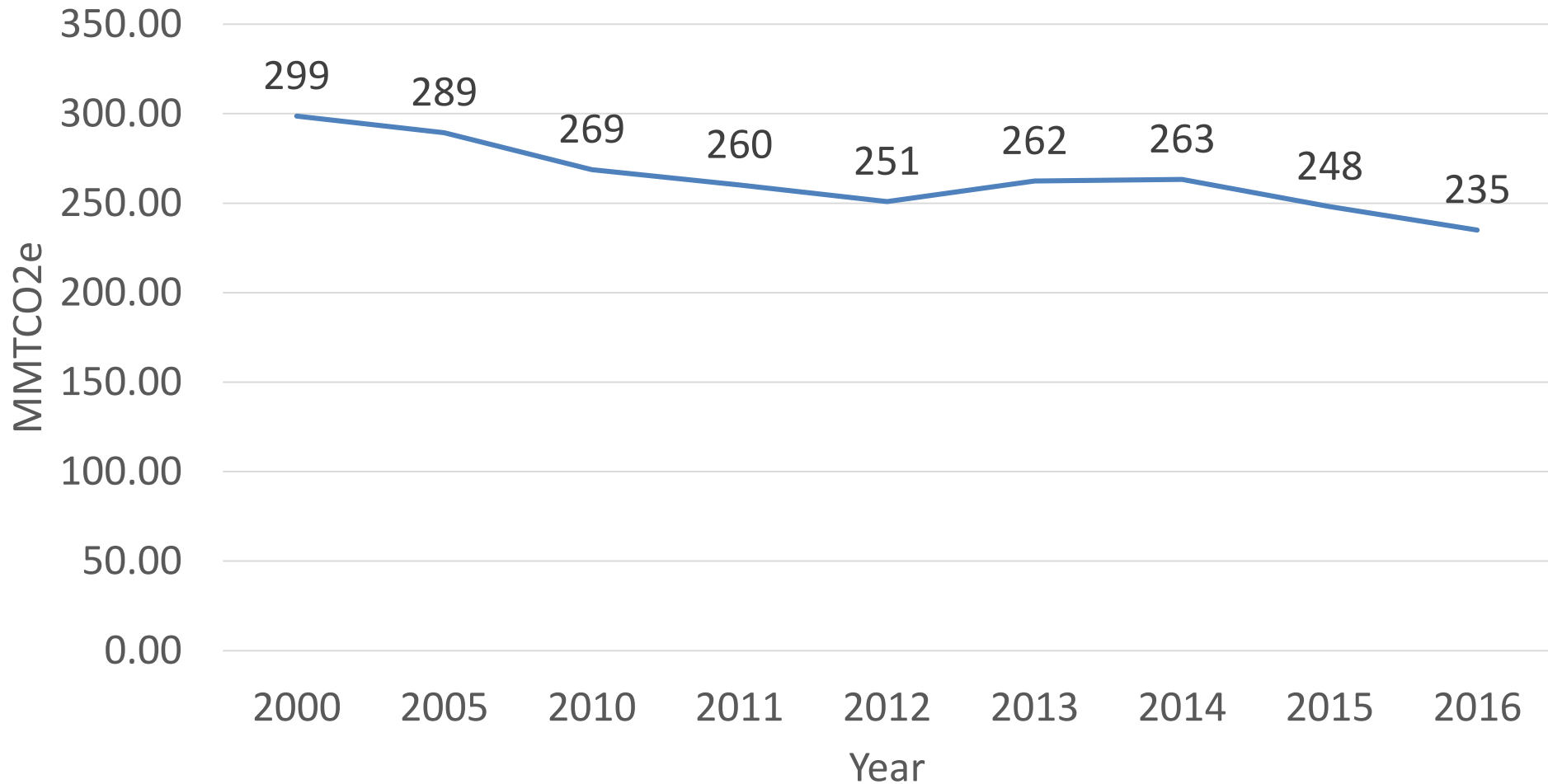
Patrick McDonnell, Secretary

# GHG Emission Inventory

- State Inventory Tool:
  - Made available on November 5, 2018.
  - Updated all 11 modules with data through 2016.

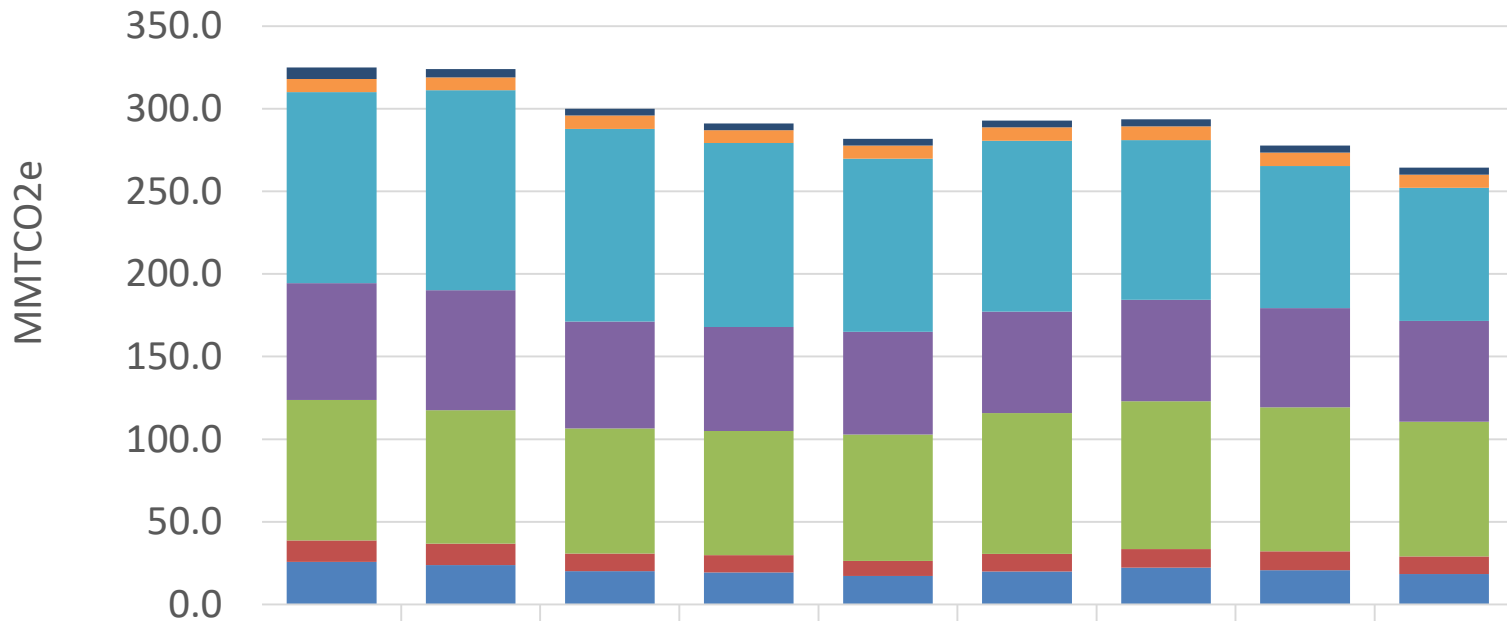
# GHG Inventory Results

Total Statewide Net Emissions  
(MMTCO<sub>2</sub>e)



# GHG Inventory Results

## GHG Emissions (MMTCO<sub>2</sub>e) by Sector



■ Waste Management

■ Agriculture

■ Electricity Production (in-state)

■ Transportation

■ Industrial

■ Commercial

■ Residential

2000

2005

2010

2011

2012

2013

2014

2015

2016

7.0

5.1

4.0

4.1

4.1

4.1

4.2

4.3

4.3

8.0

7.6

8.0

7.8

8.0

8.0

8.4

8.1

8.0

115.5

121.0

116.6

111.4

104.8

103.4

96.7

86.0

80.5

70.6

72.7

64.8

62.9

62.0

61.4

61.2

60.0

61.1

85.1

80.7

75.7

75.2

76.6

85.3

89.5

87.1

81.4

13.0

12.9

10.6

10.3

9.1

10.5

11.2

11.5

10.6

25.7

23.9

20.2

19.5

17.3

20.0

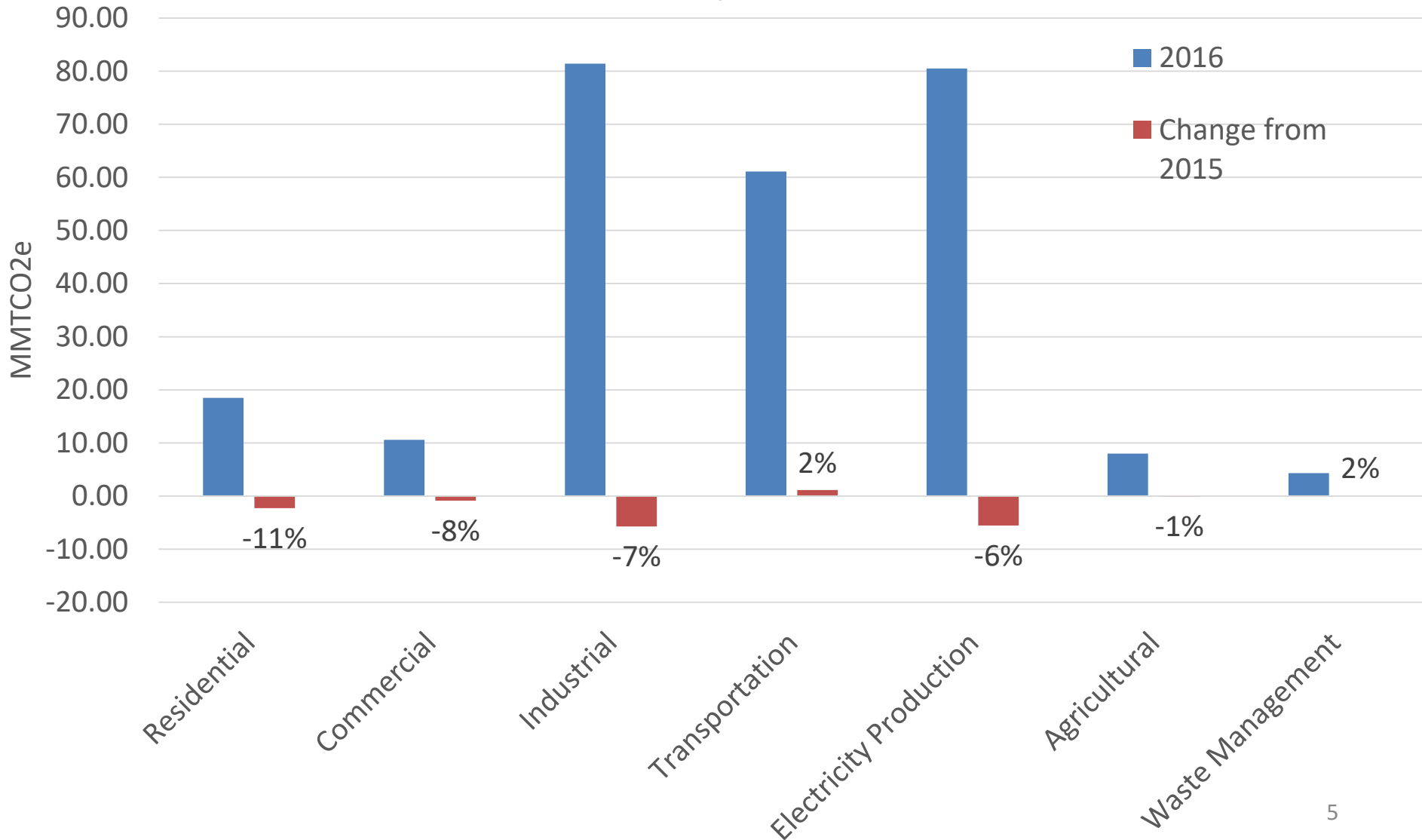
22.3

20.8

18.5

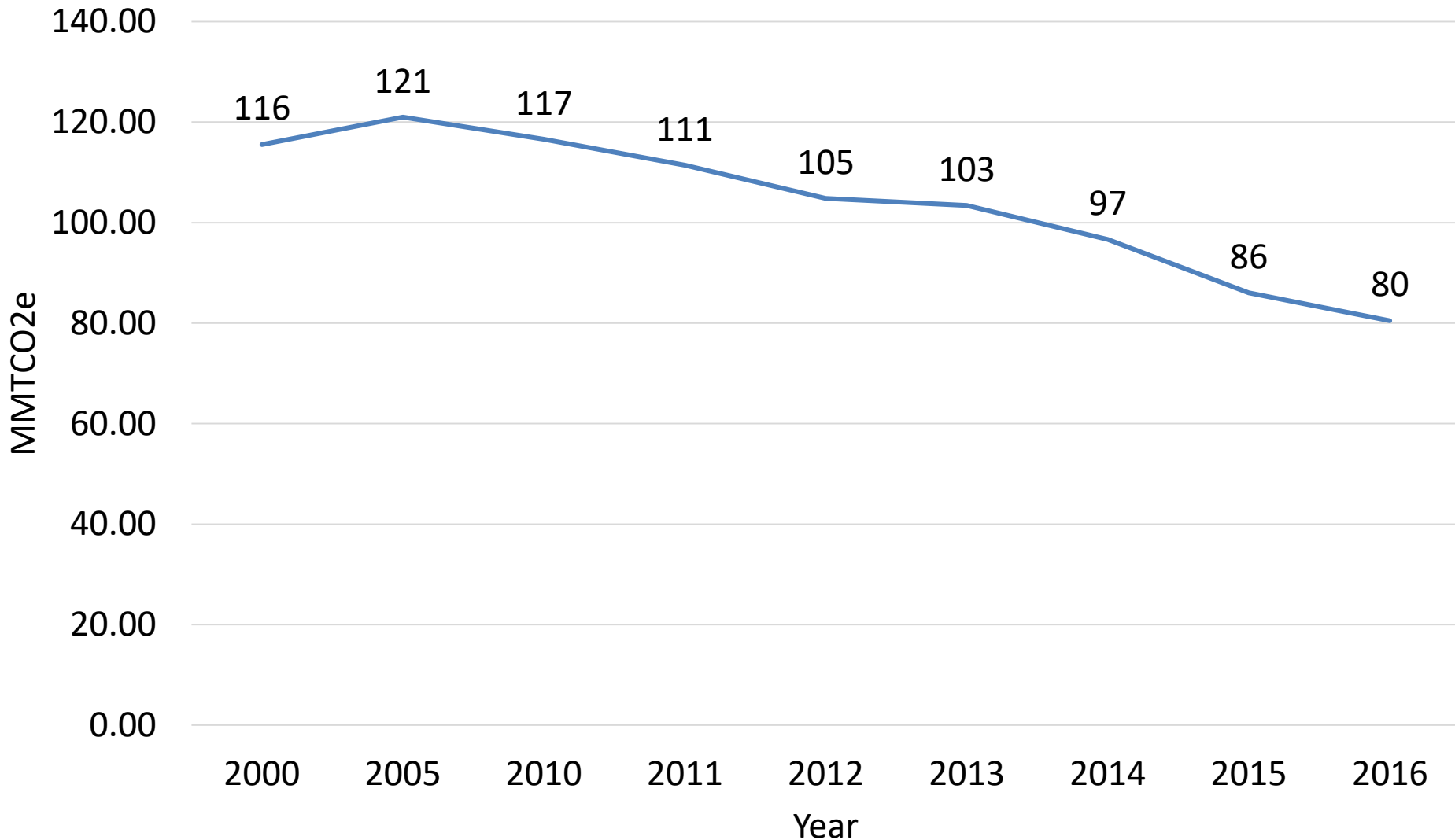
# Results By Sector

2016 GHG Emissions By Sector (MMT<sub>CO2e</sub>)



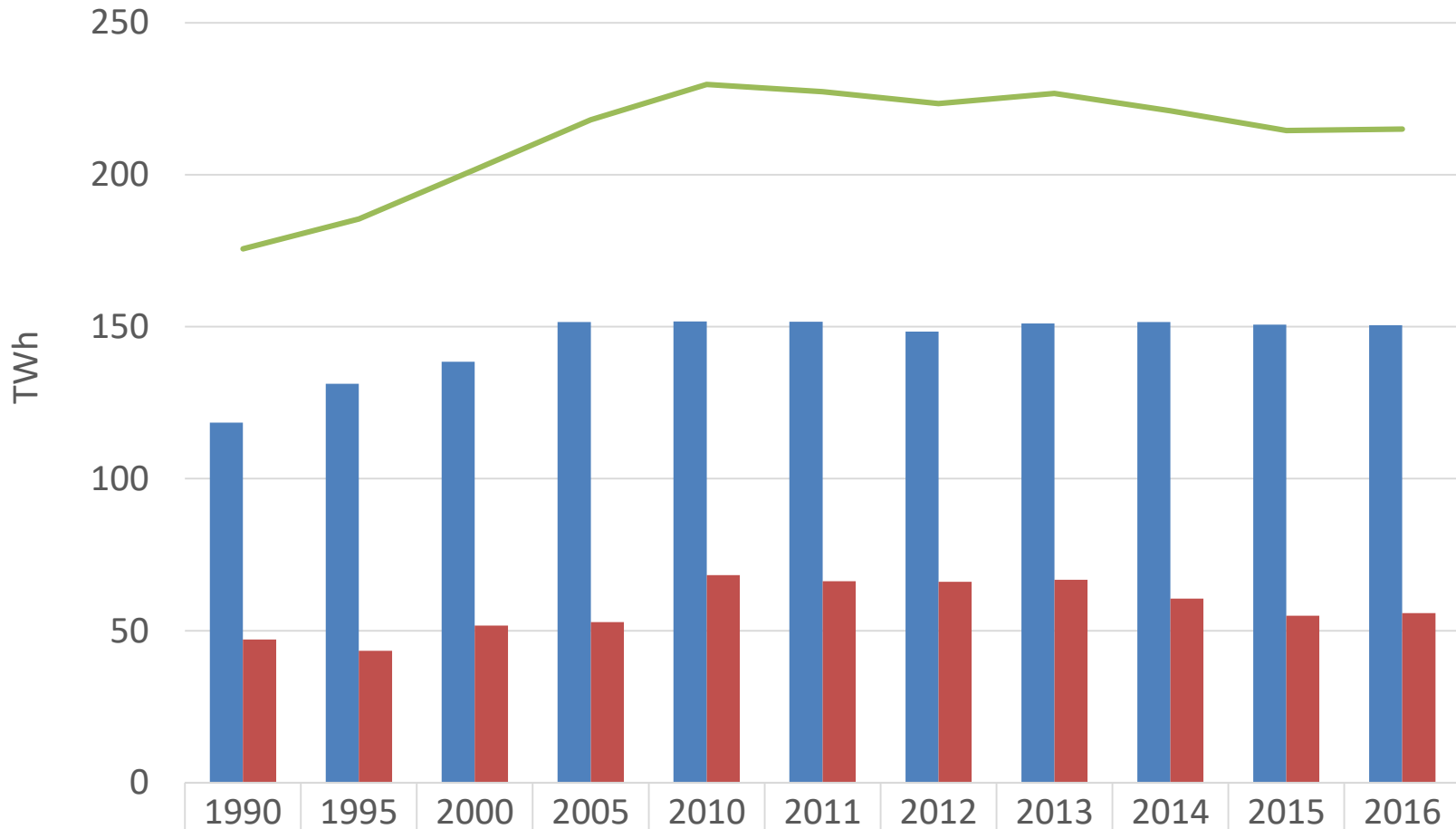
# Electricity Production

GHG Emissions from Electricity Production (MMT<sub>CO2e</sub>)



# Electricity Production

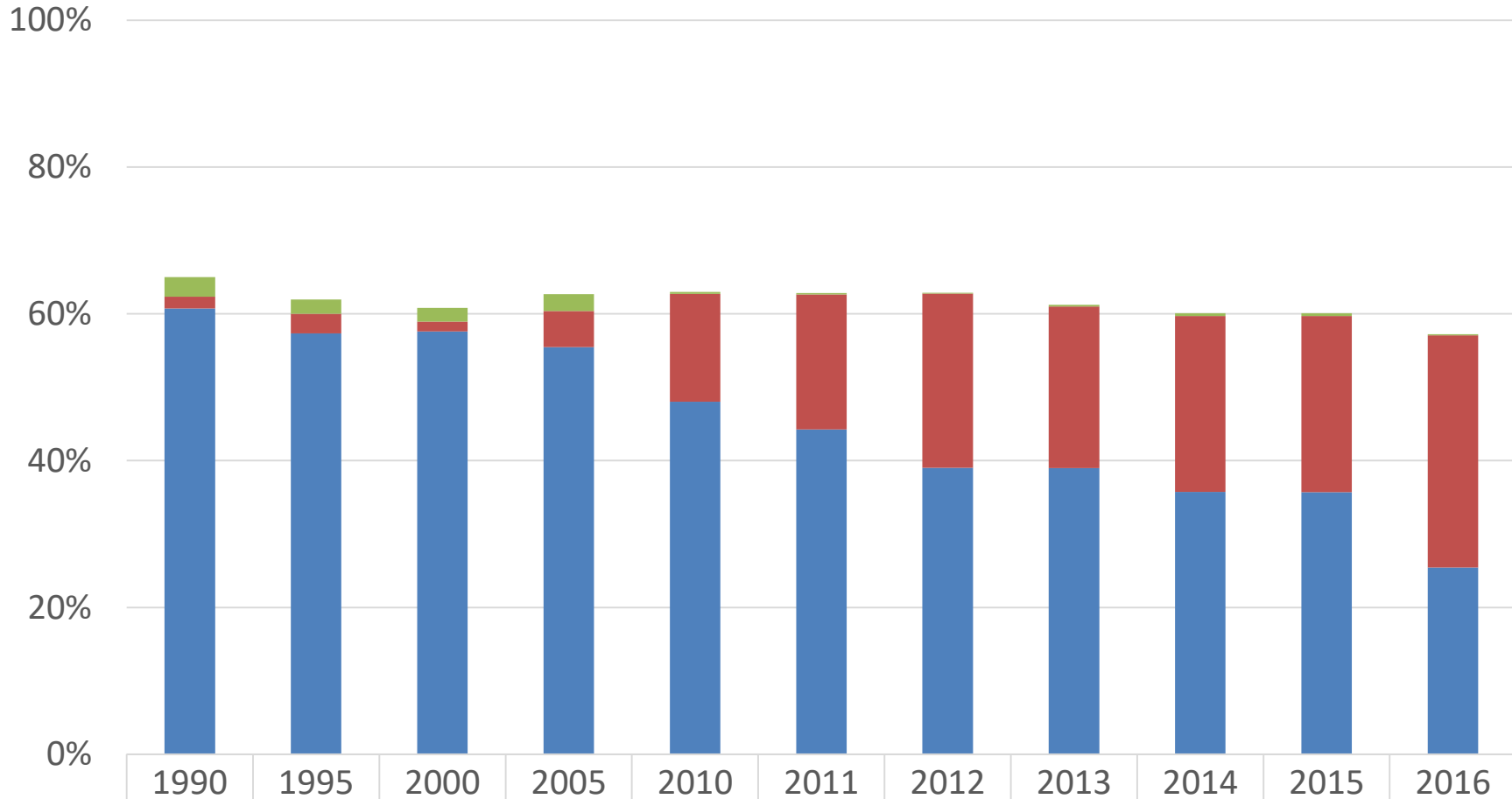
Total Electricity Generated, Consumed, and Exported (TWh)



Electricity Consumed	118	131	139	152	152	152	148	151	152	151	151
Electricity Exported	47	43	52	53	68	66	66	67	61	55	56
Electricity Generated	176	185	202	218	230	227	223	227	221	215	215

# Electricity Production Emissions

Percent Electricity Production By Fuel Type

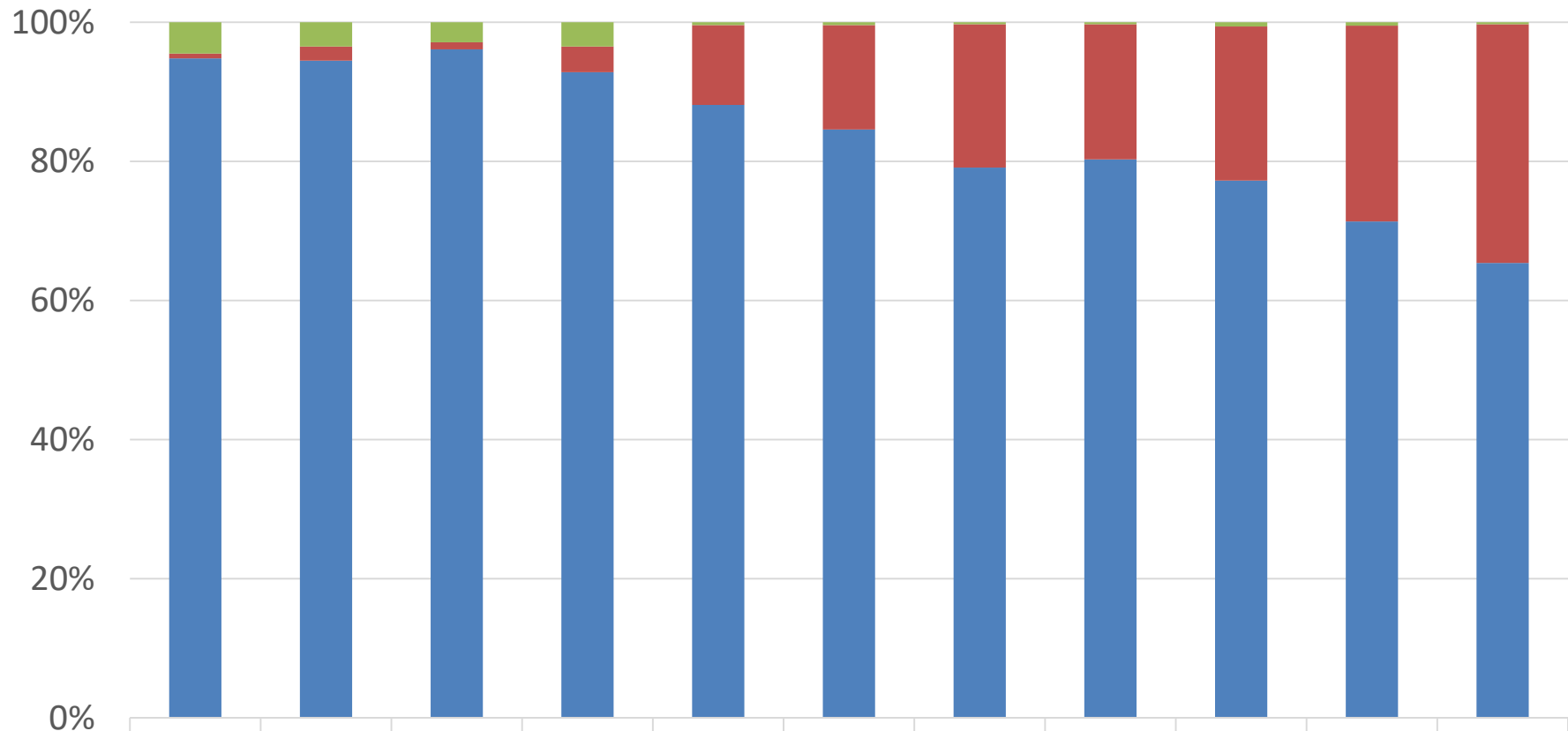


Oil	2.7%	2.0%	1.9%	2.3%	0.3%	0.2%	0.1%	0.2%	0.4%	0.4%	0.2%
Natural Gas	1.6%	2.7%	1.3%	5.0%	14.7%	18.4%	23.8%	22.0%	24.0%	24.0%	31.6%
Coal	60.7%	57.3%	57.6%	55.5%	48.0%	44.3%	39.0%	39.0%	35.7%	35.7%	25.4%



# Electricity Production Emissions

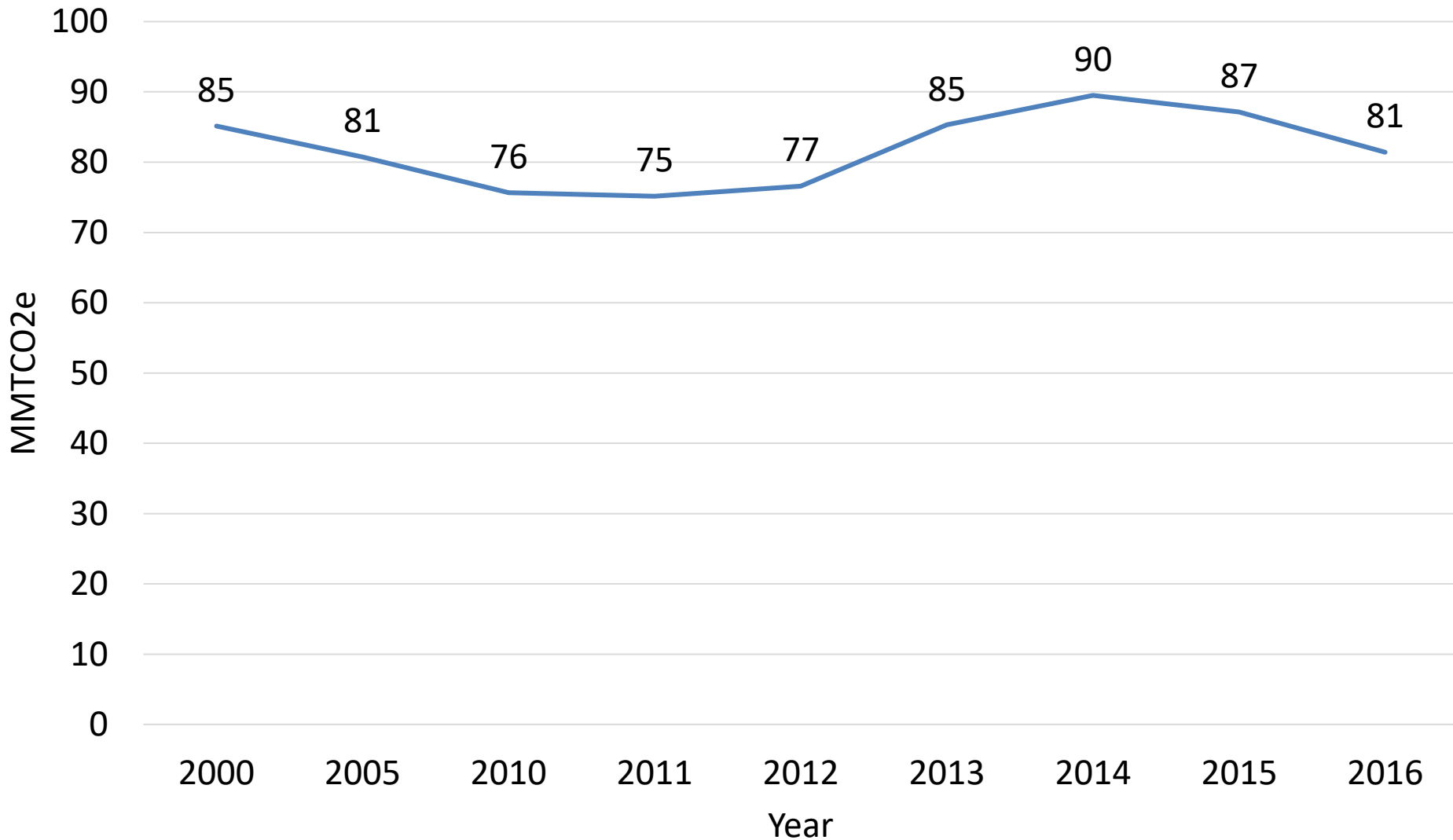
GHG Emissions from Electricity Production Sector by Source  
(% of Total)



Oil	4.5%	3.5%	2.9%	3.5%	0.4%	0.4%	0.3%	0.3%	0.6%	0.5%	0.3%
Natural Gas	0.7%	2.0%	1.0%	3.7%	11.5%	15.0%	20.6%	19.4%	22.2%	28.1%	34.3%
Coal	94.8%	94.4%	96.1%	92.9%	88.1%	84.6%	79.1%	80.3%	77.3%	71.3%	65.4%

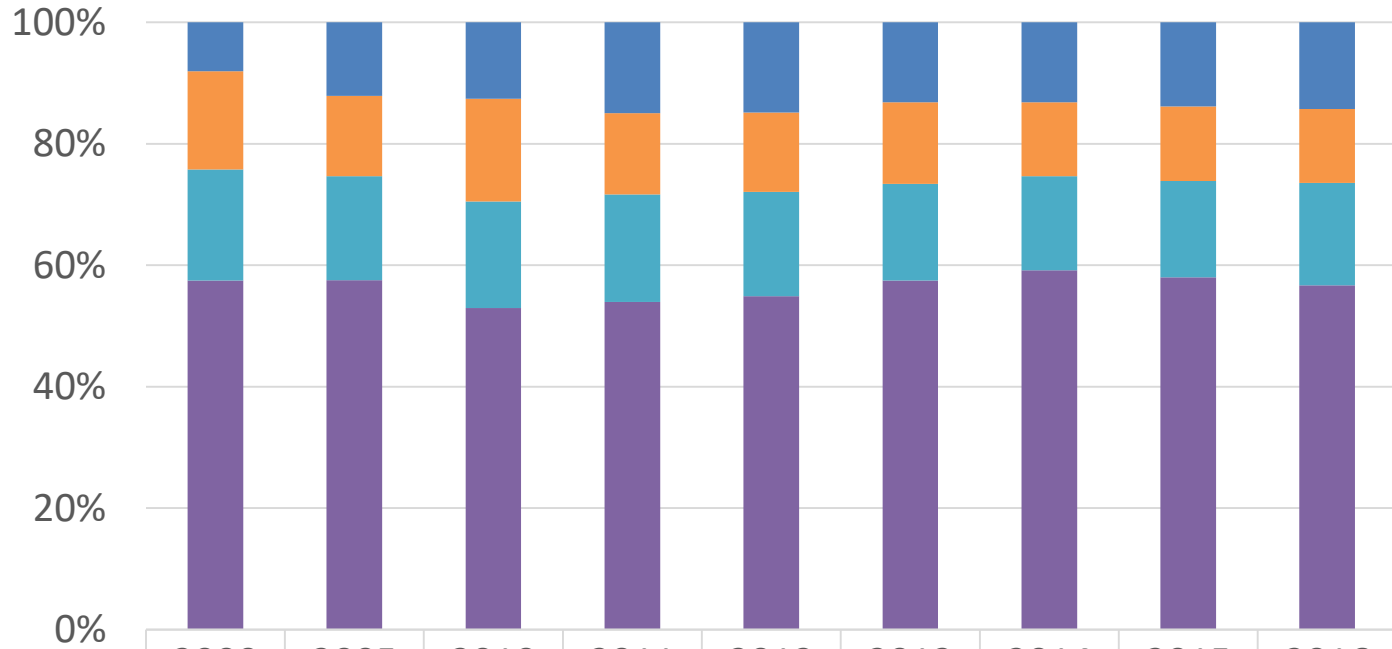
# Industrial Sector Emissions

GHG Emissions from Industrial Sector (MMT<sub>CO2e</sub>)



# Industrial Sector Emissions

GHG Emissions from Industrial Sector by Source (% of Total)

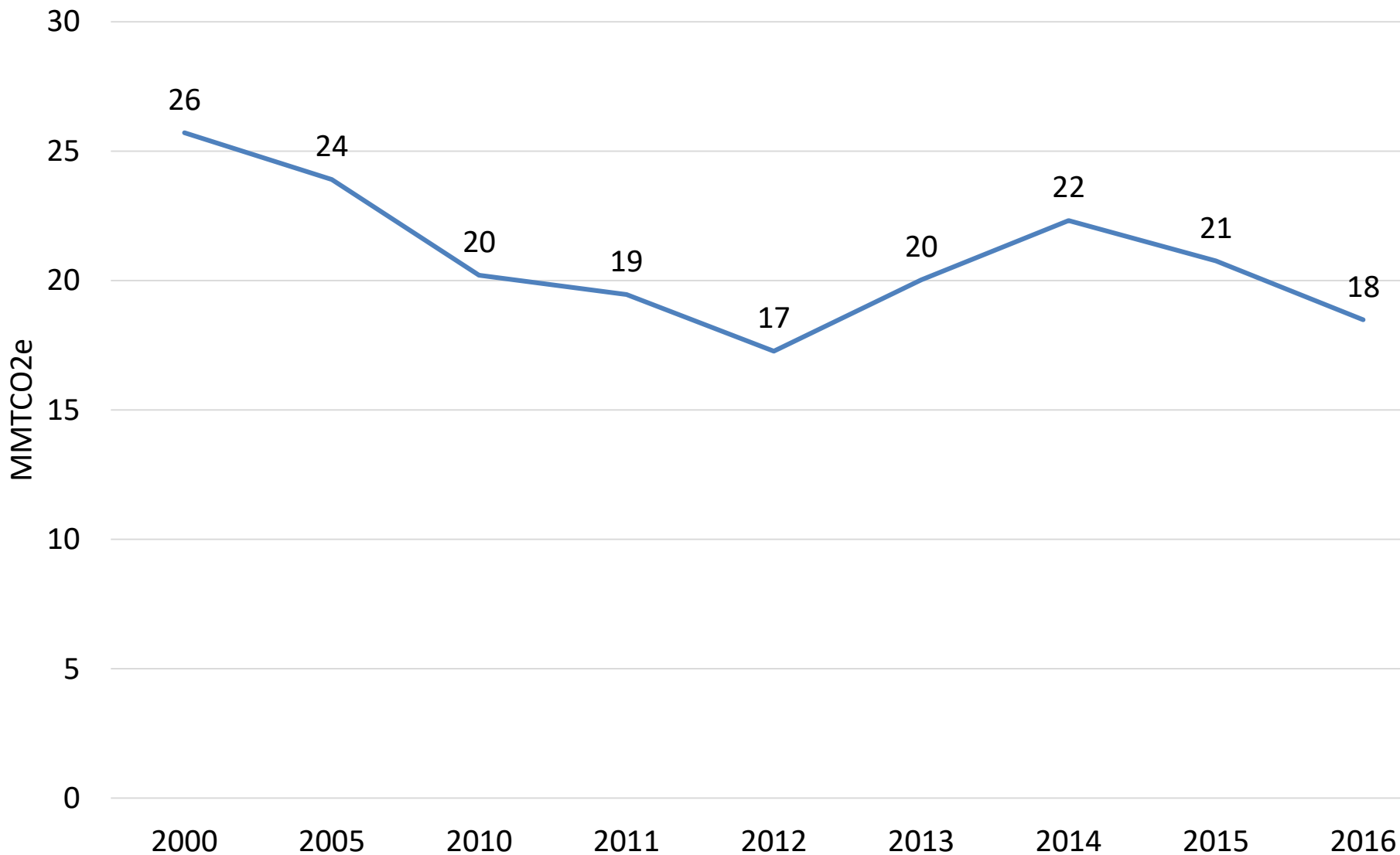


	2000	2005	2010	2011	2012	2013	2014	2015	2016
■ Natural Gas and Oil Systems	6.86	9.77	9.52	11.23	11.38	11.22	11.80	12.04	11.63
■ Coal Mining and Abandoned Mines	13.74	10.71	12.80	10.07	10.02	11.47	10.87	10.70	9.88
■ Industrial Process	15.56	13.81	13.27	13.30	13.15	13.57	13.88	13.82	13.76
■ Combustion of Fossil Fuels	48.95	46.47	40.09	40.56	42.05	49.04	52.95	50.57	46.16

Table values in MMTCO<sub>2</sub>e

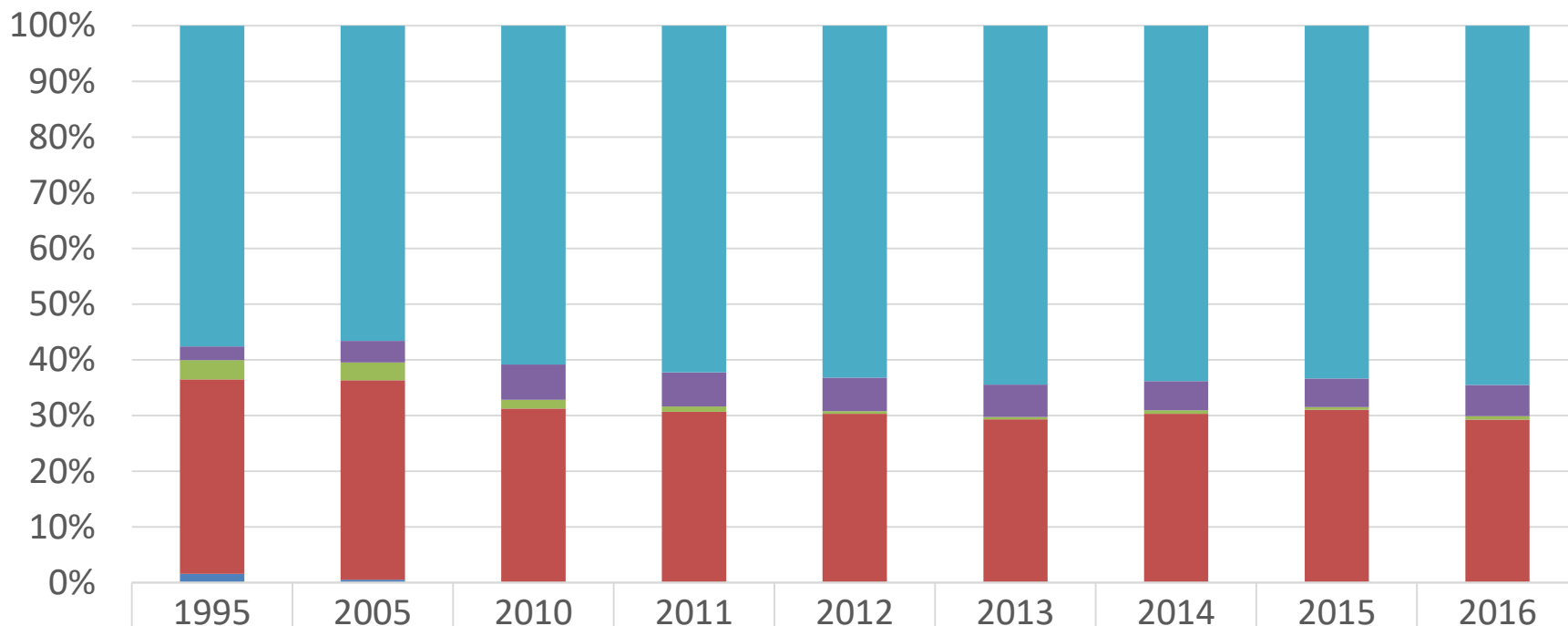
# Residential Sector

GHG Emissions from Residential Sector (MMT<sub>CO2e</sub>)



# Residential Sector

Residential Emissions by Fuel Type (% of Total)

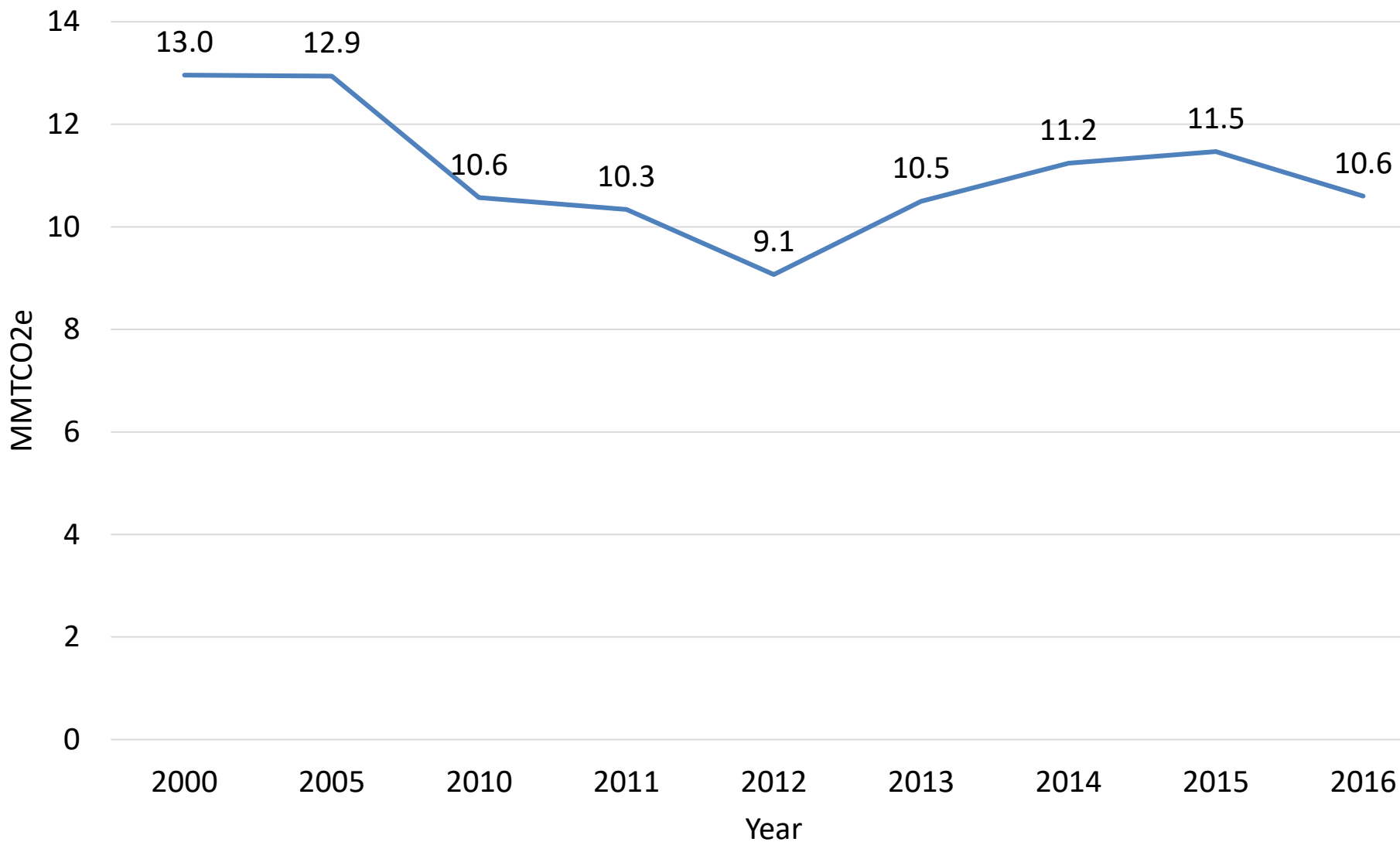


■ Natural Gas	14.40	13.53	12.30	12.10	10.93	12.92	14.21	13.12	11.93
■ Propane	0.62	0.93	1.28	1.19	1.04	1.17	1.16	1.06	1.04
■ Kerosene	0.86	0.76	0.31	0.19	0.08	0.08	0.15	0.10	0.11
■ Heating Oil	8.74	8.56	6.32	5.96	5.24	5.87	6.74	6.43	5.41
■ Coal	0.38	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table values in MMTCO<sub>2</sub>e

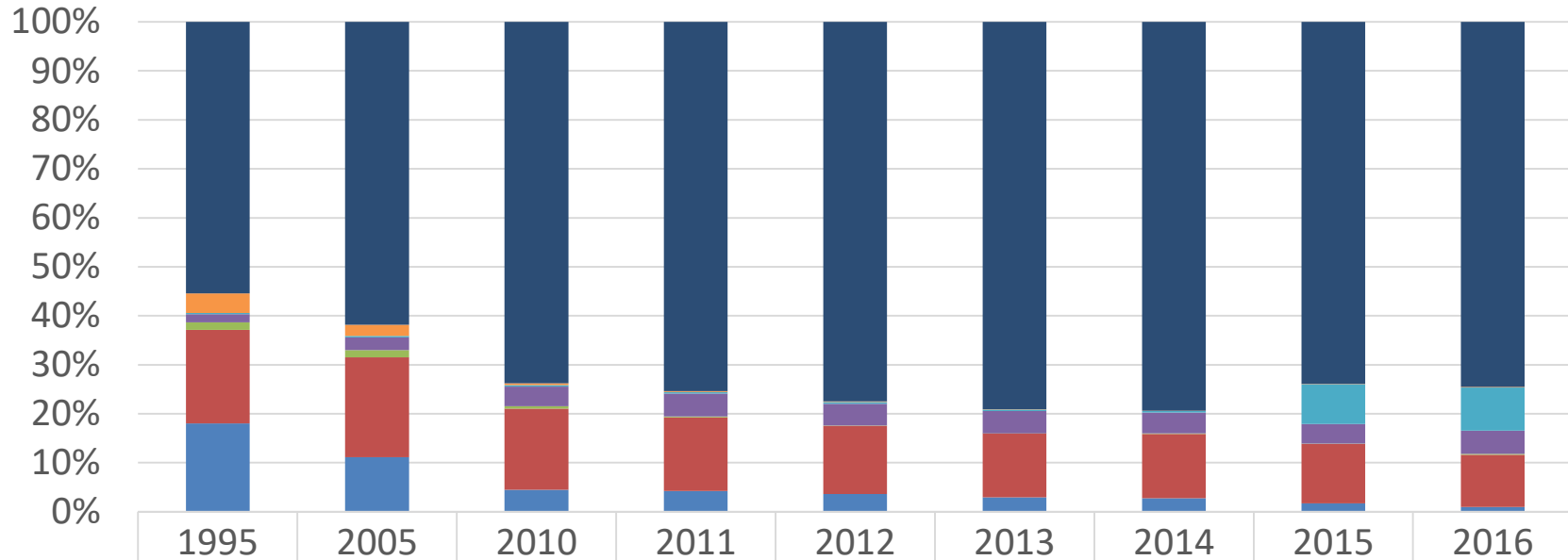
# Commercial Sector

GHG Emissions from Commercial Sector (MMTCO<sub>2</sub>e)



# Commercial Sector

Commercial Emissions by Fuel Type (% of Total)

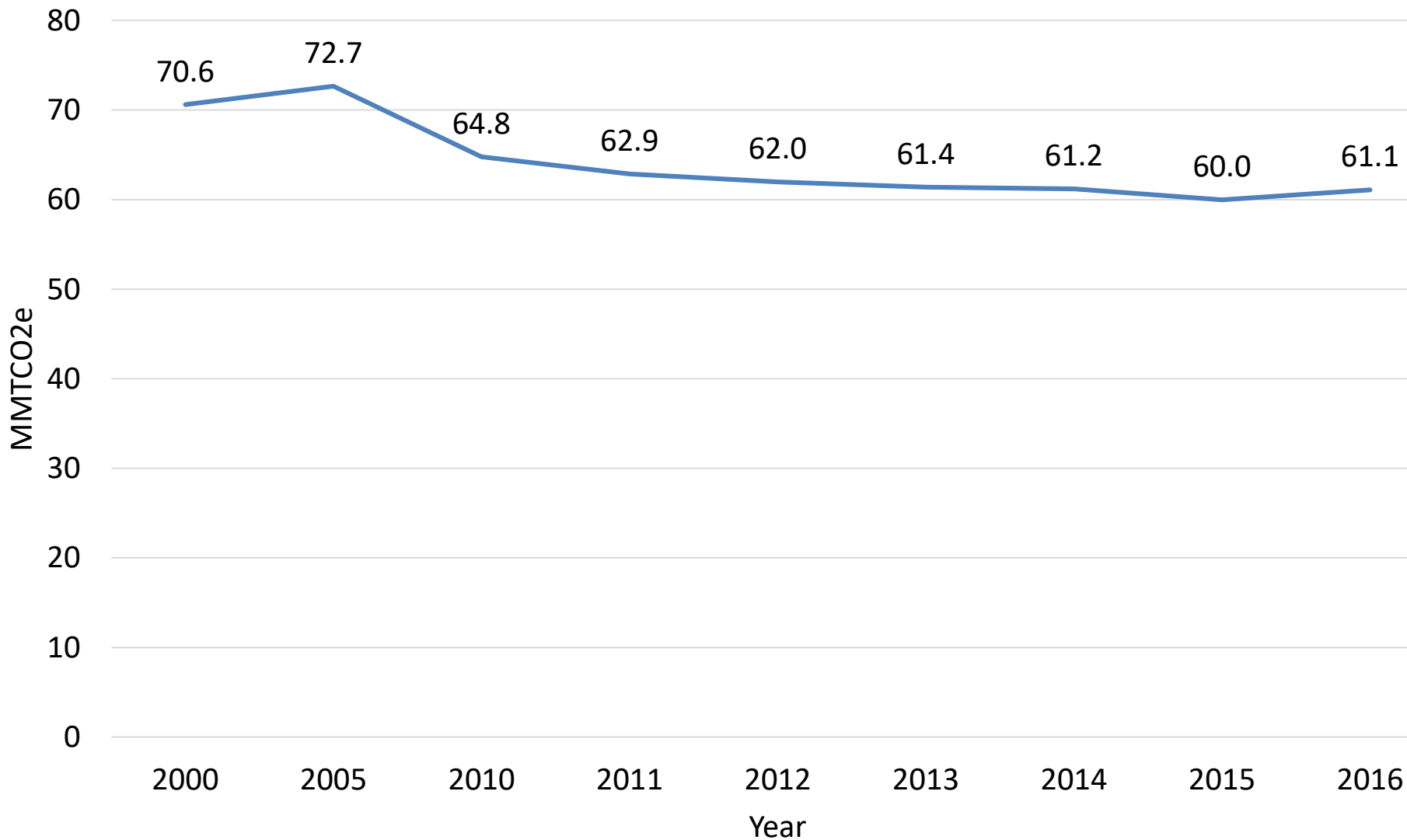


	1995	2005	2010	2011	2012	2013	2014	2015	2016
■ Natural Gas	7.89	8.00	7.79	7.79	7.03	8.31	8.90	8.47	7.90
■ Residual Fuel	0.58	0.30	0.04	0.02	0.01	0.00	0.01	0.00	0.01
■ Motor Gasoline	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.93	0.94
■ Propane	0.24	0.34	0.42	0.49	0.40	0.48	0.48	0.46	0.50
■ Kerosene	0.22	0.19	0.06	0.01	0.00	0.00	0.02	0.01	0.02
■ Heating Fuel	2.73	2.64	1.75	1.56	1.26	1.37	1.47	1.39	1.13
■ Coal	2.57	1.44	0.47	0.44	0.33	0.31	0.31	0.20	0.10

Table values in MMTCO<sub>2</sub>e

# Transportation Sector

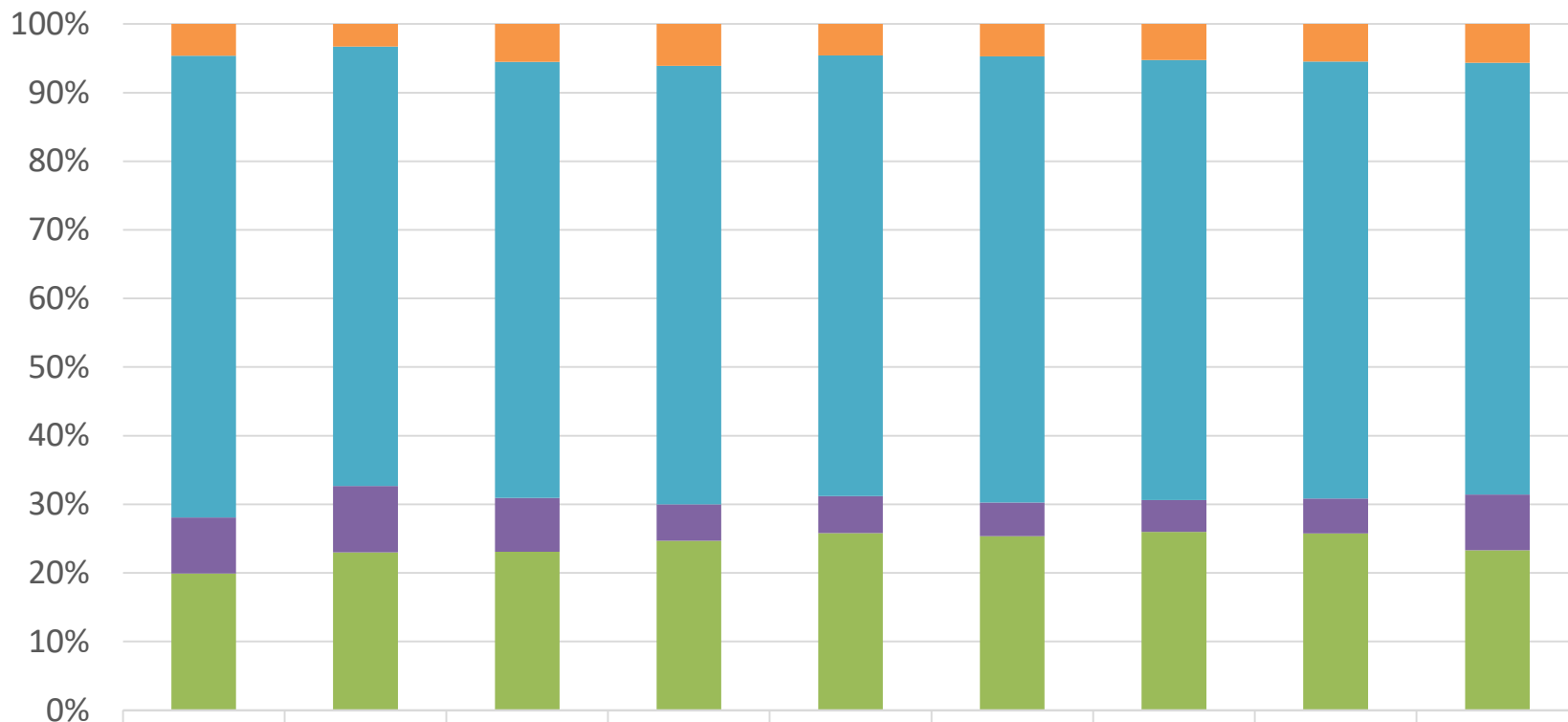
GHG Emissions from Transportation Sector (MMT<sub>CO2e</sub>)





# Transportation Sector

Transportation Sector Fuel Use (% of Total)



	1995	2005	2010	2011	2012	2013	2014	2015	2016
■ Natural Gas	39,317	32,312	49,517	53,553	39,121	40,050	44,642	45,663	48,048
■ Motor Gasoline	574,612	628,852	572,983	561,134	550,419	553,174	546,153	530,938	536,411
■ Jet Fuel, Kerosene	69,729	95,404	70,572	46,500	46,377	41,516	39,717	42,599	69,246
■ Diesel	170,082	225,678	208,250	216,758	220,941	215,735	221,179	214,633	198,601

Table values in BBtu

# Waste Management Sector

GHG Emissions from Waste Management Sector (MMTCO<sub>2</sub>e)

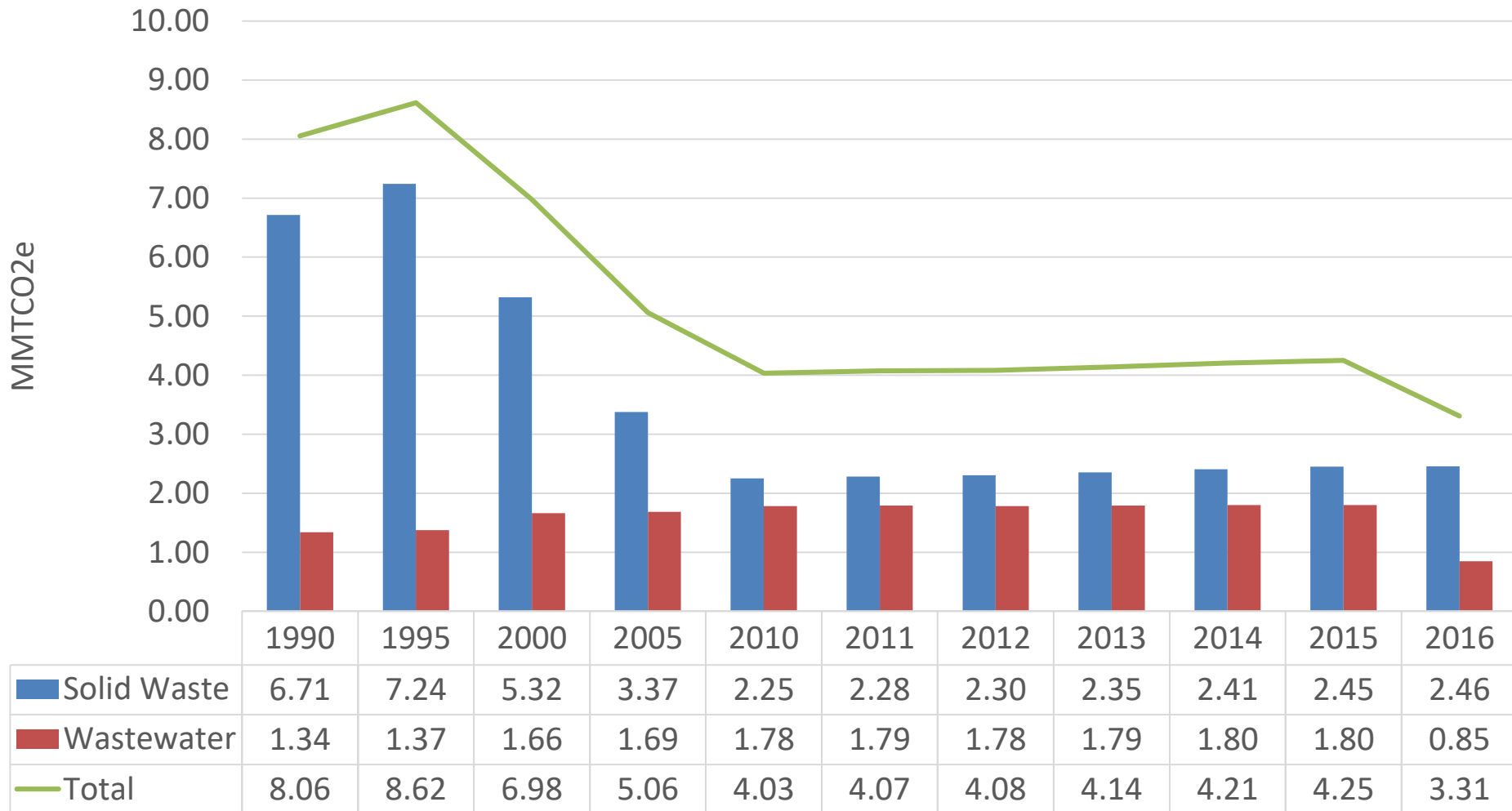
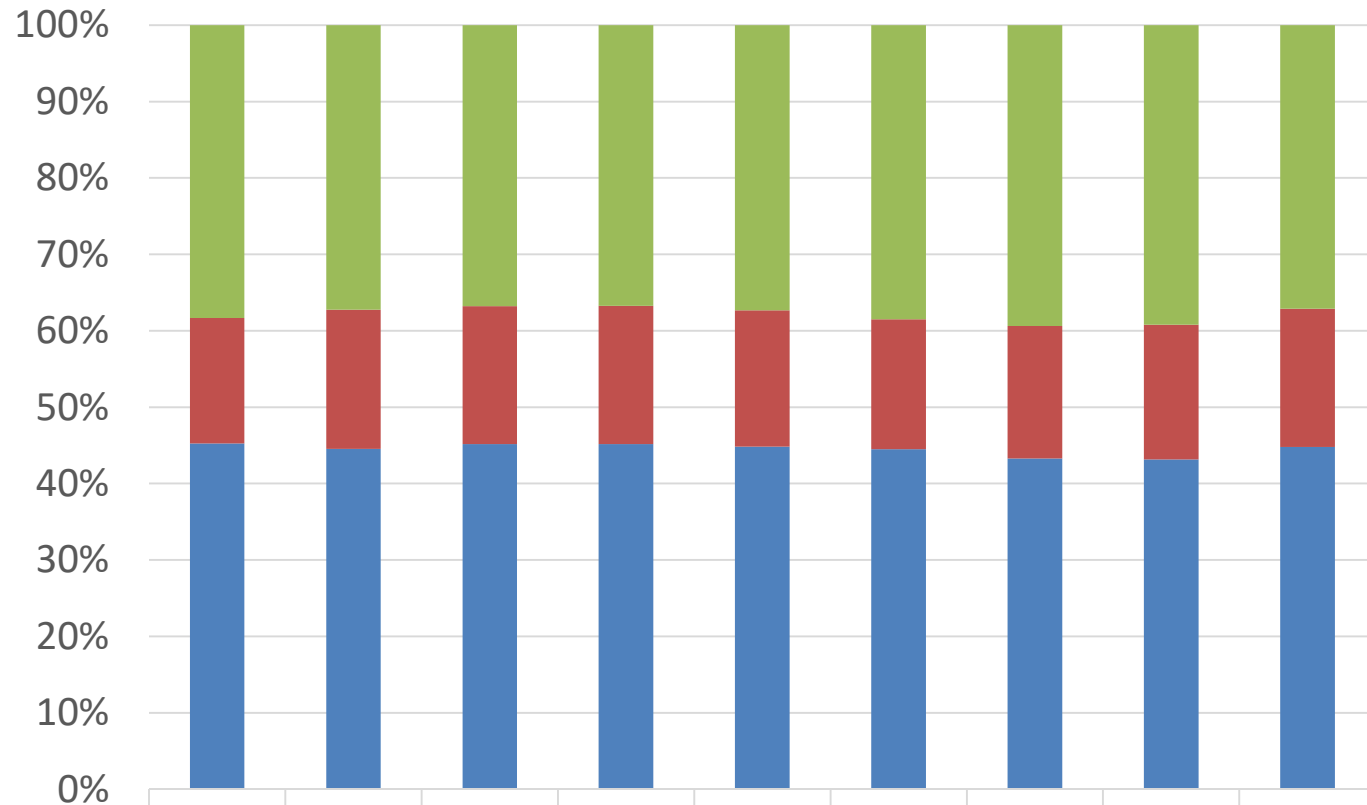


Table values in MMTCO<sub>2</sub>e

# Agriculture Sector

GHG Emissions from Agricultural Sector by Source (% of Total)



	2000	2005	2010	2011	2012	2013	2014	2015	2016
<span style="color: green;">■</span> Agricultural Soil Management	3.00	2.82	2.80	2.79	2.88	3.02	3.21	3.12	2.92
<span style="color: red;">■</span> Manure Management	1.29	1.38	1.37	1.38	1.38	1.33	1.41	1.40	1.42
<span style="color: blue;">■</span> Enteric Fermentation	3.54	3.37	3.44	3.43	3.45	3.49	3.53	3.44	3.52

Table values in MMTCO<sub>2</sub>e

# Emission Inventory

- The 2019 GHG Inventory (2016 data) shows a continued trend of overall decreased emissions from 2005.
- Net emissions continue to tick downward.
- The biggest decreases since 2015 came from the Industrial sector, with a decrease of 5.71 MMTCO<sub>2</sub>e and the electrical production sector with a decrease of 5.53 MMTCO<sub>2</sub>e.
- This decrease counteracted increases from the Transportation (1.12 MMTCO<sub>2</sub>e), and Waste Management (0.07 MMTCO<sub>2</sub>e) sectors.



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# Thank you!

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DEP Climate Change Website: [www.dep.pa.gov/climate](http://www.dep.pa.gov/climate)