History of Utah's GHG EI

- UDEQ GHG EI for 1990
- UDEQ GHG EI Update for 1993
- UEO Web Based GHG EI 2004 (2002 data, energy sectors only)

WRAP Contract for Western State's

- Provide contractor expertise CCS - Pechan
- Develop GHG EI for all western states
- Provide regional consistency
- Estimate historical, current and future levels
- Establish a basis for policy development

Emission Inventory Sectors

- Electrical Use and Supply
- Residential, Commercial and Industrial Fossil Fuel Combustion
- Fossil Fuel Production
- Transportation Energy Use
- Agriculture
- Forestry
- Waste Management

GHG Gases

- Carbon Dioxide (CO2)
- Methane (CH4)
- Nitrous Oxide (N20)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF6)

* CO2 equivalence (CO2e) indicates the relative contribution to global average radiative forcing or Global Warming Potential

Table 11. Global Warming Potentials (GWP) and Atmospheric Lifetimes (Years) Used in the Inventory

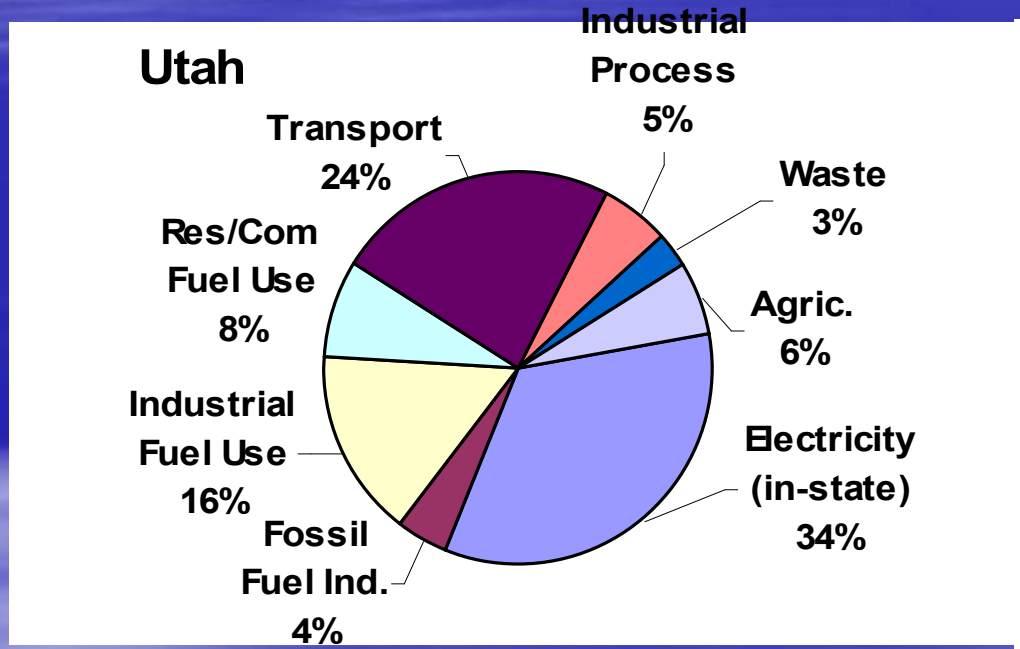
Gas	Atmospheric Lifetime	100-year GWP[a]	20-year GWP	500-year GWP
Carbon dioxide (CO_2)	50-200	1	1	1
Methane (CH_4)[b]	12±3	21	56	6.5
Nitrous oxide (N_2O)	120	310	280	170
HFC-23	264	11,700	9,100	9,800
HFC-125	32.6	2,800	4,600	920
HFC-134a	14.6	1,300	3,400	420
HFC-143a	48.3	3,800	5,000	1,400
HFC-152a	1.5	140	460	42
HFC-227ea	36.5	2,900	4,300	950
HFC-236fa	209	6,300	5,100	4,700
HFC-4310mee	17.1	1,300	3,000	400
CF_4	50,000	6,500	4,400	10,000
C_2F_6	10,000	9,200	6,200	14,000
C_4F_{10}	2,600	7,000	4,800	10,100
C_6F_{14}	3,200	7,400	5,000	10,700
SF_6	3,200	23,900	16,300	34,900

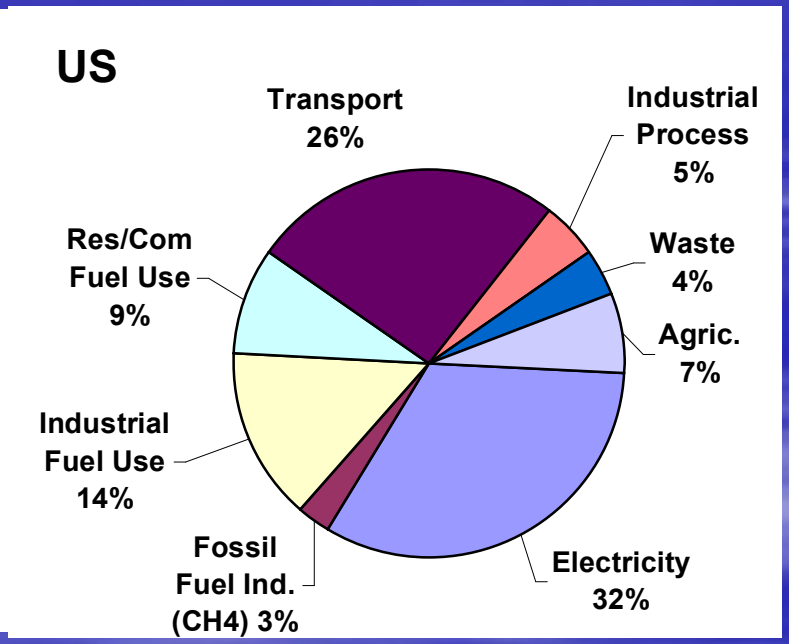
Source: IPCC (1996)

[a] GWPs used here are calculated over 100 year time horizon

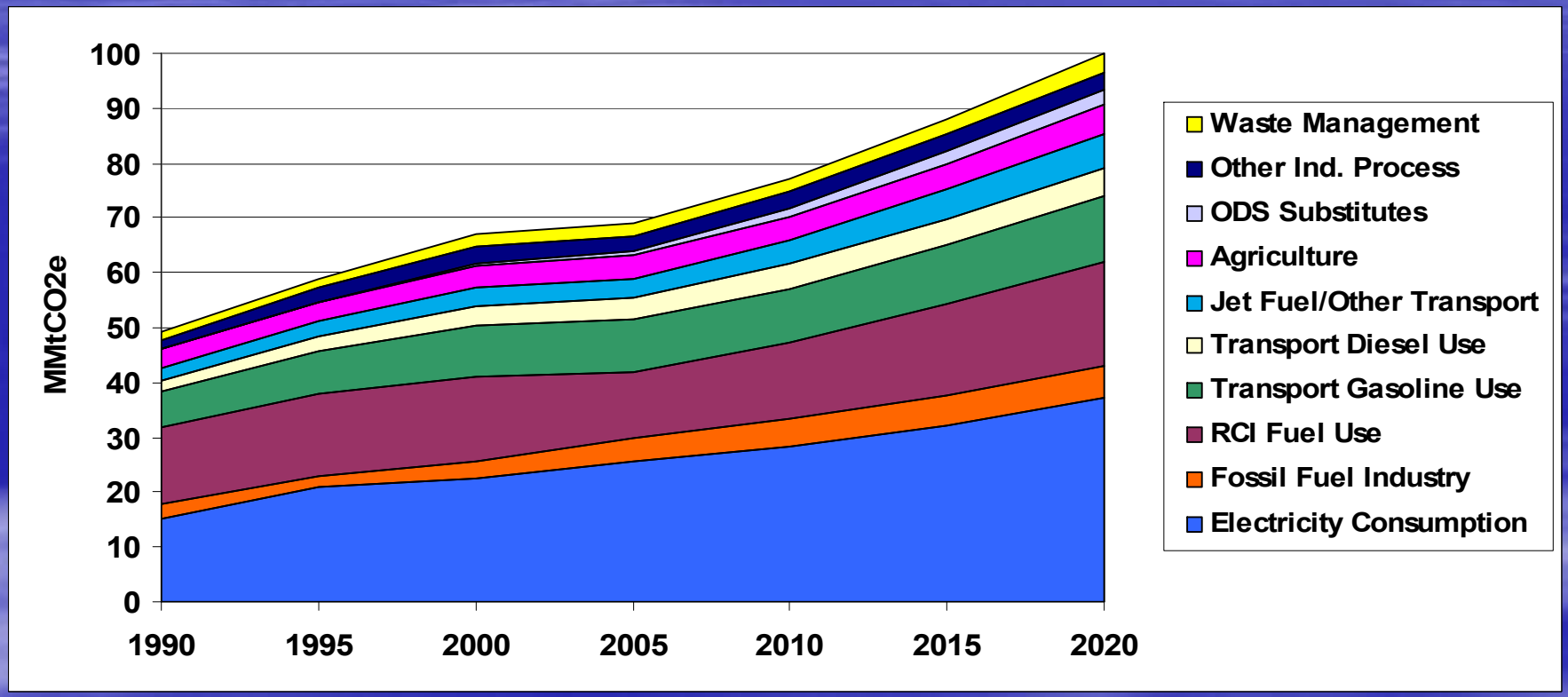
[b] The methane GWP includes the direct effects and those indirect effects due to the production of tropospheric ozone and stratospheric water vapor. The indirect effect due to the production of CO_2 is not included.

Utah & US Emissions By Sector, Year 2000

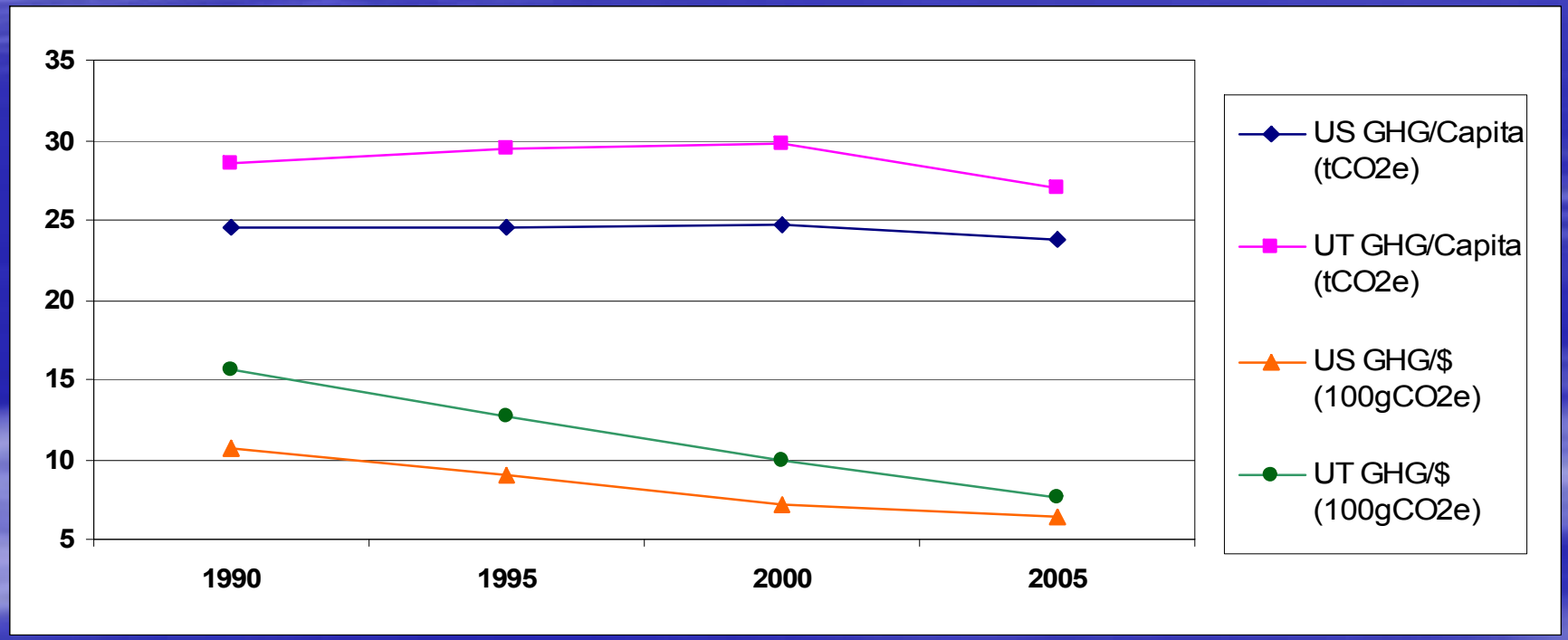




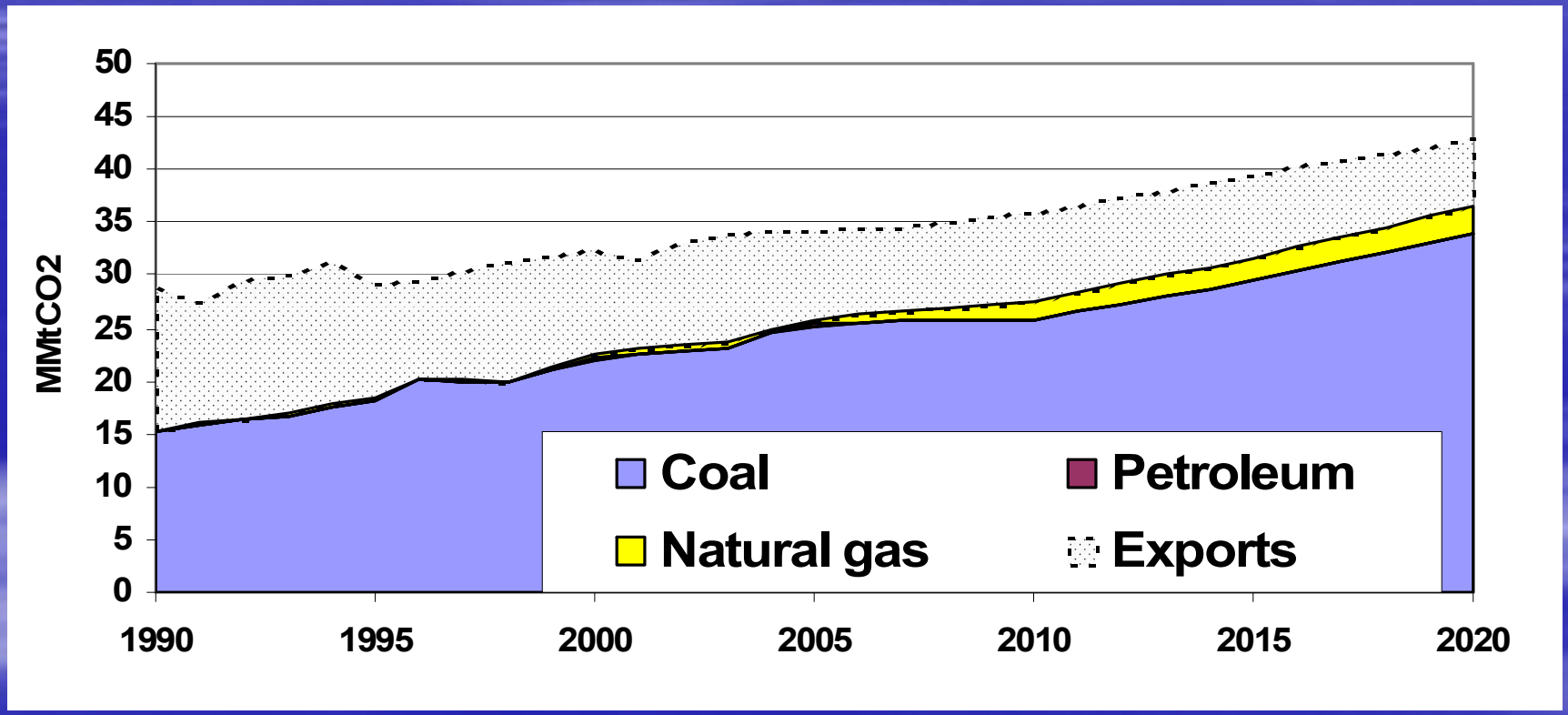
UT GHG Inventory & Forecast



Per Capita and GSP/GDP GHG Emissions, 1990-2005

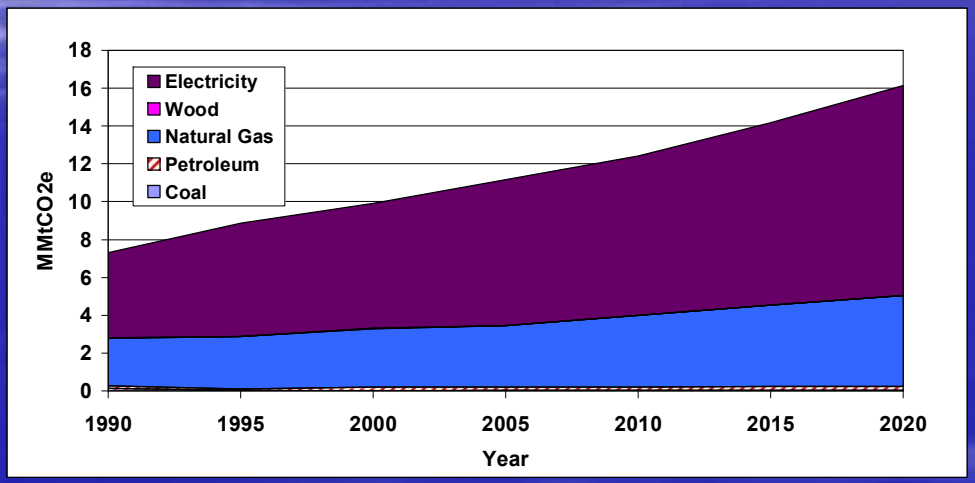


Electricity Production

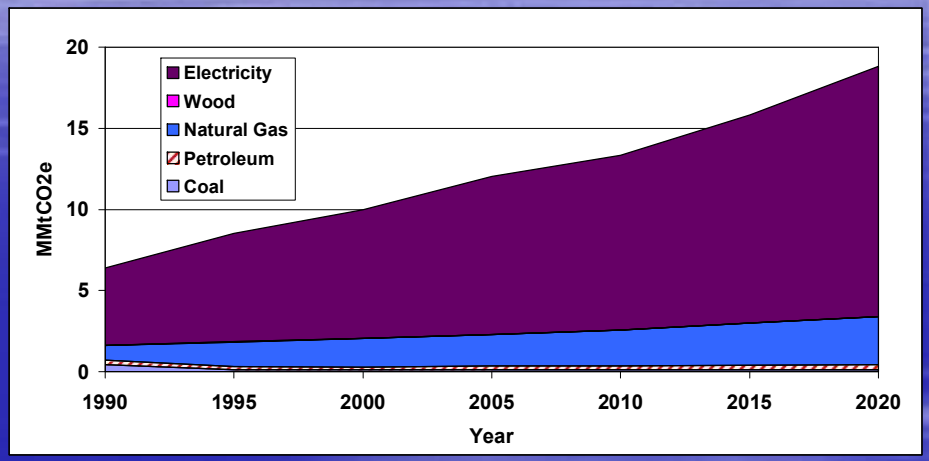


Residential, Commercial & Industrial

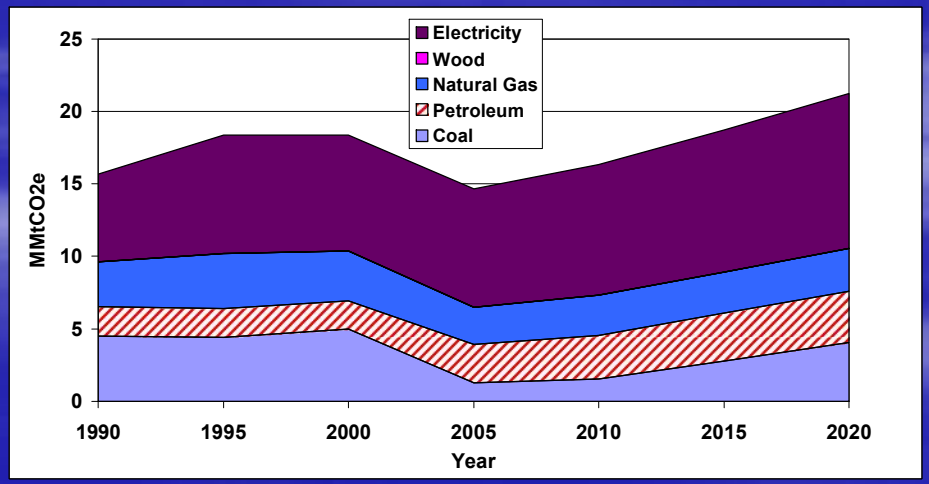
Residential Sector



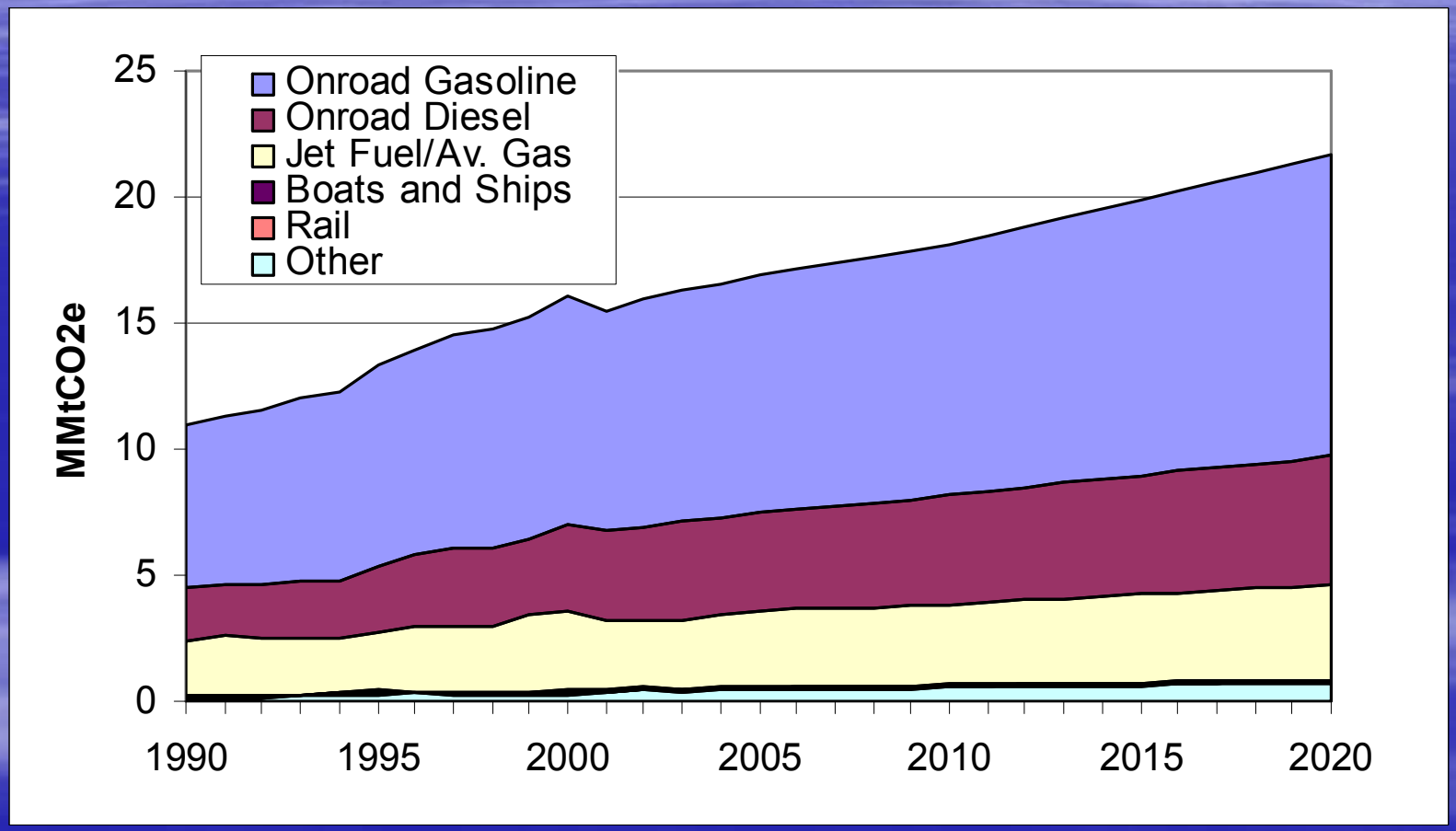
Commercial Sector



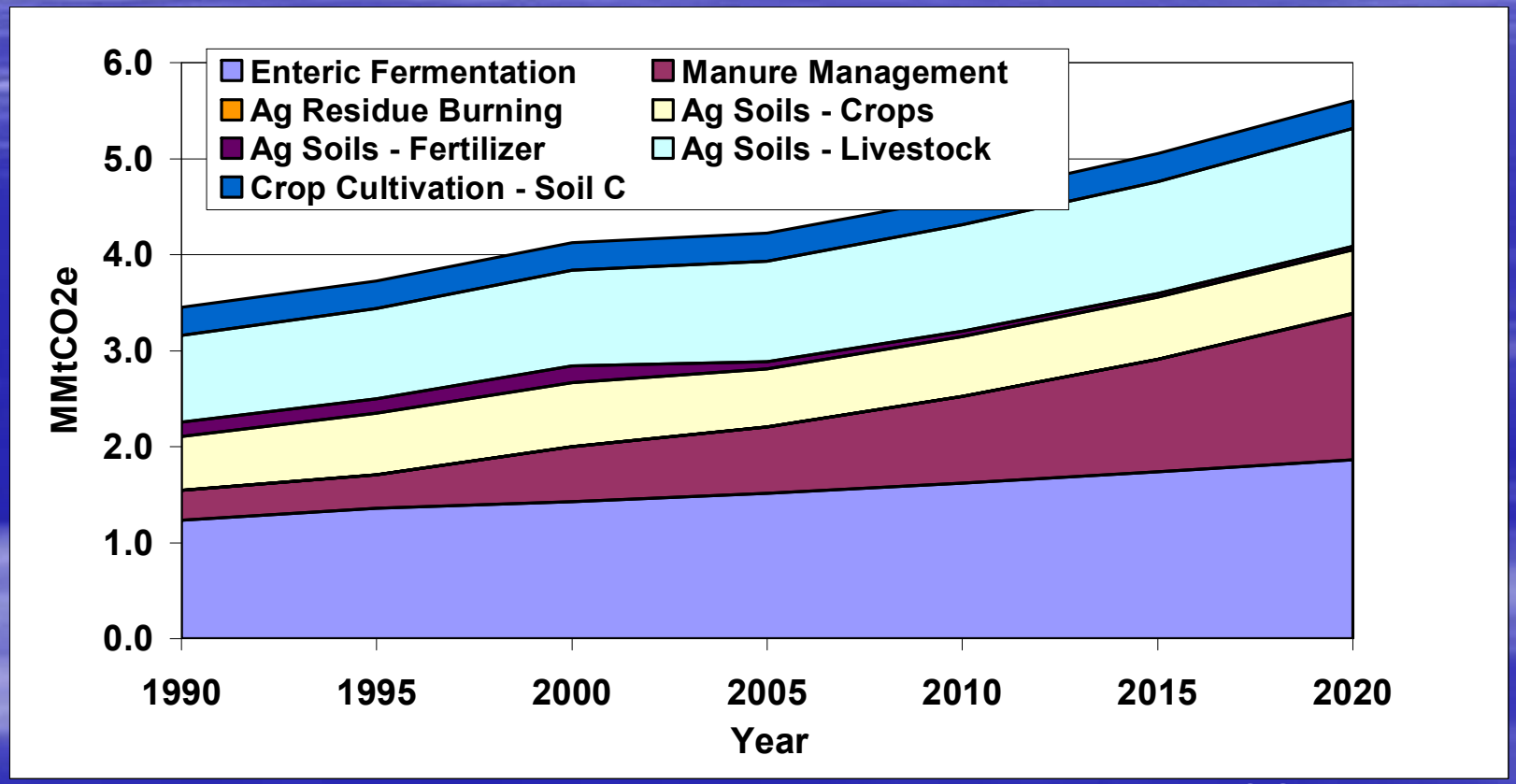
Industrial Sector



Transportation

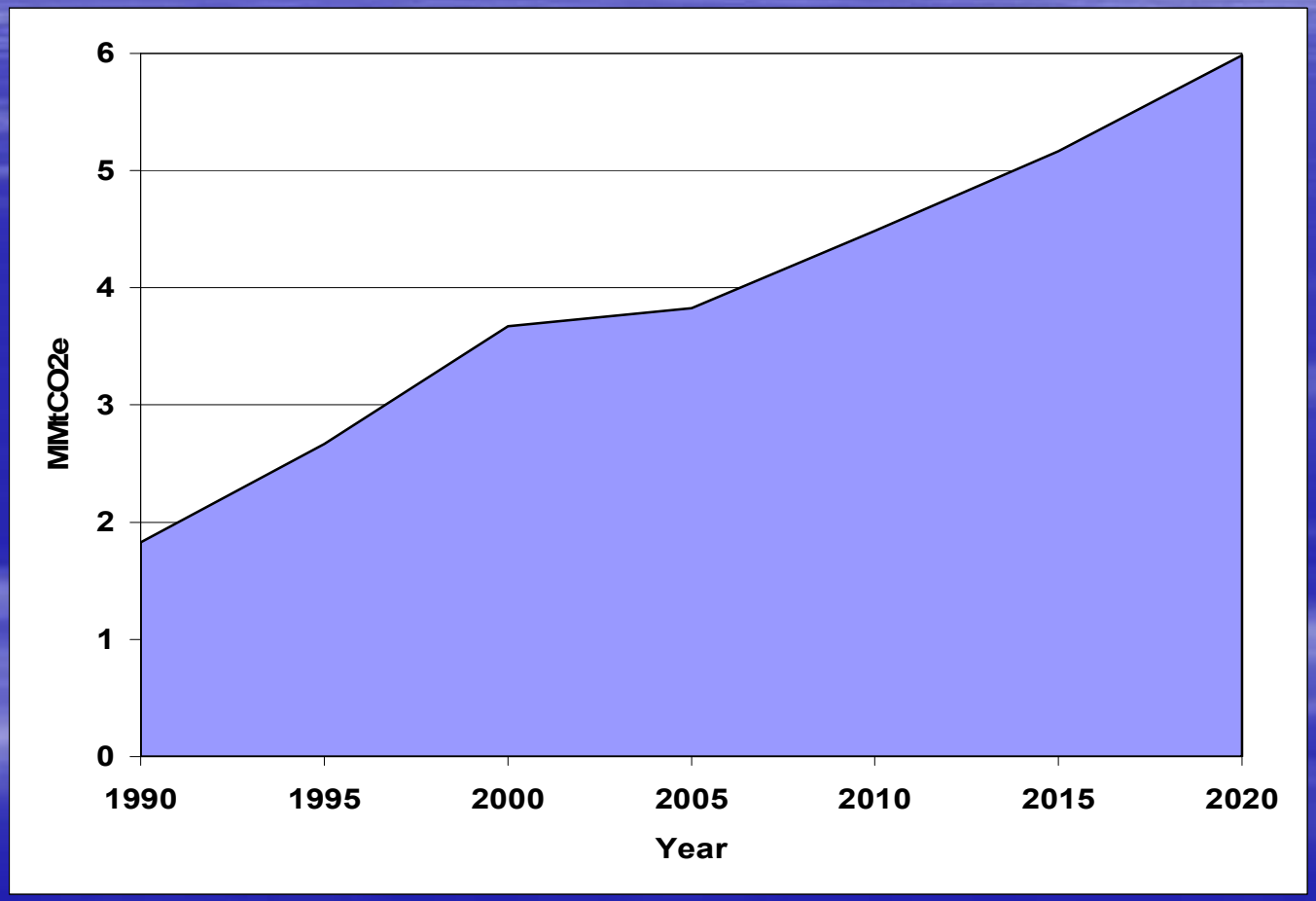


Agriculture (gross emissions)

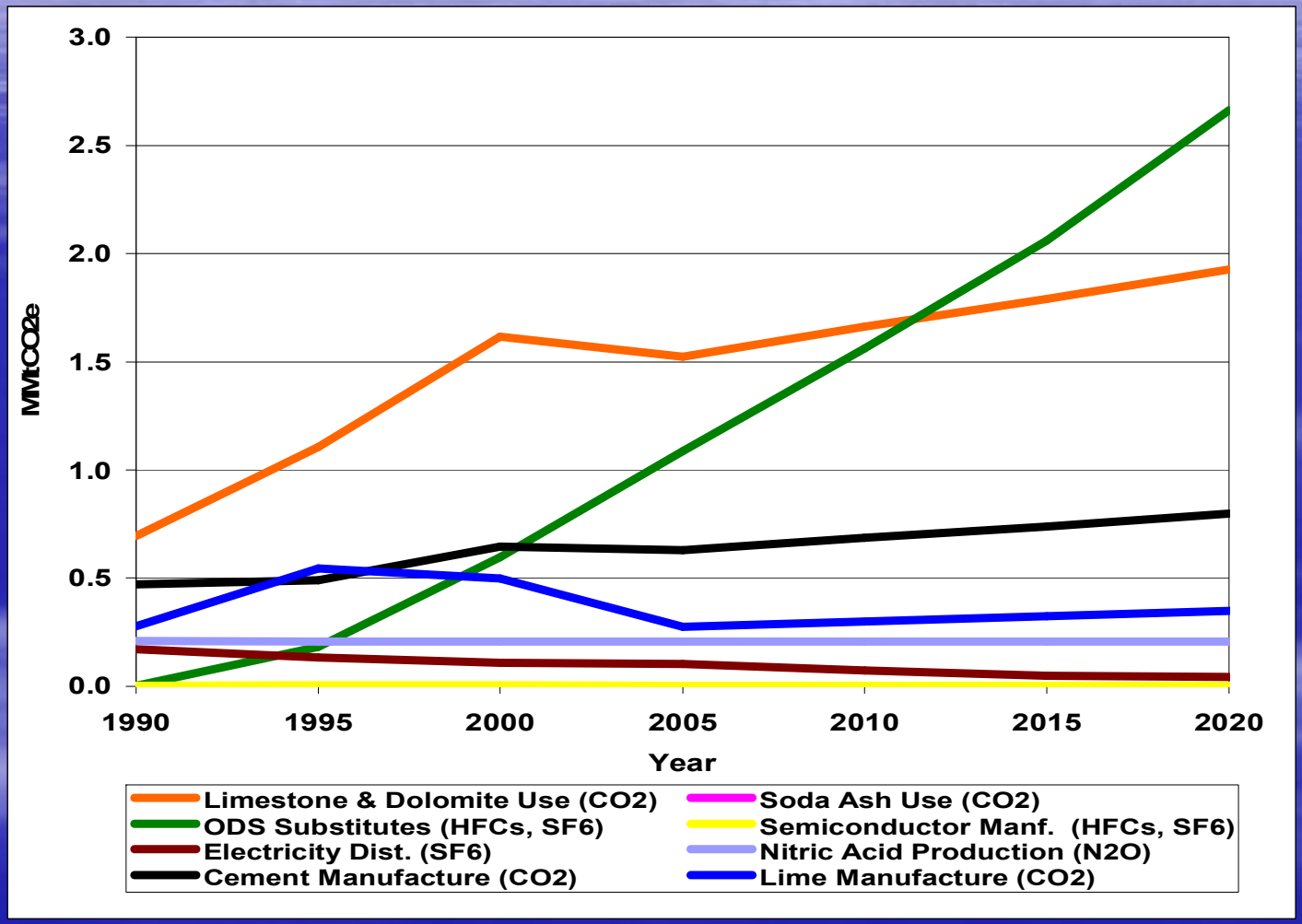


These are gross emissions that exclude about 1.0 MMtCO2e/yr sequestered in ag soils.

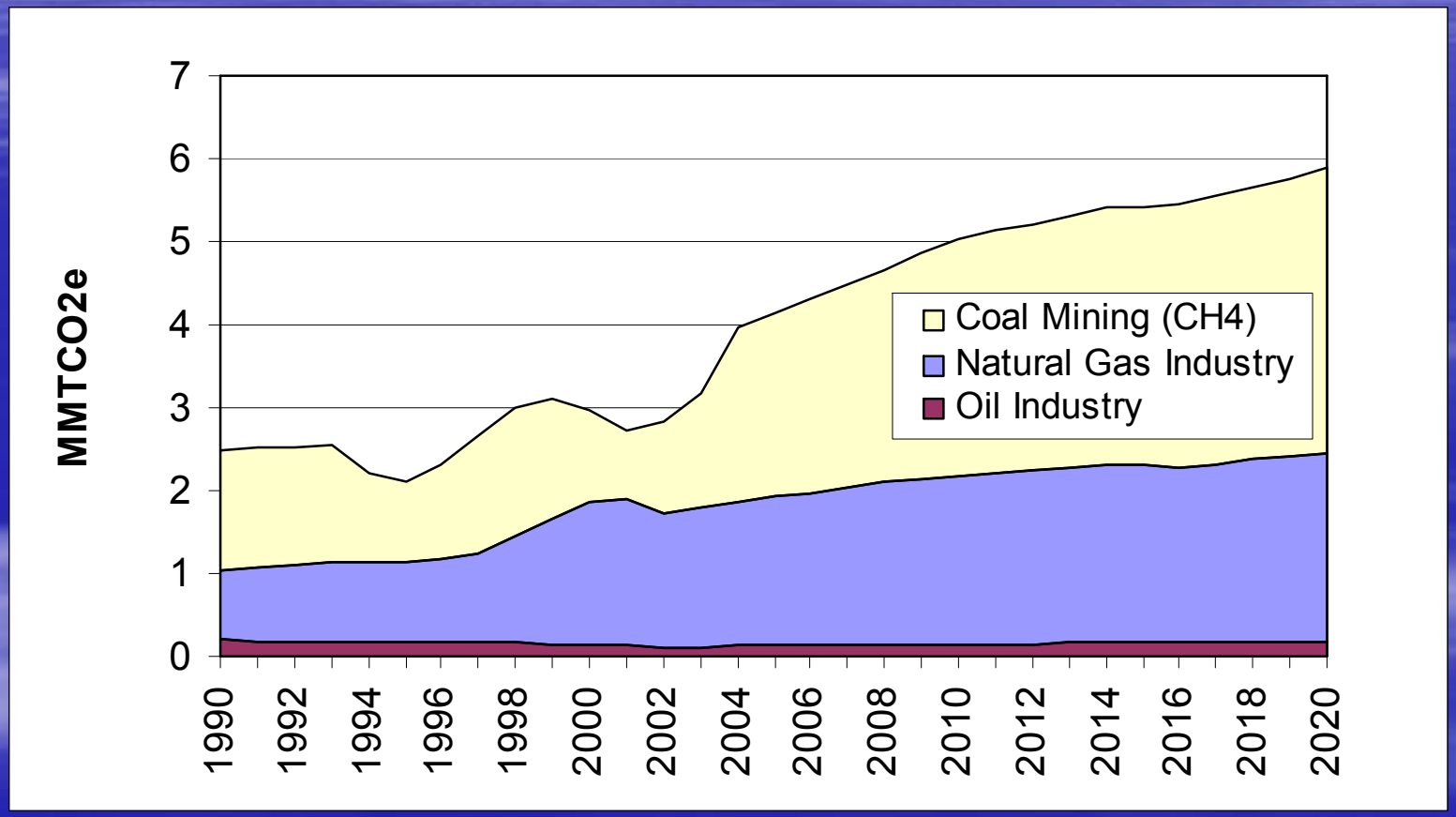
Industrial Process



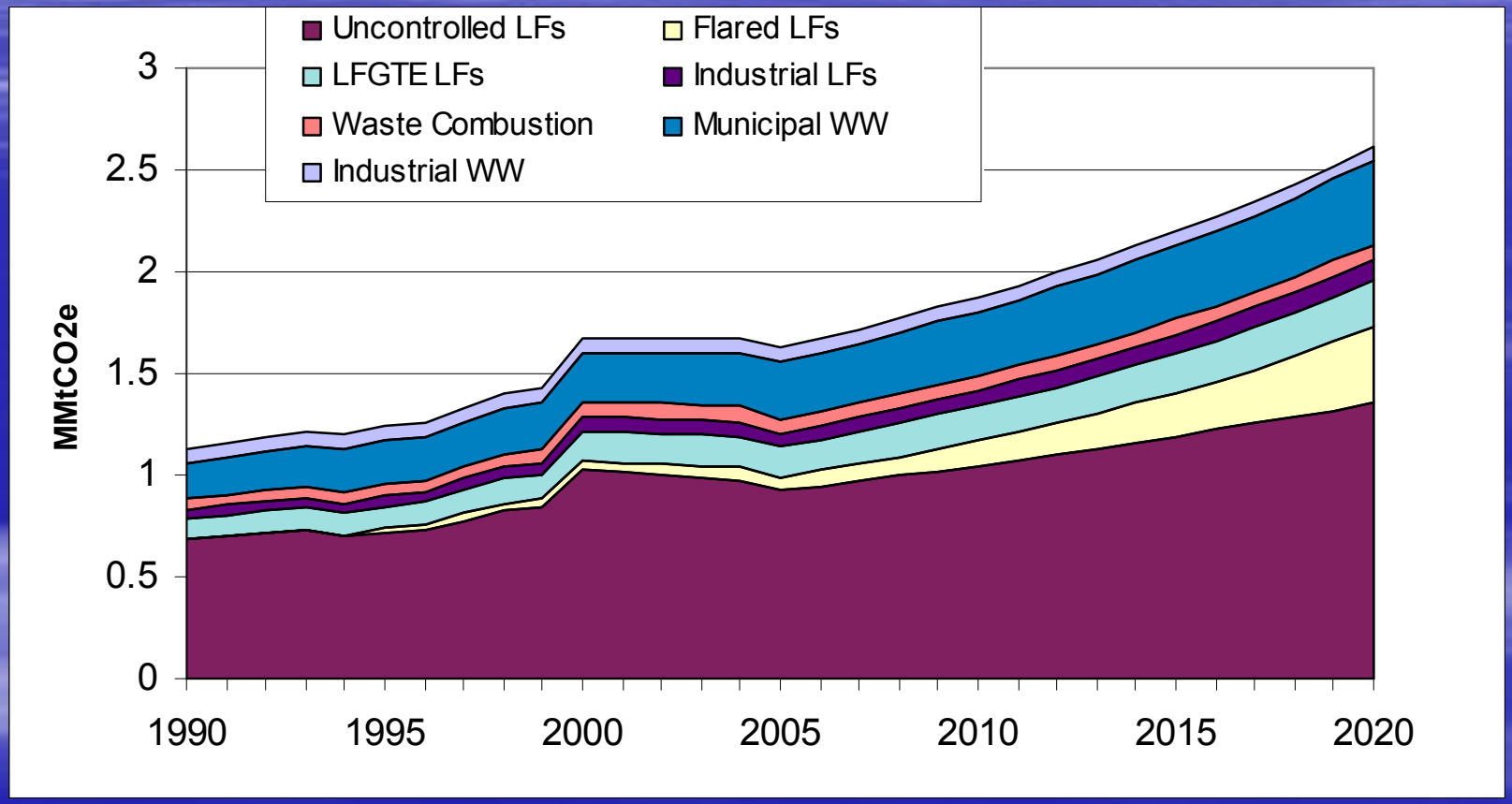
Industrial Process by Source



Fossil Fuel Production



Waste Management



Black Carbon

- One of two carbonaceous aerosol species – BC and Organic Carbon (OC)
- Also known as light absorbing carbon (LAC), and elemental carbon (EC)
- Absorbs solar energy and warms the troposphere (like GHG's)