K.KUMARASIVAM ENDOWMENT FUND (KKEF) MEMORIAL PUBLIC LECTURE & YOUNG ENVIRONMENTALIST INTERNSHIPAWARD 2016

STRATEGIZING CLIMATE CHANGE ACTIONS IN MALAYSIA

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By

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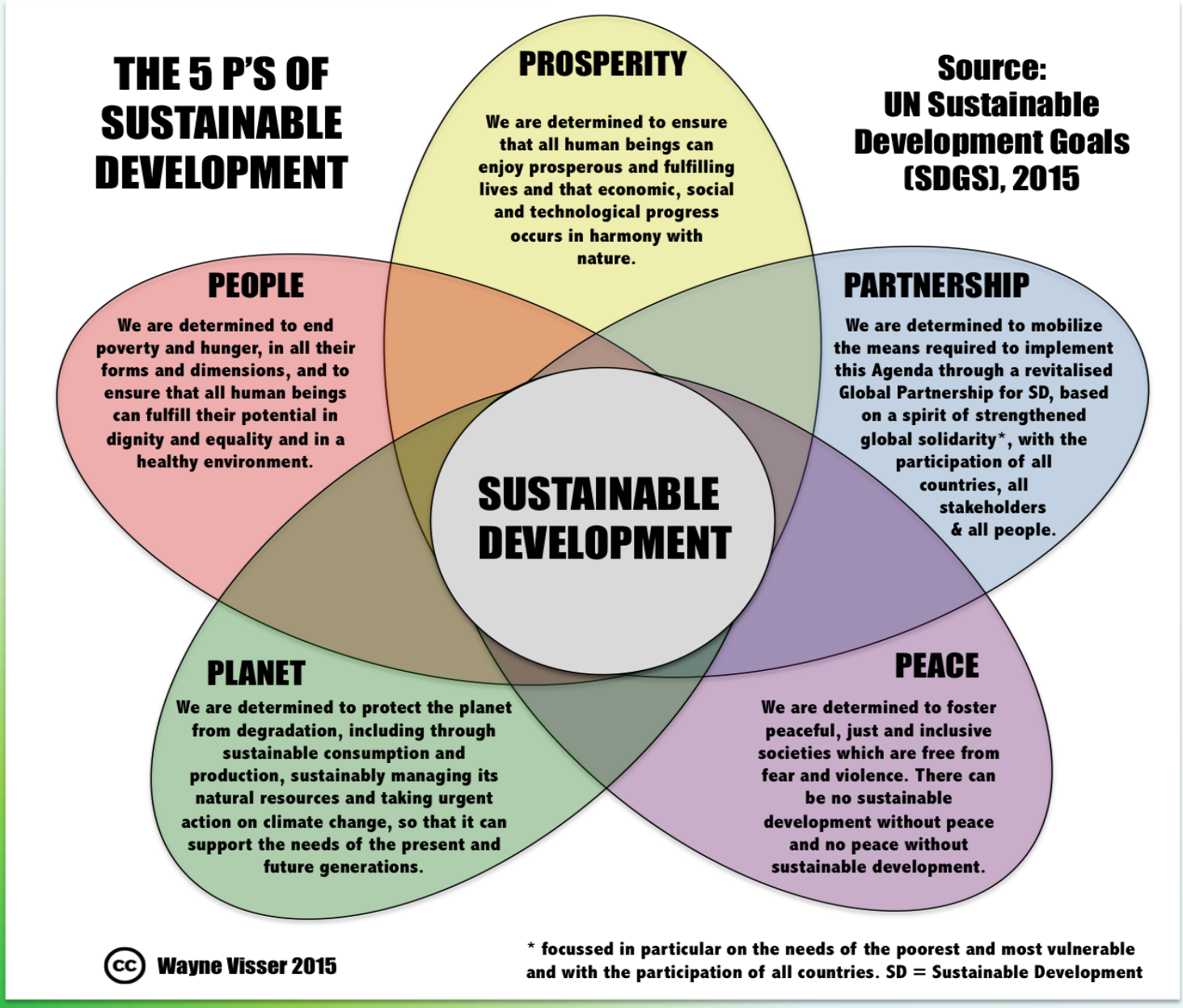
Climate Change
and
Sustainable Development


THE 5 P'S OF SUSTAINABLE DEVELOPMENT
PROSPERITY
We are determined to ensure that all human beings can enjoy prosperous and fulfilling lives and that economic, social and technological progress occurs in harmony with nature.
Source: UN Sustainable Development Goals (SDGS), 2015
PEOPLE
We are determined to end poverty and hunger, in all their forms and dimensions, and to ensure that all human beings can fulfill their potential in dignity and equality and in a healthy environment.
PARTNERSHIP
We are determined to mobilize the means required to implement this Agenda through a revitalised Global Partnership for SD, based on a spirit of strengthened global solidarity*, with the participation of all countries, all stakeholders & all people.
SUSTAINABLE DEVELOPMENT
PLANET
We are determined to protect the planet from degradation, including through sustainable consumption and production, sustainably managing its natural resources and taking urgent action on climate change, so that it can support the needs of the present and future generations.
PEACE
We are determined to foster peaceful, just and inclusive societies which are free from fear and violence. There can be no sustainable development without peace and no peace without sustainable development.
Wayne Visser 2015
* focussed in particular on the needs of the poorest and most vulnerable and with the participation of all countries. SD = Sustainable Development

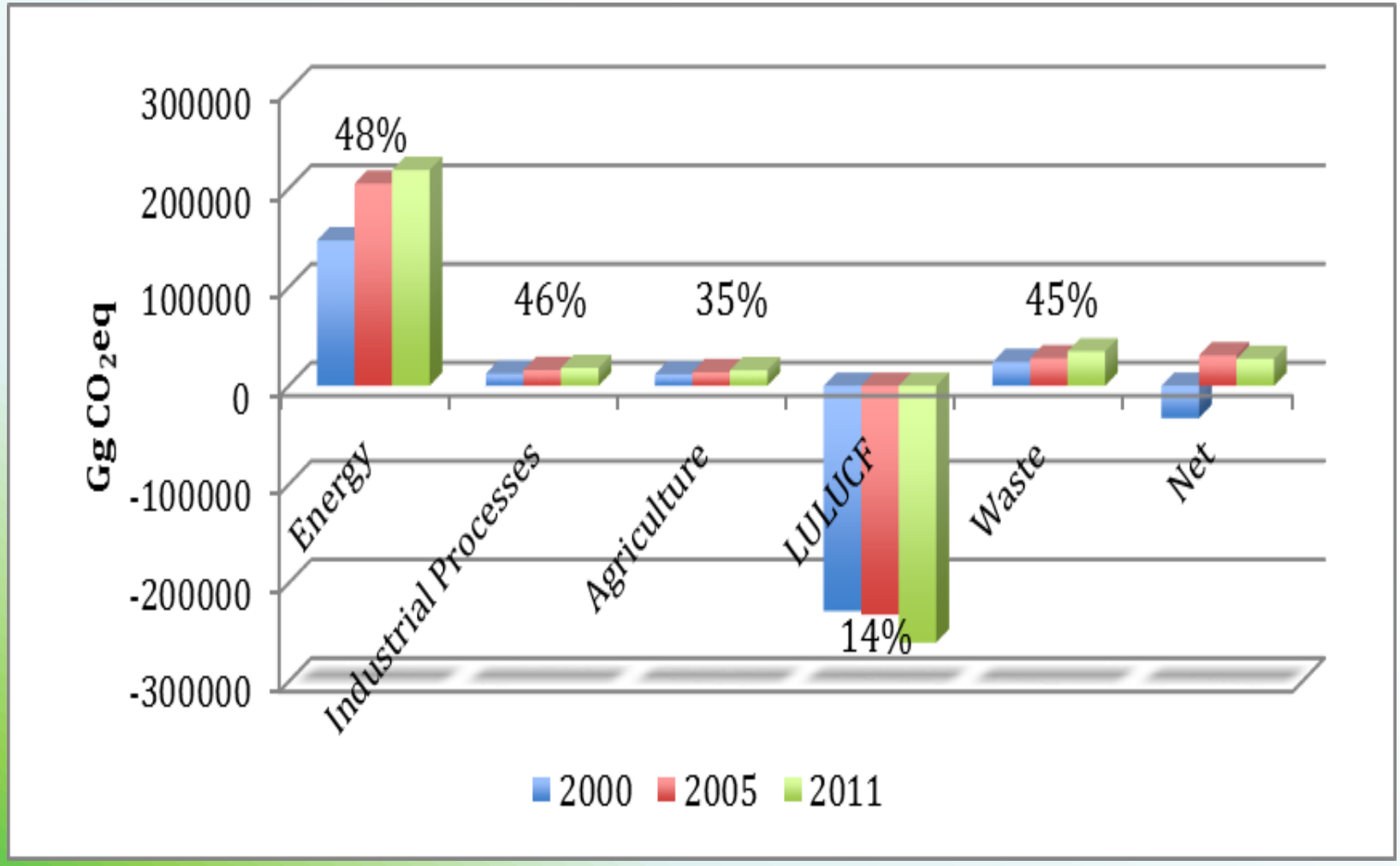
THE GLOBAL GOALS
For Sustainable Development

Historical Greenhouse Gas Emissions (of Malaysia)

Table 2.2: Emissions and Removals of GHG for each Sector in 2011

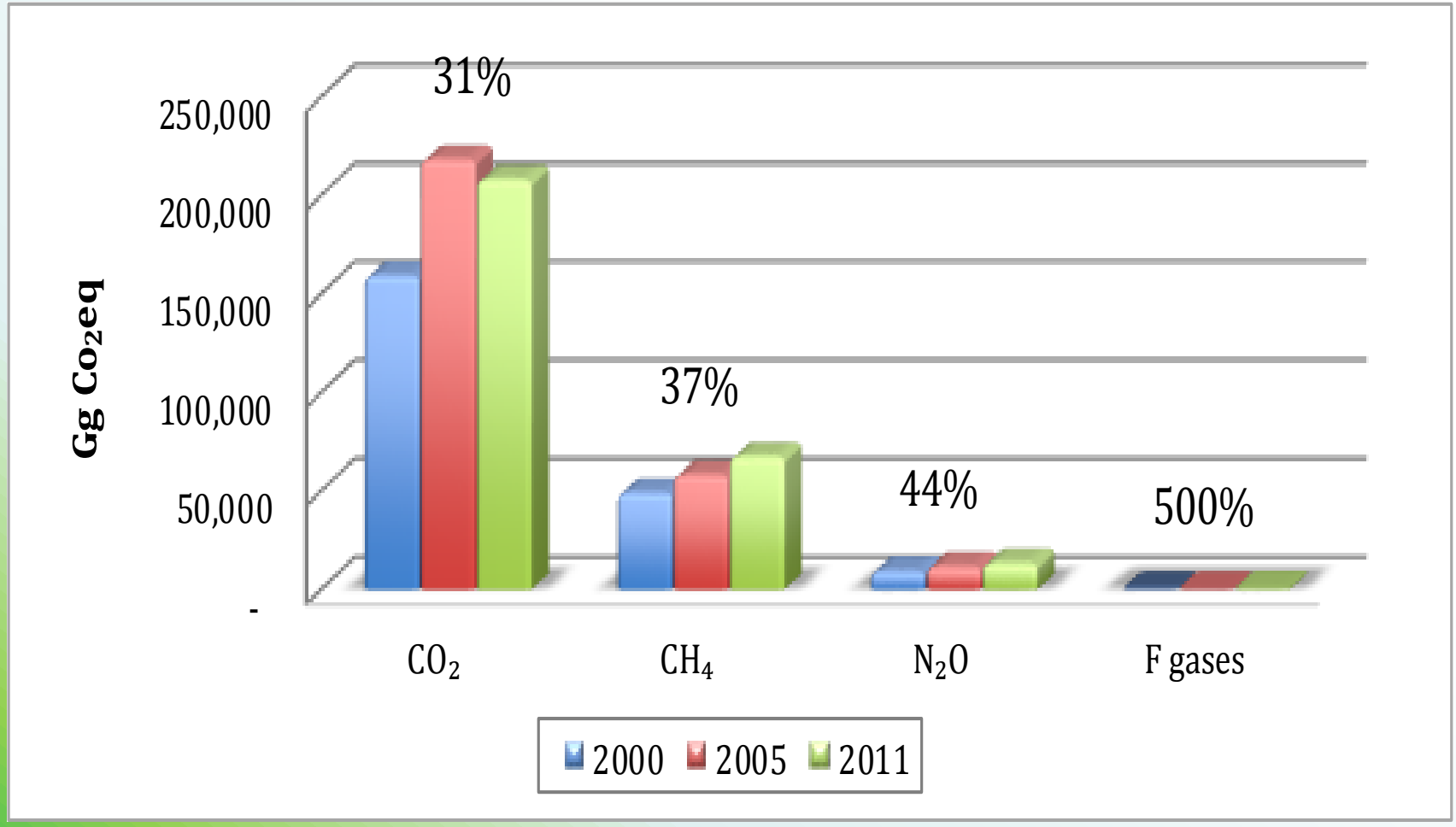
Sectors		Emissions (Gg) A	GWPs B	CO_2 Equivalent (Gg) C=(A x B)
Energy	CO_2	188,575.12	1	**188,575.12**
	CH_4	1,421.38	21	**29,848.98**
	N_2O	1.58	310	**489.53**
Sub-total				**218,913.63**
Industrial Processes	CO_2	17,192.91	1	**17,192.91**
	CH_4	5.12	21	**107.52**
	N_2O	-	310	**-**
	HFC	0.5244	1,300	**681.72**
	SF6	0.00058	23,900	**13.86**
	CF4	0.0248	6,500	**161.20**
	C2F6	0.000992	9,200	**9.13**
Sub-total				**18,166.34**
Agriculture	CH_4	159.27	21	**3,344.58**
	N_2O	40.10	310	**12,430.72**
Sub-total				**15,775.30**
Waste	CH_4	1,630.05	21	**34,230.94**
	N_2O	2.11	310	**654.10**
Sub-total				**34,885.04**
Land Use Land Use Change and Forestry (Source)	CO_2	2,489.67	1	**2,489.67**
	CH_4	0.00	21	**0.00**
	N_2O	0.00	310	**0.00**
LULUCF (Sink)	CO_2	-262,946.41	1	**-262,946.41**
Sub-total				**260,456.56**
Total (emissions only)				**290,229.98**
Net Total (after subtracting sink)				**27,283.57**

Figure 2.1 **Comparison of Greenhouse Gas Emissions by Sector between 2000 and 2011**



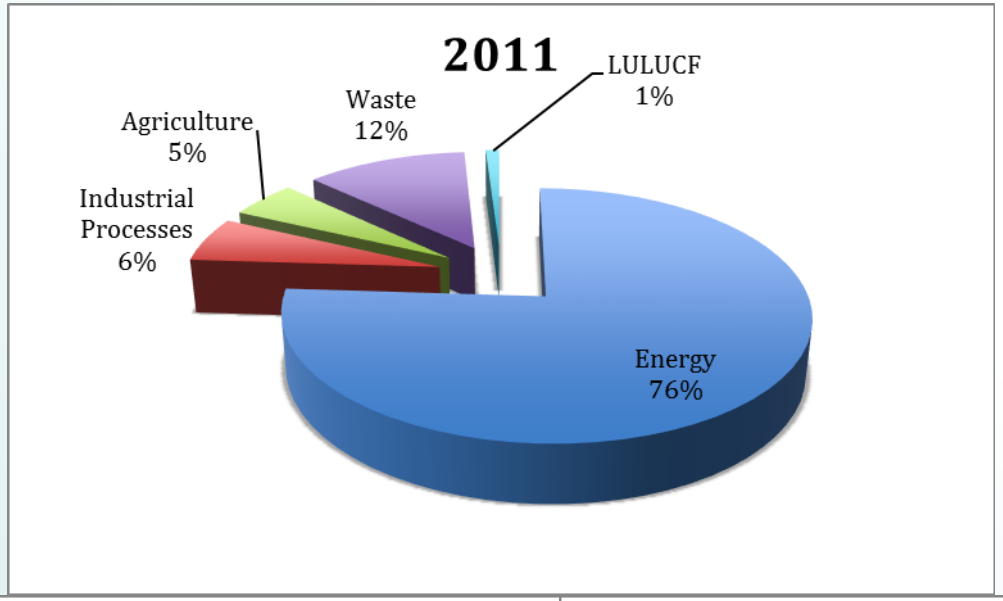
Note: Percentage indicates the % emission increase/decrease between 2000 and 2011.

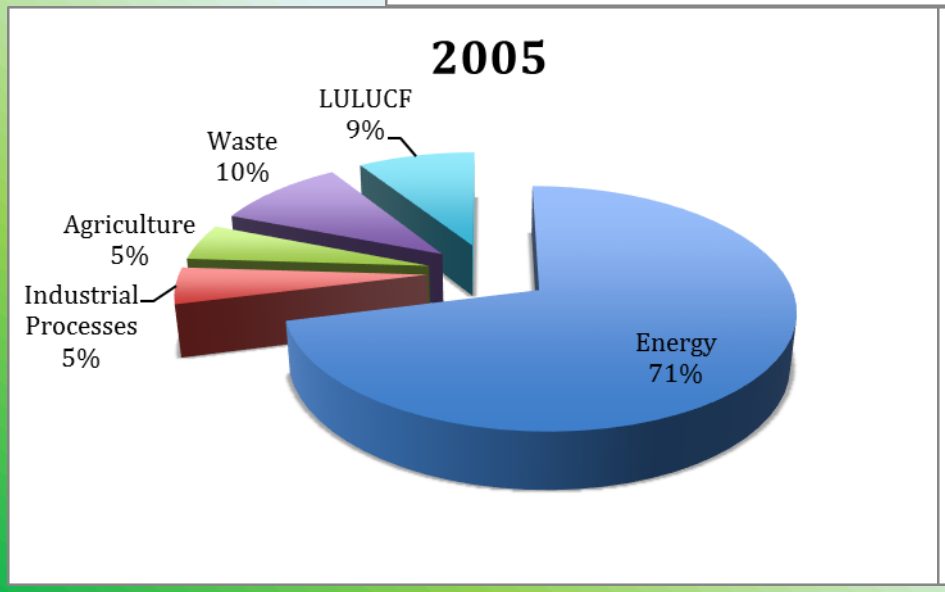
Figure 2.2 **Comparison of Greenhouse Gas Emissions by Gas between 2000 and 2011**



Note: Percentage indicates the % emission increase/decrease between 2000 and 2011.

Figure 2.3: Percentage of GHG Emissions by Sectors in 2011, 2005 and 2000





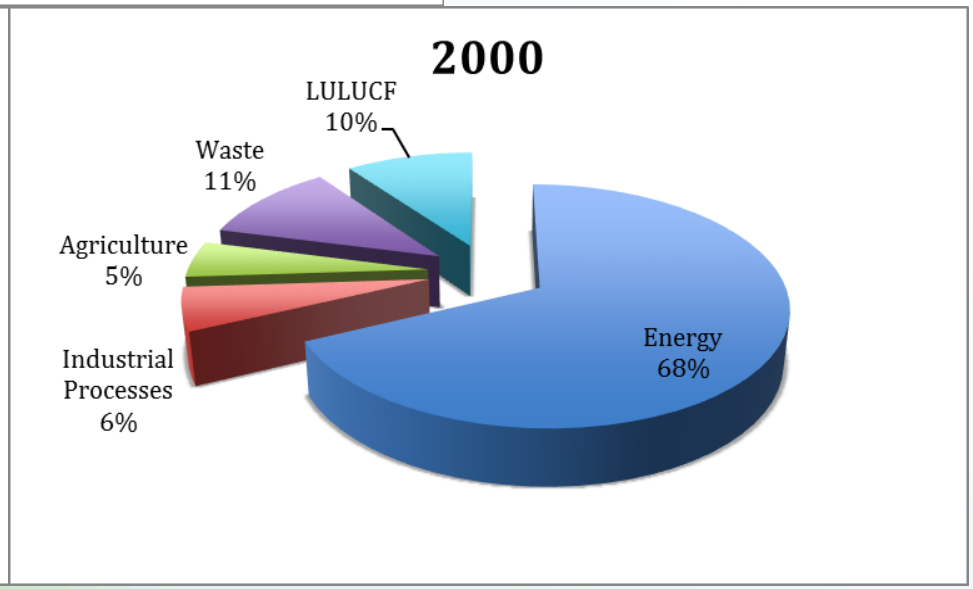
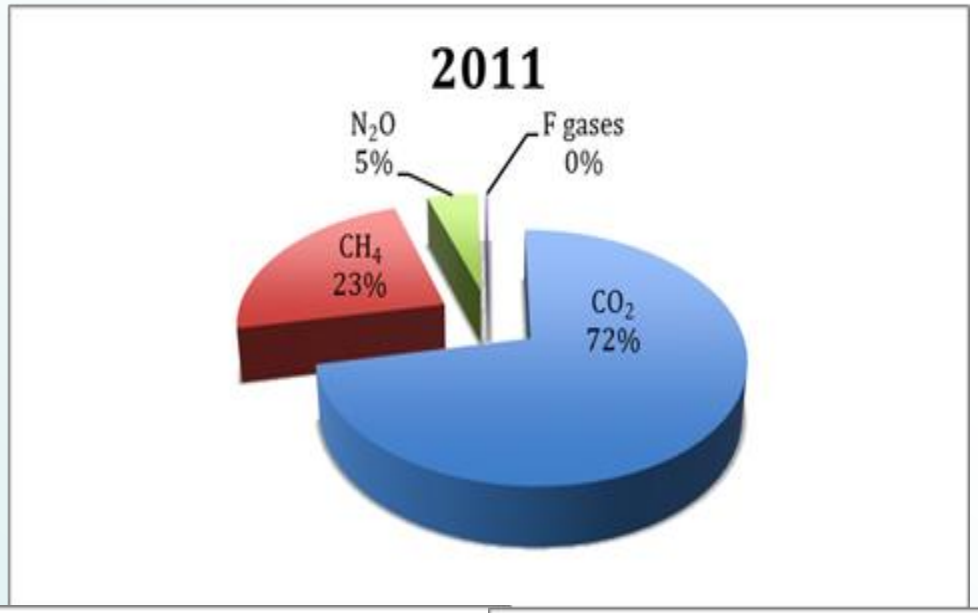
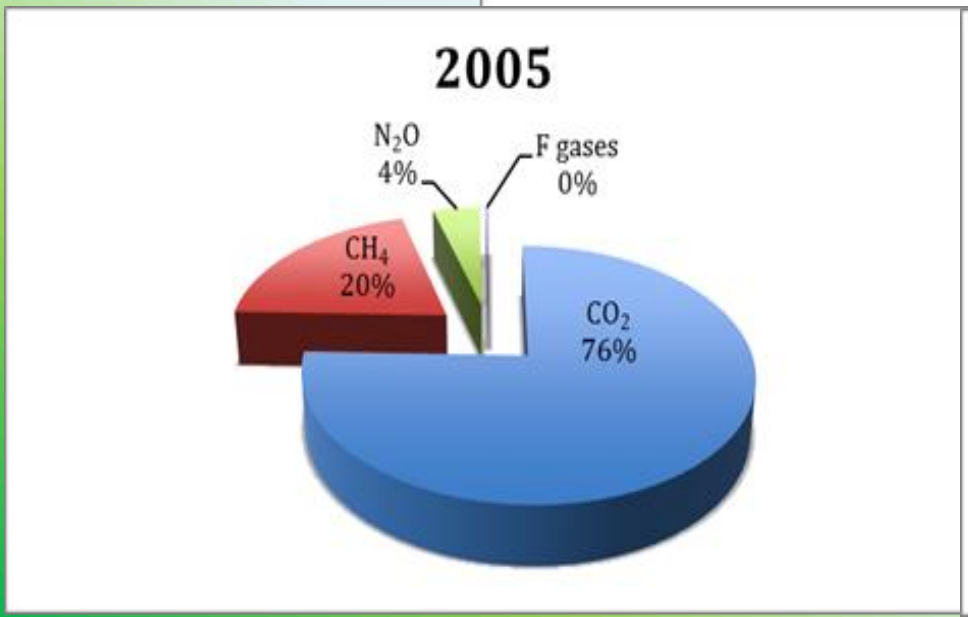


Figure 2.4: Percentage Emissions according to GHG in 2011, 2005 and 2000





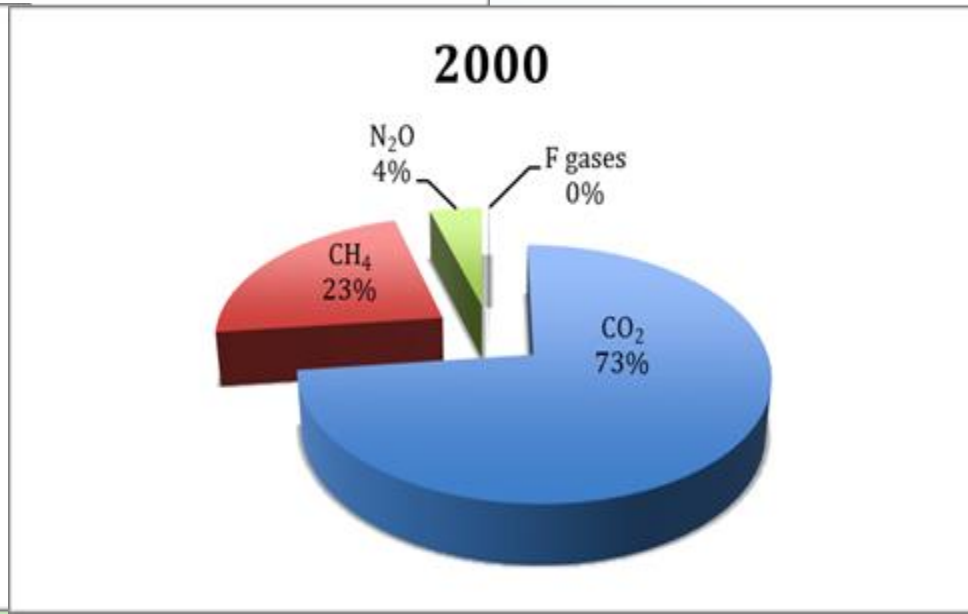


Table 2.5: Key Source Analysis of GHG Emissions for 2011, with LULUCF

Sector	*Key sources*	Gas	*Current Year Estimate (Gg CO2 Eq.)*	*Level Assessment (%)*	*Cumulative*
Energy	Energy Industries: Public Electricity	CO_2	87,885.41	30.28%	30.28%
Energy	Transport: Road Transportation	CO_2	41,601.95	14.33%	44.61%
Waste	Solid Waste Disposal Sites	CH_4	31,127.82	10.73%	55.34%
Energy	Fugitive Emissions from Oil and Gas Operations	CH_4	29,536.66	10.18%	65.52%
Energy	Manufacturing Industries and Construction	CO_2	23,003.97	7.93%	73.45%
Energy	Energy Industries: Manufacture of Solid Fuels & other Energy Industries (Natural Gas Transformation)	CO_2	22,920.48	7.90%	81.35%

Table 2.5: Key Source Analysis of GHG Emissions for 2011, with LULUCF (con't)

Sector	*Key sources*	Gas	*Current Year Estimate (Gg CO2 Eq.)*	*Level Assessment (%)*	*Cumulative*
Agriculture	Agricultural Soils	N_2O	10,948.33	3.77%	85.12%
Industrial Processes	Mineral Products: Cement Production	CO_2	7,766.20	2.68%	87.80%
Industrial Processes	Limestone and Dolomite Use	CO2	5,152.17	1.78%	89.58%
Waste	Industrial Wastewater: Palm Oil Mills	CH_4	2,960.14	1.02%	90.60%
Energy	Other Sectors: Commercial	CO_2	2,933.97	1.01%	91.61%
Energy	Energy Industries: Petroleum Refining	CO_2	2,761.16	0.95%	92.56%
Energy	Other Sectors: Agriculture, Forestry and Fishery	CO_2	2,732.81	0.94%	93.50%
Industrial Processes	Metal Industry: Iron and Steel Industry	CO_2	2,565.33	0.88%	94.38%
LULUCF	Forest Land Converted to Other Land Use	CO_2	2,489.67	0.86%	95.24%

Figure 2.8: Time Series Emissions between 1990 to 2011 for Energy Sector

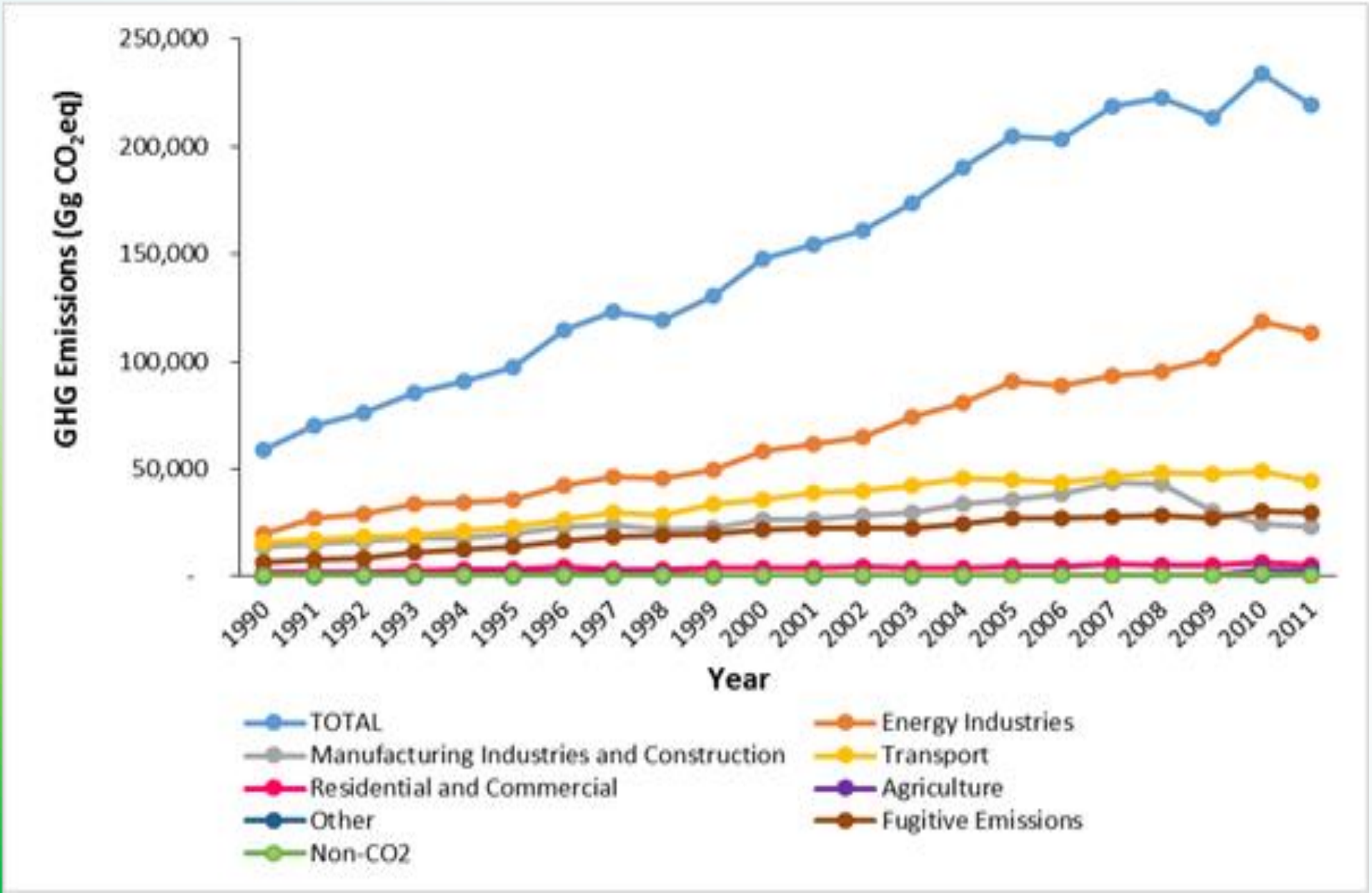


Figure 2.9: Time Series Emissions between 2000 and 2011 for Industrial Processor Sector

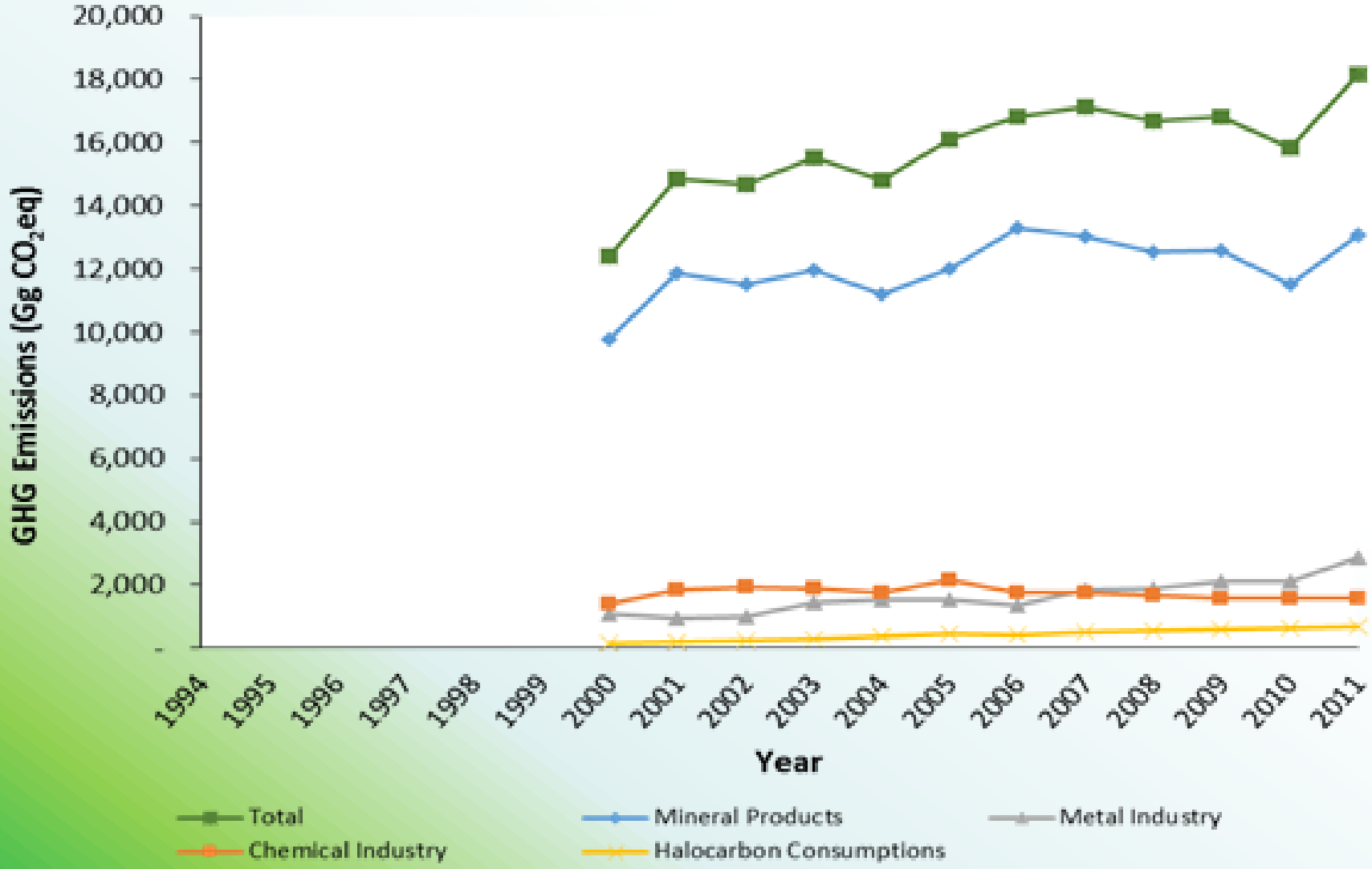


Figure 2.10: Time Series Emissions between 1990 and 2011 for LULUCF Sector

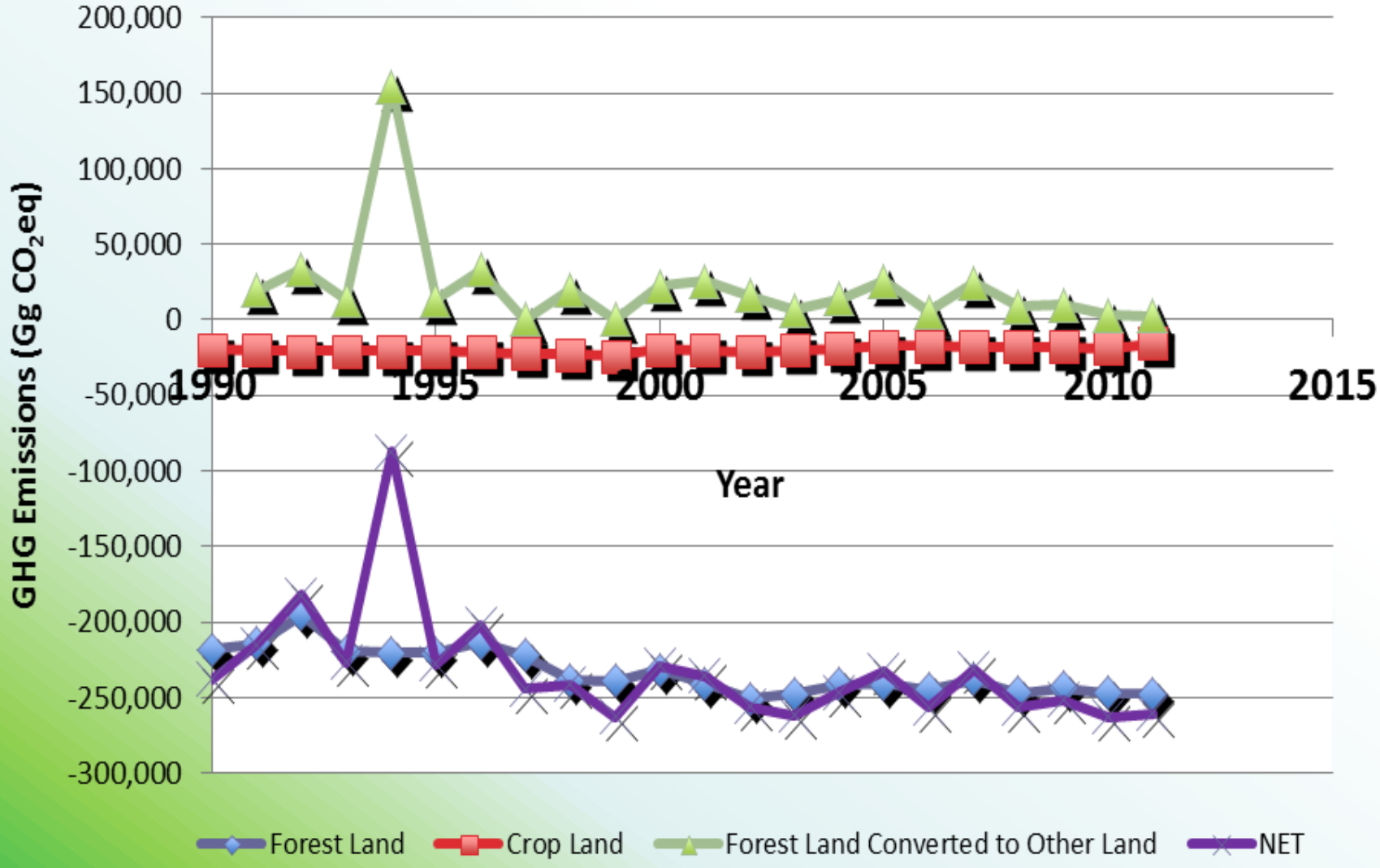


Figure 2.11: Time Series Emissions between 1990 and 2011 for Agriculture Sector

Figure 2.12: Time Series Emissions between 1991-2011 for Waste Sector

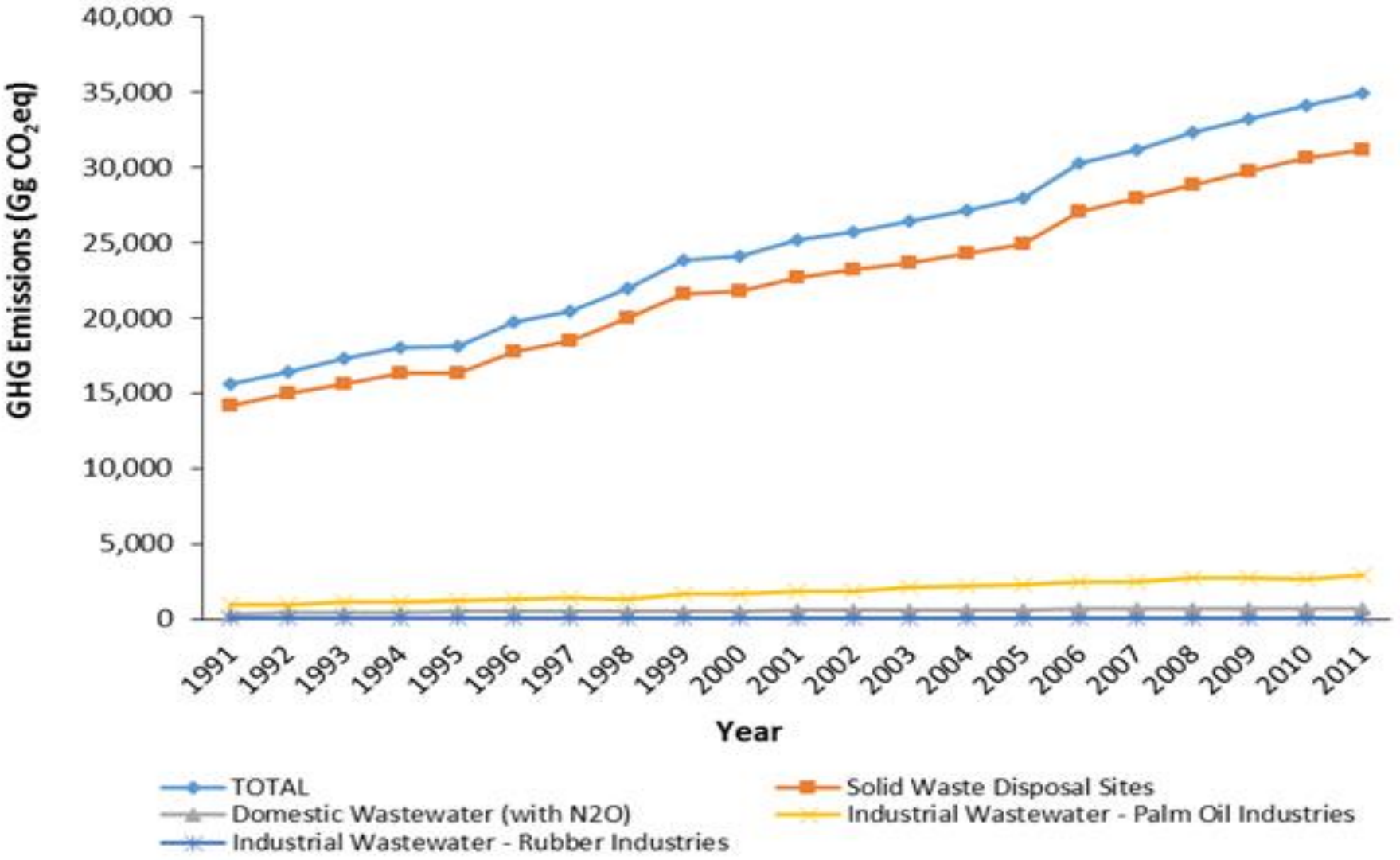


Table 2.7: GHG Emission Indices for Malaysia

	Unit	2000	2005	2011	% increase between 2005 and 2011
Population	Million	23.3	26.1	29.1	11.49%
GDP at constant 2005 prices	billion RM	431.234	543.578	711.760	30.94%
Approach 1: Without LULUCF					
CO_2eq emissions	mil tonne	195.703	262.996	287.740	9.41%
CO_2eq emissions per capita	tonne/capita	8.399	10.076	9.888	-1.87%
CO_2eq emissions per GDP	tonne/ thousand RM	0.4538	0.4838	0.4043	-16.43%

Table 2.7: GHG Emission Indices for Malaysia Con't 1)

	Unit	2000	2005	2011	% increase between 2005 and 2011
Population	Million	23.3	26.1	29.1	11.49%
GDP at constant 2005 prices	billion RM	431.234	543.578	711.760	30.94%
Approach 2: With LULUCF Emissions Only					
CO_2eq emissions	mil tonne	218.063	288.663	290.230	0.54%
CO_2eq emissions per capita	tonne/capita	9.360	11.060	9.974	-9.82%
CO_2eq emissions per GDP	tonne/ thousand RM	0.5057	0.5310	0.4078	-23.20%

Table 2.7: GHG Emission Indices for Malaysia (Con't 2)

	Unit	2000	2005	2011	% increase between 2005 and 2011
Population	Million	23.3	26.1	29.1	11.49%
GDP at constant 2005 prices	billion RM	431.234	543.578	711.760	30.94%
Approach 3: With LULUCF (emissions and removals)					
CO_2eq emissions	mil tonne	-32.864	30.869	27.284	-11.62%
CO_2eq emissions per capita	tonne/capita	-1.410	1.183	0.938	-20.71%
CO_2eq emissions per GDP	tonne/ thousand RM	-0.0762	0.0568	0.0383	-32.57%

GHG Emission Reduction Target under the Paris Agreement

Malaysia GHG Emission Reduction Targets

- **INDC 2015:** Malaysia intends to reduce its greenhouse gas (GHG) emissions intensity of GDP by **45% by 2030** relative to the emissions intensity of GDP in 2005. This consist of **35%** on **an unconditional basis** and a further **10%** is **condition** upon receipt of climate finance, technology transfer and capacity building from developed countries**.**

- **COP21 2015:** Malaysia reaffirm its commitment to maintain at least 50% level of forest and tree cover.

GHG EMISSIONS THROUGH LINEAR TREND ANALYSIS

GHG Emissions Intensity of GDP through 2030 – Linear Trend GHG Emissions & 6 % GDP Growth Rate

	2005	2010	2015	2020	2025	2030
Energy	205.100	233.736	275.912	319.021	362.052	404.960
Industrial Processes	16.115	15.964	19.061	20.765	22.470	24.174
Agriculture	13.845	17.214	17.697	19.682	21.667	23.652
Waste	27.934	34.084	38.815	43.768	48.720	53.673
LULUCF Emissions	25.666	3.239	20,000	20,000	20,000	20,000
Total	288.663	304.237	371.486	423.237	474.910	526.461
GDP (2005 prices) 6% Growth Rate	548.6	676.7	877.19	1,187.27	1,588.3	2,126.21
GHG Intensity	0.53	0.45	0.42	0.36	0.30	0.25
Percent Reduction		-14.5	-19.5	-32.2	-43.25	-52.9

SENSITIVITY OF GDP EMISSIONS INTENSITY REDUCTION TO GDP GROWTH RATES

GDP Scenarios at 2005 Constant Price

GDP Growth Rate	6%	5.5%	5%	5% first half, 4.5% second half	4.5%	4%
2005	548.6	548.6	548.6	548.6	548.6	548.6
2010	676.7	676.7	676.7	676.7	676.7	676.7
2015	887.19	878.84	870.53	870.53	862.26	854.6
2020	1187.27	1148.61	1111.05	1111.05	1074.54	1039.06
2025	1588.83	1501.19	1418.01	1384.57	1339.07	1264.17
2030	2126.21	1961.97	1809.08	1725.42	1668.72	1538.06

Sensitivity of GHG Emission Intensity Reduction to GDP Growth Rate

	2005 (actual)	2010 (actual)	2015	2020	2025	2030
6%	-	-14.5%	-20.4%	-32.2%	-43.2%	-52.9%
5.5%	-	-14.5%	-19.7%	-30.0%	-39.9%	-49.0%
5%	-	-14.5%	-18.9%	-27.6%	-36.4%	-44.7%
5% first half, 4.5% second half	-	-14.5%	-18.9%	-27.6%	-34.8%	-42.0%
4.5%	-	-14.5%	-18.1%	-25.1%	-32.6%	-40.0%
4 %	-	-14.5%	-17.3%	-22.5%	-28.6%	-34.9%

GHG Reduction required to achieve 45 % GHG Intensity Reduction with 4 % GDP Growth Rate

2005 GHG Intensity	**0.5261**
2030 GDP at 4 % Growth Rate	RM 1,536.06 billion
GHG Emissions with 45%	444.46 Mt CO2eq
GHG Reduction required	Approx 85 Mt CO2eq

GHG EMISSIONS PER CAPITA UNDER DIFFERENT SCENARIOS

GHG Emissions per Capita under different Scenarios (tons CO_2eq/per capita)

	2005	2010	2015	2020	2025	2030
Roadmap BAU	10.7	11.4	12.3	13.0	14.9	16.6
Linear GHG Emission Trend	11.1	10.06	12.2	13.1	13.9	14.6
Capping GHG Emissions at 444 Mt CO2eq in 2030 with 4% Growth Rate						12.3
Roadmap AMB	10.7	10.3	10.2	10.1	10.8	11.3

Australian-German Climate & Energy College: INDC Factsheets (May 2015)

Malaysia

(AR4 GWP)

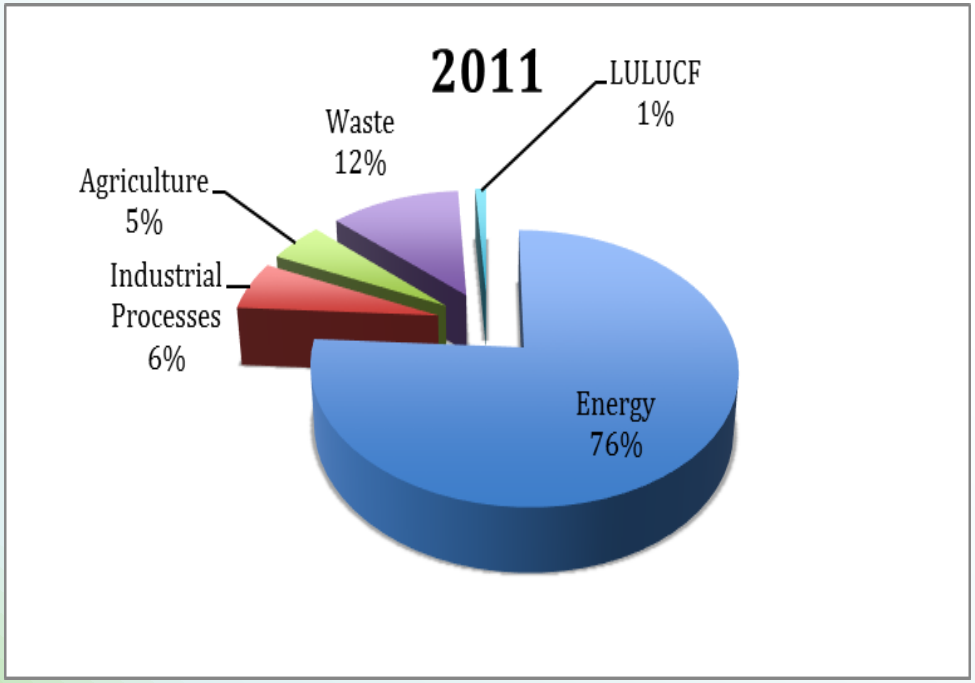
	2030	
	low	high
Total GHG Emission exc LULUCF (Mt CO2eq)	519	440
GHG emission Per capita (tons CO2eq)	14.4	12.2

Key Messages

(i) To achieve full 45 % GHG Intensity Reduction by 2030: Reduce emissions by 85 Mt CO_2eq per year by 2030

(ii) Cap Emissions per capita at 12.2 tons CO_2eq per capita for 2030

(iii) Sectoral Reduction proportional to 2011 emissions?



EMISSION REDUCTION PROGRAMMES

Implementing the Paris Agreement NDC

Sector	Mitigation Action
Energy	Renewable Energy development ▪ Feed-in Tariff (FiT) mechanism ▪ non- FiT regulated public and private licensees and other mechanisms (Off-grid biomass & biogas, hydropower and Utility-scale Solar PV)
	Enhancing industrial energy efficiency
	Promotion of efficient electricity consumption in Government and private sector buildings
	Implementation of green building rating scheme
	Development and application of green technology

Implementing the Paris Agreement NDC

Sector	Mitigation Action
Energy	Use of palm-based biodiesel for transport sector
	Development and usage of energy-efficient vehicles (EEVs)
	Use of compressed natural gas (CNG) in motor vehicles
	Rail-based & road based public transport
LULUCF	Emissions reduction through sustainable management of forest - Gazettement under CFS and HoB - Other gazettement
Waste	3R Programme & Waste paper recycling
	Biogas capture from palm oil mill effluent (POME) treatment
Agriculture	Promoting good agriculture practices

Implementing the NDC

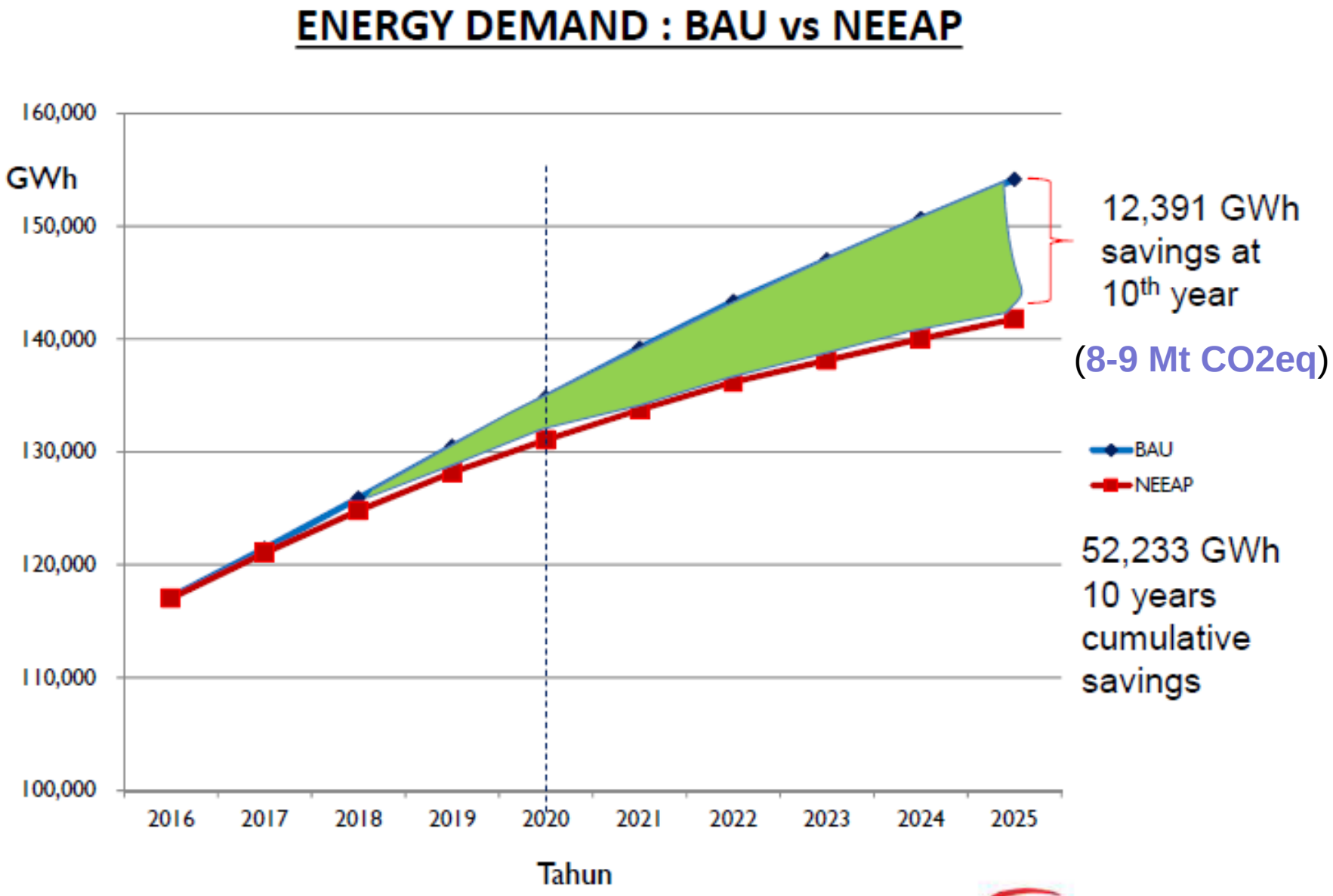
Main challenges with implementing the INDC

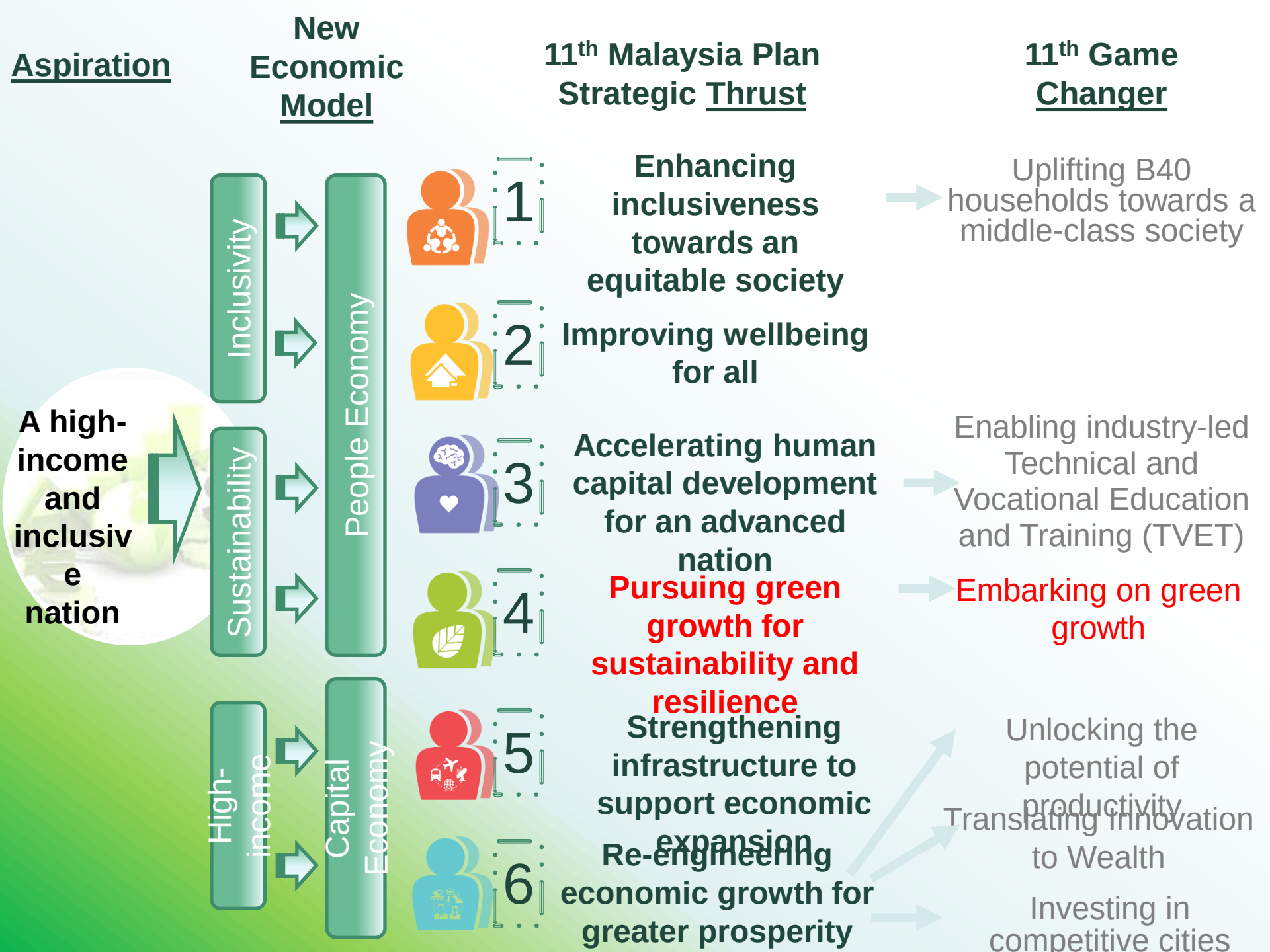
- Early implementation is essential
- Translating the NDC into sectoral roadmaps and policies
- Mainstreaming NDC implementation across government
- Maintaining a sense of collective action
- Competitiveness concerns, distributional issues, trade-offs and synergies

Malaysia's Mitigation Actions (BUR)

Sector	Mitigation Action	Emission Reduction Achieved in 2013 (kt CO_2eq)	Potential Emission Reduction in 2020 (kt CO_2eq)
Energy	RE implementation through Feed-in Tariff mechanism	252.78	5,458.09
	RE electricity generation by non Feed-in Tariff regulated public and private licensees and other mechanisms	948.77	2,179.29
	Use of palm-based biodiesel in blended petroleum diesel	719.74	1,802.49
	Application of green technology	94.81	1,426.35
	Implementation of green building rating scheme	60.40	858.40
	Efficient electricity consumption in all Federal Government ministry buildings (baseline established in 2013)	-	98.21
	Reducing emissions through development and usage of energy-efficient vehicles (EEVs)	40.96	199.74
	Use of compressed natural gas (CNG) in motor vehicles	154.62	217.57
	Rail-based public transport	214.93	977.51
LULUCF	Sustainable forest management	13,797.37	13,800.00
Waste	Waste paper recycling	1,993.47	2,159.45
	Biogas capture from palm oil mill effluent (POME) treatment	300.95	3,001.89
Total		18,578.80	32,178.99

KeTTHA's Energy Efficiency Programme




Aspiration
New Economic Model
11th Malaysia Plan Strategic Thrust
11th Game Changer
A high-income and inclusive nation
Inclusivity
Sustainability
High-income
People Economy
Capital Economy
1
Enhancing inclusiveness towards an equitable society
Uplifting B40 households towards a middle-class society
2
Improving wellbeing for all
3
Accelerating human capital development for an advanced nation
Enabling industry-led Technical and Vocational Education and Training (TVET)
4
Pursuing green growth for sustainability and resilience
Embarking on green growth
5
Strengthening infrastructure to support economic expansion
Unlocking the potential of productivity
6
Re-engineering economic growth for greater prosperity
Translating Innovation to Wealth
Investing in competitive cities

Concluding Remarks

- To ensure full 45% GHG Emission Intensity Reduction by 2030,
  - GHG Emissions should not be more than 444 MT CO2eq
  - Per Capita Emission should not be more than 12.2 tons/capita

- To achieve this, Emission Reduction Target by Sectors need to be agreed upon

- Green growth incorporating GHG emission reduction need to be a development focus

- Participation by the public and private sectors are necessary

THANK YOU