

Thailand National GHG Inventory

- Overview
- Energy Sector
- IPPU



Greenhouse Gas Information Center
Thailand Greenhouse Gas Management Organization
(Public Organization)

องค์การบริหารจัดการก๊าซเรือนกระจก (องค์การมหาชน)

Thailand Greenhouse Gas Management Organization (Public Organization)



Contents of presentation : Overview

- Background and history
- Why GHG Inventory is important?
- Institutional Framework in Thailand
- IPCC Sectors
 - GHG in each sector
 - Source of Activities Data (AD)
- GHG Emission in Thailand
- Energy Sector
- IPPU Sector
- Conclusion



History of GHG Inventory in Thailand

- ➔ 1st in 1994 (Initial National Communication; INC)
 - Thailand's Initial National Communication under the UNCCF
 - Followed the 1996 IPCC Revised Guidelines
 - Prepared by Office of National Environmental Policy and Planning (ONEP)

- ➔ 2nd in 2000 (The Second National Communication; 2ndNC)
 - Followed guidelines below;
 - Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories
 - 2000 IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories
 - 2003 Good Practice Guidance for Land Use, Land-Use Change and Forestry
 - Prepared by Office of National Environmental Policy and Planning (ONEP)



Why GHG inventory is important ?

- GHG inventories are compiled for both scientific activity and policy planning.

Scientific

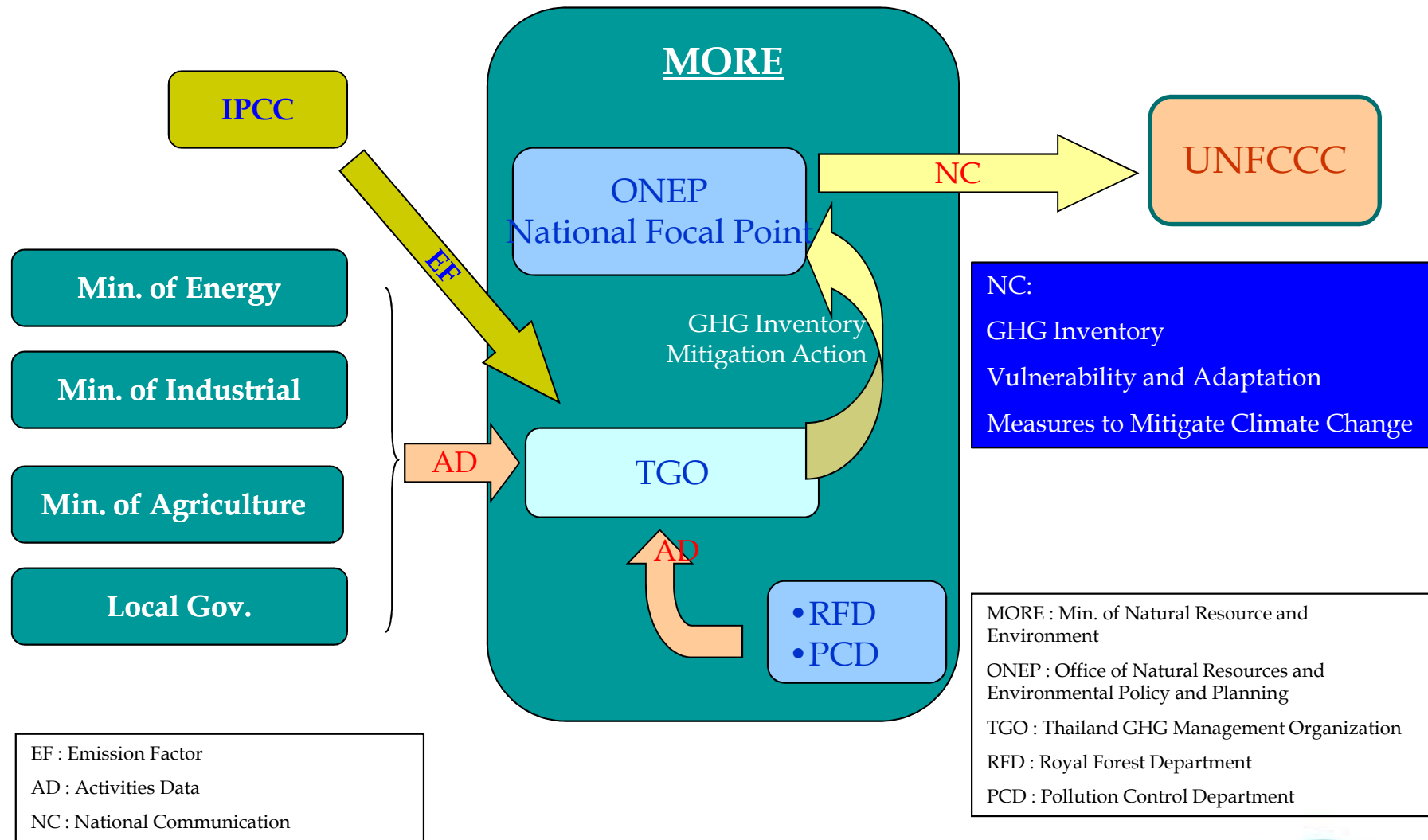
- Use for modeling (ex: impact, forecast...;etc.) activities
- Use for future projections and setting targets for emission reduction

Policy

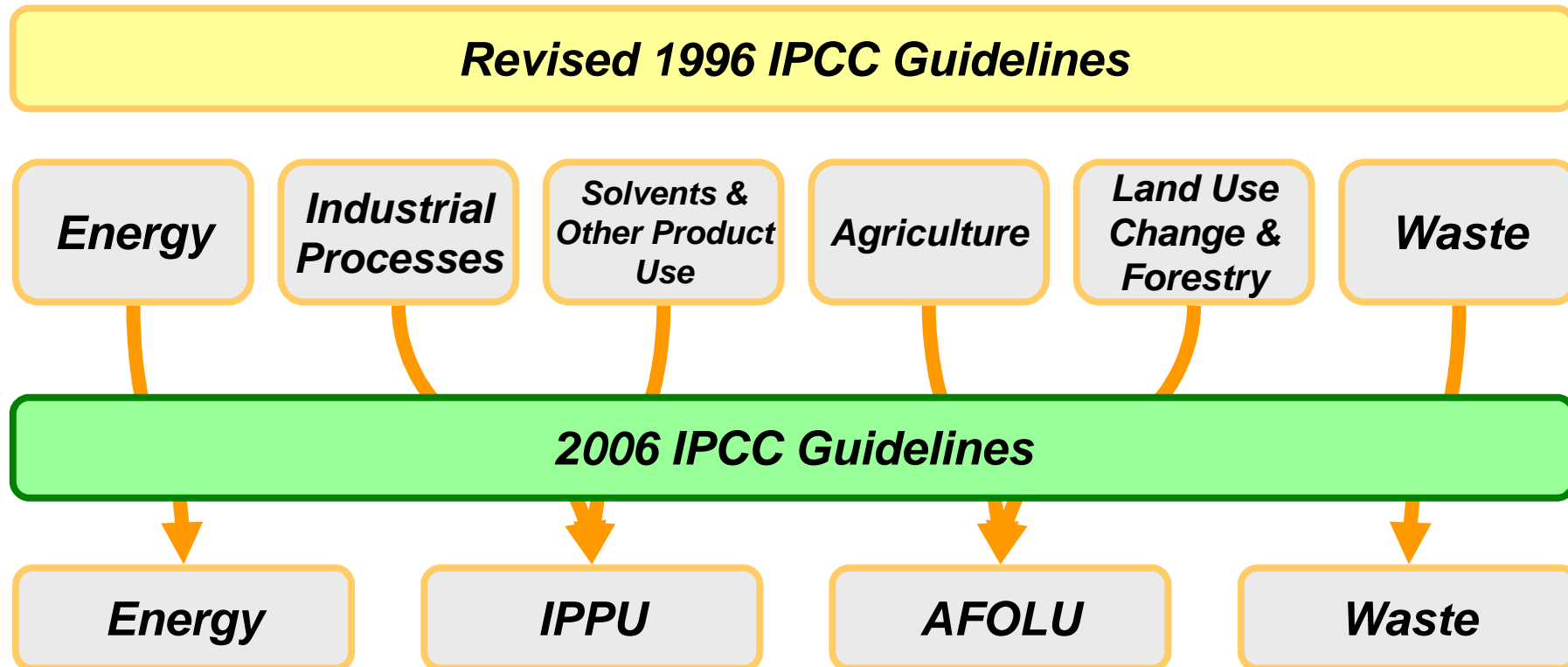
- Use for planning of policy and measures and their follow-up
- Use for consideration of possible mitigation measures



Institutional Framework in Thailand



IPCC Sectors



- IPPU : Industrial Processes & Product Use
- AFOLU: Agriculture, Forest and Other and Land Use



Greenhouse Gases related to each Sector

Sector	CO ₂	CH ₄	N ₂ O	HFCs
Energy	Fuel Combustion	Fuel Combustion Fugitive emissions from fuels	Fuel Combustion	-
Industrial Process	Cement Production, etc	Chemical Industry, etc	Chemical Industry, etc	Semiconductors, Solvent, Refrigerant, etc
Agriculture, Forestry and Other Land Use	Forest, Landuse change, Biomass Burning	Intestinal Fermentation, Rice cultivation, Manure management, etc	Agricultural soils, Manure management, etc	-
Waste	Waste incineration	Landfill, Wastewater treatment, Waste incineration, etc	Landfill, Wastewater treatment, Waste incineration, etc	-



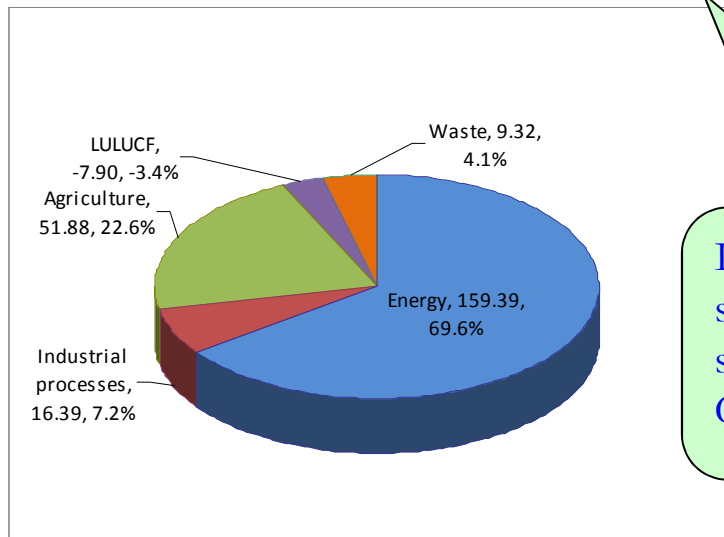
Sources of Activity data

Sector	Activity data (example)	Statistic report	Primary Data Source
Energy	<ul style="list-style-type: none"> • Energy consumption • Energy supply & transformation 	<ul style="list-style-type: none"> • Thailand Energy Report <ul style="list-style-type: none"> • Electricity • Oil & Gas • Others 	<ul style="list-style-type: none"> • Dept. of Alternative Energy Development and Efficiency
IPPU	<ul style="list-style-type: none"> • Amount of Industrial production 	<ul style="list-style-type: none"> • Industrial production statistic report 	<ul style="list-style-type: none"> • Office of Industrial Economics
AFOLU	<ul style="list-style-type: none"> • Livestock production • Agriculture plantation area • Land use • Forest area 	<ul style="list-style-type: none"> • Thailand Agriculture Report • Land use statistic report • Forest area and forest restoration report 	<ul style="list-style-type: none"> • Dept. of Livestock Development • Office of Agricultural Economics • Dept. of Land Development • Royal Forest Dept.
Waste	<ul style="list-style-type: none"> • Amount of Waste • Amount of Wastewater 	<ul style="list-style-type: none"> • No official report in Thailand • Survey report • Local Report 	<ul style="list-style-type: none"> • Pollution Control Dept. • Dept. of Industrial Work • Local Gov.



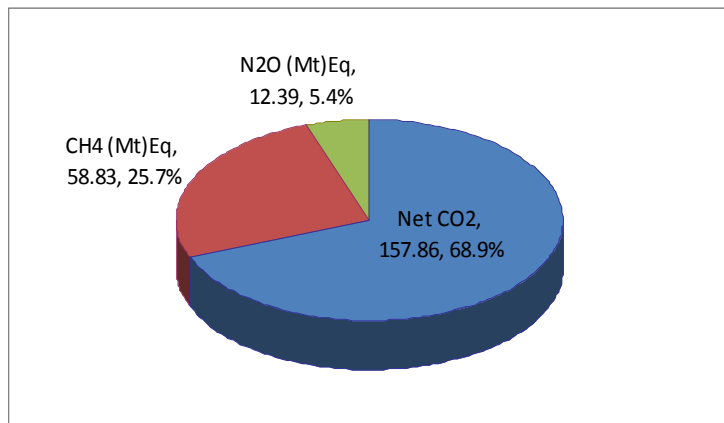
Total Emission (Data year 2000)

Total Emission (included LULUCF) = 229.08 Mt CO₂ eq



- GHG emission in 2000 (Mt CO₂ eq, %) - by sector

Include GHG emission from sources and removal from carbon sink in Land Use, Land Use Change and Forestry category

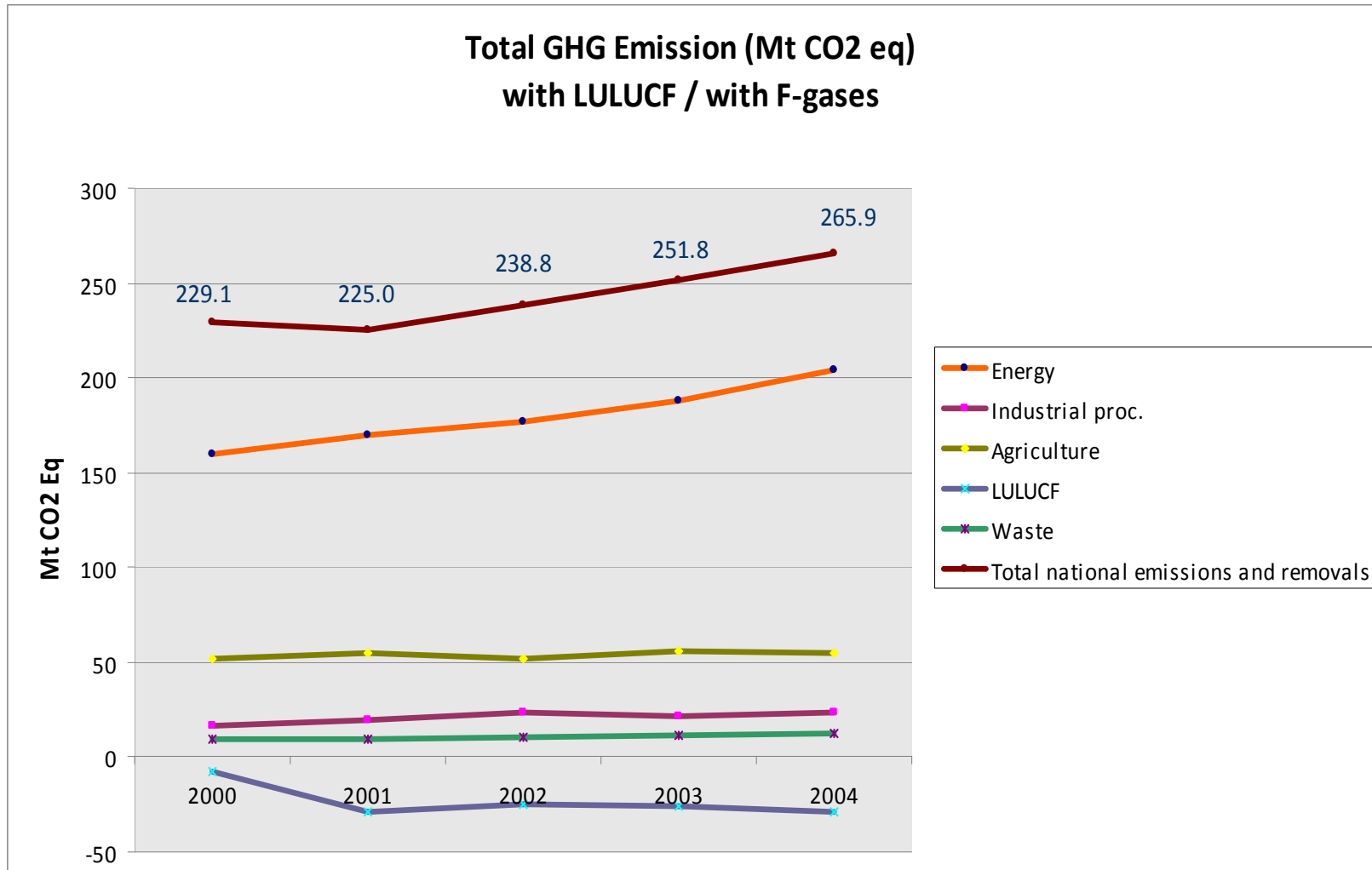


- GHG emission in 2000 (Mt CO₂ eq, %) - by Gas Type

Reference : Thailand 2nd NC



National Emission in Trend by Sector



Reference : Thailand 2nd NC



ENERGY SECTOR

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Contents of presentation : Energy Sector

- Overview of Energy Sector
- Emission from Energy Sector
- Types of GHG in Energy Sector
- Source Activities, Categories & GHG Types
- Emission of Energy Sector
- Issues in Energy Sector
- Solution



Overview of Energy Sector

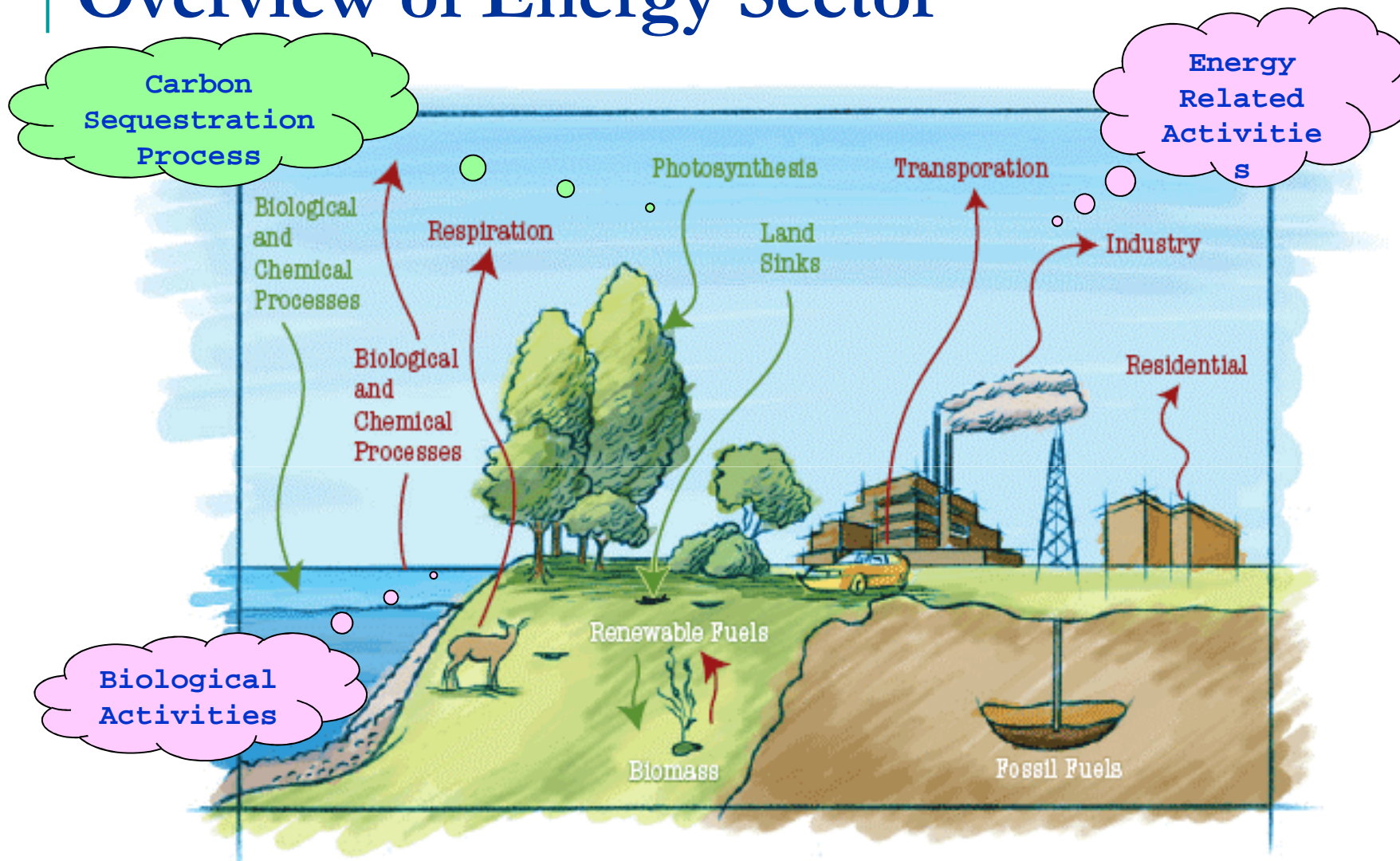


Image Courtesy www.catchlightenergy.com

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Emission from Energy Sector

- Emission in energy sector is driven by combustion of fossil fuels
- About 70% of Thailand national emission is contributed by energy sector
- 65.4% of national emission is CO₂ from fossil fuel combustion in energy sector



Types of GHG in Energy Sector

Combustion of the hydro-carbon in fossil fuel produce the chemical energy in the fuel as heat and release CO_2

- Other GHG under Kyoto Protocol

- CH_4 , N_2O

- Other Gases

- CO , NMVOC , SO_x , NO_x



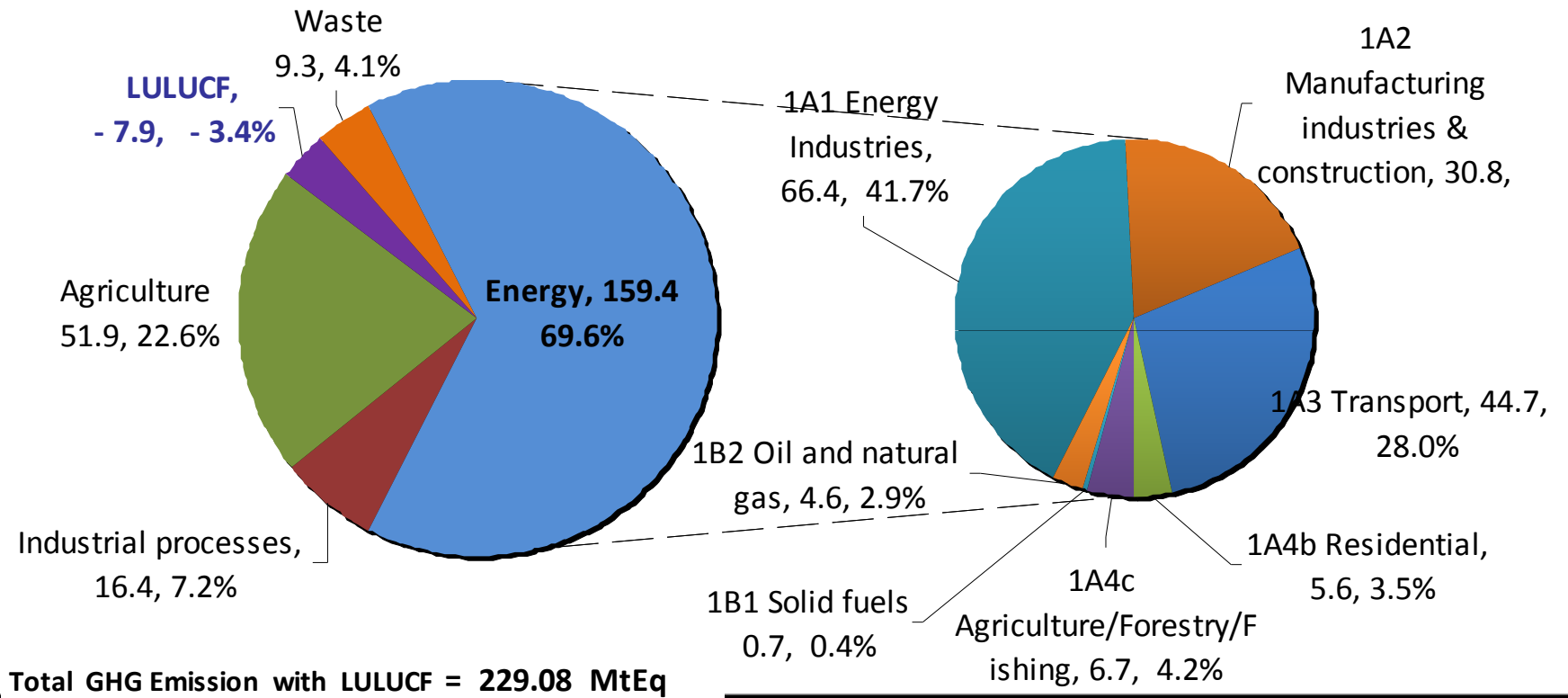
Source Activities, Categories & GHG Types

Activities	Categories	GHG Types
Conversion of primary energy to more usable energy forms	1A1 : Energy Industries	CO ₂ , CH ₄ , N ₂ O
Use of fuels in stationary and mobile applications	1A2 : Manufacturing 1A3 : Transport 1A4, 1A5 (Others & Non-Specify)	CO ₂ , CH ₄ , N ₂ O
Exploration and exploitation of primary energy sources	1B : Fugitive emission from Fuels	CO ₂ , CH ₄
Transmission and distribution of fuels	1B2biii4 : Natural Gas Transmission & Storage 1B2biii5 : NG Distribution	CH ₄



Emission of Energy Sector

Emission in 2000 by 'Energy Sector' (Mt CO2 eq, %)



Reference : Thailand 2nd NC



Issues in Energy Sector

- Discontinuous data collection
- Different definition of collected data
- Unclassified data in statics
- Duplication of the data set or data overlapping



Solution

- Allocate of supporting resources
 - Budget
 - Human
 - Technology
- Capacity building to relevant agency for GHG inventory
 - Good practice guidance for statistical data management
 - Calculation procedure of GHG estimation



Industrial Process and Product Use (IPPU)



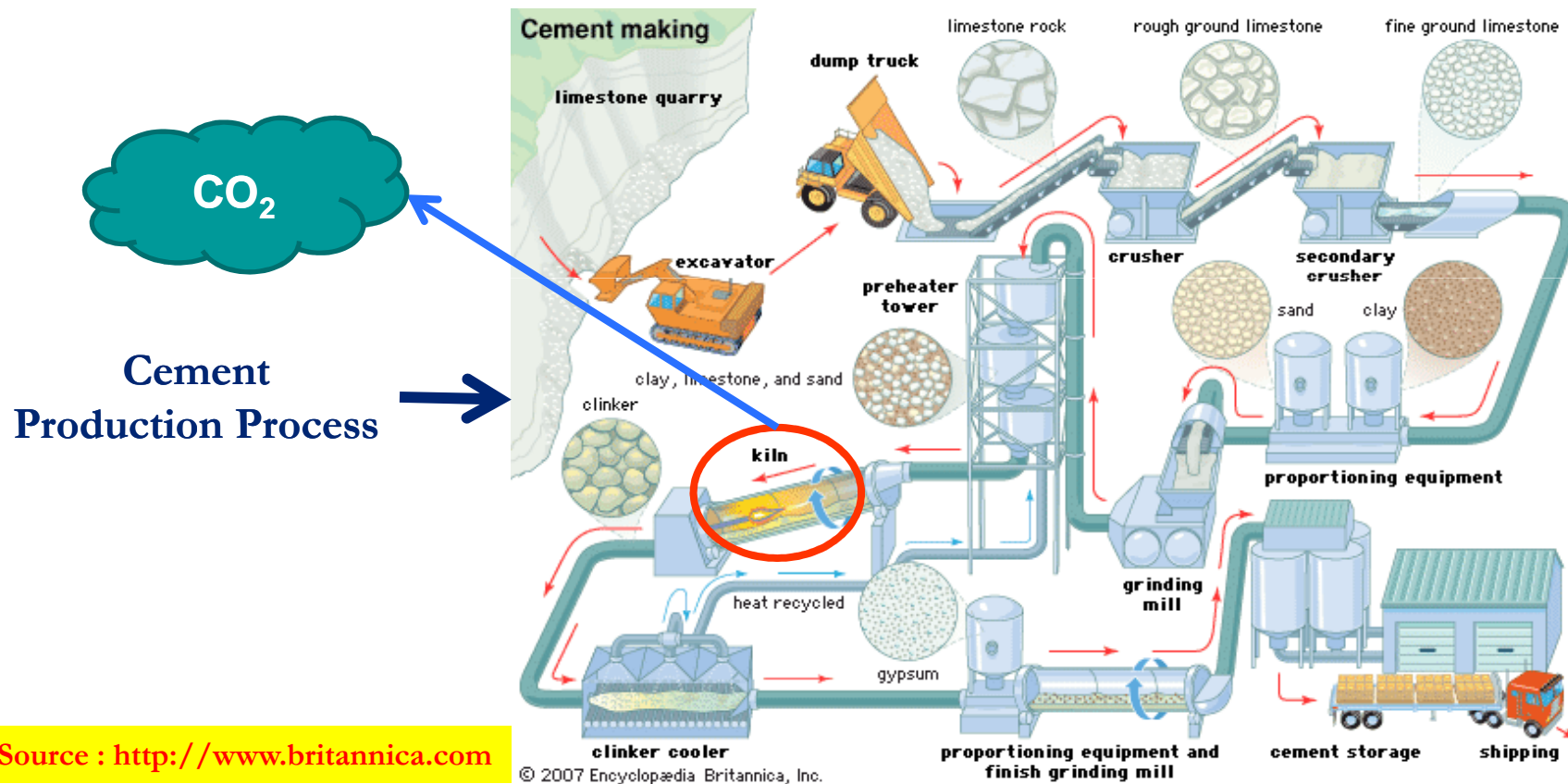
Contents of presentation : IPPU

- Overview of Industrial Processes Sector
- Overview of sub category
- Types of GHG in IPPU Sector
- Emission of Industrial Sector



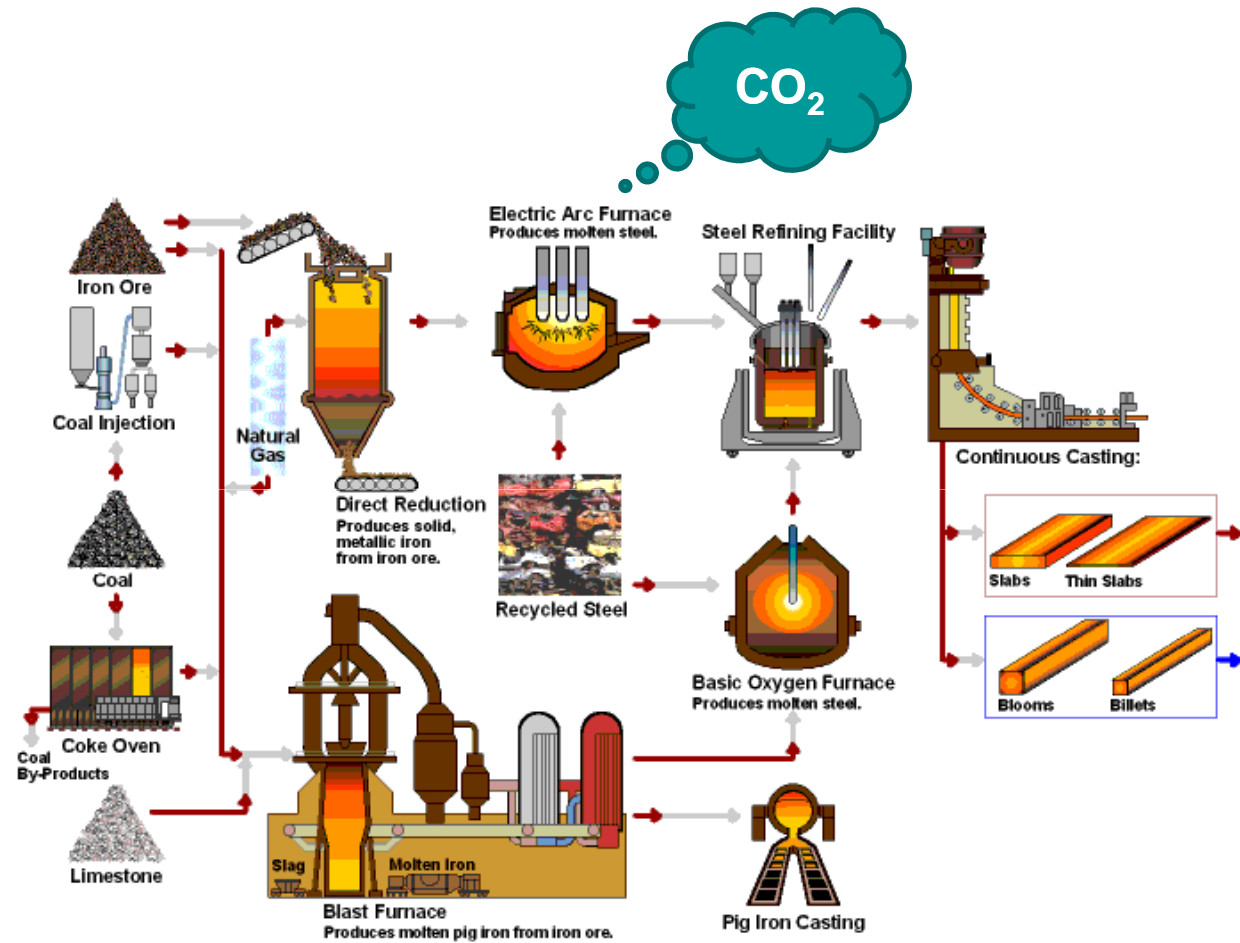
Overview of Industrial Processes Sector

- Main emission sources are from industrial processes that chemically or physically transform materials.



Overview of Industrial Processes Sector

Steel
Production
Process



Source : <http://www.eng2mfg.com>



Types of GHG in IPPU Sector

- Industrial processes, produce different greenhouse gases, including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), can be produced.

Overview of sub category

Category Code and Name	Definition
2A Mineral Industry	
2A1 Cement Production	Process-related emissions from the production of various types of cement (ISIC: D2694).
2A2 Lime Production	Process-related emissions from the production of various types of lime (ISIC: D2694).
2A4 Soda Ash Production and Use	Soda ash (sodium carbonate, Na ₂ CO ₃) is a white crystalline solid that is used as a raw material in a large number of industries including glass manufacture, soap and detergents, pulp and paper production and water treatment. Emissions of CO ₂ from the production of soda ash vary dependent on the manufacturing process. Four different processes may be used to produce soda ash. Three of these processes, monohydrate, sodium sesquicarbonate (trona) and direct carbonation, are referred to as natural processes. The fourth, the Solvay process, is classified as a synthetic process.
2A6 Road Paving with Asphalt	
2A7 Glass Production	Process-related emissions from the production of various types of glass (ISIC: D2610).



Overview of sub category (Continue)

Category Code and Name	Definition
2B Chemical Industry	
2B2 Nitric Acid Production	Nitric acid is used as a raw material mainly in the manufacture of nitrogenous-based fertiliser. Nitric acid may also be used in the production of adipic acid and explosives (e.g., dynamite), for metal etching and in the processing of ferrous metals. The main greenhouse gas emitted from HNO ₃ production is nitrous oxide.
2B4 Carbide Production	The production of carbide can result in emissions of CO ₂ , CH ₄ , CO and SO ₂ . Silicon carbide is a significant artificial abrasive. It is produced from silica sand or quartz and petroleum coke. Calcium carbide is used in the production of acetylene, in the manufacture of cyanamide (a minor historical use), and as a reductant in electric arc steel furnaces. It is made from calcium carbonate (limestone) and carbon-containing reductant (petroleum coke).
2B5 Other Chemicals	The production of other chemicals such as carbon black, styrene, polyvinylchloride, sulphuric acid, etc. can be sources of CH ₄ , N ₂ O, NO _x , NMVOC, CO and SO ₂ .



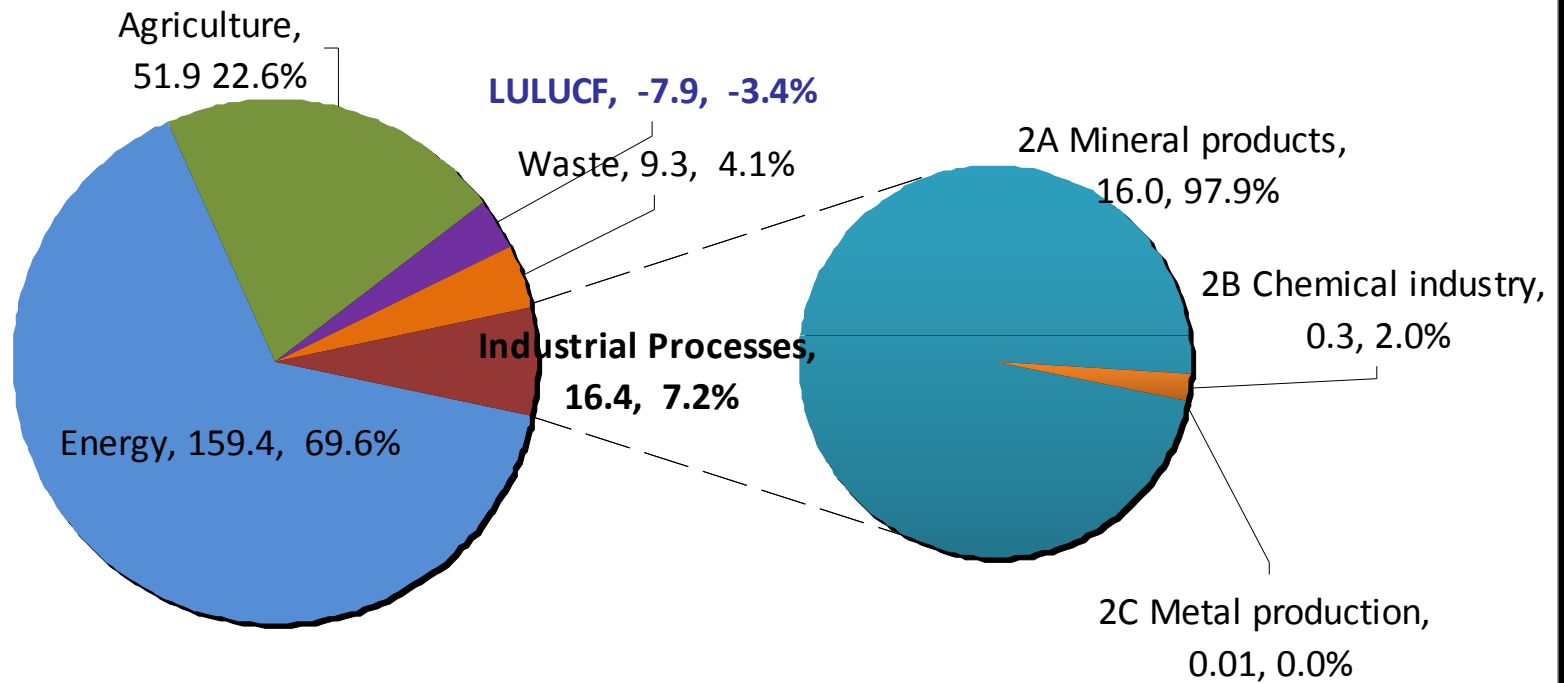
Overview of sub category (Continue)

Category Code and Name	Definition
2C Metal Production	
2C1 Iron and Steel Production	Carbon dioxide is the predominant gas emitted from the production of iron and steel. The sources of the carbon dioxide emissions include that from carbon-containing reducing agents such as coke and pulverized coal, and, from minerals such as limestone and dolomite added.
2D Other Production	
2D1 Food and Drink	NMVOCs are emitted during the production of alcoholic beverages, breadmaking and other food products.
2D2 Pulp and Paper	The production of pulp and paper involves three major processing steps: pulping, bleaching and paper production. The type of pulping and the amount of bleaching used depends on the nature of the feedstock and the desired quality of the end product. There are two main processes: Kraft (sulphate) pulping, the most widely used, and Sulphite pulping. Sulphite pulping may be divided into the acid Sulphite process and the neutral sulphite semi-chemical process.



Emission of Industrial Sector

Emission in 2000 by 'Industrial Processes' (MtCO₂eq, %)



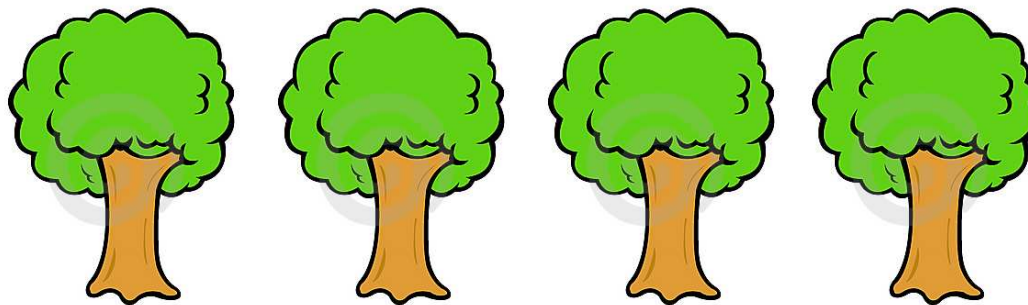
Total GHG Emission with LULUCF = 229.08 MtEq

Reference : Thailand 2nd NC



Issues

- Data Dissemination
 - Almost activity data come from private sector that is the problem for government to force them to report the data.
- Discontinuous data collection
- Lack of detailed (local specific) data
 - Development of study for local specific data collection and disclosure of the result.



Solutions

- ❑ Arrangement of relevant act or mandate
- ❑ Approval of relevant budget and resources for data collection or development of statistics data
- ❑ Capacity building of relevant sector for GHG inventory (climate change, calculation or statistics)
- ❑ Development of study for local specific data collection and disclosure of the result



Conclusion : Benefits of NI

- To **track** the national trend in GHG emissions and removals
- To **understand** and control /manage the emissions and removals of GHG of each sector
- To **find** key categories to prioritize the subsidies or budget to the appropriate sectors
- To **provide** necessary data for measure planning and political decisions



THANK YOU

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