กรมโรงงานอุตสาหกรรม
DEPARTMENT OF INDUSTRIAL WORKS

Identifying Potential Mitigation Activities in Thailand's Chemical Industry

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4th Capacity Building Hub: Building Sustainable National Capacities for Climate Action and Article 6 Implementation,
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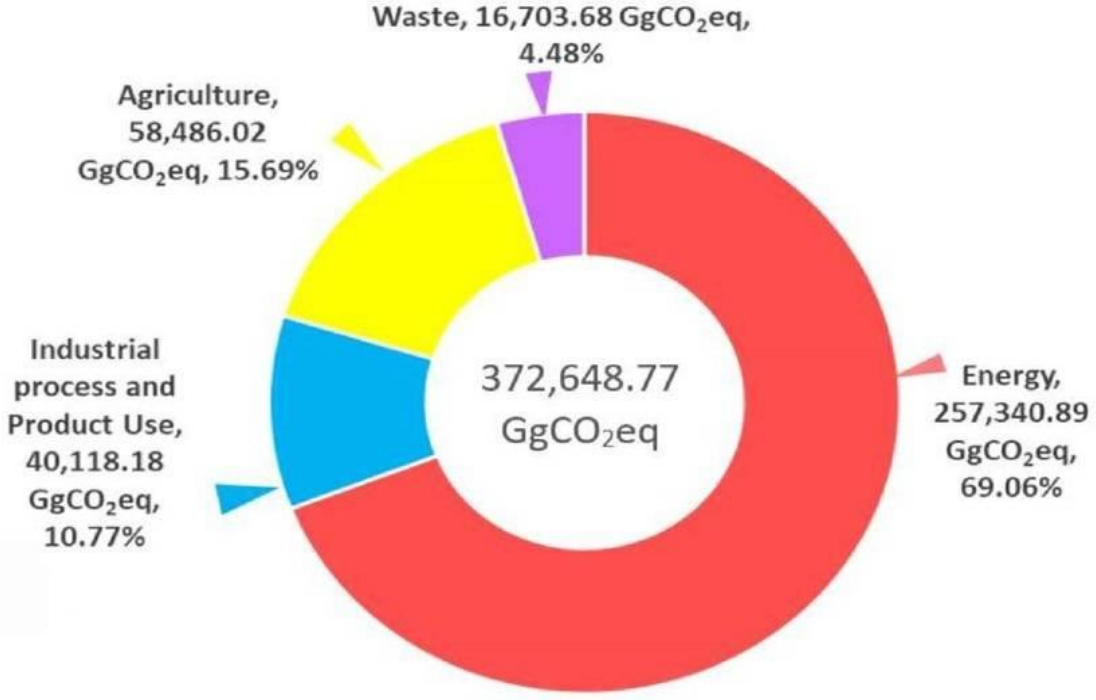
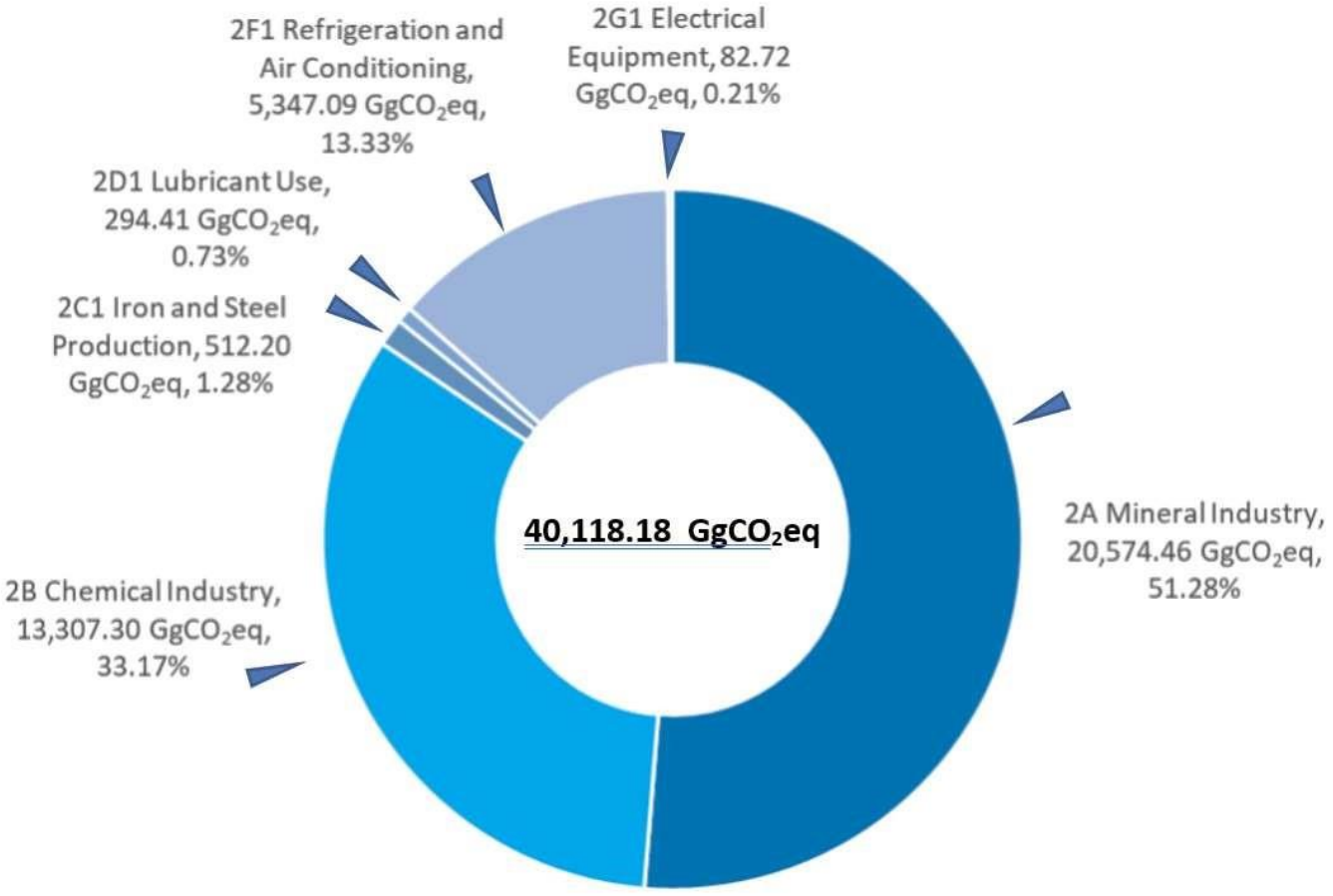
Green Industry
กระทรวงอุตสาหกรรม

ECO INDUSTRIAL TOWN

Overview of Thailand's GHG Emissions



Total GHG emissions by sector (exclude LULUCF) 2018

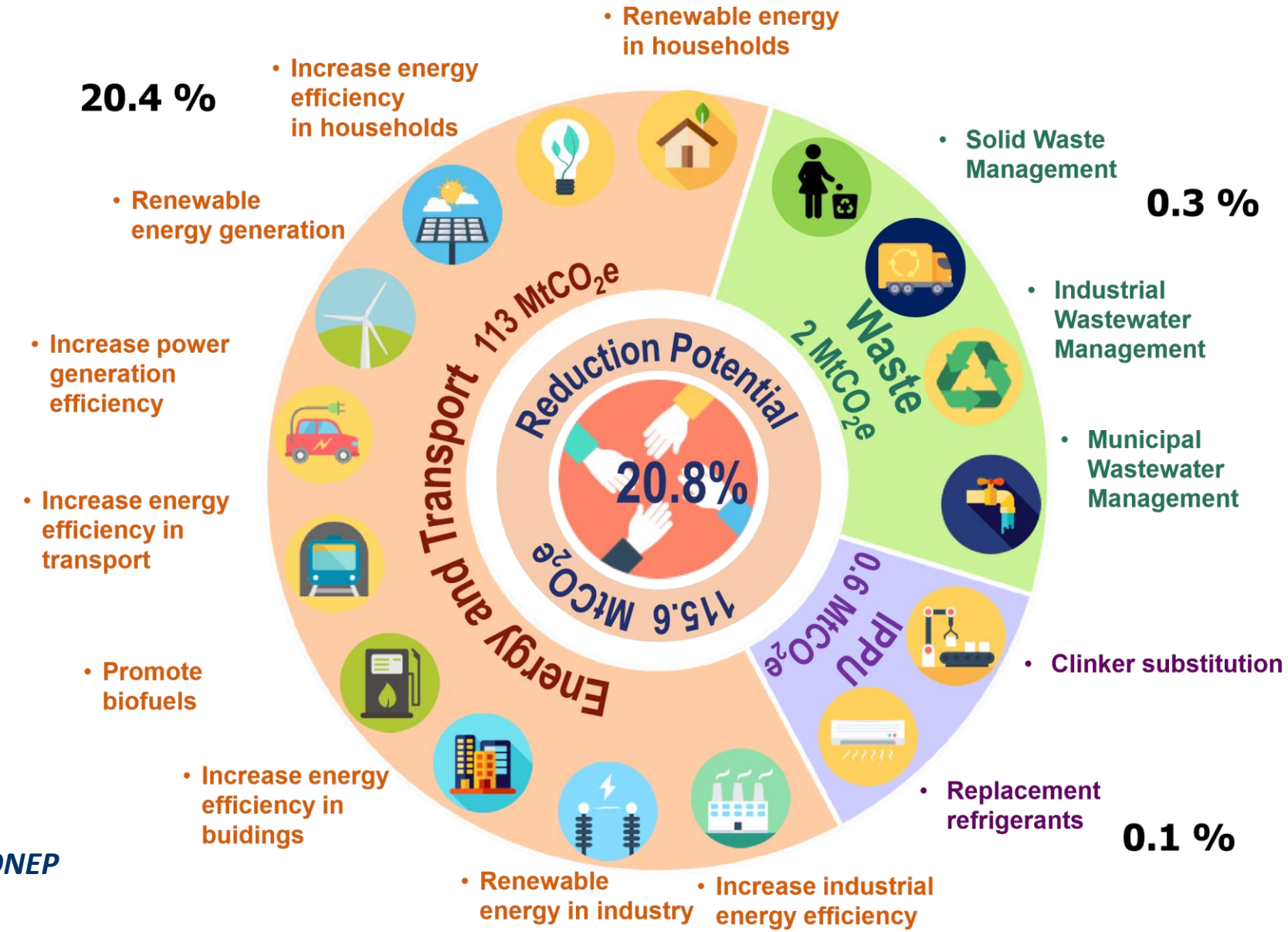


GHG emissions in IPPU sector 2018

(Ref: Thailand's 4th NC)

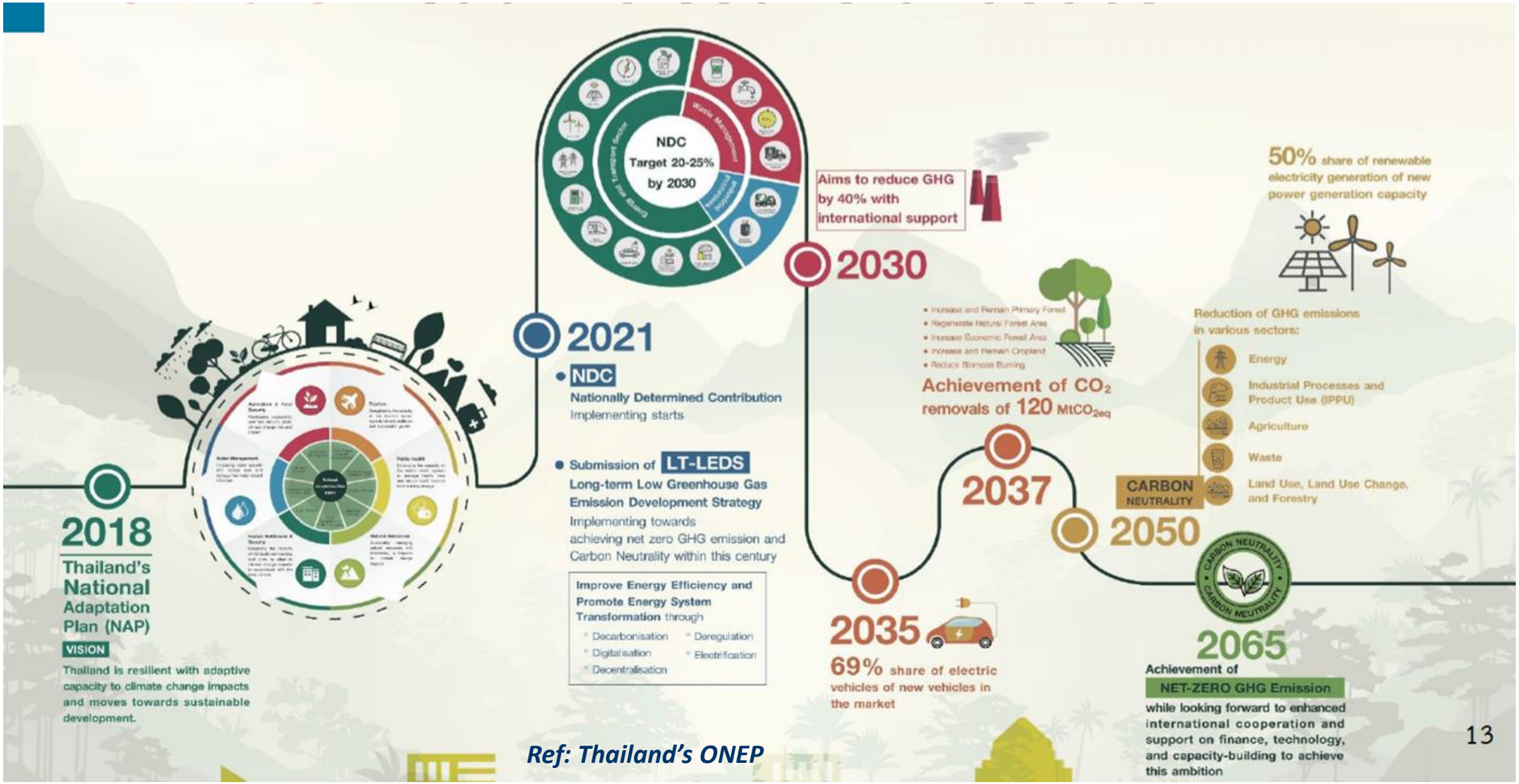
Thailand's initial NDC targets aim to reduce GHG emissions by 20 to 25 percent by 2030

Thailand's NDC Roadmap on Mitigation, 2021 - 2030



Ref: Thailand's ONEP

Thailand's updated NDC targets and long-term strategies



Ref: Thailand's ONEP

IPPU-industrial wastewater measures committed under NDC and updated NDC, 2030

No.	Sector/Measure	Mitigation Potential (tCO_2eq)	Target industries	Related plans/ projects/activities
Industrial Processes and Product Use (IPPU) Sector				
Alteration of industrial production processes		**600,000 → 1,100,000**		
1.	**Substitution of clinker substance**	300,000 → **700,000**	Cement and construction industries	
2.	**Substitution of refrigerant substance**	300,000 → **400,000**	Refrigerant producers/users	- Montreal Protocol - RAC NAMA Project
Waste Sector				
Industrial wastewater management (including domestic wastewater)		**700,000 → 1,000,000**		
3.	Methane recovery from industrial wastewater	-	Industries	- Alternative Energy Development Plan 2015 - Power Development Plan 2015
4.	Other industrial wastewater management measures		Industries	- Promotion of clean technology

Mitigation measures from the chemical industry

- Future Updated NDC
- Carbon neutrality 2050
- Net zero GHGs emission 2065

Importance of the Chemical Industry

Agricultural Chemicals

Products:
Fertilizers, Herbicides, Pesticides, and other agricultural chemicals

Specialty Chemicals

Products:
Adhesives and sealant, Food Additives, Flavors and Fragrance, Explosives

Basic Chemicals

Products: Organic and Inorganic Chemicals
Organic Chemicals: used in the production of other chemicals such as dyes, plastics, and petrochemical products.
Inorganic Chemicals: used to make solid and liquid chemicals, as well as industrial gases: sodium, sulfuric acid, and chlorine. Inorganic chemicals also serve as catalysis in the manufacture of chemicals.

Pharmaceuticals

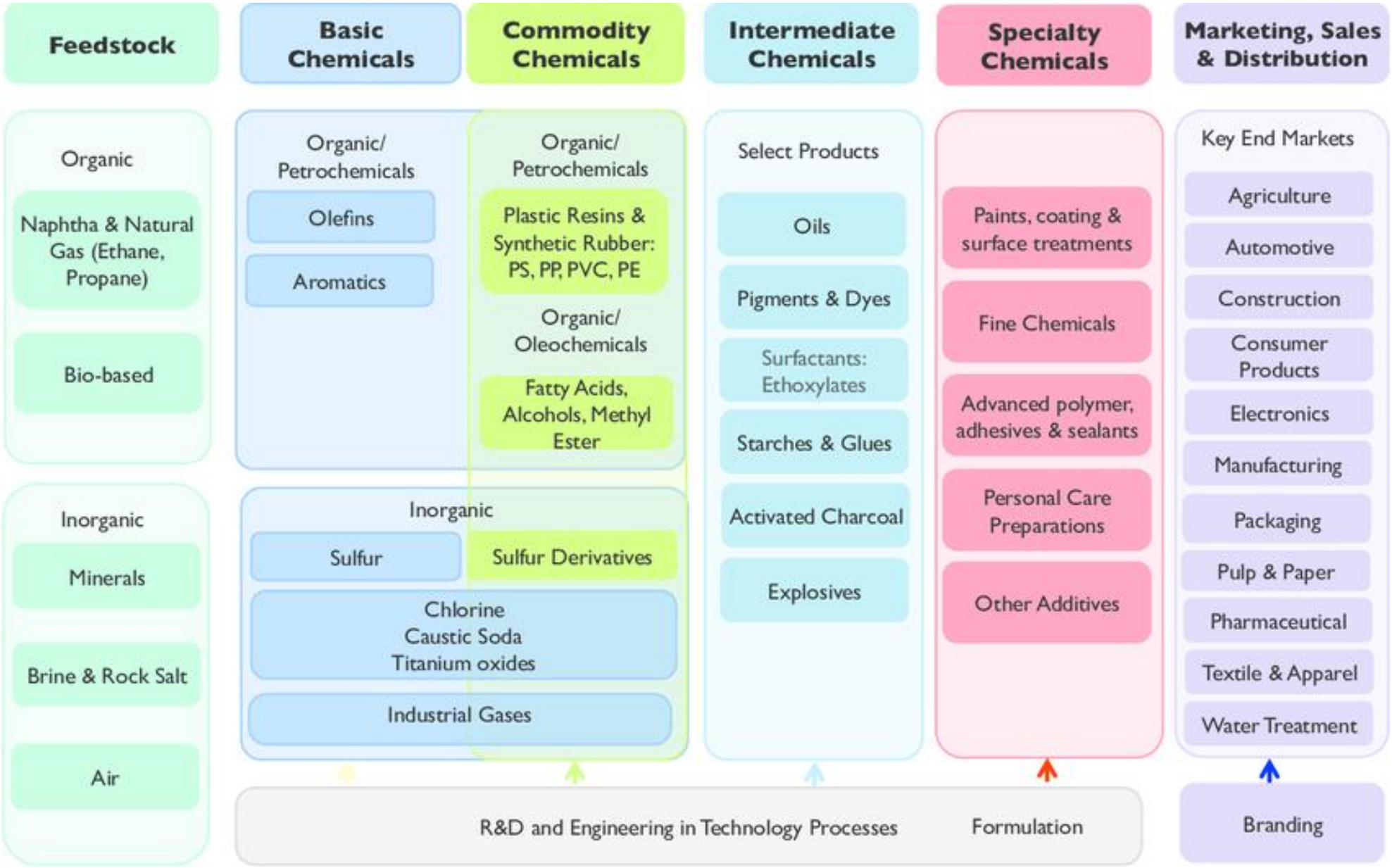
The pharmaceutical industry includes the manufacture, extraction, processing, purification, and packaging of chemical materials to be used as medications.

Consumer Products

Products:
Soaps, detergents, oral hygiene, hair and skin care products, personal care products (e.g., cosmetics, deodorants)

Source: Cyber Security and Infrastructure Security Agency (CISA)

Global chemical value chain



Ref: https://www.researchgate.net

Climate Action Programme for the Chemical Industry - CAPCI

Project focus: CAPCI provides information, knowledge, training and advice for tapping the significant potentials of the chemical industry for climate protection

Challenge

- Chemical / petrochemical industries account for 10% of world´s final energy demand and 7,4% of global GHG emissions
- Total GHG emissions of the chemical industry might more than double from 2,092 million T CO_{2eq} in 2005 to 4,507 million T CO_{2eq} by 2030
- "Hidden climate hero": The chemical industry can act as a key enabler for the decarbonization of many other industries.
- > 95 % of all other industries use chemicals and chemical products

Key Elements of CAPCI Approach

- ✓ Webinars and knowledge platform with best practices on the nexus chemistry – climate change
- ✓ National stakeholder dialogues, comprehensive training programmes
- ✓ Close cooperation with the chemical industry (ICCA, associations)
- ✓ Action-oriented capacity building, advice, knowledge transfer

Fact & Figures

- BMUV (IKI)
- Global project with focus on 3 - 5 countries in Africa, Asia and Latin America
- 03/2021 – 02/2024

Main Impact

- Awareness creation, information and best practices on climate protection in the production and use of chemicals
- Public – private dialogues mitigation roadmaps in the chemical industry
- Targeted capacity building for climate action in the chemical industry

Potential mitigation actions of chemical and petrochemical industrial processes and products use for Thailand – Scope 1

NDC measures	• Replacement of high GWP refrigerants/management and disposal of ODS waste. • Deployment of CCS.
Outside NDC measures	• N_2O abatement in nitric acid, caprolactam, and adipic acid production plant. • Reducing HFC leakage from refrigeration and air conditioning equipment, recovery of gases at the end of equipment lifetime, use of natural refrigerants (NH_3, CO_2 , hydrocarbons), taxes or capping sales of HFCs on regulated markets, ban the use of HFCs for certain applications. • CO_2 recycling in ethylene oxide plants/ Carbon Capture and Utilization (CCU).

Potential mitigation actions of chemical and petrochemical industrial processes and products use for Thailand – **Scope 2**	
NDC measures	• Energy Efficiency Resource Standards (EERS) and labeling, i.e., high-efficiency chiller, high efficiency boiler, cogeneration/tri-generation. • Usage of on-site renewable energy, i.e., solar, biomass co-firing.
Outside NDC measures	• Improvement of process efficiency (reducing usage of thermal energy) by using selective catalyst. • Usage of low carbon-intensive electricity (low-carbon content fuels fired plants or low-to-zero carbon energy sources, i.e., solar, wind, bioenergy, switching from coal to natural gas/ green H_2, NH_3, CH_3OH. • Application of electricity-based processes, e.g., electrically heated cracking, production of ammonia and urea from electrolytic H_2 and CO_2

Potential mitigation actions of chemical and petrochemical industrial processes and products use for Thailand – **Scope 3**	
NDC measures	• Up cycling/recycling of plastic waste
Outside NDC measures	• Uses of alternative low-carbon and low-to-zero GHG emission-intensive raw materials or processes, e.g., recycled plastics, replacement of fossil feedstock with renewable feedstock, i.e., biomass and biotech chemical synthesis. • Increasing material efficiency (input of material per unit production). • Downstream process technology, e.g., olefins from synthetic naptha and cracking. • Reducing CH_4 emissions from oil and gas by reducing venting and flaring, reducing fugitive emissions from gas pipeline and usage of leak detection and repair (LDAR) system • Reducing transmission & distribution losses

Thank you

~Kob Khun Krub / Kob Khun Ka ~

Thailand
Land of Smile