



Department of Alternative  
Energy Development and Efficiency  
**MINISTRY OF ENERGY**

# Net Zero Target and Policy on Renewable Energy

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## **Carbon Footprint of Renewable Energy for ASEAN Countries**

At Centara Grand at Central Plaza Ladprao, Bangkok, Thailand

18 August 2022

# Outline

- Energy Situation and CO<sub>2</sub> Emission from Energy Consumption in Thailand
- National Energy Plan
- BCG Model



## Production

**↓ 18.9%**

**721 KBPD\***

Primary energy production decreased, except hydropower had risen for 51.1%

Final energy consumption soared in every energy forms, particularly oil accounted for 52% had risen from last year for 12.3%. Similarly, electricity consumption also increased for 4.1%

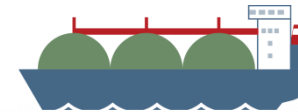
## Primary Energy

### Import (net)

**↑ 0.6%**

**1,566 KBPD\***

Energy import (net) had increased in every energy sources, consist of crude oil, electricity and natural gas. Coal import, however, remained steady.



## Final Energy

**↑ 10.3%**

**1,571 KBPD\***

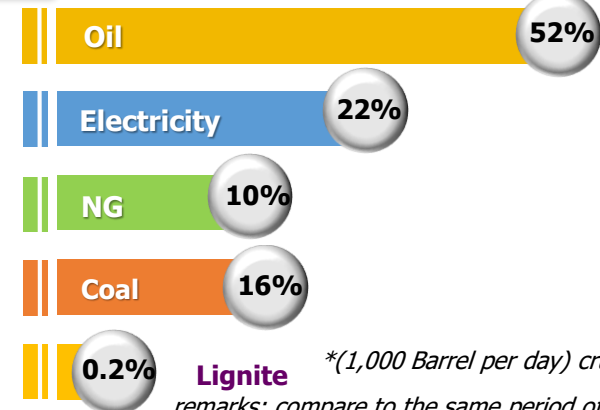


### Consumption

**↑ 1.3%**

**2,077 KBPD\***

Energy consumption had increased compare to the same period of previous year. Consumption of natural gas, coal, hydropower and imported electricity were risen.



*\*(1,000 Barrel per day) crude oil equivalent  
remarks: compare to the same period of last year*

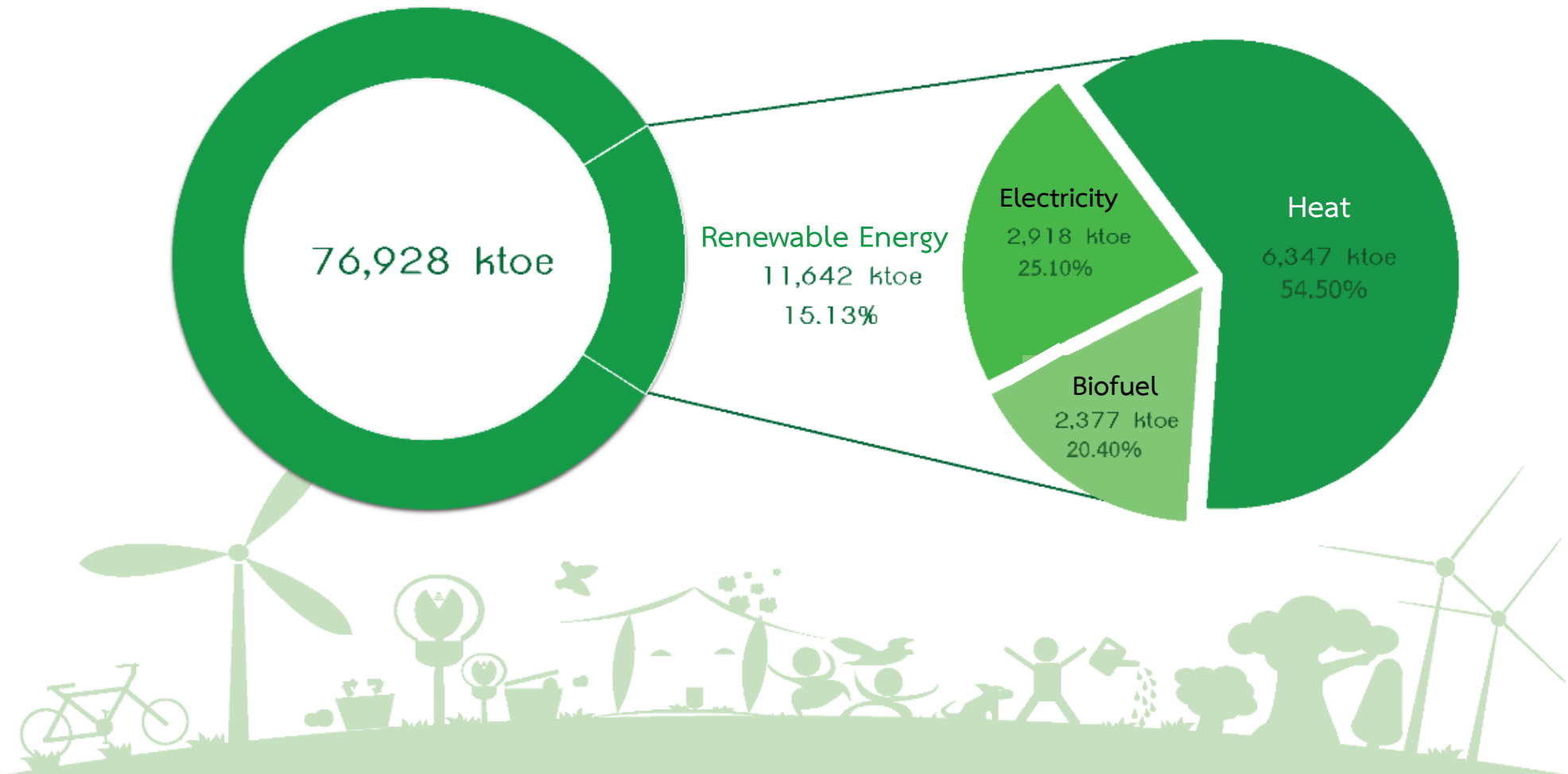


# Renewable Energy Consumption in Thailand (as of December 2020)

## Renewable Energy Consumption

Final Energy Consumption

Renewable Energy Consumption



# CO<sub>2</sub> Emission from Thailand Energy Consumption

as of 2020

*remark: compared to the same period of last year*

CO<sub>2</sub> Emission by sector

244.8 MT CO<sub>2</sub> ↓ 0.5%

Power  
37%

90 MT CO<sub>2</sub> ↓

Transport  
29%

70.6 MT CO<sub>2</sub> ↓

Industry  
28%

69 MT CO<sub>2</sub> ↓

Others\*  
6%

15.2 MT CO<sub>2</sub> ↓

\*consist of household, agriculture, commerce, etc.



CO<sub>2</sub> emission per energy consumption

2,030 Tonne CO<sub>2</sub>/KTOE

Thailand CO<sub>2</sub> emission per energy consumption is below global, Asian countries, USA, China, and EU average

CO<sub>2</sub> emission per capita

3.68 Tonne CO<sub>2</sub>/capita

as of 2020

Thailand CO<sub>2</sub> emission per capita is below global, USA, EU and China average, however, above Asian countries average

CO<sub>2</sub> emission per GDP

23.85 kg. CO<sub>2</sub>/Million Baht

as of 2020

Thailand CO<sub>2</sub> emission per GDP is below China and Asian countries average, but higher than global, USA, and EU average

CO<sub>2</sub> emission per electricity generation

0.437 kg. CO<sub>2</sub>/kWh

Thailand CO<sub>2</sub> emission per electricity generation is below China and Asian countries average, but outweigh EU and developed countries in America

Energy consumption means primary energy consumption which includes renewable energy



## Thailand's measures to achieve Carbon Neutrality and Net Zero GHG Emission

### Power and Transport Sector

- Energy efficiency improvement/adjustment of new technologies such as EV, CCS, CCUS, BECCS
- Increase RE proportion in electricity and heat production
- Increase energy performance in power sector
- Development of infrastructure to cope with technology transition toward 4D1E policy
- RE utilization in vehicles (Ethanol and Biodiesel)



EV = Electric Vehicles  
 CCS = Carbon Capture Storage  
 CCUS = Carbon Capture Utilization and Storage  
 BECCS = Bio-Energy with CCS

### Industrial Process and Product Utilization

- Replacement of clinker in hydraulic cement and ready mixed concrete production, and utilization of low CO<sub>2</sub> emission technology in cement production process
- Methane management in industry
- Low GWP refrigerant, such as Hydrocarbon (HCs) refrigerant
- Wastewater management in industry sector by increasing biogas production from its wastewater



### Waste Management

#### Municipal Waste Management

- reduce waste
- utilization of gas for waste landfill
- application of biowaste to fertilizer

#### Municipal Water Management

- accumulation of wastewater into the system
- increase community wastewater treatment system



### Agriculture

- Manure management
- Sustainable agriculture
- low GHG emission plant implantation




### Forestry and Land Utilization

- Reforestation and forest rehabilitation
- Forestation of economic forest
- Increase green area in urban and rural
- Forest invasion and wildfire safeguard

# Strategic Direction of National Energy Plan 2022

**01**



**Energy** for economic growth

**Reduce the burden of energy costs and promote investments in energy infrastructure**


**02**



**Energy** for jobs & income

**Support SMEs and vulnerable groups to overcome the economic hardship due to COVID-19. Also, strengthens the local economy**

**03**



**Energy** infrastructure of the future

**Transform energy sector with new innovation and environmental concern**

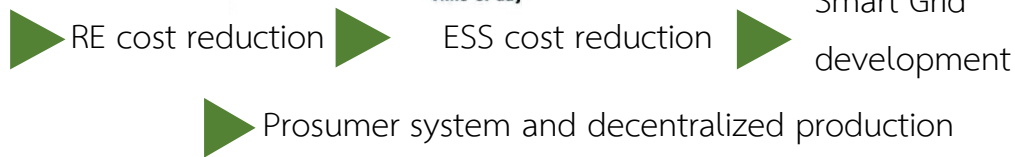


## Thailand Energy Policy Direction

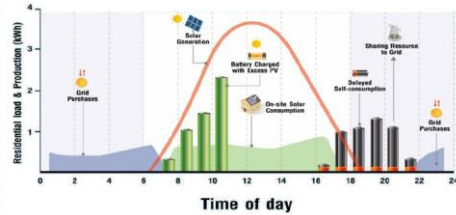
### Energy Policy Adjustment towards Low Carbon Economy



RE >50%



Increase electricity generation from RE more than 50%

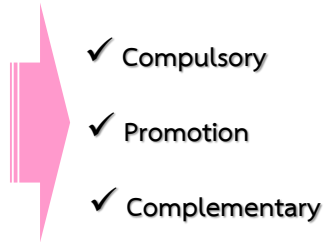


EE >30%

Increase EE target for more than 30% by utilization of high performance technology

5 sectors:

- Industry
- Building
- Household
- Agriculture
- Transport



## Carbon Neutrality 2050



EV 30@30

Increase EV share at 30% by 2030

- Supporting measures
- ✓ EV promotion and battery industry
  - ✓ EV infrastructure development
- Benefits
- ✓ reduce PM 2.5, CO<sub>2</sub>
  - ✓ clean energy promotion in transport sector
  - ✓ reduce energy cost



4D1E

- DIGITALIZATION**
- DE-CARBONIZATION**
- DECENTRALIZATION**
- DE-REGULATION**
- ELECTRIFICATION**



# Energy Infrastructure for the future

## Identify Key Energy innovation technology

- EV / Battery
- Smartgrid
- Smart Energy
- Hydrogen

## Rearrange industry structure and management

*Enable market-mechanism to increase competition in the energy sector*

## Innovation and new technologies

*De-carbonization  
Grid modernization  
EV/ESS to promote*

## Smart energy management system

*Use of AI for grid management,  
National Energy Information Center*

## New energy businesses

*New opportunities for energy business such as smart grid smart energy, network/business, peer-to-peer energy trading, distributed energy system*

# 4D and 1E Policy



## Digitalization

- Enhance the transmission system to be “Smart grid”
- Support development of ESS for increasing stability to community and large power plant

## De-centralization

- Promote P2P power trading by supporting of electricity conveying through on-grid and off-grid system
- Promote community power plant, including proceeding for community power plant network mapping

## De-carbonization

- Promote production and utilization of electricity from solar and bioenergies

## De-regulation

- Originating of “Sandbox” Project for energy innovation development Promote “Energy Start-up” concept
- Conduct flexibility of ENCON fund utilization for promoting community’s energy business
- Increase opportunity for public for electricity purchasing (“Prosumer”)

## Electrification

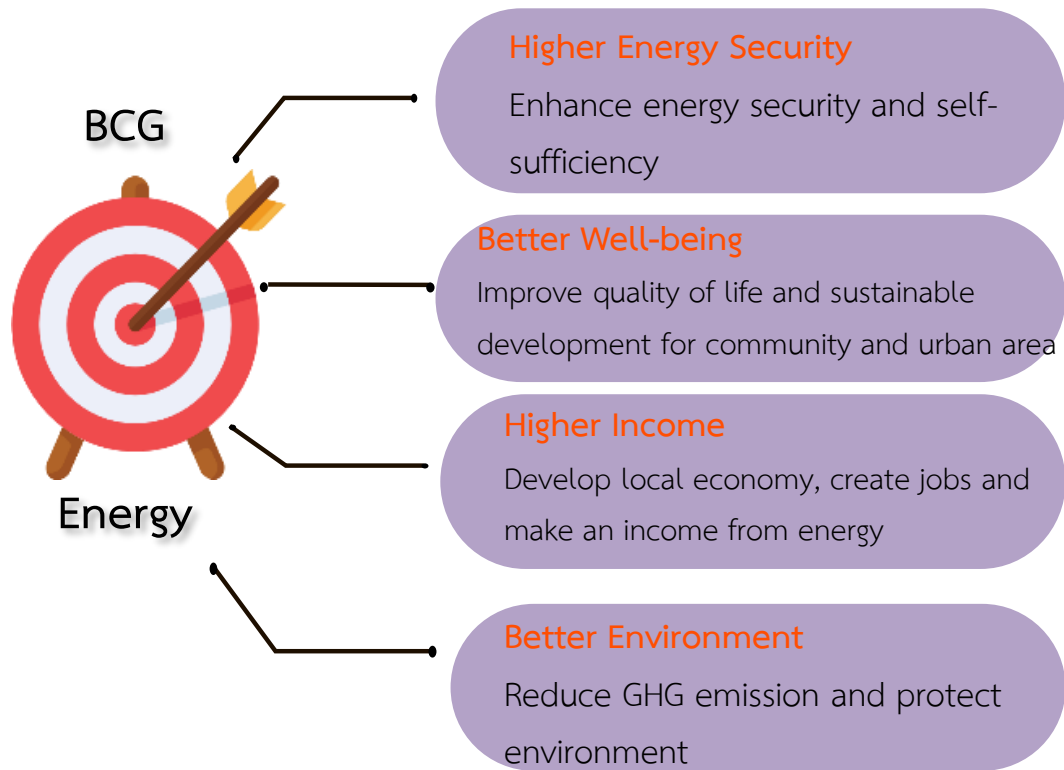
- Promote utilization of EV
- EV infrastructure

# Driven Mechanism of MoEN's BCG

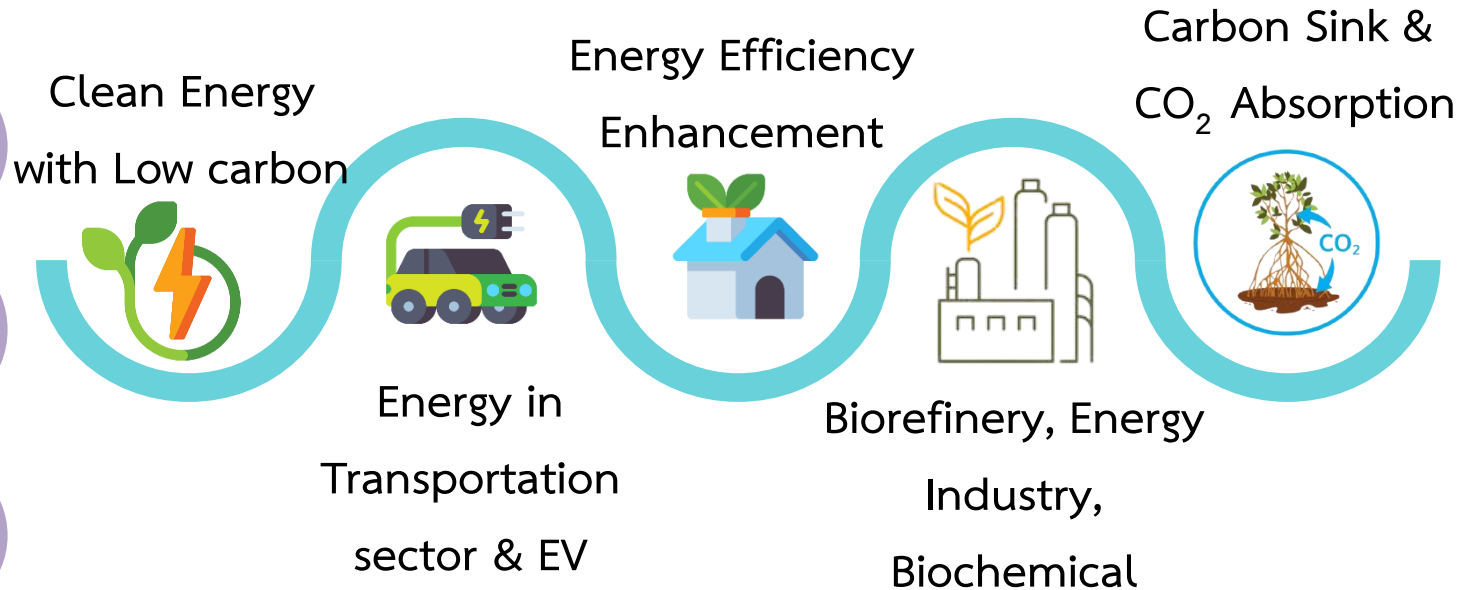
Vision :

Develop Green Energy according to BCG Model to achieve Carbon Neutrality by 2050

## Driven Mechanisms of BCG on Energy

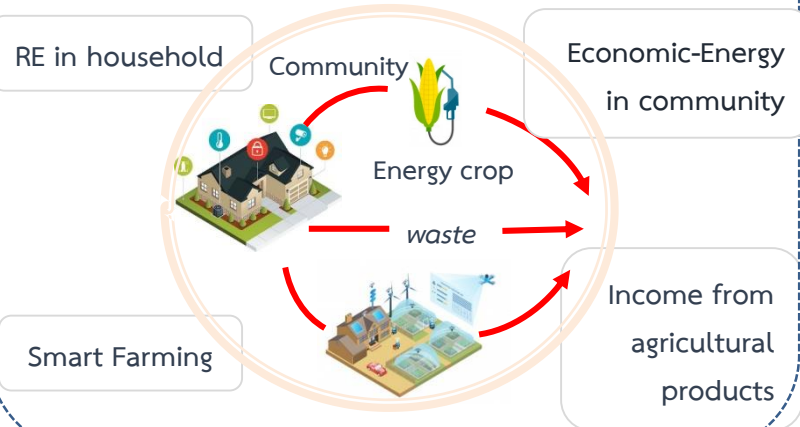


## GREEN ENERGY - CARBON SINK



# Driven Mechanisms of BCG on Energy

## Develop energy in community, household and agriculture



## 1. Clean Energy with Low Carbon



### Disseminate Community Power Plant Project



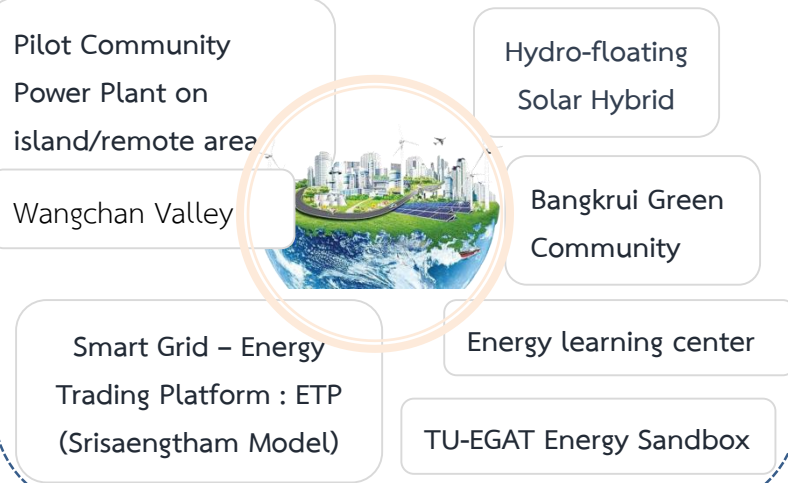
- Community Power Plant Project
- Community Power Plant Project integrating with water food and energy

### Promote RE in industrial and commercial sector



- Reduce coal use and promote clean energy
- Circular Economy Organization
- Smart Business – Smart Energy
- Waste to Value

## Develop Pilot Area/Sandbox on Energy Trading



### Develop infrastructure and regulation to promote green energy

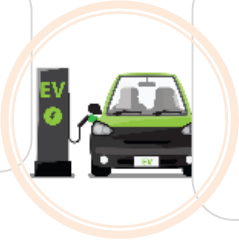


- Power trading market in pilot area
- Power system management to support decentralized power system

# Driven Mechanisms of BCG on Energy (cont'd)

## 2. Energy in Transportation Sector & EV

Develop Infrastructure for EV, power system, charging station, regulation/safety



Develop value added industry for biofuel's raw material to reduce impact from the transition to EV

Develop and promote new energy technology; hydrogen

## 3. Energy Efficiency Enhancement

Increase energy efficiency in government organization

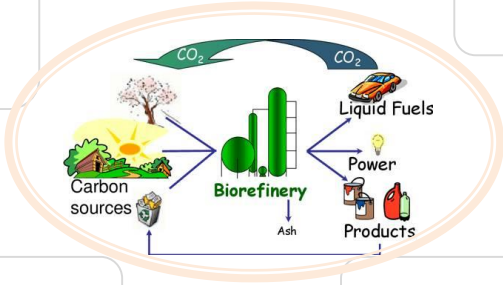


Promote energy saving in SMEs and household

Promote technology, innovation and high efficiency equipment

## 4. Biorefinery

Improve base-technology on entired biochemical industry

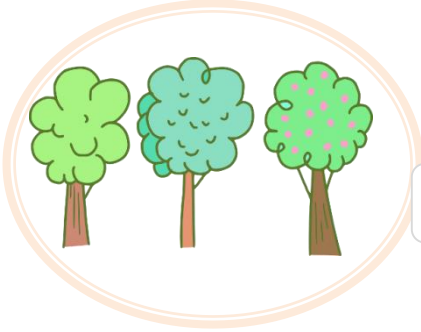


Develop Olechemical on EEC area

Become the leader of Biorefinery in the region

Nakornsawan Biocomplex Phase 1 - Phase 2

## 5. Carbon Sink & CO<sub>2</sub> Absorption



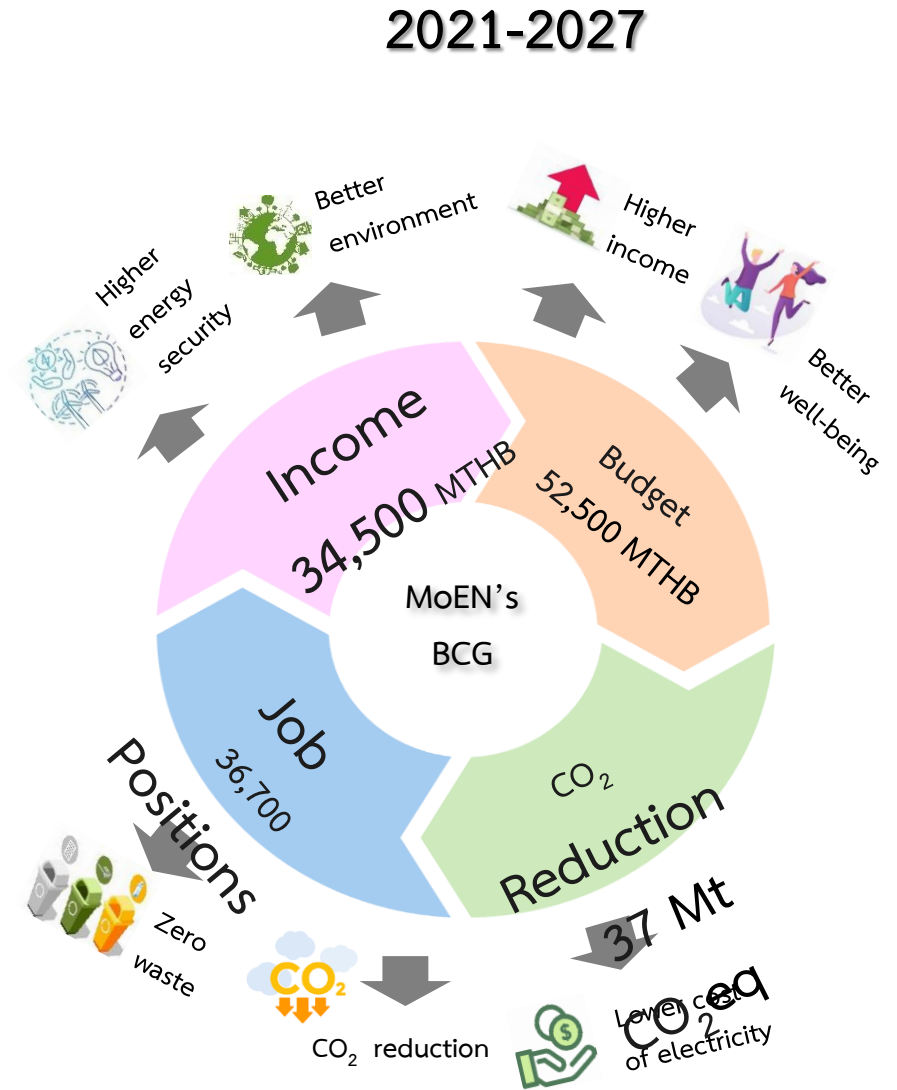
Afforest to increase carbon absorption

Develop carbon pricing and carbon credits

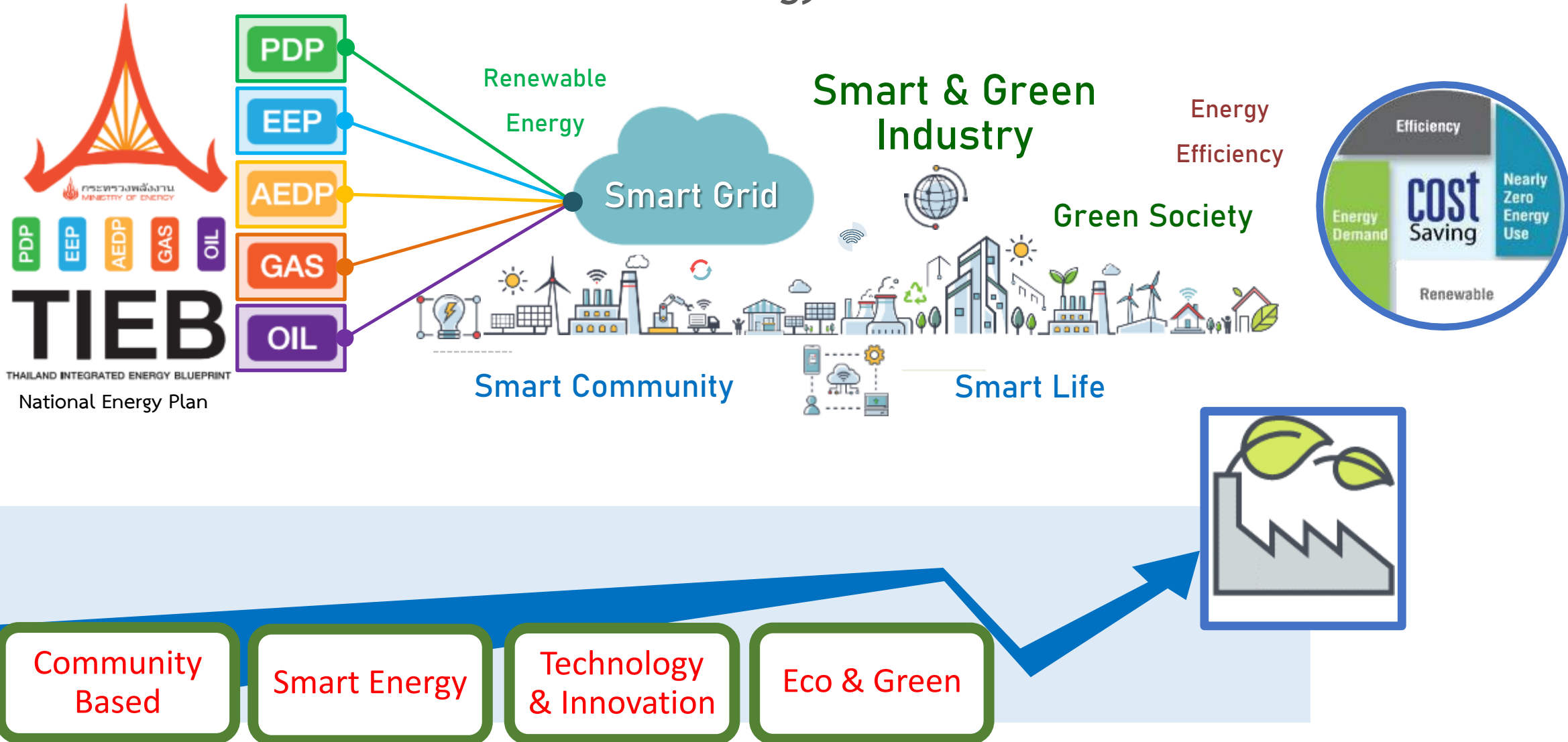


## MoEN's BCG 2021-2027

- Smooth ENERGY TRANSITION according to National Energy Plan
- Support national development to have high-income and pass over middle-income trap
- Develop based economic and social and sustainable growth of community
- Protect environment for next generation and achieve Carbon Neutrality target



# Energy Transition





# Thank you for your attention



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