Thailand's 1.5 Degrees

24th AIM International Workshop

National Institute for Environmental Studies, Japan

November 5-6, 2018

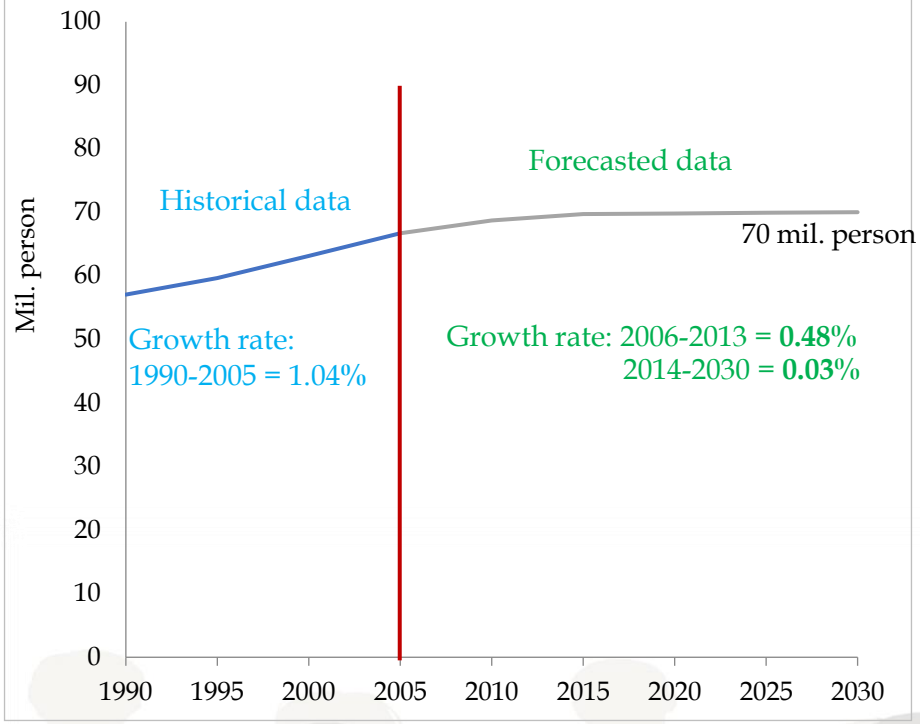
Sustainable Energy & Low Carbon Research Unit (SELC)

Thammasat University, Thailand

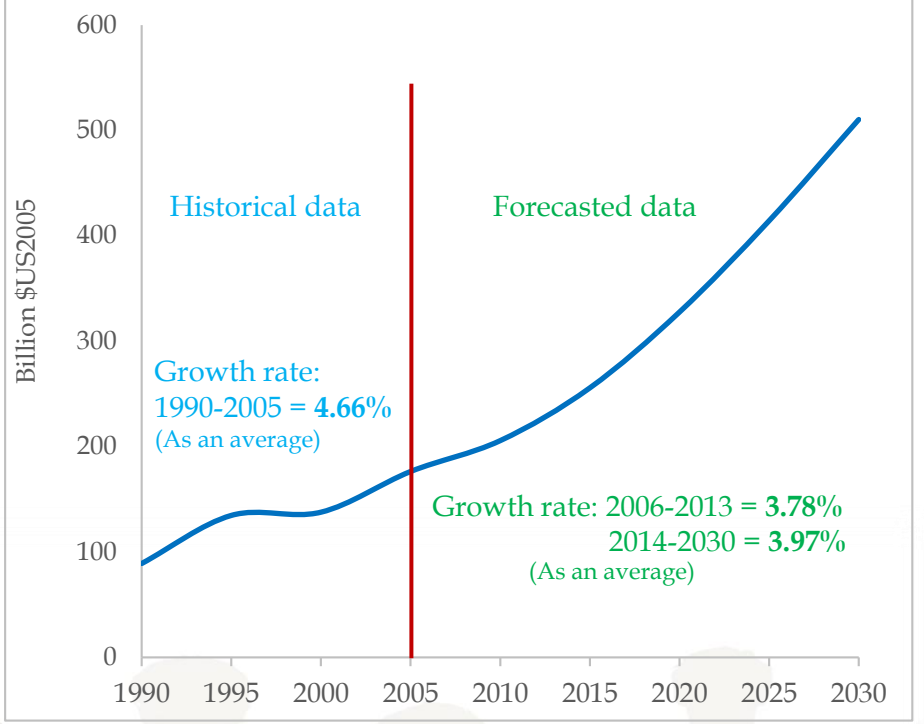
SELC
Sustainable Energy & Low Carbon Research Unit

SOCIO-ECONOMIC ASSUMPTIONS

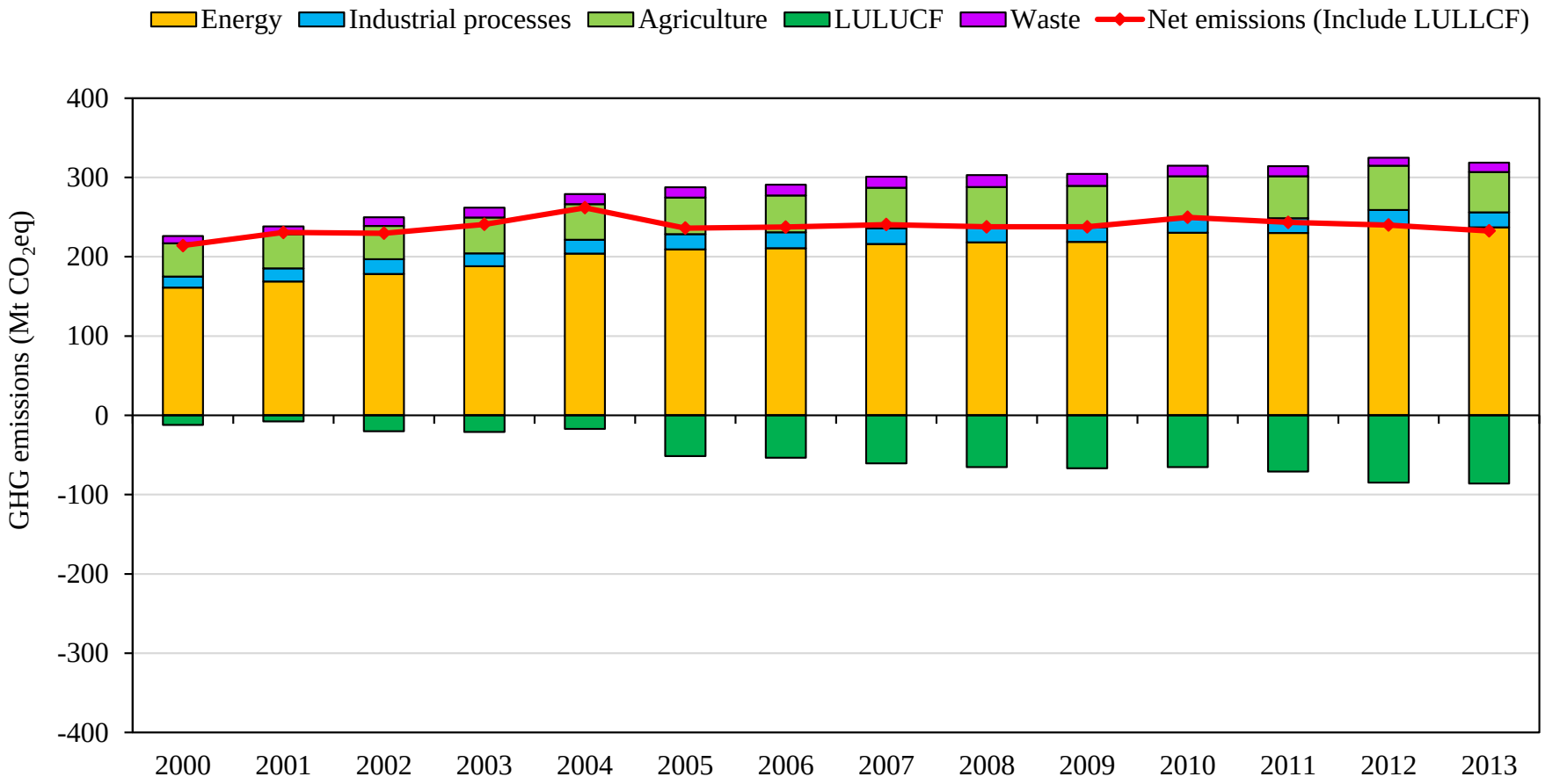
Population



GDP

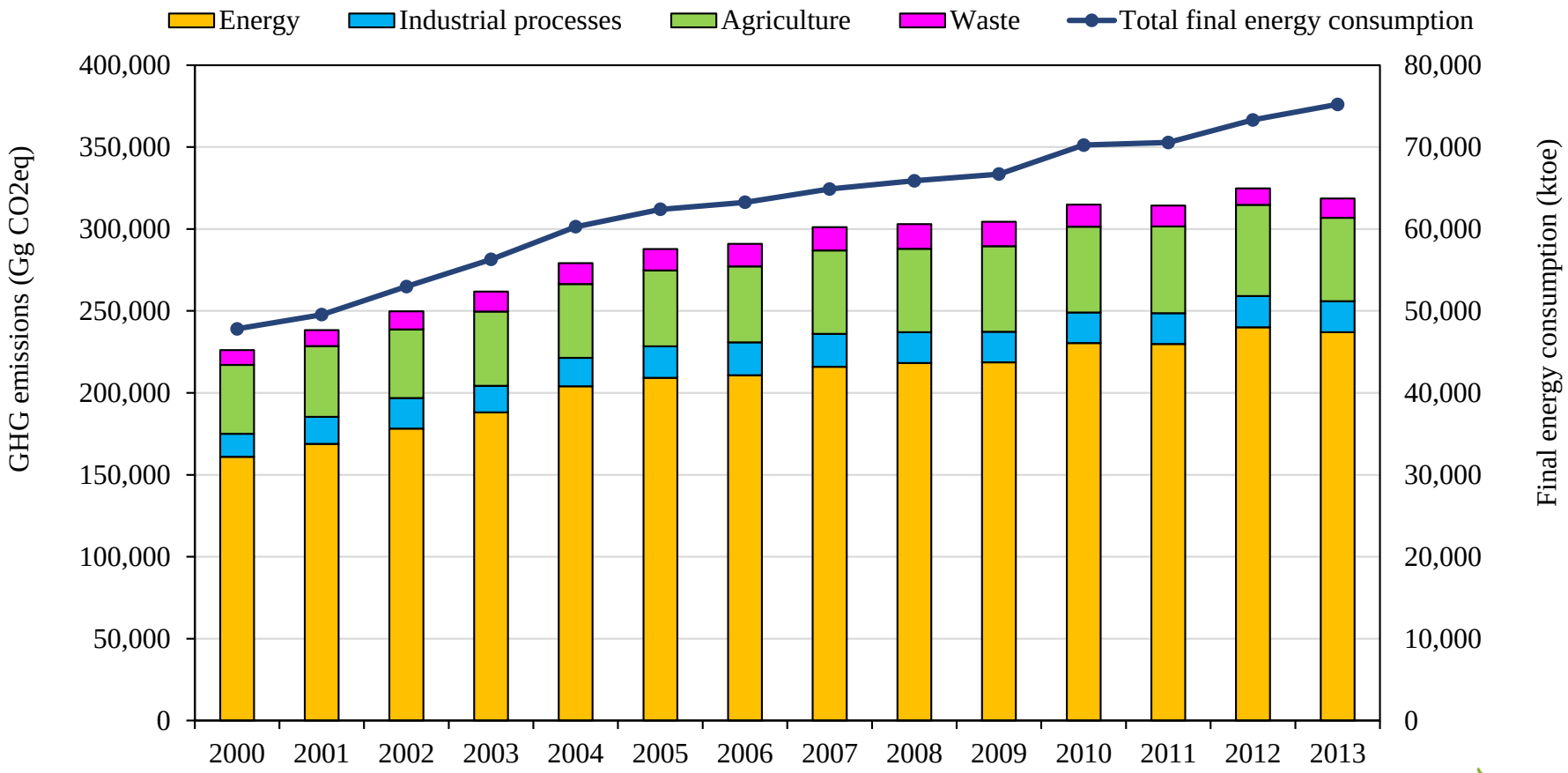


GHG Emissions Inventory: 2000-2013



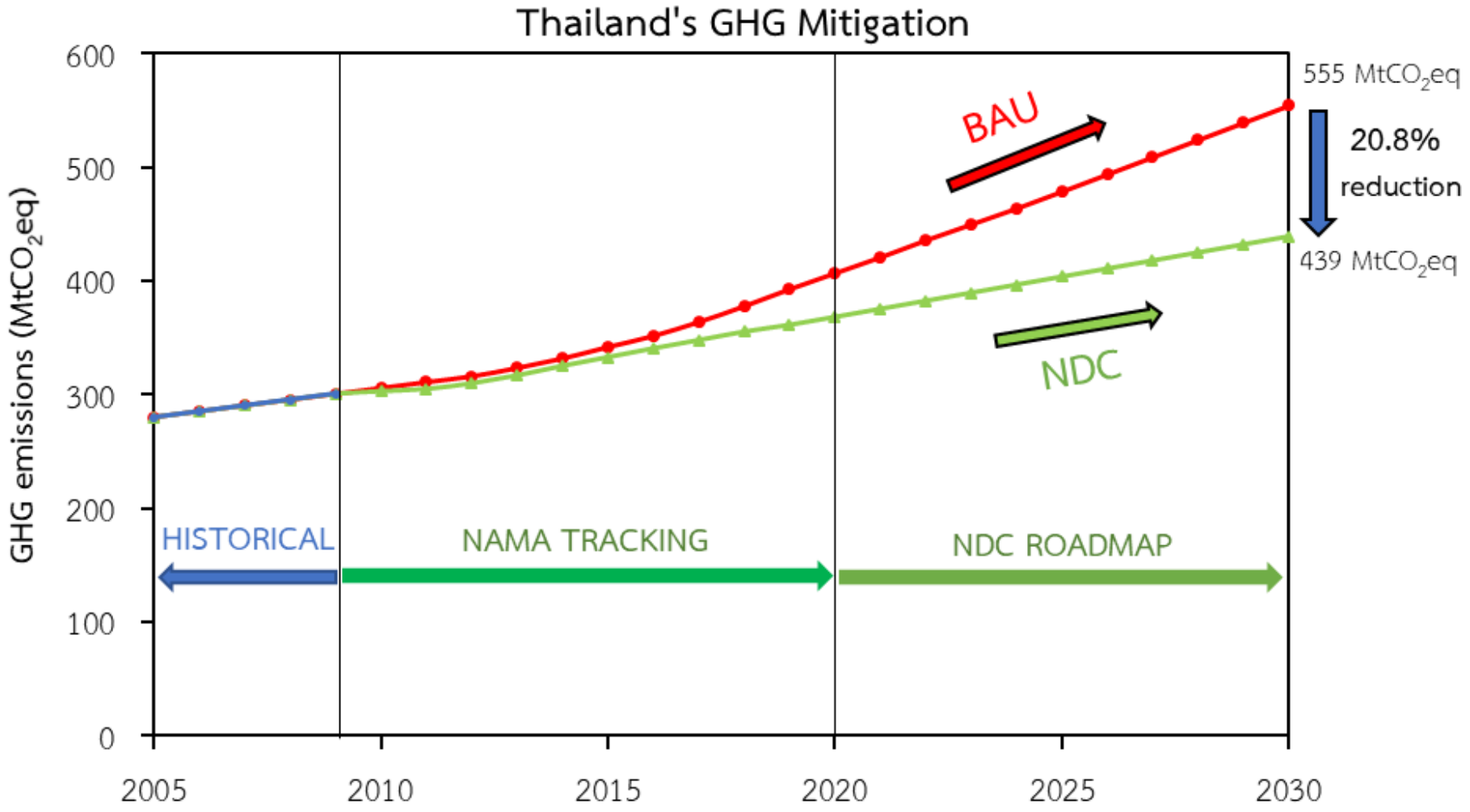
Source: Thailand's third national communication

Trends of GHG emissions and Total final energy consumption: 2000-2013



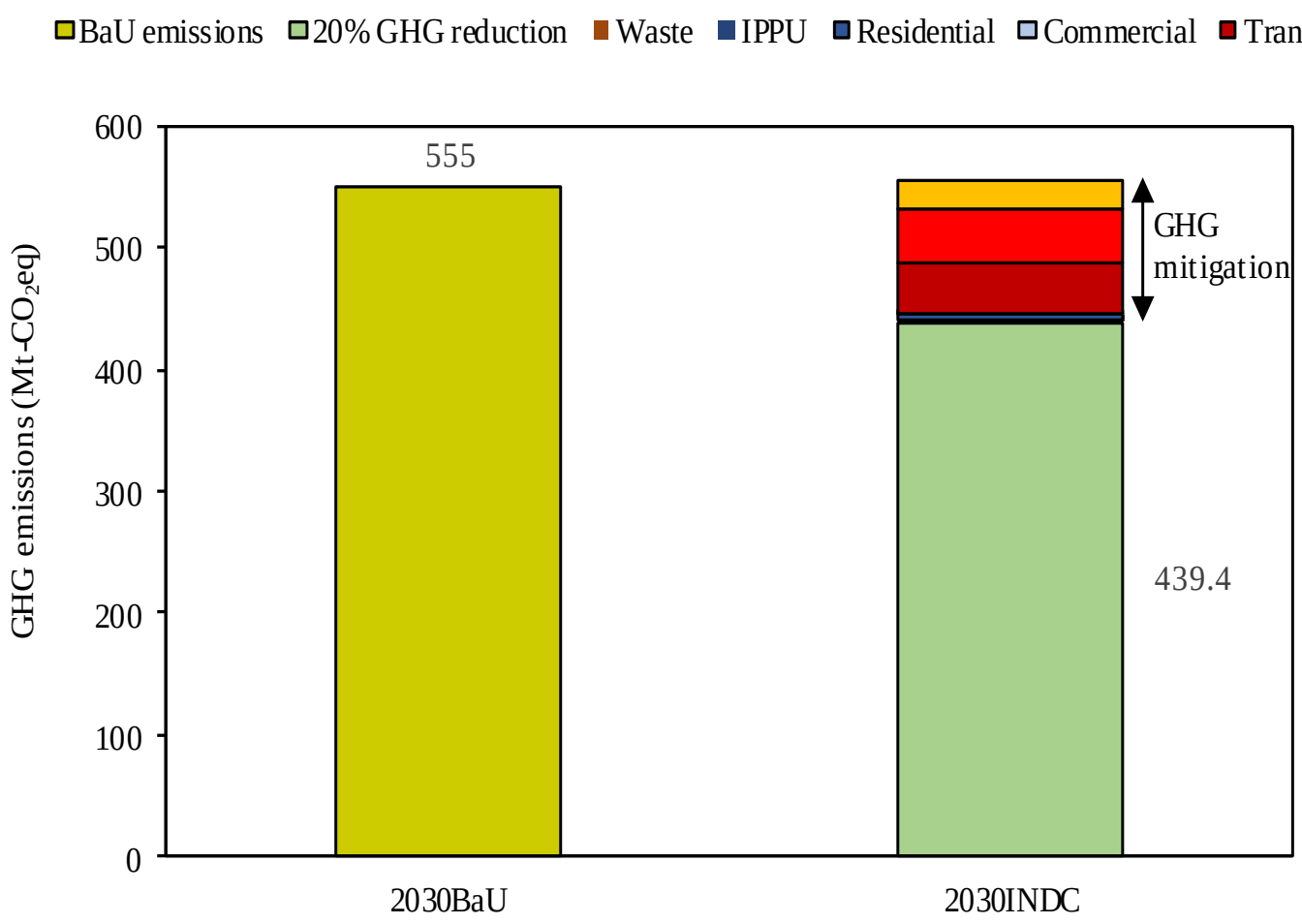
Source: Thailand's third national communication

Thailand's GHG mitigation: NAMA 2020 and NDC 2030



Source: Thailand's third national communication

GHG emissions in the BaU scenario and Thailand's INDC by 2030



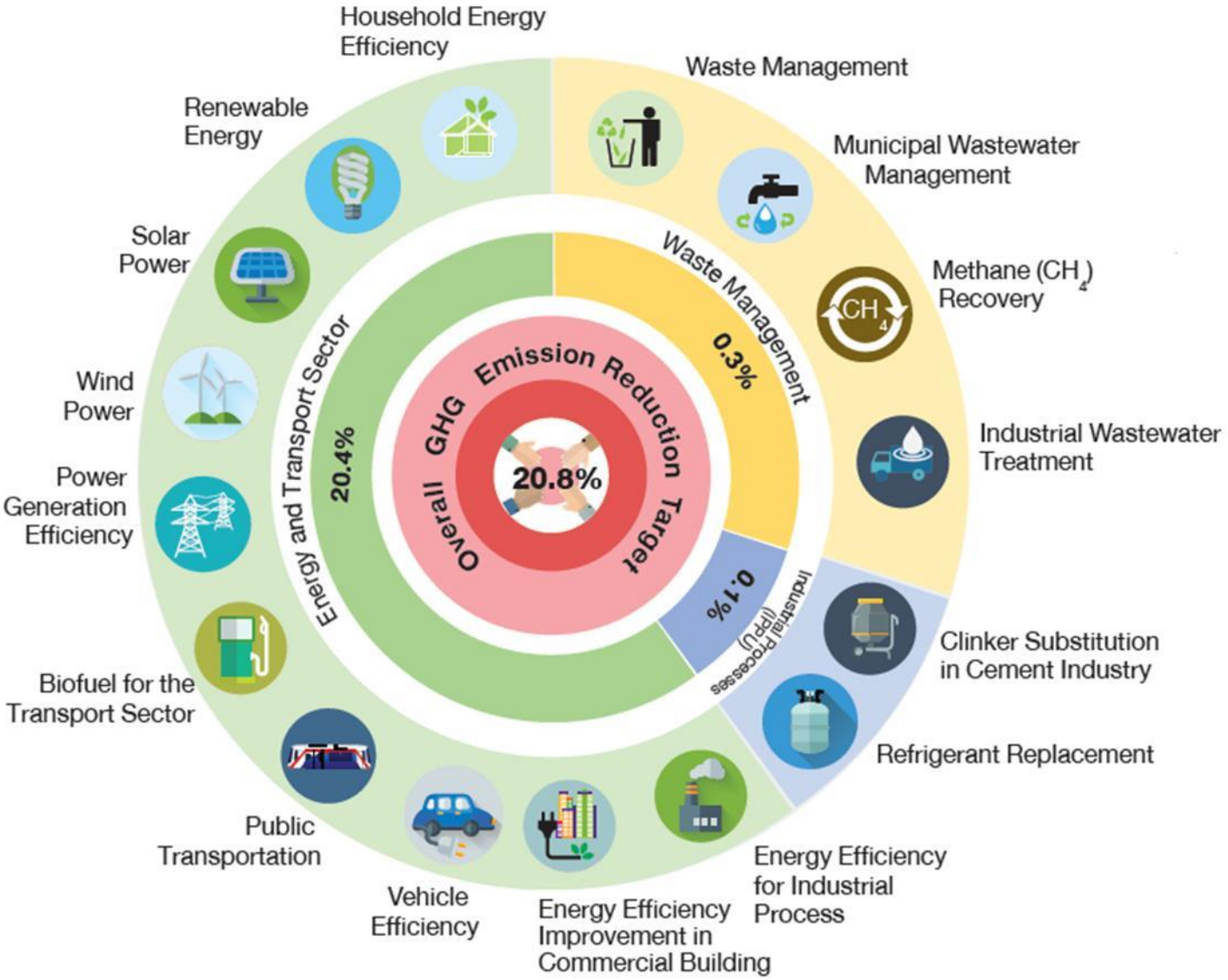
GHG mitigation

- Power 24 Mt-CO_2eq
- Industry 43 Mt-CO_2eq
- Transport 41 Mt-CO_2eq
- Residential 4 Mt-CO_2eq
- Commercial 1 Mt-CO_2eq
- IPPU 0.6 Mt-CO_2eq
- Waste 2 Mt-CO_2eq

Total GHG mitigation

115.6 Mt-CO_2eq

THAILAND NDC ROADMAP 2030



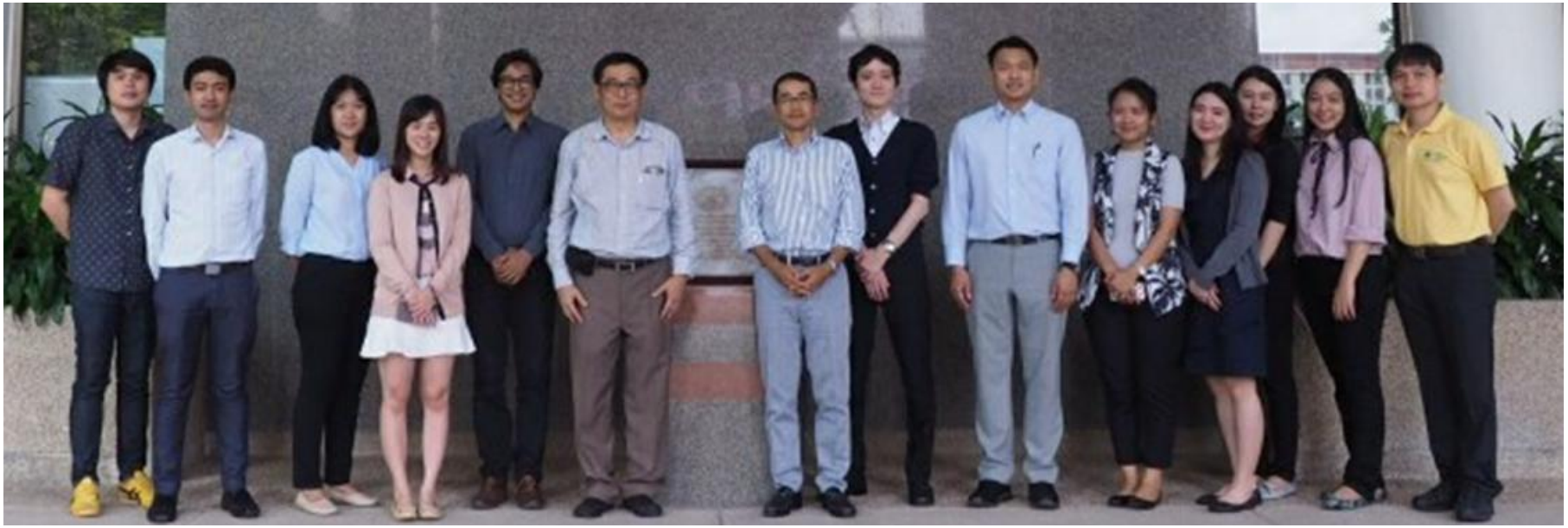
NIES & Mizuho Visit

30 March 2018

AIM Training Workshop in Thailand

AIM/Enduse Training Workshop at SIIT-TU, Thailand

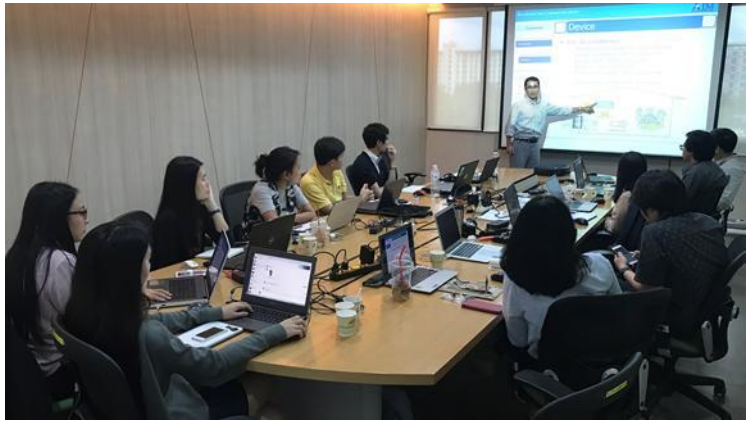
11-15 June 2018 (Beginning level for Policy maker)



AIM/Enduse Workshop

11-15 June 2018

- Redefine the energy system's description in the residential and the commercial sectors
- Redesign the EV technologies in the transport sector
- Recalculate the service demand projection in all energy sectors
- Restructure the industry service-flow diagram such as cement industry in the IPPU sector



AIM Training Workshop in Thailand

CGE Training Workshop at SIIT-TU, Thailand

26 June 2018 (Beginning level for Policy Makers)

Participant: Bhutan, Thailand: ONEP & CITC, SIIT-TU, JICA-Thailand

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AIM Training Workshop in Thailand

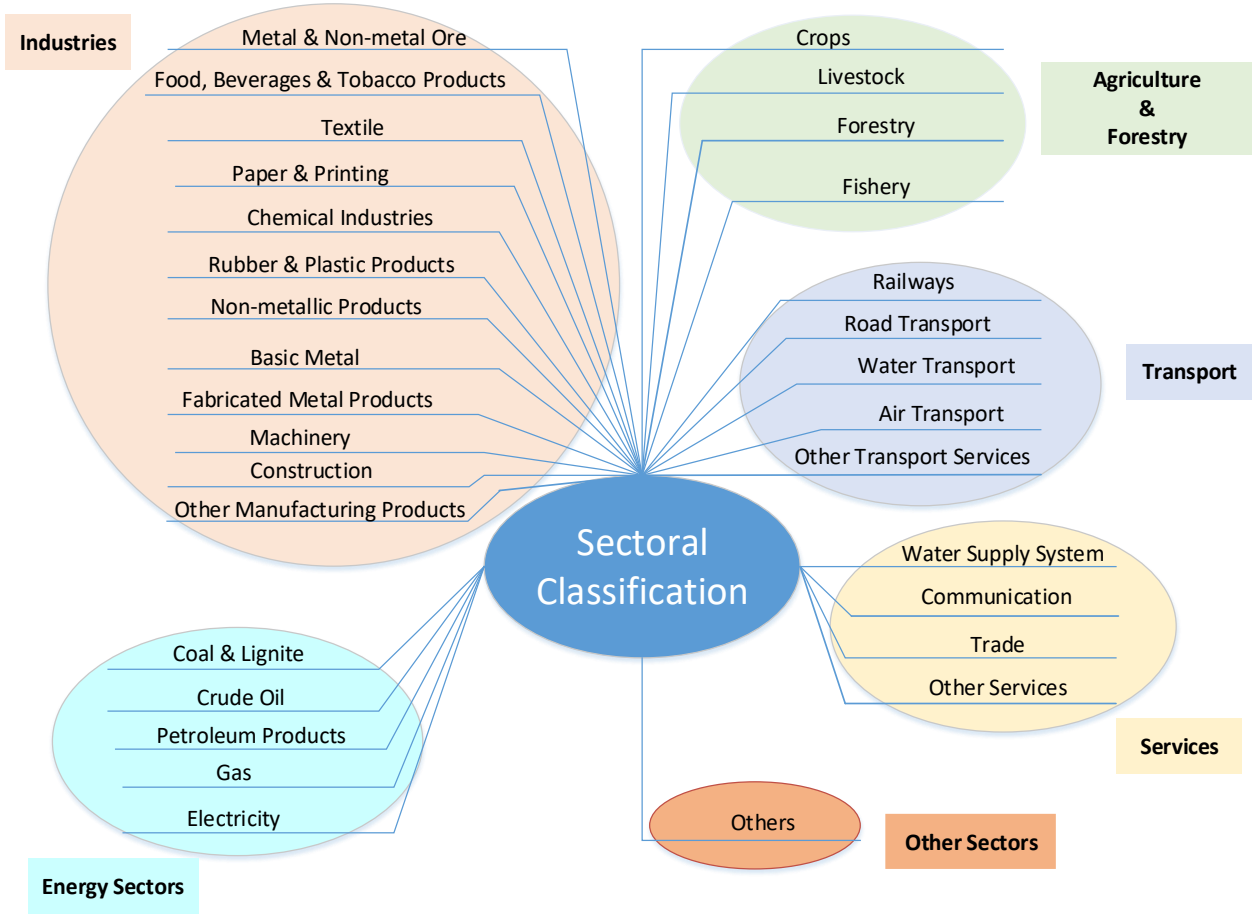
CGE Training Workshop at SIIT-TU, Thailand

26 June 2018 (Policy Dialogue: Climate Policy Assessment)

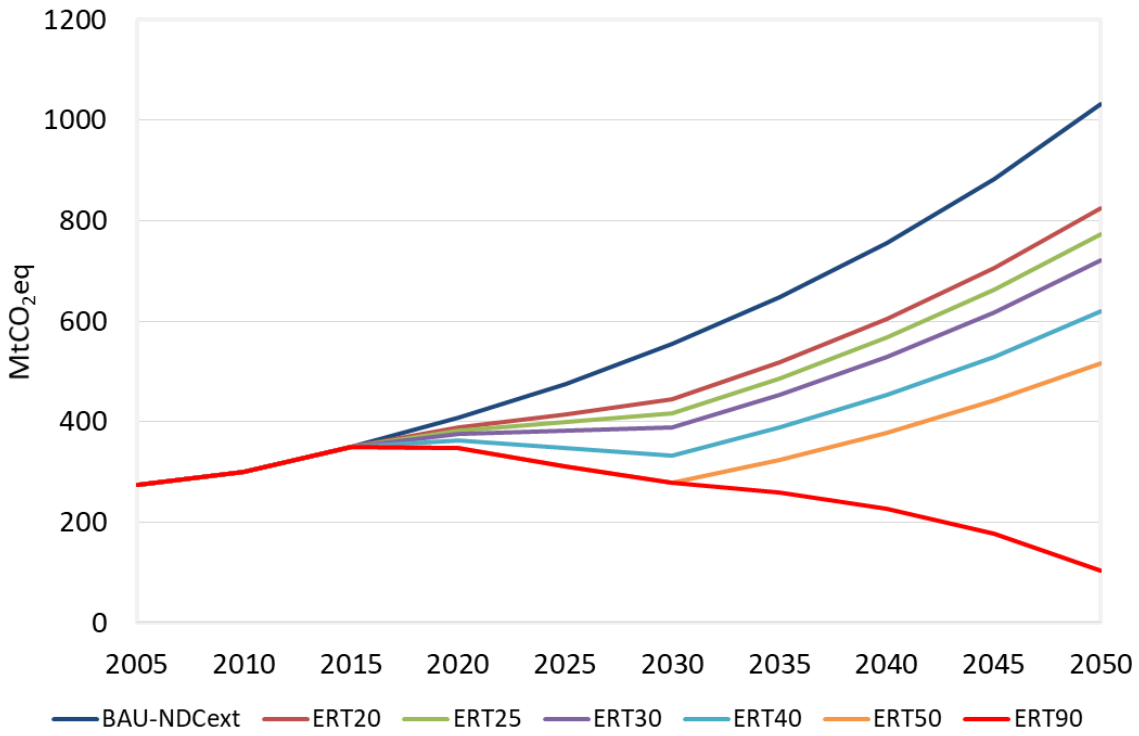
Present Status of Thailand CGE

- Development of Thailand CGE model – Base case
- Assessment of the effects of GHG mitigation on the economy – The analyses of Thailand's NDC 2030
  - BAU scenario, and five GHG mitigation scenarios: 20%, 25%, 30%, 40% and 50%.
  - In addition, the peak emission scenario to analyze the feasibility of zero GHG emissions in Thailand to pursue efforts to hold the global temperature rise to 1.5°C above pre-industrial levels, as considered in the Paris Agreement were also assessed.
- Manuscript submitted to the International Journal

Sectoral Classification in the Thailand CGE
(31 sectors & 31 Commodities)



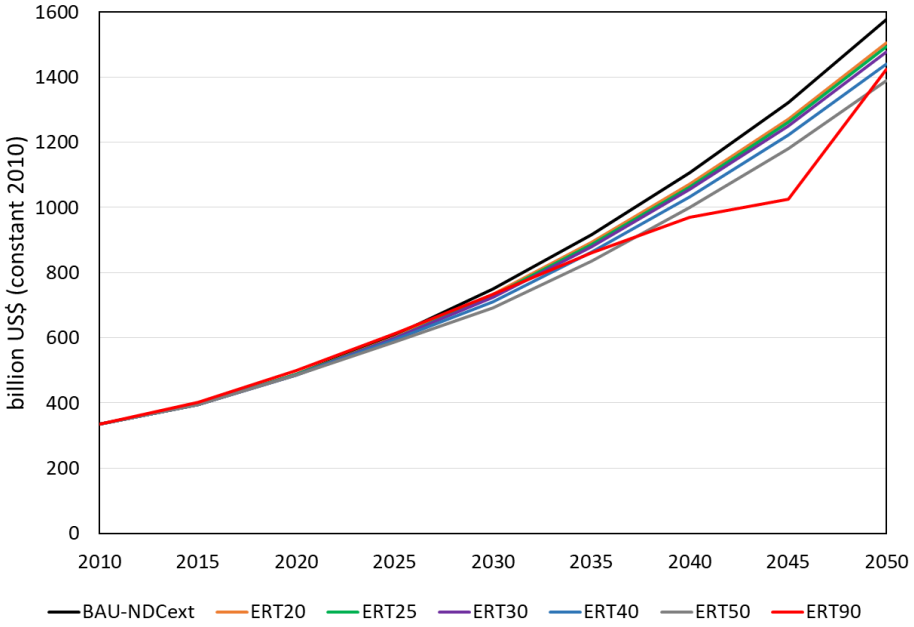
GHG Emission Trajectories in Thailand's Scenarios



Scenarios	Description
BAU-NDCext (an NDC extended scenario)	GHG emissions during 2010-2030 to be the same as that given in the Thai NDC study. From 2030 – 2050, the GHG emission is estimated to grow at an average growth rate of 3.1%
ERT20	A constant 20% reduction during 2030-2050
ERT25	A constant 25% reduction during 2030-2050
ERT30	A constant 30% reduction during 2030-2050
ERT40	A constant 40% reduction during 2030-2050
ERT50	A constant 50% reduction during 2030-2050
ERT90	90% GHG emission reduction by 2050, leading to zero emissions by 2060

Impacts on Thailand's GDP

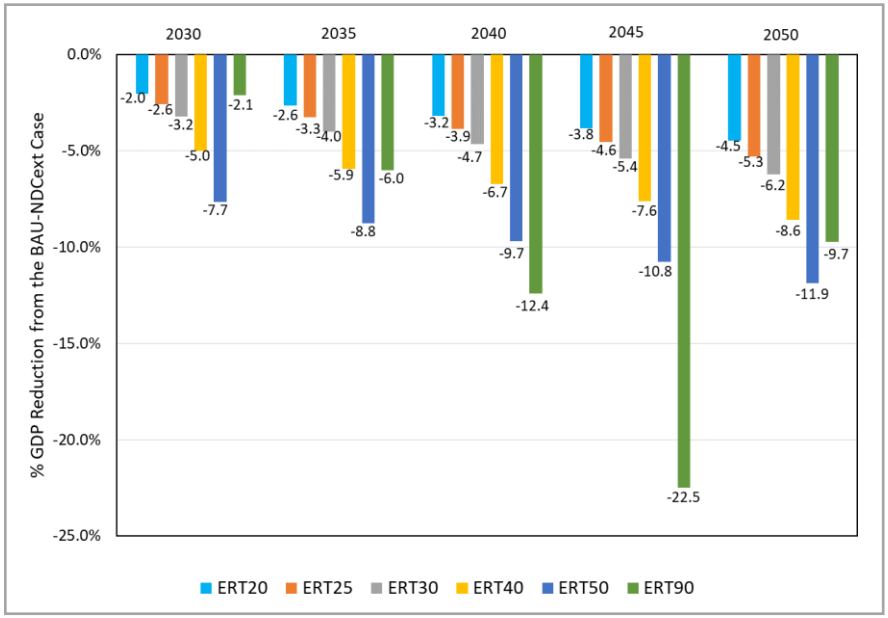
GDP in all Scenarios



GDP would attain a slightly higher growth rate of 0.2% than the expected GDP growth rates of 3.78% in the BAU-NDCext scenario

The imposition of GHG emission reduction targets will have negative effects on the national economy with a decline in the country's GDP.

Reduction in GDP under the ERT Scenarios



With 22.5% reductions, the GDP loss would be severe in 2045 under the ERT90 scenario

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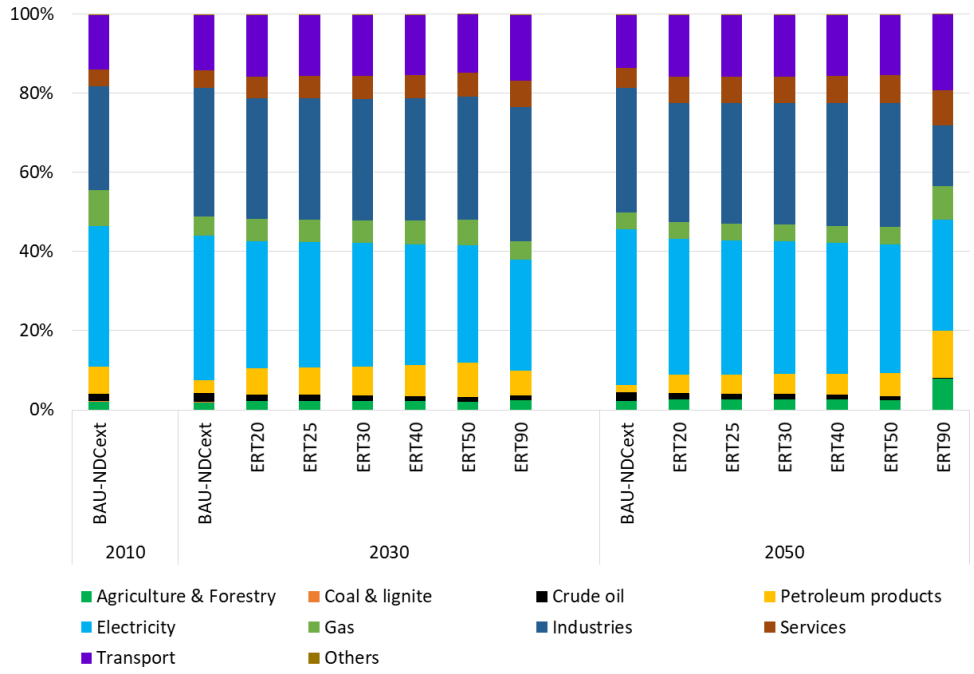
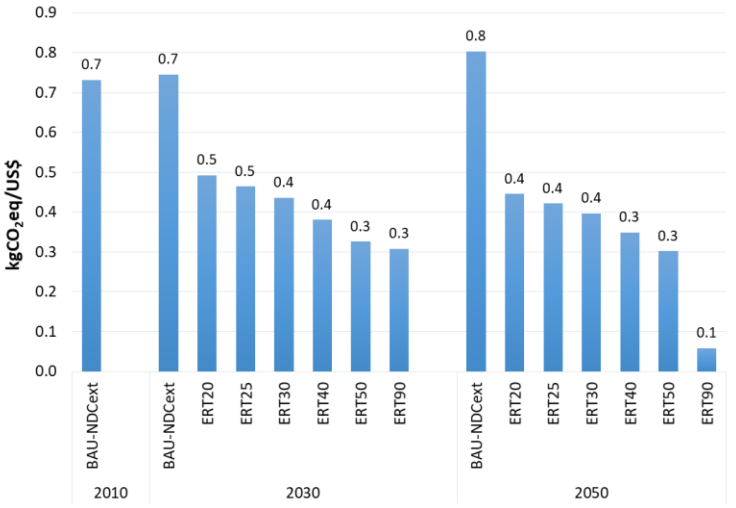
Impacts on GHG Emissions & GHG Intensity

Variations in Sectoral Share in Total GHG Emissions in all Scenarios



GHG Intensity in all Scenarios



Major GHG emission reductions required is from the electricity & the industry sectors

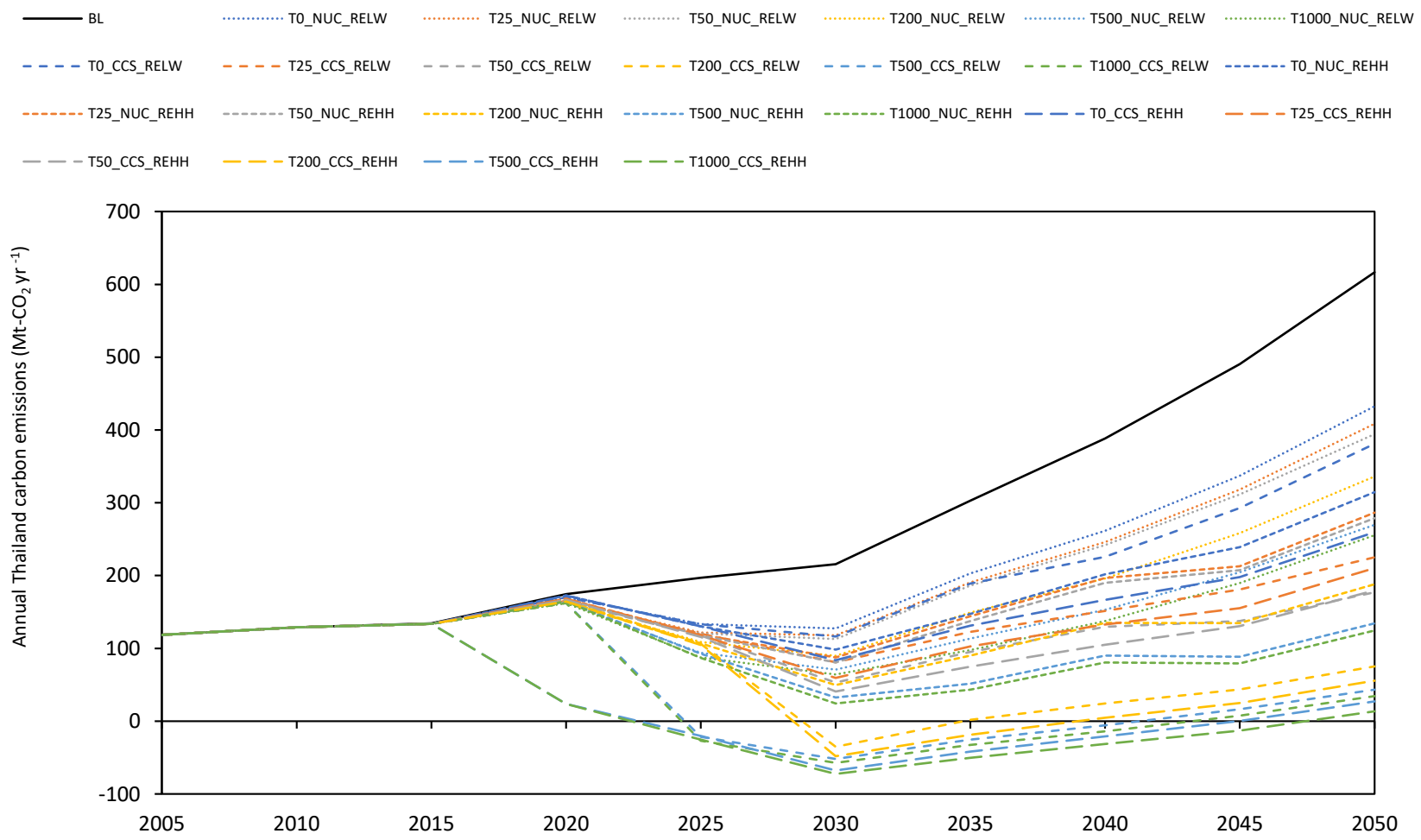
Thailand Energy System Transition to Keep Warming Below 1.5 Degrees

(Carbon Management, Accepted OCT 2018)

- The figure suggests that early actions should be taken to achieve net zero CO_2 emissions.
- CO_2 emissions should peak in 2015 at US$1,000 /t$CO_2$ in the CCS_REHH scenario.
- However, CO_2 emissions can peak five years later in the CCS_RELW scenario at US$1,000/t$CO_2$.
- Because of renewable energy deployment and fossil fuel based with CCS and BECCS, CO_2 emissions are completely removed from the power sector in the CCS_REHH scenario.

Thailand Energy System Transition to Keep Warming Below 1.5 Degrees

(Carbon Management, Accepted OCT 2018)



Thailand Energy System Transition to Keep Warming Below 1.5 Degrees

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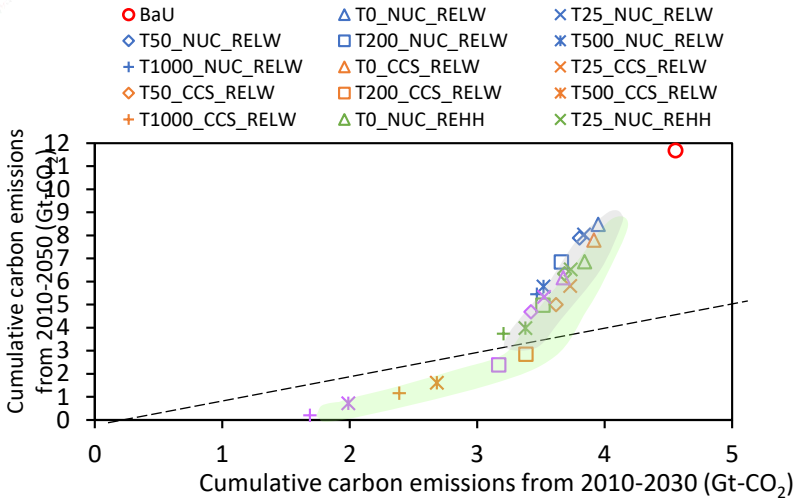


Note: light green shade = The CCS scenarios
grey shade = The nuclear scenarios

- Keeping net cumulative carbon emissions virtually zero can be achieved during 2030-2050.
- Zero CO_2 emissions strategies
  - CCS technologies (fossil-based fuel plants integrated with CCS and BECCS)
  - Stringent RE target
  - CO_2 emission taxes (US$500-US$1000 per tCO_2)
  - Climate change awareness through international organizations' scientific reports and media
  - Capacity building within organizations, government offices and communities

Strategy 1 — **CCS & BECCS**
- Electricity generation
- Manufacturing industry

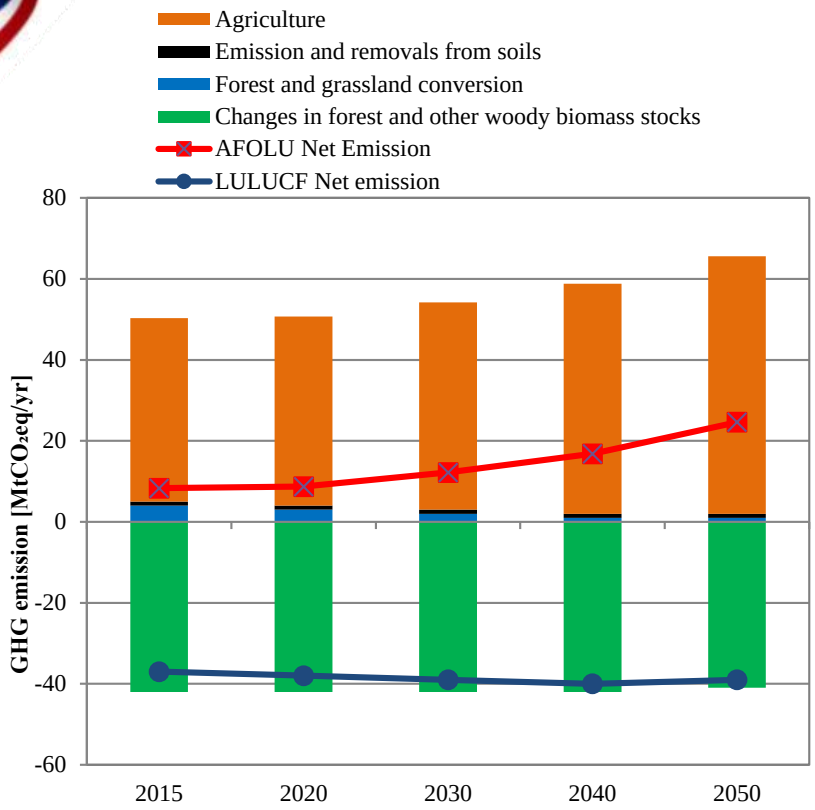
Strategy 2 — **Stringent RE**
- Electricity generation
- Vehicle

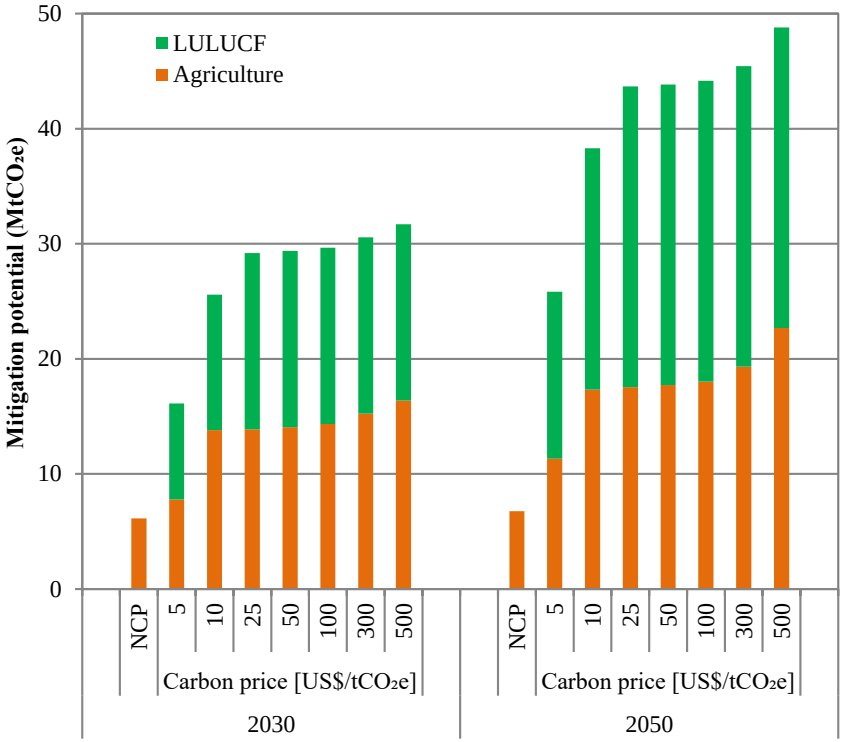
Strategy 3 — **CO_2 emission taxes**

Strategy 4 — **Climate change awareness**

Strategy 5 — **Capacity building**

Climate Change Mitigation in Agriculture, Forestry And Other Land Use (AFOLU) Sector in Thailand



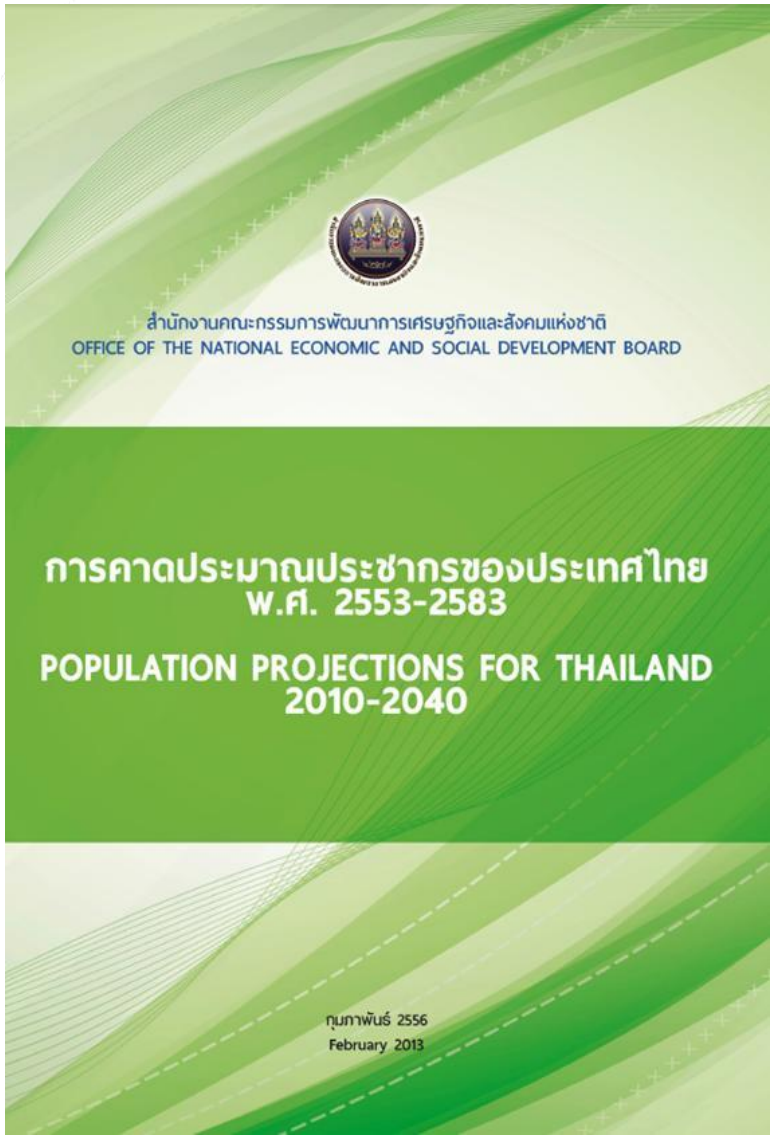


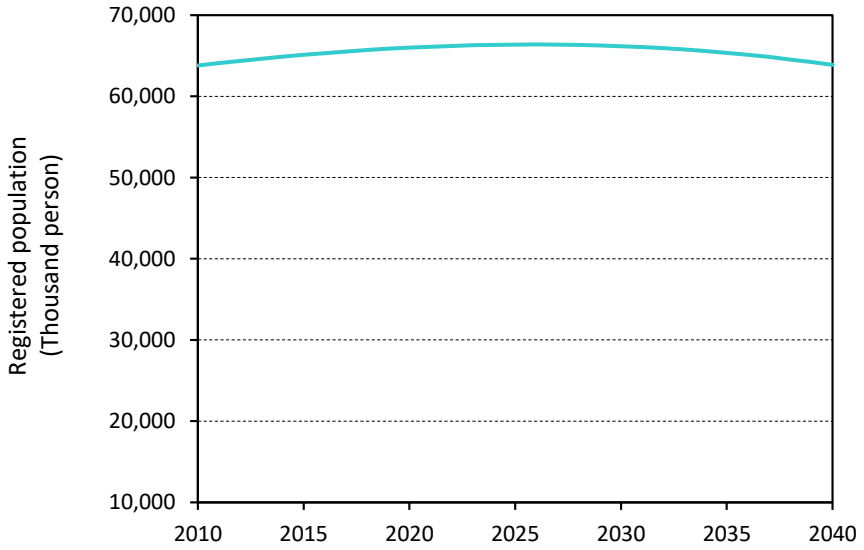
This paper analyzed mitigation/sequestration potentials in the AFOLU sector at different carbon prices by using AFOLU-B.

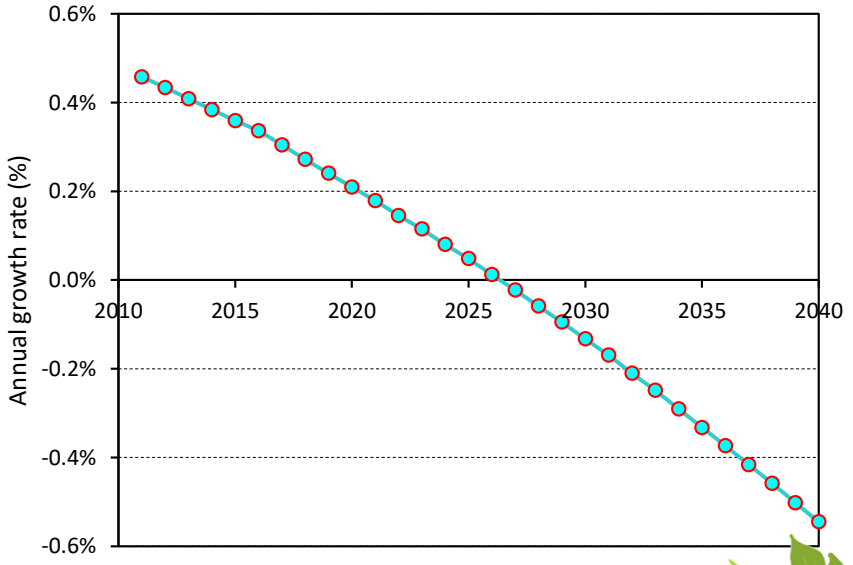
Acknowledgement: Prof. Yuzuru Matsuoka and Dr. Tomoko Hasegawa

DEVELOPMENT OF LONG-TERM PROJECTION OF GREENHOUSE GAS EMISSIONS FOR THAILAND 1.5 DEGREES

Population


สำนักงานคณะกรรมการพัฒนาการเศรษฐกิจและสังคมแห่งชาติ
OFFICE OF THE NATIONAL ECONOMIC AND SOCIAL DEVELOPMENT BOARD
การคาดประมาณประชากรของประเทศไทย
พ.ศ. 2553-2583
POPULATION PROJECTIONS FOR THAILAND
2010-2040
กุมภาพันธ์ 2556
February 2013

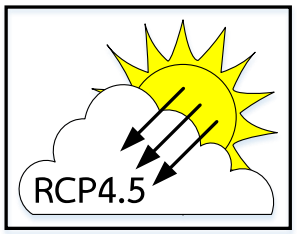

Registered population
(Thousand person)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
2010
2015
2020
2025
2030
2035
2040

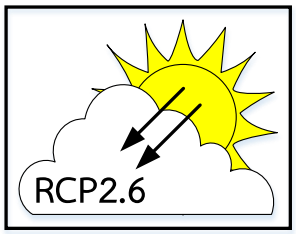

Annual growth rate (%)
0.6%
0.4%
0.2%
0.0%
-0.2%
-0.4%
-0.6%
2010
2015
2020
2025
2030
2035
2040

Targeting the emission scenarios through the “RCPs”

DEVELOPMENT OF LONG-TERM PROJECTION OF GREENHOUSE GAS EMISSIONS FOR THAILAND 1.5 DEGREES

“RCP4.5” and “RCP2.6”





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Developing the two-dimensional classifications of the IAM in terms of **“RCPs x SSPs”**

DEVELOPMENT OF LONG-TERM PROJECTION OF GREENHOUSE GAS EMISSIONS FOR THAILAND 1.5 DEGREES

“SSP2” and **“SSP1”**

SSP2 is close to present situation

SSP1 is expected in future

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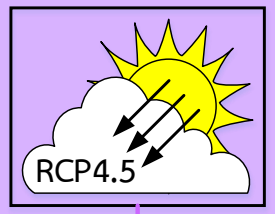
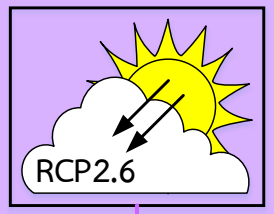
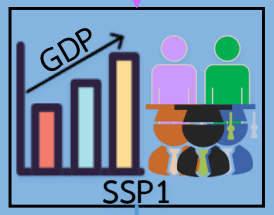
Developing the three-dimensional classifications of the IAM in terms of "RCPs x SSPs x SPAs"

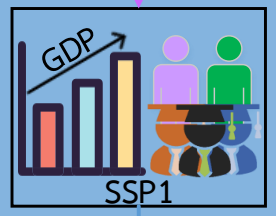
Representative Concentration Pathways "RCP"



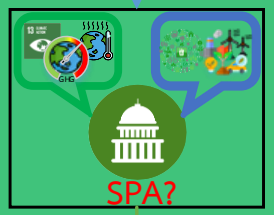


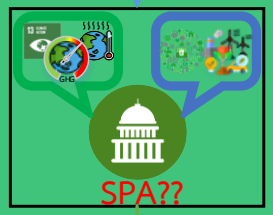
Integrated assessment model in terms of "RCPs x SSPs"

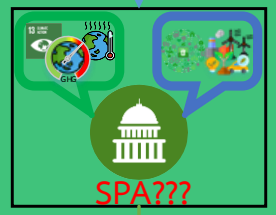


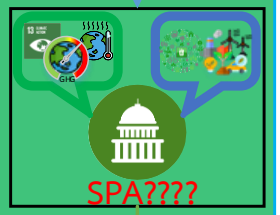


Integrated assessment model in terms of "RCPs x SSPs x SPAs"

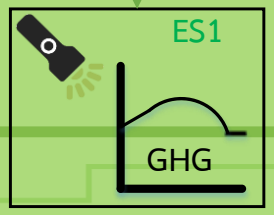


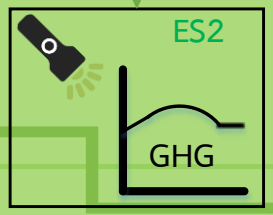


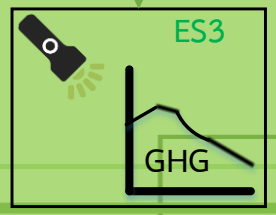


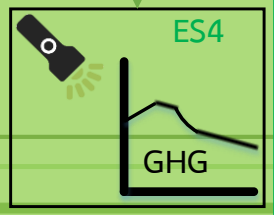


Thailand's emission scenarios "ESs"









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Thailand's National Strategy for 20 years

Royal Thai Government Gazette, 13 OCT 2018

Thailand's NDC Roadmap 2030

Overall GHG reduction target = 115.6 $MtCO_{2eq}$ (20.8%)

IPPU

0.6 Mt CO_{2eq}
(0.1%)

Energy & Transport

113 Mt CO_{2eq}
(20.4%)

Waste

2 Mt CO_{2eq}
(0.3%)

THANK YOU

SELC
Sustainable Energy & Low Carbon Research Unit