

# How can emission pathway modeling contribute to raising ambition levels of nationally determined contributions (NDC)?

## Modelling the roadmap of Thailand's NAMAs and raising ambition levels of INDCs

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HOTEL AMBASCIATORI

Rome, Italy

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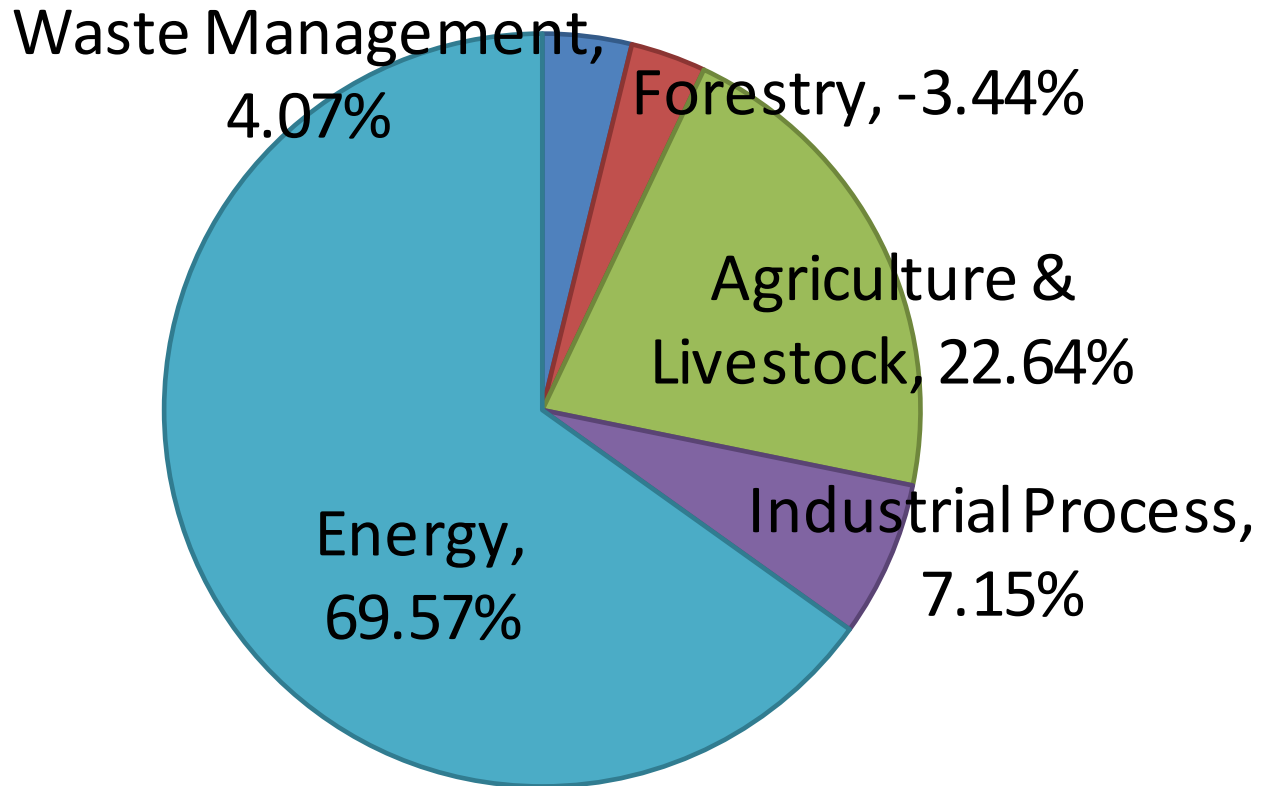
## Thailand NAMAs 2020

Thailand's NAMAs actions are in line with national development plans, and aimed at achieving a reduction in emissions relative to 'business as usual' emissions in 2020, resulting in GHG mitigation, and has an impact that can be measured, reported and verified (MRV).

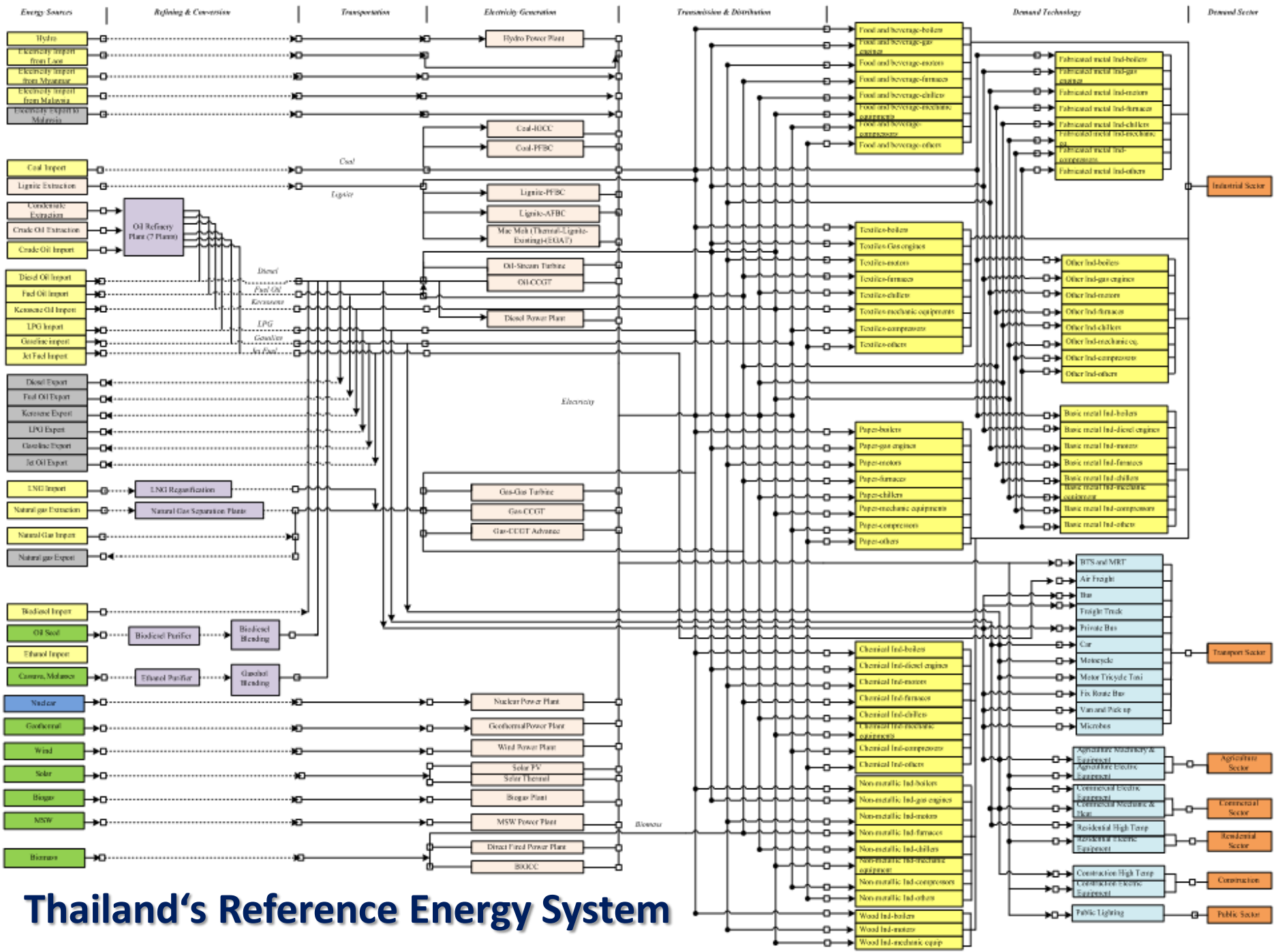
Thailand is now constructing a national strategy "Roadmap to Thailand NAMAs 2020" with clear targets of emission reduction in the range of 7-20% in 2020.

The AIM/Enduse model is used to construct emission pathways for analysis of "Roadmap to Thailand's NAMAs 2020".

# Thailand GHG emissions by sectors in 2000

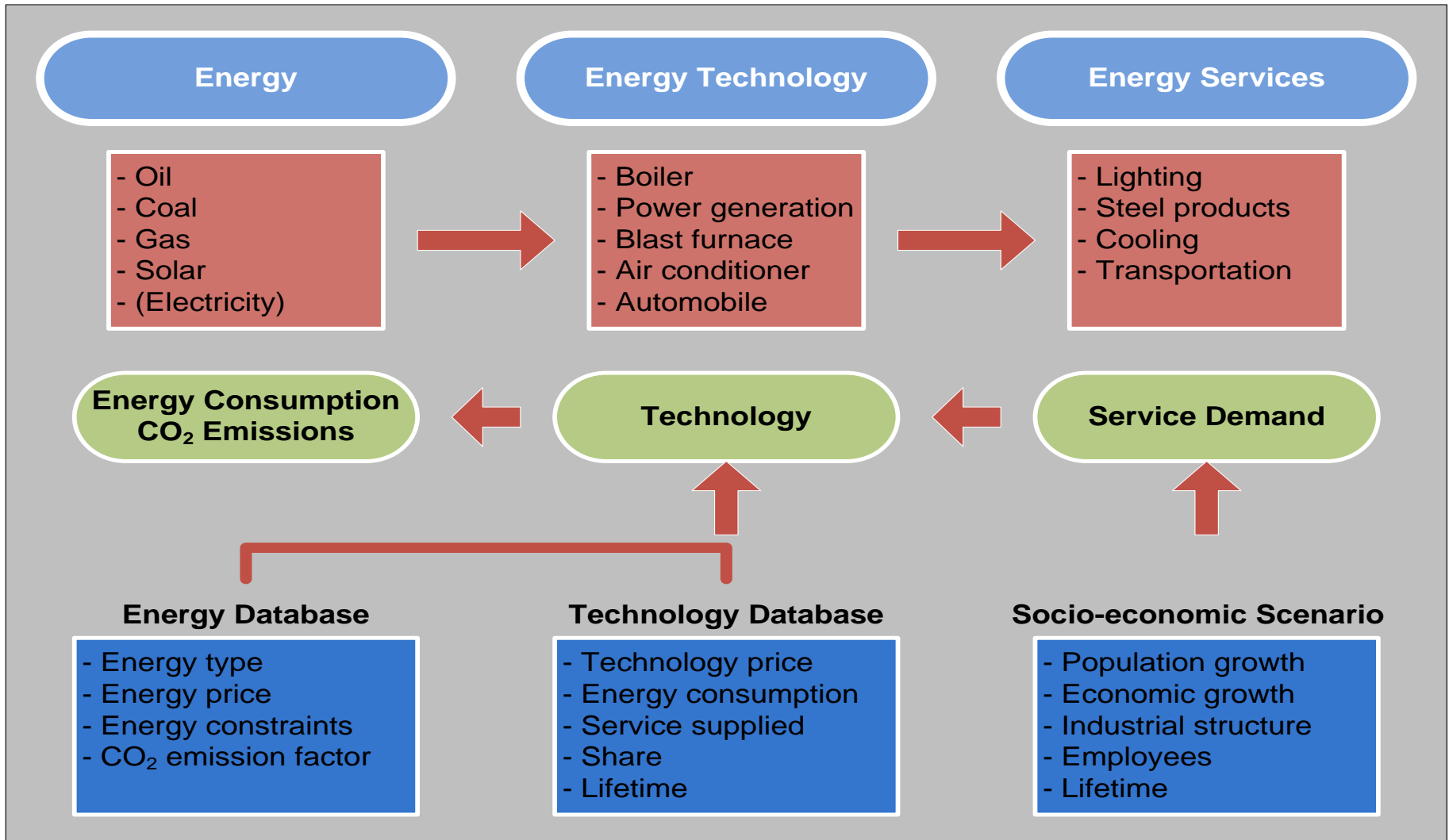


Source: Thailand's Second National Communication, (ONEP, 2011)



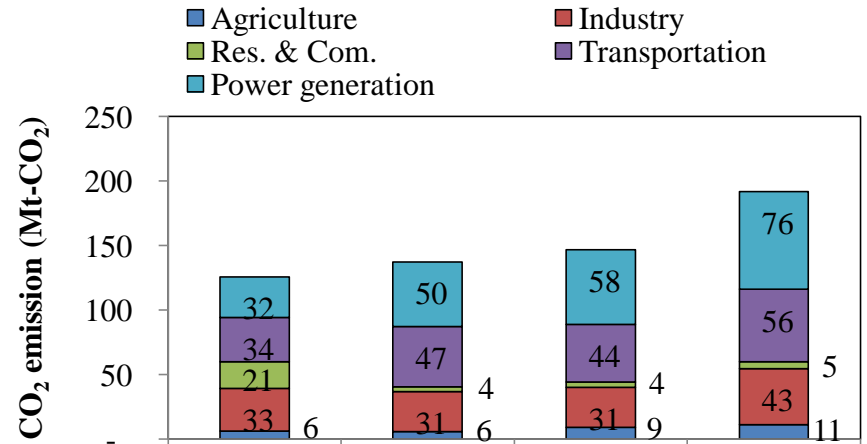
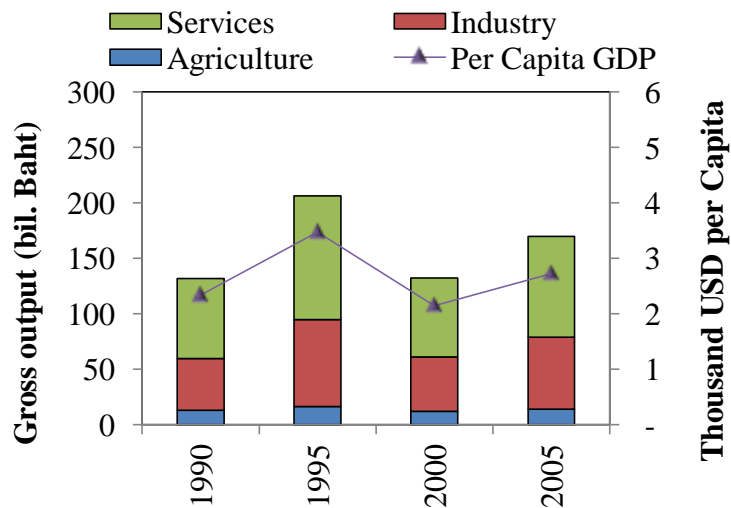
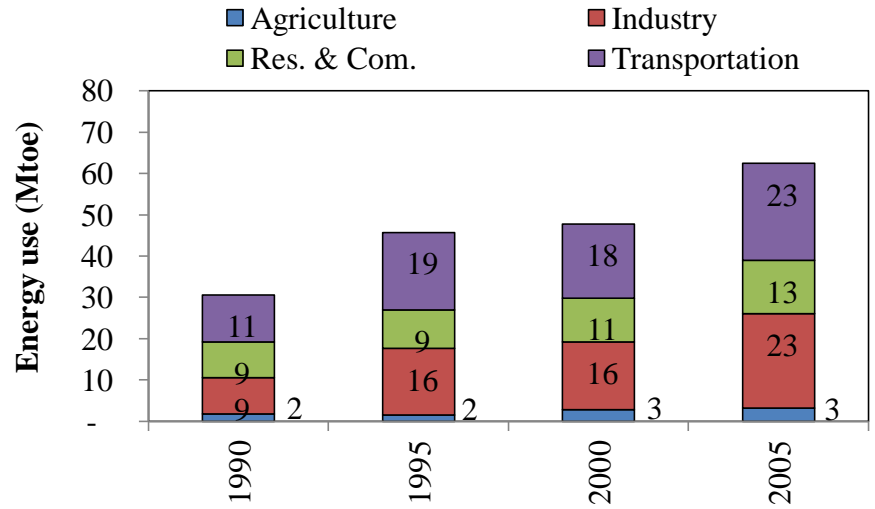
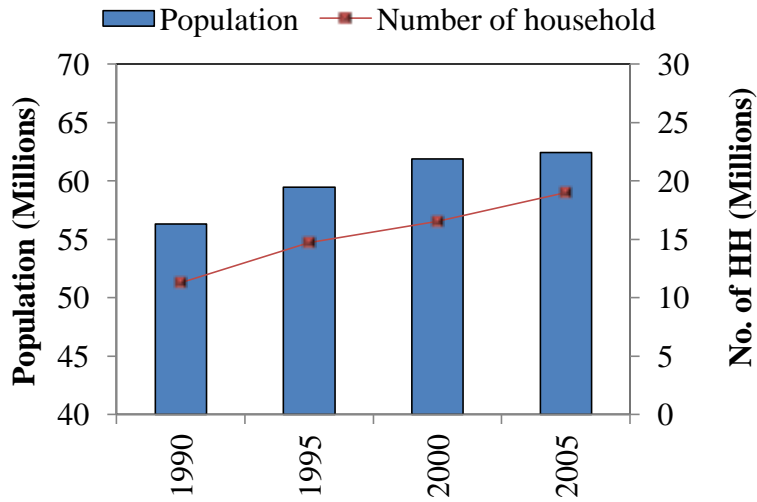
# Thailand's Reference Energy System

# Methodology (AIM/Enduse), NIES



# National Circumstance: Thailand

## Population, GDP, Energy, CO<sub>2</sub> emissions



# ***Proposed NAMAs Mitigation Pledge 2020***

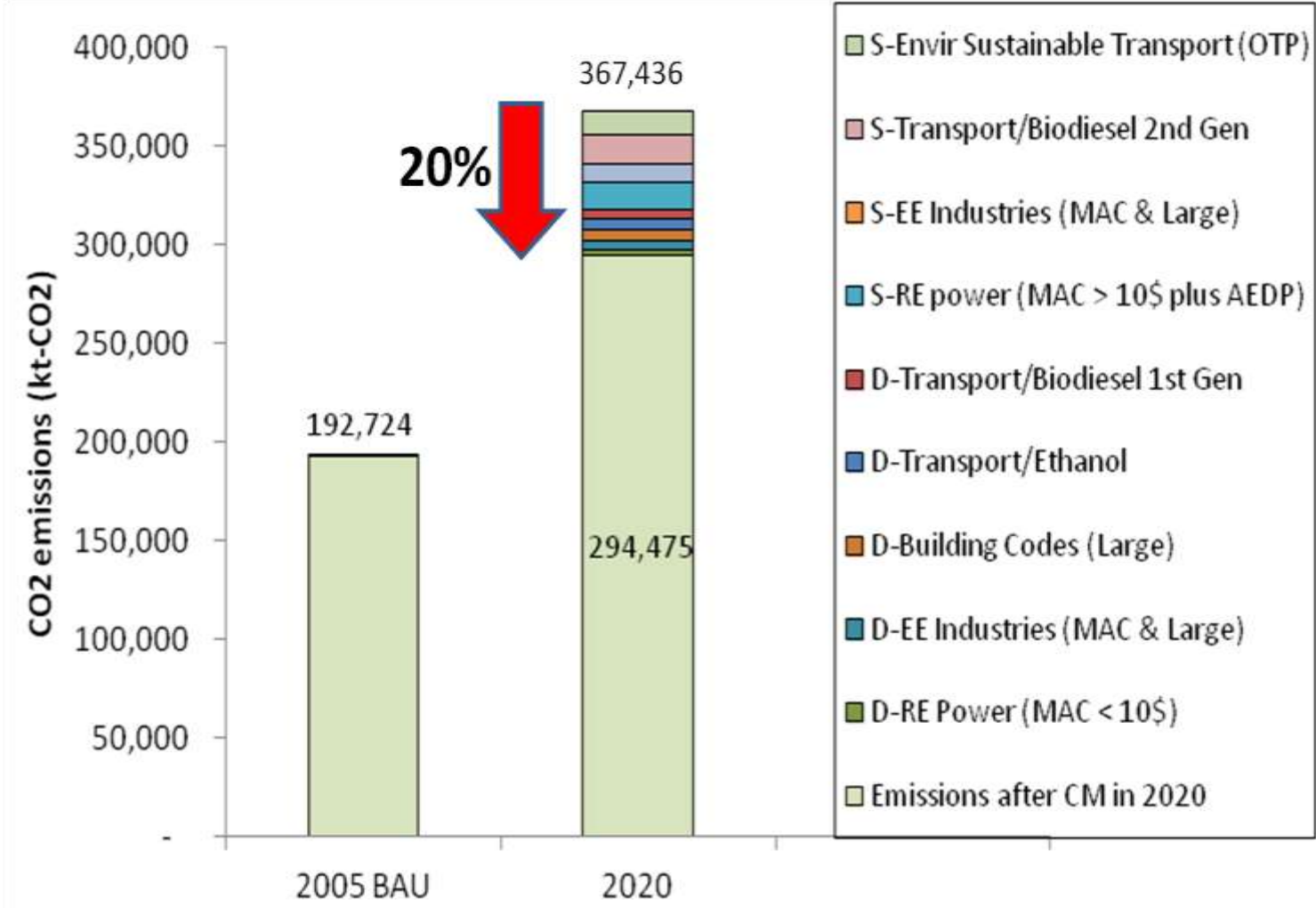
**“Thailand will endeavor to lower CO<sub>2</sub> emissions by 20% in 2020 compared to the BAU”**



## ***CO<sub>2</sub> Counter-measures for low-carbon green growth***

- *Renewable electricity: Biomass, biogas, hydro, Waste-to-energy, Solar, Wind etc.*
- *Energy Efficiency Improvement in Industries, Building Codes.*
- *Bio-Fuels, Improving Fuel Economy & NGV in Transportation & Environmental Sustainable Transport System.*

# Potential of CO<sub>2</sub> Mitigation in Thailand NAMA 2020





# Thailand NAMAs 2020

- In 2012, the first study by TGO shows that Thailand has high potential of GHG emission reduction by both domestically supported NAMAs and internationally supported NAMAs about 23-73 Mt-CO<sub>2</sub> in 2020, or approximately accounted for 7-20% in 2020 of the total GHG emissions (TGO, 2012)
- The abatement costs of NAMAs vary from zero to 1000 US\$/t-CO<sub>2</sub>.
- However, all CO<sub>2</sub> reduction actions are domestic NAMAs.
- The actions include measures in i) renewable energy, ii) energy efficiency, iii) bio-fuels in transportation, and iv) environmental sustainable transport.



# Thailand's Mitigation Pledge to UNFCCC (DRAFT)

## Based on consensus building among stakeholders

*In accordance with the provisions of Article 12 paragraph 1 (b), Article 12 paragraph 4 and Article 10 paragraph 2 (a), I have the honor to communicate to you the information on Thailand's Nationally Appropriate Mitigation Actions (NAMAs), for information to the UNFCCC Parties, as follows:*

*Thailand will, on a voluntary basis, **reduce its GHG emissions in the range of 7%-20% below the business as usual (BAU) in 2020**, with subject to the level of international supports provided in the form of technology, finance, and capacity building for NAMAs preparation and implementation.*

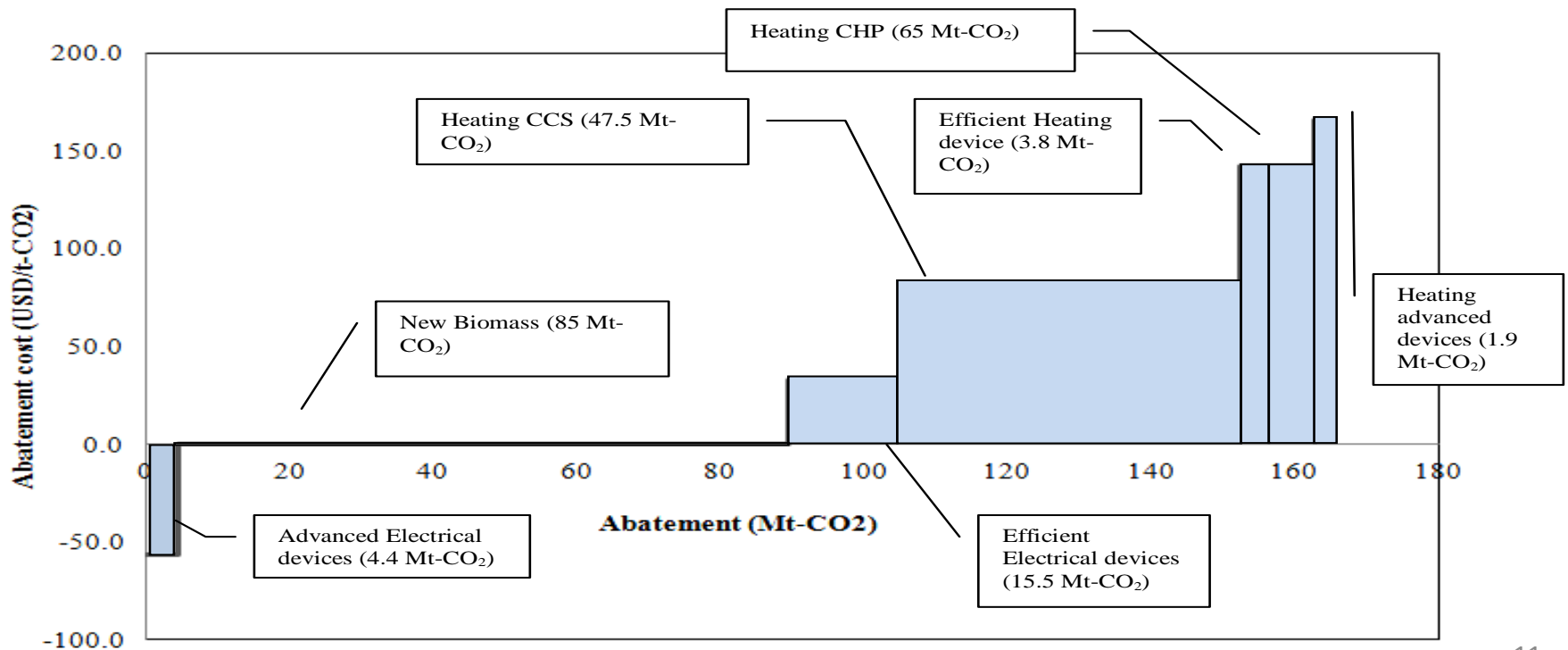
*The above-mentioned NAMAs will include counter-measures, as following:*

- *Renewable energy*
- *Energy efficiency improvement in industries, buildings and transportation;*
- *Bio-fuels in transportation*
- *Environmentally sustainable transport system.*

*Please note that the communicated information on NAMAs as announced will not have a legally binding character, and will be implemented in accordance with the principles and provisions of the UNFCCC, in particular Article 4 paragraph 7, and taking into account the national circumstances.*

# Thailand NAMAs 2020

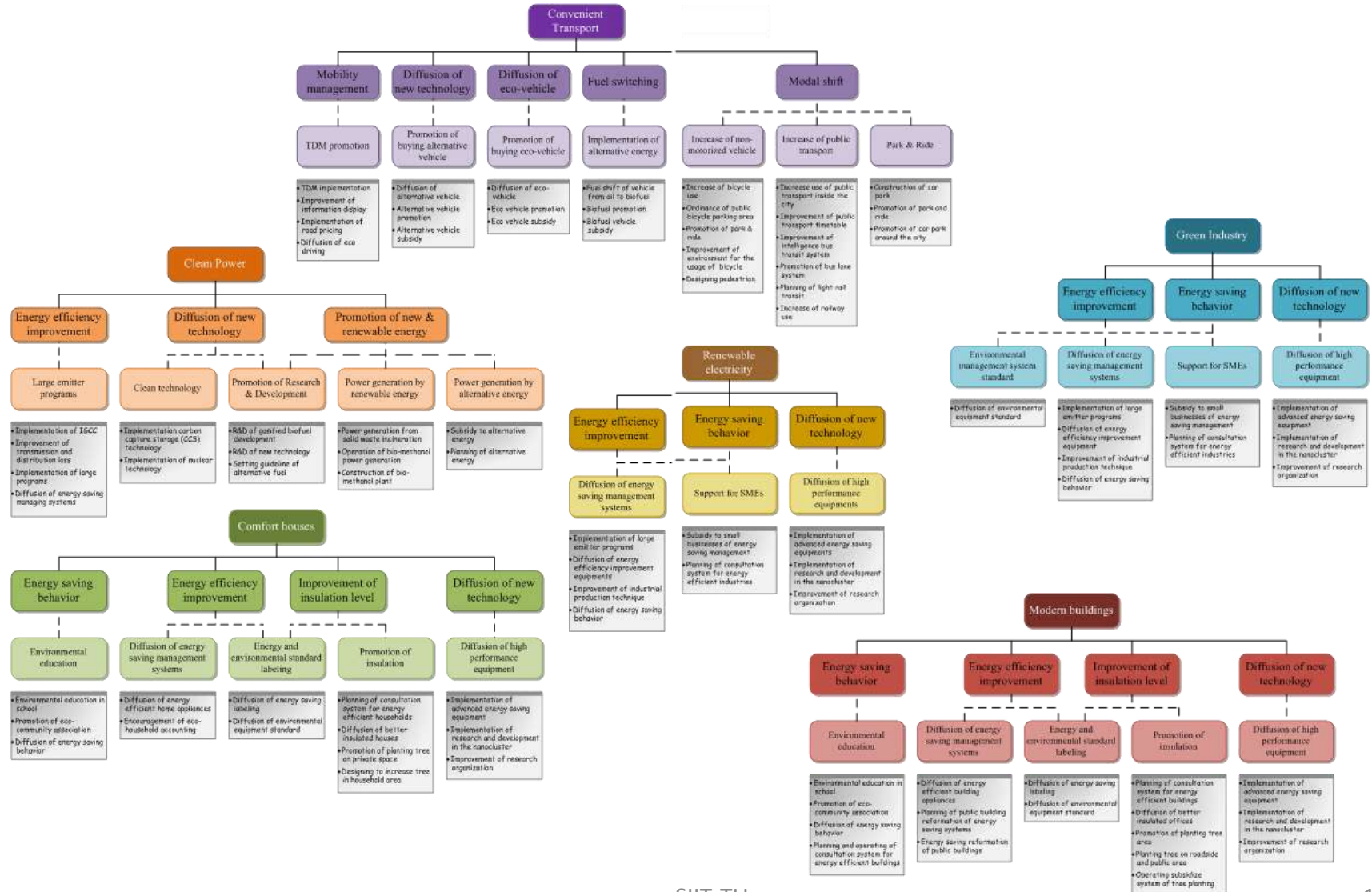
- Co-benefits of NAMAs are also assessed, and they reveal positive aspects of GHG mitigation under NAMA framework (TGO, 2012)
- The MRV process of these NAMAs needs cooperation among related ministries (DEDE, 2014)
- Abatement costs of actions are also identified from AIM/Enduse.



# Thailand NAMAs 2020

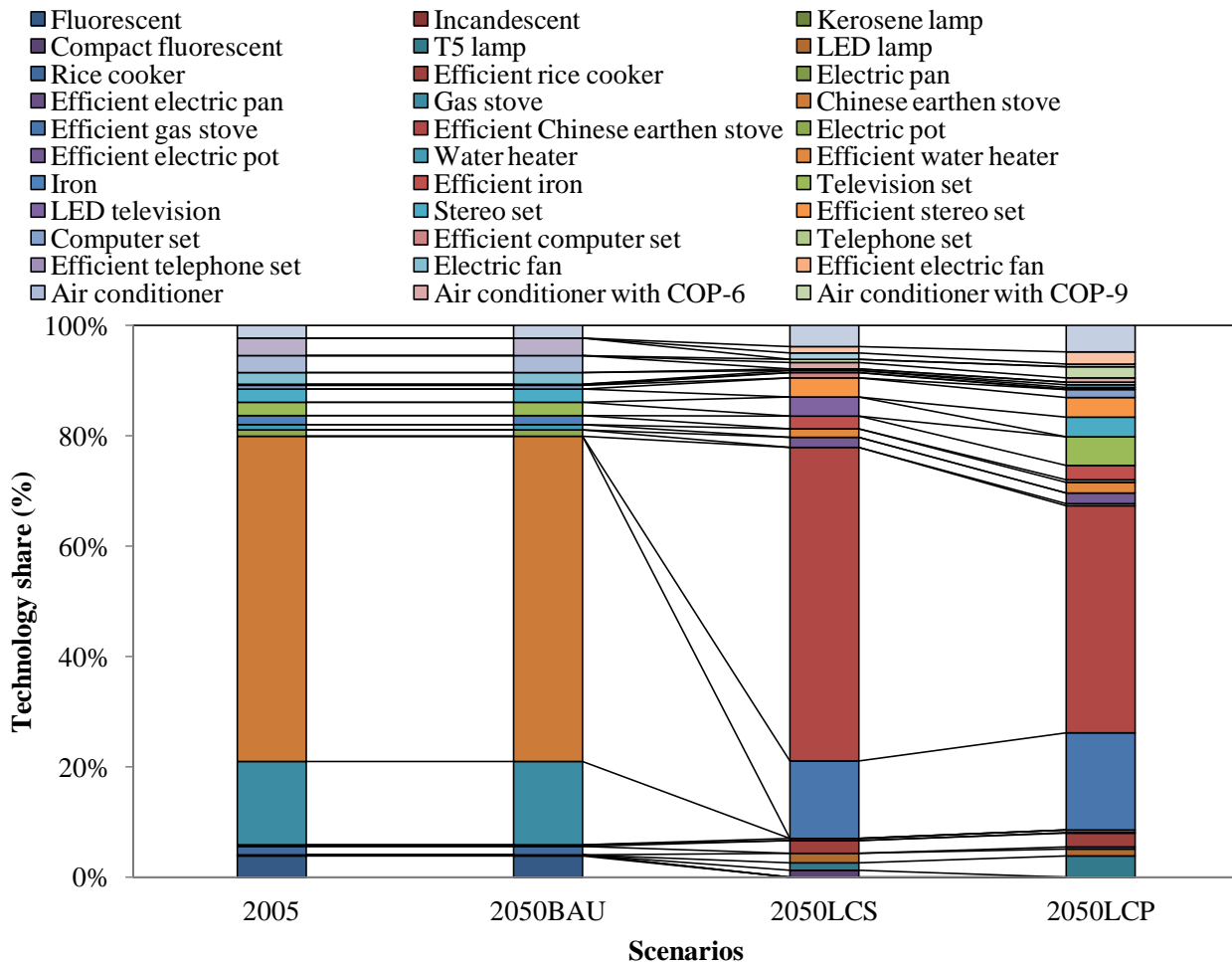
- In addition, “Policies and Measures to Remove Energy Efficiency Barriers in Thai Buildings toward Thailand’s NAMAs” are assessed (Asayama, 2014) (DEDE,2014).
- The priority of actions in Thailand’s NAMAs are also assessed across key criteria under context of Thailand such as cost effectiveness of actions.
- Then the Roadmap to NAMAs 2020 for Thailand has been laid out.
- It is concluded among Thai stakeholders that the NAMAs action of 7-20% reduction in CO<sub>2</sub> will be taken by Thailand voluntarily as unilateral/domestically supported NAMAs.
- However, MRVs of such actions are required to ensure the GHG reduction target in 2020.

# Robust Roadmap to Thailand NAMAs 2020



# Peak CO<sub>2</sub> Scenario 2050

## Action in Thai Style Comfortable Houses



### Highlighted LCS Actions in 2050 Peak Scenario

#### Cooking

- Higher efficiency stove
- Renewable stove

#### Lighting

- T5
- LED Lamp
- Compact Fluorescent

#### Cooling

- A/C and refrigerator COP6
- A/C and refrigerator COP9
- New Building codes

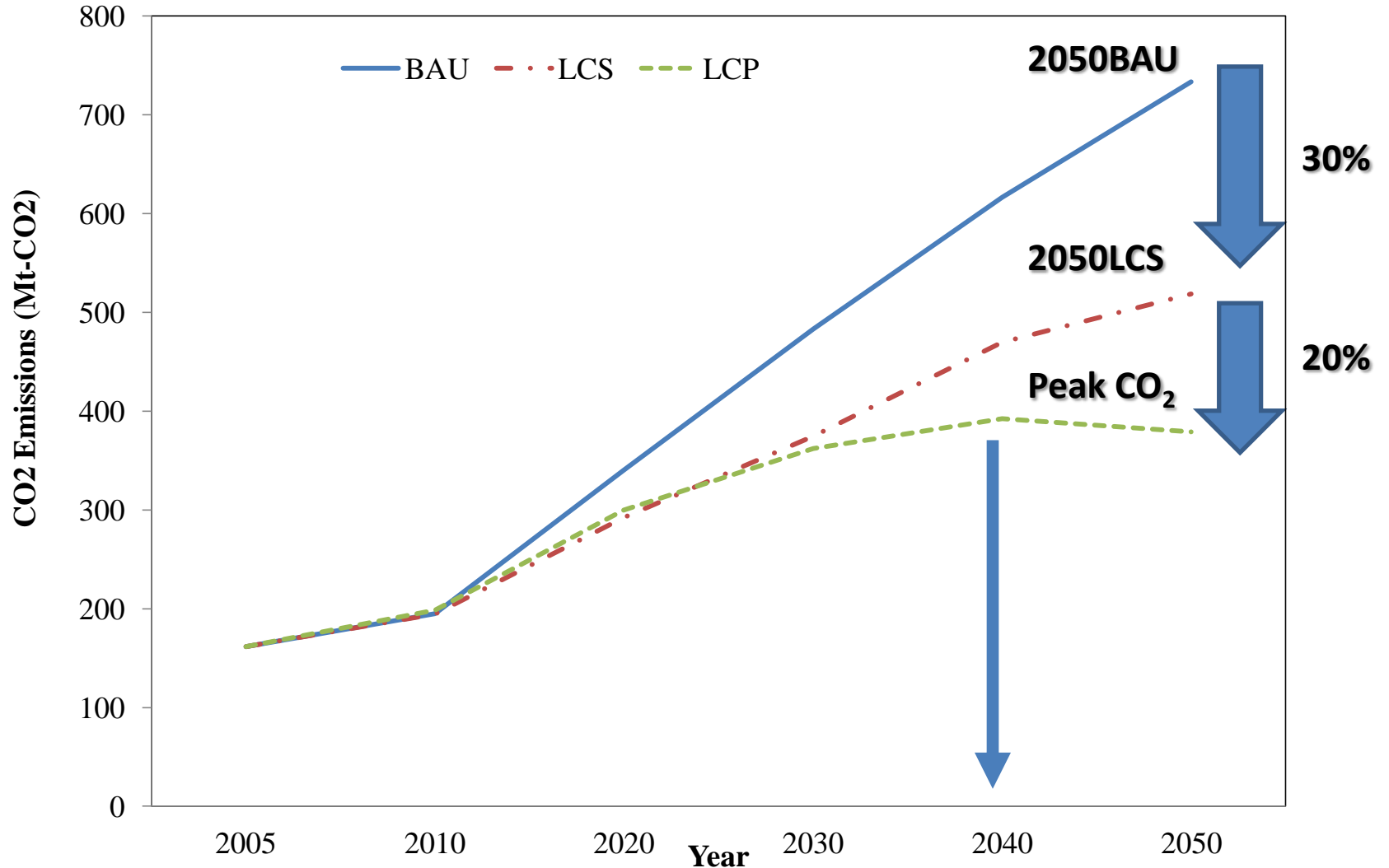
# Peak CO<sub>2</sub> Scenario 2050

## Action in Thai Style Comfortable Houses

		2020	2030	2040	2050
1	T5 lamp				
2	LED lamp				
3	Efficient Appliances				
4	Advanced Air-conditioners				
5	Advance Refrigerators				

# Fine-tuning Post2020 Scenarios

## LCS and Peak Emission Scenarios by AIM/Enduse



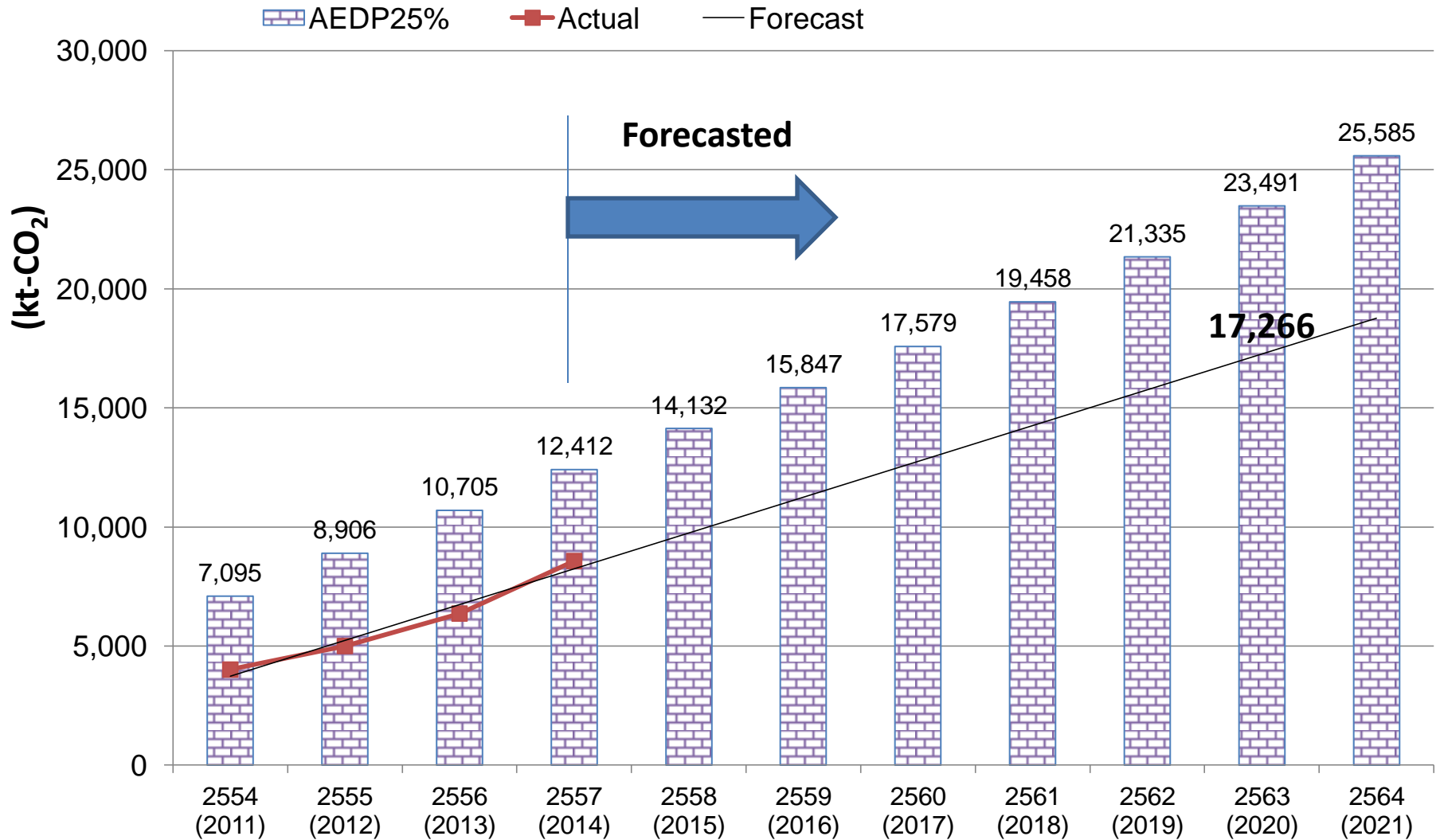


# Domestic EE NAMA in Buildings and Industries and MRV process

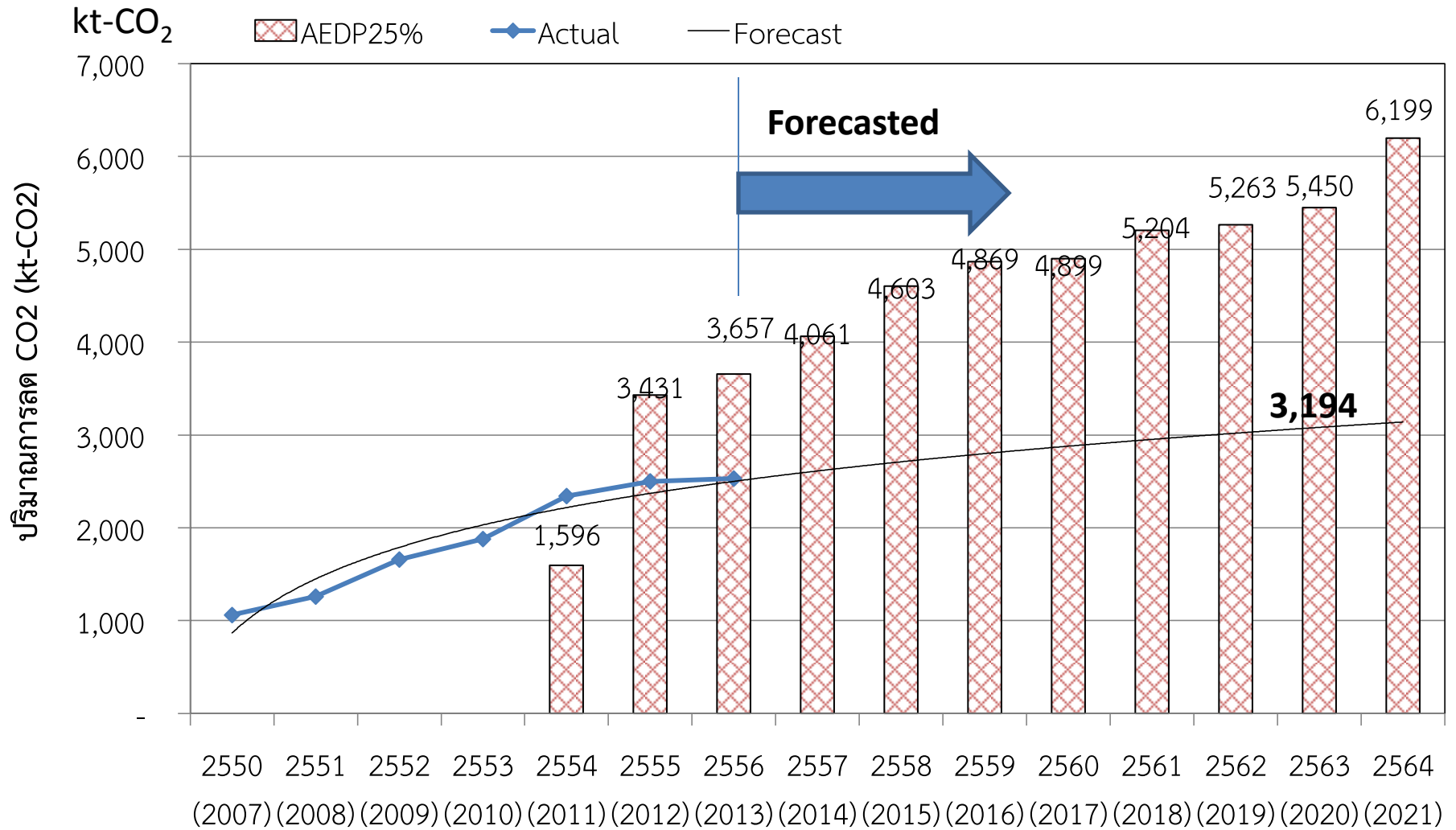


# Estimated CO<sub>2</sub> Reduction by RE Electricity in RE Plan

CO<sub>2</sub> Reduction (kt-CO<sub>2</sub>)



# Estimated CO<sub>2</sub> Reduction by Bio-oil in RE Plan



# Roadmap to Thailand NAMAs 2020

PLAN	Action	Potential of CO <sub>2</sub> Reduction (kt-CO <sub>2</sub> )	NAMAs	
			Roadmap 2020	
			NAMA7%	NAMA20%
Plan 1	Renewable electricity	17,266	✓	✓
	Ethanol in Gasohol	3,517	✓	✓
	Bio-oil in Biodiesel	3,194	✓	✓
	Repowering (EGAT)	960	✓	✓
Plan 2	Industry	26,006		○
	Buildings	14,474		○
	Household	8,800		○
	Transport	7,529		○
	Power Sector	35,716		○
Plan 3	Transportation (Rail system)	12,000		✓
Total Estimated CO <sub>2</sub> Reduction (Mt-CO <sub>2</sub> )			25	70

✓ = CO<sub>2</sub> countermeasures with high quality MRV (confirmed)

○ = Proposed CO<sub>2</sub> countermeasures in the Lists

# Barriers in Energy Efficiency Buildings

Issues of addressing legal and institutional barriers to overcome EE in buildings (Asayama and Bundit,2014):

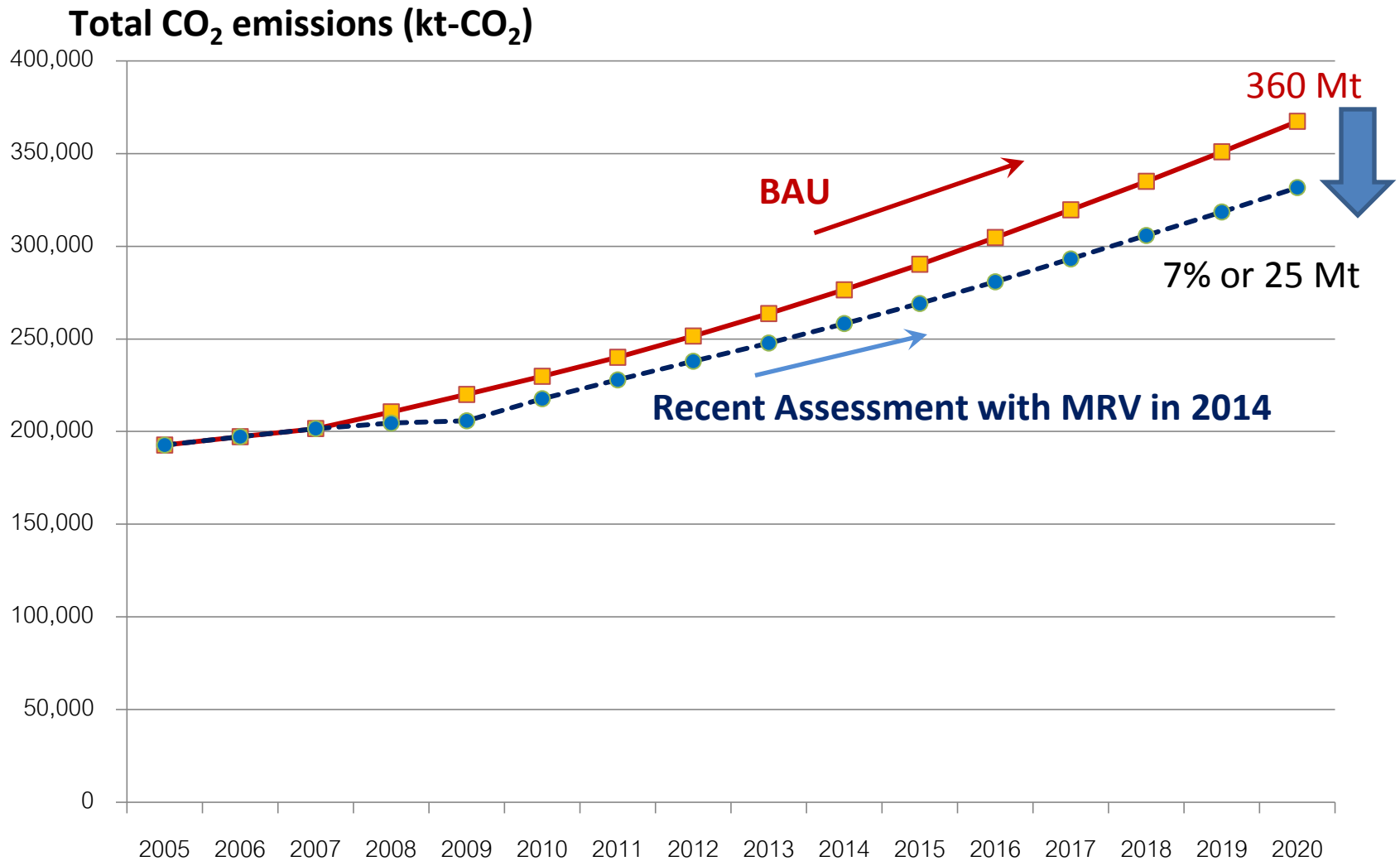
1. There are no enforcement of implementation to achieve the target under the Energy Conservation Promotion (ECP) Act and Energy Efficiency Development Plan (EEDP) 2011 -2030.
2. There are no minimum energy performance standards for both new and existing buildings.
3. BEC has not been implemented yet due to the technical and institutional barriers.
4. There is no inspection system during building construction or after its completion.

# Barriers in Energy Efficiency Buildings

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5. There is *no benchmark* to identify electricity consumption levels compared with other similar types of buildings.
6. There is *limited information* whether and how existing technologies and technical information have actually contributed to energy savings and the operational management.
7. The *limitation on human resources and capacity* to implement the verification and monitoring prevents strengthening ministerial regulation and revising the energy efficiency performance standards.
8. There are *limitations on funding* to building energy efficiency.
9. Costs for capacity buildings and technical assistance is high due to the diversity of end-use activities.

# CO<sub>2</sub> Emissions in the BAU and NAMA7% in 2020



# ***Key issues in Modelling: Thailand's INDC 2030***

## **Ex-Ante Clarification: 9 Steps before modelling**

- 1. Baseline Scenario vs. 2030 Scenario**
- 2. Realistic policy/actions (RE, EE, low carbon/low emissions)**
- 3. Projection methodology/modeling (AIM, MARKAL, LEAP etc.)**
- 4. Data sources (Official Statistic Reports, Gov't policies)**
- 5. Sectoral approach for emission/reduction.**
- 6. Integrated modeling will be done for energy system.**
- 7. Land-use and forestry will not be included.**
- 8. Annual GHG reduction as well as cumulative emission reduction until 2030 will be quantified.**
- 9. Double counting of actions will be avoided.**



## ***Key issues in Modelling: Thailand's INDC 2030***

- **Thailand's INDC 2030 will be robust, realistic and achievable.**
- **Additional effects of Thailand's INDC 2030 will be investigated such as co-benefits, energy security, social and economic impacts to ensure sustainable development.**
- **The GHG countermeasures in Thailand's INDC will be selected on the basis of unilateral action, and available domestic information.**
- **Additional international supported mechanism will enhance GHG reduction target in 2030.**

# Institutional Framework for Climate Change Policy in Thailand

## National Committee on Climate Change Policy (NCCC)

Chair

Prime Minister

Vice-Chair

Minister of Natural Resources and Environment

### Sub-committees

#### NCCC members:

- |   |                                       |   |
|---|---------------------------------------|---|
| 1. Prime Minister's Office                              | 6. Ministry of Energy                 | Administration  |
| 2. Ministry of Finance                                  | 7. Ministry of Commerce               | 14. Office of the National Economics and Social Development Board |
| 3. Ministry of Agriculture and Cooperatives             | 8. Ministry of Interior               | 15. Bureau of Budget  |
| 4. Ministry of Transport and Communications             | 9. Ministry of Science and Technology | 16. Experts   |
| 5. Ministry of Information and Communication Technology | 10. Ministry of Education             |   |
|   | 11. Ministry of Public Health         |   |
|   | 12. Ministry of Industry              |   |
|   | 13. Bangkok Metropolitan              |   |

Secretariat

## Ministry of Natural Resources and Environment



ONEP/CCMC

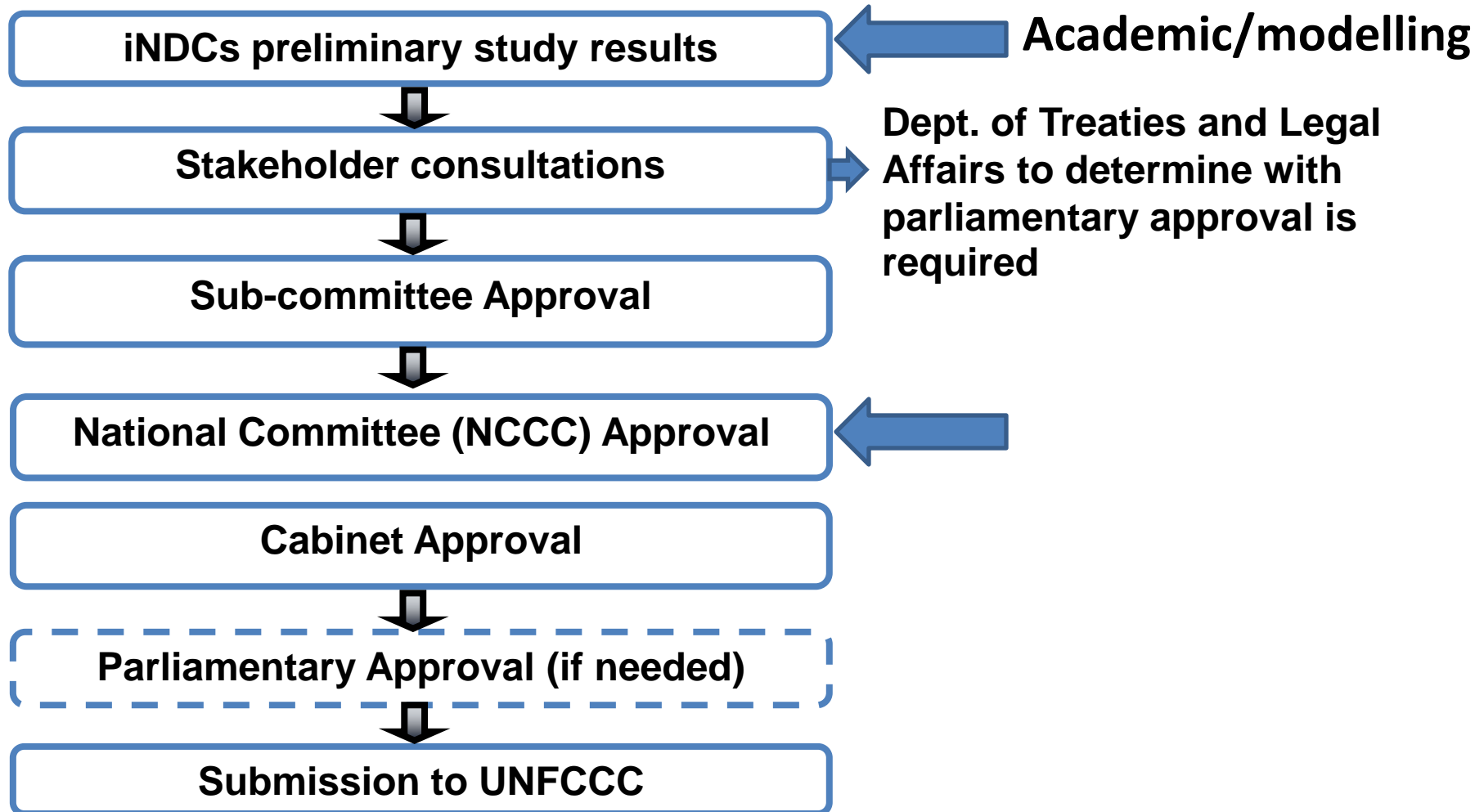
(Policy formulation and National Focal Point)

TGO



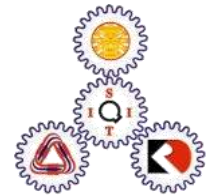
(DNA (for CDM) / Technical support and services to project developers)

# Thailand's INDCs Approval Process



# Conclusions

- In 2050, these CO<sub>2</sub> countermeasures will result in **transformational changes** in not only supply side but also demand side.
- To achieve **Peak target**, Thailand needs, i) **Capacity Building**, ii) sustainable **Feed-in Tariff scheme** for renewable electricity, iii) enforcement of **Energy Efficiency laws in buildings and industries**, iv) **co-funding** of the LCS Actions in both **demand side** and **clean supply side**.
- The **Peak target** will not be achieved **if it is not planned & implemented in the early stage**.
- In addition, **M R V** of LCS actions are of necessity.



**Thank You**