Modeling the roadmap of Thailand's NAMAs 2020 and raising ambition levels of INDCs

Thailand NAMA, in line with national development plans, reveals a GHG reduction target of 7-20% related to BAU emissions by 2020. Both domestically and internationally supported NAMAs need MRV to ensure emission reduction.

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Introduction

The Nationally Appropriate Mitigation Actions (NAMAs) concept was first introduced in the "Bali Action Plan" in COP13 in 2008. There are two types of NAMAs in Thailand: 1) Domestically Supported NAMAs; 2) Internationally supported NAMAs. Both need measurable, reportable and verifiable (MRV) processes to ensure the quantified emission reduction. The first study by the Thailand Greenhouse Gas Management Organization (TGO) shows that Thailand has high potential of GHG emission reduction by both domestically supported and internationally supported NAMAs: in 2020 about 23-73 million t-CO_2 per year, or approximately 7-20% of the total GHG emissions. The abatement costs of NAMAs vary from zero to 1000 USD/t-CO_2. However, most of these CO_2 reduction actions will be voluntarily taken by Thailand. There are limited internationally supported NAMAs in Thailand.

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The GHG mitigation actions include measures in: i) renewable energy; ii) energy efficiency; iii) biofuels in transportation; iv) environmental sustainable transport. Since 2012 Thailand's mitigation pledge to UNFCCC has been prepared on the basis of these measures. Co-benefits of NAMAs are also assessed, and they reveal positive aspects of GHG mitigation under the NAMA framework. The MRV process of these NAMAs needs cooperation among the relevant ministries.

The AIM/Enduse model is used to construct emission pathways for analysis of "Roadmap to Thailand's NAMAs 2020". The roadmap to Thailand's NAMAs 2020 has been laid out by Office of Natural Resources and Environmental Policy and Planning (ONEP), Thailand Climate Change Focal Point, to achieve the CO_2 reduction target of 7-20% in 2020. In addition, the peak CO_2 scenario is fine-tuned to provide the reality of Thailand's INDC scenario.

Methodology

The energy system of Thailand is modeled using the

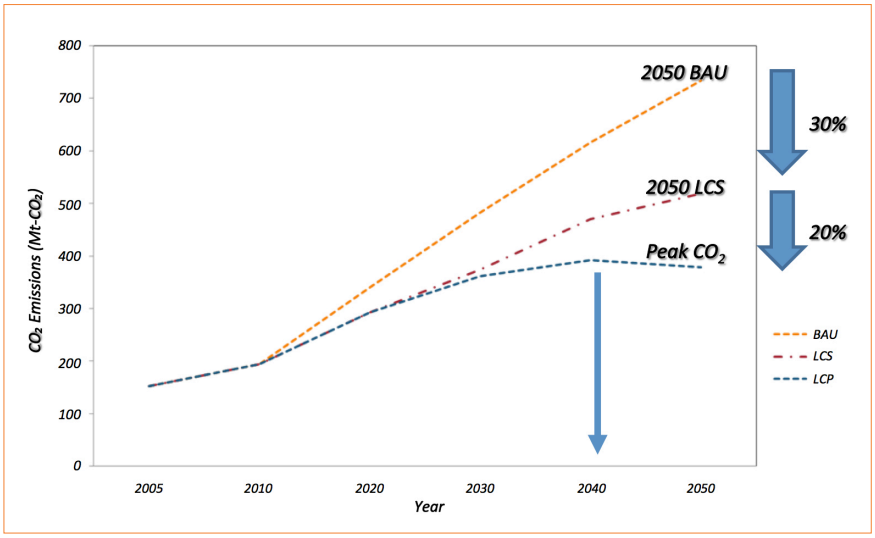

FIGURE 1 Emissions in the BAU and peak scenarios

Asia-Pacific Integrated Model (AIM)/Enduse, which is a recursive dynamic, bottom-up optimization model [1]. The economic sectors included in modeling are: 1) residential sector; 2) commercial building sector; 3) industrial sector; 4) transport sector. The power sector is modeled as supply side. The base year in the modeling is 2005 and the target year is 2020 for the NAMA scenario, 2030 for the INDC scenario and 2050 for the peak CO_2 scenario. The socio-economic information on the existing energy demand and GHG emissions are obtained from government offices [2] and [3].

In addition, the co-benefits of GHG mitigation are also assessed, as well as energy security. These indicators are: 1) diversification of primary energy demand; 2) oil or gas share; 3) renewable fuel share; 4) carbon intensity; 5) social benefits.

Results and Findings

Results from modeling show that CO_2 emissions from the energy system in Thailand will increase from 193 Mt-CO_2 in 2005 to 360 Mt-CO_2 in 2020, 480 Mt-CO_2 in 2030, and 730 Mt-CO_2 in 2030, respectively, in the BAU scenario.

The "Roadmap to Thailand's NAMAs 2020" shows that current Thailand's domestic MRV processes already achieved a CO_2 reduction target of 7% in 2014, and are expected to get a minimum reduction of 7% by 2020 if the present MRV process is still continuing until 2020. The additional strengthening of MRV processes in energy efficiency in buildings and industries, due to several domestic barriers, will increase the level of CO_2 reduction up to 20% when compared to the BAU, resulting in CO_2 emissions decreasing down to 295 Mt-CO_2 in 2020.

Co-benefits of Thailand's NAMAs 2020 have been assessed. All indicators of co-benefits show that GHG mitigation under Thailand's NAMAs will result in: increasing diversification of the primary energy demand, decreasing imported oil and gas share, increasing renewable fuel share, decreasing carbon intensity, and increasing social benefits.

However, modeling results show that Thailand's NAMAs 2020 will contribute to a CO_2 reduction by 30% in 2050, and CO_2 emissions will decrease from 730 Mt-CO_2 in the BAU down to 520 Mt-CO_2 in 2050. However, Thailand cannot meet the peak CO_2 emissions yet (see Fig. 1).

In the peak CO_2 scenario, results show that Thailand has to cut CO_2 emissions by 50% from the BAU in 2050. Peak CO_2 emissions will happen in 2040 at 400 Mt-CO_2. However, the CO_2 countermeasures in the peak scenario are not realistic and not compatible with the existing national climate change plans among the relevant ministries

In modeling Thailand INDC 2030, there are several key issues to be clarified: baseline scenario vs. 2030 scenario, policy/actions, projection methodology in modeling, data sources, sectoral approach for emission/reduction, integrated modeling for the whole energy system, exclusion of land-use and

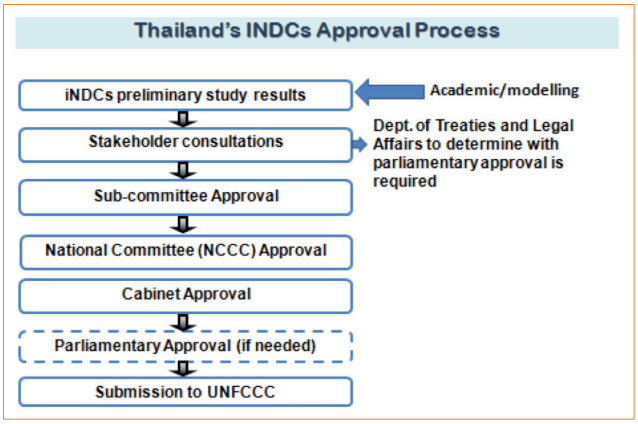

FIGURE 2 Thailand's INDC approval process

forestry, annual GHG reduction as well as cumulative emission reduction by 2030, avoiding double counting of actions. Figure 2 shows Thailand's INDC approval process.

Results of Thailand INDC 2030 will be robust, realistic and achievable. Additional effects of Thailand INDC 2030 will be investigated, such as co-benefits, energy security, social and economic impacts, to ensure sustainable development. In addition, MRV processes of Thailand's INDC will be prepared to confirm their transparency.

Conclusions

The CO_2 countermeasures in the NAMA and INDC scenarios will result in transformational changes not only on the supply but also demand side. To achieve the 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 on both demand and clean supply side. The peak target will not be achieved if it is not planned & implemented in the early stage. In addition, MRV processes of LCS actions are necessary.

It is found from modeling that peak CO_2 emissions in Thailand will not happen before 2040, due to the lock-in selected technologies according to the existing government plans. This information will activate the Thai government to be concerned with the long-term national climate change master plan 2050.

Finally, the MRVs of energy efficiency actions in Thailand's NAMAs 2020 and Thailand's INDC 2030 need improvement to show the transparency of CO_2 reduction pathway. Both capacity building and financial supports will enhance the transparency of MRV processes in Thailand.

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references & notes

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