Workshop Proceedings

Renewables Readiness Assessment and REmap Analysis for Thailand – 2nd Workshop

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1. Introduction

The Alternative Energy Development Plan (AEDP 2015) of Thailand has demonstrated the level of ambition on renewable energy with a new target to achieve 30% renewable share of the total final energy consumption by 2036 – more than a doubling over the 2014 level. However, understanding what the 2036 renewable energy target implies for the country and where efforts need to focus to reach its aims requires an examination on the current policy, regulatory and institutional frameworks along with an understand of potential renewable technological development and energy demand changes within the country. The comprehensive assessment of the current status of the energy system, with a particular focus on renewables, is essential, in terms of identifying key actions and renewable energy technological and sectoral options that can be successfully implemented.

In this context, a project composed of Renewables Readiness Assessment (RRA) and REmap Analysis (renewable energy roadmap) was jointly initiated by the International Renewable Energy Agency (IRENA), and the Ministry of Energy of Thailand (MoE), in response to the request of technical assistance made by the H.E. Minister of Energy of Thailand to the Director-General of IRENA in February 2016.

The project consists of a numerous stakeholder meetings and workshops where IRENA and MoE experts can present and discuss the findings of the report. The first workshop was held in November, 2016 and focused on the RRA component of the report, detailing the initial findings from the RRA draft. These proceedings detail the second workshop, help on 23-24 February 2017, where the final findings from the RRA component were detailed, and the preliminary findings from the REmap analysis were presented for ministerial and expert feedback.

2. Renewables Readiness Assessment and REmap Analysis for Thailand

The Renewables Readiness Assessment (RRA) is a tool developed by IRENA to identify a detailed list of implementable actions necessary for further renewable energy development. Applying this methodology to individual countries provides a comprehensive analysis of the presence or absence of enabling conditions for the development of renewable energy. Crucially, this analysis needs to take into account how the renewables policy of the country contributes to its national policy objectives and more importantly identify the gaps that need to be closed in order for the countries to scale up the use of renewable energy sources. IRENA assists the country in developing the articulated actions and recommendations that can be implemented with the timeframe of 3-5 years, followed by facilitating discussions with development partners, financial institutions and the private sector in respect to the implementation of actions formulated through the RRA process.

REmap, the International Renewable Energy Agency's (IRENA) renewable energy roadmap programme, aims at paving the way to promote an accelerated renewable energy development through a series of activities that include global, regional and country level studies. REmap analyses and activities also serve to develop other IRENA related publications that focus on specific

renewable technologies or energy sectors such as renewable potential in industry, transport, synergies between energy efficiency and renewable energy, and decarbonisation.

IRENA release its latest global REmap report on March 2016 that builds on the bottom-up analysis of 40 countries encompassing 80% of the global final energy demand. Since that time the number of REmap countries has expanded to 70, representing over 90% of global energy. In past years, in close collaboration with countries, IRENA has also been releasing comprehensive country reports that expand the analysis conducted for countries for the global report. Seven reports have been released as of early 2017 that include China, Germany, Mexico, Poland, Ukraine, United Arab Emirates and the United States of America. For regions with their energy demand underrepresented in the REmap analysis, IRENA has also being preparing regional analysis that complement the country work. The first of its kind was released for Africa in October 2015. One other key region is Southeast Asia that is represented by the Association of Southeast Asian Nations (ASEAN) and a regional report was released in October 2016.

IRENA is now expanding on the analysis done for Thailand as part of the REmap ASEAN work in a similar method as was done for country reports, and will combine this expanded REmap analysis for Thailand with the RRA report for the country. This joint-report, *Renewables Readiness Assessment and REmap Analysis for Thailand* (provisional title), will be the first combined report for the agency, bringing the strengths of both approaches to provide Thailand with a comprehensive perspective on renewable energy development needs and potential to 2036.

3. The workshop

As part of the implementation plan for the joint RRA-REmap project, a multi-stakeholder consultation workshop took place from 23-24 February 2017 in Bangkok and was the concluding meeting for the project. The first workshop took place in November, 2017 in Bangkok. The final report is due in summer of 2017.

This second workshop was organised jointly by the Department of Alternative Energy Development and Efficiency (DEDE) of the Ministry of Energy of Thailand and International Renewable Energy Agency (IRENA) and presented the latest results from the Renewable Readiness Assessment and an overview of the REmap analysis for Thailand with a presentation of the preliminary results for the country.

Prior to the workshop IRENA conducted around 10 in-depth interviews and site visits with actors active in renewable energy. IRENA also met with around 15 representatives of DEDE and the Thailand Energy Planning and Policy Office (EPPO) a day before the workshop and provided a demonstration and training to the participants on the REmap tool.

The workshop on the 23-24 February was attended by over 50 participants from diverse institutions as well as DEDE and IRENA staff. The target audience of the workshop included relevant governmental officials, Energy Regulatory Commission, Electricity Generating Authority of Thailand,

industrial associations, renewable energy project developers, investors, the financial institutions, energy consulting firms, and the academia.

The workshop had multiple aims, including:

1. Review the latest RRA findings and suggestions, and the preliminary REmap analysis for the Thailand;
2. Discuss key themes from the analysis and their implications;
3. Discussing the finalisation of the report and completion timetable.

3.1. Meeting at DEDE preceding the workshop – REmap Tool Training

A meeting at DEDE ahead of the workshop took place on 22 February 2017. The objective was to provide an overview of the REmap tool to DEDE staff. IRENA presented first on the method for a REmap analysis and on the key assumptions and data needs. DEDE staff were trained on the REmap tool and process, and were provided with the REmap tool for them to work directly in the tool environment. IRENA explained that the REmap analysis details the key renewable energy technology options in the power generation and end-use sectors, as well as their associated potential and costs, and air pollution and CO_2 reduction impacts of deploying higher levels of renewable energy. Participants were able to discuss the methods of the tool and provide their viewpoints on how the tool could better be applied in the context of Thailand.

3.2. The Workshop – RRA-REmap preliminary results overview and discussions

The first day of the workshop started with an opening session and welcome speech by Mr. Roya Juntaratana, Deputy Director-General of DEDE, Ministry of Energy as well as from IRENA staff. IRENA then introduced the joint project and presented the results and suggestions of the Renewables Readiness Assessment. An overview of the key findings of the RRA was presented and topics for discussion were proposed to the participants so that the main barriers and challenges in the implementation of Thailand's renewable energy plan could be discussed and input sought from the audience.

The afternoon session of the first day was dedicated to the REmap analysis. IRENA introduced the REmap process and its main objectives and methodological approach to the audience. Following that the preliminary results for the Thailand analysis were presented for each of the sectors considered in the REmap Tool: the power sector, buildings, industry and transport. After each presentation time slots were allocated for discussion of the preliminary results and collection of inputs from the audience.

The morning of the second day continued with the presentation of the preliminary findings of the REmap analysis covering results relating to impact of renewable energy on costs, investments, air pollution and CO_2 emissions.

To conclude the morning session of the second day two deep-dive discussions were conducted, one to discuss the key REmap findings relating to bioenergy, given its importance in Thailand's renewable

energy plan, and another on the regional coordination and synergies to accelerated renewable energy in the ASEAN context.

In the afternoon of the second day DEDE gave a presentation on Thailand's Alternative Energy Development Plan (AEDP) which includes their targets on renewable energy and explained the main barriers for the achievement of their goals. The workshop was closed with a wrap-up session with an overview of key items discussed and results and the next steps towards finalisation of the report.

3.3. Detailed notes and key items discussed during the workshop

The following is a summary of the key items discussed during the workshop. The discussion items are broken down into key topic areas:

Power Sector

- What assumptions are used for the reference case and how do they differ from the AEDP target. What are the assumptions for the accelerated deployment scenario (REmap)?
- Do you also consider social economic benefits of different technologies when deciding among solar, wind, biomass?
- In the case of the biomass industry which is a major player in power generation, the main issue for industry is to deal with their biomass residues, in addition to cost.
- Check bioenergy power capacity factor, perhaps it is too low and might be one reason why IRENA's numbers in the Reference Case do not match.
- Biogas power, does it include gas from energy crops? IRENA should check bioenergy technology grouping and explain why REmap 2036 biogas differs, may be similar if energy crops are considered
- For VRE integration has IRENA compared Thailand's VRE shares with other countries/regions where VRE is already high? And how to deal with integration? Is there a limit on the amount of VRE the grid can take?
- Include qualitative discussion on grid and integration impacts.
- Discuss interconnectors and plans for expanding connections to the region.
- The government has clear policy to move from subsidies such as FiT to net metering.
- Wind power is overlooked and country could do more.
- Solar PV can be increased and argument on how it can be done should be discussed including decentralised nature of generation and link to EVs.
- Discuss impact of large hydro including import.
- Discuss what is the correct approach to substitution, whether it is coal, natural gas.
- Give examples of share of natural gas and coal imported to frame discussion on energy diversity.

Buildings Sector

- Energy efficiency is vital to focus on in the building sector. The country must meet its Energy Efficiency Plan.
- Discuss solar thermal (ST) potential in buildings.
- Past ST programs have had difficulty due to lack of knowledgeable installers, maintenance.
- One area for ST is National Housing Authority and using larger systems in those buildings, also tourism sector.
- Energy code for buildings forthcoming and is opportunity to argue for more ST as part of it.

Industry Sector

- Solar thermal use exists, around 50000 square meters installed currently, many more in planning and potential is much larger.
- Most of drying is done naturally, using sun, but could be improved and ST systems are in use and have potential.
- Industry uses hot water from boilers, with solar thermal for pre-heating the water before feeding the boiler.
- Solar driers are a possibly probably but industry needs more support in understanding costs and technologies.

Transport Sector

- Bioenergy target in the AEDP are aggressive. Very challenging goal on liquid biofuels in the AEDP .
- Feedstocks (cassava, molasses) represent almost 80% of ethanol costs.
- Cellulosic ethanol it is a trend coming from Europe/US but context is not the same as Thailand.
- The next 20 years does not include 2nd generation biofuels, but the country will do research and explore options.
- The country needs to develop the agricultural sector, needs to emphasize that improving yields are needed.
- The blend wall seems not to be an issue – it is more about the supply side, there isn't enough supply of ethanol and biodiesel at the moment.
- Target for 1.2 million EVs by 2036, there is more potential.
- Electric three-wheelers there is trial program but limited quantity in operation.
- Electric two-wheelers are not common, so IRENA can highlight and say there is case to be made that this is an important technology.
- Now there is a lot of discussion about EVs in Thailand and what direction should industry head.

Bioenergy Deep-deive

- Biomass residues are the majority of bioenergy resources left untapped in agriculture. But biomass residues produced in industry are fully utilized. If yields increase, there will be more residues to help meet targets.
- Thailand should have a common standard price of biomass residues, should have holistic approach to biomass management. Some have suitable quality but others like rice straw and cane tops and leaves require pre-treatment before energy use, biomass logistics must be improved across the board.
- Achieving the biomass feedstocks aims by 2036 there needs to be a larger discussion on the greater bioeconomy.
- Biomass CHP should the country look at options for improving heat market in cogeneration from biomass, are there opportunities?
- Market exploration for RE in heat sector is required – especially biomass – the country lacks market mechanism to achieve targets.
- Most applicable and interesting applications for heating is in industry because on one hand the agroindustry for sugar, palm, rice, wood have their residues in the mill itself and at the same time have heat demand, so balance between steam and power is important, but here is link with incentives for surplus power. There is no incentive to produce power to grid, industries do it inefficiently because usually there is more residues than what they need, there should be incentives to use residue as efficiently as possible by means of power exports to the grid.
- Make it clear that solutions are country and industry specific, and a view to adapt to specific contexts.
- Accessibility to resources, non-commercial biomass is scattered over large areas and require increasing efforts and costs to be collected.

Costs and savings

- The costs of substitution could vary depending on whether less coal is substituted and instead natural gas. Intention of Thailand is to reduce natural gas because resources will be depleted so trend is to move to coal for energy diversity and security reasons.
- Explain how costs of integration and transmission are in addition to costing analysis, but include a qualitative perspective on things such as the costs of grid integration.
- Thailand does not have enough fossil resources apart but they do have renewable energy. So they need to diversify but at the same time keep costs low because Thailand is an exporting economy and needs to remain competitive with neighbouring countries.
- Explain how the substitution cost differ and what the main drives are.
- Explain a bit more about how to calculate the costs of externalities related to health impacts.

Regional discussion

- "Energy 4.0" is a target of Thailand, how does the country identify future technologies for renewable energy.
- Move towards more advanced technologies, would be helpful if IRENA could advise Thailand what the most suitable mix with "advanced" RE technologies.
- ASEAN very much views Thailand as a regional renewable leader, and many look to Thailand. Therefore, they are trying to identify but what is the right mix of technologies, this is the value added that the report can give.
- Interconnections between countries are taking place, but not enough and more is needed.

Other Aspects

- Energy security is a key driver in the country. Indigenous fossil fuel supply is limited and will run out in 5-15 years.
- Job creation and the country needs to look into building local competence, especially in the context of small scale applications.
- For policy the country has to improve coordination between ministries given the interdependency between policies in agriculture, energy, transport, technology – how to best promote that? What are the best practices in other countries?

Potential challenges for renewables as detailed by Ministry of Energy (DEDE)

- Market design: RE zoning and reverse auction are key instruments. Also creating a market for renewable heat is important.
- Renewable sources: feedstock management and availability is key.
- Infrastructure: grid stability and flexibility when accommodating higher shares of VRE needs to be understood.
- Technology advancement: increasing cost reductions for technologies; EE improvement and meeting stringent goals, and what is the role of local technology are all important.
- Institutional framework and capacity building: allow for adoption of new technology, and inter-ministry coordination is key.
- Policy plan consistency: TIEB linked to all plans and is a good first stop, but also plans need to be tracked and revised accordingly.