

Renewable Energy Development and Environment in Thailand: Rangsana Sarochawikasit

1. Thailand national energy policy

Dr Thaksin Shinawatra's government has formulated an energy policy to emphasize and promote the efficient usage of energy, balancing energy demand and the development of RE in order to reduce the level dependence on imported energy by accelerating the development of domestic energy resources

Government energy policy objectives are as follows:

- ◆ Enhance competitiveness of economic sector with energy supply security
- ◆ Improve the quality of the environment
- ◆ Raise the living standards of the Thai people
- ◆ Drive Thailand to become an energy hub in the South-East Asian region

2. Thailand energy strategies

Four main energy strategies formulated by the Ministry of Energy are as follows:

- ◆ Strategy for efficient use of energy
 - By 2007, Thailand has set a goal to reduce energy elasticity (growth rate of energy consumption per GDP) from 1.4:1 to 1:1, in order to strengthen national competitiveness potential
 - Doing so will save the country up to 3.1 billion baht within 10 years
- ◆ Strategy for energy security
 - Ensure that Thailand has sufficient and reliable energy supplies for at least 30 years
 - Identify goals for increasing reliability of energy supplies, especially natural gas, for the next 50 years
- ◆ Third strategy (Thailand as a regional center)
 - Improve tax structures to eliminate tax leverage duplication
 - Develop linkage from Middle East to SE Asia and East Asia for oil production and transport with Energy Land Bridge Project (this project has been designed to promote the strategy)
- ◆ Strategy for RE development
 - Ministry of Energy has identified a goal to increase the share of RE from 0.5% in 2003 to 8% of total final energy demand in 2011

To achieve highly efficient energy utilization and to increase Thai economy energy security, the Ministry of Energy will use energy information technology in a vital role as an energy center, linking domestic and international information in order to provide updated and accurate information to all stakeholders

Most importantly, measures for public participation and environmental concern will be emphasized in order to encourage the use of clean fuels like ethanol, biodiesel and natural gas in the transportation sector, and to set up funds for development of local communities around energy facilities

3. Energy Situation in Thailand

Energy consumption in Thailand has continuously increased during the past ten years with an average annual growth rate of 4% (excluding during the economic crisis from 1997 to 1998)

In 2004 , the total final energy demand was about 61 million toe (tons of oil equivalent).

Of the total energy consumption:

- ◆ Transportation is the main consumer – accounting for more than 37% of total energy demand
- ◆ Following this is the industrial sector, at about 36% , and then the residential and commercial sector

This energy demand is expensive for the country – US\$25 billion was spent on oil imports in 2004

To cope with the cost of oil imports and the current debt of foreign currency, the Ministry of Energy proposed a RE policy to the government, which the cabinet approved on September 2, 2003.

Target of the RE policy:

- ◆ Increase utilization of RE in the commercial sector
- ◆ Increase RE utilization from 0.5% to 8% by 2011
 - More than 83% of total energy consumption in 2003 was commercial energy
 - 16.5% was traditional energy, mainly charcoal and firewood
 - Only 0.5% comes from RE

To promote this policy, targets have been established within the RE strategic plan by dividing energy production from RE into 3 categories: electricity generation, heat and biofuel

- ◆ Heat is the main portion of the target, accounting for half of the target

To achieve RE targets, several strategies have been introduced:

- ◆ RPS (Renewable Portfolio Standard)
An investment of about 5% of installed capacity must be made in new RE power plants by power plants (using fossil fuels as fuels) planned for construction
- ◆ Incentive
Government provides financial support such as “feed-in tariffs” to supplement the price of selling electricity to the grid
- ◆ R&D
Narrow the gap of production cost of uneconomic RE technologies, increase the locally-located parts of RE technology, and secure the supply of raw materials or feedstock for RE purposes
- ◆ Facilitator
This will mainly deal with enabling cooperation and facilitation, matching private sector companies, investors and foreign companies or suppliers together. My department (Department of Alternative Energy Development and Efficiency (DEDE)) will act as facilitator

R&D will be conducted to strengthen Thai knowledge of RE technologies, and RE technologies will be disseminated through model project demonstration conducted via cooperation between public and private partnerships.

Successful cases will then be promoted to the concerned communities and/or private firms so that they will utilize RE technologies that are suited to domestic RE resources available in respective areas.

The government will set up an incentive to stimulate RE utilization. Incentives will:

- ◆ Provide the competitiveness of RE technologies with conventional energy technologies to investors
- ◆ Divert the uncertainty or risk of the investment
- ◆ Create a market opportunity for the penetration of RE technologies

Main purposes of government strategic plan incentive measures launched by the Thai government to promote and disseminate RE utilization:

- ◆ To push the RE market in Thailand to be more commercially active
- ◆ To reduce financial burden of RE technologies
- ◆ To make RE become a more available energy source
- ◆ To reduce imported energy bills
- ◆ To improve the environmental impact of energy use

In terms of tax incentives, the Thai government provides a BOI privilege scheme to

renewable energy investment projects

- ◆ According to this BOI privilege, investors in any renewable energy project will receive an exemption on import duty for imported equipment or machines and corporate income tax holidays for 8 years
- ◆ Soft loans are an additional financial tool to provide low interest rate loans for RE projects, but it limits the ceiling for borrowing money to 50 million Baht or less
- ◆ To make renewable energy investment more promising, the government provides a CDM program of carbon credits to supplement renewable energy promotion in Thailand

Gasohol Strategic Plan

- ◆ Proposed by the Ministry of Energy to the cabinet where it received approval on December 9, 2003
- ◆ The plan targets promotion of the use of ethanol by blending with gasoline at 10% by volume (“E10”), creating up to 1.0 million liters per day (MLPD) in the year 2006, increasing to 3.0 MLPD by the year 2011
- ◆ In accordance with this road map:
 - The government has already issued specifications for gasohol (ethanol blend with gasoline) for gasoline with octane 95 (E10) and octane 91 (E10)
 - Government vehicles are requested to use only gasohol
 - By the end of this year or beginning of next year, there will be no gasoline octane 95 in gas stations throughout the country
 - At present, 24 ethanol plants have received concessions from the government, with a total capacity 4.8 MLPD
 - Of these, 5 exist already with total production capacity of 0.6 MLPD, and another four with a total production capacity of 0.6 MLPD are under construction, and expected to be completed by the end of this year
 - The main feedstock used in ethanol production is molasses and cassava – production of cassava should be sufficient for ethanol production
 - As of June 2006, there are 9 petroleum companies with 3,200 gas stations selling gasohol, and selling volume averaged 3.6 MLPD, equivalent to 0.36 MLPD of ethanol

Biodiesel strategic plan (two phases) is as follows:

- ◆ 2004 -2006:

Research and demonstration phase providing technical information to support the second phase. Main activities will emphasize management of raw material supply. Ministry of Agriculture and Cooperatives will be responsible for land preparation and palm oil yield improvement for biodiesel production,

including other oil plantation R&D such as that for jatropha.

- ◆ 2007 -2011:
 - “Biodiesel mandate”
 - Blending of biodiesel and diesel oil (biodiesel = 2%), known as “B2”, has already started in Cheiang Mai province, and presently a 5% biodiesel blend (“B5”) is sold in many areas, particularly Cheiang Mai and Bangkok.
 - It is expected that the biodiesel market will expand to cover the whole country by 2011, with a production capacity of 4.0 million liters/day
 - ◆ To achieve these targets, many R&D activities on raw material for supply as feedstock have been carried out
 - ◆ To promote the establishment of biodiesel plants, Thai government has provided the BOI privilege scheme for encouraging private investment in renewable energy projects including biodiesel production plants
 - ◆ The Special Purpose Vehicle (SPV) program, overseen by the Ministry of Finance, has been set up to encourage private investment in palm oil plantations and biodiesel plants

4. Environmental issues in Thailand concerning energy utilization (Issues related to environment and energy in Thailand)

The Study on Framework and Guidelines for CDM Implementation in Energy Sector, in December 2004, clearly illustrates that greenhouse gas (GHG) emissions in Thailand was about 344 million tons. The energy sector seems to be the biggest emitter, accounting for 56% of the total GHG, and following this is the agriculture sector.

Energy demand in Thailand has continuously increased, and fossil fuels make up 70% of this demand – resulting in rising energy sector GHG emissions.

However, Thailand compares favorably with the world, OECD, Asia and some selected Asian countries such as China, Japan, Korea, Malaysia in terms of CO₂ emission per ton of oil equivalent (total emissions as well as emission per capita). (See slide no. 13)

To cope with GHG emissions, the DEDE study has identified the potential of CDM projects in Thailand. Most promising are those promoting renewable energy, followed by waste to energy; bio-fuel is also important

On August 15, the government passed a resolution regarding the organization overseeing CDM in Thailand – Ministry of Natural Resources and Environment proposed this CDM structure to the cabinet and received approval. In accordance with

the same cabinet resolution, the National Committee on Climate Change will be set up, chaired by the prime minister or deputy prime minister. An office in the Ministry of Natural Resources and Environment will act as secretary – this office will be set up by next year

- ◆ CDM project approval process:
 - The office passes project documents received from private companies to ministries concerned and expert groups for review
 - Comments made by the expert groups and ministries concerned (e.g. for energy projects DEDE will make comments) are sent back to the office, which are then submitted to the National Committee for approval
 - After approval is made, the National Committee informs the cabinet, and the cabinet's acknowledgement is received
 - The CDM project is then passed through the office which issues a letter, and send the project to the UNFCCC for registration

5. Research and development activities in RE in Thailand, including cooperation with neighboring countries

Barriers for renewable energy in Thailand:

- ◆ High investment cost of RE technology
- ◆ Lack of continuous policy and measures for RE was a problem, although this problem has now been solved as the government has established long-term RE policies (up to 2011)
- ◆ For the low quality and discontinuity of supply, the Ministry of Energy has cooperated with ministries concerned including the Ministry of Agriculture and Cooperatives to emphasize R&D to improve production of agriculture products
- ◆ Unattractiveness of existing development models: attempts have been made to develop model projects for RE technology; these models are to be used as a showcase and distributed to private investor
 - This, together with high investment and operation costs, is being discussed at the ministerial level, and regulation shortcuts are being made
 - PR is used to show private investors successful cases

The Energy Conservation Fund was set up to promote RE use and energy conservation – it will be collected from petroleum oil used, perhaps 0.1 cents per liter.

Many R&D activities are being carried out for RE development

- ◆ R&D of biofuel utilization is promoted – the Biodiesel Production Plan is carried out as a model
 - Performance tests carried out on car engines using biodiesel – this information is provided to users
 - Biofuel value chain development will also be emphasized, not only for

proposed biofuels, but biodiesel development will also be taken into account

Future trends indicate biofuel use increasing due to:

- ◆ Environmental concerns and increasing oil prices
- ◆ Increased technological development related to biofuels
- ◆ Biofuel markets will be affected by GHG and global warming effects

Expected bio-energy pathways

- ◆ In the future it is expected that hydrogen produced from biofuels (ethanol) will be used
- ◆ New biomass integration and gasification technology will come to market

Regional Cooperation

- ◆ Thailand cooperates with neighboring countries such as Laos, Myanmar and Cambodia in biofuel development and hydropower development
- ◆ “Contact farming” established between Thailand and neighboring countries, in order to ensure supplies for biofuel programs

Conclusion

- Policy and measures to promote RE must be clearly stated and targeted
- R&D should be carried out to create local knowledge

Most importantly, cooperation from all stakeholders is needed – not only from the governmental sector, but also financial institutions, the academic sector and private investors