

Summary of Discussions
Third Meeting of the GMS Subregional Energy Sector Forum (SEF-3)
Phnom Penh, Cambodia
20-21 August 2009

1. **Objectives.** The SEF-3 meeting was held primarily to jumpstart the implementation of the GMS Road Map for Expanded Energy Cooperation, which was endorsed at the 15th GMS Ministerial Meeting held in Thailand in June 2009. The meeting initiated the various activities that will enable the SEF to perform its major tasks as follows: (i) overseeing assignment of "Lead"¹ countries to prepare and implement projects; (ii) programming projects/ activities to achieve the road map's medium-term thrusts; (iii) driving the process of setting suitable GMS performance targets under the road map; (iv) monitoring the progress of the road map; and (v) serving as the principal vehicle for information and knowledge sharing in GMS energy cooperation.

2. The SEF-3 meeting was held in Phnom Penh, Cambodia on 20-21 August 2009 and co-organized by the Ministry of Industry, Mines and Energy (MIME) of Cambodia and the Asian Development Bank (ADB). It was co-chaired by Mr. Anthony Jude, Director, Energy and Water Division (SEEW), Southeast Asia Department, ADB and Mr. Yongping Zhai, Lead Professional (Energy), Energy and Water Division (SEEW), Southeast Asia Department, ADB. It was attended by representatives of Cambodia, Peoples' Republic of China (PRC), Lao PDR and Viet Nam, as well as by representatives of the Center for Energy and Environment Resource Development (CEERD), Environment Operations Center (EOC), Gunung Ganang, Mekong River Commission (MRC), and ADB. Myanmar and Thailand were unable to send representatives to the meeting. Attached is the agenda and program of the meeting (**Annex 1**) and the list of SEF-3 participants (**Annex 2**).

Opening Session

3. Dr. Ith Praing, Secretary of State, MIME of Cambodia warmly welcomed the participants to Phnom Penh and expressed his pleasure at hosting the meeting. He recalled the transformation of the Electric Power Forum into the SEF for the purpose of covering other energy sub-sectors that would help realize greater economic benefits from a more integrated GMS energy market. He noted that the SEF-2 meeting in Viet Nam last year discussed the energy road map which contains the priority activities in accordance with the energy strategy study. He said the SEF-3 would undertake a fairly detailed discussion on various issues, synthesize the discussions and ensure consistency in agreements across various sub-sectors. He enjoined everyone to continue the work to achieve stronger consensus towards moving the energy trade agenda forward, reminding that the programs need to be consistent with the future regional energy market being envisioned under the GMS Program. He thanked ADB for the excellent support to the SEF and invited everyone to enjoy the beautiful city of Phnom Penh.

4. Mr. Anthony Jude, Director, SEEW, ADB welcomed the participants and thanked the Cambodian Government for the hospitality and excellent meeting arrangements. He noted that Phnom Penh and its neighboring cities are showcasing the economic progress that power trade helps realize. He stressed that the SEF-3 meeting would jump-start the implementation of the

¹ Per the energy road map, as "Lead", the GMS member country will be tasked to oversee the progress of its assigned project, including the formulation and refinement of the project proposal, and coordination with development partners for possible financing and technical support to the project.

GMS energy road map, which will guide the subregion's efforts in addressing the concerns of energy security, energy self dependency, sustainable energy development and climate change, The latter has assumed greater urgency as GMS countries recognize their vulnerability from climate change effects. He emphasized the strong nexus between energy and the environment, and energy's role in the global climate change response through viable clean energy technologies and effective demand side management. He noted the importance of mainstreaming climate change mitigation and adaptation in both donor and domestically-financed projects, and in capacity and awareness building at central and local levels. He added that ADB's Climate Change Implementation Plan (CCIP) for Southeast Asia will support transition to low-carbon growth through a stronger portfolio of energy efficiency, renewable energy, sustainable transport and waste management investments. He proceeded to explain the major agenda items' coverage and expectations, as follows: (i) review of the road map's implementation arrangements; (ii) review of the list of projects, prioritization of projects, and assignment of "Lead" country; (iii) setting of suitable GMS performance targets under the road map for monitoring purposes; (iv) preparation of priority projects for possible financing; and (v) conduct of knowledge sharing in GMS-appropriate energy practices and technologies. He said that at the meeting's conclusion, there would be synthesis of the agreements and review of proceedings to ensure everyone is on the same track. He wished the meeting success through open and substantive exchanges.

GMS Road Map for Expanded Energy Cooperation: A Recap, Prioritization of Projects and Activities, Timetable, and Lead Country for Priority Projects

5. Mr. Zhai (ADB) gave a quick presentation of the highlights of the road map (**Annex 3**) indicating its policy framework, medium-term thrusts, and work plan (composed of proposed projects/activities) and implementation arrangements. He informed of the suggestions and changes to the road map made by GMS country delegations during the 15th GMS Ministerial Conference (MC). Development partners at the 15th GMS MC expressed strong support for the road map particularly on the following aspects: (i) inclusion of demand side management and energy efficiency policies in regional planning; (ii) enhanced planning and analysis of the social, environmental and transboundary aspects of power trade and energy development; and (iii) focus on renewable energy, carbon capture and storage (CCS) and other efforts in support of climate change mitigation. Concerns were expressed of the global economic crisis and its impact on the power trade program, and the trade-offs in biofuels production that needed to be examined further in the context of food security.

6. Mr. Zhai then presented the original list of projects and activities under the work plan of the road map and showed a shorter list of projects which some development partners expressed interest in (**Annex 4**). Mr. Zhai explained that it would be useful for the meeting to identify the country that could take a lead in the development of these projects and gave the guiding parameters to determine the lead country, such as (i) level of technological maturity, (ii) the potential for RE, and (iii) financing to ensure sustainability. He focused on the first project in the short list, on promotion of renewable energy (RE), clean fuels (CF) and energy efficiency (EE) technology and asked the GMS representatives' views on this project.

7. **Discussions:** The GMS countries' views on the RE/CF aspects of the project are as follows:

- a. Cambodia representative indicated its current efforts in developing biomass sources (for power generation) and micro hydropower sources. Mr. Zhai noted that Cambodia's pilot RE program was funded by grants from Japan, and expressed interest in knowing how

this can be sustained through a scale up of this program. Dr. Priang mentioned that Cambodia has a lot of biomass residues from rice husks, cashew nuts, peanut shells that could be used to generate electricity in remote village not connected to the grid. He also noted the potential of harnessing the flows in main Mekong River by using submerged bulb turbines installed on rafts to generate 100kW to 500kW for villages located along the river system. Mr. Jude mentioned need for MIME to consider the development of a policy framework that would support private sector investments in such technologies for rural and off-grid applications but with an option that when a grid is extend to some of these areas, the excess electricity could be sold to the grid. He also cautioned on supporting biofuel plantations such as Jatropha or corn/cassava for bioethanol production as there will be competing needs of land for such revenue generating crops and lands for food production.

- b. PRC representative mentioned wind power as a priority area of RE development, and that PRC has a comparative advantage in RE technology, given their experience in scaling up turbine manufacturing from 750kW size to 2-3 MW unit size. Biogas is another area where PRC has had considerable experience since 1970s. Biogas plants designed and built in rural areas can be used for lighting and cooking. PRC representative noted that manufacturers of wind power equipment still enjoy some form of subsidy. Mr. Jude said it would be useful to learn from the PRC experiences developing the wind energy sector through the use of policy and financial incentives. Mr. Zhai noted that it would be interested to know how wind power development in PRC could be sustained through a combination of policy, institutional actions, and evolution of technology as well as at point in time financial incentives will be reduced or removed. The meeting noted that these issues could be addressed in the study that PRC would take the lead in preparing.
- c. Lao representative expressed interest in taking the lead in the study of micro hydro development for off-grid applications and the need to ensure success in this field through enabling policy and institutional reforms. Lao representative also noted that its micro and mini hydro programs had limited success and cited some lessons learned from its experience, such as the need to have curriculum in local universities on mini hydropower development, establishment of training institutions in hydro technology, and access to spare parts, which is an issue for plant break down and to get them back on line soon. In Lao, such spare parts are not available and have to be imported. Mr. Zhai noted that in other countries, such off-grid rural electrification is linked to livelihood activities. Hence, the aim is not only to provide electricity for household lighting but also to enable the community generate incomes from such activities milling rice, flour, carpentry, etc. as these activities could help generate funds for O & M operations that could sustain the RE/electrification program. Mr. Jude stressed that institutional mechanisms and government policy (incentive mechanisms, legislative rules and regulations) are just as important as technology.
- d. Viet Nam representative noted that it has an existing policy framework for developing small hydro projects as well as wind and biomass sources. Mr. Zhai suggested that Viet Nam could share its success story in mini hydro development and could partner with Lao PDR in this area. Viet Nam noted it has a strategy and program for developing RE and informed the meeting of the significant share of mini hydro, biogas and solar power in meeting energy needs. Viet Nam noted that it has a thriving energy service companies that could harness energy from RE sources for rural applications. The Institute of Energy of Viet Nam has reported the huge potential of RE sources from its recent survey. Viet

Nam's representative informed of the Government's aim to centralize all government efforts in RE in a single entity, which will handle policy, regulation, provision of incentives in piloting some of the projects.

8. **Agreements.** It was agreed that responsibility for RE development would be divided among the countries by type of RE: Lao PDR would take the lead in micro hydro (used for isolated systems); Viet Nam would take the lead in mini and small hydro systems that are grid-connected; PRC would take the lead in wind power development; while Cambodia would take the lead in biomass development.

9. On energy efficiency (EE), and energy conservation (EC), Mr. Zhai explained that this would cover both demand side and supply side efficiency promotion. He asked the countries' views on what they can share in the EE and EC field:

- a. Cambodia representative informed of Cambodia's improved stove program (using charcoal) for cooking and for producing sugar from sugar palm. Cambodia has also implemented efficient lighting and airconditioning programs in the hotel industry and government buildings. He informed that there is no EE agency or comprehensive policy framework in Cambodia. In response to a question on whether tariffs reflect the true cost of supply, he mentioned that lower tariffs were imposed on low-end power consumers (50 kWh/month), with cross-subsidies among other consumers (like industry, commercial and large residential consumers) within Phnom Penh area. The other provincial towns have higher tariffs and there is no subsidy.
- b. PRC representative informed of EC programs in three areas: manufacturing, building and transportation. He said energy service companies (ESCOs) have been established who have successfully implemented in EC programs in a number of provinces. Mr. Zhai inquired about how PRC actually promotes EC through price signals. PRC representative explained that Government has taken measures to reduce energy intensity over the next 10-15 years in its development plans. He also mentioned that the Government took a policy measure to shut down all old and inefficient coal power plants of less than 100 MW unit size in the provinces. This has resulted in the development larger sized 300 MW to 600 MW sized power plants using circulatory fluidized bed combustion (CFB) technology, super critical or ultra supercritical boiler technologies. ADB asked whether PRC is using market-based instruments to promote EE/EC, and PRC responded that escrow funds are set up that are used by ESCOs in promoting EE and these escrows are increasingly from the private sector.
- c. Lao PDR representative informed that a number of energy audits of Government buildings had been carried out with assistance from the World Bank. This has identified huge benefits/savings to the Government if these are implemented. He said that the challenge was changing the mind-set of Laotians to be more aware of energy conservation. The EE measures in building could also be expanded to the residential, commercial and service sectors. As such the Government is taking measures to implement demand side management (DSM) programs in office buildings, and expressed interest in taking the lead in the study of promotion of public-private partnerships in EE. Mr. Jude mentioned that ADB was undertaking a mission in Sept'09 to Laos PDR to have further discussions with Ministry of Energy and Ministry of Finance in determining (i) capacity building needs, (ii) policy and

regulations (Laws) needs to sustain energy efficiency programs, and (iii) government buildings that could be retrofitted and financed in 2010 by ADB.

- d. Viet Nam representative informed of the huge EE program in commercial and industrial sectors in Viet Nam. He said Viet Nam has prepared a draft law on energy conservation that is expected to be approved by end 2009. He informed of the Government's target in 2010 and 2015 for reduction in energy consumption by 5% and 8% of total energy consumption, respectively from implementation of EE/EC programs. Mr. Zhai noted that from the context of climate change, Viet Nam's greatest potential lies in implementing EE/EC programs. Mr. Jude mentioned that energy audit of selected industries (cement, iron and steel, food processing plants, etc) is ongoing and the results will be available by November'09. The challenge is financing these projects through a financial intermediary like a commercial bank. In this context, capacity building of the commercial banks is required in evaluating the energy efficiency projects. ADB is considering to provide a loan in 2010 in the amount of \$70 million to support such activities. Mr. Jude also mentioned that in the long term Viet Nam could consider banning incandescent in favor of compact fluorescent lamps (CFLs) as is being done in Australia and the Philippines.

10. **Agreements.** Mr. Zhai stated that countries can jointly contribute to the EE projects, under the ADB Energy Efficiency Initiative (EEI) umbrella, by sharing specific experiences in EE such as for cooking stoves (Cambodia), ESCOs (PRC), office building energy conservation (Lao PDR) and EE/ EC programs in commercial and industrial sectors as well policies and regulations (laws) required to implement the projects (Viet Nam).

11. On enhancing GMS cooperation in energy planning, Mr. Lefevre (CEERD) updated the meeting on the progress of training in power development planning (PDP) under the RETA 6440 and raised the need for supplemental planning for additional work that is required in GMS energy database development, networking and in sharing knowledge in developing country energy plans. He raised a valid point regarding permanent structure and staffing within the countries that would eventually "own" the subregional power development plans and the knowledge generated under the project assistance that can be updated by the countries themselves.

12. On the proposed Regional Transmission and Regulatory Authority (TRA), Mr. Zhai noted that current efforts under the RPTCC are geared towards preparing the GMS countries for power trade operations, and suggested that this component to be discussed at the next RPTCC meeting in November 2009 and its timing for development. Ms. Gabrielson (ADB) shared her experiences with respect to her work (under SIDA) on power trade development in Africa and Europe.

13. Mr. Zhai noted that coal will continue to play a major role in meeting the subregion's energy needs and hence it is important to promote the use of clean coal technologies to help lower carbon emissions. He asked the participants of their views on carbon capture and storage (CCS) as it can help mitigate carbon emissions from coal based power generation. PRC representative informed on PRC experiences in promoting super critical and ultra super critical technologies through policy instruments and support for technology improvements. He also mentioned that PRC is now piloting an integrated gasification combined cycle (IGCC) with carbon capture ready but the costs are high. Carbon capture technology is not yet commercially available and not appropriate for developing countries yet. The use of supercritical and ultra-super critical power plants will be more appropriate for the subregion to reduce carbon

emissions. Viet Nam express interest to learn from PRC's experience in use of super-critical/ultra super critical boiler technology in lowering emissions. He added that Viet Nam is constrained by lack of technology and other factors. Mr. Jude noted however that adoption of super-critical technology in Viet Nam has been limited due the need to import coal as local coal is not suitable for such technologies. Viet Nam needs to seriously evaluate its decision to increase coal based generation and how it will meet its own national targets to reduce carbon emissions. This can only be done through a policy decision that calls for use of super critical and ultra supercritical technologies but this entail use of imported coal. This will also result in higher generation costs but need to factor the environmental benefit from the use of subcritical technologies and supercritical technologies. Mr Jude also added that because of environmental concerns and higher efficiency from super/ultra super critical boilers, PRC has surpassed all developed counties in the use of super-critical or ultra super critical technologies.

14. Mr. Jude said that efforts in oil, gas and coal sectors should first focus on the development of appropriate policies and regulatory framework that will rationalize the development of these energy sources in the individual countries. These efforts could be subsumed under the proposed project on enhancing energy planning and capacity building. On nuclear energy Mr. Jude stressed that ADB does not support nuclear development but could support for knowledge sharing on safety and public awareness issues on the use of nuclear energy.

Country Presentations on Recent Developments in the Energy Sector (Country Presentations, Annex 5): Focus on Performance Targets for Monitoring Energy Programs (targets by country are in Annex 6)

15. **Cambodia.** Mr. Victor Jona of the General Department of Energy, MIME presented an overview of Cambodia's energy policy, structure of its electricity sector, electric sector status and strategy, generation expansion plan, and rural electrification program, which seeks to promote use of RE. He showed the difficulties, status, goals and targets of new and renewable energy (NRE) development in Cambodia. He discussed the Government's policy for NRE development in relation to the village electrification plan and the NRE projects (solar, biomass gasifier, micro hydro, biofuel, and bioenergy) being implemented. He showed the potential of biomass for power generation and stressed the importance of balancing supply and demand side approaches in reducing carbon emissions toward climate change mitigation.

16. **Discussions.** Mr. Zhai inquired about the level of rural electrification and Mr. Jona said only 10% of rural areas are electrified (which comprise 85% of total households). Mr. Jona clarified that approaches to expand rural electrification include grid connection, setting up of rural electric enterprises, cross-border connection, and developing RE for isolated systems. The Cambodian delegation briefed on the programs for rural electrification being implemented and planned to achieve the targets for rural electrification, which are: 100% of villages by 2020 and 70% of households electrified by 2030.

17. **PRC.** Mr. Gao Shixian, Assistant Director General, Energy Research Institute, National Development and Reform Commission (NDRC), provided an overview of the energy sector in PRC, showing the composition in energy output and consumption in 2008, and the trend in energy intensity (energy consumed per unit of GDP) and energy consumption. He discussed the PRC's institutional structure for energy development and the measures for supporting RE and EE in 2009, which covered wind, photo-voltaic, EE in transport, EC, EE in power generation, and capacity building in EC and emission reduction. He showed some programs for energy development such as equipment innovation for RE, advanced nuclear (mid and west China),

large scale wind power, smart grid, etc. He said 2 million households in PRC are still without electricity.

18. **Discussions.** Mr. Zhai asked about the targets for RE and EE. Mr. Gao said that PRC's target for 2011 to 2016 is 20% reduction in energy intensity; by 2020, the share of NRE will be 15% of total energy (30 GW for wind power). Mr. Jude suggested that the GMS countries also look at EE in transport, through the use of more fuel-efficient modes such as monorail and bus rapid transport. He also called for the need for coordination with Ministry of Transport.

19. **Lao PDR.** Mr. Khamso Kouphokham, Chief of Executive Planning Division, Department of Electricity, Ministry of Energy and Mines, provided an overview of indigenous energy production of Lao PDR in 2006, and the growth trends from 2000-2006. He also showed the breakdown of final energy consumption in 2006 and the growth rates from 2000-2006. He briefed on the government's policy for promotion of renewable energy focusing on biofuels, and the target is for increasing the share of biofuels to total energy consumption to 10-30% by 2020. Rural electrification target is 90% of total households by 2020, up from the current 65%. The rural electrification program includes solar photovoltaic systems funded by the World Bank and the Australian Agency for International Development (AusAid) and government has signed agreements with private companies to plant jatropha to produce biodiesel. He said the energy program focuses on among others achieving energy saving goals and renewable energy production.

20. **Discussions.** Mr. Jude stressed the importance of baseline data in doing energy planning. He also asked what will happen in areas where solar home systems are in use when the grid is extended to these areas. Mr Khamso said that the solar homes systems in place in areas where the power grid is extended will be relocated to other areas that are not serviced by the power grid.

21. **Viet Nam.** Mr. Tuan Nguyen, Manager, International Relations, Institute of Energy (IE) provided an updated overview of the energy sector covering the energy production (2005-2008) and final consumption (1990-2007), noting the huge share of non-commercial energy to total consumption. He updated on the energy demand forecast (2010-2030) and the commercial final energy consumption forecast, with the largest increases in electricity. He showed the future outlook for energy supply capability and showed that RE potential for power generation is expected to grow from 560 MW (2007) to 3554-4306 MW by 2025 and 9,500 MW by 2030. He explained the analysis of energy demand-supply balances from 2000 to 2030 and noted that the deficit could be met through EE and EC, fuel imports, RE and nuclear power options. He explained the implementation plan for EE, DSM, rural energy development, energy pricing, and RE development (10-13% of total energy consumption in 2025), among others. He presented the targets and scenarios for RE development- grid, off-grid, and for heat utilization. He noted that Viet Nam has high energy usage to produce a unit of GDP, and has targeted to reduce energy elasticity to 1.2, and electricity elasticity to 1.6 from 2.

22. **Discussion.** Mr. Jude inquired about the status of nuclear energy development and noted that coal share in power generation will increase but if the aim is to use domestic coal, then there is a need for investing development of new coal mines, transport infrastructure (rail and roads), port facilities, and coal washing plants. He also asked how Vietnam plans to cost domestic coal to international coal price. Mr. Tuan updated on the processing of the pre-feasibility study for the nuclear plant and that this will be submitted to the national assembly for consideration in the Nov'09 session. Initially, Vietnam will construction a 2000 MW plant even though the power development plan calls for construction of 8,000 MW of nuclear capacity. On

coal, Mr. Tuan said that the IE is responsible for power projections, and not coal and oil/gas development. Hence, production data from Vinacomine and PetroVietnam is used in the demand forecast.

23. Based on the submission by Thai delegation, the target is to increase RE share to 20% of final energy consumption of Thailand by 2022.

Project Discussions: Promoting the Development of Renewable Energy (RE), Clean Fuels (CF) and Energy Efficiency (EE) Technology in the GMS (Concept Papers: Annex 7)

24. Mr. Tranquilino (ADB Consultant) presented the project's rationale and its strong links to country and regional strategy. He presented the project's impact and expected outcomes, which included making the GMS a showcase for a low carbon marketplace and expanding rural electrification using RE/CF sources. The expected outputs included (i) a strengthened SEF as a forum of information exchange and networking, with the SEF in this case acting as the project steering committee, (ii) performance targets and compliance mechanisms set, and (iii) established best practices in RE/CF/EE measures. He discussed the potential project issues and risks, and detailed the proposed implementation arrangements, stakeholder participation and financing of the project.

25. **Discussion.** Mr. Jude suggested that the countries be given time to submit their comments on the proposed technical assistance, which would also give Myanmar and Thailand time to submit their views on the proposal. A two period was agreed by which time all countries should submit their comments or suggestion on what else they would like to be covered, including capacity building.

Project Discussions: Promoting Environmentally-Sustainable Regional Power Trade Planning, Coordination and Development (Concept Papers: Annex 7)

26. Mr. Tranquilino explained that the project is a follow up to RETA 6440, aims to establish a joint program for comprehensive promotion of strategic environmental assessment (SEA) and other tools to consider cumulative and indirect impacts early in the project process. He discussed the scope of the project which includes capacity assessment/ capacity building, pilot testing of environmental management tools, and setting up of regular monitoring and evaluation mechanisms. The project's scope should address the concern on project sustainability by passing on the knowledge gained on SEAs to appropriate agencies and staff in GMS countries. He requested GMS members' views on the specific activities, implementation arrangements and possible financing of the project.

27. **Discussion.** Mr. Jude noted that the SEA development is being implemented with EOC support and the main concern under the proposed assistance is to ensure sustainability through transfer of knowledge to appropriate GMS country staff. He noted that EOC has provided assistance to IE in Vietnam for development of Power Development Master Plan 6 and Viet Nam has once again requested assistance for SEA in the development of Power Development Master Plan 7. He stressed the need for IE, Ministry of Environment and Natural Resources to mainstream this into their planning process.

28. The meeting agreed that the GMS representatives will submit their comments on the proposed project within **two weeks** of the meeting or September 3. A follow up email will be sent to the GMS representatives concerning the requested comments on Monday, 24 August. The countries are requested to indicate their views on the general directions of the projects, and

provide if possible specific comments on the proposed objectives, scope, and outputs of the projects.

Ensuring the Environmental Sustainability of GMS Energy Development

29. Mr. Sumit Pokhrel, EOC Representative discussed the context of GMS energy planning and explained how this manifested into national plans, with Lao PDR as the example. He noted the importance of linking environmental considerations into GMS energy development and proceeded to cite the experiences in integration environment and energy development in GMS countries, primarily the strategic environmental assessment (SEA) of the Hydropower Master Plan of Viet Nam under the Core Environment Program (CEP). Under this exercise, Viet Nam enhanced its SEA ownership and capacity which resulted in the following: (i) a request for follow up assistance in Viet Nam, (ii) a request from Lao PDR to build SEA capacity, and (iii) increased collaboration to strengthen coordination between the Regional Power Trade Coordination Committee (RPTCC), Working Group on Environment (WGE)/ EOC, and MRC. He then discussed the EOC efforts to promote renewable energy for environmental resilience and livelihood development and the emerging themes in GMS CEP and Biodiversity Conservation Corridor Initiative (BCI). He noted the emerging challenges in the GMS, foremost of which are the climate change risks and energy vulnerabilities, and explained the EOC efforts at climate proofing energy investments and exploring co-benefits of climate change mitigations. He cited the regional entry points to strengthen the energy-environment interface, such as integration of SEA in power trade agreement, promotion of RE with SEF, knowledge product development (also with SEF), and climate proofing energy investments, through ADB's climate change fund and CCIP.

Ensuring the Sustainability of GMS Energy Development: MRC Hydropower Program

30. Mr. Voradeth Phonekeo, Project Manager, Initiative on Sustainable Hydropower, MRC, provided a brief of the MRC and the 1995 Mekong Agreement. He said the MRC is composed of the four lower riparian states (Cambodia, Lao PDR, Thailand and Viet Nam) but with good working relationship with PRC and Myanmar. He said the MRC is primarily concerned with the sustainability of hydropower development and is cognizant of its adverse impacts (barriers to fish migration, sedimentation, water quality problems, etc.). Other MRC concerns included the strengthening of the PNPCA process (procedures for notification, prior consultation and agreement), information sharing and capacity building. He discussed the main elements and requirements of prior consultation, and noted the poor linkages in the two decision spheres in practice, involving (i) integrated basin planning, and (ii) energy/ power sector sphere (where hydropower decisions are made). He presented the general principles of design guidance, and the areas where these are applied (sedimentation, dam stability, etc.). He presented the SEA undertaken for 11 mainstream Mekong dams, which emphasized transparency in the process.

31. **Discussion.** Mr. Phonekeo explained that MRC's entry point is the National Mekong Committee in each country. Mr. Jude asked about MRC's success in sensitizing the member governments of the links between the various uses of dams following integrated water resource management (IWRM) principles. Mr. Phonekeo explained that the conduct of SEAs is an exercise meant to bridge this gap. Mr. Jude asked about MRC's leverage over developers, and whether MRC study findings and recommendations are followed. Mr. Phonekeo explained that developers follow the guidelines of the host country, and that consultations take place between MRC and developers over compliance standards that may be adopted.

Day 2

SEF Knowledge Sharing Series 1: Success Factors in PRC's Wind Energy Development (Annex 8)

32. Mr. Gao Shixian provided general information on wind power development in PRC, and showed installed capacity (38 MW in 1995, 12.17 GW in 2008) and projected capacity by 2020 (new: 100-150 GW). He noted that the companies have not met the quota for wind power. He showed the distribution of PRC's wind resources and the growth in the wind power market. He discussed the steps in the development of wind power in PRC: demonstration (1986-1993), industrialization (1994-2003), and large scale (2003-2008). He compared PRC's wind power capacity with other countries, which comprised 8% of the global total. He discussed PRC's policies for wind power development, embodied in the Law on Renewable Energy enacted in January 2006, and the creation of a department on RE under the National Energy Administration. He explained the policies on wind power development before and after the Law on RE was enacted and showed sample pricing for wind power for different locations. He summarized the factors for success as follows: (i) the importance attached by government to targets, quotas and resources survey; (ii) promotion policies for connection to grid, price, taxation, tariff; (iii) recognition of great market potential; and (iv) technical progress achieved through research and development, equipment popularization to reduce cost, etc.

33. The points raised during the discussions are as follows:

- a. Mr. Gao clarified that government does the resource survey and shares this information with the private sector.
- b. Mr. Zhai noted that wind power is priced at 8 US cents per kWh and asked about the price charged to consumers; Mr. Gao said that the consumer pays for the added cost.
- c. On the power companies' quota for wind power, Mr. Gao clarified that this was set at 3% by 2010 and at 8% by 2020, but that currently the companies have met only .3-2.6%.
- d. Mr. Tuan (Viet Nam) inquired whether the policies on wind power are applicable to other types of RE; Mr. Gao replied that the policies are generally applicable to all RE types.
- e. Mr. Quang (Viet Nam) noted the interesting steps for wind power development in PRC and asked about the incentives that were given during the demonstration step; Mr. Gao said some of the demonstration projects were supported by development partners.
- f. Mr. Zhai said the discussions presented a number of key points for the GMS countries to consider, such as proper application of quotas for power producers, or whether to build manufacturing capacity on a GMS-wide basis.

SEF Knowledge Sharing Series 2: Thailand's Incentive System for Development of Renewable Energy (RE) and Clean Fuels (CF) (Annex 8)

34. Mr. Zhai shared that Thailand's presentation under this session provides for a target to increase the share of RE to 20% of final energy consumption in 2022. He showed a slide on Thailand's road map to achieve this target, from 6.4% (2008) to 15.6% (2011) and eventually 20.3% by 2022, with corresponding initiatives/ measures and financing that would help meet such targets. He said this is a good example of programming to achieve certain RE targets

which the other GMS members could consider following. He said that the table on GMS targets could be augmented by indicating the measures and funding needed to realize the targets.

SEF Knowledge Sharing Series 3: Promoting the Clean Development Mechanism (CDM) in Lao PDR (Annex 8)

35. Ms. Thounheuang Buithavong of the Water Resources and Environment Administration (WREA) of Lao PDR provided a background on the CDM involvement of Lao PDR and discussed the four criteria on CDM projects along the lines of environment, social, economic and technology. She presented the CDM organizational chart in Lao PDR and the draft project idea note (PIN) and project design document (PDD) procedures. She discussed the potentials and issues on CDM projects in Lao PDR; among the key issues are the high cost of project preparation, lack of investment, lack of experience and the expiry of Kyoto Protocol commitments after 2012. She gave a list of CDM projects in Lao PDR and their status, and showed the Beer Lao project as the first Lao project registered with the UNFCCC, and the Xeset II as the first Lao CDM hydropower project. She showed the ongoing activities for CDM in Lao PDR (regulations, decree and guidelines). She concluded by stressing that the global carbon markets can assist Lao PDR in sustainable development and poverty reduction, and that more CDM projects should be conducted in Lao PDR, which the CDM decree could help boost.

36. Ms. Gabrielson asked about the Xeset II hydropower and its CDM aspects. Mr. Khamso briefed on Xeset II which is a run-of-the-river type hydropower project that primarily exports power to Thailand.

37. Mr. Jiwan Acharya, Climate Change Specialist (Energy), ADB, provided a brief on the ADB Carbon Market Initiative and explained the CDM concept and its elements of carbon credits, funds, technology and capacity building. He presented information on the growing carbon market, registered CDM projects, CDM pipeline, and project examples. He presented the issues in promoting CDM, the CDM project cycle, the post-2012 issue (end of Kyoto commitments), the global negotiation timeline, and the emerging schemes for post-2012. He proceeded to ADB's climate change program and discussed its adaptation, mitigation and financing elements and consultations with developing countries on their needs in scaling up green house gas (GHG) mitigation projects. He explained the mechanics of the carbon market initiative (CMI) and ADB's future Carbon Fund, and provided a sample project credit flow, project financing plan, and sample impact on project finance. He explained the summary of CMI advantages for project developers/ sponsors, which include: certainty of funds today; reduced budget commitments; comprehensive technical and implementation support; and extra credits from successful project implementation, which can be marketed for further financial upside.

38. The points raised during the discussions are as follows:

- a. Mr. Khamso (Lao PDR) asked about how ADB services could be availed for CDM projects; Mr. Acharya said that ADB has a technical team that could be tapped to facilitate CDM project preparation and help reduce risks from CDM projects.
- b. On the large number of CDM projects in PRC, Mr. Acharya noted that this is due to the high potential of PRC as well as due to strong capacity, technical opportunities and government support. Mr. Jude added that PRC's success is also due to its ability to "think outside of the box".

- c. Mr. Khamso asked about ADB's view on what would happen once Kyoto Protocol commitments expire (after 2012). Mr. Jude replied that ADB will continue to support CDM projects after 2012, unless there are new arrangements agreed to by the countries by then. He added that ADB could look into capacity building activities to boost Lao PDR's capacity for preparing CDM projects.

39. Mr. Acharya also presented his observations on the country presentations on increasing access to energy in the GMS. He was encouraged by the countries' commitment to address the persistent energy poverty in the GMS and noted that good models exist in the GMS, which could be replicated and scaled up. He presented some thoughts on scaling up access to energy, which include: leverage additional financing; focus on models than technologies; set targets on households rather than villages; clarify role of government (implementer or facilitator); involve financial institutions and private sector; consider specific approaches (for rural-urban areas, or for electricity and other fuels for cooking); and link with other programs (electricity for education, for health). He presented ADB's Energy for All (EFA) initiative which aims to scale up successful approaches to provide modern energy, and discussed the initiative's two pillars (access support and energy partnerships). He showed the structure of the EFA partnership and provided tips on how the GMS countries can participate under the initiative.

40. Mr. Lefevre (CEERD) gave an update of the work under RETA 6440, and first provided a brief of the project and its components, namely (i) facilitating regional power trading and (ii) building capacity for environmental assessment of power projects. He showed the project's website and structure. He discussed the objectives and activities of component (ii) and explained the expected outputs under this component. He outlined the present status of project implementation under the two components, showing the completed and planned workshops and training courses. He discussed the potential links between RETA 6440 and the work of the Environment Operations Center (EOC), covering pilot strategic environmental assessment (SEA) studies, pilot cumulative impact assessment (CIA) study, environmental management plan (EMP), on-the-job training, field trips, power development plan (PDP) training in Cambodia, and common research activities. He showed the potential future areas of cooperation between RETA 6440 team and EOC and MRC, which include training in SEA and PDP, and linking EOC's and MRC's SEA studies with the GMS power master plan.

SEF Knowledge Sharing Series 4: Experiences in Environmental Audit in Various Countries (Annex 8)

41. Mr. Ganesh Kumar, Managing Director, Gunung-Ganang Corporation, presented on the elements of comprehensive environmental audit and commenced with a brief on his company's profile and scope of services. He presented the concept and objectives of independent environmental audit (IEA) and the environmental impact assessment (EIA) process, and compared the conventional project management structure with the structure containing IEA. He showed select project experience examples and discussed the timeframe of IEA involvement. He then discussed the IEA case studies in Malaysia (Selangor River Phase 3, Bakun Hydroelectric Power, Pahang-Selangor Raw Water Transfer, and Second Penang Bridge) focusing on each project's description, the issues and the IEA scope of work. Among the benefits of IEA that he enumerated are the following: provides a proactive approach complementing accountability mechanism, supplements social protection strategy and SEA, creates public confidence, demonstrates commitment to environmental protection, ensures proper handling of environmental impacts, etc. He concluded by stressing that the IEA approach addresses the key issues of (i) commitment to environmental protection, (ii) transparency and consultation, (iii) technical excellence (in depth and breadth to cover all environmental issues)

and (iv) independence of environmental advice and audit, and that the IEA strikes a balance between development and environmental imperatives by advocating environmental sustainability.

42. Mr. Kumar discussed IEA Team's work for the Noi Bai-Lao Cai Expressway in Viet Nam and noted the areas of concern such as environmental impacts (water quality, soil erosion, change in hydrology, air and noise pollution, effects on national parks/ wetlands) and social impacts (disruption, resettlement, health). He showed the proposed reporting structure of the project and proposed scope of work and outputs of the IEA Team.

43. The points raised during the discussions are as follows:

- a. Mr. Khamso (Lao PDR) asked whether there are other companies in Malaysia doing IEA and how Gunung-Ganang obtains IEA contracts. Mr. Kumar replied that Gunung-Ganang is the only one doing IEA in Malaysia and noted that the company obtains contracts by convincing government officials of the need for IEA.
- b. Mr. Acharya (ADB) asked about how much IEA costs; Mr. Kumar informed that IEA consultancy services in the sample projects cost around \$4 million and in return has saved the government much more in terms of adverse impacts averted.
- c. Mr. Jude noted that for Nam Theun 2 which will be completed soon, there may be a need to undertake post-evaluation to carefully assess likely social and environmental effects in order to mitigate or avert possible future negative impacts.
- d. Mr. Pokhrel (EOC) asked about social and environmental guidelines to be followed in countries where these are deficient. Mr. Kumar said that international best practices may be adopted in such cases.
- e. Mr. Jude noted that in the GMS, it may be important to look into the problems that may be caused by increase in human trafficking and a rise in HIV/AIDS transmission.

44. Mr. Zhai requested proposals for topics for future SEF meetings. The GMS representatives suggested sharing of experiences in rural electrification with PRC and Viet Nam sharing their success cases and taking the lead in discussions.

45. The meeting also provided additional inputs to the table on performance targets (Annex 7). It was agreed to circulate this table to the countries to provide additional inputs and updates.

Session VI: Closing Session

46. **Synthesis of Discussions/ Agreements.** Mr. Jude was pleased to note the meeting's substantive agreements on jumpstarting the Road Map and the interesting discussions during the knowledge sharing session. He asked the countries to confirm the areas in which they could take the lead or areas where they need further assistance. He asked the countries to give priority to developing the energy database, and stressed the importance of populating/ contributing to the database and ensuring its relevance and usefulness.

47. **Consideration and Adoption of Proceedings.** Mr. Jude announced the distribution of the draft summary of proceedings for review by the body. After the SEF members reviewed the

draft summary of proceedings, and after incorporation of suggested changes, the body therefore approved the minutes of the Special SEF meeting *ad referendum*.

48. **Closing Remarks.** Mr. Jude thanked the participants for their substantive contributions and exchanges during the meeting. He thanked the Cambodian Government, particularly MIME for successfully hosting the meeting.



Greater Mekong Subregion
Third Meeting of the Subregional Energy Forum (SEF-3)
Phnom Penh, Cambodia, 20-21 August 2009

Agenda and Program

20 August (Thu)

Day 1

08:45am – 09:00am

Registration

09:00am-09:20am

Opening Session

Welcome Remarks

- **Dr. Ith Praing**, Secretary of State
Ministry of Industry, Mines and Energy (MIME), Cambodia

Opening Remarks/ Introduction

- **Mr. Anthony Jude**, Director
Energy and Water Division, Southeast Asia Department

09:20am – 10:00am

GMS Road Map for Expanded Energy Cooperation

- Recap of Highlights of Road Map, Proposed Projects/ Activities, Proposed Implementation Arrangements (ADB)
- Discussions

10:00am- 10:15am

Coffee Break

10:15am- 11:00am

GMS Road Map for Expanded Energy Cooperation (continued)

- Discussion on Priority Projects and Timeline (ADB and GMS Representatives)

11:00am- 12:00nn

GMS Road Map for Expanded Energy Cooperation (continued)

- Discussion on Lead Country for Priority Projects
 - o Cambodia
 - o People's Republic of China
 - o Lao PDR
 - o Myanmar
 - o Thailand
 - o Viet Nam
- Agreement on Lead Country, Timeline for Implementation (ADB and GMS Representatives)

12:00nn– 1:30pm

Lunch Break

01:30pm- 03:00pm

Country Presentations on Recent Developments in Energy Sector (oil, gas, renewable, etc.-other than power)

- Highlighting the Performance Targets Used by Each Country to Monitor Progress in their respective Energy Programs
 - o Cambodia
 - o People's Republic of China
 - o Lao PDR
 - o Myanmar
 - o Thailand
 - o Viet Nam
- Discussions on Process for Adoption of Performance Targets/ Adoption of Interim Performance Targets for the Road Map (ADB/ GMS Representatives)

03:00pm- 03:15pm

Coffee Break

- 03:15pm- 04:00pm Proposed Project: Promoting the Transfer of Renewable Energy (RE), Clean Fuels (CF) and Energy Efficiency (EE) Technology in the GMS
- Scope/ Components of Proposed Project
 - Implementation/ Financing Plan
 - Next Steps for Lead Country/ ADB
- 04:00pm- 04:20pm Proposed Project: Promoting Environmentally-Sustainable Regional Power Trade Planning, Coordination and Development in the GMS
- Scope/ Components of the Proposed Project
 - Implementation/ Financing Plan
 - Next Steps for Lead Country/ ADB
- 04:20pm- 04:45pm Ensuring the Environmental Sustainability of GMS Energy Development
- Presentation of the GMS Environment Operations Center (EOC) focusing on Core Environment Program (CEP) linkages with the GMS Energy Road Map
- 04:45pm- 05:00pm Ensuring the Sustainability of GMS Hydropower Development
- Presentation of Mekong River Commission (MRC) Hydropower Program

21 August (Fri)

Day 2

- 08:30am – 09:15am SEF Knowledge Sharing Series 1: Success Factors in PRC Wind Energy Development (PRC Representative)
- Discussions on Policy, Institutional Arrangements, Funding, Economic and Technical Issues
 - Lessons for GMS Countries
- 09:15am- 10:30am SEF Knowledge Sharing Series 2: Thailand’s Incentive System for Development of Renewable Energy (RE) and Clean Fuels (CF) (Thailand Representative)
- Incentive Schemes (e.g. escrow funds) for RE and CF
 - Institutional and Implementation Arrangements
 - Technical and Economic Issues
- 10:30am- 10:45am Coffee Break
- 10:45pm- 12:00nn SEF Knowledge Sharing Series 3: Promoting the Clean Development Mechanism (CDM) in Lao PDR (Lao PDR Representative)
- Lao PDR Experience in Securing Donor Support for CDM
 - Current CDM Programs and Results
 - Institutional, Technical and Economic Issues in CDM Implementation
- 12:00nn- 01:30pm **Lunch Break**
- 01:30pm- 03:30pm SEF Knowledge Sharing Series 4: Experience in Environmental Audit in Other Countries (Private Sector Resource Person from Malaysia)
- Elements of Comprehensive Environmental Audit
 - Links with Environmental Performance Monitoring and Assessment Work of the GMS Environment Operations Center (EOC)
- 03:30pm-03:45pm Coffee Break
- 03:45pm- 04:10pm Closing Session
- Chair’s Synthesis of Discussions/ Agreements in SEF-3
 - Consideration and Adoption of Proceedings
 - Closing Remarks



**Greater Mekong Subregion
Third Subregional Energy Forum\
Intercontinental Hotel, Phnom Penh, Cambodia
20–21 August 2009**

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GMS Road Map for Expanded Energy Cooperation: Providing Affordable and Sustainable Energy for All

**15th GMS Ministerial Conference
Senior Officials' Meeting
Petchburi Province, Thailand
17 June 2009**



Outline of the Presentation

- I. Rationale, Goal, Objectives of Strategy, Policy Framework**
- II. Thrusts/ Key Projects (Work Plan)**
- III. Key Features in Implementation**
- IV. Next Steps and Conclusion**



I. Background/ Rationale of Strategy

Basis for expanded GMS energy cooperation

- Agreed to expand energy cooperation at 11th Electric Power Forum (EPF-11) meeting (Bangkok, Dec. 2004)
- EPF becomes Subregional Energy Forum (SEF)
- Energy strategy study findings

Recent developments- stronger rationale for cooperating beyond power:

- Reduce costs by accessing energy supply outside the border
- Expand markets for scale efficiency
- Diversify sources for improved energy security
- Address trans-border environmental implications: addressing climate change challenges
- Enhance efficiency of regional energy system



I. GMS Road Map for Expanded Energy Cooperation:

- **Goal: An integrated approach to deliver sustainable, secure and competitive low carbon energy**

Major Strategic Objectives:

- Enhance **access to modern energy** to all sectors/ communities
- Develop/ utilize **low carbon, renewable domestic** resources while reducing oil dependence
- Improve **regional energy cooperation and security**
- Promote **private participation** in GMS energy development



I. POLICY FRAMEWORK

Enhance access to modern energy:

- Establish **interconnection** arrangements
- Promote cost-effective **rural electrification** schemes
- Promote best practices for **off-grid systems**
- Coordinate with other GMS sectors for maximum synergies

Develop low carbon, renewable domestic resources:

- Promote use of **renewable energy resources**
- Promote **engineering/ manufacturing capacity**
- Enhance **energy efficiency/ conservation** (demand and supply)
- Develop best practices for **improved thermal plant efficiency**
- Develop institutional capacity to develop projects using **CDM**
- Monitoring technology development of **carbon capture & storage**



Improve regional cooperation and energy security:

- Strengthen information exchange and collaboration
- Enhance institutional and technical capacity in cross-border trade and energy integration beyond the power sector
- Improve transport modal mix

Promote private participation in GMS energy development:

- Enhance institutional/ regulatory environment
- Share best practices in terms of incentives to project sponsors
- Promote networking and exchanges in state of art in energy efficiency, renewable and clean technologies



II. Work Plan: Key Thrusts, Priority Projects, 2009-2015

Energy Efficiency (EE) and Conservation: Information sharing/ networking on best practices; Enhanced energy management; Energy efficiency in transport; Financing for EE initiatives

Priority Project: Improving EE Through Demand Side Management and Energy Conservation in the GMS

New and Renewable Energy (RE): Policy/ institutional framework for RE development; Promoting biofuels/ biomass; Information networking

Priority Project: Promoting Development of RE and Clean Fuels

Regional Energy Planning, Policy, Program: Energy policy, planning, program management; Sustainable financing and support

Power: Policy/ regulatory framework for power trade; Grid interconnection and power generation for export; Rural electrification; Environmental sustainability of power infrastructure

Priority Project: Promoting Environmentally-Sustainable Power Trade Planning, Coordination and Development

Oil and Gas: GMS sections of Trans-ASEAN Gas Pipeline; Logistics and network

Coal: Clean coal technologies; Framework for trade/ investment in coal



III. Key Features in Implementation

- Strong commitment of GMS members
- Each country to act as a “Lead” per project
- “Lead” to formulate/ refine proposals, seek development partners’ support

GMS countries also agreed to adopt performance targets to properly monitor success and serve as benchmarks for future directions



IV. Next Steps and Conclusion

Role of the Subregional Energy Forum (SEF):

- Drive the process for “Lead” Country for priority projects
- Set and monitor performance targets
- Regularly monitor progress of Road Map
- Serve as vehicle for information sharing
- Enhance development partnerships in support of the Road Map



Thank you



Energy Road Map: Work Plan Priority Projects and Projects for Immediate Implementation

Medium Term Thrusts	Work Plan Priority Projects/ Activities	Projects/ Activities for Immediate Implementation
A. New and Renewable Energy (NRE) Sources		
1. Enhancing the policy and institutional framework for development, financing and private investment in NRE	i. Regional framework for RE development (coherent policy for stimulating investments in NRE in GMS context) ii. Small scale clean generation fund (study for fund to support community based clean generation like micro hydro, biofuels/ biomass, micro-grids, solar, etc.) iii. Renewable energy resource assessment studies (research and development, demonstration projects in GMS) iv. Promoting the development of renewable energy and clean fuels in GMS	I. Promoting the Transfer of Renewable Energy (RE), Clean Fuels (CF) and Energy Efficiency (EE) Technology in the GMS Scope will include some of the work in projects listed as items i to x (under NRE) and xi to xix (under EE and EC). Also includes items xxxi and xxxii, which involve promotion of RE in off-grid systems.
2. Promoting utilization of biofuels and biomass.	v. Sharing best practice in biofuels vi. Biomass generation project (piloting of private/ community-owned biomass-fired power plants) vii. Coordination between SEF and Working Group on Agriculture (WGA) on Rural Renewable Energy (RRE) Project viii. Training on Biodiesel at the community level	
3. Strengthening of information networking particularly in GMS-appropriate NRE technology.	ix. Study on networking for propagating GMS-appropriate NRE (e.g. dissemination of findings/ applications of the WGA's RRE project) x. Renewable energy advocacy program for the GMS	
Energy Efficiency (EE) and Conservation		
1. Promoting information sharing/ dissemination and networking on best practices in the GMS context.	xi. Improving energy efficiency (EE) through demand side management (DSM) and energy conservation (EC) in the GMS xii. Study on development of GMS EE network	

Medium Term Thrusts	Work Plan Priority Projects/ Activities	Projects/ Activities for Immediate Implementation
	<p>(sharing of EE practices in GMS context, such as improving fuel conversion for power plants for the GMS grid, energy audits for industries in GMS corridors, etc.)</p> <p>xiii. Implementing public awareness campaign for energy conservation particularly in residential sector</p>	
<p>2. Expanding private sector involvement through enhanced energy management in industrial and commercial sectors.</p>	<p>xiv. Study of prospects of public-private partnerships for EE (covering (i) government owned buildings, enterprises in special economic zones, (ii) hotels [with Tourism Working Group], and (iii) revolving fund, tax incentives and promotion of energy services companies)</p>	
<p>3. Promoting energy efficiency in the transport sector.</p>	<p>xv. Study on promoting carbon-neutral GMS economic corridors (included in Environment Operations Center [EOC] work program)</p> <p>xvi. Energy efficient transport modal mix (with Subregional Transport Forum [STF])</p> <p>xvii. Improvement of transport system efficiency</p> <p>xviii. Study for promoting use of electric cars in GMS countries</p>	
<p>4. Expanding financing for energy efficiency initiatives.</p>	<p>xix. Regional energy efficiency program (support for studies/ fund windows for broad range of EE programs)</p>	
Regional Energy Planning, Policy and Program Coordination		
<p>1. Strengthening the energy policy and planning, and program management, coordination and networking in the GMS.</p>	<p>xx. GMS energy database development, publications, and networking (under SEF supervision, to be linked to RPTCC database and website)</p> <p>xxi. Sharing of methodology and analysis for developing each country's economy and energy development plan</p>	<p>II. Enhancing Cooperation in GMS Energy Planning, Capacity Building, Project Preparation, and Policy and Program Coordination</p> <p>Scope will include some of the work of projects listed as items xx to xxvi, and xxxv to</p>

Medium Term Thrusts	Work Plan Priority Projects/ Activities	Projects/ Activities for Immediate Implementation
	xxii. Training needs analysis and capacity building program for energy initiatives in the Road Map (in coordination with ASEAN Plan of Action on Energy [APAEC]) xxiii. Study on accreditation schemes for energy managers/ technical personnel in the GMS xxiv. Study on initiative for oil stockpiling and strategic reserves for enhanced oil security within GMS xxv. Sharing of knowledge and experience in nuclear energy development, safety issues, and public information/ awareness campaigns	xxxix, especially: <ul style="list-style-type: none"> - Training needs analysis and capacity building program - Study on viable areas of cooperation in various energy sub-sectors and specific areas of concern, such as (a) ensuring oil security; (b) sharing in nuclear energy experience, safety issues and public information; (c) cooperation with ASEAN on the gas pipeline development; (d) use of natural gas in transport; (e) oil safety, security and environmental mitigation. - Project preparation facility to include funding for priority projects in the road map and assistance in project preparation.
2. Ensuring sustainable financing and support for initiatives under the road map for expanded GMS energy cooperation.	xxvi. Regional project preparation TA facility (for funding studies for priority projects under the road map)	
Power		
1. Establishing the policy and regulatory framework for power trade in the GMS (including building capacity for power trade operation, coordination and grid interconnections).	xxvii. Major items include (i) regional power database and website; (ii) development of performance standards; and (iii) developing the regional transmission and regulatory authority.	III. Developing the Regional Transmission and Regulatory Authority (TRA)
2. Developing the grid interconnection infrastructure and power generation projects for export.	xxviii. Priority interconnections such as: GMS Laos (Nabong)- Thailand (Udon Thani) Power Transmission; Viet Nam-PRC (Yunnan) 500 kV Interconnection; Laos (Ban Sok)- Vietnam	

Medium Term Thrusts	Work Plan Priority Projects/ Activities	Projects/ Activities for Immediate Implementation
	<p>(Pleiku); Laos (Ban Sok) – Cambodia (Stung Treng)- Vietnam (Thay Ninh); China (CSG grid)-Laos-Thailand (Nong Don) 500 KV Interconnection; Myanmar (Shweli)-China (Yunnan Interconnection)</p> <p>xxix. Power generation projects such as: - Lao PDR: Export of 7000 MW to Thailand, including Nam Thuen 2 Hydro (920MW), Nam Ngum 2 Hydro (615MW); Theun Hinboun Hydro Expansion (220MW), Nam Tuen 1 Hydro (523 MW), Nam Ngum 3 Hydro (440MW); 5000MW exports to Vietnam including Sekaman Hydro 1-4 (907 MW); Nam Kong Hydro 1,2,3 (240 MW); - Cambodia: Lower Sesan II + Lower Srepok II Hydro (420 MW), Steung Treng Power Hydro (980MW), Sambor Hydro (2600 MW); - Myanmar: Shweli Hydro 1,2,3 (600MW+460MW+360 MW)</p>	
<p>3. Expanding power coverage to all (rural electrification).</p>	<p>xxx. Power distribution and rural electrification projects linked to backbone transmission lines (e.g. GMS Northern Power Transmission Project of Lao PDR)</p> <p>xxxi. Development of decentralized (off-grid) energy systems for integration of isolated areas (e.g. review of policy/ regulations, incentives for private sector investment, sharing technology and piloting of micro/mini hydropower)</p> <p>xxxii. Piloting of smart subsidies for the use of RE technologies in off-grid systems (e.g. feed-in tariff for renewable energy)</p>	<p>See project I.</p> <p>See project I.</p>
<p>4. Promoting environmentally sustainable development of electricity infrastructure.</p>	<p>xxxiii. Promoting environmentally-sustainable regional power trade planning, coordination and development in GMS</p>	<p>IV. → Promoting environmentally-sustainable regional power trade planning, coordination and</p>

Medium Term Thrusts	Work Plan Priority Projects/ Activities	Projects/ Activities for Immediate Implementation
	xxxiv. Coordination between RPTCC and Environment Operations Center (EOC), e.g., conduct of strategic environmental assessments (SEAs) for the power sector, and environmental impact assessments (EIAs) for energy projects	<p align="center">development in GMS</p> <p>Scope will cover some of the work of projects listed as items xxxiii to xxxiv.</p>
Oil and Gas		
1. Supporting realization of GMS segments of Trans-ASEAN Gas Pipeline (TAGP).	xxxv. Review of identified GMS segments of TAGP, other possible segments (e.g., production-distribution logistics, facilitation of contractual arrangements for exploration/ supply of gas, pipelines and interconnection policy, etc. xxxvi. Sharing experience and best practice on regulatory issues and legal framework	See project II. See project II.
2. Promoting the development of oil and natural gas logistics and network in the GMS.	xxxvii. Development/ propagation of the use of natural gas in transport (e.g. Thailand tax incentive and revolving fund for natural gas in vehicles) xxxviii. Coordination of efforts to enhance energy market integration in ASEAN (ASCOPE-HAPUA)	See project II. See project II.
3. Mitigation of environmental risks in construction/ operation of pipelines.	xxxix. Conduct of Studies (on safety and security of oil/ gas pipelines, environmental risk mitigation, research and development on carbon sequestration, etc.)	See project II.
Coal		
1. Promotion of energy efficiency, clean coal technologies and reducing carbon emissions from coal plants.	xl. Abated Clean Coal Generation (promotion of carbon abatement technology); Development of energy efficiency and clean coal technology, and sharing of technology with other GMS countries	<p>V. Promotion and Piloting of GMS-Appropriate Clean Coal Technology</p> <p>Scope will cover some of the work of projects listed as items xl to xlii.</p>

Medium Term Thrusts	Work Plan Priority Projects/ Activities	Projects/ Activities for Immediate Implementation
<p>2. Strengthening of policy and institutional framework to enhance GMS trade and private investments in the coal subsector.</p>	<p>xli. Coal liquefaction and carbon neutrality technical assistance (study on technical viability of coal to liquids processes). xlii. Monitoring international technical progress (including costs) in carbon capture and storage (CCS)</p>	



Contents

- **Basic Facts of Cambodia**
- **Overview of Power Sector**
- **Energy Policy**
- **Structure of Electricity Sector**
- **Cambodia Power Sector Strategy**
- **The Status of New & Renewable Energy Development**

BASIC FACTS OF CAMBODIA

- Country: Area 181,035 sq km, water 2.5%. Population 14,241,640. Pop growth rate 1.75% (2008)
- GDP growth rate 9.6% (2007)
GDP/capita \$589 (2007)
- GDP by sectors:
-agriculture 31%, -industry 26%, -service 43%.
- Hydro power potential about 10,000 MW, at present the capacity < 1% used



3

Overview of Power Sector

- EDC's Capacity output in 2008 : 210 MW and 1,155 GWh
- Projection in 2024 : 3045.33 MW and 16,244.61 GWh
- At present, only 20 % of households has access to electricity (70% in Urban and only 10% in rural)
- Annual energy consumption per capita: 103 kWh
- 22 small isolated power systems
- 100 % of oil, LPG are imported
- Biomass account for 84 % of total energy consumption

4

Energy Policy

To provide an adequate supply of energy throughout Cambodia at reasonable and affordable price,

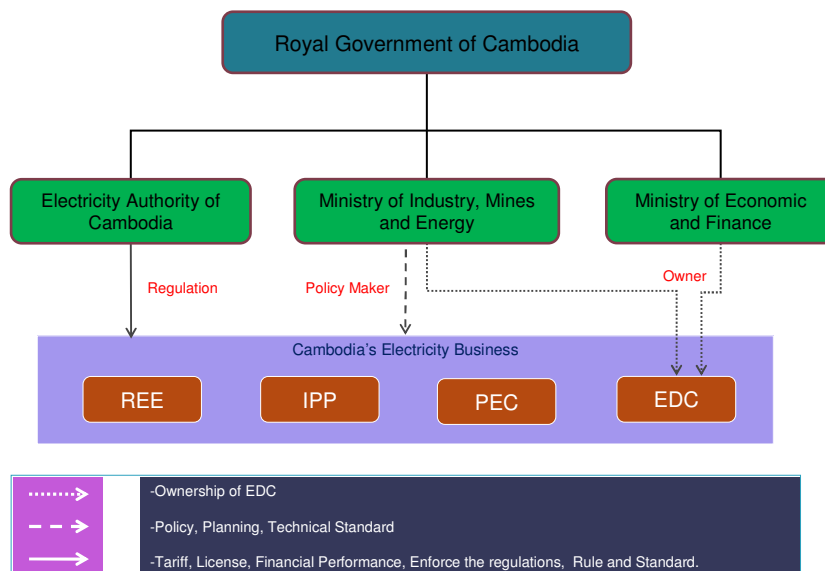
To ensure a reliable and secured electricity supply at reasonable prices, which facilitates the investments in Cambodia and developments of the national economy,

To encourage exploration and environmentally and socially acceptable development of energy resources needed for supply to all sectors of Cambodia economy,

To encourage the efficient use of energy and to minimize the detrimental environmental effects resulted from energy supply and consumption.

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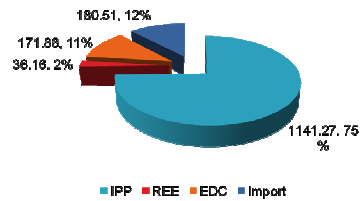
Current Structure of Electricity Sector



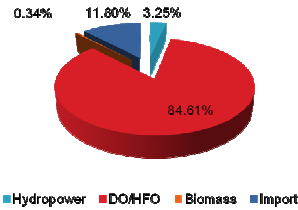
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Current Electric Sector Status

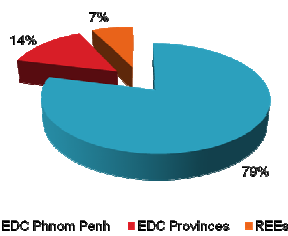
Energy Dispatched (GWh) In 2007



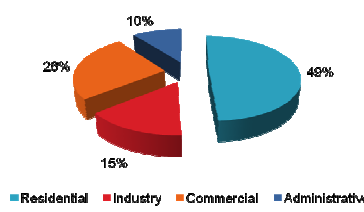
Generation by Fuel Type (GWh) In 2007



Energy Distributed by Areas

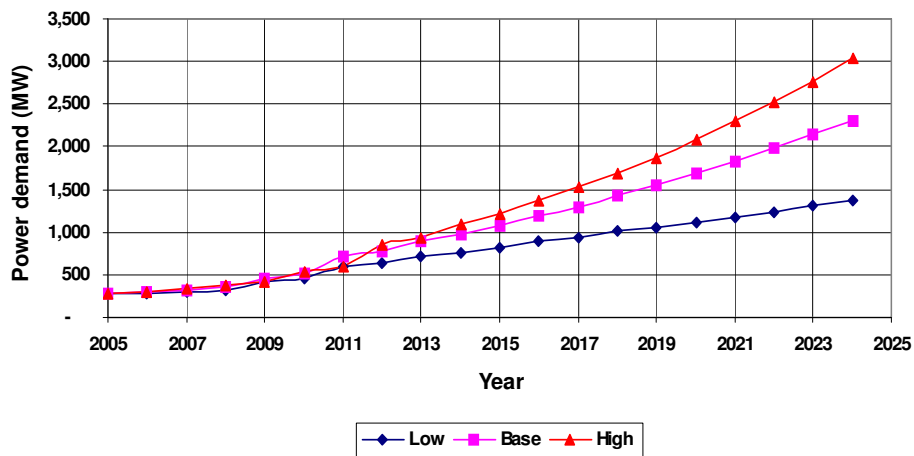


Energy Consumption by Sectors In 2007



Cambodia Power Demand

Power Demand in Cambodia (in Power Grid)



Cambodia Power Sector Strategy

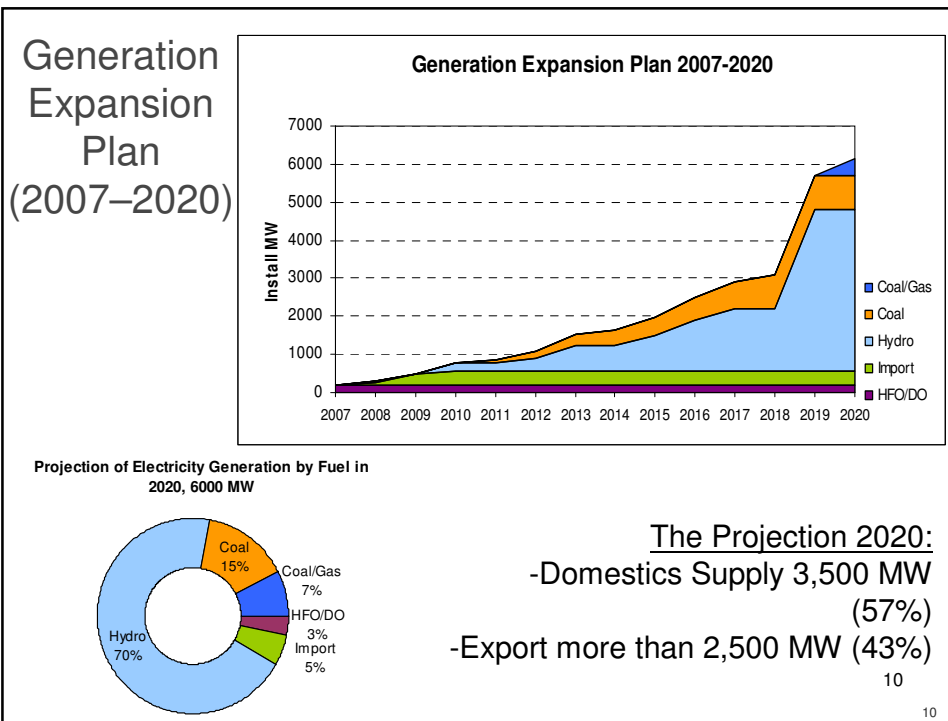
Cambodia Power Strategy Components:

A- Development of Generation and Transmission

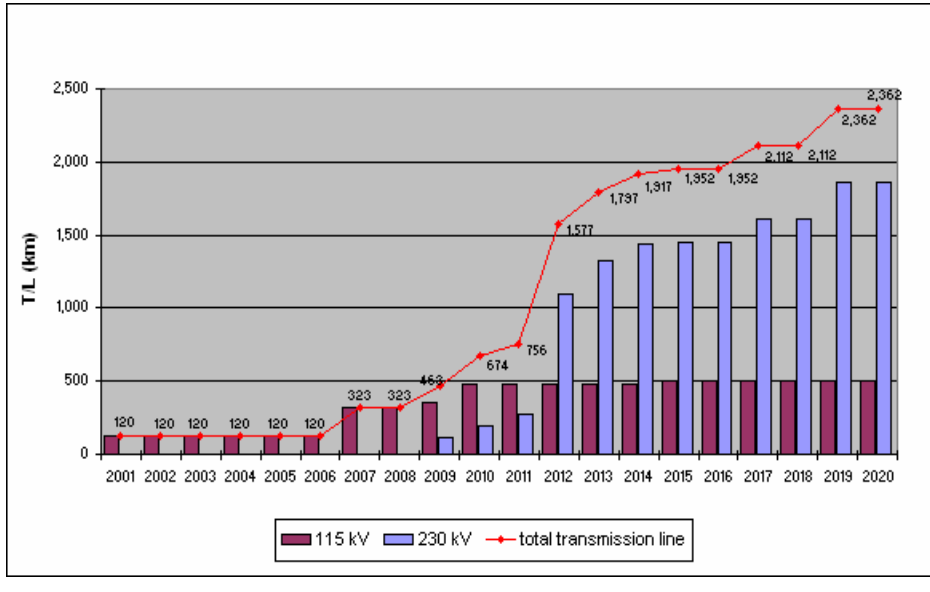
B- Power trade with neighboring countries

C- Provincial and Rural Electrification / Role of Renewable Energy for Rural Electrification

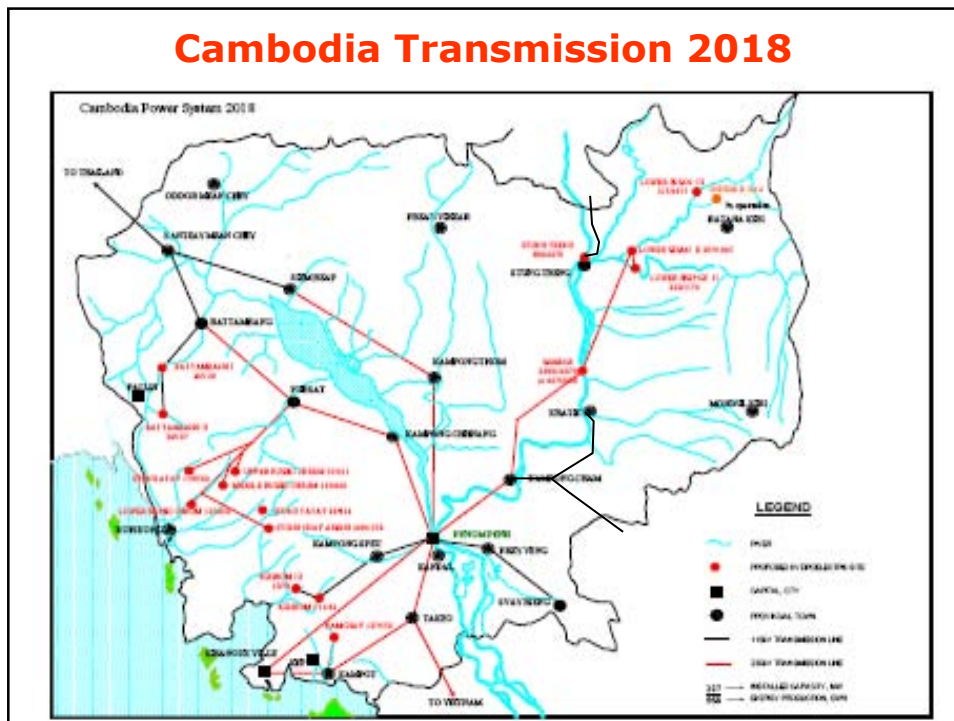
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Transmission Expansion Plan (2001 – 2020)



Cambodia Transmission 2018



Rural Electrification

- It is a tool for national socioeconomic development
- Most of population lives in rural areas, 85% (Policy)
- Reduce the gap between Urban and Rural areas
- RE promotes agricultural development
- RE can increase agro-industrial and commercial activities/increase employment
- RE improve the living conditions
- Reduce in the flight of rural people to the urban areas etc.

Difficulties in RE

- Low income levels of rural population
- Low benefit
- Financial constraints faced by the REE's
- Lacking of investment
- High loss, Low load factor, High cost & poor quality of supply,
- But the Policy of the Govm't, we have to provide power throughout the country.

Current Status of New and Renewable Energy in Cambodia

- At present, the development of NRE sources in Cambodia is slow in comparing with other countries in the region, because of the lack of experiences, funds, and inadequate data in this field,
- Current status of NRE Technologies in Cambodia mainly in research development and demonstration stages,
- New & Renewable Energy will reduce the impact on climate change/ decrease the CO₂ emissions and contributed to global warming reduction

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Government Policy for NRE Development

- In order to promote NRE development, the RGC has formulated Renewable Energy Policy, which lays down the policy intention, objectives and guidelines for providing electricity services in rural areas.
- To achieve its rural electrification goals by providing electricity services to 100% villages by 2020 and 70% households by the year 2030, the Royal Government set up the Rural Electrification Fund (REF) and formulated Renewable Electricity Action Plan (REAP).

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Fig. 1. Village Electrification Plan

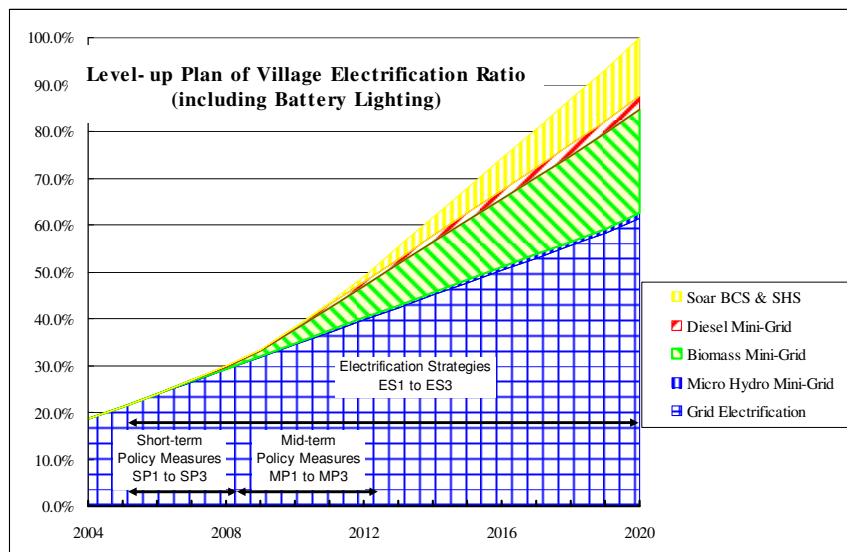
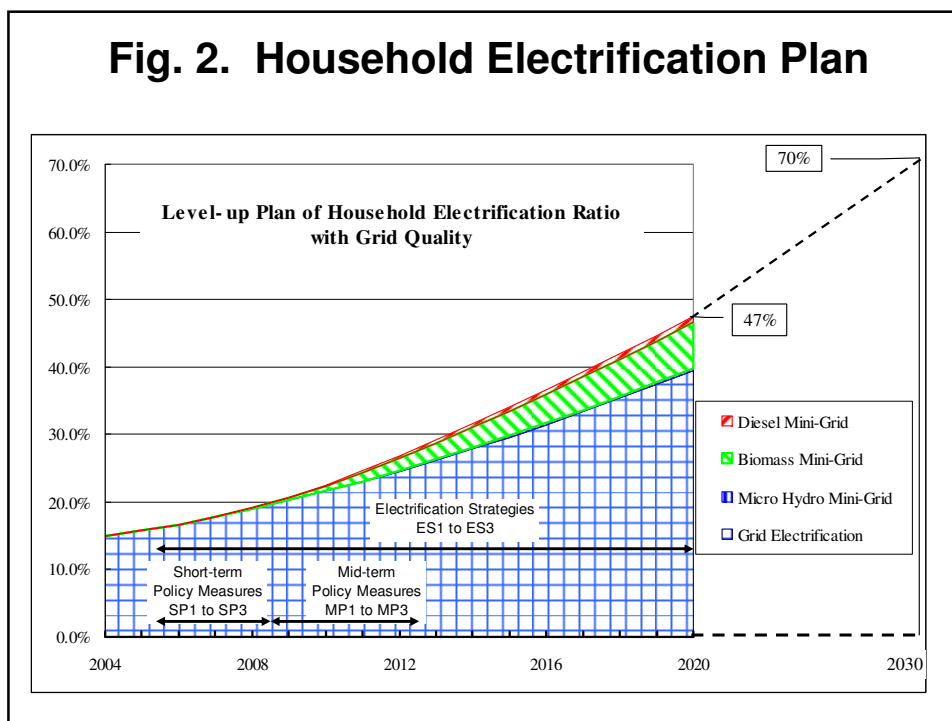


Fig. 2. Household Electrification Plan



NRE's Implementation Projects

- **Solar Photovoltaic:** Project with NEDO Japan, SIDA , other international and national institutions including Prime Minister project we had installed around 1.5 MW in the country.
- **Biomass Gasification:** Project with Canada in Battambang (7kw + 20kw) and with DEDE Thailand in Kompong Cham (30kw). On going project in Sambour District, Kompong Thom Province with the capacity 30kw by FONDEM France by 2009 and a number of biomass gasifiers done by local investors
- **Microhydro:** On Going Project with UNIDO capacity 65kw two units (130 kw), Grant from JICA 2 micro hydropower plants 370 kw already put in operation in Nov. 2008.

Biomass account for 84% of total energy consumption, mainly use for households purpose (firewood and charcoal, main source for energy use for cooking)

Potential of Biomass for electricity generation

Agricultural Waste

Rice husk - One million t/year rice husk; 60-100 MW capacity

Cashew nuts shell, sugarcane bagasse, cassava stems etc.

Old Rubber Trees

40,000 ha plantation, 25-30 year replanting cycle, 180 t/ha

250,000 t/year; 20-50 MW capacity

Forest Resource

Plantation, tree farming

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22



NRE's Implementation Projects (Con't)

- **Bio-fuel:** Have more than 10 companies doing with Jatropha, planting around 1,000 ha, no once do with big scale yet.
- **Bio-Energy:** One company from Korea doing on this field with the production capacity of ethanol 36,000 t/year from 100,000 tons of cassava.
- The WB assist to Rural Electrification Fund (REF) by providing granted (GEF) and IDA Loan Aprox. USD 12 mil. to implement the following projects:
 - 1- Expansion off-grid new 50,000 connections with subsidy \$45/connection,
 - 2- Study and development of micro hydropower plants (village hydro) with investment cost USD 2.7 mil.,
 - 3- Install 12,000 SHS to people in rural areas – people have to pay back all the cost during 3-5 yrs period .

NRE's Implementation Projects (Con't)

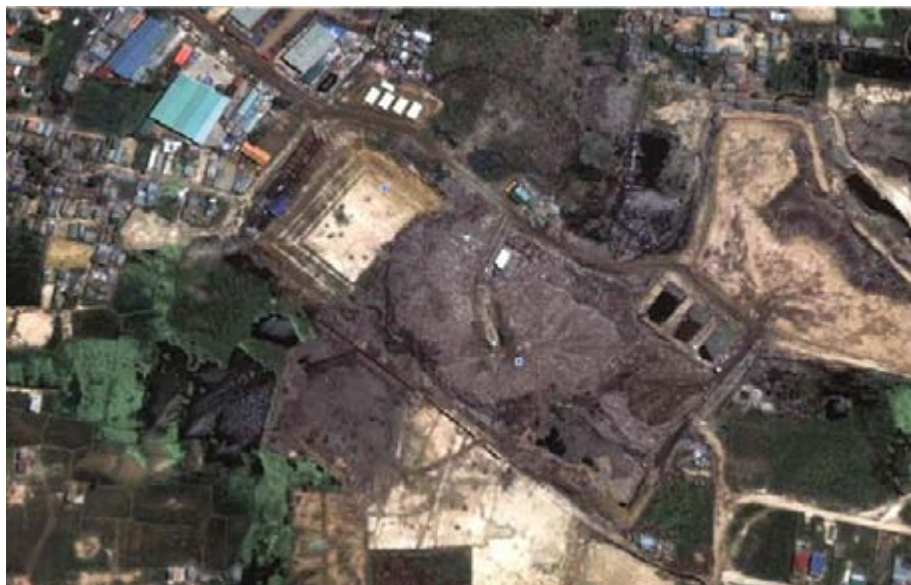
- The F/S LFG Power Generation Project 2 MW was submitted by Korean Company to MIME,
- MIME supports this project as it is the multi-purposes project such:
 - to generate electricity by using landfill gas that has been emitted to the air since 1975,
 - to reduce Green House Gas, In order to participate in international challenge to cope with climate change,
 - to make clean environment In order to eliminate bad smell, fire smoke, fire, and explosion of landfill,

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Current Site View

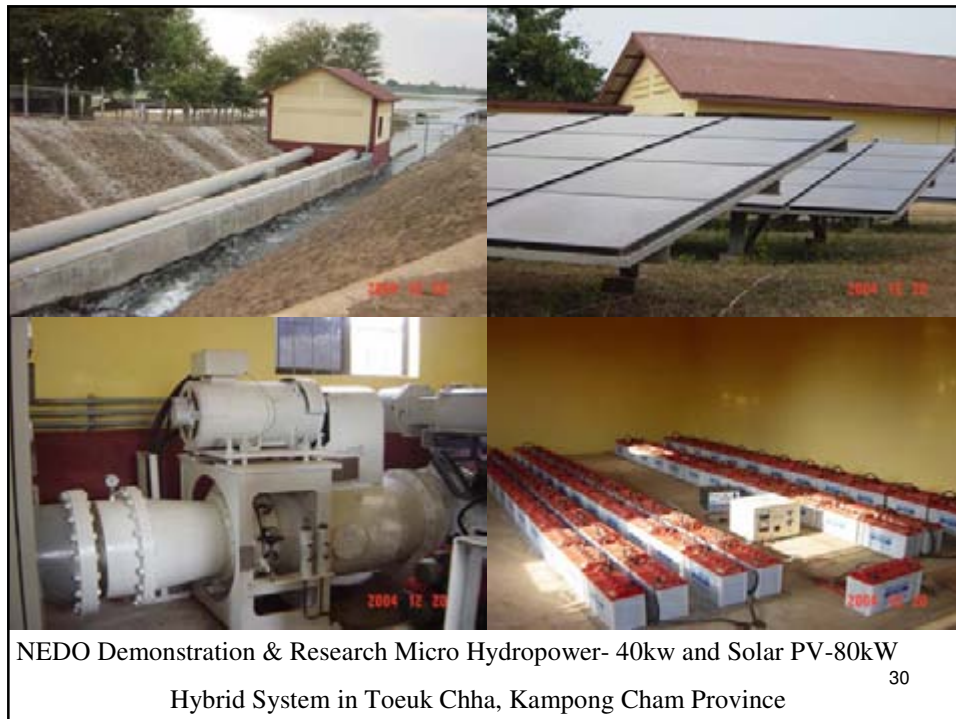
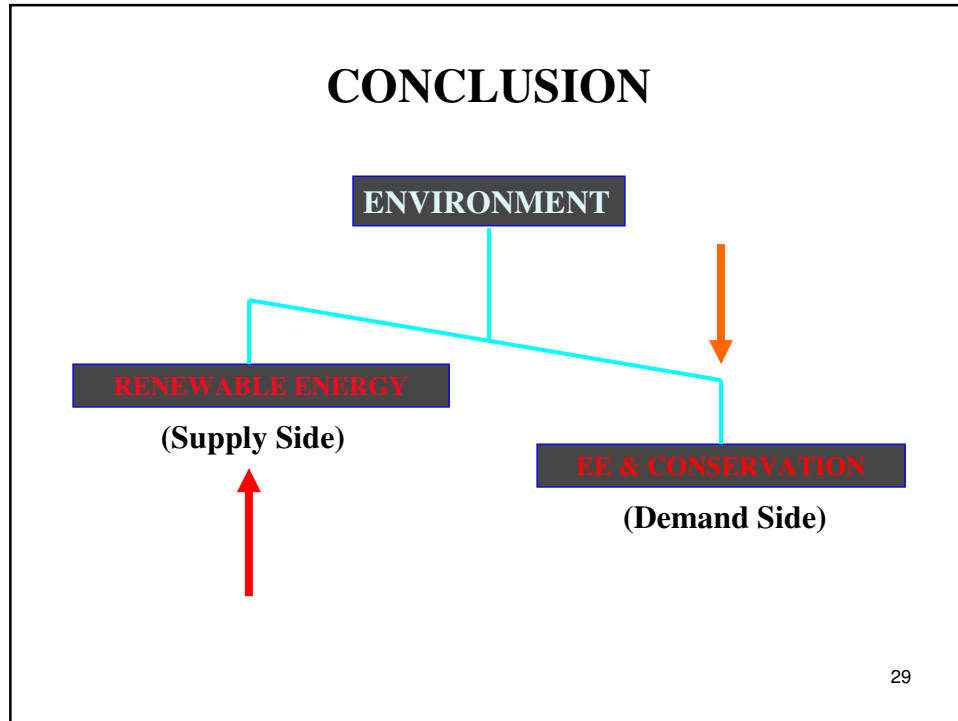


Current Site Top View



Future View







Solar PV for Bridge Lighting and Telecommunication Systems



Solar PV-BCS

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**NEDO Demonstration & Research Solar PV (50 kW)
and Biogas Engine (2x35kW)**

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RECENT DEVELOPMENT IN LAO PDR ENERGY SECTOR

Khamso Kouphokham
Director of Executive Planning Division, Department of Electricity
Ministry of Energy and Mines, Lao PDR
20 August 2009, (SEF-3)
Phnom Penh, Cambodia

BACKGROUND

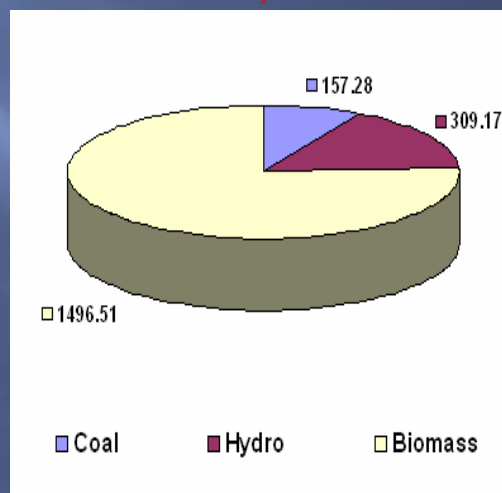
INDIGENOUS PRODUCTION OF ENERGY, 2006

TOTAL: 1,962.95 KTOE

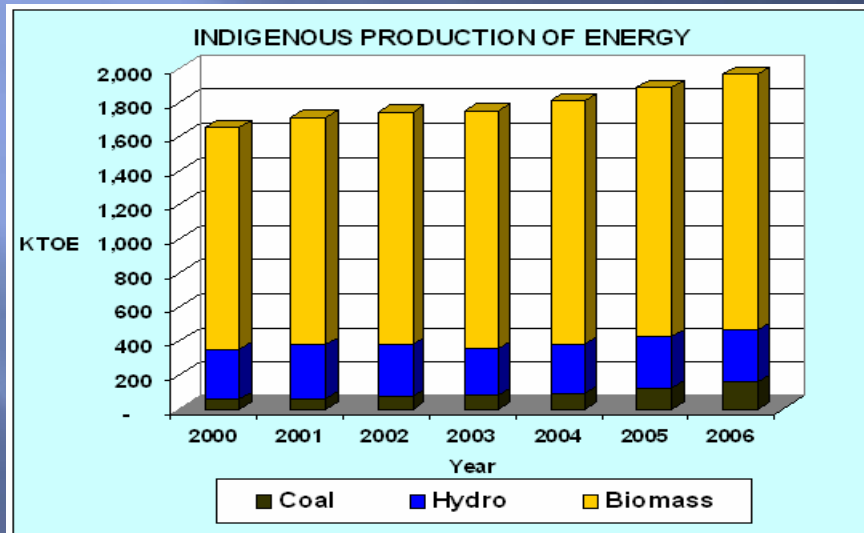
BIOMASS: 76.24%

HYDRO: 15.75%

COAL: 8.01%



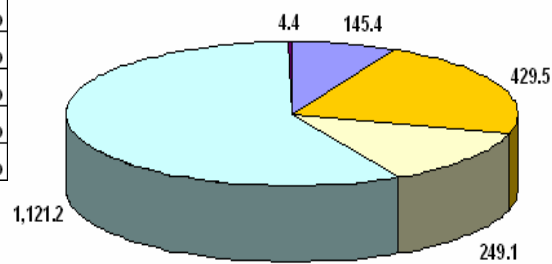
BACKGROUND



BACKGROUND

FINAL ENERGY CONSUMPTION, 2006

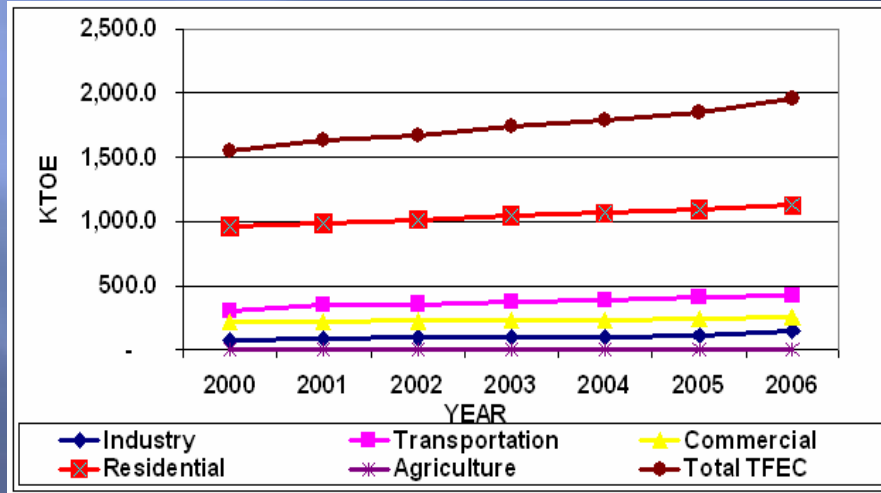
Industry	7.5%
Transportatio	22.0%
Commercial	12.8%
Residential	57.5%
Agriculture	0.2%
	100.0%



■ Industry ■ Transportation □ Commercial □ Residential ■ Agriculture

BACKGROUND

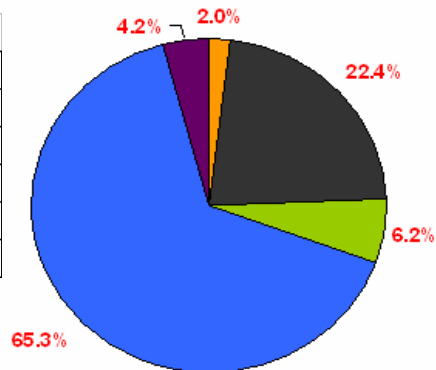
FINAL ENERGY CONSUMPTION GROWTH



BACKGROUND

FINAL ENERGY CONSUMPTION BY TYPES

	KTOE	%
TFEC	1,949.6	100.0%
Coal	39.0	2.0%
Petroleum Products	437.2	22.4%
Electricity	120.2	6.2%
Fuel Wood	1,272.2	65.3%
Charcoal	81.0	4.2%



■ Coal ■ Petroleum Products ■ Electricity ■ Fuel Wood ■ Charcoal

Energy Policy

- ❑ Prime Minister has directed Ministry of Energy and Mines and other line agencies to set up Renewable Energy Policy, which focuses mainly on bio fuel promotion and development, to increase bio fuel consumption share in total energy mix to 10-30% in 2020. The development strategy to implement this policy is being drafted.
- ❑ Ministry of Energy and Mines is drafting Energy Policy which will cover all types of energy and energy related activities, drawing the experiences from ASEAN and its dialogues partners.
- ❑ Rural Electrification target is 90% of total households having access to electricity by 2020, the current rate is around 65% of total country's 943,810 households.
- ❑ September 2008, Ministry of Energy and Mines has signed MOU with ADB to prepare a policy to encourage development of medium, small and mini hydroelectric power projects (public and private sector) to provide electricity from a clean and renewable source of energy and then apply for CDM.

Energy activities

- ❑ Rural Electrification Program 1: Funded by World Bank, 3,750 sets of solar photovoltaic systems have been already installed for rural households and remaining 5,250 sets are being installed (all 9,000 sets).
- ❑ Rural Electrification Program 2: 10,000 sets of solar photovoltaic systems are going to be installed by 2011, funding scheme: WB and AusAid.
- ❑ The government has signed many agreements with private companies to plant the jatropha to produce bio diesel.

Energy activities

- ❑ Xeset 2 Hydropower Project located in the southern part of Lao PDR with an installed capacity of 76 MW will be officially opened in September 2009. All produced power is to be used locally.
- ❑ Nam Theun 2 Hydropower Project located in the central part of Lao PDR with an installed capacity of 1080 MW will be officially opened on 15 December 2009. Almost produced power will be selling to Thailand.

International Cooperation

Under ASEAN cooperation:

- ❑ The ASEAN Energy Sub-Sector Network on Renewable, Energy Efficiency and Conservation, Regional Energy Policy and Planning and Nuclear Energy Safety;
- ❑ ASEAN Council on Petroleum
- ❑ Promotion of Energy Efficiency and Conservation Project (PROMEEC);
- ❑ The Energy Supply Security Planning in ASEAN (ESSPA);
- ❑ ASEAN-German Mini Hydro Project.

International Cooperation

Under Lao PDR - Finland cooperation

- ❑ Project : The Lao PDR Renewable Energy Strategy Development and Capacity Building has been started.
- ❑ Project: Future Resource Economy and Policies in Laos till the Year 2020 has been started.
- ❑ Energy and Environment Partnership in the Mekong Region;

Conclusion

- ❑ To monitor the progress of the energy programs, energy policy is necessary and used;
- ❑ More campaigns and activities on energy and energy week will be proposed to increase public awareness of energy conservation;
- ❑ Setting up energy saving goal and action plan and target of renewable energy production ;
- ❑ Setting up reporting and feedback channels to closely monitor the each program functioning.

THANK YOU FOR YOUR KIND ATTENTION

GMS SEF-3

China's Presentation on Recent Development in Energy Sector

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August 20-21, 2009
Phnom Penh, Cambodia

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1. Energy output and consumption in China in 2008

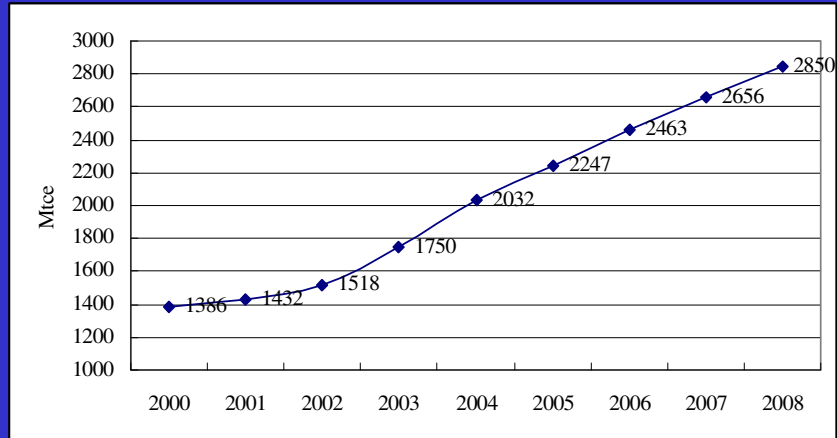
	Unit	Output		Consumption	
		Amount	Growth rate	Amount	Growth rate
Total	Gtce	2.6	5.2	2.9	7.3
Coal	Mt	27930.0	4.1	2740.0	3.0
Oil	Mt	189.7	2.2	360.0	5.1
Natural gas	Gm ³	76.1	9.9	80.7	10.1
Electricity	TWh	3466.9	5.6	3450.2	5.4
Which of: Thermal	TWh	2790.1	2.5		
Hydro	TWh	585.2	20.6		

The energy intensity in term of GDP decreased 4.59%, Energy consumption in term of GDP was 0.81.

China is largest energy producer in the world accounted about 16% of total world;

China is the second largest energy consumer in the world accounted about 17.7% of total world.

2. China's energy consumption

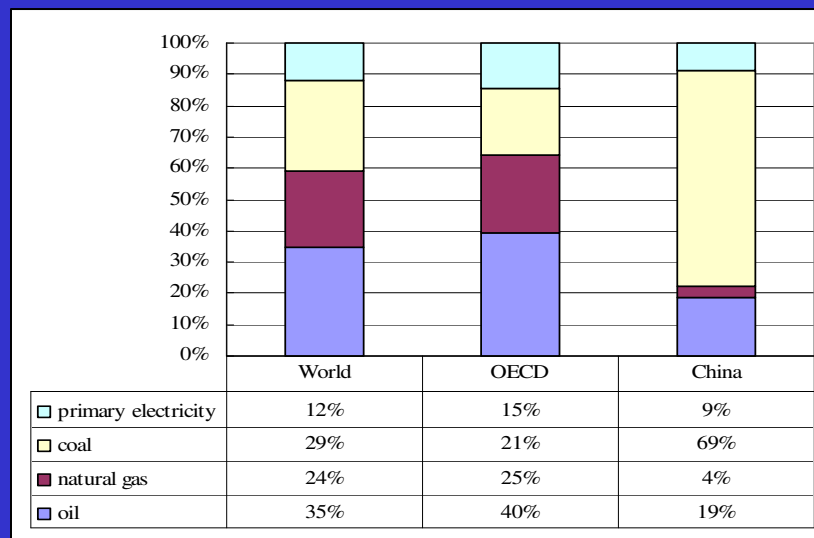


The growth rate of energy consumption during 2000-2008 was 9.43%;

It was 8.25 during 2005-2008

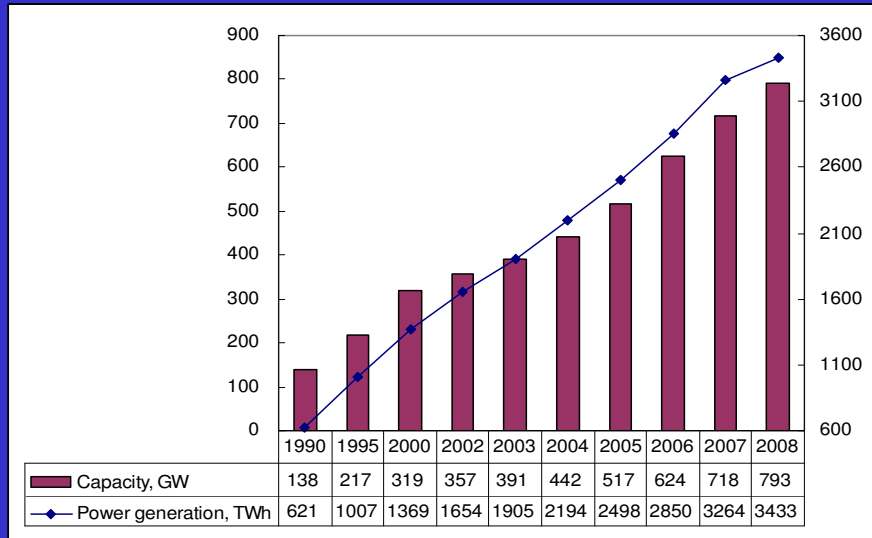
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3. Composition of Energy Consumption in China in 2008



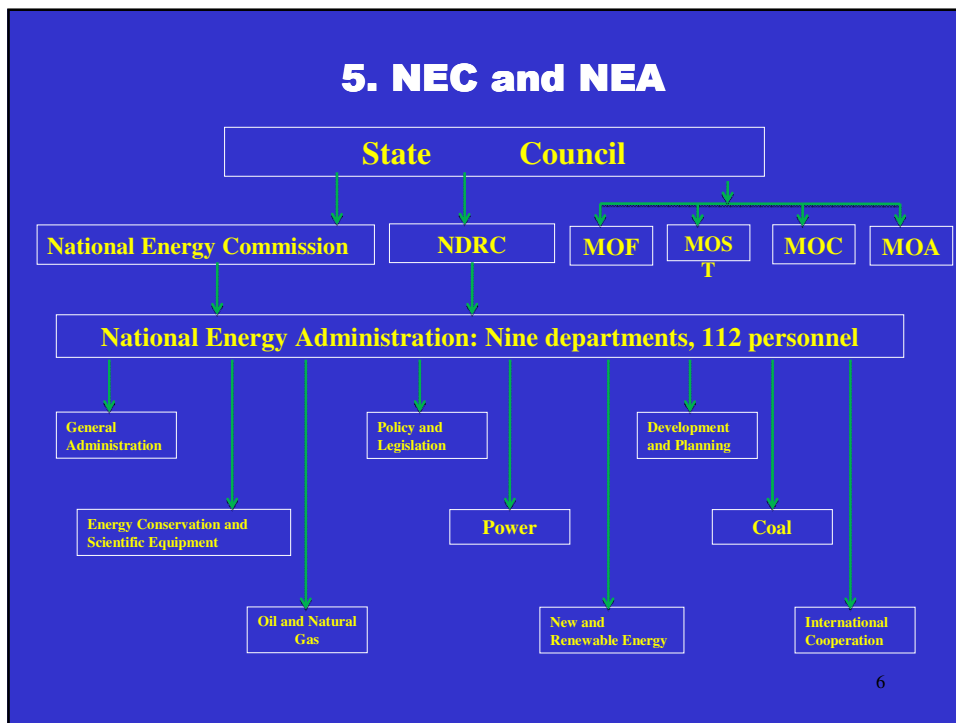
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4. Power Generation



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5. NEC and NEA



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6. Some measures for supporting RE and EE in 2009

- Development of Wind power at large scale. To start to construct large scale wind power bases based on the estimate and plan of wind resource, establish a more perfect wind power industrial system;
- To speed up PV market through subsidiary;
- To demonstrate car projects using new energy and high efficient energy. To encourage to use new energy and high efficient energy buses and taxis in 13 cities in Beijing, Shanghai, etc through subsidiary;
- To speed up implement ten Programs of Energy conservation;
- To eliminate the capacity with low energy efficient, including power generation, steel, etc;
- To support capacity building in energy conservation and reducing emission.

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Thank you for your attention!

8

GREATER MEKONG SUBREGION ADB

Third Subregional Energy Forum (SEF-3)

**DEVELOPMENT IN VIETNAM
ENERGY SECTOR**

Phnom Penh, 21-22 August 2009

I ENERGY PRODUCTION PERIOD 1995-2008

Year	Coal (tr. tấn)	Crude oil (tr. tấn)	Electricity (TWh)
1995	10	10	15
2000	12	15	28
2001	13	16	30
2002	15	17	35
2003	18	18	40
2004	28	20	48
2005	35	19	55
2006	40	18	62
2007	45	17	70

Growth Rate 1995-2007:

- Coal Production **14,6 %**
- Electricity **13,8 %**
- Crude oil **6,3 %**

2008

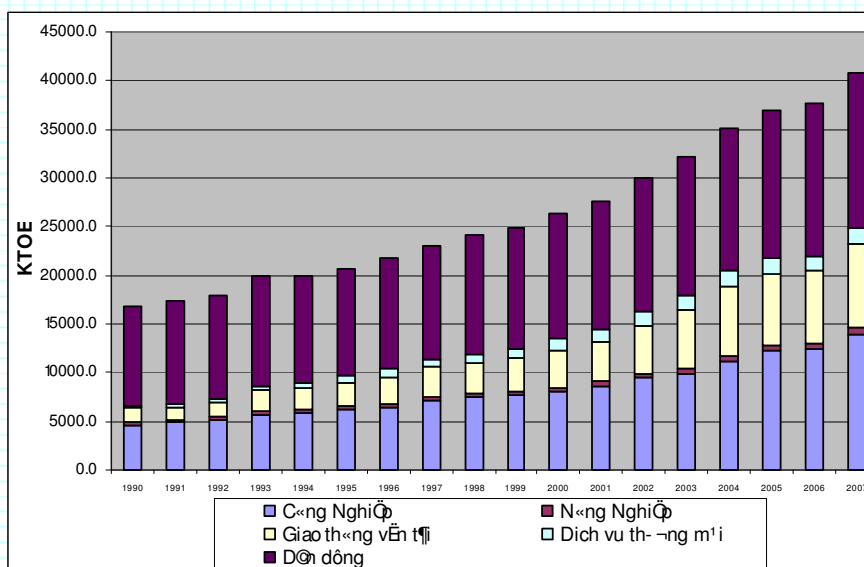
- Coal: **39,8 Mill.tons**
- Elect. Power **69,1 TWh**
- Crude oil: **14.9 Mill.tons**

I FINAL ENERGY CONSUMPTION 1990-2007

Unit: KTOE

Năm	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007
Coal	1324	2603	3223	3743	4017	4337	4851	5351	5528	6090
Petroleum	2479	4247	6920	7427	8884	10235	11888	12254	12317	14016
Gas	5.0	21.2	19.4	18	18	18	270	515	310	543
Electricity	532	963	1927	2223	2600	3002	3405	4051	4630	5256
Non-Commercial	12421	12872	14191	14297	14399	14694	14734	14780	14841	14848
Total	16760	20707	26280	27708	29918	32286	35148	36951	37627	40752

I FINAL ENERGY CONSUMPTION 1990-2007



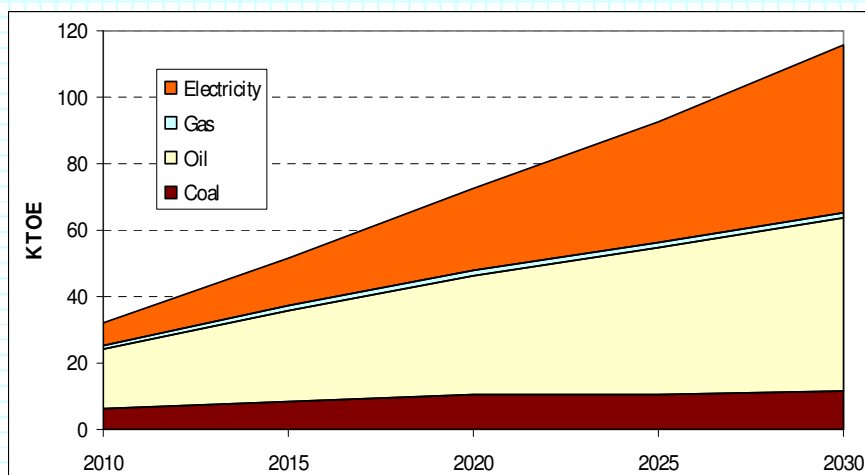
II ENERGY DEMAND FORECAST

Years	2010	2015	2020	2025	2030
Case	Base/ Hi.	Base/ Hi.	Base/ Hi.	Base/ Hi.	Base/ Hi.
Coal	6,18 / 6,44	8,44 / 9,55	10,58 / 13,03	10,7 / 14,2	11,4 / 15,25
Electricity	7,3 / 7,3	14,6 / 15,9	24,3 / 29,1	35,9 / 43,6	50,4 / 61
Oil Productions	18,06 / 20	27,24 / 31,8	35,8 / 47	44 / 65,1	52,1 / 79,9
Gas	0,82 / 0,89	1,49 / 1,74	1,7 / 1,96	1,8 / 2,2	1,9 / 2,5
Non-Commercial	14,9 / 15,1	15,42 / 15,98	15,48 / 18,12	14,5 / 18,0	13,62 / 18,05
Total-KTOE	47,3 / 49,7	67,2 / 75	88 / 109,2	107 / 143	129,5 / 176,8

Growth rate **2001 – 2007: 11%**

	2011-2015	2016-2020	2021-2025	2026-
2030				
- High case	8.6%	7.0 %	5.0%	4.6%
- Base case	7.3%	5.5 %	4.0%	3.9%

II COMMERCIAL FINAL ENERGY CONSUMPTION – BASE CASE



III PRIMARY ENERGY SUPPLY CAPABILITY

Up to 2025

- **Coal:** ~80 90 MT/ann
- **Crude oil:** 18-21 MT/ann.
- **Gas:** 16,5 BCM/ann..
- **Hydropower:** 60 TWh/ann.

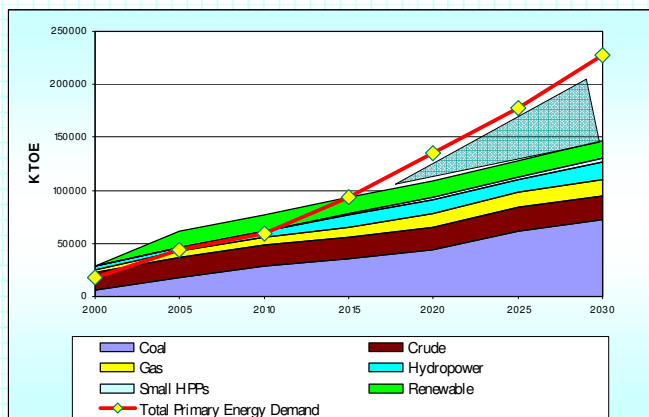
... to 2030

- **Coal:** >100 MT/ann.
- **Crude oil:** 18-22 MT/ann.
- **Gas:** 18 - 20 BCM/ann..
- **Hydropower:** 70 - 80 TWh/ann.

Renewable energy for power generation

	2007		Potential to 2025		Potential to 2030	
	MW	GWh	MW	TWh	MW	TWh
Small HPPs	410	851	2300-2700	11,3 - 13,7	9500	30,5
Win	0,8	0	800-1000			
Solar	0,8	NA	4-6			
Biomass	150	NA	250-400			
Geothermal	0	0	200			
Total	560	~900	3554-4306			

IV. ENERGY DEMAND – SUPPLY BALANCE



Deficit

- EE & C options
- Import (fuel/energy)
- Renewable
- Nuclear PPs

V. ENERGY STRATEGY - Planning

Strategy

- Security: **Diversify**
 - **Energy type (wind, solar, renewable)**
 - **Investment sources.**
- Reduce the dependence of import energy: **Refineries (1,2 &3)**
- Promote exploration/ production of Coal & Gas
- Establish step by step Competitive Energy market
- Energy development in parallel with conservation - sustainable - environment

Plan - Implementation

- Commercial Energy Efficiency program/ SME Energy Efficiency program
- National DSM program
- Rural Energy development
- Energy Price
- Promoting Renewable Energy Development (10-13% total Energy consumption in 2025)
- Power interconnection/Trade
- Gas pipeline interconnection (TAGP)
- Nuclear PP

Thank you

Targets/ Indicators	Rural Electrification/ Access to Energy	Energy Intensity/ Energy Efficiency	New and Renewable Energy (NRE) and Clean Fuels	NRE Law	Energy Conservation Law
Cambodia	<ul style="list-style-type: none"> 100% villages by 2020 70% households (HH) by 2030 			Rural electrification Policy (use of RE)	Guidelines for EE
China	Provision of power to 2 million HH currently without electricity	For 2011-2016-20% reduction in energy intensity (4.4%/year)	<ul style="list-style-type: none"> 15% for total energy from NRE sources by 2020 Wind power to generate 30GW by 2020 	2006	2007
Lao PDR	90% HH by 2020 (65% currently)		Bio-fuel 10%-30% by 2020 Transportation	Drafting	ADB
Myanmar	100% village electrification soonest	<ul style="list-style-type: none"> 5% reduction in primary energy consumption by 2020 (based on 2005 level); by 8% in 2030 Energy intensity (TOE/US\$2000) reduction from 323 in 2005 to 191 by 2030 High end-use energy efficiency improvement of 16% for all sectors by 2030 (2005 level). Sector target EE improvements by 2020: <ul style="list-style-type: none"> Industry- 10% against 	In Transport: substitution with biofuel of at least 8% by 2020. Electricity sector: 18% RE in total power installed capacity by 2020.		

Targets/ Indicators	Rural Electrification/ Access to Energy	Energy Intensity/ Energy Efficiency	New and Renewable Energy (NRE) and Clean Fuels	NRE Law	Energy Conservation Law
		business as usual (BAU); ○ HH and commercial- 7%			
Vietnam	100% of HH by 2020 (95% currently)	Elasticity • 1.2 energy • 1.6 electricity by 2015	<ul style="list-style-type: none"> • Potential for generating 3554-4306 MW by 2025 • 9500 MW by 2030 • Electricity RE 4.1% of total by 2015; 4.8% by 2020 	Plan	drafting
Thailand	99.99% of total (current status)	15.4 in 2010	20% by 2020	Renewable Energy Development Plan (15 years, 2008-2022)	Energy Conservation (ENERCON) Program Phase 3 (2008-2011)

GMS Road Map for Expanded Energy Cooperation: Priority Projects for Immediate Implementation

Third Subregional Energy Forum Meeting

Phnom Penh, Cambodia

20-21 August 2009



Promoting the Transfer of Renewable Energy (RE), Clean Fuels (CF), and Energy Efficiency (EE) Technology in the GMS

Link to Country/ Regional Strategy:

- GMS Energy Road Map focuses on RE, CF and EE to address GMS climate change concerns
- Promoting GMS-appropriate practices/ technologies needed to upscale RE/CF/EE
- RE/CF/EE becomes more viable with technology transfer, stronger manufacturing capacity and economies of scale
- Policy framework needed to foster innovations and remove financial biases against RE/CF/EE
- **GMS can take part in market place for low carbon technologies**



Impact:

- By 2015: Share of RE/CF to GMS energy supply to rise to 15%
- From 2010-2015: Doubling energy saved from demand side management (DSM) and energy conservation (EC)
- Climate change (CC) concerns mainstreamed in RE/CF/EE plans
- Energy security concerns integrated in national CC action plans

Outcome:

- GMS made a showcase for low carbon market place
- Expanded rural electrification using RE/CF resources
- Reduced damage to woodlands
- Reduced energy intensity
- Enhanced capacity of public/private providers in RE/CF/EE
- Improved technology/ engineering processes
- Higher private sector share in RE/CF/EE activities
- Increased awareness of RE/CF/EE benefits

Expected outputs and time frame:

- Strengthened SEF as forum for information exchange, networking
- Assessed key barriers to RE/CF/EE technology transfer
- Set regional performance targets and compliance mechanisms
- Established best practices/ technical standards in RE/CF/EE measures
- Capacity enhanced in policy, planning, programming, technology transfer
- Completed five (5) feasibility studies for RE/CF/EE projects
- Completed RE/CF resource assessment and energy audits for EC
- Advocacy program to enhance RE/CF/EE benefits awareness

Potential issues and risks:

- Past efforts have not succeeded in technology transfers
- Difficulty sustaining interest of governments/ private sector given oil price declines
- Reluctance to provide subsidies for imported equipment
- Lack of appreciation of the value of reduced environmental damage could not offset higher cost of RE/CF/EE technologies

Executing/ Implementing Agencies:

- ADB to be Executing Agency
- Energy policy and planning agencies in GMS countries to be Implementing Agencies
- International and national consultants to undertake TA


Stakeholder participation and consultation:

- SEF discussions on the Energy Road Map agreed on policy for promoting RE/CF for off-grid systems, best practices and engineering capacity and exchange of knowledge on RE/CF/EE
- Proposal to benefit from findings of ongoing REC/CF/EE programs
- Need for closer coordination between SEF and Subregional Transport Forum and Environment Operations Center

Financing:

- AFD/ADB: \$1.4 million
- GMS governments: \$200,000

Project: Promoting Environmentally-Sustainable Regional Power Trade Planning, Coordination and Development in the GMS

Objective:	Establish joint program for comprehensive promotion of strategic environmental assessment (SEA) and other environmental management tools, to consider cumulative and indirect impacts early in the planning process.
Scope: 	<ul style="list-style-type: none"> a. Undertake assessment of capacity of power authorities for environment planning; b. Pilot test application of environmental management tools (SEA, etc.); c. Develop/ implement capacity building program; d. Set up regular monitoring and evaluation mechanisms with power utilities and environment agencies; e. Provide forum for information exchange and sharing of best practices. f. Others ???
Specific Activities:	Suggestions from GMS countries???
Financing Plan:	Suggestions from GMS countries???



Thank You!

ELEMENTS OF COMPREHENSIVE INDEPENDENT ENVIRONMENTAL AUDIT

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*Greater Mekong Subregion
Third Subregional Energy Forum (SEF-3)
20-21 August 2009*



PRESENTATION OUTLINE

- **COMPANY PROFILE & SCOPE OF SERVICES**
- **INDEPENDENT ENVIRONMENTAL AUDIT CONCEPT & OBJECTIVE**
- **ENVIRONMENTAL IMPACT ASSESSMENT PROCESS**
- **CONVENTIONAL PROJECT MANAGEMENT STRUCTURE**
- **PROJECT MANAGEMENT STRUCTURE WITH INDEPENDENT ENVIRONMENTAL AUDITOR (IEA)**
- **SELECTED PROJECT EXPERIENCE**
- **TIMEFRAME OF IEA INVOLVEMENT**
- **INDEPENDENT ENVIRONMENTAL AUDITING CASE STUDIES IN MALAYSIA**
- **BENEFITS OF IEA**
- **CONCLUSION**



COMPANY PROFILE

- **Integrated environmental turnkey service provider**
- **Competence in international standards & environmental best practices**
- **Board of Directors comprising Architects, Engineers, Economists, Legal Experts, Environmental Specialists & Scientists**
- **Fulltime professionals with approximately 30 years expertise & experience**
- **Extensive network of associates in specialised fields**



2

SCOPE OF SERVICES

- **Environmental Audit & Surveillance**
- **Social & Economics Assessment**
- **Environmental Performance Monitoring**
- **Environmental Assessment & Management**
- **Natural Resource Management**
- **Ecological Assessment**
- **Institutional Strengthening & Capacity Building**
- **Advisory Services**



3

INDEPENDENT ENVIRONMENTAL AUDIT CONCEPT

The undertaking of
environmental audit & services
by a team of
independent auditors & specialists,
free from any undue influence
that could be exerted by the auditee.



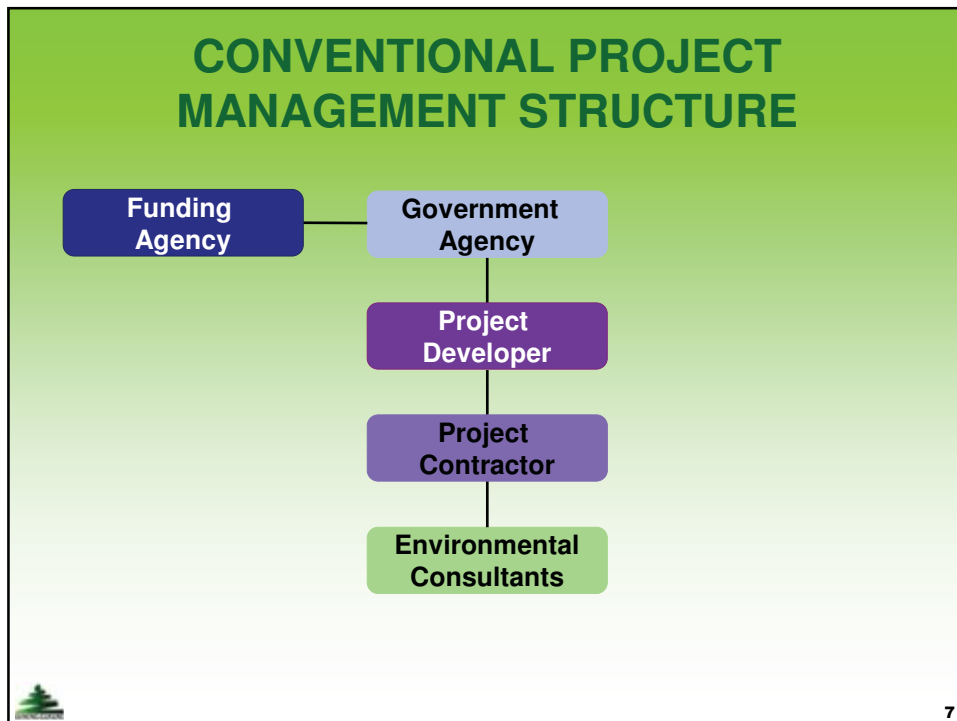
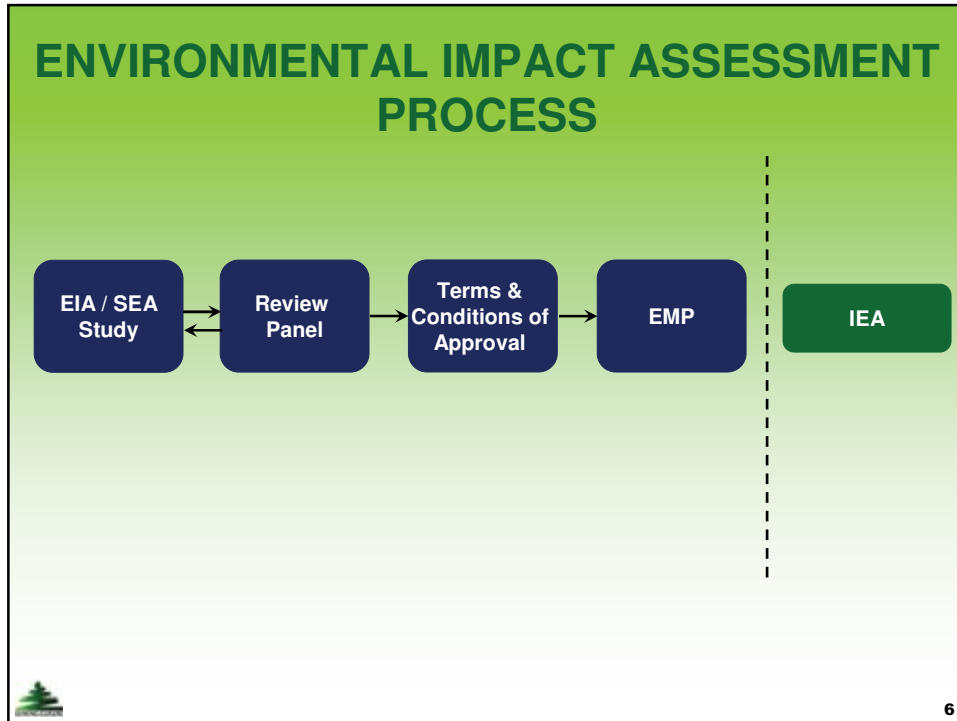
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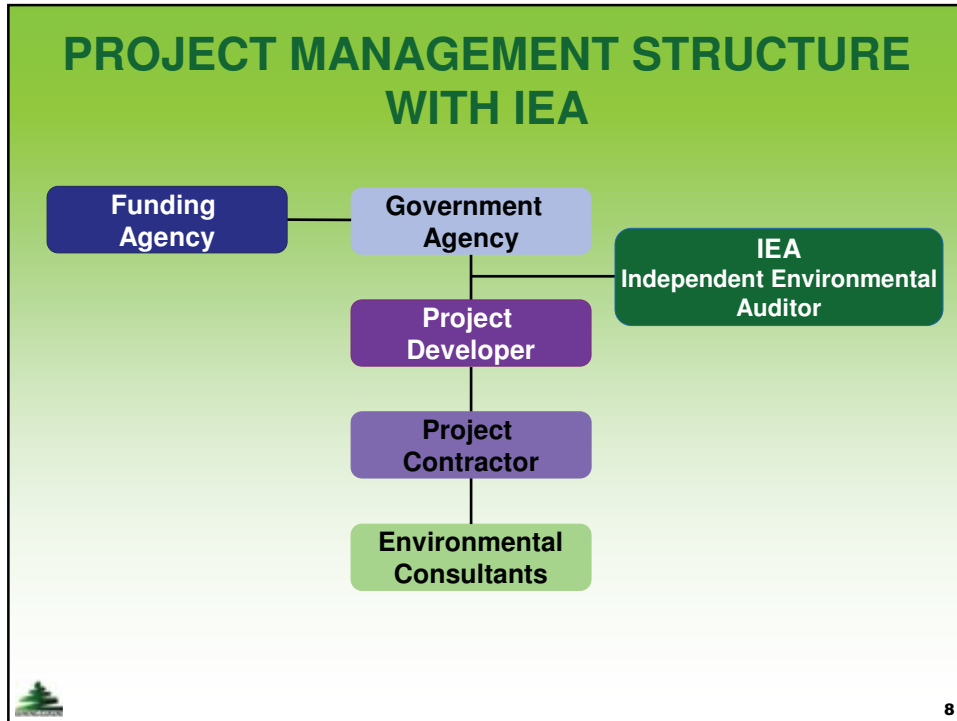
INDEPENDENT ENVIRONMENTAL AUDIT OBJECTIVES

- Encourage effective environmental management
- Ensure environmental sustainability & social development
- Independent & transparent monitoring & evaluation mechanism
- In line with ADB's strategic priorities, Millennium Development Goals & Equator Principles



5





SELECTED PROJECT EXPERIENCE



BAKUN HYDROELECTRIC PROJECT (BHEP)
≈ USD 1.9 billion*



* Exchange Rate: 1 USD = RM 3.5165

10

SELECTED PROJECT EXPERIENCE

**PAHANG-SELANGOR
RAW WATER TRANSFER
PROJECT (PSRWT)**
≈ USD 1.2 billion*



* Exchange Rate: 1 USD = RM 3.5165

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SELECTED PROJECT EXPERIENCE



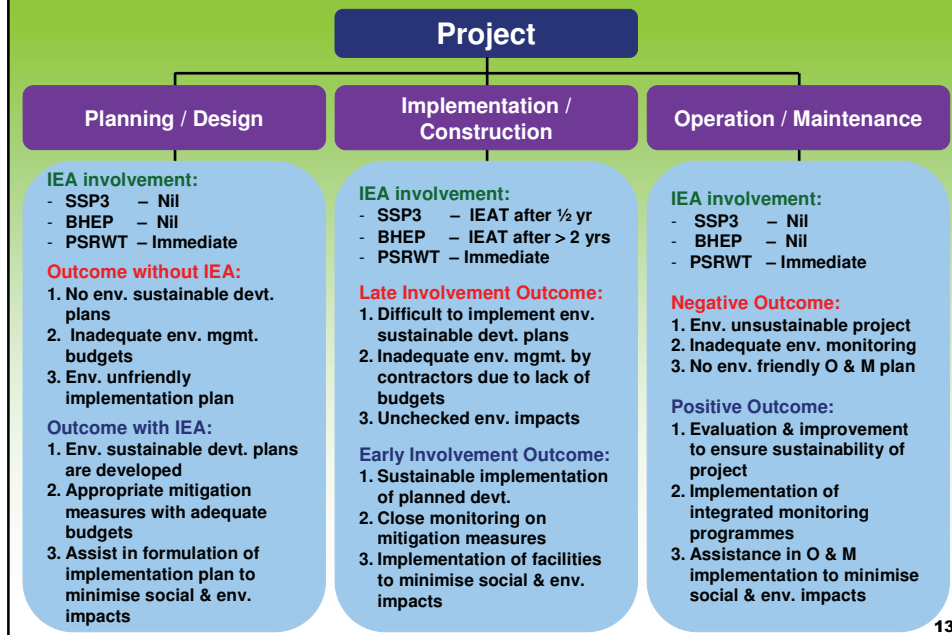
SECOND PENANG BRIDGE PROJECT
≈ USD 1.3 billion*



* Exchange Rate: 1 USD = RM 3.5165

12

TIMEFRAME OF IEA INVOLVEMENT

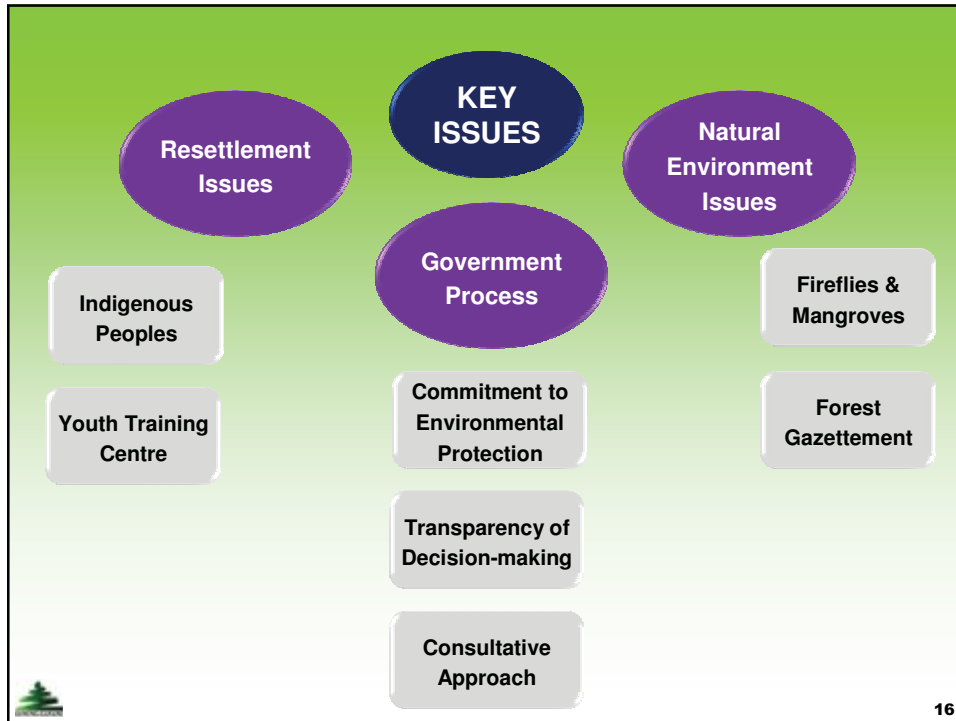


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**INDEPENDENT ENVIRONMENTAL
AUDITING CASE STUDY
IN MALAYSIA**

***SELANGOR RIVER PHASE 3
PROJECT
(SSP3)***

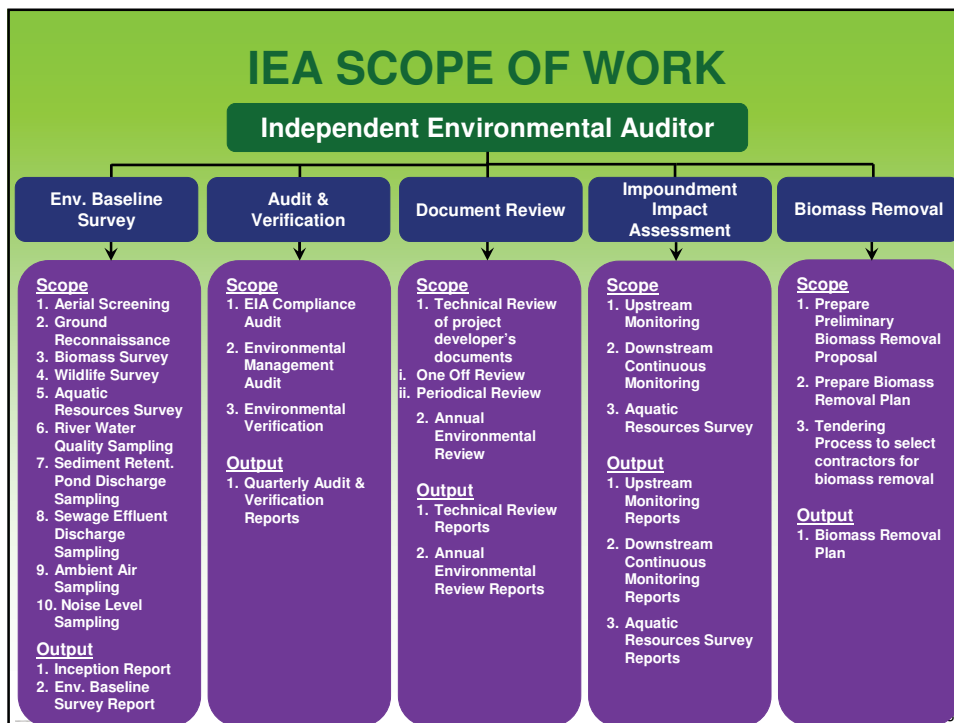
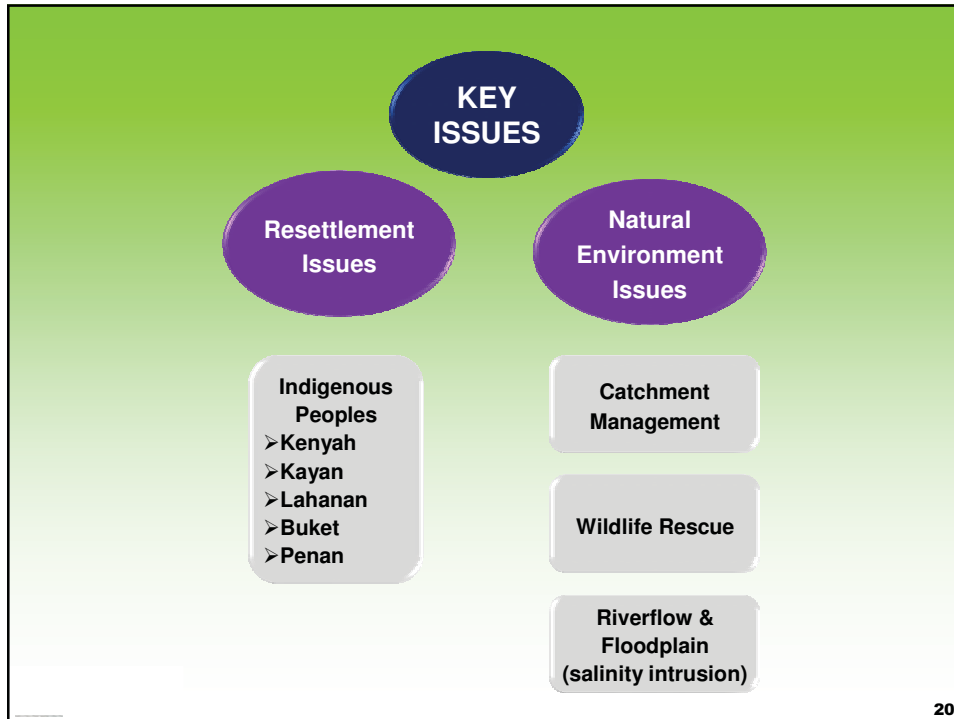




**INDEPENDENT ENVIRONMENTAL
AUDITING CASE STUDY
IN MALAYSIA**

***BAKUN HYDROELECTRIC PROJECT
(BHEP)***

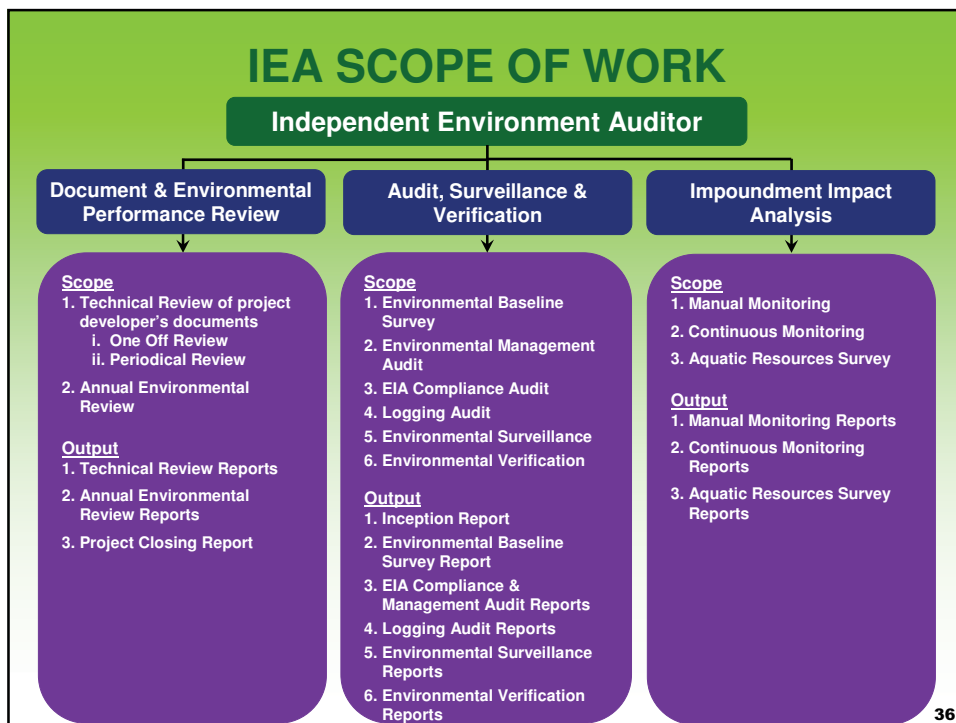
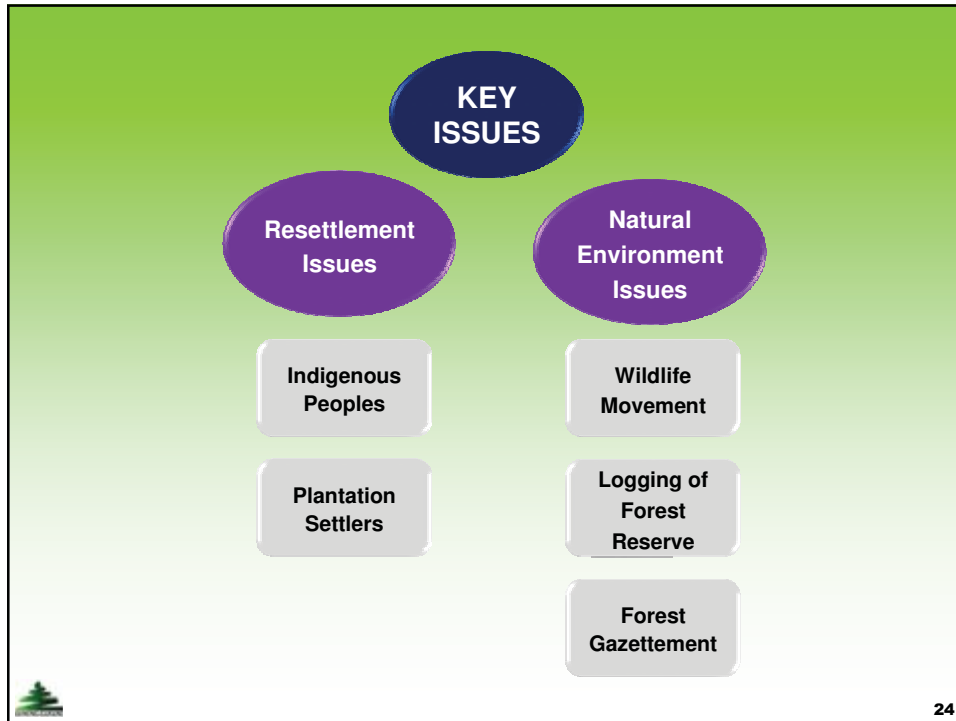




INDEPENDENT ENVIRONMENTAL AUDITING CASE STUDY IN MALAYSIA

PAHANG-SELANGOR RAW WATER TRANSFER PROJECT (PSRWT)

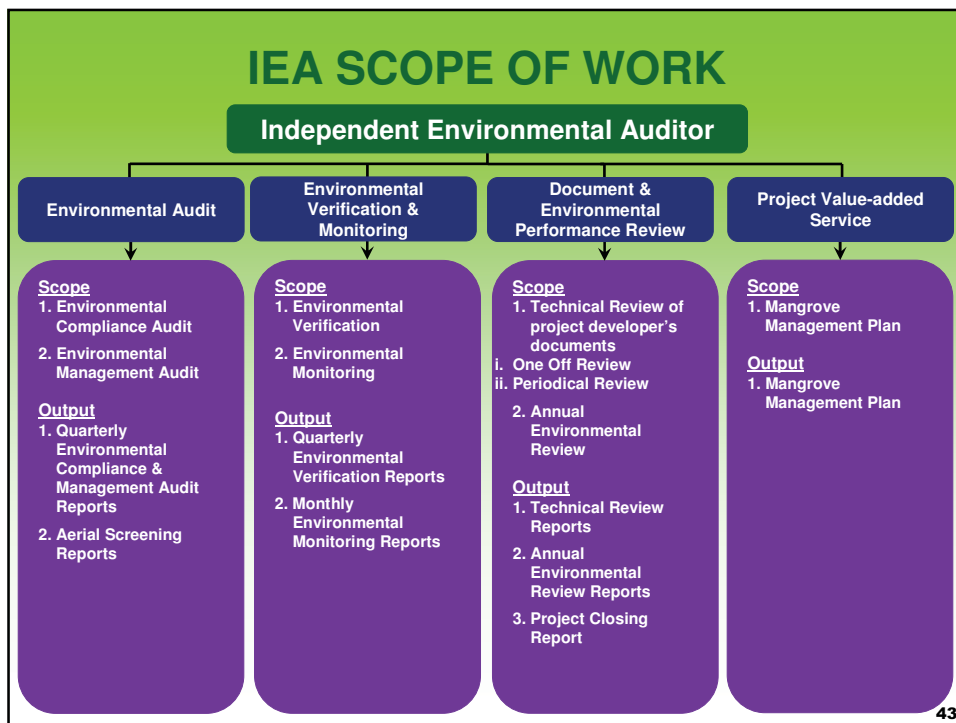
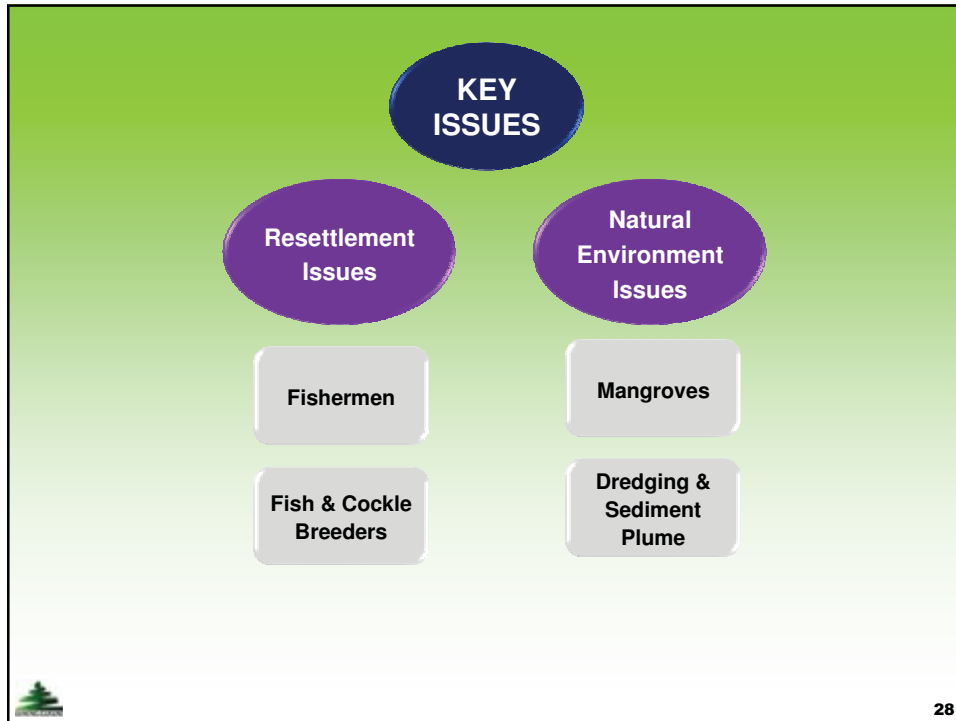




INDEPENDENT ENVIRONMENTAL AUDITING CASE STUDY IN MALAYSIA

SECOND PENANG BRIDGE PROJECT





BENEFITS OF IEA

- Proactive approach to compliment Accountability Mechanism
- Supplements Social Protection Strategy & SEA
- Create public confidence in recipient country's dedication to transparency & accountability
- Demonstrate commitment to environmental protection, pollution reduction & sustainable development
- Ensure environmental impacts are handled adequately & mitigated effectively
- Independent & transparent mechanism to dispel untoward allegations & accusations
- Provide recipient country with a powerful back-up team to monitor work of the project developer



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CONCLUSION

IEA approach addresses the key issues of:

- **Commitment** to environmental protection
- **Transparency & consultation**
- **Technical excellence** in depth & breadth to cover all environmental issues
- **Independence** of environmental advice & audit



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**Independent Environmental Audit
strikes a balance between
development & environmental imperatives
by advocating
environmental sustainability.**



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THANK YOU

Gunung-Ganang Corporation Sdn. Bhd. (476117-P)
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Third Meeting of the Sub - regional
Forum (SEF-3) 20-21 August 2009,
Phnom Penh, Cambodia.

Clean Development Mechanisms - CDM
CDM status in Lao PDR

Department of Environment, WREA

1

☞ Outline ☞

- Background information.
- CDM Criteria.
- CDM Organization Chart in Lao PDR.
- List and Status of CDM Project in Lao PDR
- Potential and Issues on CDM Project.
- Conclusion.

2

Background information

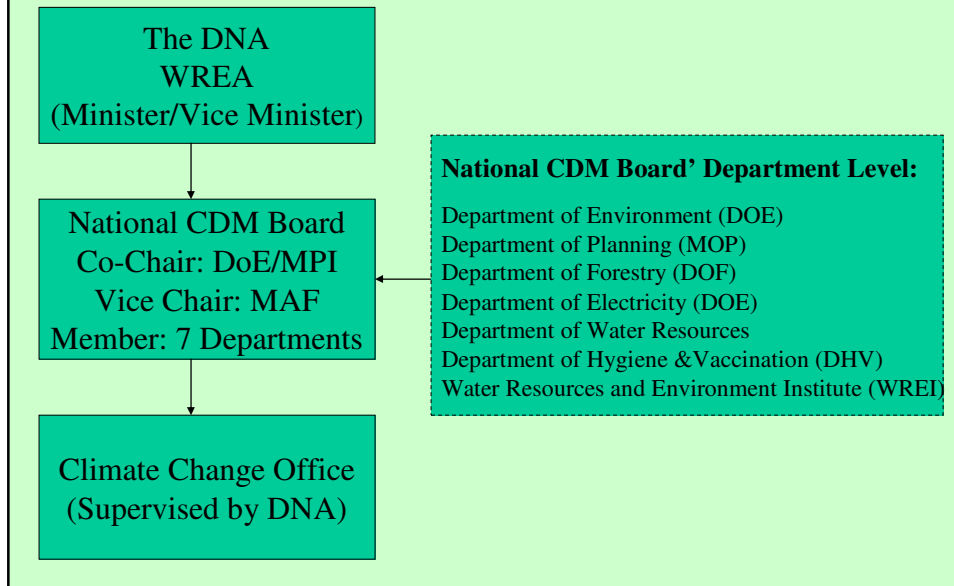
- Lao PDR has been ratified the UNFCCC on 4 April 1995
- Lao PDR has been Ratified the Kyoto Protocol on 6 February 2003.
- The Water Resources and Environment Administration (WREA) is assigned by the Government to be the UNFCCC National Focal Point and the CDM Designated National Authority (DNA) on 15/07/2003.



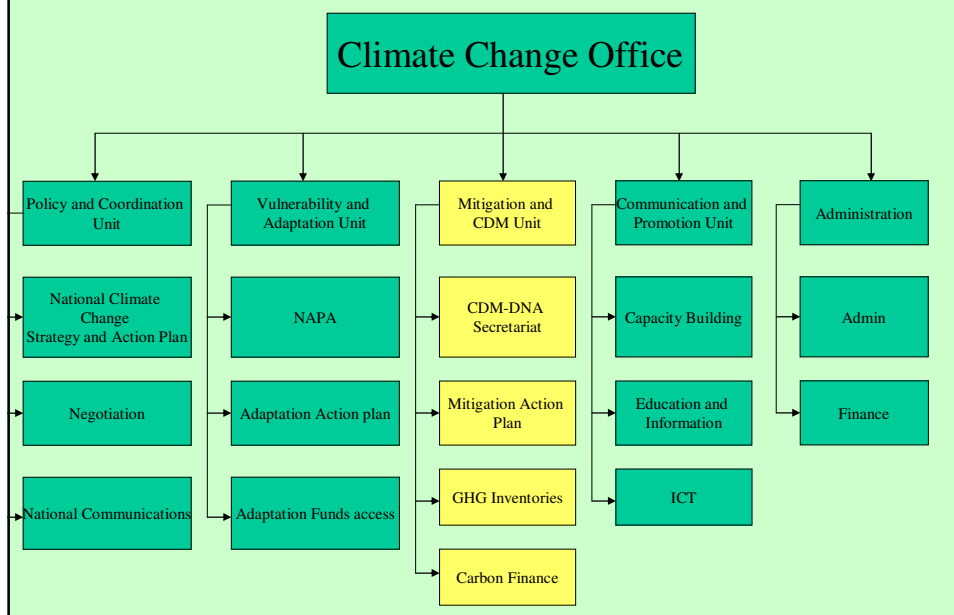
☞ CDM Criteria in Lao PDR ☞

- ☞ There are 4 Criteria on CDM Project:
1. Criteria on Environment: To mitigate on climate change, to control pollution and to save the environment.
 2. Criteria on Social: To develop the pro-poor household, to poverty alleviation and to create jobs.
 3. Criteria on Economic: To reduce import of fossil fuel from other countries.
 4. Criteria on Technology: To transfer technology, and technology system should be good and suitable for the project.

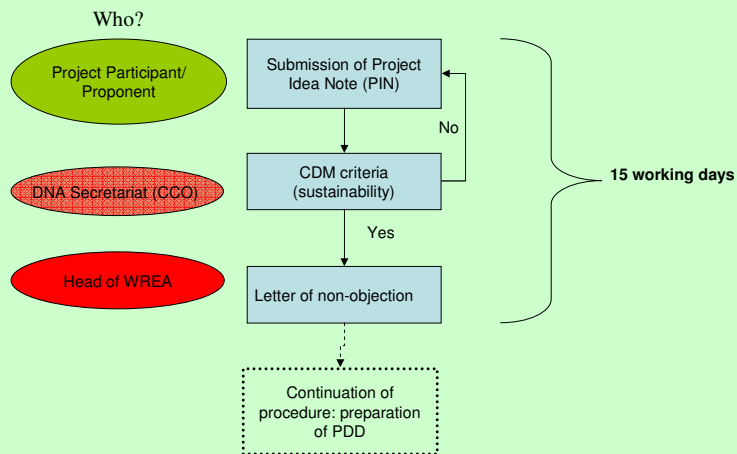
CDM Organization Chart in Lao PDR.



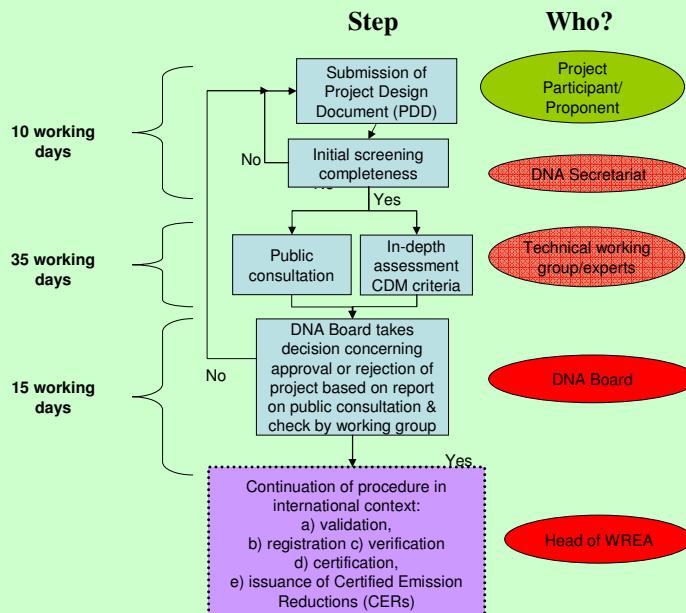
☞ Climate Change Office Organization Chart ☞



Draft Project Idea Note (PIN) procedure



Draft Project Design Document (PDD) procedure



Potential and Issues on CDM Project

➤ Potential:

- No registered hydropower projects as CDM in Laos yet.
- Almost 100% of electricity in Laos can be supplied by hydropower plants. And CO2 emission factor in Lao national grid can be almost zero.
- In order to develop CDM projects in Laos, the projects need to export electricity to Thai grid or substitute the electricity import from Thai grid.

➤ Issues:

- CDM Project preparation quite high cost (50,000\$-200,000\$)
- Kyoto Protocol commitments will be ending in 2012.
- Lack of Investment.
- Lack of Experience.

☞ List and Status for CDM Project in Lao PDR ☞

No.	Name of Project	Project Proponent	Project Developer	Submit PIN	Issue of Non-Objection Letter	Submit PDD	Issue of Approval Letter	Registered to UNFCCC
1.	Beer Lao Brewery	Beer Lao Brewery	Beer Lao Brewery	×	×	22/05/2006	18/01/2007	08/08/2008
2.	Xeset II Hydropower Project	EDL	ESL	×	×	21/08/2008	01/07/2009	
3.	Nam Sim Hydropower Project	ECI	Nor Power as	18/03/2009	13/05/2009	-	-	
4.	Tad Salen Hydropower Project	Tad Salen Power Co.,LTD	Tad Salen Power Co.,LTD	08/05/2009	26/06/2009	-	-	
5.	NamTheun I Hydropower Project	GAMUDA BERHAD	GAMUDA BERHAD	15/01/2009	03/03/2009	-	-	
6.	Lao Thai Hua Rubber Co.,Ltd	Lao Thai HuaRubber Co.,Ltd	Lao Thai Hua Rubber Co.,Ltd	26/08/2008	30/09/2008	22/12/2008	-	
7.	Lao Agro-Promotion Co., Ltd	Lao Agro-Promotion Co., Ltd	Lao Agro-Promotion Co., Ltd	25/06/2009	12/07/2009	-	-	

Beer Lao: First Project in Lao PDR has been registered to UNFCCC

- **Project Developer:**

- Beer Lao Brewery Co., Ltd. (Lao PDR)
- Proact International Inc. (Japan)
- Mayekawa MFG Co., Ltd. (Japan)



- **Target:**

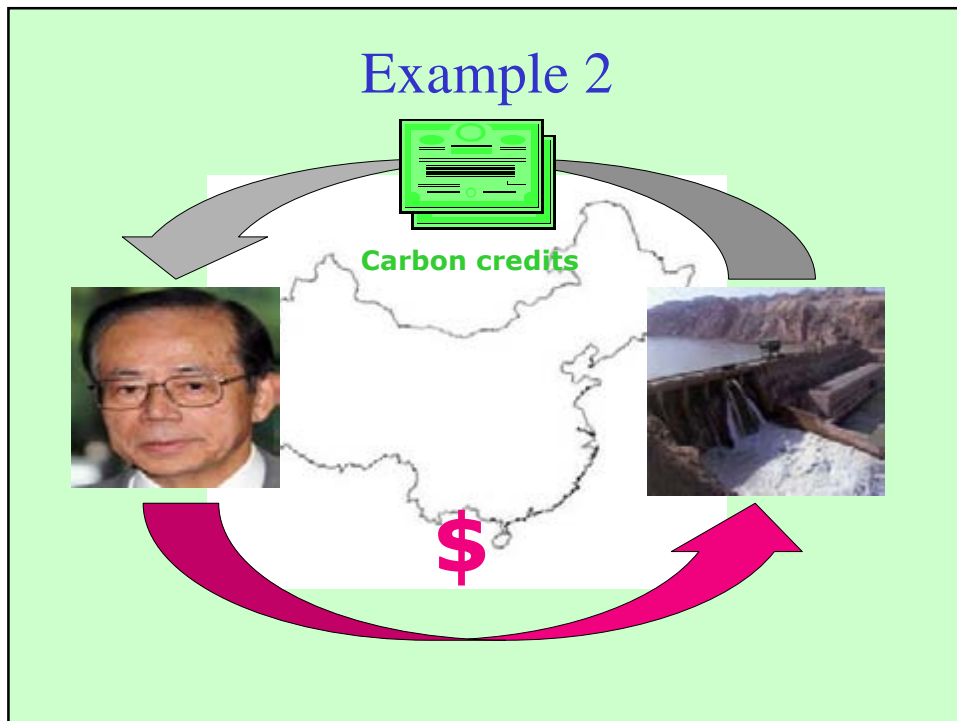
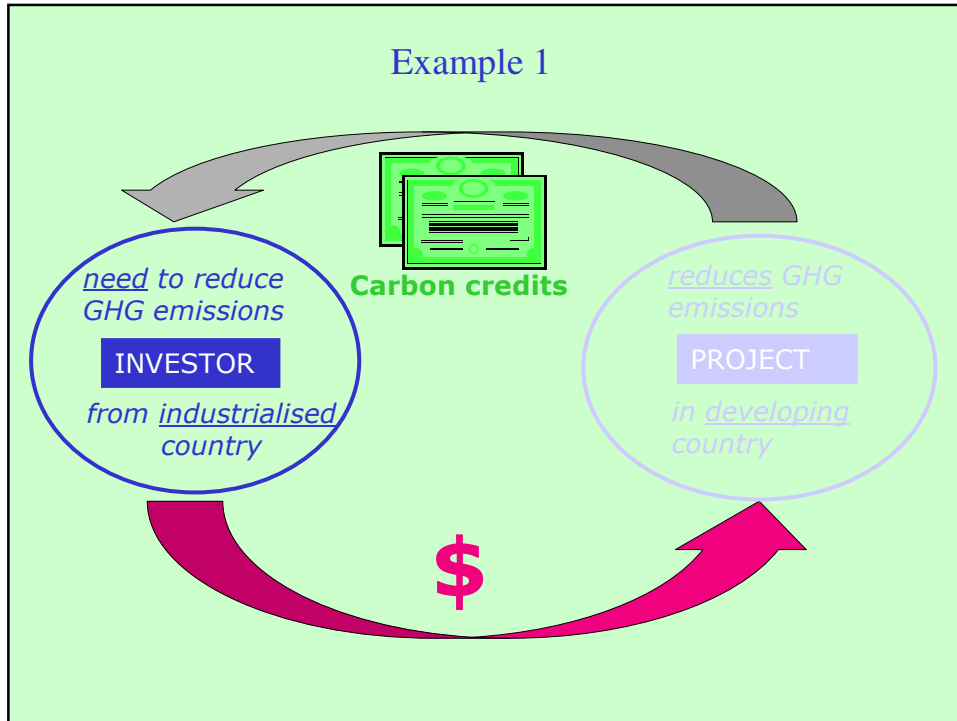
To improvement energy efficiency in industrial sector by using bio-gas instead of using oil on heating and also can reduction 20,116 Tones of Co₂ in 9 years from 2007 to 2015.



Beerlao

Xeset II: First CDM Hydropower Project in Lao PDR.

- Xeset II Hydropower Project located in the southern part of Lao PDR with an installed capacity of 76 MW will be officially opened in September 2009, all produced power is to be used locally.
- Additional financing through the CDM is essential to the Xeset II hydropower project.
- Contribute towards the increase IRR of the Project.
- Contribute towards the planning and implementation of other community benefit programs within the project region in Lao PDR
- Provide an incentive for EDL to invest in other similar marginal hydropower projects in Lao PDR making them financially more attractive investments.



Ongoing activities for CDM in Lao PDR.

- Draft Regulation on the Approval Procedure for Proposal CDM in Lao PDR.
- Draft Decree on CDM in Lao PDR
- Draft CDM Guideline

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Conclusion

- **Global carbon markets can assist Lao PDR in their sustainable development and poverty reduction.**
- **More CDM-projects should be conducted in Lao PDR (now only 1)!**
- **The CDM Decree at hand is a big step in that direction.**



GMS SEF-3

China's development of wind power

GAO Shixian
Energy Research Institute,
National Development & Reform Commission, P.R. China

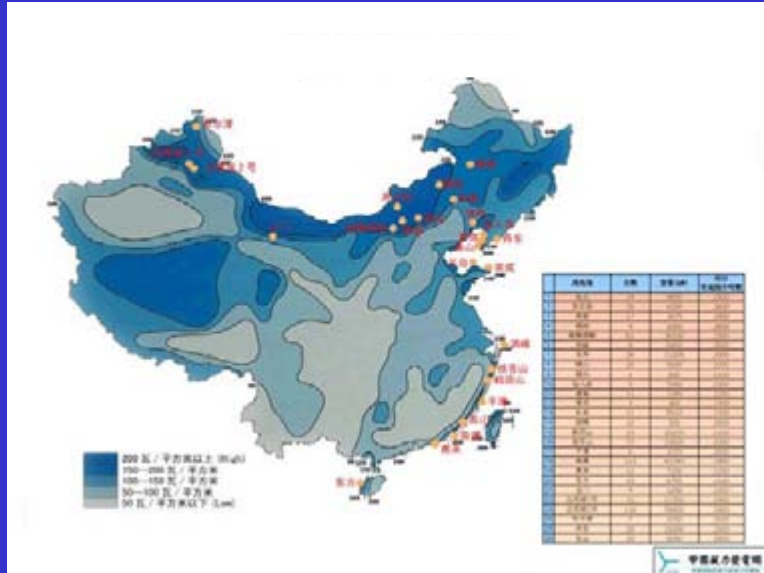
gaoshixian@amr.gov.cn
Tel: +86-10-6390-8471;
Fax: +86-10-6390-8472

August 20-21, 2009
Phnom Penh, Cambodia

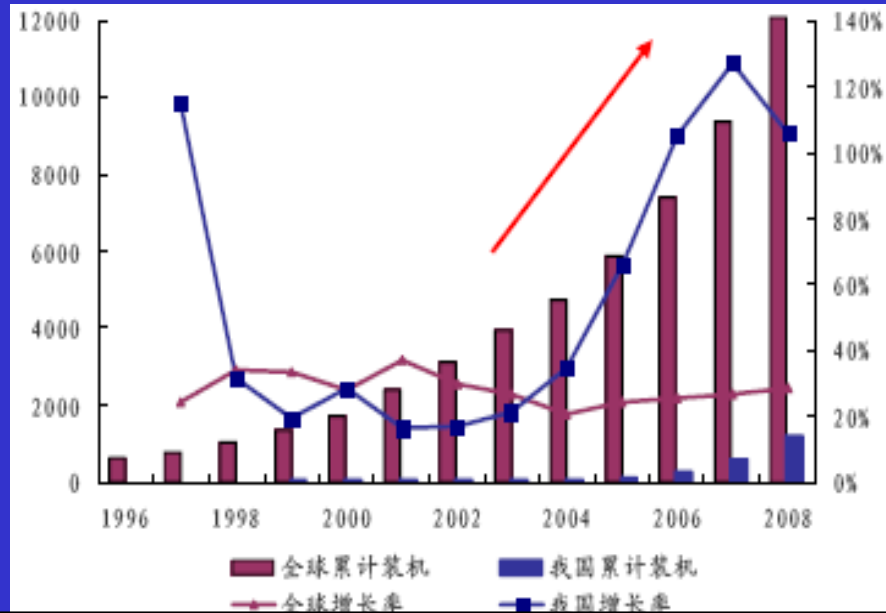
1. General Information on Wind Power Development in China

- Wind power resource is rich
 - Economical the technical utilization resources are about 700-1200 GW
 - Installed capacity was 38 MW in 1995.
 - Installed capacity was 12.17GW in 2008.
 - Old projection capacity by 2020: 30GW
 - New projection capacity by 2020: 100-150 GW
- It is necessary in the quotas for companies of power generation
 - Quota: 3%, 8%
 - Present: 0.30-2.6% □ there is a big gap
 - Wind-power: cheapest renewable

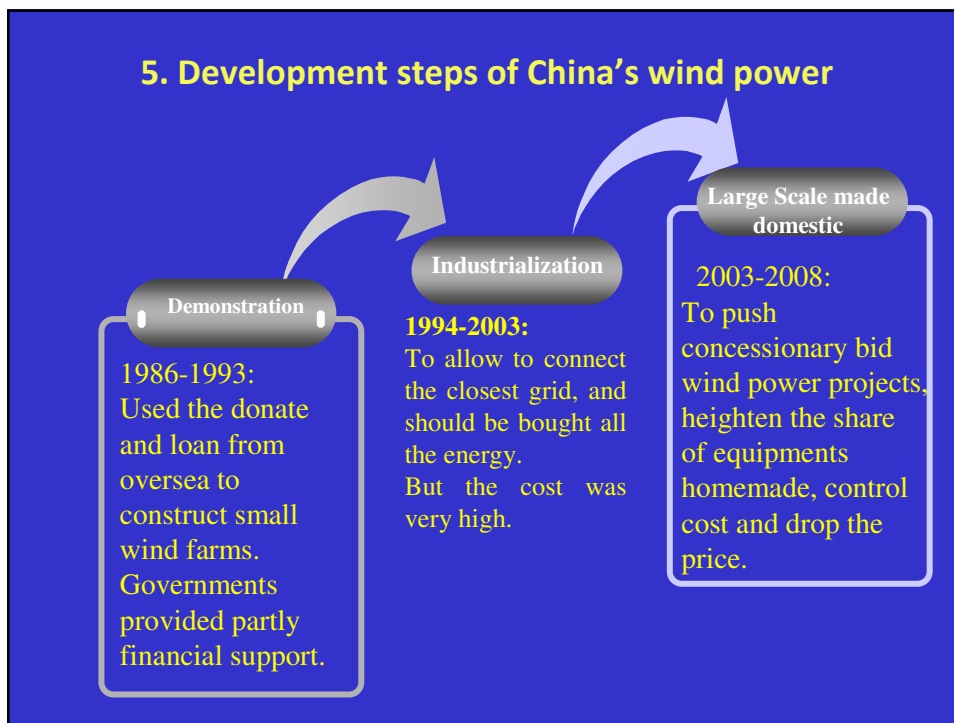
2. Distribution of China's wind resources



4. Wind power market is expanded unprecedentedly

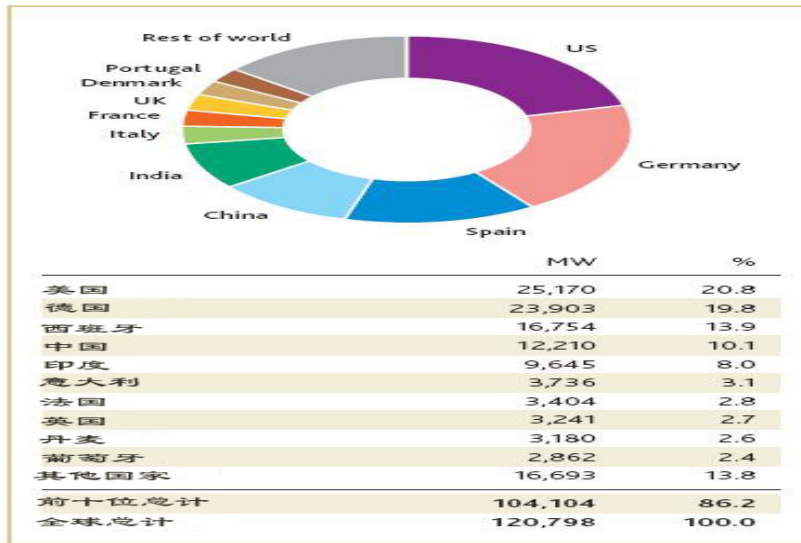


5. Development steps of China's wind power



6. Wind Power Capacity

2008年装机容量排名前十位国家



7. Policies of wind-power development

“Law on Renewable Energy” was become effective on Jan. 1st, 2006. Five fields accelerates the development of wind power, they are: overall targets, connect grid compulsively, classified tariff, cost share and special development fund.

A department titled renewable energy was established under National Energy Administration in 2008

7.1 Policies of wind-power development before “Law on Renewable Energy”

- (1) To support technical R & D development. Since 2000, China has been appropriating funds for technical R & D of wind-power development, it played a key role in 750 kW wind unit homemade.
- (2) To promote equipments homemade and industrialization development of wind power. The lowest proportion has been set (at 70% above) for the wind power projects used national debt and concession bidding.
- (3) To support in finance and taxation. They are included mainly: to derate customs.
- (4) To develop at large scale based on market (Concession bidding). Since 2003, China has adopted concession bidding to approval the wind power projects above 50 MW. Based on the concession bidding, some former problem, such as price, energy sale, additional cost share, appendant cost paid (for example, the cost for transmission between wind farm and major grid paid by grid company, the job for road to wind farm and project preparation done by local government), contractor signed by provincial government, grid company and investor won the bid.
- (5) To set up technical standards. China has issued more than ten standards and criterions in wind power filed, which of 8 national standards and 6 sectoral standards.

9

7.2 Policies of wind-power development after “Law on Renewable Energy”

- (1) “China’s renewable energy projection in middle and long tern”. It was issued in August 2007. It summarizes the potentials of renewable energy resources, and reviews the development present situation in technologies, industrialization, and market by 2005, and points the guidelines, principle rules, and development targets, policy measures by 2010 and 2020. The target for wind power is 5 GW by 2010 (actually, it has reached by 2007) and 30 GW by 2020. And it sets quotas, the proportion of renewable energy excluded hydro-power in total energy consumption in the area covered by main grids should reach 1% in 2010 and 3% in 2020; the installed capacity proportion of renewable energy excluded hydro-power in total capacity for the investors owned capacity 5 GW above should reach 3% in 2010 and 8% in 2020.
- (2) “The management regulations for renewable energy power generation”, “the trial management measures for renewable energy power pricing and cost share”, “the trial management measures for allocation of renewable energy tariff surplus revenue”. These documents were issued by NDRC and State Electricity Regulatory for supporting development of renewable energy. They are detailed rules for “Law on Renewable Energy” on “ Priority in connection grid”, “Fixed electricity price”, “Cost share”. The rapid development of wind power is benefit these policies. 10

7.2 Polices of wind-power development after “Law on Renewable Energy”

- (3) “The catalogue of guide to renewable energy industry development” . It was issued Nov. 2005, includes 23 initiatives of wind power industry, such as wind power generation, wind power equipment and facility manufacturing.
- (4) “The trial management measures for special fund of renewable energy development”. It enforced on May 30, 2006 by Ministry of Finance. The measures identified the support priorities, procedures for application and approval, financial management, review and supervision etc.
- (5) “Implementation notice of enhancement of wind power industry development”. It was issued by NDRC and MOF in Jan. 2006. It points that 6 fields are main supported included sift and evaluation of wind resources; establishment capacity building of wind power equipments standards and wind power technical examination, authentication; wind power equipment homemade, grid consisting with wind power development projection and technical research; construction and management of wind farms.
- (6) “Notice of perfecting pricing policies of wind power”. It was issued by NDRC on July 20, 2009. The price of wind power is based on the condition of resource and construction

7.2 Polices of wind-power development after “Law on Renewable Energy”

Resource Catalog	Price (Yuan/kWh)	Location
□	0.51	Areas excluded in II in Inner Mongolia; Urumchi, Yili, Changji, Kelamayi and Shihezi in Xinjiang
□	0.54	Zhangjiakou, Chengde in Hebei; Chifeng, Tongliao, Xing'an, Hulunbeier in Inner Mongolia; Zhangye, Jiayuguan, Jiuquan in Gansu
□	0.58	Baicheng, Songyuan in Jilin; Jixi, Shuangyashan, Qitaihe, Xuhua, Yichun, Daxinganling in Heilongjiang; Areas excluded in II; Areas excluded in I in Xinjiang; Ninxia
□	0.61	Others

8. Summary

- Great importance attached by government: targets, quotas, resources survey;
- Definite promotion policies: connection to grid, price, taxation, tariff...
- Great market potential
- Technical progress: R & D, popularization in equipment to reduce the cost, grid perfect, etc.

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