SESAM

SUSTAINABLE ENERGY SYSTEM AND MANAGEMENT SESAM

Final Report

SESAM/ARTES Asian Alumni Workshop
Vietnam 2009

From 5th to 9th October 2009 in Hanoi & Halong

"Policies and Strategies to Mitigate Climate Change and Energy Poverty in South East Asia"

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Table of contents

Asian Alumni Workshop Vietnam 2009

Policies and Strategies to Mitigate Climate Change and Energy Poverty in South East Asia

Organized by

University of Flensburg SESAM-Sustainable Energy System and Management	**Deutscher Akademischer Austauschdienst**	**National Centre for Technological Progress**

October 5-9, 2009

Hanoi & Halong, Vietnam

Executive Summary

This document reports on the workshop "Policies and Strategies to Mitigate Climate Change and Energy Poverty in South East Asia and China" held in Vietnam on October 5-10, 2009. The overall goal of the workshop is to build capacity for promotion, dissemination and wider application of Sustainable Energy Technologies. The objective of the workshop is to build up and improve the professional and personal capacity of the participants to cope with their professional challenges and to build up and formalize an Asian alumni network in the sustainable energy sector. Apart from this the workshop has the following specific objectives:

1. Experiences on policy and strategies, R & D and financing as well as business aspects to develop and promote renewable energy and energy efficiency in the South East Asian region have been shared
2. Competencies of the alumni on the current development and issues on the renewable energy have been strengthened.
3. The cooperation between German development cooperation agencies with South East Asian alumni has been strengthened.
4. Framework for Regional level network of South East Asia has been developed and the Asian Energy Alumni Network has been established.
5. Country coordinators are trained to build up and manage local alumni associations.

Acknowledgment

The organizers and workshop participants are grateful to the German Academic Exchange Service for the extraordinary opportunity to explore learning across disciplines.

Organization of the Workshop

Accommodation for Workshop participants has been booked at the venue of the Workshop, Hanoi & Halong, Vietnam:

Date	Place	Details
4-6/10/2009	Sofitel Plaza Hotel	1 Thanh Nien Road, Ba Dinh District, Hanoi, Vietnam Website: http://www.Sofitel.com/SofitelPlazaHanoi
6-8/10/2009	Holiday Villa Halong	No 1 - Tuan Chau Island, Ha Long, Quang Ninh Website: http://www.holidayvillahalongbay.com
8-9/10/2009	Paradise Cruise	Tuan Chau Island, Ha Long, Quang Ninh Website: http://www.paradisecruises.org
9-10/10/2009	Maison Hanova Hotel -	32 Hang Trong Street., Hoan Kiem Dist., Hanoi, Viet Nam Website: http://www.hanovahotel.com/

1 Workshop agenda

MONDAY, October 5, 2009

8:00 - 8:30	Registration
8:30 - 9:00	**Opening Ceremonies** Welcome note: Workshop In-charge, University of Flensburg - Germany Workshop In-charge, NACENTECH - Vietnam Counselor Scientific Cooperation, Germany Embassy
Plenary 1: Impact and Mitigation of Climate Change in South East Asia Chairs: Mr. Wulf Boie, Mr. Dang Xuan Cu, Ms. Tran Hai Anh	
9:00 - 9:30	National Target Program to respond to climate change; Climate change Scenario for Vietnam. Prof. Dr. Tran Thuc – Director of Institute of Meteorology and Hydrology Ministry of Natural Resources and Environment, Vietnam.
9:30 - 10:00	Preliminary Lessons for Vietnam from the World Bank's ongoing Economics of Adaptation to Climate Change Study: global track and Vietnam country case study. Dr. Douglas J. Graham, World Bank, Vietnam.
10:00 - 10:30	Tea/Coffee Break
10:30 - 11:00	Renewable energy development in Vietnam - Current situation and future perspectives Dr. Le Tuan Phong, Deputy Director of Energy Department Ministry of Industry and Trade, Vietnam.
11:00 – 11:30	Contribution of Renewable Energies to Sustainable Development in Vietnam Dr. Angelika Wasielke, Chief Technical Advisor, GTZ Vietnam.
11:30 – 12:00	National Renewable Energy Target and Energy Efficiency Dr. Phuong Hoang Kim, National Program on Energy Efficiency and Conservation - Ministry of Industry and Trade, Vietnam.
12:00 - 12:15	Vote of Thanks and group photo - Workshop Organizer
12:15 - 14:00	Buffet Lunch at Brasserie Westlake – Sofitel Plaza Hotel

Plenary 2: Sustainable Energy Systems: Policies and Implementation Strategies Chairs: Mr. Wulf Boie, Mr. Li Qingsong, Ms. Mona Doctor	
14:00 - 14:30	Promotion of Renewable Energy in Germany: The German Renewable Energy Act Dip. Ing. Wulf Boie, University of Flensburg - Germany.
14:30 - 15:00	Sustainable Energy Solutions - Practical examples currently implemented in Vietnam Dr. Elke Foerster, Representative Office Hanoi - GFA Consulting Group GmbH, Germany.
15:00 - 15:30	Vietnam Carbon Market MSc. Tran Hai Anh, Innovation Norway, Vietnam.
15:30 - 16:00	Tea/Coffee Break
16:00 - 16:30	Thailand Climate Change Strategic Plan and Future Action Plans MSc. Tubtim Limsoontorn, Project Coordinator Office of Natural Resources and Environmental Policy and Planning, Thailand.
16:30 - 17:00	Findings from a study on climate change mitigation funded by WB Carbon Finance Assist Dr. Ha Dang Son – Managing Director of RCEE.
17:00 - 17:30	Conclusions and Summary of the day

TUESDAY, October 6, 2009

8:00 - 10:30	**Field visit** Check out Sofitel Plaza Hotel - Leave Hanoi
10:30 - 13:30	Visit Biogas in Bac Ninh province
13:30 - 16:00	Travel to Tuan Chau Island
16:00 - 16:30	Check in Holiday Villa Halong - Tuan Chau Island
17:00 – 18:00	Lunch at Holiday Villa Halong - Tuan Chau Island
18:30 - 21:00	Discuss – Summary of the day

WEDNESDAY, 7 October 2009 Ha Long

Meeting	**Session 1: Impact and Mitigation of Climate Change in South East Asia** Chair: Wulf Boie, Shrestha Sharada, Tran Hong Ky
8:00 - 8:30	Policies and Strategies to Mitigate Climate Change and Energy Poverty in Rural Industrialization - MGIRI's Role in Energy and Infrastructure Dr. Ravikumar Kandasamy - Deputy Director (Energy&Infrastructure)/Mahatma Gandhi Institute for Rural Induatrialisation (MGIRI), Wardha, India
8:30 – 9:00	Biodiversity and climate change MSc. Li Qingsong, Sustainable Agro-biodiversity Management Project officer, GTZ, China
9:00 - 9:30	Renewable Energy Technology for Mitigation of Climate Change and Energy Poverty in Developing Countries: Case Study for Indonesia Dr.-Ing. Oo Abdul Rosyid, MSc - Balai Besar Teknologi Energi (B2TE-BPPT), Indonesia.
9:30- 10:00	Potential and technical aspect of solar photovoltaic systems in agriculture (emphasis on irrigation) in Bangladesh A.B.M. Aminul Islam - Solar PV System Engineer GREEN ENERGY LLC / PTL SOLAR FZ LLC
10:00 – 10:10	10 minutes Break
Session 2: Carbon trading and Setting CDM projects in South East Asia and China Chair: Mr. Li Qingsong, Mr. Wulf Boie and Ms. Tubtim Limsoontorn	
10:10 – 10:40	Post-2012 and Future Clean Development Mechanism Projects in China and South East Asian Countries MSc. Fumi Maeda Harahap, E.ON UK Projects Consultancy Limited, Malaysia.
10:40 - 11:10	Carbon Trading MSc. Susy Marisi Simarangkir, General Manager, Asia Carbon Global, Indonesia.
11:10 – 11:30	Tea/Coffee Break
11:30 - 12:00	Setting up CDM projects. MSc. Ms. Rachot Indradesa, Project Manager, GreenStream Network GmbH, Postdam, Germany.
12:00 - 12:30	Carbon financing opportunity for sustainable operation of small technology - Case of Improved Water Mill Programme in Nepal. MSc. Shakya Bhupendra, Programme Manager, Centre for Rural Technology Nepal.
12:30 - 13:00	Low Carbon Manufacturing Program in Pearl River Delta MSc. Hu Qiying, Ecofys, Bejing, China.

13:00 – 16:30	Lunch and relax time
Session 3: Sustainable Strategies to Mitigate Rural Energy Poverty Chair: Didik Notosudjono, Fumi Maeda Harahap	
16:30 - 17:00	Renewable Energy development in Rural Areas in Inner Mongolia MSc. Jie Zhang, Inner Mongolia Agriculture and Animal Husbandry Department.
17:00 - 17:30	The Socio-economic role of Wind Power to reduce Rural Energy Poverty in Nepalese Community MSc. Shrestha Sharada, Managing Director, Sustainable Energy and Technology, Nepal
17:30 - 18:00	Alternative energy system as a future option for sustainable energy use and Rural development in Thailand MSc. Jitiwat Yaungket, Energy Economics Laboratory, Kyoto University.
18:00 - 18:30	Sustainable regional cooperative planning - an experience in Auroville, India MSc. Mona Doctor, Architect, India
19:30	Buffet dinner around swimming pool

THURSDAY, 8 October 2009 Halong

Meeting	**Session 4: Sustainable Energy Development and its impact on Employment and Economy** Chairs: Mr. Riaz Ahmed Shaikh, Ms. Hu Qiying
09:00 - 09:30	Demand Side Management and Energy Efficiency: Its Impact on Reducing Greenhouse Gas Emissions in Vietnam MSc. Tran Hong Ky, Worldbank, Vietnam
09:30 - 10:00	Challenge to Implementation: Waste Energy from Palm Oil in Indonesia Prof. Dr. Ir. H. Didik Notosudjono Msc, Indonesia
10:00 - 10:30	Solar Thermal Energy Application in China MSc. Shi Cong Cong, China
10:30 - 11:00	Tea/Coffee Break
11:00 - 11:30	Sustainable Disposal of Municipal Solid Waste of Dhaka City to Generate Electricity & Organic Fertilizer: A System Dynamics Model MSc. Khatun Jorifa, Sub-Divisional Engineer, Bangladesh Power Development Board, Bangladesh
11:30 - 12:00	Improvement of Jatropha Oil Implementation for Diesel Generators on the Island of Nusa Penida, Indonesia Meiwardi Yuswan - Consultant and Manager of PT. Wahana Pengembangan Usaha (Indonesia)
Activities	Responsible: Ms. Dang Phuong Dung, Ms. Ngo To Nhien, Mr. Tran Hong Ky
12:30 - 13:00	Check out Holiday Villa Halong

13:00 - 14:30	Check in Paradise Cruise and have lunch
Meeting	**Session 5: Building up the Asian Energy Alumni Network** Chairs: Ms. Rachot Indradesa, Mr. Oo Abdul Rosyid
14:30 - 14:50	Building up REEEFAN. MSc. Evans Harvey, the Renewable Energy and Environmental Experts-African Network, Ghana
14:50 - 15:10	Challenges of managing alumni association (Sharada Sharestha, Nepal)
15:10 - 15:30	The ABCs of Starting an International NGO (Balamatti Arun, India)
15:30 - 15:40	Summary and Conclusions of the Session
Activities	Responsible: Ms. Dang Phuong Dung, Ms. Ngo To Nhien, Mr. Tran Hong Ky
15:40 - 16:40	Discover the Surprise grotto (Hang Sửng Sốt). Enjoy kayaking activities (weather permitted)
16:40 - 17:00	Transfer back to cruise ship - Continue cruising through the bay
17:30 - 18:00	Arrive at **Hang Tiên Ông** and visit the **Cửa Vạn Floating Village** - experience the daily life of local people - possibility of kayaking
18:00 - 18:30	Enjoy the open-air cooking demonstration on the sundeck (weather permitting) and discover the secrets of the Vietnamese cuisine
18:30 - 19:00	Arrive at **Tùng Sâu (pearl farm) Area** - stay overnight
19:00 - 20:00	Enjoy open-air cocktail bar located on the sundeck
21:00 - 21:00	Savor a delicious five course Set-dinner

FRIDAY, 9 October 2009 Halong

Activities	Responsible: Ms. Dang Phuong Dung, Ms. Ngo To Nhien, Mr. Tran Hong Ky
6:15	Tai Chi session on Sundeck
7:00 - 8:30	International Breakfast Buffet
8:30	Continue cruise through Halong Bay Check-out cabins and settle bills - Luggage collection
Meeting	**Session 6: Establishment of Asian Researchers Network** Chairs: Mr. Wulf Boie, Dr. Arun Balamatti, Ms. Ngo To Nhien
09:00 – 10:00	Endorsement of the bylaws for Asian Energy Alumni Network Election of the executive body Asian Energy Alumni Network Decision on 2 years action plan of Asian Energy Alumni Network Collaboration with German development cooperation bodies, German Universities and German Enterprises.

10:00 - 10:30	The role of alumni networks for reintegration/-advisory services for returnees and applicants for German Universities MSc. Dang Thi Phuong Dung, Representative Career Service Vietnam
12:00	Arrive at Tuan Chau Island - Transfer from cruise ship
12:30 - 13:30	Lunch Holiday Villa Halong - Tuan Chau Island
13:30	Leave Tuan Chau Island
15:30	Stop at Rubby Center in 30 minutes
17:30	Arrive Hanoi Maison Hanova - Check in hotel
18:30	Buffet Dinner at Hanoi Maison Hanova Hotel
20:15 - 21:00	Water Puppet Show

SATURDAY, 10 October 2009 Hanoi

Meeting	**Meeting of GANES Board** Chairs: Mr. Wulf Boie, Dr. Arun Balamatti, Ms. Ngo To Nhien
09:00 - 12:00	Discussing action plan to set up an German-Asian Alumni Network for Energy and Sustainability
12:00	Lunch

2 Workshop participants

Name	Country	University
Mr Aminul Islam	Bangladesh	University of Flensburg
Ms Khatun Jorifa	Bangladesh	University of Oldenburg
Mr Li Qingsong	China	University of Flensburg
Ms Hu Qiying	China	University of Flensburg
Ms Jie Zhang	China	University of Flensburg
Ms Shi Cong Cong	China	University of Flensburg
Mr. Wulf Boie	Germany	University of Flensburg
Mr Balamatti Arun	India	University of Flensburg
Mr Kandasamy Ravikumar	India	University of Flensburg
Ms Mona Doctor-Pingel	India	University of Flensburg
Mr Didik Notodudjono	Indonesia	University of Flensburg
Mr Oo Abdul Rosyid	Indonesia	University of Oldenburg
Mr Yuswan Meiwardi	Indonesia	University of Flensburg
Ms Fumi Harahap	Indonesia	University of Flensburg
Ms Susy Marisi Simarangkir	Indonesia	University of Flensburg
Mr Shakya Bhupendra	Nepal	University of Flensburg
Ms Shrestha Sharada	Nepal	University of Flensburg
Mr Yaungket Jitiwat	Thailand	University of Flensburg
Ms Rachot Indradesa	Thailand	University of Flensburg
Ms Tubtim Limsoontorn	Thailand	University of Oldenburg
Mr Nguyen Duy Manh Thi	Vietnam	University of Dresden
Mr Tran Hong Ky	Vietnam	University of Flensburg
Ms Ngo Thi To Nhien	Vietnam	University of Flensburg

3 Workshop implementation

3.1 Opening sessions

The first day workshop held in Hanoi, in the presence of more than 50 researchers have been studying in Germany, representatives of Vietnam ministries, universities such as Ministry of Science and Technology, Ministry of Industry and Trade, Ministry of Natural Resources and Environment, Hanoi University of Technology, the National Academy of Public Administration, ... and German organizations in Vietnam such as GTZ, GFA, DED, ... those organizations and companies are currently implementing research, develop strategy policy formulation and development of clean energy to cope with climate change. The presence of DR. Harald Leisch – Counsellor Scientific Cooperation Embassy of the Federal Republic of Germany has confirmed the importance and influence of the workshop to scientists and politics in Vietnam.

The first presentation on "National Target Program to respond to climate change; Climate change Scenario for Vietnam" was provided by Prof. Dr. Tran Thuc - Director of Institute of Meteorology and Hydrology - Ministry of Natural Resources and Environment, Vietnam. Dr. Thuc was given the results of scientific research on the impact of climate change in Vietnam and the decision of the Prime Minister of Vietnam National target program to respond to Climate change. The strategic objectives are to assess climate change impacts on sectors and regions in specific periods and to develop feasible action plans to effectively respond to climate change in the short and long-term to ensure sustainable development of Vietnam, take opportunities to develop towards a low carbon economy, and to join the international community's efforts in mitigating climate change and protecting the climatic system.

To discuss more detail about impact of climate change, alumni from others Asia countries have specific questions to compare the strategic response to climate change and the results of intensive research on climate change. The discussion after the presentation was to clarify the differences in planning response to climate change in Asian countries.

Dr. Douglas J. Graham, World Bank, Vietnam has presented at the workshop the topic about “Preliminary Lessons for Vietnam from the World Bank's ongoing Economics of Adaptation to Climate Change Study: global track and Vietnam country case study”. In the conclusion, Dr. Douglas J. Graham said:

- Adaptation to 2^{o}C warmer world will be costly ($75-100 billion/yr), even if low compared to GDPs
- Adaptation addresses effect, not causes of climate change; Mitigation critical, especially to reduce catastrophic risks
- Economic growth is the most powerful form of adaptation; but not development as usual

- Development strategies must maximize flexibility to incorporate climate knowledge as it is gained.

The presentation “Renewable energy development in Vietnam - Current situation and future perspectives” was presented by Dr. Le Tuan Phong, Deputy Director of Energy Department - Ministry of Industry and Trade. The presentation gives a brief look at the overall situation and potentials of renewable energy in Vietnam. Dr. Phong also has a review of strategic clean energy development in Vietnam and the Vietnam Government policies forward to develop clean energy.

Support to Dr. Phong presentation, Dr. Angelika Wasielke, Chief Technical Advisor, GTZ Vietnam come up with presentation “Contribution of Renewable Energies to Sustainable Development in Vietnam”. From 2008, GTZ Viet Nam has systematically screened all projects and programmes to optimise the integration of Climate Change aspects into its projects while applying the GTZ Climate Check. This ongoing process aims to ensure that all development cooperation efforts of the GTZ consider climate risks and greenhouse-gas reduction potential appropriately. There are some priority areas of German Development Cooperation in Viet Nam, as follow:

- Sustainable Economic Development
- Environmental Policy and Management of Natural Resources.
- Health Care

Dr. Angelika Wasielke introduced GTZ project “Establishment of a Legal Framework and Improvement of Technical Capacities for Grid-Connected Wind Power Development in Viet Nam”. The focus of this project rests on the establishment of a legal instrument for the promotion of wind energy. Successful elements from European laws will be adopted and promulgated in a Government decree, including the guarantee of a feed-in tariff over a set timeframe, prioritised access to the electrical grid, and a purchasing commitment for all energy generated in this fashion. In addition, this project will contribute to the implementation of ecologically-sound planning processes for wind power projects and assist a pilot province in establishing a sustainable planning process for wind power projects in Vietnam.

Besides the actives to development of renewable energy, Vietnam government have developed strategies improve energy efficiency in different sectors. The point of view of energy strategic of Vietnam:

- Diversified, reasonable and efficient exploitation of domestic resources is combining with sensible importing and exporting based on principle of reducing step by step the primary energy exporting, meeting the energy demand for socioeconomic development of the country, fuel conservation and energy security for future.

- Developing new projects with combination of existing projects improvement and upgrading. Energy efficiency and conservation using from energy production to transmission, processing and using.

- Developing energy in close cooperation with environment and resources protection.

- Establishing competitive energy market, diversifying investment and business modality in energy sector. The Government only exclusive hold the core fields to ensure the national energy security.

- Improving the energy programs for rural areas, develop renewable energy to meet the energy demand, especially island, mountainous and far center areas.

- Developing energy sector with comprehensive, efficient methods based on bringing into play domestic power with combination of extending international cooperation.

This information comes from presentation of Dr. Phuong Hoang Kim – Representative for National Program on Energy Efficiency and Conservation - Ministry of Industry and Trade, Vietnam. Dr. Phuong Hoang Kim conclusion that:

- the legal frameworks and Institutions for promoting EE&C activities in Vietnam are just in initial stage. The national energy efficiency program is the long-term EE&C program of Vietnam government.

- In order to successfully implement the EE&C programs it needs coordination among implementing and state managing organizations, together with transparent legal framework, such as tax incentives, financial funds, electricity tariff adjustment as well as standards and mechanisms for monitoring, controlling quality of equipment and devices and other technical and training assistance.

- The Energy Efficiency Law is meant to develop a framework for the national program, develop appropriate funding mechanisms, lay out government functions and consumer obligations, allow for other policy instruments such as codes and standards to be developed and generally state the Government’s long-term strategy for energy efficiency promotion within the country.

- Vietnam needs the cooperation and assistances in capacity building of the EE&C activities.

After the presentation from Dr. Phuong Hoang Kim, the conference has 1 hour break for lunch. The conference continues with presentations focus on CDM projects and carbon market in Vietnam and Asia countries.

During the workshop, participants have been contributed many valuable recommendations and remarkable comments for better project implementation. All participants were very interested in some issues of renewable energy actions in Europe and Asia, CDM projects, carbon market. According to the atmosphere of workshop, all the participants had good comments on the workshop.

3.2 Excursion

In second day of workshop (6.10.2009) a biogas study tour took place in Bac Ninh province as a part of the work package 2 (Task 2.4.5). The tour was arranged and organized by Ms. Ngo To Nhien with the support from Mr. Nguyen Viet Quang – Head of Provincial Biogas Project Division of Bac Ninh belong Department of Agricultural and Rural Development.

Project "Support Project to the Biogas Program for the Animal Husbandry Sector in some Provinces of Vietnam" is the cooperation between the Government of Vietnam and Government of Netherlands. Starting in January 2003, the project aims at developing a commercially viable and market oriented biogas industry and contribute to avoid the use of fossil fuels and biomass resource depletion. Livestock Production Department (formerly named Department of Agriculture), Ministry of Agriculture and Rural Development (MARD) and Netherlands Development Organization (SNV) are assigned to implement the project activities.

It is estimated that the project will provide clean and cheap energy equivalent to 2.800TJ per year. This energy can replace 245.000 tons of agricultural waste/ 326.000 tons of firewood/ 36.000 tons of charcoal/ 6.593 tons of kerosene/ 39.405MWh and 4.611 tons of LPG.

By the end of 2008, the project has supported construction of over 56,000 biogas plants, provided training for 500 provincial and district technicians, 700 biogas mason teams, and organised thousands of promotion workshops and trainings for biogas users.

The project was awarded Energy Globe Award 2006, which is the most reputable and honoured award to project having significant contribution to reduce "global warming".

Bac Ninh is a province of Vietnam, located in the Red River Delta of the northern part of the country. It is situated to the east of the Vietnamese capital, Hanoi, and borders Bắc Giang, Hưng Yên, Hải Dương, Vĩnh Phúc, and Hanoi. The province is rich in culture and is known nationally for Quan Họ folk music. In terms of land area, Bắc Ninh is the smallest of all Vietnamese provinces (and in fact, is smaller than any of the five province-level municipalities). It is, however, home to a relatively large number of people for its size,

having the highest population density of any province. On average, there are over 1,200 people for every square kilometre of land in Bắc Ninh.

Exactly at 8:30 am we left with the bus for Bac Ninh province, where we visited the biogas plant at midday. The participants had the chance to see the biogas digester under construction. Mr. Quang - one of the technical experts, who guided through the plant, gave comprehensive and expert information. Not only the biogas plant for household was explained, also the advantages and problems of biogas construction for households were discussed with the technician.

A short bus trip the biogas generator plant for household was visited. The owner of the plant himself was the guide and gave comprehensive information about his plant. After visit the biogas generator, the participants continue the trip to Tuan Chau Island – Quang Ninh province.

3.3 Different sections

1. Section 1: Impact and Mitigation of Climate Change in South East Asia

The countries of South East Asia are among the countries which will be the most affected by climate change. The major burden of climate change has to be borne by the rural poor. There are four presentations in this section focus on climate change and its impacts are closely linked to rural poverty and to energy poverty.

Mr. Ravikumar Kandasamy was presented about the Mahatma Gandhi Institute for Rural Industrialization (MGIRI) at Wardha. In the past six years the Institute was develop some solutions for Rural Infrastructure and Energy Section as follow:

- Development of energy efficient production systems- for example pottery kiln.
- Energy back up for rural industrial complexes through locally available energy resources like biomass from Goshala, agricultural residues and micro hydro
- Providing alternative fuels for home and industries through briquetting etc
- Evolving viable solar energy backed innovative production and utility systems like solar potter’s wheel, LED based lighting system, solar office etc
- Energy auditing and energy efficient habitat

Mr. Li Qingsong from China was presented the adaptation and mitigation measures of climate change which implemented by Sustainable Management Project on Agro-biodiversity in the mountains areas of Southern China. The project selected 28 pilot villages from 5 provinces to develop and test different strategy at the village level… His conclusion that biodiversity is fundamental importance for adaptation to climate change and are crucial to

coping with the problems it poses. However this subject has received not enough attention in the international debate on adaptation to climate change.

Dr.-Ing. Oo Abdul Rosyid from Indonesia did his research on "Renewable Energy Technology for Mitigation of Climate Change and Energy Poverty in Developing Countries: Case Study for Indonesia". He explained that Indonesia has an energy system that is highly carbon intensive may cause to the global climate change. The climate change is a global phenomenon, where its impact will be felt globally by all human beings throughout the hemisphere, including Indonesia. As a tropical archipelago country, Indonesia is very vulnerable to climate change. Increasing of sea water as one of the impacts may cause danger to millions of people living in coastal areas, etc.

Mr. Oo Abdul Rosyid conclusion that "Indonesia has an energy system that is highly carbon intensive may cause to the global climate change. Deforestation and forest fires have put Indonesia among the top three largest emitters of GHG in the world. Emission from energy sector is relatively small, but is growing very rapidly.

Renewable energy technologies may reduce GHG emissions, contributes to climate change mitigation and poverty reduction. Indonesia has vast potential resources of renewable energy, but has not been exploited optimally, due to some barriers and few incentives. CDM projects can open up a wide possibility of GHG emissions reduction and removal. Unfortunately, Indonesia has not yet been able to take advantage of the opportunities in the CDM.

The mitigation options most feasible in Indonesia are geothermal energy, the utilization of flared gas, integrated combined cycle, fuel switching, and cogeneration and heating systems."

MSc. Aminul Islam was presented about his study about "Potential and Technical Aspect Of Solar Photovoltaic Systems In Agriculture (Emphasis On Irrigation) In Bangladesh". Now a day, solar photovoltaic (PV) system is a promising option for electrification especially in developing countries where there is no grid electricity. His conclusion: "Bangladesh is low lying and agriculture based country. By using PV system it can be benefited by two ways, decrease fuel demand and mitigating climate change. The main limitations of PV system are higher initial investment, initiatives, policies. Government, non government and development organization can play a vital role to integrated PV generator in agriculture sector especially for irrigation. Due to higher investment farmers are not able to pay for that. Subsidy, donation and low interest loan will be key drivers of PV pump implementation".

2. Section 2: Carbon trading and Setting CDM projects in South East Asia and China

This session was intensed CDM topics included both Polity (Global) scale and Project scale. For the policy (global) scale, there were 3 topics: 1) Post-2012 and Future Clean Development Mechanism Projects in China and South East Asian Countries was presented by Fumi Maeda Harahap, Indonesia 2) Carbon Trading by Ms. Susy Marisi Simarangkir, Indonesia and 3) Setting up CDM projects by Ms. Rachot Indradesa, Thailand.

For the global scale topics, participants discussed widely on “high quality CER” should came from the renewable energy project and CER from agriculture sector will be focused in the 2nd commitment of Kyoto Protocal. The expected CER demand in 2020 will less than the projected CER supply potential. The pricing of carbon market depends on the marginal CER market except the United State of America. U.S.A would like to control market so U.S.A set market their price. However, project cost and carbon tax were also mentioned.

Moreover, for the setting up CDM, the question was raise on project additional. The project developer should determine on technical profile, project document and real barrier (e.g. finance) to decide the way that should go or not. To take part in this market, the small scale project owner have to know “how to pay deal by themselves and have to be careful for the first document, especially, in voluntary market, “Gold Standard required the premium quality”. Now a day, VER is not attractive because a) UN does not accept VER market and b) VER does not comply with the emission reduction of the country.

The project scale presentations were 1) Carbon financing opportunity for sustainable operation of small technology – Case of Improved Water Mill Programme in Nepal by Mr. Shakya Bhupendra, Nepal and 2) Low Carbon Manufacturing Program in Pearl River Delta by Ms. Hu Qiying, China. The question on project in Nepal were the type of support that were the grant and fix amount from the government and donor. For the comment on the cost calculation, revenue should not get in the primary period.

For the project of Low carbon manufacturing in China, the participants discussed on the subsidy amount provided for verification, audit and promotion. The benefits of manufacturing taking part in this project were 1) minimum 10% of energy saving and 2) promotion their business as the good producers.

3. Section 3: Sustainable Strategies to Mitigate Rural Energy Poverty

There are four presentations in this section, all the presentations was focus on sustainable energy use in rural energy poverty.

In the first presentation “Renewable Energy development in Rural Areas in Inner Mongolia”, Ms. Jie Zhang presented the climate change impact in northern region of China where roaming of rangers and increase of livestock and agricultural style causes decreases of grassland. Policies have been adopted for adaptation to climate change. Biogas and power generation system was implemented in the studied area as one of measures to reduce the impact.

The discussion concerned aspects of change of cultural which has been influenced because of the settling of nomadic Mongolian tribes and adaptation of the communities to climate change.

With presentation “The Socio-economic role of Wind Power to reduce Rural Energy Poverty in Nepalese Community”, Ms. Shrestha Sharada presented the energy scenarios in Nepal followed by her wind-hybrid system (wind/solar) which was installed to rural communities.

This pilot project has been carried out and successfully provided benefits to stakeholders in cross-cut aspects.

The discussion concerned the cost of the technology which was found and affordable as it is manufactured locally in Nepal. The project also provided training to people to ensure the quality of project. The users of the energy are integrated and also contribute to the project with low monthly energy fee.

This project is the pride to be shown to all workshop participants because the project is the first project successfully developed by the alumni in Nepal, FAEM Nepal.

In the presentation "Alternative energy system as a future option for sustainable energy use and rural development in Thailand", Mr. Jitiwat Yaungket presented the model study of a community in Thailand where solar PV has been exploited in different areas; almost every available PV application in the country could be found in this community. The study extends to challenges from technical and financial aspects.

The discussions concerned replication of other renewable energy potentials in the studied community as well as the improvement of project management and long term maintenance.

With presentation "Sustainable regional cooperative planning-an experience in Auroville, India", Ms. Mona Doctor presented part of her community work in terms of regional planning where activity starts with "dream catcher" which is an open discussion where members of her community gather and share thoughts. After dreaming, interests have been pushed into implementation. Constraints were there, related to political pressure. Observers from outside the community are necessary to take part in planning and therefore had been invited several times. Planning sessions took place many times with overlaying of different aspects until conclusion is reached. The conclusion was then further transformed into proposal for further governmental procedure.

The discussions concerned the community where the speaker comes from is unique and questions were raised about the characteristics of the community. Beyond those comments, the discussions went about and served the purpose of this workshop. Dreaming is a starting point, dreams and ideas need transferring into practice.

Conclusion of the day:

The focus on the first day of the workshop was on national level, specifically in Vietnam. Today's presentations were given in different cross-cut perspectives and approaches of the alumni members who work in relevant professions. The impact of climate change, from global level, to regional level, and down community level, has been discussed in depth and breadth funneled from boarder view, political and strategy point of view, down to particular example of projects that some alumni members have been experienced directly in their professional works. Renewable energy, agriculture, alleviation of poverty, supplying of energy, and GHG emission reductions are integrated as measures of potential reduction of

climate change impacts. The next day presentations shall give further inputs and gives conclusion of how the alumni network can be strengthen and remains active in renewable energies and climate change area.

4. Section 4: Sustainable Energy Development and its impact on Employment and Economy

Mr. Tran Hong Ky, World Bank Vietnam was opened the session with the presentation "Vietnam Compact Fluorescent Lamp Program. It is impact and Lessons Learned".

Reduction of energy consumption through Demand Side Management (DSM) is necessary to solve power shortage and incremental demand growth issues in Vietnam. The energy efficiency program is funded by GEF and World Bank. EVN conducted Compact Fluorescent Lamp (CFL) program as a part of energy efficiency program with target to distribute 1 million of CFL in two years in rural and suburban areas. Several barriers were faced during the implementation of program e.g. (1) market dominated with low quality CFL (2) color of CFL light (3) low awareness on the CFL (4) quality of power network (5) high cost for quality CFL. The impact of CFL program comprises of annual energy savings, market transformation which is doubled the number of CFL sold from 2006 to 2008, reduction of GHGs and reduce tariff payment of consumer.

Mr. Ky emphasized support and collaboration with local manufacturers as an important lesson learn for other program. There was also discussion about mercury content on CFL whether it can be acceptable as European Union countries does not support of using CFL due to health issue.

The presentation "Challenge to Implementation : Waste Energy from Palm Oil in Indonesia" was presented by Mr. Didik Notosudjono, Indonesia.

Indonesia produced 36% of world palm oil production and being the second largest producer after Malaysia. Palm oil plantation reduces poverty in Indonesia and creates employment opportunity. Complaints come from NGO on the implementation of palm oil production e.g. deforestation, fire forest, land use and land ownership. There are several ongoing negotiations between NGO and government to solve the problem. He concluded that the future of Indonesian palm oil is bright

The presentation "Solar Thermal Energy Application in China" was presented by Ms. Shi Cong Cong come from China.

Main market of solar market in China can be classified into 4 different regions where each of region use different technology associated to the climate. China is accounted for more than 50% of global newly installed capacity of solar thermal in 2006. Solar market in China is dominated by glass vacuum tube. This technology Is invented by Chinese people. Top 5 firms of solar water heater in China combined market share of

20%. Ms. Cong Cong also outlined the solar certificate program in China. 20 leading manufactures has labeled their manufactures. In addition, solar certificate standard is the same standard with European standard.

Ms. Jorifa Khatun from Bangladesh was presented the topic : "Sustainable Disposal of Municipal Solid Waste of Dhaka City to Generate Electricity & Organic Fertilizer: A System Dynamics Model".

The existing Municipal Solid Waste (MSW) management in Dhaka is open dumping without waste recovery. Environment contaminated & health hazard of citizens as a consequence. The chosen technology for energy recovery is anaerobic digestion technology with advantage of electricity recovery from MSW, by products can be used as organic fertilizer and reduction of CO2 emission. 3 dynamic models were developed (1) Electricity Recovery Model for AD Technology (2) Organic Fertilizer Recovery Model Equation & Result (3) CO2 emission Reduction Model Equation. The objective of this model is to improve city environment and health of the citizens as well as provide a firm solution of MSW disposal problem. The generated electricity recovery can also be fed to power grid displacing equivalent electricity recovery from fossil fuel based power plant. During the discussion time, there was suggestion to review the parameter of emission factor with international standard.

The newest alumna from Indonesia – Mr. Meiwardi Yuswan was presented his study with topic "Improvement of Jatropha Oil Implementation for Diesel Generators on the Island of Nusa Penida, Indonesia"

Mr. Yuswan had carried out a research to evaluate the existing situation of oil implementation for diesel generator on Nusa Penida Island, Indonesia. That previous project had been conducted by state owned Indonesia Electricity Company of Indonesia in 2007. It was found that very low oil production and problem in the quality as well. He used community approach to discover the problem and how brainstormed with community it can be improved in the future. He gave several recommendations in terms of technology and sustainability aspect. During the discussion, several participants have outlined that Indonesia should learned from experience of India that jatropha plantation for diesel oil did not work well due to several issues.

5. Session 5: Building up the Asian Energy Alumni Network

Mr. Evans Harvey, the Renewable Energy and Environmental Experts-African Network, from Ghana were presented how the REEEFAN was developed and established. The necessity of sharing experience and contribution to such development and establishment were listed out in form of problems and solutions.

Mr. Balamatti Arun from India was come up with presentation "Asian Alumni Association, the Opportunities and Challenges of Alumni Networking". He presented the readiness of

preparedness if the alumni network would be registered in form of an NGO/INGO in India to accommodate the Asian alumni association. He also presented the possible legal form of the alumni network. The predictable obstacles where also given as awareness of practical world compared to paper work.

Ms. Sharada Sharestha - Flensburg Association for Energy Management-FAEM Nepal was presented the Challenges of managing alumni association. She presented how the FAEM Nepal was developed and established, the difficulties during the development and extended to difficulties in running the organization.

Discussions

Discussions were concentrated after the end of the third presentations. People were interested in different steps of establishing alumni networking; getting people, motivate people, financing alumni, distributing responsibilities, short term and long term perspective. However the most critical point during the discussion of the existence of the network, goal, and the steering of the network, the quality (work/product) which shall be more important of quantity (number of member).

Today's conclusion

It was agreed that alumni network shall be firstly established and designated as focal point of the alumni network activities. Country representatives shall provide inputs from their national context as being part of the network building/strengthening. The detail discussion shall be made on the next days to have formal consensus on operative level and actions required for the register the alumni network into a legal entity.

4 Setting up Asia Alumni network

4.1 Result of Friday session

On Friday (9/10/2009), the participants has discussed about setting up Asia Alumni network. The questions were discussed during the meeting as follows:

1. Shall we make the objectives larger, broad based or more specialised? Consensus on the broad based objective to include the older and newer ARTES and SESAM graduates who are working in different fields
2. Have a representative from every country represented here on the board or responsible person for every country.
3. Create a data base for experts for every country so that it is accessible very quickly.
4. Is there a possibility of organising for all the alumni from all the countries and not only the Asian alumni? What would be the costs and is it possible for DAAD to finance that? 250 total alumni from Artes and Sesam, perhaps 120 from Asia.

5. National vs. regional meeting – national is easier to organise and finance. Active members should be involved. How do we motivate those who are not active?

6. In China DAAD organises at least once a year a meeting for alumni. That can include timing for our next alumni networking meeting.

The Final Protocol of the South East Asian Alumni Workshop 5/10/09 -9/10/09, all the participants agree that it is necessary to establish the Asian alumni network with the name is "German Asian Alumni Network on Energy and Sustainability" (abbreviated is GANES).

- The signatories launch the German Asian Alumni Network on Energy and Sustainability GANES with effect from 9/10/09

- GANES is a network of alumni who wish to contribute towards the adaptation to and mitigation of climate change and the alleviation of energy poverty in Asia by supporting the networking of German trained experts in energy and sustainability.

- GANES will be open to all Asian alumni of German Universities, who work in the field of energy and sustainability. The criteria for membership shall be defined in detail in the Bylaws.

The signatories elect the following Alumni as members of the preliminary board:

- Jorifa Khatun (Bangladesh)

- Rajeev Munankarmi (Nepal- to be confirmed or FAEM executive)

- Tubtim Limsoontorn (Thailand)

- Susy Simarangkir (Indonesia)

- Arun Balamatti (India)

- Hu Qiying (China)

- Ms. Ngo Thi To Nhien (Vietnam)

- Mr. Michael Golba –University of Oldenburg (to be confirmed – or deputy)

- Wulf Boie (University of Flensburg)

Mr Arun Balamatti will be the chair person of the preliminary board,

Mr. Rajeev Munankarmi and Ms. Ngo Thi To Nhien the vice chairs.

The signatories mandate the board to look into the pros and cons and conditions for registration and organisational capacities of existing alumni in their respective countries by Jan 2010. They shall decide on the suitable country and register the Association / NGO / INGO - GANES by March 2010.

The following activities shall be conducted within the next 6 months:

- Launch of a new alumni website as a replacement of the old SESAM alumni website, possibly in cooperation with the African Alumni Network
- Update the database of all alumni of SESAM, ARTES and PPRE.
- Preparation of bylaws and regulations for the new network and communicate to all the members

In case that the DAAD does not accept the application of the University of Flensburg (UF) for financial support of the networking activities, UF will consider to provide an initial fund for setting up the network.

The signatories mandate the working group of country representatives, who meet on the 10 Oct, 2009, to draw up a more detailed action plan for the next two years.

4.2 Actions plan

On Saturday (10/10/2009), the board members were discussed:

1. Website design, content and launching
2. Update alumni database
3. Vision, Mission statement and Bylaws of the Alumni Association
4. Decide on country location for the registration of the association in the next 3 months – 31 Dec 09
5. Decide country location and topic of the next workshop, apply by July 2010

To be done after the workshop:

1. FAEM Nepal to circulate its Bylaws - Sharada
2. Each country to communicate to the chairman activities in their respective countries
3. Nhien to upload all the presentations of this workshop.
4. Inform DAAD and all the alumni re the formation of the network and association - Wulf

1. **Website design, content and launching**
   - Time Frame
     - Information collection – 2 months – 10 Dec 09
     - Flow chart & Purchase order to design – 1.5 months – 30 Nov 09
     - Designing time – 2 months – 1 Dec – 31 Jan 2010
     - Evaluation – 1 Feb - 15 Feb 2010
     - Commercial operation date- 3 months - **28 Feb 10**

   - Domains:

- with new name – www.GANES-online.info- register quickly (Nhien)
- Joomla – open source tool could be used
- Nhien to coordinate the website, content and hire the person to design the website and Wulf to look into finances.
- (Updates should be automatically intimated to the e-mails of all the alumni. Automatic reminder of updating your database.)

- Public Domains
  - Alumni - list of members – name, position, organisation, country, if it exists and they agree or otherwise only names and country of all the alumni.
  - Vision
  - Mission
  - Contacts persons for different countries
  - Core competences
  - News
  - Registration
  - Portal for energy, sustainability and other interesting information, data, graphs, for every country – coordinators of countries to send this to the website coordinator – Nhien.
  - Webmaster
  - FAQs

  - Every country representative should update every 3 months some material for reading

- Alumni Domain – password protected
  - Details of all alumni with e-mails etc
  - Forum
- Links:
  - To alumni workshops – Nepal, Bali, Vietnam. Etc…
  - University of Flensburg website - master's thesis etc…
  - To FAEM Nepal website
  - To African database or other continents

- Administrator Domain
  - Password for alumni and for those who want to access.
  - Scrutinise the personal information and application.
  - All alumni from the all the continents shall have access to the alumni data base with permission of the administrator

2. Point 2: Update alumni database - 2 months

- Old data needs to be updated – alumni should update their own data. Country coordinator who looks into updating of the data. Ask DAAD if they have a better database. Country coordinators can contact the DAAD office in their respective country.

- Oldenburg has a good database. Needs to be looked into.
- Check www.ppre.de, www.iim.uni-flensburg.de/community (password : firstname and date of birth)
- Regular newsletter: this is important and it would be good if the articles are attached to the e-mail itself.
- Information to be sent to the whole board.
- Interim report every month to the board.

3. Vision, Mission statement and Bylaws of the Alumni Association - 1 month

- Vision and Mission:
  - World free of energy poverty
  - Ecologically sustainable development
  - Millennium Development Goals

Arun to look into the process and circulate the questionnaire which would lead to the vision statement.

4. Decide on country location for the registration of the association in the next 3 months – 31 Dec 09

- Time Frame:
  - 31 Dec 2009 to submit report to the Board
  - Evaluation – 1 month
  - Start Registration process – 1 Feb. 2010
- Finance, laws, tax regulations and board constitution requirements
- Location for the registration of the association:
  - Germany - disadvantage: Germany would be seen as the main player, Open question: can people who do not live in Germany be part of the board? The office should not be in Germany. Kobbie, Janak can be on the board.
  - Nepal - Pro: existing facilities'
  - China – to be looked into
  - India – be part of larger organisation to avoid the FCRA problems
  - Indonesia – needs to be looked into

Each country interested can submit their conclusions from a research done in the next 3 months.

- Progress report to be sent at the end of the month to the chairs.
- And Chair will communicate according to their discretion to the rest of the alumni.

- The final decision has to be communicated to all the alumni.

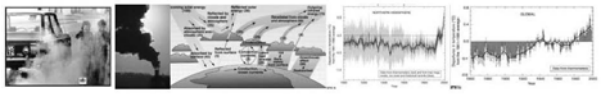
5. Decide country location and topic of the next workshop, apply by July 2010

- Favoured next location : China, India, Dubai or Germany
- Can be global – tickets to China may be cheaper
- Dubai is central location, Aminul's company can contribute, International renewable energy Agency (IRENA) headquarters in Abu Dhabi, international experts can be invited, solar power plants can be visited, eco-city planning

Annex 1: Abstracts and Presentations

National Target Program to respond to climate change; Climate change Scenario for Vietnam *Prof. Dr. Tran Thuc – Institute of Meteorology and Hydrology Ministry of Natural Resources and Environment, Vietnam.*

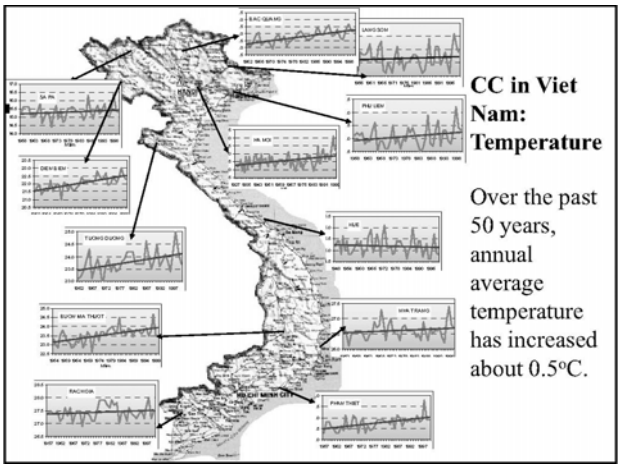
CLIMATE CHANGE IN VIETNAM AND RESPONSE



CONTENTS

1. Climate Change in Viet Nam
2. The National Target Program to Respond to Climate Change
3. Climate Change Scenarios for Viet Nam

CLIMATE CHANGE IN VIET NAM

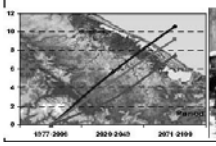


CC in Viet Nam: Temperature

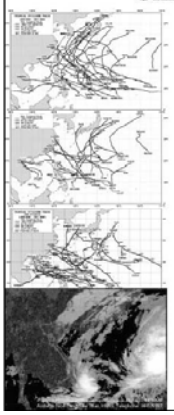
Over the past 50 years, annual average temperature has increased about 0.5°C.

Climate Change in Vietnam

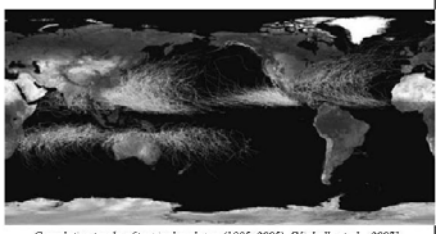
- Rainfall increases in rainy season (Sep. to Nov.)
- More heavy rainfalls causing severe floods which occur more frequently in the Central and Southern VN.
- Rainfall decreases in dry season (Jul., Aug.).
- Drought happen every year in most regions of the country.
- CC already caused severe natural disaster, especially typhoons, floods and droughts.



Climate Change in Vietnam



- More tyohoon with high intensitive;
- Typhoon trajectory moves southward;
- Typhoon season shifts to later months of the year.



Cumulative tracks of tropical cyclones (1985 2005) [Nicholls et al., 2007]

Climate Change in Vietnam

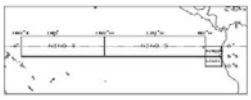
- Number of drizzle days decreases significantly;
- Frequency of cold front in the North decreases significantly in the past three decades: from 288 events (1971 -1980), 287 events (1981 – 1990), to 249 events (1991 – 2000);
- Number of extreme cold spell decreases. However, in some years it prolongs with historical insensitive, e.g. **in 2008**;

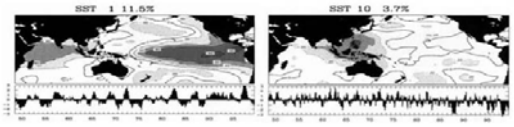
Climate Change in Vietnam

- Number of hot wave is more in 1991 - 2000, especially in the Central and South;
- Off-season extreme rainfall events occure more frequently. More profound are events in November in Ha Noi and surround in 1984, 1996, 2008.

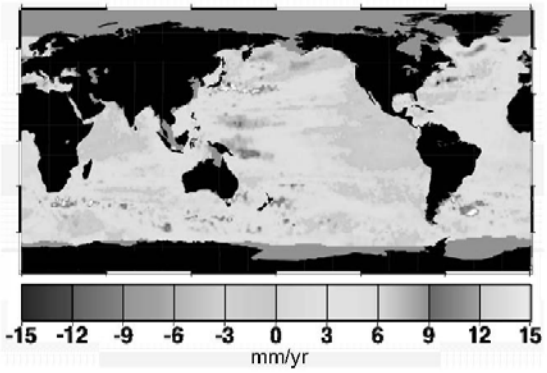

Climate Change in Vietnam

ENSO has stronger effects on weather and climate in Viet Nam





Sea Level Rise

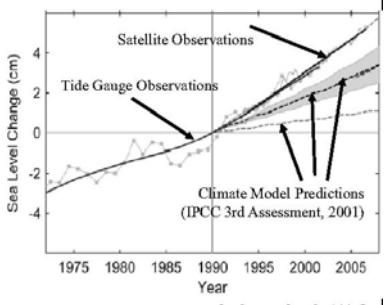


Average Sea Level Rise over 1993-2006

Sea Level Observations versus Predictions

- IPCC 4th Assessment projects 0.28 - 0.59 m of SLR by 2100.

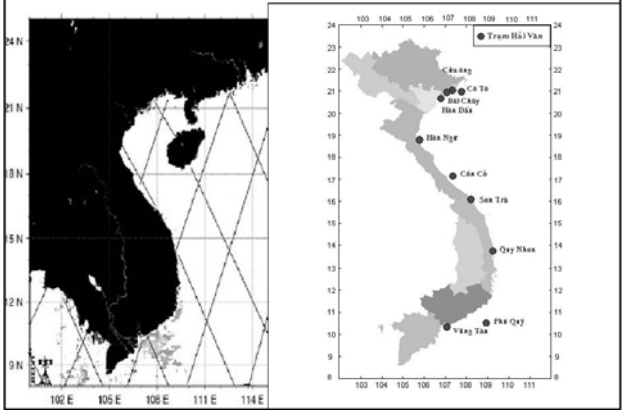
However, not all factors were included in these projections (most notably uncertainty surround how ice sheets would react to rising temperatures and interact with oceans) and are consequently too low.



[Rahmstorf et al., 2007]

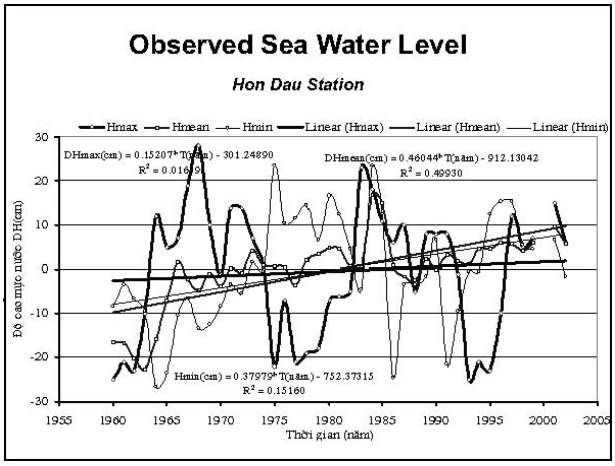
Recent study suggests higher rates: 0.5 - 1.4 m by 2100.

Sea Water Measurement in Viet Nam



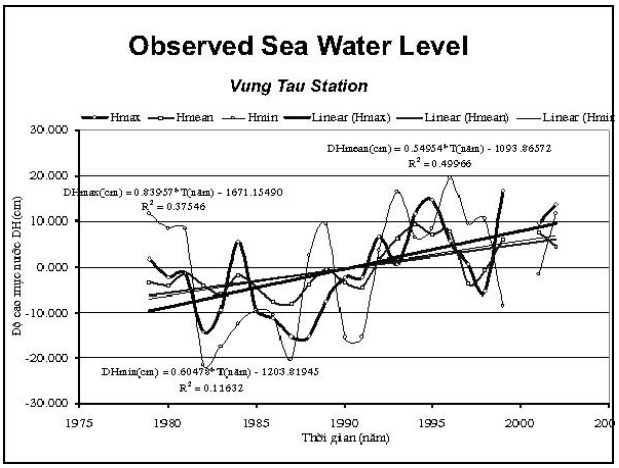
Observed Sea Water Level

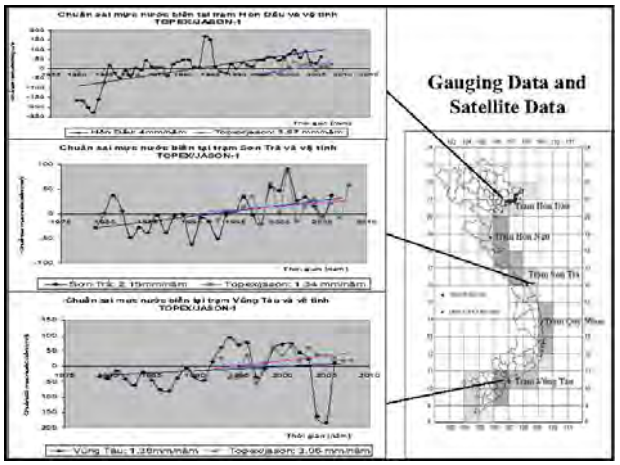
Hon Dau Station



Observed Sea Water Level

Vung Tau Station





Sea Level Change

Based on OPEX và JASON-1 satellite data, 1993-2008

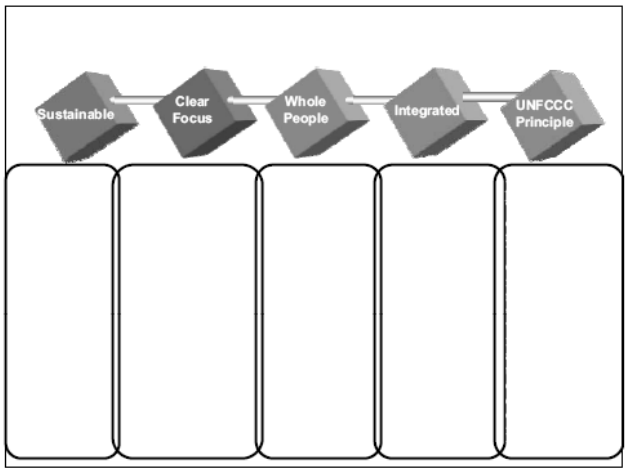
No	Station	Latitute	Longtutute	Period	Rate (mm/yr)
1	Hon Dau	20^0 - 21^0	106^0 - 107^0	1993 - 2008	3.6
2	Son Tra	16^0 - 17^0	108^0 - 109^0	1993 - 2008	1.3
3	Quy Nhon	13^0 - 14^0	109^0 - 110^0	1993 - 2008	3.8
4	Vung Tau	10^0 - 11^0	107^0 - 108^0	1993 - 2008	3.1
				Average	**3.0**

II. NATIONAL TARGET PROGRAM TO RESPOND TO CLIMATE CHANGE

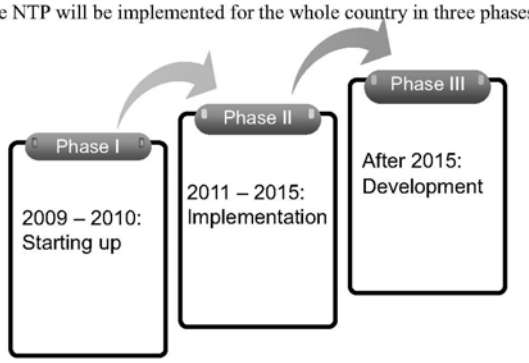
(Decision No. 158/2008/QĐ-TTg dated 2nd December 2008)

GLOSSARY OF TERMS

1. **CC:** Change in the state of the climate identified by changes in the mean or variability of its properties. ***CC may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.***
2. **Respond to CC = Adaptation + Mitigation**
3. **Adaptation:** Adjustments in natural or human systems, intended to reduce vulnerability to actual or anticipated CC variability or exploit beneficial opportunities.
4. **Mitigation:** Actions resulting in reductions to the degree or intensity of GHG emissions.

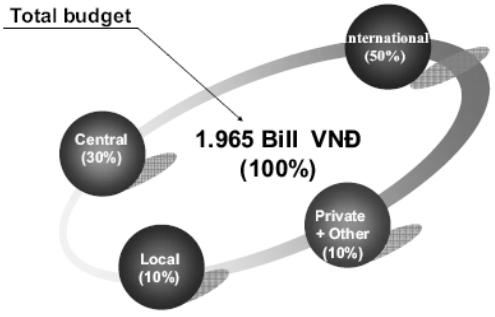


The NTP will be implemented for the whole country in three phases:

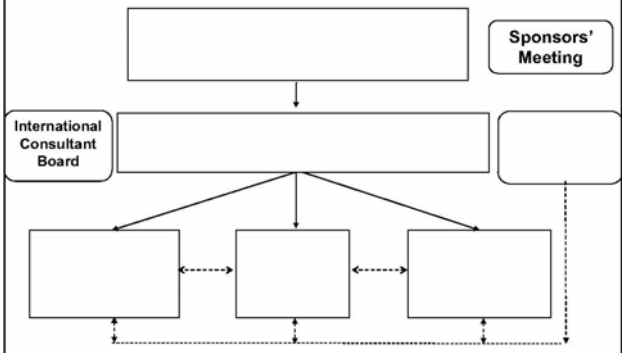


- and assess CC impacts on sector, area and locality
- Identify measures to respond to CC
- Promote scientific and technological activities to establish the scientific and practical basis for CC response measures
- Consolidate and enhance organisational structure, institutional capacity and the development and implementation of policies to respond to CC
- Enhance public awareness, responsibility & participation; and develop human resources to respond to CC
- Promote international cooperation to obtain external support in response to CC
- Mainstream CC issues into socio-economic, sectoral and local development strategies, plans and planning
- Develop and implement action plans of ministries, sectors and localities to respond to CC

Strategic objectives are to assess CC impacts on sectors and regions in specific periods and to develop feasible action plans to effectively respond to CC in the short and long-term to ensure sustainable development of VN, to take opportunities to develop towards a low-carbon economy, and to join the international community's efforts in mitigating CC and protecting the climatic system



ORGANIZATION FOR IMPLEMENTATION



DIFFICULTIES IN THE IMPLEMENTATION

1) First difficulty in implementing the NTP is poor awareness in scope and level as well as measures to respond to CC. Lack of awareness exists at levels, from decision makers, officials in sectors and localities, to vulnerable communities. Therefore, raising awareness of all levels is obviously first priority the activities.

2) Second difficulty is lack of coordination to respond to CC in developing policies, plans and programs in sectors/regions, even in climate highly sensitive sectors/regions. There are still not awareness of the necessity to integrate CC information into policies/plans. Integrating CC in developing master plans, designing and implementing policies do not almost exist, in particular, links between CC and poverty reduction and hunger eradication, livelihood are missing.

DIFFICULTIES IN THE IMPLEMENTATION

3) Third difficulty in implementing the NTP is lacks of tools and methodologies to instruct and give out consultancy to the decision makers. This happens also with experts in the sectors/local levels as well as in vulnerable communities. Therefore, training and knowledge upgrading; collecting and utilizing data on CC; developing tools/ methodologies for analysis and adaptation with CC are important activities that should be done immediately.

4) Fourth difficulty in implementing the NTP is lacks of knowledge. CC is a long-term issue, impact of CC are very complex including present impact and potential impact in the future. Knowledge of the world and VN on trend of CC and its impacts to socio-economic activities is still limited.

CLIMATE CHANGE, SEA LEVEL RISE SCENARIOS FOR VIET NAM

Targets set by the NTP

- ***"Complete CC scenarios, especially SLR, in Vietnam by early 2009 based on existing studies so that sectors and localities can use the scenarios to develop their action plans to respond to CC";***
- ***"By the end of 2010, update CC scenarios, especially SLR, for each period between 2010-2100. The scenarios must have a solid scientific and practical basis";***
- ***"By 2015, Update CC scenarios, especially SLR, in Vietnam".***

Objectives

- To provide the basic information of the future trends of CC and SLR in Vietnam, corresponding to different scenarios of global socio-economic development which cause different emission rates of GHG.
- Basis for ministries, sectors and provinces/cities to assess possible CC impacts on socio-economic sectors, to develop and implement their respective action plans for responding to and reducing potential impacts of future CC.

Human have emitted excessive greenhouse gas to the atmosphere through activities such as industry, agriculture, transportation, deforestation… hence, **the basis to greenhouse gas emission scenarios are:**

- Development at global scale;
- Population and consumption;
- Income and way of life;
- Energy consumption and energy recourses;
- Technology transfer; and
- Land use change;…

Greenhouse Gas Emission Scenarios

- **A1 family**: Rapid economic growth; Population reaches 19 bill. in 2005 then gradually declines; Quick spread of new and efficient technology; A convergent world-income, way of life converge between regions, Extensive social and cultural interactions worldwide:
  - A1FI: An emphasis on fossil fuels (high);
  - A1B: Balanced emphasis on all energy sources (medium);
  - A1T: Emphasis on non-fossil energy sources (low).
- **A2 family**: world of independently operation; Continuously increasing population; Regionally-oriented economic development; Slower and more fragmented technological changes and improvements to per capita income (high scenario, similar to A1FI).

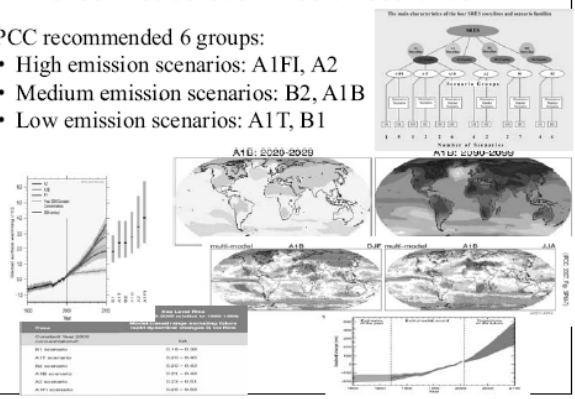
Greenhouse Gas Emission Scenarios

- **B1 family**: Rapid economic growth as in A1, but with rapid changes toward a service and information economy; Population rising to 9 billion in 2050 and then declining as in A1; Reductions in material intensive and the introduction of clean and resources efficient technologies; An emphasis on global solutions to economics, social and environment stability (low scenario, similar to A1T).
- **B2 family**: Continuously increasing population, but at a slower rate than in A2; Emphasis on local rather than global solutions to economic, social and environmental stability; Intermediate levels of economic development; Less rapid and more fragmented technological changes than in B1 and A1 (medium scenario, the same group of A1B).

Greenhouse Gas Emission Scenarios

IPCC recommended 6 groups:

- High emission scenarios: A1FI, A2
- Medium emission scenarios: B2, A1B
- Low emission scenarios: A1T, B1



Referrences for Development of CC, SLR for VN

Over Sea:

- The 2nd (1995), 3rd (2001), and 4th (2007) IPCC AR;
- Results from the global climate model (*MRI*-AGCM) with 20 km resolution from the Met Research Institute and Japan Department of Met;
- Report of CC scenario for Vietnam by research group of Oxford University, UK;
- Data from TOPEX / POSEIDON and JASON1 satellite;
- Studies on SLR: CSIRO; Proudman Oceanographic Laboratory, Univ. of Hawaii Sea Level Center;.....
- SLR scenarios in IPCC AR in 2001 and 2007;
- Reports on SLR from TIEMPO Climate Cyberlibrary

Referrences for Development of CC, SLR for VN

Study in Viet Nam:

1) CC scenario in 1994, project funded by ADB;
2) CC scenario for the VN Initial Communication to UNFCCC (*IMHEN, 2003*);
3) CC scenario developed by applying MAGICC/ SCENGEN 4.1 software and statistical downscaling method for VN and other smaller regions(*IMHEN, 2006*);
4) CC scenario for the preparation of the VN Second Communication to UNFCCC (*IMHEN, 2007*); ;
5) CC scenario by IMHEN in 2008 by applying MAGICC/SCENGEN 5.3 software and statistical downscaling method;

Referrences for Development of CC, SLR for VN

Study in Viet Nam (Con't):

6) Climate change scenarios for Vietnam domain developed by using dynamical method (*IMHEN, SEA START and Hadley Centers, 2008*);
7) Tidal gauges data at Vietnam coastal stations;
8) Vietnam studies on sea level rise such as East Sea Tides and Water Level Rise along Vietnam Coasts; Assessment of sea level rise-induced damages; ... carried out by the Marine Center (*General Department of Sea and Islands, MONRE*).

Method Used for Scenario Development

- Ensemble Global Climate Models (GCM)
- Dynamic Downscaling
  - Statistical Downscaling,
  - MAGICC/SCENGEN softwave,
  - Others (chart, interpolation,...)

The statistical downscaling method analyze empirical data from weather stations and extrapolate the results into the future by using climate trend from the GCMs.

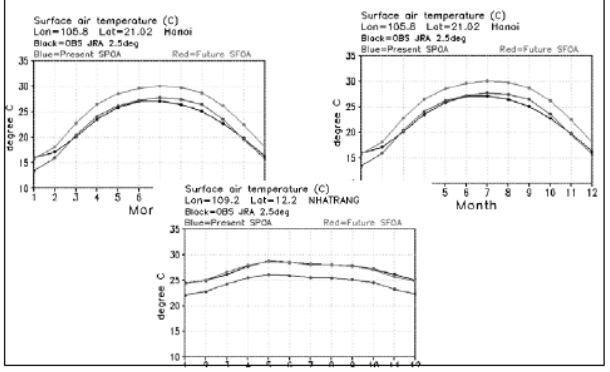
- Advantage: partly based on empirical local climate knowledge.
- Disadvantage: Availability of empirical data for long period without gaps.

Application of MRI/AGCM Model - Japan

Calibration:
- Stations used: 18
- Data: Monthly rainfall, temperature
- Period: 1979-2007

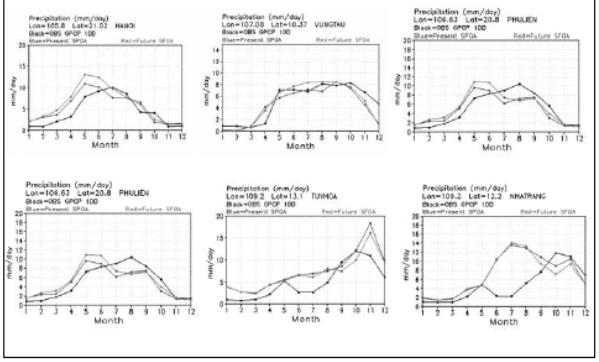
Application of MRI/AGCM Model - Japan

Comparison between Observed Data and Simulated Results: **Temperature**

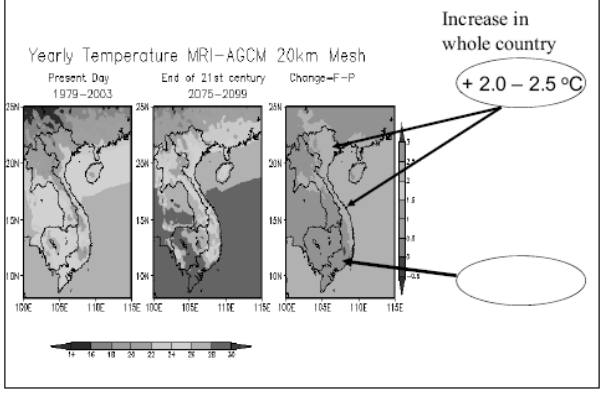


Application of MRI/AGCM Model - Japan

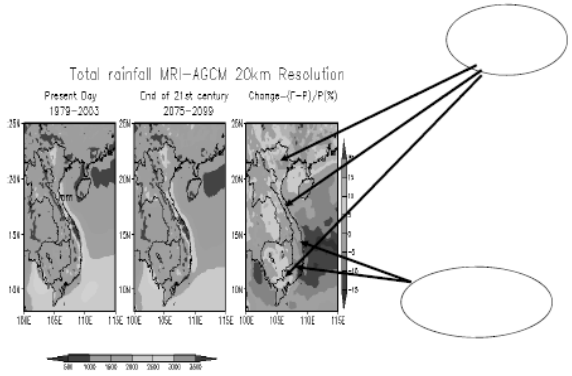
Comparison between Observed Data and Simulated Results: **Rainfall**



Application of MRI/AGCM Model - Japan

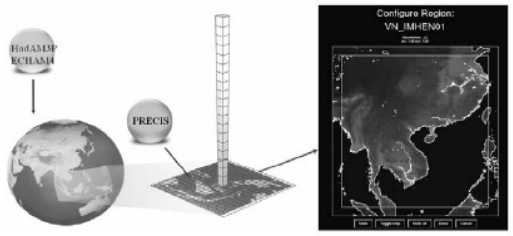


Application of MRI/AGCM Model - Japan



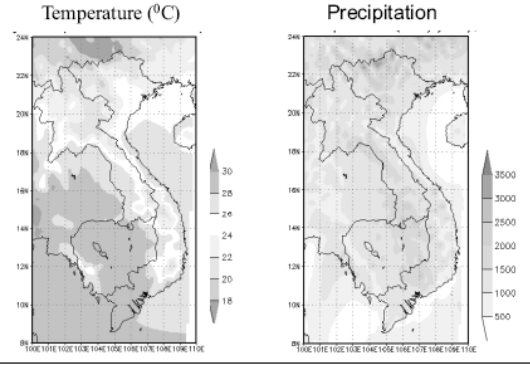
Application of PRECIS model - Hadley Center, UK

Computation Domain

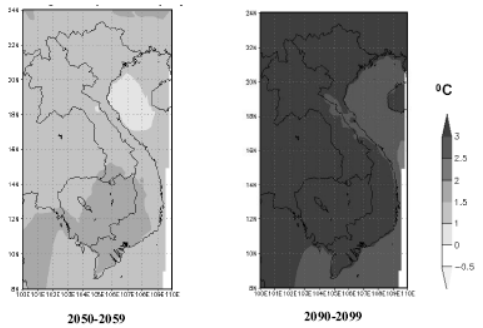


Application of PRECIS model - Hadley Center, UK

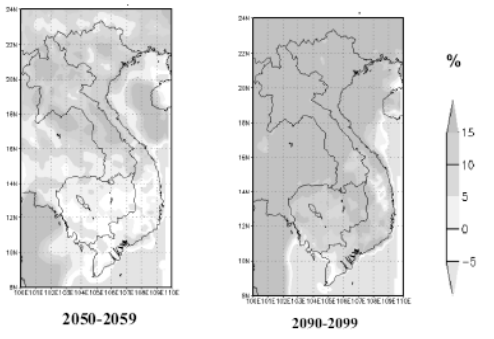
period 1980 – 1999



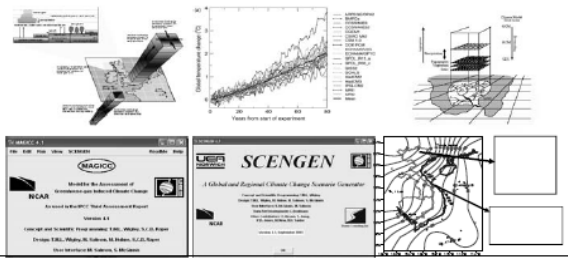
Application of PRECIS model - Hadley Center, UK



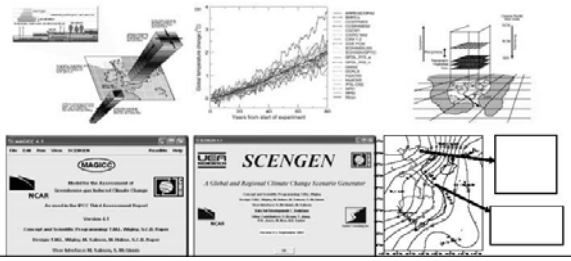
Application of PRECIS model - Hadley Center, UK



Application of MAGICC/SCENGEN software and Statistical Downscaling Method



Application of MAGICC/SCENGEN software and Statistical Downscaling Method



Criteria for selection of methods for CC scenario development

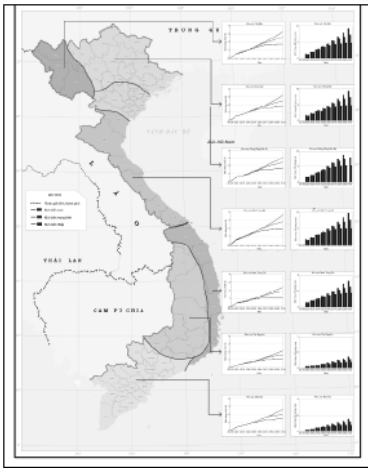
1) Credible level of global CC scenario;
2) Level of details of CC scenario;
3) Inheritance;
4) Up-to-date;
5) Regional appropriate;
6) Comprehension of scenario;
7) Possibility for Updating.

Climate Change Scenarios for Viet Nam

Three GHG emission scenarios used for CC scenarios development are:

- Low scenario (B1);
- Medium scenario of the Medium Emission Group (B2).;
- Medium scenario of the High Emission Group (A2).

CC scenarios for temperature and rainfall are developed for 7 climatic regions of Viet Nam: North West, North East, Northern Region, North of Central Region, South of Central Region, Central Highlands, and Southern Region. Baseline period is 1980-1999 (same as that of IPCC 4th Report).



Changes in **Annual Mean** Temperature and rainfall
- Low scenario (B1),
- Medium scenario (B2),
- High scenario (A2)

Sea Level Rise Scenarios

- Low Scenario: B1
- Medium Scenarios: B2
- High Scenarios: A1FI

SLR Scenario	Decades in the 21 Century								
	2020	2030	2040	**2050**	2060	2070	2080	2090	**2100**
Low (B1)	11	17	23	**28**	35	42	50	57	**65**
Medium (B2)	12	17	23	**30**	37	46	54	64	**75**
High (A1FI)	12	17	24	**33**	44	57	71	86	**100**

CONCLUSIONS (1)

1) CC, SLR scenarios for VN are developed basing on different emission scenarios: low (B1), medium (B2), and high (A2, A1FI).

CONCLUSIONS (2)

2) Low scenarios (B1) describes the world with low emission: changes toward a service and information economy, low population growth, clean and resources efficient technologies; global solutions to economics, social and environment stability.

   However, with a current convergent world economy, different views between the developed and developing countries, difficulties in negotiation in limiting temperature increase to 2°C, low emission scenario does not seem to be possible for the 21st century.

CONCLUSIONS (3)

3) High scenarios (A2, A1FI) describes the world with high emission, independently operation, self-reliant nations; Continuously increasing population, regionally-oriented economic development, slower and more fragmented technological changes and improvements to per capita income (A2); or extensive use of fossil fuels (A1FI).

   These are the worst scenarios we can imagine. With the development of new and climate friendly technology, affords in negotiation in greenhouse gas reduction, the world's campaign in "combating CC", we can hope that the high scenarios will not happen.

CONCLUSIONS (4)

4) Due to the complexity of CC and limitation of our knowledge in CC, both in VN and in the world, together with the consideration of mentality, economy, uncertainty in green house gas emission ..., **the medium scenario is, therefore, harmonious and recommended** for CC impacts assessment and action plan development.

CONCLUSIONS (5)

5) By the end of 21st century, temperatures in Vietnam would rise 2.3°C relative to the average of 1980 - 1999.

   The increase in temperature would be in the range of 1.6°C to 2.8°C in different climate zones.

   Temperatures in Northern and Northern Central climate zones of Vietnam would increase faster than those in Southern zones. In each climate zone, winter temperatures would increase faster than summer ones.

CONCLUSIONS (6)

6) Both annual rainfall and rainy season's rainfall would increase, while dry season's rainfall tends to decrease, especially in Southern climate zones.

   For the whole country, annual rainfall by the end of the 21st century would increase by 5% compared to that of the period 1980-1999. In Northern climate zones, rainfall increasing rate would be more than that of Southern ones.

CONCLUSIONS (7)

7) By mid of the 21st century sea level is expected to increase about 30cm and sea level would rise about 75cm by the end of 21st century compared to the period of 1980 - 1999

CONCLUSIONS (8)

8) Results still contain uncertainties due to: (i) Low confidence level of emission scenarios; (ii) Certain errors of models in simulating for a long period; (iii) Certain errors in the statistical downscaling method based on the global and regional data; (iv) Large differences of climatic factors by locations.

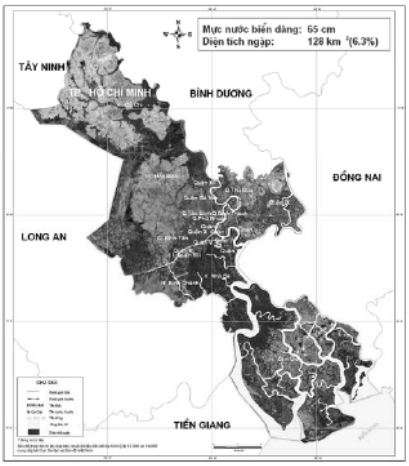
IPCC recommended applying tolerance, e.g., a tolerance for temperature by the end of 21st century: 0.4 - 0.6°C; annual rainfall: 1 - 2%, monthly rainfall: 5% . Moreover, scenarios must be frequently updated in data, knowledge, computing model, and method of computation.

CONCLUSIONS (9)

9) Climate change scenarios will be updated:
- *2010;*
- *2015.*

INUNDATION MAPS

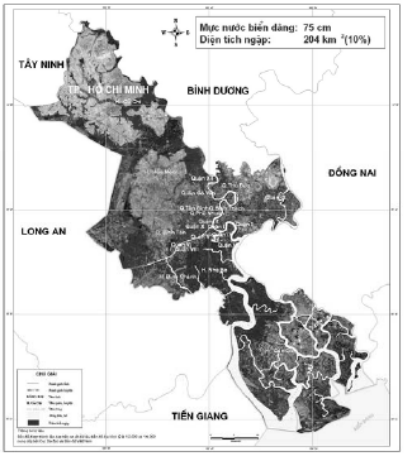
- The inundation maps are constructed based only on topographic maps.
- Other aspects such as effects of tide, wave, storm surge, flow from rivers and other dynamic effects are not yet considered.



Inundation Map of Ho Chi Minh City Area

SLR: 0.65 m
Inundated: 128 km² (6.3%)

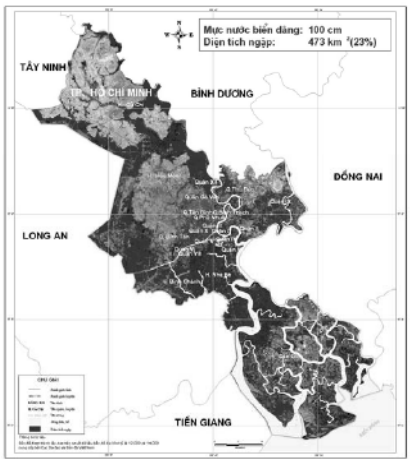
- *Based on Topographic Map Scaled 1/2.000 and 1/5.000*
- *Sources: Department of Survey and Mapping , MONRE*



Inundation Map of Ho Chi Minh City Area

SLR: 0.75 m
Inundation: 204 km² (10%)

- *Based on Topographic Map Scaled 1/2.000 and 1/5.000*
- *Sources: Department of Survey and Mapping , MONRE*

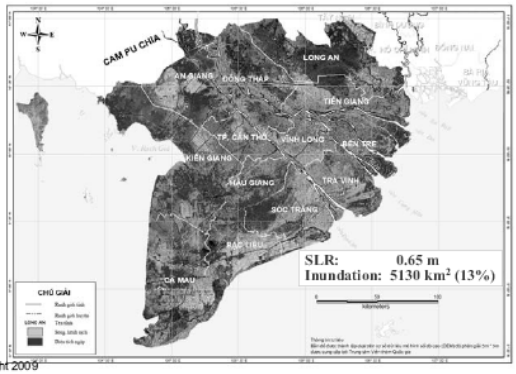


Inundation Map of Ho Chi Minh City Area

SLR: 1.0 m
Inundation: 473 km² (23%)

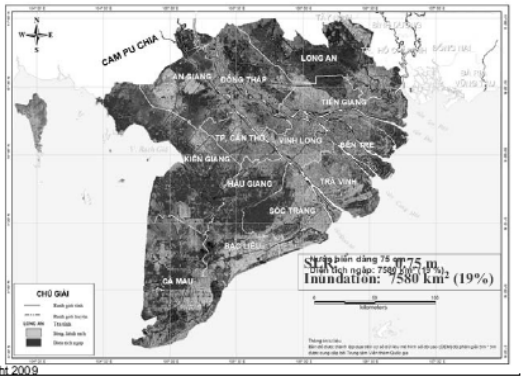
- *Based on Topographic Map Scaled 1/2.000 and 1/5.000*
- *Sources: Department of Survey and Mapping , MONRE*

Inundation Map of Mekong River Delta, SLR 0.65 m



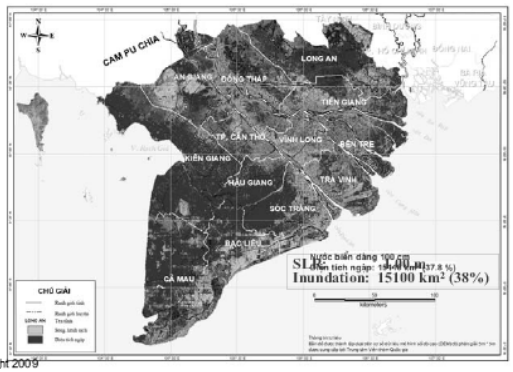
Basing on DEM (5 x 5 km) Provided by National Remote Sensing Center, MONRE

Inundation Map of Mekong River Delta, SLR 0.75 m



Basing on DEM (5 x 5 km) Provided by National Remote Sensing Center, MONRE

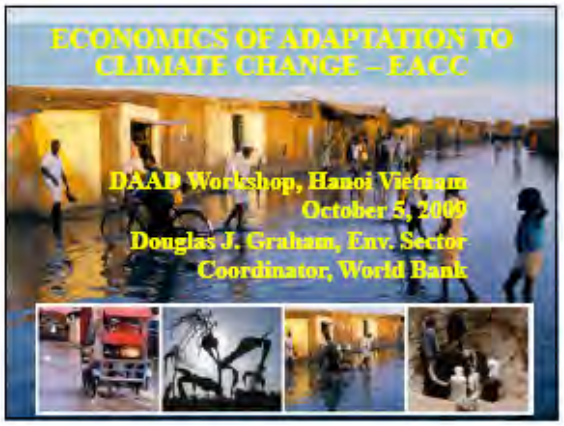
Inundation Map of Mekong River Delta, SLR 1.0 m

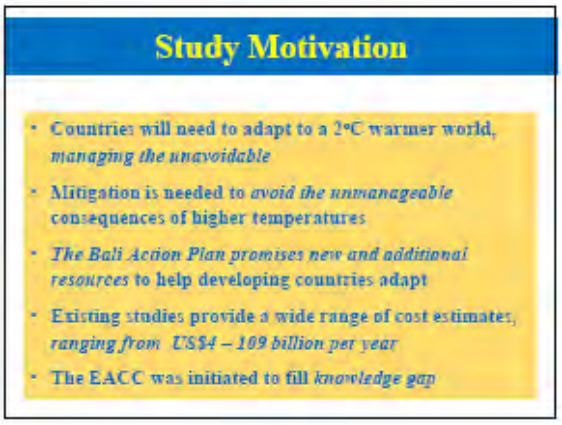


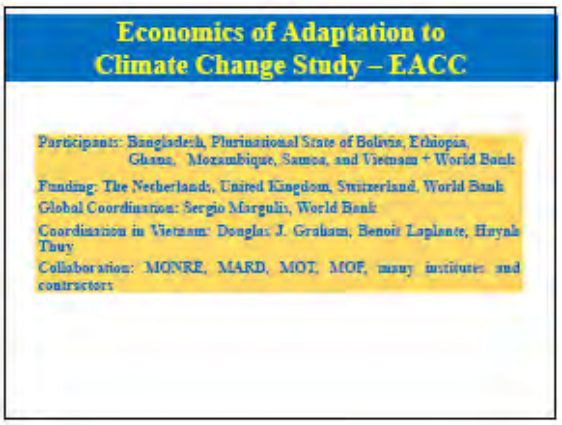
Basing on DEM (5 x 5 m) Provided by National Remote Sensing Center, MONRE

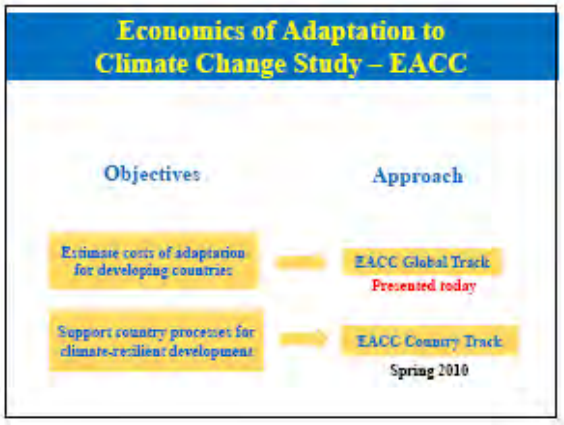
"Preliminary Lessons for Vietnam from the World Bank's ongoing Economics of Adaptation to Climate Change Study: global track and Vietnam country case study"

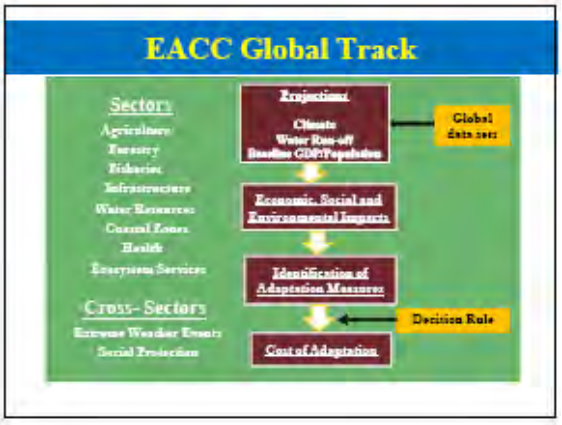
Mr. Douglas J. Graham, World Bank











Other Key Assumptions

Time Frame — 2010 to 2050

Discount Rate — 0% and constant 2005 prices

Development Baseline — A2 SRES

Only Public Sector (Planned) Adaptation Included

Only "Hard" Physical Actions Included

Sectoral (as opposed to General Equilibrium) Approach

No Catastrophic Climate Change Scenario

What is not covered…

- Complete assessment of ecosystem services and climate uncertainties
- Distributional implications of impacts and adaptation
- Assessment of institutional capacity and financial mechanisms

Study Objectives

Critical Assumptions

KEY RESULTS

Study Messages

Annual Costs of Adaptation: by Sectors, 2010-2050, US$ Billion

SECTOR	Climate Scenario	
	DRY	WET
Agriculture, Forestry, Fisheries	7.3	7.6
Water Supply	18.8	13.7
Human Health	1.6	2.0
Coastal Zones	29.6	30.1
Infrastructure	13.7	29.5
Extreme events	6.5	6.7
Total	77.6	89.7
Adding costs differently	75.0	100.0

2005 Constant Prices, 0% Discounting
Source: World Bank Analysis

Annual Costs of Adaptation: by Regions, 2010-2050, US$ Billion

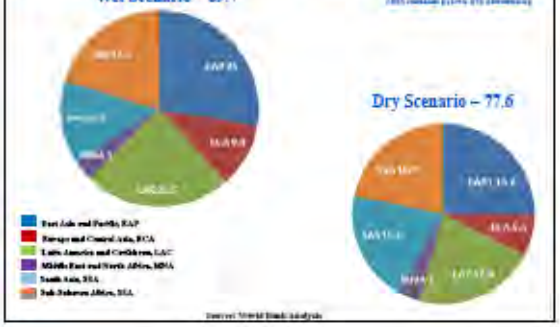
Climate Scenario	East Asia	Europe C. Asia	Latin America	M. East N. Africa	South Asia	Africa Sub-Sah.	Total
DRY	19.6	5.7	16.9	3	15.6	16.9	77.6
WET	15	9.5	21.5	3	12.7	18.1	89.7

2005 Constant Prices, 0% Discounting
Source: World Bank Analysis

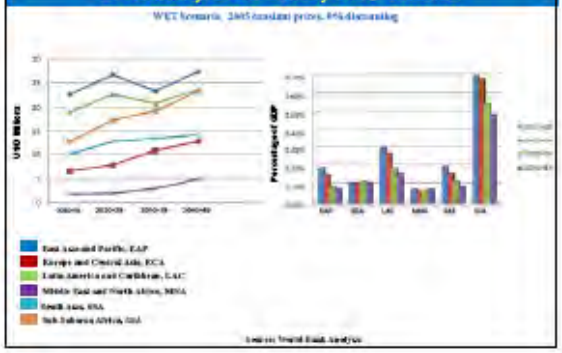
Annual Costs of Adaptation: by Region, 2010 – 2050, US$ Billion

Wet Scenario – 89.7

Dry Scenario – 77.6



Annual Costs of Adaptation: by Region, Decades, 2010-2050, US$ Billion



Implications of Study Assumptions

Assumption	Implication for Cost Estimate
2010 to 2050	↑ with longer horizon
0% Discount Rate	Net present value ↓ with positive rate
A2 Development Baseline	Higher growth implies ↑ absolute costs, but ↓ as % of GDP
Public Sector (Planned) Adaptation	↑ if private included
Only "Hard" Physical Actions Included	Unknown effect if "soft" (policy) actions included
Sectoral Approach	Unknown if analyzed under general equilibrium
Catastrophic Impacts	Considerably ↑

Study Objectives

Critical Assumptions

Key Results

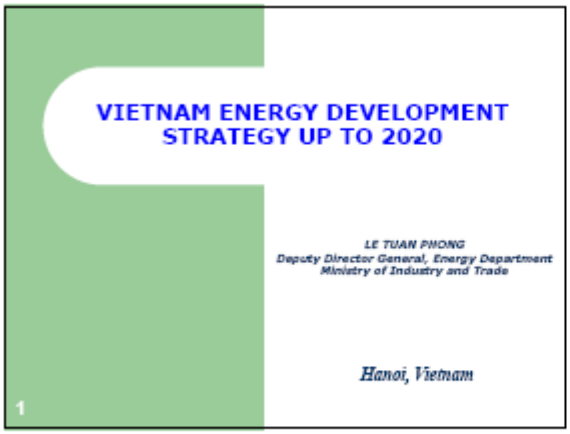
STUDY MESSAGES

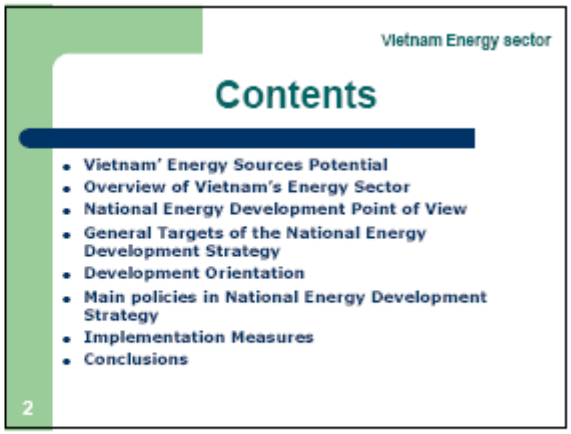
Study Messages

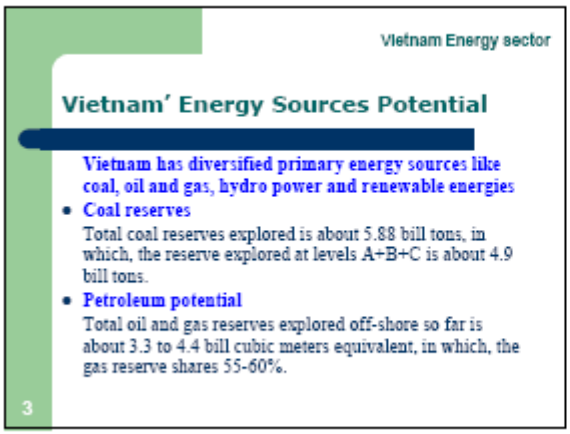
- Adaptation to 2°C warmer world will be costly ($75-100 billion /yr), even if low compared to GDPs
- Adaptation addresses effect, not causes of climate change; Mitigation critical, especially to reduce catastrophic risks
- Economic growth is the most powerful form of adaptation; but not development as usual
- Development strategies must maximize flexibility to incorporate climate knowledge as it is gained

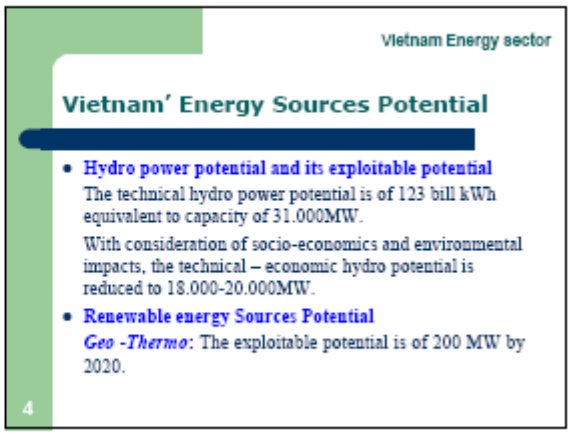
Renewable energy development in Vietnam - Current situation and future perspectives

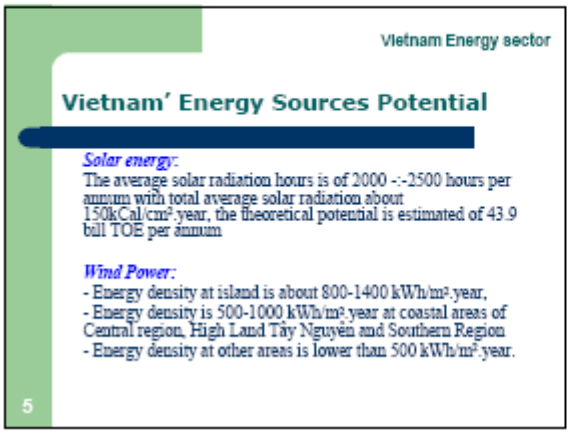
Dr. Le Tuan Phong Deputy Director of Energy Department, Ministry of Industry and Trade, Vietnam

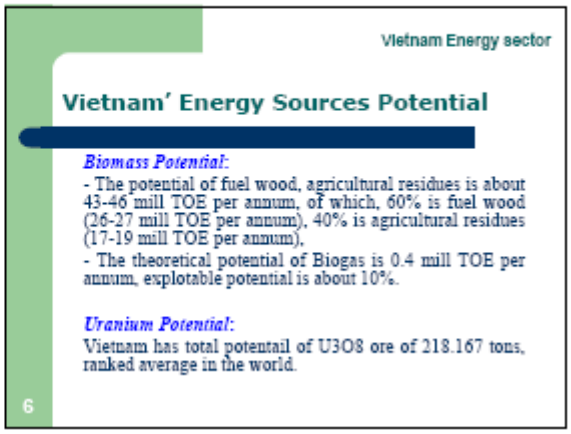












Overview of Vietnam's Energy Sector

Achievements of Vietnams Energy sector

- Basically meet the energy demand for socio-economic development, contribution to country's modernization and industrialization
- Three main subsectors: power, oil and gas, coal dramatically developed in exploration, exploitation and are gradually operated by market mechanism with orientation of Government.

7

Overview of Vietnam's Energy Sector

- The international integration of energy sector is intensified by import-export activities, power grid interconnection and especially, in investment capital attraction from international corporations.
- Energy supply considerably contributed to raise people's living standard. More than 93% of rural households can access to electricity.

8

Overview of Vietnam's Energy Sector

The weaknesses of Energy Sector

- Low Energy Efficiency, high energy intensity (in 2005, energy intensity is 463 /1000 USD – GDP, about two times of Thailand), low reliability and safety.
- The primary energy sources are not assessed sufficiently and energy utilization is inefficient. Energy utilization integration is inadequate, renewable energy is not paid attention sufficiently.

9

Overview of Vietnam's Energy Sector

The weaknesses of Energy Sector

- Investment capital in energy sector has not met the demand. The energy balance between Northern, Central and Southern Regions are not synchronized.
- The energy business companies are slowly renovated and lack of general integration.
- The legal document system for sector development is still unsynchronized, unsuitable with international practices.

10

Overview of Vietnam's Energy Sector

Energy production by years

Types of Energy	Units	Energy Production in 2007	Energy Production in 2008	Estimated Energy Production in 2009	Estimated Energy Production in 2010
Electricity Generation	bill kWh	83.47	75.7	78.1	89.6
Electricity Sale	bill kWh	58.18	66.5	72.3	81.7
Screened Coal	mill tons	43.16	44.8	40.0	42.0
Crude Oil	mill tons	15.99	10.0	16.0	15.0
Natural gas	billion	6.86	7.3	8.0	8.0

11

National Energy Development Point of View

a) Energy sector development must be compliant with Socio- Economic Development Strategy and must ensure going a step ahead with high growth rate and sustainability, synchronization in parallel with diversity of energy sources and energy efficiency and conservation as a focal tasks during industrialization and country's modernization.

b) Nation's energy sector development must comply with international integration: efficient utilization of domestic energy source in combination with reasonable oversea energy exploitation and utilization; establish national energy security in open condition, implement efficient regional and global integration, combine national security with independent and self – control economic development.

12

National Energy Development Point of View

c) Gradually establish energy market, diversify the ownerships and business modes to meet the best benefit of consumers. Speed up elimination of subsidy and monopoly to fully eliminate the socio-economic policy implementation by pricing energy.

d) Synchronically and reasonably develop energy system: electricity, petroleum, gas, coal and renewable energy; priority is given to clean energy and renewable energy development. Reasonably allocate energy system by regions and territories.

e) Apply the knowledge economy's achievement in energy efficiency and business efficiency improvement.

f) Develop energy system in parallel with environmental protection to ensure sustainable development

General Targets of the National Energy Development Strategy

- To ensure national energy security;
- Contribute to national security and independent and self – control economic development;
- Sufficiently supply energy to socio- economic development
- Reasonably exploit and utilize indigenous energy sources;
- Diversify investment schemes and business in energy sector to form the perfect energy market;
- Intensively develop the renewable energy sources and nuclear energy, bio-fuels to meet the socio- economic development demand, especially in remote and island areas;
- Rapidly, efficiently and sustainably develop energy sector in parallel with environmental protection

Specific objectives of the National Energy Development Strategy

- **Sufficiently supply energy for socio-economic development**
  - 47.5 to 49.5 mill TOE of primary energy by 2010
  - 100 to 110 mill TOE of primary energy by 2020
  - 110 to 120 mill TOE of primary energy by 2025
  - 310 to 320 mill TOE of primary energy by 2050
- **Precisely assess the primary energy resources** (coal, petroleum, hydro and uranium); cooperate with countries in the region and the world in exploration, exploitation of coal and petroleum to supplement to domestic energy demand deficit;
- **Develop the power plants and grid** to ensure socio-economic development, the reliability of power sources is of 99.7% and grid meets standard n-1 by 2010;

Specific objectives of the National Energy Development Strategy

- **Develop the oil refinery plants** gradually meeting domestic oil products demand; increase total oil refinery plants capacity up to 25 – 30 mill tons of crude oil by 2070;
- Ensure oil stock pilling capacity of 45 consumption days by 2010, 60 consumption days by 2020, 90 consumption days by 2025;
- **Priority in developing the renewable energy sources to meet target of**
  - 3.0 percents of total primary commercial energy by 2010
  - 5.0 percents by 2020 and
  - 11.0 percents by 2050

Specific objectives of the National Energy Development Strategy

- **Complete the Rural Energy Program**
  - 50% of rural households using commercial energy by 2010 and 80% by 2020;
  - 95% of rural households access electricity by 2010 and 100% by 2020;
- **Transform dramatically the electricity, coal and petroleum sectors** to the competitive market with state regulation; formulate the retail power market after 2022; formulate the coal and oil and gas markets in period up to 2015.

Specific objectives of the National Energy Development Strategy

- Actively prepare necessary condition for putting the **first nuclear power unit** into commissioning by 2020 then speed up the ratio of nuclear power plants in national energy structure; by 2050, nuclear power plants share of 15 -20 % of total commercial energy consumption.
- Intensify international cooperation in energy sectors: in 2010-2015 regional grid interconnection by 500 KV; in 2015-2020, regional natural gas pipeline interconnection.

Development Orientation

1. Power Sector

- Ensure power supply for socio- economic development. Prioritize in building hydro power plants, coal fired and gas fired power plants. Encourage development of renewable energy based power plants.
- Gradually set up and develop power market in Vietnam, the Government has executive right in transmission

19

Development Orientation

- Study development of Nuclear Power Plant
- Ensure sustainable development, minimize negative impacts to environment
- Form and develop competitive power generation market in period 2006-2014; develop competitive power whole sale market in period 2015-2020 and competitive power retail market in period after 2020.
- .....

20

Development Orientation

2. Coal Sector

- Speed up exploration and assessment of coal above level - 300m, and explore at lower level of - 400 ÷ -1100 m at Quang Ninh coal basin.
- Encourage local authority to invest in coal exploration and exploitation to meet the local coal demand
- Sustainable development of coal sector to meet coal demand for socio- economic development; ensuring stabilization of domestic coal market and exporting reasonable coal amount.
- Coal sector development must harmonize with socio- economic development, tourism and national defense, security and ecosystem protection.

21

Development Orientation

3. Petroleum sector

- Prioritize development, exploitation and utilization of natural gas.
- Encourage and incentive investors in exploration and exploitation of gas fields, especially, in marginal gas field (where its NPV=0).
- Diversify investment schemes, join-venture in building gas fired power plants.

22

Development Orientation

4. Renewable Energy

- Renewable Energy Planning: Renewable Energy is not planned sufficiently, It needs to invest for additional survey, update the database for planning and zoning renewable energy types to invest and exploit.
- Set up the organizations responsible for renewable energy survey, planning
- Propagandize and R&D on RE technologies, national wide implementation of RE technologies

23

Development Orientation

- Encourage utilization of RE in remote areas and islands. Set up suitable institutions for maintaining and developing RE based power sources in these areas.
- Integrate RE into National Programs such as rural electrification, forestation program, Poverty Alleviation Program, Rural clean water program, VAC, etc.
- The Master Plan on Renewable Energy Development has been submitted to Prime Minister for approval.
- The Decree on promotion of Renewable Energy Development is being conducted by MOIT.

24

Main policies in National Energy Development Strategy

1. Ensure National Energy Security;
2. Energy pricing;
3. Invest in development of RE, bio-fuel and nuclear energy;
4. Energy Efficiency and Conservation;
5. Environmental Protection;

Implementation Measures

1. Investment measures
2. Financial mechanism
3. Human Resource Development
4. Organization

Conclusions

- Vietnam's energy demand growth rate is at high level
- Vietnam has high primary energy source potentials
- Vietnam will be short of energy supply
- Legal documents for RE development are being improved
- Monopoly in energy sector is being eliminated to create competitive environment.
- Private sector has opportunity to invest in energy sector.

Thank you for your listening

Contribution of Renewable Energies to Sustainable Development in Vietnam

Dr. Angelika Wasielke, Chief Technical Advisor, GTZ Vietnam

gtz

Contribution of Renewable Energies to Sustainable Development in Viet Nam

October 5th, 2009, Hanoi

gtz List of Content

- Effects of Climate Change in Viet Nam
- Energy Situation in Viet Nam
- Abatement Potentials of RE
- Economics of RE
- Potentials for RE
- Master plan for RE Development
- GTZ's contribution

gtz Prognosis of CC in Viet

gtz Effects of CC harming Sustainable Develop

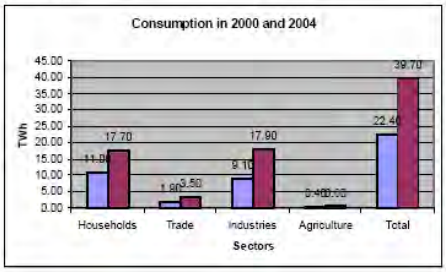
- Sealevel rise: up to 1m could hit about 22 Mio. People
- Temperature rise of 2,5°C till the end of the century.
- Heavy rainfall and sudden floding, higher frequency of **heavy storms**
- Droughts in the context of El Nino hampering **agriculture** and **fishing**
- Shifting climatic zones as a **threat to biodiversery**
- Stress on the **health system** (spread of Malaria)
- **Migration** (Climate refugees)

gtz Energy and Climate C

- **Emissions from electricity generation main part of predicted increases of CO_2**
- **Vietnam signed and ratified the United Nations Framework Convention on Climate Change (UNFCCC) on 16 November 1994 and ratified it on 20 August 2002.**
- **Climate Change Mitigation through Renewable Energies part of the National Target Program to Respond to Climate Change.**

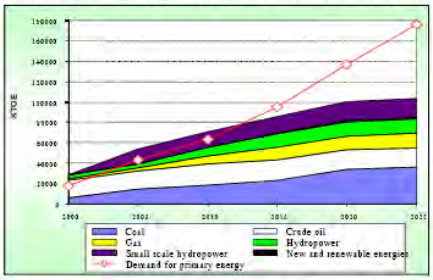
gtz Energy Situation in Viet N

- The electricity demand in Viet Nam will grow more than 10% per year until 2020.



gtz Energy Situation in Viet

Balance between domestic primary energy vs. Total demand for primary energy



gtz RE Mitigating CO_2 Emiss

- Topics like sustainability, climate change, environmental protection, and security of energy supply have been widely discussed both in academic and political spheres. Most countries are making efforts to increase productive efficiency, minimize import dependency and negative effects on the environment through the optimization of energy use.
- An important factor in this realm are renewable energy sources, as they offer "clean", domestically available resources that can be used to address these problems.
- The range of estimates for health and environmental damage costs for Vietnam is **19 VND/kWh** (World Bank Six Cities Study methodology) to 73 **VND/kWh** (CRESP estimate for Yunnan).
- Coal would be a major fuel for the power sector of Vietnam. This implies that CO_2 emission from the power sector would be significant. In the BC, from 21.33 million ton in 2005, CO_2 emission is expected to increase to 307.45 million ton by 2025. Representing this figure per capita, the increase would be from 0.26 million ton in 2005 to 2.99 million ton in 2025, equivalent to a growth rate of 13% per year.

gtz Energy Situation in Vie

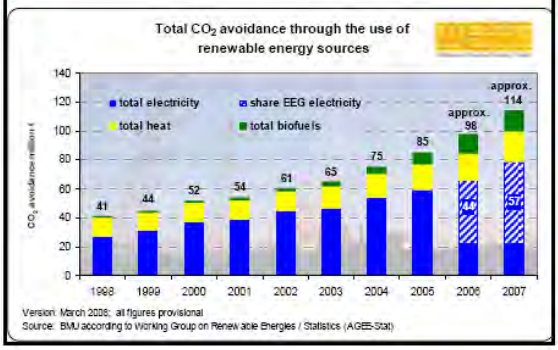
Structure of RE in the Vietnamese power mix

Traditional electricity	11128	97.407
Coal fired	1515	13.131
Oil fired	575	5.005
Gas turbines	4.655	40.917
Diesel	245	2.132
Large scale hydropower	4.138	36.550
Renewable electricity	**297.48**	**2.593**
Wind	1.22	0.011
Small scale hydropower	135	1.170
Solar energy	1.26	0.011
Biomass	150	1.300
Total	**11425.48**	**100.000**

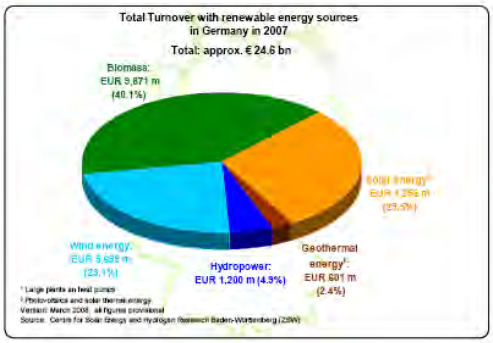
gtz Potential Capacity for RE in Viet Nam till 2025

No.	RE	2009	2010	2011	2012	2013	2014	2015	2020	2025
1	Small hydro	1140	1166	1256	1349	1476	1594	1692	1988	2454
2	Biomass	157.7	165.3	207.5	220.5	234.5	247.7	300.2	380.7	505.3
3	Biogas	9	9.2	9	9	9.5	9	9	11	12
4	Solar	1.654	1.654	1.654	1.654	1.654	1.654	2.65	3.85	5.25
5	Wind	9	9.2	39.5	39.5	109.5	109.5	217	362	493
6	Bio-fuels	0	0	0	0	19	36	51	214.1	239.1
7	Bio-energy	0	0	0	0	0	0	0	0	0
8	Tidal wave	0	0	0	0	0	0	0	3	15
9	Garbage	3.4	11.6	11.6	13.6	13.9	13.9	20.4	47.4	97.6
	Total (MW)	1315	1405	1568	1687	1859	2063	2227	3001	3799

gtz RE Mitigating CO_2 Emiss



gtz Economics of RE e.g. Ger



Master plan for RE

- Targeted share of RE in electricity generation is 5% by 2020.
- Priority is given to low cost RE sources such as small scale hydro-power, bagasse, garbage, geothermopower, wind, rice husk, heat from RE, and bio-energy and to off-grid projects related to rural electricfication in areas where costs of RE are lower than diesel electricity or connection to the national grid.
- Decree for Renewable Energy Development
  - Renewable Energy Agency
  - Renewable Energy Fund
  - Support schemes for RE
  - Obligation to buy RE electricity

Master plan for RE

Financial Incentives:

- Renewable energy is a field of investment incentives. The investor can get the advantages such as import tax exemption and land fee exemption in a definite period of time.
- Equipment, materials and technologies imported for RE projects will receive import tax exemption, VAT exemption and other additional cost support provided that these items have not been produced within Vietnam.
- RE projects will be able to make medium and long term loans at preferential interest rates from the Renewable Energy Development Fund.
- Power generated from RE sources will be purchased by local EVN branches. Prices will be indentified for each type of RE.

GTZ's Contribution

Wind Energy Project

Project
Establishment of a Legal Framework and Improvement of Technical Capacities for Grid-Connected Wind Power Development in Viet Nam

GTZ's Contribution

- In 2008, GTZ Viet Nam has systematically **screened** all projects and programmes to optimise the integration of **Climate Change** aspects into its projects while applying the **GTZ Climate Check**. This ongoing process aims to ensure that all development cooperation efforts of the GTZ consider climate risks and greenhouse-gas reduction potential appropriately.

GTZ's Contribution

Priority Areas of German Development Cooperation in Viet Nam

Sustainable Economic Development

Environmental Policy and Management of Natural Resources

Health Care

GTZ's Contribution

Project Area
Management of
Natural Resources

gtz GTZ's Contribution

Priority Area Management of Natural Resources

Sustainable Forestry and Agriculture
- Forest Policy Advice
- Establishment of Forests
- Marketing & Trade
- Cultivation of Communal Resources

Protection and Preservation of Biodiversity
- Environmental Politics
- Protected Area and Buffer Zone Management
- Sustainable Tourism
- Financing Mechanisms

gtz GTZ's Contribution

Cross-cutting Sector: Poverty reduction

Project
Poverty Alleviation in Rural Areas (Cooperation with IFAD)

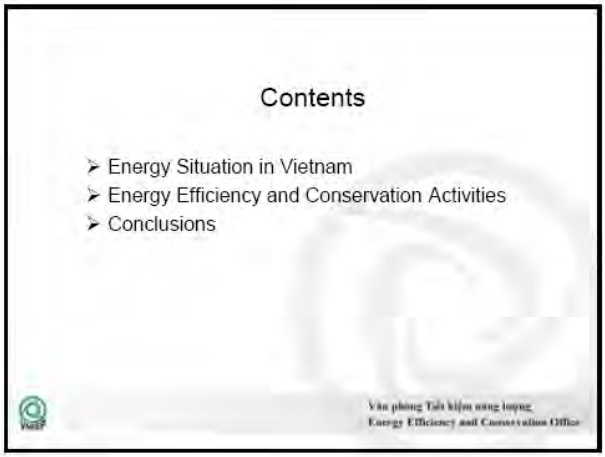
Project
Support for National Poverty Reduction Strategy

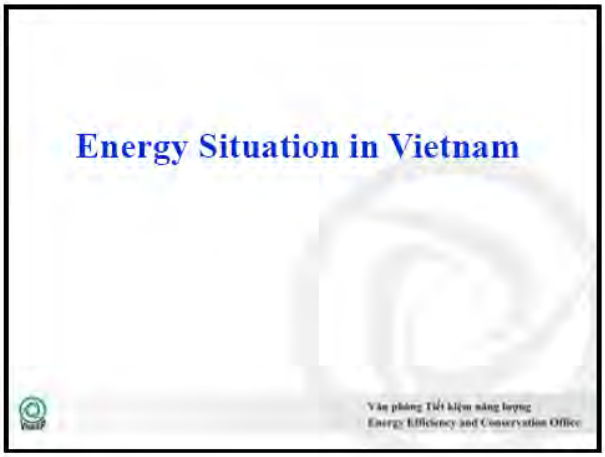
gtz

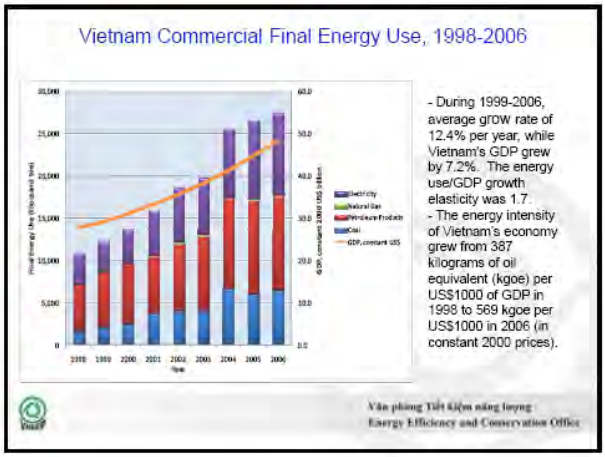
Thank your for your attention!

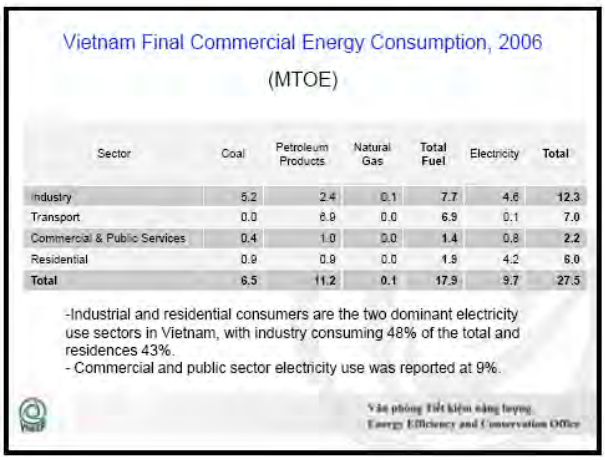
National Renewable Energy Target and Energy Efficiency

Dr. Phuong Hoang Kim, National Program on Energy Efficiency and Conservation - Ministry of Industry and Trade, Vietnam.

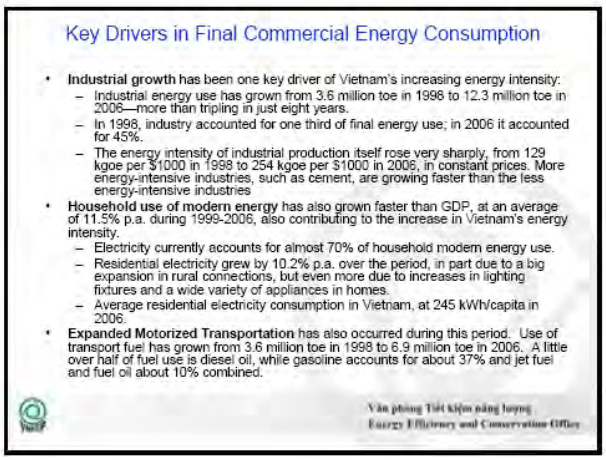








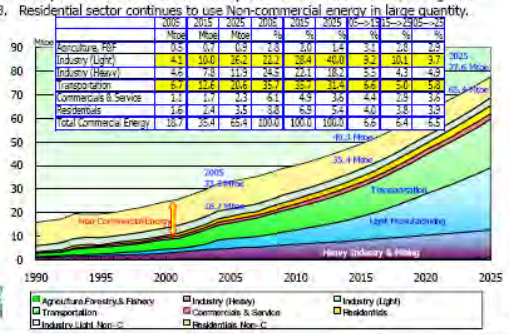
Sector	Coal	Petroleum Products	Natural Gas	Total Fuel	Electricity	Total
Industry	5.2	2.4	0.1	7.7	4.6	12.3
Transport	0.0	6.9	0.0	6.9	0.1	7.0
Commercial & Public Services	0.4	1.0	0.0	1.4	0.8	2.2
Residential	0.9	0.9	0.0	1.9	4.2	6.0
Total	6.5	11.2	0.1	17.9	9.7	27.5



Sectoral Energy Outlook

1. Energy demand will increase fast in Light Manufacturing Industry that will be leading the economic growth.
2. Transportation sector will be relatively slow as motorbike will be peaking out.
3. Residential sector continues to use Non-commercial energy in large quantity.

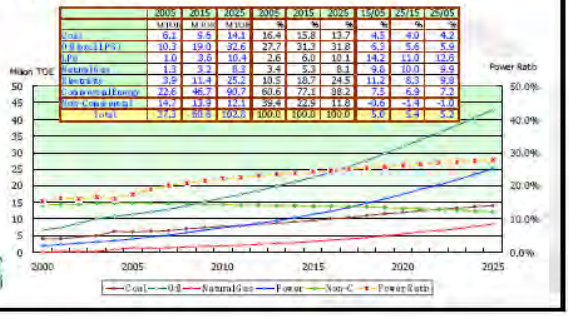
	2005 Mtoe	2015 Mtoe	2025 Mtoe	2005 %	2015 %	2025 %	05->15 %	15->25 %	05->25 %
Agriculture, FRF	0.5	0.7	0.9	1.8	2.0	1.4	3.1	2.8	2.9
Industry (Light)	4.1	10.0	26.2	15.2	28.4	40.0	9.2	10.1	9.7
Industry (Heavy)	4.6	7.8	11.3	24.5	22.1	18.2	5.5	4.3	4.9
Transportation	5.7	12.5	20.6	35.7	35.4	31.4	8.6	5.0	6.8
Commercials & Service	1.1	1.7	2.3	6.1	4.9	3.6	4.4	3.0	3.6
Residentials	1.6	2.4	3.5	8.8	6.8	5.4	4.0	3.8	3.9
Total Commercial Energy	18.7	35.4	65.4	100.0	100.0	100.0	6.6	6.4	6.5



Final Energy Demand by Source

1. Demand for LPG, natural gas and electricity will increase fast reflecting modernization of industry and civil life.
2. Non-commercial energy remains in large quantity though its share declines from 40% to 12%.

	2005 MTOE	2015 MTOE	2025 MTOE	2005 %	2015 %	2025 %	15/05 %	25/15 %	25/05 %
Coal	6.1	9.5	14.1	16.4	15.8	13.7	4.5	4.0	4.2
Oil (excl LPG)	10.3	19.0	32.6	27.7	31.3	31.8	6.3	5.6	5.9
LPG	1.0	3.6	10.4	2.6	6.0	10.1	14.2	11.0	12.6
Natural Gas	1.3	3.3	8.3	3.4	5.3	8.1	9.6	10.0	9.9
Electricity	3.9	11.4	25.2	10.5	18.7	24.5	11.2	8.3	9.8
Commercial Energy	22.6	46.7	90.7	60.6	77.1	88.2	7.5	6.9	7.2
Non-Commercial	14.7	13.9	12.1	39.4	22.9	11.8	-0.6	-1.4	-1.0
Total	37.3	60.6	102.8	100.0	100.0	100.0	5.0	5.4	5.2



Energy Efficiency and Conservation Activities

Point of view of energy strategic of Vietnam

1. Diversified, reasonable and efficient exploitation of domestic resources combining with sensible importing and exporting based on principle of reducing step by step the primary energy exporting, meeting the energy demand for socioeconomic development of the country, fuel conservation and energy security for future.
2. Developing new projects with combination of existing projects improvement and upgrading. Energy efficiency and conservation using from energy production to transmission, processing and using.
3. Developing energy in close cooperation with environment and resources protection.
4. Establishing competitive energy market, diversifying investment and business modality in energy sector. The Government only exclusive hold the core fields to ensure the national energy security.
5. Improving the energy programs for rural areas, develop renewable energy to meet the energy demand, especially island, mountainous and far center areas.
6. Developing energy sector with comprehensive, efficient methods based on bringing into play domestic power with combination of extending international cooperation.

Major Energy Efficiency and Conservation Programs

	Project Name	Year	Sponsor	Implementing Agency
1.	Vietnam Demand Side Management and Energy Efficiency (DSM) – Phase 1&2	2000-2007	WB, SIDA and GEF	MOIT and EVN
	1a. The Pilot Commercial Energy Efficiency Program (CEEP)	2004-2009	WB and GEF	MOIT
	1b. Compact Fluorescent Lamp (CFL) Promotion Program (CFL)	2004-2007	WB and GEF	EVN
	1c. Fluorescent Thin Tube Lamp (FTL) Promotion Campaign	2004-2009	WB and GEF	EVN
2.	Energy Conservation and Efficiency Program for Vietnam (EE&CP)	1996-2001	GOV and Netherlands, EU, SIDA, UNDP, US-EP	MOST
3.	Promoting Energy Conservation in Small and Medium Scale Enterprises (PESME)	2006-2010	UNDP	MOST
4.	Vietnam Energy Efficient Public Lighting (VEEPL)	2006-2010	UNDP and GEF	MOST
5.	The Study on Master Plan on Energy Conservation and Effective Use in Vietnam (EE&CMP)	2008-2009	JICA	by J-Power, a Japanese consultant

Recent Donor Support and Activities

- **Asian Development Bank (ADB)**
  ADB approved in 2007 the Technical Assistance (TA US$1.16 million), "Supporting Implementation of the National Energy Efficiency Program," which aims to promote energy conservation in the industry sector in Vietnam:
  - Survey of Energy consumption in Industrial Enterprises;
  - Development of a Training Program for Energy Managers;
  - Conducting Energy Audits of Selected Large Industrial Enterprises;
  - (4) Upgrading the Capacity of Existing Energy Centers into Professional ESCOs;
  - (5) Devising a Mechanism for Financing Energy Conservation Plans for Industrial Enterprises.

  ADB will consider options to create an industrial energy efficiency financing program: power plant retrofits of Electricity of Vietnam (EVN), procurement and distribution of Compact Fluorescent Lamp (CFL) program using the Clean Development Mechanism (CDM).
- **United Nations (UN)**
  - UNDP has been implementing: "Vietnam: Promoting Energy Conservation in Small and Medium-Scale Enterprises", with a program period from 2005-2010 and budget of US$28.8 million, part of which is US$5.5 million from Global Environment Fund (GEF) and US$3.0 million UNDP/GEF public lighting efficiency project with Vietnamese Academy of Science and Technology (VAST);
  - and a US$3.0 million UNEP/GEF incandescent lamp phase out program.
  - Planned UNDP/UNIDO support from 2010 and beyond include energy efficiency building codes, energy efficiency appliance labeling and standards, capacity building for implementation of the Energy Conservation Law, promotion of Energy Management Standards via ISO 500001 Management Standard, and coordination of climate change adaption and mitigation efforts.

Recent Donor Support and Activities

- **The World Bank Group (WB)**
  - The WB has been supporting energy efficiency in Vietnam since 1997:
    - This program began with a US$3.6 million Swedish Sida-supported TA grant, administered by WB,
    - Phase 2 project, the Demand-Side Management and Energy Efficiency Project (2003-2009), was developed. This $20 million program, supported with IDA and GEF funds, included support for:

      (a) implementation of several larger DSM programs within EVN and the PCs (including TOU metering, CFL and FTL promotion);

      (b) development and implementation of a pilot commercial energy efficiency program, which included training of service providers and audit/investment grants;

      (c) development of some pilot market transformation programs with solar water heaters and air conditioners with MOIT's EECO.
    - The WB is now working with MOIT to conduct an independent evaluation of the commercial energy efficiency pilot program and is considering options for a third phase investment program in 2011.
  - **The International Finance Corporation (IFC):** As part of IFC's growing Environmental & Social Sustainability Program Phase 1 of Vietnam Cleaner Production & Energy Efficiency Program (VCPEEP) includes US$1.6 million of financing from the Mekong Private-Sector Development Facility, a large multi-donor trust fund managed by IFC. The program will include:
    - advisory and investment services to selected financial institutions;
    - technical assistance to develop the consultancy market for CP-EE investments; and
    - promotion activities to increase awareness among local industries.

Recent Donor Support and Activities

- Danish International Development Agency (DANIDA): DANIDA has recently approved about US$15 million technical assistance program, provided through budget support, for the energy efficiency program of the Ministry of Industry and Trade (MOIT). The program would focus mainly on technical training for energy efficiency (including a certification program with local universities) and industrial energy audits, as well as potential support to the Energy Savings Fund (ESF) of Vietnam.
- Japanese Support
  - **The Ministry of Economic, Trade and Industry** (METI) also provides expert assistance in the development of Energy Conservation Law also have been actively conducting energy conservation training programs for developing countries mainly in the Asian region, including Vietnam.
  - **Japan International Cooperation Agency (JICA):** JICA has implemented a Development Study, "Study on National Energy Master Plan in Vietnam." The project objectives are as follows:

    (1) establish the National Energy Master Plan up to 2025 including energy security, energy diversity, power import-export, rural electrification, promotion of renewable energy utilization, CO2 emission, energy conservation, investment plan, socio-environmental impacts and international cooperation;

    (2) develop national database of Vietnam including socioeconomic data and energy data covering electric power, coal, oil and gas, renewable energy, etc.; and

    (3) build capacity of the bodies under MOIT.
  - One development scheme of JBIC or the new JICA is the Private-Sector Investment Finance program, which supports private enterprises with funds provided as either equity investments or loans. JICA is considering a US$50 million financing program with VDB.

Key policy framework

- **Electricity Law**
  - Enforced on July 01 2005
  - Comprises of one Chapter that specifies Electricity Efficiency in generation, transmission, distribution and utilization
- **Decree No.102/2003/ND-CP on EE&C**
  - Issued on Sep. 3rd 2003
  - MOI has responsibilities to conduct the program of EE&C
- **Circular No. 01/2004/TT/BCN on EE&C:**
  - Issued on July 2th 2004
  - To enforce the Decree No. 102/2003/ND-CP, serves as the guideline for energy conservation and its efficient use in factories
- **Circular No. 08/2006/TT/BCN**
  - Issued on November 16th 2006;
  - to enforce the Decree No. 102/2003/ND-CP served as guideline for Energy Efficiency Standard and Labeling.

Key policy framework

- **EE Commercial Building Code No. 40/2005/QD-BXD**
  - Promulgated on November 17th, 2005
  - Applicable on commercial buildings to reduce energy loss in building and to improve the condition for people working/living in buildings
- **Decision No.79/2006/QD-TTg: National Energy Efficiency Program**
  - Issued on April 14th 2006 by Prime Minister
  - 11 projects to promote EE&C activities
- **Decision No.80/2006/QD-TTg: Electricity saving program for the period 2006-2010**
  - Issued on April 14th 2006 by Prime Minister
  - Increasing awareness of public and Electricity Saving

A program for development of legal text and documents system for energy conservation and efficient use

- Law on Energy Efficiency and Conservation
  - Monitor key energy consuming enterprises
  - Compulsory energy audit and reports
  - Plan for reducing energy consumption per product
  - Energy and energy saving labeling for energy consuming products
  - Set forth conditions for energy auditing units and energy saving consultants
- Decrees guiding the implementation of Law
- Decrees for handling of administration violation in energy conservation and efficient use
  - Behaviors of violation and regulations on financial penalty
  - Competence of handling violations
- Technical regulations issued by MOIT on norm, technical standards system of energy performance for industries
  - Regulations can be compulsory regulations or only for references by time period

A program for development of legal text and documents system for energy conservation and efficient use

- MOF's regulations on tax preferential and capital loan system for energy saving projects
- Roadmap development for compulsory labeling of energy consuming equipment and means.
- Development of minimum energy performance standard and minimum energy consumption level for energy consuming equipment used in civil works and industries
- Development of regulations and formulation of energy conservation and efficient use management agencies in Central and localities
- Development and formulation of consulting agencies system and technology transfer in terms of energy conservation and efficient use in localities and industries.

National Energy Efficiency Programme

National Energy Efficiency Programme:

- Implementation time: 2006 – 2015
- First phase (2006-2010): Developing comprehensively all Programme's activities.
- Second phase (2011-2015): Developing deeply and broadly the Programme's activities based on the obtained-experiences from the first phase.

General objective:

- Estimated saving 3 – 5% of total rate of national energy consumption in the period of 2006 - 2010;
- Estimated saving 5 – 8% of total rate of national energy consumption in the period of 2011 - 2015

(in comparison with the scenario without counting the potential of energy saving in social economic forecast).

National Energy Efficiency Programme (VNEEP)

III. The Projects of the EE&C Program

The program comprises of 11 projects:

1) The first project: Completing legal framework on EE&C in all activities.
2) The second project: Propagandizing to raise community's awareness of energy saving and effective use.
3) The third project: Put education of energy saving and effective use into national education system.
4) The fourth project: campaign on establishment of model named "Energy saving in each household".
5) The fifth project: developing standards and putting energy-saving label on some targeted products.
6) The sixth project: Providing technical assistant to domestic manufacturers who meet the standards on energy efficiency.
7) The seventh project: Establishing Energy Management System in enterprises.
8) The eighth project: Assisting manufactories to upgrade, improve and rationalize production line for energy saving and effective utilization.
9) The ninth project: capability building and implementing activities of EE&C activities in designing and managing buildings.
10) The tenth project: Construct Pilot Buildings and put the EE&C activities in Buildings into discipline.
11) The eleventh project: Optimally exploit capacity of means of transportation, minimizing fuel consumption and reducing emission.

National Energy Efficiency Programme

Programme Arrangement

Steering Committee membership including Representatives of the Ministries: Industry, Construction, Transport, Education and Training, Culture and Information, Science and Technology, Planning and Investment, Finance, Justice, and the Union of Vietnam Science and Technology Associations)

Energy Efficiency & Conservation Office

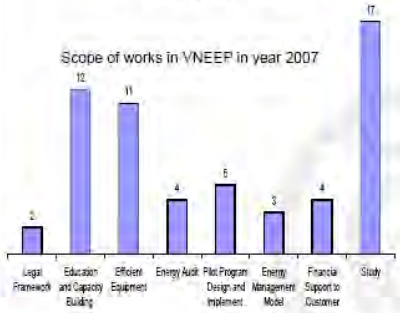
People Committees of Provinces and Central Cities:
To prepare policies for monitoring Energy saving and efficiency at local level;
To collaborate with NPSC for implementing projects in localities.

Programme Branched Offices: Established at selected provinces and central cities

Supporting bases:
Laboratories for checking energy efficiency of electric devices
Certificated Energy Auditing Agencies.

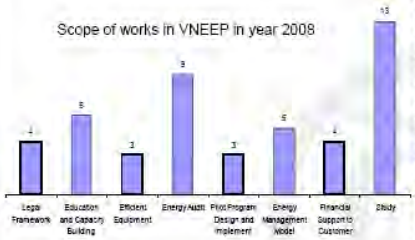
Programme components: 11 Projects located in 6 component groups.

VNEEP projects in two initial years



- In year 2007, a total of 28 projects belonging to 6 Components of VNEEP have been carried out. Of which, many projects have been resulted and commissioned. Total VNEEP budget in year 2007 from the state budget is about 30 billion VND (of which 10 billion VND to support for 2 EE lighting manufacturers)

VNEEP projects in two initial years



- In year 2008, 48 projects have been registered for implementation, in which many continuing projects from year 2007, with a total budget of 36 billion VND (of which 14 billion VND was invested for setting up an EE laboratory for air-conditioners, refrigerators, and supporting for 03 large enterprises to conduct EE measures).

Conclusions

- The legal frameworks and Institutions for promoting EE&C activities in Vietnam are just in initial stage. The national energy efficiency program are the long-term EE&C program of Vietnam government.
- In order to successfully implement the EE&C programs it needs coordination among implementing and state managing organizations, together with transparent legal framework, such as tax incentives, financial funds, electricity tariff adjustment as well as standards and mechanisms for monitoring, controlling quality of equipment and devices and other technical and training assistance.
- The Energy Efficiency Law is meant to develop a framework for the national program, develop appropriate funding mechanisms, lay out government functions and consumer obligations, allow for other policy instruments such as codes and standards to be developed and generally state the Government's long-term strategy for energy efficiency promotion within the country.
- Vietnam needs the cooperation and assistances in capacity building of the EE&C activities.

Renewable Energy and Regional Development- Approaches in Germany and Scotland

Wulf Boie, University of Flensburg

Due to the Renewable Energy Sources Act renewable energy technology has experienced a boom in Germany for the past 10 years. Renewable energy technologies have created employment and have pushed development especially in rural areas of Germany. Renewable energy is also considered as an important instrument for regional development in rural areas of Scotland.

Can renewable energy also help to alleviate poverty in rural areas of Asia? My presentation will not answer this question. As an input for our discussion during the next days I will give an overview of the different approaches to promote renewable energy and their impact in two European countries, Germany and Scotland.

But let me start with an example from Asia: In the fiscal year 2007/2008 Nepal's total exports amounted to approx. 59 Billion Rupees, the imports to 221 Billion Rupees, a trade deficit of 162 Billion. 44 Billion Rupees have been spent for the import of fossil fuels.[1]

At an oil price of 150 $/barrel and even at a growth rate of the export earnings of 9 % annually Nepal would spend almost 3 times her export income for fossil fuel in 2015. The oil price was already close to 150 $ in 2008.[2] A graduate from the last group of the last SESAM course made an, of course simplified but however interesting, calculation: If you would invest 100 % Nepal's spending for oil in 2007/2008 in Hydropower you could build 200 MW capacity which could produce around 1200 GWh electrical energy, the primary energy content of approximately 10 % of Nepal's fossil fuel imports in the same year. 200 MW is 1/3 of Nepal's existing hydropower capacity.[3]

Of course Nepal consumes oil mainly for transport and converting a transport system from fossil fuels to renewable electricity is of course a much more demanding and expensive exercise. The calculation does also not include operation/maintenance cost and investment in the grid. As a landlocked country without fossil fuel reserves but with a huge hydropower potential Nepal is also not a representative example.

This is a simplified but nevertheless impressing comparison which shows that we spend money for the wrong commodities.

[1] Dürhager, Arthur (2010): Wirtschaftshandbuch Asien-Pazifik 2009/2010
[2] Nakarmi, Amrit (2008): Current & Future Scenarios of Downstream Petroleum Products Market in Nepal, Presentation on the FAEM South Asian Regional Workshop on Renewable Energy for Sustainable Development –Kathmandu 19 May 2008
[3] Adhikari, Giri Raj Adhikari (2009): Fast Track Hydropower Development by Encouraging Private Sectors to Participate in the Energy Market of Nepal, SESAM Master Thesis

According to a thesis of a Bhutanese student two years ago the installation of a 60 MW Hydropower plant creates employment for 180 people for 5 years. If we extrapolate this figure 200 MW would lead to employment of 3000 personyears for people with a wide range of qualifications from the highly skilled engineer to unskilled labourers. This does not even include the whole value chain but only the direct labour for the erection of the power plant.[4]

Should we not better spend our money for renewable energy investments, create qualified and sustainable employment and thereby elevate poverty instead of producing CO2 from fossil fuels? You will certainly approve that but how can we finance the transition of our energy systems. Nowadays it is a common sense that the private sector has to be motivated to invest in renewable energy. But the private sector ranges from small farmers to global players in the energy sector.
At this point I would like to move from Asia to Europe and introduce you to two examples from Germany and Scotland which show how small scale investors and even communities can become involved in renewable energy and how they, and not the big players, can earn money with electricity generation.

Many of you know the regulations of German Renewable Energy Sources Act[5]:

- Private investors (households, community, investment funds, big enterprises) invest in renewable energy technology
- Grid operators are obliged to feed electricity from renewable energy into their grids and pay a fixed tariff. The grid operators equalize the different amounts of renewable electricity among themselves
- Electricity suppliers are obliged to buy the electricity and add it to their electricity mix. The additional cost of the renewable electricity will be equally distributed to all electricity suppliers
- Customers pay for electricity, including a certain percentage for the renewable electricity

Apart from the obligation of the grid operators to feed the renewable electricity into the grid and for the electricity suppliers to sell the renewable electricity to their customers the Renewable Energy Sources Act guarantees the plant operator a tariff for the duration of 20 years. The tariffs depend on the type of technology its capacity and a number of other factors. The table gives you an idea of the tariffs paid for some technologies. The tariffs cover the electricity production cost and allow an acceptable return on investment. A degression for new installations shall force manufacturers to reduce the investment and maintenance cost of their technology.

[4] Choden, Deki (2007): Private Sector Participation in Hydropower Development: Institutional and Financial Options for Bhutan, SESAM Master Thesis
[5] Act Revising the Legislation on Renewable Energy Sources in the Electricity Sector and Amending Related Provisions – Renewable Energy Sources Act – EEG 2009

As the tariffs are guaranteed the risk for investors is low and it is relatively easy for them to get bank loans as long as they can submit positive feasible studies.

New hydropower up to 5 MW,depending on size	0.0765-0.1267	€/kWh
Biomass up to 20 MW, depending on size, Bonuses for cultivated biomass and for CHP	0.0779 - 0.1167	€/kWh
Geothermal up to 20 MW, depending on size, Bonuses for cogeneration	0.105-0.16	€/kWh
Wind onshore (initial for five years)	0,092	€/kWh
Wind onshore (final)	0,0502	€/kWh
Wind offshore (initial for five years)	0,13	€/kWh
Wind offshore (initial for five years)	0,035	€/kWh
Solar PV, depending on size, different tariffs for roof mounted and freestanding plants	0.3194-0.4301	€/kWh

Guaranteed for 20 years, degressions for installation after 2009

Opponents of the Renewable Energy Sources Act, especially the large utilities, often argue that the electricity price has increased due to the feed in tariff. In fact electricity prices have increased from about 14 cent/kWh in 2000 to about 21.5 cent/kWh in 2008. However, the additional cost of electricity due to the feed in tariff has only increased from about 0,1 cent to 1.1 cent/kWh.[6] A part of the cost for renewable electricity is also hidden in electricity production: between 0.4 and 0.8 cent for additional control energy, required for balancing wind and PV electricity. On the other hand a study of the Fraunhofer Institute shows that on the energy exchange especially the wind energy in the German electricity system has led to a reduction of the market price in the range of the additional cost of the Renewable Energy Sources Act.[7] The main cost drivers are the generation, transmission and marketing cost, caused by the increase of fuel cost, but also by a still insufficient competition on the German electricity market. If we look at an average German household, the monthly cost of the feed in tariff are in the range of 3 € /month at average electricity cost of 63 €/month.

What do we get for the slightly higher electricity tariff?

Since enactment of the Renewable Energy Sources Act the share of renewable in the German electricity generation has increased from 6.3 % to 15.1 %.[8]

[6] Federal Ministristy fort he Environment, Nature and Nuclear Safety(2009): Electricity fron renewable Energy Sources-What does it cost?
[7] Sensfuß, Frank and Ragwitz, Mario (2007): Analyse des Preiseffektes der Stromerzeugung aus erneuerbaren Energien auf die Börsenpreise im deutschen Stromhandel -Analyse für das Jahr 2006- Gutachten im Rahmen von Beratungsleistungen für das Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit (BMU)
[8]Federal Ministry for the Environment, Nature and Nuclear Safety(2007): Renewable Energy Sources Act (EEG)-Progress Report 2007

Most of the renewable energy plants are not owned by big companies but by individual farmers and households or by groups of individuals. In the north western most district of Germany, North Frisia, for example 90 % of the wind energy capacity is owned by citizen wind farms: A large number of citizens of a village or the district form a joint company. Each individual, very often farmers, contributes to the equity of this company which then gets loans from a bank to purchase wind turbines.

Apart from 75 million tonnes of CO2 renewable energy also saved around 1 billion of import expenditures for fossil fuels and has become and important economic factor in Germany with an annual turnover of almost 30 Billion €.[9]

Renewable energy in Germany has an important impact on regional development. Almost 280000 work in the German renewable energy sector. Renewable energy creates employment even in rural areas which are far away from the industrial centres. In North Frisia which in the past mainly depended on agriculture and tourism. A survey in 2003 counted almost 10000 jobs in the wind energy sector.

In North Frisia about 90% of the wind capacity is owned by locals who joined forces to install wind farms. Many of them are small and medium scale farmers who found it difficult to survive with farming alone. Wind energy, and since recently also photovoltaic, allows them to make a living and to stay in their area. Renewable energy also provides a future and income opportunities for their children. Renewable energy is an effective means to reduce rural-urban migration.

Also the community as such benefits from renewable energy. In Germany enterprises have to pay a business tax to their local community council or municipality. In 2008 owners of wind and PV farms in the district of North Frisia paid 9.1 Million Euro business tax to their local councils, money which can be invested in improving the infrastructure to make the region more attractive for business, families and young people.[10]

These all are impacts of an attractive and guaranteed feed in tariff, which increased electricity cost by just 1 cent/kWh. Of course, the situation in Germany cannot be compared to the one in many countries of Asia. The majority of farmers in Germany is not poor. They have land which can serve as collateral for bank loans. The rise of electricity cost by 1 cent/kWh is not a large burden for German households.

The situation in Scotland is a bit different from the German situation.

[9]Federal Ministristy fort he Environment, Nature and Nuclear Safety(2007): Renewable Energy Sources Act (EEG)-Progress Report 2007

[10] Bundesverband Windenergie: Regional Impulse (URL: http://www.wind-energie.de/de/windenergie-in-der-region/regionale-impulse/?type=55) 30/09/09

Since 8 years we are conducting research projects in Scotland as a part of our study courses and in the course of time we learnt a lot about some interesting approaches to community development through renewable energy.

Scotland has the best wind resources in the whole of Europe. Average wind speeds of 10 m/s and more are common. The present remuneration for renewable electricity is very attractive and higher than in Germany. But in the British certificate system the tariffs are not guaranteed and are subject to short term political decisions. It is also very difficult to get a planning permission for wind turbines and there is no obligation of the grid operator to connect larger renewable energy plants to the grid.

On the other hand additional income is desperately needed in the rural areas. Agricultural land is of poor quality, apart from tourism and public services there are not many employment opportunities and compared to other European regions the infrastructure is poor. Migration of young people and over ageing of the population is a big problem. Investment to improve the infrastructure could attract business, create employment and attract young people and families.

But because of the risks of investment in renewable energy and because of the lack of collaterals and equity bankers find it difficult to provide loans to individuals or groups of individuals. They prefer the big players.

Our partner organisation, Community Energy Scotland (CES) has developed an interesting approach to support communities who are willing to invest in renewable energy.[11]

Scotland has a more centralised administrative system than Germany. There is no local business tax, therefore local communities do not necessarily benefit from private investments in their local area. Therefore CES does not support individuals or groups of individuals but only communities.

Communities who want the support of CES first have to form a community company which is obliged to spend all their profits on community projects. As a precondition a large majority of the community has to be involved in the community company. Very often these companies are subsidiaries of community trusts. Once a community company has been formed CES will support the community to identify a potential wind site and provide a grant for a feasibility study and, if the outcome is positive, the planning process. This eliminates the risk of the planning process for the community.

In today's market situation it is very difficult for small communities to purchase just one or two wind turbine. Once the community company has gained planning permission CES supports the community to identify and purchase a turbine. Therefore CES conducts calls for tender for a number of communities at the same time.

[11] http://www.communityenergyscotland.org.uk 30/09/09

Most of the communities find it difficult to provide sufficient equity. To increase the equity of the project CES offers communities to buy preference shares of up to 200,000 £ which have to be paid back with an appropriate return on investment within 5-10 years. CES thereby creates a revolving fund which is used to support other communities.[12]

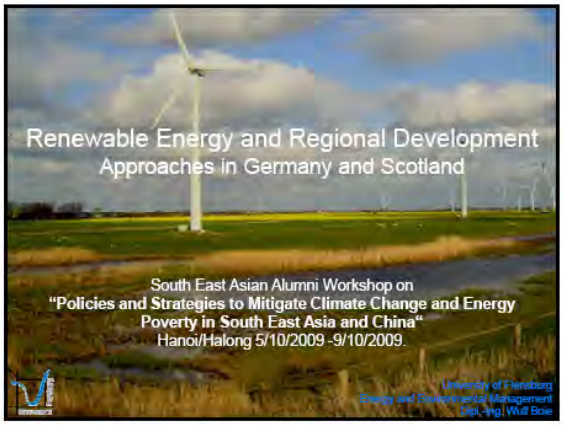
By the end of 2008 there were 28 community groups involved in large scale renewable energy projects, most of them wind projects of 800kW to 1 MW. A major problem in Scotland, especially for community wind projects, is the long planning process. Only 3 projects had secured planning consent by end of 2008. They started with their activities 5-6 years ago. A small community needs tremendous persistence to carry a project through such a long period. It is therefore too early to judge on the success of the CES approach, but we should watch it closely.

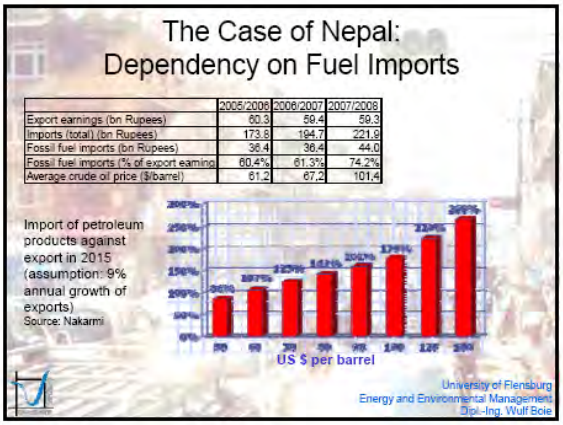
A community wind project which was implemented before CES started their activities is the small wind farm on the isle of Gigha. Gigha used to be a privately owned island and has been bought by the community in 2002. In 2004 the community installed three second hand Vesta V27. The community calls them "the dancing ladies" and they even have names: Faith, Hope and Charity. To ensure the equity the predecessor of CES, the Highland and Island Enterprise HIE bought shares of 120 000 £ at an interest rate of 6%, to be paid back within 5 years. The remaining funds came from grants (132 000 £) and a commercial loan (148 000 €). Although the community accumulates a reinvestment fund of 160 000 £, it still receives an annual net profit of 75 000 £ for the first 8 years of operation.

The community used the funds to improve and provide housing and other infrastructure, as well as to employ a business development officer. With success: The population which had declined to 98 people in 2002 has since increased to 157. 60% of the islanders are now below the age of 45 and the number of school children has increased from 6 to 31.[13] This is not only an effect of the income from the wind turbines, but the turbines have provided an important contribution to this positive development.

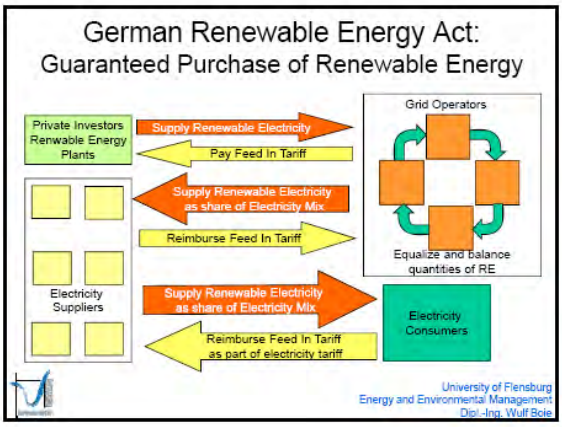
[12] Energy4All Ltd : A Step-by-Step Guide to Financing A Community Renewable Energy Project, Prepared for The Highlands and Islands Community Energy Company Ltd (HICEC) by

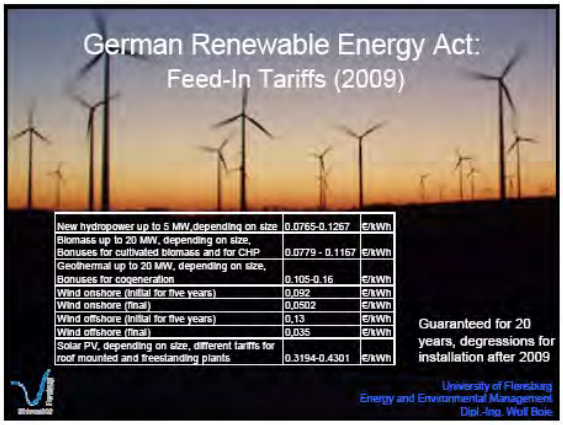
[13] http://www.scotland.gov.uk/Topics/Built-Environment/regeneration/engage/empowerment/casestudies/buyout 30/09/09





	2005/2006	2006/2007	2007/2008
Export earnings (bn Rupees)	60.3	59.4	59.3
Imports (total) (bn Rupees)	173.8	194.7	221.9
Fossil fuel imports (bn Rupees)	36.4	36.4	44.0
Fossil fuel imports (% of export earning	60.4%	61.3%	74.2%
Average crude oil price ($/barrel)	61.2	67.2	101.4





New hydropower up to 5 MW,depending on size	0.0765-0.1267	€/kWh
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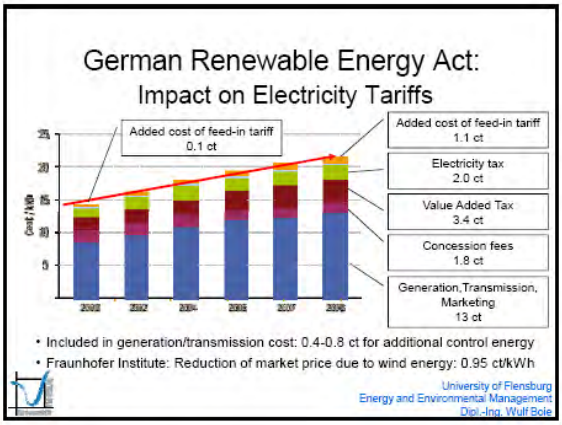
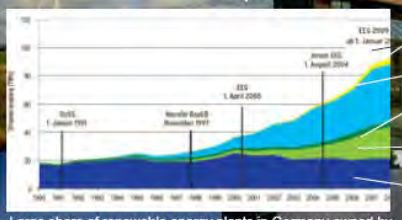


German Renewable Energy Act: Impact



Large share of renewable energy plants in Germany owned by individual farmers, households, groups of individuals:

- 90 % of windfarms in North Frisia owned by groups of citizens
- 80 % of biogas plants in Germany below 500 kW_{el}, 17% owned by cooperatives
- Most PV plants roof mounted, owned by households, farmers, communities

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Dipl.-Ing. Wulf Bole

German Renewable Energy Act: Impact on Environment and Economy

- Climate: 72 million t CO_2eq. savings in 2008
- Fossil fuel import: 1 billion € savings in 2007 (mainly coal and natural gas)
- Economy: Total turnover of the RE sector: 28.8 Billion € in 2008

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Dipl.-Ing. Wulf Bole

German Renewable Energy Act: Impact on Regional Development

- Employment: 278 000 people working in the German RE sector in 2008

Example Northern Schleswig Holstein (360 000 inhabitants): 9500 directly and indirectly employed by wind energy sector in 2003

- Local income from energy sales if RE plants are locally owned

Example North Frisia (167 000 inhabitants): approx. 30 Million €/year net income from energy sales

- Tax income: Operators of RE plants pay local business tax to communities

Example North Frisia (167 000 inhabitants): 676 MW wind capacity, 9,1 mio income from business tax

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Renewable Energy for Community Development in Scotland

- Extremly good wind speeds
- High remuneration for electricity from RE but no guaranteed feed in tariff (Certificate System)
- High risk due to long and bureaucratic planning process
- No obligation of grid operator to connect RET to grid
- Low value of agricultural land (mainly pasture)
- Low average household income
- Rural-urban migration
- Low population density and therefore poor infrastructure compared to other European regions

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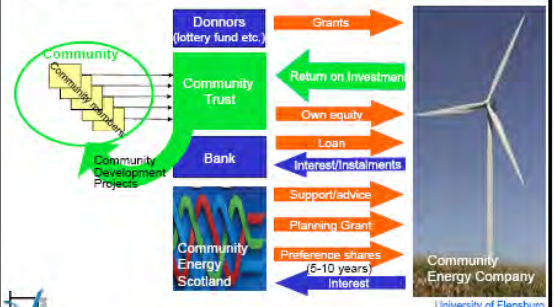
Renewable Energy in Scotland: The CES Community Development Approach



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CES Community Development Approach The Isle of Gigha

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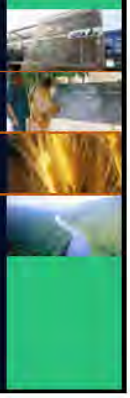
Sustainable Energy Solutions - Practical examples currently implemented in Vietnam

Dr. Elke Foerster, Representative Office Hanoi - GFA Consulting Group GmbH, Germany.



Sustainable energy solutions - practical examples currently implemented in Vietnam: "PoA CDM for household based biogas"

Presentation for the Workshop on
"Policies and Strategies to Mitigate Climate Change and Energy Poverty in South East Asia and China",
SESAM Alumni, Hanoi, October 5, 2009

Dr. Elke Förster (GFA Consulting Group)

Study financed by the German Ministry for Environment (BMU)

Presentation content

1) Introduction to the Study
2) PoA approach
3) Biogas Programme (SNV-MARD)
4) Findings of the Study
   a) BPD PoA set-up
   b) Baseline establishment and emission reduction calculations:
      i) Methane avoidance from animal manure management systems improvement
      ii) Fossil fuel switch
      iii) Non-sustainable firewood fuel switch
   c) Expected amounts of CERs
4) Conclusions

Introduction to the Study

Study „PoA Concept development for the use of biogas installations on small and medium sized pig farms for a decentralised energy supply in Vietnam"

- Study financed by the German Ministry for Environment (BMU) though the Internation Climate Protection Initiative
- Time Schedule: March-June 2009
- Study developed by GFA ENVEST
- Partners for the Study development;
  - Biogas Programme office (MARD/SNV)
  - SNV
  - VNEEC
- Study objective: Develop a PDD for registering Carbon Emission Reduction Certificates (CER)

Introduction to PoA approach

What is a Programme of Activities (POA) ?

- A voluntary action,
- Implementing a policy, measure or stated goal,
- Coordinated by a public or private entity,
- Resulting in emission reductions or removals that are additional.

Goal:

- project activities under a PoA can be registered as a single CDM project activity

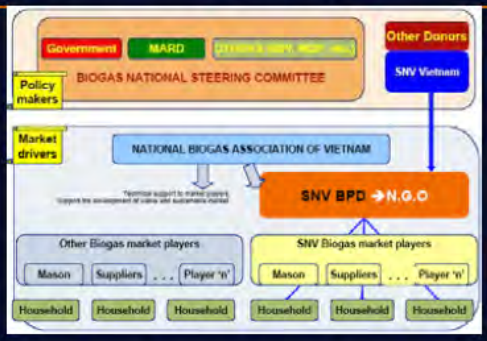
Introduction to PoA approach cont´d

- PoA is made up of CDM Programme Activities (CPAs)
- CPAs are project activities under a programme of activities which can be successively added during the lifetime of the PoA .
- PoAs and CPAs exist at large and small-scale level

Biogas Programme MARD/SNV

- Biên bản Ghi nhớ (MOU) năm 2003 giữa SNV/MARD; Giai đoạn I (2003-2006)
  - Kết quả: 18.000 công trình, 12 tỉnh
- MOU 2006; năm bắc cầu
  - Kết quả, 8.610 công trình, 20 tỉnh
- MOU 2006; Giai đoạn II
  - 2007-2010, 140.000 công trình, 58 tỉnh
  - Kết quả đến hết 2008: 30,000 công trình, 29 tỉnh

Structure of Biogas Programme



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6

Findings: 1. Recommended PoA set-up

- **Project coordinator** (managing entity) – Biogas Programme Division
- **PoA coverage** – all the units installed after 22nd June 2007 – in this way almost all of the units installed under BP2 will be included (a part from the 2.669 units installed in the period January-June 2007)
- **Table 1: Number of plants under PoA by years**

22nd June - 31st Dec. 2007	2008	2009	2010	2011	2012
11.691	15.826	22.000	28.000	32.000	28.000
				Total	137.517

9

Findings: 1 contd.

Carbon rights:

- CERs are owned by the BPD (contract)
- Circular 58/08: revenues from CERs generated via ODA belong to the State (VEPF)

→ Negotiation between MARD and MONRE

CPA Definition :

- According to time period of installation
- A CPA will have less than 6,400 biogas units to stay under SSC threshhold, at 5.9 kW/hh, and < 45 MW thermal energy installed (total)
- Monitoring on CPA level (unique identification of each digester)

10

Findings 2: Baseline establishment

- During the Study 3 sources of emission reductions were investigated:
  - a) Methane recovery from improved animal manure management system (not recommended)
  - b) Fossil fuel switch
  - c) Non-renewable biomass fuel switch (still under investigation)

11

Findings 2 contd.: Baseline establishment

a) **Methane recovery - methodologies** :

- AMS-III.R "Methane Recovery in Agricultural Activities at Household/ Small Farm Level"
- AMS-III.D "Methane Recovery in Animal Manure Management Systems

→ **focus on AMS- III.R**

Manure management systems in households in Vietnam:

- 2006 IPCC guidelines describes 20 systems – no match in VN
- No official data on national level, only various studies
- Second National communication of VN not yet provides detailed data (AMS IIIR requires Tier 2 approach)

→ **Survey Required, Amounts too small**

12

Findings 2 contd.: Baseline establishment

b) Fossil Fuel-switch - Methodology:

AMS I C "Thermal energy production with or without electricity"

Applicability: "*renewable energy technologies or users with thermal energy that displaces fossil fuel use.*"

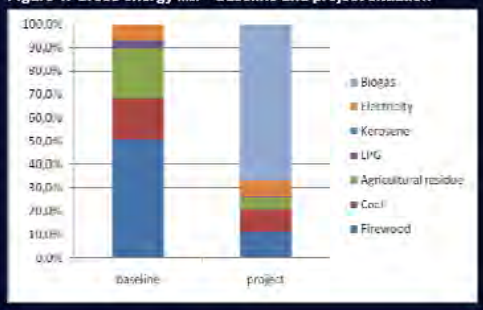
- **Quality of data about fuel consumption in households**
  - No official data on the national level
  - Biogas programme data: very heterogeneous, high standard deviation

⟹ **Use project data for** baseline emission calculation and obtain data for project emissions via monitoring, or

⟹ Collect new data, but improve the surveying methods – **higher costs!** establish a **dynamic baseline** during programme implementation

Findings 2 contd.: ... fossil fuel switch

Figure 1: Gross energy mix – baseline and project situation



Findings 2 contd.: ... fossil fuel switch

Emission reduction calculation:

$$ER = BE - PE$$

Table 2: Baseline emissions

Fossil fuel	Amount consumed (kg/year)	Calorific value (MJ/kg)	Effective CO_2 EF ($kgCO_2/TJ$)	CO_2 emissions (tCO_2/y)
Coal	362,4	20,9	94.600	0,716
LPG	30	47,3	63.100	0,089
Kerosene	0,98	43,8	71.900	0,003
Total				0, 808

b) Fossil fuel-switch – cont´d

Table 3: Project emissions

Fossil fuel	Amount consumed (kg/year)	Calorific value (MJ/kg)	Effective CO_2 EF ($kgCO_2/TJ$)	CO_2 emissions (tCO_2/y)
Coal	168	20,9	94.600	0,332
LPG	1,9	47,3	63.100	0,006
Kerosene	0	43,8	71.900	0
Total				0,338

ER = BE - PE

0,808 – 0,338 = 0,470 tCO_2 eq/year

Findings 2 contd.: Baseline establishment

c) Non-sustainable firewood fuel – switch – methodology: AMS-I.E "Switch from Non-Renewable Biomass for Thermal Applications by the User"

Challenge: classification of renewable- and non-renewable biomass

⟹ Prove **Applicability in Vietnam,** as Forest expands on a national level.

- Two-phased approach:
  - (i) choose provinces where firewood may decrease;
  - (ii) confirm increasing firewood scarcity.

Assumption: current energy use includes ***20% non-renewable firewood***

Expected amounts of CERs – cont´d

Table 6: Amount of CERs per household per year

	PoA CDM (AMS IC + AMS IE)
Baseline emissions	1,24 t CO_2e
Project emissions	0,34 t CO_2e
Emission reductions	0,90 t CO_2e

Note: assumption 20% of firewood is non-renewable

Expected amounts of CERs – cont´d

	PoA project
2010	70.230
2011	97.818
2012	121.229
2013	118.805
2014	116.429
2015	114.100
2016	111.818
2017	109.582
2018	107.390
2019	105.242
Total estimated reduction	1.072.644
Total number of crediting years	10*
Annual average of estimated reductions over the crediting period	107.264

19

Conclusions

1. PoA suitability: A household-based biogas project could be financially supported through Carbon credits (PoA CDM -CERs, or VERs)
2. In Vietnam, baseline establishment is difficult and costly as national level data are missing.
3. Carbon rights are owned by the project, distribution of Carbon revenues needs to be negotiated between MONRE and MARD.
4. Unclear revenue distribution and costly baseline establishment impedes further investments and registration of the PoA
5. Household based emission reduction is more likely to be feasible in countries with non-sustainable fire wood.
6. International support to small-scale PoAs has to be increased to make the application viable.
7. A Manual for using the PoA approach for household-based biogas is available online with UNEP:

http://www.cd4cdm.org/WorkingPapers.htm

20

Thank you for your attention!

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21

Vietnam Carbon Market

MSc. Tran Hai Anh, Innovation Norway, Vietnam.

INNOVATION NORWAY

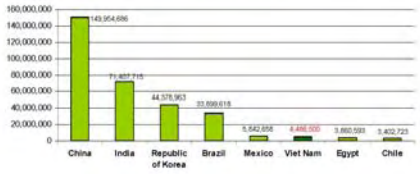
Vietnam CDM Market

Presented by: **Tran Hai Anh**
Market Advisor Innovation Norway Hanoi
SESAM 2000 Student
Hanoi – 5th October 2009

Content

1. Market Size and growth
2. Applicable technology
3. Legal Framework
4. Key Players
5. Market Price
6. Conclusion and Recommendation

1.1 Market Size and Growth



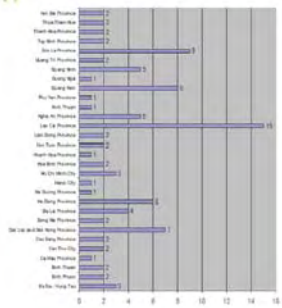
By 9/2009, Vietnam ranks sixth in the world in terms of issued CER amount.

1.2 Market Size and Growth

Register with EB	Expected annual CER
1 CDM Project of Dong Thanh Landfill LFG Recovery in Ho Chi Minh City	1,476,183
2 Rang Dong Oil Field Associated Gas Recovery and Utilization Project	574,000
3 Wind Power Plant No.1 - Binh Thuan 30 MW	57,999
4 Cao Phong Reforestation	2,665
5 Song Mua Small Hydro Power Station Rehabilitation Project	4,288
6 Suoi Tan Hydro Power	14,841
7 Da Lo Hydro Power	17,576
8 Muong Sang Hydro	4,920
9 Phu Mau Hydro Power	13,395

- DNA Vietnam has approved 98 Project Design Documents (PDDs) and 23 Project Idea Notes (PIN);
- 9 Vietnam projects have been registered with Executive Board (EB).

1.3 Market Size and Growth – Geographical distribution



1.4 Market Size and Growth – CDM Project ownership

CDM projects' ownership in Vietnam belongs to the following categories:

- SME (joint stock company, Limited company, etc.);
- State owned economic group;
- Joint venture among foreign partners and Vietnamese partner;
- Public Private Partnership (PPP).

Photo: Rang Dong Oil Field Associated Gas Recovery and Utilization Project - source: DNA Vietnam

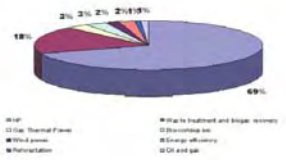
1.5 Market Size and Growth – CDM Vietnam Rating

Rank	Country	Rating	(Previous rating)	Climate institutions	Investment climate	Project potential and status
1 (1)	India	A-	(A)	AA-	B-	AA-
2 (2)	China	BBB+	(BBB+)	BBB-	BB	AA
3 (3)	Chile	BBB	(BBB)	A-	BBB+	BB
4 (4)	Mexico	BBB	(BBB)	A-	BB-	BBB-
5 (7)	Brazil	BBB-	(BBc)	BBB-	BB-	A-
6 (5)	Peru	BB+	(BBc)	A-	BB-	B
7 (11)	Indonesia	BB+	(BB)	A-	CCC	BB
8 (9)	Malaysia	BB	(BB)	BBB-	BB-	BB-
9 (11)	South Africa	BB	(BBB-)	A-	CCC-	BB-
10 (8)	Korea	BB	(BBB-)	BB	BB-	BB-
11 (10)	Morocco	BB	(BB-)	BBB+	B	CCC
12 (12)	Vietnam	B+	(B+)	BBB	CCC+	B
13 (16)	Philippines	B	(B)	BB	CCC-	B-
14 (16)	Thailand	B	(CCCa)	B-	B	B+
15 (13)	Argentina	B	(B)	BB-	CCC+	B-
16 (15)	Egypt	B-	(CCCa)	CCC	B	B

Source: www.pointcarbon.com

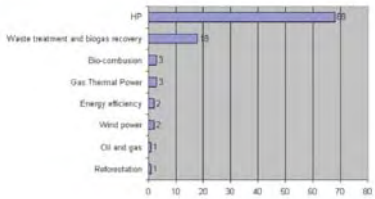
- In January 2009, Vietnam CDM rating is B+ (given by pointcarbon);
- Vietnam ranks 16th in the list;
- It is expected that the rating of Vietnam will be higher by next year.

2.1 Applicable technology



Hydropower is predominant technology applicable for Vietnam CDM projects

2.2 Applicable technology



- Waste treatment technologies: landfill and gas recovery; wastewater treatment and biogas recovery; household biogas; etc.
- Two CDM rice husk combustion projects in Can Tho.
- Two wind power CDM projects.
- Three CDM gas turbine combine cycle projects of PetroVietnam.
- In the coming time, PetroVietnam has planned to develop a number of oil and gas CDM projects and need special technologies and international competence.

3.1 Legal Frameworks

- Vietnam signed UNFCCC on the 11th of June 1992, and ratified UNFCCC the 16th of November 1994.
- On the 3rd of December 1998, Vietnam signed the Kyoto Protocol (KP) and it was ratified four years later, on the 25th of September 2002.
- Vietnam is none - annex I country and eligible for CDM projects.

3.2 Legal Frameworks – Relevant legal document

- Directive No 35/2005/CT-TTg, dated 17/10/2005, to guide implementation of UNFCCC and KP in Vietnam.
- Circular No 10/2006/TT – BTNMT, dated 12/12/2006 is a guide to implementation of CDM projects under the KP.
- Decision No 47/2007/QD-TTg approves Vietnam master plan for implementation of KP, period of 2007-2010 dated April 2007.
- Decision No 1016/QD-BTNMT in April 2007 to set up Climate Change National Committee in July 2007. This committee is responsible for overseeing implementation of KP and UNFCCC.

3.3 Legal Frameworks – Relevant legal document

- Decision No 1133/QĐ-BTNMT in July 2007 to set up National Standing Office, the representative of the Steering Committee. The National Standing Office is responsible for drafting regulations, policies, implementation manners, etc. and is the key contact organization among relevant entities.
- Decision No 130/2007/QD-TTg dated 2/8/ 2007 to provide mechanism and financial policies toward CDM projects in Vietnam.
- Inter-circular No 58/2008/TTLT-BTC-BTN&MT dated 4/7/2008 issued by MONRE and MOF to guide implementation of Decision No 130/2007/QD-TTg .

3.4 Legal Frameworks – Vietnam Government Commitment

BUSINESS

Việt Nam commits to green development

4.1 Key Player

Investor: private companies, limited companies, joint venture, share holding companies, large state owned economic groups, individuals, etc. It is often seen that CDM projects are owned by more than one investor.

Consultant: in Vietnam, both international consultants and local consultants are active. Consultants play important roles in the CDM market. In most cases, consultants are either buyers or authorized by investors for looking for buyers. In a number of projects, consultant fees are paid in form of a certain percentage of the CDM revenue.

Buyer: Japanese, European, Korean, Singaporean buyers are often seen in Vietnam. Among those, Japanese buyers are most active.

Broker: there are several financial organizations in Vietnam acting as CDM brokers. Brokers are not only to facilitate to find a buyer but also to arrange financing for preparing CDM documentation...

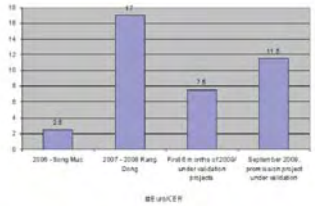
4.2 Key Player

Local authority: local authorities usually encourage developing CDM projects and play a role of partners in a number of municipal waste treatment projects.

DNA Vietnam: the International Cooperation Department of MONRE was designated as a DNA in Vietnam in March 2003. DNA Vietnam is responsible for the endorsement of PIN, granting Letter of Approval, coordinating CDM relating activities within Vietnam and the region, etc.

Ministry/organization: representatives from relevant ministries are members of Vietnam Climate Change National Steering Committee namely MONRE, MOF ,MOIT,MOST, MOFA, MOISA,, MOT, MPI, MARD, MOT, MIC, VUSTA, others. The main tasks of these representatives are steering, management and coordination of activities related to Vietnam's implementation of the Kyoto protocol.

5 Market Price



The information of pricing of purchased CERs is not public in Vietnam. The information provided in this document is based on comments from market participants directly.

6 Conclusion and Recommendation

- Legal frame work for developing CDM projects in Vietnam is fully set up;
- Information of buyers are not disserminated among sellers;
- Vietnam CDM will developed faster in the time to come, especially at the end of Kyoto period;
- Opportunities for international consultant to develop CDM rpoject in Vietnam;
- Opportunities for international buyers to buy CER in Vietnam.

Many thanks for your attention!

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Thailand Strategic Plan on Climate Change and Future Action Plan (10-year comprehensive plan)

MSc. Tubtim Limsoontorn - Project Coordinator Office of Natural Resources and Environmental Policy and Planning, Thailand

Thailand realized the importance and urgency of climate change challenges and is committed to working with the international community in combating climate change, as a ratified Party to the United Nationals Framework Convention on Climate Change (UNFCCC) in 1994 and the Kyoto Protocol in 2002. The Office of Natural Resources and Environmental Policy and Planning (ONEP) under the Ministry of Natural Resources and Environment (MONRE) was also appointed as National Focal Point to the UNFCCC with the responsibilities to formulate national policies and plans to address climate change issues.

Under the Convention, in 2007, Thailand had established 3 the National Climate Change Board, oversees and approves the formulation of Thailand's climate change policies and plan. We also established the 3 subcommittees on Climate Change Science and Technology, on Climate Change Negotiation and International Cooperation and on Climate Change Public Awareness and Participation in 2009.

Early 2008, The National Committee on Climate Change Policy formulated the National Strategic Plan on Climate Change B.E.2551-2555 (2008-2012). This Plan is used by relevant agencies as guidelines to develop their own plans to address climate change. Currently, ONEP is developing a 10-year Master Plan and 3-year Immediate Action Plan on climate change. The 10-year Master Plan, apart from expanding the timescale of the 5-year National Strategies, will focus on guidelines for investments by relevant agencies to develop infrastructure, research, system and capacities, as appropriate, to address climate change.

Regarding the plans, Thailand will emphasize on 1) Energy Efficiency 2) Adaptation Plan and 3) Low Carbon Society to reduce greenhouse gas emission, to use natural resources sustainability and to decrease the impact of climate change on vulnerability sectors.

Strategic Plan on Climate Change and Future Action Plans

(10-year comprehensive plan)

Ms.Tubtim Limsoontorn

Project Coordinator,

Office of Natural Resources and Environmental Policy and Planning

Thailand

Strategic Plan on Climate Change and Future Action Plans

- **Background**
- Responsibility Organizations
- National Strategic Plan
- Future Action Plans

Background

- Thailand realized the importance and urgency of Climate change challenges
- Is committed to working with the international community in combating climate change
- As a ratified party to the UNFCCC in 1994 and Kyoto Protocol in 2002

Background (cont.)

- ONEP under MONRE was also appointed as National Focal Point to the UNFCCC
- Responsibilities to formulate national policies and plans to address climate change issue
- In 2007, Thailand had established the National Climate Change Board
- Chaired by the Prime Minister

Background (cont.)

- Oversees and approves the formulation of Thailand's climate change policies and plans
- Also established the 3 Subcommittees on
  - Climate Change Science and Technology
  - Climate Change Negotiation and International Cooperation
  - Climate Change Public Awareness and Participation

Background (cont.)

- Consisted of high-level officials from relevant ministries, climate scientists, academic institutions, and environmental policy experts
- Subcommittees have important mandates
  - to synthesize climate change policies and plans,
  - to formulate Thailand's positions in both bilateral and multilateral cooperation concerning climate change

Background (cont.)

- to disseminate knowledge and promote awareness from relevant stakeholders
- As well as to provide guidance for Thailand's cooperation with the international community

Strategic Plan on Climate Change and Future Action Plans

- Background
- **Responsibility Organizations**
- National Strategic Plan
- Future Action Plans

Responsibility organizations

- MNRE just established the Office of Climate Change Coordination (OCCC)
  - Work under the ONEP
  - Main mandates are
    - to formulate national climate change policies and plans
    - To support, coordinate and expedite climate change implementation
    - To act as secretariat to the National Climate Change Policy Board

Responsibility organizations (cont.)

- Thailand's Greenhouse Gas Management Organization (TGO)
  - Works under MNRE
  - Main mandates are
    - to create and maintain national GHG inventory
    - to review and promote CDM (Clean Development Mechanism) projects and carbon markets
    - to act as secretariat to the Thai CDM Board

Strategic Plan on Climate Change and Future Action Plans

- Background
- Responsibility Organizations
- **National Strategic Plan**
- Future Action Plans

National Strategic Plan

- Early 2008, the Thai Cabinet acknowledged the National Strategic Plan on Climate Change B.E.2551-2555 (2008-2012) formulated by the National Committee on Climate Change Policy
- Agreed that the Plan be used by relevant agencies as guidelines to develop their own plans to address climate change

National Strategic Plan (cont.)

STRATEGY 1 Build capacity to adapt and reduce vulnerabilities to climate change impacts

STRATEGY 2 Promote GHG mitigation activities based on sustainable development

STRATEGY 3 Support R&D to better understand climate change, its impacts and adaptation and mitigation options

STRATEGY 4 Create awareness and participation of problem solving on climate change

STRATEGY 5 Build capacity of relevant personnel and institutions and establish a framework of coordination and integration

STRATEGY 6 Support international cooperation to achieve the common goal of climate change mitigation and sustainable development

Strategic Plan on Climate Change and Future Action Plans

- Background
- Responsible Organizations
- National Strategic Plan
- Future Action Plans

Future Action Plans

- Currently, ONEP is developing a 10-year Master Plan and a 3-year Immediate Action Plan on Climate Change
  - 10-year Master Plan: apart from expanding the time scale of the 5-year national strategies
    - will focus on guidelines for investments by relevant agencies to develop infrastructure, research, system and capacities as appropriate, to address climate change

Future Action Plans (cont.)

- 3-year Immediate Action Plan
  - will supplement the comprehensive national strategies and master plan by concentrating on measure requiring immediate implementation
- Both plans will also address six dimensions set forth in National Strategic Plan
- Regarding the plans, Thailand places an important emphasis to support research and development in relevant fields

Future Action Plans (cont.)

- We also recognize that climate change research requires continuous efforts and support
- In the past, R&D requirements in natural resources and environmental management were usually planned and carried out by single agency
- the National Plan attempts to overcome this by integrating R&D plan by relevant agencies into a single plan overseen by the National Committee on Climate Change Policy

Future Action Plans (cont.)

- Energy Efficiency
- Adaptation Plan
- Low Carbon Society

Energy Efficiency

- Technology
  - Transportation sector
  - Building and Hotel
- Awareness
  - Reduce Reuse and Recycle

Adaptation Plan

Vulnerable sectors

- Agriculture
- Biodiversity Coasts
- Forests
- Settlements
- Water

Adaptation Plan (cont.)

- specific to individual sectors or regions
- the impacts will vary depending on the sensitivity of the system and its adaptive capacity

Low Carbon Society

- Linkage Strategy 2 ***"Promote GHG mitigation activities based on sustainable development"***
  Goal: reduce greenhouse gas emission and promote clean technologies
- ***Implementation***
  - **Establishment of market mechanisms to promote the use of alternative energy in electricity generation**

Low Carbon Society(cont.)

- Establishment and improvement of the supply of raw material and the infrastructure to support the use of renewable and alternative energy in the transport sector (use of biodiesel, gasohol)
- Development of legal instruments to promote energy-efficient machinery in the industrial sector

Low Carbon Society(cont.)

- Implementation of CDM to promote greenhouse gas mitigation in various sectors (September 2009, 88 CDM projects were approved by Thailand's DNA-CDM which account GHG reduction 5.12 Mtoe/year)
- Introducing GHG mitigation Innovations to Thai society:
  - Carbon Labeling
  - Carbon Footprints : Products
  - Cool Mode : Garment

  (http://www.tgo.or.th)