

***“Capacity Building and Networking for Sustainable Energy Development Across the Mekong Region”***

**Workshop Report and Summary**

**May 17 – 27, 2010**

MEE Net’s 2010 workshop focused on understanding the problems in the power sector within the Mekong region to build towards sustainable energy development. Bringing together participants from each of the six Mekong countries over the course of 10 days, the workshop included a mix of lectures, group exercises, and visits to alternative energy sources in Thailand. A final schedule is attached.

In total, the workshop included 16 individuals from each of the six Mekong countries plus Finland representing research institutes, non-governmental organizations, and the media. The individuals included:

**BURMA**

Mr. M. Zarni, Research Fellow, Institute for Security and International Studies, Chulalongkorn and London School of Economics

Mr. Khun Chankhe, Member, Pa-oh Youth Organization

Ms. Ah Nan, Assistant Coordinator, Burma Rivers Network & Kachin Development Networking Group

**CAMBODIA**

Mr. Oum Sony, Project Development Officer, Fauna and Flora International

Mr. Por Narith, Provincial Programme Coordinator, My Village Institute

**CHINA**

Mr. Wang Ying Chun, Journalist, China Economic Herald

Mr. Ke Cao, Project Officer, Global Environmental Institute

**LAO PDR**

Mr. Bousing Soukkaseum, Research Assistant

**THAILAND**

Ms. Wasukan Chimsuk, Assistant Project Coordinator, Alternative Energy Project for Sustainability

Ms. Weerakan Kenkaj, Thailand Solar Generation Coordinator, Greenpeace

## **VIETNAM**

Ms. Phan Thi Minh Thao, Deputy Director, Research Center for Energy and the Environment

Mr. Nguyen Thao, Policy Advocate, Environmental Defense Fund

Mr. Hoang Duc Minh, Director, Raising Awareness on the Environment and Climate Change Program

Mr. Nguyen Anh Dung, Expert on International Relations, Institute of Energy

Mr. Le Sy Thang, Coordinator of community Development Program, WARECOD

## **FINLAND**

Mr. Oliver Wastie, Siemenpuu Foundation

### **WORKSHOP INTRODUCTION AND GOALS:**

In the course of 10 days, the workshop was divided into the following components:

- 1) Establishment of workshop goals, objectives, and vision for power sector development in the Mekong region.
- 2) An understanding of the current power sector plans in each of the six Mekong countries, the region, as well as a review and analysis of technologies available to provide energy services
- 3) Introduction to impact assessments
- 4) Introduction to energy planning, scenario building, governance issues
- 5) Renewable energies, Demand side management, and energy efficiency including site visits
- 6) Analysis of structure, current problems, trends in the power sector and possible solutions

### **SUMMARY OF MAIN POINTS and LESSONS LEARNED:**

Beginning from the first day, participants were enthusiastic to learn about what sustainable power sector development entailed, what the current state of development was in the Mekong region, as well as possible solutions to reach a more sustainable future for power sector development.

- I. *Vision for the power sector:* energy services should be used to meet the basic needs of individuals and families. Greater emphasis should be given to promoting energy efficiency and green technological resources. Part of this must come via a shift in how we view the use of energy for both ourselves and for economic development. Energy and electricity should not merely be viewed for pure economic development, but more for community level use. Local production should also be encouraged both to ensure energy security while decreasing the risk of exploitation.

- II. *Power sector plans:* Each country group presented their country's power sector system and current state of energy use. In every case, government plans focus on continued greater economic growth and increasing need for power sector development. Highlights include:
- a. Burma: increasing development of hydropower, gas, and other resources for export to neighboring countries even though only 5% of households in Burma have access to electricity and must rely on expensive stand alone diesel generators. Extremely centralized planning by the military government allows no public participation.
  - b. Cambodia: the government plans to increase transmission lines, focus on hydropower development and some coal fired power plants to meet further needs.
  - c. China: economic growth continues unabated. More resources are being put into power sector development, including renewable energy. China's West – East policy means that many more transmission lines must be built to take electricity from the where area it is generated to the area where it is used. Energy efficiency is also an important government target. The power sector system is also being reformed to introduce more competition.
  - d. Laos: hydropower plants plans continue to be built for export to neighboring countries including China, Vietnam, and Thailand. These include projects on the Mekong mainstream.
  - e. Thailand: the latest power development plan still over projects the demand forecast. Nuclear power is also a component in planning. Demand-Side Management and renewable energies are still marginalized. Public participation is superficially practiced.
  - f. Vietnam: rapid economic growth has the government planning on an annual 11% growth in installed capacity. This is to be met by a mix of coal imports, hydropower construction, and a number of nuclear power sites. Energy efficiency and renewable energies also play more prominent roles in government plans. Vietnam is also trying to reform its electricity power sector structure in the next 20 years.
  - g. Regionally: both ASEAN and the Asian Development Bank's Greater Mekong Subregion Project are promoting greater economic integration including transmission pipelines for gas and electricity. These grand visions affect national level government planning.
- III. *Energy resources:* Participants engaged in an exercise to examine the different energy sources available, comparing prices, technologies, impact, etc. At present, conventional sources are cheaper compared to other renewable sources, outside of wind energy. However, great strides are being made into renewable energies and prices have dropped markedly compared to years past. In addition, for households outside of grid areas, small scale local production (at the community level) can be provided and be very efficient.

- IV. *Impact Assessments*: Power development projects often only look at capital costs without transmission costs, not to even mention environmental, health, social costs, and other externalities. Thailand has managed to devise a system using impact assessments to affect government policy. Findings from studies are put into economic terms that are understandable to policymakers.
- a. In addition, assessments are also used to gather local community reactions that can also be used at policy level decisions.
  - b. A movement is being made to make these impact assessments applicable at the ASEAN level as well.
- V. *Energy Planning, Scenario Building, Governance Issues*: Planning is currently based only on economic growth throughout the region. Governments tend to project energy needs based on economic growth into the future. The majority of the time, this leads to overestimation. Almost all countries in the world experience demand overestimation, high investments, and debt once economic growth do not meet expectations.
- a. Once the estimated demand is established, current energy mix is skewed towards conventional resources, while not enough attention is placed on promoting energy efficiency and renewable energies.
  - b. Decision making processes in the countries are opaque with little participation. The focus is on large scale development over small scale. In Thailand, greater investment is rewarded over need and efficiency.
- VI. *Renewable Energy, Energy Efficiency, Demand- Side Management*: Energy efficiency programs have proven to be the most cost effective mechanism to meet energy goals. However, thus far, policy has not been able to successfully promote energy efficiency and demand side management at the national level. Thailand and other countries have managed some positive examples, however much more needs to be done. More also needs to be done at the policy level (through SPP and VSPP regulations) to promote renewable energies in the energy mix.
- VII. *Power Sector Structure*: Discussions about the power sector in the region also included the structure of the power sector industry. With growing demand for lower costs and higher efficiency, many countries are looking to open up the sector away to more competition. Several examples were presented including: vertically integrated, single buyer, wholesale competition, and full competition models. Doing so allows for more players into the system. Question remains, does this drive towards privatization make sense? Which sections should be government's responsibility and which the private sector's?
- a. The increasing role of the private sector makes engagement more difficult as companies are not liable to the public but rather are accountable to their shareholders.

- b. Civil society must find its role and point of entry in this changing structure.
- VIII. *Current Problems and Solutions:* Many problems remain in the power sector ranging from a cost structure that benefits high investment over efficiency and consumer welfare, governance problems driven by conflicts of interest, captive consumers, inefficiencies in the system, and a move towards commoditization of the sector.
- a. *Solutions:* Each country must identify the major problems it faces as well as lowest hanging fruit that can be addressed. These can range from a better EIA process to better regulations for renewable energy, energy efficiency, and even towards addressing governance problems.
  - b. Utilizing a mind map to understand problems within the power sector is a powerful tool to recognize how each action has more than one affect.

**FOLLOW UP:**

To continue with fulfilling MEE Net's vision, several avenues were identified for participant participation following the closure of the workshop. They are as follows

- 1) Chom S. Greacen, MEE Net's resource person, will be initiating a study looking at participants' visions for energy development in the region, the problems confronting that vision, and possible solutions. Most MEE Net participants have agreed to help co-author or work on this report.
- 2) Others have identified their own avenues for engagement with MEE Net. These include a youth video conference covering the main themes laid out in the workshop, a feature article to be published in Chinese media about the workshop, as well as the interweaving themes from the workshop into a documentary about Vietnam's largest hydropower project, Son La.
- 3) A final group of participants have also volunteered to develop content for sections of MEE Net's webpage.

## ***FULL NOTES Organized by Day***

***Monday, May 17<sup>th</sup>, 2010***

Conference Goals and Objectives:

- 1) To gain an understanding of regional perspectives of power development
- 2) To understand what sustainability and sustainable development means
- 3) To learn about International and local/community level lessons that can be brought home

Conference settings:

- 1) To have an open environment for the exchange of ideas and experiences between the participants from each country.
- 2) To have first hand experience talking to and learning about both successes and failures of conventional vs. alternative energy options.

**Basics in energy (Chom S. Greacen):**

Energy is measured in joules, BTU, calories

Power = energy \*time

Gas: measured in cubic meters

Generation examples: turning turbines through hydropower. Thermal generation refers the use of energy sources for boiling water whose steam that turn turbines.

Transmission: lines that transport electricity from generation sources to homes. In the process, it must be stepped down to be able to use in homes and businesses.

Decentralized energy/stand alone: is not connected to the grid

Reserve margin: difference between installed capacity and consumption (generation capacity – peak demand/peak demand) expressed in a percent.

**Important point:** Electricity demand and supply must match (voltages must stay the same) for the system to function. Electricity cannot be easily stored.

**Mycle Schneider (Discussion on energy services and failures)**

Question: What do you think of when looking at energy?

You want a system that is clean, reliable, efficient, user friendly, and just.

Energy should be considered a service. Basic energy services would include: Cooked food, heat/cold, lighting, community, transport, mobility.

In providing energy services, a policy planning process is involved that includes: international, regional, national, municipalities, and individual responsibilities.

**Examples of how energy planning has failed:**

- 1) England: basic heating services were not provided.
  - a. Measured against stated goals. England stated that they would provide heat to the most vulnerable groups in 2002. In 2007, the number of vulnerable individuals doubled. The goal was not met.
  - b. In fact, a new figure developed to measure the number of deaths due lack of heat. Studies show that homes with higher energy efficiency have less deaths due to heat poverty than houses with energy inefficient homes.
- 2) In Germany, the renewable energy portion has risen dramatically in the past year, yet carbon dioxide emissions has stayed constant. Why?
  - a. Consumption of electricity and energy resources has also risen at the same rate as renewable energy growth, meaning that all growth in renewable energy was consumed, no one was cutting back on electricity use.

**Mykle Schneider had several points:**

- 1) Forecasting is not useful, it assumes that the future cannot be changed by human behavior; when in reality it can.
- 2) Individual companies/groups have conducted studies to determine the economic costs of decreasing carbon emissions of certain energy sources. They have found that the costs change rapidly (example: costs associated with nuclear power plant carbon abatement has risen drastically, it is no longer as cost efficient as believed).
- 3) Too much belief is put into technology and a “silver bullet” to solve problems identified. There is no one solution to the problems.
- 4) Energy efficiency programs (programs to limit energy/electricity use) have not worked particularly well at the national level anywhere in the world. There are some good examples of energy efficiency programs made at the local/regional levels.

**Solutions:**

- 1) Start by analyzing energy in terms of energy services and conducting an analysis based on energy services needs.
- 2) Places human needs first (at the family level)
- 3) Boost systemic approaches to design, too much attention has been place on short term not long term analysis. You need to look at the whole system, not just one short term solution
- 4) Need to involve more social scientists and civil society in energy planning, not engineers. Social scientists and civil society can see the societal/long term implications, not just solutions to problems. They can also help package messages, and determine strategy.
- 5) Develop a kit for energy efficiency and renewable energy tools that link renewable energy to an efficiency approach

- 6) Undertake research into potential conflicts in infrastructure investments that may have adverse system effects for emerging strategies. You don't want investments to contradict in the long term.

**Dr. Peter du Pont (Energy Efficiency)**

- 1) There are various fuel options including: coal, petroleum, natural gas, renewables, nuclear
- 2) In developing countries, economic growth has led to growth in incomes and increases in energy demand.
  - a. Coal and oil development will rise as dominant factors
  - b. SEA will import 70% of oil
  - c. You can raise efficiency of coal through co or tri generation
  - d. Air pollution is very high in most places
  - e. Asia's portion of CO2 is increasing rapidly.
  - f. China is focusing on reducing its industrial energy intensity by 45%.
- 3) In energy planning, energy efficiency is the most cost effective solution, providing for same amount of energy need with less cost.

**Q&A:** Why are VSPP & SPP not successful?

A: Capital investments have no guarantee of a return on investment.

Compared to large conventional projects, decentralized electricity services cannot miss by much, because the margin of error is much less.

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***Tuesday, May 18<sup>th</sup>, 2010***

**Carl Middleton (Political ecology of dams)**

Why do you care about the Mekong?

- 1) Home
- 2) Livelihoods
- 3) Fishery (food security)
- 4) Cultural and celebrations

The Mekong is nature's supermarket, river provides food and sustenance to not only those who live on its banks but also far away.

Tonle Sap, Cambodia: Expands 10 times its size during the wet season compared to the dry season providing a birthing ground for fish in the flooded forests.

Today: ecological balance is crucial. Overfishing means smaller fish and even baby fish that cannot reach maturity

Problems of fish farms: requires quite a lot of capital to set up farms. Pesticide and antibiotic uses also create a lot of problems. Introduction of other fish species changes the balance, some are predators compared to others.

Asian Development Bank: Has a GMS program (Greater Mekong Subregion) looking at regional integration at a gov't to gov't level.

Some problems – ADB has prescribed to a hydropower development model for economic growth in the region. They came up with this after hiring a consultancy called Norconsult to do a program. Problem: the firm is a hydropower development company = conflict of interest.

Trends:

- 1) Increasing role of the private sector through BOT model (Build, operate, transfer) – comes into conflict with other agendas. Once transferred the technology is also old.
- 2) Becomes a commodity rather than a public good.
- 3) Private partnership: government as a regulator. Transfers all risks to gov't, while ensuring profits for the companies through various power purchase agreements that guarantee a certain price level.
- 4) Money is also crossing borders through private institutions that have few safeguards.
- 5) Projects are more towards large development rather than what people want.

There are many players in development projects, especially from financiers to civil society, public, government, bilateral and multilateral organizations.

Most money from dam projects don't stay in the country either – it is exported out (like in Burma and Laos).

In VN there is less hydropower now as Typhoon Ketsana showed the system's vulnerability.

In China, projects on the Nu river have been halted due to local opposition, impact on World Heritage site.

### **Dr. Decharut (Thailand and Health Impact Assessments)**

Health was considered for the first time in policy making after the Ottawa Charter. The idea is that a healthy public is vital in planning and in order to do this you need to use a health impact assessment.

Method:

- 1) Environmental impact assessments (EIAS) were used initially (before projects are approved). These are project oriented with people looking at how to mitigate negative affects. People looked at the costs, options/alternatives. (The studies were conducted by investors)
- 2) In Thailand, there is an expert committee that can look at the EIA and comment, but cannot say no. In this, case, EIA began to broaden into biomedical models of health.

- 3) Health Policy moved further still towards looking at things in socio-environmental models, look at health determinants in a wider scope (including social, cultural, and environmental determinants)
- 4) HIA in Thailand during the last 6 years.
  - a. The HIA during this time developed into a Health Policy Plan. The new plan allowed the public to ask for an HIA as needed and created space for public participation
  - b. Also included Sec. 67 in constitution that stipulated a need to have environmental and health assessment prior to any project with serious impact and required the development of an independent body to comment on HIAs submitted in addition to an expert committee.
    - i. Health act tested, people have demanded that an HIA/EIA be conducted for certain projects
    - ii. Ma Ta Phut (economic zone in Rayong Thailand) also tested the system. Locals sued the gov't using Sec. 67 in administrative court which led to closure of projects. Forced gov't to set up independent body to comment on HIA/EIA.
  - c. Process of HIA and EIA review (by independent body) is made in an open setting, and attended by ministries and decision making body.
  - d. Approval of EIA moves project along, not an ok for whole project.

Comments: Thailand is proposing at ASEAN level a similar HIA/EIA system

Vietnam: the EIA system was recently changed. Smaller scale projects are up to the decision of the provincial authority as to whether they need to complete an EIA or not.

Pak Mun Dam example: Scandal is that World Bank who funded and supported the project insisted that there would be no negative impacts. Amount paid for compensation doubled over time. Has great affect on fish migration.

Dr. Decharut used a community level process for HIA (more info in slides). In analyzing people's incomes before and after dams, he found that people's household debt grew following the building of dams, as people took out money to complete projects.

#### **National level policy action:**

In using impact assessments at the national level, Dr. Decharut has tried to use economic and monetary terms to approach policymakers. Analysis was made by placing renewable and traditional technologies side by side for evaluation.

Some studies used to compare technologies:

- 1) Chronic mortality rate
- 2) Extern-E approach (external costs of all energy – to calculate the costs)

- 3) Eco-Indicator – disability adjusted for life years. Example: normal life expectancy is usually 70 years. If people pass away at 67, then they have lost 3 years. Also, if individuals do not pass away but instead live with a disability for many number of years, these are also disability adjusted years.
  - 4) Looking just at costs: in comparison, renewables are 5.2% cheaper.
    - a. They have an 8.7% lower import burden
    - b. Lead to an increase of 2.7% in GDP
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**Wednesday, May 19<sup>th</sup>, 2010**

- 1) Visit to Solartron – overall production capacity is 30 MW a year. Works mainly at downstream stage of module assembly.
  - a. Main areas of work: Solar water pumping, grid connection system, home, road lighting, telecom, hybrid power.
  - b. Part of Solar home project, connecting 200,000 Thai homes to the grid.
  - c. Solar wafer are imported from Germany.
  - d. Development process: feasibility (finance, energy production, preliminary assessment), engineering and design, logistics.
    - i. Works with Grundfos – solar water heater technology. Import from China.
    - ii. Demonstrations: Solar Pumping, street light, rural house, solar heater

**Mapping Project For Each Country**

**Thailand:** Majority of Thailand's power generation comes from gas and coal

- A. Thailand imports electricity from Laos and is also planning on importing electricity through hydropower dams from Burma. It already imports gas from Burma.
- B. Also exports a small amount of electricity to Cambodia
- C. Problems in the country:
  - a. Cycle of overinvestment
  - b. Over growth, overconsumption
  - c. Tariff rates passed on to consumers

- d. Migrant worker
- e. Issues of security – Yadhana pipeline through Burma
- f. Conflict of Interest

D. Flow of money and investments going into neighboring countries as well

**China:** Western China has Oil, gas, wind, and solar. North and Central: Coal; Tibet: Solar; East Coast: Nuclear; South and Central: Hydro. To China's East, offshore wind capacity is planned for 10,000,000 KW while gas will be imported through Burma. There are also plans to build a pipeline from Russia and Central Asia.

Consumption patterns are highest along the Eastern Sea board due to both factory and family use. Overall domestic consumption continues to rise.

Upcoming government plan is to build a smartgrid that allows for transmission of electricity from the West (energy supplies) to the East (to the economic hub).

Policy: Plans are for the closing of old and small CFPP over the next years.

- Yunnan province: hydropower construction on the Mekong (Lancang) and Nu Rivers.
- Gas from Burma is also directed to Kunming

**Burma:** reserves of coal, hydro, natural gas as well as hydropower potential. Most of this is used for export to Thailand, China, India either as raw products or in the case of hydropower, for electricity.

Problems: Individuals pay a double price for the goods, electricity is sold to China and then bought again for use in country.

2 natural gas offshore fields: Yadana (Thailand) and Shwe gas field (China and India split use)

China is building gaslines to transport energy products directly to Kunming without passing through Malacca straits

Internal politics: 2 major ministries deal with energy and compete against each other. Most of energy reserves found in ethnic minority areas and unstable areas.

Even with rich resources, only 5% of Burma has access to electricity.

**Laos:**

8 existing dams – in BOT (build operate transfer model) whose electricity is exported to Thailand and VN. Also exports to China for re-import into Laos at much higher price. Currently electrification is about 6-8% with a target of 90% rural electrification.

A Coal Fired Power Plan project also exists in Xayaburi (plans are also underway for a large hydropower project).

VN companies among largest investors into Laos

### **Cambodia:**

There is some hydropower in the country, usually small scale for local use.

Future plans: also move into electricity export (Sesan II to Vietnam). Other projects being built to regulate waters from dam building.

Coal Fired Power Plants are also being built in Sihanoukville. Coal for plant is being imported from Indonesia for these projects.

China Southern Grid is main investor building these power plants. China Southern has faced opposition in their power plant projects within China, so most of their investments are in Cambodia and Laos.

### **VN:**

Coal found in North, and some in the Mekong Delta.

Hydropower (red River, Central)

Offshore (gas and oil reserves)

Central VN also has small CFPP.

A national grid connects Northern and South for electricity use. (Hanoi's consumption is mainly by households while HCMC is for industries and factories)

Current coal is running low and will eventually need imports from Indonesia and Australia.

Oil is also exported and then imported after being refined.

Nuclear power plans: currently 2 first, later 16 total reactors for 20,000 MW. Also looking at increasing wind and solar in Central Vietnam, while large dams are still being completed (Son La)

### **Regionally:**

ASEAN and ADB are both planning on building power grids throughout the region connecting countries through electricity, gas pipeline and other infrastructure projects. Some important issues still need to be resolved including the overlapping claims area between Cambodia and Thailand and China & Southeast Asia.

Risks for the region:

- 1) Social conflicts

- 2) Security risks
- 3) Ecological problems
- 4) Paradigm shifts
- 5) How to get actors to change course
- 6) Econ development causing problems for planet and people. Planning done for short term benefits over long term progress in a finite resource world.

In this scenario who wins: Government and companies

Losers: smaller countries, grassroots, communities.

Hope:

- 1) Build more equal system with systemic changes
- 2) Cooperate, work together to highlight problems
- 3) Better government with social accountability.

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***Thursday, May 20<sup>th</sup>, 2010***

Morning:

- 1) Review of previous day
  - a. Issue of energy imbalances/trade, changes in one country will affect changes in another country.
  - b. There needs to be a paradigm shift in understanding how to deliver development.
    - i. A shift in basic concept, context of how issues are understood
    - ii. Needs to shift in movement from upper level to lower level.
    - iii. Underlying assumptions needs to change and shift.
    - iv. Development concept needs to change from mainstream dominant view.
- 2) Session 2: Background, profile of electricity system in each of the countries.
  - a. Objectives: To understand basic power sector systems and players in Southeast Asia
  - b. Questions:
    - i. Identify consumption pattern, who consumes what amount of electricity
    - ii. What is the energy mix
    - iii. Who are the main actors/players
    - iv. What is the country's future plan

## Country Profiles

Country	Consumption Pattern	Current Energy Mix	Main Players	Future Plans
Burma	Industries controlled by government, including: defense industries. Residential consumption predominantly in Rangoon, however only about 5.7 million have access to electricity	Hydropower: 62.3%, Gas: 12%, Coal: 3.7%, Bio-Fuel 10.3%, Oil and Petroleum - 12%, Total installed Capacity: 1750 MW	Military Junta controls entire sector. Mainly: Ministry of Defense, Ministry of Electric Power (Responsible for generation, transmission and distribution), Ministry of Energy, Ministry of National Planning, Myanmar Export Bank, Ministry of Science and Technology, Agriculture and Irrigation.	Continued development of hydropower, gas pipelines for export to neighboring countries
Cambodia	Peak demand reached 487.4 MW. Residential: 39.2%, Commercial: 33.3%, Industrial: 17.5%, Government: 9.2%.	Diesel: 95%, Hydro: 3.5%, Biomass: .5%, Coal: 1%	<b>Electricity Authority of Cambodia:</b> sets tariffs, licenses, reviews, plans investment. <b>Ministry of Industry, Mines, and Energy:</b> does overall planning. Four subgroups exist under this plan: <b>Public Electricity utility, Independent Power Producer, Private Electricity Companies, and Electricity du Cambodge.</b> PEC and IPP produce most of Cambodia's energy, EDC only produces a small amount of electricity (348MW).	Typified by lack of central grid, hence future plans for greater transmission lines. Increase hydropower production.

China	Industry: 76.6%, Residential: 11%, Agriculture: 2%, Import: 14%. Expected import of .1 billion tons of coal.		<p><b>State Council:</b> approves largest projects such as Three Gorges Dam. NDRC: Does central planning every 5 years. <b>State Regulatory Commission:</b> has less power than the NDRC. Also has some powers at provincial level. Will have more power after reform of the system.</p> <p><b>National Energy Commission:</b> Is the policy maker - national energy department, plays policy maker, regulator, and executive. Structure of electricity generation.</p> <p><b>Generation:</b> through 5 state owned companies - Hua Heng, Hua Dien, Da Tang, China Power Investment, Guo Dian. <b>Transmission and Distribution currently under two companies:</b> State Grid and China Southern Power Grid. Local distributors under two grid companies. The two grids serve two parts of China.</p>	Fossil fuels: 85%, non fossil: 15%. Hydro and wind growing rapidly. Non hydro renewable is 3%. 20 nuclear power plants also under construction
Thailand	Industry: 44%, Business & Service: 24.2%, Resident: 22.47%, Agriculture: 0.23%, Total: 134,792.86 GWh	Natural Gas: 72.%, Coal: 8.4%, Hydropower: 4.7%, Lignite: 11%, Renewable Energy: 14%, Import from Laos: 1.6%	Ministry of Energy and EGAT do planning. <b>Generation;</b> EGAT, IPPS (Including VSPPs and SPPs) EGAT is single buyer and owns transmission system. <b>Two distribution companies:</b> PEA and MEA to final end users. Overall regulator overseas system	Increases in imports from neighboring countries, coal plants, gas plants, and 4 nuclear plants(4000 MW). Smaller increases in SPPs, VSPPs, and DSM.
Vietnam	Industry: 50.6%, Residential: 40.1%, Commercial and Services: 4.6%, Agriculture: 0.9%, Other: 3.7%. Peaked: 13,900 MW in November, 2009	Total: 17,000 MW, Hydropower: 36%, IPP & Other: 29%, CCGT (Combined Cycle Gas Turbine): 18.5%, Coal: 10.5%, Fuel Oil & Diesel Oil: 5.9%	Policymaking set by <b>Ministry of Industry and Trade, Institute of Energy</b> provides consultation, <b>Electricity Regulation Authority of Vietnam</b> also consults. Government of Vietnam decides on overall plan. Generation by <b>Electricity of Vietnam</b> and Independent Power producers. Transmission and Generation by EVN.	Power Development Plans assume growth of at least 11% per year from 2011 - 2025. Increased Role of Renewable energy to 8%, energy efficiency to 8% of PDP. Nuclear will become central part of plans.

Finland	Total: 87.2 TWh (2008). Housing and Ag: 26%, Services & construction: 20%, Losses: 3%, Forest Industry: 28%, Chemical Industry: 8%, Metal Industry: 9%, Other Industry: 6%.	Nuclear: 25.3%, Cogenerational (district heat): 16.7%, Cogenerational (industry): 13.6%, Imports: 14.6%, Hydropower: 19.4%. Wind: 0.3%.	Ministry of Economy and Employment and Cabinet Ministry on Climate Change and energy. EU, Government, Regulator (Energy Market Authority), Finland, FORTUM, TVO	Nuclear. Continued electricity trade between Nordic countries and EU
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### What do people learn?

- 1) Projected energy consumption is still upwards, population is growing, even though renewable energy grows, it is still below 25%, amount of renewable.
- 2) Profile of 7 countries – how would you group them together

### Visioning exercise: Main Goals for your Environment and Energy System with Indicators

- 1) Community based scale
- 2) Clean environment
  - a. Look at Waste water (indicator)
  - b. CO<sub>2</sub>, NO<sub>2</sub>, So<sub>2</sub> emissions (indicator)
- 3) Local Production and consumption
  - a. Local employment (indicator)
  - b. Distances from sources (indicator)
- 4) Peace, Justice and Equity
  - a. Gini coefficient applied to a country and in the region (indicator)
- 5) Provision of basic needs, physical comfort
- 6) Appropriate use of resources
  - a. Indicators: Less Waste (indicator)
  - b. Footprints (indicator)
- 7) Decreasing exploitation
  - a. Displacement (indicator)
  - b. Forced relocation (indicator)
  - c. Numbers whose livelihoods are affected (indicator)
- 8) Green future

### Government objectives:

- 1) Poverty reduction
- 2) Growth
- 3) Energy Balance
- 4) Employment
- 5) Basic Services (access to electricity)
- 6) Energy security

- 7) Revenues
- 8) Image/reputation
- 9) Affordability of energy sources
- 10) Social stability

**Friday, May 21, 2010**

**Basics of Energy Planning**

To meet the growth in consumption and demand, governments have the choice of picking certain technologies (energy mix) based on different scenarios.

*Increasing installed capacity:* Peak demand, reserve margin, installed capacity. Usually in government planning, installed capacity equals = base load plus a reserve margin (standard of 15%, Thailand is always higher at 25%). A higher reserve margin allows for greater construction of power plants.

*One energy resource example:* Integrated Gassification Combined Cycle turns coal into gas to generate electricity. (higher efficiency, but more expensive)

*Discussion:* It is important to increase consumer awareness so that individuals can influence policy makers and their energy choices (example: Seattle citizens are much more environmentally conscious, so more renewable energy and energy efficiency projects). This is also due to the electricity system that is out of the hand of gov'ts.

**Comparisons of different energy resources (Please see attached Excel File)**

**A Closer Examination of Energy Sources**

Centralized and Decentralization (distributed) power sector resources – the closer the distance between where electricity is produced and consumed, the less loss there is from transmission lines. Distributed energy where generation is closer to where it is consumed leads to less loss. Bigger (economies of scale) does not always equal better.

Typically, costs between technologies only consider generation costs, without transmission costs and other infrastructure that is needed. These extra costs (such as transmission), are not needed if power is produced at local levels. (decentralized generation).

Planning of energy systems in developing countries is usually based on the utilities point of view, not the publics.

*Supply Options (chart, dsm, spp, vspp, gas cc, coal, nuclear)*

Supply options	Cost estimate (Baht/kWh)
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	Generation	Transmission <sup>1</sup>	Distribution <sup>2</sup>	CO <sub>2</sub> <sup>3</sup>	Other envi impacts <sup>4</sup>	Social impacts	Total
DSM	0.50 – 1.50 <sup>5</sup>	-	-	-	-	-	0.50 -1.50
SPP cogeneration (PES > 10%)	2.60 <sup>6</sup>	-	0.44	0.08	0.71	-	3.83
VSPP (Renewable)	Bulk supply tariff (~ 3) + Adder (0.3 – 8)	-	0.44	-	0 – 0.63	0 – low	3.3 – 11.0
gas CC	2.25 <sup>7</sup>	0.37	0.44	0.09	0.79	low – medium	3.93
Coal	2.11 <sup>7</sup>	0.37	0.44	0.15	2.76	High	5.82
Nuclear	2.08 <sup>7</sup>	0.37	0.44	-	0.15 + 1.00 <sup>8</sup>	High – very high	4.04

## Energy Planning

What do we need? (how to look at this need differently?)

When do we need it?

Where do we get it from?

Electricity for fundamental services is vital.

Power sector planning is currently based only on economic growth numbers and projected into the future. In Thailand has always been an overprojection of electricity needs.

Demand forecast:

- 1) Fictional (we want to move away from this)
- 2) Move towards providing for basic needs
- 3) Inefficient consumption (we want to move away we want to move away from this)
- 4) Demand inconsistent with vision or finite world (we want to move away from this mode)
- 5) Productive, efficient economic activities consistent with finite world

*How to look at efficiency (energy intensity)* – ratio between economic growth and amount of energy needed for 1 unit of economic growth. Ideally, the ratio should be close to 1, or below one, meaning you use energy efficiently for economic growth. Examples: in VN about 2 to 1, or two units of energy are needed for 1 unit of growth. In Thailand, ratio is also increasing. China: has set a reduction rate of 45% in energy intensity, promoting a more efficient energy system.

In Thailand, government is still supporting industries that are highly inefficient, - high energy use, little economic use. China is threatening to shut down industries that have high energy use and little economic growth.

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**Saturday, May 22, 2010**

Power Sector System (Actors and Relationships) – Electricity Industry:

Changing for different reasons:

- 1) Tech advances
- 2) Financial/management crisis/inadequate investment (b4 was state, moving into private financiers)- VN
- 3) Public opposition
- 4) Consumer demand for lower costs, better service
- 5) Political reasons – VN, China
- 6) WTO commitments (International force)

Industrial reforms – market reforms to break down monopoly. Why? Central government planning not as successful, market may be more efficient.

Regulator as an entity for a more transparent system, more fair.

### **Deregulation and Restructuring**

Monopoly – free market structure, but there are many steps, giving more rights and privileges to more players over time.

- Politics and security are more of an issue in the electricity system.

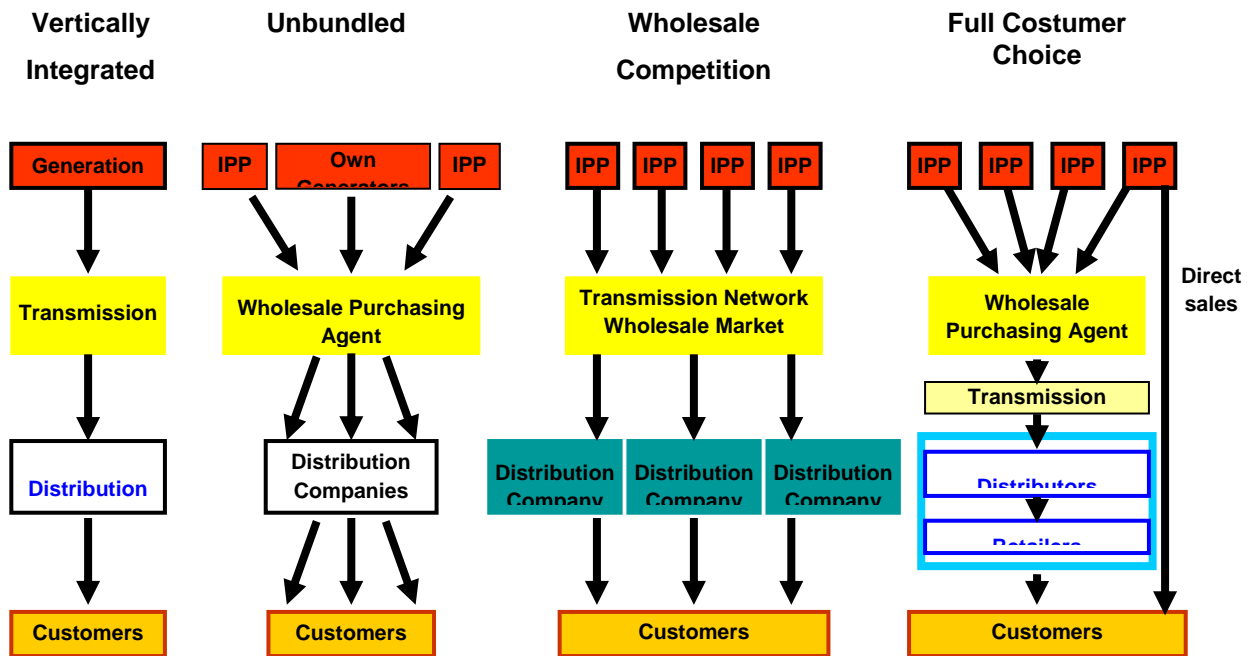
Deregulation and unbundling

Restructuring Theory/Objectives:

- 1) Raise capital
- 2) Improve regulation
- 3) Eliminate government/investor conflict of interest
- 4) Boost economic efficiency
- 5) Lower rates and improve service
- 6) Give producers and consumers competitive choices

Industry schemes presented:

- 1) Vertically integrated models
- 2) Unbundled – Single Buyer Model
- 3) Wholesale competition
- 4) Full customer choice



Take or pay in unbundled – single buyer model – to cover fixed costs for ipps

- 1) Centralized planning and operation
- 2) Transmission centrally owned/operated by central utility.
- 3) Problems small consumers, government still conflicted as owner/regulator. Central utility can still shut out competitors.

VN: Different at distribution/retail level. Single buyer model implementation is currently delayed

China: Middle and Western china (direct customers) from power producer

**Group Discussion Questions:**

- 1) What is good/bad about existing power industry structure?
- 2) What changes you want to see to serve your vision?
- 3) How to improve transparency, accountability & participation in the energy system?
- 4) What's your role in influencing the changes?

**Group feedback:**

Group 1

*Problems:*

Cambodia: decentralized but high price

Finland: strong independent regulator, choice, market. Too much nuclear (not necessarily good)

Burma: not enough power, only military/elite, not public. Good: gov't look at diff forms of power for generation

Thailand: System leaves room for corruption

VN: Transmission and distribution good. Quality of service is low – no competition, no innovation.

*Changes you want to see:*

Cambodia – access to electricity, regulator independence

Finland – paradigm shift on nuclear, more decentralized power systems

Burma: remove control of utilities from gov't

Thailand: more competition

VN: Indep regulator. More organizations to advise to gov't besides IE, more competition in transmission and distribution.

*How to improve:*

Cambodia – open info policymaking. Revenue for public service. Microhydro increase

Finland: more public awareness on nuke power. More info on alternative power

Public awareness (Burma and Thailand – public participation in more meaningful way)

VN: civil society empowered to get into power sector policymaking

*Your Role:*

Cambodia: more EIA

Finland, more involved in Mekong

Burma: more awareness

Thailand: collaboration amongst NGOs

Raising public awareness and law enforcement is important (VN)

### Group 2:

VN: More efficient system. Financing problems, prices are low, no encouragement for investment for IPPs. Improve energy price, more energy efficiency. Separate transmission and distribution.

Burma: Electricity shortage and high prices. Need a revolution. Price high – more power that serves the people.

Cambodia: Electricity shortage and high prices are problems. Increasing hydropower, including small hydropower

Laos: Electricity shortage and high prices are problems. More hydropower may help.

China: Separate transmission and distribution. National grid too powerful, separating this can be more competitive. More decentralization in system to compete with national grid

### Group 3:

VN: energy is basic need, have right to access. Better policy from gov't for investment in renewable and clean energy.

Burma: Same problems of government. To help solve this, electricity should not be seen from perspective of profitability. .

China: More policy from gov't for more investment in renewable and cleaner energy

Thailand: Customer have right to access green energy, less destructive sources. More participation in transmission and distribution in energy structure

## **OVERALL FEEDBACK: NEED MORE RENEWABLE ENERGY**

### **Political Economy of the System**

Geopolitics of SEA and Mekong region –

US influences in the region has shifted to Japanese and other large economies in the region (Asian Tigers, China, Taiwan, S. Korea, etc).

Regional Integration: Mainstream SEA – trans ASEAN gas pipeline and infrastructure projects in the region are being promoted by ASEAN. However, if there ever was an ASEAN power grid on top of single buyer national system, how do you ensure equal access, use of resources, operator for system?

### **Roles of IFIs and ODA for regional economic integration:**

These organizations take prominent roles in the: Physical infrastructure, political infrastructure, economic infrastructure of developing countries.

Private right system over common goods system leads to commoditization of goods, ownership over water usage, regime of the ecosystem .

The poorest/voiceless are usually excluded.

**Basic Steps to build a power plant:**

National energy policy leads to a PDP (national and regional development plans) → pre -Feasibility studies → MOU → feasibility studies (EIA, etc) → Project Development Agreement/bidding (concession and PPA) → Approval, construction and operation. Based on an English Law model.

Voting Rights at International Financial Institutions (skewed to big economies, voted through board of directors) – Asia Development Bank

Governance issues of IFIs. Why do large economies such as the US have more of a say in development in Asia?

**National Level interest (Thailand, case study):**

In 2008: Thailand Peak Demand was about 22,568 while installed cap was 30,305. Who's paying for and why? Why continual over demand?

Energy companies that gain from PDPs gain (Stock market prices rose)

Cycle of over-investment – utilities profits and benefits – costs passed onto consumers. Transparency in the tariff structure is not clear. “cost-plus” issue passes costs onto consumers.

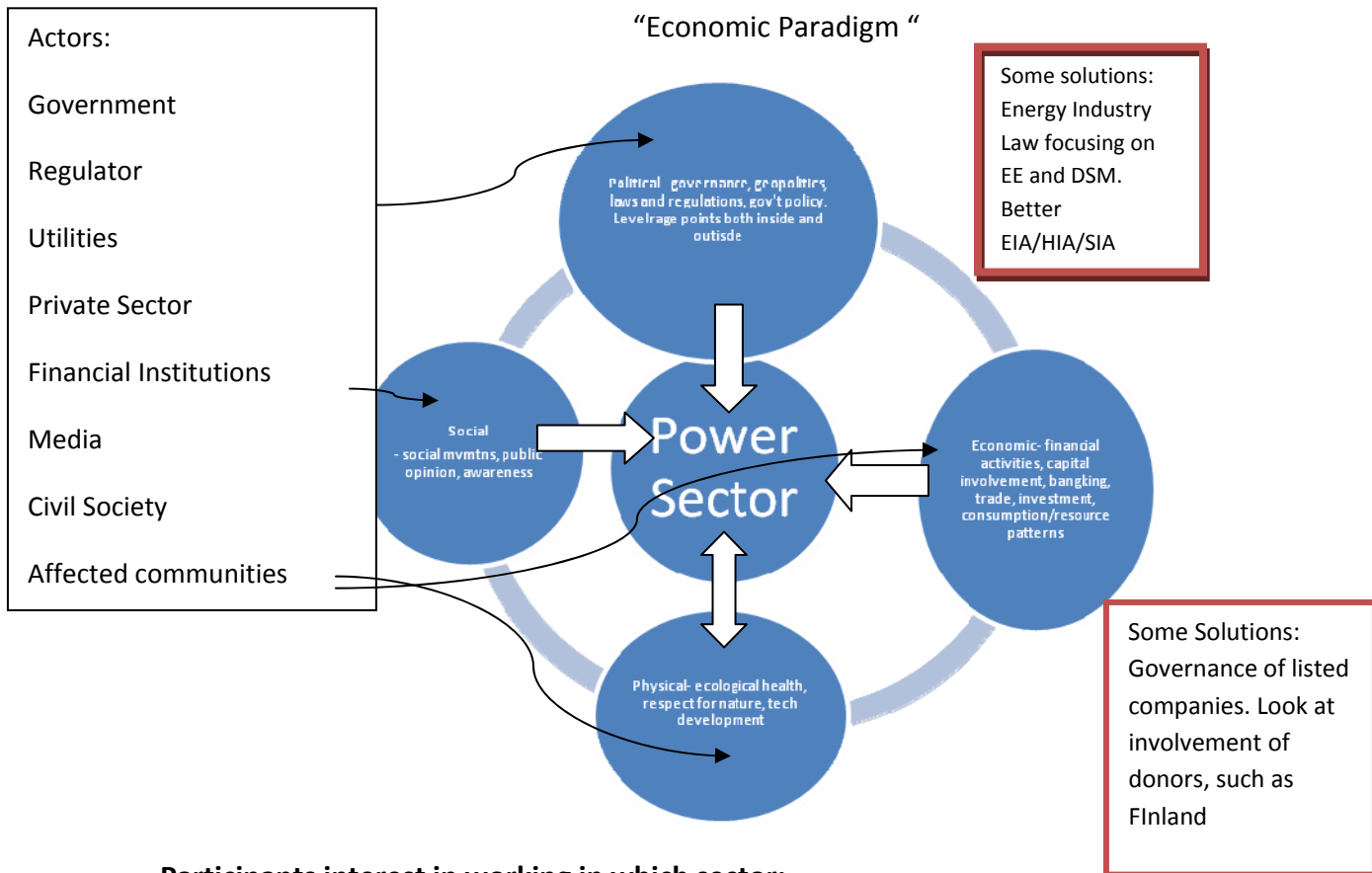
People who lose: air pollution and loss of livelihoods

**Energy Ashram Demonstrations:**

- 1) Learned about charcoal making that also makes wood vinegar for pesticide use and improving soil conditions. Charcoal making is at the center of the ashram's design.
  - 2) Also learned about biogas and organic farming
-

May 23, 2010

Analysis and solutions of power sector:



**Participants interest in working in which sector:**

**Actors:**

Thao (Media through documentary on Son La hydropower plant)

Ah Nan (Civil society)

Chankhe & Narith (Affected Communities)

Wang (civil society and media)

Oliver (International actors)

**Social:**

Taew (Social Movements)

Sony, Chankhe, Narith, Oliver, Thang, Minh (Raising awareness in different spheres including with affected communities, international actors, and youth)

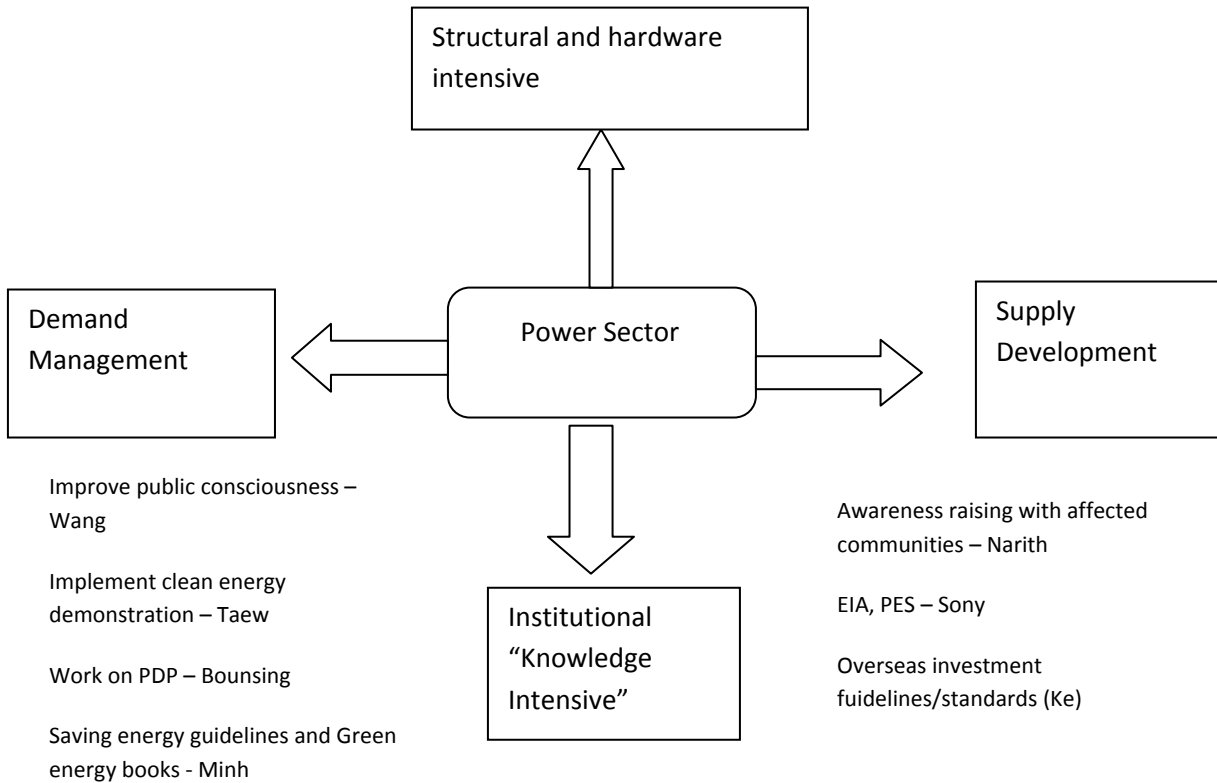
**Physical:**

Sony, Ke, Ah Nan to work on respect for nature

**Economic:**

Dung and M. Thao (Consumption and resource pattern change)

**Matrix of Power Sector:**



**Factors Influencing the Power Sector**

Today, financial activities are becoming more important in the total economic sphere. Investments and movement in capital are large portions in the GDP.

**Problems with the Power Sector**

Cost Plus structure = costs of projects + profits, passed onto consumers to pay.

In places with subsidies, gov’t bears burden and taxpayers bear costs of building new plants.

**Cost Structure and Consumers**

Incentive structure for utilities:

- Financial criteria links investments to profits
- Utilities guaranteed profits through power purchase agreements
- ROIC: Return on Invested Capital means: the more invest, the more profits)
- ROIC = net profit after tax/invested capital
- EGAT: 8.4%, MEA and PEA: 4.8%
- No common sense involved, technically usually if there is too much surplus and not enough demand, then profits go down. In this system, it doesn't happen. more investment = more profit.
- Costs involved in more investment is just passed onto consumers.

<b>ROIC</b> = $\frac{\text{Net profit after tax}}{\text{Invested capital}}$	
EGAT	8.4%
MEA	} 4.8%
PEA	

In Thailand, cost plus regime began when Gov't was deciding to privatize EGAT. The number of 8.4% guarantees a set amount for investors.

How are policymakers and those in electricity sector influenced by each other – what is the governance issue?

Conflicts of interest: Policy vs. Business –Bureaucrats from ministries also sit on Board of Directors of companies at same time. State and private distinctions are not clear.

Bureaucrats can wear both hats. This does not apply to elected officials.

Regulators – cannot hold both positions, but can have revolving door.

Conflict of interest: Ministry of Finance – EGAT – Ratchaburi. EGAT holds monopoly power – passes costs onto consumers. Ratchaburi has no incentive to save on costs, they know that EGAT will take care of costs, buy power produced.

**SOLUTIONS (Where to work, how to influence)**

Outcome of problems:

<b>Negative:</b> Waste, inefficiencies, expensive cost of service	<b>Positive</b> Energy security
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Inadequate access to service	Industrial activities
Resource depletion	Economic development
Social, health, eco impacts	Cheap cost of energy
Threats to food security	Profits
Injustice	National champion (growth of the state, prestige of country – china investments into Africa)
Conflicts	(Investors, utilities, developers, politicians, financiers, upper class)
Unhappiness	
Corruption	Both parties: consumers, investors, developers
Entrenched framework	
(Affected communities, low income, marginal groups )	

Solutions need to target different sectors including: consumers, politicians, and utilities.

Civil society's role is to increase participation in phases 1 and 2 (utilities and politicians in terms of policy changes). Consumers – changing lifestyle.

### **Group Discussion, how to do so?**

#### *Policymakers*

Thao Nguyen - How to change policy? Some past examples include: working on an efficiency law, finding manners to influence laws. Introducing themes learned into Son La Hydropower project documentary.

Oum Sony – Working on EIA reports to influence the Ministry of Environment, working with Royal University – Phnom Penh. This leads to an increase in gov't awareness. Help gov't officials to develop guidelines on EIA process. Networking with NGOs

Ke Cao – Working with government for system service relations, to offset negative impacts of hydropower. Trying to work towards internalizing costs.

- Moving towards promotion of RE in laws in consumption. Promotion of alternative energy and policy to support these ideas.
- Talks with utilities/policymakers.

Wang Ying Chun – Influence through media and newspaper that can influence NDRC.

#### *Civil society role*

Thao – sustainable energy service for consumers, choice for green energy. More awareness raising with urban and rural consumer, to make them more aware of energy choices.

Ah Nan – working with affected people in Burma on social and environmental projects. Awareness raising with them.

Taew – awareness raising for youth in green energy for family. Policy level to affect clean energy and efficiency (with others in Greenpeace). Educational curriculum in schools.

Thang – How to influence the planning process by looking at policies related to pricing and costs. Possibility: Establish inspection panel to oversee operations and functioning of utilities. In VN – can try to develop an independent panel to oversee/study power sector in the country.

Minh – grassroots level with people – promotion knowledge about energy saving and energy efficiency. Raising awareness rather than changing behavior.

Oliver – How do you work on international actors to influence their behavior.

Bouncing – researching on national PDPs. If can work on this, can affect issues on the lower level.

### **Possible solutions to problems identified:**

1) To address entry point for renewable energy and small power producers: establish VSPP regulations

A) Thailand net metering project: Thailand has a number of VSPP projects established before the grid reached all users, in the 1990s, as the grid was reaching them question arose of what to do with existing projects. (30 KW microhydro projects, other)

Problem: PEA does not allow for 2 systems – grid plus microhydro. (microhydro limited, not as reliable as grid system.)

Introduce VSPP regulations in 2002: during an opportune time. Initially 1 MW, renewables only.

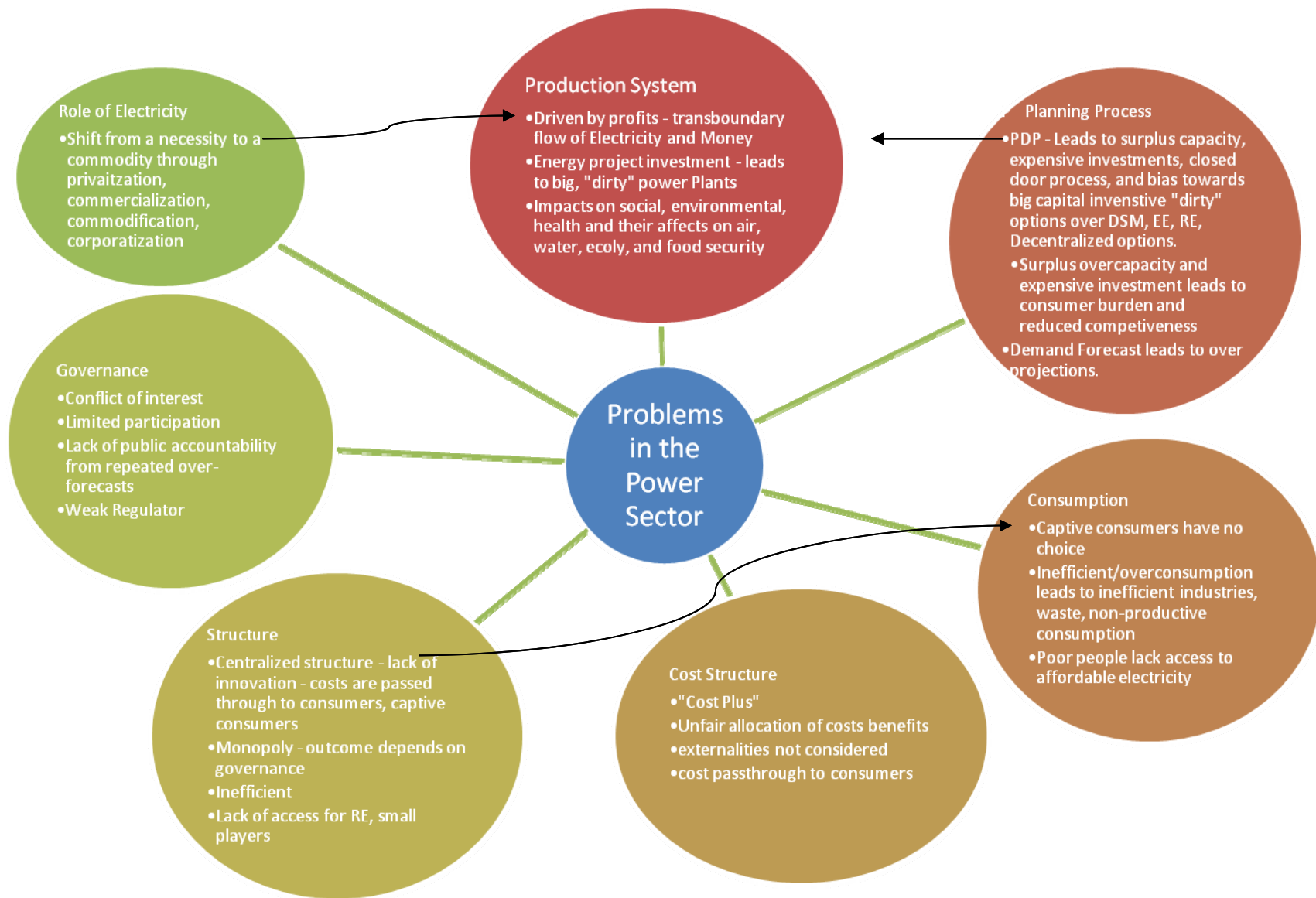
Once regulations passed, brought utilities to US to learn of examples from American utilities.

In 2006 – increase to 10 MW, both renewable and cogeneration. Also feed-in tariff (adder) along with net metering. If greater than 1 MW, utility pays only 98% of energy.

B) GET- Fit Energy – transfer of funds from developed to developing countries for feed-in tariff as a mechanism for renewable energies.

2) To address the different governance problems: Electricity Governance (EGI toolkit) helps to identify and benchmark best practices.

3) There needs to be an identification of low hanging fruit. Depending on who you know in the system, introduce concepts to them.



## Possible Solutions to Problems and MEE Net Participant Identified Interests

### **Governance Sector:**

Improvements in the process and independent regulator (World Resource Institute has an Electricity Governance Initiative). **Thao Nguyen expressed interest**

### **Role of electricity:**

Need research into the area. In Thailand a lawsuit was used to reverse privatization.

### **Production System:**

Implementation of green energy and promotion of alternative energy options such as microhydro

For impacts, you can introduce EIA, HIA, SEA (**Chan Khe, Sony, Ah Nan**)

Trainings for solar household system villagers

Research on the operation of utilities

### **Planning process:**

PDP – Can work on alternative PDP and Integrated resource planning. Need to introduce international best practices (**Bounsing**)

For Consumer burden: can work with consumer groups

Demand forecast: Can work on critiques and review, research, and analysis. (**Thang VN**)

Research in EE and DSM (**A. Dung and M. Thao**)

### **Consumption:**

To live a simpler lifestyle, introduce more choice so consumers are not held captive (**Duc Minh**)

### **Cost Structure:**

Introduce performance-based regulation,

Conduct a tariff review study

Externalities of costs – can look at payment for eco-services (**Ke Cao and Sony**)

### **Structure:**

Sector Reform

International best practices

Net metering law, VSPP promotion, feed in tariffs **(Ke Cao and Wang would like to work with lack of access for Renewable Energy and Small Players)**

Unbundling of generation and transmission

**Grenzone Visit:**

- 1) Has been working on Sustainable Project for Education, Renewable Energy and the Environment to provide energy resources to rural households.
- 2) Saw demonstrations of a solar water softening system, charcoal making, solar water filtration, solar groundwater pump, solar panel that produces up to 3.0 KW. The 3.0 kw panel is a VSPP that earns Grenzone about 14,000 baht/month.

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**24<sup>th</sup> May, 2010**

EGAT and Lam Ta Khong (Khun Napaporn, Director for Demand Side Management)

Main points:

1) EGAT works on DSM. Program started in 1993.

DSM: changing manner of use through energy savings programs or load management program to move consumption off of peak hours.

In 2010, peak load reached 24,000 MW, a rise of 9%.

2) Most of EGAT's work now is with residential consumers rather than commercial due to financial obligations involved. The Department of Alternative Energy Development and Efficiency under the Ministry of Energy is the main policy and implementer for commercial side DSM and EE.

3) EGAT cycle of for DSM includes: looking at potentials – designing DSM plan – Program design = program implementation – program evaluation – load analysis.

4) It deals with significant endogenous factors related to market fluctuations, this makes their work much more trying.

5) Today the DSM department budget comes from EGAT's budget and an Energy Conservation Fund.

6) Strategies include: market transformation, customer-oriented program design, public-private sector partnership, and attitude creation. In next 5 years, the focus will continue to be on phasing out incandescent lightbulbs in favor of CFLs (T5)

7) In total, DSM has been able to replace production with savings of 1,893 MW, costs of doing this is less than half of what usual generation costs.

8) In most cases, may be better to undertake DSM programs at the distribution rather than generation and transmission levels.

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**25 and 26<sup>th</sup> May, 2010**

**Follow-up assignment and Networking**

Option 1: Assist with P'Chom's research project:

Ke Cao, Oliver (Finish/Nordic perspective if wanted), Taew, Thang, A. Dung, M. Thao, Ah Nan, Zarni, Chankhe, Narith, Sony

Option 2: Individual project:

1. Minh - video conference in Mekong region with students
2. Wang – article on workshop for news/media sources,
3. Thao - script on Son La Hydropower project will include themes and lessons from MEE Net Workshop

Option 3: Still deciding: Bouncing and Oliver

Option 4: Help develop MEE Net website

Ke Cao, Wa

**Towards Ecological Recovery and Regional Alliance:**

Introduced concepts of networking. Main message: To work together in the region, improve local capacities to work on politically sensitive issues related to resource management. Empowering civil societies throughout the region to challenge conventional government thinking.

**Dr. Ludovic Lacrosse (Energy & Environment Partnership Program)** – Explained the program in terms of transfer of technologies between the Nordic countries and Mekong countries (Thailand, Vietnam, Cambodia, and Laos). Target is rural poor, ethnic minorities, women to increase investment in technology on renewable energies and energy efficiency.