Know Your Power
Towards a Participatory Approach for Sustainable Power Development in the Mekong Region

Conference Report
18-19 January 2012
Chulalongkorn University, Bangkok
Introduction

The Mekong region is undergoing a period of intense economic and social development as the economies in the region continue their rapid growth. Regional economic integration has become the dominant discourse through which this development is viewed and thus sets the decision-making framework within each country. The power sector is central to country and regional development; however, the complexity of the sector and the large number of actors present environmental, social and economic hurdles, accentuating regional differences. The paramount concern is that social and environmental impacts of the power sector within this rush towards integration may have been overlooked or only superficially examined. It is also believed that more financially and environmentally sustainable power alternatives have not been given adequate consideration.

The conference focused on investigating the current situation in the regional power context. Entitled ‘Know Your Power: Towards a Participatory Approach to Sustainable Power Development in the Mekong Region’, the conference examined the following aspects: power strategies and power sector planning in the countries throughout the Mekong region, alternatives to these strategies, issues related to the power sector, sources of finance for power projects, possibilities to enhance environmental sustainability and recommendations for future progress within the energy sector.

This report presents the main topics and issues discussed during the conference and comprise the opening speech and remarks together with a summary of each speaker’s presentation. The first chapter explores issues related to power generation and consumption and a potential solution to problems of over-projection of electricity demand in the Thai context, encompassed in Chuenchom Greacen’s presentation, Rethinking Thailand’s Power Development Plan. This is followed by two presentations from members of the Mekong Energy and Ecology Network team that examine some of the ramifications of power development plans and externalities of power projects in the Mekong region. Dr. Peter du Pont’s presentation examines energy efficiency as an ‘alternative fuel’ and the impacts this may have on reducing negative externalities of the power sector.

The second chapter presents a wider illustration of the power sectors in the countries of the Mekong region. It includes presentations on the power sectors in Myanmar, Lao PDR, Vietnam and China.
Chapter three analyses the potential of using Decentralised Renewable Energy (DRE) technologies to replace centralized power generation in the supply of electricity, particularly to remote rural communities. This chapter includes papers on the benefits of DRE technology, practical policies for encouraging decentralized electricity generation from the perspective of Thailand, and a study on off-grid potential in Laos. This chapter also has presentations covering DRE projects that have been implemented in Thailand, Myanmar and Laos.

Chapter four examines the financial influences within the energy sector. The first paper looks at the trends in energy finance by illustrating the role and objectives of institutions, such as the World Bank and the Clean Development Mechanism, in achieving a ‘triple objective’ of ensuring security of energy supply, reducing energy related poverty and reducing carbon emissions within the power sector. This is followed by a presentation that further explores the objectives of the World Bank in relation to financing energy projects and examines the Bank’s effort to promote rural electrification in Laos, through the Power to the Poor initiative. The final paper in this chapter analyses the ways in which private financial actors have influence upon the sector and can be influenced.

The final chapter comprises a summary of the last panel session of the conference. Seven panellists were invited to participate in this session, representing international organisations and academics who specialise in energy sector issues relating to the Mekong region. They were invited to give comments and recommendations on the issues discussed at the conference, which formed a conclusion to the proceedings.
Contents
Introduction.................................................................................. 1

Opening Speech
Associate Professor Dr. Sunait Chutintaranon
Chulalongkorn University ......................................................... 5

Opening Remarks
Witoon Permpongsacharoen Director
Mekong Energy and Ecology Network ................................. 6

Chapter One Power Sector Issues and Potential Solutions
Rethinking Thailand’s Power Development Plan
Cheunchom Greacen ................................................................. 9

Grid Centralization in Lao PDR – An Analysis of the Grid Centralization Plans in Lao PDR
Oliver Wastie ........................................................................ 24

Evidence of Negative Externalities from IPP Hydropower Projects: the Mekong and its tributaries
Tanwan Topoklang ................................................................. 27

Energy Efficiency, the First Fuel
Dr. Peter Du Pont ................................................................. 31

Chapter Two Country Power Sectors in the Mekong Region
Review of Electricity Demand Forecast in the Power Development Plan 7 in Vietnam
Dr. Nguyen Quoc Khanh ............................................................ 37

Development in Myanmar: Energy Security and Investment
Naw Ei Ei Minn ....................................................................... 42

Power Sector Development in Laos: Big Picture
Mattijs Smits ........................................................................ 46

Challenges of Social and Environmental Justice in Chinese Energy Development
Yu Yin ................................................................................... 54

Chapter Three Decentralised Renewable Energy Technology and Options
Supplying Power to Remote Villages in Laos – Role of Off Grid Technologies
Samuel Martin ................................................................. 59
<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transforming Cambodia’s Energy Policy: Fulfilling the Potential of Decentralised Energy Solutions</td>
<td>62</td>
</tr>
<tr>
<td>Practical Policies for Decentralized Electricity Generation</td>
<td>64</td>
</tr>
<tr>
<td>Community-Based Rural Electrification Through the Promotion of Safe Pico-Hydro</td>
<td>67</td>
</tr>
<tr>
<td>Rural Renewable Energy Revolving Fund (RRERF) Trial Project in Myanmar</td>
<td>69</td>
</tr>
<tr>
<td>Thailand Solar Home System Sustainability: Rural Renewable Energy Revolving Fund (RRERF) Trial Project in Myanmar</td>
<td>72</td>
</tr>
<tr>
<td>Chapter Four Financial Perspectives in the Energy Sector</td>
<td></td>
</tr>
<tr>
<td>Climate Objectives Shaping the Energy Agenda: A Case Study of the World Bank and Laos</td>
<td>76</td>
</tr>
<tr>
<td>GMS Electricity Market and Rural Electrification</td>
<td>80</td>
</tr>
<tr>
<td>Regional Banks, Regional Investments and Regional Responsibilities: Strengths, Shortcomings and Trends of Thai Commercial Banks’ Corporate Governance and CSR Policies</td>
<td>84</td>
</tr>
<tr>
<td>Chapter Five Reflection and Policy Recommendations</td>
<td></td>
</tr>
</tbody>
</table>
Opening Speech
Associate Professor Dr. Sunait Chutintaranon
Chulalongkorn University

Distinguished guests, ladies and gentlemen

It is my great pleasure and honour to welcome you to Chulalongkorn University and to this international energy conference under the title ‘Know Your Power: Towards a Participatory Approach to Sustainable Power Development in the Mekong Region’. The conference has been jointly organized by Mekong Energy and Ecology Network, Finland Futures Research Centre, and the Mekong Studies Centre, Institute of Asian Studies, Chulalongkorn University. This conference is the first of its kind as it is the first time that a conference specifically dedicated to power issues in the Mekong region is being held. The issue of energy is obviously one that affects all of us and every day of our lives. The subject is also intricately linked to some of the great challenges facing the world community right now, such as climate change, global warming, the energy crisis and their related issues such as global financial markets and carbon trading. The context within the Mekong region is, however, what we are here to focus on over the coming two days. Rapid economic growth in all the countries in the region and the rise of China are obviously trends that are impacting on all spheres of the region’s social and economic development. Those subjects will undoubtedly be specifically focused on during the conference. The aim of the conference is to examine the interlinkages between energy and development by examining the multitude of actors, their roles and influence within the power sector. Likewise, the strategies being pursued and the planning underpinning these strategies will also be examined. The second day of the conference aims to present the issues within a regional context and to link them to the wider discourse of power issues in the broader context of sustainability. Finally the aim is to present recommendations on the way forward to achieve more sustainable power development in the Mekong region.

Ladies and gentlemen, I would like to take this opportunity to thank you for being here and hope that you will participate as fully as possible in the debates and discussion that will no doubt arise over the coming two days. I would also like to thank Siemenpuu Foundation and the European Union for their support for this event. So without further delay, I would like to wish you all a successful and productive conference and declare the conference open. Thank you very much.
Opening Remarks
Witoom Permpongsacharoen
Director, Mekong Energy and Ecology Network

I would like to take this opportunity to introduce why we are holding today’s conference and how it will be framed. Before that, however, I would like to thank all of you for coming to attend our two-day conference. Actually today we also have another activity together with the conference and have invited about 30 journalists from the six countries in the region to come and learn from this conference and practice reporting on power issues. We would also like to thank Thai PBS, the public TV channel in Thailand for supporting the journalist workshop.

I would like to take a few minutes to explain why we organized the theme ‘Know Your Power’. Know your power reflects the question: ‘how much do we know about our power sector?’ In this room two years ago, we held a conference to mark the 15th anniversary of the Mekong River Commission (MRC). One of the points that came out of that conference was that according to a study by the MRC, there is clear evidence that there will be an impact on fisheries if mainstream dams are developed. The study in question was on the environmental impacts of hydropower, but the question that needs asking is what about a study on whether or to what extent we actually need the electricity and are there any other options? Maybe there does not have to be a trade off with fisheries. The former CEO of the MRC admitted that the organization has not done a study on the power sector. So that is why we think that there might be a need for civil society to try to facilitate a study on the power sector in the six countries of the Mekong region. This is the reason why we came up with the theme ‘know your power’, which is underpinned by the concept of sustainable power sector developments and public participation.

When examining stakeholders of hydropower projects or even power plant developments in Thailand and other countries, the question that has to be asked is do we give people enough information about why they have to sacrifice their livelihood for electricity security? How can we tell them that their sacrifice is fair and will help national economic prosperity? Or do we tell consumers of electricity how much people have to trade off for the electricity that we use? If we really want the power sector to become more sustainable we need to know the answers to questions such as who are the actors, who is planning the electricity systems and how do the systems operate in each country and at the regional level? How future electricity demand is forecast and how plans are drawn up are other issues we need to know about along with who is who in the energy sector and energy industry. Another important issue is who actually has
decision-making power when it comes to energy sector developments. This is why we have come up with the theme ‘know you power’.

So how do we intend to frame this conference? Actually this conference is part of our three-year efforts to conduct research, which we have also undertaken together with our partners in the region. Some of our partner organizations have also carried out their own research initiatives in their area, so this conference is very much the first step by civil society, NGOs and some academics in the region to try and study the power sector. At first, we considered using the different countries as a framework, but we discovered that in terms of power sector developments, a country-based approach is not a good framework for understanding the sector because the state of development of the power sector is heterogeneous in each country there are also many cross border issue. For example, there are many transmission lines that go across borders; so then we realized that it may be better to frame the conference in a different way. Therefore, we have divided the two days into seven sessions and each session will show you how we see the state of power sector developments and how the power sector of each country interacts with other countries.

We will start by looking at Centralized Power Sector Developments: Trade and Security Beyond Country Borders, which will examine countries such as Thailand, which has a fully 100 per cent centralized power sector. However, the Thai national grid also expands to the neighbouring country of Lao PDR to connect with IPPs there to trade in electricity. The second session will look at energy efficiency and is entitled Recommendations for Energy Efficiency in the Region, which will be presented by Dr. Peter Du Pont, who has a lot of experience in energy efficiency within the region. His presentation will also greatly contribute to the presentation of the first session by Chenchom Greacen. The third panel session will be State Power Sector Expansion, and this is relevant to most of the countries in the Mekong region where states are planning to develop their national grid. This session will examine what the state of progress is in developing the national grids. The fourth session will be on decentralized power sector. We included this session because some countries, such as Cambodia, are still able to take advantage of decentralized power sector developments and we also see potential in other countries to develop decentralized systems. Session five represents the opposite of session 1 and is entitled Off-Grid Power Sector Expansion: Off-Grid Rural Electrification. This session will focus on the potential of rural communities in our region to go straight to off-grid system developments rather than waiting or expecting the grid to expand to that area. Session six will look at financial issues and how a practical understand of the issues can contribute to sustainability. The title of this session is Towards Mekong Power Sector Sustainability: Financial Perspectives and it will feature presentations from people who have been researching different areas or aspects relating to finance. The last session will have representatives of different actors such as World Bank, the ADB, the electricity regulator in Thailand and academics. We would like them to give their reflections as policymakers and some policy recommendation on the topics that will be covered over the course of the two days. I hope the outcome will bring us a greater understanding on what is going on within power sector developments in the region.
Chapter One
Power Sector Issues and Potential Solutions
Rethinking Thailand’s Power Development Plan
Cheunchom Greacen

This presentation examined the evolution of the Thai power sector and highlighted the issues and trends that have occurred in its development. One of the main trends identified is the changing perception of the nature of electricity from being regarded as a public good to something with a more commercial nature that drives profits for businesses and governments. Thailand’s Power Development Plan (PDP), prepared periodically by the state-owned Electricity Generating Authority of Thailand (EGAT), is the master investment plan for power system development. It determines what kind and what quantity of power plants get built, where and when. The information presented in the PDP is based on demand forecasts contained in the document. There is concern, however, that the PDP has become disconnected from the actual need for electricity and serves to justify profitable investments in the power sector. Therefore, the idea of an alternative PDP 2010 (the latest PDP), or a ‘PDP 2012’ has been developed, the features of which are presented and examined in this summary.

History and Development of the Thai Power Sector

During the 1960s there was competition between two models of power supply: the decentralised cooperative model and the centralised utility model. The centralised utility model was selected largely due to cold war politics rather than because of the system’s technical superiority. The aim of the government at the time was to rapidly win over the hearts and minds of the Thai public with the promise of providing a reliable source of electricity. Three state-owned utilities were established to fulfil this promise; however, because capital was a significant constraint to developing the power sector, the World Bank (WB) and other development agencies played a key role in this process. Funds from development financing institutions facilitated a rapid expansion in the power sector from the 1960s to the 1990s. During this time, Thailand’s electrification rate rose to over 90%, which provided the foundation for increased economic growth, which in turn led to increased wealth and improved the availability of capital.

The Energy Generating Authority of Thailand (EGAT) was established in 1969 through a merger between the three state-owned enterprises of Yanhee Electricity Authority, Lignite Authority and the Northeast Electricity Authority. It is presently operated as a state-owned enterprise under the Ministry of Energy of Thailand. With ownership and control of the national transmission grid and about half of the country’s generation capacity, EGAT serves as the monopoly buyer of electricity and sells wholesale to two state-owned distribution utilities. In addition to its generation, EGAT purchases electricity from private power suppliers and neighbouring countries.

During the early 1990s, the Thai government faced pressure to reform the ownership structure of the energy sector in response to the neoliberal thinking of the time. This led to a partial divestiture of EGAT's generation assets to form two subsidiaries: the Electricity Generating Company (EGCO) and Ratchaburi Holding Company (RATCH). Shares in EGCO and RATCH, respectively, were offered to strategic investors and the public.
There was a further change to the power sector in the 1990s with the adoption of regulations to allow Independent Power Producers (IPPs) and Small Power Producers (SPP) to operate within the sector, which further eroded EGAT’s monopoly power. These long-term contracts facilitated the entry of private capital into the sector for the construction of power plants. IPPs and SPPs were deemed necessary, as despite the growth generated over the previous three decades, Thai companies still had limited capital available. Therefore, foreign capital, now sourced from foreign private sectors, had to be utilised in order to develop the energy sector.

The Thai government continued to develop different forms of financing for the power sector into the early 2000s. During this time, the idea of establishing a commodity market for electricity, called the Power Pool, was introduced. This would have turned electricity into a commodity that could be bought and sold on the market on an hourly basis. However, the idea was abandoned partly due to the lessons learned at the time from the Californian electricity market. Prices were being influenced by techniques such as ‘power withholding’, which in turn led to blackouts and expensive electricity prices.

Instead, the government continued its attempt to privatise the power sector through a plan to partially privatise EGAT as a monopoly through offering shares to private investors on the stock market, transforming EGAT from a state utility to a corporation; this effort was thwarted by a civil society law suit. However, the financialization of the power sector has continued through EGAT’s subsidiaries and joint ventures between foreign capital and other Thai energy companies. Of late, non-energy companies such as construction companies have joined the foray into the power project development business. The role of listed companies in the stock market and their needs for quarterly profits have become a significant force shaping power sector development and has led to a ‘mushrooming’ of power projects in Thailand and neighbouring countries.

**Issues and Trends in the Power Sector**

Traditionally electricity was considered a necessity, a public service that everyone was entitled to. However, with the increasing reliance on sources of private finance external to the local power sector, electricity has increasingly become a commodity. This poses a threat to the Thai population largely in regards to the question of accountability. Under a public private partnership model for supplying electricity, if prices rise too high or services are not delivered properly or at all, the fault may lie with the private company, which, unlike the government, is not accountable to the public. Therefore, it is likely that the public, as customers, will find it harder to influence policy, investment and operational decisions that affect them directly.

Another problem related to the commodification of electricity is the ensuing commodification of natural resources including, for example, rivers and land belonging to rural communities. This can also be described as a form of economism whereby the value of natural resources is seen only in economic terms. This approach fails to take into account the impact of damage to the environment on local communities and wildlife. Furthermore, when impacts are taken into account, the compensation is likely to be far from adequate due to a lack of understanding of the intrinsic value of affected ecosystems or social relations.
With the increased involvement of private firms, often external to the power sector, this has resulted in conflicts of interest at the policy-making level. There are policy-makers who work as full-time high-ranking officials in government agencies such as the Ministry of Energy and Energy Policy and Planning Office (EPPO). They set important policies for the country but at the same time serve as directors of energy corporations (See table 1). This inevitably raises the question as to whose interests they serve primarily, those of the public or private corporations. Because their monthly income as full-time bureaucrats is a fraction of their remuneration (including bonuses and access to credit cards) from serving energy corporations, it is perhaps not surprising that policy decisions can benefit corporations at the expense of the public.

Another worrying trend of the commodification of electricity provision is the privatization of the power utilities. Efficiency has been cited as a justification for privatizing state-owned utilities though the results have been mixed. A case in point is the privatization of the formerly state-owned Petroleum Authority of Thailand, which became PTT PLC and is the largest listed company on the Thai stock market. While the company’s profitability skyrocketed, PTT’s efficiency at delivering a reliable gas supply left a lot to be desired (and became EGAT’s justification for its proposed temporary increase in the power generation reserve margin from 15% to 25%). Despite the disservice to Thai consumers, EGAT aspired to follow PTT’s privatization model (a hybrid status of being a profit-maximizing corporation while endowed with certain state power such as monopoly rights). Fortunately for the Thai public, however, the corporatization process of EGAT was ruled illegitimate and was reversed. Privatization of the Thai power sector continued, however, in the form of increased commercial opportunities via EGAT’s private subsidiaries, EGCO and Ratchaburi. These companies end up benefiting handsomely from new generation projects that sell power to EGAT, the monopoly buyer of electricity on behalf of the Thai public. Top EGAT executives, retired as well as current, end up serving as directors of these companies and their subsidiaries, raising questions of whether the purchase deals between them and EGAT were to the best interest of their private shareholders or the Thai public.

Furthermore, the role of the PDP in power sector planning has diminished, along with the influence of the public and government. Some projects in the power sector are driven by the interests of corporations with good political connections, whereby they are put on a fast track
even before they appear officially in the PDP; the Xayaburi dam project constitutes an example of this. Energy policy and plans have also become tools to drive the stock market, for example, when the government approved the PDP 2007 (which provided generous energy investment opportunities). The PDP provided justification for an IPP bidding process and resulted in significant windfall benefits for a handful of companies. The share prices of companies benefiting from the PDP 2007 jumped by 66% (while other companies in the Thai stock exchange had on average an 8.7% rise).

The incentive of increased stock market value is creating a disconnect between the capacity and generation requirement of the power sector and the actual electricity needs of the country. The official criterion for determining additional generation requirements is the reserve margin, which refers to the generation capacity in excess of peak demand. A margin of 15% has traditionally been considered sufficient to maintain reliability in electricity supply, however, the PDP 2010 called for developments that exceeded this reserve margin. The bullet points below detail some of the additions made under the PDP 2010:

- 920 MW from Nam Theun 2 when the reserve margin was > 28%
- 597 MW from Nam Ngum 2 when the reserve margin was > 27%
- 660 MW from Gheco1 when the reserve margin was > 27%
- 1600 MW from SiamEnergy when the reserve margin was > 25%

The government issues official demand forecasts based on a forecast of the country’s GDP 15 years into the future. However, the GDP and power demand predictions are often speculative and over-optimistic compared to the actual need. Figure 1 displays the government’s forecasts from 1992 to 2010 compared to the actual demand, which is represented by the red line. During the year that Nam Theun 2 came online, the actual demand was 5,800MW lower than the projected level predicted at the time of the project approval.

![Figure 1: Thai Government’s Power Demand Forecasts, 1992-2007](image-url)
Over-investment in the power sector has several ramifications: firstly, it results in unnecessary impacts on the environment and communities, such as damage to fisheries, relocation of local communities and increased pollution. Secondly, the economic burden resulting from over-investment and inefficiently utilized assets leads to inefficiency throughout the Thai economy, reducing its competitiveness in the global market. Consumers do not benefit from over-capacity and may in fact face higher prices for electricity. Investment that has gone towards these projects may have been more productive in other areas of the economy that are in need of capital resources. A former Thai Prime Minister once stated that there was approximately THB400 billion invested in over-capacity within the power sector. Overall, Thailand is one of the few countries (along with Vietnam) that is bucking a worldwide trend towards a reduction in energy intensity (energy used per one unit of economic output) (see figure 2).

![Wasteful Inefficiency changing energy intensity over 20 yr period](image)

*Figure 2: Worldwide Trend in Energy Intensity*

**Energy Security and the PDP 2012 and PDP 2010v2**

When concerns about inefficient over-investments, environmental and social impacts are raised, power sector planners often respond by using the ‘energy security’ trump card. Energy security has become the policy-makers’ effective mantra for fending off concerns and opposition to power projects and for sealing approval for nuclear, ‘clean coal’, mega-dam and centralized gas power projects. But what is ‘energy security’? This section examines the concept of energy security, proposes a framework for evaluating PDPs and then compares two alternative PDP scenarios, called the PDP 2012 and the PDP 2010v2, against the official PDP.

What does the term energy security actually mean? Those who are familiar with the Thai government’s information campaigns might be led to think that energy security means the more (energy or generation capacity), the better. Some think energy security is synonymous with resource adequacy. But ‘security’ has more than one dimension to many people well versed on the issue.
A paper by Dr Marilyn Brown of the Georgia Institute of Technology reviewed 91 academic peer-reviewed articles on energy security. She found that the dimensions of energy security can be broken down into 4 groups: (1) Availability, (2) Affordability i.e. price of energy, (3) Energy and Economic Efficiency, (4) Environmental stewardship.

In Thailand, the scope of energy security actually encompasses all the above elements (resource adequacy & affordability & efficiency & environmental quality), as is stipulated by the Energy Industry Act 2007. Section 8 of the law sets out a framework for government policy that includes resource adequacy, minimum dependency on imports and diversification from supply disruption, and in the case of affordability it mentions affordable cost of service and minimum exposure to price volatility. It also mentions efficiency and energy as well as economic efficiency, and the environment – i.e. minimum environmental impacts.

We can therefore see how much the concept of energy security as practiced by the power utilities and policy-makers in Thailand has strayed from the Energy Industry Act, so the aim of this analysis is to propose that we develop a framework to ground the debate about energy security back in a policy framework again using a set of indicators to evaluate PDPs. The next step is to look at making new and improved PDPs. As has been demonstrated earlier, Thailand’s PDPs have not served the public well. In the past, we have relied on the government to issue plans and then civil society has been allowed to comment, but the comments may or may not have been taken seriously. So it is time for us to make our own PDPs.

However, it is first worth taking a look at the official PDP 2010. Under the plan, generation capacity will almost double from around 30,000 MW to almost 70,000 MW by the year 2030. The new generation includes over 10,000 MW of imports, over 8,000 MW of coal plants, over 16,000 MW of gas plants and 5,000 MW of nuclear. This is represented below in Figure 3.

![Figure 3: PDP 2010](image)

The forecasts used to justify the need for new power projects are presented in figure 4 below. The graph represents the annual increase in peak demand in Thailand up to 2011. The forecasts used by the government are represented by the red bars. The blue lines represent the actual
increase per year up to 2011, which illustrates the ups and downs in demand resulting from, for example, the economic crisis of 1997 and subsequent uncertainties in the political situation. As can be seen, the average increase projected by the PDP is very high, averaging about 1,500 MW per year compared to past averages which hover around 800 MW per year. Thus, there is almost a doubling of projected need for electricity used in the PDP. Instead of these demand forecasts, the new and improved PDP, which is referred to as PDP 2012, assumes that future demand will reflect past demand, represented by the green dotted line.

**PDP 2012 and PDP 2010v2**

For the purpose of comparison, there are two proposed scenarios – one is called the PDP 2012, which is the first option and this scenario uses a more realistic demand forecast (green dotted line). This green line does not mean that electricity does not increase; it increases every year but not as high as the government projection. The other scenario is called the PDP 2010v2. This is a revision of the PDP 2010 and uses the government’s optimistic power demand forecast (red bars) but with several changes. With the exception of the demand forecast, the PDP 2012 and PDP 2010v2 share the same methodology. Firstly, a 15% minimum reserve margin is maintained since the goal is to ensure Thailand has enough electricity to meet growing demand. Investment in energy efficiency (EE) and demand side management (DSM) are prioritized as a resource option. In the past, the Thai PDPs have not considered investment in EE as a resource option at all, so we think that this should be changed. Another step is to consider life extension of power plants. In drawing up the PDP, EGAT only considers building new plants and it does not consider trying to better utilize its existing assets by making upgrades and refurbishments to extend the life of old power plants. We consider this a way to delay retirement and new investment in power plants. Another approach we took is that even after DSM and life extension, additional capacity is still needed and in that case we would prioritize a highly efficient form of power generation technology called cogeneration over inefficient centralized generation. The last change we implemented was that new generation that was not already committed or under
construction would be considered removable from the PDP if they are not needed to maintain a 15% reserve margin.

Let us return to the assumptions in more detail – first the inclusion of more energy efficiency and demand side management. In Figure 5 below, the blue bars are the levels of EE included in the official PDP by the government. However, after the PDP was approved the government issued another plan called the 20 year energy efficiency plan and the red bars represent the savings called for under this plan. The new PDP 2012 actually corresponds to the newer approved energy efficiency plan. The reason for prioritizing EE have been demonstrated in a study for the Pacific Northwest in the US, where investments in EE measures are considered the cheapest option to meet growing demand, yet in Thailand these are not considered supply options so we changed this in the PDP 2012. After having invested in energy efficiency for over 30 years, the Pacific Northwest has continued to find new ways to have more energy efficiency savings and that is what we are aiming for.

![Figure 5: Energy Efficiency and Demand Side Management Savings in the PDP 2010 and 20-Year EE Plan](image)

Cogeneration or Combined Heat and Power (CHP) is a much more efficient way to generate electricity (see Figure 6). With conventional power plants, like the ones included in the PDP such as coal-fired plants, most of the energy is wasted. If you put in 100% energy then about 60–70% of the energy is wasted through the smoke stack. Because of its smaller scale and location next to industrial applications like heat and steam or cooling, cogeneration is a lot more efficient and only 10% is wasted. The PDP 2010 already included some cogeneration but not nearly enough – we reviewed the existing potential and discovered that another 4,800 MW could be added in the PDP 2012 (see figure 7). The rationale is that if additional capacity is needed, CHP is preferred over centralized generation, due to its high efficiency and thus environmental benefits (less CO2 and other emissions). As distribution generation, CHP plants have economic benefits: because of their proximity to load, the need to invest in expensive transmission infrastructure is significantly reduced.
Plant life extension

As was stated above, plant life extension is considered as a means to delay retirement and new investment in power plants. Not all plants were extended under the PDP 2012, for example those that had reached a life of 40 years at decommissioning, but some plants that are planned for decommissioning at the age of 25 years are extended to 30 years, the same with IPP plants. Figure 8 below shows plant life extension under the PDP 2012.
Renewable Energy

In the case of renewable energy, the PDP 2012 would assume the same amount as planned in the PDP 2010 because we believe the PDP did an acceptable job of including more renewable energy in the plan and also because RE projects still have impacts and face community opposition, so we did not want to advocate a lot more renewable energy until the energy impact assessment loophole in Thai law is addressed.
The results of the analysis are that we have three very different PDPs. These are summarized in the Figures 9 and 10 below.

![Figure 9: Comparison of the Three Different PDPs](image)

<table>
<thead>
<tr>
<th>Generation by fuel type</th>
<th>2010</th>
<th>PDP 2010</th>
<th>PDP 2010 v. 2</th>
<th>PDP 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MW</td>
<td>%</td>
<td>MW</td>
<td>%</td>
</tr>
<tr>
<td>Coal</td>
<td>3,527</td>
<td>11%</td>
<td>12,669</td>
<td>19%</td>
</tr>
<tr>
<td>Gas</td>
<td>16,091</td>
<td>51%</td>
<td>21,668</td>
<td>33%</td>
</tr>
<tr>
<td>Hydro – EGAT</td>
<td>3,424</td>
<td>11%</td>
<td>3,936</td>
<td>6%</td>
</tr>
<tr>
<td>Hydro – imports</td>
<td>1,260</td>
<td>4%</td>
<td>9,827</td>
<td>15%</td>
</tr>
<tr>
<td>Cogeneration</td>
<td>1,878</td>
<td>6%</td>
<td>7,024</td>
<td>11%</td>
</tr>
<tr>
<td>Renewables</td>
<td>767</td>
<td>2%</td>
<td>4,804</td>
<td>7%</td>
</tr>
<tr>
<td>Oil/gas</td>
<td>3,784</td>
<td>12%</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>0</td>
<td>0%</td>
<td>5,000</td>
<td>8%</td>
</tr>
<tr>
<td>Others (fuel oil, diesel, Malay)</td>
<td>619</td>
<td>2%</td>
<td>619</td>
<td>1%</td>
</tr>
<tr>
<td>Total generation</td>
<td>31,350</td>
<td>100%</td>
<td>65,547</td>
<td>100%</td>
</tr>
<tr>
<td>Additional EE/DSM savings</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Resources</td>
<td>31,350</td>
<td>65,547</td>
<td>60,411</td>
<td>45,502</td>
</tr>
</tbody>
</table>

![Figure 10: Comparison of Generation by Fuel Type](image)

In the case of the PDP 2012, we found that under this approach that were able to maintain energy security without having to build new centralized gas plants, coal plants or imports from neighbouring countries beyond the projects that are already under construction. There would be no need for any nuclear power plants and it would still be possible to maintain the security of the energy system.

Let us now look back at the indicators referred to earlier in terms of grounding the PDP back in the policy framework enshrined in the energy industry act.

Firstly let’s look at dependency on electricity/fuel imports. The reference case is the situation in 2010. In Figure 11 below, the 3 bars represent the level of dependency on imports in 2030, you can see there is a drastic increase in the amount of electricity derived from foreign sources, so in
the future uranium may come from Kazakhstan and Australia, power imports may come from Laos and Myanmar, gas will come Myanmar or the Middle East or Indonesia, and coal will come from Indonesia or Australia. Therefore with respect to dependency on imports we see a worsening trend.

**Figure 11: Dependency on oil, gas and power imports**

In terms of costs of service, we use the indicator Baht per month not Baht per KWh because when you invest in energy efficiency even though the costs of electricity may be higher, you get the same level of service without the same amount of KWh so the bill you pay (product of cost times kWh usage) is actually lower. The two scenarios show a decrease compared to the PDP 2010. The revised PDP 2010v2 would see a decrease of around 13% and the PDP 2012 shows a slight increase of 1.3% but is much less than the increase under the PDP 2010. See Figure 12 below.

**Figure 12: Comparison of Cost of Service**
In terms of exposure to price volatility risks (Figure 13 below), we see an improvement across the board. All three scenarios will lead to less exposure to price volatility partly because of the diversification of technology.

![Figure 13: Exposure to Price Volatility Risk (Change in 2030 Compared to 2010)](image)

In the case of energy intensity, which is a measure of energy efficiency and economic efficiency, we see a worsening trend for the PDP 2010, while the other 2 scenarios will see improved energy intensity (Figure 14 below).

![Figure 14: Comparison of Energy Intensity](image)

With respect to emissions of air pollutants, if the graph is really high, it means that we see more emissions from the plan. In Figure 15 below, the blue bars represent the change in the case of the official PDP 2010, and it shows a much worse trend for all pollutants across the board. The only plan that will see an improved trend would be in the case of PDP 2012.
Putting all these indicators together, we get the summary graph below in Figure 16. The PDP 2010 will be examined first of all. When the bars go up it means a worsening trend of energy security in the year 2030 compared to 2010. When the bars go in the negative area it means an improving trend. For the case of PDP 2010, you see a worsening trend for environmental performance and import dependency and a worsening trend for energy intensity and cost of service but an improvement in terms of exposure to price risk and concentration of plant disruption. But in the case of the improved PDP 2010v2 you see an improvement in efficiency, cost of service, exposure to price volatility and concentration. In the case of PDP 2012, you see the most improvement, so in terms of environmental quality you see a significant improvement compared to the official PDP as well as less dependency on imports and improvements in the cost of service, energy intensity and other indicators.
Conclusion

In conclusion, we saw a worrying trend of commoditizing electricity which led to the concept of energy security and the PDP process being distorted to generate profits for a select group at the expense of affected communities, the environment, the consumer, the environment and the economy. So we need a better framework to hold the PDP process and concept of energy security accountable to the Energy Industry Act and the public. There is also a need for a new framework and to reform the PDP process so that cheaper and cleaner options can be prioritized to meet growing demand. This is the reasoning behind why we have put forward the new PDP 2012 to better achieve energy security without the need for any new greenfield coal, nuclear, gas or dam projects.
Grid Centralization in Lao PDR – An Analysis of the Grid Centralization Plans in Lao PDR
Oliver Wastie

The aim of this presentation was to examine the grid expansion plans as set out in Electricité du Laos’ (EdL) Power Development Plan 2010–2020 (PDP) and also to examine the regional context and policies influencing decision-making in Laos. Another key aim was to appraise the role of the Asian Development Bank (ADB) in promoting a regional grid and the impact this is having on the policies being adopted by the Lao government.

The grid system in Lao PDR has been developed significantly over the last few years, mainly through loans from multilateral development banks. In the past, Laos had four separate grids but now EdL only refers to three separate areas: the northern, central and southern areas. In addition to the 115 kV transmission system, the grid system comprises two 230 kV lines not connected to the Lao grid for executing power to the Electricity Generating Authority of Thailand (EGAT) as well as a 500 kV line for transmitting power from Nam Theun 2 also to EGAT. There are also several international connections at lower voltage levels that serve border area loads not connected to the Lao grid and these include connections with China, Vietnam, Cambodia and Thailand.

The future plans as set out in the PDP 2010–2020 are very ambitious as well as expensive. The grid expansion plans involve expanding the 115 kV network, constructing a new 230 kV transmission from the north of the country to the south, as well as a regional 500 kV network, with the total length to be built 7,208 km (excluding the 500 kV lines) at a cost of US$1,597.4 million (excluding IPP projects). However, if all the elements in the PDP relating to transmission expansion, upgrading, distribution and rural electrification are combined they amount to over $8 billion. This figure seems ambitious given that EdL’s net profit for 2009 was 228 billion kip (around US $28.5 million) according to the Annual Report for 2009.

The construction of the 230 kV line is a key feature of the PDP and illustrates the focus of the plans on the export of electricity. The estimated costs of the 230 kv transmission line are high (over 1 billion USD) and it is unclear how the Lao people will benefit directly from this strategy, since it will primarily serve regional interests rather than domestic consumers. The transmission expansion plans are also solely based on expanding large-scale hydropower, which is a strategy that also involves considerable environmental and social risks, which have not yet been fully quantified as has been demonstrated with respect to the debate on the proposed Xayaburi project. However, the Renewable Energy Development Strategy in Lao PDR (December 2010), which aims to increase the share of renewable energies to 30% of total energy consumption by 2025 (excluding major hydropower), could form the basis to an alternative, decentralized approach to meeting the government’s electrification targets as well as boosting socio-economic development.
500 kV Regional Grid

The PDP 2010-2020 includes plans to construct 1,612 km of 500 kV transmission lines and five 500 kV substations with a cost estimate of over $1 billion. The plan for a regional network of 500 kV transmission interconnections is being actively taken forward by the Asian Development Bank and comes under its GMS Program.

The minutes of all the meetings of the various committees and working groups raises many unanswered questions about the planning process and rationale behind the Program and the goal of establishing a power trade. Plans and documents are drawn up by foreign consultants that appear too ambitious and which do not reflect the reality of the situation on the ground. This is also acknowledged by the Bank and the minutes of a meeting in December 2010 comment that ‘there is a noticeable disconnect between methodological and technical development performed under Regional Power Trade Coordinating Committee and real life cross border interconnections and power trading.’ This is also evident in individual transmission line projects and many consultants’ reports on ADB transmission projects put forward complex operating structures that do not reflect reality. For example, the Na Bong-Udon Thani transmission project (Laos-Thailand) and Ban Sok–Pleiku Power Transmission (Laos-Vietnam) projects include the collection of wheeling charges, setting up an independent transmission company (TRANSCO) with responsibility for the transmission network and international connections. But the current PDP states that EdL will own the 230 kV network and 500 kV network. Thus, it is not clear who will use and operate the transmission system or how such a system will be integrated regionally when Thailand, for example, operates under an enhanced single buyer model.

Another key area of concern is the lack of participation; plans that will have significant transboundary impacts at many levels are decided at meetings attended by only a few people. There has been very little public debate as to the merits of the plans being pursued or the alternatives.

Another area of concern is the lack of reliable data. For example, the Executive Summary of Final Report, Component 1, Module 1, Update of the GMS Regional Master Plan (RETA 6440) states many problems with reliable data including, inter alia, no regional database, 4 different versions of the PDP from Lao PDR, an incomplete and an obsolete PDP for Vietnam. Plans are therefore considered to be ‘beneficial’ but are based on assumptions and indeed, the above report states ‘the different actual transmission projects would require more detailed studies (pre-feasibility and feasibility of transmission and HPP projects studies’).

In addition to the above problems in the planning process, there are also some contradictory policies underpinning these regional power development plans. The ADB representative stated in the meeting of RPTCC-10 (Minutes of May 2011, Paragraph 13 e.) that the ‘ADB could not support any hydropower project in the mainstream Mekong river but will support hydropower..."
projects on the tributaries but these will be subject to strict adherence to ADB’s safeguard policies. However, the updated Master Plan refers to a ‘high export case’ scenario with 9 mainstream dams.

Furthermore, with respect to the ADB’s safeguard policies, transmission projects are considered standalone projects: the hydropower projects behind them are disregarded e.g. Na Bong-Udon Thani transmission project.

There also appears to be a certain amount of conflicting aims, since the rationale behind developing the Ban Sok – Pleiku transmission project was that it ‘will provide cheap and clean energy and will postpone new investment in terms of thermal power generation.’ However, an ADB press release on 24 November 2011 announcing $309 million for the construction of the O Mon IV plant in Vietnam stated that the project will ‘support expanded industrial activity, spur new livelihood opportunities, and reduce dependence on hydroelectricity tapped from other regions.’

In conclusion, EdL’s planning process should be made more transparent and the reason why various options have been chosen should be explained. For example, given the limited resources of Laos, why is the focus on serving regional needs rather than domestic users? There needs to be greater consideration given to a more decentralized approach. Above all, there also needs to be much greater participation and debate within the region as a whole about power sector plans that will have huge transboundary impacts, especially those being pursued within the ADB’s GMS Program.
Evidence of Negative Externalities from IPP Hydropower Projects: the Mekong and its tributaries
Tanwan Topoklang

Although hydropower was claimed to be relatively climate friendly compared to other types of thermal generation since hydropower was originally thought not to generate greenhouse gas emissions, it does, however, pose considerable risks to ecosystems and livelihoods, such as impacts on fish abundance and diversity. Such risks from hydropower projects bring extra costs that are not priced in the market, namely externality costs. Externality costs can be defined as economic costs borne by society and the environment that are not reflected in tariffs (IEA 2000). The failure to internalize these negative externality costs might lead to the setting of an inappropriate financial tariff, a too low estimate for the financial rate of return (Foran et al. 2010), less revenue than expected, or it may even push those costs onto third parties, such as local people and cross-border riparian communities.

These externality costs might be seen in the form of a risk of large hydropower projects becoming economically unsuccessful. Examples of the associated problems include, for instance, the planning process based on inaccurate power demand forecasts (Greacen and Greacen 2004), over-run costs due to construction delays or difficulty during operation, and too little consideration given to the loss of natural resources and ecosystem services (Figure 1). These risks must be addressed in detail during the planning stage and should be made transparent to decision-makers and stakeholders in order to allow balanced decision-making.

Figure 1: Risk factors that lead to the failure of a hydropower project's sustainability. These are risks that should be avoided in order to achieve the objectives of the IPP export-led policy (adapted from IEA, 2000).
This summary presents evidence of externality risks under the following topics.

**Difficulties during operation**

**Flood Control: A case study of Nam Theun 2 (NT2)**

The Nam Thuen 2 (NT2) Hydropower project is a 450 km2 reservoir dam situated in the Nakai plateau, 250 km to the southeast of Vientiane. Its installed capacity is 1,080 MW, of which 920 MW will be exported to Thailand through EGAT under a 25-year concession, and is dispatched through a 500 kV transmission line. Water from the turbines feeds into a man-made downstream channel connected to the upper Xe Bang Fai (XBF) River. This river converges with the Mekong at Thakhek in southern Laos. The World Bank played a major role in funding the project and pushed for feasibility and impacts studies that meet world standards to be conducted. The NT2 has been operational since 2009.

Changes in the river’s flow might be the most tangible impact expected on downstream livelihoods and the ecosystem. According to a report by the ADB (ADB 2004), the average flow change in the channel running down to the XBF was 220 m3/s during its operational period. Villages in the Mahaxai district, near the upper XBF River, might receive the greatest impact of flow alteration since they are situated next to the downstream channel. Moreover, the water level at the Lower XBF is influenced by backwater inundation from the Mekong mainstream in the Thakhek area. However, the NT2 project has been held up as a model project in terms of both its social and environmental impacts and the studies conducted were expected to lead to suitable mitigation and management programmes.

According to the Concession Agreement for NT2 (NTPC 2005), the flood management plan was set by tracking the flow alteration of the XBF in the Mahaxai area. According to the plan, operations will be restricted if the flow at Mahaxai approaches 1,970 m3/s and the operations will be stopped before the flow reaches 2,270 m3/s. However, a record of actual flow alteration data of the XBF inflow at Mahaxai (Figure 2) showed that during the flood period marked in the data in October 2010 (NTPC 2011), the peak flow never reached the rate at which the operations would have been stopped and the flow approached the restricted point on day 5 to day 7 of the flood event (2,057, 2,110 and 2,110 m3/s respectively). Furthermore, the ADB report predicted the river level increase (ADB 2004) would be an average of 2 m in the wet season and 4 m in the dry season. During the same flood period in 2010, the river level measured at XBF at Mahaxai increased from 148 m to 154 m within 9 days or an increase of around 6 m (NTPC 2011)- (Figure 2).

Recent flooding in the Mahaxai area in 2011 highlighted the unsynchronized and uncontrollable timing of power demand from the electricity purchaser (EGAT) and supplier (NTPC), which accelerated the flow alteration and caused more damage from flooding downstream. Ten days after EGAT ordered almost 40% more electricity from NT2 due to a shortage in the supply of natural gas, high rainfall caused the river to burst its banks and inundated many areas in Laos.
including at Mahaxai. NT2 stopped operating for almost 20 days after that (reported by Vientiane Times 2011). This also questions the reliability of hydropower to be able to supply electricity in sudden demand.

**Loss of availability and value of natural resources**

An increasing number of IPP hydropower projects are being proposed in Laos, which is in part due to the Government of Lao’s policy. Developing a policy based on an IPP model and private-sector financing may inevitably lead to a reduced focus on socioeconomic analysis and public consultation during the planning process. Given the financial and time constraints of developers, there are questions relating to the ability of external consultants to assess complex and interrelated ecology and livelihood systems. For secondary data, there is no fundamental scientific knowledge on issues such as taxonomy and the distribution of fish in the region (Kääkönen and Hirsch 2009). Furthermore, there are no public subsidies for hydropower impact mitigation measures, unlike for other forms of energy exploration, such as off-shore gas (IEA 2000).

There are many intangible impacts of hydropower that have not been taken into consideration or monetized, such as sediment retention. Thus, these ecosystem service functions need to be identified when planning compensation and mitigation programmes. A Strategic Environmental Assessment (SEA) of Hydropower on the Mekong Mainstream prepared for the Mekong River Commission (MRC) by the International Centre for Environmental Management (ICEM, 2010) analysed a scenario of impacts after the construction of 11 mainstream dams on the Mekong River and estimated the losses in terms of environmental and social impacts to be about 450 million USD per year. However, a review by Costanza and his research team (2011) using the same data set as that used for the Basin Development Plan 2 (2007) revealed the estimated cost to be 50 times higher than the ICEM’s study. Their calculation was conducted by adjusting some of the cost parameters, such as price per kilogram of fish capture, which resulted in a loss in

[Figure 2: Flow alteration and water level of the XBF at Mahaxai monitored by NTPC during the wet season in 2011 (September – November 2011)]
profits from hydropower of more than 25,000 million USD per year. Moreover, there were other ecosystem functions, which act as regulation functions of the ecosystem, such as the mitigation of soil erosion prevention, which had not been well monetized in the SEA report (2010). These regulation functions were valued to be worth 11.2 million USD per year in the SEA report (2010) but the report did not forecast any losses if 11-mainstream dams were to be built. In contrast, Costanza’s study predicted that the impacts from the 11-mainstream dam scenario would result in the loss of regulation functions totalling some 275 million USD per year.

Another factor needing consideration is the high economic discount rate of 10-12% that is normally set to satisfy the financial viability of projects (Foran et al., 2010). However, high discount rates can be considered as unsustainable development, as the long-term damage or costs associated with a project are simply discounted away, and externality costs and project risks are not taken into account (IEA 2000). The studies of the 11-mainstream dams scenario showed that the revenue generated decreased by 1,000 million USD per year at a 10% discount rate compared to 24,000 million USD per year at a 1% discount rate (Costanza et al., 2011). The difference in the results was derived from sensitivity analysis to deal with uncertainty parameters concerning discounting the value of fish, and the value of wetlands. One recommendation for dam developers and decision-makers is that they should be required to take out catastrophic risk insurance against the failure of the dam from all possible causes (flood, earthquake, landslide, poor construction, mechanical failure, etc.). This would internalize the risk of failure into the cost of the dam.

**Conclusion**

In summary, externality costs occurring from the failure to include risks of large-scale hydropower projects into project costs were identified. Evidence of risks as shown in the example case of Lao IPP hydropower projects can be summarized into two points: risks from difficulties during operation of the plants, and risks in underestimating the losses in terms of the availability and value of natural resources. With respect to the former point, the case of NT2 raised the question of ineffective risk management conditions being set in the concession agreement, which do not take into account changes in environmental conditions and the likeliness of extreme catastrophic events. Moreover, hydropower can be seen as an unreliable source of peak electricity since its power generation depends on natural rainfall. Sudden requests for more electricity might not be possible or may even exacerbate damage to downstream communities if they occur during the flood period. The second point questioned private developers’ ability to conduct socioeconomic analyses and public consultation during the planning process, which also directly impacts the mitigation budget. It seems that there were many intangible ecosystem service functions that were not monetized, especially natural hazard protection functions as highlighted from the impact prediction costs under the mainstream dam scenario. Lastly, varying the discount rate by conducting sensitivity analyses of the BDP2 data gave a clear illustration of the high externality costs arising from risks and uncertainty that previously that were not previously taken into account in the project planning.
Energy Efficiency, the First Fuel
Dr. Peter Du Pont

This presentation examined the future of the energy supply and demand landscape in developing and developed countries, as well as the importance of and potential impact of energy efficiency. The issue of energy efficiency is particularly pertinent to Asia, as by 2030, 38% of global energy demand will stem from Developing Asia (see figure 1).

![Figure 1: Global Energy Demand, 2008 vs. 2030](image)

Due to the large gains in growth predicted throughout Developing Asia, efforts in promoting sustainable, renewable energy and energy efficiency must be concentrated in this region. There are many opportunities in the region to influence energy patterns, despite the amount of energy that regions such as the United States and Europe waste.

**Energy Efficiency**

Energy efficiency should be considered as a resource in itself as it has a large potential to reduce carbon emissions through reducing demand for energy. According to Figure 2, energy efficiency (end-use, power plants, renewables, biofuels, nuclear, CCS) can account for 65% of the share of abatement of CO2 to meet the 450ppm carbon emissions goal in 2020. For this to become reality, energy efficiency measures need to be considered more seriously as they currently only account for between <1% and 10% of reductions in carbon emissions. In this respect, development assistance has an important role to play; the amount of energy assistance contributed towards energy efficiency rose from 3% in 1997-1999 to 6% in 2003-2005 (see figure 3).
It is important to understand the drivers of energy consumption and the ways in which the energy sector can be influenced to promote energy efficiency. For example, conventional notions, such as that energy consumption increases per capita as income increases, need to be challenged. The fallacy of this assumption is demonstrated by figure 4, whereby the United States and Japan have similar levels of income but vastly different levels in per capita energy consumption. Although each country has unique factors such as climate and size, this graph suggests that there is no reliable, predetermined relationship between income per capita and energy consumption.
Figure 4: GDP per Capita & Energy Demand, Source: IEA 2006

There are factors aside from sustainability concerns that provide an incentive for Developing Asia to reduce its energy consumption in the future. One primary consideration is that of ‘energy security’. Although this can be an illusive term, energy security is used here to mean the security of the supply of energy. The trend of importing oil amongst developing countries is intensifying (see figure 5). This increases their reliance upon external sources of oil, namely, from the Middle East. As this is characteristically an unstable region, reliance upon it for oil may pose severe threats to the supply of energy to Developing Asia. Focusing on energy efficiency now can help to avoid potentially negative ramifications of stronger future dependence on external sources of energy.

Figure 5: Oil Imports/ Oil Supply
**Future Energy Consumption Trends**

The key trends in electricity production for Developing Asia, 2008-2030, are as follows:

- Production of electricity from natural gas will increase three-fold and the share of natural gas will increase from 8% to 12%
- Production of electricity from nuclear will increase more than twelve-fold and the share of nuclear will increase nearly six-fold, from 2% to 11%.
- Production of electricity from biomass will increase by more than fifty-fold and the share of biomass in electricity production will increase from <1% to 4%.
- Production of electricity from hydro will increase by 44% but the share of hydro will decrease from 18% to 13%.
- Production of electricity from oil will decrease by 15% and the share will increase from 3% to 1%

On a global level, there is increasing interest in renewable energy, demonstrated through a rise in investment in these energy types (see figure 6). Wind and Solar energy generation are the two most popular forms and approximately two thirds of the investment in solar energy is contributed towards decentralised methods. In 2010, the level of developing country investment in renewable energies overtook the level in developed countries (see figure 7). This is an encouraging statistic for Developing Asia as it demonstrates progress towards achieving energy efficiency.

![Figure 6: New Investment in Renewable Energy Technology 2010 (Sbn)](source: Bloomberg New Energy Finance/UNEP)
Overall there are many ways in which Developing Asia can implement energy efficiency measures, which make a significant contribution to reducing demand for energy. This would not only have benefits in terms of mitigating climate change but would also benefit the region by reducing its reliance on foreign sources of energy and vulnerability to shocks in energy supply. The prospective key trends for Developing Asia’s energy generation, 2008-2030 present many opportunities for implementing energy efficiency, through adopting technology such as wind and solar power. It is important that investment continues to be channelled towards these means of power generation.

Figure 7: Financial Investment in Renewables: Developing vs. Developed ($bn), Source: Bloomberg New Energy Finance/UNEP
Chapter Two
Country Power Sectors in the Mekong Region
Review of Electricity Demand Forecast in the Power Development Plan 7 in Vietnam
Dr. Nguyen Quoc Khanh

Dr. Khanh’s presentation was on the demand forecast that underlies Vietnam’s latest power development plan 7 (PDP 7). The demand forecast forms the basis of projections and policy within the PDP. From this analysis, observations and recommendations are made on improving electricity demand forecasting in Vietnam. Vietnam is becoming an increasingly important country in the Mekong region as it integrates further into the regional economy. From 1998–2009 electricity consumption increased by 13% per year and the country’s installed capacity increased from 5,000MW to 18,000MW, equating to 12% per annum.

The first model used was the Cobb Douglas model. This is based on the correlation between electricity demand, per capita income and the price of electricity. The Cobb Douglas model was introduced to Vietnam by the World Bank under a capacity-building initiative. It has since been simplified due to a lack of available data. The price of electricity is highly subsidised and does not reflect the actual production cost of supplying electricity, therefore, it cannot be used as a parameter for the Cobb Douglas equation. Instead, the parameter that has the most influence on demand forecasting is GDP.

The second model is the SimpleE model, developed by the Institute of Energy Economics of Japan. This model is based on the relationship between electricity demand and other socio-economic parameters such as GDP, population, the number of households and electricity consumption levels in past years. Before demand forecasts can be made, a database of socio-economic indicators and electricity consumption must be created. Scenarios for social economic development are then constructed and this information is used in both models to calculate the demand forecast. The Simple E model is the main model used for forecasting and the Cobb Douglas model is used to check the consistency of demand forecasts.

Two electricity demand scenarios corresponding to two macroeconomic scenarios have been generated (see figure 1). The first scenario is the ‘base’ scenario in which Vietnam’s GDP is projected to increase at a rate of 7.7% per annum from 2010–2030. Accordingly, the generation of electricity is projected to increase at an average of 10% per annum over the same period of time. The second scenario is the ‘high’ scenario, which assumes that GDP will increase at a higher level of 8.5% per annum from 2010–2030. The electricity projection for this scenario is for generation to increase by 11.2% per annum over the same time period.
Discussion of Results
According to figure 2, the per capita consumption of electricity in relation to GDP generated by projections in the PDP 7 is inconsistent with historical figures of energy demand in other countries. The three countries of Thailand, China and Malaysia were selected and demand in these countries was compared with energy demand in Vietnam. These countries were selected because they have similar features to Vietnam in regards to climate, culture and economic development. By 2030, the GDP per capita in Vietnam is forecast to be almost equivalent to the level of Thailand in 2005, yet the forecasted electricity consumption is more than two times greater. Similarly, in comparison with Malaysia, income in Vietnam is equivalent to the level in Malaysia in 1990 but electricity consumption is once again projected to be over two times greater.
Figure 2: Energy Forecast Comparison

Figure three displays the intensity of electricity use between different countries. It reflects the amount of electricity needed to produce US$1 value added to GDP, presented in terms of kW per hour. There are three groups of countries segregated in the figure. High-income countries such as the US and Japan have very good energy efficiency. Middle-income countries tend to have accelerating electricity intensity to begin with, which then slows down when income reaches a certain level. Developing countries that have an income per capita of less than US$1,000 per annum tend to have decreasing electricity intensity. Vietnam however, diverges from this trend; instead, electricity demand in Vietnam is increasing according to the forecast, which is not in keeping with data from other countries.

Figure 3: Comparison of Electricity Intensity
Figure four illustrates the possible reason behind the overestimation of demand. It shows a comparison between PDP 5 and PDP 6. PDP 5 underestimated the future demand for electricity and thus there were blackouts of electricity from 2000–2005. As a result of these shortages, PDP 6 over-projected demand forecasts so as to avoid possible shortages in electricity supply. The government also assumed very high GDP growth in PDP 6 due to potential foreign investments and favourable economic conditions. The demand forecast in PDP 7 is even higher than that of PDP 6, the former’s base scenario demand is 30% higher than the latter’s.

![Graph comparing PDP 5 and PDP 6 demand forecasts](image)

**Figure 4: Comparison between PDP 5 and PDP 6**

This overestimation of demand has several implications if adopted. It would result in over-investment in the power generation capacity and network, which could possibly lead to the consideration of controversial sources of energy such as nuclear. Power plants would then run at low capacity factors, leading to a more profound difference between production cost and price.

In the larger context, such an over-investment would increase national debt. PDP 6 estimates that an annual investment capital of about US$4.5 billion would be needed to finance power sources and power grid expansion projects, while the revenue of EVN in 2006 was just US$2.4 billion. Thus, finance would come mainly from loans and according to a report of the National Assembly, the national debt of Vietnam is already increasing. The debt over GDP ratio for 2007 and 2008 and 2009 are 33.8%; 36.2% and 41.9%, respectively.

As a result of these studies, a set of recommendations was drawn up on demand forecasting for the PDPs. Firstly, the demand forecast should be made with reference to other countries and trends in electricity consumption. For example, it should be recognised that there is a tendency
for electricity consumption to slow down at a certain level. For countries undergoing industrialisation, electricity consumption will increase at a rapid rate but once the basic industrial and commercial infrastructure is established, the rate of power demand will slow down.

When forecasting power demand, it is important to consider the sectors that drive GDP, rather than basing demand on GDP as a whole. This is necessary as different sectors require differing amounts of power, for example, the industrial sector versus the service industry. In turn, demand can be more accurately forecasted based on the potential growth for each sector.

The forecasting should give proper consideration to energy efficiency. There is a large capacity within Vietnam to implement greater energy efficiency, due to its high intensity of energy consumption. The main discouraging factor in terms of achieving energy efficiency is that electricity and energy prices in Vietnam are highly subsidised. If energy and electricity continue to represent a low production cost, there will be no incentive for industry and consumers to implement energy efficiency measures.

In conclusion, the overall message of the presentation was that the Vietnamese economy should be restructured towards sectors that can produce high value added products whilst consuming less energy. This strategy should be taken into account by energy planners and policymakers to produce demand forecasts that are more accurate and efficient.
Development in Myanmar: Energy Security and Investment
Naw Ei Ei Minn

Myanmar has recently experienced very large increases in foreign investment; from 1998-2010 $16bn was invested in the economy and from 2010 to 2011, this increased to $20bn. These investments have primarily taken the form of many new energy projects throughout the country, which has inevitably led to profound changes to the environment, society and economy. This presentation examined the pattern and sources of investment, Myanmar’s development trajectory, impacts of large-scale foreign investment energy projects and ways in which negative impacts can be mitigated.

The largest share of investment comes from neighbouring China ($14.1bn), followed by Thailand ($2.9bn) then Korea ($2.7bn) (see table 1). Investment is largely concentrated in the oil and gas sector, followed by power (hydropower) and then mining. Although Myanmar’s economy has traditionally comprised of agriculture, there is little investment in this sector.

Table 1: Foreign Investment in Myanmar by Country and Sector

<table>
<thead>
<tr>
<th>Investing Country 2010-11</th>
<th>Value $B</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>14.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>2.9</td>
</tr>
<tr>
<td>Korea</td>
<td>2.7</td>
</tr>
<tr>
<td>Other</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>20.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Investment Sector 2010-11</th>
<th>Value $B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil and Gas</td>
<td>10.2</td>
</tr>
<tr>
<td>Power (Hydropower)</td>
<td>8.2</td>
</tr>
<tr>
<td>Mining</td>
<td>1.4</td>
</tr>
<tr>
<td>Other (Agriculture &amp; Manufacturing)</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>20.0</td>
</tr>
</tbody>
</table>

There are several anticipated infrastructure projects in the near future, for example, dams in Kachin, hydropower projects on the Salween River and the Shwe oil & gas pipeline. Many of these are intended to boost exports of power to other countries within the region. In turn, the population of Myanmar will not gain much in terms of power supply and sustainable returns on investment flowing back into the economy.

The primary reason for the influx of investment is Myanmar’s wealth of natural resources in tandem with low labour costs and a lack of regulatory framework to protect communities and the environment. These factors combine to form low barriers of entry for investment into a
country that has vast opportunities for extracting resources. Furthermore, all land is owned by the state, therefore, when foreign investors show interest in starting large projects, it is relatively easy for communities to be cleared off the land that is needed. In addition to the threat of displacement, there are no standards for compensation or relocation, leaving communities with little to no social or economic safety net.

Myanmar has an unclear idea of what sort of projects will be most beneficial for development; however, the country is very keen to move forward. All offers have traditionally been accepted although this trend is changing slightly, as demonstrated by the postponement of the Dawei Coal Power Plant. One criticism of Myanmar’s approach to development is that there is a lack of diversification of projects amongst different industries, which is key to avoiding a resource curse. Instead, the oil, gas and power sectors receive the most attention as opposed to industries such as manufacturing, reducing the country’s resilience to shocks in these industries. Furthermore, the investment in such sectors is carried out on a project basis, which does not provide sustainable opportunities for employment (see figure 1).

![Figure 1: Kachin Dam Project Labour Projections](image)

There are a myriad of social impacts linked to investment in large-scale projects in the energy sector. Villagers often have little to no knowledge of projects and their impacts until construction is commenced. This gives them no opportunity to oppose the projects or to prepare to cope with impacts such as changes to the environment and displacement (see figure 2: land ownership survey). Although communities may regard themselves as owners of the land they live on, they rarely have legal papers to claim ownership, making it easier for them to be displaced. Based on past experiences and weak regulation, compensation for project impacts is unlikely.
In addition to this, when projects take place little is invested back into the community. Thus the level of poverty, represented by a lack of education and health care, does not improve. Another risk associated with projects is the likely increase in militarisation to protect land claimed for developments and foreign workers. The military often exploits local communities for food, shelter, and money and has been accused of taking sexual advantage of local women.

The fact that Myanmar is trying to develop at a very rapid rate magnifies the multitude of risks associated with large-scale projects. This is not to suggest that development in the form of power and energy projects should not be undertaken, rather, the way in which it is undertaken is key to mitigating negative social and environmental impacts. There are a number of ‘tools’ that exist throughout the region that can be adopted by Myanmar to form a stronger regulatory framework and safety net, for example, Environmental Impact Assessments, Health Impact Assessments and Social Impact Assessments. Myanmar should draw on the lessons of other countries that experienced a similar development trajectory and adapt these lessons or tools to suit Myanmar’s context.

An integral part of Myanmar’s journey to development is securing a supply of energy to domestic metropolitan and rural populations. Currently there is little to no planning for local distribution of energy, which is often very costly due to factors such as the remoteness of communities. In tandem with the high costs of supply, locals often cannot afford to pay the prices that energy would sell for overseas. Furthermore, electricity sold on the domestic market decreases revenue generated from exports. With these considerations in mind, decentralised renewable energy generation would be a suitable way to supply local communities with electricity. This form of electricity generation avoids many of the negative social and environmental impacts of large-scale, foreign investment projects, reduces costs and empowers communities towards independence.
In conclusion, there are several considerations that need to be examined to improve Myanmar’s development progress. Foreign investment has great potential to harm and benefit Myanmar, however, different investment models are needed from the current ‘mega-project’ template. The country must adopt a proactive approach in deciding which projects are allowed, framed within a greater strategy for Myanmar’s development. Finally, pro-poor electricity schemes must be developed to ensure the generation and supply of power for domestic means. In this respect, decentralised power models have strong potential in addressing this issue.
Power Sector Development in Laos: Big Picture
Mattijs Smits

The question that underlies analysis of the ‘big picture’ of power development is ‘whose big picture?’ As demonstrated by the photograph below of a lady carrying energy in the form of wood under large transmission lines; energy needs and consumption patterns can differ greatly between participants in the economy. This picture illustrates two types of energy needs, highlighting the contrast between large-scale developments and local poverty, both of which are prevalent throughout Laos.

Whose Big Picture?

This presentation examined each of the three main objectives of energy planning policy in Laos and their associated issues and concerns, followed by a conclusion of the main themes for consideration in regards to Laos’ power development. The three objectives of power planning are as follows:

- To expand the electricity grid to provide electricity to 90% of the population by 2020
- To increase government revenue from investments in IPPs
- To promote an integrated 500KW grid in the Great Mekong Sub region

**Objective 1: To Expand the Electricity Grid**
Laos’ rate of electrification is currently at 70%, the country has achieved a strong record in achieving rural electrification, as demonstrated by figure 1. This change from a 15% rate of electrification in 1995 to the current level has mainly been facilitated by soft loans from the Asian Development Bank (ADB) and World Bank (WB).
However, there are major differences in rates of electrification across the country (see figure 2), which perpetuate inequalities throughout Laos. Electricity has great potential to remediate poverty in many circumstances but this is inhibited by unequal access to power. For example, Vientiane has a 99.5% rate of access to electricity whereas Phongsali, in the North, only has a 15% rate of access.
The goal of 90% electrification will be increasingly difficult to meet due to Laos’ geography. Much of Laos is very mountainous with low population densities in rural areas. This will become a physical as well as economic challenge as it becomes increasingly inefficient and expensive to electrify remote areas. However, the difficulty in supplying centralised electricity to rural areas provides an opportunity for decentralised energy solutions. There are several off-grid systems that have become important throughout Laos, for example, solar home systems, car batteries and pico-hydro systems (figures 3-5 below).

Similar to other countries in the region, Laos has significantly increased its projection of energy needs over the coming decade (see figure 6). The PDP 2002 had a virtually linear prediction of energy demand with an increase of approximately 10% per year. The 2007 PDP predicted a slightly higher increase in demand of approximately 14% per year. However, the PDP 2010 is based on annual increases in demand for energy of 27%, moving from the linear demand of PDP 2002 to exponential increases in demand.

Although it is hard to determine whether these figures are realistic or not the PDPs will definitely have an impact on the number of power plants and contracts issued for power project developments. The majority of the source of predicted demand will come from industries such as mining and resources, concentrated in the South of Laos (see figure 7).
Issues and Questions in Regards to Expanding the Electricity Grid
There are several questions that pertain to the government’s first objective, for example; is the current model of grid expansion the best option? How can off-grid renewable solutions be more effectively promoted? Is the proposed expansion of capacity necessary/the most cost effective way? Once again, the underlying theme of these questions is whose ‘big picture’ is being depicted? In other words, how can access to electricity contribute to development and will it contribute towards reducing inequality throughout Laos?

Objective 2: Increase Government Revenue from Investment in IPPs
IPP involvement in the Laos power sector began during 1998 and transformed the way electricity was being generated. From 1998, IPPs have contributed to approximately 50% of electricity generation (see figure 8); prior to this, EdL was the sole generator.
The table below (and figure 9) details the number of IPP projects in operation and the number of projects in the planning stage. If all the planned projects are built, the total added capacity would amount to over 21,200 MW. These projects include 9 controversial mainstream dams and only one non-hydro power project, the Hongsa Lignite coalmine. Although hydropower projects can provide a large source of revenue for the government, river systems and local peoples’ lives will change dramatically and many communities will have to find other land and livelihoods. Furthermore, the majority of electricity generated will be exported overseas rather than used in Laos (see figure 10). IPP projects are also likely to be funded by foreign firms, thus profits will also flow overseas.

**Table 1: Power Projects in Laos, Source: GoL 2011**

<table>
<thead>
<tr>
<th>Number of projects</th>
<th>Capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operational</td>
<td>14</td>
</tr>
<tr>
<td>Under construction</td>
<td>10</td>
</tr>
<tr>
<td>Planning stage</td>
<td>25</td>
</tr>
<tr>
<td>Feasibility stage</td>
<td>37</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>86</strong></td>
</tr>
<tr>
<td><strong>21,200</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 9: Map of Existing and Proposed Dams, Source: International Rivers, 2011**
Issues and Questions in Regards to Increasing Government Revenue from Investment in IPP

One of the greatest risks with IPP projects is the ability to effectively enforce environmental and social standards, for example, providing adequate compensation for communities that are displaced. The transboundary impacts in environmental, social and economic terms also need to be thoroughly examined for these to be effectively mitigated; environmental impacts are not contained by country borders, thus, neither are social impacts. Laos also needs to avoid the threat of ‘Dutch Disease’ where too much investment in a particular sector harms other sectors due to upward pressure on the currency value. These issues are once again framed by the overriding question of whose big picture are energy developments catering to? In turn, the question of how costs and benefits can be shared more equally needs to be addressed.

Objective 3: The Greater Mekong Subregion Grid

The rationale for building a regionally integrated grid is to replace bilateral deals with a regional power-trading scheme. This objective is being driven by the idea that resources in the GMS are often located far from centers of demand. For example, electricity generated from hydropower projects in the North of Laos could be transmitted to Thailand. The ABD and WB are the primary supporters of the regional grid and see it as having positive economic impacts on the GMS.

The regional grid will require significant investment; this has already been reflected in the latest PDP in which investment in building transmission lines and substations has increased by 11 fold. It remains to be seen as to how the government will fund such drastic increases in investment.
Figures 11-12: Regional Grid Developments, Source: ADB 2010

Source: EdL PDP 2010-2020
Issues and Questions in Regards to the Greater Mekong Subregion Grid
The main question is to what extent can/will the claimed benefits of the grid be realised? The answer to this question will depend on a number of factors, namely, whether the grid can be adequately regulated. The power sector in each GMS country is highly centralised and monopolistic. Thailand is the only country that has had any experience with a regulator and this begs the question, if there is no domestic regulator for many of the countries, how could they form an effective regional regulator? Such a regional regulator is key to ensuring the economic benefits predicted by the ADB and World Bank materialise. Without adequate management of transborder impacts and agreements, it is unlikely that the grid will improve inequality.

Conclusion
The Laos power sector is changing rapidly with predictions of demand increasing exponentially. This will profoundly transform the economy, society and environment; particular attention to the question of whose big picture are energy projects catering to is required in order to ensure that the needs of communities as well as corporations are met.

Overall, there is a striking disconnect between domestically led development and IPP led development. The latter is financed from foreign sources and electricity is sold in foreign markets. Under this scenario Laos may run the risk of over exploiting its resources and relinquishing control over the power sector. Although IPPs present an opportunity to significantly increase revenue, they also pose potentially severe social and environmental dangers if they are not managed properly.
Challenges of Social and Environmental Justice in Chinese Energy Development
Yu Yin

The 2012 round of energy meetings amongst energy officials in China suggests that the next (12th) five-year energy plan will comprise accelerated hydro power development, nuclear power, wind, expanded solar energy development and increased investment in developing other sustainable energies. Although China is aiming to reduce the number of coal-fired plants being used, the percentage amount of coal-generated power will reduce but the real number of coal-fired plants will increase. This presentation assessed the social and environmental challenges associated with these four key energy resources, explained the costs of the challenges posed and highlighted problems associated with the Chinese political structure of energy policy and planning.

China has experienced three decades of rapid growth and energy intensive economic development, especially since joining the World Trade Organisation in 2000. For the next five to ten years, the government aims to ensure that the economic growth rate will remain at around 8%. In addition, the trend towards urbanisation will continue. Securing abundant and stable sources of energy is key to achieving this growth. China’s 12th version of the five-year plan has not yet been released; however, some data has been leaked. Energy efficiency and emissions reductions were a priority in the 11th five-year plan and continue to be so in the 12th, however, China will also need to expand its energy generation to meet the prospective increases in demand. Mega coalmines and power plant complexes will be the main source for meeting this demand over the next five years.

In recent meetings, China has reaffirmed that it will continue to honour its commitment made at the Copenhagen Climate Conference 2009 to reduce energy intensity by 16% and carbon intensity levels by 17% of the 2010 level by 2015. Despite this, there will be a huge increase in hydropower, nuclear, wind and coal seam gas energy generation (see table 1). There are many social and environmental challenges underlying such ambitious energy plans, which are examined below by energy type.

<table>
<thead>
<tr>
<th>Energy Type</th>
<th>Installed Capacity 2010</th>
<th>Estimated Installed Capacity 2015</th>
<th>Electricity Generation Per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydropower</td>
<td>213 GW</td>
<td>260 GW</td>
<td>N/A</td>
</tr>
<tr>
<td>Nuclear</td>
<td>11.9 GW</td>
<td>40 GW</td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>31 GW</td>
<td>100 GW</td>
<td>190 billion kwh (Coastal wind power reach to 5 million kwh)</td>
</tr>
<tr>
<td>Solar</td>
<td>8 GW</td>
<td>15 GW</td>
<td>20 billion kwh</td>
</tr>
<tr>
<td>Coal Seam Gas</td>
<td>1.5 billion cubic meter</td>
<td>30 Billion cubic meter</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Coal

The 2011 five-year energy plan called for the closure of ten thousand small-scale coal plants to improve energy saving and reduce carbon emissions. Although this may be regarded as a positive step, the government was constructing several mega-scale coalmines and power complexes at the time, which will result in an increase in coal-fired energy generation. This form of energy generation carries with it a significant number of external costs. For example, China has one of the highest rates of coalmine and coal plant accidents (see figure 1). The latest figures suggest that during 2011 alone there were 1,201 accidents and 1,973 miners were killed. The increase in the number of large-scale coalmines and plants will mean that many more miners are threatened with the possibility of an accident or death.

![Figure 1: Coalmine Accidents & Deaths (2000-2006)](image)

A second issue concerning public health is the effects of coal ash on air pollution in China. Due to the number and scale of coalmines and plants, coal ash has become a very significant health issue in China as it contains heavy metals and reactive substances. Furthermore, when coal ash burns it has a higher concentration of these substances than raw coal and ash can travel long distances with the wind. Another complication with this matter is a lack of transparency from the government about levels of pollution. The mega cities of China have recently experienced very bad air pollution during the winter and civil society requested that the government to disclose the level of PM2.55, a particular particle that has adverse impacts on the body and leads to chronic disease. However, this information has not been made available.
Coal generated energy makes a significant contribution to carbon emissions and the Chinese government has exploited a loop hole in its commitment to reducing emissions, to allow for the increased use of this energy source. Although they claim to be reducing emissions, this will only happen in terms of intensity rather than the actual level of emissions.

**Hydropower**

In the 12th five-year plan, hydropower will play a key role as it is an important renewable energy for China. There are plans to build over sixty large-scale dams in sizeable river systems throughout China. If these plans proceed, at least 1.5 million people will be displaced over the next five years. This will inevitably lead to an increase in social unrest due to dissatisfaction with compensation payments and concerns over the future possibilities for sources of livelihood. Furthermore, due to the hydropower developments being located upstream, the effects of the projects will not be confined to one area. Rather, trans boundary issues will come into play as water levels, fish stocks and other environmental factors are disrupted.

**Nuclear**

China began its nuclear programme in 1985 and during the ensuing years, nuclear development has been prolific. Thirteen power plants have been built during this period, comprising approximately 2% of the country’s electricity. The government is a strong supporter of nuclear power generation, which will lead to China becoming a lead country in the use of nuclear power in future. For example, during 2010 China completed two out of five nuclear power plants that were underway globally. Currently, out of fourteen plants being constructed globally, nine are in China.

The Fukushima accident in March 2011 highlighted the potential for possibly detrimental impacts of nuclear power to occur. This provoked the Chinese authorities to pause the approval of new nuclear power plants in order for safety measures to be revised and improved. For example, China is now looking to import more advanced technology in the form of modern
safety features pertaining to nuclear power. Unfortunately, the nuclear incident in Japan did not stifle the government’s enthusiasm for nuclear power as it has been confirmed that nuclear power developments will continue to go ahead.

Many people are concerned about nuclear power because China lacks a regulatory framework to govern nuclear energy. For example, there are no risk assessments of nuclear accidents, there is a lack of legal restriction on nuclear safety, there are no public EIAs for nuclear power plants and there is a lack of neutral public information.

**Wind**

Power generated from wind has traditionally been regarded as an ecologically and community-friendly source of power. However, the scale and inefficiency of wind developments in China has highlighted the potential difficulties in using this technology as a source of power generation. Wind developments in China are taking place on a very large scale; for example, one plant that is currently undergoing development will have 8-10GW farms and will occupy approximately 10,000ha of land. This will inevitably result in conflicts over land and social upheaval through the displacement of communities. Furthermore, it is believed that up to 20% of annual wind power generated has been unable to be transferred to the grid due to inadequately regulated wind development.

**Issues with China’s Energy Sector Structure**

Since the 1990s, structural reform of the Chinese energy sector has transformed many energy ministries into state owned enterprises. Ensuing from this, the decision-makers within the energy sector are now business people who are profit orientated yet have strong linkages with the National Development and Reform Commission, which is responsible for formulation and implementing strategies of national economic and social development within China. Therefore, similar to Thailand’s energy policy and planning situation, this will inevitably result in conflicts of interest between serving the needs of the domestic population as well as protecting the environment and serving business interests, such as generating profit.

**Conclusion**

Overall, there has been much discussion in China about the choice of technology for energy development and what would be the best solution for addressing climate change and energy demand. However, the choice of technology is not the ultimate solution, rather, it is the system and structure of the energy sector that needs reform. To promote real, sustainable environmental development in the future, China needs a mechanism that is able to address social and environmental injustice, improve regulatory frameworks that govern the energy sector, disclose neutral information to the public and engage them in the decision-making process.
Chapter Three
Decentralised Renewable Energy Technology and Options
Supposing Power to Remote Villages in Laos – Role of Off Grid Technologies
Samuel Martin

The Lao government’s objective of achieving a 90% electrification rate by 2020 is very commendable; however, what is not discussed enough is the way in which this should be achieved. For example, what technologies should be used – decentralised renewable energy (DRE) or grid extension? Who should cover the costs – villagers or government subsidies? Grid extension is the favoured method by which the government aims to achieve its goal, although, as was demonstrated in this presentation, using DRE can be more cost effective, empower rural communities and in some cases is more effective in meeting the needs of communities.

Grid extension involves the government building medium voltage transmission lines and low voltage distribution lines, which in turn transmit electricity to villages. The villagers’ contribution is to then install the required internal wiring, meters and connect their households to the village distribution lines. Grid extension projects have predominantly been funded by grants and loans from the Asian Development Bank (ADB) and the World Bank (WB): $400 million was supplied in the form of grants by these organisations from 1987-2010. Over recent years, China and India have played an increasing role in facilitating grid extension; these countries have provided grants and loans on the condition that their equipment and services must be purchased when constructing the grid. Another increasingly popular delivery mechanism for grid extension is for local private companies to invest upfront, build the medium voltage transmission network and transfer it to the national utility Electricite du Laos (EDL) once completed. These companies are then reimbursed by the Government over a 5-7 year period.

As the grid extends further into rural areas, the cost of expansion per household increases, especially due to Laos’ rugged geography and low population density. The Rural Electrification Master Plan (REMP), funded by WB, uses economic criteria as a means to determine the appropriate extent of grid expansion. The economic criteria aims to examine the benefits that electricity would bring to a particular village. If the prospective benefits are calculated to be worth more than the cost of grid expansion, the grid would be extended to the village and vice versa. Under these criteria, the limit set for the cost of extending the grid to households was $2,700/hh in the North and $6,000/hh in the South.

Grid extension is justified by the notion that access to electricity through the grid is equated with development. However, according to preliminary studies completed by HELVETAS, the impact of grid extension on socio-economic development is not a guarantee in the short term. HELVETAS conducted a survey amongst 38 villages that had recently been electrified to examine the benefits gained and what impacts this had had on development. Firstly, the study found that the supply of electricity from EdL was not unlimited and that there were issues with the quality of supply in some rural areas. Secondly, the use of electricity for productive means was limited; mobile phones and lights were the most popular uses of electricity (see table 1). Overall, the
results of the survey suggested that development stemming from access to grid-supplied electricity was not as prominent as expected.

**Table 1: Average saturation rate per household of the 7 most common electric appliances in 38 surveyed villages**

<table>
<thead>
<tr>
<th>Household Appliance</th>
<th>Average Nr/ electrified hhs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile phone</td>
<td>3.2</td>
</tr>
<tr>
<td>Light - fluorescent (tube) (long)</td>
<td>1.5</td>
</tr>
<tr>
<td>Light - fluorescent (tube) (short)</td>
<td>1.5</td>
</tr>
<tr>
<td>Television</td>
<td>0.9</td>
</tr>
<tr>
<td>Satellite</td>
<td>0.9</td>
</tr>
<tr>
<td>Light - CFL</td>
<td>0.8</td>
</tr>
<tr>
<td>VCD/DVD</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Source: HELVETAS (2012b)

Furthermore, extending the grid may not always be the cheapest option for supplying electricity. HELVETAS compared the cost of supplying electricity via the grid to the cost of three DRE options: solar photovoltaic, pico-hydro and micro-hydro. The comparison was made for the same demand for each option (grid extension and DRE) and the demand scenarios considered are the same as in the REMP. At a certain distance from a village the grid is no longer the most cost effective way of supplying electricity, this point is considered to be the ‘breakeven distance’. Pico-hydro proved to be the most efficient DRE source of electricity (see figure 1) followed relatively closely by micro-hydro, however, the solar photovoltaic system was significantly less efficient.

**Figure 1: Breakeven distance for 3 DRE technologies in Northern Laos.** Source: Helvetas (2012a)
HELVETAS developed GIS maps based on maps in the REMP to visualise the above findings (see figure 2). A circle was drawn around each un-electrified village, with a radius equal to that of the breakeven distance of the DRE technology chosen. This circle takes into account the size of the village and is based on a chosen technology and demand scenario. If a village is connected to the grid system within the radius of the circle, it would be cheaper for the un-electrified village to also connect to the grid. If not, then the selected DRE technology is the most cost efficient method of providing electricity.

![GIS Visualisation of Grid vs. DRE electrification](image)

**Figure 2: GIS Visualisation of Grid vs. DRE electrification**, Source: Helvetas (2012a)

It is also argued that electricity supplied via off grid means can provide a better foundation for development through empowerment, capacity building and local job creation as villagers plan, own and construct the source of electricity themselves, rather than being passive recipients of centrally distributed electricity. HELVETAS has also developed a decentralized energy planning methodology, which allows villagers to prioritise their energy needs, for example to pump water as opposed to providing light. Some technologies such as pico-hydro have developed organically in rural Laos and villagers purchase, install and operate the technology on their own accord. Building on these existing supply chains and local knowledge is essential to ensuring the sustainability of the intervention in the form of energy supply.

Overall, there are several factors that support the adoption of DRE generated electricity. In some circumstances it is cheaper and more efficient that grid-supplied electricity, especially in remote and least populated areas. DRE technologies can also encourage development through empowering villagers by enabling them to construct, manage and own their own supplies of electricity. It is important to encourage the Lao government to give more consideration to DRE options and to help it develop sustainable delivery models to assist it in achieving its goal of electrifying 90% of the population by 2020.
Transforming Cambodia’s Energy Policy: Fulfilling the Potential of Decentralised Energy Solutions
Tonn Kunthel

Cambodia needs a greater supply of electricity at a cheaper rate to improve the lives of its population and strengthen the economy. Decentralised electricity generation offers an effective way to achieve these objectives, as it is a cost effective, sustainable and flexible solution. This presentation examined the viability and necessary requirements for implementing Decentralised Renewable Energy (DRE) options. Currently, Cambodia’s policies are focused on cheap, large-scale energy options such as coal and hydropower; however, revising the current policy could enable greater support for decentralised electricity generation.

The benefits of decentralised energy are widely recognised: it gives communities the lighting and electrical power that they need, encourages community and local ownership of power whilst minimising public opposition to power projects, averts the costs associated with large-scale power generation, promotes the development of local technical skills, minimises grid losses by producing power locally, reduces or eliminates the need for costly transmission lines, diversifies energy supply thus increasing energy security and finally, it lowers harmful emissions and promotes cleaner air, soil, and water.

The lack of electricity supply in Cambodia is in stark contrast compared to other Mekong region countries; only 16.41% of households in Cambodia have access to electricity, 73% of which are concentrated in the Phnom Penh area. Furthermore, due to limited supply the prices for electricity are particularly high, ranging from US $0.75c- $1.25 in some districts. Increased support for decentralised energy generation could remedy this situation.

In order to increase the number of households with access to electricity, the Cambodian energy policy is based on the following objectives:

- To increase the electricity supply and reduce the electricity tariff to an appropriate level.
- To encourage the construction of low cost electricity generating plants using local sources such as hydropower, natural gas, and coal.
- To explore possibilities of developing high-tech power plants including nuclear and non-traditional energy.
- To continue to pursue the import of electricity from neighboring countries.
- To encourage the construction of electricity transmission lines covering all parts of the country to lower the cost of electricity and meet the demand in urban and rural areas.

The government has made the acceleration of rural electrification through the use of renewable energy a priority in order to reduce poverty and promote equality for people living in these...
areas. The government has pledged to put measures in place to mitigate the adverse effects of energy projects on the environment and society, whilst safeguarding the project’s economic efficiency.

Although this energy policy has some encouraging characteristics, decentralised energy is not on the agenda. This is despite the fact that decentralised energy generation techniques are already prevalent throughout Cambodia; there are more than 170 licensed power providers selling to urban and rural customers. For example, Rural Electrification Enterprises operate battery-charging stations for households and businesses and there are rural businesses that use agricultural waste or biofuel to generate and sell power. Furthermore, some Cambodian technology companies sell and install renewable energy technologies to help rural populations meet their energy needs.

There are several steps that need to be taken in order for decentralised electricity to gain more support in energy policy planning. The hidden costs and negative externalities associated with DRE projects need to be examined in order to ensure that these are dealt with by the company responsible for the project. Inaccurate power sector myths, need to be challenged, namely, the notion that ‘bigger is better’ and that multiple small producers are difficult to manage. Finally, the regulatory framework that supports this sector must comprise transparent and explicit rules allowing for confidence amongst investors.

From a policy perspective, there are several initiatives that could be implemented to encourage decentralised electricity generation. The introduction of customer financing would allow households and businesses to finance the upfront capital costs of DRE generation. Measures could be taken to encourage the innovation and construction of decentralised technologies, encouraging innovation and greater participation by prospective DRE electricity suppliers in the sector. A process of competitive bidding for generation capacity may also attract more participants to the sector, coupled with power generators being given non-discriminatory access to local distribution grids. It is also essential for investors and developers to be provided with clear, stable pricing signals through the introduction of explicit measures for tariff setting and cost-recovery. Furthermore, explicit and transparent steps for obtaining permits and public approval of projects would provide a solid foundation for investment.

If such policies were implemented to accelerate the development of decentralised energy generation, Cambodia would be able to meet its electricity needs without compromising its rich environment or rural livelihoods. The benefits of decentralised generation and the policies to encourage their adoption can be extrapolated to other country contexts within the region. There are many circumstances where the lives of remote populations are inhibited by a lack of access to electricity, however, the implementation of large-scale power projects threaten the environment upon which they depend. Decentralised generation is a strong alternative to this scenario.
Practical Policies for Decentralized Electricity Generation

Chris Greacen

This presentation focused on policies to encourage decentralized energy and looked at three particular issues:

1) What is decentralized energy?
2) Observations of centralized vs. decentralized energy technologies
3) Practical policies for decentralized electricity in Thailand

Decentralized energy refers to electricity generating sources that are small and local compared to large-scale conventional sources such as coal, gas, nuclear, large-scale hydropower and natural gas. Decentralization is already a familiar concept, for example in the form of cell phones and changes from broadcast television to the internet. The old model of centralized power generation involved a centralized power plant that would produce all the electricity and send electricity to customers down the line and receive money back up the line to the utilities. A more decentralized approach involves installing energy sources at the customer’s point of use with money and electricity flowing in both ways. The change has been driven by interesting changes in costs. For the first 50 years, technologies got cheaper by building bigger and bigger power plants, but in the 1980s and 1990s costs became lower by mass production of smaller scale power plants.

Decentralized energy can save substantially on transmission costs and although generation costs are higher, these are more than offset by the decreases in transmission costs. One common example of decentralized energy is cogeneration. To understand cogeneration, first consider the surprising fact that with conventional centralized thermal generation, about two thirds of the energy used in the generation of electricity is lost up the smoke stack and cooling towers. Cogeneration involves siting energy generation facilities near to where heat or steam is needed and then using the left over steam from electricity generation for industrial loads. There are many examples of cogeneration facilities, such as Bangkok’s Suvarnabhumi airport and the University of Massachusetts in the US.

Decentralized energy can help provide electricity services to rural areas and especially the rural poor. However, not all decentralized generation is good in terms of the environment; on the one hand there is dirty, noisy, diesel-generated decentralized electricity that can be accompanied by spills of fuel and bad air particulates. On the other hand, there are opportunities for clean, decentralized renewable energy to compete, especially in rural areas because diesel electricity generation is so expensive. For example, in Cambodia electricity costs range from between 75 cents to one dollar 25 cents because high-priced diesel is used.
Some national grids have a huge amount of decentralized electricity. Denmark gets over 50% of its electricity from decentralized systems. This evolution has taken place since the 1980s when the country had a handful of centralized coal-fired power plants, compared to the situation today where there are hundreds of small cogeneration plants at community level.

In Thailand there have been a number of policies that have helped enable decentralized generation, particularly policies that make use of Thailand’s abundant renewable energy resources, especially biomass. Some of these include policies that guarantee access to the grid, feed-in-tariffs that provide stable tariff payments, low cost financing and tax incentives.

Access to the grid involves regulations that do two things: technical regulations govern the safe interconnection of generating systems to the national grid; commercial regulations govern the flow of money from the utility back to small-scale generators. Technical regulations deal with types of protection relays that are required, while commercial regulations deal with who pays what costs, how tariffs are calculated, how invoicing and payment arrangements are made, and what happens in the event of disputes between the parties. In the case of Thailand, there are standardized Power Purchase Agreements, (PPAs) which are standardized legal documents that streamline the application process.

In Thailand, the first regulations that facilitated decentralized generation were the Small Power Producer (SPP) regulations of 1992, which allowed fossil fuel cogeneration and renewable energy up to 90 MW (for export to the grid) per plant. The tariff offered was fairly low for non-firm renewable energy generators, so most of the installations that ended up coming online under this programme were industrial scale cogeneration that could meet strict availability requirements as ‘firm’ generation. A substantial amount of cogeneration is online in Thailand considered that the peak load is 24,000 MW – i.e. about 4,500 MW with more than another 4,000 MW in the pipeline with signed PPAs. Again, about 75% of this is fossil fuel generation.

It was recognized that not many smaller SPP projects (smaller meaning a few MW or smaller as opposed to tens of MW) were coming online, so Thailand adopted another set of regulations in 2002 called the Very Small Power Producer (VSPP) regulations. Initially they allowed projects up to 1 MW for export, but in 2006 this was increased to 10 MW per project and a feed-in-tariff adder was adopted that added a premium payment for renewable energy technologies. In 2009, tariffs were further modified to pay an additional premium for projects that offset diesel generation, or for projects located in Thailand’s violence-prone southern provinces. The tariffs paid are differentiated by technology and by size, e.g. smaller projects get a little bit higher tariff and solar projects get more than others, such as biomass projects.

Thailand also has a revolving loan fund that provides a loan of up to 50 million baht per project. Money is loaned to commercial banks which then loan the money to projects. Commercial banks participating in this program cannot charge more than 4% interest and there is a loan period of 7 years. The government also takes an active role sometimes as equity investor or through leasing equipment directly to renewable energy projects through a programme called the ESCO Fund.
Tax incentives can also promote decentralized energy. The Board of Investment (BOI) provides a tax holiday of up to eight years and then some additional tax deductions for a further five years as well as import duty reductions and exemptions on equipment. These exemptions are also offered to large-scale IPP generators.

The types of projects that have come online under this programme include community micro hydro projects, solar farms, solar thermal electric plants, as well as biogas generators using waste from pig farms and the tapioca industry. Rice husk and bagasse from the sugar industry also generate a lot of decentralized electricity. There has been some community opposition to some renewable energy plants (biomass plants) because of concerns about particulate emissions, and increased traffic on local roads from trucking biomass for combustion. Some have raised concerns that EIA requirements may be too loose for projects under 10 MW.

Under the VSPP programme, over 1,000 MW has come online and there are Power Purchase Agreements in the pipeline for well over 4,000 MW, which is again significant looking at Thailand’s overall peak load. Solar is very significant under this programme; and there are close to 2,000 MW of solar PPAs.

Another policy that is appropriate for countries that have a lot of off-grid areas are policies that encourage mini-grid operators to invest in their mini-grids. One set of policies can be to allow off-grid generators to set their own retail tariffs subject to transparent approval by regulators. Another issue is what happens to a mini-grid when the national grid system expands into the area? It is important to address this issue because otherwise there is a danger that mini-grid operators will not want to invest in building good distribution systems or invest in renewable energy technologies because they are afraid that if the grid expands their investment will be rendered useless. Potential solutions that could help reduce the risk to investors in decentralized mini-grids would be to allow these generators to sell electricity back to the grid and/or to be able to purchase electricity from the national system and continue to serve as retail distributors and maintain their businesses.

In summary, some of the policies that have worked in Thailand to encourage decentralized electricity generation have been policies that guarantee streamlined access to the grid, feed-in-tariffs, low cost financing, and tax incentives. For countries without extensive grid-based electrification, it is also important for policies to provide remote mini-grids flexibility in setting retail tariffs and reduce investment risk by working out the details of what happens when the big grid expands to the mini-grid area.
Community-Based Rural Electrification Through the Promotion of Safe
Pico-Hydro
Vanpheng Singharad

This presentation focused on the ‘grass roots’, smaller scale development that is occurring in Lao PDR through the implementation of pico-hydro systems (PHS) to produce community-based electrification. Pico-hydro is small-scale renewable energy that can be easily produced and used in villages. It is one of the most efficient rural energy sources and is the most efficient method of supplying electricity to villages in rural areas. Pico-hydro systems do not involve any complicated mechanisms or complex technology; they can generally be constructed from materials that villagers may already possess or have easy access to. Furthermore, due to their scale, they do not harm the environment.

The overall aim of the Poverty Reduction and Development Association’s (PORDEA) project is to contribute towards the Lao government’s electrification objective of electrifying 90% of households by 2020. The concept of the project is to promote safe and reliable pico-hydro systems in the pilot area. PORDEA found that some villagers already used such systems but in an ineffective way or that they were using the wrong techniques. Therefore, PORDEA has tried to raise awareness and educate villagers on safety measures with respect to using pico-hydro systems as well as promoted and supported the adoption of pico-hydro systems in rural areas.

The pilot project focused on one province (see figure 1) and had a budget of US$21,500, which is enough to supply electricity for 99 households. Thus, the budget for each household is US$217. These figures demonstrate that decentralised electricity can be supplied to rural houses at a much cheaper rate than centralised electricity. Three pico-hydro systems were implemented in the village, two with a 4,000W capacity and one with a 6,000W capacity. The project was designed to use natural resources and to have limited impact on the surrounding environment. For example, to reduce the impact on rivers, pico-hydro systems are constructed in canals rather than main rivers.
The project has two key objectives: the first is to build the capacity of key villagers and local partners by selecting some villagers to become roaming technicians and by including partners at the government and district level in the project. The second key objective is to support and empower rural farmers to make informed decisions on the installation of pico-hydro systems and to recognise the alternatives for electricity generation so that they can choose the best option. Rather than influence villagers’ decisions, PORDEA aims to support them to see a clearer picture and form decisions on their own.

Implementing pico-hydro systems has immediate social and economic benefits among the local population. For example, by supplying electricity for light, children are able to do their homework at night without relying on candles and women can continue to work into the night, increasing their income. To further promote the status of women, PORDEA’s project aimed to achieve a level of participation by women of 50%.

The approach to executing the project encompassed focus group discussions and the establishment of groups of villagers who attend meetings where support and training for implementing pico-hydro systems is provided. The project uses a voucher system rather than cash for villagers to obtain the systems. The use of vouchers also allows villagers to choose between using a shared system and having their own. There is also a buyer feedback system whereby the village technician works closely with the shop owner to provide feedback on the pico-hydro system and its progress.
Rural Renewable Energy Revolving Fund (RRERF) Trial Project in Myanmar

U Aung Myint

This presentation demonstrated two examples of rural electrification projects in Myanmar, exploring their structure, methods and objectives.

The objectives of the programmes were to improve the development of rural communities through using renewable energy technology and to explore financial support systems for providing renewable electricity. The latter is especially necessary in order to pursue the commercialisation of renewable energy sources. Another prime objective was to take a multi-stakeholder approach to projects and to achieve the objectives in an environmentally friendly manner. These programmes focus on a grassroots approach, i.e. the majority of the population in Myanmar, and their ultimate goal is to alleviate poverty and to empower the population to improve their lives immediately as well as protect the environment at the same time.

The first example is the Rural Renewable Energy Revolving Fund (RRERF) pilot project, which ran from 1997–2002 and was initiated by the Ministry of Energy, the United Nations Development Programme (UNDP) and the Asia and Pacific Development Centre (APDC). The project’s facilitators included the Renewable Energy Association of Myanmar REAM (NGO) and private companies that agreed to guarantee supplies of materials. It was implemented in Pale Village, Than Lyin Township, Yangon Division, Myanmar and the total project cost was US$4,747, the total amount of which went to village beneficiaries. This multi-stakeholder approach of government, international agencies, banks, the private sector, NGO/CSOs and village community-led organizations (Cooperative firm) provided many lessons and experiences for further improvement ideas.

A seed fund (50% from project budget and 50% from the bank) was then set up at the designated bank and a Revolving Fund with specified pay back periods based on the capacity of villagers to pay. The final steps involved providing necessary training on operating the solar photovoltaic system (SPV) as well as on small battery repair and maintenance. The battery charging project was then implemented and managed under the revolving fund, which also monitored loan repayments.

The second case study is the Candle Substitute Solar Lighting System (CSSLS) trial programme. This covered 20 villages in the three townships of Mawlamyine Gyun, Nat Mauk and Pauk, in the Ayarwady Delta and Dry Zone of Myanmar. It was implemented during 2010 by REAM and included project partners from the private sector and village committees from 30 villages. The total project cost was 30,000,000 Kyat and the beneficiaries comprised 1,440 poor families from 20 villages.

Both projects involved multi-stakeholder support that included participation by the following actors: ministry officials, the relevant government department, international organisations, banks, community cooperatives, private entrepreneurs, area authorities from village to township level, and local NGOs.
REAM found that despite the high level of involvement and development programmes from external parties, local communities have been most progressive in finding solutions for their daily basic energy needs. For example, villages had previously relied mainly on kerosene lamps before 1970 until there was a crisis in the kerosene market. This resulted in villagers developing other methods to power lighting, and during this period they achieved a vast improvement in satisfying their needs by developing alternative small battery lighting systems. However, their own development efforts were hampered by their weakness in technical knowledge, insufficient investment, the inadequate commercial development of batteries, as well as lighting appliances in bad quality and many difficulties in charging power by using diesel generators. For this reason, candles became the main lighting source for almost all villages in Myanmar.

The importance of the multi-stakeholder approach is demonstrated by the method used by REAM to implement their CSSLS programme, which was based on the RRERF programme design. Firstly, REAM conducted a series of surveys on the basic need for lighting of the rural poor and examined the availability of appropriate renewable energy technologies for each specific site being considered as a site for potential project implementation.

Once the technology had been chosen, a Project Facilitator Group with skills in renewable energy technology (RET) services was established. Further surveys were conducted on the beneficiaries’ willingness to participate and their actual power requirement, as well as on a possible financial support mechanism and the establishment of community-based self-management programme for the chosen sites. Further studies were carried out on government guidelines, and the participation of village CBOs.

For the implementation of the current CSSLS trial programme, the renewable energy source identified as the selected RET was a battery-charging system powered by solar photovoltaic (SPV) energy. The next stage of the programme involved the commencement of negotiations with potential financiers and developers (national, international, public and private) to establish who would become the financial administrators and system facilitators of the project. Once a good financial support system (RRERF) is established, communities who have shown willingness to electrify their own villages will be selected to receive support from the RRERF through a specific programme of supporting agencies and service providers. Most potential agencies suitable to act as service providers will be formed from working groups of NGOs and CBOs. Well established groups will become key facilitators by providing all-round services from technical to management support functions for each project. Official collaboration with private entrepreneurs, who will supply quality materials and performance guarantees, must be organized legally. The coordination work outlined above was trialled in the two case studies described in this paper.

To date, the CSSLS programme has been operating well in 20 villages. The facility used for lighting is very simple and easy to use, thus making it easier for communities to adopt the technology. Essential to the programme is the recognition of the unique situation of each villager, which affects both the technology that they need and their ability to pay for the lighting.
facilities. REAM has also obtained government permission for the programme and is now educating and advocating the adoption of similar projects to more government officials. During the current project monitoring process, beneficiaries have expressed satisfaction at receiving better lighting at lower cost than candles.

Overall, REAM considers lighting to be a basic need for villages in Myanmar, especially for poor families. There are about 65,000 villages in Myanmar, which comprise approximately 70% of the population. More than 50% of these village households do not have a secure supply of electricity even for lighting at night. The programmes discussed in this presentation reflect a simple way to implement rural electrification methods, and which have great potential to supply light to other areas in Myanmar and which will also support real sustainable development in the long term.
Border Green Energy Team (BGET) was founded during 2005 to work closely with communities on implementing renewable energy technologies, including: micro/pico-hydro, solar electric systems, bio digesters and water filtration systems. The organisation’s work with solar home systems (SHS) in communities along the Thai/Myanmar border formed the basis of this presentation, demonstrating the appropriate methods for implementing DRE technologies such as SHS and the benefits that communities can derive from them.

The above picture depicts a typical SHS supplied by the Thai government to villages that were not connected to the grid system. The system included a 120W panel that could power fluorescent lights and a small TV or other appliance. During 2002, almost 300,000 households throughout the country were still not connected to the grid and from 2004-2005, the Thai government invested USD$200 million to install more than 200,000 SHSs in these households. Fifty per cent of the SHSs are located in the North, 20% are located in the Northeast, 20% in the South and 10% in Central Thailand.

This project added 24MW of peak capacity to the renewable energy portfolio. Once all the SHSs had been installed, ownership of the project was transferred to the sub district government officers, who were required to collect a fee of 50 baht per month to cover the costs of system maintenance. However, no further budget was provided for maintenance and there were no plans on how maintenance would be carried out, thus inhibiting the sustainability of the project.
BGET and Palang Thai’s Chris Greacen foresaw the potential limitations of the project and developed a plan to train 300 local technicians to use and maintain the systems. This was carried out from 2005-2007, during which time local villagers were also educated on the warranties associated with the SHSs: solar panels had a warranty of 5 years, charge controller/inverter unit had a warranty for 3 years and the battery had a warranty for 2 years. The technicians used the skills and knowledge they learnt to survey 8,000 SHSs and as a result, filed 1,200 warranty claims because approximately 20% of the SHS systems had stopped working.

From 2008-2010 further training was given on the operation and maintenance of the systems, and BGET created a short video on maintenance, which was distributed to 3,500 local governments covering 70% of the total number of installations. BGET also raised funds to allow for the repair of 80 SHS systems in 2 villages. This was carried out by sending the broken parts back to manufacturers to be fixed, as well as replacing batteries and light bulbs so that villagers did not need to do so.

Maintenance of the SHS systems could not continue to be funded by donations channeled through BGET; therefore, a pilot project using a business model to mend broken systems was launched. Villagers were asked to pay incremental costs over 1-3 years to cover maintenance of the service and the hiring of a local technician to carry this out. The equipment used during maintenance is under warranty for the period of the repayment (1-3 years). Under this system, 80 SHS systems were mended and one local technician was hired, proving the pilot project to be successful. In addition to this success, people who did not have a SHS were provided with the option of buying a small solar lamp or phone charger at a low price.

BGET learned that to make the SHS project sustainable and expand its scope, it needed to be carried out as a social enterprise where the money generated is reinvested back into supplying and maintaining the SHS. This has proved to be the most efficient, sustainable and successful way to continue the SHS project and has been shown to be superior to government or NGO control over the project. It has also allowed for original SHS parts to be replaced with better parts, provided a flexible financing option for villagers to afford the SHS and facilitated the creation of local jobs. Furthermore, some villages are cut off for approximately 4-5 months during the wet season and must be able to manage and run the SHS systems themselves, the independence gained through the social enterprise model enhances their ability to do this.

**DRE potential: Impacts of SHSs**

Whilst carrying out the SHS project, BGET became aware of the significant difference that this form of electricity for lighting could make to villagers’ lives. One 42-year-old woman, who makes a living by selling her hand woven cotton fabric to the Royal Occupational Development Project, was interviewed about BGET’s project. She had received an SHS when the government initiated the project; it worked for 5 years but then broke and was not repaired for 1 year until it was repaired through BGET’s project. During the period that the SHS was broken she was unable to continue working into the night, thus reducing her output and income. However, once the SHS had been repaired, she was able to make 30 pieces in 1.5 months. Each piece can be sold for
between 200-700 baht meaning that in 1.5 months she made a minimum of 6,000 baht, representing a significant increase in her income.

The woman was very grateful to be able to use the system again. When asked whether she minded paying, her reply was that she had previously had to pay for candles, which were insufficient sources of light and are not cheap. Therefore, she was more than happy to put money towards having a functioning and reliable SHS.

BGET spoke to another woman who had two children in school. Before they had the SHS, the children had to do their homework by candlelight. They found it tough to read for over an hour in dim light whilst inhaling the smoke from the candles. The fluorescent light powered by the SHS made a drastic change, enabling them to complete their homework more easily. The mother reported that her children now wanted to continue their schooling into senior years and that she would be happy to pay for them to do so.

In conclusion, the work of BGET with SHS illustrates the potential for DRE technologies to significantly improve the lives of rural villagers. Having consistent and reliable access to something as simple as lighting can allow for significant increases in income for villagers or it can motivate children to try harder at school. It is important to implement and maintain SHS in an efficient and effective way, which BGET has found to be through encouraging social enterprise. Under this system, the villagers are able to obtain good quality parts, maintain independence and arrange flexible financial schemes to buy the technology.
Chapter Four

Financial Perspectives in the Energy Sector
Climate Objectives Shaping the Energy Agenda: A Case Study of the World Bank and Laos
Mira Käkönen & Hanna Kaisti

Climate change is high on the political agenda throughout the world and there is a growing unanimity about the pressing needs to take action and restructure the energy sector. Several actors in energy finance have formulated their policies around a triple objective: to ensure energy security of supply, to alleviate energy related poverty and to achieve these objectives in a climate friendly manner. Dominant actors such as the World Bank (WB) have previously been criticised for initiating anti-poor and anti-climate energy finance initiatives, therefore they are now trying to establish a ‘win-win’ scenario of achieving the three aforementioned objectives. It is thus important to closely examine the way in which rhetoric will be translated into reality, for example, in terms of actual funding decisions and implementation models; this is the purpose of this presentation.

Financing for new clean power generation is currently lower than that for non-renewable sources. In addition to this, energy investments do not focus enough resources on overcoming inequalities in energy access, even though the funding needed to provide basic energy access would be less than 3% of global energy investments. New challenges also lie ahead. There is agreement that finance for clean energy projects must be increased but definitions of terms such as ‘clean energy’ are contested. For example, the WB has highlighted hydropower and nuclear power as having considerable potential as sources of clean energy. Instead, many others regard these ‘solutions’ as worsening inequities in the distribution of energy benefits and in some cases, forming a catalyst for climate change.

The source of finance is a key consideration of energy policies, which requires close examination. Finance generally comes in the form of either public or private sources, or a combination of the two through agreements such as Public Private Partnerships. Public finance has traditionally been the means through which large-scale energy technology has been developed, for example, hydropower, nuclear and coal power. Developing clean energy technologies will also require public financial support, however, many subsidies from governments are still directed towards fossil fuel energy sources. The level of energy related Official Development Assistance stands at approximately USD$10.7 billion per year and less than half of this amount is dedicated towards low-carbon energy.

Private sources of finance for energy projects have outstripped public sources over recent decades, for example, through the increase in privatisation of public utilities and assets. This has altered the nature of public finance and led to a situation where the government focuses primarily on securing external sources of finance, rather than on contributing finance to the energy sector. Due to weak governance of private sector financing for energy projects, there is a disjuncture between expectations of what this type of financing should aim to achieve (reduce
climate change and remedy energy related poverty) and the objectives of private financing (profits).

Climate finance and carbon markets have formed a new stream of funding within the energy sector. Currently, the level of finance provided by these initiatives is relatively low yet nonetheless significant and will grow in future. These initiatives comprise a mix of public and private finance. For example, carbon markets are based on private financial flows but the institutional set-up requires public funding. In developing countries, aid money has been directed to capacity building initiatives related to forming carbon markets. The Clean Development Mechanism (CDM) has been the largest source of funding for carbon mitigation to date, a total of USD$2.6 billion had been distributed in 2009. Around ¾ of the produced credits have come from projects centered on the elimination of industrial gases, for example, HFC. The CDM has also promoted a significant number of energy projects with more than half relating to renewable energy. The dominant category in renewable energy has been hydropower.

The twin objective of the CDM is to address the mitigation of carbon emissions and to contribute to sustainable development. There has been a certain level of debate over the success of these objectives due to the problems of additionality, double counting and the underlying offsetting logic in regards to the CDM. Criticism around CDM projects has been abundant and questions have been raised as to whether the CDM is really funneling investments towards projects that need them most.

The faults of the CDM may stem from its market logic; investors are attracted to sectors where they can make the highest profits, this is related to where they can maximise their amount of emission reductions. Therefore, it is more viable for them to target high polluters such as large cement factories rather than poor villagers, who are likely to be using biomass or fossil fuels in small quantities. As a result of this, the CDM is ineffective in improving equality of access to electricity for local communities. The same logic may explain the unbalanced regional distribution of the projects where China, India and Brazil have the majority share of projects and Least Developed Countries only have an approximately 1.1% share of CDM projects. Investors are attracted to areas where they can make the highest profits with the lowest risks and where the physical and institutional infrastructures are reliable; this scenario is often not applicable to Least Developed Countries. Furthermore, nations that already struggle to attract investment are unlikely to enforce strict regulations in regards to sustainable development in order to make it more attractive for external parties to invest in the economy.

The WB is still a significant source of funds for projects in developing countries and since 2004 it has claimed to be working towards a revolution in renewable energy. The WB’s energy related funds include the Climate Investment Fund and various carbon funds under the Carbon Finance Unit. However, the credibility of the WB’s climate policies has been challenged due to the lack of systematic mainstreaming in country assistance and throughout the portfolio as a whole. There has also been controversy over the policies promoted under energy financing, namely in relation to poverty alleviation outcomes as privatisations of power sectors during the 1990s led to a lower electricity rate in several countries.
The new energy strategy that has been drafted aims to respond to these criticisms by conforming to two new guiding principles, that of increasing access to modern energy services for the poor and shifting towards low carbon energy sources. The progression towards low carbon energy sources has focused on two primary technologies: hydropower as the main large-scale solution and solar home systems (SHS) as the main small-scale solution. Finance for hydropower projects was phased down during the 1990s due to criticism over this form of energy generation; however, hydropower projects are proliferating once again, sparking a new wave of criticism.

The situation in Laos is illustrative of the WB’s strategy of providing funding for renewable energy projects. The Nam Theun 2 dam (NT2) was funded by the WB and signifies the promotion of hydropower. In addition to this, the WB has focused on achieving rural electrification mainly through funding grid extensions and through supporting SHS schemes in Laos. Overall, the Lao government is pursuing an objective to transform the country into the ‘battery’ of Asia, and the WB’s vision is for Laos to now shift towards becoming the ‘green battery’ of the region.

However, the NT2 case represents a failure in terms of simultaneously addressing poverty and climate change. Ninety Five per cent of the electricity generated by NT2 is supplied to Thailand thus evading the priority of supplying electricity to the local population. There are problems of community resettlement and environmental ramifications caused by NT2 that are yet to be solved with 6,200 people displaced by the project and 120,000 people experiencing negative downstream effects of the dam. The distribution of government revenues generated from the project has also come under question, with complaints from the World Bank that more money is distributed to government staff salaries than to health and education programmes.

The SHS programme has had more success than hydropower as 15,000 households have been reached through this programme; however, SHS schemes are seen only as a temporary solution. The implementation model for the SHS programme is a private sector model, which is regarded as an unsound model for reaching the poorest and most remote areas of Laos because it is unviable for the company to do so. Furthermore, being connected to electricity does not come without its problems. In terms of generating income, the better-connected villages inevitably have a greater chance of improving their livelihoods, however, there have been accounts of people having to sell livestock in more remote, subsistence villages to meet the costs of electrification. In addition to these issues, SHS power is often not used for cooking and thus does not displace the use of firewood and kerosene to instigate a reduction of carbon emissions. Overall, it seems that a sound environmental rationale has not been applied when installing SHSs, rather, the rationale for this technology has been based on the ease of installation and the universal applicability of the model.

In conclusion, the WB’s energy finance policies have largely comprised the selling of old ideas in new packaging. This is primarily applicable to large-scale carbon reduction technologies whereby low-carbon frames have been used to justify technologies such as hydropower, which have so far failed to meet the WB’s stated objectives. Small-scale carbon mitigation schemes
have been more successful, although SHS programmes must be treated as more than just a temporary solution and should fit the context of each village, rather than forming a panacea. In addition to these improvements, the implementation model needs to be altered, particularly in relation to the financial viability of the private sector in meeting the poorest and most remote villages’ needs.

Overall, the ‘triple objective’ of energy security, climate change and poverty reduction seems unlikely to be achieved and more honest attention needs to be paid to the trade-offs that exist within this nexus. In relation to this, it is necessary to scrutinise the use of climate mitigation arguments in justifying energy finance decisions. As such, clean energy cannot yet be considered a solution to the uneven distribution of energy benefits and social and environmental costs. Instead, changes are required to achieve energy justice including an increase in public participation in policymaking.
GMS Electricity Market and Rural Electrification
Veasna Bun
Senior Infrastructure Specialist, World Bank

Good morning ladies and gentlemen, it’s a real privilege and honour to be here to share our experiences and talk about our programme on the greater Mekong subregion electricity market and also rural electrification. A lot of issues have been discussed and reviewed by our colleagues here, but what I am trying to do is to share with you the issues facing the electricity sector in this region at the regional and national level. The content of my presentation includes the perspective of the World Bank in this region with regard to the electricity market and the cross border and national level approach that we are taking. I will share some of the experiences of our pilot programme on rural electrification, especially concerning those who are not able to connect to the grid and then try to pinpoint some things that we can learn from this.

The overarching objective of our intervention here is to overcome the obstacles facing the development of a sustainable regional market. We are also trying to foster a regional integrated market and planning and to ensure the sustainable development of regional resources. I would like to underline sustainable development and am glad to see that previous speakers have also highlighted the green battery of the region. We would like to ensure sound principles are observed with respect to the development of the market infrastructure including generation and transmission, as well as policies on institutions and regulation. The Bank also tries to support investment in bilateral trade between the countries and national investment through large power transfers between countries, by which I specifically refer to Laos and Thailand and possibly China and Thailand in the future. We also provide support to modest power transfers between neighbouring countries such as Laos and Cambodia as well as Cambodia and Vietnam. In addition, we also provide support to national projects in terms of both on-grid extension and off-grid investment.

There are two approaches that we are taking at the moment. The first is that we provide policy advice and support, which means how to make the best use of our resources by providing institutional support and regulations. The second approach is to provide investment support. As I said earlier this includes both regional investment and national investment. At the national level, we mainly focus on rural electrification as both grid extension and also off-grid investment.

With respect to institutional support, I would like to highlight a set of documents and strategies that have been developed by the countries in the region. In Lao PDR, they have a few documents that we have been supporting, such as the import-export power strategy because Laos also not only exports power but sometimes they have to import it from neighbouring country to cover a portion of the area where the grid cannot go.
The rural energy development programme and strategy has also been supported by the Bank. It is a key document that the Bank has been supporting in the recipient countries, especially Laos and Cambodia, in order to address the issue of reaching the country’s national goals.

For investment support, as I mentioned earlier there are regional investments that we have been providing to Laos and Cambodia, but since the focus here is on rural electrification I will mention two projects that we are supporting in Cambodia and Laos in order to address the issue of accessibility to modern electricity services in both countries. In Cambodia, we have provided about $45 million for a rural electrification project that is about to complete this month. In Laos, the rural electrification phase one project will compete in the next two months and phase two is ongoing. The main purpose of this support is to increase access to electricity by rural households, to improve the standard of living and foster economic growth in rural areas.

Cambodia is one of the countries in the region, perhaps in the world, that has a very high tariff and the Bank is trying to provide support to reduce the electricity costs of EDC and to make sure that this sector’s efficiency and capacity improve. One of the ultimate goals of this project is to make sure that people living in rural areas have a chance to improve their livelihoods so that is why we support rural electrification in those areas and are trying to bring down the costs and tariffs to rural households.

At the same time we are providing renewable energy options by providing solar systems to rural Cambodian households. To date about 12,000 systems have been installed and we expect that all 12,000 will be installed by the closing date, which is 31 January 2012. In terms of Laos, the most important activity is that we go ‘the last mile’, which means poor households and those headed by women. That is why we have introduced the pilot programme Power to the Poor. The objective of the project is to increase access to electricity by rural households by providing the means and support that they need in order for them to connect to the grid. In addition, as the grid expands I think there will be the issue of losses that utilities may encounter, which is why we are also looking at the financial performance of EDL and EDC so that they can run the utility in a sustainable way. In Laos, as in Cambodia, we also provide off-grid solutions and renewable energy through the Bank’s support and also through a trust fund from donors, especially from AusAID. We are aiming to provide 25,000 solar systems in Lao PDR. The government’s objective is that by 2020 the electrification rate in Laos will 90% and the main source for this would be hydropower development to generate export revenues. To help with this objective, the Bank has been supporting five consecutive rural electrification projects since 1987 both for on-grid extension and off-grid solutions.

However, we also need to go further and analyse what the key rural electrification issues are. Although in some instances the grid has been connected to the village, surveys have shown that 20 to 40% of households are still not connected because they cannot afford to pay the connection charge. Sometimes it can cost $80-200 to connect, but which are the households
that are not connecting? They are the households that are below the poverty line and those headed by women. These are the target group that the project is trying to reach in order to provide the opportunity and chance for them to develop their own economy. We introduced the Power to the Poor programme (P2P). Power to the Poor targets villages where the grid has been connected but the poor still cannot connect. Among non-electrified households, we clearly see that households headed by women and single parents are the most critical group that we need to look at. This needs us to provide a lot of information relevant to this programme to make sure that woman participate in the programme. The programme has been developed in a gender specific fashion to ensure women participate in the consultation and discussions about how they connect to the grid. So therefore any meetings should be organized when women are available. We believe that without our support these target groups will still be unlikely to be able access electricity when the opportunity comes or when the grid comes to their village. We also believe that connecting to the grid would bring many benefits to women in particular such as a reduction in tedious tasks and would make evening activities possible for them, provide flexibility in organizing household activities and also provide chance for them to participate in income generating businesses. The most important thing is that electricity can provide greater security at night for households headed by women.

EDL has created a so-called revolving fund for those poor households. Initially EDL issues a coupon to poor households with a value of up to $80 dollars per connection. Upon receiving this coupon, the household can go to the EDL itself or can go to the local electrical engineer to connect their household to the EDL grid. This $80 coupon includes the connection and also in-house wiring. We found that in most cases rural households cannot even afford to buy the lamp and wire to do the in-house wiring, so this facility provides the assistance needed. After receiving the coupon from EDL, the households go to the local electrical technician and agree with them the cost of the installation. The local electrical technician then charges EDL and EDL pays the technician directly. The households have to pay in three years time on a monthly basis, which will include the pay back and also the bill.

By October 2011, about 20,000 households had been connected as part of P2P programme with about 15,000 in the north and 5,000 in the south. The total number of households headed by women is about 1,000 and disabled households about 600. The programme is being expanded to other districts and currently P2P is being introduced in 697 villages in 145 districts and 16 provinces. The average cost of the in-house wiring and P2P connection is about $81 per household.

What are the lessons learned? From this intervention and working together with the Lao government and EDL, we see that the commitment of the relevant stakeholder to go the extra mile is essential. In addition, we also see that the participation of the beneficiary is also critical
for the programme in order to create strong interest among the target groups and to make more people willing to connect. We need to introduce the right instrument, such as the P2P voucher, taking into account the affordability of the household. There is some flexibility and sometimes the household pays in one year and in some case in two years or three or possibly even longer. With regard to the gender inclusiveness, it is important to keep things simple. You need to find ways to involve women by trying to organize meetings so they can attend and by trying to learn from them and address the issues they want us to help with. The final conclusion is that for a little amount of money we can have a big impact, especially on rural households and the social objectives of the government.
Regional Banks, Regional Investments and Regional Responsibilities: Strengths, Shortcomings and Trends of Thai Commercial Banks’ Corporate Governance and CSR Policies
Carl Middleton

The performance of banks should be of interest to everyone, as the way that commercial banks relend our savings influences the extent to which our economy and society are sustainable and fair. The actions of banks should therefore be closely scrutinized to ensure their accountability to society, including in relation to their financing of large-scale energy projects. This presentation examined the overarching trends in the Thai banking sector and Thai banks’ support for energy projects in the Mekong region, as well as the extent to which corporate governance and Corporate Social Responsibility (CSR) has been integrated into banking practices.

Thai banks are increasingly lending on a regional basis as cross-border economic integration in the Mekong region deepens. This includes to large and controversial energy projects such as hydropower dams and coal-fired power stations; as Thai companies become involved in these energy projects in neighbouring countries, which generally export power back to Thailand, Thai banks follow them by providing the necessary finance. Furthermore, the role of private finance for energy projects has increased due to a decline in Official Development Assistance and international financial institutions; instead, agreements such as Independent Power Producers (IPPs) and Public Private Partnerships (PPPs) have facilitated a larger involvement of private finance.

Despite initial signs of change in Thai banking practices, marked by a growing discussion about corporate governance and CSR in banks’ reports and advertising, they are yet to implement thorough reform. In order to achieve sustainable development in the future, banks must take account of their environmental and social responsibility. Bankers are hidden but influential decision makers because whether an energy project is developed or not can hinge on a bank’s decision to finance it.

Globally, there are numerous actors other than commercial banks involved in financing energy projects, such as export credit agencies, private equity investments and even pension funds. Thailand’s export credit agency is heavily involved in supporting Thai investment projects in the Mekong region. In some regions of the world, pension and other similar funds are also becoming interested in energy projects, including hydropower, because of the nature of returns on these investments that provide long term and largely guaranteed revenue streams.

The table below illustrates the involvement of Thai banks in Lao energy projects. Sometimes financing takes the form of co-financing, for example Nam Thuen 2 (NT2), whereby projects are financed by Thai banks in partnership with international banks or with multilateral agencies such
as the Asian Development Bank and the World Bank. In other cases, such as Nam Ngum 2 (NN2), the projects are funded solely by Thai banks. Both NT2 and NN2 are large hydropower projects that have had many controversies pertaining to social and environmental issues. For example, during the approval process of NN2, the authorities failed to release the EIA report and thousands of ethnic minority groups were resettled without adequate land or planning.

Table 1: Thai Commercial Banks Funding Hydropower in Laos

| Bank of Ayudhya | X | X |
| Bank of Bangkok | X | X | X |
| KTB Bank | X | X | X |
| Krung Thai Bank | X | X | X |
| Siam City Bank | X | X | X |
| Siam Commercial Bank | X | X |
| Thai Military Bank | X | X |
| Thanachart Bank | X |

Many of the international banks that financed NT2 are signatories to the Equator Principles (EPs). The EPs are a set of international standards that provide a code of conduct pertaining to environmental and social risk in order to ensure due diligence and responsible decision-making. The EPs relate to financing projects and are adopted voluntarily although they only apply to project financing arrangements with capital costs in excess of USD$10 million. The fact that banks continue to finance projects such as NT2, despite a lack of compliance at various stages of the project development process, signifies the limitations of voluntary standards encapsulated by the EPs and other similar agreements.

Despite the slow progress of reforming banking practices, there have been several gradual moves in strengthening the standards of the banking sector in Thailand. Thai banks made significant changes to their practices as a consequence of the 1997 Asian Financial Crisis, in particular strengthening their corporate governance. Corporate governance prescribes the way in which a bank carries out its responsibility to shareholders and, to a lesser extent, other stakeholders, which in principle includes communities affected by their project lending. It is the system by which banks are directed and controlled, encompassing relationships between management, the board, shareholders and stakeholders. Some Thai banks have made commitments to incorporate environmental and social concerns into their corporate governance policies, and one bank has even stated that they will not lend to projects with
adverse environmental impacts. Despite this, with regard to integrating environmental and social concerns into actual decision making, to date there is limited evidence of commitments on paper being translated into practice.

CSR is distinguished from corporate governance as being the actual contributions that an organisation makes to society and the environment. Amongst the Thai banks, only Kasikorn Bank has a written and publicly available CSR policy, which consists of five bullet points. For most other banks, statements on CSR are generally merged with ‘business ethics’ and consist of aspirational and ambiguous statements or appears in the form of philanthropic activities rather than genuine changes to their business model. Amongst the Thai banks, Krung Thai bank appears to demonstrate the deepest commitment to CSR as it supports the Global Reporting Initiative standards, releases an annual report on social responsibility and has a board level CSR committee. Several Thai banks have also come to regard reputational risk as integral to their success, namely SCB and Krung Thai bank. In addition to this, there appears to be a growing demand for greater commitment to CSR by bank customers and the wider public, which has been driven in part by more competition between banks in the domestic personal banking sector, where CSR is becoming a consideration for some people on which they base their banking decisions.

Although there are several international agreements on issues such as CSR and corporate governance that the banks could state their support for, real progress towards creating green, sustainable, decarbonised, transparent and accountable banks will only be demonstrated when changes in decision making comes from within the banks themselves. There are initial signs that this has begun to occur with initiatives such as ‘green loans’ that provide lower interest rates for green investment in small and medium enterprises. There is, however, a lot more that can and should be done.

One contributing factor to the stalled progress in reforming banking practices is the ambiguous definition of CSR, which makes its implementation difficult to measure in terms of transparency, accountability and enforceability. The practice of CSR needs to go beyond public relations and philanthropic causes to genuinely incorporate the concerns of society and the environment into decision-making, for example, through changes to policy, operationalisation, implementation, independent grievance/dispute mechanisms and sustainability reporting. The overarching question that must be addressed is how do we see banks as actors and what is their role in contributing towards creating a green, decentralised, efficient and renewable energy sector?
Chapter Five
Reflection and Policy Recommendations
Reflection and Policy Recommendations

Witoom Permpongsacharoen, Director, Mekong Energy and Ecology Network

I want to spend a few minutes summarizing the issues we have been discussing during this two-day meeting and highlight some questions, which I hope can be the starting point for the debate or dialogue that our policymakers and policy analysts will respond to.

I would like to start with what I said at the beginning of the conference when I tried to explain that it is not easy to frame the current and pending power sector developments in the Mekong region. Over the past two days I think we have seen a broader picture of what we could refer to as three power sector scenarios in the region. The first scenario is of countries that are almost 100% electrified but which are now looking for future growth, which is also dependent on future demand projections, as is the case in Thailand. However, at this stage of development, electricity becomes more commercialized and the network expands to include imports of electricity from neighbouring countries. This links to the second scenario of countries that are still seeking to expand their national grid because it does not yet cover the whole country. Most of the countries in the region fall within this scenario and the developments in the sector depend on the particular country’s technical and financial capacity. Many of them have quite ambitious plans for the power sector but their achievement will depend on the budget and capacity. This second scenario is very much linked with the first in terms of the commercialization and commoditization of energy and electricity. The third scenario is about off-grid potential and during the conference we have learned that every country, including Thailand, has an area that is still identified as being off-grid. The questions include what percentage of the budget or resources should be given to off-grid developments and is this contradictory with the idea of a national grid and how can priority be given to off-grid?

I would like to look at some of the common characteristics of the power sector in the Mekong countries. Every country wants to have a single national grid or even expand to a regional grid, with the national or regional grid being a centralized state monopoly. Secondly, major investments are planned in all countries to construct new transmission systems. If you want to expand a centralized national and regional grid, then by nature a lot of resources will have to go into transmission investments. The third common element is the bias towards large-scale generation based on large hydro, coal-fired power plants, gas power plants and nuclear power plants. Another very common characteristic, even in countries that are 100% covered by a national grid and countries that still want to expand their grid, is the over projection of demand and the resultant over-planning and over-investment. We can see that this is a planning process that is very much an exclusive planning and operational system that comes under the policy discourse of security or the national economic interest. A common characteristic within this concept is the enhanced single buyer system, where the state utility still controls the market and still monopolizes the transmission system. In many countries both the generation and

Mekong Energy and Ecology network (MEE Net)
transmission systems are under the same utility or under different utilities but are owned by the state. The single buyer system also creates costs through unnecessary IPP generation. The government is promoting IPPs to invest in generation but as was shown in Chenchom’s presentation some IPPs are unnecessary and produce electricity that we do not need or the buyer still has a high reserve margin, so the costs created by this unnecessary IPP generation are passed on to the consumer in the case of Thailand and externalized to the local community where the IPP is built and both the local community and environment bear the costs. IPP projects have become a no-risk investment and have helped to create a high profit business for the banking and construction sectors as well as for some in the consultancy sector. This is the real driver for new dams and new power plants rather than actual electricity demand. In the past, we believed that the reason why we need new dams was because there was new demand for electricity, but actually Chenchom’s presentation showed us that what is going on in Thailand is that Thailand has a high reserve margin and does not need new capacity, but then new projects, such as Xayaburi, are fast tracked and become part of the PDP. So that is something we can see as being the real driving factor and not actually electricity demand.

The question to all of you and this panel is what can your organization do to tackle this problem? Another question is how can it be ensured that when the utility draws up the PDP and signs Power Purchase Agreements, which the single buyer utility will sign with IPPs, that there will be a proper process of study or public scrutiny? What role can your organization play to help make sure that a proper study and proper process of public scrutiny can be encouraged? Cheunchom’s presentation showed that the official PDP 2010 in Thailand does not respond to reality and this is the version that will be adjusted. Civil society, in this case through Cheunchom, has proposed and presented a different PDP called the PDP 2012, which is a very clear proposal on how Thailand’s power development plan should be drawn up and the objectives and criteria, which I think are accepted by all of the utilities and government, on which it should be based. So what is your opinion on this proposal? Do you see the conflicts of interest in the systems that were highlighted in Cheunchom’s presentation? What is your opinion on the role of public participation in power planning? Do you think energy efficiency should be given a higher priority? What is your role and what could be the role of your organization in helping to make this proposal become a reality?

I will also look at some questions that I think in the past the public has not paid much attention to, which is the question of transmission investments. If you frame the situation by looking at the PDPs of the Mekong region, there will be an average of about US $10 billion per country estimated as the cost of transmission investment in the next 10-year planning phase. This includes the ADB GMS transmission plan, which has an estimated cost of about US $40 billion. Which businesses will benefit from supplying the copper, for instance? When talking about transmission, what does the term actually mean? Transmission is essentially the transmission of electricity along a copper line. Therefore, it can be said that US $100 billion will mainly be used to buy copper line. But what we do not know is how many companies will supply the copper for this or how the process will work. Another perspective to consider is how many MW of generation capacity could be built under a decentralized system using this amount of capital rather than investing this entire amount in transmission? How can it be ensured that the rural
electricity projects of the World Bank and Asian Development Bank do not subsidize the building of transmission lines for IPP projects? Since the World Bank's rural electrification projects in Laos include transmission investments, the question that can be asked is transmission for whom? For power to the poor or power to the rich?

How will the ADB’s GMS grid function under the enhanced single buyer model and who will bear the costs? Every country in the region operates under a model like EGAT, i.e. an enhanced single buyer model, which means EGAT does not allow anyone else to use its transmission system and electricity has to be sold to EGAT. This means an IPP will transmit the electricity it generates from the generation site to the border and EGAT imports the electricity into its own system. The idea of the GMS grid is to establish connection links using a model called open access or third party access, which means that anyone can use the transmission system if they pay the costs. This is a different system so the question that arises is when an open access system is built from Laos to connect with EGAT how will this work in reality and what does the ADB’s GMS Program consider as being the solution to this? How can EGAT’s transmission investments be held accountable and transparent? This is a question I would like Dr Pallapa to respond to, since we found out that in the PDP 2010 about 40% of the investment budget will go to transmission or about 500 billion baht. This is a huge sum of money but we have never heard how EGAT will utilize this money and who the contractor is and how the process will be implemented. What will the process be and how can it be ensured that it will be transparent? Who will control the regional grid? How can it be based on an open access model? Does the ADB recognize the risks?

These are some of the questions I hope that all of you can respond to, especially if your organization has a role or is involved in policy in a particular area. With respect to AusAID and the Mekong River Commission, I would say that many questions and presentations over these two days relate to the issue of governance, so how can your organizations contribute to this?
Thank you for the invitation. First of all, it looks as though the ADB is doing a lot of bad things as well as some good things. However, the expectations placed on the ADB and the World Bank are very high. I will give a frank response to some of the questions raised. My first comment is in line with the topic of today’s meeting of how can we have a more participatory approach for sustainable power development in the Mekong region? So what is the meaning of sustainable power? The ADB has a very good energy policy in that sense – sustainable means socially, economically and environmentally sustainable. This is our interpretation of sustainability in our energy policy and our objective is to help our members have a reliable and affordable energy supply for inclusive growth in a socially, economically and environmentally sustainable manner. Socially means that we still have about 70 million people in our GMS member countries who do not have access to electricity, so how can we supply more to improve access? The electrification level of Myanmar, Laos and Cambodia is low so even though the costs for supplying electricity are very expensive, either through grid extension or through off-grid renewable energy, so the question is how can we supply more electricity to the entire population? That is our interpretation of socially sustainable. The concept of what is economically and financially viable is very well defined so I won’t talk about it. In terms of the environment, especially in the GMS region among the GMS six countries, we luckily have very big potential in Myanmar, Lao PDR and Cambodia with hydro either for domestic use or export, which also means big hydro dams are associated with social and environmental problems. We have our own safeguard policy to minimize them, although we cannot satisfy everyone 100%, but we try to do the maximum through our safeguard policy, which is to compensate the affected persons or peoples in the project site properly and this is a big issue. Now if we look back at how hydropower has evolved, hydropower dams were a very big development until 1990. But in 1995 the World Commission on Dams started its discussion on social and environmental issues, at which point the World Bank and Asian Development Bank stopped being involved with big hydro projects. But in 2002, the WCD issued 26 key social and environmental recommendations that should be incorporated in hydropower developments and after that Nam Theun 2 was the first project to be built based on those recommendations. The ADB also has some involvement in projects like Nam Ngum 2 and Nam Ngum 3.

Many people have raised the issue of the regional master plan. The regional master plan was completed in 2002 and updated in October 2010. However, we still have limitations since as I mentioned the level of development in the six countries of the GMS is very different, and also the availability of information from Myanmar is almost a blank and furthermore the PDP cycle of each country is different. Therefore, the availability of information is very limited but even
though the aim of the plan focuses on the long term and how to create a regional market, the ADB’s role is a planning one as well as producing some projections but not all the projects included in the master plan will be financed by the ADB. The ADB is not financing Xayaburi. We do not know the impacts on fisheries and we don’t have much information even though we have 6 hydros in the GMS through ADB involvement. The impact on fisheries is still an area where more information is needed. So therefore until that information is available, the ADB will not finance it, although others can do it for the mainstream.

**Veasna Bun, World Bank**

Dr Kim has covered almost everything, but what I would really like to point out is that as you are well aware, the countries in the region need more power every year, of that there is no doubt. At some point I think our regional resources will be developed, but how to develop them is the issue and the Bank’s view is that they have to be developed in a balanced manner taking into account the economic and social objectives of the country. To do that, we adopt an approach whereby the people in the area most affected and the beneficiary group have to be widely consulted. Another factor is that public and private financing will be involved and should work hand in hand. For this to succeed, I think a certain policy framework needs to be set out clearly and the responsibility of each group needs to be ensured. The Bank tries to support this by providing some policy recommendations to deal with the issues.

With respect to generation and transmission lines, I think in some countries, especially in Cambodia, the transmission line is the backbone and is the main issue, especially since the country has isolated areas where there is no national grid. Building a transmission line in some areas would help us to reduce carbon emissions because the country’s power generation is almost 100% based on thermal plants. So to address the issue we need to provide support for building the lines so that it is possible to connect to clean and cheaper power from neighbouring countries and also power resources within the country to support areas that are totally dependent on fuel-based generation and thermal plants. To ensure social and economic objectives are fully achieved we always ask the actors to comply with safeguard policies. I think the safeguard policies of the ADB and WB are similar although they are not exactly the same. These cover both social and environmental safeguards. One of the requirements under those policies means that from the project design to its completion and operation, the proponent of the project has to consult and discuss the project with the public from the very beginning and to get their consent, and if any comments are raised about the project, the proponent needs to
address these within the framework and needs approval by the government before the Bank can take it further. These are the policies and guidelines that everyone in the public and private sector needs to comply with.

**Alexander Marks, AusAID**

I’ve really enjoyed the presentations I’ve seen over the past two days and the conversations that have followed. I just want to take my five minutes to try and answer or provide some input on five questions. Firstly, I think the alternative PDP 2012 is an excellent piece of work and I look forward to hearing about the response it receives from public consultations and when it is submitted to national governments, the ADB and the WB. I think it will be very interesting to see what sort of response it gets.

Secondly, demand side management and should it play a greater role? Well, yes and no would be my answer. It has a role to play in the major population centres such as Bangkok, Chiang Mai, Ho Chi Minh City, and Hanoi. But you cannot squeeze any more efficiency out of a rural Lao family that isn’t using any electricity, so if a family is only using two 11 Watt compact fluoro lamps it’s not really an issue and is an issue about providing more and getting use in an economically beneficial way. Related to both of those two things, the PDP 2012 showed that there was 6 GW of over capacity in the Thai system and DSM could probably add a few MW extra to that so we have 6 GW plus plus available that is currently unused and yet we have 70% of people in Cambodia who do not have access to electricity either off-grid or on-grid and 22% of the Lao population doesn’t have access to electricity off-grid or on-grid, so how are we going to get it to them if we say we were to try and use that extra capacity that has already been built and is already working. Well, the only way is with a grid, which brings me to my next point. There has been a lot of questions raised about the rationale for grids and whether they are economically viable, whether they are sensible investments, whether it’s just about nation building and other biased policy reasons, but I think maybe we need to move to the concept of what is a good grid? If you have an issue with the way the national countries and the GMS project of the ADB have planned the grids what would you prefer it to be? If over capacity from Thailand could be distributed to those people and competition between centralized energy sources that already exist could be ensured to make sure you get the cheapest possible price yet provide a connectivity for feed-in-tariffs so that you can subsidize roof top solar panels or other non-base low power sources and other renewables, and you can also provide some resilience in the network so that if there is a problem in Laos then they can take electricity from Thailand and vice versa, then maybe that would meet your definition of a good grid. With respect to a question quite pertinent to AusAid on whether rural electrification, specifically referring to grid
extension, subsidize independent power producer projects, then one of the travesties of large IPP projects is how little energy they supply to local communities. The one that comes to mind is the Hongsa lignite plant in the Hongsa district of Xayaburi province. It has a 500 kV transmission line to Thailand, a 115 kV transmission line to the relatively rich neighbouring province of Luang Prabang but nothing to Xayaburi province. So I guess the point is the grids that are built for grid extension are small capacity and it would be great if they connected to IPP projects because then you would be using the energy coming from directly next door in the local communities but that’s currently not happening. So we actually have parallel systems that are not actually talking to each other. More communication between the two systems and more planning would actually save money and make the whole system more efficient. In response to the last question on capacity building and what is AusAid doing? We do not provide much support to Thailand because it’s a middle income country, but we are providing a lot of capacity support to Laos, Cambodia and Vietnam. This includes education from the age of two to the end of high school and to scholarships for undergraduates, graduates and PhD students, which is long term support. We are also doing capacity building projects with governments to improve their management of sectors.

Simon Krohn, Mekong River Commission (MRC):
Firstly, a thank you to all the speakers over the last two days. I certainly learned a lot and have found it very inspiring to hear the level of work going on in each of the countries and also to get a sense of the passion for the subject matter at hand because obviously it can be controversial but secondly it can be extremely valuable at all different levels of intervention to be participating in this debate about the energy market.

The MRC is an international river basin organization. If finds itself in a very difficult position in what is now termed the water, food and energy nexus, and we carry a big responsibility to inform the four governments that form the MRC about using objective scientific research and understanding on the matters that have been raised in the last two days but also wider matters that confront those four countries and their dialogue partners Myanmar and China. The MRC has in place clear strategy documentation and a basin development strategy that covers a range of studies including studies that have been raised through the strategic environmental assessment for mainstream dams and the prior consultation process for Xayaburi. These are the activities that the organization is now engaged in, so the Secretariat of the Mekong River Commission, which is the organ that is meant to be providing the technical advice, data, information and objective assessments to the four countries, has the job of undertaking those in-depth investigations. How does that connect with some of the matters we have been talking about in the last few days? The MRC has a range of different programmes and one of the programmes, which is led by Voradeth Phoneko, is the Initiative for Sustainable Hydropower and the vision of this particular programme is to try and embed sustainable hydropower practices both in the planning, construction, management and operation of hydropower projects in the region. This is of course no small task and covers a range of matters both at a detailed level, an individual project level but also at a more macroeconomic scale. In terms of
the discussions I have heard over the last couple of days, clearly the issues associated with power demand forecasts and the over- or under-estimation of those power demand forecasts are critical to understanding what role hydropower can play and in particular the role mainstream or significant tributary hydropower can play in the power supply requirements of each of these countries. If we do not have reliable power demand curves, we are obviously in a position where we could select the wrong projects for development and we would like to be able to provide that information to the member countries so they can help use that information in their decision-making. Secondly, the MRC is also deeply involved in understanding whether or not there are alternatives to the large hydrop projects that are being put forward. Therefore, we have a study under the Initiative for Sustainable Hydropower to look at small-scale, alternative innovative energy options that could potentially be used on- and off-grid to be able to provide power that might have some impact on those demand curves we talked about first. So part of the work we are undertaking in the next six months, which would partly come from a lot of the research that is being done by some of the organizations represented here over the last couple of days, is to find out what other alternatives including demand side management could play a role. The other work that is directly connected to the definition of ‘what is sustainable hydropower?’ concerns the work we have been developing with our partners in the ADB and WWF. We are working on a rapid sustainability assessment tool which is very similar to the tools associated with the international Hydropower Sustainability Assessment Protocol. This rapid sustainability assessment tool has a couple of key roles. Firstly, it helps us define what the key elements of sustainable hydropower development are, but also each of those elements can entail a dialogue at a river basin organization level, a government level, and at a decision-making level about what the state of play is in the basin with respect to the sustainability of hydropower development. The MRC is currently developing this tool and we have had one set of trials in each of the four countries over the last year and over the next period we will be undertaking detailed training both at a civil society level and at a government agency level as well as at a national Mekong committee level on how to use these kinds of tools so that we can build sustainable hydropower practice into all the different elements of the project cycle.

I guess I have a personal interest in what I call ‘gumboot science’, which is do we understand enough about the fisheries, do we understand enough about the sediment, do we understand enough about some of the basic science that is informing the decisions? My analogy is we have a little bit of information and somebody sees this bit of information as a chair and another person sees it as a table and of course we never gain any consensus about impacts or benefits, so I think we need to get involved in that direct science about what the nature of fisheries are, what fish passage options are available and what the sediment transport issues are. This is a core role of the Mekong River Commission and it is a core role that we will be looking to pursue pretty aggressively in the next six months.
Dr Pallapa Ruangrong, Energy Regulatory Commission of Thailand

Thank you, ladies and gentlemen, I am very pleased to be here. I only have 5 minutes but there are many issues that I would like to answer concerning the questions that were raised by Witoon. I think that the main question is related to the sustainability of the supply of electricity in Thailand, so I would like to introduce our office and how we relate to this. The planning for the Power Development Plan is done by the Ministry of Energy and so is not part of our function but we have to make recommendations for the Power Development Plan. We were supported by Chenchom two years ago when some experts came from the USA to talk to us about integrated resource planning and we invited people from the Ministry of Energy to come together and listen to how we should draw up a proper power development plan that includes risk management and demand side management, which means not only changing light bulbs but using pricing signals such as demand response.

How do we regulate the energy sector? The Energy Regulatory Commission issues licenses. To date, 258 generation licenses have been issued and 28 licenses are for EGAT’s generation facilities. What does this mean in practice? This means that EGAT has to provide data i.e., cost data for us to ratify or to calculate for setting the tariffs in Thailand. Under the Energy Industry Act we have the authority to fine the system operator if the system operator does not comply with the conditions that we set, so under the new act we have a lot of power to bring more transparency to the energy sector. The other thing I would like to mention is about documentation. We will develop secondary regulation, for example a regulatory manual, high-level regulations, guideline standards and procedures such as a security standard, safety standard, engineering standard and the operators will have to provide us with a document called a grid code. That means our sector, transmission lines and system operators will be subject to more code governance. Under this code governance we think we can encourage competition in the energy sector in Thailand and we will start with third party access. We set up the standards as well as the regulatory framework. We will also try to set up wholesale power purchase mechanisms, which means that all the data that we get from the licenses will come up with the wholesale price of electricity. Under a system of wholesale prices of electricity, we will know exactly how we can purchase power from other countries or then we can purchase power from renewable energy sources in some remote areas.

Professor Philip Hirsch, University of Sydney

Rather than going back over the ground we have covered already, what I would like to do is to stand back and talk about a key set of issues that I think are fundamental not just about energy provision and planning but also about the roles of the public agencies that are represented at the table here. The main topic I would like to talk about is the question of public versus private interests and the role of public institutions and public agencies in managing these. I think it’s the
key governance issue around what we have been talking about over the last couple of days. It’s an issue that is particularly important because the institutions represented at the table here, the Mekong River Commission, the Thai government, AusAID, the World Bank, and Asian Development Bank are all institutions that have been working on energy issues for some time and have been working in the Mekong region since an era when much more was in the public arena and where there were mainly public utilities developing power projects with financing that came from national and international public agencies. But now it’s an arena which has been largely privatized so it raises the key governance questions of where the public agencies stand and I think here it’s important when talking about the public to consider who the power public is. What is the power public? Of course there is not a single public – we’re looking at the public in terms of consumers who wish to have and need to have reliable, affordable, and adequate access to power, they are the taxpayers, since we’re dealing with scarce public resources so the question of whether the money is going to the most effective places, whether they be the taxpayers of the countries where the power is to be provided or even global taxpayers who one way or another are subsidizing the institutions represented here. The public also includes communities that do not have secure power and communities affected by energy development, so if we are talking about public and private interests we need to be careful about conflating all of these into a single public. We are actually talking about multiple publics and we won’t be able to deal with all of this today, but I think there is a lot of conflation and confusion when we talk about public and private here.

So when we are talking about some of the public interest issues with the shift from public to private with IPPs taking the place, for example, of public utilities, commercial banks increasingly coming in where public banks, the World Bank and ADB, used to provide the major financing, what are some of the public interest issues? It is clearly not in the public interest to have the kinds of conflicts of interest that were presented to us very clearly in Cheunchom’s presentation. There is an aspect of governance at the national and sometimes international level where we have conflicts of interests of public officials also playing a part on the board of profit making companies in the energy sector. It is not in the public interest to have over-investment of scarce public capital in infrastructure without a market if there is over-projection of demand. It is not in the public interest to have unneeded projects with significant environmental and social impacts; the old discourse used to be that of needing to have to break a few eggs to make an omelette, but if we don’t need the omelette in the first place then why break the eggs? There is also the issue that it is not in the public interest to have so many key studies done under wraps, done confidentially, done privately and done non-transparently sometimes on the basis of commercial-in-confidence as the projects are private but also sometimes because it is assumed to just be too complicated and difficult for the general public to understand. Now I think what we saw yesterday was a fantastic example from Cheunchom’s presentation of ways in which difficult, complex issues can actually be presented in a way that anyone can understand. So we need to just get away from these myths and ideas that this is an issue that for commercial reasons or for reasons of scientific complexity need to be left to the experts. I think what this meeting has done has showed us is that things can be put in the public arena.

Mekong Energy and Ecology network (MEE Net)
Larry Lohmann, The Corner House

One of the nice things about a meeting like this is how much you learn and how much you learn that your ideas before you came to the meeting might have been a little bit unclear or that they might have been wrong in many ways, and I think that this meeting has been like that for me. In that spirit I would like to return to a couple of things that I heard from the panel just now, which seem to me to reflect a little bit of unclear thinking about energy and in particular I’m referring to a phrase which was employed by Mr Kim “inclusive growth”, which is a phrase we often hear. I think if we reflect on what we have learnt at this meeting, we find there are certain unclarities in that phrase or the sentence we heard from Mr Bun “countries need more power every year yet the public needs to be consulted” and some of the remarks by Mr Marks about demand side management and how the grid is going to provide power for people who need it. But I’d like to approach these phrases by answering Witoon’s questions or at least two of them, especially the question ‘what is your opinion of the role of public participation in energy planning how much of a role, what kind of a role should there be?’ Well of course I think there should be as much public participation as possible for the reasons Professor Hirsch has mentioned i.e. there are many different publics and they have many different ideas and needs concerning energy.

Let us go back and review a few of the things we have learned from the presentations at this meeting such as for example the presentations this morning when we heard about pico-power and pico-hydro projects or about solar home systems. What was very interesting was the concept of energy that the villagers who were employing the systems were talking about. What they were talking about mostly as I understood it was that they needed energy for a particular purpose, especially lighting and lighting at night. The whole idea of solar home systems is that they are not going to be used for cooking. Another example, you remember the slide put up by Mattijs yesterday showing the woman carrying firewood underneath the giant transmission line, well she was carrying energy too in the form of wood and that was a very specific concrete kind of energy, energy for one particular purpose, which is probably for cooking. I do not want to assume too much about her, I don’t know her but just for arguments sake let us assume that. It is very interesting the concept of energy used here. Think about it, when you are cooking over a wood fire what is the concept of energy you are using? Is it the concept of the more energy the better? No if you are cooking a meal over a wood fire, actually it is not the more the better, it is the less the better. You only want just enough wood to cook your fire; you don’t want to waste wood. Or in the pico hydro systems, do you want the more energy the better? No, in fact you want the less energy the better; you want the lighting of course, but you don’t want to take away the energy from your neighbours who are also using the pico hydro system. It is one of the great ironies of energy planning that at the country level all of this disappears. The idea of getting enough energy, the less the better for what you need it for suddenly changes and there...
is a big shift and the dominant idea is often the more the better. Of course that is modified and qualified but that is the underlying assumption: the more the better. We are actually talking about a different kind of energy, a different kind of public in that case. We are talking about an energy that is unlimited, an energy that is not concrete, not specific but very abstract. Of course we try to make it more concrete, we say it is a response to demand, but actually demand is also very abstract as we also learned yesterday and today.

We learn from history that it isn’t just the demand projections for Vietnam, as Dr Khanh pointed out yesterday, that are completely inaccurate and inflated, it isn’t just the demand projections for Thailand; all demand projections without exception over the last 50 to 60 years have been inaccurate, most of them wildly inaccurate in the order of 30, 40, 50 per cent. Why is this? Let us think back to the village, the village level – the pico hydro, the wood fire – because we are not talking about that kind of concrete energy, we are talking about a big abstract energy. These are two different publics we are talking about. Abstract energy is for the purpose of economic growth, it’s for the purpose of accumulation, of building up more and more of something; and that something is of course money. Nam Theun 2 is abstract energy: its 90% abstract energy that is energy for accumulation, energy for growth, energy for the rich. So there is always this conflict in energy policy. This is why we need public participation because there are so many different ideas, we cannot assume that there is only a single energy we are talking about. We are actually talking about many energies, so just let me try to connect this with some of the remarks we have heard from the panel today. When we look at the phrase ‘inclusive growth’, for example, there is a something of an unclarity in this and a bit of a contradiction. When we talk about growth, we are talking about abstract energy, but when we talk about inclusiveness we are talking about what people actually use and need energy for: the lighting at night so children can study, the cooking that you need just enough heat for and so forth. So there is a bit of a contradiction in this and my question to my fellow panellists would be how can you clarify this unclarity in terms of policy given that we accept that there are differences between these two kinds of energy? How can your organizations help to reconcile this in the public arena? We also heard countries need more and more power every year. Again this is abstract energy, energy for accumulation, but we also heard that the public needs to be consulted about this abstract energy. If the public needs to be consulted then we are also going to have to hear the views of the people who use the ‘little energies’, the energies for cooking, the energies for lighting, the people who don’t need more and more energy as a principle but who actually need to use as little energy as is appropriate for the purpose. And I think this is another reason why we need to pay attention, as Professor Hirsch pointed out, to conflicts of interest. If we have people who are interested in maximizing an amount of abstract energy, I think that also needs to be balanced with the views of people whose interests might be threatened by the abstract energy. For example, the woman who was walking with the load of wood underneath the transmission tower; her little energies might actually be taken away from her by the big energy of the transmission line above her and that is why these views about energy are so different and that is why there has to be more public participation in energy policy.