RAPID DESK BASED STUDY: Factors at Country Level Influencing Choice in Utilisation of Energy Resource Potential

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EVIDENCE ON DEMAND

CLIMATE & ENVIRONMENT
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List of Acronyms & Abbreviations

ADB	Asian Development Bank
BOT	Build Operate Transfer
BPDB	Bangladesh Power Development Board
CDKN	Climate Development Knowledge Network
CDM	Clean Development Mechanism
COP	Conference of the Parties
DFID	Department for International Development (UK)
EDM	Electricidade de Mocambique
ERB	Electricity Regulatory Board (Kenya)
ERC	Electricity Regulatory Commission (Kenya)
ETS	Emissions Trading Scheme
FIT	Feed-in tariff
GDP	Gross Domestic Product
GHG	Greenhouse gas
GoB	Government of Bangladesh
GoC	Government of Chile
GoK	Government of Kenya
GoM	Government of Mozambique
GoN	Government of Nepal
GoV	Government of Viet Nam
HCB	Hidroelectrica de Cahora Bassa
IEA	International Energy Agency
IGES	Institute for Global Development Strategies
IISD	International Institute for Sustainable Development
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
MBM	Market Based Mechanism
NCRE	Non-Conventional Renewable Energy
NEA	Nepal Electricity Authority
NRDC	Natural Resources Defence Council
PPA	Power Purchase Agreement
REEP	Renewable Energy and Energy Efficiency Partnership
SADC	South African Development Community
SREP	Scaled-up Renewable Energy Programme
UNDP	United Nationa Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	U.S. Agency for International Development
WB	World Bank
WRI	World Resources Institute

Report Summary

The UK Department for International Development (DFID) has commissioned a rapid desk based study into the factors affecting choice of energy resource utilisation (with a focus on electricity generation). The results of the study will help to provide an improved understanding of the relative effect of each factor, and summarise available literature on how the factors have played out in six countries: Bangladesh, Chile, Kenya, Mozambique, Nepal and Viet Nam.

Literature available on each of the following factors was considered with respect to choice of energy resource utilisation:

- Factor #1: Sector governance and decision making framework.
- Factor #2: Market structure in the power sector.
- Factor #3: Constraints on the use of large scale renewables.
- Factor #4: Progress towards a market based mechanism.

Findings of the Study

The factors listed above, to an extent, affect choice sequentially and cannot be considered in isolation. The first step towards having a decision framework that enables active choice to take place is a clear governance structure. Countries where clear directions are taken and regulations are implemented send clearer signals both to markets and developers in the power generation sector:

- Chile and Viet Nam have clearly laid out governance structures and policies, which create a clear operating environment. In Chile, private entities can operate with confidence in a long standing, liberated power market. In Viet Nam, investment by the private sector has only been possible since 2005. As a result of clear and enforced policies however, a significant private sector has been established in a short space of time. A strong private sector is believed to be one of the enabling factors that make legislating for both a market based mechanism and the development of large scale renewables possible. Work needs to continue in both countries in order to meet national goals however; both countries are experiencing power shortages today.
- The governance structures in Bangladesh, Kenya, Mozambique and Nepal are less developed. Absence of policies to encourage the private sector, such as feed in tariffs or lack of enforcement of existing policies have resulted in less predictable operating environments. The result is that the participation of the private sector is weaker, there are fewer and / or ineffective market based stimulants, and market based mechanisms are not foreseen in the short or even medium term. The case of Kenya shows that a strong private sector is not always necessary for the development of large scale renewables. However, government investment alone is shown in all cases to not be sufficient to meet growing demand for electricity.

Gaps Exist in Available Literature

A gap exists in the literature identifying the major factors affecting choice of energy resource utilisation. In addition, having established sector governance as fundamental to policy development, a study into which factors enable or inhibit successful governance in the energy generation sector would be valuable. This would benefit from an analysis of the experiences of middle income and upper-middle income countries. Further, a study which examines the role of an efficient private sector in establishing large scale renewables and market based mechanisms is also recommended.

SECTION 01

Introduction

Background

The UK Department for International Development (DFID) has commissioned a rapid desk based study examining factors influencing choice in utilisation of energy resource potential at the national level, with a focus on electricity generation. The study forms part of the early stage of DFID's programme of work analysing the links between use of national energy resources and national economic development. The results of this study show how the major factors determining energy resource utilisation influence policy decisions. Secondly, the study highlights gaps in the available evidence and suggests areas of further research. The study is limited to the synthesis of secondary evidence available in the public domain, supplemented by Ricardo-AEA expert opinion.

Key Factors Identified and Countries Analysed

According to the World Bank, "the provision of adequate and reliable energy services at an affordable cost, in a secure and environmentally benign manner, and in conformity with social and economic development needs is an essential element of sustainable development"[(1)]. There are many factors which influence how developing countries may choose to utilise or plan their national energy resource strategy, and hence satisfy these conditions. Whilst national circumstances play a key part in determining policy, there are also a number of other factors that influence choice of resource use. For the purposes of this study, this report will focus on:

- Factor #1: Sector governance and decision making framework. For example, the institutional capacity to make and implement policy around decisions such as the need for domestic energy security versus the opportunity to export excess natural resources to neighbouring countries.
- Factor #2: Market structures in the power sector. For example the presence of a monopoly or the extent of the involvement of the private sector.
- Factor #3: Constraints on the use of large scale renewables. For example lack of national expertise to develop large renewable projects, lack of natural resources or regulatory barriers.
- Factor #4: The extent to which market based mechanisms are in use, or are envisaged for use, within a country. For example carbon trading mechanisms.

To establish the extent to which such factors have an effect in different environments, a range of countries have been selected to give context for the consideration of the factors listed above. In choosing Bangladesh, Chile, Kenya, Mozambique, Nepal and Viet Nam, a good spread of geographical and national circumstances is captured when analysing evidence to support the study. To put each nation's particular circumstance in context and to give background to the study, a high level summary of each of the country's circumstances is presented in Table 1. This table shows that most countries are net importers of energy. Private sector involvement is not present in some countries, is responsible for around a third of generation in others and in the one case, Chile, the market is 100% privatised. It should be noted that figures showing private sector involvement include state owned and state involved Independent Power Producers (IPPs).

Table 1 Summary of National Circumstances of the Countries Analysed in this Study.

Country	GDP (USD)* [78]	Energy consumption (Mtoe/year) [23]	Electricity Access Rate (2009)[79]	Energy Import / Export Status [14]	Capacity Notes [14]
Bangladesh	112bn	26.0	41%	Net energy importer	Large scale load shedding occurs. This has serious impacts on industrial, commercial and social activity. Oil and coal reserves are very small compared to demand. According to 2009 statistics, more than 94% and 45% of the respective needs were met through imports.
Chile	248bn	33.6	98.5%	Net energy importer	High diesel prices, droughts, limited natural gas reserves, rising energy demand and delays in the development of new projects have increased the likelihood of energy shortages and rising electricity prices.
Kenya	33bn	20.2	16.1%	Net energy importer	Challenges in the electricity sector include weak transmission and distribution networks, low countrywide electricity access and over-reliance on hydropower.
Mozambique	12bn	11.5	10.2%	Net energy exporter	Nearly all of Mozambique's electricity is produced by the Cahora Bassa Dam, built and completed before independence. Energy demand is growing considerably, at an average annual rate around 7-8% per year. The electricity supply is not consistent and there are blackouts.
Nepal	18bn	8.7	43.6%	Net energy importer	There are high system losses and frequent outages. Grid expansion is slow because of geographical difficulties and there is an urgent need for coordinated use of renewables. The growing dependency on imported petroleum fuels coupled with rising international fuel prices is severely affecting the already fragile economy.
Viet Nam	123bn	71.4	97.6%	Net energy exporter.	The power sector is in the early stages of reform and there are electricity shortages at peak demand times. Power systems operate without adequate reserves, and there is insufficient investment in energy development, especially in electricity generation.

*Figures are the latest available from the REN21 resource base

Study Methodology

A rapid desk based literature study was completed to identify countries and factors affecting choice in utilisation of energy resource potential, with a focus on electricity generation.

1. The four factors identified were reviewed to be sure that they reflect some of the main considerations which may affect choice of energy resource utilisation for electricity generation.
2. The six countries to be analysed in the study were identified and agreed. The selection of countries represents a spread of differing national circumstances:
    a. Differing levels of public and private investment.
    b. Governance structures implemented to a greater or lesser degree.
    c. From Africa, Asia and South America.
3. For each of the six countries the study:
    a. Summarised what energy resource potential can be utilised (please see Annex A).
    b. Summarised the national situation in each country e.g. regulatory framework, policies, drivers, political stability, energy security, energy mix).
    c. Identified literature and studies linking national activity to each of the four factors.
4. Conclusions were drawn highlighting:
    a. How key factors affecting choice are observed to affect each country's choice.
    b. Gaps in the literature and recommendations for future research.

Report Structure

Following this introductory chapter, the next sections consider each of the four key factors listed above with respect to each country selected for this study.

Section 2 provides an overview of how a country's sector governance and decision making framework is observed in each of the six countries. Building on this, Section 3 analyses the state of markets, pricing policy and the presence or otherwise of the private sector. Section 4 considers the barriers to the widespread adoption of large scale renewables in each country. Section 5 reports on prospects for, and progress towards, a market based mechanism.

Conclusions are presented in Section 6 where the common themes, observations and experiences reported are synthesised.

SECTION 02

Sector Governance

General and Global Context

The sector governance and decision making framework of a country is based on the national circumstances inherited by policy makers, and on the current and future needs of the country in question. The World Resources Institute (WRI) has stated that "by strengthening electricity governance, countries can develop more equitable and sustainable electricity policies. Transparent, inclusive and accountable electricity governance can ensure that decisions taken work in the public interest"[(2)]. In the context of developing countries, lack of clear institutional and regulatory frameworks, or ineffectual ones, is one of the main barriers to policy implementation. A clear and co-ordinated central approach can establish the conditions for meeting part of a developing country's power demand. Even though this may be achieved through the development of some large scale renewable projects as in the case of Kenya and Viet Nam, it is not enough by itself. Clear and effective governance can however also provide an enabling environment for development of the power sector to finally meet demand. For example, it may lead to a liberalised power sector which can in turn unlock private finance for large scale renewables. Further, clear governance and private sector participation in a power market can provide the foundation necessary for the design and implementation of a market based mechanism.

Table 2: Summary of Governance and Its Implications

Country	Governance
Bangladesh	Weak institutional capacity has led to capacity and access concerns, weak private sector involvement, limited large scale renewables exploitation and only partial progress towards use of a market based mechanism.
Chile	Governance is in place to facilitate a fully privatised power market and does not offer incentives such as feed in tariffs (FITs). The results are capacity concerns, a strong private sector, limited large scale renewables exploitation and good progress towards a market based mechanism.
Kenya	The Government of Kenya (GoK) has acted in a co-ordinated fashion to develop large scale renewables which are contributing to over 50% of the generation mix. However this is not enough to meet demand and access to energy is also a concern. Inefficiencies in governance have led to a comparative lack of private sector investment and progress towards a market based mechanism.
Mozambique	There is a vertically integrated state owned monopoly which itself sources most of its power from one hydroelectric power station. There is a system of governance in place which has resulted in limited involvement by the power sector, exploitation of other renewables and progress towards a market based mechanism. The country has recently discovered significant domestic fossil fuel resources but it is unclear how its value will be exploited at this stage.
Nepal	Weak institutional capacity has led to capacity and access concerns, weak private sector involvement, limited large scale renewables exploitation and only partial progress towards use of a market based mechanism.
Viet Nam	Currently implementing the phased set up of a private power market which will soon have a spot price, a market based mechanism and offers FITs. Strong state controls.

Bangladesh

The governance and decision making framework of the electricity sector in Bangladesh is widely reported as being inadequate to solve the energy crisis that the country faces today. The latest general elections in Bangladesh took place on 14th January 2014 and hence are unlikely to have an immediate bearing on domestic energy policy which could be captured in this study. After the previous general and presidential elections in 2008 and 2009 respectively however, the World Bank (WB) commented that "the legacy of past political interference and corruption has severely weakened the institutional capacity of the sector and is a direct contributor to almost every problem affecting the sector. The country is getting neither the affordable, efficient energy needed to power economic growth, nor is it able to sustainably increase access to energy services. Reform is urgently needed if investment to the sector is to be attracted"[3]. This reform does not appear to have happened to date, as reported by Ahmed *et al* (2011[4]) who has more recently cited today's problems of inadequate funding, weak governance and inefficiency as building on historic and still present problems of long term negligence and corruption in the power sector. A recent study[5] estimated that Bangladeshi households were paying around USD37m in bribes for electricity per annum. Having determined that the lead time and cost of nuclear power makes that option unviable, that solar options available are far too expensive and prospects for wind power development were low, the Asian Development Bank (ADB) analysed policy options based on natural gas reserves in late 2013. Using a dynamic economic forecasting model, the ADB[6] analysed eight policy options and concluded that, as the most "attractive policy options available have the drawback of higher carbon emissions, supplementary policies and suitable technology adoption should play a balancing role".

Chile

Chile was one of the first countries to instigate a comprehensive reform of its electricity sector. It has been widely hailed as a successful example of electricity market liberalisation, and has been emulated by other countries in the region and elsewhere. The International Energy Agency (IEA) has stated that "Chile can be proud of its energy policy achievements and that pioneering privatisation and liberalisation of its electricity sector in the 1980s, ahead of almost all IEA member countries, was the foundation for a competitive energy sector, which has sustained the rapid growth of the Chilean economy over the past two decades"[7]. The development of Chile's electricity sector is particularly linked to the country's political story of the last thirty years. As Pollitt (2004) noted, "Chile was a democratic country from its inception until September 1973 when the socialist government of Salvador Allende was deposed in a military coup headed by General Pinochet… the military government suppressed its political opponents, but in contrast to the populist economic policies of military governments elsewhere in the region (most notably Argentina), pursued neo-liberal economic ideas inspired by the likes of Milton Friedman. Within a few years many of the previously loss making nationalised companies were being returned to their previous owners, and large state owned companies, such as electricity companies, were being forced to trade on a commercial basis"[8]. However, with such a clear policy of liberal governance, it has been suggested that Chile's electricity sector may not be capable of overcoming the barriers it faces in order to take advantage of the country's renewable energy potential. Sector reforms in 2004 and 2008 are reported to have not been sufficiently strong enough to achieve the targeted amount of renewable energy that the country has planned to have contributing to the generation system by 2020 or 2024[9]. These barriers are discussed further in Sections 3 and 4. In summary, market forces alone have been relied upon and appear insufficient to address the financial issues around renewables development, as demonstrated by the noteworthy absence of state measures providing financial incentives including subsidies or power purchase guarantees.

Kenya

In the main, literature with respect to Kenya's sectoral governance focuses on reforms in the energy sector made since the mid-1990s until now. Kemei (2006) noted "these policy initiatives led to the unbundling of generation from transmission and distribution of electricity, and the creation of the Electricity Regulatory Board (ERB) through an act of parliament, the Electric Power Act, 1997"[10]. However, while progress has been made in market opening, there still exist persistent limitations in generation and supply capacities as well as incentives for private investments into the sector. In Kenya, it has been argued that the initiatives adopted in order to make parastatals more efficient are inadequate and government should not only be committed to designing performance contracts that set realistic standards, but also enforcing them strictly. It also suggested by Mwaura (2007) that "there is a need to streamline the multiple regulations that govern parastatals and reform the corporate regulatory framework of the private sector in order to raise standards of corporate governance and, as a result, ensure that the privatised services that resulted from market reforms are managed prudently"[11]. As noted by the UK Overseas Development Institute (2013), the result of the lack of strong and clear governance is continued over-reliance on hydroelectric power plants, leading to exacerbation of power shortage problems "during dry periods, when Kenya's hydropower plants – which represented nearly 50% of generation in Kenya in 2010/2011 – are unable to operate at full capacity"[12]. Under the National Climate Change Response Strategy (2010), the GoK has announced plans for a green energy development programme that will promote renewable energy sources such as geothermal, wind, solar and biofuels (IISD, 2012)[13].

Mozambique

An attempt to address the state-run monopoly which dominates the energy sector started in 1995 with the creation of Electricidade de Mocambique (EDM) as a public power utility company (REEP, 2014)[14]. As reported by Energypedia (2014) "EDM is a vertically-integrated, government-owned electric utility responsible for generation, transmission and distribution of electricity in the national grid. EDM buys most of its power supply from Hidroelectrica de Cahora Bassa (HCB), owner and operator of one of the largest hydroelectric power plants on the Zambezi (Cahora Bassa at 2.08 GW). The Government of Mozambique (GoM) owns 82% of HCB which operates as an IPP"[15]. Literature specifically related to the governance of the energy sector is not as available as for other countries. As the sector is so vertically integrated and government controlled, it is useful to consider the general climate of governance in Mozambique as it is likely to represent the energy sector too. In its Country Assistance Strategy 2009-14, USAID[16] identified five immediate policy goals for US foreign assistance, the first priority being to strengthen democratic governance in Mozambique. "As a relatively young democracy, Mozambique faces the challenge of strengthening pluralism to ensure a dynamic exchange of ideas, provide policy options for consideration and debate, and put in place checks and balances to prevent the abuse of power or misuse of state resources". Against this backdrop, it is unclear how recent discoveries of substantial fossil fuel reserves will be utilised as questioned by Gqada (2013). "Whether the GoM will be able to keep to its objective of using gas for development, either through revenues from exports or the creation of domestic gas-based industries, or a combination of both, largely depends on the way in which the sector is governed. It is too early to state with any certainty that the exploitation of this finite resource will benefit the majority of Mozambicans once production starts in 2018"[17]1.

Nepal

Historically, Nepal's power sector has been dominated by the Nepal Electricity Authority (NEA), a 100% Government of Nepal (GoN) owned utility, established in 1985 under the NEA Act 1984. The NEA is primarily responsible for planning, construction and operations

for electricity supply. The Eastern Electricity Corporation (a wholly GoN owned company) was also merged with NEA in subsequent years. As total installed generation capacity is over 90% hydropower, the Ministry of Water Resources has general responsibilities for all private and public activities related to electricity supply, including the NEA. The Authority is controlled by a management Board, headed by the Minister himself and with members drawn both from within and outside the Government (REEP. 2014)[14]. Given that Nepal is to some degree still a country adjusting to post-conflict policy making, electricity sector governance is still at an early stage. As reported by the US State Department, as of February 2013, "parliament has yet to approve the Nepal Electricity Regulatory Commission Act, designed to unbundle the functions of the NEA, and create an independent regulatory body. Experts consider these steps necessary to reform the NEA and stimulate private investment in the energy sector. Although a small number of private-sector hydropower projects have either begun operations or are in the planning stages, development of the sector has been very slow, and projects designed for the export of electricity to India remain politically sensitive"[18].

Viet Nam

Viet Nam's Ministry of Industry and Trade is "responsible for management of all energy industries, including electricity, new and renewable energies, coal, oil and gas industries. It is in charge of the formulation of law, policies, development strategies, master plans and annual plans for those sectors, and submits them to the Prime Minister for approval. The Ministry is also responsible for directing and supervising the development of the energy sector, and reporting its findings to the Prime Minister" (Kovak, 2012)[19]. Governance, whilst sometimes inefficient, is still closely controlled which appears to have facilitated decision making (for example there are plans for a domestic emissions trading scheme even though the private sector's involvement in the industry is a relatively new phenomenon). Whilst price controls are still in place[20], the Government has however taken significant regulatory steps to address issues such as corruption[21] and to set out plans for liberalisation of electricity markets via the Electricity Law, 2005[22]. Although private sector participation in the power market is comparable to others in this study, participation has grown more rapidly than in other countries. As demonstrated below, the clear governance structure and close control of the sector has also led to greater progress toward a market based mechanism than others too.

SECTION 03

Power Markets and the Private Sector

General and Global Context

The IEA states that "traditionally, electricity sectors developed and operated within strictly regulated frameworks in which vertically integrated utilities have handled most or all activities – from generation to transport to distribution. Moreover, they have often been centrally planned, wherein needs are assessed and fulfilled by electricity system planners and all associated costs are passed on to consumers"[7]. The AFD (2014) finds that "whereas some sectors which display a significant degree of private sector participation have realised positive outcomes, results in other sectors have been mixed"[24]. It is generally agreed though that some level of private sector investment is a sign of a healthy electricity generation and distribution system. The private sector can for example take risks and access capital where governments might not be so suited to do so. Also, a study by the World Bank (2013)[35] found that "for electricity, labour productivity in private utilities is twice that of public utilities. Distribution losses declined 12% in private utilities over the period studied, while public utilities saw their performance deteriorate by 5%. Annual service interruptions fell from 24 to 12 for private utilities and from 24 to 19 for public utilities. The average duration of outages also fell by more at private utilities".

Table 3: Summary of Private Sector Market Share

Country	Estimates of Private Sector Involvement (2012-13)[14]
Bangladesh	76% public owned, 24% private owned.
Chile	100% privatised.
Kenya	100% privatised but the government maintains a 70% stake in independent power producers.
Mozambique	Very little private sector involvement.
Nepal	100% government owned.
Viet Nam	70% public owned, 30% private / public.

Bangladesh

Bangladeshi legislators have taken a positive approach towards private sector investment. In 1996, the Government of Bangladesh (GoB) stated that "the likelihood of securing sufficient investment through the public sector alone to ensure energy needs were met would be remote"[25]. Many incentives have been offered to the private sector including sovereign guarantees for payments by state owned enterprises, fast tracking clearances from decision making agencies, tax and import exemptions. In a presentation by the Secretary of the country's power division in 2011[26], fossil fuel based generation was cited as being the immediate, short and medium term priorities for investment. Renewable options are only mentioned as part of the long term generation expansion plan. Although generation, transmission and distribution have been opened to foreign and private sector involvement, these sectors remain dominated by state-owned entities. Bangladesh Power Development Board (BPDB) accounts for over 70% of the electricity generated in Bangladesh[14]. At the time of writing, Bangladesh does not offer FITs to induce private sector investment or direct it toward a certain energy resource use. The reason for the

relative lack of involvement by the private sector is attributed to the lack of strong governance described in Section 2 (inefficiencies, corruption and a lack of institutional capacity have discouraged activity in the private sector).

Chile

As discussed in Section 2 and reported by CGA (2014), Chile has a liberal regulatory framework for the energy sector that is "based on the principles of competition in the generation sector and separation of the functions of electricity generation, transmission and distribution"[27]. The state currently only controls the functions of regulation and monitoring, the National Electric Commission (NEC) being the state entity responsible for preparing and coordinating plans and standards. Moreover, there is guaranteed access to transmission lines for all energy projects (i.e. no discretional exclusions) and partial or total exemption of transmission charges for small scale non-conventional renewable energy projects (NCRE). However, as also noted in Section 2, the absence of government interventions in the power market has led to barriers to private sector investment. In an analysis of the country's geothermal potential for example, the Natural Resources Defence Council (NRDC[28]) concluded that "all risk is currently assumed by developers. Without appropriate policy mechanisms in place, the initial costs of exploration could remain too high to spur and maintain significant levels of growth in the private market". Whilst individuals in industry and in academia feel FITs could be a strong incentive in Chile for renewables development. In contrast, the Government of Chile (GoC) does not feel FITs would be beneficial.

Kenya

In March 2008, Kenya's Ministry of Energy adopted FITs as a policy instrument. Kenya's FIT policy has as its objectives to: facilitate resource mobilisation by providing investment security and market stability for investors in renewable energy sources electricity generation; reduce transaction and administrative costs by eliminating the conventional bidding processes; and encourage private investors to operate power plants prudently and efficiently so as to maximise returns[29]. During a workshop aimed at identifying bottlenecks to private sector investment in Kenya organised by the World Economic Forum[30] the following key factors were identified: high risk and limited availability of risk mitigation options; equity constraints and donor competition; lending capacity for large-scale options and concessional finance crowd-out effects; inappropriate forms of finance and other market issues such as lack of renewable technology performance/time series data.

Mozambique

The 1997 Electricity Act no. 21/97 (1997) potentially opened up all aspects of electricity production, distribution and sale to private operators through concession contracts. Decree no. 8/2000 (2000) determined the legal and financial autonomy of public companies and stipulated that they should function on a commercial basis and be financially viable. The IISD's Trade Knowledge Network (2010) found that although changes to the state owned monopoly EDM have been implemented, including the unbundling of the company, the anticipated results of the reform programme which included boosting private sector participation, "particularly at district level, have not occurred. Mozambique's nascent private sector is in general still small, fragile and other fields of endeavour offer more secure promises of return"[31]. The Electricity Act mandates that the state will ensure the participation of the private enterprise in the electricity sector, guaranteeing the use of energy resources whilst protecting the interests of the state. At present however, "there are no fiscal incentives offered to renewable energy developers and no specific legislative framework exists for renewable energy projects" (Norton Rose 2013)[32]. In its *Renewable Readiness Assessment* (2012), IRENA stated "Electricity generation, transmission and distribution are therefore mainly provided by publicly owned, vertically integrated national utilities. Efforts have been made with varying degrees of success in a number of South African Development

Community (SADC) countries to mobilise private sector finance through IPPs. Efforts to stimulate private sector investment in Mozambique are hampered by risk perceptions by investors due to unfavourable legal and regulatory frameworks for private sector participation (concerns over competition between public and private generation assets). This causes difficulties in developing well-structured bankable projects"[33].

Nepal

As in the case of sector governance, Nepal's enabling environment to encourage the private sector investment in large scale projects requires significant elaboration if development needs are to be met. Taking the example of hydropower, at the International Conference on Economics and Finance in Kathmandu 2012[34], a paper was presented that concluded that "the high risk perception of hydropower investment in the Nepalese socio-political environment is not likely to attract a private equity firm to individually undertake such a huge burden of risk. The GoN does have a mechanism to promote outside investment; it can initiate cross over funds where numerous private equity companies can jointly invest in the construction of (e.g.) a hydropower plant. The cross over fund can be invested either into existing public listed companies, or it can be invested into privately held companies". However, the policy needs to enforce a higher degree of corporate governance by the recipient public and private firms, i.e. to ensure fair and transparent accounting standards and regulations are in place to protect the rights of minority shareholders. The major constraint in attracting such cross over funds in Nepal is the lack of an exit mechanism for private equity financiers. The high volatility of the stock market of Nepal and low depth in the market makes it very difficult for a large private equity fund holder to exit if needed. In short, domestic capacity to stimulate and protect the private sector in Nepal is limited. As part of sectoral and governance development, it has been suggested by Renewable Energy and Energy Efficiency Partnership (REEP)[14] that the establishment of an energy regulator, with the responsibility to oversee the sector, ensure fairness, and promote transparency and competition, would further encourage the development of the private sector. Currently, the energy sector is dominated by the state-owned corporations involved, although IPP development, whilst slow, is existent in the country. The creation of a more favourable environment for private-sector participation in the energy sector would presumably follow the establishment of an independent regulator, and a cohesive regulatory framework for energy.

Viet Nam

The Government of Viet Nam (GoV), has taken positive steps to reform its electricity sector, with one of the main instruments being the enactment of the Electricity Law 2005. As reported by Mekong Research (2005), this "aims to stimulate development and diversify forms of investment in the electricity sector, encourage economical use of electricity, protect the country's electricity infrastructure and develop a competitive electricity market"[22]. The development of the domestic power market is set to follow the timetable outlined in Table 2.

Table 2 Roadmap to a Competitive Vietnamese Power Market[77]

Timeline	Action
2005 - 2009	Prepare for a single buyer market (internal market)
2009 - 2014	Prepare for the wholesale market
2014 - 2016	Pilot a wholesale market
2016 - 2022	Develop the wholesale competitive market
2022 - 2024	Pilot a retail market
Beyond 2024	Develop the competitive retail market

The presence of IPPs in the Vietnamese power market is still limited by rigid regulatory policies such as those associated with agreeing on an acceptable "financeable" tariff or a per unit electricity price for power purchase agreements (PPAs). The low off-take price for electricity is a key factor hindering the participation of IPPs in the power market[36]. IISD (2012) reports that "according to Electricity Viet Nam (EVN), the number of power-generating projects under the Power Development Master Plan VI, 17 IPP projects and two build–operate–transfer (BOT) projects, is short of the targets of developing 47 power projects under both IPP and BOT investment schemes by 2015. Constraints around investment capital are a key barrier to private sector investment in the energy market. A private company is required to have equity capital equivalent to at least 20% of the total investment for an IPP project[37], although often the requirement can be 30%. This means that only the remaining 70-80 per cent of the required capital can be financed by bank loans"[38].

SECTION 04

Constraints on the Use of Large Scale Renewables

General and Global Context

Many circumstances can lead to the unintended hindrance of renewables development. As reported by the High Commission of India to Canberra (2012), these may include the high initial cost of establishing the infrastructure required by energy infrastructure projects, costs relating to grid connection and market access. Further, "a high level of expertise is also required to enter the industry, given the need for research and development, especially with regards to finding and assessing potential renewable sites"[39]. Examples of intentional hindrance include laws to restrict the development of large scale hydroelectric plants due to potential negative social and environmental impacts, as well as reluctance to construct major infrastructure projects in areas which may be used for irrigation, tourism or where local inhabitants face displacement. Some countries have had significant government investment into renewables at some point, but even those with a high proportion of renewables have capacity and access issues today. Public finance alone is not enough to provide sufficient renewable capacity to meet demand. Going back to the necessity of governance, *Harvard Environmental Law Review* (2010) stated that "without an improved governance structure for energy resource use transition, the growth of a renewable energy infrastructure will be costly, slow and inadequate"[48].

Table 4: Fossil fuel / renewables mix in the six countries studies. [14]

Country	Current Total Installed Capacity
Bangladesh	96% fossil fuels / 4% renewables.
Chile	65% fossil fuels / 34% renewables (mainly hydro) / 1-4% other renewables.
Kenya	58% renewables (mainly hydro) / 32% fossil fuels.
Mozambique	99% hydropower, from one hydropower plant located on the Zambezi River.
Nepal	92% renewables / 8% thermal.
Viet Nam	46% renewables / 54% fossil fuels.

Bangladesh

In Bangladesh, due to low levels of access to electricity, meeting the generation shortfall is the government's primary objective and hence least cost generation technologies take priority in generation planning[40]. Literature shows that smaller scale off-grid renewable solutions are more popular in the country due to various advantages: higher economic feasibility, less risk, supportive financing mechanisms and existing markets (for example, more than 2.1 million solar home systems had been deployed by March 2013 according to REN21[41]). According to the Renewables Global Status Report 2013, as opposed to developing large-scale renewable energy, it is stated that Bangladesh is encouraging off-grid renewable energy programmes, often with a blend of public and private sector resources, while many countries continue to benefit from international assistance.

Lack of finances has been a key barrier to large scale renewable energy deployment. According to the national Power Division, GoB utilities are involved in large scale grid connected renewable energy based power project development. However, Government financing has been largely limited according to the United Nations Development Programme (UNDP)[42]; "past initiatives on renewable energy have been few and uncoordinated. At the national level, the GoB has been focused on conventional power". In addition, the Global Environmental Facility (GEF) has highlighted the following barriers for renewables development in Bangladesh: lack of accessible and complete resource data, lack of appropriate policy and regulatory framework for renewable power investment, lack of capacity to develop financing packages for renewable projects, general lack of knowledge of designing, implementing, operating and maintaining renewable power projects and insufficient demonstrations to establish the feasibility of developing renewable-based power generation projects[43]. Going forward, Bangladesh aims to generate 5% of its electricity from renewable energy sources by 2015 and 10% by 2020. The target is planned to be met primarily by increasing the deployment of solar, biomass, hydro, and wind energy technologies[44]. The GoB has established a Sustainable & Renewable Energy Development Authority (SREDA) to assist in bringing renewable energy onto the forefront of Bangladesh's energy agenda.

Chile

Whilst over 30% of Chile's electricity generation is met by large-scale hydroelectric projects, the NRDC states that "Chile faces cyclical droughts, high transmission costs to access distant water resources and seismic risks" as barriers to renewables development[45]. Due to growing opposition to large scale hydroelectric power, Chile is now looking to deploy other sources (primarily wind, solar and geothermal energy). For example, it is claimed that the HidroAysén large hydroelectric complex proposed in Patagonia would put ecosystems in jeopardy, endanger lives and livelihoods, and concentrate a dangerously large portion of central Chile's energy supply at the end of a 2000km transmission line. According to the National Energy Strategy 2012-2030[46], Chile is faced with a number of further obstacles that have prevented deployment of large scale renewable energy projects. Some of the key barriers identified are: high costs of initial investment including technology and other implementation costs such as hiring experts, resource assessments and specialised labour for construction; lack of funding options; difficulties in signing long-term contracts due to lack of long term price stability. An International Institute for Sustainable Development (IISD) study on barriers to clean energy development in Chile states the current form of remunerating clean energy or non-conventional renewable energy projects, with an absence of stable long-term prices, means "a significant portion of clean energy projects never manage to negotiate the necessary resources from the finance system" or overcome technical difficulties with network connections[47].

In addition, the IISD also identified: lack of knowledge and capacity, high market concentration impeding new market entry and lack of adequate technical studies hindering clean energy development in the country. The International Renewable Energy Agency (IRENA) reports that Chile aims to generate 8% of electricity from renewables excluding large hydro by 2016[59]. Chile's National Energy Strategy[46] is conceived with the aim of addressing most of the above barriers and it further states the need for a different long-term strategy for each of the energy sources: solar, wind, bioenergy, biomass, geothermal, mini-hydro and tidal. It can be concluded, however, that whilst there is a liberalised market, the lack of government intervention has led to Chile not exploiting potential renewable resources as effectively as it might have.

Kenya

Kenya's electricity is produced predominantly by hydropower (supplemented with geothermal and thermal power plants). However, Kenya's hydro-power production capacity

is about to be exhausted[49]. Also, this reliance has led to an increased national vulnerability to drought. During 1998–2000 and 2008-09, climactic conditions decreased hydropower generation and led to severe energy shortages, resulting in power rationing. Hence, Kenya is currently focusing on scaling up geothermal power in the country. According to a recent study on investing in Kenya's power sector[50], the GoK "has set an objective to reduce the country's dependence on fossil fuels and also hydropower, which is vulnerable to drought, by exploiting the country's geothermal resources". Kenya is a participant in the World Bank's Scaling up Renewable Energy Program (SREP[51]), which is currently financing Kenya to scale-up development of Kenya's renewable energy potential. The programme aims to address key barriers to investment and catalyse additional financial resources. The key barriers identified by Kenya's SREP investment plan which was designed to align with the country's national renewable energy development strategy include: economic and financial limitations, insufficient technical and human capacity and various social constraints. In terms of energy sources, SREP is prioritising the development of 400MW of geothermal power generation, hybrid mini-grid systems and solar water heating projects. With the identified large potential for geothermal power (7-10GW) Kenya aims to increase the total electricity generating capacity from geothermal resources to 5GW by 2030. Kenya's National Energy Policy[52] highlights challenges for up taking renewable technologies at various scales. Some of the barriers identified for geothermal are high upfront investment costs; high resource development risks; inadequate geothermal expertise and the cost of imported technology; remote locations, siting restrictions and long distances to existing load centres; heavy investment in transmission and other support infrastructure; conflicting interests with other economic sector on land use and natural resources; and re-location and resettlement of affected persons during geothermal development.

Once again, it is concluded that the necessary sector governance to overcome non-technical and geographic risks, as well as encourage the private sector, in Kenya is preventing it from exploiting its natural resources. Hence, the country has less choice with respect to energy resource utilisation than it might.

Mozambique

While there is identified potential for solar, wind and bioenergy, the large scale renewable energy generated in Mozambique is dominated by hydropower. The focus is primarily on large hydroelectric projects in the Zambezi Basin (i.e. Mphanda Nkuwa) for exporting power to South Africa and for industrial use. As reported by *Energypedia* (2014), the country relies largely on the foreign exchange generated by exporting commercial electricity to South Africa[53]. In 2009 the GoM stated that one of the biggest challenges is to build capacity to carry out feasibility studies. Other major challenges highlighted included lack of a research and development programme for renewable energy, lack of policy and strategy to enable legal frameworks that promote renewables and lack of market potential[54]. IRENA's Renewable Readiness Assessment[33] for Mozambique identifies actions to scale up renewables deployment in the short to medium term in order to support the development of large and small-scale hydroelectricity projects. These include enhanced planning, the encouragement of the private sector and pursuit of wind power opportunities. It is concluded that the necessary sector governance to overcome non-technical and geographic risks, as well as encourage the private sector in Mozambique, is preventing it from exploiting its natural resources. Hence, the country has less choice with respect to energy resource utilisation than it might.

Nepal

Given topographic advantages, Nepal has a high hydroelectricity potential and Nepal's large scale renewable energy generation focus is primarily on large scale hydro power. The Government's main aim is to provide reliable electricity to rural populations currently lacking

access. The World Energy Council (2007)[55] states that "small-scale hydro plants are the most viable option for rural electrification. Large projects however, in view of Nepal's limited financial resources, would probably require power export contracts with India as a prerequisite". Despite the large hydroelectric generation potential of an estimated 83GW, the exploited capacity meets less than 1% of the total national energy consumption of the country[14]. A study by Independent Power Producers' Association of Nepal and the Confederation of Indian Industry on Nepal-India Corporation on Hydropower[56] identified the following barriers for hydropower development in Nepal: natural constraints; risks due to fragile geological features, high sediment loads in rivers and inadequate hydrological data; lack of Infrastructure; lack of basic infrastructure (roads and transmission lines); lack of adequate financial resources and private sector involvement; high cost of generation, mainly due to lack of adequate infrastructure to access hydropower sites, geological conditions, limited in-country capability and the requirement for international expertise and currency risk.

In addition to the above, K.C. Surendra *et al*[57] highlight other factors such as lack of long-term planning due to political instability in the country, inefficiency due to bureaucracy, and lack of effective treaties among co-riparian countries for sharing the costs and benefits of large scale hydroelectricity projects. Renewable energy development continues to be a high priority programme of government, which aims to increase the renewable energy mix to 10% and energy access rates to 30% by 2020. The GoN plans to invest USD1.1bn in developing hydropower, solar PV and biogas technologies to achieve this goal[14].

Viet Nam

Viet Nam has ambitious laws and action programmes for energy efficiency and the large-scale development of renewable energy sources. The mid to long-term objectives of these are to bring the share of renewable energy to 4.5% in 2020 and to 6.0% in 2030[58].

According to IRENA's renewable energy country profile of Viet Nam[59], the country has high potential for hydroelectric, wind and solar generated power. Historically, Viet Nam has developed large hydroelectric schemes. However, a study published by the Hungarian Chamber of Commerce and Industry[60] states that "the share of hydroelectric generation in total power production will decrease considerably in the coming decades. Viet Nam's above-mentioned total technical potential is unlikely to be achievable, due, not least, to environmental problems and the problems arising from the need to resettle sizeable populations - as shown by the Son La project, where a sustainable solution to the resettlement of the 70,000 has caused controversy".

There are other barriers that large scale renewable power generation projects face. A 2007 USAID country report on Viet Nam's clean energy development[61] highlighted the following: (a) the need for policy development, "in particular development of a Small Power Purchase Agreement (SPPA) that meets the needs of on-grid project developers; the need for awareness, as insufficient information is available about technologies, costs, and effectiveness; the lack of any stimulus to early development of renewable electricity markets; lack of a dedicated or specialised agency or ministry charged with looking after early development of a renewable energy industry; and lack of detailed resource data".

SECTION 05

Market Based Mechanisms

General and Global Context

A market based mechanism (MBM) can leverage private sector investment; provide additional capital so that projects which may not have been financially viable are able to proceed; increase the likelihood of better management if there is payment on results; and criteria for participation in a MBM can be linked to climate and development goals in order to channel investment into more sustainable projects[62]. As well as international carbon trading under Kyoto flexible mechanisms, it should be highlighted that when considering MBMs, there are a number of other options available. These include crediting mechanisms, carbon taxes, and green / white certificate trading. For many countries, the first experience of market based mechanisms is the opportunity of carbon finance for projects via the clean development mechanism (CDM). Indeed, due to the institutional capacity and experience with private project developers needed to approve CDM by government, success with the CDM is a reflection of the general governance structure of the host country. However, as found by Newell (2009) "CDM governance, however carefully designed from above, is unable to overcome or compensate for governance deficits at the national and subnational level in terms of accountability, transparency and legitimacy"[74].

Table 5: Experience with Market Based Mechanisms [73]

Country	Market Based Mechanism Status (as of February 2014)
Bangladesh	4 CDM projects registered.
Chile	105 CDM projects registered. One of the first nations in the World Bank's Partnership for Market Readiness (WB PMR) programme to publish and obtain approval for its Market Readiness Proposal. Chile has received USD4m grant for implementation of a domestic emissions trading scheme.
Kenya	17 CDM projects registered.
Mozambique	2 CDM projects registered.
Nepal	6 CDM projects registered.
Viet Nam	252 CDM projects registered; the majority in the renewable power sector. Viet Nam is also a beneficiary of grant funding from the WB PMR to develop a domestic emissions trading scheme.

Bangladesh

The study confirmed that there is currently no national domestic emissions trading system (ETS), carbon tax or domestic crediting scheme operating in Bangladesh today. As institutional capacity and governance have been found to be underdeveloped, a domestic market based mechanism is not planned for the short or medium term. Islam *et al* (2012)[63] conclude that there is "a lack of proper environmental measurement systems as well as the management and control systems in Bangladesh". Looking internationally, as a non-Annex 1 party Bangladesh is eligible to register projects under the CDM in order to receive carbon finance for emissions mitigation projects. At the time of writing, Bangladesh has only four registered CDM projects. In its submission to the United Nations Framework Convention on

Climate Change (UNFCCC) with respect to the planned new market based mechanism, Bangladesh's Government stated its position clearly[64], "Climate change is the epitome of greatest market failure so far. Using the market mechanism to redress its adverse impacts using the same market mechanism is thus a major cause of concern".

Chile

In 2009, the Inter-Ministerial Committee on Climate Change was created by a presidential instruction and was composed of ministries of Foreign Affairs, Finance, Economy, Public Works, Agriculture, Mining, Transportation and Telecommunications, Energy, and Environment. In 2010, Chile enacted a new law, Law 20,417, amending Law 19,300 of 1994, and created the Ministry of the Environment, the Environmental Evaluation Service, the Superintendent for the Environment, and the Council of Ministers for Sustainability[65]. These are the main regulatory instruments and bodies responsible for the implementation of Chile's proposed domestic emissions trading system. In 2013, Chile started to prepare long-term mitigation scenarios, known as Mitigation Action Plans & Scenarios or MAPS Chile. It aims to project greenhouse gas (GHG) emissions on a national level for the Business as Usual Scenario and different Mitigation Scenarios, considering target years of 2020, 2030, and 2050, integrating emissions trading into its plans. To date, Chile is the beneficiary of USD3.35m from the World Bank programme "Partnership for Market Readiness" (WB PMR). In the document *Roadmap for Implementing a Greenhouse Gas Emissions Trading System in Chile: Core Design Options and Policy Decision-Making Considerations* (2012)[66], considerations such as sector coverage; point of obligation for regulated sectors; the level of ambition; linking to other markets and use of (domestic and international) offsets; emissions trading phases; and allocation of units were addressed. Chile could have several overlapping objectives for an ETS: cost-effectively contributing to global emission reductions; lowering the carbon-footprint of Chile's exports in anticipation of potential trade restrictions against high-emitting countries and products; driving sustainable development including stimulation of new technologies and profiting from sales of units to international buyers. The balance among objectives will affect design decisions so clarity about their relative weight and their implications for design is useful. To date, Chile has realised some success in registering 105 CDM projects in all, the majority being in the renewables sector (as opposed to landfill gas capture or other non-renewable project types).

Kenya

Kenya announced plans in 2010 [67] to establish a regional carbon emissions trading scheme to steer Africa's carbon market. Whilst it can be concluded this has not happened, external factors such as the beginning of the collapse of the price of carbon in the EU at the time of the announcement is as likely to be the cause as any other reason. There is no express mention of carbon trading in the Constitution of Kenya[68], however the Ministry of Finance in fiscal year 2011/2012 prepared a National Policy on Carbon Investments and Emission Trading. This was in response to the advancements that were being made in the trade of carbon credits and the need to have a mode of regulation for carbon trading that was already happening. Experience of carbon trading to date is from CDM projects in Kenya, although the number of registered projects is very small. The literature reviewed confirmed that there is no domestic emissions trading system, carbon tax or crediting scheme operating or planned in Kenya today. In an analysis by Climate and Development Knowledge Network (CDKN) of the national policy on emissions trading, three conclusions were reached: future carbon market conditions will be difficult (although this is not a finding limited to Kenya in particular, more a result of collapse of the EU carbon market price); a primary trading platform is more appropriate to Kenya's needs than a secondary platform (primary platforms facilitate the origination of carbon credits, and their initial purchase from project developers; secondary platforms allow trading on a large scale to allow ultimate compliance purchasers and market intermediaries to purchase credits and manage their carbon price exposure);

and within the primary platform options, a focus on enhancing the country's Designated National Authority (focal point for CDM activity) and export promotion activities is desirable (i.e. domestic institutional capacity to support CDM is at this time limited).

Mozambique

The study confirmed that there is no domestic ETS, carbon tax or crediting scheme operating in Mozambique today. At the time of writing, Mozambique's only experience of a market based mechanism is via the CDM, however only one cook stove project has been registered since 2005; i.e. there are no electricity generation related projects. UNEP Risoe[69] have assessed that Mozambique has an emissions abatement potential of over 42MtCO_2e emission reductions that could be realised through CDM projects. As the cook stoves project's *ex-ante* forecast is to reduce emissions by less than 200ktCO_2e, the UNDP's conclusions on Mozambique's barriers to CDM[70] appear to be substantiated. These include a low awareness of CDM opportunities; the lack of upfront financing for pre-investment studies of the CDM component (baseline and PDD elaboration, monitoring programme development); lack of a national definition for 'forest' under the CDM; a low capacity to develop CDM projects, with only a very limited number of professionals and institutions having an in-depth understanding of the CDM process. The lack of a fundamentally strong governance structure has meant that the platform which needs to be developed to take advantage of CDM revenue is not in place today.

Nepal

The study confirmed that there is no domestic ETS, carbon tax or crediting scheme operating in Nepal today. As with other developing countries, Nepal's first opportunity to take part in a market based mechanism is most likely to come via the CDM or projects which earn CERs via Reducing Emissions from Deforestation and Degradation (REDD). REDD has arguably suffered more than CDM in the international marketplace for CERs due to monitoring, additionality and permanence concerns. However, the Institute for Global Development Strategies (IGES)[71] note that "a draft of a quality governance standard for the forest sector in Nepal has been completed. Its content is based on direct input and consensus from a wide range of stakeholders represented in surveys, interviews and a workshop. An informal advisory group, which was formed at the workshop, has taken up the task of overseeing development of the draft standard". In the long term, this is promising in terms of potentially preserving forests instead of them being exploited as potential energy sources. However, as noted above, due to the collapse of the EU carbon market price, it may be some years before such benefits are realised. According to the UNFCCC, at the time of writing, Nepal had only six CDM projects registered, four of which were biogas related with the other two being hydropower and cook stove projects.

Viet Nam

GoV regulation No.1775/QD-TTg established targets for emissions reductions in four key sectors including in the energy sector by 8%. One of the methods by which this is to be achieved is through a domestic ETS. To achieve this goal, Viet Nam has received USD350k from the WB PMR and is anticipated to receive another USD3m to support the implementation of a domestic emissions trading market[72]. The GoV heavily subsidises electricity prices to avoid social unrest, and hence a carbon tax is considered a remote possibility. Hence, to date the main experience of a market based mechanism in Viet Nam is the CDM, and according to UNEP Risoe[73] and the UNFCCC, the country has been remarkably successful in this area. Viet Nam has the fourth highest number of CDM projects, 252 projects in total with over 200 of them being hydropower. The extent to which CDM has driven energy resource utilisation choice is debatable, however this question is not limited to Viet Nam and is more with respect to the governance of the CDM itself; the

methodology for grid connected renewables is one of the simpler and commonly used methodologies and Viet Nam has a wealth of potential hydropower resource.

SECTION 06

Conclusions and Recommendations

Factors Do Not Affect Choice Equally

The first finding of this study is that factors influencing choice of energy resource utilisation are not of equal importance; neither can they be considered in isolation. However, it can be seen that the first step towards having a decision framework in place is the establishment of a robust governance structure. Countries where this was observed had a greater deal of control and had more developed policies than others:

- Chile and Viet Nam have clearly laid out governance structures and policies. Whilst work needs to continue on their development to meet national goals, they have at least facilitated policy developments that others in the study have not realised. For example, these countries have more advanced policy options concerning:
    - Market stimulating measures such as FITs.
    - Greater / faster growing participation of the private sector in generation. Whilst still not widespread in Viet Nam, the level of private sector investment is significant given that participation has only been legally allowed since 2005.
    - Policies in place to begin to plan for market based measures.
- Bangladesh, Kenya, Mozambique and Nepal's governance structures are less developed and the participation of the private sector is weaker, there are fewer and less effective market based stimulants, market based mechanisms are not foreseen in the medium to long term.

Therefore conclusions can be made by grouping the countries studied by firstly considering their sector governance.

Bangladesh, Kenya, Mozambique and Nepal

In Bangladesh, the country's governance structure has been criticised for being inefficient and corruption has been observed. Hence, although legislation has been pro-private sector, this has not enabled the private sector or a competitive energy market in Bangladesh to be fully established. The development of large scale renewables and the establishment of market based mechanisms require a great deal of co-ordination and institutional capacity, and these are lacking in Bangladesh. In fact, due to weak governance, the choice of energy resource utilisation is likely to continue to be governed by a primary need to produce as much electricity for the least cost possible rather than, for example, promoting the use of green technologies or technologies that stimulate jobs.

The situation in Kenya somewhat mirrors Bangladesh's; the GoK has passed legislation to encourage private sector investment, but weak and inefficient regulation has led to a lack of incentives for private sector investment. One result is a continued over-reliance on older hydropower facilities, which is a risk, given the regional propensity for drought conditions. As noted in Sections 2-4, the lack of a strong private sector or a free market in power generation not only inhibits the development of renewables, but it also means that the precursor to a market based mechanism is not in place.

In Mozambique and also Nepal (the latter still adjusting to post-conflict policy making), governance structures are particularly still in need of development. In these countries, it can be seen that there is little private sector investment and there is an absence of competitive

market structures. These are barriers to energy development that could be overcome with better governance as the foundation necessary to begin considering the design of market based mechanisms.

Chile

Chile has demonstrated a long history of private sector involvement in the energy sector, much of this as a legacy of rule by dictatorship in the latter part of the twentieth century. Whilst liberalism of the domestic power market is hailed as a success by observers, there is a lack of government intervention to provide incentives to stimulate the development of renewable resources. Hence, a conclusion is drawn that whilst a strong, liberalised market is good in many ways, some degree of government intervention (e.g. FITs) is needed to overcome some of the barriers to renewables investment. The experience of the long standing private sector has, however, been an enabling factor in the advanced development of Chile's domestic emissions trading scheme. The high level of private sector involvement and the benefits brought from this (e.g. transparency and efficiency) have led to a belief in markets and a market based mechanism for Chile. Chile has the most liberalised power market in the study and also the most advanced plan for a domestic emissions trading scheme.

Viet Nam

Viet Nam only opened its markets in 2005 so does not have a long history of private sector involvement as Chile does. However, unlike Bangladesh, Kenya Mozambique and Nepal there is a strict central planning regime in operation. Though sometimes inefficient, it is at least co-ordinated, leading to more consistent policy implementation. This has led to rapid growth in the private sector, stimulated by incentives such as feed in tariffs and tax breaks for certain types of investment. Though there is only a fledgling private sector, the Government's strong control of the sector has enabled the country to take the bold decision of designing a domestic ETS. However, as the driver of the market based mechanism is emission reductions, choice in energy utilisation may not be directly affected (as opposed to the use of a carbon tax on the use of fossil fuels, which South Africa has chosen to implement as a market based mechanism).

Lack of Governance Means a Lack of Choice

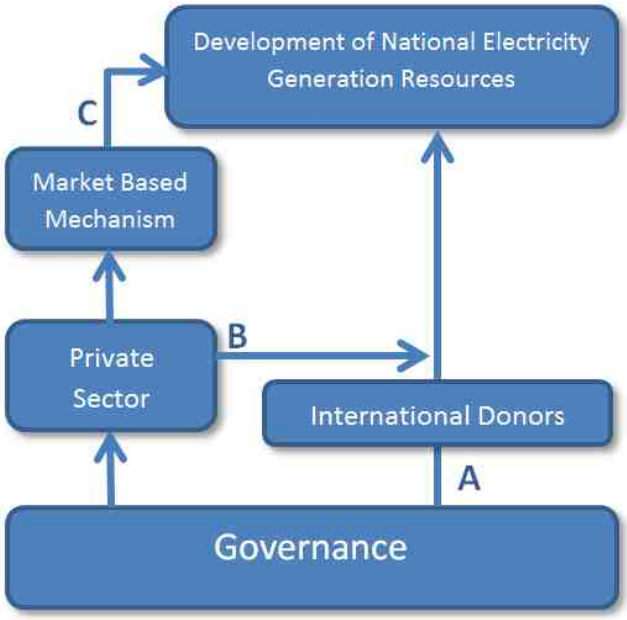
Following on from the first finding, it can be concluded that a lack of strong sector governance is hampering all countries studied in overcoming barriers, which can enable the choice of energy resource use. Lack of institutional capacity and non-enforcement of regulations is a poor signal to the private sector. In order to be encouraged to invest, the private sector needs clear signals on pricing to ensure a return on investment (for example via a feed-in tariff), corruption should be minimised so firms know they will be treated fairly and if foreign investment is to take place other assurances may be required (e.g. repatriation of profits, clarity around withholding taxes etc.). The private sector may be able to mobilise finance to invest in large scale renewable development. However, the lack of private sector involvement / liberalised markets is a key barrier to the establishment of a market based mechanism.

The CDM is an ideal opportunity for developing countries to take part in their first market based mechanism. It requires the establishment of institutional structures and availability of national data to develop baseline scenarios for example. There is a strong correlation between the governance structures and clear signals that the Chilean and Vietnamese governments have made progress towards market based mechanisms. Others, whose governance structures may include legislation which is not, or only partially or ineffectually implemented, are further away from success in CDM and developing other MBMs. The findings are represented schematically in Figure 1. This diagram represents differing paths

that can be taken to achieve the development of large scale national electricity generation resources to meet growing demand or export power:

- Scenario A: The governance structure is strong enough for the government to have completed a number of large scale projects from public funds, potentially with development assistance from other countries. This could represent the situation in Kenya for example. Whilst large scale hydropower is in operation, the private sector has not been utilised to take risk and access funding where the government cannot. With little private sector experience of markets, there are barriers to attracting investment in other renewables and the implementation of a market based mechanisms to reduce emissions / stimulate development in the sector.
- Scenario B: The government has developed some major projects using public funds. Also, a strong governance structure with incentives has stimulated the private sector, which has led to the development of projects by IPPs. To a certain extent this has happened in Chile. However, a strong private sector has not been sufficient to develop enough resources, particularly renewable resources, and a market based mechanism is a potential solution to attract the funding necessary to provide enough electricity to satisfy national demand.
- Scenario C: The governance structure is geared towards private sector participation, and a market based mechanism exists to attract the finance necessary that the domestic government and private sector alone cannot provide. Chile and Viet Nam are the most advanced countries in this study towards this scenario.

Figure 1: Alternative Policy Development Paths



The overall conclusion with respect to governance is that none of the countries analysed in this study have robust enough institutional capacity or policy to effectively make decisions on energy resource utilisation; decisions are still mainly based on economic factors and inherited national circumstances rather than being co-ordinated for wider development goals.

Policies at an Early Stage of Development

Today, policies and governance structures are limiting the ability of nations to make choices. However, there are policies, aims and strategies which are at an early stage of development which may increase the ability to make choices based on outcomes other than least cost. Given the processes which have been started by the United Nations Framework Convention

on Climate Change (UNFCCC), much energy policy is now intertwined with climate change policy. Table 6 summarises these policies.

Table 6 Early Stage Policies Which Could Enable Choice

Country	Policy / Strategy / Goal	Notes
Bangladesh	National Climate Change Policy and Action Plan (2009)	The action plan has an objective of maximising the use of renewable energy sources to lower GHG emissions and ensure energy security. Specific actions include: investments to scale up solar power programmes; research and investment to harness wind energy, particularly in coastal areas; feasibility studies for tidal and wave energy; study of the techno-economic, social and institutional constraints to adoption of improved biomass stoves and other technologies.
Chile	Chile proposes to undertake NAMAs to reach 20% below BAU in 2020 (as projected from 2007).	By 2020, and with sufficient international support, Chile pledges to reduce emission by 20% below its business-as-usual emissions growth trajectory in an effort to support its low carbon development goals. A primary focus is deriving emissions savings renewable energy development[(75)].
Kenya	National Climate Change Response Strategy (2010); Kenya National Climate Change Action Plan (2013); Vision 2030.	The National Climate Change Action Plan to implement the strategy includes subcomponents such as a national adaptation plan, a low carbon sector analysis, a technology action plan, and knowledge management and capacity building.
Mozambique	National Climate Change Strategy (NCCS), covering the period 2013-2025.	Measures such as improving access to renewable energy, and cross-cutting measures such as setting up the institutional framework for co-ordination of action on climate change.
Nepal	District Climate and Energy Plans (DCEPs) [(76)]	The main goal of a DCEP is to articulate a district-level renewable energy plan that accounts for the changing climate as well as economic and social dimensions, ultimately contributing to local and national sustainable development goals. The DCEP systematically addresses opportunities where renewable energy can contribute to climate change mitigation and adaptation, and at the same increases the competitiveness of women and oppressed social groups by engaging them in productive energy use activities.
Viet Nam	VII Power Master Plan VII (GoV decision No. 1208/QD-TTg, dated 21 Jul 2011 on approval of national electricity development planning period 2011-2030)	Increase of renewable energy share to 4.5% and 6.0% in 2020 and 2030 respectively. Wind, 0.7% in 2020, and 2.4% in 2030; biomass electricity, 0.6 % in 2020, and 1.1% in 2030; hydropower plants, doubling of capacity (17,400 MW) in 2020; nuclear power, 10.1% in 2030 [(77)]

There is little evidence in the literature to date to understand the impacts of these newly emerging governance structures and policies. However, Table 6 provides a useful overview of future direction and ambition. If these policies are effective, they will strengthen governance structures which in turn will send positive signals to the private sector and international donors with respect to investment risk.

Literature Gaps and Recommendations

During the rapid desk based study no research papers were found confirming the key factors affecting energy resource utilisation. The four factors considered in this study have therefore been based on expert judgement and experience, but there is a clear gap in the literature for a paper *identifying what the key factors are affecting choice of energy resource utilisation.*

Secondly, a study to determine *what the key factors are which affect governance in the electricity generation sector in LDCs* would be highly valuable. Studies into governance in general have revealed corruption, institutional organisation and political systems have an effect on governance in general, but one such study into governance in the power generation sector in LDCs was not found.

Further, other key factors which influence choice may be access to natural resources, political structures within countries, the trade-off between the uses of commodities (for example crops versus biofuels) or competing land use scenarios (for example tourism versus energy generation). It would be useful to study the experiences of more upper middle income countries with respect to these factors which may influence energy resource utilisation choices. In considering middle income countries, the work of the WRI's *Energy Governance Initiative* is an established source of information[81].

Finally, the policies listed in Table 6 merit further study to understand the likelihood of goals being met, progress against targets and whether they have created an enabling environment necessary for national power sector development in each case.

ANNEX A

Country Summaries

Bangladesh	
Country Overview	
Population[78]	156 Million
GDP [78]	USD112bn
Energy production [23]	26 Mtoe/year (2011)
Energy consumption [23]	31 Mtoe/year (2011)
Electricity Access Rate (2009) [79]	41%
Total Installed Electricity Capacity (2010): 5.8GW [14]	• Gas 4,800 MW (83%) • Diesel 186 MW (3%) • Hydro 230 MW (4%) • Coal 250 MW (4%) • Furnace oil 335 MW (6%)
Renewable Energy Targets [59]	• 5% of electricity generation from renewables by 2015 • 10% of electricity generation from renewables by 2020 • 500 MW of solar capacity by 2015 • 6 MW of biomass-fired capacity by 2014 (2 MW solid, 4 MW biogas)
Imports[14]	Local oil and coal reserves are very small compared to the demand – according to 2009 statistics; more than 94% and 45% of the respective needs were met through imports. Net energy imports in 2009 were 4.67 MtoE.
Capacity Concerns[14]	The present effective peak generation of about 4,000 MW of electricity against a peak demand of 5,500 MW means large-scale load shedding which seriously impacts industrial, commercial and social life.
Energy Framework and policy landscape [14] [59]	• Development of the energy sector has been prioritised via the Five-Year Development Plans of Bangladesh. • Development of the energy sector appears to be a major constraint for continued development of the nation. The Sixth Five Year Plan (SFYP) 2011-2015 is developed in line with the 'Vision 2021' national development plan. • The Private Sector Power Generation Policy of Bangladesh, 1996 • Policy Guidelines for Small Power Plants (SPP) in the Private Sector" in 1998 (Reform 2001) • National Policy Statement on Power Sector (Reform), 2000

Chile	
Country Overview	
Population [78]	16 million
GDP [78]	USD248bn
Energy production [23]	9.9 Mtoe/year (2011)
Energy consumption [23]	33.6 Mtoe/year (2011)
Electricity Access Rate (2009) [79]	99%
Total Installed Electricity Capacity (2010): 15.9GW [14]	• Thermo-electricity: 65% • Hydro-electricity: 34% • Other renewables: 1-4%
Renewable Energy Targets [59]	• 8% of electricity generation from renewables (excluding large hydro) by 2020.
Imports/ Exports [14]	• Chile´s dependence on imported energy had been increasing for the last 30 years. In 1980, approximately 58% of energy was supplied by indigenous production and 42% from net imports. However in 2005, this proportion has reversed, with 71% from imports and the remainder from indigenous production. • Chile has a mutually dependent relationship with Argentina. Chile exports energy to Argentina during the summer season, while Argentina exports thermally-produced electricity to Chile during the winter. Argentina exports most of its surplus natural gas to Chile.
Capacity Concerns [14]	• High diesel prices combined with droughts, natural gas restrictions, rising energy demand, and delay in the development of new projects increase the likelihood of energy shortages and will keep electricity prices on an upward trend for the next couple of years. • In 2009, thermal-electric power plants were under construction and planning stages, as Chile is investing to diversify its power-generating infrastructure.
Energy Framework and policy landscape [14] [59]	• The Proyecto de Electrificación Rural (PER) started in 1994 to overcome poverty, improve quality of life and integrate rural areas into the economic and social development of Chile. • Removal of Barriers for Rural Electrification with Renewable Energies, 2001 – 2008 • Access for small and non-conventional power, 2004 • Invest Chile Project, 2005 • Programa País de Eficiencia Energética (PPEE), 2005 • Non Conventional renewable energy Law, 2008 • Plan of action for climate change 2008 – 2012 (Drafted) • Regulatory framework for solar thermal power, 2009

Kenya	
Country Overview	
Population [78]	39 million
GDP [78]	USD33bn
Energy production [23]	16.2 Mtoe/year (2011)
Energy consumption [23]	20.2 Mtoe/year (2011)
Electricity Access Rate (2009) [79]	16%
Total Installed Electricity Capacity (2010): 1.4GW [14]	• Hydro-electric: 52% • Conventional Thermal: 32% • Geothermal: 13% • Wind, others: 3%
Renewable Energy Targets [59]	• Double installed renewable capacity by 2012 • 5,000 MW of geothermal capacity by 2030
Imports/ Exports [14]	• Kenya relies heavily on imported petroleum for local consumption. In 2007, Kenya imported 57,000 bbl/day of crude oil. • To address the energy crisis, Kenya has increased the import of electricity from Ethiopia, which offers cheap prices and, since 2009, has good hydro-electric sites.
Capacity Concerns [14]	• Kenya's electricity mix is dominated by hydro generation (over 50%) and thus highly vulnerable to weather conditions and climate change. The climatic conditions of 1998–2000 and 2008-2009 curtailed hydropower generation and led to severe energy shortages which culminated into power rationing. • A weak transmission and distribution network, low countrywide electricity access and over-reliance on hydropower which is vulnerable to vagaries of weather, are some of the challenges facing the electricity sector.
Energy Framework and policy landscape [14] [59]	• Least Cost Power Development Plan (LCPDP) • Rural Electrification Master Plan, Sessional Paper No. 4 of 2004 (The energy policy document) • The Energy Act of 2006 • The Feed-in Tariff Policy, 2008 • The Kenya National Climate Change Response Strategy, 2010 • Gender Audit of Energy Policies and Programmes in Kenya, 2007 • Kenya Vision 2030 (the National economic development blueprint).

Mozambique	
Country Overview	
Population [78]	21 million
GDP [78]	USD12bn (2011)
Energy production [23]	12.8 Mtoe/year (2011)
Energy consumption [23]	10.2 Mtoe/year (while production is greater than consumption, exports to South Africa are considerable, hence the low energy access rate).
Electricity Access Rate (2009) [79]	12%
Total Installed Electricity Capacity (2010): 2.3GW [14]	• Hydropower is the dominant source of electricity, accounting for 99.7% of the total.
Renewable Energy Targets [59]	• 6,000 MW of wind, solar and hydro capacity (2,000 MW each) • Installation of 82,000 solar photovoltaic systems, 1,000 bio digesters, 3,000 wind pumping systems, 5,000 renewable-energy-based productive systems and 100,000 solar heater in rural areas
Imports/ Exports [14]	• Mozambique consumes and imports over 685,000 tonnes of oil per year, the bulk of which is in the form of diesel. At present there is no oil refinery and as a result, all refined products must be imported. • Mozambique is a net exporter of electricity, 73% of the 2,075MW generated by the Hidroelectrica de Cahora Bassa (HCB) is exported to South Africa.
Capacity Concerns [14]	• Nearly all of Mozambique's electricity is produced by the Cahora Bassa Dam, built and completed before independence. • Energy demand is growing considerably, at an average annual rate around 7-8% per year. The electric supply is not consistent and there are blackouts. It is reported to be one of the reasons for the failure of some industries, particularly the clothing industry. • In addition, service is unreliable and available only 60–70% of the time. As a result, many businesses and individuals purchase small fuel generators, which add to investment costs and pollution.
Energy policy landscape [14] [59]	• The Government's Energy Policy (1998) presents a clear statement on the importance of providing energy to the households and productive sectors. It aims to build capacity and improve management within the electricity sector, increasing exports and efficiency, as well as other relevant matters. • The Energy Sector Strategy (2000) focuses specifically on how to implement the Energy Policy, including increasing the role of the private sector, developing more competitive markets, and the need for regulation • The Energy Reform and Access Project (2003-2011) aims to accelerate the use of electricity for economic growth and social services in a commercially viable manner. • The Electricity Master Plan for Development of the National Grid 2005-2019 focuses on Grid Supply Expansion in the short-to-medium term.

Nepal	
Country Overview	
Population [78]	29 Million
GDP [78]	USD18bn
Energy production [23]	9.0 Mtoe/year (2011)
Energy consumption [23]	10.4 Mtoe/year (2011)
Electricity Access Rate (2009) [79]	44%
Total Installed Electricity Capacity (2010): 0.7GW [14]	• Hydro-electric: 92% • Thermal/Imports/IPPs: 8%
Renewable Energy Targets (59)	• 1 MW of wind capacity by 2013 • 3 MW of solar capacity by 2013 • 15 MW of micro-hydro capacity by 2013
Imports [14])	As Nepal does not have any fossil fuel reserves of its own, the country has to spend significant foreign exchange on the import of fossil fuel. Nepal imported 1.10 MtoE of energy in 2009. Nearly all fossil-derived fuels consumed in the country are imported in a refined form from a neighbouring country, India. Furthermore, there is a steady increase in the import of petroleum fuels over the years. Around 50MW of power is being imported from India. Recently, an agreement has been reached between both countries to supply an additional 60MW to Nepal.
Capacity Concerns [14])	• High system losses and frequent outages • There is a slow expansion of the grid because of geographical difficulties and an urgent need for coordinated use of renewables • The growing dependency on imported petroleum fuels coupled with rising fuel price in the international market is severely impacting the already fragile economy of the country
Energy Framework and policy landscape (14) (59)	• RE development continues to be a high priority programme of Government • Government of Nepal's (GoN's) goal for the next 20 years is to increase the share of RE from less than 1% to 10% of the total energy supply, and to increase the access to electricity from alternative energy sources from 10% to 30%. • The Government plans to invest USD 1,076 million in RE by 2020, which will include support for hydro power, solar PV and biogas technologies. • The current Three Year Plan (2010-2013) envisages the addition of 15 MW of mini/micro hydro power; 225,000 solar home systems; 90,000 domestic, 50 community and 75 institutional biogas plants; 1 MW of wind power; and 4,500 improved water mills • Rural Energy Policy, 2006 • National Electricity Crisis Resolution Action Plan, 2008 • Subsidy Policy for Renewable (Rural) Energy (SPRE), 2009 • Biofuel Program, 2008/2009 • Scaling-up Renewable Energy Program (SREP)

Viet Nam

Country Overview	
Population [78]	89 million
GDP [78]	USD 123 billion
Energy production [23]	72 Mtoe/year
Energy consumption [23]	52 Mtoe/year
Electricity Access Rate (2009) [79]	98%
Total Installed Electricity Capacity (2010): 18.5GW[14]	• Gas: 43% • Hydro: 32% • Coal: 23% • Oil: 2% *Values above are for 2009* [80]
Renewable Energy Targets [59]	• 4.5% of electricity generation from renewables by 2020 • 6% of electricity generation from renewables by 2030
Imports/ Exports[14]	• Viet Nam is a net energy exporter. Previously, due to a lack of indigenous refining capacity, all crude oil production was exported. The economy imports most of its petroleum products. Oil product imports increased from 8882 ktoe in 2000 to 14 805 ktoe in 2009 at an average annual growth rate of 9.2%. Oil is still the most important energy source in Viet Nam, accounting for 43% of the economy's primary supply in 2009, compared to 41% in 2008. • At present, Viet Nam supplies electricity to the Lao PDR and Cambodia by medium voltage lines, and purchases electricity from China through 110 kV and 220 kV lines.
Capacity Concerns [14]	• The economy needs to overcome many challenges to ensure energy security: oil products will still have to be imported, although Viet Nam's first oil refinery was completed in 2009; the economy currently has no strategic oil stockpiling; the power sector is in the early stages of reform; electricity shortages still occur; and power systems operate without adequate reserves. Capacity shortfall at peak demand times is estimated to be 1,500 – 2,000 MW. Investment in energy development, especially in electricity generation, is currently insufficient to meet rapid demand growth. It is estimated that energy demand will be 110-120 million toe by 2025, and 310-320 million toe by 2050.
Energy Framework and policy landscape (14), (59)	• Renewable Energy Action Plan • Decree on Electric Power Operation and Use, 2001 • Electricity Law, 2004 • Avoided Cost tariff (ACT) regulation, 2008 • Standardised Power purchase agreement for small renewable energy power, 2008 • National Energy Development Strategy for the period up to 2020, with an outlook to 2050, 2008 • Renewable Energy Development Plan, 2010 • National Power Development Plan, 2011

ANNEX B

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ANNEX C

Annotated Bibliography

Study	Synopsis and Relevance
World Bank. 2009, *Bangladesh - Energy Policy Note for the New Government*. Washington, DC	This note provides a good understanding of underlying reasons for the significant shortages of power generation capacity and natural gas in Bangladesh. It identifies that these problems can be addressed by taking required action to improve services, restructure energy sector finances, and bolster governance. It also notes that in parallel the country should have better policy making coordination in fuel and power sector in order to address medium and longer term issues (such as assessing the place of coal-fired power in the generation mix, and considering energy trade options).
International Energy Agency(IEA), 2005, *Lessons from Liberalised Electricity Markets*	This book provides experience from OECD countries (UK, Australian, Nordic and North Eastern United States) in reforming electricity market that have been functioning with considerable success for a number of years. The study covers issues in relation to the governance structures required to create effective competition, the role of prices and transparent wholesale markets; consumer protection; incentives for investment, and impact of addressing security of supply and environmental policy.
Electricity reform in Chile, lessons for developing countries. Competition and Regulation in Network Industries, Intersentia, vol. 5(3), pages 221-263, September.	The paper discusses the progress and the lessons learnt during the reform in the Chilean power generation, distribution and transmission sectors. While the study identifies problems due to the initial market structure and regulatory arrangements it further notes how the overall experience in Chile contributed strongly for private ownership and operation of the industry.
ODI, 2013, *Low Carbon Competitiveness in Kenya*	The report looks at how issues such as climate change, international mitigation, and natural-resource scarcity will impact Kenya in the next 10 years with a particular focus on energy, agriculture and manufacturing sectors. It also identifies potential opportunities and threats to Kenya's competitiveness and growth, and possible policy responses.
IISD, 2012, *Climate Risks, Vulnerability and Governance in Kenya: A review*	This desk-based review summarise Kenya's vulnerability and exposure to climate risks, how these risks might change in the future given available climate change projections and the degree to which key sectors of the Kenyan economy and particular groups are vulnerable to existing and future climate risks. It further provides an overview of Kenya's current capacity to address climate risks given its policy framework, institutional arrangements, information availability, ongoing projects and capacity needs. The paper concludes by providing sector-specific recommendations to address knowledge gaps and general recommendations to strengthen response capacity.

Study	Synopsis and Relevance
Sustainable Energy Regulation Network (SERN), *Renewable Energy and Energy Efficiency Partnership (REEP): Policy Database* (Accessed 2014).	The REEP policy database outlines the latest policy frameworks, regulatory institutions and mechanisms in 160 countries relevant to renewable and energy efficiency. All countries have been updated during the course of 2012-2013. For each country it provides an overview of the country's energy situation including energy exports, renewable energy potential and barriers, capacity issues, exports and imports, energy demand and production.
Vietnam Country Report, Kovac, 2012 (LAUREA University of Applied Sciences)	The country report provides information on the state of Viet Nam's energy sector in relation to self-sufficiency, electricity availability and capacity; energy policies; renewable and fossil energy resources; and the supply and demand for energy solutions.
Freshfields Bruckhaus Deringer, 2005, *Vietnam – new electricity law*	The briefing note provides a summary of Viet Nam's first Electricity Law, which came into effect in 2005. It highlights the planning for energy development, the market mechanisms, pricing mechanisms and regulatory system as planned under the Law.
World Economic Forum, 2012, *Unlocking Financing for Clean Energy in Kenya Workshop - Nairobi, KENYA*	This document provides an overview of key finding of a workshop conducted to identify critical bottlenecks to financing clean energy in Kenya and to design solutions where public finance can help unlock the private finance.
International Renewable Energy Agency (IRENA), 2012, *Mozambique- Renewable Readiness Assessment (RRA)*	This is a country-led assessment conducted by IRENA to provide facts and an analysis on ways to move forward with the renewable energy agenda. The RRA is an assessment of the conditions necessary for the installation and ongoing operation of renewable energy facilities in a country. It covers all renewable energy sources and services of preference to the country's national product.
Ren 21, 2013, *Renewables 2013: Global Status Report*	The report provides a comprehensive and timely overview of renewable energy market, industry, investment and policy development worldwide. It highlights the patterns of growth of renewable energy in developing country particularly due to cost reductions and increased investments. Further it provides evidence on how implementation of suitable policies can enable the successful integration of higher shares of variable renewable into existing power systems.
Global Environmental Facility (GEF), 2011, *Project Identification Form- Development of Sustainable Renewable Energy Power generation in Bangladesh*	Through this project identification form, GEF describes Bangladesh's energy situation, Government's actions towards energy and the key problem that needs addressing through the project. It identified key barriers for the Government of Bangladesh to meet its renewable energy goals.
Opportunities and Domestic Barriers to Clean Energy Investment in Chile , IISD, 2010	This paper includes a survey of Chile's energy supply regime in terms of regulatory and policy frameworks, trends and current status. It also provides an assessment of the measures already taken and highlights the barriers to generate investments required for achieving country's clean energy goals.
IRENA, *Renewable Energy Country Profiles*	The profiles provide comprehensive and up-to-date information for each country on energy supply, electrical capacity, energy access, policies, targets, investment climate, projects and endowment in renewable energy resources. The data have been compiled from different sources and refer to years between 2008 and 2012.

Study	Synopsis and Relevance
Norton Rose Fulbright, 2013, *Investing in the African electricity sector Kenya Ten things to know*	This article highlights 10 key factors and a detailed description of them in Kenya's context that need to consider when investing in Kenya's power sector. The factors discuss the structure of Kenya's power sector, Government's participation in IPPs, financial mechanisms, ongoing regulatory reforms, risk allocation for IPPs, protections received for foreign investment and dispute resolution.
Scaling Up Renewable Energy Program (SREP), 2011, *Kenya's Investment Plan*	This investment plan is prepared as a country level and outcome focussed programmatic approach for scaling up renewables in the country. It provides a detailed presentation of the various policies, programmes and initiatives focusing om Kenya's power sector, renewable energy and climate change.
USAID, 2007, *Vietnam Country Report*	This country profile presents an overview of Viet Nam's energy sector, focusing on clean energy issues and institutions. It highlights the challenges in Viet Nam for clean energy development, policies and regulatory mechanisms involved an assessment of the institutions and existing gaps, current status and potential for clean energy and donor involvement in the energy sector.
Motu Economic and Public Policy Research, 2012, *Roadmap for Implementing a Greenhouse Gas Emissions Trading System in Chile: Core Design Options and Policy Decision-Making Consideration*, Motu Working Paper 12-14, Motu Economic and Public Policy Research, Wellington	This report addresses each of the core components of the Greenhouse Gas Emissions Trading System (ETS) in Chile: sector coverage; point of obligation for regulated sectors; the level of ambition; linking to other markets and use of (domestic and international) offsets; emissions trading phases; and allocation of units.
UNDP, *CDM Opportunities and Challenges in Mozambique*	This country overview states the key barriers which have been identified for developing CDM opportunities in Mozambique.
IGES, 2012, *Quality-of-governance standards for carbon emissions trading Developing REDD+ governance through a multi-stage, multi-level and multi-stakeholder approach*	This paper examines developments in quality standards in the governance of sustainable development in Nepal. It focuses on the governance of projects for the sustainable management of forests and the reduction of emissions and highlights the success of a voluntary quality-of-governance standard for REDD+ and the forest sector in Nepal. The authors outline the multi-stakeholder, multi-level and multi-tier approach used in Nepal, which in their view led to productive deliberation involving a diverse range of stake-holders and marginalized groups around core governance challenges.