# RAPID DESK BASED STUDY:

## Evidence and Gaps in Evidence on the Principle Political Economy Constraints and Opportunities to Successful Investment in Clean Energy in Asia

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# Report Summary

This rapid desk based study is commissioned by DFID. DFID is interested to identify evidence of factors that are deterring investment in renewable energy (RE) in most developing countries in Asia. In our understanding, DFID proposes to use this evidence, along with information on the opportunities and risks in this sector, to commission more in-depth studies in the future. These different studies will support the scoping of the potential establishment of one or more investment platforms through which DFID could deploy investment capital in order to catalyse private investment in south and central Asia. It's been proposed that the platform(s) should focus on clean energy, inclusive agribusiness and financial services.

This rapid study has been conducted based on the review of existing literature and related databases. As mandated, the study adopts a political economy assessment framework. Asia is the general focus. However, examples, wherever applicable, have been drawn only from a selected set of Asian nations. China and India have generally not been considered in this study. It is found that although most countries in developing Asia have RE potentials and plans for mainstreaming renewables in their energy systems, they have mostly under performed with regard to attracting investments and capacity build up in the RE sector. Given the existing scenario, these countries will therefore struggle to realise the seventh Sustainable Development Goal.

On closer scrutiny, it is found that there is evidence that vast, fragmented and complex networks of actors exist in the RE sector in most developing economies in Asia. The networks are characterised by competing priorities and constraints, lack of capacity and coordination, administrative difficulties, etc. which translates to considerable financial risks for potential RE investors. Together, with regard to policies - bias (towards conventional fossil fuels), conflicts, communication gaps, uncertainty, etc.; increase the risk of investment in RE. Additionally, political mandates and political orientation further aggravates this risk.

However, there is gap in evidence with regard to the specificity of risks, as most studies - consulted during the course of research for this work, have concentrated on the whole of Asia and the whole of RE sector. The nature and dimension of risk change with nations and RE technologies. Therefore, future studies, if commissioned, are required to be country specific and RE source specific. Based on the gaps in evidence, it is also recommended that studies be directed towards embedding risk mitigation measures in each of the following stages – project design, implementation, monitoring and evaluation. Scope of technical assistance may then be designed on the basis of such studies.

For harnessing RE potentials, projects are required to be local in context and should take advantage of local resources. Aligning the benefits of RE projects - delivering a global good and various co-benefits with local priorities can ensure acceptance by the local actors. Although internationally a lot of financial instruments are in place for mitigating risks of RE projects, there is evidence that this acceptance – through communication and negotiation, is the most effective risk management mechanism.

# SECTION 1

# Introduction

## 1.1 Purpose of the Review

Many countries in Asia are facing serious challenges concerning energy access. Robust infrastructure for generation, transmission and distribution are still lacking. Simultaneously, many of these countries have enormous potential for generating clean energy that could solve the problem of energy provisioning and transform their energy mix. It could further cushion them from dependence on fuel imports. However, investments in clean energy in most Asian countries – apart from China, India, Japan, Philippines and a few others, are far below what is expected and desired.

In this perspective, DFID would like to know, from the perspective of a political economy assessment framework, the evidence of existing constraints that are limiting investments in clean energy in Asia. DFID wants an enquiry into the gaps in knowledge and evidence concerning constraints and opportunities, and how these may be addressed for designing investment plans in the clean energy sector. Though Asia is the general focus of this entire enquiry, research for this study has largely concentrated upon examples from Afghanistan, Bangladesh, Kyrgyz Republic, Myanmar, Nepal, Pakistan and Tajikistan.

This report, commissioned by DFID, is a rapid desk-based review on the above mentioned objectives for enquiry. From consultations with DFID it is understood that the findings of this report will be used to provide DFID with an indication of evidence and help DFID commission a more detailed study/studies so as to approach managing the risks and leveraging opportunities arising out of the political economy of clean energy in Asia.

As mentioned, the present study has been carried out based on rapid desk research. Various secondary sources – reports, academic articles, database, have been consulted for the purpose of the study. The focus of this report remains on understanding the risk and opportunities arising out of the political economy of the investments in clean energy in Asia and the ways to approach the risk and opportunities. The report has been prepared with an investor's perspective in mind, since, from initial discussions with DFID, it is understood that DFID will use the findings as inputs in scoping of the potential establishment of one or more investment platforms through which DFID could deploy investment capital in order to catalyse private investment in south and central Asia in clean energy.

Transitions in energy systems is essentially a long term process – and involves changes in technology, economy (structure, efficiency), institutions, culture, behaviour and belief systems (Patwardhan, et al., 2012). Following the PEA framework, we try to build up on evidence for answering the following questions:

a) What is the evidence on the existing energy regimes in developing Asia, particularly with regard to clean energy?
b) What is the evidence on factors such as networks of actors and network dynamics affecting prospects of investment in clean energy?
c) What is the evidence on gaps in policies, regulations, etc. that have impacts on investments in clean energy?

d) What is the evidence on politics and political mandates of governments affecting investments in clean energy in Asia?
e) What is the evidence on risks arising out of the political economy of clean energy in Asia? How should these risks be approached and managed?
f) What is the evidence on opportunities streaming out of the political economy of clean energy in Asia? How can these opportunities be leveraged?
g) What are the gaps in evidence? How can these gaps be bridged?

## 1.2 Methodology

The authors have carried out a focussed search on the internet search engines to identify reports prepared by several international think tanks, multilateral and bilateral development financing institutions, non-profit organisations, research groups, etc. The authors have also drawn evidence and views from policy documents and academic articles and scientific research report. Further, the authors have consulted databases on energy related issues which are available in the public domain.

Although the authors tried to find country-specific examples – as many as possible, there is dearth of literature with regard to most of the countries which are listed above. Together, many policy documents and reports prepared by the national government agencies in these countries are not published in English. This limited the authors' scope for consultation of documents concentrating on Asia, Asia-Pacific, Asia and Oceania, etc. However, wherever possible, country examples and case studies have been provided. Due to limitation of space, very brief information concerning cases and examples has been provided.

The framework of analysis adopted for this study is political economy assessment (PEA) framework (DFID, 2009).

## 1.3 Context

The following are important contexts of this report

a. **Electricity from renewable sources**: The term clean energy is a generic term and encompasses many sectors – electricity, transport, industry, etc. During our initial discussions with DFID, it was finalised that this report will focus on electricity from renewable sources. In many places in the report, the word renewable energy (RE) is used to mean electricity from renewable sources.
b. **Grid-connected RE:** Electricity from renewable sources can be of different scales and is either off-grid or grid-connected. We have focussed mostly on the grid-connected RE projects. No special attention has been accorded to mini-grids and micro-grids. However, in certain cases, we have considered large scale deployment of off-grid projects also.
c. **Private, public and other investors:** In Asian countries, there is evidence on the existence of various types of investors. The incentives for investment differ across investor groups. In this report, we have not made any distinction between the different groups of investors. The report identifies opportunities and risks for investments in renewable energy.
d. **Country focus:** In this report we focus on Asia as a whole. However, we do not focus much on China and India. Close attention is accorded to the seven countries listed above, wherever possible.
e. **Risk:** Although there are different sources of risk, by the term risk, we essentially mean financial risk. We assume that all sources of risk can impact volatility of returns on investments in RE projects. In this report, uncertainty concerning return on

investment from projects and possibility of losses has been called risk. Since this study assumes an investor's perspective, such an approach has been followed.

The evidence presented in this report show that in Asia the political economy of renewable energy space is a source of risk. And, such risk deters investment in the RE sector. However, there are opportunities as well which may be leveraged. The design of the investment plan must also mainstream risk management mechanisms.

# SECTION 2

# Electricity from renewable sources in Asia

In this section we present evidence on the electricity regime in Asia with focus on renewables. We also present evidence on investment and capacity creation in renewable energy in a few selected Asian nations.

## 2.1 Electricity regime in Asia: some key issues

A low carbon development pathway is not just about reducing emission of greenhouse gases (GHG). It should also be a way to enhance energy security and energy access in the country (Patwardhan, et al., 2012). The developing Asia represents quite a negative picture in terms of both access to electricity and energy security. Evidence suggests that about 526 million people – almost 44% of world population, without access to electricity, resides in Asia. Together, there is substantial evidence of a large rural-urban divide in terms of electrification – while the electrification rate in the urban areas is 96%, the same in the rural areas is only 78% (IEA, 2015). In such a situation, there is evidence that the energy poor depend on polluting and less energy dense fuel (Sovacool, 2012) and are, therefore, exposed to the risk of economic losses and indoor air pollution (Sovacool, 2013). Similarly, most countries in Asia are characterised by dependence on imported sources for energy generation – which puts these countries at risk in terms of energy security (UNDP, 2013).

| Serial No. | Source | Percentage of electricity generated |
|---|---|---|
| 1 | Fossil fuels | 79% |
| 2 | Renewables (Total) | 18% |
| *2.1* | *Hydro power* | *15%* |
| *2.2* | *Non-hydro renewables* | *3%* |
| 3 | Others | 3% |

*Source: (EIA, 2012)*

**Table 1 Energy generation in Asia and Oceania by source (2012)**

Further, in Asia and Oceania[1], electricity generation is largely dependent on fossil fuels. The geo-physical conditions in certain Asian nations endow them with high capacity for hydro power generation. However, only 10% of the available capacity is leveraged in Asia (Sipahutar, et al., 2013). Countries like Kyrgyz Republic, Nepal, Tajikistan, etc., have a considerable share of hydropower in their energy mix. Philippines, Indonesia, etc. have leveraged geo-thermal sources for producing energy (EIA, 2012). However, although the energy policies in most Asian countries emphasise the need for mainstreaming renewable energy, the full potential of renewables is yet to be harnessed (UNDP, 2013). In the countries focused in this study, electricity generation from non-hydro renewable sources is meagre.

[1] The Energy Statistics published by the EIA puts Asia and Oceania in one group. Hence, aggregated figures have been presented in this report.

| Country | Total electricity generation (Billion Kwh) | Total generation from fossil fuels (Billion Kwh) | Total generation from renewables (Billion Kwh) | Total generation from non-hydro renewables (Billion Kwh) |
|---|---|---|---|---|
| Afghanistan | 0.9 | 0.2 | 0.7 | Negligible |
| Bangladesh | 47 | 45 | 1.9 | Negligible |
| Kyrgyz Republic | 15 | 0.9 | 14 | Negligible |
| Myanmar | 10 | 2.8 | 7.7 | Negligible |
| Nepal | 3.5 | | 3.5 | Negligible |
| Pakistan | 93 | 58 | 30 | Negligible |
| Tajikistan | 18 | 0.8 | 17 | Negligible |

*Source: (EIA, 2012)*

**Table 2 Energy generation in selected Asian countries (2012)**

## 2.2 Mainstreaming renewables: an alternative development paradigm for Asia

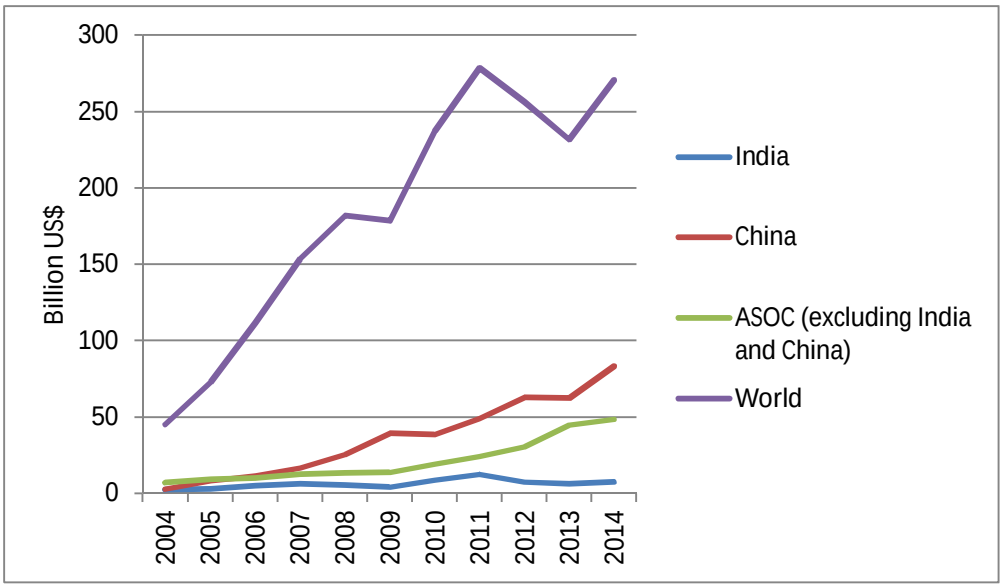
In a carbon constrained world, large scale deployment of renewable energy is regarded as a possible solution to the threats posed by climate change (IPCC, 2014). Through the use of renewable energy Asia can de-couple its rapid growth from high levels of GHG emission and can decrease carbon dependency (Anbumozhi & Kawai, 2015). Further, the seventh SDG stipulates that the world move towards an energy regime where issues concerning energy access are addressed while increasing substantially the share of renewables in the energy mix (United Nations, 2015). Therefore, Asia has to pursue an alternative development pathway and aim at a transformative change of the electricity regime where renewables will play a pivotal role (Howes & Wyrwoll, 2015).

## 2.3 Investment in RE in Asia

In recent years, annual investments in RE has witnessed an increasing trend in countries in Asia and Oceania (ASOC excluding India and China). However, in absolute terms, these investments are far below the annual investments made by China in RE. Between 2004 and 2014, the CAGR[2] of the new investments made in ASOC (excluding India and China) is 21% p.a. as against as against 39% p.a. in China. However, globally, the gap between investment by developed and developing nations in renewables is decreasing – with China showing an aggressive trend while the EU[3] reveals a downward trend in new investments. In 2014, the difference in investment between the developed and developing nations was marginal – US$ 8 billion (Frankfurt School - UNEP Centre, 2015). The developing nations witnessed a tremendous surge in aggregate investments (by about 36%) in renewables in 2014. However, this spurt in RE investments in recent years has by-passed the majority of the developing countries in Asia.

2 CAGR refers to Compound Annual Growth Rate
3 EU refers to the European Union

**Figure 1 Trend in New Investments in Renewable Energy** [4]




As per the recent Renewable Energy Country Attractive Index (RECAI) published in September 2015, very few countries in Asia are designated as 'attractive' destinations for private investments. The ease of doing business in most Asian economies is low. The selected countries' rank in the ease of doing business is considerably low. The difficulties arise from: poorly performing institutional and legal framework, slow functioning of administrative and financial machineries, and absence of speedy conflict resolution mechanisms, etc. Such hindrances deter the flow of private capital, both domestic and foreign, in the RE sector in a considerable part of developing Asia. The countries focussed in this study, are all subject to these investment maladies and have hence failed to become attractive to private investors in RE.

| Rank | Country | RECAI Score | Most attractive sectors |
|---|---|---|---|
| 2 | China | 74.2 | Wind (on-shore and off-shore), solar (PV and CSP), biomass , hydro |
| 3 | India | 65.9 | Wind (on-shore), solar (PV and CSP), hydro |
| 5 | Japan | 63.2 | Wind (off-shore), solar PV, biomass, geo-thermal, hydro, marine |
| 16 | South Korea | 52.0 | Marine |
| 22 | Thailand | 50.0 | Solar PV, biomass |
| 24 | Taiwan | 49.5 | Off-shore wind, solar PV, geo-thermal |
| 30 | Israel | 46.1 | Solar (PV and CSP) |
| 32 | Philippines | 45.5 | Geothermal, marine |
| 36 | Saudi Arabia | 44.0 | Solar (PV and CSP) |
| 38 | Indonesia | 43.3 | Geo-thermal, hydro, marine |

*Source: (Ernst & Young, 2015)*

**Table 3 Countries in Asia with high RECAI score**

[4] Source: (Frankfurt School - UNEP Centre, 2015), (REN21, 2015)

| Economy | Ease of Doing Bus. | Starting a Bus. | Dealing with Construction Permits | Getting Electricity | Registering Property | Getting Credit | Protecting Minority Investors | Paying Taxes | Trading Across Borders | Enforcing Contracts | Resolving Insolvency |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Singapore | 1 | 10 | 1 | 6 | 17 | 19 | 1 | 5 | 41 | 1 | 27 |
| Korea, Rep. | 4 | 23 | 28 | 1 | 40 | 42 | 8 | 29 | 31 | 2 | 4 |
| Hong Kong SAR, China | 5 | 4 | 7 | 9 | 59 | 19 | 1 | 4 | 47 | 22 | 26 |
| Kyrgyz Republic | 67 | 35 | 20 | 160 | 6 | 28 | 36 | 138 | 83 | 137 | 126 |
| Nepal | 99 | 105 | 78 | 131 | 72 | 133 | 57 | 124 | 60 | 152 | 86 |
| Tajikistan | 132 | 57 | 152 | 177 | 102 | 109 | 29 | 172 | 132 | 54 | 147 |
| Pakistan | 138 | 122 | 61 | 157 | 137 | 133 | 25 | 171 | 169 | 151 | 94 |
| Myanmar | 167 | 160 | 74 | 148 | 145 | 174 | 184 | 84 | 140 | 187 | 162 |
| Bangladesh | 174 | 117 | 118 | 189 | 185 | 133 | 88 | 86 | 172 | 188 | 155 |
| Afghanistan | 177 | 34 | 185 | 156 | 184 | 97 | 189 | 89 | 174 | 172 | 160 |

*Source: (The World Bank, 2015)*

**Table 4 Ease of doing business: Ranking of selected countries as per different parameters**

## 2.4 RE potential in selected countries in Asia

Although studies show that Asia has considerable potential for generating electricity from renewable sources (Howes & Wyrwoll, 2015), (UNDP, 2013), turning the potential into reality has been difficult for most of Asia (REN21, 2015). In terms of technology, following the global trend, in Asia too, solar and wind are the dominant sources of renewable power (Frankfurt School - UNEP Centre, 2015). The Asian countries have an opportunity to scale up deployment of these alternative technologies (wherever there is potential) to design a diversified renewable energy portfolio and tread a low-carbon development pathway. There is evidence of existing RE potentials in the countries focussed in this study.

| Country | Renewable energy potential |
|---|---|
| Afghanistan | Hydro power: > 2300 MW; Solar power: Possible in southern Afghanistan; Wind power: Possible in western Afghanistan (USEA, 2015). |
| Bangladesh | The country has enormous scope for producing power through bio-gas, bio-fuels, solar and wind (Islam, et al., 2014). This has also been recognised by the Government of Bangladesh (MOP, GOB, 2011). |
| Kyrgyz Republic | Potential for solar, biogas, wind along with different hybridisation exists in the country. The developments are expected to deliver significant impacts in those in areas of the country where the people do not have access to grid connected electricity (Kalybekovich & Dejumabekovich, 2012). |
| Myanmar | The solar potential for solar power in Myanmar is 40 TWh/year.[5] Due to the incompatibility of grid, the wind power potential is low in this country. However, Myanmar has considerable potential for energy generation from biomass and biofuels (ADB, 2015). |
| Pakistan | Alternative Energy Development Board (AEDB) identifies solar (in Balochistan, Punjab, Sindh, Cholistan), wind (60000 MW), bio energy and small hydro as the dominant potential sources of renewable energy (AEDB, 2015). |
| Nepal | Apart from large hydropower, Nepal is endowed with resources conducive to development of micro and mini hydropower plants, solar installations and biogas based power generation system. The Government of Nepal is aiming at harnessing such energy resources and increasing the share of renewables from the present 1% to about 10% of the total primary energy supply by 2030 (GON, 2011), (CIF, 2012). |
| Tajikistan | The country has a renewable energy potential of more than 220000 MW. |

[5] TWh/year = Terra Watt Hour/ year

| Country | Renewable energy potential |
|---|---|
| | Solar PV and small hydropower are the most important components. However, only 2.54% of the RE capacity is utilized in the country (UNDP, 2015). |

**Table 5 Renewable energy potential in selected countries**

The countries focussed in this study, have a significant potential for generating electricity from renewable sources. However, as already noted, they have failed to attract adequate investments in this sector. The rest of this report deals with evidence of some of the important reasons as to why these countries and other developing nations in Asia have failed to leverage their RE potentials to date.

# SECTION 3

## Network of actors

Theoretical studies explaining the dynamics of transition suggest that the network of actors assume an important role in maturing new innovations and deploying new technologies (Geels, 2002) (Geels & Schot, 2007). The networks steer the process of socio-technical transitions and are held as vehicles of expectations and promise, articulators of renewed requirements and demand, sources of resources and enablers of learning and dissemination of learning across (and between) actors and locations (Raven, 2012). Networks need to be 'inclusive' so that a seamless delivery of all desired functions in the value chain can be performed (Rehman, et al., 2010). A deficient network can hamper the process.

In this section we present the evidence on the impact of actors and networks on investments in clean energy in Asia.

### 3.1 Evidence on major actors

Review of literature concerning the development and deployment of RE in Asia helps us to identify a broad range of actors steering the process (ADB, 2015), (UNDP, 2013), (Ölz & Beerepoot, 2010), (The World Bank, 2011), (Krishna, et al., 2015).

| Class of Actor | Entities | Roles |
|---|---|---|
| International | UNFCC, IPCC, etc. | Sets the global climate goals; Influences policies and actions of various countries. |
| National government | Various ministries, agencies, etc. | Sets national level goals, policies and regulations concerning developing and deploying RE. Various line ministries may be crucial actors as RE has linkages with and consequence upon various other sectors – conventional power generation, grid management, transport, industry, rural development, trade and commerce, agriculture, finance, geo-political considerations, etc. |
| Sub-national governments | Various ministries, agencies, etc. | Wherever a federal structure exists, provision of energy and deployment of RE can be a responsibility of both national and sub-national governments. Hence, the sub-national government entities come to play a role in framing sub-national goals, policies, programmes, regulations, etc. concerning RE and sectors linked with RE. |
| Technology developers | Government or private entities; domestic or foreign entities | Experimentation, developing pilots and large scale feasible solutions. |
| Technology implementers/Project developers | Government or private entities; domestic or foreign entities | Deploy RE technologies implement projects and be responsible for operation and maintenance. May operate individually or in groups (consortia, joint ventures, PPP, etc.). |
| Investors | Corporate and retail investors, venture capitalists, financial | Channels and/or facilitates flow of investments in the RE sector. May finance through a variety of modes – grant, equity, debt, etc. May operate |

| Class of Actor | Entities | Roles |
|---|---|---|
| | intermediaries, financial regulators, multilateral and bilateral finance institutions | individually or in groups. |
| Activists | Civil society organisations/ non-governmental organisations | Generation of awareness; ensuring last mile delivery of RE. |
| Consumers | Households, businesses | Accept/oppose RE as a solution; provide feedback on RE programmes and applications. |

**Table 6 Network of actors for developing and deploying RE in Asia**

Evidence suggests that the network of actors for RE development and deployment is a fairly complex and fragmented web (ADB, 2015). Within each class of actors there are groups of actors with competing priorities and constraints (UNDP, 2013). Investors in RE therefore have to co-ordinate with multiple agencies each having their own goals, priorities and targets. This co-ordination exercise escalates the transaction cost of doing business. Further, it delays project implementation (Ölz & Beerepoot, 2010). The multi-layered network of actors may also be plagued by capacity deficiency in terms of knowledge and training on RE, RE potentials and solutions (IRENA, 2012). Communicating the opportunities and benefits of RE to all actors and aligning these with the goals and aspirations of the actors then becomes a time consuming process. All these factors have negative impacts on the returns on investments in RE projects.

These impacts become all the more alarming for potential investors in RE in Asia where equity -financing RE projects is still at a nascent stage. The national banks have shown limited interest in financing RE projects in the face of above risks. After the financial crisis of 2008, the financial institutions of the western countries have also shown relatively low interest in this area. Hence, the landscape of financing RE in Asia is dominated by international and bilateral financial institutions and development banks (Souche, 2014). It is The World Bank and Asian Development Bank who are the most active actors in financing RE in Asia. Along with investments, these institutions have tried to introduce new rules of governance of RE (Nakhooda, 2011).

Also, in developing nations in Asia, plagued by energy poverty, consumers demand electricity. They are indifferent between RE sources and fossil fuel sources – as long as the available source is reliable and affordable. This is a major challenge for niche RE technologies as they have to compete with the often subsidised and already mainstreamed conventional fossil fuel based energy systems (UNECE, 2011). The consumers are not willing to undertake any extra energy expenditure burden that the mainstreaming of a new technology - like RE, often demands.

## 3.2 Evidence on priorities and constraints of actors

Articulation by actors motivates a country to adopt measures for de-carbonising the economy. While the actions are local in nature, the outcome/benefit is a global public good – reduction of GHG. In many cases no unique benefit may accrue at the location of mitigation. Socio-economic priorities and constraints, cultural norms, political beliefs, etc. may distort the views of some key actors on the delivery of the global public good (Roy, et al., 2013). The divergence over local priorities and the global climate agenda may fracture desire among all actors to work together to scale up RE (Howes & Wyrwoll, 2015). This is highlighted by the continued reliance on and support towards fossil fuels to meet the energy demand by governments despite recognising RE as an alternative solution. In such

situations, the potential RE investors struggle to find an enabling environment for investment.

There is also a debate among actors over climate change benefits versus economic growth – particularly in poor and emerging economies. Short term costs and social welfare are of supreme importance to the policy makers in these countries. For example, strong climate change mitigation measures may result in job losses, particularly in the emission intensive sectors. This becomes all the more problematic when the probability of creation of green jobs is uncertain. Removal of energy subsidies on conventional fuels may translate to high cost of energy for households and agriculture. The potential trade-off between short term social costs and long term climate goals can influence the decisions by governments and policy makers (Howes & Wyrwoll, 2015). In such a regime, the cost effectiveness of RE projects can be compromised.

Many Asian economies are locked in to the infrastructure for transmission and distribution meant for fossil fuel based energy systems. Integrating RE into this infrastructure is perceived as a major constraint by the technology developers and investors (The World Bank, 2011).

Large scale RE deployment requires land. Hence, actors' perceptions, policies, laws, etc. concerning land, particularly agricultural land, can become an important barrier in implementing RE projects. In most Asian nations land acquisition is a sensitive issue (ADB, 2015). From an investor's perspective this, therefore, becomes a source of risk for successful implementation of RE projects.

Members of civil societies are influential actors in the network. While many of them facilitate the vital last mile connectivity – particularly in rural areas, some of the activist groups oppose deployment of RE technologies. In Asia, many activist groups and members of scientific communities have been known to oppose the deployment of hydroelectric power. This is because dams are known to have destroyed riverine ecosystems, affect irrigation and hence impacted agriculture and food security (Howes & Wyrwoll, 2015). Thus actions by civil societies can prove to be a major entry barrier for prospective investors in RE.

## 3.3 Network of actors: source of risks and opportunities

Network dynamics, absence of alignment of views and beliefs among actors, power struggle, etc. can impede the process of scaling up RE solutions in a country (IRENA, 2012). Malfunctioning of networks can generate a set of risks and uncertainties. Past studies have investigated this problem with regard to Asian developing nations. The table below summarises some of the main barriers arising out of inefficient network dynamics and the risks they translate into.

| **Deficiency in network** | **Impacts on RE projects** | **Risks in investment** | **Source** |
|---|---|---|---|
| Lack of coordination among line ministries, agencies, departments in national and sub-national governments | Delay in obtaining permits, approvals from concerned authorities | Delay in project implementation; cost escalation; delayed returns | (Ölz & Beerepoot, 2010), (WWEA, 2014), etc. |
| Scepticism towards RE among policy makers | Structure of the energy system skewed towards conventional energy | Increase of upfront cost; uncertainty over grid parity; possibility of lower return on investment (ROI) | (Sovacool, 2010) |
| Limited familiarity with RE technologies among actors | Inability to assess RE projects; limited understanding of benefits | Feasibility and viability of projects are often evaluated as doubtful (or negative) | (The World Bank, 2011) |

| Deficiency in network | Impacts on RE projects | Risks in investment | Source |
|---|---|---|---|
| | and co-benefits of RE | | |
| Legal and administrative barriers | Uncertainty with regard to project initiation; high transaction costs | Delay in project implementation; delay in accrual of benefits; increase in probability of a low ROI | (The World Bank, 2011) (Sovacool, 2010) (ADB, 2015) |
| No (or limited) initiative for preparing grid for RE | Lengthy negotiations concerning grid parity, grid installation, etc. | Feasibility of RE project doubtful ; delay in project implementation; delay in accrual of benefits | (The World Bank, 2011) |
| Constrained equity financing; absence of sponsors for large scale projects | Considerable dependence on debt; financing is exposed to the risk perception of the lender | Small scale projects with small developers ; loss of economies of scale | (The World Bank, 2011) (Souche, 2014) |
| Ignorance about local benefits accrued due to RE deployment | Apathy in decision to support and promote RE | Loss of motivation for project developers; implementation doubtful | (Ölz & Beerepoot, 2010) |
| Weak lobby groups for RE | Existing fossil fuel dependent regime continues | RE projects lose momentum; some projects fail - creating panic among investors | (Ölz & Beerepoot, 2010) |

**Table 7 Network dynamics and risks in investments**

Although there are risks in investing in renewable energy in Asia, the network of actors also reveals some considerable opportunities. Some of the important opportunities are:

- Most countries in Asia have taken pledges and targets concerning emission reduction. Simultaneously, these countries face serious challenges for meeting sustainable development goals. Many governments are seeing RE as means for achieving the twin targets of development and GHG mitigation. This can be an entry point for scaling up RE in developing Asia (Howes & Wyrwoll, 2015).
- Among Asian nations, energy security is the responsibility of the national governments. In a regime of disturbed geo-political situation, fluctuating oil prices, rising population, increasing aspirations, etc. most governments are concerned with the issue of long term energy security. Evidence suggest that in such a situation RE can be a solution for energy access particularly in remote areas with no grid connectivity (UNDP, 2013), (ADB, 2015). Therefore, RE needs to be mainstreamed as a feasible and sustainable solution in the long term policies of governments with an inherent image of being “pro-growth, pro-job, pro-poor, pro-environment” (Salim, 2015). Potential investors, particularly the bilateral and multilateral financial institutions, need to negotiate with governments to enable a paradigm shift for mainstreaming RE.
- Till recently, it was only the Asian Development Bank (ADB) and The World Bank, who played a pivotal role in supporting climate change mitigation and adaptation in the Asia-Pacific. However, countries in the three regional governance systems in Asia – South Asian Association for Regional Cooperation (SAARC), Asia-Pacific Economic Cooperation (APEC) and Association of South East Asian Nations (ASEAN) have adopted action plans on climate change. Therefore, there exists tremendous opportunity for enhancing climate mitigation and adaptation actions through regional cooperation and sharing of knowledge and best practices. SAARC, APEC, ASEAN, ADB and other bilateral and multilateral agencies can facilitate the process (Wyes, 2015).

## 3.4 Gaps in evidence

The knowledge base on the socio-economic (and political) dimensions of renewable energy deployment is relatively limited and dispersed (IRENA, 2015). During the course of this study this has been found true for Asia. In most studies the scale is either global or regional. Further, the studies cover all RE technologies. To this extent most of the studies are generic in nature. They fail to capture the unique attributes of networks, actors and relation between actors in different national and technological settings. Further, most studies focus on national level actors and have limited insights into how sub-national actors can influence the networks. Sub-national actors are of much importance when in a federal governance setup.

Although literature discusses risks arising out of network dynamics, it is relatively silent on how these risks can be identified and managed. Since little can be done to influence the landscape level factors – such as networks and interplay between actors, it is important to have a framework for assessing such risks and strategies for managing risks. Such a framework needs to be embedded into the project design and programme implementation for RE. Studies consulted during this research are almost silent on this type of a risk appraisal framework.

Additionally, with regard to opportunities, investors would like to be informed what actions are required to leverage the opportunities. Given the vastness and complexity of the network, it is important to identify the most critical and influential actor(s) whose priorities are best matched with the benefits and co-benefits that RE projects deliver. These actors can aid investors' interaction with the entire network. Studies consulted during the course of this rapid research remain silent on mechanisms to identify such critical actors and the ways of negotiation.

Given the gaps in evidence, future in-depth research needs to be directed towards answering some of the following questions:

- How do actors and network dynamics in a specific country affect the investment decision in RE? To what extent are the local settings important?
- How do actors and networks in specific RE technologies affect investments in these technologies?
- How does the governance system of a country affect network dynamics? To what extent the actors at the subnational levels are important?
- What are the mechanisms to identify risks arising out of actors and interplay between actors?
- What are the methods of managing such risks? Can there be a framework for prioritisation of methods?
- How can the processes of risk identification and risk management be embedded in the programme design and programme implementation?
- What are the mechanisms to identify actors and networks whose priorities are best aligned to the benefits and co-benefits of RE? How can such actors and networks be approached and convinced for leveraging opportunities in RE?
- How to build in-house capacity among project developers for assessing and managing risks arising out of resistant actors and malfunctioning networks?

# SECTION 4

## Policies and politics

Literature on managing innovations and transitions posit that policies are critical for the evolution of trajectories of transition. Policies play a crucial role in 'protecting' niche innovations from the pressures of market selection (Geels, 2002). Existence of policies which enables harnessing of financial resources for building clean energy systems have been termed as "investment grade policy regime" (Hamilton, 2009). On the other hand, policies can also act as barriers, pose risk and deter investment in RE. However, policies are closely linked to political mandates and ideology of governments and regulators. Thus, both policies and politics can have impact on trajectories of transition. In this section we present some evidence on policies and politics that can become an hindrance for RE development.

### 4.1 Evidence on flawed policy space

In literature there is evidence of flaws in the RE policy space in developing Asia (UNDP, 2013). The flaws are varied in nature but they all contort the political economy of RE and restrict investment flows to this sector. Some evidence on the flaws follows:

**Policy bias towards conventional fuels**: Policies on conventional energy may compete with policies on RE (The World Bank, 2011). Countries in developing Asia are largely dependent on fossil fuel based energy generation systems. Given the priorities for poverty eradication and energy access, most countries, historically, have policies for subsidising energy.

Studies indicate that as long as energy prices do not "*internalise externalities and fail to take into account the wider global and local environmental impacts of different technologies, as well as their contributions to reducing the price volatility of energy and increasing energy security*", renewable energy technologies will continue to be costlier than their conventional counterparts (The World Bank, 2011). The cost of RE technologies is the most important barrier for large scale deployment of RE, particularly in those countries where affordability is an issue (The World Bank, 2011) (Sovacool, 2010). Similarly, policies directed towards setting tariffs for RE also fail to take into account the multiplicity of benefits that RE deliver – diversification of the energy mix, reduced dependence on fossil fuel imports, hedge against price volatility of fossil fuels and interruption of supply, locating generation facilities near to the centres of demand thereby saving the costs of transmission and distribution, etc. (The World Bank, 2011). Thus, in most Asian countries RE remains a costlier option than the conventional fuel. This deters demand for RE solutions and hinders investors from entering the RE space. Wider reforms of policies and regulatory frameworks are required in these countries to establish parity of cost between RE and conventional fuel.

**Defects in Design**: Further, in some situations, policies forRE deployment may have a faulty design. Defective design may render a policy ineffective in terms of achieving intended goals, providing support to target population groups, etc. Studies indicate that RE policies have been found lacking in provisioning adequate incentives for investors (The World Bank, 2011), (IRENA, 2012); bridging the capacity gaps in the network of actors (UNDP, 2012); focusing on the entire range of RE options available so as to ensure last mile delivery of

energy (UNECE, 2011); etc. These gaps discourage investments in RE projects (Hamilton, 2009), (IRENA, 2012), (Souche, 2014).

**Policy conflicts and lack of clarity**: Absence of alignment between policies can result in conflicts and as a consequence clutter the investment space with confusion and uncertainty (IRENA, 2012). Often in Asia the policies are incomplete with regard to explicit enunciation of associated laws, by-laws, definitions, etc. This generates ambiguities and the actors are hesitant to adopt the policies. From the investors perspective this translates into a possibility of an absence of efficient market for RE solutions (IRENA, 2012), (Liu, et al., 2013).

**Ambiguous commitments**: Most RE technologies are characterised by high upfront costs and relatively low periodic operation and maintenance expenditures. The returns are also delayed due to a set of risks – implementation risk, technology risk, risk of grid connectivity, etc. Hence, the planning horizon for calculating returns from RE projects is relatively long (The World Bank, 2011). Contractual financial obligations like power purchase agreements (PPA), structure of feed-in tariffs and other relevant contracts (subsidy, incentives, etc.) have a direct bearing on the financial viability of RE projects. Not only do these contracts have to be unambiguous but they also have to be supported by long term guarantees through policies and regulations (IRENA, 2012) (CEPA, 2014). Many Asian countries are still in an energy regime defined by ambiguous commitments – hence, the cloud of uncertainty looms large in the context of investment in RE (Liu, et al., 2013), (The Asia Foundation, 2013).

**Unfriendly lending policies**: Debts extended to RE developers typically need to be of long tenure. However, credit policies in many Asian nations restrict financial institutions to extend debts with long tenure. This increases the credit risk for investors. Further, the investors are either compelled to scale down the projects or abstain from investing altogether (The World Bank, 2011).

**Policy volatility:** With the change of governments, policies change. The volatility in policies creates uncertainty regarding future policy support for RE projects. This phenomenon is more complicated when the country operates under a federal structure of governance – as changes in government can be at both national and subnational levels (UNDP, 2013). Policy volatility adversely impacts the predictability of cash flows (The World Bank, 2011).

## 4.2 Evidence of politics concerning clean energy

The network of actors for renewable energy space in Asia is large and scattered. While there are proponents who favour RE, there are other actors supporting the incumbent energy regime. The latter always try to orient the energy architecture and institutional framework to their advantage. Hence evidence exists of politics hampering the scaling up of renewable energy niches (Jacobsson & Bergek, 2004). The arguments put forward by the latter group of actors in support of their actions are numerous – preference of growth over environmental concern (Salim, 2015), high cost of renewable energy versus low cost options (IRENA, 2012), doubt over technological stability of RE (Jacobsson & Bergek, 2004), food security related issues (WWEA, 2014), etc.

In many countries, it is found that policies and institutions for governing the future direction of energy systems are guided by political mandate and not by a systems approach. Short term gains for the political class scores over long term impacts and consequences. Therefore, motivating the political class in policy-framing and decision making processes assume importance (Krishna, et al., 2015). Policies supporting renewable energy are indeed about lobbying over policy goals and design of a favourable institutional structure (Jacobsson & Bergek, 2004). If the renewable energy lobby of a country is weak, then investor interest in RE in the region wanes.

## 4.3 Risks and opportunities

Policies and politics concerning new technologies are often perceived as sources of risks and uncertainties by investors. They reduce the attractiveness of projects and deter investors from entering unchartered markets like RE (The World Bank, 2011). This sub-section identifies certain policy and politics risks associated with RE. The associated opportunities are discussed later.

| Nature of policy / politics | Impacts on RE projects | Risks in investment | Source |
|---|---|---|---|
| Skewed policies favouring conventional energy | Market distortions; doubtful cost competitiveness of projects | Uncertainty over the demand for RE; increase in the probability of suboptimal returns from RE projects | (The World Bank, 2011), (IRENA, 2012) |
| Disregarding positive externalities for tariff setting and allied policies for RE | Uncertain cost competitiveness of projects | Uncertainty over the demand for RE; increase in the probability of suboptimal ROI from RE projects | (The World Bank, 2011) |
| Non-alignment of policies concerning RE | Competing and conflicting policies create a space where investors and other stakeholders are unclear about the policy direction | Fear about feasibility of RE project; delay in execution; uncertainty over returns from the project; overall scepticism about RE at the grassroots | (IRENA, 2012), (UNDP, 2013) |
| Grand goals but incomplete policies | Execution of RE projects is extremely difficult | Risks concerning timely completion of projects; suboptimal ROI | (Krishna, et al., 2015), (The World Bank, 2011) |
| Ambiguous long-term commitments | Uncertainty over cash flows associated with RE projects | Suboptimal ROI; investors are discouraged | (Hamilton, 2009), (IRENA, 2012) |
| Uncertain duration of commitments and agreements | Uncertainty over cash flows associated with RE projects | Suboptimal ROI; investors are discouraged` | (Hamilton, 2009), (Nakhooda, 2011), (IRENA, 2012) |
| Frequent changes in policies | Uncertainty over execution and operation of RE projects | Loss of motivation for project developers; projects not bankable | (IRENA, 2012) |
| Unfavourable credit policies | More reliance on equity and international financing | Decrease in the size of projects; sub-optimal ROI; fear of bankruptcy | (The World Bank, 2011) |
| Too much importance of the political mandate in policy framing | Uncertainty over stability of policies | Loss of motivation for implementers; high probability of suboptimal ROI | (Hamilton, 2009) |

**Table 8 Risks in investment due to policies and politics**

In Asia, where the stated energy policy in most countries recognises the importance of mainstreaming RE, there are a set of opportunities. Some of these opportunities are:

a) Given the impact of policies on returns on investment in RE, an 'investment grade policy regime' is warranted (Hamilton, 2009). In this regard it is important that long term co-benefits and co-costs of RE and other technologies are communicated to the policy makers. Fortunately, there are well established methodologies for calculating

co-benefits and co-costs, and this opens up a window of opportunities for communication and negotiation with government, bureaucrats and technocrats responsible for policy design (Kumar, et al., 2015). Lessons from the European Union can help the process.

b) There are success stories in Asia itself where the nation states have designed coherent and comprehensive policies for RE development and have harvested results (e.g. China, India, Philippines, etc.). The other nation states which are facing a policy dilemma can learn from these countries about how to align policies, weed out conflicts and present a clear vision that can leverage investments from both public and private sources. Regional co-operation in this regard plays a crucial role (Wyes, 2015).

## 4.4 Gaps in evidence

Policies and politics assume different forms and have different roles in different countries and sectors. Political risks are specific to countries and political regimes. Most of the studies consulted during the present research are regional or global level studies. Hence, the risks and opportunities identified in these studies are generic in nature. Additionally, policies are rooted in the political ideologies of the nation states, governance structures, cultural norms and societal values. There is gap in evidence on identifying correspondence of policies supporting RE with these factors. Additionally, there is lack of evidence concerning frameworks to assess and manage policy risks and political risks.

There exists certain instruments – e.g. policy insurance (Beck & Martinot, 2004) which has been prescribed for policy risk mitigation in the case of RE projects. There is little evidence on applicability of such instruments in the context of developing Asian economies.

Keeping in view such gaps in evidence, detailed research is required to address the following questions:

- What are the specific policy and political risks, given specific country and technology contexts?
- In a country what role do different RE-technology lobbies play to influence policies and politics? How can investors effectively negotiate with these lobbies?
- Can there be frameworks that can help in assessing policy risks and political risks in individual Asian countries?
- What is the degree of relevance and applicability of the policy risk mitigation measures, available in the developed countries, for countries in Asia?
- How lobbying, negotiation, etc. can work in managing policy risks and political risks in Asia?
- How can the measures to mitigate policy and political risks be embedded in RE project design, project appraisal and project implementation in developing countries in Asia?

# SECTION 5

## Existing scenarios – selected countries

In this section, we focus on certain selected countries – Afghanistan, Bangladesh, Kyrgyz Republic, Myanmar, Nepal, Pakistan and Tajikistan to understand how the political-economy factors complicate the investment climate and deter investments in RE. Brief evidence is presented in this section.

### 5.1 Afghanistan

Afghanistan is a net electricity importer. The strategic goal of the Afghan power sector is 'to provide power supply to the population in whole (of) Afghanistan' (ADB, 2013). In 2005, the Parliament of Afghanistan passed the Private Investment Law which encourages private sector participation – both domestic and foreign, in energy provisioning. Despite the policy, private sector participation in the energy sector is low in Afghanistan. The country faces a challenge in developing an enabling environment for increasing private sector participation in power generation from both conventional and renewable sources (ADB, 2014). Evidence from literature suggest that these challenges are mostly political-economic barriers (GOA, 2013), (Liu, et al., 2013), (ADB, 2014), some of which are:

- Historically, the Afghan government has not mainstreamed RE in its long term plan for electricity provisioning. This has resulted in the absence of policy clarity and consistency. This has generated an uncertain policy regime that has hampered investment in this sector.
- Weak actor networks, particularly, at the sub-national level impedes the promotion and operation of RE technologies. There are knowledge gaps among sub-national and local actors concerning opportunities and benefits of RE. This translates into significant delays in development and planning for RE projects.
- Actors lack reliable information on RE potential at the regional and local scale. This undermines actors' confidence in accepting RE solutions.
- There exist financial, legal, regulatory and institutional barriers for promoting RE markets in the country. In the absence of efficient markets, returns from RE investments are uncertain.
- Key actors - government, members of civil societies and end users, lack the knowledge and capacity to mainstream RE. Hence the long term sustainability of RE projects is therefore doubtful.
- Dearth of infrastructure – insufficient grids, particularly in areas with abundant renewable resources; poses barriers to increase generation from RE.
- Low levels of interest and support by international financial institutions for RE projects in Afghanistan is perceived as a risk by private investors. This has resulted in investor apathy in RE development in the country.
- There is evidence of lack of co-ordination between authorities that result in long lead times and delays in project approval. This affects the financial viability of RE projects.
- The Electricity Law mandates cash-flow finance as the main financing instrument for financing operation and maintenance of power projects. However, in case of mini grids (hydro-power) it is seen that the retail consumers are either unwilling or unable to pay the full cost of supply. This results in deficit in cash-flows and hence causes financial instability for power producers.

## 5.2 Bangladesh

Bangladesh depends heavily on fossil fuels for electricity generation. The Government of Bangladesh declared its Renewable Energy Policy in 2009. The policy envisions the share of non-hydro renewables to increase to 5% by 2015 and 10% by 2020, in which the main focus would be on solar energy. Under the present scenario, the share of non-hydro renewables in the energy portfolio is less than 1% (Bangladesh Power Development Board, 2015). Although the Renewable Energy Policy accords importance to attracting both public and private sector investment in renewables, private sector investments in non-hydro renewables are yet to reach a significant level (Bangladesh Power Development Board, 2015). Some important political-economic factors affecting investments in RE are:

- The landscape for technology deployment of RE in Bangladesh is heterogeneous and marked with a high degree of complexity (Kabir & Uddin, 2015). The Government of Bangladesh has institutionalised Sustainable and Renewable Energy Development Authority (SREDA) for mainstreaming RE in both rural and urban Bangladesh. The Rural Electrification Board (REB) has started installation of solar home systems (SHS) under the "Diffusion of Renewable Energy Technologies" programme, supported by the Government of France. Twenty one NGOs – Rural Services Foundation (RSF), Bangladesh Rehabilitation Assistance Committee (BRAC), Bright Green Energy Foundation (BGEF), etc. are also working for mainstreaming SHS. To estimate the solar power generation potential in the country, Renewable Energy Research Centre, a government funded entity, is carrying out a comprehensive study, based on which solar power projects are being planned. Infrastructure Development Company Limited (IDCOL) and a private utility company, Purobi Green Energy Limited (PGEL) have jointly invested in a solar project. The German actor GTZ and the Climate Change Trust Fund under the Ministry of Environment and Forest are actively working on solar irrigation projects. Collaboration of five classes of partners – IDCOL, Donor Agencies, NGOs, Micro-financing Institutions and manufactures are working towards mainstreaming of solar lanterns in rural Bangladesh. Thus there are multiple actors working with different technologies to mainstream RE in Bangladesh. Since, priorities and incentives for each actor differ, conflicts and struggles within this fragmented network has potential to slow down this process (Ölz & Beerepoot, 2010).

- Bangladesh has large domestic reserves of coal and natural gas. To leverage this advantage, the Power System Master Plan 2010 encourages continued reliance on fossil fuel based energy. However, the plan also talks of environmental concerns and the need for mainstreaming cleaner forms of energy (MOP, GOB, 2011). Thus, despite stated goals for promoting RE, intrinsically fossil fuel remains the priority for the national government.

- Further, in Bangladesh power tariffs are highly subsidised. Solar PV systems fail to find investors in the face of such market distortions (Rechsteiner, et al., 2015). A stable feed-in tariff regime is yet to be in place - which further aggravates the uncertainty among investors (Rechsteiner, et al., 2015).

- High initial investment together with lack of finance discourages potential investors of RE. Given climate change and weather irregularities, many actors are also concerned about the efficacy of RE (Islam, et al., 2011).

## 5.3 Kyrgyz Republic

The Law of the Kyrgyz Republic on Renewable Energy Sources (No. 283) was adopted on 31 December, 2008. The goal of this policy instrument is to determine legal, organisational, economic and financial bases and mechanisms for production and installation of equipment for leveraging RE potential in the country. It also seeks to enhance the coordination between the State, producers, suppliers and consumers of RE in the country. However, the success of the policy in attracting investments in RE has been limited. The Government of Kyrgyzstan admits that "…there is no actual implementation of renewable technologies in Kyrgyzstan at this point…Less than 1% of the country's huge renewable energy potential is used" (MOE&I, The Kyrgyz Republic, 2014). Some of the reasons for this rather poor performance are:

- The country has had a long-standing tradition of using fossil fuel as a primary source of energy. Therefore, most actors in the network of actors have an intrinsic resistance to accepting renewable energy as an alternative energy choice (MOE&I, The Kyrgyz Republic, 2014).
- RE capacities require high initial investment. This therefore affects the cost effectiveness of RE projects and is perceived as a risk by investors (MOE&I, The Kyrgyz Republic, 2014).
- The government acknowledges that current policies have failed to create an enabling environment that can guarantee a regime of real (and substantial) incentive for RE development (MOE&I, The Kyrgyz Republic, 2014).
- In the network of actors, there is absence of trained scientists and professionals who can develop RE solutions customised for local applications (Kalybekovich & Dejumabekovich, 2012)
- The legal and institutional framework of the country is inappropriate with regard to speed in decision making and attracting private investment in RE. Hence, private investments have lagged behind (Liu, et al., 2013).
- The Law of the Kyrgyz Republic on Renewable Energy Sources was adopted in 2009. The law created a legislative framework for operationalisation of feed-in tariff for renewable energy. However, the law is yet to be fully implemented. Further, several bylaws – for example the definition of tariff calculation and determination - are under development (UNDP, 2015). Hence, the as yet incomplete policies have pushed back the large scale deployment of RE in the Kyrgyz Republic.

## 5.4 Myanmar

The government that assumed office in Myanmar in 2011 undertook a series of political and economic reforms that are fundamental to economic development. Realising the country's substantial potential in solar, wind and bio-fuel, the government of Myanmar earmarked RE development as an important component in the overall developmental framework of the country (ADB, 2015). Despite the importance accorded to RE development, the sector is still at a nascent stage in the country because:

- Myanmar does not have any policy for guaranteeing specific incentives for attracting private sector investment in RE. However, international developers can draw on the new Foreign Investment Law (2012) for availing incentives for investment (ADB, 2015).
- The network of actors and the institutional frameworks for provisioning of energy and deployment of renewable energy is quite complex in Myanmar (ADB, 2015). Although the Ministry of Energy (MOE) has the overall responsibility of framing the country's energy policy, there are a host of other ministries playing a role in the policies concerning RE deployment. The Ministry of Electric Power (MOEP) is responsible for

managing all large coal fired power plants and large hydropower plants. The Ministry of Agriculture and Irrigation (MOAI) has the responsibility for planning for small hydropower projects and development of energy from agriculture residues and biogas. The Ministry of Science and Technology (MOST) is entrusted with the responsibility of developing renewable energy for off-grid rural applications. The Ministry of Environmental Conservation and Forestry (MOECAF) regulates the use of biomass from forest resources for energy generation. The Yangon City Electric Supply Board (YESB) has the responsibility of distributing electricity in Yangon while Electricity Supply Enterprise (ESE) is responsible for transmission and distribution in the rest of the country. Myanmar, therefore, lacks a dedicated central organisation for up-scaling RE (UNDP, 2013).

- The network of actors is fragmented. Since there are multiple ministries and departments – each with its individual mandate, for promoting RE in Myanmar; conflicts and co-ordination failures are a possibility. The divergent mandates can delay the implementation process thereby compromising the financial viability of the RE projects (ADB, 2015) (UNDP, 2013).
- The policy landscape of Myanmar has been complicated by a large number of programmes concerning energy access, RE, etc. Goals of some of such programmes are at times at variance and create confusion among investors and other stakeholders (UNDP, 2013). This jeopardises the financial attractiveness of RE projects.
- The government remains focussed on producing crude oil and natural gas for export and to meet domestic needs. Although the importance of mainstreaming RE is stated in the policy documents, in reality, the priority accorded to RE is doubtful – there is evidence of policy conflict (UNDP, 2013).
- Despite trying to scale up renewable energy, Myanmar does not have any feed-in tariff scheme in place (Winston & Strawn, 2014). Policies are therefore deficient.

## 5.5 Nepal

The Government of Nepal acknowledges that the development partners and private investors are averse to investing in Nepal's power sector in general and RE in particular. This aversion stems largely from flaws in the political economy of RE in the country. The evidence is presented below:

- Weak governance and institutional structure, lack of policies for mobilising private sector participation, low consumer tariffs, etc. have resulted in sub-optimal utilisation of RE resources in Nepal (GON, 2011).
- In Nepal policies are biased towards energy generated from fossil fuels. The government continues to subsidise the import of fossil fuels for energy generation (Surendra, et al., 2011). This policy renders RE non-competitive with respect to fossil fuel based energy. The hydroelectricity sector in the country has already started feeling this impact.
- In Nepal the policy on micro-hydro development for rural electrification has a serious flaw. It is apathetic to the requirements of the rural poor as the policies are guided by the principles – "bigger the better" and "more the merrier" (Surendra, et al., 2011). This is a threat to affordability and therefore endangers the financial viability of micro-hydro power projects.
- Incomplete policies and lack of communication are also problems for Nepal. The country has a lot of ambitious policies for deploying RE in the rural areas. However, evidence suggests that people in the districts and villages are not aware of the RE policy portfolio. There is also absence of detailed guidelines, by-laws, modalities, etc. for aligning different policies. All these pose serious threats to implementation of RE

projects in Nepal (UNDP, 2012). From an investor's perspective, these flaws translate into financial risks and therefore deter investments in this sector.

- Nepal announced its Energy Emergency Action Plan in 2011 with a goal of inducing independent power producers (IPP) to invest in hydropower. One of the major barriers to this goal has been the failure of Nepal Electricity Authority (NEA) to increase PPA. The PPA has stagnated for over a decade (The Asia Foundation, 2013). This endangers the financial viability of RE projects.

## 5.6 Pakistan

In 2006, the Government of Pakistan announced its Policy for Development of Renewable Energy for Power Generation. The policy declared a range of incentives and benefits for private investors willing to invest in solar, wind and other RE technologies. However, the policy, though generating interest among investors, has not accelerated the pace of private investment in RE technologies in Pakistan (Yajdanie, 2010). Some important barriers have been identified as follows:

- There is a large and fragmented network of actors in the Pakistan RE space. This has the potential for generating conflicts due to divergent actor interests. The energy sector in the country is largely governed by the national government. However, the provincial governments are involved in small scale power generation (<50 MW) and granting permits for local RE projects. The Planning Commission has the overall responsibility for energy and infrastructure planning. The Ministry of Water and Power (MoWP) is the executive arm of the government for all energy related issue. The MoWP formulates policies and coordinates with the provincial governments in all related issues. The Private Power Infrastructure Board (PPIB) and the Alternative Energy Development Board (AEDB) interacts with the power producers – both conventional and RE. The Ministry of Environment (MoE) is responsible for formulating all climate related policies of the country. The Ministry of Science and Technology (MoST) is entrusted with research in energy issues and certification. Various other ministries – industries, communications, railways, food and agriculture, housing, etc. are also involved in major decisions concerning the power sector. Finally, the Ministry of Finance and Revenue (MoFR) is responsible for approving capital expenditure programmes, incentives, etc. Hence, in Pakistan, this diverse network can be a source of high transaction costs for investors in RE.
- The large network of actors can be a cause for co-ordination failure and project delays (Masood, 2010). There is evidence that lack of coordination among various government departments and agencies has been a barrier to upscaling wind energy projects (WWEA, 2014) (Mirza, et al., 2009).
- Gaps in awareness and knowledge among some actors in the network have also been cited as a crucial factor for delayed decisions concerning RE (Shah, et al., 2011).
- Problems in land acquisition have been a source of uncertainty and risks for RE projects. There is evidence that the Pakistan Supreme Court's order banning land lease agreements have hindered wind energy projects in the country (WWEA, 2014).
- Policies addressing infrastructure development in Pakistan have failed to generate capital compatible for RE development. There is evidence that with regard to wind energy deployment, grid parity has been a major barrier for upscaling technology (WWEA, 2014).

## 5.7 Tajikistan

Tajikistan accords substantial importance to diversifying its energy portfolio and increasing its reliance on RE (GOT, 2008). Large hydropower plants dominate the energy regime of

Tajikistan. However, given the sparsely distributed population in the country, it is the micro and mini hydropower plants that are expected to have an impact on the economy. Solar and wind power are also feasible options. However, the country has failed to attract significant private investments in the RE sector because of uneconomical electricity tariffs, absence of reliable data on RE potential and lack of market demand for RE. Uncertainties in legal and regulatory frameworks, and the monopolistic nature of the incumbent regime have further aggravated the situation. The state-owned company Barqi Tojik monopolises the electricity sector (Liu, et al., 2013). Previous studies have identified a set of barriers arising out of the political economy of RE in Tajikistan that dissuades investors from investing in the sector (UNECE, 2011), (Yakhoyev, 2014). Some of these barriers are:

- Because of low level of economic development and low per capita income, the government is unable to undertake an upward revision of electricity tariff in Tajikistan as it has various social and economic consequences. Current electricity tariffs are lower than the cost of generation. This has precipitated a scenario of financial distress in the electricity sector that discourages investors from entering the RE market in Tajikistan.
- Mechanisms for electricity tariff determination are found to be ad hoc and non-transparent. Potential investors therefore fail to predict the future tariff rates and hence there arises uncertainty over long term returns on investments in RE.
- Under the existing system all power producers are required to sell power to Barqi Tojik. There is evidence that Barqi Tojik has faced financial distress in the past and has failed to pay the power producers on time. This makes investors unsure about realising returns on investment.
- Further, in Central Asia, electricity tariffs are a politically sensitive issue. Rising electricity tariffs are known to have caused a political instability in neighbouring Kyrgyzstan. In view of this the government of Tajikistan is extremely cautious in revising tariffs.
- The Central Asian countries have been engaged in persistent conflicts over the joint use of water resources. The dissensions have mainly been over the trade-off between upstream hydro power generation and downstream irrigation. E.g., the Rogun Hydro Power Project (HPP) project is also a source of tension with downstream Uzbekistan. The conflicts are gaining ground and these trans-boundary water sharing issues have proven to be a major barrier in developing hydro power projects in Tajikistan.
- There have been instances of failure in attracting foreign investments for the construction of large scale hydro power projects. For the Rogun HPP the Government of Tajikistan has been forced to issue stocks and have also restricted the sale of these stocks to the citizens of the country. This action by the Tajikistan government has generated a sense of uncertainty among foreign investors. Consequently, not only has the inflow of investment in RE projects been affected, it has also hampered the flow of technology transfer.
- A weak industrial base and lack of technical expertise poses a risk to manufacturing, repair and maintenance of equipment for RE sources.

Evidence from selected countries in developing Asia suggest that governments have well enunciated national objectives to promote and deploy a RE regime in their respective countries. These stated intents are aided by the high RE potentials that the countries are endowed with. However, within their political economy systems there is evidence of barriers that can obstruct the speedy upscaling of RE. The network of actors in RE is often complex and highly fragmented thereby triggering conflicts that discourage potential investor interest in the sector. Further, the network lacks capacity that could engender an enabling environment for investment. Moreover, policies that have impact on the RE space fail to generate financial incentives that can attract investors – domestic and foreign. The policies

also precipitate market distortions that cause investor distress and hence obstruct RE deployment. Therefore, from an investment perspective, it is important to leverage the opportunities while managing risks.

# SECTION 6

# Leveraging opportunities and managing risks

## 6.1 How can opportunities be used?

Based on a rapid survey of some of the existing literature, this report has identified some opportunities for deploying RE and fostering a transition of energy system in the developing economies of Asia. A careful roadmap needs to be in place to leverage the opportunities. Some very important actions needed for designing this roadmap are presented below.

**Contextualising the local setting**
The investment programme must have a local context (IRENA, 2012). It is extremely important to understand the local energy architecture, role of renewables in the energy mix, patterns of consumption, etc. Reliance needs to be accorded to locally available resources that can reduce the import bill of the country. When the local setting is contextualised, the buy-in from the stakeholders is a relatively easy task.

**Understanding the market**
Close market assessment is required to identify the right technology and market sectors. Further, the assessment can also help identify business opportunities matching expectations on financial returns. For governments and development financing institutions, it is important to identify markets and technologies where returns are below market expectations but above financial losses (IRENA, 2012).

**Alignment of market opportunities with targets and policies**
The alignment helps in communicating and negotiating with actors like governments, policy-makers, etc. The alignment also garners support from the stakeholders. In this context assessing co-benefits is extremely important.

**Developing the right business model** (Marro & Bertsch, 2015)

- Identify actors with effectiveness, ownership and technical expertise to implement RE projects: The actor must be endowed with capacity to efficiently carry forward the programme with both public and private actors on board. Such actors must bring private-sector level efficiency to the table while having a strong lobbying power with the national government in terms of orienting policies and institutions in favour of RE deployment.
- Building strong partnerships across the value chain: Every actor in the value chain concerning RE is important in the context of long term viability and sustainability of RE projects. Hence, the implementing agency must have capacity to enter into strong partnership with other actors with clearly shared risks and responsibilities. This facilitates the seamless flow of business procedures in the model over a long range.
- Effective partnership with financing institutions: Financial partners must understand the specific nuances of RE projects and must customise the financial solution to mitigate investors' risks. Credibility and reach of the financing institutions is an important issue, particularly, when the project is co-financed through equity and/or debt from other sources.

- Ensure reliability and maintenance services: This maximises positive customers' perception about the RE project.
- Addressing the issue of price competiveness: High cost of production deters customers from using RE solutions. Therefore, efficiencies need to be enhanced – through efficiency in operation, technology infusion and, in many cases, through financial restructuring so that energy produced by specific RE solutions is affordable to customers.

## 6.2 How can risks be managed?

The finance literature argues that financial risk cannot be avoided but can be managed – minimised or transferred to a third party. In the context of financing RE projects, some of the generic risk management strategies being followed by renewable power producers in the developed world are discussed below (The Economist, 2011).

- Diversification: Both in terms of geographical location and technology. This helps to mitigate political risk, regulatory/policy risk, weather-related volume risk.
- Broad-basing financing partners: This mechanism is designed to mitigate financing risks, in response to macroeconomic and political changes.
- Internal expertise: The internal capacity building in technology, legal matters, lobbying, etc. is used to mitigate capacity and technology related risk
- Use of risk management products: Use of an array of risk-transfer mechanisms - hedging instruments, derivatives, customised insurance, catastrophe bonds, etc. There are financial intermediaries who offer such risk-transfer products.

The following table lists some financial instruments for addressing specific risks related to RE projects (Altran & Arthur D Little, 2011). However, literature puts tremendous emphasis on programme designing, negotiating and articulating promises with governments and other actors, convincing actors about goals of the project and benefits of the project, etc. These non-financial risk management mechanisms assume a lot of importance in literature. Financial instruments for managing risks is the last resort (Altran & Arthur D Little, 2011).

| Type of risk | Instrument for managing risk |
|---|---|
| Political risks | • Country Credit Default Swaps (CDS)<br>• Risk sharing schemes between developers and investors<br>• Political risk insurance |
| Economic risks | • Joint ventures and strategic agreements<br>• Insurance schemes<br>• Guarantees (Dismantling Guarantee, Weather Guarantee, etc.) |
| Credit risk | • CDS<br>• Alternative risk transfer (securitization, insurance linked securities, etc.) |
| Technical risk | • Guarantees<br>• Insurance |

**Table 9 Selected instruments for managing financial risks in RE projects**

# SECTION 7

## Conclusion

Developing Asia has a lot of potential for deploying renewable energy in its energy mix. However, this rapid review (based on PEA framework) has shown evidence that factors like dynamics of network of actors, deficient and non-aligned policies, together with politics play a crucial role in increasing risk and uncertainty in RE projects in developing nations of Asia. The factors translate to outcomes such as the absence of confidence in RE, delay in projects, escalation of RE cost, etc. and in turn affect the expectation about returns from RE projects. This has proven to be a major hindrance in scaling up investments in RE in Asia. Continuation of such a scenario will result in most developing economies of Asia being locked into a regime that is dependent on fossil fuels and have problems of energy access. In such a situation, investors willing to invest in RE will need to take measured steps and embed risk mitigation mechanisms right from the stage of project design. While there may be financial products for managing risks, the applicability of such products in Asia is yet to be ascertained. Communication and negotiations with government and other actors are possibly the most effective tools. Cooperation between countries is essential to exchange ideas about good practices and, thereby, creating an enabling environment for attracting investments in RE.

# Gaps in evidence, recommendations

The gaps in the evidence highlight the need for more focussed research and evidence gathering for better understanding of risks and opportunities. Most studies that were consulted during this rapid survey concentrated upon the region as a whole. Future studies for understanding risks and opportunities arising out of actors, policies and politics ought to be country specific and sector specific.

Further, while exploring opportunities for RE initiatives, further research needs to be directed towards understanding the local context, applicability of the business model and aligning the model to the needs and aspiration of the actors. A few robust studies can generate a framework for appraising opportunities of RE in developing Asia.

Additionally, studies must be directed at how to integrate various risk mitigation strategies in project design, project implementation and project evaluation. These detailed studies can provide a good framework for risk identification, risk measurement and risk management in the context of RE financing in Asia.

Such studies are expected to help in efficient project design and scale up RE in developing countries of Asia. These are some possible areas where DFID can play a role by arranging for complementary technical assistance (TA) and increasing the preparedness of Asia for scaling up RE.

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