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Financing Green Growth

A review of green financial sector policies in emerging and developing economies

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List of abbreviations

AChEE	Chilean Agency for Energy Efficiency (Agencia Chilena de Eficiencia Energética)
AEPC	Alternative Energy Promotion Centre (Nepal)
AFD	Agence Française du Développement (French Development Agency)
ANESCO	National Association of ESCOs (Asociación Nacional de ESCOs Chile)
ANME	Agence Nationale Pour la Maitrise de l'Énergie (Tunisia)
BEE	Bureau of Energy Efficiency (India)
BSE	Bombay Stock Exchange (India)
BPI	Bank of the Philippine Islands
CDM	Clean Development Mechanism
CER	Renewable Energy Center (Chile)
COFIDE	Corporación Financiera de Desarrollo (Peru)
CORFO	Corporación de Fomento de la Producción de Chile
CREF	Central Renewable Energy Fund (Nepal)
DANIDA	Danish International Development Agency
DBP	Development Bank of the Philippines
DCGC	Deposit and Credit Guarantee Corporation (Nepal)
EE	Energy Efficiency
EEHC	Egyptian Electricity Holding Company
EETC	Egyptian Electricity Transmission Company
EIB	European Investment Bank
Egyptera	Egyptian Regulatory Agency
ERA	Electricity Regulatory Authority (Uganda)
ERT	Energy for Rural Transformation Project (Uganda)
ESAP	Energy Sector Assistance Programme (Nepal)
ESCO	Energy Service Company
ESKOM	Electricity Supply Commission (South Africa)
ESG	Environmental Social and Governance
ERM	Environmental Risk Management
NFEE	National Fund for Energy Efficiency
FIT	Feed-in Tariff
FOMIN	Multilateral Investment Fund (Fondo Multilateral de Inversions) (Chile)
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GmbH)
IDB	Inter-American Development Bank
IDC	Industrial Development Corporation (South Africa)
IDCOL	Infrastructure Development Company Limited (Bangladesh)
IFC	International Finance Corporation
IEA	International Energy Agency
IMF	International Monetary Fund
IREDA	Indian Renewable Energy Development Agency (India)

JBIC	Japan Bank for International Corporation
JICA	Japan International Corporation Agency
JNNSM	Jawaharlal Nehru National Solar Mission (India)
KfW	Kreditanstalt für Wiederaufbau (German Development Bank)
MFI	Microfinance Institution
NCRE	Non-Conventional Renewable Energy
NEA	Nepal Electricity Authority
NGO	Non-Governmental Organisation
NREA	New & Renewable Energy Authority (Egypt)
NRP	Nepalese Rupee
NRREP	National Rural and Renewable Energy Programme (Nepal)
PPA	Power Purchase Agreement
PROSOL	Programme Solaire (Tunisia)
PV	Photovoltaic
PPEE	National Energy Efficiency Programme (Programa País Eficiencia Energética) (Chile)
PVTMA	Photovoltaic target market approach
RE	Renewable Energy
REA	Rural Electrification Agency (Uganda)
REEGLE	Renewable Energy & Energy Efficiency Partnership (Uganda)
REIPPP	Renewable Energy Independent Power Producer Programme (South Africa)
REWARD	Renewable Energy for Wiser and Accelerated Resources Development (Philippines)
SACEF	South Asia Clean Energy Fund
SEF	Sustainable Energy Finance
SERC	State Electricity Regulatory Commission (India)
SHS	Solar Home System
SIC	Central Interconnected Grid (Sistema Interconectado Central) (Chile)
SING	Northern Interconnected Grid (Sistema Interconectado del Norte Grande) (Chile)
SREP	Scaling-up Renewable Energy Programme
STB	Société Tunisienne de Banque (Tunisia)
STEG	Société Tunisienne de l'Électricité et du Gaz (Tunisia)
SWH	Solar Water Heater
UECC	Uganda Energy Credit Capitalisation Company (Uganda)
UNDP	United Nations Development Programme
UNEP FI	United Nations Environment Programme Finance Initiative
VAT	Value-Added Tax
WWF	World Wildlife Fund

Disclaimer

The content of this publication is based on an extensive desk research combined with personal interviews of key actors in the countries that have been surveyed. The information and data found in this publication are based on these sources. Wherever possible the sources are listed in section 6 at the end of this report.

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PREFACE

Achieving a successful transition towards a green economy requires enormous financial investment by both public and private investors, with the latter playing an increasingly important role. Among other things, efforts are focusing on renewable energies and resource-efficient technologies, water and waste management systems. Further areas include the conservation of resources in environmentally friendly agriculture and forestry and the prevention of climate-related disasters such as anti-erosion measures and flood defences. In the emerging economies and developing countries that make up Germany's partner countries in development cooperation, the lack of opportunities to leverage private capital in addition to state funds represents a major bottleneck. The role of the financial sector in ensuring the efficient and sustainable channelling of investment funds is a central element of green growth strategies. The issue is a priority for international environmental and development policymakers and is currently at the top of the UN and G20 agenda.

The financial sector as a whole has a significant contribution to make in achieving inclusive green growth and bringing about the transition to a resource-efficient economy. Both, the state and the private sector have a part to play but what exactly is the role of each? Who determines their responsibilities? What is the scope for action? Which programmes and instruments are being applied? The purpose of a financing strategy for green growth is to provide answers to these questions.

Until recently the term 'green finance' has been used rather inconsistently in international debate on environmental and climate issues and in the context of financial systems development. Owing to the growing interest in these topics and the need for large-scale mobilisation of financial resources, concepts for financing green growth are now gaining greater prominence in development policy.

This study highlights the role of the entire financial system in the transition to a green economy. The following areas are usually mentioned as key components of a successful financing strategy for green growth[1].

First, stable and reliable political and legal framework conditions are needed that determine the actions of stakeholders involved in the transition. Second, efficient financial institutions and capital markets, including financial infrastructure (associations, training institutes, credit information bureaus etc.), are required to offer suitable financial instruments (e.g. credit, leasing, equity finance, guarantee schemes, grants and bonds).

This study focuses on the first aspect, the political and legal framework conditions.

Financial sector policies are not the only policies that determine whether specific financing instruments are made available for investment in green growth. Also policy areas and instruments such as energy, environmental and industrial sectors policies have a direct impact. Feed-in tariffs for electricity from renewable energy or requirements for energy efficiency measures are important drivers for change and have a profound impact on the commitment of financial institutions.

On the basis of ten case studies in emerging and developing countries, this study investigates which strategies, policies and specific policy instruments have been applied at the national level, and how these have directly or indirectly influenced the actions of organisations operating in the financial sector. The ten case studies clearly demonstrate the importance of reliable and robust regulatory frameworks as well as the importance of harmonisation between policy areas in ensuring the sustainable and efficient provision of financial services. Nothing has a more detrimental impact on investment activity in the real economy and on the willingness of financial institutions to provide access to innovative financial products than inconsistent and incoherent policies.

The study also aims to provide an analytical framework for key stakeholders (governments, donor institutions and the private sector), providing guidance before initiating and building a conducive framework for financing green growth.

1 Compare: Publications of the KfW Financial Sector Symposium 2014, *Greening the Financial Sector.*

Solar panels on a hotel roof in Tunesia

German development cooperation supports these efforts by promoting a green financial sector strategy that incorporates various instruments of financial and technical cooperation such as credit lines, structured funds and also capacity development at institutional and policy level.

This study was produced on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) by the GIZ sector project 'Innovative Approaches to Financial Systems Development' with extensive support from MicroEnergy International, Berlin. With this study, we hope to make a valuable contribution to the growing debate on financing green growth, help our readers better understand the complexities of the topic, and offer appropriate solutions.

Susanne Dorasil
Head of Division
Sustainable Economic Policy; Financial Sector
German Federal Ministry for
Economic Cooperation and Development (BMZ)

Roland Gross
Head of Sector Project
Innovative Approaches to Financial Systems Development
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

1. Executive Summary

Background

With the contribution of developing and emerging countries to global greenhouse gas emissions continuing to rise, policymakers need to find ways to mobilise financing for the development of low-carbon energy technology and industrial infrastructure. Current investment in climate finance falls significantly short of the estimated annual investment that is needed to put greenhouse gas emissions on a trajectory that will ultimately keep the global average temperature increase within manageable limits. This report addresses the question of how developing and emerging countries can create coherent **policy frameworks that will spark investment in low-carbon infrastructure and technology and improve access to energy in remote areas**. It assesses the framework in ten countries[2] with regard to policy consistency, policy coherence and their ability to mobilise financing for green investments.

Current situation in the field of green finance

The 'Financing Green Growth' report draws the following main conclusions on the current situation as regards green finance in the ten countries surveyed:

- Environmental policies are not providing sufficiently strong and stable signals to encourage financial institutions to provide the capital required to achieve their sustainability objectives

- Financial sector policies almost never take green financing into account. Instead, it is promoted mainly through environmental policies as well as schemes devised by multilateral actors. Bangladesh is the only country to have adopted explicit green banking guidelines

- The majority of green financing is provided via international public and private financial institutions. Local private financial institutions contribute to green financing only to a minor extent. Typical financial instruments are subsidy schemes for specific renewable energy technologies, concessionary refinancing schemes or specific funds (mostly grants) that can be utilised for green investment

- A lack of market transparency in the energy efficiency and small-scale renewable energy sectors, often a result of complex technologies and engineering service packages, are keeping financial institutions from deploying funds

- Domestic financial institutions have been successfully involved in cases where intensive, long-term capacity building was being carried out, often coupled with financing mechanisms such as concessional financing schemes or credit guarantee schemes offered by governments or multilateral stakeholders

Green investment fields covered in the report

The United Nations Environment Programme Finance Initiative (UNEP FI) estimates that to cut global energy sector carbon emissions by half as outlined in the IEA BLUE Map scenario, the vast majority of investments in the transition to a green economy need to contribute towards the global **transformation of energy supply structures (approx. 27% of total required investments) and energy efficiency measures in various sectors (approx. 48% of total required investments)** (UNEP FI, 2011).[3] The 'Financing Green Growth' report focuses on three major areas of financing[4]:

1. The field of **large-scale renewable energy** consists of large power generation projects involving the construction and operation of power plants. The main actors in this field are project developers, power plant operators, financiers and governments.

2 Empirical and desk research in the ten countries was carried out mainly in 2012. Some recent policy changes in the respective countries may not be reflected.

3 Energy efficiency measures, by this definition, include transport, buildings, tourism, waste and industry.
4 Specialised sectors such as agriculture and fisheries are excluded from the analysis due to their highly distinctive characteristics.

2. The industrial **energy efficiency** field consists of projects that aim to reduce the use of electricity or other forms of energy in an industrial context. The main protagonists in this field are industrial companies, energy service companies (ESCOs), financiers and governments.

3. The field of small-scale renewable energy and energy efficiency consists of business models aiming to provide renewable energy and energy efficiency products and solutions to low-income populations, mostly in rural contexts. Activities in this field include installing and servicing household-scale solar systems, electric mini-grids, solar water heaters and energy-efficient cooking stoves. The key stakeholders in this field are the households or small businesses served, the businesses providing the solutions and products, financiers (often microfinance institutions) and the government.

Box 1: Green Finance Policy

Green Finance Policy: Any policy that directly or indirectly stimulates financial actors to invest in the transformation of the economy. This definition not only incorporates financial sector policies, but also extends to fiscal, energy and industrial policies.

Conceptual framework for analysing green finance policies

The conceptual framework applied to assess green finance policies comprises three core indicators:

- **Consistency in the implementation of a single policy**: assessment of the degree to which policy objectives are translated into tangible programmes, institutions, funds and instruments.

- **Coherence among a set of policies**: analysis of the ability of the entire spectrum of policies to address all the relevant barriers to mobilising green financing.[5]

- **Effectiveness of the policy framework** in mobilising financing for green investment opportunities, i.e. creation of financing schemes such as green credit or equity lines from domestic and international institutions.

On this basis, the report analyses ten country case studies, assessing their national and policy frameworks and evaluating the deployment of green finance schemes by public and private financial institutions.

Findings

All of the ten country case studies point to a need for more ambitious green finance policies and more rigorous implementation. The following pages summarise the conclusions for each of the three major fields of green investment: large-scale renewable energy, industrial energy efficiency and small-scale renewable energy and energy efficiency. Each section begins by describing the different challenges faced by investors and policymakers, then proposes specific solutions and assesses how these were implemented by policymakers in the ten surveyed countries. The last section of the executive summary highlights recommendations for development organisations on how best to address the challenges in each of the three fields.

Green investment field 1: Large-scale renewable energy

Challenges faced

The development of large-scale renewable energy projects and procurement of the necessary financing hinges on the establishment of strong, long-term renewable energy policy frameworks and their translation into reliable instruments, accessible to the private sector on a fair, level playing field.

Short-term policy agenda: All the countries surveyed are attempting to reduce the costs of renewable energy investments through fiscal and financial support mechanisms. Nine out of ten have introduced fiscal incentives, such as tax exemptions and rebates. Most countries have

5 Typical barriers include a lack of incentives, counter-productive incentives, large up-front capital cost, high transaction costs, agency problems and a lack of adequate risk assessment methodologies.

also introduced or at least considered feed-in tariffs. Funds have been created and investment subsidies granted. Altogether, however, the countries lack a long-term approach in their renewable energy policies, often re-adjusting policies to the detriment of investors' trust.

Limited market liberalisation: Most of the countries surveyed have been committed to liberalising their energy markets since the 1990s. Despite these efforts, markets are far from being competitive in many cases as policies contain significant inconsistencies. The Philippines, for example, has liberalised its market but has not supported fair competition through appropriate antitrust regulations, biasing the market towards domestic corporations with strong ties to politics. In Egypt, around 10 years after liberalisation of the energy market, the state-owned electricity company still accounts for more than 90% of the country's electricity generation and distribution.

Lack of domestic financing: In most of the countries surveyed, investments in large-scale renewable energy are driven by international finance and development institutions. The domestic legal, structural and economic frameworks are often too weak to allow the emergence of domestically financed market-based renewable energy development. In the past, the strong presence of international project developers and financiers prevented local financial institutions from gaining experience in the sector. National policies have focused on international financial support, neglecting the development of domestic capacity for renewable energy financing.

Way forward

Involving domestic financial institutions through concessional credit lines: A concessional credit line for renewable energy issued by Germany, implemented by KfW, and channelled through Chilean banks, allowed the banks to gain first-hand experience in renewable energy financing at concessional rates. Other countries provide similar examples. In Peru, public financing schemes were recently adapted to involve local financial institutions to a higher degree. In the Philippines, the positive experience of the Bank of the Philippines Islands encouraged commercial banks to develop green credit lines.

Helping financial institutions to 'learn on the job': Helping commercial banks to acquire first-hand experience through the deployment of expertise within the institutions allows them to develop the required skills in project risk assessment and build a track record of successful investments. In the Philippines, the IFC supported the Bank of the Philippines Islands by deploying two full-time energy officers specialised in the assessment of renewable energy and energy efficiency projects. As a result of their work, the bank began engaging in green finance activities. In the Philippines, the IFC programme demonstrated the viability of renewable energy finance, which in turn motivated other banks to engage in the sector.

Enforcement of contracts with private sector actors: Enforcing contracts is a particular challenge in countries where bureaucracies and corruption exist in both the public and private spheres. India's National Solar Mission, despite being the target of substantial criticism, has managed to keep renewable energy project developers in line by requiring the developers that win concessions to secure financing within 180 days of the date on which the power purchase agreement is signed. If these requirements are not met, the government withdraws generation licenses.

Green investment field 2: Energy efficiency

Challenges faced

Despite considerable inherent growth potential, energy efficiency markets are often not embedded in sufficiently developed financial and technical infrastructure. Significant barriers remain, hindering the mutually beneficial cooperation of the three key stakeholders, namely: industry, Energy Service Companies (ESCOs) and the government.

Information asymmetries between ESCOs and their clients are causing significant agency problems that jeopardise their overall business relations. While ESCOs have the technical capacity to most effectively assess the risks of investments, neither their clients nor their financiers are able to make the same assessments and therefore have trouble selecting and trusting ESCOs.

Lack of capacity to assess the risks of energy efficiency projects: As a result of the information asymmetries, financial institutions are also reluctant to provide ESCOs with access to affordable financing. Their lack of capacity to assess technical and financial aspects of ESCO projects often leads financial institutions to either refuse funding or require unrealistic liquidity and return rates.

Lack of awareness and incentives in industries: The energy efficiency market is additionally constrained by a lack of awareness among stakeholders, managers and end-consumers alike, who tend to underestimate the productivity gains and carbon reductions to be derived from energy efficiency measures. At the same time, fossil fuel subsidies and subsidies on fossil fuel-based energy lower the attractiveness of energy efficiency measures for private sector actors, despite the fact that, from a macroeconomic perspective, these measures reduce overall costs.

Way forward

Appropriate pricing of CO_2 emissions: As a basis, governments first need to create an overall enabling framework that will ensure that CO_2 emissions and energy savings realised through energy efficiency measures are priced correctly. In cases where fossil fuels or electricity are subsidised, governments should also subsidise energy efficiency measures. For this purpose, some countries have established energy efficiency funds which are fed by taxes on polluters. Such subsidies could be effectively offset by lowering spending on electricity or fossil fuel subsidies resulting from decreased consumption.

Transparency mechanisms on energy efficiency projects and ESCOS: Governments need to develop measures that reduce information asymmetries and increase trust between ESCOs and their clients as well as financiers. India, for example, has designed a standard performance contract and put in place a standard methodology for conducting audits and for measuring and verifying performance. In some instances government agencies have introduced ESCO rating mechanisms and certifications to increase transparency. The Indian Bureau of Energy Efficiency has accredited ESCOs according to the availability of technical manpower, financial strength and experience in energy performance contracting. However, these schemes have little impact when not developed in collaboration with industries and financial institutions.

Incentives for industries and awareness raising: Governments should also create an incentive framework that raises awareness among the industrial and service sectors of the financial benefits of energy efficiency, while simultaneously stimulating relevant investments. Some of the surveyed countries have developed promising instruments. Chile has implemented pre-financing of feasibility studies for energy efficiency projects and has provided subsidies for energy audits. Tunisia has introduced and subsidised mandatory energy audits for energy intensive industries, while simultaneously subsidising energy performance contracts.

Reducing risk for financial institutions: Furthermore, governments need to provide frameworks that reduce financial institutions' risk perceptions to an acceptable level. To this end governments could consider the development of guarantee mechanisms for banks, as they have been found to be a useful approach in mobilising financial institutions to begin financing energy efficiency projects. India is currently developing risk guarantee funds that are designed to attract private investments in energy efficiency.

Green investment field 3: Small-scale renewable energy and energy efficiency

Challenges faced

In rural areas distant from energy delivery infrastructure, decentralised, small-scale solutions may offer both cheaper and more effective means of delivery. These do not require very large capital investments, but often fail due to insufficient enforcement of quality in products and services and limited capacity among financial institutions to assess risks.

High transaction costs: Small-scale solutions often involve the distribution, maintenance and financing of relatively low-value products in remote and sparsely populated rural areas and thus entail comparatively high transaction costs. Similarly, credit assessments are expensive relative to the loan sizes distributed.

Lack of risk assessment capacity: By design, financial institutions lack the capacity to assess and distinguish between high and low-quality products, which can lead to problems of poor selection, i.e. low-quality products flooding markets. When financing the asset purchase of renewable energy or energy efficiency products for end users, the financial institution is in a position of relative ignorance regarding the product specifications and technological properties as well as the provision of after-sales services, although these are crucial factors influencing the repayment of product loans.

High dependency on after-sales service provision: Financial institutions are highly dependent on the appropriate provision of after-sales services as their money and, most importantly, their reputation are at stake. In practice, however, product providers tend to disregard after-sales services unless appropriate incentive mechanisms are in place. In fact, incentivising product and service providers to follow up with after-sales maintenance has been identified as a key challenge for both financial institutions and public institutions implementing the respective sector policies.

Way forward – Highlights from Country Case Studies

Applying a combination of subsidy schemes: Capital subsidies, the most common form of subsidy scheme, lower the transaction costs of product distribution and are currently being implemented in Bangladesh, Nepal, Tunisia, India and Uganda. Subsidies on loan interest rates, a much less common form of subsidy that increases the attractiveness of product financing options for end users, are provided only in Bangladesh and India. In India, however, interest rate subsidies for solar appliances attracted only modest interest from banks due to a high degree of bureaucracy and delayed payments. Transaction cost subsidies that lower the cost of assessing potential investments may further increase the willingness of financial institutions to engage in the sector (see Nepal).

Assuring appropriate product and service quality: In Bangladesh and Nepal, policymakers have introduced phased subsidy payment mechanisms that are paid out after the quality of installed systems has been confirmed. In Tunisia, the subsidies for solar water heaters are only available to suppliers whose technology fulfils the quality standards required by the National Agency for Energy Conservation. Substantial quality problems have occurred in Uganda where technical auditors of the Rural Electrification Agency have been criticised for having conducted ineffective system inspections as a result of insufficient incentives for conducting quality assurances.

Employing guarantee and enforcement mechanisms: Tunisia has introduced a guarantee mechanism that sanctions defaulting clients by turning off their electric supply. As a result, perceived risks of non-performing loans have decreased significantly in the eyes of financial institutions, thus increasing the willingness to extend loans.

Increasing transparency in the sector through rating mechanisms: In Nepal, the Alternative Energy Promotion Centre has developed a rating scheme that assesses small-scale hydropower projects and makes the information available to financial institutions. However, financial institutions were only involved in the design of the rating scheme to a limited extent. A private financial institution has reported that public rating mechanisms need to better reflect the requirements of private actors.

Capacity building in financial institutions: In cases where capacity building has been introduced, financial institutions have shown heightened interest in small-scale financing. In Nepal, for example, the Energy Sector Assistance Programme has trained local financial institutions to assess and provide loans for SHSs.

Recommendations for development organisations

International development organisations can support policy making that facilitates the financing of small-scale renewable energy and energy efficiency in the following ways:

- Encourage the appropriate liberalisation of energy markets and fair competition to provide grid access to independent power producers;

- Support public institutions in developing enforcement mechanisms, such as penalties, to accelerate project development and financing;

- Promote indirect smart concessional financing through local financial institutions, coupled with capacity building measures.

Energy efficiency

- Consult governments on the development of standardised guidelines, benchmarks and methodologies for verification and measurement in energy performance contracting;

- Consult governments during the establishment of risk guarantee funds: provide support in conducting risk appraisals and setting up funding procedures and guidelines;

- Develop ESCO capacity for the formulation of detailed and comprehensive project reports, including training on how to clearly specify project risks, risk mitigating measures and internal rate-of-return calculations;

- Develop the capacity of financial institutions through training on energy performance contracting, on energy efficiency technology available on the market and on procedures for assessing financial projections and risks of ESCO projects (e.g. deploying experts in financial institutions to coach financial analysts or establishing international training standards for financial analysts);

- Raise awareness in the private sector about productivity gains and CO2 reductions to be achieved through the implementation of energy efficiency in company value chains (i.e. through round tables and conferences). In addition, best case examples that can easily be replicated by a wide range of companies across industries are a valuable tool for attracting wide-ranging interest;

- Facilitate South-South exchange of experiences among public institutions in addressing agency and financing issues in the energy efficiency and ESCO markets. This can be done through learning seminars and conferences as well as comparative studies on the impacts of energy efficiency measures.

Small-scale renewable energy and energy efficiency

- Strengthen the capacity of public institutions implementing small-scale renewable energy and energy efficiency schemes, particularly in devising and implementing instruments for financial and technological risk management, stakeholder management schemes (including incentives and sanctions) and regulatory instruments (e.g. lending targets and obligations);

- Develop innovative refinancing instruments that provide liquidity to product and service providers while minimising risks for MFIs, e.g. through credit guarantee mechanisms and risk-sharing;

- Facilitate South-South exchange of experiences among public institutions in addressing issues related to quality control and enforcement, risk reduction and public financing through seminars and comparative policy analyses;

- Develop the capacity of MFIs to assess and minimise credit risks related to product failure and improper maintenance;

- Raise awareness among MFI investors about opportunities in renewable energy and energy efficiency lending and offer consultations on risk management measures.

2. Introduction

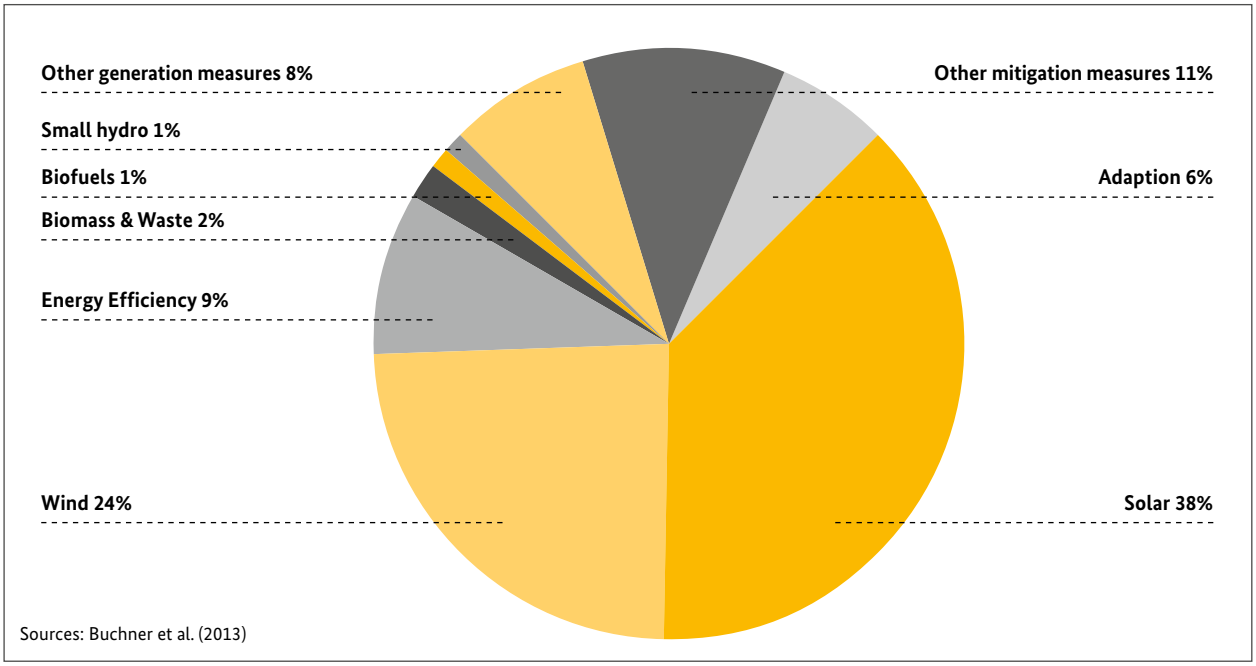
The global threat posed by climate change and environmental degradation has placed green growth and the transition towards a green economy at the top of the international political agenda. Achieving such a transition requires a considerable scale-up of investments in low-carbon technologies and environmental preservation (Hamilton, 2009). This is particularly true for developing and emerging economies, since they are home to vital ecosystems and account for a rapidly rising share of global greenhouse gas emissions, yet the financial and political environments in these countries are often not conducive to the financing of such technologies.

With the contribution of developing and emerging countries to global greenhouse gas emissions continuing to rise, policymakers need to find ways to mobilise financing for the development of low-carbon energy and industrial infrastructure and technology. This report addresses the issue by examining how energy, industrial and finance policies in developing and emerging countries can create coherent frameworks that will stimulate investment in low-carbon infrastructure and technology. It also assesses the political consistency of such frameworks, along with their coherence and the potential they offer for mobilising finance.

In the Global Landscape of Climate Finance (Buchner et al. 2013) it is estimated that in 2012, annual global climate finance flows totalled approximately USD 359 billion. 94% of total investments are being invested in mitigation. Solar and wind combined account for more than half of total investments. Only 6% were spent on adaptation (see Figure 1).

Estimations for the public and private financing that will be required for the transition to a global green economy vary considerably, depending on their respective scope, methodology and the underlying policy scenario. The International Energy Agency (IEA) has estimated the investments that will be required per year until 2035 to ensure the transition to a green economy (regarding energy efficiency and renewable energy alone). These vary between USD 493 billion per year (current policies scenario; own calculations based on IEA, 2013) and USD 695 billion per year (scenario assuming global policy action to put greenhouse gas emissions on a long-term trajectory that will ultimately limit the global average temperature increase to 2 °C; own calculations based on IEA 2012b).

Figure 1: Use of climate finance (as percentage of total investments)



Sources: Buchner et al. (2013)

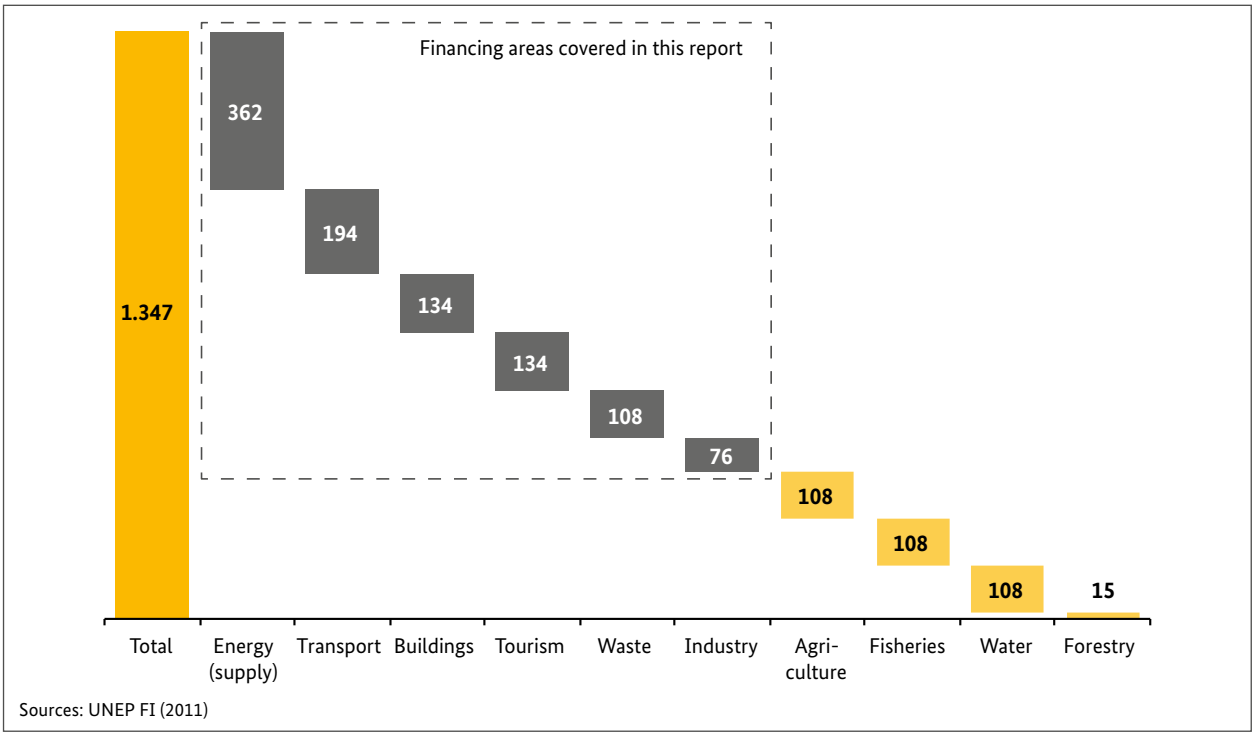
Buchner widens the scope and looks beyond the energy sector. Her recent estimates of annualised additional investments needed for mitigation range from an average of USD 490 billion per year in 2010-2020 to USD 910 billion per year in the period 2010-2050 (Buchner et al. 2013).

The United Nations Environment Programme Finance Initiative (UNEP FI) estimates that a total of USD 1.347 billion annually are required to reduce global carbon emissions by half as outlined by the IEA BLUE Map scenario (see Figure 2). While this estimation includes total investments in all sectors, UNEP FI concludes that the vast majority of investments in the transition to a green economy need to be made in the global transformation of energy supply structures and energy efficiency measures in various sectors (UNEP FI, 2011). Energy efficiency measures are defined as including transport, buildings, tourism, waste and industry. This report therefore focuses primarily on green financing in the two areas of renewable energy and energy efficiency. A third area examined in this report is small-scale approaches to renewable energy and energy efficiency, such as decentralised electrification through household renewable energy systems. Specialised sectors such as agriculture and fisheries are excluded from the analysis due to their highly distinctive characteristics.

Irrespective of which estimation of the total required financing is used, the required investments stand in stark contrast to the existing financing mobilised for low-carbon investments.

Although the need to invest in low-carbon initiatives in developing countries is obvious, their industries, financial sectors and policy frameworks are not sufficiently developed to attract financing for green investments. The risk–return balance is often unfavourable and is an obstacle to investment; even in cases where it is favourable, local financial institutions lack the capacities required to assess the risks of renewable energy and energy efficiency investments. Furthermore, the process of transitioning to a green economy poses unique challenges that need to be addressed in accordance with other social and economic development objectives.

Figure 2: Required annual investments for the transition to a green economy according the IEA BLUE Map Scenario (in USD billion)



Sources: UNEP FI (2011)

The concept of green finance

Green finance was first conceptualised in the early 1990s, when the UNEP, in cooperation with financial institutions, developed the UNEP Finance Initiative to identify, promote and facilitate the adoption of best practices in the environmental and sustainability at all levels of financial institution operations (UNEP FI, 2012). However, there is no universally applied definition of *green finance* (IFC, 2011a).[6] In this publication the term green finance implies the inclusion of the entire financial system in the transition to a green economy and the functions emerging as a result.

Box 2: Definitions of related terms

Climate Finance: Climate finance refers specifically to capital flows that target low-carbon and climate-resilient development. These international financing flows may be either concessional (public) or non-concessional (private and also public in certain forms). It may concern direct or indirect greenhouse gas emissions.

Sustainable Finance: The provision of financial capital and risk management products to projects and businesses that promote or do not have a negative impact on economic prosperity, environmental protection and social justice.

Buchner (2011), IFC (2007)

A conceptual framework for green finance policy analysis

Understanding the various factors that influence policy success requires, on the one hand, an individual analysis of each policy area to determine appropriate strategies, institutions and instruments for a given set of objectives. On the other hand, policy analysis should assess the overall ability of an entire set of policies to address major barriers to specified objectives. Thus, policy analysis must consider:

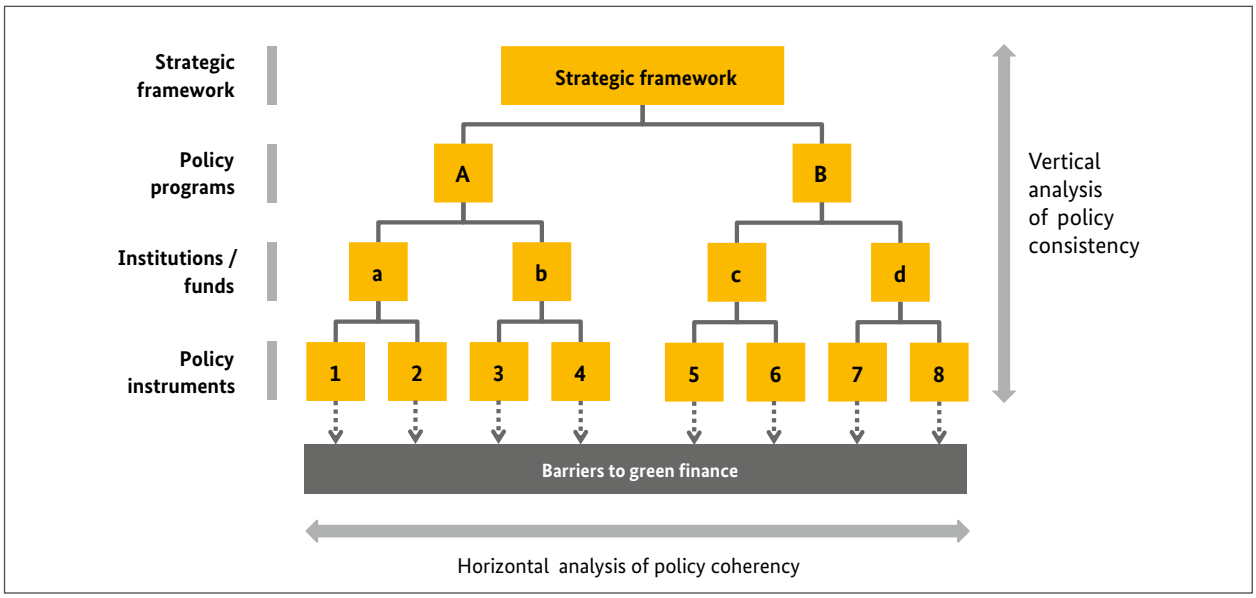
- Consistency in the implementation of a single policy: degree to which policy goals are translated into tangible policy instruments, enforced by institutions;
- Coherence among a set of policies: ability of the entire spectrum of policies to address all relevant barriers to mobilising green financing;
- Effectiveness of the policy framework in mobilising financing for green investment opportunities.

Consistency in the implementation of a single policy is analysed using a framework that differentiates various levels of policy implementation. One key indicator for assessing policy consistency is the rigorousness with which policies are translated into specific actions across the four levels of policy implementation. Policies are characterised according to the way in which strategic goals (level 1) are translated into policy programmes (level 2), institutions or funds (level 3), and, finally, concrete policy instruments (level 4). These four levels must be considered in the course of policy formulation and implementation.

- The legal and strategic framework sets the long-term national goals for achieving the transition to a green economy, including energy production objectives for renewable energy, carbon emission reduction objectives and energy efficiency objectives (e.g. Egypt's target of increasing its share of renewable energy sources in electricity production to 20% by 2020). Moreover, the legal and strategic framework defines overall policy areas and often includes specific instruments to achieve the stated goals. The strategic goals defined in the framework need to be specific, measurable and time-bound (e.g. increasing installed production capacity of renewable energy to 5,000 MW).
- Policy programmes break down strategic goals into specific objectives for distinct policy areas and industrial sectors (e.g. India's National Solar Mission incorporating a variety of instruments to be implemented).

6 Compare similar term definitions such as climate finance and sustainable finance from Buchner (2011) and IFC (2007).

Figure 3: Conceptual framework for policy analysis



Such programmes define concrete paths of action, describe policy instruments and establish institutions and funds for implementing the policy instruments. To generate an impact, policy programmes should describe instruments as precisely as possible, define enforcement mechanisms and provide the implementing institutions with sufficient legal power and resources for implementation and enforcement. Consistency among different policy areas needs to be ensured in order for policies to be implemented effectively (e.g. avoiding inconsistencies such as subsidising energy-inefficient practices).

- Implementing institutions and funds are the institutional bodies that specify and implement policy instruments. Such institutions include agencies for management and distribution incentives (e.g. the Bureau of Energy Efficiency in India or the Alternative Energy Promotion Centre in Nepal), regulatory bodies and public development finance institutions (e.g. the Industrial Development Corporation in South Africa). The institution's managerial and technical capacities need to be up-to-speed to ensure it can carry out its tasks and responsibilities. To implement incentives effectively and fairly, the institution should keep bureaucratic processes to a minimum and eliminate corruption. In devising and implementing policies, the institutions should take into account feedback from affected private sector institutions and make necessary changes to policy programmes.

- Policy instruments are the specific mechanisms deployed to promote green investments through incentives, regulation, market creation, public financing, information provision and capacity building (e.g. a renewable energy feed-in tariff). The instruments should complement each other and provide the necessary interventions to achieve the policy objectives defined in the legal and strategic framework and the policy programmes. Policy instruments need to be designed to be accessible to the target group and to address the relevant barriers to green financing.

The analysis of a given policy within a national context assesses the consistency of the policy across different levels of implementation and the appropriateness of the institutions and policy instruments in addressing barriers to achieving the strategic goals.

Coherence among policy areas: environmental, economic, energy and financial sector policies

Besides assessing the consistency of policy implementation within one policy area, an effective assessment of a country's overall policies for mobilising green finance requires a complementary analysis, evaluating the coherence of policies among different policy areas, specifically energy policy, economic policy, financial sector policy and environmental policy. Single policies often address only specific barriers to mobilising financing, whereas the complete spectrum of existing barriers can only be addressed by using a mix of policy instruments from different policy areas (see overview of policy instruments in Table 1). Thus an overall policy framework must encompass a diverse set of instruments that complement each other and, as a whole, address the entire range of barriers to achieving the defined strategic policy objectives.

Environmental policy has the objective of preventing, reducing or mitigating harmful impacts on nature and natural resources. In most developing countries, environmental policy is designed and implemented within the other three policy areas of energy, economy, and, to a limited extent, financial sector policy.

Energy policy addresses issues of energy production, transmission, distribution, and, in part, consumption. Energy policies are driven by diverse and often contradictory motivations such as establishing national energy self-sufficiency, enabling reliable universal access to electricity, reducing the cost of electricity production, transmission and distribution, reducing environmental externalities of electricity production and lowering energy consumption. In order to effectively promote green financing, energy policy needs to create a political framework that promotes stable, long-term demand for investments in renewable energy.

Economic policy covers a wide range of government interventions, such as the drawing up of the government budget, laws on national ownership and industrial policy, and elements of trade and fiscal policy. Economic policies aim to stabilise and grow the economy, redistribute income and property, improve the competitiveness of domestic firms and maintain market competition. To promote green finance effectively, economic policy needs to incentivise and regulate the domestic economy in the industrial, transportation, infrastructure and service sectors in order to create financing demands for investments in increasing efficiency and reducing waste.

The financial sector policy of a country governs the regulation of financial institutions and markets. Financial sector policies aim to enable efficient flows of capital while maintaining overall economic stability. In order to have an impact on green financing, financial sector policies need to provide financial institutions with the required incentives, regulations, information and capacity to make green investments. As financial institutions are by nature risk-averse, policy instruments need to address their ability to assess specific risks associated with green investments, shield them from risks through guarantee mechanisms, and provide incentives in the form of concessional refinancing schemes. Moreover, financial sector policies may aim to increase transparency in the green investment sector by introducing reporting standards and by using credit policies and loan targets to encourage financial institutions to support green investments.

While energy and economic policies aim to create and improve green investment opportunities in renewable energy and energy efficiency, financial sector policy needs to increase the willingness and ability of financial institutions to finance green investment. A detailed description of the policy instruments relevant to green finance can be found in Table 5.

Table 1: Overview of major policy instruments

Instrument type	Energy policy	Economic policy	Financial sector policy
Market-based	• Tradeable renewable energy certificates (Philippines, India)	• Tradeable carbon emission certificates (Nepal, Egypt)	• Issuance of green bonds
Information		• Guidelines for energy conservation • Publicly funded environmental impact assessments • Public ESCO ratings (Nepal)	• Guidelines for assessing green investments • Green stock indices • Public reporting on environmental impacts of businesses • Pre-assessment of green investment opportunities
Regulation	• Feed-in tariff (Philippines, India, Egypt, Uganda) • Renewable portfolio standards/ quotas (India, Chile, Philippines) • Net metering (Philippines)	• Energy efficiency standards/ carbon emission quotas • Enviromental impact reporting standards (South Africa) • Public accreditation of ESCOs and energy performance contracting	• Loan targets • Credit policies • Environmental impact reporting standards for financial institutions
(Fiscal) incentives	• Capital subsidies, grants, rebates (Nepal, India, Chile, Tunisia, Uganda, South Africa) • Investment tax credits (Peru, Bangladesh, Nepal, Philippines, India, Egypt, Chile, Tunesia, South Africa) • Electricity production tax credits • Sales tax reductions (India, Egypt, Philippines, Peru) • Electricity production payments	• Public grants, capital subsidies, rebates	• Interest rate subsidies (India, Tunisia, Uganda) • (Partial) credit guarantees (India, Tunisia, Uganda) • Transaction cost subsidies (e.g. subsidy for screening investments)
Public financing	• Public competitive bidding/ auctioning (Peru, India, Egypt, South Africa) • Public investment, loans, or grants (Bangladesh, Egypt, Uganda)	• Public investment, loans, or grants • Publicly funded energy performance contracting	• Green banking refinance schemes (Bangladesh, Peru, Uganda)
Capacity-building			• Provision of staff trained in green investments (Nepal) • Trainings for green investments

Barriers to green financing

Evaluation of green finance policies needs to assess the ability of policy instruments to address significant barriers to green investment. Policy analysis evaluates the overall policy setting (i.e. policy coherence) of a country and describes which barriers are being sufficiently counteracted and which barriers remain unaddressed.

Barriers to green financing have been identified in several studies and include barriers inherent in the energy and energy efficiency sectors as well as barriers endemic to the financial sector in developing country contexts (see Table 2).[7] In developing countries, there is generally a lack of incentives for low-carbon investment in both the energy efficiency and renewable energy sectors, due to pricing distortions and a deficiency of carbon pricing mechanisms. Markets in these two sectors are still immature, lacking both capacity and significant track records. Furthermore, financial institutions have little awareness of potential investment opportunities and also lack the ability to properly assess investment risks with regard to future pay-out scenarios and technical risks. In the case of small-scale investments, such as micro-hydro projects, SHSs and small energy performance contracting projects, delivery and maintenance of infrastructure is difficult, leading to high transaction costs. Furthermore, agency problems resulting from substantial asymmetries in technical capacities, especially with respect to energy efficiency, between the project implementer (e.g. an Energy Service Company / ESCO) and project clients and financiers, lead to a greater risk of moral hazard and adverse selection problems. Consequently, Energy Service Company (ESCO) markets in developing countries are still underdeveloped.

Table 2 provides an overview of major barriers to green financing that need to be addressed by policies. The country studies in this report describe the relevant policies and characterise them according to their ability to address these barriers.

Classification of green investment fields

In a developing and emerging economy context we can differentiate between three potential fields of green investment:

- Large-scale renewable energy;
- Industrial energy efficiency;
- Small-scale renewable energy and energy efficiency.

Differentiation between these three fields is based on different market structures and policy requirements in each field. For this reason, we do not use a specific investment amount or megawatt capacity to define them. Instead, the classification helps to explain how each field poses unique challenges to investors, project implementers and policymakers.

The field of large-scale renewable energy consists of large power generation projects that involve the construction and operation of power plants. The main actors in this field are project developers, power plant operators, financiers and governments. The industrial energy efficiency field consists of projects that aim to reduce the use of electricity or other forms of energy in an industrial context. The main actors in this field are industrial companies, ESCOs, financiers and governments. The field of small-scale renewable energy and energy efficiency consists of business models that provide renewable energy and energy efficiency products and solutions to low-income populations, mostly in rural contexts. Activities in this field include installing and servicing household-sized SHSs, electric mini-grids, SWHs or energy-efficient cooking stoves. The key stakeholders are the households or small businesses served, the businesses providing the solutions and products, financiers (often microfinance institutions) and the government.

7 The barriers described here have been adapted from IFC (IFC, 2011a).

Table 2: Overview of relevant barriers to green finance, adapted from IFC (2011a)

Area	Barrier	Description
Renewable Energy	Fossil fuel subsidies	• Many fossil fuels are still subsidised (USD 300 billion globally)
	Large up-front capital cost	• Many low-carbon technologies involve large overall capital needs and higher financing costs than high-carbon alternatives
	Technology risk	• Technologies are less well-known in the market and there is less capacity in the value chain for developing projects
	Network risk	• Many technologies rely on access to networks (e.g. solar PV, wind and hydro require flexible and sufficient grid capacity)
	Transaction costs	• Many renewable energy investments are small-scale (e.g. mini-hydro, SHSs), which makes delivery and after-sales maintenance more difficult, leading to higher transaction costs
Energy Efficiency	Energy pricing distortions	• Carbon externalities are not yet sufficiently and consistently priced
	Agency problems	• Often the organisation paying for the investment is not the one reaping the benefits, especially in energy performance contracting • Project financiers have little understanding of technical solutions and lack the ability to differentiate between 'good' and 'bad' ESCOs according to their service quality
	Lack of ESCOs / in-house technical expertise	• In many countries, ESCO markets are underdeveloped and technical expertise for implementing energy efficiency projects is limited
	Transaction costs	• Energy efficiency projects are often small-scale, which makes client acquisition and project delivery more difficult, leading to higher transaction costs
	Inability to price risk	• Difficulty in assessing and pricing the risk involved in energy efficiency projects due to the complexity of the solutions deployed
Financial sector	Lack of awareness	• Few financial institutions have sufficient awareness of green investments and lack information on relevant investment opportunities
	Inadequate risk assessment methodologies	• Most financial institutions lack the capacity to evaluate the risk profiles of green investment projects

The market potential for these three fields differs with regard to the size of individual financial contracts as well as the number of potential financial contracts to be concluded. In the case of large-scale renewable energy, while the financial contracts are relatively large, the potential number of contracts is rather small. In the case of industrial energy efficiency investments, potential financial deals are much smaller but the number of deals to be made is greater. Finally, financial deals in small-scale renewable energy and energy efficiency are roughly the size of typical microfinancing contracts, but market potential in respect of the number of deals to be made is enormous.

As a result of these structural differences in the three fields, each field is attractive to different investor groups. Large-scale renewable energy is particularly interesting for international investors and project developers who can bring in unique expertise in technology and experi-

ence in the construction and management of power plants, but face large transaction costs in screening a project opportunity. Still, the large investment size justifies taking on higher transaction costs that arise due to political, cultural and economic contexts in foreign countries. Mid-scale and small-scale renewable energy and energy efficiency projects, on the other hand, are less attractive to international investors as the high transaction costs cannot be offset by sufficiently large payoffs from investments. Domestic financial institutions that are familiar with the local economic, political and cultural contexts are at an advantage compared to international players. These institutions, however, lack the technical expertise needed to effectively evaluate the risks and payoffs of investment proposals, leading to market failure. Policies with the objective of unlocking green finance in these two fields therefore need to address the barriers that keep local financial institutions from financing green investment opportunities.

Depending on the national context in the three green investments fields, each country analysis focuses on specific fields (see Table 3 for a detailed overview of the countries surveyed and the focus of each analysis).

Organisation of the paper

The paper consists of an introduction outlining the research approach and content, a short methodology section, a main section and a conclusion. The body of the paper consists of ten country case studies assessing green finance policies according to the conceptual framework outlined above. Each country case study begins with a general overview of the country's green finance context, followed by a description and assessment of relevant policies and an overview of green financing schemes that could be mobilised, and ends with a summary and recommendations based on the findings.

Table 3: Overview of countries assessed

Country	Large-scale RE	Industrial EE	Small-scale RE and EE
The Philippines	x	x	x
Nepal			x
India	x	x	
South Africa	x	x	
Peru	x	x	
Chile	x	x	
Tunisia		x	x
Egypt	x		
Uganda	x		x
Bangladesh			x

The conclusion section of the paper highlights findings that were consistent across several countries, draws conclusions for policy interventions and derives recommendations for policy consulting and technical assistance through international development agencies.

Table 4: Overview of country data

Topics and Indicators	Bangladesh	Chile	Egypt	India	Nepal	Peru	Philippines	South Africa	Tunisia	Uganda
GENERAL (data from 2010)										
Population (millions)	151	17	83	1.241	30	29	95	51	11	35
GDP per capita (current US$)	675	12.640	2.698	1.375	535	5.292	2.140	7.272	4.194	515
FINANCIAL SECTOR (data from 2010)										
Size of the financial sector										
Domestic credit provided by banking sector (% of GDP)	65,94	66,03	69,42	72,98	67,30	18,09	49,23	182,44	73,80	17,10
Domestic credit to private sector (% of GDP)	47,05	66,88	33,07	50,29	54,55	24,32	29,58	145,63	68,82	15,65
Market capitalization of listed companies (% of GDP)	15,63	157,92	37,69	95,94	30,24	64,87	78,82	278,53	24,15	10,40
Health of the financial sector										
Bank capital to assets ratio (%)	n/a	8,30	6,20	7,10	n/a	9,50	11,70	7,00	n/a	13,90
Bank liquid reserves to bank assets ratio (%)	9,72	13,06	33,31	n/a	10,73	n/a	34,91	3,93	n/a	16,61
Bank nonperforming loans to total gross loans (%)	n/a	2,70	11,00	2,40	n/a	2,60	3,80	5,80	12,10	2,10
Interest rate spread (lending rate minus deposit rate, %)	5,86	3,00	4,77	n/a	4,38	17,43	4,45	3,37	n/a	12,49
Credit depth of information index (0=low to 6=high)	2	5	6	5	3	6	3	6	5	4
ENERGY SECTOR (data from 2009)										
Energy matrix (electricity production as % of total)										
Coal sources	1,69	24,53	0,00	68,56	0,00	2,55	26,61	94,08	0,00	n/a
Hydroelectric sources	4,10	41,66	9,25	11,89	99,58	57,62	15,81	0,59	0,50	n/a
Natural gas sources	89,38	6,47	68,67	12,36	0,00	34,35	32,12	0,00	89,68	n/a
Nuclear sources	0,00	0,00	0,00	2,07	0,00	0,00	0,00	5,19	0,00	n/a
Oil sources	4,84	20,01	21,26	2,90	0,42	4,08	8,69	0,02	9,20	n/a
Renewable sources, excluding hydroelectric	0,00	7,17	0,82	2,22	0,00	1,41	16,78	0,13	0,62	n/a
Rural electrification										
Access to electricity (% of population)	41,00	98,50	99,60	66,30	43,60	85,70	89,70	75,00	99,50	9,00
Rural population (% of total)	72,11	11,06	56,63	69,07	83,34	23,09	51,35	38,45	33,90	84,84
Avg. household size										
ENERGY EFFICIENCY (data from 2008)										
CO_2 emissions - total (kt)	46.527	73.109	210.321	1.742.698	3.542	40.535	83.157	435.878	25.013	3.748
CO_2 emissions per capita (metric tons)	0,32	4,35	2,69	1,46	0,12	1,42	0,92	8,93	2,42	0,12
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0,24	0,31	0,51	0,56	0,12	0,18	0,27	0,93	0,30	0,11
GOVERNMENT										
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	124	33	110	132	107	43	136	41	45	119
Corruption perceptions index (1=highly corrupt to 10=very clean)	2,70	7,20	2,90	3,10	2,20	3,40	2,60	4,10	3,80	2,40

Sources: World Bank Data, Transparency International

Table 5: Overview of policies present in the ten countries assessed

Instrument type	Policy / programme instruments	Description	Impact on financial sector
Market-based	Carbon emissions trading	A market-based approach used to control carbon dioxide emissions by providing economic incentives to reduce the emission of pollutants. A central authority sets a cap on the amount of pollutant to be emitted and allocates emission permits to firms. Firms are required to hold a number of permits equivalent to their emissions and can trade permits to meet their requirements.	Decreases financial attractiveness of high-carbon dioxide-emitting businesses
	Renewable energy certificates	A certificate awarded to certify the generation of one unit of renewable energy. In systems based on RECs, certificates can be accumulated to meet renewable energy obligations and also provide a tool for trading among consumers and/or producers. They also are a means of enabling purchases of voluntary green energy	Allows renewable energy producers to sell certificates, thereby increasing returns for investors
	Energy savings certificates	A certificate awarded to certify the saving of one unit of energy that is tradable among stakeholders in a scheme similar to carbon emissions trading	Increases returns on investments in energy efficiency
	Net metering	A power supply arrangement that allows a two-way flow of electricity between the electricity distribution grid and customers who have installed their own generation system. The customer pays only for the net electricity delivered from the utility (total consumption minus self-production)	Increases attractiveness of investing in small-scale generation systems
Information	Green banking guidelines	An approach under which public institutions (e.g. government agencies, central banks, publicly owned banks) provide guidelines for banking activities, e.g. establishing green banking units, considering environmental risk in credit decisions, assessing clean technologies, etc. Sometimes banks that comply with guidelines are given preferential treatment	Increases financial institutions' awareness of opportunities in green banking
	Public rating	A rating scheme for investment opportunities, e.g. in renewable energy or industrial energy efficiency (ESCO) projects, implemented through a government agency	Increases transparency for industries and financial institutions
Regulation	Priority / deprived sector lending	A policy that sets a quota for banks to lend a specified portion of their capital to a few specific sectors such as agriculture, small-scale industries or rural clean technology applications	Obligates financial institutions to dedicate funds to priority sectors
	Public competitive bidding	An approach under which public authorities organise tenders for a given quota of renewable energy supply or capacity and remunerate winning bids at prices that are typically above standard market levels	Increases returns on renewable energy investments; anticipated returns are not known before completion of bidding process

Instrument type	Policy / programme instruments	Description	Impact on financial sector
Regulation	Feed-in tariff	A policy that (a) sets a fixed, guaranteed price for a stated fixed-term period over which power can be sold and fed into the electricity network, and (b) usually guarantees grid access to electricity generators. Some policies provide a fixed tariff whereas others provide fixed premium payments that are added to market prices	Increases returns on renewable energy investments; as energy prices are public, financial institutions can anticipate returns
	Renewable portfolio quota	A measure requiring that a minimum percentage of total electricity or heat sold, or generation capacity installed, be provided using renewable energy sources. Utilities concerned are required to ensure that the target is met; if not, penalties are levied	Increases attractiveness of renewable energy investments
	Energy reduction targets	A target that specifies individuals' or firms' obligations to reduce energy consumption, usually coupled with penalties if firms do not achieve the target	Increases revenues for ESCO
	Power purchase agreement	A contract between government and electricity producer whereby the government guarantees the purchase of electricity at a given price over a specified time period	Increases security of investments in renewable energy plants
	Standards for energy audits	Prescribes standards for the methodologies to be applied in conducting energy audits	Higher transparency for the financing of industrial energy efficiency projects
Fiscal incentives	Tax exemption / tax reduction	An exemption from or reduction of a specific tax (e.g. income tax, value-added tax, import tax, property tax) granted to an organisation	Decreases costs of renewable energy or energy efficiency projects
	Capital cost subsidy	One-time payment by a utility, government agency, or publicly owned bank to cover a share of the capital cost of an investment	Decreases capital expenditure required for up-front investments
	Interest rate subsidy	Payment by a government agency or publicly owned institution (e.g. Apex Bank) to cover a share of the interest rate charged to clients on credit, thereby effectively reducing the client's interest rate. Public institutions sometimes fix client interest rates for banks and provide the subsidy to cover the difference between market rates and target rates	Increases financial institutions' returns on credits
	Accelerated tax depreciation	An accelerated depreciation policy allows a company, for financial accounting and tax purposes, to depreciate a fixed asset in such a way that the amount of depreciation in the earlier years of the asset's life is higher than normally allowed in the accounting regulations of the country, making the purchase of the fixed asset more attractive by reducing the purchaser's taxable income in the earlier years of the asset's life	Decreases taxable returns in the early years of an asset's life

Instrument type	Policy / programme instruments	Description	Impact on financial sector
Fiscal incentives	Subsidy for feasibility study / energy audit	Payment by a government agency or publicly owned institution to cover a share of a feasibility study conducted for technical installations (e.g. of a solar water heater or renewable energy production plants) or energy audits conducted to assess a firm's energy savings potential	Potentially increases the number of investment opportunities by lowering costs of feasibility assessments / energy audits
	Subsidy for maintenance costs	Payment by a government agency or publicly owned institution to cover a share of maintenance costs of renewable energy systems	Increases returns from operating renewable energy systems
	Carbon tax	A tax levied on firms' carbon dioxide emissions	Decreases returns on investments in carbon dioxide-emitting firms
Public financing	Public refinancing	A public funding scheme that refinances financial institutions' assets, usually at below-market interest rates	Decreases cost of capital for financial institutions
	Loan and credit guarantee	A promise by the government or a publicly owned institution to assume the debt obligation of a borrower if that borrower defaults. Loan guarantees granted by public institutions are usually limited, making the guarantor liable for only up to 70% or so of the debt	Decreases financial institutions' risks in extending credit
	Direct public financing	Financing provided by governments or publicly owned institutions to projects or firms in the form of equity, debt or mezzanine financing (e.g. subordinated debt), sometimes as part of a public–private partnership (PPP)	When combined with PPP, improves investment conditions for financial institutions
	Grant funding	A scheme whereby government agencies or public institutions offer funding for projects, programmes and feasibility studies. Grant funding is often provided within public–private partnership projects (PPP)	Increases awareness of projects through success cases financed with public grants When combined with PPP, improves investment conditions for financial institutions
	Public venture capital fund	A public financing scheme provided to early-stage, high-potential-growth start-up companies in the renewable energy and energy efficiency sectors, usually at better-than-market investment conditions	Greater investment opportunities through increased number of high-growth start-ups

3. Methodology

The case studies presented in this report follow a four-step approach in describing, characterising and assessing green finance policies in the ten country case studies:

- Description and characterisation of countries according to their financial markets and economic contexts;
- Description and characterisation of the countries' green policy contexts and concrete measures to foster the green economy within the conceptual framework using the policy effectiveness criteria;
- Description and characterisation of financing schemes set up by private and public sector institutions;
- Indicative assessment of overall policy context and concrete measures within the conceptual framework using the policy effectiveness criteria.

While the first step provides an overview along a consistent set of indicators, steps two and three focus on different sectors and policies in each country. This approach allows flexibility to focus on the most relevant fields of the green economy in each country and explore specific policies in greater depth. For example, the report on Egypt focuses on large-scale renewable energy investments, whereas the Nepal case explores rural electrification with small-scale renewable energy applications. The countries studied in this report were selected according to:

- Existence and maturity of policies affecting financing in the green economy sectors (e.g. renewable energy policies, clean rural electrification policies, energy efficiency policies);
- Involvement of multilateral institutions such as development banks and international donors;
- Geographic diversity across Asia, Africa and Latin America;
- Balance across different country sizes;
- Balance between low-income and low-to-middle-income countries.

During the study, a total of 33 experts from the public and private sector, international development cooperation institutions, academia and NGOs were interviewed. The purpose of these interviews was to gain deeper insight into each case study, especially in the process of policy design and the state of implementation.

The interviewees were chosen according to: their direct or indirect involvement in developing or implementing the relevant policy, practical experience within the target area of the policy, and specific knowledge of the issues involved. A list of all interviewees can be found in the annex to this report.

Figure 4: Overview of countries surveyed

4. Country studies

Table 6: Green finance data, Bangladesh

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	151
GDP per capita (current US$)	675
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	65.94
Domestic credit to private sector (% of GDP)	47.05
Market capitalization of listed companies (% of GDP)	15.63
Health of the financial sector	
Bank capital to assets ratio (%)	n/a
Bank liquid reserves to bank assets ratio (%)	9.72
Bank nonperforming loans to total gross loans (%)	n/a
Interest rate spread (lending rate minus deposit rate, %)	5.86
Credit depth of information index (0=low to 6=high)	2
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	1.69
Hydroelectric sources	4.10
Natural gas sources	89.38
Nuclear sources	0,00
Oil sources	4.84
Renewable sources, excluding hydroelectric	0,00
Rural electrification	
Access to electricity (% of population)	41.00
Rural population (% of total)	72.11
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	46.527
CO_2 emissions per capita (metric tons)	0.32
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.24
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	124
Corruption perceptions index (1=highly corrupt to 10=very clean)	2.70

Sources: World Bank Data, Transparency International

4.1 Green finance in Bangladesh

Key insights

- The Central Bank of Bangladesh is a major driver in raising awareness about green finance in the banking sector; it provides guidance through information-based approaches, e.g. provision of guidelines, risk assessment training etc.
- The Green Banking Policy Framework developed by the Central Bank of Bangladesh, the only one of its kind in the countries surveyed, has led to the creation of 40 green banking units and the implementation of environmental risk ratings on more than 4,000 finance proposals.
- The small-scale solar home system support scheme of the Apex Bank, named Infrastructure Development Company Limited (IDCOL), which uses a combination of capital subsidies, interest rate subsidies and concessional financing, has managed to create a competitive market for renewable energy provision at the Base of the Pyramid.
- IDCOL combines subsidised financing with quality control through special credit repayment schemes, where parts of the subsidy are only paid out after conducting randomised quality tests one year after the time of installation.

Country background

Bangladesh's economy has been growing steadily. Real GDP grew at an average rate of 5.8% per year between 2000 and 2009 compared with 5.5% between 1995 and 2009. Nevertheless, there are many constraints on economic development, including the urgent need for strong law and order, good infrastructure, sound and efficient financial markets, high-quality, affordable social services and an enabling environment for private sector development (Hamilton, 2009).

Bangladesh's financial sector is dominated by banks. The financial sector in Bangladesh has the lowest rate of market capitalisation to GDP among the South Asian countries (15.6%). In addition to the Central Bank of Ban-

gladesh, there were 48 banks and 29 non-banking financial institutions in 2008.[8] Their combined domestic credit to the private sector amounted to 47.05% of GDP in 2010 (see Table 6) (World Bank, 2012a).

In recent years, Bangladesh has introduced policies to promote banking sector involvement in the financing of green projects, with the Central Bank acting as the driving force. The latter has recognised global warming as an issue that requires action on the part of financial institutions, thereby acknowledging green financing as an important component of the transition to a resource-efficient and low-carbon economy (Bangladesh Bank, 2011).

Nevertheless, green investments, such as those in energy, remain modest. Today, only an estimated 41% of the population is connected to the electricity grid (World Bank, 2012a). In rural areas, where 72% of the population lives, only about 25% have access to electricity. As a result of these low electrification rates the government has turned its focus to rural electrification, leading in the past years to the installation of solar photovoltaic systems in over 1.5 million households, with a total capacity of 75 MW in August 2012. The overall share of renewable energy in national electricity production remains very low, with 4.1% derived from hydroelectric sources and less than 1% from wind and solar energy (World Bank, 2012a).

This case study (a) outlines the green finance policies developed by the Central Bank of Bangladesh; (b) discusses their impact on renewable energy financing; and (c) presents development finance available in Bangladesh.

Green finance policy framework

Bangladesh's green finance policy relies heavily on awareness-raising and information dissemination. There is no hard and fast regulation in place to hold the financial sector responsible for scrutinising the environmental impact of its investment decisions, nor is there a law that mandates loan targets for green growth. Some financial incentives have been introduced for renewable energy power projects, such a 15% VAT exemption for all renewable energy equipment or a five-year exemption from corporate income tax, but their volume remains modest. Instead, the Central Bank has developed a range of policies that raise banks' awareness of green investment opportunities and the environmental responsibility linked with financing decisions: e.g. a refinancing scheme for green energy, a Green Banking Policy Framework and environmental risk management guidelines (Bangladesh Bank, 2012).

In 2009 the Central Bank introduced a USD 29 million Refinance Scheme for solar energy, biogas and effluent treatment plants (Bangladesh Bank, 2012). The Central Bank charges a 5% interest rate to commercial banks, which will charge interest rates of up to 9% to their clients. The aim is for proper utilisation of the credit to be verified through randomised samples. In case of incorrect employment of the scheme, the Central Bank has the right to call back the refinanced amount with a 5% penal interest rate (Sutradhar, 2010). The value of this relatively modest refinance scheme lies not so much in generating significant investments, but rather in exposing banks to renewable energy financing and raising their awareness of business opportunities in this field.

In addition to this, in 2011 the Central Bank developed an indicative Green Banking Policy and Strategy Framework that requests banks to implement a wide range of green banking activities in a three-phased approach by the end of 2013 (Bangladesh Bank, 2011). Some of the indications are particularly relevant to green finance, as they state that banks shall:

- Establish a separate green banking unit responsible for designing, evaluating and administering related green banking issues (Phase 1);
- Incorporate environmental and climate change risk as part of the existing credit risk methodology prescribed to assess a prospective borrower (Phase 1);
- Give preference to the financing of environmentally friendly businesses (Phase 1);

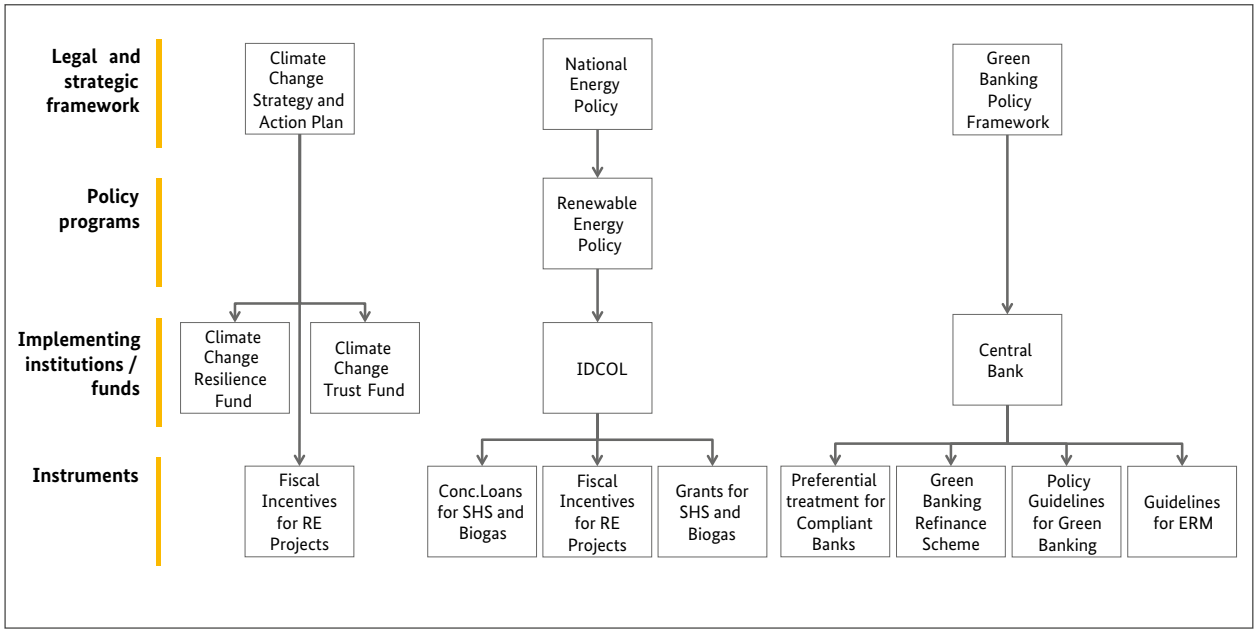
8 In Bangladesh, there are 4 state-owned commercial banks, 5 state-owned specialised banks, 30 domestic private commercial banks, 9 foreign commercial banks, and 29 non-bank financial institutions (Asian Development Bank, 2009, p. 2).

- Determine green targets for green financing to reduce loans for certain environmentally harmful activities (Phase 2).

Banks that comply with the framework benefit from preferential treatment since the Central Bank increases the overall rating of the bank, considers the green banking activities of a bank in the authorisation process for opening new bank branches, and displays the top ten banks in terms of overall performance in green banking activities on the website of the Central Bank (Bangladesh Bank, 2012).

The guidelines can be regarded as a long-term approach to stimulating green finance. Instead of mandating banks to engage in green finance, they seek to gradually encourage banks to move towards green banking and to raise awareness of its advantages. As of today, 40 banks have formed green banking units, while environmental risk ratings have been applied to around 4,400 finance proposals. 29 banks have introduced green office guides and 171 branches have been powered by solar energy (Bangladesh Bank, 2012). Even if these measures do not unlock green finance in the short term, they inevitably build up the

Figure 5: Policy overview Bangladesh (excerpt)



necessary capacity to finance green business opportunities, while simultaneously promoting an enabling institutional framework within banks.

Finally, the Central Bank published environmental risk management (ERM) guidelines in 2011 to streamline solutions for managing environmental risks in the financial sector. Banks are requested to comply with the instructions stipulated in the ERM guidelines (Bangladesh Bank, 2012). The guidelines are intended to establish a common platform from which banks can develop their own environmental risk assessment framework and can therefore be seen as an attempt to provide banks with the necessary capacity to assess the environmental risk of projects and thus facilitate the consideration of such issues in their lending decisions.

Furthermore, the Government of Bangladesh endeavours to promote renewable energy through the creation of a new institution named the Sustainable and Renewable Energy Development Authority (SREDA). SREDA started its operations in Q4 2013. Its aims are to increase power production from renewable energy sources to 10% by 2020. SREDA is envisioned to serve as the core institution

for identifying, promoting, facilitating and coordinating all renewable energy programmes at the national level. Private sector actors are optimistic that SREDA will have a positive impact on the overall development of the sector.

Mobilisation of green finance

Financing green growth in Bangladesh remains a major challenge. The policies put in place in the past years have instigated only moderate involvement from the domestic banking sector. At the time of writing, the Eastern Bank Limited is the only bank in Bangladesh that has introduced a green credit scheme for investments in renewable energy and energy efficiency, developed in cooperation with international development agencies (Reflection Media, 2012; IFC, 2012a).[9]

The Green Banking Policy and Strategic Framework likewise have had only a minor impact on banks' financing decisions. Although the guidelines have raised awareness of green banking activities in the banking sector and stimulated some modest efforts towards establishing green financial sector operations, they have not significantly increased financing for climate-friendly businesses. A complete evaluation of the policies will be possible only after the last phase of the Green Banking Policy and Strategic Framework is complete, in early 2014.

The Refinance Scheme for Solar Energy, Biogas and Effluent Treatment Plants has generated some modest investments in green energy, with the Central Bank of Bangladesh refinancing banks – e.g. the Eastern Bank Limited and the BRAC Bank – disbursing credits for biogas (USD 1.7 million), SHSs (USD 0.75 million) and effluent treatment plants (USD 0.34 million) (Bangladesh Bank, 2012).

Development finance institutions have been an important source of financing for renewable energy development in Bangladesh. In 2003, with the support of the World Bank's Global Environment Facility and acting through the implementing agencies KfW and GIZ, the Asian Development Bank and the Islamic Development Bank, IDCOL, Germany launched a solar energy programme to finance 50,000 SHSs by the end of 2008. It was refinanced at concessional interest rates, allowing IDCOL to significantly lower the financing costs for the purchase of a solar home system (SHS). IDCOL achieved its target three years ahead of time at USD 2 million below the estimated cost (Sutradhar, 2010). By October 2013, approximately 2.6 million SHSs have been installed, making the solar energy programme one of the fastest growing renewable energy programmes in the world (Haque, 2013). The IDCOL example suggests that concessional refinancing schemes can decrease financing cost sufficiently to free existing market potential for sustainable energy products.

Conclusion

Bangladesh's green finance policies triggered a development that led to the instalment of more than 2.6 million solar home systems by October 2013, making IDCOL a best-practice case for rural electrification in developing countries. The green banking policies developed by the Central Bank of Bangladesh advanced the discourse on green banking in Bangladesh, leading to the introduction of a Green Banking Policy Framework, the formulation of guidelines for ERM, and the establishment of a refinancing scheme for green energy. So far, however, the policies have failed to attract mainstream financial institutions into the green finance sector. Several lessons can be drawn from the case study of Bangladesh:

- Central Banks can play a pivotal role in raising awareness of green finance and providing guidance through information-based approaches, e.g. provision of guidelines, risk assessment training, etc.

- Providing information on green finance opportunities and guidelines on conducting risk appraisals is not sufficient to mobilise banks to extend green credits. Policies should focus on building capacity for green investment within the bank, either through an in-kind deployment of external experts or through financial training for staff. Risk appraisals may also be facilitated by introducing standardised risk assessment tools, e.g. tools to assess energy efficiency measures in housing or industry.

9 The partners involved were the South Asia Enterprise Development Facility, managed by the IFC, in partnership with the UK Department for International Development and the Norwegian Agency for Development Cooperation.

The policy objectives of the Government and Central Bank are a first step towards a developed green finance market place. To build trust among financial institutions, projects and approaches need to be identified, piloted and demonstrated to be of acceptable risk. Furthermore, a systematic programme of capacity building, particularly emphasising the competences required to assess green financing projects, would further enhance the banking sector's ability to engage in such investments. In addition, the implementation of risk sharing mechanisms such as insurance or guarantee funds could provide further encouragement for the financial sector to move towards green financing.

- IDCOL's small-scale SHS support schemes, using a combination of capital subsidies, interest rate subsidies and concessional financing, have managed to create a competitive market for renewable energy provision at the Base of the Pyramid. Policymakers in other countries can learn from the model and potentially replicate it elsewhere.

- IDCOL ensures quality of products and product servicing through special credit repayment schemes whereby parts of the subsidy are only paid out after conducting randomised quality tests one year after the time of installation. Policies addressing small-scale renewable energy distribution should incorporate similar quality assurance measures.

Table 7: Policies relevant to green finance in Bangladesh

Policy, programme	Policy instruments	Description of policy instruments	Status
Renewable Energy Policy (2008)	Tax exemption	• 15% VAT exemption for renewable energy equipment • 5 year exemption from corporate income tax for renewable energy projects	Enacted
Climate Change Strategy and Action Plan (2009)	Grant funding	• Establishment of the Climate Change Trust Fund, USD 100 million from national and international sources each year for three years (2009-2012), totalling up to USD 300 million which is used to finance public and private sector projects[10]	Enacted
	Grant funding	• Establishment of the Climate Change Resilience Fund to support Bangladesh with the implementation of the Bangladesh Climate Change Strategy and Action Plan • Financed by international sources for public sector projects (90% of total funding) and civil society and private sector projects (10%)[11]	Enacted
	Tax exemption	• Tax exemptions on investments for power generation on build-own-operate basis[12] • Exemption from corporate income tax for a period of 15 years • Exemption from customs duties, VAT and any other surcharges • No double taxation for foreign investors	Enacted
Green Banking Policy and Strategy Framework (2011)	Public refinancing	• Introduction of refinancing to protect against the risk of financing solar energy, biogas and effluent treatment plants	Enacted
	Green banking guidelines	• Request to banks to create green banking units, consider environmental risk in credit decisions, determine targets for green financing • Preferential treatment for banks that comply with the guidelines • Request to banks to incorporate environmental and climate change risk as part of the existing credit risk methodology prescribed for assessing a prospective borrower	Enacted

10 Kahn et al., 2012
11 Kahn et al., 2012
12 The build-own-operate basis allows a private investor to plan, build and operate a power plant.

Table 8: Green finance data, Chile

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	17
GDP per capita (current US$)	12,640
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	66.03
Domestic credit to private sector (% of GDP)	66.88
Market capitalization of listed companies (% of GDP)	157.92
Health of the financial sector	
Bank capital to assets ratio (%)	8.30
Bank liquid reserves to bank assets ratio (%)	13.06
Bank nonperforming loans to total gross loans (%)	2.70
Interest rate spread (lending rate minus deposit rate, %)	3.00
Credit depth of information index (0=low to 6=high)	5
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	24.53
Hydroelectric sources	41.66
Natural gas sources	6.47
Nuclear sources	0.00
Oil sources	20.01
Renewable sources, excluding hydroelectric	7.17
Rural electrification	
Access to electricity (% of population)	98.50
Rural population (% of total)	11.06
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	73,109
CO_2 emissions per capita (metric tons)	4.35
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.31
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	33
Corruption perceptions index (1=highly corrupt to 10=very clean)	7.20

Sources: World Bank Data, Transparency International

4.2 Green finance in Chile

Key insights

- A credit line established by KfW on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ), channelled through the Corporación de Fomento de la Producción (CORFO) to national Chilean banks, was important in promoting Renewable Energy (RE) projects and local bank involvement in the sector.

- Chile is now targeting risk during the construction phase of renewable energy projects through a Guarantee Fund run by CORFO. This risk has been identified by banks as a barrier to their participation in such projects.

- Many small project developers do not have the capacity to present project proposals with the quality expected by banks. In parallel, banks do not yet understand the intermittent nature of electricity production through solar and wind power, making it harder for these projects to access financing.

- There is a big disconnection between the concepts of Energy Efficiency (EE) and those of productivity, energy savings, improvement of corporate image, and reduction of industry's carbon footprint among managers, decision makers and the public overall.

- What has been achieved so far in terms of EE is the result of close cooperation between public and private actors bringing EE to the forefront of public debate.

Country background

In the mid-1970s Chile started adopting liberal and market-oriented economic policies. It has achieved relatively high levels of economic growth and development so far. This development is reflected in the consistent increases in both GDP per capita and Human Development Index of the country. The new economic policies of the 1970s and 1980s also led to the country's opening to the world, promoting foreign direct investments and signing trade agreements. This investment-friendly environment was reinforced by a programme of privatisation that included the electricity sector.

Funding for private investments in Chile relies on a financial sector that has grown quickly in recent years and has become one of the deepest in the region, while being highly integrated in the global financial system. Banks are well capitalised, liquid and highly profitable and have significant core deposits that substantially limit funding risks (IMF, 2011a). Funding is additionally eased by strong pension fund markets, with assets worth roughly USD 70 billion, and by a high market capitalisation of listed companies of around 158% of GDP (GlobalPost, 2010; World Bank, 2012a).

In 2008, 99% of the population had access to electricity (Peña Sandoval, 2010).[13] Today, 100% of the sector is owned by private actors, largely by foreign companies (Dufey, 2010). Since 1992 the electricity sector alone has received USD 13.7 billion (Foreign Investment Committee, 2012). In the period from 2006 to 2011, USD 4.5 billion was invested in renewable energy projects alone (FOMIN & Bloomberg New Energy Finance, 2012).

However, Chile faces big challenges regarding energy. Its energy matrix is highly dependent on fossil fuels and hydroelectric power, each contributing about half of the total yearly electricity generation. Chile imports a staggering 69% of its net energy use (World Bank, 2012a) which makes it vulnerable to the volatility of international oil and gas prices. Recently, large natural gas supply contracts with Argentina were severed, leaving the country without a major source of fuel for electricity generation.[14] Additionally, in the last decade Chile has experienced a series of droughts that have seriously disrupted the availability of hydroelectric power. These two factors, together with a liberalised energy market, resulted in big electricity price fluctuations and very high electricity prices.

In response, the state is promoting a series of reforms and drafted strategies for the energy sector focusing on diversification of energy sources, promotion of renewable energy and promotion of EE. These policies are also emerging due to social actors' increasing attention to societies' carbon footprint, environmental conservation, and the negative environmental effects of big energy projects.[15] All these are bringing renewable energy and EE to centre stage in public discourse.

Chile is a country where green financing is not explicitly embodied in projects, programmes, or policies. However, there are some 'green' sectors of the economy that are being targeted and promoted by direct public policies. These sectors, namely the Renewable Energy (RE)[16] sector and the emerging EE sector, embodied by ESCOs, benefit from a line of policies and programmes being implemented in Chile today. These policies are having a positive, though small, effect in expanding these sectors and are attracting more and more investment, much of which we would categorise as green financing.

Green finance policy framework

Renewable energy policies

The electricity sector is regulated mainly through the General Electricity Services Law (Ley General de Servicios Eléctricos, also known as DFL1) of 1982. This law separates electricity generation, transmission and distribution and also allows for private sector participation (Dufey, 2010). However, the electricity sector in Chile, despite its

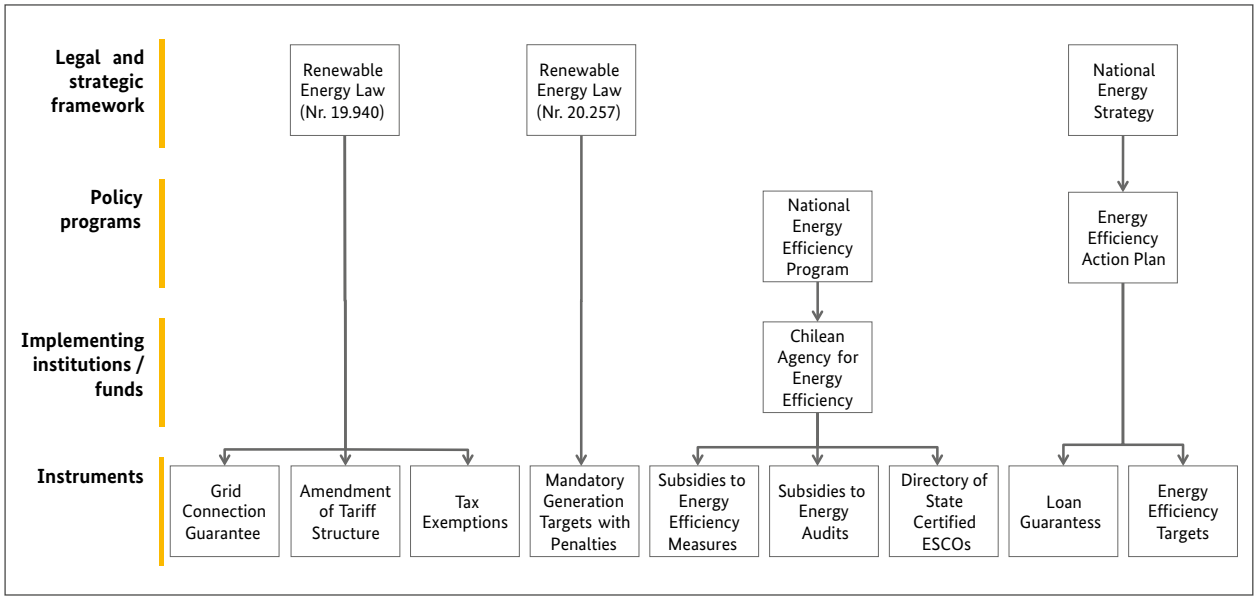
13 99.7% in urban areas and 96.3% in rural areas. The country is covered by 4 electricity systems, two of which cover 99% of the electricity supply. They are the Central Interconnected Grid (SIC), which provides 73.6% of the country's electricity and reaches 90% of its population, and the Northern Interconnected Grid (SING), which provides 25.6% of electricity and mainly supplies the copper mining industry. The remaining 1% of installed capacity is shared between the small subsystems of Aysén Grid and the Magallanes Grid. The systems are not interconnected (Dufey, 2010).

14 In 2004, Chile experienced an energy crisis when Argentina, a main natural gas supplier to Chile and itself strapped for supplies, intermittently suspended supplies to Chile (Dufey, Marzolf, & Ceppi, 2010)

15 The hydroelectric HidroAysen project would increase Chile's electricity capacity by 15% with an investment of USD 3.2 billion. it has been put on indefinite hold in the face of ongoing protests against the project (Gutierrez & Kraul, 2012).

16 Renewable Energies (RE) in Chile are called Non-Conventional Renewable Energy (NCRE). When talking about renewable energy in this country study, we are referring to energy generated from wind, geothermal, solar, biomass, tidal, cogeneration, and small hydro generation up to 20 MW, technologies that are connected to the grid (Araneda, Mocarquer, Moreno, & Rudnick, 2010)

Figure 6: Policy overview Chile (excerpt)



liberalisation, is characterised by a high concentration of generation capacity among only five companies (Central Energía, 2012). Furthermore, an interviewee from the private sector pointed out that until 2004 investments in electricity generation were carried out mainly through big thermoelectric or hydroelectric projects every five to ten years and there was limited opportunity for smaller, more sustainable alternatives.

Nonetheless, since 2004 the state has decided to adopt a legislation that has given a first push to RE, which now counts as an important part of the newly released National Energy Strategy 2012-2030 (2012).

Firstly, in 2004 the Law 19.940 (Ley Corta I) established a new tariff structure for mid-scale systems. It opened the spot market to them and guaranteed small-scale plants the right to connect to distribution networks while exempting them from main transmission tolls (full exemption for plants producing less than 9 MW and partial exemption for plants producing between 9 MW and 20 MW) (Dufey, 2010).

Secondly, and more importantly for the RE sector, is the 2008 Law 20.257 (Ley Corta III). It defines RE and requires electricity companies in SIC and SING subsystems operating over 200 MW installed capacity to certify, from 2010 to 2014, that at least 5% of their traded electricity comes from renewable energy sources. From 2015 onwards, the obligation will increase by 0.5% annually until it reaches 10% in 2024 (Araneda, Mocarquer, Moreno, & Rudnick, 2010).

Thus, the state created a market for energy generated with RE technologies through a quota system determined by law. The RE sector represents a small part of the overall energy sector in Chile, but prospects are good. By 2011, RE electricity production represented 7.17% of the total national production, out of which around two-thirds was generated from small hydro and the rest from wind and biomass sources (FOMIN & Bloomberg New Energy Finance, 2012; World Bank, 2012a).

The RE sector faces tough competition from conventional generation technologies. The energy market still runs under strict market conditions (and prices determined by them) and RE technologies are often not economically competitive. Although current electricity prices are as high as USD 250/MWh, many RE projects fail to find investors. The reason lies mainly in the lack of price guarantees, such as subsidies or FITs, for RE. Nonetheless, as an interviewee from the RE sector pointed out, some types

of RE project with more constant generation and higher load factors have been slightly more successful than others, such as wind and solar, in securing investment at market price levels and with no subsidies involved.

EE policies

The concept of EE is a relatively new one in Chile. Only in 2005 was the idea introduced in the public sphere through the National EE Programme (PPEE) by the Ministry of Economics. The idea behind the programme was to push for better use of national energy resources in order to decouple growth in energy demand from the economic growth of the country (ECONOLER & AETS, 2010).

The PPEE ran from 2005 until 2010, when the programme was institutionalised through the creation of the Ministry of Energy in 2010 and, at the same time, the Chilean Agency for EE (AChEE) was established. This agency coordinates public–private initiatives in EE and implements the Ministry of Energy's public policies.

In early 2012, the Ministry of Energy published the National Energy Strategy 2012-2030, which delineates the EE Action Plan 2012-2020. Its goal is a 12% decrease in projected energy demand by 2020 (Ministry of Energy, 2012). However, EE is not reflected in any legislation and all advances towards achieving the 12% reduction target will be promoted by AChEE through the voluntary participation of the private sector.

Mobilisation of green finance

Financing renewable energy

Financing RE development has been, and still is, a major challenge. The banking sector considers financing activities in the RE sector as high risk investments. The state's Corporación de Fomento de la Producción (CORFO) has played a fundamental role in promoting investment in the sector. An interviewed director from a public RE organisation pointed out that CORFO established incentive programmes such as the pre-financing of feasibility studies as well as establishing capital guarantees and risk capital funds. RE financing has come mainly from multilateral financial institutions and foreign banks or large multinationals. Among these actors we find IFC, EIB and KfW on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ), as well as banks such as the Credit Agricole group (FOMIN & Bloomberg New Energy Finance, 2012). Nonetheless, as mentioned by the interviewee from the private sector, local banks are slowly taking a more central part in financing RE projects. According to the same source, the involvement of KfW in 2006 in facilitating a USD 100 million line of credit through CORFO was the vital element for involving local banks in promoting the first renewable energy projects. Nonetheless, the interviewee added, increasing local financing remains a challenge; therefore, a second line of credit from KfW is now being considered to follow the previous round of financing. This approach is viewed positively by both public and private sector interviewees working in the RE sector, as it will encourage more competition among banks[17] to capture these funds and get involved in RE financing. This will be crucial in order to leapfrog from the few projects existing today to realising the full potential of the sector.

According to an interviewed RE expert, some renewable energy projects are already viable under market conditions and smaller actors are able to finance themselves through commercial banks either by closing PPAs or even through models based on spot-market prices. However, more needs to be done to reduce banks' perceived risk. The same interviewee pointed out that risk during the construction period of renewable energy projects was identified as a main risk factor driving banks' investment decisions. Therefore, CORFO is now designing instruments to counteract this risk in the form of loan guarantee funds. Also, smaller and new RE project developers sometimes lack the capacity to present acceptable financing proposals, making banks reluctant to finance them. An interviewee working in a leading public RE organisation pointed out that capacity building among developers and banks, and standardisation of bank requirements for RE projects, are now priorities of the Renewable Energy Centre (CER) in order to facilitate financing access.

17 The banking sector in Chile is highly concentrated in few institutions. Our interviewees identified only three banks that have taken steps into the renewable energy projects: Banco BICE, Banco Santander Chile, and Banco Itaú. Banco BICE financed mini and small hydro projects with USD 70 million in 2011 (Banco BICE, 2011).

Another big challenge faced by RE projects is gaining access to the grid and the disparity between the speed at which RE projects are carried out and that at which transmission infrastructure is built. A new wind farm could be installed in 18 months, whereas the corresponding new transmission lines would take at least 42 months to be completed. This discourages investors and banks alike to get involved in RE projects (Araneda et al., 2010).

Both the literature and interview partners agree that the measures undertaken by Chile in promoting green investment in RE have been moderately successful, but much more needs to be done to move on from the small successes towards a larger share of RE in the country's electricity matrix.

Financing EE

Since the implementation of the PPEE in 2005 a series of actions has been undertaken to bring the concept of EE closer to the private and public sectors and promote investments in EE activities. AChEE's lines of action focus on industry and mining, education, transport, and commercial and public buildings. The main tools used so far include pre-financing of feasibility studies for EE projects, partial subsidies for the realisation of energy diagnosis of companies, and a programme to incorporate EE criteria in new buildings.

In parallel, there has been a small but constant increase in the number of companies acting as ESCOs or offering ESCO-type services[18]. An interviewee from the energy sector pointed out that data from ANESCO, a national association of ESCOs in Chile, shows how their members grew from eight in 2007 to 23 in 2012.[19] Despite these positive developments, the concepts of EE and the ESCO as a business model are very new to Chile and there is no clear idea of their potential positive impact.

In projects involving the industry sector, AChEE would fund 40% of costs, while the other resources would be provided by a partnership between the end-customers and ESCO. Over the course of 2011 AChEE developed eight demonstration projects through ESCOs, of which five involved public buildings and the remainder were carried out in the productive sector (Langlois & Hansen, 2012).

These initiatives have not had the expected reception from the private sector. Both the literature and interviewees point to the fact that it has been very difficult to interest the private sector in EE projects. Industry's interest has been low and it has been up to the ESCOs to advertise, contact and convince possible beneficiaries of the different programmes available to them. In 2011, only 50% of the amount budgeted for EE incentives by AChEE was allocated (Langlois & Hansen, 2012). This low interest in EE is attributed to the general lack of market confidence in the model proposed by ESCOs, the limited experience of ESCOs in handling this kind of negotiation, and high risk aversion towards this type of project in both private and banking sector.

Interviewees from the energy sector stated that there is still a big disconnect between the concept of EE and improvements in productivity. Also, regardless of the fact that the notion of the carbon footprint has been popular in Chile for some time, they added that managers do not make the connection between reducing their companies' carbon footprint and EE.

Experience in the public sector has been more positive. An interviewee working in the EE sector pointed out that 24 projects were presented in 2011, of which 5 were financed completely by AChEE. The objective of covering 100% of the costs was to measure and verify the savings achieved and showcase the viability of financing such investments through the savings generated.

The same source mentioned that banks have not yet played any role in the implementation of EE projects and most investments made by ESCOs come from their own funds or through credit lines already available to

18 The ESCO business model follows the premise of an initial investment in energy efficiency measures that will pay for itself through savings over time. This initial investment can come from the ESCO alone or be shared with the beneficiary. Once the initial investment is paid off, all savings and ownership of the implemented measures are passed on to the beneficiary.

19 It is worth noting that not all members of ANESCO are purely ESCO companies, but rather a mixture of different actors involved in the energy efficiency such as engineering companies, consultants, private funds, technology suppliers and ESCOs.

bigger actors that only offer ESCO services on the side. The interviewee remarked that banks often tend towards financing larger projects (in REs for example) instead of smaller and technically more diverse projects such as the EE ones.

Considering these circumstances, one can conclude that there is little happening in the domain of green finance dedicated to EE. Nonetheless, there are promising prospects. As an interviewee working in the sector mentioned, new tools are being developed by AChEE, in cooperation with international actors such as GIZ on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), the World Bank and the Inter-American Development Bank (IDB) to make the ESCO business model viable in Chile. They also work towards a credit line available to local banks to encourage them to take a more active role in the EE market. On similar lines, a new loan guarantee mechanism is being studied to replace previous subsidies and pre-investment mechanisms. These two instruments will surely increase the flow of funds and the participation of banks in financing ESCOs and EE projects proposed by industry. Furthermore, our interviews reveal as vital the close cooperation between private, public and international actors in developing strategies or promotion measures. New opportunities are envisaged to coordinate efforts between government actors. A couple of examples are possible programmes to encourage EE through the adoption of RE, or coordinating efforts with the Ministry of Environment to link reductions in greenhouse gas emissions to EE.

However, real interest from industry will increase over time if more awareness activities are carried out and more successfully implemented projects are showcased, proving the effectiveness and viability of the ESCO model in Chile. This is the challenge and the path marked out by AChEE and ANESCO for the coming years.

Conclusion

- Since 2004 Chile has adopted legislation that has improved business opportunities for RE projects: allowing small-scale plants to connect to distribution networks, defining RE and requiring electricity generation companies to certify that at least 10% of traded energy comes from renewable sources by 2024 or face penalties. While some RE projects are already viable under market conditions, RE technologies are often not competitive and require further support. EE has received much less attention from the government and is not yet reflected in legislation. The analysis of Chile's RE and energy policy allows the following conclusions to be drawn:

- The USD 100 million credit line issued by the KfW on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ) and channelled to local banks through CORFO allowed banks to gain experience in funding RE projects while simultaneously providing access to cheap finance. Policies should promote programmes that allow the banking sector to acquire first-hand experience financing RE projects.

- Policies need to address the disparity between the speed at which RE projects are carried out and that at which transmission infrastructure is built, since it hinders timely grid access and discourages investors and banks alike from getting involved in RE projects.

- Managers in Chile still do not connect the concept of EE to improvements in productivity and reduction of companies' carbon footprint. Policies should address managers of energy-intense companies and raise their awareness of the financial benefits of EE.

Table 9: Policies relevant to green finance in Chile

Policy, programme	Policy instruments	Description of policy instruments	Status
Law 19.940 or "Ley Corta I" (2004)	Tax exemption	• Mid-scale and small-scale energy projects are exempted from main transmission tolls	
Law 20.257 or "Ley Corta III" (2008)	Renewable portfolio standards	• Electricity companies of the SIC and SING subsystems operating over 200 MW installed capacity must certify, between 2010 and 2014, that at least 5% of their electricity traded comes from RE sources. From 2015 onwards, the obligation will increase by 0.5% annually, reaching 10% in 2024 • Failure to meet RE generation requirements is penalised at approximately USD 29/MWh • Continued non-compliance with RE requirements is sanctioned by an increased penalty of approximately USD 42/MWh after three years	Enacted
The National EE Program (PPEE) (2005-2010)	Energy audit subsidy	• 50% pre-financing of energy audits in industry	Enacted
	Capital cost subsidy	• 40% of the EE projects presented by the industry in cooperation with ESCOs are financed • A directory was made of all companies offering ESCO services and meeting minimum quality and service standards	
Energy Efficiency Action Plan (PAEE20) (2012 – 2020)	Energy reduction targets	• A target was set to reduce energy demand by 12% by 2020	In development
	Loan and credit guarantee	• Designed to foster banks' involvement in lending to EE projects carried out by ESCOs	
	Direct public financing	• Aimed at measuring and showcasing the advantages of the ESCO model to both industry and banks	

Table 10: Green finance data, Egypt

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	83
GDP per capita (current US$)	2,698
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	69.42
Domestic credit to private sector (% of GDP)	33.07
Market capitalization of listed companies (% of GDP)	37.69
Health of the financial sector	
Bank capital to assets ratio (%)	6.20
Bank liquid reserves to bank assets ratio (%)	33.31
Bank nonperforming loans to total gross loans (%)	11.00
Interest rate spread (lending rate minus deposit rate, %)	4.77
Credit depth of information index (0=low to 6=high)	6
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	0.00
Hydroelectric sources	9.25
Natural gas sources	68.67
Nuclear sources	0.00
Oil sources	21.26
Renewable sources, excluding hydroelectric	0.82
Rural electrification	
Access to electricity (% of population)	99.60
Rural population (% of total)	56.63
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	210,321
CO_2 emissions per capita (metric tons)	2.69
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.51
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	110
Corruption perceptions index (1=highly corrupt to 10=very clean)	2.90

Sources: World Bank Data, Transparency International

4.3 Green finance in Egypt

Key insights

- The Government of Egypt has recently withdrawn the guarantee on power purchase agreements signed by the Egyptian Electricity Transmission Company, bringing public tendering procedures for wind energy generation to halt.
- Since their introduction in 2001, concessional loans from international development banks have triggered the large-scale development of state-owned wind farms.
- The absence of a new electricity law incorporating recent developments in Renewable Energy Policy has constrained both the development of a competitive electricity market and the facilitation of renewable energy investments.

Country background

Egypt has experienced rapid economic growth in the last decade, reaching an average annual growth rate of more than 5% between 2000 and 2010. Due to recent political upheaval, GDP growth contracted by about 3% in the first six months of 2011, reducing growth for the entire fiscal year 2010/11 to about 1.4%.

Egypt's banking sector comprises 37 licensed banks and is dominated by four state-owned commercial banks accounting for over 48% of total sector assets and about 55% of total deposits. Its financing decisions have, in the past, been characterised by high risk aversion, favouring large corporate clients over small-scale businesses.

Since the vertical and horizontal unbundling of power generation, transmission and distribution took place in 2001, there is no longer a monopoly of the Egyptian electricity market. However, the state-owned Egyptian Electricity Holding Company (EEHC) still owns and

controls more than 90% of the market, accounting for 90% of generation and over 99% of distribution (El-Salmawy, 2008).[20]

A new electricity law was endorsed by Parliament in 2008 with the objective of establishing a fully competitive electricity market, but it is still waiting for approval (Razavi, 2012).

Egypt's electricity consumption has increased substantially in the past decade, causing serious concerns about the energy sector's fuel mix, i.e. heavier reliance on fuel oil and the accompanying fiscal burden on the government. These concerns have triggered policies to diversify the energy mix, particularly for the development of renewable energy resources.

Egypt is endowed with excellent wind resources and high levels of solar radiation. Despite its high availability, renewable energy accounts for just 0.82% of national electricity production, excluding hydroelectric generation (World Bank, 2012a). Energy efficiency has received only very little political attention, as demonstrated by the absence of supportive strategic frameworks, laws, or policies. Despite the creation of an Energy Efficiency Unit in 2009, no institution with clear implementation and executive authority for pursuing energy efficiency objectives has been created (Razavi, 2012).

This case study will discuss the policies developed in the New National Renewable Energy Strategy and elaborate on its ability to stimulate private sector investments in renewable energy.

Green finance policy framework

Developing renewable energy is a major challenge in Egypt. Despite its high wind and solar energy potential, relatively little has been tapped until now, mainly due to an inhospitable legal and institutional framework. Although Egypt's energy market was liberalised in 2001, potential renewable energy investors are still confronted with substantial barriers: high subsidies on conventionally-generated electricity, incomplete legislation for the liberalisation of the energy market, and very modest financial and fiscal incentive schemes.

Recent developments have focused on improving business opportunities for renewable energy investors, leading to the development of a new electricity law draft (2008), the introduction of the New National Renewable Energy Strategy (2008) and the development of an investment incentive package through the General Authority for Investment (2012), as well as the Egyptian Solar Plan (2012).[21]

The new electricity law

The new electricity law draft, developed by the Ministry of Electricity, is currently pending legislative approval. Designed to reflect ongoing market reform, the law's main features enable a gradual liberalisation of the Egyptian electricity market. This involves enabling power producers to sell 'green electricity' directly to eligible large-scale consumers, facilitating increased direct foreign investment in the power sector and promoting mechanisms and financial support schemes for power generation from wind energy (Ministry of Electricity and Energy, 2012). As approved by the Cabinet in June 2012, the law entails regulation for the establishment of a Renewable Energy Fund that will address the risk of the foreign currency exchange, bridge the gap between the cost of electricity from conventional and renewable energies, and contribute to financing renewable energy projects (Ministry of Electricity and Energy, 2012).

The New National Renewable Energy Strategy

Egypt's Supreme Council of Energy launched an ambitious strategy in February 2008 to generate 20% of the country's electricity from renewable sources by 2020, including 12% from wind energy, 6% from hydro and 2% from solar energy (NREA, 2012).[22] Designed as a

20 Since the country's six largest energy producers, the transmission company, and the nine utilities are all part of EEHC, the holding has control over all sectors in the electricity system.

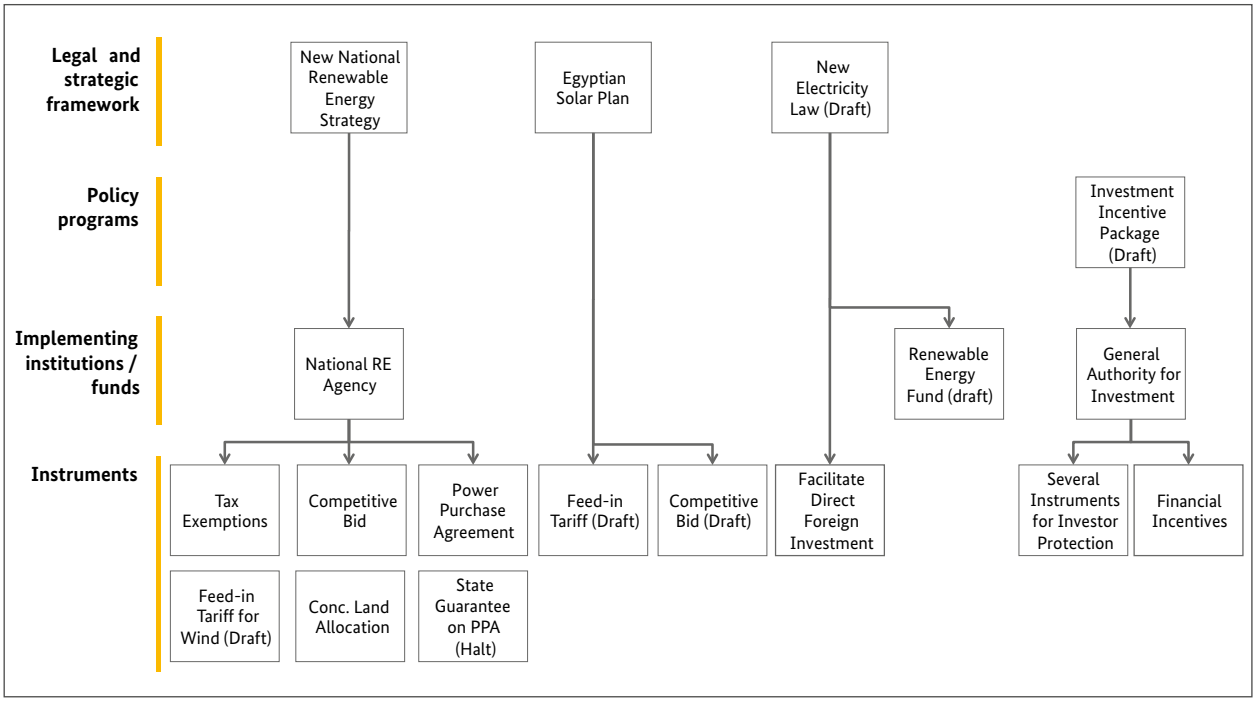
21 The Egyptian Solar Plan targets around 3,500 MW of solar installations by 2027. Private investments shall account for 66% of the installations, and will be encouraged through competitive bidding, feed-in tariffs, and third-party access schemes (Ministry of Electricity and Energy, 2012). In view of its fairly recent introduction it will not be discussed in the case study.

22 The 12% target for wind energy translates into a total capacity of 7,200 MW of wind farms to be installed by 2020.

programme specifically targeting the private sector, it has established that two-thirds of wind energy capacity (4,825 MW) is to be generated by private projects, while one-third of capacity (2,375 MW) shall be installed through state-owned projects implemented by the New and Renewable Energy Authority. The Supreme Council of Energy (July 2009) and the Cabinet (May 2010) have approved a number of policies to incentivise private sector investments, establishing that one-third of total capacity generation for wind energy shall be implemented under a:

- Competitive bidding process among interested Independent Power Producers based on a Build-Own-Operate scheme. The competitive bids are managed by the Egyptian Electricity Transmission Company (EETC), an entirely state-owned entity currently acting as a single-buyer in the national electricity market;
- Power purchase agreement (PPA) in which the bidding process will be concluded by signing long-term power purchase agreements and land use agreements with EETC and NREA respectively;

Figure 7: Policy overview Egypt (excerpt)



- Government guarantee by which financial obligations of PPAs related to wind energy investment projects will be guaranteed by the Egyptian Government (Ministry of Electricity and Energy, 2012).

Another third of the projects will be implemented through a FIT scheme designed to boost the development of small wind farms (up to 50 MW) by meeting the financing capabilities and special requirements of local and regional investors.[23] Based on a 20-year PPA guaranteed by the Central Bank of Egypt, the FIT scheme will grant investors a fixed tariff per generated kWh (local and foreign currency), which is to be initially set for a period of 5 to 7 years (Ministry of Electricity and Energy, 2012).

Other incentives for wind energy project developers, such as custom duty exemptions, concessional land use

23 The feed-in tariff regulations, which are to be officially announced by the Government of Egypt in the near future, were developed with technical support from the Germany, implemented by GIZ, by the Egyptian Regulatory Agency (Ministry of Electricity and Energy, 2012).

agreements and free bird migrations studies have been introduced.

The last third of the additional targeted capacity will be implemented by the Egyptian Government through NREA in cooperation with different international financing institutions. NREA is currently preparing and developing projects supported by various financing partners, with a cumulative capacity of approximately 1,320 MW, to be commissioned between 2014 and 2017 (Ministry of Electricity and Energy, 2012). Through this project development approach, NREA is also allowed to enter into joint venture partnerships with private investors. The first scheme of this kind is currently being negotiated with MASDAR Power, an Abu Dhabi-based company (Ministry of Electricity and Energy, 2012). The regulatory framework for these policies is based on the approval of the Supreme Council of Energy and the Cabinet and will be legally sanctioned by the new electricity law.

The investment incentive package of the General Authority for Investment

The General Authority for Investment is currently working on an investment incentive package as well as on investor protection and guarantees for private free zones that will allow interested investors to build, own and operate wind parks. Companies registered in Egypt holding a private free zone license for wind farm projects from the General Authority for Investment may benefit from a wide-ranging incentive package (see Table 11) (Ministry of Electricity and Energy, 2012). According to an interviewee, the package is still being drafted and may therefore be subject to change.

Mobilisation of green finance

Private investments in renewable energy have been constrained by prevailing energy subsidies which create a less-than-competitive market in Egypt. Until 2009 private sector participation in the energy sector consisted of only three long-term build-own-operate contracts with the EETC, which accounted for 9% of installed generation capacity.

Large-scale investments in renewable energy started in 2001 when a series of large wind farms were established with a capacity of 550 MW, with soft loans provided by partners from Germany (KfW), Denmark (DANIDA), Spain and Japan (JICA). In late 2010, KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) signed a loan agreement with Egypt for around USD 247.5 million for a second Gulf of El Zayt wind farm. The farm is additionally supported by the +opean Commission and the European Investment Bank participating respectively with a EUR 30 million (approximately USD 38.8 million) grant and a EUR 50 million (approximately USD 64.6 million) loan (KfW, 2012).

The development of Egypt's renewable energy generation capacity does not, however, rely exclusively on public investments. Despite its mixed results, the New and Renewable Energy Strategy has been able to drum up some interest from the private sector. In May 2009 the government issued an international tender for the construction of a 250 MW wind farm in the Gulf of El Zayt, which received 34 offers from national and international investors. An additional 1,000 MW wind farm is to be built on the basis of a build-own-operate agreement in the Gulf of Suez (Razavi, 2012).

An energy expert from a leading consultancy mentioned that developments, although promising, have been put in question by the recent withdrawal of state guarantees for PPAs, prompting commercial banks to stop funding and bringing the above-mentioned 250 MW project to a sudden halt. This demonstrates the extent to which the New National Renewable Energy Strategy relies on state guarantees to counteract the persistent perception among Egyptian banks that renewable energy investments carry prohibitively high investment risks.

Conclusion

- Egypt has acknowledged the importance of the private sector and is developing several instruments for its involvement in the expansion of wind energy generation. The main challenge in the coming years will be to bring about a legal reform of the electricity market that will create the necessary framework to attract investment. Plans to liberalise the market, cut subsidies and create a fund for renewable energy appear to be promising steps in this direction. The case study on Egypt enables to draw the following conclusions:

- In underdeveloped renewable energy markets, state guarantees on PPAs provide the necessary loud, stable and long-term signals that investors require to build trust. After Egypt repealed these guarantees financial institutions were no longer willing to extend loans. Egypt needs to stick to its long-term goals if it is to attract investors in the renewable energy field.
- In countries where renewable energy investments have not yet been implemented, large-scale public investments can be an important first step to demonstrate the viability of the technology in-country and thus to attract private investors.
- High subsidies for conventionally-generated electricity distort the market and place a heavy burden on the development of renewable energy.

Table 11: Policies relevant to green finance in Egypt

Policy, programme	Policy instruments	Description of policy instruments	Status
New and Renewable Energy Strategy (2008)	Competitive bidding	• Stimulation of private sector investments through the establishment of a competitive bidding mechanism	Enacted
	PPA	• 20-25 year PPAs on wind energy projects • The PPAs are secured by a guarantee from the Government of Egypt (halted)	Enacted
	Tax exemption	• Tax exemptions on renewable energy equipment and spare parts from custom duties	Enacted
	Carbon emissions trading	• Permission for renewable energy investors to sell certified emission reductions resulting from the implemented RE project	n/a
	FIT	• FIT to boost the development of small wind farms (up to 50 MW) by meeting the financing capabilities and special requirements of local and regional investors	In development
	Grant funding	• Establishment of a Renewable Energy Fund to cover the gap between the cost of electricity produced from renewable energies and that from conventional energy • Financial support for renewable energy pilot projects	In development
Egyptian Solar Plan (2012)	Competitive bidding	• Private sector contributions will be stimulated through a competitive bidding mechanism	Considered
	FIT	• FIT to incentivise solar power production is planned	Considered
General Investment Incentives for Private Free Zones (2012)	Tax exemption	• Exemption from customs, general sales tax, and any other taxes or duties for goods and materials imported to a private free zone • Exemption from income tax for salaries of foreign experts whose stay in Egypt does not exceed one year	In development

Table 12: Green finance data, India

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	1,241
GDP per capita (current US$)	1,375
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	72.98
Domestic credit to private sector (% of GDP)	50.29
Market capitalization of listed companies (% of GDP)	95.94
Health of the financial sector	
Bank capital to assets ratio (%)	7.10
Bank liquid reserves to bank assets ratio (%)	n/a
Bank nonperforming loans to total gross loans (%)	2.40
Interest rate spread (lending rate minus deposit rate, %)	n/a
Credit depth of information index (0=low to 6=high)	5
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	68.56
Hydroelectric sources	11.89
Natural gas sources	12.36
Nuclear sources	2.07
Oil sources	2.90
Renewable sources, excluding hydroelectric	2.22
Rural electrification	
Access to electricity (% of population)	66.30
Rural population (% of total)	69.07
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	1,742,698
CO_2 emissions per capita (metric tons)	1.46
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.56
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	132
Corruption perceptions index (1=highly corrupt to 10=very clean)	3.10

Sources: World Bank Data, Transparency International

4.4 Green finance in India

Key insights

- The obligation to achieve financial closure within six months after a power purchase agreement, combined with the withdrawal of the license in case of default, imposed a sanction mechanism that speeded up project developers' finance acquisition.
- Capital subsidies for small-scale renewable energy applications reduced product cost but did not increase finance availability.
- Accrediting ESCOs based on their technical and financial capabilities did not improve finance availability.
- The information asymmetry between ESCOs and their financiers/clients causes significant agency problems, jeopardising ESCO business opportunities.

Country background

With its average annual GDP growth rate of 5.8% over the past two decades, reaching 6.1% in 2011–12, India is one of the world's fastest-growing economies (IMF, 2011b). Economic growth was facilitated by India's wide-reaching economic liberalisation in the 1990's, including financial sector reforms which opened the capital market to foreign investors in 1993 and allowed Indian companies to raise capital abroad, amounting to USD 50.8 billion in direct foreign investments in 2011 (Ernst & Young, 2012).

India's financial sector enjoys a long tradition of functioning capital markets, with a market capitalisation of listed companies reaching around 96% of GDP (World Bank, 2012a). Finance also benefits from a banking sector that has considerably improved its rating with respect to capital adequacy, profitability, asset quality and risk management in the past years.

As its economy surges ahead, India is witnessing an unprecedented demand for energy, causing a growing deficit in power supply for both normal energy requirements and peak load demand. National electricity production, mainly derived from coal (68.56%) and natural gas resources (12.36%), has not been able to satisfy the

burgeoning demand (World Bank, 2012a). Recognising the economic, ecological and social fallout as well as the tangible energy security risks posed by fossil fuel dependence, the Government of India has developed a wide range of policies to set India on the path to green growth. Increased investment in domestic energy production has ensued in recent years, notably in renewable energy sources, making India the world's fifth largest producer of wind power (Indian Energy Portal, 2012).

In June 2008 Prime Minister Manmohan Singh released India's first National Action Plan on Climate Change, outlining existing and future policies and programmes addressing climate mitigation and adaptation. The plan identifies eight core 'national missions' running through to 2017, among them the Jawaharlal Nehru National Solar Mission (JNNSM) and the National Mission on Energy Efficiency.

The National Solar and Energy Efficiency missions, in particular, have developed a wide range of strategies, targets and policy instruments to create a regulatory environment facilitating investments into solar energy and energy efficiency. This case study will present both missions and discuss their ability to unlock finance for investments into these sectors.

Green finance policy framework

Renewable energy

India is shifting rapidly from direct government support for renewable energies to more market-driven mechanisms. In the mid-1990s tax incentives kick started the Indian renewable energy economy, leading to significant investments in wind parks by Indian companies (Bridge to India, 2012). Wide-ranging fiscal incentives have since then been put in place, such as an accelerated tax depreciation benefit of up to 80% (2002),[24] a generation-based incentive scheme (2009),[25] excise duty exemption, sales tax reduction and a 5-year tax holiday for investments in renewable energy power production. Having developed into the world's fifth largest producer of wind power, India has now started to promote the large-scale production of solar energy.

In January 2010 the JNNSM was launched. The objective of the mission is to create a policy and regulatory environment which provides a long-term incentive structure enabling rapid and large-scale capital investment in solar energy. The mission has set ambitious targets for 2022 and resolved to:

- Reach 20 million m^2 of installed solar thermal collectors;
- Promote off-grid systems to serve populations without access to commercial energy and achieve a power production of 2,000 MW;
- Extend capacity of grid-connected solar power generation to 20,000 MW.

JNNSM has significantly reduced up-front costs for renewable energy, stimulating considerable investment in grid-connected solar power. Power purchase agreements for solar power have ensured the necessary financial security, while capital cost subsidies of 30% have considerably reduced prices. A competitive bidding mechanism was introduced for the installation of solar utility grid power,

24 An accelerated depreciation policy allows a company, for financial accounting and tax purposes, to depreciate a fixed asset in such a way that the amount of depreciation in the earlier years of the asset's life is higher than normally allowed in the accounting regulations of the country. Thereby the purchase of the fixed asset becomes more attractive to the company because the company can defer corporate income taxes by reducing taxable income in the earlier years of the asset's life.

25 The Ministry of New and Renewable Energy has introduced generation based incentive schemes separately for wind and solar energy. Under the scheme for wind power, an incentive of USD 0.01 (Rupees 0.50) per unit of electricity fed into the grid is provided for a period not less than 4 years and a maximum period of 10 years with a cap of approx. USD 112,621 (Rupees 6.2 million) per MW. Under the Scheme for Solar Energy, an incentive is provided to support small grid solar power projects connected to the distribution grid (below 33 KV) to the state utilities. The Indian Renewable Energy Development Agency has selected 78 projects with a total capacity of about 98 MW for which the Ministry will provide an incentive of approx. USD 0.23 (Rupees 12.41) per kWh to the State utilities when they directly purchase solar power from the project developers.

with the lowest price as key criterion for selection. Projects are required to achieve financial closure within 180 days of power purchase agreement signature and otherwise lose their power generation license, creating a strong incentive to accelerate financing (Ministry of New and Renewable Energy, 2012). A strong focus on investment incentives, however, may result in lowered generation quality.

For example, when the Accelerated Depreciation Benefit was introduced, allowing investors to claim up to 70% of costs, India witnessed an upsurge of wind energy investments which later turned out to have average load factors (17% in 2007) considerably lower than those of other large wind markets such as Germany, Spain and the United States (all above 20%) (GIZ, 2012a).[26] Although a generation-based incentive was later introduced, investors preferred the Accelerated Depreciation Benefit since it was more profitable and the incentives could not be combined. The director of an energy consultancy stated in our interview that construction and installation of renewable energy projects require a better system of checks and balances.

In short, subsidies are viewed as the key factor in upscaling grid-connected solar energy production in India. Without them, the executive director of a large Indian ESCO explained, investments would not have been commercially viable and will not be so in the next few years.

JNNSM's incentives for off-grid electrification and solar thermal applications consisted of a 30% capital cost subsidy and 5% interest rate on financing for related loans. In early 2012, interest was abolished and the capital cost subsidy raised to 40%.[27] According to an interviewee from the financial sector, banks had financed only around 40,000-50,000 SHSs by the first quarter of 2012. These low numbers, the interviewee added, are attributable to a lack of service and maintenance infrastructure. Borrowers were not willing to invest in such systems without being sure that their systems were properly installed and maintained. The interviewee also pointed out that commercial banks were particularly reluctant to grant solar loans. Whereas around 40 rural banks adopted finance schemes for solar energy within the JNNSM, only half a dozen commercial banks did so. Due to the small loan amounts, commercial banks did not see a viable business case, so only big banks with more financial backing adopted solar loan schemes. In addition, the interviewee added, banks often have little knowledge of financing schemes for solar technology.

However, since the introduction of JNNSM, considerable progress has been made in the financing environment for solar loans through Indian banks. The above interviewee pointed out that several banks used business facilitation schemes, easing loan collection for banks while improving after-sales service for solar applications. Awareness-raising and capacity building workshops for banks were carried out by public institutions such as the National Bank for Agriculture and Rural Development. However, more needs to be done. The workshops, he continued, should concentrate on conveying the economic opportunities for small rural branches inherent to off-grid solar finance schemes, while training banks to apply financial and risk return analysis when assessing the economic viability of financing for micro energy systems. In short, business facilitation schemes, training, and awareness-raising activities by NGOs such as TERI and companies such as SELCO had a beneficial impact, leading to a relatively high growth of financing for solar applications, equalling 150,000 SHSs financed since the beginning of 2012.

Energy efficiency

India's energy efficiency policy is supported by wide-ranging legislation that will require mandatory fuel efficiency norms for all vehicles, introduce green building codes and amend the Energy Conservation Act to make it obligatory for a group of energy-intense industries to take part in a scheme to cap energy usage. The National Mission on Energy Efficiency, implemented by the Bureau of Energy Efficiency (BEE), is the most recent strategy to promote energy efficiency on a large-scale. Within this mission, two schemes are particularly relevant for the financing of energy efficiency:

26 The load factor refers to the average share of time per day in which a renewable energy installation generates energy.

27 Unlike the capital cost subsidy, the interest rate subsidy created high administrative costs for NABARD and for the banks themselves.

- The Energy Efficiency Financing Platform, which aims to stimulate funding for delivery mechanisms based on ESCOs for energy efficiency

- The Framework for Energy Efficient Economic Development, which seeks to develop fiscal instruments to promote energy efficiency, including innovative fiscal instruments and policy measures (BEE, 2012)

Accordingly, BEE is currently developing a risk guarantee mechanism for banks that fund energy efficiency, the Partial Risk Guarantee Fund, and a Venture Capital Fund for Energy Efficiency. The former aims to reassure lenders by providing guarantees for performance contracts commissioned by ESCOs (BEE, 2012). Although the rules for the funds were published in 2011, the funds are yet to be established.

An interviewee from the energy sector explained that guarantee mechanisms are an important step to address what is perceived by many, ESCOs in particular, as the major barrier to developing an energy efficiency market: lack of affordable finance for energy efficiency projects. Other policies, like accrediting ESCOs, developing verification standards and establishing a super-ESCO, have addressed this barrier but, as the interviewee added, have not yet produced satisfying results.

Attempting to increase the credibility of ESCOs among companies likely to demand their services, as well as financial institutions, BEE rated ESCOs according to criteria relevant to fulfilling energy efficiency projects: performance contracting, availability of technical manpower, financial strength, etc. (BEE, 2008).[28] Although it was expected to help ESCOs successfully bid for energy service projects and arrange financing for their execution, the accreditation did not create any significant benefit for accredited ESCOs (BEE, 2008, 2010). Government accreditation does not seem to give ESCOs credibility with banks or potential customers to significantly increase the willingness for cooperation. According the managing director of an ESCO, customers use competitive bidding tenders to select their ESCO and, in their tendering, pay little attention to accreditation status. He added that there were no other incentives, such as government-sponsored financial incentives, to contract preferably accredited ESCOs.

A government-supported standard methodology covering the entire project chain from audit to performance measurement and verification has been announced, but according to an interviewee from the energy sector, it has not yet been put in place. In order to develop a viable ESCO industry, the Ministry of Power set up a super-ESCO in 2009, Energy Efficiency Services Limited, to facilitate energy efficiency projects through ESCO and financial institution capacity building and support for preparation of energy efficiency projects (EESL, 2010). According to two energy sector interviewees, the super-ESCO has not yet significantly improved the functioning of ESCOs.

Mobilisation of green finance

Financing renewable energy

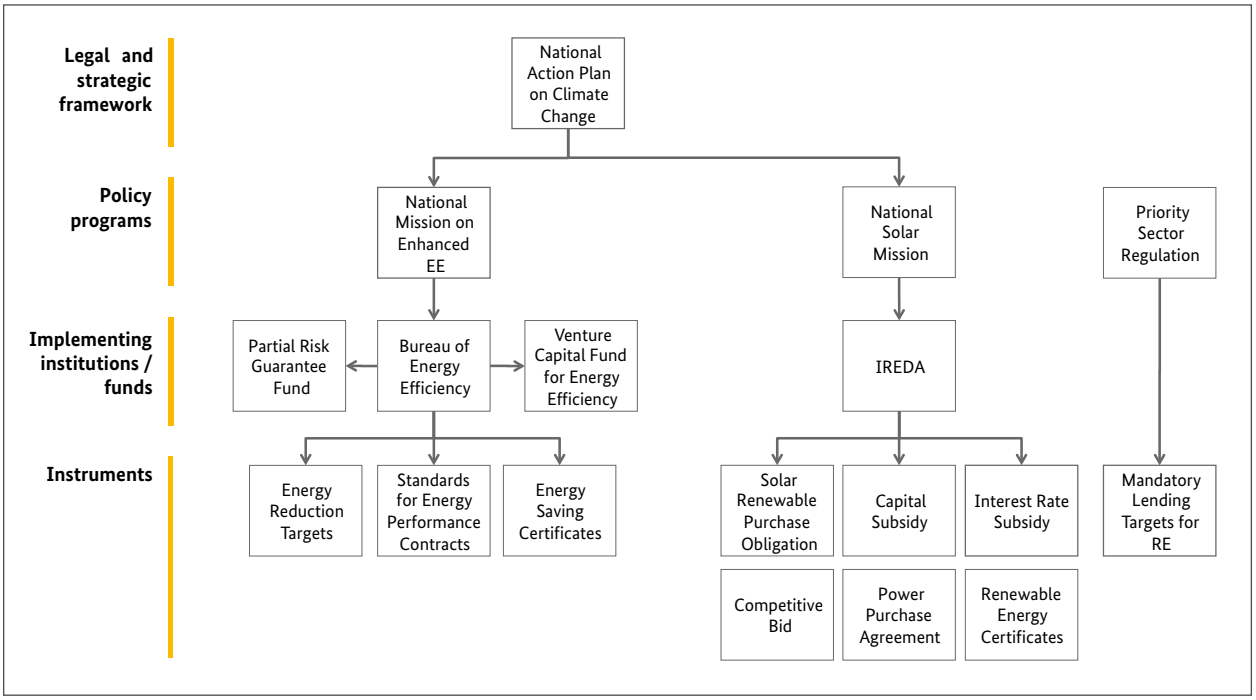
Up to now, India has not developed a legal framework requiring banks to scrutinise the environmental impact of investment projects, nor is there any law that makes banks responsible for the environmental damage caused by their clients (Sahoo, 2008). Bank self-regulation is weak. Only two banks have signed the UNEP FI declaration and none are signatories to the Equator Principles (UNEP FI, 2012).[29] Promising developments are, however, taking place on the institutional level, as finance sector policies promoting green investments are beginning to emerge.

In February 2012 the Bombay Stock Exchange (BSE) launched the Green Index, India's first energy-efficient index indicating the 20 BSE-100 companies that perform best in terms of carbon emission reduction, market capitalisation and turnover. The index is designed, among

28 Rating performed in 2008 through the Credit Rating and Information Services of India Investment Information and the Credit Rating Agency of India Limited.

29 In December 2007, the Reserve Bank of India published a circular advising banks to put in place a 'suitable and appropriate plan of action towards helping the cause of sustainable development', to draw particular reference to the 'IFC principles on project finance (Equator Principles)' and to thus contribute to the mitigation of climate change. Likewise, it encouraged banks to commit to sustainability reporting (Non-Financial Reporting) (RBI.IN /Bookmark).

Figure 8: Policy overview India (excerpt)



other criteria, to help institutional and retail investors evaluate a stock on the basis of financial advantages gained from a firm's energy efficiency (Reuters, 2012).

Additionally, in July 2012 the Central Bank of India revised the priority sector regulation to include loans to individuals for setting up off-grid solar and other off-grid renewable energy solutions for households (Reserve Bank of India, 2012). This regulation could push financial institutions to diverge funds from other priority sector areas to clean off-grid electrification (see also Nepal's deprived sector lending scheme for comparison).

Commercial finance through banks for renewable energy and energy efficiency is still rare. Accordingly, many funds available for renewable energy and energy efficiency are developed with the financial support of multilateral financial institutions.

- Since 1999, the KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) has supported India in the use of renewable energy through low-interest loans to the Indian Renewable Energy Development Company (IREDA), which has distributed them to local investors. IREDA has received loans amounting to a total of USD 322 million. In March 2011 a credit line of around USD 261.7 million was made available to support renewable energy (KfW, 2012).

- With financial support from the KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) and JICA, the SIDBI Bank has developed a scheme to finance energy efficiency projects and cleaner production in the MSME sector at concessional rates of 1% below the normal lending rate (SIDBI, 2012).

- The State Bank of India has introduced a credit line known as 'Green Homes' which assists environmentally friendly residential projects by offering concessions such as softer interest rates and zero processing fee on home loans (Rupee Times, 2009).

- The private Yes Bank is 'co-sponsoring' the South Asia Clean Energy Fund (SACEF) in collaboration with the Global Environment Fund. SACEF is a USD 200 million fund targeting investments in clean energy, clean technology and energy efficiency across India, Sri Lanka, Nepal and Bangladesh (Yes Bank, 2012).

In recent years, the Indian wind energy market has witnessed growing interest from private equity investors. Venture capital and private equity investments in wind energy amounted to USD 425 million in 2011 (The Guardian, 2012). As the associate vice president of IFCI Venture Capital Funds pointed out, the Accelerated Depreciation Benefit incentives and the tax benefits of up to 10 years for wind energy investors have had a beneficial impact on the investment climate (The Economic Times, 2012).

Financing energy efficiency

India's potential market for energy efficiency services is valued at an estimated USD 13.6 billion (BEE, 2011). The ESCO industry has likewise seen growth over the past five years, reaching an estimated compounded annual growth rate of 95.6% between 2003 and 2007. Still, by 2011 less than 5% of the market potential had been tapped (Nix, 2011). The development of the Indian ESCO industry is constrained by a lack of affordable finance, which is mainly caused by inconsistent policies and limited awareness among financial institutions of the distinct revenue models and financing needs of Indian energy service companies.

Firstly, ESCOs are often not able to provide the internal rates of return (IRR) and debt service coverage ratios (DSCR) that banks expect and are therefore denied access to capital. As the managing director of an ESCO explained, banks expect returns on investment between 20-30% and sufficiently high liquidity. These rates, he added, mostly surpass the financial capabilities of ESCOs, which usually reach IRR rates of up to 15% and often do not provide the required liquidity to meet DSCR requirements. Within this environment, only big ESCOs that benefit from economies of scale from larger project volumes and greater liquidity attain the requested IRR and DSCR benchmarks. Therefore, it is not surprising, that the ESCO industry is dominated by a few large enterprises, which in 2007 accounted for 84% of that year's total revenue within the ESCO industry (Nix, 2011). Lower interest rates in ESCO financing could attract more ESCOs to the market, increase competition and benefit the market as a whole.

Banks demand securities in the form of collateralised assets such as property, factories, inventories, etc. Since ESCOs' cost structures consist to a large extent of direct costs rather than capital investments, ESCOs are not able to provide the kind of collateral banks require. Moreover, ESCO revenue streams are based on a fee-for-service-model where the service provided by the ESCO is repaid by a fee that extends over several months or years. Several interviewees from the energy sector pointed out that many banks do not understand the opportunities that lie in the energy performance contracting business. Hence, capacities in banks to better comprehend and assess the revenue models as well as technical and business risks in energy performance contracting are needed.

The ESCO market's lack of transparency with regards to the effectiveness, technical viability and long-term value of ESCO measures makes it difficult for ESCO clients and financiers to choose and evaluate their contract partners. An energy sector interviewee pointed out that appropriate guidelines could enhance the credibility of ESCOs' technical claims and improve understanding of proposed measures by clients and banks. Likewise, there is a need for standardised knowledge on current best practices to verify and benchmark the results of energy efficiency projects in commercial and industrial facilities (Nix, 2011). The absence of such standards, the same interviewee added, may lead to conflicts between signatories and, in extreme cases, to a refusal of payment by the client. Clear standards would, in turn, reduce the perceived risk associated with the financing of ESCO projects. In fact, as a financial sector interviewee pointed out, loan officers usually lack the capacity to assess the economic and technical soundness of proposed energy efficiency measures. Banks that were refinanced to provide loans for energy efficiency could not deploy the funds and instead returned them unused. Their willingness to finance such projects

would substantially increase once they could rely on simple, standardised tools to assess the energy efficiency potential of selected projects. The toolkit for energy efficient residential building initiated by the KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) is an interesting example. It calculates the projected energy demand of a building as a whole and identifies potential energy savings in comparison to a reference building. Information on potential energy savings may, in turn, be used to apply for loans from commercial Indian banks, which will be refinanced by the National Housing Bank. The strength of the tool lies in its ability to standardise assessment of energy efficiency measures and thus facilitate bank financing.

Conclusion

Based on the above insights, the following conclusions and recommendations can be drawn for Renewable Energy Policy:

- Investment-based incentives stimulate quick upscaling of renewable energy that may neglect generation capacities. Policies need to ensure satisfying generation ratios, either through generation-based incentive schemes or through verification procedures that assure the quality of the installed renewable energy, and should therefore focus more on generation-based criteria.

- The obligation to reach financial closure six months from power purchase agreement signature, with the license withdrawn in case of default, has accelerated power producers' financing efforts, demonstrating that policies can significantly speed up investment processes.

- Capital subsidies for small-scale renewable energy applications reduce product cos t but do not increase financing availability. To engage financial institutions, policies should incentivise credit provision through interest rate subsidies and risk guarantee mechanisms.

- India's energy efficiency market is constrained by the lack of affordable finance for ESCOs. Policies need to address this barrier through different supportive measures, such as:

- Tackling the information asymmetry between ESCOs and their clients by promoting the development of a standardised methodology for verifying and quantifying ESCO energy efficiency measures.

- Providing clear energy efficiency standards and comparable benchmarks. Policy advice should focus on creating higher transparency through standardised benchmarks on savings potential for projects.

- Providing qualification in assessing technical and financial risks for energy efficiency projects to financial institutions.

- Providing assistance, through international development agencies, in conducting financial risk appraisal of projects to be assessed under the Venture Capital Fund for Energy Efficiency and the Partial Risk Guarantee Fund. (The Bureau of Energy Efficiency has a stronger focus on technical aspects of ESCOs.)

- Subsidising energy efficiency audits or even making energy audits compulsory for companies could raise awareness and reveal the financial attractiveness of energy efficiency measures.

Table 13: Policies relevant to green finance in India

Policy, programme	Policy instruments	Description of policy instruments	Status
Jawaharlal Nehru National Solar Mission (2010)	Renewable portfolio standard	• Announcement by almost all Indian States of a renewable portfolio standard (solar renewable purchase obligation) of 0.25-0.5% of total State energy production during the first phase of the National Solar Mission	Enacted
	Power purchase agreement	• 25-year power purchase agreement for solar power utilities	Enacted
	Renewable energy certificate	• Establishment of a renewable energy certificate mechanism • State electricity regulatory commissions (SERC) can meet their targets through the purchase of these certificates	Enacted
	Public competitive bidding	• Establishment of a competitive bidding system for solar power producers	Enacted
	Capital cost subsidy	• 30% capital cost subsidy for thermal applications, solar lighting systems and small capacity PV systems	Enacted
	Interest rate subsidy	• Interest rate subsidy (5%) for off-grid applications	Enacted
Financial Incentives for renewable energy investments	Accelerated tax depreciation benefit	• Investment tax reduction in the RE sector allowing investors to claim an Accelerated Depreciation Benefit of up to 80% of project cost	Enacted
	Feed-in tariff	• Provision of USD 0.09 per unit of wind electricity fed into the grid for a period not less than 4 years and a maximum period of 10 years with a cap of USD 112,810.90 per MW	Enacted
	Renewable portfolio standard	• Obligation for SERCs to purchase a minimum percentage of energy from renewable sources with targets varying between 1 to 10% from State to State • 5-year tax holiday for RE power generation projects	Enacted
	Tax exemption	• Excise duty exemption for wind-operated electricity generator, its components, and parts thereof, as well as for water-pumping windmills and wind aero-generators and battery chargers	Enacted
	Tax reduction	• Reduction in central sales tax and general sales tax on sale of renewable energy equipment in various states	Enacted

Policy, programme	Policy instruments	Description of policy instruments	Status
National Mission for Enhanced Energy Efficiency (2010)	Loan and credit guarantee	• Establishment of the Partial Risk Guarantee Fund guaranteeing a maximum 50% of the loan (principal only) provided by the participating financial institution • In case of default, coverage of the first loss through the fund subject to maximum of 10% of the total guaranteed amount • Coverage of the remaining default (outstanding principal) amount on pari-passu basis up to the maximum guaranteed amount	In development
	Public venture capital	• Establishment of the Venture Capital Fund for Energy Efficiency providing risk capital support to energy efficiency investments in new technology, goods and services • Co-investment of the fund with venture capitalist on same return expectation as private venture capitalist • The fund could be last to be paid in case of liquidation of investment in projects	In development
National Mission for Enhanced Energy Efficiency (2010)	Energy reduction target	• Designation of Specific Energy Consumption (SEC) reduction targets for the 685 energy-intensive units which are designated consumers under the Energy	In development
	Energy saving certificate	• Issuance of energy saving certificates for savings going beyond the energy reduction targets for energy-intensive units • Permission to trade energy saving certificates	In development

Table 14: Green finance data, Nepal

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	30
GDP per capita (current US$)	535
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	67.30
Domestic credit to private sector (% of GDP)	54.55
Market capitalization of listed companies (% of GDP)	30.24
Health of the financial sector	
Bank capital to assets ratio (%)	n/a
Bank liquid reserves to bank assets ratio (%)	10.73
Bank nonperforming loans to total gross loans (%)	n/a
Interest rate spread (lending rate minus deposit rate, %)	4.38
Credit depth of information index (0=low to 6=high)	3
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	0.00
Hydroelectric sources	99.58
Natural gas sources	0.00
Nuclear sources	0.00
Oil sources	0.42
Renewable sources, excluding hydroelectric	0.00
Rural electrification	
Access to electricity (% of population)	43.60
Rural population (% of total)	83.34
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	3,542
CO_2 emissions per capita (metric tons)	0.12
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.12
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	107
Corruption perceptions index (1=highly corrupt to 10=very clean)	2.20

Sources: World Bank Data, Transparency International

4.5 Green finance in Nepal

Key insights

- Banks resisted the lending targets for the priority sector imposed on them due to high credit failure rates and significant risk averseness.
- Some banks did not trust the ratings and pre-assessments developed by the Alternative Energy Promotion Centre (AEPC) to facilitate lending activities in priority sectors, preferring to develop their own ratings.
- The staged subsidy scheme for small-scale solar appliances was successful in ensuring high service quality as it paid out the last share of the subsidy only one year after installation.

Country background

Nepal is a landlocked country, bordering India to the south and China to the north, with an economy based on agriculture (37% of GDP; employing 80% of the population). The country is to a large extent economically dependent on India. Much of the population lives in relative poverty. Ranking comparatively low in corruption and ease of doing business, the government is challenged by high levels of bureaucracy and corrupt officials.

The country's financial sector has been significantly liberalised since the 1990s and its legal system has been strengthened, attracting new market entrants and increasing domestic credit to the private sector from 30% of GDP in 2000 to 55% in 2010 (World Bank, 2012a). Financial markets have been less involved in financing local businesses, with market capitalisation of listed companies amounting to only 30% of the nation's GDP (World Bank, 2012a).

While the country's electricity production, transmission and distribution are integrated under the Nepal Electricity Authority (NEA), there are several independent power producers who generate electricity and sell it to NEA under power purchase agreements. Nepal's economic and social development is hampered by insufficient

energy supply to rural areas. Although hydropower is the country's primary source of energy, its full potential is not exploited; if it were, the country could become a net electricity exporter. In the meantime, the country faces the challenge of expanding electricity access to the half of its population that is still off the grid.

Green finance policy framework

Renewable energy policies

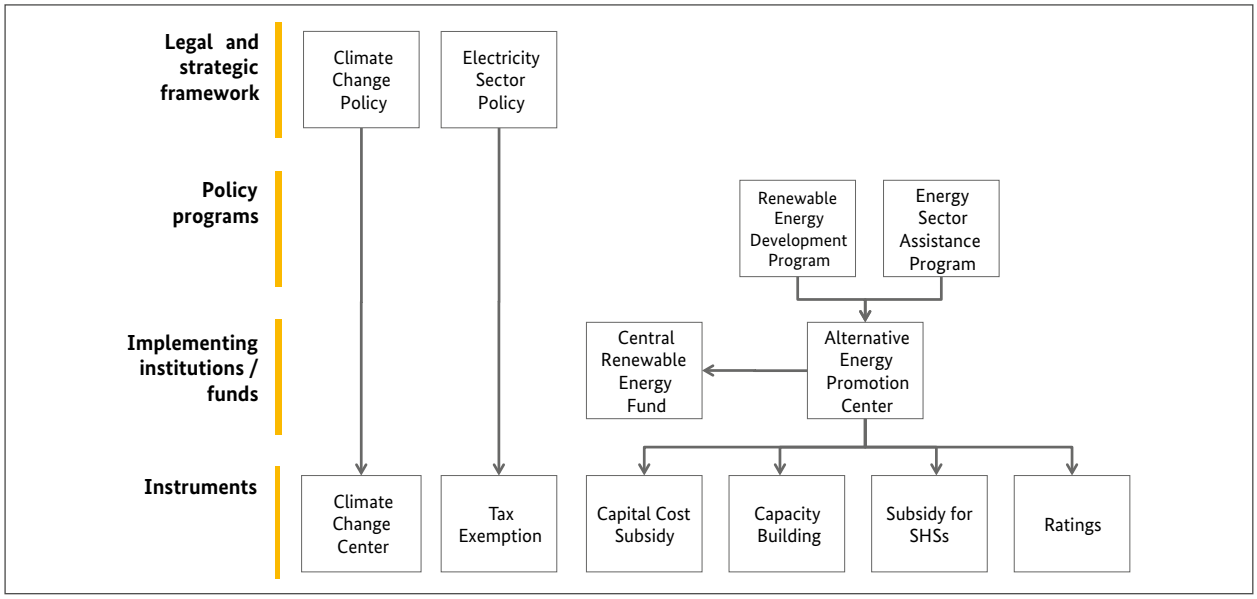
The AEPC, established in 1996 by the Government of Nepal, is a government institution responsible for designing, implementing and monitoring energy programmes while pursuing the objective of developing and promoting renewable energy technologies in Nepal (AEPC, 2012).

One of its earliest programmes was the Energy Sector Assistance Programme (ESAP), which was developed in cooperation with the Danish Development Agency in 1999 to improve the living conditions of rural populations by enhancing the access to and affordability to rural energy solutions. Since then, the programme has provided benefits to more than 1.5 million people in rural Nepal. Phase II of ESAP (2007-2012) supported the installation of 191,000 improved cooking stoves, 157,000 solar home systems and 9,000 small solar home systems; it also provided 63,000 households with access to electricity from mini-grids (Ministry of Foreign Affairs Denmark, 2011). ESAP II was flanked by establishment of the Renewable Energy Fund (REF) which was set up in order to direct and control subsidies from the government and international donors.

Among other factors, the success of the programme relies on a number of policies set up to lower energy application investment costs and improve access to finance. Firstly, ESAP introduced a subsidy scheme for the purchase of SHSs and improved metal stoves. The subsidy modality was built on a distribution mechanism linking subsidy disbursement to quality control. By pre-approving components and pre-qualifying vendors, this system effectively assured compliance with minimum quality standards (Ministry of Foreign Affairs Denmark, 2011). Additionally, as a programme officer from ESAP explained, ESAP used a staged subsidy payment scheme, in which the last payment was made after the one-year service visit had taken place. The reasonably well-functioning after-sales service can be traced back to this incentive mechanism (Ministry of Foreign Affairs Denmark, 2011).

Finally, ESAP II launched a pilot project to secure finance for the purchase of 3,000 SHSs by rural households.

Figure 9: Policy overview Nepal (excerpt)



Addressing the limited financial and technical capacities of local finance institutions to finance SHSs, as well as their difficulty in accessing commercial funds through commercial banks, the programme facilitated capacity development and trust building among the stakeholders (Ministry of Foreign Affairs Denmark, 2011). Twenty-one local finance institutions in six districts were trained in assessing and providing loans for SHSs and received courses in business planning and bookkeeping. As a result, four commercial financial institutions got involved in wholesale lending to 21 local finance institutions for retail lending to SHS purchasers (Ministry of Foreign Affairs Denmark, 2011).

The Rural Energy Development Programme (REDP), which was initiated by the government of Nepal, UNDP and the World Bank in 1996, introduced decentralised renewable energy services to the remote populations of Nepal. Its objective was to improve the living standard of the rural population, reduce dependency on traditional energy and attain sustainable development through integrating alternative energy in rural communities (Ministry of Finance Norway, 2012).[30] The programme was concluded in 2011.

The National Rural and Renewable Energy Programme (NRREP) was started in 2012 in order to combine all AEPC efforts under one umbrella. It has three main components: (a) the Central Renewable Energy Fund (CREF), (b) technical support and (c) business development for renewable energy and productive energy use (Ministry of Finance Norway, 2012). The immediate objective is to establish the Central Renewable Energy Fund (CREF) as the core financial institution responsible for the effective delivery of subsidies and credit support to the renewable energy sector. So far only subsidies are being channelled through the CREF. No credit facilities are in place. The fund replaces the old REF and has the objective of providing subsidies and technical assistance (TA) as well as soft loans for the development and expansion of micro, mini and small hydroelectricity, solar energy, wind energy and biogas systems and improved cooking stoves, while not excluding applications arising from other forms of alternative energy (SREP, 2011). 40% of the fund is financed by the government of Nepal and the remainder originates from several international donors, including KfW acting on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). Half of the fund's volume will be remitted as a subsidy, while the other half will be channelled through banks for on-lending to the target group.

AEPC technical expertise supported banks in selecting appropriate renewable energy projects. Pre-qualifications were granted to projects fulfilling AEPC technical criteria. Financial institutions were able to access information on pre-qualified project proposals and privilege those projects. This mechanism, essentially a type of project rating, was put in place in order to enhance technological transparency for financial institutions desiring to invest in the sector, by decreasing information asymmetries. However, a private sector interviewee criticised the rating scheme for not solving the actual problem of financial institutions' insufficient capacity to evaluate technical projects. Ratings can reduce information asymmetries if financial institutions put their full trust in the ratings. However, building trust in rating schemes is difficult and requires that financial institutions trust the rating institution's expertise in assessing projects from their perspective.

Instead, some financial institutions have found ways to engage in green product financing without public TA, independently organising financing for TA and identifying channels for the distribution of such products as clean energy systems (as stated by a private sector interviewee). ACE Development Bank, for example, engaged Winrock International, using funding from the Frankfurt School UNEP Collaborating Centre, to advise the bank on local financial institutions through which it could channel money to finance SHSs.

30 According to UNDP, the programme has connected more than 59,000 households to micro-hydro energy supplies and installed 317 new micro-hydro plants, around 14,700 improved cooking stoves, 7,041 toilet-attached biogas plants and 3,238 solar home systems (UNDP, 2011).

Priority sector lending policies

After opening up to international trade, Nepal introduced lending target policies to channel investments into prioritised sectors of the economy. In 1974, commercial banks were instructed by the Central Bank of Nepal to make 12% of their investments in the agriculture, industry and service sectors, defined as priority sectors (Deposit and Credit Guarantee Corporation, 2012). The Central Bank of Nepal revised priority sector regulation in 1991, setting lending targets for the development of the agriculture, energy and deprived sectors (Bhusal, 2005).[31] Designed, implemented and monitored by the Central Bank of Nepal, the instrument requires financial institutions to distribute a predefined percentage of their credit volume to the agriculture, energy and deprived sectors, either directly or through wholesale loans channelled by intermediary institutions such as lower-status financial institutions, financial intermediary NGOs and cooperatives (Nepal Rastra Bank, 2010). The Government of Nepal extended the definition of the deprived sector in 2006 to incorporate lending requirements for clean energy and small businesses (Nepal Rastra Bank, 2009) and raised targets for credit volume in these fields in 2012.[32] Banks that comply with the regulation are eligible to receive loans from the Central Bank at zero per cent interest rates, while their interest rates for on-lending are capped (The Kathmandu Post, 2012). Non-compliance is penalised by the Central Bank.

In sum, lending targets have failed to create an enabling framework for the ongoing funding of the priority sectors through financial institutions (Ferrari et al., 2006). This can be traced back to a variety of reasons:

1. High credit failure rates and the low capital base of banks resulted in high risk averseness among banks and the withdrawal of funds for the priority sector (Ferrari et al., 2006; Nepal Rastra Bank, 2011). Accordingly, credit volumes for agricultural and deprived sectors did not rise significantly after the introduction of the priority lending scheme (Ferrari et al., 2006).

2. Regulatory loopholes enabled banks to bypass priority sector lending and still avoid Central Bank penalties. According to a public sector interviewee, banks can avoid the risks of lending to the deprived sector by transferring cash to microfinance institutions' balance sheets. These microfinance institutions keep the cash on their balance sheets without lending to their clients. Thus, financial institutions fulfil their lending quotas without exposing their assets to the risks involved in actually lending to the deprived sector. Regular inspections to verify policy compliance have failed to identify and penalise financial institutions taking advantage of these loopholes. Penalties imposed so far have therefore been insignificant. While banking sector penalties amounting to USD 29,800 were imposed in 2010, they shrank to USD 3,090 in 2011 (Nepal Rastra Bank, 2011).[33]

3. The policy has not been able to address the institutional barriers within financial institutions. The banks' capital base remains low, while potentially profitable projects are not funded due to perceived risk. Lack of initiatives to raise banks' awareness of business opportunities in the deprived sector and improve their risk assessment capacities has further compounded the problem.

31 The deprived sector includes the poor, women, physically disabled, and marginalised farmers and craftsmen (Nepal Rastra Bank, 2010). It is relevant for green finance policies because of the explicit inclusion of household-scale clean energy technologies for the poor.

32 Off-grid energy product loans up to 60,000 rupees (roughly USD 672) without collateral and 150,000 rupees (roughly USD 1,680) with appropriate collateral are included in deprived sector lending. This explicitly covers micro-enterprises and the following: 'micro hydropower projects up to 50 kilowatts, solar home systems, solar cookers, solar dryers, solar pumps, bio-gas, improved water mills, improved cooking stoves and wind energy' (Nepal Rastra Bank, 2010). The incorporation of clean energy loans into the deprived sector lending scheme was promoted by the AEPC in particular.

33 Penalties are calculated as the shortfall between the lending target and actual amounts loaned to the priority sector, and are multiplied by the highest interest rate the bank charged in the relevant year (Ferrari et al., 2006).

4. Measures to reduce the risk exposure of banks have not been able to unlock finance for the deprived sector. In 1974 the Ministry of Finance and the Central Bank set up the Deposit & Credit Guarantee Corporation (DCGC), a quasi-apex institution guaranteeing loans to the priority sector (Deposit and Credit Guarantee Corporation, 2012). A primary objective was to create an environment of easy access to finance for rural entrepreneurs in Nepal by guaranteeing loans invested in the priority sector.

The guarantee has been in place for years, but credit volume for the deprived sector has not significantly increased. It seems that merely addressing the risk-return gap through a guarantee mechanism is not an appropriate response to financial institutions' risk aversion. The guarantee is only partial; banks have to complement such investments with their own equity, usually at least 20-30%, and are therefore reluctant to invest in risky projects. Project developer ratings, as proposed by the AEPC, could create the necessary trust in the viability of the investment, but only if the ratings themselves were deemed trustworthy. In line with this, a financial sector interviewee confirmed that he would extend loans to the priority sector only if his organisation had the capacity to conduct the necessary credit assessments itself.

AEPC asked DCGC to provide guarantees to financial institutions when extending loans as part of AEPC programmes. DCGC refused to extend such guarantees, arguing that it lacks the funding to do so. A public sector expert interviewee explained that AEPC, having been rejected by the DCGC, attempted to reduce financial institutions' risk perception by enhancing their capacity to assess project risks and collateralising the assets in renewable energy projects, allowing lenders to use fixed assets such as mini hydropower plants as collateral in loan contracts. The same source added that collateralising the assets would motivate banks to provide credit.

Mobilisation of green finance

Multilateral financial institutions and national development agencies play a pivotal role in the financing of renewable energy in Nepal. National stakeholders, such as the AEPC, are mostly too weak to self-sufficiently develop appropriate financing schemes and therefore rely on the financial and technical support of international stakeholders (Government of Nepal, 2012). To address this issue, several programmes have been put in place:

- A joint financing agreement was signed by the Governments of Nepal, Denmark and Norway on 15 March 2007 and by KfW on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ) on 11 June 2010 to fund the ESAP II through REF, reaching a total budget of USD 60 million (Ministry of Foreign Affairs Denmark, 2011). DFID also joined ESAP II at a later stage.

- The Climate Investment Funds, through the Scaling-up Renewable Energy Programme in low income countries (SREP) approved in 2009, will support investments to scale-up renewable energy generation in Nepal. They have agreed on an allocation of up to USD 40 million for this purpose (SREP-Nepal, 2011).

- The Rural Energy Development Programme (REDP) has been established by the UNDP and the World Bank to support the government in implementing the Rural Energy Policy in all districts (UNDP, 2011).

- The Government of Norway and various international donors have agreed to provide financial and technical assistance for the implementation of the National Rural and Renewable Energy Programme under which all other efforts shall be handled, directed and monitored (Ministry of Finance Norway, 2012). With regard to CREF, a joint financing agreement was signed by the governments of Nepal, Denmark and Norway.

- According to an interviewee from the public sector, Nepal, acting through AEPC, has been pushing financial institutions to provide financing to project developers and microfinance institutions and succeeded in mobilising approximately USD 2.6 million in private financing for solar home systems and approximately USD 0.9 million for micro hydropower plants.[34]

34 The sum for hydropower plants includes committed funds as well as partially and fully disbursed loans.

Altogether, the availability of funding for renewable energy development in Nepal is thwarted by several institutional barriers.

On the one hand, multilateral financial institutions are wary of distributing large funds to the Nepalese authorities. According to the AEPC programme officer interviewed, corruption and lacking capacities in the management of such funds have raised suspicions as to the reliability of the entrusted actors. The Central Renewable Energy Fund will therefore be managed by a newly built Nepalese institution tasked with ensuring a transparent and internationally standardised selection process for fund management. Mandatory international financial audits will be conducted to guarantee the quality of the work.

Additionally, financial institutions lack the technical capacity to assess the risk of renewable energy projects and are not aware of the business case for clean energy projects.

Conclusion

Altogether, Nepal's policies for the promotion of large-scale renewable energies are less sophisticated than in other countries surveyed. However, the government has developed innovative approaches to the challenge of achieving its rural electrification objectives while distributing small-scale renewable energy products. The country is unique in applying priority sector lending regulations to renewable energy, thereby forcing financial institutions to commit certain funds to the field. The following conclusions can be drawn from the case study on Nepal:

- Banks resisted the lending targets for the priority sector imposed on them due to high credit failure rates and significant risk averseness. Before enacting financial sector regulations, policymakers should ensure that financial institutions have the required capacity to follow regulations and provide appropriate support schemes

- The staged subsidy scheme for small-scale solar appliances was successful in ensuring high service quality as it paid out the last share of the subsidy only one year after installation. Policymakers should consider this mechanism as a viable option for the technical quality assurance of relevant subsidy programmes

- Support schemes for financial institutions need to be developed by financial experts and in close collaboration with the private sector. Even though the AEPC designed such support schemes with ratings and pre-assessments, the ACE development bank independently developed a rating scheme that was more in line with its risk appraisal requirements

Table 15: Policies relevant to green finance in Nepal

Policy, Programme	Policy instruments	Description of Policy instruments	Status
Electricity Sector Policy	Tax exemption	• Income tax exemption for small scale hydropower: • 10 year exemption for generation profits • 15 year exemption for transmission and distribution profits	Enacted
Energy Sector Assistance Program (1999)	Capital cost subsidy	• Capital cost subsidies for solar home systems and improved metal stoves within the Solar Energy Support and Biomass Energy Programmes	Enacted
	Capital cost cubsidy, capacity building	• Establishment of a Rural Energy Fund to provide subsidies and technical assistance for renewable energy generation • Financed by 40% by the Government of Nepal and supported by the Danish Development Agency and the Government of Norway	In development
	Capacity building	• Technical Support for biomass energy, solar energy and mini-grid electrification to provide technical support for the development and implementation of renewable energy solutions	Enacted
Renewable Energy Development Program (1996)	Public rating	• Since 2012, ratings of project developers and energy companies through the Alternative Energy Promotion Centre	Enacted
	Capital cost subsidy	• Commitment of the government to provide up to 80% of the capital investment required in rural electrification construction costs • Responsibility of the communities for contributing at least 20% of the total cost of the grid extension via labour, household donations, bank loans, etc.	Enacted
	Capacity building	• Capacity building and community mobilisation efforts in relation to rural electrification focusing on organisational development, skills enhancement, capital formation, technology promotion, environmental management, vulnerable community empowerment	Enacted
Subsidy Policy for Renewable Energy (2009)	Capital cost subsidy	• Subsidy to households for installing SHSs of 10-18 Wp, and more than 18 Wp, to an amount of NRP 5,000-10,000 (approximately USD 57.50-115.00) • Subsidy for solar PV systems used by public institutions in remote areas of up to 75% of the capital cost • Subsidy for solar pump up to the capacity of 1,500 Wp amounting to 75% of the cost, but not exceeding NRP 1 million (approximately USD 11,496) • Subsidy for solar cooker of up to 50% of its cost, but not exceeding NRP 5,000 (USD 57.50) • Subsidy of up to 50% of the cost for family-sized solar dryer costing up to NRP 20,000 (USD 230), and up to 70% of total cost for commercial use	Enacted

Policy, Programme	Policy instruments	Description of Policy instruments	Status
Subsidy Policy for Renewable Energy (2009)	Capital cost subsidy	• To speed up renewable energy service delivery and provide better quality and a variety of technologies to households, communities and micro, small and medium-sized enterprises in rural areas. • Subsidy to households for installing hydropower devices varies between approx. USD 100-200 per household and an additional USD 500-1400 per kW depending on the capacity and the location of the household. • Subsidies to households for installing solar PV systems amount to approx. USD 46-110 depending on the capacity and the location of the household. • The subsidy for solar thermal technologies will be provided in the rural areas only. The subsidy amounts to 50% of the total costs with different ceilings depending on the type of installation. • The subsidy for wind power installations varies from USD 150-200 per household and approx. USD 1600-2500 per kW depending on the capacity and the location of the household. • Improved water mills and biogas and biomass installations also qualify for subsidies. • The additional subsidy of approx. USD 25 per household will be provided to households with single women, widows, vulnerable communities, disaster victims and poor and endangered ethnic groups as identified by the Government of Nepal.	Enacted
	Carbon emissions trading	• Preparation of a national strategy for carbon trade in order to benefit from the Clean Development Mechanism by 2012 • Formulation and implementation of a low carbon economic development strategy that supports climate-resilient socio-economic development by 2014	In development

Table 16: Green finance data, Peru

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	29
GDP per capita (current US$)	5,292
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	18.09
Domestic credit to private sector (% of GDP)	24.32
Market capitalization of listed companies (% of GDP)	64.87
Health of the financial sector	
Bank capital to assets ratio (%)	9.50
Bank liquid reserves to bank assets ratio (%)	n/a
Bank nonperforming loans to total gross loans (%)	2.60
Interest rate spread (lending rate minus deposit rate, %)	17.43
Credit depth of information index (0=low to 6=high)	6
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	2.55
Hydroelectric sources	57.62
Natural gas sources	34.35
Nuclear sources	0.00
Oil sources	4.08
Renewable sources, excluding hydroelectric	1.41
Rural electrification	
Access to electricity (% of population)	85.70
Rural population (% of total)	23.09
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	40,535
CO_2 emissions per capita (metric tons)	1.42
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.18
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	43
Corruption perceptions index (1=highly corrupt to 10=very clean)	3.40

Sources: World Bank Data, Transparency International

4.6 Green finance in Peru

Key insights

- Peru's public auctioning of renewable energy production concessions was successful in attracting investments, financed particularly through international investors and concessional financing.
- Local financial institutions hesitate to invest in RE projects, despite favourable conditions, due to insufficient ability to assess and manage such projects' risks.
- Lack of transparency in public auctioning processes, clarity in land entitlements and speed of concession processes is a major barrier that slows down implementation of RE projects.

Country background

Peru is a market-oriented emerging economy, experiencing the highest growth rate among Latin American countries throughout the past years, regularly exceeding 7-8% annually, with the exception of 2009. Since 1990 the government has enacted a range of neoliberal policies, promoting foreign direct investment, reducing state ownership of companies and ending price controls and protectionism.

Peru's financial sector is comparatively small, with domestic credit to the private sector amounting to roughly 24%. However, it has experienced substantial growth in recent years, mainly driven by financial inclusion in the retail banking sector.

In addition, Peru's energy sector has been liberalised over the past 20 years. In 1992, the government enacted the Electricity Concessions Law, which unbundled the vertically-integrated state monopoly into generation, transmission and distribution and provided the basis for private commercial companies to enter the transmission and distribution business. Moreover, in 1994 the government began giving first concessions and transferring generation assets to private companies.

Green finance policy framework

In recent years the Government of Peru has formulated high goals for the increase of renewable energies and EE:

- Increase of the share of RE to 33% of total energy use by 2020 (UNFCCC, 2011);[35]
- Reduce greenhouse gas emissions from deforestation to zero by 2020;[36]
- Reduce energy demand by 15% and CO2 emissions by 35.63 million tonnes during the period 2007-2018 compared with business-as-usual.[37]

To increase the use of RE in electricity generation, the government of Peru enacted Law 1002 in 2008, setting the goal of awarding 5% of total electricity production capacity to RE in biannual public auctions. In 2010, the first auctions were held, awarding 411 MW to biomass, solar, wind, and hydroelectric power projects (OSINERGMIN, 2011).[38] The policies enacted by the government of Peru have been hampered by red tape and lack of transparency. Delays and difficulties have arisen in applying the early refund of value-added tax, leading to time-consuming procedures. Regulatory approval of projects is time-consuming and intransparent, causing delays in the delivery of permits and authorisations that in turn impose additional entry costs for project developers and investors (IFC, 2011c).

Mobilisation of green finance

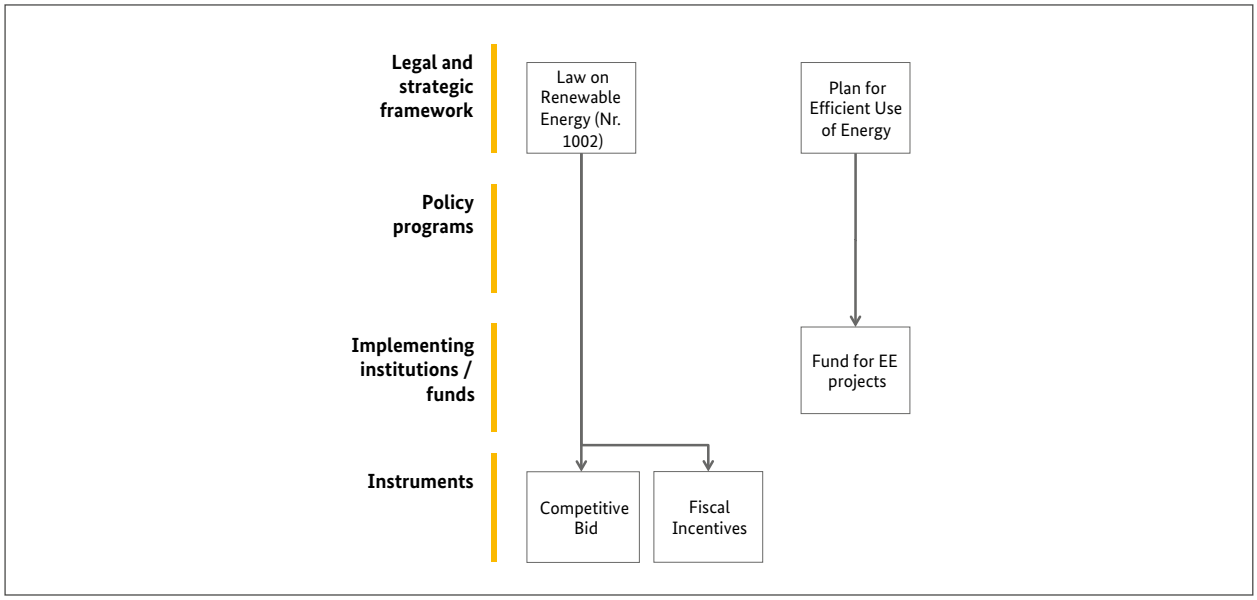
Financing of green initiatives in recent years has come mostly from concessional loans through international development banks, channelled through either the Peruvian Development Bank or local banks. Some national banks are beginning to experiment with financing RE and EE. The Development Bank of Peru, COFIDE, mobilised and channelled significant amounts of concessional financing from international actors such as Germany, implemented by KfW and JICA into RE and EE projects:

- In 2012 the German Federal Ministry of Economic Cooperation and Development (BMZ) has agreed to provide an interest subsidy loan amounting to EUR 55 million. Additionally there is a EUR 65 million credit line from KfW on behalf of BMZ to provide soft loans to project developers in RE and EE projects flanked by EUR 1.5 million for technical assistance.
- A USD 100 million credit line from JICA to finance RE and EE projects through commercial banks.
- Moreover, the IFC provided a USD 35 million loan to BBVA bank, a private commercial player, to finance EE (USD 25 million) and RE projects (USD 10 million) in SMEs (IFC, 2011a).

Peruvian financial institutions are still hesitant to finance renewable energies. They do not have the technical capacity to assess and manage the risks of such projects. The same is true for EE projects, which are often refused funding due to insufficient understanding of revenue streams derived from reducing resource consumption. The market mechanisms set up by the Government of Peru in the field of RE have not been able to reverse the situation.

35 Renewable energies in this respect include biomass, wind, solar, geothermal and tidal power, excluding hydropower beyond 20MW plant size.
36 In 2000 deforestation represented 47% of Peru's emissions (Ministry of Environment Peru, 2009).
37 A total demand reduction of 372.6 PJ by 2018 is envisaged, with contributions of 39% from the residential sector, 39% from the commercial sector, 22% from the transport sector, and less than 1% from the public sector (Ministry of Environment Peru, 2009).
38 For comparison, Peru's installed capacity for energy production was roughly 8.7 GW.

Figure 10: Policy overview Peru (excerpt)



Financing opportunities for RE have been constrained by juridical, administrative, and physical barriers constraining the development of RE projects. For example, four 20 MW solar power plant projects, initiated following public tender in 2010, faced considerable costs due to difficulties in acquiring land close to connection points to feed high voltage electricity into the grid and substantial delays in land allocation.[39]

Acknowledging these risks, COFIDE is currently setting up a risk guarantee fund that will secure 50% of the default risks for investment in RE and EE. For such programmes to work, banks would also require enhanced ability to assess and manage risks related to RE investments. As IFC emphasises in its paper on SEF, training for internal employees and expertise in project assessment are essential factors to enable green finance through Peruvian banks (IFC, 2011c). Such training, according to an interviewee, should adhere to international standards that would leverage both their appeal and recognition. The development of standardised tests for environmental accountants, like those for the Chartered Financial Analyst and the Certified Public Accountant, could further improve trust in training and boost interest in related capacity building measures.

Conclusion

- The following conclusions can be drawn from the Peruvian case study:
- Lengthy bureaucratic processes in the application and awarding of concessions created uncertainties and significantly slowed down investment processes;
- Public financing credit lines to Peruvian banks built capacity and track records in banks to extend financing to RE projects;
- Banks require standardised training in assessing RE projects to build their ability to invest;

39 In fact, the public land on which the plants were to be built did not belong to a single public entity. Instead the public institutions stated that there could be several public bodies with entitlement rights to the land. A process of clarifying land ownership entitlements among various stakeholders was required before project implementation could begin.

- The risk of not being able to connect to the physical electricity grid affects potential investments in renewable energy;
- Unclear entitlement of public lands is a major risk for RE investments, delaying the start of project development.

Table 17: Policies relevant to green finance in Peru

Policy, programme	Policy instruments	Description of policy instruments	Status
Law on the Promotion of Electricity from RE Sources (2008)	Public competitive bidding (2010)	• Public bidding for concessions • Price premium on the spot price of electricity paid by government to sellers of electricity from RE sources • Total capacity of 411.7 MW awarded in first round 2010	Enacted
	Tax exemption	• Tax rebates on the sale of electricity from RE sources • Accelerated depreciation of assets in RE at 20%, effectively reducing taxes in the first five years after investment	Enacted
Referential Plan of Efficient Use of Energy 2009-2018	Public refinance scheme	• Public fund to finance EE projects	In development

Table 18: Green finance data, Philippines

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	95
GDP per capita (current US$)	2,140
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	49.23
Domestic credit to private sector (% of GDP)	29.58
Market capitalization of listed companies (% of GDP)	78.82
Health of the financial sector	
Bank capital to assets ratio (%)	11.70
Bank liquid reserves to bank assets ratio (%)	34.91
Bank nonperforming loans to total gross loans (%)	3,80
Interest rate spread (lending rate minus deposit rate, %)	4.45
Credit depth of information index (0=low to 6=high)	3
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	26.61
Hydroelectric sources	15.81
Natural gas sources	32.12
Nuclear sources	0.00
Oil sources	8.69
Renewable sources, excluding hydroelectric	16.78
Rural electrification	
Access to electricity (% of population)	89.70
Rural population (% of total)	51.35
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	83,157
CO_2 emissions per capita (metric tons)	0.92
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.27
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	136
Corruption perceptions index (1=highly corrupt to 10=very clean)	2.60

Sources: World Bank Data, Transparency International

4.7 Green finance in the Philippines

Key insights

- Market liberalisation in the Philippines has been constrained by a power oligarchy controlling over 10 of the 20 privatised generation plants from the former National Power Corporation.
- Inconsistent renewable energy policies coupled with high bureaucracy led banks to mistrust fiscal incentives and the feed-in-tariff scheme.
- IFC's SEF Program convinced banks to join green finance schemes by offering TA by energy officers specialised in assessing energy efficiency and renewable energy projects.
- The Bank of the Philippine Islands' positive experience with energy financing encouraged private and state-owned banks to follow its example and develop their own green products.

Country background

The Republic of the Philippines is one of the most populous and economically-dynamic countries in South-East Asia (Market Watch, 2012). It has had a democratic government since 1986, but faces problems with inefficient bureaucracies and high levels of corruption. The Philippines has the worst 'Ease of Doing Business' ranking among the ten countries surveyed in this report (World Bank, 2012a).

The financial sector of the Philippines is highly reliant on institutional banking. While the country's financial markets and insurance sector are comparatively weak and underdeveloped, its banking sector is relatively well capitalised, liquid and resilient (IMF, 2010).

The total primary energy supply of the Philippines is primarily based on fossil fuels (32% oil and 16% coal and peat) (IRENA, 2012). Although in 2010 the country produced 26.3% of its electricity from renewable energy sources – mostly geothermal and hydropower – other renewable energy sources like wind and solar are still

underdeveloped (0.1% of the total energy mix) (GIZ, 2012a). Electricity prices are high due to expensive power generation and distribution (Morales, 2012a). The electricity sector has been privatised and unbundled since the issuance of the Electric Power Industry Reform Act in 2001. The Power Act, however, led to a power oligarchy where two families own 10 of the 20 privatised generation plants of the former National Power Corporation (Uy, 2010). This situation is worsened by the fact that the Philippines has no anti-trust law in place (Irisarry, 2012). Furthermore the Philippine economy relies heavily on fossil fuel imports (Reegle, 2012).

Although the government has not put in place any direct green policies in the financial sector, some financial incentive mechanisms can be found within the renewable energy and energy efficiency policy frameworks. Moreover the banking sector has launched several green finance facilities with substantial support from multilateral institutions. Most notably, the BPI has extended about USD 36 million to clients involved in energy efficiency and renewable energy projects under the Sustainable Energy Finance Programme (SEF) of the International Finance Corporation (IFC).

Green finance policy framework

The government of the Philippines has set targets to reduce final energy demand by 10% and install 15.4 MW of renewable energy capacity by 2030 (Department of Energy, 2008; Republic of the Philippines, 2010). Although a comprehensive set of financial incentive mechanisms has been enacted, only few tangible support schemes have been implemented (Department of Energy, Republic of the Philippines, 2011; Department of Energy, 2009; GIZ, 2012a).

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Renewable energy policies

In the renewable energy sector, the government has enacted fiscal incentives and a feed-in tariff (FIT), which was publicly announced in 2010 but not approved until July 2012. The government's commitment to energy efficiency has been rather inconsistent over the past years. A disabling tariff policy along with structural challenges in the energy market and difficulties in both policy design and implementation pose significant barriers to establishing an effective Renewable Energy Policy.

Firstly, feed-in prices are lower than originally announced, creating uncertainty among banks regarding future changes in policy setups (Morales, 2012b). Secondly, as stated by a renewable energy expert, the lower prices create particular pressure on smaller project developers who are less likely to be able to compete against larger developers within the new setup. Moreover, the 760 MW installation target approved by the Ministry of Energy in 2011 and the 5MW project size cap for solar projects are also considered too low to ensure businesses viability (Morales, 2012a).[40] Finally, according to a renewable energy expert from the financial sector, the quasi-monopoly situation in the energy market is seen as an obstacle to fair competition, resulting in high barriers for new market entrants.

There is controversy as to whether the FIT will reduce associated risks and influence banks' renewable energy funding decisions. A leading employee from a Philippine bank explained, commercial banks, such as the Bank of the Philippine Islands, have stated that the FIT will increase the financing opportunities for the renewable energy sector. The above-mentioned energy expert stated that the delays in the implementation of the FIT, associated with the above-mentioned barriers, have resulted in growing distrust for public support schemes and reinforced banks' cautious approach to financing renewable energy projects.

Further support for renewable energy development has come from the Renewable Energy Act (2008). It introduced fiscal incentives for renewable energy investments,

40 The installation targets are 250 MW each for hydroelectricity and biomass, 200 MW for wind power, 50 MW for solar energy, and 10 MW for ocean technology.

such as tax credits and tax exemptions, that were further developed in 2010 by the Investment Priority Plan (Department of Energy, 2008; President of the Philippines, 2010). The effectiveness of these instruments has been questioned by an interviewed energy expert, who identified the lengthy bureaucratic process and the corruption of government officials as primary barriers for the successful deployment of the incentives.

Nonetheless, following a large number of applications for wind and solar projects, the Ministry of Energy announced in November 2012 that installation targets for these two sectors would be increased (Remo, 2012).[41]

Energy efficiency policies

So far, the Philippines has not implemented any significant support schemes to promote investments in energy efficiency. Although the importance of energy efficiency is recognised and policy measures described, policies ultimately lack the necessary commitment. The recommendation of the Energy Efficiency and Conservation Act to implement energy efficiency projects was, as the renewable energy expert explained, not backed by the introduction of supportive fiscal incentives in the ensuing Investment Priority Plan.

The government of the Philippines had furthermore envisioned the development of a super-ESCO, which was expected to support the capacity development and business activities of ESCOs and, likewise, provide risk capital for project financing (IFC, 2011b). However, the project failed, according to a former Asian Development Bank officer involved in the project, due to inconsistent commitment on the part of the government.

Other projects, although promising, did not receive the necessary institutional support. While attempting to implement a project to develop criteria for assessing ESCOs' eligibility for energy performance contracting with the Development Bank of the Philippines (DBP) and the Banco de Oro, the United Nations Development Programme faced various technical, financial and institutional hurdles, such as the absence of accreditation for energy performance contracting (IFC, 2011b).[42] Initiatives to strengthen the ESCO market, such as publicly enforced accreditations of energy performance contracting, could lead to higher transparency and hence greater access to finance, but have so far not been enacted.

Mobilisation of green finance

Despite the challenges in the regulatory framework described above, the banking sector of the Philippines has initiated several green financing activities with financial and TA from multilateral institutions (Hiemann, 2012). According to a renewable energy expert from the financial sector, the stable, well-developed banking sector in combination with the country's high electricity prices made the country a perfect candidate for financing new energy projects.

The three major banks offering green lending products are the BPI, the Land Bank of the Philippines (LBP) and the DBP.

- Since 2008 the BPI has been participating in the SEF Program implemented under the initiative of the IFC. The bank receives technical and financial assistance through a risk sharing facility amounting to USD 15 billion (Hiemann, 2012). Since 2008, the BPI has assisted 72 clients with an average loan volume of about USD 500,000 each (Hiemann, 2012). Moreover, Banco de Oro Unibank (2011), BPI Globe Bank[43] (2012) and China Bank (2012) have also recently joined the programme.

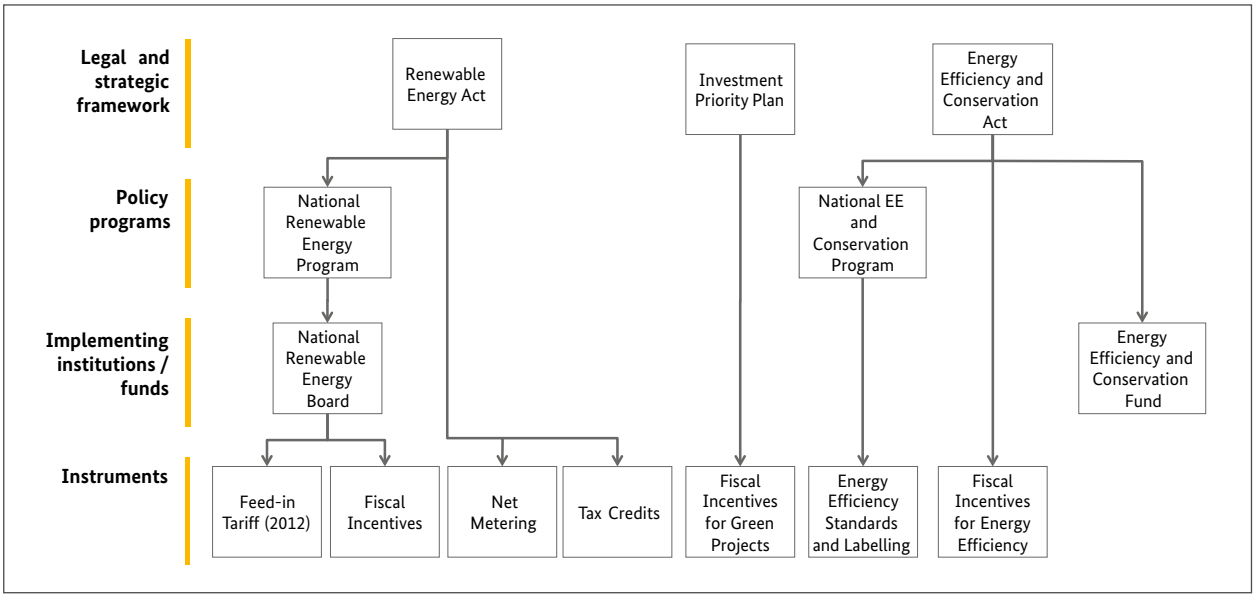
- The LBP launched a loan facility known as the Renewable Energy for Wiser and Accelerated Resources Development as well as a credit line for Energy Efficiency

41 The initial plan being studied by the Ministry of Energy is to increase the installation target for wind projects by another 50 to 60 MW to increase the allowed capacity to as much as 300 to 310 MW. The installation target for solar projects may also be increased by another 30 MW to a total of 80 MW (Remo, 2012).

42 Other hurdles are lack of financing programmes for industry and/or ESCOs, immature ESCO market, unavailability of governmental incentives, and weak understanding of the energy performance contracting concept (IFC, 2011b).

43 BPI GlobeBanko is a microfinance mobile-based savings bank, launched through a partnership between BPI, Globe Telecom, and Ayala Corporation.

Figure 11: Policy overview Philippines (excerpt)



and Climate Protection with support from Germany, implemented by KfW. The Land Bank extended loans amounting to USD 95.3 million (LBP, 2012).

- The DBP launched dozens of green credit lines including a rural power project with the World Bank, the Cleaner Public Transport Financing Facility and the Climate Change and Carbon Financing Facility (Hiemann, 2012).

Until now, credit lines have mainly focused on energy efficiency projects due to a lack of success stories in the renewable energy sector.

Apart from green credit lines, other initiatives are emerging, like the collaboration between the First Metro Investment Corporation and the Global Business Power Corporation to undertake renewable energy projects, initiated in 2011(De Leon, 2011).

IFC's SEF Program

The first and the largest green finance initiative launched in the Philippines is the SEF Program implemented by IFC with the BPI (2008), Banco de Oro Unibank (2011), BPI GlobeBank (2012) and China Bank (2012) (Hiemann, 2012).

The programme provides banks with financial and TA to develop financing schemes, including risk assessment schemes, in the fields of renewable energy and energy efficiency, as well as in cleaner production. According to an international development consultant, technical support provided to banks is often the strongest argument for participating in this type of green finance scheme (Hiemann, 2012).

The BPI cited several reasons for establishing its green credit line. Firstly, BPI sought to address a niche market and new business opportunities in the context of the adoption of the Renewable Energy Act (2008) and the Biofuel Law (2007). Secondly, BPI's mother organisation, the Ayala Corporation, one of the first conglomerates to adopt sustainability principles in the Philippines, encouraged BPI to look into green products (Salvosa & Carreon, 2009). Finally, as an IFC renewable energy officer stated, the IFC offered to deploy two energy officers specialised in the assessment of energy efficiency and renewable energy projects at no cost to the BPI.

The interviewee added that the 50% risk sharing facility made available by the IFC, which is currently under expansion,[44] has been crucial in launching energy lending activities. A leading employee of a Philippine bank further stated that the BPI has also developed its own credit policies and standards for ESCOs and launched new products: Energy performance contracting and green mortgages[45] According to a financial sector interviewee, government fiscal incentives, which the BPI considers as unreliable, are not taken into account when assessing the viability of a project, nor is the government accreditation of ESCOs fully trusted (it is double-checked by the BPI).

Financing of small-scale renewable energy

However, as mentioned by an interviewee from the renewable energy sector, these lending facilities have a clear focus on large-scale projects and, therefore, opportunities for small-scale and residential projects are limited. As for small-scale solar photovoltaic projects, the interviewed energy expert from the financial sector mentioned that the neglect of product quality and after-sales services has led banks to resist providing funding. Two attempts to provide financing to micro and small projects are the micro-lending facility launched by the microfinance institution CARD NGO[46] and the recently launched partnership between IFC and the microfinance saving banks BPI GlobeBank (Frankfurt School UNEP Collaborating Centre, 2011; Remo, 2012).

Conclusion

The Philippines has addressed the barriers to both renewable energy and green financing through banks. It has liberalised the energy market, introduced a FIT, and developed green finance initiatives with the help of nance development institutions. Despite these efforts, important barriers remain: the policies' inability to drive a consistent and coherent liberalisation of the energy market and tackle both corruption and investors' distrust of political initiatives. From the case study, several lessons can be drawn:

- FITs on capped-size projects, such as 5 MW in the Philippines, contribute to decentralised renewable energy generation, but cap the return on investment, making the investments less attractive for foreign competitors.

- Lengthy bureaucratic processes and high corruption create distrust in subsidies and limit their effectiveness. Political institutions need to address red tape issues in order to unravel the full impact of political instruments.

- Market liberalisation in the Philippines has been constrained by a power oligarchy of two families controlling over 10 of the 20 privatised generation plants from the former National Power Corporation. In order to free up a competitive market for renewable energy, anti-trust issues need to be addressed by policy makers.

- Franchises to electric distribution utilities by the Government of the Philippines providing the exclusive right to sell electricity in a given area created monopolies in electricity production. In order to reduce costs, policies need to promote greater competition.

- The SEF Program by the IFC convinced banks to join green finance schemes by offering TA from energy officers specialised in assessing energy efficiency and renewable energy projects. This enables banks to acquire hands-on experience in green finance assessment. Policymakers and international development organisations should consider replicating this initiative.

- The Bank of the Philippine Islands' positive experience with energy financing encouraged private and state-owned banks to develop green products. Policymakers should take advantage of best practice examples to entice second movers to follow in establishing green finance units.

44 BPI started with a USD 15 billion risk-sharing facility and is now hoping to increase it to USD 120 billion. Since 2008, the BPI has assisted 72 clients with an average loan volume of about USD 500,000 each (Hiemann, 2012).45 A green mortgage is a loan product that allows
borrowers to reduce their utility bill costs by allowing them to finance the cost of incorporating energy-efficient features into a new housing purchase or the refinancing of existing housing.
46 CARD NGO, the biggest microfinance institution in the Philippines, developed a lending scheme for Solar Home Systems and is currently conducting a feasibility study on the potential of biogas.

Table 19: Policies relevant to green finance in the Philippines

Policy, programme	Policy instruments	Description of policy instruments	Status
Plan Renewable Energy Act (2008)	FIT	• Guaranteed payments over 20 years to renewable energy developers utilising emerging renewable energy resources (wind, solar, run-of-river hydro, biomass, ocean)	Enacted
	Net metering	• Connection/sale of customers' renewable energy generation to the grid	Considered
	Tax exemption	• Income tax holiday (7 years) for RE producers • Duty-free importation of RE machinery, equipment and materials including control and communication equipment • 0% VAT rate on the sale of fuel or power generation • 0% VAT rate on purchases of local supply of goods, properties and services needed by RE developers • Tax-free and duty-free importation of components, parts and materials necessary for the manufacture and/or fabrication of RE equipment and components made after obtaining approval for such importation	Enacted
	Tax reduction	• Tax rebate on all or part of the tax paid for the purchase of RE equipment for residential, industrial, or community use • Special realty tax rates on equipment and machinery not exceeding 1.5% of their original cost • Corporate tax rate of 10% on net taxable income after 7 years of income tax holiday • Tax credit on domestic capital equipment and services • Net operating loss during the first 3 years	Enacted
	Renewable portfolio standards	• Binding targets on Philippine power companies to source a portion of their electricity from RE sources	Considered
	Renewable energy certificates	• Establishment of a renewable energy market, as a subset of the wholesale electricity spot market, to trade renewable energy certificates	Considered
Act Investment Priority (2010)	Tax exemption	• Incentives for RE, forestry, ecological waste management, clean water and other green projects: • Income tax holiday • Exemption from taxes and duties on imported spare parts • Exemption from export tax, duty, impost and fees	Enacted
	Tax reduction	• Incentives for RE, forestry, ecological waste management, clean water, and other green projects: • Deductions from taxable income • Tax credits	Enacted

Policy, programme	Policy instruments	Description of policy instruments	Status
Energy Efficiency and Conservation (2010)	Public financing scheme	• The Energy Efficiency and Conservation Fund will be set up and funded by distribution utilities, generation companies and transport entities • 10% of the fund will finance programmes that benefit the sector as a whole • The remaining 90% are available for the respective entities' programmes for energy efficiency and conservation	In development
	Tax exemption	• Tax-free and duty-free import of capital equipment • 100% tax credit on domestic capital equipment	Considered
	Tax reduction	• Recommendation to establish a targeted tax-relief mechanism for imported machinery	Considered

Table 20: Green finance data, South Africa

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	51
GDP per capita (current US$)	7,272
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	182.44
Domestic credit to private sector (% of GDP)	145.63
Market capitalization of listed companies (% of GDP)	278.53
Health of the financial sector	
Bank capital to assets ratio (%)	7.00
Bank liquid reserves to bank assets ratio (%)	3.93
Bank nonperforming loans to total gross loans (%)	5.80
Interest rate spread (lending rate minus deposit rate, %)	3.37
Credit depth of information index (0=low to 6=high)	6
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	94.08
Hydroelectric sources	0.59
Natural gas sources	0.00
Nuclear sources	5.19
Oil sources	0.02
Renewable sources, excluding hydroelectric	0.13
Rural electrification	
Access to electricity (% of population)	75.00
Rural population (% of total)	38.45
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	435,878
CO_2 emissions per capita (metric tons)	8.93
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.93
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	41
Corruption perceptions index (1=highly corrupt to 10=very clean)	4.10

Sources: World Bank Data, Transparency International

4.8 Green finance in South Africa

Key insights

- The adoption of a renewable energy competitive bidding mechanism and energy efficiency requirements for the industry sector has triggered the launch of green credit lines by public and private financial institutions.

- Due to a limited number of successful case studies in the renewable energy and energy efficiency sectors, risk-averse South African banks are reluctant to finance renewable energy, in particular small-sized projects.

Country background

South Africa is Africa's only upper-middle income economy, but faces extremely high levels of inequality, with unemployment currently estimated at 25-40%.[47] The country's economy is reasonably diversified with emphasis on mining, agriculture and vehicle manufacturing. The government is comparatively business-friendly and has moderate levels of corruption.

South Africa has a well-developed financial sector characterised by a highly consolidated banking sector concentrated around four major institutions [48] (Coppock et al., 2009; World Bank, 2012b). Of the ten countries surveyed in this report, South Africa has by far the highest penetration of the banking sector, with domestic credit by banking sector (as % of GDP) of 182%, exceeding India's ratio by a factor of more than 2.5.

South Africa's energy sector relies almost entirely on coal sources (94.1% of total electricity production), with renewable energy having an almost negligible significance (<1% of total energy production) (World Bank, 2012a). Due to a large industrial sector and an abundance of cheap coal resources, South Africa is a highly energy-intensive country and an intensive emitter of greenhouse gases (AFD, 2011). Serious power outages in 2008 in combination with continued political pressure to extend

47 Although the official unemployment rate is at 25%, The Economist estimates it at 40% (The Economist, 2012).
48 The 'Big Four' local banks are ABSA, First National Bank, Standard Bank, and Nedbank.

electricity provision to unelectrified areas show that the country needs to develop new energy sources and increase energy efficiency in the industrial sectors in order to ensure its energy security (Edkins, Marquard, & Winkler, 2010). The government has also taken on the issue of climate protection, launching a Green Economy Accord in 2011 that provides recommendations for investing in sustainability initiatives (Economic Development Department, Republic of South Africa, 2011).[49]

However, concrete green finance initiatives are still scattered. This analysis will therefore focus on financial instruments dealing with the renewable energy and energy efficiency sectors as well as on voluntary sustainable and responsible investment initiatives.

Green finance policy framework

Renewable energy policies

In order to provide energy security for its growing economy, the government has set extremely ambitious policy goals: increasing the share of renewable energy in power generation to 42% by 2030 and improving energy efficiency by 12% by 2015 (Department of Minerals and Energy, 2005; Republic of South Africa, 2011).[50] South Africa's ambitious renewable energy goals have not, however, been translated into concrete, consistent policies (GIZ, 2012a). Even though the government has released policy documents providing general orientation for the development of the renewable energy sector (e.g. White Paper on Renewable Energy [2003], South Africa Renewables Initiatives [2011]), a renewable energy expert stated that only a few policy instruments addressing barriers to viable renewable energy investment opportunities have been implemented so far (Department of Minerals and Energy, Republic of South Africa, 2003; Ministers of Trade and Industry and Public Enterprises, 2011). Apart from the enactment of minor subsidies[51], the absence of investment tax reductions, import duty reductions, or other forms of fiscal incentives is perceived as a major barrier to increased investment (GIZ, 2012a). Moreover, interviewees from the public sector regretted the absence of long-term perspective in policy mechanisms and consistency in governmental decisions.

The most notable policy instrument deployed is the Renewable Energy Independent Power Producer Programme (REIPPP), launched in 2011 as the first policy instrument expected to have a positive impact on the financing of renewable energy investments. The REIPPP consists of a public auctioning process under which the cheapest bidders among a group of pre-selected companies receive energy concessions (SA Government News Agency, 2012). It is expected to deploy 3,725 MW of renewable energy by 2016 and lead to a reduction of 8.4 million tons of CO2 emissions per year (GIZ, 2012b). Previous to the implementation of the public auctioning scheme, the country briefly experimented with a Renewable Energy Feed-In-Tariff introduced in 2009 by the National Energy Regulator. However, this first attempt to promote renewable energy through FIT was highly criticised for cost-effectiveness and competitiveness reasons, giving an unfair advantage to larger corporations (Pegels, 2011)[52]. Despite initial uncertainty about whether the problems with the FIT would persist in the new mechanism, the two first rounds of the competitive bidding programme attracted substantial interest among project developers (SA Government News Agency, 2012).

Energy efficiency policies

Governmental policy objectives for energy efficiency have so far not been translated into regulations and incentive schemes. An energy efficiency strategy entailing mandatory requirements was formulated in 2005 and updated in 2008. A further revision was expected in 2011, but has to date not taken place, which an interviewed international

49 The Green Economy Accord recommends that investments are to be made through the Industrial Development Corporation, private investors, and retirement funds (Economic Development Department, Republic of South Africa, 2011).

50 A large variety of actors is involved in the design of green finance policies in South Africa, with industry associations and civil society organisations like the WWF playing an active lobbying role (WWF, 2011).

51 Since the establishment of the Renewable Energy Finance and Subsidy Office in 2005, six projects with a total installed capacity of 23.9 MW have been subsidised (Department of Energy, 2012).

52 An ideological divide between the Energy Regulator and the more liberal-oriented National Treasury was also evoked by an interviewee.

development consultant regretted (Morgan, 2011). Nevertheless, some instruments have been put in place by two main policy drivers, the national utility provider ESKOM and the National Energy Efficiency Agency (NEAA), a publicly funded entity established in 2006. Driven by increasing political pressure to extend its electricity services to a great number of customers, ESKOM is encouraging energy efficiency measures in the industrial and household sectors in order to avoid costly investments in the extension of electricity production capacity (ESKOM, 2012). ESKOM has thus set up several incentive schemes such as efficient light bulb replacements and subsidies for SWHs (ESKOM, 2012).[53,54] An interviewee, an energy efficiency expert from the public sector, stated that NEEA had implemented tax allowances and provided TA for energy efficiency projects across industries.

Moreover, different banks, like Nedbank or Development Bank of Southern Africa, offer financing options for the acquisition of SWHs (Development Bank of Southern Africa, 2011; Nedbank, 2012). Finally, a Standard Offer[55] Programme, currently under discussion, is expected to attract further sustainable financial stimulus into energy efficiency interventions (GIZ, 2012b).

Besides the renewable energy and energy efficiency strategies set up, the South African Ministry of Industry and Trade, driven by the primary objective of creating jobs and promoting the economy, has identified green industries as one of the key sectors for strengthening concessional funding (Department of Trade and Industry, 2010). However, an international development consultant points out that the Ministry also sees a threat in renewable energy if higher renewable energy investments result in greater imports of technologies. Therefore, the Ministry promotes policies increasing local content requirements[56] in renewable energy public bidding, which could hinder the development of the renewable energy sector, especially solar (Ramayia, 2012).[57]

Mobilisation of green finance

Generally South African banks are rather risk-averse (IMF, 2008) and, according to a researcher from a South African business school, have little awareness of the environmental impact of their financing activities.

Nevertheless, according to an international development consultant, the launch of new policies in the renewable energy and energy efficiency sectors, creating new market opportunities in the clean energy market, has encouraged some financial institutions to establish green credit lines. Among the most pertinent policies, the interviewee mentioned the competitive bidding mechanism for renewable energy production and the Industrial Policy Action Plan (IPAP II), which sets mandatory energy efficiency targets for the industrial sector and identifies green industries as one of the key sectors for further concessional funding.

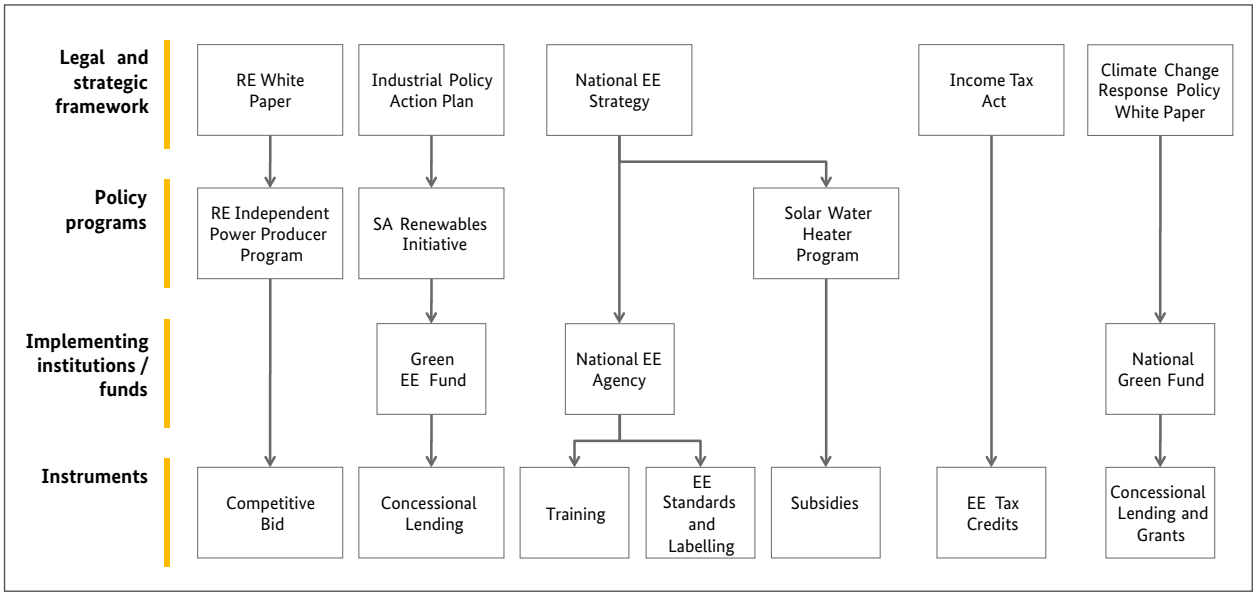
Some of the financing schemes launched by state-owned banks are based on governmental requirements; others – established by commercial banks – have been set up on a voluntary basis with the support of international donors. The main initiatives are listed below.

- In 2012 the government of South Africa launched the USD 90 million National Green Fund, managed by the Development Bank of Southern Africa, providing capital grants, project developments grants and concessional financing (Department of Economic Affairs, Republic of South Africa, 2012). The three thematic focus areas of

53 The national SWH programme (2009) has the target of installing 1 million SWHs by 2014. 290,000 SWHs had been installed by October 2012.
54 The programme is supported by the National Building Regulations and Building Standards Act (amended in 2011), which stipulates that all new commercial and residential buildings will have to receive at least 50% of their hot water requirements from renewable energy sources.
55 The standard offer is a mechanism to acquire demand-side resources (energy efficiency/load reduction) under which a utility purchases resources based on a pre-determined rate.

56 Local content requirements currently are around 35-45% but are expected to increase to 75% for solar projects (Ramayia, 2012).
57 The Department of Industry and Trade has, together with the South African Photovoltaic Industry Association (Sapvia) and the World Wildlife Fund (WWF), commissioned a study assessing whether local content requirements are hindering solar development (Ramayia, 2012).

Figure 12: Policy overview South Africa (excerpt)



the fund are (a) green cities and towns, (b) low-carbon economy and (c) natural resource management (Department of Energy, 2012). Scepticism towards the fund has been expressed by an interviewed researcher due to delays in fund disbursements.[58]

- The Development Bank of Southern Africa set up the Renewable Energy Market Transformation project in 2010 with the support of the World Bank, providing matching grants for capacity building to project developers as well as assistance in identifying, preparing and obtaining financing for renewable energy power generation and commercial solar water heating (Development Bank of Southern Africa, 2011).

- The Industrial Development Corporation (IDC), a national development bank, is setting up a USD 337 million fund to finance the manufacture of green products and components as part of its plan to deploy USD 1.5 billion of investments altogether in the green economy over the next five years (Economic Development Department, Republic of South Africa, 2011). IDC set up a strategic business unit on green industries (focusing on the areas of non-fuel-based green energy, energy efficiency, emissions and pollution management, fuel-based green energy, and biofuels) (IDC, 2012).

- The IDC also launched a USD 63 million Green Energy Efficiency Fund, financed by Germany through KfW, to finance energy efficiency and renewable energy investments with loans between USD 110,000 and 5.5 million at an interest rate of 2% with debt tenures of up to 15 years (Economic Development Department, Republic of South Africa, 2011).

- The French Development Agency recently completed a three-year negotiation process to set up a USD 150 million credit line to finance energy efficiency projects in the industrial sector through the South African commercial banks ABSA and Nedbank, as well as with the IDC (AFD, 2011).

- Sasfin Bank has been allocated a USD 10 million credit line by the IFC to develop financial energy products, execute energy audits and deliver training, with a focus on ESCO (IFC, 2012b).

58 Previously the Development Bank of Southern Africa was criticised for not disbursing funds in the so-called 'job fund scandal'.

Most of these credit lines focus on large-scale industrial projects, failing to encourage investments in the small and medium enterprise (SME) sector (interviewee: Stéphanie Giamparcaro). Moreover, the rigorous administrative procedures in the application process for credits were highly criticised by an interviewed renewable energy expert from a South African university. Nonetheless, an interviewed energy efficiency expert from the public sector expressed enthusiasm for the recently launched cooperation between the Sasfin Bank and the IFC to finance Energy Efficiency SMEs (IFC, 2012b). He added that the South African market for ESCOs, which is still underdeveloped, is indeed perceived as an upcoming investment opportunity by banks and private investors. The IFC-Sasfin cooperation could potentially be a first step to improve access to finance for small-scale projects.

In all cases, international donors have identified a need for capacity building in regard to technology appraisal and are thus emphasising the provision of TA through the National Energy Efficiency Agency (AFD, 2011; IFC, 2012b).

In some cases efforts of banks to move into the field of green financing have been criticised as lacking in seriousness and determination. Although Nedbank adopted the Equator Principles and launched a partnership with the WWF, an interviewee from civil society qualified the bank's strategy as charitable rather than marketing-oriented. Nedbank's Green Index (2011) measuring the performance of companies with environmentally sustainable business practices has been criticised for listing South Africa's top polluters, such as Sasol, Arcelor Mittal, or Pretoria Portland Cement (Still, 2012).

Active role of the Government Employee Pension Fund

The South African Government Employee Pension Fund, the country's largest asset owner, has been a major driver of the socially responsible and green financing movements in South Africa. According to an interviewed scientist, the fund was the first financial institution in the country to incorporate Environmental, Social and Governance (ESG) considerations into its investment analysis schemes. It is applying the Socially Responsible Investment Index[59] launched by the Johannesburg Stock Exchange in 2004 as a measure for determining social responsibility of companies.

Furthermore, the Government Employee Pension Fund encouraged the national government to amend the Pension Funds Act to incorporate guidelines that prudent investing should give appropriate consideration to environmental and social governance criteria (National Treasury, 2011). Despite the unspecific character of the ESG criteria, the interviewed scientist added, this amendment has been received positively by supporters of Environmentally Responsible Investment because pension funds are now allowed to invest 10% of their portfolio in private equity funds. The same interviewee believes that this new regulation is a positive step since equity funds in South Africa have been keen to fund green investments e.g. the Evolution One Fund – South Africa's first private equity clean technology fund with a volume of USD 100 billion (Evolution One, 2007) – and the recently launched Green Enterprise Development and Infrastructure Private Equity Fund. Moreover, an initiative led by the IFC was recently launched to mainstream ESG reporting among pension funds in southern Africa (Gardiner & Jagdessi, 2011).

Conclusion

- South Africa's green finance initiatives are scattered. The government is addressing barriers to the financing of renewable energy and energy efficiency projects through policy regulations which have encouraged public and private financial institutions to launch green credit lines. Crucial policies in this regard are the renewable energy competitive bidding mechanism and energy efficiency requirements for the industry sector. The pension fund industry has also pioneered the adoption of ESG considerations in investment analysis. Nevertheless, important barriers to green finance remain: lack of fiscal incentives in the renewable energy sector and incentive schemes for energy efficiency.

59 SRI Index indicators are structured along the categories of Environment, Society, and Governance (ESG), with climate change assessed as a focus area since 2010 (JSE & EIRIS, 2011).

Furthermore, despite the support of international donors, banks remain risk-averse towards financing small projects. From the case study, several lessons can be drawn:

- Governmental policy instruments like competitive bidding mechanisms for renewable energy production and energy efficiency targets have the potential to trigger the launch of green credit lines by financial institutions. South Africa's Industrial Policy Action Plan encouraged the IDC, a national finance institution dedicated to industrial development, to launch an Energy Efficiency Fund.

- The absence of successful case studies in the clean energy sector creates a climate of risk aversion within financial institutions leading to reluctance to finance small-scale projects. Policymakers and international donors should showcase local successful case studies in the field of renewable energy and energy efficiency. Banks' capacities to assess financial risk in relation to social and environmental impacts should also be reinforced.

- Financial institutions also need capacity building in renewable energy and energy efficiency technology appraisal. National technical institutions along the lines of the South African National Energy Efficiency Agency should be launched to provide technical advisory services to banks.

- The innovative cooperation between the IFC and Sasfin Bank is expected to improve access to finance for small-scale projects and support the development of the South African ESCO market.

- The Government Employee Pension Fund encouraged the South African government to amend the Pension Funds Act to incorporate guidelines that prudent investing should give appropriate consideration to environmental and social governance criteria. Green finance strategies should consider the pension fund industry, which can play a driving role in the launch of socially responsible and green financing private and public initiatives.

Table 21: Policies relevant to green finance in South Africa

Policy, programme	Policy instruments	Description of policy instruments	Status
RE Independent Power Producer Programme (2011)	Public bidding	• Public bidding mechanism for the generation of 3,725 MW of renewable energy • Qualifying technologies are onshore wind (1,829 MW), solar thermal (200 MW), solar PW (1,450 MW), biomass (12.5 MW), biogas (25 MW), landfill gas (25 MW), small hydro (75 MW) and small projects (100 MW)	Enacted
National Energy Efficiency Strategy (2005/2008)	Energy reduction targets	• Mandatory target of 12% energy efficiency improvement by 2012 • Energy efficiency standards for household appliances	In development
	Capital cost subsidy	• Funding for energy efficiency measures in governmental buildings	Enacted
	Standards for energy audits	• Accredited performance standards and approved methodologies for energy efficiency audits	Considered
Income Tax Act (section 12i) (2010)	Tax exemption	• Energy efficiency tax allowance for the manufacturing sector • 5-year tax incentive for green and brownfield manufacturing-related projects in the form of capital investment and training • Eligibility criteria: projects must result in a minimum of 10% energy demand reduction in the year that the investment is realised	Enacted
	Tax reduction	• This tax allowance, 'Regulations on the allowance for energy efficiency savings' is expected to allow industries from all sectors to claim a tax deduction for substantiated energy efficiency savings.	In development
SWH Program (2009)	Capital cost subsidy	• Subsidy for buying a certified solar water heater in replacement of a geyser	Enacted
Industrial Policy Action Plan (IPAP 2) (2010)	Energy reduction targets	• Recommendation to establish energy efficiency standards for the industrial sectors	n/a
National Climate Change Response White paper (2011)	Carbon tax	• Carbon tax rate expected to be equivalent to the marginal external damage costs of GHGs	In development

Table 22: Green finance data, Tunisia

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	11
GDP per capita (current US$)	4,194
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	73.80
Domestic credit to private sector (% of GDP)	68.82
Market capitalization of listed companies (% of GDP)	24.15
Health of the financial sector	
Bank capital to assets ratio (%)	n/a
Bank liquid reserves to bank assets ratio (%)	n/a
Bank nonperforming loans to total gross loans (%)	12.10
Interest rate spread (lending rate minus deposit rate, %)	n/a
Credit depth of information index (0=low to 6=high)	5
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	0.00
Hydroelectric sources	0.50
Natural gas sources	89.68
Nuclear sources	0.00
Oil sources	9.20
Renewable sources, excluding hydroelectric	0.62
Rural electrification	
Access to electricity (% of population)	99.50
Rural population (% of total)	33.90
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	25,013
CO_2 emissions per capita (metric tons)	2.42
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.30
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	45
Corruption perceptions index (1=highly corrupt to 10=very clean)	3.80

Sources: World Bank Data, Transparency International

4.9 Green finance in Tunisia

Key insights

- The success of the Tunisian policy to promote the installation of SWHs in homes was the result of combining a suitable and affordable finance mechanism, a simplified bureaucratic procedure to access the financing and an extensive quality verification system.
- The combination of a five-year repayment scheme, 20% capital subsidy, concessional interest rates and energy savings have assured low acquisition costs for Tunisian households of USD 6-13 per month.
- The introduction of mandatory energy audits for energy-intense establishments in 2004, together with subsidies for subsequent energy efficiency measures through the National Fund for Energy Conservation (FNME), has increased awareness of the financial benefit of energy efficiency and led to substantial investments in energy efficiency by industry.

Country background

Tunisia has a diverse, market-oriented economy, with important agricultural, mining, tourism and manufacturing sectors. In 2011 it was ranked as one of the most competitive economies in Africa (World Economic Forum, 2011). However, the economy continues to be characterised by heavy dependence on traditional sectors of low added value. Even though the revolution of 14 January 2011 has led to a quickening of reforms affecting public administration, regional development and press freedom, it has also slowed down economic growth.

Banks dominate the Tunisian financial system and play a major role in funding the economy, while institutional investors, such as pension funds and investment companies, account for a significantly smaller share of total assets. As of 2010, banks provided domestic credit with a value equivalent to 73.8% of GDP (World Bank, 2012a). The soundness of the financial sector has improved in recent years; the share of non-performing loans in total assets has declined by 11% since 2003, reaching 13.2% in 2009 (Making Finance Work for Africa, 2012).

Tunisia went from being a net exporter of petroleum and gas in the 1970s and 1980s to being a net importer of energy by the end of the 1990s (OECD, 2012). Domestic sources now cover only about three quarters of the country's energy needs. In 2009, Tunisia's electricity production derived 89.7% from natural gas, 9.2% from oil and 0,62% from renewable sources, not counting hydroelectric generation (World Bank, 2012a). The growing cost of fossil-based energy has fostered policies to promote energy conservation through improved energy efficiency over multiple sectors of the economy and has likewise pushed the development of renewable energy.

The most significant investments for renewable energy are made in wind energy through the national energy provider, the Society Tunisienne de l'Électricité et du Gaz (STEG), and the residential Programme Solaire (PROSOL) launched in 2005 to promote the purchase of domestic water heaters. To date, a wind generating capacity of 54 MW has been put in place, with an additional 190 MW being currently installed (OECD, 2012). Private sector investments are still limited, since investments in renewable energy are still seen as essentially government-funded.[60]

The following sections (a) describe and analyse Tunisia's energy efficiency policy in the industrial sector and its ability to stimulate investments in energy efficiency; (b) discuss the policy to promote investment in residential solar heaters and attract commercial capital; (c) present an overview and assessment of financing initiatives in Tunisia.

Green finance policy framework

Aware of its growing dependence on imports of oil products, Tunisia has been progressively adopting a legislative and regulatory framework to control energy use. The first energy savings law was passed in 1985, followed by a law on energy conservation in 1990 (OECD, 2012). A 2004 law introduced mandatory periodic energy audits beyond a certain consumption threshold (Law 2004-72). The most important strategic framework in recent years was developed within the National Energy Efficiency and Renewable Energy Programme (2005-2007 & 2008-2011); both programmes developed laws and instruments to promote investment in renewable energy and energy efficiency (IEA, 2012a).[61] Tunisia's policy for renewable energy and energy efficiency exerts pressure on fiscal incentives to decrease the capital costs of investment, an approach fortified by regulations obliging certain energy-intense industries to, for instance, conduct energy audits.

The legal framework for energy efficiency was established by Law 2004-74, which elevated energy efficiency to a national priority. It introduced mandatory periodic energy audits for industrial, tertiary, transport and residential establishments with energy consumption in excess of 500 tonnes of crude oil (Law 2004-74, decree 2004-2144).[62] At present 215 industrial entities are subject to such audits, representing 75% of primary energy use in the industry sector and 36% of total energy consumption in Tunisia (ANME, 2012; Turki, 2011). All enterprises subject to the audits are mandated to sign performance contracts with the National Agency for Energy Conservation fixing the technical, economic and financial aspects of planned investments (Law 2004-74).

Investments made within this framework are supported by a number of fiscal incentives covered by the National Energy Fund (FNME), significantly reducing the cost of energy efficiency measures and, in turn, creating a higher demand for financing from financial institutions.[63] The energy conservation law of 2004 was amended in 2009 to allow electricity production from renewable sources. It

60 The Tunisian Solar Plan attempts to promote related private investments and has planned 40 projects to be carried out by private investors, mainly foreign, in the period 2010-2016. Since the programme is fairly new it is not analysed in this case study.

61 The 2008-2011 programme's targets were to reduce energy consumption by 20% by 2011, reduce energy intensity by 3% per year, and fulfill 4% of electricity demand through renewable energy (IEA, 2012a).

62 This regulation applies to industrial entities whose energy consumption exceeds 1000 tonnes of fossil oil and to transport, tertiary, and residential entities whose consumption exceeds 500 tonnes.

63 These incentives were introduced and defined by law 2005-82 and decree 2005-2234, and amended by law 2009-7 and decree 2009-352. They include subsidies for: Energy Audits, Consultation prior to operation-expansion of an industrial establishment, Energy efficiency investments, Demonstration projects, Renewable Energy Installations, and Gas Conversion.

also authorises self-generation of electricity using renewable energies with the right to sell up to 30% of the power generated to the Tunisian Electricity and Gas Company (STEG), thus encouraging cogeneration and electricity production by households and enabling them to circumvent the STEG monopoly (OECD, 2012).

In 2005 the Tunisian government launched the PROSOL residential programme to promote investment in renewable energy. The programme, subdivided into PROSOL 1 (2005-2007) and the improved PROSOL 2 (2007-2012), incentivised the purchase of SWHs in residential areas through a number of measures:

- A subsidy of 20% of the cost of SWHs, issued by the National Agency for Energy Conservation (ANME) through the National Fund for Energy Conservation, with a maximum of USD 63/m²;
- A mechanism to facilitate consumers' access to credit and overcome the lack of tailored end-user financing options by facilitating a temporary interest rate subsidy (7% in the first 12 months, 3% in the following 6), a 50% reduction in interest rates (from approx. 12% to approx. 6%), and longer repayment terms (from 3 years to 5 years) (Trabacchi et al., 2012);
- A loan guarantee to commercial banks to finance the residual cost of SWHs provided by the state-owned utility (OECD, 2012).

With the financial support of the UNEP and the Italian Ministry of Environment, the Tunisian government extended the financing mechanism to the industrial sector in 2007. In particular it is targeting the service sector and hotels, under the PROSOL Tertiary Programme (Trabacchi et al., 2012).[64] The incentive scheme provides subsidies for capital costs and interest rates, but does not include a guarantee for banks. In 2009, PROSOL Industry was introduced and is still in its pilot phase.

Mobilisation of green finance

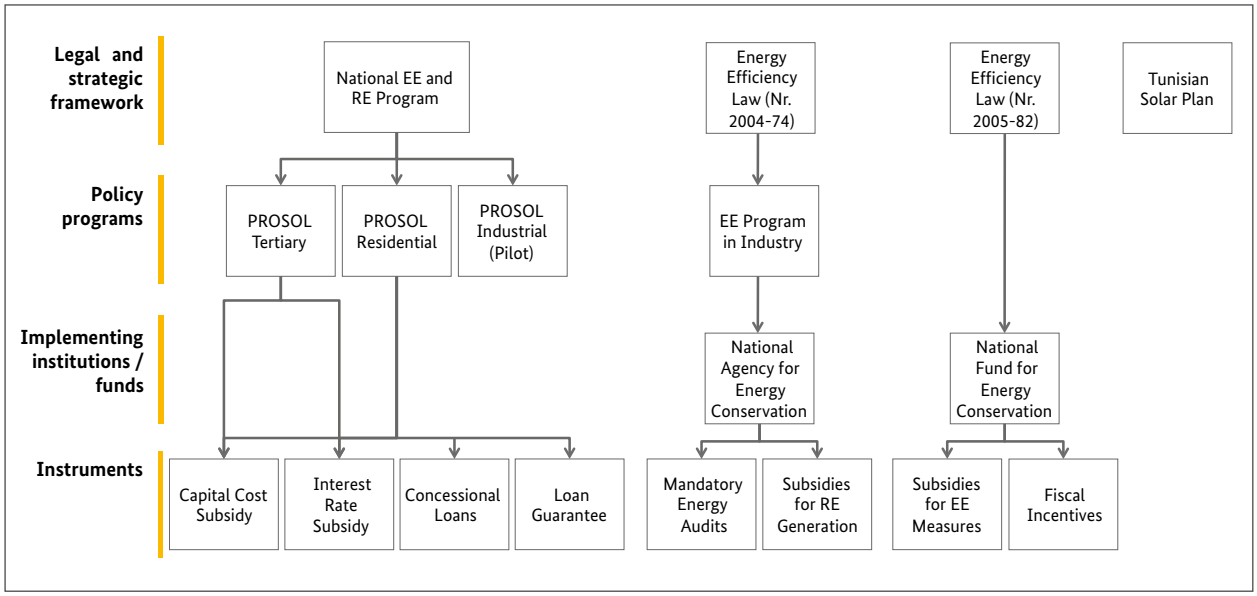
Finance for investments in renewable energy, energy efficiency and other environment-friendly technologies relies heavily on multilateral institutions and government funding. Banking sector involvement in developing commercial credit schemes for renewable energy or energy efficiency could not be identified. However, businesses investing in green sectors can rely on both international credit lines and national funds:

- A multilateral line of USD 55 million established by the World Bank to scale up industrial energy efficiency and cogeneration investments (World Bank, 2009);[65]
- A grant of USD 8.5 million from the World Bank to finance energy efficiency projects in the industrial sector;

64 Several factors have inhibited the success of the tertiary PROSOL programme. First, the state utility did not act as a debt servicer and guarantor for loans from commercial banks. Accordingly, the state-owned STB Bank was the only financial institution to offer loans at concessional interest rates (Trabacchi et al., 2012). Secondly, the financial benefits to be gained through investment in commercial SWHs were too low to justify the high investment costs. This was exacerbated by the precarious financial situation of the highly-leveraged Tunisian tourism sector. Additionally, more than half of the hotels use natural gas and therefore see no need to invest in SWHs that would have very long payback rates of around 10.5 years (Trabachhi et al., 2012). National engineering and installation companies' lack of technical expertise in big and complex SWH installation has, according to an interviewee, led to poor installation quality and reduced confidence among those who were actually interested in purchasing and installing such applications.

65 The Amen Bank, the Bank of Habitat, and the Banque de Financement des Petites et Moyennes Enterprises were provided with World Bank funds at concessional interest rates of 1.8-2.4%, allowing them to finance energy efficiency projects at correspondingly low interest rates of 5.5-7.5% (RIAED, 2012). Fund repayment was guaranteed by the Tunisian Government (Turki, 2011). To avoid lengthy and cumbersome application procedures, the National Agency for Energy Conservation was summoned to work closely with participating financial institutions to prescreen projects for financing (World Bank, 2009).

Figure 13: Policy overview Tunesia (excerpt)



- A grant of EUR 19 million (USD 24.5 million) from the European Union involving a boost of the financial resources of the AFD (USD 20.8 million) and subsidisation of the AFD line of credit (USD 2.6 million);

- A new line of credit supported by the European Union and the French Development Agency which has provided three Tunisian banks with a preferential credit line of EUR 40 million (around USD 51.7 million) to encourage environmental investment, including pollution abatement in the tourism sector (OECD, 2012);

- The Pollution Cleanup Fund, created in 1992, which grants subsidies of up to 20% of the amount of investment for clean technology and de-pollution projects (OECD, 2012).[65]

FNME funding has provided strong incentives to act upon the obligatory energy audits and invest in energy efficiency measures. In fact, as an interviewee explained, the mandatory energy audits raised awareness of potential financial gains through performance contracts, leading to investment interest which was then consistently backed up by considerable financial incentives. As a result, the policies have generated remarkable investment in energy efficiency. Performance contracts signed by industry leaped from 117 (1987-2004) to 511 (2008-2011) (ANME, 2011; Turki, 2011). Reduction in primary energy consumption reached 14% in 2011.

PROSOL Residential – Assuring finance for renewable energy

Since the inception of PROSOL, the sale of SWHs for the residential sector has had annual growth rates of 80%. The market has stabilised at about 80,000 m2 of installed heaters per year (ANME, 2011). Through PROSOL (2005-2010), more than 119,000 SWHs were installed in Tunisia (Trabacchi et al., 2012). The PROSOL programme has been widely acclaimed as a best-case example of a well-designed and successful policy instrument. This popularity is the result of combining a suitable and affordable finance and incentive mechanism, a simplified bureaucratic procedure to access the financing, and a quality verification system.

65 The National Fund for Energy Efficiency (FNME), established in 2005, finances energy conservation measures through subsidies for renewable energy and energy efficiency investments.

The key innovation enabling the success of PROSOL is a guarantee mechanism to mitigate risk for banks, thus incentivising them to finance residential SWHs. Loans are repaid via the client's electricity bill through the state-owned utility (STEG). In case of delayed payment or default, STEG can suspend the electricity supply and thus take on the role of debt repayment enforcer and loan guarantor (Trabacchi et al., 2012). This provided enough guarantee to extend five-year rather than the usual three-year loans and apply an interest rate reduction (Climate Finance Options, 2012). Loans are remitted by the Attijari Bank, Amen Bank and UBCI, which were awarded the license through a competitive bid. Amen Bank and UBCI together loaned USD 7.3 million in PROSOL I; Attijari Bank made loans for USD 52.5 million in PROSOL II (Trabacchi et al,. 2012).

Engaging banks by addressing their risk perception has been a key to the success of the financing mechanism. STEG relieves banks of a risk they are unwilling to bear, shifting the burden of non-repayment from banks to households. The near-zero default rate of PROSOL loans has made the initiative profitable for banks despite the lower interest rate charged (Trabacchi et al., 2012).

Furthermore, the lower interest rates, five-year repayment scheme, 20% capital cost subsidy and electricity savings generated by SWHs use resulted in very low financing costs of USD 6-13/month for end-users. This makes the programme affordable even to low-income households.

ANME has additionally specified concrete technical requirements that all thermal appliance sold through the PROSOL programme must fulfil. As stated by an interviewee from the public sector, manufacturers have to provide technical data specifications demonstrating the appliance's conformity with the energy agency's requirements. Installation companies, he continued, are held accountable for the quality of their services. ANME verifies installation quality regularly and sanctions poor performance by withdrawal of the installation license. These measures increased trust on the part of both banks and end-users.

Finally, PROSOL Residential was facilitated by a quick and simplified application procedure. Customers could contact the supplier, fill out the application form at the SWH supplier office and present their latest state utility bill and ID. Once the application and engagement forms were signed, installation followed immediately (Trabacchi et al., 2012).

Conclusion

Tunisia's renewable energy and energy efficiency policies have in many ways been successful. Unlike other surveyed countries, Tunisia has developed a powerful mechanism to attract commercial capital into renewable energy investment for households by coherently addressing the relevant barriers, both technical and financial. In the case of PROSOL Tertiary, policies have failed to generate a comparable impact because of their inability to successfully address important barriers, namely the high up-front costs of the investment, limited access to finance, and weak technical capacity to dimension and install complex thermal applications. Energy efficiency policies in the industrial sector, on the other hand, have developed an intelligent mix of awareness-raising obligations and subsidies for energy efficiency measures.

From this, the following lessons can be drawn:

- Tunisia's policies managed to ensure market-oriented involvement of commercial banks through streamlined administrative procedures and reliable quality management. In particular, policies of quality control through randomised technical audits of installed solar thermal systems and penalties for failure to meet quality standards are vital to ensure repayment of product loans to financial institutions.

- Tunisia substantially raised awareness of energy efficiency measures by conducting mandatory energy audits and at the same time offering subsidies for implementing such measures. This type of policy setting can be replicated in other countries.

- Engineering and installation companies lack the expertise to design and install solar thermal applications for the tertiary and industrial sector. Public support institutions should provide appropriate capacity building measures to enable private sector actors to implement energy efficiency measures.

- PROSOL Tertiary overestimated the market potential for thermal applications in the hotel sector, demonstrating that incentive schemes inappropriate to the needs of the target group run a high risk of failing. Hence, incentive schemes need to be assessed in collaboration with stakeholders to ensure a good fit.

Table 23: Policies relevant to green finance in Tunisia

Policy, programme	Policy instruments	Description of policy instruments	Status
PROSOL Residential (2005)	Capital cost subsidy	• 20% subsidy of SWH cost, to a maximum of USD 63/m²	Enacted
	Credit guarantee mechanism	• Guarantee mechanism for banks to secure loans to low-income households for thermal applications • Secured repayment through the state utility, which takes the role of debt repayment enforcer and loan guarantor	Enacted
PROSOL Tertiary (2008)	Tax exemption	• VAT exemption for thermal applications	Enacted
	Tax reduction	• Custom duty reduction for thermal applications	Enacted
	Feasibility study subsidy	• 50% subsidy of cost of feasibility studies (economic/technical feasibility, dimensioning, assistance, and performance verification) • Maximum payment of TND 5,000 (USD 3,189) • Obligation for industries expanding their operations and exceeding the threshold for mandatory energy audits to conduct prior consultations (Obligatory Energy Audits) • Consultation subsidy of 70% to a maximum of USD 19,113	Enacted
	Capital cost subsidy	• 30% capital subsidy for investment with a maximum of USD 96/m² (TDN 150/m²)	Enacted
	Maintenance cost subsidy	• Subsidy for SWH maintenance for the first four years after warranty expiration	Enacted
	Interest rate subsidy	• 2-point reduction for hoteliers on the interest rate requested by commercial banks	Enacted
PROSOL Industrial (2009)	Capital cost subsidy	• 30% capital subsidy for investment with a maximum of USD 96/m² (TDN 150/m²)	Enacted
Program for Energy Efficiency in Industries	Energy audit subsidy	• 70% of energy audit cost financed to a maximum of USD 19,113	Enacted
	Capital cost subsidy	• 20% subsidy for material energy efficiency investments to a maximum of USD 63,710-159,276 • 70% subsidy for immaterial investments • 50% subsidy for establishments that create demonstration projects to a maximum of USD 63,710 • Subsidies for companies installing renewable energy: 30% for thermal applications, 40% for biogas, 20% for biogas with electricity production	
	Generation-based subsidy	• 20% subsidy with a maximum of USD 318,552 to any company converting to the use of natural gas	Enacted

Table 24: Green finance data, Uganda

Topics and Indicators	VALUE
GENERAL (data from 2010)	
Population (millions)	35
GDP per capita (current US$)	515
FINANCIAL SECTOR (data from 2010)	
Size of the financial sector	
Domestic credit provided by banking sector (% of GDP)	17.10
Domestic credit to private sector (% of GDP)	15.65
Market capitalization of listed companies (% of GDP)	10.40
Health of the financial sector	
Bank capital to assets ratio (%)	13.90
Bank liquid reserves to bank assets ratio (%)	16.61
Bank nonperforming loans to total gross loans (%)	2.10
Interest rate spread (lending rate minus deposit rate, %)	12.49
Credit depth of information index (0=low to 6=high)	4
ENERGY SECTOR (data from 2009)	
Energy matrix (electricity production as % of total)	
Coal sources	n/a
Hydroelectric sources	n/a
Natural gas sources	n/a
Nuclear sources	n/a
Oil sources	n/a
Renewable sources, excluding hydroelectric	n/a
Rural electrification	
Access to electricity (% of population)	9.00
Rural population (% of total)	84.84
ENERGY EFFICIENCY (data from 2008)	
CO_2 emissions - total (kt)	3,748
CO_2 emissions per capita (metric tons)	0.12
CO_2 emissions per GDP (kg per 2005 PPP $ of GDP)	0.11
GOVERNMENT	
Ease of doing business ranking (1=most business-friendly regulations, up to 185)	119
Corruption perceptions index (1=highly corrupt to 10=very clean)	2.40

Sources: World Bank Data, Transparency International

4.10 Green finance in Uganda

Key insights

- Poorly implemented post-installation auditing of solar appliances by technicians from the Rural Electrification Agency has had a negative impact on the confidence of both financial institutions and customers in the Solar Power Subsidy Programme.
- Insufficient marketing of the small-scale Solar Power Subsidy Programme was a significant barrier to the success of the programme.
- Bank loan officers often did not understand the advantages and challenges of solar technology and thus could not market the programme appropriately to potential clients.

Country background

Since 1990, economic reforms have led Uganda into a period of solid economic growth based on continued investment in infrastructure, improved incentives for production and exports, lower inflation and better domestic security. Rich in natural resources, the country boasts fertile soils, small deposits of copper, gold and other minerals, and recently-discovered untapped oil resources. Agriculture is the most important sector of the economy, employing 80% of the workforce. Over the past two decades, Uganda's economy has witnessed steady growth reaching annual GDP growth rates of 6.5% in the 1990s and over 7% in the 2000s. Uganda rates poorly on the Ease of Doing Business indicator and is ranked as highly corrupt according to Amnesty International's corruption index (World Bank, 2012a).

Uganda's financial system is characterised by a small banking sector that in 2010 provided domestic credit to the private sector equal to merely 15.65% of its GDP. Access to funding is constrained by a very low market capitalisation of 10.4% for listed companies (World Bank, 2012a).

Uganda has an installed electricity generation capacity of 595 MW, mostly consisting of hydropower. It's per capital electricity consumption is among the lowest in the world.

In 2009, only about 9% of the population had access to the electricity grid. In rural areas, where 85% of the population lives, roughly 1% of households are connected to the grid (Reegle, 2012; World Bank, 2012a). Biomass in the form of wood for cooking is the most important source of energy for most of the population, providing 90% of the total primary energy consumption.

The development of renewable energy in Uganda has been constrained by a disabling legal framework,[66] insufficient access to long-term financing and limited capacity for planning and implementing renewable energy projects (World Bank, 2009). Apart from large-scale hydropower plants, only a small fraction of Uganda's renewable energy resource potential has been tapped (World Bank, 2009). Solar energy is primarily used for off-grid electrification of rural communities, cooking and water heating. No large-scale wind energy production has been deployed in the country (Reegle, 2012).

Green finance policy framework

To counteract the precarious energy situation, the Government of Uganda has developed strategies aimed at improving the country's electrification rates, particularly in rural areas, through private sector investments in renewable energy. Addressing the perceived high risks of such investments, the government has recently launched specific instruments and programmes to create business opportunities in renewable energy, while simultaneously striving to increase the involvement of financial institutions. It has introduced a FIT based on PPAs, implemented the Rural Energy Transformation Programme with the help of the World Bank, and created the Uganda Energy Capital Trust to develop credit enhancement mechanisms for renewable energy investments.

Feed-in tariff

In 2007 the government of Uganda introduced the Renewable Energy Policy (2007-2017) aiming to increase the share of renewable energy from 4% to 61% of national energy consumption by 2017 through the establishment of a financing and fiscal policy framework to promote renewable energy investments (Gipe, 2011). A FIT has been developed, which applies to small-scale renewable energy systems up to a maximum installed project capacity of 20 MW of prescribed priority technologies. The feed-in tariffs promised to buy electricity from the developers for a period of 20 years. However, due to low cost of production figures, project developers responded only hesitantly.[67] Consequently the FIT was reviewed in 2010 and a new tariff was developed that contained updated levelled costs of production figures.[68] The second phase (2011-2012) has improved the policy design by widening the scope of technologies covered, providing caps for each technology and addressing a number of risks that were not fully covered under first phase.[69] The figures for cost of production in the FIT were raised again in January 2013.

The tariff specifies capacity caps, amounting to less than 20 MW for each project. Projects with an installed capacity greater than 20 MW will be required to negotiate a tariff and PPA on a case-by-case basis, while tariffs for each priority technology will be determined by using a $/kWh levelled-cost approach based on the electricity generation costs from the renewable energy source (Gipe, 2011).

66 Until a relatively late restructuring strategy was launched by the government in 1999, the legal framework allowed only the national electric utility to sell power.

67 In fact, the policy stipulates that feed-in tariffs and power purchase agreements are negotiated on a case-by-case basis, increasing transaction time and costs, thus leading to lower margins for investors (Rural Electrification Agency, 2007).

68 Uganda is offering tariffs for a full suite of technologies, including geothermal, bagasse, and varying tariffs for hydropower projects that range from 1 MW to 8 MW. The latter are in fact linear but presented in tabular form in increments of 100 kW. The FIT will be managed and implemented by the Electric Regulatory Authority as part of its mandate under the Electricity Act of 1999.

69 Some of the risks include automatic grid interconnection and pricing flexibility; off take risks since the renewable energy generator signs a power purchase agreement with the Ugandan Electricity Transmission Company Limited. The FIT mitigates the price and currency risks to the energy generator as these are taken by the System Operator in the long term. The tariffs are not adjusted downwards when a renewable energy generator qualifies for Certified Emission Reduction or Clean Development Mechanism revenues, so that additional incentives are provided.

Several companies have already shown substantial interest in participating in the tariff scheme.

The energy for rural transformation project

In addition to the Renewable Energy Policy, Uganda has developed the Energy for Rural Transformation Project (ERT), which is designed to build capacity and create an environment conducive to commercially-oriented delivery of sustainable energy services. The project was funded by the World Bank and the Global Environment Facility (World Bank, 2009).

Among the six components of the ERT, four are specifically designed to promote private sector investments in renewable energy, calling for (a) the extension of main-grid-related power generation and distribution to underserved rural areas, with a significant part of the power to be generated from renewable sources; (b) the expansion of independent grid systems; (c) the installation of solar PV systems in homes and community institutions; and (d) capacity building, TA and training for public and private sector institutions implementing associated projects (World Bank, 2009). Several instruments have been introduced to foster green investments under this programme.

Firstly, a refinancing scheme for solar PV has been established, including the provision of funds to three microfinance institutions, namely Uganda Microfinance Limited, Commercial Microfinance Limited and PostBank.[70] The funds facilitate the sale of SHSs to rural customers through capital subsidies and the extension of capital loans to solar vendors and increase affordability by facilitating the extension of credit for solar products. Out of the USD 1.02 million disbursed to these three agencies, 17%, 55% and 70%, respectively, was used for loans, reflecting low demand (World Bank, 2009).

Secondly, the ERT project provided grants and subsidies of 30% that were channelled through the Private Sector Foundation and supported renewable energy installations of over 1.3 MW peaks in the private sector. According to the World Bank these high numbers are attributable to the large quantities of solar systems purchased on a community level. End-users of SHSs responded with low interest in the scheme (World Bank, 2009).

Finally, in 2008 under the ERT, the Rural Electrification Agency (REA) launched the Solar Power Subsidy Programme, providing capital cost subsidies of up to 40% for PV installations and involving financial institutions in the provision of solar loans (World Bank, 2009).[71] PostBank, FINCA and other microfinance institutions distributed loans for PV installations subsidised by the programme. In order to assure the quality of the product, REA established a verification system linking subsidy payment to installation quality. Sellers of solar systems will receive the subsidy for their products only after technical auditors from REA have certified the quality of the installation and performance of the system (Rural Electrification Agency, 2010).

The Uganda Energy Capitalisation Trust

On an institutional level, the government of Uganda has tried to address the high risk perception of private investors through the establishment of the Uganda Energy Capitalisation Trust, which is meant to enhance the flow of private sector financial resources towards investments in small-scale, renewable energy generation and distribution projects and/or rural electrification projects in Uganda.[72] Credit enhancement instruments for investments in renewable energy have been developed, including the following:

- A solar refinance facility that includes lending to final beneficiaries for the purchase of solar systems via participating microfinance institutions;
- A liquidity refinance option which acts as a liquidity insurance facility to enable participating financial institutions (PFIs) to extend loan tenure;

70 The solar refinance facility for financial institutions is provided by the Energy Capitalisation Company.

71 The Private Sector Foundation is responsible for programme marketing. The Energy Capitalisation Company provides the solar refinance facility to financial institutions that, in turn, issue credits for the purchase of solar systems.

72 The Uganda Energy Capitalisation Trust is managed by the Uganda Energy Credit Capitalisation Company, the Government of Uganda, and various multilateral and bilateral institutions.

- A bridge financing facility covering interest payments during the construction stage of a project, before it starts generating cash flows;
- A subordinated debt finance facility for project developers whose levels of equity fall short of those required by the debt providers;
- An interest rate buydown decreasing the currently high interest rates that are not in line with the requirements of project financing.
- Until now, only the solar refinance facility and the liquidity refinance option have been enacted, while the others are still to be authorised.

Mobilisation of green finance

Development finance institutions have played an important role in financing the development of renewable energy in Uganda. In December 2001 the World Bank approved the Energy for Rural Transformation Project (ERT) with a credit volume of USD 49.15 million and a grant of USD 12.12 million from the Global Environment Facility in support of the first phase (2001-2009) and USD 75 million from the World Bank committed for the second phase (2009-2013) (World Bank, 2009). Without such funding, many of Uganda's ambitious projects to improve the country's energy situation could not have been implemented.

Private sector involvement in renewable energy generation in Uganda is still weak. Both the ERT Project and the Solar Power Subsidy Programme have been unable, despite significant effort, to stimulate private investment in renewable energy. Investors continue to perceive such investments, especially those in rural energy development, as high risk (World Bank, 2009). Phase I of the Energy for Rural Transformation Project, expressly designed to instigate a private-sector-led expansion of energy and renewable energy production in particular, has not been able to significantly change these perceptions. This was particularly true for the expansion of the main grid, which was met by a disappointing response from the private sector and had to be financed 100% by the Government of Uganda (World Bank, 2009).

The subsidy scheme in the Solar Power Subsidy Programme has likewise struggled to trigger the expected investments in renewable energy. End-user demand for solar products was weak despite the high capital cost subsidies. The PostBank, which besides being involved in the distribution of solar loans within the Solar Power Subsidy Programme had independently developed a solar loan product for the purchase of energy services in rural areas, conducted field research to understand the barriers to the success of the subsidy programme, identifying five main problems: disappointing marketing strategies, poor system performance, inadequate after-sales service, deficient technical auditing and insufficient technical expertise within the bank (PostBank Uganda & REA, 2010).

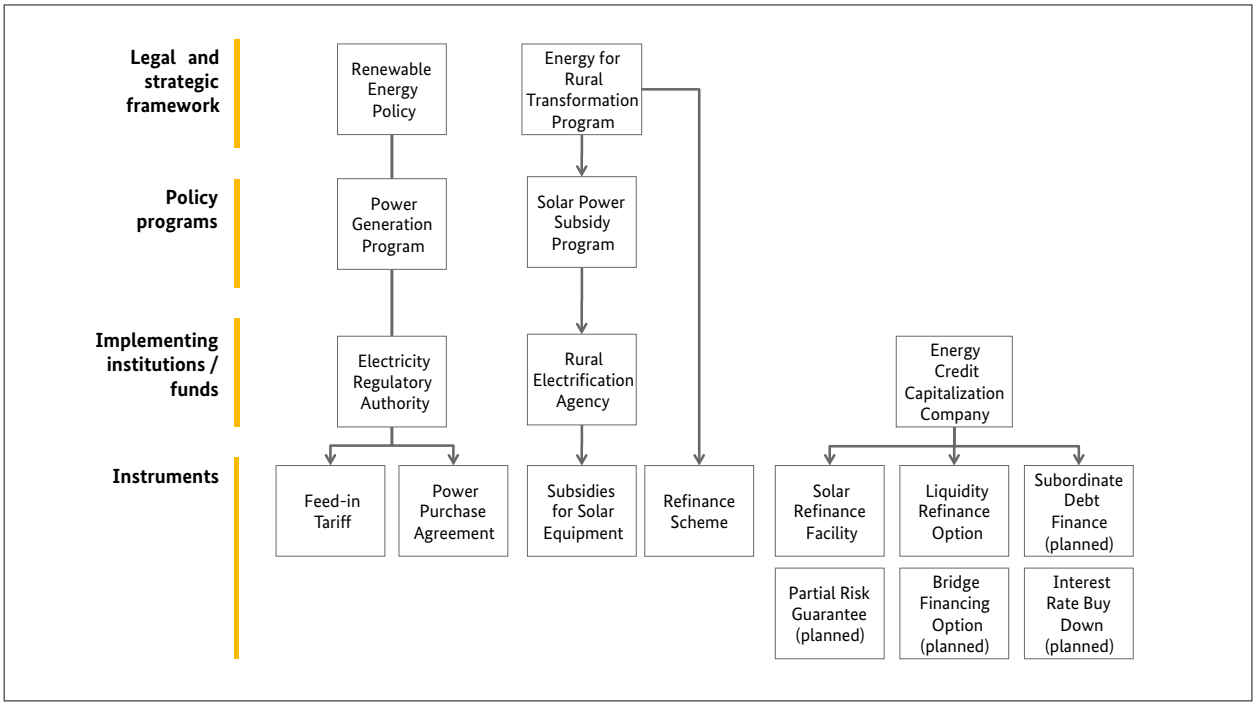
Firstly, end-users were often simply not aware of the subsidy programme and the potential economic and social benefits of solar products since the Private Sector Foundation, which was responsible for promoting the programme, did not market the subsidy scheme appropriately (Rural Electrification Agency, 2010).

Additionally, end-users complained about poor system performance and inadequate after-sales service by the solar companies, leading some to default on loan repayments. In response, the PostBank report suggested the enforcement of minimum technical and service requirements for solar companies, while simultaneously improving end-user education in the maintenance of the systems (Rural Electrification Agency, 2010).

Quality problems were further exacerbated by unprofessional behaviour of REA's technical auditors. Improper system inspection was widespread, for example, conducting audits via telephone interviews with customers rather than through on-site verification as well as frequent failures to report system defects to the REA (Rural Electrification Agency, 2010). Such deficiencies might be counteracted, as an interviewee explained, by stronger involvement of the financial institution, since it has, in contrast to REA technicians, a strong financial interest in ensuring the technical quality of the appliances.

Finally, PostBank loan officers had insufficient knowledge to fully understand the benefits and shortcomings of the PV technology, affecting their ability to both market the

Figure 14: Policy overview Uganda (excerpt)



product and appropriately respond to complaints (Rural Electrification Agency, 2010).

In sum, the above-mentioned shortcomings represent a threat to financing through banks, as they undermine the quality of the programme as a whole and, more importantly, heavily affect the trust of the customers and financial institutions involved in the Solar Power Subsidy Programme (Rural Electrification Agency, 2010).

Conclusion

Uganda has formulated ambitious goals to promote private investment in renewable energy, notably through the introduction of a FIT and the development of the ERT Project. Policy instruments, albeit rightly addressing some crucial barriers, have not been able to kick off expected private investments. Important barriers remained and were not always appropriately addressed, as exemplified by the Solar Power Subsidy Programme. From this, several conclusions can be drawn.

- Insufficient marketing of the small-scale Solar Power Subsidy Programme was a significant barrier to that programme's success.

- The technical auditing of small-scale solar appliances carried out by REA technicians was poorly implemented, which can be traced back to weak incentive and enforcement schemes for ensuring product and service quality. Bad service quality in turn negatively impacted loan repayment rates. Policymakers thus need to ensure that stakeholders are incentivised and monitored appropriately. Furthermore, penalty schemes need to be established.

- Bank loan officers often did not understand the advantages and challenges of solar technology, and could therefore not market the programme appropriately to potential clients. To ensure lack of technical expertise does not constrain bank involvement, policies should support relevant capacity building measures.

Table 25: Policies relevant to green finance in Uganda

Policy, programme	Policy instruments	Description of policy instruments	Status
Renewable Energy Policy	PPA (2005)	• For installed capacity greater than 20 MW • Tariff decided on case-by-case basis • Tariffs determined by using a $/kWh levelled-cost approach based on electricity generation costs from the RE source	Enacted
	FIT (2007/2011)	• FITs for hydropower, bagasse, biomass, biogas, landfill gas, geothermal, solar PV and wind • Tariffs up to a maximum capacity of 20 MW per year	Enacted
Credit Enhancement Instruments, overseen by Energy Credit Capitalisation Company	Public refinancing	• On lending to final beneficiaries for the acquisition of solar systems via participating microfinance institutions	Enacted
	Public refinancing	• Liquidity insurance facility to enable PFIs to extend loan tenure	Enacted
	Credit and loan guarantee	• Cost-overrun insurance facility, available during the construction phase of investment projects • Enablement of projects to initially access a guaranteed cover for cost-overruns of up to 15% of total project cost • Overruns beyond the 15% but not exceeding 50% of the project cost may be financed on a 50:50 basis between the Uganda Energy Credit Capitalisation Company and the developer	Considered
	Interest rate subsidy	• Covers interest payments during the construction stage of a project, before it starts generating cash flows • Buys down the interest charged by the banks on energy projects	Considered
	Direct public financing	• Addresses project developers who have some equity, but fall short of the levels required by debt providers	Considered
ERT Program	Refinancing scheme	• Refinancing scheme for solar PV including provision of funds to three microfinance institutions	Enacted
	Consumer loan	• Grants and subsidies of 30% channelled through the Private Sector Foundation	Enacted
	Subsidy	• Subsidies of up to 40% for PV installations	Enacted

5. Conclusion

All ten country case studies point to a need for more ambitious green finance policies with more rigorous implementation. The following paragraphs summarise the conclusions for each of the three major fields of green investment: large-scale renewable energy (RE), EE, and small-scale renewable energy and energy efficiency. Each section first describes the different challenges faced by investors, followed by the effectiveness of policy instruments in addressing investment barriers and recommendations for policymakers. Finally, recommendations for international development organisations are provided.

Large-scale renewable energy

Development of large-scale renewable energy projects and procurement of financing depend on establishing strong, long-term RE policy frameworks and translating these into reliable instruments that are accessible to the private sector on a fair, level playing field.

In most of the countries surveyed, investments in large-scale RE are driven by international finance and development institutions. The legal, structural and economic framework is often too weak to allow the emergence of market-based RE development. In this situation, large RE investments are catalysed by international finance and development institutions. This was the case in Egypt, where, a decade after the first wind farms were installed with the help of international development funding, home-grown policies have started to promote private sector investments.

Challenges faced by financial institutions

In most cases, before introducing policies specifically designed to promote private sector investments in RE, policies have addressed structural barriers.

Most countries introduced policies to liberalise energy markets. When energy production, transmission and distribution are still bundled together and controlled by public enterprises, private investors will put little trust in the long-term availability of incentive schemes. Recognising this problem, most countries have been committed to liberalising their energy markets since the 1990s. Despite these efforts, markets are far from being competitive in many cases and policies contain significant inconsistencies. The Philippines, for instance, has liberalised its market but has not supported fair competition through appropriate anti-trust regulations, thus biasing the market towards domestic corporations with strong ties to politics. In Egypt, around ten years after liberalisation of the energy market, the state-owned electricity company still accounts for more than 90% of electricity generation and distribution.

All the countries surveyed have tried to reduce the costs of renewable energy investments through financial support mechanisms. Nine out of ten have introduced fiscal incentives, such as tax exemptions and rebates. Most countries have also introduced or at least considered FITs. Funds have been created and subsidies for investment granted.

Assessment of policy instruments and recommendations

In the past, the strong presence of international project developers and financiers prevented local financial institutions from gaining experience in the sector. National policies have focused on international financial support, neglecting the development of domestic capacity for renewable energy financing. However, some promising instruments have been introduced.

As the Chilean example demonstrates, rethinking the role of development finance may reduce this negative side effect. A concessional credit line for renewable energy issued by KfW on behalf of the German Federal Ministry of Economic Cooperation and Development (BMZ), channelled through Chilean banks, allowed the banks to gain first-hand experience in renewable energy financing at concessional rates. In markets with good renewable energy investment conditions but only modest financing experience, such schemes may provide the necessary impetus for banks to overcome their reservations by encouraging them to gain important experience that may, as in the case of Chile, pique the interest of other financial actors. Other countries provide similar examples. In Peru, public financing schemes were recently changed to involve local financial institutions to a higher degree. In the Philippines, the positive experience of the Bank of the Philippine Islands encouraged commercial banks to develop green credit lines.

Providing financial and technical assistance to establish green credit lines is another way to attract banks to green financing. In the Philippines, the IFC supported the Bank of the Philippine Islands by deploying two full-time energy officers specialised in the assessment of renewable energy and EE projects, thus stimulating green finance activities by the bank. Helping commercial banks to acquire first-hand experience through the deployment of expertise within the institutions allows them to develop the required skills in project risk assessment and build a track record of successful investments. In the Philippines, the IFC programme demonstrated the viability of renewable energy finance, which in turn motivated other banks to engage in the sector.

Besides promoting energy market liberalisation, building implementation capacity in public institutions and involving local financial institutions, governments also need to ensure that private project developers meet their targets. Enforcing contracts is a particular challenge in countries where bureaucracies and corruption exist in both the public and private sphere. India's National Solar Mission, despite substantial criticism, has managed to keep renewable energy project developers in line by requiring the developers who win concessions to secure financing within 180 days of the date on which the PPA is signed. If these requirements are not met, the Government withdraws generation licenses.

Recommendations for development organisations
International development organisations can support efforts to mobilise the financing of large-scale renewable energy projects in the following ways:

- Encourage further liberalisation of energy markets and fair competition to provide grid access to independent power producers;
- Support public institutions in developing enforcement mechanisms, such as penalties, to accelerate project development and financing;
- Promote indirect concessional financing through local financial institutions, coupled with capacity-building measures.

Energy Efficiency

High oil prices and growing concern about national carbon emissions have compelled several governments to consider EE as a valuable option in addressing climate change and energy security threats. Since even modest investment in efficiency can yield substantial energy savings, EE has, in recent years, become a fixture on the political agenda in developing and, in particular, emerging economies such as India and South Africa.

EE markets offer enormous untapped potential. However, they are often not embedded in sufficiently developed financial and technical infrastructure. Significant barriers remain, hindering the mutually beneficial cooperation of the key stakeholders: ESCOs as the energy service providers, industries and companies as their potential clients, banks as the financing link between the two, and governments establishing an enabling environment that will motivate actors to engage in EE.

Challenges faced by financial institutions
Information asymmetries between ESCOs and their clients and financiers create significant agency problems that jeopardise overall business relations. While ESCOs have the technical capacity to assess the investment risks, neither their clients nor their financiers are able to make the same assessments and so have trouble selecting and trusting ESCOs. As a result, banks are reluctant to provide ESCOs with access to affordable financing. Failing to understand the opportunities in energy performance contracting, banks tend to assign high risk status to these unknown territories. Their lack of capacity to assess technical and financial aspects of ESCO projects further compounds the problem. These factors often lead banks to either refuse funding or require liquidity and return rates that threaten the viability of ESCO projects.

The energy market is additionally constrained by a lack of awareness among stakeholders, managers and end-consumers, who tend to underestimate the productivity gains and carbon reductions to be derived from EE measures. At the same time, subsidies for fossil fuel and fossil-fuel-based energy lower the attractiveness of EE measures for private sector actors, despite the fact that, from a macroeconomic perspective, these measures reduce overall costs.

Assessment of policy instruments and recommendations
In order to enable healthy market development for EE, and ESCOs in particular, governments first need to create an overall enabling framework to ensure that CO_2 emissions and energy savings realised through EE measures are priced correctly. In cases where fossil fuels or electricity are subsidised, governments should also subsidise EE measures. For this purpose, some countries have established EE funds which are fed by taxes on polluters. Such subsidies could effectively be offset by lower spending on electricity or fossil fuel subsidies resulting from decreased consumption.

Secondly, governments should address the agency problem by developing measures that reduce information asymmetries and increase trust between ESCOs and their clients and financiers. Some of the countries surveyed are experimenting with different measures to tackle this issue. For instance, India has recognised the importance of designing a standard performance contract and implementing a standard methodology that covers the entire project chain from audit to performance measurement and verification. In some instances government agencies have introduced ESCO rating mechanisms and certifications in order to increase transparency in technical skills. In India, for example, the BEE accredits ESCOs according to the availability of technical manpower, financial resources, and experience in energy performance contracting.

Governments should also create an incentive framework that raises awareness in the industrial and service sectors of the financial benefits of EE, while simultaneously stimulating relevant investments. Some of the countries surveyed have developed promising instruments. Chile has implemented pre-financing of feasibility studies for EE projects and has provided subsidies for energy audits. Tunisia has introduced and subsidised mandatory energy audits for energy-intensive industries, while simultaneously subsidising energy performance contracts.

Furthermore, governments should provide frameworks that reduce the risk perception of financial institutions to an acceptable level. To this end, governments could consider developing guarantee mechanisms for banks, a demonstrably successful inducement for financial institutions to finance EE projects. India is currently developing risk guarantee funds designed to attract private investments in EE.

Recommendations for development organisations
International development organisations can support policymaking to finance EE and ESCO market development in the following ways:

- Counsel governments developing standardised guidelines, benchmarks and methodologies for accrediting and measuring energy performance contracting;
- Counsel governments establishing risk guarantee funds: provide support in conducting risk appraisals and setting up funding procedures and guidelines;
- Develop ESCO capacity to produce detailed, comprehensive project reports by providing training on how to clearly specify project risks, risk-mitigating measures and internal rate-of-return calculations;
- Conduct capacity building for financial institutions by providing training on energy performance contracting, EE technology available in the market, and procedures for assessing financial projections and risks of ESCO projects. This can be done, for example, by deploying experts in financial institutions to coach financial analysts during the technical and financial risk assessment of EE projects. Furthermore, establishing international training standards in EE for financial analysts could give capacity-building efforts additional credibility;
- Raise private sector awareness of productivity gains and CO_2 reductions to be achieved by implementing EE in company value chains (e.g. through round tables and conferences). In addition, best-case examples that can easily be replicated by a wide range of companies across industries are a valuable tool for attracting wide-ranging interest;
- Facilitate South-South exchange of experiences among public institutions in addressing agency and financing issues in the EE and ESCO markets. This can be done through learning seminars and conferences as well as comparative studies on the impacts of EE measures.

Small-scale renewable energy and energy efficiency

The field of small-scale renewable energy and EE relies on business models providing renewable energy and EE products and solutions to low-income, largely rural populations. Examples include providing and servicing household-scale SHSs, electric mini-grids, SWHs and energy-efficient cooking stoves. The key stakeholders in this field are the households or small businesses served, the businesses providing the solutions and products, financiers (often microfinance institutions), the government and development organisations.

Generally, government promotion of small-scale renewable energy and EE is driven by the aim of increasing access to electricity and other forms of energy. Some governments have determined that decentralised, off-grid approaches using small-scale solutions are a feasible alternative to grid extension. In rural areas distant from energy delivery infrastructure, decentralised, small-scale solutions may offer both cheaper and more effective means of delivery. These do not require very large capital investments and can be implemented with less capital risk. They are therefore attractive to chronically underfinanced governments.

Challenges faced by financial institutions

Small-scale solutions do, however, pose several challenges. One key obstacle in this field is the comparatively high transaction costs involved in distributing, maintaining and financing relatively low-value[73] energy products/solutions in remote and sparsely-populated rural areas. Similarly, financing of such products and solutions for end-users entails high transaction costs with respect to credit assessments.

Financial institutions lack the capacity to assess and distinguish between high-quality and low-quality products, which can lead to problems of poor selection, i.e. low-quality products flooding markets. When financing the asset purchase of renewable energy or EE products for end-users, the financial institution is in a position of relative ignorance regarding product specifications and technological properties, although product quality is a crucial factor influencing the repayment of product loans. Appropriate after-sales service (generally performed by the product providers) to maintain and repair products motivates end-users to repay product loans. Financial institutions are highly dependent on the appropriate provision of after-sales services as their money and, most importantly, their reputation are at stake. In practice, however, product providers tend to disregard after-sales services unless appropriate incentive mechanisms are in place. Incentivising product and service providers to follow up with after-sales maintenance has been identified as a key challenge for both financial institutions and public institutions implementing the respective sector policies.

Assessment of policy instruments and recommendations

In order to address the above issues, policy instruments need to (1) provide appropriate subsidies to ease the transaction cost issue, (2) ensure high-quality products and appropriate deployment of after-sales service, (3) decrease the risk perception of banks, and (4) build capacity in financial institutions for assessing financing risks.

Subsidy schemes are a core component of any policy promoting adoption of small-scale renewable energy and EE solutions. Appropriate subsidy mechanisms to address the relevant issues are vital. Capital subsidies, the most common form of subsidy scheme, lower the transaction costs of product distribution, whereas subsidies on loan interest rates, a much less common form of subsidy, increase the attractiveness of product financing options for end-users. This provides a more long-term incentive to both end-users and financial institutions. Capital subsidies of up to 40% of the product cost are implemented in Bangladesh, Nepal, Tunisia, India and Uganda, whereas interest rate subsidies are provided only in Bangladesh and India. Besides interest rate subsidies, other measures can be taken to increase the attractiveness of financing deals. In Tunisia, the government prompted Attijari Bank to extend its loan repayment plan from three to five years by decreasing perceived repayment risks.[74] Furthermore, transaction cost subsidies that lower the cost of assessing potential investments may further increase the willing-

73 Capital costs of such products generally vary from a few hundred to a few thousand dollars per household.

74 This was done through an end-user sanctioning mechanism with the help of the national energy provider. If borrowers did not repay on time, their electricity supply would be cut.

ness of financial institutions to engage in the sector. For example, the AEPC in Nepal provides banks with part of the assessment costs of evaluating small hydropower investment projects.

Governments should devise policies to assure appropriate product and service quality of small-scale solutions. Financial sanctions on suppliers for poor performance of their technology have proven to be a powerful tool. In Bangladesh and Nepal, policymakers have introduced phased subsidy payment mechanisms, which gradually pay out the subsidies to suppliers on the basis of technology performance. Performance of the installed products is tested through randomised quality checks in the field. In both countries this approach held service providers accountable for their maintenance and repair duties and, as a result, significantly improved the performance of installed appliances. Consequently, the portfolio risks of financial institutions were reduced substantially. Secondly, high-quality standards and technical audits increase the performance of renewable small-scale technology because they sanction poor performance with high costs. In Tunisia, subsidies for SWHs are available only to suppliers whose technology meets the quality standards of the National Agency for Energy Conservation. Additionally, installation companies are inspected through randomised technical audits of their installations, held accountable for the quality of their services, and, where necessary, sanctioned through the withdrawal of the license to install SWHs under the subsidy programme. Although promising, this approach may be constrained by a lack of commitment from national stakeholders if they are not held accountable. For example, in Uganda, technical auditors of the REA were criticised for having conducted disappointing system inspections and seemed to have insufficient incentives for appropriate quality assurance.

Policies should reduce the risk perception of banks in order to increase both their involvement in government subsidy schemes and their alignment with national lending regulations. Frequently, well-intentioned policy instruments for small-scale renewable energy have failed due to a lack of commitment from banks. In India, for instance, the interest rate subsidy for solar appliances attracted only modest interest from banks. In their view, the potential financial benefits often seemed too low to justify engagement.

Policies should introduce guarantee mechanisms that reduce the number of non-performing loans. Tunisia is an illuminating case, having introduced a guarantee mechanism which sanctioned defaulting clients through electricity cuts and provided banks with enough security to engage in the subsidy programme. Besides relying on financial involvement in subsidy schemes, national policymakers have submitted financial institutions to priority sector regulations, which in India and Nepal involved renewable energy and EE lending. As the case of Nepal demonstrates, policymakers should include guarantee mechanisms in such measures, or banks will resist and circumvent them. Banks in Nepal used loopholes to avoid lending to the renewable energy sector, so the priority sector lending scheme became largely ineffective.

To increase transparency in the sector and thus decrease perceived risks, some governments have tried to introduce rating mechanisms. In Nepal, for example, the AEPC developed a rating scheme to assess small-scale hydropower projects and make the information available to financial institutions. However, financial institutions were not involved in designing the rating scheme. ACE Development Bank, a Nepalese private sector financial institution, developed its own rating scheme that reflected its risk assessment requirements better than the scheme provided by the state. This is one of many cases highlighting the importance of involving financial institutions in the design of policy instruments.

Policies should also include capacity building in financial institutions as a key factor in their commitment to small-scale renewable energy and EE financing. The absence of such capacities can pose severe barriers to banks' involvement in small-scale renewable energy. In Uganda, PostBank loan officers complained about having insufficient knowledge to fully understand the benefits and shortcomings of PV technology, which affected their ability to market the product, respond to complaints and assess lending risks. In cases where capacity building was introduced, financial institutions reacted with heightened interest in small-scale financing. In Nepal, for example, the Energy Sector Assistance Programme trained local financial institutions to assess and provide loans for SHSs. This training included courses in business planning and bookkeeping. Programme evaluations suggested that the

training ushered commercial banks into wholesale lending to the trained local financial institutions.

Recommendations for development organisations
International development organisations can support policymaking to finance small-scale renewable energy and EE in the following ways:

- Strengthen the capacities of public institutions implementing small-scale renewable energy and EE schemes, particularly in devising and implementing instruments for financial and technological risk management, stakeholder management schemes (including incentives and sanctions), and regulatory instruments (e.g. lending targets and obligations);
- Develop innovative refinancing instruments that provide liquidity to product and service providers while minimising risks for MFIs, e.g. through credit guarantee mechanisms and risk sharing;
- Facilitate South-South exchange of experiences among public institutions, addressing issues related to quality control and enforcement, risk reduction and public financing through seminars and comparative policy analyses;
- Develop the capacity of MFIs to assess and minimise credit risks related to product failure and improper maintenance;
- Raise awareness among MFI investors about opportunities in renewable energy and EE lending and offer consultations on risk management measures.

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Sector project Innovative Approaches to Financial Systems Development
Dag-Hammarskjöld-Weg 1-5
65760 Eschborn
Germany
Tel. +49 (0) 6196 79 - 0
Fax +49 (0) 6196 79 - 1115

info@giz.de
www.giz.de

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Addresses of the BMZ offices

BMZ Bonn
Dahlmannstraße 4
53113 Bonn
Germany
Tel. +49 (0) 228 99 535 - 0
Fax +49 (0) 228 99 535 - 3500

BMZ Berlin
Stresemannstraße 94
10963 Berlin
Germany
Tel. +49 (0) 30 18 535 - 0
Fax +49 (0) 30 18 535 - 2501

poststelle@bmz.bund.de
www.bmz.de