Financing the Green Transformation

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Ulrich Volz
Senior Lecturer in Economics, SOAS, University of London, UK & Senior Research Fellow, German Development Institute, Germany

Judith Böhnke
Economist, KfW Development Bank, Germany

Vanessa Eidt
Economist, KfW Development Bank, Germany

Laura Knierim
Economist, KfW Development Bank, Germany

Katharina Richert
Lecturer, Department of Economics, University of Heidelberg, Germany

and

Greta-Maria Roeber
Financial Sector Expert, Financial Systems Development Competence Centre, GIZ German Technical Cooperation, Germany

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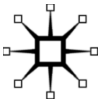

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List of Abbreviations

ADB	Asian Development Bank
AFD	Agence Française de Développement (French Development Agency)
AMDAL	Analisis Mengenai Dampak Lingkungan (Environmental Impact Assessment)
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
BAPPENAS	Badan Perencanaan Pembangunan Nasional (Indonesian Ministry of National Development Planning)
BAU	Business as Usual
BI	Bank Indonesia
Bn	Billion
BNI	Bank Negara Indonesia
BRI	Bank Rakyat Indonesia
BTN	Bank Tabungan Negara
CBRC	China Banking Regulatory Commission
CCF	Climate Change Fund
CCPL	Climate Change Programme Loan
CDM	Clean Development Mechanism
CEFPF	Clean Energy Financing Partnership Facility
CER	Certified Emission Reduction
CFIF	Climate Finance Innovation Facility
CIF	Climate Investment Fund
CMI	Carbon Market Initiative
CSR	Corporate Social Responsibility
CTF	Clean Technology Fund
DFID	Department for International Development
EE	Energy Efficiency
ESCO	Energy Service Company
ESMAP	Energy Sector Management Assistance Program
ETF	Environmental Transformation Fund
G20	Group of Twenty

GCF	Green Climate Fund
GCPF	Global Climate Partnership Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GoI	Government of Indonesia
Gt	Gigaton
ICCSR	Indonesia's Climate Change Sectoral Roadmap
ICCTF	Indonesian Climate Change Trust Fund
ICF	International Climate Fund
ICI	International Climate Initiative
IEA	International Energy Agency
IFC	International Finance Corporation
IPCC	Intergovernmental Panel on Climate Change
IPP	Independent Power Producers
kWh	Kilowatt/hour
LCEC	Lebanese Center for Energy Conservation
LDCF	Least Developed Countries Fund
LUCF	Land Use Change and Forestry
MDB	Multilateral Development Bank
MoE	Ministry of Environment
MoF	Ministry of Finance
MEMR	Ministry of Energy and Mineral Resources
MSMEs	Micro, Small and Medium Enterprises
NAMA	Nationally Appropriate Mitigation Actions
NAP	National Action Plan Addressing Climate Change
NCS	Nusantara Carbon Scheme
NGO	Nongovernmental Organisation
ODA	Official Development Assistance
OECD-DAC	Organisation for Economic Co-operation and Development-Development Assistance Committee
OJK	Otoritas Jasa Keuangan (Financial Services Authority)
PLN	Perusahaan Listrik Negara (State-owned Power Producer and Energy Supplier)
PPP	Public Private Partnership Programme
PROPER	Program for Pollution Control, Evaluation, and Rating

RAN-GRK	Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca (National Action Plan for Green House Gas Reduction)
RE	Renewable Energy
REDD	Reducing Emissions from Deforestation and Degradation
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (National Medium-Term Development Plan)
SCCF	Special Climate Change Fund
SCF	Strategic Climate Fund
SME	Small- and Medium-sized Enterprise
TDM	Transportation Demand Management
TOE	Tons of Oil Equivalent
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UKL-UPL	Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup (Environmental Management Efforts and Environmental Monitoring Efforts)

1
Introduction

Planetary boundaries and a scarcity of natural resources require a significant boost of investment into clean and renewable energy and a more efficient use of resources in developing, emerging and advanced economies alike. Addressing climate change globally requires the mobilisation of unprecedented financial resources. Developing and emerging economies face a particular challenge, since they not only need to mobilise resources for climate change adaptation and mitigation, but also have to address more imminent challenges such as infrastructure investments and poverty reduction. The development needs of societies and environmental sustainability need to be reconciled by moving towards a "green transformation" which puts "green growth at the heart of development" (OECD 2013).[1] Green growth can be defined as the "improvement of ecological quality of growth that simultaneously realizes economic expansion, improvement of welfare, poverty reduction and environmental protection, and emphasizes eco-efficiency of consumption as well as production" (Mori 2013: 5).

Despite varying amounts of financial commitments from national governments and international donors to finance a green transformation in developing and emerging economies, public finance alone will never suffice. To mobilise the necessary financial resources it is elementary that both private and public players combine forces in their financing efforts. According to the World Bank (2012a: 10) approximately 85% of the needed financial resources must come from private investors. In this context, the financial sector will have

to play a key role in allocating "green finance" into sustainable investment and development. The concept of green finance, although still in its infancy, has attracted considerable interest in recent years, not least in the development community. Green finance comprises all forms of investment or lending that consider environmental effect and enhance environmental sustainability. An important element of green finance is sustainable investment and banking, where investment and lending decisions are taken based on environmental screening and risk assessment to meet environmental sustainability standards.

To foster green investments, not only the willingness of the financial sector to supply sufficient finance is crucial, but also the attractiveness of green investments for the private sector, thus generating the demand for green finance. By nature, the greatest attractiveness of green finance is seen in those sectors where resource saving is economically profitable and where abatement measures have only limited implications on consumer lifestyles (Vattenfall 2007). However, in addition it is crucial to focus on those sectors that will face increasing emissions caused through economic development. Key sectors, in this regard, are the energy and the industry sector where emissions are sharply on the rise in developing countries (Nyboer and Sharp 2007; Moomaw 2007). As a result, the industry and the energy sector offer large potential for the development of green finance in developing and emerging economies. The United Nations Framework Convention on Climate Change (UNFCCC) has calculated that total mitigation to keep industrial emissions in 2030 on a 2004 level will cause USD 205.5 bn of incremental costs (Nyboer and Sharp 2007: 8, 16). In addition, total investment for mitigations in the energy sector has been estimated by UNFCCC to be more than USD 20 trillion, up to 2030 (Moomaw 2007: 7).

Against this backdrop, this book investigates the challenges for developing and emerging economies for enhancing green financing for sustainable and resource- and energy-efficient investment, using Indonesia as a case study. Indonesia, a lower middle income country with a per capita income of approximately $3,500 in 2013 and the world's fourth most populous country with almost 250 million people, is an interesting case study. The country, in which growth has followed a very carbon-intensive path, faces vast financing needs for green investment in clean and renewable energy, wastewater

treatment and sanitation, as well as transport and infrastructure, both in rural areas and in urban areas such as Greater Jakarta with approximately 33 million people. Indonesia also needs to invest in a more efficient use of natural resources. At the G20 Summit in Pittsburgh in September 2009, then President Susilo Bambang Yudhoyono pledged to reduce Indonesia's emissions by 26% by 2020 compared to a "business as usual" (BAU) trajectory. With international assistance, the emission reduction target is even higher with 41%. This is the highest commitment in absolute terms made by any country. At the same time, however, the government emphasises that the environmental goal should not come at the expense of other political dimensions: policies should be "pro-growth, pro-jobs, pro-poor and pro-environment", allowing Indonesia to sustain growth at more than 6.5% a year as well as to halve poverty. As a result, the country faces vast financing needs for a green transformation of its industry and energy sector.

The study looks at three different levels to identify approaches for enhancing green finance: (1) the regulatory framework, (2) the potential supply of green finance through financial institutions and (3) the potential demand for green finance from the corporate sector. It also analyses the role that international development cooperation can play in supporting developing and emerging economies in designing a regulatory framework geared at increasing green investment. The book provides an in-depth analysis of the challenges facing developing and emerging economies in financing the green transformation. It includes the results of two surveys that were conducted in the Indonesian banking and corporate sector, respectively. Based on the empirical analysis, the book devises innovative policy recommendations for the Indonesian government to develop a regulatory framework that will increase incentives for a more efficient use of resources and increased investment in sustainable and energy-efficient ventures. The Indonesian case study is interesting in its own right, given that Indonesia is one of the largest emitters of greenhouse gases worldwide, but it also provides important insights for other developing and emerging economies so that the book should be of interest to a wider audience in scholarly as well as policy and business circles.

The book is organised as follows. Chapter 2 elaborates on the challenge of financing the green transformation that societies and

economies worldwide are confronted with, and the particular challenges for developing and emerging economies. It examines the reasons for underinvestment in green projects from the corporate sector as well as the reasons why financial institutions have been hesitant to provide green finance. Private investments in the green transformation are obstructed by a combination of market and government failures. These failures prevent the allocation of capital into green investments to a socially optimal degree. The chapter dissects these failures and establishes the rationale for public intervention. Subsequently, it defines a set of criteria that should guide public intervention to facilitate private green investment and discusses different instruments to overcome the failures. It also spells out the potential pitfalls of such intervention. Despite the dangers of government failures, it is clear that the public sector ought to play a key role in catalysing and leveraging green investments.

Chapter 3 turns to Indonesia, where the government has set out an ambitious agenda for a green transformation. The chapter discusses the need for a green transformation of the Indonesian economy and analyses the Indonesian policy goals for significantly reducing carbon emissions and the resulting investment needs. It also provides an overview of the existing institutional and regulatory framework and investigates which of the challenges discussed in the previous chapter apply in the Indonesian context. Finally, it delineates the necessary action to achieve the set goals and discusses the relevance of and potential for green finance in Indonesia.

While the Indonesian financial sector ought to play a pivotal role in channelling the required resources to finance the green transformation, so far green financing is hardly existent in Indonesia, and beyond theoretical considerations there is very little empirical evidence to explain this underperformance. Moreover, there is only limited knowledge about the potential demand for green finance from Indonesian companies. To shed light on this, Chapter 4 presents an empirical analysis of the supply and demand side of green finance in Indonesia, based on comprehensive surveys in the banking and corporate sectors, respectively, as well as qualitative interviews with Indonesian government officials, representatives of banks and corporations, and numerous experts from business associations, international organisations, development agencies, academia and non-governmental organisations (NGOs). The surveys and

the interviews were carried out in Indonesia in 2013. The analysis focuses on the following two research questions: (1) What are the bottlenecks for banks to provide green finance and for companies to invest in green projects? (2) Which policies or instruments could help enhance green investments? Section 4.1 examines the supply side of green finance. In order to test various working hypotheses, two questionnaires were developed for the banking sector. First, a questionnaire comprising 10 questions was sent to all 127 banks in Indonesia through Bank Indonesia, the central bank. Second, semi-structured qualitative interviews, comprising 30 questions, were conducted with 15 banks together with Bank Indonesia. The section introduces the hypotheses, discusses methodological issues, and presents and interprets the empirical findings of the survey and the interviews. Subsequently, Section 4.2 analyses the demand for green finance. To get a better understanding of firms' environmental awareness, their views on resource efficiency, their interest in undertaking energy efficiency and other green investments, and their access to finance, an online firm survey was conducted, comprising 29 questions along with 10 specifications of company characteristics. Based on the theoretical analysis in the second chapter, the survey tests a number of hypotheses regarding the most important obstacles for corporations in undertaking green investments as well as the effectiveness of instruments which could help to facilitate such investments and enhance the demand for green finance. Similar to the bank survey, the firm survey was complemented by qualitative, semi-structured interviews with firms, which were asked 24 questions in total. Section 4.2 outlines the hypotheses, discusses the methodology, and presents and interprets the empirical findings of the company survey and interviews. Section 4.3 summarises the main findings from the bank and firm surveys.

Based on the preceding empirical analysis of the bottlenecks to furthering green finance and investment and of the suitability of various instruments to address these hurdles, Chapter 5 develops policy recommendations for Indonesian policy makers as well as for international development cooperation committed to supporting the green transformation in Indonesia (or elsewhere). Drawing on the insights gained from the financial and the corporate sector surveys and the interviews with relevant ministries, business associations, international development agencies and other stakeholders, the

chapter develops a three-phased approach for introducing a green finance framework in Indonesia aimed at developing the capacities for green lending in the banking sector that match the demands from the corporate sector. To this end, the chapter also reviews the approaches to fostering green finance that were recently taken by Bangladesh, China and Thailand and analyses the first experiences with these countries' green finance policies. Although the proposed framework is tailored to the Indonesian context, the approach can be adopted also by other developing or emerging economies, considering the specific country context.

Finally, Chapter 6 summarises the main findings and policy proposals of this study. Using the Indonesian example as an illustration, it draws lessons that are relevant also for other developing and emerging economies that seek to engage the financial sector in the transition towards a green and sustainable economy. Developing green finance, it argues, is not only crucial for successfully managing a green transformation, and hence desirable from a societal perspective, but also provides lucrative business opportunities for the financial sector. At the same time, a better access to green finance will facilitate corporate investments in energy and resource efficiency and hence raise the overall competiveness of the economy.

2
Financing the Green Transformation – Market Failures, Government Failures and the Role of the State

Green investments are obstructed by a combination of both market and government failures. These failures prevent the allocation of capital into green investments to a socially optimal degree. However, although government failures cannot be ruled out *per se*, most experts would agree that the public sector ought to play a vital role in catalysing and leveraging green investments. This chapter introduces these failures and establishes the rationale for public intervention. Subsequently, it defines a set of criteria that should guide public intervention and discusses different instruments to overcome the failures.

2.1 The economic rationale for public intervention – addressing the obstacles to green finance

The under-provision of green finance is due to a combination of market and government failures. As a result, a gap emerges between what would be economically desirable from a societal perspective and what seems profitable from the microeconomic perspective of decision makers at the bank and company level.

2.1.1 Market failures

Bator (1958: 351) defines market failure as "the failure of a more or less idealized system of price-market institutions to sustain 'desirable' activities or to estop 'undesirable' activities", where "[t]he desirability of an activity … is evaluated relative to the solution values of some

explicit or implied maximum-welfare problem." There are different reasons why an allocation of resources may not be optimal, including the non-internalisation of externalities into decision making; insufficient incentives for the private provision of public goods because their consumption is non-excludable and non-rival; imperfect information and transaction barriers; imperfect competition because of monopolistic or oligopolistic market structures, collusion or barriers to entry; and capital market imperfections.

In environmental economics, one of the most important market failures is due to *negative externalities* which arise when the marginal social cost (i.e., the sum of marginal private costs and the marginal external costs) of production and/or consumption of goods and services are higher than the marginal private cost. That is, the negative effects of economic activity on the welfare of others or the society at large are not considered by individual action because the welfare of others is not reflected in market prices. Since companies in many cases do not have to pay for the pollution they cause, investments in pollution reductions are much rarer than would be optimal for the society as a whole. In other words, companies' marginal costs differ from societal marginal costs, which also include environmental costs. Negative externalities also occur when the environmental costs of production are not borne by the producer but are rather imposed on future generations (World Bank 2012a; Bowen et al 2009; Stern 2007).

Since the true costs of greenhouse gas (GHG) emissions are not included in the market mechanism, the market for relevant goods (energy, innovation, land use, etc.) cannot be considered socially optimal (Stern 2007). Examples for negative externalities that are not reflected in market prices are the environmental damages caused by conventional electrical energy generation from fossil fuels (i.e., coal, oil and gas). The comparison of costs of conventional and renewable energy generation looks very different when the damage costs caused by the combustion of fossil fuels are taken account of and incorporated in electricity prices. Owen (2006: 632) points to important "market failure constraints on the adoption of renewable energy technologies" and highlights that "renewable technologies would possess a significant social cost advantage if the externalities of power production were to be 'internalised'. Incorporating environmental externalities explicitly into the electricity tariff today would

serve to hasten this transition process" (ibid.: 642). Table 2.1 provides an overview of different market barriers that can prevent new and superior technologies to penetrate the market.

Positive externalities can similarly hold back green investments. Positive externalities occur for instance when companies that invent green technologies unwillingly have to share their innovation with free-riders. In many cases, green projects heavily rely on new technologies and unproven business models. Thus, an inventor has to cover relatively high readiness costs (learning and early transactions costs) (Ritchie 2010). Followers benefit from the effort of the first mover using the innovation without adequately rewarding the first mover (Vivid Economics 2011). Hence, incentives for first movers to invest in green projects are relatively low. The low incentives for first movers create a severe shortage of needed innovations and development of green business models and technologies – consequently leading to a slower green sector development than desired optimal (Ritchie 2010).

Green investments, especially first mover projects, are often held back because investors face *imperfect information* (Schleich 2011). Investors lack information of green investment opportunities, or cost saving potentials, thus making investment decisions which are optimal from neither a microeconomic nor societal perspective. With imperfect information, firms might be reluctant to incur risks related to relatively new technologies and often unproven business models, especially when investments require a long planning horizon. Thus, investors tend to invest less than the optimal amount in upgrading machinery and buildings (World Bank 2012a). In the case of asymmetric information between landlord and tenant, a situation may emerge which is commonly known as the "split-incentive": investments made by the landlord in the energy efficiency of a building reduce the energy costs of the tenant, but can only be recovered by the landlord through an increase in rent. If one of the two actors is not well informed about the cost saving potential, the investment will possibly not take place (IPCC 2001).

Information also plays a crucial role in the financial sector. Due to the relatively "newness" of many green investments, financiers often lack the necessary experience and information to adequately assess technical and market risks of green projects as well as arising opportunities. Hence, financiers tend to overestimate the risks and thus

Table 2.1 Types of market barriers and measures that can alleviate them

Barrier	Key characteristics	Typical measures
Uncompetitive market price	Scale economies and learning benefits have not yet been realised	• Learning investments • Additional technical development
Price distortion	Costs associated with incumbent technologies may not be included in their prices; incumbent technologies may be subsidised	• Regulation to internalise "externalities" or remove subsidies • Special offsetting taxes or levies • Removal of subsidies
Information	Availability and nature of a product must be understood at the time of investment	• Standardisation • Labelling
Transactions costs	Costs of administering a decision to purchase and use equipment (overlaps with "Information" above)	• Reliable independent information sources • Convenient and transparent calculation methods for decision making
Buyer's risk	• Perception of risk may differ from actual risk (e.g., "pay-back gap") • Difficulty in forecasting over an appropriate time	• Demonstration • Routines to make life-cycle cost calculations easy
Finance	• Initial cost may be high threshold • Imperfections in market access to funds	• Third party financing options • Special funding • Adjust financial structure
Inefficient market organisation relating to new technologies	• Incentives inappropriately split – owner/designer/user not the same • Traditional business boundaries may be inappropriate • Established companies may have market power to guard their positions	• Restructure markets • Market liberalisation could force market participants to find new solutions
Excessive/ inefficient regulation	Regulation based on industry tradition laid down in standards and codes not in pace with developments	• Regulatory reform • Performance based regulation

Continued

Table 2.1 Continued

Barrier	Key characteristics	Typical measures
Capital stock turnover rates	Sunk costs, tax rules that require long depreciation and inertia	• Adjust tax rules • Capital subsidies
Technology-specific barriers	Often related to existing infrastructures regarding hardware and the institutional skill to handle it	• Focus on system aspects in use of technology • Connect measures to other important business issues (productivity, environment)

Source: IEA (2003, table 4.1).

do not provide the needed capital to finance these green projects (WBGU 2012). Imperfect information over green investments has different causes. Green projects are often based on novel technologies and untested business models. At the same time, many green investment projects are relatively small in scale or spread across a wide range of sites. These features substantially increase transaction costs for feasibility studies and due diligence processes of green investment projects. Before approving credit, banks have to either mandate expensive feasibility studies or only grant credits to those clients whose balance sheets either permit for failure or who have sufficient collateral (Vivid Economics 2011). Moreover, access to financial services is often constrained for small- and medium-sized firms, which further constraints green investments, even if at a small scale. As shown by Stiglitz and Weiss (1981), banks tend to ration credit in markets with imperfect information. As a result, the financial sector provides less finance for green investments compared to a situation where adequate information is easily available.

Especially the lack of financing for long-term green projects is a major barrier to investments in the green transformation (World Bank 2010b). Green projects tend to require high upfront costs and longer time horizons of financing; however, financiers are short-term oriented and rather risk-adverse (Stern 2007). In addition, the cash flow streams of green projects are usually less predictable than those of conventional investments (not least because of inconsistencies in policy frameworks, see below), increasing the risk for financial

institutions (World Bank 2012a). As financiers are not fully aware of the potential for green investments, it is the client's balance sheet which matters more to financiers than the expected returns of these projects (Vivid Economics 2011). Furthermore, financiers may be reluctant to invest directly in green projects because these often have little recoverable value which could serve as collateral. As a result, financiers typically demand significantly higher interest rates for green projects which make it hard for companies to obtain credit in the first place. Consequently, there is an under-provision of adequate finance for green investments.

Another market failure is the existence of *oligopoly or monopoly power* which can lead to price distortions. Monopolists tend to undersupply and at the same time over-price the product while simultaneously hampering the innovation process due to lacking competition (Bowen 2009). Particularly the energy sector is often dominated by monopolists. Monopolist power over the grid system can decrease the attractiveness of renewable energy investments for the private sector, since feeding into the grid could potentially be unattractive.

In conclusion, there are numerous market failures that may discourage the private sector from undertaking green investments because they impose additional costs. In other words, these market failures result in serious bottlenecks to green finance on the company as well as the banking level. Consequently, without public intervention, there will be too little investment to initiate a green transformation and a continued over-production of GHG emissions and other pollutants.

2.1.2 Government failures

Although market failures in general provide a justification for government intervention in order to counteract the former, it is important to acknowledge that governments do not in all cases perfectly tackle these failures and at times may even set wrong incentives that lead to inferior outcomes. The lack of success to correct for market failures is commonly considered a "government failure" (Keech, Munger and Simon 2013). According to Winston (2006: 2–3), a "[g]overnment failure … arises when government has created inefficiencies because it should not have intervened in the first place, or when it could have solved a given problem or set of problems more efficiently, that is, by generating greater net benefits." Krueger (1990) distinguishes

between errors of "omission" and "commission". Errors of commission relate to "those actions of government that lead to an outcome inferior to that which would be observed under laissez-faire" (Krueger 1990: 11). Errors of omission, in contrast, relate to government's "failures to act" to correct market failures which thus lead to a Pareto-sub-optimal outcome. There are various ways in which government failures can hinder green investments and the development of green finance.

Conflicting regulation: Public decision making does not always take place with a comprehensive understanding of different policy areas. Moreover, different policy branches may be led by conflicting interests. Resulting inconsistencies in public policies may have adverse effects on the outcome of certain interventions. It goes without saying that public decision making is a highly complex process and heavily influenced by factors unrelated to efficiency considerations. This political nature of decisions taken on the policy level will diminish the effect of any action meant to improve them.

The most striking examples of contradictory policies are direct and indirect fossil fuel subsidies that directly undermine efforts to reduce energy consumption and improve on energy efficiency. According to the International Energy Agency (IEA), global fossil fuel subsidies amounted to USD 523 bn in 2011. These energy subsidies impede the internalisation of externalities (Stern 2007; World Bank 2012a). Still, as international business competitiveness and especially green growth moves higher up on countries' priority lists, governments may be expected to take the consequences of regulatory inconsistencies more seriously.

Non-compliance and uncertain regulation: Another obstacle to green investments arising from the public sector is an uncertain regulatory environment. Policy measures aimed at incentivising green investments are often implemented without an overarching framework or with weak compliance measures. Credible, stable and strong policy commitment is, however, an important prerequisite to increase green investments, given that the policy framework effects on revenue flows and investors rely on the consistency of these flows. Since expected rates of return are influenced by policies such as subsidised prices or production standards, the frequent change of these policies supports the perception that green projects are riskier than conventional ones (World Bank 2010b).

Insufficient provision of public goods: The government needs to provide certain public goods. Energy infrastructure and education are two examples of particularly important public goods that are needed for advancing the green transformation. Regarding the former, in most countries the current energy infrastructure is not suited for renewable energy facilities and public investment to develop such infrastructure is lacking. To date, national grids are usually tailored in favour of centralised power plans. Feeding of energy that is produced through green technologies into the existing grid network proves challenging. Renewable energy investments often are small in scale and distributed across a large number of sites. Most grids, however, are not suited to receive electricity from small, decentralised sources. In addition, large-scale renewable energies may also face difficulties if they are located far away from existing grids. Promoting renewable energy investments on a large scale will require an energy infrastructure comprising smart-grids that are suitable to balance inconsistent feed-in of renewable energy facilities (World Bank 2012a).

Furthermore, the government may need to help develop the human capital required to initiate a green transformation (Schleich 2011). This relates to developing appropriate vocational training and university programmes that will improve countries' absorption capability on the technology side, for instance training graduates with skills needed for operating and maintaining energy efficiency technologies (ibid.). There may also be a case for publicly organised training programmes in the financial and corporate sectors aimed at nurturing "the skills required for adequate project financing … or for preparing feasibility studies, business plans, and environmental impact assessments" (ibid.: 20).

2.1.3 Balancing public and private interest

Overall, there are numerous obstacles that may discourage private sector investments because they impose additional costs on conducting green business. As a consequence, without public intervention, there will be too little investment to set off a green transformation. Consequently, the public sector needs to play a pivotal role in leveraging private financing because the greening of investments essentially requires mitigating externalities that are conventionally valued neither by markets nor by investors (World Bank 2012a). However, to safeguard the effectiveness of public intervention and

to avoid an overregulation of business, governments should follow certain principles.

First, it will be important to balance private and public interest and align incentives. Governments have to be aware that the green transformation is not an endeavour which can be achieved by the public sector alone. It rather requires the public and the private sector to collaborate closely. It is crucial that the public sector balances the aim of emission reduction with the private interest of doing business. Thus, it is decisive for the public sector to recognise the interests of the private sector in detail and to take these interests into consideration when designing and implementing policies.

To approach emission reduction as a business case, banks and government have to co-operate in every aspect from project development to project evaluation (World Bank 2008). Balancing public and private interests means considering green financing from different viewpoints and fostering dialogue in order to create a win-win situation (Sarkar and Singh 2010). However, collaboration between the public and the private sector can only work if both face similar incentives. According to Bowen (2009), the necessary preconditions for a fruitful collaboration of the public and private sector are met when the former is monitored and accountable for providing a stable framework and when the private sector faces market and/or shareholder pressure to deliver adequate returns on their investments. Nonetheless, it is important to note that the outcome of the collaboration will be strongly determined by the distribution of risk and return to the parties involved (Bowen 2009).

With reference to the Arrow-Lind theorem, Stern (2007) highlights that governments also have an important role to play in undertaking and supporting riskier investments as they are risk neutral because they are large enough to spread the risk. Nevertheless, the intervention of the public sector should be strictly limited to risks associated with the afore-mentioned market failures and market barriers which cause unwillingness in the private sector to invest. In addition, public risk sharing and support facilities should, by no means, exceed projects where the private sector is initially unwilling or unable to carry the risk on its own. As soon as these specific risks are removed through public intervention, it is up to the private sector to decide whether or not to pursue a green investment.

Last but not least, it is important that public intervention is credible, which requires measures and policies within the market to be predictable and reliable, with policies being perceived as ensuring a fair distribution of the costs of reducing GHG emissions (Bowen 2009).

2.2 Measures and instruments to enhance green finance

As discussed in Section 2.1, several obstacles affect the supply of and the demand for green finance. Regarding barriers originating at the policy level, it is particularly inconsistent regulations, a lack of an appropriate energy infrastructure and fossil fuel subsidies that may have adverse effects on the magnitude of for green investments that will be undertaken in an economy. At the level of financial institutions, a lack of experience with financing green investments might lead to insufficient supply of green finance. Lastly, at the corporate level, demand for green finance is often below what would be economically profitable. As just discussed, a variety of market failures and barriers are partly to blame. In response, the state needs to play an active role. The crucial question is: *How?*

This section discusses several measures and instruments that may help to overcome these barriers. Obviously, none of them can serve as universal remedy and they all bear potential pitfalls which must be considered to prevent unintended side effects. Some instruments are market-based, others focus on the regulatory level (Bashmakov and Jepma 2001). In the following text, the measures and instruments are classified according to the level to which they are targeted and not according to their design or to who implements them. Therefore, mirroring the three levels on which obstacles occur, we discuss measures and instruments at the policy level, the level of financial institutions and the corporate level.

2.2.1 Creating a conducive policy framework

As discussed, the public sector ought to play a central role in the mitigation of market failures and barriers to promote green finance. An obvious starting point is environmental legislation that requires producers to comply with certain standards and internalise negative externalities. Furthermore, various public schemes can help overcome barriers to green investment by reducing financing or investor

risk, for example, via publicly supported guarantee schemes or subsidies. Tax incentives could additionally increase the attractiveness of green investments for corporations. These potential schemes, however, need to be consistent and reliable in the long term. Public intervention should be limited to risks associated with the market failures and barriers discussed earlier. Any measure beyond the elimination of the specific risks carries the danger of being inefficient or harmful to the market mechanism in the long run (Bowen 2009).

Further, to ensure effectiveness of government intervention, especially in the case of regulatory measures, they need to be carefully designed and credibly enforced. Capacity building measures targeting government officials are considered a useful instrument to improve the quality of policy making (ADB-ADBI 2012). In addition, it is important that public intervention is transparent and credible and that policies are perceived as being predictable, reliable and fair (Bowen 2009). Moreover, implementation and enforcement matter greatly. In practice, a weak institutional framework which is not capable of implementing and enforcing regulation represents an important drawback. The complexity of regulation should thus correspond to the ability of institutions to implement and enforce it. Too complex regulations or schemes are likely to be circumvented or inefficient.

2.2.2 Extending the supply of green finance

The reluctance of financial institutions to finance green investments has numerous reasons, including lack of experience, weak economic incentives as well as higher (perceived) risks associated with green investments. In view of these obstacles on the level of financial institutions, the question is *how to enhance the supply of green finance?*

To address the lack of knowledge and experience, capacity building can help financial institutions to better assess potential benefits and risks of green investments. For example, bank officers need to handle alternative models of calculating a project's expected cash flow to take revenues from energy savings into account. The first component of the United Nations Environment Programme's (UNEP) Climate Finance Innovation Facility (CFIF), for example, envisages a banker training that offers "a range of training courses and information tools to help bank staff build their knowledge of climate-mitigation technologies, including and understanding of their operating

characteristics, key risks, and market potential." A simple yet effective support can be the development of lending or investment manuals that specifically provide guidance for the appraisal of environment-related risks and detection of environmental opportunities.

In response to the high existing or perceived risk of green investments, a number of risk-mitigating instruments can be considered to stimulate the supply of green finance. Guarantee schemes, for example, can serve as instruments to insure green loans. They apply if the investment fails, and guarantee the debt issuers to retrieve at least part of their loan. The premium to be paid for the loan guarantee depends on the type of loan, its risk, the guarantee's coverage and the loan period (Schick and Kim 2011). Guarantee products can be structured as "subordinated recovery guarantees, portfolio first loss and second loss guarantees [...] or loss reserve funds" (Rezessy and Bertoldi 2010: 9). Syndicated loans are another risk-mitigating instrument and serve to share credit risks between multiple financial institutions. Especially when large investment sums are required, financial institutions might be willing to lend collectively, while none would take up the credit risk unilaterally (Rezessy and Bertoldi 2010).

Instruments such as guarantee schemes or subsidised credit lines can be implemented either by national entities (including development banks) or by international donors. A large number of climate funds, both bilateral and multilateral funds, have been established (see Annex I – Annex IV). Some explicitly target climate mitigation or adaptation projects, others focus on capacity building or technology transfer (UNDP 2013c). The International Finance Corporation (IFC) – for example – offers partial credit guarantees as well as structured financing for adaptation and mitigation projects. The CFIF is an example of a facility that offers technical assistance in the form of trainings to bank officials.

Furthermore, financial regulation can require lenders and investors to consider environmental risks. As a result, conventional investment may forfeit some of their attractiveness whereas green investments should become relatively more interesting (Lindlein 2008). A further, more drastic way of forcing financial institutions to scale up green lending or investment is to introduce (and enforce) regulation that requires them to achieve a certain green share in their portfolio, obliging them to deal with the green niche. Such a

regulation has already been issued in Bangladesh for the domestic banking system (to be discussed in greater detail in Chapter 5).

Although risk-mitigating products and regulations can help increase the supply of green finance, there are important pitfalls that need to be considered. Risk-mitigating products have the disadvantage that they may invite moral hazard and ultimately render the guarantee scheme financially unsustainable (Schick and Kim 2011; Honohan 2008).[1] To diminish potential moral hazard effects, a careful design of the guarantee scheme is crucial. In this respect, central for the success of a guarantee facility has been to verify in past projects whether the loan risk is assessed by the guarantor (who is less experienced in this regard) or by the lender (who has more experience) (Graham 2004). Regarding regulatory provisions which would "force" financial institutions' interest in green finance, care needs to be taken that such regulation does not worsen financial institutions' risk profile, which may contribute to financial instability.

2.2.3 Fostering the demand side

As discussed earlier, it is not only a lack of finance that holds back green investments but a variety of other bottlenecks. In view of these obstacles, the question is *how to encourage green investments by the corporate sector?*

As in the public and financial sector, there is also a need to build capacity and environmental awareness in the corporate sector. Especially regarding new green technologies, companies lack knowledge and experience. Awareness and capacity building efforts could therefore comprise a demonstrational element. Green fairs, for example, can serve as a platform for technology producers and users and can promote confidence in green technologies among enterprises. A lack of capacity in the corporate sector might also lead enterprises to underestimate energy saving potentials of investments in energy efficiency. Facilitating the access to professional energy audits might therefore be a useful strategy to raise enterprises' awareness concerning saving potentials (ADB-ADBI 2012).

Second, the lack of investments in green projects might be due to weak economic incentives as alternative investment options are more attractive for companies. Policy makers, however, can nudge the corporate sector onto the green development path and thereby prevent industry to lock in a high-carbon pattern. A rich variety of

incentives are conceivable to make green investments more attractive, touching upon tax incentives, concessional loans, rebates on the purchase of green technology or tailor-made green credit lines (ADB-ADBI 2011). An example of such a green credit line exists between the Agence Française de Développement (AFD) and three South African banks. In this case, AFD provides concessional loans to the banks, earmarked for investments into energy-efficiency projects and renewable energies, and thereby lowers the interest rates to be paid by the final clients. Further, AFD's support to the South African banks includes a component of technical assistance, seeking to increase capacity within the banks and to promote the new loan facility in the country.

Even if capacities to assess and undertake green investments are high, enterprises might be reluctant to assume the risk of investing in often large, capital-binding projects with long maturities. There are, however, a number of risk-mitigating instruments for the corporate level. Instead of binding assets and purchasing new technology, firms might prefer leasing options. Leasing allows a company to avoid high upfront investments into modern technology by renting the equipment for a certain period. In case of capital leases, which are usually long-term, the lessee gains ownership of the equipment at the end of the period (Rezessy and Bertoldi 2010).

Another form of mitigating investment risks is to use equity finance or mezzanine finance to fund the investment. Equity finance allows companies to raise funds by selling shares to external investors, who acquire partial ownership of the company, and also part of the risks incurred. Equity capital is always subordinated to standard bank financing (debt financing). Mezzanine finance is provided as debt capital by the lender, but convertible to equity if the loan is not repaid in time. As equity capital, it is again subordinated to senior debt. Equity and mezzanine financing serve as assets on a company's balance sheet, which is attractive for companies as it allows them to assume more standard bank financing. Both types of financing serve essentially to distribute the investment risk between investor and entrepreneur. Investors can range from domestic companies or banks to international funds (Rezessy and Bertoldi 2010).

Various development agencies and multilateral institutions have launched initiatives to enhance the availability of green finance for corporates. For instance, the *Global Energy Efficiency*

and Renewable Energy Fund (GEEREF) provides equity finance and technical assistance (GEEREF 2013). The *Deutsche Investitions- und Entwicklungsgesellschaft GmbH* (DEG) offers credit guarantees as well as mezzanine finance. The *End-User Finance for Access to Clean Energy Technologies in South and South-East Asia* (FACET) project provides different incentives to green investors, ranging from transaction cost sharing mechanisms to temporary interest rate subsidies (UNDP 2013c). Although risk-mitigating products and incentives can help to increase the demand for green finance, these instruments may also cause moral hazard, that is, they might lead enterprises to assume unnecessary risks, the costs of which would be passed on in part to the financer.

Overall, the discussion in this chapter has shown that market failures as well as government failures can create serious bottlenecks to the development of green finance and that various policies, regulations and initiatives can be designed to overcome them. In order to assess which bottlenecks are most binding and how these can be best addressed, a thorough analysis of the respective situation in the countries in question is crucial. It is important to emphasise that the challenges faced in developing and emerging economies will be even larger than in advanced economies, given that enforcement of environmental regulation is often more difficult and governments' capacities are often (but not always!) more constrained. In the remainder of the book, we study the bottlenecks for developing green finance and enhancing green investment in one major emerging economy, Indonesia, and discuss ways of facilitating green finance so as to kick-start Indonesia's much-needed green transformation.

3
The Green Transformation in Indonesia

The Indonesian economy has recorded solid growth over the last decade, with an average annual growth rate of gross domestic product (GDP) of 5.4% for the period 2000–2013. Yet growth has followed a very carbon-intensive path. This chapter discusses the need for a green transformation of the Indonesian economy to put it on a sustainable pathway and investigates which of the challenges discussed in the previous chapter apply in the Indonesian context. After briefly reviewing why a green transformation is needed, it outlines Indonesia's environmental policy goals which pave the way towards a green transformation. Finally, it delineates the necessary action to achieve these goals and discusses the relevance of and potential for green finance in Indonesia.

3.1 The need for a green transformation

Indonesia's worrisome emission profile

In 2007, the UK's Department for International Development (DFID) and the World Bank published a study that found Indonesia to be the third largest Greenhouse gas (GHG) emitter worldwide (Sari et al. 2007). Although the study was later contested for its methodology, there is a consensus that Indonesia's emissions profile is worrisome. Figure 3.1 illustrates Indonesia's emission levels by source in 2000 and 2005. It shows that most emissions result from land use change and forestry (LUCF) as well as from peat fires.

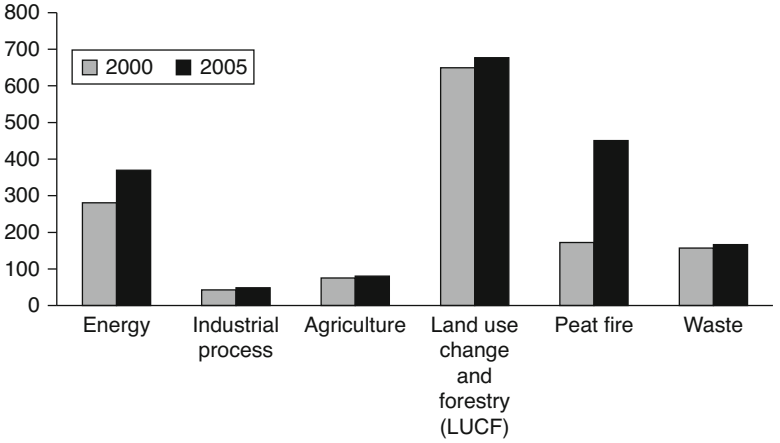


Figure 3.1 GHG emissions (in trillion g CO_2e) in Indonesia by source, 2000 and 2005

Source: Compiled by authors with data from MoE Indonesia (2010).

LUCF emissions are mainly caused through logging (particularly timber harvesting), land conversion for agriculture (particularly for oil palm plantations) and forest fires (ESMAP 2012; MoE Indonesia 2010). Although many measures are taken already to limit deforestation, it is predicted that Indonesia's forest cover will further decrease by 1% annually in the coming five years (MoE Indonesia 2010). Agricultural expansion and population growth are seen as driving forces for LUCF emissions (MoE Indonesia 2010).

The same factors also cause the second largest source of emissions: peat land emissions. Peat fires and decomposition pose a heavy threat to the environment since natural peat lands sequester carbon, thereby mitigating climate change.[1] Peat land related emissions are mostly caused by the burning of peat land with the purpose of land-clearing or by decomposition due to drainage, by which the carbon is released (ICCTF 2012; Embassy of Norway 2010). Since Indonesia is the country with the largest peat land areas – approximately 20 million hectares or approximately 5% of total global peat

lands – maintaining those areas plays an important role in mitigating climate change (ICCTF 2012).

The third largest source of emissions in Indonesia is the energy sector, comprising emissions that are caused through either energy generation by the energy supplier or consumption of energy by other sectors. The category "energy" in Figure 3.1 includes fugitive emissions and emissions caused by fuel combustion. In 2010, in the category "emissions caused by fossil fuel combustion", most emissions were caused by the manufacturing industry and construction sector with 123.9 million tons of CO_2 emissions. Approximately 120.4 million tons of CO_2 emissions furthermore result from electricity and heat production while 105.8 million tons of CO_2 are emitted annually by the transport sector. In total, fossil fuel emissions from fuel combustion equalled 410.9 tons of CO_2 in 2010 (IEA 2012). In Indonesia's national communication to the United Nations Framework Convention on Climate Change (UNFCCC), its energy sector is divided into three sub-sectors: the power sector, the transport sector and the industry sector (BAPPENAS 2011). This categorisation will be followed throughout this study.

Although in 2005, LUCF emissions accounted for more than 60% of overall emissions in Indonesia, the picture is predicted to change because of population growth and economic development (MoE Indonesia 2010). With 252.2 million inhabitants in 2014, Indonesia has the fourth largest population in the world and is expected to grow to 300 million people by 2030 (World Bank 2013). Furthermore, the fast growing Indonesian economy is very energy intensive with a 1% growth in GDP leading to estimated increases in energy demand by 1.8% (USAID 2008). In the face of continuous population and economic growth, energy consumption is therefore expected to rise by 9% per year up to 2020 (DIFFER 2012). Accordingly, emissions caused by fossil fuels are expected to overtake land-based emissions by 2030 (APEC 2009; ABB 2012).

Given that energy generation and consumption are expected to become the major sources of Indonesia's emissions, the thrust of this research centres on financing investments in energy efficiency and also renewable energy. While the protection of forests and peat land is of utmost importance and this obviously also has enormous financial implications, it will require first and foremost

an adequate land-use regulation and enforcement thereof. Moreover, there is arguably a lesser role for private investments and financial sector lending in forest and peat land conservation than for enabling investments in renewable energy or energy efficiency in, say, the industrial or construction sector. For a rapidly growing emerging economy such as Indonesia, achieving a green transformation can only succeed if the financial sector is on board and ready to facilitate green investments.

The need for mitigation and adaptation policies

Since Indonesia is already one of the largest GHG emitters worldwide, further rising emissions will come at high ecological and social costs not only for the world but also for Indonesia itself. Indonesia consists of more than 17,500 islands which are mostly covered by forest, harbouring an extremely rich biodiversity (World Bank 2011). Besides the ecological threat of pollution and climate change for flora and fauna in Indonesia, there are additional costs in the form of poverty and vulnerability increases for the Indonesian population and economy.

In a speech on the publication of the National Action Plan to Combat Climate Change, then President Yudhoyono (State Ministry of Environment 2007: iii) made clear what is at stake for Indonesia:

> Global warming has led to climate change that is already impacting on the physical and biological systems of our earth. Higher temperatures have started to melt the ice-caps of the north and south pole. Sea levels have started to rise and to threaten coastal areas and their inhabitants. In some places in Indonesia, this rise measures 8 mm per year. Our country consists of not less than 17,500 islands with a coast line of 81,000 km. The majority of our population lives in coastal area – around 65% of the population of Java lives in coastal regions, for example. Indonesians are therefore vulnerable to the impacts of climate change. Climate change has also changed the pattern of rainfall and evaporation with the potential to cause floods in some places and drought in others. This issue therefore threatens livelihoods in our country – both agriculture and fisheries. As a country that is vulnerable to their impacts, it is important for Indonesia to mitigate global warming and climate change.

Indeed, Indonesia is considered one of the countries at greatest risk of climate change (Yusuf 2010). It is hence imperative that Indonesia seeks to reconcile its economic growth targets with the aim of climate change mitigation. This necessitates a transition towards a greener, low carbon economy. To accomplish this transformation, huge investments will be needed, and Indonesia will need to ensure that sufficient green lending and investment will be made available.

Adaptation measures can help to reduce the social and economic costs of climate change, but the described vulnerability of Indonesia illustrates the importance of mitigation actions to prevent rising GHG emissions. Adaptation can focus mainly on agriculture and coastal zones through the construction of seawalls for instance or climate-resistant crop varieties (World Bank 2009). The Asian Development Bank (ADB 2009) estimates the annual costs of adaptation in Indonesia to amount to approximately USD 5 bn by 2020. Nonetheless, to limit the extent of climate change and thereby also the cost of adaptation, mitigation is decisive for several reasons.

Action geared towards climate change mitigation would not only decrease the environmental costs of economic growth. Green investments can also benefit Indonesia's long-term competitiveness and positioning in the global economy. Since international agreements such as within the Group of Twenty (G20) or Asia-Pacific Economic Cooperation (APEC) have put increasing pressure on national governments to decrease subsidies for fossil fuels, these subsidies are expected to decrease in the long run (Lang 2011). Timely changes towards "greener", less fossil-fuel intensive production would create a cost advantage for companies in the face of rising energy prices. Second, because of increasing consumer awareness and environmental conscience, changing patterns of international demand put pressure on firms for greener production (PWC 2010). This creates new or changing sales markets. With an early change towards greener production, Indonesian firms could strategically position themselves in this new market and moreover avoid the risk of being excluded from access to important markets for not fulfilling international standards for green production (World Bank 2012b). Third, a change towards a greener production at an early stage, compared to competitors on international markets, provides subsequent advantages regarding know-how and cost-efficiency (ESMAP 2012). Overall, there are convincing reasons to advance green economic

growth in Indonesia and put the economy on a path of sustainable development.

Besides hoping to reap the economic benefits from a green transformation, Indonesia's GHG emissions reduction strategy is related to the country's aspirations in terms of international leadership by example. In the official planning documents, the Government of Indonesia (GoI) highlights that "Indonesia hopes to demonstrate its leadership and become a driver for other countries, especially developed countries to reduce global GHG emission" (BAPPENAS 2011: 6).

Overall, due to its geographical characteristics, Indonesia is very vulnerable to climate change, and various simulations gauge the economic and social cost of climate change adaptation to be very high, creating a strong rationale for Indonesia to invest in climate change mitigation. The fast growth of energy use per capita is the largest threat to Indonesia's future emissions profile. Even though the land-based sectors currently account for the largest share of GHG emissions, rising emissions from fossil fuel combustion will in the future offset any success from reductions made in the land-based sector (ESMAP 2012), a trend of which the Indonesian government is well aware. Furthermore, there seem to be more investment opportunities in the energy sector (via investments in more energy efficient production processes for instance) than in the land-based sector, where land-use regulations will be more important. Accordingly, it makes sense to focus efforts on facilitating investments that will help to mitigate fossil fuel related emissions caused through energy production and consumption in the industry sector and elsewhere.

3.2 Policy goals and initiatives

3.2.1 Policy goals

Since 2007, the Indonesian government has put special emphasis on environmentally friendly policy frameworks. Indonesia's *Long-Term Development Plan* (Law no. 17) from February 2007 outlines Indonesia's development goals and strategies for the period from 2005 to 2025. It requires the Indonesian government to pursue its economic growth targets in accordance with socially balanced, resource-efficient and environmentally friendly management (BAPPENAS 2011).

Important milestones of Indonesia's commitment contributing to a global green transformation were the 13th Conference of the

Parties (COP-13) as well as the High Level Forum of Finance Ministers which were hosted by the GoI in Bali in December 2007. In both meetings, held under the umbrella of the UNFCCC,[2] the subject of financing the green transformation played a prominent role (Brown and Peskett 2011). The Bali High Level Forum stressed the importance of developing financing sources for the green transformation (MoF 2010). For the first time, finance ministers met internationally on the topic of climate change and their positions in this field were strengthened (MoF 2009). Moreover, participants agreed to include climate-related activities into their national development strategies and economic policies. Overall, 2007 marked an important year for making climate change an integral part of the global development agenda, but it was also an important year for Indonesia, which published in November 2007 the *National Action Plan Addressing Climate Change* as a guide for the Indonesian government (State Ministry of Environment 2007). Indonesia underlined its commitments by the formation of new institutional structures in 2008. For the co-ordination of all policies related to climate action, the government formed the National Council on Climate Change (NCCC, or *Dewan Nasional Perubahan Iklim, DNPI*), which is mandated to devise climate strategies, national policies and programmes. For this facilitation, the council consists of several working groups dedicated to topics such as mitigation, adaptation or financing mechanisms. In addition, a co-ordinating commission for UNFCCC's programme for Reducing Emissions from Deforestation and Degradation (REDD) was installed under the Ministry of Forestry (Brown and Peskett 2011). The biggest challenge for both institutions is the co-ordination of the different government agencies, as well as between central and decentralised governments (Angelsen 2009).

Subsequent to the national prioritisation of climate action, Indonesia committed itself internationally to comply with concrete environmental policy goals. At the 2009 G20 Summit in Pittsburgh, then President Yudhoyono announced that Indonesia will reduce GHG emissions by 26% in 2020, compared to the BAU level. Furthermore, including international support, Indonesia's emission reduction target lies at 41% (BAPPENAS 2011). Domestic policies and actions to reach the 26% goal that are deemed as Nationally Appropriate Mitigation Actions (NAMA) shall focus on cost saving and implementation of mitigation measures with low cost per ton of carbon. All reductions between 26% and 41% that shall be reached

through international support shall focus on investments with medium to high costs. A third category comprises reductions on top of these 41%. These reductions can focus on credited NAMAs in the form of carbon markets such as the Clean Development Mechanism (CDM) (BAPPENAS 2011).

The Intergovernmental Panel on Climate Change (IPCC) envisions a (non-binding) goal of GHG emission reductions between 15% and 30% for developing countries to limit global warming to 2°C. Indonesia's policy goals can thus be regarded as ambitious, lying at the upper threshold for voluntary contribution. Even though calculations of the corresponding absolute amounts of GHG emissions differ (cf. Section 3.3), under every estimated scenario these are the largest absolute commitments made by any developing or transition country. Worldwide, Indonesia received praise and recognition for its ambitious plans (Brown and Peskett 2011).

3.2.2 The National Action Plan

To meet the government's ambitious policy goals, a National Action Plan for Green House Gas Reduction (*Rencana Aksi Nasional Penurunan Emisi Gas Rumah Kaca*, RAN-GRK) was developed by the National Development Planning Agency (BAPPENAS), which is also responsible for its co-ordination (Brown and Peskett 2011). The National Action Plan was approved and officially signed by then President Yudhoyono in September 2011. RAN-GRK defines emission reduction goals and has the objective of "the implementation of various activities both directly and indirectly to reduce greenhouse gas emissions in accordance with the national development targets" (President of the Republic of Indonesia 2011). RAN-GRK identifies five priority sectors for climate change mitigation to reach the 26% target. According to their effect on GHG emissions, Indonesia defined agriculture, forestry and peat land, energy and transport as well as industry and waste management as priority sectors for climate change mitigation (BAPPENAS 2011). Table 3.1 gives an overview of the envisaged activities and implementing ministries in the five priority sectors.

The RAN-GRK constitutes a comprehensive framework for sustainable development planning, but obstacles in the implementation still exist. Consequent planning since 2008 and mainstreaming of climate change action into the National Medium-Term Development Plan (*Rencana Pembangunan Jangka Menengah Nasional, RPJMN*)

Table 3.1 RAN-GRK priority sectors and envisaged action

	Action plan	Implementing ministries
Forestry and peat land	Forest and land fire control, network system management and water management, forestry and land rehabilitation, industrial plantation forest, community forest, illegal logging eradication, deforestation prevention, community empowerment	Ministry of Forestry Ministry of Environment Ministry of Public Works Ministry of Agriculture
Agriculture	Introduction of low-emission paddy varieties, irrigation water efficiency, organic fertilizer use	Ministry of Agriculture Ministry of Environment Ministry of Public Works
Energy and transport	Bio-fuel use, engines with higher fuel efficiency standard, improvement in Transportation Demand Management (TDM), quality of public transport and roads, demand side management, energy efficiency, renewable energy development	Ministry of Transportation Ministry of Energy and Mineral Resources Ministry of Public Works Ministry of Environment
Industry	Energy efficiency, use of renewable energy, etc.	Ministry of Industry Ministry of Environment
Waste	Use of final landfill, waste management and urban integrated waste water management	Ministry of Public Works Ministry of Environment

Source: BAPPENAS (2011: 8).

underline the seriousness and political will for a green transformation (Yusuf 2010). However, credibility of the demanded interministerial efforts is reduced, since the "master plan" that was later released refers only once to the RAN-GRK (Coordinating Ministry for Economic Affairs 2011). Also, the acceptance of the plan apparently differs between the governmental and local administration levels, thus putting obstacles to its implementation on the ground (Yusuf 2010).

RAN-GRK envisages that emission reductions shall be achieved, among others, through energy conservation and efficiency measures (cf. Box 3.1). Thus, a number of energy conservation policies

were adopted and some programmes have been launched as well as certain binding rules set or proposed. Furthermore, Indonesia has further issued general environmental regulations for the industry sector. Both will be discussed in the following.

Box 3.1 Policies and strategies to reduce emissions in energy, transportation and industrial sectors

Energy and transportation sectors

Policies taken to support the RAN-GRK:

Increased energy saving

The use of cleaner fuels (fuel switching)

Enhancement of renewable energy utilisation

Utilisation of clean technologies for both power generation and transportation equipment

Development of low emission, sustainable and environmentally friendly national mass transport

Strategies:

Conserve the final energy both through the application of cleaner and more efficient technologies and through reduction in the consumption of non-renewable energy (fossil)

Encourage the use of new and renewable energy in small and medium scales

(Avoid) – reduce the travel needs, particularly in city areas (trip demand management), through land use management, reduce travel activities and unnecessary distances

(Shift) – shift from using private vehicles (transportation facilities with high energy consumption) to low-carbon transportation pattern, such as non-motorised, public, or water transportation facilities

(Improve) – improve energy efficiency and carbon release reduction in motorised vehicles in transportation facilities

Industrial sector

Policies taken to support the RAN-GRK:

Increase in industrial growth by optimising the use of energy

Strategies:

Conduct an energy audit especially on energy-intensive industries

Provide incentives in energy efficiency programmes

Source: President of the Republic of Indonesia (2011: 10, 19).

3.2.3 Energy conservation policies

Already in 2006, before the comprehensive RAN-GRK was issued, the Indonesian government issued soft laws on emission reduction in the energy sector. It announced as overarching objective that energy elasticity, that is, the rate of change of energy supply over the rate of change of GDP, should be less than 1% by 2025 (ABB 2012, Article 2.2). This objective should be met among other initiatives by enhancing energy conservation. To improve energy conservation, an incentive and disincentive structure was developed (GoI 2007, Article 25: 3) and put into practice in the following years via detailed regulations, instructions and decrees issued by the Ministry of Energy and Mineral Resources and the Ministry of Environment. These documents paved the way for concrete actions and further proposed several not yet implemented instruments.

(i) Public private partnership programme (PPP) on energy conservation

Already in 2002, the PPP was established in order to give cost-free audits to commercial buildings operators and industrial firms to stimulate energy conservation. After the announcement of Indonesia's ambitious environmental goals, the PPP was reinvigorated. Since no special accreditation mechanism has been established yet, a temporary fast track certification has been set up as a component of the programme. Until 2011, 645 enterprises and buildings of various sizes have been audited. In 2011 and 2012, IDR 30 bn were budgeted to finance further 375 audits (Ministry of Energy 2012). However, it appears that the follow up on the recommendations of energy audits has been weak so far, not least because energy efficiency investments that require medium to high expenditures could not be implemented because the companies would lack access to finance (MoF Indonesia 2013). But problems do not only occur on the implementation side. According to expert opinion, the quality of the cost-free-audits was rather poor and reports were oftentimes lacking practicable solutions. Since no special accreditation mechanism for auditors has been established yet, a temporary fast track certification has been set up as a component of the programme. The Ministry of Energy is well aware of the weaknesses of the current certification process and is aiming at the establishment of

a certification body for energy auditors. Overall, the PPP on energy conservation seems to present a step in the right direction but is still lacking a more comprehensive framework that also secures access to finance for green investments.

(ii) Rules and incentives for customers with consumption above 6,000 tons of oil equivalent (TOE)

In 2009, a Government Regulation on Energy Conservation (GoI 2009) laid down binding rules for energy consumers above 6,000 TOE, which overall make up for 60% of Indonesia's energy consumption. These companies are required to appoint an energy manager, to develop an energy conservation programme, to conduct regular energy audits as well as to follow up on the audit's recommendations and to report on their energy conservation efforts (GoI 2009, Article 12.3).

However, while this policy could make an important contribution to improving energy efficiency, there appear to be problems with implementation of this regulation and control mechanisms seem to be lacking. Furthermore, since the Indonesian economy is dominated by small- and medium-sized enterprises (SMEs) which often consume less than 6,000 TOE of energy, additional mandatory measures for those companies could speed up the process of enhancing energy conservation (Machmud and Huda 2011).

The 2009 regulation on energy conservation also created incentives for energy conservation investments for energy users with consumption above 6,000 TOE and manufacturers of energy efficient appliances. These include tax facilities, the reduction or alleviation of provincial taxes and custom facilities for companies investing in energy efficient equipment.

(iii) Electricity price increases

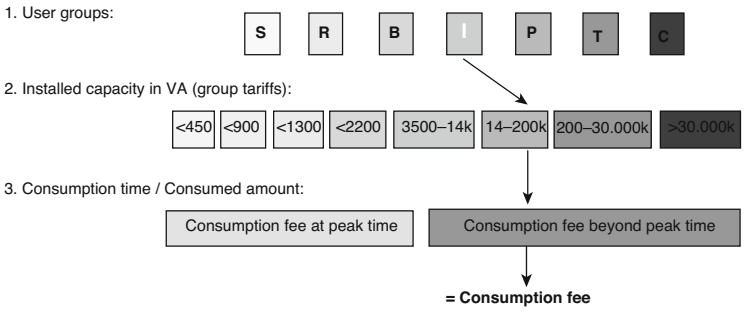
The removal of electricity subsidies for the industrial sector has been long discussed as a key-factor to increase energy conservation efforts.[3] In 2012, finally, an electricity price increase was announced. In 2013, electricity prices have risen for all seven consumer groups (Box 3.2), for customers with an installed capacity of 1,300 VA and more. Prices are supposed to keep rising on a three-month basis, as listed in Annex V.

Box 3.2 Electricity price structure in Indonesia

The structure of electricity prices in Indonesia follows a rather complex system. First, prices differ between various types of user groups: social service users (S group), household users (R group), business users (B group), industrial users (I group), public service and public lightening (P group), transport (T group) and other users (C group). Within each *user group*, different "group tariffs" are further defined, according to the level of installed capacity. For instance, eight different *group tariffs* exist within the group of industrial users. Within each *group tariff*, prices differ again according to either time of consumption or consumed amount. For 2013, electricity prices have increased in all seven consumer groups for customers with an installed capacity of 1,300 VA and more. Prices rise quarterly as listed in annex V.

Example of medium installed capacity of an industrial user:

Price depends on 3 factors:



*Charged costs for this group tariff: 40 (hours on) x installed capacity (kVA) x consumption fee

Source: Compiled by authors.

3.2.4 Further environmental regulations

Aside from the RAN-GRK, which defines emission reduction goals for the industry sector and Indonesia's energy conservation policies, there is a set of more general environmental rules which affect banks and companies that should be mentioned. The following text briefly describes environmental regulations for the corporate sector and environmental regulations pertaining to banking practices respectively.

Environmental licenses

Indonesian companies are required to comply with certain environmental standards. In line with the "Regulation on Environmental Permits", an environmental license is mandatory to receive a business license (GoI 2012). The license can be obtained by completing one of the two environmental impact assessments, either the AMDAL (*Analisis Mengenai Dampak Lingkungan*) or the UKL-UPL (*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup*) assessment. Whether a company needs the more comprehensive AMDAL or a simple UKL-UPL assessment depends on the environmental effect of the sector the company operates in. An AMDAL assessment is required for companies in those sectors having a potentially significant effect on the environment. An UKL-UPL assessment is needed by all other companies. Exemptions to this rule can be granted to companies in regions with a regional AMDAL, in cities with a spatial plan and businesses that can be classified as emergency response (Lubis Ganie Surowidjojo 2012).

Program for Pollution Control, Evaluation, and Rating (PROPER)

Already in 1995, the MoE established a rating for companies regarding their environmental performance. The rating aims to enhance industrial compliance with pollution control regulation. Companies get colour-coded from gold (beyond compliance) to green (good compliance), blue (satisfactory level of compliance), red (not complying) and black (seriously not complying) (World Bank 2003). Companies can either apply for a PROPER audit or get chosen by the ministry. So far 1,400 companies have been audited by the program.

Environmental impact assessment for large loans

Bank Indonesia Act 10/1998 obligates banks to conduct an environmental impact assessment for large loans or high risks loans. Regulation 2004 concerning asset quality adds that an environmental assessment should be part of the overall credit assessment. Measures taken by the debtor to protect the environment shall particularly be integrated in business prospect calculations (Bank Indonesia 2005, Article 11.1).

Furthermore, according to Bank Indonesia, banks should consider the PROPER rating in their risk assessment of those clients that have

received such rating by the Ministry of Environment. Since companies with a black PROPER rating can theoretically have their licence revoked and be shut down, banks should increase the risk premium for these companies. The bank survey presented in Section 4.1 tests to what extent banks comply with this regulation.

3.3 Emission reduction potentials, investment needs and financing sources

Achieving the government's emission reduction targets just discussed will require comprehensive policy action. As mentioned in Section 3.1, the fast growth of energy use per capita is the largest threat to Indonesia's future emissions profile. Even though the land-based sectors currently account for the largest potential to reduce GHG emissions, emissions from fossil fuel combustion will increase by four times in a BAU scenario by 2030, thus potentially offsetting any success from reductions made in the land-based sector (ESMAP 2012). Meeting the carbon emission reduction targets will require significantly reducing energy intensity of economic activity and also the exploitation of alternative, low carbon energy sources. Given the importance of actions to be taken in the energy sector, the following section provides an overview of the potential GHG emission reductions in the energy sector. This is followed by a discussion in Section 3.3.2 of the projected investments needs to meet the reduction targets in the different priority sectors, as well as an overview of possible sources of green finance in Section 3.3.3.

3.3.1 Potential GHG emission reductions in the energy sector

The carbon intensity of energy generation is highly dependent on the energy source. The high carbon intensity of Indonesia's economy results from a dependency on energy sources that are emission-intensive in the energy production process, oil and coal in particular. In 2010, energy supply in Indonesia consisted of 37.5% crude oil and oil products, 20% biomass, 19.5% natural gas and products, 19% coal, 3% hydro power and 1% geothermal energy (MEMR Indonesia 2011).[4] Emissions can be reduced by means of switching to energy sources that are less carbon-intensive. Coal is by far the energy source with the highest emissions per energy output: generating energy by burning coal releases roughly twice as much emission as the process of energy production from gas (ESMAP 2008).

However, the energy mix is predicted to change from dependence on oil towards coal as Indonesian oil reserves are decreasing while energy consumption is increasing (USAID 2008). Over the last years, Indonesia has increasingly imported crude oil and oil products (APEC 2009; USAID 2008). Since oil is still subsidised, imports are costly and strain the government budget. Thus, the government has announced plans to decrease the share of oil to less than 20% by 2025 (BAPPENAS 2011, GoI 2006). To satisfy the rising energy demand, the extraction of coal, which is Indonesia's largest fossil fuel reserve, shall be further developed (ESMAP 2008; USAID 2008). Since increasing coal extraction will cause rising emissions, this will run contrary to efforts to mitigate climate change.

In order to decrease emissions the government has set the goal of developing Indonesia's renewable energies, but development has been slow thus far (BAPPENAS 2011). This is despite the fact that Indonesia possesses approximately 40% of global geothermal energy potential which could potentially cover a large share of Indonesia's energy demand. Especially given that only 71% of Indonesia is yet electrified, tapping renewable energy sources such as biomass, wind, solar, geothermal and hydroelectric would be a smart way of producing electricity in those regions that do not yet have access to the national energy grid. Box 3.3 provides an overview of Indonesia's power system.

Box 3.3 Indonesia's power system

"The development of the power system in Indonesia varies greatly, from well-connected Java-Bali power line to small-scale power systems scattered throughout all the regions. Indonesia's regions are connected by seven power systems located on four large islands namely, Java-Bali, Sumatera, Kalimantan and Sulawesi. The largest power system in Indonesia is Java-Bali, a connected system that contributes more than 77% of the state's power production.

However, regarding degree of electrification, only around 64% of the population had access to electricity in 2009 and this increased to 67% in 2010.

Most of the electric power supply in Indonesia is provided by PT.PLN (Persero), with connected capacity of around 84% of the total capacity. Meanwhile, around 18% constitutes participation from private power companies (PLS).

In 2009, PLN had almost 40 million consumers with the biggest demand coming from housing, reaching 40.8%, followed by industry (34.3%), commercial sector (18.5%), social sector (2.5%), road lighting (2.2%), and government buildings (1.7%). Meanwhile, energy consumption for housing and commercial consumers reached around 60% of the total power need in Indonesia.

The total energy produced in 2009 was 156.8 TWh, including the power sold from PLS (36.2 TWh). Around 36% from the energy was produced by coal, 24% by gas, 29% by petroleum, 9% by hydro and 3% by geothermal."

Source: BAPPENAS (2011: 45–46).

Investment into renewable energy is severely hampered by the structure of the energy market, which is shaped by three actors: the major actor is the state owned company PT Perusahaan Listrik Negara (PLN). PLN has the monopoly on electricity distribution. However, PLN is unable to ensure a permanent supply of energy in all regions. Apart from PLN, independent power producers (IPPs), mostly financed by international investors, provide additional energy. IPPs are currently most interested in the development of renewable energies. However, IPPs are obliged to feed their energy into the grid of PLN for fixed feed-in tariffs, which makes investments less attractive. As pointed out by BAPPENAS (2011: 46), "a low power tariff offered by PLN since 2003 has failed to draw investors for investment in the power sector, so that there has been a lack of capacity especially outside Java in the last few years." Because of PLN's insufficient and unsteady energy supply, certain energy-intensive industries, including for example cement mills or pulp factories, have resorted to producing their own energy. The excessive energy produced by firms cannot be sold to other companies directly, but needs to be fed into PLN's grid.

In addition to changing the energy mix of the energy suppliers, also more energy-efficient consumption, especially by the large energy consumers, could significantly help to reduce Indonesia's emissions profile. One reason behind Indonesia's emissions profile is its relatively energy intensive development. Figure 3.2 underlines that, within one decade, energy consumption in the industry sector roughly increased by 40%. As mentioned before, a 1% growth in GDP leads to a 1.8% growth in energy consumption. Since the National Industrial Policy

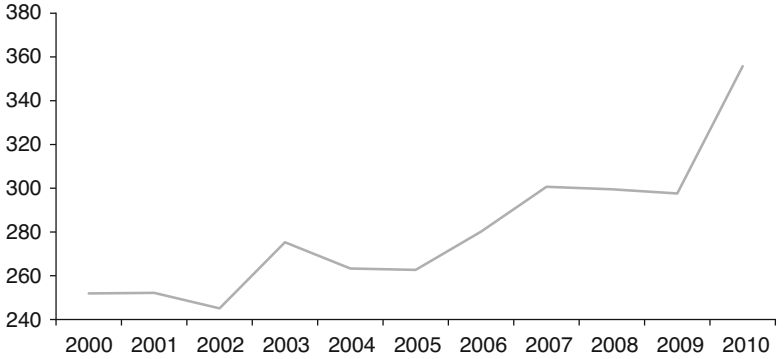


Figure 3.2 Energy consumption in the industry sector (in million barrel of oil equivalent)

Note: The calculation includes biomass.

Source: Compiled by authors with data from MEMR Indonesia (2011).

foresees an industrial growth rate of more than 8% per year until 2025 (Presidential Regulation No 28/2008) energy consumption of the industry is expected to grow significantly and emissions are forecasted to triple between 2005 and 2030 (ESMAP 2008).

Energy is consumed by three major groups: in 2010, 33% of the total energy supply was consumed by the industry sector, closely followed by households (30%) and transport (24%) (MEMR 2011). Since households rely to a large extent on biomass, they do not pay for a major part of their energy consumption. When excluding biomass, 44% of total energy was consumed by the industry sector; 36% by the transport sector and only 11% by the household sector (MEMR 2011).

To counteract the projected rise of emissions, the GoI wants to foster energy efficiency in the industry sector. In 2006, the Indonesian government has announced that energy elasticity should be reduced to less than 1% by 2025 (ABB 2012: § 2.2). The objective of a decreased energy elasticity shall be met, among other initiatives, by enhancing energy conservation.

The government has decided to focus on those sectors with the largest potentials for energy and emissions reductions. Indonesia's Climate Change Sectoral Roadmap (ICCSR) enlists cement, iron and steel, pulp and paper, textile and fertiliser industries as those with

the highest potential for GHG emission reductions (BAPPENAS 2010). Furthermore, it sees potential for energy efficiency improvement in glass and ceramics, refined sugar and cooking oil industries, since they are among the higher energy-consuming industries (BAPPENAS 2011).

However, the lack of economic incentives to reduce energy consumption plays a major role for the high consumption levels. The essential factor lies in the highly subsidised consumer prices of Indonesia's energy mix, which is supplied by the national energy monopolist PLN. According to UNFCCC (2009a), electricity in Indonesia is priced at approximately 60% of the real costs of its generation. Thus, low energy prices decrease the attractiveness of investments in renewable energy and at the same time boost consumption. As discussed, energy prices started to rise modestly in 2013, but only for customers with an installed capacity of 1,300 VA and more. This is a start, but subsidies remain substantial and need to be phased out so that they reflect not only the real cost of energy production but also negative externalities. The current energy subsidies are without doubt the biggest drawback that holds back green investments in Indonesia.

3.3.2 Investment needs

Emission reduction potentials and abatement costs

To reach the envisioned GHG reduction goals, different estimates of investment needs were released by BAPPENAS (2010, 2011) and UNFCCC (2009a). Decisive for the estimations of the reduction potentials and investment needs are the BAU-scenarios, which differ substantially depending on the methodology used. UNFCCC (2009a) and BAPPENAS (2011) in its RAN-GRK implementation guide use the same BAU-scenarios based on which they predict 2.95 Gigaton (Gt) CO_2 emissions until 2020.[5] For the ICCSR, however, BAPPENAS (2010) calculated a different BAU-scenario with 18.72 $GtCO_2$ which makes a big difference to the overall potential of achievement, since efforts would need to be more than six times as high.

Since the calculation methodologies used for these scenarios were not made public, an assessment concerning the quality of the estimates is difficult. What becomes apparent, however, is that different scenarios will lead to a wide range of estimat**es** of potential GHG emissions and that estimations are difficult and uncertain (Yusuf 2010). In any case, the estimated proportions of contributions to GHG reductions by different sectors remain similar in both scenarios. Table 3.2 displays different estimates for emission reduction potential

for the different sectors and their corresponding abatement costs by UNFCCC (2009a), MoE (2010) and BAPPENAS (2011) on the one hand and BAPPENAS (2010) on the other. Overall, the outlined actions meet the 26% and 41% goal of total emission reductions.[6] In the following table 3.2, we will refer to the latest calculations used by UNFCCC (2009) and BAPPENAS (2011) only.

The plan for achieving the 26% reduction target relies mainly on efforts in the forestry and peat land sector, with envisaged emission reductions of 22.78% in BAPPENAS (2011) and UNFCCC (2009a). Compared to all other sectors, in BAPPENAS (2010) the forestry and peat land sector are assessed to have the lowest abatement costs per tCO_2. Emission reduction in this sector is therefore considered relatively cheap. However, according to Yusuf (2010), the emission reduction potential might be overestimated, given the uncertainty of estimations. Actions aimed at reducing emissions in the forestry and peat land sector include sustainable peat land management, forest and land fire control and forestry and land rehabilitation (see Table 3.1 for further examples). The second largest potential for GHG reduction is seen within the waste sector. These reductions contribute 1.63% to the domestic goal (BAPPENAS 2011; UNFCCC 2009a). The main field of action here targets solid and liquid waste reduction. The combined energy and transport sector is regarded as the third most important sector to target, with an envisaged contribution of 1.29% to the 26% reductions targeted (ibid.). The target shall be reached via a shift to low-emission transport modes, and the development of alternative and renewable energy resources. Fourth, BAPPENAS (2011) and UNFCCC (2009a) see a potential of 0.27% GHG emission reduction in the agricultural sector. Main areas of action focus on the introduction of low-emission crop varieties. Lastly, the industry sector shall contribute 0.03% of GHG emission reductions to the main goal, mainly by focusing on energy efficiency and the use of renewable energies. Overall, in order to reach these GHG emission goals, the Indonesian government committed itself to allocate USD 8.9 bn from different sources for the 26% goal and estimated a need for an additional USD 17.96 bn of international funding to reach the 41% target (UNFCCC 2009).

It should be emphasised once more that emissions originating in the energy, transportation and industrial sectors are predicted to overtake land-based emissions by 2030. It is understandable that the government emphasises the potential of reducing GHG emissions

Table 3.2 Emission reduction potential per priority sector

	UNFCCC (2009a), MoE (2010), BAPPENAS (2011)				BAPPENAS (2010)	
Sector	**Percentage of emission reduction goal (26% of 2.95 $GtCO_2$)**	**Cost (bn USD)[a]**	**Percentage of emission reduction (additional 15%)**	**Cost (bn USD)[a]**	**Percentage of emission reduction goal (26% of 18.72 $GtCO_2$)**	**Total cost (bn USD)**
Energy	1.29	0.01	0.36	8.00	0.82	63.49
Transportation		1.07	0.28	1.07	0.49	2.01
Industrial processing	0.03	0.06	0.14	0.25	0.23	0.47
Agriculture	0.27	0.38	0.11	0.43		
Forestry	22.78	4.95	11.02	3.94	21.03	0.34
Peat land		1.76	2.03	3.73		
Waste	1.63	0.65	1.07	0.53	1.12	2.3
Total	26.00	8.9	15	17.96	23.69	68.61

Note: [a] costs are converted from trillion IDR into billion USD at the exchange rate of 1 December 2009.

Source: Compiled by authors drawing from UNFCCC (2009a: 27), BAPPENAS (2010: 125) and BAPPENAS (2011: 8).

in the forestry and peat land sector, given the lower abatement cost (forestry and peat land conservation requires first and foremost a more stringent land policy) and also the ample availability of international climate finance (cf. Annex I, II and IV). But it is clear that any success from reductions made in the land-based sector will be offset with continued economic growth and BAU, and that concerted efforts are needed to reduce energy intensity of the energy, transportation and industrial sectors.

Investment needs in the energy sector

To date Indonesia's record of investments in renewable energy infrastructure has been dismal despite the country's enormous potential in renewable energies. Other emerging economies such as Thailand, South Africa or Argentina have invested much more in renewable energy infrastructure than Indonesia (cf. Table 3.3), even if the Indonesian economy is 2.2, 2.5 and 1.4 times larger than these economies, respectively.

To achieve the climate goals, the government wants to centre investments in the power sector on alternative sources of energy. According to the ICCSR, action shall focus on three areas to transform the power sector (BAPPENAS 2010): (1) education, training and information; (2) institutional development; and (3) implementation or replacement with alternative energy sources. The concrete investments needs depend on different scenarios, which will be presented further below, after the action plan is illustrated (cf. Table 3.4).

Table 3.3 Top countries for south-originating investment in renewable energy infrastructure, 2004–2013Q3

	Cumulative investment (in billion USD)
China	233.1
Brazil	47.7
India	44.4
Thailand	5.8
South Africa	5.5
Argentina	5.2

Source: Adapted from Zadek and Zhang (2014: 11, table 2).

Table 3.4 Activities in the energy sector as put forward in the Indonesia Climate Change Sectoral Roadmap

Category	2010–2014	2015–2019	2020–2024	2025–2029
Data, information and knowledge management	Energy Conservation Partnership through energy audit services for industry and construction	Formulation of renewable energy technology information	Preparation of competence standard of Energy Manager	
	Development of Clearing House as information centre on energy conservation	Socialising policies on gas flaring to stakeholders	Promotion and preparation for energy saving labelling procedure for home appliances	
	Increasing public awareness through different methods			
Planning and policy, regulation and institutional development	Education and training on energy efficiency and Conservation			
	Formulating Ministerial Decree on gas flaring utilisation in Production Sharing Contract			
	Formulating Ministerial Decree on gas flaring utilisation as part of field's Plan of Development (POD)			
	Formulating technical regulation on gas flaring.			
	Search for funding and technical assistance to implement small-scale gas flaring projects			

Implementation and control with monitoring and evaluation	Village electrification program based on renewable energy	Development of energy independent village based on BBN and non-BBN	Power plant facilitation program based on renewable energy
	Development of biogas for domestic use	Development of geothermal	Development of biomass turbine for rural areas
	Substituting fossil fuel (BBM) with natural gas (BBG) or nuclear energy (BBN)	Carry out several short listed gas flaring projects	
	Accelerating the development of natural gas infrastructure.		

Source: BAPPENAS (2010: 112).

The first area of action covers "data, information and knowledge management" (BAPPENAS 2010: 112). BAPPENAS foresees partnerships between the energy sector and the industry in order to increase knowledge about energy conservation potentials through energy audits. In addition, education and training measures for energy efficiency and energy conservation are planned. Simultaneously, public awareness shall be increased for alternative energy sources.

To foster institutional development, action in the second area deals with "planning and policy, regulation and institutional development" (BAPPENAS 2010: 112). So far, plans have been developed only for the stimulation of gas as energy source. Governmental regulations on gas flaring utilisation shall be formulated and options for financial and technical support for the implementation of small-scale gas flaring projects identified.

Actions in the third category shall foster the implementation of alternative sources of energy. Particularly rural areas, which are usually difficult to connect to the grid, shall be provided with independent energy production facilities. These alternative energy sources should ideally be of low carbon-intensity, based on renewable energy. BAPPENAS (2010) envisages that fossil fuels are gradually substituted by natural gas or nuclear energy. In addition, GoI plans to increase the provision of biogas and geothermal energy for domestic use (BAPPENAS 2010). However, considerations by the GoI to increase the share of nuclear power have raised concerns that the fulfilment of the GHG emission targets might come at the cost of nuclear waste as well as the omnipresent danger of nuclear accidents threatening flora, fauna and humans.

The costs of the necessary investments have been calculated for three different scenarios for the country's two main power systems, namely the Java-Bali Power System and the Sumatera Power System. Investment costs for developing the Java-Bali Power System are estimated at between USD 54,771 million and USD 68,282 million by reaching emission reductions between 9% and 26.4% from the sectoral BAU level (BAPPENAS 2010: 107–108).[7] The estimated investment cost for the Sumatera power system range from USD 9,714 million to USD 9,856 million (BAPPENAS 2010: 109–110).

Box 3.4 Policies, actions and instruments for the energy sector

"A more integrated energy and climate change policy is needed to put the long-term national energy plan strongly on the low-carbon energy path ... To develop a future low-carbon energy path, it is necessary to propose policies, actions and instruments that will enhance low-carbon economic development in the energy sector. Moreover, it can provide a framework that supports the key tasks as follows:

1. To orient the energy system towards low-carbon energy sources,
2. To develop and spread low-carbon and carbon-free energy technologies,
3. To promote increased efficiency in energy production (supply side) and energy use (demand side),
4. Efficient transmission and distribution systems, and
5. To revise related policies and regulatory frameworks to draw more investment into the energy sector, including innovative financing that creates synergy between financial sources to stimulate the flow of investment in energy."

Source: BAPPENAS (2011: 45).

Investment needs in the industry sector

Investment needs in the industry sector to reduce GHG emissions can be classified into three categories: (1) improving on energy efficiency of production; (2) changing the type of energy source, for example, switching from coal to renewable energy sources; and (3) using alternative, less GHG emission intensive production inputs, such as recycles material (BAPPENAS 2010). More concrete actions and corresponding investment needs have thus far been developed only for single industries and are still under development. Table 3.5 provides examples of possible measures aimed at reducing GHG emissions for the different industry sub-sectors.

The Climate Change Sectoral Roadmap comprises six steps to guide the industry sector towards the emission reduction goal (BAPPENAS 2011). First a baseline regarding BAU has to be developed for all remaining relevant industries, apart from the cement industry. Second, scenarios for possible mitigations have to be explored. As a third step, concrete actions have to be developed to meet the elaborated targets. Then, the proposed actions have to be implemented by the policy level and the industry sector. These actions need to be

Table 3.5 Examples of industrial technology available for GHG emission mitigation in the industry sector

Industry sub-sector	**Energy efficiency**	**Replacement of fuel**	**Key process modification**
Cement	Lighting, motor efficiency, air conditioning and engine's fuel	Agricultural biomass, urban solid waste, B3 waste	Blended cement
Iron and Steel	Smelt reduction, optimised electrical furnace, improved performance of preheating process	Use of biomass, biogas, product gas combine cycle	Recycling of products and waste
Pulp and paper	Boiler efficiency, drying process, shoe press usage, condebelt drying	Use of biogas, gasification process with black liquor	Recycling of products and waste, using raw materials, from plantation or non-wood raw materials
Fertiliser	Boiler efficiency, replacing dryer, reducing air compression		
Textiles	RF dryer, transformer, pumps, energy-saving motors	Use of natural gas	
Ceramics	Optimised kiln and dryer, insulation		Modification of ceramic body, use of fly ash as mixed raw materials
Petrochemical	Optimized boiler, furnace	Use of natural gas, biogas	Improved recycling and efficiency of raw material
Cooking oil	Optimised boiler, cogeneration, use of VSD motor	Use of biomass (oil palm empty stem)	
Sugar	Optimised boiler and drying, cogeneration, use of VSD motor, integrated process	Use of biomass (bagasse), biogas from waste processing	

Source: BAPPENAS (2011: 63).

monitored and evaluated in a fifth step. Finally, there is a verification mechanism needed to measure the actual GHG emission reduction effect and compare it to the envisioned targets (BAPPENAS 2011).

Overall, the Indonesian government has committed to ambitious emission reduction goals and it has devised a comprehensive framework for achieving them with the RAN-GRK. Besides implementing binding and effective land use policies to bring to an end large-scale deforestation and destruction of peat land, the two most important causes of carbon emissions in Indonesia, the government is facing the challenge of limiting the fast-growing emissions in the energy, transportation and industrial sectors which are predicted to overtake land-based emissions by 2030. So far, the government has initiated a number of policies aimed at energy conservation, but implementation has been slow. The implementation of a green finance framework will be important to boost investment in the green transformation.

3.3.3 Potential sources of green finance in Indonesia

As elaborated above, for Indonesia to reach its emission goals large financial investments are required. The question that arises is *how to finance these investments*? In general, private and public as well as domestic and international sources can be tapped to finance the green transformation.

Public funds

Indonesia is already receiving substantial financial pledges and commitments for green investments from bilateral and multilateral donors and development banks around the world. In addition, there are numerous international funds with the aim of financing the green transformation in developing and developed countries. Brown and Peskett (2011) calculate that in 2011 the committed and secured international financial support for climate change related issues in Indonesia amounted to approximately USD 4.4 bn, which will be made available over the next several years. GHG emission reductions financed through these international sources are earmarked for reaching the 41% emission reduction goal of the GoI. Indonesia has also established national funds to attract and to channel investments in green projects to advance the green transformation. An overview of the existing financial sources for Indonesia, both on the

international and the domestic level, to finance the green transformation can be found in Annex I–Annex IV.

However, even if the Indonesian government provides the USD 8.9 bn estimated to meet its 26% goal and the international community increases its financing commitments and eventually affords the USD 17.96 bn that the Indonesian government considers necessary to reach the 41% target, it should be clear that the needed green transformation cannot be achieved through public finance alone. The green transformation can only succeed when all actors in the public, financial and corporate sector internalise all environmental cost in economic decision making. It is therefore important that there is a business case for both banks and enterprises to provide and undertake green financing and investments, respectively. International support can provide funds for high upfront costs, provide technical assistance and help banks to offer new credit lines. However, only if green financing and investment becomes a triple win situation – for banks, enterprises and the society – it will become a sustainable business model.

It should be therefore evident that the domestic financial sector will have to play a focal role in providing green finance for sustainable investment and development. Therefore, it is vital to also look at the capacity and willingness of the Indonesian banking sector – given that Indonesia has a bank-dominated financial system and capital markets play only a minor role to date (see below) – to engage in green finance and the potential demand of enterprises for financing green investments. Accordingly, we will have a closer look at the Indonesian financial sector in the following section, since this is the place where demand and supply of green finance needs to be balanced.

The financial sector

The Indonesian financial sector staged a remarkable recovery after it was shattered during the Asian financial crisis of 1997–1998. Since the crisis, the Indonesian government has put high emphasis on the reduction of national debt and maintaining macroeconomic and financial stability.[8] As a result, Indonesia was able to regain investment grades from Fitch and Moody's in 2011 and 2012, respectively (Manurung and Moestafa 2012; Table 3.6). Consequently, the Indonesian government has been able to refinance itself at relatively

Table 3.6 Indonesia's sovereign ratings, August 2014

Rating Agency	Rating	Outlook
Moody's Investor Service	Baa3	Stable
Standard & Poor's	BB+	Stable
Fitch Ratings	BBB–	Stable
Japan Credit Rating Agency	BBB–	Stable
Rating & Information Inc.	BBB–	Stable

Source: Compiled by authors with information from the Bank Indonesia website.

low interest rates on the international capital market. Although interest rates went up significantly in summer 2013 when Indonesia was labelled as one of the "fragile five" emerging economies after the Federal Reserve's tapering shock, Indonesia's sovereign international refinancing costs are still historically at low levels. It should be noted that even though the global interest rate environment over the past years has provided the Indonesian government with an excellent opportunity to cheaply finance long-term infrastructure and energy investment, the government has been reluctant to increase public spending as well as to make use of international refinancing due to its priorities on debt reduction. This cautious spending policy of the government can be seen as harmful to the country's development path (BAPPENAS 2010; World Bank 2012b).[9] Azis (2013) has called the failure of the Indonesian government to use low international interest rates for infrastructure investment as a failed opportunity.

Indonesia has a bank-based financial system, with 79.2% of all assets held by commercial and rural banks (Figure 3.3). The Indonesian banking sector is a two-tier banking system with a broad range of commercial banks and rural credit banks. Although the 1,640 rural credit banks far outnumber the 120 commercial banks (Table 3.7), the latter dominate the market.[10]

The ratio of domestic credit extended to the private sector over GDP is much lower than the average for all developing countries in the East Asia and Pacific region (Figure 3.4). According to the latest Enterprise Survey report that the World Bank produced on Indonesia, access to finance is seen by far as the major business environment constraint (World Bank 2010a). Only 51% of the companies in Indonesia hold a checking or savings account and only 18% made

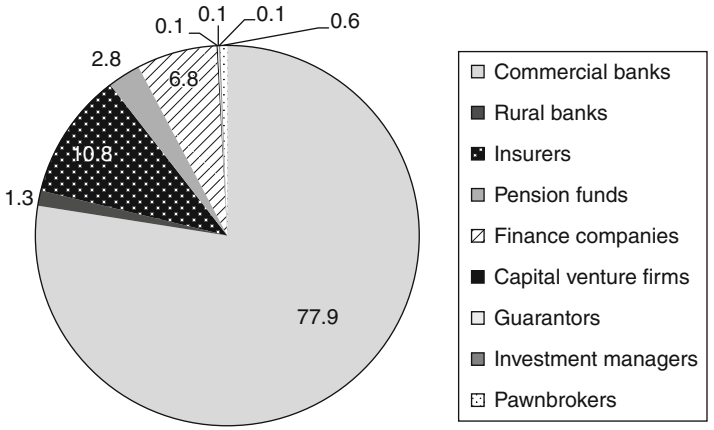


Figure 3.3 Asset composition of financial institutions (as of June 2013)
Source: Compiled by authors with data from Bank Indonesia (2013b: 9).

Table 3.7 Number of financial institutions, 2013

Type of financial institution	Number of financial institutions
Commercial banks	120
Rural banks	1,640
Insurers	139
Pension funds	268
Finance companies	197
Capital venture firms	89
Guarantors	7
Investment managers	73
Pawnbrokers	1

Source: Compiled by authors with data from Bank Indonesia (2013b: 9).

use of a bank loan or a formal credit line (World Bank 2010a). The access to finance problem is most prevalent among smaller companies (Kuntchev et al. 2014). According to Machmud and Huda (2011: 272), only 56% of all SMEs in Indonesia have access to formal financial institutions. Indonesia's access to finance problem is related to the countries weak institutional and legal framework, as a "lack of information about borrowers, restrictions on collateral, and the difficulty and expenses of recovery in cases of default, all make lenders

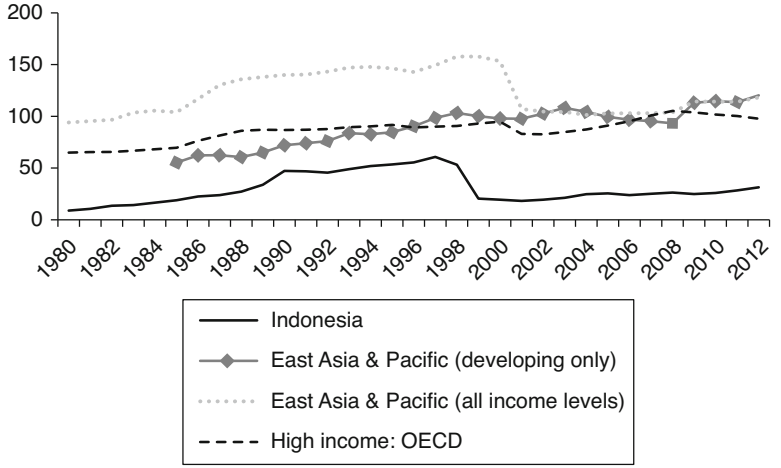


Figure 3.4 Domestic credit to private sector by banks (% of GDP), 1980–2012

Source: Compiled by authors with data from the World Banks World Development Indicator database, August 2014.

generally hesitant to grant loans, especially to small businesses or to new forms" (Tipton 2008: 427). To obtain credit, many SMEs have to rely on informal sources that can be external (e.g., loan sharks, friends or relatives) or internal (e.g., retained earnings, loans from employees or owners' private savings) (Machmud and Huda 2011).[11] The lack of access to bank finance is seen as a major barrier towards green investments (UNIDO 2011) and will be analysed in the next chapter.

Although bond markets have grown rapidly, in June 2013 credit extended by the banking sector was still three times larger with USD 359.7 bn than the size of domestic bond markets with USD 118.0 bn (Figure 3.5). Capital markets, especially corporate local currency bond markets, which have grown from USD 2.81 bn in December 1997 to USD 18.31 bn in June 2014, clearly have an important role to play as a source of funding for green investment. However, they are still nascent and given that credit by banks remains by far the most important form of financing in the Indonesian economy, it is evident that banks also ought to play an important role in financing the green transformation.

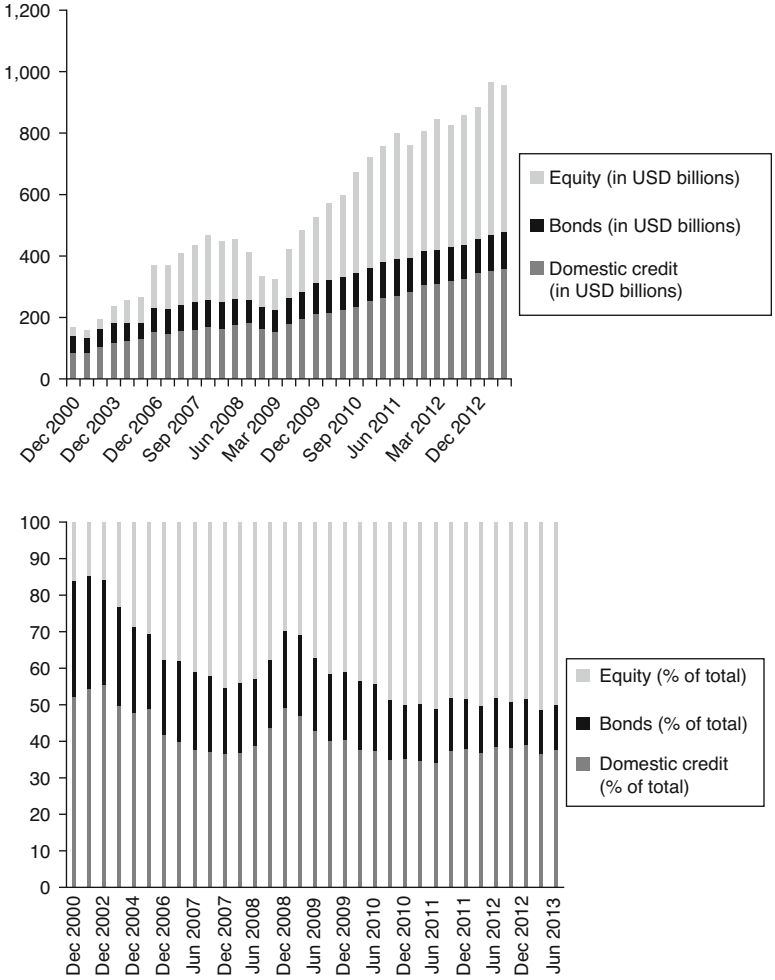


Figure 3.5 Equity, bonds and domestic credit (in billion USD and as % of total), December 2000–June 2013

Source: Compiled by authors with data from ADB Asian Bonds Online, August 2014.

Overall, Indonesia's relatively stable financial and macroeconomic situation provides a good starting point from which to engineer a green transformation. But the lack of financial deepening and access

to finance hold back investments in innovation and resource efficiency that are urgently needed to get the green transformation moving. As pointed out by the IMF (2013: 19), by "deepening financial markets and offering a greater range of products, more domestic savings could be mobilized ... Resource allocation as a whole would be expected to improve to support growth, including to fund infrastructure development and other long-term commitments." There is still much room for development in both banking and bond markets. The challenge will be to tap this potential to make green finance work in Indonesia.

4
Empirical Analysis of Supply of and Demand for Green Finance in Indonesia

It is clear that the Indonesian financial sector will have to play a pivotal role in channelling the required resources to finance the green transformation. However, so far we observe that green banking is hardly existent in Indonesia and beyond theoretical considerations there is very little empirical evidence to explain this underperformance. Moreover, there is only limited knowledge about the potential demand for green finance from Indonesian companies. To fill these knowledge gaps our empirical analysis investigates two research questions: (1) What are the bottlenecks for banks to provide green finance and for companies to invest in green projects? (2) Which policies and instruments could help enhance green investments?

To get a comprehensive understanding of the bottlenecks for green financing and investment and to be able to devise adequate policies and instruments to remove them, we conducted an analysis at three levels: (1) the policy level, (2) the banking level where we investigate the potential supply of green finance into green investments and (3) the corporate level, where we examine the potential demand for green finance from the corporate sector. To identify the most important bottlenecks to green finance at the policy level, including possible government failures as discussed in Chapter 2, we analysed the current regulatory and policy framework (cf. Chapter 3) and conducted qualitative interviews with representatives of relevant ministries (including the MoF, the MoE, BAPPENAS and the MEMR), as well as numerous experts from business associations, international organisations,

development agencies, academia and non-governmental organisations (NGOs). At the financial and corporate levels, we conducted comprehensive surveys in the banking and corporate sectors, respectively. All surveys and interviews were carried out in Indonesia in 2013.

The next section delineates the hypotheses and methodology of the bank survey and the bank interviews and interprets the empirical findings. Subsequently, Section 4.2 outlines the hypotheses and methodology of the company surveys and presents and interprets the empirical findings. The respective survey findings will be complemented with insights gained from the interviews with government officials, business associations, international organisations, development agencies, academia and NGOs. Section 4.3 summarises the main findings from the surveys and interviews.

4.1 Supply side: Bank survey and interviews

4.1.1 Methodology: sample selection, hypotheses and questionnaires

To learn about the reasons why the supply of green finance is low in Indonesia and to identify instruments that could help to ameliorate this, we conducted two surveys in the banking sector. First, a questionnaire comprising 10 questions in Bahasa Indonesia was sent to all Indonesian commercial banks through Bank Indonesia, the central bank. Second, semi-structured qualitative interviews, comprising 30 questions, were conducted with 15 selected banks together with Bank Indonesia. In order to develop the respective questionnaires, which are reprinted in Annex VI (in English) and Annex VII, we identified the following working hypotheses based on theoretical considerations and the Indonesian country context:

1 **Lack of economic incentive:** Banks do not regard green credit lines as an attractive business opportunity.
2 **Lack of capacity:** Banks lack the capacity to assess environmental risk in general and the risks of green investments in particular.
3 **Risk perception:** Banks regard investment credits for renewable energy facilities or energy efficiency as particularly risky.

The quantitative survey was sent by Bank Indonesia to all 120 Indonesian commercial banks, via email or postal service. Of these,

68 banks (or 56.7% of all Indonesian commercial banks) completed the questionnaire. We complemented the written survey with semi-structured qualitative interviews to obtain additional information. Since the design and management of green credit lines requires certain capacities, we assumed that so far only large banks in Indonesia might have these capacities, or at least an interest in developing them. Therefore, qualitative interviews were conducted with the nine largest Indonesian banks.[1] In addition, we also included two regional banks (in spite of them being considerably smaller) as previous research indicated that they showed the greatest interest in adopting green finance products (GFA Consulting Group 2011). Furthermore, three Sharia banks were invited for interviews to investigate whether their business models may facilitate their adoption of green finance.

In preparation of the qualitative interview process, one test-interview was conducted with a senior manager of one of the largest Indonesian banks to test the questions for their relevance and comprehensibility. The semi-structured interviews, which lasted about one hour each, were arranged and accompanied by Bank Indonesia staff but conducted mainly by the research team in English. The Bank Indonesia team assisted with translations and explanations, when necessary. Interviewees were mostly in senior management positions within departments for risk management and strategy.

4.1.2 Findings

The findings that are presented in the following are based on the results of the quantitative bank survey. They are complemented by insights gained from the bank interviews and insights from relevant expert interviews. The analysis is grouped into four thematic clusters, the first three relating to our three hypotheses (lack of economic incentives, lack of capacity, risk perception of green investments) and one additional cluster for a discussion of supportive policies and instruments.

(i) Lack of economic incentives

To test our first hypothesis, namely that a lack of economic incentives hinders the development of green finance activities, we asked the banks about their view of green finance as a business opportunity. As discussed earlier, profitability in the banking sector is very high. To find out if banks are nevertheless interested in green finance, the

banks were asked if they consider it a promising business area and if they plan to develop or expand their activities in green finance.

Green finance is seen as a promising business area and banks generally aim to extend their activities, but it is not a priority It is striking that all 14 interviewed banks considered green finance as a promising business area. Renewable energy projects were highlighted as particularly interesting. In this regard, several bank representatives underlined that they see a need to complement conventional energy sources with renewable energy to satisfy Indonesia's growing energy demand.

The survey results, displayed in Figure 4.1, however, suggest that the topic is no priority for most banks. While a majority (49/68) of banks generally considers green finance as a promising business area, in contsrast to 12 banks which show no interest at all, only 6 banks consider green finance a "very promising" business area. Also, 26 banks consider green finance moderately promising and 17 banks find it a bit promising.

The majority of banks wants to extend their activities in green finance Furthermore, 47 out of 68 banks expressed their intention to expand their activities in green finance (Figure 4.2). However, also

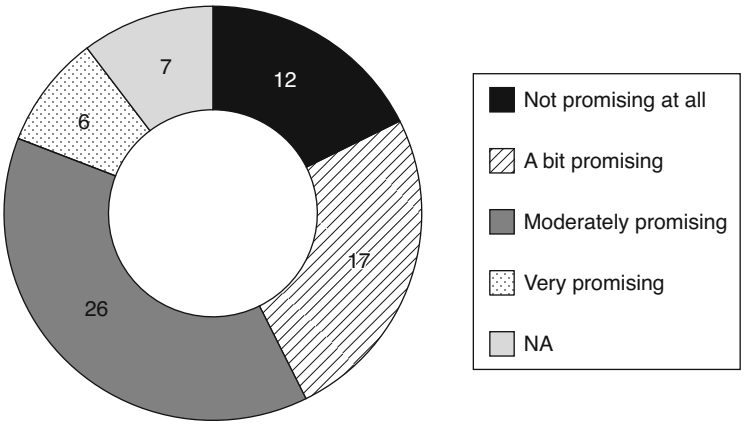


Figure 4.1 Green finance as a promising business area
Source: Compiled by authors.

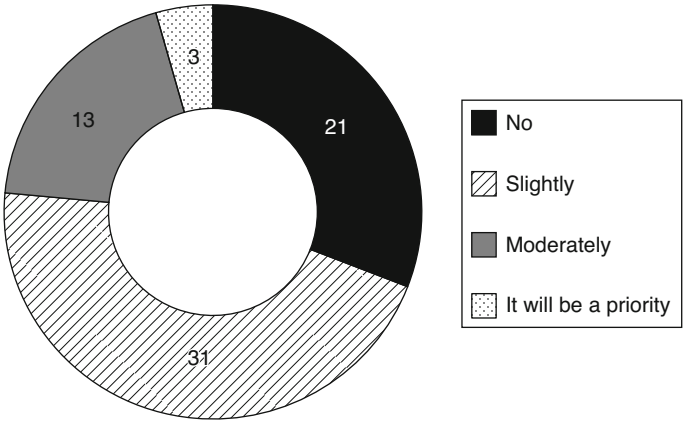


Figure 4.2 Extension of green finance
Source: Compiled by authors.

regarding this question, the devil is in the details. Given that green finance is still in its infancy in the Indonesian banking sector, banks will mostly have to start their green lending business from scratch, thus leaving banks with huge potential for expansion in this area. Nevertheless, although many banks plan to expand their activities in green finance, only three banks want to increase their portfolio "to a high extent" while 13 banks answered that they plan to extend their green finance portfolio to a medium extent. The other 31 banks seemed more hesitant in developing their green finance portfolio and indicated that they only want to expand it to a little extent.

Overall, the lack of economic incentives does not seem to be a very severe obstacle to green finance, since banks generally perceive it as an interesting business area. However, although most banks consider expanding their activities in this field, it does not appear to be viewed as a top priority but rather as one among other options. Thus, it is decisive to set the right incentives for banks to choose this option over other new business areas.

(ii) Lack of capacity

Lack of an organisational unit for green finance The second hypothesis is that a lack of capacity hinders the development of green finance. When asked whether the banks have a unit responsible for green

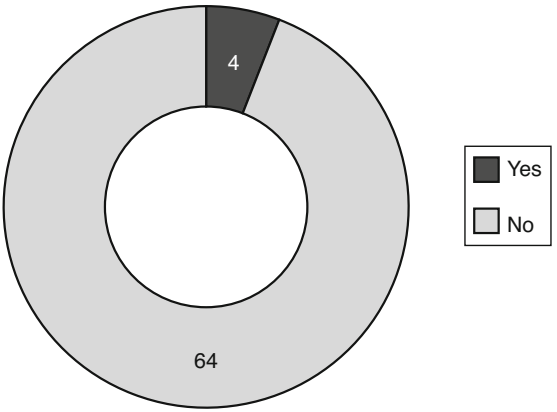


Figure 4.3 Green finance working unit
Source: Compiled by authors.

finance, an overhelming majority of 64 out of 68 banks answered "No" (Figure 4.3). Only four banks said that they have established a special unit which is responsible for green finance. This finding was further supported by the interviews: none of the 14 interviewed banks had a unit responsible for green finance. Several banks regard their Corporate Social Responsibility (CSR) unit as responsible for this topic. Only one bank mentioned environmental issues in its vision and mission. The other banks, if at all, mention it in their CSR strategy.

No clear definition of green finance Furthermore, in the interviews it became clear that the term "green finance" was rather unclear to the bank representatives. It is telling that one respondent had an understanding of green finance that only covered internal green office practices, without making any connection to the bank's lending business. Other definitions of green finance varied from "any business that does not harm the environment" to "pro-active emission reduction". When asked what, according to their perception, is included in the definition, most respondents considered projects related to waste management and renewable energies as green finance.

Banks only regard investments as green if the primary purpose of the investment is to save natural resources Furthermore, energy efficiency

investments seemed to be a rather unfamiliar concept to many banking executives. Investments to replace machinery with more energy efficient machinery were not regarded as green investments, since customers primarily intend to cut on costs with these investments and emission reductions would be only a side effect. Due to the fact that saving natural resources was not the primary purpose of the investments, banks consider them as standard business instead of green investments.

As a consequence of this lack of a common definition of green finance, it is currently also very difficult if not impossible for Indonesian banks to assess the share of green finance in their portfolio. Three banks made a hesitant guess that their share of green lending is approximately 1%. The other banks were not able to quantify their share at all. It is clear that a common understanding of green finance is necessary to obtain any meaningful measure of the status quo of green lending.

Capacity for environmental assessment is weakly developed Third, when asked about the availability of appropriately qualified and experienced staff regarding environmental assessments of credits, a large majority of banks said that qualified staff is scarce or very scarce (Figure 4.4). Only 12 banks regarded the availability as sufficient.

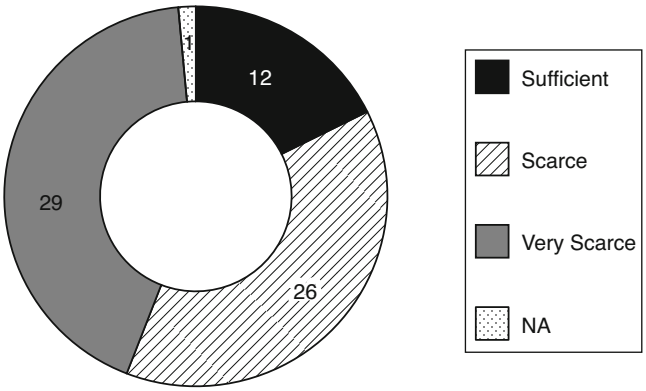


Figure 4.4 Availability of qualified staff
Source: Compiled by authors.

It is telling that no responding bank percieved the availibility of qualified and experienced staff as good or even very good.

In line with these findings, in the interviews only four banks indicated that they have special in-house trainings for environmental risk assessment for credit officers. But these in-house trainings are held only sporadically and are neither large in scale nor regular. Although banking officials apparently seem to be well aware of a lack of capacity, the banks are not very active in capacity building. Given the apparent lack of qualified and experienced staff, it is quite surprising that only 20 of the responding banks have sent their staff to external capacity building seminars so far. In the light of these findings, the banks' assurance that green fianance is viewed as an important area in which banks plan expansion seems questionable.

Lack of experiences hinders green investments When we asked why so few green investments have been financed thus far, most banks referred to a lack of experience with green lending which also caused higher administrative costs for the assessment of green project proposals.

Overall, the survey and interview results confirm that a lack of banks' capacity and previous experience in green lending seems to be a major hindrance for the development of green finance. This finding was underlined by the fact that banks typically neither have organisational unit responsible for green finance nor is the capacity of staff regarding environmental assessment high.

(iii) Risk perception

In-house tools for environmental risk assessment of credits are rare Next we hypothesised that banks associate green investments with high risk. To test this hypothesis we first aimed to understand to what extent environmental risks are considered in credit decisions, if at all. In line with the former finding of low capacity, 52 of the responding banks stated that they lacked the necessary tools to assess environmental credits risks. The majority of the interviewed banks reported that they have no in-house tools to assess the environmental risk of projects. Only two banks have developed an internal environmental guideline which goes beyond checking environmental licenses of the companies. The usual practice for banks is to just check the existence of AMDAL (*Analisis Mengenai Dampak Lingkungan*) and

UKL-UPL (*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup*) licenses (cf. Section 3.2.3). Some banks have also checked the Program for Pollution Control, Evaluation, and Rating (PROPER) rating. But since only approximately 1,400 companies have obtained a PROPER rating yet, not all banks have made experience with this rating. The interviewed bank representatives who already had experience with the PROPER rating emphasised that if a company received a negative PROPER rating before applying for credit, the rating could significantly affect the credit decision. Some banks would in this case even reject the application. Others said that a positive cash flow could outweigh a negative PROPER rating. In case a black or red PROPER rating has been assigned to a customer, the standard procedure would be to ask the customer for a mitigation plan.

In this context, it is important to emphasise that legal enforcement of environmental regulation in Indonesia is weak and that non-compliance to environmental regulation in most cases has no consequence. Since companies rarely have to face financial penalties for non-compliance, environmental performance of firms and credit default are totally uncorrelated in Indonesia. It is telling that six interviewees highlighted that only a stricter enforcement of environmental regulations would motivate firms to improve their environmental record and enhance green investments.

Environmental risks effect on the banks' portfolio diversification strategy Prudent environmental risk assessment procedures are not only important for ensuring adequate control over the risk of individual credit transactions and hence credit performance, managing environmental risks is also important for financial institutions in reducing aggregate risk exposure. Thus, a question was included in the questionnaire to test banks' sensitivity for environmental risks on the aggregate bank level. The response patterns are quite interesting. Although environmental risk considerations seem to be of little importance in individual credit decisions, environmental risks seem to be considered when it comes to the overall portfolio.

When asked to what extent environmental or climate change risks affected on their portfolio diversification strategy, 24 banks replied that they consider it to a high extent (Figure 4.5). Apparently

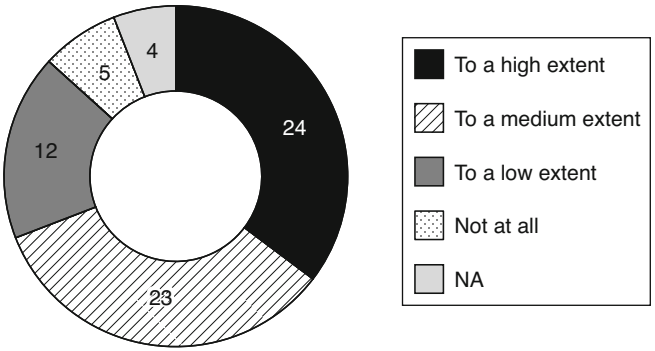


Figure 4.5 Effects of environmental risks
Source: Compiled by authors.

none of the banks considers the effect of environmental or climate change risks to a very high extent. In addition, it is worthwhile to note that 12 banks consider the effect of these risks only to a low extent while five banks even stated that they do not consider the effect at all in their portfolio diversification strategy.

Renewable energy investments are perceived as rather risky Furthermore, we sought to find out to what extent green investments are perceived as more risky than conventional investments. Since none of the banks in the interview sessions counted energy efficiency as green investment, we focused on renewable energy investments since the interviewees had some experience with those (9 out of the 14 interviewed banks had mini- or micro-hydro projects in their portfolio).

In the interviews, it became apparent that renewable energy projects were considered more risky than conventional projects. Some banks made a distinction between the construction phase, which they perceived as risky, and the commercial phase which they considered as less risky. To cope with (perceived) higher risks, banks followed different strategies. Some banks said that they only finance renewable energy projects as part of their conventional corporate financing business or have applied hybrid financing models of corporate and project finance. Some banks accepted renewable energy projects from existing customers only. One regional bank said that it only

financed renewable energy projects after the successful completion of the construction period.

In the survey, however, we could not find support for our hypothesis that green investments are perceived as more risky than conventional projects: only four banks pointed to higher risk when asked why they haven't provided more financing for green investments.

Overall, the questions on environmental risks give insight into two different issues. First, environmental risk assessment in credit application procedures is only weakly developed. This is in line with the apparent lack of staff that has the capacity to undertake such assessments. However, banks seem to be aware that environmental risk may affect their aggregate risk exposure and should thus be considered in the banks' overall portfolio diversification strategy. Second, credits for renewable energy are regarded as more risky than conventional credits. However, no general finding on the risk perception on green investments could be deducted from the survey results.

(iv) Instruments and policies to unleash green finance

The previous findings show that most banks consider green finance as an interesting business area, but that capacity for credit or project appraisal for green investments is low and that banks have little if no experience thus far. To investigate what instruments or policies may be useful for supporting the development of green financing capabilities, we asked banks what was holding back green finance and to give their views on various possible measures to improve incentives and conditions for green lending and investment.

A regulatory framework would be welcomed to create a one-level playing field When asked whether they would consider the develpment of a regulatory framework for green finance as conducive to foster green investments, more than half of the banks responded positively: eight banks believe that a regulatory framework for green finance would be conducive to foster green investments "to a significant extent" while 30 banks still think this would help "to a medium extent" (Figure 4.6). On the contrary, 12 banks think that a regulatory

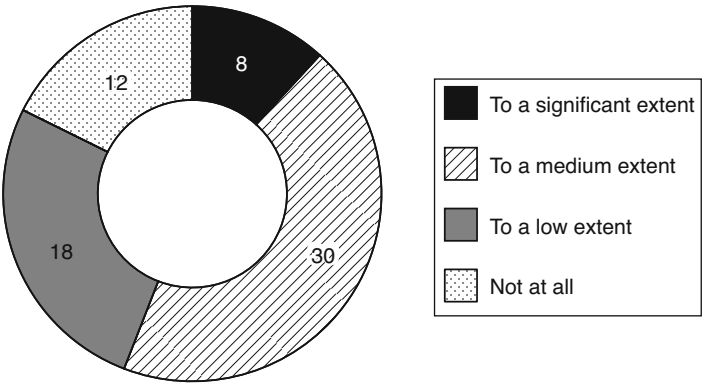


Figure 4.6 Opinions on regulatory framework
Source: Compiled by authors.

framework would not be conducive at all to foster green finance and 18 banks believe this to make little difference.

In the interviews a more homogeneous picture emerged. Out of the 14 interviewed banks, 10 called for a specific green finance regulation from Bank Indonesia or the newly established Financial Services Authority (*Otoritas Jasa Keuangan*, OJK).[2] Such a regulation was seen as creating a level playing field, allowing (and forcing) all banks to make steps in the direction of green finance at the same time. However, it is important to note that the interviews were conducted in the presence of official from Bank Indonesia. Therefore, interviewees might have felt the need to answer in accordance with what they may consider Bank Indonesia's "expectations".

Lack of experiences hinders green investments When asked for the reasons why so few green investments have been financed so far, several obstacles were listed (Figure 4.7). Thirty-one banks (46% of the responding banks) indicated that they do not have enough experience to finance green projects and thus refrain from doing so. A lack of experience can result in higher administrative costs for the assessment of green project proposals, in comparison to conventional projects, as one bank highlighted in the interview sessions.

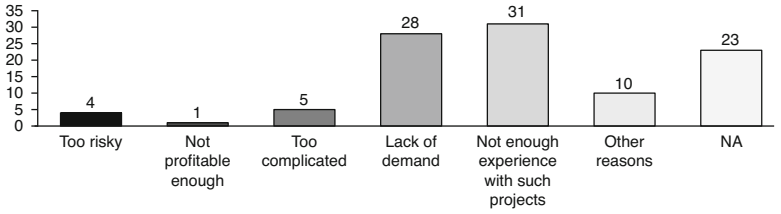


Figure 4.7 Obstacles to green finance
Source: Compiled by authors.

Furthermore, 28 banks indicated that there is a lack of demand for credits for green projects among their customers. Also, four banks in the interviews described demand as quite low, except for mini-hydro projects. Furthermore, it is quite interesting that in the survey only four banks perceive the financing of green projects as too risky and only one bank thinks that financing of green projects is not profitable enough.

Access to information, capacity building and technical assistance are key demands of the banks In light of the obstacles that the banks listed, it is not surprising what kind of support they believe would help them to step up their green lending activities (Figure 4.8). Most respondents consider better access to information a priority. Banks need better information on green financing needs and financing solutions, including information on viable green lending models and environmental risk management practices. In the interviews and the comment section of the survey, some banks recommended the establishments of green credit guidelines and the inclusion of clear categories for green investments in the reporting sheets to Bank Indonesia. Moreover, in the survey as well as in the interviews many banks asked for capacity building measures. The need for capacity building measures was closely followed by the demand for technical assistance. Furthermore, 23 banks suggested that recognition awards for banks with outstanding green financing activities may work as an incentive. Several banks called upon the government to develop an incentive structure for banks to engage in green finance.

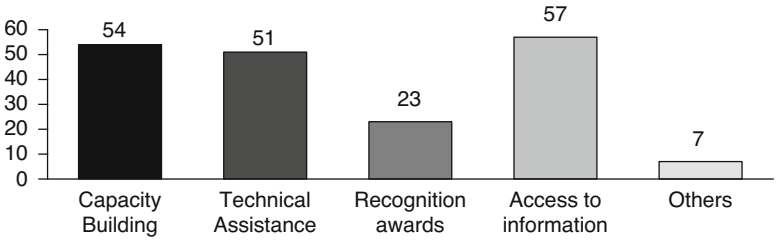


Figure 4.8 Support from banking authority
Source: Compiled by authors.

In addition, several survey respondents and interviewees mentioned the following instruments or support measures that could help banks to engage more in green finance.

Consistency and enforcement of environmental regulation Several interviewees maintained that a better enforcement of environmental regulation would enhance green investments. For example, some respondents stated that legal prosecution of companies violating environmental regulations was weak and that enforcement of environmental regulation was particularly weak at the local level. Another problem highlighted by some banks are that local and central governments applied different rules regarding environmental licenses.

Soft loans Some banks recommended in the questionnaire the introduction of soft loan schemes to foster green finance. This was further underlined in the interview sessions where a proposal of the Ministry of Finance to set up a revolving fund that would disburse credit lines to bank to provide soft loans was discussed with the banking representatives. In general, the proposal was met with interest. However, several bank representatives also recalled negative experiences with soft loans. One bank highlighted that previous experience has shown that high administrative costs can undermine the attractiveness of a soft loan credit line. Another bank cautioned that it has made negative experiences with moral hazard because customers regarded soft loans as a gift from government and therefore repayment was low. A third bank which had already established

a subsidised green credit line in cooperation with an international donor highlighted that the demand for these loans has been quite low so far.

Government guarantee scheme In the questionnaire, some banks suggested a public credit insurance scheme for green lending. In the interviews, this recommendation was also picked up by six banks which suggested a governmental guarantee scheme. Some banking representatives envisaged a scheme comparable to the existing *Kredit Usaha Rakyat* (KUR) micro-credit guarantee programme, which covers 80% to 100% of credit risk. However, one bank that has made experience with existing public guarantee schemes warned that the administrative process can be rather cumbersome and complicated.

Differentiated capital adequacy ratio for green investments Last but not least, in the interviews several banks called upon the financial authority to consider changing the capital adequacy ratio for green investments to increase incentives for banks to issue such loans.

4.2 Demand side: company survey and interviews

4.2.1 Methodology: sample selection, hypotheses and questionnaires

Thus far, there has been little analysis of the potential demand for green investment in Indonesia. To get a better understanding of firms' environmental awareness, their views on resource efficiency, their interest in undertaking energy efficiency and other green investments, and their access to finance, an online firm survey was conducted, comprising 29 questions along with 10 specifications of company characteristics (cf. Annex VIII). Similar to the bank survey, the firm survey was complemented by qualitative, semi-structured interviews with firms, which were asked 24 questions in total (cf. Annex IX). Mirroring our research questions, this survey tries to investigate the most important bottlenecks for firms to carry out green investments and the role that a lack of finance might play in there as well as policies or instruments which could help to stimulate green investments.

(i) Hypotheses

Based on the theoretical analysis in Chapter 2 and the country context as discussed in Chapter 3, the survey tests a number of hypotheses

regarding the most important obstacles for corporations in undertaking green investments as well as the effectiveness of instruments which could help to facilitate such investments and enhance the demand for green finance. The hypotheses are as follows:

1 **Awareness:** Companies show little awareness for environmental concerns.
2 **Capacity:** Companies lack the capacity to plan and implement green projects.
3 **Information:** Companies lack information to assess the cost saving potential and risk of green investments.
4 **Low quality of machinery:** Since companies do not trust the quality of new machinery they don't rely on long-term cost savings.
5 **Access to finance:** Medium-sized companies face an access to finance problem.
6 **Low-economic incentives:** Low energy prices decrease economic incentives for investments into energy efficiency and renewable energy investments.
7 **Lack of pressure:** Low pressure on companies to comply with environmental standards demanded by either international clients or the government decreases the need to carry out green investments.

(ii) Sample selection

To narrow down our sample, we established three pre-selection criteria: geography (province), sector (choice of sub-industries) and size (size of enterprises).

First, Java was chosen as the geographical focus of our study. Although the capital island Java covers only 7% of Indonesia's land area, it contributed about 57% of Indonesia's GDP in 2012 (ANU Indonesia 2013). Furthermore, the generation of electricity needed by Java's manufacturing sector causes 24 Million tons of CO_2 (GTZ 2009: 7). For these as well as organisational reasons, we decided to focus the personal interviews on different cities on Java only. Also, the online survey was mainly distributed to Javanese companies.

Second, within the industry sector, we identified specific sub-sectors to target in the company survey. To this end, we categorised Indonesian businesses by energy consumption and CO_2 emission rates. According to the Indonesia's Climate Change Sectoral

Roadmap (ICCSR) (BAPPENAS 2010), glass, ceramics, refined sugar and cooking oil producers are the largest CO_2 emitters in the industry sector. Cement, iron and steel, pulp and paper, and textiles are the largest energy consumers and thus also seemed interesting for our case. Following expert advice we enhanced the sample to include food processing industries and the packaging industry.

Third, we decided to analyse medium to large enterprises. As mentioned before, general access to finance is a serious problem in Indonesia for Small- and medium-sized enterprise (SMEs). Since especially small firms suffer from very limited access to bank credit, one can safely assume that these firms would not get access to green finance either. We hence decided to focus our survey on firms that have established business relationships with formal financial institutions and a general access to credit and investigate to what extent these firms perceive access to finance a bottleneck for green investments.

From these three criteria we established a list of focus industries:

The textile industry is an interesting case study because of its size, emission level and saving potential. First, the textile industry is the industry with the second highest number of establishments and employees in Indonesia (GFA Consulting Group 2011: 11). Second, in 2005 this sector has already been the largest CO_2 emitter and according to estimates Greenhouse gas (GHG) emissions caused by this industry will increase by 50% until 2025 maintaining BAU (GTZ 2009: 9). Moreover, the sector holds large energy saving potential. The Ministry of Industry has calculated that through energy conservation measures, 20–35% of the energy currently used could be saved (GTZ 2009: 10). Third, energy costs make up a significant share (10%) of total production costs in the textile sector (GFA Consulting Group: 7). Since the textile industry is highly competitive, cost saving is crucial and an economic incentives for green investments exist.

The food processing industry was added because of size, emission level and current growth rates in this sector. The industry is highly concentrated on Java and provides for the largest number of establishments on the island (Bayliss Associates Pty Ltd 2005: 6). Thus, it is not surprising that the food processing industry ranks third when comparing industries on Java for emissions caused through energy use (GTZ 2009: 9). The Ministry of Industry has calculated possible

savings between 13–15% for this industry (GTZ 2009:10). It is also a sector that is growing rapidly (14% growth in 2000–2004) (Bayliss Associates Pty Ltd 2005: 16). According to UNIDO, electricity costs make up for an average 5.5% of total production costs in this sector (GFA Consulting Group 2011: 7).

The plastic and packaging industry was included since it causes significant emissions by electricity consumption, although it is a relatively small industry (GFA Consulting Group 2011). However, high growth rates of 7–8% are expected in this industry, which makes investments in energy efficiency particularly interesting (GFA Consulting Group 2011: 13).

The furniture and wood processing industry is one of the smallest CO_2 emitters in sectoral comparison (GFA Consulting Group 2011:6). However, it is a relatively labour-intensive sector on which only limited information is available (GTZ 2009). The study thus aims to provide further insights into the status quo of green investments in furniture and wood processing.

The cement, iron and steel, pulp and paper and refined sugar industry did not qualify as focus industries but were added to the sample because they are either large GHG emitters or energy consumers. Since these industries are characterised by only few, very large and, in many instances, multinational players, they are unlikely to experience major financing bottlenecks for any kind of investment. However, regarding their large GHG emission reduction potential they are still interesting actors as they might reveal further missing incentives to invest in "green" projects, apart from access to financing.

In addition to the manufacturing industry we included firms that use large **buildings** in our sample, given that investments in energy efficient buildings is highly relevant for the green transformation. Emissions in the buildings sector contribute only to 1/10th of global emission; however, rising industrial growth and income will most likely cause rising emissions in this sector in developing and emerging countries. UNFCCC has estimated that approximately USD 93.5 bn will be needed to mitigate emissions in the buildings sector. Since the maintenance and operation of these buildings consume large amounts of energy, there is great potential for energy efficiency investments, which makes accordingly service and retail industries suitable targets for our company survey. We hence included

shopping malls, hotels and schools in the sample. The lower part of Table 4.1 gives a detailed overview over all sub-sectors included in our survey.

(iii) Sampling of the online survey

The online survey comprised 29 questions (with several options to skip questions if not applicable) and 10 specifications of company characteristics (see Annex VII for the complete questionnaire).[3] The online survey was tested in English and Bahasa Indonesia with staff in management positions in relevant firms in order to assure the relevance and clarity of questions. The questionnaire was sent out as online survey in Bahasa Indonesia only.

Firm contacts were obtained through different channels, including several business associations in the above-mentioned sub-sectors, international development agencies, audit firms, green business councils and regional offices of Bank Indonesia, which helped to establish contact with companies or distribute the online survey. Overall, 26 different channels were used to spread the link to the online survey, including email invitations to participate in the survey as well as postings on websites or Facebook pages.

Out of the approximately 500 companies that were invited to participate, 41 provided complete answers. A further 23 companies completed parts of the survey and we were able to use their answers at least partly. Moreover, 61 of the firms participating in the online survey were located in Java and a further 3 in Sumatra. The mean company size in net assets was between 10 and 100 bn IDR and between 201 and 500 employees. Table 4.1 shows the exact distribution.

The sample has to be considered as biased to a certain extent: First, we most likely face a response bias since only interested and generally committed companies might have taken the time to complete the survey. Second, a sample selection bias might occur, since 41 of the 64 respondents belong to the customer data-base of an audit-firm (conducting not necessarily energy audits). They may therefore be expected to be more informed and aware of the need to improve their production processes than the average Indonesian company. This bias has to be kept in mind when interpreting the survey results.

Table 4.1 Company size and sample distribution per sub-sector of firms participating in online firm survey and interviews

	Number of companies			Number of companies	
Net assets (in IDR)	**Online survey**	**Interviews**	**Number of employees**	**Online survey**	**Interviews**
up to 50 million	1	0	0–20	1	6
50–500 million	6	5	21–50	6	5
500 million–10 bn	20	5	51–100	10	3
10 bn–50 bn	10	8	101–200	9	4
50 bn–100 bn	11	6	201–500	10	1
More than 100 bn	14	0	501–1,000	13	2
Unspecified	2	10	1,001–5,000	10	2
Total	**64**	**34**	5,001–10,000	1	0
			10,001–50,000	4	0
			> 50,000	0	0
			Unspecified	0	11
			Total	**64**	**34**

	No. of respondents			No. of respondents	
Sector	**Online survey**	**Interviews**	**Sector**	**Online survey**	**Interviews**
Manufacturing	43	22	Services	18	10
Of which:			Of which:		
Furniture	10	2	Education	9	0
Food processing	6	8	Hotel	2	9
Packaging	5	1	Mall	1	1
Textile and leather	6	7	Others/unspecified	6	0
Iron and steel	3	1			
Metal industry	2	0	Other sectors	3	2
Glass and ceramics	2	0	Of which:		
Cement	0	1	Government	1	0
Pulp and paper	0	1	Mining	1	0
Others/unspecified	9	1	Shipping	1	2
			Total	**64**	**34**

Source: Compiled by authors based on survey data.

(iv) Sampling of qualitative interviews

As with the banking survey, the firm survey was complemented by qualitative interviews in order to interpret the survey results. The interviews were semi-structured and comprised 24 questions in total. Whenever possible, interviews were run in English by two members of the research team. But especially for the interviews conducted outside Jakarta, it was necessary to hire translators who directly translated the responses. The interviews took between 30 and 60 minutes.

To arrange the company interviews, firms were contacted through the same organisations that helped the distribution of the online survey. Therefore, we also have to assume the same bias here. In total, 34 interviews were conducted with companies located in the Javanese cities Jakarta, Bandung, Semarang and Yogyakarta. Table 4.1 shows the distribution of surveyed companies among industrial sub-sectors.

4.2.2 Findings

The following analysis is based on the 64 responses to the online survey. Since the sample is not large enough to allow for robust inferential statistics, the data analysis concentrates on descriptive statistics, enhanced by interesting correlations when significant results could be found mainly between company characteristics and hypotheses. The quantitative findings were compared with and complemented by the qualitative interview results with companies as well as with experts. The major findings are described in the following text and presented according to the hypotheses they assess.

(i) Lack of awareness

As discussed, we assumed that one of the most important bottlenecks is a lack of awareness of environmental concerns and of green business opportunities. First, companies seemed to be aware of the cost saving potential of energy efficiency investments. A large majority of the respondents agreed that either in the long or in the short run an investment in energy efficiency would pay off (Figure 4.9). The qualitative interviews confirm this finding: most companies believed that investments in new machinery could be paid off by energy savings.

Energy cost saving potential is recognised Second, it turned out that among a list of environmental concerns electricity saving is the

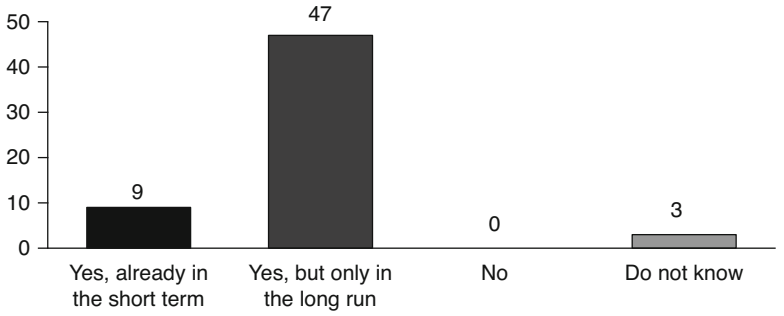


Figure 4.9 Awareness
Source: Compiled by authors.

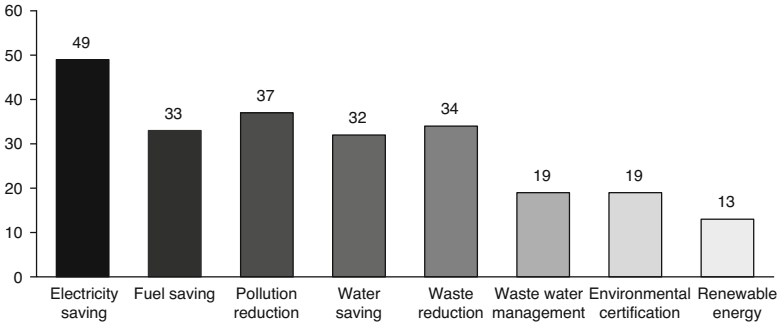


Figure 4.10 Environmental concerns
Source: Compiled by authors.

most relevant area for the majority (76.6%) of surveyed companies (Figure 4.10). The second most important concern is pollution reduction (58%), followed by waste reduction (53%) and fuel saving (51.6%). Thereby, 84.4% of the companies see at least one form of energy saving as relevant for the company's future.

To countercheck in how far awareness has triggered to action we also looked at past investments of the companies (Figure 4.11). The picture that emerges is coherent: in the last three years the companies invested mainly in electricity saving (21.8%) and fuel saving (14.4%). Surprisingly, only 17.5% said that they did not invest in energy saving at all.

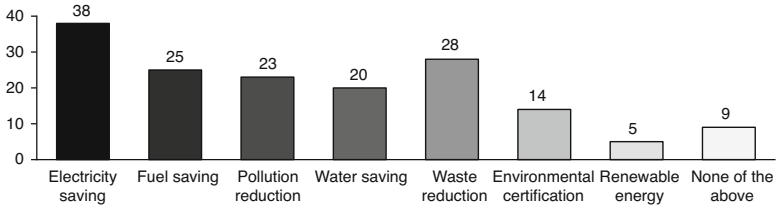


Figure 4.11 Environmental investments
Source: Compiled by authors.

A closer look at the answers to both questions reveals that company size and age seems to determine how much importance companies attribute to energy saving and also to renewable energies: renewable energy investments seem to be important only for large companies that have been operating for more than 10 years already.

However, environmental awareness does not go much beyond energy cost saving considerations. Approximately 70% of the surveyed companies state that they check the consumption level of new machinery because of cost-saving potentials while 12% of companies bring forward environmental reasons for considering energy consumption levels of new machinery. Only 3.4% of the surveyed companies do not check energy consumption levels at all.

These findings hint to an awareness of companies regarding the potential to save energy, however, when it comes to general environmental awareness the picture changes. Strikingly, more than half of the companies were unaware of the government's endeavour to decrease carbon emissions by 26% by 2020. The interviews also show that the meaning of the term "green economy" is largely unknown, especially to smaller companies.

Overall, firms seem to be generally aware of the need to save resources, in particular energy, as well as the associated cost saving advantages. However, there is further need for raising awareness among companies regarding environmental concerns which are unrelated to cost considerations.

(ii) Lack of information

Better information on cost saving potential is crucial to improve investment demand Even though many companies are aware of cost saving

potentials of energy efficiency equipment, they might have difficulties to access reliable information on appropriate ways to realise these potentials. When we asked under which conditions companies would increase investments in energy efficiency, the most important prerequisite for companies was to have more information on the energy saving potential of new equipment (Figure 4.12). The interviews yielded the impression that the complexity of calculating future energy savings, paired with the fact that energy efficiency is no investment priority (despite the fact that companies are aware of cost saving potentials), have led to a certain indolence on the part of companies.

(iii) Lack of capacity

In-house capacities on energy management depend on company size In addition, we wanted to find out to what extent companies have the internal capacity to plan and implement green projects, for instance the competence to calculate saving potentials and assess risks. To make the question more concrete, we focused on energy efficiency investments and asked the companies whether they have an energy manager. In our sample, 59% of the interviewed companies had no energy manager. Whether companies have an energy manager is significantly correlated with asset size as well as total number of employees. This is in line with regulations that make it mandatory for energy-intensive companies to appoint an energy manager. In 88% of the companies with an energy manager, he or she is consulted in investment decisions. From the findings it is hard to say whether companies really lack the capacity to assess the cost saving potentials and risks of energy efficiency investments. The analysis of the online survey and the interviews suggests that only large companies have in-house capacities to plan and manage electricity expenses.

(iv) Low quality of machinery

Low quality of new machinery is not a major bottleneck to energy efficiency investments To test the hypothesis that low quality of machinery hinders green investments, we asked companies whether better quality of machinery would be a reason to invest more in energy efficiency. A mixed picture emerged. Approximately 50% of the 56 respondents to the online survey stated that improved quality of machinery would make them invest more in energy efficiency

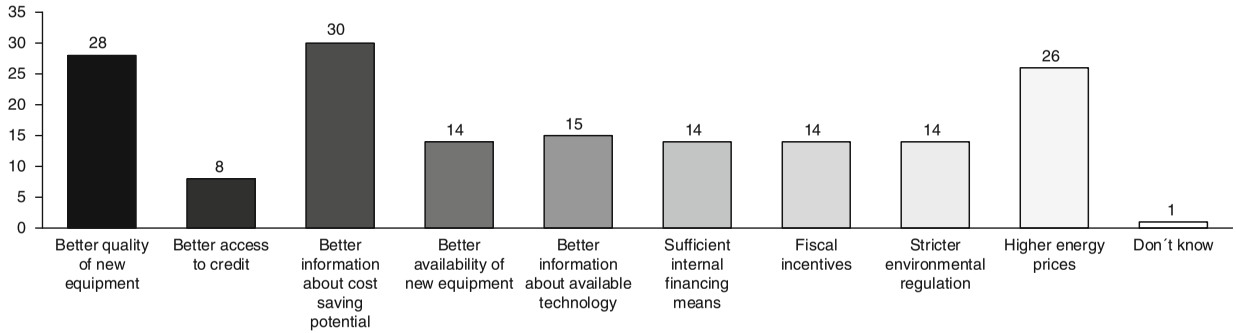


Figure 4.12 Conditions to foster investments

Source: Compiled by authors.

(Figure 4.12). Also, the interviews revealed that several companies made disappointing experiences with cheap Chinese or Indonesian products and therefore prefer products from established international brands. However, as an answer to a different question in the survey, technology risk was only considered by three companies as an investment risk. Furthermore, only 7 out of 34 interviewed companies say that there are problems with the quality or availability of energy efficient equipment in Indonesia.

Overall, neither a low quality of machinery nor the availability of equipment appears to constitute a major problem. Although much of the required machinery is not produced in Indonesia, everything can be imported. However, especially for the smaller companies, the import of high-quality equipment is often not affordable. As one interviewee explained, there is no general lack of good quality machinery available in Indonesia, but high quality comes at a price that not every company can afford. The higher price of high quality machinery which, in turn, requires a high up-front investment could be an obstacle to investments in energy efficiency equipment. Thus, financing as an obstacle will be analysed in the following section.

(v) Lack of access to finance

Access to finance is only a minor obstacle to companies When choosing the sample, we opted for medium to large companies because we assumed that they would have general access to finance from formal financial institutions. In our field study this assumption was confirmed. In our sample, there was practically no firm which suffered from access to finance from the formal banking sector. The large majority of companies in our sample (77%) perceive access to finance as no (50%) or a minor (27%) obstacle (Figure 4.13). No significant differences can be observed among small or large companies. Moreover, 60% of the surveyed companies did apply for investment loans from a formal financial institution in the last three years and almost all of them (32 out of 33) were granted credit. This result is mirrored in the qualitative interviews: Here, 22 out of 34 interviewees stated that their access to credit is easy or very easy. An entrepreneur running a medium-sized enterprise even quipped: *"Banks queue to give us credit."*

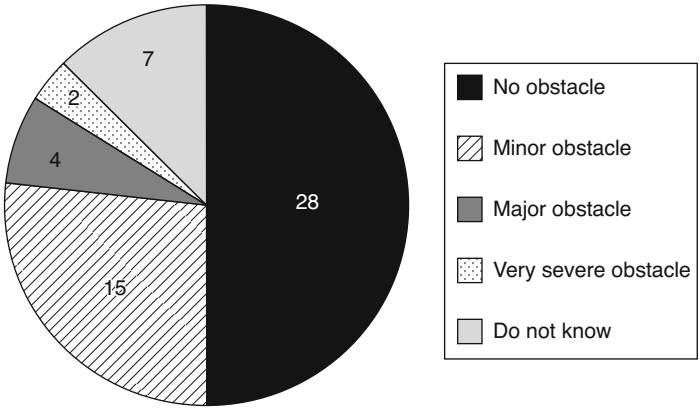


Figure 4.13 Access to finance
Source: Compiled by authors.

Disregarding the relatively good access to loans, companies would finance investments in new equipment largely through internal funds When asked how they would, hypothetically, finance investments in new equipment, 22 companies (or 34%) said that they would finance new equipment via "internal funds or retained earnings". Furthermore, 29% said that they would "borrow from banks or other financial institutions". The ability to finance investments internally was significantly and positively correlated with the company's age. Among the interviewed firms, 16 of 34 said that they do not take credits from banks because they do not see the need to invest or because they prefer to finance investments with their own capital.

In line with these answers, only around half of the companies taking part in the quantitative and qualitative survey actually have taken out loans. This means that even though a majority of companies does not perceive access to finance as obstacle, there are still many companies without bank credit. This may be indication that the conditions to take up credits are not favourable enough to make companies willing to apply for loans. Earlier studies have shown that companies are cautious to take up credits for investments. According to a World Bank survey, 88% of entrepreneurs would make use of internal finance for investments. This is in line with data from Bank Indonesia, according to which only approximately 20% of total loans are taken out for investments (Mourougane 2012: 18).

The general mood among a large number of Indonesian entrepreneurs seems to be well reflected in the following statement made by one respondent: "My 'philosophy' is: *We work with what we have*. Anyway, I'm afraid of any sort of debt." This fear seems to be based on several risks that respondents connected with investment credits. As Figure 4.14 shows, more than 50% of the 52 companies perceive rising interest rates as a major risk of an investment credit. Approximately 44% fear rising business costs that will impede repayment and 35% are afraid of market risk and changing regulations. These answers are followed by currency risk (27%), political instability (23%) and technological risk (6%).

Furthermore, 57% of the surveyed companies said that they did not apply for a loan because they had sufficient own capital to finance their investments or did not need credit (Figure 4.15). The next

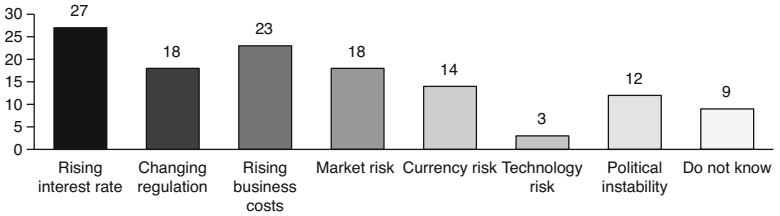


Figure 4.14 Obstacles to credits

Source: Compiled by authors.

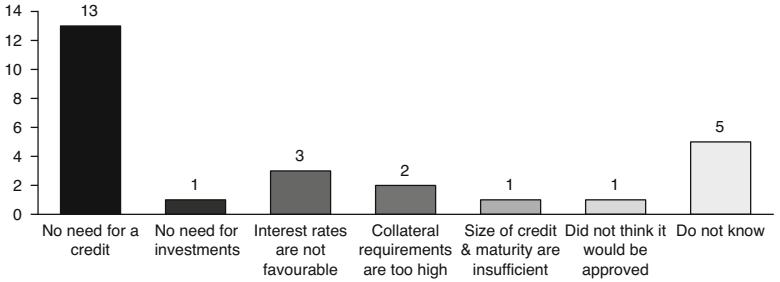


Figure 4.15 Risks of an investment credit

Source: Compiled by authors.

most important reason was unfavourable interest rates. This finding found strong support in the qualitative interviews, where a majority of companies regarded lower interest rates as a crucial condition for increasing green investments.

Improved access to green credits alone would not increase investments Since access to finance was not a major problem for the companies in our sample, it does not come by surprise that these companies did not also regard an improved access to credit as a catalyst for green investments. Figure 4.12 showed that improved access to credit is the least important condition under which companies would increase investments in energy efficiency, chosen by only 8 of 56 companies.[4] Thus, according to our findings, improved access to finance alone is unlikely to increase green investments but has to be complemented by further incentives and regulations.

(vi) Lack of economic incentives

Next we hypothesised that there might be a lack of economic incentives to carry out green investments, with energy subsidies being a particularly important disincentive. The disincentivising economic effect of energy subsidies on energy efficiency investments has already been discussed, not only in this study but also in the Indonesian policy debate at large. Still, the survey results offer surprising insights into the likely magnitude of energy expenditure among Indonesian companies.

Electricity expenses: Not to be underestimated Contrary to general belief, electricity expenses already figure as an important expense in companies' budgets, despite high subsidies. Further, awareness of energy cost saving potential is higher than generally deemed. Therefore, the effect of gradual energy price increases (as they are envisaged by the Indonesian government) can be expected to have a significant effect on energy consumption.

As shown in Figure 4.16, for more than 50% of the surveyed companies spending on electricity constitutes among the top three expenses. Therefore, despite high subsidies on energy, we can conclude that electricity expenses are important and considered large enough to make energy efficiency investments lucrative.

A decrease in subsidies: Positive effect on energy efficiency investments likely When asked how they would react to an increase in electricity

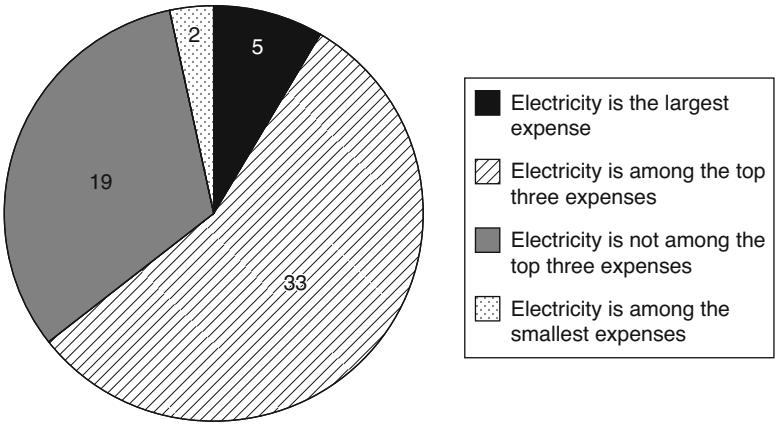


Figure 4.16 Electricity expenses
Source: Compiled by authors.

prices, the answers where unambiguous: A majority of companies said that they would "absolutely" (19 out of 56) or "probably" (21 out of 56) increase their investments in energy efficiency when faced with cuts to energy subsidies (Figure 4.17).

Everybody gets subsidies, but not everybody is aware As Figure 4.17 shows, several companies (14/56) that participated in the online survey were unaware of the fact that they receive subsidies. Similarly, in the interviews 11 companies claimed not to benefit from subsidies (compared to 10 companies stating that they receive subsidies of some sort and 13 companies who did not answer). One respondent reflected on energy prices in the following manner: "We don't receive an electricity subsidy. Since our consumption is high we need to pay a different tariff than households." However, according to ministerial regulation 30/2012, even though industrial consumers pay higher prices than households, they still receive subsidies to varying degrees.

It is oftentimes argued that energy price increases would seriously affect Indonesia's business competitiveness and harm the economy's growth prospects. To investigate this assumption we asked how much the firm's business competitiveness would be affected by increasing energy prices (Figure 4.18). It is striking that more than 75% of the surveyed companies do not expect any effect,

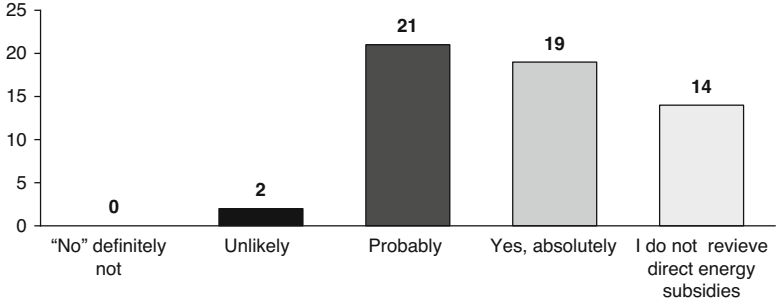


Figure 4.17 Effects of an increase in energy prices
Source: Compiled by authors.

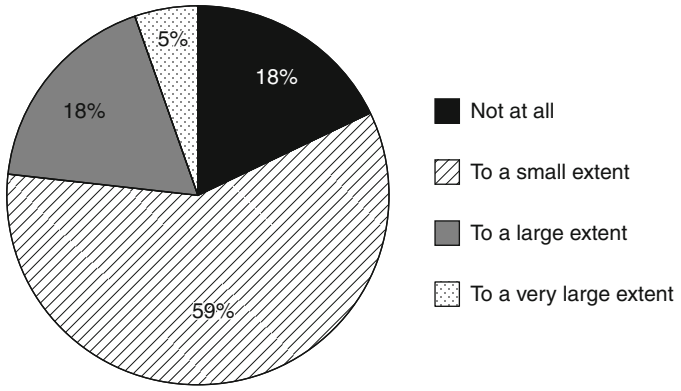


Figure 4.18 Subsidies and business competitiveness
Source: Compiled by authors.

or only a small one on their business competitiveness. Thus, even though dwindling subsidies might lead to a surge in energy efficiency investments, very few companies expect a negative effect on their competitiveness. This supports the notion that environmental policies need not harm growth, and that green investments are indeed compatible with growth.

Overall, it is not surprising that our sample confirms that an increase in energy prices will be an important trigger for green investments. Figure 4.17 further documents the strong effects of an

increase in energy prices. An increase in energy prices is among the top three causes which would push companies to increase investments in energy efficiency equipment. A decrease in subsidies will therefore most likely have a direct, positive effect on investments in energy efficiency. The results show that energy costs are already a topic which is of economic interest to companies, even cutting on subsidies can be only one way of increasing energy efficiency investment.

(vii) Lack of pressure

Exporters consider environmental certification an important future issue Furthermore, we hypothesised that a lack of national or international environmental standards leads to low amounts of investments in resource efficiency. The results displayed in Figures 4.11 and 4.12 confirmed that, overall, companies do not seem to pay much attention to environmental certification. However, when comparing those that "consider environmental certification to be a relevant future issue" with those companies that are exporters (almost 50% of the surveyed companies: 29 out of 64) we found a significant correlation. This indicates that pressure from international clients might indeed be a reason for companies to take environmental standards more seriously (or at least to look as if they do).

Exporters are more likely to have domestic environmental licenses Regarding domestic environmental licenses, Figure 4.19 shows that most companies have either an UKL-UPL or an AMDAL license. However, it is interesting to note that actually 29 companies had neither AMDAL nor UKL-UPL. Since in principal all

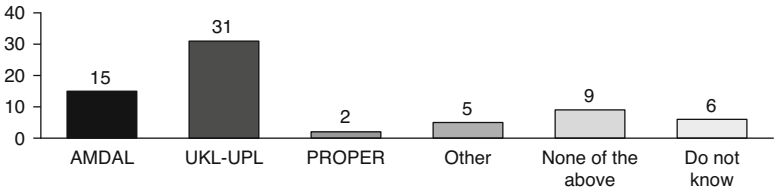


Figure 4.19 Environmental licenses

Source: Compiled by authors.

companies are required to have an environmental licence, this underlines what the banking survey already showed: enforcement of domestic regulation is weak in Indonesia. The challenge is nicely described in a quote from one interviewee: "Enforcement of regulation is the most important issue! It would let the market for energy efficiency grow and make energy efficiency investment more attractive. However, enforcement is an obstacle as there is not enough government capacity and control is very costly in such a big country."

To test the previous finding that exporting companies are more likely to have an environmental licence, possibly due to higher pressure on exporting companies, we relate "having an environmental certification (domestic or international)" to "being an exporter". Although there is apparently no strong correlation between these two, there is, for whatever reason, a significant correlation between "being an exporter" and "having at least one domestic license". It is not clear how to interpret these results: Exporters might just be more strictly supervised and therefore be more likely to have one of the mandatory domestic licenses. Also, being an exporter is positively (and significantly) correlated with the total number of employees. Hence, the company size might be the true underlying explanatory variable; implying that big companies are more likely to comply with mandatory domestic certification schemes.

In the interviews, the companies were asked whether they have the impression that clients, both domestic and international, care about certificates and whether environmental regulation would incite more investment in energy efficiency. The interviews revealed a very heterogeneous picture. Some companies consider "eco-friendliness" to be a selling point. For instance, one interviewee stated that "there is rising demand for eco-friendly wood products from Europe. Since 2007 our company is certified by the Forest Stewardship Council." On the other hand, 15 companies (out of 34) stated that environmental standards are not important for their clients. One interviewee even stated that "environmental licenses won't make any difference, since they can be bought. AMDAL, for example." There is no observable pattern across sector. But it seems as if companies exporting to the European or North American market are more likely to be confronted with environmental requirements. As one hotel manager

said: "Indonesian (hotel) guests do not care. Only foreign guests care".

(viii) Instruments on the company level

Having discussed the findings relating to our seven hypotheses, the following text sums up our findings regarding three instruments that were discussed – energy audits, leasing and stronger environmental regulations.

Energy audits Even though awareness of energy cost saving potential seems rather high, companies still require better information to scale up their green investments. The following gives a brief analysis of findings concerning one specific and potentially very important channel of information: energy audits. Although many companies were well aware that they lack adequate information in order to undertake green investments, only 8 out of 52 companies in the online sample have, so far, carried out an energy audit. Compared to the Indonesian corporate sector in general, this share of 15% of companies is presumably still too high and not representative.

When asked why firms have not conducted an energy audit, companies put forward three major reasons: First, companies do not feel sufficiently informed about energy audit suppliers (22). Second, they do not regard an audit as an urgent issue (18). And, third, they consider the costs of an energy audit as too high (15).

These results underline that a lack of information exists not only regarding energy saving potentials of machinery, but also regarding energy audit firms as potential suppliers of such information. The fact that 18 companies said that conducting an energy audit is just "not urgent" supports our previous interpretation: Instead of a real lack of capacity, we might interpret the companies' demand for more information as a lack of motivation to invest the time and effort into screening the market place for information. This further underlines the importance of proactively promoting energy efficiency investments.

Leasing Second, for those companies with weak access to finance the option of leasing new equipment, instead of buying it, might

represent an interesting opportunity. In the firm survey, 71% of companies (37/52) consider leasing an interesting option, especially in the energy efficiency context, as they state that they would invest more in energy efficiency equipment if they had the opportunity of leasing it.

The interviews, however, revealed a slightly different picture: Most of the interviewed companies (18/34) were not interested in leasing (only 6 out of 34 companies were interested while 10 did not answer). It became apparent that for large companies leasing is less interesting, presumably because they have no major financing problem. For many of the interviewed companies, it seems as if the potential advantages of leasing remain unclear. As one interviewee said, "I have never used leasing. And I'm not interested as it's probably expensive."

Stricter environmental regulation Third, we asked to what extent stricter environmental regulation could promote green investments. Referring again to Figure 4.12, we observe that "stricter regulation" is as important as a trigger of energy efficiency investments as are fiscal incentives. Furthermore, the importance of enforcement of environmental regulation was highlighted in the company interviews. As one interviewee said, "Education, enforcement and discipline is needed. Companies have to compete with others when they invest in the environment – therefore, a level playing field is needed." Companies state that strict governmental regulation is a crucial element to increase investments in energy efficiency and more environmentally friendly production processes in general: "I would only invest more in energy efficiency if there were regulations to oblige me." Or, as another interviewee stated: "The major challenge in my opinion is the lack of binding regulation from government!"

Without binding regulation that is adhered to across industry, cost concerns are likely to deter companies from spending this "extra money" on the environment, as competitiveness considerations largely outweigh environmental concerns – even when in fact many investments in resource efficiency are likely to pay off through resource savings. However, companies see large obstacles on the policy level. To quote one interviewee: "Policy itself needs to change

to turn into a good example for the population – but the problem is corruption." To conclude, even though current environmental regulation including the obligatory domestic environmental licenses is not fully enforced in Indonesia, many companies call for more active government regulation.

To sum up, the analysis at the company level has shown that the potential bottlenecks regarding green investments that were identified in Chapter 3 exist to a varying extent in the Indonesian case (Table 4.2). A certain degree of environmental awareness exists, but the large majority of firms seems to view green investments as an additional cost to business rather than an investment in greater cost efficiency. Information on the cost-savings potential of investments in resource efficiency seems to be rare and should be further provided. Capacity to identify resource savings potential, especially regarding energy use, differs between companies to a large extent and could in some cases hinder investments. However, we might interpret companies' demand for more information and capacity building as a lack of motivation to invest the time and effort into screening the market for information. Furthermore, weak regulation and little pressure on companies to take action can be considered a bottleneck. In contrast, neither a lack of good quality machinery,

Table 4.2 Major findings at the company level

Bottlenecks	**Findings**
Awareness	Awareness exists regarding cost saving potential
Information	Companies lack reliable and easily accessible information
Capacity	Small companies rarely have the capacity to plan green investments
Low quality of machinery	Quality of machinery is no major problem in Indonesia
Low economic incentives	Despite subsidies, electricity prices already seem to be an economic incentive for energy saving
Lack of pressure	Pressure is only weakly developed

Source: Compiled by authors.

nor the low energy prices seem to be a severe barrier to green investments.

Overall, the findings highlight the importance of proactively promoting green investments. It seems that companies would be more inclined to invest in resource efficiency if the information on its benefits came in a handy "package". As most companies do not attribute a high urgency to resource efficiency, it appears that energy efficiency has to be proactively marketed to them while the pecuniary incentives for increasing resource efficiency need to be raised, not least through an elimination of energy subsidies.

4.3 Summary of findings

Although the strength of our empirical findings varies among the different hypotheses we have analysed, we feel confident about the major findings of the empirical research that we conducted at the policy, the bank and the firm level.

Banks, as well as companies, are generally interested in financing and undertaking green investments, respectively. Overall, 68% of banks consider green finance a promising business area while 60% plan to expand their services in green finance. Facing scheduled increases in electricity prices from 2013 onwards, a majority of companies, on the other hand, said that they would "absolutely" or "probably" increase their investments in energy efficiency. Companies' sensitivity to electricity price increases is explained by the fact that despite energy subsidies, electricity costs already figure among the top three expenses for 56% of companies.

However, green investments are no priority, neither for banks nor for companies. While a majority of banks (46/68) generally considers green finance as a promising business area, only six banks classified their interest as reaching a "high extent". Further, the actual share of green credits in banks' portfolios seems to be negligible. Banks also report very little demand for green finance from companies, which indicates that even though companies might be interested in energy efficiency and renewable energy projects the interest is not strong enough to result in action. Particularly the company interviews revealed that companies regard an expansion of their business activity as significantly more important than saving on energy costs.

This second finding underlines the need for higher energy prices, financial and non-financial incentives or motivation schemes to push green finance and green investments higher up the priority list of banks and companies.

However, it has also become clear that the lack of know-how and capacities among banks represents a significant obstacle to green investments. Banks deplore the scarcity of qualified staff able to assess environmental risks and to adequately assess and finance energy efficiency or renewable energy projects. The bank interviews showed very clearly that banks have no clear concept of green finance and no strategy to develop a green finance business. This lack of experience in green finance is therefore, not surprisingly, the most important reason brought forward by banks why they do not extend more credit to finance green projects. Consequently, the kind of support banks demand from the banking supervision authority is more information, capacity building and technical assistance. This points to the need not only for capacity building measures for banks to facilitate their engagement in green investments, but also for a clear definition of green financing that will help banks to develop this new business area.

Yet it is also clear from the survey results that both banks and companies are hesitant to be the first movers. Among companies, a certain hesitance to take on debt to invest in resource efficiency measures that are not considered central to the operation of the business seems to prevail. Maybe surprisingly, both banks and companies ask for regulation to create a level playing field. The claim is that no bank will dare to move first into the green finance field unless regulation forces every bank to take a step towards this still unknown territory. At the same time, companies fear a loss in competitiveness if they would be the only ones to invest in environmental sustainability of their production, instead of the expansion of their business (although this need not be a contradiction). Clear and binding regulations and a stricter enforcement thereof can help to create a level playing field. In this context, however, it is important to highlight that more regulation as such cannot be the solution; what matters is a consistent framework conducive for green investments rather than a set of incoherent policies and regulations which are only weakly enforced as is currently the case.

Figure 4.20 Bottlenecks and recommendations
Source: Compiled by authors.

Overall, our empirical findings suggest that the most important barriers to fostering green finance and investment are a lack of know-how and experience, little urgency attributed to green finance and investments, as well as the prevailing reluctance to make the "first move". Figure 4.20 depicts the main bottlenecks to fostering green finance and investments as well as the needs identified to overcome these. In the following chapter, we will propose concrete policy measures to overcome these bottlenecks.

5
Policy Recommendations

Based on the preceding analysis of bottlenecks and needs for the development of green finance and investments, this chapter discusses several policies that would be conducive to increasing the supply of green financing from the banking sector and boost corporations' willingness to undertake green investment in Indonesia. Since Indonesian banks are generally highly liquid, the following policy recommendations are based on the assumption that a scarcity of funds is no major obstacle for them and that their hesitation to develop a green finance business is rather due to a lack of capacity and also a lack of demand from the corporate sector for "green" credit which would increase the sense of urgency for developing these capacities in the financial sector. For corporations, green investments seem to be associated with a fear of losing competitiveness through higher cost as compared to BAU.

Before turning to our policy recommendations for enhancing green finance and investment, we would like to once more point to the elephant in the room, that is, the need for decreasing energy subsidies. Indonesia is among the top ten countries with the highest energy subsidies (Mourougane 2010) and had the third largest fuel subsidies in 2012 (Davis 2013). The government has proposed schemes to reduce these subsidies step-by-step and certain progress has already been made (Lang 2011). Nevertheless, Indonesia is still far from a complete elimination of subsidies and the issue is politically heavily contested (Mourougane 2010; IISD 2011). A removal of subsidies is estimated to save up to 6.6% of CO_2 emissions (Yusuf

et al. 2010). The elimination of energy subsidies may indeed be the single most important instrument to push the demand for green energy saving investments. None of the other instruments discussed below, be it soft loans or energy service company (ESCO) models, has so much potential to enhance the attractiveness of green investment and boost the demand for green finance.

5.1 A three-phased approach to fostering green finance

The findings of our research indicate that a vital concern of Indonesian banks is the creation of a level playing field which would allow them to develop a green lending business without the disadvantages of being "first movers" (whatever these may be) into an unknown business area where risks are perceived to be much higher than in banks' traditional businesses. Interviewed banks and experts generally agreed that equal conditions can be created only by a green finance framework that on the one hand puts pressure on banks through a compulsory green finance regulation and at the same time supports them in developing their capacities to do so.

Developing a green finance regulation may at first seem astonishing and some may argue that financial authorities need not be concerned with environmental regulation. There are, however, good reasons why financial regulatory authorities should consider environmental and climate change risk and effect on banks' investment decisions and the creation and allocation of credit (cf. Campiglio 2014; Volz 2014). The first argument relates to a credit market failure, where commercial banks "may decide to provide an amount of credit that is sub-optimal from a social perspective, or allocated in a sub-optimal manner – for instance, too much credit may be flowing to highly polluting industries" (Campiglio 2014: 11). Having a large share of credit flowing into polluting and carbon intensive industries is clearly not optimal from a social perspective and if financial authorities have the tools to prevent this from happening while other public institutions are not able to do this, there is a strong case for mandating financial authorities with environmental objectives.

However, correcting such a misallocation of capital is also important from a purely financial stability-oriented perspective since a heavy exposure of financial institutions in environmentally

harmful sectors may increase financial fragility. Indeed, from a macro-prudential perspective, climate change is a systemic risk, if it is largely ignored by financial authorities to date. Leaton et al. (2013: 23) highlight that "the banking system and regulators are not yet watching for the warning signals [of climate change] – leaving a financial system that is still not fit for purpose. The rules that guide and govern the operation of financial markets need to evolve to address this systemic risk." There are at least two risks. First, as the effects of climate change become ever more apparent, "a large share of the fossil-fuel reserves of oil, gas and coal companies would be at risk of becoming 'stranded assets' – and left undeveloped – in the event of global policy action to limit warming to 2°C" (Kiernan 2014). In other words, once policy makers get serious about carbon pricing and environmental regulation, financial institutions may find themselves with a large portion of "stranded assets" in their balance sheets. Second, although general awareness of risk from extreme weather and climate change is rising, also in Indonesia, the vast majority of businesses are not prepared for the effects of climate change. A recent report of the Center for Climate and Energy Solutions (CCES) assessed business resilience to climate change and came to the conclusion that the great majority of businesses are not prepared for the effects of climate change:

> Broadly speaking, the research reveals that while the vast majority of companies recognize risks from extreme weather and climate change, and many see these risks in the present or near term, uncertainty about the precise nature, timing and severity of climate impacts often inhibits investment in resilience beyond "business as usual." A few leading companies are taking steps to address climate risks where they see significant opportunities to become more efficient, reduce costs, or provide greater value to customers – in other words, where there is a clear business case to do so. By and large, however, the business response thus far is largely a continuation of existing practices based on a historical picture of past risks, and often fails to adequately consider changing climate and weather conditions. Thus, the most common strategy for addressing climate-related risks leaves most companies without the resilience they need to weather future physical impacts of climate change. (CCES 2013: 9)

The effects of climate change, however, may be significant. A recent study by the Risky Business Project (2014: 2) on the economic risk of climate change in the U.S. concluded:

> The U.S. faces significant and diverse economic risks from climate change. The signature effects of human-induced climate change – rising seas, increased damage from storm surge, more frequent bouts of extreme heat – all have specific, measurable impacts on our nation's current assets and ongoing economic activity. ... Damage to coastal property and infrastructure from rising sea levels and increased storm surge, climate-driven changes in agricultural production and energy demand, and the impact of higher temperatures on labor productivity and public health.

Because of its geographical characteristics and the lesser means available for climate change adaption, the economic risk stemming from climate change for Indonesia is much larger than for the U.S. And this will inevitably have repercussions for the Indonesian financial sector, which needs to get serious about climate risk. Indonesian financial supervisors hence ought to "ensure that the systemic risk stemming from climate change is incorporated into financial institutions' risk models since a failure to do so is associated with a high risk of economic and financial calamity" (Volz 2014: 7).

One of the first central banks to take the risks stemming from climate change seriously has been Bangladesh Bank, the central bank of Bangladesh, a country that is among the most vulnerable to climate change. In 2011, Bangladesh Bank was the first central bank to introduce a comprehensive and compulsory green banking policy. The main features of Bangladesh Bank's approach are summarised in Box 5.1. In 2012, the China Banking Regulatory Commission (CBRC) issued Green Credit Guidelines for the country's banks (cf. Annex X). Meanwhile, the People's Bank of China, China's central bank has set up a large green finance research programme. The third central bank that has gotten serious about green finance is the Banque du Liban, the central bank of Lebanon. Together with the Lebanese Center for Energy Conservation (LCEC), an agency affiliated to the Lebanese Ministry of Energy and Water, Banque du Liban implemented a National Energy Efficiency and Renewable Energy Action scheme in 2010 aimed "at providing cheap credit to the private sector for

projects related to renewable energy production and energy efficiency in buildings" (Campiglio 2014: 15).[1] These examples from Bangladesh, China and Lebanon show that attitudes in the central banking and financial regulator community are slowly changing. Bank Indonesia and the newly established *Otoritas Jasa Keuangan* / Financial Services Authority (OJK) could be at the forefront of this development.

Box 5.1 Implementation of a green banking policy by Bangladesh Bank

As one of the first central banks in the world, the Bangladesh Bank, the central bank of Bangladesh, issued a compulsory green banking policy in 2011. The overall aim of the policy is to implement measures to reduce environmental pollution while providing service to customers. The implementation of the policy has been divided into three phases. It proved to be beneficial to phase the implementation of the policy in order to ensure an incremental and sustainable implementation of the policy and full internalisation of the requirements within each bank.

Under Phase I (2011), banks had to develop internal green banking policies, establish a separate green banking unit to kick-start and ensure a general commitment concerning environmental issues both in-house (energy saving measures etc.) as well as when working with clients. Starting in this phase, banks were obliged to consider environmental and climate change risks when assessing a prospective borrower. Another component was the establishment of a Climate Risk Fund as part of the Corporate Social Responsibility (CSR) expenditures, which provided financing at the regular interest rate without charging additional risk premium in climatic emergency cases such as floods and droughts. Furthermore, banks had to report their green activities to the central bank on a quarterly basis. The declaration of top ten banks for green banking initiatives has been a motivational boost and has caused competition among the banks to remain in the top ten list.

During Phase II (2012), banks had to, inter alia, design specific policies for environmentally sensitive sectors. Furthermore, banks have been strongly advised to reduce the issuance of loans for environmentally harmful activities while at the same time introduce a particular percentage of environmental loans and green financial products. In addition, banks were required to develop an environmental risk management plan and to disclose environmental activities and performances both in their annual report and on their website. At the end of 2012, 45 out of 56 banks had formulated the policy for green banking, 46 banks had formed a green finance unit, 41 had introduced a guide for green in-house measured and in total 13,779 environmental risk ratings had been carried out.

Under Phase III (2013), banks are required to introduce environmentally friendly products as well as to publish an independent green annual report.

In addition, banks are also required to allocate a specific amount for green banking in their annual budget. This will include, inter alia, a budget for green finance, a budget for the Climate Risk Fund as well as a budget for marketing and capacity building measures in the area of green banking.

To ensure compliance with the policy, the central bank developed an incentive scheme. Banks which are successfully implementing the described activities will have preferential treatments in the following areas:

- CAMELS* rating will be positively affected which consequently leads to a positive effect on the overall rating of the bank.
- The central bank will publish the names of the top ten banks for their overall performance in green activities on its website.
- If a bank wants to open a new branch, green banking activities of the respective bank will be taken positive into consideration within the decision process.

On the contrary, if banks do not fulfil the requirements by the above mentioned deadline set by the central bank, then they have, most likely, to pay a fine.

Note: *The CAMELS rating is an international bank-rating system where bank supervisory authorities rate institutions according to the following six factors: Capital adequacy, Asset quality, Management quality, Earnings, Liquidity and Sensitivity to market risk. On CAMELS see, for instance, Lopez (1999).

Source: Compiled by authors drawing from Bangladesh Bank (2011) and Islam and Das (2013).

Given the infant stage of green banking practices in Indonesia, any green regulation should be phased in very gradually to allow banks to build capacities and have sufficient time adapting to new green banking practices. Bangladesh's experience has demonstrated that implementing a green banking policy in sequenced phases can support a sustainable learning process and ensure compliance with the new policies. Each phase should comprise mandatory action to be taken by all banks but also encourage voluntary additional steps by banks that are willing to take a pioneering role. It is crucial that the banking supervisory authority gives a very clear guidance for each envisaged activity and supports the banks with capacity

building measures and advice. In the following, we propose a three-phased approach for introducing a green finance framework in Indonesia.

Phase 1 (1 year)

- Announcement of a detailed definition of green finance, with appropriate information for banks and capacity building measures that will help banks to implement the following required and suggested measures.
- Banks are encouraged to send their staff to regular capacity building measures related to green finance.
- Banks are requested to screen their existing portfolio and categorise outstanding loans as "green" or "non-green" according to the regulator's official green finance definition. The same categorisation should be applied for new loans.
- Within one year banks should provide the financial regulator with an overview of the share of green loans in their total portfolio.
- Banks need to introduce environmental and social risk management systems.

Phase 2 (3–5 years)

- Considering the initial position of banks regarding green finance, the regulator announces a non-binding target for the share of green finance in banks' portfolios that should be reached by banks within three to five years.[2]
- Banks are required to designate a board member responsible for green finance and report every year to the regulator their share of green finance in their portfolio. The results will be openly published by the regulator in an annual report on green banking.
- There will be annual awards for banks with a high share or a rapidly increasing share of green lending.

Phase 3 (open-ended)

- The regulator will evaluate the progress made by individual banks in achieving the green finance-targets set out at the beginning of phase 2 and decide on binding targets for the share of green finance in banks' portfolios.

- Banks that do not achieve the binding target will be required to pay a penalty fee at the end of each year into a newly-established green finance fund. Underperforming banks will also be required to present a plan for improvement. The regulator will continue publishing annually a report on Green Banking in Indonesia.
- Annual awards for banks with a high share or a rapidly increasing share of green lending.

Needless to say that the details of such a regulatory framework have to be carefully worked out and implemented step-by-step in order to reach full effectiveness. Moreover, it can only be successful if regulations are strictly enforced and if banks can be persuaded to take internal capacity building measures. Moreover, it will not suffice to prompt banks to increase the supply of green credit – it will be equally important to create incentives for the corporate sector to undertake green investments and thereby create sufficient demand for green credit. The aim is to kick-start the development of a competitive banking landscape for green finance practices in Indonesia – no more, no less. Although the implementation of binding targets for the share of green finance in banks' portfolios may seem draconic, it will be important to exert pressure on banks so that they do adjust their lending behaviour and develop the necessary capacities. The Chinese example has shown that a green credit guideline without binding targets will not bring about a change in banks' lending practices.

5.2 Defining green finance

The starting point for any kind of green finance policy – including the green finance framework proposed earlier – ought to be to define green finance. The bank interviews showed very clearly that there is no common understanding of green finance. To effectively implement guidelines or regulations, it is imperative to have a workable definition of green finance as banks will require a clear and operational definition to screen their existing portfolio and categorise new loans as green or non-green. Also, to verify whether an individual bank has met the binding target for the share of green credits in their portfolio, bank officers and supervisors need to be able to determine unequivocally the type of project defined as "green". To this end, a clear definition has to be formulated.

Such a definition should comprise all forms of investment or lending that take into account environmental effect and enhance environmental sustainability. In this sense, it does not suffice to define green finance as financing of investments that comply with existing national environmental policies and regulations, such as UKL-UPL (*Upaya Pengelolaan Lingkungan Hidup dan Upaya Pemantauan Lingkungan Hidup*) and AMDAL (*Analisis Mengenai Dampak Lingkungan*), since these should (at least theoretically) apply to virtually all investment. Rather, green finance should relate to investments that have a positive environmental effect compared to BAU and thereby contribute to environmental sustainability.

To avoid reinventing the wheel, it would make sense to build a definition of green finance on Indonesia's already existing national climate change policy framework, as laid out in the National Action Plan for Greenhouse Gas Reduction (RAN-GRK, cf. Section 3.2.2).[3] As part of RAN-GRK, the Nusantara Carbon Scheme (NCS) was established as a voluntary Indonesian emission reduction certification scheme.[4] Relating to the United Nations Framework Convention on Climate Change (UNFCCC), the NCS allows the following activity types (Takahashi and Kuriyama 2013: 3):

- Production and utilisation of renewable energy;
- Energy efficiency and conservation;
- Efficiency improvement or modification of industrial process;
- Sustainable management of waste;[5]
- Afforestation and reforestation;
- Reducing Emissions from Deforestation and Degradation (REDD) and
- Sustainable agriculture.

Given these activities are allowed by the NCS, investment in any of these categories should be classified as green finance, irrespective of whether the investment has been or will be certified by the NCS. To avoid extra cost and bureaucratic procedures, existing certification should be used wherever possible and appropriate. Projects certified by the NCS – and maybe also by the UNFCCC's Clean Development Mechanism (CDM) – should automatically be classified as green finance, whereas for other investments in these areas some kind of certification of positive environmental effect would be needed, such as certification of low energy usage for new machinery or sustainable

agriculture. To qualify as "sustainable agriculture", certification schemes or standards could be used, such as ISPO (Indonesian Sustainable Palm Oil) and RSPO (Roundtable on Sustainable Palm Oil) in the palm oil sector (even if such sustainability standards are not without criticism).[6] In some of the above areas, especially for "production and utilization of renewable energy" activities, a list could be composed of investments that fall into this category, including hydropower, wind power, solar power, geothermal power and biomass power.

Besides the seven categories used by the NCS, there are other activities in which financing of investments should be reasonably classified as green.[7] These include the following:

- Measures leading to emission reduction of CO_2 and non-CO_2 GHG;
- Investment into public transportation;
- Investments into green buildings and
- Sustainable tourism.

This list may not be comprehensive, but it could provide the basis for a catalogue with which banks and other financial institutions could identify green activities. The financing of such activities would accordingly count as green finance. The list may be amended over time, to take account of new developments and practicability issues. It would be necessary to complement a green finance definition and a list of activities with operational guidelines. Such operational guidelines should give examples of the different activities and mention existing certification schemes and standards that would help banks to identify green activities.

As an isolated measure, the introduction of a green finance regulation, no matter how operational the definition is, would miss the goal of enhancing green finance and investment. Forcing banks into the green finance business, given their current lack of know-how, could be even counterproductive if banks do not develop the necessary capacity for assessing the risk of green investments that fall outside their previous range of lending. Thus, to prevent banks and companies from negative experience, capacity building needs to complement the phase-in of regulation.

5.3 Capacity building

Recalling our empirical findings, a lack of capacity and information is a crucial bottleneck to the realisation of green investments. In the company survey, most respondents pointed to the need for more and better information when asked under which conditions they would invest more in energy efficiency equipment. On the banking side, the vast majority of banks describes the availability of qualified staff for environmental risk assessments as scarce.

An important area for capacity building among banks is trainings for environmental risk assessment. One such example is the development of an environmental risk categorisation system that allows for monitoring and evaluation of a bank's exposure to the aggregated environmental risk at the portfolio level. Box 5.2 provides an overview of risk categorisation and management of portfolio risk as developed by the Sustainable Banking Network (SBN), an informal knowledge network for banking regulators and associations that aims to "facilitate the collective learning of its members and to support them in policy development to create drivers for sustainable finance practices".[8]

Box 5.2 Risk categorisation and managing portfolio risk

"To help a financial institution to determine the extent of environmental and social due diligence that will be required for a particular transaction, a environmental and social risk category should be assigned to each transaction.

The level of environmental and social risk will vary greatly for different types of financial transactions and by industry sectors. It can also be determined by factors such as scale and location and magnitude of potential environmental and social impacts.

To help a financial institution to determine the extent of environmental and social due diligence that will be required for a particular transaction, financial institution staff should assign a environmental and social risk category to each transaction. This provides an initial assessment of the environmental and social risk associated with the transaction. Together with the findings of the environmental and social due diligence, this environmental and social risk category can be incorporated into the overall risk assessment of a transaction and factored into the decision-making process.

The financial institution should develop a environmental and social risk categorization system to assign a environmental and social risk category to every transaction in a systematic and consistent manner. A typical system includes three environmental and social risk categories, designated as high, medium and low risk (or other similar terms such as A, B and C or 1, 2 and 3) representing different risk levels:

High Risk: Transactions typically involve clients/investees with business activities with significant adverse environmental and social impacts that are sensitive, diverse, or unprecedented. A potential impact is considered sensitive if it may be irreversible (such as loss of a major natural habitat), affect vulnerable groups or ethnic minorities, involve involuntary displacement and resettlement, or affect significant cultural heritage sites.

Medium Risk: Transactions typically involve clients/investees with business activities with specific environmental and social impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures and international best practice. Potential adverse environmental impacts on human populations or environmentally important areas are less adverse than those of High Risk transactions.

Low Risk: Transactions typically involve clients/investees with business activities with minimal or no adverse environmental and social impacts.

The financial institution can also assign Financial Intermediary (FI) as a risk category to those transactions involving clients such as banks, microfinance institutions, private equity funds, and leasing and insurance companies, which act as financial intermediaries in making financing available to other clients. By assigning the FI Category, the environmental and social risks related to these types of transactions can be managed accordingly.

A environmental and social risk categorization system enables a financial institution to monitor and evaluate its exposure to environmental and social risk aggregated at the portfolio level. A financial institution can set internal threshold levels for its overall exposure as a function of environmental and social risk category or by exposure to industry sector or transaction type as a function of environmental and social risk category. This allows the financial institution to better manage and track changes in the overall risk profile of its portfolio and the associated environmental and social impacts of its clients/investees. This information can also be used by the financial institution to report internally to Senior Management and externally to stakeholders on overall environmental and social performance."

Source: First for Sustainability website (http://firstforsustainability.org/risk-management/managing-environmental-and-social-risk-2_2/components-of-an-esms/risk-categorization-and-managing-portfolio/). Content on the First for Sustainability website, including *Risk Categorization and Managing Portfolio Risk*, is freely available to the public at http://firstforsustainability.org/.

Other examples of useful capacity building measures for banks include the development of cash flow lending models and the structuring of green investments. Illustrative lending models can provide a useful guideline for banking operations. Bank Indonesia has already held a number of awareness and capacity building workshops about green investments for banks, partly sponsored by international development agencies. Such workshops have been favourably received by banks. These efforts should be further continued and expanded by OJK. Since such workshops can reach only to a limited number of bank officers, banks need to ensure that new knowledge gained at such workshops is passed on internally through in-house training.

To extend the demand for green financing, capacity building should also target the demand side in order to raise awareness among companies of resource savings potential and green investment opportunities. Since the interviews indicated that the government is regarded as a neutral and trusted source of information, public bodies should step up efforts to raise environmental awareness of the society at large but also specifically through targeted information campaigns on topics such as resource efficiency in production processes. For instance, the Ministry of Energy could issue detailed information on how to save energy in different industrial sectors. Information could be distributed through different channels, including local government's agencies. In China, for example, 200 local energy conservation centres have been set up to spread awareness about energy saving (Zou et al. 2010). Important is, furthermore, the inclusion of business associations, many of which hold close contact to member companies and some already inform their members about environmental issues. Business associations can play a central role in providing information about green investment opportunities for companies.

5.4 Energy service companies

Investments into energy savings are a good example of green investments that pay off by themselves. While the empirical findings suggest that firms are generally aware of the possibility to save energy, they often lack information about their individual energy saving potentials, as well as the capacity and know-how to undertake

energy saving projects. Since electricity prices are set to significantly rise in the coming years, companies seem to be increasingly interested in energy saving projects. To successfully implement energy saving projects, despite the lack of capacity and know-how, a comprehensive "package" solution is needed.

Energy service companies (ESCOs) could support companies in designing, financing and maintaining energy efficiency projects. ESCOs may vary in the extent to which they offer different services. Whereas a full-service ESCO manages the whole implementation process of an energy efficiency project from design to maintenance, intermediate types are also conceivable: An ESCO could also focus just on the design and installation of the energy efficiency project. Since our study revealed a lack of capacity as well as, to a certain extent, a lack of financing, our findings would suggest the establishment of full service ESCOs in Indonesia to support firms in realising their energy-savings potential. However, further research on the precise information and financing needs of Indonesia's industry is required before a specific ESCO type can be recommended.

An ESCO can help to decrease the investment risk for companies and facilitate energy efficiency investments for companies that may be hesitant to finance those investments through bank credit or face problems in obtaining the latter. Since an ESCO has the capacity to calculate future energy cost saving revenues, the investment risk for companies should decrease. A full-service ESCO, for instance, could offer a "carefree" package: offering its know-how to assess energy saving potentials, implementation and maintenance as well as verification and monitoring of savings (World Bank 2004). Furthermore, if financing falls also under the responsibility of the ESCO, it could bundle small-scale energy efficiency investments and, thus, apply for portfolio loan at a bank. This decreases the bank's transaction costs, which are relatively large if project proposals are handed-in one-by-one. By this means, the ESCO could increase access to (green) finance among the small- and medium-sized enterprise (SME) sector. However, a legal framework that would safeguard such contracts is still perceived as major challenge and essential for the function of ESCOs (Hasan 2012).

Instead of establishing new institutions, the range of services provided by already existing energy audit firms could be expanded. Essentially, ESCOs can only function if companies trust them. Thus,

instead of establishing a new (possibly public) ESCO, enhancing the services of already existing private energy audit firms may have several advantages. Existing audit firms already possess the necessary know-how and capacity to assess energy saving potentials. Furthermore, they also have established relations to providers of machinery. The government could promote the development of existing energy audit firms through private sector incentives.

To phase-in ESCO services in Indonesia, several supporting measures could be provided: technical assistance, information provision and competition promotion are among the most important. Especially to perform their potential role as financial intermediaries, audit firms would need to develop their in-house capacities in this area. Through technical assistance the gap between the current service offers of energy audit firms and their new tasks as financiers could be closed. Second, to promote demand for ESCO services among companies, it might be advisable to initiate a pilot phase where ESCO services are offered at subsidised rates.[9] In addition, a green finance regulation along the lines discussed above could include the refinancing of ESCOs in the suggested "green banking" share to increase banks' incentive to refinance ESCOs. Thus far, banks are still hesitant to provide finance to ESCOs because of a lack of familiarity with their business model (Hasan 2012). Promotion by the banking regulator could help overcome this obstacle. Third, although private auditors shall be supported by government to some extent, it is also important to foster competition among them. The governmental certification scheme for auditors is a first step in this regard (Ministry of Energy 2012).

Overall, the establishment of ESCOs in Indonesia seems to be, in principle, a suitable model to address the current lack of capacity, know-how and finance that holds back investments into energy efficiency. However, for the time being ESCOs are only weakly developed in Indonesia and will need more time to become important actors.

5.5 Soft loan schemes

Although ESCOs can facilitate the assessment and implementation process of energy efficiency investments, another strategy to make green investments more attractive and boost the demand for green

credit is the development of targeted soft loan schemes. Lower interest rates could increase the incentive for companies to undertake green investments. The empirical findings underlined that green investments are not yet a priority for companies. Since market lending rates are comparatively high in Indonesia (on average 12.7% for the period 2009–2013), subsidised lending rates could attract companies' interest in green investments. Credit schemes with subsided interest rates could push green investments higher up the priority list of companies and demonstrate their profitability. At the same time, a higher demand for green credit could encourage banks to shore up their activities in the area of green finance.

Our bank survey has shown that green investments are no priority for banks; a soft loan facility linked to favourable refinancing conditions and support for capacity building could potentially stimulate banks' interest in exploring green finance credit lines as a new business area. The measure would aim to increase the number of credits to finance green investments and at the same time demonstrate the profitability of these investments so that banks will continue such lending when the soft loan is phased out after a certain period. However, international donors report of substantial difficulties to find partner banks to set up such facilities in Indonesia. Various international donors have already tried to establish partnerships with Indonesian banks with limited success. Even where local partner banks were found and green credit lines were established, disbursement of credit proved difficult. For instance, the first loan of the USD 30 million Energy Efficiency Project Finance Program that the Asian Development Bank (ADB) developed in 2011 together with government-owned Eximbank (which is also known as the Indonesian Export Financing Agency) was not agreed until 2014 (Sipahutar 2014). The ADB's Energy Efficiency Project Finance Program is targeted to exporters in the steel, cement, textile and food industry. As part of the agreement with ADB, Eximbank has been required to establish an environmental and social management system (cf. Box 5.2). A major hurdle to the success of such schemes apparently is that both banks and credit-taking companies are obliged to cumbersome formal requirements that significantly reduce the attractiveness of the programme – which they try to avoid.

Currently, the Indonesian Ministry of Finance envisages the establishment of a public soft loan facility financed through a

revolving fund. An example of such a scheme is the Thai Energy Efficiency Revolving Fund (cf. Box 5.3). The Ministry of Energy and Renewable Resources issued a decree proposing the establishment of a revolving fund to issue soft loans for investments in renewable energy and energy efficiency already back in 2004 (Menteri Energi dan Sumber Daya Mineral 2004, Article 42), and the Ministry of Finance has taken up this proposal. The idea is essentially that the revolving fund shall provide cheap refinancing lines to commercial banks at 2–3% interest rate and that banks would then issue green loans at a maximum of 7–8% interest rate to companies (MoF 2013). The banks' interest margin of 5% should allow banks to cover administrative costs and allow a profit. The default risk would be carried by the banks. A challenge, however, is the question how it will be financed. In the case of Thailand, the fund was financed by the revenues of a fuel tax, an option that currently does not exist for Indonesia.

Box 5.3 The Thai Energy Efficiency Revolving Fund

Already in 1992, the government of Thailand launched the energy conservation fund (ENCON fund). The fund has been filled with revenues from the Thai petroleum tax, which yields approximately USD 59 million annually (World Bank 2012c). In 2003, the Thai government then launched the *Energy Efficiency Revolving Fund* (EERF), which made use of funds from the ENCON fund. The new fund aimed to stimulate investments in energy efficiency and renewable energy projects, particularly. The fund was set up for five phases, with different size: phases 1 and 2 (USD 62.5 million), phase 3 (USD 92 million) and phases 4 and 5 (USD 12 and USD 15 million) (Ministry of Energy, n.d.).

In the phases programme loans (2.5–10 million USD) were given with 0.5% interest rate to 11 participating commercial banks with a tenor of 10 years (Jue et al. 2012; Frankfurt School 2012).* These loans were then distributed by the bank for renewable energy and energy efficiency projects with a maximum interest rate of 4% (compared to a market rate of 9%) (Jue et al. 2012). A list of projects that were eligible for funding was provided. The banks used their own project appraisal criteria to assess project proposals and had to cover the default risk. A public agency furthermore provided a technical assessment for each proposal. Repaid loans could be used again within the tenor. In exchange, the banks were obliged to submit monthly reports including total amounts of the loans and the repayment schedules (Frankfurt School 2012).

Industrial and commercial energy users, ESCOs and project developers could apply for loans at their commercial bank. Remarkably, no minimum requirement for energy saving has been set up (Institute for industrial productivity 2012). Loans were given with a maximum tenor of seven years. Projects that required less than USD 1.63 million could be financed 100% from the EERF, larger projects solicited additional 50% funding by a local bank (Jue et al. 2012).

In 2011, the EERF was closed down after 294 projects had been financed. In total, USD 236 million had been invested from the EERF and an additional amount of USD 285 million had been leveraged from local banks. The average pay-back period of three years showed to be much shorter than the maximum tenor (Sinsukprasert 2010). Most common had been investments in chillers or installations of biogas systems (Frankfurt School 2012).

The Thai experience shows that setting up a revolving fund is a cumbersome process. It took three to four years until companies and banks were well informed, and an adequate number of projects was registered (Frankfurt School 2012). Second, since projects were managed by commercial banks and since no collateral support was provided, banks made use of their conventional creditworthiness assessments. Thus, loans were provided "asset based" instead of "project based", which excluded small companies to some extent from the programme (Institute for Industrial Productivity 2012). Setting up a similar fund in Indonesia could be challenging since there is no sustainable cash flow from a fuel tax that could be used to fill the fund. In addition, the revolving fund was only one component out of a series of programmes the Thai government has been running to foster energy conservation.

Note: *In the first phase the interest rate was set at 0%, which was adjusted with the start of the second phase (Jue et al. 2012).

Source: Compiled by authors.

Since Indonesian banks have been reluctant to expand their business to areas with lower profit margins, the establishment of a soft loan facility could provide an incentive to overcome these hesitations and develop a new business area. On the one hand, as with any subsidy, there is a risk that banks will try to lock in these subsidies for much longer than would be socially desirable, an argument that actually puts into questions the desirability of establishing a permanent revolving fund. On the other hand, subsidised schemes would need to run long enough to enable banks to develop new green lending models that are sustainable and profitable when subsidies are phased out.

The empirical analysis hints at three factors that are decisive for the successful establishment of a soft loan facility: little governmental interference, lucrative but limited profit margins for banks and a low administrative burden. First, since banks, especially the large ones, are highly liquid in Indonesia, their inclination to implement government- or donor-funded lending schemes is limited if they come with too many strings attached. The currently favourable refinancing conditions of Indonesian banks reduce the attractiveness of such schemes if those eat into their usual profit margins (6–8%) or require a high administrative burden. The facility should, thus, allow for profit margins that are perceived as lucrative enough by the banks while obliging banks to offer lending rates that are below commercial rates. Since the banks should be responsible for project appraisal and carry the default risk, the lending rate should be set by the bank in the end. To ensure banks' interest in such a facility, banks would demand large tranches with a tenor of several years.

5.6 Credit guarantee scheme

Alternative scheme to soft loan facilities, which can only be recommended with caution, are credit guarantee schemes. The banking survey and interviews showed that a bottleneck to green finance in Indonesia is the perception that green investments, including renewable energy investments, are more risky than conventional ones. This is to a large extent due to banks having little experience with green investment projects and their insufficient capacity to adequately assess the risk. Apart from capacity building measures to improve risk assessments, an instrument to mitigating risk and boost the supply of green finance could be a credit guarantee scheme.

In Indonesia, a guarantee scheme for green credits could, for instance, be established according to the model of the existing *Kredit Usaha Rakyat* (KUR), a micro credit guarantee programme. KUR is part of the *Jaminan Kredit Indonesia* (JAMKRINDO) credit guarantee scheme and is 100% government-owned (cf. Box 5.4). KUR offers guarantees for loans given to micro, small and medium enterprises (MSMEs) and therefore decreases the lending rate for these loans. A similar scheme for green projects could reduce the lending risk for banks offering loans for green investments and thereby reduce lending rates for green credits.

Box 5.4 Kredit Usaha Rakyat credit guarantee scheme

The micro credit guarantee programme KUR is one successful Indonesian example for a credit guarantee scheme. It was launched in 2007. The goal of the programme is to facilitate access to bank loans for MSMEs that have a profitable business but lack access to loans. To supplement the collateral required by banks the government provides a guarantee fee. The KUR consists of two types of schemes. Under the KUR retail scheme, loans up to USD 50,000 are offered and 80% of the collateral needed is guaranteed by the government. The maximum interest rate per year under this scheme is 13%. Besides this, the KUR micro scheme offers loans up to USD 2,000. Under this scheme 100% of the collateral is guaranteed and the maximum interest rate is 22% per year. The interest rate is determined by a committee chaired by the co-ordinating Ministry of Economy.

In total 4 state-owned banks, 26 regional banks, 2 Sharia banks and 1 private bank participate in the KUR programme. Even though the programme is relatively young, it is generally considered to be very successful. By the end of 2011 KUR had benefited 2.2 million people for a total disbursement of IDR 29 bn (approximately USD 3 million) (Mourougane 2012: 19). As shown in Figure 5.1 disbursement under the KUR programme has increased steadily since 2009. Nevertheless, there are some limitations of the programme. Its support is limited to certain regions (Java and Bali 49%, Sumatra 23% and Kalimantan 10%) as well as to certain sectors (credit distributed to the productive sector, in particular agriculture, remains significantly smaller than that to the trading sector) (Mourougane 2012: 19). One way to expand the regional and sectoral coverage would be to allow more banks to qualify for the programme. In addition, the government could act to improve awareness among companies of the financing options under the KUR scheme.

Source: Compiled by authors.

On the one hand, both banks and companies could benefit from a guarantee scheme, since it would allow the realisation of green investments which were considered too risky or too costly beforehand. In the interviews, several banks indicated that credit guarantee schemes would help them to develop their green lending business. Also, the findings of the company survey suggest that a credit guarantee scheme could be an interesting instrument to lower unfavourable interest rates for companies. In addition, a credit guarantee scheme is an instrument to facilitate access to credit for firms that normally have difficulties in obtaining credit. Although the findings of our survey do not suggest that access to finance is a major problem for the surveyed companies, as previously discussed, other studies

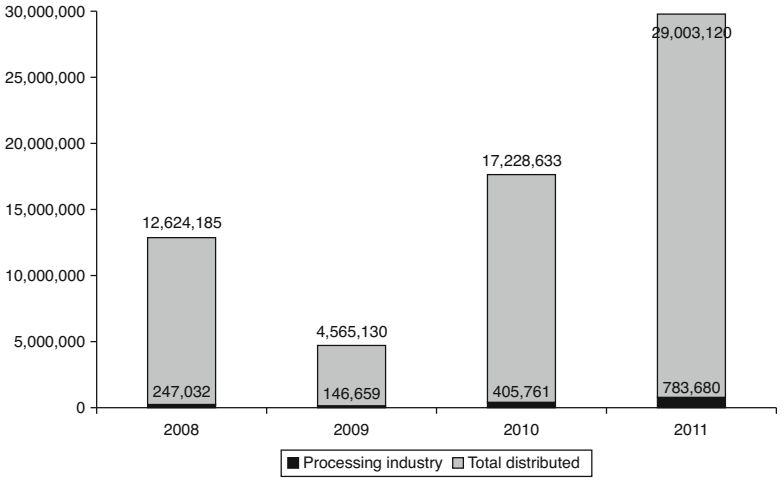


Figure 5.1 Kredit Usaha Rakyat credit guarantee scheme disbursement, 2008–2011

Source: Compiled by authors with data from the Indonesian Ministry of Industry, Directorate General of Small and Medium Industry.

show that especially SMEs in Indonesia do have only limited access to finance (see Machmud and Huda 2011).

On the other hand, the survey revealed an ambiguous picture concerning the attractiveness of such a credit guarantee scheme, as banks expressed concern of a heavy administrative burden. Apparently, existing guarantee schemes in Indonesia are not much demanded. Only few banks have made use of public guarantee schemes. Some of the banks who used them described the procedures as cumbersome. Furthermore, as discussed in the literature, credit guarantee scheme may increase moral hazard. Borrowers might not have an incentive to repay if they know that a guarantor has insured the loan; similarly, lenders might approve loans with higher risks of defaulting since they are insured and do not have to carry the losses (Navajas 2001). Hence, if a credit guarantee scheme for green credits is considered for implementation, it is vital that capacity building comes first and that banks have to share part of the risk in order to minimise moral hazard. In this context, Indonesia could benefit from the experiences made with the existing micro credit guarantee programme KUR.

5.7 Utility finance

An interesting instrument which decreases the risk of energy efficiency investments for companies and helps to address companies' lacks in capacity of carrying out energy efficiency investments is utility finance. The bank survey revealed that banks lack the capacity and experience to assess green investments. This lack of knowledge also increases the perceived risk associated to such investments and makes banks reluctant to extend energy efficiency loans. Companies, on the other hand, have mentioned the high upfront costs of energy efficiency equipment as an important bottleneck when asked about potential energy efficiency investment projects. In this context, utility financing – also known as on-bill financing – is a suitable instrument to scale up financing of energy efficiency projects by addressing these central problems.

Utility finance is defined as a "financial product that is serviced by, or in partnership with, a utility company for energy efficiency improvements and repaid by the customer on his or her monthly utility bill" (Bell et al. 2011: iii). This implies that the monthly charge on the utility bill remains equal to, or even slightly less, than the pre-investment amount despite monthly energy cost savings, until the investment has been repaid. Usually, utility companies can finance energy efficiency programmes without government schemes since their large balance sheet will typically facilitate refinancing credit lines by banks (Wood 2011). Also, on-bill financing holds potential for engagement of private investors as customers tend to prioritise their utility bill payments which makes this form of investment especially secure (Bell et al. 2011). Utility finance, however, requires that the energy provider is interested in saving energy, not only in selling it. Furthermore, utility finance presupposes a general administrative capacity as the utility is now charged with a variety of extra tasks of rather financial nature.

The main point of attraction remains that energy efficiency investment can be undertaken without customers feeling the "financial pain". Furthermore, utility finance may allow companies that would otherwise be excluded from formal bank credit to benefit from their utility companies' support as long as the latter can consider the bill payment history of its clients (Bell et al. 2011).

When using utility finance, the investment risk lies with the utility company. Yet the risk for the utility company might be lower

than for banks, for three reasons: First, utility companies probably have a better technical insight into the energy cost saving potential of energy efficient equipment and might find it easier to calculate a project's expected cash flow. Second, the utility company has insights into the bill payment history of its clients which might, to a certain extent, function as a credit history. Finally, the repayments to utility companies are considered of lower risk as customers prioritise the payment of utility bills, facing the risk of being shut off from services otherwise (Bell et al. 2011).

This extension of a utility company's responsibilities requires the latter to modify their billing system and to find legal solutions to handling the transfer of property. Further, there is of course the risk of non-payment of the bill. However, as already mentioned, the usually long relationship between utility company and customers as well as the priority accorded to paying the utility bill, makes this risk appear manageable.

Indonesia's national utility provider, PLN (*Perusahaan Listrik Negara*), has a monopoly on electricity distribution in Indonesia. The particularly strong standing of this institution in the Indonesian context could encourage the implementation of utility financing as a financing model for energy efficiency investments. Given that PLN is a fully government-owned corporation, it should be easy for the government to mandate PLN with energy-savings programmes as it does not need to focus solely on increasing their sales of energy. Regarding the refinancing of a potential on-bill programme administered by PLN, funding should not be a problem, since PLN has preferred access to bank credit as a publicly-owned institution.

5.8 Vendor financing

The findings of the company survey call for an instrument that provides improved financing opportunities for green investments and decreases the initial cost burden for companies. The last recommendation introduces an instrument which potentially also reaches companies lacking formal access to credit: vendor finance, where the vendor of specific equipment gives a loan to the buyer so that the latter can buy the vendor's product. Instead of issuing a formal loan to the buyer, the vendor hands over the product in which the buyer is interested. The payment is then time-delayed, divided into various rates and includes interest rate payments, just as loan repayments. However, the interest

rate will typically be above market level, since the credit risk is fully borne by the vendors who have to refinance themselves at market conditions. The rates and times of repayment are flexibly agreed upon.

This instrument facilitates investments in new machinery for companies, while at the same time increases the vendor's sales. It enables companies without access to formal loans or who consider formal loan application processes as too cumbersome to carry out investments, for instance in energy efficient equipment. Repayment rates and timing can be calculated according to the project's expected cash flow (considering future cost saving revenues). The buyer has to pay for the improved access to finance with higher interest rates compared to the market level. However, administrative costs for the whole process are lower than for bank credits, since the bank no longer appears as an intermediary between vendor and company.

For the vendor, the disadvantage lies in the credit risk that he fully has to bear. Unless there is an already established vendor-buyer relationship, the vendor will most likely lack the capacity and information to adequately assess the risk – a problem that will particularly affect international suppliers. This might be a reason why this instrument is not well established in the Indonesian market. To decreasing the risk for the vendor, a leasing element can be incorporated in the contract so that ownership of the machinery remains with the vendor until the repayment is completed. In case the buyer is not able to repay the rates, the machinery is returned to the vendor. This option is also described as a weak form of ESCO (World Bank 2004). The success of the instrument depends on whether international vendors (who mainly provide the machinery in Indonesia) consider the leasing element as sufficiently risk-absorbing.

5.9 Summary

To nudge Indonesian banks into developing a green lending business, it will be necessary to develop a comprehensive green finance framework. Although green lending can be a viable and lucrative business model, banks are still hesitant to develop this market as they perceive green lending more risky than their conventional business. The higher perceived risk results not least from a lack of internal capacity and lack of experience. Also, the large Indonesian banks have been able to generate high profit margins and have been therefore shunning the seemingly less lucrative green finance market.

The main idea behind progressively introducing a green finance regulation is to gradually increase the pressure on banks to build capacities for environmental risk assessment and green lending. The ultimate formulation of binding targets for the share of green credit in banks' portfolios signals to banks that green finance is taken seriously. A green regulation necessarily requires a precise definition of the type of financing that is to be classified as "green". It is clear that a rushed and unprepared introduction of a green regulation is not going to work and that an ill-designed regulation could lead to higher non-performing loan risk if banks are pressured into giving out green credit without being able to adequately assess and manage the associated risk. Therefore, one of the most important elements during the phasing-in of the proposed green regulation is the development of banks' internal capacities. This relates above all to the capacities of bank officers to recognise the business potential of green projects such as energy efficiency or renewable energy investments, to define the adequate loan structure and to assess the related risks.

Although the idea behind the introduction of a green finance framework is the exercise of pressure on banks to increase the supply of green finance, this alone will not suffice to boost green investment and reduce the carbon intensity of the Indonesian economy. Obviously, carbon pricing and in particular an elimination of energy subsidies would provide a big boost for green investments. Furthermore, a series of complementing measures would help to increase the attractiveness of green investments for companies, which should come to realise that many green investments are a business opportunity, not an unwelcome burden. The establishment of ESCOs, promoting utility finance for energy efficiency measures, or providing technical assistance associated to soft loan schemes all target the lack of knowledge and experience among Indonesian banks and companies regarding green lending and investment, respectively. Soft loans and to a certain extent credit guarantee schemes provide economic incentives for companies and banks to undertake green investments and finance them, respectively. In view of the little urgency attributed to green investment and finance that became apparent in the bank and firm surveys and the abundance of green business opportunities in the Indonesian market, different ways need to be explored to make green investments and the financing thereof more appealing so as to lay the groundwork for sustainable and low-carbon development in Indonesia.

6
Summary and Conclusions

The Indonesian government has pledged to reduce the country's carbon emissions by 26% by 2020 compared to a BAU trajectory, while emphasising that policies should be "pro-growth, pro-jobs, pro-poor and pro-environment". To achieve these goals, Indonesia needs to diverge from its high-carbon growth path and undergo a green transformation. To this end, the country faces vast financing needs for green investment in renewable energy generation, improvements in energy efficiency, a more efficient use of natural resources in general and intelligent transport systems.

The Indonesian government has recognised the need for supporting green growth and has made first strides at promoting green finance. Green finance comprises all forms of investment or lending that consider environmental effect and enhance environmental sustainability. A vital element of green finance is sustainable investment and banking, where investment and lending decisions are taken on the basis of environmental screening and risk assessment to meet environmental sustainability standards. Against the backdrop of the Indonesian government's quest to promote low-carbon growth, this book investigated the country's challenges in enhancing green financing for sustainable and low-carbon investment. To this end, we conducted a survey in the Indonesian banking sector to analyse the current bottlenecks for the financial sector to allocate more capital towards green investments. Our analysis of the Indonesian banking sector's willingness

and capacities to increase the supply of green finance was complemented by an analysis of the demand for green finance from the corporate sector; through an online survey and interviews we sought to investigate the current bottlenecks for companies in undertaking green investments and the extent to which this was hampered by a lack of green finance.

The empirical analysis shows clearly that while the current share of green credits in banks' portfolios is negligible and the amount of realised green investments is low, both banks and firms regard green investments as an interesting business opportunity. Nonetheless, green investments are held back by various bottlenecks, including low energy prices, a weak enforcement of environmental standards and a lack of the necessary experience and information to adequately assess technical and market risks of green projects. Furthermore, the higher uncertainty in cash flow streams of green projects compared with those of conventional investments and a lack of banks' capacities to carry out environmental risk assessments hinders the development of green finance.

These bottlenecks need to be addressed and incentives need to be created in order for banks and firms to realise green business opportunities. Based on the survey results, as well as expert interviews with regulators and financial practitioners, the study develops a framework for green finance that provides incentives for the financial sector to channel more resources into green investments while avoiding adverse effects on the risk structure of banks' credit portfolios. Most importantly, the study proposes the introduction of a green finance regulation in three phases to gradually raise banks' share of green lending. Although the introduction of a green finance regulation with binding targets for the share of green finance in banks' portfolios may seem draconic at first, there are good reasons for such an intervention. First, the experience in China, which introduced a non-binding Green Credit Guideline in 2012, has shown that such non-binding guidelines will not suffice to affect banks' lending practices in any meaningful way. It will be important to exert pressure on banks so that they do adjust their lending behaviour and develop the necessary capacities for green lending. Second, it is important to point out that climate risk brings about significant economic and financial risks – risks that need to be managed

not least by the financial sector: climate risk is a systemic risk for the financial sector, and as such the financial regulator needs to ensure that financial institutions are equipped to cope with this risk. There is a broad consensus that the Indonesian economy will be heavily affected by climate change; it is against this backdrop that Indonesia will have to increase the resilience of its corporate sector against the effects of climate change, and financial firms will need to strengthen their environmental risk assessment and green project appraisal capacities to avoid the accumulation of "stranded assets" in their balance sheets.

A regulatory framework for green finance, we argue, needs to be accompanied by capacity building measures in the banking sector, not least to ensure that green lending does not undermine the quality of bank balance sheets as banks are pushed into green lending. In view of the comfortable profit margins that Indonesian banks can earn with conventional lending business and the little urgency they currently attribute to the development of their green finance capacities, we also discuss soft loans and credit guarantee schemes as possible instruments to enhance economic incentives for banks to finance green investments and develop corresponding lending models. Such schemes, especially when linked to capacity building elements, can support the development of green finance, but their effect will be limited and they need to be designed in a way that minimises moral hazard.

Our analysis showed very clearly that the low amount of green investment in the Indonesian economy is not simply due to a lack of supply of green finance, even though this certainly is an issue. It became clear that the overall incentives for undertaking green investments are poor and need to be improved. The elephant in the room, evidently, is the high energy subsidies that disincentivise investments in energy efficiency. Weak enforcement of environmental regulation is another hindrance to green investments. Given a lack of awareness of their country's environmental challenges as well as little incentives and even less pressure to improve on their environmental records, it should not be surprising that Indonesian companies have been reluctant to undertake green investments, which are seen by many as additional costs that should be avoided rather than an investment in the company's future competitiveness.

Indeed, it became clear that policy efforts are needed to increase the attractiveness of green investments and turn them into business opportunities. In this respect, besides increasing the cost of energy, the study discusses further measures to address bottlenecks that hold back green investments by the corporate sector, including the establishment of ESCOs, the development of utility financing, as well as technical assistance and targeted capacity building measures linked to soft loan schemes.

Although our empirical analysis was conducted in Indonesia and our policy recommendations are tailored to the Indonesian context, we hope and believe that our analysis will be also relevant and that lessons can be also drawn from the Indonesian example for other developing and emerging economies that seek to engage the financial sector in the transition towards a green and sustainable economy. To date, empirical research on green finance is scarce and this is indeed one of the first studies that provides an in-depth analysis of the challenges facing developing and emerging economies in financing the green transformation (and the first one to analyse green finance in Indonesia). While we are aware of the many shortcomings of this piece of research, we are hopeful that this study has shed some light on the so-far under-researched field of green finance and hope that our study may prove useful for both researchers and policy makers. Although more detailed and sector-specific research is needed, we hope this book can contribute to a better understanding of the prospective challenges to realising green investment opportunities in developing and emerging economies.

To conclude on a positive note, we believe it is important to emphasise that developing green finance is not only crucial for successfully managing the green transformation in each and every country, and hence desirable from a societal perspective – but also provides lucrative business opportunities for the financial sector once the necessary capacities have been developed. At the same time, a better access to green finance will facilitate corporate investments in energy and resource efficiency and hence contribute to raising the overall competiveness of economies. Developing green finance is therefore not only a necessity, but also an opportunity.

Annex

Annex I: Multilateral channels for green finance

Clean Development Mechanism

The Clean Development Mechanism (CDM) is an instrument of the United Nations Framework Convention on Climate Change (UNFCCC), enacted by the Kyoto Protocol in 2001. It is an incentive mechanism to support projects that reduce Greenhouse gas (GHG) emissions. The CDM gives industrialised countries the possibility to invest in emission reduction projects in developing countries, in order to earn certified emission reduction (CER) credits. These CERs can be used by industrialised countries to meet part of their emission reduction targets set by the Kyoto Protocol. The CDM can promote sustainable development and emission reductions worldwide while giving industrialised countries flexibility in how to meet their emission reduction targets. By September 2012, 4,626 projects have been registered as CDM projects, resulting in 1 bn CERs (each credit equivalent to one tonne CO_2) (UNFCCC 2013).

There are currently 76 registered CDM projects in Indonesia (as of May 2012) of which the majority are biogas projects. According to IGES (2012), these projects lead to an average annual emission reduction of 108,939 tonnes of CO_2. One example for a CDM project in Indonesia is the "Yogyakarta Bus Replacement" project which aims to reduce emissions by low-GHG emitting vehicles. The project targets the replacement of 200 buses and intends to retrofit existing diesel engines, enabling them to consume less fuel per kilometre (Napitupulu et al. 2004).

Climate Investment Funds

The Climate Investment Funds (CIFs), established in 2008, are administered by the World Bank and operate in partnership with regional development banks. The CIFs aim to help developing countries pilot transformations in clean technology, sustainable management of forests, increased energy access through renewable energy (RE), and climate-resilient development. The CIFs consists of two trust funds: the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF) (Climate Investment Funds 2013). Both funds are able to provide concessional loans, grants and guarantees to recipients via the partner Multilateral Development Banks (MDBs).

The CTF promotes investments to initiate a shift towards clean technologies. Through the fund, countries, the MDBs and other partners agree

upon country investment plans for programmes that contribute to the demonstration, deployment and transfer of low-carbon technologies with significant potential for GHG emissions savings.

The SCF finances targeted programmes in developing countries to pilot new climate or sector approaches. Programmes are for example the Forest Investment Program, the Pilot Program for Climate Resilience, and the Program for Scaling-Up Renewable Energy in Low-Income Countries. The CIFs have a total pledge of USD 6,951 million and contributors can provide funding to the trust funds in form of grants or capital contributions and additionally in the case of CTF, concessional loan contributions (Climate Investment Funds 2010).

The CTF Investment Plan for Indonesia proposes CTF co-financing of USD 400 million to support Indonesia's goals of providing 17% of total energy use from renewable energy and improving energy efficiency by 30% from a BAU scenario, by 2025 (Climate Investment Funds 2010). It proposes financing particularly for two programme areas: increase of large-scale geothermal power and acceleration of initiatives to promote energy efficiency and renewable energy (in particular biomass). The CTF investments aim to mobilise upto USD 2.7 bn from multilateral financiers, state-owned enterprises and the private sector (Climate Investment Funds 2010).

Global Climate Partnership Fund

The Global Climate Partnership Fund (GCPF) is a public-private partnership dedicated to mitigate climate change through a reduction of GHG emissions in emerging and developing countries. The GCPF focuses on financing energy efficiency and renewable energy projects, primarily in cooperation with local financial institutions (International Development Finance Club 2013). Loans to small- and medium-sized enterprises (SMEs), private households and small renewable energy projects are channelled through financial institutions (minimum 70% of total volume); direct lending is made to larger industrial companies, funding for Energy service companies (ESCOs), and small energy efficiency (EE)/ renewable energy projects (maximum 30% of total volume) (Global Climate Partnership Fund 2011). The fund is a joint approach of the German Ministry for Environment, KfW and IFC, with Deutsche Bank being the investment manager. GCPF is a fund capitalised by international investors; the target funding volume after five years is USD 500 million. Currently, the fund has a portfolio of approved investments of USD 105 million (Thies 2011). Beneficiaries of the fund are mainly private households, home owner associations and SMEs. Typical projects financed by the fund are for example energy efficient light systems, biomass ovens, solar heating or boiler replacements (Beck 2011).

Indonesia is one of the core countries among the recipients of the fund. One project example is the "Industrial Efficiency and Pollution Control

Loan". The project aims to reduce industrial pollution through the provision of loans for SMEs for investments in environmentally friendly technologies. The fund amounts to EUR10 million (Grant and IDA-Loan) and is channelled through BNI, Bank Ekspor Indonesia and commercial banks selected by the two institutions (CTF 2012).

The Global Environment Facility

The Global Environment Facility (GEF) was established in 1991 as an operating entity of the financial mechanism of the UNFCCC. Currently, the GEF is the largest public funder worldwide of projects aiming to generate global environmental benefits, while supporting national sustainable development initiatives (GEF 2012). The GEF unites 182 governments in partnership with international institutions, the private sector, and civil organisations and provides grants for projects related to biodiversity, climate change, international waters, land degradation, persistent organic pollutants and the ozone layer (GEF 2013a). Since 1991, the GEF provided USD 10.5 bn in grants and leveraging USD 51 bn in co-financing for more than 2,700 projects in more than 165 developing and emerging countries (ibid.). Through its Small Grants Programme, the GEF has also made available more than 14,000 small grants directly to civil society and community based organisations. More than 97% of the pledged contributions to the GEF Trust Fund are from members of the Organisation for Economic Co-operation and Development – Development Assistance Committee (OECD-DAC) and may be reported as official development assistance (ODA) (OECD 2012). The GEF also administers the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF) to support small-scale adaptation plans and projects.

Indonesia received so far GEF grants totalling USD 150 million that leveraged USD 955 million in co-financing resources. With this budget, the GEF financed 42 national projects and 44 regional and global projects (GEF 2012). In addition, the GEF Small Grants Programme that started in Indonesia in 1992 received financial support totalling USD 6.6 million. This amount leveraged USD 6.8 million in co-financing for 356 projects executed by civil society and community-based organisations (GEF 2012). One GEF project in Indonesia is for example the Chiller Energy Efficiency Project. The aim of the project is to support the replacement of inefficient chillers with energy efficient chillers and to contribute to a reduction of GHG emissions and demand for electricity. The GEF grant for this project is approximately USD 3.6 million plus co-financing of USD 19 million (GEF 2013b).

Green Climate Fund

The Green Climate Fund (GCF) of the UNFCCC was agreed upon at the Durban COP in 2011 and is to be set up in South Korea. The fund will

promote the paradigm shift towards low emission and climate-resilient development pathways. This shall be done by providing support to developing countries to reduce their GHG emissions and to adapt to the effects of climate change (Green Climate Fund 2013). In future, it is expected to become the primary channel for international public climate finance. The goal is to make the fund operational by 2014. It remains to be seen, how Indonesia will benefit from the GCF.

ADB Carbon Market Initiative

The main goal of the Asian Development Bank (ADB) Carbon Market Initiative (CMI) is to help developing member countries benefit from CDM projects. The CMI pays upfront costs for carbon credits and gives technical support to CDM projects in the region. The fund size is approximately USD 152 million (UNDP 2013a).

ADB Climate Change Fund

The Climate Change Fund (CCF) was established in 2008 by the ADB to facilitate investment in the developing member countries to affect the causes and consequences of climate change. The CCF pools resources within ADB to address climate change through technical assistance and research as well as through grant components of investment projects. The three priority areas of the CCF are clean energy development, reduced emissions from deforestation and degradation and improved land use management and adaptation. Recipients of the investments are developing member countries of the ADB. The Bank provided the fund with an initial USD 40 million, which is open for contributions from other countries, development organisations and the private sector (ADB 2013a). The CCF finances several projects in Indonesia, many of them supporting Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative, but as well a number of energy efficiency and geothermal projects.

ADB Clean Energy Financing Partnership Facility

Another climate change mechanism, administered by the ADB is the Clean Energy Financing Partnership Facility (CEFPF), established in 2007. The aim of the CEFPF is to improve energy security in developing member countries and to reduce GHG emissions in the region. The main activity of the CEFPF is to finance the deployment of more efficient and less polluting supply and end-use technologies. Furthermore, resources are projected to finance policy, regulatory and institutional reforms that promote clean energy development. Approximately 30% of the fund will be used for technical assistance and approximately 70% for grant components of investments (ADB 2013b). The CEFPF investments include deployment of new clean energy technology, projects that lower the barriers to adopting clean energy technologies, projects that increase

access to modern forms of clean and efficient energy for the poor and technical capacity programs for clean energy. The fund size is approximately USD250 million; supporters of the grant are Australia, Norway, Spain, Sweden, Japan and the Australian Global Carbon Capture and Storage Institute (UNDP 2013b).

One project in Indonesia, for example, aims to strengthen the power supply grid in West Kalimantan and to extend access to electricity by investing in new power transmission lines and substations. The project is financed with USD 2 million and will provide access to electricity to approximately 16,000 households (AusAID 2013).

Source: Compiled by authors.

Annex II: Bilateral channels for green finance

A large share of public climate finance (an estimated USD 24.6 bn per year) is directed through bilateral channels, administered largely through existing development agencies (Buchner et al. 2011).

One example is Germany's *International Climate Initiative* (ICI) which focuses on four different areas: building a climate friendly economy, adapting climate change, REDD+ and conserving biological diversity. The ICI focuses on developing and newly industrialised countries as well as on states in transition. The initiative receives funding from emissions trading and has approved so far USD 770 million for a total of 219 mitigation, adaptation and REDD+ projects (Brown and Peskett 2011).

In Indonesia, there are currently several projects financed by the ICI. One example is the *Energy Efficiency for Sustainable Tourism in Pangandaran* project which focuses on emission reduction measures, particularly in the tourism sector. Project measures target more efficient utilisation of energy (especially in hotel complexes and by urban infrastructure services), elaboration of a municipal energy concept for renewable-energy applications, public awareness-raising on climate issues and the implementation of adjustment measures (BMU 2013).

The UK's *International Climate Fund (ICF)* is the primary channel of UK climate change finance. It became operational in 2011 and replaced the Environmental Transformation Fund (ETF). The main target of the ICF is to help developing countries to adapt to climate change, embark on low carbon growth and tackle deforestation (Climate Funds Update 2013a).

Japan's *Fast Start Finance*, set up in 2009, has pledged USD 15 bn through bilateral and multilateral channels, as well as for direct projects with the private sector with the aim to help developing countries address climate change. Indonesia is one of the major recipient countries (Climate Funds Update 2013b).

In May 2010, Norway signed a *letter of intent* with the Indonesian government to provide USD 1 bn for REDD+ finance between 2010 and 2016. The purpose of the partnership is to contribute to significant reductions in GHG emissions from deforestation, forest degradation and peat land conversion. The partnership aims to conduct a policy dialogue on international climate change policy and to support the development and implementation of Indonesia's REDD+ strategy (Caldecott et al. 2011).

Source: Compiled by authors.

Annex III: National climate change funds

Besides the international climate change funds and the bilateral agreements, Indonesia has established national funds with varied functions, resourced through international finance and/or domestic budget allocations and the domestic private sector.

As one of the first countries in the world, Indonesia has established a new national fund for organising climate change finance. The *Indonesian Climate Change Trust Fund* (ICCTF), established in 2009 by the GoI, is a national funding entity which aims to align development assistance for climate change more closely with development priorities defined by GoI and to pool and coordinate grants for climate change related programmes (Brown and Peskett 2011). The fund was established to support EE, sustainable forestry and peat land management, as well as climate change resilience. It acts as a catalyst to attract investments and to implement alternative financing mechanisms for climate change mitigation and adaptation programmes and as a place for donors making small financial pledges to pool resources for efficiency gains by reducing transaction costs (Brown and Peskett 2011). Currently the UK, Australia and Sweden are the only financial supporters of the fund, with the UK being the largest donor. The ICCTF is getting international attention as it is seen as a new model for how international support for climate change could be delivered, moving towards increased national ownership (Brown and Peskett 2011).

Furthermore, the GoI set up the *Climate Change Programme Loan* (CCPL) which is a concessional loan to support GoI's efforts to develop a lower carbon, more climate-resilient growth path. The programme loan focuses on mitigation, adaptation and strengthening the institutions and policy framework needed for a successful climate change response (Brown and Peskett 2011). Since its establishment in 2008, the CCPL has been jointly financed by Japan and France. Since 2010 it is also financed by the World Bank and is likely to be joined by other donor agencies.

Source: Compiled by authors.

Annex IV: Overview of climate funds

Fund name	Type	Instruments	Administered by	Area of focus	Donors	Recipients	Volume	Date operational	Project in Indonesia	Intermediary
Clean Development Mechanism (CDM)	Multilateral	Emission trading, Certified emission reduction credits	UNFCCC	Reduction of GHG				2001	"Yogyakarta Bus Replacement" project aims to reduce emissions by low-GHG emitting vehicles	
ADB Carbon Market Initiative (CMI)	Multilateral	Financial and technical support for CDM projects	ADB	Mitigation, Energy, EE, Fugitive Methane, Low-Carbon, RE, Waste Management		ADB developing member countries	USD 152 million	2006		
ADB Climate Change Fund (CCF)	Multilateral	Grant, technical assistance, research	ADB	Clean energy development, reduced emissions from deforestation and degradation, improved land use management and adaptation		ADB developing member countries	USD 50 million	2008		

ADB Clean Energy Financing Partnership Facility (CEFPF)	Multilateral	Grant, technical assistance	ADB	Deployment of more efficient and less polluting supply and end-use technologies	Australia, Norway, Spain, Sweden and Japan, and the Global Carbon Capture and Storage Institute		USD 250	2007	Investment in new power transmission lines and substations in West Kalimantan	direct
Global Climate Partnership Fund	PPP	Loan	German Ministry for Environment, KfW and IFC	Energy efficiency and renewable energy projects	KfW on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU), OeEB (Development Bank of Austria)	Mainly private households and SMEs in developing and emerging countries	USD 105 million	2011		
The Global Environment Facility Trust Fund	Multilateral	Grant	UNFCCC	Adaptation, Mitigation – general	182 governments, international institutions, private sector, civil organisations		GEF provided USD 10.5 bn in grants	1991	Chiller Energy Efficiency Project	

Continued

Annex IV: Continued

Fund name	Type	Instruments	Administered by	Area of focus	Donors	Recipients	Volume	Date operational	Project in Indonesia	Intermediary
Climate Investment Funds – Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF)	Multilateral	Loan, grant, guarantees	World Bank	Mitigation, Agriculture, EE, Fuel Switching, Industry, Infrastructures, Transport	Australia, France, Germany, Japan, Spain, Sweden, United Kingdom, United States	Partner Multilateral Development Banks	USD 4.5 bn pledged by donors	2008		Through Multilateral Development Banks to recipients
Green Climate Fund	Multilateral		UNFCCC	Adaptation, Mitigation – general				Not yet operational		
International Climate Initiative (ICI)	Bilateral	Grant	Government of Germany	Adaptation, Mitigation, REDD	Germany	Developing and newly industrialised countries	EUR 120 million per year	2008	EE for Sustainable Tourism in Pangandaran	
International Climate Fund (ICF)	Bilateral	Grant	Government of the United Kingdom	Adaptation, Mitigation, REDD	United Kingdom	Developing countries	GBP 2.9 bn	2011	Indonesia Low Carbon Growth project	
Japan's Fast Start Finance	Bilateral	Grant, loan	Government of Japan	Adaptation, Mitigation, REDD	Japan		USD 15 bn	2008		

Indonesian Climate Change Trust Fund (ICCTF)	Multi-Donor, National	Grant	BAPPENAS	Adaptation, Mitigation, REDD	United Kingdom, Australia, Sweden	Indonesia	USD 8.5 million	2010	Established as a place for donors making small financial pledges to pool resources
Climate Change Programme Loan (CCPL)	Multilateral	Concessional loan	Government of Indonesia – MoF	Adaptation, Mitigation	Japan, France, World Bank	Indonesia		2008	
Norway-Indonesia Letter of Intent	Bilateral	Grants, performance based grants	UNDP	REDD projects	Norway	Indonesia	USD 1 bn	2010	

Source: Compiled by authors.

Annex V: Energy tariff structure for the Indonesian corporate sector

Tariff group	Power limit	Continuous costs Fixed rates/ Manner of charging of costs	Consumption fee (Rp/KWh) und (kVArh) 2013				Prepaid (Rp/kWh) 2013			
			01.01–31.03	01.04–30.06	01.07–30.09	Ab 01.10	01.01–31.03	01.07–30.06	01.07–30.09	Ab 01.10
Group tariffs for small/home industries with low installed capacity										
I-1/TR	450 VA	26.000	**Blok I:** <30kWh: 160 **Blok II:** >30kWh: 395	No change	No change	No change	485	No change	No change	No change
I-1/TR	900 VA	31.500	**Blok I:** <72 kWh: 315 **Blok II:** >72 kWh: 405	No change	No change	No change	600	No change	No change	No change
I-1/TR	1.300 VA	**Minimum Account (RM):** RM1: 40 (hours on) x installed capacity (kVA) x consumption fee	803	843	886	930	803	843	886	930
I-1/TR	2.200 VA	(same group)	830	871	915	960	830	871	915	960
I-1/TR	3.500 VA–14 kVA	(same group)	961	1.009	1.059	1.112	961	1.009	1.059	1.112
Group tariffs for small businesses with low installed capacity										
B1-TR	450 VA	23.500	**Blok I:** <30kWh: 254 **Blok II:** > 30kWh: 420	No change	No change	No change	535	No change	No change	No change
B1-TR	900 VA	26.500	**Blok I:** <108kWh: 420 **Blok II:** > 108kWh: 465	No change	No change	No change	630	No change	No change	No change
B1-TR	1.300 VA	**Minimum Account (RM):** RM1: 40 (hours on) x installed capacity (kVA) x consumption fee	835	876	920	966	835	876	920	966
B1-TR	2.200 VA–5.200VA	(same group)	950	998	1.048	1.100	950	998	1.048	1.100

Other sized enterprises: Low installed capacity										
I-2TR group tariffs for industrial purpose with low installed capacity	14kVA–200 kVA	**Minimum Account (RM):** RM2: 40 (hours on) x installed capacity (kVA) x consumption fee blok beyond peak time	Blok peak times: K x 840 Blok beyond peak time: 840 kVArh: 914	Blok I: K x 882 Blok II:882 kVArh: 959	Blok I: K x 926 Blok II: 926 kVArh: 1.007	Blok I: K x 972 Blok II: 972 kVArh: 1.057	–	–	–	–
B2-TR group tariffs for medium sized businesses with installed capacity	6.600 VA–200kVA	**Minimum Account (RM):** RM2: 40 (hours on) x installed capacity (kVA) x consumption fee Blok I	**Blok I:** 0–60 hours: 1.035 **Blok II:** 60+ hours: 1.380	Blok I: 1.245 Blok II: 1.380	Blok I: 1.310 **Blok II:** No change	1352 (keine Blöcke mehr)	1.215	1.316	1.347	1.352
Other sized enterprises: Medium voltage										
B3-TM Group tariffs for special businesses with medium installed capacity	>200kVA	**Minimum Account (RM):** RM3 = 40 (x Hours used (kVA] x consumption fee blok beyond peak time	Blok peak times: K x 880 Blok beyond peak time: 880 KVArh: 963	Blok I: K x 925 Blok II: 925 KVArh: 1.013	Blok I: K x 975 Blok II: 975 KVArh: 1.067	Blok I: K x 1.020 Blok II: 1.020 KVArh: 1.117	–	–	–	–
I-3/TM Group tariffs for medium industrial use with medium installed capacity	>200 kVA	**Minimum Account (RM):** RM2 = 40 (x hours used (kVA) x consumption fee blok beyond peak time	Blok peak times K x 704 Blok beyond peak time: 704 kVArh: 757	Blok I: K x 728 Blok II:728 kVArh: 783	Blok I: K x 765 Blok II: 765 kVArh: 823	Blok I: k x 803 Blok II:803 kVArh:864	–	–	–	–
Group tariffs for large scale industrial use and high voltage:										
I-4/TT	>30.000 kVA	Minimum Account (RM): RM3 = 40 (hours on) x installed capacity (kVA) x consumption fee blok peak time and beyond.	Blok peak time and beyond: 629 kVArh: 629	654 kVArh: 654	689 kVArh: 689	723 kVArh: 723	-	–	–	–

Annex VI: Questionnaire bank survey

Bank Indonesia and the German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE) are conducting a survey among banks in Indonesia. The aim of the survey is to collect information about the current situation of banks regarding Green Finance. The findings of this survey will help Bank Indonesia to evaluate the status quo of Green Finance and to facilitate its development.

We would highly appreciate if you would take the time to complete the following survey. Overall, it should take approximately 10 minutes to complete the survey. Your responses are voluntary and will be treated confidentially. Responses will not be attributable to individual respondents. Responses will be compiled and analysed as a group. If you have any questions or concerns regarding the research project or the survey, please contact [redacted].

Thank you for your cooperation.

Part I: Green finance

Definition: Green finance comprises all forms of funding or lending that take into account environmental impact and enhance environmental sustainability. Green finance comprises for example lending to companies for investments to save electricity, water and fuel, to reduce waste or pollution, to establish and operate renewable energy facilities (e.g., geothermal, biomass, hydropower, solar, wind) or investments related to ecotourism or eco-labelling of products.

Does your bank have a unit responsible for green finance?	
Yes	☐
No	☐

Do you consider green finance as a promising business area?	
Not promising at all	☐
A bit promising	☐
Moderately promising	☐
Very promising	☐
Not applicable	☐

Does your bank plan to expand its activities in green finance?	
No	☐
Yes, slightly	☐
Yes, moderately	☐
Yes, it will be a priority	☐
Not applicable	☐

Why doesn't your bank extend more credit to finance green projects? (Multiple responses possible)	
Too risky	☐
Not profitable enough	☐
Too complicated	☐
Lack of demand for green finance	☐
Not enough experience with such projects	☐
Not applicable	☐
Other reasons. Please specify:	☐

Part II: Risk management

How would you describe the availability of appropriately qualified and experienced staff in the banking sector with regard to environmental assessment of credits?	
Very scarce	☐
Scarce	☐
Sufficient	☐
Abundant	☐
Not applicable	☐

Does your bank have the tools to assess environmental credit risks?	
No, not at all	☐
To a low extent	☐
To a medium extent	☐
Yes, to a high extent	☐
Not applicable	☐

Has your bank sent staff to capacity building seminars focusing on environmental risk assessment?	
Yes	☐
No, suitable seminars	☐
No, not interested	☐
Not applicable	☐

To what extent do environment or climate change risks impact on your portfolio diversification strategy?	
Not at all	☐
To a low extent	☐
To a medium extent	☐
Significant extent	☐
Not applicable	☐

Part III: Green finance regulation

Do you think that a regulatory framework for green finance would be conducive to foster green investments?	
Not at all	☐
To a low extent	☐
To a medium extent	☐
Significant extent	☐
Not applicable	☐

What kind of support from the banking supervision authority would help your bank to engage more in green finance? (Multiple responses possible)	
Capacity building (seminars, trainings)	☐
Technical assistance	☐
Prudential practices (e.g., ATMR)	☐
Recognition awards	☐
Access to information	☐
Other support. Please specify:	☐
Not applicable	☐

Annex VII: Questionnaire for bank interviews

Lending to medium sized companies

What share of your loan goes to small, medium and large companies (please refer to footnote 1)?

a. Small: _____%
b. Medium: _____%
c. Large: _____%

According to the new regulation from Bank Indonesia (December 2012), within 3 years 20% of credits have to be assigned to small and medium enterprises. How does this affect your current business model?

What is the average tenor for an investment loan to a medium sized company?

What is your interest rate range for a medium sized company for an investment loan?

In general, do interest rates for medium sized companies differ from rates for large companies?

If yes, please describe to what extent.

Under which conditions can your bank offer an investment loan with fixed interest rates to a medium sized company?

Footnote 1

Definition of MSMEs according to Bank Indonesia:	**Net assets excluding sites and buildings of the enterprise (in IDR)**	**Annual sale income (in IDR)**
Micro enterprise	up to 50 million	up to 300 million
Small enterprise	50–500 million	300 million–2.5 bn
Medium enterprise	500 million–10 bn	2,5 bn–50 bn

Green finance

Is environmental sustainability included in your bank's vision and mission statement?

The Indonesian government is now implementing a domestic carbon market "Nusantara Carbon Scheme (NCS)". Would you accept carbon credit as collateral?

Does your bank have a unit responsible for environmental sustainability issues/ green finance?

Does your bank have a specific definition of green finance? If yes, how do you define it?

In your opinion, financing for which of the following investments would be green finance?

a. Investments related to waste management, e.g., waste water filter
b. Investments related to renewable energy, e.g., mini-hydro and hydro projects
c. Investments related to energy efficiency, e.g., more energy-efficient chillersd. Investments related to reforestation
e. Investments related to energy security, e.g., coal plants
f. Any type of investment which underwent an environmental risk assessment
g. None of the above

What proportion of your credit portfolio would you approximately classify as "green"? Please specify what is included.

Do you consider green finance as a promising business area? Please explain.

Training measures

Which tools, if any, do you have to evaluate environmental credit risks?

Do your credit officers receive particular in-house training to make environmental credit assessments?

Which trainings would be beneficial to promote environmental credit assessments?

PROPER rating

Do your credit officers take the PROPER rating into consideration?

Within your credit portfolio are there currently any companies holding a credit, which are rated red or black in their PROPER rating?

If yes, what action, if any, do you take to mitigate the credit risks associated to a black PROPER rating?

Financing of renewable energy and energy efficiency projects

Does your bank have any experience in financing renewable energy or energy-efficiency projects?

What is the value of your outstanding loans to renewable energy (in IDR)?

Is there any regulation within your bank that hinders you to extent the grace period for investments in renewable energy facilities? For example, to wait for the completion of a renewable energy facility.

If a company requests a credit to replace a machinery by more modern (*energy saving*) machinery, would you accept the new machinery as collateral?

Do you take potential *energy savings* from investments into energy efficiency into consideration when calculating a customer's future cash-flow/ future pay-back capacity?

Do you consider energy efficiency / renewable energy investments to be more risky than conventional credits? Please specify.

Outlook

Which conditions have to change so that your bank would become more interested in developing green financial products?

What kind of governmental support would you like to receive in order to raise the share of your green financial products in your portfolio?

Which actions would you recommend to Bank Indonesia to foster green finance?

Would green loans be more attractive to you if you could ensure them?

Is there anything important you would like to add?

Annex VIII: Questionnaire company survey

Deutsches Institut für Entwicklungspolitik

German Development Institute

d·i·e

Indonesian Green Economy Survey

Bank Indonesia and the German Development Institute / Deutsches Institut für Entwicklungspolitik (DIE) are conducting a survey among medium and large enterprises in Indonesia in collaboration with the GIZ Regional Economic Development Programme. The aim of the survey is to collect information about companies' potential demand for environmentally friendly investments, their awareness of energy saving potentials and their general access to finance. The findings of this survey will help Bank Indonesia to develop a regulatory framework that will improve a company's access to credits for green investments and thereby contribute to Indonesia's sustainable development.

We would highly appreciate if you would take the time to complete the following survey. Overall, it should take about 10 to 15 minutes to complete the survey.

Your responses are voluntary and will be treated with utmost confidentiality. No response will be attributable to an individual respondent. All responses will be compiled into one single dataset and analysed as a whole.

If you have any questions or concerns regarding our research project and/or our survey, please contact: [redacted].

Your participation is very important and will contribute to improving the business environment in Indonesia.

Thank you very much in advance!

Company characteristics

Begin of operations of the company:
Ownership

Ownership		Asset holder		Main business		Supplier	
State owned company	☐	Domestic company – 100% of assets domestically owned	☐	Production mainly for domestic market	☐	Supplier of multinational company	☐
Privately owned company	☐	Assets are more than 50% held by foreigners	☐	Production mainly for export	☐	No supplier of multinational company	☐
Public-private ownership	☐	Assets are less than 50% held by foreigners	☐	Doesn't apply (Hotels & Malls)	☐		

Location of headquarters / province:

Jakarta Special Capital Region	☐	East Kalimantan	☐	North Sulawesi	☐	Banten	☐
Central Java	☐	East Nusa Tenggara	☐	North Sumatra	☐	West Kalimantan	☐
East Java	☐	Gorontalo	☐	Special Region of Papua	☐	West Nusa Tenggara	☐
West Java	☐	Special Region of Aceh	☐	Riau	☐	Special Region of West Papua	☐
Special Region of Yogjakarta	☐	Jambi	☐	Riau Islands	☐	West Sulawesi	☐
Bali	☐	Lampung	☐	South East Sulawesi	☐	West Sumatra	☐
Central Kalimantan	☐	Maluku	☐	South Kalimantan	☐	Bengkulu	☐
Central Sulawesi	☐	North Kalimantan	☐	South Sulawesi	☐		
Bangka-Belitung	☐	North Maluku	☐	South Sumatra	☐		

City in which your company's headquarter is located:

Jakarta and surroundings	☐
City with population over 1 Mio	☐
City with population of over 250,000–1 Mio.	☐
City with population between 50,000–250,000	☐
City with population < 5,000	☐

Number of employees:

0–20	☐
21–50	☐
51–100	☐
101–200	☐
201–500	☐
501–1,000	☐
1,001–5,000	☐
5,001–10,000	☐
10,001–50,000	☐
More than 50,000	☐

Business area: [Please tick all options that fit]

Packaging	☐
Textile	☐
Hotel	☐
Cooking oil	☐
Sugar-refining	☐
Retail operator	☐
Mall	☐
Cement	☐
Pulp & Paper	☐
Food Processing (other than cooking oil)	☐
Iron & steel	☐
Glass	☐
Ceramics	☐
Others, please specify _____	

Assets of company (Net assets excluding sites and buildings of the enterprise in IDR)

Up to 50 million	☐
50–500 million	☐
500 million–10 bn	☐
10 bn–50 bn	☐
50 bn–100 bn	☐
More than 100 bn	☐

Questions

1. From the following list of environmental concerns; which are relevant for your company's future? (Multiple answers possible)
   - Electricity saving
   - Fuel saving
   - Pollution reduction
   - Water saving
   - Waste reduction
   - Waste water management
   - Environmental certification of your products
   - Renewable energy (e.g., geothermal, biomass, hydro, solar, wind)
   - Others, please specify…
2. Did you invest in the following areas in the last 3 years?

Electricity saving	Yes ☐	No ☐	Do not know ☐
Fuel saving	Yes ☐	No ☐	Do not know ☐
Pollution reduction	Yes ☐	No ☐	Do not know ☐
Water saving	Yes ☐	No ☐	Do not know ☐
Waste reduction	Yes ☐	No ☐	Do not know ☐
Waste water management	Yes ☐	No ☐	Do not know ☐
Environmental certification of your product	Yes ☐	No ☐	Do not know ☐
Renewable energy	Yes ☐	No ☐	Do not know ☐

3. Did you replace equipment with more energy-efficient equipment in the last 3 years?
   - Yes
   - No
   - Do not know
   - Refuse to answer
4. What kind of energy-efficient equipment did you purchase precisely?

   _____
5. When you buy new machinery do you check their energy consumption levels?
   - Yes…why? (Multiple answers possible)
     1) Because of cost-saving potential
     2) For environmental reasons
     3) Because of the Volt / Ampere restrictions
   - No
   - Do not know
   - Refuse to answer

6. Regarding current operational costs: How large are your electricity expenses?
   - Electricity is the largest expense
   - Electricity is among the top three expenses
   - Electricity is not among the top three expenses
   - Electricity is one of the smallest expenses
   - Do not know
   - Refuse to answer
7. Do you think investment in energy-efficient equipment would pay off from the savings in energy/resources it generates?
   - Yes, already in the short-term
   - Yes, but only in the long-term
   - No
   - Do not know
   - Refuse to answer
8. Does your company have an energy manager or dedicated person with specified knowledge about energy-efficiency?
   - Yes
   - No
   - Do not know
   - Refuse to answer
9. Is he /she consulted in the investment decision of the company?
   - Yes
   - No
   - Do not know
   - Refuse to answer
10. Energy subsidies will decrease by 15% this year and consequently electricity prices will rise. As a response, will your company invest more in energy-efficiency?
    - I do not receive direct energy subsidies
    - Yes, absolutely
    - Probably
    - Unlikely
    - No, definitely not
    - Do not know
    - Refuse to answer
11. How much will your firm's business competitiveness be affected by this rise in electricity prices?

Not at all
To a small extent
To a large extent
To a very large extent
Do not know
Refuse to answer

12. Are you aware of the Indonesian government's endeavour to decrease carbon emissions by 26% by 2020?
    Yes
    No
    Refuse to answer
13. Under which of the following conditions would you increase investments in energy-efficient equipment? (Multiple answers possible)
    Better quality of new equipment
    Better availability of new equipment
    Better access to credit
    Better information about energy and cost saving potential of alternative technology/equipment
    Better information about the sources of available technology/equipment
    Sufficient internal financing means
    Availability of fiscal incentives (tax reduction, subsidies etc.) for investments in energy-efficient equipment
    Stricter environmental regulation and enforcement
    Higher energy prices
    Do not know
    Others, please specify
    Refuse to answer
14. How would you finance an investment in new equipment?
    Internal funds or retained earnings
    Owners' contribution or issued new equity shares
    Borrowing from banks or other financial institutions
    Borrowing from capital markets
    Purchase on credit from suppliers and advances from customers
    International financing mechanisms
    Informal borrowing (moneylenders, friends, relatives)
    Others

Do not know
Refuse to answer

15. Is access to finance generally
    No obstacle
    Minor obstacle
    Major obstacle
    Very severe obstacle … to your company?
    Do not know
    Refuse to answer
16. Did you apply for one or more investment loans from a formal financial institution in the last 3 years?
    Yes
    No
    Do not know
    Refuse to answer
17. Was at least one of the credit applications approved?
    Yes (go to question 20)
    No (go to question 19)Do not know
    Refuse to answer
18. What were the main reasons why your company did not apply for any loan in 2012? (Multiple answers possible)
    No need for a credit – firm has sufficient capital
    No need for investments in 2012
    Application procedures for credits are complex
    Interest rates are not favourable
    Collateral requirements are too high
    Size of credit and maturity are insufficient
    Did not think it would be approved
    Do not know
    Refuse to answer
19. Did you take on a bank credit to invest in the following areas in the last 3 years? (Multiple answers possible)

Electricity saving	Yes ☐	No ☐	Do not know ☐
Fuel saving	Yes ☐	No ☐	Do not know ☐
Pollution reduction	Yes ☐	No ☐	Do not know ☐
Water saving	Yes ☐	No ☐	Do not know ☐
Solid waste reduction	Yes ☐	No ☐	Do not know ☐
Waste water management	Yes ☐	No ☐	Do not know ☐

Environmental certification
of your products Yes ☐ No ☐ Do not know ☐
Renewable energy Yes ☐ No ☐ Do not know ☐

20. If requests for new credits were rejected in the past, what were the main reasons? (Multiple answers possible)
    Credit requests have never been rejected
    Bad credit record
    Firm has already too high debt
    No credit history
    Insufficient profits
    No collateral
    No account held with bank
    Application incorrect
    Others
    Do not know
    Refuse to answer
21. What kind of collateral is required when you apply for a loan? (Multiple answers possible)
    Land, buildings under ownership of the establishment
    Machinery and equipment including movables
    Accounts receivable and inventories
    Personal assets of owner (house, etc.)
    Company's shares
    Other forms of collateral not included in the categories above
    No collateral required
    Do not know
    Refuse to answer
22. What do you regard as a major risk of an investment credit? (Multiple answers possible)
    Rising interest rate
    Changing regulations
    Rising business costs
    Market risks
    Currency risk
    Political instability
    Technology risk
    Other, please specify
    Do not know

Refuse to answer

23. Would you invest more in energy-efficient equipment if you had the option of leasing it?
    Yes
    No
    Do not know
    Refuse to answer
24. Did you ever carry out an energy audit?
    Yes
    No
    Do not know
25. Why not? (Multiple answers possible)
    Too costly
    No supplier
    No trust in external auditor
    Not enough information about energy audits
    Not urgent
    Not interested
    Could not obtain financing for undertaking investment
    Other
    Do not know
    Refuse to answer
26. Did you follow up on any of the recommendations of the auditor?
    Yes
    No
    Do not know
    Refuse to answer
27. Why were recommendations not followed up?
    Recommended investment too costly
    No trust in quality of new equipment
    No trust in the recommendations
    Not urgent
    Not interested
    No access to finance for investments
    Other
    Do not know
    Refuse to answer

28. Which of the following environmental licenses does your company have? (Multiple answers possible)
    Amdal
    UKL-UPL
    PROPER
    Other, please specify
    None of the above
    Do not know
    Refuse to answer
29. Does your company have one of the following internationally recognised quality certificates?
    ISO 14000 (…)
    ISO 50001 (…)
    Do not know
    No, we do not have one
    Refuse to answer

Annex IX: Guideline for company interviews

Bottleneck – Awareness:

When you hear the term "Green Economy", what do you spontaneously associate with this concept?

If you had to pick, from the list below, the most important issue your company needs to tackle in the future, which one would it be: a. Energy-efficiency b. Renewable Energies c. Waste management d. International environmental standards and certificates e. None of the above

Does your company consider investing / did your company invest in one of the following areas in the last 12 months?

a. Energy-efficiency
b. Resource-efficiency
c. Waste management
d. Waste water management
e. Environmental certification of your products
f. Renewable energy
g. Do not know

From your point of view, what are the major challenges and potentials to reach less carbon intensive development?

Under which conditions would your company be willing to invest more in energy efficiency or renewable energies? / What would be an incentive for your company to invest more in energy efficiency or renewable energy?

Do you think you could reduce electricity costs by investing in energy-efficient equipment?

Do you have in-house capacities to plan and manage electricity expenses?

Instrument – Information:

Do you feel well informed about options to save energy or to produce your own energy from renewable sources?

What type of information would be relevant to inform your investment decisions? Whom would you trust most to provide you with this relevant information?

Instrument – Decrease subsidies:

Among Asian countries, subsidies in Indonesia are among the highest. Do you think Indonesia needs to abolish subsidies in the long run? How much longer do you think does Indonesia need energy subsidies?

Electricity subsidies will decrease by 15% in this year. How does this affect your company? Do you think investments in energy-efficiency are now more interesting?

Instrument – External pressure:

[*In case, company has a black or red Proper rating*]: Does your Proper rating influence your ability to obtain credit?

[*In case, company has a black or red Proper rating*]: How would you describe the impact of this rating on your company's success?

Do you have the impression that your clients demand "green" products or environmentally friendly production? Do you have the impression that you could sell more / improve your business opportunities via environmental certification of your production process?

Bottleneck – Access to finance:

How would you describe your company's access to loans from banks?

What makes receiving a loan from a bank difficult? / What do you perceive as your companies biggest bottleneck to receive financing? / What kind of collateral is accepted by your bank?

Which conditions should be given, to make you consider taking up an investment credit for an energy efficiency or renewable energy project?

Instrument – Third party liability:

Have you ever applied for a credit guarantee, for example to ASKRINDO?

Would you invest more in energy efficiency and RE, if you had the opportunity to apply for a credit guarantee scheme?

Instrument – Leasing:

Did you ever lease equipment? If yes, how often?

Bottleneck – Risk / macroeconomic uncertainty:

What would you favour, if you had the choice?

a. Investments with moderate rates of return within the next year?
b. Investments with high rates of return starting 3 years after the investment?

Bottleneck – Low quality of machinery

In general, when you bought new machinery, did the quality of the new machinery meet your expectations?

Yes, absolutely.
Yes, mostly.
No, not entirely.
No, not at all.
Do not know

Is high-quality, energy-efficient machinery readily available to you in Indonesia? / What could improve your access to new technology?

Do you trust in the quality of new machinery? / What would improve your confidence in the quality of new machinery?

Bottleneck – Scarce equity

Would you invest more in energy efficiency or renewable energy projects if you had the access to equity finance (instead of debt)?

Annex X: Notice of the China Banking Regulatory Commission (CBRC) on issuing the *Green Credit Guidelines*

CBRC local offices, policy banks, state-owned commercial banks, joint-stock commercial banks, financial assets management companies, the PSBC, provincial rural credit unions, as well as all trust firms, enterprise group finance companies and financial leasing firms directly regulated by the CBRC:

To implement the macro adjustment policies provided for in the *Integrated Working Plan of the State Council for Energy Conservation and Emission Reduction during the 12th Five-year Period* and the *Comments of the State Council on Strengthening Environmental Protection Priorities*, and to follow the requirements of matching supervisory policies with industrial policies, the CBRC has formulated the *Green Credit Guidelines* for the purpose of encouraging banking institutions to, by focusing on green credit, actively adjust credit structure, effectively fend off environmental and social risks, better serve the real economy, and boost the transformation of economic growth mode and adjustment of economic structure. The *Guidelines* are hereby printed and issued for implementation.

Banking supervisory authorities should forward the *Notice* to local banking institutions and urge them into implementation.

Feb. 24, 2012

The China Banking Regulatory Commission

Green Credit Guidelines

Chapter 1 General Provisions

Article 1 For the purpose of encouraging banking institutions to develop green credit, these Guidelines are formulated pursuant to the *Law of the People's Republic of China on Banking Regulation and Supervision* and the *Law of the People's Republic of China on Commercial Banks*.

Article 2 Banking Institutions mentioned herein include policy banks, commercial banks, rural cooperative banks and rural credit cooperatives lawfully incorporated within the territory of the People's Republic of China.

Article 3 Banking institutions shall promote green credit from a strategic height, increase the support to green, low-carbon and recycling economy, fend off environmental and social risks, and improve their own environmental and social performance, thus optimizing their credit structure, improving the quality of services, and facilitating the transformation of development mode.

Article 4 Banking institutions shall effectively identify, measure, monitor and control environmental and social risks associated with their credit activities, establish environmental and social risk management system, and improve relevant credit policies and process management.

The environmental and social risks mentioned herein refer to the hazards and risks on the environment and society that may be brought about by the construction, production and operating activities of banking institutions' clients and key affiliated parties thereof, including environmental and social issues related to energy consumption, pollution, land, health, safety, resettlement of people, ecological protection, climate change, etc.

Article 5 The CBRC is responsible for, in accordance with applicable laws, regulating and supervising banking institutions' green credit business and their environmental and social risk management.

Chapter 2 Organization and Management

Article 6 The board of directors or supervisory board of a banking institution shall build and promote green credit concepts concerning energy saving, environmental protection and sustainable development, be committed to giving play to the functions of facilitating holistic, coordinated and sustainable economic and social development, and establish a sustainable development model that will benefit the society at the same time.

Article 7 The board of directors or supervisory board of a banking institution is responsible for developing green credit development strategy, approving the green credit objectives developed by and the green credit report submitted by senior management, and monitoring and assessing the implementation of green credit development strategy.

Article 8 The senior management of a banking institution shall, pursuant to the resolutions of the board of directors or supervisory board, develop the green credit objectives, have in place relevant mechanisms and processes, define clearly the roles and responsibilities, conduct internal checks and appraisal, annually provide report to the board of directors or supervisory board on the development of green credit, and timely submit relevant reports to competent supervisory authorities.

Article 9 The senior management of a banking institution shall assign a senior officer and a department and configure them with necessary resources to organize and manage green credit activities. Where necessary, a cross-departmental green credit committee can be set up to coordinate relevant activities.

Chapter 3 Policy, System and Capacity Building

Article 10 Banking institutions shall, as per national environmental protection laws and regulations, industrial policies, sector entry policies, and other applicable regulations, establish and constantly improve the policies, systems and processes for environmental and social risk management and identify the directions and priority areas for green credit support. As for industries falling within the national "restricted" category and industries associated with major environmental and social risks, they shall customize credit granting guidelines, adopt differentiated and dynamic credit granting policies, and implement the risk exposure management system.

Article 11 Banking institutions shall develop client environmental and social risk assessment criteria, dynamically assess and classify client environmental and social risks, and consider the results as important basis for credit rating, access, management and exit. They shall adopt differentiated risks management measures concerning loan investigation, review and inspection, loan pricing, and economic capital allocation.

Banking institutions shall prepare a list of clients currently faced with major environmental and social risks, and require these clients to take risk mitigation actions, including developing and having in place major risk response plans, establishing sufficient, effective stakeholder communication mechanisms, and finding a third party to share such risks.

Article 12 Banking institutions shall establish working mechanisms conducive to green credit innovation to boost innovation of green credit processes, products and services while effectively curbing risks and ensuring business continuation.

Article 13 Banking institutions shall give priority to their own environmental and social performance, set up appropriate systems, step up the publicity and education on green credit concepts, standardize their operational behaviors, promote green office, and improve the level of intensive management.

Article 14 Banking institutions shall strengthen green credit capacity building, establish and improve green credit labeling and statistics system, improve relevant credit management systems, enhance green credit training, develop and employ related professionals. Where necessary, they can hire an eligible, independent third party to assess environmental and social risks or acquire related professional services by means of outsourcing.

Chapter 5 Process Management

Article 15 Banking institutions shall strengthen due diligence in credit granting. The scope of due diligence on environmental and social risks shall be defined according to the characteristics of the sector and region in which the client and its project is located, so as to ensure the due diligence is complete, thorough and detailed. Where necessary, the banking institutions can seek for support from an eligible, independent third party and competent authorities.

Article 16 Banking institutions shall examine the compliance of clients to whom credit will be granted. As for environmental and social performance, compliance checklist and compliance risk checklist shall be developed according to the characteristics of different sectors, so as to ensure compliance, effectiveness and completeness of the documents submitted by the clients, and make sure they have paid enough attention to related risk points, performed effective dynamic control, and satisfied the requirements on substantial compliance.

Article 17 Banking institutions shall strengthen credit approval management, and define reasonable level of credit granting authority and approval process according to the nature and severity of environmental and social risks faced by the clients. Credits may not be granted to clients whose environmental and social performance fails to meet compliance requirements.

Article 18 Banking institutions shall, by improving contract clauses, urge their clients to strengthen environmental and social risk management. As for clients involving major environmental and social risks, the contract shall provide for clauses that require them to submit environmental and social risk report, state and avow that they will strengthen environmental and social risk management, and promise that they are willing to be supervised by the lender; the contract shall also provide for clauses concerning the remedies banking institutions can resort to in the event of default on environmental and social risks made by the clients.

Article 19 Banking institutions shall enhance credit funds disbursement management, and consider appropriation management, and regard

how well clients have managed environmental and social risks as important basis for credit funds appropriation. As for projects to which credit is granted, all stages, including design, preparation, construction, completion, operation and shutdown shall be subjected to environmental and social risk assessment. Where major risks or hazards are identified, credit funds appropriation can be suspended or even terminated.

Article 20 Banking institutions shall strengthen post-loan management. As for clients involving potential major environmental and social risks, relevant and pertinent post-loan management actions shall be developed and implemented. They shall watch closely the impact of national policies on the clients' operation, step up dynamic analysis, and make timely adjustment to asset risk classification, reserve provisioning and loss write-off. They shall establish and improve internal reporting system and accountability system concerning major environmental and social risks faced by the clients. Where major environmental or social risk event occurs to the client, the banking institution concerned shall timely take relevant risk responses and report to competent supervisory authorities on potential impact of said event on itself.

Article 21 Banking institutions shall strengthen the environmental and social risk management for overseas projects to which credit will be granted and make sure project sponsors abide by applicable laws and regulations on environmental protection, land, health, safety, etc. of the country or jurisdiction where the project is located. The banking institutions shall make promise in public that appropriate international practices or international norms will be followed as far as such overseas projects are concerned, so as to ensure alignment with good international practices.

Chapter 5 Internal Controls and Information Disclosure

Article 22 Banking institutions shall incorporate green credit implementation into the scope of internal compliance examination, and regularly organize and carry out internal auditing on green credit. Where major deficiencies are identified, investigation shall be conducted to determine whom to be held accountable as per applicable regulations.

Article 23 Banking institutions shall establish effective green credit appraisal and evaluation system and reward and penalty system, and have in place incentive and disciplinary measures, so as to ensure sustained and effective offering of green credit.

Article 24 Banking institutions shall make public their green credit strategies and policies, and fully disclose developments of their green credit business. As for credit involving major environmental and social risks, the banking institutions shall disclose relevant information according to laws and regulations, and be subjected to the oversight by the market and stakeholders. Where necessary, an eligible, independent third party can be hired to assess or audit the activities of banking institutions in performing their environmental and social responsibilities.

Chapter 6 Monitoring and Examination

Article 25 Banking supervisory authorities at all levels shall strengthen the coordination with competent authorities, establish and improve information sharing mechanism, improve information services, and remind banking institutions of related environmental and social risks.

Article 26 Banking supervisory authorities at all levels shall strengthen off-site surveillance, improve off-site supervisory indicator system, enhance the monitoring and analysis of environmental and social risks faced by banking institutions, timely guide them to strengthen risk management and adjust credit orientation.

Banking institutions shall, pursuant to the provisions hereof, perform overall green credit evaluation at least once every two year, and submit the self-evaluation report to competent banking supervisory authorities.

Article 27 When organizing and conducting on-site examination, banking supervisory authorities shall take into full account the environmental and social risks faced by banking institutions, and make clear the scope and requirements of examination. As for regions or banking institutions involving prominent environmental and social risks, ad hoc examination shall be conducted and urge said institutions to improve in light of examination results.

Article 28 Banking supervisory authorities shall provide more guidance to banking institutions on green credit self-evaluation, and, in conjunction with the results of off-site surveillance and on-site examination, holistically assess the green credit performance of banking institutions, and treat the assessment results, as per applicable laws and regulations, as important basis for supervisory rating, institution licensing, business licensing, and senior officer performance evaluation.

Chapter 7 Supplementary Provisions

Article 29 These *Guidelines* become effective as of the date of promulgation. Village banks, lending firms, rural mutual cooperatives and non-banking financial institutions shall enforce actions in reference to these Guidelines.

Article 30 These *Guidelines* are subject to interpretations by the CBRC.

Source: China Banking Regulatory Commission (2012).

Notes

1 Introduction

1. See also UNEP's (2011) plea for a *green economy* as well as the World Bank's (2012d) call for *inclusive green growth*.

2 Financing the Green Transformation – Market Failures, Government Failures and the Role of the State

1. Moral hazard occurs when a party incurs risk because the eventual costs of risk-taking are burdened upon another, third party.

3 The Green Transformation in Indonesia

1. The sharp increase in emissions caused by peat fires that can be seen in Figure 3.1 between 2000 and 2005 is largely due to changes in the measurement methodology (MOE 2010).
2. Meetings of the 194 member countries of the UNFCCC take place annually to assess the progress made in dealing with climate change. Therefore, the meetings are also known as Conference of the Parties (COP) and represent the supreme decision making body of UNFCCC (UNFCCC 2013a). The most famous of these meetings was the one in Kyoto in 1997, where the Kyoto Protocol was concluded.
3. See, for example, the ministerial decree 002/2004 Article 44, Menteri Energi dan Sumber Daya Mineral.
4. The Indonesian energy supply mix is shaped not only by Indonesia's domestic consumers but also by international consumers since Indonesia is caught in long-term oil export contracts.
5. The BAU-scenario calculations were undertaken by the Ministry of Environment (MoE 2010) for their "Second National Communication" which was submitted to UNFCCC as an update of the Indonesian GHG emission planning process.
6. The emission reduction goal under the second estimation of BAPPENAS (2011) does not add up to 26% but 23.69%. The reason for the discrepancy is that they have not yet incorporated all sectors in their emission reduction scenarios.
7. It is important to distinguish between the total BAU level and the sectoral BAU level. Reductions compared to the sectoral BAU level are compared to the emissions calculated within one sector only under BAU. Thus, the shares of reductions compared to sectoral BAU level will always be higher than total BAU.

8. While Indonesia maintains tight restrictions on overseas borrowing for banks, corporate external debt has actually doubled between 2009 and 2014.
9. Particularly, investments in infrastructure would be necessary to increase GDP growth (BAPPENAS 2010b; World Bank 2012b).
10. Of the rural credit banks 154 are Islamic banks. Rural banks play an important role in Indonesia and provide mainly at the village level deposit and credit services to a large number of individual clients with small financial resources. Rural banks are usually owned by the regional government. Banking services are also provided by approximately 13,000 cooperatives which are supervised by the Ministry of Cooperatives and SMEs.
11. There are several reasons why access to finance is limited for SMEs. First, banks' transaction costs are relatively higher for SME lending than for lending to large enterprises, since the size of the loan is generally smaller. Second, collateral is often insufficient to meet banks' requirements. And third, bank credits require too high administrative efforts for short-term financing needs of enterprises. Due to the fact that SMEs often need quick financial support, they tend to use informal sources with high interest rates. Further reasons for turning down applications are poor credit history of the enterprise or business plan and insufficient sales, revenues or cash flow (Machmud and Huda 2011). Since the beginning of 2013 a new banking regulation attempts to overcome the financing shortcomings for SMEs. Indonesian banks are required to give 20% of total loans to SMEs. Besides the obvious positive effects for SMEs, the regulation challenges banks' capacities. Especially big and international banks that focus on large companies so far lack the capacity to give out a high number of very small loans. Furthermore, there is the concern that this regulation could increase banks' general credit risks.

4 Empirical Analysis of Supply of and Demand for Green Finance in Indonesia

1. The Indonesian banking sector is dominated by ten commercial banks that hold together 64% of all assets. Four of these are state owned: Bank Negara Indonesia (BNI), Bank Rakyat Indonesia (BRI), Bank Tabungan Negara (BTN) and Bank Mandiri. Together they hold 36% of all earning assets in the commercial bank industry (GFA 2011). Among the privately-owned banks, the most important banks are the foreign exchange banks that together hold 38% of all earning assets. The largest ten banks are the important players in the banking system and largely determine the system's operational performance (GFA 2011).
2. The Indonesian financial supervisory system is currently undergoing transformation. In December 2012, OJK was established in order to supervise banks, stock brokerage companies as well as financing and insurance companies. Before the establishment of OJK, Bank Indonesia was responsible to supervise the banking sector while the MoF was in charge of supervising capital markets and insurance firms. These sectors are now all under the supervision of OJK.

3. The online-questionnaire took companies on average between 10 and 20 minutes to complete.
4. Among the eight companies was three small companies (50–500 Mn), two medium-sized companies (50–100 Bn.) and three large companies (>100 Bn).

5 Policy Recommendations

1. For this scheme, Banque du Liban has introduced a differentiated reserve requirements policy for green credit under which reserve requirements of commercial banks are lowered by an amount of 100–150% of the loan value if the bank's customer can provide a certificate from the LCEC which confirms the energy savings potential of the financed project.
2. This approach would follow on Bank Indonesia's requirement that banks extend at least 20% of their credit to SMEs.
3. Cf. Presidential Regulation of the Republic of Indonesia No.61 on the RAN-GRK.
4. For further information on the NCS, see: http://skn.dnpi.go.id/en/
5. For GF, this should include investment that reduce air or water pollution.
6. For a case study on sustainability standards and certification in the Indonesian palm oil sector see Brandi et al. (2012).
7. For a comprehensive discussion of emission reduction options in different sectors see Chapter 3 on "Technological and economic potential of mitigation options" of IPCC (2001a).
8. Cf. http://firstforsustainability.org/sustainable-banking-network/. The SBN was formally launched in September 2012 and is facilitated by the International Finance Corporation.
9. An example in this regard is the collaboration between the Ministry of Energy and Danida, the Danish development agency, for offering energy audits for free.

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