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Instruments to incentivize private climate finance for developing countries



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Abstract: Multiple financial instruments are available to de-risk or reduce costs related to climate mitigation measures and projects in developing countries. The financial instruments can be divided into the categories: revenue support, credit enhancement, direct investments, and insurance. More of these instruments are suited for de-risking than for cost reduction, and especially for reducing market and commercial risks. In terms of cost reduction, the majority of instruments affect transaction costs or the rate of return. Not all financial instruments are suited for all situations. Assessing financial instruments with the help of leverage ratio (amount of private finance raised per unit of public finance spent), scaling-up potential, and reliability, we find that the most suitable or promising instruments are significantly dependent on the context, foremost the 'climate' for investments in a country and the sectors invested in. The suitability of financial instruments is guided by the mandate of the agency extending climate finance, the specific goals pursued, and the barriers faced when trying to fulfill these goals. The case studies show that financial instruments often are used in combination to make a transaction possible. We present a procedure for assessing climate finance instruments, consisting of evaluation of barriers that have been observed in specific cases and possible solutions that should be considered, as well as some further checkpoints. This procedure should be helpful for public agencies responsible for designing support, financing schemes and climate-related projects for developing countries.

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Instruments to incentivize private climate finance for developing countries

Foreword

Climate finance will play a pivotal role in the implementation of the Paris Agreement, which is to enter into force in 2020. The Paris Agreement was adopted at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties (COP 21) in December 2015. Developed country parties have agreed on mobilizing at least 100 billion USD annually for climate actions (mitigation of emissions, and adaptation) in developing countries from 2020. However, the need for climate finance for a climate-friendly and more climate resilient society is much larger. Part of this finance can be public, but private finance also has a key role to play.

This study has been carried out in the period December 2014 to November 2016 on assignment from the Norwegian Ministry of Foreign Affairs. The aim of the study is to explore a wide portfolio of financial instruments suitable for climate finance from industrialized countries to developing countries, emphasizing appropriate tools to incentivize and de-risk private finance under different sector and country contexts. The assessment of financial instruments is based on a literature review and a number of case studies.

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Executive summary

Multiple financial instruments are available to de-risk or reduce costs related to climate mitigation measures and projects in developing countries. The financial instruments can be divided into the categories: revenue support, credit enhancement, direct investments, and insurance. More of these instruments are suited for de-risking than for cost reduction, and especially for reducing market and commercial risks. In terms of cost reduction, the majority of instruments affect transaction costs or the rate of return. Not all financial instruments are suited for all situations. Assessing financial instruments with the help of leverage ratio (amount of private finance raised per unit of public finance spent), scaling-up potential, and reliability, we find that the most suitable or promising instruments are significantly dependent on the context, foremost the 'climate' for investments in a country and the sectors invested in. The suitability of financial instruments is guided by the mandate of the agency extending climate finance, the specific goals pursued, and the barriers faced when trying to fulfill these goals. The case studies show that financial instruments often are used in combination to make a transaction possible. We present a procedure for assessing climate finance instruments, consisting of evaluation of barriers that have been observed in specific cases and possible solutions that should be considered, as well as some further checkpoints. This procedure should be helpful for public agencies responsible for designing support, financing schemes and climate-related projects for developing countries.

Summary for policymakers

There is a huge gap between required and implemented policies and measures to meet the climate policy target in the Paris Agreement, adopted December 2015. Climate finance, defined as funding of projects to mitigate greenhouse gas emissions, enhance resilience to future climate impacts, or adapt to climate change impacts, is a vital component of the required climate policy framework to meet the climate policy ambitions. The annual 100 billion USD target for climate mitigation and adaptation in developing countries by 2020 is a first marker of climate finance for developing countries, but the estimated need to de-carbonize economies and build climate-resilient infrastructure is much higher. According to New Climate Economy (2014), USD 6 trillion in infrastructure investments is required annually in the period 2015 – 2030 to limit human-induced warming to 2 °C by year 2100. Government funding will be insufficient, so a sizeable share has to come from private sources. This raises the issue of how the private sector can be mobilized to provide a sizeable share of climate funding.

Instruments to mobilize and incentivize private climate finance can be divided into cost reducing and risk reducing instruments. The main cost categories relate to rate of return, transaction, and information. The main risk categories are market risks, political risks, technology risks, and outcome risks. Investors would seek to increase expected return, through reducing risk and cost components, and increasing earnings. Some investment strategies may reduce both risk and cost.

This report develops a procedure for identifying the most suitable and applicable financial instruments for supporting climate projects in developing countries, and in particular mobilizing private finance, contingent on sectors and national circumstances.

Review of financial instruments

A number of financial instruments are available to public entities to extend climate finance to developing countries, and particularly for mobilizing private climate finance, either by reducing risk or costs associated with specific investments. These instruments can contribute to mobilizing financial flows from private investors to support climate action in developing countries (and emerging economies), by lowering the threshold needed to attract private investors.

Five main groups of financial instruments are available to public entities for de-risking and reducing cost associated with investments, see Figure S1. We present a number of examples of

applications of these instruments in the context of industrialized country support to climate-related projects in developing countries.

Figure S1. List of instruments available to public entities for de-risking and reducing cost, for mobilizing private finance for climate change mitigation in developing countries

<p>Revenue support policy Feed-in tariff Feed-in premium Tradable green certificate Tendering process</p>	<p>Direct investments Concessional loan Dedicated private-equity funds Equity investment of Development Banks Grant Public-private partnerships</p>	<p>Credit enhancement Export credit guarantee Interest rate subsidy Loan guarantee Partial credit guarantee Securitization</p>
<p>Insurance First-loss insurance Public political risk insurance/guarantee</p>		<p>Other Debt-for-climate swaps Green bonds</p>

Assessing financial instruments

An important issue when exploring financial instruments is the appropriateness of the various instruments to de-risking and reducing the cost of private climate finance. Additional elements to the discussion are leverage ratio, scaling-up potential, and reliability. Some other challenges and issues are also associated with the use of these instruments.

The financial instruments presented have been created to de-risk and/or reduce costs associated with for example, private climate finance. De-risking refers to reducing the perceived risk of an investment, whereas cost reducing financial instruments directly lower the cost of a project. Both de-risking and cost-reduction ultimately result in making a project attractive to a wider range of investors.

Drawing on the literature, we select the following criteria for assessing financial instruments for climate projects in developing countries:

- Leverage ratio
- Scaling-up potential
- Reliability

The focus is thus on the instruments' ability to raise private money in a developing country context and the wider scaling-up potential, not on the 'output' of climate finance. 'Output' refers to the actual impacts of the investments and projects in terms of reduced emissions of greenhouse gases, improved resilience to climate change, and reduced damages from climate change due to adaptation measures. No commonly accepted methodological standard for an 'output' exercise exists. In this study, we limit our attention to input measures, since a study of results and impacts of investments would require different analytical methods and add substantial amounts of complexity.

The leverage ratio refers to the amount of private finance raised per unit of public finance spent. This involves estimating the value of different public instruments applied, and making an estimate on the level of private finance mobilized via the financial instrument, before linking the public and private figures to estimate the leverage ratio. (The related concept ‘co-finance’ is used sometimes, implying a weaker causal link between private and public finance than for leverage). The scaling-up potential of a public instrument is based on the present use of the instrument as compared to the potential maximum, but realistic use of the instrument. Since standard methodologies for assessing the potential maximum use of an instrument are less developed, our assessment will be more subjective than for the leverage ratio. Reliability refers to an instrument’s ability to induce private climate finance within a certain range. In terms of leverage ratio, an interpretation of high reliability could be a leverage ratio for an instrument in the range of 4 to 5 (narrow range), whereas a low reliability could be a leverage ratio of 2 to 7 (wide range).

Table S1. Additional criteria to assess the suitability of various financial instruments. N/A - Not Available.

Category	Name	Leverage ratio	Scaling-up	Reliability
Revenue support policy	Feed-in tariff	5	High	Medium
	Feed-in premium	< 5	High	Medium
	Tradable green certificates	N/A	Low	N/A
	Tendering process	N/A	High	N/A
Credit enhancement	Export credit guarantee	6 -10	Uncertain	Medium
	Interest rate subsidy	5 - 12	High	Low
	Loan guarantee	6 - 10	Uncertain	Medium
	Partial credit guarantee	6 - 10	Uncertain	Medium
	Securitization	2.3	High	Low
Direct investments	Concessional loan	0.04 - 0.4	High	High
	Equity investment	1.7 - 33	High	Low
	Grant	0 and above	High	High
	Public-private partnerships	> 0 – 33	High	Low
Insurance	First-loss insurance	5	High	Low
	Public political risk insurance/guarantee	10 and above	High	Low
Debt-for-climate swaps		N/A	Low	N/A
Green bonds		N/A	High	Low

Table S1 summarizes the estimated leverage ratios, the scaling-up potential, and the reliability of the leverage ratio estimate based on the cases and applications of financial instruments contained in this report. Given a number of uncertain factors, the estimates provided in Table S1 should be treated with care.

A procedure to identify most promising financial instruments

More of the financial instruments are suited for de-risking than for cost reduction, and especially for reducing market and commercial risks. Choice of instruments must furthermore be in coherence with economic, energy, and climate strategies in the developing country where climate-related investments are planned. The case studies in this report show that financial instruments often are combined to make a transaction possible.

Based on a number of case studies, Table S2 summarizes the most important risk factors and barriers associated with specific country and sector cases analyzed in this report, and lists the instruments and measures sought to overcome these barriers.

Table S2. Barriers and risk factors for greenhouse gas reduction and adaptation to climate change, and instruments used, based on cases explored.

Barriers and risk factors	Cases	Instruments
Low power grid capacity	South Africa. Uganda	Interest rate subsidy. Technical support.
Insufficient investments in infrastructure.	Uganda, Get-FiT	Technical assistance facility. Partial risk guarantee facility. Premium payment mechanism. Concessional loans. Equity. Public-private partnership.
Lacking legal standardization	Uganda, Get-FiT	Support to standardize legal documents (technical support).
Lacking drought insurance	Malawi	Micro-insurance. Risk pooling and risk transfer.
Lack of incentives for forest protection	REDD+	Concessional loans. Green bonds. Equity.
Lacking farmer skills	Strategy for food security	Technical assistance. Public-private partnerships.
High political risk. High commercial risk	GEEREF	Regional sub-funds. Technical assistance facility. Public-private partnership.
Risk of non-payment for exports	Export Credit Norway	Long-term loans, with low interest. Export credit guarantees.

Additional checkpoints

We advise examining the additional checkpoints in Box S1 when planning support for new climate finance projects in developing countries.

Box S1. Additional checkpoints

Reviewing context:

- Consider what has been done in the country in question and why this is insufficient.
- Consider if there are specific barriers to private engagement in this country/sector context.
- Assess coherence with national economic, energy and climate strategies and plans in the relevant developing country.
- What is the role of the developing country government in creating and enabling a suitable policy environment?
- If any other public actor from developed countries is involved, what are links and inter-dependencies between these actors?

Other considerations:

- What is known about leverage factor, scalability, and reliability of the financial instruments under consideration?
- What level of uncertainty is attached to data and assessments done?
- Address any other important concerns attached to the specific bilateral or multilateral climate finance case (e.g. Climate Investment Fund) at hand, the entity sourcing the money, and the developing country and sector case.
- Are there particular opportunities tied to a specific developing country? For example, are conditions ripe for debt-for-climate swaps or green bonds?
- Carefully assess second order effects such as rebound effect, potential moral hazard and competition distortion, associated with the proposed plan/measure.

We emphasize the importance of country and sector context when considering the most applicable financial instruments in a new climate finance case in a developing country. It is very challenging to identify the most promising financial instruments with a wider applicability - that is beyond specific cases. Nevertheless, in this report we present a procedure for assessing climate finance instruments, building on barriers that have been observed in specific cases, and possible

solutions that should be considered, as well as further checkpoints. This procedure should be helpful for public agencies responsible for designing support and financing schemes for climate-related projects in developing countries.

1 Introduction

There is a huge gap between required and implemented policies and measures to meet the climate policy target in the Paris Agreement, adopted in Paris December 12, 2015, at the 21st Conference of the Parties (COP). The target is to keep global warming well below 2 °C by end of this century, and pursuing efforts to limit warming to 1.5 °C. The biggest failure in climate policy so far is insufficient price on emissions of carbon dioxide and other greenhouse gases (GHG), to induce firms and households to make the right choices with regard to activities affecting climate, and existing taxing and emission trading systems having a limited scope with regard to geographical and sector coverage. Climate finance, defined as funding of projects to mitigate greenhouse gas emissions or to enhance resilience to future climate impacts, is one important component of a broader climate policy framework. Climate finance can be motivated as an alternative to carbon pricing (a ‘second best’ policy), in the absence of sufficient pricing of GHG emissions. A second motivation for climate finance – from industrialized to developing countries – is to support climate-friendly development in developing countries. Industrialized countries should support investments in improved resilience and adaptation to climate change in developing countries for fairness reasons, which is in terms of responsibility for most emissions, capacity to act, same right to access global commons, and larger vulnerability to climate change impacts in developing countries (Ringius et al. 2002). An additional argument for industrialized countries supporting developing countries is the opportunity for cost savings, doing part of needed emission mitigation in developing countries rather than in industrialized countries, since emission reductions can be de-coupled from who is paying.

OECD (2015a) estimates that so far about 60 % of the promised 100 billion USD annually for climate mitigation and adaptation in developing countries by 2020 has been realized by industrialized countries.¹ The Paris Agreement, in article 9, states that industrialized countries

¹ There is yet no agreement on the definition of climate finance in relation to meeting the 100 billion USD target. As an illustration, India has expressed little confidence in the methods and estimates applied

shall provide financial resources to assist developing country parties with respect to mitigation of emissions and adaptation, and that such mobilization of climate finance should represent a progression beyond previous efforts. Government funding will likely increase, but a sizeable share will have to come from private sources. The 100 billion USD target is a first marker of climate finance for developing countries since the estimated need to de-carbonize economies and build climate-resilient infrastructure in order to meet the 1.5 - 2 °C warming target by end of this century is much higher.² According to New Climate Economy (2014), USD 6 trillion in infrastructure investments is required annually in the period 2015 – 2030 to meet the 2 °C warming target. This raises the issue of how the private sector can be mobilized to provide a sizeable share of climate funding, not the least for developing countries. For each emission mitigation or adaptation technology, and geographical case, there are certain challenges and barriers to overcome to generate sufficient interest among private investors to finance climate solutions. Many of the concerns for private investors are linked to return and risk. A number of financial instruments have been developed to target these barriers.

Instruments to mobilize and incentivize private climate finance can be divided into *cost reducing* and *risk reducing* instruments. The main cost categories relate to rate of return, transaction, and information (see Table 1 and section 1.2). The main risk categories are market risks, political risks, technology risks, and outcome risks (see Table 1 and section 1.3). Investors would seek to increase expected return, through reducing risk and cost components, and increasing earnings. There may be some tradeoff between risk and return, but some investment strategies may reduce both risk and cost. This report explores instruments to incentivize private climate finance – foremost climate finance directed to developing countries, identifies criteria to assess the efficiency of these instruments, as well as investigating appropriateness based on a selection of cases studies.³ The literature on this topic is limited, but interesting contributions are Jachnik

in the OECD (2015a) report, stating that a realistic estimate is only around 2 billion USD, implying that only government grants are legitimate.

² The Paris Agreement, adopted 12 December 2015, in Article 9.3 states that “As part of a global effort, developed country Parties should continue to take the lead in mobilizing climate finance from a wide variety of sources, instruments, and channels, noting the significant role of public funds, through a variety of actions, including supporting country-driven strategies, and taking into account the needs and priorities of developing country Parties. Such mobilization of climate finance should represent a progression beyond previous efforts”.

³ Some studies differentiate between instruments and tools related to climate finance. Green bonds and equities are examples of instruments. These instruments are tradable assets. Tools, however, are used to reduce costs or mitigate risks, such as a loan guarantee and first-loss insurance to reduce risk. In this study, the distinction between instruments and tools is not essential, so we use only the word instrument.

et al. (2015), CPI (2015), Frisari et al. (2013), Micale et al. (2013), Brown and Jacobs (2011), and Brown et al. (2011).

Table 1. Cost and risk categories associated with private climate finance.

Reducing costs/Cost categories			Reducing risks/Risk categories			
Rate of return	Transaction costs	Information costs	Market risks	Political risks	Technological risks	Outcome risks

This study is undertaken to move the literature on climate finance forward through a comprehensive exploration of financial instruments applied to climate-related projects, with an emphasis on experience gained in a broad selection of case studies, representing a wide variety of instruments, developing countries, and sectors.

From the perspective of a government having a target of supporting a certain level of climate finance for developing countries, important issues become selecting the public institutions to be involved, what developing countries to engage with, what instruments to rely on, and what type of climate mitigation or adaptation projects to support.⁴

In a broader perspective, climate finance can be divided into two phases, where the first focuses on input measures, which is sourcing of money for climate purposes in developing countries. The second phase is about output, which is the actual impacts of the investments and funded projects in terms of reduced emissions of greenhouse gases, improved resilience to climate change, and reduced damages from climate change due to adaptation measures. No commonly accepted methodological standard for an ‘output’ exercise exists. Our study focus on the instruments’ ability to raise private money in a developing country context and the wider scaling-up potential, not on the ‘output’ of climate finance. A study of results and impacts of investments would require different analytical methods and add substantial amounts of complexity.

The aim of this study is therefore to develop a procedure for identifying the most suitable and applicable financial instruments for supporting climate projects in developing countries, and in particular mobilizing private finance, contingent on sectors invested in and national circumstances.

⁴ In a project funded by the Norwegian Ministry of Climate and Environment (KLD), we analyze Norwegian climate finance for developing countries with a focus on money streams, particularly private climate finance facilitated by government measures; refer to Torvanger et al. (2015).

1.1 Type of investors

An overview of financial actors, sources and instruments is provided in Figure 1 (from Francke Lund et al. 2015), which we take as a starting point for this report.

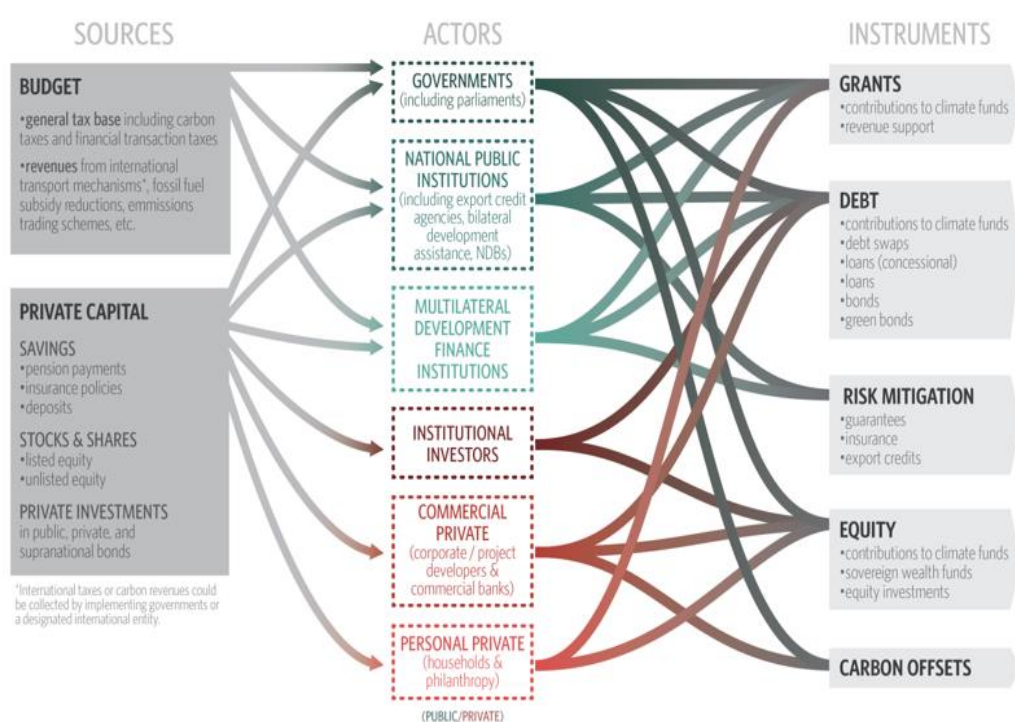


Figure 1. The figure illustrates the principal sources of climate finance to the left (public budgets and the instruments used to raise public revenues; and private capital made up of savings, equity, and investments into debt instruments). The mid-column highlights key actors whose decisions determine climate finance flows. The right column illustrates the main instruments that act as vehicles for climate finance to flow to end uses and developing countries. Source: Francke Lund et al. (2015).

The relevant public entities for this report are introduced below, as well as their activities related to climate finance and their contribution to climate finance. The contribution by the different entities are extracted from Buchner et al. (2015), refer to Table 2.

National Development Financial Institutions (DFIs) are the largest contributors to climate finance with an estimated USD 66 billion in 2014. A government creates a National DFI for the purpose of economic development in the country (e.g. Chinese Development Bank).

Multilateral DFIs are the second largest contributors with an estimated USD 47 billion. These institutions are set up by a group of countries with the aim of making financing and professional advice available for development (e.g. World Bank, International Finance Corporation, Nordic Development Fund). Bilateral DFIs also made a significant contribution to climate finance with an estimated USD 17 billion in 2014. These institutions are set up by a single country to finance projects in developing countries (Norfund is one example from Norway).

The next group of public entities includes direct public contributions from government agencies and ministries including official development assistance programs. This group contributed USD 15 billion in climate finance in 2014.⁵ In the case of Norway, Torvanger et al. (2015) estimated climate finance flows to developing countries in 2014, amounting to about 1 billion USD, where 578 million USD was allocated bilaterally, and 441 million USD through multilateral channels, refer to Table 3.

Finally, multilateral (including funds under the UNFCCC) and national climate funds (e.g. Global Energy Efficiency and Renewable Energy Fund - GEEREF) contributed an estimated USD 2.2 billion in 2013.⁶

In this study, we focus the attention on bilateral and government agency sourcing of climate finance for developing countries, since multilateral sourcing of climate finance is more complex and less transparent.

Table 2. Public actors and their contributions in 2014. Source: Buchner et al. (2015).

Type of public entity	Approximate climate finance contribution
National Development Financial Institutions	USD 66 billion
Multilateral Development Financial Institutions	USD 47 billion
Bilateral Development Financial Institutions	USD 17 billion
Government agencies	USD 15 billion
Climate funds	USD 2 billion

⁵ Sovereign investment funds is another category of investors, like Norges Bank Investment Management (NBIM), managing the Norwegian pension fund. NBIM has limited focus on climate-related investments, and on developing countries, so we have not included this fund in the study.

⁶ Export Credit Agencies (ECAs) is a sixth category. ECAs offer medium and long-term credit insurance or guarantees. According to the UNDP (2011), ECAs are considered public funds as they may act as direct lenders on behalf of governments. They currently underwrite USD 55 billion in developing countries.

Table 3. Norwegian climate-related flows to developing countries, 2014. Source: Torvanger et al. (2015).

Type of public entity	Climate finance contribution
Ministry of Foreign Affairs, Embassies	USD 360 million
Norad (Official Development Assistance; ODA)	USD 330 million
Ministry of Foreign Affairs, Oslo	USD 114 million
Ministry of climate and environment	USD 110 million
Norfund	USD 102 million

Private investors play a role in climate finance for developing countries, but so far quite limited. However, as noted earlier, more private finance will be decisive to fill the gap between the estimated need for climate finance and the supply through public sources. Estimating private climate finance is not straightforward due to insufficient reporting and data, and technical difficulties. Different estimation approaches exist. According to Jachnik et al. (2015), estimation of mobilized private climate finance raises a number of methodological issues, first related to estimation of public finance and private finance, and then to the relation between public and private finance. Important issues are choice and conversion of currency, choice of point of measurement, value of different public interventions, and definition of boundaries of and accounting for total private finance. Measurement can be at approval, commitment or disbursement points. The valuation of different public interventions depend on risk-return profile, level of funding provided, and some instruments being dependent on trigger events or project performance. Definition of boundaries for accounting private finance should be considered at instrument level. Public investment in equity funds is relatively straightforward. For public guarantees linked to private finance three alternatives for accounting are: a) Only the portion of finance guaranteed; b) The full value of the private instrument guaranteed; or c) All private finance involved in the investment (Jachnik et al. 2015, p. 30-31).⁷

⁷ OECD is working on “monitoring resource mobilization” (methodologies for capturing finance and private resources leveraged by official intervention), called “the Total Official Support for Sustainable Development (TOSSD) measurement framework”.

1.2 Types of costs affecting return

Investors active in developing countries are exposed to a number of factors that affect the cost and return to their investments (Fiestas and Sinha 2011). The main cost categories affecting return to investments are:⁸

1. Costs affecting rate of return.
2. Transaction costs.
3. Information costs.

Examples of factors under category 1 are the interest rate on the finance provided (either interest rate on borrowing, or the return on best alternative investment), price of commodity or service sold, quantitative regulation of market to stimulate demand (e.g. tradable green certificates for renewable energy), taxation, and more generally labor cost, energy cost, and cost of property and infrastructure. Given that there are more challenges linked to quality of information, less transparency, and more uncertainty attached to political, institutional and social conditions in many developing countries than in most industrialized countries, transaction and information costs are likely to be higher for projects in developing countries.⁹

1.3 Types of risk

Investors face a wide array of risks. These risks can be grouped into four distinct categories (Frisari et al. 2013; Micale et al. 2013):

1. Political, policy, social risks.
2. Technical, physical risks.
3. Market, commercial risks.

Political, policy and social risks broadly cover all risks related to legitimate¹⁰ and illegitimate actions by authorities and citizens (e.g. corruption), as well as instability and societal resistance.

Technical and physical risks are associated with the physical characteristics of the assets and to the risks over the lifetime of the project from construction to decommissioning (e.g. power production risk for intermittent renewable energy sources such as wind).

⁸ More generally, the overall ‘climate’ for investments determines how attractive business engagement in a developing country is. OECD’s PFIs (Policy Framework for Investment) is a well-established tool for assessing the countries’ investment and business climates, as well as opportunities for designing reforms.

⁹ Some degree of corruption is more or less common in a number of countries. Spending resources to minimize the risk of corruption can be interpreted as either a type of information cost or transaction cost.

¹⁰ E.g. change in policy instruments, termination of instrument use, and reduced competence and capacity of authorities.

Market and commercial risks relate to the economic dimension of a project. Such risks are typically associated with the cost and availability of financial resources and the economic value of inputs and outputs (e.g. currency risks and market risks).

The last category of risks, namely outcome risks, pertains to risks that publicly supported projects fail to meet announced objectives, for instance emission reductions. Budget impact risk, or in other words the possibility that the initial cost assessment turns out too low such that the public commitment has to increase (e.g. with a feed-in tariff scheme), is a first type of outcome risk. A second type of outcome risk, co-impact risks, implies the possible failure of a government to deliver on the creation of, e.g. green jobs or energy security.

Among these, technical and physical risks are the categories most readily addressed by private actors (Frisari et al. 2013). Technical and physical risks are outside of the scope of this report.

1.4 The role of context

Most developing countries have expressed concerns about the difficulties they face in embracing green growth owing to the lack of technical capacity. Consequently, measures need to be undertaken such that the developing partner country is able to advance their technical capacity. Increased capacity will ensure that green growth policies will be effectively implemented, managed and ultimately be able to attain their desired objectives. Lacking institutions and capacity refer to the ability to perform functions, solve problems and achieve objectives, and this can be difficult to address in developing countries.

1.5 Structure of report

In section 2 we review a range of cost reducing and de-risking instruments based on literature and examination of actual cases, before classifying these interventions into suitable categories. Next, in section 3, we discuss cost reduction and de-risking features of the instruments; propose criteria for assessing performance, before summarizing performance on these criteria. In section 4, we analyze a selection of case studies in order to improve our understanding of the most promising instruments and related conditions for success. Finally, in section 5, we summarize findings in the form of a procedure for identifying suitable and applicable finance instruments for supporting climate related projects in developing countries.

2 A review of financial instruments for cost reduction and risk mitigation

A number of financial instruments are available to public entities to extend climate finance to developing countries, and particularly for mobilizing private climate finance, either by reducing risk or costs associated with specific investments. These financial instruments can contribute to mobilizing financial flows from private investors to support climate action in developing countries and emerging economies, by lowering the threshold needed to attract private investors.

Four main groups of financial instruments are available to public entities for de-risking and reducing cost associated with investments. A first category of financial instruments pertains to revenue support policies. These policies typically reduce output risks, which is a type of commercial risk. Credit enhancement is a second category of financial instruments available for improving the debt or credit worthiness of climate action in developing countries (and emerging economies). Credit enhancement instruments typically lead to better terms for an outstanding debt, higher credit ratings, lower borrowing costs, new sources of financing, and/or allow for longer tenors. The third category of financial instruments used by public entities to facilitate climate finance in developing countries is direct investments, whereas the final category includes insurance.¹¹

¹¹ Public intervention can either be ‘tied’, meaning that it can only be used towards a specific purpose, or ‘un-tied’, meaning that it can be applied to a range of measures. Generally, public interventions such as direct investments will influence the relative competitiveness of businesses in the afflicted markets, which may induce a loss in efficiency that overall benefits must cover, foremost mitigation of GHG emissions and preparedness for impacts from climate change (refer to section 4.3 for an example from South Africa).

The list of instruments in Figure 2 is based on Bird et al. (2013), Brown et al. (2011), Buchner et al. (2012), Chaum et al. (2011), Ellis et al. (2013), Frisari et al. (2013), IFC (2013), IFC (2011), Kato et al. (2014), Micale et al. (2013), OECD (2015b), Pauw (2014), and Trabacchi and Stadelmann (2013). The division of instruments in categories is primarily based on Frisari et al. (2013).

<p>Revenue support policy Feed-in tariff Feed-in premium Tradable green certificate Tendering process</p>	<p>Direct investments Concessional loan Dedicated private-equity funds Equity investment of Development Banks Grant Public-private partnerships</p>	<p>Credit enhancement Export credit guarantee Interest rate subsidy Loan guarantee Partial credit guarantee Securitization</p>
<p>Insurance First-loss insurance Public political risk insurance/guarantee</p>		<p>Other Debt-for-climate swaps Green bonds</p>

Figure 2. List of instruments available to public entities for de-risking and cost reduction for mobilizing private finance for climate change mitigation in developing countries.

Based on these listings and the literature, we develop instrument categories in the following, which are well situated in standard financial instruments as well as reflecting climate finance. The boxes included provide examples of actors using these instruments and of projects that have been facilitated via these instruments.

In this section, we describe the financial instruments at a general level. Examples are provided to facilitate the comprehension on when and why the instruments have been used. Whenever possible, instruments are selected in a way that reflects Norway’s involvement in developing countries or are connected to a country Norway has strong relationship with. In some cases, we deviate from this rule to underline particular elements of interest. The quality of the examples vary dependent on how much information is publicly available.

2.1 Revenue support policies

A first category of financial instruments pertains to revenue support policies. These policies typically reduce output risks (Narbel et al. 2014). Public entities in industrialized countries can facilitate the implementation of revenue support policies such as feed-in tariffs, feed-in premiums, tradable green certificate mechanisms, and tendering processes in developing countries.

Feed-in tariff

A feed-in tariff is a long-term contract to renewable energy producers, guaranteeing a fixed price per unit of electricity generated over a pre-defined duration of time. The main benefit of a feed-in tariff is to eliminate market risks. The price usually differs per technology such as to take into account the different costs of generating power. The cost of the instrument is generally recovered via a premium on the price of electricity paid by end customers.

Box 1. Renewable Energy Feed-in-Tariff – Kenya (Nganga et al. 2013).

In 2011, it was estimated that the electrification rate in Kenya had doubled in eight years. However, the new connections mostly occurred in urban areas rather than rural areas, which constitute 67 % of the population. The production of electricity could not keep up with the demand. This was further exacerbated by resource constraints (water shortages in summer) as Kenya has an electricity mix that is dominated by hydropower (52 %).

A solution to address these barriers was found in a Renewable Energy Feed-in-Tariff (REFiT) program implemented in 2008 by the Ministry of Energy (MoE). Prior to this decision, pre-feasibility and feasibility studies identified that small hydro, wind and biomass were potential sources of energy. The major actors involved in the development of the policy were the MoE, Kenya Power, and the Kenya Electricity Company Limited. The three primary reasons for the development of the policy were to increase the uptake and production of renewable energy, promote smaller electricity projects, and facilitate the shift of power generation to the private sector. As of 2013, the private sector, both domestic and international, have collectively invested more than USD 2.8 billion in Kenya's renewable energy industry (Mungai 2014). As of March 2015, Independent Power Producers (IPPs) had 1.2 GW of wind projects online or in development, together with 272 MW of geothermal, 221 MW of solar and 28 MW of small hydro (Climate Scope 2015).

In 2010, the REFiT policy was revised, and biogas and solar photovoltaics were added as eligible technologies. Consequently, the policy is now attractive to small-scale hydropower, biomass, solar, and wind power projects, which has resulted in 60 approved projects. Mini-grids in rural areas have also been added, as these projects have been identified as key in enhancing rural area access to electricity. However, incentives are needed to support rural electrification owing to the fact that developers bear the costs and risks of implementing a certain technology. On the negative side, the REFiT policy has had negative consequences on the price of electricity for consumers in Kenya. However, if transaction and technology costs decrease, consumer prices may go down. Lastly, the REFiT program has also stimulated the local economy with the first manufacturer and supplier of solar modules in the East Africa operating in Kenya.

Feed-in tariffs are popular globally, including in developing countries, refer to the example in Box 1. These policy instruments have been very effective in facilitating the deployment of renewable energy provided that the feed-in tariff has been high enough. It has, however, been documented in numerous studies (e.g. Green and Yatchew 2012) that unrestricted and favorable feed-in tariffs put pressure on public finances as the cost of the policy often become higher than anticipated.

Feed-in premium

A feed-in premium is a policy instrument specific to renewable energy, guaranteeing a fixed premium in addition to the electricity price per unit of electricity generated over a pre-defined

period of time. Feed-in premiums can be differentiated according to technologies, size and location. Similarly to feed-in tariffs, the cost of the policy is generally borne by electricity consumers.

Tradable green certificates

A system based on tradable green certificates, also known as tradable renewable energy certificates or as an electricity certificate market, imposes a minimum share/quantity of electricity from renewable technologies onto electricity producers. As opposed to feed-in tariffs and feed-in premiums, tradable green certificates do not differentiate between technologies as all technologies compete in the same market. Producers can sell or trade certificates on a secondary market if their share of renewable electricity exceeds or is below the mandatory target. Thus the price of the certificates is market driven, and therefore also the support for renewables. As for other policy instruments, the system is paid for by end-users of electricity.

Few developing nations relied on this type of system by the end of 2015. Ghana, India, Vietnam and Nepal are examples of countries that have introduced some sort of green certificate mechanisms (REN21 2015). In these cases, additional climate finance could be mobilized by developed countries purchasing green certificates from developing countries in exchange for a higher renewable energy target. If finely tuned, such an intervention would not increase the burden on end consumers. Norway and Sweden started a joint electricity certificate market in 2012, with a common goal of increasing the renewable electricity production by 28.4 TWh by 2020, providing an example that collaboration between countries is also possible.

Tendering process

In a tendering process, public authorities decide on a quantity of renewable energy, or a specific technology, to be built. The price is set by a competitive mechanism for allocating financial support to renewable energy projects. The result of the tendering process can take various forms, such as a feed-in tariff, premium or investment grants.

Many developing countries rely on a tendering process to facilitate the deployment of renewable electricity technologies, including Indonesia, Morocco, Kenya, the Philippines, and South Africa (REN21 2014). The South African REFIT program has been facilitated by technical assistance funding from Denmark, Germany, Spain, and the UK (Eberhard et al. 2014). Another example is the reversed tendering procedure for solar energy in Uganda (see section 4.1.1 for more details).

2.2 Credit enhancement financial instruments

Credit enhancement instruments include export credit guarantee, interest rate subsidy, loan guarantee, partial credit guarantee, and securitization.

Export Credit Guarantee (ECG)

An export credit guarantee is a financial instrument provided by governmental agencies, generally an export promotion agency, to exporters, protecting these exporters against non-payment by the importer of shipped goods. Export credit guarantees thus allow exporters to keep their prices competitive since they are certain they will receive their payment. Export credit

guarantees are provided for a fee based on the value of the goods, the creditworthiness of the importer, and risk factors associated with the country.

Box 2. Export Credit Guarantee – Norwegian Export Credit Guarantee Agency (GIEK 2015)

Investors may be scared to invest in some countries if the risk perceived is deemed too high. This barrier is addressed by export credit agencies such as the Norwegian Export Credit Guarantee Agency (GIEK). GIEK has the mandate of promoting Norwegian export of goods, services and investments outside the country, as well as being a supplement to the private banking market. This mandate is fulfilled by providing guarantees and it is primarily commercial and political risks that are being addressed. In order to obtain a guarantee, projects must generate cash flows and investors need to show that they have access to equity. If up to 95 % of the investment for a period of 20 years can be guaranteed, the risk premium depends on the risk of the project and on its tenure. Guarantees for projects requiring long-tenure, located in countries with a significant political or commercial risk may thus be prohibitively expensive. Guarantees are therefore not suitable for all projects and other financial instruments may be more suitable. Yet, a guarantee can be the element that makes a transaction/investment financially attractive and thus mobilizes private climate finance.

GIEK's activities are divided between the offshore industry, maritime industry and other industries, which include renewable energy. In 2014, GIEK emitted 163 new guarantees totaling NOK 89.3 billion, of which 97 % were loan guarantees. Most of the guarantees (approximately 90 %) are directed towards the oil and gas, and shipping industries.

In 2013, Africa's largest solar power plant was opened in Kalkbult, South Africa. A major stake in the company belongs to Scatec Solar (55 %) and the KLP Norfund Investment (35 %), while South African companies including Black Economic Empowerment (BEE) investors hold the remaining 10 %. The Kalkbult plant is approximately 105 hectares large, has a capacity of 75 MW and will be able to provide 33 000 South African households with electricity. GIEK provided four guarantees linked to Scatec Solar deliveries. The guarantees ensured that Scatec Solar could secure a financial closure to the project without searching for additional equity. The use of ECG allowed Scatec Solar to ensure that they could avoid diluting interests in the venture to other international players. The ECG has also enabled the training of over 500 people in technical fields and project management.

Interest rate subsidy

A government provides an interest rate subsidy to lower borrowing costs by reducing the amount of each interest payment, temporarily or permanently. Interest rate subsidies thus make a project more affordable (Frisari et al. 2013). Box 3 provides an example from India.

Box 3. Solar loan program

In the 2000s, many Indian houses lacked access to a reliable electricity grid, and most households were not able to afford the high up-front cost of solar home systems without access to a loan. In an attempt to remedy the situation, the United Nations Environment Programme (UNEP) put in place a solar loan program in 2003, where the main financial instrument was an interest rate subsidy provided through two local banks. This instrument had the benefit of facilitating the deployment of solar home systems in India without disturbing competition. Under the solar loan program, banks would provide loans to customers at concessional rates of interests of 5 %, which is around 7 % below banks' prime lending rates at 12 %. Under the interest rate subsidy scheme, customers could decide which solar home systems from qualified vendors was best suited to their needs, and then contract a concessional loan from the two banks participating in the program (UNEP 2015). Under this program, UNEP and the Shell Foundation paid USD 900 000 in subsidy to nearly 20 000 households, which led to USD 6.7 million in private financing. This translates to a leverage ratio of 7.5. Such programs have proven to be scalable, and UNEP implemented similar programs in other countries.

UNEP estimated that other types of financial instruments would not have led to better terms on loans, since banks were not familiar with solar home systems at the time. Interest rate subsidies thus render projects more affordable and, at the same time, allow banks to keep loans in line with their commercial rates. In selecting the most appropriate financial instrument for facilitating access to solar home systems, UNEP carefully avoided disturbing a nascent solar rural electrification industry and therefore decided to collaborate with banks as opposed to other forms of assistance.

An interesting feature with the India interest rate subsidy scheme is that the results demonstrate that the barriers to bank engagement in clean energy had more to do with perception than underlying economics (UNEP 2015). This became apparent when banks not partaking in the program started to offer similar terms.

An interest rate subsidy is not necessarily the only solution to such a problem. For example, EnDev-Bangladesh provides buy down grants at 20-25 USD per solar home system since 2011, and is now introducing a results-based financing approach (subsidy). This shows that as markets and products evolve, different financial instruments can be implemented. This underpins the importance of context when selecting a financial instrument.

Loan guarantee

A loan guarantee implies that a public entity will step in to repay the outstanding balance of the debt if the company defaults on a loan related to a project. Loan guarantees are either direct (reimbursement of the debt) or counter-guarantees to indemnify intermediaries issuing guarantees to lending institutions (Frisari et al. 2013). Box 4 presents a loan guarantee example from China.

Box 4. China Utility-Based Energy Efficiency Finance Program

The China Utility-Based Energy Efficiency Finance Program (CHUEE) was set up to address ways to enable key players in China's economy to finance energy efficiency and renewable energy projects. More specifically, the program aimed at removing barriers to energy efficiency investments in China such as the lack of information, awareness and experience, and risk aversion amongst key actors. Chosen instruments included technical assistance to market players, a loan guarantee mechanism to get the private sector involved, outreach and dissemination (IEG World Bank 2010). The program went through several rounds of investments. The eagerness of local banks to participate is taken as an indication that the combination of instruments has contributed to remove real and perceived barriers to energy efficiency and renewable energy projects in China (Institute for Industrial Productivity 2012).

Partial guarantee

A partial credit guarantee partially shields investors from the risk of debt service default by private, government or public sector borrowers, irrespective of the cause for the default (Frisari et al. 2013). The guarantee can be drawn to meet debt service payments on the principal and/or interest up to the guarantee amount when the borrower fails to service the debt. DFIs typically provide these type of guarantees. A similar instrument is the partial 'risk' guarantee which shields investors from the risk of default for risks specified in the guarantee.

Box 5. Partial credit guarantee on a 12-year bond issued in South Africa

Rating is key in obtaining cheaper financing. In order to help the City of Johannesburg refinance its high-cost debt, as well as to extend the maturity of its debt and diversify its funding sources, the International Finance Corporation (IFC) provided a joint partial credit guarantee with the Development Bank of Southern Africa. The partial credit guarantee (40 % of the principal) increased the City's rating and allowed it to issue a USD 153 million 12-year bond in 2004.

Securitization

Securitization is a technique where an issuer pools financial assets into investment products, and markets the debt to third party investors. The debt is repaid from the cash flows generated by these assets. The inherent risk in the asset pool is split into several tranches (layers of risk) suitable to various types of investors.

Box 6. Green for Growth Fund

How to attract private investors and mobilize climate finance for Southeast Europe in order to foster nascent markets for energy efficiency and renewable energy was the challenge taken up by the Green for Growth Fund in 2009. Practically, it meant increasing demand for investments, create awareness around green energy both in the financial sector and the general population, and reduce the risk for private investors in countries with limited proven records and deeply affected by the global financial crisis (Green for Growth Fund 2016).

The chosen approach to address these barriers was a multi-tranche investment fund with a layered risk-return structure. By using securitization, the fund can target different group of investors and offer appropriate risk-return products, and thus achieve the goal of the fund. By the end of 2015, the Green for Growth Fund had committed funds for Euro 368 million, divided as Euro 28.7 million in notes, Euro 222.6 million in senior shares, Euro 26.4 million in mezzanine shares, and Euro 90 million in junior shares. (Mezzanine shares is a hybrid debt issue subordinated to another debt issue from the same issuer. Mezzanine debt has embedded equity instruments attached - warrants, which increase the value of the subordinated debt). 10 % of the total capacity of the fund was provided by private investors at year-end 2015. In case of default, senior shares will only suffer losses if junior shares and mezzanine shares are entirely depleted, thus providing senior share owners with added safety. Similarly, notes are depleted last. This structure makes notes and senior shares attractive to private investors, whilst mezzanine shares and junior shares are restricted to international financial institutions and public donors.

2.3 Direct investments

A third category of financial instruments used by public entities to facilitate climate finance in developing countries are direct investments such as concessional loans, dedicated private-equity funds, equity investments, and public-private partnerships.

Concessional loans

A concessional loan is a form of public grant used to provide more favorable terms than market loans. While the principal has to be repaid in full (Frisari et al. 2013), concessional loans include reduced interest rates, longer tenor and/or grace periods. Concessional loans are therefore a type of low-cost debt (Buchner et al. 2014). Many examples of concessional loans exist, such as the concessional loans SELCO Foundation (The Solar Electric Light Company, in India) arranges in collaboration with regional rural banks in India to allow poorer households to access sustainable energy services (SELCO 2016).

Box 7. Concessional loan to increase electricity access in Nepal and Climate Investment Funds (CIF)

The government of Norway in 2014 provided USD 60 million in co-financing to a USD 180 million concessional loan from the Asian Development Bank to Nepal in order to increase electricity access and help overcome power shortage in that country (Asian Development Bank 2014). The concessional loan comes with a 32 years repayment period, including a grace period of 8 years, and initial interest rate of 1 % per annum, which increases to 1.5 % per annum after the grace period.

Another example is the Climate Investment Fund (CIF), which target several purposes/barriers. The CIF facilitates the deployment and adoption of technologies for low carbon development and climate resilience, by providing large-scale funding to specific technologies. The CIF contributes to creating viable markets to ensure sustained transformation toward low carbon and climate resilient economies by targeting barriers inhibiting market development (lack of knowledge, high upfront costs, lack of access to financing). In addition, the CIF aims to strengthen institutions, policy and regulatory environments to achieve transformational change and influence behavioral change among stakeholders by setting program goals in the context of larger national goals (CIF 2016). The Climate Investment Fund was created in 2008 by 14 countries that had contributed with USD 8.3 billion by end 2015. Norway's contribution amounted to USD 270 million, or 3.3 % of the total value of the fund. Among other funds, the contribution is allocated through a USD 5.6 billion Clean Technology Fund, which provides middle-income countries with concessional resources, a USD 1.2 billion Pilot Program for Climate Resilience (grants and concessional financing), and a USD 780 million Scaling Up Renewable Energy in Low Income Countries Program (concessional financing). Concessional financing is the main instrument utilized by the CIF.

As of end 2015, USD 3.8 billion (out of the USD 5.6 billion) had been allocated to 76 projects (wind, transportation, solar, geothermal, smart grid, and energy efficiency) under the Clean Technology Fund. The amount of co-financing reached USD 46 billion, of which 39 % is provided by private actors (Clean Technology Fund 2015). The leverage ratio in terms of how much private capital is mobilized per unit of public funding is thus approximately 0.4.

Equity investment

Equity investment is a financial instrument where public institutions contribute with equity such as to enhance a project capital base and thus reduce potential investors' perceived risk. Investments are made with the aim of generating a positive return by offering market terms and sharing risks with co-investors.

Box 8. Lake Turkana Wind Project in Kenya.

Risk mitigation to encourage private investors to invest in renewable energy projects in developing countries can be achieved by providing equity. Equity investment is one of the financial instruments offered by the Norwegian Investment Fund for Developing Countries – Norfund (refer to Box 11 for more information about Norfund). As an example, Norfund is involved in the Lake Turkana 300 MW Wind Project in Kenya, and supported the development of the project for NOK 13.6 million before taking equity shares as the project matured. Ownership is shared between a consortium of six public and private investors.

Equity can also be provided via dedicated private equity funds that take shares in companies, with the expectation that private investors will match the investment (Frisari et al. 2013). The aim is to attract private investors who would normally avoid risky investments in developing countries.

Box 9. Global Energy Efficiency and Renewable Energy Fund (GEEREF).

To facilitate a project, public actors can invest directly into it. Yet, a fixed amount of funding can result in more projects per Euro invested if the public actor manages to attract co-financing from private actors. This is precisely the aim of the Global Energy Efficiency and Renewable Energy Fund (GEEREF), which leverages public sector contributions by catalyzing private sector investments into funds and projects.

GEEREF was launched in 2008, with funding from the European Union, Germany and Norway, totaling Euro 112 million. In addition, Euro 110 million were mobilized from private investors as part of the fund. The amount of private finance raised per unit of public finance spent (leverage ratio) at this level is approximately 1. The Euro 222 million are in turn invested in regional funds in Asia, Sub-Saharan Africa, and South and Central America, typically in the range of between Euro 10 to 15 million each, taking a 10-15 % equity share in each regional fund. These regional funds typically invest in projects with debt-to-equity ratios of 30/70 to 50/50. Considering that co-financing is mobilized at each level, the leverage ratio for GEEREF can be quite high depending on how it is calculated (confer Torvanger et al. 2015 for more information).

Grant

Grants are non-repayable cash transfers or in-kind support for a project (Buchner et al. 2014). Grants can pursue very diverse goals. For example, a capacity building grant targets information barrier reductions or technical assistance to projects in an attempt of minimizing the perceived risk by investors (Frisari et al. 2013). Other grants may target capital cost reductions for

mitigation and adaptation projects (Buchner et al. 2014), or be specific to feasibility studies or demonstration activities (Jachnik et al. 2015).

Grants are flexible financial instruments that can address different types of costs. For example, the Nordic Development Fund, in collaboration with the Asian Development Bank co-finances a special fund that shall be used to provide up-to-date information to support the formulation and implementation of effective climate-sensitive policies, therefore addressing information costs. Other grants will simply activate a project.

Box 10. The Nordic Development Fund (NDF)

Funding is often a barrier preventing climate measures. Grants is a financial instrument available to remove this barrier. The Nordic Development Fund (NDF) is a multilateral development finance institution established by Denmark, Finland, Iceland, Norway and Sweden, which focuses on climate change and development. In 2014, the four governments paid Euro 19.5 million in the Nordic Development Fund, of which Norway's contribution amounted to Euro 4.4 million. Support to low-income countries is provided via grant financing. In 2014, NDF approved grant financing for 14 projects for a total of Euro 38.9 million. Projects cover a variety of development, climate mitigation and climate adaptation measures such as renewable energy, climate resilient housing and resilient agriculture.

Most projects are co-financed with public partners. One example is the rural roads improvement project II in Cambodia, where 1,031 km of rural roads in nine provinces will be rehabilitated and made more climate-resilient. The project also includes other climate change adaptation measures. The cost of the project amounts to USD 157 million, which is funded by the Asian Development Bank (USD 54 million), the Government of Cambodia (USD 14.65 million), the Government of Australia (USD 6.67 million), the Government of Korea (USD 41 million), the French Agency for Development (USD 36 million), and NDF (USD 5.4 million).

Grants can, however, contribute to increasing the leverage ratio of other financial instruments. A feed-in tariff and a renewable purchase obligation have been put in place by the Government of India in order to facilitate the deployment of 20,000 MW of solar power by 2020. The technology, policy and commercial risks were, however, too high to mobilize private climate finance (Hervé-Mignucci 2013). To mitigate risks, the Asian Development Bank collaborated with commercial banks and offered partial credit guarantees for up to 50 % of a project's loan. USD 150 million were committed under this scheme, but was priced too high for investors. Eventually a USD 10 million grant from the International Climate Fund made the financial instrument attractive to private investors, by halving the cost of the guarantees.

Public-private partnerships

Public-private partnerships occur when a public agency enters a medium to long-term agreement with a private sector entity with the purpose of delivering a service, which

traditionally behooves the public sector. The contribution of the public partners can take different forms such as equity or loans.

Box 11. Norfund

A public-private partnership is an instrument available to reduce cost and mitigate risk such as to facilitate particular measures/actions. A public actor set up to enter public-private partnerships is Norfund, a Norwegian DFI, established by the Parliament in 1997. The objective is to contribute to sustainable commercial businesses in developing countries. The agency is a state-owned company with limited liability, owned by the Ministry of Foreign Affairs on behalf of the Norwegian government. Norfund provides equity, other risk capital, and loans to companies in selected countries and sectors where businesses lack access to sufficient capital. Norfund invests in clean energy, financial institutions and agribusiness, in addition to small and medium sized companies through investment funds. Thus, clean energy is the most climate-relevant sector for Norfund's operations. Renewable energy shall comprise more than 50 % of allocated capital. The main investment regions are Southern and Eastern Africa, but Norfund in addition invests in selected countries in South-East Asia and Central America. Projects with strong development effects are prioritized. The agency always invests jointly with Norwegian and non-Norwegian partners, to leverage additional capital that ensures the industrial and local knowledge needed for each investment. Norfund is thus set up to serve as an instrument for Public-Private Partnerships. All of Norfund's activities are in accordance with the core principles of Norway's ODA policy. At year-end 2014, Norfund had a portfolio of about USD 1.7 billion (NOK 12.8 billion).

Many enterprises and individuals in developing countries do not have access to basic financial services, such as bank accounts. Norfund seeks to contribute finance for small and medium-sized enterprises. The main Norwegian partners are Norad, Innovation Norway, Confederation of Norwegian Enterprises. International partners are European DFIs and IFC (World Bank private sector investment fund). Norfund also collaborates with Norwegian energy companies (SN Power Invest, TrønderEnergi, and BKK), and in the finance sector (Ferd, KLP, Storebrand, and DNB). Norfund operates between traditional development aid and strictly commercial market actors. It is not a traditional aid provider since funds are invested in, or lent to, commercial enterprises. However, Norfund accepts high risks and low returns, and invests in countries and sectors that are very challenging. Most private investors are hesitant to invest in poor countries due to high risk and limited knowledge. Norfund can reduce barriers for private engagement acting as a skilled and business-oriented intermediary. The agency prefers an equity approach, in addition to building a loan portfolio. Through equity investments, Norfund can catalyze capital from other investors, and facilitate extended loans from banks and other private investors against collateral. According to its mandate, Norfund shall be a minority owner with an ownership interest of less than 35 %. Through investing in cases of lacking capital and skills, Norfund considers its investments as additional to what would otherwise have taken place in the market.

2.4 Insurance

The fourth category of financial instruments available to public entities is insurance. This can take several forms such as first-loss insurance or public political risk insurance/guarantees.

First-loss insurance

A first-loss insurance is a financial instrument insuring capital should there be a financial loss on a security (Hervé-Mignucci et al. 2013). First-loss insurance is typically made available by multilateral development agencies and can be designed to target specific risks, e.g. first-loss dedicated insurance instruments to address policy risks (Buchner et al. 2012). Another type is a first-loss protection instrument that shields investors from a pre-determined amount of financial loss.

Box 12. First-loss portfolio guarantee for Bulgaria

The following example is not related to climate finance, though it is straightforward to imagine how it could apply to climate finance as well. The European Regional Development Fund put in place a first-loss portfolio guarantee system (i.e. first-loss insurance), which has been made available to Bulgaria for the period 2011-2015. The starting point for this program was a financial gap in the lending market, and that banks would typically ask for guarantees in excess of 100 % of the loan value. This, in addition to high interest rates, made loans unavailable to small and medium sized businesses.

Via its first-loss portfolio, up to 80 % of a loan is covered (European Commission and European Investment Bank 2015), thus allowing banks to grant loans to Small and Medium-sized Enterprises (SMEs). The European Regional Development Fund committed to the program with Euro 51 million, while the Government of Bulgaria contributed with Euro 9 million. Private financial intermediaries joined the program with another Euro 301 million. A significant amount of private finance has thus been mobilized.

In terms of outcome, 95 % of the amount available had been utilized by 3,990 SMEs by June 2014 and a total of 78,000 jobs have been created (European Commission and European Investment Bank 2015).

Public political risk insurance/guarantee

A public political risk insurance/guarantee is made available to businesses in order to mitigate and manage risks resulting from adverse actions or inactions of governments (Frisari et al. 2013), such as expropriation, war and civil disturbance, currency inconvertibility and/or transfer restriction (Matsukawa and Habeck 2007). Political risk guarantees cover a wider range of political and

Box 13. Multilateral Investment Guarantee Agency – political risk insurance

Political risk can be a deterrent to investments in particular countries. Guarantees are instruments available to mitigate this barrier. An example of actor providing guarantees is the Multilateral Investment Guarantee Agency (MIGA), which provides political risk insurance and covers, among other risks, risks related to war, terrorism and civil disturbance, expropriation, and breach of contract resulting from governmental actions/inactions. MIGA provides guarantees up to 95 % of an investment for periods between 3 and 15 years.

In 2014, MIGA issued guarantees for USD 3.2 billion, which are expected to catalyze an additional USD 2.6 billion of public and private co-investment. This organization is financially self-sustaining such that public financing is limited to the initial commitment. If this initial endowment is managed well, it can be recycled many times.

regulatory risks than political risk insurance, such as government contractual payment obligations or changes in laws, regulations, taxes or incentives (Matsukawa and Habeck 2007).

2.5 Other financial instruments

Debt-for-climate swaps

Debt-for-climate swaps imply canceling a developing country's debt on the condition that monetary means are made available by the developing country to facilitate the deployment of climate change mitigation or adaptation measures (Hassoun and Frank 2010; Francke Lund et al. 2015).

Box 14. Debt for Climate Swaps – The Polish ‘Ecofund’ and the government of Seychelles

Fund availability is a barrier to investment towards environmental protection. Provided that a government owes debt to a creditor, the creditor can enter an agreement under which the debt is waived provided that the amount the government would have used as repayment is allocated towards environmental protection. An example is the Polish ‘Ecofund’ established in 1992 by the Ministry of Finance (OECD 1998). It was set up in the form of a “debt for environment” swap, where six creditor countries agreed to waive repayment of 10 % of Poland’s public debt if funds, provided in the form of grants, were used for environmental protection. Several European countries and the United States contributed to the ‘Ecofund’ through the debt swap option. Norway, however, provided a grant to the fund at the end of 1997.

The debt repayment period ended in 2010 with approximately PLN 2.5 billion disbursed (Klarer 2011; OECD 2015c). During this time, grants were awarded for over 1 500 projects addressing various environmental issues, including transboundary air pollution of sulfur and nitrogen oxides, reduce pollution and eutrophication causing substances entering the Baltic Sea, reduce GHG emissions, protect and promote biodiversity, and stimulate appropriate waste management and soil reclamation.

The Seychelles is located in the western Indian Ocean and consists of 115 islands. The economy of the Seychelles is mainly driven by the tourism and fisheries sectors. The local government has been engaged in a USD 78 million sovereign debt swap deal in exchange for a commitment to invest in climate adaptation and marine conservation projects. Specifically, marine conservation projects include marine protected areas, improved coastal zone management, marine policy and regulatory protection, and coral and mangrove restoration. This deal entails the creation of a special purpose vehicle known as the Seychelles Conservation and Climate Adaptation Trust. This trust will seek to further bi-lateral swaps on a portion of the country’s outstanding Paris Club concessional and non-concessional sovereign debt, and to purchase the remaining portion of the Paris Club debt based on agreed-upon rates. (The Paris Club is an informal group of creditor governments from major industrialized countries.) South Africa is also part of the deal.

Green bonds

Green bonds apply environmental labelling to traditional bonds for financing green and climate projects. The green bond market has grown rapidly in recent years, and shows promise for furthering climate action if the environmental quality is robust.

Depending on how they are designed and which institution is issuing the green bond, they can be examples of credit enhancement, export credit guarantees, and in some cases securitization. When public institutions issue green bonds, their higher credit ratings can be a form of credit enhancement, providing assurance to investors that the issuer will commit to repaying the bond. Approximately 75 % of green bonds have been issued by government-owned or government-backed entities, including bonds issued by national government institutions, municipalities and

cities, and multilateral and bi-lateral development institutions (CBI 2014). Thus, the public sector has played a key role in providing high credit ratings for green bonds.

The World Bank was the first issuer in the green bond market in 2008, and DFIs continue to play a strong role in issuing green bonds. Multilateral and bilateral development finance institutions have issued over 40 % of cumulative green bonds to support climate action in developing countries (Clapp & Pillay, forthcoming). Green bonds issued by DFIs can help de-risk green investments in developing countries through the high credit rating of multilateral finance. DFIs can also play an intermediary role in de-risking through purchasing a green bond issued in a developing country. For example, the IFC issued a green bond listed on the London Stock Exchange to finance its purchase of green bond shares issued by Yes Bank, a commercial bank in India. In this way, the IFC was able to use its high credit rating to attract secondary investors.

Box 15. KEXIM export credit case

This case focuses on an export credit example of a green bond from South Korea. The export-import bank of Korea (KEXIM) is a government-owned export credit agency of South Korea, whose aim is to provide export credit and guarantee programs to support the international business development of Korean companies. It issued a green bond in 2013 to facilitate the expansion of green Korean companies internationally. This was the first green bond issued by a publicly owned Asian entity (Korea EximBank 2014). The green bond will invest in renewable energy, green technology, and water projects. The selection framework for the use of proceeds of the bond adheres to Korean green certifications and OECD guidance (CICERO 2013).

KEXIM's green bond allows investors to buy into a bundle of loans for climate-friendly projects. In this way, it is an example of a government-owned entity providing a de-risking extension of credit for investors.

The KEXIM green bond was issued in US dollars to attract overseas investors. The majority (79 %) of purchasers listed in the order book were located either in America or in Europe, with the remaining investors based in Asia (Wee 2013). This indicates that the KEXIM green bond facilitated a financial flow from developed countries to Korean industry. KEXIM was also able to attract new investors such as the New York City-based Teachers Fund (Wee 2013).

3 Assessing financial instruments for mobilizing private climate finance

In this section, we first discuss the appropriateness of the various financial instruments at de-risking versus reducing the cost of private climate finance, before specifically looking into the risks and cost types best addressed by these financial instruments.

Thereafter, we will bring in additional elements to the discussion, such as leverage ratio, scaling-up potential, and reliability, as well as a short discussion on the challenges and issues associated with the use of these instruments.

3.1 De-risking versus cost reduction

The financial instruments presented in section 2 have been created to de-risk and/or reduce costs associated with climate finance, particularly private climate finance. De-risking refers to reducing the risk or perceived risk of an investment, whereas cost reducing financial instruments directly lower the cost of a project. Both de-risking and cost reduction ultimately result in making a project attractive to a wider range of investors.

Three main cost categories, namely costs affecting the rate of return, transaction costs, and information costs were discussed in section 1.1. Risk categories best addressed by public entities are: political, policy and social risks, market and commercial risks, as well as outcome risks, as described in section 1.2. Table 4 describes the primary use of the various financial instruments, either addressing costs or risks.

The majority of financial instruments primarily aim at de-risking, though several financial instruments are available for cost reduction as well. The financial instruments cover market and commercial risks well, whereas fewer target political and societal risks, or outcome risks. Among the three costs categories, information cost has the least coverage by existing financial instruments.

Table 4. Classification of financial instruments according to their ability to address the various categories of costs, and illustration of categories of risks targeted by different financial instruments for de-risking investments (Frisari et al. 2013; Micale et al. 2013).

Category	Name	Cost reduction vs. de-risking		Type of costs			Type of risks		
		Cost reduction	De-risking	Rate of return	Transaction costs	Information costs	Political, policy, social risks	Market, commercial risks	Outcome risks
Revenue support policy	Feed-in tariff								
	Feed-in premium								
	Tradable green certificates								
	Tendering process								
Credit enhancement	Export credit guarantee								
	Interest rate subsidy								
	Loan guarantee								
	Partial credit guarantee								
	Securitization								
	Concessional loan								
Direct investments	Equity investment								
	Grant								
	Public-private partnerships								
	First-loss insurance								
Insurance	Public political risk insurance / guarantee								
	Debt-for-climate swaps								
Green bonds									

3.2 Introducing assessment criteria

Drawing on the literature, we select the following criteria to assess ability to overcome barriers to private climate investments in developing countries: Leverage ratio, scaling-up potential, and reliability (refer to e.g. Jachnik et al. 2015; Bird et al. 2013; Brown et al. 2011; Ellis et al. 2013). The focus is thus on the instruments' ability to raise private money in a developing country context and the wider scaling-up potential. Our discussion is broad and qualitative, and based on the cases introduced in section 2. We do not analyze the 'output' of the climate finance in terms of mitigated greenhouse gas emissions or improved resiliency to climate change impacts. An analysis of 'output' would be very challenging due to no commonly accepted methodological standard, and is deemed outside the scope of this report.

The leverage ratio refers to the amount of private finance raised per unit of public finance spent. As an example of calculating leverage ratio, if a government allocates 1 Euro for climate finance and this induces 5 Euro in private climate finance, the leverage ratio would be 5. This involves estimating the value of different public instruments applied, which is straightforward in some cases, but more complicated in other cases (confer to Torvanger et al. 2015 for more information). It also involves making an estimate on the level of private finance mobilized via the financial instrument, before linking the public and private figures to estimate the leverage ratio. This brings up issues of causality and attribution, refer to Jachnik et al. (2015). Attribution can be based on the volume of finance, risk exposure, level of concession provided, point of entry, the role of public and private actors, or all associated private finance linked to the public intervention. Given this uncertainty, in addition to leverage ratios often being misinterpreted, since they can refer either to amount 'leveraged' or to co-finance, the estimates provided in Table 5 should be treated with care.

The scaling-up potential of a public instrument is based on the present use of the instrument as compared to the potential best, but realistic use of the instrument. Since standard methodologies for assessing the potential best use of an instrument are less developed, our assessment will be more subjective than for the leverage ratio.

Reliability refers to an instrument's ability to induce private climate finance within a certain range. In terms of leverage ratio, an interpretation of high reliability could be a leverage ratio for an instrument in the range of 4 to 5 (i.e. a narrow range), whereas a low reliability could be a leverage ratio of 2 to 7 (i.e. a wide range). In this study we discuss the reliability of each public instrument based on the contextual features described in the case studies.

The assessment of these criteria is much more uncertain than establishing which risks and costs are best targeted by different financial instruments. The uncertainty stems from the fact that the success of a financial instrument to a high degree depends on the context onto which it is applied. In addition, the estimates we present are based on the rather limited number of case studies from section 2 (20 studies in total).

Prior to presenting some results, we caution the reader when interpreting the conclusions. For example, financial instruments are often combined in order to make a transaction possible. A

prime example is the Lake Turkana 310 MW wind farm, expected to be commissioned in 2017. The project cost has been estimated at Euro 650 million. Private actors (Vestas, Aldwych) and public actors (Norfund, Finnfund, EU-Africa infrastructure trust fund, etc.) will provide Euro 175 million in equity for this project. The rest of the sum is securitized and provided as senior debt by public (European Investment Bank, etc.), private actors (Standard Bank of South Africa and Nedbank), and junior debt by various development financial institutions. A combination of financial instruments, however, renders difficult the attempt of calculating a leverage ratio because it is the combined use of financial instruments that allow the transaction, not any single instrument.

Table 5 summarizes the estimated leverage ratios, the scaling-up potential, and the reliability of the leverage ratio estimate, based on the limited number of cases.

Table 5. Criteria to assess the suitability of various financial instruments. N/A - Not Available.

Category	Name	Leverage ratio	Scaling-up	Reliability
Revenue support policy	Feed-in tariff	5	High	Medium
	Feed-in premium	< 5	High	Medium
	Tradable green certificates	N/A	Low	N/A
	Tendering process	N/A	High	N/A
Credit enhancement	Export credit guarantee	6 -10	Uncertain	Medium
	Interest rate subsidy	5 -12	High	Low
	Loan guarantee	6 -10	Uncertain	Medium
	Partial credit guarantee	6 -10	Uncertain	Medium
	Securitization	2.3	High	Low
Direct investments	Concessional loan	0.04 - 0.4	High	High
	Equity investment	1.7 - 33	High	Low
	Grant	0 and above	High	High
	Public-private partnerships	> 0 – 33	High	Low
Insurance	First-loss insurance	5	High	Low
	Public political risk insurance/guarantee	10 and above	High	Low
Debt-for-climate swaps		N/A	Low	N/A
Green bonds		N/A	High	Low

4 Framework to identify appropriate financial instruments and case studies

Due to Ethiopia's ambitious strategy for a Climate Resilient Green Economy (CRGE) there is a significant pull factor for sustaining fast growth in the country combined with keeping emissions of greenhouse gases low and increasing resilience to climate change. Norway is a major development aid donor country to Ethiopia. In 2013 Ethiopia and Norway adopted a partnership agreement on REDD+ (Reducing Emissions from Deforestation and Forest Degradation, including the role of conservation, sustainable management of forests, and enhancement of forest carbon stocks). The focus in terms of sectors has been on forest conservation and agriculture, and energy as deforestation drivers, and in terms of policy design and capacity building. This has led to the establishment of a national REDD+ strategy and REDD secretariat. The first results-based disbursement at 60 MNOK took place in 2014. In a green growth context (climate-smart) agriculture, forestry, and clean (renewable) energy are significant and strategic sectors.

In this case study we examine one innovative instrument framework to support green growth in Ethiopia, namely Green Bonds (GB), and ask whether such bonds could be a promising tool to facilitate green growth in the Ethiopian agriculture-forestry-energy nexus. The discussion is organized according to three main barriers: less developed financial institutions; high risk for investors; and dominance of small-scale firms and farms. We discuss how to overcome each of these barriers.

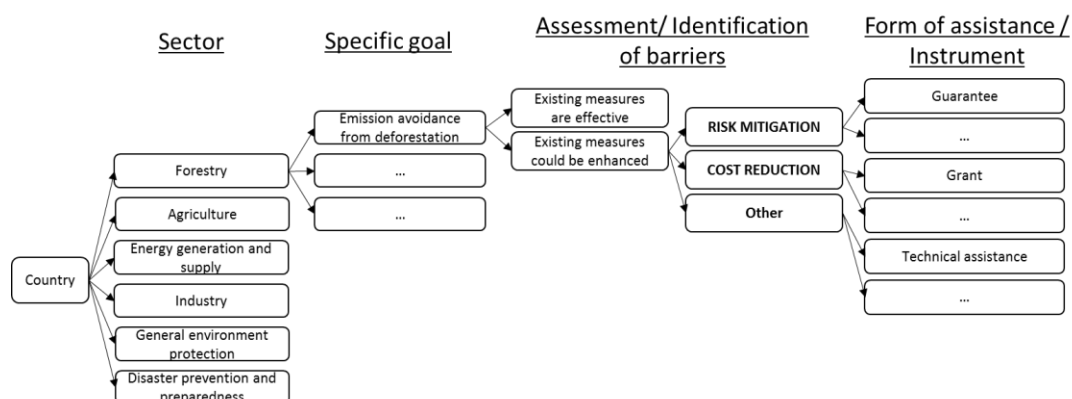


Figure 3. Financial instrument selection.

Provided that a recipient country has been identified, as well as a specific sector, for example forestry, specific goals within that particular sector can be chosen. One goal could be avoiding CO₂ release from deforestation. Once a goal has been identified, one must assess to what extent the country in question could be effective in meeting the specific goal without foreign assistance. As long as existing measures are judged insufficient to reach a certain goal, possible forms of assistance pertaining to risk mitigation, cost reduction or other can be evaluated. Only in such a situation, selecting a financial instrument makes sense. The choice of a financial instrument depends on the motivation for the intervention and the barriers obstructing the pursued goal, as well as the mandate of the extending agency in consideration.

In some cases, as we will illustrate below, a sector is chosen prior to a recipient country. In that case, the framework can be reorganized such as to meet the purpose of the program.

Creating a methodology to indicate which financial instrument is appropriate for solving different challenges in a number of ODA countries is a challenging task. In addition, conditions within these countries change over time, sometimes promptly, and such a framework could thus rapidly become outdated. Instead, we present selected case studies to illustrate how the knowledge presented in this report can be used.

4.1 Renewable Energy

Many public interventions aim at facilitating the deployment of renewable energy in developing countries. Different geographical or technological focal points, institutional development levels, type of costs and risks encountered, as well as different mandates, have fostered multiple solutions. The three cases presented in this section are:

- Facilitating the deployment of renewable energy in Uganda;
- Helping Norwegian exports succeed abroad; and
- Bringing clean energy to developing countries.

Other approaches, such as providing grants for a pre-feasibility study, public-private partnership in project finance, or the creation of joint ventures between public and commercial actors have

been used, and could have been presented here as well. Yet, these cases are perhaps more straightforward. In order to save space, we focus on the most innovative cases, or alternatively, on cases where the impact can be scaled-up significantly.

4.1.1 Facilitating the deployment of renewable energy in Uganda

Description of the case

In 2007, the Government of Uganda implemented a feed-in tariff such as to facilitate the deployment of renewable energy in the country. Among other barriers, the feed-in tariff was too low to attract investors. A program, named Get-FiT (Global Energy Transfer Feed-in Tariffs), was therefore established in 2013 with the aim of supplementing the existing tariff with a front-loaded results-based premium payment. The Get-FiT program aims at making investments into small-scale renewable energy projects more attractive, in addition to reducing emissions, strengthening the regulator and creating jobs. The program also provides support to standardize legal documents, as well as technical assistance in order to tackle some of the barriers faced by investors. Several European countries, including Norway, finance the program.

In addition to the interventions named above, it has proven necessary to strengthen the grid to make it resilient to the deployment of small-scale renewable energy. Some of the actors involved in the Get-FiT program, in collaboration with the Government of Uganda, provide the capital needed. These interventions, taken together, facilitate the deployment of projects in Uganda.

On the project side, the first projects are expected to come online in 2016 (i.e. three years after the commencement of the program). These projects are often financed by multiple actors, either via loans, equity or other financial instruments from public and private actors. To make the picture even more complex, there is evidence that some of the projects benefited from grants to finance pre-feasibility studies. The World Bank is offering partial risk guarantees, and there may be other public actors contributing to these projects in one way or another.

Fitting the case into the framework for selecting financial instruments

Let us describe how we fit the Get-FiT program into the framework developed in section 4. The motivation behind the program was to “*Assist East African nations in pursuing a climate resilient low-carbon development path*” (Rieger 2015). Renewable energy was the chosen sector. In Uganda, the government had implemented a Feed-in Tariff in order to encourage investment in small-scale renewable energy sources. However, a combination of a “*patchy enabling environment for investment in small-scale renewables*”, “*insufficient incentives to encourage investment in small-scale renewables*”, and “*high demands on the government of Uganda as a counterpart in the timely realization of small-scale renewables*” (Rieger 2015), were seen as barriers preventing the deployment of a number of small-scale renewable energy projects.

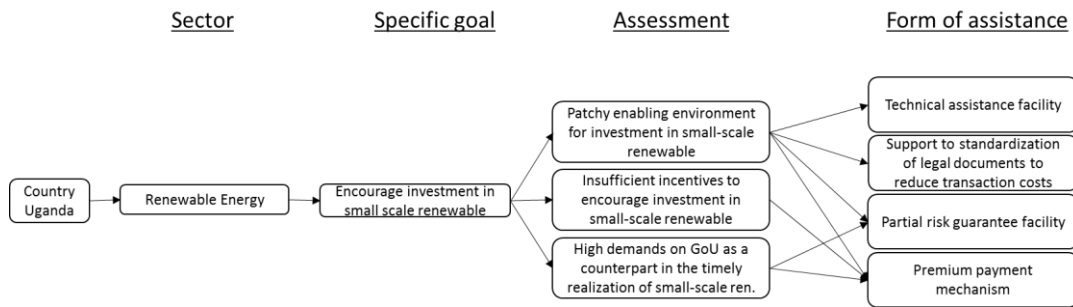


Figure 4. Financial instruments appropriate to fast-track small-scale renewables in Uganda.

Then it became necessary to decide how these challenges should be addressed. One of the goals was to facilitate the deployment of renewable energy projects. The problem was that the return was too low to attract potential investors given the feed-in tariff scheme in place.

Two options are possible in order to attract potential investors. Either the revenue side can be improved, or costs reduced. A premium system was implemented to improve the revenue side of potential projects, while a partial risk guarantee facility was made available to de-risk transactions, further enhancing existing incentives. Alternative approaches would in theory generate the same output, such as providing selected projects with a grant to transfer some of the cost to the donor countries. The benefit of the program is that it centralizes the resources available, thus allowing the participation of other donors, and maximized the scaling-up of the program. In itself, this contributes to a stronger outcome for the program.

Regarding the other challenges (e.g. lack of standardization), few alternatives are available and technical assistance is necessary. Support to standardize legal documents is provided, as well as grants to strengthen the grid. Finally, technical assistance is provided for the training of selected staff members, in particular for the regulator. Figure 5 summarizes some of the instruments used in Uganda to promote the deployment of renewable energy.

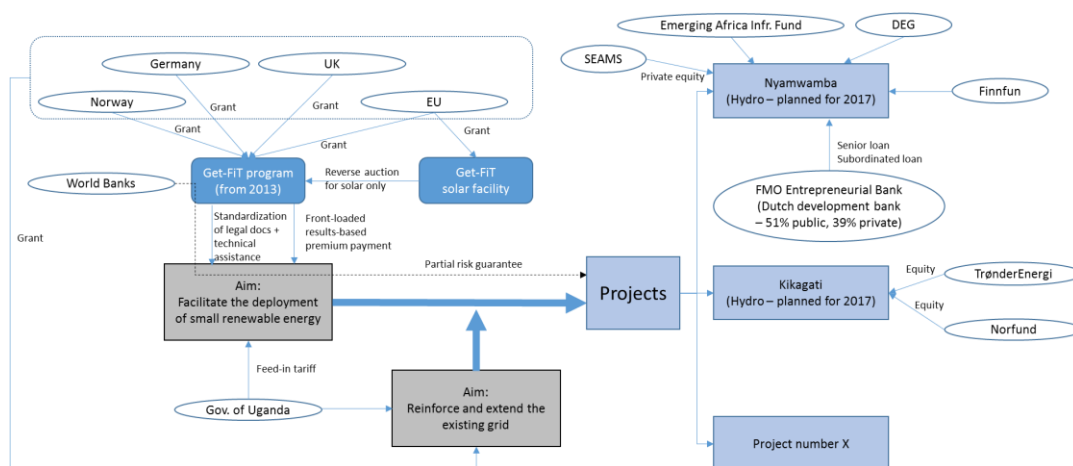


Figure 5. Financing renewable energy in Uganda (Source: Multiconsult, Nordplan 2014).

Concluding remarks

Concluding on how much private climate finance is unlocked by the different public interventions is a challenge. Yet, it is fair to assume that the output of the program would have been weaker without the premium (which improves the revenue side), a resilient grid (which connects production to consumption), and stronger institutions that reduce the risk and costs associated with the process of getting the permission to build and operate a power plant. The combination of direct and indirect interventions makes this program successful.

The potential for deploying a similar program in other countries exists, though the program has to be tailor-made - if it can be applied - given that each country has its own set of challenges and energy regulations.

4.1.2 Helping Norwegian exporters succeed abroad

Description of the case

Export Credit Norway helps Norwegian exporters through competitive, available and effective financing (Export Credit Norway 2015). To date, Export Credit Norway has financed relatively few renewable projects in developing countries.¹² Three reasons explain this fact. First, Export Credit Norway's mandate restricts its financing abilities to Norwegian exporters (as opposed to, for example, financing Norwegian owned projects relying on products developed and

¹² In 2014, Norway exported renewable technologies for NOK 8 billion. This can be compared to the NOK 274 billion in export from the oil and gas industry (excluding sale of oil and gas) in 2013 (Slengesol 2016).

commercialized in other countries). Second, the number of Norwegian suppliers in the renewable energy field is limited. Finally, amongst the large number of applications for financing received by Export Credit Norway, few renewable energy projects are competitive with the applications from other Norwegian export industries.

Despite these limitations, some Norwegian renewable energy developers have received financing from Export Credit Norway for investment in ODA countries. A prime example is Scatec Solar, which secured a 53 MW solar project in Honduras in October 2015 (Scatec Solar 2015).

Fitting the case into the framework for selecting financial instruments

The approach chosen here is very different from the first case study. Instead of identifying specific challenges preventing the deployment of goods, services and technologies in a given country, it is a general barrier preventing export that is targeted. Providing loans up to 85 % of the contract value, competitive interest rates and with a repayment period up to 18 years for renewable energy and climate change mitigation projects, was chosen as a solution to remove this barrier.



Figure 6. Export Credit Norway: Helping Norwegian exporters to succeed abroad.

Choosing the case of solar energy in Honduras, once more the combination of various financial instruments makes the project financially viable given its risk. The National Electricity Company of Honduras will purchase the power generated under a 20-year Power Purchase Agreement, de facto reducing the market risk associated with the project. Norfund provides equity to the power plant, whereas Scatec Solar will provide the remaining equity. This is made possible via a loan from the American Bank of Economic Integration and a loan from Export Credit Norway. Scatec Solar could obtain a loan from Export Credit Norway because it will build and operate the plant. The loan is guaranteed by Norwegian Export Credit Guarantee Agency (GIEK) (Scatec 2015), thus allowing for attractive terms. The following figure depicts how the financial instruments interact with each other.

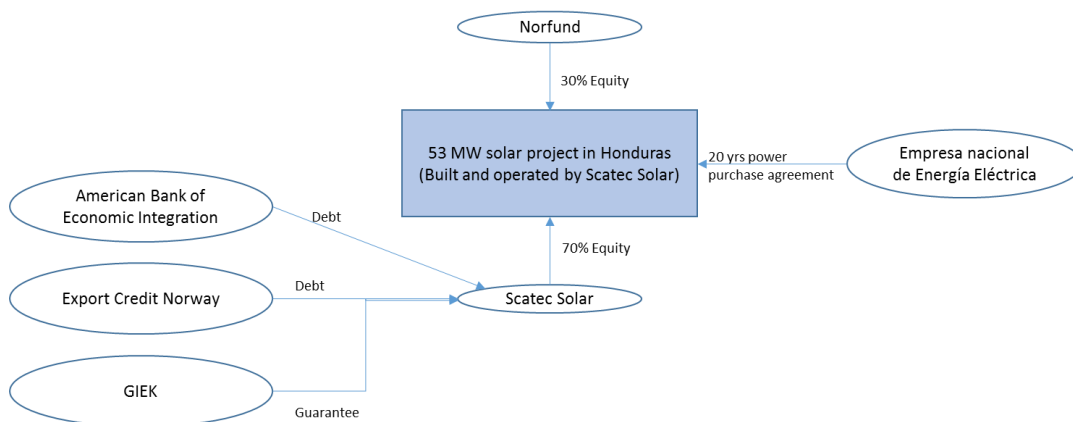


Figure 7. Financing solar power in Honduras (Source: Scatec 2015)

Concluding remarks

Though this solution in theory can be replicated by other projects, lack of projects within the field of climate finance constrains the extent to which export credits can be scaled up. A possibility to allow Export Credit Norway to play a bigger role in facilitating private climate investment in developing countries is to extend its mandate such as to allow for loans towards Norwegian-owned projects that use non-Norwegian products.

4.1.3 Bringing clean power to developing countries

Description of the case

The first two cases, the Get-FiT program and export credits, showed two different approaches of facilitating private climate finance related to renewable energy in developing countries. The present case is also related to renewable energy, though the approach is fundamentally different.

In this case, we review the Global Energy Efficiency and Renewable Energy Fund (GEEREF), which is a Fund-of-Funds leveraging public sector fund to catalyze private sector investment into small and medium-sized clean energy or energy efficiency projects in developing countries. GEEREF is a public-private partnership.

Fitting the case into the framework for selecting financial instruments

GEEREF was established with the aim of bringing clean power to developing countries, as well as mobilizing private investments for the benefit of these countries. Sub-commercial returns due to high upfront costs and long pay-back periods, high political and commercial risks, as well as considerable transactions costs (Bird 2009) meant barriers to private investment into renewable energy and energy efficiency projects in developing countries. These barriers are lowered via the investment in private equity sub-funds specializing in financing small and medium-sized project developers and enterprises to implement energy efficiency and renewable energy projects in developing countries.

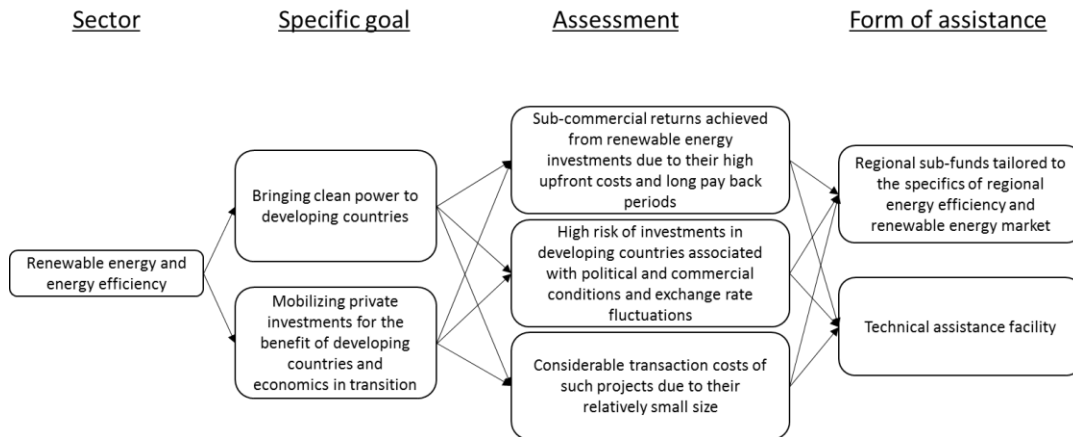


Figure 8. Bringing clean power to developing countries (Source: Bird 2009)

In an interview in September 2015, Cyrille Arnould from GEEREF explained how the initial commitment from the European Commission, Germany and Norway of Euro 112 million was nearly matched by private investors from within and outside the European Union. Private investors obtained preferred returns on their capital, meaning that the downside of investing into GEEREF is limited, while the upside potential is rather large.

The sum of public and private capital is invested into regional funds (equity) which, in turn, invest into projects with debt-to-equity ratios of 30/70 to 50/50.

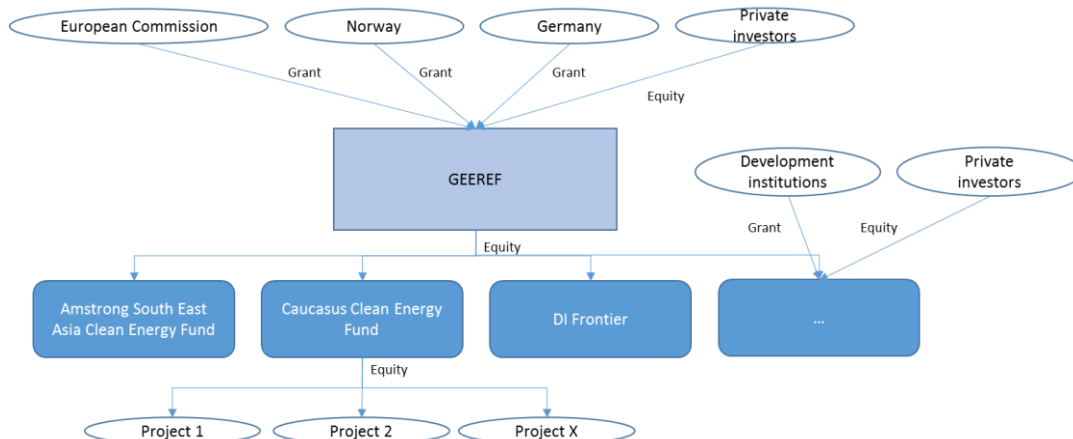


Figure 9. Financing renewable energy in developing countries

Concluding remarks

GEEREF reduces the costs and risks associated with renewable energy and energy efficiency investments in developing countries. Given its structure, GEEREF can facilitate the mobilization of private capital in more countries than a program such as Get-FiT, though it will

be more dependent on countries having appropriate regulatory frameworks for clean energy and energy efficiency investments.

Due to its record of accomplishment, it is possible that private investors would contribute with more capital if a successor program were put in place. Hence this solution is, if not scalable, at least replicable.

4.2 Additional case studies

4.2.1 Food security in a climate perspective

Description of the case

The Norwegian Strategy for Food Security in a Climate Perspective (2013-2015) is a tool for Norwegian development cooperation, with a focus on increased food production, small-scale climate-resilient agriculture, promoting smallholders' rights, especially women, but also intending to strengthen aquaculture and fisheries (NORAD 2015). 'Climate-smart agriculture' is a keyword. One pathway is supporting national authorities and their plans for boosting food production and security, through international and regional support (FAO, IFAD, WFP, and the Global Alliance for Climate Smart Agriculture (GACSA)), another is knowledge and skills transfer to farmers in order to adopt climate-smart agriculture practices, see Figure 10. Programs cover Zambia, Malawi, Mozambique, Tanzania, Ethiopia, Mali, and Bangladesh.

At the level of individual countries, Norway is promoting public-private partnerships as the main vehicle, providing incentives for private investments, supported through Norfund and Norwegian embassies. In 2014 the total Norwegian support to food security projects was at NOK 1.2 billion, of which 18 % was core support to multilateral organizations. Bilateral support received 61 % of the total funding.

There are numerous references to the farmers' need to build resilience towards the impacts of climate change and adapt to climate change. However, it will not be possible to draw a distinct line between general support for agriculture development on the one hand, and specific support for improving climate change resilience and adapting to climate change on the other hand. Complexity is added due to private companies being engaged in business, e.g. sales of agricultural machinery, at more or less commercial terms, but where some government support is an ingredient.

Fitting the case into the framework for selecting financial instruments

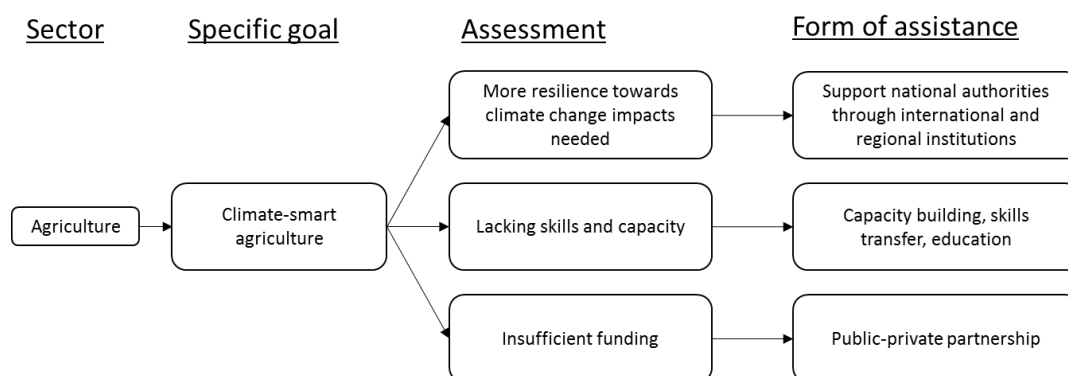


Figure 10. Supporting climate-smart agriculture.

Most support is focused on technical assistance and capacity building in various forms, such as agro-forestry courses, literacy capacity building, training of staff and farmers, and training in technical and business management skills, as well as funds for private sector support (feasibility studies, training, environmental installations, piloting, etc.). Furthermore, Norway provides support for higher education, together with joint research, and grants to universities. Some support is channeled through civil society organizations. Norway is also providing support to multilateral organizations and funds with activities related to climate-smart agriculture. Another vehicle for support is public-private partnerships.

Concluding remarks

Increased resilience to expected climate change impacts on agriculture in developing countries requires long-term strategies, handling of climate change uncertainty, improved skills, and funding. These barriers make capacity building for national authorities and farmers vital, channeled through education, research, and courses for farmers. Public-private partnerships and support through multinational institutions and funds can facilitate investments in climate-smart agriculture, but specific data on private engagement is not available.

4.2.2 Climate Insurance for Drought Resilience

Description of the case

Malawi is a least-developed country (LDC) in Southern Africa with a population of approximately 13 million people of which 80 % are dependent on smallholder subsistence farming for their livelihoods. In 2005, the Malawian government in partnership with the World Bank's Commodity Risk Management Group embarked on developing the concept and application of a loan and index-based weather insurance program as a means of mitigating the risks of drought faced by smallholder farmers (Hess and Sykora 2005; Meze-Hausken 2009). This drought insurance product sought to build on the current micro-credit schemes used by smallholder farmers while investigating the requirements and barriers to implementing insurance products related to weather. The partnership landscape for the micro-insurance pilot included: stakeholders delivering technical expertise on the design of the insurance product;

smallholder farmer associations that provided access to seed inputs while acting as intermediaries with farmers; Malawian financial institutions which participated as loan underwriters; and the Malawian meteorological service, who provided climate data to establish drought and flood risks in the region (confer Figure 11).

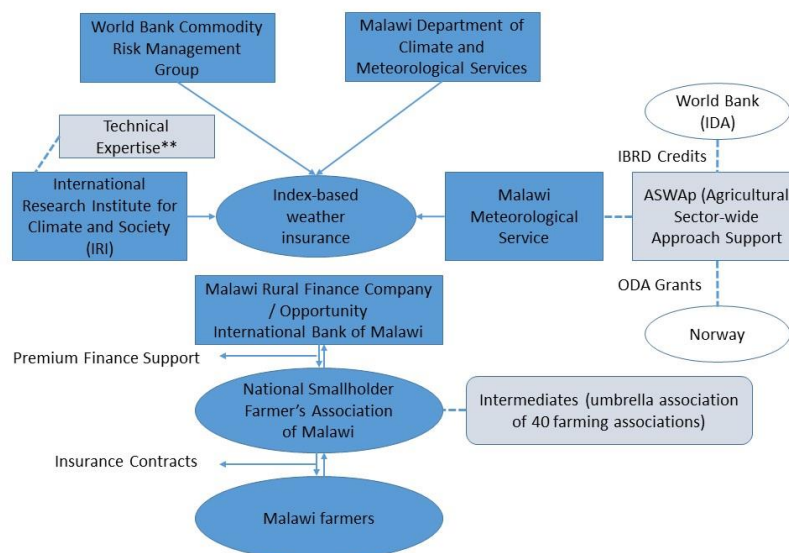


Figure 11. Partner Landscape of Drought Insurance in Malawi (** indicates that the form of financial support is uncertain).

Traditional insurance products directed at the crop failure of smallholder farmers have found that it is challenging to avoid higher payouts and higher premiums as farmers may allow their crops to fail in order to obtain a payout. Furthermore, it is difficult to attribute the cause of the crop failure if crop yield is assessed, as this could be a result of bad farming practices and not the prevailing environmental conditions. To avoid insurance malpractice, establishing payouts based on relationships between environmental variables and crop failure ensures that farmers have an incentive to promote productive farming management while being covered against climate risks.

The initial tasks prior to undertaking the pilot on the weather insurance program included the identification of the commodity to test the concept, and sites for implementation. Even though drought sensitivity is a key selection criterion, factors such as the cost of inputs, crop value, crop suitability for smallholder farmers and others are included as well. This was investigated in consultation with the National Smallholder Farmers Association of Malawi.

Outcomes of the Climate Insurance Scheme

The targeted farmers were able to afford the insurance owing to the higher crop yields (groundnut). For this particular type of insurance product, the trigger for payouts or the selected index was the requirement for water (a weighted sum of cumulative rainfall during the 130-day growing period, with individual weights assigned to (10-day) rainfall totals) (Hess and Sykora 2005). The envisioned benefits of the Malawi scheme were as follows:

- Farmers were able to focus their farming exploits on higher value-added products as additional capital was provided by the loan scheme with the insurance scheme reducing the risk;
- Farmers could invest in better seeds and irrigation technology which could increase their productivity; and;
- Higher productivity would allow for greater profits, which would allow greater financial security in drier or less favorable seasons.

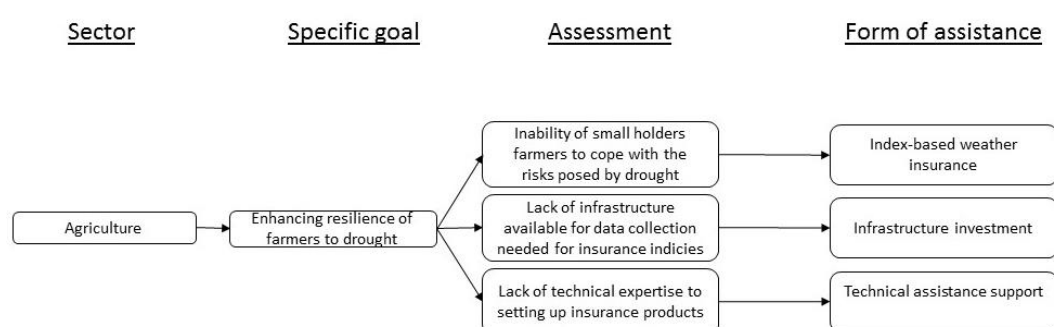


Figure 12. Financial instruments appropriate to investment in agriculture in Malawi.

The total pay-out estimated for the pilot was USD 40,000. This was based on nearby weather station data (Tadesse 2015). Several gaps were identified during the pilot phase, including concerns over the robustness of rainfall data used (from one rainfall station) to decide payout triggers; poor seed quality decreasing crop yield; and side-selling to those offering a higher price than the National Smallholder Farmer’s Association of Malawi (NASFAM). From 2006 to 2009, the loan and insurance scheme has been expanded to other crop types. By the end of the 2009 season, the program covered 2500 farmers and possessed a transaction value of USD 2 million (IRI 2007). There is a definite need to scale-up the use of such insurance programs.

Concluding remarks

To ensure that micro-insurance schemes are viable products for smallholder farmers, complimentary investments are required to strengthen the institutional landscape. To address the issue of data robustness owing to a lack of rainfall stations, the Malawian government supported by the World Bank and Norway introduced the Agriculture Sector Wide Approach (ASWAp), which invests in new weather stations in Malawi. Furthermore, additional investments for improved farming practices, better input provisions, and commodity sale can also enhance the effectiveness of micro-insurance.

There is certainly potential to scale-up the use of climate insurance in African countries to provide coverage to small-holder farmers. This is particularly important as these famers will possibly face increased climate risk from drought in the future. The scaling-up potential and reliability will be determined by the technical expertise gained to allow for accurate hazard

modelling, institutional capacity to promote appropriate data collection practices and the evolution of the financial actors within African financial markets.

4.2.3 REDD+ Forest financing alternatives

Description of the case

The Reduced Emissions from Deforestation and Forest Degradation (REDD+) came into operation to address emissions that emanate from land use change, principally deforestation, which constitutes 12 – 20 % of global greenhouse gas emissions. REDD+ can be described as a payment for ecosystems services (PES) scheme where the donor countries offer incentives in the form of financial payments to recipient countries in exchange for forest protection. Norway is the largest contributor to multilateral funds for REDD+ with 1,685 million USD deposited of the total 3,458 million USD pledged. Most of Norway's finance is channeled through its International Climate Forest Initiative (ICFI), which also directs finance through the Forest Investment Program (FIP), Forest Carbon Partnership Facility (FCPF), UN-REDD (United Nations – Reduced Emissions from Deforestation and Forest Degradation (REDD+), and the Congo Basin Forest Fund (CBFF). The REDD+ initiatives have clearly defined long-term goals, but to some extent these goals are dependent on progress being made in the climate negotiations. There is arguably consensus amongst the researchers that the REDD+ framework could be improved to enhance the efficiency of the mechanism and deliver increased mitigation potential. This case study aims to assess the alternative forest financing mechanisms that can be used to supplement REDD+.

Fitting the case into the framework for selecting financial instruments

Currently, the REDD+ framework can be described as a results-based finance framework where finance is earned by the forest protection that has been verified. Theoretically, a REDD+ scheme can preserve specific areas of land. However, it does require extensive international grants and can disadvantage other stakeholders associated with that area of land. The 'landscape approach' can be inclusive of more stakeholders including indigenous communities and local farmers. However, the landscape approach does require significantly more funding. Therefore, the landscape approach would require private investment to supplement public funds.

To stimulate more private sector investment, several funds such as the Althelia Ecosphere and Moringa Funds have been mobilized within the area of sustainable land-use space. These funds aim to invest in agribusinesses through equity and/or debt investments such that they are able control and steer the practices in ways that are more sustainable. These particular funds use co-investment from public sources which helps leverage increased private sector financial flows. Other initiatives include the Landscape Fund (TLF), which provides low interest, long-dated loans to producers in selected supply chains to fund sustainable agricultural practices. By using existing finance providers and channels of credit, TLF will access smallholders and informal producers, broadening its scope of impact. To access private capital, TLF is designing a scalable software platform through which it will securitize its loan portfolio into debt instruments with an attractive risk/return profile.

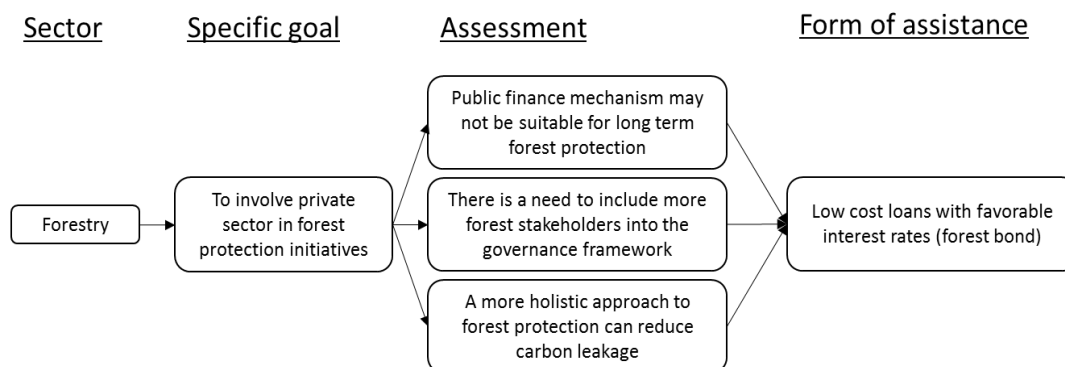


Figure 13. Financial instruments appropriate to investment in forestry and REDD+.

The Unlocking Forest Finance (UFF) was initiated by the German government and operates in two states in Brazil and one in Peru. The program seeks to promote sustainable benefits in agricultural supply chains. The UFF provides low-cost loans to producers and manages the interest rate and risk of default by selecting supply chains that have the potential to grow over the medium term. Early next year, UFF will package the portfolios into liquid investments, probably in the form of a bond issue. There is already high demand for ‘green’ bonds from emerging economies such as Brazil and Peru. To further stimulate the demand, less profitable aspects of the portfolio (for example capacity building and conservation) could be subsidized by public finance. Other approaches that can promote inclusivity amongst forest stakeholders and thereby stimulate REDD+ finance include auctioning, green bonds, bio-banking, and biodiversity offsets.

Concluding remarks

To ensure that there are sufficient financial flows for REDD+, it is vital that schemes include both private and public sectors. Moreover, the use of different financial instruments and approaches besides that of international grants can help promote increased participation by different forest land users while enhancing the co-benefits of forest protection in REDD+ schemes.

There is a possibility to scale up forest financing initiatives such as forest bonds. As the green bond market grows, there may be interest from institutional investors for bonds with proceeds earmarked for sustainable forestry. The scaling-up potential of these bond types will be dependent on how well they are packaged to provide a return on investment. The use of equity within forest funds could also be scaled-up, particularly if the GCF provides equity contributions which may attract other private sector actors. Lastly, forest programs using the landscape approach could be enhanced if additional flows are realized from prominent climate funds focused on sustainable land management, such as the BioCarbon Fund Initiative for Sustainable Forest Landscape (ISFL), operating under the World Bank.

4.3 South Africa

For the final case, we select a country and apply the framework for selecting financial instruments for additional measures to increase the share of renewable energy, as opposed to presenting an existing measure in some details. The reasons that motivated the choice of renewable energy in South Africa include that this country receives non-negligible amounts of ODA support from Norway, and is often showcased as a success when it comes to renewable energy. Yet, the country still mainly relies on fossil fuels and emissions per capita are high, despite 15 % of the country's citizens not yet having access to electricity. The aim with this case is also to show that additional measures may not necessarily result in more renewable energy. This case thus shows how to apply the framework for selecting promising instruments that was introduced at the start of section 4.

Description of the case

Energy is particularly important since millions of South Africans do not yet have access to electricity, and because the supply of electricity struggles to keep up with growing demand. The latter resulted in load shedding (i.e. shutdown of power in parts of a power-distribution system) with all the welfare consequences such actions entail. As a remedy, South Africa is building, among other measures, two large coal-fired power plants, namely Medupi (4,800 MW) and Kusile (4,800 MW). In terms of impact, these plants will significantly enhance the country's power generating capacity (by over 20 %) and strengthen the country's private sector competitiveness (African Development Bank 2009). On the downside, the plants will also put a strain on the climate with annual carbon emissions estimated to 60 Mt (Earthlife 2013) and on the country's scarce water resources, with annual water consumption estimated to over 4.5 billion liters each (African Development Bank 2009).

Both GHG emissions and water issues can be managed by deploying renewable energy (e.g. dry-cooling concentrated solar power, solar photovoltaic, passive solar power, and wind power) instead of coal. Renewable energy technologies are, however, capital-intensive technologies (meaning that most of the costs associated with the plants occur prior to producing power). Measures are therefore necessary to facilitate the deployment of renewable energy.

Despite its high reliance on fossil fuels, South Africa has seen a rapid deployment of renewable energy. In its latest assessment on the conditions for clean energy investments, Climatescope (2016) ranks South Africa in the top four amongst 55 developing countries, only preceded by China, Brazil and Chile. The main reason for this high rank is the success of the South African Renewable Energy Independent Power Producer Procurement Program (REIPPPP) implemented in 2011 (Eberhard et al. 2014). This program involves a competitive tender where the government issues requests for proposals for renewable energy capacity. After proving that a bid satisfies minimum requirements related to environmental, legal, technical and economic aspects, bids are ranked based on price. This step also takes into account other factors such as local content, job creation and socioeconomic development. The best bids will be awarded a tariff, until the capacity set by the government is reached.

Several bidding rounds have been organized and 6 327 MW of renewable capacity has been awarded under the program (Department of Energy 2015), with some of it commissioned or

under construction. It is primarily wind, solar photovoltaic, and concentrated solar power contracts that have been awarded. By design, private actors are playing a dominant role and no less than Rs 193 billion have been mobilized so far. Of this amount, 28 % is provided by foreign institutions as debt or equity, with Europe accounting for 67 % of that amount, which can be compared to the 3 % financed by other African countries (Climatescope 2016). Despite the success of the program, the share of renewable power in South Africa is a mere 4 % and all renewable energy deployed under the program, if built, will still not produce as much as the new Medupi or Kusile coal-fired power plant.

More can be done, but a key question is whether the South African government will want to do more towards renewable energy given the economic situation of the country. For instance, a central aspect of the State of the Nation Address of February 2016 (South African Government 2016) was that new governmental measures shall “not undermine employment creation, the thriving of small businesses or sustained economic growth”. In the short term, coal may appear to the South African Government as a better option than seemingly expensive renewable technologies, hence an indication that additional measures from the South African government facilitating the deployment of renewable energy are unlikely in the short term.

One of the lessons behind the REIPPPP program was to show that private sponsors and financiers are willing to invest in renewable energy if the right conditions are put in place (Eberhard 2014). The challenge thus becomes to identify external interventions that would help increase the role of renewable energy in South Africa.

Fitting the case into the framework for selecting financial instruments

A first and perhaps obvious intervention is to reduce the risk/cost associated with future projects (grants, guarantees, export credits, equity, debt, etc.). Since a tender process is in place in South Africa (where the target is set by the government), public interventions from developed countries beyond what is being done today, would result in lower prices for the bids and allow support projects to outcompete other projects. This would benefit South Africa but not result in more renewable energy as long as a sufficient amount of proposals is submitted in each bidding round. Hence, to be ‘useful’ an intervention should lead to more renewable energy. This can be achieved in many ways, some of which are hypothesized below.

A possibility is to assist South Africa in increasing the capacity to be awarded in each round. Financial resources being limited in the country, a program where international donors provide a grant to South Africa equivalent to the cost of the scheme for a given quantity of capacity would allow the country to increase the target by the quantity sponsored by donors. International actors, such as Scatec Solar, have so far been eager to invest under the tender scheme. Increasing the capacity to be awarded in each round therefore has the potential to mobilize additional private climate finance, assuming that the appetite of international actors for investments in South Africa is not yet satiated.

In addition, private actors in South Africa have not simply accepted load shedding and many have purchased a diesel or petrol generator (Bates 2014). In terms of the environment, these generators are bad news. Alternatives exist, such as a system based on solar photovoltaics and batteries. Though again, these systems are capital-intensive, may appear comparatively

expensive on a direct cost basis, and few financial actors may be used to dealing with them. External interventions, such as an interest rate subsidy, lower the cost associated with purchasing these systems with a loan and can put them on par with diesel generators. This would allow private actors to get accustomed to them and thus lead to the deployment of this type of system in the country. The benefits are multiple, from the local and global environment, to offloading the grid and providing houses with reliable power.

A third alternative is again resulting from load shedding and not sufficiently developed infrastructure. Load shedding creates a social cost. A power cut/curtailment will reduce the output from industries and perhaps severely reduce the country's attractiveness for power-intensive industries. An additional challenge is that most power plants are located near the capital. It can therefore be costly and lengthy to bring power to new industries located far from the production points and the existing grid. This provides ground for local solutions supplying end-users with the amount of power needed. Assisting in the creation of a framework that would allow industries to be self-sufficient can lead to a significant amount of private investment being mobilized, by installing their own power plants (solar, wind, batteries or a combination of these). Guarantees, export credits, grants, equity, debt, securitization, and green bonds are all possible tools for achieving this goal, though technical and legal assistance would most certainly be required.

Figure 14, based on the framework for selecting financial instruments, summarizes the findings.

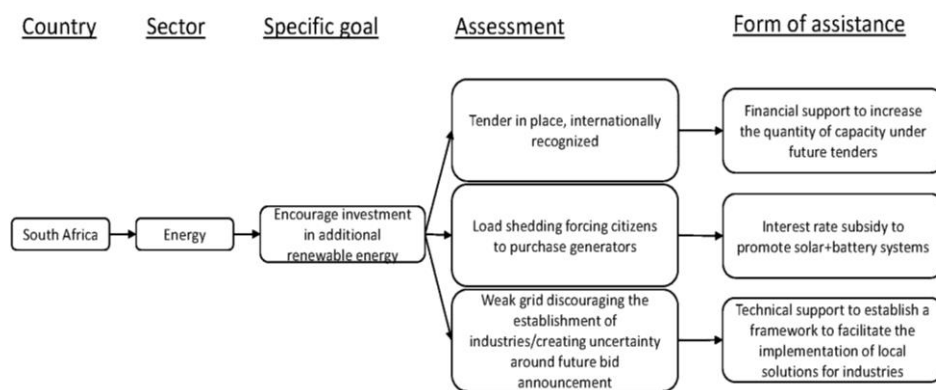


Figure 14. Financial instruments appropriate to investment in South Africa.

Concluding remarks

This brief case study illustrates how, despite existing efforts, more can be done in South Africa. Yet, any intervention needs to be carefully studied to ensure that they lead to additional results compared to what is already being done in the country. If carefully tuned, interventions in South Africa can have a potentially high leveraged ratio and be scalable. This conclusion is based on previous schemes, such as the tender system implemented to facilitate the deployment of renewable energy in the county, which have mobilized private finance, and on proven track record for these schemes. However, in most cases financial instruments must be combined with

other types of interventions (such as technical assistance, raising awareness) in order to lead to substantial results.

5 A procedure to identify most promising financial instruments for climate finance to developing countries

Multiple financial instruments are available to de-risk or reduce costs related to climate mitigation measures and projects in developing countries. More of these instruments are suited for de-risking than for cost reduction, and especially for reducing market and commercial risks. In terms of cost reduction, more instruments affect transaction costs or rate of return than other cost categories.

Not all financial instruments are suited for all situations, not the least with regard to inducing private finance. Thus, the most promising instruments depend on the context. It is necessary to carefully assess potential issues such as rebound effects, moral hazard and competition distortion, when choosing an instrument. Choice of instruments must furthermore be in coherence with economic, energy, and climate strategies in the developing country where climate-related investments are sought. The suitability of instruments is furthermore to be guided by the mandate of the agency in the developed country extending climate finance, the specific goals pursued, and the barriers faced when trying to fulfill these goals. The case studies in this report show that financial instruments often are combined to make a transaction possible.

We propose a two-step procedure for identifying the most promising climate finance instruments when considering a new climate-related project in a specific sector and developing country case:

- I. Examine experiences from use of specific finance instruments from earlier projects in the same country and/or for the same sector cases.
- II. Consider additional checkpoints on context, efficiency, and other issues.

5.1 Experience from case studies

Table 6 summarizes the case studies with respect to countries, sectors, and employed financial instruments. Other instruments may have become more relevant in the meantime. The dominating sector is renewable energy.

Country; Region; Fund	Renewable energy	Energy efficiency	Transport	Agriculture	Forestry	Waste, water, marine
Kenya	Feed-in tariff Equity investment			Securitization		
South Africa	Export credit guarantee. Interest rate subsidy. Partial credit guarantee. Public private partnership.					
Uganda	Equity Partial risk guarantee					
Malawi				Securitization		
Eastern Africa	Public private partnership			Securitization		
China		Loan guarantee				
Nepal	Concessional loans					
Honduras	Export credit					
Brazil					Grant	
Central America	Public-private partnership					
Seychelles						Debt-for-climate swap
CIF	Concessional loan	Concessional loan	Concessional loan			
Nordic Development Fund	Grant			Grant		
GEEREF	Equity fund	Equity fund				
Multiple countries (Bahrain, Indonesia, Pakistan, etc.)	Green bond	Green bond				

Table 6. Barriers and risk factors for greenhouse gas reduction and adaptation to climate change, and instruments used, based on cases explored.

Table 7. Barriers and risk factors for greenhouse gas reduction and adaptation to climate change, and instruments used, based on cases explored.

Barriers and risk factors	Cases	Instruments
Low power grid capacity	South Africa. Uganda	Interest rate subsidy. Technical support.
Insufficient investments in infrastructure	Uganda, Get-FiT	Technical assistance facility. Partial risk guarantee facility. Premium payment mechanism. Concessional loans. Equity. Public-private partnership.
Lacking legal standardization	Uganda, Get-FiT	Support to standardize legal documents (technical support)
Lacking drought insurance	Malawi	Micro-insurance. Risk pooling and risk transfer.
Lack of incentives for forest protection	REDD+	Concessional loans. Green bonds. Equity.
Lacking farmer skills	Strategy for food security	Technical assistance. Public-private partnerships.
High political risk. High commercial risk.	GEEREF	Regional sub-funds. Technical assistance facility. Public-private partnership.
Risk of non-payment for exports	Export Credit Norway	Long-term loans, with low interest. Export credit guarantees.

Through the case studies, we have identified a number of barriers to climate related projects in developing countries. Table 7 summarizes the most important barriers/risk factors associated with specific country and sector cases, and lists the instruments and measures we have identified in these case studies to overcome the barriers.

5.2 Additional checkpoints

We advise to examine these additional checkpoints when planning new climate finance projects:

Reviewing context:

- Consider what has been done in the country in question, and why this is insufficient.
- Consider if there are specific barriers to private engagement in this country/sector context.
- Assess coherence with national economic, energy and climate strategies and plans in the relevant developing country.
- What is the role of the developing country government in creating and enabling a suitable policy environment?
- If any other public actor from developed countries is involved, what are links and inter-dependencies between these actors?

Other considerations:

- What is known about leverage factor (i.e. private investments induced per unit of public climate finance extension), scalability, and reliability of the financial instruments under consideration?
- What level of uncertainty is attached to data and assessments done?
- Address any other important concerns attached to the specific bilateral or multilateral climate finance case (e.g. Climate Investment Fund) at hand, the entity sourcing the money, and the developing country and sector case.
- Are there particular opportunities tied to a specific developing country? For example, are conditions ripe for debt-for-climate swaps or green bonds? (For example, a well-developed and stable financial market is a prerequisite for green bond issuance).
- Carefully assess second-order effects such as rebound effect, potential moral hazard, and competition distortion associated with the proposed plan/measure.

In summary, we emphasize the importance of country and sector context when considering the most applicable financial instruments in a new climate finance and developing country case. It is very challenging to identify the most promising financial instruments with a wider applicability, that is beyond specific cases. Nevertheless, in this report we present a procedure for assessing climate finance instruments, consisting of barriers that have been observed in specific cases, and possible solutions for consideration, as well as further checkpoints. This procedure should be helpful for public agencies responsible for designing support, financing schemes and climate-related projects in developing countries.

References

- African Development Bank (2009). Medupi power project – project appraisal report.
- Asian Development Bank (2014). Proposed loan, technical assistance grant, and administration of grants – Nepal: South Asia Subregional Economic Cooperation Power System Expansion Project.
- Bates, E. (2014). Surging demand for generators.
- Bird, N. (2009). GEEREF: a model climate fund? Overseas Development Institute.
- Bird, N., Tilley, H., Canales Trujillo, N., Tumushabe, G., Welham, B. and Yanda, P. (2013). Measuring the effectiveness of public climate finance delivery at the national level, March, Overseas Development Institute.
- Brown, J., Buchner, B., Wagner, G. and K. Sierra (2011). Improving the effectiveness of climate finance: A survey of leveraging methodologies, December, Climate Policy Initiative.
- Brown, J. and Jacobs, M. (2011). Leveraging private investment: the role of public sector climate finance. Overseas Development Institute, April.
- Buchner, B.K., Heller, T.C. and Wilkinson, J. (2012). Effective green financing: What have we learned so far?, December, Climate Policy Initiative.
- Buchner, B., Trabacchi, C., Mazza, F., Abramskiehn, D. and Wang, D. (2015). Global landscape of climate finance 2015, November, Climate Policy Initiative.
- CBI (2014). Bonds and Climate Change: The State of the Market in 2014. HSBC and Climate Bonds Initiative. <http://www.climatebonds.net/bonds-climate-change-2014>
- Chaum, M., Faris, C., Wagner, G., Buchner, B., Falconer, A., Trabacchi, C., Brown, J. and Sierra, K. (2011). Improving the effectiveness of climate finance: Key lessons, 23 November, Climate Policy Initiative.
- CICERO (2013). Second Opinion on the Export-Import Bank of Korea (KEXIM)'s Framework for Green Bonds. CICERO, Oslo.
- Clapp, C. and Pillay, K. "Green bonds and climate finance", Climate Finance, eds. A. Markandya, D. Rubbelke, and I. Galarraga, World Scientific, forthcoming 2016.
- CIF (2014). Assessing "Leverage" in the Climate Investment Funds. Climate Investment Funds, The World Bank Group, Washington DC.
- CIF (2016). Empowering a greener future. Annual report 2015. Climate Investment Funds, The World Bank Group, Washington DC.
- Clean Technology Fund (2015). Clean Technology Fund.
- Climatescope (2015). South Africa.
- Climatescope (2016). Another year in the top 5 for South Africa!
- Climate Policy Initiative (2015). The role of technical assistance in mobilizing climate finance – Insights from GIZ programs.
- Department of Energy (2015). State of renewable energy in South Africa. Pretoria, South Africa.
- Earthlife (2013). Factsheet: A deadly clash between climate science and coal-3.

- Eberhard, A., Kolker, J., and Leigland, J. (2014). South Africa's Renewable Energy IPP Procurement Program: Success Factors and Lessons. World Bank Group.
- Ellis, J., Caruso, R. and Ockenden, S. (2013). Exploring climate finance effectiveness, Climate Change Expert Group, OECD and IEA.
- Export Credit Norway (2015). Annual report 2014.
- European Commission and European Investment Bank (2015). First Loss Portfolio Guarantee – Case Study.
- Fiestas, I., Sinha, S. (2011). Literature review on constraints to investment in developing countries. Retrieved from Department for International Development. Nathan Associates Inc. Emerging Market Economics.
- Francke Lund, H., Clapp, C., Torvanger, A., Wilkinson, J., Buchner, B., Stadelmann, M., Mazza, F., Oliver, P. and Abramskiesh, D. (2015). Background report on long-term climate finance, prepared for the German G7 presidency 2015 by CICERO and Climate Policy Initiative.
- Frisari, G., Hervé-Mignucci, M., Micale, V. and Mazza, F. (2013). Risk gaps: A map of risk mitigation instruments for clean investments, January, Climate Policy Initiative.
- GIEK (2015). Årsrapport 2014, The Norwegian Export Credit Guarantee Agency, Oslo.
- Green for Growth Fund (2016). Annual Report 2015 – Growing.
- Green, R., and Yatchew, A. (2012). Support schemes for renewable energy: An economic analysis. *Economics of Energy & Environmental Policy* (1/2), pages 83-98.
- Hassoun, N. and Frank, M. (2010). Are debt for climate swaps morally permissible? Working Paper Carnegie Mellon University.
- Hess, U. and Sykora, J. (2005). Weather-based Insurance in Southern Africa. The Case of Malawi. *Agriculture and Rural Development Discussion Paper 13*. The World Bank.
- Hervé-Mignucci, M., Frisari, G., Micale, V. and Mazza, F. (2013). Risk gaps: First-loss protection mechanisms, January, Climate Policy Initiative.
- IEG World Bank (2010). Assessing the impact of IFC's China utility-based energy efficiency finance program. The World Bank, Washington.
- Institute for Industrial Productivity (2012). China Utility-Based Energy Efficiency Finance Program (CHUEE) – Prepared by Aequero.
- International Finance Corporation (IFC) (2013). Leverage in IFC's climate-related investments – A review of 9 years of investment activity (Fiscal years 2005-2013), International Finance Corporation.
- International Finance Corporation (IFC) (2011). Climate finance: Engaging the private sector – A background paper for “Mobilizing climate finance”, A report prepared at the request of G20 finance ministers, International Finance Corporation.
- International Research Institute for Climate & Society (IRI) (2007). Climate Risk Management in Africa: Learning from Practice, 1 -9.
- Jachnik, R., Caruso, R. and Srivastava, A. (2015). Estimating mobilized private climate finances: methodological approaches, options and trade-offs”, *OECD Environmental Working Papers*, No. 83, OECD Publishing.
- Kato, T., Ellis, J. and Clapp, C. (2014). The role of the 2015 agreement in mobilizing climate finance, Climate Change Expert Group, OECD and IEA.
- Klarer, J. (2011). Use of Economic Instruments to Promote Environmental Conservation in the United Republic of Tanzania. *AEquilibrium Consulting*, Pp. 113.
- Korea EximBank (2014). “Korea EximBank Green Bond Newsletter”, Korea EximBank, January 2014.
- Matsukawa, T. and Habeck, O. (2007). Recent trends in risk mitigation instruments for infrastructure finance – Innovations by providers opening new possibilities, May, GRIDLINES.
- Meze-Hausken, E., Patt, A. and Fritz, S., (2009). Reducing climate risk for micro-insurance providers in Africa: A case study of Ethiopia. *Global Environmental Change*, 19, 66 – 73.
- Micale, V., Frisari, G. and Mazza, F. (2013). Mapping the World Bank Group risk mitigation instruments for climate change, Climate Policy Initiative.
- Multiconsult, Nordplan (2014). GET FIT Uganda.

- Mungai, O. (2014). Private Investment Mobilization Instruments that Work. Presentation during LEDS Global Partnership. Addis Ababa, Ethiopia.
- Narbel, P., Hansen, J. P., and Lien, J. (2014), Energy technologies and economics, Springer International Publishing, Switzerland.
- New Climate Economy (2014). Better growth – Better climate.
<http://2014.newclimateeconomy.report/>
- Nganga, J., Wohlert, M., Woods, M., Becker-Birk, C. and Rickerson, W. (2013). Powering Africa through feed-in-tariffs. Heinrich Boll Stiftung, Johannesburg.
- Norad (2015). Food security in a climate perspective, Annual report 2014, Norad, Oslo.
<https://www.norad.no/globalassets/publikasjoner-2015-/food-security-in-a--climate-perspective-annual-report-2014.pdf>
- OECD (2015a). Climate finance in 2013-14 and the USD 100 billion goal, a report by the Organisation for Economic Co-operation and Development (OECD) in collaboration with Climate Policy Initiative (CPI).
- OECD (2015b). Mapping channels to mobilize institutional investment in sustainable energy, OECD Report to G20 finance ministers and central bank governors, OECD, Paris.
- OECD (2015c). OECD Environmental Performance Reviews: Poland 2015. OECD Publishing.
- OECD (1998). Swapping Debt for the Environment: The Polish Ecofund. OECD, Paris.
- Pauw, W.P. (2014). Not a panacea: private-sector engagement in adaptation and adaptation finance in developing countries, Climate Policy.
<http://dx.doi.org/10.1080/14693062.2014.953906>
- REN21 (2014). Renewables 2014 – Global status report. Renewable Energy Policy Network for the 21st Century, Paris.
- REN21 (2015). Renewables 2015 – Global status report. Renewable Energy Policy Network for the 21st Century, Paris.
- Rieger, S. (2015). GET FiT Uganda. Public-Private Infrastructure Advisory Facility (PPIAF), Washington D.C.
- Ringius, Lasse, Asbjørn Torvanger and Arild Underdal (2002), Burden sharing in international climate policy: principles of fairness in theory and practice, International Environmental Agreements: politics, law and economics, 2(1), 1-22.
- Scatec Solar (2015). Scatec Solar secures a 53 MW solar project in Honduras.
<http://www.scatecsolar.com/Investor/Stock-exchange-notices/Scatec-Solar-secures-a-53-MW-solar-project-in-Honduras>
- SELCO (2016). About us. http://www.selco-india.com/about_us.html
- Slengesol, I. (2016). Vi trenger flere som vil legge penger i fornybar energiteknologi. Teknisk Ukeblad.
<http://www.tu.no/artikler/vi-trenger-flere-som-vil-legge-penger-i-fornybar-energitknologi/276395>
- South African Government (2016). State of the Nation Address.
- Tadesse, M.A., (2015). Weather Index Insurance for managing drought risk in smallholder agriculture: lessons and policy implications for sub-Saharan Africa. Agricultural and Food Economics, 3, 1 – 21.
- Torvanger, A., Narbel, P. and Francke Lund, H. (2015). Estimating mobilized private climate finance for developing countries – A Norwegian pilot study, Report no. 4, CICERO.
- Trabacchi, C. and Stadelmann, M. (2013). Making adaptation a private sector business: Insights from the pilot program for climate resilience in Nepal, San Giorgio Group, Case study, December, Climate Policy Initiative.
- UNDP (2011). Catalysing Climate Finance – A Guidebook on Policy & Financing Options to Support Green, Low-Emission & Climate-Resilient Development.
<https://www.cbd.int/financial/climatechange/g-climateguidebook-undp.pdf>
- UNEP (2015). Indian solar loan programme overview. United Nations Environment Programme.
<http://www.unep.org/climatechange/finance/LoanProgrammes/IndianSolarLoanProgramme/ProgrammeOverview/tabid/29628/Default.aspx>
- UNIDO (2015). UNIDO Renewable Energy Program. Access to energy in peri-urban areas of Kenya using community power centers. Felix Kiptum and Paul Njuguna
- Wee, D. (2013). Going green? Buy a Kexim bond. Finance Asia, 22 February 2013.
<http://www.financeasia.com/News/334012,going-green-buy-a-kexim-bond.aspx>



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CICERO (Center for International Climate and Environmental Research - Oslo) was established by the Norwegian government in 1990 as a policy research foundation associated with the University of Oslo. CICERO's research and information helps to keep the Norwegian public informed about developments in climate change and climate policy.

The complexity of climate and environment problems requires global solutions and international cooperation. CICERO's multi-disciplinary research in the areas of the natural sciences, economics and politics is needed to give policy-makers the best possible information on which to base decisions affecting the Earth's climate.

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