



CHINA AND RENEWABLE ENERGY IN AFRICA: OPPORTUNITIES FOR NORWAY?

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Contact details

Oslo**Econ Pöyry**

Pöyry Management Consulting (Norway) AS
Post Box 9086 Grønland,
N-0133 Oslo
Norway

Visiting address:
Schweigaards gate 15B,
N-0191 Oslo

Telephone: +47 45 40 50 00
Telefax: +47 22 42 00 40
e-mail: oslo.econ@poyry.com

Stavanger**Econ Pöyry**

Pöyry Management Consulting (Norway) AS
Kirkegaten 3
N-4006 Stavanger
Norway

Telephone: +47 45 40 50 00
Telefax: +47 51 89 09 55
e-mail: stavanger.econ@poyry.com

<http://www.econ.no>

Enterprise No: NO-960 416 090

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SUMMARY AND CONCLUSIONS

Introduction

This study assesses the potential for Norwegian engagement in Sino-African renewable energy development. The study analyzes Norwegian competitiveness and complementarities towards Chinese energy actors in the African market, and identifies respective strengths and weaknesses against the backdrop of the African market. The report identifies barriers and opportunities for Norwegian commercial and developmental engagement towards upscaling renewable energy in Africa that may also apply to other OECD countries. Finally, the report points to possibilities for Norway to support sustainable Sino-African renewable energy development.

Background

The African market is seen as increasingly viable by foreign investors. Expected increased energy demand, underpinned by the poverty reduction agenda and combined with vast and untapped renewable energy potential, has spurred ambitions by African leaders to increasingly attract and facilitate renewable energy investments in the continent.

Discussions of renewable energy in Africa need to make two important distinctions: First between large scale hydropower and other renewable sources, and second between South Africa and the rest of sub-Saharan Africa. Hydropower is already a commercially viable sector in Africa, while other renewable at scale is dependent on appropriate grid infrastructure and Government schemes. In sub-Saharan countries, only South Africa has a developed market for renewable other than hydropower at present.

China is engaged in a number of large hydropower development projects in Africa. The market for solar and wind energy in Africa is emerging and China is posed to play a major role in further developments. At the Sino-African summit in 2009, Chinese premier Wen Jiabao announced that China will carry out 100 renewable energy projects (excluding large hydropower) in African countries. The concrete plans are expected to be announced soon.

Major Chinese renewable energy companies in wind and solar energy are now entering Africa on a large scale. The largest such project announced so far is the Lesotho Highlands Power Project, \$15 billion renewable programme backed by Chinese lenders and with Chinese wind turbine manufacturer Ming Yang providing the wind turbines. The project aims to install 6GW of wind and 4GW of pumped-storage hydro capacity in Lesotho's Maloti Mountains over the next 15 years.

Opportunities for Norway

Norway has an advanced energy-industrial complex, including a strong renewable power sector. Strengths include power market development, hydropower expertise, and some important business actors within solar power. In addition, Norwegian stakeholders also possess expertise within certain new energy sector technologies and the ICT sector, and have a track record of designing and supporting environmental policies and strengthening of institutional capacity.

Based on an analysis of potential demand related to Sino-African renewable energy projects and Norwegian strengths, the following opportunities are outlined:

- In the large hydropower sector in Africa many projects have Chinese financing or project development involvement with preference for Chinese companies, which generally limits opportunities for Norwegian business in Sino-African projects.

- In the wind energy sector Chinese companies have extensive experience with project development, production, installation and operation from their home market and demand for Norwegian products and services is likely to be limited.
- In the solar energy sector, Chinese solar PV producers lack experience with project development, operation and maintenance and there could be Chinese demand for experienced Norwegian/Western solar energy developers.
- Across sectors, Norway has potential in high-end niches such as hydropower turbines and operational systems, high efficiency solar cells, recycling of silica dust, ICT-systems and metering, grid modelling and operations systems.
- Finally, Norwegian actors are likely to be competitive in various specialist services related to assessing legal and political implications, performing Environmental Impact Assessments (EIA), carbon project development (e.g. CDM, voluntary carbon market), feasibility studies, financial modelling, stakeholder consultations, local development plans etc.

Barriers and support frameworks for Norwegian companies

For Norwegian actors, barriers to pursue such market opportunities include lack of capital, existence of safer options in Norway or other regions, undeveloped markets and unfavourable policies including fossil fuels subsidies, as well as weak governance frameworks, lack of contextual and cultural knowledge, and the risk of political instability.

A number of public schemes exist to address and mitigate these barriers, including extending subsidized loans and risk guarantees, providing market information, and strengthening the enabling environment through development assistance. According to our interviewees, there is a potential for utilizing existing instruments on a larger scale to support companies entering a high-risk region such as sub-Saharan Africa. Whether this is a result of mismatch between needs and available mechanisms, or simply reflects a lack of information, remains unclear.

Ultimately, for Norwegian companies willingness and ability to invest in the African energy market will be defined by each company's risk profile. A potential significant upside is mirrored by significant risks that the various mechanisms available cannot fully compensate for.

An original objective of this analysis was to explore the extent to which tripartite arrangements with Sino-Norwegian partnerships could mitigate risks and increase opportunities for Norwegian actors in Africa. Interviews and analysis point to two conditions under which such partnerships could be explored

- First, for most Norwegian firms, such partnerships are perceived as risks in themselves, not risk mitigation. Any joint venture would be contingent on increased mutual trust and knowledge, most likely coupled with confluent political interests and Government backing.
- Second, some areas do exist where Norwegian firms complement Chinese actors, and can offer either sector competence, niche products, or different approaches that may be in demand depending on the specific context. The latter is particularly relevant for local content and sustainability issues, subject to African preferences and requirements.

Public support remains an important differentiating factor between Chinese and Norwegian companies. For China, support to business engagement in China is a first step in a wider global expansion strategy and China is therefore willing to subsidize increased Chinese engagement through favorable loans tied to use of Chinese companies. Support to Norwegian companies abroad, on the other hand, needs to comply with international

standards and not stand in the way of more viable commercial alternatives. Similarly, development assistance from Norway cannot be used to promote the interest of Norwegian businesses.

Possible ways forward

Norway's main potential to provide added value in Sino-African upscaling of renewable energy possibly lies in targeted strengthening of market frameworks that can ensure sustainable and relatively fast renewable energy development in sub-Saharan Africa.

Providing services such as regulatory capacity building, strengthening of institutional frameworks, consultancy and advice on grid-development etc. in a targeted manner will strengthen the frameworks that shall ensure sustainability of Sino-African renewable energy development projects, as well as other renewable energy projects.

Norway already has a long and generally positive track record of providing support to energy sector development in sub-Saharan Africa, and there is a demand for this type of service especially from the African side. For the Norwegian cluster of competence in upscaling clean energy to play a distinct role in Sino-African development of clean energy, it would help if the Norwegian cluster engaged in distinct, focused and concrete initiatives addressing concerns and needs related to Sino-African clean energy development in selected countries.

Possible development of such initiatives should be guided by the African Energy Minister's Johannesburg Declaration (September 2011), which focus on the need for "accelerated and effective technology transfer and human resource development programs" to boost the capacity of African energy institutions and professionals and create "a network of regional centres of excellence".

INTRODUCTION

This study assesses the potential for Norwegian engagement in Sino-African renewable energy development.

The study analyzes Norwegian competitiveness and complementarities towards Chinese energy actors in the African market, and identifies respective strengths and weaknesses against the backdrop of African market. The report identifies barriers and opportunities for commercial and developmental engagement towards upscaling renewable energy in Africa that may also apply to other OECD countries.

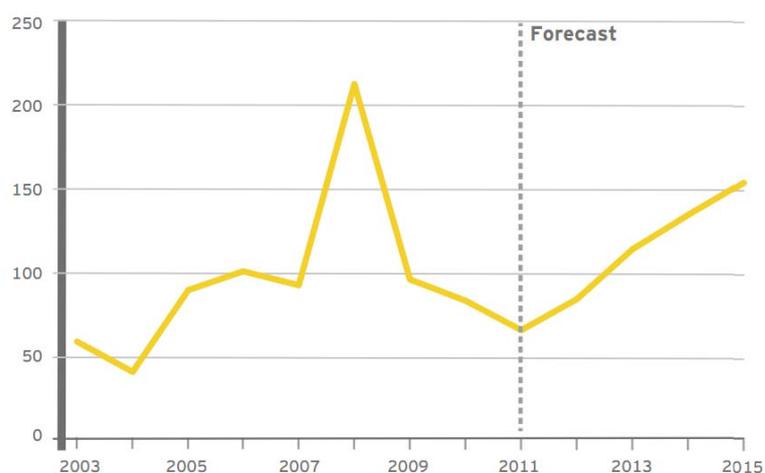
The study was commissioned by WWF-Norway. To contribute to the upscaling of renewable and sustainable energy in Africa is key to WWF's agenda of securing low-carbon development options that are compatible with mitigating climate change and ensuring ecological sustainability. The study has been carried out by Econ Pöyry on the basis of desktop studies and interviews with African and Norwegian stakeholders. A list of interviewees is provided in an annex.

1 CHINA AND RENEWABLE ENERGY IN AFRICA

1.1 THE POTENTIAL OF RENEWABLE ENERGY IN AFRICA

Western companies increasingly turn to Africa as an attractive region for investments. Capital investments in Africa from new Foreign Direct Investment are projected to grow significantly in the coming years (see Figure 1.1. below), in particular within power consuming industries, such as manufacturing and construction (Ernst & Young 2011). Industrial growth combined with expected increase in consumer demand will put additional pressure on the African power markets.

Figure 1.1 Capital investment in Africa from new FDI projects (billion USD)



Source: Oxford Economics/fDi Intelligence

Currently, Africa has the world’s lowest rate of access to modern energy services. Unless significant changes are made in policies and the pace of investments, more people in Sub-Saharan Africa will be without energy services in 2030 than today as a result of population growth (IEA et al. 2010).

Limited access to electric power represents a significant barrier to economic growth and poverty reduction in Africa. This is in particularly the case in sub-Saharan Africa. The entire power generation capacity of the continent stands at 124 GW, of which only 30 GW is in sub-Saharan Africa (excluding South Africa). 30GW equals the current total production capacity in Norway, a country with 5 million people. Sub-Saharan Africa has an estimated population of 700 million people (of which close to 50 million in South Africa). 70% of the population in sub-Saharan Africa lack access to electricity and in rural areas access to electricity is virtually non-existent outside of a few countries.

Increased renewable energy production in Africa is a priority for African leaders. At the African Energy Ministers’ meeting that was held in September 2011 in Johannesburg, the ministers announced that a dramatic ramp-up of renewable energy capacity in Africa is on top of their agenda going forward (African Energy Ministers conference 2011).

The renewable energy potential in Africa is vast. Renewable energy sources are abundant in the form of solar energy throughout the continent, as well as rich wind, hydropower, biomass and even geothermal resources in particular countries. WWF’s Energy Report (WWF 2011), estimates that Africa is the continent with the second largest potential, after Asia, for generating electricity from renewable sources. The study estimates that Africa has potential to annually produce 42,000 TWh from renewable energy sources by 2050.

Yet in the short term, fossil energy sources generally remain cheaper and simpler to use than renewable energy other than large hydropower. Development of renewable energy in sub-Saharan Africa requires special attention in terms of policy frameworks, infrastructure, and investment. Development of renewable energy production capacity is hampered by political and economic instability, lack of capital, lack of technical capacity, and poor regulatory and financial frameworks.

When assessing the renewable energy situation in Africa, two important distinctions should be made: First, the distinction between large hydropower and other renewable energy sources, and second, the distinction between South Africa and the other sub-Saharan countries.

First, large hydropower is already the primary source of electricity in many African countries, even though the potential remains far beyond current levels. 22 countries in Africa generate more than 50% of their power from hydropower, and for 8 countries this is more than 90% (EIA 2011). And yet, currently only 8 per cent of Africa's hydropower potential has been developed (Brautigam 2009). Medium scale hydropower development is also increasing, with more than a dozen countries having 20-60 MW hydropower plants, and even some recent CDM projects approved for this scale (e.g. Bugoye Hydropower in Uganda).

Outside of hydropower, however, renewable energy use is largely limited to remote off-grid applications. Solar home system, household and facility scale biogas digesters, improved cook stove projects, and LED lanterns are all making some progress in the continent, but the total amount of renewable power is very small.

Morocco, Egypt and Tunisia are the only countries in Africa at present with wind farms of more than a few MW, but similar developments are now happening (often with CDM funding) in Ethiopia, Kenya, Tanzania, and South Africa.

Second, South Africa is a very different position from the rest of Sub-Saharan Africa in terms of infrastructure and market maturity. South Africa currently represents the only large scale commercial opportunity for renewables other than hydro. South Africa is the only country with a large procurement plan for grid connected renewables. Uganda and Kenya have Feed-In Tariff programmes, but these are for smaller scale plants less than 20MW and 50MW, respectively, with annual limits for generation. A number of countries have improved their regulatory framework in the last few years, but infrastructure and regulations remain inadequate to absorb major investments and produce and distribute renewable power on a large scale. Building and improving institutional capacity and legal frameworks is urgently needed to enable scaled up access to renewable energy across the continent.

1.2 CHINA IS INCREASINGLY ENGAGING IN AFRICA

China's presence in Africa has increased significantly over the last decade, something which has spurred much writing and commentary in Western media. The topic is complex and a lack of precise data on the overall trends, coupled with anecdotal evidence, misconceptions and often biases among Western commentators, has created a largely negative and not very precise impression of China in Africa in Western media (Alden 2007, Brautigam 2009, 2011a). In this section, we briefly summarize the main points related to China in Africa, taking into consideration the most recent research.

During the past ten years, China has scaled up its presence in Africa. Growth in trade has increased tenfold from \$10.7 billion in 2000 to \$106.8 billion in 2008. In 2010, trade between China and Africa surpassed \$120 billion. The Heritage Foundation, an American think-tank, has estimated that in 2005-10 about 14% of China's investment abroad found

its way to sub-Saharan Africa (The Economist 2011). China is now Africa's largest trading partner, largest lender and largest investor in infrastructure.

China's increasing focus on and involvement in Africa has been positive for Africa in a number of ways. Increased investment and trade has contributed to economic growth. Specifically, China's increasing imports of natural resources from Africa is one of the main reasons for the strong economic growth we now see in many Sub-Saharan African countries and has contributed to a new economic optimism in the region. China is also playing an important role in improving African infrastructure on a large scale. Import of low-cost Chinese products has allowed many Africans to purchase products previously not affordable. China's increasing involvement has led traditional Western trading partners to increase their investments and assistance to the region significantly, to respond to the increased competition from China in the African market. The increased competition between foreign players offers more alternatives to African states compared to the past, when African countries were largely dependent on North America and European countries for trade.

China's engagement in Africa is part of the Chinese government's strategy of globalizing Chinese business. In this context, Africa is an underdeveloped market with needs and conditions similar to China's in the near past. Africa is thus a good starting point for many Chinese companies aiming to go global.

China provides development aid to almost all African countries, but in smaller amounts than each of the traditional Western donors (Brautigam 2011a). The big financial volume of China's engagement comes in the form of export credits. The "Chinese model" (which actually is based on Japanese practices) is to provide large export credits at competitive market rates, tied to Chinese machinery, equipment and construction services, with repayment in oil or other resources. This allows countries with a lack of cash and resources to get infrastructure needed for development, while Chinese companies get work and experience abroad.

China is establishing seven economic development zones in African countries, to allow Chinese industries to move offshore in groups and develop manufacturing abroad. Chinese exports and manufacturing are increasingly competing with African industries in their home markets and abroad, something which provides new challenges for African companies. On the other hand, the increased Chinese involvement in manufacturing in Africa is leading to increased market dynamism and also, increasingly, transfer of skills. While it is true that Chinese industry in many cases import Chinese workers for a limited period who live in compounds on site, the general pattern is that Chinese industry in Africa is increasingly relying on and developing skills of African employees (Brautigam 2009). Many Chinese workers stay behind after finishing their contracts, to pursue business opportunities in Africa while drawing on family and village networks and funding. There is thus also a wide network of smaller Chinese business activities in Africa primarily driven by Chinese individuals. This has contributed to Chinese migration to Africa over the last decade of up to 750 000 people (Brautigam 2009), although the numbers are uncertain.

The Forum on China-Africa Cooperation (FOCAC) was established in October 2000 and provides a framework for the development of Sino-African relations. At the last FOCAC meeting in 2009, Chinese Premier Wen Jiabao announced eight measures for the 2010-2012 Action Plan, intended to strengthen Sino-African co-operation (FOCAC 2009). The top story from the summit was the announcement of a \$10 billion low cost loan, twice the size of the loan granted from the FOCAC meeting in 2006. A \$1 billion special loan fund for small and medium-sized African businesses was also established. Wen announced that China will write off the debt of some of the poorest African countries and gradually lower customs duties on 95 percent of products from African states with which it has diplomatic ties. China will also provide investments and training related to agricultural technology, in order to help strengthen Africa's ability to improve food security, health

(especially combating malaria) and education (e.g. building 50 China-Africa friendship schools, training 1,500 principals and teachers, and providing scholarships to African students to study in China). The next FOCAC meeting will be held in Beijing in 2012 (FOCAC 2009).

1.3 CHINA AND RENEWABLE ENERGY IN AFRICA

China is now a world leader in renewable energy generation and cost-effective production of renewable energy generation products at scale, especially for wind and solar energy. Renewable energy technology in China is considered a strategic sector for technological development, and China has strong ambitions for gaining market share in the expanding global market (Econ Pöyry 2011). In this context, Africa is an increasingly attractive market that can also serve as a testing ground for Chinese companies embarking on a global expansion strategy.

China's engagement in renewable energy in Africa could potentially bring several benefits to Africa:

- Increasing access to electricity, increasing supply, improving energy security and reducing dependence on petroleum imports.
- Increasing the renewable energy share of energy mix, thereby mitigating climate change and reducing pollutants from fossil fuel energy sources.
- Supporting rural livelihoods with decentralized energy generation and local mini-grids in the absence of adequate national transmission systems.
- Stimulating knowledge transfer and development of an African renewable energy industry sector.

At the FOCAC meeting in 2009, Chinese Premier Wen Jiabao also announced that China would construct 100 clean energy projects across the continent, focusing on solar power, biogas and small hydropower, and also carry out 100 demonstration projects related to technology development and research. At the China-Africa Think Tank Forum on 28 October 2011, a representative of the Chinese Ministry of Foreign Affairs revealed that China has worked out country-specific plans for setting up projects in 11 African countries, including Ethiopia and Mozambique, and that projects will start in the near future (Xinhua 2011).

China has in recent years established itself as a major player in large-scale hydropower in Africa, leveraging technology and engineering expertise acquired through large scale development of hydropower in China in recent decades. The database maintained by International Rivers reports more than 70 major hydropower projects with Chinese involvement in Africa (International Rivers 2011). These include some of the largest power developments on the continent, such as Ethiopia's Gibe III (1870MW), Nigeria's Mambila (2600MW) and Sudan's Merowe (1250MW). The projects have typically been financed through resource-backed loans.

China's industrial engagement in renewable energy development in Africa outside of hydropower is still at an early stage. Of the seven economic development zones China is setting up in African countries, none are focussing on renewable energy industries (Brautigam 2011b).

China is now focussing on expanding its wind and solar PV industry in global markets, with lenders providing financial support for renewable projects in emerging markets in exchange for developers signing deals with Chinese wind and solar energy product manufacturers (Recharge 2011a). Major Chinese renewable energy companies are now about to enter Africa on a large scale in sectors such as wind and solar energy.

The largest such project announced so far is the Lesotho Highlands Power Project. This is a \$15 billion renewable programme backed by Chinese lenders and with Chinese wind turbine manufacturer Ming Yang providing the wind turbines. The Lesotho Highlands Power Project aims to install 6GW of wind and 4GW of pumped-storage hydro capacity in Lesotho's Maloti Mountains over the next 15 years. Much of the electricity will be purchased by state owned South African utility Eskom. The first stage of the project, a 150MW wind park, is scheduled to start construction next year.

The Chinese wind power company Ming Yang recently announced that it has secured a USD 5 billion loan from the China Development Bank for the period 2011-15, to support its expansion plans in China and abroad (Recharge 2011b). Chinese turbine producer Goldwind, one of the world's largest turbine producers, has during the course of 2011 won a turbine deal in Ethiopia and opened an office in Cape Town, South Africa (Recharge 2011a). China LongYuan Power Group Corporation has a joint venture in South Africa for the development of 5 large scale wind power projects (Mulilo Energy 2011). Two of these projects (De Aar and Springbok) are already undergoing validation as potential CDM projects (Fenhann 2011). Other Chinese turbine makers, such as Dongfang and XEMC, are also pursuing plans to establish manufacturing footprints in Africa.

Also Chinese PV companies are showing increasing interest to gain a toehold in Africa. Suntech, one of the world's largest solar PV producers, has signed a memorandum of understanding with a South African developer. Yingli Green Energy International Trading Company Ltd also has a CDM proposal at validation in South Africa for a 20 MW solar PV project, under the local company name Yingli Green Energy SA.

2 SINO-AFRICAN CHALLENGES AND NORWEGIAN OPPORTUNITES

In this chapter we will first look at the challenges related to Sino-African cooperation on renewable energy. These technological, institutional, political or other challenges, may represent opportunities for engagement of Norwegian (or other) stakeholders. We then map out relevant Norwegian competencies and assess the match between these competencies and the challenges facing Sino-African renewable energy projects. The focus is on how Norwegian competencies could strengthen and support the effectiveness and sustainability of Sino-African projects.

2.1 POTENTIAL CHALLENGES IN SINO-AFRICAN RENEWABLE ENERGY PROJECTS

Currently there are few Sino-African renewable power projects actually taking place on the ground in Africa outside of the large hydropower sector. In this section we describe potential challenges for Sino-African projects, based on relevant experiences in other sectors, available information from existing projects (mainly hydropower), as well as our knowledge about the African power markets.

2.1.1 *Generic challenges*

There has been significant and wide-ranging critique of Chinese infrastructure development projects in Africa, with focus on issues such as corruption, labour conditions, human rights and lack of local development (Alden 2007, Brautigam 2009, 2011a). This is a complex issue, which it is not possible to address fully here, and where there are diverse examples from different countries, which all have their own unique context.

Broadly speaking, Chinese projects in Africa reflect the standards Chinese companies apply at home. China is a developing country with a nominal GDP per capita in 2010 of USD 4,382 (IMF), which is less than 10 per cent of Finland's per capita GDP (44,496) and about 5 percent of Norway's (84,144). China is still in the middle of an industrialization process where cheap labour and weak environmental regulations have been characteristic elements. This is about to change in China, with the 11th Five Year Plan 2006-2010 increased focus on environmental issues, the establishment of a Ministry of Environmental Protection in 2008, and as reflected in president Hu Jintao's focus on the "Harmonious Society".

The generic challenges for Chinese projects in Africa reflect general Chinese challenges and work culture. With regards to labour, this includes issues such as top-down management, lack of labour standards conforming to international standards, and long working hours. With regards to project management this often includes lack of local consultation and community development initiatives, and may include corruption and ignoring local environmental regulations. Often these problems are multiplied by the fact that many African countries have weak legislative regimes and standards related to social and environmental aspects of development, poor enforcement of existing regulations, and by cultural and communication differences.¹

¹ For a nuanced and generic description of main issues, see Brautigam (2009: 299-306): "China gains business with low social and environmental standards".

2.1.2 *Specific challenges related to renewable energy and the environment*

In terms of the environment, Chinese companies have been documented to be implicated in illegal harvesting of old-growth timber and illegal fishing, violation of environmental laws and in obtaining concessions without regard to the rights of local communities (Mackenzie 2006, Milledge et al. 2007, Reinvang and Tobiassen 2009, Brautigam 2009).

In August 2007, China's State Forestry Administration and the Ministry of Commerce (MOFCOM) released guidelines that Chinese logging companies are expected to use abroad and which include an emphasis on consulting and compensating local communities. There are no sanctions for not following the guidelines, however, and without much civil society activism in China to hold Chinese companies accountable, progress can be expected to be slow (Brautigam 2009).

Hydropower dams are at the centre of much of the social and environmental critique of China's role in Africa. Sudan's Merowe Dam is so far the most extreme example of a problem project, with the UN raising concerns over violations of the human rights of 60,000 people living in the project area (UN 2007). In 2006, Sudanese police shot and killed several farmers during a protest over forced resettlement (Brautigam 2009).

Failure to address and mitigate adverse social and environmental impact is not a solely Chinese phenomenon. Large scale hydropower has significant social and environmental consequences, but also potential economic benefits for the poor in terms of increased clean energy access. In response to controversies, safeguards and compensation schemes have been upgraded within international development agencies over the last few decades. Fledgling efforts to upgrade Chinese planning systems and business practises to better include social and environmental sustainability dimensions are also gradually contributing to raising standards for Chinese projects abroad. For example, in 2008, the China Exim (Export-Import) issued social and environmental impact assessment standards including land rights and resettlement as concerns (Brautigam 2009). Such standards are especially important in countries with weak legislative regimes related to social and environmental issues, which is often the case in Africa.

Corporate Social Responsibility (CSR) is still a new concept in China, and something Chinese companies with global ambitions will need to understand and adapt to. For Chinese companies operating overseas, CSR is usually understood as building schools and clinics – and with no concept of the human rights core of the issues (Brautigam 2009: 304). The positive side is that Chinese government institutions and Chinese companies have begun to address such issues. China's state-owned companies are moving to develop positive global reputations and brands, and are often eager to learn (Brautigam 2009). Chinese companies engaging in Joint Ventures with Western companies are often pushed by their partners to apply international standards. In addition, Chinese developers have begun to use international consultants for social and environmental issues.

In 2007, the World Bank's International Finance Corporation (IFC) and the China Exim Bank set up a memorandum of Understanding, after which IFC staff began training Chinese banks and ministries in the "Equator Principles". The Equator Principles are a voluntary set of social and environmental principles for sustainable lending practises which the World Bank has been promoting since 2002.

2.2 NORWEGIAN RENEWABLE ENERGY COMPETENCE

Norway, largely due to its natural resources has an advanced energy-industrial complex, including a strong renewable power sector. Norway also has a track record of applying high environmental standards across industries.

Power Market development. The Nordic power sector is characterized by advanced market structure and a sophisticated financial energy exchange market (Nord Pool). Nord Pool Spot runs the leading power market in Europe and offers both day-ahead and intraday markets to its customers. 350 companies from 18 countries trade on the market. In 2010 the group had a total turnover of 310 TWh, which includes the auction volume in the UK market N2EX.

Norwegian power consultants have been instrumental in establishing and developing the Nordic power market during a deregulation process over the last 20 years. During the past few years, several such companies have also been engaged in developing regional power pools in Africa, such as the SAPP (South African Power Pool) and EAPP (East African Power Pool). As renewable production capacity is growing, there will be an increasing need for well-functioning markets in Africa connecting countries.

Norway has an advanced **hydropower sector**, with the majority of Norway's electricity coming from hydropower generation. Several hydropower companies are already engaged in hydropower development in emerging markets, such as Agua Imara (part of SN Power) and Trønder Energi (which recently developed a 13MW power plant in Bugoye, Uganda). Norway also has a cluster of energy engineering and energy management consulting companies with extensive experience from work in developing countries, often partly funded by Norwegian foreign development aid.

In the **solar sector**, Norway has several companies and leading research organisations. The largest Norwegian solar company is REC, with production in Singapore, USA and Norway. REC was among the top-10 solar producers in 2010. REC originally entered the rural solar energy off-grid markets as a pioneer in several African markets through the subsidiary company Solar Vision (PTY) Ltd. in South Africa. In 2009, REC sold Solar Vision and announced that rural solar energy off-grid markets are no longer defined as core business for REC (REC 2009).

Elkem Solar (owned by the Chinese company Blue Star) and Norsun are other examples of Norwegian solar PV panel producers. Scatec Solar is a turn-key supplier of solar PV solutions, with a global portfolio of projects including West and South Africa as well as India. In 2010 Scatec Solar was ranked among the world's top 15 installers of solar PV systems (Scatec Solar 2011). The Norwegian company Metallkraft has developed a technology for effective recycling of silicon dust, and runs factories for that purpose along solar PV production plants in China and in Singapore (REC).

Wind energy is big in Europe but Norway is not among the leading European countries. In 2010 Norway had installed capacity of 434MW (WWEA 2011). Norway still has a number of companies with experience in turbine development, supported by accumulated expertise related to offshore wind development and meteorological mapping. Several of Norway's hydropower companies have branched out into wind energy abroad. The major example is Statkraft, Europe's leading producer of renewable energy, which is engaged in the development of offshore wind parks in the North Sea as part of the Forewind consortium. Another example is Vardar, which is engaged in offshore wind energy development in the Baltic States and wind parks in China. NBT is another Norwegian company engaged in the development of wind parks in China.

Finally, Norway is at the forefront in development of **new energy sector technologies** including carbon capture and storage technologies, deep sea off-shore wind development, and early stage solutions such as harnessing the energy generated by the meeting of freshwater and salt water (“salt-power”). Norway also has leading research organisations and small and medium sized companies in the **ICT-sector**, with advanced technologies and systems applicable for energy trading, on-line metering and energy efficiency.

Norway was the first country in the world to establish a Ministry of the Environment in 1972. In the decades from 1972 until 1994 Norway was a pioneer in developing **environmental policies and legislation**, which contributed significantly to the development of environmental legislation in the EU in the 1990s together with examples from the other Scandinavian countries. Since the mid-1990s Norwegian environmental policy has largely been aligned with EU’s, which in general terms can be said to represent global best practice.

Norway’s pioneer position in developing environmental standards has produced world-leading companies providing **environmental management services** and risk management. The prime example is DNV, which has provided services worldwide since 1867 and has been present in China for more than a century. DNV currently has 9,000 staff and is one of the major certification bodies internationally for environmental standards (ISO) and validation and verification of carbon offset projects under the Clean Development Mechanism (CDM) and Joint Implementation (JI) mechanism of the UN Framework Convention on Climate Change (more specifically the Kyoto Protocol).

There are a whole suite of services related to **strengthening institutional capacity** in African countries that are crucial for developing renewable energy in Africa. Many Norwegian consulting companies are already engaged in these projects and the scope for further engagement is potentially large. Current examples include Norwegian consulting companies supporting the Mozambique national utility in JV negotiations for new power plants, conducting scoping studies on accessing forest carbon financing in Uganda, providing advice and recommendations to South Africa’s internal electricity market system and trading platforms, as well as support to the Regional Electricity Regulators Association (RERA) of Southern Africa.

Transfer of best practice and institutional capacity development related to environment and energy has been an important focus in **Norwegian development aid** in recent decades, in Africa (especially Eastern and Southern Africa) as well as China. While Norway’s Oil for Development initiative supports institutional and legislative improvements in developing countries with significant petroleum resources, its younger “brother” Clean Energy for Development initiative has been established as a common umbrella for development assistance towards the development of energy markets and infrastructure. Liberia, Mozambique, Tanzania, Uganda, Nepal and Timor-Leste are focus countries for the Initiative. Norway has also recently announced a new initiative called “Energy+”, through which Norway and partner countries and multilateral institutions will provide performance-based funding for the scaling up of renewable energy in pilot developing countries (Energy for all conference 2011).

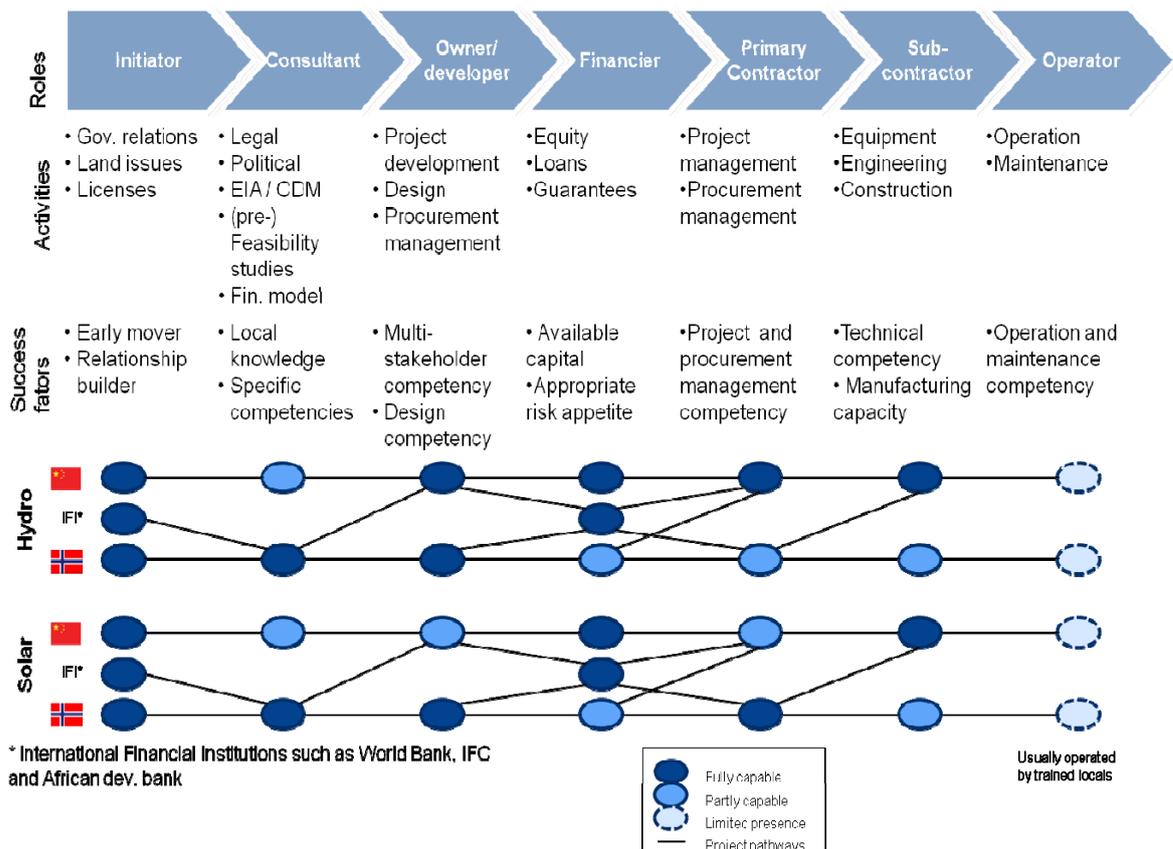
2.3 POTENTIAL FOR NORWEGIAN COMPANIES IN SINO-AFRICAN PROJECTS

2.3.1 Potential demand from Chinese stakeholders

In the large hydropower sector in Africa many projects have Chinese financing or project development involvement, but the Chinese investors would normally try to ensure that Chinese technology is used with Chinese financing. This would limit opportunities for Norwegian companies, unless the government insisted on having a tender process for the contractor even after Chinese financing had been committed (e.g. the Ethiopia case for Gibe III).²

In the wind energy sector Chinese companies have extensive experience with project development, production, installation and operation from their home market. It is difficult to see a Chinese demand for Norwegian products and services here, besides some consultancy services in areas where international standards are required. In the solar energy sector the situation is different. Chinese solar PV producers are used to produce and export solar PV panels to an international market, but have limited experience with project development, operation and maintenance. In Sino-African solar PV projects there may thus be demand for experienced Norwegian/Western solar energy developers.

Figure 2.1 China and Norway's match with hydro and solar development in Africa



Source: Econ Pöyry (2011).

In some cases Norwegian companies may produce or have potential to produce high-end products that are relevant for Sino-African renewable energy development projects.

² The current Gibe III hydropower project in Ethiopia has Chinese financing, but an Italian project developer.

Norwegian companies may have potential competitive edge in niche markets such as hydropower turbines and operational systems, high efficiency solar cells, recycling of silica dust, ICT-systems and metering, grid modelling and operations systems. Being part of the value chain for Sino-African renewable energy projects can provide a significant business opportunity in niche markets.

Finally, when developing a renewable energy project, a number of specialist services are needed, related to assessing legal and political implications, performing Environmental Impact Assessments (EIA), development of CO₂ emissions reduction projects (e.g. CDM, voluntary carbon market), feasibility studies, financial modelling, stakeholder consultations, local development plans etc. This is an area where Chinese companies often lack some competences and where there is a market for Norwegian and international consulting companies with such knowledge. As an example of this in the Sino-African Longyuan-Mulilo wind power development project in South Africa, the CDM consultant used is a Dutch-Russian joint venture with a South African office (Blue World Carbon).

2.3.2 *Potential from an African perspective*

It is useful to think of the African renewable market, and accompanying stakeholders, in three categories: the South African utility-scale market, the African large hydro market, and the African non-hydro renewables market.

For the South African utility-scale market, this consists of a government procurement process mainly for large scale wind and solar (with some biomass and land fill gas power as well). The process used many international advisors in the earlier stages, to support the government and regulator in the analysis necessary to set terms for the tariff proposal and then for the bidding proposal. The scale of investment and skills required is such that almost all bidders have multiple companies from multiple countries, so it would be possible for Norwegian technology companies to partner with consortia that included Chinese financiers or technology companies. Norwegian companies could contribute to other consortia, as well as providing niche services to successful bidders. This market, therefore, has significant potential for Norwegian companies, but not necessarily in the support of Sino-African projects.

Table 2 Potential engagement of Norwegian companies in Sino-African clean energy projects

Type of company	Services provided	Key Client				Business Potential
		China private partner	African private/parastatal	African government	Other investor with Chinese contractor	
Project Developer	Turnkey engineering and construction	-	?	-	-	Very limited, except in consortia (South Africa)
Technical sub-contractor	Engineering design, specialist technologies	√	-	-	√	Limited, niche markets
Consultant to public sector	Market design, institutional and regulatory capacity building, environmental standards and procedures	-	√	√	-	Significant
Consultant to private sector	EIA/ESIA services, stakeholder engagement, CDM services, licensing	√	√	-	√	Mixed, depends on project type

The large hydro market in Sub-Saharan Africa is a relatively mature market, driven by government decisions to develop new power resources. In large hydropower projects there may be niche opportunities for Norwegian companies for environmental services, carbon consulting, and stakeholder engagement. With a large undeveloped hydropower potential, there are many business opportunities outside of Sino-African projects. The main business opportunities for Norwegian hydropower companies would seem to lie in turn-key development of small to medium hydropower plants.

The final market is the non-hydro renewables market, which is only viable in Africa with significant financial support from governments and donors. In contrast to the large hydro market, this market only really exists at scale where there is government support of some form, and an appropriate regulatory environment. Here the main barrier to increase investment from Chinese and Norwegian players is the regulatory environment and institutional capacity. Even for off-grid and rural power, where renewables are generally cost competitive already with traditional energy sources, private investment requires the appropriate regulatory environment (e.g. concessions for off-grid power, Power Purchase Agreements (PPAs) for small scale renewables feeding mini-grids or national grids, reducing subsidies for diesel generation). This is an important niche market, therefore, for Norwegian companies with these skills. Many African governments and utilities are familiar not only with Norway's historical involvement in regulatory and market issues, but are also familiar with the many Norwegian consultancies that operate in this field. There is a demand for more of this type of work, particularly to share the emerging experiences from South Africa, Uganda, Kenya and countries in Northern Africa with other countries in Africa.

2.4 A NORWEGIAN COMPANY PERSPECTIVE

Engagement of Norwegian companies in Africa fundamentally depends on whether the companies believe that Africa is an attractive market for them. Norwegian companies we have interviewed are beginning to see business opportunities in renewable energy in Africa as attractive, as many countries in Africa are showing growth figures close to the ones in China and India. The actual engagement of stakeholders of the Norwegian renewable energy-industrial complex in Africa is still modest, however. The few big Norwegian power companies with muscle and potential to be real partners for major Chinese renewable energy developers in Africa (e.g. REC, Statoil and Statkraft) have no plans in the near term to engage in renewable energy development in Africa.

Hydropower. Norwegian regional power companies are receiving stable cash flows from hydropower operations in Norway, which to some extent are invested internationally. The Norwegian regional power companies are in different stages of development with respect to African operations. Trønderenergi is already building and operating hydro power plants in Uganda while others are assessing a range of projects identified by international financial institutions and African governments. There are also companies that are considering entering the African continent after having operated in other regions. Despite the risks and potential downsides, the Bugoye 13MW project in Uganda is reporting satisfying profits.

Besides return on investments, to build capabilities and attract talent are important drivers for Norwegian hydropower companies to pursue international operations. The Norwegian power sector is mature, and most available sites have been developed. Further development on existing plants is limited to regular maintenance and scheduled upgrades. Greenfield development of hydropower in other countries represent great opportunities to maintain crucial competences as well as providing learning fields and testing grounds for state-of-the-art technologies and practices. The new generation of skilled employees in Norway are consistently placing international opportunities as one of their top priorities when assessing where they want to work and build their careers.

Given the opportunities they see in Africa the Norwegian hydropower companies do not see much potential in acting as sub-contractors to big Chinese hydropower companies. The opposite set-up is seen as much more viable, but then they would go to a global market for sourcing. The Norwegian companies report that the increased Chinese involvement in hydropower in Africa is maturing the market and thereby also opening up possibilities for Norway.

With respect to types of projects to embark on, the niche for Norwegian companies is perceived to be small- to medium-sized hydropower, where there is limited competition from the Chinese at the moment. The undeveloped potential is huge and there are plenty of opportunities outside the scope of Sino-African projects. The Norwegian companies see Chinese companies having a role in small- to medium-sized projects as contractors and sub-contractors with low prices and medium to high quality of delivery, according to our interviewees and their past experience from this type of project elsewhere.

Solar power. Our interviewees report that while solar technology generally suffers from limited financing and cost disadvantages compared to other technologies in the international market, the barrier is lower in Africa. Africa is therefore an interesting market of opportunity. Some Norwegian solar companies are capable of managing large PV development projects, including complex governmental and stakeholder relationship management. This is seen as a competitive advantage compared with Chinese solar companies, which generally lack this type of experience. Norwegian solar companies therefore see potential for partnerships with Chinese companies, with the Chinese side as turnkey- and technical contractors. Currently, the market for on-grid solar power is most mature in South-Africa and partially in Kenya and Uganda, whereas the market for off-grid

is much larger. When appropriate grid-access is in place, the market for on-grid will grow considerably.

Norway also has a company, Metallkraft, providing recycling of silicon slur services that reduces material loss in the PV construction process. This company has its own facilities for this purpose located beside factories producing PV panels in China and Singapore (REC), in accordance with agreements with the producer. In general terms, such a company has potential to grow with an increased Chinese production of solar PV panels for the African market. The company does not, however, see production in Africa as a possibility in the near future.

3 BARRIERS FOR NORWEGIAN STAKEHOLDERS

In sections 3.1 and 3.2 below we explain the barriers highlighted by the 10 Norwegian renewable energy companies we have interviewed. We have also independently assessed the list and believe it is representative of the main issues. In section 3.3 and 3.4 we discuss possibilities to overcome these barriers with the use of different Norwegian policy tools and models for international cooperation.

3.1 GENERAL POLITICAL AND COMMERCIAL RISKS

Political risk. The African continent is regarded by Norwegian companies as economically underdeveloped, with unpredictable political regimes and unstable economies, creating a harsh environment for investments and long-term projects. One type of political risk is related to unclear or uncertain policies, be they fiscal, monetary, trade, investment, industrial, income, labour or developmental. This could include government currency policy, regulatory changes, sovereign credit defaults, endemic corruption, conflict and wide shifts in policies due to changes in governments. In many instances the local authorities operate quite independent of the central government, and have their own incentives for cooperation. Another type of political risk is political instability, and includes unforeseen events such as terrorism, riots, coups, civil war, and insurrection. The political risk is particularly large for very big investment projects that will operate for decades, and could affect the earnings, the work force as well as the integrity of the physical capital in the form of infrastructure.

Bureaucratic processes. The process for setting up companies and projects many countries in Africa is highly bureaucratic and managing the complex legal requirements and regulations is costly. While improvements have been documented in a number of countries by the IFC and World Bank's Doing Business Index,³ important red tape remains in many countries.

Undeveloped markets. In many African countries, there is a lack of a proper regulatory framework for the power market, and particularly renewable energy, and a non-existent market regulator. This makes it difficult to compete on equal terms, in many instances favouring the incumbents (which are often government-owned fossil fuel-based companies). In most countries in Southern Africa, one power company dominates the market completely.

Cheap fossil alternatives. Energy from coal-fired power plants is cheap and represent the main competing technology for renewable energy. Most African national regulatory systems do not provide incentives for renewable energy, and many implicitly subsidise fossil fuels through tax benefits, state owned enterprise control, and providing security for financing.

Lack of cultural understanding. To succeed with infrastructure projects in Africa, the developer needs to offer value to all stakeholders, on a national as well a local level. This is complicated. African governments have clear national-wide objectives targeting production capacity, grid coverage and clean energy. But the local communities often have other immediate goals, and those living around transmission lines may not benefit from the lines directly. Not managing local community expectations may cause problems of theft and vandalism, while finding a way to manage local community expectations in a reasonable manner is complicated and a often a long and tedious process, according to our sources.

³ <http://www.doingbusiness.org/>

3.2 BARRIERS ON THE NORWEGIAN SIDE

Lack of capital. Lack of capital is always a barrier to investment, in particular for small companies and for high risk projects. While Norwegian companies will raise capital in a competitive Western environment, Chinese companies will in many instances have easier access to capital from Chinese banks.

Safer alternatives at home limit international ambitions. Many Norwegian power companies are managing a stable portfolio of power stations with predictable cash flows and lack the drive to expand their operations internationally. The alternatives, namely investing in the capital market or paying out generous dividends, are often seen by the owners as better options than international growth.

Attractive alternatives in other regions. For Norwegian power companies with international ambitions, there are a number of places to operate with considerably lower risks and higher returns than the African continent. Currently, the Balkans, Turkey and Georgia represent attractive opportunities for European power companies. The countries in this region are increasingly showing stability, economic growth and steady demand for clean energy.

Lack of skilled labour, capacity and costs. Norwegian companies often lack sufficient human resources to run large-scale renewable projects on their own. This is particular the case for large-scale hydropower projects. The cost of skilled labour from Norway is in the range of 10-20 times the cost of skilled labour from China. Local labour lack the skills necessary and proper training is time-consuming and costly.

Uncoordinated action. Norwegian companies operate independently. This has led to instances where Norwegian companies have been bidding and competing against each other for the same renewable construction project. In comparison, Chinese companies are often operating in a coordinated manner as consortia with clear common objectives and bidding together for projects benefitting all the participating companies.

3.3 DOES NORWAY HAVE APPROPRIATE TOOLS TO OVERCOME BARRIERS?

In light of barriers discussed above, and underpinned by official ambitions to increase the presence of Norwegian business in Africa, a number of support schemes are available. Norwegian firms entering the African market can apply for support for feasibility studies, matchmaking services, loans, and investment guarantees, among others.

- A number of mechanisms can help raise necessary **capital** through various financial tools including equity and loans. Actors include Norfund and its subsidiary Agua Imara, and subsidized export credits and investment guarantees through Norwegian and multilateral institutions. In 2008, *Statens Investeringsvesen AS*, later Investinor AS, was established to invest in small entrepreneurial companies with international potential in business areas of particular interest to Norway, including energy.⁴
- To address **risk related barriers**, efforts have been made to ensure a more consistent policy towards developing countries in general and Africa in particular. In 2007, the Government presented its platform for a comprehensive Africa policy (Utenriksdepartementet 2007), and in 2008 a national commission presented the green paper "*Samstemt for utvikling (NOU 2008:14)*" on how to make Norway's development policy more consistent across development assistance and trade relations (Utviklingsutvalget 2008). For energy business actors in Norway, lack of infrastructure including grids, and immature energy markets with weak institutions and

⁴ www.investinor.no

policies constitute important barriers. Norad's Clean Energy for Development Initiative (launched 2007) supports a number of African countries in developing their energy markets and institutions, as well as building human capital (Norad 2011).

- Limited **market knowledge** can be a barrier particularly to small businesses with good investment alternatives at home or in other markets. Norad and Innovation Norway can provide support for market and feasibility studies. Joint efforts to build knowledge about new markets and invest in marketing can reduce costs with similar benefits. A recent example is the visit of Norwegian Minister of Trade, Mr. Trond Giske, and Norwegian Minister of Environment and Development, Mr. Erik Solheim, to Angola, Ghana and Mozambique with a Norwegian trade delegation 20-25 November 2011. Seminars, workshops and match-making related to hydropower development were on the agenda in each country during the visit.

Box 3.1 Energy Norway – the Energy and Development project

Energy Norway (*Energi Norge*) is a trade organization representing around 270 Norwegian partners with various energy related businesses/activities. In 2009 Energy Norway launched a three year project on Energy and Development, with the aim to engage the commercial sector for a longer term involvement in developing countries. Some of the key achievements under this project:

- Production of a compendium of international standards for environmental and social performance in renewable energy projects to guide investors.
- Study identifying key success factors and challenges for commercial clean energy investments in developing countries.
- Organization of a dialogue between industry, civil society and government representatives on international standards and best practice to achieve sustainable hydropower development, including issues such as indigenous peoples, benefit sharing, human rights, national and international law, environment, anti-corruption and transparency.

Source: Energi Norge www.energinorge.no

3.3.1 Raising capital

The most important public mechanisms are probably those that can help raise capital. Possibilities include debt and equity financing, export credits, investment guarantees and insurance schemes. The Norwegian governmental financial institutions Norfund, former Eksportfinans, and Garanti-Instituttet for Eksportkreditt (GIEK) exist for this purpose, in addition to IFC which mainly targets large companies, possibly in partnership with smaller ones.

Export credit financing through subsidized loans

Commercial Interest Reference Rate (CIRR)-loans are fixed rate loans extended to exporters with interest rates equaling government bonds plus one percentage point. The interest rate level is fixed at the time of contract signing between exporter and importer, while the loan is typically disbursed at a later stage. The borrower may choose between the fixed CIRR rate *or* the current market rate at the time of disbursement, effectively hedging against risks in interest rate fluctuations. The foreign share of goods and services may represent up to 50 percent of contract value, and a maximum of 30 percent can originate from the importing country. For low income countries, issued loans are valid for a ten year period. From July 2012, the Norwegian Government will assume responsibility for the arrangement, until now managed by the private bank coalition **Eksportfinans**, and funded by interest rate compensation over annual budgets (NHD 2011).

Equity financing and loans through Norfund and IFC

Norwegian development funds are also channeled through **Norfund** who invests both directly in commercial projects and through various development-oriented investment funds. Norfund's mandate is to "... establish viable, profitable enterprises that would not otherwise have been established because of high risk".

Norfund invests equity, directly in enterprises and indirectly through funds, as well as providing loans to individual companies. Specifically, Norfund's portfolio is distributed in four investment areas: Financial Institutions, SME Funds, Renewable Energy and Industrial Partnerships. 45 per cent of Norfund's new investment commitments in 2010 were in Least Developed Countries (LDCs) (Norfund 2011).

In pursuance of its renewable energy investments, Norfund and Statkraft co-own the hydropower company SN Power which focuses on business opportunities in emerging and developing markets. SN Power has a separate Africa arm - **Agua Imara**. Agua Imara was founded by SN Power and Norfund in 2009 as the SN Power Group's vehicle for expansion into primarily Africa but also Central America (Agua Imara 2011).

Norway is a significant donor to the **International Finance Corporation (IFC)**, part of the World Bank Group, which also extends various financial tools and support enabling conditions for private sector growth in developing countries. There is no standard application form for IFC financing. A company or entrepreneur, foreign or domestic, seeking to establish a new venture or expand an existing enterprise can approach IFC directly. IFC does not lend directly to micro, small, and medium enterprises or individual entrepreneurs, but many investment clients are financial intermediaries that on-lend to smaller businesses (IFC 2011).

Clean Development Mechanism (CDM)

The Clean Development Mechanism (CDM) under the UN Climate Convention's (UNFCCC) Kyoto Protocol opens up possibilities for emitters in developed countries (more specifically the signatories in Annex 1) to get CDM credits (CERs) from financing greenhouse gas mitigation projects in developing countries. This opens a channel of funding for renewable energy projects in Africa. Uncertainty around the near-term outcome of international climate negotiations has, however, led to a decrease in investments in CDM-projects post 2012. Although strictly speaking the CDM does not expire in 2012, its exact future format is yet to be defined.

According to the World Bank, investments in 2010 fell to just a fifth of its record high in 2007 of \$7.4 billion. Uncertainties impact both the price of CDM credits and the profile of demanded projects. A challenge with CDM has been its limited rollout in the poorest countries. China and India account for approximately 40% and 20% of registered projects respectively. Currently, only 21 of the 2,767 registered CDM projects are hosted by LDCs (UNFCCC 2011). One effect noted by investors on current uncertainties has been a shift in demand towards CDM projects in the LDCs because these are sure to be accepted into the EU Emissions Trading Scheme post-2012, according to EU law (Risk.net 2011). Norad at present does not support the preparation of CDM applications due to uncertainties about the future form of CDM.

Guarantees offered by GIEK and MIGA

GIEK guarantees for Norwegian companies' export credits on behalf of the Norwegian Government. GIEK's mandate is to promote Norwegian exports and foreign direct investments and its guarantees enable exports and investments in high risk markets.⁵

⁵ Similar to other guarantee institutes in OECD countries, GIEK is governed by OECD guidelines to screen investments for corruption, environmental degradation, or adverse effects on cultural heritage or local business. OECD-based

Norwegian companies investing in a developing country are also in principle eligible for insurance through the Multilateral Investment Guarantee Institute – MIGA (MIGA 2011). MIGA can help investors and lenders deal with these risks by insuring eligible projects against losses relating to: (i) Currency inconvertibility and transfer restriction; (ii) Expropriation; (iii) War, terrorism, and civil disturbance; (iv) Breach of contract; and (v) Non-honoring of sovereign financial obligations.

3.3.2 *Advisory services and joint efforts*

For small business in particular, insufficient market knowledge or country network can constitute a barrier to entry in new markets.

- **INTPOW** is a membership-based non-profit organization established in cooperation between Norwegian Ministry of Oil and Energy and the Norwegian renewable industry business. INTPOW aims to facilitate export of Norwegian renewable energy products and services. INTPOW typically provides market analysis of international markets and facilitates contacts, relevant study tours and conference participation. INTPOW's priority markets are (INTPOW 2011) hydro power markets (priority South East Europe), offshore wind markets (priority UK and Germany) and solar PV markets (Southern Europe/Italy). Under hydropower markets, INTPOW lists South Africa and Mozambique as second priority and that sub-Saharan Africa in general is "under observation" (INTPOW 2011).
- **Innovation Norway (IN)** is the Norwegian Government's main instrument for innovation and development of Norwegian enterprises and industry. IN supports companies in developing their competitive advantage and enhancement of innovation, and provides competence, advisory services, promotional services and network services. IN is the Norwegian government's official trade representative abroad and aims to assist Norwegian businesses grow and find new markets. In China, IN facilitates the Norwegian Energy and Environment Consortium (NEEC), which has as its vision to use Norway's energy and environment legacy to promote a sustainable future for China.
- To help Norwegian businesses navigate the various arrangements available, an advisory office (*Veiledningskontoret for næringsutvikling i utviklingsland*) was established by Norfund and Norad in 2007 (Veiledningskontoret 2011). The office, staffed by two people and housed in Norad, provides advice on availability of financing, support to business planning and preparatory work for commercially viable investment projects in countries with a per capita income less than US\$ 6,925.
- **Norwegian Embassies** have an important function as facilitators for business relations and typically assist in business delegations and in establishing direct contact between firms for possible matchmaking services through Innovation Norway and Norad. Norad can also support pre-entry studies, training of local staff and partners, and important contextual information related for prospective exporters.

3.3.3 *Indirect risk mitigation through development assistance*

While less profiled than the Oil for Development program, Norad's program for Clean Energy for Development has similar objectives. The Clean Energy for Development Initiative encompasses various programmes and initiatives of different sizes and focuses

consultations are in place to ensure that development assistance is not channeled to promote commercial interests in the donor country. While these regulations have been adopted by OECD countries, alternative export guarantee arrangements offered by exporting non-OECD states constitute a challenge to competitiveness for OECD based firms.

within clean energy. Activities funded include infrastructure and grid development, CDM registration and follow-up, and institution and capacity building (Norad 2010).

The Initiative is an umbrella comprising a number of partners and activities. The Ministry of Foreign Affairs, together with the Clean Energy for Development Secretariat in Norad, serves as important focal points for the overall coordination of the Initiative. Decision making and responsibility for the budget lines remain within the different appropriating units of the Ministry of Foreign Affairs, embassies, Norad and Norfund.

3.3.4 *Insufficiently targeted or simply not commercially viable?*

According to our interviewees, there is a potential for utilizing existing instruments on a larger scale to support companies entering a high-risk region such as sub-Saharan Africa. Whether this is a result of mismatch between needs and available mechanisms, or simply reflects a lack of information, remains unclear. Subsidized credits mostly include requirements on the share of Norwegian value in each contract, which may constitute a challenge. A large part of GIEK's portfolio and issued export credits target maritime sector contracts, and it is possible that mechanisms are not sufficiently geared towards others sectors. Also, guarantees and export subsidies are regulated across OECD countries and to some extent WTO. However, Chinese currency policies remain a challenge to non-Chinese exporters not covered by existing trade agreements.

To the extent that promoting Norwegian commercial engagement in renewable energy in Africa is an official objective, more targeted support taking account of current barriers is necessary. Barriers and needs may be different for energy actors seeking African opportunities than maritime companies exporting to Brazil or Canada. However, ultimately willingness and ability to invest in the African energy market will be defined by each company's risk profile. A potential significant upside is mirrored by significant risks that the various mechanisms available cannot fully compensate.

Norway's situation is different from China's. Support to Norwegian companies abroad needs to comply with international standards and not stand in the way of more viable commercial alternatives. Similarly, and in likely contrast to Chinese public programs, an important principle for Norad programs such as Oil for Development and the Clean Energy for Development Initiative is for development assistance to be untied. In other words, development assistance from Norway cannot be used to promote the interest of Norwegian businesses. As noted by OECD, traditional tied development assistance limits the recipients influence over its own development process and typically increases project costs – with as much as 25 percent. Over the last decade untied assistance has become the norm for Norway, with all contracts subject to international tenders (Utviklingsutvalget 2008). In contrast, the Chinese government provides various forms of direct support to Chinese business engagement in Africa as a first step in a wider global expansion strategy. At least in the short term, As a consequence of the relatively high risk of engaging in Africa and the competition from China and others, investing in Africa by Norwegian renewable energy companies, at least in the short term, appears to be limited to the least risk averse companies.

3.4 IS THERE A POTENTIAL FOR TRIPARTITE COOPERATION?

An objective of the present analysis has been to explore to what extent and under what conditions tripartite arrangements with Sino-Norwegian partnerships could mitigate risks and increase opportunities for Norwegian actors in Africa with the ultimate goal of promoting sustainable and renewable energy development in Africa..

Interviews and analysis point to two conditions under which such partnerships could be explored.

- First, an initial hypothesis was that barriers to investment for small business would be reduced through joint ventures with larger companies. Specifically, can small and medium Norwegian firms tap into the muscles of larger Chinese companies? Our interviews indicate limited interest for such alliances. While on a general level the presence of Chinese business contributes to expanding and maturing the market and indirectly impacting on opportunities for Norwegian actors, most are reluctant to enter into direct business partnerships with Chinese firms. For most Norwegian firms, such partnerships are perceived as risks in themselves. Any joint venture would be contingent on increased mutual trust and knowledge, most likely coupled with confluent interest and Government backing.
- Second, looking at the specific strengths and weaknesses of both Norwegian and Chinese companies, we explored what complementarities exist between Chinese and Norwegian companies, and how these respond to needs and demand in the African market. In this perspective, a number of areas exist where Norwegian firms complement Chinese actors, and can offer either niche products or different approaches that may be in demand depending on the specific context. The latter is particularly relevant for local content and sustainability issues, subject to African preferences and requirements.

In other words, triangular partnerships are most relevant when relations are symmetrical, subject to both mutual trust and confluent interests. To illustrate, we have identified two examples of areas where there could be potential for tripartite Sino-Norwegian-African cooperation on renewable energy. These are back-of-the-envelope ideas that provide examples of what such cooperation could look like. The ideas have thus not been tested with relevant parties or properly assessed in terms of business feasibility.

- *Scatec Solar* is the only real example we have been able to identify of a Norwegian renewable energy company possessing commercial skills not available in Chinese companies in the same renewables sector. In a hypothetical tripartite public-private Sino-Norwegian-African partnership, Scatec Solar and a Chinese solar PV company would spearhead solar PV development at scale in a sub-Saharan African country. Scatec Solar would offer complementary services and technology to its Chinese partner, and underpinning the partnership, Norwegian government support could enable feasibility studies and training of local maintenance staff. Maintenance capacity and gradual grid development could strengthen the partnership by maturing and expanding the market for generated power.
- In the second case, a triangular partnership could include a cluster of Norwegian and Chinese *hydropower* developers and investors who would plan and rollout selected hydropower projects jointly with host country authorities. Subject to relevant requirements from the host country, Norwegian firms would ensure robust stakeholder consultations and environmental and social safeguards, as well as local content and capacity building, possibly in combination with regulatory and policy support. The joint effort would both reduce risk and increase the market, while supporting access to clean energy in the host country.

Of the two examples provided here, the solar example is probably the least complicated. The solar industry in China is young and oriented towards Western markets. The Chinese hydropower sector is a more mature sector in China, with large companies that have extensive experience from China and whose international experience is mainly from developing countries. This would likely be a more difficult sector to penetrate, especially for the relatively small Norwegian companies. Large hydropower is also controversial and often touches upon complicated issues of water sharing agreements between countries, resettlement plans, and biodiversity issues.

For both examples, the role of respective Governments is important. For Norwegian actors, adjacent technical assistance on regulatory and policy environment is possibly catalytic but not directly enabling. Chinese companies on the other hand, are likely to be backed by public capital on a scale beyond the financing schemes available to Norwegian firms. Given the role of Government in Chinese business, any partnership arrangement would need to involve high level agreements between public officials. This will in turn require good diplomatic relations and mutual and explicit interests in strong Sino-Norwegian trade relations.

4 POSSIBLE WAYS FORWARD

In this study we have assessed how Norway could contribute to sustainable Sino-African upscaling of renewable energy. In our view, the crucial question is where Norway can add value and fill demands that will not otherwise be met or be met with low quality or severe delays.

As discussed earlier, Norwegian renewable energy companies that are in some stage of engaging with the African market are generally not in a position to become strategic partners for Chinese renewable energy companies in Africa. The Norwegian companies that are currently engaging are generally too small and there is also a lack of strategic complementarities (with the possible exception of the solar industry). There is potential for Norwegian companies providing consultancy services and high-end products, to benefit from and contribute to Sino-African renewable energy projects. In this market, Norwegian companies will compete with other international consultancies.

In our view, Norway's main potential to provide added value in Sino-African upscaling of renewable energy lies in targeted strengthening of market frameworks that can ensure sustainable and relatively fast renewable energy development. Providing services such as regulatory capacity building, strengthening of institutional frameworks, consultancy and advice on grid-development etc. in a targeted manner will strengthen the frameworks that shall ensure sustainability of Sino-African renewable energy development projects, as well as other renewable energy projects.

Norway already has a long and generally positive track record of providing support to energy sector development in sub-Saharan Africa, and there is a demand for this type of service especially from the African side. The market for such technical and advisory services to African governments and institutions is primarily driven by OECD donor funds and programs, as well as relationships with African governments and utilities.

Norway is already providing this type of support to African countries and engaging Norwegian and other Western companies, but with an approach that may not be strategic and focussed. For the Norwegian cluster of competence in upscaling clean energy to play a distinct role in Sino-African development of clean energy, it would help if the Norwegian cluster engaged in distinct, focused and concrete initiatives addressing concerns and needs related to Sino-African clean energy development in selected countries.

Possible development of such initiatives should be guided by the African Energy Minister's Johannesburg Declaration, which urges the international community to mobilize support and resources "for accelerated and effective technology transfer and human resource development programs with emphasis on South-South exchanges to boost the capacity of African energy institutions and professionals". The African energy ministers also call for "greater international support for a network of regional centres of excellence and innovative funding streams to support the development, dissemination and deployment of appropriate technologies adapted to Africa's needs, including home-grown and other solutions that create jobs, foster entrepreneurship and contribute to enhanced export earnings."

Norway could, for instance, support 'competence development centres' for renewable energy regulation and promotion as part of the "regional centres of excellence", in partnership with relevant African institutions and possibly other South partners. Such competence centres could support the development of robust legal, administrative and management frameworks for renewable energy, particularly for technologies other than large hydropower, in selected countries and focus on promoting particular technologies. Many Norwegian companies would be well positioned to provide services and capacity building in such a context. While such centres would not directly target Sino-African

renewable energy projects, they would certainly indirectly contribute to enhance the quality and speed of Sino-African upscaling of renewable energy.

One such centre could focus on developing regulatory capacity for renewable energy development and upscaling in Africa. Creation of such a centre could be backed by an “African Renewable Energy Regulatory Capacity Initiative”, supported by donor and recipient countries. Developing such an initiative would need further study to assess feasibility, identify already existing aid programs of such a nature and to elaborate the most appropriate mechanisms and approaches for selected countries.

Norway and partner countries would have relevant experience to leverage in such an initiative. For instance, the concept of “peer learning”, which has already been used in a Norwegian supported project for the Regional Electricity Regulators Association (RERA) in Southern Africa, is possibly an important model, because it combines sharing of experience within the region (e.g. South Africa and the renewable energy bidding process) with other best practice examples from Norway and OECD countries. Norway’s role as lead International Cooperation Partner for the Southern African Development Community (SADC) energy sector may provide useful experience for developing a more ambitious programme to support renewable energy policy frameworks in the continent. There are likely also lessons that can be drawn upon and applied from the Norwegian Government’s Oil for Development Programme, through which Norway provides institutional strengthening to developing countries with petroleum resources.

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ANNEX I - LIST OF INTERVIEWEES

Africa	
Matthews Bantsijang	Director, Electricity, Department of Energy, Pretoria, South Africa.
Karin Ireton	Standard Bank, Director Group Sustainability Management, Johannesburg, South Africa.
David Mdingwa	Energy expert (consultant) for NEPAD in Gabon. ⁶
Ethel Teljeur	Regulator, National Energy Regulator of South Africa (NERSA), Pretoria, South Africa.
Reinhold Viljoen	Managing Director, Retosolar, Cape Town, South Africa.
Norway	
Hans Arild Bredesen	Power Market Expert, Pöyry Management Consulting Norway.
Geir Elsebutangen	Managing director, INTPOW.
Torstein Jenssen	CFO, NBT Windpower.
Per Øyvind Johansen	CEO, Green Clean Energy.
Tor Ottar Karlsen	CEO, Vardar.
Nils Arne Nessiøy	Vice President, Agua Imara.
Terje Osmundssen	Vice President, Emerging Markets, Scatec Solar.
Per Arne Saxvik	Managing Director, Scandic Energy.
Ronny Schumann	Global Sales and Marketing Director, Metallkraft AS.
Ole Jakob Sørdal	Head of Energy & Environment, Innovation Norway.
Jon Einar Wærnes	Vice President, Trønderenergi.

⁶ Responded to questions in panel discussion at conference.

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Econ Pöyry

Pöyry Management Consulting (Norway) AS

Schweigaards gate 15B
0191 Oslo
Norway

Tel: +47 45 40 50 00
Fax: +47 22 42 00 40
E-mail: oslo.econ@poyry.com