The million jobs question
Localisation for Renewables in Africa
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Executive Summary

Background
Africa’s need for energy infrastructure growth is currently driven by the local and regional challenge of sustainably improving the existing infrastructure in order to meet the region’s rapid economic growth as well as increasing and improving access to energy while simultaneously meeting the global challenge of reducing carbon emissions. This has resulted in the development of a renewables generation component as well as a focus on growing an industry that creates as many relevant jobs as possible.

Although localisation has been part of the development discussion for many years, a clear definition of localisation has often been lacking. However, there seems to be consensus that localisation has strong elements of job creation and enterprise development. The African renewables renewable energy sector needs to define for itself what localisation means; taking into account the skills, financing, and economic development challenges faced by the continent. This will naturally play out on a country by country basis, with each country taking on a different path to what localisation means to them and how best to internalise the benefits of the Renewables sector.

Countries have adopted different localisation strategies. China and Brazil have stipulated minimum requirements for local content in the manufacturing industry with differing results; China has become a leader in the renewable manufacturing sector whilst Brazil dropped its local content requirements due to insufficient factory capacity. China, in addition, has provided financial and tax incentives. India’s approach was to have a 51% domestic equity ownership in all projects. For both India and China, the size of the potential market played a crucial role in attracting investors to localise manufacturing. The recent Independent Power Producer (IPP) procurement programme for renewable energy projects in South Africa embraces a blend of the two approaches.

Increased investment in renewable energy will also mean an increase in jobs as the local population will be given employment opportunities at all stages of electricity generation, from power plant construction and grid connection to operation and maintenance.

- UNEP FI 2012 report on Kenya’s feed-in tariffs
- Financing renewable energy in developing countries
- drivers and barriers for private finance in sub-Saharan Africa
Key Questions:
• What is the optimum degree of localisation for Africa?
• What is the optimum generation portfolio for job creation?
• Is there a pay off between the technologies available and the jobs needed?
• How should the localisation strategy be rolled out?
• What are some of the challenges?
• How does the region develop the total value chain around the energy generation including logistics, manufacturing etc. And, what is the longevity of such an all-encompassing approach? -
• What policy framework should exist to enable localisation strategies to take effect?
• Does the country and region have a mechanism to support what is a subsidised sector?

Whilst growing our energy economies, we need to ensure that localization of supply chains for not only the supply of equipment and plant, but the maintenance and operation of our facilities. This will create jobs and grow skills as well as reduce costs

- Johannesburg Declaration
Africa Energy Ministers Conference 2011
Renewable Energy in Africa

Africa has the lowest percentage of access to electricity with 70% of the 700 million Sub-Saharan Africa population lacking access to electricity where the power generation capacity is only 30 GW of a continent total of 124 GW. 7 GW of additional new generation capacity has been identified as necessary in order to meet demand and support economic growth. The World Wildlife Fund estimates Africa’s renewable energy potential to be 42 000 TWh by 2050, the second largest after Asia.

Hydropower presently dominates the renewable landscape in Africa with 22 countries in Africa generating more than 50% of their power from hydropower with only 7% of Africa’s hydropower potential being developed. There exists potential for small hydropower in Equatorial Africa due to the extended river network.

Solar and wind have a strong potential throughout the continent but increased usage is limited due to the high costs of grid extensions with the exception of North and Southern Africa. In North Africa, solar and wind energy face the challenge of competing with cheap fossil fuel. Recent research has predicted that policy mechanisms in North Africa could result in a local content for CSP of 60%. South Africa has recently embarked on a renewable energy programme with strong solar & wind allocations.

Biomass usage presently accounts for 80% of total energy usage in Sub-Saharan Africa which is mainly off-grid and can be a driver for jobs if the industry is able to transform itself into becoming more sustainable and efficient. One of the challenges is that a large portion of this biomass is non-renewable which could lead to negative climate change implications.

Geothermal energy potential is mainly restricted to the Rift Valley region in East Africa. Increasing the percentage of renewable energy is a priority for African leaders as highlighted by Energy Ministers at the African Energy Ministers’ meeting held in September 2011 in Johannesburg.


By 2040, Africa’s residential / commercial energy demand will be nearly equal to China’s

- ExxonMobil 2012 The Outlook for Energy: A View to 2040
Job Creation Opportunities

So far, economic commentary has focused on the onset of globalization with much less attention paid to the forces of localization. In both cases, however, what matters most is moving beyond traditional concepts of economic growth, to putting people - their health, welfare, education, opportunity, and inclusion - at the heart of the development agenda for the 21st century.

Skills and Unemployment in Africa
A report by the World Bank showed that 62% of Africa’s population is below the age of 25 with 70% of the youth living in rural areas. According to the International Labour Organisation (ILO), 3 in 5 of the total unemployed in Sub-Saharan Africa are youth with 72% living on less than $2 a day. The proportion of youth will remain high for the foreseeable future due to the high fertility rate in Sub-Saharan Africa creating pressure for the creation of viable jobs in order to eradicate poverty.

Sub-Saharan Africa has the lowest primary education completion rate of any region, 60% compared to the worldwide average of 86%. More than a third of the young population in the region is illiterate with many young people having little or no skills and thus excluded from the formal marketplace.

Historical Job Creation in the Renewable Sector
An ILO report shows that as of 2009 the renewable sector directly employed approximately three million people worldwide with the sub-sector breakdown amongst the leading seven countries shown in Figure 1. UNEP estimates that by 2030 up to 12 million people could be employed in biofuels related agriculture and industry, up to 2.1 million in wind energy, and 6.3 million in solar PV. Bioenergy is employment intensive, with jobs being created all along the value chain, including production, procurement, transportation, conversion, distribution and marketing.

- World Bank, 2009. Youth and Employment in Africa

- James D. Wolfensohn

2012 The Outlook for Energy: A View to 2040
Solar PV has been shown to be the most labour-intensive sub-sector, Table 1 in terms of jobs required for each megawatt of energy generated.

**Table 1:** Average employment (jobs per megawatt of average capacity) over life of facility

<table>
<thead>
<tr>
<th>Technology</th>
<th>Manufacturing, construction, installation</th>
<th>Operating &amp; maintenance / fuel processing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar Photovoltaic</td>
<td>5.76–6.21</td>
<td>1.20–4.80</td>
<td>6.96–11.01</td>
</tr>
<tr>
<td>Wind Power</td>
<td>0.43–2.51</td>
<td>0.27</td>
<td>0.70–2.78</td>
</tr>
<tr>
<td>Biomass</td>
<td>0.40</td>
<td>0.38–2.44</td>
<td>0.78–2.84</td>
</tr>
<tr>
<td>Coal Fired</td>
<td>0.27</td>
<td>0.74</td>
<td>1.01</td>
</tr>
</tbody>
</table>

*Figure 1:* Employment in renewable energy by technology in selected countries (China, Brazil, USA, Germany, Spain, Denmark, India)
Skills Challenges in Africa

The transition to a low carbon economy presents opportunities for new technology, investment and job creation. The ILO 2011 report on renewable energy states that there is a great shortage of green collar workers worldwide with training needs in the technical, legal, financial, and engineering disciplines of the renewable energy sector.

A strong skills development drive needs to be undertaken to build critical mass of technical skills in order to ensure a sustainable, long-term industry. Technical skills are not only needed in the manufacturing and construction phase of projects but also for operating, modifying, producing and innovating renewable energy and energy efficiency technologies. Many renewable projects in Africa require a large component of skilled labour from overseas but often skills transfer to local people is not carried out successfully resulting in a risk of project failure when expatriates leave. It is thus important to ensure that local staff are trained. A lack of management skills at policy-making level may result in the development of ineffective policies.

Innovative solutions to reduce costs and increase efficiency may create a barrier to new entrants who may struggle to understand the best available technology in a relatively short space of time. Countries with a relatively developed technical knowledge base may enter at a late stage without much prior experience but countries with less indigenous technical capacity may find it more difficult to develop new technologies. In addition, intellectual property rights have served as barriers to entry in several markets.

Localisation Options and Policy Support

Many policy mechanisms such as local content requirements, tax incentives, feed-in tariffs, domestic equity ownership requirements are some examples of policy options used to influence the utilisation and localisation of renewables.

The use of local content requirements is often the most direct mechanism to increase domestic manufacturing. In large domestic markets this approach has a better chance of working but in others it can increase the price of renewable energy and results in a domestic industry which is unable to compete in the international supply chain. Local content requirements may also hinder innovation in that the latest technology is excluded from the domestic marketplace.

Requiring domestic production for a large portion of the value chain also risks losing access to the latest technology and low-cost components for domestic electricity generation, which may be available only as imports. Local content requirements have discouraged the entry of foreign producers into some countries.
Case Studies

China

China doubled its wind energy capacity between 2007 & 2009. According to the Global Wind Energy Council (GWEC), in 2007, 20GW of new wind power was installed globally, led by the United States, China and Spain. The rapid growth of wind power in China has encouraged the development of domestic production of wind turbines and components. This has led to the emergence of local firms such as Goldwind, Sinovel Wind, Dongfang, Windey and Sewind. The additional income streams coming from the sale of carbon credits from the Clean Development Mechanism (CDM) of the Kyoto Protocol has played a role fast tracking the development of the wind power industry in China.

In 2006 Suntech Power, “the world’s largest producer of silicon solar modules”, was listed third in the top 10 listed companies with core business in the development and operation of Renewable Energy technology. Suntech has offices in 13 countries and had more than 20,000 people, more than 90% in China, in their employ worldwide in 2010.

Morocco
In November 2009 the Moroccan Minister of Energy declared the “national, ambitious and realistic project aims at establishing by 2020 a capacity of 2,000 megawatts”. The Moroccan Solar Program includes the development of five solar power plants including Ouarzazate, Ain Beni Mathar, and Boujdour. The Moroccan Agency Solar Energy (MASEN) was established with the aim of implementing solar projects with a minimum total capacity of 2000MW by 2020. MASEN has identified training and industrial development as challenges to the programme. The 470MW Beni Mathar Solar Plant employs some 500 workers, and helped develop local SME’s who provide support services to the plant. The project also involved the building of a road and two bridges over the Charef and Tabouda wadis.

South Africa
In November 2011 the South Africa Bureau of Standards (SABS) issued technical specifications to provide guidance on defining and calculating the local content of goods, services and works in SA. The Department of Energy’s IPP Procurement Programme for Renewable Energy Projects, which was issued in August 2011 in South Africa, has localisation requirements. The procurement programme provides a framework within which successful bidders are to adhere to job creation, and local content requirements and the development of communities closest to the project site. It is also well supported by local legislation. The recently released outcomes of the second window of bid submissions reflect an increase in the local content proposals. For instance, the Local Content in Solar Photovoltaic for the second window is 47.5% compared to 28.5% in the first window. Although the operational success of this programme is yet to be demonstrated; initial indications are encouraging.
Brazil
Currently, hydropower and sustainable exploitation of biomass play a large role in the Brazilian energy matrix with hydropower accounting for 14% from and biomass 27%. The biomass to energy value chain in Brazil is the largest in the world and has resulted in approximately one million jobs as of 2002 playing a major socio-economic role in reducing income inequalities. Hydropower has had less of a long-term impact with 1000–5000 jobs created during the 2-5 year construction phase reducing to 50–200 jobs during long term operation.

Energy conservation has been shown in recent studies to have higher potential for job creation in Brazil than for energy generation.

- *Africa Development Bank*
Key Challenges

• The development of local content requirements which enable the creation of sustainable but internationally competitive local manufacturing industries
• Poor legal, regulatory and policy frameworks
• Poor infrastructure with many people not connected to the grid
• Few countries have a policy framework for renewables in place
• Difficulty in breaking into a relatively mature international manufacturing industry
• Limited local technical capacity
• Low levels of investments in Africa comparison to those in other developing regions
• High initial capital costs
Way Forward

It is important that each country study the full value chain to understand where their competitive edge lies and support local companies to become more innovative in their identified focus areas. It is to be noted that the manufacturing section of the value chain is not the only creator of jobs and that services such as engineering, supply chain management, labour, etc. could form a significant portion of the value chain.
Our experience in the renewable sector

Deloitte has been involved in the Renewable Energy sector locally and abroad for many years. We have been involved in assisting Renewable Energy projects access additional income through the Clean Development Mechanism (CDM) of the Kyoto Protocol to make these projects more financially feasible. More recently, Deloitte in South Africa has been involved in assisting Renewable Energy Projects with the bidding process under the Department of Energy’s IPP Procurement Programme. This programme seeks to, amongst other things, enable the development of local manufacturing industries. Worldwide, Deloitte has worked with Renewable Energy industry players to develop strategies to develop locally sustainable operations.
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