RENEWABLES ON THE RISE

A West African Energy Transformation

Written by
Hans Verolme

HEINRICH BÖLL STIFTUNG
NIGERIA

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AN ENERGY TRANSFORMATION IN WEST AFRICA?

INTRODUCTION

Energy poverty is pervasive and has been identified as a major break on sustainable development. Our challenge is that there is an urgent need to create a low carbon energy future that meets the sustainable development needs of all people in West Africa and puts an end to energy poverty. Not all Africans experience energy poverty in the same way. Energy poverty is not gender blind, far more women suffer its consequences then do men. Rich people living in the cities are better able to cope with a lack of reliable energy supply then do the rural poor, but all pay a price.

Despite a wealth of fossil and renewable energy resources, West Africa has a very low per capita electricity use. This situation is destined to change. If electricity demand increases ten-fold by 2030, as projected, the urgent question arises what an optimal sustainable power supply mix is. The need for modern clean energy has not and cannot possibly be met by the grid. Even those communities currently served by the grid are struggling with black outs and low voltage periods. Small enterprises and the households who can afford to do so have resorted to the use of generators. This may shield them from the vagaries of the grid, but this 'energy security' comes at a high cost to both governments (that subsidize fuels) and the users (one Kwh of diesel generated electricity costs US$ 0.40 at market prices). Moreover, it exposes people to substantial noise and dangerous air pollution.

At the same time, West Africa is already being impacted by climate change and its efforts to adapt to global warming are putting a strain on resources. So far, African governments and most NGOs have approached the climate change challenge through the lens of adaptation, strengthening resilience, especially in agricultural development and infrastructure, and the need for financing for sustainable development. Mitigation has largely been perceived as a problem for old industrialized economies to address. While climate change is not the focus of this paper it puts the challenges outlined in a special perspective. For that reason, a brief summary of the most recent findings by the IPCC pertaining to Africa can be found in Annex 1.

RATIONALE

Ahead of COP 21 in Paris, West African civil society is in a unique position to bring their governments to adopt climate-friendly energy policies that also favor sustainable economic development for all.

The draft of this paper was prepared for participants of a Reseau Climat et Developpement conference held in Lomé, Togo, April 2014. Drawing on the best available, most recent research, the paper aims to support NGOs in developing lobbying positions on climate and energy policy that can effectively influence governments at the national and regional level. Based on a literature review of thousands of pages of research published since 2011, the paper provides a rapid assessment of energy policy options for West Africa. As the target audience is not the lay public but those already knowledgeable about energy policies, technology and markets, many expert terms are left unexplained.

OUTLINE

The introduction to the paper outlines the challenge of a low carbon energy future that meets the sustainable development needs of West Africa.
Taking a global look, the first chapter describes the state of global renewable energy market, and highlights some recent developments in technology and finance.
The second chapter gives a state of play in the West African energy sector, providing initial thoughts on options for medium and long-term development.
The third chapter discusses four major challenges facing the energy sector in West Africa.
The final chapter provides cases of best practice and draws some lessons that are relevant for West Africa and outlines options for immediate actions that might be taken.
Throughout, boxes highlight information from around the globe that is relevant to the argument.
Important resource materials are listed in Annexes and have been made available electronically to conference participants. As this is not an academic paper, the paper is not extensively footnoted.

GLOBAL ENERGY POLICIES AND MARKETS

The global goal of the UN Sustainable Energy for All initiative is to double the share of renewable energy in the global energy mix by 2030 (compared to 2010). Indeed, many experts say that a 100% renewable electricity system is needed and achievable by 2050. In recent years some small steps have been taken towards that end. According to the IEA (2013), power generation from hydro, wind, solar and other renewable sources worldwide will exceed that from gas and be twice that from nuclear by 2016. However, global emissions continue to rise.

Bloomberg New Energy Finance (2013) talks about a new energy reality which emerged since 2010. The bad news is that in the age of climate change, exploration of unconventional, risky fossil fuel reserves (such as tar sands and gas fracking) is rising. The good news is that we observe a continuous improvement in energy intensity. The improvement is evidence of a decoupling of economic growth from energy use. Some, however, point to the efficiency rebound effect: if for example fuel consumption is reduced by an improvement in engine efficiency and the price of fuel is low, some people might drive more. But, despite its appeal to nay-sayers, research by Yale University (Gillingham et al., 2013) showed the rebound is often of limited significance and certainly cannot be an excuse for not pursuing more energy efficiency.

From an energy investment perspective, the big news is that the age of cheap clean energy has arrived, with clean energy investment in many markets outpacing fossil investment. Yet, energy markets remain unpredictable, which highlights the need for strengthening resilience. Renewable energy is now more affordable in both developed and developing countries. Markets, manufacturing and investment shift increasingly towards developing countries. There has been a major drop in the cost of technology (-30% for wind and - 80% for solar technology in 10 years). This has led to significant over-production against projected demand, creating a buyers' market. In recent years, the renewables industry saw consolidation amidst continued growth in manufacturing, sales and installation. Policy uncertainty and declining policy support following the 2009 crisis affected investments in Europe, China and India. Still, solar photovoltaics and onshore wind power experienced continued price reductions due to economies of scale and technology advances, and a production surplus of modules and turbines.

The balance of investment in renewable power has rapidly shifted from developed to developing economies. Since 2011, global investment has stagnated around US$250 billion per year, but installed capacity has continued to grow due to falling technology costs. Globally, an estimated 5.7 million people work in the renewable energy sector. Policymakers are increasingly aware of the potential national development impacts of renewable energy. By the end of 2012, 138 countries had renewable energy targets. Feed-in tariffs (FITs) and renewable portfolio standards (RPS) are the most frequently used policy tools.

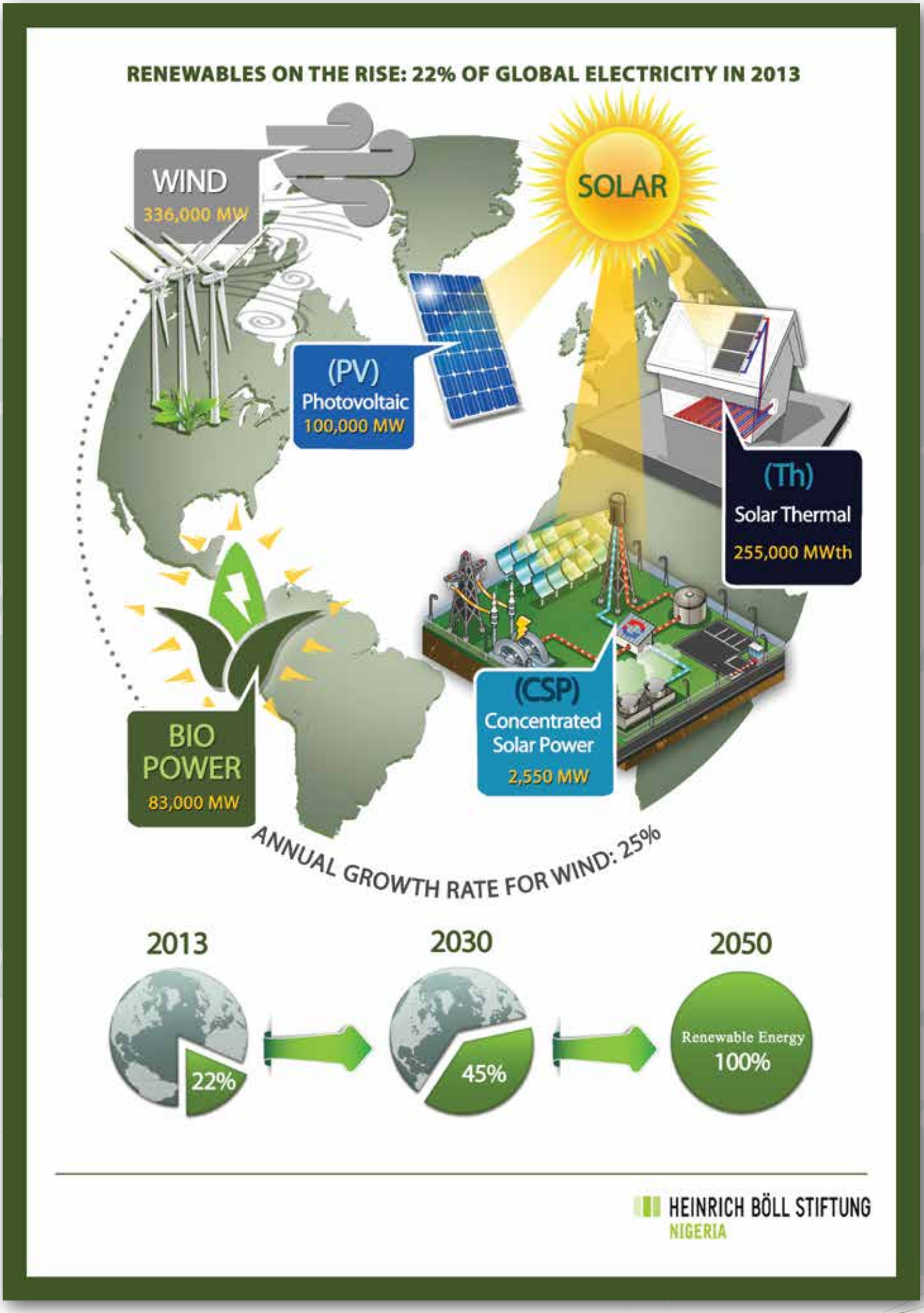
Making energy poverty visible: The Night Lights of Planet Earth

Rural use of renewable electricity has increased with greater affordability, improved knowledge about local renewable resources, and more sophisticated technology applications. Attention to mini-grids has risen in parallel with price reductions in solar, wind, inverter, gasification and metering technologies. We witness an increase in direct involvement by the private sector, with rapid technology innovation reducing prices. In Africa, there has been a rise in social entrepreneurship, with successful business models in rural energy through dealership and fee-per-service, leasing arrangements, and in some cases Public Private Partnerships.

THE GLOBAL RENEWABLES SHIFT IN NUMBERS

To put some numbers behind the global shift towards clean energy, REN21 (2013) shows that in 2012 almost 22% of global electricity was produced from renewable sources. It estimates that renewables now account for just over half of the estimated 280GW of new installed electric capacity. Some further highlights:

- Total global operating capacity of solar PV reached the 100 GW milestone and prices of solar PV modules fell by more than 30 %.
- Almost 45GW of wind power capacity came in operation in 2012, increasing global wind capacity 19% to 283GW.
The annual growth rate of cumulative wind power capacity between 2007-2012 averaged 25%.
- Interest in concentrated solar power (CSP) is on the rise, particularly in developing countries, including Africa. In 2012, total global CSP capacity increased more than 60% to about 2,550 MW.
- Global solar thermal capacity reached an estimated of 255 GWth for glazed water collectors, mostly installed in China and Europe.
- Around 350 TWh of electricity was generated from bio-power. Bio-power capacity was up 12% to nearly 83 GW, with notable increases in fast-growing emerging economies.
- Geothermal electric generating capacity grew by an estimated 300 MW during 2012, bringing the global total to 11.7 GW and generating at least 72 TWh.


RENEWABLES ON THE RISE: 22% OF GLOBAL ELECTRICITY IN 2013
WIND
336,000 MW
SOLAR
(PV)
Photovoltaic
100,000 MW
(Th)
Solar Thermal
255,000 MWth
(CSP)
Concentrated
Solar Power
2,550 MW
BIO
POWER
83,000 MW
ANNUAL GROWTH RATE FOR WIND: 25%
2013
2030
2050
22%
45%
Renewable Energy
100%
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STATE OF PLAY: THE WEST AFRICAN ENERGY SECTOR

Unfortunately, governments and NGO experts will have to come to terms with the uncertainty flowing from the lack of publicly available reliable energy statistics across the ECOWAS region. This includes an absence of up-to-date information on existing policies, legislation, prices, generation costs, resources, and investments. This can pose a major impediment for further policy development, sector planning, as well as investment. Clearly, decision making by investors and policy making by governments will in the absence of core data be distorted. The lack of energy information impedes the building of capacity for a West African energy transformation. Sharing information and spreading best practice and lessons learned become all the more important.

Despite the dearth of knowledge, the continent's governments seem to have accepted the magnitude of the challenge describe in the first chapter of this paper and have agreed to the need:

- To increase access for the poor in the absence of [adequate] financial mechanisms to facilitate such access;
- To address climate-change issues and to move towards a low-carbon energy sector;
- To deal with social equity in the exploitation and use of the continent's energy resources;
- To enhance regional cooperation; and,
- For an integrated approach to grid and off-grid electrification initiatives. Source AfDB (2013)

ESMAP (2014) describes the standard two-track governmental response strategy to a lack of energy access as follows:

- On a centralized track, electrification is undertaken by national governmental entities such as the state-owned national utility, a rural electrification agency (REA), or the ministry of energy. Electrification occurs primarily through extension of the national grid.
- By contrast, on a decentralized track, electrification is carried out through non-governmental entities such as cooperatives, community user groups, or private entrepreneurs. They construct and operate mini-grids that provide power to one or more local communities and produce electricity from small generators using fossil fuels, renewable fuels, or a combination of the two.

For this strategy to succeed, small producers need to invest in and operate equipment, most of which is renewable energy or co-generation technologies. For

this to happen, a number of regulatory and policy decisions must be made by electricity regulators and policy makers. The playing field needs to be leveled and opportunities seized. Few West African governments have done so.

In a rapidly warming world, African governments have worried first and foremost about the need to strengthen resilience and adapt to the immediate impacts of climate change. Climate impacts on water security, food production and biomass availability continue to be a priority. Recently, however, the lines between adaptation and mitigation have become blurred. Any development needs to be climate smart (resilient) and that includes mitigating and managing emissions (growth). The potential for this is substantial especially when it comes to coal and diesel-powered electricity generation. This terrain remains unexplored in most of Africa.

THE OUTLOOK FOR A WEST AFRICAN ENERGY TRANSFORMATION

The traditional view of energy sector development by, e.g., the World Bank has been that "African countries will need to spend at least six percent of their GDP on energy over the next 10 years to keep up with their economic growth. It is, therefore, clear that a number of technologies (both traditional and new) will need to be applied." Furthermore, the view of governments and the mainstream development community towards renewables has traditionally been biased. As recently as 2008, Rod Cargill, an influential energy expert summarized the prevailing sentiment: "The number of failed renewable energy projects in Africa over the last 20 years is unacceptable, and verging on the irresponsible. These failed projects have set back development by raising aspirations and then failing to deliver." This is one reason why governments have shied away from renewable technologies. However, not all renewables are created equal and since 2008 a lot has changed. Surprisingly, the World Bank still focuses its efforts on combined heat-and-power, bio-fuels, mass transportation (diesel, LNG) and energy efficiency but not on solar, geothermal, small-scale (in-river) hydro, wind or hybrid systems.

Big is beautiful? Today, nobody believes that the future of Africa is one of a purely grid-based electricity system. The electric utility infrastructure (grids-plus) necessary for further large-scale power plants is lacking. There is a massive rural - urban split. Those who are oil and gas importers have been plagued by record high prices for several years now. Renewable energy potentials vary widely across the region.

ENERGY ACCESS FOR WOMEN AND MEN

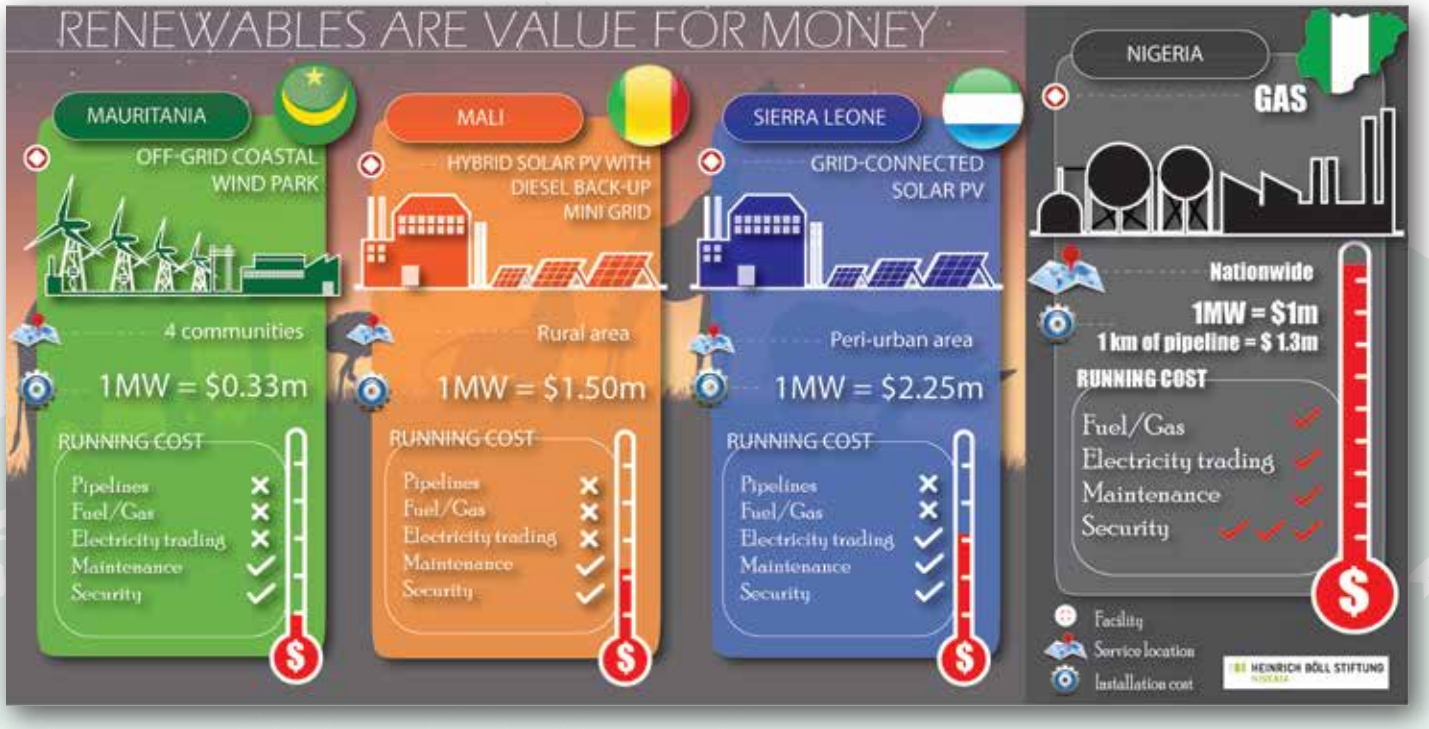
According to the IEA, only 14% of rural African households have

access to electricity and biomass energy continues to play a major role. Early renewables initiatives unsurprisingly promoted clean biomass technologies. But with a growing global market for commercial-scale biomass production and bio-fuels, serious concerns have emerged about the social, economic and environmental implications of biomass production and competition for food, feed and fiber. Domestic users have to substitute fuel crops with waste and often shift production for personal use onto marginal and vulnerable lands. Most households continue to rely on traditional renewable biomass resources for their energy needs. Women and men have different roles, responsibilities and voice within households, markets, and their communities. This leads to differences in their access and use of energy, and the impact of energy services on their lives. This needs to be considered if policy making and project design is to be effective. Any change in household energy expenditures will impact men and women differently due to their roles in household decision making and use of disposable income after paying for energy services. In West Africa, the burden of securing a steady supply of biomass is often placed on women. They are also the ones most exposed to the health risks. Yet, with the exception of clean cook stove programmes, energy projects have been slow to integrate a gender perspective throughout the operational cycle of projects; to improve gender equity in participation, benefits and opportunities.

BEST POLICY AND PRACTICE

In reviewing the recent literature, many useful case studies were found, mostly at the project level and only some policy-driven: Tanzania introduced standardized power purchase agreements to level the playing field for renewables. Mozambique has created a rural electrification fund. The Central Bank of Nigeria has pushed lending for electricity for SMEs. In all of West Africa clean and efficient cook stoves are becoming the norm. In Ethiopia and South Africa, solar water heaters are spreading fast. In all Africa fee-based micro-solar systems pop-up and serve communities with light, credit and cell phone access. The IRENA / ADFD loan facility shows how renewables today operate at scale. In Sierra Leone they are building a grid-connected solar PV system to improve grid stability in a peri-urban area (4 MW at a cost of $9 million). In Mali they built a hybrid solar PV with diesel back-up mini grid for a rural area (6 MW / $9 million). In Mauretania an off-grid coastal wind park will serve four communities (15 MW / $5 million).

Algeria: Solar for the grid



Let us look more closely at the case of Uganda, where two policy measures have proven key to development of the renewable energy sector.

FEED IN TARIFF

In addition to generation from mini-hydros, sugar companies have the potential to increase power generation from bagasse and sell a surplus to the grid. They could be selling up to 50 MW or 20% of total electricity supply to the grid. In 2007, the Electricity Regulatory Authority announced a feed-in tariff (FiT) for hydro power plants of less than 20 MW and for bagasse co-generation. The feed-in tariffs were initially for a 3-year period. This well designed feed-in tariff and clear guidelines have proven effective in promoting co-generation.

MARKET CERTAINTY

Uganda has enjoyed a stable and predictable regulatory environment. In 1999, Uganda unbundled the vertically integrated government-owned utility into separate businesses for generation, transmission and distribution. The role of the government was limited to policy making. The role of licensing and tariff setting was transferred to an independent regulator. Electricity tariffs should be set so as to allow recovery of all the reasonable costs incurred by licensees including a reasonable rate of return. By creating a single buyer entity market, certainty was created and the risks of low (politically driven) tariffs reduced. This has attracted independent power producers (IPPs) in generation. A standardized power purchase agreement has also been developed for renewable energy projects.
Source: INFORSE

OPTIONS FOR MEDIUM AND LONG-TERM DEVELOPMENT

FINANCE AND INVESTMENT

The IEA says Africa needs US$300 billion to achieve universal access to electricity, and compared to recent investment flows this is easily within reach. Investing in clean energy makes economic sense—every additional dollar invested can generate three dollars in future fuel savings by 2050 (IEA, April 2012). Put differently, the fuel savings will quickly be greater in value than the initial investment. Investment in the energy sector is increasingly becoming a joint public – private responsibility. Today, West Africa only plays a marginal role in the fast growing renewable energy investment market. Most market analysis places West Africa in the category "Rest of the World."

Since 2009, equity investors are showing a growing interest in clean energy, with green exchange traded investment funds (ETFs) performing well. ETFs, however, still operate mainly in the OECD and BRICS markets. Similarly, the international bond market has recently seen an upsurge in the issuance of green bonds; according to Dealogic, $11.2 billion in 2013 alone. Green bonds create a crucial fresh flow of finance towards low-carbon development. While the first of these bonds were issued by the World Bank and European Investment Bank, more recently large companies made up the lion's share if this market. To increase stability in the market, which had been weakened by policy uncertainty in many industrialized countries, a Climate Bonds Standard was launched to assess environmental claims. In 2014, Green Bond Principles, voluntary guidelines to promote market integrity through transparency and disclosure, were adopted by some of the world's largest investment houses. We are, however, not aware of any African bank or private company issuing such bonds. Governments might well do so in the coming years. Sovereign wealth funds maintained by those countries in the region with significant natural resources would be well advised to invest in such vehicles.

CAPITAL FOR RENEWABLES

THERE ARE MANY SOURCES OF FUNDING TO INCREASE INVESTMENTS INTO RENEWABLE ENERGIES. HERE ARE THE POINTS FOR LOBBYING FOR MORE AFRICAN AND INTERNATIONAL CAPITAL FOR RENEWABLES

ETF – EXCHANGE TRADED INVESTMENT
Green ETFs are trading well in OECD & BRICS countries. West African countries should attract some of this money to invest into Renewable Energy schemes.

GREEN BONDS
Green Bonds Principles were launched in 2014 to ensure transparency and disclosure, and adopted by some of the world's largest investment houses. West African governments should issue green bonds (using the best available standards) to attract capital for Renewables.

SOVEREIGN WEALTH FUNDS
SWFs or their equivalents are meant to use fossil earnings for a secure and stable future of the host countries. These funds should be used to:
a. Directly invest in low carbon developments, incl. renewable energy infrastructure
b. Invest in green bonds

AFRICAN DEVELOPMENT BANK, AFDB
In 2013, the AfDB launched the Africa50 Infrastructure Fund to mobilise private financing for infrastructure. The AfDB should commit this fund to invest in low-carbon development alone.

PIDA (PROGRAMME FOR INFRASTRUCTURE DEVELOPMENT
A joint programme by the AfDB, NEPAD and the AU Commission, PIDA favours business-as-usual infrastructure with an emphasis on exportation rather than domestic use. Example: the gas pipeline from Nigeria to Algeria to transport gas into the European market. PIDA should favour investments into renewable energy infrastructure.

FROM GOVERNMENT TO PEOPLE
To grow renewable markets, West African governments should phase out fossil fuel and make available low-interest renewable energy loans, enabling large numbers of SME companies, communities and individuals to install off-grid solutions.

NEW DEVELOPMENT BANK (BRICS BANK)
In July 2014, the BRICS countries (Brazil, Russia, India, China, South Africa) launched their New Development Bank (NDB), to attract large sums of international monies waiting to invest in 'Africa the last frontier'. The NDB should invest in the long-term future of Africa in form of low carbon and renewable energy projects.

PLUGGING THE RESOURCE LEAK
Resource wealth in Africa is pilfered by tax evasion, oil bunkering, illegal mining, overfishing, illegal logging etc. The 2014 report by Kofi Annan's Africa Progress Panel shows that Africa's massive infrastructure financing gap could be closed if the plunder stopped.

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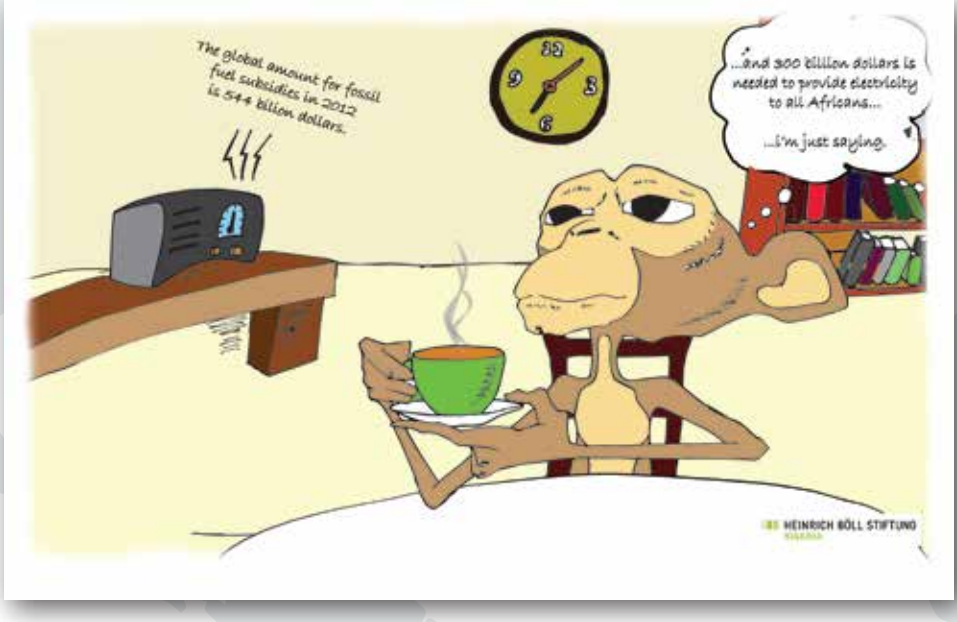
To that end, the African Development Bank launched in 2013 the Africa50 Infrastructure Fund. The main aim of the fund is to mobilize private financing for infrastructure delivery. It will focus on national and regional projects in the energy, transport, ICT and water sectors. The AfDB aims to raise $10 billion in equity, thereby leveraging $100 billion in capital. For 2014, Africa50 has a target of raising $3 billion in start-up equity. Africa50 intends to maintain a single A investment rating to attract sovereign wealth and pension funds as investors. Unfortunately, there is no commitment by AfDB shareholders and member governments to invest in low-carbon development alone. In fact, looking at the experience with the G20 Development Action Plan, such large investments are favoring business-as-usual development; aka White Elephants. However, this kind of development is not pro-poor and unlikely to provide clean energy access for all. This should be of serious concern to civil society advocates.

As the Africa Progress Panel, led by former UN Secretary-General Kofi Anan, shows in its 2014 report, Africa's massive infrastructure financing gap could be closed if only the plunder of its abundant natural resources, specifically timber, fish and minerals, were brought to a stop. The Panel in 2013 highlighted illicit financial flows, often connected to tax evasion in the extractives industry, that cost Africa more than it receives in either international aid or foreign investment.

THE CHALLENGE OF REMOVING FOSSIL FUEL SUBSIDIES



When we speak of leveling the playing field for renewables, we do not simply refer to the rules and regulations that can be rewritten to ensure clean energy access but about overcoming decades of preferential treatment of the fossil fuel sector. According to the International Energy Agency (IEA), in 2012 global fossil fuel subsidies with a direct impact on consumption totaled $544 billion, while those for renewables amounted to $101bn. The International Monetary Fund (IMF) puts the total post-tax cost of the subsidies nearer $2 trillion, by factoring in the implicit subsidies from the failure to charge for pollution, climate change and other externalities. This is equivalent to about 2.9 per cent of global GDP or 8.5 per cent of government revenues. In some West African countries, the cost of subsidies make up more than 20% of the government budget. In 2009, the G20 committed to phase out "inefficient fossil fuel subsidies that encourage wasteful consumption," but progress has been painfully slow.

Subsidies are widely accepted as distorting consumption and reduce the willingness to pay, even by those who can afford it, for the use of electricity. Many governments argue these subsidies are pro-poor, despite research showing they favor big business and the urban middle class. Not surprisingly, the beneficiaries are those with the strongest political voices.

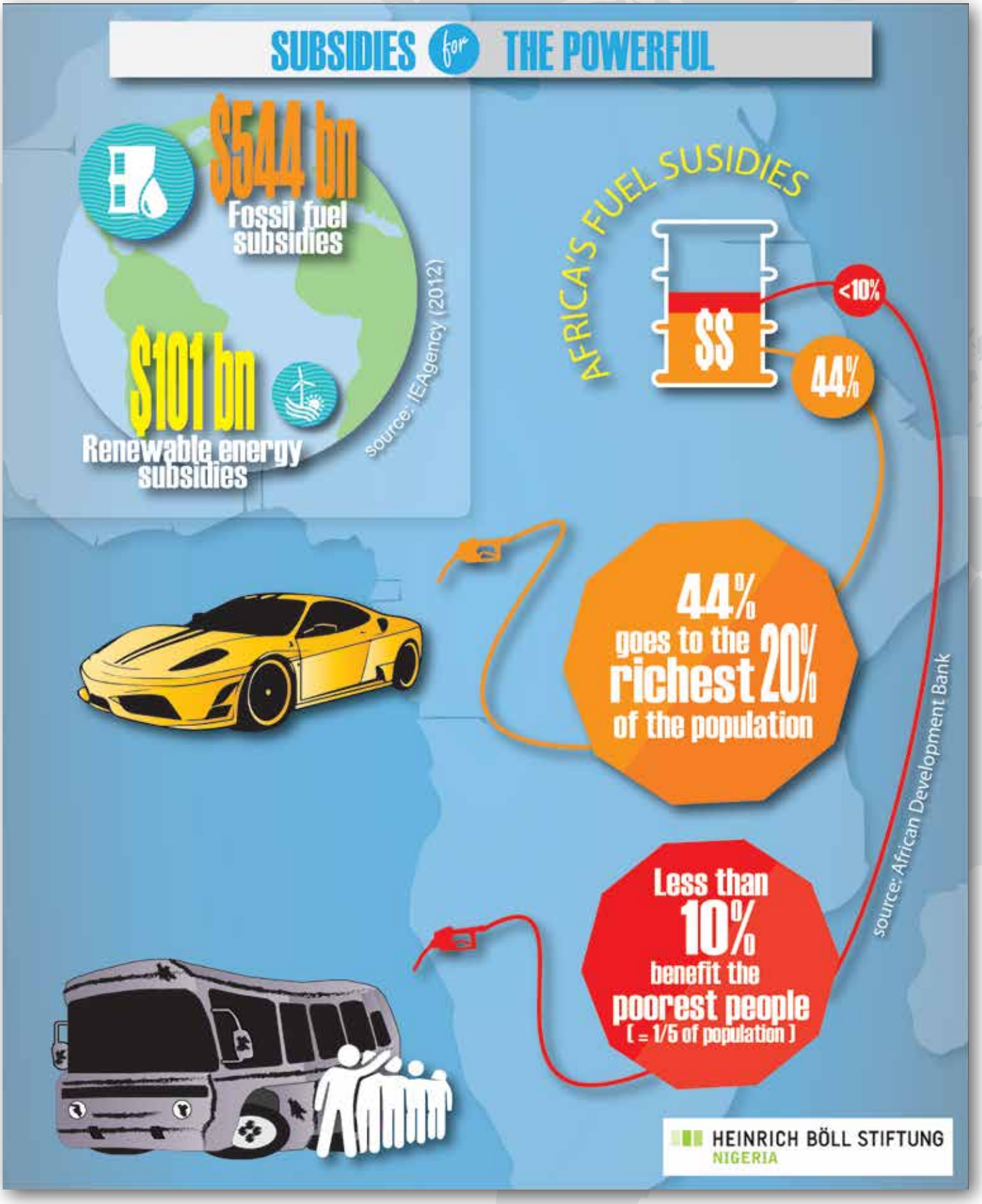
But steps are being taken. The first impacts of subsidy reductions have been felt across West Africa, most dramatically in Nigeria where in December 2011 and January 2012 people took to the streets to protest a dramatic increase in the price of fuel. Interestingly, many of the government's critics did not deny the need for change but they lacked trust in the government to deliver the measures intended to mitigate the impacts for the poorest.

In most of West Africa, subsidies to fossil fuel producers often support inefficient state-owned energy companies and stifle private investment in the energy sector. Private companies simply cannot compete with low, government-subsidised prices. At the same time, few governments can afford to provide cheap power to their entire population. Most do not even manage to efficiently generate power in major urban areas. In April 2012, the CFA zone Ministers of Finance publicly recognized the need to reform fossil fuel prices while putting in place appropriate social safety net programmes (see African Development Report 2012, p. 77).

The majority of subsidies are for consumption, rather than production. Consumer subsidies have encouraged excessive consumption by the wealthy at the expense of the poor. This leads to an unsustainable demand cycle: rich and middle class, urban voters demanding ever more cheap power that the government cannot possibly afford to supply. Similarly, artificially low petrol prices at the pump have stimulated a massive growth in road transport which necessitates more infrastructure investment. The knock-on effect of petrol price increases on the cost of living is often the main political deterrent to removing the subsidy. Subsidy removal has at times been used by unscrupulous traders to increase prices.

Other subsidies range from reduced tax rates and wage subsidies to cash handouts and undercharging for government services. In developing economies most subsidies are in the form of state investments at very low rates of return, and the lost income from selling fuel at an artificially low price mentioned above.

Fossil fuel subsidies tend to increase not decrease the gap between rich and poor. According to the IMF, the richest 20% get six times the benefit of the poorest 20%. The poorest do not own cars or own many power-hungry appliances, and benefit only indirectly from cheap petrol and electricity. The AfDB (2012) quotes multiple sources stating that in Africa, an estimated 44.2 percent of fossil fuel subsidies go to the richest 20 percent, while the poorest 20 percent benefit from only 7.8 percent of these subsidies. Likewise, about 45 percent of subsidies for kerosene go to the richest 40 percent. In Senegal, the IMF (2008) found that the poorest 40 percent of citizens were benefiting from only 19 percent of LPG subsidies, while the richest 40 percent gained


SUBSIDIES for THE POWERFUL
$544 bn
Fossil fuel subsidies
$101 bn
Renewable energy subsidies
source: IEAgency (2012)
AFRICA'S FUEL SUSIDIES
$$
<10%
44%
44% goes to the richest 20% of the population
Less than 10% benefit the poorest people (= 1/5 of population)
source: African Development Bank
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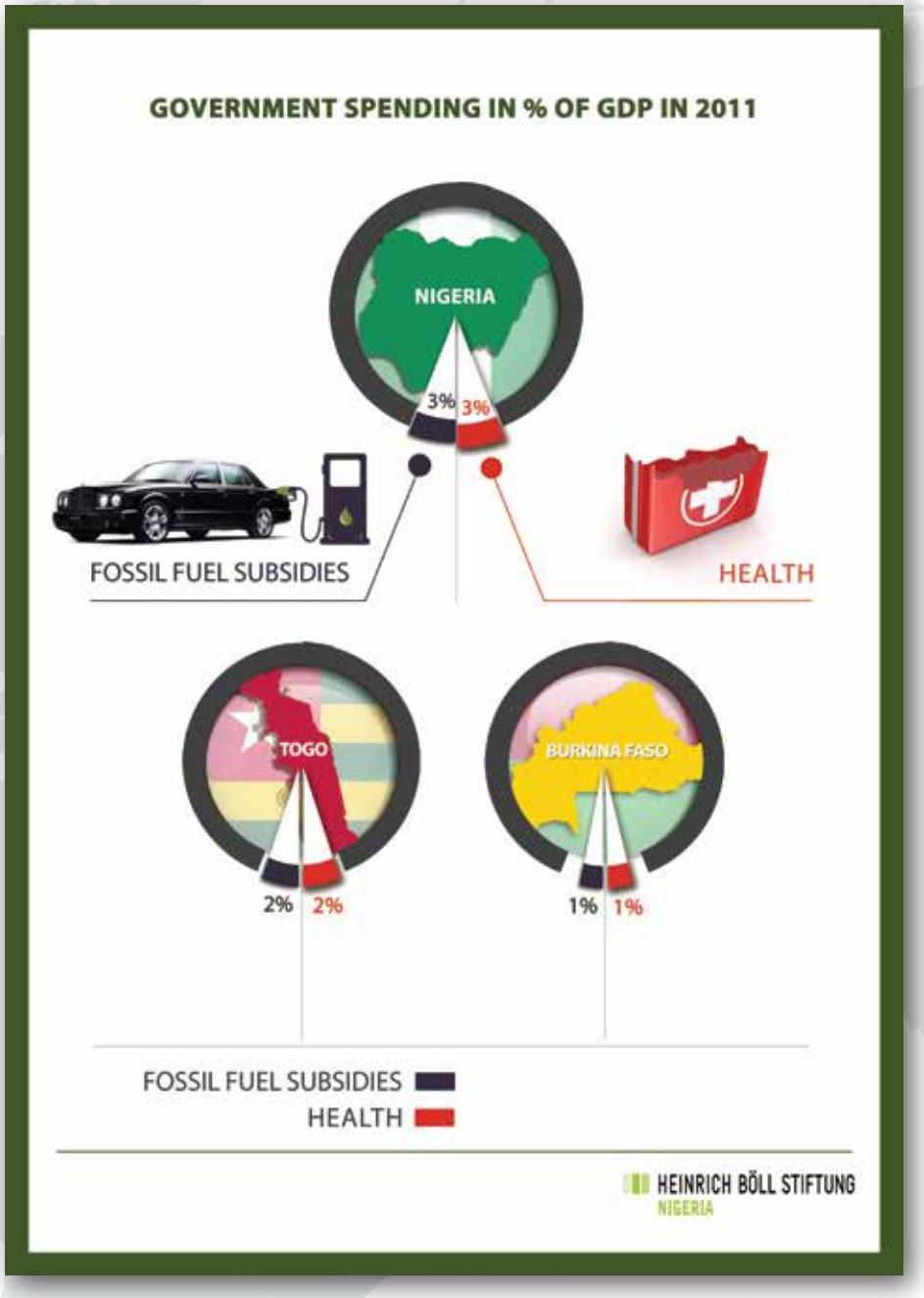


over 60 percent of these subsidies. In Mali, 43 percent of fossil fuel subsidies benefit the richest 20 percent of households, while only 11 percent go to the poorest 20 percent (Kpodar and Djiofact, 2010). Put plainly, fossil fuel subsidies are inefficient and unfair from the perspective of the poor. According to UNEP, in Africa scarce government resources are thus diverted from pro-poor spending. In 2011, West African governments spent 1 per cent (Burkina Faso), 2 percent (Togo) and an estimated 3 per cent (Nigeria) of GDP – equivalent to the total health care allocation – on fossil fuel subsidies.

Because energy cost is an important component of the cost of living for most households, subsidy reform is a political mine field. The first step taken tends to be the introduction of differentiated pricing, with private and commercial users paying market prices and public transport being given access to subsidised fuel depots . By redirecting revenue gains to more productive uses and mitigating the impact on the poor, it is in fact possible to go further. Ironically, regional integration commitments of WAEMU members have in the past prevented countries such as Senegal from removing LPG subsidies. With borders in the region effectively open, policy coordination in the ECOWAS region is essential.

Reducing subsidies provides a direct incentive for greater efficiency and innovation. Transparency and accountability in the process of subsidy removal is crucial, as trust in government tends to be low. A package of well-designed and pro-active measures to ameliorate the impacts on the poor, engagement of stakeholders and a strategic approach to communications are essential elements of any reform process. By following these rules and delegating domestic market regulation and price setting to an independent authority, Ghana has managed to effectively reduce subsidies.

CLIMATE FINANCE

Following the public commitment by the world's leaders, made at the climate summit in Copenhagen in December 2009, to mobilize $100 billion in climate finance by 2020, many African countries had high expectations. Yet, mobilization of climate (mitigation and adaptation) finance has been slow and only a relatively small portion of global climate finance has reached West Africa, particularly the poorest countries. According to Climate Funds Update, major barriers to investment are the transaction costs of small-scale projects that are often most appropriate for the poorest regions and the difficulty of designing and implementing financially viable programs. There are over a dozen multilateral climate funds, like the GTF, GEF and GEEREF, and at least as many bilateral ones. In Africa, the AfDB claims to be the largest financier of clean energy, committing $4.3 billion since 2007. Today, it manages World Bank Climate Investment Funds with clean energy projects in e.g., Ghana, Liberia, Mali, Niger and Nigeria. For up-to-date information, we recommend Climate Funds Update maintained by hbs and ODI. An overview of international climate finance funds allocated to the ECOWAS region appears below. The gap between the need for investment in clean energy access and the small size of these projects is striking. To exacerbate the problem, only a fraction of approved funds is actually spent. A step change is needed.

CLIMATE FUNDS UPDATE FOR ECOWAS (in millions of USD)

Country	Approved	Disbursed
Benin	31.55	8.61
Burkina Faso	79.66	4.64
Cape Verde	9.45	4.92
Cote d'Ivoire	18.43	2.09
Gambia	30.98	3.98
Ghana	48.85	20.55
Guinea	22.9	8.53
Guinea-Bissau	5.94	4.2
Liberia	19.02	9.24
Mali	50.02	10.86
Niger	121.76	9.41
Nigeria	49.76	13.8
Senegal	36.37	19.56
Sierra Leone	26.42	4.86
Togo	28.48	2.02

Data compiled 9 May 2014

LESSONS FROM THE CLEAN DEVELOPMENT MECHANISM

International emissions trading was intended to create a steady flow of climate finance to projects in developing countries as a first step on the road to low-carbon development. The Clean Development Mechanism (CDM) was created under the Kyoto Protocol to assist developing countries in achieving sustainable development, and for industrialised countries to reduce their costs of greenhouse gas abatement. After the USA left the Kyoto Protocol, Europe and Japan were expected to be the largest buyers of carbon credits. Indeed, from 2005 through to May 2014, the CDM generated 1,451 MCERs carbon certificates and registered some 7,500 projects. Despite this, the CDM finds itself in crisis: It has failed to deliver on its dual objective.

Governments and business had high hopes for the CDM, with most NGOs taking a more critical stance. Some NGOs expressed fundamental critique of the creation of international carbon markets, others were concerned with specific technologies being supported (such as HFC conversion) and the lack of safeguards for human rights for CDM projects (such as with large jatropha plantations). There was no disagreement about the value of, for example, capturing methane from landfills, ending the flaring of gas from oil extraction or putting an end to deforestation. But the question of who benefits was rarely answered. Large-scale hydro power, tree plantations and biofuel projects have proven especially profitable for business, not the African people. Sub-Saharan Africa has not, as originally

HFCs (hydro-chloro-fluoro-carbons) are industrial refrigerant and propellant gases that are widely used in air conditioners, fire extinguishers and fridges. The precursors of HFCs, known as CFCs, seriously damaged the ozone layer and were banned by the Montreal Protocol. Unfortunately, some HFCs damage the climate even more than their predecessors.

Destroying HFC-23, an accidental byproduct created in the production of HFC-22, can earn you large emission reduction credits under the Clean Development Mechanism. The CDM is an international regulated market for carbon credits from projects that reduce emssions. Under the CDM, a project sells emission reductions it has achieved to a buyer who needs them to meet legally binding targets. Governments and companies that need credits use them to compensate for a lack of domestic carbon mitigation action.

Whether the CDM has indeed reduced emissions is heavily debated. Some argue it has only made project developers richer and that the development and carbon benefits are marginal at best. The methodologies to calculate the difference between business-as-usual development and low-carbon development are questionable indeed. In the case of HFC-23 it is however simple. You capture the gas when producing HFC-22 and destroy it and make a lot of money - to be precise, you can earn 11,000 times as much as when avoiding the production of a similar amount of CO2! The perfect scam was invented as a result: produce lots of HFC-22 you do not need and become rich by destroying the HFC-23.

When the distortion of the CDM became clear, an uproar resulted but China in particular made a lot of money from this distortion. Yet China was not alone: from 2005 to June 2012, nineteen manufacturers of refrigerants (11 in China, 5 in India, and one each in Argentina, Mexico and South Korea) were issued with 46% of all the certified emissions reduction units from the CDM. David Hanrahan, the technical director of IDEAcarbon believes each plant would probably have earned between $20 million to $40 million a year from the CDM. The EU finally banned these credits from use in the European Trading Scheme from 2013 onwards. That has significantly reduced their production / destruction.

hoped by governments, become a major market place for carbon projects. According to the UNEP Risoe CDM/JI Pipeline, despite initiatives to increase the number of CDM projects on the continent, in 2013 Africa's share of the CDM remained below 3% of projects and CERs issued.

To stimulate CDM project development investment in Africa, several initiatives were launched. For example, UNEP, Standard Bank and the German government created the Africa Carbon Asset Development Initiative. In West Africa, the African Biofuels and Renewable Energy Fund was established. Globally, the World Bank manages a number of carbon funds with projects in Africa.
The reasons for the CDM's failure in Africa are multiple. Some are inherent in the design of the mechanism. For example, it has proven hard for new project developers to calculate the difference in economic viability of projects with and without carbon credits (incremental cost). Other reasons are the high transaction costs relative to the average project size. Furthermore, several cases of fraud, corruption and poor technology choices have been well publicized.

The fundamental critique of the CDM centers on the fact that emissions trading gives business a license to continue polluting in developed countries with emissions limits (a carbon cap). The emissions reduction projects in developing countries often do little more than subsidize business and the same-old development, often at the expense of local communities. Even when judged on its own terms, the CDM has real problems. Carbon credits should only go to projects that could not be built without its support. They are intended to pay for the 'additional' or 'incremental costs' of projects that would otherwise not be economically viable. Business-as-usual development should not be supported, as they do not deliver actual emissions reductions. Experts agree this additionality is difficult to assess. There have been estimates that 20-70% of all CDM projects are non-additional.

The European market has struggled with an over-supply of carbon certificates and depressed demand following the 2009 financial and economic crisis. The price dropped below €10 per tonne compared to nearly €30 per tonne in 2008. This is too low to be an incentive to business to reduce emissions. This had a serious impact on the CDM, with prices of credits falling to below US$1,00. Clearly, the expected inflow of carbon finance did not materialize.

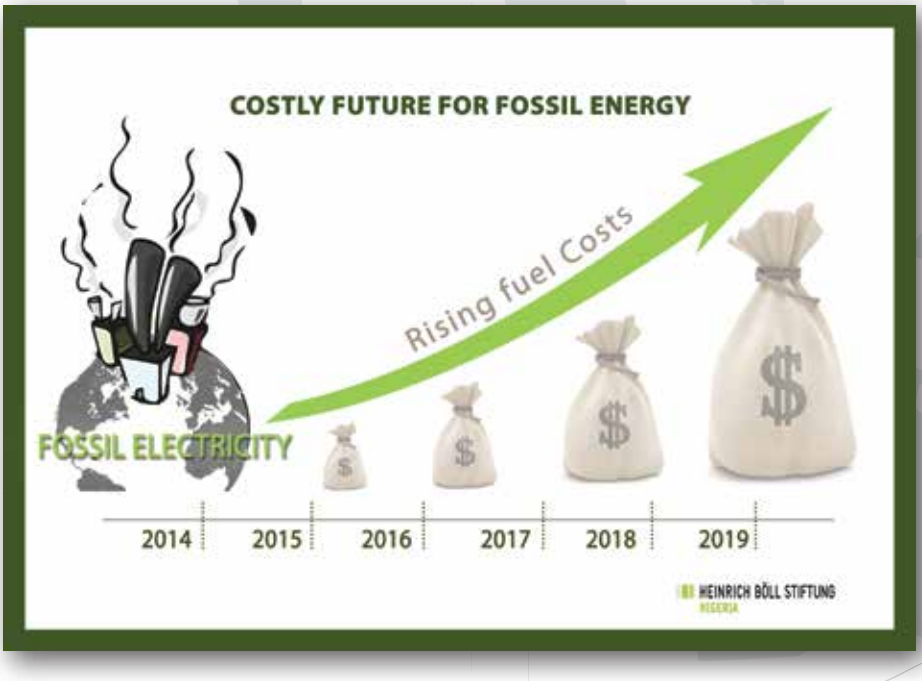
FROM CDM TO SUPPORT FOR NATIONALLY APPROPRIATE MITIGATION ACTIONS

Few people expect the CDM, as we currently know it, to continue operating beyond 2020. Governments seek to establish a mechanism that can operate at a larger scale in the context of a new international policy framework. Unsurprisingly, most African governments do not seek an end to international emissions trading. What they appear to be pursuing is a program-based system where bundles of policy actions and projects are nationally determined and offered on the international 'market'. This leads to a competition of sorts with countries or businesses offering mitigation potential at a certain cost and other countries or companies purchasing the offering they like best, be it because of the low price or for their sectoral focus. The past decade of CDM experience can be of value when designing the NAMA system; regardless of the question whether or not one agrees with the direction the governmental negotiations are taking.

REDUCING COST

The biggest hurdle for energy investments to move into renewables is a higher upfront cost per Kwh when compared to most (subsidized) fossil sources. Whereas over the project lifetime fossil power plants are facing the challenge of rising cost of fuels, renewables projects face the challenge of debt servicing. Policies that re-level the playing field or indeed give renewables a leg up against dirtier alternatives are needed. As shown already, if this were done, fuel powered generators would no longer be the energy source of choice for households but would likely be replaced by solar panels.

According to CPI (2014), reducing the cost of debt dramatically reduces the total amount of support that a growing renewable energy market requires, and makes those subsidies cheaper to provide. Analysis demonstrates that policy makers could reduce the cost of supporting renewable energy in rapidly developing economies by 30% if it were delivered through subsidized debt rather than through higher tariffs or subsidies on top of wholesale energy prices. According to IRENA (2013), Ghana's ARB Apex Bank for example has with government backing developed a successful financing model to support the roll-out of mini-grids. An additional measure is the indexing of renewable energy tariffs to foreign currency: with this, \middle-to-low-income countries with ambitious renewable energy targets could attract additional foreign debt to the sector. This measure reduces the currency risks that would otherwise erode the cost advantages of cheaper, longer-term foreign debt and could save countries 30% on their renewable energy support.



CREATING A LEVEL PLAYING FIELD WITH REFiTs

The experiences of introducing tailor-made renewable energy Feed in Tariffs across Africa (WFC / hbs / FoE 2013) have taught us valuable lessons that actually apply to any NGO policy lobby effort:

- In order to build momentum for a REFiT policy, it is important to have high-level political support as well as buy-in from all other stakeholders. South-South learning exchanges involving ministries, utilities, regulators, financiers, project developers and community representatives have been a successful tool in this context.
- Broad coalitions involving civil society in addition to policy makers and private sector representatives have proven successful in designing and implementing REFiT policies that are resilient to changes in the political landscape.
- The success of a REFiT depends on an enabling environment. The policy should thus be an integral part of the country's wider development strategy. Awareness raising about renewable technologies in general and REFiTs in particular will help overcome skepticism. Moreover, a specific programme to build technical capacity of local companies should be implemented. A strong national value chain avoids expensive imports and provides economic benefits beyond the renewable energy sector.

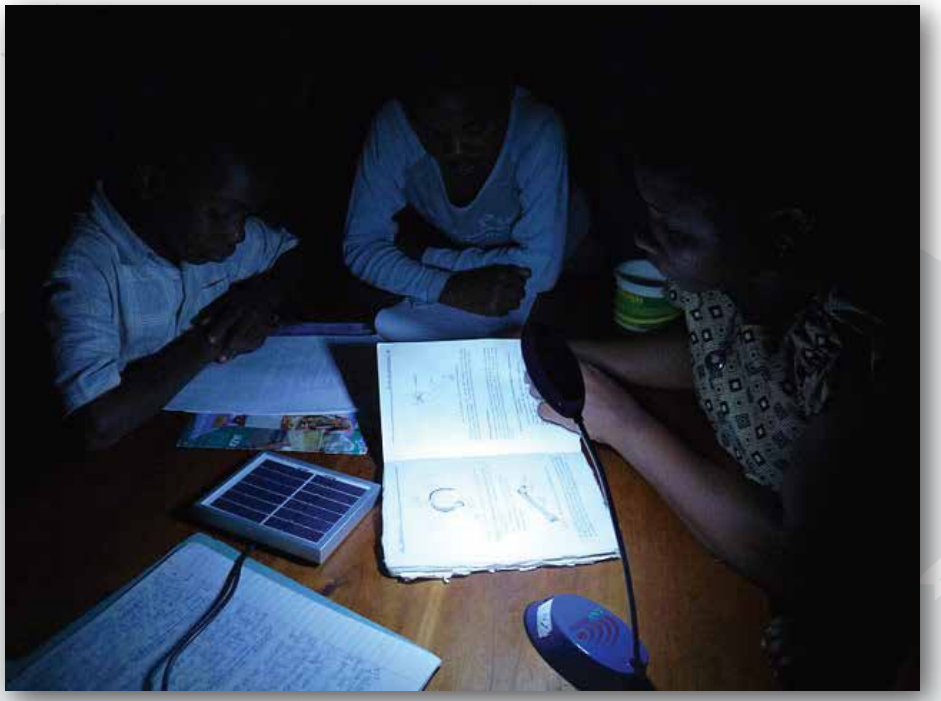
A FOCUS ON PRO-POOR ENERGY ACCESS

By adopting a service-based rather than a supply-based approach to energy delivery, the chances of reaching the poor are greatly increased. Due to the infrequent and often informal nature of income, many poor people find cost the biggest hurdle to purchasing energy services. To reduce the upfront cost, wires, meters and construction materials can be made affordable through subsidized micro-loans or a community-managed fund. It is acknowledged that different types of affordability exist. Recent research into energy efficient lighting projects in Ghana, Uganda and Rwanda (DIE 2014) has shown the relevance of behavioural factors in designing pro-poor energy efficiency policies. Social preferences, framing, as well as innovative financing solutions that acknowledge people's "mental accounts" should be taken into account. Behavioural levers can, however, only work if they form part of a package of measures that addresses wider technical, market and institutional barriers to energy efficiency.

International project experience is that energy services can reliably be delivered to slums, even in the absence of legal tenure, if the service provider and local government are willing to negotiate solutions with a community. Unfortunately, there often is a mutual lack of trust. Furthermore, in the absence of awareness raising and training about the benefits of cleaner, efficient energy services it is unlikely slum dwellers will take them up. Using simple, innovative technology that can be maintained locally is important. Local retailers are often those best able to adapt to circumstances, such as poor infrastructure. (ESMAP, 2013) Practical Action (2013) with 40 years of experience delivering appropriate technology solutions to poor communities shows how a focus on the energy services for the community, such as street lighting, drinking water pumping, refrigeration and sterilisation for health care, public institutions, education and telecommunications infrastructure, is a cornerstone of access to sustainable energy for all. The concept of total energy access helpfully shows the inter-locking components of any energy strategy: energy for communities, energy for households and energy to earn a living. CAFOD and IIED (2013) describe the enabling policy environment as a sine qua

non for a service-based energy delivery model for the poor to succeed. But each country has its own unique set of barriers and enabling factors.

For a pro-poor energy shift to occur, remaining major structural impediments need to be addressed. It is our view that four major challenges need to be tackled before an energy transformation can take hold in West Africa. We will describe these challenges on the following pages.

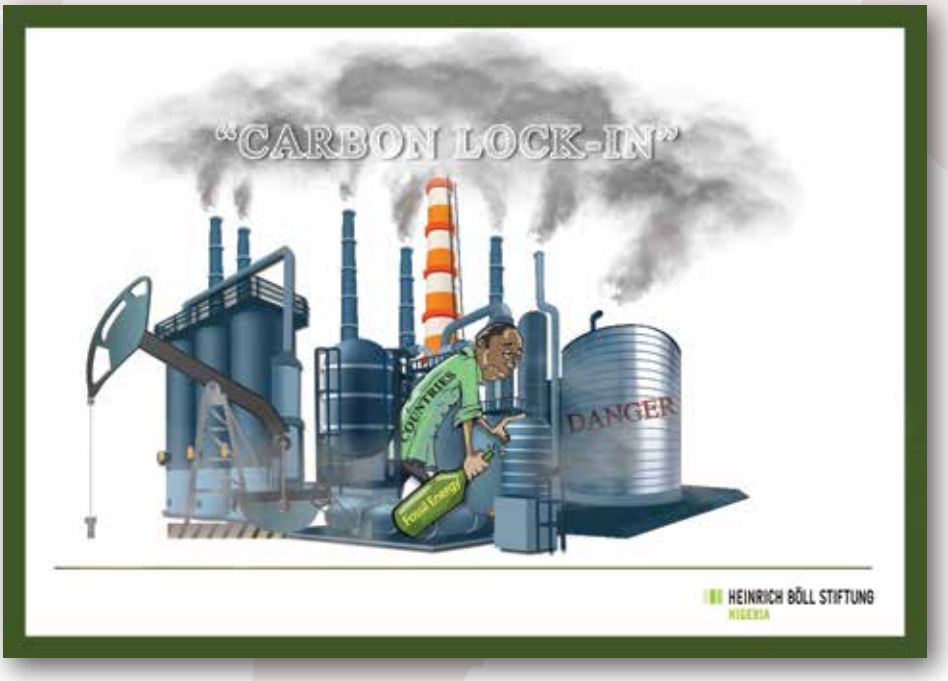


Kilolo Tanzania solar light

CHALLENGES

CHALLENGE 1: LACK OF VISION

The debate about West Africa's energy future is about much more than energy access or indeed climate change alone. It is a vision that concerns itself with employment for youth, business development in rural areas and bringing health and education services to remote communities. Without clarity of vision, there can be no effective strategy. National planning for a 2015 global climate agreement is an excellent hook for civil society to open the debate on what a low-carbon future in West Africa means. But we wish to warn against applying a carbon-only metric or indeed an energy-access-at-all-cost approach to further development of the energy sector. Each solution has its own social, distributional and environmental impacts, which for some low-carbon technologies are significant. This is readily apparent when we look at the intricate relationship between the agricultural sector, in all its diversity, and the use of traditional biomass for rural energy. A push for so called modern biomass to fuel power plants, discussed in detail below, would not only have major land and water use implications but, for example, put pressure on 'marginal' lands and the poor.



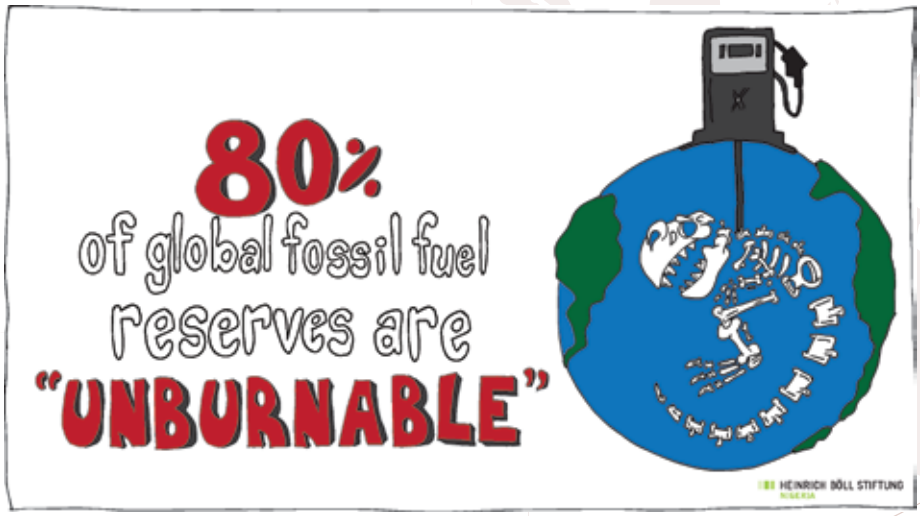
The IPCC tells us that today's addiction to fossil energy will lead to a dangerous path dependency, known as "carbon lock-in." This addiction forecloses a safe and healthy future. A power plant built today will still be in operation 30 years from now. Indeed, mega-sized power plants, like the one currently under construction in South Africa, run for 50 years. Yet, most energy sector planning is myopic and concerns itself solely with energy security (for some). But this is often done poorly, though national realities differ significantly. For example, the fossil fuels for electricity generation are often imported and their prices are high and volatile, subject to global developments. Fuel price developments impact on government budgets yet are often not correctly accounted for in investment decisions.

This lack of foresight is exacerbated by the economics of energy sector investments that are non-transparent, even in so called developed market economies. Large investment decisions lock government and business in for decades, so many factors come into play. Regardless of the vision any vibrant democracy may develop for itself, private companies' investment decisions tend to be shaped by their short-term (shareholder) needs, long-term (preferential) financing arrangements with governments, and partnerships with banks, investment funds and, in some cases, international institutions. Few companies that invest in the power sector are truly domestic, foreign investors often hold a controlling stake. Decisions are thus taken in a global rapidly shifting geo-political context. Those energy companies that are domestic in origin tend to be politically well-connected. Either way, rarely are the full terms of the contracts transparent and publicly available, even those in parliament may not be able to hold the companies accountable.

Before proceeding, it is important to be aware that the Carbon Tracker Initiative has labeled the remaining 80% of global fossil fuel reserves technically "unburnable" as the world is rapidly consuming the remaining carbon budget. Stock markets assign value to companies on the basis of their so-called proven fossil fuel reserves. In order to stay within our carbon budget (I.e., to limit warming to below 2 degrees Celsius), only 20% of these reserves can be burned unreservedly. This puts the energy choices people are presented with in a different light.

VISION 20: 2020 AND NIGERIA'S LOW-CARBON DEVELOPMENT POTENTIAL

In Vision 20:2020 the government of Nigeria has laid out ambitious development targets. The World Bank, in 2012, analyzed the climate change mitigation potential in the agricultural, transport, energy and oil and gas sectors within the constraint of meeting these growth targets. Through detailed modeling, the WB showed that Nigeria's agricultural vision of a six fold increase of domestic agricultural production could be reached by 2025. It further found that there was enormous potential for emissions reduction by sustainable management of land use through intensification and an increase in tree density. These improvements are more affordable than existing policies to both government and farmers.

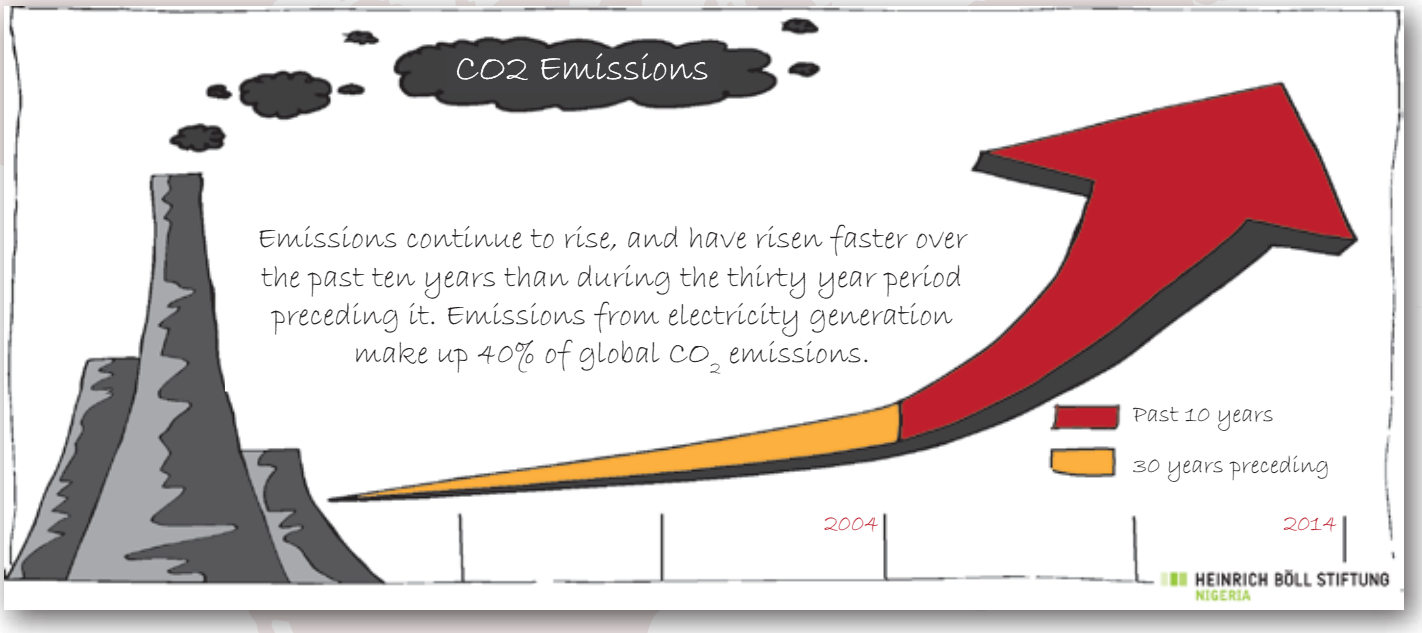


With regards to the oil and gas sector, as also shown in our 2012 Green Deal Nigeria report, the World Bank states that controlling the flaring of associated gas can both deliver more return on investment but also significantly reduce emissions.

es, that can be fueled by compressed natural gas, CNG. Finally and most importantly, vehicle emissions standards need to be

Coal: An energy poverty solution?

Due to its abundance and low market price, coal is the largest source of energy production in the world, accounting for 40% of all electricity produced world-



The power sector is hampered by an unreliable supply and load shedding. As a result, more than 50% of electricity in Nigeria is produced off-grid by generators. Vision 2020 seeks to reduce that number by expanding conventional generation capacity. The World Bank argues a low-carbon pathway is available at lower cost through diversification and a more regionally balanced supply.

Road transport and the concomitant demand for transport infrastructure are fast growing. This is driven by an increasing population and rising personal incomes. A modal shift of freight to the aging rail network was deemed necessary, as was an expansion of mass transit, especially in citi-

raised. While not delivering major emissions reductions, these measures significantly reduce urban air pollution and can beat the forecast explosion of emissions.

So what energy options are available to West Africa and how do they stack up when measured against the need to provide access to energy, fuel sustainable development, promote transparent and accountable governance and prevent run-away climate change? In Africa, renewable energy generation is still not being prioritised by governments. Renewables are included in national energy frameworks, but they continue to play a marginal role.

wide. In 2005 it was responsible for 72% of global CO2 emissions from power generation. However, in recent years, coal is retreating in the developed world and fast-growing BRICS economies. Why?

Coal is called a ”killer” for good reason. It is a major source of air pollution and climate change. Recent figures for India show millions of cases of asthma and 100,000 premature deaths. Coal-fueled air and water pollution is now the main source of social unrest in China. Coal mining destroys local communities, forests and water resources through run-off and soil contamination with heavy metals like zinc, copper, manganese, cobalt, cadmium, selenium, mercury,

arsenic, iron, lead and chromium. Coal-fired power plants need millions of liters of clean water every year to operate. The reason behind the shift away from coal is that its true costs are very high and that alternative energy sources are now cost-competitive, even when the true cost of pollution is excluded from the equation. Harvard University estimated the cost of coal to the US economy to be at least US$ 500 billion.

In Epstein et al. (2011), The Full Cost of Coal in Annals of the New York Academy of Sciences, the total cost of externality estimates ranges from 9 to 27 US$ cents per kilowatt-hour (kWh) of electricity generated, with a median of 18 US$ cents per kWh. Based on US EIA data from 2010, the externalities are sufficient to triple the true cost of coal power. If externalities are included, the levelized cost of coal power is 28 cents per kWh, more than hydro, wind, geothermal, biomass, solar PV, and on par with solar thermal (whose costs are falling rapidly, whereas fossil resource prices rise steadily). Epstein et al. noted their estimate is conservative, because they were unable to account for every associated impact.

Coal is often touted as the pro-poor energy solution. However, when taking a closer look at the economics of coal, one finds a different reality. While coal may be the most abundant of natural resources, it is by far the dirtiest and most expensive energy source when all costs are factored in. But even if one ignores those issues, recent research by IEEFA's Tim Buckley categorically discredited the argument that importing coal might alleviate India's energy poverty. At current international market prices, India would need to double its wholesale electricity prices for power generation to remain economically viable. When compared to building a new coal plant, renewables not only start out cheaper, but also get cheaper over time. In India, in line with the global trend, the cost of electricity from solar has fallen by 65% over the last 3 years alone. In contrast, the average price escalation for imported coal in India equates to 4% per year in local currency terms because coal is purchased with US$. For economic and political decision makers, the fact that fossil energy resources can be an important driver of inflation, while renewables are deflationary, matters a lot. Importing coal, purchased with hard currency adds to the current account deficit, fuels economic instability and reduces energy security and diversity. It is then not surprising that many export-credit and investment guarantee agencies in the OECD have now ended their support for the construction of new coal-fired power stations in the developing world.

Currently, West Africa does not even feature in international coal import and export statistics. For those countries with significant domestic reserves, it is feasible to leave the coal in the ground. Yet, in Nigeria for example some argue that with large deposits, coal exploitation is the only available option. Really? It is somehow hard to imagine Nigeria repeating past mistakes in fossil resource extraction and further polluting its own back yard, despite solid evidence that shows a clean and affordable alternative exists. As often, the question arises: who decides and who stands to benefit? In Senegal, talk about another dirty coal-fired power plant to supply electricity to a grid that inadequately serves its cities ignores the needs of rural communities. Energy politics across West Africa appears to be driven by the needs of the large cities that provide the mainstay of voters. Hence the grid is prioritised in government budgets. The cost of rural – urban migration and unemployment is ignored at the government's peril.

Coal? Gas? No, combined cycle concentrated solar power!

Gas: A bridge to a low-carbon future?

Globally, investment in generating capacity is rapidly shifting from coal to gas. Gas units are smaller, more efficient and more flexible than coal. Compared to coal, with gas the fluctuations in electricity demand can be managed without any problem. Gas power generation units are built faster and at lower cost, with fewer cost overruns. Indeed, many argue that while oil and coal are heavily polluting, gas is a necessity for short-term economic growth. Some go as far as calling gas a bridging fuel to a climate-safe future. But we should point out that the life-cycle emissions of natural gas electricity systems are much higher than is generally accounted for.

Methane leaked during gas production is a potent greenhouse gas. This is also a problem in shale gas production through hydraulic fracturing, better known as fracking, which has significant health and environmental impacts. Fracking requires massive amounts of water and uses a deadly cocktail of chemicals; many of which are undeclared by the companies. The shale gas revolution in the USA has reduced US dependence on foreign oil, but at the same time it has increased groundwater pollution and affected human health. The return on energy investment for marginal and high risk fossil fuel resources is very low and many communities are reluctant to accept the risks.

Some economist and indeed industry insiders have argued that the US fracking boom is a classic example of a bubble, even a Ponzi-scheme as only by continued investment can existing debtors be paid off. Gas is of course brought to us by the very same companies that caused the resource curse to begin with: Exxon and Shell supported by General Electric and Siemens. These companies are not interested in business models for SMEs. Social entrepreneurship, which in our view will be at the core of Africa's renaissance, is not encouraged by the corporations.

On balance, along with stricter efficiency standards, LNG / LPG is a good bet for the fast-growing transport sector in the short-term. In the medium- to long-term, gas can only play a minor role in the electricity sector, because the planet will not be able to sustain any more emissions come 2050.

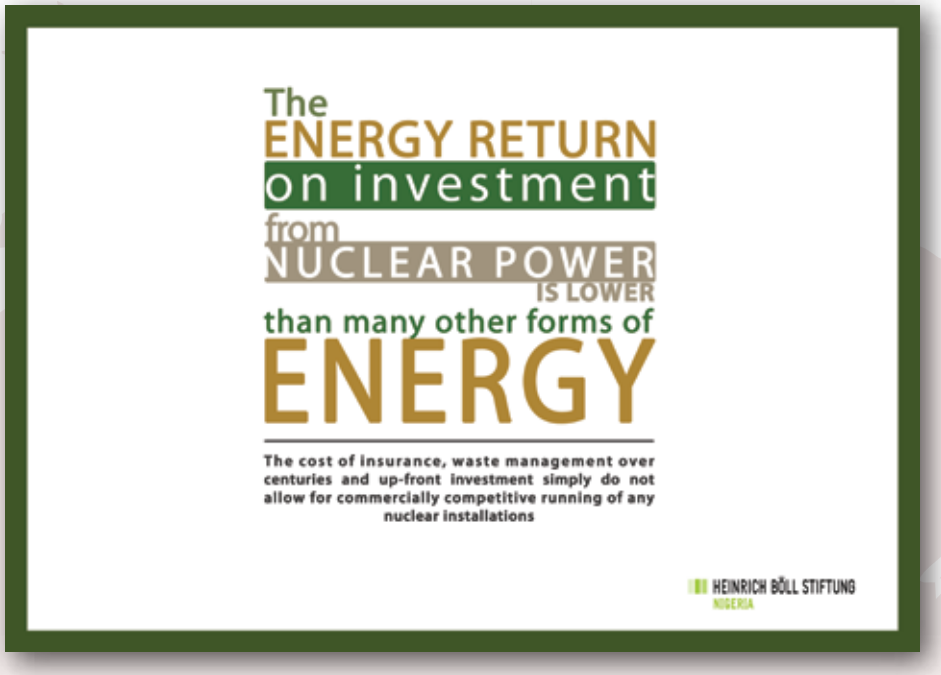
Oil and Diesel: On the way out?

A few cities in West Africa still operate power generation units running on oil or diesel, but as those are expensive (and dirty), they are gradually closing. Recent high and volatile oil prices have heavily impacted the power sector. This has a knock-on effect on other sectors of the economy. Governments often struggle with volatile high prices of imported fuels. The macro-economic effects are a deteriorating trade balance, through a higher import bill and a weakening fiscal balance, as governments try to insulate the domestic economy against market developments through measures such as subsidies. The micro-economic impacts include higher volatile prices that result

in investment uncertainty and undermine economic development. Further indirect effects are inflation, which may lead to wage demands; a drop in consumer confidence and less purchasing power; loss of competitiveness from higher power costs; and ultimately undermining of government authority and the regulatory environment as pressure is put on governments to bypass market mechanisms. Even though financial instruments exist that can help manage price risk in the short term, the only structural measure is to reduce dependence on oil consumption. Though well-established in the commercial sector, the use of price risk management instruments is not widespread in the public sector. Recent volatility in energy and food prices, however, has awakened the interest of many governments that are eager to learn more about how they can use these tools (ESMAP 2012).

Nuclear Energy Insecurity

After accidents in Chernobyl, Three Mile Island and Fukushima, not to mention dozens of smaller incidents that never made global media headlines, it may be surprising that nuclear energy proponents predict a nuclear renaissance. Notwithstanding wide public opposition and fear of further accidents, with a new generation of smaller nuclear reactors some believe the industry just got a new lease of life. Companies from the USA, Russia, France, South Korea and ironically Germany, which is phasing out nuclear generation at home, are all active in the market. Most of them are supported by taxpayer-funded export credits. Proponents like to argue that nuclear energy is a safe low-carbon electricity source. But nothing is further from the truth. Uranium must be mined, milled, converted, enriched, converted again and then manufactured into fuel. The "energy return on investment" from nuclear power is lower than many other forms of energy. Furthermore, the havoc uranium mining has wreaked on communities in the Republic of Niger, for example, is well documented.



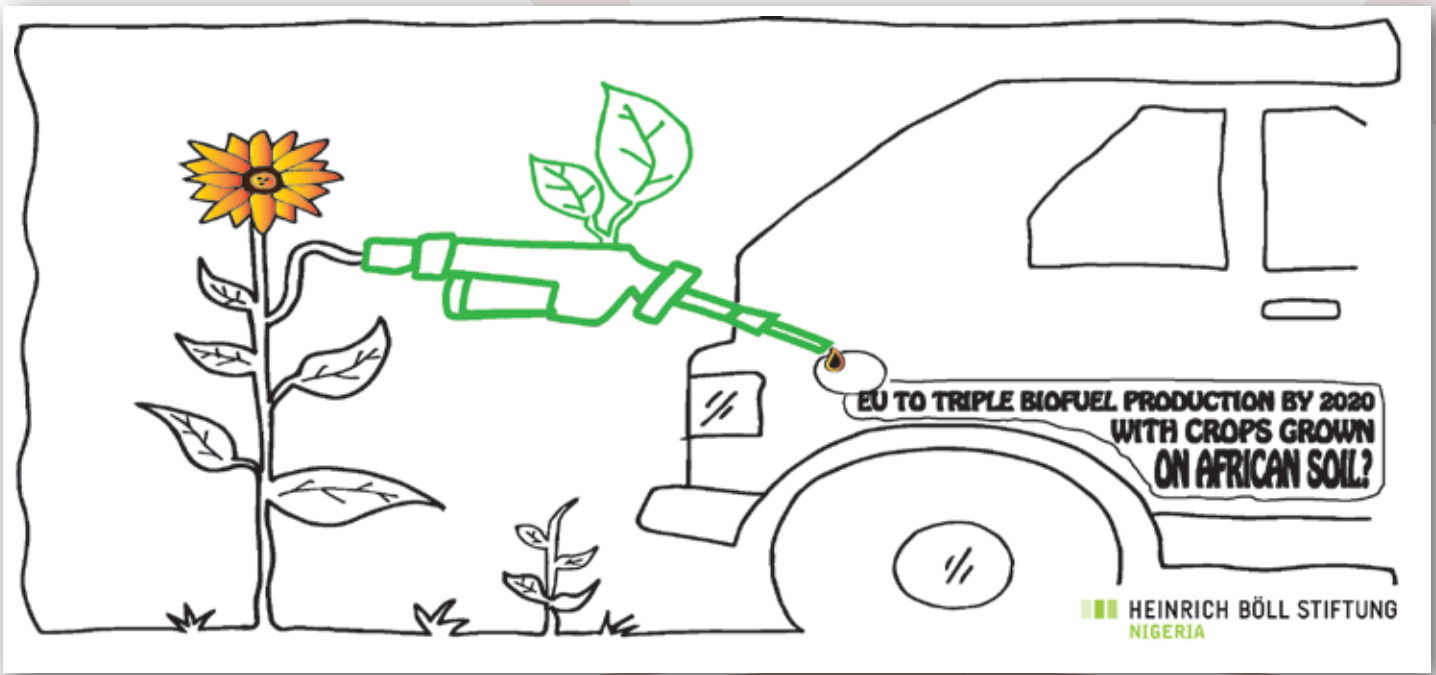
Energy economics nor security risks are rarely, if ever, adequately considered in government decision-making on nuclear generation. For many countries, nuclear energy is a matter of prestige. In fact, market economics has kept many countries from launching or completing nuclear energy programmes. The UK government, for example, has already spent several billion pounds to cover liabilities of eight privatized nuclear power plants. The costs of insurance, waste management over centuries and up-front investment simply do not allow for commercially competitive running of any nuclear installation. No nuclear power plant seems to have been constructed on time and on budget, even in the most advanced world economies. The final construction budget of the US nuclear fleet has on average been thrice the cost estimated at the start of construction. The same holds true for a new Finnish reactor, construction of which has been delayed again and again; construction began in 2000 and the plant is currently expected to open in 2020.

Nuclear investment does not deliver clean energy this decade or even the next, it simply crowds out urgently needed investments in efficiency and renewables. A significant benefit of less nuclear power is the greatly reduced risk of nuclear proliferation and terrorist incidents. But it is too early to write-off nuclear energy completely. Many governments (secretly) aspire to acquire nuclear technology. But a renaissance of this dangerous technology is only possible with billions in government subsidies and new policies to protect the companies managing them.

Biomass for the masses

Traditional biomass accounts for some 9 percent of the world's total energy requirements, still more than is provided by modern renewables. But the share of traditional biomass has remained fairly static over the past two decades, while modern renewables have soared. Bio-energy spans a vast range of resources from wood and pellets to energy crops and waste streams and presents an opportunity for rural development and the agricultural sector. As with every opportunity, the biomass opportunity carries its own risks. Research shows that the export by African countries of bio-energy feedstocks, especially ethanol – which is much sought after by the EU, puts additional pressure on local food prices. The EU bio-fuels targets set in 2009 as a means to lower its emissions, require it to triple bio fuel production by 2020 to some 45 billion liters, and ethanol is exempted from import duty when sourced from ACP countries. The true potential, however, is disputed. "Biomass Potential in Africa," a recent DBFZ study for IRENA compared various methodologies, benchmarked the results, and identified the key elements. It concluded that an enormous range of calculated biomass potentials exists.

Very few people still dispute that the development of conventional biofuel production has an impact on access to land and water. It often leads to an increase in land concentration to the detriment of smallholders. The EU bio-energy policy has resulted in strong interest by European companies in acquiring agricultural land, especially in Africa. In West Africa, community land titles may not be legally registered and people often lack the legal knowledge needed to seek redress in the event of land grabbing. Furthermore, land acquisitions are often linked with free, even exclusive access to wa-



ter in a context of increasing water scarcity (AETS 2013). Those most affected are women and pastoralists.

Starting in 2005 (Ghana), most West African countries developed a bio-energy and bio-fuels policy or strategy, including creating incentives to stimulate development of the sector. Bio-fuels have the potential to enhance domestic energy security, if an Integrated Food-Energy Systems approach is taken. But in most countries, a regulatory framework is missing and most (foreign) investors invest in biofuels production for export and ignore the domestic market.

What is waste to some is a resource to others! There are now advanced second generation biofuels produced from feedstocks, which do not compete with food and feed crops, and which are produced from sources such as (municipal) waste, used cooking oil or (in rare cases) agricultural residues. These can contribute to a sustainable energy system. According to Rabobank, the largest Netherlands bank that is rooted in the agricultural and SME sectors, agricultural residues will play an increasing role in the use and potentially trade of biomass for energy. A few examples of good practice in the region were found: extensive public consultations and mapping of customary land rights were undertaken by Addax Bioenergy in Sierra Leone; a technology centre and business incubator were created in association with the Markala Sugar Project in Mali; and a biogas project in the Casamance region and a rural electrification pilot project in the Fatick region were developed by NOVIS in Senegal (ibid.). In 2009, the Scanstyle Biofuel Mim's pellet plant came online in Ghana: this Danish-invested mill utilizes waste wood from local industry rather than from forests.

In the meantime, European NGOs have been putting considerable pressure on the EU to adopt strict sustainability standards for the sector. In the fall of 2013, following presentation of what many considered a weak draft, decision-making stalled. No new deadline for standard-setting had been announced at the time of writing this report (June 2014).

CHALLENGE 2: THE GRID

West Africa has an 'embryonic' grid system when compared with even the poorest members of the OECD. Satisfying electricity demand from industry is key, but even residential users often despair at the black outs. For this to change, the West African Power Pool grid needs to be stabilized. A well-managed and stable grid is a (costly) prerequisite to electricity sector development. It probably pays to fix existing grid problems before investing in generating capacity. Grid costs need to be transparently and equitably shared by all users. But beyond that, it simply does not make economic sense (and indeed would take decades) to keep on expanding the grid to reach every town.

Mini-grids in India

In India, valuable lessons have been learned building mini-grids.

The NGO Center for Science and the Environment argues that scaling up of mini-grids can be successful only if:

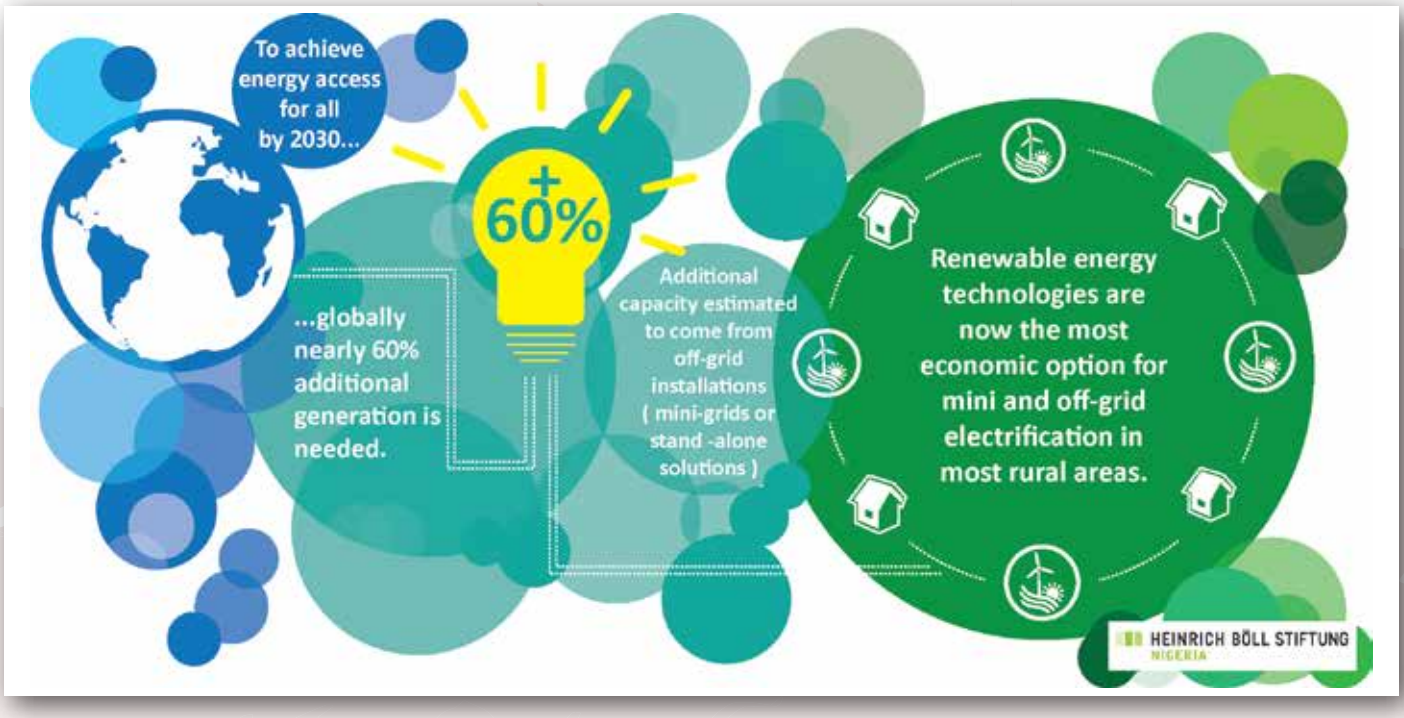
- the unit cost of electricity can be minimized
- the likely growth in demand for electricity as a result of growing aspirations of users can be met (the cost of which can be borne by the consumers)
- there is a viable financial model (i.e. the project does not unduly depend on subsidies); and,
- the developer can operate and co-exist if the grid reaches the village.

For more remote locations, where the grid may never reach, capital subsidies are in fact essential as the private sector is less likely to invest. Tariffs should be levied on the end user for operation and maintenance. The tariff can be calculated with an eye towards the cost of traditional biomass or fossil generator fuel.

For towns where there already is a grid connection, grid-interactive mini-grids need to be built. For this, the government needs to move from away from capital subsidies towards feed-in-tariffs, combined with preferential loans at lower interest to meet upfront costs. Renewable energy producers should be certain they can export excess power to the grid at a pre-determined feed-in-tariff. Developers could, when required, also import power to meet the growing needs of rural households. Small power producers would both import from and export to the grid.

Globally, nearly 60% of additional generation is needed to achieve energy access for all by 2030. The additional capacity is estimated to come from off-grid installations, either mini-grids or stand-alone solutions. Small-scale hydro power is technologically mature and has been cost competitive for years. Due to high oil prices and technological innovation, we have witnessed over the past five years a different kind of energy revolution: a global drop in hardware prices and competitive renewable energy.

Renewable energy technologies are now the most economic option for mini- and off-grid electrification in most rural areas. This means renewables have the potential to play a central role in extending electricity access and stimulating socio-economic development (IRENA, 2013). In our assessment this holds true for West Africa. A combination of localised mini-grids, connecting between a few dozen and thousands of small enterprises and households, and direct off-grid energy supply for remote individual households is the only sensible solution to the problems outlined.



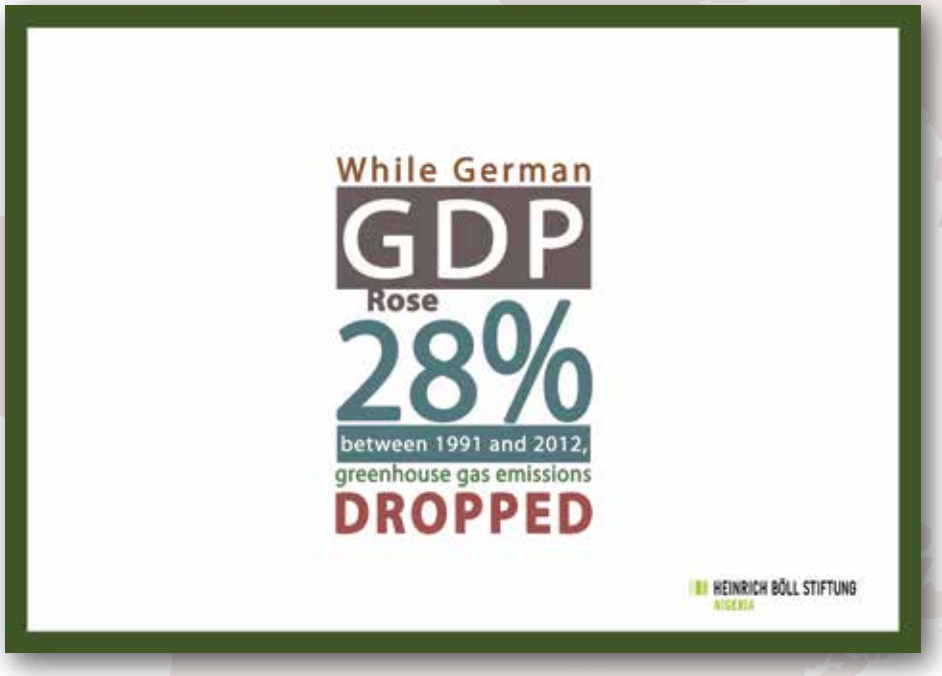
Renewables, in particular micro-hydro and solar photovoltaics, combined with electricity storage (battery banks), have in recent years become cheaper than (unreliable) grid-connections or diesel generators. IRENA's economic analysis of a variety of projects has found that the main obstacle to the comparatively high upfront capital investment cost for renewables are the fossil fuel subsidies that make diesel and kerosene artificially cheap. Transforming those consumer subsidies into pro-poor sources of finance for localised renewable energy systems is essential if we wish to avoid a dirty business as usual electricity system. In remote locations renewables projects make economic sense even under the present fossil fuel subsidy regime.

The German Energy Transformation

Opposition to nuclear energy has a long history in Germany. Feed-in-tariffs for renewables were put in place in 1990 and continue to this day. After the March 2011 nuclear disaster in Fukushima and under pressure by public opinion, the conservative government decided to fully phase-out nuclear energy by 2022. In the summer of 2013, renewable power supplied half of the electricity demand in Germany, the 3rd largest OECD economy, without causing any blackouts or grid fluctuations. At its peak, renewables provided 60% of electricity; including 234 GWh of solar, whereas it currently provides some 25% of electricity on average. Paradoxically, in 2013 German emissions rose on the back of historically low electricity wholesale prices and with subsidized lignite pushing imported natural gas from the market. This ongoing German energy transformation process demonstrates:

- That it is possible to integrate a growing share of variable and distributed renewable energy into a power grid of a highly industrialised country without suffering blackouts or voltage fluctuations;
- That regional and national coordination among transmission system operators on load management is crucial; and,
- That the information and communication technologies needed to integrate variable and distributed (by opponents often referred to as “unreliable”) power sources are all available.

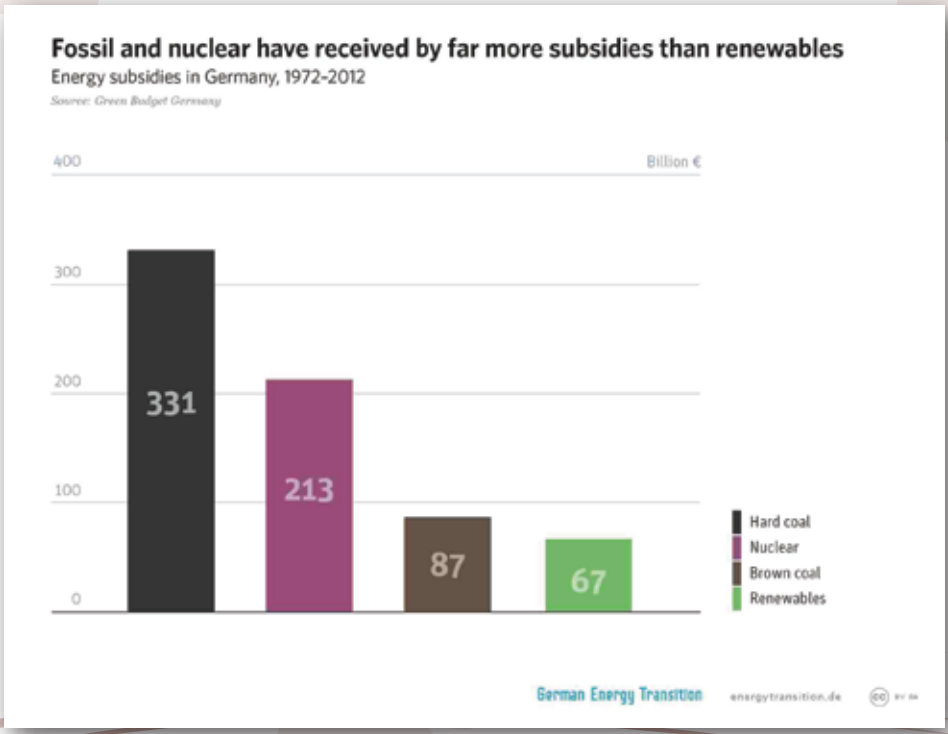
Some issues regarding grid integration and expansion remain to be resolved. But there are no technological barriers as often argued by fossil and nuclear power proponents. The shift to renewables is a matter of politi-



cal and policy coordination. It requires incentives and large scale implementation of "smart" technologies. Substantial investments in the grid and changes in load management will be needed to maintain grid reliability as the share of variable renewable power, like wind and solar photovoltaics rises further. Many in Germany believe the country can lead the world towards a 100% renewables future, 24 hours a day, 365 days a year. While German GDP rose 28% between 1991 and 2012, GHG emissions dropped 22%. The renewables industry employs double the amount of people of the fossil industry sector. Interestingly, this is a true citizens movement, with local people and cooperatives owning 47% of the installed capacity (2012). Nevertheless, the question "who pays" does keep people busy. The costs of shutting down old power plants before their scheduled end of life span and building a smart grid are not funded through government bonds or taxes but by a surcharge on electricity provided to ordinary consumers, from which large business is exempt. This is the source of a heated political debate.

CHALLENGE 3: JOBS - INDUSTRY DEMANDS MORE MWs

The structure of the West African grid mostly benefits large industrial users, despite the fact that industries have been seriously under supplied over decades: for example, the Manufacturing Association of Nigeria states that production cost in Nigeria is nine times higher than in China because of the additional cost of power (and security). This has seriously stifled industrialisation and concurrent job creation across West Africa. The need for power has become so pressing that some big companies have entered the recently privatized energy sector and have applied to build smaller, more flexible and efficient gas-fueled power plants: in Nigeria, the first gas-to-power plant was installed at a Dangote cement factory.



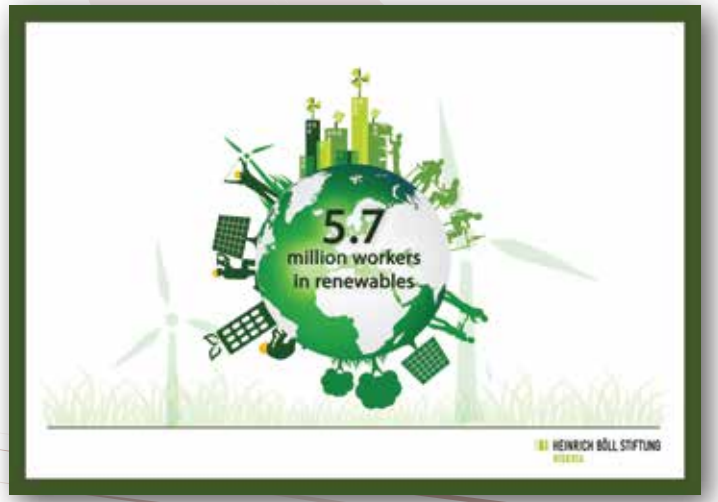
German energy subsidies 1975 - 2012

However, overall it is private residential users who have drawn the short straw. They are the first to lose power when shortages arise. This has led to a proliferation of generators.

The main argument used to maintain the status quo and focus government efforts on large scale fossil-fuel generation tends to be "jobs." Jobs are one of West Africa's highest development priorities. In the fossil energy sector, however, there is a global trend of declining employment as well as a declining employment per tonne of production. Nigeria's experience in job creation in the fossil resources sector has been disappointing. It is estimated that only 50,000 direct jobs have been created in the oil sector. Renewable energy and energy efficiency fuel economic growth more than fossil fuels can, as renewables provide not only energy but also many more local jobs. Renewables come with a high proportion of local content and thus grow the economy of all citizens. The renewable energy and energy efficiency sector has a far greater potential to create jobs for both low-skilled and skilled workers.

In Germany, more than 400,000 jobs have been created in the renewable energy sector, which is more than double of the jobs available in the coal mining and conventional fuel industries. With the renewable energy potentials of many West African countries being many times higher than that of Germany (which has as much solar radiation as Alaska), it is not too difficult to imagine a much larger labour pool emerging in the WA renewables sector.

Importantly, the needs of rural enterprises are small, yet their impact on employment can be large. In assessing the impact of electrification on rural SMEs, including in Benin and Ghana, it was found that in both the manufacturing and the service sectors, businesses use electricity mostly for lighting and phone charging. Some rural manufacturers also use electric appliances essential for their production process (such as welders). But in general take-up of electric appliances remains modest. In the service sector more appliances are used, mostly refrigerators and entertainment devices (giz 2013). A small step forward in

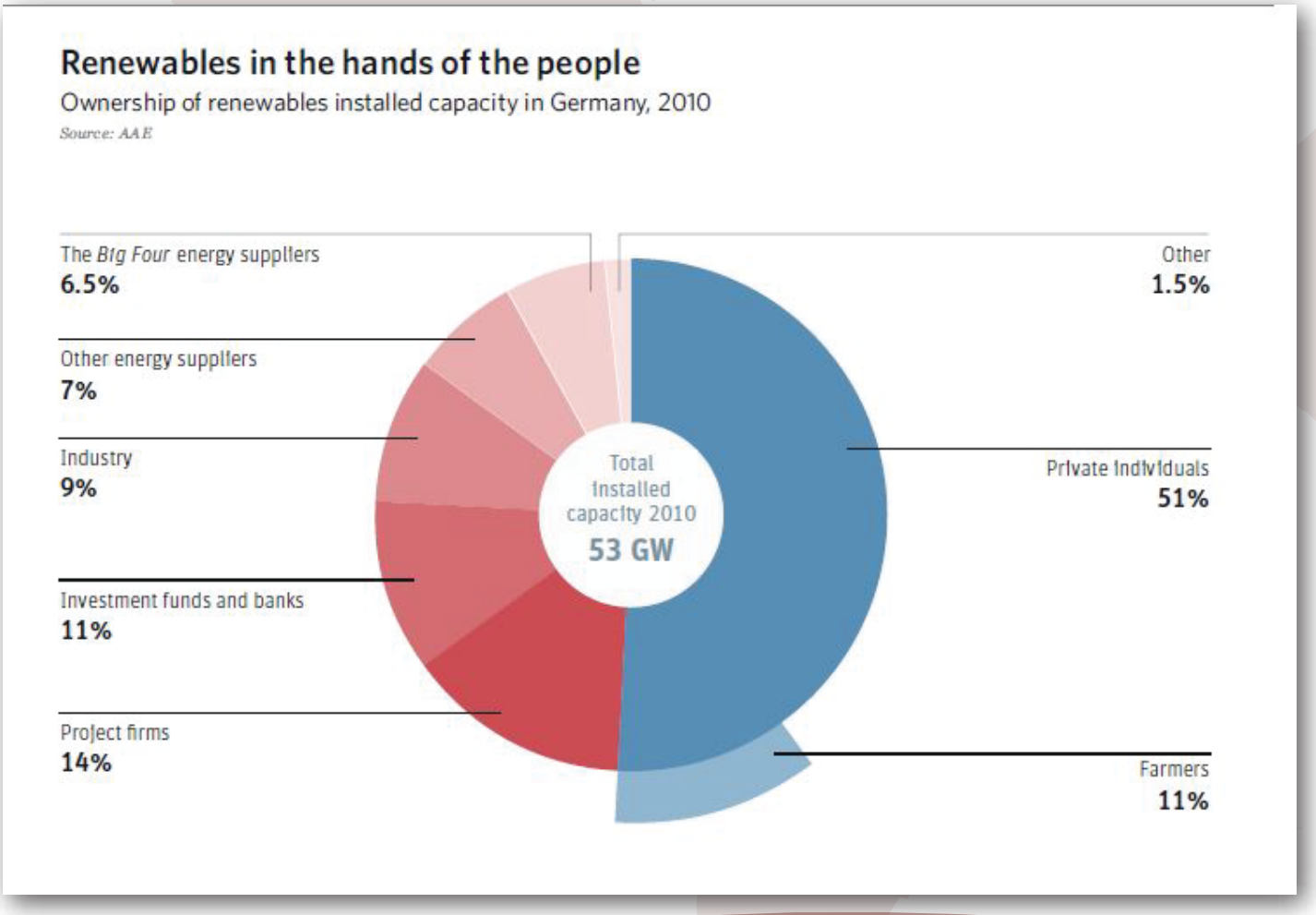


Installing a small solar PV panel

the provision of electricity can thus have a major positive impact on local small business and jobs. A renewable energy system thus delivers a dual benefit: more direct jobs in a fast-growing sector, and more indirect jobs as a more stable and sustainable supply of electricity to (remote) communities are essential to SMEs and indeed social cohesion. Mini-grids and off-grid electricity systems often are used first to supply health centers, schools and street lighting in markets, which are essential to the social fabric of remote and marginalized communities.

CHALLENGE 4: MORE POWER IN THE HANDS OF THE PEOPLE

The main hurdle to international investment in the energy sector is the same as that to foreign investment in general. The perceived risk, especially on the policy front, is too high. High standards in business, transparency and accountability, and a stable, reliable policy environment provided by government at all levels are good for all. But an attractive inward investment climate is not necessarily only good news for small companies. Even some Feed-in-Tariff policies have been written to favor big business: where no help is offered to newcomers into the market, it is the same old business magnates who provide the starting capital for renewable energy plants, in order to reap the sometimes overrated tariffs for renewables. However, FiTs can easily be designed to especially support individual producers at household level, as they were in Germany from 1991 thru 2009. This has led, as noted abo-



ve, to a high share of household and community ownership in renewable projects in Germany. With the appropriate support, individual households can acquire small scale solutions and where the technology is spreading at the household level, small cottage industries and community solutions are likely to follow.

A government can only spend citizens' (scarce) money once. By focusing on a small number of mega-projects, decision makers simply leave little room for smaller initiatives, like mini-grids. Hence there is a significant opportunity cost to any decision. Development policy has also tended to favor mega-projects, such as infrastructure, rather than a diverse set of community projects. Interestingly, the African Development Bank's energy sector policy recognizes past failures. It describes today's challenges as follows: "security of supply and energy access; inadequate investments in energy; slow progress in renewable energy and energy efficiency; ineffective regional integration; inadequate energy access for rural development and agriculture; lack of capacity for implementing reforms; and inadequate capacities to manage environmental impacts."

Resilience and local autonomy need to be enhanced by increasing access to preferential finance at low interest rates for local communities and accessible loans for renewable technologies for small private power operators that wish to serve those communities with mini-grids. Off-grid solutions and private or community ownership can further be supported through custom waivers, appropriate technology centers, and research and training for the renewables and efficiency market.

Rural Energy Workshop in Hon, Benin by Barefoot Photographers

LESSONS LEARNED

African NGOs are well positioned to develop and deliver a balanced and effective pro-poor lobbying strategy with the objective of providing access for all people to clean energy. This paper and the accompanying online resources should provide some helpful knowledge and analytical tools.

The demands of a comprehensive lobbying strategy by West African civil society could consist of several of the elements discussed above, building on the challenges and vision, then moving on to the required specific policy changes. For example, where electricity retail prices are politically determined (i.e. reduced), through subsidies for fossil resources, renewables can hardly be competitive. It is, therefore, important for NGOs to seek to level the playing field, in particular in the area of subsidies and tax benefits, as these can easily become a major source of corruption. Demanding transparency and accountability is an obvious campaign angle for NGOs to take, though one should be careful not to end up playing rural and urban electorates off against one another.

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For a strategy to deliver, NGOs first need to explore the strengths of their diversity. This is done by considering what each organization's niches are: as most aspects of development in West Africa have an energy aspect to it, NGOs can deal with

energy issues within their usual work, be that Gender Democracy, Rural Development, Fishing Rights or Girls' Education. As explained in this document, clean energy is often the most people friendly and accessible development path for communities.

Just to illustrate the breadth of possible advocacy overlap and synergies, here are some hypothetical examples for possible advocacy action:

1. A gender NGO is working with women fish smokers and is trying to raise their economic independence by equipping them with fuel efficient/ clean stoves.
- Advocacy intervention: reducing the price of the stoves by introducing custom waivers for in-country production of stoves

2. An agricultural NGO offers information and networking to rural communities, trying to lift farmers out of poverty and marginalization.
- Advocacy intervention: Government support for small and medium scale renewable solutions can improve the value chain of farmers and increase food security. It has the potential to reduce rural-urban migration.

3. A health NGO demands greater access to pre-natal care and anti-retroviral drugs in semi-urban and rural areas.
- Advocacy intervention: As renewable energy can make health service delivery faster and more cost effective (e.g. through cold chains) than the long awaited grid expansion, Local Governments should be aware of their options, have access to technical advice on the best renewables mix for their area and be able to purchase goods and services that have been quality controlled by government agencies.

4. A consumer association is campaigning for land rights of communities threatened by eviction after large scale land acquisitions have taken place to make land available for large scale solar generation.
- Advocacy intervention: Demanding transparency and review of an existing Feed-in-Tariff that might favour large scale solutions over appropriate, people friendly and equitable small scale solutions.

5. A transparency group is working with legislators of Provincial Parliaments on Millenium Development Goals and their successor regime, the Sustainable Development Goals.
- Advocacy intervention: Demanding a pro-active energy policy from the central government, which addresses the gaps in the power grid and gives Provinces a fair chance at accelerating their development plans by achieving energy security through the deployment of renewable energy.

A successful strategy does not need a single and fully unified message, unless you stay at a high level of abstraction, like "clean energy for all" or "stop wasting money on big business."

Developing messages is a craft. Messages need to be tested before they are deployed at scale. One approach to finding effective messages might be to unpick the messages government sends: rarely does a government promise such as bringing electricity to all citizens, stand the test of reality. A solid base for NGO messaging is to simply call a spade a spade. This increases credibility with ordinary people. By offering sound solutions on the back of this you increase your likelihood of success. We have shown how an important part of the solution is putting power back in the hands of the people, literally. Creating community investment schemes for small renewable power plants seems the smart way to go. This is something NGOs can lobby for. Finally, while it is easy to know what to be against, always say what you are in favor of:

Give Clean A Chance: Prioritising RE in the long-term energy framework.

Power from the People: A community-owned RE infrastructure now!

A RECOMMENDATION TO NGOs ON DATA COLLECTION

ECOWAS energy statistics

Notwithstanding the fact that the electricity sector is highly regulated with a preponderance of measures, and indeed subsidies, to promote investment in grid-connected capacity, information is lacking. Most publicly available numbers only cover a few countries and date back to 2010 (or before). A quick analysis shows them to be obviously unreliable.

It is not possible to describe the sources of energy and their current utilisation for the region and indeed for most individual countries. While the Open Data for Africa project enables users to see at a glance data from the IEA and World Bank, these data are old and have clear gaps.

With this caveat, we have found the energy profiles prepared by SERN / University College London for REEEP (February 2014) helpful. We recommend civil society organisations partner to prepare country case studies and drawing on their contacts with officials and academics. On the basis of country case studies, information gaps can be identified. The studies could lay the foundation for long-term clean energy scenarios to be developed.

Databases of renewable energy and energy efficiency policies and measures, maintained by IRENA / IEA, are incomplete. For example, in the case of Nigeria the IEA only lists the 2011 Renewable Energy Master Plan. The database also did not contain any energy efficiency regulations for Senegal or Nigeria.

The Wiki-portal for clean energy information for the ECOWAS region can be found at the OpenEI site.

Energy information from about half the ECOWAS member states, for which at least some data are available, is currently being compiled on the ECOWREX platform, maintained by ECREEE. See attached pdf Energy Profiles for Senegal and Nigeria. ECOWREX further operates a useful GIS resource, enabling users to map renewable energy resources and potential.

ANNEX 1

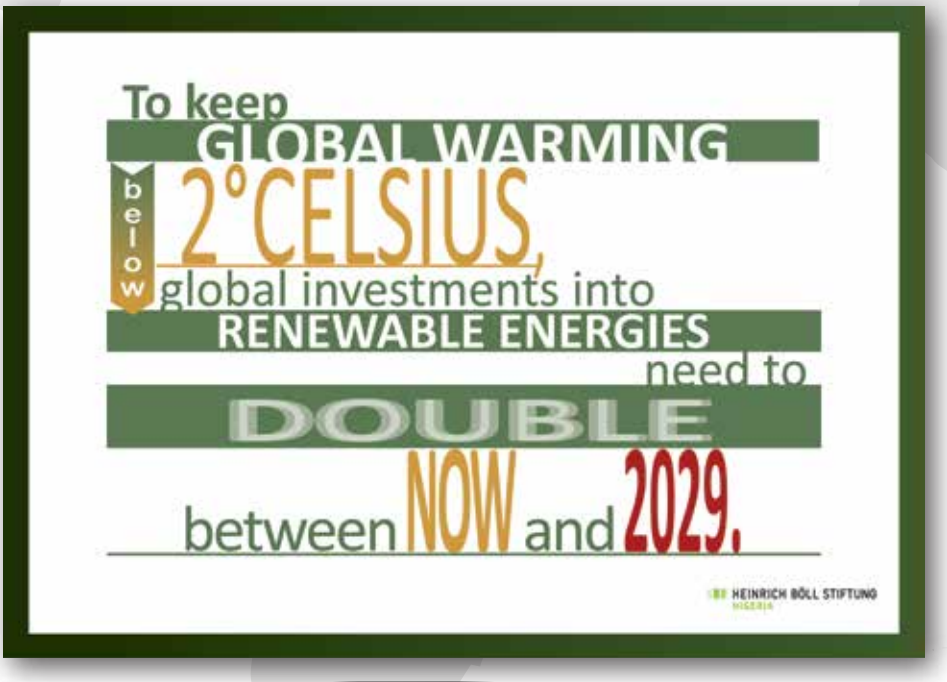
THE IPCC FIFTH ASSESSMENT REPORT (AR5)

In March and April 2014, the Inter-governmental Panel on Climate Change released its latest authoritative and comprehensive assessment of both adaptation and mitigation. The summaries of the assessment were adopted by all governments. The findings have high relevance for West Africa.

WORKING GROUP 3: MITIGATION

Key Findings

Global warming can be kept below 2 degrees Celsius compared to pre-industrial levels - the danger-threshold beyond which scientists project climate change to spin out of control. Even keeping warming below 1.5 degrees C, the option advocated by some of the most vulnerable nations, hasn't been ruled out. Securing a safe climate future will not cost the earth. In business-as-usual scenarios, consumption grows by 1.6 to 3 percent per year. Ambitious mitigation would reduce this growth by just around 0.06 percentage points. Importantly, economic assessments of the cost of mitigation don't include the co-benefits of taking action - such as better public health and increas-



ed energy efficiency - or the cost savings which result from avoiding future impacts. Looking at these low costs, the co-benefits and the savings, it's clear that climate mitigation is an economic no-brainer. However, we will have to almost quadruple our use of zero and low carbon energy by 2050, to have any chance of keeping warming below the 2 degrees C threshold. Substantial shifts in annual investment flows between 2010 and 2029 will be required. This will require significantly less investment in fossil fuels in the coming decades, and more than doubling the investment in renewables.

Renewable energies must be a significant part of this change, are an increasingly attractive option, and have strong future prospects - particularly if governments put in place stronger enabling policies. The major expansion and price reduction associated with renewables, such as solar PV and onshore wind, makes them the energy sources of choice. Clean solutions have to replace fossil fuels, which drive global emissions. Emissions continue to rise, and have risen faster over the past ten years than during the thirty year period preceding it. The energy sector, especially coal power, is the biggest culprit. An important component of cost is the necessary growth in the energy sector intended to make up for a decades long delay in investments, resulting in rising short-term electricity prices.

The stabilisation of GHG concentrations at low levels will have to include the "long-term phase-out of unabated fossil fuel conversion technologies". Concentrations of CO2 in the atmosphere can only be stabilised if global emissions peak and decline toward zero in the long term. Whether the long-term is 2050 or 2070 depends on whether you believe in the large scale deployment of carbon capture and storage (CCS) by mid-century.

Some policy implications

In a large number of countries, fuel taxes (although not explicitly designed for mitigation) act as sectoral carbon taxes. Reduction of subsidies to fossil fuels can achieve significant emission reductions, but can have a high social cost if not done carefully. Many countries have reformed their tax and budget systems to reduce fuel subsidies, which largely accrue to the wealthy, utilising lump-sum cash transfers to off-set impacts on the poor. Potential adverse side-effects of mitigation due to higher energy prices, for example, on improving access of the poor to clean, reliable and affordable energy services, can be avoided.

Approximately three billion people worldwide do not have access to electricity and/or depend on traditional solid fuels for cooking and heating - with various negative consequences. The costs for achieving nearly universal energy access are between 72 and 95 billion USD per year until 2030. The contribution of renewable energy to energy access can be substantial. Achieving universal energy access reduces short-lived climate pollutants and methane emissions, and yields only negligibly higher GHG emissions from power generation.

WORKING GROUP 2: IMPACTS, RISKS AND ADAPTATION

Key Findings

The first section of the report looks at observed impacts of climate change. The second section at future risks, as well as adaptation strategies. Escalating temperatures are expected to slow economic growth, erode food security and exacerbate social and economic inequalities. It provides conservative estimates of global economic losses (between 0.2% and 2% of global income) of warming of just 2.5°C. Many climate impacts do not have monetary value and are, therefore, not measured

using this approach. The costs of inaction, or delayed action, are substantial. The time to take action to avert extreme climate change is now. The next decades up to 2040 are the era of "climate responsibility".

Impacts

People everywhere are vulnerable to extreme climate events, though poor, marginalized populations are most vulnerable. Impacts from recent extreme climate events show how vulnerable some ecosystems are, and many other systems people depend upon - such as the health system, food production and security, as well as infrastructure. The 5th Assessment Report states high risk levels of present climate impacts such as the incidence and range of disease in Africa.

The impacts of recent extreme weather events show that our current adaptation to climate change remains low. The report identifies an "adaptation deficit" in both developing and developed countries.
The impact on agriculture has been, and will continue to be negative. Food production is being affected by climate change in several regions, with increased production in some areas, decreased in others. Overall though, scientists are confident that the negative impacts are more common than the positive ones. It is clear now that climate change constitutes an additional burden for rural and urban poor, and that climate events can push poor people into chronic poverty. Marginalized peoples are most at risk from dangerous impacts of climate change. Climate change could halt and/or reverse hard won development gains achieved in recent decades.

Risks

Climate change will increase the frequency, severity and/or duration of many types of extreme weather, including heavy rainfall, warm spells and heat events, intense storm surges and related sea-level rise. Climate impacts will slow economic growth and poverty reduction, further erode food security and trigger new poverty traps.

Reducing carbon pollution rapidly and immediately can cut the overall economic damage of climate change by half.

Globally, more people will be exposed to floods and economic losses due to flooding. It's also likely that presently dry areas will become more severely drought-stricken in a warmer world.

The impacts of climate change on water resources are expected to reduce economic growth, particularly in developing countries. Forests appear to be more sensitive to climate change than previously thought and ecosystem "tipping points" can be crossed. When forests die, they release previously trapped carbon, resulting in significant increases in emissions. Sea-level rise and the impacts from it increasingly threaten coastal areas, and it's expected to get worse in the near future. Acidification and warming of coastal waters will continue with significant consequences for coastal ecosystems and fish stocks.

The most recent estimates of global adaptation costs for developing countries suggests a range from USD70 to 100 billion per year globally by 2050. These cost estimates are substantially greater than current adaptation funding and investment, suggesting a growing adaptation deficit.

The cost of climate change impacts will be significant - especially for developing regions that are more dependent on agriculture and natural resources. Specifically, climate change will lead to higher prices and increased volatility in agricultural markets, which may undermine the security of global food supply as the human population keeps growing at rapid speed.

Climate change is a 'threat multiplier' and poses an increasing threat to peace and security in the world. The greatest factors leading to security threats are rising and extreme temperatures,

changes in precipitation patterns, sea level rise, and destructive extreme weather events.

Our ability to adapt has limits. Adaptation is unavoidable, as even the aggressive emissions cuts won't immediately end global warming. Mitigation remains essential, as without mitigation, impacts will grow larger than our capacity to adapt. Hence both adaptation and mitigation policies are essential.

The regional findings pertaining to Africa can be found in the documentation/resource annex at https://drive.google.com/-folderview?id=0B9pX-1YT_Tp9MV3NDdU-hCSHBmX2c&usp=sharing

ANNEX 2

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The listed references have been uploaded to https://drive.google.com/folderview?id=0B9pX-1YT_Tp9MV3NDdUhCSHBmX2c&usp=sharing

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Online Resources

The following online resources have been valuable in our research.

Bloomberg New Energy Finance provides analysis of developments in RE policy but esp. markets.

The ECOWAS Regional portal on Access to Energy Services (bi-lingual).

ECREEE esp. Renewable Energy In West Africa. Status, Experiences And Trends (2012) and

ECOWREX the ECOWAS Observatory for RE and EE.

IEA, the International Energy Agency, despite conservative leanings has published a lot on RE and EE; though most of its publications are not free of charge.

INFORSE, esp. the energy access case studies collected by the Southern Voices program.

IRENA, an inter-governmental organisation dedicated to the renewables revolution. Since being founded in 2011, it has published up-to-date resource materials on RE in Africa.
Open Energy Information (OpenEI) is a knowledge sharing online community dedicated to connecting people with the latest energy information and data.

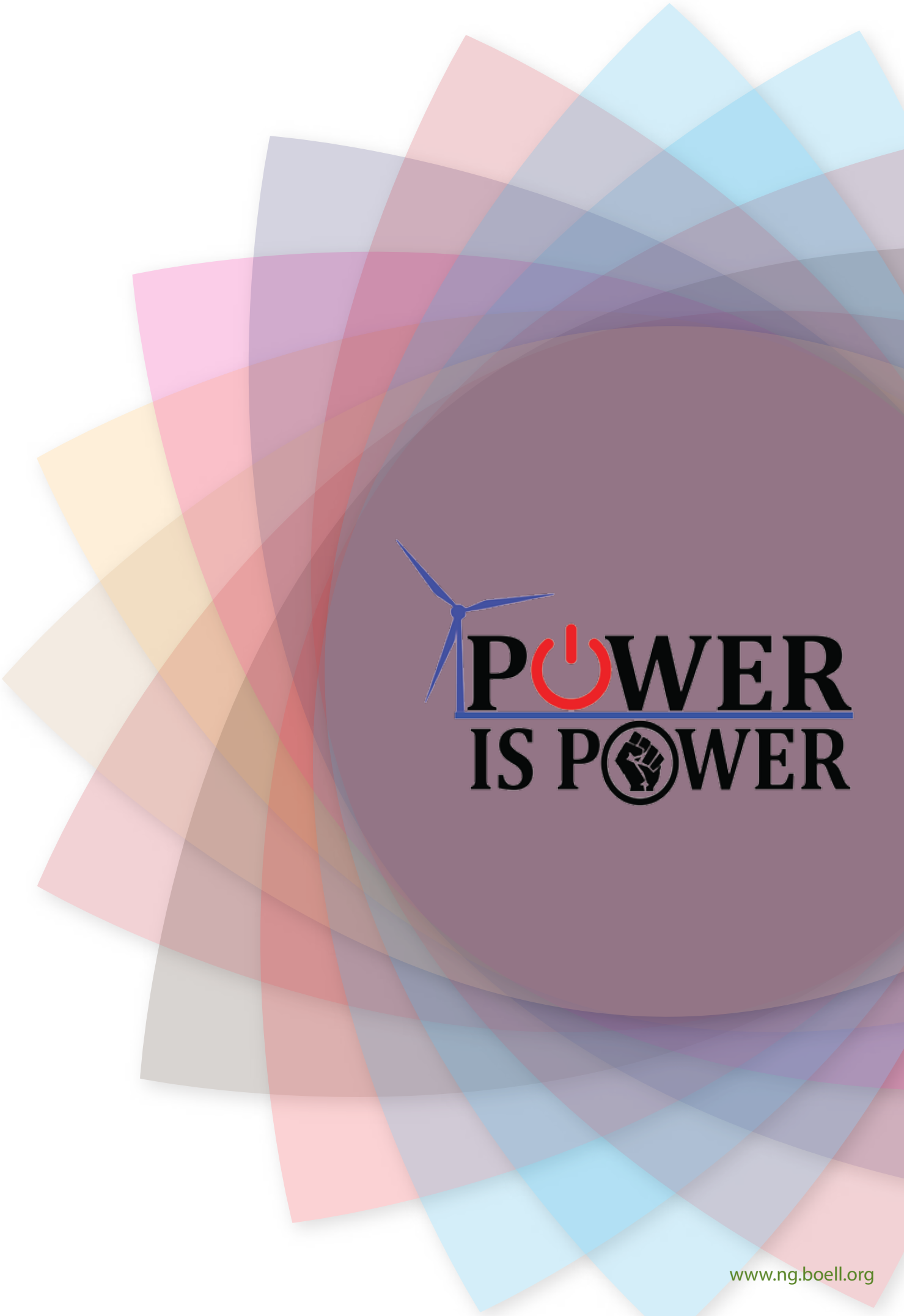
REEEP, the Renewable Energy and Energy Efficiency Partnership and esp. the REEGLE clean energy portal which includes a database of policies and country profiles, as well as the REEEP/UNIDO energy regulation toolkit for Africa.

REN21 esp. the annual Renewables Global Status Report and the Global Futures Report. In 2014, they intend to publish a special ECOWAS Renewable Energy Status Report.

The World Bank Group, in particular the ESMAP, the Energy Sector Management Assistance Program.

ANNEX 3
Acronyms

ADFD	Abu Dhabi Fund for Development
AfDB	African Development Bank
AR5	Fifth Assessment Report of the Inter-governmental Panel on Climate Change
CDM	Clean Development Mechanism
CFA	Communauté Financière d'Afrique
DBFZ	German Biomass Research Centre / Deutsches Biomasseforschungszentrum
DIE	Deutsche Institut für Entwicklungspolitik
ECREE	ECOWAS Centre for Renewable Energy and Energy Efficiency
ECOWAS	Economic Community Of West African States
ECOWREX	ECOWAS Observatory for Renewable Energy and Energy Efficiency
ETF	exchange traded fund
ESMAP	Energy Sector Management Assistance Programme
G20	The Group of 20 major economies (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russian Federation, Saudi Arabia, Spain, South Africa, South Korea, Turkey, United Kingdom, United States—and the EU)
GDP	Gross domestic product
GEEREF	Global Energy Efficiency and Renewable Energy Fund
GEF	Global Environment Facility
GTF	Global Technology Foundation Fund
ICT	Information and communications technology
IEA	International Energy Agency
IEEFA	Institute for Energy Economics & Financial Analysis
IMF	International Monetary Fund
IPP	Independent power producers
IPPC	Inter-governmental Panel on Climate Change
IRENA	International Renewable Energy Agency
LNG	Liquid Natural Gas
LPG	Liquefied Petroleum Gas
MCERs	Million Certified Emission Reductions
MW	Mega-watt
PV	photo-voltaic
UNEP	United Nations Environment Programme
WAEMU	West African Economic and Monetary Union (UEMOA in French)



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