Chapter 2  
Light up and power Africa

Energy is at the heart of development. It helps businesses thrive, powers essential services and makes communities safer, particularly for women and girls. Reliable and affordable energy encourages investment, growth and job creation. Energy is also key to Africa’s transition to green growth. The continent’s rich renewable energy potential needs to be harnessed to address chronic capacity shortages and achieve the Sustainable Development Goals.

Regional energy integration is high on Africa’s development agenda. While only 8% of power is currently traded across borders, this share is steadily growing. Access to electricity is also improving — 52% of the population across African countries now have access to electricity. The Bank is helping Africa integrate its energy resources, increase its renewable energy capacity and improve access to reliable and affordable power. Major interconnection and renewable energy projects are under way. The Bank is committed to working with governments, regional organisations and the private sector to identify priority projects and expedite the integration of Africa’s power systems.

Connecting Africa’s electricity grids for enhanced access

Africa is rich in natural energy, but the distribution of this wealth is uneven. While larger countries have an abundance of domestic options, smaller countries lack the scale and resources to rely solely on domestic resources. Regional energy integration, through power pools, contributes to redressing this imbalance and transforming the energy landscape in Africa.

African energy corridors help boost trade and industry

Regional energy integration is high on Africa’s development agenda. It supports energy security through integrated markets and cross-border infrastructure development. It enables countries to develop their energy systems more collaboratively and avoid the inefficiencies of small markets, lowering costs and increasing access. The Bank’s New Deal on Energy for Africa underlines that regional energy integration has the potential to reduce investment and power costs as much as 15%, benefiting both businesses and consumers. And it generates economies of scale that are attractive to investors.

Regional energy integration has the potential to reduce investment and power costs as much as 15%

However, regional energy integration has proceeded only slowly. Policies to promote it have met with mixed success because of the complex and long-term nature of regional integration projects.

There are now five regional power pools in Africa. While according to McKinsey & Company less than 8% of power crosses international borders in any African region, the cross-border trade of energy is...
Table 2 Light up and power Africa indicators (Level 1 & Level 2)

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>ALL AFRICAN COUNTRIES</th>
<th>ADF COUNTRIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIGHT UP AND POWER AFRICA INDICATORS—PROGRESS IN AFRICA (LEVEL 1)</strong></td>
<td>Baseline 2015</td>
<td>Latest 2018</td>
</tr>
<tr>
<td>Share of population with access to electricity (% population)</td>
<td>42</td>
<td>52</td>
</tr>
<tr>
<td>Share of population with access to clean cooking solutions (% population)</td>
<td>32</td>
<td>29</td>
</tr>
<tr>
<td>Total installed electricity capacity (GW)</td>
<td>168</td>
<td>191</td>
</tr>
<tr>
<td>Installed renewable capacity (GW)</td>
<td>33</td>
<td>37</td>
</tr>
<tr>
<td>Electricity losses through transmission, distribution and collection (%)</td>
<td>15</td>
<td>17.1</td>
</tr>
</tbody>
</table>

| **LIGHT UP AND POWER AFRICA INDICATORS—AIDB CONTRIBUTIONS (LEVEL 2)** | Baseline 2015 | Actual 2018 | Target 2025 | Baseline 2015 | Actual 2018 |
| New total power capacity installed (MW) | 490 | 447 | 880 | 8 000 | 80 | 30 |
| New renewable power capacity installed (MW) | 24 | 197 | 560 | 5 600 | 20 | 7 |
| People with new electricity connections1 (thousands) | 72.5 | 570 | 2 400 | 24 000 | 72.5 | 566 |
| — of which women | 36 | 261 | 1 200 | 12 000 | 36 | 262 |
| People connected through off-grid systems (thousands) | ... | ... | 1 200 | 12 000 | ... | ... |
| — of which women | ... | ... | 600 | 6 000 | ... | ... |
| People provided with clean cooking access (thousands) | ... | ... | 3 200 | 32 000 | ... | ... |
| — of which women | ... | ... | 1 600 | 16 000 | ... | ... |
| New or improved power distribution lines (km) | 875 | 2 430 | 3 520 | 35 200 | 875 | 2 400 |
| New or improved power transmission lines (km) | 69 | 480 | 576 | 5 760 | 69 | 450 |
| Emissions reduction in energy (thousand tons CO₂) | 17.3 | 719 | 1 800 | 18 000 | 10.2 | 649 |

1. There are different definitions for assessing the number of people with new electricity connections. The one used here is consistent with the definition provided in the Bank Group’s Results Measurement Framework and the New Deal on Energy: it measures the number of people connected to electricity by distribution lines only.

Box 6 Mozambique becomes an energy exporter

Mozambique produces almost three times as much electricity as it consumes. The surplus is exported to neighbouring countries through major transmission projects like the Mozambique-Zambia interconnector and the Centre-South Backbone, which runs from the centre to the south of Mozambique and on to South Africa.

The efficient transmission of power remains a challenge because of the country’s size and sparse population pattern. Thus, while surplus power is exported, up to 85% of consumed power is reimported back from South Africa’s Eskom.

Demand for Mozambique’s surplus power is expected to grow. Mozambique is seeking to increase and diversify its energy sources. The Cahora Bassa dam on the Zambezi River currently accounts for more than 80% of Mozambique’s electricity production. The country has commissioned several gas thermal plants and is exploring numerous solar and wind opportunities. Its first utility-scale solar power plant, with a capacity of 40 MW, was commissioned in 2017.

Growing. Countries are increasingly relying on imported energy; some now import over half their energy (see Figure 5). Through regional power pools, countries that produce a surplus of energy, like Mozambique, can export their energy to meet rising demand in neighbouring countries (see Box 6).

Despite the growth in energy trade in Africa, there are still severe capacity gaps across the continent, which are gradually being addressed through new investment. In 2018, Africa reached 191 GW total installed electricity capacity, of which 37 GW is renewable capacity. In the coming years, major investments will be made in the continent’s renewable energy capacity — for example, South Africa’s Redstone and Kenya’s Kopere solar power projects.

The efficiency of Africa’s electricity infrastructure remains a cause for concern. In 2018, electricity losses through transmission, distribution and collection averaged 17.1%, up from 15% in 2015. Aging infrastructure, inefficiencies in energy distribution and power system planning and the vulnerability of networks to tampering have all contributed to this decline. To increase access to reliable power, African countries will need to invest more in maintaining their electricity infrastructure. The newly established Electricity Regulatory Index (ERI) aims to encourage such investment by...
highlighting infrastructure and governance issues in the sector (see Box 7).

The availability of data is key to the increased investments Africa’s energy sector needs. Thus the Bank created the Africa Energy Portal, an easy, reliable data platform for all stakeholders, including investors and governments (see Box 8).

Access to energy by household
Overall, the share of population with access to electricity in Africa has increased — from 42% in 2015 to 52% in 2018, and for low-income countries from 24% in 2015 to 36% in 2018. While access to electricity in Africa remains below the global average, since last year growth in this area now outstrips population growth. However, electricity demand in Africa is projected to triple by 2030, which implies that a huge increase in investment will be needed to achieve universal electrification by 2030, as SDG 7 calls for.

The share of population with access to electricity in Africa has increased

With few exceptions, access to clean cooking solutions is limited in much of the developing world. Across Africa, the share of population with access to clean cooking solutions has declined overall to 29%, but has increased to 12% for low-income countries. While the health and environmental costs of burning solid fuels for cooking are high, even households with access to clean cooking solutions often continue to use solid fuel in parallel, due to gas shortages and affordability.

The Bank’s impact in the drive for universal energy
The Bank is committed to providing more and cleaner energy for all Africans. Our Ten-Year Strategy (2013–22) recognises that meeting Africa’s energy needs is critical to economic development and poverty reduction. And under the New Deal for Energy, we work to drive reform and investment in the sector.

To realise our commitments, we are investing in a wide range of energy projects across the continent. With governments and the private sector and through multi-stakeholder initiatives, the Bank is working to identify priority projects and raise finance to expedite the integration of Africa’s power systems and increase access to affordable and clean energy.
Box 9 Better access to energy delivers impact for women in Tanzania

The electrification of rural communities in Tanzania’s Arusha, Mwanza, and Shinyanga regions has had a transformative impact on the lives of women.

More than 129,000 households have enjoyed electricity for the first time. Over 18,200 agro-processing industries and businesses have been connected to electricity, and many small and medium-scale businesses have been established as a result of the availability of electricity. In one project area, the number of grain mills has increased from 3 diesel-fueled mills to 24 electricity-powered mills, and the price of grain has fallen from TZS 3500/kg to TZS 2000/kg — benefiting women who undertake the burden of manual grain processing at household level.

Health-care services, education and security have improved for women and girls in areas that were electrified by the project. At the Mwambola Village Dispensary, staff attend an average of four night deliveries each week. Before electrification, expectant mothers who visited the dispensary at night were referred to Misungwi Hospital, more than 6 km away. Girls’ performance in schools has improved. Women and girls are now better able to attend their studies, work on their businesses and attend to their social responsibilities in safety during late evening and night hours.

In 2018, we delivered 480 km of new or improved power transmission lines, compared to 69 km in 2015. We also delivered 2430 km of new or improved power distribution lines, compared to 875 km in 2015. Upgrades to distribution networks in Tanzania, Uganda, Guinea, Nigeria and Cape Verde have improved access to energy services, providing more reliable and cheaper electricity. Overall, our investments have enabled 570,000 people to receive new electricity connections, of whom 261,000 were women. In Tanzania, our electrification project benefited rural communities and made a huge difference to women (see Box 9).

Interconnection projects increase capacity, reduce cost, and increase access to energy. They provide reliable and cheaper electricity and reduce reliance on expensive diesel-powered thermal plants. In East Africa, the NEL SAP Interconnection of the Electric Grids of the Nile Equatorial Lakes Countries project (see Figure 7) will enable five countries to share capacity reserves and significantly increase electricity transmission capacity through the construction and upgrading of power lines and transformer stations.

Similarly, in the West Africa region, the Côte d’Ivoire, Liberia, Sierra Leone and Guinea Electricity Networks Interconnection Project, with a transmission capacity of up to 290 MW, will establish a dynamic regional power market and increase access to electricity for about 24 million people. These investments will reduce costs, improve access and reliability, and attract investment.

Figure 7 East African countries are steadily building interconnector capacity

![East African countries are steadily building interconnector capacity](source: AfDB)

Interconnection projects provide reliable and cheaper electricity

Overall in 2018, we installed 447 MW of new total power capacity, compared to 490 MW in 2015. Inadequate preparation and contracting issues caused delays and escalated overhead costs in some of our energy generation projects, including, for instance, in our Lake Turkana wind farm in Kenya, which is now operational (see Figure 8). Limited and aging infrastructure, creditworthiness of state utilities, procurement processes and right of way disputes have also affected the availability of financing for renewable energy generation projects.

We have stepped up efforts to address the low levels of energy production and consumption across the continent. As part of the New Deal on Energy, we launched the first edition of the Africa Energy Market Place, bringing together public, private and civil society stakeholders, including government agencies, development partners and investors in the energy sector, to discuss investment, infrastructure, governance and capacity building. We also invested in projects that are expected to contribute to major capacity increases in the near future, including South Africa’s Medupi Power Project (4764 MW) and Morocco’s Global Rural Electrification Programme (1270 MW).

By tapping into available funds, such as the Sustainable Energy Fund for Africa (see Box 10), we are also investing in better project preparation, including funding feasibility studies — a key element to improve project quality and effectiveness.
Of the new power capacity installed in 2018, 197 MW was new renewable power capacity. To achieve our commitments set in the Africa’s New Deal on Energy, the Bank has been actively investing in large-scale renewable projects. Our power generation investments in 2018 will generate up to 60% of installed power capacity from renewable sources. In Zambia, we have invested in a 120 MW hydropower generating plant. In Morocco, Phase 1 of the Noor Ouarzazate Solar Complex project has installed capacity of 160 MW and guarantees electricity to half a million people (see Box 11). We have also co-invested with the Climate Investment Fund in one of the largest wind energy projects in South Africa, the 100 MW Sere Wind Farm Project.

The Bank also contributed the single largest investment in Kenya’s history. The $680 million Lake Turkana Wind Power Station began full commercial operation in March 2019, following delays in connecting the 436-km transmission line to the national grid. Africa’s biggest and most efficient wind power station, its 365 wind turbines will produce 310 MW of reliable electricity — enough to supply 1 million homes (see Figure 8).

Our focus on delivering renewable investments reduced CO₂ emissions by 719,000 tonnes in 2018, considerably more than the 17,300 tonnes we achieved in 2015.

Natural gas has the potential to contribute to greater economic integration in Africa through increased domestic utilisation and cross-border trading of gas and its derivatives, such as electricity and bottled cooking gas. In 2018, following new discoveries, the Bank supported policy dialogue on domestic utilisation of natural gas in the East and West Africa regions.

We have yet to complete operations that connect people through off-grid systems or provide people with clean cooking access. We are, however, working in these areas in line with our commitment to provide energy access through decentralised renewables under the New Deal for Energy in Africa. In 2017, the Bank launched the off-grid revolution initiative to develop green mini-grids and solar home systems. The Bank is already providing technical assistance in support of this initiative in countries like Togo. In 2018, we also began financing private sector investments in renewable energy (see section on new programmes below).

We have recently approved funding for a clean cooking technical assistance project that will be piloted in Cameroon, Ghana and Kenya. It will promote the growth of clean cooking solutions, support small and medium-sized enterprises and create jobs for young people.

The Bank has also approved a $30 million investment in the Facility for Energy Inclusion Off-Grid Energy Access Fund, which will reach 75 million households through off-grid energy access solutions.
by 2025. By supporting the use of clean energy instead of fossil fuels to power communities, the Fund is expected to reduce up to 8 million tonnes of CO\textsubscript{2} emissions over its lifetime.

**Optimising investments under the New Deal on Energy for Africa**

The New Deal on Energy for Africa is a partnership-driven effort that has the aspirational goal of achieving universal access to energy in Africa by 2025. In line with the Bank’s aim to support regional integration, the New Deal provides funding, technical and legal advisory support to accelerate the development of regional power projects.

Under the New Deal, we are working with regional organisations to overcome obstacles to regional energy integration. We are strengthening capacities, encouraging exchanges and dialogues, and supporting initiatives to facilitate technical and regulatory harmonisation. The Bank will seek to establish fast-track finance for large-scale regional projects and will use its own capital to mobilise other finance for regional projects.

**New programmes to power the continent**

Among our recently approved projects, we have joined with other donors in committing $20.8 million to support the reform of Burkina Faso’s energy sector. This will improve power sector governance, increase access to energy, particularly in rural areas, and increase investment in the energy sector.

In Rwanda, we are funding the construction of 795 km of medium-voltage and 7317 km of low-voltage lines as part of the $265.32 million Scaling-Up Electricity Access Program Phase II. This is the Bank’s first results-based financing project, which aims to ensure that by 2024 all Rwandan households, health centres, schools and businesses are connected to reliable electricity.

In Côte d’Ivoire we are supporting the first stand-alone private sector off-grid investment to facilitate the deployment of solar home system kits. This will meet the energy demands of 700 000 households in mainly rural areas. In South Africa, we will be investing $221 million in the 100 MW Redstone Concentrated Solar Power project, which will support South Africa’s transition to renewables and improve its energy mix, whilst also increasing supply and access. In Kenya, we have approved $18.17 million for the Kopere Solar Power Project, and we are mobilising additional resources from the Climate Investment Fund’s Scaling-Up Renewable Energy Programme. This project will reach approximately 600 000 people and save 1 081 kt CO\textsubscript{2} eq in greenhouse gas emissions annually.

**Box 11  Stories from beneficiaries: Rural electrification breathes new life into small businesses in Morocco**

Bank investments have helped transform the lives of small business owners in rural Morocco. At the end of 2017, close to 12.7 million Moroccans had been connected to the grid.

Mohamed Dakhni, 32, a welder in Douar Bou Azza, has seen his business take off. “Electricity has enabled me to create things, and I’ve been able to develop my business by expanding my customer base. I can earn more and live better,” he said with a broad smile.

Ahmed Hassani, who hails from the same region, had a similar experience. The father of four has transformed a plot of land he inherited from his parents using an irrigation system powered by electricity. “It was total desert when I got here in 2010,” he recalled. “Now, electricity has solved my pumping and irrigation problems. With constant water supply to my field, production has continuously increased.” Ahmed now employs four or five seasonal workers for his harvests.

With the Green Climate Fund, we are cofinancing Zambia’s Renewable Energy Financing Framework, which will finance 100 MW of renewable energy projects under the country’s Renewable Energy Feed-in-Tariff policy. This will diversify Zambia’s energy production, which relies heavily on hydropower.

In Malicounda, Senegal, we have committed a $58.02 million loan to finance a 120 MW dual combined cycle power plant. The plant will increase the base load needed to strengthen grid stability and will facilitate the addition of more renewables into the grid.

We are also providing two grants under SEFA: $1.5 million to help Ghana overcome technical, financial, and regulatory and institutional barriers to scaling up renewable energy investments; and $1.5 million to support the Nigerian government in implementing phase 1 of its Jigawa 1-GW on-grid Independent Power Producer Solar Procurement Program.

The Bank has placed climate change mitigation and powering Africa at the top of its agenda. Through its support of regional energy integration, it has delivered projects that increase access to and reduce the cost of electricity to businesses and communities across the continent. We have delivered and continue to finance
We will increasingly focus on off-grid decentralised and clean cooking solutions. Under the New Deal, we will continue to work with governments, the private sector, and energy sector initiatives to achieve our goal of reaching universal access to energy in Africa by 2025.

### What has worked well

**High-level political backing at regional and national levels**

Political commitment is required to sustain regional cooperation and achieve long-term results in multinational projects. In the Ethiopia-Djibouti interconnection project, the political commitment of the governments involved and the close cooperation between the utilities helped make the project successful. All parties’ adherence to the agreements underlying multinational operations is a major prerequisite for successful project operations.

**Enhanced dialogue as a solid foundation for ownership and sustainability of outcomes**

The rural electrification project in Guinea benefited from strong government commitment to the country’s energy sector. A strong sense of ownership was fostered throughout the lifespan of the project, from the President of the Republic to the beneficiary populations. Consultation with the population and the involvement of authorities and civil society should be encouraged for project success.

### What has not worked so well

**Coordinating regional energy projects to make joint progress**

The success of regional projects requires strong coordination and commitment mechanisms, which were lacking in the NELSAP Interconnection Project. As a result, countries made uneven progress and interconnection was hindered. Strong regional institutions have a key coordination and regulatory role to play.

**Designing realistic timeframes to deliver results**

Realistic timeframes are required to ensure effective project implementation. A cluster evaluation of the Bank’s interconnection projects reported that timeframes were overly optimistic and agreements lacked provisions to motivate borrowers to fulfill loan conditions. Solid analysis and assessment of potential risks is needed to minimise delays that could affect project schedules and costs.