AFRICA ENERGY PORTAL COUNTRY PROFILE

Côte d’Ivoire
May 2019
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Part 1: Overview

**Figure 1** Basic Data

<table>
<thead>
<tr>
<th>Land area</th>
<th>322,460 sq km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population (World Population Prospects, United Nations)</td>
<td>23,695,919 inhabitants in 2016 (55% urban, 45% rural) 33,337,306 inhabitants in 2030 (57% urban, 43% rural)</td>
</tr>
<tr>
<td>Main towns (World Gazetteer, 2013 estimates)</td>
<td>Abidjan: 4,467,000 inhabitants Bouaké: 713,000 inhabitants Daloa: 269,000 inhabitants Yamoussoukro (capital): 243,000</td>
</tr>
<tr>
<td>Currency</td>
<td>FCFA (franc de la Communauté financière africaine)</td>
</tr>
<tr>
<td></td>
<td>FCFA 655.957 = EUR 1 (fixed to the euro)</td>
</tr>
<tr>
<td></td>
<td>FCFA 554.52 = USD1 (2018 estimated average)</td>
</tr>
<tr>
<td>Access to electricity (SE4All Tracking Framework)</td>
<td>37% in 2000; 48% in 2010; 64% in 2017</td>
</tr>
<tr>
<td>Installed generation capacity (CI-Energies)</td>
<td>2,199 MW in 2018 (60% hydro, 40% thermal)</td>
</tr>
<tr>
<td>Power losses (CI-Energies)</td>
<td>21% losses recorded in the transmission network in 2017</td>
</tr>
<tr>
<td>Tariffs (ANARE-CI)</td>
<td>Average price: 71.7 FCFA/kWh</td>
</tr>
<tr>
<td>Demand Profile (CI-Energies)</td>
<td>Gross national consumption in 2018: 8,913 GWh (+2.3% vs 2017, with a peak load recorded at 1,388 MW)</td>
</tr>
<tr>
<td>Electricity Import and Export (ANARE-CI)</td>
<td>Total export: 1,685.1 GWh; 47% to Burkina Faso; 27% to Mali; 19% to Ghana; 6% to Benin and Togo; 1% to Liberia Total import: 54.7 GWh; 99.4% from Ghana, 0.3% from Burkina Faso, 0.3% from Mali</td>
</tr>
</tbody>
</table>

**Figure 2** Key energy indicators (1990-2016)

1. Source: IEA World Energy Balance, 2018
Macroeconomic performance

Real GDP growth reached an estimated 7.4% in 2018, down from 7.7% in 2017, supported by external demand for agricultural and oil products and stronger domestic demand resulting from major investment projects and households consumption. The economy faced several shocks in 2017, including a sharp decline in cocoa prices, higher oil prices, and social tensions. As a result, the budget deficit increased to 4.2% of GDP, but it improved to an estimated 3.8% in 2018. Public debt increased to 48.2% of GDP in 2018, driven

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by Eurobond issuances in 2017 and 2018. The risk of debt distress remains moderate. Inflation was low, at an estimated 0.5% in 2018, down from 1.0% in 2017. The current account deficit widened to an estimated 2.7% of GDP in 2018 from 1.8% in 2017. The economic outlook remains favorable, with real GDP growth projected at 7.0% in 2019 and 6.9% in 2020. A good performance in the agricultural sector will keep inflation below the 3% convergence threshold for the West African Economic and Monetary Union (WAEMU). The current account deficit is projected to stabilize at 2.8% in 2019, in connection with sustained imports of capital goods related to infrastructure projects.

The economy remains vulnerable to external shocks that may stem from unfavorable evolution of commodity prices (mainly cocoa and oil) and adverse climate conditions. Another pressing challenge is to sustain economic growth and ensure a more balanced distribution across sectors, with a view to achieving a structural transformation of the economy. This would require improving the quality of agricultural products and upgrading the industrial sector toward higher value added and high-job creation activities.

**Business environment and private sector development**

Côte d’Ivoire has made significant progress that have placed the country among the top ten business environment reformers in the world. Since 2012, the business climate has improved thanks to, notably: (i) the implementation, in 2012, of the new Investment, Mining, and Electricity Codes, which are attractive and comply with international standards; (ii) the operationalization of the one-stop shop for investments; (iii) shorter timelines and simplification of formalities for starting a business and paying taxes. The country’s ranking in the World Bank’s annual report on “Doing Business” has improved from the 167th place in 2012 to the 122nd in 2019. Other reforms concerned the establishment of a commercial court and the operationalization of CN-PPP, attached to the President of the Republic. The Government’s efforts have enabled Côte d’Ivoire to continue to be the most attractive economy in the WAEMU region and to occupy the third place.

Côte d’Ivoire framework has allowed private investment in energy production since the 1980s and as of 2017 three IPPs are active (Azito Energie, Aggreko and Ciprel). The liberalization of other segments of the sector provided by the electricity code of 2014 will allow investments in the other segments by the end of the concession of the CIE (2020), with the exception of the dispatching activity which will remain a State monopoly.

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**Box 1**

**Headwinds and tailwinds**

Côte d’Ivoire has implemented many reforms as part of its 2016–2020 National Development Plan. In energy, reforms have focused on ensuring the sector’s financial sustainability, clearing arrears for independent producers, and investing in supply capacity. As a result, installed capacity increased by 56% between 2011 and 2018 to 2,200 MW. Rural electricity coverage has also expanded from 33% of the rural population to 54%. Reforms in the sector of agriculture have focused on accelerating the development of value chains and increasing local processing for major agricultural products, including cocoa, cashew nuts, palm oil, and rubber. Investment has also improved the quality of and access to basic education and health services. But poverty and inequality reduction remain a challenge.

Côte d’Ivoire is party to most of the relevant continental institutions dedicated to regional integration. The country has historically been an important destination for immigration and remains at the center of one of the continent’s most dynamic migration routes. Côte d’Ivoire is also an important transit corridor for its landlocked neighbors, thanks to its ports in Abidjan and San Pedro. It is a key partner in the regional electricity market and is part of an electricity interconnection network with Benin, Burkina Faso, Ghana, Togo, and soon Mali, as well as to the Mano River Union countries (Guinea, Liberia, and Sierra Leone). Côte d’Ivoire is the major player in WAEMU’s financial markets and hosts the regional securities exchange. Côte d’Ivoire has also increased investment in regional energy, road, and air infrastructure and telecommunication networks.

**Key takeaways on the electricity sector**

**Electricity Access**

Côte d’Ivoire electricity access reached 92% of the population in urban areas, while in rural areas is still limited to 38%, although increasing. The national overall electricity access rate is 64% excluding ongoing electrification projects (*), 82% including them (**). These rates are one of the highest in the sub region. Detailed indicators are as follows:

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4 Source: CI-Energies
<table>
<thead>
<tr>
<th>Service rate</th>
<th>Definition</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of households having electricity / total # of households</td>
<td>33%</td>
<td>38%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coverage rate</th>
<th>Definition</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of electrified localities / total # of localities</td>
<td>51% (**)</td>
<td>46% (*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>54% (**)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Access to electricity rate</th>
<th>Definition</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total number of population for electrified localities / total # of population</td>
<td>81% (**)</td>
<td>64% (*)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>82%* (**)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 1: Rural electrification

<table>
<thead>
<tr>
<th>Year</th>
<th># of electrified localities</th>
<th># of localities to be electrified</th>
<th># of localities without electricity</th>
<th>Coverage rate (**)</th>
<th>Access rate (**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>3,032</td>
<td>3,428</td>
<td>5,481</td>
<td>36%</td>
<td>76%</td>
</tr>
<tr>
<td>2014</td>
<td>3,282</td>
<td>3,588</td>
<td>5,239</td>
<td>43%</td>
<td>78%</td>
</tr>
<tr>
<td>2015</td>
<td>3,497</td>
<td>4,126</td>
<td>4,387</td>
<td>48%</td>
<td>80%</td>
</tr>
<tr>
<td>2016</td>
<td>3,785</td>
<td>4,194</td>
<td>4,319</td>
<td>53%</td>
<td>81%</td>
</tr>
<tr>
<td>2017</td>
<td>3,958</td>
<td>4,614</td>
<td>3,899</td>
<td>54%</td>
<td>82%</td>
</tr>
</tbody>
</table>

### Installed capacity

Côte d’Ivoire’s existing electrical system is the third largest in West Africa, and is positioned to be one of the main hubs of electricity trading within the West African Power Pool (WAPP). In 2011, the electricity system had structures with limited capacity, and recorded production shortfall and significant financial deficit. Over the 2011-2017 period, investments were made in power generation, transmission, and distribution, as well as in rural electrification. Actions have been taken by the Government to improve the financial situation of the electricity sector. Over the period, an additional capacity of 790 MW was commissioned, thereby increasing the installed capacity from 1,391 MW in 2011 to 2,200 MW in 2017. In addition, the transmission and distribution network was strengthened by the commissioning of new source stations in Abidjan region, the reinforcement of existing source stations and the extension and strengthening of the distribution network.

### Production

Electricity production over the last ten years shows a predominance of reliance on thermal energy: on average, 84% of electricity is produced by thermal power plants. Côte d’Ivoire wants to reach an installed capacity of 4000 MW by 2020, mainly with the participation of the private sector. Indeed, almost all thermal energy production is in the hands of independent producers, while hydropower plants are owned by the state. Following the award of the distribution to CIE, the country also awarded the first IPP contract in Africa to Ciprel in 1994, and in 1998, it awarded the largest IPP in Africa to Azito Energie. Currently, electricity generation is dominated by the private sector (63% of total installed capacity in 2015), which accounted for a total of 7,649 GWh in 2018, down 6.6% in comparison to 2017. Total cost of energy bought to IPP in 2018 was equal to 177 billion FCFA, with the following breakdown: 75.13 billion to Ciprel, 71.48 billion to Azito Energie, and 30.03 billion to Aggreko.

### Table 2: Detailed breakdown of plants availability per site and type of technology, in %:

<table>
<thead>
<tr>
<th>Year</th>
<th>HYDRO</th>
<th>THERMAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>50.00</td>
<td>86.25</td>
</tr>
<tr>
<td>2008</td>
<td>49.95</td>
<td>89.92</td>
</tr>
<tr>
<td>2009</td>
<td>70.02</td>
<td>92.00</td>
</tr>
<tr>
<td>2010</td>
<td>36.66</td>
<td>89.18</td>
</tr>
<tr>
<td>2011</td>
<td>14.43</td>
<td>88.84</td>
</tr>
<tr>
<td>2012</td>
<td>82.62</td>
<td>89.81</td>
</tr>
<tr>
<td>2013</td>
<td>71.69</td>
<td>85.65</td>
</tr>
<tr>
<td>2014</td>
<td>15.70</td>
<td>90.19</td>
</tr>
<tr>
<td>2015</td>
<td></td>
<td>84.72</td>
</tr>
<tr>
<td>2016</td>
<td></td>
<td>86.94</td>
</tr>
<tr>
<td>2017</td>
<td></td>
<td>85.10</td>
</tr>
</tbody>
</table>

**NB:** Data related to Soubré plant are not displayed as the plant was only operational in November 2017.

### Source

ANARE-CI 2017 Annual Report, page 27-28
Africa Energy Portal  
Côte d'Ivoire

Table 3  
Detailed breakdown of electricity production per site\(^6\):  

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th></th>
<th>2017</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDRO</td>
<td>(GWh)</td>
<td>(%)</td>
<td>(GWh)</td>
<td>(%)</td>
</tr>
<tr>
<td>Ayame 1</td>
<td>75.24</td>
<td>0.70</td>
<td>73.80</td>
<td>0.74</td>
</tr>
<tr>
<td>Ayame 2</td>
<td>111.51</td>
<td>1.20</td>
<td>103.00</td>
<td>1.04</td>
</tr>
<tr>
<td>Kossou</td>
<td>56.15</td>
<td>0.60</td>
<td>84.20</td>
<td>0.85</td>
</tr>
<tr>
<td>Taabo</td>
<td>453.90</td>
<td>4.50</td>
<td>405.20</td>
<td>4.10</td>
</tr>
<tr>
<td>Buyo</td>
<td>823.88</td>
<td>8.60</td>
<td>749.60</td>
<td>7.50</td>
</tr>
<tr>
<td>Faye</td>
<td>8.40</td>
<td>0.10</td>
<td>0.90</td>
<td>0.01</td>
</tr>
<tr>
<td>Soubre</td>
<td>0.00</td>
<td>0.00</td>
<td>630.50</td>
<td>6.40</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>1,529.08</td>
<td>15.17</td>
<td>2,047.20</td>
<td>20.60</td>
</tr>
<tr>
<td>THERMAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azito</td>
<td>3,057.25</td>
<td>30.33</td>
<td>3,128.00</td>
<td>31.40</td>
</tr>
<tr>
<td>Ciprel</td>
<td>3,569.29</td>
<td>35.41</td>
<td>3,267.74</td>
<td>32.80</td>
</tr>
<tr>
<td>Aggreko</td>
<td>1,679.92</td>
<td>16.67</td>
<td>1,312.20</td>
<td>13.20</td>
</tr>
<tr>
<td>Vridi 1</td>
<td>236.88</td>
<td>2.35</td>
<td>185.00</td>
<td>1.90</td>
</tr>
<tr>
<td>Isolated plants</td>
<td>7.68</td>
<td>0.08</td>
<td>7.30</td>
<td>0.07</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>8,551.01</td>
<td>84.83</td>
<td>7,900.90</td>
<td>79.40</td>
</tr>
<tr>
<td>TOTAL PRODUCTION</td>
<td>10,080.10</td>
<td>-</td>
<td>9,948.10</td>
<td>-</td>
</tr>
</tbody>
</table>

Production costs  
Total production cost in 2018 was equal to 44.53 FCFA/kWh, which is 1.5% higher than the targeted 43.85 FCFA/kWh, but 5.5% lower than that of 2017 (47.15 FCFA/kWh). This decrease of total production cost compared to 2017 is mainly due to the increase of hydraulic production in 2018.

- Production cost of thermal electricity: total production cost was equal to 55.87 FCFA/kWh in 2018, which is 7.8% higher than the targeted 51.85 FCFA/kWh, and approximately equal to thermal production cost in 2017. This deterioration in the cost of production is mainly due to the weakness of thermal production compared to what was planned by CI-ENERGIES.

- Production cost of hydraulic electricity: total production cost was equal to 17.62 FCFA/kWh in 2018, excluding structural costs of the hydraulic power stations (3.95 FCFA/kWh) and the purchase price of the energy of 35 FCFA/kWh from Soubré. This production cost is 5% lower than the 2018 target (18.63 FCFA/kWh), but 28% higher than that of 2017 (13.78 FCFA/kWh). This increase is due to the increased use of production from Soubré unit, whose proportion in total hydro production went from 30% in 2017 to 44% in 2018.

Maintenance  
Though electricity services showed resilience throughout the crisis, the performance and development of the sector were compromised, and the impact of the crisis is still unfolding. Very little investment took place and maintenance of the electricity network was neglected during the period of political crisis and war in the North and West of the country from 2002 to 2010. However, the Compagnie Ivoirienne d'Electricité (CIE), the electricity service operator, continued to supply power throughout the country. The private generation companies Azito and Ciprel also withstood the crisis and continued to supply power effectively, despite a buildup of payment arrears. These arrears were the result of insufficient revenues for the national utility to pay these independent power producers (IPPs), and of insufficient resources for Côte d'Ivoire to support the sector during the crisis period. Many of the challenges currently facing the sector are due to the lack of investment and minimal maintenance of networks during the long political crisis. Interestingly, the private sector presence in the energy supply chain, from gas production through power production to network management and power distribution, may have served as a bulwark against greater decline during the crisis years, as payment discipline through the supply chain was observed to a large extent.

Downtime and efficiency\(^7\)  
Average downtime and overall efficiency improved from 50 hours and 71.3% in 2013 to 22.20 hours and 82.00% respectively in 2018. Overall performance in 2018 is up by 0.20 points from 2017, mainly thanks to the improvement in transmission efficiency from 92.27% to 93.99%, and the increased production within the country via the Soubré site. This improvement

\(^6\) Source: ANARE-CI 2017 Annual Report, page 24  
\(^7\) Source : CI-ENERGIES
in transmission efficiency is expected to continue following the closure of the northern network by the commissioning of the 225 kV Laboa-Boundiali Ferké line on December 30, 2018.

Best performance in the national network was achieved in 1997, prior the civil war, with an average downtime equal to 13 hours and an overall performance equal to 87.43%.

<table>
<thead>
<tr>
<th>Year</th>
<th>Overall performance (%)</th>
<th>Average downtime (h)</th>
<th>Non-distributed energy (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>77.07</td>
<td>49.32</td>
<td>35.28</td>
</tr>
<tr>
<td>2014</td>
<td>78.59</td>
<td>40.03</td>
<td>30.82</td>
</tr>
<tr>
<td>2015</td>
<td>78.78</td>
<td>44.63</td>
<td>36.23</td>
</tr>
<tr>
<td>2016</td>
<td>80.30</td>
<td>27.72</td>
<td>23.93</td>
</tr>
<tr>
<td>2017</td>
<td>81.80</td>
<td>23.83</td>
<td>21.29</td>
</tr>
<tr>
<td>2018</td>
<td>82.00</td>
<td>22.20</td>
<td>nd</td>
</tr>
</tbody>
</table>

**Tariffs**

Between 2012 and 2015, national energy consumption grew at an average rate of 15% per year. During this same period, rates increased on an average of 5% per year. In 2016, following the demonstrations that followed the announcement of the price increase, measures were cancelled. Electricity consumption, meanwhile, continued to grow in 2016 to more than 8,000 GWh. Export tariffs are on average 19% more expensive than at national level. In 2016, after a slight decline, they were equal to more than 70 FCFA/kWh and reached 71.7 FCFA/kWh in 2017. That same year, the volume of exports was up sharply (+84%) to more than 1,600 GWh. Côte d'Ivoire master plan anticipates an average energy production cost of 45 FCFA/kWh in 2030, a decrease of 44% compared to 2014 when it was estimated at 65 FCFA/kWh.
Part 2: National and Regional Policies

Country strategy on the energy sector

**National energy policy**  The revised national energy policy adopted in 2013 sets the objective for Côte d’Ivoire to become the main energy hub in West Africa. The adopted energy policy has three main axes: (i) restore the financial viability of the energy sector - tariff adjustments and reduction of losses; (ii) sufficient electricity production to meet demand; and (iii) improvement of the institutional framework. In the country’s efforts to become an emerging country by 2020, energy needs, with a growing demand of about 10% per year, translates into 150 MW of additional capacity needed per year. On the other hand, the master plan forecasts an electricity demand growth of 10% to 12% in the short term and 5 to 7% from 2020 on. It also anticipates the preponderant role that Côte d’Ivoire may have in electricity exchanges in the sub region. Thus, the master plan provides for a doubling of the volumes of energy exported over a 10-year period, from 2015 to 2025. In 2011, the Government of Côte d’Ivoire developed a Strategic Development Plan for the 2030 Horizon via the Ministry of Planning and Development and the Ministry of Petroleum Energy and Renewable Energy. This plan, downloadable [here](#), defines four major strategic areas: (i) the match between supply and demand; (ii) sustainable energy through the development of renewable energies; (iii) the institutional framework review and capacity building, and (iv) the financial viability of the electricity sector. A [National Seminar on Energy](#) in 2012 clarified these major orientations.

**Use of renewable energy** In 2015, the Government of Côte d’Ivoire also finalized Master Plans including the “Transport Production” plan, with objectives in terms of energy mix, set out in the Renewable Energy Action Plan (PANER) carried out within the framework of regional initiatives of ECOWAS, and validated in April 2016, in line with the objectives of the SE4ALL initiative. The country has set the objective of a 42% energy mix based on renewable energy by 2030, of which 26% will come from medium and large hydro, and the other 16% will come from “others” (i.e. solar, biomass and mini hydro). Detailed breakdown is provided below.

**Figure 3**  
Energy mix (actuals and projections)⁸

<table>
<thead>
<tr>
<th>Year</th>
<th>Installed capacity, in MW</th>
<th>Production, in GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1,459</td>
<td>5,148</td>
</tr>
<tr>
<td>2016</td>
<td>6,148</td>
<td>20,585</td>
</tr>
<tr>
<td>2017</td>
<td>6,585</td>
<td>20,585</td>
</tr>
<tr>
<td>2020</td>
<td>10,293</td>
<td>20,585</td>
</tr>
<tr>
<td>2030</td>
<td>11,293</td>
<td>20,585</td>
</tr>
</tbody>
</table>

**Table 4**  
Projected generation from renewable energy sources

<table>
<thead>
<tr>
<th>Source</th>
<th>2015 GWh</th>
<th>2020 GWh</th>
<th>2025 GWh</th>
<th>2030 GWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mini hydroelectric power stations(&lt;30 MW)</td>
<td>153</td>
<td>207</td>
<td>608</td>
<td>685</td>
</tr>
<tr>
<td>Medium and large hydroelectric power stations (&gt; 30 MW)</td>
<td>1,306</td>
<td>3,292</td>
<td>6,380</td>
<td>6,380</td>
</tr>
<tr>
<td>Solar PV</td>
<td>38</td>
<td>60</td>
<td>672</td>
<td></td>
</tr>
<tr>
<td>Biomass</td>
<td>1,611</td>
<td>3,537</td>
<td>3,556</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1,459</td>
<td>5,148</td>
<td>10,585</td>
<td>11,293</td>
</tr>
</tbody>
</table>

⁸ Source: ANARE-CI 2017 Annual Report, page 26
The government of Côte d’Ivoire signed MoUs with promoters for the sites presenting an important potential for hydro, in addition to the Soubre project (275 MW) which started operating in 2017. For other types of renewables, following a call for tenders launched in 2013, a first solar plant 25 MWp started being built in 2017, and 3 other plants have been the subject of requests for Expression of Interest in 2016: a 25 MW cotton biomass plant at Boundiali, a biomass 20 MW in Gagnoa and a 25 MWp solar power plant. Two OTC (unsolicited) projects were under negotiation as of 2017: a biomass plant based on oil palm residues (carried out on the initiative of the company Ivory Coast Biokala and baptized Biovea of 2\*23 MW) and a solar PV plant of 50 MWp from the Canadian Solar Corporation. The government wishes for the future to continue to attribute the different projects planned through tendering processes.

### Table 5 Resource potential and existing pipeline across technologies

<table>
<thead>
<tr>
<th>Resource &amp; generation potential</th>
<th>Generation capacity</th>
<th>Pipeline</th>
<th>Policy framework</th>
<th>Business environment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hydro</strong></td>
<td>Based on a study conducted in 1979, there is an estimated national capacity of 3,900 MW capable of generating an estimated 10,000 GWh per year.</td>
<td>There is an installed capacity of 879 MW. Currently installed sites produced 1,516 GWh in 2016.</td>
<td>2014 Master Plan identified 18 projects. 11 projects are actively being developed, representing 592 MW.</td>
<td>2014 Master Plan for hydropower development exists but could benefit from outlining response systems for environmental and social impacts and best practices for acquiring land.</td>
</tr>
<tr>
<td><strong>Biomass</strong></td>
<td>Annually, 9 million tons of residues (70% of total generated amount annually) are available as fuel with a technical potential for generating more than 1,200 MW annually.</td>
<td>Small scale (&lt;10MW) personal use biomass energy generation exists, with 80 MW installed capacity.</td>
<td>Government has identified pilot projects and issued tenders but progress towards the 236 MW 2030 goal remains slow. The 46 MW plant being developed by Biokala signed a PPA and upon completion is estimated to generate 288 GWh of electricity per year.</td>
<td>Procedures, rules, protocols, tariff structure, legislation, GHG regulation, ownership of feedstock, and project shortlisting processes could be created and/or institutionalized.</td>
</tr>
<tr>
<td><strong>Solar</strong></td>
<td>6 hours of sunshine per day, ranging from 2 to 6 kWh/m²/day with highest irradiation levels in northern region. Potential estimated at 10,325 TWh per year.</td>
<td>Several investments are underway with KFW and Nova Power equal to between 78-88 MW. Some projects remain in planning stages and the 2030 pipeline includes 320 MW of solar PV projects.</td>
<td>Strong demand for supporting policies that stipulate feed-in tariffs, dispatch obligations, and incentives.</td>
<td>Upfront costs remain high, and bankability is challenged by lack of favorable regulatory framework for IPPs.</td>
</tr>
<tr>
<td><strong>Wind</strong></td>
<td>Moderate-to-low (6 m/s), with no detailed wind maps in existence.</td>
<td>None built, but there are private sector developments underway in Toubia and Ehania (MW unknown). Difficult to determine without detailed understanding of existing resources.</td>
<td>Large demand for improved grid codes to ensure fair treatment of developers and operators. Excluded from Master Plan.</td>
<td>There are resources sufficient for a competitive wind plant using modern low wind turbines on tall towers, but more data is required to design a viable investment.</td>
</tr>
</tbody>
</table>

NB. When used, MW and GWh figures are estimates.

### Country strategy on the environment and climate change

**Policy and regulation** Côte d’Ivoire remains vulnerable with impacts at various levels. The country is suffering from hazards associated with increasing exploitation of its natural resources, a drastic reduction in forest cover leading to loss of biodiversity, as

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9 Source: IFC Analysis – References:

   - Hydro: Study conducted by Electricité de France in 1979 [Not available online]
   - Biomass: IFC, forthcoming study [Not available online]


well as air, water and soil pollution by domestic, industrial, agricultural, mining and maritime activities. To remedy the situation, the Government has taken measures to restore and safeguard the environment. The Forestry and Environment Code laws have been amended to promote better environmental protection and a more sustainable development, via notably the use of renewable energy. Côte d'Ivoire currently lacks a legal and regulatory framework to combat climate change, required for creating a favorable context for private investment in adaptation and mitigation (and more generally climate-resilient and low GHG emission development). Côte d’Ivoire adopted an Orientation Law on Sustainable Development in 2014. However, the law does not incorporate some of the key climate factors subsequently adopted – particularly the National Strategy for Combating Climate Change and the Contribution Determined at National Level (CDN), the main instrument for implementing the Paris Climate Agreement, and the preparation of a national roadmap for its implementation.

**National Climate Agency** A bill on climate change and its implementing decrees, intended to provide a sufficiently precise legal basis to guide climate activities, is under consideration with the support of the European Union (EU). To advance the climate agenda, Côte d’Ivoire intends to establish a National Climate Agency, in accordance with the Orientation Law on Sustainable Development adopted by the National Assembly of Côte d’Ivoire. This law clearly stipulates the need to create, by decree, several entities, for example an agency and a climate fund. In addition, the National Strategy for Combating Climate Change goes to buttress this position. A feasibility study, which will help specify the mandate and powers of the new agency and its articulation with other elements of the institutional framework, is being conducted with the EU, including a law on combating climate change.

**Regional Integration with the West African Power Pool (WAPP)**

**2018 Highlights** In 2018, the supply of electrical energy for export was marked by the following elements:

- Commissioning of the Ghana-Burkina interconnection in June 2018 via the 225 kV Bolgatanga (Ghana) - Zagtouli (Burkina) line;
- Improvement of the voltage withstand at the 225 kV Ferké substation following the commissioning of the 225 kV Laboa-Boundiali-Ferké line in December 2018. This line will also be used to decongest the 225 kV Taabo-Kossou-Bouaké artery which handles transport to Burkina Faso and Mali
- Since September 2018, energy exported to Burkina has fallen considerably compared to the targeted supply programme. This is due to the fact that the power system of Burkina Faso encounters difficulties to maintain the average transit beyond 60 MW, when 90 MW were targeted.

**Figure 4** Côte d’Ivoire exports, in GWh

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11 Source: African Development Bank Analysis; The Economist Intelligence Unit, December 2018
**Integration challenges**  According to Sédiko Douka, energy commissioner of the Economic Community of West African States (ECOWAS), West African nations face an energy crisis and individual state energy sectors are disadvantaged by local circumstances such as limited access to energy, poorly performing electricity companies, expensive tariffs, while challenges include the need to overcome a reliance on hydrocarbons and the development of renewable sources of energy. More will need to be done if regional progress towards electricity integration (via projects such as the recent commissioning of the Bolgatanga-Ouagadougou interconnection linking ECOWAS members Burkina Faso and Ghana) is to continue in the medium and long term. With access to electricity hovering between 40% and 52% of the population, and brownouts and blackouts averaging about 80 hours a month, the 15 ECOWAS member states need to confront a chronic lack of access to electricity across the region and persistently high prices. A lack of historical infrastructure planning and poor implementation contribute to enduring poverty and have led to an engrained reliance on emergency rental plants, which inflates power costs even more. Complicating the challenge of extending power supply infrastructure is the fact that several of the group’s landlocked states, including Niger, Chad, Mali and Burkina Faso, are located in the Sahel region—an arid zone that will experience significant desertification as global temperatures rise over the course of the 21st century, according to forecasts by climate scientists. ECOWAS estimates that more than 75% of the population of member states are already affected at least once every two years by natural phenomena whose effects are becoming increasingly damaging because of climate change.

**Clashing imperatives**  Besides supporting the mandate for immediate power demand, the role of the West African Power Pool (WAPP) extends to driving long-term climate-proofing strategies recommended under the framework of the Paris Agreement on climate change, which is due to be implemented by 2020. This regional body is mandated to translate overarching public policy guidelines into sectoral investment schemes that favor relatively new green technologies. The schemes include encouraging the installation of diversified sources of renewable energy, creating off-grid generation and storage technologies and nurturing regional power networks and new trading mechanisms. Although these initiatives are complex, require close co-operation between member states and are expensive to implement, they will secure long-term electricity supply security for West Africa if they succeed.

Domestic power utilities are at the forefront of electrification efforts, and their mandates to increase nationwide electricity production frequently lead to conflicts with the WAPP over the type of power generation used. The WAPP is concerned that regional pressure on states to increase electrification could lead to an oversupply of inefficient, fossil fuel-intensive or environmentally damaging generation that relies on coal or hydropower, which would be counterproductive to the WAPP’s climate-proofing aims. Indeed, new research by the US National Academy of Sciences suggests that similar large-scale electrification projects in Western countries in the past have had a disastrous long-term effect on the environment. At present, domestic demand in West African countries is often too low to attract investment in such large-scale projects, but this is changing. Several countries are set to increase their reliance on hydrocarbons as a result of developments in the West African basin, especially in Senegal, Ghana, Côte d’Ivoire and Nigeria (the last being an established oil producer). But the countries involved argue that the resulting power generation from these developments will mostly be gas-fired, which would provide significant low-emission generation gains to the power market.

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**Source:** Electricity from renewable resources – Status, Prospects and Impediments, The National Academies of Sciences, Engineering and Medicine, 2010. Accessible here: [https://www.nap.edu/catalog/12619/electricity-from-renewable-resources-status-prospects-and-impediments](https://www.nap.edu/catalog/12619/electricity-from-renewable-resources-status-prospects-and-impediments)
**Network integration** If the installation of new power generation capacity remains largely a domestic state-based prerogative, the integration of existing networks is firmly in the WAPP’s remit. The continued involvement of third-party donors and financial institutions such as the African Development Bank and the World Bank is likely to ensure that the focus on regional integration remains at the forefront of electricity stakeholders’ concerns. In 2016, with the African Development Bank’s help, the WAPP accelerated the construction of a 330 kV double circuit high voltage transmission line from Erukan (Nigeria) to Sakete (Benin) and help meet the needs of the ECOWAS region in suppling reliable electricity supply at affordable cost. The Project, a WAPP key priority, will ensure stable integration of the national electricity networks in the ECOWAS Region and facilitate the accessibility to economic energy resources to all member states of the region. The realisation of this 330 kV WAPP Nigeria–Benin Project will facilitate optimal power exchanges and trading between the Member States. It seeks to establish a robust transmission link from Côte d’Ivoire to Nigeria passing through Prestea, Aboadze, Volta in Ghana, Lomé in Togo, and Sakete in Benin. In 2017, with the World Bank’s help, the WAPP launched a regional off-grid electrification project which aims to increase access to electricity in rural areas through innovative solar power solutions, and a regional electricity trading market, which was launched in July 2018. A number of transmission interconnections have already been completed or are under way, such as the 225-kV exchange line between Burkina Faso and Ghana, a 225-kV transmission project linking Côte d’Ivoire, Liberia, Sierra Leone and Guinea and the OMVG interconnector, which will link Senegal, Gambia, Guinea-Bissau and Guinea. It is estimated that the entire region will be connected by the start of the next decade.

**Regional electricity market** Assuming that regional states can overcome the obstacles identified earlier, the integration of West Africa’s growing power-generating capabilities could create the region’s first true power market. Currently, only about 7% of the electricity produced in West Africa is traded. However, in July 2018 the WAPP launched a trading market (with its headquarters in Cotonou, Benin) that will allow ECOWAS member states to trade their surplus electricity. The World Bank estimates that an integrated power-trading system in the region could bring operational and power-generation cost savings of USD 5bn-8bn a year by allowing countries to import cheaper and more cleanly generated electricity. However, the potential new market throws up several complex political and technical challenges, which will require close cooperation and determination among policymakers, regulators and utilities if they are to work. Throughout much of the region, local power utilities are expected to hinder the conclusion of trading agreements, and low capitalization, ongoing supply problems, poor domestic collection capacity and corruption are likely to result in poor collection of payments, making it difficult to enforce international contracts. Such problems have already been reported in pre-existing projects operating on a smaller scale, such as the West African gas pipeline system linking Nigeria, Benin, Togo and Ghana. After force majeure was declared on the supply of gas by Nigeria at the start of the project in 2011, the pipeline underperformed and the Ghanaian authorities consequently underpaid for supply. The WAPP
will need to instigate measures to improve the power sector’s creditworthiness, provide guarantees and involve regional institutions, if it is to take the lead in ensuring that the region’s electricity infrastructure stands a chance of succeeding, once it is built.
Part 3: Market Information

Key stakeholders in the power market

**Institutional framework**  Up until 2014, the electricity sector in Cote d'Ivoire was governed by Law No. 85-583 of 29 July 1985 organizing the production, transmission and distribution of electricity in the country. The new law No. 2014-132 of 24 March 2014 on the Electricity Code reflects the State's willingness to open to competition the transport, distribution and marketing in the same way as production (liberalized since 1985). This law promotes new and renewable energies and energy management, and as of October 2018 the implementing texts of the new electricity code are being drafted. The key electricity sector institutions and operators in Côte d'Ivoire include both public and private sector players:

- The Société des Energies de Côte d'Ivoire (CI-ENERGIES) is a state-owned asset holding company responsible for managing public assets in the electricity sector as well as planning and contracting investments. CI-ENERGIES is the contracting party with the gas suppliers and independent power producers.
- The Compagnie Ivoirienne d’Electricité (CIE) is a private company that operates and maintains, on behalf of CI-ENERGIES, a vertically integrated business combining the national transmission and distribution networks and hydro generation plants under a 15-year renewable “affermage” (concession, without investment obligations) contract. CIE’s affermage contract is set to expire in 2020, and the Government has begun an analysis of post-2020 options to improve the performance of the sector.
- IPPs such as Ciprel, Azito, and Aggreko dominate thermal power generation and rely on indigenous natural gas production from private producers, such as Fox trot or CNR.
- The Autorité Nationale de Regulation du Secteur d’Electricité (ANARE-CI) is responsible for overseeing compliance with laws, regulations and obligations under the authorisations and conventions in force in the electricity industry. ANARE has purely advisory functions.
- The Ministry of Oil, Energy, and Development of Renewable Energy (MPEDER) sets policy and plays an overarching surveillance role of the sector.

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Category</th>
<th>Role and mission</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministère du Pétrole, de l’Energie et du développement des Energies renouvelables</td>
<td>Government</td>
<td>Initiates and leads sector policies</td>
</tr>
<tr>
<td>Direction Générale de l’Energie</td>
<td>Public administration</td>
<td>Implements and manages sector policy</td>
</tr>
<tr>
<td>Energies de Côte d’Ivoire (CI-Energies)</td>
<td>Public utility</td>
<td>Manages the State-Owned assets within the sector&lt;br&gt;Ensures the financial balance of the sector&lt;br&gt;Monitors the management of purchasing functions, and energy movements</td>
</tr>
<tr>
<td>Autorité Nationale de Régulation du secteur de l’Electricité (ANARE-CI)</td>
<td>Public administration</td>
<td>Compliance monitoring&lt;br&gt;Arbitration of conflicts between the actors of the sector&lt;br&gt;Protection of consumer interests&lt;br&gt;Issuance of opinions on authorizations provided to developers to operate and regulatory texts</td>
</tr>
<tr>
<td>Direction de l’Électrification Rurale au sein de la Direction Générale de l’Energie auprès de Ministère du Pétrole, de l’Energie et du Développement des Energies Renouvelables</td>
<td>Public administration</td>
<td>In charge of rural electrification with CI-Energie</td>
</tr>
<tr>
<td>Direction de la Maîtrise de l’Energie et des Energies Renouvelables au sein de la Direction</td>
<td>Public administration</td>
<td>In charge of renewable energy and energy efficiency</td>
</tr>
</tbody>
</table>
Générale de l’Energie auprès de Ministère du Pétrole, de l’Energie et du Développement des Energies Renouvelables

| Compagnie Ivoirienne d’Electricité (CIE) | Public administration | • Generation, Transmission and Distribution operation through « affermage » contract  
• Management of cash waterfall |

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**Table 7**  
Mapping of current stakeholders across agreements

Signatory parties from the State are the Ministère du Pétrole de l’Energie et du Développement des Energies Renouvelables, the Ministère de l’Économie et des Finances and the Secrétariat d’État auprès du Premier Ministre, chargé du Budget et du Portefeuille de l’État.

<table>
<thead>
<tr>
<th>Type of agreement</th>
<th>Beneficiary</th>
</tr>
</thead>
</table>
| Concession Agreement type BOOT | • Ciprel  
• Azito Energie  
• CI-Energies Soubré |
| Rent Agreement | • Aggreko |
| Concession Agreement on electricity public service | • Compagnie Ivoirienne d’Electricité (CIE)  
NB: End-consumers have subscription contracts with CIE |
| Natural gas sale and purchase agreement | • Petroci-CI 11  
• Foxtrot International  
• CNR International |

**Key project finance lenders**  
Côte d’Ivoire has 23 private banks, three public banks, and two non-banking financial institutions. As is the case in most of the region’s markets, activity is highly concentrated. Medium- to long-term infrastructure projects, including private-sector projects, are often financed by development partners rather than commercial banks. Multilateral lending institutions such as the World Bank (WB), the African Development Bank (AfDB) and the International Finance Corporation (IFC) provide funding for agribusiness, small business and infrastructure projects among other areas of support. The main commercial banks operating in the country are: Société Générale, Banque Atlantique, EcoBank, NSIA, Banque Internationale pour le Commerce et l’Industrie de la Côte d’Ivoire (BICICI), Société Ivoirienne de Banque (SIB), BNI Banque Nationale d’Investissement.

**Key players from the private sector**

<table>
<thead>
<tr>
<th>Company</th>
<th>Summary</th>
<th>Technology</th>
<th>Current Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olam</td>
<td>Produced and consumed on-site to power boilers for processing food products</td>
<td>Biomass</td>
<td>80 MW</td>
</tr>
<tr>
<td>BioTherm</td>
<td>BioTherm is a South Africa-based IPP 100% supported by Denham Capital. They currently control a development portfolio totaling 1 GW in the region. BioTherm also works with Power Africa, focused on mini-grid and distributed power service and infrastructure. They have secured solar PV tenders (34 MW) in Burkina Faso, Zambia (10 MW), and Ghana (20MW) and are actively developing other wind and solar projects across the continent.</td>
<td>Solar PV</td>
<td>20 MW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wind</td>
<td>75 MW</td>
</tr>
</tbody>
</table>

---

13 Source: ANARE-CI 2017 Annual Report, page 23  
14 [https://oxfordbusinessgroup.com/overview/key-changes-country-looking-maintain-high-growth-restructuring-and-reinvigorating-sector](https://oxfordbusinessgroup.com/overview/key-changes-country-looking-maintain-high-growth-restructuring-and-reinvigorating-sector)  
15 [https://www.export.gov/article?id=Cote-d-Ivoire-Project-Financing](https://www.export.gov/article?id=Cote-d-Ivoire-Project-Financing)
Eranove is an industrial group that works across Africa for public services management and independent water and electricity production. Headquarter in Paris, Eranove operates throughout Africa including Côte d'Ivoire. Eranove operates CIPREL (Ivory Coast Electricity Production Company), a combined gas and steam turbine. CIPREL is 83.5% owned by Eranove and operates under a concession contract with the government which expires in 2035. CIPREL is a combined gas + steam 556 MW, estimated annual production of 3810 GWh (CIPREL), 390 MW (Atinkou).

Phaesun: Phaesun works on off-grid solar and wind systems to contribute to individual energy independence. Phaesun Ivory Coast is one of their associated companies. One current project in Côte d'Ivoire is PV lighting in Abidjan Harbour, consisting of 85 solar LED lights installed at the Vridi channel in collaboration with local partner, S-TEL.

ENGIE: ENGIE has been active across Africa for the past 50 years, most recently as an Independent Power Producer (IPP) in Morocco and South Africa. ENGIE already has more than 1 million customers with domestic solar installations and local microgrids, and aims to become one of the viable leaders on the continent’s off-grid service market. ENGIE recently installed the first ever compressed natural gas (CNG) vehicle fueling station in Abidjan.

EDF: In 2016, EDF created a new subsidiary in Côte d'Ivoire called EDF-CI. Taking into account energy development needs and spurred by the BIOVEA project (which aims to develop a biomass plant of 2x23 MW), EDF-CI will continue to carry out energy project development in Côte d'Ivoire. They will focus on the BIOVEA project and a rural electrification project in partnership with Off-Grid Electric (known as Zola Electric, a joint venture between Off-Grid Electric and EDF). EDF-CI will continue to explore the market and promote EDF’s products, including in the fields of sustainable cities and hydroelectricity.

Bouygues: A French company, Bouygues is primarily a construction company. They work in the energy infrastructure sector, providing urban development, eco-neighborhoods, smart cities, energy services, and other industrial activities.

Azito Energie: Azito is one of two combined cycle natural gas-fired power plants in Côte d'Ivoire. Azito power plant is located in Azito, 6km west of Abidjan, and the project company Azito Energie is 77% owned by GlobalEq.

### Funding breakdown of major infrastructure projects

<table>
<thead>
<tr>
<th>Project</th>
<th>Total Investment ($m)</th>
<th>Sponsor (% ownership, when available)</th>
<th>Debt Providers ($m, when available)</th>
<th>Sector</th>
<th>Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compagnie Ivoirienne de Production d’Electricite (CIPREL Vridi)</td>
<td>$902.60</td>
<td>• Eranove (83%) • West African Development Bank (2%)</td>
<td>• African Development Bank ($155.6) • Agence Francaise de Developpement (AFD) ($155.6) • BOAD ($8.1) • World Bank (IBRD) ($79.7) • IFC ($239.34) • Standard Chartered bank • Proparco ($146)</td>
<td>Gas-fired power plant</td>
<td>36%</td>
</tr>
</tbody>
</table>
Electricity Regulatory Index

**Regulatory assessment** The Electricity Regulatory Index for Africa (ERI) is a flagship publication of the Power, Energy, Climate Change and Green Growth Complex of the African Development Bank, which seeks to empirically evaluate the performance of African utility regulators, benchmark their performance against international best practices as well as a peer-to-peer comparison of their performance. In 2018, Côte d’Ivoire ranked 12th out of the 15 surveyed countries and overall performance of the country indicates that there is a minimal impact of regulatory actions on the sector, even though Cote d’Ivoire has taken initial steps to develop appropriate laws, regulations, codes and standards for the sector.

Côte d’Ivoire’s ambition to be the energy hub of the sub-region will require more proactive actions. The sector challenges are at three levels:

(i) Reinforcement of the power generation fleet and improvement of the energy mix by increasing the proportion of renewable energy to meet growing demand, particularly demand induced by real estate and industrial development prospects;

(ii) Resolution of the financial imbalance

(iii) Need to develop new gas fields in view of the risk of importing more expensive LNG. Given these constraints, governance should be improved in these important sectors.

Côte d’Ivoire ranked 14th out of the 15 surveyed countries on the Regulatory Governance Indicator which assesses the level of development of regulatory framework and the scope at which the laws, procedures, standards, and policies governing the electricity sector, provide for a transparent, predictable, and credible regulator. There is an opportunity for the government to draft necessary policies to enable higher level of independence, and enhanced clarity of roles.

Furthermore, diversification of the energy mix should be pursued with a larger proportion of clean alternative energies and minimum efficiency performance standards. The country has already elaborated and enforced some regulation on energy efficiency. However minimum efficiency performance standards are supposed to be determined by the Ministry of Energy in collaboration with all the other relevant stakeholders. Therefore there is a need of assistance to draft all these standards.
**Recommendations**  The 2018 ERI\textsuperscript{16} identified regulatory gaps in all the three pillars of regulations – Regulatory Governance, Regulatory Substance and Regulatory Outcome. An analysis of the responses by ANARE to ERI survey questionnaires revealed the following critical gaps that have a significant impact on the overall sector performance:

- **Tariff setting guidelines and methodology:** The tariff framework of the regulation is governed by the #5 Addendum of the Concession agreement with CIE. The tariff is revised by CIE. Recently four tariff revision occurred. In 2012, 2015, 2016 and 2017. However, there are no documented and published tariff guidelines and methodology. It is also best practice for tariff framework and tariff setting be controlled by the regulator.

- **Quality of service Regulation (grid code):** There is a mechanism for determining the affordability of tariffs in the country. This mechanism affect all the categories of customers from residential to industrial. In addition, grid connection draft regulations are under elaboration by CIE. However, there is no documented and published grid connection policy in line with the tariff setting policy. ANARE needs to be assisted in handling the grid code elaboration.

- **Quality of service Regulation (capacity building):** The current quality of service regulations covers only the technical performance and the quality of service performance. The enforced regulations do not cover the financial and the commercial performance. There is a need in capacity building to incorporate those missing fields of quality of service regulations.

- **Technology specific PPAs:** The existing regulations provide for the Regulator to be able to elaborate a template PPA model for energy sale to all the eligible consumers. However, this has not been achieved yet and furthermore there are no technology specific PPAs. Therefore it is necessary, for the development of template PPAs specific to stand-alone systems and renewable energy.

- **Licensing framework:** The stand-alone and remote electricity systems establishments are governed by the traditional and grid connected regulations which are not appropriate for off-grid systems. Besides, license granting is centralized at the level of the ministry. There is no simplified licensing framework for new utilities, stand-alone or remote electricity systems.

**National utility**

**General profile**  CI-ENERGIES was created following the third reform of the electricity sector undertook by the government of Côte d’Ivoire in 2011. This change resulted in the dissolution and the merger of the Société de Gestion du Patrimoine du Secteur de l’Electricité (SOGEPE) and the Société d’Opération Ivoirienne d’Electricité (SOPIE), which were State-owned companies resulting from the second reform of the national electricity sector in 1998. Following decree n°2011-472 of 21 December 2011, CI-ENERGIES was entrusted with the missions and attributions of SOGEPE and SOPIE. It is important to note that Côte d’Ivoire undertook the first reform of the sector by privatizing the operations of the electricity system in October 1990. At that time, the Energie Electrique en Côte d’Ivoire was holding a monopoly on the transport, distribution, export and import of electricity, and became an assets company in charge of the management of concessions as well as the development of the sector of electricity.

**Policy and strategy**  CI-ENERGIES is committed to supporting the economic recovery that will make Cote d’Ivoire an emerging country by 2020 thanks to the strengthening of the national power system. The new strategic plan of CI-ENERGIES for the period 2018-2022 aims to make Cote d’Ivoire a regional energy hub, provide electricity to the population at a competitive cost, and support the utility’s financial and operational sustainability. This strategy is broken down into 6 different axes:

- **Axis 1 – Adequacy between the supply and demand of electrical energy:** four Master Plans will be updated by 2020 and installed capacity will increase from 2,199 MW in 2018 to 3,054 MW by 2022.

- **Axis 2 – Access to electricity:** national coverage rate will increase from 58% in 2018 to 91.1% in 2022, access rate will increase from 89.5% in 2018 to 96.6% in 2022, and average downtime will be reduced from 22h20 in 2018 to 16h in 2019, 10h in 2020, 7h in 2021 and 5h in 2022.

- **Axis 3 – Sustainable development:** installed capacity from renewable energy production units will increase from 879 MW in 2018 to 1271 MW in 2022, increase proportion of renewables in the energy mix from 40% in 2018 to 42% in 2022.

- **Axis 4 – Development of the international and sub regional cooperation:** total capacity of interconnection lines will increase from 885 MW in 2018 to 1,180 in 2020 (no further increase afterward) in order to increase the volume of exports in WAPP countries from 1,065 MW in 2018 to 2,215 MW by 2022.

- **Axis 5 – Improved financial performance**: overall performance of the network will increase from 80.32% in 2018 to 86% in 2022.
- **Axis 6 – Development of the potential of human resources and social responsibility**: additional management positions will be created to improve supervision of technical staff, and internal communication will be reinforced.

### Table 8

**CI-ENERGIES Key Figures**

**Production:**

<table>
<thead>
<tr>
<th>Commissioning date</th>
<th>Installed capacity (MW)</th>
<th>Avg annual production (GWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDRO</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ayamé 1</td>
<td>1959</td>
<td>20</td>
</tr>
<tr>
<td>Ayamé 2</td>
<td>1965</td>
<td>30</td>
</tr>
<tr>
<td>Kossou</td>
<td>1972</td>
<td>174</td>
</tr>
<tr>
<td>Taabo</td>
<td>1979</td>
<td>210</td>
</tr>
<tr>
<td>Buyo</td>
<td>1980</td>
<td>165</td>
</tr>
<tr>
<td>Grah</td>
<td>1983</td>
<td>5</td>
</tr>
<tr>
<td>Soubré</td>
<td>2017</td>
<td>275</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commissioning date</th>
<th>Installed capacity (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>THERMAL</td>
<td></td>
</tr>
<tr>
<td>Vridi TAG</td>
<td>1984</td>
</tr>
<tr>
<td>Ciprel 1</td>
<td>1995</td>
</tr>
<tr>
<td>Ciprel 2</td>
<td>1998</td>
</tr>
<tr>
<td>Azito 1</td>
<td>1999</td>
</tr>
<tr>
<td>Azito 2</td>
<td>2000</td>
</tr>
<tr>
<td>Ciprel 3</td>
<td>2009</td>
</tr>
<tr>
<td>Aggreko 1</td>
<td>2010</td>
</tr>
<tr>
<td>Aggreko 2</td>
<td>2012</td>
</tr>
<tr>
<td>Ciprel 4</td>
<td>2013</td>
</tr>
<tr>
<td>Aggreko 3</td>
<td>2013</td>
</tr>
<tr>
<td>Ciprel TAV</td>
<td>2015</td>
</tr>
<tr>
<td>Azito TAV</td>
<td>2015</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
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</table>

**Transport and distribution networks – Lines and cables length, in km:**

<table>
<thead>
<tr>
<th>Year</th>
<th>225kV</th>
<th>90kV</th>
<th>15kV and 33kV</th>
<th>Low Tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>2,088</td>
<td>2,636</td>
<td>20,300</td>
<td>17,660</td>
</tr>
<tr>
<td>2014</td>
<td>2,088</td>
<td>2,641</td>
<td>21,718</td>
<td>18,737</td>
</tr>
<tr>
<td>2015</td>
<td>2,088</td>
<td>2,613</td>
<td>22,336</td>
<td>19,599</td>
</tr>
<tr>
<td>2016</td>
<td>2,469</td>
<td>2,624</td>
<td>23,516</td>
<td>20,746</td>
</tr>
<tr>
<td>2017</td>
<td>2,469</td>
<td>2,664</td>
<td>24,026</td>
<td>21,233</td>
</tr>
</tbody>
</table>

**Average tariff, in FCFA/kWh, excluding taxes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Low Tension</th>
<th>High and Medium Tension</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>62.54</td>
<td>58.47</td>
<td>60.62</td>
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<tr>
<td>2014</td>
<td>71.64</td>
<td>57.55</td>
<td>64.85</td>
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<tr>
<td>2015</td>
<td>71.02</td>
<td>63.02</td>
<td>67.32</td>
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<tr>
<td>2016</td>
<td>71.76</td>
<td>63.17</td>
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</tr>
<tr>
<td>2017</td>
<td>73.02</td>
<td>65.28</td>
<td>69.45</td>
</tr>
</tbody>
</table>

17 Sources: African Development Bank analysis; CI-ENERGIES institutional reports
Mapping of ongoing programmes and projects

Donors interventions:

- As part of Energos 2, the European Union is providing support to the tender offer process for the selection of IPPs, including pre-feasibility and feasibility studies, and legal and financial support across all RE technologies. More information available [here](#).
- **World Bank ROGEP** has $200 million in funding to support off-grid development across 19 countries, including Côte d’Ivoire.
- The German Gesellschaft für Internationale Zusammenarbeit (GIZ) is conducting a feasibility study for a 3-yr project starting at end of 2018 that would provide €5 million in technical assistance for private sector RE and energy efficiency.
- The German Kreditanstalt für Wiederaufbau (KfW) is considering a guarantee mechanism for RE as part of G20’s Compact with Africa in collaboration with the African Development Bank and the European Investment Bank.
- KfW is also preparing to support rehabilitation of transmission lines to connect future solar plants in the north.

Mapping of ongoing projects across the power spectrum

Although Côte d’Ivoire’s renewable energy experience has been primarily in large hydro generation, several projects are under development. Some projects are in the stage of pre-feasibility and feasibility studies, and others are in the funding stage. During the 2012 national energy seminar, the Ministry of Petroleum, Energy and Renewable Energy identified the following projects moving forward.\(^\text{18}\):

- Use of municipal waste and agricultural residues:
  - The SITRADE project related to the production of electricity from solid waste in the District of Abidjan: 8.3 billion CFA, of which 1.3 billion CFA will come from the state.
  - Energy production from waste treatment discharged from Anyama: 263 billion CFA, which private parties will finance.
- Producing electricity from the sun and wind:
  - Electrification of rural sites using a solar PV system: 7.15 billion CFA, of which 1.8 million CFA will be financed by the state.
  - PCCI 01 solar plant (PV plant): 95 billion CFA to be privately funded.
  - Promotion of renewable energy for rural communities (promotion of renewable energy for decentralized electrification in view of the creation of activities that generate revenue in rural zones): 1.63 billion CFA, of which 400 million CFA is from the state.
  - Pilot public-lighting project by a PV system: 2 billion CFA from the state.
  - 6 MW wind project: 4 billion CFA, 1 billion CFA of which is from the state.
  - Cogeneration: 7.5 billion CFA, 2.1 billion CFA of which is from the state.
- Developing small hydroelectric plants:
  - Hydroelectric plant of Drou: 16 billion CFA, 600 million CFA of which is from the state.
  - 300 kW hydroelectric plant on the Agnéby river: 800 million CFA, 320 million CFA of which is from the state.
  - Hydroelectric planning of Aboisso-Bia: 8.6 billion CFA, to be financed by private parties.

Investment opportunities for the private sector

Côte d’Ivoire has an ambitious goal to reduce its greenhouse gas (GHG) emissions by 28 percent by 2030, including a target to generate 42 percent of electricity from renewable energy by 2030 (with a breakdown of 26 percent large hydro and the other 16 percent into “other”—solar biomass, small hydro, and wind). The country is focused on spurring economic growth and solidifying its role as an economic engine for West Africa. The government recognizes the important role of private sector investment in expanding renewable energy penetration. The main drivers of sustained growth are expected to be both public and private investments in infrastructure, opening up significant opportunities for the energy and electricity sectors.

Priority projects sponsored by the government during the Africa Investment Forum as of November 2018¹⁹

- Project #1: 255MW Solar PV station, USD 295 million [link for download]
- Project #2: 80MW Biomass station, USD 235 million [link for download]
- Project #3: 77MW Mini-hydro station, USD 262 million [link for download]
- Project #4: 45MW, Off-grid systems, USD 300 million [link for download]
- Project #5: 277km ‘Green corridor’ transport line, USD 91 million [link for download]
- Project #6: 1,500km distribution line, USD 985 million [link for download]
- Project #7: Storage unit and LNG regasification, USD 160 million [link for download]

Additional investments required to meet renewable energy targets

It is estimated that even if all these projects are built, there will still be a 13% shortfall in installed renewable energy capacity to meet the 2030 goals. To achieve its targets, Côte d’Ivoire will need to consider increasing the number of high-likelihood renewable energy projects in the pipeline. According to IFC analysis, the pipeline plan should be aligned with the targets to ensure consistency and communicate the government’s objectives to investors.

**Figure 6** Required investments to reach the 42% target of renewable energy by 2030

<table>
<thead>
<tr>
<th>Year</th>
<th>Hydro (dam)</th>
<th>Hydro (RoR)</th>
<th>Solar PV</th>
<th>Biomass</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td></td>
<td></td>
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<td>2020</td>
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<tr>
<td>2030</td>
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</tbody>
</table>

Source: Presentation made by the Minister of Energy of Côte d’Ivoire during the Africa Investment Forum in November 2018, with the support of the African Development Bank.

Sample sources of concessional funding

- A list of available sources are available here: [https://www.get-invest.eu/funding-database/?_search=1](https://www.get-invest.eu/funding-database/?_search=1)

¹⁹ Source: Presentation made by the Minister of Energy of Côte d’Ivoire during the Africa Investment Forum in November 2018, with the support of the African Development Bank.
- Seed Capital Assistance Facility (SCAF): [https://www.scaf-energy.org/](https://www.scaf-energy.org/)
- IRENA/ ADFD: [https://www.irena.org/ADFD/Project-Facility/Funding-Offer](https://www.irena.org/ADFD/Project-Facility/Funding-Offer)

### Contact information of local donor representations

<table>
<thead>
<tr>
<th>Organization</th>
<th>Information</th>
</tr>
</thead>
</table>
| **African Development Bank (AfDB)** | Immeuble du Centre de commerce International d'Abidjan CCIA Avenue Jean-Paul II 01 BP 1387 Abidjan 01  
Acting Vice President of the Energy complex : Mr. Wale SHONIBARE  
Tel: +225 2026 3900  
Web: [http://www.afdb.org/](http://www.afdb.org/) |
| **African Legal Support Facility (ALSF)** | Immeuble du Centre de commerce International d'Abidjan CCIA Avenue Jean-Paul II 01 BP 1387 Abidjan 01, Côte d'Ivoire  
Director and CEO : Mr. Stephen KARANGIZ  
Tel: +225 20 26 35 96  
Email: alsf@afdb.org  
Web: [http://www.aflsf.org/](http://www.aflsf.org/) |
| **ECREEE - Energy Center for Renewable Energy and Energy Efficiency** | 01 BP 2541 Abidjan 01  
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FOCAL PERSON: M. CISSE Sabati  
Director General of Energy  
ALTERNATE: M. N'GORAN Konan Norbert  
Engineer  
Nathalie Weisman (SE4ALL Coordinator)  
Email: nweisman@ecreee.org  
Tel: 0962 3632  
Web: [http://www.ecreee.org/](http://www.ecreee.org/) |
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Fax : (+225) 20 21 40 89  
Email: delegation-ivory-coast@eeas.europa.eu  
Head of delegation: Jean-Francoise Valette |
French Development Agency (AFD)

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01 BP 1814 Abidjan 01

Tel: 00 225 22 40 70 40
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Email: afdabidjan@afd.fr

Web: https://www.afd.fr/en/page-region-pays/cote-divoire

GIZ

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Web: http://www.giz.de

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Tel: (+225) 22 40 04 48
Fax: (+225) 22 44 44 83
Email: pagbemebia@ifc.org (Pelagie Agbemebia)
Web: https://www.ifc.org/

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Web: https://www.proparco.fr/fr

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Part 4: FAQ

About the market

1. **Who is responsible for creating energy policy?**
   - The **Ministry of Petroleum, Energy, and Renewable Energy** is the primary government institution responsible for creating energy-related policies.

2. **What laws, regulations, and plans/programs exist for clean energy?**
   - **(1985):** In 1985, Law-85-583-of-29-July-1985 established the legal framework for the electricity sector. The Law organized the production, transmission, and distribution of electricity up to March 2014. While the 1985 Law liberalized electricity production and promoted the installation of several IPPs, it did not include a clear provision to encourage investment in renewable energy. It also did not consider rural electrification and other aspects related to security and regulation. Furthermore, the law did not provide any punitive measures to address electricity fraud.
   - **(1990):** In 1990, decree 90-1390 established a public-private partnership with the private company **Ivorian Electricity Company** (CIE). As a result, CIE became the concessionaire for the national electricity public service and was charged with the production, transmission, import, export, and distribution of electricity. In 2005, the government renewed this concession for 15 years, to expire in 2020.
   - **(1985 – 2014):** Between 1985 and 2014, the following new laws and plans addressed renewable energy:
     - The **Strategic Action Plan for the Development of the Electricity Sector by 2030** (2011) aims to increase total installed capacity to 3,000 MW by 2020. This will be achieved through public-private partnership arrangements, with hydropower and solar as priority technologies. Renewable energy is planned to constitute 5 percent of the supply mix by 2015, 15 percent by 2020 and 20 percent by 2030. These have been superseded by a more ambitious renewable energy target to derive 42 percent of electricity from renewable energy by 2030 as part of the **Nationally Determined Contribution** (NDC) to the UNFCCC.
     - The **Program for Investment in Energy Access Services** (PNIASE) (adopted December 2012) outlines access to modern cooking energy and diesel energy. The components consist of five sectoral sub-programs: agriculture, education, energy, water and health.
     - The code liberalized electricity production and reduced monopoly, allowing private operators to enter different segments of the electricity sector, including transmission, distribution, commercialization, import, and export.
     - The code grants third-party access to grids and raises the possibility that eligible clients may choose their supplier. It also establishes general price-setting principles for the electricity sector.
     - Finally, the code promotes the development of new and renewable energy projects by introducing special fiscal and customs incentives for operators. The code also includes objectives to reduce electricity fraud and illegal activity, which was absent from the 1985 law.

3. **What is the structure of the sector? To what extent have generation, transmission and distribution activities been unbundled?**
   - Production activities were privatized in 1985 (Law-85-583-of-29-July-1985). **Electricity Code No. 2014-132** (2014) confirmed this liberalization, opening up transmission and distribution to private operators but not dispatching.
   - Liberalization will not be effective until the government’s contract with the private company **Ivorian Electricity Company** (CIE) expires in 2020, as **Electricity Code No. 2014-132** specifies that current agreements remain valid until they expire.
4. Who owns and operates the grid-connected generation, transmission and distribution assets?
   - Electricity Code No. 2014-132 (2014) liberalized generation, transmission, and distribution, keeping only the dispatching activity under state monopoly and providing third party access to the transmission grid:
     - The Energy Society of Côte d’Ivoire (CI-ENERGIES) owns the grid-connected generation, transmission, and distribution assets.
     - The Ivorian Electricity Company (CIE) is a private company that operates and maintains national distribution network and hydro generation plants under a 15-year renewable concession contract that began in 1990, was renewed in 2005, and is due to end in 2020, pending any new contractual arrangements.
     - Almost all thermal power generation is owned and operated by the private sector, representing 60 percent of Ivorian electricity production (55 percent natural gas and five percent oil) in terms of MW installed, and 82 percent of energy generation in terms of GWh. These independent power producers (IPPs) (CIPREL, Azito, and Aggreko) signed Power Purchasing Agreements (PPAs) with the Ministry of Petroleum, Energy, and Renewable Energy.
     - The remaining production is from seven state owned and Ivorian Electricity Company (CIE)-managed hydro stations (with a 27 percent capacity factor).

5. Are tariffs cost-reflective?
   - Electricity Tariffs (current rates can be found here) are not linked to inflation (2.1 percent in January 2019) and are not reflective of the real costs of energy, putting the long-term financial sustainability of the sector at risk.
   - The sales tariffs are established in such a way as to ensure the financial equilibrium of the electricity sector, making it possible, among other things, to cover the contractual revenues of the concessionaires in the sector’s business segments and the revenues required to ensure the financial equilibrium of the parastatal organizations created to carry out public service missions in the electricity sector.
   - Electricity sales tariffs are set and revised by an inter-ministerial decree of the Ministry of Petroleum, Energy, and Renewable Energy, and Ministry of Economy and Finance on the basis of tariff proposals submitted to the minister in charge of energy by the National Authority for Regulation of the Electricity Sector in Côte d’Ivoire (ANARE) after opinion of the inter-ministerial consultative commission.
   - The National Authority for Regulation of the Electricity Sector in Côte d’Ivoire (ANARE) is the entity responsible for ensuring that the need for affordable tariffs is balanced with the need for project promoters to profit from their investments. Current electricity tariff levels can be found here.

6. What is the status of the grid and is it capable of handling intermittent (renewable) energy resources?
   - Côte d’Ivoire’s energy mix is dominated by dispatchable (sources that can be dispatched according to market needs) generation sources (hydro and gas), so the grid is already capable of managing the addition of intermittent renewable energy sources.
   - The Energy Society of Côte d’Ivoire (CI-ENERGIES) is currently in the process of making physical updates and extending the grid to the transmission and distribution networks to improve its capacity to sustain injections from additional independent power producers (IPPs).
   - Historically, rehabilitation and reinforcement funding availability has been scarce, but there have been recent efforts to leverage existing funds over the past five years. Development partners including the World Bank, the European Union, the African Development Bank, the French Development Agency, China, and the West African Development Bank have committed $1.5 billion dollars to support the government’s efforts. The World Bank Electricity Transmission and Access Project has allocated $115.6 million to upgrade and reinforce priority transmission lines and $95.4 million to rehabilitate, reinforce, and extend distribution networks.

7. Who is responsible for planning and procuring additional capacity to meet demand?
   - The Energy Society of Côte d’Ivoire (CI-ENERGIES) is responsible for managing assets in the electricity sector and planning and contracting new investments.
   - CI-ENERGIES also provided support to the Ministry of Petroleum, Energy, and Renewable Energies in the development of the 2016 National Action Plan for Renewable Energy (PANER), which outlines plans for installed capacity and generation of renewable energy by 2030.
8. Who is responsible for supplying electricity to consumers?
   - The Ivorian Electricity Company (CIE), in application of the concession agreement established with the government of Côte d'Ivoire in 1990 (Decree No. 90-1389 of 25 October 1990) and renewed in 2005 (Decree No. 2005-520 of October 27, 2005) for 15 years, has exclusive rights to transmit and sell electricity to consumers.

9. Is there an independent regulator? Which activities are subject to economic regulation?
   - The National Authority for Regulation of the Electricity Sector in Côte d'Ivoire (ANARE) is the regulatory agency and provides advisory and stakeholder conflict resolution functions. Information on new and existing regulations is available on their website. Broadly, ANARE is charged with overseeing the compliance with the laws, regulations, and obligations under authorizations and conventions in the electricity sector. ANARE proposes electricity tariffs, as well as tariffs to access the national grid. ANARE ensures protection of consumers and their rights and arbitrates disputes between operators or between operators and the state. Finally, ANARE advises and assists the state in regulating the electricity sector. Electricity Code No. 2014-132 (2014) gives greater independence and authority to the body by specifically providing that it is an independent legal entity with financial autonomy.

10. Is net metering allowed in the country?
    - Net metering is currently not allowed but there is scope to introduce it moving forward.

11. Does the country belong to a regional power pool?
    - Côte d'Ivoire is positioned as one of the main hubs of electricity trading in the sub-region as part of the West African Power Pool (WAPP) transmission line with interconnections to Ghana, Burkina Faso, Mali, Liberia, Sierra Leone, Guinea, and beyond in existence or under construction.

12. Are there any interconnectors in place?
    - Yes. As part of the West African Power Pool (WAPP), Côte d'Ivoire is part of a transmission line with interconnections to Ghana, Burkina Faso, Mali, Liberia, Sierra Leone, and Guinea.
    - The current map and master plans are available here, on page 33.

About opportunities in the country

13. Is installed generating capacity adequate to meet existing demand?
    - Yes, according to the National Authority for Regulation of the Electricity Sector in Côte d'Ivoire (ANARE) 2017 Annual Report (pages 18 and 31), generated capacity has always exceeded average annual peak demand:
      - 2017 installed capacity = 2,172 MW
      - 2017 production = 9,948.2 GWh
      - 2017 consumption = 6,630.2 GWh

14. What is the current energy production mix?
    - The most recent energy mix data is available in the National Authority for Regulation of the Electricity Sector in Côte d'Ivoire (ANARE) 2017 Annual Report (page 24):
      - 2017 production: 9,948.2 GWh
        - Hydro: 2,047.2 GWh (20.6% of total)
        - Gas: 7,900.4 GWh (79.4% of total)

15. What is the projected demand?
    - According to the 2016 National Action Plan for Renewable Energy (PANER, page 9), power demand is expected to grow between 10 and 12 percent per year.
    - Two contributing factors in this expected increase are:
      - Export commitments to the West African Power Pool (WAPP), which will grow with completion of the 2019 Côte d'Ivoire-Liberia-Sierra Leone-Guinea transmission line.
      - The Electricity for All program, which was adopted in 2014, aims to annually connect 200,000 households to the electricity system, achieving a 60 percent access rate (1 million households) by 2020.
16. Is there a proposed new energy mix?
- Yes. The Strategic Action Plan for the Development of the Electricity Sector by 2030 (2011) aims to increase total installed capacity to 3,000 MW by 2020. This will be achieved through public-private partnership arrangements, with hydropower and solar as priority technologies.
- Additionally, Côte d’Ivoire’s Nationally Determined Contribution (NDC) to the UNFCCC aims to derive 42 percent of its electricity from renewable energy by 2030.
  o Total: 6,759 MW:
    ▪ Thermal energy: 3,948 MW (58 percent)
    ▪ Renewable energy: 2,811 MW (42 percent)
      • Hydro: 1,891 MW (67 percent)
      • Biomass: 500 MW (18 percent)
      • Solar: 420 MW (15 percent)
- In 2018, the government announced the agreement to construct two new combined-cycle thermal power plants with a total capacity of 643 MW that are expected to be completed in 2021:
  o Phase 4 of Azito with a 253 MW capacity for a cost of 225.8 billion CFA (344.2 million Euro). It will consist of a 179 MW gas turbine and a 74 MW steam turbine.
  o Phase 5 of CIPREL with a 390 MW capacity for a cost of 247.9 billion CFA (378 million Euro). It will consist of a 260 MW gas turbine and a 130 MW steam turbine.

17. Will the current pipeline of renewable energy projects be sufficient to achieve plans?
  o The 2016 National Action Plan for Renewable Energy (PANER), identifies a pipeline of renewable energy projects, which is sufficient to generate achieving the 42 percent electricity goal in terms of generation (GWh). However, this assumes high capacity factors when operational.
  o The Energy Society of Cote d’Ivoire (CI-ENERGIES) supported the development of this pipeline of new energy projects up to 2030, some of which are for renewable energy. According to 2018 analysis from the International Finance Corporation (IFC), even if all these projects are built, there will still be a 13 percent shortfall between the plan and the pipeline for renewable energy by 2030.
  o Installed capacity (2017) compared with planned installed capacity and identified pipeline capacity (2030):
    ▪ Hydro
      - 2017 Installed capacity: 879 MW
      - 2030 planned installed capacity: 1,891 MW
      - 2030 identified pipeline capacity: 1,891 MW
    ▪ Gas
      - 2017 Installed capacity: 1,320 MW
      - 2030 planned installed capacity: 2,548 MW
      - 2030 identified pipeline capacity: 2,728 MW
    ▪ Coal
      - 2030 planned installed capacity: 1,400 MW
      - 2030 identified pipeline capacity: 1,400 MW
    ▪ Solar
      - 2017 Installed capacity: 0 MW
      - 2030 planned installed capacity: 420 MW
      - 2030 identified pipeline capacity: 320 MW
    ▪ Biomass
      - 2017 Installed capacity: 0 MW
      - 2030 planned installed capacity: 500 MW
      - 2030 identified pipeline capacity: 236 MW
18. What is the investment potential associated with meeting Côte d'Ivoire’s renewable energy goals?
   o Based on the pipeline included in the 2016 National Action Plan for Renewable Energy (PANER), for each source of energy, the International Finance Corporation (IFC) estimates that delivering on renewable energy plans could create an investment opportunity of over $4.7 billion.

19. What short and long-term opportunities for investment exist?
   o Based on the pipeline included in the 2016 National Action Plan for Renewable Energy (PANER), solar PV represents most of the investment potential leading up to 2020. Plans for new hydro projects will cause the investment potential to drastically increase between 2021 and 2030, with biomass representing a larger portion between 2028 and 2029.

20. What financing options exist for developing renewable energy projects?
   o Côte d’Ivoire is making considerable progress in developing and supporting financial and political infrastructure for renewable energy technologies. The Ministry of Petroleum, Energy and Renewable Energy expects to publish a draft strategy in the near future, and CI-ENERGIES has established a project pipeline categorized by technology, available in the 2016 National Action Plan for Renewable Energy (PANER), which can inform potential investors.
   o International organizations contribute to financing opportunities as well, for example:
     - **EU Energos 2**: Provides guarantee funds under its external investment plan and is developing a multi-building audit as part of its project on energy saving in public buildings, with additional funding from the French Development Agency.
     - **GIZ**: is conducting a feasibility study for a three-year project, due to start at the end of 2018, with €5 million in technical assistance.
     - **KfW**: is considering a guarantee mechanism for renewable energy as part of the G20’s Compact with Africa, which aims to promote private investment in Africa, in collaboration with other development partners (the African Development Bank and the European Investment Bank).
     - **IFC**: has a Global Toolbox showing instruments available from multilateral development banks to support private investment in Africa, including a number of funds supporting clean energy such as the AfDB’s Sustainable Energy Fund for Africa and the European Investment Bank’s Global Energy Efficiency and Renewable Energy Fund.
     - The EU Energy Initiative Partnership Dialogue Facility and Africa-EU Energy Partnership have produced the report Mapping of Energy Initiatives and Programs in Africa (report and high-level initiatives).
     - **Power Africa**: Power Africa’s Project Preparation Facilities Toolbox, Understanding Power Project Financing handbook
     - **IRENA**: Sustainable Energy Marketplace
     - **NDC Partnership Funding and Initiatives Navigator**
     - The Centre for Renewable Energy and Energy Efficiency (ECREEE) has developed an Investment Prospectus for investors
     - **Sustainable Energy for All** completed a rapid assessment gap analysis for Côte d’Ivoire in 2012
     - Details on existing investment incentives and the electricity code and eight associated decrees (and ordinances) are available from the Investment Promotion Centre in Côte d’Ivoire (CEPICI) and ANARÉ websites.

21. What is the tender process, and where are they announced?
   o Tenders are posted on the Ministry of Petroleum, Energy, and Renewable Energy website (through the Renewable Energy and Energy Control Directorate and Energy Monitoring and Regulatory Directorate) and on the National Steering Committee for Public Private Partnerships (CNP-PPP) website.
   o CI-ENERGIES can also issue tenders, available here.
   o Note: The grid requires rehabilitation before effectively sustaining injections from independent power producers. For this reason, the government prefers to launch tenders by identifying specific sites that account for current grid status.
   o Recent tenders:
In August 2016, the biomass sector saw tenders issued for a **20 MW cocoa biomass plant** and a **25 MW cotton plant**. There is a strong potential to harness lessons learned from this experience to apply to other renewable technologies (specifically, clarifying and simplifying necessary procedures and requirements to improve competitiveness for potential investors).

In 2018, the VITIB launched a tender for a 25 MW power plant at a site located on the island of Vitré, about fifty kilometers from Abidjan. VITIB is a public company set up by the government to operate the Grand Bassam free zone. The 25 MW plant was to occupy part of a 300 hectares (ha) site belonging to the VITIB, and all the operating permits had to be issued by the VITIB as is done for all the industries and companies installed on the site. The process was suspended without further explanation.

**About private sector participation**

22. **What are the incentives for foreign and private investment?**
   - There are no additional incentives that separate domestic versus foreign and private investment. *Electricity Code No. 2014-132 (2014)* makes no distinction between the origins of the investments, however, for national interest considerations, specific financial, fiscal and customs benefits may be granted to operators in the electricity sector (*Article 52 of Law no. 2014-132 of 24 March 2014*).

23. **Can a foreign registered company submit an Expression of Interest to develop a renewable energy project?**
   - Yes. All companies, regardless of their location, can submit an expression of interest to the Energy Society of Cote d’Ivoire (CI-ENERGIES) or the Ministry of Petroleum, Energy, and Renewable Energies.
   - Tenders are posted on the Ministry of Petroleum, Energy, and Renewable Energy website (through the Renewable Energy and Energy Control Directorate and Energy Monitoring and Regulatory Directorate) and on the National Steering Committee for Public Private Partnerships (CNP-PPP) website.
   - CI-ENERGIES can also issue tenders, available here.
   - Note: The grid requires rehabilitation before effectively sustaining injections from independent power producers. For this reason, the government prefers to launch tenders by identifying specific sites that account for current grid status.
Part 5: Resource center

Côte d’Ivoire Energy Statistics [link for download]

Côte d’Ivoire Energy Infographics [link for download]

Key links
List of government projects (Including energy sector projects): http://www.ppp.gouv.ci/projets/categorie/154
Information on IPPs: http://anare.ci/index.php?id=23
Information on the Public Electricity Service concessionaire: http://anare.ci/index.php?id=22,
Investments code: http://www.cepici.gouv.ci/?tmp=code_investissements&p=code_investissements

Institutional documents
- Plan d’action national des énergies renouvelables 2016-2020-2030, Avril 2016 [link for download]
- Plan d’action national pour l’efficacité énergétique 2016-2020-2030, Avril 2016 [link for download]
- CI ENERGIES rapport d’activité 2018 [link for download]
- ANARE rapport d’activité 2016 [link for download]
- ANARE rapport d’activité 2017 [link for download]
- WAPP Presentation Master Plan 2019-2033, February 2019 [link for download]
- Etude nationale prospective Côte d’Ivoire 2040, Document de synthèse, Ministère du Plan, Janvier 2016 [link for download]
- Etude nationale prospective Côte d’Ivoire 2040, Rapport final, Ministère du Plan, Janvier 2016 [link for download]
- Défis et enjeux du secteur de l’énergie en Côte d’Ivoire, Mesures d’urgence et plans à moyen et long-terms, Séminaire Gouvernemental, Novembre 2012 [link for download]

African Development Bank Publications
Africa Investment Forum:
- Présentation Côte d’Ivoire par le Ministre de l’Energie M. Thierry TANOH version longue, Novembre 2018 [link for download]
- Presentation of Cote d’Ivoire deals by the Minister of Energy Mr. Thierry TANOH, short version, November 2018 [link for download]

Africa Energy Market Place
- Plan d’action, Juillet 2018 [link for download]
- Diagnostic Pays, Juillet 2018 [link for download]

Economic and Sector Work
- PPP Country Profile for Côte d’Ivoire, African Legal Support Facility, November 2017 [link for download]

World Bank Group Publications
- La Côte d’Ivoire face au changement climatique, Banque Mondiale, Juillet 2018 [link for download]
- Débloquer les investissements privés, Une feuille de route pour atteindre l’objectif de 42 pour cent d’énergies renouvelables d’ici 2030, IFC, Juillet 2018 [link for download]
- Unlocking private investments, A roadmap to achieve Côte d’Ivoire’s 42 percent renewable energy target by 2030, IFC, July 2018 [link for download]

Others
- ECREE Prospectus d’Investissement, Etat des lieux et perspectives, Octobre 2016 [link for download]
- Prospectus d’Investissement SE4ALL Côte d’Ivoire, Juin 2017 [link for download]
- Africa CEO Forum, Projets prioritaires du secteur de l’énergie en Côte d’Ivoire, Mars 2016 [link for download]