



# 2017 Energy Sector

## Private Participation in Infrastructure (PPI)

## Acknowledgement & Disclaimer

This report was written by a team comprising Deblina Saha (Task Team Leader), Akhilesh Modi and Teshura Nair, with copy editing by Luba Vangelova and design by Victoria Adams-Kotsch. The team is very grateful for the support and guidance received from Jordan Schwartz (Director, IPG Group), Abha Joshi-Ghani (Senior Adviser, IPG Group) and Towfiqqa Hoque (Head of Infrastructure Finance and PPPs, Singapore). The team is thankful to Darwin Marcelo (Senior Infrastructure Economist, IPG Group) and Takafumi Kadono (Senior Energy Specialist, Transport & Digital Development) for providing valuable comments which helped shape the report.

This report describes Private Participation in Infrastructure (PPI) as indicated in the [Private Participation in Infrastructure Database](#). The database records investment information for infrastructure projects in low- and middle-income countries globally.

The PPI Database represents the best efforts of a research team to compile publicly available information, and should not be seen as a fully comprehensive resource. Some projects—particularly those involving local and small-scale operators—tend to be omitted because they are usually not reported by major news sources, databases, government websites, and other sources used by the PPI Projects database staff.

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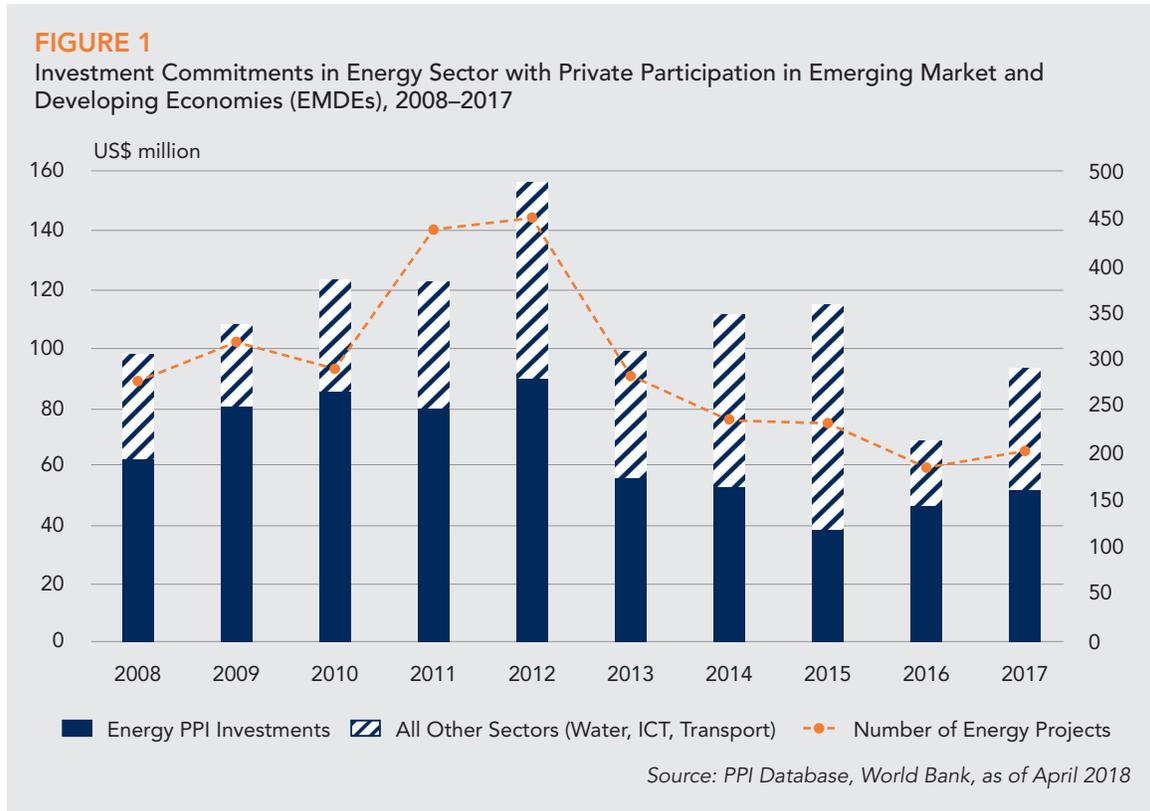




## 2017 Energy Highlights

- **PPI investment in energy in 2017 marked a 11-percent increase over 2016 levels.** In 2017, investments in energy stood at US\$51.9 billion across 203 projects, compared to US\$46.8 billion across 183 projects in 2016.
- **Energy investments dominated total PPI investments, accounting for more than half of the totals across all four main infrastructure sectors**—energy, water, transport and information and communication technologies (ICT). Although the energy sector continued to be the predominant sector attracting private investments, due to an increase in investments in other sectors, investments in energy projects accounted for 56 percent of all PPI investments in 2017, compared to 69 percent in 2016. In terms of number of projects, two-thirds (67 percent) of all PPI investments in 2017 were in the energy sector, indicating larger numbers of smaller projects than in the past.
- **Investments in renewable energy continued to increase in 2017, but the share of renewables in electricity-generation projects dropped,** due to coal megaprojects in Indonesia. Of the 197 electricity-generation projects in 2017, 173 projects (88 percent) were renewable-energy projects. However, the share of renewable-energy investment in 2017 dropped to 57 percent, from the previous five-year average of 64 percent. This was due to four Indonesian coal projects worth US\$7.7 billion, which reached financial close in 2017. Additionally, nearly 70 percent of large-scale projects (with capacity greater than 500 megawatts) still use conventional power sources.
- **East Asia and Pacific (EAP) attracted the most private-sector investment in energy, though unlike other regions, most of this was for conventional energy.** EAP accounted for 38 percent of the total sectoral investment, but 61 percent of the total sectoral investment in EAP was accounted for by conventional-energy projects, particularly six multibillion-dollar coal projects in Indonesia, Vietnam and the Philippines.
- **Government policies were clearly targeted to stimulate investments in the renewables as almost all government support went to renewable energy projects.** Almost two-fifths of the energy projects received some form of government support, and except for one coal project, all the other energy projects that received government support were renewable-energy projects (see Section 3).
- **Development finance institution (DFI) financing for renewable-energy projects increased four-fold in 2017.** Fifty-six renewable-energy projects received multilateral support in 2017, compared to 14 renewable-energy projects in 2016. Similarly, bilateral support was extended to 45 renewable energy projects in 2017, compared to only 18 in 2016.

# 1. Overview



In 2017, PPI investments in energy stood at US\$51.9 billion across 203 projects (compared to US\$46.8 billion across 183 projects in 2016), and accounted for more than half (56 percent) of the PPI investments across all four infrastructure sectors included in the PPI database—energy, water, transport and ICT.

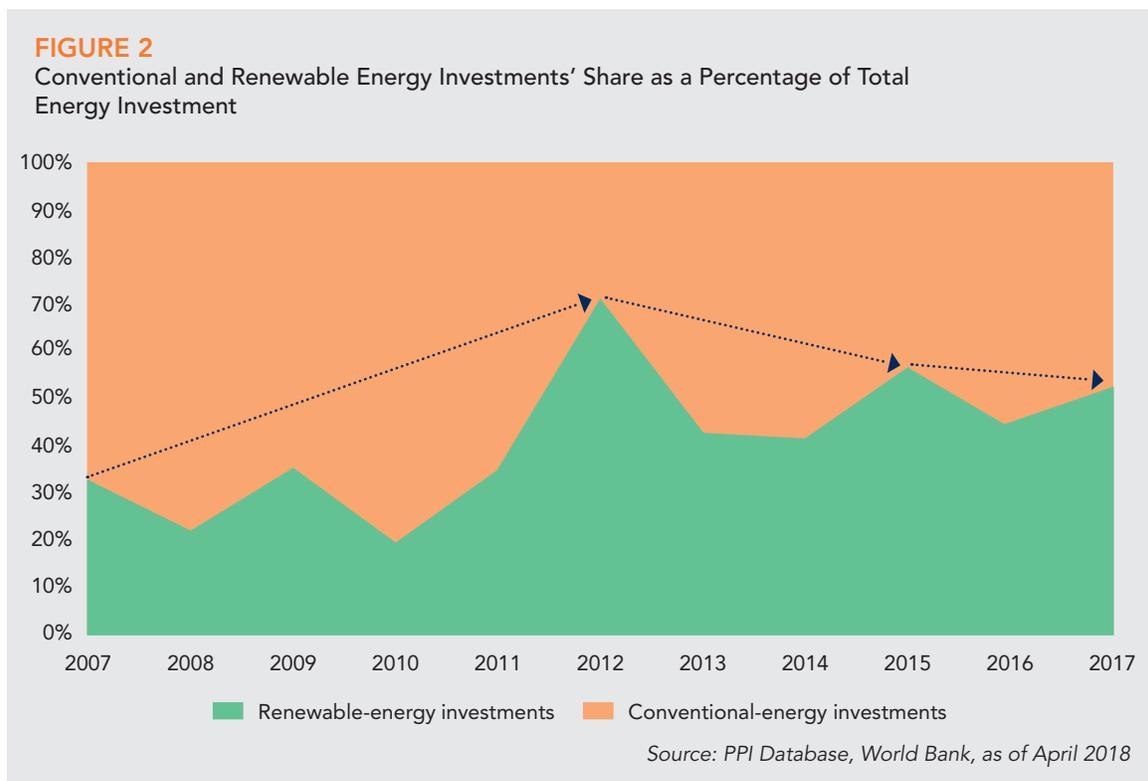
Of these four, the energy sector has attracted the most private-sector participation. By dollar value, from 2008 to 2017, cumulative investments in the energy sector (conventional and renewable energy) accounted for approximately 59 percent of total PPI investments. Although the energy sector continued to be the predominant sector attracting private investments in 2017, because of increased investment in other sectors, the share of energy-sector investments decreased from 69 percent of all PPI investments in 2016 to 56 percent in 2017.

Energy investments reached their peak in 2012, as private investors shrugged off the effects of the global financial crisis and pumped US\$89.6 billion into the sector. However, by 2015, private-sector investments in energy reached their lowest levels, at US\$38.5 billion, a trend largely accelerated by a steep drop in oil prices in 2014 and a subsequent decrease of investment in the conventional-energy sector.<sup>1</sup> From 2015 to 2017, investments picked up gradually, with increasing investments in renewables.

<sup>1</sup> McKinsey & Company. (2018). Lower oil prices but more renewables: What's going on? [online] Available at: <https://www.mckinsey.com/industries/oil-and-gas/our-insights/lower-oil-prices-but-more-renewables-whats-going-on> [Accessed 11 Jun. 2018].

In terms of the number of projects, two-thirds of all projects (203 out of 304) in 2017 were in the energy sector. Interestingly, the number of energy projects as a percentage of all PPI projects fluctuated very little after 2014. On average, from 2008 to 2017, the PPI energy projects accounted for 69 percent of all PPI projects.

## 2. Renewable vs. Conventional Energy Projects



Total renewable-energy PPI investments shot up by 29 percent, from US\$ 21 billion in 2016 to more than US\$ 27 billion in 2017. The share of PPI investments in renewable energy in 2017 was the third highest of the previous 10 years, behind 2012 (when the figure stood at 72 percent) and 2015.

At the same time, since 2015, conventional-energy projects have seen an upward trajectory in investments, with 78-percent growth, from US\$11.5 billion in 2015 to US\$20.7 billion in 2017. The increase since 2016 (when investments were US\$15.0 billion) stands at 38 percent. Despite this trend, conventional-energy projects still attracted less investment than renewables. Conventional projects have a long gestation period and are larger in size than solar and wind-energy projects. Because more renewable-energy projects can be undertaken by smaller private investors, the share of renewable-energy

projects is greater and keeps rising. Consequently, 2017 was a year of higher investment commitments, particularly in solar and wind-energy projects.

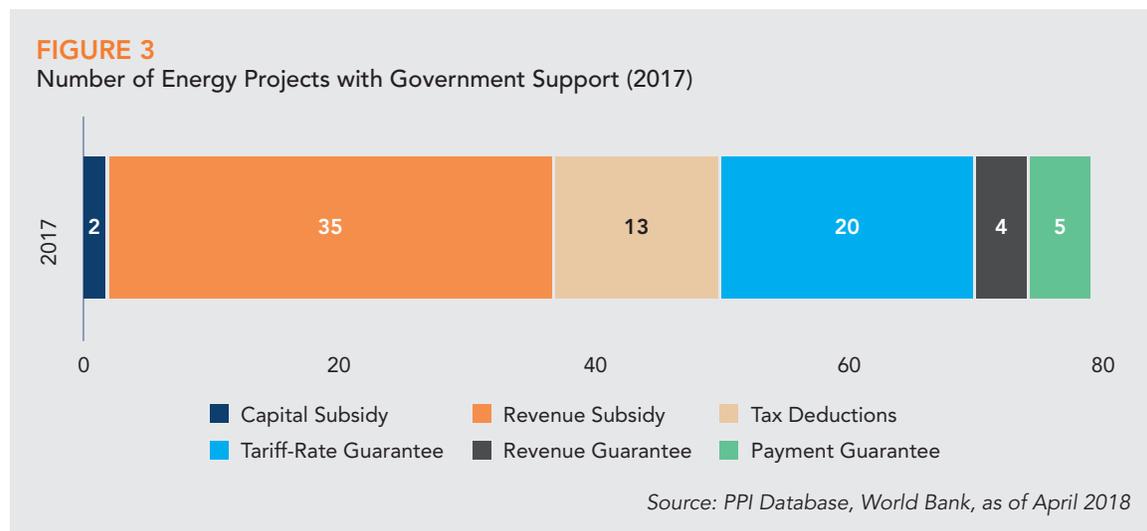
In 2017, the share of renewables in terms of number of projects and total generation capacity (installed megawatts), was similar to the respective averages for these over the previous five years (88 percent and 55 percent, respectively). However, the share of renewable energy, in terms of investment volume, fell to 57 percent in 2017, from an average of 64 percent over the previous five years. This was largely due to four Indonesian coal thermal-power projects, worth a total of US\$7.7 billion, which reached financial closure in 2017. In contrast, almost all the electricity-generation projects in Egypt, China and Brazil adopted renewable technology, largely as a result of direct and indirect government support.

Nearly 70 percent of large-scale electricity-generation projects (i.e., those with capacity greater than 500 megawatts) still use conventional sources of power, such as coal or natural gas.

### 3. Government Support

Government support falls into two categories—direct and indirect. Direct government support includes government liabilities that are certain to occur, because they directly cover project costs, either in cash or in kind. Indirect government support is provided either through contingent liabilities or through government policies that support investment.

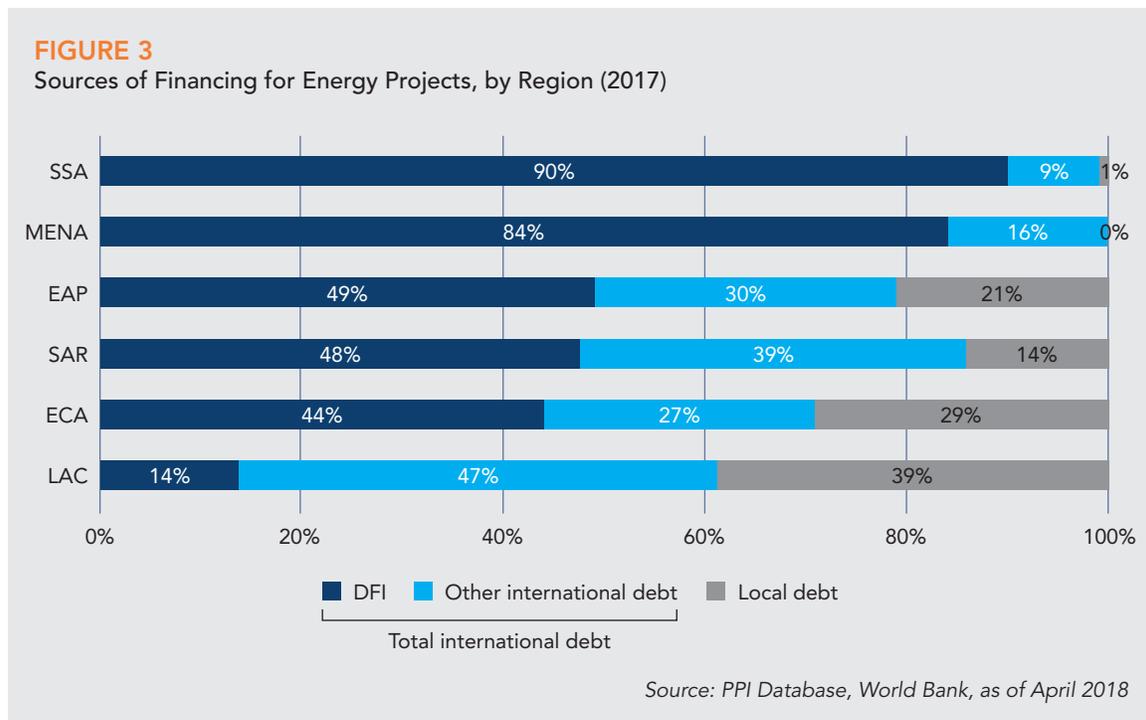
Information about government support was available for 79 of the 203 energy projects that received private investments. Thirty-seven projects received direct government support in the form of subsidies, while the remaining 42 projects received indirect government support in the form of guarantees and tax deductions (Figure 3). Only one project benefitted from both kinds of subsidies. It is remarkable that, except for one coal project, all other energy projects that received government support were renewable-energy projects.



## 4. DFI Support

Multilaterals and bilaterals increased their support to renewable-energy projects, indicating a willingness of DFIs to focus on financing clean-energy projects. Fifty-six renewable-energy projects received multilateral support in 2017, compared to 14 in 2016, marking a four-fold increase. Similarly, bilateral support was extended to 45 renewable-energy projects in 2017, compared to only 18 in 2016.

DFI support continued to play a prominent role in financing energy projects in Sub-Saharan Africa (SSA) and the Middle East and North Africa (MENA) in 2017 (Figure 4). Most regions raised debt internationally for their energy projects, with the exception of Latin America and Caribbean (LAC), where 39 percent of debt was from local lenders.



## 5. Global, Regional and Country-Level Investments

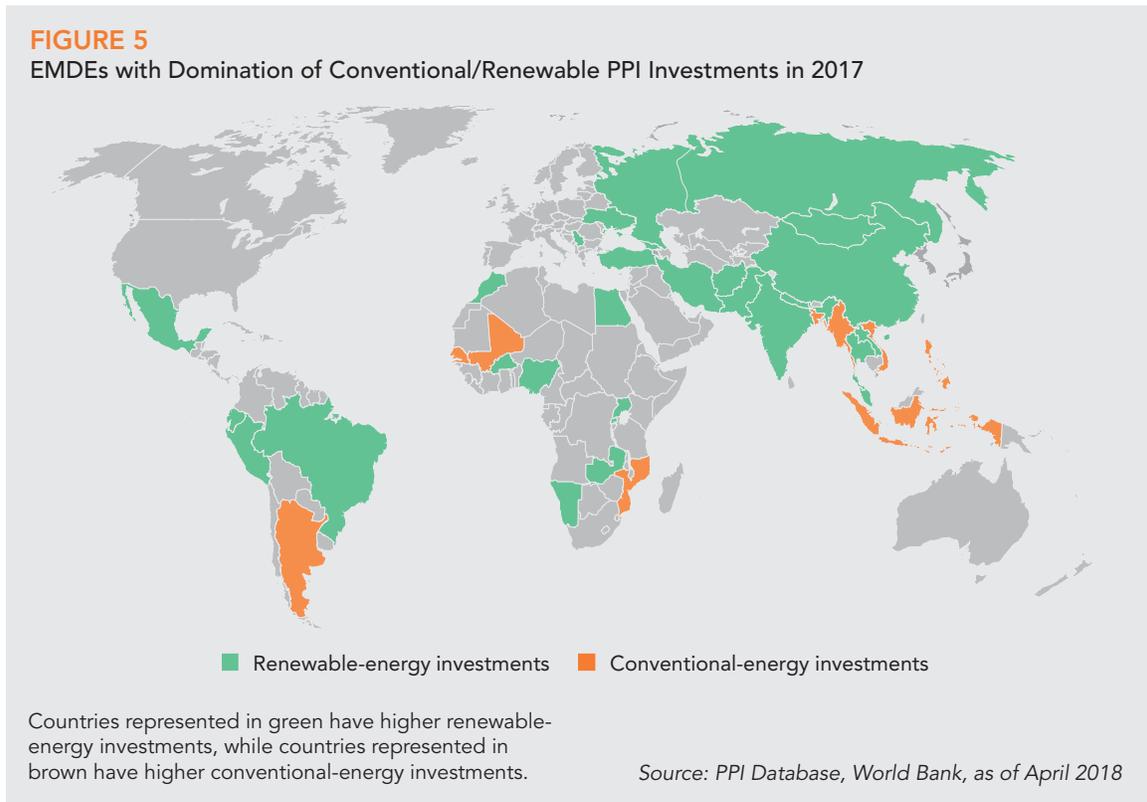
**TABLE 1: NUMBER OF PROJECTS AND AMOUNT INVESTED IN ELECTRICITY-GENERATION PROJECTS BY REGION, 2017**

Region	Renewables		Non-Renewables	
	Number of Projects	Amount Invested (US\$ million)	Number of Projects	Amount Invested (US\$ million)
LAC	41	8,483	8	3,582
EAP	51	7,806	7	12,292
ECA	13	1,534	0	0
SAR	26	5,365	3	2,378
MENA	31	3,294	1	2,109
SSA	11	717	5	497

Source: PPI Database, World Bank, as of April 2018

EAP received the highest investment commitment in energy projects among the six regions, accounting for 42 percent of the total, followed by LAC, which accounted for 25 percent. Most of the countries that attracted private-sector investment in 2017 focused on renewable-energy projects (Figure 5), with the exception of a few major countries such as Argentina, Indonesia, the Philippines and Vietnam, which continued to draw more investments in conventional-energy projects. However, these countries are in the minority—73 percent of the countries studied have initiated targeted efforts to improve renewable-energy generation. These include critical global economies such as Brazil, China, India, Mexico and Russia.

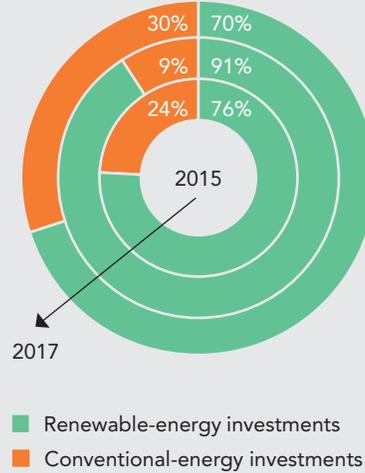
**FIGURE 5**  
EMDEs with Domination of Conventional/Renewable PPI Investments in 2017



## 5.1 LATIN AMERICA AND CARIBBEAN

In 2017, LAC received cumulative PPI energy investments of US\$15.9 billion of which US\$12.1 billion were directed to electricity generation projects and the remaining US\$3.8 billion were invested in transmission and distribution projects. The US\$3.8 billion were split among four electricity and natural gas distribution and transmission projects in Brazil and Mexico. All four projects obtained private investments of more than US\$500 million each including a US\$1.8 billion electricity transmission project in Brazil. The share of renewable-energy dropped to 70 percent, from 91 percent in 2016 (Figure 6), largely on account of several natural-gas projects in Mexico, Argentina and Jamaica. Not only did Mexico have a significant amount of conventional-energy investments, it also accounted for 44 percent of total PPI renewable-energy investments in the LAC region in 2017. Brazil was not far behind, garnering US\$3.3 billion worth of PPI investments in renewable-energy projects in 2017.

**FIGURE 6**  
Overview of Energy Investments in LAC

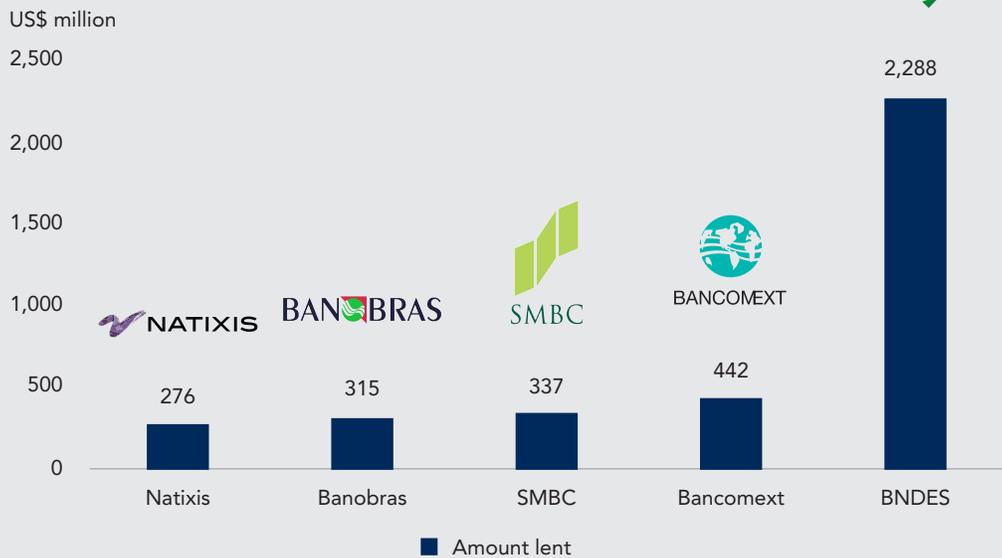


Countries represented in green have higher renewable-energy investments in 2017, while countries represented in brown have higher conventional-energy investments. Inner-most circle of the graph on the right represents renewable/conventional energy share in 2015 and so forth.

Source: PPI Database, World Bank, as of April 2018

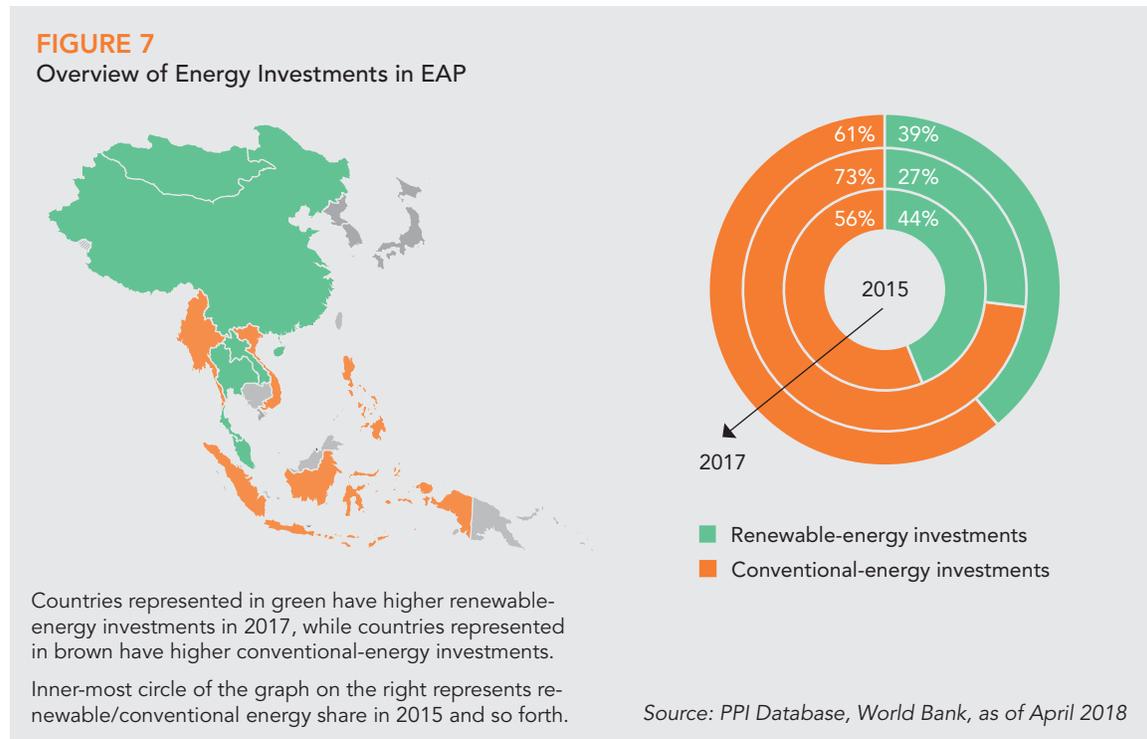
Although LAC saw quite a few lenders extending credit facilities to energy projects, the top five lenders accounted for almost US\$3.7 billion (Figure 7). It is interesting to note that two of the region’s largest lenders were non-LAC-based lending institutions—SMBC (Japan) and Natixis (France).

**FIGURE 7**  
Top Lenders in the LAC Region and Amounts Funded (2017)



Source: PPI Database, World Bank, as of April 2018

## 5.2 EAST ASIA AND PACIFIC



Although in most parts of the world, investment in renewable-energy projects has been dominating, EAP attracted more significant investments in conventional-energy projects (Figure 8). On the brighter side, the renewable-energy PPI investment in EAP in 2017 (US\$7.8 billion) marked a twofold increase over the level in 2016.

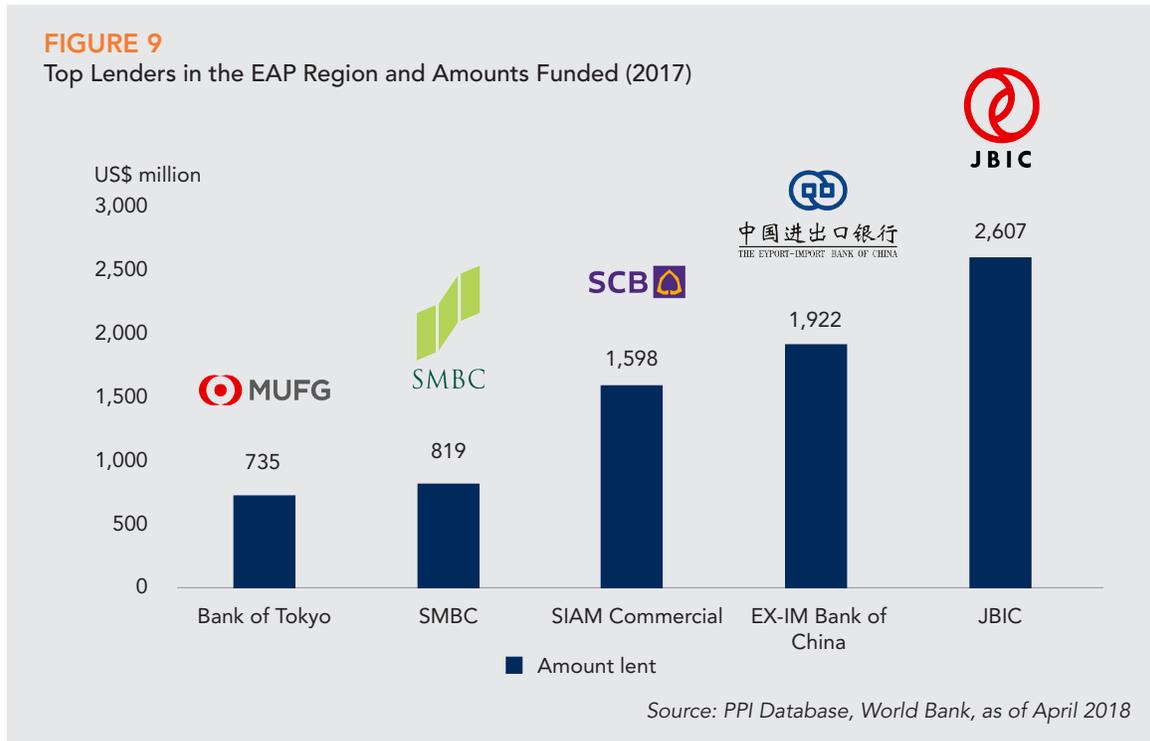
Indonesia accounted for 64 percent of all conventional-energy PPI investments in the region in 2017, followed by Vietnam and the Philippines. On the other hand, none of the countries receiving renewable-energy PPI investments (except Indonesia) attracted any private-sector participation in conventional-energy projects.

China invested US\$3 billion in renewable-energy projects, in adherence to its 13th five-year plan on energy development, which was released in January 2017. The country is targeting a capacity of more than 210 gigawatts of wind energy and 110 gigawatts of solar energy by 2020, while reducing coal's share in the energy mix from 62 percent to 58 percent.<sup>2</sup>

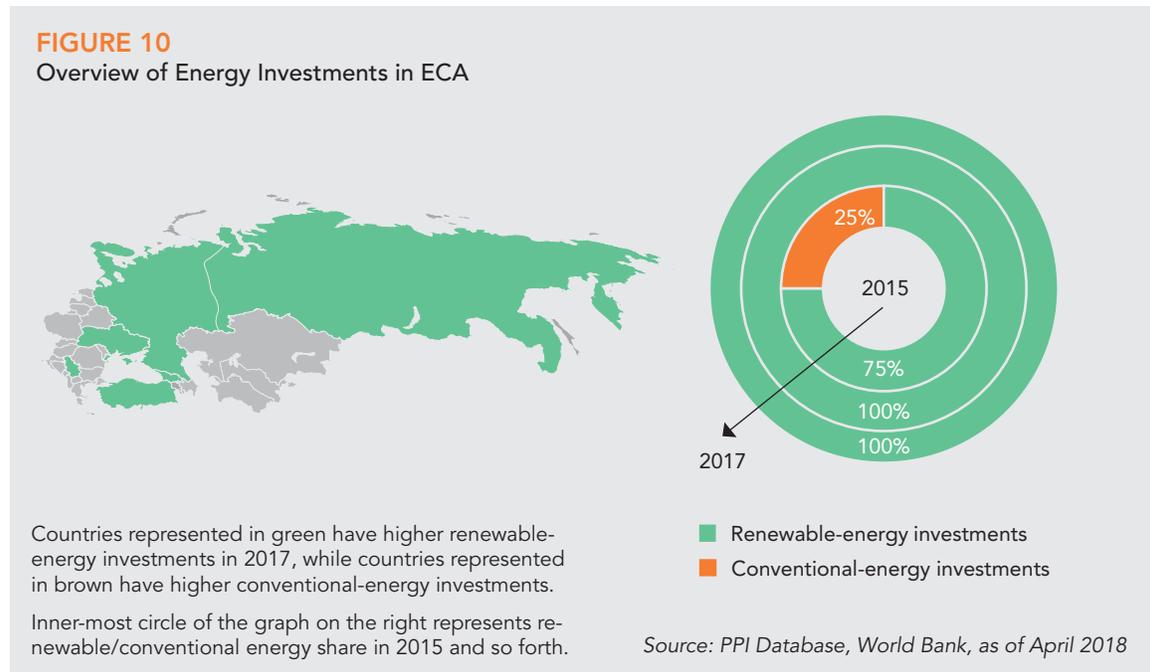
Looking at other countries, Laos (US\$1.9 billion) and Thailand (US\$1.3 billion) were among the largest recipients of renewable-energy investment in the region, while Malaysia and Mongolia received the lowest investments (US\$362 million and US\$120 million, respectively).

<sup>2</sup> Tianjie, M. 2018. "China's Ambitious New Clean Energy Targets." *The Diplomat*. <https://thediplomat.com/2017/01/chinas-ambitious-new-clean-energy-targets/> [Accessed June 12, 2018].

The EAP region received the highest amount of financing among all six regions. All lenders were located in the EAP region itself. Three of the five largest lenders were Japanese companies, which cumulatively financed almost US\$4.2 billion of the total US\$7.7 billion.

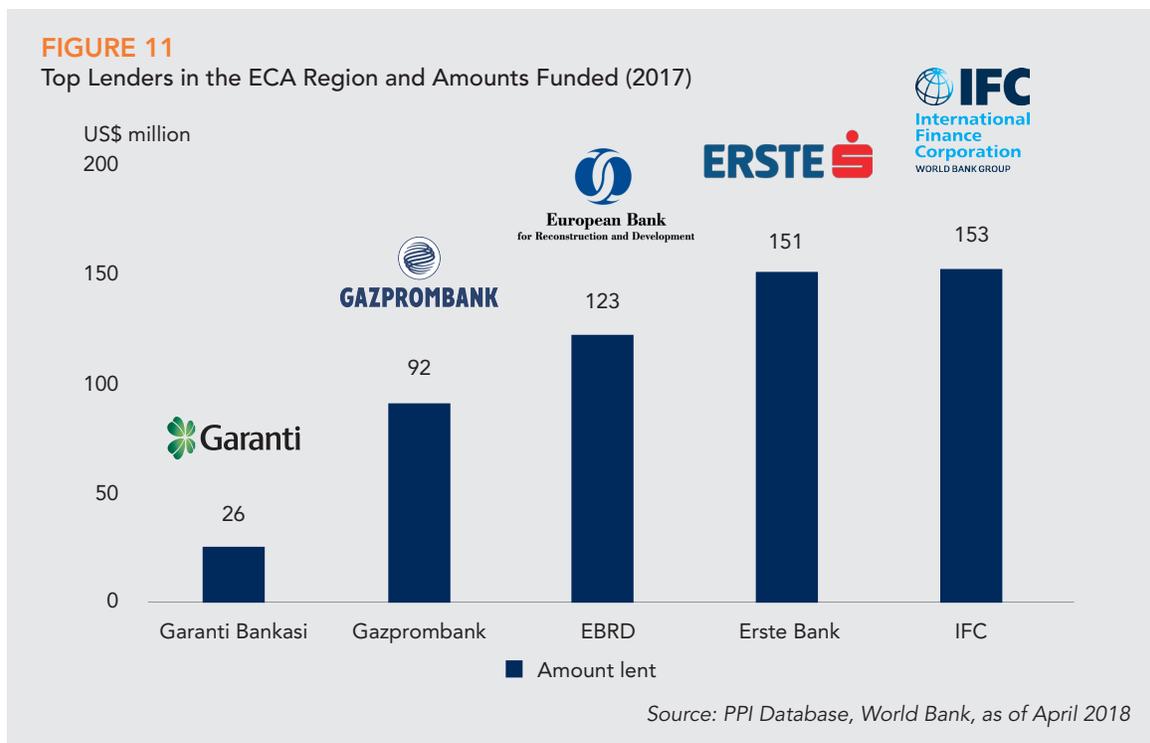


### 5.3 EUROPE AND CENTRAL ASIA

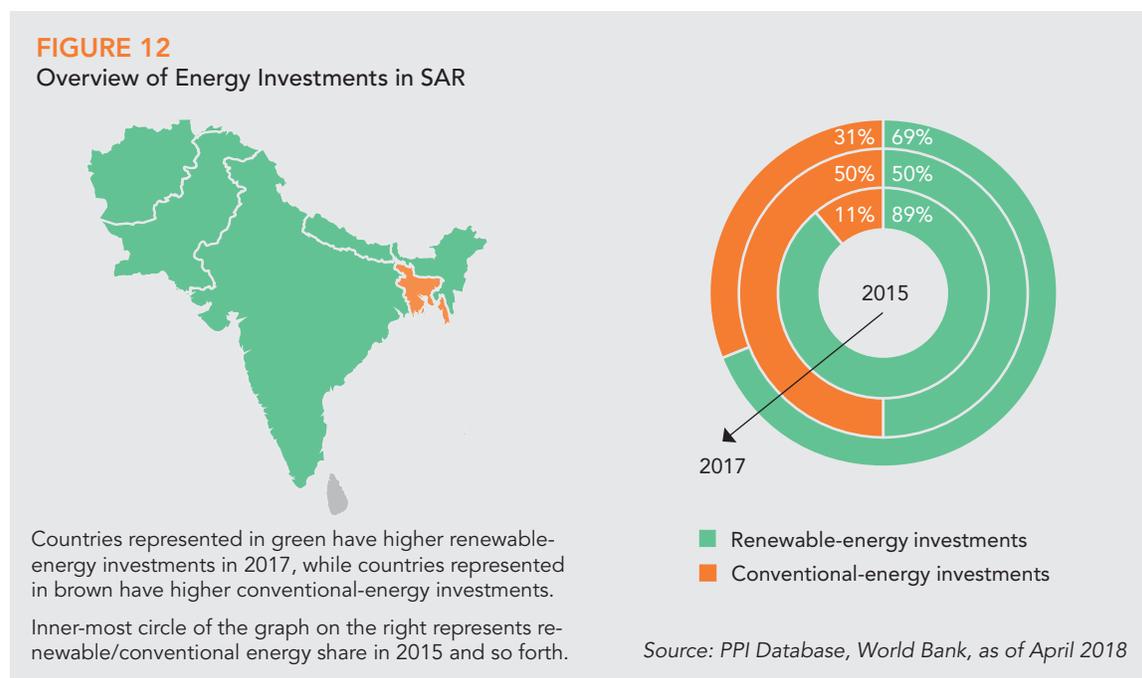


Europe and Central Asia (ECA) received the second-lowest PPI investment commitment in energy among the six regions. Total PPI investment in 2017 in ECA stood at US\$1.6 billion, with 95 percent of it going to electricity-generation projects of which all are renewables (Figure 10). Of the total amount invested, US\$818 million (53 percent) was in Serbia. Turkey received more than US\$460 million worth of investments, followed by Russia, with US\$161 million. Georgia and Ukraine were the other two countries that received less than US\$70 million in investments.

Similar to other regions, there was a heavy reliance on international debt, which stood at two-thirds of the total debt in the region. Of the top five lenders, three were from the ECA region; the International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD) were the international financiers (Figure 11).



## 5.4 SOUTH ASIA

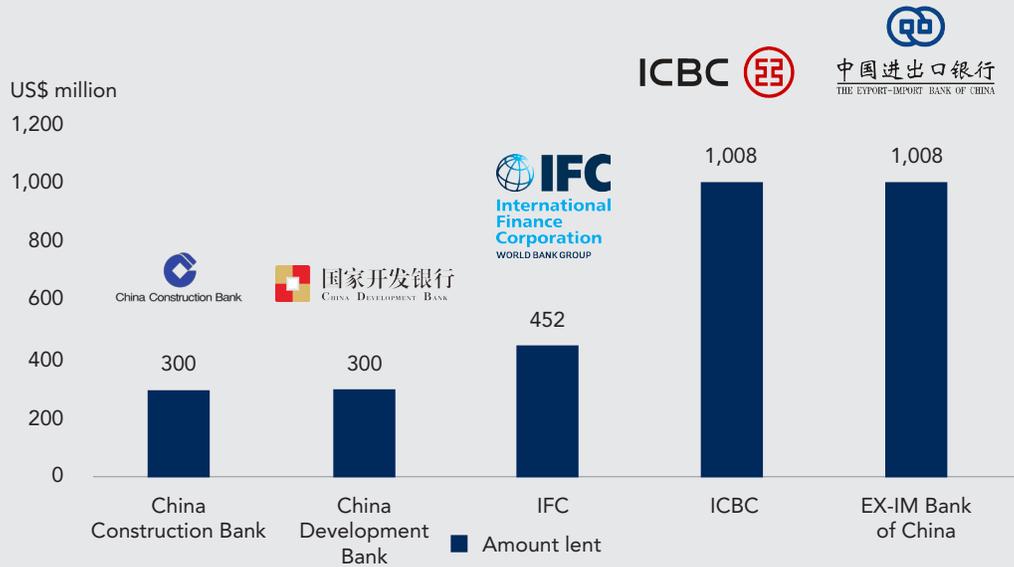


The South Asia Region (SAR) saw cumulative investments worth US\$7.7 billion in energy in 2017, of which US\$5.4 billion was in renewable energy sources accounting for almost 70 percent of the investment as compared to 50 percent in 2016.

Renewable energy projects dominated in almost all countries, barring Bangladesh which received US\$438 million worth of investments or 18 percent of all energy investments in conventional-energy projects. Surprisingly, Pakistan was the largest recipient of PPI investments in both conventional and renewable energy, leaving the heavyweight in the region (India) behind. Investments in renewable-energy projects in Pakistan were twice the size of conventional-energy projects (US\$3.9 billion vs. US\$1.9 billion).

Among the largest financiers in the region, Chinese financial institutions provided the most in loans. Four of the largest lenders were China-based banks, and the IFC was the only international financial institution active in the region (Figure 12). It is noteworthy that none of the banks based in SAR were among the top financiers. Most of the loans from China-based institutions were provided to Pakistan under the CPEC framework (China-Pakistan Economic Corridor).

**FIGURE 13**  
Top Lenders in the SAR Region and Amounts Funded (2017)



Source: PPI Database, World Bank, as of April 2018

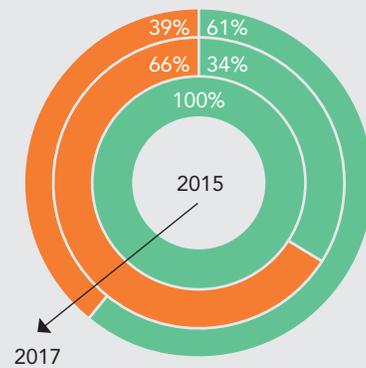
## 5.5 MIDDLE EAST AND NORTH AFRICA

**FIGURE 14**  
Overview of Energy Investments in MENA



Countries represented in green have higher renewable-energy investments in 2017, while countries represented in brown have higher conventional-energy investments.

Inner-most circle of the graph on the right represents renewable/conventional energy share in 2015 and so forth.

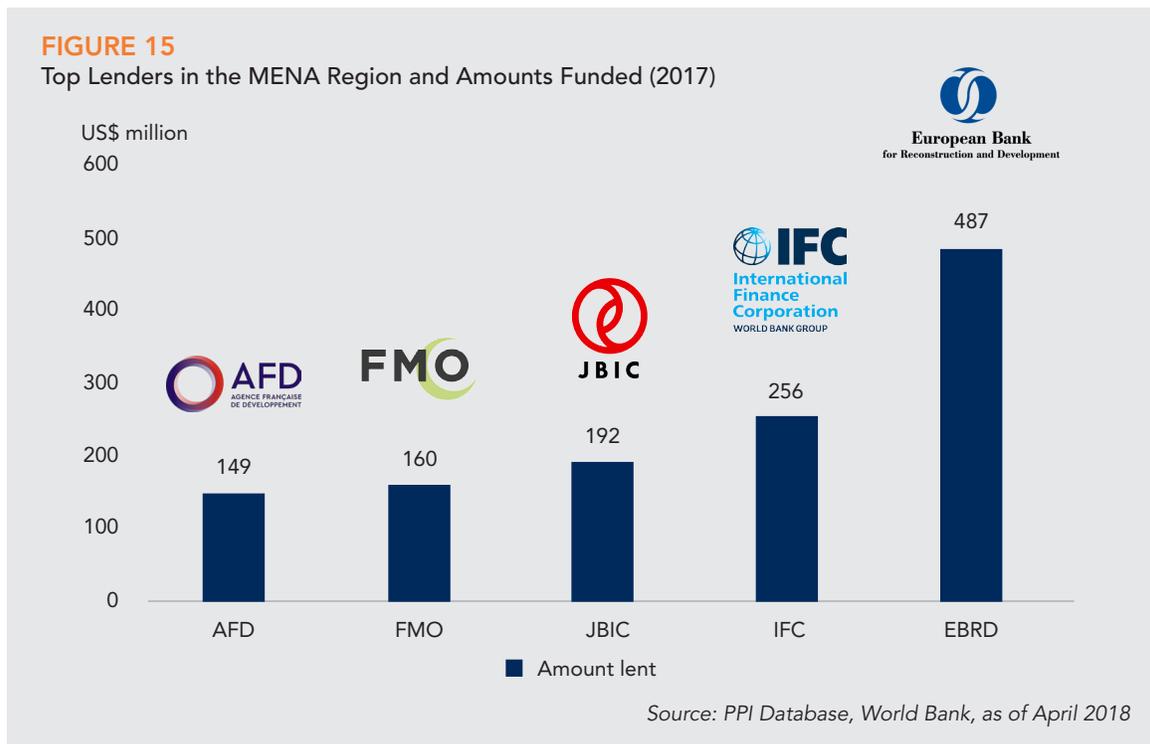


■ Renewable-energy investments  
■ Conventional-energy investments

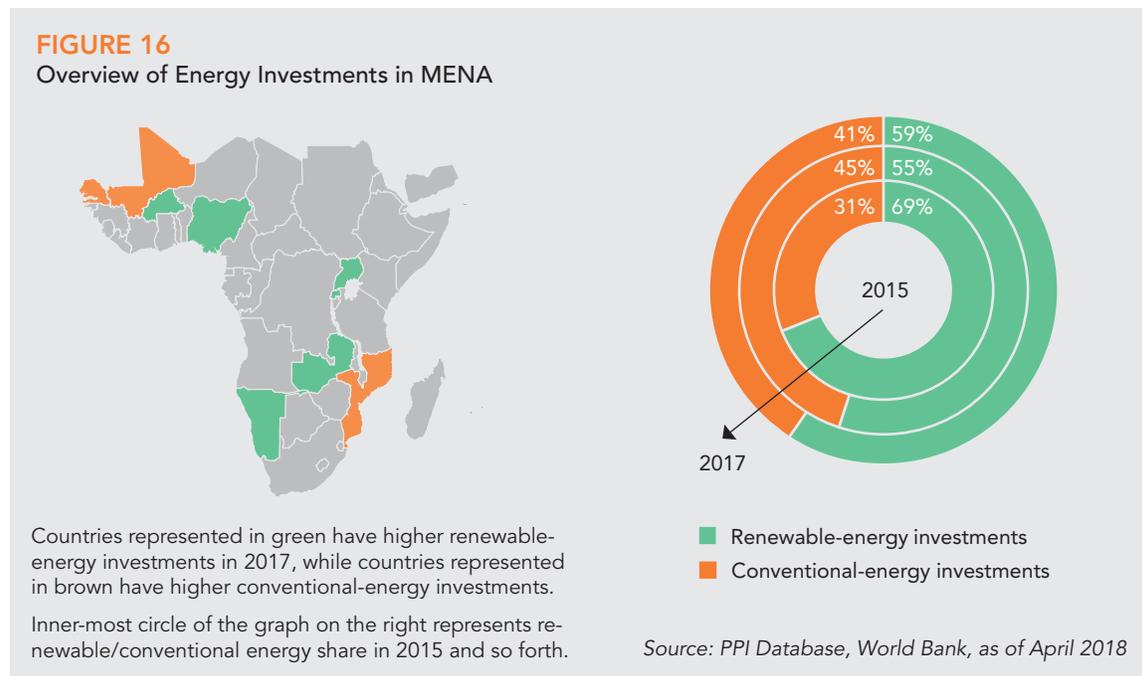
Source: PPI Database, World Bank, as of April 2018

The MENA region received a total of US\$5.4 billion worth of investments in 2017. This was the third lowest among the six regions, with US\$3.3 billion invested in renewable energy and one megaproject (worth US\$2.1 billion) in conventional energy. Most of the PPI investments were concentrated in Jordan and Egypt. Egypt attracted US\$2.4 billion worth of renewable energy PPI investments, by far the highest in the region. Most of this investment was in the Benban solar-park project, and a few wind-energy projects. The high level of investment in conventional-energy was due to the Attarat Oil Shale-Fired Power Plant in Jordan, which was worth US\$2.1 billion.

All of the financiers in the MENA region were either DFIs—such as the Agence Française de Développement (AFD), the EBRD, and the Netherlands Development Finance Company (FMO)—or banks from other regions. The EBRD was the largest lender, extending credit lines amounting to US\$487 million. The IFC was next, with US\$256 million, followed by the Japan Bank for International Cooperation (JBIC), with US\$192 million.



## 5.6 SUB-SAHARAN AFRICA

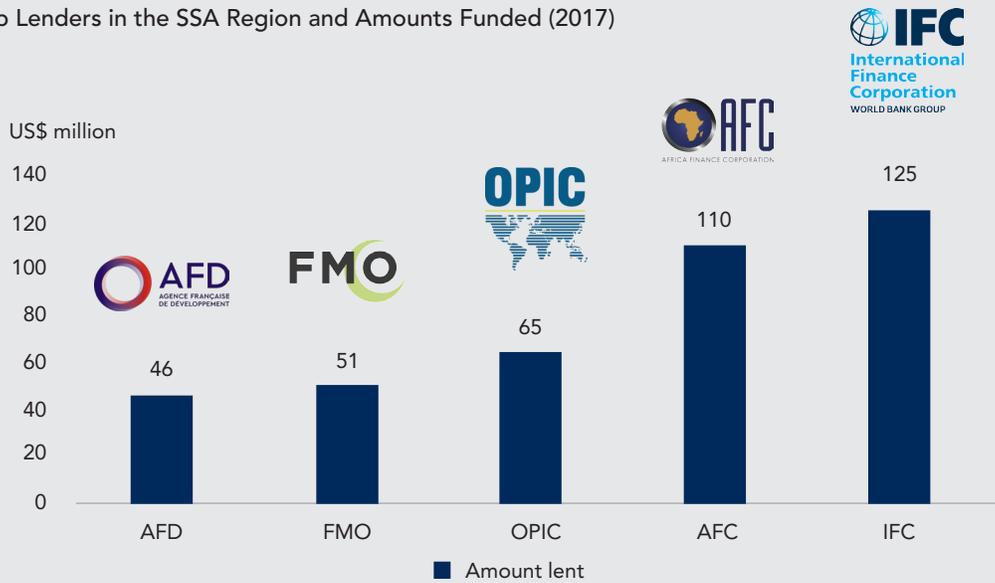


The Sub-Saharan Africa (SSA) region received cumulative investments of US\$1.2 billion, the lowest among the six regions. More than 59 percent of the total PPI investments took place in renewable-energy projects (Figure 16). Eight countries in the region attracted renewable-energy PPI investments worth US\$717 million. By comparison, only four countries (Ghana, Mali, Mozambique and Senegal) saw conventional-energy PPI investments, worth US\$497 million. Rwanda received the most renewable-energy investments, reaching US\$362 million and accounting for slightly more than 50 percent of all renewable-energy PPI investments in the region. This increased focus on renewable-energy projects was the result of a 2017 agreement between the Government of Rwanda and the World Bank to increase access to electricity through off-grid renewable energy (Rwanda Renewable Energy Fund Project).<sup>3</sup> On the conventional-energy front, Mozambique was the leader, while Mali saw the highest investment (US\$136 million) for a thermal power plant.

Not surprisingly, mostly due to a lack of local debt markets in the region, the IFC and the Africa Finance Corporation (AFC) were the two largest loan providers in SSA. In fact, all of the top five financiers were DFIs, and no local commercial banks acted as major financiers (Figure 17).

<sup>3</sup> World Bank. 2018. "Government of Rwanda and the World Bank Sign Agreement to Increase Access to Electricity Through Off-grid Renewable Energy." <http://www.worldbank.org/en/news/press-release/2017/07/07/government-of-rwanda-and-the-world-bank-sign-agreement-to-increase-access-to-electricity-through-off-grid-renewable-energy> [Accessed June 12, 2018].

**FIGURE 17**  
Top Lenders in the SSA Region and Amounts Funded (2017)



Source: PPI Database, World Bank, as of April 2018



# About the Private Participation in Infrastructure Projects Database

The Private Participation in Infrastructure Database is a product of the World Bank Group's Infrastructure, PPPs and Guarantees team. Its purpose is to identify and disseminate information on private participation in infrastructure projects in low- and middle-income countries. The database highlights the contractual arrangements used to attract private investment, the sources and destination of investment flows, and information on the main investors. The site currently provides information on more than 8,000 infrastructure projects dating from 1984 to 2017. It contains over 50 fields per project record, including country, financial closure year, infrastructure services provided, type of private participation, technology, capacity, project location, contract duration, private sponsors, debt providers, and development bank support.

For more information, please visit: [ppi.worldbank.org](http://ppi.worldbank.org)

# About the World Bank Group

The World Bank Group plays a key role in the global effort to end extreme poverty and boost shared prosperity. It consists of five institutions: The World Bank, including the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA); the International Finance Corporation (IFC); the Multilateral Investment Guarantee Agency (MIGA); and the International Centre for Settlement of Investment Disputes (ICSID). Working together in more than 100 countries, these institutions provide financing, advice, and other solutions that enable countries to address the most urgent challenges of development.

For more information, please visit: [www.worldbank.org](http://www.worldbank.org)



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