

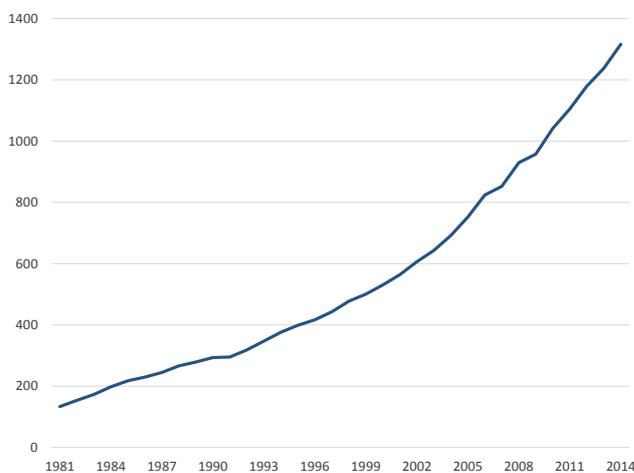


## MENA power investment: finance and reform challenges persist

MENA governments are prioritising investments in the power sector to feed rapidly rising electricity demand. We estimate that in the period 2017-21, the region will need to invest \$302bn in its power sector. Of this, \$179bn will be needed to add 138GW of generating capacity, while the rest should be invested in transmission and distribution (T&D). In the GCC, governments have coped well with rising electricity demand. As well as adding capacity, some countries have also recently increased electricity prices and introduced some limited power sector reforms. In the Mashreq region, inadequate investments and instability have weighed on the power sector and persisting blackouts continue to put pressure on governments to act; while in the Maghreb region, renewable-energy projects are at the forefront of long-term government plans to diversify power-generation capacity and reduce the fuel import bill. But investment in the power sector will continue to be a challenge due to finance constraints and tight government budgets.

Electricity demand in the MENA region has been growing rapidly, driven by population growth and urbanisation, rising income levels, industrialisation, and low electricity prices. Looking ahead, these factors will continue to place greater demand on electricity-generation capacities. MENA economic growth has slowed compared with historical highs, but the International Monetary Fund still expects an increase of 3.2% in 2017, rising to 3.6% in 2021. The region's population is also expected to grow at an average rate of 2% per year in that period. To meet rising demand, we estimate that MENA power capacity will need to expand by an average of 7.4% each year between 2017 and 2021, which corresponds to additional capacity of 138GW. This would require \$179bn of investment in generation capacity and a further \$123bn for T&D. Governments have been accelerating their investment plans and our estimates show that 97GW of capacity additions are already in execution stage.

### MENA historical production (TWh)



Source: APICORP Research

### GCC

The GCC represents 43%, or 157GW, of current MENA power-generating capacity. Despite this large capacity, the GCC will

require \$81bn for the addition of 62GW of generating capacity and another \$50bn for T&D over the next five years.

But declining oil revenues and large budget deficits mean that GCC governments can no longer continue to support the provision of cheap power. Subsidy reforms announced in late 2015 are part of a programme that aims to liberalise domestic energy prices over the medium term (See Vol.1 No.4 - Energy price reform in the GCC: long road ahead). Saudi Arabia increased electricity tariffs from SAR0.12/kWh (\$0.03/kWh) to SAR0.20/kWh for consumption levels between 4,000kWh and 6,000kWh per month and unified prices at SAR0.30/kWh for consumption levels above 6,000kWh per month. The UAE also increased electricity prices, with non-nationals bearing the brunt, while Qatar also surprised by hiking electricity prices in October 2015.

More recently, the Saudi government announced the second phase of reforms aimed at liberalising electricity prices by July 2017 for the residential sector and by 2018 for the non-residential sector. The new prices will most likely reflect the export value of feedstock fuels and higher generation costs.

As well as lifting tariffs, the Saudi government has some plans to reform the power sector. The Saudi Electricity Company (SEC), the Kingdom's largest power generator, announced that it would break SEC up into four power-generating companies, one transmission company and one distribution company. This is a first step towards market liberalisation, which has long been overdue. Much uncertainty remains on the timing of these reforms, which were first announced to take place by the end of 2016. The plan will centre on allocating SEC's power-generating assets to four companies, with the likelihood that these companies will be offered to local and international investors.

The region is also placing greater emphasis on renewable energy. The UAE recently announced a nationwide power strategy which aims to have 50% clean energy by 2050. Solar power features heavily in its plans and is expected to account for 25% of the generation mix once a \$13.7bn (5GW) solar park is fully commissioned in 2030. Saudi Arabia also recently unveiled its latest renewable-energy initiatives. The program will aim to develop 10GW of solar and wind energy by 2023.

Already, plans to build 300MW of solar PV and 400MW of wind are underway.

Saudi Arabia is also leading the drive to make the necessary capacity additions by 2021. Estimated capacity stood at around 86GW in 2016, with SEC representing around 60GW, but we estimate that in order to meet rising demand, the country will need to invest \$59bn, increasing capacity to 114GW. Over 25GW of capacity is already in the pipeline. Major projects include the 3.1GW Yanbu 3 plant, expected online in 2018, and the 2.6GW Shuqaiq plant. SEC has had to increase reliance on domestic and international financing to help with its expansion plans, the latest example being a \$1.3bn loan from local banks. In fact, the state utility borrowed a record \$5.1bn in 2016, surpassing previous records of \$3.7bn in 2014 and 2015; and since 2007, SEC has to date borrowed over \$21bn from local and international capital markets.

The UAE needs to invest at least \$35bn to meet the 17GW capacity addition needed over the medium term. The UAE is pushing strongly to diversify its energy sources in the power mix; we estimate that 10.4GW of capacity additions are already in execution. The majority of power is generated using natural gas, but Abu Dhabi's Barakah nuclear-power plant will see four reactors come on line between 2017 and 2020, contributing 5.6GW in total.

### Required GCC investment 2017-21 (\$bn)

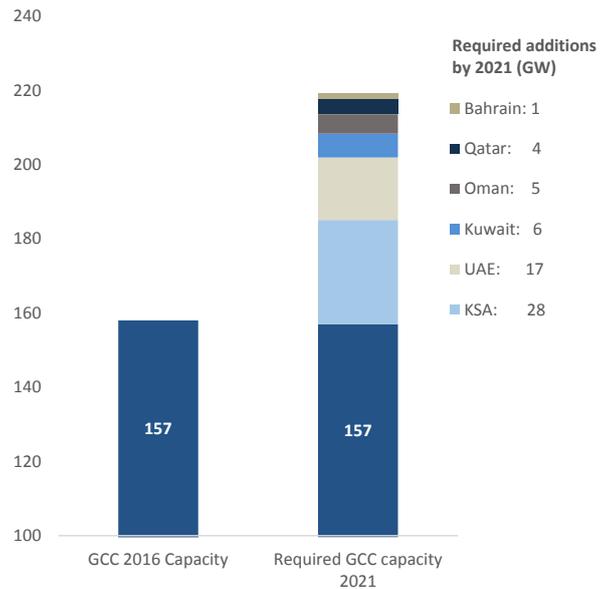
	Generation	T&D	Total
Bahrain	1.9	1.1	3
KSA	36	23	59
Kuwait	8.4	5.2	14
Oman	6.8	4.2	11
Qatar	5.5	3.4	9
UAE	22	13	35

Source: APICORP Research

Kuwait's estimated capacity in 2016 was around 17GW but will need to reach 23GW by 2021, requiring \$14bn of investment. In the medium term, the country has five power projects in the pipeline, which will add around 6GW of capacity. They include Al-Zour North 1 and 2, with a capacity of 1.5GW and 1.8GW. Al-Khairan will add capacity of 2.5GW. The project is led by France's Engie and represents Kuwait's first public-private partnership. The Ministry of Electricity and Water will buy electricity supplied from the power plant for 40 years. The country has plans to launch its first IPO for the Al-Zour North power plants

In Oman, rising electricity demand will require generation capacity to grow at an annual rate of 9.9%. The country will need to add 5.3GW in the medium term, requiring investment of \$11bn. Current medium-term plans are for development of plants with a combined capacity of 4.7GW. Two major projects are the 3.2GW Ibri & Sohar 3 independent-power producer (IPP) and the 445MW Salalah 2 IPP, both due on line towards the end of the decade. Oman also plans to integrate renewables in the power mix, with the 50MW Harweel wind farm likely to be commissioned in 2017. The country is also expected to tender 200MW of solar PV later this year.

### GCC required capacity additions 2017-21 (GW)



Source: APICORP Research

Our estimates suggest that Qatar will need to invest around \$9bn to add 4.3GW to meet rising demand in the medium term: \$6bn in generation and \$3bn in T&D. Qatar has not built additional capacity over the past five years because it already boasts adequate capacity of 8.8GW. But with increasing demand and peak load reaching a record 7.1GW in 2015, the country sanctioned two new projects that will add nearly 4.5GW in the medium term. The first is the Umm Al Haul power and desalination project with capacity of 2.5GW and costing \$3bn. The plant will be built by K1 Energy and owned by Qatar Electricity and Water Company, K1 Energy, Qatar Petroleum and the Qatar Foundation. The second is the 2GW Ras Laffan D independent water and power project. These planned investments should keep the country on track to meet demand growth.

In Bahrain, capacity will need to grow at 6% per annum. While this is a high growth rate, it is nevertheless one of the lowest by GCC standards. As a result, we anticipate that \$3bn needs to be invested over the next five years to meet capacity additions of 1.4GW, bringing the total to 5.8GW by 2020.

### Iran and Iraq

In Iran, much uncertainty still surrounds the country's ability to attract foreign investment as it re-emerges from sanctions. Iran is one of the Middle East's largest electricity producers with capacity exceeding 75GW. But the country will need another 24GW over the next five years – roughly \$50bn for generation and T&D. Currently, only 7GW worth of projects are in execution, so Iran will clearly need to accelerate its progress to meet rising demand. Iran and Russia signed agreements in 2014 for the construction of two large nuclear reactors in Bushehr. The government also plans to install 5GW of renewable capacity, including hydro, wind and biomass.

Ongoing instability and violence has decimated Iraq's infrastructure, making it difficult to assess the existing conditions of the country's power plants and therefore its exact generating capacity. We estimate that capacity at the end of 2016 stood at 15GW meaning an additional 10GW of power-generation

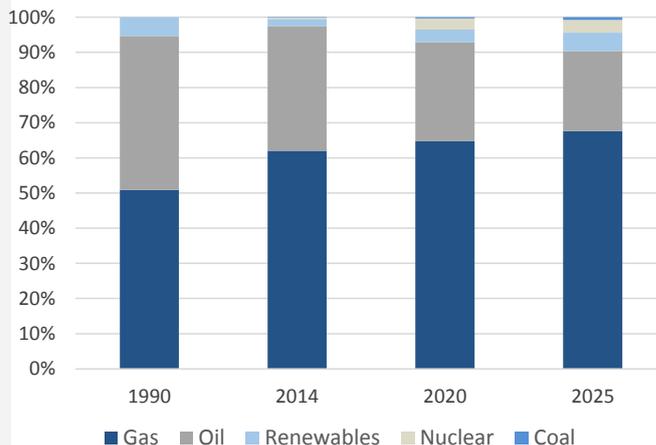
capacity is required over the next five years, amounting to \$34bn of investment. T&D will need to be prioritised to ensure adequate power delivery and a reduction in power outages, which in Baghdad can last for half the day. Security concerns and a tight budget continue to threaten investments in Iraq, increasing reliance on foreign investment to develop the power sector. Earlier this year, General Electric secured orders worth \$1.4bn to build new plants and upgrade existing plants that could boost capacity by 2.3GW within the medium term. But Iraq also faces gas shortages needed to fuel power plants due to wasteful production and is working to reduce gas flaring which accounted for 74% of total gas production. Progress was made last year as flaring was reduced to 64%, but more will need to be done to ensure adequate feedstock for new power plants.

## Egypt and Mashreq

It is becoming increasingly difficult to finance power projects in many parts of the region. Investors are concerned about political and macroeconomic instability and challenging public finances – putting many projects on hold. Egypt, for example, suffers from low reserves of hard currency and was forced to float its currency – driving the Egyptian pound down to a record low against the dollar. The government also provides little assurances to power companies about the availability of foreign currency, which has put off many investors.

Our estimates suggest that Egypt will need to invest \$31bn in power generation and a further \$20bn in T&D. This would increase capacity in MENA's most populous country by 24GW to reach 62GW in 2021. The country suffers from shortages of gas – typically prioritised for power generation – but the discovery of the giant Al-Zohr field, coupled with BP's West Nile Delta upstream developments and several LNG import contracts should ensure more regular flows of gas supply. Orascom and Siemens are currently constructing three 4.8GW combined-cycle gas-power plants, which will be among the largest in the world. Egypt has also signed memoranda of understanding with several companies for the construction of 14GW of coal plants, which should displace 1.3bn cubic feet per day of future gas demand. All told, 22GW of capacity is in execution and ready for commissioning by the end of the decade, leaving Egypt a little short of what is required in that time.

Middle East power generation mix (%)



Source: IEA

Many countries in the region already suffer regular blackouts because of insufficient infrastructure and acute gas shortages. Inadequate investments in the previous years have put pressure on governments to prioritise development plans and reduce social discontent. This is a serious issue for Egypt where, in some instances, outages can occur more than three times a day. Blackouts are also persistent problems in Iraq, Libya, Lebanon and Yemen, leaving many to rely on expensive generation for at least three hours per day.

The rest of the region will need at least 4GW within the next five years, amounting to \$8bn of investment. Jordan already has 1.6GW of capacity additions under execution, nearly half in renewable energy. This falls slightly short of the 2.4GW we estimate the country will need by 2021. Lebanon's major concerns will revolve around generation and adequate T&D infrastructure to alleviate frequent power outages.

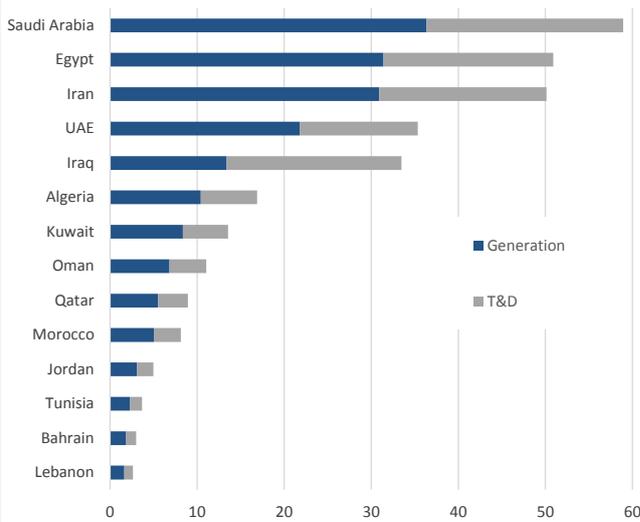
## Maghreb

In the Maghreb region, renewable energy will be at the forefront of governments' plans to increase power capacity. We estimate that 2.5GW of renewables will be added in our outlook period. Morocco and Tunisia are moving steadily to diversify away from costly fuel imports. Algeria, on the other hand, is still struggling to kick-start its ambitious solar programme.

Algeria is one of a few countries in the region that has more power-generation capacity construction underway than is needed by our estimates. It raised capacity by a third between 2011 and 2013 and announced plans to add a further 30% in 2015-18. Required capacity over the period is 8GW, needing \$17bn of investment for both generation and T&D. Currently, 12GW is in execution with the gas-fired Mostaganem plant among the largest of these projects. Algeria is also committing to renewable energy with its 12GW solar project expected to be completed by 2030, significantly increasing the share of renewables in the power generation mix. However, funding is a problem across Algeria's energy sector with the country running a trade deficit in 2016, the second year it has done so. Foreign reserves have also been falling, standing at \$113bn last year, down from \$177bn in 2014. Sonelgaz will struggle to secure funds from Algeria's reserve fund (FRR) - set up in 2000 to collect hydrocarbon surplus and cover budget deficits – as reserves fell by 60% to \$8bn last year. Algeria's priority in the short term is therefore to secure foreign loans in order to bridge a \$10bn funding deficit standing in the way of their capacity expansion targets under the 2018 investment programme.

In Morocco, estimated capacity in 2016 was 9GW, but the country's expected capacity requirements by 2021 are around 12GW and expansions will cost at least \$8bn. Renewable energy features heavily in its plans, as it seeks to increase solar and wind capacity to reduce its fuel imports. It has set a target of 2GW of solar and 2GW of wind by 2020, which is likely to be achieved. The country relies on international and development institutions like the European Bank for Reconstruction and Development and the European Investment Bank for financial support. As for Tunisia, \$4bn is required to bring capacity from 5.2GW in 2016 to 6.9GW in 2020. Like Morocco, the country will prioritise the development of its renewable sector.

## MENA required investment 2017-21 (\$bn)



Source: APICORP Research

## Challenges and constraints

While countries in MENA are pushing for investments in the power sector, several challenges and constraints will prove pivotal in the medium term.

First, oil-exporting countries – mainly in the GCC – are reducing expenditure and shelving many projects. But countries are rationalising spending and prioritising critical projects in the power sector.

Second, changes to the current unbundled market structure will be important in the power sector's evolution. Saudi Arabia announced its plans to reform its power sector, and a breakup of the SEC monopoly will allow more competition in power generation. The outcome will determine whether investors are attracted to the sector.

Third, financing projects continue to be challenging with credit worthiness in MENA not seeing any improvement from Standard & Poor's average 'BBB sovereign ratings'. Although recent efforts to attract foreign investment have seen some success, political and economic concerns mean investors will be cautious. However, this environment also creates opportunities, as regional players would be forced to seek external finance. We have already noted how Saudi Arabia's SEC has been increasingly resorting to debt finance.

Fourth, many countries are accelerating their price-reform plans with the aim of liberalising prices in the short term. While these programmes will aim to reduce the fiscal burden on governments, they will also put downward pressure on power demand. We expect this trend to continue as tariffs increase. Investors will closely monitor the outcome of these reforms as they make investment decisions.

Finally, persistent conflicts in Syria, Iraq, Yemen and Libya have already resulted in the destruction of existing generation capacity and these countries are unable to attract necessary investments. Regional instability is unlikely to recede in the immediate future, and investors will be wary of spill-over effects in neighbouring countries.

Despite 2016 being an unsettling year for the region, Arab governments are continuing to prioritise critical investments in their power sectors. We estimate that in the period 2017-21, MENA will need to invest \$302bn in their power sectors. But success in implementing key power projects and attracting the necessary investment will vary across the region. The GCC governments will continue to cope well with rising demand and energy-price reform will help temper demand rises. Although GCC governments are running budget deficits and indicated that government expenditures will be tightened in response to lower oil prices, investments in the power sector should not be affected and will be given priority.

However, even in these countries, there is clear realisation of the importance of reforming the power sector and establishing a regulatory framework to spur greater participation from the private sector. In the Maghreb region, renewable energy projects will continue to be at the forefront of long-term government plans to diversify generation capacity. Meanwhile, in other parts of the region, the challenge to meet electricity demand is more serious. In countries like Iraq, Yemen, Libya, Lebanon and Syria, political instability and inadequate investments will continue to result in power shortages, damaging their economies and frustrating their citizens.

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Comments or feedback to [energy.research@apicorp-arabia.com](mailto:energy.research@apicorp-arabia.com)