

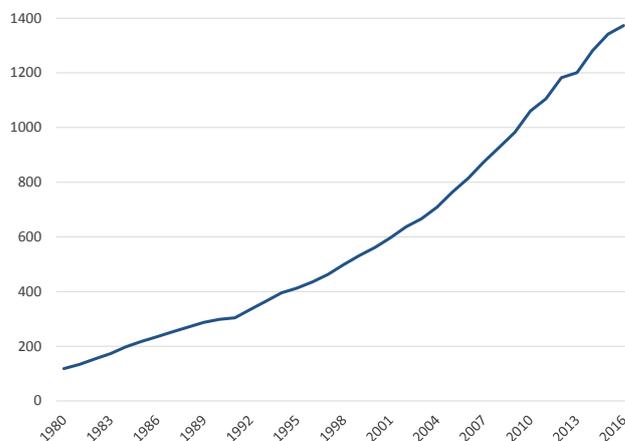


## MENA power investment: reforms slowing demand growth

MENA governments are prioritising investments in the power sector to meet rapidly rising electricity demand. We estimate that in the period 2018-22, the region will need to invest \$260bn in its power sector. Of this, \$152bn will be needed to add 117GW 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. However, recent industry reforms have sharply increased electricity prices in Saudi Arabia which is likely to feed into slower demand growth. In the Mashreq region, inadequate investment and political instability have weighed on the power sector and persisting blackouts continue to put pressure on governments to act, with Iraq driving an ambitious programme to add significant capacity in the next five years. Renewable energy projects are also at the forefront of long-term government plans in the Maghreb region 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, with the private sector playing an increasingly important role.

Electricity consumption in the MENA region has been growing rapidly, driven by population growth and urbanisation, rising income levels, industrialisation, and low electricity prices. MENA economic growth has slowed compared with historical highs, but the International Monetary Fund still expects an increase of 3.2% in 2018 and 2019, rising to 3.5% in 2022. The region's population is also expected to grow at an average rate of 1.5% per year in that period. To meet rising demand, we estimate that MENA power capacity will need to expand by an average of 6.4% each year between 2018 and 2022, which corresponds to additional capacity of 117GW. This would require \$152bn of investment in generation capacity and a further \$108bn for T&D. Governments have been accelerating their investment plans and our estimates show that 91GW of capacity additions are already in execution stage.

### MENA historical production (TWh)



Source: APICORP Research

### GCC

The GCC represents 47%, or 151GW, of current MENA power-generating capacity. Whilst this is significant, the GCC will still require \$55bn for the addition of 43GW of generating capacity and another \$34bn for T&D over the next five years.

Declining oil revenues and budget deficits meant that GCC governments can no longer continue to support the provision of cheap power. The second round of Saudi subsidy reforms announced in late 2017 significantly increased domestic energy prices (See Vol.03 No.05 – Saudi energy price reform getting serious). Saudi Arabia increased electricity tariffs from SAR0.05/kWh to SAR0.18/kWh for residential consumption levels below 6,000kWh/month. Residential consumption levels above 6,000kWh/month remained at SAR0.30/kWh.

As well as lifting tariffs, the Saudi government has other plans to reform the power sector. The Saudi Electricity Company (SEC), the Kingdom's largest power generator, announced that it would break itself up into four power-generating companies, one transmission company and one distribution company. This represents the first step towards market liberalisation, which has long been overdue, although considerable uncertainty remains on the timing of these reforms.

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

Saudi Arabia is also leading the drive to make the necessary capacity additions by 2022. Estimated capacity stood at around 82GW in 2017, with SEC representing around 60GW, but we estimate that in order to meet rising demand, the country will need to invest around \$21bn, which will increase capacity to 92GW. This is a substantial decrease from our estimates last year and is due to the recent electricity price hikes driving residential electricity prices up 250%. As a result, demand growth in the next five years is only expected to be in the range of 1.5-2%. Major projects include the 2.6GW Shuqaiq plant and the 1.4GW Waad al-Shamal plant. More recently, the Ministry of Energy awarded the first large-scale solar project to be

developed in Sakaka with a capacity of 300MW. SEC has had to increase reliance on domestic and international financing to help with its expansion plans, the latest example being a \$2.6bn loan from international banks. In total, 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 \$25bn from local and international capital markets.

The UAE needs to invest at least \$33bn to meet the expected additional 16GW capacity requirement over the medium term. The country is pushing strongly to diversify its energy sources in the power mix; we estimate that nearly 10GW 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 2018 and 2020 despite delays, contributing 5.6GW in total.

### Required GCC investment 2018-22 (\$bn)

	Generation	T&D	Total
Bahrain	1.9	1.2	3
KSA	12.9	8.0	21
Kuwait	9.1	5.7	15
Oman	5.4	3.4	9
Qatar	5.4	3.4	9
UAE	20.5	12.7	33

Source: APICORP Research

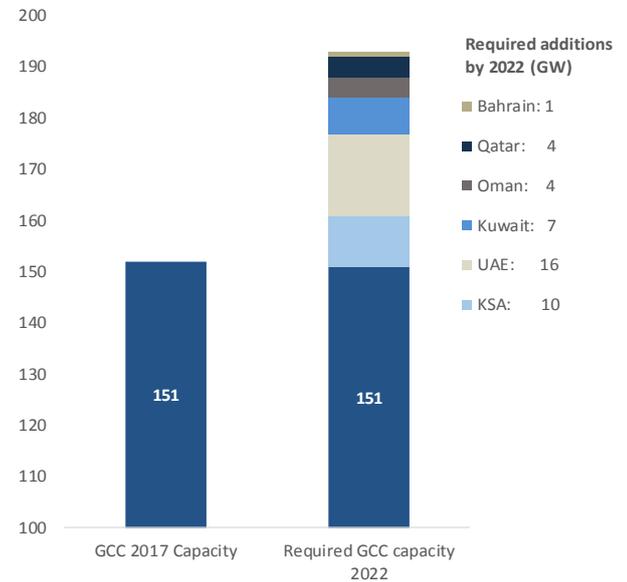
Kuwait's estimated capacity in 2017 was around 17GW but will need to reach 24GW by 2022, requiring \$15bn of investment. In the medium term, the country has several power projects in the pipeline, which include the 750MW Subiya CCGT plant. The latest to come on line is the Al Zour North 1 power plant in 2016, with a capacity of 1.5GW, while the second phase of the project has been delayed. At the same time, the country has announced plans to obtain 15% of its electricity needs from renewable sources by 2030.

In Oman, rising electricity demand will require generation capacity to grow at an annual rate of 8.5%. The country will need to add 4GW in the medium term, requiring investment of \$8bn. Current medium-term plans are for the development of plants with a combined capacity of 4.6GW. Two major projects are the 1.7GW Sohar 3 IPP and 1.5GW Ibri IPP, both due on line in 2019. Oman also plans to integrate renewables in the power mix with the Oman Power and Water Procurement Company in the process of tendering a 500MW solar PV project expected to be commissioned in 2021.

Our estimates suggest that Qatar will need to invest around \$9bn to add 4.2GW 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 is planning to add capacity in the medium term, with the first project being the large Umm Al Haul power and desalination plant boasting a 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.

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 2022.

### GCC required capacity additions 2018-22 (GW)



Source: APICORP Research

### Iran and Iraq

Since the removal of sanctions in Iran, the government has not been successful in attracting much needed foreign investments due to several political and economic challenges. Iran is one of the Middle East's largest electricity producers with capacity exceeding 77GW. But the country will need another 25GW over the next five years – roughly \$50bn for generation and T&D. Currently, only 12GW worth of projects are in execution, so Iran will clearly need to accelerate its progress to meet rising demand. Whilst Iran is seen as a veteran player in the area of renewable energy in the Middle East, its activities have been focused on Hydroelectric. More recently however, Iran has set a 5GW renewable energy capacity target to be achieved by the end of 2022. Most recent initiatives include the signing of a \$2.9bn deal with Norwegian firm Saga Energy for the development of 2GW solar plant to be completed within the medium term. Iran and Russia already signed agreements in 2014 for the construction of two large nuclear reactors in Bushehr.

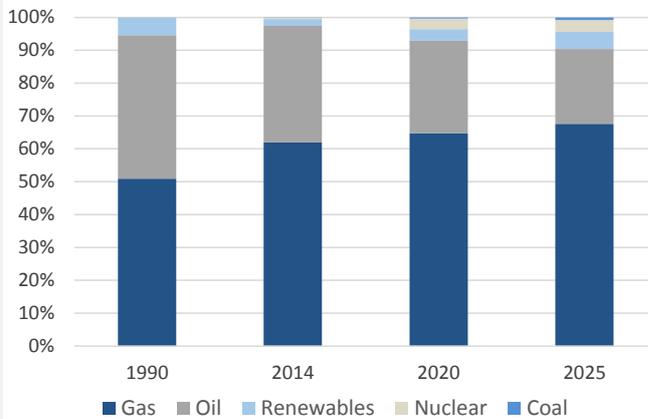
In Iraq, the government is prioritising the power sector, especially following loss of generation and transmission during the war against the so called Islamic State. The exact generating capacity of the country has therefore been difficult to assess. We estimate that capacity at the end of 2017 stood at 17GW, meaning an additional 12GW of power-generation capacity is required over the next five years, amounting to \$39bn of investment. T&D will need to be prioritised to ensure adequate power delivery and a reduction in power outages. Disputes between the Kurdish Regional Government and Baghdad as well as the outcome of the upcoming elections will cloud the investment outlook, and reliance on foreign investment to develop the power sector will be crucial. Last year, Siemens was awarded a contract to upgrade and maintain turbines within four

gas-fired plants with a total installed capacity of 2.6GW. In February 2018 during the Iraq donor conference, the country highlighted several critical projects in the power sector open for private sector investment with a total capacity of 6.5GW including 410MW of solar energy projects. Iraq also faces gas shortages needed to fuel power plants due to wasteful production and is working to reduce gas flaring. Progress has been made to reduce flaring to around 60%, but more will need to be done to ensure adequate feedstock for new power plants.

## Egypt and Mashreq

Our estimates suggest that Egypt will need to invest \$28bn in power generation and a further \$18bn in T&D. This would increase capacity in MENA's most populous country by 22GW to reach 60GW in 2021. The country historically suffered from shortages of gas – typically prioritised for power generation – but the commissioning of the giant Al-Zohr field and BP's West Nile Delta, coupled with 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, and are expected to come on line this year. Egypt has also signed an agreement with Russia for the development of four nuclear Reactors in Dabaa, with the aim of them being fully commissioned at the end of next decade. All told, we estimate that 25GW of capacity is in execution and ready for commissioning shortly after our outlook, meaning the country should be on track to meet its requirements by 2022.

### 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 issues 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 3GW within the next five years, amounting to \$7bn of investment. Jordan already has 1GW of capacity additions under execution, nearly half in renewable energy. This falls slightly short of the 2.1GW we estimate the country will need to add by 2022. Lebanon's major concerns will revolve around generation and adequate T&D infrastructure to alleviate frequent power outages.

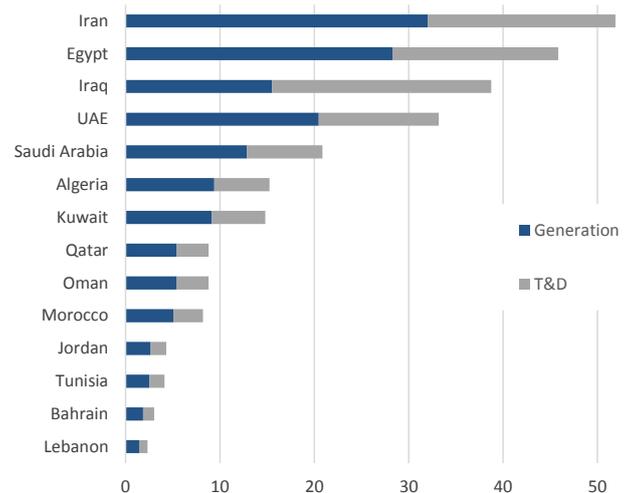
## Maghreb

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 in the past five years and still has plans for further expansion. Required capacity over the period is 7GW, needing \$15bn of investment for both generation and T&D. Currently, 8GW 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 aimed 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 along with falling foreign reserves.

In Morocco, estimated capacity in 2017 was 9GW, but the country's expected capacity requirements by 2022 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 will be required to bring capacity from 5GW in 2017 to 7GW by 2022. Like Morocco, the country will prioritise the development of its renewable sector.

### MENA required investment 2018-22 (\$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 but announced that they would go ahead with investment plans. Meanwhile, other countries with lower fiscal

buffers and competing pressures on their revenues will continue to face political and economic challenges in executing their capacity expansion programmes.

Second, the financing of projects continues to be challenging despite some successful efforts recently to attract foreign investment. 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.

Third, 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. Already, electricity demand growth in Saudi Arabia has been dramatically revised downwards to 1.5-2% in the next five years, following years of growth rates of over 6%. We expect this trend to continue as tariffs increase, and investors will closely monitor the outcome of these reforms as they make investment decisions.

Despite 2017 being an unstable year for the region, Arab governments are continuing to prioritise critical investments in their power sectors. We estimate that in the period 2018-22, the MENA region overall will need to invest \$260bn in the power sector. 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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