

# Gulf Nations Invest To Accelerate Deployment Of Renewable Energy

February 27, 2023

## Key Takeaways

- Decarbonizing the power sector by making significant investments in renewables is part of the national objective for achieving net zero targets in both the UAE and Saudi Arabia.
- We rated a solar power project, Sweihan PV Power Co. PJSC, at 'BBB+' in January 2022 and expect to see more such projects being financed through similar structures in the region in the coming years. In our view, solar photovoltaic (PV) plants with contracted prices are more predictable and simpler to operate and maintain than other power-generating assets.
- Solar PV power is particularly well-suited to the region, but installed capacity remains low relative to many other regions. Capacity in the UAE and Saudi Arabia was 3 gigawatts (GW) in 2021; it had been just 165 megawatts (MW) in 2016.

Despite their dependence on the oil and gas industry, the Gulf nations have all announced new targets or renewed their commitment to the Paris Agreement in the past two years. As one of the largest sources of emissions, the power sector looms large in most national plans for decarbonization. S&P Global Ratings expects to see significant investment in renewables during the current decade.

The two largest economies--the United Arab Emirates (UAE) and Saudi Arabia--continue to lead climate-related efforts in the Gulf Cooperation Council (GCC) region. As of year-end 2021, about 90% of the region's established renewable energy capacity was in these countries, with the UAE alone representing 77%. They have also committed to updated targets as part of renewed efforts to reach net zero.

Although net zero strategies encompass other initiatives, S&P Global Ratings focuses here on the GCC's renewables sector. The governments of Saudi Arabia and the UAE have announced their intention to continue to invest in this space. We believe plans to establish a renewables sector could help them in their efforts to achieve their climate goals.

Government-related entities have taken the lead on procurement, inviting local and international developers to bid for tenders. Most developers then finance the assets on a nonrecourse basis, which means using substantial commercial bank debt. However, the UAE and Saudi Arabia have both established public-private partnership frameworks, making project finance an obvious

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## Gulf Nations Invest To Accelerate Deployment Of Renewable Energy

choice for funding deployment. As energy transition in the region progresses, we expect to see more renewables projects tapping the capital markets for financing, including a growing number of solar PV projects. In our global portfolio of solar PV projects, the key credit qualities include the timing of and budget for maintenance, availability, and good management of solar panel degradation.

## Renewables Are Part Of Most GCC Nations' Climate Roadmaps

The Paris Agreement requires all signatories to set and maintain goals, known as nationally determined contributions (NDCs; see table 1). Although their circumstances differ, all the governments in the region have publicly announced their net zero targets and are looking to deploy renewable energy to meet the climate commitments in their NDCs. The power sector is a key source of emissions. The UAE and Saudi Arabia--which produce the most greenhouse gas (GHG) emissions in the GCC in absolute terms--have made the largest investments in renewables. Their governments are among the many globally to have publicly announced their net zero targets, and a roadmap toward net zero.

### Business-As-Usual Scenarios

Many countries, including those in the GCC, set their NDCs by reference to a "business-as-usual (BAU) scenario." This is a counterfactual baseline scenario based on the emissions that are predicted to have occurred if no steps to mitigate climate change had been taken since the base year, incorporating the effect of economic growth on emissions. This means that in the short term, emissions in some countries might continue to increase, in absolute terms, but have been reduced compared with a scenario in which no policy interventions occurred.

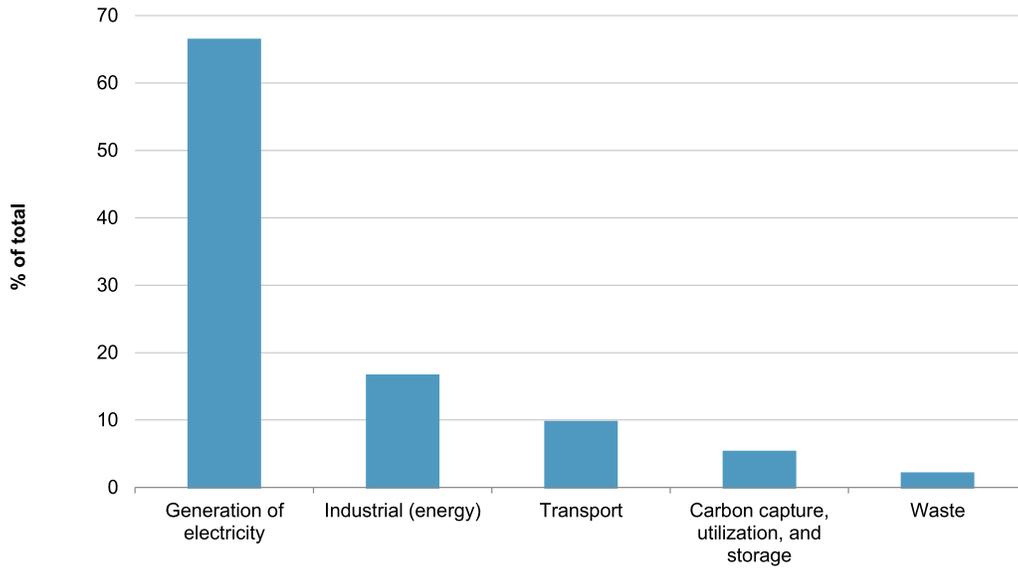
In 2022, in its second NDC, the UAE increased its target for reducing GHG emissions to 31% by 2030, relative to its BAU scenario. Its earlier commitment was to a reduction of 23.5% against the BAU level. Under the new NDC, the UAE will limit emissions in 2030 to 208 million metric tons of carbon dioxide equivalent (CO<sub>2</sub>e), relative to the 301.2 million metric tons of CO<sub>2</sub>e emissions predicted under its BAU scenario.

The UAE's Renewable Energy Strategy 2050 states that decarbonization of the power sector is a key priority. Organizations like the International Renewable Energy Agency (IRENA) do not include nuclear power in their datasets on renewable energy; the UAE, by contrast, includes nuclear and renewables in its definition of "clean energy." The UAE's goal is to have clean energy provide 30% of its energy mix by 2030, and 50% by 2050 (see chart 1).

Chart 1

### Decarbonization Of The Power Sector Is At The Heart Of The UAE's Efforts To Cut Emissions

Each sector's contribution to the UAE's 2030 emission reduction target



Source: Updated Second Nationally Determined Contribution of the United Arab Emirates, 2022. UAE --United Arab Emirates.

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In 2021, Saudi Arabia announced an update to its NDC. By 2030, it now intends to reduce, avoid, and remove annual emissions of 278 million tons of CO<sub>2</sub>e. The NDC uses a base year of 2019. To achieve this objective, it aims to generate about 50% of its power from renewable sources by 2030. Saudi Arabia has also set its net zero target for 2060.

## Gulf Nations Invest To Accelerate Deployment Of Renewable Energy

Table 1

### Commitments On Climate Change Vary Across The Gulf

Country	Summary	Most recent update to the NDCs
Bahrain	Emissions are relatively low, so adaptation is prioritized over mitigation. Under the 2017 National Renewable Energy Action Plan, mitigation goals include renewable energy meeting 5% of peak capacity by 2025 and 10% by 2035.	2021
Saudi Arabia	By 2030, reduce, avoid, and remove annual GHG emissions by 278 million tons of CO <sub>2</sub> e, compared with a base year of 2019. To meet this goal, renewable energy is to provide about 50% of the energy mix by 2030.	2021
Kuwait	National efforts aim to cut GHG emissions by 7.4%, relative to BAU emissions with a base year of 2015, by 2035. No specific goal on renewable energy, but seeks to increase its share of the energy mix.	2021
Oman	Seeks to reduce emissions by 7% in 2030, relative to BAU level. Target for renewables is that they generate 20% of energy consumed by 2030, and up to 35%-39% by 2040.	2021
Qatar	Aims to reduce GHG emissions by 25% in 2030, relative to a BAU level with a 2019 base year. More renewable energy is to be deployed.	2021
United Arab Emirates	GHG emissions to be reduced by 31% by 2030, measured in CO <sub>2</sub> e, relative to BAU level with a base year of 2016. By 2050, 50% of energy to be generated from renewable sources or nuclear.	2022

Source: Nationally determined contribution (NDC) reports from each country and International Energy Agency policy database. GHG--Greenhouse gas. CO<sub>2</sub>e--Carbon dioxide equivalent. BAU--Business as usual.

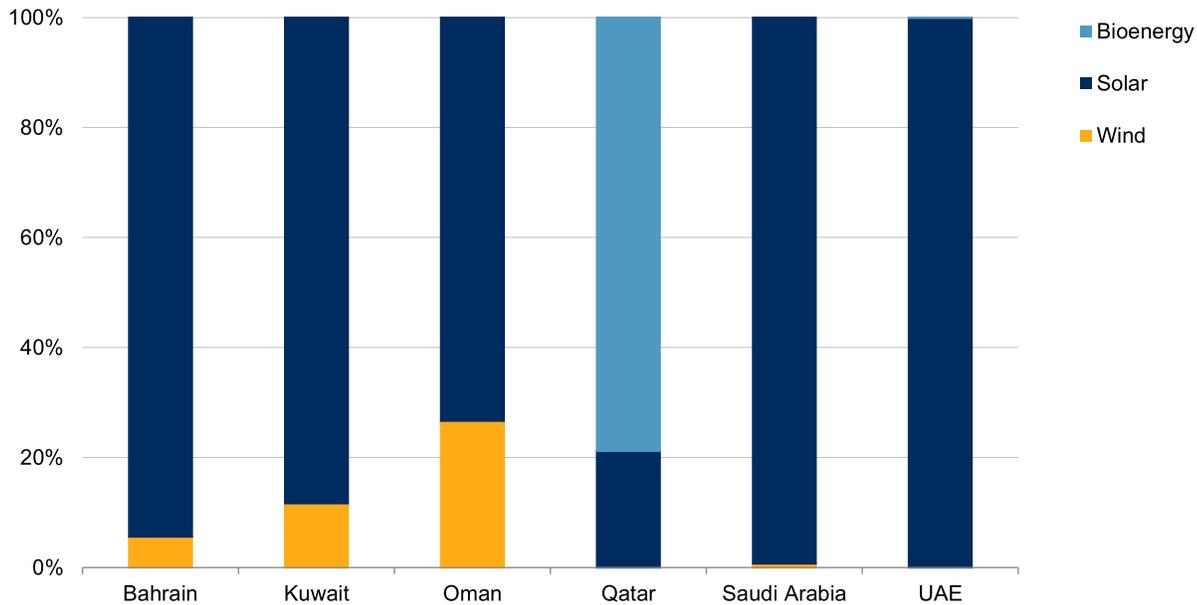
### Deployed Capacity Is Mostly Solar

To date, GCC countries have used solar generation more than any other renewable technology. As of 2021, 97% of installed capacity for renewables in the GCC related to solar power (source: IRENA; see chart 2). Conditions for solar power generation in the region are excellent because of:

- High levels of solar radiation and sunlight hours all year round;
- Ample land on which to install PV panels; and
- Production and demand being well-matched, as both generation and consumption peak in the daytime, and in the summer.

Chart 2

**Solar Is By Far The Most Dominant Renewable Asset**  
 Breakdown of installed renewables capacity by technology (2021)



The renewable power capacity data shown here represents the maximum net generating capacity of power plants and other installations that use renewable energy sources to produce electricity. Source: Renewable Energy Statistics 2022, International Renewable Energy Agency.

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The Al Dhafra plant, in Abu Dhabi, is expected to be fully operational in 2023, and will be one of the world's largest single-site solar plants. When commissioned by Emirates Water and Electricity Co. PJSC (EWEC) and its partners, the plant will have a capacity of 2.1 GW and will cut CO2 emissions by about 2.4 million tons a year. EWEC has also recently announced the Al Ajban Solar PV project tender, which would enhance its solar PV installed capacity by a further 1,500 MW.

**Credit risk in solar projects**

In our view, solar PV projects with contracted prices are more predictable and carry lower operational risk than other power-generating assets. Maintenance needs are relatively straightforward, and the technology is not complex. The main issue is that solar PV assets generate direct current, which is converted to alternating current for interconnection with the utility grid using inverters. The life span of an inverter is shorter than the 25-year typical useful life of a PV asset.

PV assets therefore require an adequate operating budget to allow for the replacement and refurbishment of spare parts. The replacement of inverters is the largest major maintenance

## Gulf Nations Invest To Accelerate Deployment Of Renewable Energy

expense for solar PV projects. We consider the timing of the task to be an important element in our analysis.

In addition, we incorporate solar panel degradation into our forecasts. Our performance assumptions include a linear decline in solar output over the long term. That said, module manufacturers now have long-standing performance records. Across our global portfolio of rated PV projects, most assets have demonstrated availability levels of above 99%. Downtime risk is limited, and annual generation is broadly in line with the one-year P90 level we assume in our base case (the one-year P90 level is a statistical estimate of energy yield: how much electricity is produced at least 90% of the time over a one-year period).

### Sweihan PV Power Co. PJSC

In January 2022, we assigned our first project finance rating to a solar PV project in the Middle East. Our 'BBB+' rating on Sweihan PV Power Co. PJSC is based on the project's operating risk; construction of the 1.2 GW Noor plant was completed in April 2019. The outlook is stable.

The Abu Dhabi-based project issued the first green bond in the region and was the first large-scale independent solar power project to have EWEC as offtaker. As the market grows, we expect more schemes in the region to be funded using comparable project finance structures.

Our assessment is based on:

- The solid and well-proven technology of PV plants. Operation and maintenance risk is limited by the simplicity of the works needed to operate the plant.
- The supportive power purchase agreement with EWEC, Abu Dhabi's sole offtaker, which means that the project is not exposed to market risk.
- The minimum debt service coverage ratio of 1.20x, based on the one-year P90 generation forecast we assume in our base case. The profile is flat over the debt tenor.

Sweihan's contract with EWEC sets a fixed tariff for the term of the power purchase agreement. The project is not subject to any renegotiation or curtailment risk. This is typical for fully contracted solar assets in the region, where resource variation presents a greater risk to project revenue than market price uncertainty.

EWEC expects the Noor plant to help it meet its target for generating electricity from renewables. Its base-case production forecasts for the plant suggest that, by displacing significant volumes of gas, the project reduces CO<sub>2</sub> emissions by up to 1 million metric tons per year. In turn, this generates huge cost savings, estimated at \$1 billion over 2020-2035.

In rating the project, we considered how the scale and location of the plant affect its maintenance needs. The Noor plant generates power through 3.2 million monocrystalline modules linked to 828 central inverters. As it operates in the desert, module performance could be degraded by soiling, and maintenance has to be carefully timed because of the heat. The Noor plant uses a waterless robotic cleaning solution that has already been used by other large power plants with limited access to water. The operating budget in our base case covers the cost of maintaining the 1,430 remotely operated robots that clean the modules daily. We assume a proportion will need replacement each year.

## **Other Decarbonization Options Are Being Explored**

Although solar is the dominant form of renewable energy generation in most of the GCC, some countries--Bahrain, Kuwait, Saudi Arabia, and Oman--had also incorporated wind farms into their energy mix by the end of 2021. Dumat Al-Jandal, Saudi Arabia's first wind farm, is the region's largest wind asset in operation, according to the Saudi Green Initiative (SGI). It is expected to displace nearly a million tons of CO2 per year. The commissioning of this 400 MW project significantly increased the country's total renewable energy capacity. Saudi Arabia is also developing larger wind projects at Yanbu (700 MW capacity), Wa'ad Al Shamal (500 MW capacity), and Al-Ghat (600 MW capacity).

We expect investment in renewable energy for hydrogen production to ramp up alongside investment in pure power facilities. Where hydrogen is generated using renewable energy sources such as wind and solar (instead of natural gas), it is defined as green hydrogen. Saudi Arabia plans to build one of the world's largest green hydrogen plants, powered by over 4 GW of solar and wind energy and expected to come on stream by 2025. The plant, part of the Neom project, is forecast to produce 650 tons of green hydrogen per day and 1.2 million tons of green ammonia per year.

Abu Dhabi-based renewable energy company Masdar entered into a strategic alliance with Engie S.A. to explore the co-development of a UAE-based green hydrogen hub. The two companies are looking to develop projects with a capacity of at least 2 GW by 2030, and to invest a total of US\$5 billion in the region. Masdar's ambition is to expand its renewable energy capacity globally to at least 100GW by 2030, and to become a leader in clean energy and green hydrogen.

## **Switching To Renewables Has Economic Advantages**

Subsidizing electricity for consumer use is common in the region, but the rising cost of such subsidies is putting pressure on budgets. PV plants produce electricity more cheaply than thermal power plants, especially since the Russia-Ukraine war caused oil and gas prices to surge. The planned move to increase the share of renewable assets in the energy mix will therefore reduce the cost of domestic power generation. The switch to renewables will also free up oil and gas resources for export.

## **Progress Toward Decarbonization Has Been Slow**

Many solar projects have stalled in recent years because of the cost and difficulty of acquiring PV modules over the past two years. Most modules are manufactured in China. Pandemic restrictions caused many manufacturing plants on the Chinese mainland to shut down and, at the same time, worldwide logistical issues created a spike in transport costs. Prices for modules soared. As polysilicon and wafer became easier to source, we saw prices start to fall; as of January 2023, module prices were back at pre-pandemic levels. Sourcing modules at an affordable cost is, in our view, a necessary prelude to offtakers achieving the growth in renewables they expect.

Power production in the GCC still predominantly relies on thermal power, although the region has been investing in renewables for some time. According to official sources, the UAE, for example, had invested over \$40 billion in renewable energy by 2021.

Despite this investment, total installed capacity for renewable energy in the GCC, at about 3.4 GW in 2021, still represents only a tiny proportion of its total capacity for power generation (source: IRENA). When the 2022 figures become available, we expect capacity to have improved further.

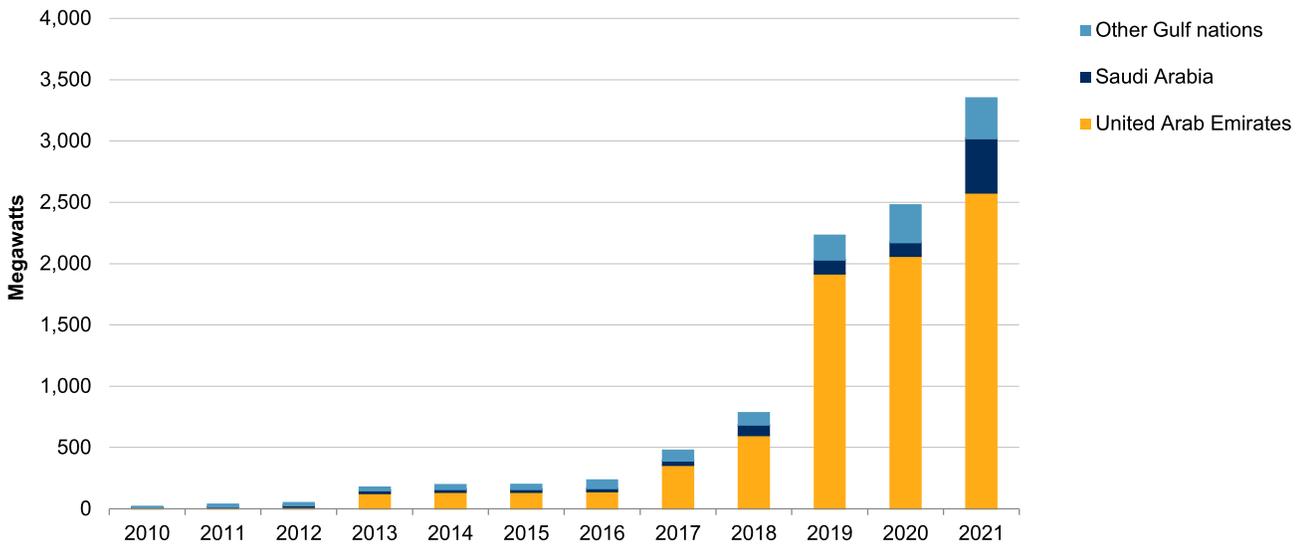
## Gulf Nations Invest To Accelerate Deployment Of Renewable Energy

According to IRENA, in 2021, the UAE had the largest installed renewable capacity in the GCC, at around 2.6 GW (see chart 3).

Chart 3

### UAE And Saudi Arabia Had Around 90% Of Renewable Capacity In 2021

Increase over time of installed renewable power capacity in the Gulf



Note: The renewable power capacity data shown represents the maximum net generating capacity of power plants and other installations that use renewable energy sources to produce electricity. Source: Renewable Energy Statistics 2022, International Renewable Energy Agency.

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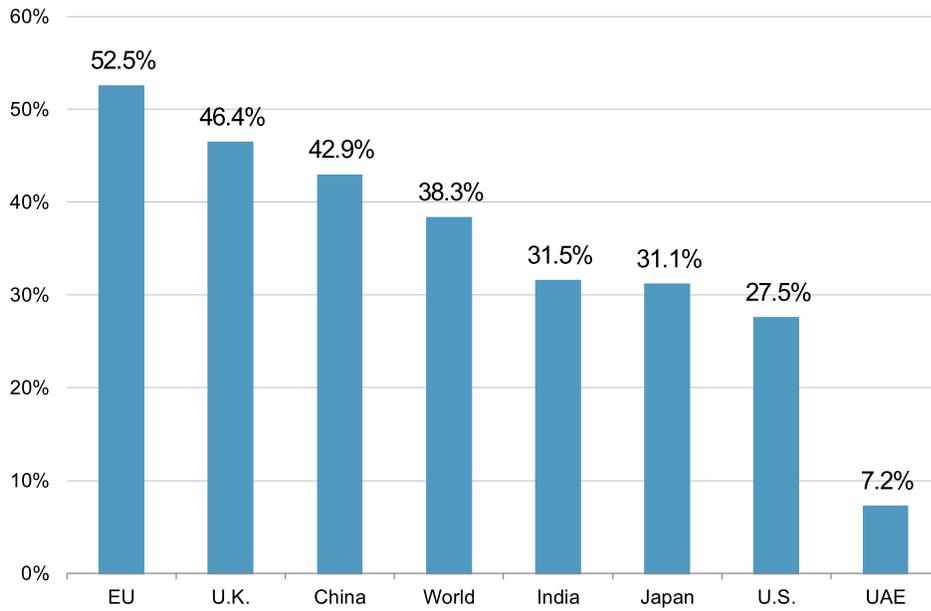
## Other Regions Have Outpaced The GCC On Renewable Capacity

According to IRENA, renewables represented 38.3% of total electricity capacity, globally, in 2021. In the EU, the equivalent figure was 52.5% (see chart 4). For the UAE, renewables represented just 7.2% of total capacity (see chart 5).

Chart 4

**The Share Of Renewables Is Very Low Compared With Other Regions And Countries**

Renewables as a percentage of total electricity capacity (2021)

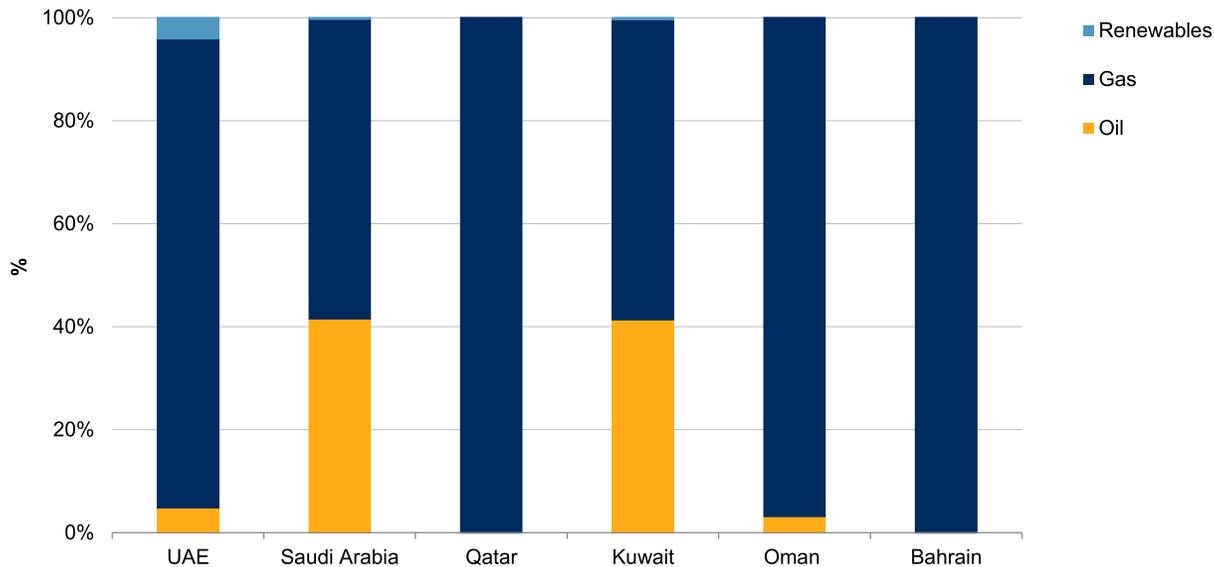


Source: Renewable Energy Statistics 2022, International Renewable Energy Agency.  
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Chart 5

### Renewables Represent A Very Small Share Of Power Generation Across The GCC

As of 2020



Source: IEA Energy Transitions Indicators.

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GCC countries are still investing in nonrenewable, but lower-emission, power projects, to support the expected growth in demand while limiting emissions. For example, in the UAE, the Dubai Electricity & Water Authority has converted its Hassyan Power Complex to run on natural gas instead of coal. The UAE also hosts the only nuclear power generation facility in the GCC region--which it includes within its renewable energy targets. The Barakah nuclear power plant will eventually have four units in operation and will then have capacity to generate 5.6 GW. According to Emirates Nuclear Energy Corp., as of December 2022, the plant's power generation had increased to 4.2 GW. This followed the third unit coming into operation.

### As 2030 Approaches, Capacity Expansion Will Accelerate

Data from IRENA shows that Saudi Arabia's renewable energy generation capacity increased to 443 MW in 2021 from 24.3 MW in 2016. Capacity is expanding rapidly--according to the SGI, the country had 700 MW in renewable capacity connected to the grid as of 2022, and a further 11.4 GW of capacity under development. SGI announced 13 new projects during 2022. Given the commitments made in the NDCs, and despite the recent price and supply chain stresses, we expect investment in renewable power projects to increase across the region.

## **Related Research**

- Sweihan PV Power Co. PJSC, Feb. 6, 2023
- Carbon Pricing, In Various Forms, Is Likely To Spread In The Move To Net Zero, Report Says, Aug 9, 2022
- Water Scarcity In The Middle East: Is Reverse Osmosis Desalination The Solution?, March 29, 2022

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