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How the Gulf Makes Its Power

An industry primer on the business of power generation in the Gulf.

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Scope of this paper

This paper examines how electricity is generated in the Gulf. Its subject is the generation of power: the plants that produce electrical energy, the fuels and technologies behind them, the companies that build and run them, the customers whose demand they serve, and the economics of the whole activity. It covers the six Gulf Cooperation Council states, with the most detail on Saudi Arabia and the United Arab Emirates, which are the two largest systems and the two that disclose the most. The transport of electricity across each country and its sale to the final consumer are distinct activities with their own economics, and they are not covered here. A note on data is necessary at the outset. Official disclosure across the Gulf is uneven. Saudi Arabia publishes usable statistics, the United Arab Emirates publishes less at the national level, and the smaller states publish little. Several important figures conflict between credible sources, and these conflicts are flagged where they occur.

Executive summary

The question this paper answers

How is electricity generated across the Gulf today, why does a region rich in oil and gas increasingly build solar and nuclear instead of burning its own fuel, and what does that generation business look like in economic terms?

~845 TWh	~90%	~1 million b/d	1.04 US cents
electricity demand across the Gulf, 2024	of generation still from gas and oil	average oil burned for power in Saudi Arabia	per kWh, a world-record solar contract price

The six states of the Gulf Cooperation Council are Saudi Arabia, the United Arab Emirates, Qatar, Kuwait, Oman and Bahrain. The analysis covers the fuels and technologies the region relies on, who consumes the power, how the business works, and where it is heading.

One idea explains almost every decision in Gulf power. The region sits on some of the largest oil and gas reserves in the world, yet it is spending very large sums on solar plants and nuclear reactors so that it can burn less of its own fuel to make electricity. A barrel of oil burned at home in a power station, sold locally at a heavily subsidised price, earns very little. The same barrel sold abroad earns hard currency at the world price. Every unit of solar or nuclear power

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that replaces a burned barrel frees that barrel for export. The Gulf is not building clean power because it is short of fuel, nor mainly for environmental reasons. It is doing so because burning its own hydrocarbons at home carries a cost that never shows up on the domestic electricity bill. Economists call this opportunity cost.

The scale is large. Electricity demand across the Gulf reached about 845 terawatt hours in 2024, and about 90 per cent of generation still comes from natural gas and oil. Saudi Arabia is the biggest system by far, at roughly half the regional total, and it still burns a great deal of oil directly in its power stations, of the order of a million barrels a day on average and more at the summer peak. The United Arab Emirates is the exception. It has put about a third of its generation onto nuclear and solar through two deliberate national projects: the Barakah nuclear plant and a series of very large solar parks.

As a business, Gulf generation is unusual. Almost every new plant is built by an independent developer, often state-backed, and its output is sold to a single government-backed buyer in each market under a long contract, often for twenty-five to thirty-five years and priced in United States dollars. That structure, together with exceptional sunshine, near-free desert land and very cheap capital, has produced solar contracts among the lowest-priced ever recorded, close to one United States cent per kilowatt hour. A small group of state-backed developers, above all ACWA Power of Saudi Arabia and Masdar of Abu Dhabi, dominate the building of new capacity and have grown into global businesses on the back of it.

The change is real but uneven, and large announcements run ahead of slower delivery. The United Arab Emirates has reached about a third clean. Saudi Arabia has tendered an enormous solar and wind pipeline at record-low prices, but had only about 12.3 gigawatts of it connected to the grid by the end of 2025, far short of its stated goals for 2030. The smaller states range from Oman, which is moving steadily, to Kuwait, which struggles to meet its summer peak.

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1. The paradox at the heart of Gulf power

The best way into the Gulf power sector is through a puzzle. Here is a region that holds some of the largest reserves of oil and natural gas on earth, fuel it can pull from the ground cheaply and in great quantity, and yet it is spending tens of billions of dollars to build solar farms and nuclear reactors so that it can burn less of that fuel at home. The obvious question is why a region so rich in oil would invest in solar at all.

The answer is opportunity cost. Every barrel of oil and every unit of gas that a Gulf state burns in its own power stations is sold to its own citizens at a price far below what it would fetch on the world market, because cheap energy is treated as a benefit of national wealth. That same barrel, if it were not burned at home, could be exported and sold at the full international price, earning hard currency that is the foundation of these economies. So when a Gulf state builds a solar park, the real prize is not the cheap electricity the panels produce. It is the oil and gas that no longer has to be burned to make that electricity, which is then freed up to be sold abroad. A solar plant in the desert is, above all, an export strategy.

This reframes the whole sector. The Gulf is not decarbonising its power system mainly because it is running out of fuel, which it plainly is not, nor mainly out of environmental conviction, though climate commitments do exist and carry real weight. It is doing it because the domestic burning of exportable hydrocarbons carries a hidden cost that is enormous and that does not appear anywhere on the household electricity bill. Reading Gulf power as a decarbonisation story leads to the wrong conclusions. Read it instead as a hydrocarbon-optimisation business, in which cheap clean power is a tool for freeing valuable fuel for export, and the region's behaviour makes sense.

> **The core logic**
>
> The Gulf builds solar and nuclear not because it is short of fuel, but because every barrel burned at home to make cheap domestic power is a barrel that cannot be exported at the world price. Clean power frees hydrocarbons for export. That single piece of arithmetic drives the sector.

A rough figure shows the size of the prize, though it should be read as an illustration rather than a precise account. Saudi Arabia has stated an aim of displacing the liquid fuels it currently burns for power. If it were to free up something of the order of a million barrels a day, roughly its average oil burn for power across the year, that is roughly 365 million barrels a year. Valued at a world oil price of, say, sixty to eighty United States dollars a barrel, that is of the order of twenty to thirty billion dollars a year of gross export value that domestic burning currently

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consumes, by a Planet Ganges calculation. The true net figure is lower, because production is limited by output agreements and because not every freed barrel would be sold at the full price, but even a fraction of that sum explains why the Kingdom is willing to build so much solar. The prize is measured in export earnings, not in cheaper electricity.

2. Power and water, born together

One structural feature, especially pronounced in the Gulf, shapes how plants are built and owned. In most of the Gulf, electricity and drinking water are produced together. The region has very little fresh water of its own, so it makes much of its drinking water by desalination, the process of turning seawater into fresh water, and desalination consumes enormous amounts of energy. For decades the standard solution was to build large coastal plants that produced electricity and water at the same time, using the waste heat from burning gas or oil to drive the desalination process. Power and water were, quite literally, made in the same building.

This is why the characteristic contract in the Gulf is not simply a power contract but an Independent Water and Power Project, in which a private developer builds a combined plant and sells both electricity and water to the state under a long agreement. It is why the largest energy companies in the region are power and water companies rather than power companies alone. And it is why the demand for electricity in the Gulf has always been bound up with the demand for water, so that a power planner in the region is really planning for two outputs at once.

This deep link is now beginning to loosen, and the reason matters for the future of generation. Newer desalination plants increasingly use a different technology, reverse osmosis, which pushes seawater through membranes using electricity alone rather than heat. Few new heat-based plants are now being built, and most future growth in desalinated water is expected to come from the electricity-driven kind. This has two consequences. Power plants no longer need to be sited and sized around water production, which frees generation to be built where the sun and land are best. And water itself becomes a large and growing consumer of electricity rather than a by-product of making it. As the region's desalinated water output rises in the coming years, reverse osmosis will become one of the significant new loads that the generation fleet must serve.

3. What the Gulf runs on now

Electricity demand across the Gulf reached about 845 terawatt hours in 2024, according to the Baker Institute, up from about 470 in 2010, as populations, cities and industries expanded. The defining fact is that about 90 per cent of generation still comes from burning natural gas and oil. Gas is the backbone in every single country. Oil, in the form of crude and fuel oil, is burned

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in large quantities in Saudi Arabia and Kuwait in particular. Clean sources, meaning nuclear, solar and wind, still supply a small share of the regional total, though that share is rising and is far higher in the United Arab Emirates than anywhere else.

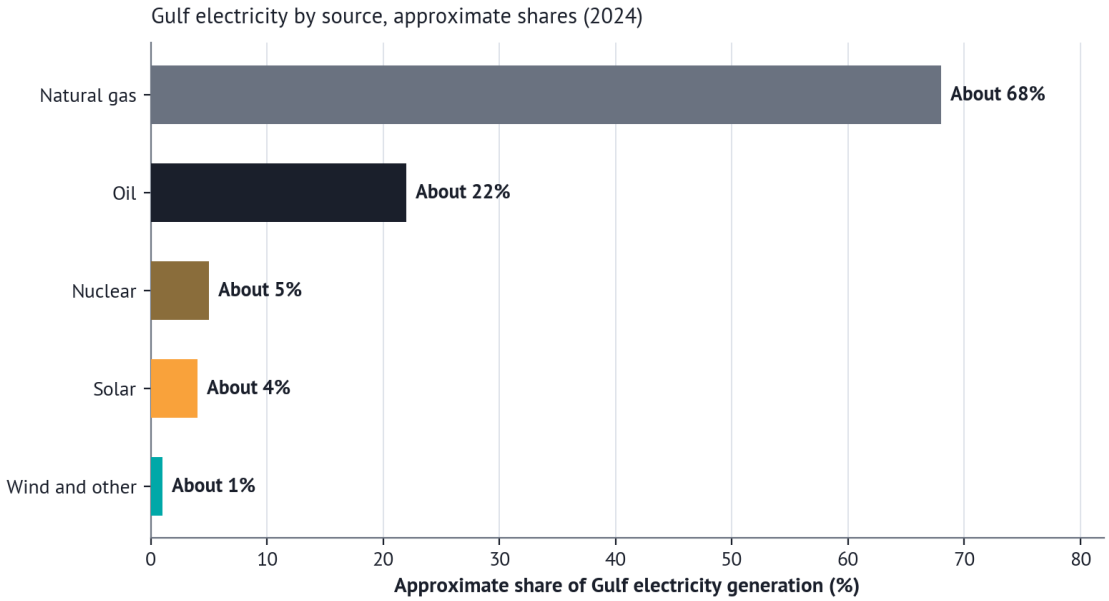

Exhibit 1. The Gulf's electricity generation by source, approximate shares for 2024.

Gas is the backbone across the region and oil adds a large share in Saudi Arabia and Kuwait. Clean sources are still small in the regional total. Built up from national and International Energy Agency data; shares vary by country.

No single body publishes a consolidated set of figures for the whole region, and several national figures conflict, so the regional picture is built up from sources of different quality and different years. National totals also leave out some captive and industrial generation, which is one reason they add up to less than the regional demand figure.

3.1 Saudi Arabia: gas and a great deal of crude

Saudi Arabia is the largest power system in the Gulf, at roughly half the regional total. It sent about 403 terawatt hours to the grid in 2024 and its customers consumed about 340, according to its General Authority for Statistics. Its generation runs on natural gas for a little under two-thirds of the total and on oil for most of the rest, with renewables still only a low single-digit percentage. What sets Saudi Arabia apart is the sheer quantity of crude oil it burns directly in power stations, which is a costly use of its most valuable export and exactly the practice its reforms are designed to end.

That oil burn, and its seasonal swing, is the biggest prize the Saudi transition is chasing. Counting crude, fuel oil and gasoil together, the Kingdom burns of the order of a million barrels a day for power across the year, and far more at the summer peak when air conditioning drives demand to its highest. Total oil burned for power hit a record of about 1.42 million barrels a day in June 2024. It eased in 2025, averaging about 0.99 million barrels a day, as more gas

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came on line and demand was milder. Then, in early 2026, a disruption to shipping through the Strait of Hormuz cut Saudi oil output and with it the associated gas that fuels many power stations, so more oil was burned to fill the gap, reaching a preliminary figure of about 1.16 million barrels a day in April 2026. That episode is a reminder that Saudi power remains structurally tied to the oil sector, because so much of the gas it burns is produced alongside oil.

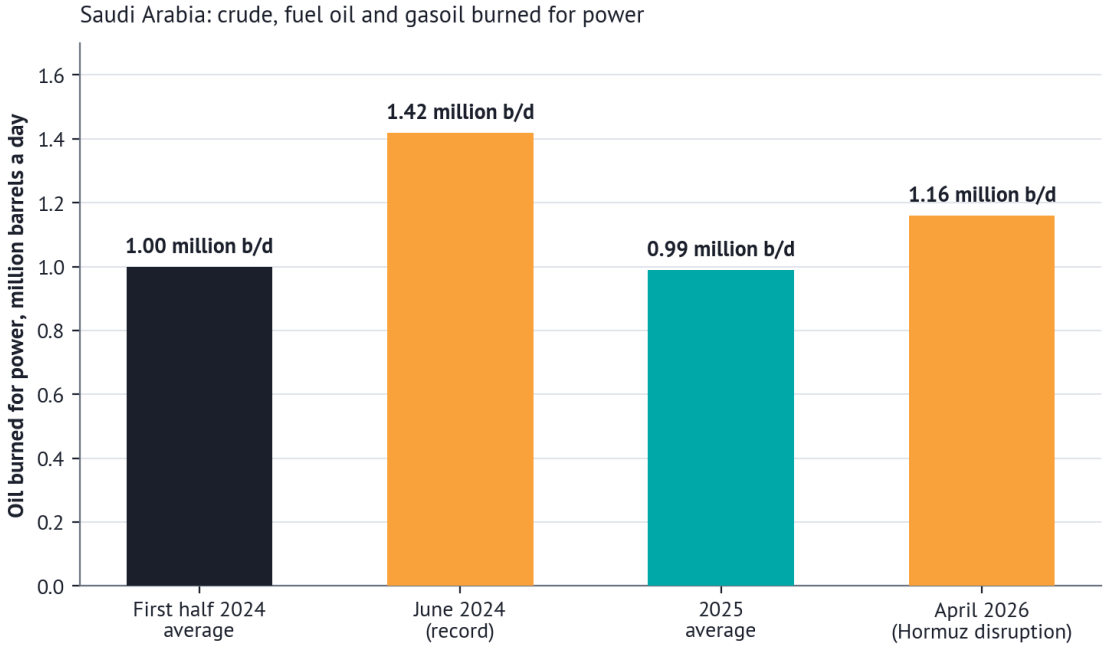

Exhibit 2. Saudi Arabia's oil burned for power, million barrels a day.

Crude oil, fuel oil and gasoil burned for power, around a million barrels a day on average with sharp summer peaks. The April 2026 figure reflects the Strait of Hormuz disruption and is preliminary. Source: JODI, MEES, S&P Global Commodity Insights, Rystad Energy.

3.2 The United Arab Emirates: the clean-power exception

The United Arab Emirates is the story of how fast a Gulf system can change when a state decides to. As recently as 2018, gas made almost all of its electricity, about 99 per cent. By 2024 and 2025 that share had fallen to around two-thirds, and clean sources, meaning nuclear and solar together, had risen to about a third. The country's energy ministry reported that clean sources supplied 32.4 per cent of its electricity in 2025, already at its target of 32 per cent for 2030, and in 2026 the government raised the target to 35 per cent by 2030-31. This is an unusually fast shift in a national generation mix, and it was achieved even as total demand kept climbing.

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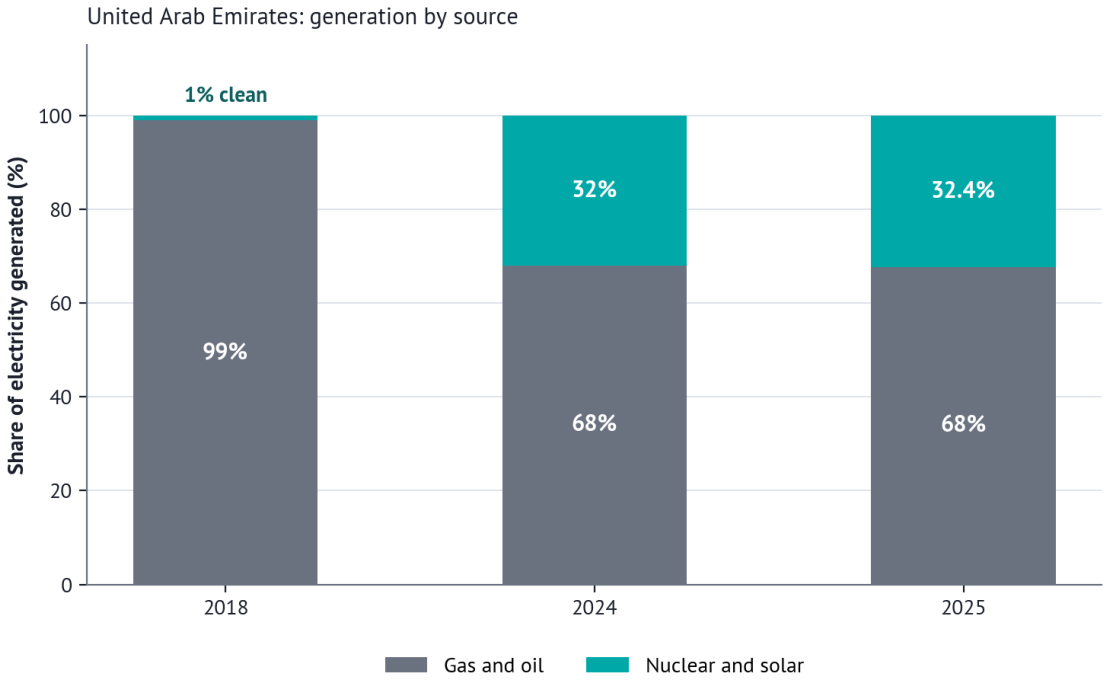

Exhibit 3. How the United Arab Emirates changed the way it makes power.

Gas fell from almost the entire mix in 2018 to about two-thirds, as nuclear and solar rose to roughly a third by 2025. Source: UAE Ministry of Energy and Infrastructure, International Energy Agency; figures approximate.

Two deliberate projects drove the change. The first is the Barakah nuclear plant, the first nuclear power station in the Arab world, which its operator says can meet up to a quarter of the country's electricity needs. The second is a series of very large solar parks that have set world records for the cheapest electricity ever contracted. A caveat applies. The United Arab Emirates stopped publishing a detailed national breakdown of its generation some years ago, so these figures are drawn from its ministry, from international agencies and from the disclosures of the emirate utilities, and they should be read as close approximations rather than exact official records. There is even a visible conflict in the headline generation total, which different credible sources put at either about 164 or about 193 terawatt hours for recent years, a gap too large to be a simple revision and probably a difference in what each figure counts.

3.3 The smaller states

Beyond the two giants, the pattern varies. Qatar generates almost all of its power from the natural gas of which it is one of the world's largest exporters, and doubled its solar capacity to about 1.7 gigawatts in 2025. Oman runs mainly on gas and is moving steadily into solar and wind through a well-run procurement system. Kuwait remains heavily dependent on gas and oil, has almost no utility-scale renewables, and is the one Gulf state that has struggled to generate enough power to meet its summer peak, resorting to load management in recent

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years. Bahrain is almost entirely gas-fired with only a sliver of renewables. Current data for these smaller states is limited, and the figures in Table 1 are best read as indicative.

Table 1. **The six Gulf power systems at a glance.**

Country	Electricity (latest)	Capacity	Mix and position
Saudi Arabia	About 403 TWh sent to grid (2024)	About 91 GW licensed (2023)	About 62% gas, most of the rest oil; renewables about 2%
United Arab Emirates	164 to 193 TWh (2024 to 2025; sources differ)	About 45 GW (2024)	About two-thirds gas; 32.4% nuclear and solar (2025)
Kuwait	About 90 TWh (2024)	About 20 GW (2023)	Gas and oil; summer peak near 17.6 GW strains supply
Qatar	About 56 TWh (2024, estimate)	About 10.6 GW thermal; solar 0.8 GW, about 1.7 GW from 2025	More than 90% gas; solar share rising
Oman	About 45 TWh (2024)	Not published as one national total	About 96% gas; renewables 4%, 1.55 GW contracted
Bahrain	Not published	About 5.0 GW (latest published)	Almost entirely gas; record peak 3.8 GW (2023)

Latest available figures, drawn from national statistics offices, utilities and procurers (GASTAT, UAE Ministry of Energy and Infrastructure, Kahramaa, Nama Power and Water Procurement, EWA), the International Energy Agency and the US Energy Information Administration. Years differ by country and several figures are contested; the Qatar generation total rests on a secondary estimate.

4. The fuels and the landmark assets

A small number of landmark projects carry much of the region's clean generation, alongside a large and still-growing gas fleet.

4.1 Natural gas, the backbone

Gas is the foundation of Gulf power and will remain so for years, even as clean sources grow. It is burned in every country and still makes the largest share of the region's electricity. Far from being phased out, gas capacity is still being built, both to replace the dirtier oil-fired plants and to provide the firm, around-the-clock power that keeps the system stable while solar is added around it. Saudi Arabia is building large new combined-cycle gas plants that will arrive in 2027 and 2028, the United Arab Emirates continues to add gas capacity, and Kuwait is planning a

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substantial gas build to close its supply gap. The Gulf's clean-energy push sits on top of a gas backbone that is itself still growing.

4.2 Oil, the fuel being designed out

The direct burning of crude oil and fuel oil for power is the practice the region, and Saudi Arabia above all, is working hardest to end, because it consumes the most valuable export in the least valuable way. The new gas plants and the new solar farms are, between them, aimed squarely at displacing this oil. Progress is real but slow and can reverse when gas supply is disrupted, as the disruption to shipping through the Strait of Hormuz in early 2026 showed. Oil burned for power is what the transition is designed to remove.

4.3 Nuclear, the Arab world's first

The Barakah nuclear plant in Abu Dhabi is the most consequential clean-power asset in the Gulf. It is the first nuclear power station in the Arab world, built as four large reactors of Korean design with a combined capacity of about 5,600 megawatts. Construction began in 2012, the first reactor was connected to the grid in 2020 and entered commercial operation in 2021, and the fourth and last entered commercial operation in 2024, completing the plant. It now produces of the order of 40 terawatt hours of electricity a year, which its operator puts at up to a quarter of the country's needs, making it the largest single power station in the United Arab Emirates. Saudi Arabia has a civil nuclear programme at a much earlier stage, with a site identified and international cooperation agreements signed, but no reactor yet awarded or built, so nuclear in the Kingdom remains a plan rather than a plant.

Table 2. The Gulf's nuclear position.

Asset	Country	Capacity	Status
Barakah	United Arab Emirates	5,600 MW (4 reactors)	Fully operating; about 40 TWh a year, up to a quarter of UAE needs
Saudi civil nuclear programme	Saudi Arabia	Two large reactors planned	Site identified, cooperation agreements signed, no award as of 2026

Barakah, in Abu Dhabi, is the first nuclear plant in the Arab world, built with Korean partners and operated by a national company. Source: Emirates Nuclear Energy Corporation, World Nuclear Association, 2026.

4.4 Solar, the record-breaker

Solar is the fastest-growing source in the Gulf and the one that has drawn the world's attention, because the region has contracted it at some of the lowest prices ever recorded. The physical build-out is led by a handful of very large parks. In the United Arab Emirates, the Mohammed bin Rashid Al Maktoum Solar Park in Dubai and the Al Dhafra and Noor Abu Dhabi

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plants in Abu Dhabi are among the largest single-site solar plants in the world, and Abu Dhabi is building a project that pairs about 5.2 gigawatts of solar with a very large battery to deliver round-the-clock clean power. In Saudi Arabia, the Sudair, Shuaibah, Sakaka and other parks anchor a pipeline that runs to tens of gigawatts.

Table 3. **Landmark solar and wind assets in the Gulf.**

Asset	Country	Capacity	Note
Mohammed bin Rashid Al Maktoum Solar Park	UAE (Dubai)	3,860 MW operating, over 8,000 MW planned	Among the world's largest single-site solar parks
Al Dhafra Solar	UAE (Abu Dhabi)	1,580 MW (about 2,000 MWp)	Set a world-record low solar price in 2020
Noor Abu Dhabi (Sweihan)	UAE (Abu Dhabi)	935 MW	Operating since 2019
Round-the-clock solar-plus-battery	UAE (Abu Dhabi)	5,200 MW solar + 19 GWh battery	Under construction; delivers about 1 GW around the clock
Sudair Solar	Saudi Arabia	1,500 MW	One of the Kingdom's largest solar plants
Al Shuaibah Solar	Saudi Arabia	About 2,060 MW combined	Shuaibah 1 set a world-record low solar price
Dumat Al Jandal	Saudi Arabia	400 MW	The first utility-scale wind farm in Saudi Arabia
Dawadmi wind	Saudi Arabia	1,500 MW	Awarded at a world-record low wind price in 2025

Leading non-fossil assets in the two largest Gulf systems. Solar parks are built in phases, so operating capacity is often below the planned figure. Source: developer and utility disclosures, 2025-26.

4.5 Wind and storage

Wind is a smaller but real part of the picture, concentrated in Saudi Arabia, where the Dumat Al Jandal project was the first utility-scale wind farm and the Dawadmi project was awarded in 2025 at a world-record low price for wind power. Storage has moved quickly from a novelty to a standard part of how the Gulf buys power. A growing share of large solar tenders in Saudi Arabia and the United Arab Emirates now includes batteries, because storage is what allows

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cheap daytime solar to be shifted into the evening, when demand for cooling is still high and the sun has gone. The Abu Dhabi round-the-clock project, which bundles a very large battery with its solar, is the clearest sign of where procurement is heading.

5. Record-low solar prices

The most striking economic fact about Gulf power is the price at which the region has contracted its solar electricity. The lowest winning bids have been signed at about one to one and a half United States cents per kilowatt hour, the unit in which electricity is sold, among the lowest prices for electricity from any source ever recorded. The Shuaibah 1 project in Saudi Arabia was contracted at about 1.04 cents, the Najran project at about 1.10 cents, and a wind project at Dawadmi at about 1.34 cents, itself a world record for wind. Nor are they isolated cases. Across roughly thirty awarded Saudi solar contracts, the large majority sit between about 1.2 and 1.9 cents.

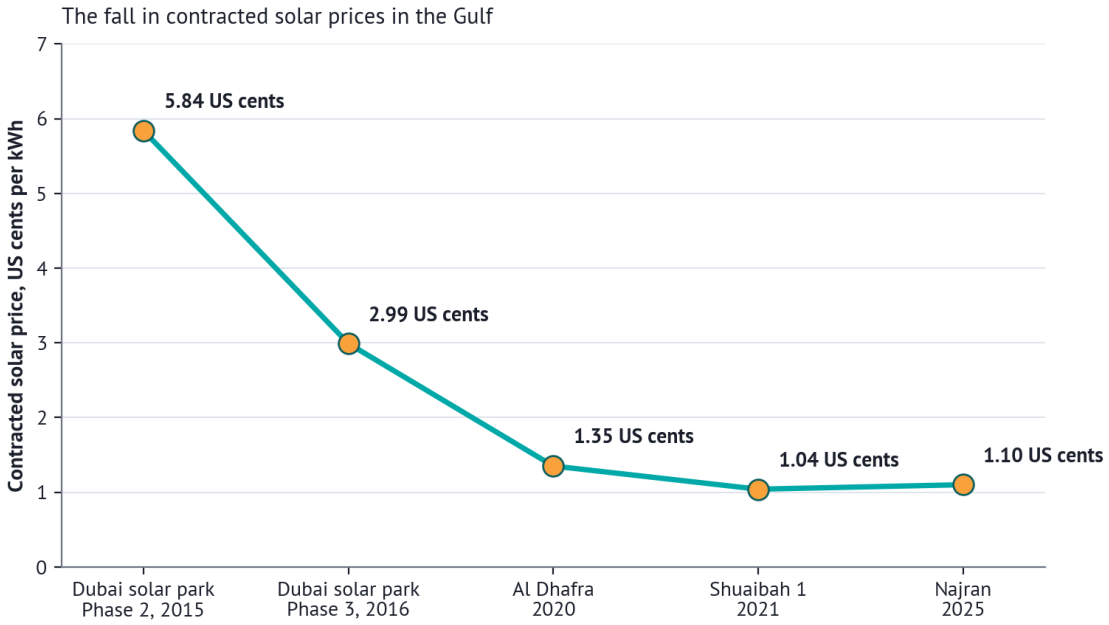

Exhibit 4. The fall in contracted solar prices in the Gulf.

From 5.84 US cents per kilowatt hour for the second phase of Dubai's solar park in 2015 to about 1 cent at recent Saudi projects. Source: Dubai Electricity and Water Authority; developer and procurer announcements.

Several conditions combine to produce these prices. The region has some of the best sunshine in the world, so each panel produces more than it would almost anywhere else. It has vast areas of flat, empty, state-owned desert land that is provided at little or no cost. It has access to very cheap, long-dated capital, because the projects are backed by wealthy governments and their sovereign wealth funds. The contracts are long, often twenty-five to thirty-five years, which spreads the cost over a long life and lowers the price of each unit. And the developers who bid are a small group of strategically motivated national champions who are willing to

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accept thin returns in exchange for scale. Together they have produced some of the cheapest electricity ever contracted.

One caution belongs with these numbers, and it should always travel with them. The record price is the price of the solar energy alone, at the moment the sun is shining. It is not the cost of running a whole power system, which still needs gas plants ready for the hours the sun is down, and increasingly batteries to shift solar into the evening, both of which cost money the headline figure leaves out. The record tariffs show how cheaply the Gulf can build solar energy, and therefore how cheaply it can free its hydrocarbons for export. They are not the true all-in cost of keeping the lights on.

6. The business: a single buyer and a few champions

The Gulf generation business is built on a model that explains who builds, who profits and why the prices are what they are. It is a single-buyer model. In each country, a state-owned body is the sole purchaser of power from generators. Private developers compete in a tender to build a plant, they bid the lowest price at which they are willing to sell its output, and the winner signs a long contract, usually for twenty-five to thirty-five years and priced in United States dollars, to sell everything the plant produces to that single government-backed buyer. The buyer carries the risk that demand might fall, and it has the credit standing of the state behind it, which is what makes the contracts bankable and the financing cheap.

In Saudi Arabia the buyer is the Saudi Power Procurement Company, which runs the tenders and signs the contracts. In Abu Dhabi it is the Emirates Water and Electricity Company. In Dubai it is the Dubai Electricity and Water Authority, which runs the Mohammed bin Rashid Al Maktoum Solar Park. In Oman it is Nama Power and Water Procurement, and in Qatar, Kuwait and Bahrain the national utilities and procurement authorities play the same part. The state often keeps an equity stake in the projects as well, so it sits on both sides of the deal, as buyer and as part-owner.

The building of new capacity is dominated by a small number of state-backed developers who have grown into substantial global businesses on the back of this model. Two stand out. ACWA Power of Saudi Arabia, anchored by the Kingdom's sovereign wealth fund, held about 93 gigawatts of gross power capacity across 15 countries at the end of 2025, more than half of it renewable, and describes itself as the world's largest private water desalination company. Masdar of Abu Dhabi, owned by a group of Emirati state entities, holds a clean-energy portfolio of tens of gigawatts and has set a target of reaching 100 gigawatts by 2030. They are national champions, funded by sovereign capital, able to commit very large sums at once and to take a long view, and their scale is a deliberate instrument of state economic policy. Alongside them,

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international utilities from Korea, France, Japan and elsewhere take minority stakes, and Chinese firms supply much of the equipment.

> **Why this model matters**
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> Gulf generation runs through a small number of state-backed players rather than a competitive private market. Sovereign balance sheets give them very cheap capital and the patience to wait out a thirty-year plant, which is a decisive advantage in an industry where the cost of capital is one of the largest inputs into the price of power. It is a big part of why the region can contract power so cheaply.

According to the Baker Institute, renewable generation alone drew about 8.3 billion United States dollars of investment across the Gulf in 2024, and could draw about 12 billion dollars a year. In Saudi Arabia, renewable power purchase agreements signed by the Saudi Power Procurement Company represented about 4.8 billion dollars of investment for about 6.2 gigawatts in the whole of 2023, and about 10.5 billion dollars for 15 gigawatts in the first nine months of 2025. New gas plants add billions more on top. Reliable, consolidated figures for the total value of generation across the whole region are not published, and the commercial market-size reports that circulate diverge so widely and rest on such unclear methods that they cannot be relied on. What can be said with confidence is that the sums are large, that they flow through a handful of sovereign-backed buyers and developers, and that the region can build new generation, especially solar, at some of the lowest costs anywhere.

7. Why the Gulf is changing

Opportunity cost is the hard engine of the Gulf's shift, but it is not the only force, and a full picture needs the others alongside it.

7.1 Opportunity cost and energy security

This is the strongest force. Every unit of clean power frees a unit of exportable hydrocarbon, and in a region whose economies rest on selling oil and gas, that is worth a great deal. In Saudi Arabia the explicit aim is to displace the crude and fuel oil burned for power so it can be sold abroad. In the United Arab Emirates, where less oil is burned for power, the equivalent prize is avoiding the need to import expensive gas. Either way, the logic is the same: domestic clean power protects the export business that underwrites the state.

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7.2 Economic diversification

The second force is the wider effort to build economies that do not depend so completely on selling oil. Saudi Arabia, through its Vision 2030 programme, and the United Arab Emirates, through its own long-term strategy, are trying to create new industries and companies beyond the oil sector. A domestic clean-energy industry is part of that ambition, and the state-backed national champions are being deliberately built into global businesses that can export their expertise. The nuclear operator in Abu Dhabi and the big solar developers are, in this sense, meant to become exports in their own right.

7.3 Climate commitments

The third force is a real and public commitment to reducing emissions, which outsiders sometimes underestimate. The United Arab Emirates has committed to reaching net zero emissions by 2050, and Saudi Arabia by 2060. Both have backed those pledges in visible ways. The United Arab Emirates hosted the COP28 global climate summit in 2023, which produced an agreement, sometimes called the UAE Consensus, that included a global goal of tripling renewable energy capacity by 2030. Each state has set its own clean-power targets: Saudi Arabia has aimed for half its electricity from renewables by 2030, the United Arab Emirates for 35 per cent clean electricity by 2030-31, and Oman, Qatar, Kuwait and Bahrain have each set targets of their own. For an economy that lives by selling hydrocarbons, a credible climate position is also a commercial asset, because it protects access to markets and capital that are increasingly sensitive to carbon. So while opportunity cost is the hard economic engine, the pull of the region's own net-zero targets is real, and it points in the same direction, towards cleaner generation.

7.4 Cost

The fourth force is simply that clean power has become the cheapest new power the region can build. With solar contracted at around one to two cents a unit and wind not far behind, clean generation now costs less than the fuel alone would cost in a gas or oil plant if that fuel were valued at its export price. That makes the shift close to self-financing at the level of the whole system, quite apart from the export prize or the climate targets. Cost, export value and policy now point the same way.

8. Who uses the power

A generation fleet is built to serve demand, so the shape of that demand explains a great deal about what gets built. The Gulf's demand has a distinctive shape driven above all by one thing: cooling. In a climate where summer temperatures are among the highest on earth, air

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conditioning is essential, and it dominates the load. Across the Middle East and North Africa, according to the International Energy Agency, cooling accounts for close to half of the peak demand for electricity and about a quarter of all the electricity used across the year. This gives the Gulf a sharply seasonal load that peaks in the summer afternoons and evenings, which in turn shapes the generation mix. Cheap solar matches the midday cooling peak well, but the demand carries on into the evening after the sun has set, which is exactly why storage and firm gas capacity remain essential and why batteries are now bundled into solar tenders.

On who consumes the power, Saudi Arabia offers the clearest window, because it publishes a proper breakdown, and its pattern is characteristic of a wealthy, hot, highly urbanised society. Homes take almost half of all the electricity, about 47 per cent, far more than industry, which takes under a fifth. Commercial users take about 17 per cent, government about 11 per cent and other users the remainder. That dominance of household demand is the signature of a place where air conditioning runs in homes for much of the year.

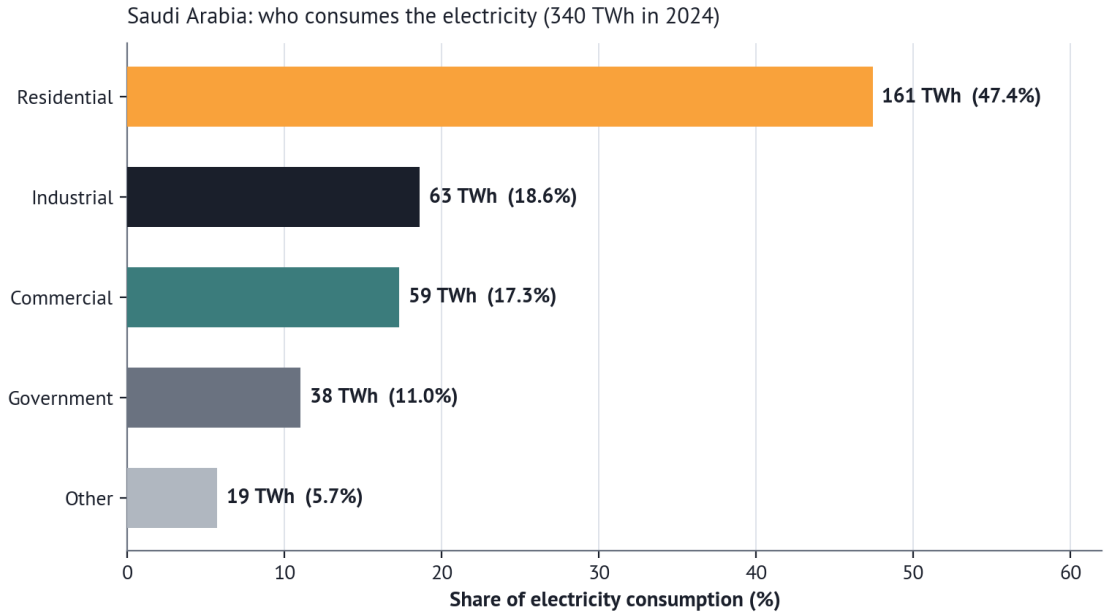

Exhibit 5. Who consumes Saudi Arabia's electricity, 2024.

Homes take almost half of the total, a pattern driven by cooling in a hot, urbanised society. Saudi Arabia consumed about 340 terawatt hours in 2024. Source: Saudi General Authority for Statistics, 2024.

The direction of demand matters as much as its shape. The region's electricity use has grown quickly for two decades and is expected to keep rising strongly, driven by population growth, by industry, by the shift of desalination onto electricity, and increasingly by new large loads such as data centres, which the Gulf is courting as part of its diversification. The Baker Institute projects Gulf demand of about 1,073 terawatt hours by 2030, and the International Energy Agency expects electricity demand across the Middle East and North Africa to rise by about half again by 2035. A generation fleet that must grow that much, while also changing its fuel mix, faces a very large building task.

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9. Announcements against delivery

The defining tension in Gulf power today is the gap between what has been announced and what has actually been built. Governments in the region set very large targets, and they have the capital and the political will to pursue them, but building power plants takes years, and targets have often been revised rather than abandoned when they slip. The announced target and the delivered megawatt always need to be read separately.

The clearest illustration is Saudi Arabia. The Kingdom has tendered an enormous renewable pipeline, of the order of 64 gigawatts, and signed contracts for about 43 gigawatts of it, at record-low prices. Yet by the end of 2025 only about 12.3 gigawatts was actually connected to the grid and generating. Its stated goal of drawing half its electricity from renewables by 2030 is, on any realistic reading, very unlikely to be met. Even if every contract already signed were running by 2030, the generation it would produce would amount to something close to a fifth of the Kingdom's electricity, not a half. Meeting half of a projected 2030 demand of about 551 terawatt hours would take something of the order of 116 gigawatts of solar and wind running at typical desert capacity factors, nearly ten times what was connected at the end of 2025. On current evidence, Saudi Arabia will build one of the largest solar-and-storage programmes in the world and still fall short of its own 2030 share target, while displacing a meaningful amount of oil in the process.

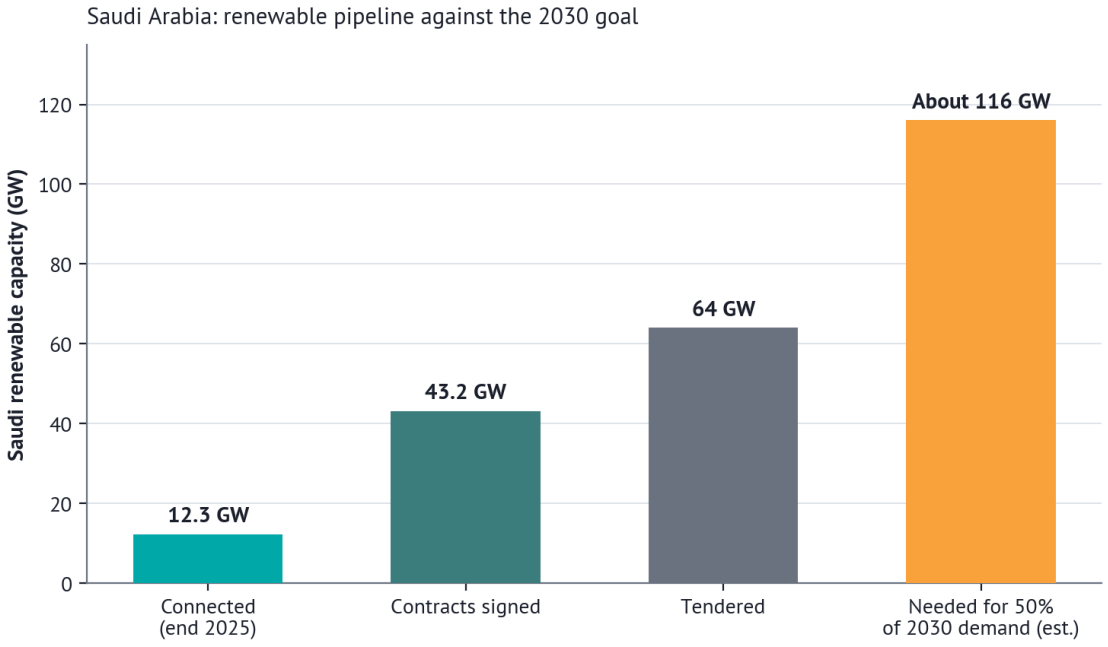

Exhibit 6. Saudi Arabia: a large pipeline against a small operating base.

Only about 12.3 GW was connected by the end of 2025, against 64 GW tendered. The final bar is an estimate of the capacity needed to meet half of projected 2030 demand, calculated for this paper. Source: Saudi Ministry of Energy; Baker Institute; Planet Ganges estimate.

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The rest of the region ranges around that picture. The United Arab Emirates is the exception that is broadly on track, having already reached about a third clean, though its challenge is that fast-growing demand, including from data centres, could keep gas generation flat or rising even as clean capacity is added. Oman is moving steadily and has a credible chance of meeting its renewable goals through a well-run pipeline. Qatar, which aims for about 4 gigawatts of solar by 2030, can reach that more modest goal if it completes its planned large solar plant. Kuwait and Bahrain are likely to lag well behind, Kuwait because it is struggling even to meet peak demand and has almost no renewables, and Bahrain because its programme is very small. The regional pattern, then, is of states all moving in the same direction, towards more solar and, in one case, nuclear, but from different starting points, at very different speeds, and mostly slower than their announcements suggest.

On the technologies themselves, the pipeline is clear enough in shape even if its timing is not. Solar will scale fastest, increasingly paired with batteries. Gas will keep growing as the reliable core of the system and as the replacement for oil. Nuclear beyond Barakah is a long-term possibility rather than a near-term certainty. Storage is becoming standard. And green hydrogen, made by using renewable power to split water, is beginning to appear in very large projects, most notably in Saudi Arabia, though these will consume generation capacity rather than supply the grid. The direction is not in doubt. The pace is the open question, and the safe assumption is that delivery will run behind announcement.

10. Conclusion

The Gulf power story comes down to a handful of ideas. The first and most important is opportunity cost. The region builds solar and nuclear not because it is short of fuel but because every barrel burned at home is a barrel that cannot be sold abroad, so clean power is, above all, a way of freeing valuable hydrocarbons for export. Read the sector as a hydrocarbon-optimisation business and it makes sense; read it as a simple decarbonisation story and it does not.

The second idea is that Gulf power is structurally joined to water, through the desalination that the region depends on, which shaped how its plants were built and owned and is now turning water into a major new consumer of electricity. The third is that the region has contracted some of the cheapest electricity ever recorded, through a rare combination of sun, land, sovereign capital and long single-buyer contracts, but that the record prices are the cost of solar energy alone and not of a whole reliable system. The fourth is that the business runs through a small number of state-backed buyers and developers rather than a competitive market, which is what makes its capital so cheap and its champions so large.

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The fifth idea concerns how to read Gulf announcements. The region sets very large targets and delivers against them slowly, so the gap between the announced goal and the connected megawatt is the measure that matters. The United Arab Emirates has reached about a third clean. Saudi Arabia will build an enormous programme and still miss its headline 2030 goal while freeing a great deal of oil. The smaller states will move at their own pace. In practice this means valuing domestic fuel at its export price, treating water and power as one system, reading record tariffs for what they include and exclude, and separating what has been announced from what has been built.

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Method and sources

This paper is based on secondary research from published sources. Official disclosure across the region is uneven, which shapes what can and cannot be said with confidence. Saudi Arabia's General Authority for Statistics publishes usable figures for generation, consumption and demand by customer type, and these underpin the Saudi figures. The United Arab Emirates publishes less at the national level, so its figures are drawn from its Ministry of Energy and Infrastructure, from the International Energy Agency, and from the disclosures of the emirate utilities and developers, and they are best read as close approximations. For the smaller states, current data is limited, and the figures shown are indicative. Oil-burn figures are drawn from the Joint Organisations Data Initiative and from established energy analysts. Nuclear figures are from the operator and the World Nuclear Association. Tariff and project figures are from published auction results and developer disclosures. The regional demand total is from the Baker Institute; national figures are of differing quality and years.

Official and regulatory bodies provide the core data, supported by the International Energy Agency, independent research institutions and company disclosures. Where credible sources conflict, the conflict is flagged. The most important case is the United Arab Emirates' annual generation, which differs by a wide margin between sources, probably because of what each includes. Two figures are Planet Ganges calculations rather than published statistics, and both are identified in the text or exhibit captions: the illustrative export value of displacing oil burned for power, and the estimate of about 116 gigawatts of renewable capacity needed to meet half of Saudi Arabia's projected 2030 demand, which assumes a projected demand of about 551 terawatt hours and a capacity factor of about 27 per cent. Where a figure is a target or a projection rather than a delivered outcome, it has been described as such. The 2026 figures relating to the Strait of Hormuz disruption are preliminary, and all figures are accurate to the period described.

Full disclosure. Planet Ganges uses artificial intelligence tools to support secondary research, data synthesis and the drafting of text and exhibits. The research questions, analytical direction, source selection, review and conclusions are the firm's own. Material figures have been traced to the sources listed. Where a statement rests on general industry reporting rather than a specific disclosure, the text says so.

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