



Oil and Gas in Lebanon: Time to Rethink Expectations

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Key messages

- Lebanon’s hopes of “entering the club of oil producers” have not materialized.
- The country’s chances of becoming a producer are highly uncertain. Many of the reasons for this are beyond its control.
- The socioeconomic benefits of any oil and gas production will likely be smaller than politicians have claimed.
- Too much focus on burning gas for electricity risks undermining solar and wind as energy sources, which could have greater long-term benefits and potential.
- Lebanon needs a new, more realistic vision of what oil and gas can do for its economy and its people.
- The current moment, though very painful, offers leaders a chance to build a new energy strategy for implementation when Lebanon’s economic and political fortunes improve.

Introduction

Lebanon's hopes of "[entering the club of oil producers](#)" have not materialized. After almost a decade of high expectations, the country still has no proven reserves of oil or natural gas. Instead, the one well drilled so far, by partners Eni, Total and Novatek, [revealed](#) only trace amounts of gas. Now the government has extended the companies' deadline to explore until August 2022 and has [postponed](#) a second oil and gas licensing round.

These disappointments are just one of many fronts in the crisis the country is weathering. In the last 18 months, Lebanon defaulted on its Eurobond debt and saw its financial sector unravel. One government resigned and its replacement took a year to form. An explosion in the port of Beirut killed hundreds and caused billions of dollars in damage. The [coronavirus](#) pandemic forced the population indoors, worsening unemployment, poverty and public health. Meanwhile, the energy sector has been dogged by technical failures and corruption allegations: power cuts now last all day in some places, Lebanese prosecutors have accused officials of [conspiring](#) to import adulterated fuel for generating electricity, and the U.S. has [sanctioned](#) a former minister for allegedly demanding bribes related to a power plant. Now many are wondering: what's still possible?

Lebanon needs a new, more realistic vision of what oil and gas can do for it. For years, politicians in Beirut have told the public that exporting fossil fuels would transform the country's failing economy, and that generating electricity from gas would turn around its mismanaged power sector. These populist narratives, in turn, have fed vague, unrealistic expectations across society. To address them, the following five key questions require realistic answers:

- How much oil and gas does Lebanon have?
- When, if ever, will Lebanon start producing oil and gas?
- Will Lebanon find willing investors for its oil and gas projects?
- What economic benefits would fossil fuel exports bring?
- What would be the benefits of burning gas for electricity?

From our analysis and consultations with a range of stakeholders the country, we conclude that the country's chances of becoming an oil and gas producer are highly uncertain, for reasons largely outside its control. Producing oil and gas also isn't a solution to Lebanon's economic problems and could make some of them worse. Likewise, we find that overselling the upsides of running power plants on gas risks making power sector reform harder rather than easier. Leadership should focus instead on building a more sustainable economy and on developing solar and wind power, which could offer greater long-term benefits.

In this briefing we do not try to predict the future—especially considering how fast conditions on the ground are changing. Instead, we offer an evidence-based warning about the wisdom of Lebanon staking its economic or energy future on oil and gas. The conclusions and observations are based on analysis of the current situation and on the experiences of fossil-fuel dependent countries and other prospective new producers.

The current moment, though very painful, offers the country a chance to build a new energy strategy that it can start to implement when its economic and political fortunes improve. This strategy should realistically and sustainably meet people's needs, rather than make them worse.

1. How much oil and gas does Lebanon have?

Politicians have made vastly differing claims about the size of Lebanon’s natural resource wealth, based on limited information.

Public discourse around Lebanon’s fossil fuel endowment has become very politicized. A 2012 seismic study by the British firm Spectrum estimated recoverable gas reserves at 25.4 trillion cubic feet (tcf). This estimate covered a limited area offshore and was never endorsed officially by the Ministry of Energy and Water (MEW). However, just a year later, politicians in the majority were already predicting four times the amount of gas, and nearly a billion barrels of oil, with many claiming the new numbers were based on interpretation of seismic data. “With more surveys and analyses,” the then-Energy Minister told Reuters, “we are getting higher results and higher expectations.” Events elsewhere in the Levant Basin—notably, a US-funded geological study and gas discoveries by Israel and Egypt—fueled the hype. Opposition figures, meanwhile, pushed a counter-narrative—said it was “a lie”, for instance, to call Lebanon an oil producer, and that the country had “no trace of gas,” either.

A single dry well doesn’t necessarily mean failure, either for Block 4 or for oil and gas exploration in Lebanon overall. Big discoveries in frontier basins often take multiple tries across several years.

The actual size of the country’s oil and gas reserves remains in doubt.

The only well drilled to date, in Block 4, has yet to lead to any commercial discoveries. Announcing the results, the MEW [said](#) it had uncovered trace amounts of gas and some evidence of a “petroleum system” but no reservoir of oil or gas. The energy minister described the findings from the block as “a wealth of information” that will make drilling Block 9 easier.

While these disappointing results aren’t a predictor of failure, they raise concerns that the odds of finding commercial quantities of oil and gas could be long. A single dry well doesn’t necessarily mean failure, either for Block 4 or for oil and gas exploration in the country overall. Big discoveries in frontier basins often take multiple tries across several years. Projects in frontier areas like Lebanon have especially low success rates, though—just seven percent according to a [study](#). The huge hype around [Africa](#)’s under-explored petroleum basins is a recent example: since 2001, only six out of twelve countries that looked for first oil or gas actually found enough for companies to reach a final investment decision (FID) on a project. Out of those, only three have started producing.

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2. When, if ever, will Lebanon start producing oil and gas?

The political narrative for oil and gas has never had a clear, achievable timeline. This has helped mask inertia and routine delays.

Government statements about the start of production have been unrealistic and confusing. Officials have at times [acknowledged](#) the road ahead was long and uncertain, and that deadlines were slipping. But just as often, they have used misleading language to stoke unjustified excitement—for instance, by saying that a licensing round [had](#) put Lebanon “in the club of oil producers” or that offshore drilling “fulfilled” the country’s “[dream](#)” of becoming a producer.

Even before the current crisis, Lebanon’s track record in the sector was one of shifting deadlines and multi-year delays. This is a common challenge among prospective oil and gas producing countries, which [tend to experience significant delays](#) in project timelines. In Lebanon’s case these were due in part to the internal divisions that dominate its gridlocked, blame-shifting political culture. Two years passed between ratifying the Offshore Petroleum Resources Law (OPRL) and the establishment of the Lebanese Petroleum Administration (LPA) – the regulatory body. Even more time – five years – passed between the launch of the first bidding round in 2013 and the closing of that round in 2018. The second round has been delayed twice; it’s now unclear when it will happen. Offshore drilling “was supposed to kick off in [2013](#),” not 2020. The MEW promised a first well in Block 9 by the [end of 2020](#); now the companies have until at least [August 2022](#). A former energy minister even [said](#) that oil would start flowing no later than 2017 or 2018.

Lebanon is unlikely to produce any oil or gas until sometime in the 2030s—if production ever starts.

In the best of conditions, large upstream projects take years to develop and have trouble keeping to schedule. One recent [survey](#) found that globally, the average time between discovery and production was 7.5 years. An EY [study](#) found that nearly four-fifths of large upstream oil and gas projects fell behind schedule. In 2019, the LPA predicted that first oil was still 6 to 11 years away, and that was before the dry Block 4 well, the two-year delay in drilling Block 4, the collapse of the financial sector, the resignation of the government or the pandemic.

The longer it takes Lebanon to find oil and gas, connect with willing markets and start producing, the higher the chances are that prices will have dipped too low or the energy transition will favor cleaner sources of energy. This decade’s new oil and gas projects will operate for an average of 30 years—well into the 2050s, by which time the governments of the world’s largest economies have pledged to be carbon-neutral. This means that even under the best timeframes, Lebanon’s hypothetical offshore fields would be pumping well into the era of oil’s (and possibly gas’) decline.

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3. Will Lebanon find willing investors for its oil and gas projects?

Politicians in Beirut have made big [pronouncements](#) for years about luring new investors to the country with oil and gas. In reality though, outside interest in the sector was low even before the pandemic caused a global economic slump and the energy transition started gaining momentum. During the first licensing round nearly a decade ago, 23 companies prequalified, including most of the big international players. A total of five blocks were on offer, but in the end only two—Blocks 4 and 9—drew bids, both from the same consortium made up of Eni, Total and Novatek. Experts from within the industry confirmed to us that the government has delayed the second round partly because officials fear no one will bid, not just because of the pandemic and the economic crisis. Pushing back licensing processes does not necessarily deter investment in itself, and Lebanon is by no means the only country to have done so recently. But a number of additional factors make it a marginal destination for future oil company investment:

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If the reserves aren't sufficiently large, companies won't agree to extract them.

The consortium exploring Blocks 4 and 9 hasn't publicly said how much oil or gas it must find before taking FID. But large deepwater projects like the Lebanese government has envisioned can carry hefty price tags, with upfront capital costs possibly running into the billions of dollars. Companies looking for oil and gas won't extract what they find unless it is a volume large enough to recoup costs and make a good return—typically around 10 percent of the capital they expect to invest.

Relatively high production costs could make Lebanon less attractive in an age of volatile, declining oil prices.

No one knows just how much it would cost to produce Lebanon's hypothetical oil and gas reserves. In an age of high uncertainty around oil prices, that's a potential barrier to investment. Since Lebanon does not have an oil refinery, foreign refiners, traders or others would need to buy all of the oil produced. Lebanon's "[breakeven](#)" oil price—that is, the average price a company would need to get for the oil over the life of a project to achieve its expected return—is unknown. But the sort of projects the Lebanese government wants tend to be relatively high cost, meaning that there are at least two unknowns that could steer away investors:

The high likelihood of future oil price shocks.

Whether caused by market problems or unforeseen events like the coronavirus pandemic, the high chance of such disruptive events increases the risks of investing in Lebanese oil. When prices fall, oil companies' perceptions of risk go up and their available investment capital goes down. This can cause them to delay or drop investments, even in projects that still look profitable on paper. In April 2020, [Rystad](#) forecasted that the 2020 price shock would delay USD 195 billion in new non-shale oil and gas projects. This included \$55 billion worth in the Middle East—the single biggest drop worldwide.

The global transition to cleaner energy.

Moving towards renewable energy sources will also lower oil prices in the longer term. No one knows how global oil demand will look going forward, whether the world has already reached “peak oil,” or how much demand will be permanently lost. Though prices will likely rise in the next few years, a growing number of analysts and international oil companies (IOCs) are cutting their long-term projections—Total has lowered it to around [\\$50](#) per barrel, for instance, and Eni to [\\$60](#). If world oil consumption were to shrink enough to keep global warming under 2 degrees Celsius, the long-term price could even land somewhere in the [\\$40s](#).

Transportation issues and Europe's transition to cleaner energy pose serious challenges to the export of Lebanese gas.

In past years, government and industry analysts imagined a part of Lebanon's gas going to Europe, which was looking to cut its reliance on Russia. Natural gas's future in Europe looks shaky, however. The continent is already experiencing a [gas glut](#) as it mops up supplies that used to go to Asia. Just in the last year, European energy companies have [scrapped](#) a multi-billion dollar liquefied natural gas (LNG) import deal and [abandoned plans](#) to build a new gas import terminal, partly over environmental concerns. This trend is unlikely to change in the near future, as the European Investment Bank has [signaled its intentions](#) to phase out funding for natural gas projects and the European Commission is [looking at options](#) for curbing methane-heavy LNG imports.

OECD gas demand has grown by only around [one percent](#) a year this century and most projections show it flat-lining over the next decade, influenced by falling costs for renewables, improvements in clean energy storage and green recovery policies and programs. These include the EU's 2050 climate neutrality goal and its new target for a 55 percent greenhouse gas reduction by 2030, both of which could mean a faster transition away from imported fossil gas, if policies and investments match commitments. A recent [modelling](#) by the European Commission found that with the new EU target, gas demand on the continent should fall by around 30 percent by 2030 compared to 2015, and that EU gas imports would drop by 13 to 16 percent.

Challenges in getting Lebanese gas to market could also make it relatively expensive for European buyers. Ideas for [various pipelines](#) linking Lebanon to Europe (or neighboring countries) have been floated, but regional competition, geopolitics, insecurity and funding problems make all of them long shots. This leaves the option of exporting LNG, which comes with high infrastructure and transportation costs. Estimating these now is difficult, but it does seem likely that Lebanese LNG would struggle to compete on price with Russia's cheapest imports, which have sold for as little as \$2/MMBtu (metric million British thermal unit). Globally, LNG is also an industry with some big unanswered questions. Price trends are uncertain, new production outstripped growth across the 2010s, and there were already too many projects in the global queue even before the pandemic hit.

As delays and obstacles to export sales have mounted, the government has reimagined its hypothetical gas as a fuel solely for domestic consumption. This shift, while understandable, might not offer producer companies the most attractive value proposition. Total, Eni and Novatek haven't said publicly whether Blocks 4 and 9 would need an export gas component to be commercially viable, and we have not analyzed the question ourselves. However, the Lebanese economy has relatively few forward linkages for natural gas. Fertilizers, petrochemicals and plastics are all imported; piped gas isn't used for cooking, heating or heavy industry. This leaves the country's chaotic electricity sector as the anchor customer—a [tough prospect](#) even in less troubled markets, let alone Lebanon, where the main buyer would be Électricité du Liban (EDL), the mismanaged, perennially insolvent state-owned utility. Absent a range of long discussed but largely unimplemented policy, technical and institutional reforms, producer companies would struggle to fetch high prices for any gas they sold to local power plants. Even assuming, then, that gas will be the dominant fuel in the country's future energy mix—an assumption addressed below—companies might be hesitant to continue looking for it offshore if the power sector is their only possible source of return.

At the same time as buyer countries shift to cleaner energy, foreign oil companies themselves will be under mounting pressure to decarbonize their operations. Expansion into Lebanon may run counter to that. Even if Lebanon's oil and gas can be produced and transported cheaply enough to find foreign buyers, the IOCs extracting it will likely face calls from investors, the climate community and some governments to lower their own emissions. The extent of the pressure will depend partly on different countries' economic recovery policies and timeframes, especially in the U.S., Europe and China. Evolving science and norms—on the dangers of methane, for instance—could particularly affect gas projects.

Thus far, oil and gas companies' climate [commitments](#) don't align with Paris Agreement goals, leading some activists to accuse them of "greenwashing." Most are also still trying to boost production and are [rewarding](#) managers for extracting more. In a possible sign of things to come, though, Eni's emissions reduction [plan implies](#) the company would cut around a fifth of its production within 15 years and greenlight only few new projects after 2025.

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Faced with such big shifts, pressures and unknowns, some oil companies are already changing their strategies in ways that don't favor Lebanon.

Most international oil companies (IOCs) are already shifting their focus away from growing reserves to cutting costs and propping up their shareholder returns, which have been falling for years. Three trends in particular could erode prospects for Lebanese oil and gas:

- Companies are choosing cheaper projects with low breakeven prices and quick lead times—the opposite of the sort of deepwater output that would be most likely in Lebanon. Total recently [said](#) it was taking a hard look at projects with “reserves beyond 20 years and high production costs,” since it expected oil demand will have peaked “beyond 2030.”
- They are also focusing on basins they know well, and exploring less in frontier areas like the Levant. There is already more than enough oil and gas discovered to meet projected demand up until 2040. Many big companies look poised to keep their exploration budgets low this decade, and most new production will come from already-developed fields. Several major companies are withdrawing from frontier oil exploration altogether.
- This decade, companies will also approve fewer projects overall. New project approvals fell to a [40-year low](#) in 2020, and some firms are walking away from already-planned projects. Between Q4 2019 and Q2 2020, IOCs wrote down an unprecedented [\\$87 billion](#) in assets, including \$9.3 billion from Total and \$4.7 billion from Eni. Off the record, some oil company executives are saying this was only a first cut, and that the age of canceled projects is just starting.

4. What economic benefits would fossil fuel exports bring?

For nearly a decade, top government officials have made grand—and vague—pronouncements about how oil and gas would transform Lebanon’s economy.

The prevailing political narrative has described the start of oil production as an economic “[turning point](#)” and a beginning of a new era. Soon after the 2012 Spectrum study and before the launch of the first bidding process that same year, government-sponsored [billboards](#) started cropping up in cities, praising oil money as a game changer for everything from transportation to health care and defense. Leading voices vowed that having oil would [give Lebanon](#) “political, economic and financial independence”—and that the [earnings from it](#) would create thousands of jobs, cover the public debt and spread wealth among the population.

Such high hopes are certainly understandable today, given the desperate economic situation. The last year [saw](#) a projected 25 percent GDP contraction, triple-digit inflation, a 16 percent [budget deficit](#) and the withdrawal of key food, fuel and medicine [subsidies](#). At the [household level](#), at least 30 percent have lost all their income, nearly three quarters have unstable or no employment and 94 percent are earning less than minimum wage. This minimum wage used to be equivalent to around \$450 per month, but is [now worth around \\$30](#) on the black market. A third of Lebanese can afford only half the food they were buying a year ago, four fifths cannot pay their children’s school fees and the national poverty rate may have already passed [50 percent](#).

Yet even if Lebanon did start producing oil and gas, the socioeconomic benefits of exporting them would not be transformative.

Oil and gas exports could conceivably help address these fiscal and monetary crises. An influx of petrodollars could help reduce budget deficits and fund social protection measures. Lebanon could use the money to pay down its debt, though one [study](#) concluded that the total public earnings from one large gas field would cover the country’s debt payments for just a single year. Oil and gas export income could help prop up the dollar-pegged pound as Lebanon tries either to make its economy less dependent on dollars or find new sources for them.

The populist story about oil and gas’s huge economic promise is not supported by numbers, however. Neither the government nor external actors like the World Bank or IMF have quantified Lebanon’s possible earnings from extraction, or the value of its (hypothetical) oil and gas reserves. This would require further exploration and appraisal work. Two pre-coronavirus studies from local banks predicted the country could earn [\\$8 billion](#) from oil and gas the first year and that its reserves could be worth more than [\\$250 billion](#) over 20 years. Both relied on questionable assumptions, though, including very high production rates and prices. The Council of Ministers said it had factored “the wealth that is stored in the Lebanese sea” into its revenue [projections](#) for the 2019 budget. That budget was widely criticized as [unrealistic](#), with figures for revenue, debt and inflation that were untethered from reality.

Until commercial quantities of oil or gas are found and evaluated and a clear path to production exists, Lebanon should be wary of grand predictions about earnings. Government agencies, industry analysts and international financial institutions like the IMF and World Bank have chronically overvalued oil and gas reserves in new producer countries. Perhaps more realistically—although again, there’s not enough information available for truly reliable figures—one recent LOGI-Open Oil [model](#) projected that tax income from a large gas field might peak at only three percent of the annual budget for a few years. And even with Lebanon’s relatively small population, revenues from oil and gas could translate to only a few hundred dollars per capita per year, while the sector could directly employ a few thousand people at most.

Difficulties controlling project costs could also shrink returns. Under the production agreements for Blocks 4 and 9, the more costs Total, Eni and Novatek incur as they explore for or produce oil and gas, the less the government gets to sell itself. Big cost overruns are routine in the industry. Globally, [EY](#) found that 65 percent of big upstream projects ran over budget—by a hefty 53 percent on average. A World Bank [study](#) noted that all successful new producer countries in Africa netted less revenue than they had expected, partly due to higher costs. Producer countries, new ones like Lebanon included, can also [struggle](#) to audit the costs companies claim, especially for [suppliers](#) of goods and services to oil projects. And when commodity prices plummet, costs [tend to fall](#) more slowly and less deeply. The longstanding complaints of wasteful spending and overpricing in other types of Lebanese government contracts—for [transportation](#), [waste management](#) and [civil service hires](#), for instance—are also worth pointing out, as similar challenges seem likely in the oil and gas sector.

Becoming an oil and gas producer could also make some of the country’s economic governance problems worse.

Unreasonable expectations about future revenues could encourage wasteful spending, bigger budget deficits and risky new debt—if they haven’t already. The choice to base the 2019 budget’s revenue estimates on “the promise” of future oil earnings is an early warning sign of this. In many countries that have discovered oil or gas, overspending based on unrealistic revenue projections led the governments to [save less](#) and [run bigger deficits](#). Leaders also went on fresh, at times [unsustainable](#), borrowing sprees. Lebanon has hardly been a model of fiscal discipline, as its current crises show. The [budget process](#) is already opaque and non-consultative, and once approved, budgets rely heavily on debt, contain very little capital spending and are subject to weak oversight. The parliament passed no budgets at all between 2005 and 2017.

Producing oil and gas would open new avenues for political corruption. Oil and gas-producing countries score worse on cross-country measures of corruption, and poor resource governance correlates with [wider corruption trends](#). Worldwide, the extractive industry also accounts for [more foreign corruption cases](#) than any other sector. Windfall revenues from oil discoveries tend to [encourage graft](#), which in turn can [deepen](#) the [vulnerabilities](#) that make economies less [resilient](#).

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Lebanon has [committed](#) to curbing corruption in oil and gas, and to implementing various transparency measures, including beneficial ownership disclosure and joining the Extractive Industries Transparency Initiative. Nonetheless, the country's leaders would manage the new wealth within the existing political system, where corruption risks are high. While the forms corruption may take in the extractives sector are unknown, some studies do suggest major [risk points](#). Lebanon also has well-established channels for international money laundering and illicit financial flows out of the country, the latter estimated at nearly [\\$2 billion](#) a year (or equal to [four](#) to [seven](#) percent of GDP).

Relying too much on oil and gas rents could also substitute one kind of unpredictable, harmful dependence for another. The economic freefall the country is living through today is partly the result of the economic model it has chosen, one based on propping up consumption with rents from banking, remittances, real estate, tourism or aid, instead of domestic production. Treating fossil fuel exports as the solution to its problems would effectively be more of the same, merely shifting dependence to another sector.

Speaking on the day drilling started in Block 4, President Aoun [said](#) that producing oil would “transform [Lebanon’s] economy from a rentier, utilitarian one to a productive one to which everyone contributes and by which everyone benefits.” Apart from supplying some of its gas for electricity production, a Lebanese oil and gas sector probably wouldn’t have many linkages to the wider economy, making wider wealth generation unlikely. Relying on fossil fuel production could also negatively impact Lebanon’s future resilience, as producer countries tend to perform weaker on innovation and [economic diversification](#).

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5. What would be the benefits of burning gas for electricity?

The political narrative around power sector reform in Lebanon has treated the introduction of natural gas as a solution to many of the sector's ills.

Introducing natural gas as a fuel for power generation has long been a pillar of the Lebanese government's plans to overhaul the crumbling electricity system. A [2019 policy paper](#) by the MEW predicted that, by the middle of this decade:

- Gas would replace diesel and fuel oil in most of EDL's existing thermal plants.
- Private companies would construct up to three new independent power plants (IPPs) that would run on gas, adding 2600 megawatts (MW) to the grid.
- EDL would roll out another 1,050 MW of temporary or "fast-track" generation that burned gas at least part of the time.

Gas is "the key for the strategic transformation of the sector," the Policy Paper concluded, mainly because switching to it would add new generation capacity to the grid, boost power plant efficiency and lower fuel costs at plants. The Ministry expected gas to be the fuel for half of all Lebanese electricity by 2030, up from the current zero.

Past governments hoped the country's own offshore fields would supply the gas, though officials said they were also willing to import it. The MEW announced plans to procure up to three floating storage regassification units (FSRUs) to help receive, process and transport foreign shipments of LNG to power plants. The hope was that imports would feed the plants until the country's own gas came on stream, at which point they could be phased out. A tender for the FSRUs lapsed, though, and the MEW's Q1 2021 deadline for first gas imports has come and gone.

The focus on new gas plants intensified as the economy collapsed and the government, understandably, was looking for ways to save dollars. In addition to the Ministry's policy paper, emergency reform plans put out by the [World Bank](#) and the [French government](#) also called for big investments in gas-fired power. As the situation worsened, the political narrative around gas seemed at times to conflate the hypothetical windfall from exporting gas with the supposed savings from using it to keep the lights on. One former energy minister [called](#) "the gasification" of the power sector "a no-brainer," saying the country had "no other choice."

Renewable energy alternatives, meanwhile, have received far less attention.

Lebanon has good [solar](#) and [wind](#) energy potential, but growth has been minimal. The country enjoys eight to nine hours of sunshine for 300 days a year and favorable wind speeds. Yet despite this, it does not have any utility-scale projects, and most of its renewable power today comes from solar water heaters, old hydro plants (which top out at around three percent of total electricity supply) and photovoltaic (PV) rooftop systems. Auctions for larger projects have been well subscribed, yet a group of wind farms in Akkar District are the only projects to make serious headway so far, and even these have suffered from serious delays.

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Although the country has set an ambitious target for renewables, actual plans to develop the sector are much more modest. A prior government promised [30 percent](#) renewables use by 2030, yet the [2019 policy paper](#) foresaw adding only a few hundred megawatts of solar and wind this decade—an amount insufficient to meet even an earlier, much less ambitious target of 12 percent. Meanwhile, renewables have played a much smaller role in public discourse around energy sector reform and the government has had fewer officials working on them. Clean energy has been more of a priority for civil society and foreign donors, and there are no large constituencies pushing for action on environmental issues or climate change, either.

The government’s focus on gas as a cost saver could be misleading, as there is no guarantee that burning gas for electricity will generate significant savings.

Switching plants over to gas could cut generation costs, at least in the short term. But actual savings would depend on future oil and gas prices. The imported diesel and fuel oil that EDL’s power plants run on now add up to nearly twice the company’s revenues and make up two-thirds of all power sector costs. Estimates of the annual savings from phasing out these fuels in favor of gas vary widely, from [\\$200 million](#) to [\\$1.9 billion](#). It’s worth remembering, however, that the costs of producing Lebanon’s own gas are unknown, as are long term LNG prices. And even though diesel and fuel oil will likely stay more expensive than gas, their prices should eventually fall along with oil prices.

Dysfunction and delays around new gas projects could also add costs. Compared to solar and wind, gas-to-power value chains are long and complex, with more places to [break down](#). This is not least because the extensive infrastructure needed to deliver the fuel to a power plant. If Lebanon built a new gas-fired thermal plant, every piece of equipment in the chain would have to come on stream in a carefully timed order. Many preparatory steps would be necessary for this to work, from planning and regulatory overhauls to host community consultations, successful project financing and the timely start of gas production or imports.

Lessons from other countries teach that missteps in this process often cause [imbalances of supply and demand](#), both of gas and electricity. These imbalances, in turn, can cause hidden costs for a country. For example, if Lebanon was burning domestically produced gas, but its onshore power plants were not ready for the gas produced by its offshore fields, the producers would have to reinject or flare the gas. Reinjection can damage wells; flaring pollutes the environment, can create health problems for nearby communities and is a waste of fuel, causing government revenue losses. It’s also unlikely that any producer of Lebanese gas would agree to sell to a local power plant unless the sales contract had a [take-or-pay clause](#). “Take-or-pay” means the plant owner must pay the producer for a set amount of gas even if the plant can’t use it. When [Ghana](#) overspent on new gas-to-power infrastructure that it couldn’t finish on time, it wound up owing its offshore gas producers close to a billion dollars annually in take-or-pay penalties—which the government [said](#) “posed grave financial risks to the whole economy.” Conversely, if slow domestic gas production failed to meet power plant demands for fuel, Lebanon could face pressure to subsidize the plants and spend more on gas imports—a [trend](#) seen across a wide range of countries.

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Solar and wind could offer Lebanon greater long-term cost savings than gas-fired power, as well as additional benefits. These benefits haven’t received the attention they deserve in the current debate around power sector reform.

Already today, renewable energy companies say they can produce electricity in Lebanon at much lower rates than current ones. The Akkar wind farms contracted to deliver power at [prices](#) that were half the generation costs at some (diesel- or oil-powered) EDL plants and around a [third](#) of what consumers pay on average for electricity now. The lowest bidders in the first solar PV auction offered to deliver power at rates about 50 percent cheaper than the wind farms.

Solar and wind power could quickly become cheaper than gas – if they aren’t already. Since no Lebanese power plants run on gas, solar or wind right now, it is unclear which fuel would be cheapest to run, either now or in the future. That would require more detailed, scenario-based modeling. However, multiple studies predict the levelized costs of energy (LCOEs) for solar and wind to be lower than those of gas. A recent World Bank cost-of-service study [estimated](#) that switching existing EDL plants to gas, and adding new ones with combined-cycle gas turbines (CCGTs) running on imported LNG would cut average generation costs by around three cents, from \$0.16/kWh to \$0.13. This is five cents more per kWh than the prices at which the Akkar farms agreed to sell power and ten cents more than the lowest solar auction bids. The [Renewable Energy Roadmap](#) (REMAP) from the International Renewable Energy Agency (IRENA) and the Lebanese Centre for Energy Conservation (LCEC), projected that in 2030, the LCOEs for large solar and onshore wind projects in Lebanon will be much lower than those for gas under low, medium and high price scenarios:

Fuel	Low	Med	High
Large solar PV	2.44	4.47	6.50
Onshore wind	6.93	8.27	9.60
Natural gas	9.28	10.75	12.22

Similarly, a draft least-cost generation plan prepared by Électricité de France (EdF) predicted that the choice to add natural gas generation capacity instead of renewables will lead to higher average LCOEs in 2030. The report further forecasts that solar and wind LCOEs for Lebanon will out-compete those for gas by 2026 at the latest.

The upfront infrastructure costs for renewables may also be lower. Building utility-grade solar and wind plants can be expensive, but we haven’t found detailed data for Lebanon suggesting that the price tag for a similar-sized gas plant would be cheaper, either absolutely or per unit of power produced. Some of the big-ticket items—a new gas pipeline network, gas processing plants and FSRUs, for instance—would not be needed at all. One study found that [turnkey costs](#) for solar PV projects in Lebanon dropped from around \$7,000 per kWh in 2011 to \$800 in 2018—an 88% reduction in just eight years. No comparable shift happened for gas-fired power, neither in the country nor globally, and to the best of our knowledge, none is expected. The EdF’s least-cost generation plan predicted per-kW building costs at \$650 for solar, \$1,200 for wind and \$800-\$935 for gas.

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Predicted 2030 LCOEs for solar, wind and gas (\$/kWh)

Source: IRENA-LCEC REMAP

Adding solar and wind to the domestic energy mix would increase Lebanon's energy security and leave the economy—and the population—less exposed to volatile world commodity prices. Integrating gas as a fuel could have the opposite effect—especially if it is imported. LCOEs for solar and wind power are mainly a function of how much plants cost to build—a number that's relatively easy to foresee. LCOEs for gas mostly depend on fuel costs, which, at least for imported LNG, would be unpredictable. The best available estimates of spot LNG prices this decade range anywhere from \$4 to \$8/MMBtu. Relying on the sun and wind for fuel will remove this layer of uncertainty. It will also leave Lebanon less dependent on energy politics and foreign diplomatic agendas.

More solar and wind power would also reduce pressure on the country's scarce supply of dollars. As long as Lebanon were to burn imported LNG for electricity, it would need dollars or another foreign currency to buy the fuel. After the recent [blackouts](#) caused in part by problems financing diesel and fuel oil imports, Lebanon's political leaders should be leery of committing to another fuel source that could eat up billions in foreign exchange each year – especially when the long-term fix for the financial sector's shortage of dollars, domestic production, remains elusive.

Gas versus renewables isn't necessarily an "either-or" choice for Lebanon.

Neither gas nor solar and wind, by themselves, will be able to close the power supply gap. Unmet electricity demand in the country is huge—[more than twice](#) the peak generation capacity. For years, power outages in Beirut have routinely lasted three hours or longer; now many areas are dark for most of the day. The situation has gotten significantly [worse](#) of late, due partly to fuel scarcity. Some forecasts see electricity demand rise by as much as [three percent](#) a year this decade, meaning the supply-demand gap is likely to grow.

Right now, less than half of EDL's generation capacity can run on gas. Several of its older plants are also highly inefficient and need to be phased out, along with the company's three temporary power barges. This means that much of the electricity from new projects would merely replace existing capacity rather than add more.

Estimates of resource potential for renewables have been high, as noted earlier—according to one recent [study](#), over 6200 MW of wind and 182,000 MW of solar. Technological and funding limits mean that actual capacity will be far lower, though, and the most ambitious projections—all made before the economic collapse and the pandemic—have solar and wind making up no more than 40 percent of total power supply by 2030.

The case for adding gas-fired power to the grid alongside renewables depends partly on Lebanon's big-picture goals for electricity sector reform. If the government is still committed to ending all use of diesel and fuel oil at power plants, for example, it will have to add a significant number of natural gas turbines or engines to compliment renewables. Conversely, if cost reduction remains its biggest goal, and the ultimate cost savings from big gas projects look doubtful, arguments for big investments in gas-fired power would weaken. Similarly, reform plans that put increasing generation above all else might have to include new gas plants, since renewables can't close the demand gap. But if the government chooses to accept a long-term, growing demand gap, solar and wind could be allowed to supplement existing diesel and fuel oil-based power more gradually.

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The need for gas-fired generation would also vary based on how it would complement renewables in the electricity mix. Existing published plans say little about this, and the [choice of generation technology](#) matters. CCGTs could boost plant efficiency and add stable base-load power to the grid but are a relatively expensive form of peak-load power, given their high fixed costs. Open-cycle gas turbines' (OCGTs) quicker ramp-up times and lower costs can make them a better option for peak loads, though they're less efficient overall. Smaller gas reciprocating engines at existing or new plants could help manage the intermittency of renewables and cut start-up times when parts of the grid go down. But the suitability of each option depends on a range of factors, ranging from the location of new projects to the details of how EDL updates and manages the grid.

Lebanon's political leaders should also ask whether the country will be able to finance an electricity system that depends heavily on gas in the longer term.

Adding gas to the grid, as noted earlier, would require billions of dollars in up-front spending on infrastructure. Depending on design, the big-ticket items could include a new pipeline network, gas processing infrastructure, retrofits for some existing thermal plants and construction of new plants, with the Deir Amar, Zahrani and Salatta facilities slated to cost [\\$2 billion](#). A draft least-cost generation plan prepared by Électricité de France (EdF) put the ten-year capital costs of adding 1,754 kWh of gas-fired power to the system at between \$4.9 and 5.2 billion—or roughly half a billion dollars a year. The three FSRUs for LNG that the government tendered for in 2018 could cost a further \$13.5 billion over ten [years](#), one estimate said.

Lebanon will not be able to finance all this construction itself while facing a chronic shortage of dollars. Private foreign investors meanwhile will be reluctant to risk their own capital, especially when the energy sector and economy at large remain dysfunctional and mismanaged. Commercial and investment banks [still lend](#) tens of billions of dollars each year to fossil fuel projects, but few, if any, would get involved in a Lebanese gas-to-power deal without strong risk guarantees. A guarantee from the government in Beirut, however, would have little value now that it has defaulted on bond debt. Liability and reputational concerns could chase off investors who are subject to foreign anti-bribery laws, with the recent U.S. corruption [sanctions](#) around a Lebanese power plant and the sector's long, suspect [history](#) of mismanagement feeding perceptions of risk. Overseas banks might also demand that a large project carry [political risk insurance](#), which would be costly for a volatile country like Lebanon.

Alternatively, the government could ask the companies building the new infrastructure to foot the bill, but options here are limited as well. As recent experience shows, big foreign energy firms would look mainly to [export credit agencies](#) (ECAs) for the money, and ECA support for oil and gas projects, while still given, has been [falling for years](#). When a [2019](#) tender for the Zahrani and Deir Ammar plants fell through, the government tried ad-hoc negotiations with foreign companies, none of which progressed beyond the stage of a Memorandum of Understanding. Elsewhere, the operating agreements for Blocks 4 and 9 require Total, Eni and Novatek to put forward an “Infrastructure and Marketing Plan” that would map out much of the installations and terms under which gas produced

offshore would reach power plants. The contracts don't make clear who would pay for what's proposed, though, which could be a future source of conflict. Lebanese government officials should also consider whether a gas value chain designed by three foreign oil companies would best serve the country's interests and needs.

Realistically, then, Lebanon's best hope is that a multilateral development bank (MDB) or public finance institution like a state-owned development corporation takes interest in its gas-to-power projects—which could well be a long shot. Gas projects in low- and middle-income countries [still receive](#) more international public finance than clean energy, including from [the G20](#) as a group. In some wealthy countries, [promises](#) to cut such funding have not been followed by action. At the same time, total MDB financing for fossil fuel projects has seen [double-digit drops](#) in recent years, and the bulk of funds for gas projects come from just a [handful](#) of mostly Asian countries, few of which are big investors in Lebanon. Most MDBs or bilateral finance institutions have not explicitly [sworn off](#) financing gas projects, but it's only a small group, again mostly in Asia, that is aggressively pursuing new gas sector investments. Quite a few others say they will back gas projects only under limited conditions—for instance, if they meet climate goals, if there are no comparable opportunities in renewables, or if host countries meet strict governance standards. Meantime, US government [opposition](#) to MDB funding for gas projects has grown and the EU has seen [tightening standards](#) and [divisions](#) among member countries. Gas-to-power projects, it should also be noted, would generally not be eligible for international climate finance.

The chronic delays and inertia of Beirut politics will push the search for funding farther out into the future, when the available pool of funds for gas-to-power projects almost certainly will be even smaller. The idea to build new gas-fired thermal plants in the country isn't new: versions of it have been discussed as early as the 1990s. Officials [announced](#) plans for multiple specific plants that never materialized, and the 2019 Policy Paper basically repeated the plans from an unimplemented 2010 plan. The situation with LNG imports is similar. They were first proposed in [1999](#), then, after interest and attention waned, the government [promised](#) to start building an underwater pipeline in 2012 so that first imports could happen by 2015. That didn't materialize either, though, and an eventual tender for FSRUs in 2018 was left unfinished and has now lapsed, even though the 2019 Policy Paper expected first deliveries by Q1 2021. And critically, Lebanon's government needs to ask itself: will it be able to find sufficient funding, not just for the initial construction, but also for all the infrastructure upgrades? Retrofits and expansions might be needed decades later, as power plant profits erode, climate rules tighten and local electricity demand grows.

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Toward a sustainable energy strategy

Oil and gas will not be saving Lebanon’s energy sector or economy any time soon. After nearly ten years of high hopes, the country’s path to selling its own fossil fuels and burning gas for electricity in some ways looks longer than ever, even though time is very much of the essence. The government could still choose to import LNG as a fuel for power plants—assuming it could afford the change – but lessons from other countries suggest it could take at least [five to seven years](#) for any new gas-fired thermal plant to come on stream.

This reality, though disappointing, offers the country a chance to press pause and rethink its energy strategy. This short briefing does not claim to offer a roadmap for such a complex, high stakes process, especially now, when the economy is still bottoming out and the future is extremely uncertain. However, the following paragraphs suggest some important steps stakeholders could take in the coming months.

On the production and export side, the government needs a fuller picture of how it would use the revenues and manage the risks that extraction would bring. For instance, if they haven’t already, the MEW, LPA, Ministry of Finance, Bank of Lebanon (BdL) and others should consider hosting a participatory, multi-stakeholder risk assessment for oil and gas after the pandemic, using different market and energy transition scenarios to model outcomes. This would help adjust expectations about the sector’s prospects and envision the links that could exist between fossil fuels and the rest of the economy. Such an assessment should address some key questions:

- What are Lebanon’s chances of becoming a producer at this point?
- What would extraction’s full costs and risks be, socially, economically, politically and environmentally?
- How would producing and exporting oil and gas contribute to development and diversification of the economy? How might it undermine them?
- How predictable are the outcomes? How much vulnerability to uncertainties would a decision to extract generate?

A similar exercise could be done for gas-to-power—or ideally, overlapping groups of stakeholders would look at the two side by side.

Regarding electricity, the new administration needs to clarify the main goals and targets for power sector reform. The MEW should confirm, for instance, whether the three main goals from the 2019 revised policy paper still stand. The paper mentioned lowering EDL’s costs, switching to natural gas to cut costs and boost efficiency, and raising the consumer tariff – measures which prioritize near-term crisis management and favor a fossil fuel-heavy status quo. Past plans also lacked a vision of how improved electricity supply would support broader economic development, as well as targets for specific industries, technologies and parts of the country.

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The government should also describe the roles of gas and renewables in the future electricity mix. Past published plans said very little about how natural gas, solar, and wind will complement each other in the domestic mix, or even about the roles of each in isolation. Would natural gas, for instance, serve mainly as a base or peak load fuel? How would plants use gas-fired infrastructure to manage the variability of renewables? The plans also do not appear to be strongly based in scenario planning or modeling work. In particular, they treat solar and wind energy's potential over the next decade mainly as a function of what projects were already under contract or in planning at the time.

Officials need to study the investment barriers to utility-grade solar and wind projects and find ways to help lower them. The MEW, for instance, should consider commissioning a [grid impact assessment](#) to assess how the grid would perform at different levels of renewables generation and what upgrades and modifications are needed, including a new [grid code](#). It should also assess the best demand centers for solar and wind in the country. Just as critically, the government needs to study what steps it can take to boost investor confidence in the sector. Raising the consumer tariff is essential, as is figuring out who will provide risk guarantees for projects now that the government has defaulted on its debt. Officials should also ask what investment incentives the country will be able to afford (e.g., tax and duty exemptions). Another important set of considerations involves power producers' worries about payment: Will power purchase agreements need to include clauses calling for payment in dollars, for example, and how soon will BdL have to float the pound to limit the risk of exchange rate losses?

In parallel, the government should prioritize completing the regulatory and institutional frameworks for the electricity sector. Clarity in these areas can increase investor confidence and lower finance costs, especially if it reduces off-take risk for the companies selling power. First and foremost, the government should take the long overdue step of setting up and funding the Electricity Regulatory Authority. EDL's role going forward also needs to be carefully defined. The company will have to take part in any successful energy sector overhaul, given its central roles in power purchasing, transmission and distribution. As long as IPPs have to do business with the company, its health will be key to their success. Past plans and Law 462 leave quite a few open questions about the shape of its future operations, though.

In terms of regulation, the MEW should weigh the need for a law dedicated to distributed renewable energy projects. It might also need to propose new regulations governing the sale of electricity, including a provision clarifying that IPPs can bypass EDL and sell directly to distributors. If the government decides to go forward with gas-to-power projects, regulations for things like gas sales, transportation, storage, processing and operational health and safety will also be important.

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As the planning develops, the MEW and EDL should also make progress on procurements and operational improvements that they can afford. The MEW could address the ongoing issues with net metering, for instance, and update its energy efficiency plan for the nation. If the planning process comes out in favor of procuring FSRUs, a new tender will be needed, since the prior one (from 2018) has lapsed. EDL, for its part, should keep improving its debt collection and working on whichever grid loss issues it can afford to address—illegal connections, for instance.

Crucially, the government needs an early, coordinated plan for getting feedback on, and communicating, any new direction it wants to take in the energy sector. Assessing needs and managing public expectations will be critical for the success of any new strategy, and no plans should be made without wide-ranging consultations. Past administrations have struggled with this step, and should Lebanon become an oil- and gas-producer, the situation is unlikely to improve: studies show that resource-rich countries tend to [involve](#) their citizens less in decision-making, and have less accountable, effective and stable [public institutions](#).

At the end of the strategy process, Lebanon should have developed a new narrative about what oil and gas can and can't do for its economy and its citizens. Technocratic, on-paper strategies do more to drive behavior if they are translated into stories about the future that people can understand and buy into. Crafting a new narrative won't be simple: among other things, the story will have to account for the uncertainties of the post-pandemic, post-crisis recovery and the many unknowns of the global energy transition. Unlike the old one, the new story should be more solidly based on facts and hard trade-offs, and less on unrealistic hopes and appeasement. In the end, the story of Lebanon's energy future needs to be something that the government, the private sector, the media, civil society and citizens arrive at together. Officials holding lengthy meetings on Zoom or in office buildings won't be able to create a reliable one alone.

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