



One Year On:
The Impact Of The Coronavirus On Energy
January - 2021

Energy Industry
Report



The Al-Attiyah Foundation





INTRODUCTION

ONE YEAR ON: THE IMPACT OF THE CORONAVIRUS ON ENERGY

The global energy sector endured a dramatic year in 2020, as the coronavirus (Covid-19) pandemic slashed demand and upended markets. Investor confidence slumped, with oil and gas one of the hardest-hit industries, as flights were grounded, fleets parked, factories and refineries closed, and work from home orders imposed. Crucial world economies are still struggling to ease containment measures as new Covid-19 variants spread in 2021. Has Covid-19 resulted in a permanent realignment of world energy markets? How has it influenced the global transition towards renewables? And which of its impacts are here to stay?



Energy Industry Report

This research paper is part of a 12-month series published by The Al-Attiyah Foundation every year. Each in-depth research paper focuses on a prevalent energy topic that is of interest to The Foundation's members and partners. The 12 technical papers are distributed in hard copy to members, partners, and universities, as well as made available online to all Foundation members.



EXECUTIVE SUMMARY

- In 2020, world energy demand and oil prices slumped on the back of the Covid-19 outbreak and the ill-timed Russia-Saudi Arabia price war in March that resulted in potentially the worst oil oversupply in history.
- The pandemic has faced the oil and gas industry with a triple dilemma: coping with viral effects and response, rapidly approaching peak demand, and an even more accelerated energy transition.
- Global energy-related carbon dioxide (CO₂) emissions fell by 8% in 2020 to their lowest levels since the financial crisis of 2009, due to dramatic reductions in coal, oil, and natural gas demand.
- The pandemic has had a catalysing effect on the energy transition, forcing companies to shift gears on transformation plans.
- Commitments to climate change in 2020 signal an acceleration of the transition but it is unclear whether these will materially take form in 2021 as the fallout from the pandemic lingers.
- Oil and gas producers need to respond to the interlinked crises of rebounding demand in emerging economies and renewed lockdowns in developed countries in a way that does not lose sight of critical markets or the transition.
- The sector must become more resilient and play a more active part in the global effort towards post-pandemic recovery.

IMPLICATIONS FOR MAJOR OIL AND GAS PRODUCERS

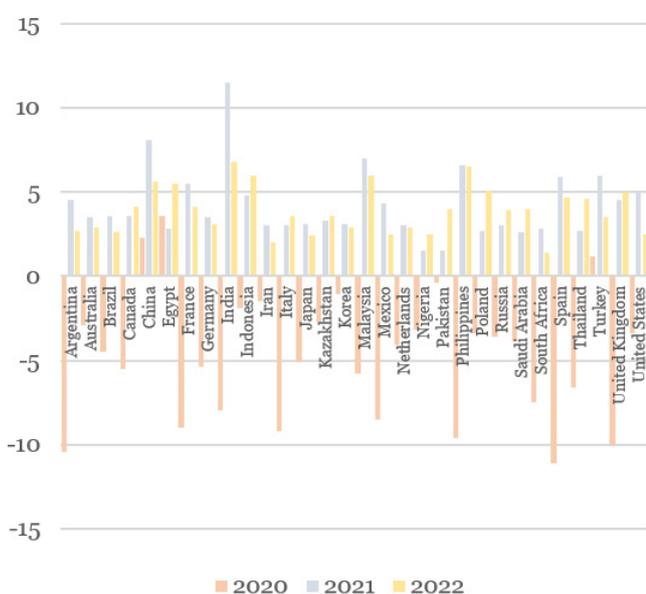
- The coronavirus pandemic has emphasised the need for economic diversification in oil and gas exporting countries, requiring significant external and domestic funding as well as economic reform.
- As vaccine rollouts take off in earnest around world economies, oil and gas producers and exporters are presented with a unique set of opportunities to fuel economic recovery. Still, they have to balance this carefully with an uneven recovery across countries, sectors, and energy sources.
- The Organization of Petroleum Exporting Countries (OPEC) will be crucial within the OPEC+ framework as it shifts gears to moderating oil prices in 2021 even as demand growth picks up.
- Gas/LNG demand growth is likely to continue in Q1, before easing out over warmer weather. Large producers could still secure demand by developing new markets, such as LNG-cooled warehouses for the vaccine.
- In the medium to longer-term, low-cost natural gas producers will benefit most from hydrogen and carbon capture projects to support their oil and gas activities while aligning with international climate change policies.
- 'Green' economic recovery packages will favour renewable energy, EVs, hydrogen, and other low-carbon areas.

- The United States (US)-China political and economic confrontation, already in action but intensified by Covid-19, will lead to competition in new energy investment. In contrast, other key energy players such as the EU, Russia, Japan, and the Middle East will have to re-orient their policies accordingly.

COVID-19 HAS PROVIDED A GLIMPSE OF A NEW BASELINE FOR OIL AND GAS

The oil and gas industry has grown accustomed to experiencing shocks since the 1970s, but 2020 has introduced the industry to an unparalleled new trauma level. Covid-19 led to an unprecedented collapse in oil demand in 2020, with after-effects carrying forward into 2021. The instantaneous falls are sharper than the 2009 financial crisis or even the Great Depression, with almost all world economies registering negative GDP growth (Figure 1).

Figure 1 Real GDP growth changes (%) for selected countries



COVID-19 HAS PROVIDED A GLIMPSE OF A NEW BASELINE FOR OIL AND GAS

According to the World Bank, the pandemic and shutdown measures to contain it resulted in a global economic contraction forecasted at 5.2% in 2020, the deepest recession since the Second World War, with the largest fraction of economies witnessing drops in per capita output since 1870 ⁱⁱ. Economic activity among developed economies is estimated to have shrunk 7% in 2020 with domestic demand and supply, trade, and finance severely disrupted. Although recent vaccine approvals had raised hopes of a turnaround in the pandemic in early 2021, renewed waves and new variants pose renewed oil demand concerns.

The IMF forecasts the global economy to grow 5.5% in 2021 and 4.2% in 2022, albeit with exceptional uncertainty. Air travel (usually a consumer of some 8 Mbbbl/day of jet fuel) continues facing patchy shutdowns, and passenger transportation in OECD Americas and Europe has been slower than expected. Sea and road freight for logistics, however, appear less affected.

The International Civil Aviation Organization estimates a global reduction of 50% of seats offered by airlines, removal of 2,699 million passengers (-60%), and approximately a US\$ 371 bn loss of gross passenger operating revenues of airlines ⁱⁱⁱ. This resulted in a fall in global jet-kerosene demand of 35% to only 4.9 Mb/d in 2020 ^{iv}. Domestic air travel in China recovered to pre-Covid-19 levels as early as September 2020, with the International Air Transport Association (IATA) forecasting a recovery in passenger numbers by 2024 at the latest. Rising fuel prices and environmental concerns will continue to affect short-haul air travel, while interregional travel, which is the major driver of jet-fuel, will increase.

A possibly long-lasting reduction in business travel will require economy fares to be raised, further constricting passenger demand.

The Middle East, a key hub for long-distance flights, shows a steep drop (Figure 2) in passenger demand, estimated by IATA at 73%, and forecasted to rebound by 43% but remaining 61% lower than 2019 levels. For instance, Saudi Arabia's jet fuel demand is expected to increase moderately from 51 kb/d in 2020 to 65 kb/d in 2021 ^v.

Figure 2 Middle East tracked flights in 2020

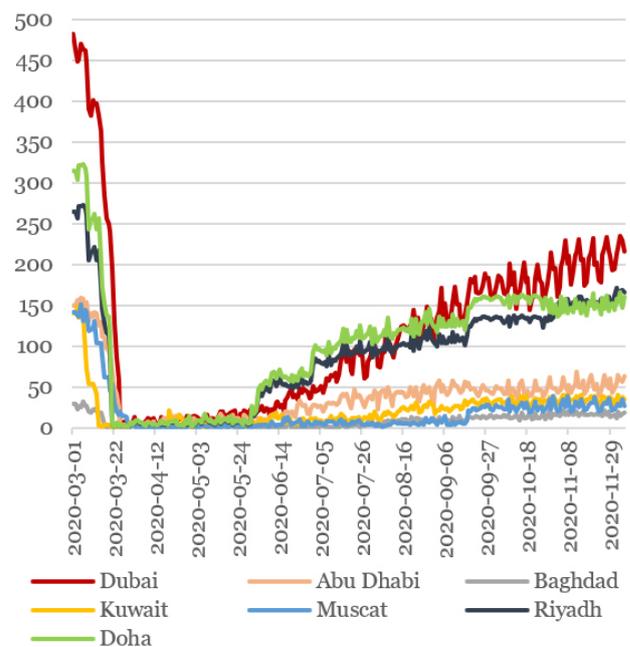
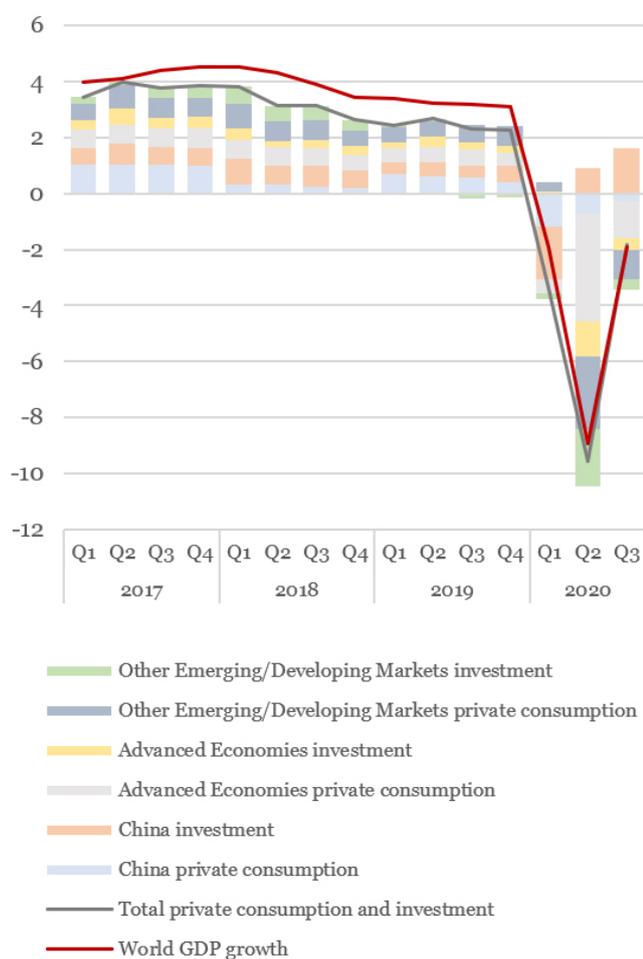


Figure 3 highlights the contribution of global consumption and investment to GDP performance in 2020. The lone warrior appears to be China where investment surged to its highest in Q3 2020 since 2017 due to successful early containment measures, even though at the height of the pandemic, demand was down by over 4 Mbbbl/d. China's GDP climbed 6.5% in Q4 2020 from 2019's levels, pushing growth to 2.3% for 2020 ^{vi}.

Figure 3 Contributions of consumption and investment to global GDP growth (Percentage points, year-over-year) ^{vii}



However, even in China, the recovery in Q2 and Q3 was investment-led and dependent on government stimulus, with consumer demand still down.

Record bankruptcies and economic damage in other geographies have caused oil majors to re-evaluate their global portfolios and the resilience of existing oil and gas projects, including potentially new ones, to accommodate the unpredictable demand and price outlook. The debt of companies in bankruptcy in the North American oil and gas industry passed US\$100 bn in 2020 for the first time ^{viii}.



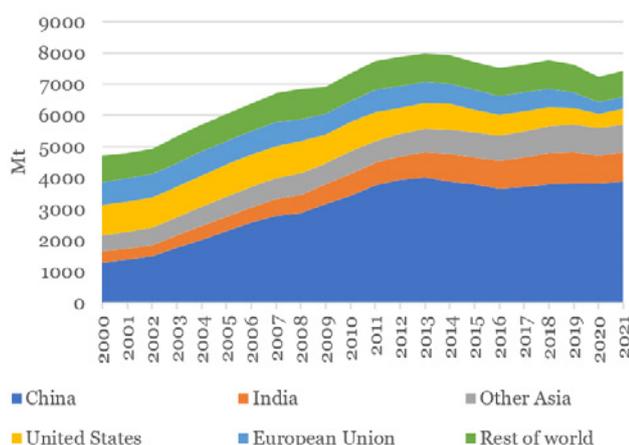
GLOBAL ENERGY CONSUMPTION TOOK A MAJOR HIT WITH A SHAKY OUTLOOK

Covid-19 has been the most extensive disruption to the energy sector in recent history, more than the 2008-9 global financial crisis, perhaps as much as the 1970s oil crises. The pandemic continues to exact a tragic toll on global energy consumption in 2021, as new strains and waves of Covid-19 lead to re-imposed lockdowns and different forms of restrictions around the world. Estimates of the associated energy demand contraction differ from one source to another. The International Energy Agency (IEA) is more optimistic as they estimate a 5% drop in global energy consumption in 2020, while energy-related CO₂ emissions' decline is anticipated at 7%. Meanwhile, DNV GL estimates a slightly deeper contraction of 8% in 2020, with demand recovery picking up from 2021 onwards, but likely to fluctuate annually at 6-8% below their pre-pandemic forecasts to 2050. Consequently, oil and coal are severely affected, followed by gas, with renewables least impacted (Figure 5).

Coal demand

This century, global demand for coal has shown rapid growth, from 5 Gtpa in 2000 to a peak of 7.7 Gtpa in 2014 but has been on a bumpy ride since then. In the last few years,

Figure 4 Global coal consumption by region, 2000-21^{ix}



old coal-fired power stations closed in Europe and North America, and several projects in their pre-construction phase were cancelled, particularly in China (Figure 4). DNV GL, along with the International Monetary Fund (IMF), expects that 2020 global demand for coal dropped by 5% due to the pandemic, mainly due to a reduction in steel production and manufactured goods output and power generation.

A weakening competitive position versus gas and renewables, along with increasing adoption of environmental policies, will continue to reduce coal-fired electricity generation. IEA anticipates drops in coal power generation of 3.2% in Japan and 10% in Korea for 2020. Coal power generation is expected to have gained some ground in Q4 2020 in India, after double-digit declines in H1 2020, ending with an overall decline of 4.5%. China, the world's largest coal consumer, is expected to have maintained 2019's coal demand in 2020, although coal-fired power generation is expected to decline slightly. China's 2021 coal demand is expected to increase by 3.1%, whereas the EU's is likely to increase only marginally, but still its first rise since 2012.

Oil demand

In March 2020, Saudi Arabia and Russia sparked the most significant oil price crash since the 1991 Gulf War with oil prices dropping almost 40%, from US\$ 50/bbl. This crash came as Russia walked out from a meeting of OPEC and non-OPEC ministers in Vienna after Saudi Arabia demanded production cuts to cope with the pandemic's impact on global oil demand. Following the breakdown of talks, in apparent retaliation, Saudi Arabia made dramatic cuts to official pricing (down US\$ 6/bbl to Europe

and US 8/bbl to Asia) and increased production to 12.3 Mb/d in April 2020. As the pandemic worsened, prices crashed, and the Donald Trump administration applied political pressure. In April, the OPEC+ group reached a historic deal to cut global oil production by 9.7 Mb/d, ending the Russian-Saudi price war, but not going far enough fully to offset the Covid-19 impact.

The marathon of bilateral calls and ministerial video conferences joined OPEC+ and the G20—although G20 didn't make any concrete pledges in an unprecedented deal, lifting oil prices from almost 20-year lows, but the supply glut remained. Brent oil prices dropped to US\$ 18.38/bbl in April, from US\$ 63.65/bbl in January, before rebounding in May to just over US\$ 40/bbl. They then stagnated before increasing again in November with high OPEC+ compliance, demand recovery and the prospect of effective vaccines, and rose to US\$ 49.99/bbl in December. Meanwhile, WTI prices briefly traded at around negative US\$ 37/bbl, which increased to US\$ 49.10/bbl in December 2020. Prices further approached US\$ 60/bbl in February 2021. These increases came as lockdowns were eased across the world, allowing for continued economic activity, hence improved demand, and as deep production cuts were extended until December at 9.7 Mb/d, along with the voluntary cuts made by certain OPEC countries. Prices also increased amid hopes that a rollout of Covid-19 vaccines will help recover global fuel demand.

The volatile and low prices triggered by the pandemic put oil producers under pressure. Shell cut its dividend for the first time since the Second World War, while US producers shut in some 1.6 Mb/d of output by June as it had become uneconomic ^x.



Realising that returns on investments in development projects are not guaranteed, investment in 'unconventionals' and long-cycle challenging environments such as deepwater and/or Arctic locations will be reduced dramatically.

As air traffic plummeted, so did the demand for jet fuel, with refiners taking a major hit as they reached a jet fuel glut. Some refiners started to blend jet fuel into the diesel pool but had to cut overall run rates to avoid diesel excess. According to EIA, US refiners reacted quickly by reducing run rates, dragging national utilisation down to 67.6% of capacity in April 2020. Some refineries shuttered temporarily; other refiners' self-help actions entailed cutting capital spending by deferring some refinery enhancement projects and delaying turnarounds. This also included suspending dividends, accessing capital markets, and selling off assets^{xi}. Chinese refiners stepped up crude imports to take advantage of low prices, raising stockpiles sharply, and leading to a backlog of tankers waiting to unload.

For the last 30 years, global oil demand has been rising at an average rate of 1.1%/yr, with China, India, the Middle East, and South-East Asia constituting major growth markets. On the other hand, North America and OECD Pacific have witnessed a decline in oil demand of less than 1%/yr. Oil demand in 2020 is expected to have declined to 89.3 Mb/d, compared to 99.6 Mb/d in 2019. This is projected to increase in 2021 to 94.8 Mb/d, but still be capped by regional lockdowns and slow international aviation recovery, with air travel operations still far from pre-Covid-19 levels. DNV GL's projections are more pessimistic, suggesting a 13% reduction



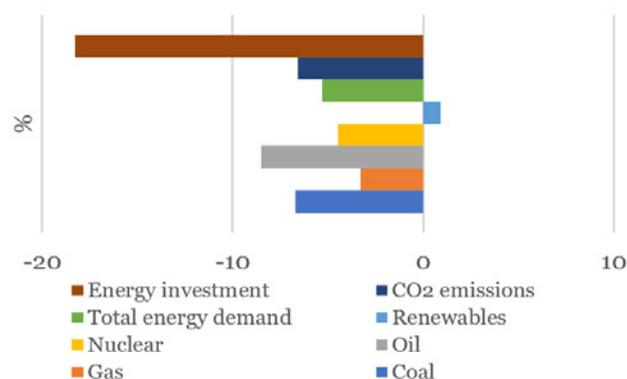
in global oil demand in 2020, with oil demand peak to reach a plateau already, peaking in 2019.

Natural gas demand

On the other hand, natural gas demand is expected to have been less affected. However, it still is estimated to have fallen by 3% in 2020, down 120 billion cubic metres (bcm)—the largest annual drop on record^{xii}. This is due to a combination of Covid-19 effects and an exceptionally mild 2019/20 winter in the northern hemisphere. Most of the decline took place in mature markets across Europe, North America, and Asia, collectively accounting for 80% of the estimated drop in global natural gas demand for 2020. LNG continued to play a central role in balancing global gas markets and at the same time creating flexibility to match fluctuations in demand.

According to Wood Mackenzie, the LNG industry faced its first seasonal demand contraction since 2012, with demand in summer expected to be down 3 Mt, 2.7% below 2019's levels. The torrent of gas supply started to ease as US and Egyptian plants shut down temporarily because of unprofitable economics, but 2020 remained a volatile year for LNG. Though Q2-Q3 2020 witnessed a massive drop, demand in Asia returned in Q4, with LNG futures for January 2021 surging due to outages at some liquefaction plants, high demand for heating, and increasing freight rates. In the US, LNG exporters restarted plants as demand and price recovery in buyer markets like Asia and Europe incentivises exports. Floating storage remains volatile, and overall global demand is expected to have fallen by 6.7 Mt in 2020 from 2019 levels of 335 Mt.

Figure 5 Key estimated energy demand, CO₂ emissions and investment indicators, 2020 relative to 2019^{xiii}



Electricity demand

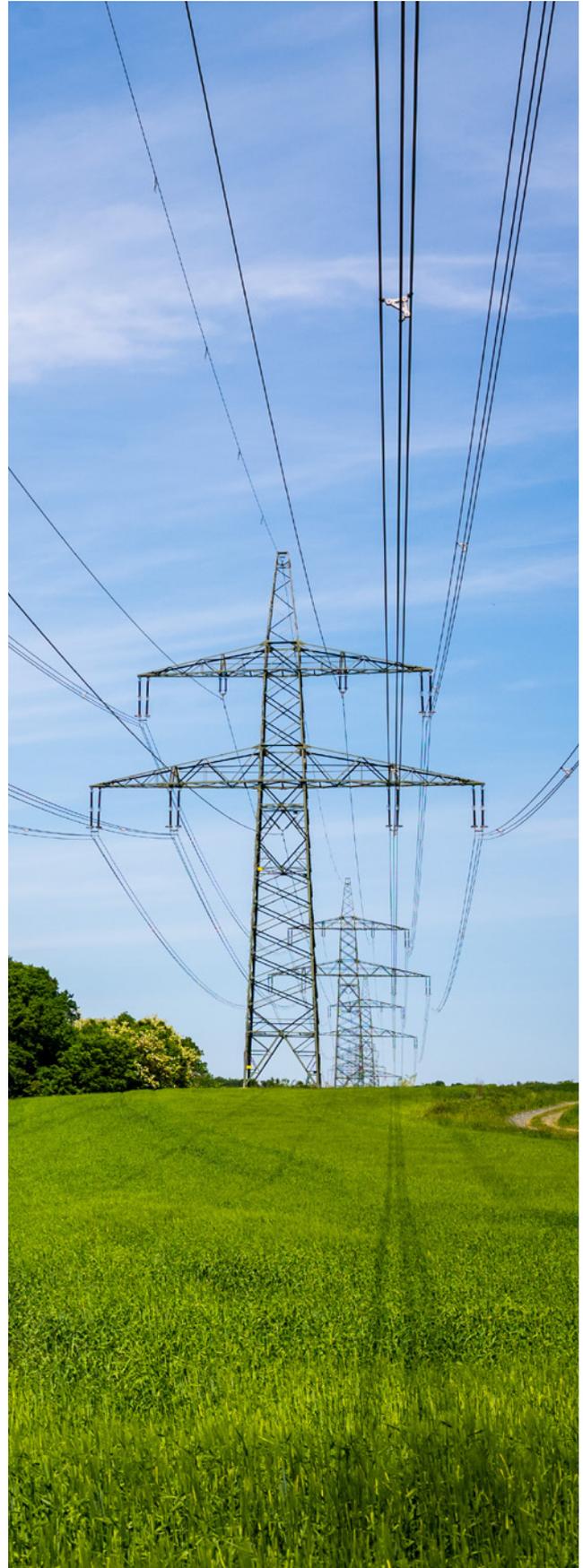
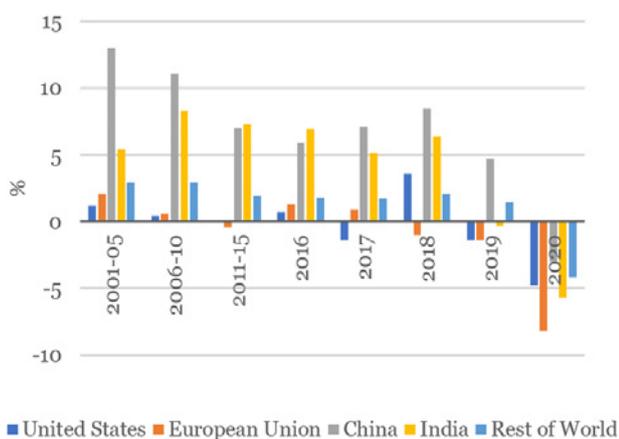
Covid-19 has also impacted electricity demand globally, with DNV GL expecting a 3.4% decline in consumption, amounting to 880 TWh, in 2020. According to the IEA, global electricity demand would fall 5% in 2020, with 10% reductions in some regions (Figure 6). Reductions in commercial and industrial uses outweighed increases in residential demand. In the US, the EIA estimates retail sales of electricity to the commercial and industrial sectors in 2020 fell by 6% and 7.9%, respectively, while the residential sector's purchases of electricity were 1.3% higher despite a mild winter earlier in the year, probably linked to work-from-home policies. This lifted the share of renewables in electricity supply: since they have minimal variable costs and usually priority grid access, their output is unaffected by demand. Renewables-based generation increased by an estimated 7%, mainly due to a double-digit percentage growth for wind power and an increase in solar PV output from new projects, with the share of RE in electricity supply nearing 28% in Q1 2020, up 26% from 2019's levels. Meanwhile, demand fell for all other sources of electricity, including coal, gas, and nuclear.

GLOBAL ENERGY CONSUMPTION TOOK A MAJOR HIT WITH A SHAKY OUTLOOK

Despite the increase in output from renewables, natural gas use in power generation fell an estimated 2% year-on-year globally in 2020, in line with global electricity demand. In the US, gas-fired generation increased 3% in 2020—due to abundant US output—while overall electricity output was down 2% and coal's share decreased by 19%. In Europe, gas-fired generation rose by 4% year-on-year through H2 2020, after a steep decline of more than 10% in the first half. Meanwhile, coal-fired generation fell by more than 8% in Q3 2020. This decline came from nuclear plants' retirements, maintenance work, and optimisation of fuel usage. This upward trend was also seen in China as gas-fired generation rose by 2% in the first 11 months of 2020, while electricity demand increased by 2% and coal declined slightly. There was a pressure on associated gas supply in the Middle East because of OPEC+ cuts, which coincided with peak electricity demand in the summer, leading to a resurgence of oil used in power generation in Saudi Arabia and Iraq.

On the other hand, biofuels' demand has declined because of lower transport activity.

Figure 6 Annual average growth rates of electricity demand in selected regions, 2001-2020 ^{xiv}



THE LONG-TERM OUTLOOK FOR THE ENERGY SECTOR IS SHAKY AND PATCHY

In the long run, coal demand is projected to flatten in 2025 due to coal-fired power plant retirements in developed countries, higher uptake of low-carbon generation technologies, and the costcompetitiveness of gas and renewables in certain regions.

Without Covid-19's impact, oil demand would have been expected to peak just over 106 Mb/d in 2030. Taking the pandemic's effects into account, Rystad Energy revised its global oil demand, expecting a peak at 102 Mb/d in 2028.

As for gas, the pandemic is expected to have repercussions on the medium-term growth potential too, with around 75 bcm of expected growth loss between 2019 and 2025.

Gas consumption by industry will be the main contributor to demand growth to 2025, rising by an average of 2.5%/yr, and accounting for 40% of incremental consumption. This additional demand will be concentrated mainly in China, India, and other Asian markets. In contrast, demand for gas as a feedstock will be driven by gas-rich regions, including the US, Russia, North Africa, and the Middle East, mainly for manufacturing fertilisers and petrochemicals for domestic and export markets.



THE OIL AND GAS SECTOR IS FACING AN ACCELERATED TWIN DILEMMA

As a result of the 2020 downturn, the oil and gas sector is now contending with an accelerated triple dilemma: the post-pandemic energy economy, peak demand, and the energy transition.

Covid-19 responses may permanently have re-shaped energy demand. Key features would include:

- A great acceptance of remote working and videoconferencing;
- Reducing business travel; and
- Commuting while boosting home energy use.

Pressure from stakeholders has increased to improve environmental, social, and governance performance while meeting returns^{xv}. Many outlooks indicate that the oil and gas industry already needs to start grappling with the notion of peak oil demand.

Underinvestment in new fields and the support of stimulus packages for the sector in some countries may bring a market upturn in the short term. US shale, a key flexible source of production, may grow much more cautiously, as investors were already tiring of low returns before 2020. Such factors point to the first stage of transition to a new long-term strategy for big crude exporters. The 'green stimulus' will revive the economy initially, but in the EU and US, it will focus heavily on areas such as renewables, energy efficiency, electric vehicles, and batteries.

The pandemic has already sidelined about a third of global oil and gas investments, raising the potential for future 'stranded assets'. Rather than consider faster monetisation, most significant producers are warier of lower prices and the risk of being

excluded from major markets due to the urgency of adopting cleaner technologies. The EU is expected to revamp its Emissions Trading Scheme (ETS) to support its transition to a low-carbon economy in coming months, increasing the risk premium for carbon-intensive products (including oil and gas) making way to its shores.

Along with the desire for higher near-term revenues, these combined factors lead major oil producers in the OPEC+ framework to make only gradual increases in production as demand recovers.

Some leading energy organisations have produced forecasts of future oil and gas demand by taking 2020 as the new baseline for all predictions. These include oil companies (BP, Equinor, Shell, and Total), governmental agencies (such as the International Energy Agency, US Energy Information Administration, and OPEC), and consultancies, investment banks, and thinktanks (DNV, McKinsey, Wood Mackenzie, BloombergNEF, and Goldman Sachs).



Table 1 Peak oil estimates

Institute / Scenario	Peak Oil Date
DNV ETO	2019
BP Rapid	2019
BP 'Net Zero'	2019
BP Business-as-Usual	Early 2020s
Equinor	2027-28
IEA	Within 2020s
Total	2030
OPEC	2040
Goldman Sachs	<2030
McKinsey	2033
BloombergNEF	2035
Wood Mackenzie	2035

Like DNV's Energy Transition Outlook, some have gone as far as to say that peak demand had already passed us in 2019. BP's 'Rapid' and 'Net Zero' scenarios also put the peak for oil demand in the past. Simultaneously, its "business as usual" case forecasts a slight recovery by 2025 but drops away slowly after that.

Different outlooks estimate that peak oil demand will arrive this decade, the next, or the one after.

All major forecasts mentioned in the table above show oil demand growth slowing down significantly, as economies re-orient themselves towards services, efficiency improves, and clean transportation technologies, such as the electric passenger vehicles segment, grows.

Gas, meanwhile, appears more promising as a vital driver of the energy transformation. Natural gas will increasingly be traded as LNG,

driving a surge in Capex. New sources of gas supply, particularly in North America and Africa, and expansions by large Middle East producers, notably Qatar, will help establish the infrastructure required to sell gas to new centres of demand in South, South-East, and Far East Asia, where investments are being made for gas-receiving facilities.

Most prominent among these are South-East Asian countries like the Philippines and Vietnam. Government policies on third-party access to infrastructure could also open up the gas and power sector for non-state gas players in China, South Korea, Malaysia, Thailand, and Pakistan.



THE OIL AND GAS SECTOR IS FACING AN ACCELERATED TWIN DILEMMA

Super-major oil firms and national oil companies (NOCs) have already turned to natural gas as the fuel with brighter demand prospects and low-carbon capabilities, as an alternative to maximise oil output and push prices lower (in a bid to drive out high-cost producers such as US shale and Canadian oil sands from a shrinking market). In the case of BP, this shift is driven by its new corporate strategy, which forecasts a reduction in production by 40% and an increase in renewable energy spending 10-fold by 2030 in its plans to become a net-zero emissions company by 2050.

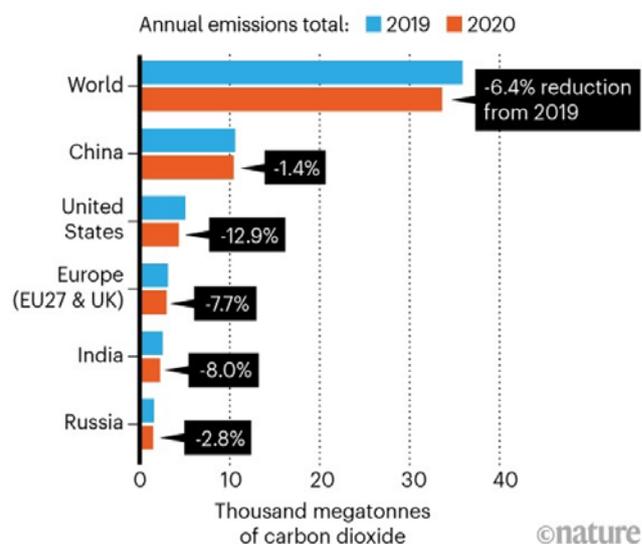
As the lockdown measures contributed to a global 8% reduction in CO₂ emissions in 2020, the emissions run the risk of returning to pre-pandemic levels as economies have reopened.

This mandates a shift towards more hydrogen, carbon capture, use and storage (CCUS), carbon pricing, and carbon offsets to keep such resources viable for large oil and gas producers. Producers of low-cost and low-carbon assets will be the most advantaged in the medium term.

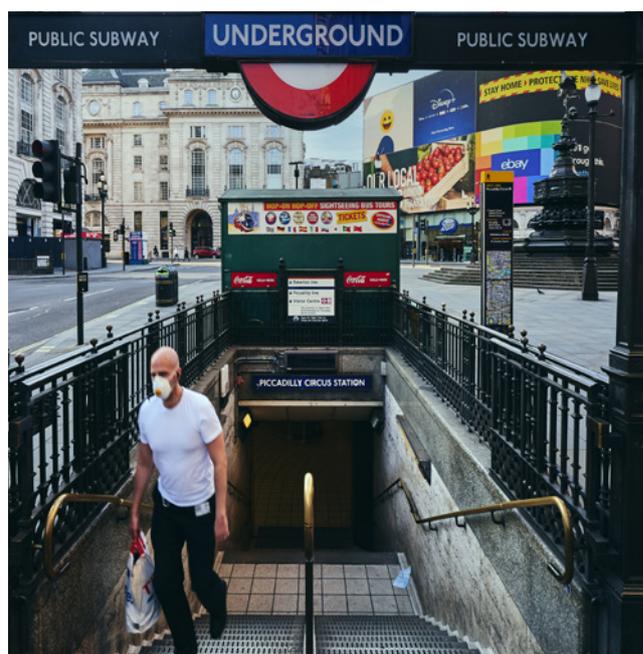
GLOBAL ENERGY-RELATED CARBON EMISSIONS WILL CONTINUE TO INCREASE AT A SLOWER RATE

After increasing steadily for decades, global CO₂ emissions decreased by 6.4%–2.3 bn tonnes—as the world was forced into lockdown due to the pandemic. Although the drop is significant, accounting for double Japan's yearly emissions, it remains smaller than many climate experts expected, given the pandemic's scale. The US contributed to most of the fall, with nearly a 13% decline in

Figure 7 Annual carbon emissions per region, 2019 versus 2020^{xvi}



its emissions, as vehicle transportation reduced significantly with lockdowns in March and continued as the virus escalated by end-2020 (Figure 7). Global energy-related emissions made the biggest fall, down 48% from their 2019's levels. Although early in 2020, China experienced the largest reductions since it locked down its cities and industries to end the spread of the virus, it was the first major economy to recover.



The decline is not expected to last as the virus is being increasingly contained, and more people are receiving Covid-19 vaccines. Zhu Liu, an Earth-system scientist at Tsinghua University in Beijing, co-leading the international Carbon Monitor project, expects a strong rebound in emissions once the pandemic ends. According to the United Nations Environment Programme, the world would need to cut carbon emissions by 7.6% per year by 2030 to prevent global warming from exceeding the 1.5°C above pre-industrial levels in line with the 2015 Paris Climate Agreement. However, without significant, collective, and integrated efforts to curb emissions, the world is on track to exceed the 2°C goal.

Of the almost 2.6 Gt decline in CO₂ emissions, reduced coal use would contribute over 1.1 Gt, followed by oil (1 Gt) and gas (0.4 Gt), with the US to undergo the largest decline at around 600 Mt, followed by China and the EU (Figure 8).

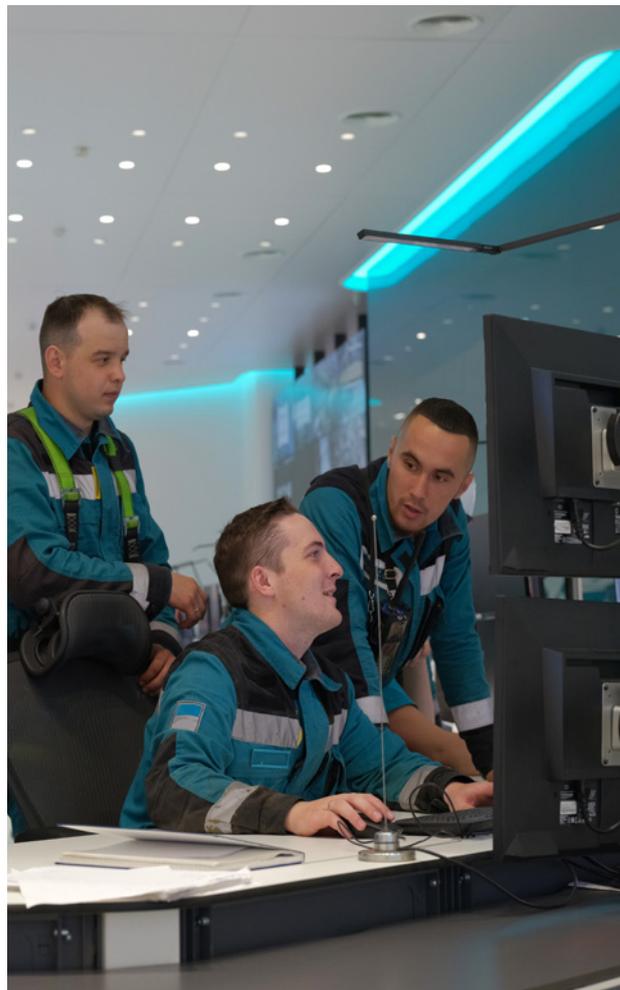
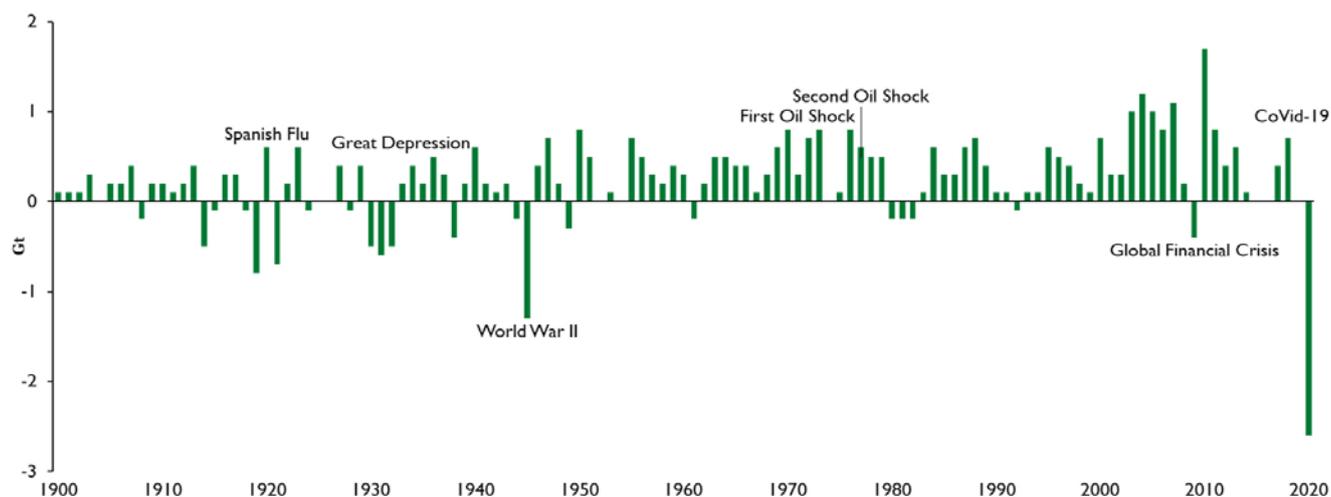


Figure 8 Annual change in global energy-related CO₂ emissions, 1900-2020 ^{xvii}



CORONAVIRUS AND THE ENERGY TRANSITION: PROBLEMS AND OPPORTUNITIES

The energy transition that started before the Covid-19 pandemic is a transformational switch away from fossil fuels and into renewable and clean energy sources (mainly, solar, wind, and hydropower). The outbreak has created opportunities and problems for the energy transition in terms:

1. The economic impact and its response;
2. Demand for hydrocarbons; and
3. Its subsequent impact on global politics.

The accompanying economic shock has rebooted the global economy. This could have negative and positive implications for the energy transition. At the initial stages of the Covid-19 pandemic, we observed governments worldwide pursue an expansionary fiscal and monetary policy that typically included increased rates of socioeconomic expenditure, decreasing tax collection, low-interest rates, and rising public sector debt.

Given the decline in government revenues, combined with the liquidity crunch across public and private capital markets, supply chain disruptions, and lockdown measures—many future clean and renewable energy projects are likely to be delayed, cancelled, or will be recommissioned at a future date.

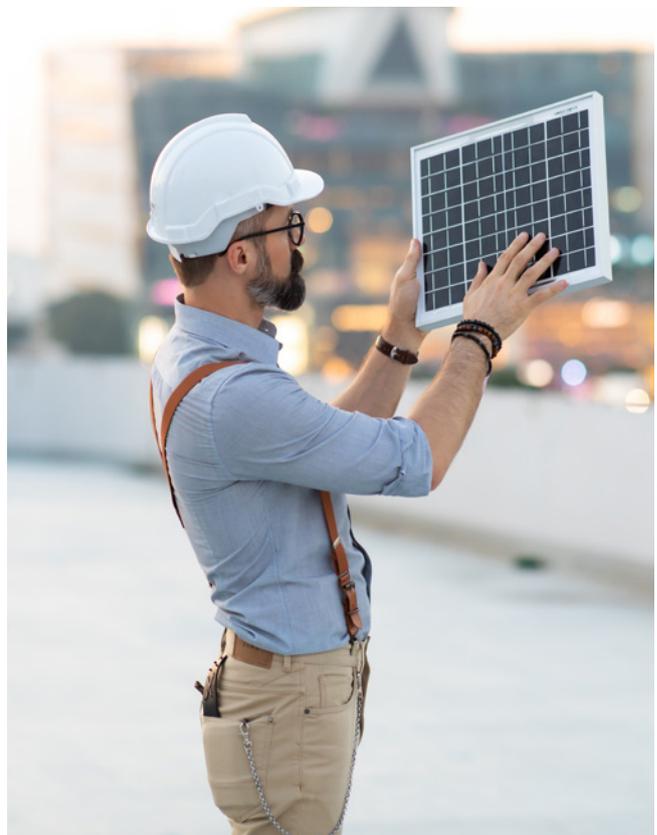
Also, in the longer term, the increased government debt incurred during the Covid-19 pandemic has created lasting risks to investments across the energy value chain, particularly those aimed at the renewable energy sector.

Emerging-market projects that are awaiting a final investment decision (FID) are competing for a smaller capital pool,

which means fewer will be approved. This is particularly detrimental where financing options aimed at renewable energy deployment are limited, and governments are fiscally constrained.

To alleviate this, emerging market countries that favour the acceleration of the energy transition are increasingly looking to developed countries that have introduced large stimulus, or 'green deal' packages aimed at a sustainable and 'green' economic recovery.

In addition to green deals, countries that favour an acceleration of the energy transition argue that the pandemic arrived at a critical point when consumer, producers, investors, and government regulators operating across the energy value chain were increasingly facing pressures to adopt impactful decarbonisation strategies.



For emerging markets adopting an economic recovery/stimulus plan that incentivises renewable energy deployment, allows them to unlock critical investments and technological developments that could also improve their energy security.

Medium-term to long-term government policies and economic recovery plans will determine the supply of transitional energy. Still, the pace of transition will depend heavily on the continuing demand for fossil fuels. Future low prices for crude oil could harm the energy transition, such that:

1. Low oil prices could further decrease profits and liquidity for oil companies that intend to diversify by investing in technologies such as carbon capture, use and storage (CCUS), hydrogen, and renewable energy; and
2. lower oil prices could slow the move to cost-parity by electric vehicles (EVs).



However, in the longer term, crude oil's current low-price environment is relatively positive for the energy transition. Low prices are an outcome of weak demand, meaning decreased investments in future oil production and supply.

In contrast to crude oil, the Covid-19 pandemic has had a mixed effect on natural gas. In the longer-term, lower natural gas prices will help demand and reinforce natural gas as an attractive and affordable alternative to other sources, encouraging the switch from coal. This will also lead to more investment in LNG regasification projects across various markets, notably in South and South-East Asia, Eastern Europe, and possibly parts of Africa. However, as the 2020/21 winter price spike showed, gas prices have to be high enough to incentivise continuing supply expansion.



The two geopolitical events that interact with and could determine the pandemic's legacy in terms of the energy transition are 1) the result of the elections in the US and the new Joe Biden administration, and 2) how this administration intends to develop its relations with China.

The Democratic Party's win of the White House and Senate (at least until the 2022 midterm Congressional elections) could significantly boost the energy transition. The climate emergency will be prioritised through sweeping regulation, reducing greenhouse gas (GHG) emissions, investment in low-carbon energy, and bans on drilling across federal lands and waters, in addition to returning to the Paris Agreement. There is also a decisive employment-oriented and protectionist turn to these green policies.

In terms of US-China relations, the Covid-19 pandemic has increased verbal hostility between the two countries, increasing their competition, and decreasing their cooperation capacity. As these two superpowers continue on a divergent path, they are expected to go to great lengths to meet their energy demand and sustain their competitiveness in the international system.

An escalation of the cold war could lead to China and the US increasingly exploiting their indigenous fossil fuel resources. China will continue to dominate the manufacturing of renewable energy technology, while the US seeks to gain in areas such as advanced batteries, autonomous vehicles, and EVs. Strategic energy minerals, notably rare earth elements, whose mining and processing is currently a Chinese strength, may become an area of contestation or American attempts

to boost self-sufficiency. Beijing may turn to its indigenous and abundant coal resource if threatened. During the intense trade-war negotiations over tariffs, it created threats for its gasification plans and a peak in coal use. In turn, the US would emphasise its most major energy resource, natural gas, to achieve a competitive advantage. Other countries will be drawn into this competition: Europe as the third pole of clean-energy technology development and deployment; Japan as a Chinese rival, US ally and key potential hydrogen market; Australia as a politically-exposed source of coal, LNG, iron ore, and other key commodities to China; and Russia as an essential but subordinate energy partner to Beijing, providing gas and oil through secure land and marine routes, while having rivalries in Central Asia.



Overall, the effects of the Covid-19 pandemic have been adverse and tragic. However, the introduction and implementation of new green deals, decline in fossil fuel consumption and production, and an increasing rivalry between the US and China to dominate the clean and renewable energy sector could lead to an acceleration of the ongoing energy transition.

Acceleration is the likely outcome for the renewable energy transition.

Acceleration of the energy transition is the likely outcome of the post-pandemic world driven by:

1. Changes to the pre-pandemic energy mix and system;
2. Changes to the pre-pandemic investment climate; and
3. Economic recovery that prioritises renewable energy deployment.

Over the last 10 years, the global energy consumption mix and system has changed with increasing renewable and clean-energy sources, vastly amplified by a decreasing cost of renewable energy generation and an increasing shift from coal consumption. As a result, renewable energy accounts for more than 25% of the electricity generation mix in Spain and Italy, and more than 35% in the United Kingdom and Germany.

The restructuring of the existing pre-pandemic energy system with renewable energy sources has undercut coal-based electricity generation, reduced popular support for natural gas as a transition source to a renewable energy-based mix, and led to the development and adoption of battery storage technologies by



power and utility companies in preference to backup natural gas or diesel generators.

The restructuring of the existing pre-pandemic energy system changes the way we consume energy across the agricultural, residential, commercial, industrial, and transport sectors. For example, in transportation, analysts accept the reality that the combustion engine is almost at the end of its lifecycle, with the most ambitious projections estimating that all cars purchased in the next 6-10 years will be electric vehicles. Several large automakers, such as GM and Daimler, will phase out internal combustion engine models during the 2030s.

In contrast to the recovery from the 2009 global economic crash, the oil, gas, and coal sectors increasingly look risky compared to the renewable energy sector. Across developed and emerging markets, investing in utility-scale, solar or wind power projects guarantees consistent, predictable, and inflation-linked single-digit returns (double-digit for emerging markets) over an economical period of 20 – 25 years. Investors have a choice of deploying capital through:

1. Direct financing or pre-construction financing of greenfield projects;
2. Through secondary financing of operational brownfield projects;
3. Investing in Yield-Cos that operate portfolio renewable energy assets; and
4. Investing in renewable energy companies that operate across the entire value chain.



Hence, the sector is ideal for risk-averse investment vehicles such as pension funds, insurance funds, and sovereign wealth funds.

Furthermore, in the past few months as the magnitude of economic disruption caused by the Covid-19 pandemic became clear, academic institutions, businesses, think tanks, and governments increasingly advocated a sustainable and greener economic recovery that promotes the ongoing energy transition. In part, the analysis has drawn on experience gained through rebuilding after the 2008 – 2009 global financial crash, when some governments aimed for a 'green' recovery, notably the US under the administration of President Barack Obama, that invested US\$ 90bn to promote renewable energy as part of the American Recovery and Reinvestment Act of 2009.

For example, in Germany, the government has agreed to a post-pandemic stimulus package worth US\$ 146bn with a strong focus on energy transition and sustainable mobility. A notable feature is US\$ 11bn allocated to the development of the hydrogen sector, particularly renewable ('green') hydrogen. Across the European Union, a US\$ 903bn recovery fund as part of a US\$ 1tn budget for the next seven years was introduced. The budget earmarks 30% for climate action.



CONCLUSIONS

Covid-19 has been an unprecedented social and economic shock. Previous pandemics occurred before the modern globalised energy economy took shape, so did not have the same impact on reducing worldwide energy, and in particular oil, demand. Even though energy demand will bounce back as the outbreak comes under control, it will be patchy as different countries and sectors have been differentially affected. Hiccups in vaccination and the emergence of new viral strains will leave some areas struggling through 2021 and perhaps longer. Some impacts, such as reducing business and commuting travel, are likely permanent or at least long-lived.

The energy industry showed remarkable flexibility and resilience under such stress. Except for the brief WTI negative excursion, oil and gas prices dropped but remained in reasonable ranges. There were no severe energy shortages, products or blackouts. Most major energy companies survived, despite financial strain. The action of OPEC+ was crucial in supporting the recovery of oil prices during 2020 and avoiding a complete filling of global storage. To a lesser extent, cuts by flexible LNG exporters in the US and Egypt helped ease a gas glut in the summer.

Nevertheless, Covid-19 will prove to have accelerated and re-shaped existing trends more than creating them. The drop in oil demand has likely brought forward the date of peak oil demand, which could occur during the 2020s. That will require major producers to concentrate on cost-competitiveness and the best strategies to cope in a shrinking market. OPEC+ may have to change its approach of price defence through production cuts. Gas suffered less in the pandemic and has a more promising outlook and needs to improve its

environmental credentials and target expanding markets in China, South and South-East Asia, and Africa.

The fall in GHG emissions in 2020 was sharp but insufficient to slow global warming significantly. This indicates that the rapid and radical transformation of the worldwide energy, transport, industrial, and agriculture systems is required to meet the Paris Agreement's goals; slowing or halting economical growth would be insufficient. Green stimuli in the US and Europe, the drive for manufacturing employment, and the competition between China and the US to lead the world's technological new era will intensify government spending and incentives for crucial new energy technologies. Renewables are already well-established, EVs and batteries are emerging, so key future areas will include hydrogen, carbon sequestration and offsets, likely CCUS, and possibly other areas such as advanced nuclear.

Covid-19 has been both a foretaste and an accelerator of the future for the energy business. Now the pandemic's direct effects will give way to the even less predictable results of consumer trends, technological advancements, and government policy choices.



APPENDIX

- i. IMF World Economic Outlook, January 2021
- ii. <https://www.worldbank.org/en/news/press-release/2020/06/08/covid-19-to-plunge-global-economy-into-worst-recession-since-world-war-ii>
- iii. https://www.icao.int/sustainability/Documents/Covid-19/ICAO_coronavirus_Econ_Impact.pdf
- iv. <https://www.argusmedia.com/en/news/2181333-argus-live-covid19-clouds-outlook-for-jet-recovery>
- v. <https://www.spglobal.com/platts/en/market-insights/latest-news/oil/123020-commodities-2021-middle-east-eyes-slow-jet-fuel-demand-recovery-on-lingering-travel-restrictions>
- vi. <https://www.bloomberg.com/news/articles/2021-01-18/china-s-economy-grew-2-3-in-2020-accelerating-global-rise>
- vii. IMF World Economic Outlook, January 2021
- viii. <https://www.nenergybusiness.com/features/oil-gas-bankruptcy-2020-north-america/>
- ix. IEA, World Energy Outlook 2020, <https://www.iea.org/reports/world-energy-outlook-2020>
- x. <https://www.woodmac.com/our-expertise/focus/upstream/shale-shocked-us-producers-shut-in-1.5-million-bpd-since-early-april-but-when-will-crude-return/#:~:text=Capturing%20shut%20ins%20in%20real%20time&text=From%20its%20peak%20in%20March,-price%20driven%20shut%20ins.>
- xi. <https://www.spglobal.com/platts/en/market-insights/latest-news/oil/062520-us-refinery-capacity-tops-20-million-bd-in-2020-as-refiners-slow-defer-further-expansion-plans>
- xii. Global Gas Security Review 2020.
- xiii. IEA
- xiv. IEA
- xv. Accenture
- xvi. <https://www.nature.com/articles/d41586-021-00090-3>
- xvii. IEA

OUR MEMBERS

Currently, The Foundation has over 15 corporate members from Qatar's energy, insurance, and banking industries as well as several partnership agreements with business and academia.



The Al-Attiyah Foundation collaborates with its partners on various projects and research within the themes of energy and sustainable development.





Barzan Tower, 4th Floor, West Bay, PO Box 1916 - Doha, Qatar

Tel: +(974) 4042 8000, Fax: +(974) 4042 8099

 www.abhafoundation.org

 AlAttiyahFndn

 The Al-Attiyah Foundation