

March 2021

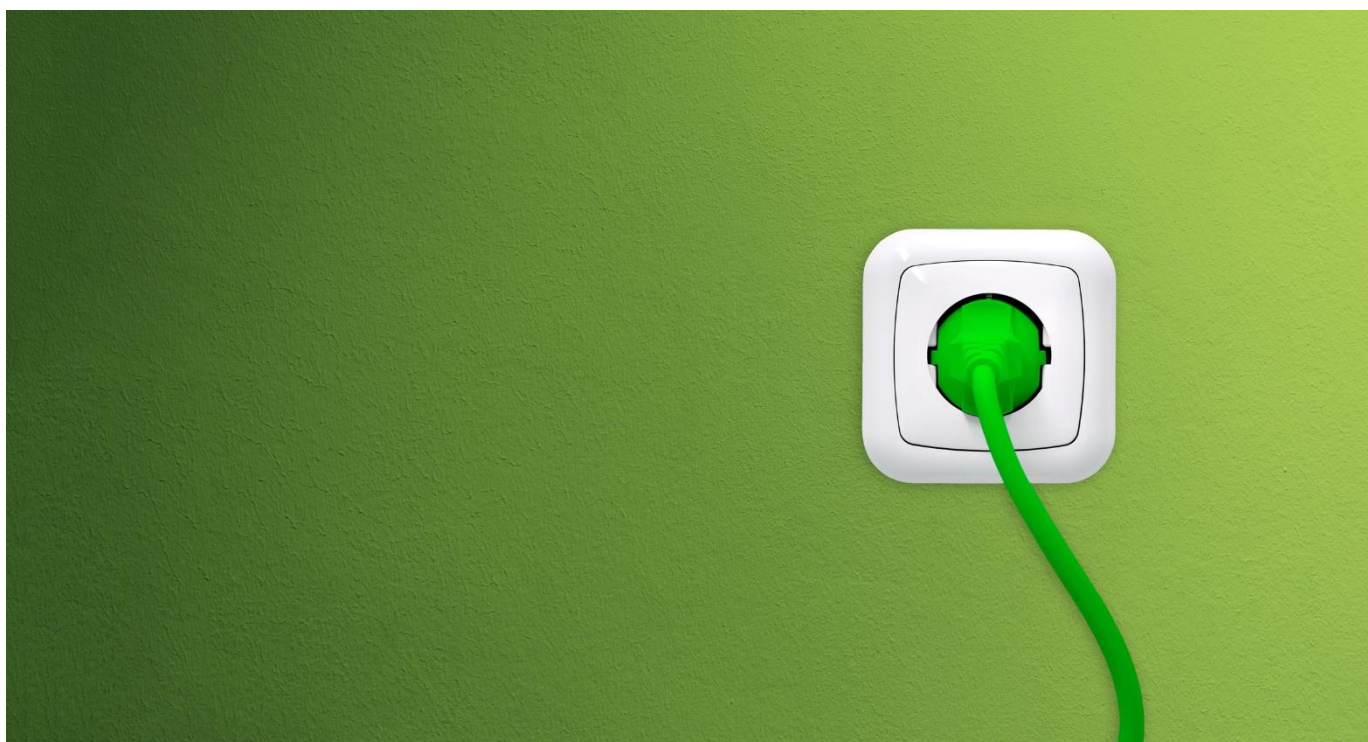


Old vs New Energy

Review of a rapidly evolving sector at the core of the ESG debate

Investment & Portfolio Advisory

- 02 Executive Summary
- 04 Energy sector review
- 10 Ideas for Advisory clients





Executive Summary

Fundamentals and drivers of change in the energy sector

Unpacking the topic

- In this piece, we unpack the fundamentals within the energy sector, and examine some of the drivers of change in an industry that is evolving quickly
- Whilst we believe that it is possible to align ESG and financial goals in any sector, there are some short vs long-term trade-offs to consider.
- For oil and gas majors, transitioning toward new energy requires transforming part of their business, which requires significant investments and can lead to higher operating costs, return dilution on allocation to less profitable businesses and governance issues.
- Companies not investing or investing little capital are penalized by the market. Conversely, companies investing material amounts of capital are now trading on valuation grounds not justified by the return on capital invested.

Drivers of change

- Fossil fuels represent around 60% of energy consumption globally today, with natural gas, nuclear energy, renewables, hydroelectricity and hydrogen making up the rest. In 2050, renewables will represent more than 40%, and fossil fuels only around 20%. Over the next 30 years, natural gas will play an important role but will eventually be overtaken by hydrogen which produces even lower greenhouse gas emissions but is currently still relatively expensive to produce.
- Changes in fuel consumption are driven by policy, decreasing costs of producing renewables and natural gas, and changing consumer preferences.
- Regulation, subsidies and carbon taxes will significantly impact energy production and consumption in coming years, with the Green Deal in the EU and the CLEAN Act in the United States just two examples.
- Shale remains costly to extract and sustained high oil prices are needed for a real recovery. Drilling activity remains subdued due to low cashflows, elevated costs of financing and ESG headwinds.

Fossil fuel alternatives

- Hydrogen is predicted to increase to eight times today's use by 2050, with transport, industrial processes and power generation accounting for the bulk of this growth.
- Its inherent properties (light, storable, transportable and energy-dense) will give hydrogen a key role in refining, and the production of ammonia, steel and heavy-duty vehicles in coming years. The speed at which hydrogen will become a realistic fuel alternative will be determined by the continuing decrease in renewable power costs
- Renewable-focused companies such as utilities could at first glance appear good investment. However, we see them as capital intense businesses, with no moat, which barely honour their cost of capital.

Ideas for Advisory clients

- From a top down perspective, we prefer to play the economic recovery by investing in other cyclical sectors such as industrials, materials and financials.
- In energy, stock valuations have rebounded some way already. We see ESG and structural challenges as substantial and have recently maintained a tactically underweight position even as economic recovery has taken root.
- For clients already invested in the sector, consider diversifying out of pure oil and gas players, favouring high quality businesses. For example, **Epiroc** provides some commodity exposure; **Linde** is a play on the hydrogen theme.
- For clients wanting to maintain or initiate an allocation to oil and gas: Large integrated companies offer somewhat more stable returns thanks to their diversification. We focus on less levered companies that are showing incremental steps toward ESG. **Chevron** is less levered than its European peers; **Total** is more ESG oriented.

Past performance is not indicative of future performance and the value of investments and income from them can fall as well as rise



Unpacking the topic

With the race to zero carbon emissions at the forefront of many country, company, and global citizen agendas, our investment team at Rothschild & Co WM unpacks some of the big questions surrounding the energy sector.

- The last 12 months saw record investment flows into renewable energy sources, a violent pandemic-induced collapse in the oil price, magnified by the start of a price war by suppliers, a subsequent recovery due to supply cuts, and significant commitments from "old" energy companies such as BP, Total, Shell, and others to investing in alternative energy sources. More recently, the Texas freeze storm in February 2021 is an example of the type of extreme weather linked to climate change we may have to get used to in coming years, and a reminder of the importance of ensuring sustainability in energy provision, whilst respecting the carbon transition agenda.
- In the asset and wealth management world, global funds linked to environmental, social and governance principles took in nearly USD350bn last year, compared with USD165bn in 2019, according to data from Morningstar. Unsurprisingly, the S&P Global Clean Energy index, which tracks the share price of 30 companies, has almost doubled in value in the past year, giving it a valuation of 41 times its companies' expected profits, according to Bloomberg data. By contrast, US blue-chip stocks are up about 16 per cent over the same period and are valued at above 20 times on year forward earnings. Some large institutional investors and insurance companies have pledged to stop financing coal. In 2019, the European Investment Bank (EIB) agreed to phase out oil, gas and coal projects by 2021 to become the world's first "climate bank". In 2020 Larry Fink, CEO of Blackrock, the largest worldwide asset manager, disclosed plans to engage with and pressure companies to do a lot more to lower their carbon emissions. This will certainly contribute to behaviour changes from companies.
- Meanwhile on the ground, the price of carbon allowances has increased by more than 5 times over the last 3 years, signaling significant headwinds for the biggest polluters. Analysts expect the price of a tonne of CO2 to be around 80-90 EUR in Europe by 2030, up from 40 EUR today, and 8 EUR 3 years ago. This year, the EU is expanding its Emissions Trading Scheme to include shipping, transport and building, which should further support price increases in carbon allowances.
- It appears that while setting emissions targets is all well and good, the fundamental questions about how we get there are yet to be answered and the path is uncertain. In this piece, we highlight some of the issues challenging the energy sector today, examine the drivers of change and give our view on how to position portfolios to invest in the energy transition in a meaningful way.

Source: Bloomberg

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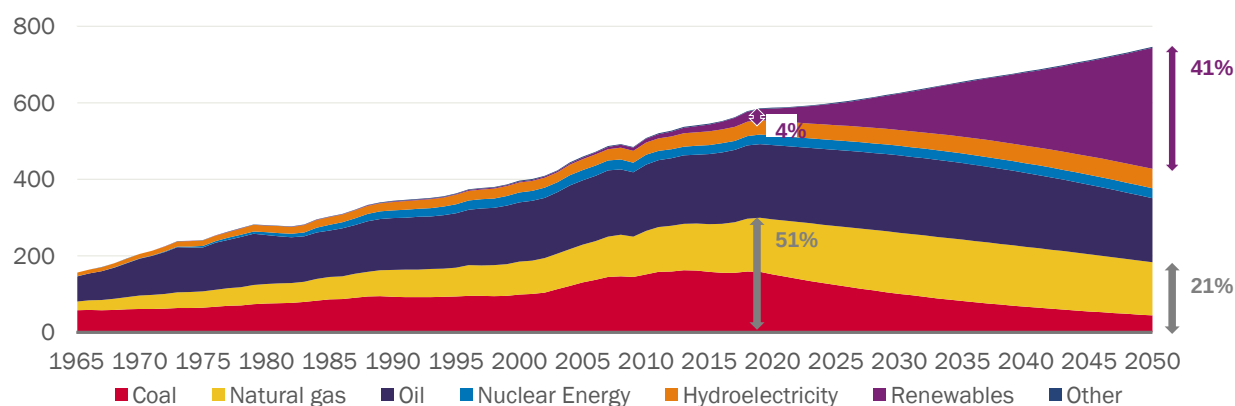


Drivers of change in the energy sector

Policy shifts and decreasing costs are changing the energy landscape

- Today, oil and coal are still the main fuel consumed worldwide (combined share of 60%). However, if we look at the growth in total consumption of fuel over the last 10 years, around 2% per year, it was driven mainly by renewables and natural gas, which together made up over half of the net increase. Meanwhile, oil consumption grew at around 1% and coal consumption declined.
- As a result, the share of both renewables and natural gas gained importance in the energy mix, representing one third of the total in 2019, while oil and coal declined (see chart 1).
- Policies encouraging a shift to lower-carbon energy sources (through subsidies and favourable taxation) are proving a powerful driver of change. For example, the Paris Agreement aiming to limit global warming well below two degrees Celsius was signed by 196 countries in 2015. Since then, 'net zero' policies were adopted in Europe with the EU-28-Green deal, and Asia (China, Japan, South Korea). Goldman Sachs estimates that the countries with net zero goals account for about 45% of global emissions, with China alone accounting for around 30% (based on 2018 data).
- Across geographical regions there is considerable divergence regarding the transition toward low-carbon energies, with Europe in the lead. Going forward, there will be a gradual convergence in the fuel mix across countries.
- Looking at the fuel mix across uses and geographies, the decreasing cost of natural gas and renewable energy over the last decade has been the main factor of demand increase. According to EDF, wind energy prices have fallen 70% and solar photovoltaics have fallen 89% on average, outcompeting coal. Coal is primarily used for electricity generation across sectors but has been declining from the continuous switch to natural gas (also called LNG, Liquefied Natural Gas).
- The outlook for LNG is brighter than that of other fossil fuels because of its comparatively lower cost and lower emissions from production and combustion. Natural gas emits between 45-55% less greenhouse gases than coal when used to generate electricity.
- Natural gas should continue to benefit from the switch from coal in the next few years but is likely to eventually start to decline in the mix as a result of environmental considerations, competition from renewables, alternative low-carbon gases such as hydrogen, and notably, electrification.

Chart 1: World fuel consumption (exajoules) and share (%)



Source: BP, IEA, Goldman Sachs "The rise of the green majors" report, Jan 2021

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The increasing importance of renewables

Over the next 30 years, there will be a gradual convergence in the fuel mix across countries

While fossil fuels remain indispensable for some industries, renewables and hydrogen are gaining traction

- Petroleum products derived from crude oil, such as gasoline, diesel and jet fuels are mainly used in transport. Other products include fuel oils, used for heating and power generation, or petrochemical feedstocks for making chemicals, plastics, and synthetic materials (chart 2). A shift toward electricity and other cleaner energy sources is ongoing, but remains gradual.
- Renewables (wind, solar, geothermal and biomass) are expected to continue to expand, from 5% in 2019 to around 40% in 2050, driven by falling costs of production, widespread availability, and the increasing electrification of the energy system. Finally, electricity consumption is expected to double by 2050, for example in transports, with Electric Vehicles (EV) continuously growing. Assuming EV continue to grow at ca.30% per year, in 2030 half of the cars sold would be EV and EV would represent 30% of cars worldwide.
- Finally, clean hydrogen is currently enjoying unprecedented political and business momentum but is still almost completely absent from key sectors such as transport, buildings and power generation (IEA). However, it has robust advantages over other energy sources (light, storable, transportable and energy-dense). Both green hydrogen (made by electrolysis using renewable power) and blue hydrogen (extracted from natural gas) are expected to gain in importance in the next decades.

Chart 3: Energy Source Evolution in Different Scenarios

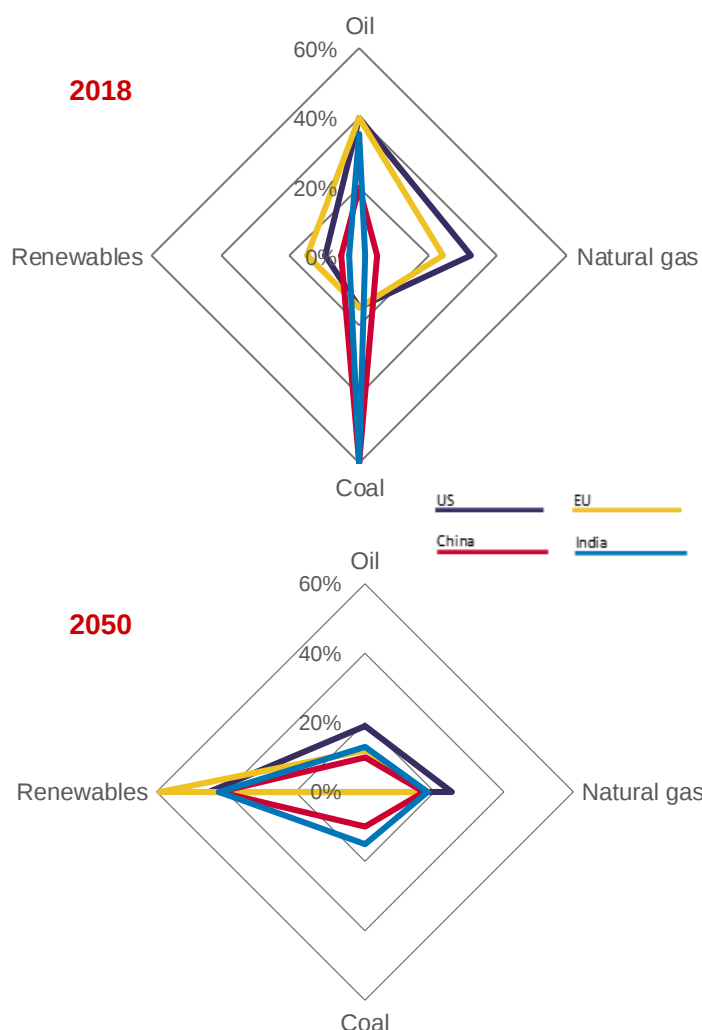
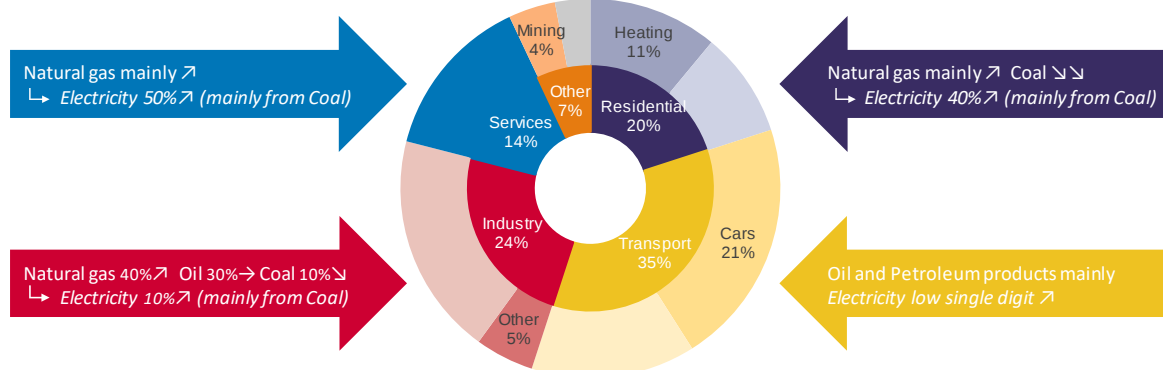


Chart 2: Energy consumption by sector



Source: Rothschild & Co, IEA, EIA, BP, Rothschild and Co, percentages are based on US sources. McKinsey Report "Global Energy Perspective", Jan 2019
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Factors influencing demand and supply in oil

Oil prices are determined by global supply and demand, with many variables affecting both sides

- On the demand side, global economic growth drives the demand for energy. In 2020, the OECD represented 40% of the total demand (including 16% in the US and 14% in Europe) with non-OECD countries at 60% (of which China at 24%, India 6%, Russia 5% and Brazil at 2%). In the short-term, demand growth will be driven by the post-Covid-19 macro recovery. In the medium-term, non-OECD countries should continue to drive demand.
- On the supply side, the OPEC (Organization of the Petroleum Exporting Countries) is the largest producer, at 35% of the total (95-100 Million Barrels Per Day, of which Saudi Arabia produces about one third. The OECD produces around 30%, of which the US more than half of it (followed by Canada and Norway). Outside of the OECD, Russia is a large player and part of the OPEC+ (about 10% of total production), followed by countries such as Brazil, Kazakhstan and China. As discussed above, alternative sources of energy such as renewables represent around 5% of the total and are growing fast, and therefore also distorting supply.
- There are always many unknowns in determining the price of oil, especially on the supply side:
 - ✓ Will there be any new discoveries?
 - ✓ At what pace will shale grow?
 - ✓ How much will the OPEC produce (how will the quotas evolve), and will the different countries respect their quotas? Will Iran and Venezuela resume production and export at some point or will they remain constrained by sanctions?
 - ✓ How will the geopolitical landscape in the middle East evolve?
 - ✓ To what extent and how fast will renewables and biofuels replace oil supply?
- Added to this, substitution is becoming a major driver of both supply and demand going forward. On the demand side, several countries have introduced targets to achieve net-zero emissions by 2050 which also mean that their fossil fuel need will be less correlated to their GDP growth.



The Impact of Regulation

New legislation, subsidies and favourable taxation aim to reshape the sector over time

- Evolving rules and regulations around energy production and consumption are having a non-negligible effect on the industry.
- Subsidies from governments providing incentives to those switching their heating system to electric or solar powered systems, bans on diesel and petrol cars announced by cities and countries in Europe for the near future – these moves are impacting consumers, especially in Europe, and are being encouraged by the EU's Green Deal.
- On the investment side, the Sustainable Taxonomy initiative is forcing investment houses to think more carefully about their role in the carbon transition.
- In the US, the new CLEAN act being discussed by the Biden administration will likely further tilt the balance away from traditional energy sources and towards renewables and hydrogen, and with it have us rely increasingly on electrical power and the surrounding infrastructure.

Hydrogen – fuel of the future?

Growth of hydrogen as a realistic alternative will be determined by renewable energy cost

- Hydrogen use may increase to 540 million tons a year by 2050, from about 70 million now, with transport, industrial processes and power generation accounting for the bulk of this growth. EU plans to spur green hydrogen production have driven rising capacity by the leading suppliers.
- Its inherent properties (light, storable, transportable and energy-dense) are likely to give hydrogen a key role in refining, and the production of ammonia, steel and heavy-duty vehicles in coming years. It will be less present in heating, power generation and cement production.
- According to McKinsey, hydrogen could be a “game-changer”, going from close to zero now, to as much as 40% of the new electricity demand between 2035 and 2050.
- Whilst hydrogen has robust advantages over other energy sources, its production is still a very small part of the majority of big corporates' activity, and the smaller, purely hydrogen-focused companies are still mostly EBITDA-negative. The growth of hydrogen as a realistic alternative to fossil fuels and a practical complement to renewables will be determined by the continuing decrease in renewable power costs (to increase water electrolysis, necessary for green hydrogen production).



Shale oil in 2021

Following a 12 month rollercoaster in the oil price, shale production is less in focus

Shale requires a sustained high oil price to grow meaningfully, and faces ESG headwinds

- To provide some background, in the late 1990s and early 2000s, progress in two technologies (hydraulic fracturing, or fracking, and horizontal drilling) transformed the commercial viability of shale gas and somewhat revolutionised the oil production landscape, with the US becoming the biggest producer worldwide. In 2019, about 70% of total US crude oil and natural gas production was produced onshore. In 2020, the US was energy self-sufficient for the first time.
- For oil, the main producing area is the Permian Basin, with more than half of the total oil, followed by Bakken and Eagle Ford (15-20%) and the other regions in the single digit area. Regarding natural gas, Appalachia is the biggest producing area (40%), followed by the Permian (20%), Haynesville (15%) and the other regions in the single digit area.
- From the mid-2000s, shale oil and gas experienced low double-digit growth and reached a double-digit share of the total worldwide production, becoming a source of supply impossible to ignore.
- However, shale remains difficult hence costly to extract and sustained high oil prices are needed for a proper recovery. While current higher oil price prices are driving a small rebound in drilling activity it remains subdued due to low cashflows, elevated costs of financing and ESG headwinds. The environmental impacts of shale extraction using fracking are not fully known. Some concerns have been raised related to water supply, spills, or degradation of the environment. Moreover, shale producers stated in their recent earnings releases their commitment to

shareholder returns over production growth. Therefore, shale is not expected to be a major driver of oil prices in the short term.

Chart 4: Map of oil and gas producing areas in the USA

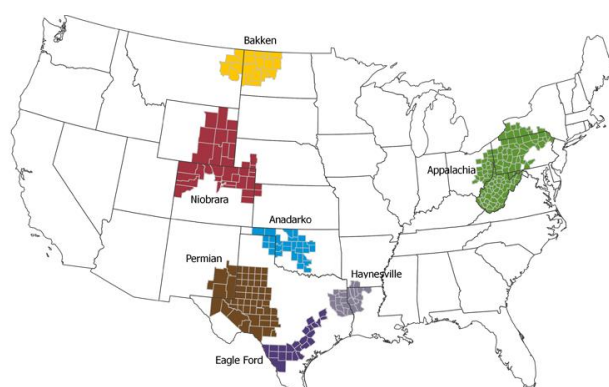


Chart 5: Evolution of oil rig number 2000-2020

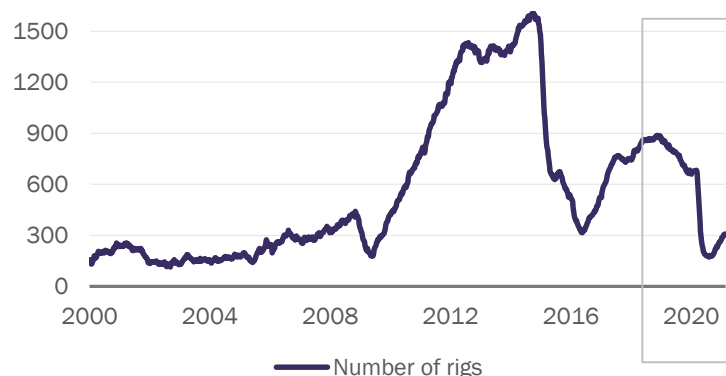
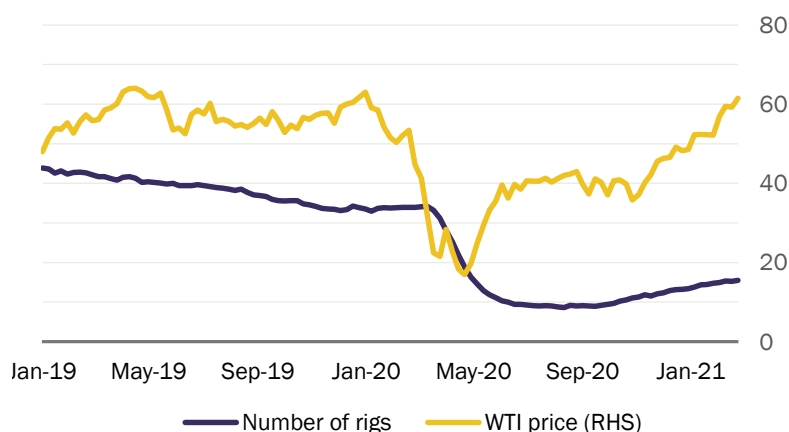


Chart 6: Zoom on 2019-2021 including WTI oil price



Source: EIA, Bloomberg, Baker Hughes United States Crude Oil Rotary Rig Count Data, US Geological Survey website
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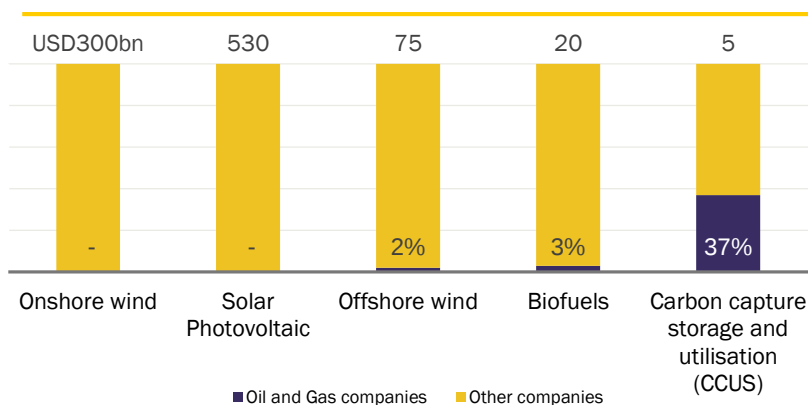
Investing consciously in energy

How can investors be positioned to align financial and ESG goals?

In our view, aligning ESG goals can be compatible with investing in any sector

- Most oil and gas companies, especially in Europe, have set ambitious emissions targets. As an example, among the five majors, Total, Shell, and BP all aim to become net-zero companies by 2050, which is the same goal as Nestlé. Furthermore, oil and gas companies have started to invest capital in low-carbon activities.
- To put some numbers around it, Shell expects to allocate 12% of capital expenditure (capex) into renewables (USD2-3bn) in 2021, Total above 20% in 2021 (USD2-3bn) and BP stood at 15% in 2020 (USD2bn). In comparison, the utility company Iberdrola aims to spend about half of its capex in renewables (EUR6-8bn). As a side note, including natural gas in the capex directed to low carbon activities would result in a much higher share, particularly for Shell and Total.
- Yet, there are two points to bear in mind. First, transitioning toward new energy requires transforming part of the business, which requires significant investments and can also lead to higher operating costs, return dilution on allocation to less profitable businesses and governance issues. Second, despite being significant in absolute numbers these investments of oil majors remain small in the global context, which has been flooded by utility and renewable companies.
- Furthermore, the renewable market is highly fragmented, with many companies willing to benefit from the growth trend. This in turn creates fierce competition in the market and reduces returns on investment. For instance, the market share of European renewable majors (such as Iberdrola, Orsted, Solaria, SSE, RWE, Acciona, etc) stood at less than 10% overall in 2019 and in the low single digits for oil and gas companies.
- Renewable-focused companies such as utilities could at first glance appear good investment. However, we see them as capital intense businesses, with no moat, barely (if at all) honouring their cost of capital (some do, thanks to government subsidies).
- Interestingly, against investor pressure to allocate more capital toward new energies, oil and gas company CEOs are becoming cautious. For example, recently Total's CFO Patrick Pouyanné said in an interview “there is a bubble” in the renewables sector, with valuations often up to 25 times earnings being “just crazy today”.
- In conclusion, the perfect ESG candidate in the energy space is hard to define and find: companies not investing or investing little capital are penalized by the market. Conversely, companies investing material amounts of capital are now trading on valuation grounds not justified by the return on capital invested, in our view.

Chart 7: Share of global capital investment in selected low-carbon technologies (2015-2018, %)



Source: Redburn, Rothschild & Co, Financial Times article with Total CEO on 21 Feb 2021

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Implementation Ideas for Advisory Clients

As we write, we remain underweight energy from a top down perspective

We prefer to play the economic recovery by investing in high quality names within other cyclical sectors such as industrials, materials and financials.

- At Rothschild & Co, we focus on wealth preservation. Despite the recent strong rally in both commodity prices and oil and gas companies on the back of vaccine optimism and the expected re-opening of the global economy, we remain underweight energy from a top-down perspective.
- As discussed in this paper, we see ESG and structural challenges as substantial, and we have recently maintained a tactically underweight position even as economic recovery has taken root
- In practice this means that we are invested in energy but hold small positions relative to our benchmark.
- From a bottom-up view, our focus is on high quality companies. We favor capital-light, high moat businesses with strong pricing power, companies with robust, growing and predictable returns on capital invested (ROIC) and healthy cashflows. Unfortunately, none of the large-cap energy companies offer this combination of strong fundamentals.
- The price of oil depends on several external factors that are themselves difficult to predict, making oil and gas companies' top line very volatile. As their cost base is rather static, returns are unpredictable. We also express doubts regarding capital allocation, as asset purchases are often written off years later, as we have seen in 2020. Moreover, cash flows generally do not cover the capital returns promised to investors due to the high amount of debt. We therefore believe that it is difficult to justify investing in oil and gas equities when aiming at wealth preservation.
- Finally, oil and gas companies are facing investor pressure to diversify toward less carbon-intensive businesses, which could

lead to trade-offs in capital allocation and governance issues.

- Within the oil and gas sector, we believe that large integrated companies offer somewhat more stable returns thanks to their diversification. Among the integrated companies, we favour the ones with a lower amount of debt compared to their equity (i.e. a lower leverage or gearing). We also note that European companies are currently more advanced in terms of ESG initiatives.
- For clients already invested in the sector, consider diversifying out of pure oil and gas players, favouring high quality businesses. For example, **Epiroc** provides some commodity exposure; **Linde** is a play on the hydrogen theme.
- For clients wanting to maintain or initiate an allocation to oil and gas: Large integrated companies offer somewhat more stable returns thanks to their diversification. We focus on less levered companies that are showing incremental steps toward ESG. **Chevron** is less levered than its European peers; **Total** is more ESG oriented.

If you would like to review our latest asset allocation publication, please contact your Client Adviser.

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