

Long-term energy market outlook - 2018 to 2040

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Service overview

The next 20 years threaten to be a watershed moment for energy markets with an unusually large number of landmark events on the horizon making the future incredibly hazy.

The Long-term energy market outlook service provides our forecasts for international energy markets out to 2040. As well as a region/country-specific and fuel-type approach, we also look at the key contributing sectors. This holistic approach provides an all-encompassing understanding of how oil, gas, coal, renewables and nuclear markets will evolve over the coming decades based on existing and likely policy decisions and trends.

The key issues and questions addressed in our Long-term energy market outlook include:

- The emergence of new non-oil propelled motorised transport—particularly electric vehicles but also gas-powered transport (trucks, buses, cars and ships)—and how, by focussing on the rapid growth in the sales of these new vehicles as opposed to the associated evolution of the total vehicle fleet, the true impact of these new technologies is often misunderstood.
- Changing vehicle ownership preferences—the ‘uberisation’ of road transport—and, further out, the impact of autonomous vehicles.
- The rapidly expanding role of nonconventional oil supplies, vis-à-vis conventional oil, and the implications of this transition on company cashflows, future drilling cycles, and the changing role of OPEC.
- The advent of increasingly cost-competitive renewable power, and how this impacts the energy mix, especially coal and natural gas.
- The rapidly expanding size of Asia’s new middle-class population—as an unprecedented number of previously very low per capita energy consumers are finally able to enter energy wealth—while huge numbers of other emerging market citizens (particularly in Africa) are first able to consume significant volumes of energy.
- Tightening emissions regulations—such as IMO 2020 for ships—changing not only the composition of demand, but also downstream oil strategies.

The complex demand-side models incorporated in our Long-term energy market outlook help to examine these, often opposing, issues. We produce comprehensive forecasts, through to 2040, providing clarity in an increasingly uncertain world. Each of the primary energy sources is dealt with in detail, providing outlooks for oil (broken down by all the major product categories), natural gas, coal, renewables and nuclear. Detailed forecasts are accordingly provided for each major region (both by total primary energy demand and each major fuel) and for all of the major sectors of energy demand (aviation, power, road transport, petrochemicals, industry and shipping).

By explicitly modelling oil on a field-by-field basis, our global supply model addresses many additional questions such as: the long-term implications of the 2014-2016 price slump, whether the industry can deliver the supply to meet the ongoing appetite for oil (we do not expect demand to peak before the mid-2030s), the role of shale and unconventional oil in the global energy mix, and the implications of this transition on company cashflows and how companies will navigate these turbulent times.

Our analysis combines a bottom-up field and project-level short/medium-term model (engineering and technical) with a top-down resource-driven long-term model (influenced by both economic and political factors) to provide insights into production potential. Transparent logic is critical and we address how producers respond to price signals. Importantly, we also seek to address the significance of cashflows in navigating the energy transition. Oil is, and will remain for some time, one of the most important energy sources for meeting future demand. Conventional oil has been the main focus of the oil industry since its inception, but we are currently amidst a rapid transition to develop vast volumes of unconventional resource. In this report we address this impact over time, assessing the dynamic between OPEC/non-OPEC and show how shale evolves.

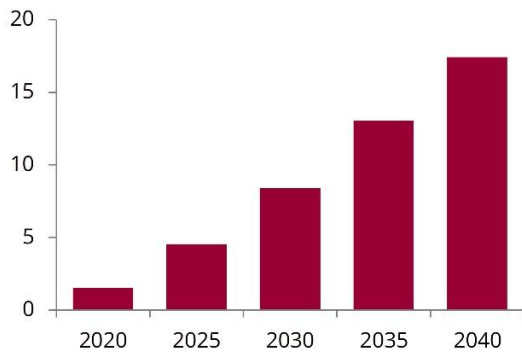
Examples of the sectoral modelling work in this report:

Electric vehicles: Don't believe the hype!...at least not all of it

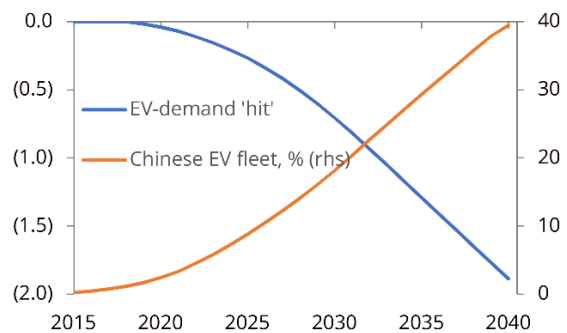
Electric vehicles (EVs) have been one of the biggest stories to grace energy markets in recent years but their potential impact is often overblown. The problem stems from a fundamental misunderstanding of vehicle sales (especially EV sales) and how they impact energy demand. The vehicle fleet is the key demand determinant, not sales. Scrapping—the removal of vehicles from the fleet—is just as important as sales but has garnered very little to no media attention. Furthermore, reports of 'record EV sales' or 'double-digit EV sales growth' need to be weighed against their very low baseline. In contrast, reports such as 'declining Chinese (gasoline) car sales' do not equate with a declining fleet—the key metric—as Chinese scrappage is far smaller than sales.

Our models show rapidly expanding EV sales penetration worldwide, from approximately 2% of the total fleet today, to 16% in 2030 and 37.5% by 2040. But this equates to a much lower reading for the key transport variable—fleet penetration—as forecast EV penetration rises only modestly, from less than 1% in 2018, to 9% by 2030 and 25% in 2040. The theoretical 'lost' oil demand from EVs equates to approximately 2.4 mb/d in 2030 (or just under 5% of prospective road transport oil demand) and 7.5 mb/d by 2040. Putting this EV effect in context, the efficiency loss—i.e. how much prospective oil demand is 'lost' to vehicle efficiency gains—is forecast to be 11.2 mb/d in 2030, which is five times greater than the 'EV hit'... *(continued within Long-term energy market outlook)*

Chinese EV sales, million



Chinese oil demand degradation (mb/d) and EV fleet (%)



IMO 2020: serious implications for oil

The looming International Maritime Organization (IMO) legislative change—whereby ships will be limited to sulphur oxide (SO_x) emissions of no more than 0.5%—will significantly impact energy markets in the run-up to the 2020 implementation date and encourage ‘cleaner’ fuels in the longer term. Not only will IMO 2020 prove a huge adjustment for the shipping industry but, if enforced with rigour, it will also have serious consequences for oil prices—potentially sending late 2019/early 2020 crude oil prices up sharply and raising the competition (and prices) for cleaner fuels.

Despite the severity of the forecast 2020 adjustment, total demand from the shipping industry will continue to rise sharply through 2040, up by an estimated net 1.9 mb/d over 2018-2040 or 1.4% per annum on average. Asia will dominate the upside—adding 1.5 mb/d or 2.3% per annum on average—along with other developing economies, such as the Middle East, Africa and the former Soviet Union. In contrast to the growth we forecast in most emerging markets, our shipping models predict modest declines in both North America and Europe. Despite IMO 2020 upsetting the proverbial apple cart, oil products remain by far the dominant fuel of choice through 2040 but natural gas increasingly takes market share at the margin, rising from a very modest 0.2% of global shipping demand in 2018, to an estimated 5% in 2030 and 12% by 2040...*(continued within Long-term energy market outlook)*

Aviation outlook: parts of the barrel continue to fly

Due to an inherent lack of competitor fuels, the aviation sector will provide ongoing and robust support to oil demand through our long-term forecasting horizon. Between 2018 and 2040 the global aviation sector adds approximately 3.2 mb/d (or 145 million tonnes), 40% of the overall forecast gain in oil, with the overwhelming majority of these additions focussed on the dominant aviation fuel, jet/kerosene. Indeed, the aviation sector accounts for roughly nine-out-of-every-10 barrels of jet/kerosene consumed worldwide, the remainder largely being used in the Asian buildings sector. Rising by a compound average annual rate of roughly 1.7% per annum over 2018-2040, robust aviation fuel demand growth continues to provide a key support to oil and energy demand through our forecast.

Strong aviation fuel demand growth will be underpinned by continued rapid gains in total flight numbers, themselves heavily correlated with economic activity. Our baseline macroeconomic outlook points towards relatively robust economic conditions through 2040, with global economic growth forecast to average 3.6% per annum over 2018-2040 (compared to the IMF's estimate of 3.9% growth in 2018). Of

course, increased flight numbers do not necessarily equate to higher aviation fuel demand, as planes are forecast to steadily become more efficient through the forecast...*(continued within Long-term energy market outlook)*

Unpicking petrochemicals

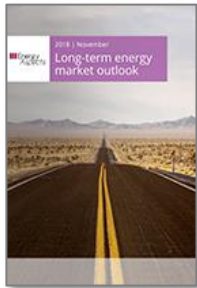
The global petrochemical industry has been one of the chief supports to oil demand growth in recent years, rising by 0.4 mb/d per year on average over the past five years. Accounting for roughly a quarter of global oil demand growth through this period, the petrochemical industry also accounts for approximately one out of every eight barrels of oil consumed globally. Hence, petrochemical demand is an important and increasingly significant component of global oil product demand, and one that will play a pivotal supporting role to our forecast that global oil demand will not peak until the mid-2030s.

When we talk about petrochemical demand—with roughly 12.6 mb/d of oil products consumed by the petrochemical industry in 2018, or a combined 16.2 mb/d (0.6 billion tonnes of oil equivalent, btoe) of primary energy demand—we refer to the total quantity of energy that is required to produce petrochemicals, of which roughly 90% is used as a feedstock and the remainder for thermal energy. Historically, the main feedstock that has been used has been naphtha, accounting for roughly one out of every two barrels of oil used by the petrochemical industry or 38% of the primary energy used. Ethane is rising in significance, particularly in North America, and is forecast to continue to through 2040 as additional supplies become available...*(continued within Long-term energy market outlook)*

Industrial outlook

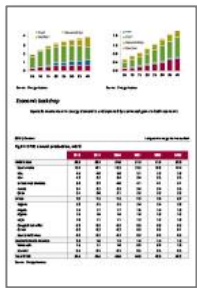
Historically dominated by coal, the industrial sector—which overall accounts for roughly one-fifth of total energy demand—has long been an important component of the global energy mix and will remain so through our long-term forecasting horizon. Forecast to rise from approximately 3.0 btoe in 2018—not including the petrochemical sector, which we treat separately—to around 3.6 btoe by 2040, a compound per annum growth rate of 0.9%, the industrial energy mix is evolving dramatically. The first decade of this millennium saw industrial coal use surge, largely as a consequence of the rapid industrialisation of China, but the story since has increasingly become about the increased electrification of industry worldwide. Despite mounting calls to decarbonise energy use worldwide, industrial demand will find it hard to significantly shift towards renewables other than through the indirect impact through the power market...*(continued within Long-term energy market outlook)*

Long-term energy market outlook deliverables



Long-term energy market outlook

This annual report contains our views on supply, demand and prices from 2018 to 2040. Built on our detailed model of primary energy production and consumption, it incorporates detailed analysis of a wide range of relevant topics (e.g. electric vehicles, petrochemicals, Asian economic growth, etc). The report provides particularly detailed forecasts over the next five years, our medium-term outlook horizon.



Long-term outlook data

Download the detailed data behind our outlook for the five sources of primary energy—oil, coal, natural gas, nuclear and renewables. The data cover relative supply and demand on a global and regional basis, and price forecasts for crude oil and natural gas.



Medium-term update

We refresh the medium-term outlook—looking out over the next five years—once a year to ensure our forecast reflects the latest fundamental drivers at the prompt such as economic shifts, technology changes, and regulatory and political dynamics.



E-mail alerts

We publish timely e-mail alerts examining pertinent developments related to the assumptions that drive our long-term forecast. For example, a series of major new upstream discoveries, a significant technological breakthrough or a shift in the outlook for the global economy.

Each month we provide a synopsis of the latest developments related to, and potentially impacting, the long-term outlook.



Workshop

Subscribers are invited to exclusive workshops, held annually in both London and Houston. The workshop provides a forum for our analysts to present our long-term methodology and views and fully address topics of interest. Subscribing companies will have two seats at either the London or Houston workshop.

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