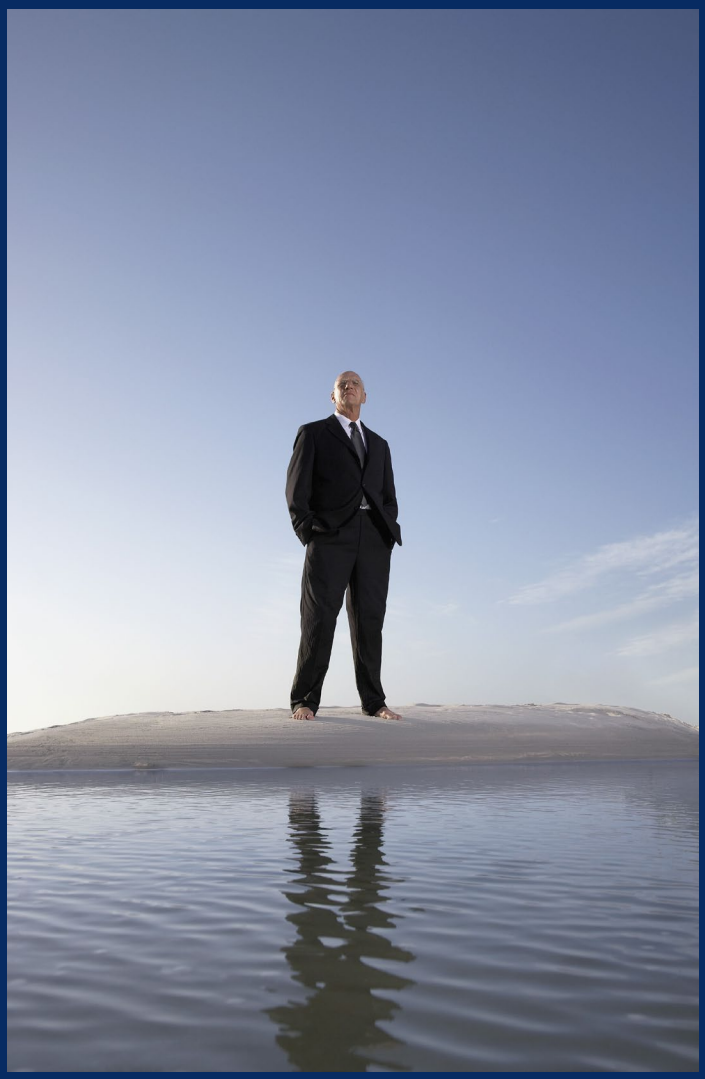

The Stranded Assets Myth

Refuting Mark Carney's Claims

Robert Lyman

Sept. 13, 2020

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ABOUT THE AUTHOR

Robert Lyman is an economist with 27 years' experience as an analyst, policy advisor and manager in the Canadian federal government, primarily in the areas of energy, transportation, and environmental policy. He was also a diplomat for 10 years. Subsequently he has worked as a private consultant conducting policy research and analysis on energy and transportation issues as a principal for Entrans Policy Research Group. He is a frequent contributor of articles and reports for Friends of Science, a Calgary-based independent organization concerned about climate change-related issues. He resides in Ottawa, Canada. Full bio.

THE STRANDED ASSETS MYTH

REFUTING MARK CARNEY'S CLAIMS

EXECUTIVE SUMMARY

In late December, 2019, the outgoing Governor of the Bank of England, Mark Carney, gave a speech to a Lloyd's of London dinner. In it, he warned members of the international financial industry that their valuation of loans and investments should be reduced to consider the losses that fossil fuel companies will suffer from a catastrophic collapse in value as a result of climate change policies. The key danger, he alleged, was that changes in government policies will leave oil drillers and coal miners with stranded assets – reserves that have little value because the fight against climate change will "require" them to be left in the ground.

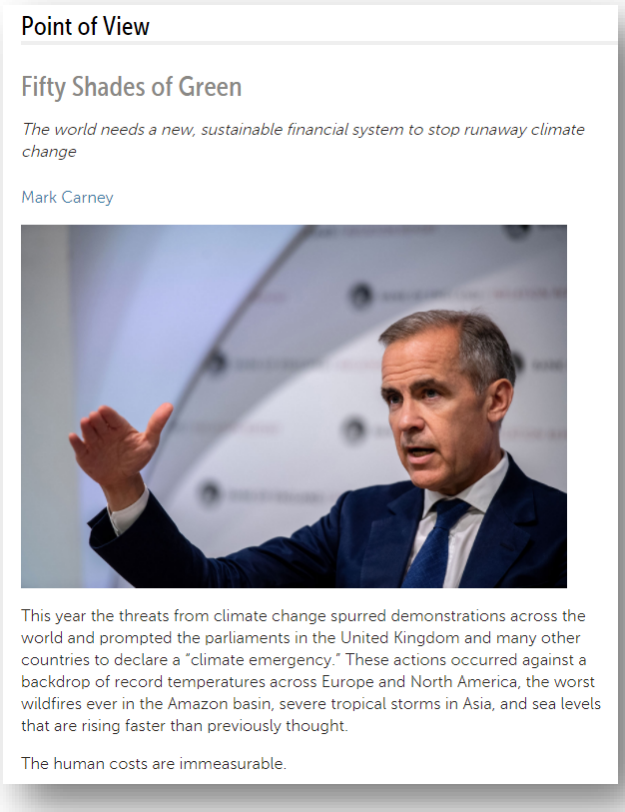
In this article, I will compare Carney's claims with what is actually happening in global energy markets, as well as what can reasonably be expected to drive energy markets over the foreseeable future, according to the best authorities available. I will try to show that the financial institutions and energy companies that pass up opportunities to invest in fossil fuels will run a far greater risk of foregoing significant profits.

Global demand for oil, natural gas and coal is now and will continue to be driven by demographic and economic trends in Asia, not in Europe and North America. The resulting large increases in demand for these fuels, which will probably become evident no later than 2022, must be satisfied. If government policies and investor reticence and/or lack of investment capital result in insufficient supply to meet this burgeoning demand, prices will rise significantly. While that, in turn, will dampen demand growth, it will yield very large profits to producers and provide them with the cash flow needed to expand reserves and production with less reliance on traditional sources of lending.

In such a future, the institutional investors can, of course, refuse to join in the profit-taking. I doubt they will.

THE STRANDED ASSETS MYTH

REFUTING MARK CARNEY'S CLAIMS



Point of View

Fifty Shades of Green

The world needs a new, sustainable financial system to stop runaway climate change

Mark Carney

This year the threats from climate change spurred demonstrations across the world and prompted the parliaments in the United Kingdom and many other countries to declare a "climate emergency." These actions occurred against a backdrop of record temperatures across Europe and North America, the worst wildfires ever in the Amazon basin, severe tropical storms in Asia, and sea levels that are rising faster than previously thought.

The human costs are immeasurable.

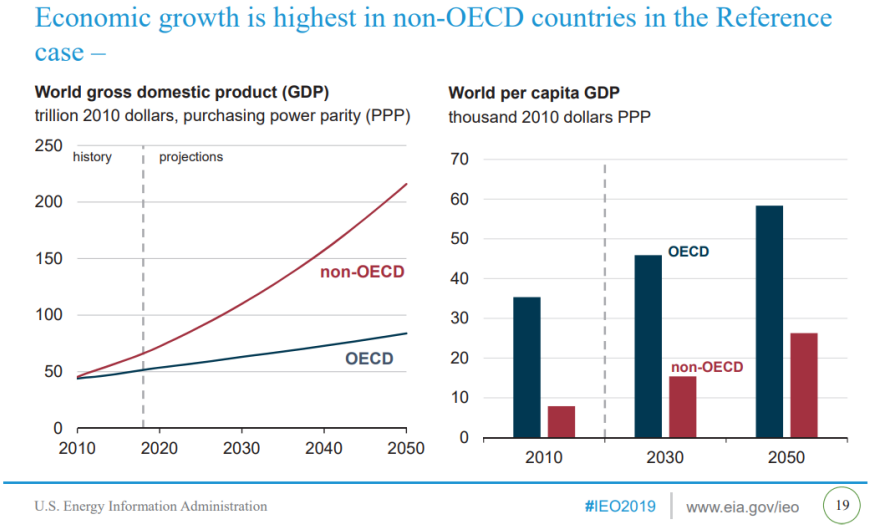
Source: https://www.imf.org/external/pubs/ft/fandd/2019/12/a-new-sustainable-financial-system-to-stop-climate-change-carney.htm

In late December, 2019, the outgoing Governor of the Bank of England, Mark Carney, gave a speech to a Lloyd's of London dinner. In it, he warned members of the international financial industry that their valuation of loans and investments should be reduced to consider the losses that fossil fuel companies will suffer from a catastrophic collapse in value as a result of climate change policies. The key danger, he alleged, was that changes in government policies will leave oil drillers and coal miners with stranded assets – reserves that have little value because the fight against climate change will "require" them to be left in the ground. According to Carney, "*The exposure of UK investors, including insurance companies, to these shifts is potentially huge.*" Further, he noted that "*research suggests that*

current modelling in the industry may be underpricing risk by 50 per cent if current weather trends become normal".[1] [2]

Several large institutional lenders have heeded Carney's advice and accepted the thesis that, within the usual time frame for investment planning of twenty to thirty years, government policies will so reduce demand for oil, natural gas and coal, and so constrain the global production of these energy sources, as to make many current investments worthless.

In this article, I will compare Carney's claims with what is actually happening in global energy markets, as well as what can reasonably be expected to drive energy markets over the foreseeable future, according to the best authorities available. I will try to show that the financial institutions and energy companies that pass up opportunities to invest in fossil fuels will run a far greater risk of foregoing significant profits.



[1] Roger Pielke, Jr.'s analysis shows that there is no increase in trends in weather disasters or risks based on some 25 years of study and evidence. https://www.amazon.ca/Rightful-Place-Science-Disasters-Climate-dp-0999587749/dp/0999587749/ref=dp_ob_title_bk

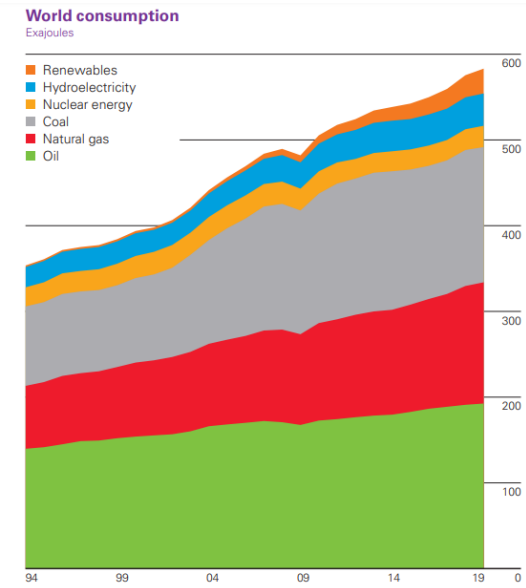
[2] Steve Kopits of Princeton Energy Advisors fact-checked Mark Carney's famous speech to Lloyd's of 2015 "Breaking the Tragedy of the Horizon" and found it to be a 'failure of analysis'. http://www.prienga.com/blog/2015/10/9/fact-checking-mark-carneys-climate-claims

For those who prefer to hear the 'bottom line" first, here it is. **Global demand for oil, natural gas and coal is now and will continue to be driven by demographic and economic trends in Asia, not in Europe and North America. The resulting large increases in demand for these fuels, which will probably become evident no later than 2022, must be satisfied. If government policies and investor reticence and/or lack of investment capital result in insufficient supply to meet this burgeoning demand, prices will rise significantly. While that, in turn, will dampen demand growth, it will yield very large profits to producers and provide them with the cash flow needed to expand reserves and production with less reliance on traditional sources of lending.**

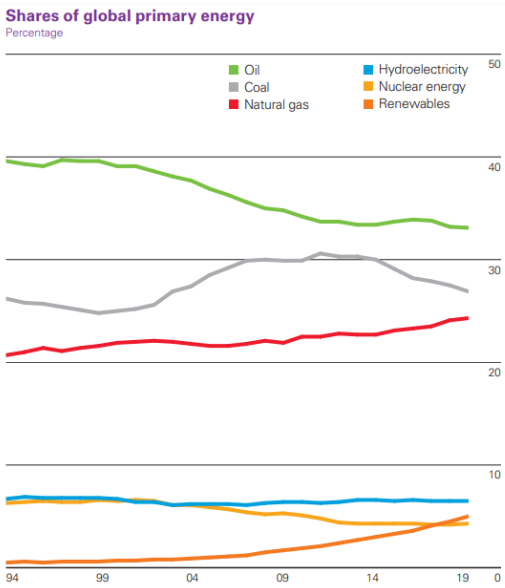
In such a future, the institutional investors can, of course, refuse to join in the profit-taking. I doubt they will.

A REMINDER OF THE WORLD ENERGY SCENE BEFORE COVID-19 – AND OF WHERE IT IS GOING

The last decade has witnessed the fastest growth in absolute demand for fossil fuels of any period in history. According to the statistics published by the *British Petroleum Statistical Review of World Energy 2020*, from 2010 to 2019:



Primary energy consumption rose by 1.3% last year, less than half its rate in 2018 (2.8%). Growth was driven by renewables (3.2 EJ) and natural gas (2.8 EJ), which together contributed three quarters of the increase. All fuels grew at a slower rate than their 10-year averages, apart from nuclear, with coal consumption falling for the fourth time in six years (-0.9 EJ). By region, consumption fell in North America, Europe and CIS and growth was below average in South & Central America. In the other regions, growth was roughly in line with historical averages. China was the biggest individual driver of primary energy growth, accounting for more than three quarters of net global growth.



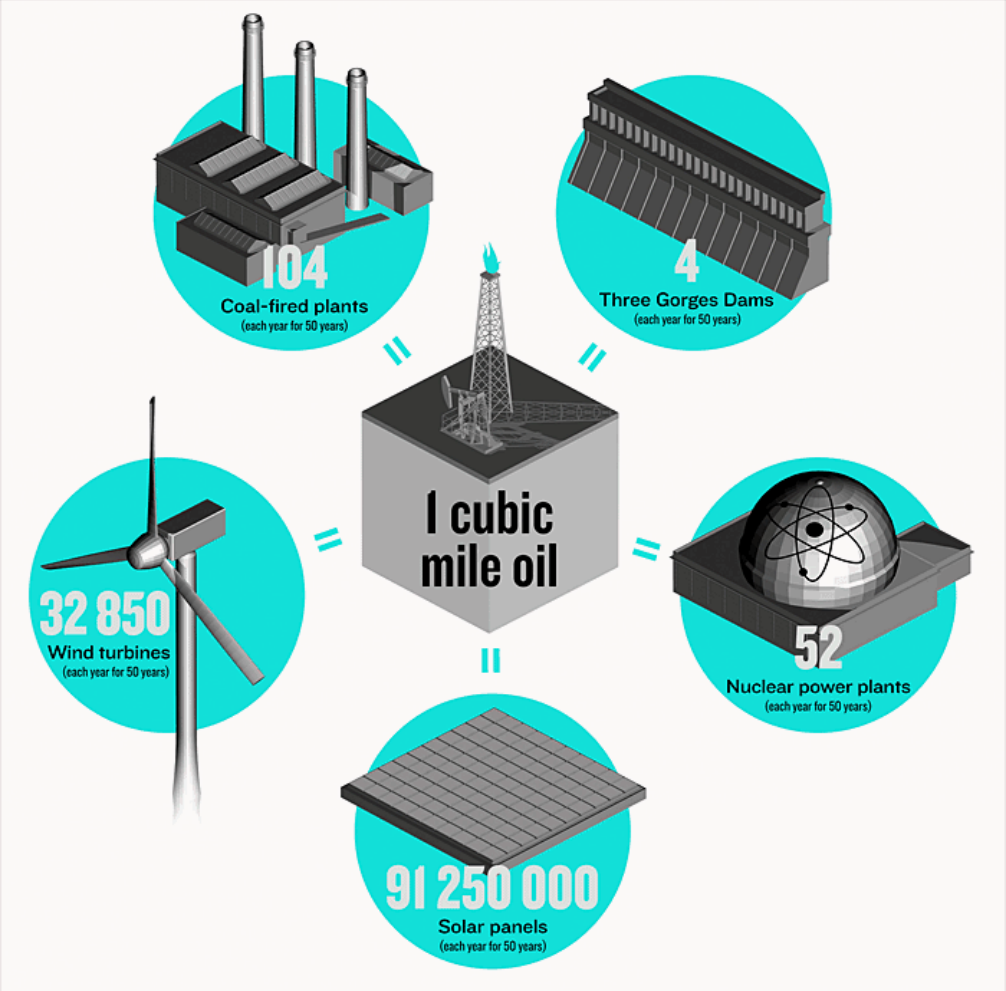
Oil continues to hold the largest share of the energy mix (33.1%). Coal is the second largest fuel but lost share in 2019 to account for 27.0%, its lowest level since 2003. The share of both natural gas and renewables rose to record highs of 24.2% and 5.0% respectively. Renewables has now overtaken nuclear which makes up only 4.3% of the energy mix. The share of hydroelectricity has been stable at around 6% for several years.

- Global demand for all energy sources increased from 483 exajoules in 2010 to 584 exajoules in 2019 an increase of 21 per cent.
- **Global demand for oil and natural gas liquids increased from 85.7 million barrels per day (b/d) in 2010 to 101 million b/d in 2019, a 19 per cent increase. In fact, liquids demand rose at an annual average rate of over 1.5 million b/d, the fastest rate in history.**
- **Global demand for natural gas increased from 2941 billion cubic metres in 2010 to 3929 billion cubic metres in 2019, a 34 per cent increase. In energy-equivalent terms, natural gas demand rose 31 per cent faster than demand for renewable energy and in 2019, gas consumption was almost five times that of renewables.**
- Global demand for coal grew from 144.5 exajoules in 2010 to 157.9 exajoules in 2019, a 13 per cent increase.

Almost all of these increases were due to economic growth in the non-OECD countries, and especially in Asia. In fact, by 2019, the non-OECD countries constituted 60 per cent of world energy consumption (and 65 per cent of carbon dioxide equivalent emissions).

The BP Statistical Review of World Energy 2020 can be found here: https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2020-full-report.pdf

These trends are not the results of government-directed behavior, but of the free choices made by consumers. They, of course, are based on the underlying forces that are driving the global economy. There are three potent trends - rapidly growing population in the non-OECD countries, contrasted with stable or declining population in the OECD countries; faster rates of economic growth in the non-OECD countries, leading to higher per-capita incomes there; and gradual, rather than precipitous, declines in the "carbon dioxide intensity" of the world's economy due to competitively priced fossil fuels and the inherent difficulties in achieving faster turnover in the capital stock of buildings and infrastructure. **Trying to hold back or offset these trends will prove a futile exercise.**

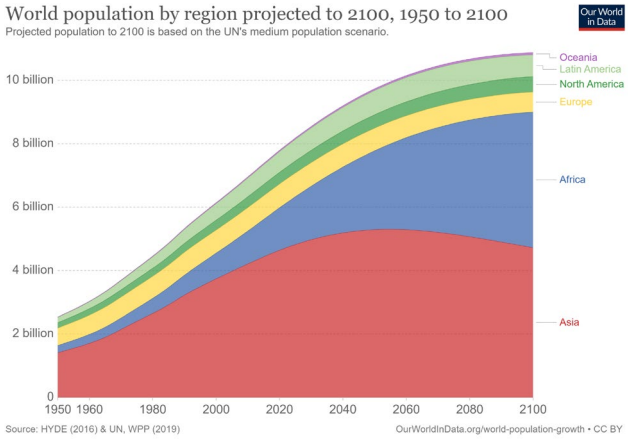


The world presently uses 3 Cubic Miles of Oil Equivalent (CMO) Energy every year. One Cubic Mile of that energy is oil. *"To obtain in one year the amount of energy contained in one cubic mile of oil, each year for 50 years we would need to have produced the numbers of dams, nuclear power plants, coal plants, windmills, or solar panels shown here."* *https://spectrum.ieee.org/energy/fossil-fuels/joules-btus-quads-lets-call-the-whole-thing-off*

Aside from being a high density energy form, oil, natural gas, and coal are portable, storable, and they all have diverse product streams that multiply products, services, jobs, and revenues for countries, provinces, states, and municipalities.

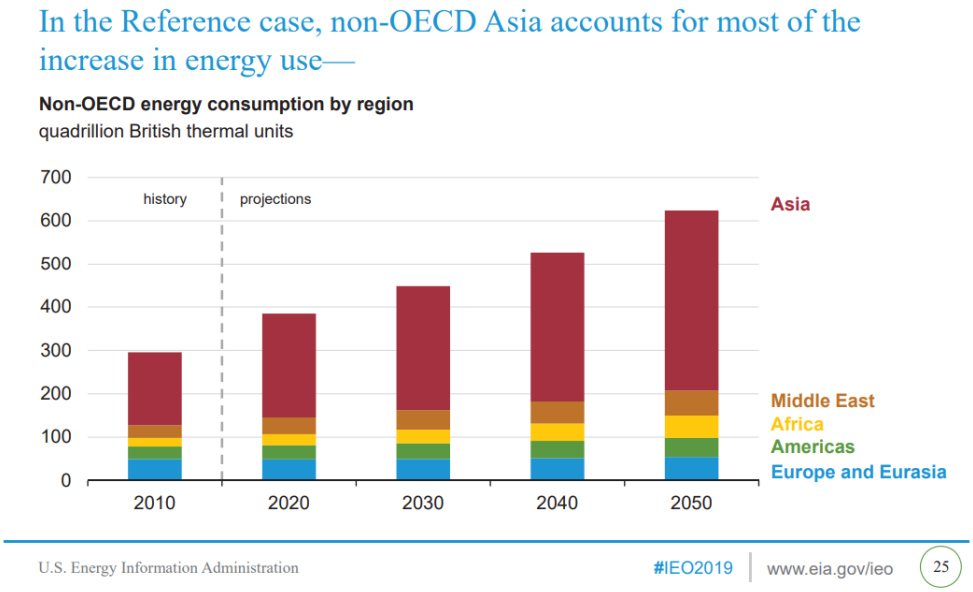
The two most authoritative sources of analysis on global energy supply and demand trends are the United States Energy Information Administration (EIA) and the International Energy Agency (IEA). I will use here the analysis of the EIA because its projections extend out to 2050. The EIA projections can be found here: https://www.eia.gov/outlooks/ieo/

Relying on input from the United Nations Population Agency, the EIA projects the global population to increase steadily from about 7.6 billion people in 2018 to 9.7 billion people in 2050, with almost all of the increases occurring in the less developed countries. By 2050, 8.2 billion people, or 85 per cent of the total, will live in the non-OECD countries.



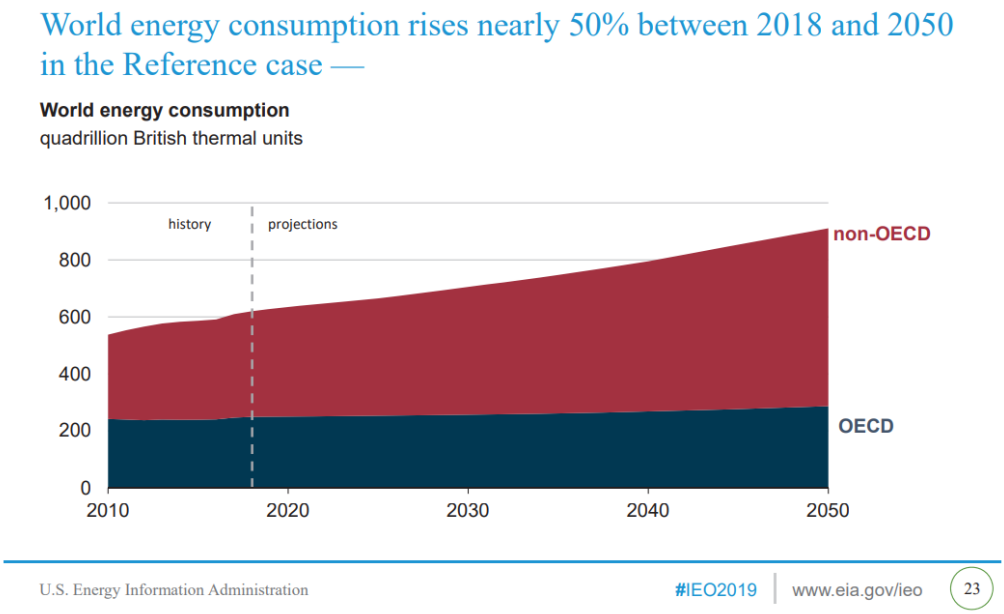
Source: https://ourworldindata.org/future-population-growth

The projected increases in global incomes will magnify the effects of the population growth. Per capita incomes are projected to continue rising in the OECD (i.e. the more developed countries), going from about U.S. $43,000 per person in 2020 to about $58,000 per person in 2050. More important for global energy consumption trends, the per capita incomes in the non-OECD countries are projected to rise from about U.S. $8,000 per capita in 2010 to about $26,000 per capita in 2050.



The latter has enormous consequences. As the populations and incomes increase, billions of people will move into urban areas, where they will want better housing, access to motorized transport, heating and air-conditioning, and the many services provided by electricity. Further, they will choose their energy services based on their affordability, security of supply and reliability, not whether they emit an odorless,

colourless gas. Overall, the EIA projects energy consumption in non-OECD countries to increase nearly 70 per cent between 2018 and 2050 in contrast to a 15 per cent increase in OECD countries. Fossil fuels will continue to dominate the global energy mix, and by 2050, oil, natural gas and coal are projected to still constitute 70 per cent of global energy demand.



With respect to the carbon dioxide intensity of the world economy, that is declining in both OECD and non-OECD areas, as it has been for decades. The EIA projects the average CO2 intensity in the non-OECD countries to decline from about 65 tonnes of CO2 per billion British thermal units (BTU) in 2010 to 50 tonnes per billion BTU in 2050, and the average CO2 intensity in the OECD to decline from 54 tonnes per billion BTU in 2010 to 41 tonnes per billion BTU in 2050. These reductions will be the result both of technological change and the increasing prominence of the service sector compared to manufacturing in modern economies. They will not be sufficient to offset the effects of population and economic growth.

Let us pause here to consider the significance of this. For the lifetimes of most people in Europe and North America today, the economic, social and political trends in the OECD countries have dominated the world and largely driven energy outcomes. Over the next thirty years and beyond, that situation will change fundamentally. While the OECD countries will retain their higher per capita income advantages, they will become progressively less and less important in terms of the global economy and the world's energy and environmental trends. **Not to put too fine a point on it, what western**

governments want or think about global energy use won't really matter at the global level.

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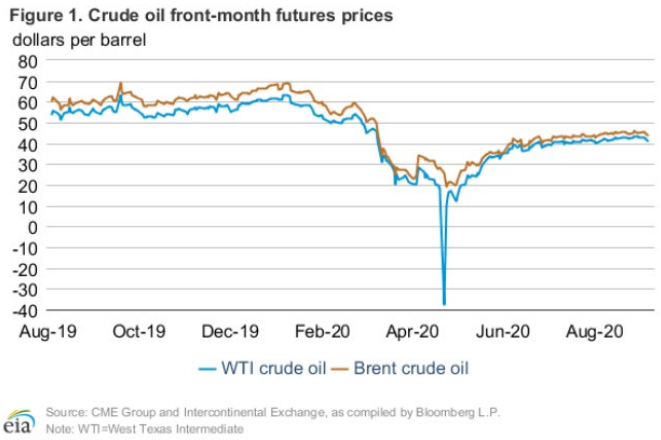
West vs East

THE SHORT-TERM OIL MARKET

The mass media and the public that depends on it for news and analysis of trends have a severe case of short-sightedness. Many people seem to believe that what has happened over the last six months is an accurate indicator of what will happen, not just over the next six months, but for the foreseeable future. Let us, instead, take a closer look at what is now happening and seems likely to happen in international oil markets over the next few years. I will compare three different sources of analysis, the IEA, EIA and private industry.



The International Energy Agency publishes monthly oil market reports. The following are its key observations in the 2020 reports up to and including August:

- Global oil demand has been hit by hard by the coronavirus-inspired shutdown of much of the global economy. After unprecedented declines in demand in the second quarter of the year, demand has bounced back somewhat, and world oil demand in 2020 is projected to be 91.9 million barrels per day (b/d) in 2020, down 8.1 million b/d from 2019 according to IEA's accounting.
- Global oil supply has been constrained by production cuts by OPEC and other countries. However, in July, these countries increased their production by 2.5 million b/d. **Overall, the IEA sees 2020 world oil production falling by 7.1 million b/d from 2019 levels**.
- There has been a very large buildup of crude oil stocks, both on land and in tankers. Those stocks are likely to be drawn down gradually, which will have a dampening effect on crude oil prices for several months.
- **Global oil demand is projected to recover to 97.1 million b/d in 2021, a strong recovery but limited by low demand from aviation**.
- As always, there are major uncertainties. The re-imposition of restraints on economic activity could delay the growth in demand. Higher-than-expected production in Iran, Libya or Venezuela could increase supply. On the positive side, the discovery and rapid take-up of a vaccine for the virus could accelerate the return to higher levels of economic activity.
- **Everything considered, the IEA projects global demand to grow from 2019 to 2025 at an average annual rate of just under one million b/d, with China and India accounting for about half of that growth.**

The IEA August oil market report can be found here:

https://www.iea.org/events/oil-market-report-august-2020

THE ENERGY INFORMATION ADMINISTRATION

In its Short-Term Energy Outlook published in August 2020, the EIA also noted the great uncertainty about projecting in the current period. With that precaution, it considered that:

- Global demand for petroleum and liquid fuels averaged 93.4 million b/d, down about 9.1 million b/d from July 2019, but for all of 2020 will average 93.1 million b/d.
- Global liquids fuel production will average about 90.4 million b/d in 2020.
- **In 2021, consumption will rise to 100.1 million b/d in 2021, completely recovering to its pre-coronavirus level.**
- Crude oil prices remain depressed, averaging about U.S. $41.95 per barrel in August. High stock withdrawal rates are expected to put modest upward price pressure through the end of 2020 and into 2021. EIA projects an average crude oil price of $50 per barrel in 2021.

The EIA Short Term Outlook report can be found here:

https://www.eia.gov/outlooks/steo/marketreview/crude.php

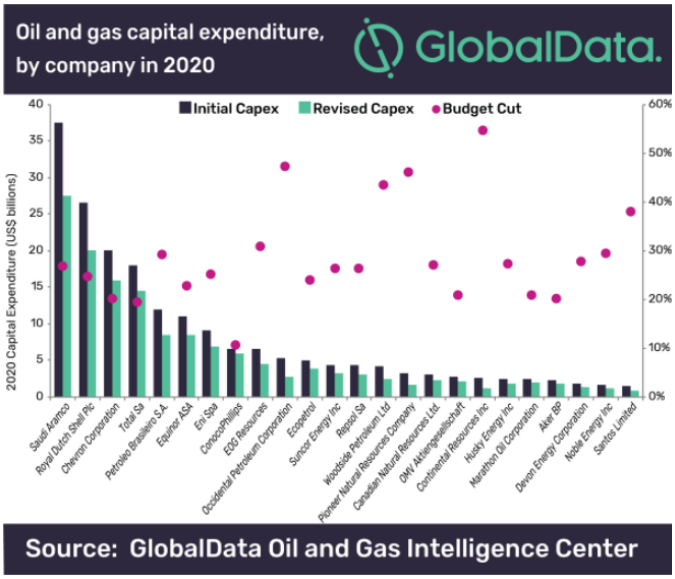
PRIVATE SECTOR FORECASTERS

Oil companies spend money investing in new supply, reducing debt, paying dividends, buying back stocks, and making acquisitions and other investments. Even before the 2020 crisis, the flow of energy investments was lower than would be required to meet future supply needs, and the crisis has made that situation worse.

IHS Markit is a British information services provider and the owner of Cambridge Energy Research Associates. According to IHS Markit[3], oil company debt levels are reaching an all-time high, with a collective net debt of 55 globally listed companies expected to rise to $960 billion by year-end 2021, up some 14% from year-end 2019. Paying down this debt will soak up substantial amounts of free cash flow in the years ahead. The natural response will be to consolidate, sell assets where companies can, and reassess investment and employment plans.

The Value Portfolio[4], a source of analysis for all investors, considers that, with limited surplus production capacity in OPEC (and continuing declines in OPEC production capacity over time), the real constraint on rising crude oil prices is whether U.S. shale oil production responds by increasing enough to stabilize prices. In this view, by keeping prices around U.S. $40 per barrel, the market has "guaranteed" low levels of drilling activity, while simultaneously making sure supplies do not fall off further via shut-ins.

Global Data is another British Information services provider. According to its Oil and Gas Intelligence Center, oil companies have reduced their budgets by 20 to 60 per cent, and slashed capital spending. This is illustrated in the adjacent graph.



Source: GlobalData Oil and Gas Intelligence Center

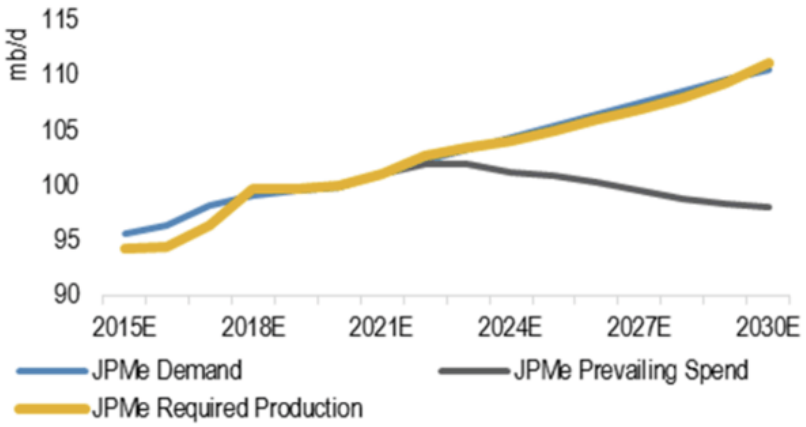
J.P. Morgan, a global financial services provider and a firm that follows oil markets closely, has a "bullish" view, at least with respect to future oil prices. It estimates that, to meet its projected global oil market demand

[3] *The new dynamics of upstream supply and spending after Covid-19*, INS Market Energy and Natural Resources Research and Analysis, August24, 2020.

[4] *The Thesis For Oil Prices Reaching New Highs*, The Value Portfolio, Seeking Alpha, September 7, 2020

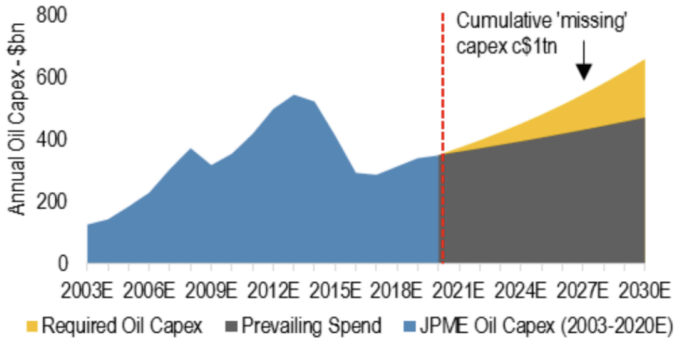
of 110 million b/d by 2030, $210 billion in oil producer capital expenditures ("capex") will be needed by 2025 and much more by 2030. According to J.P. Morgan, projected capex levels will fall below that rate starting in 2022 and the "shortfall" in required capex could reach a cumulative $1 trillion by 2030. The following figures from J.P Morgan shows its projections of the coming disparity between world oil demand and the oil production that will result from currently projected levels of oil industry capex.

Figure 7: Capex a key input into the forecast of potential supply growth in outer years. We show that the current rate of investment in liquids is well below what is required to meet oil demand in 2022+



Source: J.P. Morgan estimates.

Figure 9: In order for supply to meet the JPM base case demand forecast, an incremental $210bn is needed by 2025, compounded to $1tn by 2030



Source: J.P. Morgan estimates.

The International Energy Agency, in its World Energy Investment Report 2020, estimated that, if oil industry investment stays at 2020 levels this would reduce the previously expected level of oil supply in 2025 by almost 9 million barrels per day. This report can be found here:

https://www.iea.org/reports/world-energy-investment-2020

CONCLUSION

The global economy is already on track to recovery in energy demand; the most authoritative sources available foresee a return to rapid fossil fuel demand growth no later than 2022.

Mark Carney's warning to financial institutions seems premised on some unfounded beliefs about the nature of the world energy economy. True, there may be risks to oil, natural gas, and coal producers from the nefarious actions of western governments. Full disclosure, however, obliges that one identifies all the risks. In that regard, western governments inspired by climate mania cannot control the growth in fossil fuel demand beyond their borders.

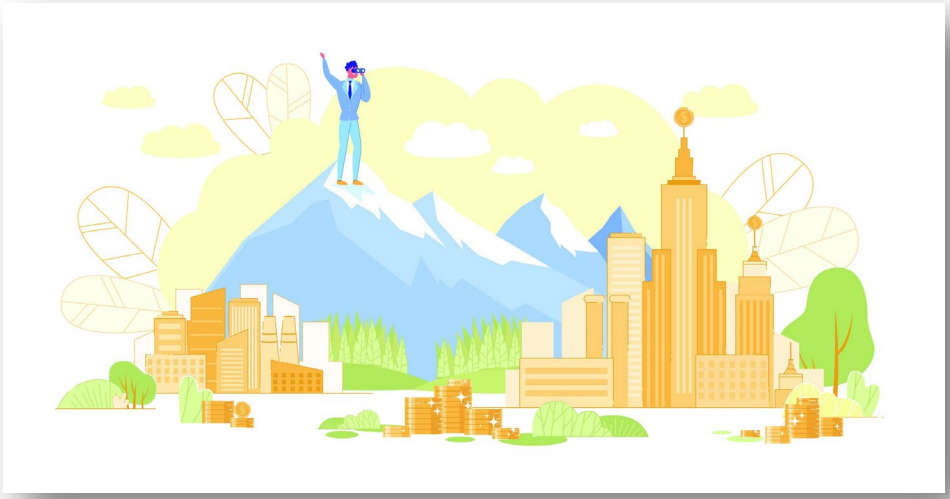
If the world finds itself in a situation in which the available oil production is increasingly below the amount needed to meet demand, prices will rise to the level needed both to "destroy" demand (i.e. drive consumers to other energy sources) or to stimulate more investment in supply development. In the meantime, the supply "cliff" could produce extremely high prices (possibly well above $100 per barrel) and much increased cash flow for existing producers. The approach recommended by Mark Carney would only make supply shortfalls and price spikes worse.

Further, Carney's thesis rests on the premise that profitable projects won't be funded because capital will avoid fossil fuel investments. If one observes the current trends in stock markets, they do not appear to support the claim that capital is a scarce resource. What is increasingly scarce are investments with good returns. If there are good fossil fuel-

related projects available, they may be funded by sources other than the institutions that avoid fossil fuels.[5] There is abundant capital out there looking for good returns. In other words, in the medium-term capex cuts will likely push the oil price up. This will attract capital to invest. Balance will be restored.

Even if producers, constrained by the availability or cost of credit, delay resuming capital expenditures until they can do so based entirely on internal cash flow, sharply higher prices and profits may make that possible before the middle of the next decade. In that case, the banks, as well as consumers, will be the big losers.

The stranded assets myth propagated by Mark Carney and the Task Force on Climate-Related Disclosures and UNPRI does not stand up to scrutiny. The long-term view shows that oil, natural gas, and coal are extraordinary growth markets, especially in non-OECD countries of Asia where populations are also projected to boom.



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[5] Signatories to the United Nations Principles for Responsible Investment (UNPRI), typically institutional investors, academic and union pension funds have been urged to divest of hydrocarbon stocks (including via campus student hunger strikes). Many university funds have complied – but private funds are not signatory to the UNPRI, and this offers the private funds excellent share value at lower prices. Investments in wind, solar and most forms of 'clean-tech' are reliant on government subsidies and taxpayers' means, which will be limited going forward, due to the economic meltdown of COVID19 lockdowns. Not to mention, all renewables are made from oil, natural gas, and coal – the energy generated by them and their product streams.

ABOUT FRIENDS OF SCIENCE SOCIETY

Friends of Science Society is an independent group of earth, atmospheric and solar scientists, engineers, and citizens that is celebrating its 18th year of offering climate science insights. After a thorough review of a broad spectrum of literature on climate change, Friends of Science Society has concluded that the sun is the main driver of climate change, not carbon dioxide (CO2).

Friends of Science Society
P.O. Box 23167, Mission P.O.
Calgary, Alberta
Canada T2S 3B1
Toll-free Telephone: 1-888-789-9597
Web: friendsofscience.org
E-mail: contact(at)friendsofscience(dot)org
Web: climatechange101.ca