Energy Markets in the Time of Coronavirus

BY MICHELLE MICHOT FOSS

Across the spectrum of business and economics research and thinking, a grand dissection and diagnosis is taking place. Not just a virus is being placed under the scope. Courtesy of the collapse in oil prices and collapse in energy use attending severe economic dislocation, the excruciating tradeoffs between the humanity of public health and that of economic life are in full view. In this time of coronavirus, we IAEE members, our colleagues and researchers at large need to exercise extreme caution about what we think we are observing and understanding. We've been here before when faced with signature events, and we usually underestimate and misinterpret human adaptability and behaviors.

Backdrop – Cautionary "Tails"

Let's be clear: prior to emergence of the new coronavirus and COVID-19 pandemic, energy markets already were in various stages of tension. Ample supplies of oil, oil products, natural gas and liquefied natural gas (LNG) were pressuring commodity prices and profit margins. Energy demand was cooling within a context of uncertainty about the global economic outlook. The International Monetary Fund (IMF) attributed the global slowdown in 2018 to disagreements over trade (IMF, 2019) and expected a tepid recovery for 2020-2021 (IMF, 2020). China's real gross domestic product (GDP) clocked in at 6.4 percent, year over year, for the first quarter of 2019. The Chinese economy, in fact, has been growing at a diminishing pace, with a steady decline to about half of the 2010 high. The impact of a weaker Chinese performance weighed on China-dependent economies (Taiwan, Hong Kong, Malaysia, Singapore, Korea, Chile and Australia), which collectively declined about two percent in real GDP growth during the course of about a year. The apparent trend for Chinese-dependent economies led to a conclusion "that the Chinese economic outlook may be a bit more concerning than the official data suggest…with China-dependent economies flashing a warning sign and the struggles in Europe ongoing, a further escalation in the U.S.-China trade dispute could slow global growth to lows not seen since the Great Recession" (Pugliese and Bennenbroek, 2019).

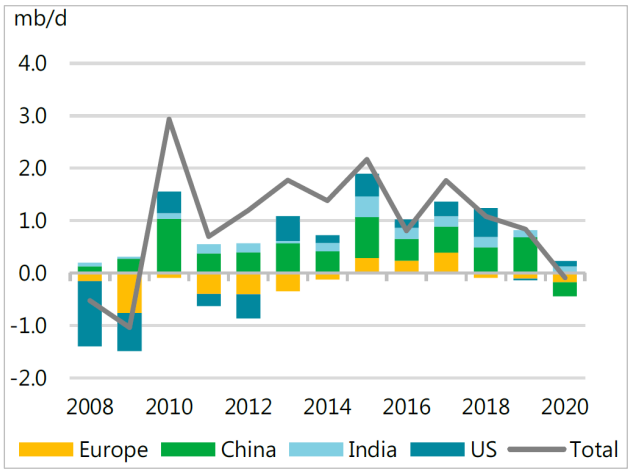

Figure 1. Growth in Global Oil Demand, Year-Year
Source: IEA Monthly Oil Report, March 2020, https://webstore.iea.org/oil-market-report-march-2020.

It is also important to bear in mind that post-2008-2009 recession energy demand growth was not supposed to happen, or at least not in the way, or extent, that it did. Significant events, especially long tail events, induce opinions and judgments about new paradigms that can be biased by the events themselves and how we interpret their impact. Severe recessions, alone or in tandem with other disruptions, can bring out our worst tendencies toward confirmatory, culture and selection bias. A quick tour of two recession effects – housing demand and vehicle ownership and gasoline use – that drove public and private domain outlooks for post-recession energy use demonstrates our hubris, at least for the United States.

- **Housing patterns**: A key post-recession assumption was that the prevalence of younger people continuing to live, or returning to live, in parents' homes signaled the end of home buying in favor of renting, sharing, swapping.

In fact, the National Association of Realtors (NAR) surveys indicate that the main demographic expected to convey most of the recession-driven shifts in behaviors were, in actuality, the largest cohort of

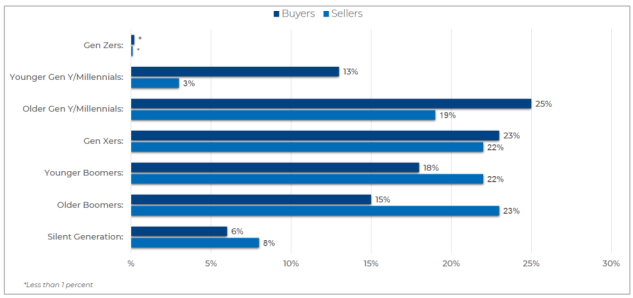

Figure 2. Share of Buyers and Sellers by Generation
Source: 2020 NAR Home Buyer and Seller Generational Trends, https://www.nar.realtor/sites/default/files/documents/2020-generational-trends-report-03-05-2020.pdf. Open source.

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See footnotes at end of text.

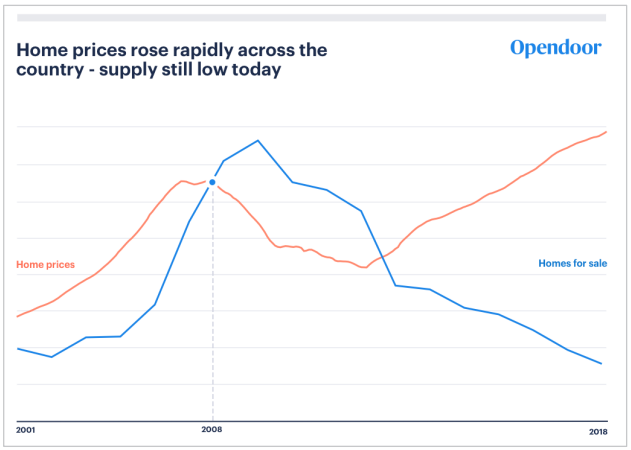

Figure 3. Home Prices and Stock of Homes for Sale
Sources: Opendoor, https://www.opendoor.com/w/guides/2020-housing-market-trends. Based on U.S. Census Bureau, Housing Inventory Estimate, Vacant Housing Units for Sale for the United States, retrieved from FRED. Open source.

home buyers. As measured by the NAR, younger age groups constituted the bulk of both buyers and sellers in 2019. Indeed, younger age groups in 2019 made up the same 79 percent of home buyers (Figure 2) as they did in 2013, the first year of NAR sampling. Home buying patterns reflect a familiar landscape for the U.S., with suburban and exurban single family dwellings comprising the bulk of the market as young families seek out affordability and open space in a tradeoff with work commutes. Indeed, prior to the COVID-19 pandemic, lack of available housing inventory was pushing up prices (Figure 3) and mortgage costs. Borrowing expenses climbed even as interest rates remained low, a relic of federal actions to mitigate economic consequences and spur recovery.

- **Vehicle sales and gasoline demand:** Pre-recession gasoline consumption represented a "peak demand". Post-recession preferences for communal living along with ride sharing and inability to purchase or lack of interest in purchasing vehicles would combine to reduce gasoline sales and traffic congestion.

After slipping until 2012, U.S. gasoline demand returned to its pre-recession levels. Between 2010 and 2012, crude oil was expensive, a consequence of actions by large producing, exporting countries to pull back on production and seek higher prices and revenues in order to manage political disruptions across the Middle East-North Africa, MENA, region. Leading up to present circumstances, gasoline consumption softened, an outcome of the slower growth trajectory from 2018.

After collapsing sharply during the last recession, total vehicle sales recovered rapidly (Figure 5), preserving U.S. dominance worldwide. Even more interesting, and pertinent for future expectations, has been the pronounced shift in vehicle preferences by

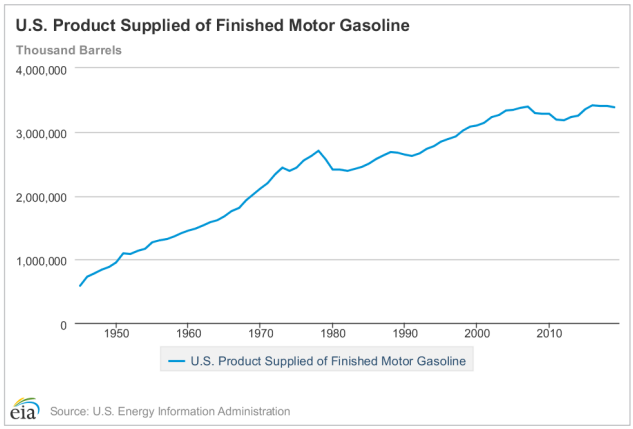

Figure 4. Inferred Demand for Gasoline
Source: EIA, https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mgfupus1&f=a. Open source.

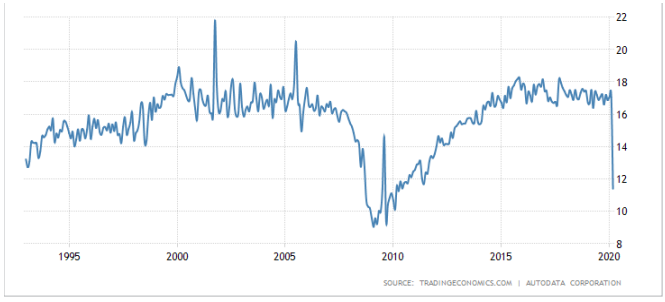

Figure 5. U.S. Total Vehicle Sales
Source: Trading Economics, https://tradingeconomics.com/united-states/total-vehicle-sales. Login may be required.

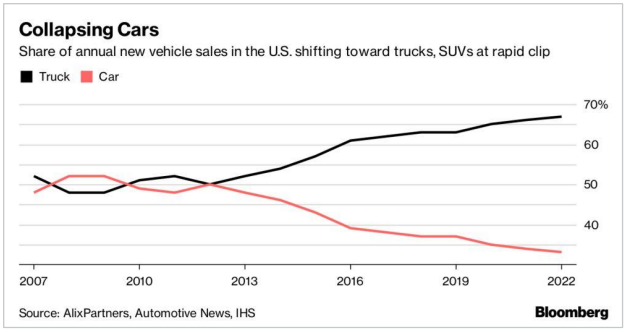

Figure 6. U.S. Vehicle Sales by Type
Source: Bloomberg, https://www.bloomberg.com/news/features/2018-01-16/why-the-american-sedan-is-marked-for-death. Subscription may be required.

customers and automakers (Figure 6). Customers readily switch back to larger vehicles when gasoline prices are more attractive, a reflection of fundamental, and much studied, tastes and preferences. Auto makers have a clear preference to make and sell higher profit margin products. These two sides of the vehicle sales coin represent a rare convergence between producers and customers and present any number of

profound challenges for the future of electric vehicles or EVs (see Foss and Zoellmer, 2020, for a first pass).

Nor has ride sharing exerted the effect that was widely expected. Widely reported coverage of recent research on urban traffic patterns (see Brown, 2020 for example) suggests that ride sharing habits – with most customers "shunning pooling even though it costs them more" – contribute to congestion. Consumers that replace their vehicles with ride sharing services simply are transferring their demand for transportation fuel. The various research results also point to consequences for mass transit, as ride hail services undermine public transportation options.

Many lessons can be drawn from these and many other vignettes of the previous significant long tail event, a deep, nearly worldwide financial recession brought around by a failure of mortgage risk markets. Will we remain a largely remote, virtual workforce forever? Any number of us are university based and there is plenty of fodder for debate about the future of higher education. Is remote education cheaper? Better? Will pent up demand as we re-engage surprise and swamp expectations about recovery?

As the COVID-19 experience is dissected, conclusions already are being drawn about peak oil demand, permanent shifts in living and work patterns with fundamental alterations in energy use including, perhaps most notably, the "energy transition" itself. In fact, not only are conclusions being drawn, advocacy is intensifying for governments to hasten an energy transition by committing funds to myriad alternative energy expansion programs, including renewable energy, chemical battery storage and electric vehicles. This seems a sure way to waste a precious resource – taxpayer dollars that are needed for the public health emergency response and long term planning for future pandemics as well as recovery from the COVID-19-induced economic collapse. Apart from that consideration, several good reasons exist for discipline in the time of coronavirus. These reflect unrecognized realities embedded in how we have tended to think about "green" energy as well as abundant learnings about how the modern global economy is organized.

Avoiding Potholes and Pitfalls on the Path Forward

First, dealing with COVID-19 has silver linings, and one has been to expose the underbelly of global supply chains. The renewable energy industries, electric vehicles and battery energy storage – the three linchpins of popular responses to energy and environment agendas – fall squarely in that dilemma. Prior to the onset of this pandemic, an important evolution in understanding about China's dominance in critical aspects of technology and raw materials was happening. This one aspect of the global economy deserves frank and open treatment. Clearly, defining solutions will test political economy institutions and skillsets in the U.S. and abroad.

Chinese photovoltaic manufacturing capacity has undermined not only rival PV makers in Germany, the U.S. elsewhere, as well as within China itself as unutilized capacity has dragged on profitability. The same has been true for batteries and EVs. China controls much of emerging advanced solar and battery technology and intellectual property. Based on analysis of U.S. Geological Survey data and other sources, Chinese dominance of minerals and materials supply chains is clear and inferences for resource competition between China and the U.S. already are being drawn (Gulley, et.al, 2018). Including influence and control in fragile states (see Gbadamosi, 2020 for an excellent and accurate case study), Chinese dominance of raw materials supply chains will test limits of international cooperation. The sphere of influence that is emerging in research and analysis, as we peel the onion on ownership and control of everything from ores to minerals processing and refining to materials components, is not beneficial. Lack of transparency in minerals and metals extraction, production and pricing encumber analysis. As this crisis passes, a priority will be how to reset relationships with China and retool our supply chains to reduce dependence and enable these nascent industries to flourish. We simply cannot proceed with many of our own energy ambitions in the U.S. unless these very tough nuts are cracked.

Second, much work is needed to improve the expansion of renewable energy and, indeed, to "vet" whether that expansion is justified in the first place. Little research has been or is being done on environmental implications ranging from locations of projects and ecosystems impacts to myriad nuisance effects that undermine public acceptance of projects and supporting infrastructure like high voltage transmission. Recycling, disposal and overall end of life management along with an assortment of public safety concerns related to hazardous materials treatment are growing in visibility as distinct challenges. Years of hard and tough work to build markets for electricity, in order to enable more transparency on costs and pricing, are being dismantled to accommodate green energy agendas. This is ironic to the extreme, given that the historic arrangement of regulated electric power, in particular, was blasted by the same interest groups for being too opaque and too heavily controlled by investor owned utilities. From the PGE case study, to the complex meltdown on how best to repair or whether to even keep the PJM capacity market, to the failure to ask basic questions and shine any light on the full gamut of costs associated with integrating intermittent production of electricity into energy systems – there are clear signals that a great deal is lacking in market design. A great deal is lacking even in the capacity to imagine a free and competitive market approach for "new energy". Rather, proponents continue to devolve to government backing and control.

Third, in truth, no government support for any part of the energy landscape is needed in these times. Investors and the entrepreneurs and projects

they support need to find viable business models. Otherwise, many ventures will fail to deliver as promised. This is true regardless of whether it is the stress and strain that will be felt as the shale oil and gas patch is right-sized – and make no mistake, this simply must happen – or the very difficult growing pains as the new energy businesses are pushed through the sorting hat. The harsh reality is that returns on capital to investors have been scarce across all of these ventures. Nor are they anywhere in sight for electric vehicles.

Shale plays, renewable energy projects, battery energy storage, electric vehicles all entail common themes. They require enormous infusions of capital which, in a world of sunk cost fallacy, results in "doubling" and "tripling" down in businesses that are thin margin to begin with. The push to build scale means constant pressure on profitability, exposing businesses and industries to persistent losses. The risk of escalating commitments in the new energy space is made worse by the perception that it is "cheap". Proponents constantly point to low or declining costs for solar, wind and batteries as a main rationale. But those cost curves are nearly entirely driven by Chinese capacity, by Chinese domination of supply chains and by Chinese control and influence over essential raw materials inputs.[1] All of the reactions to these conditions will bend cost curves upward: right-sizing of Chinese capacity, already underway before current events; improving diversity and robustness of supply chains[2], including "reshoring" key manufacturing to the U.S.; reversing the trend of decreasing access to critical minerals resources; the science and technology push to solve persistent shortcomings in performance of batteries, solar and other components.

One thing is for sure – energy systems worldwide will be hallmarked by slack capacity utilization for some time to come. Throwing precious tax dollars at new projects that will only exacerbate supply overhang makes no sense. It is far more important, vital, humane to push our tax dollars toward bolstering the lives of those who face the worst in lost employment and income. Other agendas should simply be parked for the duration.

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Footnotes

[1] China is estimated to control 50 percent or more of global copper refining. Of 19 refineries in the triennial global survey, eight facilities in five countries did not report 2018 cathode tonnages, including all four in China that are included in the sample. Michael Moats, Missouri Science & Technology, Rice University/Imperial College Workshop on Energy & Minerals, Framing Integration Futures, September 18-19, 2018, Center for Energy Studies, Rice University's Baker Institute for Public Policy. See Moats, et.al., 2019.

[2] Examples, including research by CES fellows, are provided in the presentation by the author during Session 2 of the third annual CES/Baker Botts energy summit, October 2, 2019, https://www.bakerinstitute.org/events/2025/. Information on gaps also is included in the CES film series, https://www.bakerinstitute.org/ces-documentary-series-energy-in-transition/, Energy Transitions segment.

[3] Based on proprietary reports from Bloomberg New Energy Finance, Wood Mackenzie and other sources.

[4] The search for new materials and effective substitutes to solve specific challenges in electrochemical energy storage will push battery costs higher. For example see Hsieh, et.al., 2019.