

The Road Report & More

Health, Science, & Climate Action

Dr. Shahir Mastri

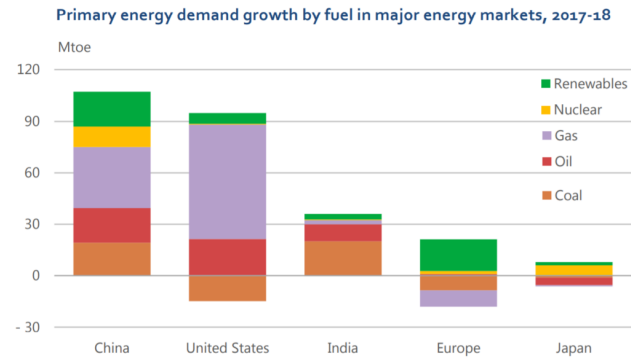
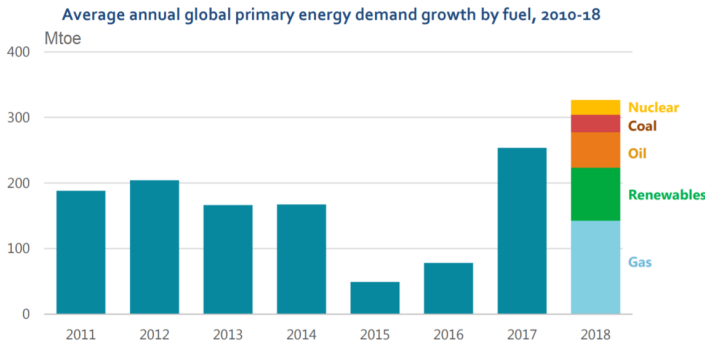
SPECIAL ISSUE

Global Energy & CO2 Status Report

Given concern over carbon dioxide (CO₂) emissions and climate change, and because CO₂ emissions depend so heavily on energy use, I've decided to dedicate this special issue of my newsletter to summarizing the most recent statistics as it relates to global energy use and CO₂. How fast are renewables being deployed? What about coal? Are CO₂ emissions on track to meet climate targets? These questions and more will be answered in this issue of The Road Report. The info will be particularly useful to those of you who do climate outreach, give climate presentations, or who simply want to be in the "know" on this topic. What you'll read will be a summary of the 2018 [Global Energy & CO₂ Status Report](#), published by the International Energy Agency (IEA).

Energy Demand

Global energy consumption in 2018 increased at nearly twice the average rate of growth since 2010, driven by a robust global economy and higher heating and cooling needs in some parts of the world. Demand for all fuels

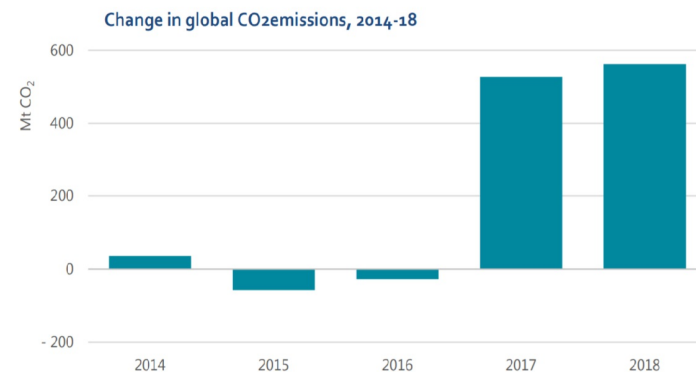
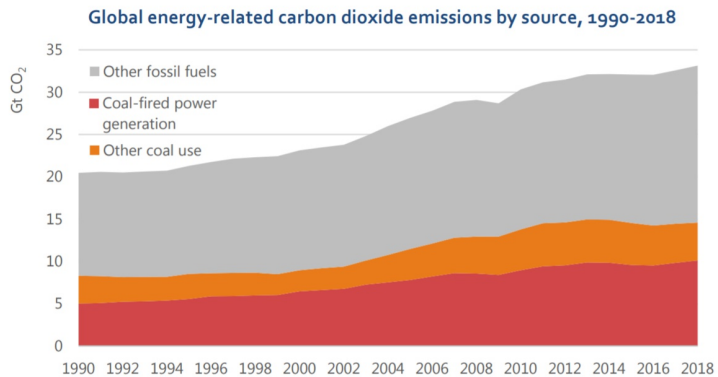


increased, led by natural gas, even as solar and wind posted double-digit growth. Higher electricity demand was responsible for over half of the growth in energy needs. Unfortunately energy efficiency saw only minimal improvement. In the first graph above, you'll see a breakdown of energy growth over time, according to different energy technologies. The y-

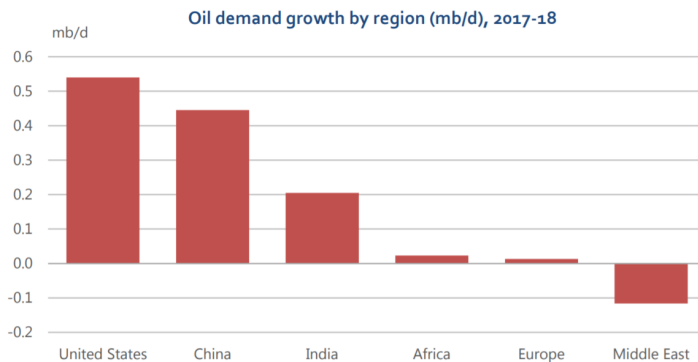
axis is in terms of "Mtoe," or millions tonnes of oil equivalent, which is a standardized way of accounting for energy use. In the second graph, you'll find a similar chart showing how various regions differed in terms of their energy growth in 2018.

CO2 Emissions

Despite headway in adopting renewable energy technologies, energy-related CO2 emissions nonetheless increased in 2018, reaching a new historic high of 33.1 billion tonnes of CO2. All told, there was a 1.7% increase in emissions, which is equivalent to the total emissions from all international aviation combined. While emissions from all fossil fuels



increased, the power sector accounted for nearly two-thirds of emissions growth, with coal-burning power plants alone (mostly from Asia) accounting for most (2/3) of this. The countries of China, India, and the U.S. accounted for 85% of the increase in emissions that we saw last year, while emissions declined for Germany, Japan, Mexico, France and the U.K. The growth in CO2 emission in 2018 was driven by a robust global economy in which low-carbon energy options did not scale fast enough to meet the rise in demand, as well as due to weather conditions that increased demand for heating and cooling. Interestingly, the EIA conducted its first assessment of the impact of fossil fuel use on global temperature increases, concluding that CO2 emitted from coal combustion is responsible for about 0.3°C of the 1°C global average temperature rise that has occurred since pre-industrial times.



Status on Oil

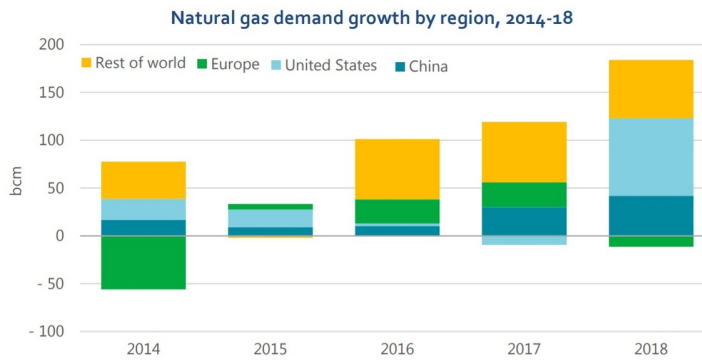
Oil demand saw a 1.3% increase in 2018, due mostly to strong economic growth in the U.S. You may be wondering how U.S. oil demand can be growing while electric and hybrid

vehicles become increasingly abundant. Interestingly, the U.S. growth in oil demand was not due to growth in gasoline use, which actually slowed down, but rather due to the start-up of large petrochemical projects. Overall, the U.S. and China showed the largest overall growth, while demand fell in Japan and Korea and was stagnant in Europe. To elaborate a bit more on the status of cars in the world, the growth rate of oil demand in China slowed last year as the country moved towards a less oil-intensive model of development to improve urban air quality. Total passenger car sales in China, the world's largest auto market, decreased by 4% in 2018. Meanwhile, electric passenger car sales more than doubled from around 600,000 in 2017 to 1.2 million in 2018. This transition serves as exciting news as we increasingly look to China as a key driver of greenhouse gas emissions.

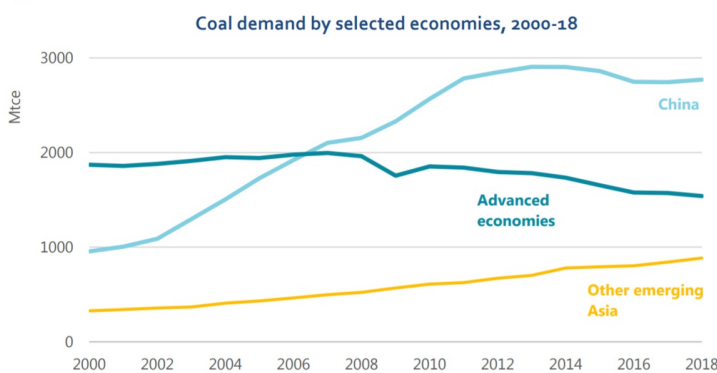
Natural Gas

Natural gas (NG) consumption grew by about 5% in 2018, its

largest increase since 2010 when the globe recovered from the 2008 financial crisis. This growth was partly due to growing energy demand and partly due to the fact that NG has been out-competing and replacing coal for



electricity generation in the marketplace. The switch from coal to NG accounted for about 20% of the rise in NG demand, with the U.S. leading this growth, followed by China. These two countries together accounted for 70% of the global growth in NG. Compared to last year, the U.S. alone increased its NG demand by 11%, it's highest increase since the 1950s. For context, this single-year increase in the U.S. is roughly equal to the annual NG consumption of the entire U.K. Again, some of this was due to coal-substitution, which is a good thing, while the remainder was due to other factors. Interestingly, about half of the growth was attributed to a colder winter and hotter summer than average in the U.S., which increased energy demand. For those of you who have read my book *Beyond Debate*, you'll recall the term "positive feedback." Well, what we're seeing here with increased energy demand due to extreme temperatures is an example of an anthropogenic positive feedback, as opposed to the natural ones I discuss in my book. This only increases the challenge of achieving net-zero carbon emissions while meeting energy demand in the face of climate change.



Latest on Coal

Although coal demand grew for a second year, its role in the global mix continued to decline. Last year's 0.7% increase was much slower than the 4.5% annual growth

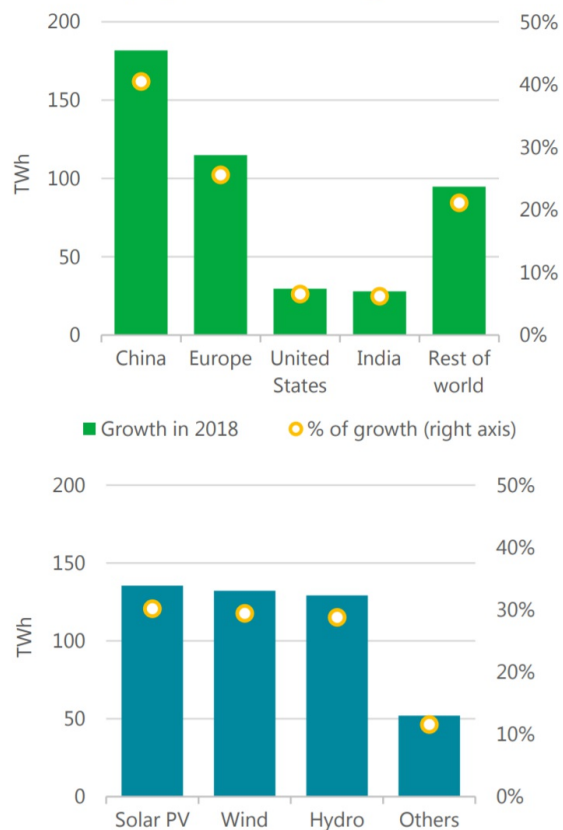
rate seen in the period 2000-2010. This is a great thing, as coal is the "dirtiest" of the fossil fuels! That is, compared to other fossil fuels, coal produces more CO2 per unit energy yield. That said, we still have a long way to go as coal remains the largest source of electricity and the second-largest source of primary energy in the world. While renewables are becoming increasingly utilized for electricity production, coal-generated electricity still saw 5% growth in both India and China

in 2018. In the U.S., coal continued to decline in 2018 to levels not seen since the mid-1970s. Coal now accounts for 29% of the U.S. electricity mix, a record low for the nation. In Europe, the trend is similar. Thanks mostly to renewables, Germany just saw the closure of its last hard coal mine, ending a long chapter in German industrial history.

Renewable Energy

Renewables increased by 4% in 2018, accounting for nearly 25% of the growth in global energy demand. This was led by the power sector, with renewables-based electricity generation increasing at its fastest pace this decade. Solar, hydropower, and wind each accounted for about a third of the year's growth. When looking at electricity generation alone, renewables accounted for nearly half the growth in global production. This marks another positive sign as we strive to reduce CO2 emissions! Who do we credit with the 2018 growth in renewables? China comes out as the year's leader, accounting for over 40% of the growth, followed by Europe (25%). The U.S. and India each accounted for less than 10% of growth. Globally, solar PV electricity generation saw a record year, growing a whopping 31%. Yet overall, hydro-power remains the largest source of renewable electricity, accounting for about 60% of renewable production, followed by wind power. Despite the exciting growth in renewables, this sector need to expand much faster if we're to meet long term climate targets. To meet the IEA Sustainable Development Scenario goals, for examples, the global share of renewables in the power sector needs to rise from 25% to about 33%, and in transport from 3.5% to 19%, by 2040. In other words, we've come a long way, but we've also got a long way to go!

Growth in renewable electricity generation by region and technology, 2017-18



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Dr. Shahir Masri

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