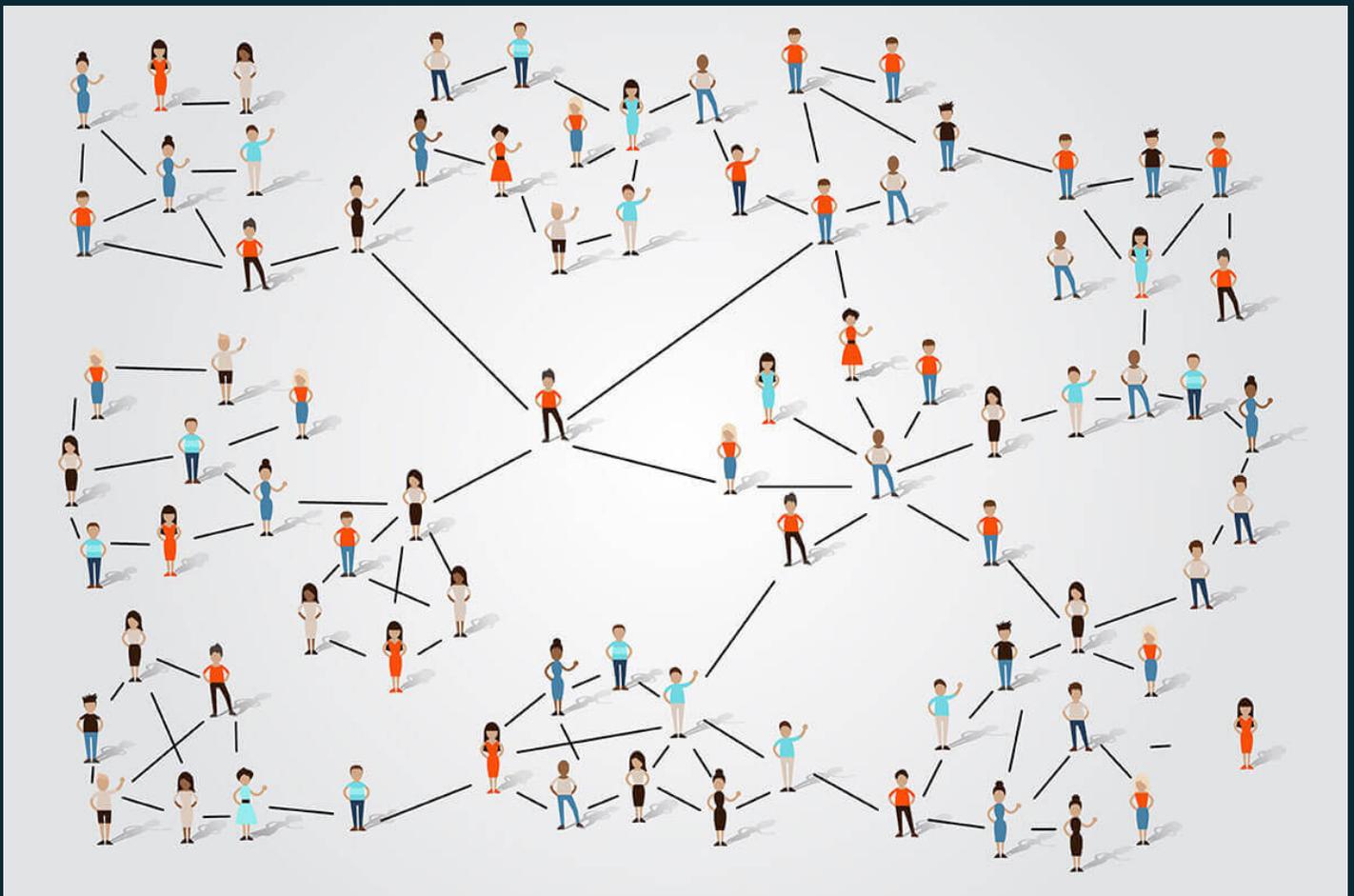


# Global Foresight

Q3 2021



Source: [The Six Degrees of Separation theory | HackerEarth Blog](#)

## 4.5 Degrees of Separation

Long-Term Investment Themes for an Increasingly Connected World

By David P. Harris, CFA

**In this issue of Global Foresight, I discuss some sectors that could grow faster than the overall global economy for the next twenty years. Growth will likely be driven by three converging global trends: aging demographics, reducing greenhouse gas (GHG) emissions (mitigation), and adapting to a changing climate (adaptation). Each of these pose real societal challenges that should create attractive investment opportunities in shares of companies in healthcare, industrials, energy, and agriculture.**

John Guare’s hit 1990 play (and subsequent film) *Six Degrees of Separation* popularized a concept that mathematicians, economists, and sociologists have debated for decades: just how tightly connected are individuals around the world? The prevailing thought was that virtually any two individuals on the globe could be tied together through no more than six connections of mutual friends and acquaintances. In fact, there was no rigorous basis for Guare using the number six as he credited that number to radio inventor Guglielmo Marconi’s Nobel Prize acceptance speech in 1909.

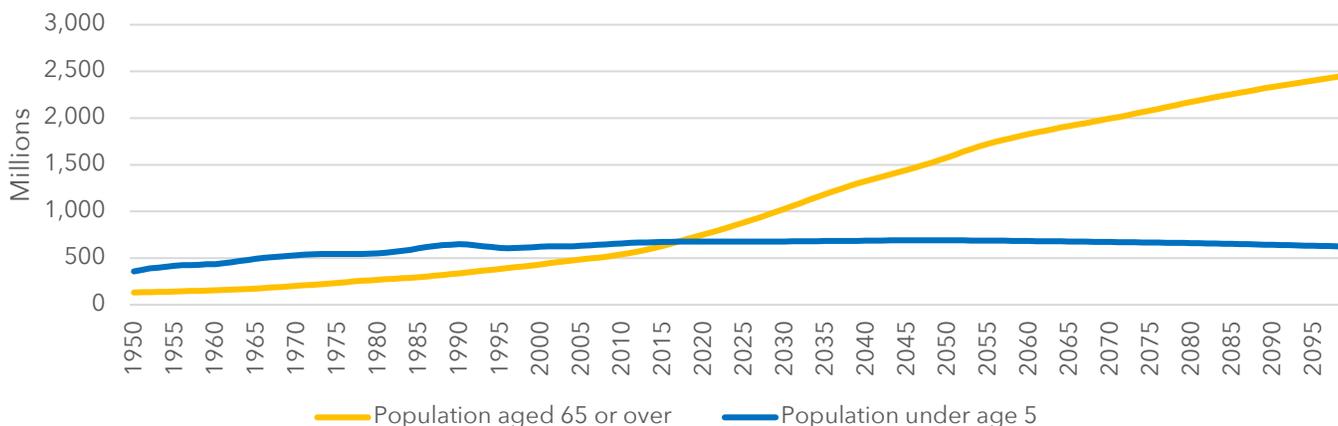
Thanks to the advent of social networks, we now have a more empirical basis to measure social connectivity, and it turns out Marconi and Guare were not far off the mark. While the major social media companies have studied their networks to analyze this specific issue, Facebook - with the largest network - is arguably best positioned to estimate. According to their work from a couple of years ago, virtually everyone on the planet can be

connected through merely 4.5 relationships. Indeed, new forms of media are tying more folks together than ever before, enabling trends to sweep across geographies at an ever-faster clip.

But even before the rise of social media, there were three secular changes that are increasingly globally connected and should have profound long-term investment implications. First, fertility rates have been collapsing for decades in virtually every nation, and in most of the world’s largest economies, are now below the rate needed to keep populations from shrinking. Second, countries and corporations alike have been making increasingly robust pledges to reduce GHG emissions. Third, more extreme climate events, from the deep freeze in Texas to the devastating fires in Australia, have forced more adaptation to cope with increasingly volatile weather conditions.

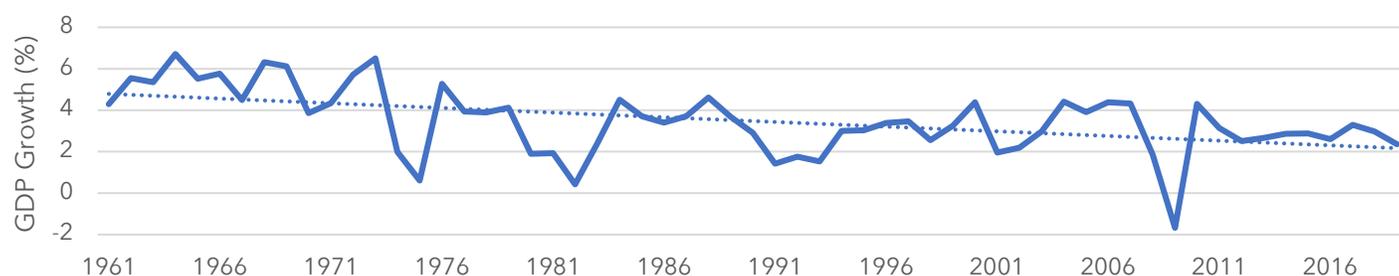
The investment impact of aging demographics varies. For example, some aging should be considered a positive, purely from an economic efficiency point of view. For example, 35-year-old workers are far more productive than 25-year-olds. But there is a point of diminishing productivity from aging. The world reached a significant milestone in 2018: the number of those aged 65 and over surpassed those under age 5. Ten years from now the 65+ demographic is projected to be double those under 5, with the gap widening for the foreseeable future unless there is an abrupt reversal shift in fertility rates that have been dropping for decades.

**World Population by Age Bracket with UN Projections**



Source: Our World in Data

## World GDP Growth Rate 1961-2021



Source: [www.macrotrends.net](http://www.macrotrends.net)

Since economic growth as measured by gross domestic product (GDP) is simply the product of productivity growth multiplied by changes in labor supply, aging populations suggest lower secular growth. This has been the pattern for decades globally as illustrated in the chart above. It also holds true at the country level.

Aging demographics should also lead to healthcare spending continuing to rise as a share of the U.S. economy, despite having already more than doubled over the last 50 years from approximately 7% to 18% of GDP<sup>1</sup>. Although the rest of the world spends less on healthcare than the U.S. does, most large economies have also seen their expenditures rise faster than GDP growth.

The sheer scope of the challenge of providing healthcare for ever larger numbers of the elderly also creates an opportunity for companies that can leverage technology. With the cost of sequencing the human genome having plunged, medicine should become more personalized with improved ability to tailor to individual DNA. Testing, diagnostics, and prevention are in their earliest stages as we are just now seeing the first liquid biopsies for cancer detection - an exciting breakthrough that should gain much wider acceptance as the tests become more accurate. mRNA vaccines have been miraculous for preventing Covid-19 and are now being tested on certain cancers. With computer processing power continuously improving, we are in the early days of harnessing breakthrough technologies that will be needed to treat the world's elderly population which will grow massively in the years ahead.

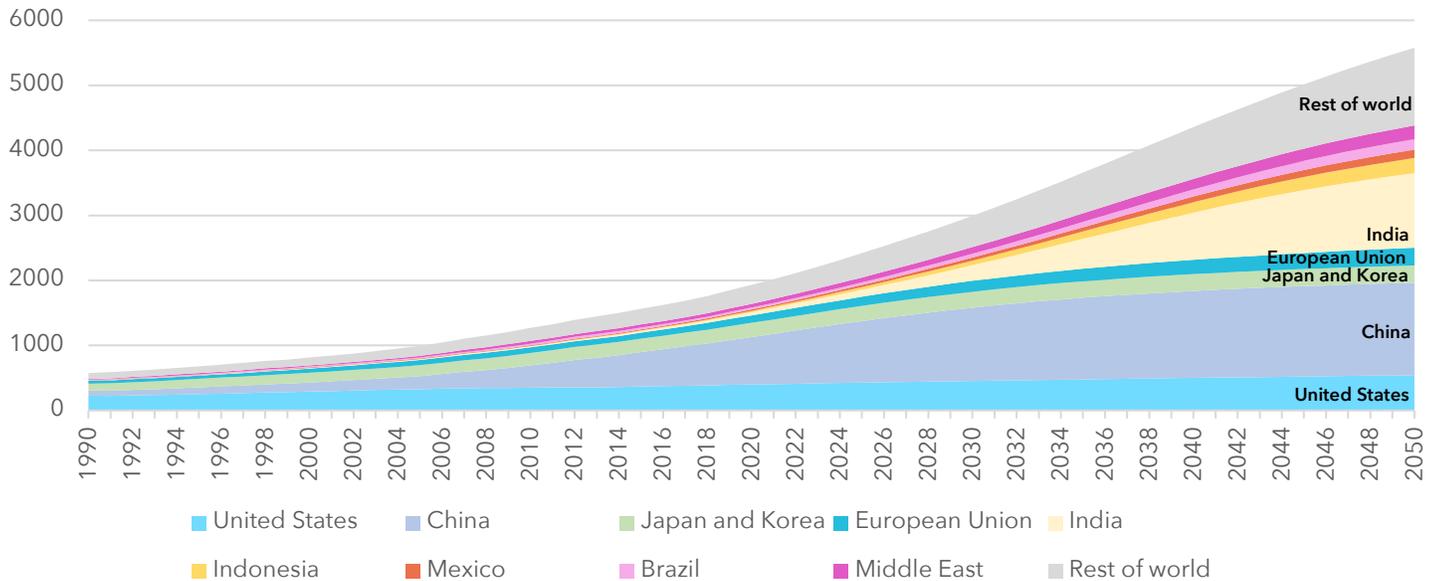
Aging will drive innovation outside of healthcare with beneficiaries such as companies in factory automation, whose products can help offset the short supply of younger, less expensive workers. Autonomous trucking could become a reality in that horizon, freeing up workers for other jobs. Autonomous cars may enable the elderly to maintain their independence for longer. We are already seeing some level of autonomous capability built into cars. The technology will only improve over time and generate more sales for component companies enabling autonomous driving.

According to the National Highway Traffic Safety Administration, 93% of automotive fatalities are due to human error, something autonomous driving should help mitigate as its technology improves. The big technology companies have taken an interest in automobiles and autonomous driving as they envision a future where drivers' eyes will be on their screens and not the road.

One positive outcome from plunging fertility rates is that they should help offset some of the strains on the planet that were predicted a couple hundred years too early by English cleric and economist, Thomas Malthus. His 1798 book, *An Essay on the Principle of Population*, warned about population growth and overcrowding. Malthus became the object of scorn as "Malthusian" became synonymous with gloom and doom. However, he failed to account for technology and innovation that led to massive productivity gains, which dramatically offset the demands of a growing population. Yet as we confront the challenges of climate change, elements of Malthus' predictions ring true today stemming from the byproducts of industrialization.

<sup>1</sup> Source: [Healthcare concentration in the US - Our World in Data](#)

## Global Air Conditioner Use from 1990 to 2050



Source: IEA

Societies will have to either reduce GHG emissions, adapt to the impact of climate change, or most likely some combination of both. Air conditioning is a useful example of adaptation strategy. Even the most energy efficient air conditioners generate carbon emissions, so an adaptation strategy of using more air conditioning will contribute to rising CO<sub>2</sub> levels.

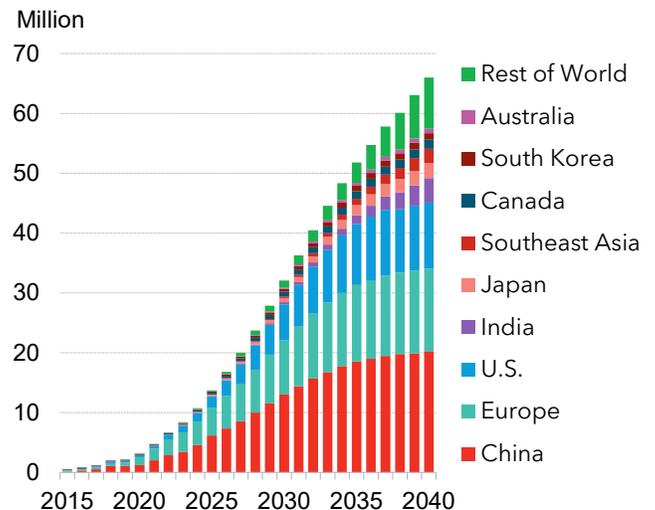
Household penetration of air conditioning should increase with demand driven by growing numbers of middle-class consumers around the globe. The demand is also supported by unbearable temperatures in geographies that historically did not need artificial cooling. As an example, much of Europe lacks air conditioning, not because of income constraints, but because of moderate temperatures. Europe's air conditioner usage is projected to grow rapidly from a very small base, shown in the chart above. India, with 18% of the world's population, barely uses air conditioning today and projects to have massive demand. Very few industries are as likely to grow as consistently as air conditioning which ranks at or near the top of any adaptation strategy.

Like the demand for air conditioning, it is safe to assume that demand for automobiles will increase where current penetration is low. China, India, and Indonesia account for 40% of the world's population and have much lower levels of automotive penetration than those of Europe, Japan, and the

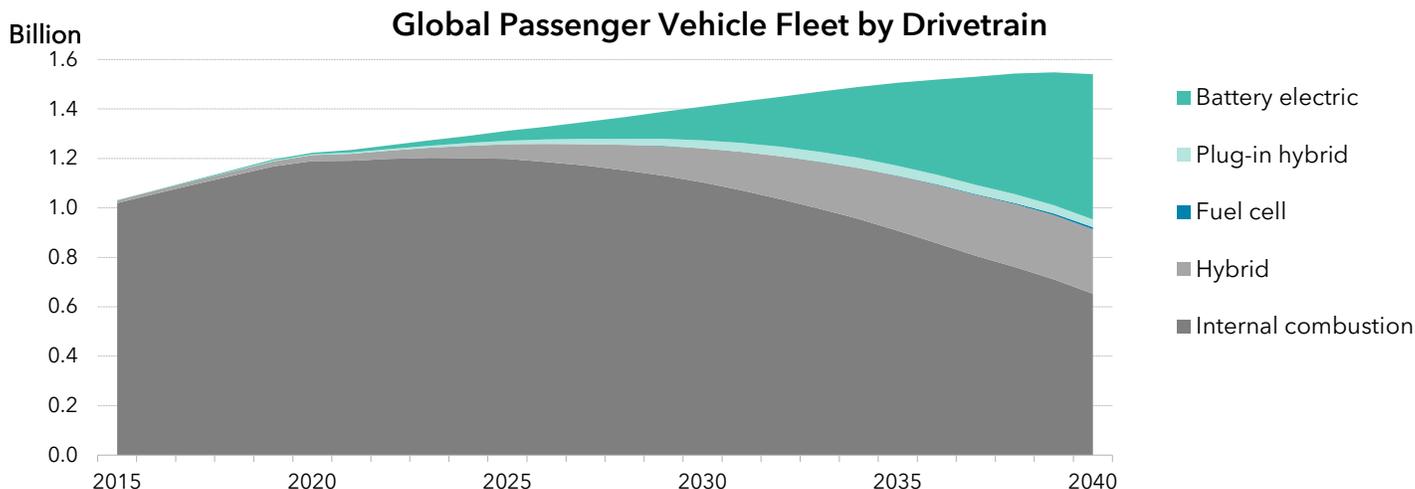
U.S. They are also oil-importing nations, which is one reason why China is heavily promoting adoption of electric vehicles (EVs). While lack of electricity generation capacity and grid infrastructure will slow EV sales in India and Indonesia, most of the world is moving as fast as it can to phase out internal combustion engines (ICE).

The chart below is a forecast showing two decades of a steady ramp in EV sales, despite little demand from India. The growth of EVs should stimulate demand for batteries, inverters, electrical connectors, and the buildout of the electric grid. We believe growth will continue to surprise on the upside for many years in this space.

## Annual Passenger EV Sales by Market



Source: BloombergNEF



Source: BloombergNEF

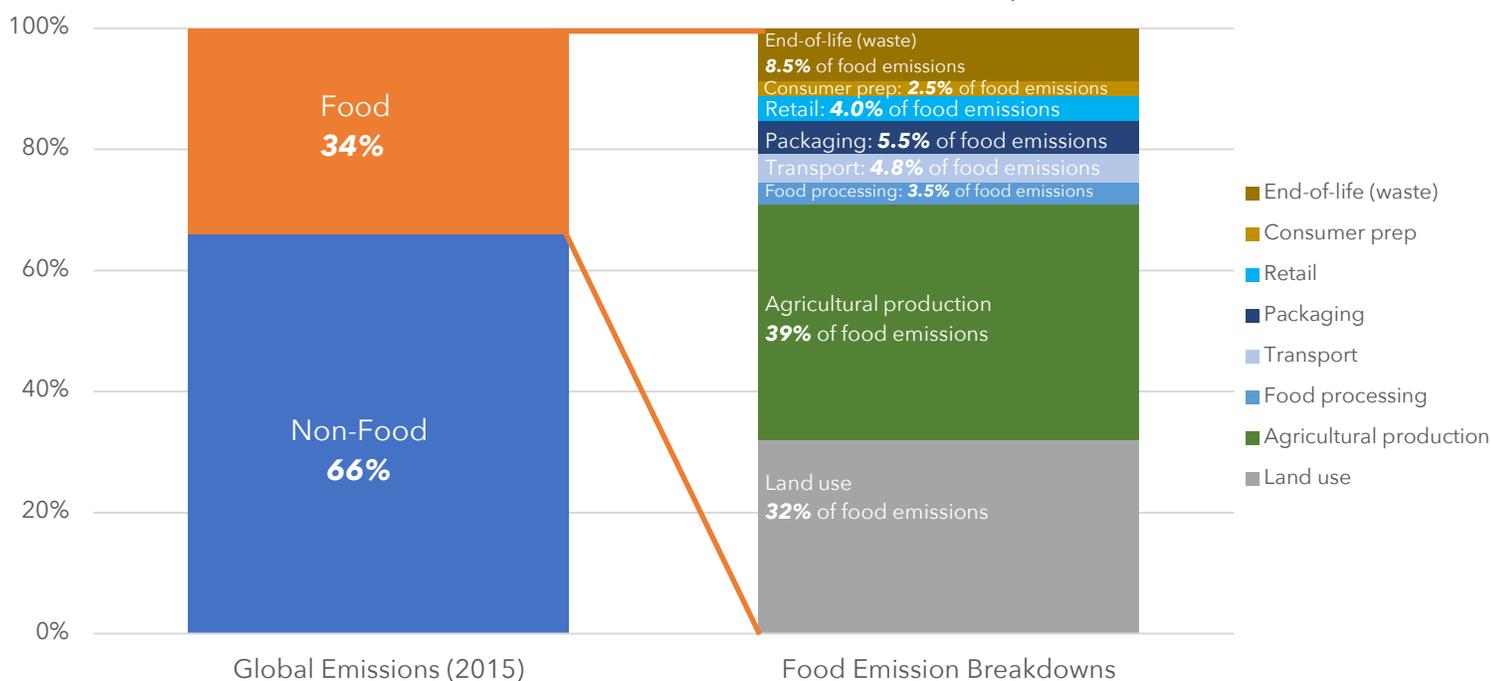
The sobering reality is that even with a sharp acceleration of EV sales, the existing fleet of ICE vehicles will still dominate the roads for the foreseeable future as most cars sold today are still ICE vehicles and will be on the road for a dozen more years. The chart above suggests that ICEs will still account for roughly half the world's fleet of vehicles by 2040.

Our agricultural systems will provide challenges and opportunities in years ahead, not exactly for the reasons Malthus envisioned, but arguably not that far off. According to a study by Monica Crippa, published in Nature Food, one-third of global GHG

emissions come from the food supply. Within the food supply, the biggest issue is the carbon intensity of animal proteins, especially beef. As diets around the world converge -- consider fast food demand in China and sushi availability outside of Japan -- there is a burgeoning opportunity for new technologies applied to our food supply. Plant-based meat substitutes are in their infancy. Cultured meats hold promise but are currently way too costly. Aquaculture may solve some of the challenges of overfishing our oceans but has its share of detractors. Many of these investment opportunities currently exist in private markets that we are monitoring closely.

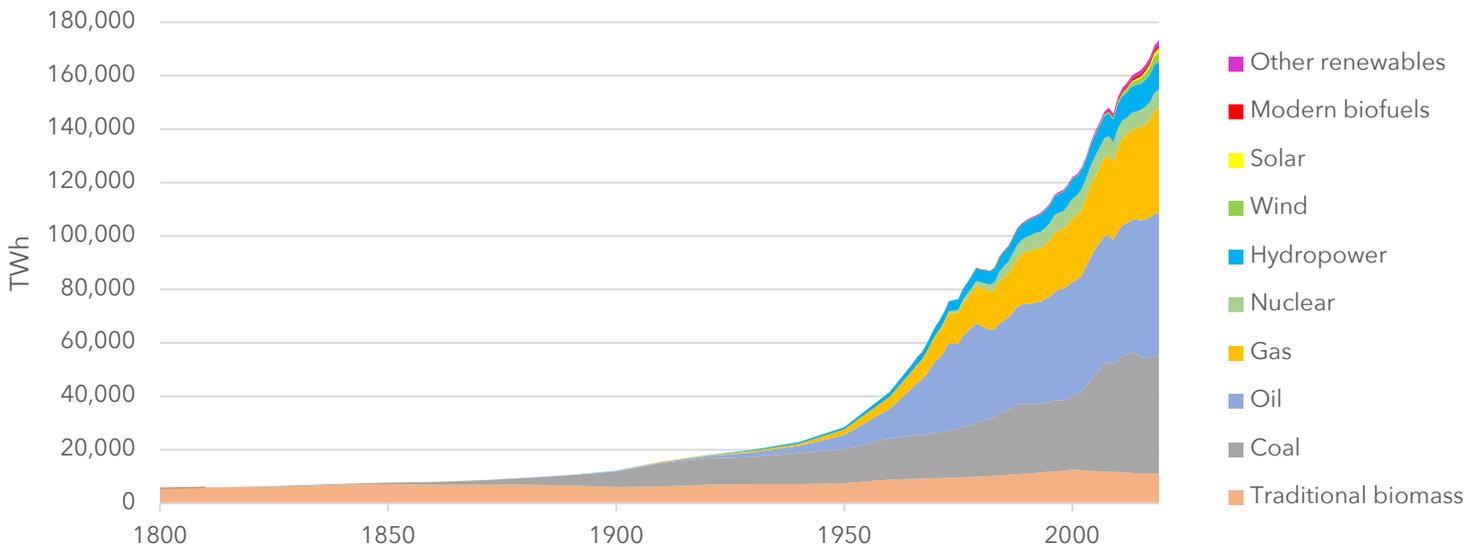
### Global Emissions (2015)

53.3 billion tonnes of carbon dioxide equivalents



Source: <https://doi.org/10.6084/m9.figshare.13476666>

## Global Primary Energy Consumption by Source



Source: Our World in Data

The energy transformation opportunity is the first one that comes to mind for many investors as they think ahead for the next 20 years. Despite a big push into renewables, the chart below illustrates how small of a dent they make in terms of energy use. I expect to see a continued push and expansion into all forms of renewables and that we could see nuclear power gaining renewed focus and acceptance. We believe many of the suppliers to renewable energy companies have attractive growth prospects, but do not expect any single source to dominate the future of power generation. Our approach has been to focus on the component suppliers which are often overlooked or under appreciated by investors.

### Conclusion

The world is currently seeing rapid economic growth, boosted by pent-up demand and robust fiscal stimulus in the U.S. As we look further ahead, we expect global growth to moderate like it has been trending for years. The ongoing challenges for global growth have been debt and demographics, both of which limit the capacity that an economy can advance. Assuming the world can achieve real long-term growth of two percent for the

next 20 years, we believe the industries that are best positioned to deliver above-average growth are those that offer products and services for our globally connected themes: aging populations, reducing GHG emissions, and adapting to climate change. Select companies within healthcare, industrials and agriculture should be well-positioned to outstrip the growth of our maturing world.

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