As a result of the consensus that has formed around the human influence on climate change, we see several major developments that have significant future economic and investment implications. This piece discusses the evolution of the consensus view and the resulting implications.

### SCIENTIFIC CONSENSUS

Founded in 1988, the Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change and is considered the world’s most authoritative scientific body on climate change. With 195 member countries, the IPCC was created to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options.

The scientific consensus is expressed through summary documents offered every several years by the IPCC. The IPCC has been producing reports since 1990 that have progressively raised the level of concern that human influence is the dominant cause of the observed warming of the earth since the mid-20th century (table below).

### CHANGE IN PUBLIC PERCEPTION

This decisive scientific consensus on human-induced climate change is leading to a growing consensus among the general public. Pew Research Center (an American think tank) surveys show that the share of Americans calling global climate change a major threat to the well-being of the United States has grown from 40% in 2013 to 57% in 2019.

Moreover, Pew surveys show a rising concern on a global basis. In 2013, a median of 56% in 23 countries said climate change was a major threat. In their most recent 2019 survey, a median of 67% in the same countries hold this view. And in 10 countries, the share of people who see global warming as a major threat has grown by at least 10 percentage points.

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<th>Evolution of IPCC Assessments of Human Influence on Climate Change</th>
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<tr>
<td><strong>1st Assessment Report (1990)</strong></td>
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<td><strong>5th Assessment Report (2013)</strong></td>
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SOURCE: BCA Research; Statements of the Intergovernmental Panel on Climate Change (IPCC) on Detection and Attribution of Global Climate Change and Hsiang and Kopp (2018).

NOTE: LIKELY denotes a probability of at least 66%, VERY LIKELY refers to at least 90%, and EXTREMELY LIKELY implies at least 95%
The increasing concern about climate change has led to several major developments.

**PARIS CLIMATE AGREEMENT**

The Paris Agreement, adopted by the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, has now been signed by 197 countries. It entered into force in 2016. The agreement established a process for moving the world toward stabilizing greenhouse gas (GHG) concentrations at a level that would avoid dangerous climate change. The centerpiece of the agreement is a set of pledges made by participating countries, known as Nationally Determined Contributions (NDCs), to near-term GHG targets they plan to achieve. These national climate action plans are leading to policy decisions with major economic and investment implications.

**CARBON PRICING**

There is broad agreement in the economics literature that carbon pricing would have the lowest economic costs among policies that would achieve any given emissions target. Consequently, carbon pricing is taking hold globally with Europe, Latin America, and Canada introducing taxation and/or cap-and-trade programs, while China announced a national emissions trading scheme.

In the U.S., around 15% of global carbon emissions are now subject to a tax or fee, and this will rise to 20% when China’s national emissions trading scheme takes effect. In the U.S., 23 states and Puerto Rico have aligned themselves with the Paris climate agreement, despite the Trump Administration’s announced intention to withdraw from it.

Controlling carbon emissions will be a major theme for the global economy, financial markets, and industries in the coming years.

**GROWING IMPORTANCE OF ENVIRONMENTALLY CONSCIOUS INVESTING**

Environmental, Social, and Governance (ESG) investing (also referred to as sustainable, responsible and impact investing or socially responsible investing) is a rapidly growing investment discipline. A cornerstone of this investment approach is the environmental criteria which looks at how a company performs as a steward of the natural environment—a key element is the firm’s impact on climate change or carbon emissions.

According to the Global Sustainable Investment Alliance’s most recent sustainable investment review, sustainable investing assets in Europe, the U.S., Japan, Canada, and Australia and New Zealand were $31 trillion at the beginning of 2018, a 34% increase since 2016.

**The ESG Investing Opportunity**

According to the Global Sustainable Investment Alliance’s most recent sustainable investment review, sustainable investing assets in Europe, the U.S., Japan, Canada, and Australia and New Zealand were $31 trillion at the beginning of 2018, a 34% increase since 2016.

In the U.S., sustainable investing continues to expand, increasing by 38% between 2016 and 2018, and represents 26% of all investment assets under professional management. Money managers reported that climate change was the “leading ESG issue” in asset-weighted terms.

Moreover, major ESG stock indices have largely tracked their conventional benchmark indices, demonstrating that sustainable investing does not have to sacrifice returns.

Please see our report, *A GUIDE TO ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) INVESTING*, from January 2019 for more detail on ESG investing.
Alternative Energy and Natural Gas:

There are two major ways to reduce greenhouse gas emissions. The first is to utilize energy sources that produce low or no carbon emissions. Coal, which produces about twice as much carbon dioxide (CO2) per unit of energy as natural gas, will continue losing share to natural gas and renewables. Major investment in natural gas, wind, and solar power will continue in the coming decades—at the expense of coal and oil. Additional investment will occur into electricity grids and battery storage, in order to ensure reliable electricity supply.

After years of technological improvement, solar and wind are now competitive with coal for power generation in the three largest GHG emitters: China, the U.S., and India. This will ease the cost of decarbonizing the electricity sector and the eventual electrification of other industries.

Select alternative energy firms and firms that produce, process, and transport natural gas are well positioned.

Utilities:

U.S. utilities are ideally positioned to benefit from state environmental policies that continue to accelerate and increase renewable energy initiatives—23 states and Puerto Rico have aligned themselves with the Paris Agreement. Advancements in technology have also significantly improved the economics and feasibility of utility scale renewables.

As a regulated entity operating under cost-of-service based rates, more investments lead to growing rate base and greater returns for utilities, especially in a low cost of debt and equity environment. This includes investments in electric wires, regulated electric generation and natural gas infrastructure, in addition to utility/non-utility commercial scale renewables.

The second major way to reduce emissions is thru energy efficiency—using less energy for any given activity. While energy intensity of gross domestic product (GDP) dropped by a third from 1990 to 2015, significant further investment will occur to take advantage of the huge potential for energy efficiency.

Industrials:

The industrial sector, which includes refining, mining, manufacturing, agriculture, and construction, accounts for the largest share of energy consumption of any end-use sector—at about 50% of end-use energy consumption. There will be an emphasis on additional spending for more efficient buildings, industrial processes and transport (electric vehicles – EV), as well as new demand-side infrastructure, e.g. for electric vehicle recharging.

Most ESG scoring models incorporate efficiency metrics (ex., energy usage/sales) which will be emphasized for corporations in the coming decades. Firms that are leaders in, or enablers of, operational and energy efficiency are beneficiaries. Waste and recycling firms have a key role to play in the future (methane from landfills is a major man-made GHG).

Agriculture:

Agricultural (crops and livestock) sector activity produces around 11% of total global GHG emissions and has a significant role to play in reducing its emissions profile, all while ensuring food security under increasingly difficult climate patterns and water stress. Agriculture in the developed world (with financial resources and institutions to support the sector) stands to benefit, while farmers in tropical regions are most vulnerable.

Firms that provide advanced technologies that increase crop yields and enhance agricultural efficiencies stand to benefit. Firms that enable efficient and reliable water sources have a secular tailwind.
Mining:
With the mining sector representing about 12% of global greenhouse gas emissions (~40% including coal burn), climate change represents a structural investment theme for the mining sector, with significant implications for demand, costs, and valuation. **ESG metrics are quickly gaining prominence for this industry.** Copper producers will likely benefit from significant renewables and EV demand. Low CO2 aluminum producers could see margin expansion as carbon pricing emerges globally.

P&C Insurance:
Evidence of increasingly more extreme catastrophe activity was evident in 2017 and 2018. According to Aon Benfield (an insurance service firm), 2017 saw 20 events that caused at least $1.0bn in economic losses while 2018 had 16 events that caused at least $1.0bn of economic losses. The average events over the past 19 years has been six. **This suggests the property and casualty insurance industry faces structural headwinds.**

A Special Note on China:
In 2017, air pollution was linked to a third of deaths in the country. Amid mounting public pressure, the government introduced the Clean Air plan. China’s 13th five-year plan (2016-2020) prioritized combating carbon emissions and air pollution, pledging to reduce its carbon emissions per unit of GDP by 60-65% from the 2005 level by 2030.

Given that coal combustion has been the largest source of carbon emissions, several policies have targeted coal. Over the past five years, the Chinese economy grew 40%, but coal consumption fell 3-4%. The International Energy Agency attributes the partial decoupling of Chinese economic growth and coal consumption to continued renewables deployment and faster coal-to-gas switching.

However, China’s carbon emissions are yet to peak as they continue to add coal capacity (over 150 GW by 2035, a 16% increase).