King Abdullah Petroleum Studies and Research Center

Transition Risks, Creative Destruction, and Stranded Assets

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About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is a non-profit global institution dedicated to independent research into energy economics, policy, technology and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

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Ten years ago, climate risks were absent from the top five global risks in the World Economic Forum's Global Risks report. In their 2020 report, the top five global risks are all climate-related: extreme weather, climate action failure, natural disasters, biodiversity loss, and manmade environmental disasters.

The Financial Stability Board's Task Force on Climate-Related Financial Disclosures divides climate-related risks into two categories: risks associated with the transition to a lower-carbon economy and risks related to the physical impacts of climate change. The physical risks from climate change include extreme weather events such as cyclones, hurricanes and floods. Most people can readily identify with these risks as they are event-driven and are frequently reported in the media. Longer-term physical risks associated with climatic shifts, such as rises in sea levels, feature less on people's minds.

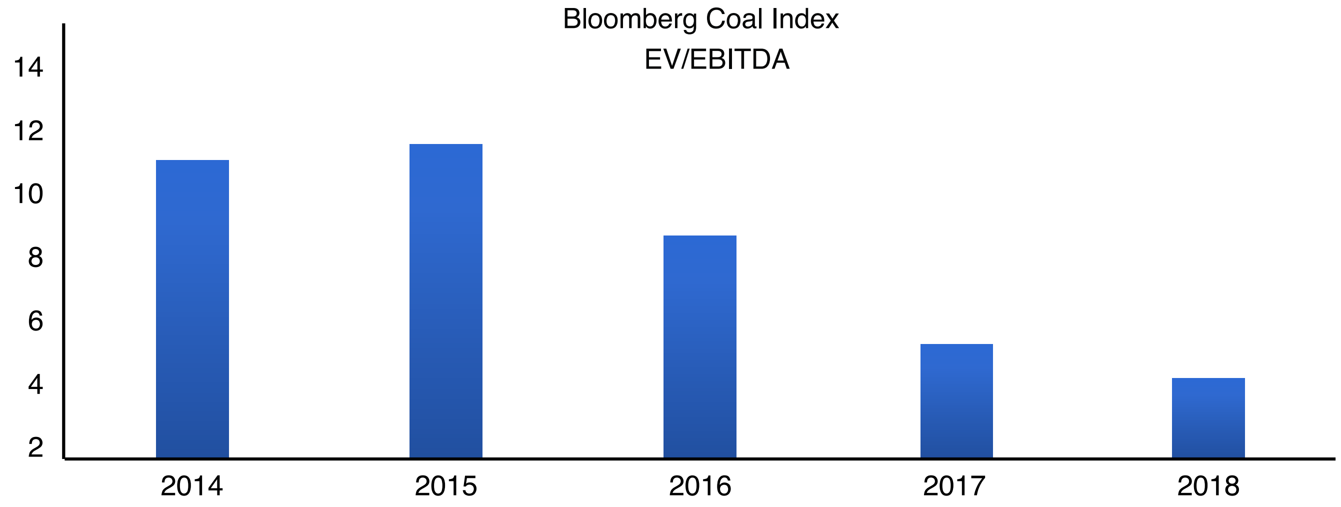
Less widely discussed are transition risks. These include the policy, legal, technology, and market changes required to address climate change mitigation and adaptation efforts. Transition risks are ever-present in the energy sector, since, according to Enerdata, the sector accounts for the largest share (45%) of global carbon dioxide (CO_2) emissions. The power sector produces 83% of all the energy sector's CO_2 emissions. A transition to a lower-carbon economy typically involves energy transitions in the power sector.

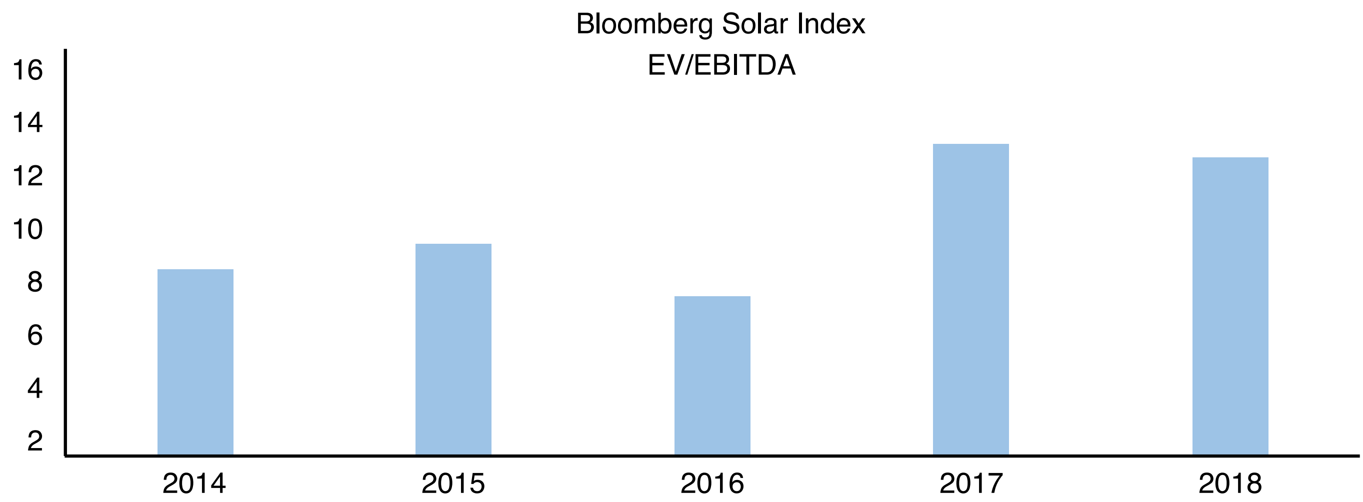
The current energy transitions are part of a larger process of 'creative destruction' that will inevitably result in winners and losers. Popularized by the influential twentieth-century economist Joseph Schumpeter, the term refers to "the process of industrial mutation that incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one." According to Schumpeter, the creative powers of dynamic capitalism lead to the destruction of old ways of doing things and make space for new approaches. This concept can be applied to energy transitions, to describe new approaches to producing low-carbon energy.

Energy transitions can happen over several years to several decades. Some scholars suggest that the process from technological innovation to market dominance can take a minimum of 40 years. In contrast, an energy transition for an entire economy could take hundreds of years, as it takes time for many sectors of the economy to adjust to new fuel sources and technologies. Future global energy mix projections suggest renewable sources of energy will take longer to become dominant sources of energy supply. In the International Energy Agency's (IEA's) Stated Policies Scenario (STEPS), by 2040, renewables (excluding hydro and bioenergy) account for only 7% of global energy demand. The wind turbine was invented in the 1880s and solar photovoltaics in 1954. It will take some time for these technologies to become the dominant sources of energy supply. In the IEA's STEPS, fossil fuels (oil, gas, and coal) will need to fill the supply gap and meet 74% of the world's final energy demand by 2040. In its more ambitious Sustainable Development Scenario, renewables make up 17% of energy demand by 2040, with 58% from fossil fuels.

The speed of energy transitions matters a lot. When they are slow and gradual, economic adjustment costs are low. When they are fast, economic adjustment costs are high, with accompanying shocks to the energy supply and energy prices.

Both cases can result in stranded assets, defined by the Cambridge Institute for Sustainability Leadership as assets that are impacted by downward revaluations or converted to liabilities as a result of the low-carbon transition. Stranded assets can pose systemic risks to the economy, and, in the case of the energy system, they can also create energy security risks. A gradual, orderly transition, which would minimize the impact of stranded asset risks, would be preferable. According to the financial think tank Carbon Tracker, a fast energy transition scenario to limit the average global temperature increase to 2 degrees Celsius above preindustrial levels would risk stranding almost a third of the roughly $5 trillion in planned fossil fuel capital investment from 2018 to 2025. According to the Bloomberg indices shown in the charts below, recent trends suggest that market valuations (indicated by the enterprise value to earnings before interest, taxes, and amortization [EBITA] ratio) of coal producers have been steadily declining, dropping 62% in the last five years. In contrast, assets of solar energy product firms have increased by 32% over the same period.





Source: Bloomberg.

Note: The coal index is the BI COATG index, an equal-weighted basket of top global coal producers. The solar index is the BI SOLRG Index, an equal-weighted basket of large manufacturers of solar energy products.

Companies can devise strategies to ride the wave of creative destruction. Some have started to internalize the costs of their carbon emissions in their investment decisions. BP, for example, assumes a carbon tax of $40 per tonne in developing worldwide projects. Danish Oil and Natural Gas (DONG) Energy, an oil and gas company, transformed itself into a wind farm specialist, Ørsted.

Stranded assets are not a new phenomenon. Monopoly utilities often incur costs when competition is introduced and their assets become stranded in power sector restructuring. In the real estate sector, changing consumer preferences have rendered many property assets redundant. Indeed, stranded assets can occur in many sectors of the economy, including energy, real estate, agriculture, mining, utilities, and transport.

Many factors can cause stranded assets, including falling technology costs, environmental concerns, consumer preferences, and government regulations and policies. Recent rapid cost declines in solar photovoltaic (PV) generation and onshore wind technologies have led to a large deployment of renewables in the energy sector. This additional electricity supply and weak grid demand have contributed to a low-price environment that has caused many utilities in Europe to book multi-billion-dollar asset impairment charges to their balance sheets. According to the professional services firm Ernst & Young, in 2016, asset impairment charges for European power and utility companies reached 23 billion euros ($25 billion), roughly 8% of their combined market capitalization. This hampers their ability to raise capital to finance new investments, which can, in turn, impact energy system security.

Environmental, social, and governance concerns have also increased pressure on asset owners and asset managers to pay attention to stranded asset risks. Divestment from over-exposed sectors is driving investment decisions. The Norwegian government recently allowed the country's $1 trillion sovereign wealth fund to reduce its shares in selected coal and energy companies. Japan's Government Pension Investment Fund, on the other hand, is advocating greater engagement with energy companies on climate change rather than divesting its shares in them. The financial community has a vested interest in better understanding stranded asset risks. According to the Network for Greening the Financial System, a global network of central banks and supervisory authorities, financial regulators and central banks are being encouraged to assess climate-related financial risks and to integrate climate-related risks into their supervision of the financial system.

The world needs orderly, sustainable transitions to find new ways of meeting energy demand while respecting the strategic priorities of individual countries. A collaborative approach is much more likely to result in less chaotic energy transitions. There is also an urgent need to learn more about the determinants of the speed of energy transitions, to help policymakers orchestrate orderly energy transitions that manage stranded asset risks most efficiently. Collaborative research to fill this knowledge gap will help policymakers develop appropriate policy and regulatory responses. Creative destruction may well result in winners and losers, but it does not have to result in disorderly energy transitions.

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