THE ENERGY TRANSITION

The world is grappling with the simultaneous issues of energy security, volatile commodity prices and climate change. The energy sector, and the way we generate and consume energy, is at the heart of these challenges. The transition of our energy systems to address these global challenges will be one of the most significant investment themes of the 21st century.

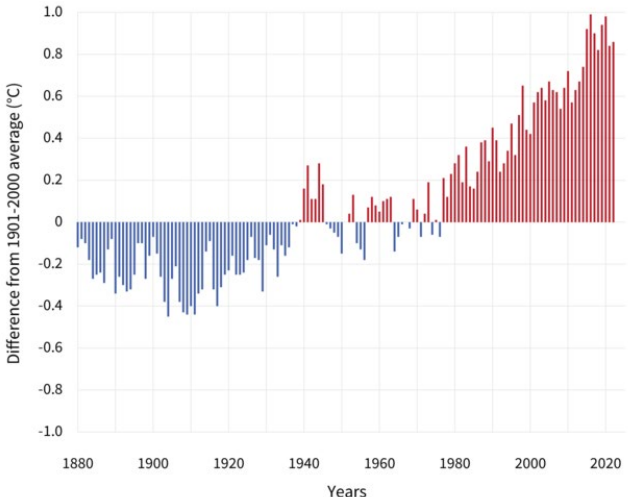
The term "energy transition" is broadly defined as the shift away from an energy supply mix that is predominately fossil fuel-based to a mix of renewable energy sources. The decarbonization of electricity generation in this energy transition is largely dominated by four trends: the declining role of coal, expansion of renewable energy, increased electrification, and the growing use of low-carbon hydrogen. Out of these four, we expect the expansion of renewable energy to be a primary trend in the decarbonization of the energy system as renewable power systems have become increasingly more efficient and costs are more competitive.

This white paper outlines why we believe the energy transition is in the early innings and how long-term energy infrastructure investing results in attractive cash flow and reliable growth over time.

Why the Energy Transition is Gaining Momentum in 2023

According to the National Oceanic and Atmospheric Administration ("NOAA"), 2022 was the sixth-warmest year on record, with the 10 warmest years on record all occurring since 2010 (Exhibit 1). The scientific community agrees that the global warming effect is largely due to greenhouse gas emissions. Thus, the amount of future warming the Earth will experience is linked to the greenhouse gas emissions that are released in the coming decades.

Exhibit 1: Global Average Surface Temperature Change

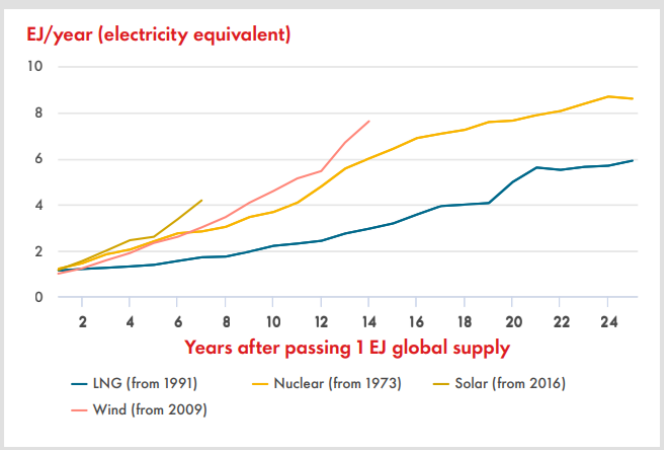


Source: NOAA.

The US Environmental Protection Agency ("EPA") estimates that electricity generation accounted for 33% of carbon dioxide ("CO_2") emissions in 2021. The well-known term "decarbonization" refers to the reduction of carbon dioxide emissions through the use of low carbon power sources. Due to its significant contribution to emissions and the warming effect in the atmosphere, electricity generation has become a primary focus in decarbonization efforts in an effort to curb global temperature impacts.

Large-scale shifts in how energy is supplied are not new. There was a transition in the 19th century as the energy source shifted from wood to coal, and again in the 20th century with the shift from coal to oil and natural gas. However, the urgency behind the present-day energy transition has differentiated itself from the previous energy transitions due to the imminent need to mitigate lasting greenhouse gas impacts.

Exhibit 2: Energy Technology Adoption



Source: Shell.

Shell conducted an analysis on the rate at which energy technology has been adopted after passing 1 EJ globally (Exhibit 2). For context, 1 EJ is approximately 0.15 percent of annual global energy consumption but represents a quantifiable milestone in a technology's ability to scale. Early indications suggest that solar and wind power are being adopted faster than previous technologies, such as natural gas and nuclear. Despite renewable energy's relatively recent introduction into a historically homogenous energy mix, its adoption has occurred at an unprecedented rate.

Recent Global Tailwinds Supporting the Energy Transition

2022 marked a pivotal year in the global energy transition as focus shifted from a singular emphasis on decarbonization efforts to include concerns of energy security. This unease has motivated a global introduction of policies supporting renewable development and, in turn, domestic energy supply. This momentum follows the increase in the number of countries and companies that are setting emissions targets which align with the 2015 Paris Agreement to limit global warming below 2 degrees Celsius.

Countries with net-zero targets have utilized policies and incentives to meet their goals. In Europe, recent policies such as the Fit for 55, RePowerEU, and The Carbon Border Adjustment Mechanism have promoted accelerated decarbonization. In the U.S., the Inflation Reduction Act ("IRA") is expected to spur massive investment into clean energy technologies in the coming years. The IRA includes tax credits and incentives towards mature technology such as wind and solar, as well as the commercialization of evolving technology, such as green hydrogen and carbon capture solutions.

Companies are driving change in the private sector by defining emission reduction goals and achieving them through renewable energy or electric vehicles. Demand from corporations seeking Power Purchase Agreements ("PPAs") with renewable energy producers is increasing, which aids in project financing for developers. In turn, companies either offset carbon emissions using renewable energy credits ("RECs") or may receive direct renewable energy from the project.

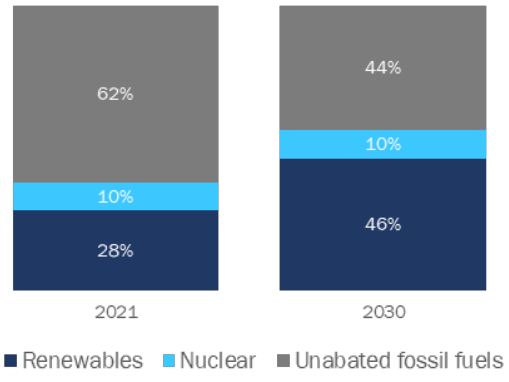
Russia's invasion of Ukraine in early 2022, and the subsequent deterioration of the energy trade relationship with Europe, has exasperated the need for energy security. As Europe's energy supply was heavily reliant on Russian fossil fuels, the sudden reduction of supply led to unprecedented energy prices and a need, rather than desire, for domestic energy supply.

The mounting need for energy security, alongside demand from the private and public sectors to adopt renewable energy to achieve decarbonization goals, will support renewable energy development and investment for years to come.

Opportunity with Renewable Energy in the Energy Transition

Expansion of renewable energy is one of the four trends of decarbonizing electricity during the energy transition. As seen in Exhibit 2, the IEA estimated that renewables will increase in share of the global supply mix from the 28% provided in 2021 to a forecasted 46% by 2030. In recent years, wind and photovoltaic solar installations have increased dramatically as upfront capital expenditure costs declined. For traditional energy sources, such as coal or natural gas, new assets often require relatively lower upfront capital but are subject to fluctuations in commodity pricing during operation. Conversely, wind and solar assets require upfront capital but only have operational and maintenance costs throughout the asset's life, with no exposure to commodity prices once in operation.

Exhibit 3: Global Electricity Supply Mix by Source



Source: IEA World Energy Outlook 2022.

Developers can offset upfront costs through tax equity (in the United States) and guaranteed pricing set by fixed price contracts. PPAs offer certainty for renewable energy systems for 15 to 20 years, depending on the contract. Variability lies primarily in the weather and seasonality of the location. However, the long-term revenue visibility on renewable assets provides reliable cash flows.

The growing share of renewables in the supply mix is not unique to the IEA's forecast. BP, one of the oil and gas "supermajors", published a 2023 annual outlook that included three demand scenarios for 2020-2050. In all three scenarios, the share of renewables in global primary energy increases from around 10% in 2019 to between 35-65%

by 2050, depending on the scenario. This significant growing share of renewables will require massive investment in infrastructure and technology.

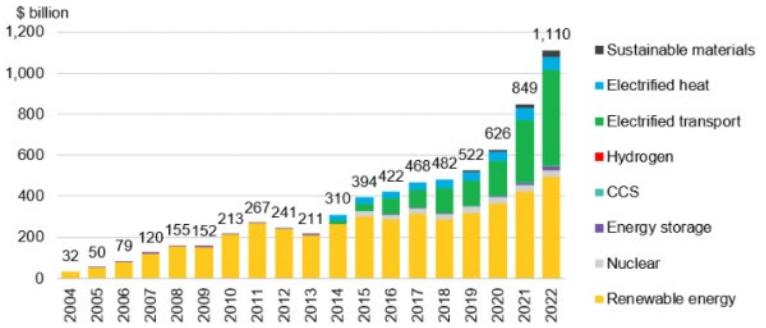
Global Investment Trends in the Renewable Energy

In 2022, Bloomberg New Energy Finance ("BNEF") estimated the global investment in the energy transition totaled $1.1 trillion (Exhibit 3), a new annual record. Renewable energy remained the largest sector, reaching $495 billion invested. The remaining sectors are largely focused on the electrification of heat and transportation. These efforts aid in the energy transition but can only truly be decarbonized if the electricity they use is from renewable sources. This again emphasizes that renewable energy is pivotal in meeting that growing demand and decarbonization goals.

Total investment in the energy transition equaled investment in fossil fuels for the first time in 2022 (Exhibit 4). Although investment in fossil fuels slightly increased last year in comparison to the previous years, the consistent and steady rise of investment in the energy transition despite economic headwinds is undeniable.

This trend is set to continue with the tailwinds of net-zero goals and clean energy policies. Renewable power capacity additions are forecasted to increase by at least 18% in 2023, reaching another record at more than 450 GW, according to BNEF. This pace of deployment is estimated to require $119 trillion by 2050 in BNEF's economic transition scenario, one that accounts for government subsidies. Overall, it's estimated that annual investment needs to increase fourfold, to approximately $4 trillion per year, within this decade to reach long-term deployment goals.

Exhibit 4: Global Investment in Energy Transition by Sector



Source: BNEF.

Exhibit 5: Energy Transition versus Fossil Fuels

Source: BNEF, IEA.

Carbon Reduction Opportunities in the Electric Power Sector	
Fossil-fired power plants	Increasing the efficiency of existing fossil fuel fired plants, substituting less carbon-intensive fuels and shifting generation to lower-emitting plants
Renewable energy	Increasing share of total electricity generated from wind, solar, hydro and geothermal sources
Battery storage	Reducing need for gas-fired generation by providing reliability between the intermittency of renewable energy systems
Nuclear energy	Extending the life of existing nuclear plants and building new nuclear generating capacity
Carbon capture and sequestration ("CCS")	Capturing CO_2 from stacks of coal-fired power plants and transferring the CO2 via pipeline or injecting the CO_2 underground

Kayne's Focus Within Energy Transition

We recognize that investment strategies range within the energy transition. These include early-stage venture investing, clean technology and manufacturing, or a focus on other areas of the economy that emit significant greenhouse gases (i.e. industrials or transportation). While we appreciate the drivers and benefits of these other strategies, our focus is on the power industry and related infrastructure. The long-term lives and contracts of solar and wind assets provide certainty of revenue throughout the majority of an asset's useful life that we believe provides an attractive investment opportunity.

As renewables impact the energy sector, company strategies are changing. Power companies and utilities are phasing out fossil fuel assets and reducing investment, while pivoting towards renewables-driven growth or business transition strategies. A company's transition to renewables can drive significant value unlock with less risk around commodity price volatility, longer contracts and no fuel costs.

Notwithstanding the strong tailwinds for renewable development highlighted in this white paper, we recognize that the transition away from a predominately fossil fuel-based grid will take decades. During these transitionary years, continued investment in companies that maintain grid reliability using fossil fuel assets is key to ensuring a stable transition. Although the investment needed for fossil fuel expansion is minimal compared to clean energy, cutting investment in natural gas prematurely may result in high prices and an unreliable electricity grid.

Therefore, our strategy considers both traditional energy companies that are leading the energy transition by converting their own fleet away from coal and fossil fuels as well as new companies that are entering the energy space as an independent power producer ("IPP") of renewable energy. These companies are achieving real growth through the development, acquisition or operation of energy assets that supply the power grid with low carbon power while investors benefit from the long-term contracted cash flows.

CONCLUSION

The energy transition from a predominantly fossil fuel-based electricity supply to low carbon sources is in the early stages with massive investment needed for growth globally. Net-zero goals and government policies, along with energy security concerns and attractive project economics set the stage for a significant uplift in the transition in the coming years. We continue to see this uplift through investment in energy infrastructure with visible long-term returns. We believe a portfolio of high-quality companies that are promoting the energy transition can generate attractive returns for investors as the power industry undergoes the 21st century energy transition.