In focus

Investing in the global energy transition

The world's third energy transition has now begun

September 2019

The world's third energy transition has now begun and is only going to accelerate from here as governments, consumers and investors recognise that switching to more sustainable energy is not only essential to stop climate change, but makes sound economic sense too. The entire value chain for how energy is generated, stored, distributed and used will need to be radically transformed. This will result in unique investment opportunities across different industries and sectors, but traditional approaches to stock market investing will fail to reap the benefits.

Summary

The way we produce and consume energy is changing. In 2018, renewables overtook coal as Germany's main source of electricity for the first time[1]. In California, 45% of all homes now have solar panels on their roofs[2] and more than 70,000 Australian households will install energy storage systems in 2019[3].

These trends are set to continue. In the past 18 months, major tipping points in the energy landscape have been reached, spurring the uptake of cleaner technologies. Policy support has also improved, with ambitious targets set at both national and local levels across the world. Over the next 30 years, the world's energy system will shift from one largely based on fossil fuels to one dominated by renewable electricity.

In the 1800s, we burned wood for energy (often referred to as traditional biofuels). The shift to coal revolutionised the pre-war industrial period. The change in power generation facilitated the boom in railways and a wave of economic development followed. The next shift started in the early 1900s with the discovery of oil. This transition not only had an impact on the energy system but also on the adoption of automobiles, transforming everyday lives.

1 Renewables overtake coal as Germany's main energy source. Reuters, 2019. https://www.reuters.com/article/us-germany-power-renewables/renewables-overtake-coal-as-germanys-main-energy-source-idUSKCN1OX0U2

2 California leads nation in residential solar installation rates, overall homes and total capacity. Altenergymag, 2019. https://www.altenergymag.com/article/2019/04/california-leads-nation-in-residential-solar-installation-rates-overall-homes-and-total-capacity/30812

3 Australia to lead world in residential battery uptake in 2019. PV magazine, 2019. https://www.pv-magazine.com/2019/01/24/australia-to-lead-world-in-residential-battery-uptake-in-2019/

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Achieving this transition will require significant investment. Between now and 2050, it is estimated that $120 trillion will need to be invested throughout the entire clean energy value chain[4]. Renewable energy is only one aspect of the change – the way we use electricity, the way it is stored and how it is distributed must also be completely transformed.

The transition to renewables will provide unique new investment opportunities

Energy transitions are long-term structural transformations in the way energy is produced, distributed and consumed. They are caused by new technologies, superior economics and changing social trends. These "technological transitions" are rare and disruptive events that radically change the existing energy infrastructure and have significant implications for both companies and society as a whole.

Although the transition to renewables has only just begun, it is expected to be equally, if not more, transformational than the previous transitions.

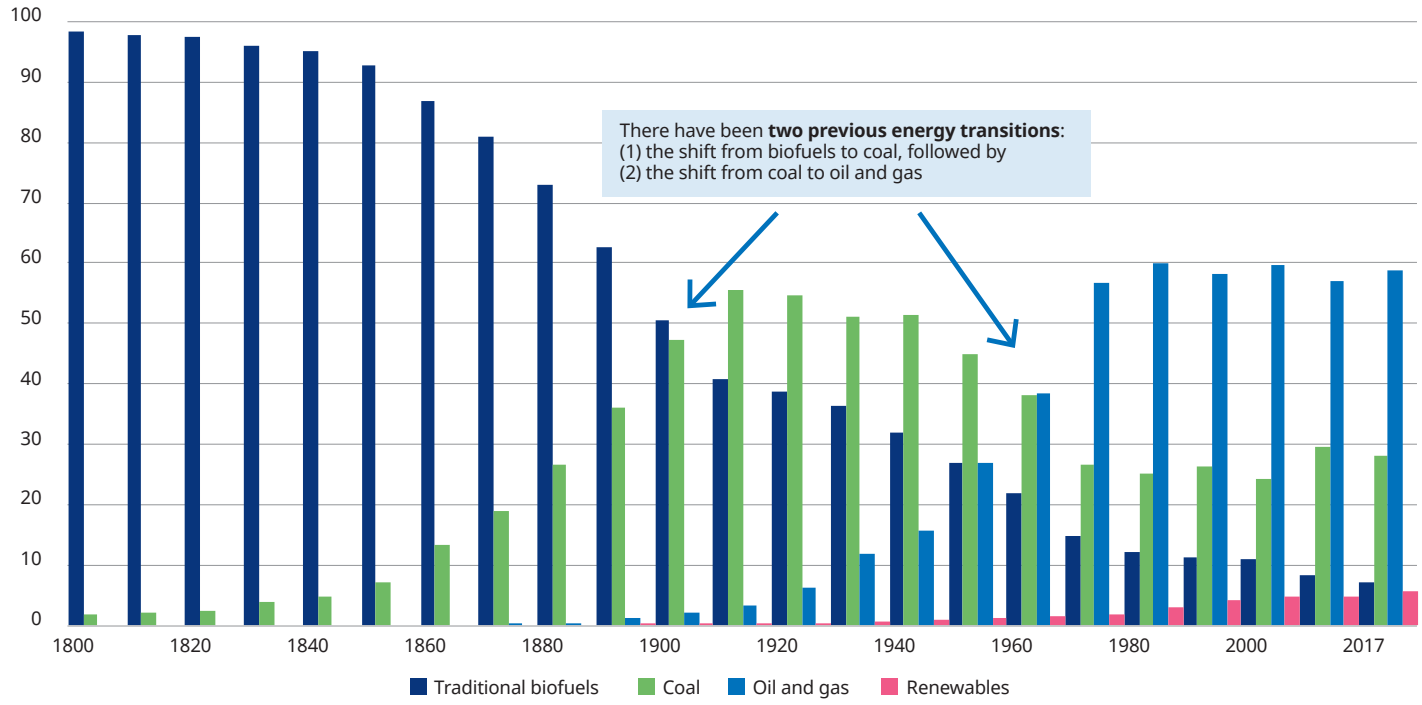
Given the size and importance of this structural investment need, companies directly involved and actively contributing to the energy transition will be well-placed to generate sustained real returns on their investments, and grow earnings and cash flows in the long term. This should provide investors with the potential for strong and consistent returns on their equity. However, the complex, evolving and wide-ranging nature of the energy transition means that identifying those companies with the greatest potential to benefit from this theme (and those with the purest exposure) is not easy.

4 Global energy transformation: A roadmap to 2050. IRENA, 2019. https://www.irena.org/publications/2019/Apr/Global-energy-transformation-A-roadmap-to-2050-2019Edition

Schroders

Figure 1: The previous two global energy transitions were hugely disruptive structural shifts

Share of global energy consumption



Source: Schroders, 2019.

Three fundamental forces are driving the energy transition

The first is the need to protect the environment and help limit global climate change. If the world is serious about meeting its globally agreed goals of limiting temperature rises to less then 2°C (in accordance with the 2015 Paris agreement), emissions must be reduced by 33% by 2030[5]. In 2018, global emissions increased to record levels, enhancing the need for a large incremental policy push over the next decade. New policies to encourage renewables are vital as an increase in extreme weather serves to highlight how severe the impact of climate change could be.

Crucially, after a decade of inconsistent and often patchy support, the global policy landscape is improving. Governments and local authorities around the world have set clear targets to encourage the adoption of clean-technology. Germany has set a target to phase out all coal-fired power by 2038[6]. The UK has committed to net-zero emissions by 2050, while Spain is aiming to produce all electricity from renewables by this date. In China, 12% of all passenger vehicles must be zero emissions by 2020[7]. Even in the US, where federal policy has regressed under Donald Trump, state level actions have been some of the most advanced globally. In California, all new homes must be built with solar panels from 2020 and 100% of all electricity in Massachusetts must come from renewables by 2050[8]. Policymakers are finally starting to take action and support is only likely to get stronger going forward.

5 The Paris Agreement. UNCC, 2018. https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

6 Germany to phase out coal by 2038 in move away from fossil fuels. Reuters, 2019. https://www.reuters.com/article/us-germany-energy-coal/germany-to-phase-out-coal-by-2038-in-move-away-from-fossil-fuels-idUSKCN1PK04L

7 China's electric car market is growing twice as fast as the US. Here's why. South China Morning Post, 2018. https://www.scmp.com/business/companies/article/2143646/chinas-ev-market-growing-twice-fast-us-heres-why

8 California's rooftop solar mandate winds final approval. Green Tech Media, 2019. https://www.greentechmedia.com/articles/read/california-solar-roof-mandate-wins-final-approval#gs.n3v6ms

The second driving force is economics. There has already been a transformative shift in the cost of renewable energy. Although regional differences still exist, the cost of renewable energy has collapsed compared to traditional forms of power, such as coal-fired generation and combined cycle gas turbines (CCGT). The cost of solar and onshore wind power is now below coal and on a par with CCGT (Figure 2). Offshore wind costs have fallen by almost 50% in recent years and are converging on coal. Whereas it was once the case that renewable energy was dependent on subsidies, this is no longer true. Although policy support is helpful, economic motivations such as this can be even more powerful at bringing about change.

Figure 2: Cost of energy for different energy technologies

USD/kWh

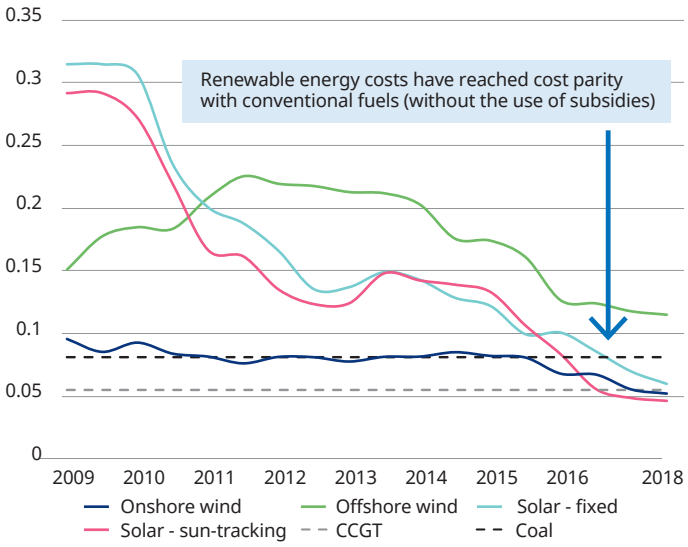


Chart shows Levelised Cost of Energy (LCOE), which is the cost of production without the use of subsidies. Source: IEA, BNEF, Schroders, 2019.

Utilities across the globe are replacing legacy fossil fuel generation with new renewable assets due to their superior economics. Corporates are also getting involved, with Amazon, Apple and Google arranging bespoke agreements with renewable power producers to provide clean, cheap electricity directly to data centres and buildings[9]. The absolute cost of residential solar power has also fallen, making it a viable economic option for consumers across the globe (Figure 3). At all scales, renewable energy has become the economic choice for utilities, governments and consumers, and is starting to drive investment into this space.

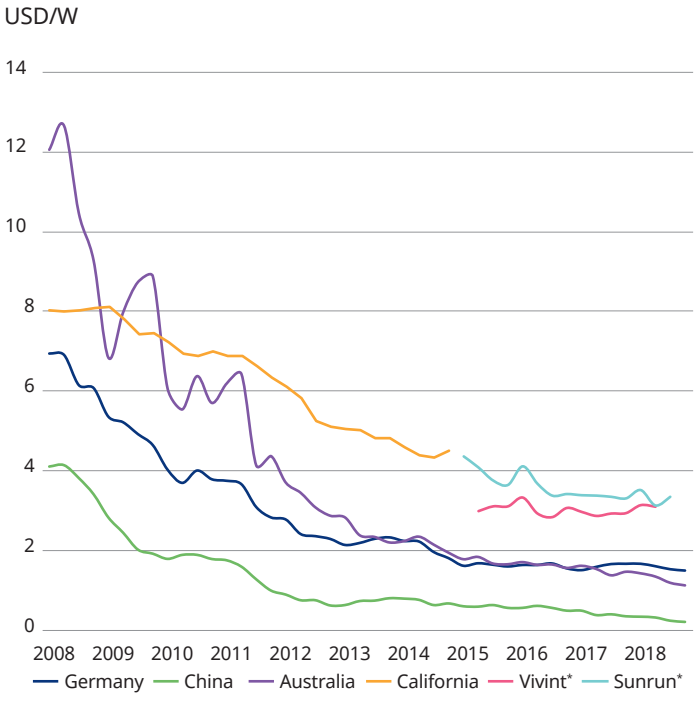
Consumer demand for new technologies powered by clean electricity is the final driver of the energy transition. Although a number of technologies are seeing rapid uptake, two in particular stand out. The first is the rapid growth in sales of electric vehicles (EVs) (Figure 4), which grew by nearly 90% in 2018. This has taken the worldwide EV fleet to more than five million. In the next few years, major auto manufacturers are launching new ranges of cheaper EVs. This supply, coupled with growing consumer demand and commitments from an increasing number of countries to phase out the petrol engine in the next 10-15 years, will sustain this momentum.

The second is the increased installation of energy storage (Figure 5). While falling costs have been a major contributor to this trend, equally relevant has been the growing desire to be less reliant on an electrical grid that is increasingly fragile and to have more control over energy use.

When examining technology transitions throughout history – whether it be the emergence of the internet and digital technologies, the widespread adoption of the automobile, or the increased use of modern medicine – consumer demand and falling costs have always been the key drivers. The energy transition is the same, but with the added benefit of potentially significant incremental policy support that will force the transition to unfold.

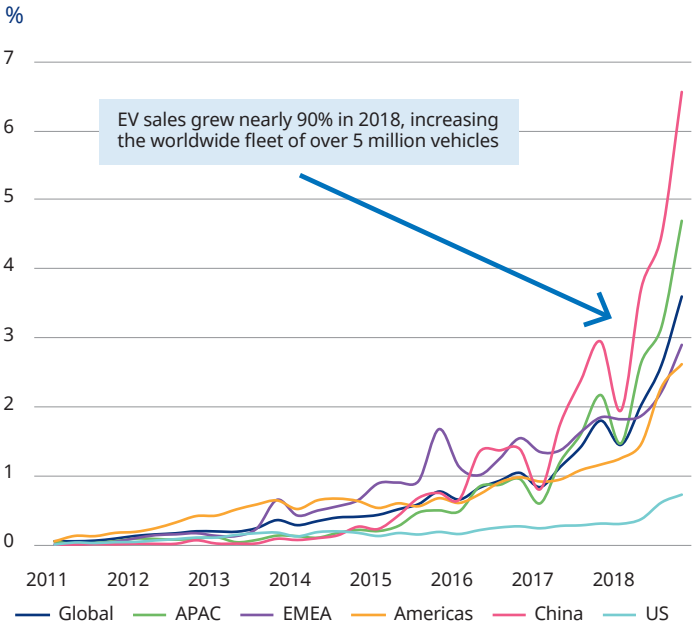
9 Google signs first Asian renewable PPA with Taiwan solar array. Recharge Transition, 2019. https://www.rechargenews.com/transition/1682423/google-signs-first-asian-renewable-ppa-with-taiwan-solar-array

Figure 3: Absolute cost of installing residential rooftop solar across the globe



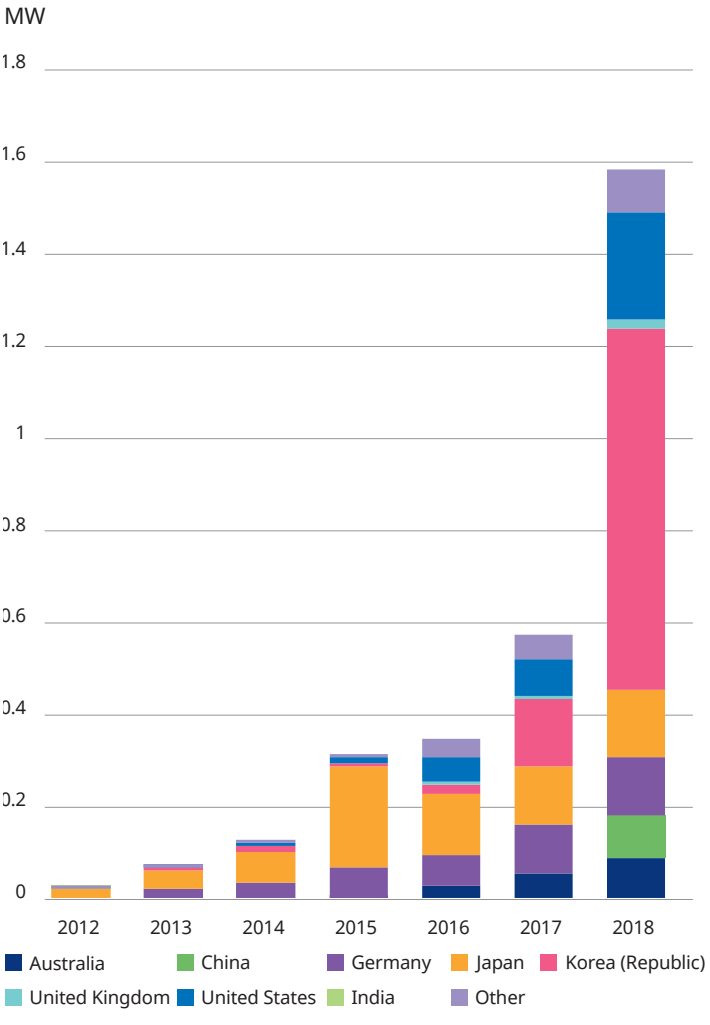
* Vivint and Sunrun are residential solar services companies who are very active in California. Source: IEA, BNEF, Schroders, 2019

Figure 4: Electric vehicle sales as a percentage of total passenger vehicle sales



Source: BNEF, Schroders, 2019.

Figure 5: Residential and commercial storage additions across the globe



Source: Bloomberg, Schroders, 2019.

The existing energy system will be radically transformed by energy transition

Energy transition investment opportunities will emerge from three main structural shifts

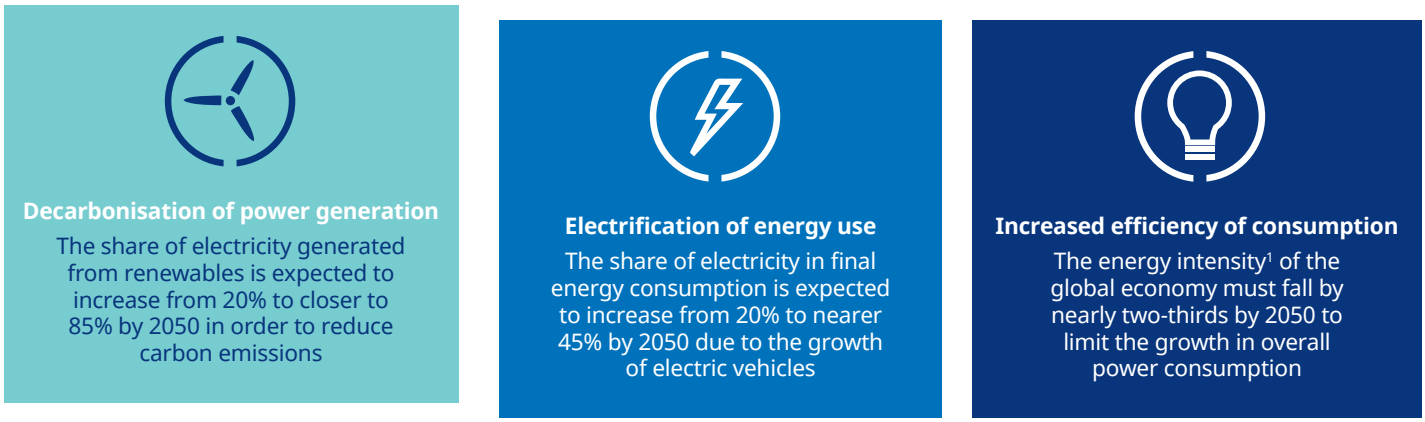
The sustainable energy transition involves shifting from a system primarily based on fossil fuels (oil, gas and coal) to one dominated by clean, renewable electricity. Its aim is to reduce energy-related carbon dioxide (CO2) emissions to help meet global climate targets. It will also make our energy more affordable, accessible and secure through cheaper, more flexible power solutions.
To achieve these goals, the energy system must undergo three main structural shifts by 2050 (Figure 6). Together, these changes will drive new investment into the energy market, creating new earnings opportunities for companies across the entire value chain (Figure 7).

The first major shift is the decarbonisation of power generation.

This involves replacing electricity produced from coal and gas with electricity produced by renewables, such as wind and solar. Electricity and heat currently account for half of all emissions globally, so making this part of the energy system cleaner is hugely important. Equally, because renewable power can also be deployed at smaller scales than conventional power plants, clean technologies can make energy more accessible and reliable. To truly realise the energy transition, the share of electricity and heat from renewables must grow from 20% currently to 85% by 2050. Coal, which currently accounts for 40% of all electricity, is unsustainable and will suffer the greatest decline in usage.

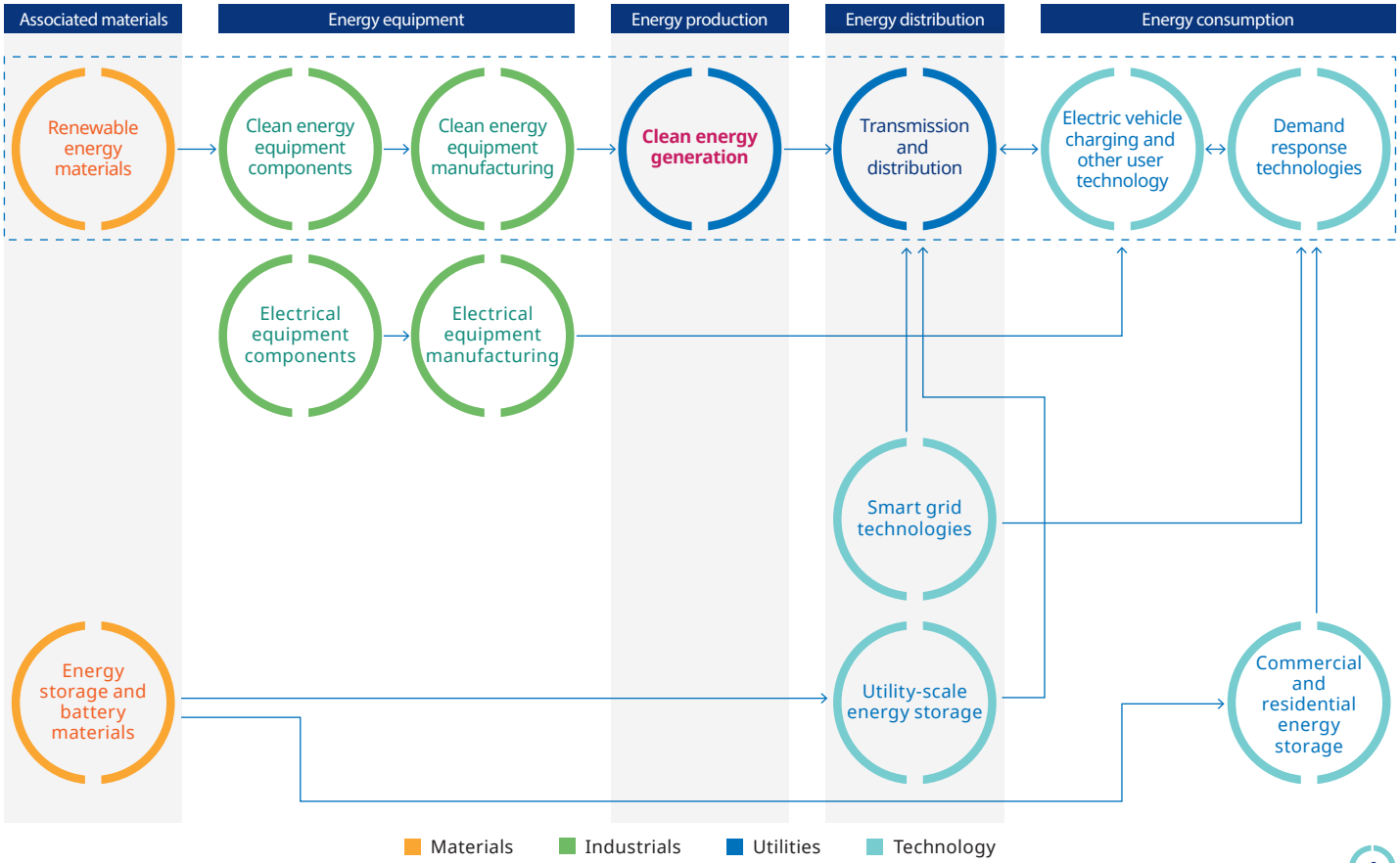
This particular structural change creates new opportunities for utilities with expertise in renewable power, as well as a fast-growing set of smaller independent power producers (IPPs)

Figure 6: Energy transition investment opportunities will come from three main structural trends



Source: Schroders, 2019.
1 Energy intensity is the amount of energy needed to produce one unit of GDP.

Figure 7: The impact will be felt across different sectors and industries



Source: Schroders, as of June 2019.

that solely develop and manage renewable assets. It also clearly benefits companies such as Vestas and First Solar, which are involved in the production of renewable energy equipment, such as wind turbines and solar panels.

However, there are less obvious winners too. Unlike conventional power plants, which can be built anywhere where there is space, renewables are (unsurprisingly) best suited to geographies with specific physical characteristics, such as strong winds or high solar irradiation. Yet these locations are often further away from where the power is needed. The US is a perfect example of this, where most wind farms to date have been built along the central US wind belt, away from populations on the East and West coasts. Offshore wind presents a similar challenge.

Connecting new renewable projects to the electrical grid creates investment opportunities for companies that manage the large-scale electrical transmission system. Indeed, even in a country the size of Belgium, the national transmission system operator is increasing its capital expenditure from approximately €300 million per year to more than €1billion per year to help connect new assets. The greater need for transmission lines creates a new need for electrical cables and other power equipment, benefiting these markets too. By 2050, the world will need to more than double the length of global power lines and transformers to enable the growth of renewables[10]. If we do not, wind and solar farms will sit idle, unable to send their power to the grid. This is currently the case in China, where the development of the national grid has severely lagged the rapid growth of new renewable power generation.

The other big winner from renewables is energy storage. The main challenge with renewable power is that it is variable – a vast amount of cheap power is produced when the wind and sun are at their strongest but no power is produced when the sun does not shine and the wind fails to blow. Unfortunately, this production profile does not necessarily match the typical demand, making it difficult for utilities to balance the amount of power on the grid.

Storage offers a solution – as shown in Australia. Batteries used by Edify Energy at their solar-plus-storage project in Victoria can provide 16,000 homes with more than two hours of power during peak demand periods[11]. Similarly, the Hornsdale Power Reserve system in South Australia now plays a key role in balancing the load on the local grid, helping to prevent blackouts[12]. As the need for storage becomes clearer, opportunities will emerge for both expert battery operators, as well as those companies that design and manufacture the growing range of storage products.

The second key structural shift is the electrification of energy use. Even if the world produced all its electricity from renewables, clean energy would still only represent 20% of energy consumed. This is because most of the energy we use today is the liquid fuels we put in our cars and the solids we burn in industry. Together, transport and industry account for almost 40% of global emissions. To maximise the potential of renewable power, we need to electrify the energy system – increasing the amount of electricity in the energy mix from 20% today to 45% by 2050. Oil, used for almost 95% of transportation, will obviously be most affected.

10 Global energy transition will lead to massive expansion of power lines and transformers. Clean Technica, 2018. https://cleantechnica.com/2018/09/13/global-energy-transition-will-lead-to-massive-expansion-of-power-lines-transformers/

11 Australia's largest solar-plus-storage project comes online. Energy Storage News, 2019. https://www.energy-storage.news/news/australias-largest-solar-plus-storage-project-comes-online

12 Hornsdale Power Reserve, 2019. https://hornsdalepowerreserve.com.au/

Two main investment opportunities will come from the growth in electricity use. The first is the need for new electrical infrastructure. While not the only factor, a crucial force here will be the rising penetration of EVs, widely estimated to have a market share of more than 60% by 2050[13]. As the number of EVs in the global fleet grows, so too must the number of chargers. According to the European Commission, if the ratio of vehicles to charging points exceeds 10, then the average consumer will start to be discouraged from purchasing[14]. The potentially huge earnings opportunities from the manufacturing, installation and operation of charging points has already attracted a range of different players, including utilities, new pure-play companies and even the oil and gas majors.

The second opportunity comes from the growth in electricity demand itself. On average, one EV uses as much power each year as a typical home. By 2030, EV use alone could increase electricity demand by close to 2000TWh – an amount three times the size of current annual German consumption. Moreover, this new demand will potentially be far more variable than it has been historically, due to differing charging habits among users. Increased and more variable electrical loads raise the likelihood of power outages. This risk is especially pertinent for countries with an already aging grid. In the US, it is thought that 70% of transformers and transmission lines are more than 25 years old, while 60% of distribution poles are 30-50 years old (relative to useful lives of 20-50 years)[15]. The frequency and cost of blackouts is already rising[16], and the energy transition has only just begun.

To ensure the vast new demand for electricity can be appropriately managed, the entire power distribution network (the local system that connects power lines to homes) needs to be replaced and upgraded with stronger and smarter technologies. Utilities in charge of these networks will of course be well-placed to benefit. But so too will those companies that make critical electrical components (substations, transformers, etc.), such as ABB and General Electric.

The third and final change is the need to increase the efficiency of energy consumption. To fully switch to a low carbon energy system as overall energy demand grows, the energy intensity of the global economy – the amount of energy needed to produce one unit of GDP – must fall by nearly two-thirds by 2050. This will require the current annual improvement in energy intensity to double from current levels. Efficiency improvements, through energy-efficient lightbulbs and better insulation in houses is one solution. But more important is the need to improve the efficiency of energy transportation. On average, 5%-10% of all electricity produced is lost on the grid due to inefficient distribution systems[17]. This needs to be improved.

13 Electric vehicle outlook 2019. BNEF, 2019. https://about.bnef.com/electric-vehicle-outlook/

14 Transport and Environment, 2018, Roll-out of public EV charging infrastructure in the EU: Is the chicken and egg dilemma resolved? https://www.euractiv.com/wp-content/uploads/sites/2/2018/09/Charging-Infrastructure-Report_September-2018_FINAL.pdf

15 Aging grids drive USD 51bn in annual utility distribution spending. Utility Dive, 2018. https://www.utilitydive.com/news/aging-grids-drive-51b-in-annual-utility-distribution-spending/528531/

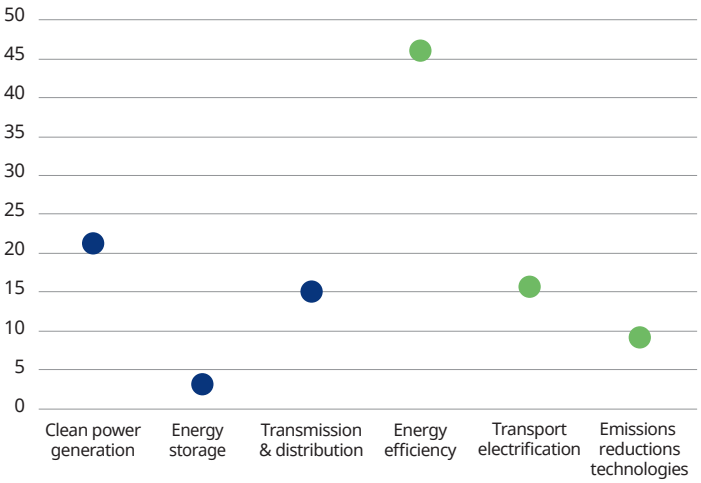
16 Rising power outage cost and frequency is driving grid modernization investment. Navigant Research, 2018. https://www.navigantresearch.com/news-and-views/rising-power-outage-cost-and-frequency-is-driving-grid-modernization-investment

17 Lost in transmission: How much electricity disappears between a power plant and your plug. IE Inside Energy, 2015. http://insideenergy.org/2015/11/06/lost-in-transmission-how-much-electricity-disappears-between-a-power-plant-and-your-plug/

Investment opportunities in this space tend to come from more agile, disruptive companies. Sunrun and Vivint Solar in the US are installing new residential solar and storage solutions in homes, taking revenues from traditional utilities as energy is produced and stored directly at the point of use. A growing set of companies, including Alfen and Sonnen in Europe, are developing micro grid solutions for corporates and local communities, allowing them to manage their power needs more efficiently outside of the traditional electrical grid. Smart-meters and other intelligent demand response technologies are allowing more visibility and control of our energy use.

The combination of these three structural shifts – which have all started to accelerate in the last 18 months – will result in a energy system in 2050 that looks very different from that of today. Energy efficiency gains should keep overall energy demand relatively flat, but electricity will displace oil as the main type of energy consumed. Renewables become the dominant source of power at the expense of coal and gas, but more of that electricity will be produced locally at smaller scales, rather than by large, centralised utilities. New technologies will allow us to constantly manage our own power usage to maximise efficacy. What were technological dreams not too long ago, are starting to become a reality.

Figure 8: Investment and earnings opportunities will emerge across the entire energy value chain



Source: Schroders, 2019.

A huge amount of investment must be made across the entire energy supply chain

Fully realising this energy transition will require significant capital spending. It is estimated that $120 trillion of new investment will be required in transition technologies by 2050[18], split between the supply and demand sides of the system (Figure 8) to achieve the three structural shifts that will characterise the transformation.

The crucial point here is that the investment will need to be made across the entire energy value chain. We will need new renewables equipment, transmission and distribution lines, energy storage, electrical infrastructures and smart technology tools. It is all completely linked.

Just like the internet has facilitated the growth of new technology applications during the digital transformation, the growth of renewable power will stimulate the adoption of novel energy solutions. The energy transition opportunity is about more than just renewables, it is about the long-term, radical transformation of the entire energy system over the next 30 years and beyond.

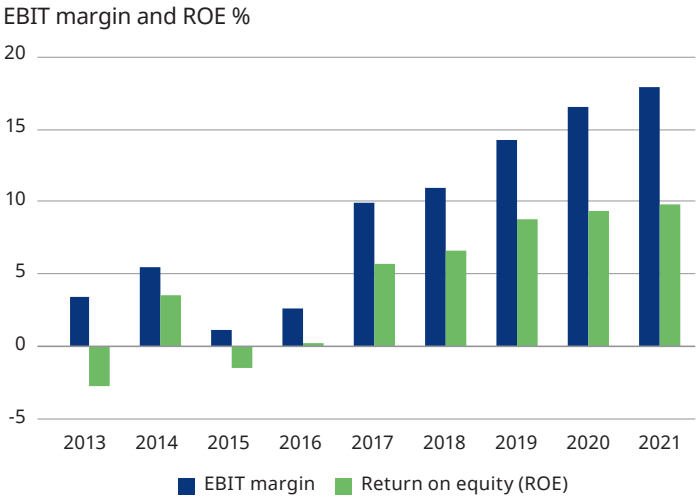
18 Global energy transformation: A roadmap to 2050. IRENA, 2019. https://www.irena.org/publications/2019/Apr/Global-energy-transformation-A-roadmap-to-2050-2019Edition

Conditions are finally aligning for profitable investment

While each of the three drivers for energy transition (environmental concerns and policy support; competitive economics; and strong consumer demand for new clean technologies) are all individually important, each can fail on its own. Indeed, over the last five years or so, a key reason why renewable energy technologies have failed to see sustained growth, is that these three drivers have been working individually, but never together. In certain locations, policy has been supportive, but costs have been prohibitive. In others, support from consumers has been strong, but the lack of clear policy slowed any potential for growth.

The inconsistency of these market drivers has created a difficult and volatile environment for companies involved in the energy transition space. This is reflected in their financial performance and the returns to investors to date (Figure 9 and Figure 10). If you had invested $1 in the MSCI Global Alternative Energy Index over the last five years, you would have only just broken even. Investors have not missed this opportunity yet.

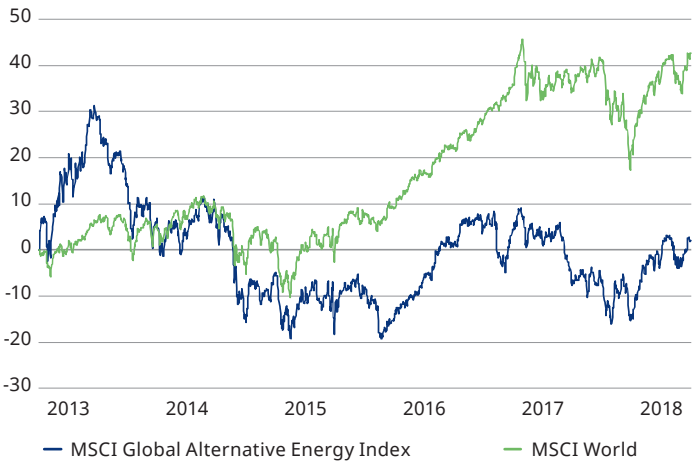
Figure 9: MSCI Global Alternative Energy Index EBIT margin and return on equity



The forecasts included should not be relied upon, are not guaranteed and are provided only as at the date of issue.

Source: Bloomberg, Schroders. Data as of June 30 2019.

Figure 10: MSCI Global Alternative Energy Index vs MSCI ACWI



Past performance is not a guide to future performance and may not be repeated.

Source: Bloomberg, Schroders. Data as of June 30 2019.

Over the last 18 months, the clear tipping points reached across the energy landscape have caused all three of these forces to start working together. Their combined force creates a very powerful environment for investment into the energy transition and should create opportunities for companies to achieve a significant return over the long-term. The result is that a large amount of the capital that companies have invested over the last decade is finally starting to yield positive results. The first proper years of healthy profitability and returns on equity were achieved in 2017 and 2018. Consensus expectations forecast these margins and the returns to expand further over the next three years as the market accelerates. The energy transition is finally starting to gather real pace and is showing no sign of looking back.

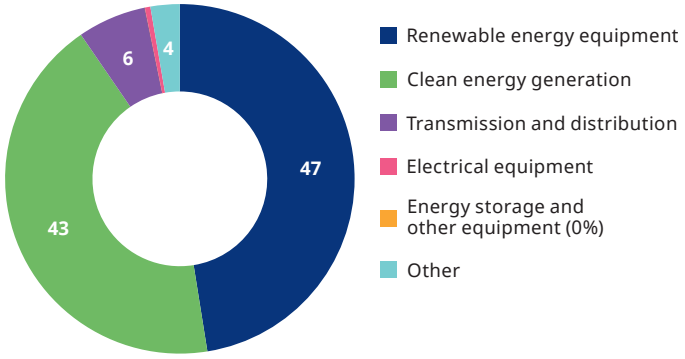
A long-term, active approach is required to capitalise on this structural trend

Identifying the companies with the greatest exposure to the energy transition is not easy

Although many of the forces which will propel our transition towards lower carbon power are coming to the fore, traditional approaches to stock market investing are unlikely to reap the benefits.

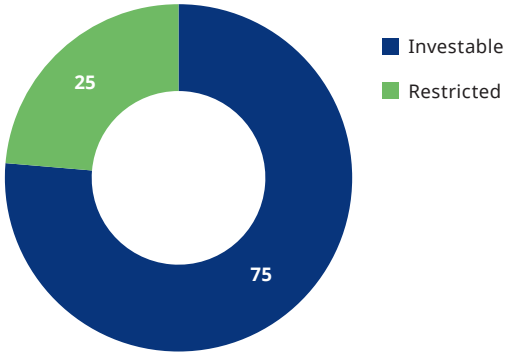
Take the closest public market index – the MSCI Global Alternative Energy Index. This index is principally focused on just two sub-themes associated with the global energy transition: clean energy generation and renewable energy equipment. It fails to offer much exposure to some of the key associated technologies and markets (Figure 11). It is also flawed in its construction, with the wind turbine manufacturer Vestas alone representing 22% of the index. Investors seeking diversified exposure to the energy transition opportunity, will likely find this unpalatable. The purity of the exposure can also be questioned, with 25% of the index either exposed to fossil fuels or principally focused on other activities (Figure 12).

Figure 11: Distribution of companies in the MSCI Global Alternative Energy Index by activity type (%)



Source: Bloomberg,Schroders. Data as of June 30 2019.

Figure 12: Companies in the MSCI Global Alternative Energy Index that would be restricted based on fossil fuel, nuclear or other inappropriate exposures (%)



Source: Bloomberg, Schroders. Data as of June 30 2019.

Achieving focused exposure to the energy transition is a broader concern. Consider a semiconductor company which makes parts for solar energy equipment but derives most of its revenues from other end users. Its performance is likely to be dominated by events in its other end markets, not global energy transition. Similarly, while large oil and gas companies are actively pursuing cleaner opportunities, their performance will largely depend on their traditional businesses and, with that, the oil price. A successful acceleration in energy transition would likely lead to them struggling, not prospering.

The focus needs to be on finding those companies that are best positioned to take advantage of the coming shift to a lower carbon powered future across the entire energy value chain. This involves a breaking of traditional regional, style or sectoral boundaries when putting together a focused, thematic portfolio. Moving away from market-capitalisation weighted structures is also essential. When we conducted analysis of individual company revenue exposure for the entire universe of listed equities, we found around 2,000 companies globally with some exposure to energy transition technologies. However, currently it is of incidental relevance for the vast majority (90%). Filtering for those which derive a high proportion of their revenues from energy transition activities, along with other factors such as liquidity, investability and financial strength, that initial universe of 2,000 declines to only 250 pure-play companies with the greatest exposure to core energy transition activities.

Equally important, is that together these 250 companies make up just 0.1% of globally listed equities. This exposure would barely amount to more than a rounding error in the returns of a traditional, broad equity portfolio. To properly capitalise on the investment and earnings opportunities associated with the energy transition, a dedicated, standalone exposure is required.

A thoughtful and sustainable investment approach is required

Although we believe there are around 250 companies that are actively contributing and directly involved in the energy transition, not all best-in-class companies are best-in-class investments. The fast-changing and evolving nature of technological transitions means that both top-down and bottom-up factors will play a part in determining the winners and losers. Weak companies in overly-competitive and disrupt-able industries need to be avoided. Conversely, strong participants in structurally attractive technologies will thrive.

Geography will be equally important, as the energy transition evolves in different directions across countries depending on their unique socioeconomic characteristics. At the company level, the quality of human capital management and the strength of relationships with customers, regulators and suppliers is key. Balance sheet management will also be important given that many clean energy technologies are in the early stages of their development and are subject to new industry risks. Other important characteristics include returns on invested capital, the path to free cash flow generation and the treatment of equity investors.

Conclusion

Clear tipping points in the energy landscape have been reached. We firmly believe that the transition to a more sustainable energy system is starting to accelerate and will be radically transformative for companies operating across the entire energy value chain. Traditional portfolios have negligible exposure and dedicated passive strategies are poorly constructed. We believe that a flexible, focused approach based on in-depth top-down and bottom-up factors is the only way to identify the real winners and losers.

Important Information

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In focus

Investing in the global energy transition

The world's third energy transition has now begun

September 2019

The world's third energy transition has now begun and is only going to accelerate from here as governments, consumers and investors recognize that switching to more sustainable energy is not only essential to stop climate change, but makes sound economic sense too. The entire value chain for how energy is generated, stored, distributed and used will need to be radically transformed. This will result in unique investment opportunities across different industries and sectors, but traditional approaches to stock market investing will fail to reap the benefits.

Summary

The way we produce and consume energy is changing. In 2018, renewables overtook coal as Germany's main source of electricity for the first time[1]. In California, 45% of all homes now have solar panels on their roofs[2] and more than 70,000 Australian households will install energy storage systems in 2019[3].

These trends are set to continue. In the past 18 months, major tipping points in the energy landscape have been reached, spurring the uptake of cleaner technologies. Policy support has also improved, with ambitious targets set at both national and local levels across the world. Over the next 30 years, the world's energy system will shift from one largely based on fossil fuels to one dominated by renewable electricity.

In the 1800s, we burned wood for energy (often referred to as traditional biofuels). The shift to coal revolutionised the pre-war industrial period. The change in power generation facilitated the boom in railways and a wave of economic development followed. The next shift started in the early 1900s with the discovery of oil. This transition not only had an impact on the energy system but also on the adoption of automobiles, transforming everyday lives.

1 Renewables overtake coal as Germany's main energy source. Reuters, 2019. https://www.reuters.com/article/us-germany-power-renewables/renewables-overtake-coal-as-germanys-main-energy-source-idUSKCN1OX0U2

2 California leads nation in residential solar installation rates, overall homes and total capacity. Altenergymag, 2019. https://www.altenergymag.com/article/2019/04/california-leads-nation-in-residential-solar-installation-rates-overall-homes-and-total-capacity/30812

3 Australia to lead world in residential battery uptake in 2019. PV magazine, 2019. https://www.pv-magazine.com/2019/01/24/australia-to-lead-world-in-residential-battery-uptake-in-2019/

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Achieving this transition will require significant investment. Between now and 2050, it is estimated that $120 trillion will need to be invested throughout the entire clean energy value chain[4]. Renewable energy is only one aspect of the change – the way we use electricity, the way it is stored and how it is distributed must also be completely transformed.

The transition to renewables will provide unique new investment opportunities

Energy transitions are long-term structural transformations in the way energy is produced, distributed and consumed. They are caused by new technologies, superior economics and changing social trends. These "technological transitions" are rare and disruptive events that radically change the existing energy infrastructure and have significant implications for both companies and society as a whole.

Although the transition to renewables has only just begun, it is expected to be equally, if not more, transformational than the previous transitions.

Given the size and importance of this structural investment need, companies directly involved and actively contributing to the energy transition will be well-placed to generate sustained real returns on their investments, and grow earnings and cash flows in the long term. This should provide investors with the potential for strong and consistent returns on their equity. However, the complex, evolving and wide-ranging nature of the energy transition means that identifying those companies with the greatest potential to benefit from this theme (and those with the purest exposure) is not easy.

4 Global energy transformation: A roadmap to 2050. IRENA, 2019. https://www.irena.org/publications/2019/Apr/Global-energy-transformation-A-roadmap-to-2050-2019Edition

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