Deutsche
Asset Management

SUSTAINABLE FINANCE REPORT

ISSUE #2

Article 3:
The search for yield and the U.S. renewables sector

THE SEARCH FOR YIELD AND THE U.S. RENEWABLES SECTOR

Investor interest towards real assets and specifically infrastructure is on the rise. Part of this added appeal reflects a more inventive mindset among investors to seek out yield as global interest rates have slumped towards zero. In this article, we examine the significant transformation of the U.S. power sector that has been underway for more than a decade. This transformation has, in part, been triggered by the collapse in natural gas prices as well as the increasing competitiveness of renewable energy compared to more traditional fuels such as coal. We also assess, at this early stage, the possible implications of the new Republican administration and how federal, state and corporate activities in the renewable sector might evolve.

Executive summary

In our first Sustainable Finance Report published last year, we examined the transformation of the Chinese power generation sector and the leading position China was establishing in the renewables sector. Here, we examine prospects for the U.S. renewables sector and the risks and opportunities that are unfolding from a competitive and regulatory perspective.

According to the International Renewable Energy Agency (Irena), the number of jobs in the global renewables sector reached 8.1 million in 2015 with China, Brazil and the United States accounting for almost two thirds of people employed in the renewables sector globally. By 2030, Irena estimates a threefold increase in the number of people employed in the global renewables sector.

In the U.S., of the roughly 770K people employed in the renewable sector, the solar sector accounts for just over a quarter with the wind industry employing approximately 90K. Jobs in the U.S. solar sector have increased by over 60% in the three years to 2015. As a result, more people are employed in the U.S. solar industry today than in the domestic oil and gas extraction sector (187K).

In the U.S., the deployment of renewable technology has been assisted by falling costs across the wind and solar sectors, which has made renewable power generation increasingly competitive compared to more traditional generating sources such as coal and natural gas.

The growth in the renewable sector has also been driven by a desire among utilities and independent power producers to diversify power fleets. According to the EIA, renewables, excluding hydro, accounted for just 7.3% of the U.S. power generation mix in 2015 with obvious room for growth.

The renewable sector is also being boosted by consumer demands for clean energy as well as U.S. corporates such as Walmart, Google and Apple stating their intent to source up to 100% of their energy from renewables.

In addition, 29 U.S. states have Renewable Portfolio Standards which mandate that a certain proportion of electricity generated must come from renewable sources. For example, New York and California have set targets that renewable energy must account for at least half of their energy source by 2030.

We believe renewable projects are also attractive from a yield and cash flow perspective. Renewable energy projects tend to be long-lived assets with 20-25 year financial lives and generally have consistent, long-term contracted cash flows that are independent of fossil based fuel price volatility. Such projects have garnered the attention of those seeking long-term, stable and relatively high yielding securities, particularly now during a period of low interest rates.

Within the renewable power generating sector, we believe opportunities are particularly attractive for distributed utility-scale power generation projects, that is projects of less than 25MW for non-rooftop solar photovoltaic and less than 100MW for onshore wind.

One of the benefits of distributed utility-scale projects is that they are sited close to the end-users of the power and as a result do not rely as heavily on the electricity transmission grid compared to large-scale utility projects. Consequently these facilities are able to mitigate a significant portion of the mark-up from transmission and distribution costs while still pricing close to retail power prices.

The appeal of the global renewable sector among institutional investors is also being enhanced by changing investor attitudes towards fossil fuels and the transition required towards a low carbon economy. This is a topic we explore in the climate risk article that features earlier in this report.

However, uncertainty towards the path of U.S. environmental legislation and its implications for the U.S. renewable sector has grown since the U.S. Presidential election at the end of last year.

In our view, policy change as it relates to the coal and renewables sectors are focused on the elimination of the Clean Power Plan, the repeal of energy tax credits that support the development of renewable energy and the possible withdrawal by the United States from the Paris climate agreement.

While federal legislation may become more supportive to coal and possibly less favourable to renewables, we expect state, corporate and investor level support for the U.S. renewable sector will prove resilient. This reflects improving competitivess of renewables as well as attractive investment opportunities for the sector.

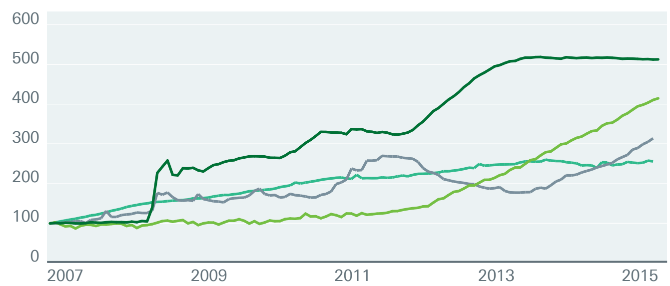
1 | Introduction

In the aftermath of the 2008-09 financial crisis and the collapse in global interest rates, institutional investors such as pension funds and life assurance companies have become more active in their search for yield. Infrastructure plays an important part in this story since as an asset class infrastructure can offer not just attractive yields, but, also match institutional investors' long-term liabilities.

Infrastructure assets consist of physical structures and essential services that facilitate in the efficient working of an economy. We typically focus on those in the transportation and utilities sectors such as airports, rail and toll roads on the one hand and water, power generation and electricity transmission and distribution on the other.

The expansion in global central banks' balance sheets and the appearance of negative real interest rates have also raised concerns among investors of an eventual pick-up in inflation, Figure 1. Naturally this is increasing the appeal of gaining exposure to hard or real assets such as infrastructure given their perceived inflation hedging properties. Moreover, like the micro-finance sector, there can be diversification benefits in investing in certain hard assets given the low or negative correlation of returns relative to more traditional asset classes such as bonds and equities.

Figure 1: Central bank balance sheet expansion



Source: Bloomberg Finance LP (November 2016)
Central bank total assets in local currency terms; rebased end January 2007=100

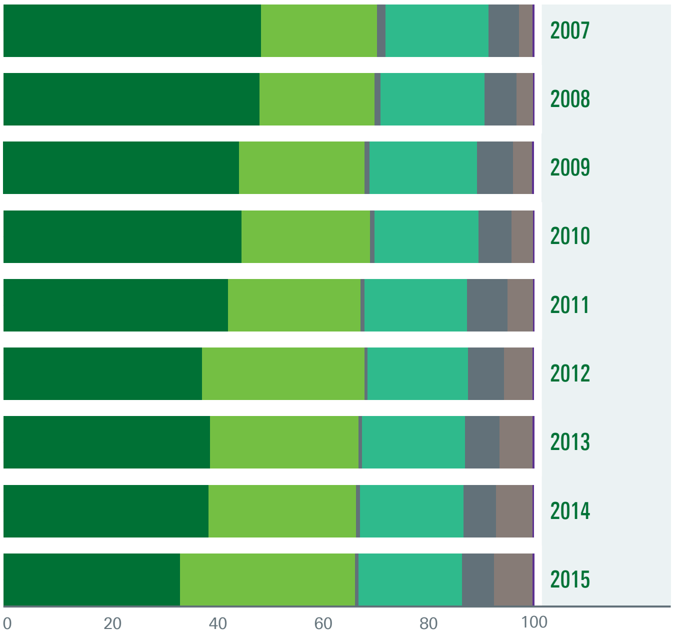
Another appeal of infrastructure assets has been rising budget deficits and the increasing indebtedness of the official government sector. This has encouraged some private sector investors to migrate into the infrastructure space, which has traditionally been dominated by the public sector, leading to the emergence of a market for Public Private Partnerships.

In this article, we focus on the transformation of the U.S. power sector and specifically examine prospects for the U.S. renewables sector. While the new U.S. administration may derail federal legislation such as the Clean Power Plan, turn its back on international climate agreements and attempt to reverse the decline in the coal sector, we assess the many economic and financial factors that will continue to assist in the development and expansion of the U.S. renewables sector.

2 | The transformation of the U.S. power sector

The U.S. power generation mix has historically been dominated by coal. Indeed in 2008 coal accounted for 48.2% of total U.S. power generation by fuel type, Figure 2. However, since then coal's dominance has been declining such that by 2015 coal represented just 33.2% of the U.S. power generation mix, according to data published by the U.S. Energy Information Administration (EIA).

Figure 2: U.S. power generation mix by fuel type (%)

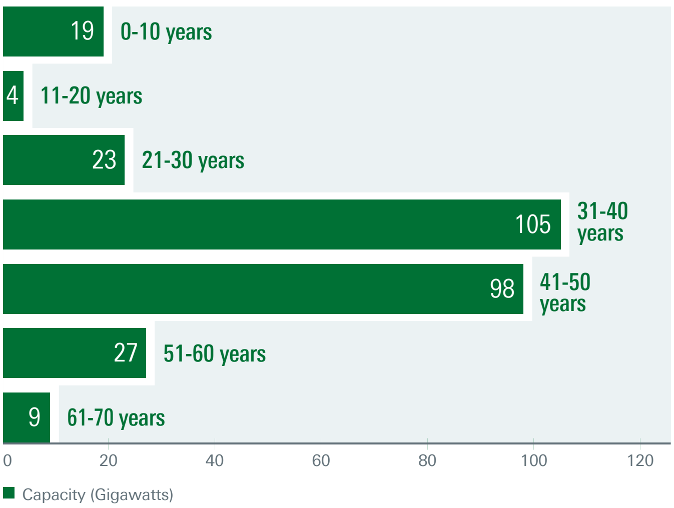


Source: U.S. DOE EIA Electric Power Monthly (October 2016)

According to the EIA, 2016 will see natural gas overtake coal as the main fuel source in the power generating sector. Meanwhile, the share of non-hydro renewables, that is wind, solar, biomass/waste-to-energy, geothermal and tidal energy generation, will have increased from 3.1% in 2008 to a projected 8.8% by 2017 according to the EIA.

The decline in coal and the increasing penetration of renewables in the power generation mix have been driven by a multitude of factors. Firstly, the retirement of coal-fired power generation, a result of the uncompetitiveness of coal and its aging infrastructure. Wood Mackenzie data show that 70GM of coal-fired generation was closed between 2008 and 2016 and estimates made before the U.S. Presidential result, indicated a further net closure of 29.5GW from 2017 to 2024. This scale of decommissioning is in part a function of aging infrastructure. According to the EIA the capacity-weighted average of U.S. coal-fired power generating capacity is currently 38.6 years, that is close to the end of its typical lifespan, Figure 3.

Figure 3: U.S. coal-fired generation capacity by age

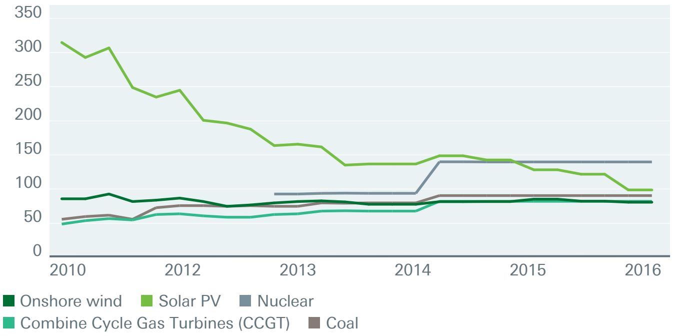


Source: U.S. Energy Information Administration

U.S. efforts to reverse decommissioning coal plants may be achieved by scaling back any further tightening in emission standard regulation, such as the repeal of the Clean Power Plan. However, we expect this may simply help to extend the life of existing coal fired power generators rather than stimulate new power generating capacity. We examine the potential implications of a Trump Presidency on coal-fired power generating capacity in sector 4 of this article.

A second factor increasing the share of renewables in the power generation mix has been the rapid decline in cost curves for renewable technology. For example, the cost of solar panels has fallen 65% in the five years to 2015, while the cost of wind turbines has fallen by approximately 23% over the same period. Combined with falling installation costs, this trend has resulted in a declining overall levelized cost of electricity (LCOE) for renewable energy projects, Figure 4. Lower LCOE has resulted in renewable energy projects becoming increasingly cost competitive with coal, natural gas, nuclear energy and other traditional forms of electricity generation on a wholesale basis, that is excluding transmission and distribution (T&D) costs.

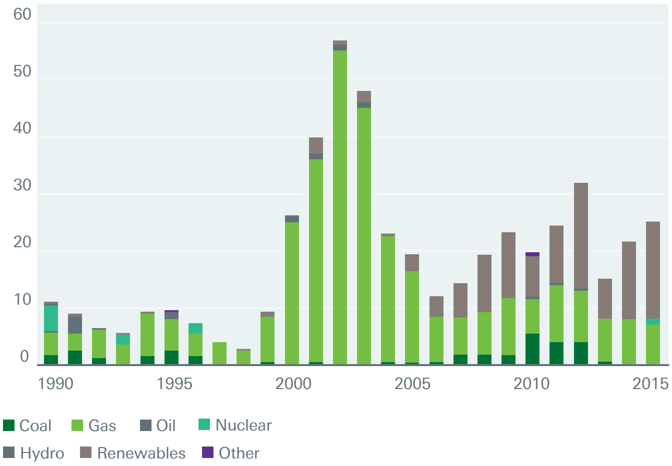
Figure 4: Global average levelized cost of energy (LCOE)



Source: Bloomberg New Energy Finance (April 2016)

The increasing cost competitiveness of renewables is evident in the mix of new power generating capacity coming on line. Since 2005, renewables have accounted for almost 50% of new power generating capacity additions with natural gas constituting the bulk of the remaining share at 42%, Figure 5.

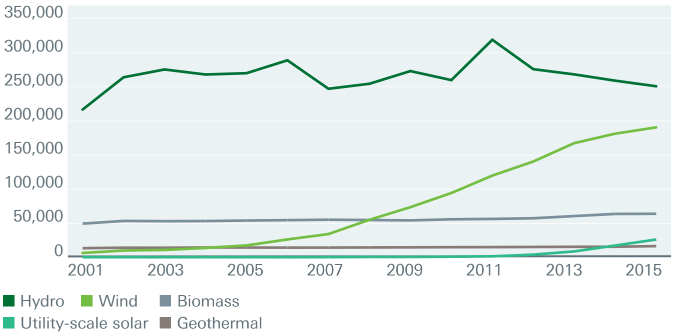
Figure 5: U.S. power generating capacity additions by fuel type (Gigawatts)



Source: Bloomberg New Energy Finance (April 2016), EIA

If we examine capacity additions by technology we find that wind and solar have captured the lion's share. Between 2008 and 2012 wind dominated capacity additions among the various renewable sources, representing just over 80% of the total. On current trends, wind could overtake hydro as the most prevalent renewable energy source by 2019.

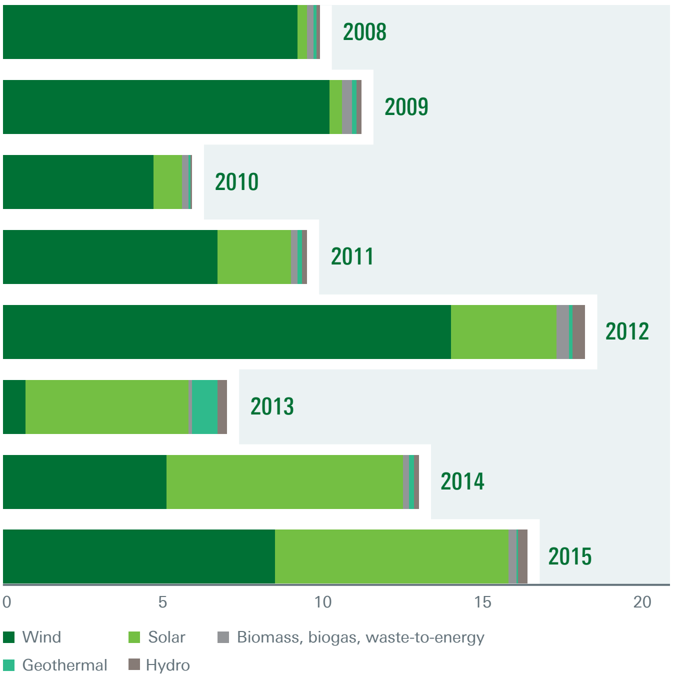
Figure 6: U.S. renewable electricity generation by energy source (GWh)



Source: U.S. DOE EIA Short Term Energy Outlook (October 2016)

However, since 2013 solar has been making increasing inroads such that it has accounted for approximately 55% of renewable capacity additions, compared to 13% in the previous five year period, Figure 7.

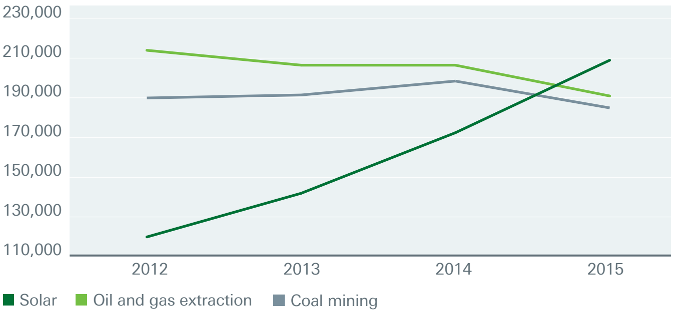
Figure 7: Renewable capacity additions by technology (Gigawatts)



Source: Bloomberg New Energy Finance, EIA

The rapid growth in solar over recent years is also evident in U.S. employment figures such that the number of people employed in the U.S. solar sector has risen by over 60% in the three years to 2015. As a result, in 2015 more people were employed in the solar sector than in the domestic U.S. oil and gas extraction sector or the domestic coal mining sector, Figure 8. We would expect that this will limit the extent to which the new Trump administration may wish to make major cuts to key renewable energy incentives such as Production Tax Credit (PTC) and Incentive Tax Credit (ITC), which are energy tax credits that support the deployment of renewable energy. As we discuss later, Trump voters are strong supporters of expanding the renewable sector.

Figure 8: Number of people employed in the U.S. solar, oil and gas and coal mining sectors compared



Source: International Renewable Energy Agency, Renewable Energy and Jobs Annual Review 2016 (May 2016); U.S. Bureau of Labor Statistics, Bloomberg Finance LP

Aside from the retirement of coal fired power plants and the rapid decline in cost curves for renewables, power price hedging has also become a key driver of market growth within the renewable sector. This reflects large power customers seeking to mitigate the sizeable swings in electricity and commodity prices by directly contracting for renewable power at fixed power prices over long-term (20-25 year) periods.

Within the overall U.S. renewable energy market, we believe the distributed utility-scale (DU) generation sector is one of the bright spots in terms of investment opportunities. DU generation refers to power projects of less than 25MW for non-rooftop solar photovoltaic and less than 100MW for onshore wind. Such facilities tend to be sited close to the end-users of the power and consequently do not rely as heavily on the electricity transmission grid compared to large-scale utility projects. As a result, these facilities are able to mitigate a significant portion of the mark-up from transmission and distribution costs while still pricing close to retail power prices, resulting in attractive project economics.

Retail power prices, the basis upon which distributed-scale renewable energy projects compete with traditional power generation, tend to be approximately 50-55% higher than wholesale power prices. This is due to T&D costs, that is the cost of maintaining energy infrastructure required to deliver power to end-users as opposed to the costs of the coal, natural gas or other underlying commodity used to generate the electricity.

In 2015, more people were employed in the U.S. solar sector than in the domestic U.S. oil and gas extraction sector or the domestic coal mining industry.

As a result, even as commodity prices have declined and remained subdued over the past two years, acting on a drag on wholesale power prices, U.S. retail power prices have tended to hold steady or even increase over the same period. Indeed over the past decade, although U.S. natural gas wholesale prices have fallen by approximately 86%, peak-to-trough, retail power prices in the U.S. have increased by approximately 20%. This is because natural gas-based power, although currently inexpensive at the wholesale level, relies on T&D to ship power from centralized power plants to retail customers and therefore incurs T&D-related costs at the retail level.

By siting generation close to or at the source of end-user power consumption, distributed utility-scale energy projects are able to largely avoid this 50-55% T&D mark-up. Siting generation next to the load can also help avoid potential congestion charges, which can be incurred when power flow is constrained due to transmission capacity limitations. The farther a project is sited from the load, the more likely it is that this type of charge may be incurred. In our view, these cost advantages are one of the key factors driving the appeal of distributed utility-scale renewable energy projects.

Other factors creating tailwinds for distributed utility-scale generation is the increasingly aged T&D infrastructure across North America, with 70% of transmission lines and power transformers in the U.S. now 28 years or older. As a result, dollar investments in U.S. transmission have increased every year from 2008 to 2014, with 2014 transmission investments more than doubling those of 2008. The Edison Electric Institute forecasts this trend to continue, with over USD 58 bn in total investment projected for the 2015-2017 period.

As this trend continues, distributed utility-scale renewable energy offers significant benefits, not least by removing strain from the aging, centralised energy transmission infrastructure. In time we expect this to also increase distributed utility-scale renewable energy's attractiveness to utilities which are struggling with operational, regulatory and permitting challenges associated with T&D upgrades and new investment.

On the regulatory side, utilities continue to be subject to requirements intended to increase their consumption of renewable energy. According to the National Renewable Energy Laboratory, 29 U.S. States have Renewable Portfolio Standards (RPS), which are state-level regulations requiring local utilities to derive a certain percentage, variable from state to state, of their electricity generation from renewable sources by certain specified dates.

3 | Renewables and the U.S. political landscape

Before the U.S. Presidential election result last November, the U.S. Environmental Protection Agency's forecast that the share of renewables, including hydro, in the U.S. power generation mix would rise from 14% in 2015 to 28% by 2030, and that this would be entirely driven by non-hydro renewable capacity growth.

However, the new Republican administration has introduced fresh uncertainty as it relates to environmental legislation and consequently these targets. In our view, policy changes relevant for the coal and renewables sectors are the elimination of the Clean Power Plan (CPP), the repeal of certain energy tax credits and the withdrawal from the Paris climate agreement.

Similar to previous emission standard regulation, the CPP if approved would have imposed stricter emission performance standards for new, modified and re-powered power plants. Consequently its repeal may assist in sustaining the operation of certain coal-fired power generation and slow the pace of coal-fired power generating decommissioning. However, in isolation its repeal is unlikely to alter the poor fundamentals of the coal sector since decommissioning will continue given the age of coal-fired facilities in the U.S..

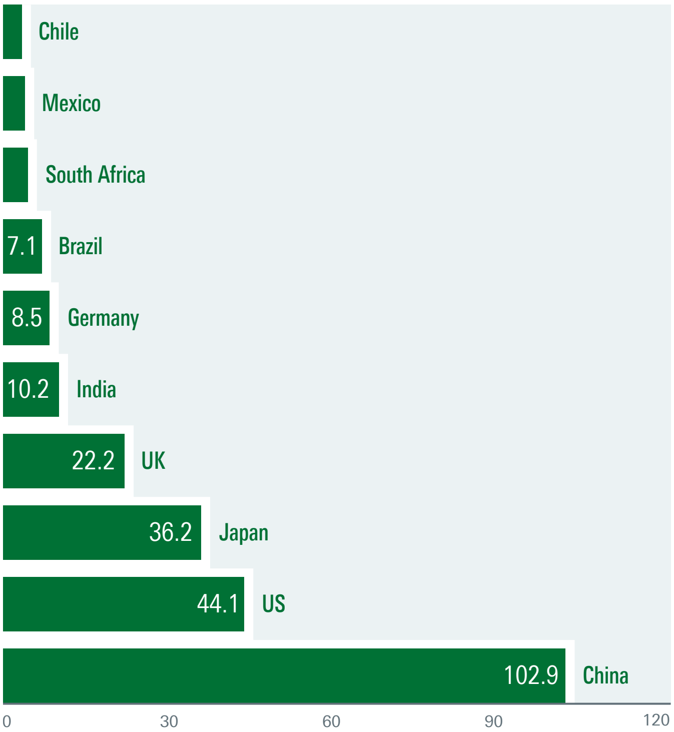
In addition, even under the scenario where the CPP has been repealed, building new coal generating capacity will still be hard to justify due to the nature of the valuation methodology of long term assets with a 50 year life expectancy. Another economic reason against the revival of coal is that renewable energy's equipment cost is projected to continue to decline, by as much as 40-60%/watt depending on technology, out to 2040.

Aside from the elimination of the CPP attention is also focused on the repeal of Production Tax Credit (PTC) and Incentive Tax Credit (ITC). These are energy tax credits that support the deployment of renewable energy with a production tax benefit primarily for wind projects and an investment tax incentive primarily for solar projects.

Any repeal would require congressional approval and Congress would also have to consider that such action would more likely curtail jobs growth in the renewables sector rather than boost jobs growth for the coal sector. Since PEW Research Center polls show Republican voters have been strong supporters of expanding the renewable sector, we would view legislative action that is focused on boosting domestic coal production as more likely than the repeal of federal tax incentives for the renewables sector.

Finally, a decision by the U.S. to withdraw from the Paris climate agreement would cede even greater leadership and strategic advantage to China. Indeed China already leads the world in clean energy investment, Figure 9, and employs over 3.5 million people in the sector.

Figure 9: New investment in clean energy by country (USD bn, 2015)



Source: UNEP, Bloomberg New Energy Finance, Global Trends in Renewable Energy Investment (March 2016)

Walking away from the Paris climate agreement could take up to 3-4 years. In addition, many greenhouse gas emission reduction initiatives in the U.S. are already occurring at a state level such as the Renewable Portfolio Standards. For example, New York and California have set targets that renewable energy must account for at least half of their energy source by 2030.

We are seeing an increasing number of U.S. corporates, such as Google, Apple and WalMart, striving to reduce their emissions as well as source an increasing share of their power supply via renewables. Investors are also increasing their investments in clean energy projects in part due to increased scrutiny on fossil fuel holdings. In the extreme, this is leading to outright divestment from fossil fuels. This includes California's state legislature instructing public pension funds in the state to divest holdings in companies that generate at least half of their revenue from coal mining by July 2017.

4 | Conclusion

The past few years has seen a significant transformation in the U.S. power generation mix as coal use has peaked and natural gas and renewables have prospered. Renewables have benefited from declining cost curves, a desire among power producers to diversify into renewables and increasing demands at a state, investor and consumer level requiring the adoption of renewable energy.

We believe growth in the U.S. renewable sector presents an attractive investment opportunity with distributed utility-scale projects a particularly bright spot. We also expect a Trump Administration will not derail what is one of the fastest growing segments of the economy, when measured in employment terms.

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RESPONSIBLE INVESTMENT STYLES AND THE REGULATORY ENVIRONMENT	MEASURES TO ADDRESS CLIMATE RISK IN INVESTMENT PORTFOLIOS
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