SEPTEMBER 2021

CLIMATE CHANGE

The Importance of Infrastructure in the Transition to Low Carbon

Part One: The Urgent Need to act Now and the Role of Infrastructure

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INTRODUCTION

From an investment perspective, infrastructure assets have many appealing characteristics. They provide investors with a solid yield and capital returns, underpinned by defensive and stable cash flows, as well as inflation protection and downside protection in negative markets. At the same time, global warming, which has been dubbed "the challenge of our lifetime"[1], is reshaping the industries which generate or facilitate greenhouse gas (GHG) emissions. Serious changes need to be made in the coming decades. For example, electricity and heating must shift entirely away from fossil fuels, and transport must shift to fully electric or green fuels. Importantly for investors, the sectors impacted most by climate change and our response to it make up a large part of the investible infrastructure universe, and so infrastructure is at the forefront of these required changes. Along with the adaptation burden, however, genuine investment opportunities arise.

To protect against capital losses from the imminent and rapid regulatory and market-driven disruption, not to mention the physical risks of climate change, investors must be active in assessing and managing these risks. On the one hand this involves avoiding impacted businesses and those slow to adapt, such as oil and gas pipelines which will become stranded. On the other hand, investing in assets set to benefit from the changing environment will serve investors well. For example, through assets like electricity distribution grids, investors have the opportunity to participate in the energy transition, with stable and consistent growth in dividends, while avoiding the boom-and-bust cycles of green field renewables. This will be critical to the future performance of infrastructure investments.

This paper is a climate change tryptic and for the reasons outlined above, is a must-read for the infrastructure investor. Part One looks at why the climate change situation is so serious, and what role infrastructure can and must play in the transition to a more sustainable future. The second part in the series examines the various risks and costs which an investor needs to bear in mind when investing into the infrastructure asset class. Finally, Part Three looks at how markets are already responding to climate change, and how to be on the right side of change from an investment perspective.

[1] Oliver Bäte, CEO of Allianz, Co-founder of the UN-convened Net Zero Asset Owner Alliance, and co-chair of the Global Alliance initiative

An Urgent Need to Act

The earth has now warmed by 1.1°C or more since industrialisation.[2] A further warming of ~0.3°C is locked in by greenhouse gases that will be emitted between now and 2025.

At the 2015 Paris climate change conference, a long-term goal of keeping the increase in global average temperature to 'well below' 2°C above pre-industrial levels was agreed. The problem however is that the individual Paris Agreements made by each country (termed Nationally Determined Contributions or "NDCs") are not sufficient to meet this goal and thus an expansion of these commitments is required. But even if the Agreements are tightened to meet the 2°C target, and fully enacted, recent research suggests that halting warming at 2°C has a less than 50% probability, with 3°C the more probable outcome.

To be clear, even a warming of 2°C is no benign outcome. A 2°C average temperature increase would entail serious disruption to large swathes of the world's current agricultural production, extreme heat events becoming on average 2.6 times worse, the death of 99% of our coral reefs, and the mass extinction of animal species. It would also mean top summer temperatures of 50°C for Sydney and Madrid, and 45°C or more for London, Brussels and Paris.[3]

Beyond 2°C, the negative consequences of our inaction worsen even further.

"It is, I promise, worse than you think… no matter how well-informed you are, you are surely not alarmed enough."

David Wallace-Wells, "The Uninhabitable Earth", New York Magazine, 9 July 2017.

According to the World Bank, a warming of 4°C (the likely scenario if the existing Paris NDCs are partially enacted and not tightened further; the "business-as-usual" scenario), could result in the collapse of the global economy and widespread famine and war.

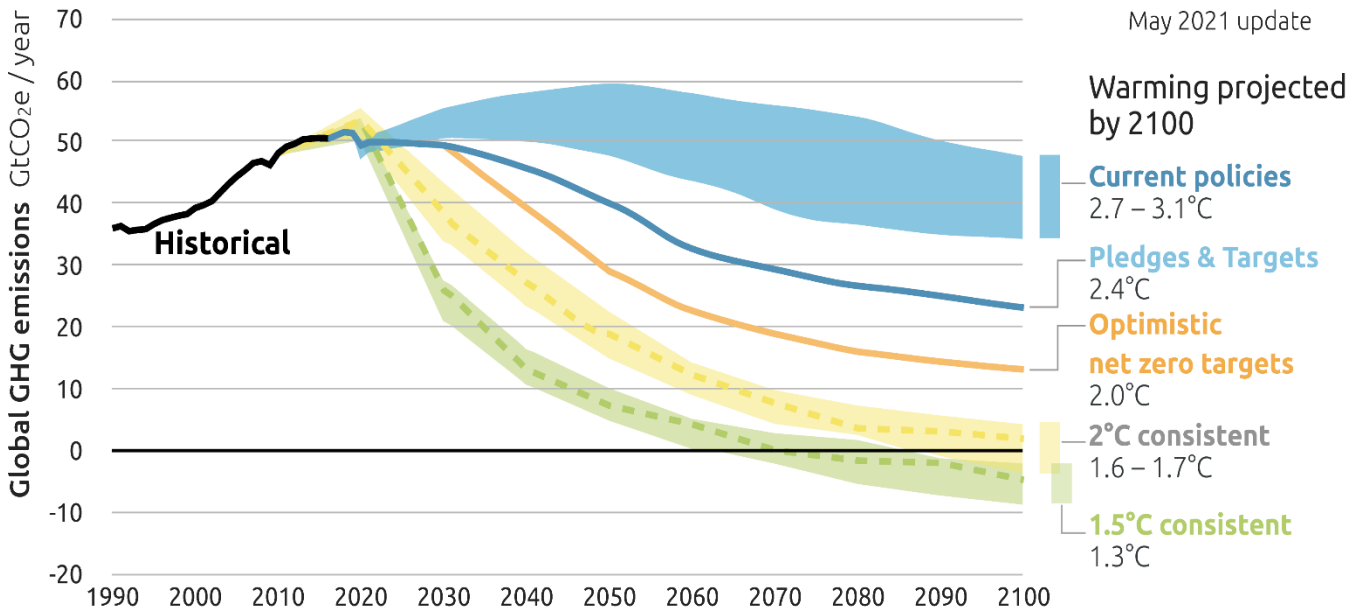
And the above outcome is only if destabilising feedback loops do not cut in. If triggered, negative feedback loops could result in sea levels several metres higher within this century. The risk that a warming of 1.5°C (what is locked in already) could be sufficient to trigger negative feedback loops may be low but is nonetheless statistically significant. And importantly, this risk rises steeply as temperatures rise further.

The following chart from Climate Action Tracker illustrates the sharp reversal in emissions required from 2020 and shows how far away current policy settings are.

[2] https://www.unenvironment.org/interactive/emissions-gap-report/2019/

[3] https://www.ipcc.ch/sr15/

Chart 1: Global Greenhouse Gas Emissions and the Emissions Gap



Source: Climate Action Tracker[4]

[4] *https://climateactiontracker.org/global/temperatures/*

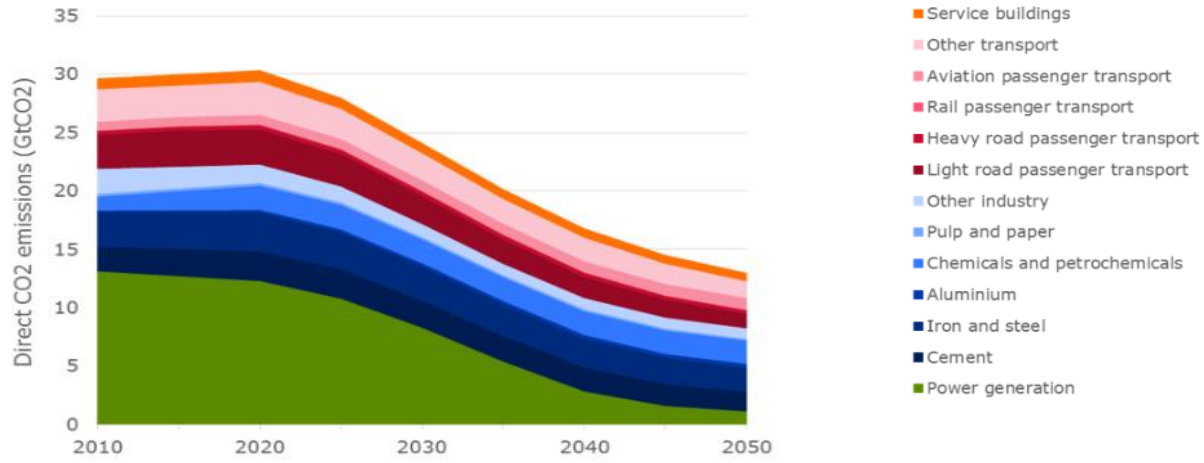
THE ROLE OF INFRASTRUCTURE

With such a large task ahead, the burden of carbon reduction will fall most heavily on the largest sources of emissions: power generation, heating, and transport. These sectors make up a large part of infrastructure's investible universe. In the coming decades, the electricity and heat we use must shift completely away from coal and gas, and transport must switch to electric.

As fossil fuel-linked infrastructure is phased out, new infrastructure must be built, and existing infrastructure adapted to a low carbon economy.

To meet the 2°C target, the following chart, from the Science Based Targets initiative (SBT), based on IEA modelling, shows from where the reductions are forecast to come.

Chart 2: The SBT Sector Breakdown of CO2 Budget in a 2°C Scenario



Source: Science Based Targets [5]

As can be seen in the previous chart, power generation emissions must decrease to near-zero well before 2050, with the largest reductions required within the next decade.[6] This makes the next five years a critical period for transition of all energy systems. Although the first six months of 2020 saw an estimated drop of 8.8% in global emissions[7], emissions must continue to fall by over 7% each year to 2030 to be on track to meet the 1.5°C target.

The carbon intensity of power generation must be reduced by at least 40% by 2030, and by 95% by

[5] http://toddfincannon.com/sda/doc/instructions.html

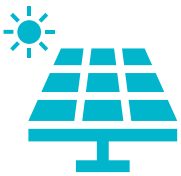
[6] The Paris Agreement targets and forecasts assume that CO_2 capture, or 'negative emissions' is viable from 2030 onwards. There have been some recent positive developments in this area, but the technology is still only at a small scale, with costs still well over US$250 per ton of CO_2 https://qz.com/1100221/the-worlds-first-negative-emissions-plant-has-opened-in-iceland-turning-carbon-dioxide-into-stone/

[7] https://www.nature.com/articles/s41467-020-18922-7

2050 from 2010 levels. Emissions from cars must also drop by 40% by 2030. To stay within 2°C with a 50% probability we need to leave 80% of known coal reserves, 50% of gas and 30% of oil in the ground.

So, what does this mean for investors? By 2034, the value of stranded assets is expected to be at least US$50 billion in power generation, US$600 billion in coal, and US$400 billion in gas.[8] But the energy gap created by leaving all this fuel in the ground will require significant capex globally, which will in turn offer many investment opportunities. These include in electric vehicle infrastructure, renewable energy, energy storage, expanding and adapting the power grid, expanding water supply infrastructure, and in green fuels such as biodiesels and green hydrogen.

Below is an example of how core infrastructure is essential to the energy transition and the benefits to investors:



Founded in 1823, ***Consolidated Edison (ConEd)*** is a US-based regulated utility company, supplying electricity, gas, and steam to 10 million people in New York City and Westchester County.

Well over 90% of all new solar, wind and battery installations are designed to be grid-connected, so the electricity grid is the essential infrastructure enabling the expansion and distribution of renewable power, both large scale and domestic. It is also key to replacing gas for heating and increasing electric vehicle charging capacity. Con Ed's infrastructure is critical to the energy transition, and company earnings will grow as new infrastructure is built to support a 100% green energy future. Initiatives include:

- $1.5 billion invested in energy efficiency by 2025
- $300 million investment to develop 21,000 electric vehicle charging points by 2025
- New York and other northeast states are targeting the development of 22,500 megawatts of offshore wind capacity by 2035. This would require transmission extensions and reinforcements and ConEd is focusing on becoming a significant player in the development and ownership of the offshore transmission grid
- ConEd also operates its own renewable power generation business. While a much smaller business than the regulated utilities, it is still the 7th largest solar power producer in the world, and the 2nd largest in North America. This business also generates stable earnings with a good rate of return, entering long-term power purchase agreements (typically +15 years in length). Con Ed plan on spending $400 million per year over the next three years in solar, wind and battery storage projects.

In total, the company expects to spend around $4 billion per annum over the next three years, with a significant portion of this specifically on energy transition and energy efficiency. This expenditure will grow the regulated rate base by 5% to 6% p.a., with each dollar in regulated assets then earning a return on equity of 8.8%p.a. or more. This gives investors exposure to the growth in green energy, without the boom-and-bust risk of renewable power developers and component manufacturers. ConEd has a dividend yield of 4.2% and has 47 consecutive years of increasing dividends.

https://investor.conedison.com/environmental-social-and-governance-esg-resources

[8] http://www.oecd.org/sd-roundtable/papersandpublications/Divestment%20and%20Stranded%20Assets%20in%20the%20Low-carbon%20Economy%2032nd%20OECD%20RTSD.pdf

CONCLUSION

While there are significant opportunities for infrastructure investment, the risks are more severe than most investors realise, and the rate of change significantly faster.

To protect against capital losses from the rapid regulatory and market driven disruption, and the physical risks of climate change, investors must be active in assessing and managing these risks. This will be critical to the future performance of infrastructure investments.

Infrastructure portfolios face a higher climate change risk than other sectors given the high emissions intensity associated with the use of the assets, the long life of the assets, and their large physical footprints. For example, in a DCF valuation of a typical electricity utility, roughly 60% of the net present value (NPV) is in the forecast years beyond 2038, yet the traditional utility business model will likely not exist by then.

When considering an investment into infrastructure, it is vitally important to include an assessment of the embedded climate change risks and opportunities.

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