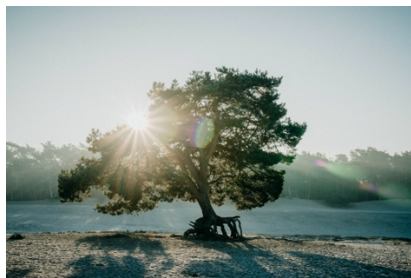


Portfolio construction and new energy infrastructure investing for the next decade

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- **In this inaugural letter to investors**, we reflect on the accelerating impact of climate change, the state of financial markets and how growing investments related to the decarbonisation of energy systems can offer attractive risk-return for long-term investors.
- **Over the past few decades**, investors have reaped the economic benefits of structural disinflation, falling interest rates and massive quantitative easing through huge capital gains, but the impulse cannot last forever. Today's elevated equity valuations and record low bond yields pose severe challenges for pension funds and life insurers needing to generate income to match liabilities for their increasingly ageing policy members.
- **Building a robust asset portfolio for the future** will depend on investors ability to invest sustainably, reduce dependency on equity portfolio returns, replace low-yielding bond allocations and account for the risk of rising equity and bond return correlation. Some of these challenges can be addressed by a shift out of equities and bonds into economically resilient infrastructure. This asset class' ability to create long-term and predictable returns, improve portfolio diversification and hedge against inflation will be necessary to stay competitive in the decade ahead.
- **But not all infrastructure returns are created equal.** The economic slowdown and volatility of the COVID-19 pandemic have provided new empirical evidence; there is a substantial overlap between economically resilient infrastructure sub-sectors and those suitable for sustainable investing. Fibre, primary care, cell towers and renewable energy investments lead the league-table for resilience in economic performance and emerge as the sectors of choice for investors looking for true diversification and sustainable investing.
- **The market for renewable energy is now ready for investment at scale.** New solar and wind projects are even undercutting the cheapest of existing coal-fired plants in most locations. The ability for renewable energy to carry its costs without the support from government subsidies reduces the political risk earlier associated with the asset class. Combined with the drive to decarbonise the energy system, this new reality is reflected in a paradigm shift that sees renewables account for 72% of all new capacity additions worldwide in 2019. This increased by an eye-popping 97% for the first half of 2020.

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1. DON'T LET THE MOMENTUM OF THE COVID-19 CRISIS GO TO WASTE

1.1. Climate change effects escalating

Our planet is passing irreversible “tipping points”, while nine of the ten warmest years have occurred since 2005

Observing the climate crisis unfold is like watching a movie on fast forward. Our planet is passing irreversible “tipping points” in rapid successions, and the velocity of climate change has reached a level where developments have become difficult to follow, let alone comprehend. Concentrations of greenhouse gases in the Earth's atmosphere will hit another record high this year while global temperatures keep increasing. Data for the first half of the year indicate that 2020 is set to become the warmest year on record and nine of the ten warmest years have occurred since 2005.^{1,2} As a consequence, wildfires, droughts, hurricanes and other extreme weather events are causing damage never before seen, and costs related to this is increasingly becoming a concern for governments and policymakers.³ In the US, a recent report explains how the number of extreme weather events per year has increased fourfold since 1980, and the annual direct cost of disasters has increased fivefold.⁴ Since it is only possible to slow the rate of future warming—but not reverse it, at least in the coming decades—demand for policy action is gathering momentum. Even if all new greenhouse gas emissions are magically stopped tomorrow, the planet will continue to warm for decades to come, with ever more visible and catastrophic physical manifestations of climate change for humanity to face.⁵ In the World Economic Forum global risk perception survey this year, climate change and related environmental issues ranked as the top five risks in terms of likelihood. It is the first time in the survey's history that one category has occupied all of the five top spots.⁶

1.2. Decarbonising of the power generation sector

Investors should view this as an opportunity for secular growth in the climate change sector

These worsening effects of climate change that have no part of the world untouched will be a significant driver of policy action, political mobilisation, litigation, shifting public opinion and consumer preferences that will help accelerate and sustain the single biggest energy and economic transformation since the industrial revolution. Sustainability, in itself, will become a sizeable secular force in reshaping economies and financial markets.

Investors should view this as an opportunity for secular growth in the climate change sector, along with the potential for attractive returns. Investing in climate change strategies can also bring other benefits, such as increased portfolio diversification, reduced stranded asset risks and improved inflation protection. But not all sectors are investment-ready at scale.

The power sector stands out on all three accounts with renewables having fully matured and with its decarbonisation fundamentally underpinning the drive to tackle climate change across all sectors of the economy including housing, transport and industry. But soaring fiscal deficits and increased public indebtedness will limit governments ability to invest, thereby expanding the role that private capital will need to play, mainly post COVID-19. Investors should set course for a fully decarbonised power system over the next two decades, and several countries across the globe are starting to declare serious decarbonisation targets for the first time.

¹ United in Science 2020, [World Meteorological Organisation](#), September 2020

² It's a race against heat, and humanity is looking, [Bloomberg Green](#), August 2020

³ The inevitable policy response, [UN PRI](#), 2019

⁴ Climate change-fueled weather disasters, [Datu Research](#), Summer 2020

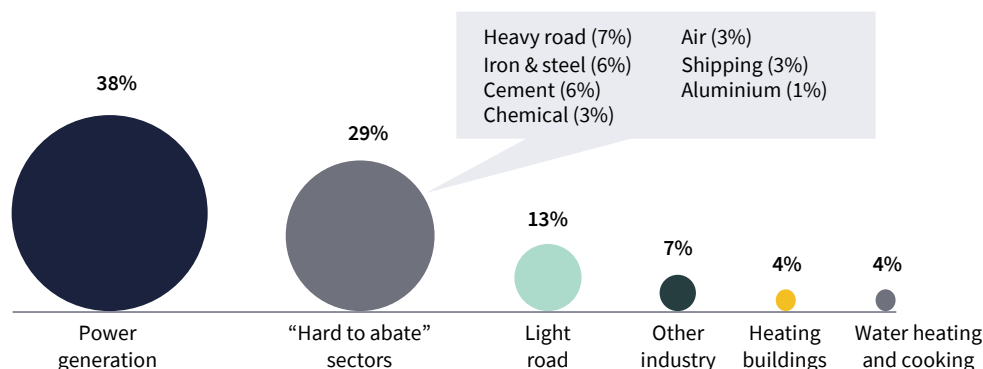
⁵ Global warming doesn't stop when the emissions stop, [PhysOrg](#), 2017

⁶ Global Risks Report, [World Economic Forum](#), January 2020

Now is the time to allocate capital towards the energy transition that can both strengthen the economic recovery and bolster sustainable development

Unlike in 2009, when a lot of the recovery packages in G-20 economies went into rebuilding and reinforcing the existing fossil-fuel-based structures in the economy, post COVID-19 recovery measures are being aligned far more with an emergent sustainable future as envisaged by the Paris Agreement and the UN agenda for sustainable development. Now is the time to allocate capital towards the energy transition that can both strengthen the economic recovery and bolster sustainable development. Governments around the world recognise that a crisis of this magnitude is too big to let go waste, particularly considering that power generation accounts for the largest share of carbon emissions worldwide.

Figure 1. Global source of global carbon dioxide emissions⁷



Decarbonising global power generation will generate huge opportunities for investors to do good, and make strong risk-adjusted returns

Decarbonising global power generation requires a multi-stakeholder approach involving a broad coalition of both public and private actors. Governments need green stimulus programs, such as the "EU Green Deal" in Europe, the Democrats' "Build Back Better" plan in the US and China's recent pledge to become carbon neutral by 2060. Businesses need to adapt and evolve, especially in the areas of clean power generation, carbon capture and transportation. International organisations—the United Nations, International Energy Agency, World Bank, World Economic Forum and others—need to provide analysis and policy recommendations. Think tanks, non-governmental organisations and academia need to provide additional research and, importantly, data. A blueprint published last month by the Institutional Investors Group on Climate Change (IIGCC) provides investors with a useful set of tools to help them decarbonise their portfolios. This coalition of 70 pension funds and investment managers, who represent assets worth \$16 trillion, has designed a net-zero framework to be implemented before 2050.⁸ This is a very fertile environment for institutional investors to find sustainable investments that both serve a good societal purpose, bringing reputational gains as well as attractive risk-adjusted returns across sectors at the heart of the energy transformation.

2. THE CURRENT STATE OF FINANCE

2.1. A world of low inflation, expansive monetary policy and soaring budget deficits

In an environment where inflation targeting has remained the main objective for monetary policy, two consecutive decades of disinflation have facilitated massive cuts in policy rates with enormous bouts of quantitative easing on top. Central banks are purchasing more assets from financial markets than have been supplied, resulting in an

⁷ Getting back to basics for a transitioning to a low-carbon economy, [World Economic Forum](#), 2020

⁸ Net zero investment framework for Consultation, [IIGCC](#), August 2020

Record 65% of European government bonds and 25% of corporate bonds at negative yield

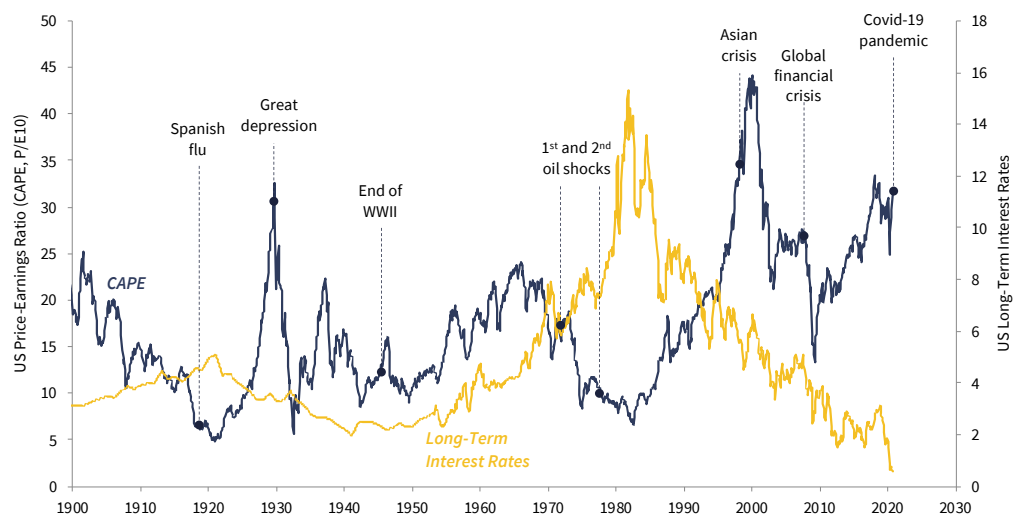
Incorporating the effects from the increase in global unemployment, growing social unrest and escalating trade wars between U.S. and China, the cyclically adjusted P/E-ratio for equities begins to look exceptionally impressive

artificial collapse in both nominal and real rates—fundamentally altering free market supply and demand dynamics. As a consequence, financial markets have seen an unprecedented compression in risk premia. The pool of negative-yielding government bonds in the Eurozone rose to around 65% of the total market in July this year. Compression can also be seen in corporate bond markets, where nearly 25% of the corporate investment-grade bond market traded at a negative yield.⁹ Public budget deficits are surpassing wartime levels and government spending programs financed by central bank printing will send public debt soaring over the coming years.¹⁰

2.2. Long-term bond yields and cyclically adjusted price-earnings

In the meantime, equity markets have experienced a remarkably strong recovery despite the toll that the COVID-19 pandemic has taken on global GDP this year. The World Bank expects most countries to plunge into recession in 2020, with per capita income contracting across the largest number of countries globally since 1870. It projects that the GDP of the OECD countries will shrink by 7% on average, with hard-hit countries such as Spain experiencing declines twice as high. The growth outlook for emerging markets is also poor, with even G-20 members such as India facing their worst crisis in living memory. Incorporate the effects from the increase in global unemployment, growing social unrest and escalating trade wars between the U.S. and China, and the cyclically adjusted P/E-ratio comes across as exceptionally impressive. Long-term interest rate forward rates have reached all-time lows, anticipating that interest rates will remain low during the coming decades. Increasingly verbal, increasingly long-term commitments from central banks such as the US Fed to keep rates "lower for longer", reinforcing the expectations.

Figure 2. US long-term bond yields and cyclically adjusted price-earnings¹¹



It is striking to note that since the global financial crisis, equity investors have only needed to be worried about idiosyncratic risks as systemic risks have been borne by somebody else, with taxpayers being handed the bill. Investors subscribing to this point of view have been rational to take more growth-related risk, which has been handsomely rewarded.

⁹ Monthly Activity Report, [TradeWeb](#), August 2020

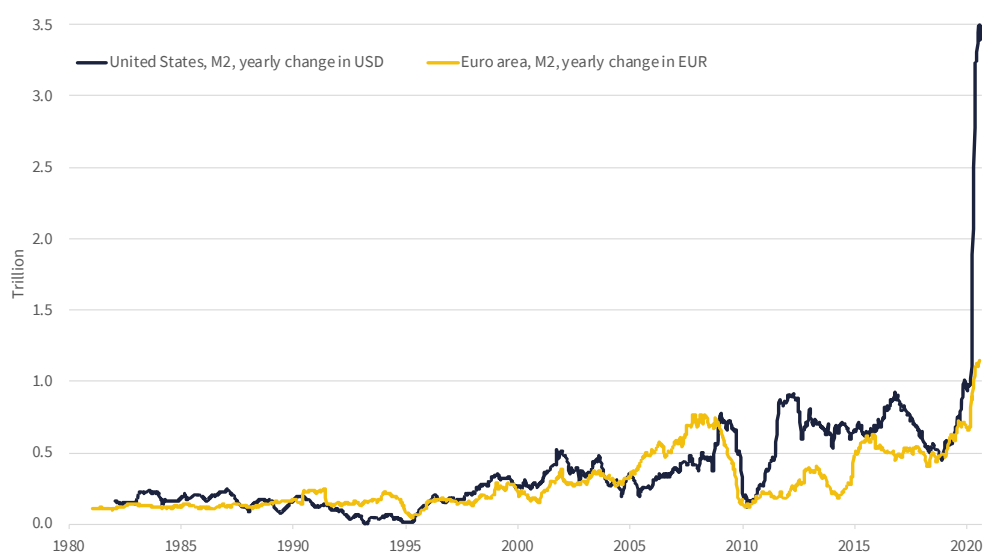
¹⁰ US Treasury historic tables, 2020 budget table S-10, [US Office of management and budget](#), 2020

¹¹ S&P/Case-Schiller index, [Yale](#), 2020

It seems prudent to suggest that the relative unattractiveness of bond markets and the ambitious valuation of equity markets has led to an increased level of risk in investor portfolios over the past couple years, reinforced by what some have called the "Greenspan Put on steroids". The 60/40 portfolio that has served investors so well up to this point may not do as well in the future.

The near-consensus view that interest rates may stay low for a very long time could very well be wrong. In the very near term, where the COVID-19 pandemic has caused a severe slowdown in economic growth, the immediate concern may be that of deflation. Medium to longer-term, however, the expansive monetary and fiscal policy may become a source of concern for bond markets not at least since government continue to launch enormous stimulus programs to restart economies and support labour markets over coming years. Central banks too, have extended their quantitative easing programs and thereby continue to increase the money supply to never before seen levels.

Figure 3. Annual changes in money supply for the US and Euro area¹²



The financial market risks that follow such extreme monetary policy action can be partly mitigated by allocating a larger share of the portfolio to inflation-linked securities and alternative investments with a linkage to inflation, and with a proven resilience against GDP volatility.

2.3. More long-term challenges for investors

Demographics is changing fast and the age dependency ratio is set to double from 1980 to 2050

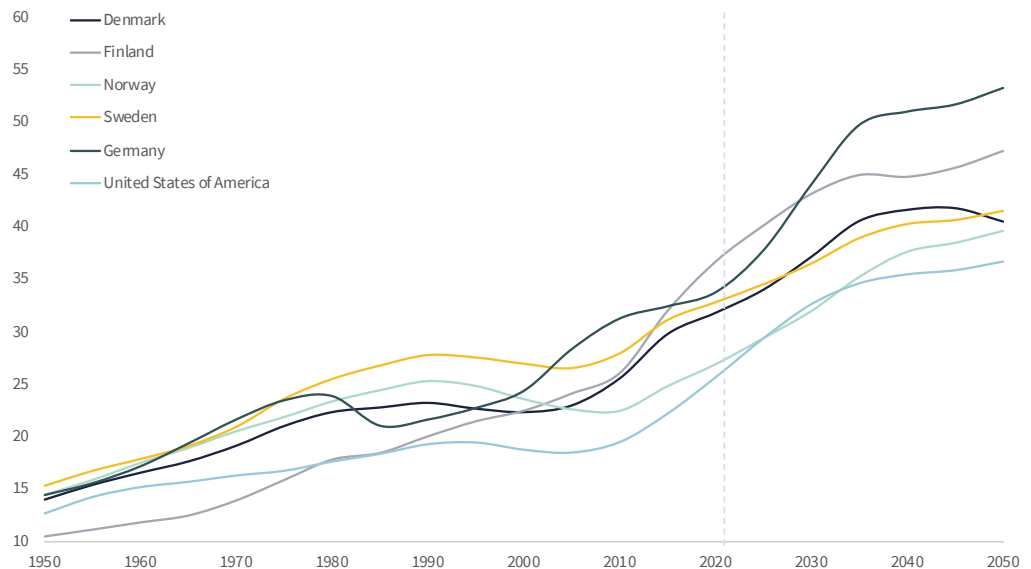
The prospect of compressed risk premia and low bond yields are not the only concerns for long-term investors such as pension funds and life insurers. Demographics are also beginning to have a material impact on cash-flows as the old-age pensioners to working-age population ratios across developed markets now enters a phase of steep incline. In the 1980s, the proportion of the population aged 65+ relative to those aged 15-64 ranged between 15-25% across the countries that we have reviewed. Today, the range is 25-35%, and by 2050 the United Nations projects it to range between 30-50%. In conclusion, the age-dependency ratio is set to double from 1980 to 2050. The demographic decline in the

¹² United States money supply M2, Europe money supply M2, [St Louis Fed](#), 2020

EU and Japan is especially precipitous with the number of workers having already started shrinking in many economies.

Pension funds and life insurers have already begun to experience capital outflows to a greater extent than before, but have so far been generously compensated by the relentless rise in asset prices. It is unlikely that financial markets will continue to provide such elevated capital gains over the coming years and these investors need to begin to replace equity and bond allocations with income-generating alternative long-duration assets that offer better cash-flow servicing of their liabilities.

Figure 4. Projected old-age (65+) to working-age (15-64) population ratio (%)¹³



Pension funds and life insurers would do good in replacing non-existent bond yield with alternative sources of income

The combination of increasing age-dependency ratios and the yield replacement risk in bond markets will most likely speed up portfolio outflows causing the balance sheets of pension funds and life insurers to shrink. These businesses will resort to negotiating higher premiums, negotiating lower pensions payments or increasing the pension age. To mitigate these risks, pension funds and life insurers would do good in replacing non-existent bond yield with alternative sources of income. This can be done by rotating into assets such as renewable energy infrastructure funds with long duration, which have the added benefit of reducing bond replacement risk, and do not carry the price risk that equities do.

3. FURTHER FISCAL POLICY STIMULUS TO SUPPORT ECONOMIC RECOVERY

Policymakers from the EU to the UK, through Korea and even China, have now announced binding economy-wide targets for net-zero emissions by 2040-2060 that will require unprecedented public policy and capital support and a large-scale reallocation of private capital both within businesses and in capital markets.

3.1. The EU Green Deal

Over the summer, EU members and the European Central Bank have worked hard to gather member states around a collective policy response to the COVID-19. The Commission agreed on the one-off increase in the budget itself to fund a short-term

¹³ World population prospects 2019, [United Nations Population Division](https://www.un.org/en/development/desa/population/publications/), 2020

EU earmarks €555 bn for green investments consistent with the Paris Agreement objectives to support climate neutrality by 2050

"Next Generation EU (NGEU)" recovery plan worth €750 billion, to be executed over 2021-2024. This plan comes on top of the long-term €1,100 billion "Multiannual Financial Framework (MFF)" EU budget that will be deployed over 2021-2027. "Climate Action" will be prioritised in both the packages, according to the European Commission, with 30% of both programs will be directed towards green investments. These investments—amounting to €555 billion in total—will be consistent with the Paris Agreement objectives of climate neutrality by 2050 and will have to contribute towards achieving the EU's new enhanced emergent 2030 climate target of emissions reductions of 55% (up from 50%) compared to baseline. The NGEU part of the financing will be "limited in size, duration and scope" and will therefore be front-loaded and will begin to impact markets very soon.

The Commission has released little detail about exactly how much of the "climate action" funding will be released for the renewable energy sector, but a leaked document released by Euractiv outlined two initiatives to support the sector. The first one is to increase the investment capacity of the European Investment Bank (€10 billion of capital over the coming two years, starting in 2021). The second one is to tender an EU scheme for renewable electricity projects worth 15 GW over two years, with a proposed capital investment of additional €25 billion. An EIB fund worth €10 billion per year, would also be set up to grant loans for hydrogen infrastructure.¹⁴

EU loans will be partly financed by carbon tax

Interestingly, the part of the packages that will be given out as loans will partly be financed by a carbon tax based on the Emissions Trading Scheme. Consequently, EU carbon allowance prices surged in July to their highest since 2008, with bullish sentiment continuing to dominate as participants look ahead to upcoming market reforms and focusing on the need for non-power sector emissions reductions. The cost of emitting a ton of carbon dioxide has soared towards a record of €30. Higher emissions costs will also begin to have an impact on several business sectors. Meanwhile, a new report by the risk committee of the Commodity Trading and Futures Corporation (CFTC) in the US has also called for policymakers to consider a carbon price, and several bills are pending in the US congress for precisely that. China's scheme for emissions trading also comes online this year.

EU carbon emissions pricing near all-time high

Figure 5. EU carbon allowance prices surged during the EU summit (€)¹⁵



¹⁴ Europe's draft 'green recovery' plan, [Euractiv](#), May 2020

¹⁵ EU carbon price viewer, [Ember](#), 2020

The carbon pricing market is now beginning to see the interest from some of the world's biggest hedge funds. Pension funds and insurers are also reported to take a bigger interest in the market as a potential hedge against climate change risk-related parts of their portfolios. Forget about hedging portfolio risk using gold at \$1,940 per ounce. Some investors now believe that carbon pricing is a one-way bet to help offset portfolio risk.¹⁶

3.2. The US "Build back better"

US presidential candidate Biden details \$2 trillion climate proposal

In the US, the debate on climate change has been hostage to politics, with President Trump unable to accept that climate change is human-made. However, Democratic nominee Joe Biden decided to take the initiative and has detailed a \$2 trillion climate proposal spent over four years seeking to boost renewables and to rebuild infrastructure. The proposal was the second plank of Biden's new economic agenda, "Build back better", which aims to put the US on an irreversible path to net-zero carbon dioxide emissions by 2050. It represents a transformational shift for the US energy market, and Biden's new pledge to fully decarbonise the power sector in the US by 2035 is incredibly ambitious. In a speech in Delaware in July, Biden sought to signal that he understands the urgency of global challenges:

"I know meeting the challenge would be a once-in-a-lifetime opportunity to jolt new life into our economy, strengthen our global leadership, protect our planet for future generations... If I have the honour of being elected president, we're not just going to tinker around the edges. We're going to make historic investments that will seize the opportunity, meet this moment in history."¹⁷

We would hope one day to see a bipartisan passage of a US climate strategy, such as the Carbon Rebate Plan from the Climate Leadership Council.¹⁸ But at least, if Biden wins the presidential election, these pledges will be difficult to back away from. Troubled fossil fuel businesses will have to give up resistance, and the proposal will effectively allow those who can shift to renewable energy to begin the process. Looking also at the most recent US national poll data, Biden is far ahead of Trump with a 52% to 42% in a recent poll.¹⁹ In November this year, we will know whether this ambitious plan will come to fruition. Similar to the EU, Biden has even supported a price on US carbon emissions, although Democratic party members believe this will be difficult to fulfil in the near term.²⁰

4. PORTFOLIO CONSTRUCTION FOR THE NEXT DECADE

Infrastructure investing may help improving the risk-return profile of the portfolio

Taking into account the increasing emergency of climate change, the current state of financial markets and the wall of fiscal support reaching the new energy sector in the coming years, we make four representations of why we believe thoughtful infrastructure investing may help to improve the risk-return profile of the portfolios over the next decade.

¹⁶ Carbon: the 'one-way' bet for hedge funds, [FT's The Big Read](#), August 2020

¹⁷ Biden announces USD 2 trillion climate plan, [New York Times](#), July 2020

¹⁸ The Bipartisan Climate Solution, [Climate leadership council](#), 2020

¹⁹ 2020 Presidential Election Polls, [CNN/SSRS](#), October 2020

²⁰ Daily briefing: Greenland ice sheet lost a record 1m tonnes of ice per minute in 2019, [CarbonBrief](#), August 2020

4.1. Four considerations for portfolio construction

Conventional assumptions for portfolio optimisation may have to be challenged

Building a robust asset portfolio for the coming years will not be easy. Conventional assumptions for portfolio optimisation—asset risk, return and correlation—may have to be challenged in order for an investment portfolio to sustain rapid changes in financial market conditions. Lessons from the financial market's reaction to the COVID-19 pandemic can be learned and integrated into the strategic asset allocation process. Based on this, we state four objectives for portfolio construction for the coming years. We argue that continued allocations to alternative investments should improve the risk-return profile of the total portfolio:

- i. Invest sustainably to make the investment portfolio more resilient: The global and gradual portfolio rotation into sustainable investments represents an irreversible and secular trend that has only just begun. The Paris agreement and the UN commitment to achieve the sustainable development goals (SDGs) started the movement, and changes in regulation and legislation now take place on national levels. Given the increasing financial risks of not going sustainable, investment mandates are in the process of being implemented to reduce "stranded asset" risk and to strengthen long-term portfolio resilience. (Up to 60% of institutional investors expect some financial losses in the next three years due to climate change as a result of stranded assets, regulatory costs or damaged infrastructure.²¹) Once this portfolio rotation catches more momentum, we will likely experience compression in risk premia also in sustainable investments in the years ahead.
- ii. Bring down expectations for future equity market returns: Long-term equity market valuations are becoming a concern. Cyclically adjusted P/E-ratios remain uncomfortably high – and so are equity market capitalisations as a proportion of GDP – despite the weak macroeconomic backdrop following the unresolved consequences of the COVID-19 pandemic. Leaving the equity markets to an unconditional dependency on economic policy for growth may prove a weak argument. (Valuation concerns also extend to private equity, relating mostly to the potential risk to the exit environment.) It makes sense to reduce the portfolio's overall dependency on GDP growth by reducing the expected return for the equities.
- iii. Reduce nominal bond market exposure: Two decades of disinflation, central bank easing, and massive quantitative easing have brought bond markets to a point where the compensation rewarded for duration risk has become non-existent. Nominal bond yields can no longer service liabilities, and negative real yields have made bond markets disproportionately exposed to inflation risk. The ability of nominal bonds to hedge against an economic downturn is diminished.
- iv. Account for greater equity and bond return correlation risk: Two decades of negative correlation between the returns of equities and bonds have been beneficial to total portfolio risk. The ability to maintain high allocations to equities has been underpinned by the bond markets ability to provide efficient diversification through low or negative correlation. We argue that evidence can be found for a potential shift in correlation from negative to positive, reducing the ability for investors to maintain their high equity allocations.

Equity and bond return correlation may shift quickly

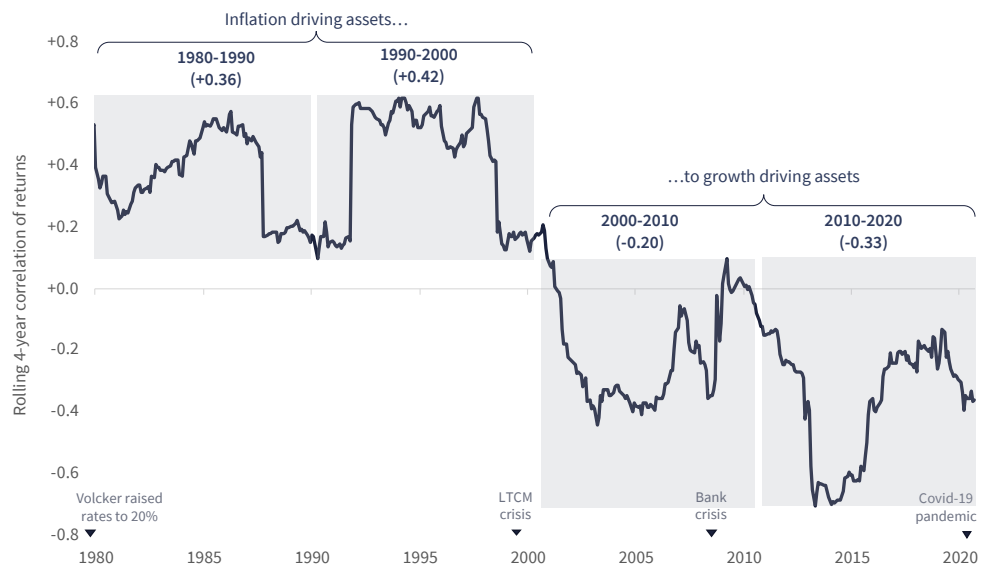
²¹ Investors anticipating climate change-related financial losses of the next three years, [Kearney Foreign Direct Investment Confidence Index](#), 2020

4.2. Equity and bond return correlation may begin to shift

Inflation drives equity and bond return correlation

The negative correlation of equity and bond returns has been a powerful driver of portfolio construction. Understanding the time-variation of correlation over time, and thereby gaining the insight into the future shifts from negative to positive correlation (and vice versa), is a crucial input to the strategic asset allocation. This is highly relevant today, when financial markets appear to have disconnected from the reality of macroeconomics and where twenty years of negative correlation is prone to shift to positive. As period 1998-2002 illustrate in figure 6, such shifts may take place at short notice. There are long-term, structural drivers behind the extended periods of either positive or negative correlation. These drivers are linked to economic growth and inflation, especially so in countries where inflation targets set monetary policy.²² Negative equity and bond correlation is associated with periods of low or falling inflation and accommodating monetary policy, such as the period 2000-2020. Positive equity and bond correlation is associated with periods of higher inflation coinciding with better economic performance, such as the period 1980-2000. There may be brief periods of financial market uncertainty where the long-term correlation between macroeconomic factors breaks-down, such as "flight-to-quality" capital flows which may produce short periods of negative correlation independent of growth regimes. However, these short periods often take place over days or weeks rather than years.²³

Figure 6. Rolling four-year equity and bond return correlation 1980-2020²⁴



Rise in inflation may shift portfolio correlation and force investors to de-risk

Should the correlation revert to the upper part of the 1980-2000 range, portfolio diversification using traditional asset classes will become extremely difficult—there will simply be "nowhere to hide" since equity and bond markets can underperform at the same time. This rapid increase in correlation would be an inflexion point for portfolio construction, which would cause far-reaching negative implications for the overall risk level of investor portfolios. Assuming a constant risk budget, portfolios would have to be rebalanced to hold a smaller allocation to equities and expected portfolio returns would

²² Stock-bond correlations, macroeconomic regimes and monetary policy – an international perspective, [SSRB Baele/Van Holle](#), 2017

²³ Why does the correlation between stock and bond returns vary over time?, [Applied Financial Economics Vol. 18](#), 2008

²⁴ S&P 500 total return index and UST total return index, FactSet/Nordea/Worthwhile Capital Partners, 2020

Our concerns are that financial markets will not be able to facilitate risk transfer when investor sentiment changes

Investors need to be comfortable of holding illiquid assets at times of financial market distress

Investors that intend to increase allocations to alternative investments are 4 times greater than those looking to invest less

fall as a consequence. Already today, it seems like rational and a fiduciary responsibility to begin diversifying portfolios with high allocations to traditional equities and bonds into alternative asset classes, and perhaps these changes should be larger than previously anticipated. One of our primary concerns is that financial markets will not be able to facilitate risk transfer when investor sentiment changes. Portfolio rotation needs to take place before then.

4.3. Liquidity risk management

Allocating large proportions of asset portfolios to alternative and illiquid investments may enhance the risk-adjusted return of the asset portfolio, but also introduces other layers of risk. Investors need to be comfortable of holding illiquid assets at times of financial market distress, such as witnessed in March 2020 when global equity indices fell by more than 30% in just a month. There are at least three conditions that need to be considered for larger allocations to alternative and illiquid investments to be possible:

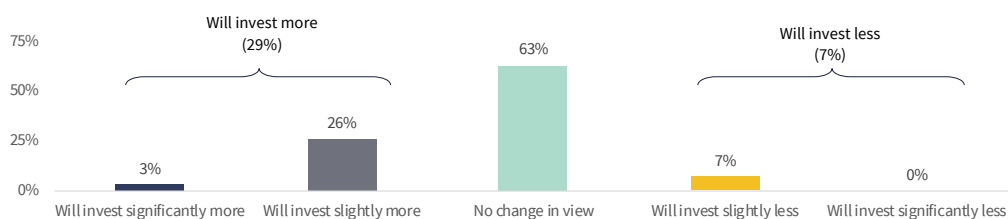
- i. Regulatory constraints: Solvency capital can never be in breach of minimum regulatory requirements.
- ii. Economic constraints: Cash-flow servicing of liabilities must be upheld at all times so that forced selling of asset at disadvantageous prices can be avoided.
- iii. Internal constraints: Asset allocation boundaries found in investment mandates need to be able to sustain adverse scenarios so that positions can be maintained.

These risks can be carefully quantified using scenario analysis and help investors to increase their allocation to illiquid assets without unintentionally breaking risk limits. Judging by the anecdotal evidence and recent surveys, investors will keep allocating to alternative investments in the years ahead. After all, the ability to systematically collect an illiquidity premium is one of the biggest competitive advantages of pension funds and life-insurers that invest for the longer term.

4.4. The shift into alternative investments will continue

Over the past two years, Worthwhile Capital Partners has conducted more than 400 investors meetings and calls, and there is strong anecdotal evidence that many institutional investors plan to increase allocations to alternative assets in 2021-22. This is consistent with a new Preqin survey, where investor interests for alternatives have not diminished after the economic fall-out from COVID-19. A majority of investors said that the pandemic had not impacted their planned commitment for either this year or the longer term (63%). The proportion of investors looking to increase commitments to alternatives (29%) were more than four times greater than those looking to reduce them (7%).²⁵ These numbers are consistent with our own experience.

Figure 7. Investor intentions for alternative investment allocations post COVID-19



²⁵ Preqin Investor Interviews, [Preqin Pro](#), June 2020

New energy infrastructure is a suitable candidate for alternative investing

Reminiscent of our four observations for portfolio construction over the next decade, there is generally a growing interest to replace bond and equity allocations with infrastructure assets in particular. Ideally, such replacement should come with a low correlation to GDP volatility, a higher yield and at least some protection against increasing inflation. New energy infrastructure would be a suitable candidate, providing for both returns and for ambitions to invest sustainably.

5. INVESTING IN NEW ENERGY INFRASTRUCTURE

The ability for renewable energy to carry its own costs absent of any government subsidies, reduces the political risks earlier associated with the asset class. This new reality has been reflected in a paradigm shift for private investment

As the world moves forward to the new, post-COVID-19 normality, the transition of power generation will form a key part of public economic stimulus. The market for renewable energy is now ready for investment at scale. More than half of the renewable capacity added in 2019 achieved lower electricity costs than new coal-fired plants, while new solar and wind projects are already undercutting even the cheapest existing coal-fired plants in most locations. The ability for renewable energy to carry its costs absent of any government subsidies reduces the political risks earlier associated with the asset class. This new reality has been reflected in a paradigm shift for private investment. 2019 saw renewables account for 72% of all new capacity additions worldwide. This surged to an eye-popping 97% for the first half of 2020.

Equipment costs have come down, technologies have improved, and governments across the world have raised clean-power targets as they seek to combat climate change. Renewables also align recovery measures with climate resilience, sustainable development and other medium- and long-term policy goals. Cheaper electricity, job market stimulus and the mitigation of climate change risk, all central components of the Green New Deal and Build Back Better agendas are an opportunity that governments from the EU to China are taking very seriously. So should investors.

5.1. New energy investments across sectors

For the energy transition to be able to take place, investments are needed across renewable energy generation, flexibility and connectivity

For the energy transition to continue to proceed, investment is required not just into renewable energy, but also the other forms of infrastructure needed to accommodate more deeply decarbonised energy networks. As grid systems evolve, it is therefore essential for investors to view energy infrastructure of consisting of three distinct but interlinked sub-sectors, being:

- i. Generation—renewable generation assets themselves, such as wind, solar, hydropower or bioenergy;
- ii. Flexibility—"renewable enabling" assets such as batteries or other forms of energy storage required to balance the variable output of renewables; and
- iii. Connectivity—being the grid assets, such as transmission cables and distribution networks, needed to accommodate the more distributed location of renewables around the grid.

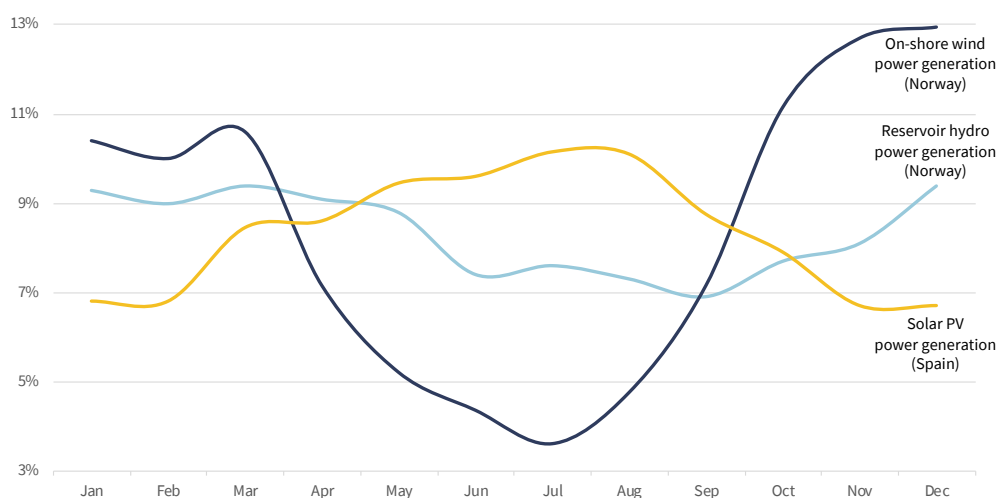
Investors should consider investing across energy infrastructure sub-sectors to improve risk-adjusted portfolio returns

Investors, therefore, should undertake a thoughtful quantitative analysis of the risks, returns and correlation of power generation and power pricing across these sectors. Adopting a carefully thought-through approach to investing across all three sub-sectors is likely to produce a more stable investment return profile than investing in renewables alone. In particular, taking this more comprehensive portfolio approach allows investors to benefit from negative correlations in both short-run and long-run contexts.

Over the short-term, the negatively correlated (with each other) production profiles of certain new energy infrastructure assets can be exploited in portfolio planning to reduce annual volatility in cash flow generation. Seasonality of production plays an essential role and can to stabilise cash-flows, as illustrated in figure 10 below. Further, in periods of

lower than expected renewable energy production the gross margin achieved by flexibility assets such as flexible gas generation may be higher due to the systems greater need for such investments to keep supply and demand for power in balance.

Figure 8. Renewable energy generation profiles of power output (%)²⁶



Over the long-term, different new energy sub-sectors exhibit differential and, in some cases inverse, correlations with extraneous factors. Consequently, by mixing such assets, portfolio risk is reduced, and risk-adjusted returns improved. For example, the build-out rate of renewable energy is negatively correlated to the returns of wind and solar assets. In the long-term, a higher than expected penetration of renewables could adversely affect the value of wind and solar. Still, it is positively correlated to the returns from flexibility assets such as batteries and flexible gas generation because a high renewable deployment implies greater volatility in wholesale power prices, creating more scope for value-capture by flexibility assets.

Institutional investors increasingly demand more specialised infrastructure fund managers than has previously been the case

In our role as an independent placement agent specialising entirely on sustainable investing, we begin to discern that institutional investors increasingly demand more specialised infrastructure fund managers than has previously been the case. Investors appear increasingly less keen to let fund managers diversify outside new energy assets, as broader core infrastructure managers tend to mix traditional infrastructure investments with new energy investments, which is perceived as needed more expertise. Many investors have also already built significant exposure to conventional infrastructure such that broad infrastructure fund strategies that also include new energy assets simply offer too much overlap to existing portfolios.

And in part, demand for sector-based specialist infrastructure managers is expected to increase further based on recent learnings from how infrastructure sub-sectors have performed following the COVID-19 pandemic. Sectors representing needs-based infrastructure have proven far more economically resilient than those representing availability-based infrastructure. We return to this subject a little later.

We have also identified other trends. The cost for implementing infrastructure investments is definitively under pressure, and fund managers need to compensate with scale to make the economics work; large size commitments to funds often come at

²⁶ Proprietary data, Augusta & Co, 2020

rebated management fees. This is also the reason why we experience an increase in the demand for co-investments, which is usually offered by fund managers at zero management fees and carry.

There is also clearly a strong preference for infrastructure funds that have a longer duration. Investors have expressed interest in extending the fund's life towards the physical life of the underlying assets, and in this low interest-rate environment investors prefer to hang on to retain their 8-10% infrastructure returns for a little longer.

5.2. Renewables market expected to grow 2-3 times next five years

The size of the renewable energy market will grow between \$547-783 billion every year

The need for renewable power generation is growing fast. The years 2010-2019 will have seen \$2.6 trillion invested in renewable energy capacity (excluding large hydro), more than three times the amount invested in the previous decade. Solar is set to have attracted the most capital during the last decade, at \$1.3 trillion, with wind securing \$1 trillion and biomass and waste-to-energy \$115 billion. Looking ahead, investments are expected to increase by a factor of 2-3 times the coming decade. Depending on whether we rely on the International Renewable Energy Agency's (IRENA) Stated Policy scenario (what we say we will do) or Sustained Development Scenario (what we should do to meet climate targets), the size of the renewable energy market will grow between \$550-800 billion every year, turning them into an essential and mainstream asset class. This market still offers attractive investment returns, even absent the subsidies or preferential tariffs that have previously tainted these investments with political uncertainty and risk.

5.3. Solar and wind the cheapest sources of power

Renewable energy is the cheapest source of power today

Solar and onshore wind power is now the cheapest new sources of electricity in at least two-thirds of the world, further threatening the two fossil-fuel incumbents—coal and natural/fossil gas.²⁷ The levelized cost of energy (LCOE) production for these two renewable energy sources has continued to fall over the past ten years, with the largest drop seen in solar photovoltaic (PV) costs, which fell by a game-changing 82%. Mature renewable energy sources, such as bioenergy for power, geothermal and hydropower have not seen the same level of cost reduction, but those sources started from a lower cost base.

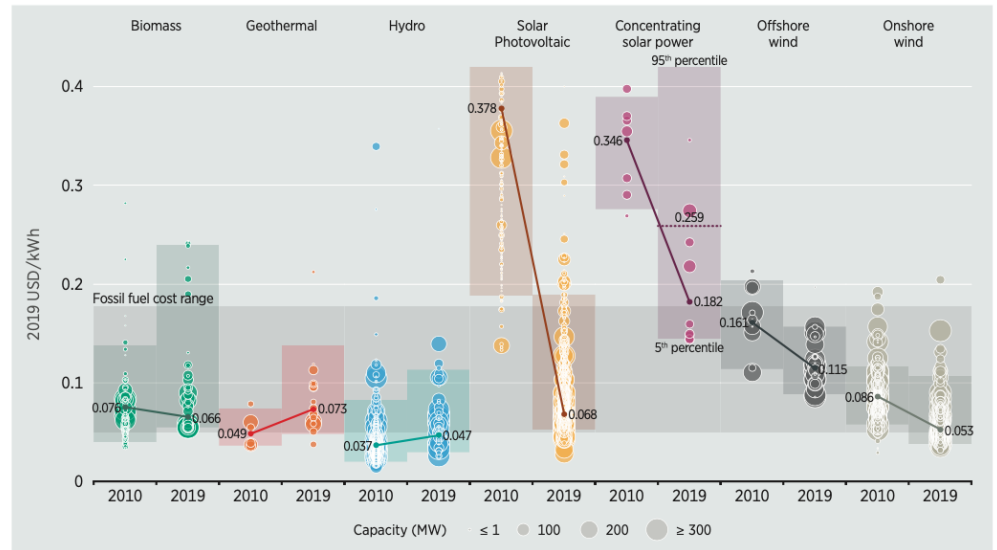
Last year, more than half of all newly commissioned utility-scale renewable power generation capacity provided electricity at a lower cost than the cheapest fossil fuel-fired option

Figure 9 on the following page illustrates the changes in levelized cost of energy (LCOE) production for different renewables sectors between 2010-2019. Last year, more than half of all newly commissioned utility-scale renewable power generation capacity provided electricity at a lower cost than the cheapest fossil fuel-fired option. The diameter of the circles represents the sizes of the projects, with its centre the value for the cost of each project on the Y-axis. The thick lines are the global weighted-average LCOE values for plants commissioned in each year, while the grey area marks the fossil-fuel cost range for reference.

This chart, spanning over a decade where global power generation increased by about 33%, clearly demonstrates that the transition into renewable energy is an unstoppable and a secular trend.

²⁷ Solar and wind cheapest sources of power in most of the world, [Bloomberg NEF](#), April 2020

Figure 9. Global levelized cost of energy production for utility-scale renewable energy²⁸



The COVID-19 pandemic can also have a range of impacts on the relative cost of fossil and renewable electricity for the coming years. One crucial question is what happens to the costs of finance for different types of power projects over the short and medium-term. Another question concerns commodity prices—coal and gas prices have weakened significantly on world markets. A third one is the implementation of carbon emission taxes. A final one is the enormous wave of policy stimulus hitting the market from next year. On balance, these developments continue to support strongly investments in renewable energy power generation with the tailwinds far exceeding any headwinds the sector may face.²⁹

5.4. New energy infrastructure has outperformed during the COVID-19 pandemic

The COVID-19 pandemic has been the first significant test of infrastructure's defensive characteristics for decades

As we have argued, building a robust asset portfolio for the coming decade will depend on several factors. One of them is to diversify into alternative, sustainable and economically resilient investments. Another is to reduce the portfolio's dependency on equity portfolio returns and to account for a significantly higher risk to bond returns. Taken together, the latter two warns of a greater correlation between equity and bond returns. All of these conditions can be fulfilled by continued allocations towards sustainable and needs-based infrastructure assets in the years ahead (as opposed to infrastructure dependent on GDP growth, which is less resilient to economic downturns). This asset class' ability to create long-term and predictable returns, increased portfolio diversification and hedge against inflation will be necessary to protect portfolio returns and to stay competitive in the years ahead.

Not all infrastructure returns are created equal

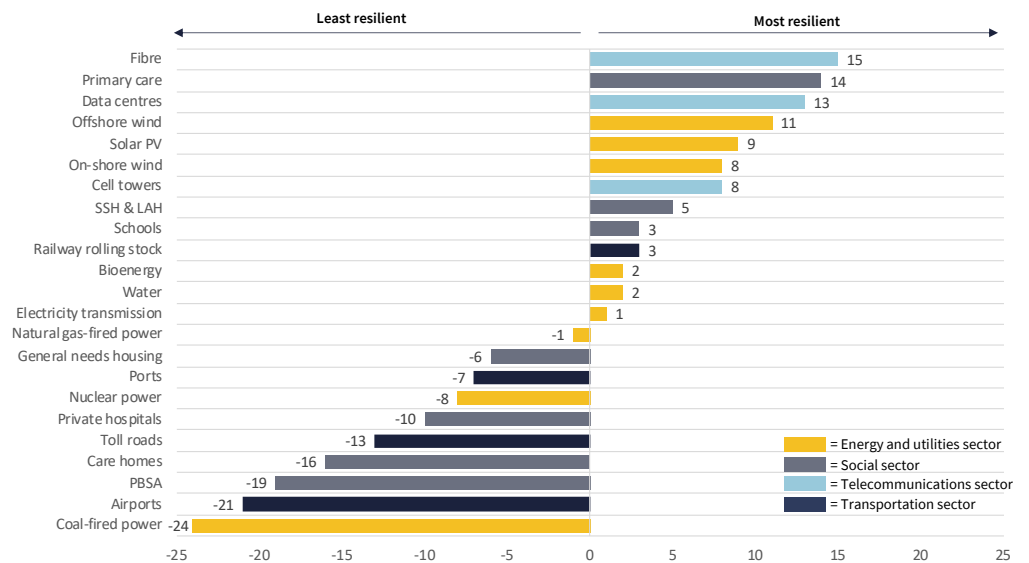
Not all infrastructure returns are created equal and sub-sectors have performed very differently following the economic slowdown that has followed the COVID-19 pandemic, which has been the first significant test of infrastructure's defensive characteristics for decades. Resilience across different infrastructure sub-sectors can be measured against a range of investment fundamentals such as quality of revenues, ability to sustain or mitigate costs, access to financing, changes to political and regulatory environments and operational performance. An interesting analysis in this regard has been published by the infrastructure manager Foresight Group, who measures these fundamentals against their

²⁸ Renewable power generation costs in 2019, [IRENA](#), June 2020

²⁹ Solar and wind cheapest sources of power most in the world, [Bloomberg NEF](#), April 2020

robustness to withstand external changes, the possibility to allow for alternative choices under stress and the speed with which disruption can be overcome.³⁰

Figure 10. Overall global pandemic resilience across sub-sectors



Increasingly, we expect investors to be looking for sustainable and needs-based infrastructure investments, and less for growth-related infrastructure as they want to reduce correlation to equity returns

The market volatility this year has provided empirical evidence that infrastructure sub-sectors with the most economic resilience are the same as those suitable for sustainable investing. Fibre, primary care, data centres, off-shore wind, onshore wind and solar PV lead the league-table for resilience in economic performance and emerge as the sectors of choice. This is a thesis that any investor engaging in sustainable investing was hoping for, but only now do we begin to discover the real evidence for it.

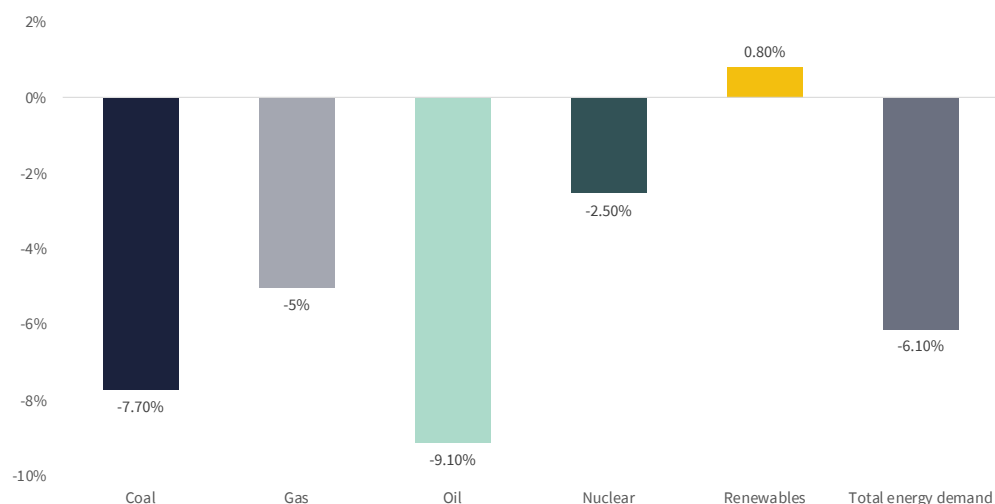
Other sectors represented in core infrastructure portfolios have demonstrated unwantedly high correlation to the pandemic and to economic growth, which is precisely what we would like an infrastructure portfolio to avoid. Increasingly, we expect investors to be looking for sustainable and needs-based infrastructure investments, and less for growth-related infrastructure as they want to reduce correlation to equity returns.

Taking a closer look at the power generation sector, it is not surprising that power demand has fallen during the year as confinement measures were enforced across the globe, especially in the industrialised world. These measures had interesting knock-on effects on the power mix. Global coal, gas and oil demand was hit hard, while renewable sources of power generation grew in demand, driven by larger installed capacity and priority dispatch into the grid.

Note that renewables, which is the power sub-sector that is most suitable for sustainable investing, is also the power sub-sector which has shown most resilience to the economic downturn, as shown in figure 10 above.

³⁰ Infrastructure pandemic resilience – a true test of infrastructure’s defensive characteristics, [Foresight Group](#), September 2020

Figure II. Projected change in primary energy demand by fuel in 2020 relative to 2019³¹



Infrastructure sub-sectors with documented resilience against GDP volatility may even become the norm for defensive positioning and a core part of investor portfolios (as opposed to other alternative investments). Renewable energy should undoubtedly have a place here.

5.5. "Qualifying infrastructure investments" attracts a lower capital charge

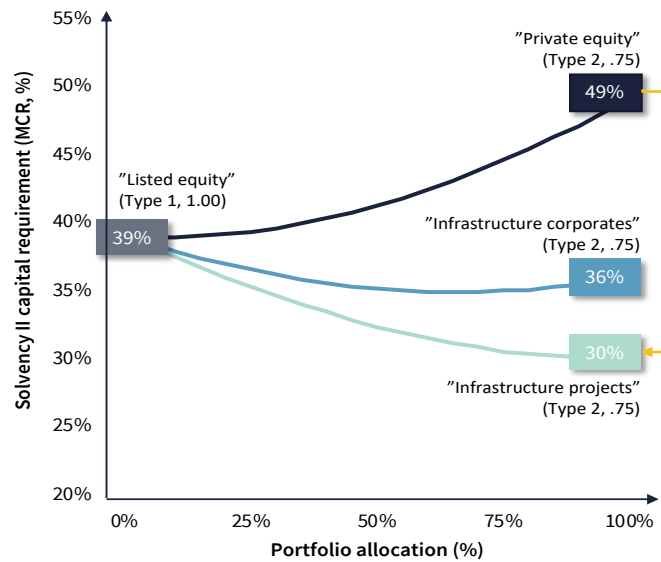
Even before the COVID-19 pandemic, the financing dynamics of the infrastructure landscape were fundamentally changing. While increasingly indebted governments are finding it difficult to use public funds to finance infrastructure projects, banks feel the pain of capital constraints and tighter bank regulation under Basel III. According to the World Economic Forum, developing countries need \$1 trillion per year until 2030 to meet the demand for new infrastructure investments.

Long-term investors—such as pension funds and life insurers—are well placed to help to bridge this gap but have previously found Solvency II regulatory capital charges prohibitively expensive. Infrastructure investments were classified as "private equity", which attracts a 49% capital charge.

However, in 2017, the European regulator responded by reducing the capital charges for "qualifying infrastructure investments". Infrastructure projects that derive more than 75% of revenues from owning, financing, developing or operating infrastructure in OECD/EEA countries may qualify for a reduced capital charge of 36% (Type 2, 0.75 correlation) for infrastructure corporates and just 30% (Type 2, 0.75 correlation) for qualifying infrastructure projects. See figure 12 on the following page.

³¹ Global energy review 2020, [IEA](#), April 2020

Figure 12. Qualifying infrastructure projects drop from 49% to 30% capital charge



Qualifying infrastructure investment offers superior risk-adjusted regulatory return on capital (RAROC), thereby improving regulatory capital strength at the same time

A pension fund or life insurer reporting under Solvency II could consider allocating out of listed equities with a 39% capital charge into qualifying infrastructure with a 30% capital charge, and at the same time increasing the regulatory capital strength of the balance sheet. This exercise is worth comparing to a similar allocation out of listed equities into private equity with a 49% capital charge. In simple terms, this means that a private equity investment due to its higher cost of capital would then need to justify 1.63 times (49%/30%) greater return than a qualifying infrastructure investment, for the PE investment to offer the same risk-adjusted regulatory return on capital (RAROC) as the qualifying infrastructure investment. The conclusion is, therefore, that renewables are very competitive on both economic risk basis as well as on a solvency capital basis.

5.5. Portfolio implementation

Investing with external and specialist managers comes at a cost, but carries several advantages

Investors approach renewables portfolio implementation from different positions. While some pension funds and life insurers have extensive experience and have specialist teams responsible for identifying and implementing renewable investments, others are building their exposure from the start. Few investors, however, have achieved a fully diversified exposure to infrastructure—let alone to renewables assets. Investors may therefore want to consider fund managers as they build out their renewables exposure, although such allocations attract costs in terms of management fees. Developing strategic relationships with specialist renewables fund managers have several advantages, which can help investors:

- iv. Getting access to experienced investment and asset management teams; this gives time for investors to grow in-house competences and to prepare for making their own direct investments.
- v. Increasing the speed of implementation; conducting thorough due diligence, commissioning consultants and implementing direct investments is a time-consuming strategy that can easily be outsourced to the fund manager.
- vi. Diversifying renewable exposure at an early stage of investing; this is a particularly important aspect of investing in the decarbonisation of the power system since there are several benefits in fully exploiting the low or negative correlation across renewable energy generation, renewable energy infrastructure (battery storage, hydro, gas peakers) and transmission/distribution assets. Fund managers can also offer

geographic diversification considerably faster than possible using time-consuming direct investments.

- vii. Expanding the geographical reach of the investment portfolio; Reputable fund managers with large teams have access to relevant deal flow and can identify the best investment opportunities as well as diversifying the portfolio not only based on technologies but also geographically. This may also diversify against locally-owned direct investments.
- viii. Providing sophisticated sustainability reporting; newly developed reporting standards can meet particular investment objectives and UN Sustainability Development Goals.

Allocating capital to specialist fund managers at an early stage can benefit from all of these advantages, while at the same time accessing deal flow for co-investments to bring costs down. There may also be an opportunity to get involved in the secondary market for funds. Over time, once sufficient experience has been gathered, the implementation may also shift more towards direct investments into renewables.

5.7. EU Taxonomy validation

The investments needed for the decarbonisation of our power system are textbook examples of the types of investment that can be validated for the EU Taxonomy

While many investors have setup general objectives for sustainable investing linked to the UN's Sustainable Development Goals (SDGs), there has until recently been little definition of what qualifies as sustainable investing. In March this year, the EU technical expert group (TEG) for sustainable finance published their final report on which screening criteria would qualify investments for sustainable investing.³² It was a welcome report.

The criteria in the report are based on existing standards and scientific scenarios, such as those of the IPCC.³³ Referred to as the EU Taxonomy, this set of criteria include several environmental objectives, a do no harm restriction and the aim to meet several different minimum safeguards. This taxonomy is an essential tool that will help investors to improve their environmental performance, as well as helping to identify which investments are environmentally friendly. In doing so, the EU Taxonomy is one of the most significant developments in sustainable finance and it will have wide-ranging implications for investors because it will ensure more confidence in sustainable investing and less "greenwashing" of investments. The European Commission reasons that this will result in more private financing for the transition to a carbon-neutral economy by 2050. The investments needed for the decarbonisation of our power system are textbook examples of the types of investment that are validated for the EU Taxonomy.

Figure 13. TEG's final recommendations of criteria for climate change adaption activities

Sector	Examples	Number of eligible activities
Agriculture and forestry	Afforestation, rehabilitation, livestock production and other	8
Manufacturing	Cement, aluminium, iron, steel and other	11
Electricity, gas, steam and air conditioning supply	Renewables, hydropower, co-generation, storage and other	25
Water, sewerage, waste and remediation	Collection, treatment, anaerobic digestion, permanent sequestration and other	12
Transportation and storage	Passenger and Freight rail transport, inland water transport and other	10
Buildings	New constructions and renovations	2
Financial and Insurance Activities	Non-life insurance	1
Professional, Scientific and Technical Activities	Engineering activities	1

³² Taxonomy: Final report of the technical expert group on sustainable finance, [European Commission](#), March 2020

³³ IPCC special report – global warming of 1.5 degrees, [IPCC](#), 2019

6. SUMMARY

Worthwhile Capital Partners is an independent placement agent focusing exclusively on the marketing of investment strategies that support institutional investors in their ambition to meet sustainability and return targets. At our core, we believe in the positive impact and transformational power that connecting capital with sustainable investment opportunities can bring to every aspect of our planet, society and economy.

In this inaugural "Letter to investors", we have taken stock on the speed of climate change, the state of financial markets and how to financially and sustainably participate in the decarbonisation of our energy systems, in what will have to become the largest energy transition since 1850. To us, it makes a great deal of sense for long-term asset owners that aim to preserve economic value for future generations, also invest their portfolios in assets that also preserves the planet these generations.

We are proud to work with—and grateful to learn from—some of the best specialist managers in the world who understands how asset owners can meet their increasingly ambitious sustainability targets. These managers work hard to achieve the UN Sustainability Development Goals (SDGs) and make certain that their assets can be validated for the EU Taxonomy to the greatest extent possible, without sacrificing returns.

As always, we are keen for asset owners to join our community and to share more of our thoughts on climate change, the state of financial markets and portfolio construction for the next decade. You can follow our work on LinkedIn and our website, www.worthwhilecap.com. We would like to thank our partners who have directly and indirectly contributed to the letter but would like to clarify that any errors or mistakes are entirely our own.

Sincerely yours,

The fundraising team at Worthwhile Capital Partners

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