KPMG

Decarbonising growth

Managing the transition

November 2020

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Foreword

ENRICH has evolved into India's finest platform for energy and natural resources (ENR) professionals to discuss innovative solutions to help India build a sustainable and inclusive energy future. The conclave brings together policy makers, CXOs, regulators, investors, private players, utilities officials and industry analysts to gain and share insights. As part of this year's conclave, I am delighted to share our report 'Decarbonising growth'.

This year the discussions have additional significance as the world is seized with the imperative of decarbonisation. Climate change and the world of energy are intricately coupled. Decarbonisation is a critical energy strategy to manage climate change.

Countries across the board are making commitments to Net Zero emissions and charting plans towards this ambition. A systems perspective is required, incorporating energy demand management, improving energy efficiency and increasing the share of clean energy in the overall energy mix. Topics to be addressed include electrifying end-use sectors and investing in emerging technologies like hydrogen, carbon capture, utilisation and storage (CCUS) and bioenergy.

This report highlights the importance for businesses to identify their strategies and portfolios of technologies to meet their respective Net Zero targets. Investment horizons must be prudently aligned with evolving maturity levels. Governments need to de-risk this change through policy reforms, stable fiscal and monetary stimulus and financing.

Our report is shaped by our deep sectoral knowledge, broad cross-cutting experience and belief in high-impact and emerging solutions. Our aim is that this report will shine a light on many of the intricacies of decarbonisation and provide insights to potential pathways an organisation can chart.

The current crisis holds profound lessons for us to chart a decarbonisation path. Such a path will require new business models, new technology, products and service designs – and conversations like ENRICH.

Arun Kumar
Chairman and CEO
KPMG in India

Essential takeaways

1. The transition to a sustainable future, characterised by "Net Zero" is inevitable and beginning to reverberate both upstream as well as downstream owing to globally integrated supply chains.

- A recent global survey by Eversheds and KPMG IMPACT[1] of more than 500 directors and C-suite executives from the world's leading companies indicates that there is a growing recognition that climate risk is a very serious business issue which ultimately equates to financial risk and for some, will result in significant business transformation
- The survey highlighted that the corporate sector is feeling these pressures – from customers, regulators and employees, and from across the financial sector, including investors, lenders, auditors and credit rating agencies. Climate related financial risk is a huge topic of discussion and investors are increasingly clamouring for disclosures
- Large global corporations have started to urge their suppliers to reduce their carbon footprint as part of their own decarbonisation strategy, which is likely to result in a domino impact on smaller nations and companies
- Harder to abate sectors are also taking bolder steps to tackle the climate agenda
- More private sector commitments are coming in and sectoral decarbonisation discussions are picking up.

2. Decarbonisation technologies are fast gaining ground. Sector specific measures on the demand side and energy efficiency will continue to see impact and largely align with investment and retrofit cycles. CCUS (Carbon capture, utilisation and storage) and hydrogen will co-exist to play a key balancing role in hard to decarbonise sectors with impact felt post 2030.

- Main sources of carbon globally are electricity 42 per cent, transport 25 per cent and industries 18 per cent. There are three primary routes to decarbonisation for any sector 1) demand reduction 2) energy efficiency 3) clean energy usage. There needs to be an interplay among all three to achieve Net Zero
- In the technology roadmap, electrification, CCUS, hydrogen and bio-energy all have roles to play
- Electrification of end use sectors such as transport and industries will need to be supported by massive adoption of RE and its integration will require both batteries and hydrogen to come in based on application required (ranging from frequency response, to seasonal storage)
- CCUS will find a strong focus in decarbonisation of industrial sectors especially hard to abate sectors for capture of emissions and deployment in blue hydrogen production
- Blue hydrogen is likely to act as a bridge technology in decarbonisation. Falling prices of natural gas and better access by some of the gas consuming countries will increase focus on blue hydrogen in the near term
- Green hydrogen will help decarbonise hard to decarbonise energy consuming sectors such as transport and industries through sector coupling
- Green hydrogen may cannibalise some of the growth of CCUS but may co-exist as hydrogen will not be able to cater to all industrial processes

1. Climate change and corporate value: What companies really think, Eversheds Sutherland and KPMG IMPACT , November 2020

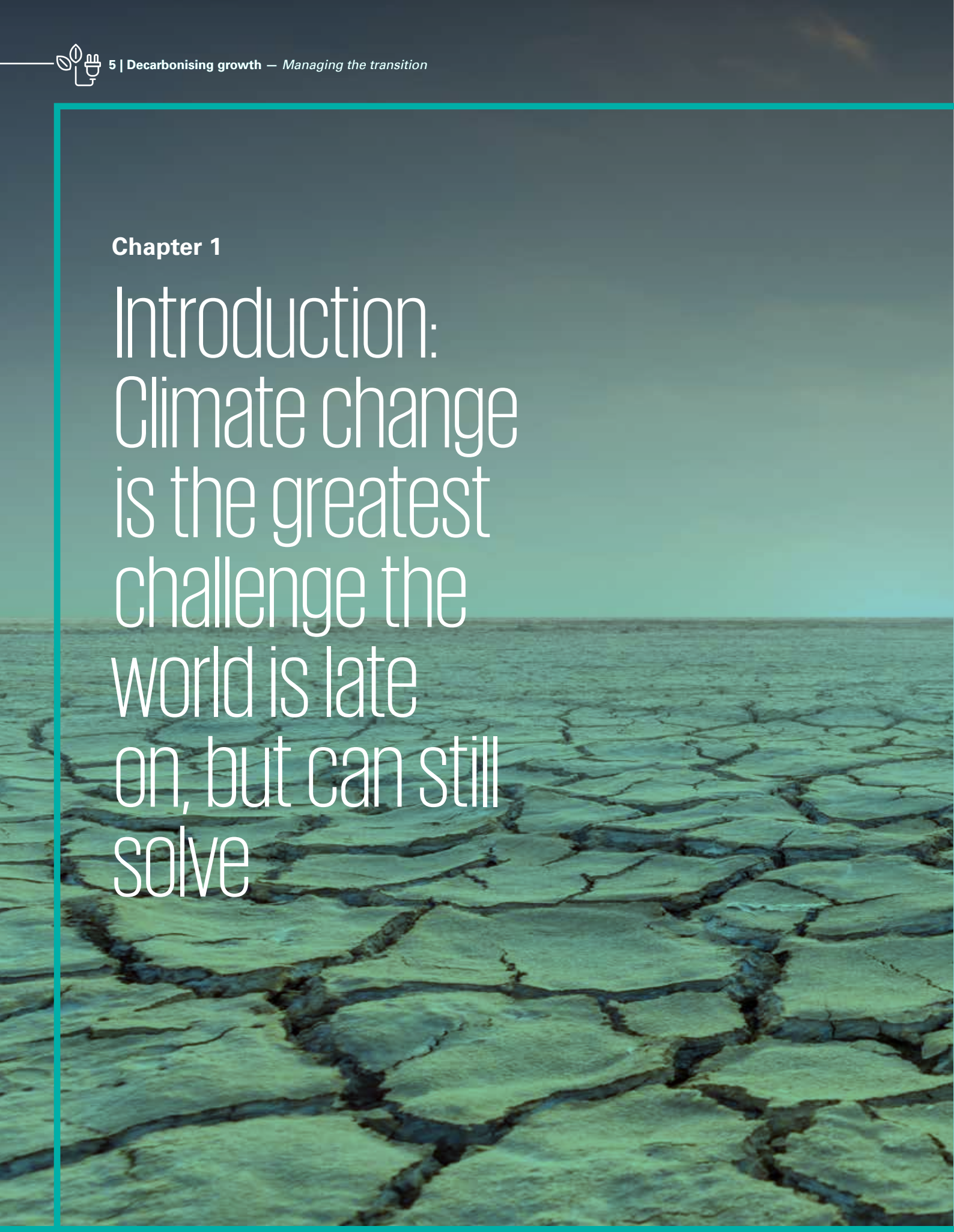
- In the transport segment, share of natural gas will rise. EVs (electric vehicle) are expected to start making greater inroads in LDV (light duty vehicle) and by 2030 hydrogen is likely to start making impact in HDVs (heavy duty vehicle)
- Countries and corporations need to act now and set their technology priorities.

- **Key priority 1:** Identify your strategy and portfolio of technologies to meet your 'Net Zero' target in your areas of operations
- **Key priority 2:** Align your investment horizons with evolving technology types. Plan for high gestation period for technological maturity
- **Key priority 3:** Integrated approach through multiplicity of bets could be important owing to inherent high risks
- **Key priority 4:** Governments need to steer this change by focusing on risk alleviation through policy reforms, stable fiscal and monetary stimulus and facilitating financing. Net Zero will serve as the North Star for defining the transition pathways.

3. Government, financiers, industry, consumers will need to act together to make the transition happen

- The eco-system comprising of policy, technology, market, investments, standards and society has to work together in a complementary manner in this transition journey
- The transition will not be quick and cannot be actuated with a switch. There must be dedicated finance available for the transition
- The option of cross-boundary collaborations and market mechanisms will have to be evolved even in the current geo-political dynamics as world trade is still dispersed around the globe
- It is essential to start policy directions at the earliest in some sectors as it will take time for transformations to happen in energy systems or land use towards desired outcomes
- It is also not just about technologies, there must be a focus on societal behavioral change. There have to be rapid strides to change consumption patterns and move towards a circular economy
- Universally acceptable standards to measure and navigate the journey are important to ensure transparency and accountability. Standards also will help in benchmarking and monitoring of progress.

A large part of the change process is political and hence unity of political vision and actions will be a critical change lever. The recent U.S. election results could significantly alter the political discourse and the fissions in the global political leadership on the course of action, especially in the coming three to four years. This will be critical for the foundational efforts for reversing the trends and for the low carbon initiatives to become business as usual. There is increasingly a deeper awareness and consciousness among people at large, even as there are deniers alongside. Such things eventually do evolve, and we may well be at that turning point in history.



Chapter 1

Introduction: Climate change is the greatest challenge the world is late on, but can still solve

For over a century now the world has been hurtling towards a catastrophe of human making. However, it is only in recent decades that we have come to estimate its effects. In 1975, US scientist Wallace Broecker put the term "global warming" into the public domain in the title of a scientific paper.[1] The Rio Earth Summit saw governments agree on the United Framework Convention on Climate Change (UNFCCC) for "stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system". Developed countries agreed to return their emissions to 1990 levels.[2]

On the supply side, decarbonisation was to happen through rapid transition to renewable energy. New era renewables sources (primarily solar and wind) presently constitute 5 percent of the energy basket. However, this relatively low contribution to the energy basket should not take away anything from the advancements on renewables. Just five years ago, in 2014 the share of renewables was less than 2.5 per cent of the primary energy basket. Doubling of share over five years in the face of established alternatives with developed ecosystems is no mean achievement. In this period between 2014 and 2019 the energy intensity of global GDP has also dropped very significantly. As the Global Energy Statistics Handbook 2020 reports, global energy intensity (total energy consumption per unit of GDP) improved by 2.1 per cent in 2019, i.e. faster than its historical trend (-1.6 per cent per year on an average between 2000 and 2018 and -1.2 per cent in 2018).[3]

Unfortunately, substantial as they are, the gains are inadequate to stall global warming and the harmful effects of pollution of air, land and seas. Much greater improvements, - 3.5 per cent/year decrease – are required in energy efficiency to achieve the 2°C limit over pre-industrial age temperature levels to avoid catastrophic effects on life on the planet.[4] The changes need to be much more rapid and fundamental and must involve a range of solutions that would not only require rapid scale up of renewable energy and energy efficiency, but also introduce new levers at scale through CCUS, hydrogen, etc. Adjunct technologies like energy storage in various forms including through batteries, pumped storage and others would also play critical roles. New economic models will have to be developed to wind down the legacy arrangements and bring in the new. Some of the cleaner and more flexible fossil fuels, especially natural gas, will have a role to play in the transition as the world dials down on high carbon content fuels and transitions to clean energy.

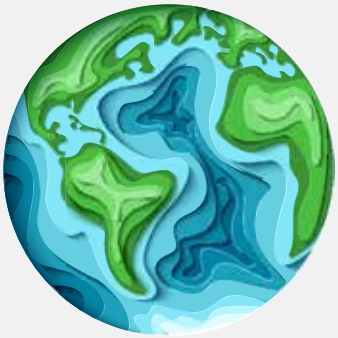
The actions that we take in this decade will be vital. Different technologies and user sectors will have varied trajectories with some segments like steel, cement, shipping and aviation being harder to abate, but nonetheless must be addressed eventually. Evolving the right cocktail from among these complex and varied choices would require a clear direction to be set. In the context of the challenges one has on the environment which many now consider to be one of the most existential challenges for the world, radical transformation and far reaching changes are required. All such deep changes require a North Star goal to navigate the journey. Every country, every industry and indeed everyone has to steer course based on those ambitious goals and define the pathways for achievement. For nations, that goal must be Net Zero or better, and in a timeline that the global environment can support.The timeframes will inevitably vary by country given that nations are at

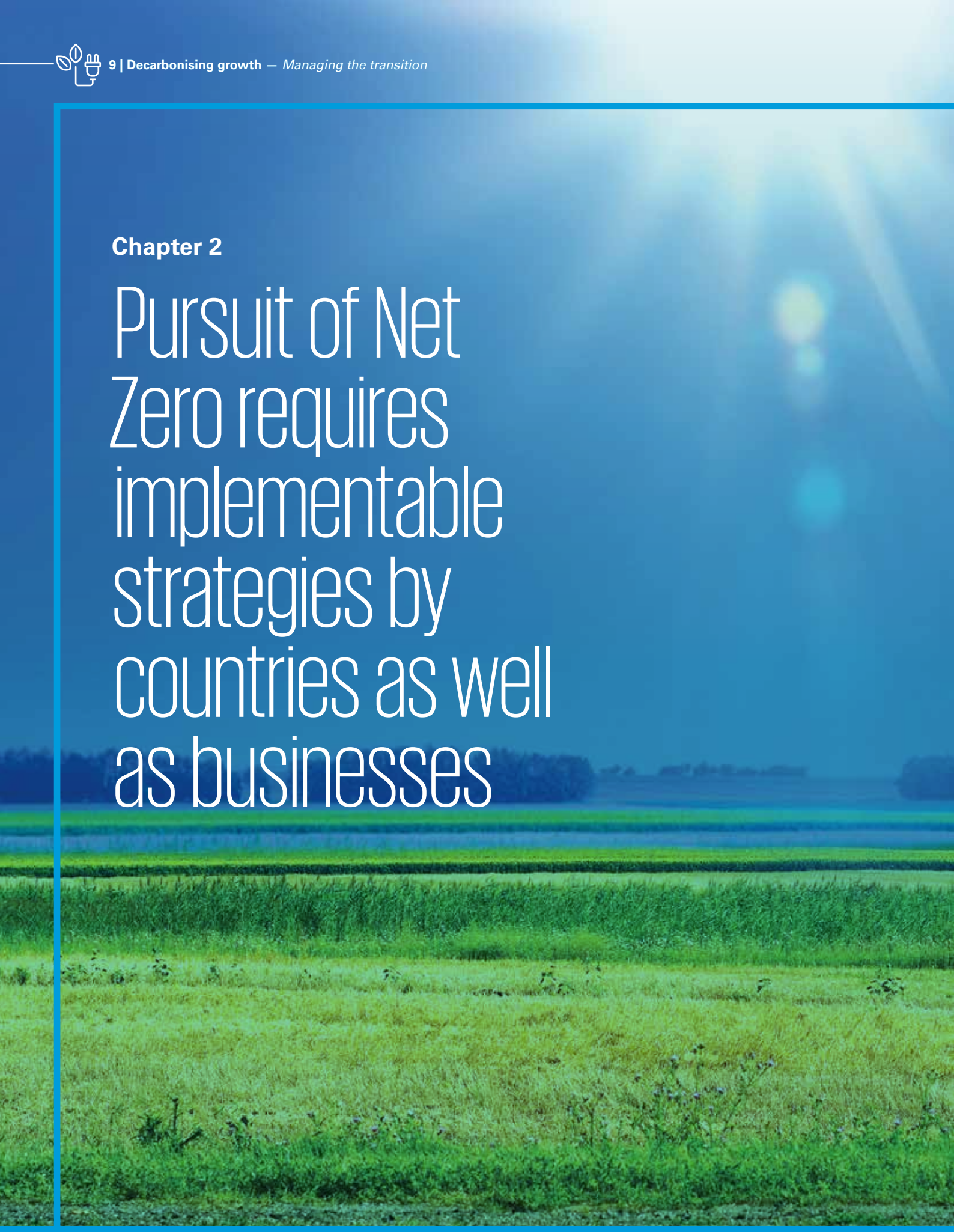
1. A brief history of climate change, BBC, September 2013
2. United Nations Framework Convention on Climate Change, United Nations, 1992
3. Energy intensity, Global Energy Statistical Yearbook 2020, accessed on November 2020
4. Agreement at COP 21 Paris Climate Conference, 2015

various stages of maturity and advancement. However, recent times have witnessed an increasing commitment from countries for this common cause. Indeed, several major nations have set those outer limits of time for themselves –for example Uruguay plans to go Net Zero on carbon emissions by 2030, Finland by 2035, Sweden by 2045, Canada, European Union, Japan, New Zealand, South Korea, Switzerland and the U.K. by 2050, China by 2060. More could follow as public opinion across the world comes to recognise the need for reversal of course before it is too late.

The transition to Net Zero will involve many dimensions covering infrastructure, technology, capital and above all people who will need to act together to make this happen. In a world struck badly already by COVID-19 effects, whose full effects are yet unknown, there would be inevitable challenges. However, the pandemic has also reaffirmed sustained commitment to the global climate goals rather than divergence from them. It gives the world the hope that we can win this battle to turn the clock on the greatest challenge that the world faces.

COVID-19 has emphatically proven to us that global catastrophes are not just scenarios and can actually play out. The biggest risk for the world is climate change. We are possibly late on this agenda but perhaps can still solve this.





Chapter 2

Pursuit of Net Zero requires implementable strategies by countries as well as businesses

Countries need to design deliberate pathways to meet their climate commitments

At the Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015, the parties to the Paris Agreement pledged to "hold the increase in the global average temperature to well below 2°C above pre-industrial levels". There is a clear agreement that a 2°C warmer world would be largely unsafe and there is an urgent need to pursue "efforts to limit the temperature increase to 1.5°C above pre-industrial levels" to "significantly reduce the risks and impacts of climate change."[1]

The Paris Agreement spurred the discussions around Net Zero emissions globally. 'Net Zero' refers to attaining an overall equilibrium between the amount of greenhouse emissions produced and the amount of greenhouse emissions removed from the atmosphere.[2] A Net Zero state would thus imply, that the world could continue to emit as long as the emissions released are equipoised by emissions eliminated or removed.

To achieve Net Zero, businesses, industries, countries, and civil societies have extended strong support towards the U.N. High Level Climate Champions' Race to Zero campaign that aims to mobilise a coalition of leading initiatives[3]. However, despite commitments by several countries and commercial organisations, greenhouse gas emissions have risen by 1.5 per cent every year over the last decade[4]. At this rate, global temperature is expected to increase by 3°C to 5°C by 2100, resulting in disastrous effects across the world.

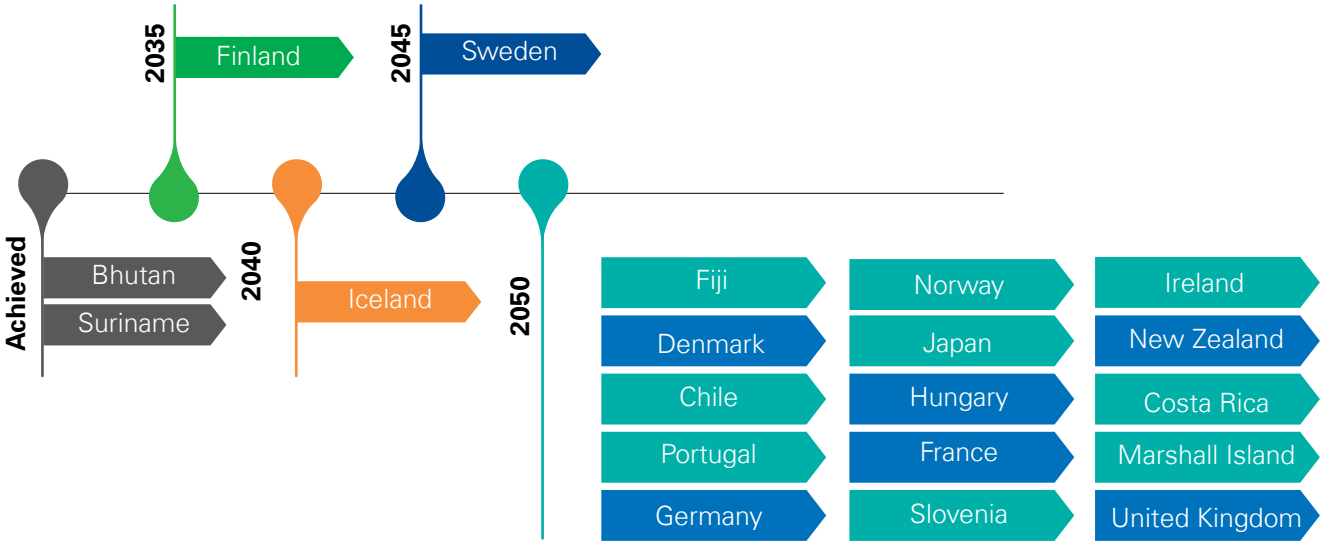
According to the Intergovernmental Panel on Climate Change (IPCC), limiting global warming to 1.5°C requires net carbon dioxide (CO2) emissions caused by human activities to decline by 45 per cent by 2030 and reaching Net Zero by 2050. Concomitantly, the total of greenhouse gas emissions needs to reach Net Zero between 2063 and 2068. Even for limiting temperature rise to 2°C, CO2 emissions will have to decline by 25 per cent by 2030.[5]

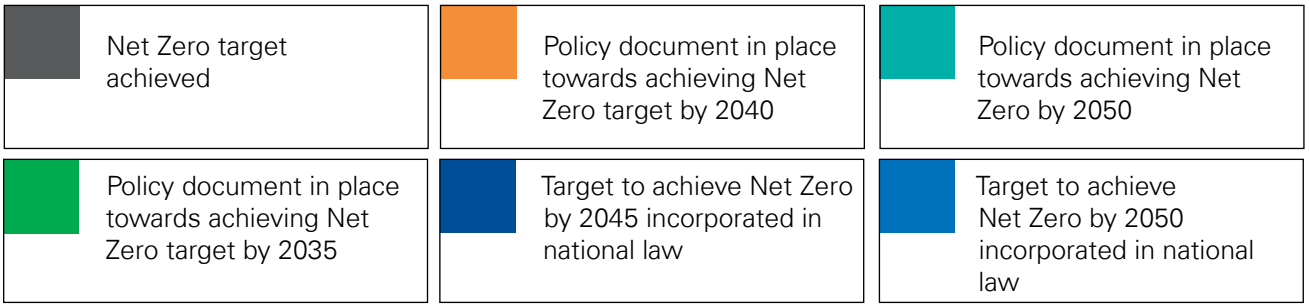
Presently, barely 10 per cent of global emissions are covered by some form of adopted Net Zero target. Forestalling the impending climate change disasters as a result of the unabated emissions worldwide, would thus require a complete and immediate turnaround of the present trend.

1. Paris Agreement, United Nations, Released in 2015
2. What is net zero?, National Grid Group PLC, Accessed on November 2020
3. Race to Zero Campaign, UNFCCC, Accessed on November 2020
4. Cut Global Emissions by 7.6 Percent Every Year for Next Decade to Meet 1.5°C Paris Target – UN Report, UNFCCC, Released in November 2019
5. Global Warming of 1.5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty, IPCC, Released in 2018

To accelerate the transformation required to reach Net Zero by 2050, the Climate Ambition Alliance was formed ahead of 2021 United Nations Climate Change Conference, also known as COP26,[6] to align decarbonisation efforts by countries, corporates, cities and further facilitate the countries to submit their enhanced nationally determined contributions (NDCs), targeting the emission reduction requirements[7]. As of September 2020, more than 120 countries worldwide have committed to Net Zero targets through the Climate Ambition Alliance. Ironically, some of the major contributors such as the U.S., China, India and the Russian Federation do not form a part of this alliance.[8] However, China has pledged to achieve the Net Zero status by 2060. The Russian Federation has published a draft strategy towards achieving Net Zero by 2070, and India has pledged to increase renewable energy capacity to 175 GW by 2022 and further to 450 GW by 2030. In a recent turn of events, U.S. has withdrawn from the 2015 Paris Agreement on climate change mitigation, and more is awaited on its stance towards the global issue.[9]

Figure 1: Net Zero targets by countries[10,11]





Of the countries which have legally adopted Net Zero targets, only two countries – Bhutan and Suriname are carbon negative (as of October 2020).[11] Further, only 20 nations and the European Union have developed sectoral targets, roadmaps and policies which have the potential to achieve the desired outcomes.[12]

Ultimately, for any country, several design factors and implementation choices will determine the effectiveness of these targets and their ability to achieve a Net Zero status in the long-term. This would thus necessitate countries to design careful and deliberate pathways of reducing and eliminating GHGs.

6. Climate Ambition Alliance: Nations Renew their Push to Upscale Action by 2020 and Achieve Net Zero CO2 Emissions by 2050, UNFCCC, Released in December 2019.
7. Chile Launches Climate Ambition Alliance, International Institute for Sustainable Development, Accessed on November 2020
8. The Net-Zero Challenge: Fast-Forward to Decisive Climate Action, World Economic Forum, Released on January 2020
9. Climate change: US formally withdraws from Paris agreement, BBC News, Matt McGrath, Accessed on November 2020
10. Net zero: why is it necessary?, Energy&Climate Intelligence Unit, Released in September 2018
11. Net zero emissions race, Energy & Climate Intelligence Unit, Accessed on November 2020
12. The Net-Zero Challenge: Fast-Forward to Decisive Climate Action, World Economic Forum, Released in January 2020

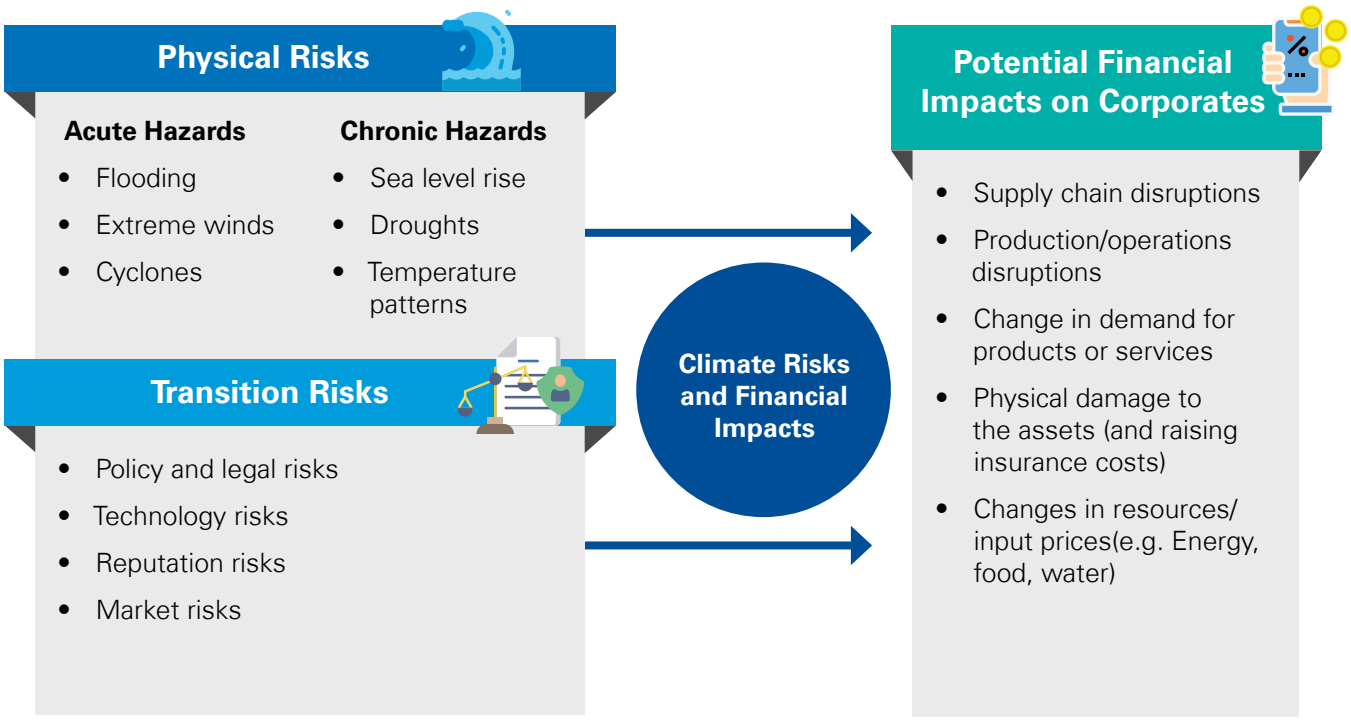
The world now has its eyes set on COP 26 due to be held in 2021. This will be the first Conference of Parties post-pandemic which makes it extremely significant in the context of decarbonisation. The extended period of preparation and the rapidly evolving geopolitical landscape is expected to result in positive climate change dialogues, taking the world a step closer towards Net Zero.

Corporates need to assess the full impact of climate risk including physical as well as transitional risk and make implementable strategies to move towards Net Zero

Globally, an increasing number of companies have made climate change mitigation commitments in an effort to chart a path towards decarbonisation. A larger number of companies are now going for public disclosure on their emissions and setting ambitious targets for themselves. Several initiatives including Science based Targets Initiative,[13] UN - Global Impact, Business Ambition for 1.5°C,[14] B- Corps commitment to reach Net Zero[15] have witnessed enhanced corporate participation in the recent years.

There is enhanced corporate awareness on the financial implications owing to climate change including both physical as well as transition risks. Corporate leaders are increasingly acknowledging that climate risks have real financial impacts and such risks are not only in terms of physical threats in specific regions and countries around the globe, but also in the form of economic hazards related to transition risks.[16]

Figure 2: Climate change risks and potential impacts on corporates[17]



13. Science Based Targets Initiative (SBTi), Climate Action in Financial Institutions, Accessed on November 2020
14. Business ambition for 1.5°C, United Nations Global Compact, Accessed on November 2020
15. Certified B Corporation, Accessed on November 2020
16. These are the business risks that climate change brings, World Economic Forum, John Scott, Accessed on November 2020
17. Shades of climate risk. Categorizing climate risk for investors, Center for International Climate Research, Accessed on November 2020

Physical risks arising on account of extreme weather events and climate change induced disasters are affecting the business globally and have gained traction among financial actors including asset managers, venture capitalists, private equity funds and the investor community at large.

Transition risks emerging as a result of movement towards decarbonisation also impact the risk exposure of organisations significantly and may typically arise on account of policy and regulatory changes as governments around the world adopt legal standpoint on climate change action.

> "As corporates we tend think of straight lines when we project revenues and costs. This is not going to be a straight line. Executives have very little time to be lost on this subject because it is going to bring about the most fundamental transformations of their business models they could ever have imagined."[18]
>
> *Jim Barry, Managing Director, Chief Investment Officer of BlackRock Alternatives Investors and Global Head of BlackRock Real Assets Inc.*

Interestingly, the report by Eversheds Sutherland and KPMG IMPACT incorporating views of more than 500 directors and C-suite executives from the world's leading companies,[18] indicates that corporate leaders are beginning to appreciate that climate risks can carry real financial impact but don't feel equipped to deal with them.

The enhanced corporate awareness is further fueled by stakeholder pressures and increased activism as well as scrutiny of climate-change related disclosures. The number of Net Zero pledges have doubled in the recent years. Over 1,500 companies cumulatively reporting revenues close to USD11.4 trillion and employing nearly 19.3 million, have set Net Zero targets.[19]

The pandemic has created a new level of awareness among investors of the potential financial damage from climate change

18. Climate change and corporate value: What companies really think, Eversheds Sutherland and KPMG IMPACT, Released in November 2020
19. Accelerating Net Zero: Exploring Cities, Regions, and Companies' Pledges to Decarbonise, Data-Driven EnviroLab & New Climate Institute, Accessed on November 2020

Climate Action 100+ (an investor group of 500 firms with over USD47 trillion AUM) recently wrote to the world's 160 largest companies, representing 80 per cent of industrial emissions, to demand they publish strategies to reduce emissions by 45 per cent by 2030 and reach Net Zero by 2050.[20]

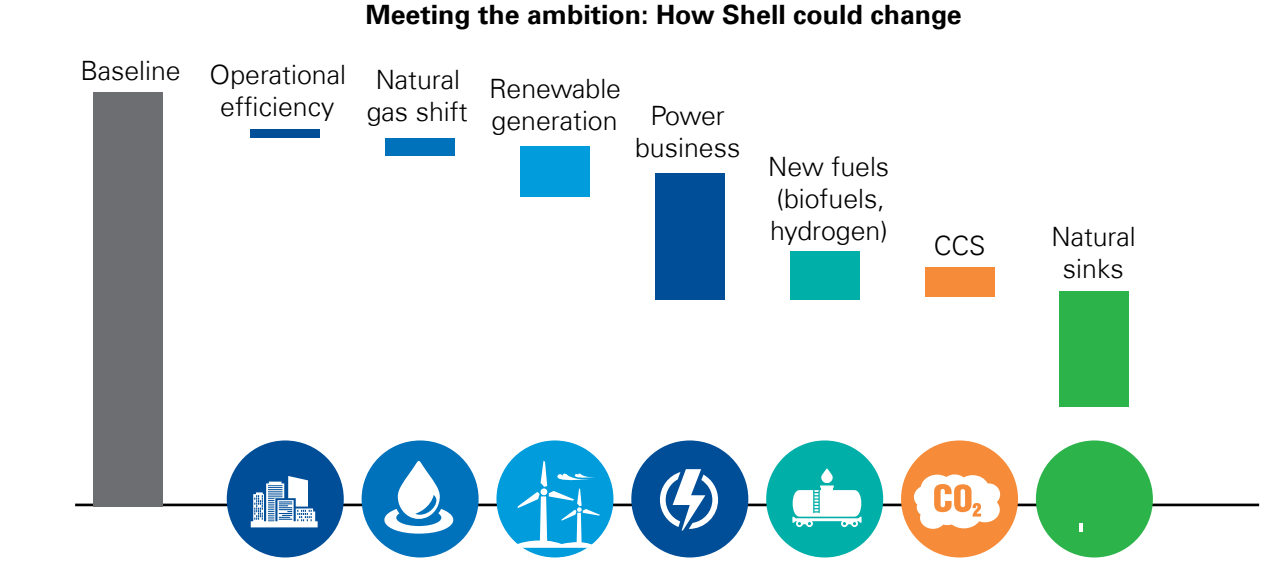
Even in the energy and natural resources industry, where in the past, executives have sought to address ESG concerns from investors by reporting on carefully chosen projects or initiatives, expectations and strategies are changing now. The project by project approach is found to be no more acceptable. As stakeholder pressure increases and results in regulatory pressures for action, the risk to the sector is far enhanced. Diminished asset value and lack of social license to operate may become more evident. We are seeing the recognition of the need to bring in deep rooted changes in business and operating models across industries and some of these trends are captured below. However, the sector at large is yet to substantively start investing into this.

1. **Businesses are increasingly acknowledging that decarbonisation may entail a fundamental transformation in business portfolio**

   Royal Dutch Shell (Shell) announced in April 2020 that it is aiming to achieve Net Zero operational emissions by 2050 and a 65 per cent reduction in carbon intensity of its energy production and sale.[21]

   To chart its decarbonisation pathway, Shell bucketed its role into three areas: energy provider, energy user and partner for change. As an energy provider, Shell is looking at drastically changing its portfolio by focusing on new fuels and power to address emissions from the use of energy products (estimated to generate around 85 per cent of overall emissions). Shell is aiming to reduce the carbon intensity of its energy products by 30 per cent by 2035 and by 65 per cent by 2050 compared with 2016.[21] This is expected to be achieved through low carbon businesses such as renewables, hydrogen, biofuels as well as EV charging/hydrogen refuel stations.

Figure 3: The breakdown of Shell's options for meeting its new 2050 carbon-reduction goals[22]



20. Climate change and corporate value: What companies really think, Eversheds Sutherland and KPMG IMPACT, Released in November 2020
21. 'Shell's ambition to be a net-zero emissions energy business', Royal Dutch Shell, accessed on 4 November 2020
22. 'Shell's Net Carbon Footprint ambition: FAQs', Royal Dutch Shell, accessed on 4 November 2020

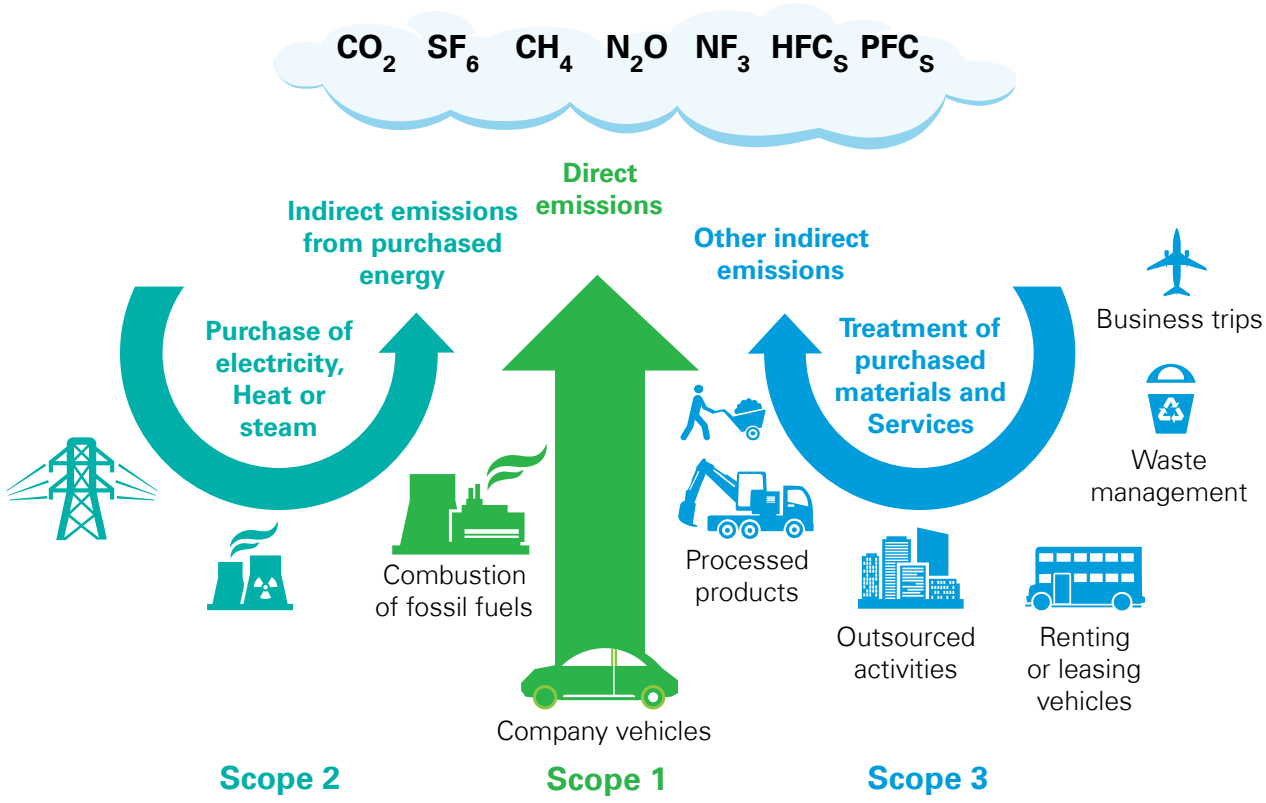
Shell has pursued a combination of organic, inorganic strategies with heavy investment in R&D on new fuel mixes, CCS, and mobility solutions, in its quest. Shell has set up a New Energies business to intensify its efforts in the new and fast-growing segments of the energy industry. Shell has recently acquired companies in this space such as NewMotion, one of largest providers of battery electric vehicle charging points in Europe.[23]

As per Eversheds Sutherland and KPMG IMPACT survey,[24] 74 per cent of respondents agreed that decarbonising the business requires significant changes to the business model.

2. Corporates are looking to decarbonise not only their businesses but their wider supply chain

The decarbonisation strategies of businesses have largely focused on Scope 1 and Scope 2 emissions, but now corporates are taking a more proactive approach to address Scope 3 emissions involving indirect emissions related to the value chain of the company (both upstream and downstream). These are often the biggest source of GHG related to a company's operations and standards.

Figure 3: Emissions across value chain of corporates[25]



Kraft Foods was a participant in the "road test" of the new Scope 3 guidance. Kraft Foods worked with the GHG Protocol and found that value chain emissions comprise more than 90 per cent of the company's total emissions.[26]

23. Shell Sustainability Report 2019, Royal Dutch Shell, accessed on 4 November 2020
24. Climate change and corporate value: What companies really think, Eversheds Sutherland and KPMG IMPACT, Released in November 2020
25. FAQ, Greenhouse Gas Protocol, accessed on 11 November 2020
26. 3 ways business can benefit from Scope 3 emissions reductions, GreenBiz, May 2013

Recently new global standards, GHG Protocol Corporate Value Chain (Scope 3) Standard and GHG Protocol Product Standard have been developed which take a value chain or life cycle approach to GHG accounting.[27] These help businesses identify the hot spots across their value chain and develop strategies for achieving meaningful reductions, not only in their operations, but including the upstream and downstream emissions.

3. Harder to abate sectors are also taking bolder steps to tackle the climate agenda

The biggest hurdles in achieving meaningful decarbonisation may yet be faced by harder-to-abate industries such steel, cement, aviation, shipping, etc. However, Energy Transition Commission[28] has concluded that reaching Net Zero by mid-century by harder- to- abate sectors is possible. Technologies are commercially ready or at research phase for accelerating the transition and this is expected to cost less than 0.5 per cent per cent of the global GDP.

Lafarge Holcim is the first global building materials company to sign the UNGC's "Business Ambition for 1.5°C" initiative, with a 2030 SBTi-verified action plan. Lafarge Holcim is taking a holistic approach on its decarbonisation journey since 1990 looking at leveraging all options including demand management through measures such as better recycling, energy efficiency measures such as reducing clinker, automation, artificial intelligence for creating smart, connected and energy efficient sites as well as adopting technologies such as renewable energy, CCUS, including investing in R&D for future materials such as sustainable cement and green concrete.[29]

Figure 5: CO2 footprint of LafargeHolcim[30]

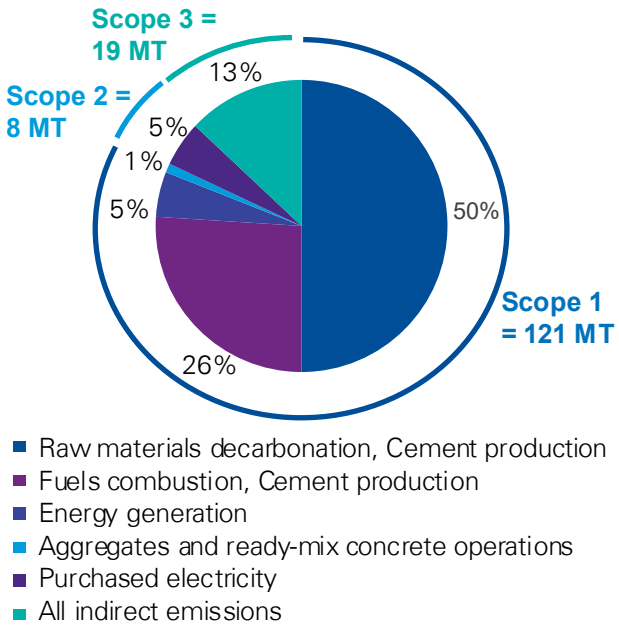
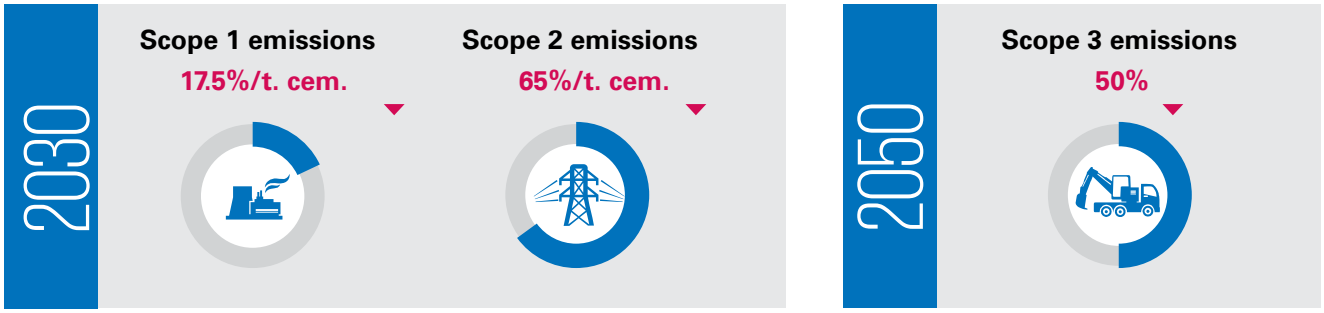


Figure 6: LafargeHolcim's emission targets



(reduction from 2018 baseline)[31]

To accelerate the change in harder-to-abate sectors, it is critical for policy makers, industry associations, investors and businesses to work together without which this vital and technically feasible transition will not be achieved.

27. FAQs, Greenhouse Gas Protocol, accessed on 4th November 2020
28. 'Mission Possible: Reaching net-zero carbon emissions from harder-to-abate sectors by mid-century, Energy Transitions Commission, November 2018, accessed on 4th November 2020
29. 'Becoming a net zero company: Our pledge in numbers', LafargeHolcim, accessed on 4 November 2020
30. Our CO2 footprint, 'LafargeHolcim', accessed on 4 November 2020, Sustainability Report FY19, 'LafargeHolcim', accessed on 4 November 2020
31. Our net zero roadmap', LafargeHolcim, accessed on 4 November 2020 and 'LafargeHolcim Signs Net Zero Pledge with Science-Based Targets', Business Wire, September 2020, accessed on 4 November 2020

4. **Corporates are increasingly taking up audacious goals to move the needle**

It's encouraging to see organisations such as Microsoft recognise that their businesses have a larger role to play in the society in promoting sustainable development through their business practices and cloud-enabled technologies.[32,33]

Figure 7: Microsoft's pathway to carbon negative by 2030[33]

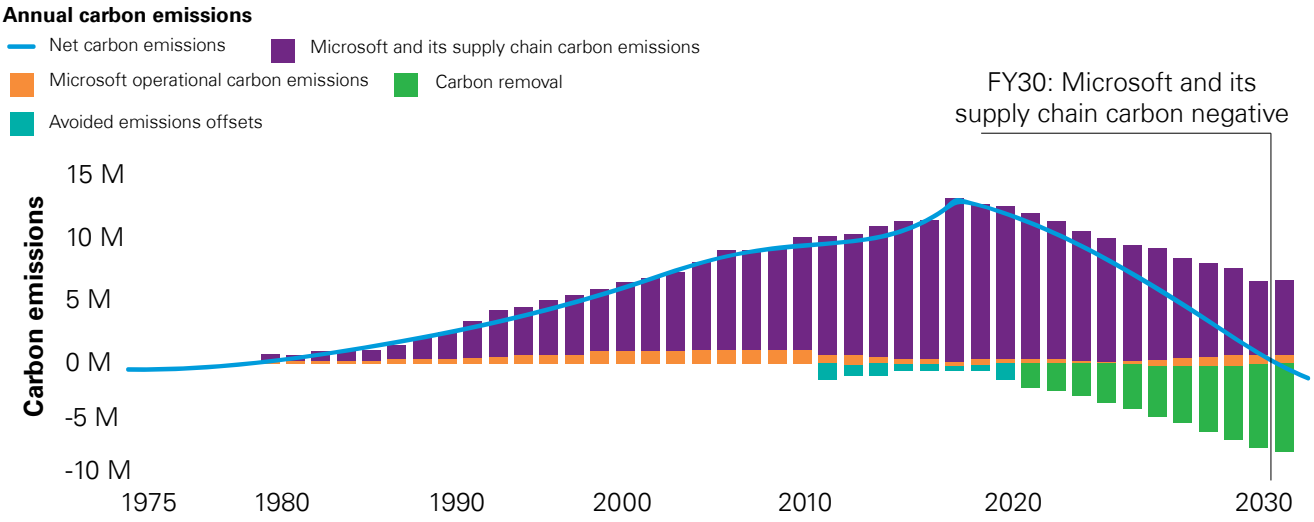
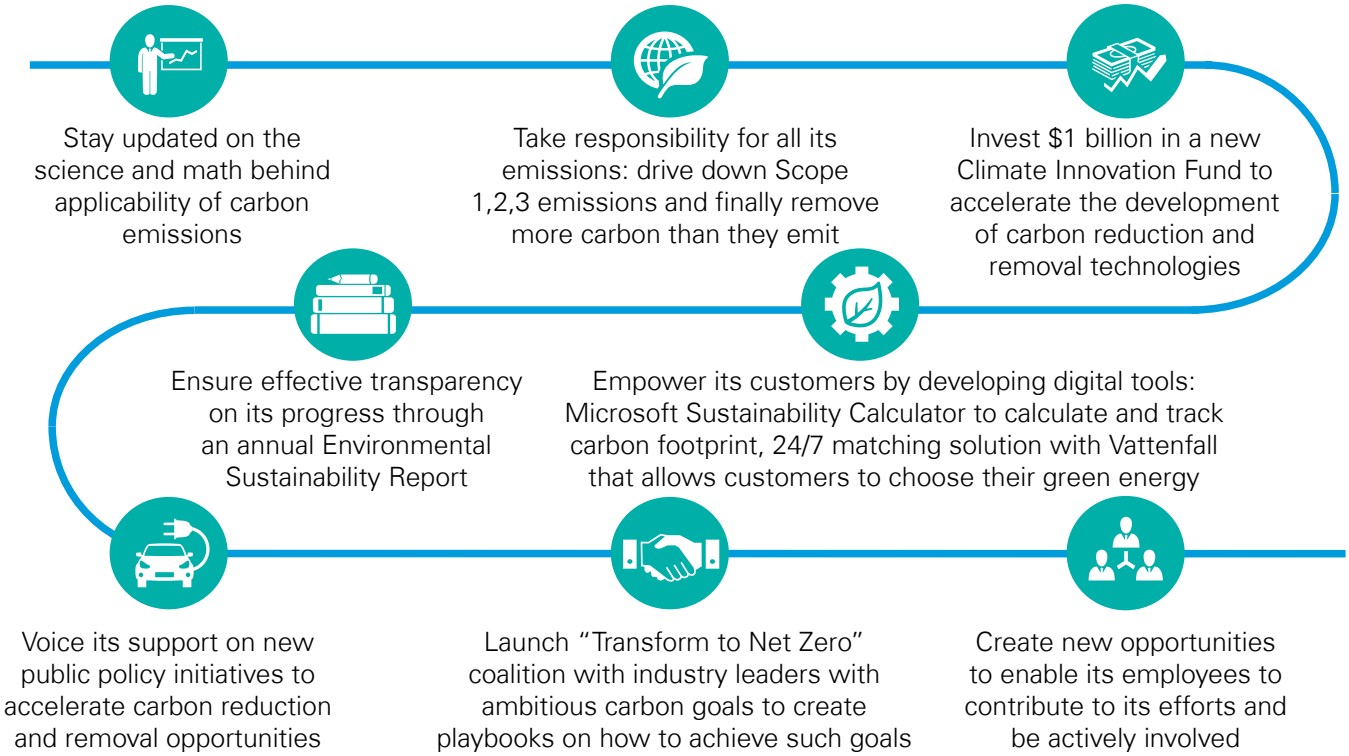


Figure 8: Microsoft's approach principles[33]

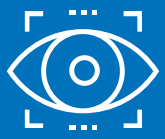


32. Microsoft Sustainability Guide, Microsoft Corporation, accessed on 31st October 2020
33. 'Microsoft will be carbon negative by 2030', Microsoft Corporation, January 2020, accessed on 31st October 2020

Microsoft has not only chartered one of the most aggressive paths towards decarbonisation but also has been playing a strong role in policy advocacy around the world and launching coalitions to help lower emissions and expand clean energy. Microsoft has worked with customers and NGOs to accelerate their low-carbon transformations, including creating a USD1 billion climate innovation fund to stimulate and accelerate the development of carbon removal technology.[34]

Learnings from the decarbonisation journeys

The learnings from the decarbonisation journeys indicate that the transition to Net Zero will require a significant transformation across the organisation with massive reallocation of capital which is likely to create unprecedented challenges. It is imperative that the candidate areas for change are deliberated upon and duly prioritised.

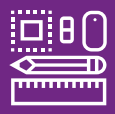


Vision and targets: Businesses need to appreciate the deep financial impact of climate risks and make climate change their pressing agenda with clear vision and targets. The agenda needs to be led from the top.

Business portfolio: Is likely to be affected substantially especially in the energy sector where a substantial part of the emissions comes from the use of the products. Portfolio diversification will need to be a key part of business strategy.

Supply chain: Companies need to look beyond their emissions to the wider supply chain in order to bring about a notable change. It is imperative that companies work with stakeholders across its value chain to incentivise them to introduce green interventions at every step.

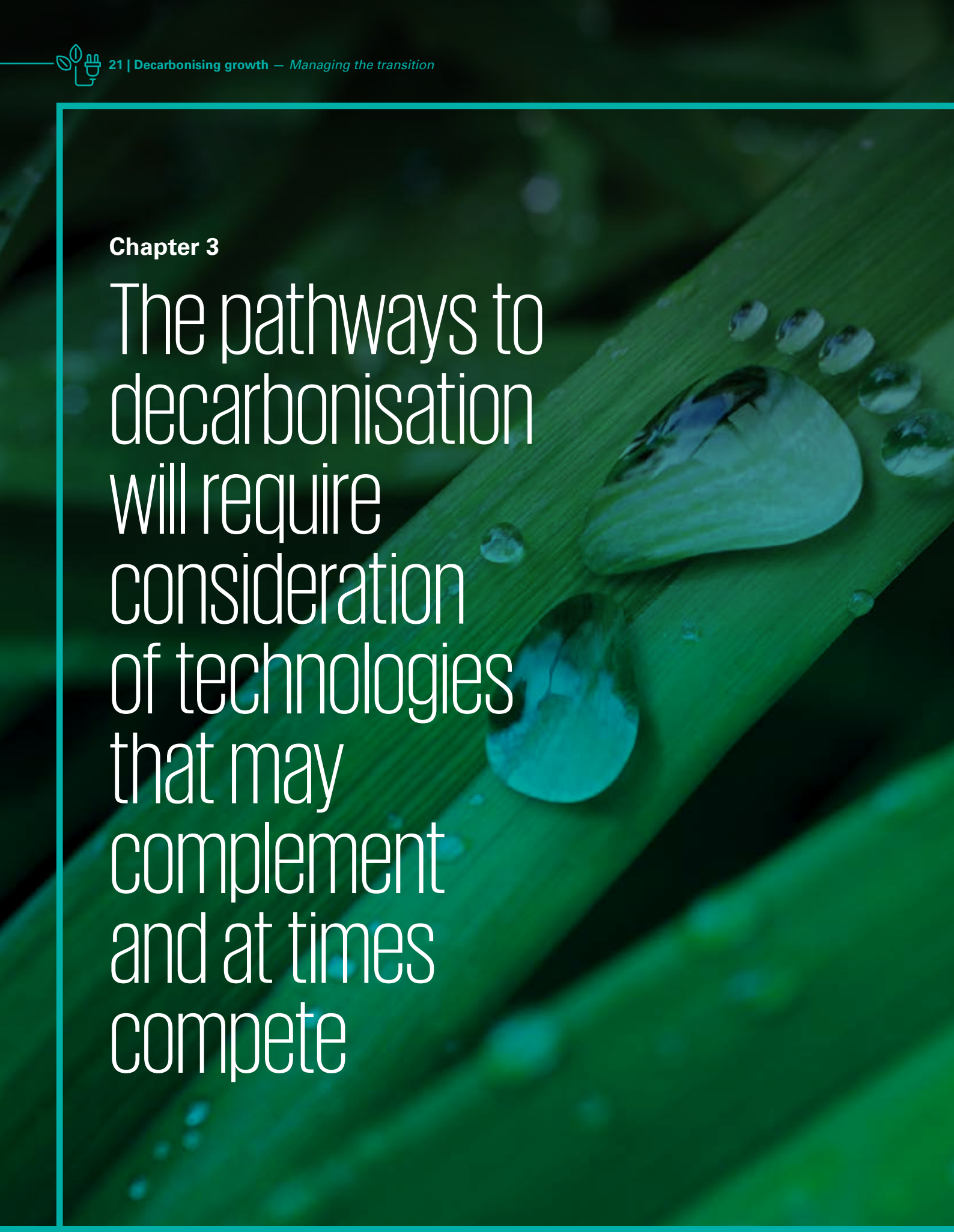
Technology: Businesses will need to evaluate and plan their technological pathways to decarbonisation. Further, as the digital revolution catches up with the sector, boundaries will blur with new areas of competition. Businesses will have no choice but to anticipate and plan for a change in their business models.



Structure: There have to be radically altered organisational arrangements that align to the business imperatives arising from climate change and the need for a deep focus on innovation and agility.

ESG: ESG is no longer a matter of mere compliance. ESG has taken a centerstage in the energy transition/ decarbonisation process. There is a critical link between financing and ESG that has emerged. How this will evolve in practice is a matter that is not well known presently.

34. We are still in, Microsoft, accessed on 4th November 2020



Chapter 3

The pathways to decarbonisation will require consideration of technologies that may complement and at times compete

To attain the monumental Net Zero targets, transformational changes are required in ways in which energy, in all forms, is generated and utilised. This would also require development of innovative technology solutions in varied combinations and applications across all sectors of the economy.

Decarbonisation pathways need integrated approaches

Journey towards zero-emissions will involve adopting following integrated approaches:

Demand management

Demand management can be achieved through circularity, materials efficiency, and demand reduction. This would involve (i) improving recycling and reuse of existing stocks of materials and (ii) reducing demand for materials in key value chains (e.g. transport, buildings, consumer goods, etc.) through improvements in product design, increased lifetime, and innovative service-and sharing business models.[1] In sectors such as steel, cement, aluminum, plastics, ETC[1] estimates the potential of demand reduction by almost 40 per cent globally, while in sectors such as transport, this could be up to 20 per cent.

Energy efficiency

Significant improvement in energy efficiency is critical for energy and industrial systems to achieve Net Zero CO2 emissions. Energy efficiency encompasses reduced flaring and grid losses, improved better building insulation, electric boilers, electric engines, improved aerodynamics and reuse of waste heat.[1] Theoretically, energy efficiency improvements of up to 50 per cent can be achieved in the transport sector; while comparatively modest, yet significant improvements of 10 per cent to 20 per cent could be achieved in the industrial sector.[1]

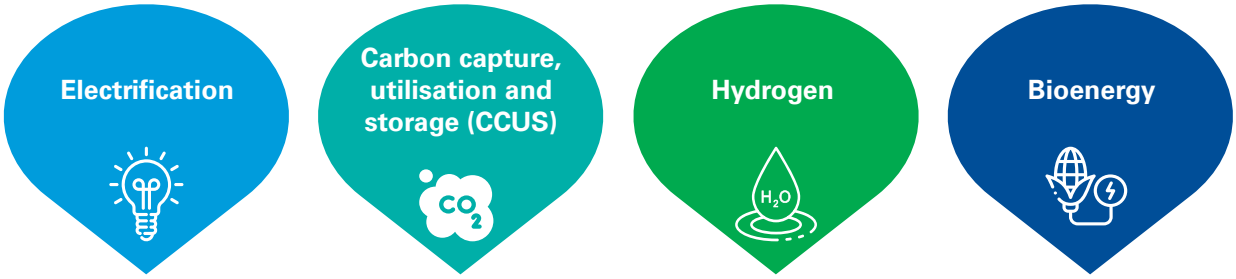
Clean energy technologies

The main sources of carbon today globally are electricity 42 per cent, transport 25 per cent and industries 18 per cent.[2] Power and heavy industry, which account for a large part of the emissions, are also more difficult to decarbonise owing to long lock-ins of the underlying investments especially for developing countries where most of the infrastructure has been recently built. This necessitates the deployment of technologies such as CCUS or hydrogen to decarbonise these sectors, playing a complementary and at times competing role in the technologies stack. The choice between competing technologies would depend upon their maturity curve, investment cycles of the industries and finally the costs.

1. Making Mission Possible, Energy Transitions Commission, Sep 2020
2. CO2 Emissions by Sector in India, Data and Statistics, IEA Accessed on November 11, 2020

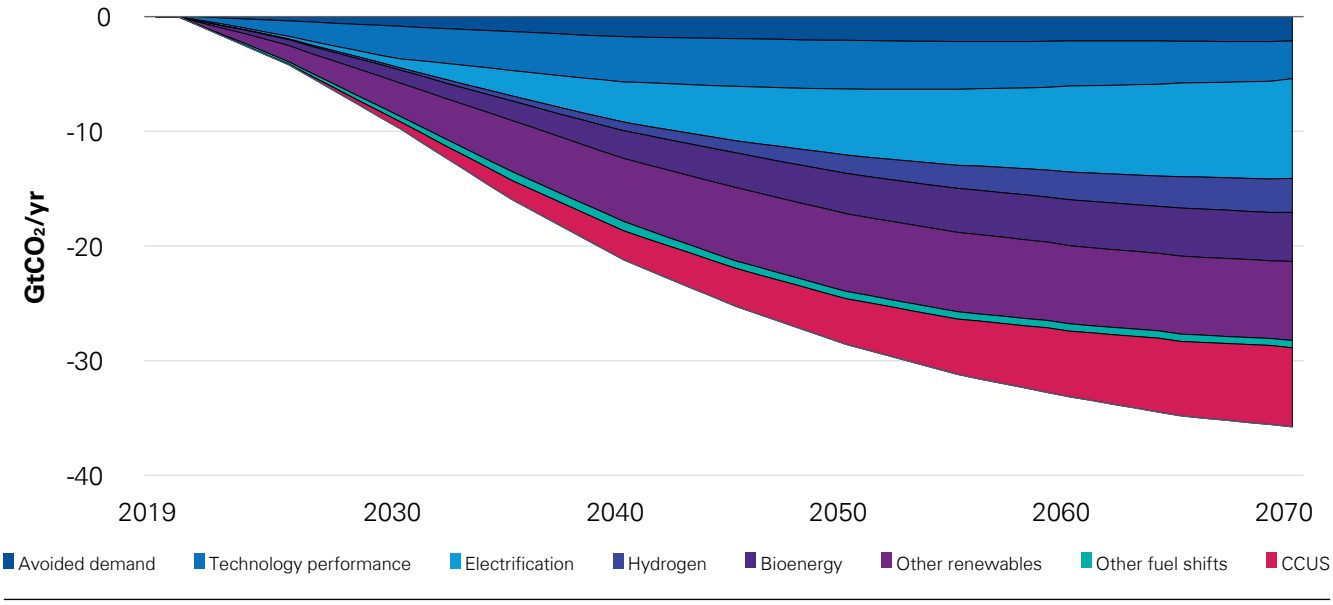
Clean energy technologies are at different levels of maturity and may play complementary and at time competing roles

The four dominant clean energy technology pathways are:



As per IEA, these technologies are expected to contribute to a majority of the emissions reduction efforts over the next 50 years.

Figure 1: Potential impact of clean energy technologies in decarbonisation of various end use sectors[3]



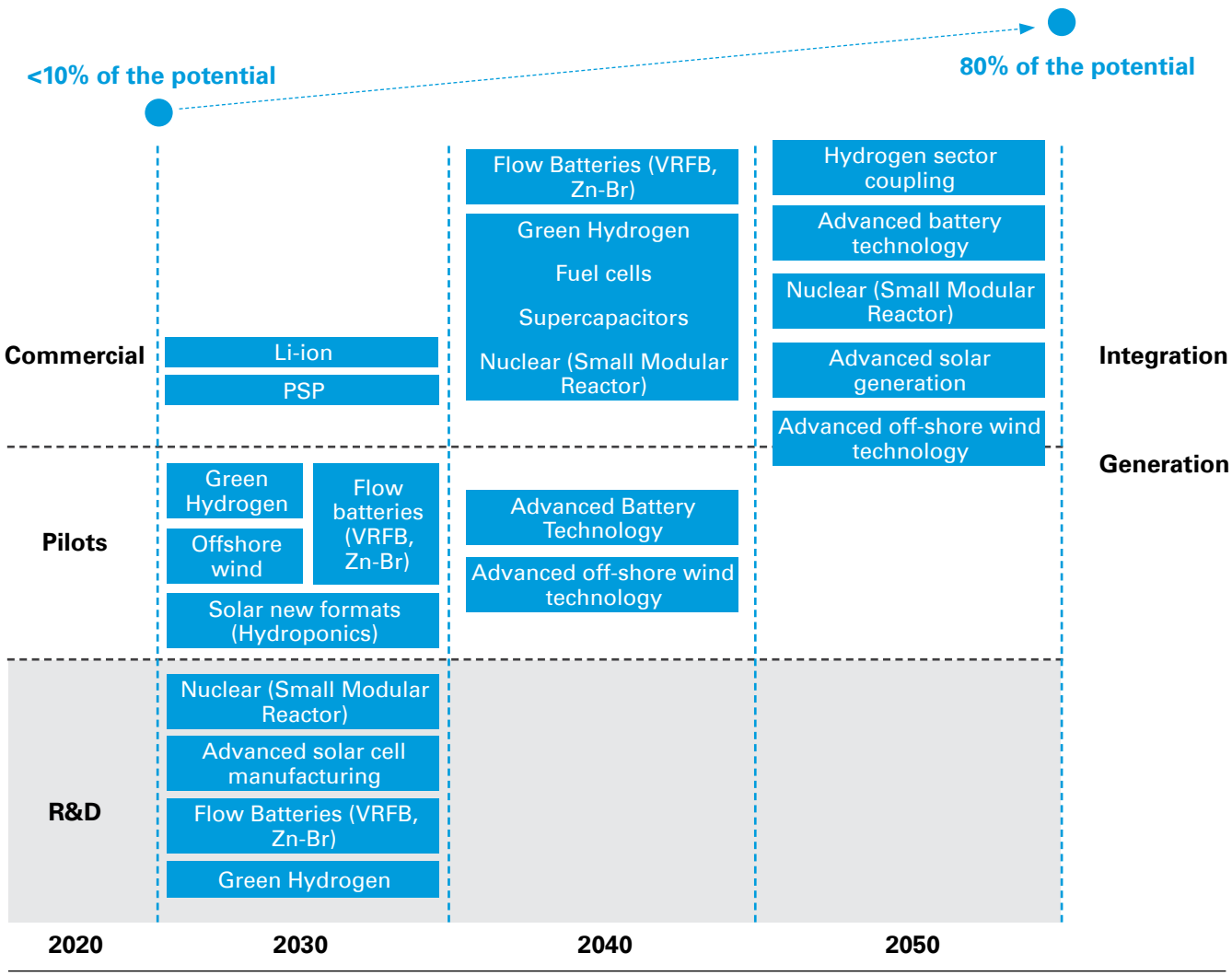
3. Energy technology perspectives, IEA, Sep 2020.

a. **Electrification of end use sectors will be the largest contributor in reaching Net Zero emissions**

The global primary energy demand is expected to increase at a CAGR of 1.2 per cent over next 20 years fueled by population and GDP Growth. The power sector is expected to absorb almost 75 per cent of the increase in energy demand driven by power demand growth as well as electrification of end use segments such as industries, buildings and transportation.[4] Direct electrification will be the primary route to decarbonisation supported by increasingly inexpensive renewable energy and adjunct technologies such as storage in electricity generation for its effective integration.

A detailed plan for deployment of various storage options is required to guide investments in technology development as well as commercial deployment. The plan needs to take into account technical and commercial maturity of the chosen technologies as well as complementary or contrasting roles played by these. For instance, battery storage systems are suited for short-term, quick response requirements while pumped hydro storage systems or hydrogen can deliver long term storage.

Figure 2: Potential pathway for technology deployment for moving from ~10 per cent RE based electricity generation to a predominantly RE-based generation capacity by 2050[5]



4. BP Energy Outlook, 2019 Edition, bp p.l.c. Accessed on November 11, 2020
5. Envisioning the role and operations of various technology options in a renewable energy dominant system: IETP with support from KPMG India and Carbon Trust, Accessed on November 11, 2020

Hydrogen, other than helping in RE integration, is also expected to play a crucial role in extending the demand for renewable energy with sector coupling benefits. Green hydrogen produced through electrolysis (using water and green energy) can be used to decarbonise industries and transport etc.

Figure 3: Electrification value chain maturity assessment[6]

	Renewable Energy & Storage	Infrastructure	Electrification of end-use sectors
Mature	• Hydropower/Nuclear/ Geothermal • Mechanical storage		• Electric trains • Electric cooling
Early Adoption	• Solar PV/Thermal • Wind • Ocean Energy • Coal with CCUS • Large scale heat pumps • Battery storage	• Ultra-high voltage transmission • Fast charging	• Electric heavy duty road vehicles • Hydrogen from electrolysis of water • Heat pumps
Demonstration	• Natural gas with CCUS • Hydrogen turbines	• Dynamic charging • Flexible high voltage or AC transmission	• Electric ships
Prototype		• Fast frequency response • Smart charging	• Electrified aircraft/ chemicals/cement • Solid state cooling

6. Energy Technology Perspectives, IEA, September 2020

b. **Carbon capture, utilisation and storage (CCUS) will be a crucial enabler for achieving Net Zero**

CCUS is an emissions reduction technology used to capture CO2 emissions produced by the use of fossil fuels and is a crucial enabler for fulfillment of "Net Zero" ambitions owing to the following:

— CCUS is a critical technology for decarbonising hard to abate sectors (for instance, steel, cement) especially where investment lock-ins are long and plants are relatively new as for most newly industrialised nations

— It is one of the few technologies that can abate emissions from fossil fuel-based power generation which is one of the highest contributors to global emissions.[7] Coal based power generation alone is estimated to contribute ~30 per cent of total global emissions . While renewable energy adoption is planned in a big way, it may not completely usurp the stranglehold of coal and gas-based power plants for many decades. For instance, more than 500 GW[8] of the global coal-based power plant fleet has been added in the last decade and more than 1200 GW in last 20 years or less.[9] These investments represent substantial lock ins and CCUS could offer a compelling value proposition as a candidate technology for decarbonisation through retrofitting existing power plants

— CCUS is key to building a low carbon hydrogen economy by enabling production of blue hydrogen, which is likely to play an important role in the decarbonising industry on a large scale and at a relatively low cost—Technologies such as bioenergy with carbon capture and storage (BECCS) and direct air capture CCUS also allow for carbon removal which may be the final link for meeting climate goals.

CCUS overview

Capture: It is the first step in the CCUS process chain. In this stage, CO2 is separated from other gases released during the industrial process (manufacturing/power generation).

Transport: After the separation of CO2, the gas is compressed and transported via pipelines, trucks and ships to an appropriate geological reservoir for storage.

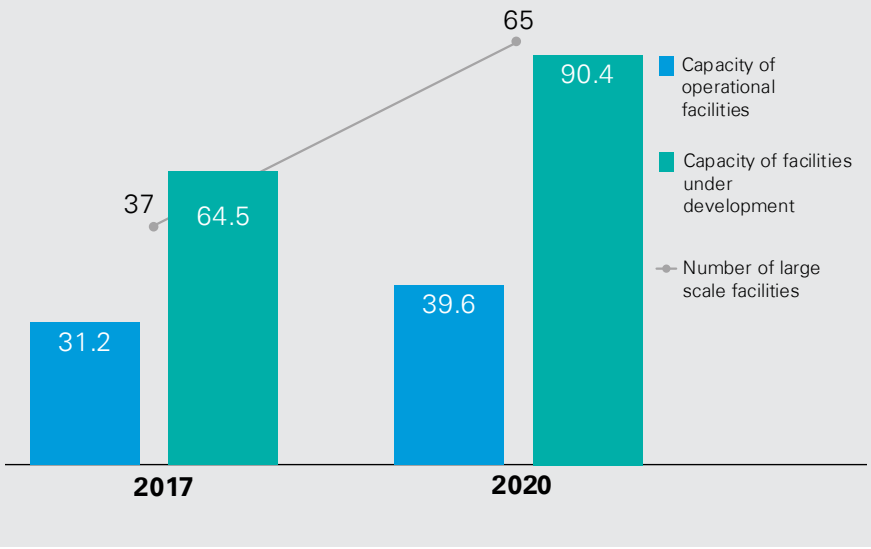
Utilisation: After Carbon is captured, it could be used for making products such as Urea, methanol, plastics etc.

7. Global Energy and CO2 Status Report 2019, IEA, March 2019
8. The Global Status of CCS:2017, Global CCS Institute, Accessed on November 11, 2020
9. Coal Fired Power, IEA, June 2020, Accessed on November 11, 2020
10. Johnson heralds UK green investment to meet climate targets, Financial Times, Accessed on November 16, 2020

As of 2020, the number of large-scale CCUS facilities operational, under construction/ development are 65, of which 21 are operational and have the capacity to capture and permanently store around 40 million tonne of CO2 per annum.[11]

The market which exceeded USD3 billion in 2019,is expected to grow more than two-fold to surpass USD6 billion by 2026.[12] As per IEA, the investment potential of CCUS projects that are close to a final investment decision is estimated to be about USD27 billion, more than double the investment planned in 2017.[13]

Figure 4: Large-scale CCS facilities (2017–20, capacity in Mt)[14]



11. CCUS in Clean Energy Transitions, IEA, Sep 2020
12. Carbon Capture and Storage Market Size, Global Market Insights, published in March 2020. Accessed on November 11, 2020
13. CCUS in Clean Energy Transitions, IEA, Sep 2020
14. Global Status Report 2019, Global CCS Institute, Accessed on November 11, 2020 and CCUS in Clean Energy Transitions, IEA, Sep 2020

c. **Hydrogen is expected to play a key role as an energy vector in the on-going energy transition**

Hydrogen is the most abundant element in the universe but is not readily available in pure form on earth. Instead, hydrogen is usually found chemically bonded in water (H2O), bio-waste, wood, fossil fuels like coal, natural gas, and oil. Presently, the hydrogen industry is well-established, and it has years of experience in the industrial sector as a feedstock.

Figure 5: Hydrogen is expected to play a key role as an energy vector across end use[15]

Sector	Demand	Application	Opportunities
Industrial	Heat	Industrial	A huge potential source for hydrogen demand globally, given the significant portion of the market in which hydrogen can be deployed. Demand is often geographically concentrated around industrial clusters and provides an embedded source of hydrogen demand.
Residential & Commercial		Residential and Commercial	Hydrogen could be deployed to decarbonise residential and commercial heat, with limited appliance modification. This would retain the significant demand volume within the gas network, maximising the energy transmission bandwidth.
Power			In the short term, hydrogen will deliver significant benefit to the power system by providing long term energy storage for intermittent renewable technologies. As hydrogen penetrates the gas system, this will be used to drive lower carbon combustion systems and, in the long term, negative emissions via CCUS.
Transport			The second-largest potential hydrogen demand base, despite being limited due to competition for market share from EVs. Heavy transport in particular offers an attractive long-term source of demand, due to the requirement for light weight propulsion with high power density.

Green hydrogen (produced by electrolysis) and blue hydrogen (from natural gas reformation) have distinct upstream value chains, with unique chemical processes and because of its purity can have multiple applications including for transport. Blue hydrogen production is reliant on CCUS and has associated carbon emissions as it is not possible to capture carbon completely through CCUS.

15. KPMG Global analysis

Figure 6: Overview of types of hydrogen[16]

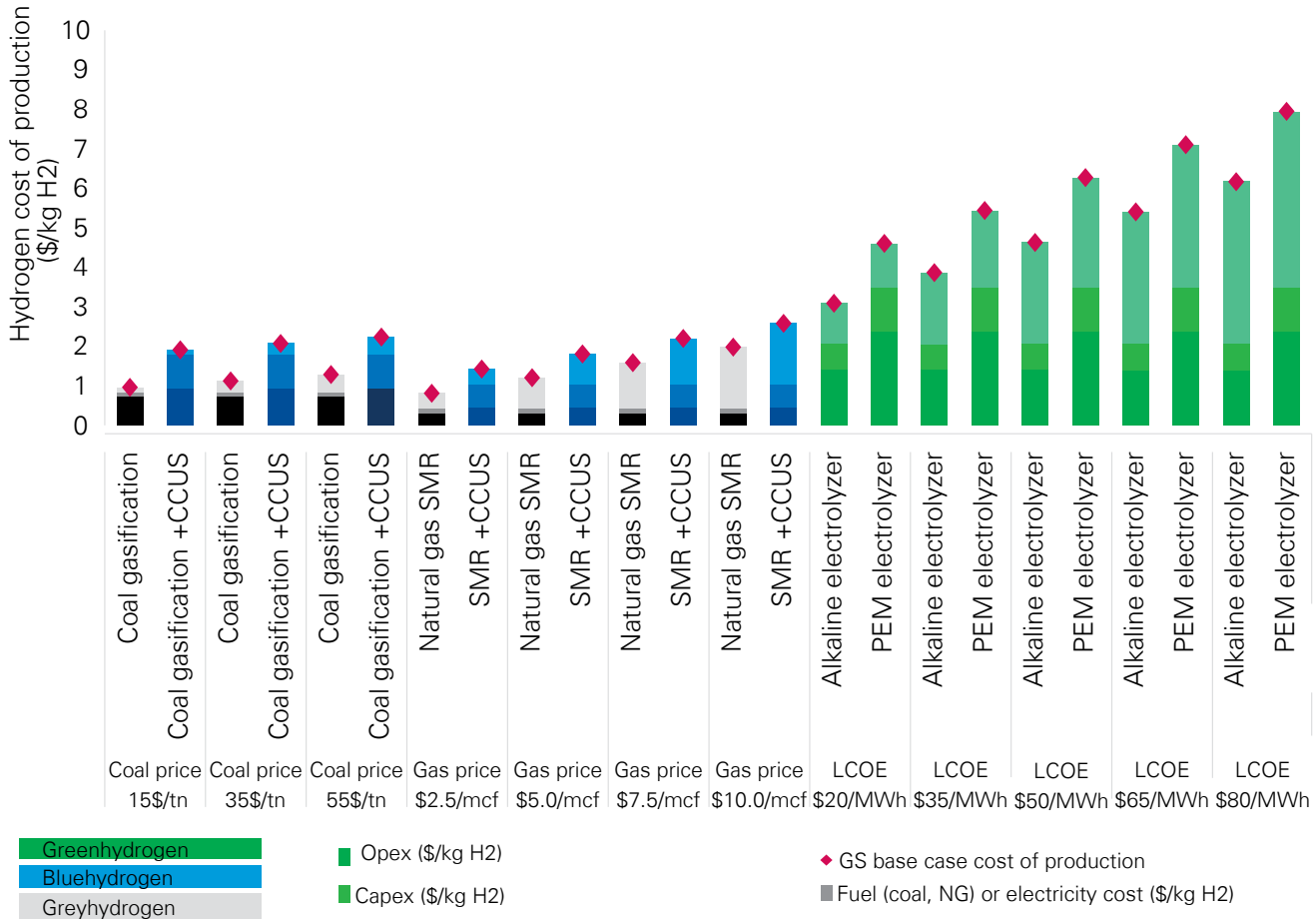
Hydrogen technology	Production method	Production infrastructure	Estimated construction period	Emissions released	Use case
Grey	Produced in steam methane reforming (SMR), auto thermal reforming plant, which separate hydrogen from natural gas through a chemical reforming process	SMR/ATR	3 years	100%	Producing hydrogen for oil refining and other industrial processes
Blue	As grey hydrogen with the addition of CCUS which is integrated with the SMR/ATR plant. In theory, upto 90% of the carbon emission could be captured and stored; however rate of carbon capture varies by facility	SMR/ATR and CCUS infrastructure	4 years	10-30%	Producing low carbon hydrogen for use in industrial processes and heating
Green Alkaline PEM SOE	Renewable electricity is delivered to electrolyser, which pass the current through distilled water. Hydrogen separated from the water molecule passes through a membrane and is collected	Electrolyser	1 year for small projects but 1-3 years for larger projects	0%	Producing zero carbon hydrogen at a purification level that is suitable for use in transport applications, industrial processes and heating

Carbon Capture Utilisation and Storage removes CO2 from combustion process emissions. Operational facilities are able to recover 70-80% of emissions; although the industry is optimistic that this can be improved to 90% in the near future. The gas stream is subsequently redirected to:

1. Recover heat stored in the gas flow (where possible)
2. Use gas to enhance oil recovery, by pressurizing the well; and finally
3. Store the emissions, typically underground in depleted oil wells

16. KPMG Global analysis

Figure 7: Hydrogen cost of production under different technologies & fuel prices[17]



Green hydrogen will help decarbonise hard to abate energy consuming sectors such as transport and industries through sector coupling.

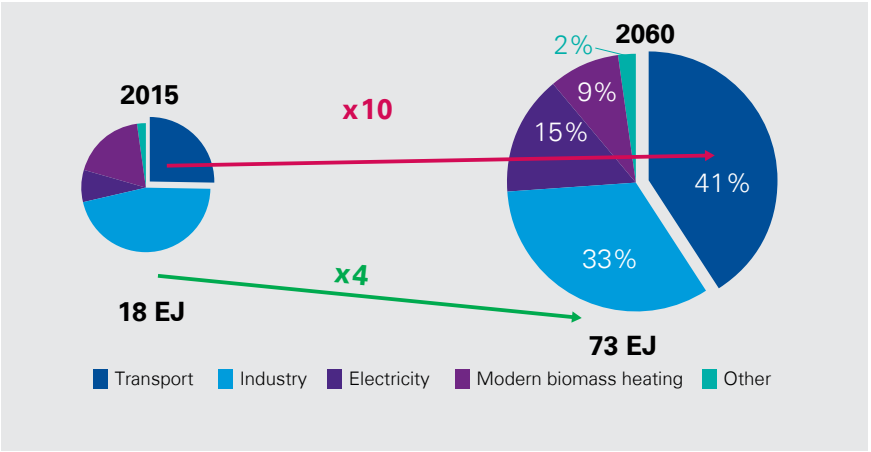
17. Goldman Sachs Global Investment Group, 2019

Bioenergy: As per IEA, Bioenergy contributes to climate change mitigation in case when biomass is sustainably grown using waste/residues and is efficiently converted to displace GHG intensive fuels. Modern bioenergy accounts for 50 per cent of all renewables in total final energy consumption and is the only renewable source that can provide electricity, direct heat and transport fuels.[18]

Currently, two thirds of the modern bio energy is used in industry for heat. Use of bioenergy for electricity and transport fuels (biofuels) have grown in recent years with policy support. Use of biofuels in transport applications is expected to show the strongest growth and is expected to play an important role in decarbonisation of some hard to abate sectors such as shipping, aviation, heavy transport.

The other aspect that makes this technology very crucial is that bioenergy can also be a form of negative emissions technology when linked with CCS (BECCS or Bio-CCS) as discussed before. BECCS is a class of technologies that is being considered as the most scalable negative emissions option; the technology captures CO2 released from bioenergy applications and addressed through CCUS. While, the BECCS technology, like other CCUS technologies has current cost barriers, declining technology cost

Figure 8: Modern bioenergy in final energy consumption[19]



is expected to bring the cost of BECCS implementation down. However, an increasing concern is that once the technology matures and reaches the stage of large-scale deployment, its cost could significantly grow due to limited land and other resources.

Technologies for generating biofuels from industrial waste have been generating significant interest and these transcend the limitation of availability of organic biomass. LanzaTech, one of the early adopters of CCS technology to produce biofuel, has partnered with various companies across countries to boost biofuel-focused R&D. The company manufactures ethanol by fermentation of industrial waste using anaerobic bacteria. The ethanol so produced can be used as a low carbon fuel and can be converted to other fuels such as jet fuel, diesel, and household products.

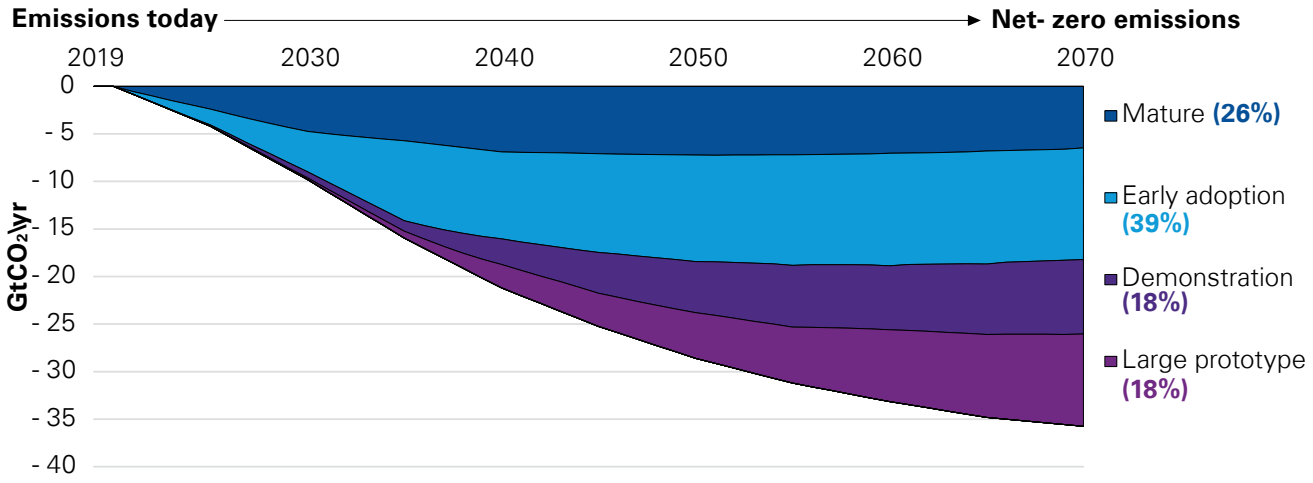
Unlike electrification, use of biofuels can be expanded in the near-term without significant investment into infrastructure or changes in vehicle fleet or building equipment stock. Biofuels can be used to achieve significant reduction in emissions in the near-term in synergy with the longer transition to electric applications. In addition to significantly reducing emissions, biofuels can reduce NOx & PM (Particulate Matter) emissions. Biofuels can be used to complement efforts to increase efficiency and transition towards electrification of vehicles and buildings— especially for applications where electrification is expensive in the near term or those that have long-lived existing capital stock and are expected to play a crucial role in decarbonisation pathways of many businesses.[20]

18. Global Bioenergy, IEA Bioenergy, Luc Pelkmans, May 2020
19. IEA Bioenergy Roadmap, 2017
20. The Role of Renewable Biofuels in a Low Carbon Economy, MJ Bradley and Associates, February 2020

Companies need to select and back R&D efforts required for bringing technologies to market based on investment cycles

There are scores of clean energy technologies currently being developed along these dominant technology pathways across all sectors of the global economy. These technologies are at widely varying stages of development as per the Technology Readiness Level (TRL) which is used to rank the maturity of a given technology. Technologies at a Prototype or Demonstration stage would typically take significantly more time and effort than those at early adoption stage to gain wide-spread acceptance and recognition. As per current estimates by IEA, the technologies which are in the current mature technologies stage are expected to reduce the emissions by only 26 per cent. This requires collective R&D and innovation efforts to be made on technologies that are in various stages of development.

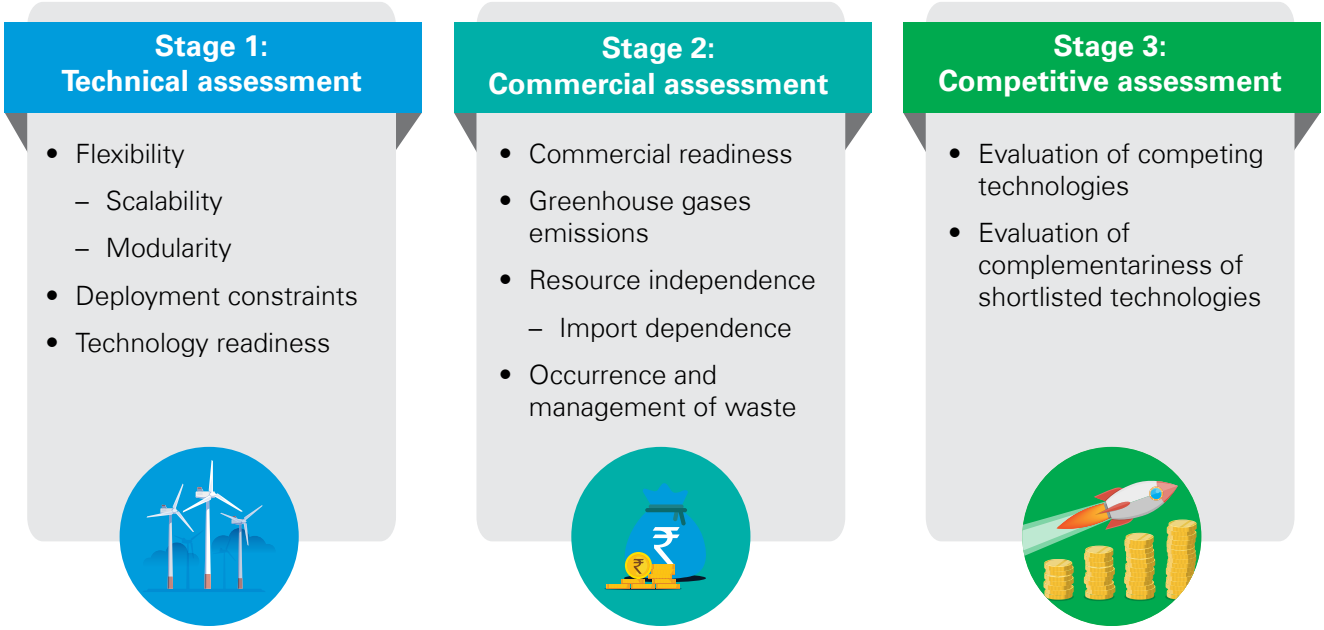
Figure 9: Global energy sector CO2 emission reduction as per Sustainable Development scenario[21]



Businesses need to select and prioritise relevant technologies as per their areas of operations. This is easier said than done, companies generally straddle multiple priorities and their approaches for technology selection and prioritisation may end up becoming unbalanced. Here it would be important to develop objective frameworks based on the company's key decision criteria to comprehensively assess, select and prioritise the right technology portfolio.

21. Energy Technology Perspectives, IEA, September 2020

Figure 10: Illustrative evaluation criteria for decarbonisation technology assessment.[22]



Further, for some industries investment cycles can be as large as 25-30 years making it necessary for such industries to take a view on technologies keeping in view the technology lock-ins in conjunction with the maturity curves of different technologies. E.g., most steel mills have basic oxygen furnaces which burn coke. These basic oxygen furnaces typically have a long life and thus have long technology lock ins. The decision to evaluate CCUS v/s hydrogen (which can be used as a fuel if electric arc furnaces are deployed post retirement of the oxygen furnace) could depend upon the investment cycle of the business along with the maturity curves of these technologies.

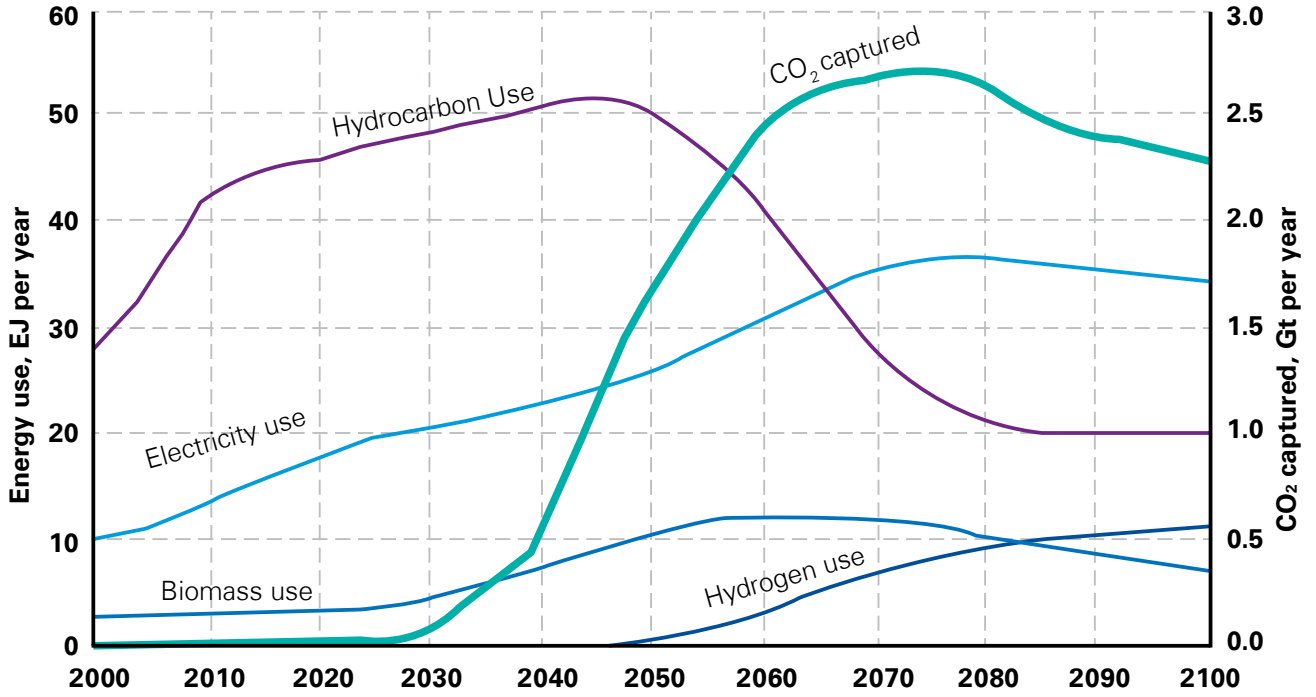
This makes it imperative for businesses to select technologies based on defined frameworks and to evaluate deployment while considering their investment cycles, to appropriately time and accelerate their innovation efforts.

22. KPMG India analysis

Businesses will need to manage interplay with competing technologies and hedge their risks at the same time

Competition interplay between various technologies is very interesting. Companies have been busy managing these competing technologies. For example, Shell, a global energy supermajor has envisaged a Net Zero future for heavy industries under the Sky scenario, with co-existence of dominant technological pathways as under:

Figure 11: Heavy Industry story under 'Sky' scenario[23]



Here Shell has considered early realization of CCUS & electrification over hydrogen in heavy industry. At the same time, Shell has consciously kept space for hydrogen growth starting 2050 onwards, thereby upholding the basics of portfolio approach for risk hedging.

On similar note, bp, another energy supermajor is seeking early positions in hydrogen and carbon capture technologies, while building out a customer gas portfolio to complement these low carbon technologies. While sticking to cleaner fuel story, they have also taken great strides into EV space. It is evident here that companies are harmonizing their technological efforts considering that most of these technologies are competing and eventually one can dominate other. Thus, preparing the right portfolio and keeping it hedged is important.

23. Decarbonizing Heavy Industry, Shell, David Hone, May 2018

Ultimately, governments will have a role to play in bridging the gap of the unknown

Though global majors are cautious and are placing their bets on multiple technological pathways to create a balanced portfolio which can meet the rigors of time, investment size, and changing customer preferences, there are still some risks that are unforeseen. We see it as a place where Government policy support and guidance is essential to bridge the 'gap of the unknown'.

The risks are considerable. COVID-19 has been the biggest unknown of recent times. Governments need to address the basic premise that new technologies and business models come with greater uncertainty. They need to support in addressing perceived investment risks viz., country risks, consumer awareness and uncertainty through robust policies and fiscal mechanisms and by facilitating innovative financing mechanisms including insurance products to overcome high upfront costs and de-risk private investments.

Summing up, technological uncertainty towards Net Zero future is immense. Companies need a balanced portfolio approach towards various technological pathways, they need to time their periodical capex investment cycles with available technological choices. Technology's gestation cycles are uncertain, and businesses need to adopt a balanced and more integrated approach to hedge risks across the technological spectrum. Governments need to steer this change by focusing on risk alleviation through stable policy reforms, fiscal and monetary stimulus.

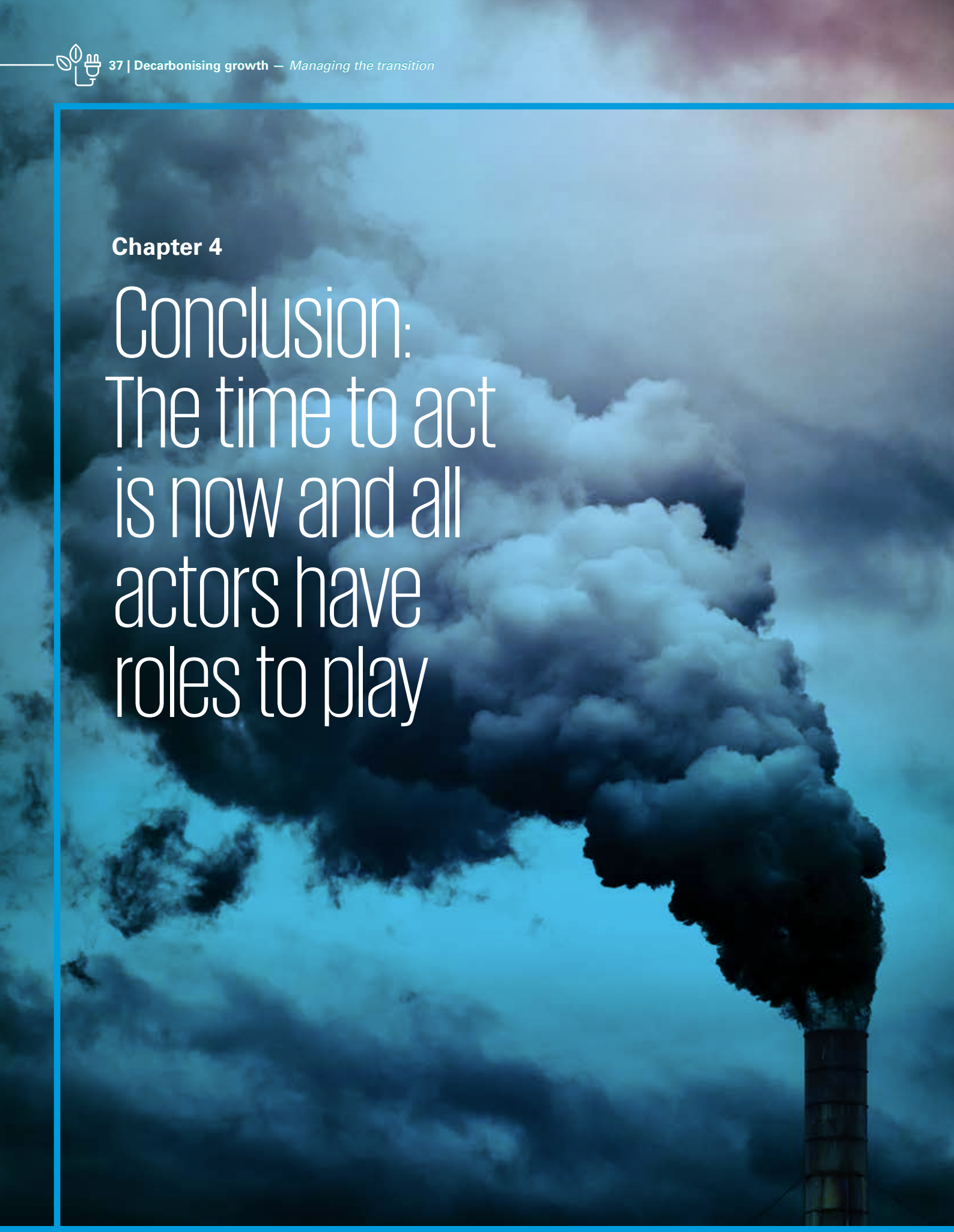
Key priority

- **Key priority 1:** Identify portfolio of technologies to meet your 'Net Zero' target in your areas of operations
- **Key priority 2:** Align your investment horizons with evolving technology types. Plan for high gestation period for technological maturity
- **Key priority 3:** Integrated approach through multiplicity of bets could be important owing to inherent high risks
- **Key priority 4:** Governments need to steer this change by focusing on risk alleviation through policy reforms and stable fiscal and monetary stimulus

> We need more than ever the courage to think in a new way, the strength to leave familiar paths, the willingness to try new things, and the determination to act faster, convinced that the unusual can succeed - and must succeed if the generation of today's young people and their descendants should still be able to live well on this Earth[24]

Angela Merkel, German Chancellor

24. I'm using all my strength to fight climate change, says Merkel, Reuters, Reuters staff, published on 31st December 2019



Chapter 4

Conclusion: The time to act is now and all actors have roles to play

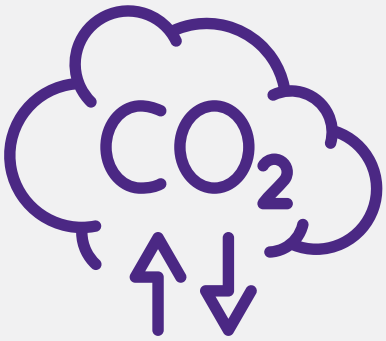
As we are entering the age of consequences from climate change, decarbonisation and Net-Zero are no longer buzz words. They are realities that need to be adopted rapidly as we are running out of time. This decade for action will determine the course of mankind. As the confluence of events are increasing the complexity of risk, the solution also will require an integration of thoughts and initiatives towards the common pursuit. Governments, business and society have to collaborate to accelerate the change. In this renaissance, policy, technology and behavioral change are three aspects that will play the key roles.

Policy goals have to be ambitious. The European Green Deal is the EU's move towards a sustainable transition. It is very important to look at financing not just clean technologies but also to help the sectors to transition. The Just Transition Mechanism is supposed to address the socio-economic impact of the transition. It is important that we anticipate investments which are devised inclusive of the impacts that will be resultant of the transition.

Regulation has to converge and the disconnects between inter-sectoral regulation (and regulators) through the supply chain have to be minimised. Disconnects exist between policy goals and regulation on various facets involved in tackling climate change. For example, the targets around biofuels need to be evaluated against the impacts of land-use change and resulting food security and biodiversity challenges. Similarly, directional climate goals for power production from renewables may not align with plans for fossil fuel production and associated regulation. As of now, the number of countries who have put together integrated policy and regulatory approaches in the current stage of journey to Net Zero is small. This needs to accelerate.

Managing the transition will require dexterity. The world's ways of producing and consuming energy are manifested in the present energy asset base which is not only large but also involves the lives and livelihoods of a very large number of people. Without compromising on the climate goals these people at large cannot be losers in this transition. Hence, new, cleaner ways of utilising the current asset fleet before phasing them out will be a key. The transition paths will inevitably involve the

The price of carbon will have to be internalised and is no longer an externality. Regulations will increase which will push internalisation of carbon cost



cleaner methods through coal gasification accompanied by CCS/CCUS, hydrogen production, etc. However, it will also require red lines around polluting usage and technologies to be drawn out much more boldly.

Technology evolution and the costs of clean technology will play a super-critical role. The Net Zero goal is heavily betting on new technologies. Hence the progress on these must be backed with appropriate emphasis on R&D. The technology pathways have also the potential to compliment and to compete. But careful planning can achieve complementing ecosystem. For example, the improvements in renewable energy coupled with hydrogen production and CCUS can help extend the decarbonisation in many other industry segments which use other forms of energy beyond electricity.

Collaboration will be a key. Technology also needs support from institutions that can carry out research and funding. Deep tech research takes longer time compared to application tech to reach the market, but it is essential to solve the climate crisis. There must be a collaborative eco system that needs to be evolved between corporates, investors, start-ups and academia to ensure we succeed in developing some path breaking innovation which is crucial to our climate solution.

Behavioral change will be the critical part of the process to solve. We need to talk about diets, eating habits, consumption patterns, building efficiencies etc. The challenge that resulted from the tragedy of commons will not be solved without a collective good for society. Appropriate standards to benchmark and make conscious decisions will also play a key role in behavioral change and market creation. Creative communication will also be a key.

There is a clear role and responsibility for everyone in the decarbonisation journey. Below are some of the key changes that are required and how they can be actioned.[1]

1. Making Mission Possible report by ETC and KPMG India analysis

Change	Responsibility	Action
Pricing Carbon	Energy Companies, Investors, Governments	• Pursue international agreements while setting differentiated prices across sectors which are defined in advance. Consider the lifecycle impact while setting up the price.
Enhancing Investment in Green Technology	Investors and Government	• Develop financial products for Green investments viz., credit guarantee schemes, insurance products etc. • Enhance investment into R&D and commercial deployment of decarbonisation technologies for harder-to-abate sectors • Create financing mechanisms for an inclusive transition
Manage technology uncertainty	Companies and Government	• Identify portfolio of technologies to meet your 'Net Zero target in your areas of operations • Align investment horizons with evolving technology types. Plan for high gestation period for technological maturity • Integrated approach through multiplicity of bets could be important owing to inherent high risks • Create conducive environment for deep tech R&D and innovation
Risk Alleviation to bridge the gap of unknown	Governments and Investors	• Policy reforms, stable fiscal and monetary stimulus and facilitating financing including insurance products • Push for more transparent disclosures
Creating demand for green products & services	Customers and Consumers Standard setting bodies	• Make voluntary "green procurement" commitments of e.g. industrial components, building materials, trucks, etc. • Evolve standards that can help in benchmarking and decision making
Regulations	Government	• Provide commercial safeguards to responsible businesses • Focus on material changes that are required

A large part of the change process is political and hence unity of political vision and actions will be a critical change lever. The recent US election results could significantly alter the political discourse and the fissions in the global political leadership on the course of action, especially in the coming 3-4 years which will be critical for the foundational efforts for reversing the trends and for the low carbon initiatives to become business as usual. There is increasingly deeper awareness and consciousness among people at large, even as there are deniers Such things eventually do evolve, and we may well be at that turning point in history. Especially given that it mostly makes much more economic sense to go low carbon, to conserve and be frugal in resource use. Hence, while there are ominous signs from the centuries of damage, the time to seize the opportunity to turn matters around may be here.

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KPMG

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OUR DRIVE TO ACHIEVE THE EXTRAORDINARY
UNMOVED BY FEAR OR CONSTRAINT
WE'RE DRIVEN BY JOSH AND IT SHOWS

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