HSBC Global Research

5 May 2021

Energy & Climate Watch

Net zero, burgers and jobs

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Equities & Climate - Energy

- World's biggest oil consumer commits to slash emissions and aim for 'net zero' in wave of new country climate targets…
- … but facts on the ground tell a different story; CO_2 emissions are set for 2021 rebound led by an EM coal revival
- Jobs and dietary habits also emerge as political economy dimensions to what 'net zero' emissions mean in practice

Oil powerhouse stakes it claim to climate leadership: Some of the world's largest emitters committed to re-double efforts to cut global emissions at last month's climate summit; most striking was the world's largest oil producer/consumer and second largest emitter, the US, pledging to cut its 2030 net emissions in half relative to 2005 levels. On paper, this puts around 50% of global oil & gas demand in countries that have pledged (to varying degrees) to achieve a measure of 'net zero' emissions in coming decades.

After the talk comes the doing: The US announcement was accompanied by new ambitions set by the likes of Canada, Japan, the UK and South Korea. For many, the formation of policies to turn headline pledges into reality on the ground is still at an early stage and we think that clarity on how governments seek to fulfil aims is crucial in shaping corporate and investor behaviour to align themselves with such goals.

An unwelcome home truth – global emissions expected to rebound sharply in 2021: While world CO_2 emissions saw an historic YoY fall of 6% in 2020 due to COVID-19, they are set to bounce back this year to within 1% of 2019 levels – in our view both highlighting the structural rigidities of today's energy system, and the magnitude of the task to reach global 'net zero' emissions. Coal use in EM economies is set to rise in 2021 to within range of its 2014 peak level; as the single largest source of energy-related CO_2, its continued use at scale is among the largest impediments to reaching global 'net zero'.

Burgers & jobs – the changing narrative around climate action: Almost as soon as ambitious national climate plans are unveiled, questions can often surface over what the implications might be to deliver them. We discuss the political economy connotations of ever more ambitious climate action, where we highlighted employment and dietary habits as two factors at play; both of which have grabbed headlines of late.

EU carbon price is getting hard to ignore as it closes in on EUR50 per tonne CO_2: Having doubled in 6 months, and tripled since March 2020, the EU carbon allowance price has hit all-time highs – we discuss some of the drivers and implications of the movements, including why sentiment is an increasingly important factor.

Hydrogen and carbon capture get high level mentions – have they now 'arrived'? Finally, we note the increased frequency of mentions of these two emissions-reducing technologies in both government and corporate strategies – bolstering their bids to be part of the net zero 'toolbox'. However, as we have previously opined, both need firm policies to facilitate their scale-up and broad deployment.

This is an abridged version of a report by the same title published on 05-May-21. Please contact your HSBC representative or email AskResearch@hsbc.com for more information

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Net zero, burgers and jobs

- Global climate ambitions take a step-change, with the world's second largest emitter now aiming for 'net zero'…
- …but global CO_2 emissions are set to rise sharply in 2021 led by a resurgence in coal
- Ambitious national climate pledges could, in our view, be increasingly met with questions around the implications for individuals' lives

World's largest oil consumer aligns with 'net zero' by 2050

The new US climate targets need a step-up in action to be fulfilled

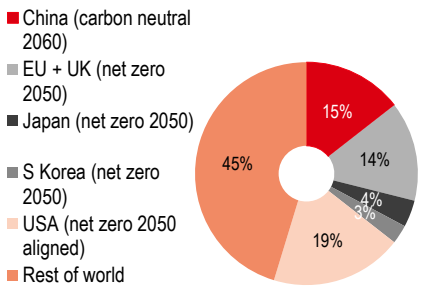
Last week, the US committed to cutting its net greenhouse gas emissions in half by decade-end from 2005 levels (or over 40% from 2019 levels), both raising its near-term ambition level and aligning itself to 2050 'net zero' trajectories – see *Climate Investment Update: Back to the moon as the US aligns to net zero* (23 April 2021). As the world's largest oil & gas producer, the biggest oil consumer, and with the second highest national emissions, the US energy and climate policy matters for global ambitions.

Whilst the recent target is somewhat light on explicit policy detail, the Biden administration has put climate at the forefront of its domestic agenda to date. The new ambition implies an annual decarbonisation rate of roughly 5% out to 2030 and the future use of carbon offsets in put it on a path to meet 'net zero' emissions by 2050; this compares to an average decarbonisation rate of less than 1% a year over 2005-19. For reference the EIA estimates that US energy-related emissions fell by 11% in 2020 but expects them to rise around 5% in 2021.

We have previously highlighted that if the US adopted emissions goals in line with 'net zero', then around 50% of global oil & gas demand would be in countries with similar ambitions to significantly cut emissions in coming decades (if mostly not ratified or legally binding).

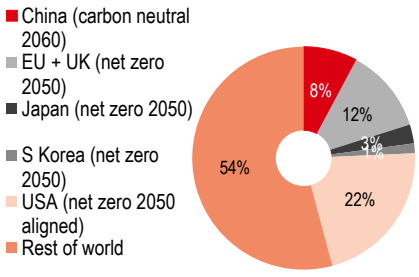
Large portions of global oil & gas demand sit in countries aiming for various forms of 'net zero' emissions

2019 global oil demand



Source: BP Statistical Review of World Energy, HSBC estimates

2019 global natural gas demand



Source: BP Statistical Review of World Energy, HSBC estimates

Ambitions, and on the ground reality, are out of sync for now

Climate pledges have been ramped up, but emissions are set to bounce back sharply in 2021…

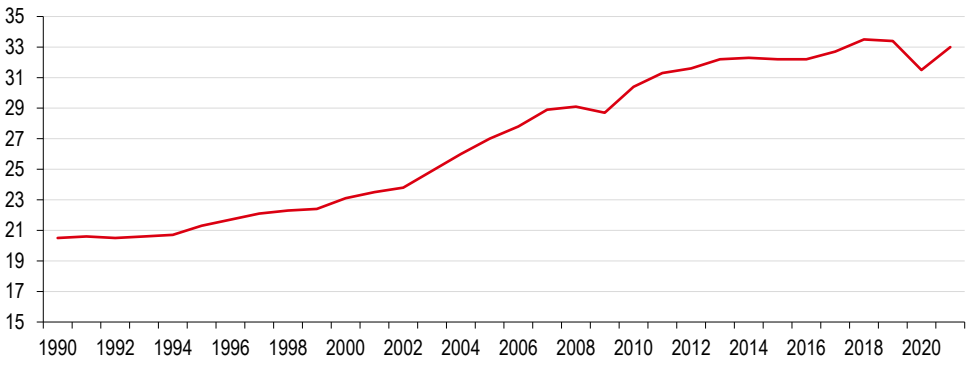
Emissions rebound effect will take hold in 2021

Against the backdrop of increasingly ambitious country and corporate climate goals, the underlying trends in energy-related CO_2 emissions appear to be painting a different picture. Cyclical falls in global emissions – such as those seen in 2020 or in 2007/8 – tend to reverse as economic activity returns, and the IEA forecasts both global energy demand and emissions to rise sharply this year after historic falls in 2020. Energy demand is set to increase by 4.6% to surpass pre-COVID-19 levels whilst energy-related CO_2 emissions are expected to rise by almost 5% year-on-year to be around 1% below 2019 peak levels – see below chart.

In our view this highlights the structural 'stickiness' of the current global energy system and the challenge of meeting ever more ambitious climate targets. Energy use, emissions and economic output continue to be closely linked; and whilst there has been a relative decoupling of global CO_2 emissions and GDP in recent years, the continued trend of rising absolute levels of energy-related emissions make the goal of reaching 'net zero' emissions all the more challenging – the higher these rise, the further they will have to be brought down to halt climate change.

Global energy-related CO_2 emissions 1990-2021e (billion tonnes CO_2)

…and the further emissions rise, the greater the task to reach 'net zero'



Source: IEA

A stark reminder of why coal continues to matter

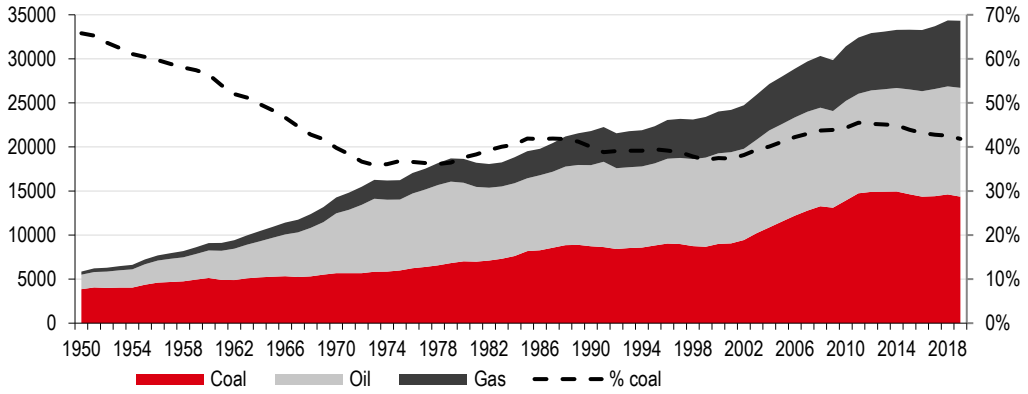
Coal use is the single largest contributor to energy emissions and its use is set to rise sharply this year

Whilst each of the three main fossil fuels had different fortunes over 2020 (with the fate of oil arguably gaining the most attention as the WTI price briefly went negative), the expected pronounced bounce in global coal demand in 2021 is set to have a more material emissions impact. Whilst coal is gradually being squeezed out of the energy mix in geographies such as Europe and the US, the IEA sees global coal consumption growing 4.5% this year, fuelled by developing economies, to exceed its 2019 (pre-COVID-19) level and approach its 2014 peak.

As the most emissions intensive fossil fuel, coal's continued use at scale across the world is among the largest impediments to achieving global emissions reduction goals. Coal's share of fossil based energy emissions has shrunk from around 65% in 1950 to just over 40% in 2019 (compared to oil at 36%); but the absolute level of annual CO_2 emissions its use generates is yet to definitively peak and is around 60% higher than 2000. As the single largest source of energy-related CO_2 (see chart on following page), the longer that coal's consumption remains at such elevated levels, the more might need to be done in other areas of the energy system to put global emissions trajectories on a downward trend in coming years.

China's President Xi Jinping recently pledged to "strictly control" China's coal-fired power plant construction and "phase down" coal consumption in the five years from 2025 – the IEA estimates that China's coal-fired power fleet accounts for around a third of global coal demand.

Historical global energy-related emissions by fossil fuel source (LHS, million tonnes CO_2) and share from coal (RHS)



Source: Centre for International Climate Research

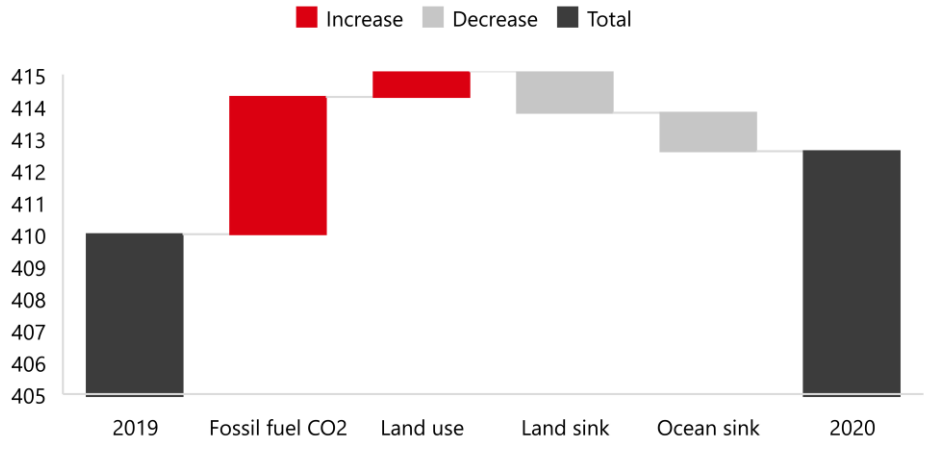
CO_2 levels in the atmosphere rose in 2020, despite a fall in annual emissions

Atmospheric CO_2 levels rose in 2020 despite the record annual emissions fall

Climatic changes are ultimately driven by cumulative concentrations of absolute CO_2 in the atmosphere, rather than the flow of carbon dioxide emissions. As such, whilst the annual rate of emissions in 2020 experienced a historic year-on-year fall, the fact that it still represented sizeable additional absolute emissions meant that atmospheric CO_2 levels rose last year – see below chart. The IPCC has previously estimated that limiting CO_2 concentration levels to around 450ppm is needed to cap global temperature rises to around 2°C.

This relationship highlights the importance of not only 'net zero' as an end goal – ie. a point where no new net emissions are added to the atmosphere – but also the journey to get there. The longer the route to global 'net zero' emissions takes (eg. say by 2080 instead of 2050 or 2070), the higher the risk that upper limits to atmospheric CO_2 levels get tested along the way. However, it is also worth noting that many of the climate pathways/scenarios that halt global warming to 1.5-2°C feature a 'temporary overshoot' of emissions and atmospheric CO_2 levels. This trend is then reversed through using carbon dioxide removal methods at a large scale which can result in global 'net negative' emissions – meaning atmospheric CO_2 levels fall back.

Atmospheric CO_2 levels (in parts per million) continued their rise in 2020



Source: Global Carbon Project

Burgers and jobs meet climate change

We recently discussed the potential political economy implications of ever more ambitious climate mitigation action, including the prospect that discussions around meeting emissions goals start to extend beyond more familiar subjects such as using more renewable energy and adopting electric vehicles. These include the need for political support to implement (and spend on) emissions reducing policies, the likelihood of required lifestyle changes to reach 'net zero' and the increasing prevalence of employment-based narratives in discussions around climate action.

Dietary change enters the debate as part of the personal contribution to 'net zero'

Some media outlets implied that US citizens might have to drastically cut meat consumption to reach national CO_2 reduction goals…

At around 15% of total global greenhouse gases, agricultural-based emissions linked to human activity are a sizeable part of the world's carbon footprint; meaning it will likely need to face change in coming years and decades in order to reach global 'net zero' goals.

The need to alter national dietary habits was mentioned in the UK Climate Change Committee's (CCC) 6th carbon budget report – which underpins the country's pledge to reduce its emissions by 78% by 2035 (compared to 1990 levels). The document talks to a potential need to reduce meat and dairy consumption by 20-50% by 2050 to fulfil national carbon goals.

Similarly, a 2020 study by the University of Michigan's Center for Sustainable Systems on the potential impact of dietary habits on CO_2 emissions was reported in some media outlets (Fox News, Daily Mail) to suggest that in order for the US to achieve its 2030 emissions reduction targets, Americans will have to cut their red meat consumption by 90% to around 4lbs a year – or roughly the equivalent of a hamburger a month. Whilst the connection or relevance between the underlying University of Michigan study and President Biden's new national climate target appears to have been misplaced, we reference the mentions of lifestyle change as a way to highlight the point that the discussion around tackling climate change – particularly in developed markets – is shifting to encompass a wider set of actions and measures than has historically been the case.

…and the citizen's guide to 'net zero' actions might need some clarity

More broadly, we also note that there is reason to believe that civil society's understanding of what may (or may not) be needed to reach 'net zero' at a personal level is also not fully appreciated. For example, a recent IPSOS poll of over 20,000 people across 30 nations found that a majority of individuals believe that increasing recycling, switching to energy efficient lightbulbs and air-drying clothes (actions that typically carry a relatively small carbon footprint) are more effective in combating climate change than more impactful actions such as avoiding long distance air travel, adopting a plant-based diet or not owning a personal car.

Net zero jobs, not zero jobs

The employment implications of national decarbonisation plans remain important

Another area in which we are noticing the narrative around climate action shifting is the potential impact on employment. Historically, the idea of aggressive emissions cuts has been associated with downside risks to economic activity and jobs in certain sectors, but national climate plans are increasingly being framed as a way to not only protect livelihoods, but also provide a new source of skilled employment. For example, President Biden's address to the Leaders Summit on Climate specifically mentioned the need for decarbonisation to create employment – specifically "good-paying, union jobs" – which is consistent with the objectives of his proposed green infrastructure bill. The UK's climate manifesto also details a goal to "to create and support up to 250,000 green jobs" as one of its core objectives. We also note that a recent IEA report found that the labour or employment 'intensity' of certain emissions reducing investments – such as installing solar PV, pursuing energy efficiency measures and retrofitting buildings – is higher than that of spending on new gas or coal-fired electricity generation, creating roughly double the jobs per unit spent.

At a shade under EUR50, Europe's carbon price is hard to ignore

Whilst copper and iron ore have recently set multi-year highs, another commodity-linked security is also breaching new ground; carbon emission allowances in Europe (EUAs) are closing in on EUR50 per tonne CO_2. The price has doubled in the last 6 months and tripled since its sharp fall at the onset of the COVID-19 pandemic in March 2020.

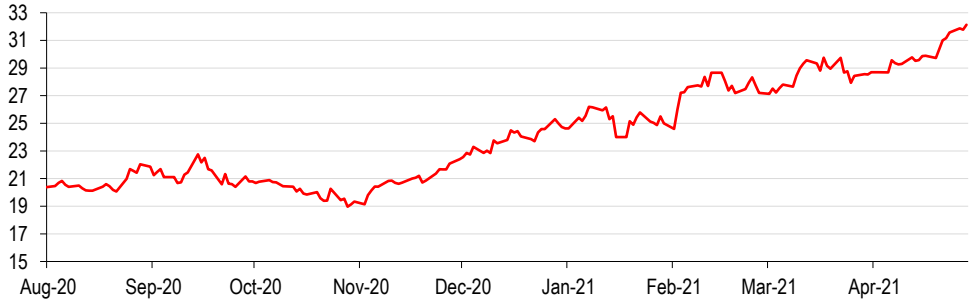
European emissions allowance price (EUR per tonne CO_2)

Source: Refinitiv Datastream

The cap-and-trade emissions scheme serves as one of the key cornerstones of Europe's climate policy, with an objective of putting a cost on carbon as a way to move economic activity to lower-CO_2 means. A number of factors can influence the supply/demand balance of EUAs, including the price of fuels used in electricity generation (coal or natural gas), corporate industrial activity levels (and hence the need to emit CO_2), seasonal weather patterns and the annual linear reduction of the supply of allowances (currently mandated at 2.2% in Phase IV of the EU scheme).

Traditionally, EUA market participants have been the corporates and other entities that need to buy allowances in order to emit; these typically do not take active positions but rather seek to match future expected emissions with sufficient allowances. However, with a rising price and more financial market participants seeking to gain exposure (including ETFs that track the most liquid carbon pricing schemes globally – see below), another driver of the price of carbon appears to be sentiment – namely, that a high EUA price will be needed for the bloc's climate agenda to succeed. As such, the carbon price might be interpreted by some in the market as a gauge for expectations on Europe's push to reach net zero by 2050.

KFA Global Carbon ETF (KRBN US) performance since August 2020 (USD)



Source: Refinitiv Datastream

There often isn't a 'right' carbon price

Views vary across countries and industries as to whether i) pricing carbon is the most suitable climate policy instrument, and ii) what is the 'right' price for CO_2. For example, the sharp rise in EUA has caused some emitting industries in Europe to call for the acceleration of plans for a border carbon tax adjustment (Financial Times, 29 April). Other industry groups have called for a single global carbon price as a market-efficient way to reduce emissions (an unlikely outcome in our view due to material differences in various countries' climate policy objectives and conviction), and some corporates account for carbon prices of as high as USD100 per tonne CO_2 in internal capital spending planning.

Moreover, the carbon price level that either causes an adverse competitive impact or incentivises a change in technology is different across sectors; but there is only typically one CO_2 price in an economy. That is to say that the carbon price that, for example, makes green hydrogen cost competitive, is unlikely to the same level that makes coal-to-gas switching price-effective, or the point at which technologies such as carbon capture become beneficial.

It is also worth noting that not all carbon prices are set by markets; 'floating' carbon prices – like the EU scheme – are dynamic in nature (with a fixed supply), whereas 'fixed' carbon prices or taxes are set and do not move based on the level of emissions or market demand.

Have carbon capture and hydrogen now 'arrived'?

Whilst the lion's share of the focus on emissions cutting technologies has arguably been on the likes of renewable electricity (wind and solar), batteries and electric vehicles in recent years, the re-emergence of hydrogen and carbon capture as pillars of the 'net zero' push has been noticeable of late.

The technologies have previously been in the shadows for numerous reasons but have recently gained explicit mentions at the highest level of global climate policy making. Examples include the UK's Ten Point Plan for a Green Industrial Revolution, the EU's hydrogen strategy and President Biden's address to global leaders last week.

> ***"I see engineers and construction workers building new carbon capture and green hydrogen plants to forge cleaner steel and cement and produce clean power***
>
> **President Joe Biden**

Corporate interest in carbon capture is rising, but often has caveats…

This momentum has been reflected in news flow among some oil & gas value chain companies, with some notable mentions of carbon capture & sequestration (CCS). This included a major US oil & gas player's proposal for what would be the world's largest CCS site in Texas which could capture and store up to 100m tonnes CO_2 (for context, current global CCS capacity is ~40mt CO_2 pa). The plan would need significant government funding support, or as one of the company's board member opined, a carbon price in the region of USD100/tonne CO_2 (or double the current 45Q tax credit for sequestering CO_2), before investment decisions could be made – a common stumbling block for projects in the development or planning phase. The company has also talked to a potential total CCS addressable market of USD2trn by 2040.

…or, in our view, may rely on overly optimistic deployment forecasts

A US oilfield services company talked about it's the outlook for carbon capture activity on its Q1 result call, indicating an expected addressable market for the company of between USD35-USD40bn by decade-end. This was framed in the context of a "relatively mid-case of 450 million tonnes of CC(U)S by 2030" – however we note that this figure is over 10x the current global large scale CCS capacity and around 4x Rystad Energy's 2030 forecast based on the current project pipeline.

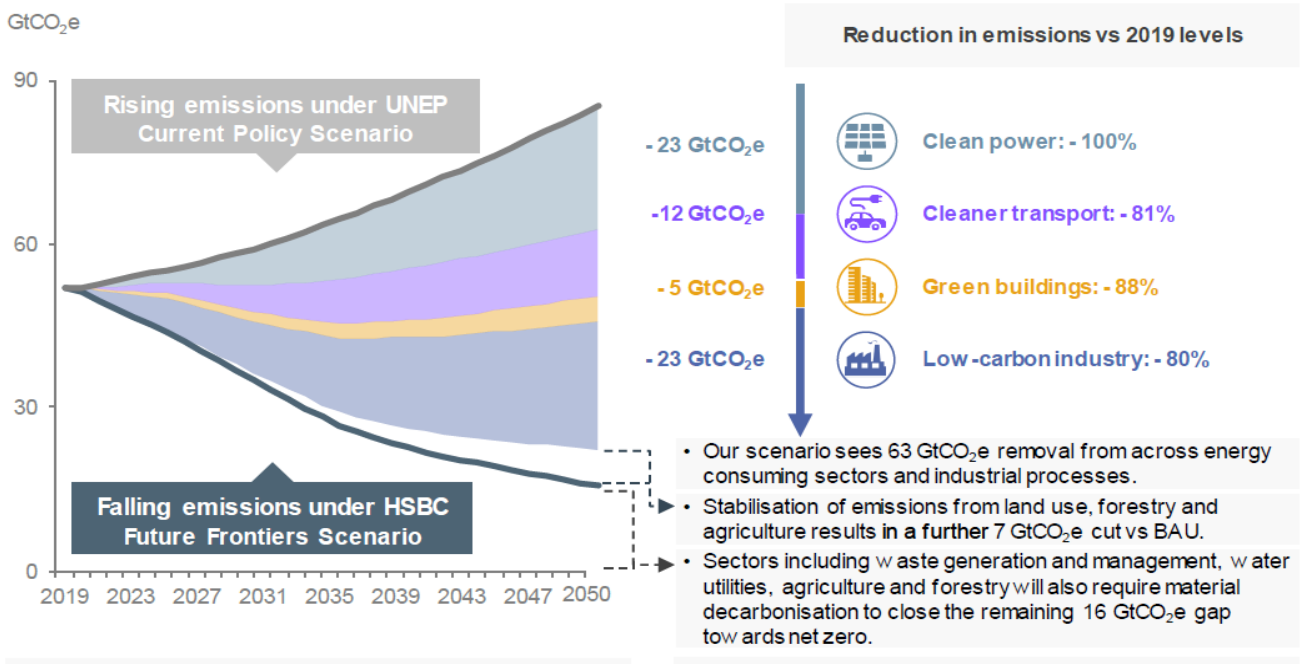
After a busy 2020, we sense the feeling is that 2021 is to be a year of 'doing' for green hydrogen

In our recent stocktake of hydrogen news flow, we noted that incremental announcements on green hydrogen developments remain positive, if less intense as witnessed in 2020.

Finally, a reminder of what 'net zero' might look like in practise

In our recent report on potential energy system pathways out to 2050 we explored what level of actions might be needed to deliver a 'net zero' emissions outcome. Our modelled HSBC Future Frontiers Scenario reduces global emissions by over 80% compared to a 'business as usual' case. The level of implied ambition in the scenario is high and fully utilises available technology options at an accelerated pace in many instances and explores what could be possible.

HSBC Future Frontiers Scenario illustrating a 81% in CO_2 emissions by 2050 compared to business as usual



Source: HSBC

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Upside/Downside is the percentage difference between the target price and the share price.

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