ACHIEVING NET ZERO

Challenges and Opportunities

Edited by David Crowther
and Shahla Seifi

DEVELOPMENTS IN CORPORATE
GOVERNANCE AND RESPONSIBILITY

VOLUME 20

ACHIEVING NET ZERO

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ACHIEVING NET ZERO: CHALLENGES AND OPPORTUNITIES

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INVESTOR IN PEOPLE

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PART 1

NET ZERO AND SUSTAINABILITY

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STEPS ON THE JOURNEY TO NET ZERO

Elaine Conway and Yousuf Kamal

ABSTRACT

This chapter discusses the global challenge to reduce greenhouse gas (GHGs) emissions to net zero by 2050. It explains what net zero means and how it is calculated, together with some of the debate around the suitability of the target to maintain global warming levels within 'acceptable' boundaries. The chapter then presents some of the opportunities and challenges that transitioning towards net zero will pose to countries and their inhabitants, in terms of changes to policies, products, processes and behaviours that will be required to attain the target. It then discusses the need for a strategy to achieve net zero across different sectors of society and provides a few suggestions of tools and concepts that could be adopted to support the changes necessary, such as planning for change, the Sustainable Development Goals (SDGs), integrated reporting and the circular economy. The chapter concludes with a reflection on the need for the net zero target and how it is our collective responsibility to support the challenging transition to net zero for the benefit of all.

Keywords: Net zero; planning for change; strategy; Sustainable Development Goals (SDGs); integrated reporting; circular economy

INTRODUCTION

This chapter examines the net zero agenda, what it is, how it is measured and the debates that continue around the global goal of achieving net zero greenhouse gas (GHG) emissions by 2050. It also discusses some of the challenges and opportunities that arise from the transition towards net zero, from a government/national standpoint, but also at organisation and individual level. Undoubtedly, achieving net zero will necessitate a significant change across various aspects of our lives, but if we are to prevent untenable environmental disasters from

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threatening the viability of life on earth as we understand it, then change will be inevitable. Hence, we should look at net zero with a balanced viewpoint as to the challenges to be faced but also the positive opportunities it may bring.

The chapter proposes some ways in which organisations can transition to net zero, by considering planning for net zero within the business strategy and providing some alternative perspectives, such as the Sustainable Development Goals (SDGs), integrated reporting, and the circular economy concepts as starting points to leverage the transition process for a sustainable and far-reaching effect.

The chapter concludes with a reflection on the need for the net zero target and how it is our collective responsibility to support the challenging transition to net zero for the benefit of all.

WHAT IS NET ZERO?

Within the 2015 Paris Agreement on climate change, world leaders committed to significantly reduce greenhouse gas (GHG) emissions to contain the increase in global temperatures to 2°C below that of pre-industrial levels during this century, whilst striving to limit temperature increases to 1.5°C where possible (UNFCCC, 2016). In addition, leaders agreed to balance the emissions of GHGs within the second half of the current century, such that the total of all GHGs emanating from human activities nets off to zero (Rogelj, Geden, Cowie, & Reisinger, 2021). This has coined the term 'net zero', where countries and organisations alike are setting the goal of achieving this balance within their scope of operations. Many states in the United States, the European Union and China, amongst others, are mandating a net zero economy by 2050, including many large companies (Deutch, 2020; Fankhauser et al., 2022).

However, what does this mean in reality? Despite being a step in the right direction for reducing global temperatures and GHGs, the devil is in the detail of these national and corporate plans. For example, some plans target only carbon dioxide (CO_2) emissions, whilst others include all GHGs in their remit (Rogelj et al., 2021). Equally, there is no consensus on the scope of emissions which are included in the target: for example, some consider only those emissions which they can control directly (called Scope 1 emissions), whilst others consider their wider supply chain both up and down stream, such as raw material suppliers and the end use of their product (Scope 2 and 3 emissions) (Rogelj et al., 2021). Another grey area in many targets is whether the aim is to reduce emissions or just to offset them with other activities, such as carbon sinks (Fankhauser et al., 2022), so the target is NET zero (after the offsets), rather than zero emissions from the product/process in question.

There is also a debate about country or industry specifics (Rogelj et al., 2021). For example, should emerging economies be subject to the same targets as more highly industrialised countries, given that the latter nations are likely to be the highest polluters and have greater resources to work on reducing them? At industry level, should more highly polluting or energy-intensive industries be

required to achieve net zero before less polluting or lower energy consuming ones? Some uses of energy are relatively easily convertible to decarbonised sources, such as for powering cars and other light vehicles, by converting or designing them to use electricity as their power source, and then creating the electricity from renewable sources, such as solar, wind or even nuclear (Davis et al., 2018). However, other current usages of power cannot currently be so readily converted, such as in the production of steel and cement and long-distance travel (aviation and shipping). Demand for these uses is forecast to continue well into the future, and hence until technology adapts to address these applications, their impacts on achieving net zero will need careful consideration. Some of these opportunities and challenges will be discussed in more detail later in this chapter.

These challenges are regularly the subject of international discussions at conferences such as the annual United Nations Climate Change Conference (Conference of Parties (COP)). It is critically important that countries discuss these issues together to work out the most appropriate global response. It will require substantial cooperation across nations to make the necessary changes. Clearly, it is of limited use if countries unilaterally make commitments to net zero if others increase their emissions or shift them to other countries. For example, the way in which countries depend on each other for raw materials, energy and products should be acknowledged. Many countries' demands for energy (oil and natural gas) exceed their own natural reserves and hence they rely on imports from oil- and gas-rich nations for their energy. Therefore, it is unreasonable to criticise the emissions of these fossil fuel-extracting countries which have unavoidable emissions that other countries do not have. Equally, the offshoring of manufacturing from high wage countries to lower wage countries in recent years has also shifted the inherent emissions from these manufacturing processes, which has the consequence of making the importing countries' emissions appear artificially low in comparison with the exporters', as they are still consuming the goods, just not producing them locally. The increased freight costs (and emissions) associated with this offshoring activity should also be assessed when considering the long-term viability (economic or otherwise) of such offshoring. Because of such interlinked activities worldwide, it is imperative that discussions about how to address global emissions are made at a high level across countries, so that the problem is addressed holistically and as equitably as possible.

This holistic approach is also needed to avoid unintended consequences of actions, which on the face of it reduce emissions, but then create other negative impacts. For example, whilst the shift away from fossil fuel-based power generation to sustainable sources, such as hydroelectricity is laudable, the creation of dams for hydroelectric power generation can cause significant and sometimes catastrophic damage to the environment, threatening biodiversity and huge social problems due to the diversion of water away from its natural course (Arantes, Fitzgerald, Hoeinghaus, & Winemiller, 2019; Bosshard, 2015). This has caused backlash against new hydroelectric installations across the world as there is greater awareness of the negative impacts they can have on local communities and the environment as access to water is then restricted (Schapper, Unrau, & Killoh, 2020). Growing populations, with increased water and power demands

coupled with water scarcity, can instigate the construction of more hydroelectric dams. This can become particularly critical when a dam is constructed in one country which impacts the access to water in another, as has been the case in some Arab countries and is the source of conflict between Ethiopia which is constructing the Grand Ethiopian Renaissance Dam on the river Nile, which will significantly affect access to water in Egypt and Sudan (Salameh, 2021). Iran too has developed dams which have affected the quantity and quality of the water in Iraq over several years (Salameh, 2021). Aside from these geopolitical and social impacts, there is also evidence that such installations create not insignificant emissions themselves, since once a dam is constructed, there is a flooding of land to fill the reservoir, which results in an increase in GHG emissions due to the degradation of biomass from that land. These emissions are largely methane, which is a GHG which remains in the atmosphere far longer than CO_2 (Levasseur, Mercier-Blais, Prairie, Tremblay, & Turpin, 2021).

Despite remaining issues, it is generally regarded as a positive step that countries have acknowledged the need for targets to reduce the level of GHGs in the atmosphere (Rogelj et al., 2021). In many cases, there is considerable work being done to achieve them, even if that effort is not universal or being made quickly enough to be achieved by the deadline. However, there is also controversy whether achieving net zero by 2050 is sufficient to keep global temperature increases below 2°C. This is because the calculation to assess the average global temperature increase is complex. The 'temperature increase at any time is proportional to the logarithmic change in atmospheric CO_2 concentration' (Deutch, 2020, p. 2237). It is expressed as:

$$\delta T(c) = \varepsilon \ln\left(\frac{c}{c_0}\right)\ln(2)^{-1}$$

Where δT = change in global temperature, c = CO_2 concentration at a point in time, ln = natural logarithm and ε = the equilibrium climate sensitivity (the temperature increase from a doubling of the concentration) (Deutch, 2020).

One difficulty is that the equilibrium climate sensitivity varies significantly due to the ways in which the planet reacts to changes in its environment (Hausfather, 2021). For example, there is debate as to whether fires have a positive or negative effect on this figure. Due to this volatility, as a measure, it can vary between 1.5 and 4.5, which affects the calculation considerably, such that even if net zero were to be achieved by 2050, there is no guarantee that the earth will not increase in temperature by more than 2°C (Deutch, 2020).

The choice of a 2°C cap on average global temperatures as a target is not universally accepted in environmental and scientific circles. On the one hand, there is the sense that 2°C is unachievable and that 3°C limit should be the target, whilst on the other hand, there is concern that even if achieved, a 2°C cap is not sufficient to avoid significant environmental damage, and that the world should be aiming towards a 1.5°C limit (IPCC, 2018). In 2021, the CO_2 concentrations were approximately 416.45 parts per million by volume (ppmv) (Tiseo, 2022), which is equivalent to global temperatures rising by 1.3°C since the pre-industrial

era (Hausfather, 2021). If carbon emissions do fall to net zero, then the world will still continue to warm slightly for several years, but at a much slower rate as the atmosphere adjusts to the new levels of carbon being released and absorbed. Eventually, if the carbon levels remain zero, then this warming is expected to stop (Hausfather, 2021).

Despite the variability of the calculations to underpin the global target and whether 2°C will deliver the outcomes which climate change scientists expect, net zero is the currently agreed global target. It is up to the countries themselves to work out how they will achieve their own net zero targets. First, the target itself needs to be clarified, whether it means carbon reduction only, carbon offsetting or a combination of both. Then governments will need to enlist the support of organisations and individuals to do all they can to contribute to this process, whether voluntarily or mandated by national laws.

In most cases, the initial focus is on reducing carbon where possible as this has the longest-term effect and is currently one of the quickest methods of making an impact. Where this is not possible, or the best efforts have been made to reduce carbon, then it is likely that carbon offsetting will be used to balance out the carbon emissions which are more difficult to reduce or eradicate at the current time (Fankhauser et al., 2022).

The next step after reducing the amount of carbon being released into the atmosphere is to remove residual carbon through carbon management activities (Davis et al., 2018). This is because some of the GHGs being released currently will remain in the environment for centuries (such as CO_2), whereas others, such as methane have an impact for only a few years (Fankhauser et al., 2022; Rogelj et al., 2021). At present, we have limited technologies to remove the shorter impact gases such as methane but are developing the means to remove some of the longer impacting GHGs. However, it is hoped that in time, newer technologies will be developed to achieve this process: the focus currently is to reduce the release of more GHGs into the atmosphere in the first place.

At this point, despite many countries and companies signing up to net zero, progress has been patchy. The next section will discuss some of the main opportunities and challenges faced by nations and organisations in their race to net zero.

CHALLENGES POSED BY THE NET ZERO AGENDA

Change to a net zero world is perhaps one of the most daunting tasks ever encountered by humankind. It requires a complete transformation of not only the production and consumption process but also the mindset of how people use resources for these processes. Reaching a net zero emissions level needs substantial changes across the economy. For example, in the UK context, it represents a tremendous shift in the economy that was once the largest coal consumer in the world (Hook & Sheppard, 2019). To fulfil the net zero target by 2050, there is a need for countries and their citizens to understand the urgency needed to avoid the worst impact of global warming. The 2050 target has presented substantial challenges from

business to industry, from developed country to developing country and from West to East. Some of these challenges are discussed in this section.

One key sector which needs to be transformed as quickly as possible is the energy sector. This sector contributes approximately 75% of GHG emissions, and it is the single largest factor that needs to be overcome to offset the severe impact of climate change (United Nations, 2022). To reach net zero emissions by 2050, the energy sector must be decarbonised at an exceptional speed. Coal, gas and oil-fired power sources need to be rapidly replaced by renewable sources of energy such as wind or solar, and countries need to move to these alternative sources as soon as practical. This transformation would require substantial industrial modifications and will involve major cost. For example, more than 80% of UK dwellings are heated by natural gas, contributing about 15% of total UK greenhouse emissions (Hook & Sheppard, 2019). It will be a real challenge to make new houses with alternative heating systems (hydrogen could be an option but involves huge cost) or convert all the existing housing stock to renewable sources. In the United Kingdom currently, all new build properties must be built to Future Homes Standards with Energy Performance Certificate (EPC) rating A (the highest level), and legislation is under development which will require older houses to retrofit improvements to heating source and insulation levels (Hook & Sheppard, 2019).

The transport sector is another significant source of GHG emissions. For example, in the case of United Kingdom, it accounts for 28% of emissions. Whilst the sale of new petrol- and diesel-fuelled cars will cease by the end by 2030, there needs to be greater availability of affordable electric cars and more charging points to speed up consumer adoption (Harrabin, 2020). The vehicle manufacturing industry needs to transform their manufacturing process from fossil fuel to alternative sources of power, which will pose another challenge for automobile industry. Gaeta, Businge, and Gelmini (2022) argue that by 2050, renewable energies will contribute approximately 90% of the basic energy utilisation by replacing traditional fossil fuels. However, this would be a challenge for some developing countries as to what extent they can use this renewable energy for decarbonisation.

The next challenge emanates from the industrial sector. For example, steel, petrochemical and cement manufacturing still produce huge amounts of CO_2, without having any CO_2 capturing method such as re-injecting it underground, keeping it out of atmosphere or recycling it in another industrial process. This is particularly important to understand in the context of emerging markets and developing economies who are considering their development in terms of building huge infrastructure, which requires heavy industries using fossil fuels, especially to produce extreme temperature heat for industrial processes. While the use of electricity may be an alternative to fossil fuels, the electricity generation method is key. Electricity can be generated from water, wind, coal or nuclear-powered plants. Some countries, for example, the United Kingdom, have made substantial progress towards coal-free electricity and have become one of the world's biggest offshore wind users to generate electricity. Other countries around the globe are still significantly using coal to generate electricity (Gaeta et al., 2022).