

A Post-COP26 Review of the Global Efforts and Opportunities to Combat Climate Change

BY JOHN HOLDING

Abstract

This paper will firstly review the history of the global efforts to counteract climate change under the auspices of the UN and how these efforts have evolved and shifted over time. Looking forwards a reality check regarding fossil fuel use plus the opportunity for carbon dioxide removal techniques will be explored.

A critique of global efforts to date to combat climate change

COP26 which concluded in Glasgow Scotland in mid-November 2021 presents a timely opportunity to review the status of the global efforts to counteract climate change. The current year 2022 represents thirty years from the founding of the UNFCCC in Rio de Janeiro - the "Earth Summit" - held in June 1992 [1]. Moreover 2022 represents the point at which some thirty years hence the *global goal of substantially reducing global emissions by 2050* should have been realized [2].

COP26 closed by stating *The aim of the UK COP26 Presidency was to keep alive the hope of limiting the rise in global temperature to 1.5°C, and the Glasgow Climate Pact does just that* [3]. This wording could similarly have been applied to a parallel global challenge; the spectre of COVID-19 patients being 'kept alive' on ventilators in intensive care hospitals comes to mind. Sadly though, very many such patients have not survived. So, the broader question is, has COP26 made real progress towards the ultimate aim of the creators of the Framework Convention on Climate Change - that is, *preventing "dangerous" human interference with the climate system*" [4]? The notion of 197 Parties to the Convention [5] striving to achieve Net Zero emissions by a date some thirty years from now might be considered idealistic, given the politico-economic challenges of (i) the absolute costs associated with energy transitions, (ii) the need for wholesale revamping of road transportation, power transmission infrastructures along with upgrading heating and cooling systems in existing buildings, and (iii) the developing world's industrialization, urbanization and poverty alleviation programs. The Arab News published on November 11, 2021 as COP26 was ending [6] elaborated some of the fundamental developing world issues and promoted the application of the *Circular Carbon Economy* approach [essentially, energy from waste; see for example [7]]. Furthermore, unexpected events can intervene such as the first NDC submissions made pursuant to the Paris Agreement [8] which were confronted by the exigencies from the ongoing COVID-19 pandemic. At the time when the NDC submissions would have been under preparation,

it was most unfortunate timing that events forced the WHO to make the global pandemic declaration in March 2020.

With the origins back in 1972, it was the Stockholm Conference on the Human Environment [9] [10] that merged for the first time the subjects of the world's environment with sustainable development. It therefore placed environmental issues at the forefront of international concerns and marked the start of a dialogue between industrialized and developing countries on the link between economic growth, the pollution of the air, water, and oceans and the well-being of people around the world. The COPs of the twenty-first century continue to wrestle with these disparate subjects.

The establishment of the UNFCCC in Rio in 1992 included the commitment [Article 4, 2. (b)] that Annex I Parties revert, individually or jointly, to their 1990 emissions levels of carbon dioxide and other greenhouse gases (GHGs) [11]. The first Conference of the Parties, COP1, was convened in Berlin in 1995 setting the path towards legally binding obligations on such emissions levels which were then cemented by the 1997 Kyoto Protocol (COP3). 192 parties ratified the Protocol whilst 37 industrialized nations plus the European Union (that is, the majority of Annex I parties) agreed to cut their country's emissions to 5% below 1990 levels between 2008 and 2012. However, the USA dropped out in 2001 whilst "owing to a complex ratification process" the Protocol itself did not enter into force until February 2005 [12]. Then Canada denounced it in 2012 on the basis that without the participation of the USA and China, the two largest emitters of GHGs, the Protocol was unworkable and therefore a new pact was needed [13].

In 2009 efforts shifted away from the Kyoto Protocol approach at COP15 in Denmark; when the Copenhagen Accord committed to the long-term goal of limiting the maximum global average temperature increase to no more than 2°Celsius above pre-industrial levels, subject to a review in 2015. However, this was not binding nor was there an agreement on how to do this in practice. Furthermore, the conference also acknowledged a key demand by vulnerable developing countries to consider limiting the temperature increase to not more than 1.5°C. Other major outcomes from COP15 were that developed countries promised to fund actions to reduce GHGs and to provide for adaptation in developing countries by providing US\$30 billion during 2010-

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2012 plus to mobilize long-term finance of a further US\$100 billion a year by 2020 [14].

Oddly in retrospect, the Kyoto Protocol was adopted for a second commitment period, starting in 2013 and lasting until 2020, by means of the Doha Amendment (COP 18) in 2012 [15]. Parties to this Amendment committed to reduce their GHG emissions by at least 18 percent below 1990 levels in this period.

A more objective approach evolved in 2015 when the Paris Agreement was signed at COP21. This effectively supplanted the Kyoto Protocol and now forms the basis for current conversations on climate change. The drive was to *strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°Celsius* [16]. The Agreement included for enhanced support to assist developing and the most vulnerable countries to participate in line with their own national objectives. Perhaps the most notable outcome from Paris was that all Parties were required to put forward their best efforts through “nationally determined contributions” (NDCs) and to strengthen these efforts in the years ahead. There was also to be a global stocktake every 5 years to assess the collective progress. Significantly 193 Parties out of 197 Parties to the Convention became Parties to the Paris Agreement. Overall, this COP appears to represent a near global commitment to addressing climate change with the submission of national targets which would be subject to peer review.

Meanwhile, the IPCC’s Special Report (SR15) on *Global Warming of 1.5°C* [17] was being developed leading to publication in October 2018 just ahead of COP24 which was held in Katowice Poland – a country where 80% of the electricity is generated from coal. Delegates at Katowice clashed over how to respond to the IPCC’s Special Report which linked the potential to limit global warming to 1.5°C with a 2050 net zero target for GHG emissions. Whilst some participants wished to clearly signal the need to stay within this temperature limit, the COP *in toto* produced a disappointing outcome despite UN secretary-general António Guterres’ personal intervention at the conference [18].

The pronouncements and declarations made at COP26 in Glasgow in November 2021 are still fresh in our minds – particularly the carefully worded statement about keeping alive hopes of limiting the rise in global temperature to 1.5°C [3]. Some key countries did not align to a 2050 target for net zero emissions; China, Russia and Saudi Arabia pledged a 2060 target whilst India declared 2070. Moreover, the last-minute action of India supported by China exasperated Conference President Alok Sharma as the closing statement was forced to be modified to *phase down* rather than *phase out* unabated coal power.

The overall result was summarized by The Economist, *Although 197 parties agreed a pact, the summit’s closing moments were hardly jubilant. [. . .] Not the stuff of triumph; but not a trainwreck, either* [19]. Separately, The Times of India reported, *India on Sunday called the COP26 summit a “success”. saying it put across the con-*

cerns and ideas of the developing world quite “succinctly and unequivocally” in front of the world community. [. . .] [The deal] recognises India’s intervention for the world to “phase down, rather than “phase out” fossil fuels. [20].

One thing clear is that the results of COP26, and this is generally applicable to all previous conferences, is that they do not garner unequivocal support for actions but produce a range of statements and carefully worded interventions that national delegations can ‘live with’, can ‘sell’ to their constituencies back home. Nevertheless, the mobilization annually of nearly 200 nations towards finding any sort of common action to deal with something as esoteric as climate change is remarkable. This, despite the changing objectives such as the merging of environmental issues with sustainable and economic development, the cutting of emissions by industrialized nations to below their 1900 levels, shifting the vocabulary between “global warming” and “climate change”, limiting the global temperature rise to at least 2°C below pre-industrial levels, developing and openly submitting NDCs, targeting Net Zero emissions and agreeing massive transfer of money from richer to poorer countries. All this is impressive, and COP26 possibly more so, as it was held against the background of the surging COVID19 Omicron variant and the fact that a COP in 2020 had not taken place because of the pandemic. Glasgow was not a failure – at the very least, it actually took place, and “kept alive the hope . . .”

And, in a response analogous to the challenge of the Coronavirus and its mutations, the climate change response has shifted in the light of new information and predictive modelling. Novel insights and untested solutions have been offered, for example, carbon dioxide removal techniques – of which more will be said later.

Fossil Fuels - still with us in 2050?

COP26 saw NGOs, activists, civil society coalitions and renewable energy campaigners [21] press to keep fossil fuels in the ground [22], bemoaned the lost opportunity to “consign coal to history” [23] and criticized the new Carbon Offsetting agreement [24]. This latter which concluded Article 6 of the Paris Agreement [25], was critiqued by the Financial Times [26] noting that the inclusion in the system of inferior credits generated under the Kyoto Protocol [25 years ago] was a concern to some observers. However, Shell’s Chief Climate Change Advisor opined that the completion of Article 6 *makes COP26 a success* [27]. On the other hand, Glasgow’s achievement of removing public subsidies for fossil fuel extraction and unabated utilization hardly resonated with the NGO lobbyists. But, whatever the point of view, the practical application of energy finance and economics can operationalize the climate change actions that are necessary.

The general public may equate fossil fuels directly with CO₂ emissions, hence global warming and climate change; thus, crude oil and natural gas have had a rough time these last years whilst coal extraction and its unabated use is currently under very serious pressure. Still, a recent article in IAEE Energy Forum [28] by Dr. Salameh shattered some of the myths about the Global Energy Transition; “It is not possible [. . .] to sim-

ply ditch fossil fuels for renewable energy [. . .] Fossil fuels are simply more energy dense than other energy sources [. . .]” And with a emblematic reference to the world’s travails over the last two years, “If anything, the pandemic has proven irrevocably the inseparable link between the global economy and oil.”

International oil companies tend to express themselves more opaquely, proclaiming their altruistic credentials and concern for people and society in general. ExxonMobil declare “Energy and human development are inextricably linked”, “Oil and natural gas play an important role over the coming decades in lower 2°C pathways” [29]. Shell’s Energy Transformation Scenarios offer the view that “A better life for all requires sufficient energy to provide everyone with a decent quality of life”, “Taking steps towards the goal of the Paris Agreement could be rewarding both economically and environmentally, although the necessary actions involve costs” [30].

Even the single greatest contributor to global carbon emissions of any company in the world since 1965 [31], Aramco, says “We believe in the power of energy to transform lives, enhance communities, advance human progress, and sustain our planet” [32]. China Energy, the largest power company in the world [33], proclaims “Clean Energy, Green Future” which will be realized by “determined efforts to achieve a low-carbon transformation featuring clean utilization of fossil fuels” [34].

It is possible that fossil fuels could move progressively into a transitional phase where, for example, power generation using abated natural gas CCGT generators will serve for peak shaving and stand-in support for intermittent renewable supplies. Abatement technologies might advance to allow continued use of fossil fuels in industrial production processes. The possibility of on-board abatement for the internal combustion engine has yet to materialize but research into capturing CO₂ from tailpipe emissions has indicated potential but “it may require several years to realize such system in practice” [35]. Electric Vehicles must be the answer of course, yet without government incentives and higher battery capacities so as “to say goodbye to EV range anxiety” [36] the public remains sceptical. The implication overall is that abated fossil fuels could become recognized as a *sustainable* energy source. McKinsey’s *The Global Energy Perspective 2021* “more than half of all global energy demand comes from fossil fuels by 2050” [37]. This, if realized, would represent a decline from the 2020 figure of 83% reported in BP’s Statistical Review [38] but may not be enough for a Net Zero or “less than 1.5°C” world.

The elephant in the room

When COP55 convenes in 2050 the delegates may or may not have cause to celebrate the achievement of Net Zero GHG emissions and a global temperature rise that has been kept markedly below 2°Celsius. Yet there may still be *an elephant in the room*; the accumulated volume of greenhouse gases residing in the atmosphere since industrialisation commenced, and which have been added to ever since . . . plus the prospect of emissions to come by virtue of population growth, food

and land demands, poverty alleviation and technological progress demanded by the developing world.

CDR (Carbon Dioxide Removal), alternatively CCUS (Carbon Capture Utilization and Storage) or GGR (Greenhouse Gas Removal) are innovations that have been recognized in several quarters as potential climate change solutions – for example, the *IPPC Special Report on Global Warming of 1.5°C* [17] makes six references to CDR and states that it will almost certainly be required to achieve the 1.5°C limit on global warming. In their *Communication of long-term strategies* submitted to UNFCCC under the Paris Agreement [39], several countries such as Germany, the UK, the USA (whose document includes a useful discussion of CDR methods) state their intended use of CDR in achieving national net zero targets by 2050. A 2012 piece of research by Kriegler into the application of CDR concluded that it can be a game changer for climate policy [40] whilst a more recent paper (June 2020), also from Germany, looked into why virtually no action had been taken on this topic so far and emphasized the importance of CDR. This latter work was strongly endorsed (July 2020) by Shell’s Chief Climate Change Advisor [41]. Moreover, the UK’s Royal Society has declared (June 2021), “Carbon capture and storage (CCS) is essential for net zero emissions to be achieved in any economy using fossil fuels or releasing carbon in any other ways” [42].

Given this growing interest in CDR the USAEE launched, ahead of COP26, a virtual Student Case Competition seeking to respond to a request from a fictitious company (CRSV) to analyze global CDR opportunities for future investment needs and potential. Five student teams entered with the winners being a team from Carnegie Mellon University, Pittsburgh PA [43]. The team reviewed the main CDR contenders for the opportunities of likely interest to their client; Bioenergy with Carbon Capture and Sequestration, Direct Air Capture with Carbon Sequestration, Afforestation and Reforestation, Enhanced Weathering, Ocean Fertilization, Biochar and Soil Carbon Sequestration.

The conclusion here is surely that CDR offers not only a means of removing historic accumulations of CO₂ from the atmosphere but it can be applied concurrently as a mitigating element alongside global efforts to reduce GHG emissions.

A final word with respect to COP26; yes, more could have been achieved but at least the UK hosts tried hard. The conference was well-intended and demonstrated a positive engagement by delegates. The continuous pursuit of action on the environment by the developed and the developing world coming together at COPs must continue in order to pursue the aspirations laid out at the 1992 Earth Summit. These efforts should be maintained despite individual nations’ challenges and limitations.

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