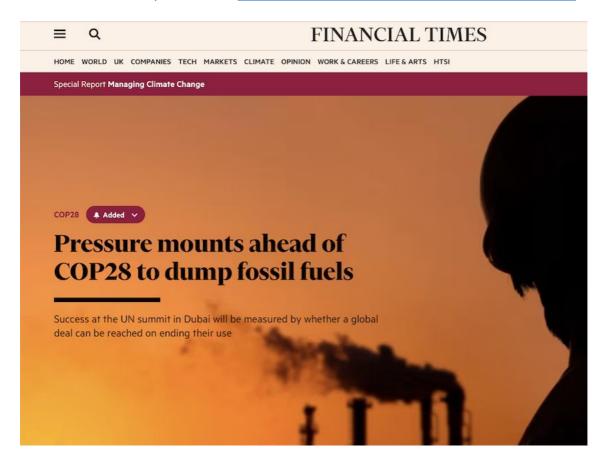
Al Jaber Proves An Unexpectedly Good Choice For COP President

Blog by Chris Rose chris@campaignstrategy.co.uk twitter @campaignstrat 1st December 2023 published at https://threeworlds.campaignstrategy.org/?p=3076



To use an old fashioned English term, whither the Climate Convention now? In other words, where will the UNFCCC (United Nations Framework Convention on Climate Change) go, after COP28? This blog makes some suggestions about how it could handle the fossil fuels issue, possible battle lines for campaigns, and from where I sit, way behind the frontline, shares my perspective on COP (Conference of the Parties).

A lot has changed in the 31 years of its existence. The 'science debate' has been won, climate change effects are no longer a prediction but a lived reality, renewable energy can now effectively replace fossil fuels (though politicians may not really get this), and we live in a multipolar world in which the influence of the old 'West' such as the US and Europe, is giving way to blocs around countries such as China and India. Before Covid intervened, climate protests led by Greta Thunberg, 350, XR and others reached unprecedented levels in many democracies.

One thing that has yet to change, is for the Convention to seriously tackle fossil fuels. Until a week or so ago it didn't look like a fossil fuel phase out would even be an agenda item for COP28. Since oil CEO and COP President Sultan Al Jaber was exposed as using the conference to make oil deals, it looks like the central issue. As the *Financial Times* puts it: 'Success at the

UN Summit in Dubai will be measured by whether a global deal can be reached on ending their use'.

This blog proposes:

- The Climate Convention risks becoming a Zombie Convention and losing pubic trust if it does not start a phase out of fossil fuels, the Elephant in the Room
- Al Jaber's oil business deals around COP and the industry's investment plans and PR efforts confirm that the fossil fuel industry is going for broke in the end game and business as usual not a genuine green transition
- The oil industry is socially and culturally incapable of transforming itself into part of the green energy industry and only government action can bring that about and ensure the full potential of exponentially cheaper renewable energy is maximised to help the world stay within 1.5C
- Many solution technologies identified as with potential for exponential growth offer a smörgåsbord of campaign opportunities, as their obstruction would be a scandal
- Convention rules should be changed to firewall the influence of the fossil fuel industry away from navigational decisions such as targets, timetables and policies, and instead put into a form of 'steerage class', involved only in implementation of a fossil fuel phase out
- All evidence used in Convention decision making should be Positive Vetted and required to show proof of funding to exclude anything with fossil fuel linked sources
- The COPs should be reorganised so they only deal with negotiations, and held separate in time and space from the trade fairs and satellite activities
- National governments should enact similar firewall rules on the fossil fuel industry
- If the work of the Convention is to connect with a gain public traction it needs a simple intuitively understandable scalable concept of what it means on the ground, in the same way that 'Rewilding' did for nature conservation
- The Climate Convention's mission ultimately is about disrupting business as usual. To show they mean business and build credibility and trust, governments should start by disrupting business as usual for the very rich, beginning with a ban on private jets
- Nobody should be allowed to come to the Convention by private jet

'Credibility Under Threat'

COP28 in Dubai is where the world's governments convene to conclude the 'Global Stocktake' on how they are doing in tackling climate change, five years on from the COP21 Paris Agreement. Last year's COP27, in Egypt, <u>saw</u> growing NGO dismay at the number of fossil fuel lobbyists in the convention (636, up from 503 at COP26).

An attempt led by India the EU to secure a declaration that fossil fuels must be phased out, was backed by over 80 countries but failed. The whole COP was almost derailed by disagreements over finance to help developing nations transition away from fossil fuels and manage climate impacts. UN Climate Change Executive Secretary Simon Stiell <u>said</u> "The credibility of this process is under threat. Let's remember there is nowhere else to go to solve these issues".

Once the Asian Convention Parties (it was their turn to host) had chosen UAE as the venue, and UAE had selected oil CEO Sultan Al Jaber as COP President, COP28 was always going to be a public test of the credibility of the Convention in taking on the fossil fuel industry.

There were pro's and cons to Al Jaber's credentials. On the one hand, he has backed huge renewables projects and a global tripling of renewables, overseen a huge Emirati contribution to energy transition in African countries, and <u>declared</u> the "phasedown of fossil fuels is inevitable". On the other, UAE and the Abu Dhabi National Oil Company he heads, plans to <u>nearly double</u> oil production, and UAE has <u>failed to report</u> on its huge fossil methane emissions.

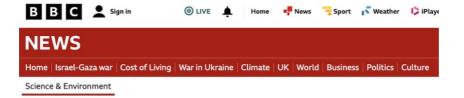
Jaber's appointment was denounced by scientists, NGOs and more than 100 members of the European Parliament and US Congress.

Backed by the US, UK, EU and others, the Convention organisers embraced the gamble, hoping that Al Jaber would show the impartiality required as COP President and bridge divides between both countries and interest groups.

If it the gamble had succeeded, and the fossil fuel industry accepted a path to it's own phase out, then COP and all who sailed in it would have been hailed as heroes. If it had clearly failed, or more likely left us with a muddy outcome of many warm words and incremental progress on issues excluding a phase out of fossil fuels, the UNFCCC might have started to look like a Zombie Convention: walking and talking but with no real live political grasp on the question that matters most.

As it is, the pre-event <u>disclosure</u> that Al Jaber's team was using the talks as an opportunity to do petrostate business and increase fossil fuel production, has inadvertently cleared the water.

It revealed that for the fossil fuel industry, the climate crisis is still an opportunity for Business as Usual. It's not just UAE, you could argue that's true in many other countries including the US, UK, Australia and even Norway but it was UAE's choice to put Al Jaber front and centre. If Al Jaber's trip to the summit of climate negotiation is remembered for anything at all, right now it looks like it may be for an unintended confirmation that the emperor has no clothes. Perhaps one of the greatest political wardrobe malfunctions of all time.



COP28: UAE planned to use climate talks to make oil deals





Dr Sultan al-Jaber is president of the climate summit and the head of the United Arab Emirates' state oil company

By Justin Rowlatt

Climate editor, BBC News

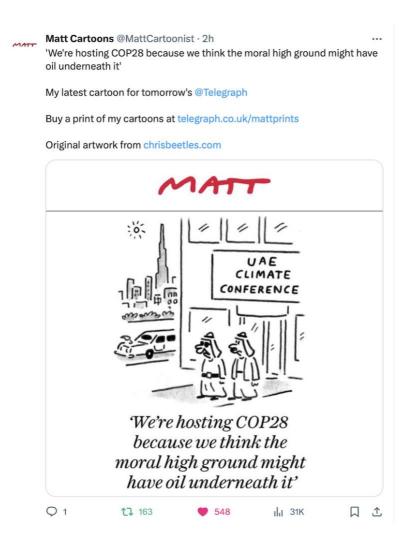
The United Arab Emirates planned to use its role as the host of UN climate talks as an opportunity to strike oil and gas deals, the BBC has learned.

Leaked briefing documents reveal plans to discuss fossil fuel deals with 15 nations.

The UN body responsible for the COP28 summit told the BBC hosts were expected to act without bias or self-interest.

To that extent Al Jaber was a good choice. His actions have confirmed that the fossil fuel industry is not to be trusted to self regulate, rather it's going for broke in the end game.

Al Jaber will still be faced with the same agenda of issues as he had before. Both he and Stiell have called for the response to the 'Global Stocktake' to "course correct" the current path, which an authoritative analysis <u>describes</u> as 'failing across the board', and he has <u>talked up</u> his commitment to make good on the top COP agenda items. That still leaves him and perhaps more important, his optimistic backers with a need to secure real measures towards ending use of fossil fuels, and the Convention with a big 'Fossil Lobby' problem (more below).



Cartoon by Matt for The Daily Telegraph, 28 November 2023.

Is COP Fit For the Job?

As Stiell says, 'we have nowhere else to go'. Having invested so much time and effort in the UNFCCC, governments would be more than reluctant to replace it with anything else. That does not mean a new Protocol might not emerge (the famous Montreal Protocol on ozone depleting substances was a protocol of the Vienna Convention, not a treaty in itself). The elephant in the room is a Convention mechanism on fossil fuels, with a phase-out as the obvious candidate.

The Climate Convention was established in 1992, without reference to fossil fuels. It may seem strange now but in 1997 when Greenpeace mounted the Atlantic Frontier campaign against oil exploration, the main aim was to reframe the public climate debate as about fossil fuels and energy choices. (The first UNFCCC text, on coal and fossil fuel subsidy, eventually came in 2021 at COP26).

COP26 climate deal includes historic reference to fossil fuels but doesn't meet urgency of the crisis



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That campaign called for a fossil fuel phase out on grounds of the 'carbon logic' (= unburnable carbon), and for the June 1997 UN General Assembly Special Session on the environment to set a carbon budget. This <u>previous blog</u> from the time of the 2015 Paris COP tells the story, and noted that the UNFCCC mechanisms: "bear hardly at all on the critical machinery of fossil energy systems, and not at all on the stockpile issues of carbon resources and reserves".

That's almost still the case but outside the Convention, some governments have made a start. **BOGA** or the <u>Beyond Oil and Gas Alliance</u> was launched in 2021 by Costa Rica and Denmark. The initial members were France, Greenland, Ireland, Québec, Sweden and Wales, with California and New Zealand as Associate Members. The Alliance also now includes the Marshall Islands, Tuvalu, Vanuatu, and the US Washington State as core members, and Chile, Fiji, Finland, Italy, Luxembourg and Columbia, as 'friends'. Its <u>declaration</u> states that 'more oil and gas resources need to be left in the ground'.

Core members of BOGA 'commit to end new concessions, licensing or leasing rounds for oil and gas production and exploration and to set a Paris-aligned date for ending oil and gas production and exploration on the territory over which they have jurisdiction'.

Many **NGOs** have run campaigns to keep fossil fuels in the ground, from the global 350 to <u>StopCambo</u>, devoted to opposing new oil fields in the UK, particularly Rosebank which lies West of Shetland, in the same oil frontier as Rockall, where Greenpeace appealed to the UN in 1997.



In the Atlantic Frontier oil province. Greenpeace 1997, and Stop Rosebank 2023. Photos: The Guardian and Friends of the Earth Scotland.

Then there's the campaign for a **Fossil Fuel Treaty**. Eight governments from low lying states: Vanuatu, Tuvalu, Tonga, Fiji, Niue, and the Solomon Islands from the Pacific, Antigua Barbuda in the Caribbean and Timor Leste in SE Asia, have all supported the campaign for a <u>Fossil Fuel Non-Proliferation Treaty</u>. It presents as 'complementary' to the Paris agreement, and was launched in 2020. It stems from a call for a moratorium on fossil fuel extraction made by Pacific Island leaders in 2015. It is supported by over 100 Nobel Laureates, 3,000 scientists, the World Health Organisation, the European Parliament and nearly 100 cities and subnational governments.

Its website states 'to meet the goals of the Paris Agreement, we need international cooperation to explicitly stop the expansion of fossil fuels and manage a global just transition away from coal, oil and gas in a manner that is both fast and fair'.

As an inventory would be required for any stockpile-reduction type negotiation, Carbon Tracker Initiative, Global Energy Monitor and the Fossil Fuel Treaty team have produced a public <u>Global Registry of Fossil Fuels</u>, a database of current and planned production and related emissions. The Treaty campaign follows a long established strategy of modelling the work that needs to be done and at the same time building a base of support.



Support for a Fossil Fuel Non Proliferation Treaty

If COP28 does not find a way to revisit India's initiative and make a declaration on a fossil fuel phase out, it's likely that the public, or in UN-speak, Civil Society, will look elsewhere. That could lead to a split between major fossil-fuel states and other nations. (Last November, Oil Change International <u>reported</u> that the US plans the biggest increase in oil and gas development by 2025).

At one time taking on the fossil fuel producers this would have seemed an insurmountable obstacle. Politicians and advisers still thinking in pre-2020s terms might recall the 1970s oilcrisis, and the perception, if not the reality, that OPEC held the West to ransom through an embargo. Or G W Bush's famous 2006 statement "America is addicted to oil", which was intended as a rallying call to develop alternatives but was repeated by many (especially climate sceptics) as describing a permanent reality. Now the fundamentals have shifted. True America is still using huge amounts of oil but globally, a surging tide of cheap new renewable energy is taking over.

A New Fundamental: Cheap Renewable Energy

During the founding years of the UNFCCC, renewables were still largely perceived as clean but small, which they were, and expensive, which when compared to fossil fuels, they were. Neither is any longer true (especially for solar and wind). Whether or not COP28 has come to terms with this, remains to be seen. It may not have done, as reflexive political thinking, especially amongst senior politicians, is often based on the verities of the past.

Analyses of the plummeting costs of renewable energy are typically very technical, which is a barrier to political consumption but in terms of raw politics, consider this, from the Rocky Mountain Institute X-Change report from July 2023:

It is notable that according to the IEA, the number of people working in the renewable energy industry is already larger than those working in the fossil fuel industry ...

... In broad terms, we have largely solved our technology and economic barriers and the main remaining ones are political. And here, numbers are on the side of change. Some 80% of people live in countries that import fossil fuels, 100% of people live in countries that have more renewables than fossil fuels, and fewer than 1% of people work in the fossil fuel industry. There are billions of people with a very strong incentive to find ways to deploy nearly unlimited renewable energy.

The main reason renewable energy has become cheap, is that it has become big, and not just big but very fast growing, and as production scales up the technology gets improved. fossil fuel technology, by comparison, is going nowhere. For now fossil fuels are still dominant in the market but the industry is ploughing the same furrow, or drilling essentially the same holes.

RMI's report focuses on electricity generation. It stated:

'surging solar, wind and battery capacity out to 2030 is now in line with ambitious net-zero scenarios' and 'what is already the cheapest form of electricity in history will roughly halve in price again by 2030'.

'exponential growth has put the electricity system at a global tipping point — where the transition away from fossil fuels has become hard to reverse, suggesting fossil fuel demand has peaked in the electricity sector and will be in freefall by the end of the decade'

Subsequent analysis by Lauri Myllyvirta of the Centre for Research on Energy and Clean Air reported in Carbon Brief also suggests China's carbon emissions may fall in 2024 'and could be facing structural decline, due to record growth in the installation of new low-carbon energy sources'.

RMI pointed out that this change meant that the trebling of renewable energy proposed at COP27 and now lined-up to as an achievement for COP28, was not so much a stretch target as something that will probably be exceeded (the increase may be fourfold). Not only would this make limiting climate heating to 1.5C more achievable but it undermines the case for allowing continued development, subsidy and use of fossil fuels.

This seemed to me to be highly significant in the politics of responding to climate change. In the art of the possible, much more had 'suddenly' become possible. Surely there would be specific calls for a faster replacement of fossil fuels by renewables? Yet almost nothing happened, there was hardly a ripple.

At *Business Green*, James Murray <u>noted</u> that in previous days both IEA and Bloomberg had also published about the explosive surge in low cost renewable energy but in the mainstream UK press little or nothing was said.

Era of global boiling has arrived, says UN chief as July set to be hottest month on record

Head of World Meteorological Organization also warns 'climate action is not a luxury but a must' as temperatures soar

US climate blog - latest updates



One reason for the lack of media reaction was, ironically, that there was another big climate story of the moment, which was was much easier to tell: "climate change is out of control" said UN Secretary Antonio Guterres after record temperatures at the start of the month, which he followed up with "the era of global boiling has arrived", as July became the hottest month ever recorded. The heat became life-threatening in Asia and North America and and fires ravaged Turkey.



From The Guardian

But even that media distraction didn't seem enough to explain the almost non-response from the policy community to this window of opportunity. One thing campaigning has taught me is that it is a mistake to take it for granted that decision-makers actually understand what's going on.

There is a long history of incumbent businesses failing to grasp the threat posed by exponential growth of new technologies. News websites and newspapers, Airbnb and hotels, cars and horses and now ICE cars and electric cars, mobile phones and landlines, Wikipedia and print encyclopaedias, Amazon and high street retailers etc etc.

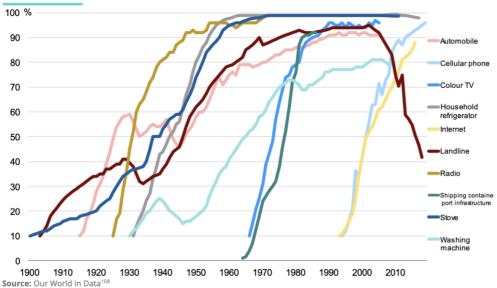
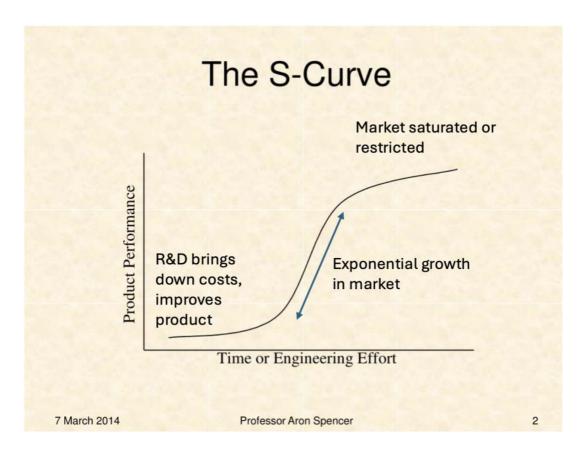


Figure 22: Past examples of S-curves — share of US households using specific technologies

S-curve examples – from RMI X Change



Idealised S-curve by Aron Spencer with my annotations. With solar costs were falling exponentially in the early 'nearly flat' phase but it went un-noticed by most policy makers as they did not understand that it would be followed by a rapid uptake once it passed a price and performance tipping point.

Key to this is exponential growth, which means that something grows in increasingly large leaps and bounds. Exponential growth involves a constant percentage rate of increase and shows greater increases of resulting quantity with passing time, creating an exponential curve.

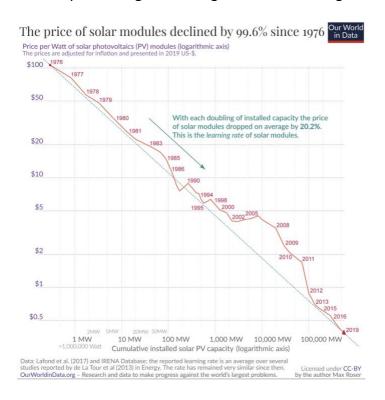
'For example, suppose a population of mice rises exponentially by a factor of two every year starting with 2 in the first year, then 4 in the second year, 8 in the third year, 16 in the fourth year, and so on. The population is growing by a factor of 2 each year in this case. If mice instead give birth to four pups, you would have 4, then 16, then 64, then 256. Exponential growth (which is multiplicative) can be contrasted with linear growth (which is additive)' (Investopedia)

This means that forecasts/ expectations of the growth of a technology such as solar or wind, will be wrong if they assume linear growth with the same annual addition, whereas in reality the annual additions are getting bigger each time.

By the same token, with a steady rate of exponential growth, if technology-learning takes place in each cycle, making the tech cheaper, something expensive but getting exponentially cheaper each cycle, will still look expensive for a long time, and then it reaches parity, it will be about to become vastly cheaper. In the case of tech displacing fossil fuels we need

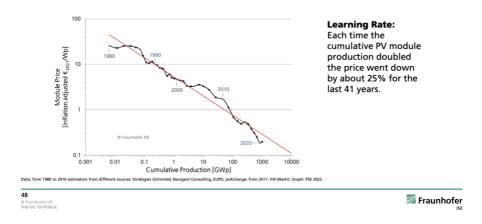
politicians to remove barriers to growth so it can grow fast enough to help us stay within 1.5C. (See RMI report discussion of fast and faster exponential growth).

Solar cost reductions have been exponential for decades (<u>Swanson's Law</u>) but conventional forecasting failed to embrace the implications until very recently, maybe because most of the messengers were from outside their silo. (The RMI explanation of why linear modelling fails to anticipate falling costs and growth of technologies is at 5.1 in the X-change report).



From <u>article</u> by Max Roser at Our World In Data- costs are still falling – it was not until 2005-10 that sales started to increase rapidly

Price Learning Curve Includes all Commercially Available PV Technologies



The falling price of solar electricity – pv modules (<u>Fraunhofer Institute</u>). Note the scale on the left and that the learning rate for solar has increased.

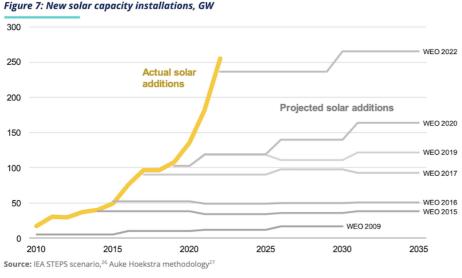
A Lack of Political Understanding

In countries like the UK at least, very few governing politicians have any background in science, let alone analysis of technology change. The ongoing UK Covid Inquiry has shown how then Prime Minister, Boris Johnson, struggled with 'graphs' and the threat posed by exponential growth of the virus. He was not alone. Evidence from the UK's Chief Scientific adviser (Patrick Vallance) included this:

Sir Patrick told the inquiry that the issue of helping politicians understand the data was not unique to the UK: "I would also say that the meeting that sticks in my mind was with fellow advisers from across Europe, when one of them – and I won't say which country – declared that the leader of that country had enormous problems with exponential curves, and the telephone call burst into laughter, because it was true in every country".

So could it be that RMI's message was not making much impact because it wasn't comprehended by politicians? In August I asked a few people if they thought this might be down to a lack of political understanding of S-curves and technological change? Had anyone investigated this? Nobody I spoke to knew of any such study of politicians (if you do please get in touch here or on Twitter @campaignstrat).

In the case of 'what's possible' on climate change, politicians are highly reliant on advisers, and here may lie part of the explanation: a lot of people who advise governments, might have to admit they had been wrong. Specifically, modellers arguing (not just RMI [1]) that maturing renewables would become exponentially cheaper and so grow exponentially, had long been ignored by forecasters who used models without exponential S-curves (eg this <u>from 2015</u> on IEA and solar).



Actual solar installation increasing exponentially (yellow), and the (grey) IEA predictions 2009 – 2022 based on linear growth assumptions. Governments assumed the grey lines would happen. In fact the yellow one did. From RMI X change.

In October, Nigel Topping, former UN Climate Change High-Level Champion for COP26 and founder of the climate collation <u>WeMeanBusiness</u>, was interviewed for a <u>GARP podcast</u> on what to expect from COP28 (the podcast is designed for risk professionals and is worth listening to). Topping, who had a hand in both the RMI report and the State of Climate Action report, declared that "most people are not prepared for either the pace of change or opportunities", had this to say about energy forecasting:

"we know technology transitions follow an exponential S-curve ...[but] all of the mainstream forecasts don't use that fact in many of their forecasts. They try and do very bottom-up modelling which is why they are always wrong on the low side" [in this case, under-estimating growth of renewable energy] ... "I think it's a scandal. If you are always wrong on one side in your forecasts you should either quit the field or be sacked. But people keep earning a lot of money ... a bit like economists generally. So it's a real problem that these always-wrong forecasts get taken seriously by policy-makers".

He added that it's:

"finally starting to change ... we have academic research showing that extrapolating an exponential is a better forecasting technique than all the integrated assessment models and other techniques, and actually there's some very good news coming. It's good news if you're ahead of the curve. That is in terms of renewable energy and electric vehicles we're looking at net zero in 2045 or 2042 ... [and at 23.30] ... most of the other sectors are amenable to that sort of technology change"

Topping points out that it is in the interests of nations and businesses to understand the implications of technology learning curves, giving the example of cars:

"... the European car manufacturers are all privately cursing the fact that they didn't start investing seriously in electric vehicles ten years earlier than they did. [they are] losing market share to Tesla and the Chinese. Tesla have 21% of the US luxury vehicle market – [that's] 21% loss [for] the BMWs, Audis and Mercedes ... Chinese companies already have 8% of the European ev market and the European ev will be the whole [world] ev market in four or eight years".

It is of course this dynamic which led the US and EU to embark on strategic programmes to grow green industries.

Potential For Exponential Growth In Many Sectors

One of the reports to have taken S-curves on board is the comprehensive study 'State of Climate Action' published in November 2023 by Systems Change Lab and others. It translates the NDCs or national plans (Nationally Determined Commitments) of countries taking part in COPs, into 42 sectors. This covers much of the waterfront of issues to be discussed at COP28 through the GST or Global Stocktake.

Action on 41 of 42 sectors was found to be lacking (the only one heading in the right direction at the right speed was sales of electric cars, which is in the exponential stage of the S-curve).



Slide from State of Climate Action <u>webinar</u> (available online) November 15 2023, hosted by WRI. Webinar <u>slides here</u>.

However another eight of the 42 were marked as 'likely' to have potential for S-curve (exponential) change, with another nine marked as 'possible'. These relate to electric vehicles, electricity generation, cement production, technological carbon removal, car journeys, electrified bus sales, zero emission shipping, 'sustainable' aviation fuels, green steel production, green hydrogen, medium and heavy duty commercial vehicle sales, and new zero carbon buildings. That's a huge part of the climate pollution problem.

The technological learning element means it is easier to see how a learning-curve could come into play, ie progressive technical production improvements and scaling-up, dropping cost and driving uptake. Others have also suggested that this might happen in some areas of agriculture and food production. Regulation and market-boosting government policy can spur (or inhibit) these developments.

Scandals Of Climate Obstruction

Being aware of the effects of exponential growth in energy solution technologies is important for campaigners and others trying to combat climate change. In the transition there is increasing interest in 'climate obstruction' (eg this, this and this), in other words the obstruction of progress in closing down and replacing processes and industries which produce climate heating.

Government climate obstruction can be overt – such as UK Prime Minister Rishi Sunak's attempt to build 'wedge issue' political support by adopting deliberately anti-green policies such as more licensing of oil and gas exploration, against the advice of both the IEA and his

own statutory Committee on Climate Change, and his more comical pledge to ban an imaginary 'Meat Tax' – and less overtly, continuing to allow or require the use of out-dated and more polluting technologies and practices, and failure to prevent lies and misinformation about what is possible, cleaner and cheaper, or to mandate the use of new technologies which are in the public interest.

As has been discussed in previous posts, the existence of an unused solution, and allowing the continued use of a process which has awful consequences, converts a tragedy (which nobody can do anything about), into a scandal. Particularly where the perpetrators gain an immoral benefit from the (avoidable) problematic activity. (See the <u>Scandal Equation</u> and VW).

Analyses of S Curve cases are dry and technical but offer campaign groups a smörgåsbord of potential campaign opportunities, focused on whether or not governments are delivering on climate solutions which could give their citizens cleaner, cheaper, healthier energy and jobs. Depending on national statutes, many such cases could also involve legal action and challenges to climate impunity.

Identifying barriers or absences which easily translate into everyday intuitive understanding (<u>Track 1 as opposed to Track 2</u>) may be a fruitful way to identify the most viable campaign opportunities.



From this blog

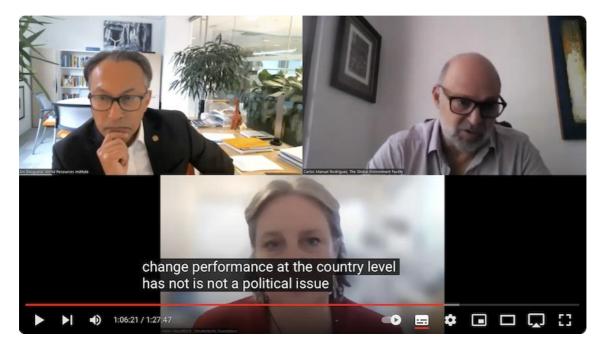
Perhaps it hardly needs saying but domestic campaigns and public pressure often play a significant role in shifting government policy, and by and large, what happens at COPs and in the preparatory inter-sessional meetings, is the playing out of negotiations based on national positions decided in advance, often long in advance, of the get-togethers.

Yes a multitude of side deals are made and ideas are hatched in the massive jamboree which the COPs have become, and if you are on one of the network of inside tracks inside the COP bubble, that's valuable. But to the wider public, including 'community level' campaigners, concerned individuals and the increasingly large world of 'green' businesses, the UNFCCC process is remote and as much foreign-policy theatre as relatable substance. This is something of a risk for the credibility of Climate COPs in terms of public trust and support, especially as climate impacts magnify and public concern increases.

Can COP Become A Public Political Issue?

The Climate Convention, which is effectively charged with climate governance, with more than 42 issues and 197 countries and the EU to deal with. It has a bigger complexity problem than French leader Charles de Gaulle who famously complained "how can anyone govern a country that has 246 varieties of cheese?" So is it possible for public campaigns to effectively help make the Convention work?

The logic of COP organising is driven by process. The GST is all about meeting and improving on Nationally Determined Commitments. But how many neighbours or relatives people do you know – professional climate geeks aside – who have even heard of a NDC, let alone know what it is? Governments write them can the public hold them to account?



Country performance on COP NDCs is "not a political issue": Carlos Manuel Rodriguez of GEF (right) with Anil Dasgupta of WRI and Helen Mountford of Systems Change Lab.

Former Environment Minister of Costa Rica, Carlos Manuel Rodriguez is CEO and Chairperson of the World Bank Global Environment Facility (GEF) which helps fund action to foster those NDCs. He worries about the failure to connect the public with the workings of COP. In a webinar discussion following the launch of the State of Climate Action report he argued that "more important" than the money [subsidies and loss and damage funding being big COP topics]:

"climate change performance at the country level is not a political issue [eg in Johannesburg, Sao Paulo, Mexico City] "the common citizen doesn't know what the Environment Minister is

doing in his commitment to implement the NDC. There is no control by civil society by common citizens in most developing countries, and I would include the developed nations as well" ...

"we are not building capacity in civil society in those same countries so civil society can use that reporting as a mechanism to do political control of the executive branch as regards the implementation of the Paris Agreement"

"as a politician myself I see multiple gaps that we need to understand so we can empower the private sector, unions ... the whole range of policy stakeholders at the country level, with the data and information so they can do political control based on reliable information which is what they are reporting to the convention"

And critically:

..."without such checks and balances ... that element is not there [and] many countries will continue to commit to unrealistic goals and targets"

Even in the UK, which is blessed with a law which commits the government to set and meet carbon budgets set by a statutory Climate Change Committee which can explain what needs to be done and whether it is being done, holding government to account is a real problem. (Today 1 December 2023 the UK Prime Minister is being <u>criticised</u> for changing how climate spending is calculated, to claim it will exceed targets).

The Convention itself has no powers to impose sanctions. This poses a public communication problem as 'common sense' dictates we should have a climate police force to keep governments in line.

Rather, like much international law, agreements made at COPs depend for being 'binding' on countries treating them as such. Which in turn requires "a sense that a rule constitutes a legal obligation and that compliance is therefore required rather than merely optional" (a lawyer quoting a philosopher).

Arguably only the EU has a system of sanctions which national government cannot ignore, under its own supranational regime of shared sovereignty. The Paris Agreement it does not make adherence to the 2.C (or 1.5C) 2050 target obligatory because that for the US to sign up, President Obama would have needed two-thirds in the Republican-controlled US Senate. Instead it made the *process* of production of NDCs a requirement. Hence their importance to the COPs.

A World Economic Forum/ Quartz <u>article</u> explains:

'The Paris Agreement can apply pressure on signatories. It authorizes a committee of international experts to monitor how well parties are complying with the treaty's mandates ... In reality, as with other international accords, the more obvious compliance mechanism has been peer pressure: The climate summits themselves have been nudging parties to honour their obligations. At COP26, for example, prominent world leaders have publicly shamed

nations. The media has elevated those nations that are pulling their own weight or out performing others.'

Which all leads back to public pressure and belief in the COP system. Which also requires public understanding and as campaigners will know, a multitude of factors such as a perception that climate-related actions will make a difference (value expectancy) and salience/ visibility in people's own lives. My <u>previous blog</u> described one attempt to make climate change problems and solutions more locally relevant in one county of England.

If I were asked to advise on making the work of COP more salient at a national level (which is vanishingly unlikely), I'd start by looking at what people already see as important, and for parallels which have dealt with similar communications problems. One of the latter, is 'rewilding'.



Rewilding of a Scottish Glen

Needed: A Climate Equivalent of Rewilding

For many decades, conservation and environment groups, academics and inter-governmental agencies searched for ways to explain concepts like 'biodiversity' and the changes to 'land use management' or 'habitat conservation' practices necessary to sustain and recover nature. It was pretty unsuccessful, and mostly an exercise in taking language and ideas from the

professional techy world, requiring analytical thinking (Track 2) and trying to transpose them into the common or garden (intuitive, Track 1) communication terms of daily life. The contents of NDCs are comparably hard to translate into everyday terms.

'Rewilding' however was easy to understand, and could apply from the field or garden to a national or international level. So far as I am aware, the COP agenda lacks any such idea with vertical reach and scalability which captures both identifiable actions and an end result, and which can be applied to real places, such as homes, factories, towns, villages, regions or countries.

For all its limitations, 'Net Zero' has a similarly simplifying effect which is probably why it helped mobilise politicians but it is perhaps too flawed (not real zero, not climate recovery) and 1.5C compliant/consistent or SBTI 'Science Based Targets', is another professional bit of jargon, fine print to public audiences.

The People Probably Aren't Wrong

As to what the public see as important, viewed from inside the COP machine, the NGO clamour for action to kick the fossil fuel industry out of the climate talks is no doubt a bit annoying. For one thing, it's not a priority on the COP grid, unlike NDCs and the GST.

A second reason might be that the COP executive itself probably can't do that much apart from require more <u>lobbyist transparency</u>, which in the light of the Al Jaber moment, it may make a point of. For a third, the 'realpolitik' is certain to be more complicated than pretty. It's probably no accident for instance, that the Asian COP members chose UAE to host COP28, UAE being one of the richest non-Western countries in the world.

But the simple moral logic of not letting the industry which does the most damage, influence the rules supposed to stop that damage, is simple natural justice. It will be instantly recognized by the public, if not welcomed by the elites, in all countries. As Phillip Jakpor, of Public Participation, Nigeria <u>said</u> at COP27; "If you want to address malaria, you don't invite the mosquitoes".

It's a 'whose-side-are-you-on?' question. Alienating the fossil fuel industry might, for a time, leave the Convention a Zombie Convention unable to reign in the worst offender but at least it would be our zombie. Alienating the public would simply increase despair and erode trust, especially amongst the young.

In 2020 the UNDP <u>People's Climate Vote</u>, the worlds biggest climate survey, found that nearly 70% of under-18s said that climate change is a global emergency, more than in any older age group. A 2023 UK survey <u>found</u> 'almost three-quarters (73%) of 16- to 24-year-olds reported that the climate crisis was having a negative effect on their mental health'.

A 2021 Lancet study of 10,000 16 – 25 year olds across ten countries* found:

'over 50% felt sad, anxious, angry, powerless, helpless, and guilty about climate change and 45% said their feelings about climate change negatively affected their daily life and functioning. .. Respondents rated the governmental response to climate change negatively

and reported greater feelings of betrayal than of reassurance. Correlations indicated that climate anxiety and distress were significantly related to perceived inadequate government response and associated feelings of betrayal'.

[*Survey in Brazil, India, Philippines and Nigeria, UK, Finland, USA, Australia and Portugal].

Expectations and Trust

Climate COP insiders are very aware of the effort they have to expend to keep their Convention moving forward. Progress is often slow and hard won. Process is complex and hard to explain, even if they have the opportunity. Small positive steps must be celebrated in a war of attrition, and patience is a virtue. The flip side is that the insider view can become detached from both the public view and the climate reality.

Every time a 'climate leader' uses phrases like "last chance" to talk up a COP, they up the ante and the level of public anxiety. On 20 November 2023 UNEP <u>launched</u> its 'Emissions Gap report, highlighting the fact that existing Paris Agreement commitments need to be strengthened to achieve a 42% cut in emissions to have a chance of staying within the 1.5 C threshold. "We know it is still possible to make the 1.5 degree limit a reality. It requires tearing out the poisoned root of the climate crisis: fossil fuels" said Antònio Guterres, Secretary-General of the United Nations.

As the self-acknowledged 'only game in town' the UN COP process becomes the go-to delivery address for every new call for climate action. For instance on November 16 ice-scientists released the State of the Cryosphere 2023 – Two Degrees is Too High warning 'melting polar ice sheets, vanishing glaciers, and thawing permafrost will have rapid, irreversible, and disastrous impacts worldwide'. It addressed the COP directly: "At COP28, we need a frank Global Stocktake, and fresh urgency ... We need tangible results, and a clear message about the urgency to phase out fossil fuels and for more robust financial mechanisms to finance climate action'.

Public rhetoric about climate change reaching 'boiling point' or 'being out of control' (that one's undoubtedly true) rarely fits with the calibrated judgement of insiders as to what's possible, such as Nigel Topping. He who frankly stated to GARP that "no huge negotiated breakthrough [is] expected at this COP". Yet of course, that's what the ice-scientists and many others hope for.

Nigel also responded to the complaint that "we've had so many years of COPs yet emissions are still going up", by saying "everything's failing ... but it's trivially true". The 'so what?' said Topping is "ok smarty pants, what's your suggestion for a better process that's actually politically achievable? ... that's when they start stuttering".

I have some sympathy with Nigel Topping's frustration. There are hundreds if not thousands of alternative process ideas and we have no time to rip everything up and start again. But the COP process could align itself better with both climate reality and public hopes and expectations. After all, if fossil fuels are the 'poisoned root of the climate crisis', whose job is it to "tear it out"?

Dealing With The Fossil Fuel Industry

The Poisoned Root sounds like something out of a fairy story but it's clear that the fossil fuel industry is the chief proprietor of poisoned root of the climate crisis. So what should the UN do about its participation in the Climate Convention?

As a devout Catholic perhaps Antonio Guterres had in mind a 'temple moment'? The Christian story is debated but the temple economic system was corrupt, and at Passover sacrificial animals had to be purchased using temple currency. The conversion rates ripped off the poor. Jesus overturned the money changers tables and threw them out.



Christ Driving the Money Changers from the Temple (El Greco, Washington)

Wikipedia

The current UN approach seems aimed at making a rational appeal to the oil industry to transition itself away from fossil fuels to new businesses based on petrochemicals, and renewables. Al Jaber is of course in a great position to contribute.

A mark of how much things have changed since the 1990s is that Faith Birol, head of the IEA has become a trenchant advocate for an end to fossil fuel expansion, reminding governments that it is not needed to sustain the industry under any scenario compatible with the Paris accord. In the introduction to its 2023 IEA World Energy Outlook Special Report *The Oil and Gas Industry in Net Zero Transitions* the IEA Director Faith Birol <u>states</u>

'The industry ... faces a choice – a moment of truth – over its engagement with clean energy transitions. So far, its engagement has been minimal: less than 1% of global clean energy investment comes from oil and gas companies'

The IEA is an autonomous International Energy Agency set up by the OECD following the 1970s oil crisis. Its report devotes over 200 pages to detail transformative business models across the whole complex ecosystem of companies in the oil and gas industries.

Will it work? Big Oil <u>refers</u> to BP, Chevron, Eni, ExxonMobil, Shell, and TotalEnergies. These companies control a minority of oil reserves but have an an outsized role in lobbying, particularly in above the line public propaganda. Recently, Shell for example, has been <u>criticised</u> for investing heavily (in PR budget terms) in trying to win over young people through paying influencers to promote its brand <u>through</u> the popular computer game Fortnite. Big Oil revenue was 1.68 trillion U.S. dollars in the 2022.

Oil Majors 'encapsulates' the largest oil companies by tanker chartering'. This includes NOCs, National Oil Companies such as Sinopec in China, Gazprom in Russia, Saudi Aramco and ADNOC, headed by Al Jaber. A 2022 Wood Mackenzie report found 65% of the discovered oil and gas reserves in the world are owned by NOCs rather than the more obvious Big Oil companies. In recent decades the proportion controlled by NOCs has increased although the public Big Oil companies are said to be better at commercialising their finds.

It is obvious that the Big Oil companies are more available to public pressure than are the nearly all the NOCs. For instance, through shareholder pressure, and via governments of the countries they both sell in and where they have headquarters, staff and assets. However right now the fossil fuel industry plans to expand exploration and production. In 2022 Oil Change International <u>found</u> that if enacted, Final Investment Decisions already taken by 2022 will commit the world to warming beyond the Paris target of 1.5C. In November 2023 Urgewald <u>calculated</u> that of the 1,623 companies covered by the 'Global Oil & Gas Exit List' database, accounting for 95% of all production, over a thousand plan to expand fossil fuel infrastructure.

From their investments, actions and public relations efforts, it is self-evident that the industry is going for broke and trying to cash in on its existing business opportunities rather than planning to transform as IEA, UNFCCC and others hope.

So can it be done? Yes of course it can but only by force majeure. Eventually the displacement of fossil fuels by renewable energy will come about through pure market forces, and that will be non-linear and faster than many assume and will affect politics. Consider for instance the psychological effect on voters who no longer see the need for oil or gas in their personal lives because they all power or cool their homes and cars with renewable electricity. Governments would love this scenario where the market deals with the problem. Only it isn't going to happen fast enough to avert a climate catastrophe.

Don't the people in fossil fuel companies themselves care enough to change, don't they understand? Yes of course they understand but just as they understood about their products causing climate change way before governments even considered a Climate Convention, the 'business case' for continuing business as usual outweighed that.

Plus as social machines from my experience, oil companies tend to be culturally incapable of such radical self improvement. They are conservative, product-led rather than market-led, and not entrepreneurial. Around 2001 when BP temporarily rebranded itself as 'Beyond

Petroleum" one senior BP executive told a frustrated adviser friend of mine, "you have to realise that this company has not taken a qualitative decision in over 100 years".

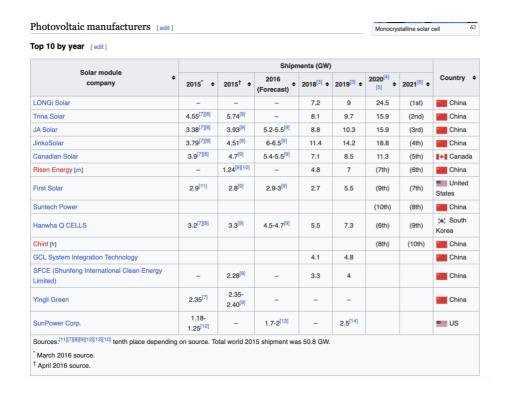
They also attract people who do not want to bend to external pressures. A BP executive charged with making the company's operations more user-friendly to local communities explained the resistance that he faced when asking staff to 'listen' to outsiders and couldn't understand what he was doing wrong until he realised that 'pushing it through' was the very thing that had attracted many people to join the industry.

At a 'White Space' workshop run for Shell in 2001 another told me how difficult it was for them to agree change, partly because of group think. They were all engineers (etc). I asked him if they used psychometric models like MBTI and he glumly said they had, but they were nearly all the same, which as he knew, meant that getting change agreed was hard. Even so, that workshop took place because at the time, Shell was trying to change, due to the shock of losing public trust. One of its scientists briefing external consultants asked to generate new more sustainable business ideas explained that "our working assumption is that the future will all be electric, renewable".

Many oil companies have indeed ventured into renewables, only to drop them again. And sometimes to pick them back up, and drop them once more. Back in 1997, Greenpeace put some of BP's own solar panels on its oil exploration HQ in Aberdeen. Not long after, John Browne of BP declared that 'with appropriate government support, solar could be cost competitive against fossil fuels 'within a decade'. BP was expanding solar production. Shell followed. Both aimed to capture 10% of the global solar market by 2005. (Story here).

Shell <u>withdrew</u> from investing in wind and solar in 2009. BP <u>closed down</u> BP Solar in 2011, after 40 years of solar R&D. Shell went back into wind, only to <u>scale it back</u> and lose its renewables CEO in 2023, citing 'investor pressure to focus on the most profitable businesses'.

The reality is that when the oil price rises, there is so much money to be made (and available for exploration for more oil and gas), that with shares linked to reserves and bonuses linked to profits, sticking with fossil fuels has been the default, and still is. The solar pv market today is supplied 90% by Chinese companies, 6% Canadian/US, and 4% European. None are oil companies.



<u>From Wikipedia</u> The United States and Canada manufactured 6%, and Europe manufactured a mere 4%. In 2021 China produced about 80% of the polysilicon, 95% of wafers, 80% of cells and 70% of modules



2023: having gone back into renewables again, BP shifts back to oil again. The FT <u>says</u>:

The echoes of the early 2000s' "Beyond Petroleum" campaign and subsequent reversal are clear. There is logic to the move. Oil and gas prices are high, making the company's fossil fuel operations hugely profitable once again. Many investors were never really convinced by BP's transition strategy, which called for putting profits from oil and gas operations into lower-return, clean energy businesses. The strategy was not green enough to compete with "pure-play" renewables groups, but no longer oily enough to keep up with the other oil majors.

The Only Option

Which leaves only public pressure and government action. Oil companies do care about governments do. Governments control exploration licences – hence the logic of BOGA. And they control tax, which can determines profits.

During the Brent Spar campaign about disposal of redundant oil industry infrastructure, the CEO of Shell UK told me that he was trapped and couldn't change course because of government policy – by which he mainly meant UK tax rules. It was only the intervention of Shell International as result of reputational damage and European government threats, which forced (or enabled) him to do so.

A significant problem at least in the UK was that oil companies saw the government as more powerful than them, and politicians saw the oil industry as more powerful. An oil company executive privately explained to Greenpeace "Once we get the signal from government that renewables are more profitable [as decided by tax rules] than oil or gas, that's what we will do." But the signal never came.

The politicians did not see it as their role to make renewables cheaper than fossil fuels, and did not understand what oil industry forecasters <u>did understand</u>, that technology learning curves would at some point, make new renewable technologies cheaper than fossil fuels.

So it is the governments of COP who must act. Then the UNFCCC – and others – will have the political space to organise a phase out. COP however can send a signal.

A 'Steerage' Proposal

The anti-tobacco health lobby is fond of this <u>quote</u>: "Tobacco is the only legally available consumer product which kills people when used entirely as intended" Except that now could also be said about fossil fuels. They cause climate change and that's killing people.

In 2003 the WHO <u>established</u> the Framework Convention on Tobacco Control. It has since become one of the most rapidly and widely embraced treaties in United Nations history, so many Parties to climate COPs are already signatories.

Overtly or covertly, the fossil fuel lobby has always been in and around the UNFCCC but by COP26 it had become a major issue. The BBC's Matt McGrath <u>reported</u>:

Campaign groups argue that the World Health Organization didn't get serious about banning tobacco until all the lobbyists for the industry were banned from WHO meetings. They want the same treatment for oil and gas companies at COP.

"The likes of Shell and BP are inside these talks despite openly admitting to upping their production of fossil gas," said Pascoe Sabido of the Corporate Europe Observatory ...".

"If we're serious about raising ambition, then fossil fuel lobbyists should be shut out of the talks."

A <u>useful paper</u> by Rob Ralston and others in *The Lancet* notes: that 'Article 5.3 is a general obligation of the FCTC that requires parties to protect public health policy making from tobacco industry interference'.

Before the 2023 talks on a UN Plastics Treaty in Nairobi, which are also attracting a huge lobbying effort by the oil industry, 170 organisations <u>signed</u> on to a letter to UNEP calling on it to protect the talks from fossil fuel interference on the same basis as the Tobacco Convention. The <u>letter</u> calls for an Accountability Framework, and states:

'Limiting the influence of vested private interests has proven to have a positive impact on treaty outcomes. This was demonstrated by the World Health Organisation (WHO) when agreeing to the Framework Convention on Tobacco Control (UNFCTC). To prevent and address a conflict of interest between the tobacco industry and public health, the WHO instituted a firewall between the tobacco lobby and public health officials. Known as Article 5.3, it also comes with clear guiding principles on how to apply it. '

I agree that this is the approach also needed at the UNFCCC. I suggest:

- 1. Firewall the fossil fuel industry by keeping it from having any presence or role in setting targets, timetables, texts or policies adopted at Climate COPs. Isolate fossil fuel lobbyists from the navigational systems of the Convention with no access to the bridge of the ship COP. Keep them onboard but in the equivalent of the old fashioned Steerage Class for passengers on ships. Make this easier by organising the the COPs, so that the negotiations are separated in time and space from the trade fairs and other satellite activities.
- 2. As fossil fuel interests will, along with many others, be needed in the phase out of fossil fuels, establish separate meetings that take instructions from the navigational level, and sort out implementation, monitored and controlled by the Convention.
- 3. Establish a Positive Vetting system for any evidence presented to any part of the Convention process, requiring it to be shown to be authored and financed independently of any interests responsible for or benefitting from emissions of climate pollution. To prevent use of cut-outs such as foundations with anonymous donors, finance should be positively confirmed in a similar way to how banks must comply with money-laundering legislation by requiring proof of source of funds.

This leaves open the issue of National Oil Companies owned by Parties. One option would be to reconfigure the UNFCCC to recognize classes of Parties, as some trade treaties do (eg importers and exporters).

The UNFCCC would be more likely to adopt such an approach if national parliaments and governments started to adopt it themselves. Indeed, one reason the current civil society and media outrage over the infection of the Climate Convention by the fossil fuel lobby has relatively little traction with governments, is that they too have allowed the fossil lobby into their own decision making, not just meeting lobbyists but inviting them in through secondments from energy companies into government energy departments.

For NGOs, public campaigns aimed at elected representatives to push governments to firewall the influence of the fossil industry, would be an obvious way to start.

Changing Business as Usual

The underlying political challenge facing the Climate Convention is disrupting Business as Usual. As national governments need to change if COPs and UNFCCC are to change, and if the tenuous reach of the COP process is to be strengthened and create a positive feedback of action between local national and global as Rodriguez hopes, this means disruption at a society level, not just in policy thinking.

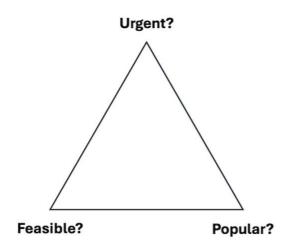
Default political offers in developed countries are to maintain business as usual in terms of prosperity and well-being. In countries like mine that has meant an expectation that people will go on getting richer in real terms, from one generation to the next. The creeping realisation that this has not been the case for a while, was one of the <u>factors behind</u> the vote for Brexit, although Brexit itself has made the UK poorer still, especially, in real terms, for the young.

The market success of 'sustainable investing' of pensions has been predicated on the sales pitch that you can have much the same return on investment without doing damage to the planet, as you can with conventional investment. In their book <u>The Unsustainable Truth</u>, investment managers David Ko and Richard Busellato argue convincingly that if that was ever true, it's not now. Funds under 'responsible' management are now so vast that there simply isn't enough space or natural resource to make a return of say 10%. 1% would be more realistic (apparently in Japan 2-3% is considered reasonable).

Financing pensions and health systems is a chronic problem in many developed nations with ageing populations, Japan and the UK being just two examples. These also tend to be countries with https://doi.org/10.2016/nc.10 of socially conservative Settlers, instinctively averse to change. They are prone to support opposition to the very innovations, such as renewable energy which could actually leave us all healthier and better off, if change threatens to upend their established behaviours or local amenity. Opposition to wind farms and new grid connections for instance.

Developing countries tend to have much younger populations with high-proportions of Prospectors seeking the freedom to prove themselves successful. When faced with few local prospects, corruption and insecurity, these are the people most likely to become economic migrants, including because of climate change. They seek to get to places like Europe, where significant immigration can trigger Settler fears, leading to nationalism and values polarisation.

A combination of these and economic problems can lead politicians to push climate change down their list of priorities. It may be an existential threat but is it the most urgent? In my experience a triad of simple heuristics explain the making of many political decisions in democratic governments: is it easy (feasible), is it popular, and is it the most urgent ('shooting the crocodile nearest the boat').



Heuristic Triad of political decision making

Multiple studies show considerable levels of cynicism and despair about politics. "Vote for change" often actually seems to mean a vote for a change of who's in charge, not what happens after the election. And the rich consistently seem to get richer.

Such feelings often mirror those about climate change. What can we do about it? What will really make any difference? Evidence shows that when people actually see change happening, they are more likely to try and join in and emulate it, and demand it because it is available. Domestic solar pv is an example. If COP wants to connect, its programme needs to be relevant and visible on the ground.

So is there an angle or a fault line which aligns with the changes needed to tackle climate change, and which cuts through these BaU business as usual dysfunctions?

Disrupt BAU For The Rich

The best option looks to me to be to disrupt business as usual for the rich, starting with the very rich. Their lives are hyper mobile compared to the rest of the population, more able to escape the effects of climate change. Normal people do not enjoy the benefits of tax havens, golden passports and private jets.

By the same token, the very rich tend to be super-high emitters of carbon. Stockholm Environment Institute, *The Guardian* and Oxfam recently produced series of good reports on 'The Great Carbon Divide', <u>noting that</u> the richest 1% produce more carbon pollution than the poorest 66% of the world population. So they are not responsible for all the problem, only most of it.

UNESCO's latest *World Inequality Report* shows that nations have become richer but governments poorer (and so less able to do what's needed), inequalities have increased most at the very richest end of income distribution, and it states: 'our data [including gender inequality] shows that these inequalities are not just a rich vs. poor country issue, but rather a high emitters vs low emitters issue within all countries'.

So it seems to me that XR, Greenpeace, economist <u>Thomas Pikkety</u> and other campaigners are on the right track in targeting private aviation. Start there and once private jets are banned, <u>work down</u> into corporate frequent flying. If everyone was given an annual budget for flying by national government, and that could be sold on if not used, it could also redistribute money from the richer, to the poorer. If aviation was additionally <u>restricted</u> to using proven negative carbon capture power technologies it could also become climate neutral.

Forbes magazine <u>reports</u> that Schiphol Airport in The Netherlands says private jets will 'no longer be welcome' from 2025.

The principle should be to disrupt the rich, and highest emitters first and most, and to target benefits at the bottom two thirds, starting with the least well off. Ironically this personalisation of carbon responsibility was of course <u>first conceptualised</u> in the Carbon Footprint by BP in 2004, as a way of distracting from corporate responsibility for climate change.

Hitting the carbon emitting activities of the rich would show that governments mean business, and real change is possible. It hardly needs saying that many elected politicians are themselves very rich, and nobody should arrive at a COP by private jet.

[1] There are many reports and studies on technology disruptions, S curves and the implications of exponential growth. See for instance <u>The Breakthrough Effect: How To Trigger A Cascade of Tipping Points To Accelerate The Net Zero Transition</u> (SystemIQ, University of Exeter, Bezos Earth Fund January 2023); <u>Nafeez M Ahmed</u> in https://ageoftransformation.org/energyphasetransition/ on Tony Seba's 2014 book *Clean Disruption of Energy and Transportation*; and Octopus Energy blog citing Ray Kurzweil of Google on falling solar costs and exponential growth, in "The Law of Accelerating Returns" in 2011, at https://octopus.energy/blog/growth-solar-power/; and Carbon Tracker's 2021 Spiralling Disruption, https://carbontracker.org/reports/spiralling-disruption/