

The inconvenient truth of failed climate policies

Sometimes policymakers have backed the wrong technologies, lacked ambition or simply not engaged with potential emissions reductions. Sonja van Renssen explores climate policies that have not delivered and why.

Carbon capture and storage (CCS) and biofuels are two emissions reduction technologies that policymakers have pursued with fervour, but with debatable results, for over a decade now. These are often the first that come to mind in response to a question about ‘failed’ climate policies (Fig. 1). But depending on whom you ask, they may be quickly joined by other examples, notably emissions trading. Even the success stories of renewables and energy efficiency offer lessons. Transport and heating and cooling are new on the radar of climate policymakers, while agriculture and diet remain largely untouched. Electrification and digitization are capturing imaginations, but with uncertain climate implications.

Kyoto Protocol

The long pursuit of a top-down global climate agreement is today widely perceived as a mistake: the Paris Climate Agreement is the international success story. “For many years we tried to come to an agreement that would bind everyone,” says Saleemul Huq, director of the International Centre for Climate Change and Development (ICCCAD). “The closest we got was the Kyoto Protocol, but even there the biggest polluter left so it didn’t work. Now, countries can take decisions for themselves and look, country after country is deciding to forego investments in fossil fuels.”

Alden Meyer, director of strategy and policy at the Union of Concerned Scientists in the United States, does not see the Trump administration’s decision to pull the country out of the Paris Agreement as a death knell. “For me the real test is: will Europe, China, India, Brazil and so on move forward despite Trump?” he says. “I think it’s [the Paris Agreement] been proven to be more effective since Trump came in than when it was agreed,” says Jennifer Morgan, Executive Director of Greenpeace International. She pays tribute to its “shared leadership” approach.

Not everyone is convinced that the tide has turned, however. Global emissions have gone up, not down since the UN Framework Convention on Climate Change (UNFCCC) was signed 25 years ago. Many African countries are still looking to coal to provide cheap electricity and respond to supply deficits, says Youba Sokona, special advisor

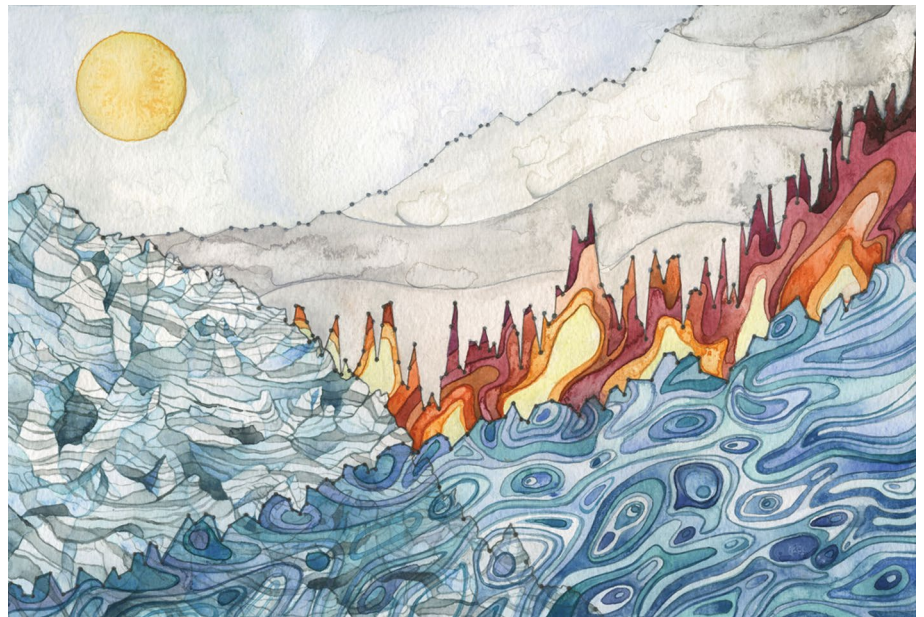


Fig. 1 | Landscape of Change. The artist has used data about sea-level rise, glacier volume decline, increasing global temperatures and the increasing use of fossil fuels to depict a landscape shaped by the changing climate. This is the world in which we are now living, despite all our efforts to curb climate change. *Landscape of Change* (2016) by Jill Pelto.

for sustainable development at the South Centre based in Geneva, Switzerland. In Africa, climate change is still often perceived as mainly an environment, not economic and development issue, he adds. Sokona regrets that policymakers did not do more to link up the UN Sustainable Development Goals, Paris Climate Agreement and Addis Ababa Action Agenda on finance for development in 2015. Huq says climate aid has “trickled” in and policymakers have failed to deliver on climate justice.

Emissions trading

For many, the EU’s flagship climate policy — the EU emissions trading system (ETS) — has been a failure. Critics argue that emissions trading makes sense on paper, but experience shows that it is not as effective in real life. For one, the emissions cap is never ambitious enough. “There is always an information asymmetry,” explains Niklas Höhne, a founding partner of the NewClimate Institute. “Those being capped know more than those capping them.” This results in the allocation of too many carbon allowances for the emissions released and

hence a low carbon price. The EU carbon price broke the €10 barrier for the first time in seven years in February 2018.

Other countries have learned from the EU and introduced from the start tools to deal with oversupply, but it remains to be seen whether these will work. The latest EU ETS reform also introduces a ‘market stability reserve’ but for many, Höhne included, it is too little too late. They believe it will be another decade at least before the EU carbon price is high enough to drive even a fuel switch from coal to gas.

The failure of the EU ETS to drive transformational change is usually attributed to three main reasons, in addition to the initial overallocation. First, the economic downturn — industrial emissions fell, increasing the allowance surplus. Second, companies bought cheaper carbon ‘offsets’ from abroad to comply with their emissions caps, again increasing the ETS allowance surplus. Third, the EU ETS had no mechanism to take into account successes in renewables and energy efficiency policy that decreased emissions — and again increased the allowance surplus.

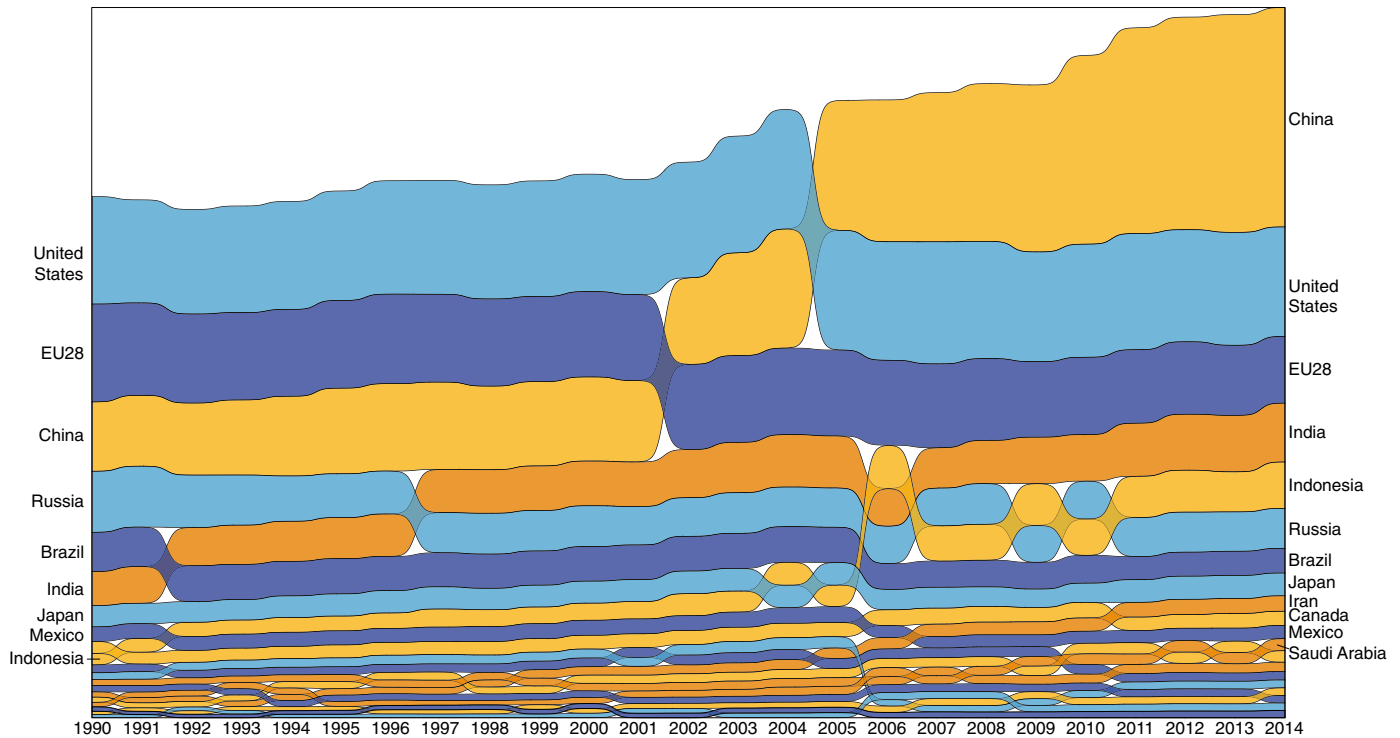


Fig. 2 | Top 20 GHG emitters since 1990. Despite growing efforts to curb climate change, the world's total emissions increased by 31% (including emissions from land use, land-use change and forestry) between 1990 and 2014. Growth has been driven by major economies such as China, which surpassed the United States as the world's largest emitter in 2005 (although the United States remains the largest emitter in cumulative terms). Credit: Neil Richards

Richard Cowart, principal and senior policy advisor at international think-tank Regulatory Assistance Project (RAP), stresses that an ETS does not need a high carbon price to deliver emissions reductions, however. The Regional Greenhouse Gas Initiative (RGGI) in the northeast United States has been a “terrific” success despite a single-digit carbon price because it invests most of the revenue it generates into energy efficiency¹. Its revenues have doubled energy-efficiency spending across the nine-state region and it has bipartisan support, leading to a much lower emissions cap. “Carbon revenue may be a more powerful tool than carbon price,” notes Cowart.

China has also launched a national ETS. But Zou Ji, president of the Energy Foundation in Beijing, does not expect any immediate results: “It’s a process. We think in a decades-long time frame.” Only if it is ineffective after 20 years, would that be cause for concern, he says. In the meantime, he expects the main driver of low-carbon innovation to be energy-efficiency policies for industry and local air-quality standards.

More generally, the most important driver of Chinese GHG emissions reductions is economic restructuring, says Zou. As China transitions out of major infrastructure construction, manufacturing emissions are expected to peak in 2020 and

clean air is becoming a top priority for the growing middle class. The second most important driver is standards and permits, followed by market-based instruments such as the new ETS.

Fossil fuel exit strategies

Renewables are considered by many to be the biggest climate success story (see Box 1). Despite this success, experts such as Patrick Graichen, director of the Berlin-based think-tank Agora Energiewende, identify a policy failure in the absence of active fossil fuel exit strategies. Without these, he says, Germany has ended up with a power mix that is largely coal plus renewables, and will miss its 40% emissions reduction target for 2020 as a result. Power production from lignite went up last year in Europe, even as renewables also hit new records. “Despite being the most dirty fuel, the lignite sector seems so far to be unaffected by Europe’s climate policy,” according to a report on European power markets².

There is talk of coal phase-outs, including in Germany, but national and EU policymakers are only beginning to grapple with the structural effects of it. The EU has created a “just transition” platform that met for the first time in February 2018. In the same month, however, the European

Commission also approved another two capacity markets (in Italy and Poland) that may pay coal plants to stay open for security of supply reasons.

In the United States, only exports to Asia are keeping coal ‘alive’, says Meyer. Because of market trends and state leadership, the United States is actually ahead of where it should be according to the Obama-era Clean Power Plan. Yet the plan remains important, he says, to harmonize decarbonization efforts across the country.

Europe and the United States are mature markets in which coal retirements create space for renewables. Yet even in a country such as India, renewables need help from policymakers to displace conventional power, at least in the short- to medium-term, says Karthik Ganesan, a senior research associate at the Council on Energy, Environment and Water in India. Without better enforcement of Renewable Purchase Obligations, he says companies will not invest in green power because they are locked into long-term Power Purchase Agreements that they have already in part paid for.

Carbon capture

With the slow decline of coal in Europe and North America, and even plans to move away from it in China, CCS has lost much

Box 1 | The renewables success story

For many, renewables are the biggest climate success story. Policymakers from Europe to India argue that government support for specific technologies is essential. “The biggest wins have come from energy [not climate] policy,” says Eickhout in Brussels. “A few countries have really invested in a specific technology and got it off the ground.” He is not alone in warning that technology neutrality — a favourite mantra among EU policymakers — protects incumbents.

Hans ten Berge picks out 2006 as a watershed moment. That year, the CEOs of 60 of Europe’s leading electricity companies pledged to go carbon neutral by 2050. “It was a turning point,” he remembers. “Until then it had only been about unbundling.” Separating the generation and transport of electricity, or liberalization, was the primary shaper of electricity markets until decarbonization came along.

The push for decarbonization was accompanied by big subsidies for renewables. The results speak for themselves: the cost of solar photovoltaics has plummeted and the latest offshore wind auctions in Europe have been won by projects asking for zero subsidies^{5,6}. The European Commission recently admitted that it overestimated the cost of meeting a 27% renewable energy target in 2030 by €2.9 billion⁷.

Amid the success, there are lessons nonetheless. “It could have been done more cheaply,” reflects Graichen. “Feed-in tariffs could have been adjusted

more quickly.” Countries such as Germany, Spain and the Czech Republic “piled up huge costs and will carry them around for the next ten years.”

Another expert, Dave Jones, a Carbon and Power Analyst at UK-based NGO Sandbag, says the high cost of that first wave of investments left some policymakers very nervous: “It created a real stigma for renewables that still exists today.” He argues that is why some countries in Europe are not accelerating their build-out of renewables, and others are actually reducing it — even if the prices of wind and solar are now below the cost of conventional power generation. Germany and the UK accounted for 57% of all new renewables from 2014–2017, up from 42% for 2011–2014².

For Jones, renewables advocates were also slow to build up a narrative around industrial opportunity and jobs: “It was too specific about trying to hit the EU renewables target. It wasn’t embedded enough in the economy.”

Despite these issues, Europe’s renewables policy remains a triumph. Höhne sums up: “A few countries in the EU paid a lot of money, yes, but as a result there is a complete change globally in the electricity sector. I think this is the biggest success story in climate policy. And I don’t see a different way it could have been achieved.” The next priority is to update power market rules and networks to better integrate renewables into the energy system.

of its original rationale. CCS is perhaps the most oft-cited climate policy failure, whether speaking to experts in Europe, the United States or South Africa. Policymakers have allocated billions towards CCS and it features in every mid-century low-carbon roadmap, but it remains expensive, unpopular and largely unused.

“CCS was an attempt to buy in the big fossil fuel producers,” says Morgan. “[But] in the end they didn’t want to be bought in.” The problem is that CCS is an end-of-pipe solution with no development benefits that would only become commercially viable at a carbon price of €40–100 per tonne. Ganesan says it is “absolutely needed” for Indian coal plants, but only by mid-century: “For now, ‘clean coal’ means PM [particulate matter] and SO_x-free and with the highest efficiency.”

More broadly, CCS may have a future not in the power sector, its original destination,

but in industry, where it can be applied at smaller scales to reduce process emissions in steel, refining and cement, for example. The high concentration of CO₂ in some of these process emissions might also make CCS in industry less costly compared with the power sector. There is more and more talk too of CCU — carbon capture and use. One of the most promising examples is the conversion of blast furnace waste gases from steel production into ethanol and then ethylene and other high-value chemicals, through bacterial action. This is a good fit with other policies such as resource efficiency or circular economy.

The problem is that steel plants are not incentivized to do this: unlike ethylene from naphthalene, it would not be recognized in the current ETS allowance allocation. One of climate policy’s biggest failures is that it has not triggered industrial transformation of this kind, argues Tomas Wyns, a researcher

at the Institute for European Studies at the Vrije Universiteit Brussel in Belgium (Fig. 2).

He believes that “a modern version of industrial policy” is needed to decarbonize energy-intensive industries. Most industrial processes today are still the same as they were at the beginning to middle of the twentieth century. Yet these industries will need new processes, feedstocks, business models and products to deliver net zero emissions by 2050³. “In a sense, it is more radical than the industrial revolution itself because of the sharp timing,” Wyns says.

The EU ETS cannot drive such far-reaching innovation, not only because of the low carbon price, but also because of its design, Wyns explains. “It is process-based [when] it should have been product-based, or even use-based. This would have encouraged more innovation of new processes, products and business models.”

Biofuels

“If we want to decarbonize the chemical sector, we will use the technologies initially developed for second-generation biofuels, such as using agricultural or forestry industry waste,” he adds. Alongside CCS, biofuels are typically listed as a classical climate policy failure because with indirect land-use change, first-generation food-based biofuels may actually be worse for the climate than conventional diesel, numerous studies have found⁴. Yet the biofuel drive has made Europe a leader in bio-based industries more generally, Wyns says. In addition, the use of biomass for chemical production would lead to higher added value for the EU economy compared with their use as fuels.

Even biochemicals have to compete with fossil fuels, however, and this is where many still see a policy failure: for all of the deficits of emissions trading, there must be a price on carbon to level the playing field. In Europe, there is increasing talk of a carbon price floor, with the UK as evidence that this can work. Experts such as Graichen and Hans ten Berge, ex-secretary general of Eurelectric, representing the European electricity industry, argue that the carbon price needs to extend beyond power and industry to heating and cooling, and transport. This could help spread the cost of developing green alternatives to other sectors and by reducing the end-price for electricity, promote their electrification.

That assumes that carbon revenues go to climate action. One of the problems in India is that income from a coal cess has largely been repurposed, most recently to compensate states for a new Goods and Service Tax regime. As a result: “Indian

consumers pay more and more for fossil fuels without having alternatives,” Ganesan says.

Electrification

Electrification is synonymous with decarbonization for many climate policymakers these days. It opens up new possibilities even in energy-intensive industries, in the form of power-to-gas, power-to-liquid or hydrogen production, to store energy or replace conventional fuels in transport, for example. “The chemical factory is the only sensible battery of the future,” says Marco Mensink, director general of the European Chemical Industry Council. “We might need an EU hydrogen directive.”

Others, such as Dutch Green MEP Bas Eickhout, are wary of building in too great a dependence on gas that might never go green. Cowart calls shale gas a “tempting distraction from thorny carbon decision-making” because gas can “only be a bridge, not a destination.” Policymakers have thus far failed to translate this reality into policy, he adds.

In China, electrification is part of the plan, although Zou also foresees gas as a bridging technology to phase in now and phase out by mid-century. China intends to phase out half of its coal (20% ‘scattered’ coal and 30% industrial coal) within the next ten years. Only after that will it tackle coal-fired power plants — these are all still relatively new today, Zou explains. In the meantime, China will electrify. Electrification only makes sense if it is underpinned by low-carbon power.

Transport

For many, one of the laggards in climate policy is transport. Car CO₂ or fuel economy standards have delivered some emissions reductions, but with inadequate ambition for a 2 °C world and they are beset by problems such as the discrepancy between lab and on-the-road emissions tests. Emissions reduction policies for trucks, aviation and shipping remain in their infancy. Models suggest that autonomous driving could end up increasing, not decreasing emissions as more people take to their cars.

A new offset scheme being developed for the international aviation sector raises the spectre of emissions reductions of questionable quality from the days of Kyoto’s Clean Development Mechanism (CDM). The CDM let rich countries invest

in (cheaper) emissions reduction projects in developing countries. But in some cases, notably for industrial gas HFC-23, campaigners alleged that producers stimulated its production purely to cash in on credits for its destruction.

Most experts do not view the CDM as a failure, however, because it built up awareness of emissions reductions in many developing countries. That said, Sokona says there were very few CDM projects in Africa. Morgan adds: “I think it put the focus in the wrong place. We don’t have time for offsets anymore. And I think that was probably true in 1997.”

Agriculture

The area that for most experts has received least attention from climate policymakers is agriculture and the associated sectors of forests, diet and lifestyle. Agriculture is not the main emitter in many countries, but it is neglected primarily because it relates to sensitive subjects such as food security, and its emissions are difficult to measure and reduce. Supply-side options such as optimizing fertilizer spread are a first port of call, while difficult issues such as meat consumption are likely to be left until last. Wyns believes that one of the few areas where a carbon price could work well is for meat consumption. This is due to the high carbon intensity of meat (especially beef) production, which would be visible in the price of the product.

Proper monitoring, reporting and verification is a challenge in all climate policy, not just agriculture. Think of CCS or CCU, fugitive methane gas, indirect land-use change or the ‘social cost’ of carbon that Trump is trying to roll back in the United States. The evolution of technologies such as remote sensing, for example, to measure car emissions as they drive by, is enabling new policies and their enforcement.

Finally, there are big successes in energy efficiency, notably in product and new building standards, but lapses too — especially on renovating old buildings. “We have failed to create the discipline of systematically looking for ways to reduce demand cost-effectively,” says Cowart. That discipline — energy efficiency first — does not yet permeate policy-making, even in developing countries without a supply-side infrastructure already in place.

And on all issues public engagement is more important than ever in a decentralized

energy system. Many experts say that policymakers are failing to register this. Policies such as the EU ETS have become so complicated that only the industries affected can understand — and influence — them. Huq urges policymakers to personalize: “An IPCC report just doesn’t cut it with a large part of the population.”

Policies matter because they determine where the funds flow. Billions have been pumped into CCS and biofuels, with few reductions in emissions to show for it (Fig. 2). It is too early to start evaluating many of the climate policies in developing countries, but there are plenty of lessons to be learned from their developed counterparts. The big challenge is still to deliver emissions reductions at the pace and scale needed, especially in a world where economies are driven by consumption. Governments have to innovate to succeed at this great task. “In the private sector, people innovate and fail all the time and it’s regarded as normal and necessary to learn and improve,” notes Cowart. In the public sector, policymakers need and deserve the same opportunity. □

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Competing interests

The author declares no competing interests.