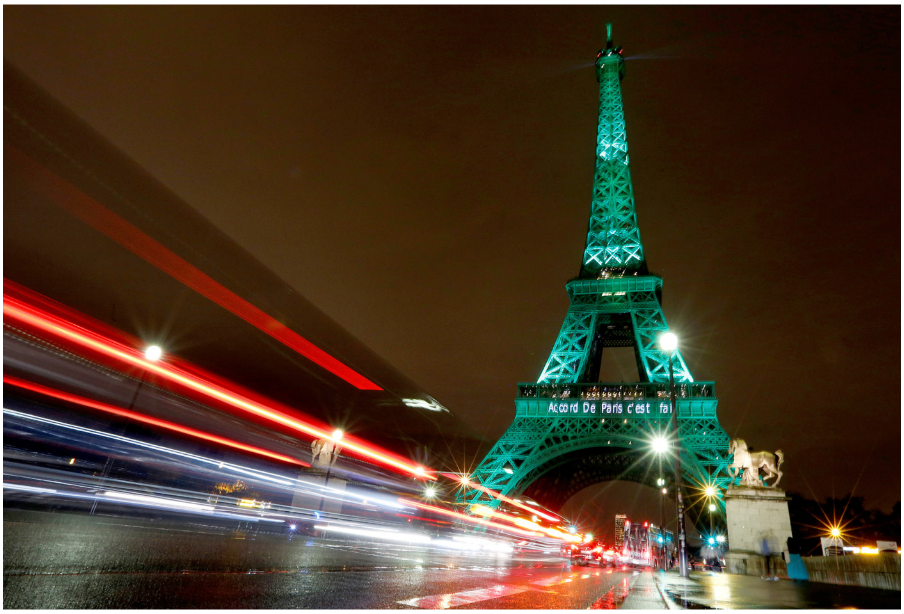
Climate Policy after Paris: Inconvenient Truths

The Paris Agreement of December 2015 fundamentally realigned the structures of international climate policy. At the same time, global targets and national measures are diverging. One direct implication is the need to consider new technology options.

By Severin Fischer

The Paris Agreement on climate protection marks the biggest success for international climate diplomacy so far. Unlike with the 1997 Kyoto Protocol, for the first time, all states party to the treaty have committed themselves to climate protection measures and agreed on a global temperature goal. Nevertheless, there is a major shortfall between what the voluntary national climate plans can achieve and the reduction of emissions needed to stay in line with temperature goals; and that gap looks unlikely to be closed anytime soon. Accordingly, the temperature goals agreed in Paris cannot be met with conventional climate protection measures alone. In addition to mitigation measures, increasing use will have to be made of new climate engineering technologies if consistency between goals and political action is to be maintained. Switzerland could have a special role to play in this respect.



The Paris Climate Change Agreement is an important road mark for international climate policy (Paris, 4 November 2016). *Jacky Naegelen / Reuters*

The Paris Agreement

With the entry into force of the Paris Agreement on climate protection on 4 November 2016, international climate policy has established a new structural order for itself under the UN Framework Convention on Climate Change (UNFCCC). With unexpected promptness, the conditions for ratification were met soon after the signing of the agreement in Paris on 12 December 2015 – accession by at least 55 countries causing at least 55 percent of global greenhouse gas emissions. Apart from other important signatory states like China and India, the EU and the US have also ratified the Paris Agreement. The administration of former US president Barack Obama already finalized the national procedure before the election of Donald Trump, who appears to be considering a withdrawal from the Paris Agreement.

After the Kyoto Protocol, the Paris Agreement is only the second international climate protection agreement successfully concluded under the UN's aegis. Essentially, the Kyoto Protocol followed a top-down rationale by defining an overall volume of emissions reduction for all industrialized countries from which national contributions were deduced. While the Kyoto Protocol required mitigation commitments only from industrialized countries, the Paris Agreement is the first comprehensive treaty to stipulate obligations for all signatories, bringing together top-down and bottom-up elements in a hybrid form. While it does on the one hand set out ambitious global temperature goals – limiting global warming to less than two degrees Celsius above pre-industrial levels and stabilizing it at 1.5 degrees if possible –, its implementation will be based on national action plans. The roughly 170 "(intended) nationally determined contributions" (INDCs/NDCs) submitted so far constitute the individual, voluntary, and self-determined climate protection efforts of the states party to the treaty.

The two core elements of the agreement, the global temperature goal and the national contributions, are only loosely linked though: Under the Paris Agreement, the contributions are to be reviewed periodically and are, in principle, to become progressively more ambitious over time. However, there are no instruments to sanction a foreseeable failure to meet temperature targets, nor will surplus emissions quotas be distributed among the participating states.

Thus, the governance structure of the Paris Agreement tacitly accepts a decoupling of the temperature goal, the national contributions, and the time factor. Accordingly, the treaty foresees no measures for implementing the self-imposed targets. Only Article 4 of the Agreement mentions a target of balancing anthropogenic emissions and the natural or artificial absorption of emissions – "climate neutrality" – by the second half of the century.

Climate researchers will have to make political decision-makers aware in quite blunt terms how limited their options are.

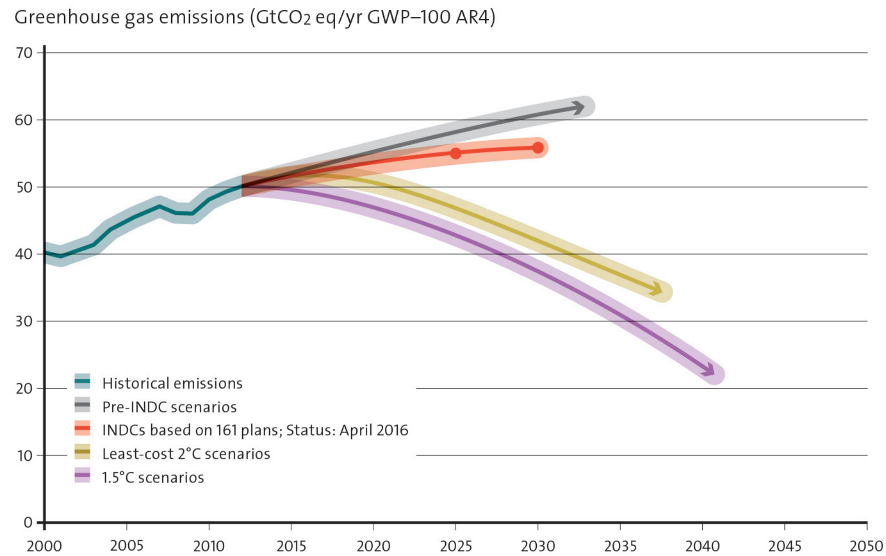
Climate Policy and Climate Research

The Paris Agreement is viewed as a remarkable success of international climate diplomacy after years of negotiations over a new treaty, but considerable additional efforts will be required for the signatory states to achieve the agreed targets. Under the climate regimes of the past decades, only a moderate constraint on the growth of emissions was achieved, and emissions are still expected to slightly increase until the year 2030 even if all of the INDCs so far announced are implemented. In Paris, however, the international community set itself temperature goals that are stricter than ever. Today, the task of limiting global warming to significantly less than two degrees Celsius compared to pre-industrial levels involves appreciably more drastic cutbacks of emissions than it would have a decade ago. This is due to the longevity of the greenhouse gases that are already present in the atmosphere, representing the expended share of the "budget" of total emissions remaining before the two-degrees target is exceeded. Even allowing for the measures hitherto only announced, but not yet implemented under the Paris Agreement, the result would most likely still be a rise in temperature of more than three degrees. Empirical evidence on the implementation of national climate goals indicates that keeping commitments is the exception rather than the rule. This is likely to be particularly true where non-adherence entails no sanctions.

Climate scientists estimate that about 800 gigatons (Gt) of future CO_2 emissions are permitted until the two-degree is likely to be reached. However, if warming is to be limited to 1.5 degrees, only 200 Gt of future emissions remain to be expended. The upper limit for emissions judged compatible with the temperature goal for the years 2020 and 2030 was recently adjusted in scientific analyses such as the UN Environmental Program's (UNEP) "Emission Gap Report". Back in 2013, experts still thought that annual emissions had to be limited to 44 Gt in 2020 and 35 Gt in 2030, and UNEP raised those estimates to 52 and 42 Gt of CO_2, respectively. Nevertheless, those carbon budget figures still seem extremely challenging when considering historic trajectories of emissions. Even when these optimistic adaptations are taken into account, the necessary emissions mitigation efforts will hardly be compatible with the socio-political experience of the past. As an example, the average annual increase rate of global CO_2 emissions between 2000 and 2011 was 2.9 per cent. What is required now is an annual global reduction of between 0.5 and 4 per cent – even as the global population increases and as developing and emerging economies are catching up with the industrialized countries. Furthermore, most of the climate models already allow for an "overshoot" – a brief overspending of the remaining emissions budget in the near term – to be compensated with commensurately more drastic savings in the more distant future.

In the coming years, climate researchers will have to make political decision-makers aware in quite blunt terms how limited their options are when it comes to climate

Scenarios of Global Emission Developments



Source: UNFCCC 2016

policy. The Intergovernmental Panel on Climate Change (IPCC), the key global consultative body in the field, will most likely do so in its 2018 report on the achievability of the 1.5-degree goal. It is expected to show clearly that attaining the temperature limit determined in the Paris Agreement is no longer feasible using conventional means of emissions mitigation only.

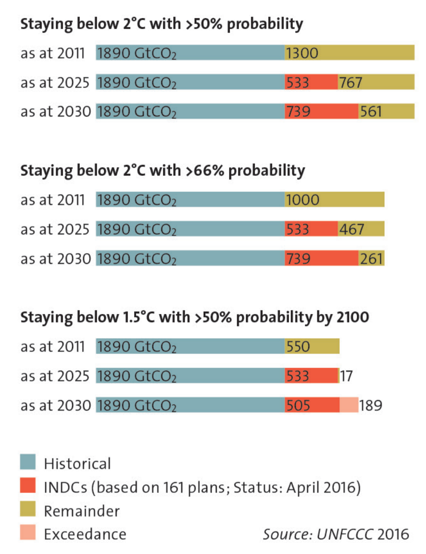
Negative Emissions and Climate Engineering

The abovementioned limitations in achieving the Paris Agreement's goal through conventional instruments show the need for a debate on the use of new, hitherto untested technologies. Already today, the most important of the IPCC's scenarios take into account negative emissions, which can be created by technologies that not only limit the emission of CO_2 into the atmosphere but additionally extract CO_2 from it. Here, the IPCC favors the use of "Bioenergy with Carbon Capture and Storage" (BECCS). Through targeted forestation, the natural soaking up of carbon in biomass, its combustion, and subsequent geological storage of emissions, CO_2 concentration in the atmosphere can be reduced. Depending on the scale of use, this could lead to a comparatively rapid reduction of atmospheric emissions. In the IPCC's Fifth Assessment Report, the use of this technology is already foreseen from 2025 onwards. Its large-scale application is anticipated for the second half of this century in the models that calculate ways of accomplishing the two-degree target. This is the only way to bring emissions down to zero in the medium term, as anticipated in the Paris Agreement's Article 4. In practice, however, only a single pilot project in the US exists so far.

> A number of (geo-)political issues and challenges associated with the application of new technologies should be addressed.

In addition to BECCS, other measures have been considered such as Direct Air Capture, reforestation, and ocean fertilization/liming. All of these can bind additional emissions for a net negative effect. In academia, such concepts are subsumed under the heading of Carbon Dioxide Removal (CDR) technologies. The common factor here is that they all focus on sucking CO_2 out of the atmosphere.

Emission Budgets



A second group of technologies seeks to limit the symptoms of emissions-induced changes to the atmosphere that have already taken place or to prevent them from happening in the first place. Foremost among those technologies is the field of Solar Radiation Management (SRM). Examples include the idea of dispersing highly reflective aerosols in the stratosphere in order to limit insolation of the Earth's surface, enhancing the reflectivity of clouds with seawater, or the genetic modification of plants for greater reflection of sunlight. SRM technologies have seen little experimental testing so far, and it is nearly impossible to anticipate their implications.

While there is no doubt that SRM technologies come under the heading of "climate engineering", CDR technologies may also be seen as unconventional forms of emissions mitigation. Both groups of technologies, however, will only see controlled and sufficient application if political actors make an effort to foster research and develop a legal framework.

As the existing measures undertaken by international climate policy become increasingly disconnected from the temperature goals and the calculations of scientific models, a debate over the abovementioned technology options becomes all the more urgent. It is important to remember that there is usually a delay of several decades between the initial steps toward testing a technology and its large-scale application. Accordingly, funding must be earmarked at an early stage.

However, there are a number of (geo-)political issues and challenges associated with the application of CDR and SRM technologies that should be addressed at the earliest possible stage. In particular, large-scale use of CDR technologies (especially BECCS), as already foreseen in the IPCC models, would likely result in conflicts over land distribution. Since tropical areas would be favored due to the need for rapid cultivation, crops employed under BECCS concepts would directly compete for agricultural land with food crops and other uses of land and water. The political debate over the use of biofuels from developing and emerging economies clearly showed that this conflict is by no means easy to solve. This is all the more true since climate scenarios foresee significantly greater acreages allocated to biomass cultivation for energetic purposes than is currently the case. Furthermore, guaranteeing the safety of subterranean storage facilities requires intense political effort to build social acceptance.

With regard to SRM technologies, even more challenges loom, including in the sphere of international politics, where the potential unintended consequences of atmospheric manipulation – such as their effects on rainfall – would be litigated. Any uncoordinated application could lead to unintended meteorological effects such as extreme precipitation or droughts in the short run, which are associated with considerable conflict potential. Furthermore, establishing polluter liability by demonstrating clear chains of causation linking the use of SRM technologies with such unintended outcomes is nigh impossible. Joint research of technologies and the development of a legal framework that could deal specifically with liability for knock-on effects are especially urgent due to the narrow timeline. So far, there has been no serious discussion of such issues in the context of regulatory frameworks established by international politics.

Which Role for Switzerland?

Since the start of the UN climate negotiations, Switzerland has considered itself among the vanguard of climate policy. By signing the Paris Agreement, the Federal Council also endorsed the objectives of the treaty. Parliament is not expected to ratify it before the summer of 2017.

Already in 2016, Switzerland submitted a first national action plan as an INDC. Among other elements, it sets an emissions reduction target of 50 percent compared to 1990 levels for the year 2030, which the country aims to meet mainly through domestic emissions reductions. If Switzerland really wants to live up to its role as a pioneer in climate policy and to the spirit of the Paris Agreement, and given an equitable distribution of the remaining emissions, the country should aspire to become climate-neutral by the middle of the century and actually to achieve net negative emissions after 2050.

Due to the specific structure of Switzerland's energy system and the distribution of emissions among the various domestic sectors, the country is in a special position. Other highly developed industrialized nations can start reducing emissions by making changes in the electricity sector. Since electricity generation in Switzerland already largely relies on carbon-neutral hydropower and nuclear power plants rather than coal and gas, this sector cannot reduce more emissions. Accordingly, other sectors such as transport, industry, and agriculture will have to be involved at an early stage in the emissions mitigation effort.

However, avoiding emissions in these sectors is not only more expensive on average than measures in the electricity sector; in the areas of transport and agriculture, such efforts also face strong societal opposition. Emissions from agriculture can hardly be reduced without giving up cattle breeding altogether. Thus, earlier than other states, Switzerland faces a problem of consistency between international commitments and the limits of domestic political acceptance.

Since the agricultural sector in particular is such an important political voice and its preservation is significant for the country's national identity, it is vital to introduce steps consistent with climate policy at an early stage in order to protect agricultural structures. Switzerland could do so through stronger engagement in research and development on negative emissions. Swiss companies have already achieved some success in this area, for instance in connection with the "Direct Air Capture" concept. If this could be implemented in a timely manner, some controversial mitigation measures could be postponed at least temporarily.

> Switzerland could strenghten engagement in research and development of a legal framework.

As a highly globalized country with strong international links, Switzerland has a vested interest in maintaining global peace and security. The effects of climate change will also affect Switzerland through economics, migration, and security policy. The country's climate policy might contribute to mitigation efforts not only by adhering to its own emissions reductions targets, but also by dealing with the many unresolved questions surrounding the application of climate engineering technologies. These could help alleviate the intensity of climate change effects. Swiss research institutions are already engaged in the development of such technology options. By fostering an international debate on security policy, developing multilateral proposals on how to shape basic normative structures, and establishing a legal framework for the application of such technologies, Switzerland would continue to apply traditional core elements of its foreign and security policy to the sphere of climate policy.

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