ethix

Innovation Brief #05

Negative Emissions

In the face of worsening climate change, international negotiations and national policy measures are characterized above all by their slowness.

To overcome this political inertia, scientists increasingly believe that new climate engineering technologies will have to be used in the near future to slow global warming.

Which new technologies contribute to the fight against climate change?

The issue

While reduction measures aim to reduce greenhouse gas (GHG) emissions at the source (energy, agriculture, deforestation), negative emission projects seek to reduce the atmospheric concentration of CO_2 that has already been emitted (bioenergy with carbon capture and storage (BECCS), ocean fertilization, CO_2 extraction from the air). Of the 116 scenarios developed by the Intergovernmental Panel on Climate Change (IPCC) in which global temperatures are kept below 2 °C by 2100, 101 propose the use of negative emission technologies.

The Paris Agreement, signed in 2015 and entered into force in 2016, also took the notion of negative emissions seriously. Its objective is not to drastically reduce GHG emissions from fossil fuel combustion, agriculture and deforestation, but to balance global emissions with “enhanced” biospheric and oceanic carbon sinks. This approach is therefore based on a technological challenge: negative emission technologies play a key role in the objectives set by states to combat climate change.

For highly specialized companies, climate engineering provides major economic potential. The main economic sectors concerned, in which patents for technologies to manipulate the climate system have already been filed, are chemistry and biotechnology. Projects such as the injection of hydrogen sulphide into the stratosphere and the fertilization of the oceans by spreading ferric sulphate emanate from these disciplines.

Future scenarios

Negative emission technologies have matured and are widely deployed. Many companies specialize in GHG capture and recycling and BECCS. Even if harmful side effects (due to the climate change, or the carbon capture technology?) gradually appear, legislation drags on, particularly under pressure from lobbies in the climate engineering industry. GHGs now represent an important resource for economic activities, but these activities do not reduce the harmful effects of GHGs in the atmosphere. Climate engineering courses have become some of the most popular courses in universities and colleges.

Negative emission technologies have been deployed on a large scale with promising effects. After a period of euphoria, climate engineering technologies have been abandoned because of their dramatic side effects on the climate system, human societies and ecosystems. We are now in a scenario of abrupt warming, impossible to avoid given the delay in taking drastic GHG reduction measures.

An armed conflict is taking place at the gates of the largest land-based GHG reserve, threatening the release of substantial CO_2 reserves into the atmosphere. If the stocks were to be released, this would lead to a climate catch-up phenomenon, with a precipitous increase in temperatures and unsuspected effects for the entire climate.

In a context of technological uncertainty, negative emission tools reduce the coherence of our international commitments and challenge our ethical and political motivation to change our habits.

Ethical risk zones

Offset effect

For many advocates of intentional manipulation of the climate system, changes in our production and consumption will be insufficient to avoid a dangerous rise in global temperatures. Based on this observation, they emphasize the need to focus on climate engineering. However, there are potential offsetting effects between the two types of measures. The mere prospect of a low-cost technological solution can make many politicians, producers and consumers less inclined to make reduction efforts. In other words, the perception of negative emission technologies as a viable option can undermine the desire to reduce emissions.

High-risk technological challenge

Maintaining our habitual production and consumption status quo is based on technological hope. We collectively wager that these negative emission technologies will be effective, usable on a large scale, and without negative side effects on ecosystems, other species, and animals. If we lose the bet, we could quickly plunge into a catastrophic scenario.

Which negative emissions technology?

Several negative emission tools exist. The most popular option is the BECCS. Scenarios that use this technology extensively to offset carbon budget overruns over the century, are also reliant on excessive use of natural resources: about one-third of the arable land available globally and nearly 3% of drinking water reserves. This would have serious negative impacts on food security by reducing agricultural production and increasing food prices, thus creating contradictory measures between combating climate change and those combating poverty.

Negative emission technologies can play a role in the fight against climate change if they are deployed on a limited scale, if they are combined with an uncompromising focus on their side effects, and if their psychological effects on our behaviour are taken into account.

Focus

Negative emission technologies could be compared to high-risk experimental medical treatment: no assurance of a cure and a potential high risk of new problems. Moreover, this treatment would only address the symptoms of the disease, it would not address the problem at its source (here: emissions from our use of energy, agriculture and deforestation).

There are now effective options to combat climate change that pose far fewer risks than negative emissions. Intentional and large-scale manipulation of the climate system poses far greater ethical risks and can have potentially much more serious side effects than a global energy transition.

For those pursuing the technological development of negative emission tools, the dangers associated with offsetting must be clearly stated. One idea would be to establish partnerships between start-ups developing negative emission technologies and start-ups developing GHG emission reduction technologies. One of the most prominent startups in the field, Climeworks, mentions a possible collaboration with companies producing carbon-neutral fuels from concentrated CO_2 extracted from the air. This type of initiative could reduce the offsetting effect by emphasizing the importance of developing abatement technologies.

We are caught in a psychological trap. The technology makes us believe that it is an easily accessible solution, with no significant cost to companies. The temptation not to implement the energy transition is great.

But if things go wrong, what will we do?

Looking forward

According to the latest IPCC special report, there are still possible paths to avoiding global warming of 1.5 °C without exceeding or with a limited overrun of the carbon budget. If these trajectories are followed, we will have little or no need for negative emissions over the century. These trajectories are characterized by rapid and profound transitions in energy, industrial systems and infrastructure, including transportation and buildings. They are unprecedented and involve drastic GHG reductions in all sectors. They are very demanding, both for producers and consumers, but they make it possible to avoid dependence on massive and risky measures of negative emissions in the near future. They also make it possible to avoid exceeding the fateful tipping point in the climate system by “overspending” the carbon budget. Exceeding the budget can cause abrupt climate change to which it will be very difficult to adapt, even in rich countries.

Thanks to the tools developed by ethix and its partners, you are able to integrate the ethical dimension of climate technologies: design, use, communication. We can help you turn ethical risk areas into opportunities.

ethix resources

ethix Mapping and ethix Canvas

A first approach in order to clarify the ethical risks of your innovation.

Continuing education

An opportunity for your team to improve its ability to meet ethical challenges (communication, HR, strategy).

ethix Innovation Brief #05 Negative Emissions | 07/2019, CC BY-NC-ND 4.0
Text: Florian Wüstholz | ethix – Lab for innovation ethix is made possible by Engagement Migros, the development fund of the Migros Group.

ENGAGEMENT
EIN FÖRDERFONDS DER MIGROS-GRUPPE