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Summary

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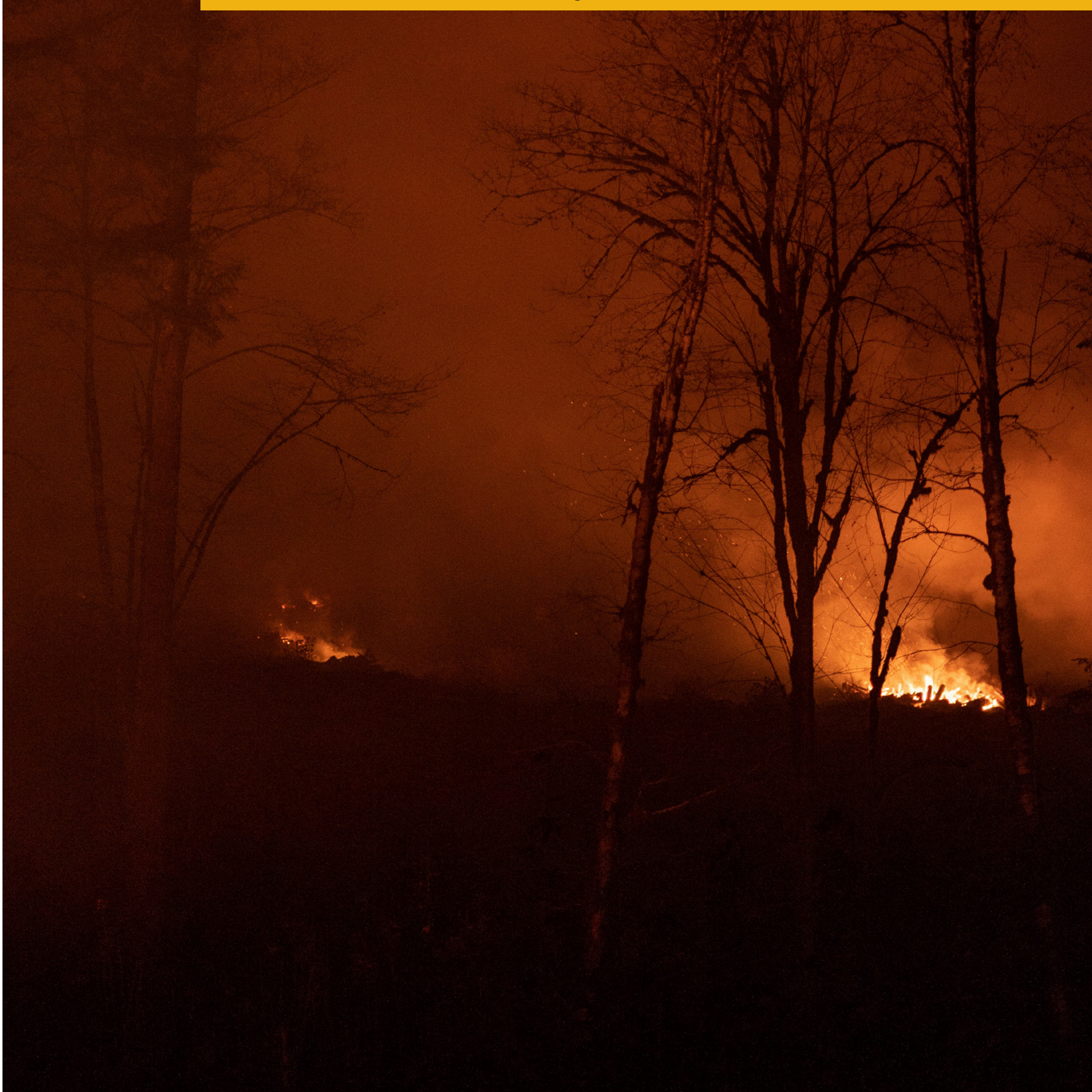

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Summary

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The Konzeptwerk Neue Ökonomie and the Heinrich Böll Foundation present the «Societal Transformation Scenario» (STS) as a low-risk and socially just climate protection pathway towards achieving the 1.5°C temperature limit. With it, the authors would like to initiate a broader debate on specific paths to limiting climate change to 1.5°C and motivate those involved in climate research to a critical discussion on economic growth and current production and consumption levels in the Global North.

The 194 signatories of the Paris Agreement have committed their nations to limiting global warming to 1.5°C. Nevertheless, with the exception of the Covid 19 lockdown period, emissions have risen since the agreement was reached. The latest report of the Intergovernmental Panel on Climate Change (IPCC) estimates that 1.5°C global warming will be reached in the early 2030s, making it imperative to drastically reduce emissions in the next 10 years. The reasons for the stagnating high emission levels are numerous and the object of intense discussions among various stakeholders. However, neither climate researchers nor politicians, nor civil society in general, are sufficiently debating one central cause of the high emission levels: the connection between greenhouse gases and the prevailing production and consumption levels, in particular in the Global North.

Global CO_2 mitigation scenarios are an important instrument in estimating the effects of various societal trajectories – including conjectures about the effect of future production and consumption levels on greenhouse gas emissions. Although the IPCC explicitly recognizes economic growth as a driver of greenhouse gases, virtually all of the mitigation scenarios it currently considers are based on a world in which, until 2100, the economies of all regions – including those in the Global North – continue to grow and the economic and social conditions basically remain the same. To model achieving the 1.5°C target, the current scenarios depend particularly on technological change based on renewable energies and on a considerable improvement in energy efficiency, envisaging to a much lesser extent any social or political change. Combined with a rapidly receding global CO_2 budget, the dependence on economic growth makes it increasingly difficult for the models to achieve ambitious aims such as the 1.5°C target simply through energy and efficiency measures.[1]

1 See Kuhnhenn: «Wachstum in der Klimawissenschaft: Ein blinder Fleck» https://www.boell.de/de/2018/09/27/wachstum-der-klimawissenschaft-ein-blinder-fleck

To a large extent, the models therefore depend on technologies that are meant to remove CO_2 from the atmosphere through «negative emission technologies» (also called Carbon Dioxide Removal (CDR) technologies). So far, however, none of these technologies have been implemented on a larger scale, and it cannot be predicted whether they will ever be able to function effectively, especially at a large scale. As «technological fixes», they also harbour the danger of extending the lifetime of the fossil fuel industry – which would explain its interest in such technologies – and minimizing the acute need for action. Moreover, these technologies bring considerable risks and side effects for humans and ecosystems.

Many of the 1.5°C scenarios also risk a «temperature overshoot», a supposedly temporary breach of the 1.5°C target, in the next decades. CDR technologies will then allegedly help re-align global warming to 1.5°C by the end of the century. Unclear is whether a «turning back» of the climate would, in fact, be that easy. Clear is that this «overshoot» would bring further irreversible damage and an increasing risk of reaching critical turning points in the climate system, which would accelerate the climate crisis.

Large-scale CDR and other geoengineering forms are wagers that risk destabilizing the global climate for centuries and gravely changing the Earth's natural living conditions.

Feasible social change instead of risky gambling on negative emission technologies

The Societal Transformation Scenario (STS) is a global CO_2 mitigation scenario that differs from the scenarios in the IPCC report: In addition to extremely ambitious technological developments in renewable energies and improvements in efficiency, it also models radical social change. It presents transparent paths developed from specific calculations related to how production and consumption could be reduced in the Global North and the 1.5°C target reached without relying on high-risk technologies such as geoengineering, CCS or nuclear power. The STS, purposely, does not share other CO_2 mitigation scenarios' technology optimism about the availability of negative emission technologies. Instead – more optimistically than other models – it is based on the general belief that social practices and legislative frameworks can be changed through transparent democratic processes.

Bearing in mind the Global North countries' overwhelming historical contribution to the climate crisis and their still very high per capita greenhouse gas emissions, the scenario's authors consider that the Global North will have to reduce its greenhouse gas emissions much faster and much more than countries of the Global South. To achieve this reduction, it will not be sufficient to switch to renewable energies, improve energy efficiency and only marginally adapt society – and, in particular, not at the current pace. Global North countries must considerably reduce consumption and production and, related to that, dismantle the globe-spanning value chains based on extractivism and ever-rising resource consumption, which continue to be dominated by the Global North. The STS simultaneously assumes that production and consumption in the Global South will increase so that consumption patterns in the Global North and South will roughly align by 2050 (see Figures 1-4).

In its modelling, the STS concentrates on some key consumption areas and related production and assumes the following developments in the Global North:[2]

Transport: Road-based traffic will be considerably reduced: for ground-based freight transport by 62% by 2050, for road-based passenger transport by 17% by 2030 and by a further 20% by 2050 (in comparison to 1990 levels). These reductions will be achieved by re-regionalising the economy and improving local infrastructures. The remaining passenger transport will shift from the car to public transport, bicycles or walking: car transport will fall by 82% in urban areas and by 52% in rural areas.

Flying: The average number of flights per person in the Global North will be reduced to one flight per year by 2025 and to one flight every three years by 2050. Flying will once again become a luxury.

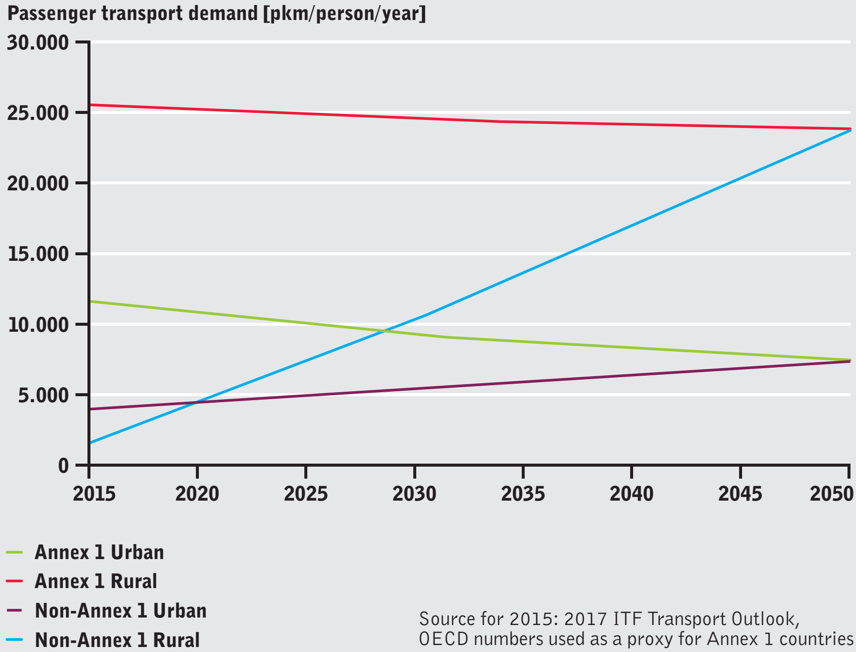
Housing: The average living space per person will fall by 25%; the number of large appliances per person will be halved. These assumptions demand new types of living and co-habitation and planning, for example, in newly built housing. They also mean a different use of existing living space and, e.g., a joint use of larger appliances, such as washing machines, in apartment blocks.

Food: Food wastage and overconsumption will be reduced. Caloric intake in the Global North will be oriented towards the WHO guidelines for a healthy diet, with 2,100 kilocalories per person per day. Meat consumption will sink by 60% by 2030.

The figures show some of the developments assumed in the scenario for the Global North and Global South until 2050.

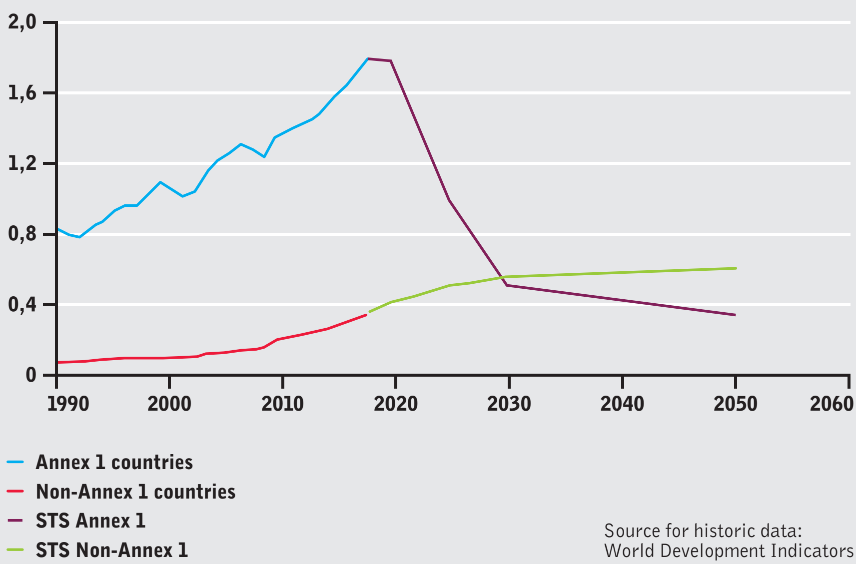
2 For assumptions for the Global South, see the English full-length version of «Societal Transformation Scenario for Staying Below 1.5°C».

Figure 1: Passenger transport demand in Annex I and Non-Annex I countries



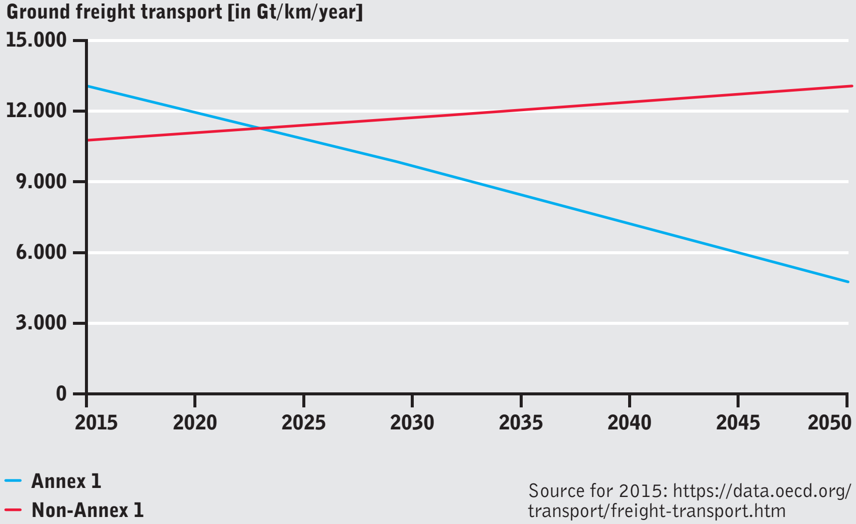
Source for 2015: 2017 ITF Transport Outlook, OECD numbers used as a proxy for Annex 1 countries

Figure 2: Average number of flights per person and year



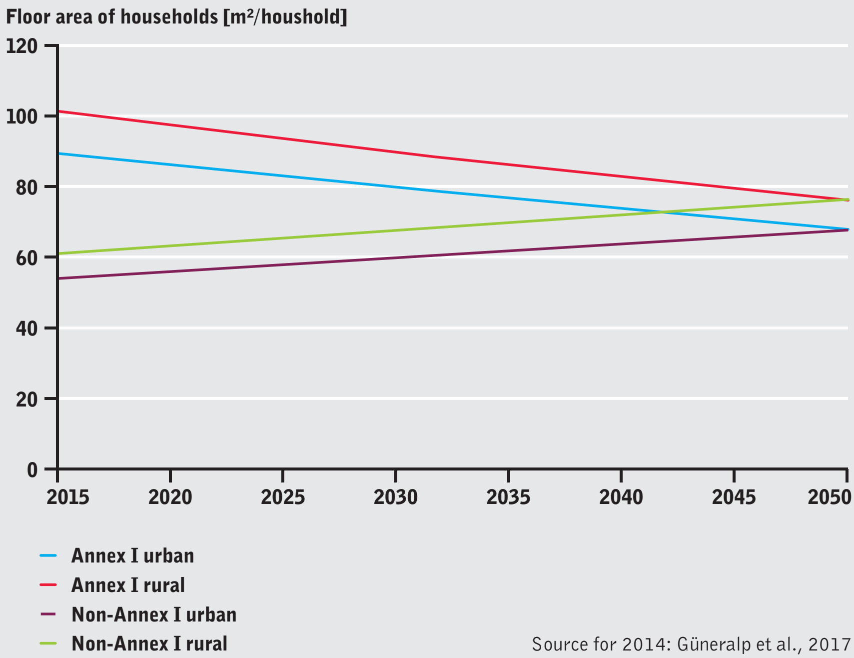
Source for historic data: World Development Indicators

Figure 3: Development of ground freight transport in the STS



Source for 2015: https://data.oecd.org/transport/freight-transport.htm

Figure 4: Development of floor space per houshold in the STS



Source for 2014: Güneralp et al., 2017

The reductions in consumption and production in the Global North modelled in the STS are not envisaged as un-coordinated shrinkage. Instead, to avoid economic recession and social hardships, they have to be implemented as part of a comprehensive, democratically driven socio-economic transformation. A transformation such as that envisaged in the STS is about satisfying human needs equitably throughout the world, redistributing wealth and serving the common good, but within ecological and planetary boundaries. This change can happen through, for example, supporting co-operative economic forms oriented to the common good, taxing resources instead of work, ensuring the independence of the social system from economic growth, reducing working hours, introducing a basic income and maximum wage, developing measures for a general deceleration of life and democratizing the (economic) decision-making process. The STS assumes that social practices and legislative frameworks will be conscientiously aligned with supporting co-operation, welfare, solidarity and sustainability.

The assumptions modelled in the STS illustrate only *one* possible pathway to staying within planetary boundaries while avoiding negative emission technologies and nuclear power; others are imaginable. Numerous studies and reports of practical examples have already described what these could look like and how they could be implemented.[3]

Global Calculator: Basis for a transparent debate about a globally fair pathway to climate protection

STS modelling is based on the «Global Calculator», a modelling instrument developed by scientists from the London School of Economics, the International Energy Agency, the Potsdam Institute for Climate Impact Research and the Chinese Institute for Energy Research, and others. But, similar to all other global emission models, the Global Calculator is only a rough instrument: The complexity and non-linearity of the real world make forecasting extremely difficult. Consequently, regardless of the global emission models' characteristics, their results are fraught with uncountable reservations. These reservations stem from the models' assumptions and extrapolations, which stretch several decades into the future, and from their high degree of abstraction.

But the models are different in their transparency. Most global CO_2 mitigation scenarios are typically designed using Integrated Assessment Models (IAMs). These are highly complex models that remain inaccessible to the general public: many ethical questions and premisses – including the presumption of continued economic growth – are hidden in their hypotheses and algorithms, making it difficult to reproduce and understand their results. For example, IAMs are based on decision algorithms that, e.g., use cost assumptions as the basis for deciding which mitigation measures to implement (construction of offshore wind parks or insulating buildings?). By comparison, the Global Calculator, which the STS uses, is a model in which the users must decide, e.g., about consumption levels and technological advances. This trait makes

3 Some of these studies are mentioned in the footnotes of the full English version: «Societal Transformation Scenario for Staying Below 1.5°C».

the Global Calculator's assumptions extremely transparent. The STS authors have based STS modelling on the Global Calculator because, while being aware that IAMs can be useful in assessing short- or medium-term scenarios, they are convinced that transparent and understandable scenarios are essential if our joint future up to 2050 or into the 22nd century is to be negotiated in a democratic discussion.[4]

Result of the Societal Transformation Scenario

When the above-mentioned assumptions in the sectors transport, housing and food are applied, the STS shows a strong reduction in energy demand in the Global North. Simultaneously, expanding renewable energies and improving energy efficiency would result in the global CO_2 emissions falling by about 50% between 2020 and 2030 and by a further 22% by 2050.

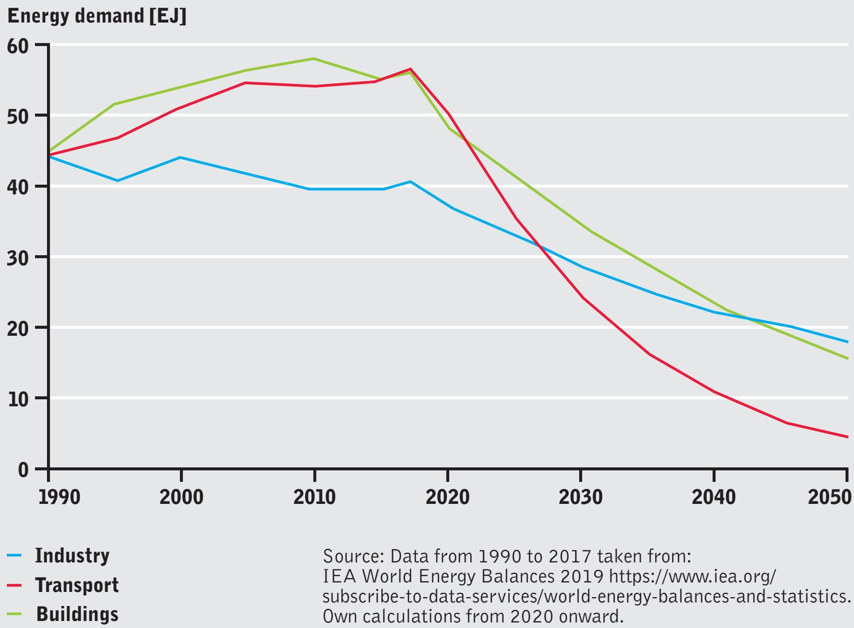
Changes towards healthier diets, lower meat consumption and less food wastage would free up agricultural land on which natural, biologically diverse, ecological and extensive agricultural systems can be carefully restored and CO_2 naturally sequestered. In comparison to other scenarios, the STS works with a moderate or low value for CO_2 sequestration in the 21st century (232 Gt) relying on ecosystem-based approaches. It understands these approaches more as an additional safety-net and not as the main means to achieving a socially just transformative mitigation pathway towards the 1.5°C limit.[5]

The STS thus models a CO_2 mitigation path that allows global warming to be kept under 1.5°C without being reliant on high-risk technologies such as nuclear power or negative emission technologies. The scenario thus allows the cumulative emissions to remain within the CO_2 budget for a 66% probability of limiting global warming to 1.5°C – a much higher probability than that achieved in most of the other 1.5°C scenarios.

4 In its original, web-based form, the Global Calculator does not differentiate between world regions and also does not allow some of the consumption parameters to be changed in the way the authors wish. Therefore, the authors used a spreadsheet model based on the Global Calculator rather than the web-based version. In the model, the consumption side was divided into two regions– Annex-1 countries and Non-Annex-1 countries, so that – at least in approximation – the difference between the Global North and the Global South could be modelled.

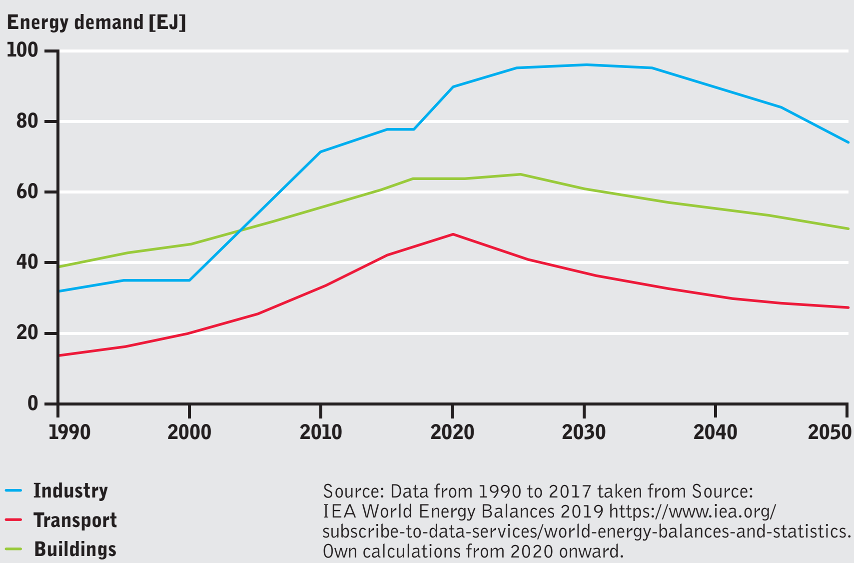
5 The CO_2 sequestration potential of natural ecological systems is hotly debated within the sciences. Current debates and climate protection plans often rely heavily on nature to compensate fossil fuel and industrial emissions. But ecologically based CO_2 sequestration has its biological limits and is not always permanent because ecosystems can be destroyed or degraded by, for example, the impacts of the climate change or economic activities. The STS, thus, limits CO_2 sequestration to max. 4 Gt CO_2 per year and focuses on drastically reducing CO_2 by limiting production and consumption. The actual sequestration potential of the world's global ecosystems may, however, be much higher (see also «Missing Pathways to 1.5°C – The role of the land sector in ambitious climate action», Dooley, K. and Stabinsky, D., 2018), and the restoration of natural ecosystems is also key for addressing many other global ecological crises.

Figure 5: Final energy demand in Annex 1 countries



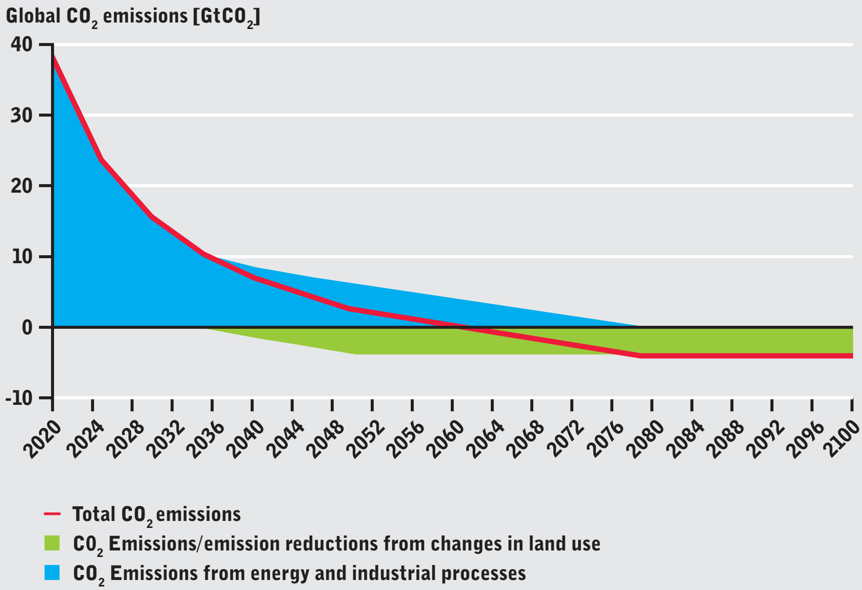
Source: Data from 1990 to 2017 taken from:
IEA World Energy Balances 2019 https://www.iea.org/subscribe-to-data-services/world-energy-balances-and-statistics.
Own calculations from 2020 onward.

Figure 6: Final energy demand in Non-Annex 1 countries



Source: Data from 1990 to 2017 taken from Source:
IEA World Energy Balances 2019 https://www.iea.org/subscribe-to-data-services/world-energy-balances-and-statistics.
Own calculations from 2020 onward.

Figure 7: Global CO_2 emissions



Source: own calculations

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