ipcc

INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2021

The Physical Science Basis

kommentiert von

PLANETARY ENGINEERING GROUP PEGE

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2021

The Physical Science Basis

3949 Seiten Diagnose ohne Therapievorschlag

Seite 6: Die Grundlage für das

A.1.1 Observed increases in well-mixed greenhouse gas (GHG) concentrations since around 1750 are unequivocally caused by human activities. Since 2011 (measurements reported in AR5), concentrations have continued to increase in the atmosphere, reaching annual averages of 410 ppm for carbon dioxide (CO_2), 1866 ppb for methane (CH_4), and 332 ppb for nitrous oxide (N_2O) in 2019[6]. Land and ocean have taken up a near-constant proportion (globally about 56% per year) of CO_2 emissions from human activities over the past six decades, with regional differences (*high confidence*)[7]. {2.2, 5.2, 7.3, TS.2.2, Box TS.5}

Netto-Null-Emissions Märchen

Seite 27: Wir kennen entscheidende

B.4.3 The magnitude of feedbacks between climate change and the carbon cycle becomes larger but also more uncertain in high CO_2 emissions scenarios (*very high confidence*). However, climate model projections show that the uncertainties in atmospheric CO_2 concentrations by 2100 are dominated by the differences between emissions scenarios (*high confidence*). Additional ecosystem responses to warming not yet fully included in climate models, such as CO_2 and CH_4 fluxes from wetlands, permafrost thaw and wildfires, would further increase concentrations of these gases in the atmosphere (*high confidence*).
{5.4, Box TS.5, TS.3.2}

Komponenten noch gar nicht

Wir wissen, dass wir nichts wissen,

B.4.3 The magnitude of feedbacks between climate change and the carbon cycle becomes larger but also more uncertain in high CO_2 emissions scenarios (*very high confidence*). However, climate model projections show that the uncertainties in atmospheric CO_2 concentrations by 2100 are dominated by the differences between emissions scenarios (*high confidence*). Additional ecosystem responses to warming not yet fully included in climate models, such as CO_2 and CH_4 fluxes from wetlands, permafrost thaw and wildfires, would further increase concentrations of these gases in the atmosphere (*high confidence*). {5.4, Box TS.5, TS.3.2}

aber Netto-Null-Emission ist die Vorgabe!

Seite 86: Wir kennen entscheidende

In permafrost regions, increases in ground temperatures in the upper 30 m over the past three to four decades have been widespread (*high confidence*). For each additional 1°C of warming (up to 4°C above the 1850–1900 level), the global volume of perennially frozen ground to 3 m below the surface is projected to decrease by about 25% relative to the present volume (*medium confidence*). However, these decreases may be underestimated due to an incomplete representation of relevant physical processes in ESMs (*low confidence*). Seasonal snow cover is treated in TS.2.6. {2.3.2, 9.5.2, 12.4.9}

Komponenten noch gar nicht

Seite 103 - 104: Wir kennen entscheidende

Thawing terrestrial permafrost will lead to carbon release (*high confidence*), but there is *low confidence* in the timing, magnitude and the relative roles of CO_2 versus CH_4 as feedback processes. An ensemble of models projects CO_2 release from permafrost to be 3–41 PgC per 1ºC of global warming by 2100, leading to warming strong enough that it must be included in estimates of the remaining carbon budget but weaker than the warming from fossil fuel burning. However, the incomplete representation of important processes, such as abrupt thaw, combined with weak observational constraints, only allow *low confidence* in both the magnitude of these estimates and in how linearly proportional this feedback is to the amount of global warming. There is emerging evidence that permafrost thaw and thermokarst give rise to increased CH_4 and N_2O emissions, which leads to the combined radiative forcing from permafrost thaw being larger than from CO_2 emissions only. However, the quantitative understanding of these additional feedbacks is low, particularly for N_2O. These feedbacks, as well as potential additional carbon losses due to climate-induced fire feedback are not routinely included in Earth System models. {Box 5.1, 5.4.3, 5.4.7, 5.4.8, Box TS.9}

Komponenten noch gar nicht

41 PgC Peta Gramm Carbon pro Grad

Thawing terrestrial permafrost will lead to carbon release (*high confidence*), but there is *low confidence* in the timing, magnitude and the relative roles of CO_2 versus CH_4 as feedback processes. An ensemble of models projects CO_2 release from permafrost to be 3–41 PgC per 1ºC of global warming by 2100, leading to warming strong enough that it must be included in estimates of the remaining carbon budget but weaker than the warming from fossil fuel burning. However, the incomplete representation of important processes, such as abrupt thaw, combined with weak observational constraints, only allow *low confidence* in both the magnitude of these estimates and in how linearly proportional this feedback is to the amount of global warming. There is emerging evidence that permafrost thaw and thermokarst give rise to increased CH_4 and N_2O emissions, which leads to the combined radiative forcing from permafrost thaw being larger than from CO_2 emissions only. However, the quantitative understanding of these additional feedbacks is low, particularly for N_2O. These feedbacks, as well as potential additional carbon losses due to climate-induced fire feedback are not routinely included in Earth System models. {Box 5.1, 5.4.3, 5.4.7, 5.4.8, Box TS.9}

sind 150 Gt CO2 pro Grad, 750 Gt bei 5°

Seite 107: Wir kennen entscheidende

Permafrost thaw is included in estimates together with other feedbacks that are often not captured by models. Limitations in modelling studies combined with weak observational constraints only allow *low confidence* in the magnitude of these estimates (TS.3.2.2). Despite the large uncertainties surrounding the quantification of the effect of additional Earth system feedback processes, such as emissions from wetlands and permafrost thaw, these feedbacks represent identified additional risk factors that scale with additional warming and mostly increase the challenge of limiting warming to specific temperature levels. These uncertainties do not change the basic conclusion that global CO_2 emissions would need to decline to net zero to halt global warming. {Box 5.1, 5.4.8, 5.5.2}

TS.3.3.2 Carbon Dioxide Removal

Komponenten noch gar nicht

Es gibt große Unsicherheiten, aber wir wollen

Permafrost thaw is included in estimates together with other feedbacks that are often not captured by models. Limitations in modelling studies combined with weak observational constraints only allow *low confidence* in the magnitude of these estimates (TS.3.2.2). Despite the large uncertainties surrounding the quantification of the effect of additional Earth system feedback processes, such as emissions from wetlands and permafrost thaw, these feedbacks represent identified additional risk factors that scale with additional warming and mostly increase the challenge of limiting warming to specific temperature levels. These uncertainties do not change the basic conclusion that global CO_2 emissions would need to decline to net zero to halt global warming. {Box 5.1, 5.4.8, 5.5.2}

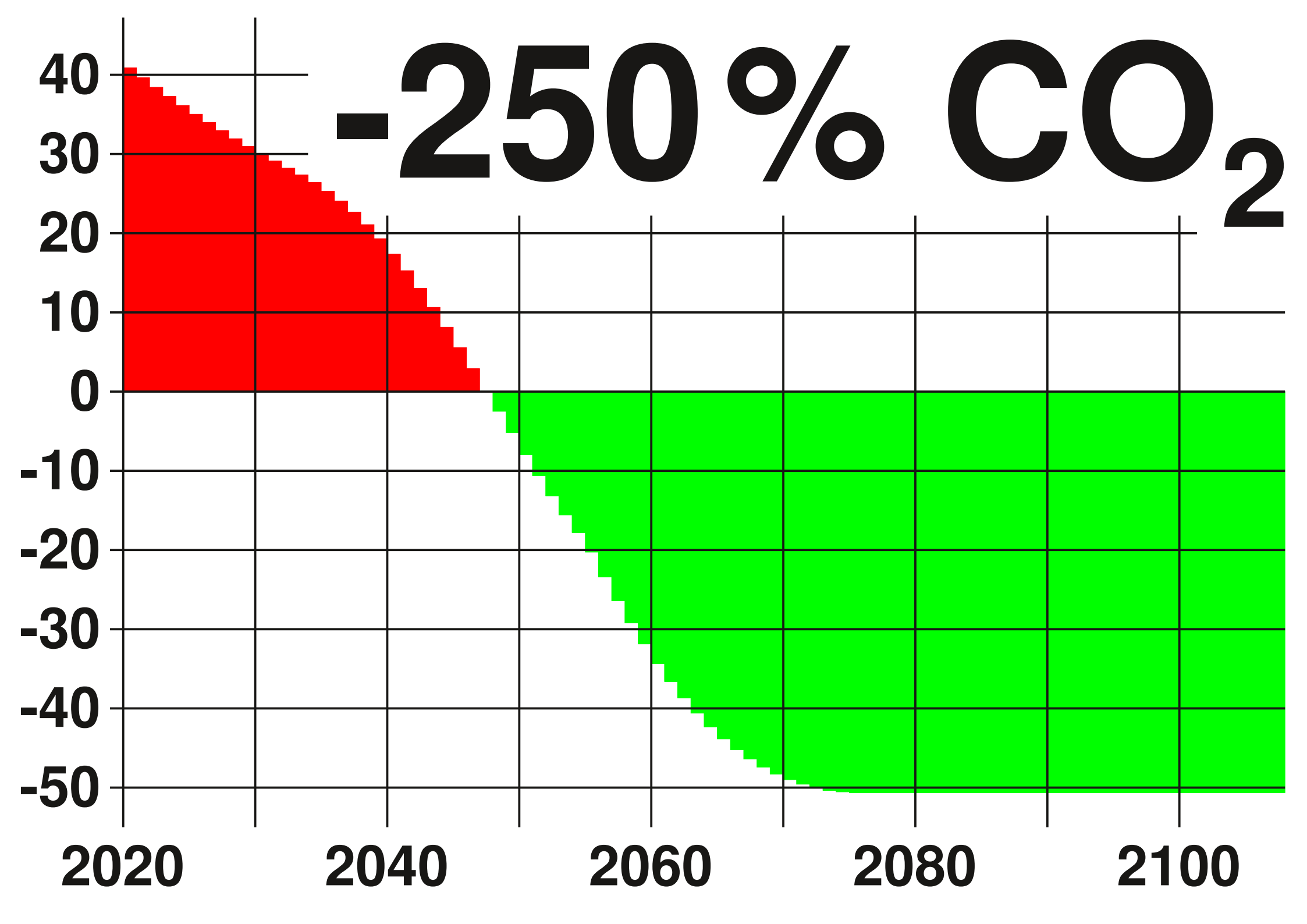
TS.3.3.2 Carbon Dioxide Removal

den Glauben an Netto-Null-Emission nicht aufgeben!

Seite 221: Wirklich? Oder darf nur

The SROCC found that the carbon content of Arctic and boreal permafrost is almost twice that of the atmosphere (*medium confidence)*, and assessed *medium evidence* with *low agreement* that thawing northern permafrost regions are currently releasing additional net methane and CO_2.

nicht sein, was nicht sein kann?

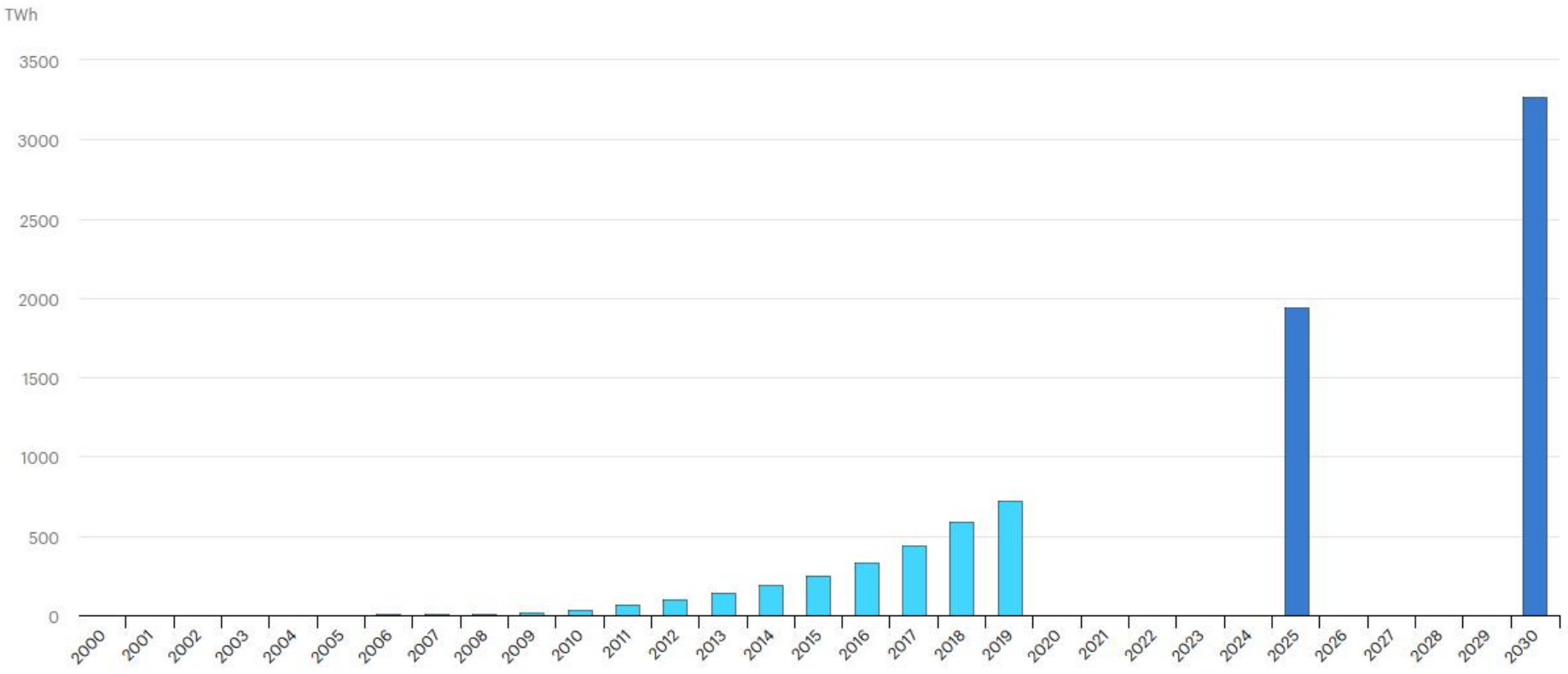

-250% CO2
40
30
20
10
0
-10
-20
-30
-40
-50
2020
2040
2060
2080
2100

Solar PV power generation in the Sustainable Development Scenario, 2000-2030

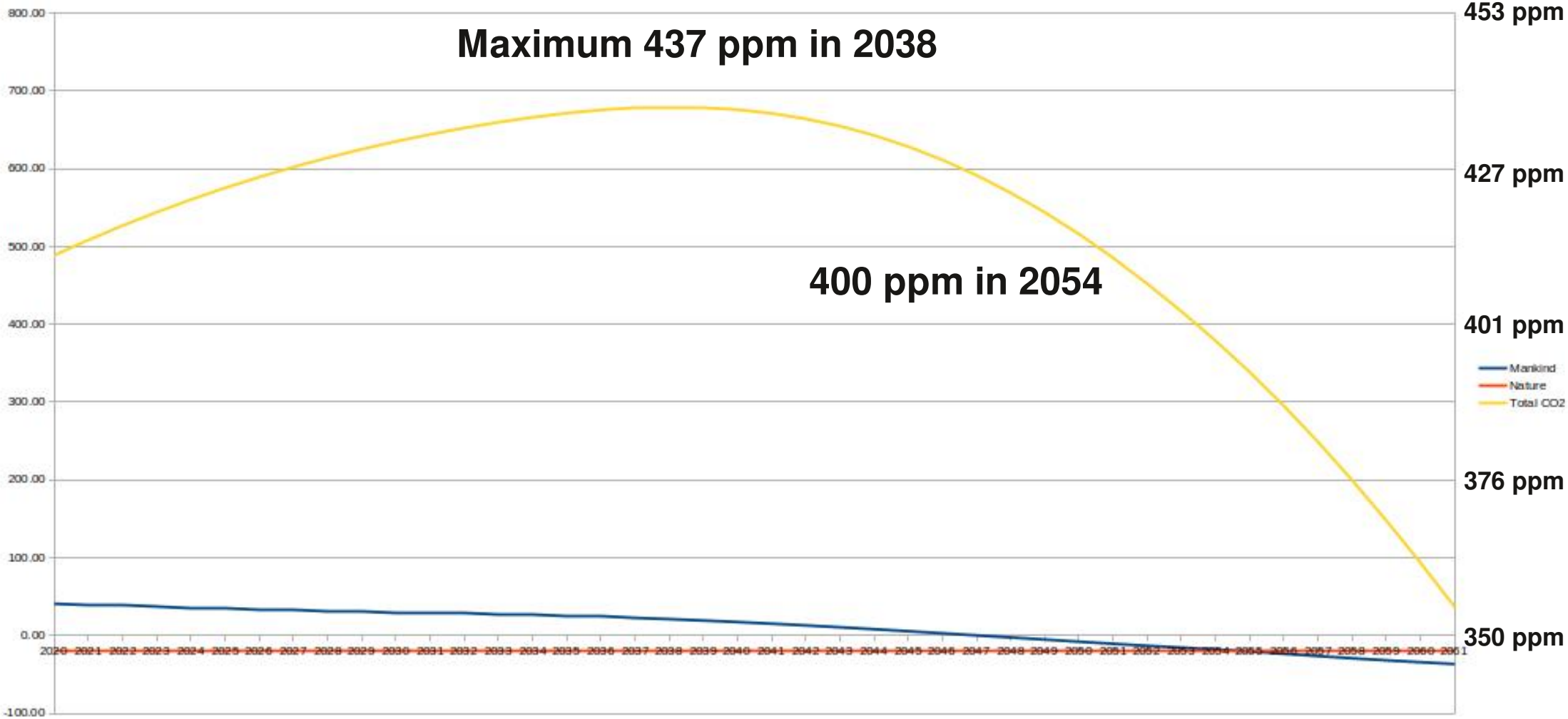
Last updated 2 Jun 2020

Download chart ↓

Cite Share



Solar PV generation increased 22% (+131 TWh) in 2019 and represented the second-largest absolute generation growth of all renewable technologies, slightly behind wind and ahead of hydropower. Despite decelerating growth due to recent policy changes and uncertainties in China (the largest PV market globally), 2019 was a year of record global growth in PV capacity. As competitiveness continues to improve, solar PV is still on track to reach the levels envisioned in the SDS, which will require average annual growth of 15% between 2019 and 2030.



Naives Szenario bis 2061: die Natur absorbiert weiter 20 Gt CO2 pro Jahr

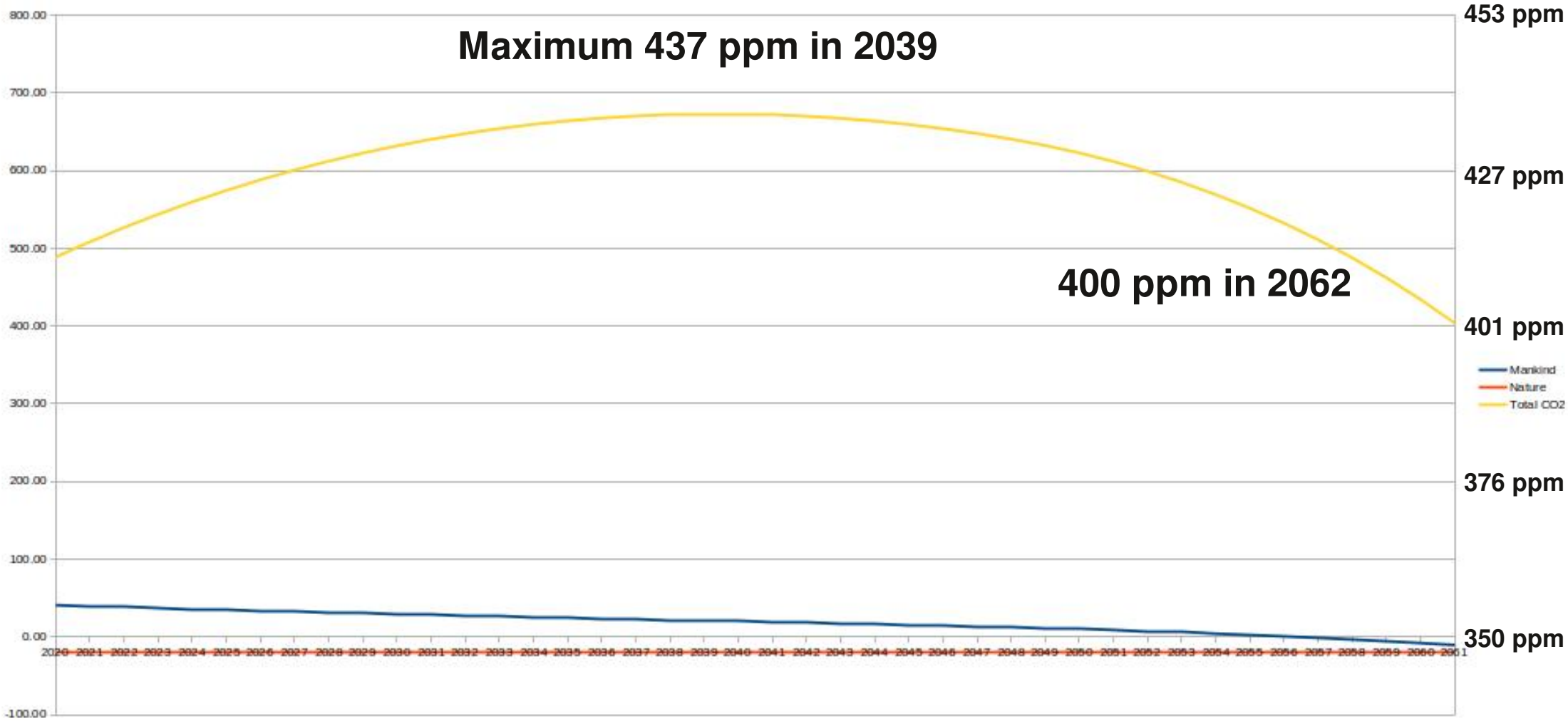
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

26 % jährliches PV Produktionswachstum bis 2032

18 TW/a wird 2055 erreicht



Naives Szenario bis 2061: die Natur absorbiert weiter 20 Gt CO2 pro Jahr

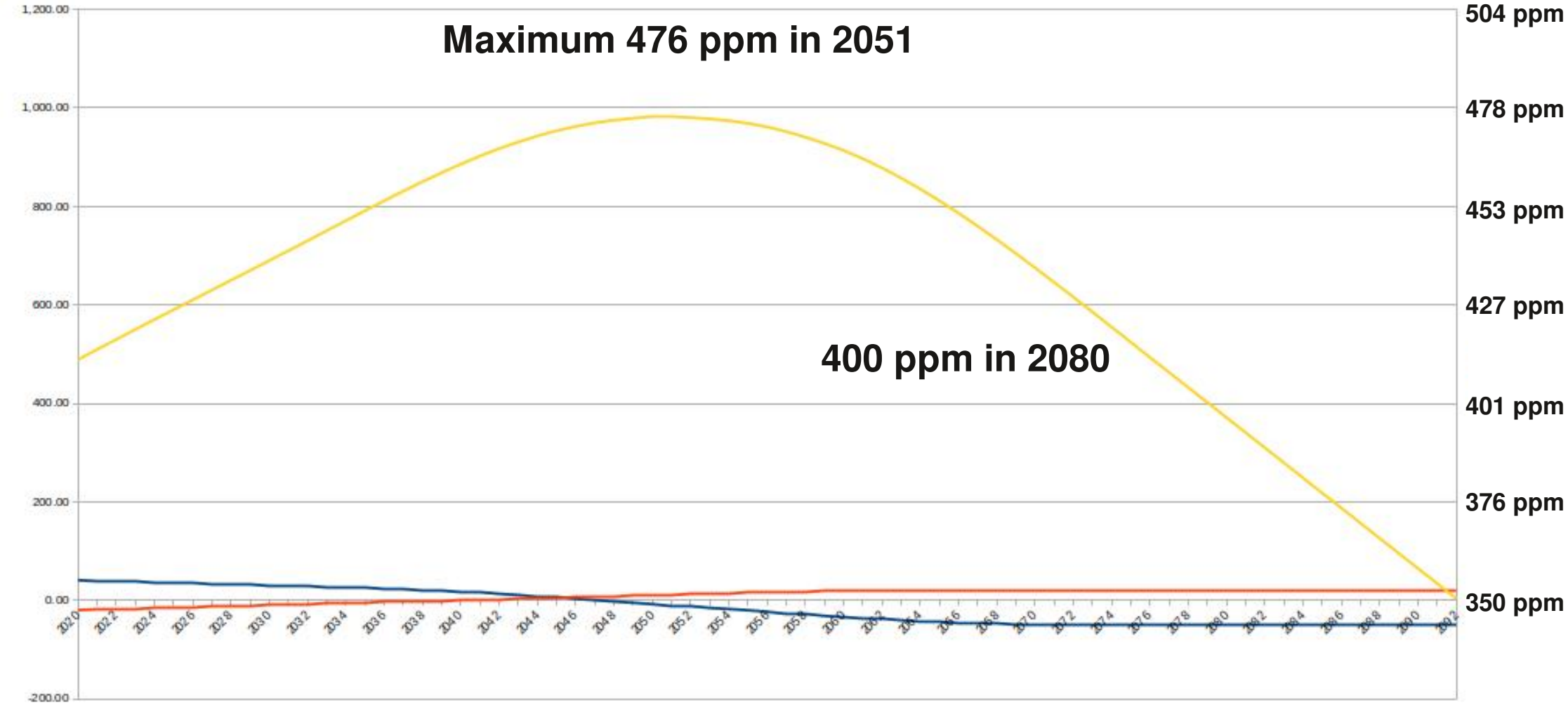
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

15 % jährliches PV Produktionswachstum bis 2047

18 TW/a wird 2065 erreicht



Wechsel von -20 Gt auf +20 Gt CO2 Emission der Natur mit 1 Gt/a bis 2092

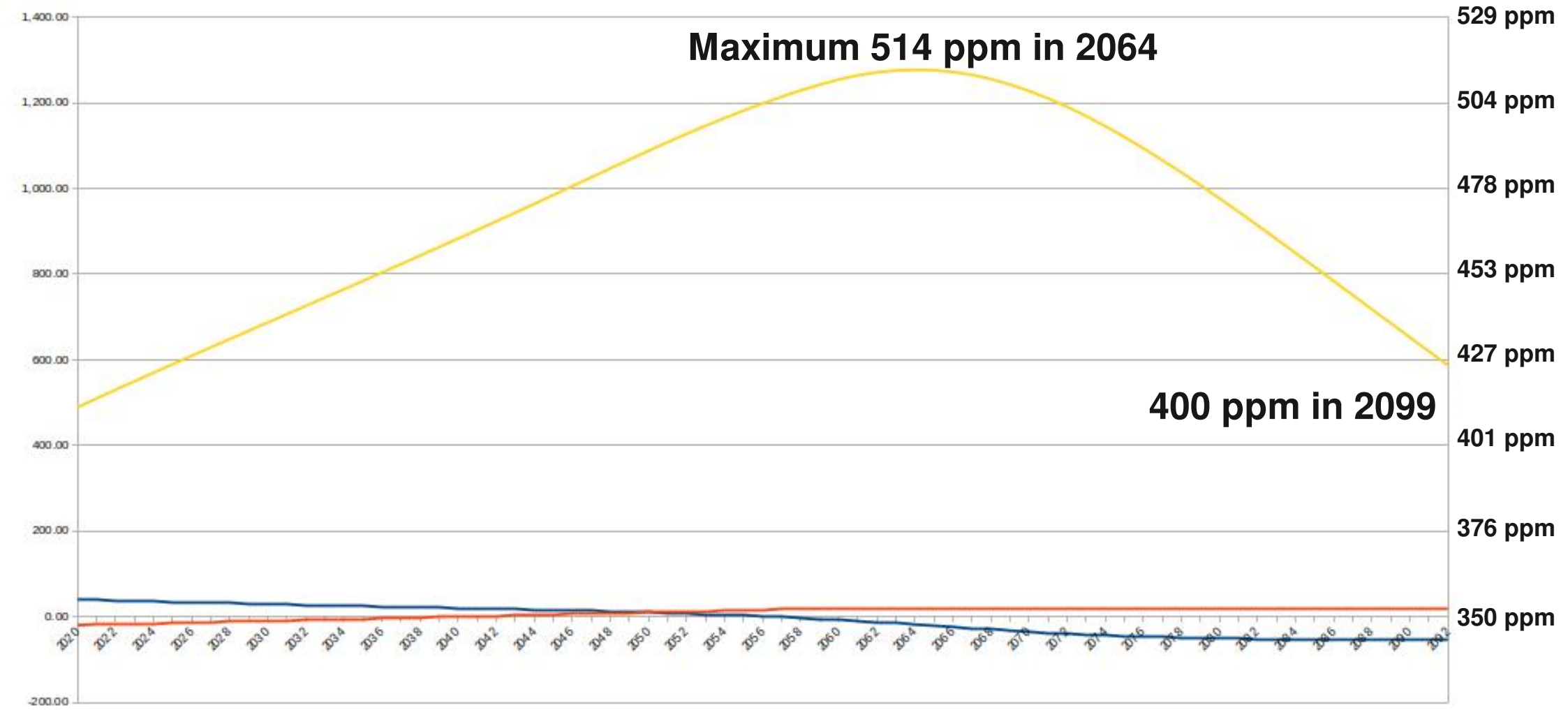
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

26 % jährliches PV Produktionswachstum bis 2032

18 TW/a wird 2055 erreicht



Wechsel von -20 Gt auf +20 Gt CO2 Emission der Natur mit 1 Gt/a bis 2092

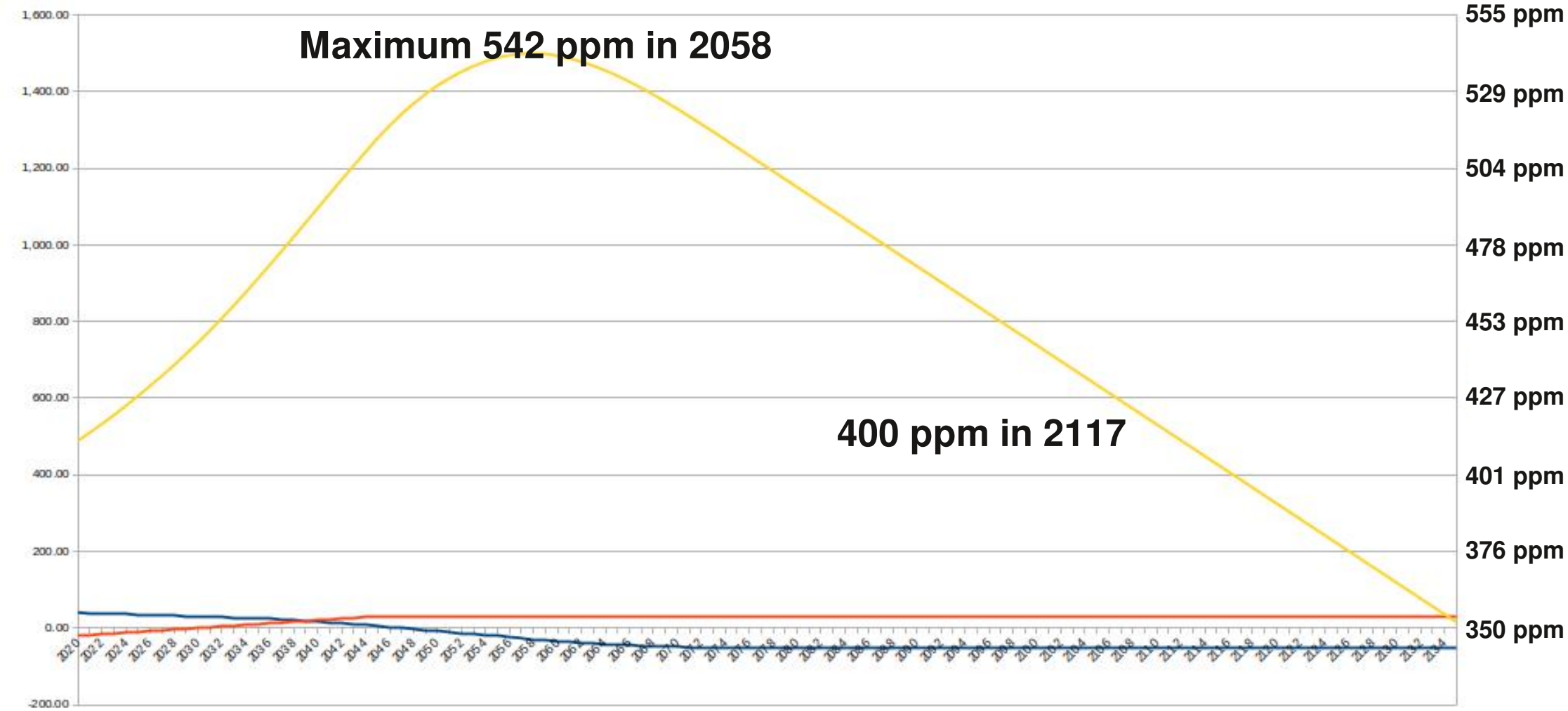
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

15 % jährliches PV Produktionswachstum bis 2047

18 TW/a wird 2065 erreicht



Wechsel von -20 Gt auf +30 Gt CO2 Emission der Natur mit 2 Gt/a bis 2135

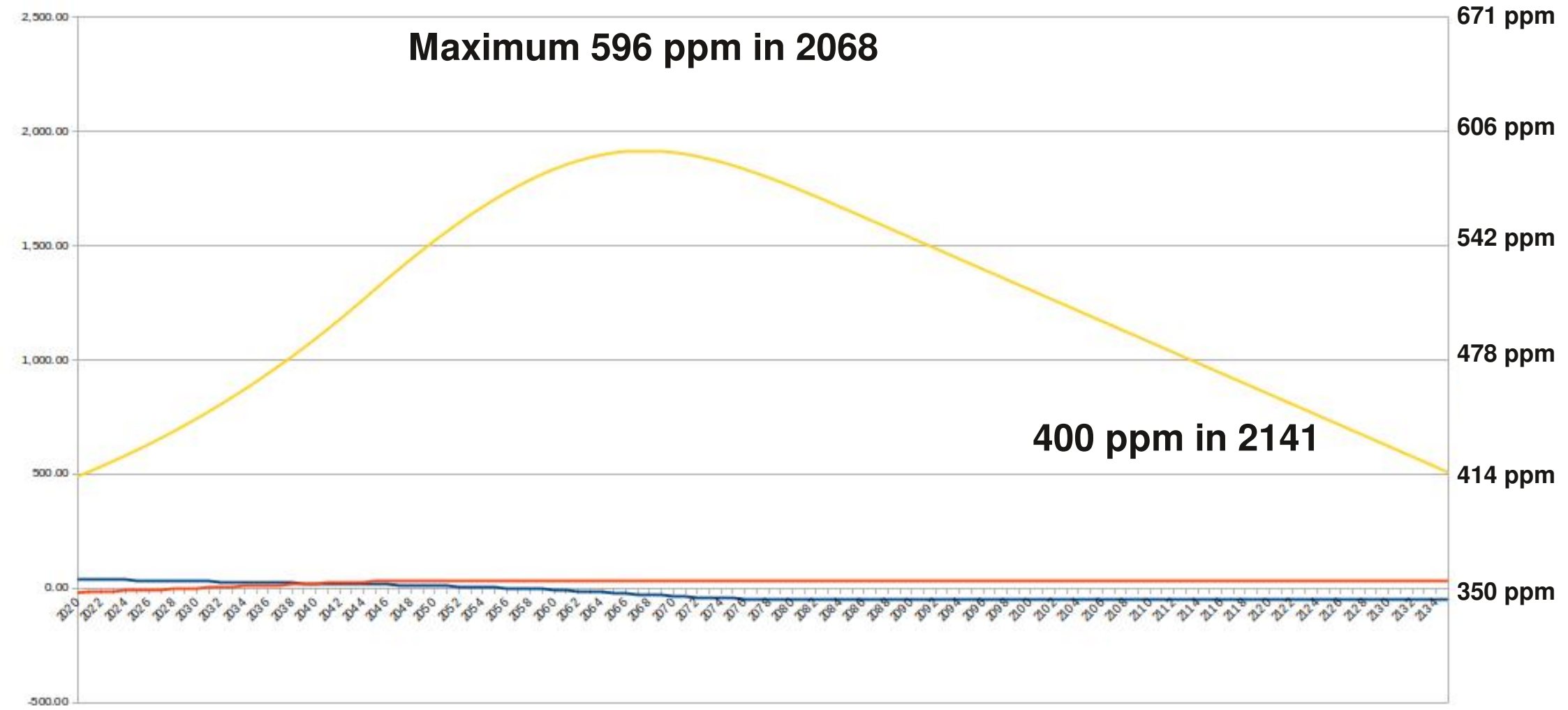
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

26 % jährliches PV Produktionswachstum bis 2032

18 TW/a wird 2055 erreicht



Wechsel von -20 Gt auf +30 Gt CO2 Emission der Natur mit 2 Gt/a bis 2135

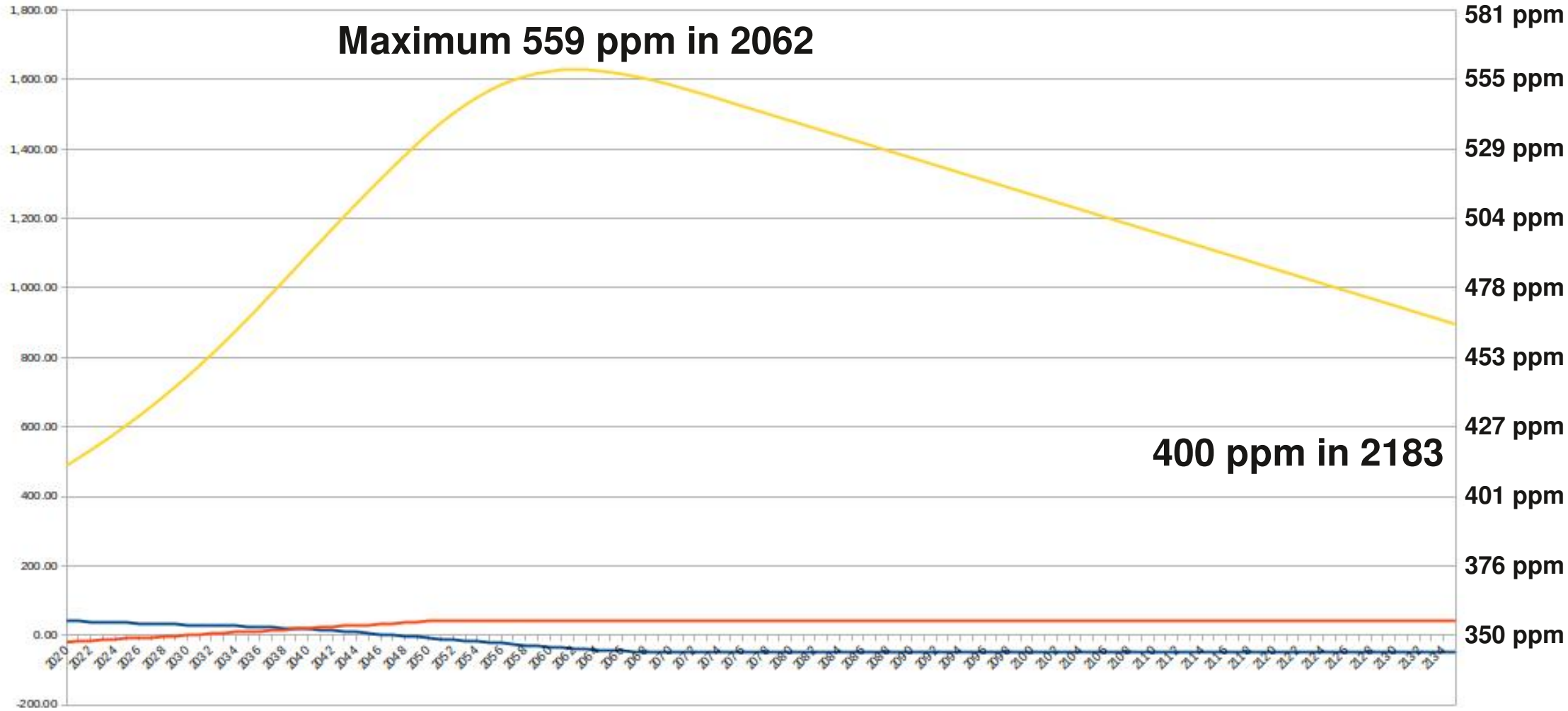
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

15 % jährliches PV Produktionswachstum bis 2047

18 TW/a wird 2065 erreicht



Wechsel von -20 Gt auf +40 Gt CO2 Emission der Natur mit 2 Gt/a bis 2135

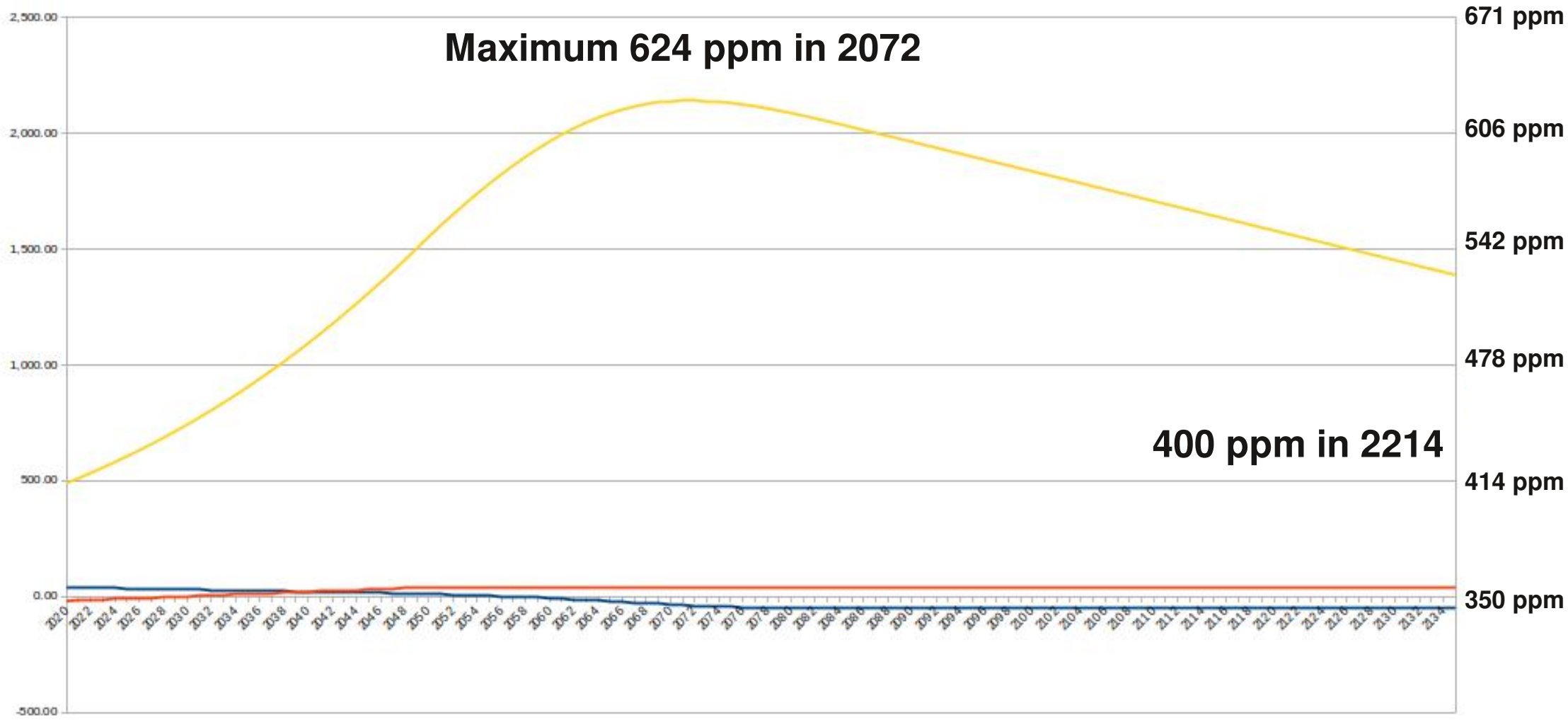
Gt CO2 Emission der Zivilisation

Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

26 % jährliches PV Produktionswachstum bis 2032

18 TW/a wird 2055 erreicht



Wechsel von -20 Gt auf +40 Gt CO2 Emission der Natur mit 2 Gt/a bis 2135

Gt CO2 Emission der Zivilisation

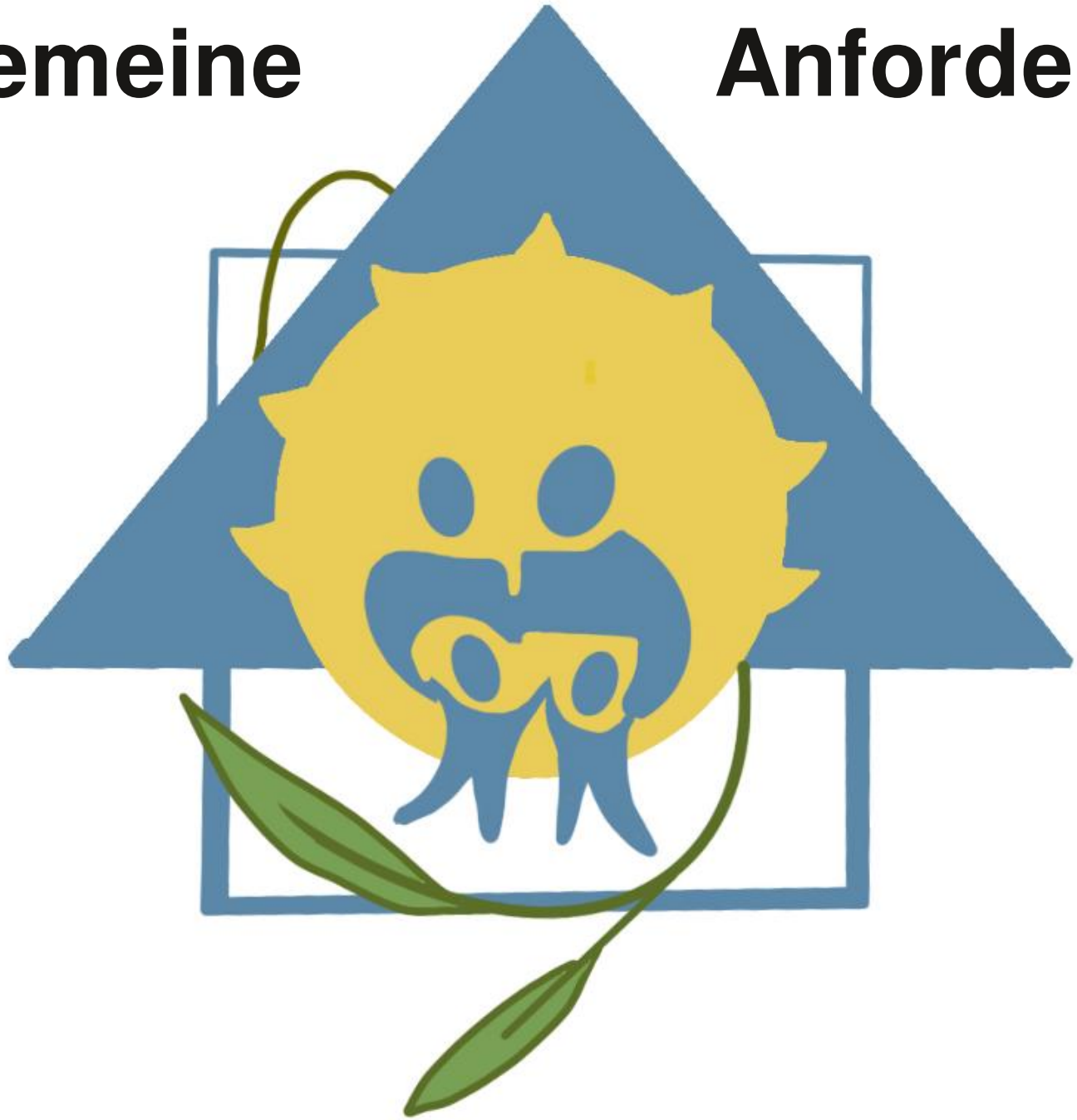
Gt CO2 Emission der Natur

Gt CO2 mehr in der Atmosphäre als bei 350 ppm

15 % jährliches PV Produktionswachstum bis 2047

18 TW/a wird 2065 erreicht

Allgemeine Anforderungen



Klima Schutz Überlegenheits Haus

KSÜH	**Durchschnitt**	**2.000.000.000**
Photovoltaik	**50 kW**	**100 TW**
Akku	**150 kWh**	**300 TWh**
Stromertrag pro Jahr	**65 MWh**	**130 PWh**
Nahrungsproduktion	**Vertical Gardening 80 m²**	**Vertical G. 160.000 km²**
Wohnfläche	**100 m²**	**200.000 km²**
Flächenbedarf mit Straßen	**800 m²**	**1.600.000 km²**

130 PWh Strom, weit jenseits des Energiebedarfs der heutigen Menschheit (Strom ungleich Wärme). KlimaSchutzÜberlegenheitsHaus als zentraler Punkt der Energiewende, aber die Energiewende ist nur ein Etappenziel auf dem Weg zur Planetensanierung.

Echte Klimaschutzmaßnahmen sind nur möglich mit einer Erhöhung des Lebensstandards, dieser muss aber speziell bei den Ärmsten 10 % der Bevölkerung gemessen werden.

Synergie Energieerzeugung, Nahrungserzeugung, hoher Wohnkomfort und die Sicherheit in Gebieten, welche die Option F=Feuer oder W=Wasser erfordern.

ipcc

INTERGOVERNMENTAL PANEL ON climate change

Climate Change 2021

The Physical Science Basis

kommentiert von PLANETARY ENGINEERING GROUP PEG