German Zero

The 1.5-Degree Climate Action Plan for Germany:

Joint Action Against the Climate Crisis

Table of Contents

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The 1.5-Degree Climate Action Plan for Germany: Climate neutrality by 2035 is necessary and practicable.

Humanity is standing at a crossroads: in one direction, global climate catastrophe—and in the other, a joint effort to secure the future of the planet. We still have a choice.

The present plan shows that politicians, in particular, must act now to fulfil their binding 1.5 °C pledge under international law and to safeguard the future for us and our children.

Forest fires, torrential rain, floods, droughts: we are already experiencing the consequences of the climate crisis on our own doorstep.[1] We can foresee horror scenarios with mass migration, mass expulsion, war and terror in a world that gets hotter by 3, 4 or more degrees in our lifetime and that of our children and grandchildren. To use a fever thermometer as an analogy: we're talking about a body temperature of 38.5 °C—or a fatal 41 °C.

There is broad scientific consensus that unprecedented suffering will befall humanity if nothing is done to prevent global heating. The climate protection the earth needs is, without doubt, technically and financially feasible. As a 'side benefit', it leads to a future with less pollution and waste, as well as clean energy sources that ensure our prosperity and the survival of all humanity.

The choice is still ours as to which future we want to live in. In the 2015 Paris Agreement on climate protection, the international community made a binding pledge under international law and committed to limiting the increase in global temperature to well below 2 °C compared to pre-industrialisation levels, and to also make efforts to keep it to only 1.5 °C if possible.[2]

The problem: we're still a very long way from implementing

Although the EU has declared a climate emergency, the climate protection legislation in Europe as well as in Germany is completely inadequate: we're needlessly delaying the transition to new technologies and are clearly on track to miss the 1.5-degree target.[3] The existing and newly introduced laws fail to recognise the dramatic nature of the situation—both in terms of CO_2 reduction volumes and the pace of change required. The Federal Government's climate protection package is not enough to prevent harm to present and future generations.

We therefore need a climate action plan for Germany that really achieves its targets. Our parents and grandparents rebuilt Germany and made it possible for us to enjoy a good life—and now we're in the process of gambling it away. A world in which the climate gets out of control is a world of disasters and misery. This view is incompatible with our responsibility towards our children and grandchildren.

If we don't do it, who will?

Germany is rich, strong and influential. We have freedom of speech, freedom of the press and a dynamic scientific community. Our economy is often the leader in future technologies. We can draw from our history and traditions. With our inventive spirit, we've advanced technology, society and democracy—and we're now facing our biggest challenge.

Many people in Germany want to protect the climate; the overwhelming majority is worried about the climate crisis. We need to lead the way in climate protection and at the same time provide extensive support to other, poorer regions in combating the climate crisis. In doing so, we're also showing other countries around the world that and how it can work. We want to lead by example—then more will follow. It's our only chance.

The by-product: A climate-policy induced economic miracle

The legitimate question that's repeatedly asked in connection with climate protection is: how much will it cost? The answer is simple: the costs of climate protection are definitely far less than the costs of the damage of the impending climate catastrophe.[4]

Ideally the Federal Government would have carried out a more detailed analysis twenty years ago, or at the latest after the Paris UN summit of 2015. At the present time, we are unable to accurately quantify the necessary investments for the measures listed in this Climate Action Plan. However, we know that these large investments will pay off—even within the next ten years, in fact:

1. Investments in climate protection are able to eliminate Germany's public under-investment.

2. The massive restructuring of our infrastructure will act as a powerful economic stimulus.

3. New employment opportunities are emerging, for example, in the field of energy-efficient building renovation, in mechanical and plant engineering, in building and energy technology, in research and development, or in the mobility sector.

A recent study by the Federal Environment Agency[5] shows, based on reliable figures, that ambitious climate protection which stimulates investment in Germany is worthwhile from a macroeconomic perspective. Positive economic effects will result—to varying degrees—in all the areas of activity under consideration.

A "climate-policy economic miracle" would be a pleasant side effect of the present plan. The important thing is that we as a society invest in saving the climate with the necessary determination and rebuild our social infrastructure accordingly. The aim is to use new revenue streams from CO_2 pricing and subsidy reduction to counter-finance costs incurred, alleviate social hardship and create private investment incentives.

The good news: the mood is shifting in favour of committed, effective climate protection

One must finish what one starts. The commitment to climate protection must go hand in hand with real determination to act: when that happens, it's no more and no less than a moral revolution—the answer to an issue of justice that is entirely comparable to the abolition of slavery or the introduction of voting rights for women.

Historically, with challenges of this magnitude, a community always goes through the same phases: first, denial of the problem, then resigned acknowledgment of it—yes, it's bad, but what can one do? Only once a certain critical mass is reached will the situation reach its turning point—and society will decisively act to provoke change. Afterwards, we look back in amazement and try to understand how we could have tolerated the old, destructive state of affairs for so long.[6]

Now we are globally in the midst of such a turning point: the emergence of the "Fridays For Future" movement marks a crucial pivot towards what is right and good. GermanZero is picking up on the momentum and amplifying it—initially, with the knowledge of experts, the experience of communication professionals and climate-policy citizen lobbyists—in future, together with thousands of committed citizens, hand-in-hand with the expertise of scientists and dedicated representatives of the young generation, and from 2022, with a cross-party majority in the German Parliament (Bundestag) and the Bundesrat (Federal Council).

How we will bring about the climate transition:

1. **We get leading professionals involved and forge a climate action plan.**
   We bring together leading scientists and experts. Together, we develop the broad outlines of a cross-sectoral catalogue of measures—in an ongoing process, initially in rough outline, and later in ever greater detail.

2. **We will enshrine climate protection in the German constitution.**
   The 1.5-degree target will be declared a state target. To this end, we're working to assure the necessary majority in the next German Bundestag across all parties.

3. **We will put together packages of measures for fair, rapid and effective climate protection.**
   Based on the recommendations of experts and with direct citizen participation, the measures required to achieve the 1.5-degree target are discussed and decided. The catalogue of measures is continually refined and developed further.

4. **We will prepare the draft legislation.**
   We will present draft 1.5-degree legislation that does no more and no less than comply with and implement the German targets within the Paris Agreement.

5. **We will launch a broad campaign to win public support for this historic task.**
   We will convince the majority of Germans of the need to make these changes in the law and to try out and practise more climate-friendly lifestyles.

Excursus: Climate Protection Targets

What do the Paris climate protection targets mean for Germany—and what do we mean when we talk about the 1.5-degree target for Germany?

Together with 194 other countries, Germany made a binding commitment on climate protection under international law at the Paris Agreement; a commitment to limit global warming to well below 2 °C and to make efforts to keep it below 1.5 °C. So far, the global average temperature has risen by about 1.1 °C compared to pre-industrial times.[7]

The global CO_2 budget

How much the earth heats up depends on how much CO_2 and other greenhouse gases[8] we're still emitting worldwide. Last year, the Intergovernmental Panel on Climate Change (IPCC) published a special report on how the 1.5-degree target can be achieved. The Intergovernmental Panel on Climate Change calculated the amount of emissions that were still available to us globally at the beginning of 2018 if we want to limit global warming to 1.5 °C, 1.75 °C or 2 °C. →

Global CO_2 budget

Climate target
Warming since pre-industrial times

Emissions budget
The amount of CO_2 that can still be permissibly emitted worldwide if we are to keep below the specified temperature with a two-thirds probability (67%).
One square corresponds to 10 gigatonnes.

Remaining emission budget for Germany for 1.5-degree target
(2.4 gigatonnes as of beginning of 2020)

Of these, 74 gigatonnes have already been consumed in 2018 and 2019 (see the hatched area in the graphic).

As the climate system is highly complex, the calculations contain uncertainties. Thus, only a certain range can be specified for the response of the climate to CO_2 and other greenhouse gases. In addition, it's still unclear how much methane will escape from wetlands and thawing permafrost soils in the future. The Intergovernmental Panel on Climate Change therefore states probabilities. The amount of CO_2 that can still be permissibly emitted if we are to remain below 1.5 °C, 1.75 °C or 2 °C with a probability of 33%, 50% and 67% has been calculated in each case.

Wait a minute: Only a 67% probability of preserving a habitable planet for our children and grandchildren?

Would we get on a plane if we knew that every third flight crashes? Would we build a factory if we knew that there was a 33% probability of its exploding? Seen from that perspective, the emission budgets calculated by the Intergovernmental Panel on Climate Change are far too high. Unfortunately, holding ourselves to a calculation with more than 90% certainty no longer makes sense—the international community has already waited too long on this and we have already crossed too many thresholds.

Climate tipping points: From this point on, there's no turning back

This is all the more crucial because scientists have so far underestimated the consequences of climate change.[9] Particularly worrying are the so-called "tipping points" in the climate system. This term denotes abrupt changes that are no longer reversible and can lead to the earth automatically getting ever warmer. No matter whether or not we reduce emissions, many processes are on track to occur without any further intervention. Examples are the collapse of the ice sheets, the melting of the permafrost soils, which then release large amounts of the greenhouse gas methane, and the dying of forests, which release the CO_2 stored in the trees. If a tipping point is exceeded, the additional global warming caused by it can trigger further tipping points. The result would be an uncontrollable avalanche that could completely destabilise the climate. Whereas 20 years ago, climate researchers assumed that tipping points would only be a threat if the planet warmed by about 5 °C, recent research shows that this could already be the case at between 1 °C and 2 °C—unfortunately, much earlier than expected.[10]

The climate catastrophe is already here

Even if no tipping points are exceeded, a global warming of "only" 1.5 °C is by no means harmless: even in a 1.5-degree world, about 40% of German summers—i.e. almost every other summer—would be as hot as the extremely hot summer of 2003, while at a 2 °C global temperature increase our summers would be this intense 60% of the time.[11] Likewise, at 1.5 °C, 70–90% of the coral reefs would already die off, and at a 2 °C increase it would be over 99%.[12] This would lead to the collapse of fish stocks and endanger the livelihoods of all those who live from fishing.[13] And at a 4 °C global temperature increase, parts of the earth would become uninhabitable, as island states and coastal regions would be submerged by the sea and deserts would spread. In addition, many ecosystems would collapse, triggering famines.[14]

National climate protection targets: inadequate and unfulfilled

The Paris Agreement does not specify how the remaining emissions budget will be distributed among the different countries. Instead, the signatory states themselves determine how much they will contribute to climate protection (so-called "nationally determined contributions"—NDCs). These national climate contributions are regularly reviewed. If they are not sufficient to achieve the overall target, the nation in question must improve their efforts. The problem is that these nationally determined contributions are far from sufficient! Even if all countries achieved the targets they've set themselves, the earth's temperature would still increase by about 3 °C. Only Morocco and Gambia have set themselves the goal of making an appropriate contribution →

to the 1.5-degree target. The climate protection targets in Germany and the EU would fail to reach even the 2-degree target by a significant margin.[15]

But it gets worse: even the far-too-low self-imposed targets are not being achieved in Germany.

Rapid reduction is necessary

In order to make a fair contribution towards combating the climate crisis and towards the global 1.5 °C target, Germany must bring its climate protection targets to the required level and also achieve those targets. The important point here is that it depends on the amount of greenhouse gases emitted overall, and not so much on the year in which climate neutrality is achieved.

In order to adhere to the overall remaining budget, emissions must be greatly reduced as quickly as possible. Each year in which emissions remain at today's high level, a disproportionate amount of the scarce remaining budget is consumed. All climate protection targets must therefore set an emission path with binding intermediate targets for the residual emission quantities, whereby the emission path must not exceed the total budget.

What portion of the global budget may Germany fairly claim for itself?

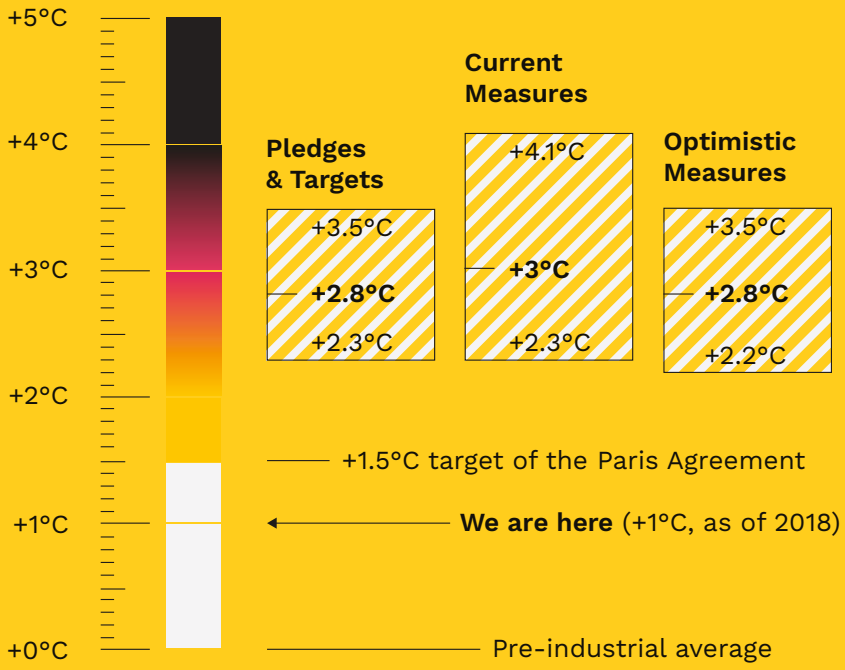
Climate scientist Stefan Rahmstorf[16] has determined the emissions budget that Germany would need to adhere to were the target 1.75 °C (not 1.5 C!), whereby it has a 67% probability of achieving that target. We've followed his calculation logic and calculated the following emissions budget for a target of max. 1.5 °C of global warming:

In order to achieve the 1.5-degree target, Germany would have no more than 2.4 gigatonnes available at the beginning of 2020. At the current emissions of around 0.7 gigatonnes per year, that budget would already be used up within three and a half years—i.e. by mid-2023.[17]

This shows that with German domestic action alone, it's not possible to fulfil Germany's mandatory contribution to the global 1.5-degree target. Our remaining budget will be exceeded in 2023**.** At the same time, the calculations presented are still very generous to Germany. The consequences of greenhouse gas emissions have been widely known since, at the latest, the first IPCC report in 1990. If the international community agreed that every country should take responsibility for the emissions produced since 1990, Germany would already have used up its budget many years ago.

– The solution: Take additional global responsibility. In order to make a fair contribution to global climate protection, Germany must help other countries to implement and finance additional climate protection measures (see chapter on "International compensation", p. 44 ff). This way, the missed target in Germany can still be compensated for by a significant overachievement in other countries, beyond their mandatory contributions. However, this must not be a substitute for extremely ambitious emission reductions in Germany. After all, global emissions must drop to zero by 2040. 2040 is the year GlobalZero is necessary.[18]

Global temperature increase by 2100[19]



As most countries, including Germany, are not adhering to their CO_2 budget, we are currently on a path to significantly exceeding a 2 °C global temperature increase by the end of the century. In addition, tipping points can trigger a vicious circle of effects leading to ever higher temperatures. This is why we must act urgently.

Excursus: The GermanZero Future Workshop

A climate-neutral Germany in ten years, but at the latest by 2035—how do we achieve this?

In November 2019, we invited around 30 German climate and policy experts from fields such as energy, industry, transport, buildings and agriculture to a 48-hour Climate Policy Future Workshop.

By 2015 at the latest, the Federal Government should have commissioned a comprehensive report for an effective climate plan. It failed to do so—perhaps out of fear of the political consequences and the drastic measures required by the 1.5-degree target? We can't say for sure.

Four years later, GermanZero began to set up such a plan under maximum time pressure: in November 2019, we invited around 30 German climate and policy experts from fields such as energy, industry, transport, buildings and agriculture to a 48-hour Climate Policy Future Workshop—i.e. to a concentrated, methodical working meeting in a confidential atmosphere. The focal task of the event was: how will Germany become climate-neutral by 2035?

The results of the Climate Policy Future Workshop

Although the expert group did not always agree, we were able to agree on important common cornerstones that now form the basis of this 1.5-degree climate plan:

- The Federal Government's existing plans are by far not ambitious enough to ensure a fair German contribution towards limiting the climate catastrophe of a global temperature increase of 1.5 °C.

- By 2035, Germany will be able to reduce its greenhouse gas emissions by around 80% through a series of core regulatory and tax policy measures, i.e. through normal instruments of political action. Twenty years ago, when the facts about climate change were certainly already known, these measures would have been much easier to implement. Today, the implementation of these measures in technical, financial and political terms will be a major feat, yet it is still achievable. The necessary measures are presented on the following pages in a compact, clear layout.

- The remaining gap of around 20% must be closed within Germany through a wide variety of multiple small mitigation measures that go beyond the scope of this publication: changes in investment and consumer behaviour, as well as natural CO_2 sequestration (e.g. through reforestation), which can remove the remaining necessary volume of CO_2 from the atmosphere, will bring us to our 100% goal.

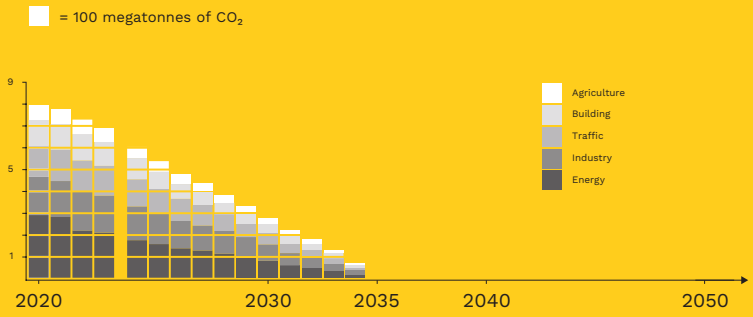
- In addition to its own climate neutrality target, and in order to comply with the emissions budget, Germany must actively support climate protection measures in other countries—beyond their existing international obligations and measures planned hitherto.

- Technically, a great deal is possible, already invented and ready for use. Climate protection also makes economic sense, as the consequential costs of an unchecked climate crisis are many times higher than the costs of making adaptations today. However, up to now producers of greenhouse gases have been protected and subsidised, while society has to pay for the financial and humanitarian costs resulting from the climate crisis. Climate-damaging profit and business models must be phased out, and fair climate protection rules must be introduced for everyone. Planning processes for climate-critical infrastructures must be sped up and simplified.

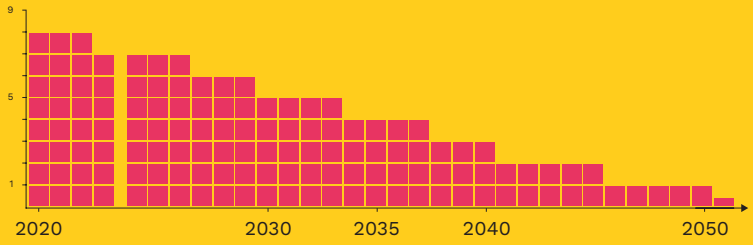
- Politicians have the central task of setting the framework for action, defining the necessary change in the economy and in our behaviour as individuals: we can and must all act and consume differently. With the introduction of CO_2 prices, which make climate-friendly behaviour cheaper and climate-damaging behaviour more expensive, this will be even easier.

Together, we can and must succeed in making Germany climate-neutral by 2035, and thus trigger a positive chain reaction at an international level!

The Climate Action Plan: our path to meeting the 1.5-degree target



Greenhouse gas emissions (CO_2 equivalents) according to the planning of GermanZero



Greenhouse gas emissions (CO_2 equivalents) according to Federal Government planning

Germany's remaining CO_2 budget for the 1.5-degree target
(2.4 gigatonnes of CO_2 from the beginning of 2020; CO_2 represents 90% of total greenhouse gas emissions)

The action taken by the German Federal Government is far too indecisive and is leading to disaster. Even if it fulfils its own targets, which it hasn't done in the past, the earth will warm by 2.5 to 3 °C. Germany must therefore significantly increase its efforts in order to be able to stop massive global heating.

Our task:

1. To ensure that Germany reduces its greenhouse gas emissions to zero by 2035 at the latest.

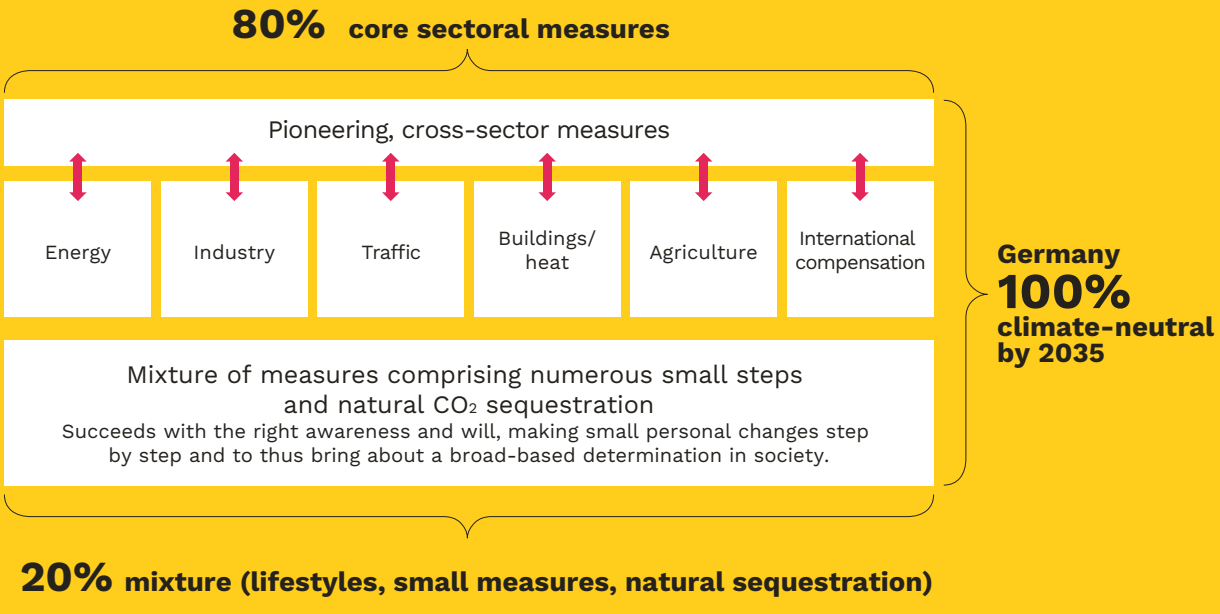
2. In addition, Germany must make a strong contribution with money, expertise and humanpower towards reducing CO_2 emissions in other countries—beyond their CO_2-saving commitments and measures up to now, and also in addition to the climate financing promised in Paris. Germany should help to save as much CO_2 abroad as we will have consumed beyond our own CO_2 budget. In this way, we are helping to create much-needed buffers to avoid global climate tipping points.

Anything else—given our many years of inaction—runs counter to the dramatic climate situation and our attitude towards intergenerational fairness.

GermanZero is therefore calling for climate neutrality in Germany by 2035 at the latest and for every ton of CO_2 emitted to be compensated abroad from 2023, when the German CO_2 budget will have been used up—as a contribution to justice for people in other countries and for future generations.

How can we achieve this target?

The GermanZero catalogue of measures



Concrete core measures reduce CO_2 emissions in the individual sectors. These are accompanied and facilitated by means of pioneering, cross-sector trigger measures. We achieve the remaining 20% of necessary CO_2 reduction through an additional mixture of small measures, additional lifestyle changes towards more sustainable lifestyles and natural CO_2 sequestration, such as forests.

We see the impending climate catastrophe as a crisis which, like the financial crisis from 2008, must be dealt with in crisis mode i.e. using every conceivable means necessary. To combat the climate crisis, we're presenting this Climate Action Plan—as a last chance to fulfil the 1.5-degree target. The measures we need to take relate to several areas. These aren't either-or measures, but simultaneous measures that must be combined adroitly and appropriately with one another. Measures that are improvable can either be improved or replaced by other, more effective measures. These measures should be introduced as quickly as possible—ideally before the next German parliamentary election, but no later than 2023. Measures that can be implemented right away are marked with TO-DO AT ONCE in the document.

On the following pages, we present the necessary measures according to this structure. We're providing the first comprehensive framework for combating the climate crisis in Germany in line with the dramatic situation, in order to achieve the 1.5-degree target globally. However, the work on this framework is far from finished. All measures must be continually further specified, reviewed and—economically and ecologically—quantified. The optimum framework for an open, transparent, scientific and social debate needs to be defined as quickly as possible: as taxpayers, we call on the Federal Government to start this process immediately and without delay, and to complete it by the end of 2020, before the start of the upcoming German parliamentary election campaign.

Greenhouse gas emissions in Germany in 2017, by selected sectors[20]

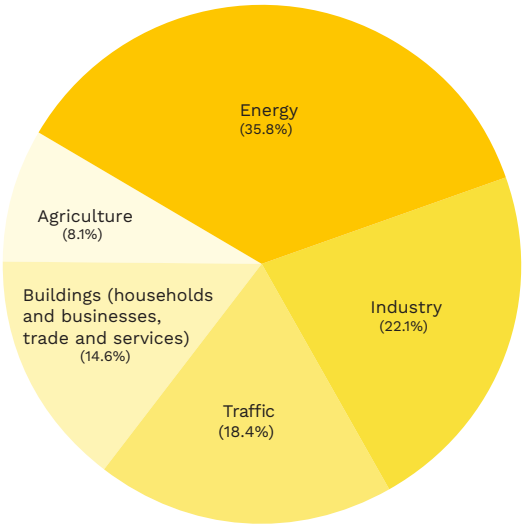
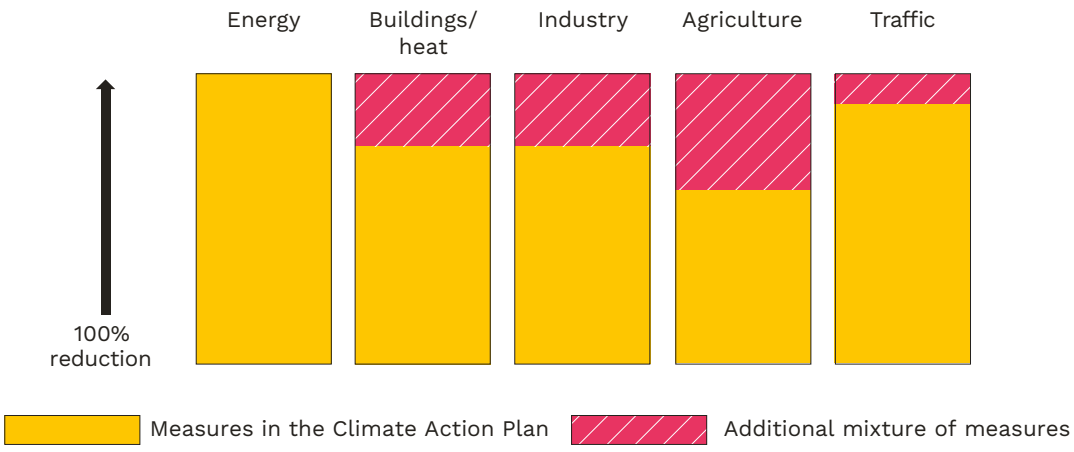


Diagram of the estimated reduction potentials up to 2035, by sector



Pioneering, overarching measures:

How we must change the rules of the game to facilitate the implementation of all core measures

The scale and speed with which we will have to rebuild our industrial society over the next 15 years is not practicable under the current general administrative and economic conditions. For example, the expansion of renewable energies is being brought to a standstill by bureaucratic hurdles, and the restructuring of the energy infrastructure is being slowed down by unwieldy administrative structures and cumbersome planning laws. Amid competing interests, climate protection is all too often subject to short-term economic considerations that do not take into account the consequential costs of the climate crisis.

The following packages of measures create a good framework in which climate protection becomes more economically attractive and at the same time easier to implement for everyone involved.

Sets of measures

1

TO-DO AT ONCE

More effective, steadily increasing minimum CO_2 prices in all sectors

Climate-friendly consumption and investment will be reduced in price, and climate-damaging consumption will become more expensive. The climate damage that individuals cause is no longer to be paid by the community, but by the polluter. The costs per ton of CO_2 amount to between EUR 180 and over EUR 600 according to the Federal Environment Agency.[21]

Social hardship must be avoided—for example, by paying back the money collected, or a large proportion of it, to citizens.

Explanation
→ The starting price must be at least EUR 50 per ton by 2020.[22]

→ The price should increase by at least EUR 10 per ton per year. For differentiation purposes, higher price steps and other measures must also be taken in the respective sectors for motor and heating fuels.

Wrongly conceived, climate-damaging effects in the current tax and levy system must be eliminated. Possible overlaps with other measures must be taken into account in drafting the CO_2 tax act.

Revenues can be used to reduce other taxes (such as value-added tax or electricity tax) or to cushion social hardship, and even per capita climate investment premiums are conceivable. In addition, ensuing climate damage and accelerated climate protection measures must be financed. Individual investment agreements can be concluded with the few energy-intensive industries in strong international competition that enable climate protection and competitiveness at the same time.

2

TO-DO AT ONCE

Dismantling and reorganising climate-damaging subsidies

Environmentally harmful subsidies worth at least EUR 57 billion p.a. will be dismantled[23] to give consumers and companies stronger incentives to work towards the 1.5-degree target. Subsidies can be broken down by sector as follows:

- Transport (EUR 28.6 billion)
- Agriculture, forestry and fisheries (EUR 5.8 billion)
- Construction and housing (EUR 2.3 billion)
- Energy supply and use (EUR 20.3 billion)

→

TO-DO AT ONCE The cutting back of these subsidies will begin by 2023 at the latest and will reduce the corresponding benefits for climate-damaging action to zero within three years. The additional revenues are to be used for financing climate protection measures (public transport expansion, building renovation).

There are numerous examples:[24]
→ Abolition of the energy tax exemption for kerosene (EUR 7.083 billion) and the VAT exemption for international flights (EUR 4.763 billion).

→ Abolition of the free allocation of CO_2 emission allowances in the European ETS (EUR 3.124 billion).

→ Reduction of peak compensation for the ecotax for the manufacturing industry (EUR 2.182 billion).

→ Termination of the commuter allowance (EUR 5.1 billion) and replacement with a mobility allowance.

→ Abolition of energy tax concessions for diesel fuel (EUR 7.353 billion).

→ Reduction of environmentally harmful VAT concessions in agriculture, forestry and fisheries (at least EUR 5.2 billion).

3

Legally enshrine climate protection priority and reservation

Climate protection must be taken into account—as a priority or at least on an equal footing with other factors—in policy, administrative and technical decisions and must be enshrined in law accordingly. Firstly, climate impacts must be explicitly identified at all political levels (federal, individual state, municipal and EU). Secondly, a compensation obligation must be established in Germany, and then, thirdly, the right of veto.

Examples:
TO-DO AT ONCE → Expressly embedding climate protection in constitutional law—to come into effect in 2023.

→ Rigorously adapt down public procurement for climate neutrality.

→ A cross-departmental right of veto and right of proposal for the Minister of the Environment.

→ Adjustment of the German Stability and Growth Law (StWG).

→ Climate protection target agreements in individual and collective labour agreements in politics, administration and public enterprises, with appropriate penalties in the event of failure to meet the target.

TO-DO AT ONCE → Embedding climate protection as a corporate objective in company law, at least equal to profit maximisation—to come into effect in 2023.

TO-DO AT ONCE → Introduce climate reporting obligations for companies—to come into effect in 2023; tightening of the Statistics Act.

→ Introduction of climate tariffs: No more world trade agreements without effective climate tariffs on climate-damaging raw materials and on other goods that can also be produced locally in a climate-friendly manner; change existing trade agreements accordingly. Arbitration courts must be excluded.

Energy

Harnessing sun and wind to become fossil free

The most important measures to limit climate heating are energy saving, energy efficiency and the rapid, far-reaching conversion of all sectors to 100% renewable energy: transport, heating, electricity—in future, all the energy we use must come from renewable sources. Germany was long seen as exemplary in the development of renewable energy, but still produces 79% of its total energy with oil, gas or coal. [25]The good news is that the costs of renewable energy and efficient technologies are getting lower and lower. In many cases, they are already cheaper than the use of fossil fuels and conventional technology. Wind power and photovoltaics must be further expanded as quickly as possible. At the same time, we need to rapidly phase out the use of coal and, later on, oil and natural gas too.

CO_2-neutral electricity is the key to the climate transition

Electricity from renewable energies will be required in significantly larger quantities in the future to provide climate-neutral energy for heat supply (including heat pumps) and the transport sector (including electromobility), and for producing hydrogen as an energy store and raw material for chemical processes. The expansion of renewable energies has to cover that additional demand as well.

In order for this to succeed by 2035, we need to save a lot of energy in industry, households and transport and use energy far more wisely—for example, whenever there are surpluses: in addition to wind power and photovoltaic systems, energy storage and electricity grids must be expanded. Theoretically, Germany can largely cover its own energy needs with renewable energies produced in Germany. In addition, we can import energy as we do today. On the one hand, this can come in the form of electricity from storage power plants in Scandinavia and from solar fields in southern Europe—while on the other, energy sources like hydrogen and synthetic energy sources such as e-fuels can be imported. Partnerships with potential supplier countries must be established and the necessary infrastructures created.

The following table provides an overview of the required energy quantities, energy imports and the necessary installed capacity of wind power and photovoltaics from current energy scenarios.[26] How many wind turbines and photovoltaic systems need to be installed depends on the extent to which energy is saved and the quantity of climate-neutral fuels imported.

Final energy demand	1000–1800 TWh
Electricity generation from wind power and photovoltaics in Germany	700–1200 TWh
Imported, renewable fuels (including raw materials for organic chemistry)	400–800 TWh
Required installed capacity from wind power & photovoltaics	300–700 GW

The studies show: in order to meet the energy demand, we need 3 to 7 times the installed capacity of wind power and photovoltaics that we have today. If the entire energy demand is to be covered by renewable energy by 2035, we need to build 13 to 40 GW of additional wind power and photovoltaic systems annually. This is a great challenge, but technically possible. For comparison, so far, the maximum rates of building additional systems within one year have been 8 GW for photovoltaics (2009–2012)[27], 5 GW for wind power on land and 2 GW for wind power at sea (both in 2015). [28]

1

Introduction of a minimum CO_2 price in electricity generation and coal phase-out by 2030 at the latest

Explanation

TO-DO AT ONCE → Starting price: EUR 50 minimum price per ton of CO_2

This change will quickly result in the replacement of coal-fired power plants with existing natural gas power plants without costing the state anything and without major investment measures. This would immediately result in enormous CO_2 savings. No other policy measure can achieve nearly as many savings in the short term.

2

Rapidly expand renewable energies

Germany can only become climate-neutral if enough renewable energy is available. This is also crucial for the other sectors.

Explanation

TO-DO AT ONCE → Abolish laws that prevent the rapid expansion of renewables. As decided in the climate package, the "PV cap", which makes it difficult to expand photovoltaics, must be abolished. The same applies to excessive, restrictive minimum distance regulations for wind turbines. These ensure that almost no new plants can be built in Germany.

→ Introduce an obligation to tolerate for new constructions and existing buildings in order to make all suitable roof and facade areas available for solar power systems.

→ Eco-friendly, socially acceptable expansion of photovoltaics, e.g. at motorway edges, on parking lots, next to federal and municipal roads, on dredging lakes, in combination with agricultural use,[29] etc.

→ Expansion of wind power at sea (under strict conservation regulations, especially during construction).

→ Accelerate planning and approval processes as well as court proceedings (increased personnel, prioritisation of these proceedings before others).

→ Accelerate planning and approval processes as well as court proceedings (increased personnel, prioritisation of these proceedings before others).

→ The protection zones required by the civil or military aviation authorities and the German Weather Service (DWD) which run counter to the approval of wind turbines should be reduced to the absolute minimum necessary.

→ Enabling self-supply with energy and decentralised feed-in to the grid through simplified application procedures and tax benefits.

→ Building the Internet of renewable energy[30] (smart grid).

3

Increase storage capacity

To compensate for the fluctuating feed-in from wind and solar power, short-term storage solutions (especially batteries and reservoirs) and storage solutions for summer-winter equalisation must be created (especially gas storage for synthetically produced gas in summer).

Explanation

→ Improve conditions for decentralised battery storage, e.g. home storage batteries, storage batteries in the area of charging infrastructure and modularised mobile storage batteries.

→

→ Introduce technical and regulatory measures to ensure that electric cars will be used to stabilise the power supply from 2025 onwards ("vehicle-to-grid").

→ Make gas storage tanks and networks hydrogen-tight.

→ Maintain and build flexible back-up gas power plants (up to an additional approx. 30 GW) and combined heat and power plants.

→ Create infrastructure for storing power peaks (through steel storage units, electrolysers, power-to-heat, battery storage etc.).

→ Consistent sector coupling[31] helps to reduce the need for storage capacity.

4

Speed up the expansion and upgrading of network infrastructure

The electricity grids (transmission and distribution grids) must be adapted to the expansion of renewable energies, and the expansion of the grid must be sped up.

Explanation

→ Accelerate planning and approval processes as well as court proceedings (increase personnel) by 2023 at the latest, without reducing nature conservation rights.

→ Financial participation in networks for residents in order to increase acceptance.

→ Bundling with other infrastructure (e.g. motorways, railway lines).

→ High-voltage direct current lines (HVDC) for transporting large amounts of electricity over long distances with few losses. Ideally Europe-wide, or at least to the reservoirs in Norway.

5

Ensure climate-neutral energy imports

In countries with high wind and solar intensity, energy can be provided in a more resource-efficient and cost-effective way than in Germany. Domestic renewable energies can to some extent be supplemented by imports of climate-neutral electricity, hydrogen and synthetic fuels.

Explanation

→ Build up infrastructure for transport and storage of hydrogen in Germany by 2030 at the latest.

→ Enter into contracts and partnerships with suitable producers (e.g. Southern Europe, North Africa, Russia, Middle East) that benefit both sides.

6

Electricity market design: reforming duties and levies

Today's electricity market design is tailored to conventional power plants. The electricity market, as well as the system of energy taxes, duties and levies, should be designed so as to favour renewable energies over fossil fuels.

Explanation

→ Ensure that renewable energy plants (plants with high investment costs and low short-term marginal costs) can refinance on the electricity market.

→ Establish flexible electricity prices (including flexible taxes) so that consumers have an incentive to consume electricity when a lot is available. A system must be set up that constantly informs consumers about prices, and it must be possible to automatically transfer available electricity into useful energy storage, for example by charging batteries of electric cars or filling hot water storage tanks.

Industry

Achieving climate neutrality through innovation and efficiency

The industrial sector—i.e. the totality of large production plants outside the energy sector—is at 22% the second largest source of emissions in Germany.[32] That figure still doesn't include the purchase of electricity and heat from public grids, emissions from the use or disposal of products derived from oil and natural gas, or the transport of goods.

About two thirds of these emissions come from industrial energy consumption—that is, from self-generated electricity and heat. These emissions can be almost completely avoided through electrification and by switching to renewable fuels such as green hydrogen. This requires the rapid construction of very large renewable energy capacities (see on chapter on "Energy", p. 21).

The remaining third of emissions consists of what are called "process emissions". In steel and cement production, for example, chemical reactions produce significant amounts of CO_2. While the production processes for some of these industries can be modified, for others, changes to the production are not possible. In such cases, all that can be done is to try to consume less material, to recycle or replace the product with more sustainable alternatives. Through CO_2 recycling (CCU - Carbon Capture and Usage), the remaining unavoidable emissions can be used to meet the carbon requirements of the chemical industry and to avoid further emissions there. At the same time, it is possible to dispense with fossil fuels to the same extent. The necessary fundamental industrial transformation must be massively, yet purposefully supported by large financial subsidies, so that the necessary investments can be safely carried out. The use of CO_2 capture and storage (CCS) is not part of this package of measures.

Sets of measures

1

Convert industrial power plants to renewable energies

In future, pure electricity production can be done climate-neutrally, using the sun and wind. Electricity will then be primarily sourced from the public grid or from people's own solar or wind power plants. If heat is needed simultaneously, combination power plants can be operated with biogas, e-methane or hydrogen.

Explanation

→ Ensuring sufficient capacity of renewable energy in the public grid.

→ No new approval of power plants that need approval according to the Federal Immission Control Act and that do not provide proof of additionally producing 100% climate-neutral energy.

→ The imposition of an appropriate CO_2 tax on fossil fuels used in industry-owned power stations and plants.

2

Switch process energy to renewable energy and hydrogen

The climate-neutral generation of the necessary process energy can be directly or indirectly accomplished by electrification—e.g. through power-to-heat or through green, i.e. climate-neutral, hydrogen.

Explanation

→ Ensure sufficient renewable energy capacities in the public grid.

TO-DO AT ONCE → Quickly ensure sufficient renewable fuel capacities (e.g. green hydrogen or e-methane), e.g. by promoting the industrialisation of electrolysis plants, guarantees for hydrogen production plants abroad (e.g. in Southern Europe).

→

3

Reduce process-related emissions, replace carbon as a reactant

About one third of the emissions are so-called process emissions. Greenhouse gases are generated by chemical reactions during production. While some of these production processes can be partly changed, others cannot. Here, the material quantities must be reduced or the products replaced by others.

Explanation

STEEL AND IRON
Today, the iron and steel industries are responsible for producing the most emissions. In the future, the energy for steel production must be green electricity (see chapter on "Energy", p. 21). This will bring the energy-related emissions down to 0. For process-related emissions to reach 0—instead of coal, green hydrogen will be used for steel production in the future. There are already functioning model plants (e.g. in Hamburg, Salzgitter and Sweden[33]), but all other plants have to be rebuilt. To do this, the steel industry needs targeted subsidies. The second alternative for coal-fired steelworks is the production of electrical steel using scrap and sponge iron.

TO-DO AT ONCE → The funding and expansion of model projects, with subsidies accounting for the cost difference compared to conventional production processes.

TO-DO AT ONCE → Certification of "green steel": The establishment of a reliable, fabrication-proof, e.g. state, system will lead to acceptance of higher prices, e.g., in CO_2-neutral passenger car production.

TO-DO AT ONCE → Initiatives for the rapid further development of processes through start-up financing among pioneer innovators.

OTHER METALS
The greatest challenges in avoiding CO_2 emissions lie in the mineral industry. Particularly in the quantitatively important area of cement production, hitherto unavoidable, large quantities of CO_2 are generated in the process.

TO-DO AT ONCE → Develop certifications, such as "green aluminium".

TO-DO AT ONCE → Approval incentives: simplify and speed up approval for new plants that rely 100% on renewable energy.

CEMENT AND OTHER MINERALS
The greatest challenges in avoiding CO_2 emissions lie in the mineral industry. Particularly in the quantitatively important area of cement production, hitherto unavoidable, large quantities of CO_2 are generated in the process.

TO-DO AT ONCE → Here, it is urgently necessary to push the research and development of alternative binding agents.

→ Funding of pilot productions.

TO-DO AT ONCE → Reduction of the amount of concrete used, e.g. through lightweight construction strategies or by replacing concrete with wood or steel.

TO-DO AT ONCE → Abolition of legal regulations which have up to now made the construction of underground garages compulsory in some urban locations.

TO-DO AT ONCE → Adapt building regulations to make it easier to use wood and alternative constructions and standardise them nationwide.

ORGANIC CHEMISTRY
Today, organic chemistry requires not only energy, but also a considerable amount of raw materials derived from oil and natural gas. To replace these, methane and hydrogen with an energy content of 280 TWh would have to be used each year. Additionally, we would have to import these in a form produced with renewable energies, which corresponds to a total electricity demand of approx. 420 TWh per year.[34]

→ Recording and planning with the energy quantities required when substituting oil and gas.

4

Close material cycles; reduce material and energy consumption

Increased resource efficiency and a consistent circular economy, enables saving of about 50% of today's demand for primary materials—and thus the energy needed for their production.

Substantial CO_2 pricing helps to make “discarded energy” more expensive. Creates incentives for the economical use of materials, intensive and long use of them and subsequent recycling.

Explanation

TO-DO AT ONCE → CO_2 tax also on the CO_2 that is released during the use of fossil-based raw materials.

TO-DO AT ONCE → Prohibition of single-use bottles.

TO-DO AT ONCE → Dramatically extend the mandatory deposit return system.

→ Export ban on residues and waste.

TO-DO AT ONCE → No public procurement without compliance with legally binding climate standards.

→ 10-year guarantees for electronic household appliances.

→ Reduce VAT on repairs.

→ Legal regulations for improved repairability of products through obligatory, cost-effective spare part delivery or authorisation to replicate spare parts.

→ Reduce material diversity to facilitate recycling, e.g. limit to a manageable number of recyclable plastics by 2025 at the latest.

→ By means of CO_2 recovery (CCU measures), unavoidable emissions (e.g. in cement) can be used to meet the carbon requirements of the chemical industry and to avoid further emissions there.

→ Expand the recycling of building materials.

5

Use waste heat more effectively

Large amounts of industrial waste heat escape unused—particularly from the steel industry and the industrial power plants operated with fossil fuels. This waste heat can partially be used in industry itself. However, it can also be used for heating apartments and other buildings in the vicinity of industrial sites.

Explanation

→ Expansion of heat and ice storage units which absorb waste heat in summer.

→ Commitment to a more intensive use of industrial waste heat.

→ Extensive infrastructure adaptations, such as expansion of local and district heating systems.

6

Replacing climate-damaging refrigerants and solvents with climate-neutral ones

Even after the ban on fluorocarbons, which damage the ozone layer, a number of fluorocarbons are still being used, particularly as coolants, despite their strong greenhouse gas effect.

Explanation

→ Legal obligation to use existing alternatives based on climate-neutral raw materials.

Transport

How we'll achieve climate-neutral mobility

Little has changed in the transport sector since 1990 in terms of emissions—most recently emissions even increased again. All savings through improved technology were cancelled out by more passenger traffic and larger cars. The volume of transported goods also rose sharply. As a result, the proportion of emissions produced by the transport sector increased to 18.4% of the total German greenhouse gas emissions.[35] The continued growth in the area of parcel delivery and logistics additionally exacerbates the situation. The volume of car and freight traffic and the number of existing vehicles must be reduced as much as possible. Solutions also lie in the comprehensive electrification of road traffic, a shift from cars to public transport and bicycles, as well as the transformation of city centres to accommodate this change.

Electric vehicles are 5 times more efficient than conventional vehicles powered by synthetic fuel (e-fuels). Hydrogen-powered vehicles stand in between, with a factor of 2.5. Therefore, by 2030, large numbers, and by 2035, 100% of passenger and commercial vehicles must be electrified. E-fuels and hydrogen, which can only be produced with a lot of green energy, should be used exclusively in air traffic and maritime shipping from then on. These are modes of transport where electrification is currently not efficient.

Sets of measures

1

Massive expansion of public transport

The transition to climate-neutral mobility will only succeed if a genuine alternative to car traffic is available. This requires a completely different quality of transport services to that available today.

Explanation

→ Frequent services at half-hourly intervals to every village, as is already custom in Switzerland and Austria.

→ Considerably more close-knit line networks.

→ More frequent services in metropolitan areas, e.g. electric sprinter bus lines, also 1st class or business class standards.

TO-DO AT ONCE → Improved speed and reliability due to complete priority to public transport.

→ Supplementary on-demand transport in very sparsely populated areas and at times of low demand.

→ In addition, pricing in public transport should be designed in such a way that—after taking into account the increase in price of car transport (see below)—public transport is generally more cost-effective than using a car. The same principle should also apply to long-distance trains as opposed to flights.

→ Combined freight and passenger transport can help to improve the range of services and the utilised capacity of infrastructure or vehicles, e.g. combined passenger and freight bus, freight trams or suburban railways.

The German Federal Government, German states, administrative districts and municipalities will have to provide significantly more financial resources for this. To generate the additional funds, earmarked financial instruments must be introduced, such as:

→ Employers' contributions
→ Development levies
→ City congestion charges
→ Car parking charges
etc.

At the same time, costs should be reduced by standardising and continually optimising vehicles, infrastructure, equipment and procedures in public transport throughout Germany.

→

2

Massive expansion of long-distance rail and coach transport

In long-distance passenger transport, the current range of comfortable, fast connections only partly meets the requirements of users. Capacity and reliability are also often inadequate.

Explanation

TO-DO AT ONCE → Expansion of long-distance coach services and long-distance coach stations or the available transfer connections.

→ Massive expansion of German and European long-distance rail transport.

→ Much earlier implementation of the so-called “Deutschland-Takt” timetable based on the Swiss model increasing frequency and decreasing waiting times at interchanges.

→ Expand the European Train Control System, (ETCS), at an accelerated rate to increase the capacity and speed of cross-border traffic.

→ Night trains to all European centres.

TO-DO AT ONCE → Standardised European ticket system.

→ Improvement of the quality of services.

TO-DO AT ONCE → Phase out disadvantages of rail transport, e.g. excessive, mandatory (EU) rail tolls and excessive taxation of traction current.

→ Almost complete expansion of overhead lines: Only around 60% of the German rail network is electrified, i.e. equipped with an overhead line. For climate-neutral, efficient railway operation, this proportion must be increased as quickly as possible. Where overhead lines cannot be implemented, insular solutions with battery or hydrogen trains with their own infrastructure must be given priority over diesel-powered trains.

3

Expansion of travel by bicycle and on foot

Half of all car trips take place over distances of less than 5 km—ideal cycling distances. To inspire change, we must offer attractive cycle paths that are so safe that we would allow any child to ride alone on them. All these measures can be fully implemented within ten years.

Explanation

TO-DO AT ONCE → Protected cycle paths that are at least 2.5 m wide on all main roads.

TO-DO AT ONCE → Speed limit of 20 km/h on all side roads and interruption of transit traffic through residential areas.

→ Safe conversion of junctions according to Dutch design.

→ Expansion of 2.5 million Bike&Ride parking spaces at all railway stations and local public transport stops and to an equal extent in urban and residential areas, some with weatherproofing, charging facilities or battery replacement stations for pedelecs, e-cargo bikes and other light vehicles.

→ Construction of cycle lanes parallel to all main roads into major cities.

→ Approx. 40% of all urban transport can be carried out using e-cargo bikes.[36] Developing the infrastructure for e-cargo bikes in commercial traffic and city logistics will also prevent the dangerous parking and stopping of vans on cycle paths.

→ Tighten the entire catalogue of. fines in order to improve compliance with the rules and thus foster a sense of safety.

→ Make turning assistants mandatory for trucks.

4

Speed limit outside towns and on German federal motorways

Germany is the only state in Europe where it is possible to drive on 70 percent of motorways[37] without any speed limit. With increasing speed, air resistance and thus fuel consumption increase exponentially. Thus, a speed limit would immediately reduce the CO_2 emissions of vehicles powered by fossil fuels, while at the same time the range of electric vehicles would increase. Internationally, the speed limit is approx. 120 km/h, so vehicle manufacturers who want to sell their vehicles in Germany are forced to offer vehicles that are correspondingly more stable and more highly motorised. Assistance systems are much safer and more cost-effective at a limited speed.

Explanation

TO-DO AT ONCE → Speed limit of 120 km/h on motorways.

TO-DO AT ONCE → Speed limit of 80 km/h outside towns.

5

Introduction of a nationwide car and city toll and elimination of parking spaces in cities

In addition to funding public transport (see above), it is necessary to make car use markedly more expensive and also to significantly reduce the number of parking spaces/car parks in cities.

Explanation

→ Introduction of a dynamic, distance-based car toll for all federal arterial roads (motorways and federal highways), mneathe price may vary, for example, depending on the traffic situation, the region or the time of day and week.

→ A driving-performance and time-dependent city toll in all cities over 100,000 inhabitants. When setting toll prices, incentives to use small, energy-efficient vehicles should be created and the quality of public transport on the specific route should be taken into account.

→ Removal of parking spaces/car parks in public spaces and provision of charging points, with parking facilities primarily being used for demonstrably resource-saving sharing offers.

→ The upgrade of vacant areas for cycling, public transport (e.g. bus lanes) and additional green areas (tree planting to cool cities in hot summers).

6

General cessation of the sale of fossil fuels from 2030

A clearly defined time frame for ceasing the sale of fossil fuels provides planning security and enables the necessary changeover of traffic to climate-neutral modes of transport.

Explanation

Due to the extremely high final energy demand in the transport sector, it is essential to rely on engines, vehicles and energy carriers that are as efficient as possible. This is the only way to avoid a dramatic increase in the electricity demand required for converting transport to CO_2-free energy. Internal combustion engines convert between 25% and 40% of the energy used into motion, while electric vehicles convert about 90%. Renewable energies can be used to produce hydrogen or synthetic fuels, also known as “e-fuels”. The production of such climate-neutral fuels is thus technically possible, but extremely costly. Biobased fuels are not a useful option, due to their extremely high space requirements. The energy demand of fuel cell vehicles is 2.5 times higher than that of battery-electric vehicles, while conventional vehicles powered by synthetic fuels require as much as five times more energy per kilometre.

→ From 2030 onwards, only electricity, hydrogen and e-fuels will be sold at German gas stations, ports and airports. Due to fiethe immense energy consumption, the production →

of e-fuels is expected to be about four times as expensive as fossil fuels and thus creates a massive incentive to almost completely electrify transport.

→ During the transition period up to 2030, the production capacities for e-fuels must be built up.

→ The stock of vehicles required in the future. must be electrified as quickly as possible.

→ Suitable vehicles can be converted to a purely electric drive.

7

Electrification of car traffic

Explanation
We need a comprehensive expansion of the charging infrastructure for electric mobility. A start has been made with the current funding measures, but ultimately a comprehensive infrastructure in the form of high-power charging parks with a connection to the medium-voltage grid must be provided at every rest area, service area and service station in the future.

TO-DO AT ONCE → All parking spaces at supermarkets, at employer companies and in cities (multi-storey car parks, Park&Ride) must be equipped with charging points.

→ An electric vehicle quota must be provided for new vehicle registrations. In 2025, At least 5 million purely electric cars will be needed, and by 2030 all vehicles must be largely electrified.

→ Facilitate the conversion of vehicles to an electric drive.

→ All charging points that are not designed for fast charging, e.g. on motorways, must be equipped as controllable charging stations to enable charging management in local networks and a grid-friendly use of the connected electric cars as mobile storage for equalising peak loads.

→ Plug-in hybrid vehicles contribute only very little to reducing CO_2 emissions: their subsidisation must therefore be stopped.

8

Electrification of trucks and buses

Explanation
The German motorway network (and subsequently also important federal highways) will be electrified. Road freight traffic will be completely converted to an electric drive. This can be realised through quick-charging stations at rest areas or electrifying the right-hand motorway lanes.

This strategy will be pursued because motorways will have enough space due to the reduced passenger car traffic and the overburdened rail network will have to be expanded for passenger transport primarily.

→ Implement measures such as a Germany-wide, or better still EU-wide, network of truck charging points by 2030 at the latest.

→ The licensing requirements for commercial vehicles must be adapted in such a way that the additional weight of the required battery, combined with the optimisation of the aerodynamics of trucks and trailers, will have no adverse effects on charging capacity.

9

The promotion of small, efficient vehicles

In order for the complete changeover to renewable energies in the transport, heating and industrial sectors to succeed simultaneously, rapid progress must be made in energy efficiency: smaller, lighter, less power consumption.

Explanation
In a new study,[38] the International Energy Agency (IEA) concludes that the boom in SUVs is destroying all progress in reducing emissions in car traffic. According to the study, SUVs contribute more to the increase in global CO_2 emissions than, for example, aviation or truck traffic. →

For energy consumption and climate balance in traffic, the size, weight and aerodynamics of vehicles are of crucial importance. Small e-vehicles require far fewer resources for their production and use.

TO-DO AT ONCE → Climate-friendly taxation: The new purchase (registration tax) and use (vehicle tax) of cars must be taxed according to CO_2 emissions, power consumption and weight.

TO-DO AT ONCE → Change car energy labelling, which currently favours heavy vehicles, and is thus counterproductive and, according to the ECJ, violates EU law: the classification of car size according to vehicle weight must instead be done according to number of occupants.

→ Create conditions for light, alternative mobility: pedelecs, e-cargo bikes, S-pedelecs, e-scooters and light single and two-track electric motor vehicles L1e to L7e can replace cars or vans in many cases. For rapid expansion and growing acceptance, funding programmes for research and development, suitable infrastructure, storage facilities and charging stations are needed.

→ Funding of resource-saving pilot projects in the field of city logistics.

→ Funding of open source technology and investment in regional public sharing systems, e.g. for e-cargo bikes.

10

Air transport

Air transport, too, must finally be adequately taxed and become climate friendly.

Explanation

→ Ensure that the train offers a price advantage: no flight may be cheaper than the spontaneous train journey without a discount.

TO-DO AT ONCE → Abolition of subsidies for air travel (lack of energy taxes, VAT, subsidisation of airports and air traffic control).

→ Significant increase in air traffic tax.

→ Expansion of certificate trading to cover all flights that take off or land in the EU, including intercontinental flights.

→ All greenhouse gas effects caused by flying must be compensated for. Not only the direct CO_2 emissions must thereby be taken into account, but also the two to fourfold amount of non-CO_2-caused greenhouse effects, such as cloud formation, soot emissions and ozone build-up and depletion.

→ Air transport must be converted to renewable energies like green hydrogen or synthetic kerosene (e-fuels) by 2030 at the latest.

→ All ground vehicles at airports (including on the apron) must be electrified.

11

Shipping

The entire shipping industry must be converted to climate-neutral energy sources.

Explanation

In maritime shipping, cargo and cruise ships are primarily fuelled with heavy oil; this is considered the dirtiest fuel. During combustion, sulphur particles are emitted, which are harmful to health and contribute to greenhouse gas emissions. In addition, soot is produced, which is deposited on glaciers and ice surfaces and intensifies the ice melt, as it absorbs more heat in sunlight.

→ Numerous examples show that it's already possible to change inland navigation over to e-propulsion systems today.[39] Appropriate incentives must be developed; the transition must take place by 2035.

→ The limit values for shipping must be tightened immediately, and CO_2 levies introduced.

→ The changeover to climate-neutral fuels must be completed by 2030.

Buildings and heat

Living without CO_2 emissions

Greenhouse gas emissions from the use of heating in buildings (14.6% of Germany's greenhouse gas emissions[40]) contribute significantly to our carbon footprint. The two central tasks in this area are, on the one hand, to renovate buildings to be high-quality energy-efficient and, on the other hand, to convert heating sources to highly efficient, climate-neutral supply technologies (especially heat pumps, solar thermal energy, waste heat utilisation, climate-neutral district heating and CHP—i.e. combined heat and power—units running on e-fuels).

Energy-efficient building renovation and highly efficient heating sources

The largest proportion of greenhouse gas emissions comes from buildings, of which only about 14% have so far been adequately renovated to become energy efficient. Overall, the building sector still consumes on average between 650 and 750 TWh for room heating and hot water (depending on the weather). Only 20 TWh are covered by renewable energy sources. If the objective of making all buildings climate-neutral is to be achieved, that energy requirement must be reduced by at least 70%, to between 195 and 225 TWh. Efficiency thus plays a key role in the building sector's energy transition. With high-quality thermal insulation, the heating energy consumption of our 22–23 million buildings can be reduced by up to 80%. This fulfils the prerequisite for the use of heat pumps, which can be run on electricity from renewable sources and can also be operated efficiently due to low heat requirements. In certain buildings heating energy consumption must, for urgent reasons such as the preservation of historical buildings, remain higher; in these cases, the necessary heat supply can be generated from renewable energies supplemented with energy input from the electricity grid: solutions such as local and district heating from CHP units, gas steam turbines and CCGT power plants, centralised thermal-solar generation in buildings, etc.

The rate of building renovation must be constantly increased—from the current 0.8% to at least 5% in 2027. Each time a renovation is carried out, the aim should be to insulate and modernise the building at a level compatible with climate protection targets—i.e. with maximum renovation efficiency. In order to increase the renovation rate and renovation efficiency as described, approx. 500,000 new jobs must be created in the construction trade within the next 5 years, taking into account possible productivity increases. This can only be achieved if attractive conditions and planning security are created for all parties involved.[41]

Create financial incentives and fair compensation

Many millions of individual agents are responsible for the greenhouse gas emissions caused by heating systems in buildings: owners of single-family houses and apartment buildings, housing associations, housing corporations, real estate funds and the public sector, as well as tenants. To date, most of these parties face the same challenge: highly efficient thermal insulation and the changeover to renewable energies are uneconomical in the short term without targeted support. As a result, energy consumption for buildings has remained at the same high level over the last ten years; the rate of renovation is too low, and current renovations often fail to reduce the energy requirement sufficiently.

This is largely due to the fact that fossil heating fuels are too cheap, as the environmental damage caused by their use is not sufficiently reflected in the price. At the same time, the existing funding programmes are confusing and have budgets that are far too low. The current policy of only subsidising measures that are not already prescribed by law needs to be changed. Care must be taken to only subsidise things that are compatible with the climate protection targets, as there are currently no adequate requirements set for the reduction of greenhouse gas emissions either for existing buildings or new buildings. The majority of renovations carried out in recent years have been carried out with insufficient savings targets. As a result, these buildings will also need to be renovated again in the long term.

1

Massively increase federal funding pool for energy-efficient building renovation

Explanation

TO-DO AT ONCE

→ Rapid increase in funding (until 2023) and degressive scheme (e.g. decreasing from 2025). Owners who renovate at an early stage are thus rewarded with higher subsidies; in addition, tax incentives are created.

→ Amendment of the federal budget regulations: the current policy is that only what is not required by law can be granted funding. This policy must be repealed. At the same time, only schemes which are compatible with the climate protection targets should be funded.

→ Transition to funding economic coverage shortfalls (the gap between additional costs and energy cost savings)—predominantly through real subsidies instead of low-interest loans

2

Simplify funding measures and bundle them together in package solutions

For many types of building (e.g. "New Homeland" houses from the 60s or industrial housing of the 1960s and 1970s in the GDR), a practice of serial, energy-efficient building renovations on an industrial scale must be established. The state must simplify the organisational framework for this as much as possible and offer solutions to make the process financially feasible.

Explanation

→ Simplification of the procedure for applications to the KfW development bank.

→ Serial renovations: Building types and sets of measures must be linked together in the form of standard programmes, in order to enable serial renovations (e.g. "New Homeland" houses from the 60s).

3

Reregulate funding and the distribution of incentives and burdens

Explanation

→ Enshrine in law, immediately and comprehensively, a model in the field of energy-efficient building renovation with a fair distribution of costs: ⅓ state, ⅓ owner, ⅓ user.[42]

→ Introduction of legally regulated cost-neutrality for rental contracts that include heating/softening cases of hardship.

- If energy-efficient modernisation causes unreasonable hardship for tenants, they will have the resulting increase in their rent (including heating) covered by public funds.

- Cases of social and economic hardship (construction year categories and building types excluded from serial solutions, such as historic buildings, etc.) of owners and tenants will receive additional funding.

→ Adjust the level of the modernisation allocation.

- Subsidies no longer have to be deducted from the investment sum to be allocated, but instead benefit the landlords directly.

→ Funding for the decarbonisation of district heating networks will be linked to energy efficiency measures on the buildings supplied with heat.

The changes can only be introduced as a package. Only in this way will they achieve the desired effect—i.e. to achieve the climate pro-

tection targets and to balance out the costs between the parties.

→ The climate compatibility of buildings must be included in building valuation methods. Only then will the owner have a guaranteed increase in value through energy-efficient renovation measures.

4

Effective, steadily increasing CO_2 pricing in the heating sector

Explanation
This has an immediate reductive effect, as 10–20% of the heating energy consumption in buildings can be saved without having to extensively invest in a new technology, particularly through optimised heating settings and adaptations in user behaviour (e.g. smart heating, see chapter on “Your Climate Action Plan”, p. 53).

→ In order to achieve an immediate reductive effect, the starting price must be at least EUR 50 per ton of CO_2. The price must gradually rise to at least EUR 150 per ton by 2030. As the heating sector is not very price-sensitive, further accompanying charges may have to be established only for heating fuels.

→ Portions of the revenue from a CO_2 surcharge can be used to fund energy-efficient renovations or improved organisational measures (operational optimisation with user involvement, without investment).

5

Climate protection roadmap, energy certificate, consultation, subsidy management, and regulatory law

If the entire building sector is to achieve climate neutrality by 2035, this must apply to every building.

This requires a regulatory authority (similar to the Tax Office for the enforcement of tax law) to be put in place which can advise, organise funding and supervise implementation.
From 2023, a climate protection roadmap must be submitted with each permit application for renovation and new construction, which also constitutes the basis for the funding.

Explanation
→ Further development of the system of energy certificates, in accordance with the climate protection targets.

→ Establishment of an appropriate authority, with regional administration and sufficient staff, or expansion of an existing authority structure, as quickly as possible.

→ Annual monitoring of renovation rates, objectives, processes, development of framework conditions, etc.

6

Plus-Energy Houses in new building projects

Most new buildings are still not designed to meet the Plus-Energy standard—although there have long been examples of buildings, even multi-storey structures in city centres, that generate more energy than they themselves consume.

Explanation
→ Building permits will only be issued if the Plus-Energy standard is met.

→

7

Reduction of living space demand

Over the last 28 years, the demand for living space in Germany has increased from less than 35 to over 46 square metres per person.[43] This increase is the central cause not only of the lack of living space, but also of area and energy consumption.

Explanation

→ Introduction of appropriate incentives, such as a "flat-sharing community bonus" or preferential funding of area-efficient renovation and construction.

→ Offer more opportunities for apartment exchange, e.g. following the Berlin model[44] and simplifying the process, e.g. by introducing a right to apartment exchange. Older people can thus exchange their often too large apartments with young families who are looking for more living space.

→ Conversion of large apartments into several smaller units as well as a better use of living space potential e.g. through loft conversions.

8

Training offensive for renovation workers and recognition of foreign professional and educational qualifications

Explanation

→ In order to enable craftsmen, architects and building managers to carry out high-quality renovations, the Federal Government must launch a state-funded training offensive.

→ Introduction of a label, for example, that of the energy auditors of the German Federal Office of Economic and Export Control (BAFA).

→ It is necessary to define new professional qualifications, such as those of a building energy technician.

→ Compulsory further training of "energy consultants" to qualify as "energy and climate protection consultants".

→ Rapid professional integration of experienced immigrants: currently, the educational qualifications of many people who have recently immigrated (e.g. from Syria) are often not recognised, even though some have already worked in planning or construction for years. Regulations must be introduced into federal policy stipulating that these people can be integrated into the labour market earlier (if necessary, with a small additional training module).

9

Promote alternative construction and insulation materials, and massively reduce the use of concrete

Up to now, the climate protection potential of renewable building materials such as wood has barely been utilised. The use of concrete as a building material is hardly questioned.

On the one hand, with appropriate planning wood can replace more climate-damaging building materials (concrete in particular) in many areas—even in buildings with many storeys. This significantly reduces the use of concrete. On the other hand, wood stores CO_2 during its growth phase; when wood is incorporated in a building, that CO_2 is thus kept out of the atmosphere throughout the life of the building.

Our use of concrete should be critically called into question and heavily reduced to only the amount that is absolutely necessary from a structural point of view.

→

Explanation

→ Mandatory greenhouse gas figures for building materials for all new buildings, with specification of maximum values.

→ CO_2-pricing for concrete and other mineral-based building materials—in accordance with their climate-damaging effect.

→ Promote sustainable planning and construction.

→ The building regulations of the German states must be adapted and standardised immediately.

→ Selective prohibition of concrete in areas where the building's physical requirements do not explicitly necessitate the use of concrete.

→ Municipal requirements (e.g. require a 60% proportion of biogenic building materials in development plans or when allocating urban plots of land).

→ Prohibition of underground garages (link with the transport sector, dismantling of parking spaces,
see chapter on "Transport", p. 30).

→ Massive promotion of timber construction, for example through:

- Further training for planners (particularly in fire protection, sound insulation).
- Restructuring the use of timber from German forestry with a focus on sustainable material use.
- Retraining craftspeople (e.g. retrain bricklayers and concrete builders to be carpenters).
- Modifying award procedures to support efficient timber construction (e.g. earlier award already during or after design, in order to involve the timber builder in the planning at an early stage).

10

Climate neutrality for public buildings by 2030; energy efficiency management immediately

Public buildings play a leading role—while at the same time, their energy costs directly burden the taxpayer.

Numerous buildings, such as administrative buildings, schools, universities and kindergartens, belong to the public sector. The German Association of Towns and Cities (Deutscher Städtetag) estimates that through municipal energy management and the implementation of the resulting low-investment measures, 15 to 30% of the energy and thus also the energy costs in municipal buildings can be saved immediately. This compares with an expenditure on personnel and financial resources for energy- saving measures of only 4% of the annual energy costs.[45]

Explanation

TO-DO AT ONCE → Obligation for all municipalities to introduce municipal energy management, with a support package for the implementation process.

→ Obligation for municipalities, the German states and the Federal Government to upgrade their own existing buildings to climate neutrality by 2030 (to be an exemplary role model)—here, the municipalities are also dependent on the above-mentioned funding programmes for financing.

Agriculture, land use and food

Sustainably restructuring the use of rural areas

The way we use our land has a big impact on our climate footprint. Addressing this issue, we look at both emissions from agriculture (8.1% of total emissions[46]) and emissions and carbon sequestration of other forms of land use (LULUCF). The nitrous oxide and methane emissions from agriculture arise from biological processes and cannot be completely avoided. If all other sectors in Germany become greenhouse gas free, agriculture will be the main producer of greenhouse gases. However, we can simultaneously work to build up the carbon stocks in soils, forests and wood products via improved land use, thereby enabling “negative emissions” (LULUCF).

Sets of measures

1

Reduce emissions from livestock farming by rigorously phasing out factory farming through regulatory and tax law.

Without reducing and improving livestock farming practices, the climate protection targets cannot be met. Emissions from livestock should be reduced by 25% by 2025 and halved by 2035. A series of measures are needed to push forward the transformation of livestock farming.

Explanation

→ Reduction of Germany’s livestock population by linking livestock farming quotas to areas of land in future.

TO-DO AT ONCE → Stricter planning laws for stable construction.

→ Reduction of upper limits for nitrogen output quantities.

→ Methane emissions from livestock farming will have a financial cost via a methane tax.

→ Grazing and animal welfare premiums (indicators: intact curled tails and beaks, for example) will support the conversion of animal husbandry to systems with a lower livestock population.

→ Soy imports will be heavily reduced and replaced by native-grown animal feed.

2

Make plant-based nutrition more attractive as an alternative to meat and milk consumption—create incentives to cut consumption in half

Dietary habits can’t be changed overnight. This series of measures will promote a climate-friendly, more plant-based diet as well as the prevention of food waste.

Explanation

→ Simplify labelling rules: Designations for foods (e.g. sausage, cutlets, cheese, yoghurt) must be legally permitted for plant-based alternative products as long as there is no risk of confusion for consumers.

→ Compulsory labelling for climate-damaging products (animal products from intensive livestock farming which have been produced using imported feed).

TO-DO AT ONCE → Predominantly vegetarian canteens: The canteens of public institutions such as schools, public offices or hospitals should, on most days, offer climate-friendly, appealing vegetarian or vegan meals only—at first a few, then mainly and finally exclusively.

→ Bringing an end to export-oriented trade by ending agricultural export subsidies.

→

3

Reduce excess nitrogen in fertilisers

The main problem is the poor utilisation of the applied nitrogen fertilisers, which are not completely absorbed by the plants. This leads to an average surplus of 90 to 100 kg of nitrogen per hectare.[47] The aim is to introduce a series of measures to reduce these surpluses by 50% and nitrous oxide emissions by over 20%.

Explanation

→ Pricing of nitrogen (fertiliser and additionally purchased feed) with the aim of increasing nitrogen efficiency in agriculture from currently about 50%[48] of the nitrogen used to 85% in 2025.

→ Regulations on fertilisers should be more effective, simpler and more clearly communicated. The farm gate balance ("material flow balance") should be based on legally binding restrictions, combined with more rigorous targets.

→ Digitisation to support planning and documentation is expedited.

4

Airtight handling of slurry and manure

Methane and nitrous oxide are produced during the storage of slurry and manure. If the manure is fermented in biogas plants (anaerobically), these emissions can be largely contained. In addition, gas, heat and controllable electricity are supplied from renewable sources and without competition for land.

Explanation

→ Provide funding for sealed slurry storage and slurry-based biogas plants, as well as for ground-level technologies to make this possible.

→ Regarding funding, low-emission manure storage must become the new standard, after a transitional period.

→ Conversion of existing biogas plants to use slurry, manure and crop residues to complete agricultural nitrogen cycles.

5

Regeneration, protection and conservation of peatlands (moors)

By restoring natural water conditions, emissions from peat soils can be significantly reduced (LULUCF).

Explanation

→ Create incentives: Users and owners of peatlands should be given incentives to carry out climate protection projects and raise water levels.

→ Can be used in areas of wet moorland for producing renewable raw materials (e.g. reeds and bulrushes for insulation materials), or for new photovoltaic systems.

→ Compensation payments for converted areas of land (for areas of land in Germany).

→ Phase out the use of peat for horticulture and the hobby sector.

6

Increase humus content in agricultural soils

Increasing organic carbon in agricultural soils is one way to achieve "negative emissions". Equally important is humus conservation to prevent increased CO_2 emissions.

Explanation

→ Expansion of the cultivation of clover grass and alfalfa as a domestic source of protein for animal feed by reorganising agricultural →

aid, combined with the research and development of new processing methods of obtaining feed, including for pigs and poultry.

→ Expansion of hedgerows and other trees/shrubs in fields, as well as agroforestry (trees grown amid crops or pastureland).

→ Development of pyrolysis processes for carbon sequestration and soil improvement.

7

Strategic reorientation of the funding and long-term development of agriculture

We need to develop a strategic mission statement for the transformation of agriculture by 2035: how can we succeed in reconciling goals such as climate protection and climate adaptation with other goals - animal welfare, environmental and nature protection, food quality, quality of jobs, landscape and regionality, etc.—in light of the economic pressure on agriculture?

Explanation
Small-scale agriculture beyond intensive farming must not only be possible but should also be made increasingly attractive again. Without creating a socio-economic perspective for such farming, the agricultural transition will face considerable resistance.

Some issues requiring clarification are:

→ Redistribution of agricultural aid in favour of environmentally compatible, natural, animal-friendly farming.
→ Greatly improved transparency for consumers and taxpayers.
→ Transparency of material flows in agriculture as a whole.
→ The future of bioenergy.
→ Flexibilisation of land use.
→ Income in rural areas, multifunctionality
→ Rural farming as a model, with livestock farming tied to area size.
→ Preservation of small farms.

8

Safeguarding and increasing carbon sequestration in forests and wood products

Explanation
→ Carbon sequestration in forests must as far as possible be safeguarded through a trend towards diverse mixed forests.

→ Durable forms of utilisation must take priority when using wood.

→ Expand the use of wood as a building material, also in order to replace emission-intensive building materials such as steel, concrete, etc. (see chapter on “Buildings and heat”, p. 38).

TO-DO AT ONCE → Faster forest fire control through increasing fire service capacities: rising temperatures and drought steadily increase the risk of forest fires. Fire services’ capabilities must be adapted. We must purchase suitable aircraft or retrofit existing ones as quickly as possible, as well as ensuring that our firefighting forces are much better prepared, e.g. in the German Armed Forces.

International compensation

Getting the ball rolling: if we lead, others will follow

If we succeed not only in making Germany climate-positive, but also in being a shining example for Europe and, ultimately, the rest of the world, we can trigger the avalanche of change that's needed to meet the 1.5-degree limit worldwide.

We therefore want to plan our advances in Germany so as to give the country as much leverage as possible in the international debate and to enable it to give decisive momentum to technological and emission-related developments elsewhere.

Fivefold leverage—the effect of the GermanZero Climate Action Plan at the international level

1. Signal effect of the initiative: we are confident that the first steps of a successful campaign, and of an appropriate German legislative programme, will already trigger a global debate in all developed and emerging countries. The specific roadmap for greenhouse gas neutrality in Germany by 2035, supplemented by strong international climate financing, will set a new standard—and have an impact far beyond Germany.

2. Impetus at the European level: if we raise our own climate targets, this will be a huge impetus for the European climate debate and for a fair implementation of the climate targets within the framework of a European Green Deal.

3. Intensification of transformational partnerships: within the framework of international climate financing, the important thing is to achieve a turning point in emissions production as quickly as possible through international transformational partnerships with those countries where the emissions are currently increasing fastest. The next step is to get on course for greenhouse gas neutrality by 2040 together with these countries.

4. Import partnerships: The transformation in Germany and around the world will require hydrogen, e-fuels and gas from renewable sources. We need to build cooperative relationships with countries in which the necessary infrastructure can be most effectively developed. These could, for example, be different countries in Africa or Chile, while Russia, Saudi Arabia or the Arab Emirates could also be involved in the conversion of the oil-based infrastructure to a hydrogen-based infrastructure.

5. Land restoration: In addition, an international strategy must be devised to make depleted soils usable again by creating forests or practising agroforestry.

   India could be a very important partner country for Germany and the EU. To date, the country produces only about a quarter of Germany's per capita emissions. Yet emissions in India are rising fast—no other country has a higher proportion of the growth in global emissions. At the same time, there are signs that a serious transformation is beginning there: the use of renewable energies is dramatically increasing. The relevant targets for 2030 that were set in Paris are being significantly exceeded. Although there is still a considerable amount of coal production, it is much less than what was planned just a few years ago. For 2019, India is expected to see its lowest CO_2 increase of this decade. And in the cities, due to the extreme air pollution, there's growing pressure to use public transport, bicycles and electric mobility solutions. A serious partnership—with development banks, guarantees, social and technological innovation—could also provide future opportunities for a changing economy in Germany, not only regarding the technologies required for an energy transition, but also in sustainable mobility development and the restructuring of heavy industry.

What could an implementation of this idea look like?

The following basic principles are important for a credible strategy that combines national with international action:

– The aim of climate protection cannot be to put less effort into phasing out coal, oil and gas in one's own country in order to support the process abroad. The classic compensation approach, whereby we contribute less at home, so that we can support more cost-effective climate protection abroad, therefore makes little sense. The phase-out of coal, oil and fossil gas in Germany by 2035 is not called into question by the following implementation proposals.

– As the German emissions budget will probably have been used up by 2022/2023 (see Excursus "Climate Protection Targets", p. 6), the German path to climate neutrality by 2035 will be supplemented by climate offsetting in other countries in the form of compensation. This means that to compensate for all CO_2 emissions still produced after the annual budget has been used up, greenhouse gas reduction schemes in other countries will be financed. However, this process must be linked to stringent conditions: →

- We may only compensate for exceeding our CO_2 budget in the context of the five priorities for international cooperation described above. It is also unfair to finance the minimum, extremely simple climate protection measures that poorer countries themselves are already in a position to implement—the financed measures must go beyond their minimum obligations.

- Whatever greenhouse gases we don't manage to reduce in Germany must be reduced in the other countries through compensation of at least the same amount. No certificates dating from before 2020 may be used, and we must avoid any double counting: if we offset the reduction achieved abroad against our reduction target in Germany, it must not be concurrently credited to the cooperating developing or emerging country.

- Furthermore, in the Paris Agreement, Germany committed itself to co-financing climate protection and adaptation to climate change in poorer countries through international and bilateral climate financing, without laying claim to anything in return. Unlike its disappointing contributions to climate protection at home, this approach to climate protection overseas makes Germany a pioneer; this is therefore an area where financial investments and partnership development are truly worthwhile. The German funds for collaborative climate protection projects from 2020 to 2025 are to be massively increased, in accordance with the objectives described above.

- The core measures mentioned in the present climate protection plan will enable approximately 80% of the required reductions in greenhouse gases to be achieved by 2035. The remaining gap of 20% will be covered by a bundle of smaller measures and changes in people's lifestyles, as well as CO_2 storage through negative emission projects. The following stringent conditions apply to these negative emission projects:

  - The phasing out of coal, oil and fossil gas by 2035 in Germany must not be delayed by such projects.
  - Only emissions from areas for which it would either not be possible, or only possible with enormous hardship, to become greenhouse gas neutral by 2035 will be compensated through negative emission projects.

- Negative emission projects can also be financed abroad. Here, the following applies: instead of storage in Germany, at least as much greenhouse gas must be stored in the other countries through compensation as would otherwise be stored in Germany.

Based on the ideas outlined above, we've developed the following sets of measures:

1

Building and expansion of international partnerships

Germany must cooperate in international partnerships to advance the transformation of countries in the global south, particularly those playing an important role in achieving the 1.5-degree target.

Explanation

→ A massive increase—at least a doubling—of the 2020 climate financing up to 2025. The increase must come from budgetary resources.

→ A massive expansion of development collaborations through development banks and financially favourable framework conditions for export projects. In order for KfW, Hermes and the international development banks to play a supportive role, these institutions must be further developed accordingly and the sustainable finance framework adapted.

→ Expansion of specific development cooperation projects. Together with the countries or regions concerned, the transformative challenges must be analysed and solutions identified for them.

→ Support in adapting to climate change: in the face of the escalating climate crisis, the German Federal Government must fund resilience projects in keeping with the magnitude of the challenge in countries of the global south.

→ Active support in building capacity for alternative fuels: within the framework of international partnerships and foreign policy, Germany must promote the global dissemination and use of hydrogen and PtX (Power-to-X) as transformational technologies. These technologies complement the primarily decentralised energy transition. The partnerships in question would predominantly be with major fossil energy exporters and the desert regions.

2

For climate compensation: define a catalogue of requirements for compensation projects abroad

Explanation

→ Compensations may only be carried out in countries that already have a 1.5 to 1.7-degree compatible climate target. Alternatively, projects can be funded if they contribute to dismantling the obstacles to transformation identified together with the partner country.

→ Compensations must lead to transformative technologies or approaches achieving entry into the market of the partner countries of the global south.

→ Technologies or approaches may only be funded through new projects for a limited period (a few years): once competitiveness is achieved or we have assured that other obstacles have been/can be overcome, no further funding may be provided.

→ No compensations may be carried out for emission reductions abroad which the selling country can accomplish itself (no “low-cost reductions” or “low hanging fruits”).

→ The new creation or recreation of forests on degraded soils that are not competing with food security can also be funded in the form of forests or agroforestry. This is very important for the credibility of a 1.5-degree scenario, as the potency of these projects lies in the double sequestration of carbon—both in the forest and in the soil. However, due to the risk that these forests might someday be cut down or lost in fires, a safety buffer must be planned so that the areas are 1.5 times larger than the calculated compensation.

3

Define a catalogue of requirements regarding the use of compensation mechanisms for Germany

Explanation

→ No compensation can take the place of the phasing out of coal, oil and fossil gas in Germany by 2035 at the latest.

→ Compensation must not slow down the implementation of the earliest possible greenhouse gas neutrality of the other sectors within Germany.

→ Compensation is only possible for those sectors whose greenhouse gas neutrality by 2035 currently appears unrealistic**,** e.g. heavy industry, air transport, agriculture and land usage

→ As the work continues, a threshold value will be set for these sectors that indicates the percentage of greenhouse gas neutrality that must be achieved through German emission reduction by 2035.

Where do we go from here?

Our last chance: we're making a start

“Mum, your generation knew everything—why didn't you do anything?”

We are heading for critical tipping points in the global climate system. If we disregard them, it’s like a bullet that’s been fired and can no longer be put back in the gun—the polar caps and glaciers will melt, methane will be released from natural stores, and ocean currents and airstreams will play havoc with the climate as we know it, with drastic consequences. The climate system is poised to develop a dynamic that can no longer be stopped.

How can we seriously explain to our children and grandchildren that we were not prepared to save the future of humanity because that cheap flight to Mallorca, that daily portion of schnitzel and that big car were more important to us—that would be as sad as it would be ridiculous.

A world worth living in at + 1.5 °C, or: What we stand to gain

Changing cherished habits calls for courage, strength, and perseverance. But how much of our happiness really depends on these cherished habits in the first place?

Consider this: no more morning traffic jams, but instead a public transport system that takes us to work comfortably and without needing to find a parking space. In addition, safe cycle paths where everyone can cycle without fear. Fewer exhaust fumes in the air, less engine noise—and more birdsong instead. Instead of concrete surfaces packed with countless parked cars, a spacious public realm where people enjoy meeting up and where children can once again play outdoors unsupervised. And at home: goods that are designed for quality and durability rather than to break quickly, and a tasty organic Sunday roast that we enjoy once a week and actually savour, rather than bolting down watery meat from factory farms every day.

It's about taking many small, liveable steps: if everyone’s doing it, if it is part of the positive consensus, then we forget about what came before. Combined, these steps can truly improve our quality of life, although perhaps this isn’t yet obvious to everyone.

The responsibility for bringing about the major, decisive changes our climate needs clearly lies with politicians—and that's where it remains. However, in a democracy, changes are only possible if the majority demands and accepts them.

Politically speaking, 2022 will be the last chance to enact major climate policy decisions to ensure a climate-neutral Germany in 2035 and to thus comply with the UN treaties for the 1.5-degree target. If Germany, as the fourth largest economy on the planet, changes course, then the EU, international organisations and ultimately the other large industrialised countries like China, India and the USA will follow. Due to its prosperity, its freedom of the press and its public support for a science-based climate policy, Germany can and must lead the way: we’re making a start!

The efforts ahead of us are comparable to a mobilisation; the critical nature of the situation is now unmistakable worldwide. If we wait any longer, the climate catastrophe will become increasingly severe.

The good news: with the Climate Action Plan outlined in this document and with quick decisive action, we have a real chance!

2019 Kickoff

2020

- Follow-up processes to confirm and optimise the catalogue of measures to be taken.
- Launch of dozens of municipal referendums for climate protection, the “Climate Resolutions”, to make many cities climate neutral by 2030 (already in preparation: KonstanZero, EssenZero, EberswaldeZero, and others).
- Start cross-party initiatives towards the goal of climate neutrality.
- Development of fair, effective and rapid measures to combat the climate crisis.
- Composing draft laws with star lawyers.
- Nationwide political mobilisation of the general public through social media, multipliers, word-of-mouth recommendation.

2021

- Organising Cross-party majorities to achieve constitutional change and enact a 1.5-degree legislative package.
- Continue to expedite the municipal “Climate Resolutions” (dozens of towns throughout Germany that want to become climate neutral).
- Gain parties and candidates for the German parliamentary election so that they can take responsibility for our children and the world as we know it.
- Accompany the coalition negotiations and the first 100 days in office.

2022

- Introduction and adoption of the legislative packages and amendments to constitutional law in the German Federal Council & Parliament.
- Last opportunity to start the immediate measures of the Climate Action Plan in order to achieve the target.
- Development and advancement of the international XX-Zero movement in order for Global Zero to become a reality.

2023

- Roll up our sleeves, implement laws, issue decrees, support the executive powers and administration in the implementation of the 1.5-degree laws.
- Massive expansion of international collaborations for global decarbonisation.
- ...

2035

Germany is climate neutral

2040

- Global climate neutrality achieved; the 1.5-degree target has been met.

Mission completed

Let's give our children and grandchildren their chance. Support the Climate Action Plan now!

We at GermanZero ask all members of the public to do the following: Start your own personal climate action plan!

- [x] Read the 1.5-Degree Climate Action Plan.
- [ ] Send the Climate Action Plan to friends and acquaintances.
- [ ] Follow GermanZero on social networks and invite friends to do so too.
- [ ] Support GermanZero's work with donations.
- [ ] Support climate protection at the political level: talk to your Members of the Federal and Regional Parliament in your constituency and your mayor and win them over to give a firm commitment to the 1.5-degree target—and thus to this Climate Action Plan. Because so far no one's come up with a better one!
- [ ] Give climate protection policies the necessary backing! If legal measures for climate protection are adopted that initially seem inconvenient to you or force you to gradually change your current living habits, embrace the cause! Remember how important this lifestyle change is in the overall context of climate protection—and spread the word with pride among your family members, at work and in your circle of friends!
- [ ] Begin by making small changes in your behaviour, in the context of your family and your circle of friends, acquaintances and colleagues. It doesn't have to be a perfect start and it can certainly be enjoyable! You don't have to manage a hundred percent right away, just focus on making small, liveable steps. Motivate yourself by setting your own personal goals! On the following pages, we've laid out our own Individual Climate Action Plan to inspire you.

What each and every individual can do

Just as politics must speed up climate protection with taxes, financial incentives and legal regulations, we, as citizens with our own lifestyle decisions, can

- reduce our own carbon footprint with immediate effect
- more than offset our remaining emissions by financially supporting climate protection projects elsewhere (compensation) and
- also get involved in our personal environment and in politics and thus contribute to making climate-friendly action easier for everyone

Each and every one of us can thus immediately become climate positive.

If we begin by taking small, liveable steps to change our own behaviour, together we will make rapid and absolutely essential contributions to the 1.5-degree target. After a while, you may even realise that making these lifestyle changes wasn't as bad as you thought; life went on and some aspects of your day-to-day life even got better. Imagine taking up cycling and feeling stronger, fitter and healthier every single day you're out in the fresh air. Imagine cutting meat out at lunchtimes and being alert and awake in the afternoons rather than feeling the need to take a nap. Imagine the pride that comes with knowing that your own solar panels are producing your electricity - and the positive surprise in your bank account when you are paying much less for electricity.

By carrying out additional climate compensation, i.e. supporting climate protection projects elsewhere, we can not only reduce our own negative impact on the climate to a minimum, but also have a positive impact on climate protection worldwide.

This not only feels good, it also sends out a powerful signal: we're a visible example to the people around us of what a more climate-friendly life could look like today. We're also simultaneously sending out clear signals to industry through buying or not buying certain products. Last but not least, our actions confirm to our elected political representatives how important climate protection is to us.

We shouldn't forget that, in addition to our actions in our private life, we also all form the electorate of this country. We do not only have the opportunity to change our own behaviour, but also to participate in changing the conditions under which all of us act and interact. This means that we can get involved and play our part in making it easier for everyone to take more climate-friendly action. For example, we can directly address politicians—such as our Member of Parliament or our Mayor—and assure them of our support for an assertive climate policy that meets the 1.5-degree target.

It's now down to every single person to make their own decision—and perhaps at first even swimming against the current—to take responsibility for future generations with their words and actions.

Carbon calculators available online (e.g. www.uba.CO_2-rechner.de) can make it easier to create a personal climate protection plan and help to inspire a responsible, inventive, curious and adventurous approach to upgrading one's green lifestyle. Changes in one's own behaviour sometimes seem difficult, but these changes can be turned into self-improvement opportunities—why not tackle the whole thing in the form of a four-week sporting challenge? We can set ourselves the goal of making a certain change and simply trying it out for four weeks, perhaps together with work colleagues, friends or family...

We suggest the following measures to anyone who's ready to make a change. Everyone can decide for themselves how quickly and consistently they wish to implement these things—but each individual should set goals for themselves!

1

Drive less, and if you must, drive in a climate-friendly way

Explanation

TO-DO AT ONCE → Particularly short distances should be typically covered on foot or by bike; public transport is more climate-friendly than an individual car. At the same time, exercise in the fresh air promotes fitness.

→ If there's no way of avoiding travelling by car, then car-sharing communities should be formed whenever possible. A ton or more of metal shouldn't be set in motion for one single person!

→ Those who live in the big cities often no longer need their own car, but can instead fall back on car sharing, a scooter or a cargo bike if necessary.

→ If you must purchase your own car, then get a small, energy-saving electric vehicle**.**

TO-DO AT ONCE → If you drive, please do it in a fuel-efficient way; you could save up to 25% on fuel costs and make a massive difference to your carbon footprint.

2

Stay on the ground as much as possible, and go on sustainable holidays

Explanation

TO-DO AT ONCE → Instead of spending hours at the airport, and enduring the discomfort of check-in, waiting and flying, you can get almost anywhere in Germany within six hours by train.

→ Flight shame and 'rail pride' work—superb landscapes in Germany and Europe offer great holiday destinations—so stay on the ground, give long-haul flights a miss and save tons of CO_2.

→ Cruises and long-distance travel are real climate killers. They should stop being seen as an occasional treat and rather must be treated as a rare, special opportunity—and then be 100% compensated.

3

Consume meat and dairy products seldomly—but when you do, only the best quality

Explanation

TO-DO AT ONCE → How about a "Sunday roast campaign" or lunchtime vegetarianism, to support a move from meat to plant-based foods? A plant-based diet saves huge amounts of greenhouse gases in the agricultural sector, is healthier and saves money—not to mention undermining cruel factory farming practices to produce cheap schnitzel.

4

Avoid food waste

Explanation

TO-DO AT ONCE → The avoidance of food waste can reduce a significant proportion of climate gas emissions from agriculture. At the same time, avoiding waste saves you hard cash.

5

Avoid buying CO_2-intensive products

Explanation

No matter whether it's electronics, fashion, furniture or food—it's up to us whether we thoughtlessly consume and dispose of these things or consciously treat them with great care:

→ It's better to buy fewer things of excellent quality and with a long lifespan than accumulating lots of low-quality clutter.

→ Many things can be bought second-hand in great condition - and for a massive saving!

TO-DO AT ONCE → Repair rather than discard—as the old German saying goes, "Washing and sewing make an old coat shine in new splendour."

→ Seldom-used tools and household appliances can be shared or lent between neighbours.

TO-DO AT ONCE → The absolute basics: reusable instead of disposable, avoid packaging waste, save energy, give preference to regional and seasonal organic food.

6

Aim for less living space and smarter heating

Explanation

→ Smaller living areas reduce the consumption of energy and land sealing.

TO-DO AT ONCE → Lowering the heating temperature by 1 °C saves approx. 6% of heating energy, CO_2 emissions and heating costs.[49]

TO-DO AT ONCE → Good ventilation (intermittently opening windows wide instead of keeping them permanently ajar) helps to achieve a comfortable temperature with less heating energy (and at less expense).

→ Even easy, cost-effective measures (new seals in windows, blow-in insulation in old buildings) can help keep your place warm.

7

Change to a climate-friendly electricity supplier

Explanation

TO-DO AT ONCE Through their choice of electricity provider, anyone can save CO_2 very easily and cheaply and accelerate the energy transition. Thereby, make sure that the provider is actually selling 100% renewable electricity, is committed to the energy transition and is not just hiding behind some green slogans. Information on this can be found, for example, at www.ok-power.de and www.gruenerstromlabel.de.

Become climate positive!

Even the most consistent “climate conservationists” in Germany still have a carbon footprint of 5 or more tons of CO_2. In fact, in current day Germany it’s not yet possible to achieve an earth-friendly—and thus grandchild-friendly—carbon footprint of under one ton of CO_2 just through adjusting our own behaviour. This is primarily due to the CO_2 emissions produced by the still largely fossil fuel-based energy supply structure in Germany—powering, for example, the factories producing the products we consume.

Yet there’s no need to despair: firstly, this will change in the coming years with the implementation of the present Climate Action Plan, and secondly, in addition to reducing our own carbon footprint through our personal behaviour, we can already become climate positive today by compensating for the remaining emissions through climate compensation. Here’s our suggestion:

Compensate for residual CO_2 emissions—and become climate positive today

It is possible to save even more than one’s remaining personal CO_2 emissions through climate compensation elsewhere in the world. This involves donating money to an organisation that is investing in climate protection projects (e.g. renewable energy plants in India). The only thing making these projects possible is the money received via climate compensation ‘donations’. Vitally, a climate compensation scheme should conform to the “Gold Standard” quality seal. This is the standard offered by providers such as Atmosfair, Klima-Kollekte, Primaklima or myclimate, who are all rated “Very good” or “Good” by the Stiftung Warentest consumer foundation.

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GermanZero will make Germany climate neutral by 2035 at the latest: this is the goal for which we campaign every single day.

All help is welcome! We're also grateful for your active involvement in the form of donations. Many volunteers are already helping us, but our campaigns and projects cost money. Please support our work at www.germanzero.de/spenden.

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Humanity is standing at a crossroads: in one direction, global climate catastrophe—and in the other, a joint effort to save the planet.

So far, no one has put a serious plan on the table as to how to bring about the necessary turnaround. This is what we're doing now—and we'll win citizens over across party lines and across all social strata.

Together, we will make Germany climate-neutral in ten years—but no later than 2035. Together with experts, we'll draw up a catalogue of measures, draft legislation and organise the political majorities. We'll involve thousands of committed citizens. Because this is the last chance.

Together, we'll implement in Germany what the German Federal Government made a binding pledge to do under international law in 2015 at the UN climate summit in Paris: our contribution to limiting global warming to a maximum of 1.5 °C. We'll be sending a signal at the international level, indicating the way forward and initiating a worldwide movement from the grassroots, from the top and from the centre of society.

The task we face is colossal. The project represents a joint action to combat global heating and the catastrophe it threatens. We must join forces—we can do it together!

German Zero