

TEXTE

162/2022

Ukraine Crisis and Sustainability Policy

Weathering the gas crisis through climate change mitigation

**Policy recommendations on gas, hydrogen and climate
change mitigation for the Federal Government in
autumn 2022**

by:

Franziska Wehinger, Katja Purr, Eric Fee, Gregor Barth, Andreas Burger, Matthias Futterlieb,
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Abstract

The following policy recommendations for the Federal Government will secure the supply of gas for the winter of 2022 and beyond, without sacrificing climate protection goals. Key findings in the second chapter to make liquefied natural gas a transitional solution and to ensure that the supply of gas is as environmentally friendly as possible are to make more efficient use of the gas pipeline infrastructure in Europe, to make the LNG terminals compatible with hydrogen and to diversify by finding new supply countries in the most sustainable way possible. A rapid ramp-up of the use of hydrogen in the steel and chemical industries can safeguard Germany's competitiveness. The third chapter discusses how the crisis can be overcome through savings in gas and energy consumption, for example through mandatory sector reduction targets and a targeted and tailored energy saving campaign. A few simple steps can also further accelerate the development of renewable energy sources and thus simultaneously mitigate the crisis and achieve the ambitious climate protection goals. The German Environment Agency (UBA) has also identified major potential savings for industry if gas-intensive products are made more recyclable. The focus of the fourth chapter turns to supplier countries and Germany's role in the international energy crisis. Proposals are made on how fossil fuel lock-ins in industrialised and developing countries can be avoided, e.g. through climate clubs, and how global carbon neutrality can be achieved through sinks and negative emissions.

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Table of Contents

List of Abbreviations.....	7
1 Introduction.....	8
2 Secure gas supplies and expand the use of green hydrogen	9
2.1 Effective use of the gas network infrastructure	9
2.2 Liquefied gas as a stopgap solution	10
2.3 Sustainable diversification	11
2.4 Organise complementary ramp-up of hydrogen use in industry and the energy sector	11
3 Reduce gas consumption and enshrine a greenhouse gas reduction target for 2030	13
3.1 Reduce overall energy demand and ensure commitment through clear sectoral targets...	13
3.2 Increase the effectiveness of energy saving campaigns	14
3.3 Reduce energy consumption through a more ambitious circular economy	15
3.4 Replace gas consumption by accelerating the development of renewable energy sources – amendments to the Easter Package	16
3.5 Socially just financial support	17
4 Solve the crisis on a global scale	19
4.1 Avoid global fossil fuel lock-ins	19
4.2 Support the transition globally through the Climate Club and innovative energy partnerships	19
4.3 Carbon sinks and negative emissions	20
5 List of sources.....	22

List of Abbreviations

BEHG	Fuel Emissions Trading Act
CCS	Carbon Capture and Storage
CDR	Carbon Dioxide Removal
EEG	Renewable Energy Sources Act
EKBG	Substitute Powerplant Maintenance Act
FSRU	Floating Storage and Regasification Unit
KWKG	Combined Heat and Power Act
LNG	Liquefied Natural Gas
ÖPNV	Local Public Transport
PET	Polyethylene terephthalate
VerpackG	Packaging Act

1 Introduction

Overcoming dependence on Russian energy sources, finding alternative sources of energy and still meeting climate targets will be a challenging but achievable journey. In Chapter 2, UBA makes recommendations on securing supplies of gas in an environmentally friendly way and on the rapid transition to a hydrogen economy. We will discuss below how the existing gas infrastructure can be better utilised through optimised use and smart reverse flows. New supply relationships must be structured in such a way that they do not lead to new fossil fuel dependencies, but rather enable Germany to strengthen its role in global climate protection in the search for new supplier countries while supporting partner countries on the path to greenhouse gas neutrality and a green hydrogen economy. Above all, we must give priority to using our own potentials more consistently, especially in the European network. At the same time, the transition to hydrogen must always be taken into account in any future areas of application, and the ramp-up of hydrogen must therefore be organised proactively.

Despite all this, energy consumption in Germany must fall by around 20% in the short term if gas shortages are to be avoided.¹ In Chapter 3, UBA outlines ways in which overall gas consumption can be systematically reduced, the energy saving campaign could be more effective and gas consumption can continue to be replaced by renewable energy sources and renewable electricity. This requires amendments to the provisions on the expansion of renewable energy sources in the package of measures adopted last summer. As gas prices continue to skyrocket and inflation rises, purchasing power will continue to dwindle alongside business investment opportunities, and economic constraints will hit households on smaller and middle incomes. Relief must be means- and asset-tested and encourage environmentally-friendly behaviour. UBA offers advice on how this relief can be financed by abolishing subsidies that are harmful to the climate.

Instead of concentrating exclusively on national concerns such as the Emergency Gas Plan, the crisis should be used as an opportunity to strengthen Germany's commitment to global climate change mitigation. Chapter 4 illustrates how ominous the gas crisis is for global climate change mitigation in both developed and developing countries, and which paths can lead out of the trap.

¹ BNetzA (2022)

2 Secure gas supplies and expand the use of green hydrogen

Core messages

- ▶ Make use of the existing natural gas pipeline infrastructure: develop new supply relationships and intra-European capacities all along the gas network and exploiting existing transport routes, for example by reversing the direction in which gas previously flowed.
- ▶ Diversify supply relationships while also actively offering support to new producing countries in moving towards a greenhouse gas-neutral energy economy.
- ▶ Floating and fixed LNG terminals facilitate the switch to green hydrogen by limiting the operating licence for the use of fossil fuels, e.g. natural gas.
- ▶ Build large hydrogen plants in Germany and Europe ourselves and thereby avert new dependencies in the hydrogen sector at an early stage.
- ▶ Ensure readiness for hydrogen in new plants (e.g. cogeneration plants) in the various application areas, especially in the energy sector and industry, in order to organise the market ramp-up of hydrogen use.

Due to the number of countries that are dependent on Russian oil and gas, the Russian war of aggression in Ukraine will inevitably lead to an energy crisis in Europe. The reduction in gas deliveries from Russia or even early delivery stops for some European countries, embargoes imposed on Russian products and energy, and the associated price escalations require an immediate response. This must focus firmly on the short-term economic consequences and must not lose sight of existing crises, such as the rapidly changing climate, or existing imbalances such as growing poverty and social inequalities. If Russian gas supplies cease completely, various analyses forecast a shortfall of 360 to 560 TWh for the EU in the coming winter.² This equates to about 10 to 15 per cent of the gas demand. For Germany specifically, a similar range is quoted by the Federal Network Agency and other research institutes.

2.1 Effective use of the gas network infrastructure

The recent turn of events has placed a lot of emphasis on the short-term solution of purchasing liquefied natural gas and the rapid construction of LNG terminals. However, we must not forget our climate and energy policy goals, which will lead to a significant reduction in gas demand. Up to now, Germany's natural gas supply has been entirely dependent on pipelines. Germany has a very dense network of natural gas pipelines and is a transit country for many other European countries. This means that Germany is connected to existing LNG terminals in Europe, meaning that it has hitherto not been necessary to have its own terminals. Pipeline transport continues to be more efficient and therefore more environmentally friendly than the use of liquefied gases. However, little consideration has been given to establishing new supply relationships along the existing pipeline infrastructure and expanding capacities in conjunction with potential future locations for the production of green hydrogen.

To date, natural gas has been transported mainly from east to west in Europe. We became too dependent on the direction of the current. In light of the current crisis, the European gas

² Enervis (2022)

network and its potential should be considered in its entirety. Reversing the direction of the flow in parts of the pipeline network combined with making use of existing European LNG terminals offer scope for developing new supply relationships along existing infrastructures, which Europe and Germany could use to achieve greater energy independence³. The network can be used more efficiently by virtual reverse flows, allowing countries suffering from heavy dependency to be supplied by alternatives. Some networks have already been modified to flow in both directions over the last 10 years, such as the Yamal-Europe pipeline. This meant that 95% of Polish gas reserves could be supplied by reverse flows of gas from Germany. Member States and the Commission should organise a framework for this cooperation as part of the EU Energy Platform under the RePowerEU initiative.

2.2 Liquefied gas as a stopgap solution

Germany will now purchase four floating LNG terminals⁴ (FSRU) in the short term to ensure a stable gas supply, and at least two terminals will be installed on land. However, the initiatives to expand the LNG infrastructure must not be viewed as a growing element of the energy transition. Fundamentally, LNG terminals offer the potential for a more diverse and therefore resilient energy supply; this was true before the war in Ukraine, it is true now, and it will still be true in a future renewable energy economy.⁵ It can be assumed that in the event of a sustainable transformation of the energy and economic system, gas demand will decrease significantly in the future and hydrogen or ammonia⁶ will play a significant role as an alternative energy source. For example, in its study “Pathways to Resource-Efficient Greenhouse Gas Neutrality – RESCUE”, the German Environment Agency outlines how gas demand can be reduced to as low as 140 terrawatt hours by the middle of the century in order to achieve greenhouse gas neutrality. This is 15 % of the amount of gas consumed in 2021. The combination of floating and permanent LNG terminals therefore makes sense for managing crises and ensuring the long-term resilience of the supply relationship. Nevertheless, neither fossil fuel dependencies nor overcapacities in the LNG infrastructure should be created in response to the current crisis, nor should the rapid transition to hydrogen be obstructed. A minimum annual capacity of 5 billion m³/a per ship is envisaged for the four floating LNG terminals leased by the German government.⁷ The LNG terminals in Wilhelmshaven and Brunsbüttel, which will be the first to come on stream at the beginning of 2023, will have a capacity of just over 10 billion m³/a and will be able to handle around 11% of current natural gas consumption in the short term. The LNG terminal in Stade, which is currently under construction, will have a capacity of around 12 billion m³/a and be able to handle 13% of current natural gas consumption. Combined, these already represent a very large proportion of the long-term gas demand. When expanding the LNG transport structure, consideration must be given from the outset to how it can be used in a future hydrogen economy. Only technical modifications to the LNG import terminals that are currently being planned or under construction can enable operation with ammonia or liquefied hydrogen. H₂-readiness”, meaning for the switch to hydrogen or ammonia, of the LNG terminals must be incorporated in the planning phase. This means that individual components must be designed and built for use with ammonia and hydrogen in terms of materials, size etc. Some system components, such as pumps, measuring equipment or even the equipment with an ammonia splitting unit, cannot be built in from the outset, but can certainly be planned. This can be done,

³ Holz et al. 2022

⁴ Wilhelmshaven, Brunsbüttel, Stade and Lubmin - other options such as Hamburg and Rostock

⁵ Wachsmuth, J.; Oberle, S.; Zubair, A.; Köppel, W (2019)

⁶ With regard to ammonia, a detailed investigation of any further environmental impacts during production, transport and use is still required in order for an overall assessment to be made with regard to environmental friendliness.

⁷ BMWK (2022)/1

for example, by limiting the operating licence of the LNG terminals for natural gas or planning and allowing for the transition in technology in the gas network development plan. Likewise, the safety of the facilities for importing both gases and ammonia must be factored in at an early stage.

2.3 Sustainable diversification

The now obvious flaws in the fossil fuel economy must not be transferred to a greenhouse gas-neutral economy. Diversification must be given consistent consideration in the new energy and industrial policy to ensure the resilience of a greenhouse gas-neutral and secure energy supply, and new supplier countries must be won over immediately for the future.

While gas from the eastern Mediterranean was still considerably more expensive than Russian gas before the invasion of Ukraine and importing it was not cost-effective, gas from Egypt, Israel or Cyprus could be a temporary solution. In this context, it must be ensured that no production or drilling is undertaken in undeveloped gas fields, and that gas is only purchased from places where it is already being extracted. While subsidies in Israel take into account environmental standards, this would still have to be investigated for Egypt. Pipelines that already exist should be used for transportation and under no circumstances should new pipelines be built. For example, the “Balkan Stream” pipeline could transport EastMed gas from Greece to Western Europe. New supply contracts must have a very short validity period for this. Cooperation to develop renewable energies in the same partner countries must be stepped up at the same time.

Furthermore, the vision and conditions for a medium-term conversion to green hydrogen should be established in these countries. In order to avoid new dependencies (both on supplier and recipient countries) and to create economic perspectives, energy partnerships should take into account and support the partner country’s own needs for renewable infrastructure and hydrogen production. One thing that must be avoided above all is a situation in which green hydrogen produced for export to Europe competes with the need for renewable electricity in the partner country, leading to increased gas consumption.

Partnerships for the production of green hydrogen or other green PtG/PtL products should address value creation in the new production country and, at the same time, ensure diversification and security of supply in Germany and Europe with high safety standards. Climate and environmental protection and resource conservation must be strengthened locally. PtG/PtL production and export must not consume all the renewable energy in the partner country and jeopardise national energy transitions. They must also be used to decarbonise the local energy industry.

2.4 Organise complementary ramp-up of hydrogen use in industry and the energy sector

In addition to the diversification strategy, it will be important to organise the market ramp-up of the hydrogen economy. The authorisations to issue statutory instruments that were passed in mid-July on hydrogen ‘sprinter’ power plants (“plants for the generation of electricity from green hydrogen”, § 39p EEG), hydrogen hybrid power plants (“innovative concepts with hydrogen-based electricity storage”, § 39o EEG) and, above all, the facilities for system-serving green hydrogen (§ 96 Point 9 Offshore Wind Energy Act) are important steps towards the testing and market ramp-up of hydrogen technologies.

The requirement for new CHP plants and biomethane plants to be hydrogen-ready in the CHP Act ensures that the facilities can also be run on pure hydrogen in the future and that the continued support of natural gas CHP plants and biomethane plants does not result in a lock-in

to a fossil fuel energy supply. This will guarantee an overall faster transition from natural gas to hydrogen. It is now a matter of structuring the respective authorisations to issue statutory instruments in the Renewable Energy Sources Act to facilitate integration in a way that benefits the system, both in terms of a growing renewable electricity supply and effective greenhouse gas reduction, while at the same time providing effective support for the construction of these hydrogen plants.

In addition to the energy industry, it is important to accelerate the hydrogen ramp-up in industry and organise the rollout of future applications. The transformation and restructuring in the steel industry – away from blast furnaces towards gas- and hydrogen-based direct reduction processes – must proceed despite the current gas crisis. At the same time, the chemical industry must be involved in the market ramp-up with suitable parameters and subsidies and, in parallel, the energy consumption allocated to it must be reduced. The gas crisis and its associated high energy costs must not be allowed to cause delays in the transformation of industrial facilities. Nevertheless, the requirements of plant safety must be taken into account while introducing hydrogen. More extensive use of hydrogen will create more flexibility for managing a wide range of disruptions.

3 Reduce gas consumption and enshrine a greenhouse gas reduction target for 2030

Core messages

- ▶ Accelerate the reduction of overall energy consumption and establish responsibilities by setting binding sectoral energy savings targets.
- ▶ The ambitious expansion of renewable energies that has been decided upon must be implemented successfully and the necessary additions to the Easter Package of measures must facilitate a rapid roll-out.
- ▶ Rapid market ramp-up of the hydrogen economy and accelerated transition in industry and the energy sector (see 2.4).
- ▶ Make rebates socially fair, promote environmentally friendly behaviour (incentives)

Natural gas was used to generate around 15.4% of electricity in Germany in 2021, which corresponds to around 90.2 TWh. A large proportion of that is generated in cogeneration plants to provide heat and electricity.⁸ On 8 June 2022, the German government decided that in the event of a gas shortage, electricity could once again be generated using coal. The Substitute Power Plant Maintenance Act (EKBG) allows coal-fired power plants to return to the electricity market for a limited period until March 2024 without obstructing the transition towards achieving GHG neutrality.⁹

The expected short-term increase in greenhouse gas emissions from the energy sector must be offset by an accelerated reduction in gas consumption, an intensified expansion of renewable energies, and an expedited transformation of the energy sector and the areas of application in order to limit cumulative emissions (see also UBA: *Treibhausgasreduzierung um 70 Prozent bis 2030: So kann es gehen!* (Reducing greenhouse gases by 70 per cent by 2030: this is it can be done!¹⁰).

3.1 Reduce overall energy demand and ensure commitment through clear sectoral targets

Reducing overall energy consumption has always been a fundamental element of the German energy transition. While the targets for expanding the use of renewable energy sources are given serious consideration and reviewed, we continuously miss the targets for reducing primary energy consumption: under these targets, primary energy consumption is supposed to be halved by 2045 relative to 2008. This must be the guiding principle for finding a way out of the energy crisis.

However, the trend so far has not shown any significant decrease in energy consumption in the last 30 years, despite the introduction of efficiency measures. Firstly, the gains in efficiency are too small, and secondly, they are quickly cancelled out by rebound effects, such as an increase in living space per person, owning second and third televisions/screens and increases in vehicle weights. Yet we know that saving energy conserves raw materials and resources, allows the proportion of renewable energies to grow more quickly and reduces greenhouse gas emissions.

⁸ BDEW (2022)

⁹ BGBI (2022)

¹⁰ Purr et al. 2021.

This is why a price cap on gas prices, as proposed by the EU Commission, is not advisable from an environmental point of view. This is because the market distortion would counteract price incentives to save gas.

In addition to mandatory climate targets in various sectors, supplementary, coordinated mandatory energy savings targets can be important indicators, clarify the responsibilities of the sectors and ministries, and guarantee commitment. They can also provide important incentives for the fuel switch away from gas and combustion fuels. Energy saving and energy efficiency can therefore be seen as the wild cards for successful climate change mitigation and energy independence.

A few legislative measures can achieve major savings potentials in the medium term, especially in existing buildings: almost 30% of heating energy could be saved by 2030 if additional requirements for insulation and heating with renewable energy sources were met.¹¹ However, the regulations on insulation were not strengthened as part of the amendment to the Buildings Energy Act in July 2022. Minimum building standards as proposed by the EU Commission for the new EU Building Directive, renovation of building envelopes with insulation and efficient windows and heating powered by renewable energy sources should be established as soon as possible.

If we follow the path to a sustainable energy and economic system involving efficient use of electricity and effective sector coupling, and only use fuels where they are technologically unavoidable, then we can greatly reduce our energy demand. The existing mix of instruments proposed by the fuel switch (carbon price, subsidy programmes for renewable heating technologies, mandatory proportion of renewable energy sources for new heating systems, etc.) can reduce our fuel requirements, for example the gas demand of buildings, from around 350 TWh¹² today to up to 240 terawatt hours¹³ by 2030. In its cross-sector study “Pathways to Resource-Efficient Greenhouse Gas Neutrality – RESCUE”¹⁴, the German Environment Agency shows that exploiting the potential for energy savings could reduce the total gas demand to 140 terawatt hours and lower the total energy import dependency to just under 50%.

In its position paper “Reducing greenhouse gases by 70 per cent by 2030: this is how it can be done”¹⁵, UBA outlines proposals on how ambitious climate targets can be achieved quickly and across all sectors. Measures to prevent greenhouse gas emissions through improved energy efficiency and/or energy savings are given the highest priority.

3.2 Increase the effectiveness of energy saving campaigns

Energy saving campaigns have had little effect. Although almost 8% less gas was consumed in the first half of 2022 than in the previous year (adjusted for temperature),¹⁶ this can hardly be attributed to the campaigns; there is much more potential for savings, especially in the medium and long term. The federal government’s current energy-saving campaign could tap into that potential even more effectively and become more target-oriented and broadly effective through measures such as individual appeals (e.g. by post), doorstep advice, etc.¹⁷

¹¹ Repenning, J. et al. (2022)/1

¹² AGEB (2020)

¹³ Repenning, J. et al. (2022)/2

¹⁴ Purr et al. (2019)

¹⁵ Purr et al. 2021

¹⁶ AGEB (2022)

¹⁷ Fee, E.; Wehinger, F.; Schubert, J.; Hendzlik, M.; Hölting, P. (2022)

Based on the Federal Network Agency’s gas scenarios, if Nord Stream 1 is utilised at less than 20% of its capacity and provided that the LNG terminals are operational as planned from January 2023, gas shortages can only be avoided if consumption is reduced by 20% over the winter months.¹⁸ The federal government has made a number of energy-saving measures mandatory with the two energy-saving regulations contained in the Energy Conservation Act.¹⁹ There are many voluntary energy-saving measures which can be implemented in our homes, such as using less hot water or lowering the room temperature slightly throughout the house. However, some measures affecting private individuals that would have an impact in the short term could also be made mandatory or appropriate incentives could be offered, such as setting a maximum speed limit of 100 km/h on motorways or a suitable follow-up scheme for the €9 ticket to use public transport instead of private cars. All this would help us not only to get through the next winter, but also spare individuals from facing high additional costs. UBA has published very practical sufficiency measures that would be easy for the German government to implement in the recently published paper [“Coping with the Energy Crisis through Efficiency and Sufficiency | German Environment Agency”](#).

3.3 Reduce energy consumption with an ambitious circular economy

Core messages

- ▶ Make gas- and energy-intensive manufactured products and goods more recyclable and thereby reduce gas and energy use, e.g. through financial incentives.
- ▶ Promote greater substitution of energy-intensive primary plastics with high-quality recycled plastics, e.g. through environmentally responsible use of recycled materials.
- ▶ Aim to manage materials as a whole in cycles of equal or higher quality as much as possible.
- ▶ Formulate absolute reduction targets for resource flows as part of industrial policy and achieve them through market mechanisms.
- ▶ Introduce a primary building materials tax of 3 euros per tonne for gravel and sand to reduce the energy demand in the construction sector.

Many raw materials and products are currently produced using large quantities of natural gas and oil. This is especially true for the production of plastics. Plastics are conventionally produced using crude oil (as a raw material) and in some cases - if methane fractions from naphtha cracking are not used - natural gas (in what is known as “steam cracking” of crude oil). The increased use of recycled plastics (e.g. for the production of textiles, packaging or electrical and electronic devices) can significantly reduce gas and, above all, petroleum consumption in production processes. However, the investments required to develop recycling methods further and to optimise processes for the production of high-quality recycled materials, which can replace virgin materials of the same quality, require an increase in demand that can be sustained in the long term, as well as an overall improvement in the viability of the circular economy. Recycling quotas (e.g. for disposable PET drinks bottles) or incentives to improve recyclability (e.g. under Section 21 of the Packaging Act) are suitable instruments that should be expanded in a manner conducive to protecting the environment.

A circular economy can be used to substitute primary raw materials, which are energy-intensive to extract, and to reduce the associated gas consumption. The current crisis is an opportunity for

¹⁸ BNetzA (2022)

¹⁹ BMWK (2022)/2

the German government to implement the Circular Economy Action proposed by the EU Commission proactively and swiftly. Intensifying production, using secondary raw materials, slowing down material cycles and recycling are key courses of action that must now finally be stimulated by economic policy, as they in turn help to conserve the energy supplies that are currently so scarce.

The aim must be to manage materials in cycles of higher or equal quality as much as possible. Products, goods and materials should increasingly be handled with their life cycle and material flows in mind, and no longer solely from the point of view of traditional waste management recycling. Clear roadmaps for reducing resource consumption – similar to the reduction targets set out in climate policy – are needed to decouple the production of wealth from resource consumption and with it the overloading of ecosystems.

The transition to a circular economy holds enormous potential for value creation and employment. If the German government acts promptly, it will be a prime mover in European and global markets and secure Germany's position as an innovative industrial powerhouse.

3.4 Replace gas consumption by accelerating the development of renewable energy– amendments to the Easter Package

Core messages

- ▶ In the Wind Energy Area Requirements Act, the deadline for achieving the interim target of 1.4% was set at 2027. This deadline should be brought forward to 2026 as originally planned.
- ▶ The regulations imposed by the federal states (*Länder*) on the minimum distance between wind turbines and residential areas should be abolished immediately in order to enable faster expansion.
- ▶ In order to be able to cope with the rapid expansion, it is imperative to:

Increase staff capacities in planning offices in local authorities, regions and the federal states. The same applies to the specialist authorities (e.g. nature conservation authorities) and licensing authorities (e.g. administrative districts) involved in carrying out the licensing procedures. Fully digitise the procedures for submitting application documents, open submissions or objection management by the end of 2023.

- ▶ Registering with national grid operators should be made easier, albeit with a transitional period until 2025. Shortening this deadline to 2023 would give a further boost to the development of renewable energy sources.
- ▶ Enforce a usage or cadastral requirement for installing and operating photovoltaic systems for new-builds and roof renovations, going beyond the stipulations of the coalition agreement:
 - On commercial buildings
 - On public buildings
 - On all new-builds and roof renovations (even private ones)
- ▶ Relieve the financial burden on local authorities by making the 0.2 cents/KWh paid by the plant operator to the local authority mandatory instead of voluntary.

Renewables have the potential to limit cumulative greenhouse gas emissions, ensure the phase-out of coal by 2030, quickly overcome the gas crisis and shape how energy will be supplied in the future. They will help to make the fuel switch from gas to electricity possible quickly. Substituting gas with renewables quickly will require a major effort. Beneficial and appropriate legislative changes were made in July 2022 in the form of the “Easter Package” (*Osterpaket*). The expansion targets for renewable energies set out in the amendment are very ambitious and promising. In order actually to achieve the expansion targets that have been set, massive efforts will be needed that go far beyond the regulations of the Renewable Energy Sources Act. In Europe, too, the REPowerPlan is intended to supplement the “fit for 55 package”, in particular the support for photovoltaic and onshore wind energy. The new target for the proportion of renewable energy sources in the EU’s energy mix is set to rise from 40% to 45% by 2030, and is to be achieved with 1,236 GW of renewable energy.²⁰

To this end, it is imperative that the personnel capacities of all the authorities involved be increased in order to speed up the designation processes as much as possible. Furthermore, the procedures, submission of application documents, open submissions or objection management should be fully digitised by the end of 2023 in order to expedite the process. The usability of existing areas should be maximised and obstacles to planning permission should be removed. This applies, for example, to simplifying and reducing the extent of inspections, including with regard to the protection of historical monuments. The announced measures aimed at improving the handling of radio navigation systems and weather radars should also be implemented as soon as possible in order to facilitate more approvals. Last but not least, financial contributions to the expansion of renewable energy sources should be designed to ensure rapid implementation and greater acceptance.

3.5 Socially just financial support

The energy crisis is exacerbating the strain on lower income groups many times over. As a result of the market-driven increases in energy prices, but also due to the gas levy planned for October, German consumers will have to deal with a three- to fourfold increase in gas prices. The carbon price is a negligible factor in this trend.²¹

Households in lower income groups will be hit particularly hard, especially if they live in buildings with low energy efficiency. UBA therefore recommends providing targeted and short-term income support for these population groups instead of providing blanket relief for all households. The second and third relief packages contain many measures that do not target lower income groups, such as the flat-rate energy price rebate, the petrol rebate, increases in child benefit and a flat-rate support for pensioners and students. In contrast, a more targeted approach to providing financial assistance is also necessary from a fiscal point of view. During times of crisis such as these, the limited funding available in the federal budget must be focused on the households most in need. It is also vital that the subsidies do not undermine incentives to use energy efficiently, for example by subsidising energy consumption in the form of a “heating rebate” similar to the fuel rebate that has already been introduced. Adjusting the housing allowance, for example, can play an important role here.

While the coalition is discussing a windfall profits tax as a means of financing the initiative, UBA has other proposals for how to finance it, for instance by cutting subsidies that are harmful to

²⁰ Holz et al. 2022 with 1,067 GW there.

²¹ The carbon pricing mechanism established by the Fuel Emissions Trading Act (BEHG) is not a factor behind this trend. In 2021, the average price of natural gas for household customers was around 7.06 cents/kWh, according to the Association of Energy and Water Industries (BDEW), of which the carbon price accounted for around 0.46 cents. In 2022, the carbon price rose by about 0.1 cents/kWh. Assuming a 3- or 4-fold increase in gas prices, the effect of the BEHG would therefore be negligible.

the environment, such as the tax exemption for kerosene. This would reduce fossil energy consumption and primarily place the burden on households with high incomes.

In the long run, however, income support for vulnerable households will result in an ineffective allocation of limited public resources. They are an important means of alleviating social hardship in the short term, but do not address the root cause of the high financial pressures – dependence on fossil fuels and low energy efficiency. In the medium and long term, the transition must be designed in such a way that all households can make the necessary modifications and become more resilient to fossil energy price increases. Consequently, the existing funding instruments in the building sector should be refined in such a way that households with low incomes and assets can also finance measures to switch to renewable energies and improve the energy efficiency of their homes.

4 Solve the crisis on a global scale

Core messages

- ▶ Avoid global fossil fuel lock-ins – no funding for fossil fuels.
- ▶ Support the transition globally – through the Climate Club and innovative energy partnerships.
- ▶ During its G7 presidency, Germany should continue to expand the Climate Club and invest quickly and effectively in the green transition of its potential energy partners.

4.1 Avoid global fossil fuel lock-ins

While the Paris Climate Agreement stipulates a stepping up of mitigation contributions and the phasing out of fossil fuels, the energy crisis has led to a short-term increase and expansion of fossil fuels in western industrialised countries. For example, Canada doubled its investment in oil sands in the space of a few months, and the UK doubled its investment in gas exploration. In response to the enormous increase in the market price of natural gas of more than 300%, Norway has increased its gas production by 8-10%.²² Norway now supplies more than 30% of Germany's natural gas demand. The G7 countries needed to put concluded agreements into perspective against the backdrop of the energy crisis. Although most G7 members committed at COP 26 not to finance any further fossil fuel projects until the end of 2022, they decided at the G7 summit in June 2022 to invest massively in gas infrastructure and gas production using public funds.²³

However, Germany, the EU and the G7 should now once again set a good example and honour international agreements (such as the G7 declaration not to finance any more fossil energy by the end of 2022) as quickly as possible. Any additional investments in fossil fuel projects must be temporary, with clearly defined phase-out periods, and must include a specific plan for a transition to renewable energy sources. It is particularly important to prevent the production of green hydrogen for export to Europe from competing with the electricity demands in the partner country and leading to increased consumption of fossil fuels there (carbon leakage). Energy partnerships should therefore not create new fossil dependencies, but rather facilitate the transition from natural gas to green hydrogen and at the same time promote a greenhouse gas-neutral energy supply and encourage value creation in the partner country.

4.2 Support the transition globally through the Climate Club and innovative energy partnerships

The US Energy Information Administration (EIA) projects that global energy demand will increase by 50% by 2050.²⁴ Germany, the EU and the G7 have a responsibility to support partner countries in the Global South in such a way that the crisis does not force them to turn away from the global energy transition. The crisis is accelerating China's and India's expansion of fossil fuel projects through cheap fossil fuel imports from Russia and the associated infrastructure. India's oil imports from Russia have risen from roughly zero to more than 1 million barrels per day since the beginning of the year, accounting for a quarter of the country's total oil imports.²⁵ In

²² Reuters 2022

²³ European Parliament (2022)

²⁴ EIA 2021

²⁵ Babst 2022; Reymond & Rimbart 2022

February 2022, China entered into a supply agreement with Russia to increase deliveries of natural gas from 10 bcm per year to 38 bcm²⁶. Given that China and India are two of the world's three largest GHG emitters, this development represents a particular challenge for global climate change mitigation. They are also dangerous path dependencies, as some aspects of the contracts are due to last for more than 30 years.²⁷

Cooperation projects to support national energy transitions and promote shared ambitious standards for climate change mitigation, for example regarding sustainable green electricity-based energy sources, can play an important role in this respect. Climate-friendly purchasing through supply chains would be one way of accelerating the global energy transition instead of delaying it. Germany should lead the charge both domestically and in its international partnerships. Knowledge sharing, innovation and financial resources are particularly important here, as is involving the private sector on both sides of the partnerships. Innovative instruments, such as blended finance and the use of special drawing rights granted by the International Monetary Fund to finance a global transition towards enhanced climate change mitigation, could open up new room for development.

In addition to specific projects, a "Climate Club" (G7 2022) as proposed by the G7 could help to avoid fossil fuel lock-ins and accelerate effective climate change mitigation. This is especially relevant now, as emerging and developing countries are being tempted by Russia to enter into low-cost, long-term supply contracts. A Climate Club with appealing cooperation projects could ensure that some countries are less vulnerable to low-priced Russian supply offers. Partnerships could, for example, help India to expand its solar industry more quickly, which in turn would make long-term contracts for fossil fuel imports from Russia much less attractive. These countries' foreign trade should be aligned with low-emission and resilient development. Climate-friendly purchasing through supply chains initiated in this way would accelerate the global transition and the reduction of CO₂ emissions.

4.3 Carbon sinks and negative emissions

Due to a lack of experience in operating them, their risks, extremely high costs and uncertainties, technological carbon sinks have so far played no role in German climate policy. Germany relies on vegetation to absorb CO₂, in other words natural sinks.

The latest IPCC report indicates that it is now very unlikely that the 1.5°C target can be achieved entirely without subsequent carbon dioxide removal (CDR). We must spare no effort in ensuring that neither this crisis nor unrealistic appraisals of the potential for removing CO₂ from the atmosphere can lead to fossil-fuel lock-ins or weaken ambitions for reducing greenhouse gas emissions. Fossil fuel projects resulting from the crisis must not be allowed to continue beyond one or two years at the most. In spite of all this, it will probably not be possible to reduce emissions as quickly as would be necessary to meet the 1.5°C target.

Unavoidable residual emissions, meaning those that cannot be minimised further through greenhouse gas mitigation measures (such as methane from livestock), must be compensated for through negative emissions. In order to be prepared as far-sightedly and realistically as possible for the 2040s and 2050s, the German Environment Agency recommends a critical examination of the estimated potential, as well as the costs and limitations, of CDR. Analysis conducted recently by the Institute for Energy Economics and Financial Analysis (IEEFA) into specific carbon capture and storage (CCS) projects showed that this technology does not live up to

²⁶ Belkaïd 2022; Reymond & Rimbart 2022

²⁷ McCoy 2022

expectations.²⁸ A specific assessment of the ecological impacts on other environmental media, the energy, water and land requirements, the costs and safety of storage capacities as well as other uncertainties and risks will be essential in laying the groundwork for a realistic discussion about and investment in technological and natural sinks.

²⁸ IEEFA (2022)

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