



Bundesrepublik Deutschland
Finanzagentur GmbH

Federal Republic of Germany Green Bond Investor Presentation

April 2023

Agenda

1	Germany's Green Footprint	5
2	Green Bond Framework Overview	18
3	Green Federal Securities in Practice - Eligible Green Expenditures	22
4	Green Federal Securities Execution - Strategy and the Twin Bond Concept	29
5	Selected Case Studies of Eligible Green Expenditures	35
6	Appendix: Contact Persons and Further Information	59

Executive Summary

Climate Policy

- Environmental and climate protection are a top priority in Germany. The Klimaschutzgesetz (**Climate Change Act**) sets a clear goal: achieving greenhouse gas neutrality by 2045. Ambitious climate targets are set for all sectors.
- Since 1990, greenhouse gas (GHG) emissions have been reduced by 40% (2022). The 2030 objective is to reduce GHG emissions by at least 65%, the 2045 objective is **a neutral GHG emission balance**.

Green Budget Expenditure

- Green Federal securities are part of Germany's sustainability strategy. They strengthen green financial markets and increase the **transparency for selected green budget items**.
- Indicative amount of eligible green expenditures for 2022 budget: **€ 18.5 bn**, selected from five sectors: (1) transport; (2) international cooperation; (3) research, innovation and awareness raising; (4) energy and industry; (5) agriculture, forestry, natural landscapes and biodiversity.

Green Federal Securities

- Germany will continue to establish a **green yield curve in 2023** with a new 10-year Green Bund and another longer maturity. The aggregate annual issuance volume **is to be further expanded to € 15-17 bn in 2023** (after € 14.5 bn in 2022, € 12.5 bn in 2021 and € 11.5 bn in 2020).
- The innovative **twin bond concept** makes the 'greenium' transparent and has created a new benchmark in the green bond market.

Green Bonds Issuance Plan 2023

	0% Bobl/g	1.3% Bobl/g	0% Bund/g	0% Bund/g	0% Bund/g
Issuance	04.11.2020	31.08.2022	02.09.2020	08.09.2021	11.05.2021
Maturity	10.10. 2025	15.10. 2027	15.08. 2030	15.08. 2031	15.08. 2050
Outstanding	€ 6.5 bn	€ 6.5 bn	€ 9.5 bn	€ 9 bn	€ 10 bn

- Planned issuance volume of € 15-17 bn
 - thereof € 3.0 bn already issued in two auctions (January und March 2023)
 - 3 more auction dates for reopenings of existing bonds
- Multi-ISIN auctions possible
- 2 syndicates for new issues of a 10Y Green Bund and one further long maturity

1 Germany's Green Footprint

Following a Stringent Green Path – Germany's Contribution to the 1.5 Degree Celsius Target

With the United Nations' 2030 Agenda for Sustainable Development and the **Paris Climate Agreement**, the German Government is pursuing the clear goal of setting the course for a sustainable social and economic system. Climate protection is a core priority, thus, Germany was one of the first countries to submit the long-term low GHG emission development strategy to the UNFCCC as required under the Paris Agreement. Germany contributes to reaching the goals set out in the Paris Agreement through the EU Nationally Determined Contributions (NDCs).

With the **Climate Action Programme 2030**, a new level of commitment is set in German climate policy, even regulated by law: For the first time, national climate targets are given legal status with the Klimaschutzgesetz (**Climate Change Act**) which – and the climate targets anchored therein – was significantly tightened in 2021 as a result of a judgement by the highest German court. Sector targets are checked upon in an annual monitoring procedure.

Furthermore, the Climate Action Programme paved the way for the **Inaugural Green Federal securities**. With the innovative twin bond approach, Germany makes a substantial contribution to the growth of the sustainable bond market.



Intergenerational Contract for the Climate

With the amendment to the Climate Change Act in June 2021, the German Government has defined a more ambitious GHG mitigation pathway and has enshrined in law the goal of achieving GHG neutrality by 2045.

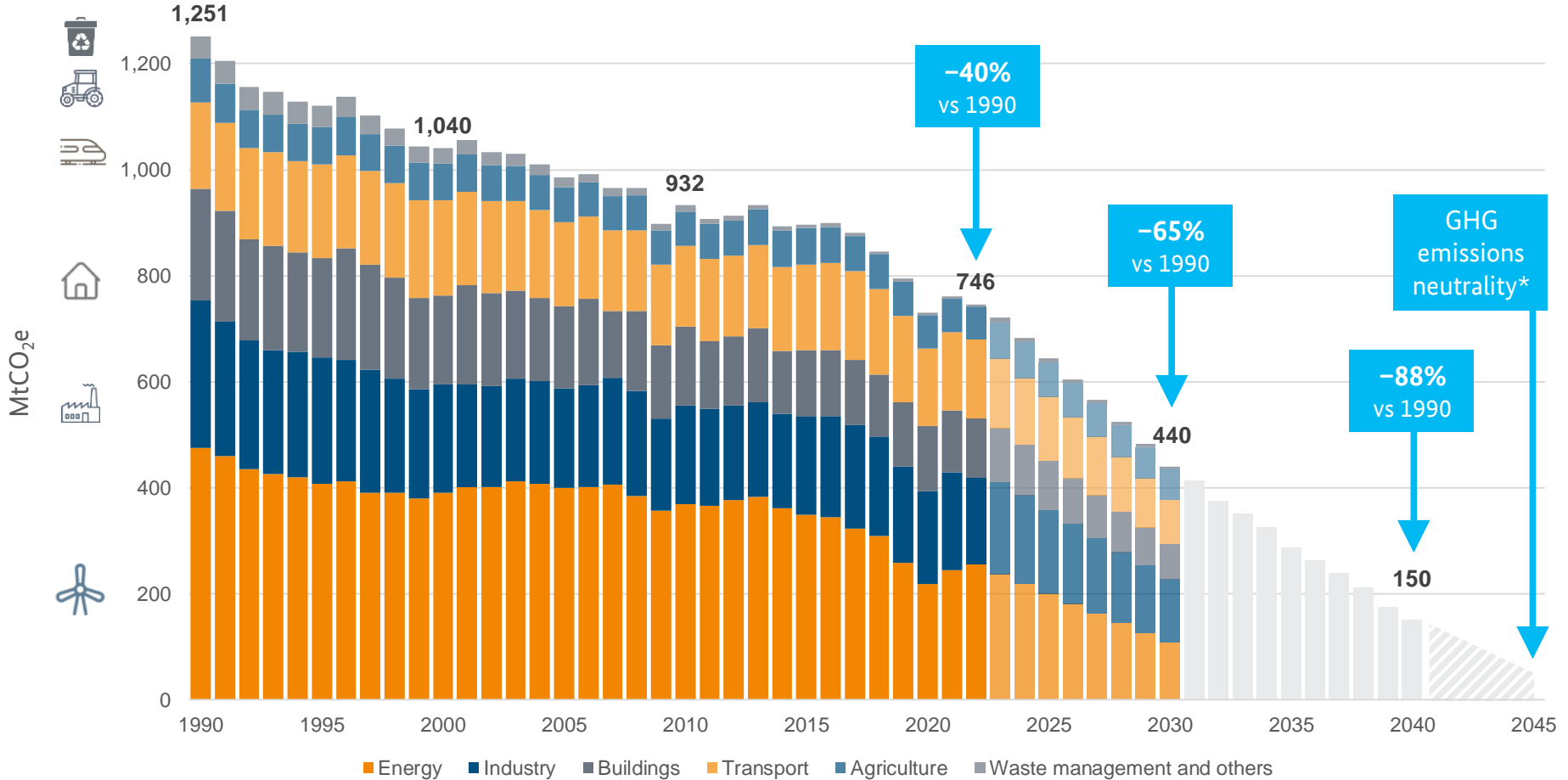
- Greenhouse gas emissions
 - By 2030: 65% less CO₂
 - By 2040: 88% less CO₂
 - 2045: Climate neutrality
- Permissible annual CO₂ emissions for individual sectors such as energy, industry, transport and buildings to be reduced.



Source: Federal Government (<https://www.bundesregierung.de/breg-de/themen/klimaschutz/climate-change-act-2021-1936846>)

Germany's Path to Decarbonisation

GHG Emissions Development in Germany per Sector (in MtCO₂e)



Sources: Federal Climate Change Act; Umweltbundesamt (15.03.2023); *net zero anthropogenic GHG emissions from all sectors covering all GHG emissions, which means emissions from carbon dioxide as well as other GHG like methane



Share of GHG emissions	34% of all GHG emissions in Germany
2022 achievement	256 MtCO ₂ e (-46% vs 1990 level)
2030 target	108 MtCO ₂ e (-77% vs 1990 level)

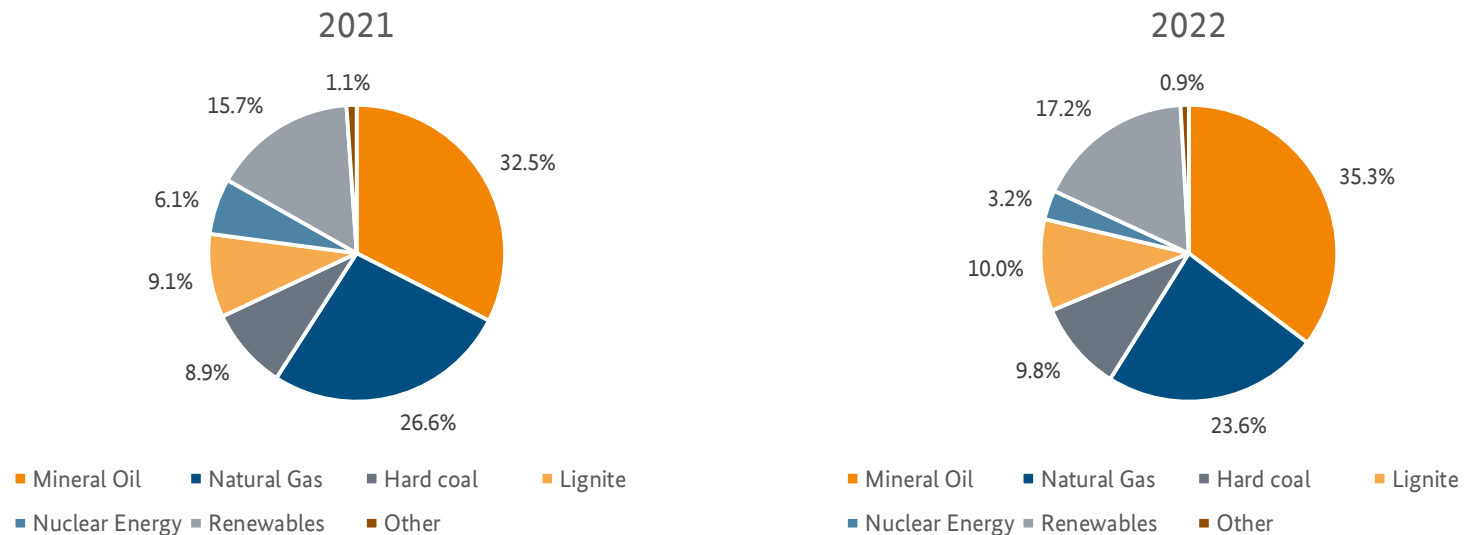
Overview

- Through ambitious targets and regulatory measures, such as the Renewable Energy Sources Act (EEG), GHG emissions in the energy sector have been halved since 1990.
- Full decarbonisation by 2045 through transformation of energy supply towards more renewable energies and energy efficiency.

Germany's path to the energy system of the future

- No more power from coal at the latest by 2038 (ideally by 2030)
- No nuclear power station in operation since 15 April 2023
- Renewables to generate 80% of Germany's power by 2030

Focus on Energy Area - Primary Energy Consumption in Germany

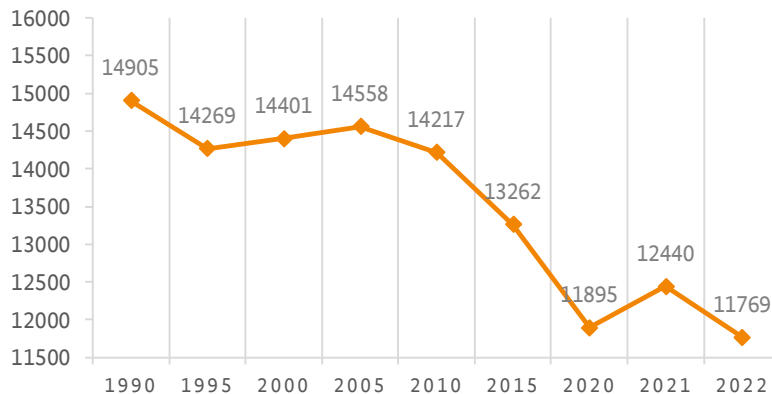


Source: Arbeitsgemeinschaft Energiebilanzen (04/2023); rounding issues may occur

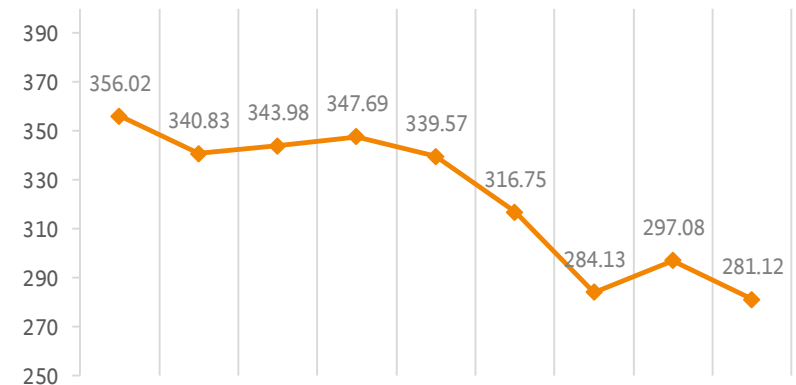


Development of Primary Energy Consumption in Germany since 1990

CONSUMPTION IN PETAJOULE (PJ)



CONSUMPTION IN OIL EQUIVALENT (OE)*



- In 2022, the consumption of primary energy recorded a reduction of 5.4 % compared to the previous year and fell to the lowest level since 1990.

Source: *Arbeitsgemeinschaft Energiebilanzen (04/2023)*; *1kg Steinkohleeinheit (SKE) = 0,7 Öleinheiten (OE) / Oil equivalent

Focus on Industry Area



Industry

Share of GHG emissions	22% of all GHG emissions in Germany
2022 achievement	164 MtCO ₂ e (-41% vs 1990 level)
2030 target	119 MtCO ₂ e (-57% vs 1990 level)

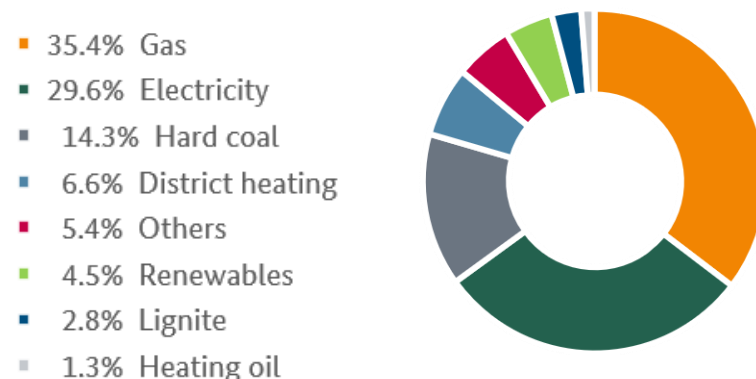
Overview

- The decarbonisation of the industrial sector is to be achieved through a comprehensive modernization strategy.
- Industry will become more climate-friendly with increased efficiency, more renewable energies and new production processes (e.g. “green” hydrogen).

Transforming the industry sector

- National decarbonisation programme, i.a. introducing Carbon Contracts for Difference
- Establishing lead markets for green products
- Incentivising energy and resource efficiency

Final energy consumption by energy source in industry (2021)



Source: *Arbeitsgemeinschaft Energiebilanzen (March 2022)*



Share of GHG emissions	15% of all GHG emissions in Germany
2022 achievement	112 MtCO ₂ e (-47% vs 1990 level)
2030 target	66 MtCO ₂ e (-69% vs 1990 level)

Overview

- The basis for making building and living more climate-friendly is a mix of funding, information and advice, CO₂ pricing and regulatory law
- Funding is focused on refurbishment and the use of renewable energy for heating, but KfW loans are also available for highly sustainable new buildings. Building codes set standards predominantly for new buildings, amendment under way to foster use of renewables in existing buildings

Sustainable green housing

- Upgrading heating systems and energy efficiency
- Tax incentives for energy upgrades
- Developing energy standards
- Supporting modular upgrades



Share of GHG emissions	20% of all GHG emissions in Germany
2022 achievement	148 MtCO ₂ e (-9% vs 1990 level)
2030 target	84 MtCO ₂ e (-49% vs 1990 level)

Overview

- With record-high investments into clean and sustainable transportation such as rail, public and non-motorised transport, as well as electro-mobility and alternative fuels (especially hydrogen), transport-related emissions should be cut significantly by 2030.
- Investments in the railway system are both a key area of action in the Climate Action Programme 2030 and a key part of Green Bunds.

New pathways for transportation

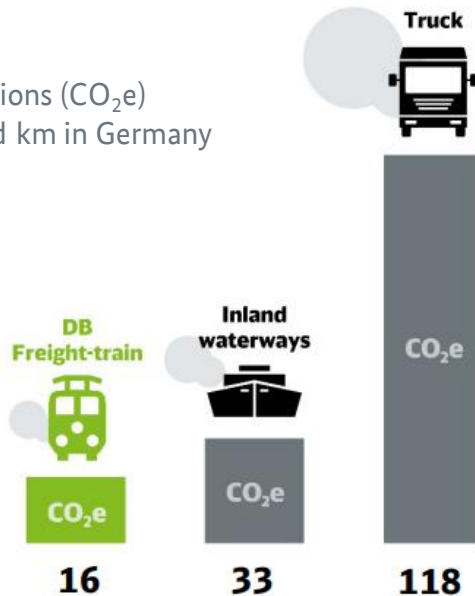
- Fundamental and massive overhaul of transport sector
- Increasing the share of passenger and freight rail transport in the modal split
- Increasing the share of the mileage in heavy road haulage of vehicles powered by electricity or electricity-based fuels.
- Expanding the charging infrastructure for electric mobility
- Expanding cycle routes
- Digitalisation of mobility



Investment in the railways

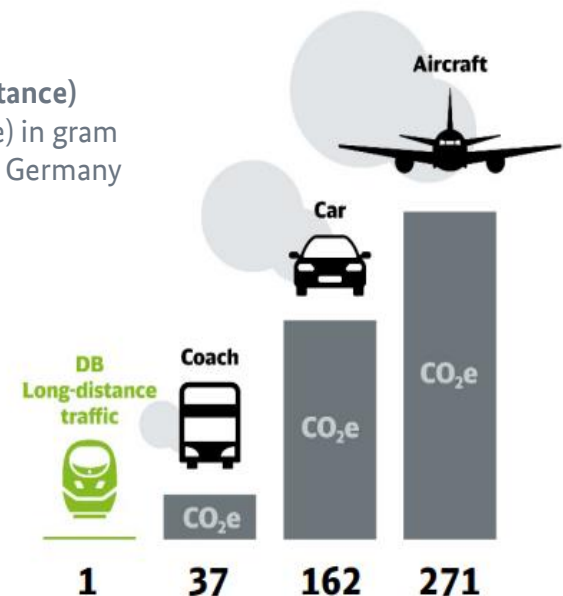
Strengthening rail freight transport

Freight GHG emissions (CO₂e)
in gram per ton and km in Germany



*Making rail travel more attractive
by modernising the rail network*

Passengers (long-distance)
GHG emissions (CO₂e) in gram
per person and km in Germany



Source: Deutsche Bahn AG, March 2023

Focus on Agriculture



Agriculture

Share of GHG emissions	8% of all GHG emissions in Germany
2022 achievement	62 MtCO ₂ e (-25% vs 1990 level)
2030 target	57 MtCO ₂ e (-26% vs 1990 level)

Sustainable agriculture - a mix of measures to make the sector more climate-friendly

- Sustainable farming
- Conservation and sustainable management of forests and timber use
- Avoiding food waste

Focus on Waste Management and others



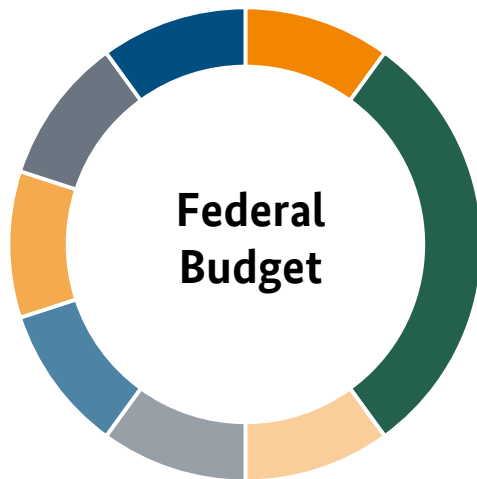
Waste management and others

Share of GHG emissions	1% of all GHG emissions in Germany
2022 achievement	4 MtCO ₂ e (-90% vs 1990 level)
2030 target	5 MtCO ₂ e (-89% vs 1990 level)

Waste management is at a very high level in Germany already. Waste is collected, separated, reused, recycled or used for energy.

Environmental and Climate Policy within the German Federal Budget

- German climate and environment policies are extensive.
- The federal budget contains a significant amount of green expenditures.
- The reporting for Green German Federal securities provides high transparency regarding the allocated green expenditures.



The federal budget contains many more green items than those selected for Green German Federal securities:

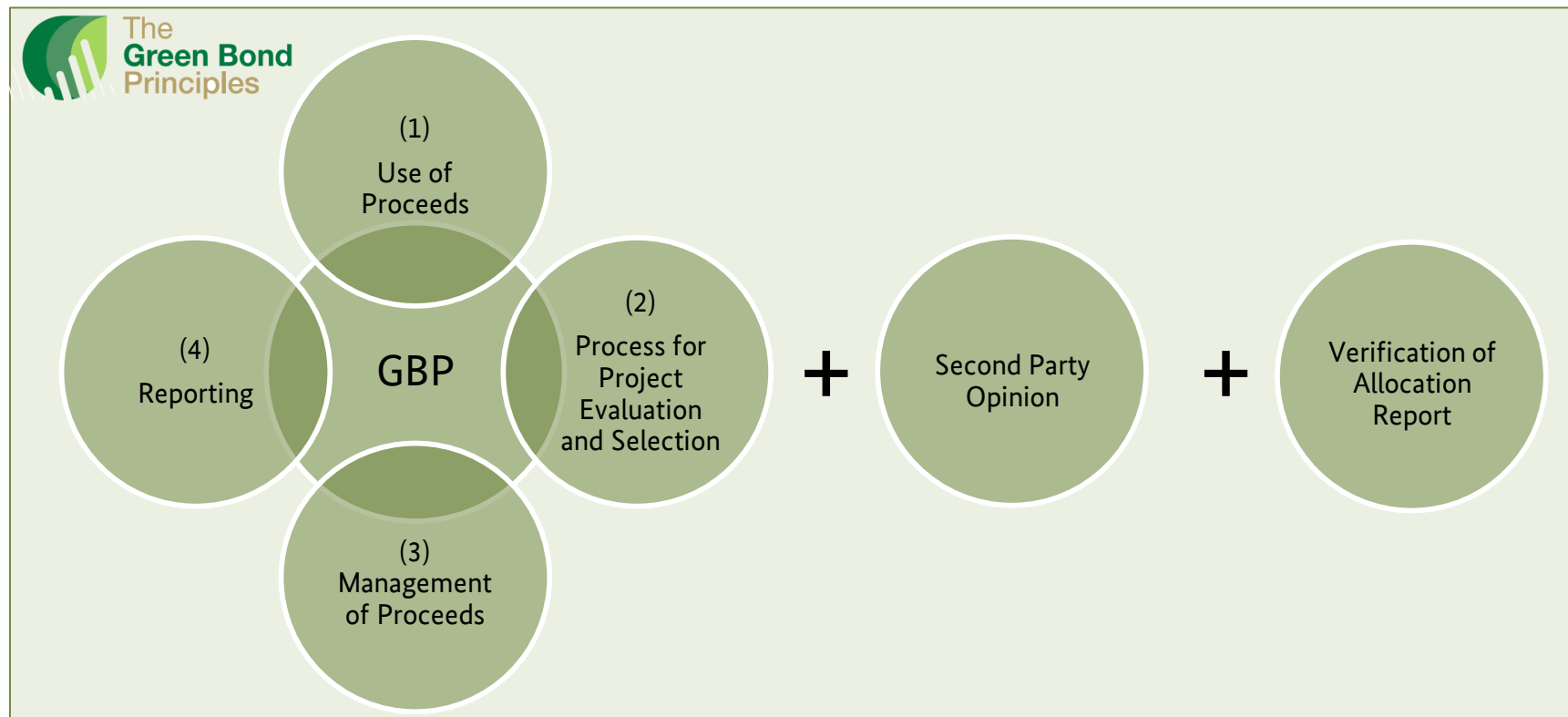
- Eligible green expenditures earmarked for the NGEU funding program
- Green expenditures associated with funds raised by the Carbon Pricing Scheme, channeled through the Climate and Transition Fund (KTF)
- Grants to increase energy efficiency in buildings associated with KfW Green Bonds
- Further green expenditures, which are neither earmarked for a green bond program nor part of the KTF

2 Green Bond Framework Overview

[Back to Agenda](#)

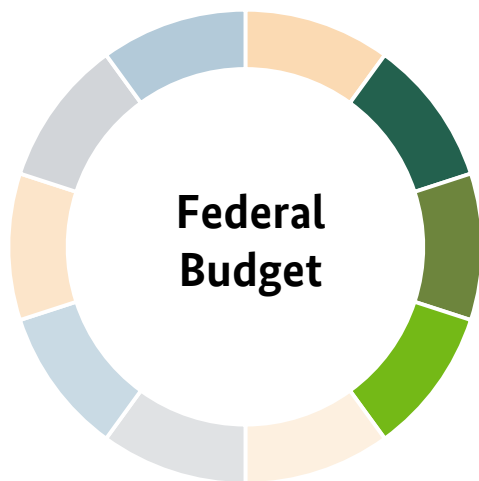
Overview of the Green Bond Framework

- Germany's Green Bond Framework follows the ICMA's Green Bond Principles ("GBP")
- A Second Party Opinion as well as a Third Party Verification of the Allocation Report are provided



Use of Proceeds

- **Germany's Green Bond Framework provides for five Green Sectors for the use of proceeds:**
(1) transport; (2) international cooperation; (3) research, innovation and awareness raising; (4) energy and industry; (5) agriculture, forestry, natural landscapes and biodiversity.
- Eligible Green Expenditures contribute to the six environmental objectives of the EU Taxonomy Regulation and at least 12 out of the 17 UN Sustainable Development Goals



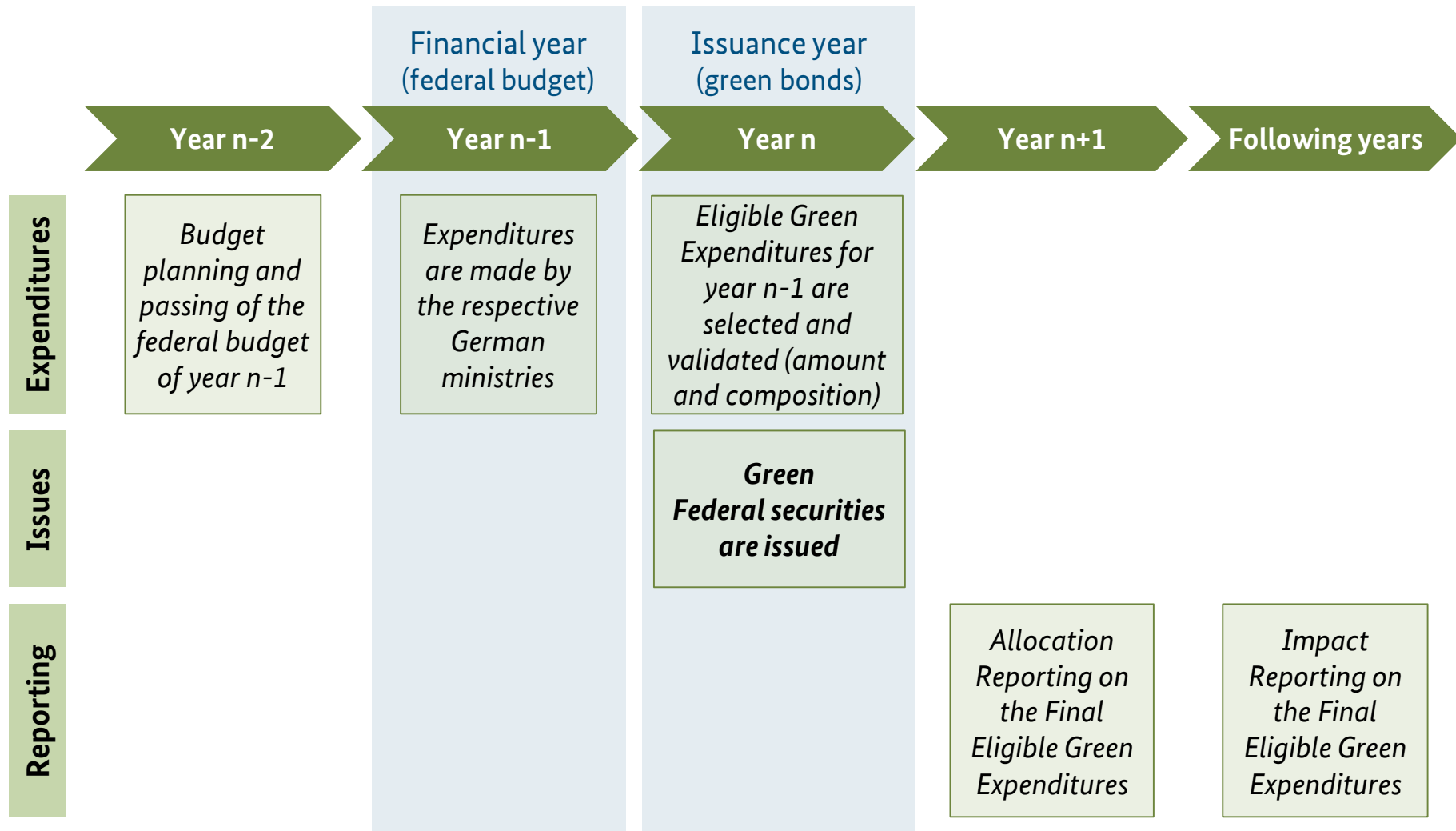
Eligible green expenditures:

- Green Eligible Expenditures can include any type of Federal expenditure contributing to a transition towards a low-carbon, resource efficient and sustainable economy

Excluded expenditures:

- State expenditures which are already earmarked by other public Green Bond issuers (such as KfW or NGEU)
- Armaments, defence, tobacco, alcohol, gambling, fossil fuels and nuclear power

Project Evaluation, Selection and Reporting



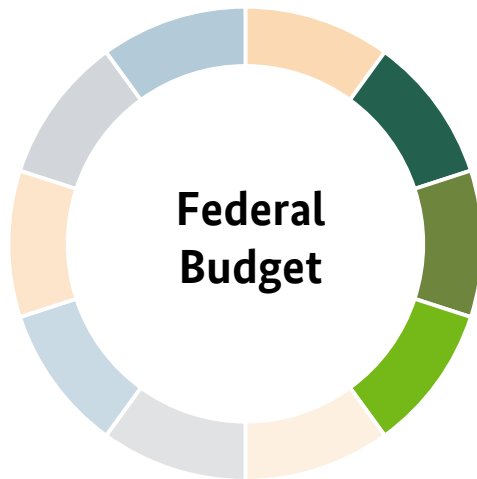
3 Green Federal Securities in Practice - Eligible Green Expenditures

[Back to Agenda](#)

High Level of Transparency and Strict Standards

➤ **Exclusion of double counting:**

Expenditures allocated to Green German Federal securities are earmarked for this purpose only, and will not overlap with the use of any other green funding source.



Clear differentiation of green expenditures:

- Expenditures proposed by the federal government in the German Recovery and Resilience Plan (DARP) for the NGEU program are excluded from the allocation to Green Bunds.
- Only KTF expenditures in the amount financed by the federal budget (including reserves) are taken into account for Green Bunds.
- Federal budget expenditures associated with KfW Green Bonds are excluded from the allocation to Green Bunds.

Overview Use of Proceeds: Eligible Green Expenditures (€ mn)

Green Sectors	2022 Indicative	2021	2020	2019	Sector Details
Transport	9,200.0	8,344.1	7,387.3	7,125.3	e.g. rail transport, alternative drive systems and fuels, waterways, cycling infrastructure
International cooperation	4,400.0	3,701.0	3,278.3	2,981.7	Assist EM and developing economies in their transition towards greater environmental sustainability; governance: page 25
Research, innovation and awareness raising	1,500.0	1,359.8	1,085.0	625.1	Support and facilitate knowledge and innovation about climate and environmental matters; eligible items: page 26
Energy and industry	2,700.0	2,665.5	1,093.2	1,198.5	e.g. energy research, renewable energy, energy efficiency
Agriculture, forestry, natural landscapes and biodiversity	700.0	767.0	564.0	381.5	e.g. sustainable agriculture and forestry, coastal and flood protection, protection of ecosystems
Total	18,500.0	16,837.4	13,407.8	12,312.1	

Key Sector “International Cooperation”



International
cooperation

Expenditure

Eligible programs and projects are targeted at mitigating and adapting to climate change, transitioning towards sustainable energy systems based primarily on renewable energy sources, improving energy efficiency, protecting habitats and biodiversity sustainable use of natural resources and energy, including developing renewable energy generation facilities and sustainable agriculture.

Governance

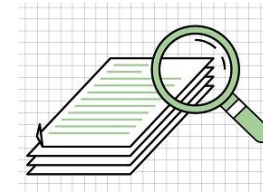
The selection and approval of specific projects is subject to **compliance with German law**, the Guidelines for bilateral Financial and Technical Cooperation **and all relevant international agreements and treaties signed by Germany**.

Governance safeguards and processes are in place for every type of expenditure to prevent corruption and money laundering in line with European and national legislation and standards.

Social safeguards and processes are in place for every type of expenditure to reduce the risk of forced labor and child labor and to promote and strengthen human rights in developing countries in accordance with European and national legislation and standards.

International support is reported in accordance **with internationally agreed guidelines**, criteria and reporting cycles, either as official development assistance (ODA) to the OECD Development Assistance Committee (DAC) and/or as climate finance to the EU and United Nations Framework Convention on Climate Change (UNFCCC).

Key Sector “Research, Innovation and Awareness Raising”



Research,
innovation and
awareness raising

Expenditure

Eligible budget items primarily include :

- Expenditure enabling the development of solutions for combating climate change, for the preservation of ecosystems and biodiversity and for compensating for fluctuations in power grids due to the increasing use of renewable energy sources to generate electricity
- Expenditure enabling research for all renewable energies and energy storage, energy efficiency, power grid and renewable energy integration, energy transition
- Expenditures enabling research related to climate change, biodiversity, nature protection and the environment
- Expenditures enabling research on coasts, oceans and polar areas

Cross-Section

In a society making a transition towards a sustainable economy, strong government commitment is essential. Thus, the federal budget contains considerable green expenditures on research, innovation and awareness raising. The expenditures are found partly in this research sector (~8% of the eligible expenditures) and partly in the other four sectors (if there is a clear connection to the respective sector). Taken together, they account for approximately 14% of the total allocated expenditures.

Contributions of Eligible Green Expenditures: Breakdown by Green Sector

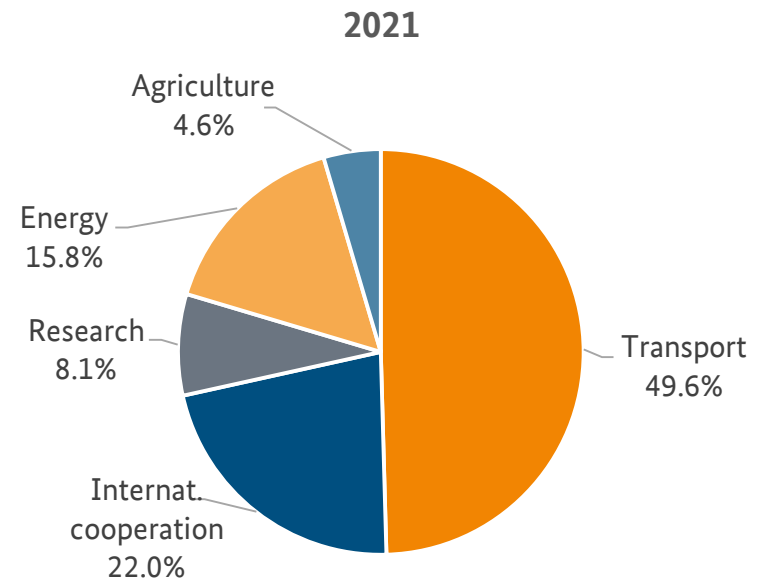
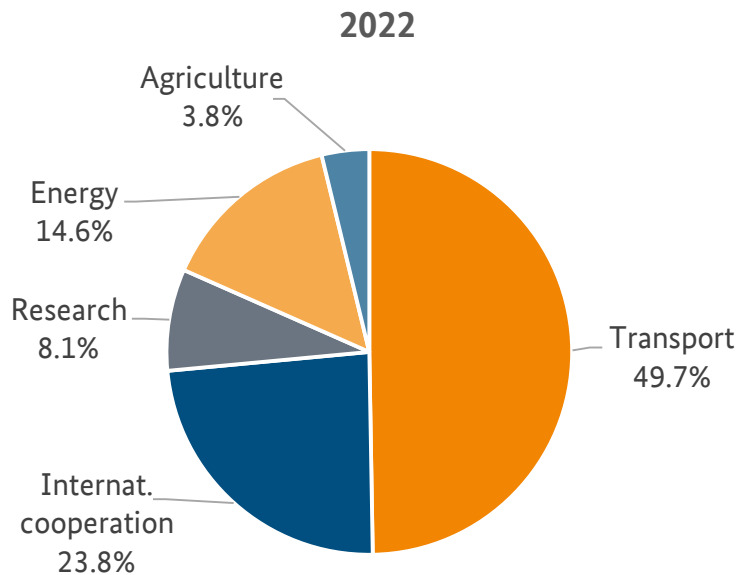
(1) Transport

(2) International
cooperation

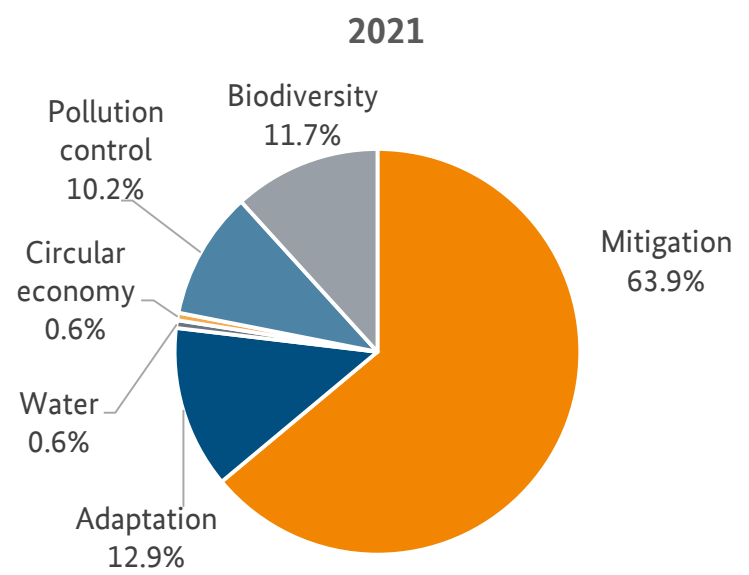
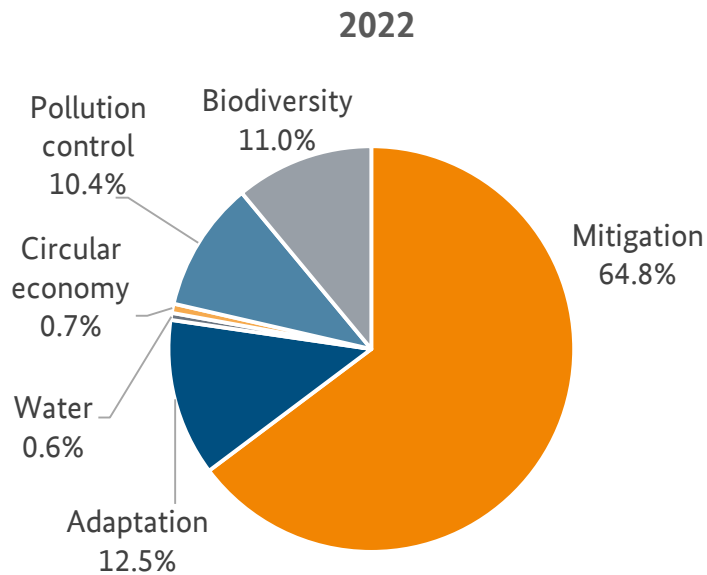
(3) Research,
innovation and
awareness raising

(4) Energy and
industry

(5) Agriculture,
forestry, natural
landscapes and
biodiversity



Contributions of Eligible Green Expenditures: Breakdown by EU Environmental Objective



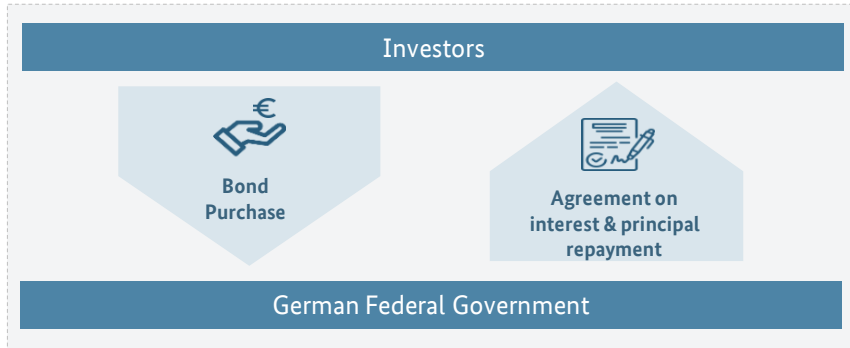
Symbols are taken from „Financing Sustainable Growth“, European Union, 2019.

4 Green Federal Securities Execution - Strategy and the Twin Bond Concept

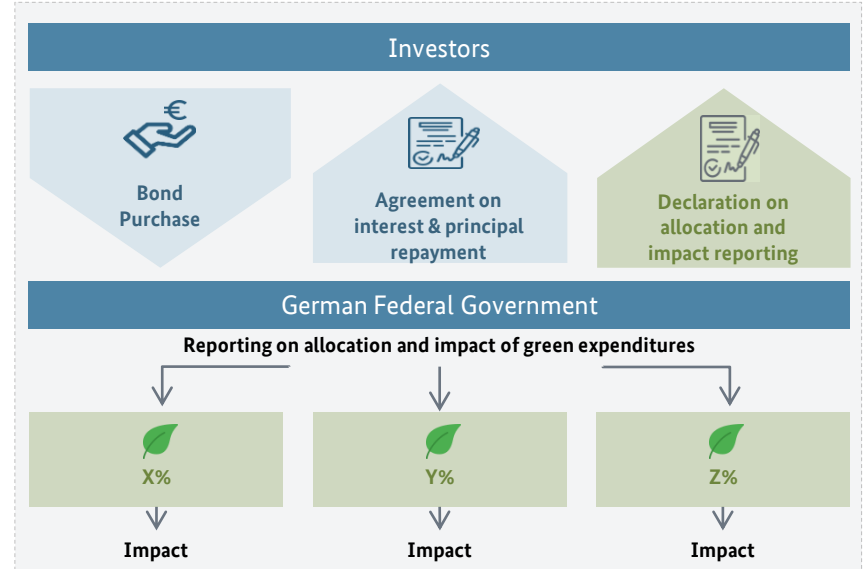
[Back to Agenda](#)

Twin Bond Concept

Conventional German Federal security “Conventional twin”



Green German Federal security “Green twin”

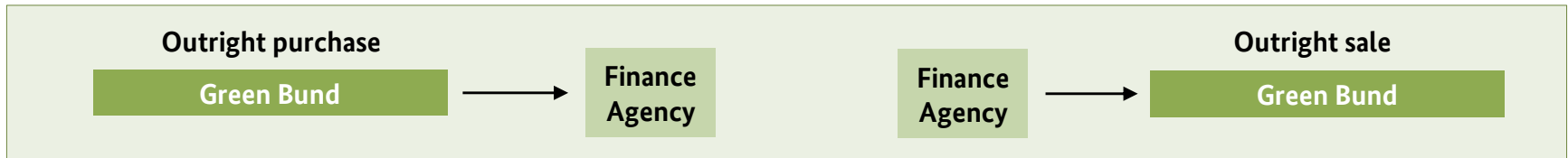


Main terms (Green) Bobl Oct 2027 as an example:

	Conventional twin	Green twin
Identical to both twins	Maturity segment	5y
	Coupon	1.3%
	Interest dates	Annually
	Maturity	15 October 2027
	Future-Contracts	Deliverable
Different for each twin	Outstanding size	€ 28.5 bn
	Issuance date	28 June 2022
	ISIN	DE0001141869
		€ 6.5 bn
		31 August 2022
		DE0001030740

Secondary Market Activity by Finanzagentur Ensures Liquidity

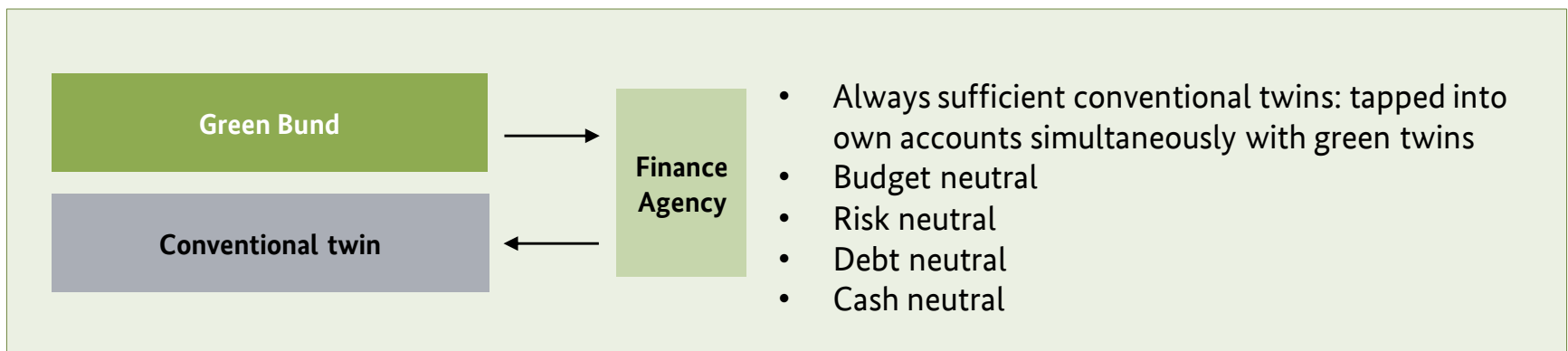
1. Outright (“one-way”) sales and purchases



2. Repurchase agreements and securities lending, using the Federal Government’s own stock of Green Bunds

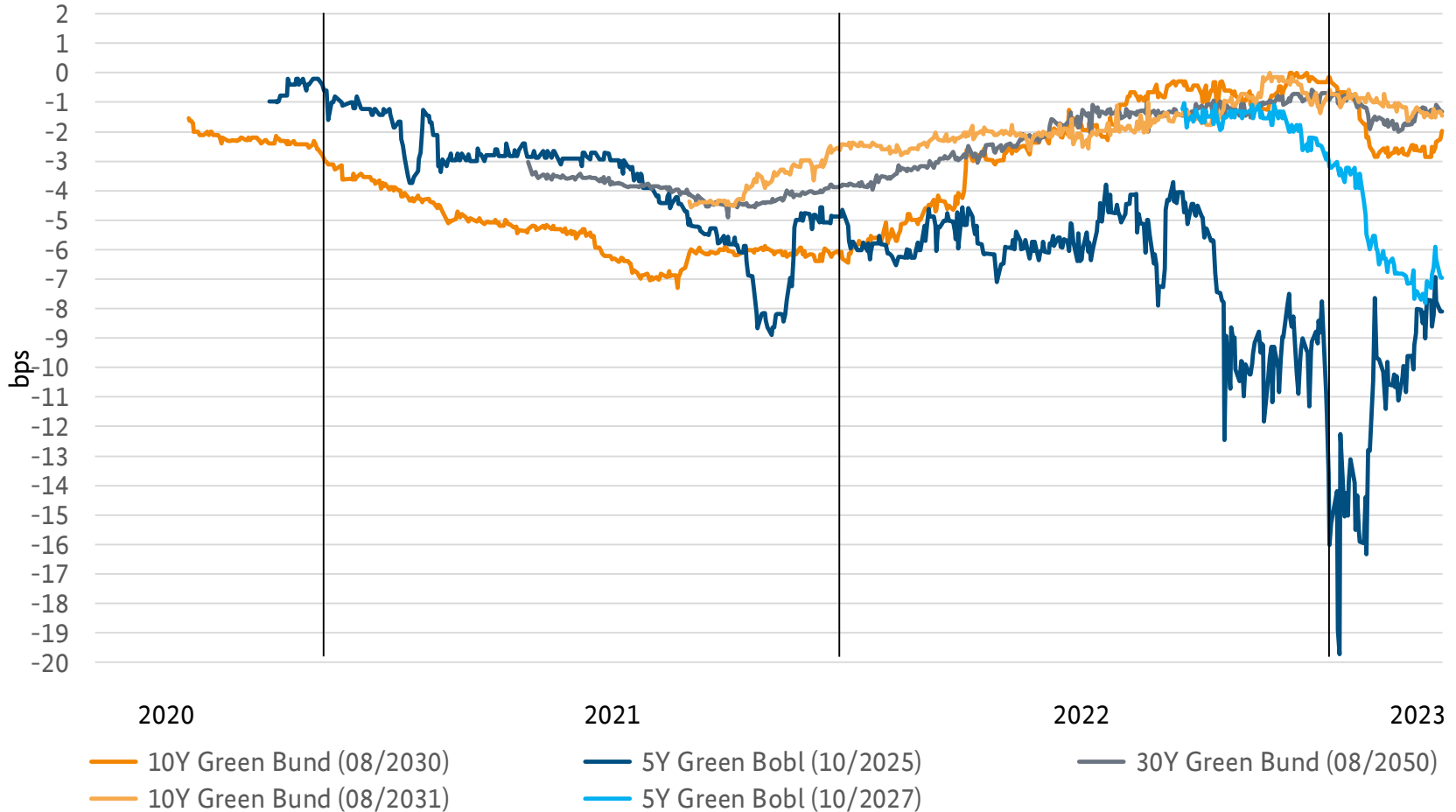


3. Combined and debt-neutral sale-and-purchase (switch) transactions: Most powerful tool



The Twins` Performance: Making the ‚Greenium‘ Transparent

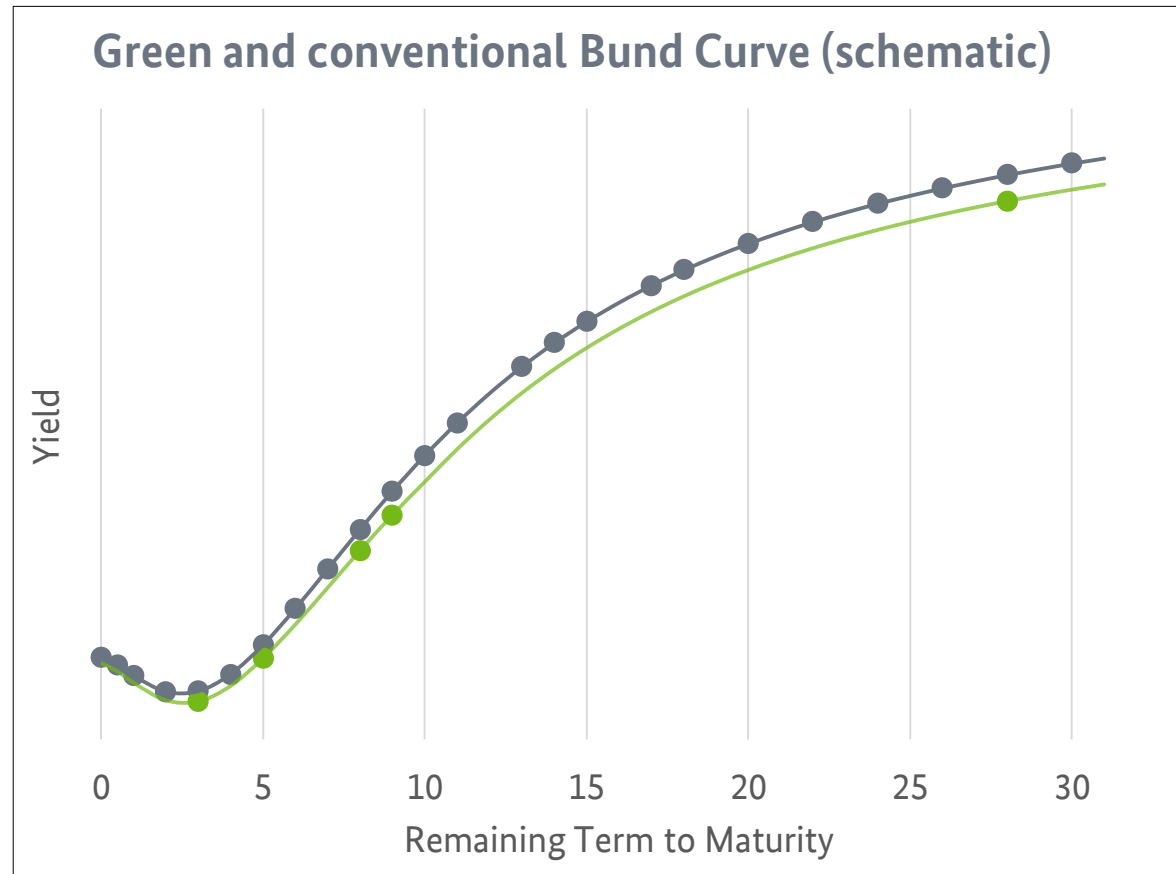
Greenium (yield spread vs. conventional twin, bps)



Greenium = yield spread between green and conventional bond

The Twin Bond Concept Creates a Liquid Curve and Offers a Diversified Maturity Spectrum for Different Investor Types

- Germany will be a permanent issuer of green bonds.
- Liquid green yield curve acts as a reference for the euro area.
- This curve serves different investor type needs, e.g.:
 - Duration considerations
 - Liquidity considerations



Developing Sustainable Finance Markets by Applying the Twin Bond Concept

The twin bond concept ...

1

... transfers the Bund's established market approach to the green segment

2

... creates a liquid curve and offers a diversified maturity spectrum for different investor types

3

... provides full price transparency and allows for outperformance of the green twins

- **will therefore accelerate the development of sustainable finance markets**
- **will serve as a catalyst to channel more investments towards a more environmentally friendly economy**
- **will attract new investors to the Green Bond market**



5 Selected Case Studies of Eligible Green Expenditures (2022 budget year)

[Back to Agenda](#)

Case Study 1: Climate-Friendly Commercial Vehicles and Infrastructure

(1) Transport

Objective

- Funding programme is part of the overall approach to climate-friendly commercial vehicles of the German Federal Ministry for Digital and Transport
- Intended to stimulate the market ramp-up of climate-friendly commercial vehicles
- Goal: one third of heavy road freight transport in Germany must be electric by 2030

Output and measures

Funding of

- Commercial & special vehicles with battery or fuel cell electric drive (EC vehicle category N1, N2 and N3) and externally rechargeable hybrid-electric vehicles (N3 only)
- Refuelling and charging infrastructure necessary for the operation of the requested commercial vehicles on private sites (in particular depots)
- Feasibility studies

Achievements

- Requested funds in the first two funding calls: approx. € 1.7 bn
- Until today € 272 mn approved (about 1,350 small and medium sized trucks and about 1,000 heavy duty trucks + charging infrastructure)
- Majority of commercial vehicles approved in first call: heavy commercial vehicles (N3)

Project partner



coordination:
NOW GmbH
granting authority:
Federal Logistics
and Mobility Office



Case Study 2: Tramway Infrastructure in Central Karlsruhe

(1) Transport

Objective

- To reduce travel times and improve timetable reliability of the light rail service in Karlsruhe, an underground bypass was built under the pedestrian area in the city centre.

Output and measures

- Through the separation of tram/light rail traffic and pedestrians in the city centre, the traffic safety and timetable stability can be increased.
- In addition, travel time can be saved for passengers crossing the tunnel.
- By eliminating the disturbance by dense tram traffic, the livability of the pedestrian area can be improved.
- Furthermore, by the launch of a street-level tram service on a green track in an adjacent thoroughfare, the streetscape there could be redesigned and the quality of life improved .

Achievements

- A tramway tunnel with a southern branch was built under Kaiserstrasse, the main shopping street in the city.
- The new infrastructure comprises a 3.5 km long tunnel with seven stops, and a new street-level tram line in an adjacent thoroughfare.
- The new service was launched in December 2021.

Case Study 3: Second Core S-Bahn Route in Munich

(1) Transport

Objective

To reduce pressure on the existing core S-Bahn route through central Munich, a second core route is being built from Laim station in the west to Leuchtenbergring station in the east.

Output and measures

- To improve journey times and reliability, the S-Bahn lines will be split into the two core routes through the city centre.
- On many S-Bahn lines, trains will run every 15 minutes throughout the day. In addition, express S-Bahn trains will offer fast and convenient service between the surrounding area and Munich city centre every 30 minutes. Also regional S-Bahn lines will be launched as a direct connection from the city to the wider metropolitan region (e.g. Buchloe and Landshut).

Achievements

- The heart of the route will be a 7-km-long tunnel connecting Munich Main Station and Munich East.
- The tunnel will serve three new subterranean stations at Munich Main Station, Marienhof and Munich East.
- Serving just three stations, the new core route will significantly reduce journey times. A new express S-Bahn system will offer attractive journey times between Munich's suburbs and its city centre.



Case Study 4: Promotion of the Purchase of Buses with Alternative Drives

(1) Transport

Objective

- Convert local public transport bus fleets to battery electric drive systems, reducing greenhouse gas emissions from public transport as around two-thirds of all CO₂ emissions from local public transport come from diesel buses
- Support the market ramp-up of electric buses in order to reduce the acquisition costs in the medium-term through learning processes, economies of scale and the resulting increased competition
- Contribute to the development of a self-sustaining market



© BMU/photothek/Thomas Köhler

Output and measures

- € 522 mn of total funding
- Transportation agencies receive up to 80% of the additional investment costs for a battery electric bus compared to a diesel bus and up to 40% of the full investment cost of non-public charging infrastructure

Achievements

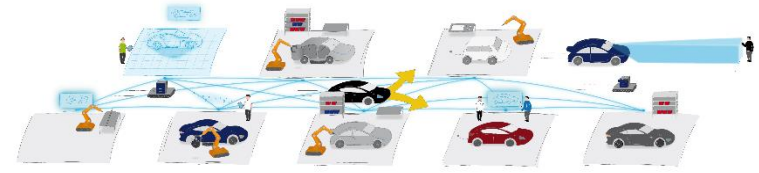
- 50 projects in over 60 cities and regions are supported
- The project supports the purchase of around 1,500 battery electric buses
- This is more than 15 times the number of buses in service before the purchase program began
- The market dynamics induced by the support program lead to an increasing differentiation of the product range on the part of the manufacturers, for example with regard to designs and battery sizes

Case Study 5: Electro-Mobil -Project AIMFREE

(1) Transport

Objective

- The AIMFREE research project aims at the parallelization of workstations and the implementation of versatility and flexibility in the final assembly of automobiles.



source: <http://aimfree.wzl.rwth-aachen.de>

Output and measures

- A key aspect of the project is the holistic consideration of all necessary aspects of an agile assembly system. This includes the initial system design as well as planning and control.
- Self-driving robots and a self-driving car for the end-of-line use case is implemented in the system.
- The aim is a comparisons of the requirements and available technologies for different kinds of self-driving vehicles.
- funding amount: € 3.6 bn; project term: 01.01.2020 – 31.03.2023

Achievements

- physical demonstrator located at RWTH Aachen
- digital demonstrator that visualizes all project outcomes
- The consortium published the results on relevant conferences, journals and produced a video of the agile assembly system.

Project partner

- RWTH Aachen; Bär Automation GmbH; ELABO GmbH; Pilz GmbH; Porsche AG; Siemens AG; ipolog GmbH; Fraunhofer IPT

Case Study 6: Energy Systems of the Future in Brazil

(2) International Cooperation

Objective

- Planning Authority (EPE): Improvement of strategies for integrating variable renewable energy into long-term energy planning based on energy system modelling.
- Regulatory Agency (ANEEL): Implementation of research-based regulatory solutions to promote a higher integration of variable renewable energies into the Brazilian energy system.
- System Operator (ONS): Support in the modernization of the system management processes.
- Ministry of Mines & Energy (MME): Development and replication of pilot projects and business models in sustainable energy and green growth.

Output and measures

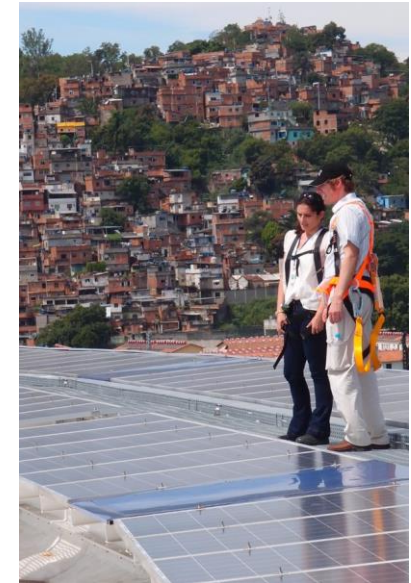
- Identification of regulatory improvements for ANEEL's Energy Efficiency Program, which has contributed to reducing energy demand on average by 335,894.77 MWh per year in 172 projects since 2008.
- Information compilation of over 200 public, private and civil society entities active in energy efficiency throughout Brazil.
- Energy Efficiency Network, which, during the 12 months of its duration, helped participating industries reduce their collective energy consumption by 38.12 GWh and increase their use of renewable energy sources by 31.14 GWh.

Achievements

- Installed capacity of solar power plants in Brazil exceeded the mark of 26 GW in 2023. Distributed solar power generation grew nearly 90% in 2022 in comparison to 2021 exceeding the mark of 16 GW.
- In 2022 solar power represented 4.3% of Brazil's electricity matrix compared to 2.5% in 2021. Wind power represented 11.6% in 2022 compared to 10.6% in 2021.

Project partner

- Implemented by



Case Study 7: Soil Protection and Rehabilitation for Food Security

(2) International Cooperation

Objective

Agroecological and climate-smart approaches for sustainable soil protection and rehabilitation have been implemented at scale in selected partner countries.

- The programme aims to support partner countries with the broad-scale implementation of field-tested approaches for soil conservation and rehabilitation.
- It helps protect or rehabilitate degraded soil and increase yields of key crops.
- At the same time, the programme strengthens strategies and incentives for sustainable land use.
- And improves the climate effect of soil protection and rehabilitation measures in selected agroecological zones



Output and measures

- Increased yields of key crops by more than 37% on protected land.
- 515,192 trained smallholder farmers in measures suitable for climate change adaptation
- 39% women are adopters of promoted measures

Achievements

- On 565,881 ha soil conservation and rehabilitation practices with a mitigation co-benefit are applied (i.a. increase of soil organic carbon and biomass)
- Based on the programme's climate monitoring system the annual mitigation contribution of the programme is 400,000 t CO₂e in 2022 on this area (0.7 t/ha)

Project partner

- Implemented by **giz** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Case Study 8: Program for the Protection and Use of Natural Resources (PAGE II)

(2) International Cooperation

Objective

- The project contributes directly to reducing deforestation and improving the socio-economic situation of the population in the periphery of protected areas.

Output and measures

- Strengthening the technical capacities of value chain actors.
- Improvement of the administrative and technical framework.
- Strengthening the capacity of government technical services in natural resource management and selected value chains.

Achievements

- More than 6,000 households (34% women) are involved in the professionalization of 6 value chains (honey, cashew nuts, moringa, honey, energy wood, construction and service wood).
- 89,000 ha of locally managed natural forests and forest plantations are sustainably exploited by actors in the wood-energy and timber sectors.
- 41 other development projects have introduced at least one approach, method or instrument for the sustainable management of the value chains supported by PAGE II, taking into account a total of 17 different approaches, methods and instruments.

Project partner

- Implemented by **giz** Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH



Case Study 9: PtX Development Fund II

(2) International Cooperation

Objective

- The PtX Development fund promotes the development of PtX (Power to X) value chains in developing countries (production of green hydrogen and its derivatives).

Output and measures

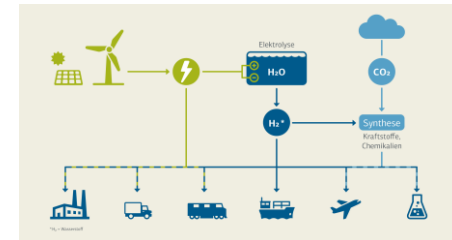
- Award of financing and investment cost grants to help the development of individual components of the value chain, including new technologies.
- All components of value chain are eligible for funding, from the generation of electricity based on renewable sources to the production of green hydrogen and its derivatives and their transport and use in different industries and sectors.
- Expected total investment (target fund volume): € 1.35 bn
- Federal Funds (Grant): € 249.98 mn (*FZ-Regionen*)
- Project will be implemented until 2027

Achievements

- Expected total GHG savings: 432,000 t CO₂e p.a.
- Expected total newly installed renewable energy capacity: 405 MW
- Expected total newly hydrogen production capacity: 1,177 t/day

Project partner

- The project is implemented by **KFW**



Source pictures: www.kfw-entwicklungsbank.de/Unsere-Themen/PtX/index.html

Case Study 10: Waste Management Programme II-IV

(2) International Cooperation

Objective

- The project supports the Peruvian government in its efforts to ensure that 100% of the waste collected in Peru is disposed of and recycled in an environmentally sound manner
- Reduction of GHG emissions and climate protection

Output and measures

- Construction of landfills, sorting facilities, composting facilities, transfer stations, the procurement of containers and waste collection vehicles in selected regional urban centers in Peru
- Construction of a mechanical-biological waste treatment plant in one urban center.
- A complementary measure also supports TA measures for the provincial administrations and the Peruvian Ministry of Environment.
- Expected total investment: € 65 mn
- KfW development loan: € 52.3 mn (subsidized interest rate)
- Project will be implemented until 2027

Achievements

- Expected total GHG savings: 602,000 t CO₂e p.a.
- The project reaches around 1.4 million people in several cities in Peru.

Project partner

- The project is implemented by **KfW**



Case Study 11: Amazon Fund

(2) International Cooperation

Objective

- Protection and sustainable use of the Amazon Rainforest

Output and measures

- The Amazon Fund remunerates proven results in reducing GHG emissions from deforestation in the Brazilian Amazon.
- raises and manages donations for non-reimbursable investments in actions to prevent, monitor and combat deforestation, and to promote the conservation and sustainable use of the Amazon biome.
- also supports the development of systems for monitoring and controlling deforestation in other Brazilian biomes and other tropical countries.

Achievements

- More than \$ 1.2 bn raised and \$ 700 mn disbursed
- More than 100 supported projects
- 207,000 beneficiaries in the scope of sustainable productive activities
- 101 indigenous territories supported

Project partner

- The project is implemented by **KFW**



**AMAZON
FUND**



Case Study 12: Central African Forest Initiative (CAFI)

the biggest forest and climate multi donor trust fund for the Congo Basin

(2) International Cooperation

Objective

According to the 2015 CAFI Joint Declaration, signed between the donors and the six partner countries of the region, the objective of this initiative is to recognize and preserve the value of the forests and peatlands of the region to mitigate climate change, reduce poverty, and contribute to its sustainable development.

Output and measures

The objective shall be attained through the implementation of country-led, holistic low emissions development investment frameworks that include national policy reforms and measures addressing drivers of deforestation and forest degradation over several sectors. Based on so called Letters of Intent, signed between CAFI and the respective partner country, projects and programs are implemented.

Achievements

- 33 projects approved and under implementation in 4 partner countries. Currently, the donors' contributions to the fund accumulate to \$ 835 mn.
- The sectors of intervention are: forest sector, agriculture, energy, demographic pressure, gender, mining and hydrocarbons, governance, infrastructure, land-use planning and land tenure
- The fund's field-level projects are expected to have reduced 75 million t of CO₂ and to have enhanced the livelihoods of up to 10 million people.
- Germany contributed with € 245 mn so far (2022: € 45mn).

Project partner

9 donors: GER, UK, NOR, EU, FRA, BEL, SWE, KOR, NEL; 6 partner countries: DRC, CMR, RoC, GNQ, GAB, CAR. UN MPTF as administrator with several implementation organizations from UN, AFD, WB, GIZ, ENABLE, etc.



Source: Home / Central African Forest Initiative (CAFI)

Case Study 13: Solar Energy Use for Storage, Fuels and Industry (Projects PEGASUS, BaSiS)

(3) Research, innovation and awareness raising

Objective

- Processing sulphur as one of the most important raw materials for chemical industry by means of solar energy (PEGASUS)
- On-demand solar power generation using sulphur storage technology (BaSiS)
- Long-term storage solutions to replace fossil power plants 24/7

Output and measures

- Novel power cycle combining a CSP plant with a sulphur storage system for 24 hours baseload operation
- Demonstrate a thermo-chemical sulphur storage cycle to permanently and efficiently store solar energy in chemical form as elemental sulphur at a 30 times higher energy density than today's molten salt systems
- Direct combustion of sulphur in gas turbines for highly efficient renewable energy recovery
- Product SO_2 can be used for sulphuric acid production and for hydrogen production

Project partner

- DLR, in cooperation with KIT, BrightSource (and others)



**Deutsches Zentrum
für Luft- und Raumfahrt**
German Aerospace Center



Source: *DLR Solar Towers in Jülich* © DLR

Case Study 14: CoBra - High Temperature Heat Pumps based on the Brayton Process; located in Cottbus

(3) Research, innovation and awareness raising

Objective

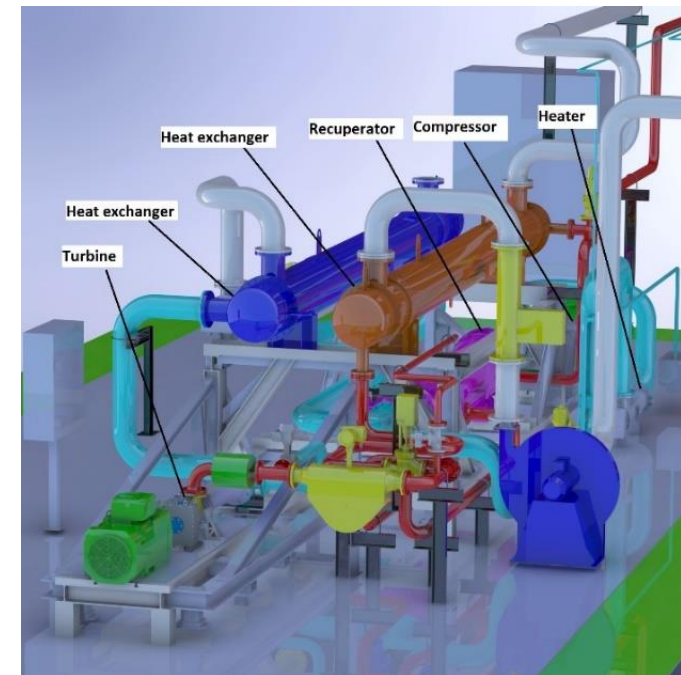
- Roughly 60% of the industrial energy demand in Germany is used for process heat
- There is significant need in CO₂-neutral process heat in the range of 150-500°C. Market cannot provide heat pumps with adequate performance.
- Objective is the development, upscaling and integration of CO₂-neutral high temperature heat pumps in energy intensive processes of several industries (chemistry, petrochemistry, iron, steel, paper, food, cement, aluminium)

Output and measures

- Demonstrator high temperature heat pump (HTHP) operational at DLR Cottbus by the end of 2022
- Development of necessary turbo components
- Accompanying research will identify options for operating scenarios
- Virtual model of the HTHP and its embedding in the industrial processes
- Electrification of the industrial process heat demand up to 500 °C could result in CO₂ savings equal to the current Switzerland's CO₂ emissions



**Deutsches Zentrum
für Luft- und Raumfahrt**
German Aerospace Center



Source: DLR, CAD scheme of the first test facility for a HTHP

Case Study 15: Institute of Maritime Energy Systems

(3) Research, innovation and awareness raising

Objective

- Development & Demonstration of sustainable CO₂ neutral maritime energy systems

Output and measures

- Sustainable maritime energy systems for ships of various sizes
- Prevention of air pollution by pollutants from the use of fossil fuels, especially CO₂.
- Introduction of CO₂-neutral fuels like H₂, NH₃, and LOHC
- Optimization of energy demand and supply on-board for power, heat and cooling
- Conception of needed infrastructure in ports
- Offering test facilities on shore and research vessel for tests and qualifications of components

Project partner



Deutsches Zentrum für Luft- und Raumfahrt
German Aerospace Center



Fuel Cells



Fuel Tanks



Batteries



Bridge



Leisure



Accommodation
Air Conditioning

Source: www.dlr.de/ms

Case Study 16: TTP Leichtbau - Verbundvorhaben CC-Mesh

(3) Research, innovation and awareness raising

Objective

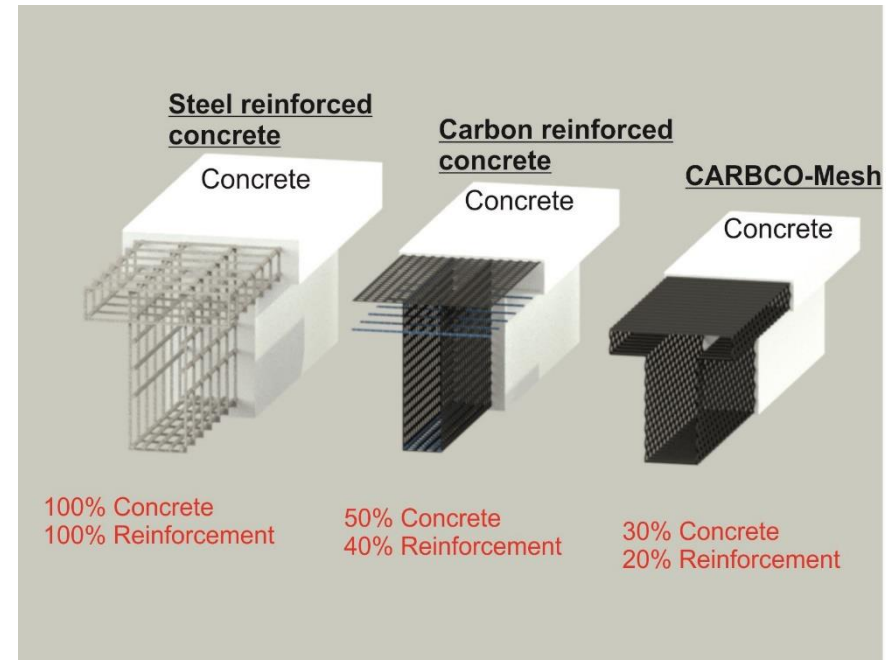
- Joint project for lightweight construction
- Transfer of design and reinforcement concepts from lightweight construction to concrete construction.

Output and measures

- Funding amount: € 1.8 mn, project term: 01.11.2020 - 31.10.2023
- Development and optimization of innovative, large-format and durable carbon reinforcements for concrete construction.
- The three-dimensional reinforcement structures adapt optimally to the force flow, GHG savings potential of up to 86% compared to reinforced concrete

Project partner

CarboCon GmbH, HA-CO Carbon GmbH, Technische Universität Dresden - Institut für Massivbau, Hochschule für Technik, Wirtschaft und Kultur Leipzig



Source: CARBOCON GMBH

Case Study 17: Project 328H2-FC

(3) Research,
innovation and
awareness raising

Objective

- Product-relevant design and realization of a hybrid-electric regional aircraft with a hydrogen fuel cell system as energy supplier

Output and measures

- Development of an airworthy fuel cell system with a performance of 1.5 MW
- Optimization of the hybrid drive architecture
- Development of a liquid hydrogen tank incl. integration into a Do328 regional aircraft
- Development of a suitable thermal management solution
- Development and integration of high-performance electronics
- Analysis of the climate impact of hydrogen-based propulsion systems

Achievements

- Top level aircraft requirements (TLAR) definition completed
- System Requirement Review #1 (SRR#1) completed, SRR#2 in preparation
- Conceptual design review (CoDR) in preparation

Project partner

German Aerospace Center (DLR), Deutsche Aircraft, H2FLY, DIEHL Aerospace, DIEHL Aviation (DAL & DAG), HS Elektronik Systeme (HSG), Bauhaus Luftfahrt, IABG, Airbus Aerostructures, GE Aviation



Source: DLR, Deutsche Aircraft GmbH

Case Study 18: HydroPoLEn

Hydrogen Powered Large Marine Engines

(3) Research,
innovation and
awareness raising

Objective

- Internal combustion engines (ICE) will continue to play a significant role in future deep sea shipping applications.
- Therefore, great efforts are currently being made to decarbonize this proven technology.
- The objective of this joint R&D project is the development of large medium speed engines with high power density for 100 % hydrogen operation.
- The power density shall correspond to the characteristics of modern diesel engines.



Output and measures

- Demonstration of hydrogen combustion processes for dual-fuel (95% H₂) and mono-fuel (100% H₂) medium speed engines. H₂-Mono-fuel engines allow a 100% reduction of GHG emissions.
- Derivation of concepts to avoid pre-ignition phenomena, which significantly limit the power density of H₂-ICE.
- Development of customized components for hydrogen injection, ignition and the tribological system.
- Funded by the Federal Ministry for Economic Affairs and Climate Action in the Maritime Research Programme.
- Funding amount: € 8.9 mn, project term: 01.09.2022 – 31.08.2025.

Project partner

MAN Energy Solutions SE / TU München / WTZ Roßlau gGmbH / Federal Mogul Burscheid GmbH

Source: MAN Energy Solutions SE

Case Study 19: Project ReCircE (Digital Lifecycle Record for the Circular Economy)

(3) Research, innovation and awareness raising

Objective

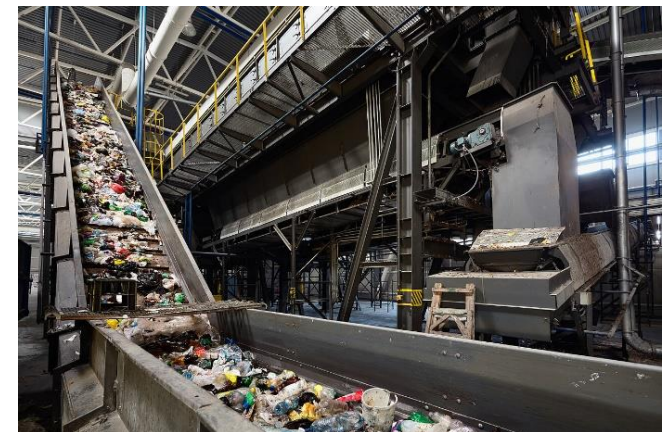
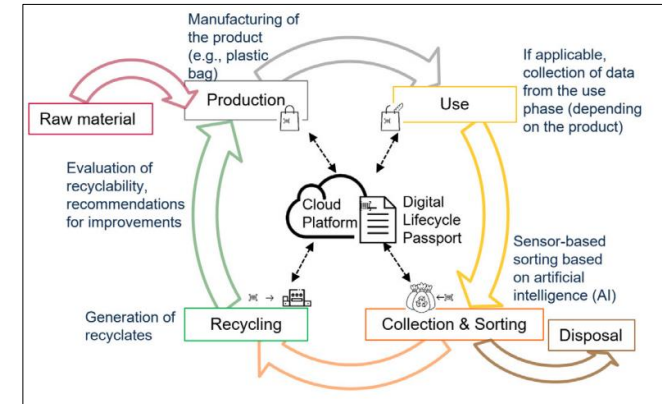
- Information/data about a product and its lifecycle is stored in a passport
- This information/data can be shared with involving stakeholders e.g. manufacturers, consumers or waste management companies
- They can use the information e.g. to improve the efficiency of the recycling process

Output and measures

- Creation of the Digital Lifecycle Passport and the cloud storage infrastructure
- Implementing a use case on an AI-enhanced sorting machine to demonstrate that the Digital Lifecycle Passport can improve the waste sorting process
- Project duration: 01.10.2020 till 30.09.2023
- Federal funding: € 1.8 mn

Project partner

- Green Delta GmbH
- German Research Center for Artificial Intelligence
- Technical University of Darmstadt
- Fraunhofer Research Institution for Materials Recycling and Resource Strategies IWKS



Sources:

- <https://www.recirce.de/>
- <https://www.z-u-g.org/foerderung/ki-leuchttuerme-fuer-umwelt-klima-natur-und-ressourcen/projekt/recirce/>
- <https://www.sciencedirect.com/science/article/pii/S221282712200021X?via%3Dihub>

Case Study 20 : Market Incentive Programme for Renewable Energies in Heating Sector (MAP)

(4) Energy and industry

Objective

- The building sector is responsible for about 35% of Germany's total final energy consumption
- The MAP funding scheme aimed at incentivizing homeowners, businesses, municipal entities, and charitable organizations to invest in the energetic refurbishment of existing buildings, for example by installing heating system such as heat pumps or heating networks.



Output and measures

- By switching from fossil to renewable energy sources for heating, substantial energy savings can be achieved and GHG emissions can be reduced correspondingly

Achievements

- From 2000 to 2022, MAP funding was granted for more than 2.3 million heating systems with federal spending of almost € 8 bn (programme ran out at the end of 2020 and was merged into the new federal funding programme for energy efficient buildings, BEG)

Source: © Adobe Stock/Gerhard Seybert

Case Study 21: Federal Funding for Energy and Resource Efficiency in the Economy (EEW)

(4) Energy and industry

Objective

- The industry sector is responsible for about 29% of Germany's total final energy consumption
- The aim of EEW funding is to create incentives for industry and commerce to invest in energy- and resource-efficient technologies, renewable process heat and reduction of energy and resource consumption



Output and measures

- Funding of investments up to 60% by grants
- the EEW includes the following modules:
 - Module 1: cross-sectional technologies
 - Module 2: renewable process heat
 - Module 3: measurement, control and regulation technology
 - Module 4: Energy and resource-related optimization of systems and processes
 - Module 5: Transformation Concepts: to support companies in planning their decarbonization strategy
 - grant competition: similar to Module 4

Achievements

From the beginning of the programme in 2019 to 2022: funding of approx. 54,000 projects with a grant volume of € 1.7 bn

Project partner



Image source: @ stock.adobe.com/Blue Planet Studio, Projektträger VDI/VDE-IT

Case Study 22: Oshivela - Green Iron from Namibia

(4) Energy and industry

Objective

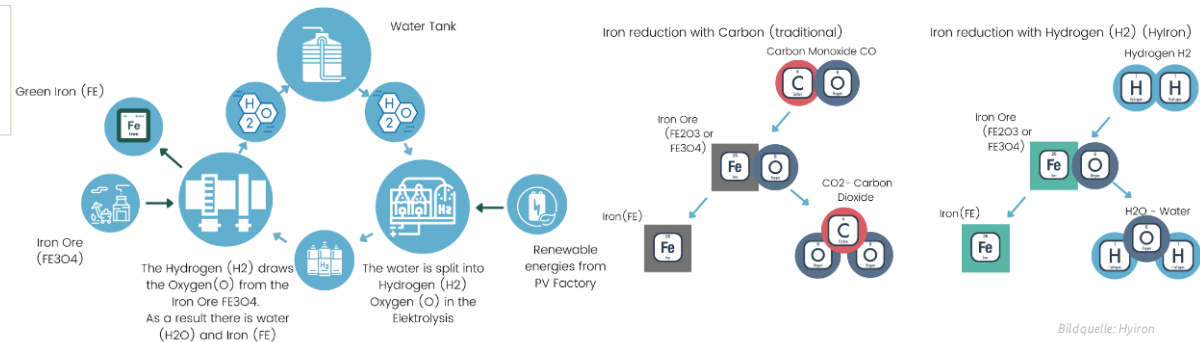
- Oshivela uses hydrogen technologies made in Germany to produce green iron in Namibia, thus contributing to the decarbonisation of the energy-intensive steel production.
- BMWK funds the project with € 13.8 mn within the funding directive for international hydrogen projects. The directive is intended to promote the establishment of trade relations with potential exporters of green hydrogen/ its derivatives and the application of German hydrogen technologies abroad.

Output and measures

- The project contributes to the industrial transformation towards a carbon-free steel industry by using innovative technologies for iron reduction and green hydrogen production.
- Within 24 month, the pilot production plant aims to produce 15,000 tons of green iron with “Net Zero” emissions using the innovative HyIron process.
- A 12 MW electrolysis plant will be set up to produce hydrogen for the HyIron process. The necessary power will be provided by a 20 MW photovoltaic power plant.
- The manufacturing process is also the basis for the development of adjacent industries (e.g., foundries, steel mills or 3D metal printing).
- Due to the enormous wind and solar resources as well as iron ore deposits in Namibia, there is great potential for the country to establish itself as an important future supplier of CO₂ neutral iron for the German steel industry. BMWK supports this transformational process by funding the Oshivela pilot project.

Project partner

CO2GRAB GmbH
TS ELINO GmbH
LSF Ltd.



Bildquelle: Hyiron

Case Study 23: Project NutriNet – Competence and Practice Research Network for the Further Development of NutriNet Management in Organic Agriculture

(5) Agriculture, forestry, natural landscapes and biodiversity

Objective

- More efficient nutrient management in organic farming through practical solutions
- Further development of methods of on-farm research / encourage farmers to engage in on-farm research
- Development of a data management tool

Output and measures

- Ten stakeholders in (organic) agricultural research are involved in the NutriNet project:
- Identification of strategies to optimize nutrient management, testing them in practice and refining them (in 6 regional networks, each consisting of 10 farms)

Achievements

- Establishment of a nationwide (on-farm) research network for nutrient management in organic farming

Project partner

Bioland Beratung GmbH, Hochschule für nachhaltige Entwicklung Eberswalde, Universität Kassel; Landwirtschaftskammer Nordrhein-Westfalen, and 6 other project partners



6 Appendix: Contact Persons and Further Information

[Back to Agenda](#)

Contact

Bundesrepublik Deutschland – Finanzagentur GmbH

(German Finance Agency)

Members of the Executive Board:

Dr. Tammo Diemer

Eva Grunwald

Olof-Palme-Str. 35
60439 Frankfurt / Main

+49 69 25 616 - 0

www.deutsche-finanzagentur.de

Investor Relations at Finanzagentur

Alexandra Beust (Head)

+49 69 25 616 - 1365

alexandra.beust@deutsche-finanzagentur.de

Steffen Becker

+49 69 25 616 - 1428

steffen.becker@deutsche-finanzagentur.de

Katharina Sasse

+ 49 69 25 616 - 1241

katharina.sasse@deutsche-finanzagentur.de

Bloomberg: **BUND <GO>** / Refinitiv: **BUND**

inst@deutsche-finanzagentur.de

Examples of Impact Reporting Approaches

Sector	Indicative impact report indicators
Transport	<ul style="list-style-type: none"> • Greenhouse gas emissions avoided (when possible) • Length of electrified railway-km • Length of newly built railway-km • Length of newly built bicycle lanes • Final reports about and descriptions of projects
International cooperation	<ul style="list-style-type: none"> • Greenhouse gas emissions avoided (when possible) • Specific reports about the environmental efficiency of the German international cooperation and the mobilisation of private capital • Listing of main initiatives and projects and presentation of key examples, and / or a description of mandates of financed multilateral institutions as well as international organisations and funds
Research, innovation and awareness raising	<ul style="list-style-type: none"> • Standard research indicators • Total funding or number of funded projects • Lists of main initiatives or presentation of key examples
Energy and industry	<ul style="list-style-type: none"> • Greenhouse gas emissions avoided (when possible) • Reduction of energy consumption, share of renewable energies • Specific reports about the climate and environmental efficiency of the subsidies
Agriculture, forestry, natural landscapes and biodiversity	<ul style="list-style-type: none"> • Specific reports about the climate and environmental efficiency of the GAK-policy (Gemeinschaftsaufgabe Agrarstruktur & Küstenschutz: joint task of agricultural structure and coastal protection)

Disclaimer

IMPORTANT: By listening and/or attending the presentation (the “Presentation”) you are deemed to have taken notice of the following limitations.

The Federal Republic of Germany represented by the Federal Ministry of Finance which itself is represented by Bundesrepublik Deutschland – Finanzagentur GmbH (“Finanzagentur”) prepared this document solely for use in connection with the Presentation. It is furnished solely for your information. Neither the Presentation nor this document constitutes an offer or a solicitation of an offer to purchase or subscribe to any securities in any jurisdiction. Further, the Presentation and this document do not constitute investment advice. This document may not be printed, downloaded or otherwise copied or distributed. Neither the Presentation nor this document nor anything in it shall form the basis of, or be relied upon in connection with, any contract or commitment whatsoever.

The Presentation and this document contain certain forward-looking statements and forecasts which reflect the current views of Finanzagentur with respect to certain future events. Forward-looking statements are statements that do not relate to historical facts or events or to facts or events as of the date of the Presentation. Such forward-looking statements involve risks and uncertainties, as they relate to future events. All forward-looking statements included herein are based on assumptions, uncertainties and other factors, the occurrence or non-occurrence of which is outside Finanzagentur’s control and are made to the best of Finanzagentur’s present knowledge.

Neither Finanzagentur nor any of its directors, officers, employees and advisors nor any other person shall have any liability whatsoever for any direct or indirect losses arising from or are related to any use of the Presentation or this document. While Finanzagentur has taken all reasonable care to ensure that the facts stated in the Presentation and this document are accurate and that the opinions contained in it are, to the best of its knowledge, fair and reasonable, the Presentation and this document are selective in nature. Any opinions expressed in this presentation are subject to change without notice and neither Finanzagentur nor any other person is under any obligation to update or keep current the information contained in this presentation.

The distribution of this document may be unlawful in certain jurisdictions. Consequently, persons into whose possession this document comes are obliged to assess whether they are permitted to possess this document.