

ENERGY EFFICIENCY MARKET AND POLICY FRAMEWORK STATUS: THE CASE OF GERMANY

Briefing Note No.7, March 2022

SUMMARY

This briefing note presents the current situation in the German Energy Efficiency (EE) market, as well as the policy framework that supports EE investments in Germany. In particular, the briefing note describes operations in, and provides data on the German EE market in key EE target sectors such as buildings, transport and industry.

KEYWORDS

Energy Efficiency Financing; Sustainable Investments; Buildings Sector; Industry Sector; Transport Sector; Germany; Sustainable Development Goals (SDG)

AUTHORS

Konstantina Tripodi (JRC Capital Management GmbH, Berlin); Petra Ristau (JRC Capital Management GmbH, Berlin)

Svenja Hector (adelphi, Berlin)



The Triple-A project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 846569.

1 Energy Efficiency Strategy and Goals for 2030 & 2050¹

Germany has set a comprehensive energy efficiency (EE) strategy effecting corporates and consumers in various key sectors, aligned with the goals set by the European Union (EU) by its European Green Deal and framed by the regulations of the Federal Climate Action Act². Over the last two years, more than €80bn have already been earmarked for climate action investments under the Climate Action Program and the economic stimulus package. Based on the same rationale that underlies the Climate Action Program 2030, initial financial support for the transition to climate-friendly technologies will gradually be replaced by incentives and rules.

To reach the targets of the EU Green Deal Germany has set an Energy Efficiency Strategy (EffSTRA). The strategy defines Germany's EE goals and lays out its roadmap for 2030 and 2050. By 2030 Germany will reduce its primary energy consumption (PEC) by 30% and by 2050 by 50% compared to 2008. EffSTRA is comprising targets and measures for EE in the key sectors:

- 1) buildings,
- 2) industry/commerce/trade and services,
- 3) transport and,
- 4) agriculture.

Germany's EE goals for each sector until 2030 and the definition of the "Roadmap for Energy Efficiency 2050" are the cornerstones of EffSTRA. The EffSTRA together with the Climate Protection Program provide a broad framework for many sector specific EE plans, instruments and incentives

Germany aims to achieve an environmentally sound energy transition by improving EE, increasing the use of renewable energy sources, and by fostering technical innovation

that enables an overall reduction of energy consumption.

The issue of energy and climate policy is of vital importance for an industrial nation like Germany and affects other policy areas, in particular economic, environmental and social policy. The three **energy policy objectives**, namely **reliability of supply**, **environmental sustainability**, and **affordability**, are and will remain a key reference point for Germany's energy policy.

2 Policy Framework/ Instruments

To track the progress under the EU Green Deal Germany publishes its National Energy and Climate Plan (NECP), which serves as a planning and monitoring instrument and provides an overview of the energy and climate policy within the six dimensions of decarbonisation, renewable energy, energy security, internal energy market, innovation, research and competitiveness and also EE. The NECP displays the current status of projects in all these areas.³

Amongst the NECP, Germany has set its National Energy Efficiency Plan (NAPE 2.0) as part of the EffSTRA. It is a comprehensive action plan that focusses on measures to decrease final energy consumption across all sectors. It provides the foundation for various new funding schemes (private and public) or incentives to foster EE, innovation and research programs and for updated legal frameworks, which match the current EE goals and technological standards.⁴

Since the building sector plays a vital role to reach the EE targets under the NAPE 2.0. Germany has published its Energy Efficiency Strategy for Buildings, which provides a detailed framework and guidance to a climate-neutral building stock by 2050 with a focus on the reduction of energy consumption for electricity

¹ https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/energieeffizienzstrategie-2050.pdf?__blob=publicationFile&v=12

² https://www.bmuv.de/fileadmin/Daten_BMU/Pool/Broschueren/klimaschutzplan_2050_en_bf.pdf

³ <https://www.bmwi.de/Redaktion/DE/Textsammlungen/Energie/necp.html>

⁴ https://www.bmwi.de/Redaktion/DE/Downloads/I/integrierter-nationaler-energie-klimaplan.pdf?__blob=publicationFile&v=4

⁴ https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/energieeffizienzstrategie-2050.pdf?__blob=publicationFile&v=12

and heat and on an increase of the renewable energy share.⁵

Furthermore, the review of the Building Energy Act will be brought forward in 2022. As part of this review, the Act will undergo more far-reaching amendments. This will also include a review of whether the requirements stipulated in the Act need to be updated. Also, the standards for new buildings may be raised.

3 Energy Efficiency Status in Key Sectors

3.1 Building Sector⁶

The building sector has a key role to play in the energy transition and in mitigating climate change in Germany. The potential for reducing energy demand and generating heating and cooling from renewables rather than fossil fuels is high. The German Government has taken account of this fact in the NAPE 2.0, placing a particular focus on ensuring that energy consumption in the building sector is reduced in an affordable, economic, sustainable and socially equitable manner. The core aim is to leverage the potential of using local and district heating networks to decarbonise the heating and cooling supply. Such networks are good for increasing the share of renewable energy in heat generation as they can be fed by solar thermal systems or large heat pumps, for example. Heat pumps are also a good example of how sector coupling helps raise EE in buildings in a significant way: heat pumps are very efficient because they generate three to four kilowatt hours of heat with one kilowatt hour of electricity. For this reason, sector coupling is given a high priority in German plans. However even here, the priority is still to reduce consumption. To monitor and to quantify the progress of EE improvements, particular in the building sector, Germany has in 2020 prepared a so-called Long-term Renovation Strategy

(LTRS) which every EU member state has to submit the EU.

3.2 Industry Sector⁷

EE in industry takes a big share of the EffSTRA. Since EE in the industry mainly goes along with the aim to reduce GHG there are various other initiatives which are related to EE to some extent. One is for example the introduction of climate change mitigation contracts in the form of Carbon Contracts for Difference (CCfD). Those contracts shall support the use of climate-neutral technologies in the raw materials industry.

Heat pumps are a key technology for the heat transition. Funding and restructuring of the levies, fees and payments on electricity make the installation and operation of a heat pump almost as cheap nowadays as oil or gas heating. They will, therefore, become cost-effective and efficient standard solutions in new buildings and for detached and semi-detached houses in the building stock when, in 2024, the installation of new fossil fuel heating systems is no longer legal except in special cases.

3.3 Transport Sector⁸

Transport is a sector with a wide range of development in various domains. The key starting points for stepping up EE and climate action in transport are to raise the efficiency of combustion engines, to utilise electrified drives, to use renewable energy for producing fuel and, not least, to restructure the transport system. Thus, The Federal Transport Infrastructure Plan (FTIP) will be adapted to the requirements of a climate-neutral Germany in 2045. The review of the requirements plan set for December 2021 will be used to introduce a reorientation. Priority will be given to maintaining the substance of the transport infrastructure. The available budget resources will be primarily used for expanding

⁵ <https://www.bmwi.de/Redaktion/DE/Publikationen/Energie/energieeffizienzstrategie-gebaeude.html>

⁶ https://ec.europa.eu/energy/sites/default/files/documents/de_final_necp_main_en.pdf

⁷ <https://www.dena.de/en/topics-projects/energy-efficiency/buildings/#:~:text=Buildings%20account%20for%20around%2035,residential%20and%20non%2Dresidential%20buildings>

⁸ https://www.stiftung-klima.de/app/uploads/2021/08/2021-08-03_Policy-instruments-climate-neutral-Germany_WEB.pdf

the rail network. The review of the requirements plan will be completed in 2023. In 2024 the expansion legislation will be adapted for the different modes of transport.

4 Energy Efficiency Incentives & Funding Schemes ⁹

The funding of planning, investment and operating costs related to EE helps to create a level playing field in the industrial, building and transport sector. Since the very beginning of the energy transition in Germany there have been various incentives and funding schemes. Already in 2011 Germany established the German Energy and Climate Fund (EKF)¹⁰. Financing from this fund is solely utilised to support the transition towards climate neutrality and EE across all sectors. In 2019 the fund had a volume of EUR 45bn.

The most recent schemes focusing on the key sectors transport, industry/trade/commerce, buildings and agriculture will be outlined in the following.

Measures in the industrial / commercial / service

1. Federal Funding for Energy and Resources Efficiency in Industry and Commerce (Energie und Ressourceneffizienz in der Wirtschaft)¹¹

The funding is aimed at all sectors and consists of six modules, each linked to a subsidy. The subsidised investment fields are defined as:

- High efficiency cross-sectoral systems;
- Process heat from renewable energies;
- Smart energy and/or resource management systems;
- Individual energy and resource efficiency concepts;

- Decarbonisation;
- Funding competition for energy and resource efficient business processes.

Subsidies range from 30 % to 60 % of the eligible investment costs with higher rates for SMEs. The subsidised amounts can range up to EUR 15,000,000 per investment project but vary for the different investment fields. For more flexibility some modules include the choice of a subsidy and/or a KfW loan with preferential conditions. The EEW funding scheme comprises a huge variety of funding possibilities for corporates and municipalities in EE to fit their individual needs.

2. Federal Funding for Efficient Heating Networks (Wärmenetzsysteme 4.0.)¹²

The funding is provided for (a) the construction of **new heating networks** that draw large parts of their heat from **sustainable and renewable energy sources** or **unavoidable waste heat** and (b) the **decarbonisation of existing heating networks**. This funding is mostly relevant for communities and communal companies. The scheme is structured in four modules along the project phases of the construction/conversion of heating networks. The subsidies range from 50 % to 80 % of eligible investment costs up to a maximum amount of EUR 15,000,000 per investment project.

3. Federal grants for stationary cooling and air condition systems (commercial usage)¹³

These grants are provided for (a) **new stationary refrigeration, air-conditioning systems and heat pumps** operated with **non-halogenated refrigerants** and additional measures for climate-protective operation and for (b) the purchase of **new air-conditioning systems in electric buses and rail vehicles** and the retrofitting of air-conditioning systems in rail vehicles if they are operated with **non-halogenated refrigerants**. The grant amounts are calculated based on the efficiency of the

⁹<https://www.bundesfinanzministerium.de/Content/EN/Downloads/Climate-Action/immediate-climate-action-programme-for-2022.pdf?blob=publicationFile&v=3>

¹⁰ <https://www.bmwi-energiewende.de/EWD/Redaktion/Newsletter/2020/04/Meldung/direkt-erklart.html>

¹¹ <https://www.deutschland-machts-effizient.de/KAENEF/Redaktion/DE/Dossier/anlagentechnik.html>

¹² https://www.bafa.de/DE/Energie/Energieeffizienz/Waermenetze/waermenetze_node.html

¹³ https://www.bafa.de/DE/Energie/Energieeffizienz/Klima_Kaeltetechnik/klima_kaeltetechnik_node.html;jsessionid=2F15F2E5A016802A659FFC6EE2F9086B.2_cid362

relevant system but make up to 50 % of the eligible investment costs in a maximum amount of EUR 150,000 per investment project.

4. KfW Energy Efficiency Program for Production Facilities/Processes¹⁴

KfW offers promotional loans to corporates for EE investments relating to [production facilities and commercial processes](#). The program covers measures such as [heat recovery, waste heat utilisation, combined heat and power plants, EE in production plants or control technologies](#). Only new investments or modernisations which lead to pre-defined energy savings can be financed. The KfW loans can amount up to EUR 25,000,000 with a preferential interest rate.

5. Additional funds for the decarbonisation of industry program (carbon contracts for difference)

As part of the decarbonisation of industry program, the Federal Government will expand the pilot scheme for [carbon contracts for difference](#). Carbon contracts help mitigate the higher operating costs of low- and zero-emission processes. The Chemistry4Climate platform will also be set up as part of the program.

Measures in the buildings sector

Existing buildings are the greatest climate policy challenge in the buildings sector. Funding budgets for 2022 and 2023 will be increased to ensure sufficient federal funding for energy-efficient buildings. From 2023 onwards, no federal funds will be provided for heating systems that can only be operated using fossil fuels.

1. Federal Funding for Energy Efficient Buildings (Bundesförderung für effiziente Gebäude)¹⁵

This scheme promotes a wide range of funding opportunities and was set up to support the transition of the building sector towards a

climate-neutral building stock by 2050. The scheme targets homeowners, corporates and municipalities where homeowners can apply for a subsidy for residential buildings, corporates for non-residential buildings and municipalities for both. The funding will be provided for [single measures implemented in existing buildings](#) and for the [renovation or the construction of a new energy efficient building](#). The subsidies can be utilised in form of a low-interest KfW loan with repayment subsidy or directly as investment subsidy without loan.

Single measures must improve the energy level of the building. Those include the installation of [efficient heating/cooling technologies and systems](#) (e.g., renewable energies in heating systems, air-conditioning systems with heat/cold recovery, smart home systems) and [measures on the building envelope](#) (e.g., insulation of the building envelope, renewal of the windows/doors or thermal insulation). The subsidies for single measures cover 20% to 50% of the eligible investment costs and to some extent also costs for energy consulting, energy audits, technical planning and construction supervision.

For the renovation or construction of new energy efficient buildings the subsidy volume depends on the EE category of the planned construction. It ranges from 20 % to 50 % of the investment costs, varying for residential and non-residential buildings. To some extent costs for energy consulting, energy audits, technical planning and construction supervision are also covered.

Measures in the transport sector

1. Federal Funding for Energy Efficiency in Electric Rail Transport (Energieeffizienz des elektrischen Eisenbahnverkehrs)¹⁶

Eligible for funding are railway companies which are investing in technologies and measures improving the [efficiency of the electrical transport](#)

¹⁴<https://www.kfw.de/inlandsfoerderung/Unternehmen/Energie-Umwelt/F%C3%B6rderprodukte/EE-Produktion-292/?redirect=601600>

¹⁵<https://www.deutschland-machts-effizient.de/KAENEF/Redaktion/DE/Dossier/beg.html>;

<https://www.kfw.de/inlandsfoerderung/Bundesf%C3%B6rderung-f%C3%BCr-effiziente-Geb%C3%A4ude/>

¹⁶https://www.bav.bund.de/DE/4_Foerderprogramme/93_Energieeffizienz_Eisenbahnverkehr/Energieeffizienz_Eisenbahnverkehr_node.html

capacity (e.g., new converter technologies, implementation of network driver assistance systems and regenerative power supply). The amount of the funding is calculated based on the EE improvement concerning the provided electrical transport service and is capped at a maximum 50% of the eligible investment costs. The subsidies will cease to be available end of 2022.

2. Federal funding for sustainable modernisation of inland and coastal vessels¹⁷

The two funding schemes for inland vessels and coastal vessels both aim for the reduction of emissions and energy consumption relating to vessels. The modernisation of the vessels by replacing the engines, improvement of hydrodynamic or propulsion. Measures are eligible for funding if they reduce energy consumption by minimum 10 %. For coastal vessels the subsidy covers up to 30 % of the investment costs, for inland vessels it covers up to 90 % of the eligible additional investment expenditure.

5 Energy Efficiency Necessity measured by SDG covered by Triple-A Database

The Triple-A Interactive Web-based Database¹⁸ is a visual representation of the most important aspects in EE financing, including the risks that could endanger the successful implementation of an EE project, the strategies that could mitigate these risks, the preferences of investors on EE investments, the financial performance of EE projects, the models and instruments that are usually used to finance EE projects and the performance of case study countries in terms of Sustainable Development Goals (SDG)¹⁹.

The need to enhance EE in the study countries is illustrated by assessing the progress of the

study countries in relation to the sustainable development goals. In this context, relevant indicators such as the total population living in poorly insulated dwellings, the total population with overdue utility bills, the country's energy imports, etc. have been taken into account. The data have been aggregated and normalised, presenting them in percentages.

The main result, as shown in the pie graph below, is that the building sector occupies the first position among the three sectors with the biggest presence of 71%. It is important to note that the building sector includes both residential and non-residential buildings with measures of Automatic Control, building and shell construction, HVAC&R, integrated renovation, lighting devices and renewable energy installations. The industrial sector based on compressed air, heating and cooling, motors, pumps and refrigeration occupies 59% of the EE necessity measures. Finally, the transport sector with the purchase of new public and passenger vehicles occupies 42% of the sustainable development target.

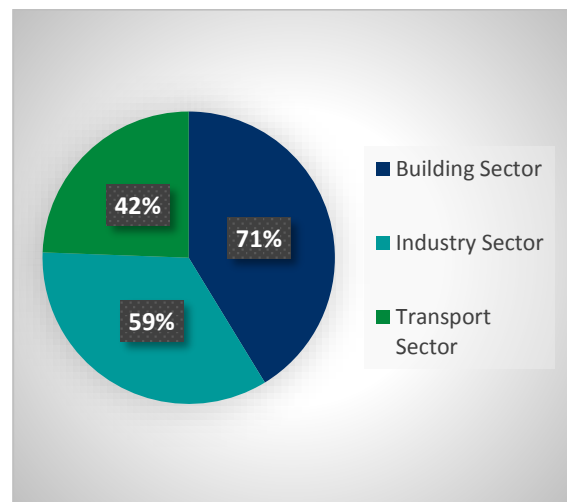


Figure 1: Energy Efficiency Necessity measured by the SDG

¹⁷ <https://www.foerderdatenbank.de/FDB/Content/DE/Foerderprogramm/Bund/BMVI/nachhaltige-modernisierung-von-binnenschiffen.html>;

<https://www.foerderdatenbank.de/FDB/Content/DE/Foerderprogramm/Bund/BMVI/nachhaltige-modernisierung-kuestenschiffe.html>

¹⁸ <https://aaa-h2020.eu/database>

¹⁹ <https://database.aaa-h2020.eu/>

6 Takeaways & Conclusion

Germany's energy system is currently undergoing a massive transformation. Besides the shift towards renewable energies in electricity generation and fuel substitution, EE plays a key part in the transformation towards a green energy economy. This briefing note outlined the contribution of EE policies as part of the green energy system transformation in Germany. The current EE policy framework in Germany was presented and the intended developments laid down in the Federal Government's latest National Energy Efficiency Action Plan, designed to deliver considerable additional savings by 2030-2050. EE is, therefore, an essential element in Germany in limiting energy demand and keeping it at a level for which the necessary generation and infrastructure can be provided.

TRIPLE-A IN BRIEF

Triple-A -Enhancing at an Early Stage the Investment Value Chain of Energy Efficiency Projects - is an EU-funded research project under the Horizon 2020 programme, aiming to assist financial institutions increase their deployment of capital in energy efficiency, making investments more transparent.

VISIT OUR WEBSITE



www.aaa-h2020.eu

CONTACT US



contact@aaa-h2020.eu

FOLLOW US



[@H2020_AAA](https://twitter.com/H2020_AAA)



[Triple-A Project](#)



[triple_a_horizon2020](#)



[Triple-A Horizon 2020](#)