Refrigeration and air conditioning systems (Kälte- und Klimaanlagen), Germany

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Background and objectives

The **Climate Action Program 2030**, adopted in October 2019, set measures across all sectors to achieve Germany's climate goals. In the field of refrigeration and air-conditioning, these include improving energy efficiency, reducing cooling demand, and cutting emissions from fluorinated greenhouse gases.[1] **National Climate Initiative (NKI)** of the **Federal Ministry for Economic Affairs and Climate Protection** supports and initiates climate protection projects throughout Germany. On this basis, **the Ministry issued the funding directive** for the Promotion of Refrigeration and Air Conditioning Systems with Non-halogenated Refrigerants in Stationary Applications of **February 12, 2024**, implementing EU Regulation 517/2014 on fluorinated greenhouse gases, and creating the current **funding scheme**: **Refrigeration and air conditioning systems** (Kälte- und Klimaanlagen). The **Federal Office for Economic Affairs and Export Control (BAFA)** is responsible for processing funding applications and disbursing grants. The scheme will expire by December 31, 2026, at the latest.[2]

Its **operational objectives** are to achieve **annual cumulative energy savings of 270 GWh net** (580 GWh gross) and **greenhouse gas reductions of 65,000 tons CO_2 equivalent net** (180,000 tons gross), while supporting the market penetration of energy-efficient, climate-friendly technologies in companies and other commercial operators.**Error! Bookmark not defined.**

Key features

The funding is available to **commercial users**, including companies, non-profit organisations, municipalities (local authorities, special purpose associations, and municipal enterprises), universities and schools, hospitals, church institutions, and contractors (commissioned by the property owner, lessee, or tenant). **Private individuals are explicitly not eligible**, and federal states/their institutions/state-owned companies are generally excluded, with exceptions for the listed institutions.

Funding is provided as a **non-repayable grant** and is structured based on either **de minimis aid** (primary basis for funding, must not exceed EUR 300,000) or the **General Block Exemption Regulation (AGVO)** (If De minimis Threshold Exceeded). The subsidy is limited to **200,000 euros per measure** and a maximum of 50% of the eligible expenditure.

Projects started before the grant notification are ineligible, and non-compliance with procurement rules (ANBest-P/Gk) can result in retroactive revocation. Grant recipients also receive a "de minimis certificate," which must be kept for ten years, presented on request, and included in future applications; if not submitted on time, approval lapses and funds plus interest may be reclaimed. The decommissioning of a subsidised facility generally leads to the revocation of the subsidy.**Error! Bookmark not defined.**

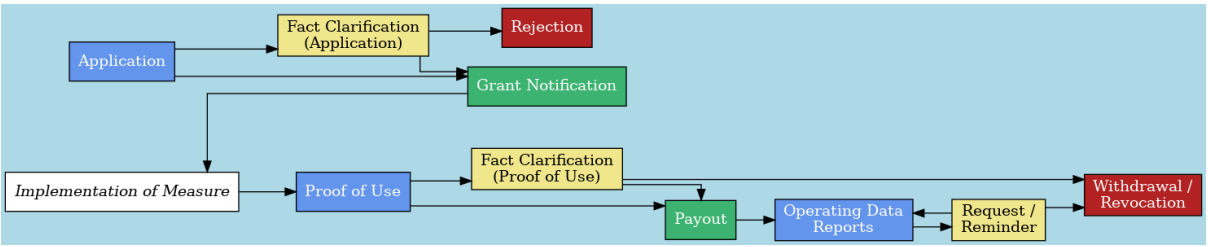
The CoolLIFE project has received funding from the LIFE Programme of the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.

Eligibility Criteria and Measures for Systems	Additional Subsidies	Mandatory documents for proof of Use
Installation of cooling units/chillers and recooling systems, heat pumps for waste heat utilisation, and components and systems (such as deep-freeze stages, air coolers/evaporators, (adiabatic) recoolers, thermal storage (hot/cold water, ice, latent heat), cooling brine circuits, components for heat pump operation and waste heat utilisation, and control/regulation technology for pre-cooling and free cooling operation)	An **additional 15% increase in funding** for the refrigeration unit can be granted for heat pump operation (outdoor evaporator). A **5% increase in subsidy** for the refrigeration unit is possible for components for waste heat utilisation.	Online form, flow diagram of the installed system, efficiency certificate (BAFA Efficiency Check or Quality Seal for RLT systems), proof of commissioning (if renewables), supply/service contract, acceptance report, contractor declaration, and maintenance contract/proof, invoices
Retrofitting of dry coolers as pre-coolers or free coolers		Same as above
Integration of renewable energy systems	A one-off lump sum of €2,000 for solar thermal systems	Same as above
Efficiency retrofitting of small compression refrigeration or air conditioning systems with fluorinated refrigerants	A **flat rate of 750 euros** is provided for control and regulation technology for pre-cooling and free cooling operation	Online form, BAFA efficiency check results, supply/service contract, contractor declaration (efficiency upgrades), invoices

Implementation

The **Federal Office for Economic Affairs and Export Control** (BAFA) is the primary administrative body, commissioned by the Federal Ministry for Economic Affairs and Climate Protection (BMWK) to implement the funding guideline. **Expert Contractors** (Fachunternehmer) are the specialized companies that carry out the installation, retrofitting, or conversion work. The **Federal Court of Auditors** ("Bundesrechnungshof") and the **auditing bodies of the European Union** are entitled to examine all submitted documents and processes related to the funding.[Error! Bookmark not defined.]

Implementation of the scheme (translated from the application process diagram)[3]



Budget (or other cost data)

It is not possible to find an overall budget for the current funding scheme or details on its administrative costs. However, the most recent evaluation finalized in August 2023, covers the funding years from 2008 until 2021: Between **2008 and 2021, €242.9 million** in funding was disbursed (€26.8 million in 2008–2011, €69.7 million in 2012–2014, €49.9 million in 2015–2017, €53.5 million in 2018–2019, €43.0 m in 2020–2021). With the following application areas in 2020-2021: Supermarket refrigeration systems: €31 million (72% of total), Other systems ("Sonstige Anlagen"): €8.6 million (20% of total), and Sorption refrigeration systems: €3.39 million (8% of total).[4]

Results and impacts

Number of Participants/Projects: In the **2020-2021 evaluation period, 903 operators** of refrigeration and air conditioning systems received funding. Historically, from **2008 to 2021, a total of 3,783 projects** were funded. The annual number of funded projects varied: 245 (2008-2011), 742 (2012-2014), 865 (2015-2017), 1,028 (2018-2019), and 903 (2020-2021).

Actions Implemented per Type of Action/Application Area: In the **2020-2021 period**, most funding went to **supermarket refrigeration systems (589 projects, 65%)**, followed by "other systems" ("Sonstige Anlagen") at **250 projects (28%)**, and sorption refrigeration systems at **64 projects (7%)**. Historically, from **2008 to 2021**, a total of **2,122 supermarket systems (56%)**, **411 sorption refrigeration systems (11%)**, and **1,250 other/climate systems (33%)** were funded.

Cooling Capacity (Kälteleistung): The total cooling capacity of funded systems in **2020 was 69,239.9 kW** (495 plants) and in **2021 was 55,371.7 kW** (408 plants). Over the program's history (2008-2021), the total cooling capacity of funded systems was **873.7 MW.**

Lessons learnt

A significant finding from the 2020-2021 evaluation is the presence of considerable deadweight and displacement effects, particularly in the supermarket refrigeration sector. The evaluation found that **approximately 30% of funded recipients would have installed a less innovative solution or not invested at all without the program's support**. Specifically, 63% of supermarket refrigeration applicants indicated they would have installed the same technology at the same time, even without funding. This high "Mitnahmeeffekt" (deadweight effect) suggested that in this segment, the required standards for funded systems largely correspond to the current state of the art, which leads to evaluators explicitly **recommending excluding supermarket refrigeration systems from future funding** from January 2023.

The 2024 version of the directive includes the following lessons: Funding amounts for de minimis aid have been **increased by 10%** to maintain incentive effect given rising costs; “Efficiency retrofitting of small systems" and "retrofitting of dry coolers" were added as new funding criteria; The "BAFA Efficiency Check for Refrigeration and Air Conditioning Systems" became mandatory for compressors with an electrical power consumption of **20 kW or more**, ensuring a minimum energy efficiency standard (MEPS) is met, verifiable via a Seasonal Energy Performance Ratio (SEPR) calculation. This strengthens the focus on demonstrable energy efficiency beyond general technical requirements. The evaluators' recommendation to exclude supermarket refrigeration systems from funding was implemented from January 2023, based on their finding of high deadweight effects in this area.

Sources

[1] Bundesministerium für Wirtschaft und Klimaschutz. (2024). *Förderrichtlinie zur Förderung von Kälte- und Klimaanlagen mit nicht-halogenierten Kältemitteln in stationären Anwendungen im Rahmen der Nationalen Klimaschutzinitiative(NKI)* [Report]. https://www.klimaschutz.de/sites/default/files/mediathek/dokumente/Ka%CC%88lte-Klima-RL_Novelle2024_0.pdf

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(n.d.). https://www.bafa.de/DE/Energie/Energieeffizienz/Klima_Kaeltetechnik/klima_kaeltetechnik_node.html

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[4] Klinski, S., Öko-Institut, Nissen, C., & Ludig, S. (2023). Evaluation 2020/2021 der Richtlinie zur Förderung von Maßnahmen an Kälte- und Klimaanlagen im Rahmen der Nationalen Klimaschutzinitiative (NKI) “Kälte-Klima-Richtlinie.” In *Evaluation Kälte-Klima-Richtlinie* (p. 3). Öko-Institut. https://www.klimaschutz.de/sites/default/files/mediathek/dokumente/A3_K%C3%A4lte-Klima-Richtlinie_Eval_2021.pdf