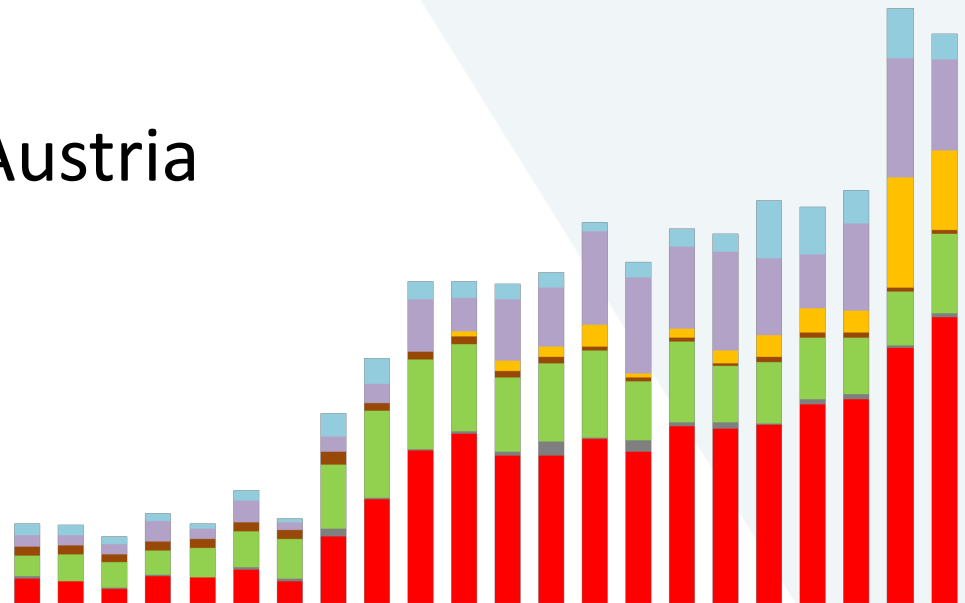


Energy RD&D 2023

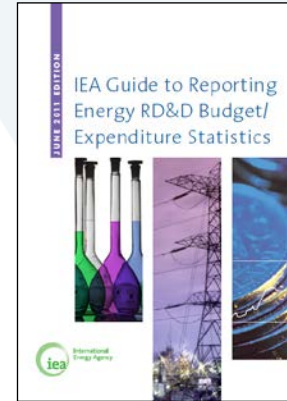
Public Expenditures in Austria

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Austrian Energy Agency
Vienna, June 2023



About the survey

- Yearly survey since 1974, internationale Verpflichtung
- Carried out by the Austrian Energy Agency on behalf of BMK
- According to uniform specifications of the IEA
- Comprehensive publication of the Austrian survey and evaluation (BMK publication series)
<https://nachhaltigwirtschaften.at/de/iea/publikationen/energieforschungserhebungen.php>
- Annual reporting to the IEA - international overview on the publicly accessible IEA database:
<https://www.iea.org/subscribe-to-data-services/energy-technology-rdd>

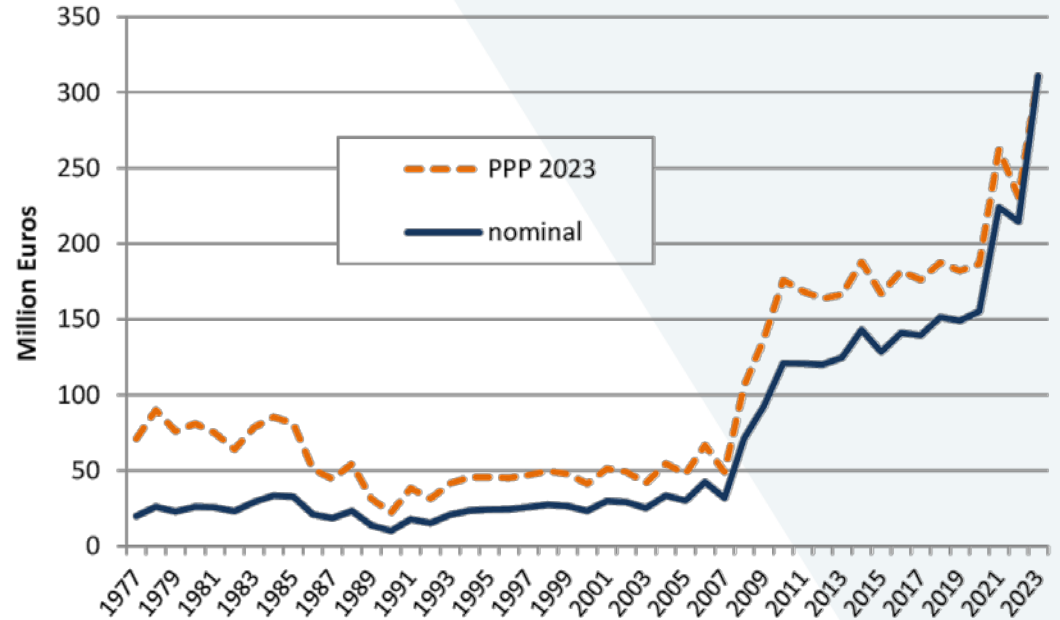


About the method

- Survey of federal provinces, ministries, FWF, FFG, AWS, KPC -> funding expenditures are surveyed (commitments entered into; not budgets) - Advantages: contractually fixed, exact amounts; high level of detail in allocation possible, as each project is assigned to one of approx. 140 topics
- Questionnaires to universities, universities of applied sciences and non-university research facilities -> Survey of how the share of own funds "basic funding from the federal government and the federal provinces" is used in relation to projects or energy
- High response rate to the voluntary survey!
- Approx. 1,400 projects and activities related to energy research were recorded for 2023

2023: 310.8 million euros

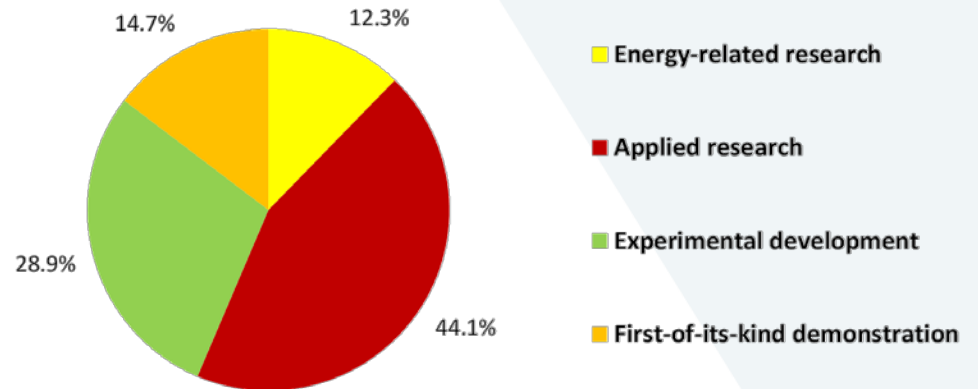
- Public spending on research, development and demonstration projects in the energy sector amounted to 310.8 million euros in 2023
- Compared to the previous year, there was an increase of 96.3 million euros or 44.9%.



Source VPI: Statistik Austria

Areas of RD&D 2023

- Four types of activities are considered and distinguished in the survey.



Topics

Expenditure by main topic in 2023 and change compared to the previous year

Energy efficiency: 121.5 million euros – plus 13.7 million euros

- Energy efficiency has clearly been the top priority of Austrian energy research since 2010 and the area with the most expenditure.

Other cross-cutting technologies and research: 61.6 million euros – plus 51.5 million euros

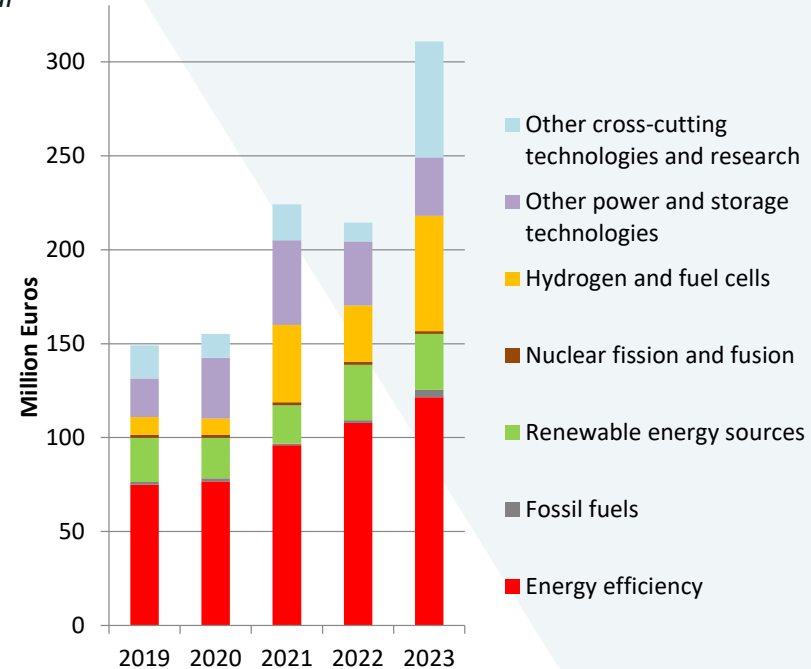
Hydrogen and fuel cells: 61.5 million euros – plus 31.4 million euros

Other power and storage technologies: 31.1 million euros – minus 2.9 million euros

Renewable energy sources: 29.8 million euros – stable

Fossil fuels: 3.9 million euros – plus 2.5 million euros

Nuclear fission and fusion: 1.4 million euros – minus 0.2 million euros

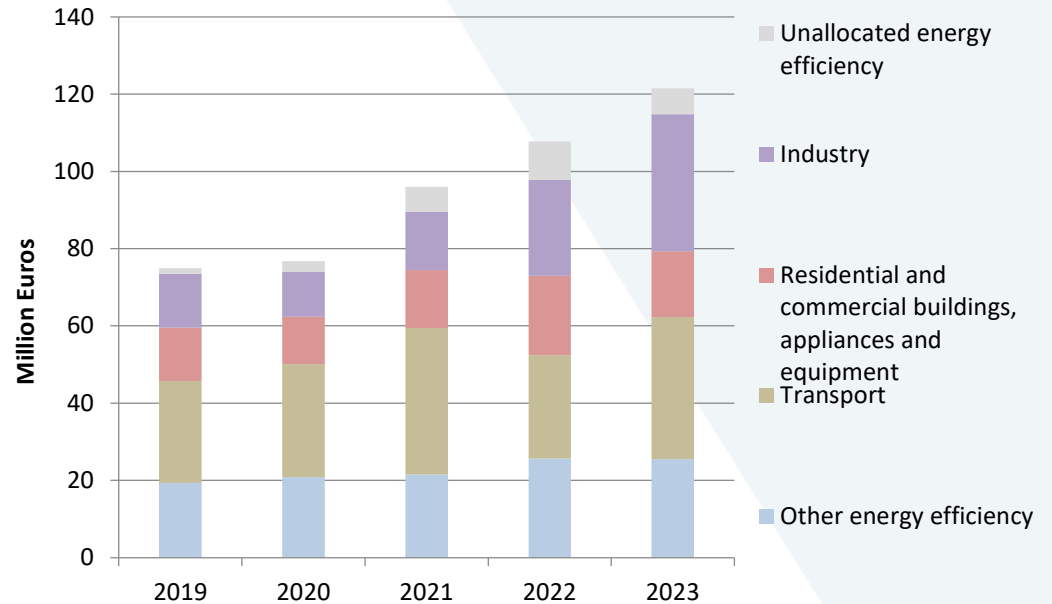


Top Ten

Rank	Subcategory	Expenditures 2023 (in million euros)
1	Hydrogen	46.0
2	Energy efficiency in industry	35.5
3	Basic energy research	26.4
4	Hybrid and electric vehicles, storage, charging infrastructure	22.9
5	Efficient municipal services, „smart cities“	19.0
6	Electricity transmission and distribution	17.5
7	Biofuels	17.4
8	Fuel cells	15.4
9	Energy-efficient buildings	14.7
10	Energy system analysis	11.2

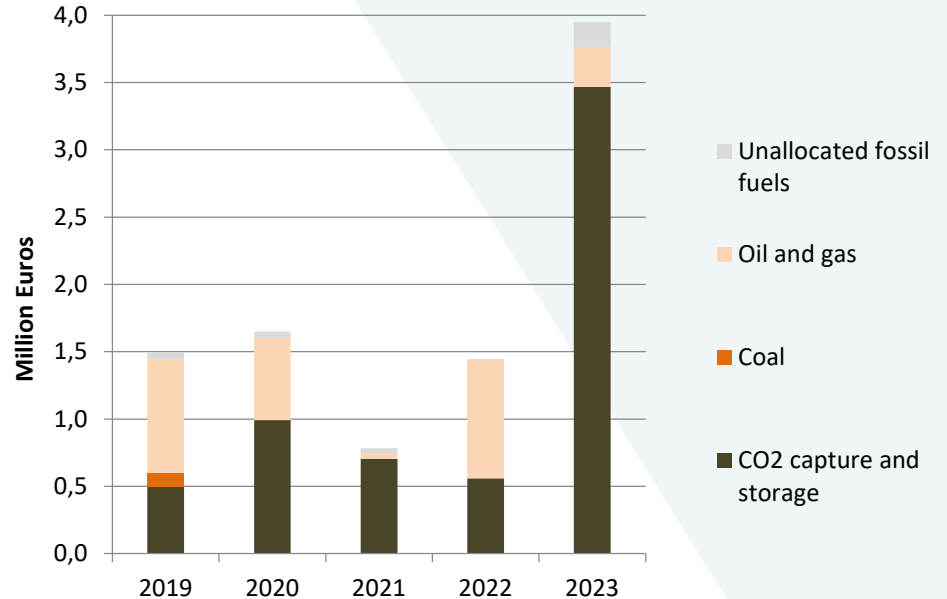
Energy efficiency

- Within energy efficiency, the "Transport" and "Industry" sub-sectors each accounted for almost 30% in 2023.
- The "Other energy efficiency" area (including issues relating to smart cities, heat pumps, etc.) accounted for 21 %
- "Residential and commercial buildings, appliances and equipment" 14 %



Fossil fuels

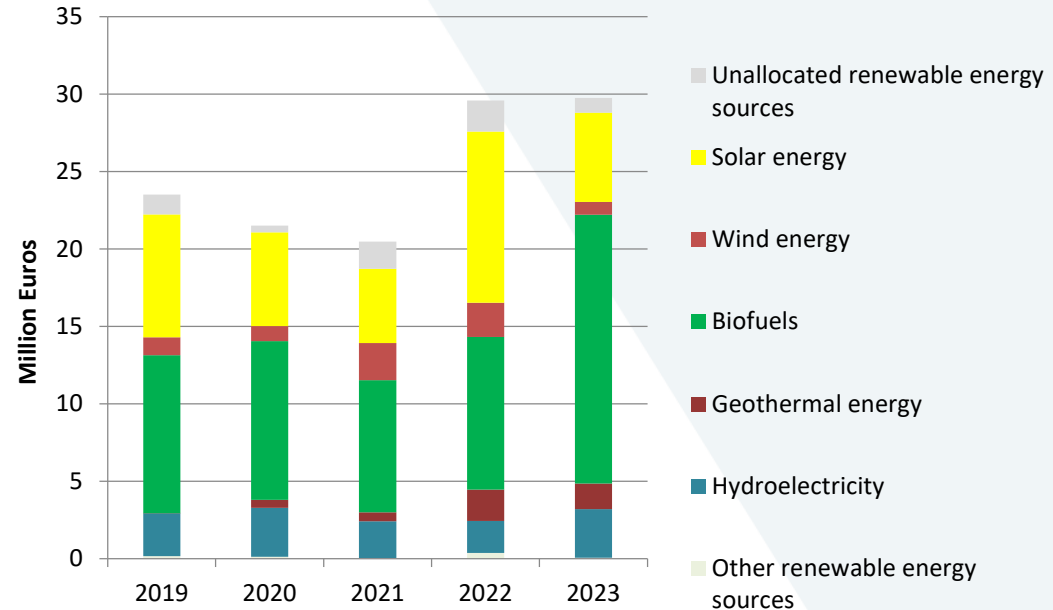
- 2023: at 3.9 million euros, the budget has risen sharply compared to previous years.
- This topic also includes all activities for capture and storage technologies for CO2 in general, which make up the largest part at almost 90 %.



Renewable energy sources

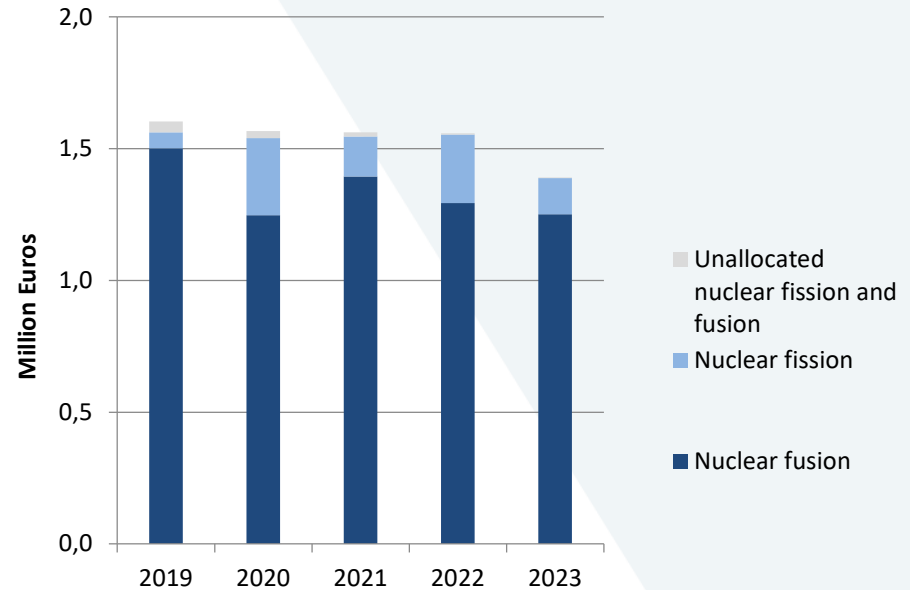
Individual areas 2023 in million euros:

- Solar energy 5.8 (thereof 5.4 for PV)
- Biofuels 17.4
- Wind energy 0.8
- Hydroelectricity 3.1
- Geothermal energy 1.7
- Very low expenditures with ocean energy



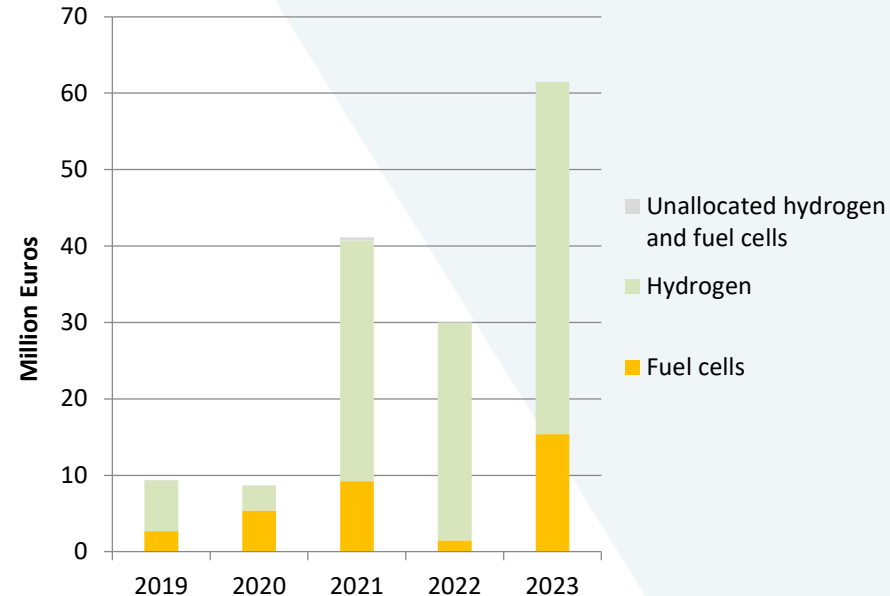
Nuclear fission and fusion

- Spending on nuclear energy R&D is 1.4 million euros in 2023.
- Nuclear fusion is 1.3 million euros. The activities are predominantly carried out within the framework of the European co-financing scheme EUROfusion.
- Nuclear fission is 0.1 million euros. Primarily self-financed research at the TU Vienna with a focus on reprocessing and safety.



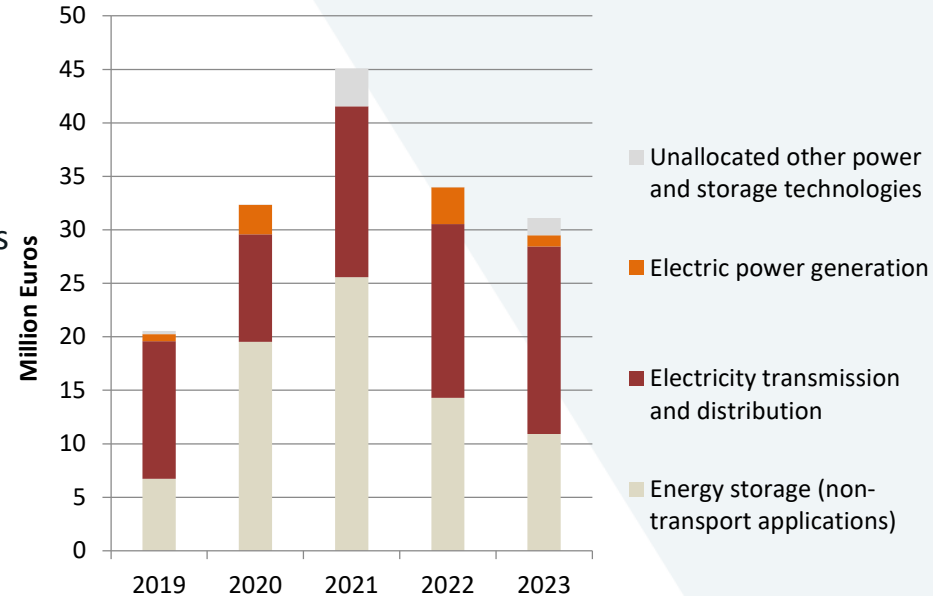
Hydrogen and fuel cells

- **Hydrogen:** Expenditure rose again in 2023 and reached a new peak of 46.0 million euros. At 25.2 million euros, more than half of these funds were provided by the federal ministries in 2023, with a further 15.7 million euros coming from the Climate and Energy Fund.
- **Fuel cells:** Funding increased tenfold to 15.4 million euros after a low point in 2022.



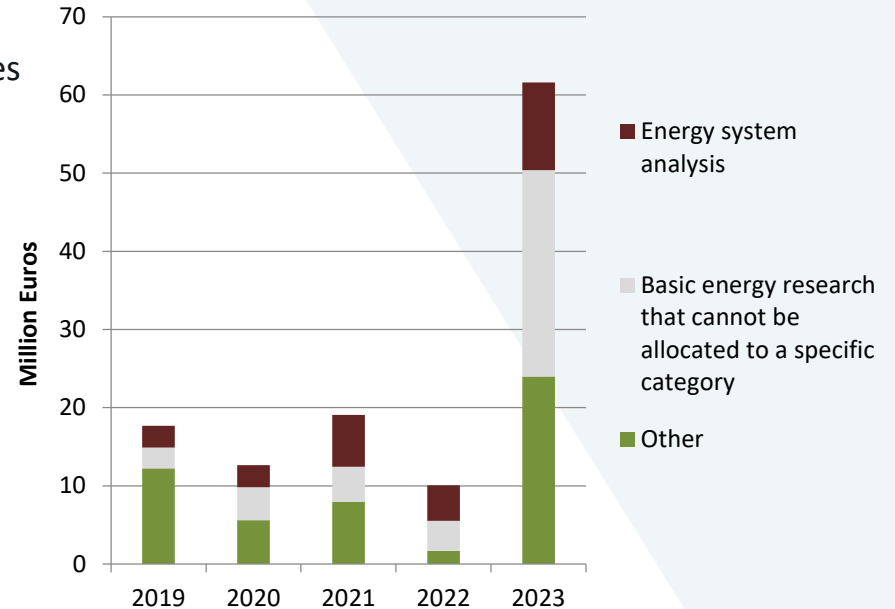
Other power and storage technologies

- 31.1 million euros in 2023
- Further decrease compared to the previous year.
- Storage sub-sector: 10.9 million euros, three quarters of which for battery storage
- Electrical transmission and distribution: 17.5 million euros, key topics: Integration of renewable energy sources into the electricity system, smart grids



Other cross-cutting technologies and research

- Very strong increase in the area of cross-cutting issues to 64.2 million euros
- All 3 sub-areas have grown



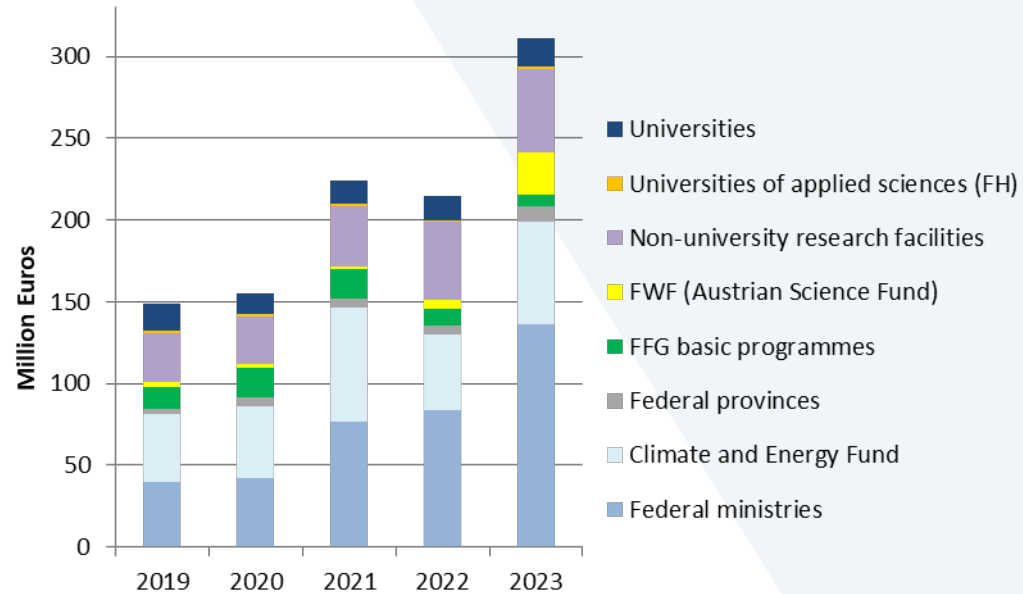
Institutions 2023 – Who financed?



78 % of the expenditure represented direct funding from funding agencies.



Remainder: own research at research institutions with basic funding from the federal or state government.



Institutions

Institution	Expenditures 2023 in euros	Change compared to 2022 in euros	Change compared to 2022 in %
Federal ministries	136,313,122	+52,415,408	+62.5 %
Climate and Energy Fund	62,330,633	+15,964,714	+34.4 %
Federal provinces	9,786,481	+4,673,765	+91.4 %
FFG basic programmes	7,216,848	-3,369,242	-31.8 %
FWF (Austrian Science Fund)	25,722,152	+20,374,724	+381.0 %
Non-university research facilities	50,708,944	+3,358,844	+7.1 %
Universities of applied sciences	1,497,945	+378,137	+33.8 %
Universities	17,194,367	+2,537,453	+17.3 %
Result	310,770,492	+96,333,803	+44.9 %

Institutions

- The Climate and Energy Fund was able to show a strong increase of one third (16.0 million euros) and thus almost reached the 2021 level again.
- The FFG basic programs were allocated 7.2 million euros and thus decreased by 3.4 million euros.
- In total, funds amounting to 184.3 million euros were processed via the FFG, but the majority of this was allocated to the ministries, federal states and the Climate and Energy Fund.
- Funding from the federal states almost doubled to 9.8 million euros, mainly Upper Austria with 7.0 million euros.
- The FWF almost quintupled its funding to 25.7 million euros.

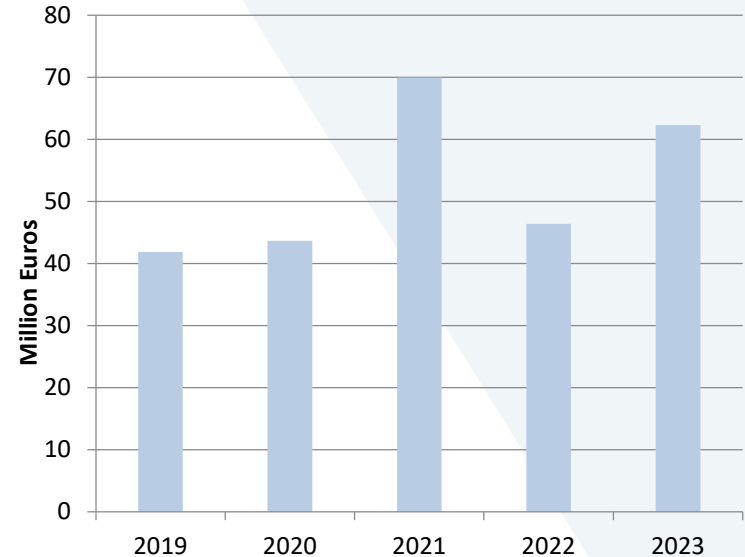
Federal ministries 2023: 136.3 million euros

- Of this, 107.6 million euros were allocated to the Federal Ministry for Climate Protection, Environment, Energy, Mobility, Innovation and Technology (BMK).
- Federal Ministry of Labour and Economic Affairs (BMAW): 25.5 million euros
- Federal Ministry of Agriculture, Forestry, Regions and Water Management (BML): 1.5 million euros
- Federal Ministry of Education, Science and Research (BMBWF): 0.9 million euros
- Federal Ministry of Finance (BMF): 0.9 million euros
- The expenditures include projects awarded directly by the ministries as well as programmes in their respective areas of responsibility that are handled by the funding agencies FFG, KPC and AWS on behalf of these ministries.

Climate and Energy Fund

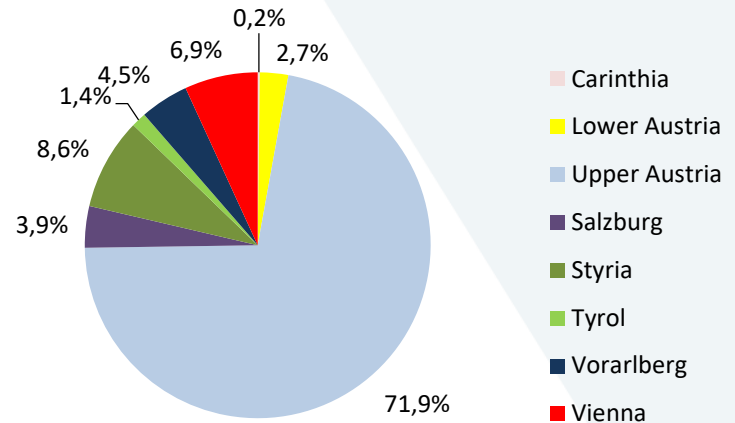
Energy research-related expenditures in 2023 were found in the following programme lines handled by the FFG:

- Energy Research (14.5 million euros)
- Energy Model Region (11.2)
- Zero Emission Mobility (8.0)
- Lighthouses for Resilient Cities 2040 (6.1)
- Austrian Climate Research Programme (2,8)
- Technology cooperation programmes in the IEA (0.6)



Federal provinces

- The expenditure mentioned by eight out of nine federal provinces for 2023 amounted to 9.8 million euros and increased - compared to the previous year - by 91.4 %.
- Upper Austria accounted for almost three quarters of the total (71.9 %), followed by Styria and Vienna with 8.6 % and 6.9 % respectively.

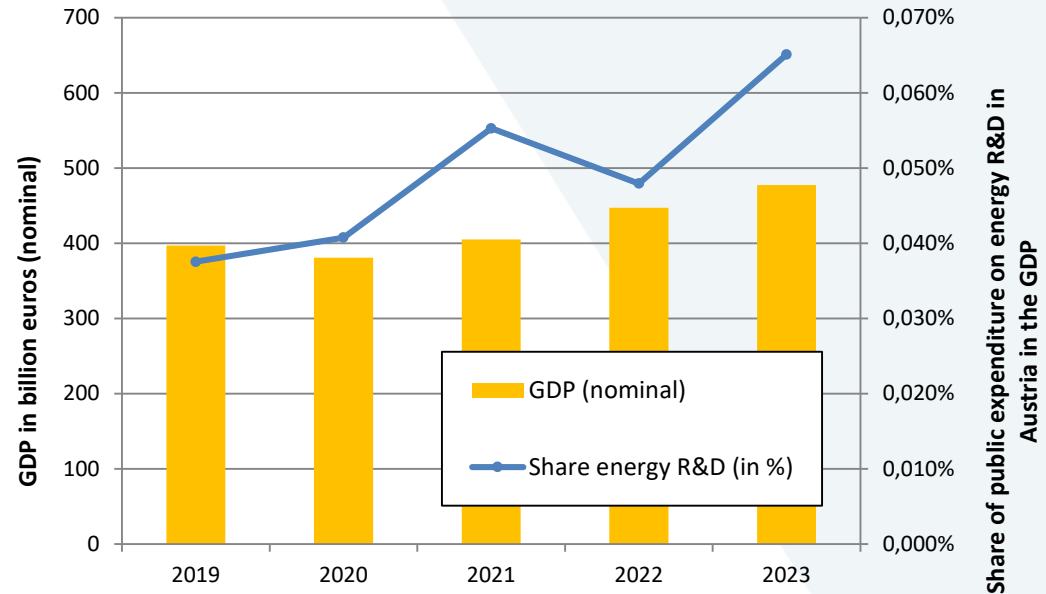


Equity capital for RD&D infrastructure

- Particularly relevant: AIT with 27.1 million euros and Silicon Austria Labs with 22.1 million euros among **non-university research facilities**.
- The **universities'** reported own equity capital rose to 17.2 million euros. Two thirds were provided by the TU Vienna.
- Expenditure from own resources at the **universities of applied sciences** increased as well and accounted for 1.5 million euros in 2023.

Public energy RD&D expenditures in Austria per GDP

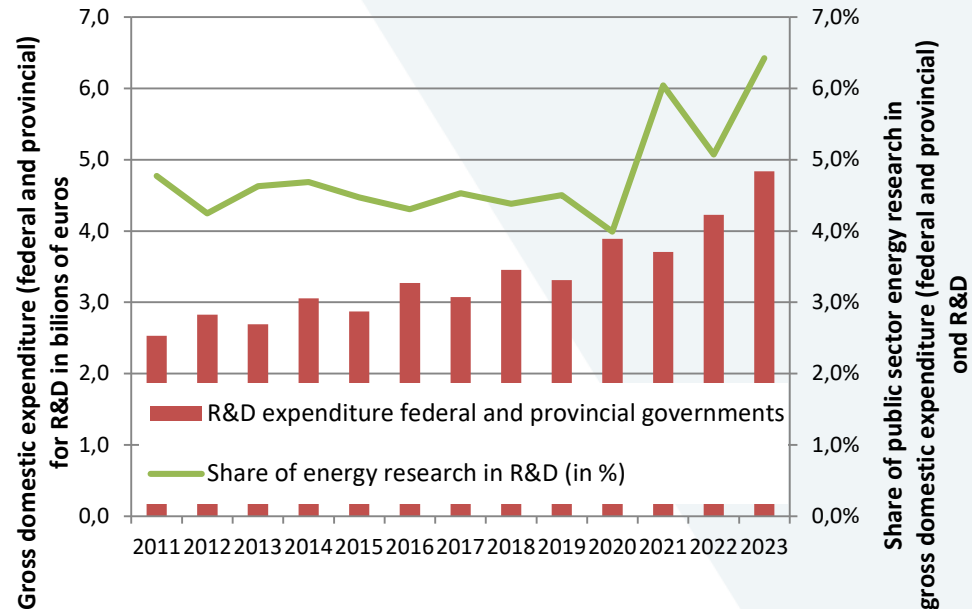
- The importance of energy research can also be measured by its share in the economic performance of a national economy (expressed by the gross domestic product GDP).
- In 2023, the high increases in the energy sector led to a substantial rise to 0.065 %.



Source GDP: Statistik Austria

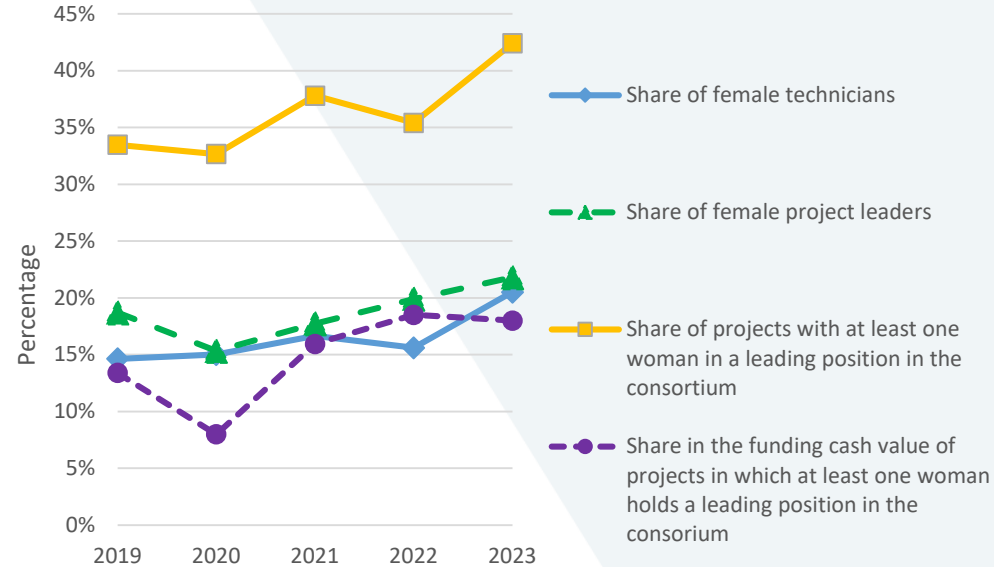
Research expenditure in Austria

- In 2023, research expenditure reached an all-time high due to the strong increases in the energy sector. The share of energy research in gross domestic expenditure on R&D rose to 6.4%, the highest value to date.
- Indirect R&D funding in the form of the research premium is not taken into account here.



Gender-specific evaluation

- In 143 out of 316 of the projects commissioned by or via the FFG in 2023, at least one woman holds a leading position in the consortium.
- More projects were led by women in 2023 than in previous years: 69 projects or one in five projects.
- The proportion of female technicians in the projects is 20.5% and has therefore continued to rise.
- On average, these female project managers were responsible for smaller projects than their male colleagues, but the gap in terms of project volume widened again in 2023.
- The respective shares vary substantially between topics or programmes.



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