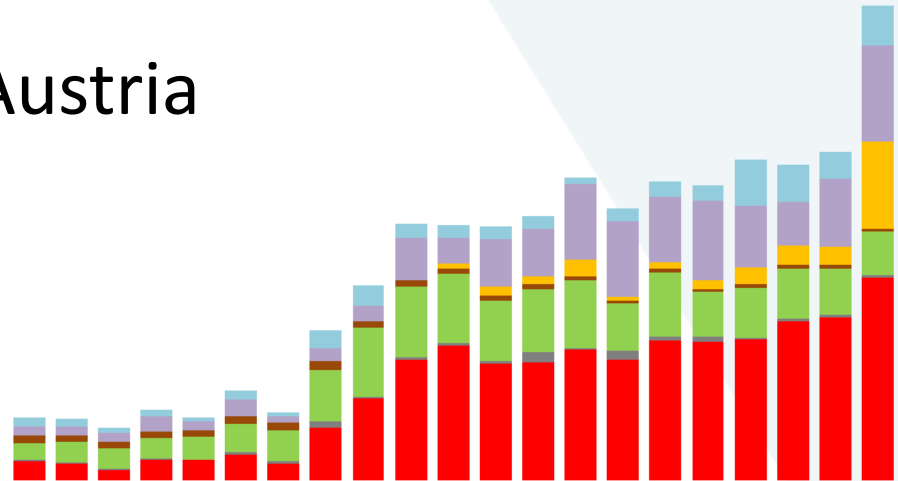


# Energy RD&D 2021

## Public Expenditures in Austria

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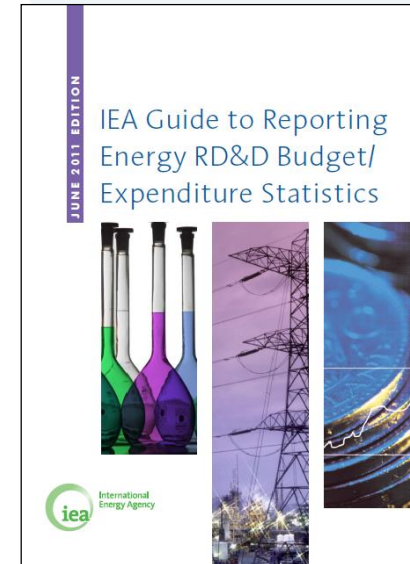
## About the survey

- Austria yearly records all energy-related research, development and first-of-its-kind demonstration projects (RD&D) financed by means of public funds
- Allows emphasising the importance of energy research for Austria as well as creating and checking policy goals
- Has been carried out annually since 1974
- The Austrian Energy Agency has been appointed by the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) to gather and evaluate the data



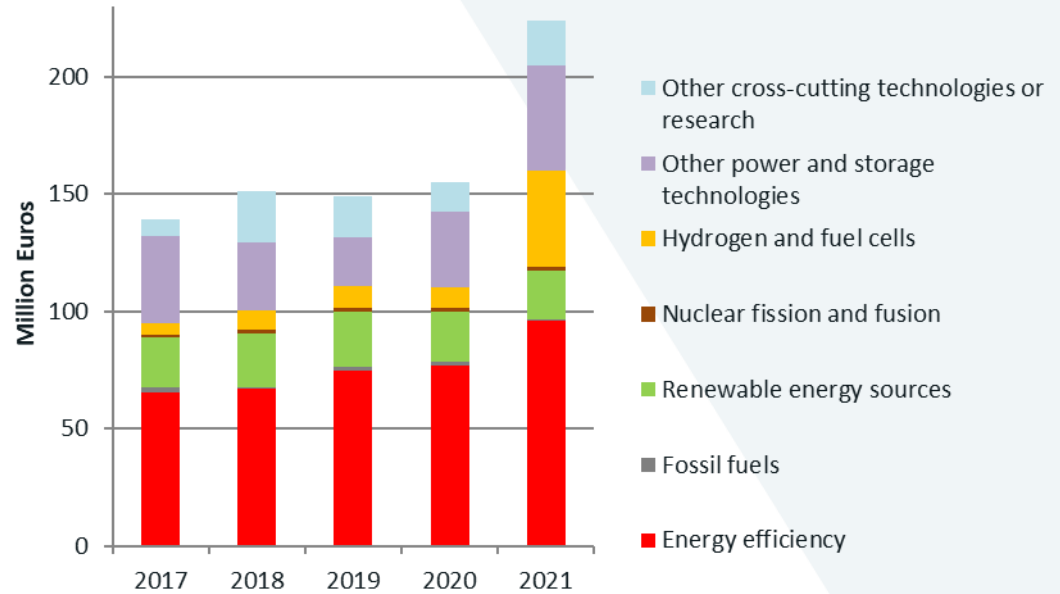
## About the method

- International standards set by IEA Guide to Reporting Energy RD&D Budget/Expenditure Statistics (June 2011) and OECD (Frascati Manual)
- Data for Austria shows obligations (money actually committed during the year 2021) – not budgets!
- No third-party financing or EU projects were covered in this survey



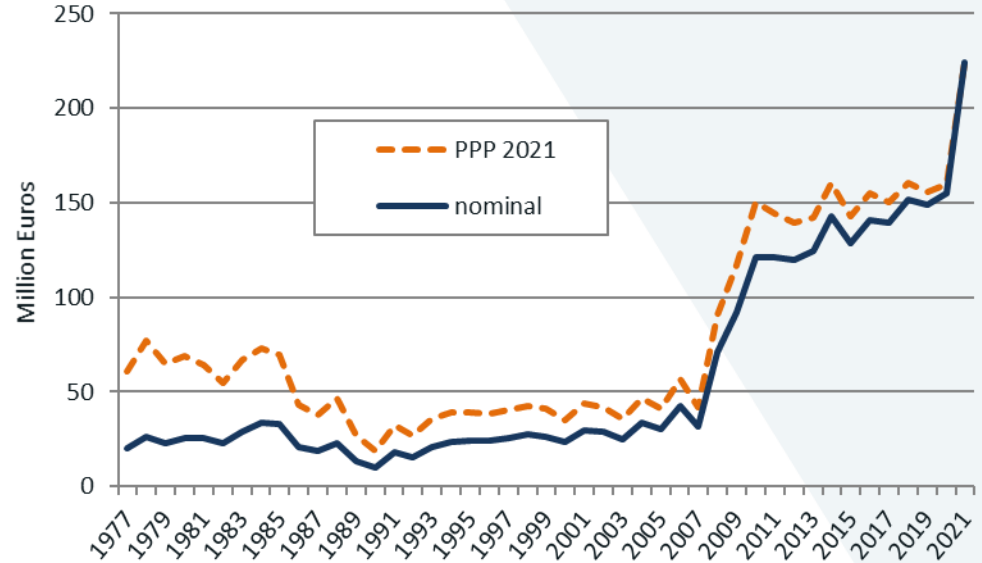
## Overview

- About 1,200 projects and activities of publicly funded energy-related RD&D registered in Austria
- 2021: 224.1 million euros
- Increase of 68.9 million euros or 44.4% compared to 2020



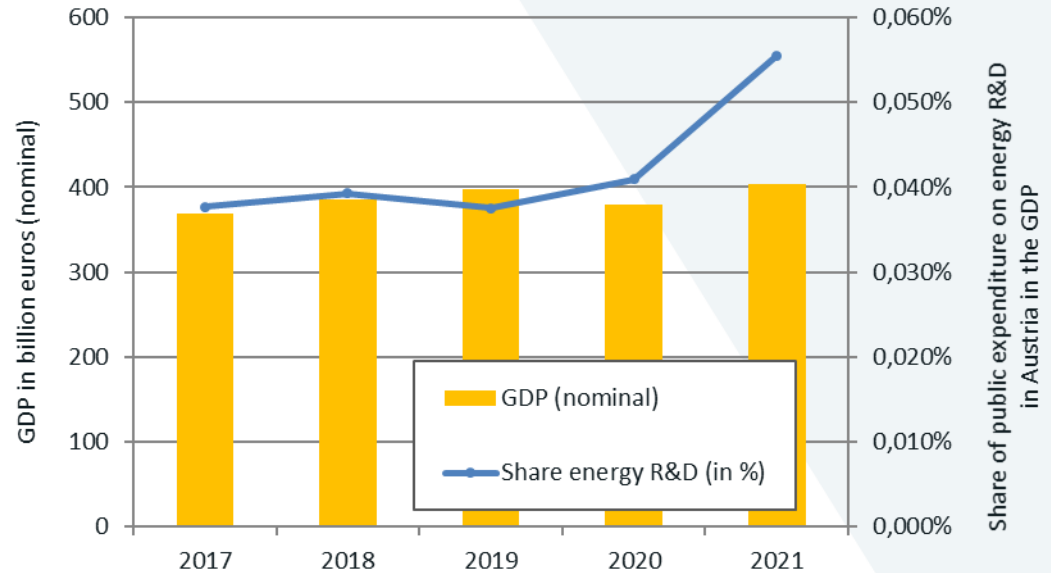
## Public energy R&D expenditures in Austria 1977 – 2021

- 2021: By far the highest value ever, both in nominal terms and also adjusted for inflation



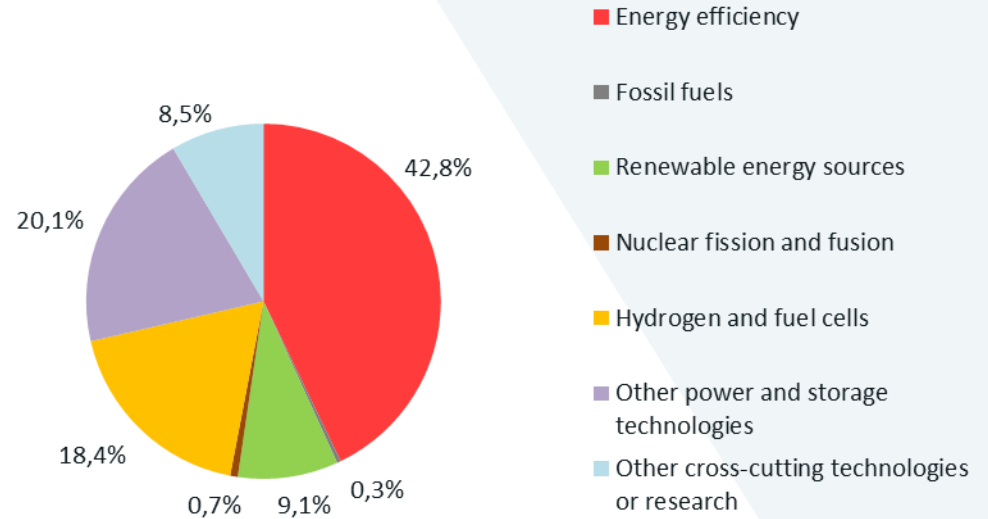
## Public energy RD&D expenditures in Austria per GDP

- The importance of energy research – measured in terms of public funding – has stagnated in the last decade but saw a significant increase from 0.041% in 2020 to 0.056% in 2021 as a share of the gross domestic product (GDP)



## Topics 2021

- Energy efficiency in transport, industry and cities/ buildings, hydrogen, renewables, and smart grids & storage define the priorities of the publicly financed energy research in Austria



## Topics

Topics according to IEA Code	Expenditures 2021 in euros	Changes compared to 2020 in euros	Changes compared to 2020 in %
Energy efficiency	95,972,399	19,200,650	25.0%
Fossil fuels	783,684	-867,802	-52.5%
Renewable energy sources	20,483,805	-1,029,301	-4.8%
Nuclear fission and fusion	1,562,503	-5,021	-0.3%
Hydrogen and fuel cells	41,133,719	32,456,288	374.0%
Other power and storage technologies	45,076,901	12,714,282	39.3%
Other cross-cutting technologies or research	19,048,477	6,407,357	50.7%
<b>Total</b>	<b>224,061,488</b>	<b>68,876,453</b>	<b>44.4%</b>

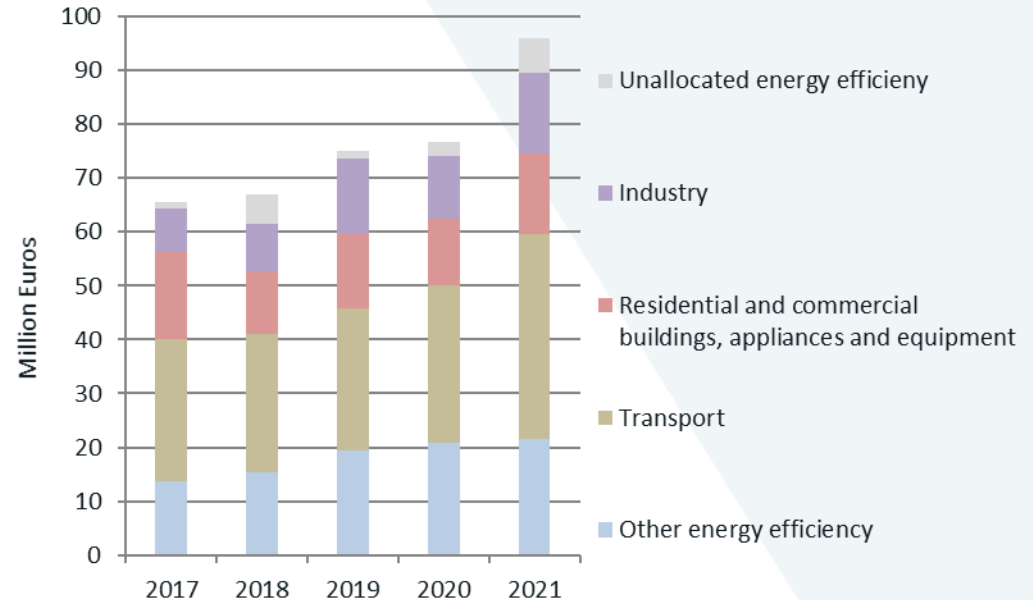


## Top ten sub-topics

Ranking 2021	Sub-topic	Expenditures 2021 (in million euros)
1	Hydrogen	31,8
2	Hybrid and electric vehicles	29,9
3	Energy storage (excluding hydrogen, storage in vehicles and portable devices)	27,8
4	Electricity transmission and distribution	17,3
5	Energy efficiency in industry	15,0
6	Efficient residential and commercial buildings	15,0
7	Smart cities and communities	13,3
8	Fuel cells	9,3
9	Biofuels	8,5
10	Other cross-cutting technologies	7,9

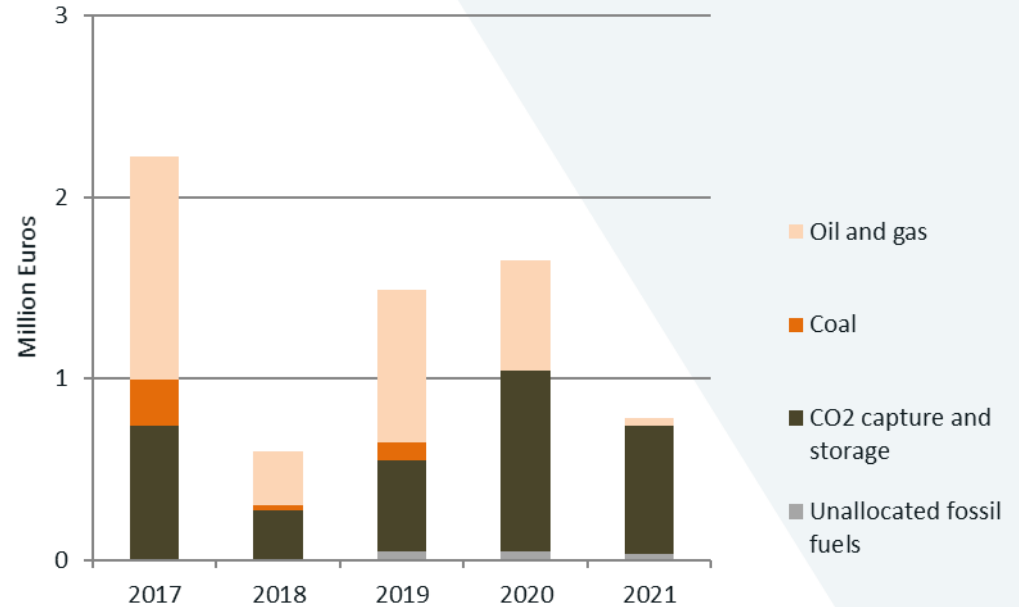
## Energy efficiency

- Transport 2021: 38.0 million euros (of which 29.9 million euros spent on technologies for HEV, mobile batteries & charging)
- “Other energy efficiency”: smart cities and communities (13.3 million euros), heat pumps (5.9 million euros) etc.
- Efficient & smart buildings: 15 million euros
- Energy Efficiency in industry: 15 million euros



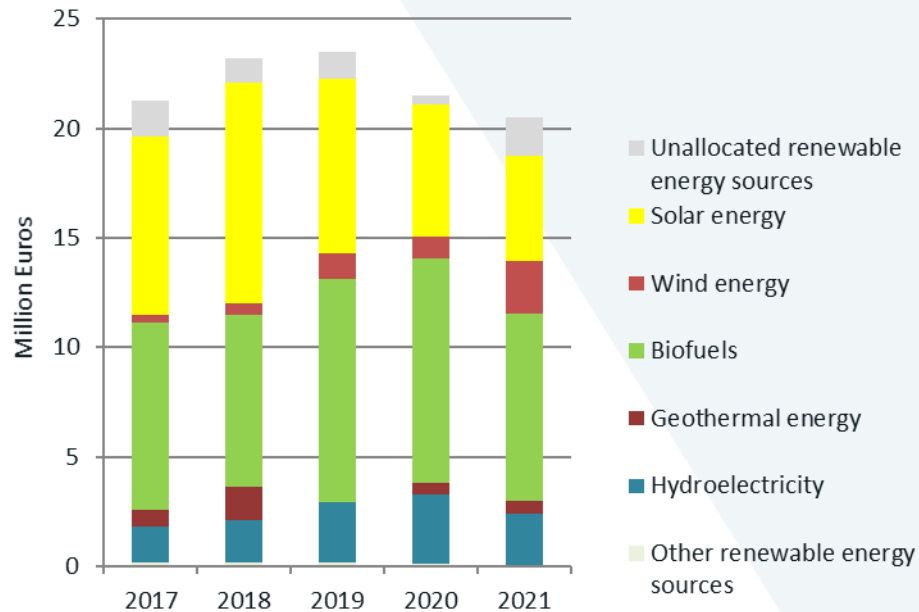
## Fossil fuels & CCS

- This thematic area is not a priority in publicly funded energy research in Austria and far behind in terms of funding (2021: 0.8 million euros)



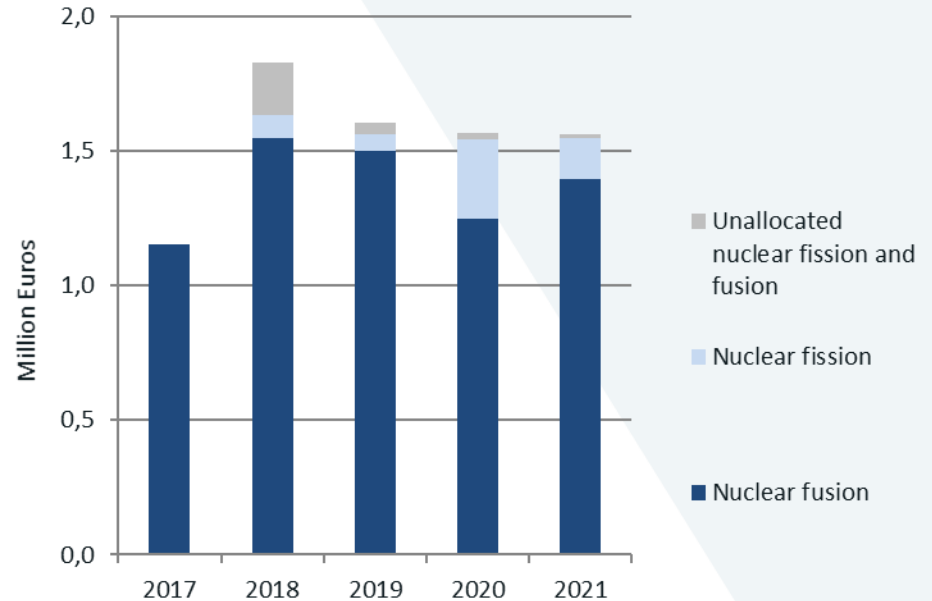
## Renewables

- 20.5 million euros in 2021, of which:
  - Biofuels 8.5
  - Solar energy 4.8 (2.9 is PV)
  - Hydroelectricity 2.4
  - Wind energy 2.4
  - Geothermal energy 0.6



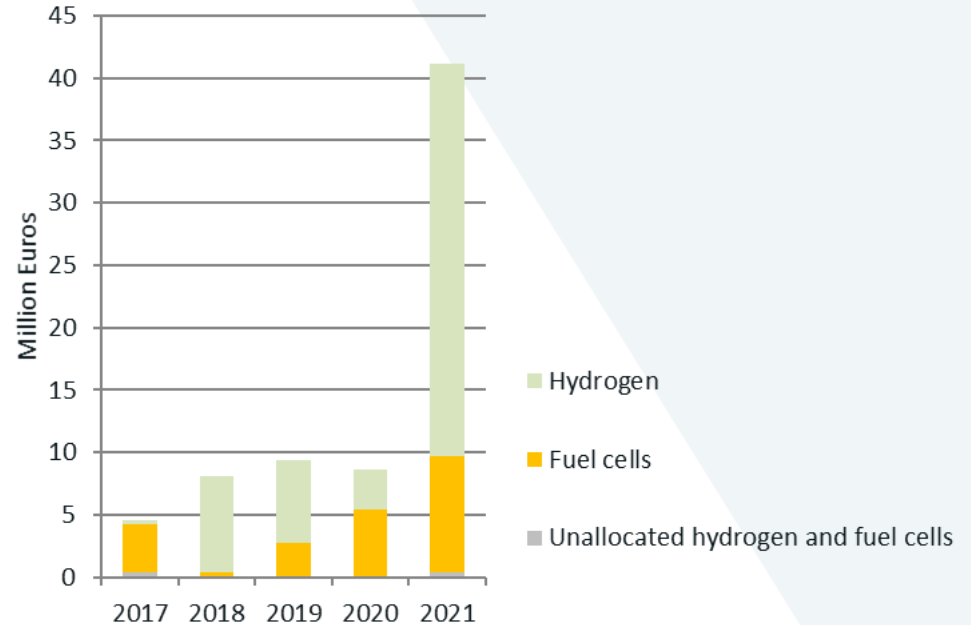
## Nuclear fission and fusion

- Projects in nuclear fusion are implemented primarily at universities within the EUROfusion programme
- Data only includes national financial contributions



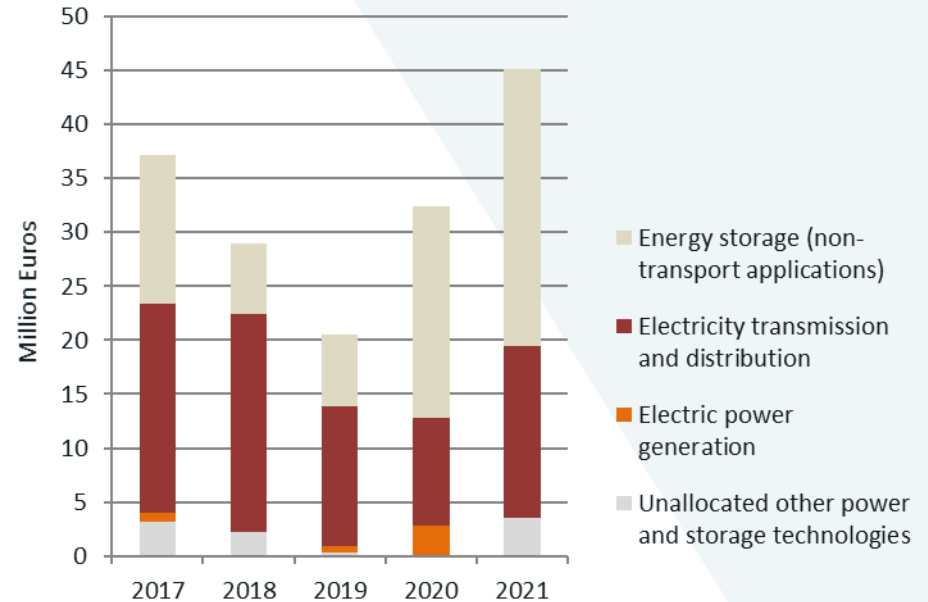
## Hydrogen and fuel cells

- In 2021, expenditures amounted to 41.2 million euros
- 31.5 million euros for hydrogen in 2021, which represents a ten-fold increase in expenditures compared to 2020

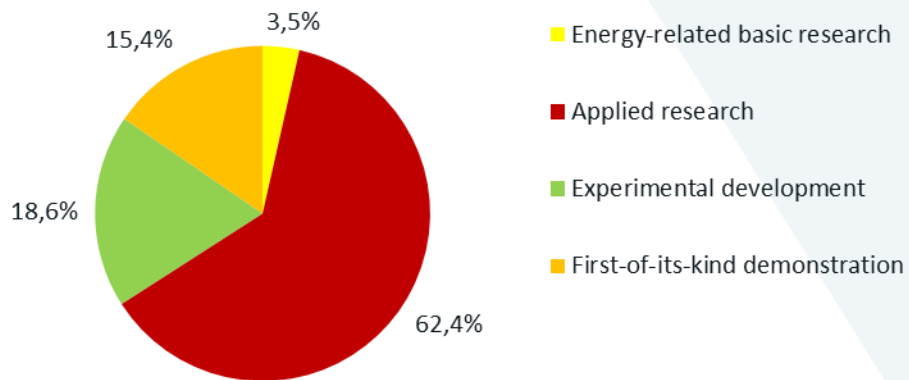


## Other power and storage

- Storage: substantial increase up to 25.6 million euros in 2021. 20.8 million euros for (stationary) batteries, of which 15,3 million euro for projects under IPCEI EuBatIn
- Transmission, distribution (including smart grids) increased up to 16.0 million euros



## Areas of RD&D 2021





## Who financed energy research in 2021?



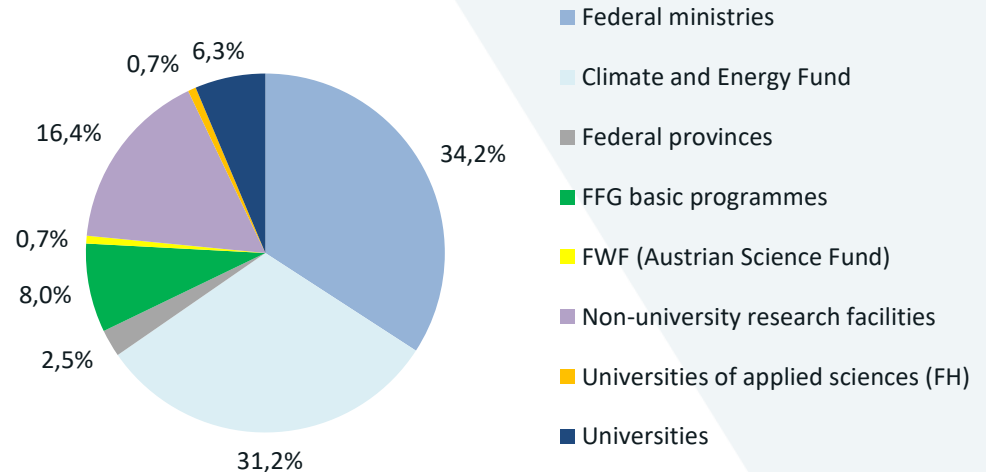
About three quarters of this expenditure were provided by governmental authorities (federal, regional, funding organisations)



The remaining part came from (publicly funded) research institutions and universities provided with equity capital

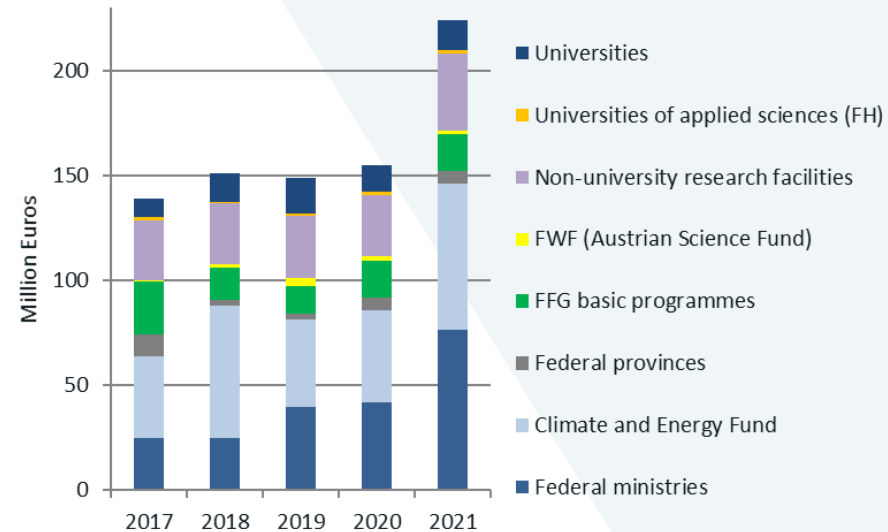


32.7 million euros were funds from the economic stimulus package that exceeded the ordinary budget



## Institutions 2017 – 2021

- The expenditures of the federal ministries totalled up to 76.5 million euros in 2021, with the Federal Ministry for Climate Action, Environment, Energy, Mobility, Innovation and Technology (BMK) investing 66.7 million euros
- The Climate and Energy Fund has provided 70.0 million euros in 2021
- Both with a strong increase in expenditures from 2020 to 2021



## Institutions

Institutions	Expenditures 2021 in euros	Changes compared to 2020 in euros	Changes compared to 2020 in %
Federal ministries	76.529.912	34.509.966	82,1 %
Climate and Energy Fund	69.958.630	26.281.776	60,2 %
Federal provinces	5.528.380	-443.378	-7,4 %
FFG basic programmes	17.916.368	14.906	0,1 %
Austrian Science Fund	1.560.331	-716.350	-31,5 %
Non-university research facilities	36.706.823	7.781.870	26,9 %
Universities of applied sciences	1.641.675	-104.649	-6,0 %
Universities	14.219.369	1.552.312	12,3 %
<b>Total</b>	<b>224.061.488</b>	<b>68.876.453</b>	<b>44,4 %</b>

# Austrian Federal Ministries

**BMLFUW:** Agriculture, Forestry, Environment and Water Management (till 2017)

**BMWFW:** Science, Research and Economy (till 2017)

**BMNT:** Sustainability and Tourism (till 2019)

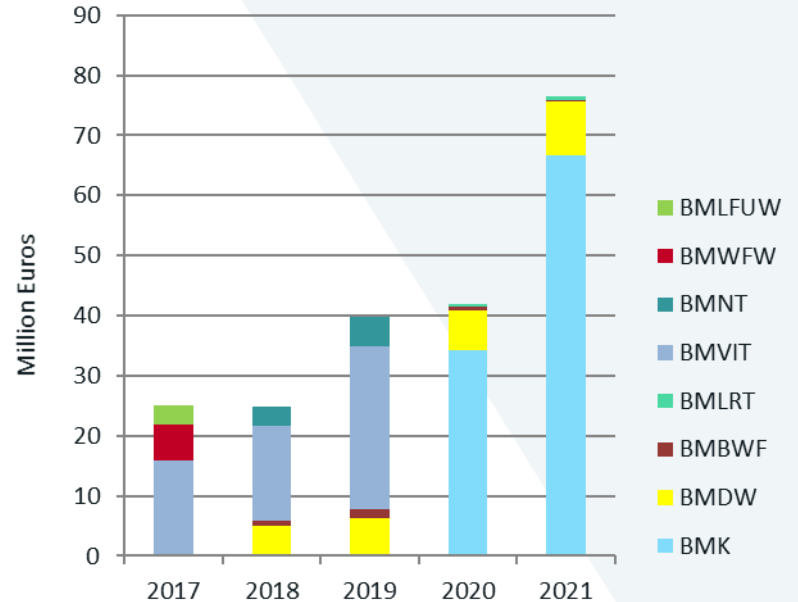
**BMVIT:** Transport, Innovation and Technology (till 2019)

**BMLRT:** Agriculture, Regions and Tourism (from 2020)

**BMBWF:** Education, Science and Research (from 2018)

**BMDW:** Digital and Economic Affairs (from 2018)

**BMK:** Climate Action, Environment, Energy, Mobility, Innovation and Technology (from 2020)



## Funding agencies for RD&D

Austria's national funding agencies assign the overwhelming share of financial resources to energy RD&D provided by federal budgets. In 2021, 163 million euros had been contracted via these institutions:

- The **Austrian Research Promotion Agency (FFG)** contracted 142 million euros, the main share of ministries' and the Climate and Energy Fund's budgets with additional bottom-up programmes for companies of 18 million euros
- **Kommunalkredit Public Consulting (KPC)** administered 19 million euros for first-of-its-kind demonstration
- **Austria Wirtschaftsservice (aws)** provided 1.6 million euros out of their seed financing programmes
- The **Austrian Science Fund (FWF)** financed energy-related basic research with 0.8 million euros

## Equity capital for RD&D infrastructure

- The expenditures based on equity capital of the **(non-university) research institutions** provided by the government were 36.7 million euros; three quarters of this sum was invested by the Austrian Institute of Technology (AIT). Silicon Austria Labs (SAL), a research centre for electronics-based systems, was first introduced into this survey (8.8 million euros).
- **Universities** (lead: TU Vienna) spent 14.2 million euros of equity capital in total. For the first time, this sector also includes activities of IST Austria (Institute of Science and Technology Austria) with some 0.7 million euros. ISTA is not formally a university but is assigned to the higher education sector as a research institution with the right to award doctorates (PhD).
- The amount of 1.6 million euros of equity capital was invested by 6 (out of 21) **universities of applied sciences** (so-called “Fachhochschulen” or FH)

## Gender-specific project information

- An additional gender analysis revealed that women headed the consortia of 53 out of 299 analysed projects in 2021
- On average, however, female consortium leaders managed smaller projects than their male counterparts
- In 37.8% of projects of the analysed project portfolio, women were responsible for the technical or scientific part of at least one organisation in the project consortium or led the consortium (2020: 32.7%)
- All these shares vary substantially between different programme lines and thematic areas

## Annual publication of data as full report

<https://nachhaltigwirtschaften.at/de/iea/publikationen/energieforschungserhebungen.pdf>  
(only available in German)

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