

Energy R&D 2017

Public Expenditures in Austria

Austrian Energy Agency (AEA)

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About the survey

- Being a member of the International Energy Agency (IEA), Austria is obliged to yearly record all energy related research, development and first-of-its-kind demonstration projects carried out in Austria and supported resp. financed by means of public funds.
- The Austrian Energy Agency has been appointed by the Federal Ministry of Transport, Innovation and Technology to gather and evaluate the data.
- This annual survey is not only an international obligation but also allows emphasizing the importance of the energy research for Austria as well as creating and checking policy goals.
- This survey has been carried out annually since 1974.
- Annual publication of data as full report, see:
<https://nachhaltigwirtschaften.at/de/iea/publikationen/energieforschungserhebungen.php>

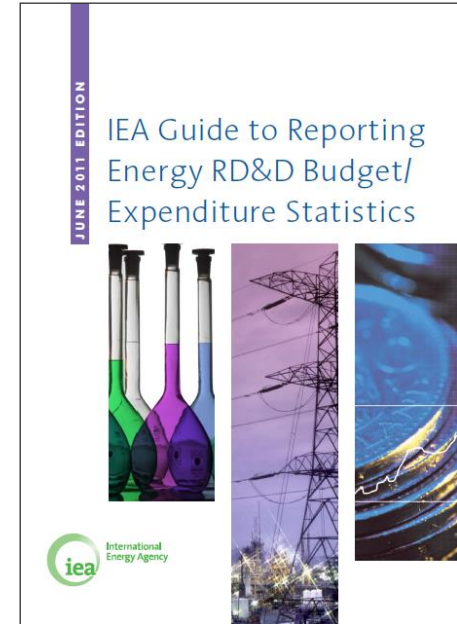
 **Federal Ministry
Republic of Austria**
Transport, Innovation
and Technology



AUSTRIAN ENERGY AGENCY

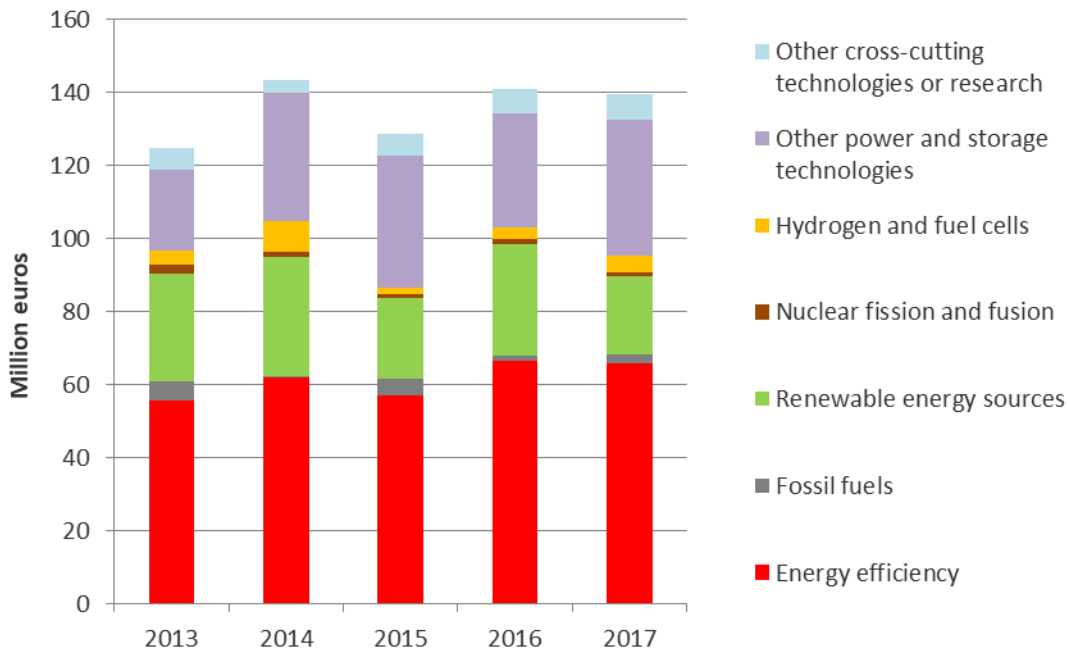
About the method

- International standards set by the IEA Guide to Reporting Energy RD&D Budget/Expenditure Statistics (June 2011) and OECD (Frascati manual).
- Data for Austria shows real expenditures (primarily obligations, that were actually committed during the year 2017) - no budgets!
- Some 850 energy research projects and activities have been registered and analyzed for the year 2017.



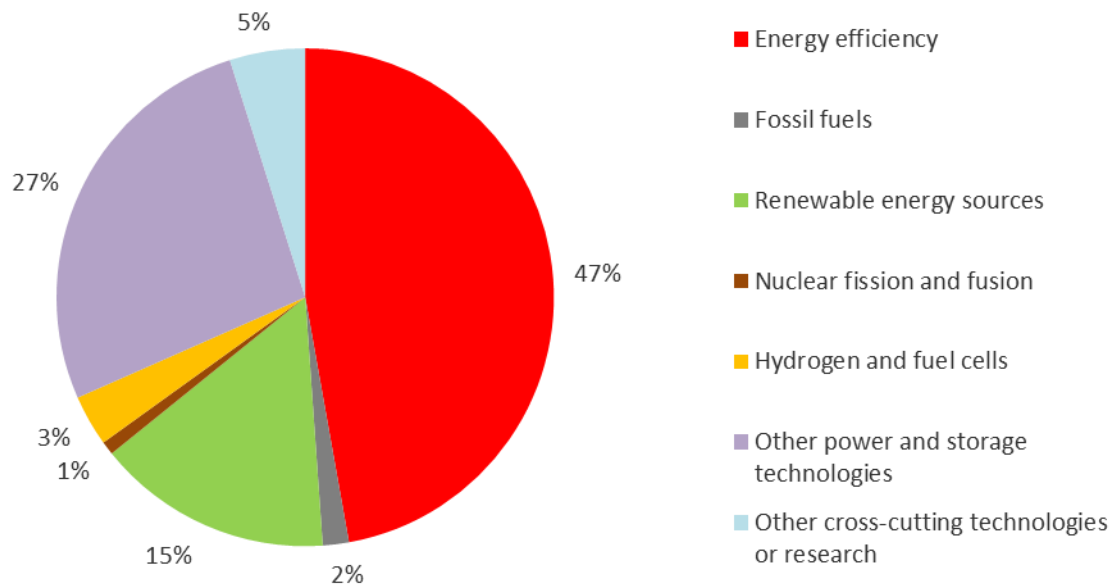
Overview

- Publicly funded energy-related research, development and first-of-a-kind demonstration amounted to 139.3 million euros ...
- ... decreasing the expenditures of 2016 by 1.1%.



Areas of R&D 2017

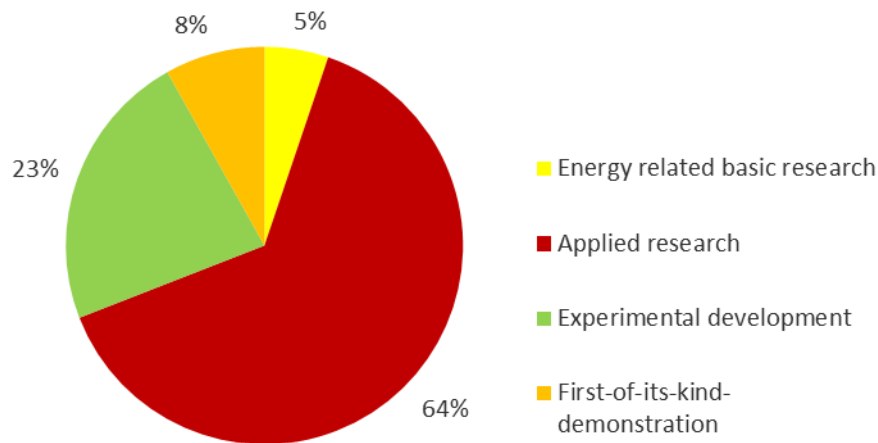
The research areas of energy efficiency, renewables, smart grids and storage define the priorities of the publicly financed energy research within Austria.



Type of energy R&D

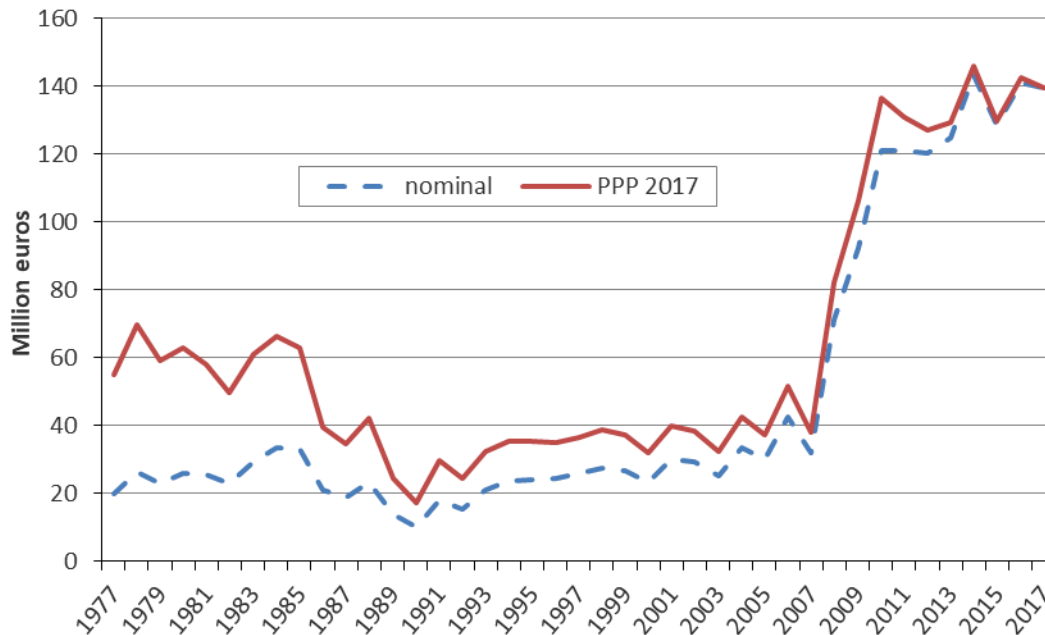
- Energy related basic research (TRL 1 - 2) represented a small yet very important portion of 5%.
- About 64% of the means were used for applied research (TRL 2 - 4).
- 23% for experimental development (TRL 4 - 7).
- First-of-its-kind demonstration (TRL 7 - 8) amounted to 8% in 2017.

TRL ... Technology Readiness Level



Public energy R&D expenditures in Austria 1977 - 2017

During the last years, the high levels of R&D expenditures as experienced in the 1970s in consequence of the oil crises have (inflation-adjusted) again been reached and were even doubled since 2010.



Topics - changes compared to 2016

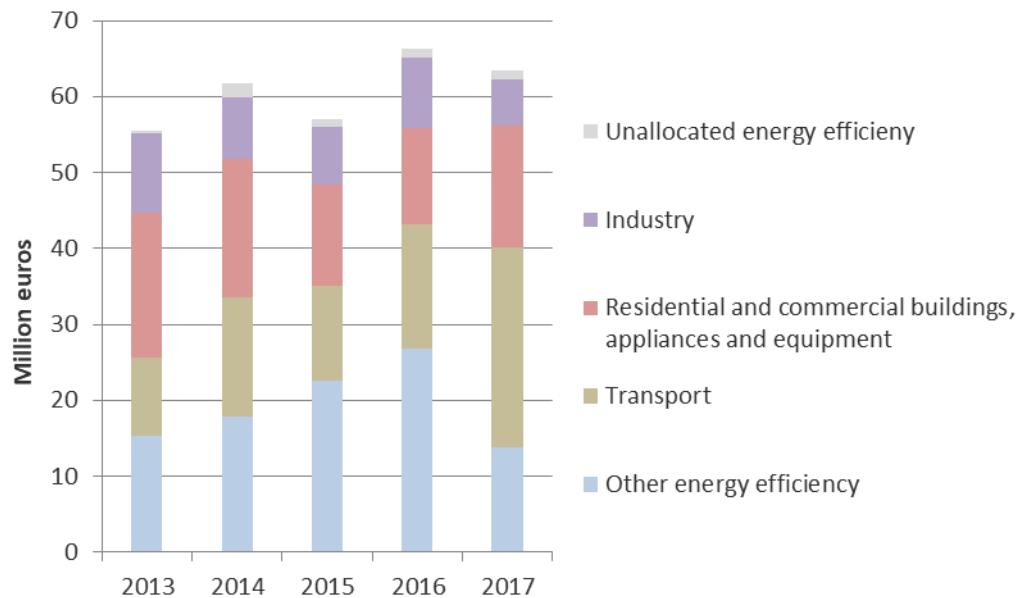
Topics according to the IEA code	Expenditures 2017 in euros	Changes compared to 2016 in euros	Changes compared to 2016 in %
Energy efficiency	65,745,199	-575,401	-0.9%
Fossil fuels	2,359,854	+852,738	+56.6%
Renewable energy sources	21,356,177	-9,130,201	-29.9%
Nuclear fission and fusion	1,214,678	-304,984	-20.1%
Hydrogen and fuel cells	4,628,025	+1,465,258	+46.3%
Other power and storage technologies	37,201,115	+6,197,467	+20.0%
Other cross-cutting technologies or research	6,835,456	-56,239	-0.8%
Total	139,340,504	-1,551,362	-1.1%

„Top 10“ for 2017

Ranking 2017	Change compared to 2016	Subcategory	2017, in million euros
1	0	Electricity transmission and distribution	19.4
2	+1	Efficient residential and commercial buildings	14.8
3	+3	Hybrid and electric vehicles	14.4
4	+4	Energy storage	13.8
5	-3	Smart cities and communities	9.9
6	-1	Biofuels	9.0
7	-3	PV	7.4
8	-1	Energy efficiency in industry	6.2
9	new in Top 10	Off-road transport and transport systems	4.7
10	new in Top 10	Fuel cells	3.9

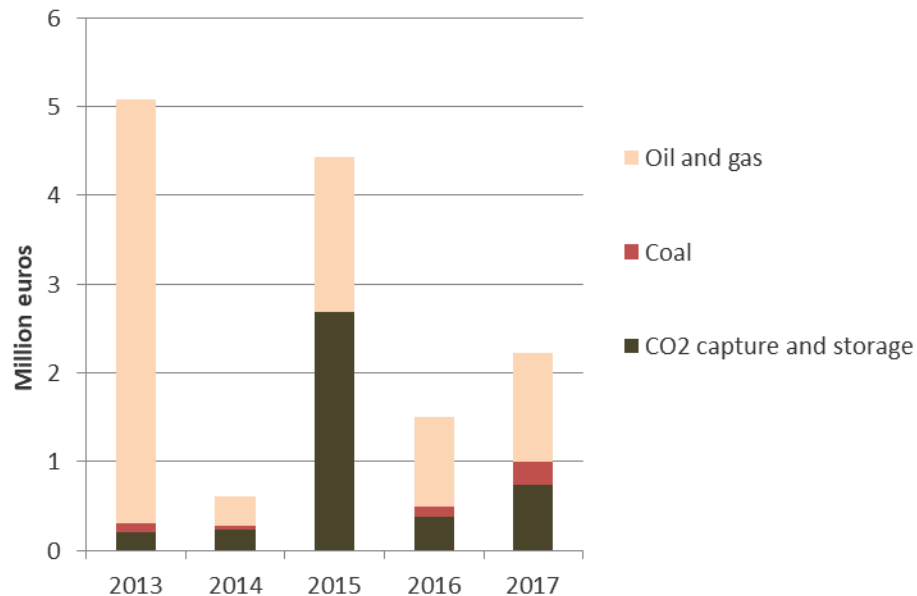
Energy efficiency

- 47% of overall expenditures were used for the sector “energy efficiency” with 65.7 million euros in total for 2017, a minus of 0.6 million euros in one year.
- Substantial shift from smart cities (under “other”) to R&D on hybrid and electric vehicles (HEV).



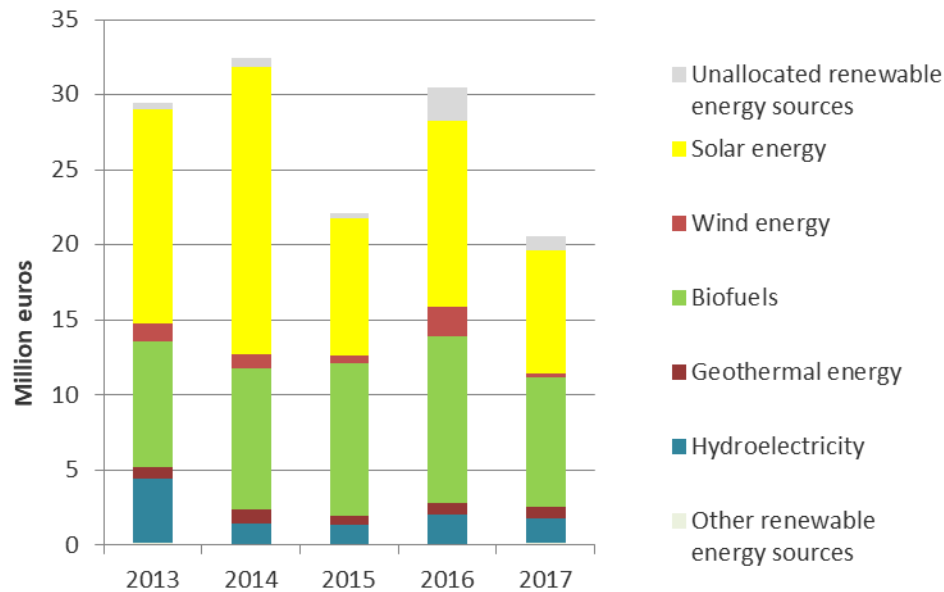
Fossil fuels

All sectors for fossil fuels could increase their expenditures from 2016 to 2017.



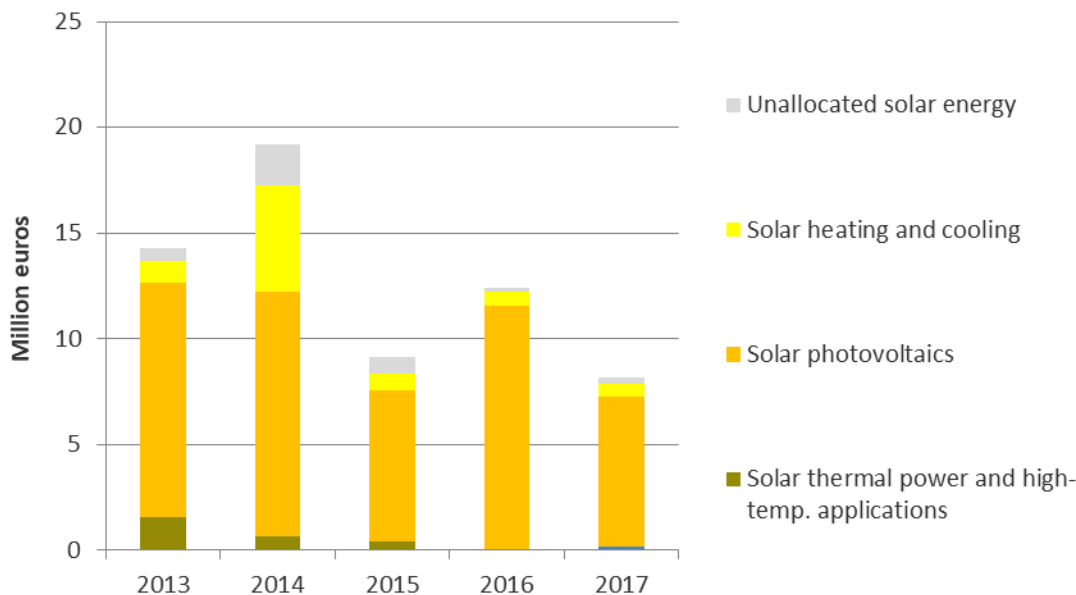
Renewables

- Expenditures for renewable energy technologies dropped down to 21.4 million euros, which was only some two thirds of the level of 2016.
- All sectors but geothermal affected.



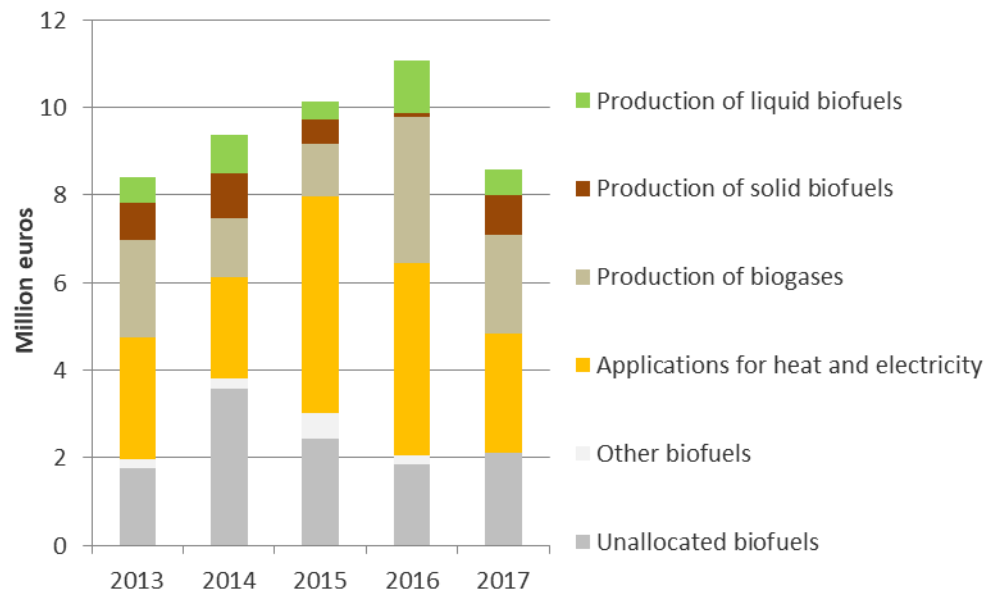
Solar energy

The volatile but generally downward trend continued in 2017, comprising all types of solar applications.



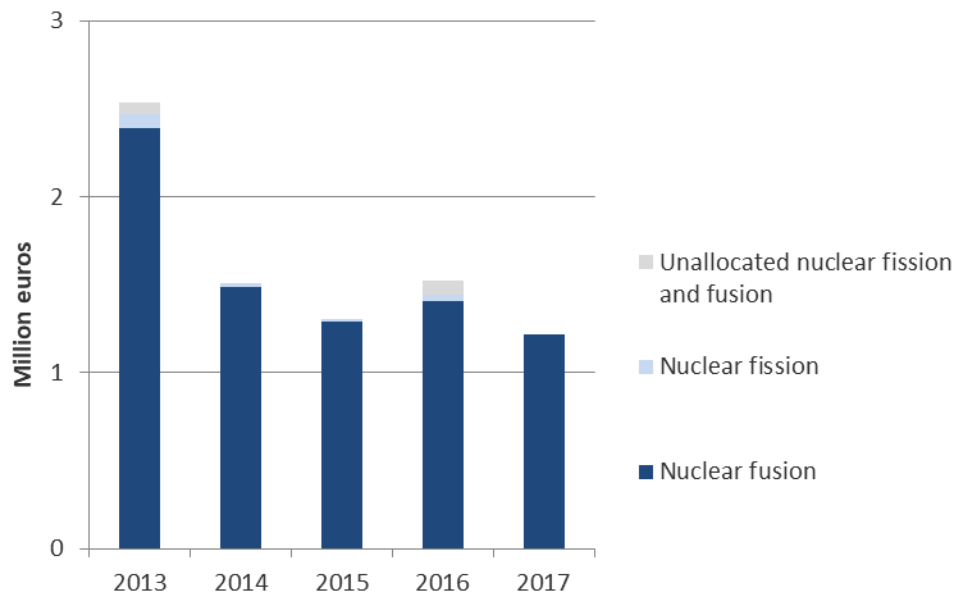
Biofuels

After continuously increasing in recent years, expenditures for biofuels showed a substantial decrease in 2017.



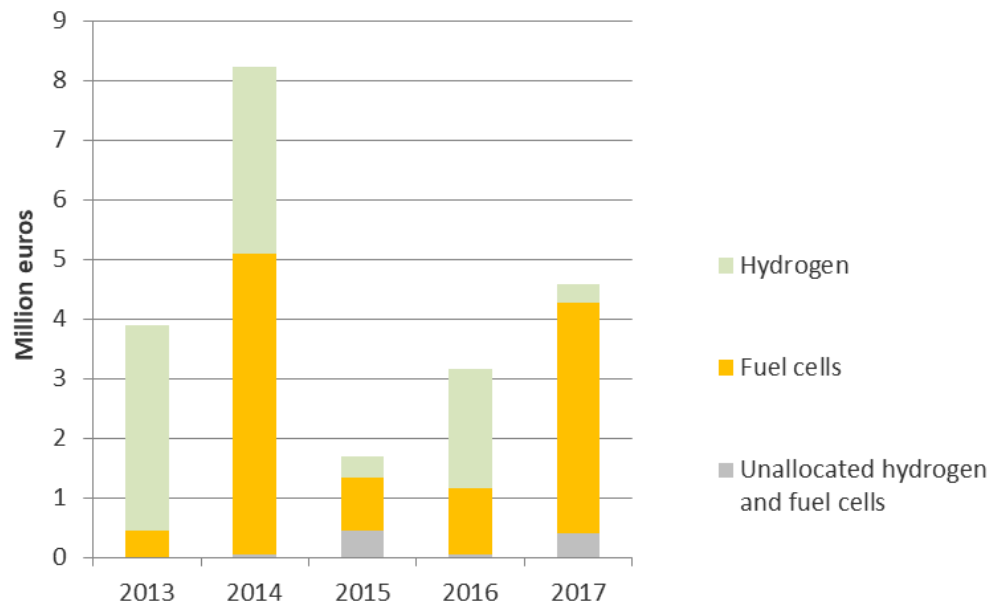
Nuclear fission and fusion

- Projects in nuclear fusion are carried out primarily at universities under the Fusion@ÖAW in the EUROfusion programme, Horizon 2020 (started in 2014).
- ÖAW stands for Austrian Academy of Sciences.
- Data includes only national financial contributions.



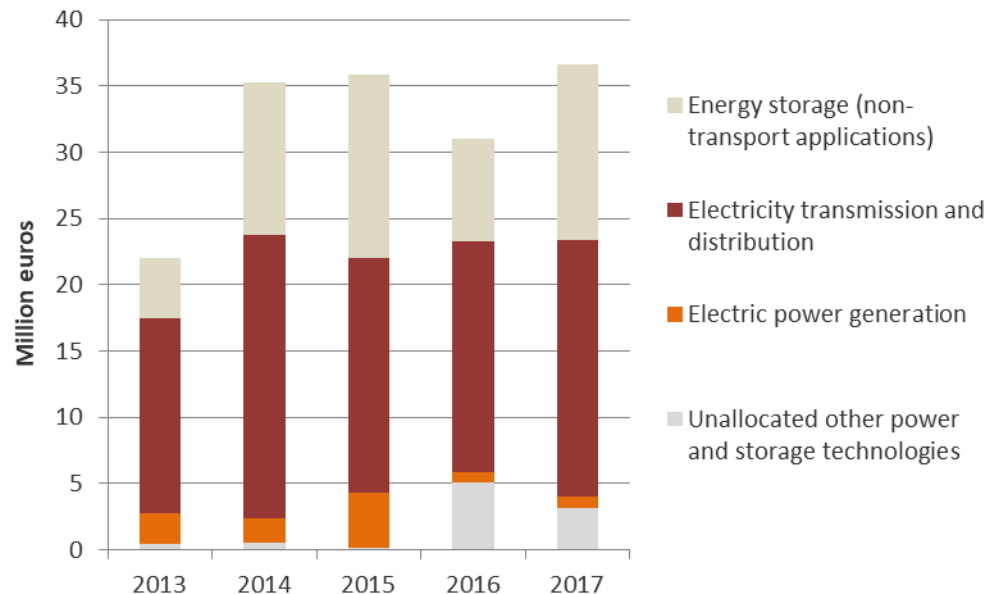
Hydrogen and fuel cells

A substantial increase in fuel-cell-activities overcompensated hydrogen's decrease in 2017.



Other power and storage technologies

This sector, comprising power technologies, electricity transmission & distribution as well as energy storage demonstrated a substantial increase of 6.2 million euros in 2017.



Who was financing in 2017?



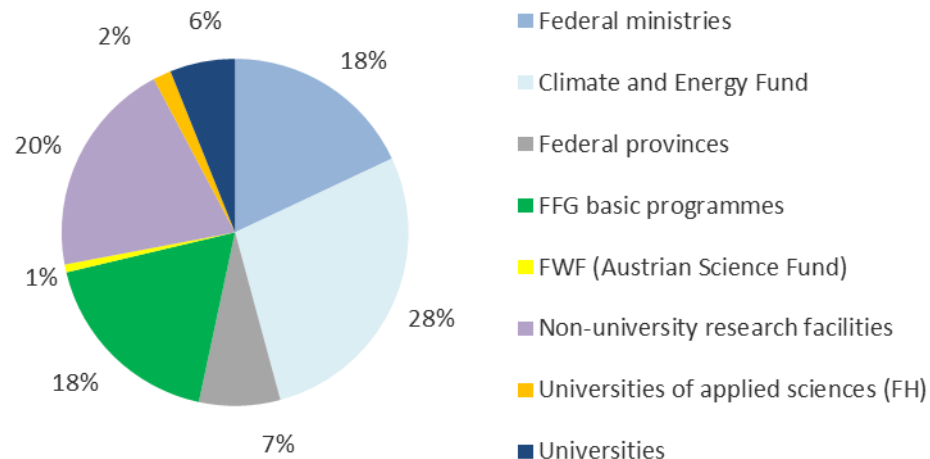
About 72% of overall expenditures were provided by governmental authorities (federal, regional, funding organizations).



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



No third party financing or EU projects were covered in this survey.

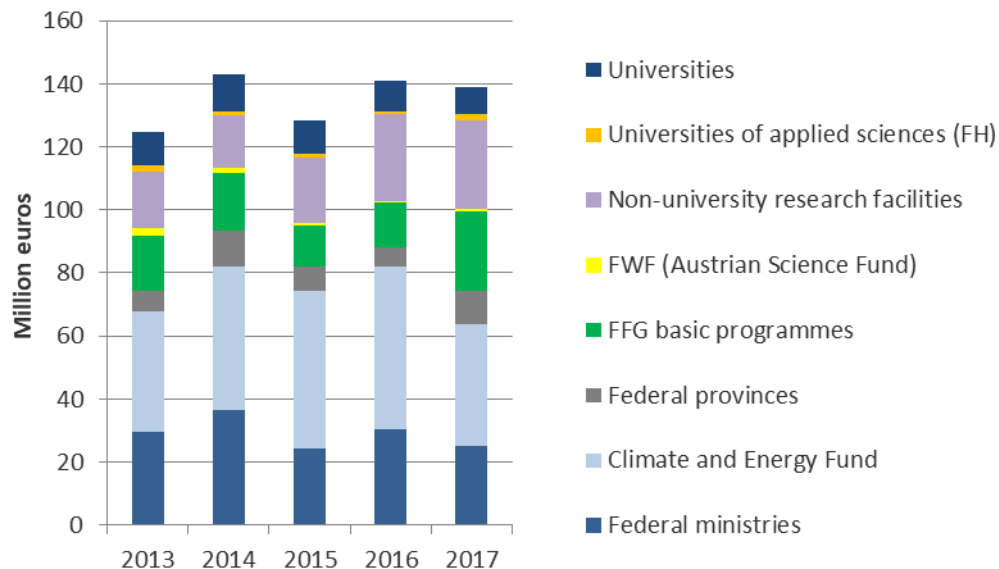


Institutions – changes compared to 2016

Institution	Expenditures 2017 in euros	Changes compared to 2016 in euros	Changes compared to 2016 in %
Federal ministries	25,102,646	-5,414,423	-17.7%
Climate and Energy Fund	38,698,677	-12,792,688	-24.8%
Federal provinces	10,539,677	+4,464,089	+73.5%
FFG basic programmes	25,000,237	+10,839,925	+76.6%
FWF (Austrian Science Fund)	1,022,777	+600,450	+142.2%
Non-university research facilities	28,155,880	+584,090	+2.1%
Universities of applied sciences (FH)	2,347,585	+1,316,502	+127.7%
Universities	8,473,025	-1,149,307	-11.9%
Total	139,340,504	-1,551,362	-1.1%

Institutions 2013 - 2017

The decrease of budgets for energy related top-down programmes was compensated by increased spending of provinces and stronger claims in general bottom-up programmes by companies.



Federal ministries

BMWF: Austrian Federal Ministry for Science and Research
(until 2013)

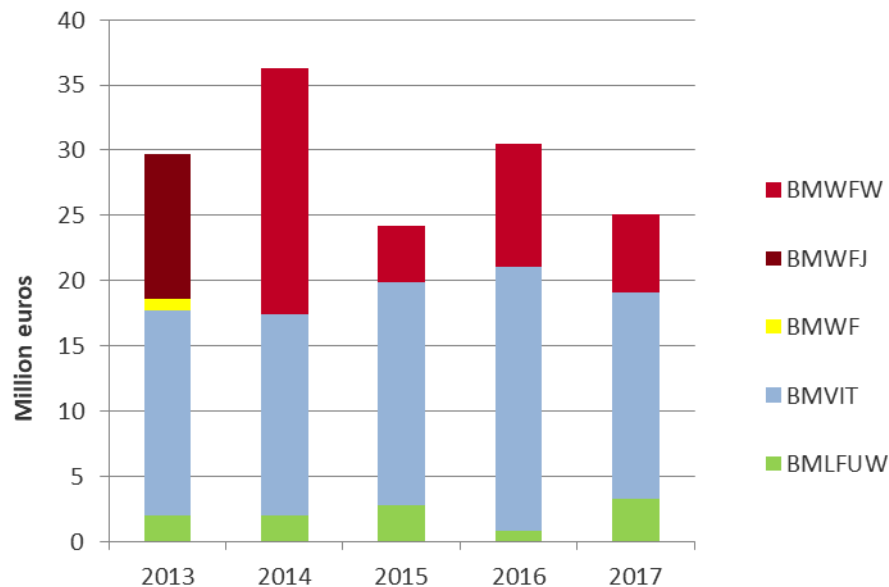
BMLFUW: Austrian Federal Ministry of Agriculture, Forestry,
Environment and Water Management

BMWFJ: Austrian Federal Ministry of Economy, Family and
Youth (until 2013)

BMVIT: Austrian Federal Ministry for Transport, Innovation
and Technology

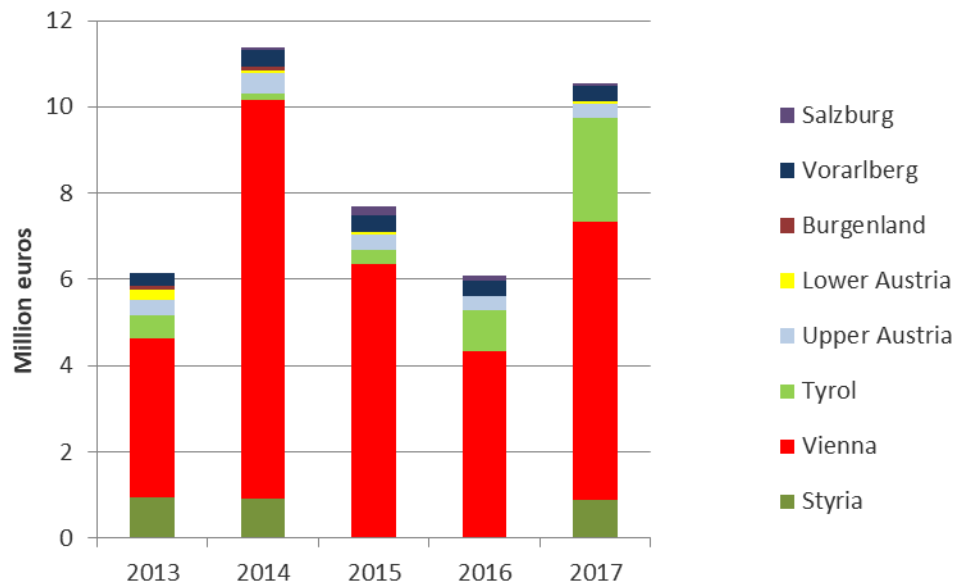
BMWFW : Austrian Federal Ministry of Science, Research and
Economy (starting 2014, replacing BMWF and BMWFJ)

Expenditures of the Climate and Energy Fund, bottom-up
programmes of FFG and the Austrian Science Fund (FWF) are
not included, but shown separately.



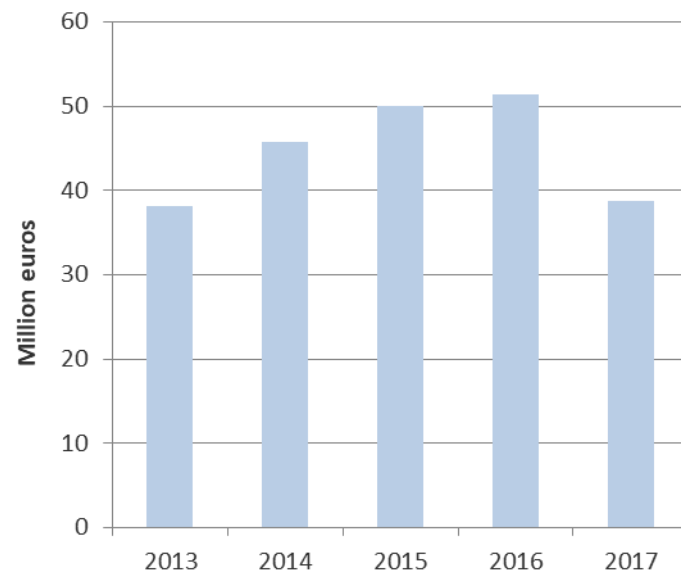
Federal provinces

The total expenditures of the nine federal provinces of Austria – with Vienna in the lead – increased to 10.5 million euros.



Climate and Energy Fund

Due to several energy research programmes, the Climate and Energy Fund spent 38.7 million euros in 2017, which was substantially below last year's expenditures.



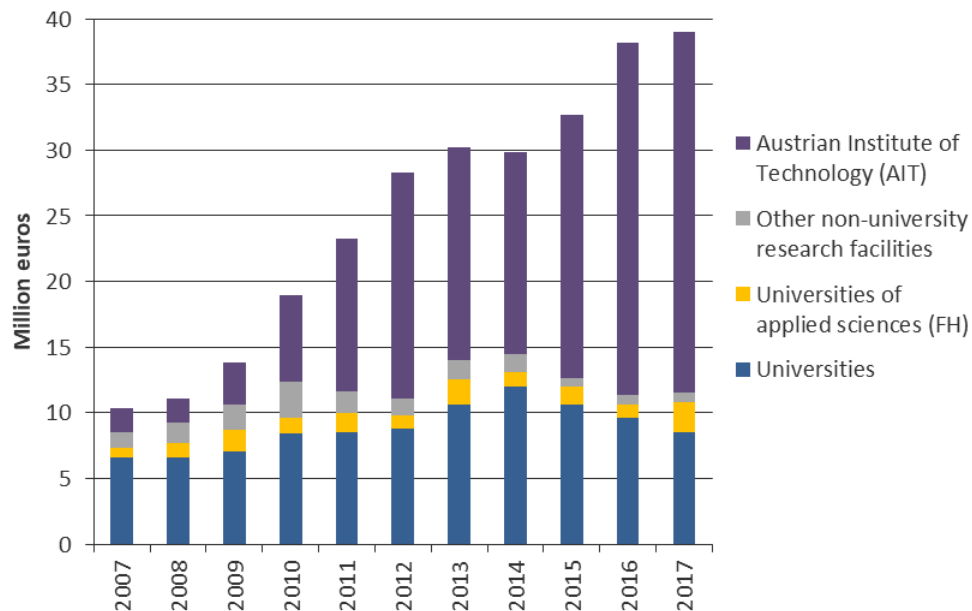
Funding agencies for R&D

Austria's national funding agencies assign the overwhelming share of financial resources for energy R&E provided by federal budgets. In 2017, 87.6 million euros had been contracted via these institutions.

- The **Austrian Research Promotion Agency (FFG)** contracted 83 million euros, the main share of ministries' budgets with additional bottom up programmes for companies with 25 million euros for energy R&D.
- The **Austrian Science Fund (FWF)** financed energy related basic research with one million euros.
- **Kommunalkredit Public Consulting (KPC)** administered 3 million euros.
- **Austria Wirtschaftsservice (aws)** provided 0.6 million euros out of their seedfinancing programme for companies carrying out R&D on energy.

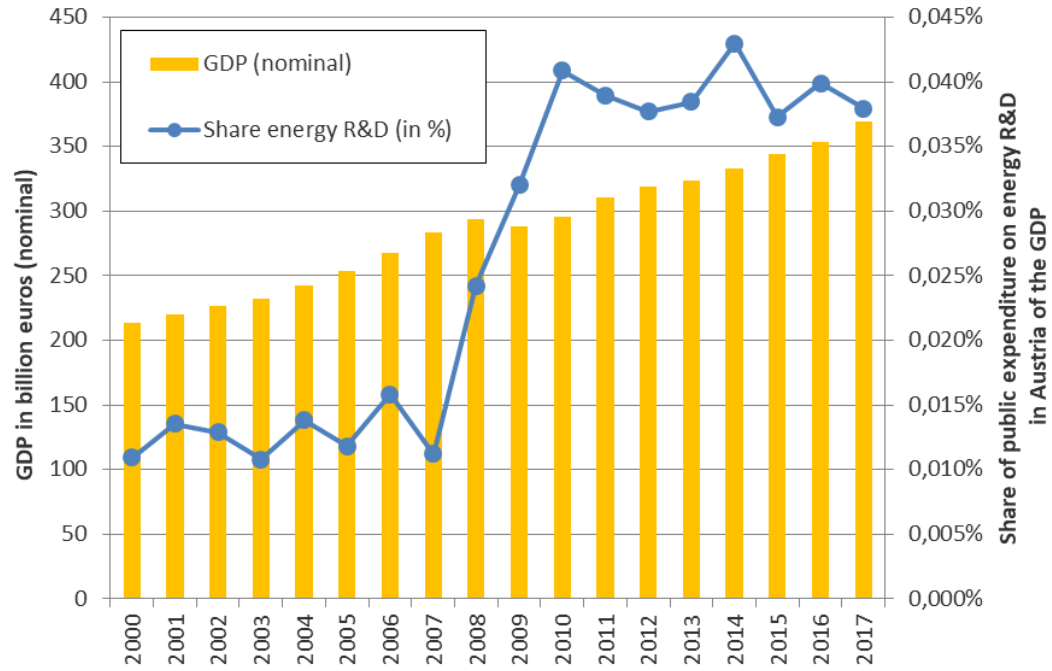
Equity capital for R&D-infrastructure

- The expenditures based on equity capital provided by the government of the (non-university) research institutions were 28.2 million euros; the predominant part of this sum was invested by the Austrian Institute of Technology (AIT).
- The universities spent 8.5 million euros in total with equity capital.
- The amount of 2.4 million euros was invested by the sector of universities of applied sciences (so called “Fachhochschulen” or FHs) with equity capital.



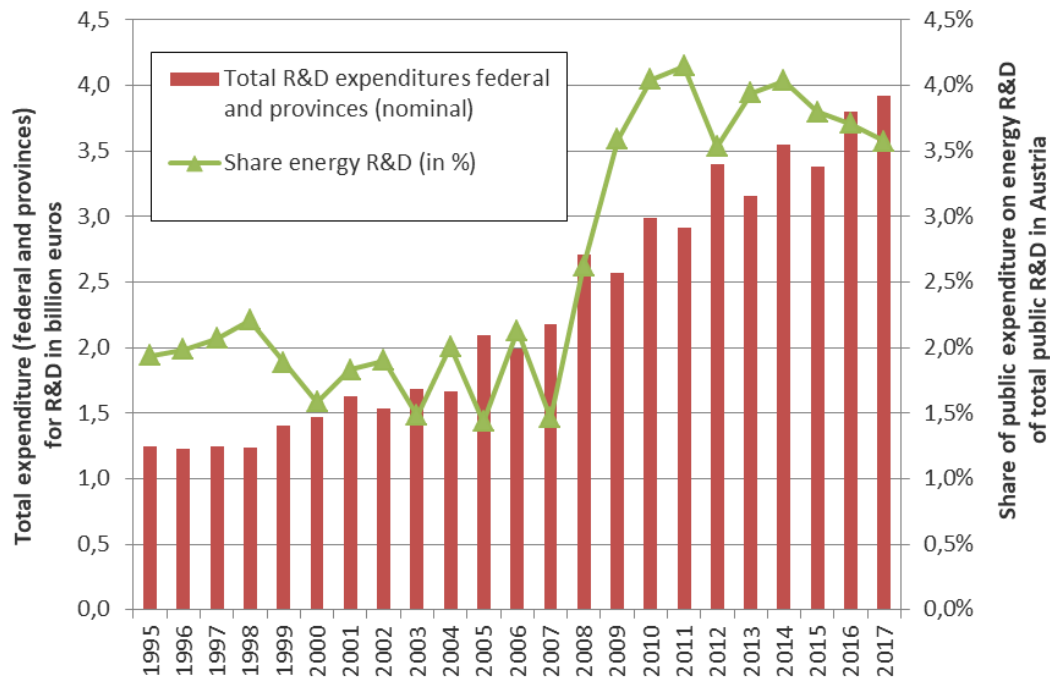
Share of the GDP

- From 2008 on: substantial increase.
- 2010 until now: around 0,04%.
- Compared to leading countries, this particular share puts Austria in the category of so called „innovation followers“!



Share in the public research portfolio

- From 2008 on: increased priority for energy research in Austria.
- 2017: Share of public expenditures on energy R&D of total public R&D in Austria at 3.6%.



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