

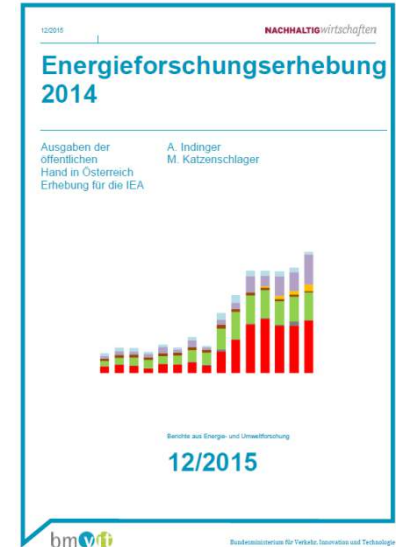
Energy R&D Public Expenditures in Austria 2014

Andreas Indinger, Marion Katzenschlager

Survey carried out by the Austrian Energy Agency
on behalf of the Federal Ministry of Transport, Innovation and Technology
June 2015

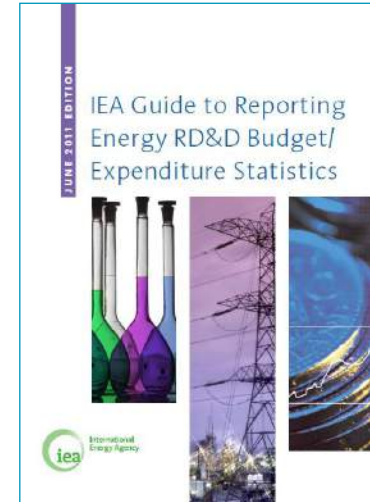
About the Survey

- 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.



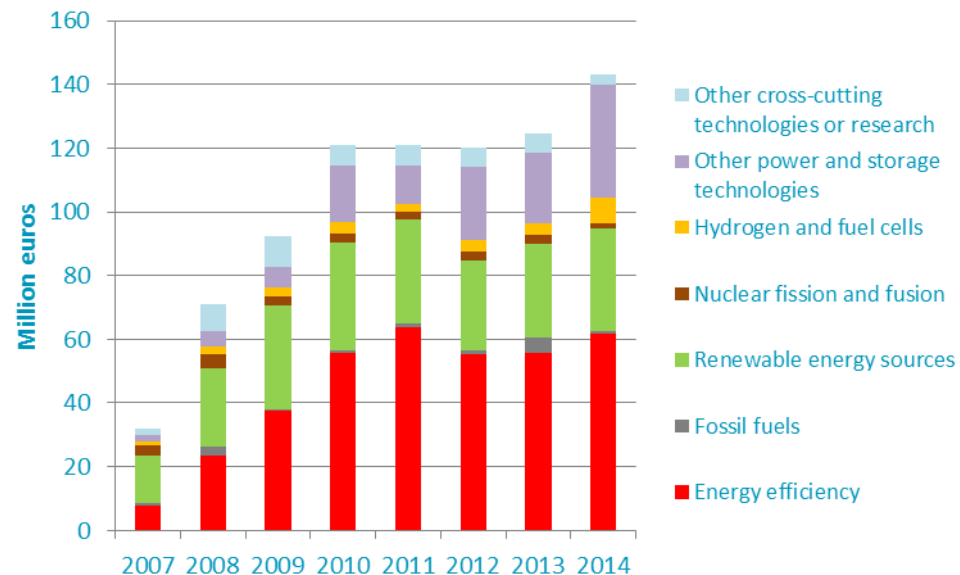
About the method

- International standards set by IEA Guide to Reporting Energy RD&D Budget/Expenditure Statistics (June 2011) and OECD (Frascati manual).
- Data for Austria shows real expenditures (primarily obligations, that were actually committed during the year 2014) - no budgets!
- Some 1,100 energy research projects and activities have been registered and analyzed for the year 2014.



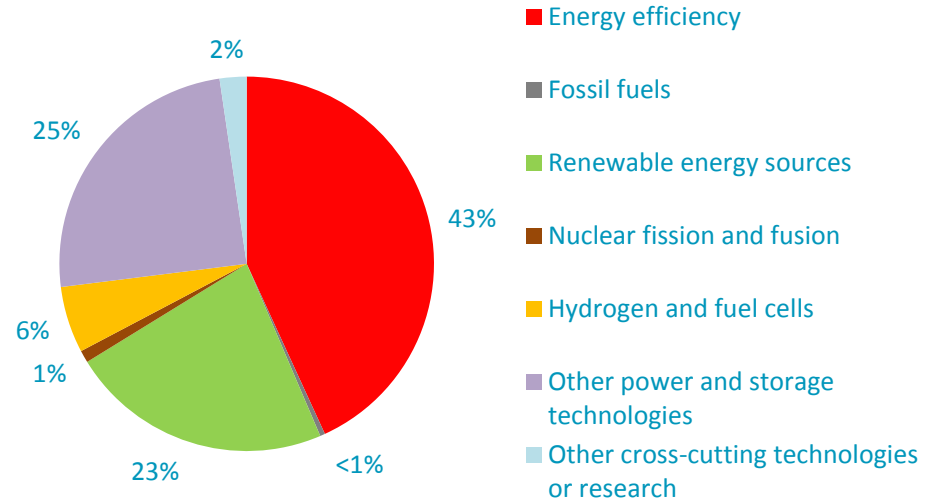
Overview

- In 2014, Austria's public expenditures for energy-related research and development amounted to 143,100,718 euros, increasing the expenditures of 2013 by 15% and reaching an all-time high.



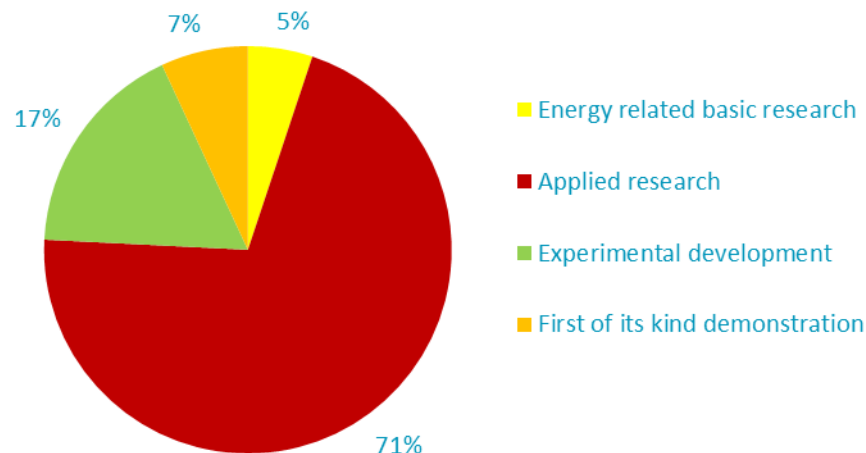
Areas of R&D 2014

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



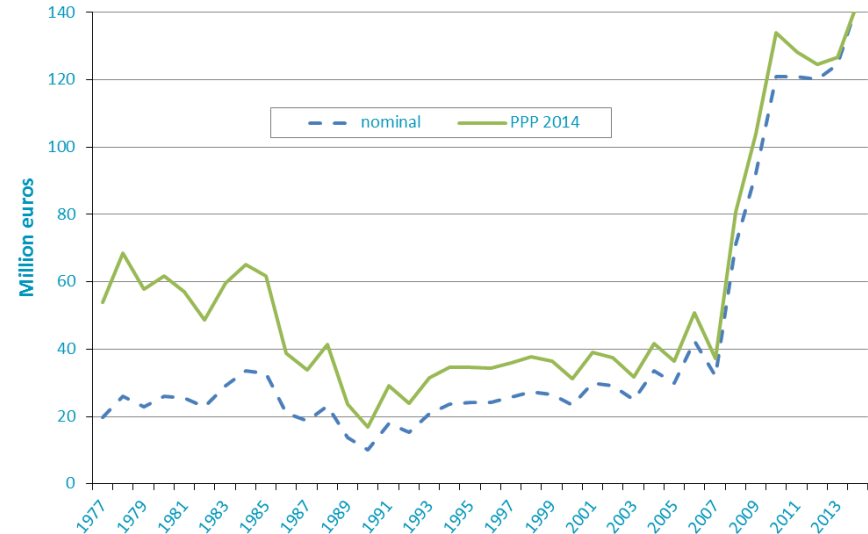
Type of energy RD&D

- Energy related basic research (TRL 1 - 2) represented a small yet very important portion of 5%.
- About 71% of the means were used for applied research (TRL 2 - 3).
- 17% for experimental development (TRL 4 - 6).
- First-of-its-kind demonstration (TRL 7 - 8) amounted to 7% in 2014.



Public energy R&D expenditures in Austria 1977 - 2014

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



Changes compared to 2013

Topics according to the IEA code	Expenditure 2014 in euros	Changes compared to 2013 in euros	Changes compared to 2013 in %
Energy efficiency	61,737,787	+6,178,272	+11.1%
Fossil fuels	616,533	-4,455,589	-87.8%
Renewable energy sources	32,413,022	+2,938,391	+10.0%
Nuclear fission and fusion	1,509,756	-1,027,890	-40.5%
Hydrogen and fuel cells	8,214,195	+4,314,424	+110.6%
Other power and storage technologies	35,288,853	+13,258,187	+60.2%
Other cross-cutting technologies or research	3,320,572	-2,650,925	-44.4%
Total	143,100,718	+18,554,870	+14.9%

„Top10“ 2014

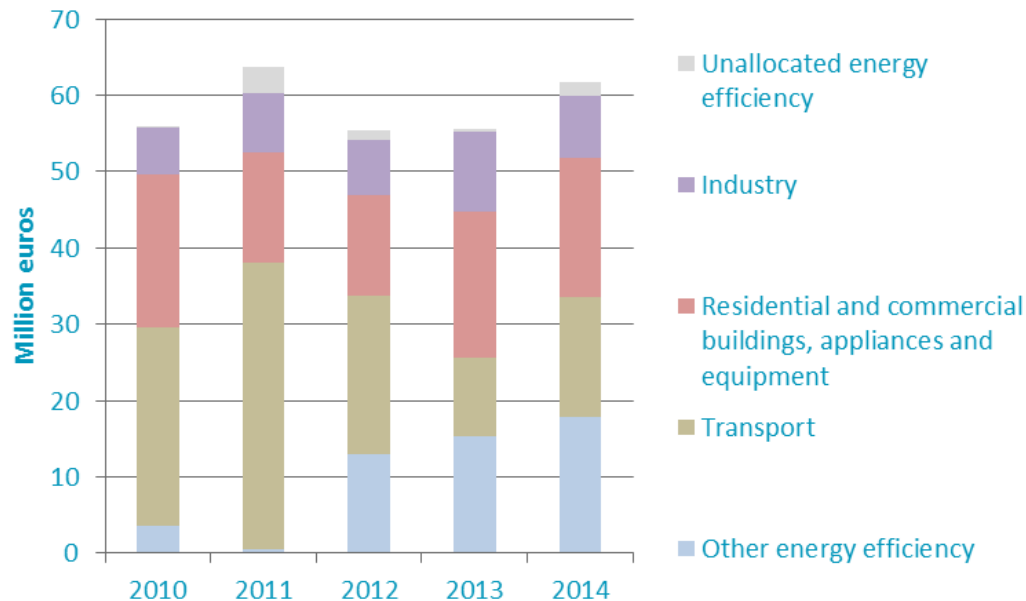
- 2014 not any more
in TOP10:

- Hydrogen
- Hydropower

Ranking 2014	Change compared to 2013	Subcategory	2014 million euros
1	+1	Electricity transmission and distribution - smart grids	21.5
2	-1	Efficient residential and commercial buildings	17.8
3	+2	Smart cities and communities	13.4
4	-1	PV	11.5
5	+3	Energy storage	11.5
6	0	Biofuels	9.4
7	0	Hybrid and electric vehicles	8.5
8	-4	Energy efficiency in industry	8.1
9	new in TOP10	Solar heating and cooling	5.1
10	new in TOP10	Fuel cells	5.1

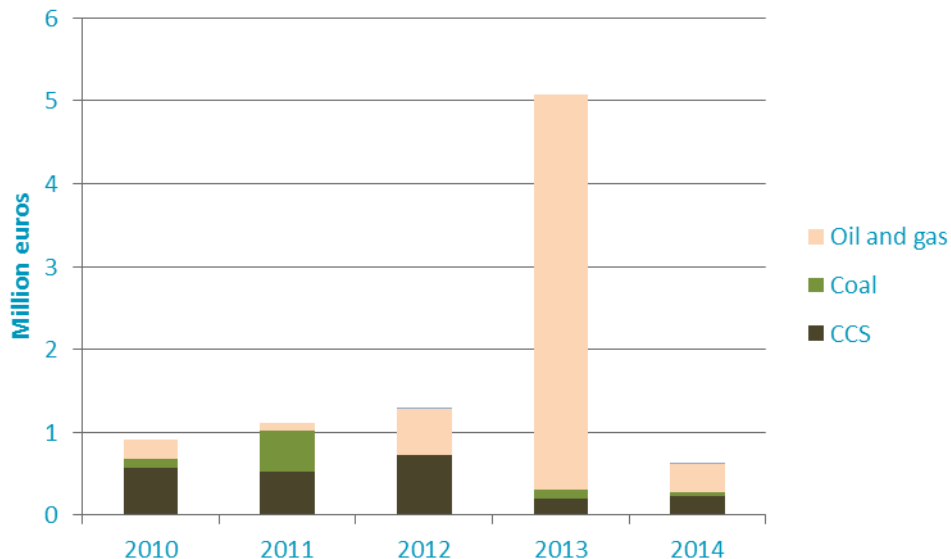
Energy Efficiency

- Top priorities 2014: efficient buildings, smart cities and communities.



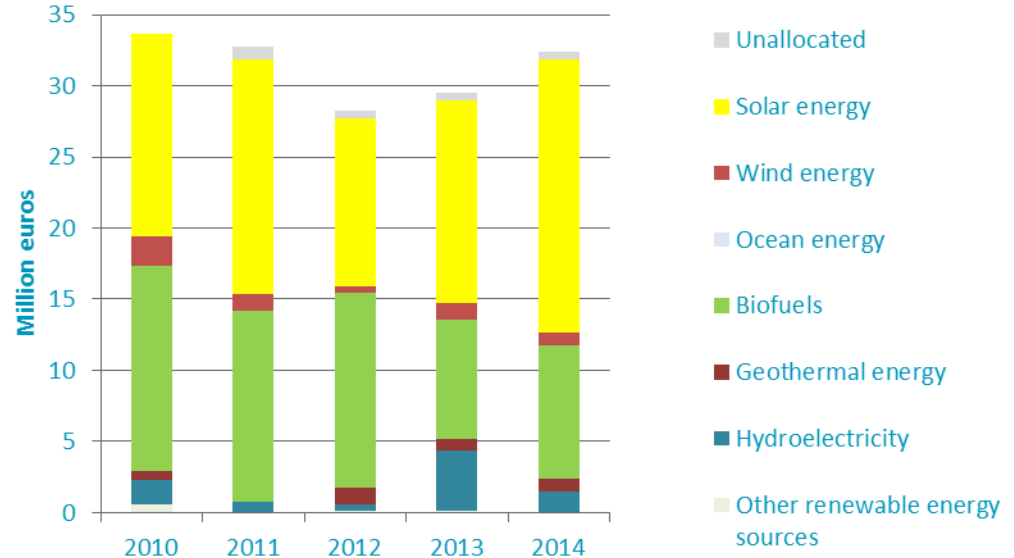
Fossil Fuels

- 2013: RD&D activities peaked, primarily due to activities in the sector „Oil and gas combustion“.
- 2014: expenditures returned to moderate levels.



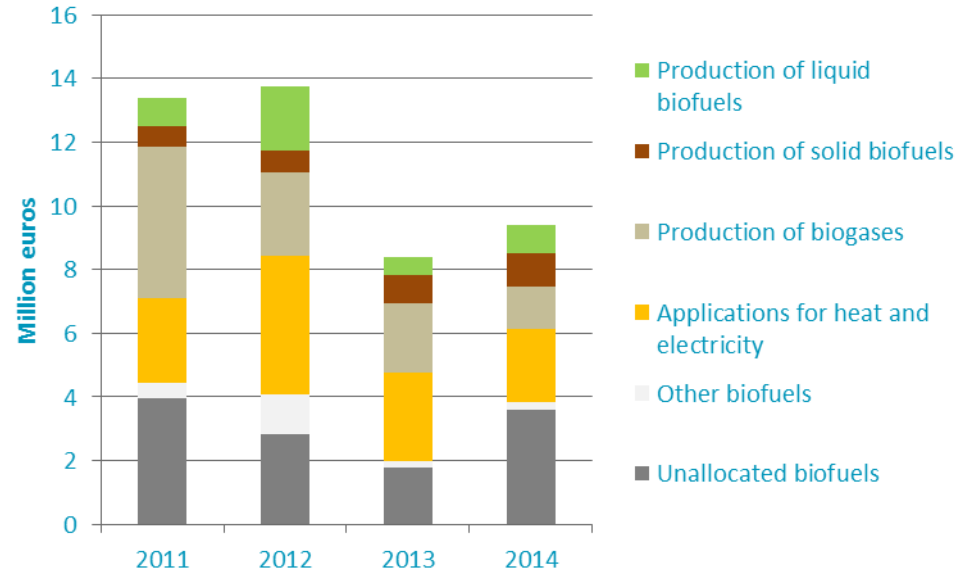
Renewable energy sources

- Broad technology portfolio in renewable energy technologies has replaced “old” biofuel-focus.
- Strong solar portfolio with 60%.



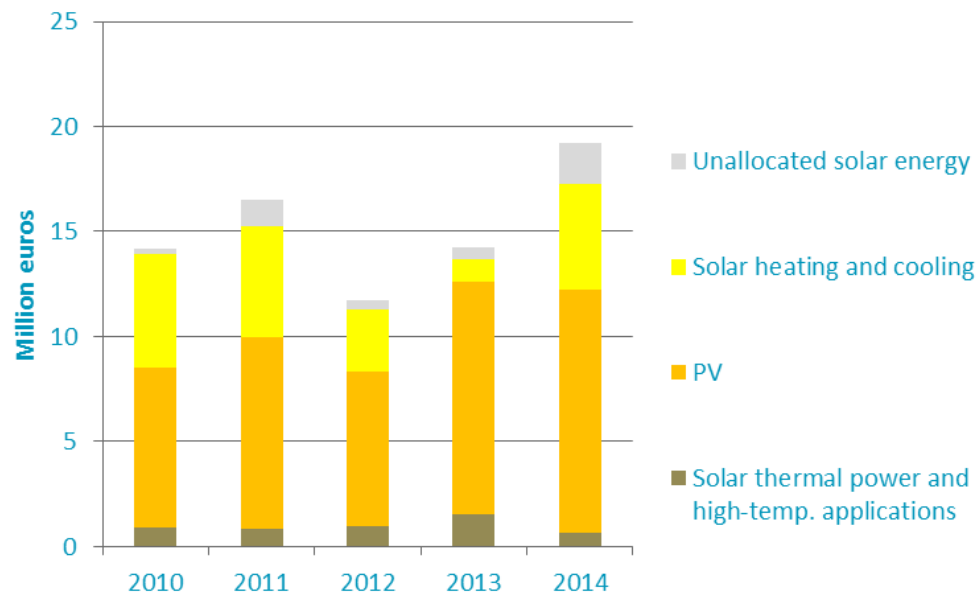
Biofuels

- High share of „unallocated“: due to many integrated projects and financing of a competence center (bioenergy 2020+).



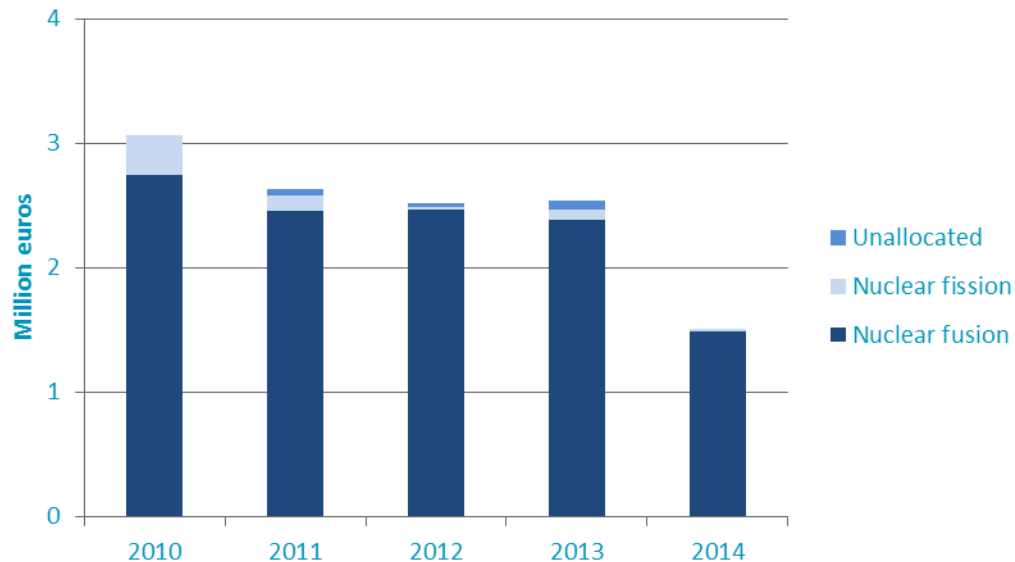
Solar energy

- Clear focus on PV in the solar portfolio.
- 2014: solar heating and cooling is recovering.



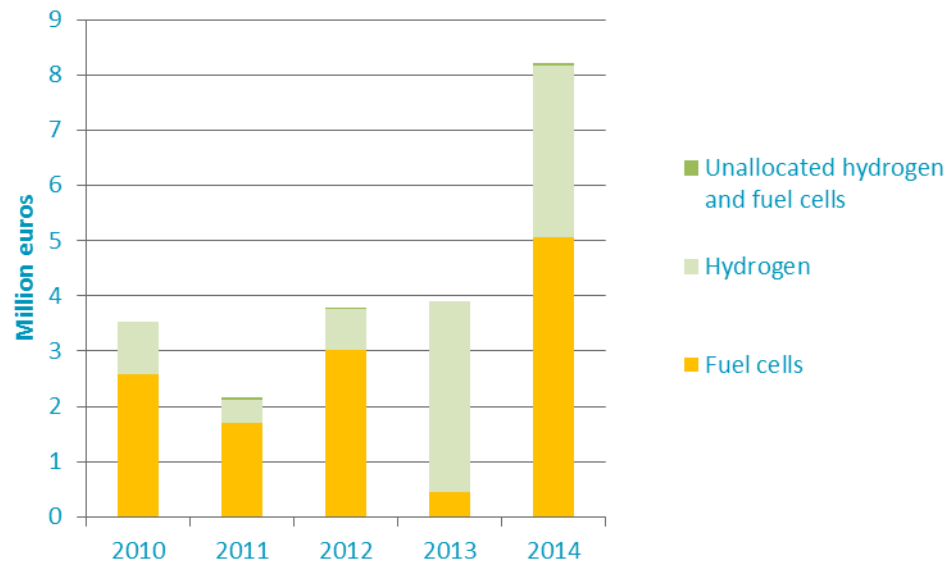
R&D nuclear fission and fusion

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



Hydrogen and fuel cells

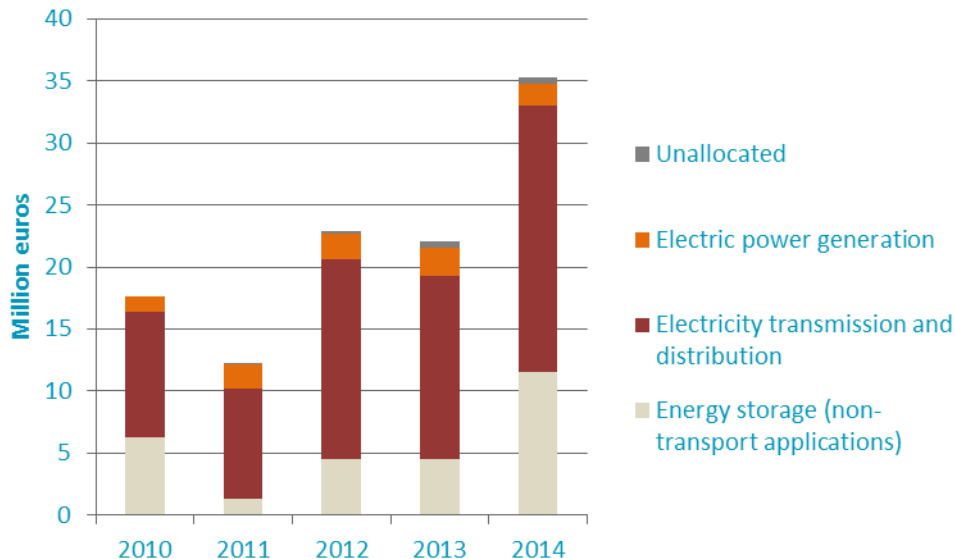
- 2014: fuel cells - strong increase.



Other power and storage technologies

- Increase of 60% in one year, totalling up to 35.3 million euros for this sector:

- 21.5 million euros for electricity transmission and distribution,
- 12 million euros for storage.



Who was financing in 2014?



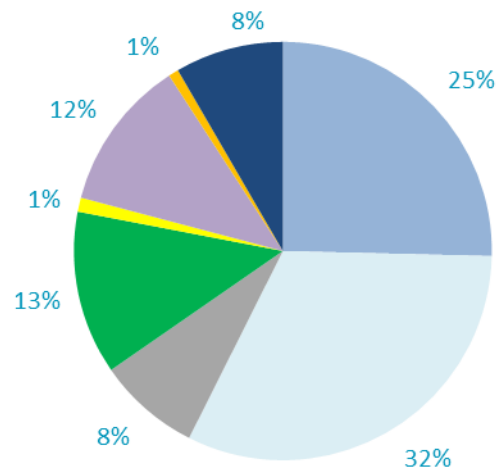
- About 79% of this expenditure were provided by governmental authorities (federal, regional, funding organizations).



- 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.

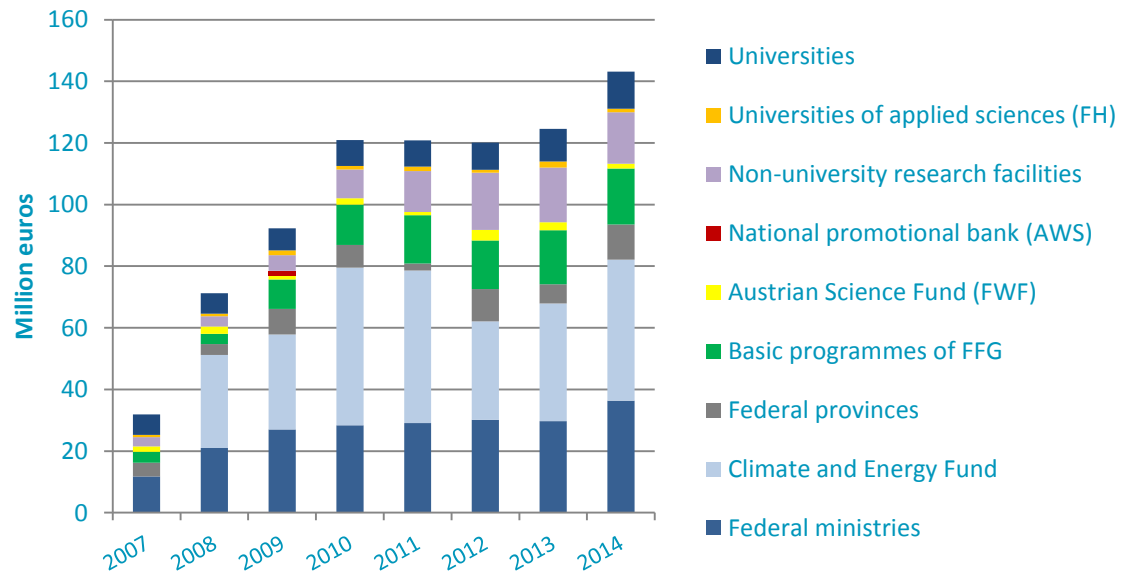


- Federal ministries
- Climate and Energy Fund
- Federal provinces
- Basic programmes of FFG
- Austrian Science Fund (FWF)
- Non-university research facilities
- Universities of applied sciences (FH)
- Universities

Institutions financing RD&D

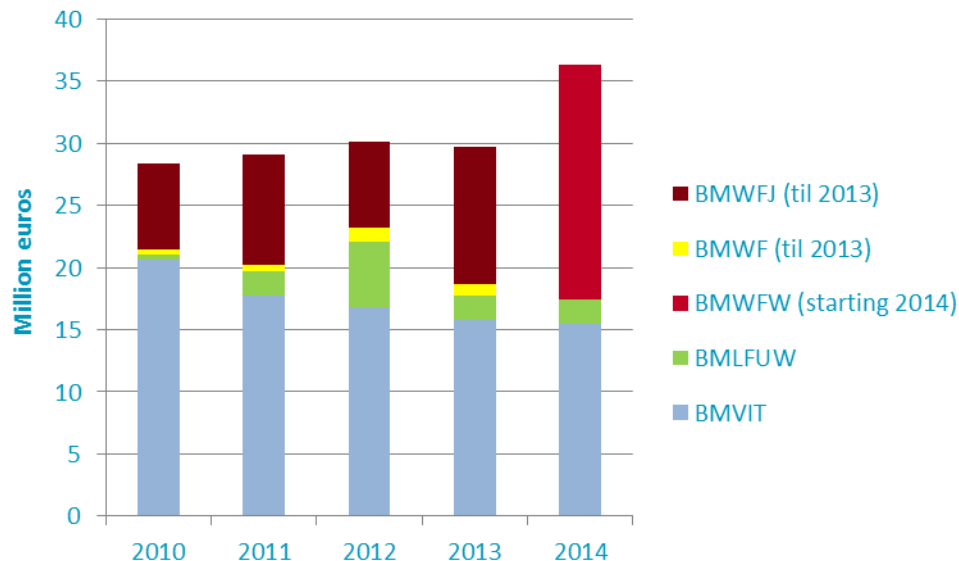
Institution	Expenditure 2014 in euros	Changes compared to 2013 in euros	Changes compared to 2013 in %
Federal ministries	36,324,956	+6,627,732	+22.3%
Climate and Energy Fund	45,824,462	+7,597,563	+19.9%
Federal provinces	11,389,996	+5,234,597	+85.0%
FFG basic programmes	18,109,570	+565,191	+3.2%
FWF (Austrian Science Fund)	1,557,552	-1,120,491	-41.8%
Non-university research facilities	16,781,293	-960,134	-5.4%
Universities of applied sciences (FH)	1,118,857	-792,244	-41.5%
Universities	11,994,032	+1,402,656	+13.2%
Total	143,100,718	+18,554,870	+14.9%

Institutions 2007 - 2014



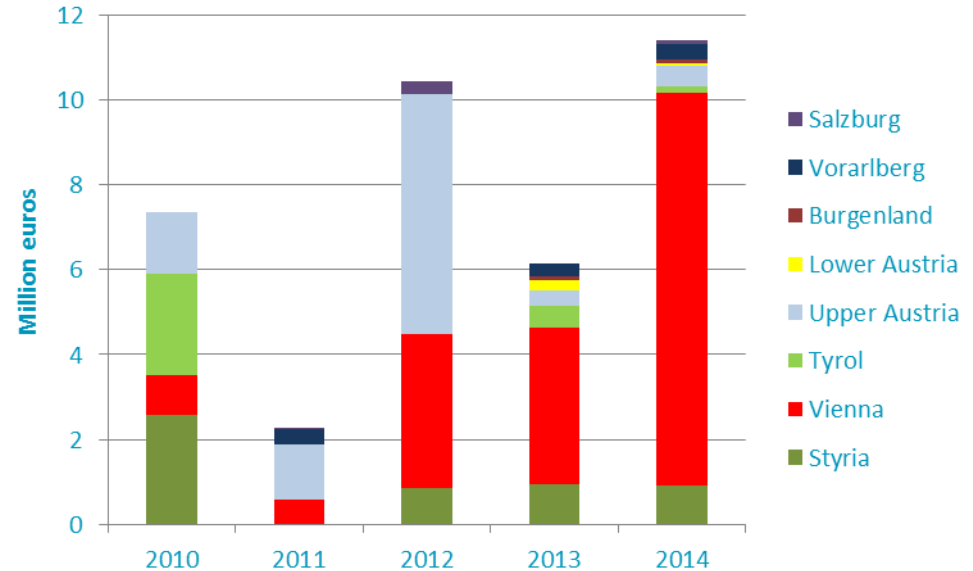
Federal ministries

- 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) not included.*



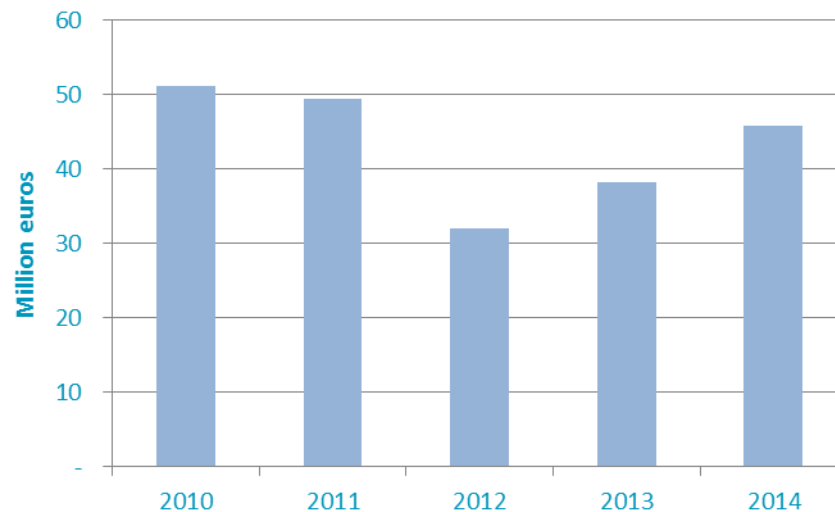
Federal provinces

- High volatility of expenditures of individual federal provinces.
- 2014: all time high, due to strong increase of Vienna.



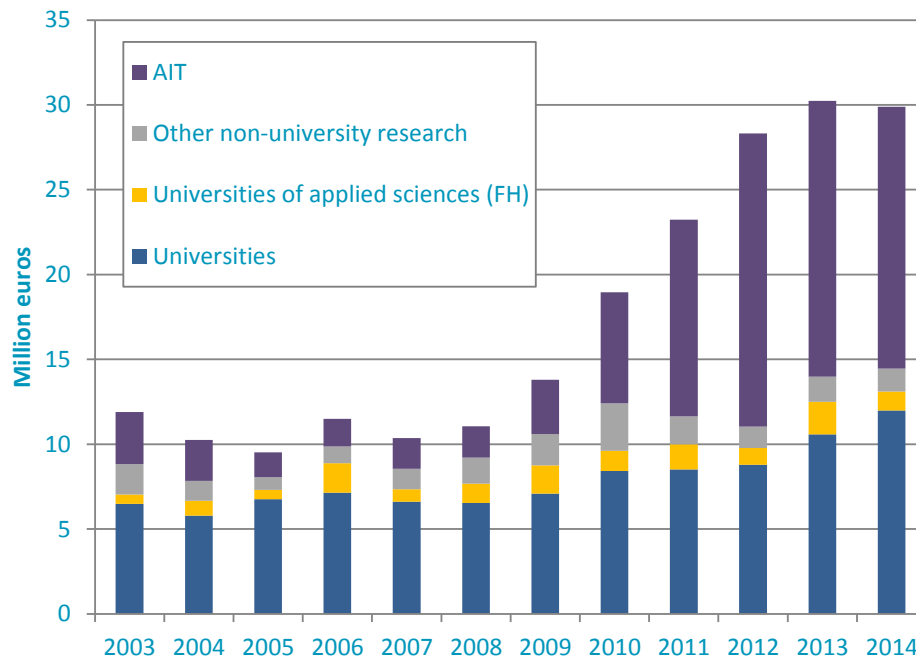
Climate and Energy Fund

- Due to several energy research relevant programmes, the Climate and Energy Fund spent 45.8 million euros in 2014.



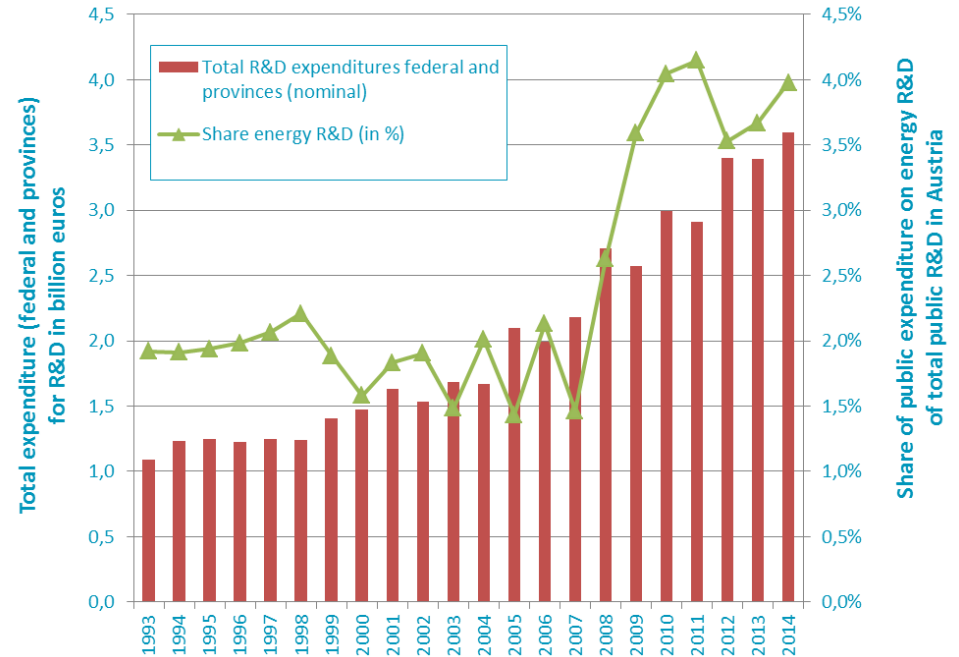
Equity capital for R&D-infrastructure

- Expenditures of (non-university) research institutions were 16.8 million euros; about 92% of this sum was invested by the Austrian Institute of Technology (AIT).
- Universities spent 12 million euros in total with equity capital. Here the Vienna University of Technology had the highest expenditures.



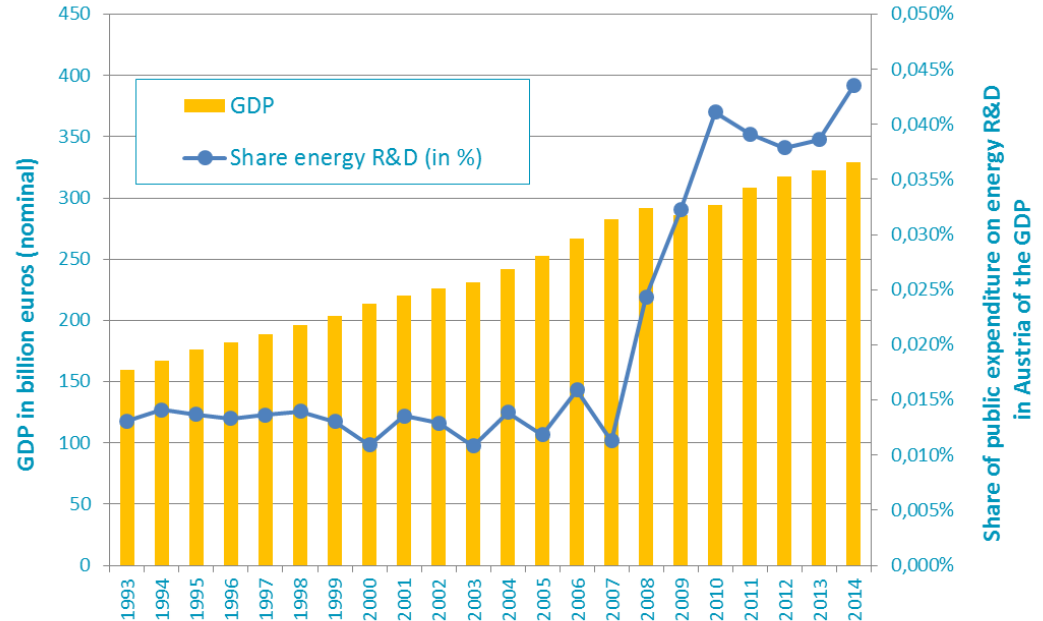
Share in research

- 2014: Share of public expenditure on energy R&D of total public R&D in Austria at 4%.



Share of the GDP

- 2014: share of public expenditure on energy R&D of the GDP with 0.044%.



Publications

- Andreas Indinger, Marion Katzenschlager, Energieforschungserhebung 2014 – Ausgaben der öffentlichen Hand in Österreich. In: BMVIT (Hrsg.) Schriftenreihe 12/2015
- Andreas Indinger, Marion Katzenschlager, Energieforschungserhebung 2013 – Ausgaben der öffentlichen Hand in Österreich. In: BMVIT (Hrsg.) Schriftenreihe 27/2014
- Andreas Indinger, Marion Katzenschlager, Energieforschungserhebung 2012 – Ausgaben der öffentlichen Hand in Österreich. In: BMVIT (Hrsg.) Schriftenreihe 38/2013
- Andreas Indinger, Marion Katzenschlager, Energieforschungserhebung 2011 – Ausgaben der öffentlichen Hand in Österreich. In: BMVIT (Hrsg.) Schriftenreihe 55/2012
- Andreas Indinger, Marion Katzenschlager, Energieforschungserhebung 2010 – Ausgaben der öffentlichen Hand in Österreich. In: BMVIT (Hrsg.) Schriftenreihe 47/2011

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