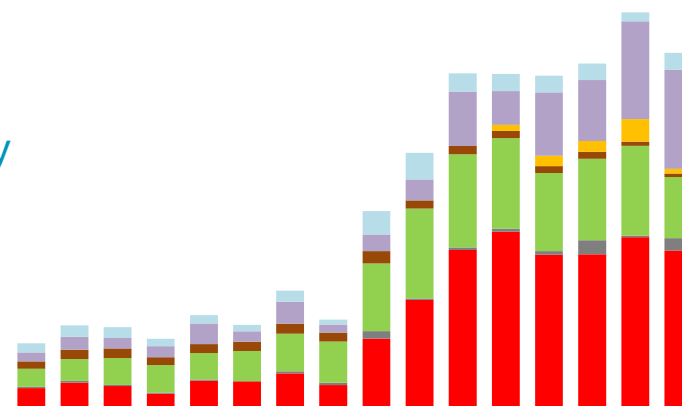


## Energy R&D Public Expenditures in Austria 2015

Andreas Indinger, Marion Katzenschlager

Survey carried out by the Austrian Energy Agency  
on behalf of the Federal Ministry of Transport,  
Innovation and Technology  
June 2016



## 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.



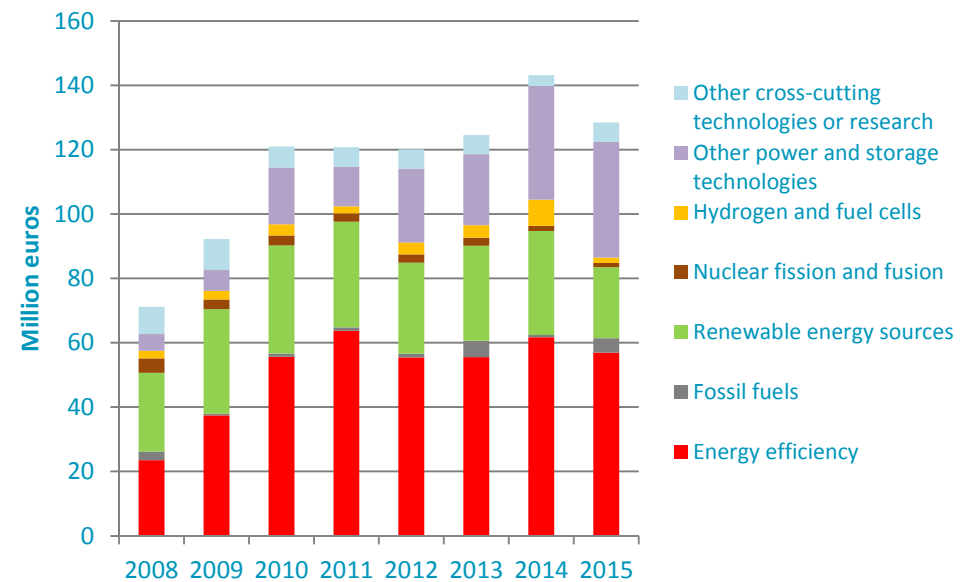
## About the method

- 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 2015) - no budgets!
- Some 950 energy research projects and activities have been registered and analyzed for the year 2015.



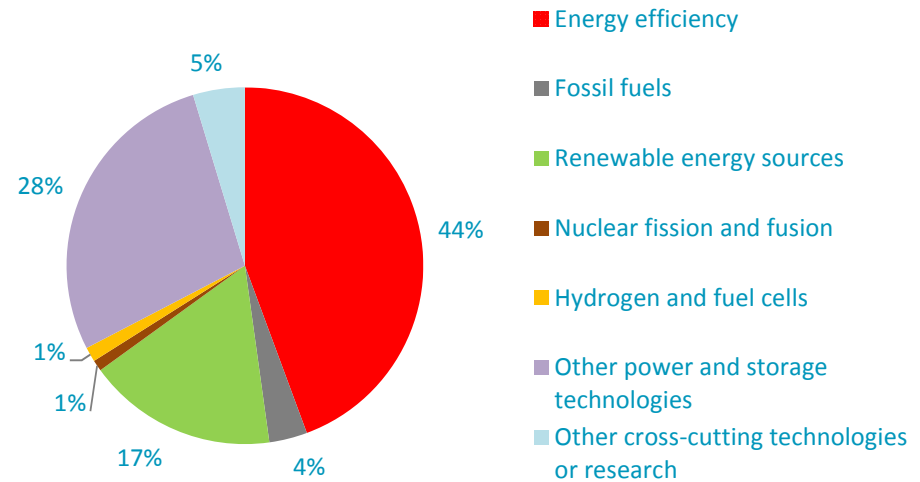
## Overview

- In 2015, Austria's public expenditures for energy-related research and development amounted to 128,415,085 euros, decreasing the expenditures of 2014 by 10.3% after an all-time high of 143.1 million euros.



## Areas of R&D 2015

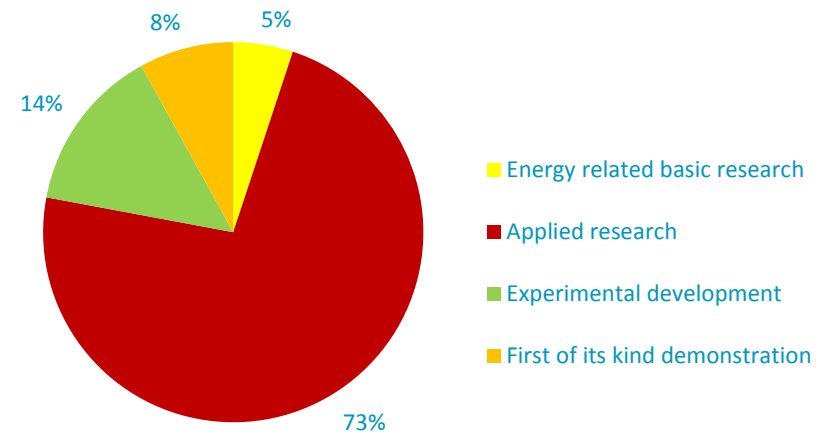
- The research areas of energy efficiency, renewables, smart grids and storage define the priorities of the publicly financed energy research within Austria.



## Type of energy RD&D

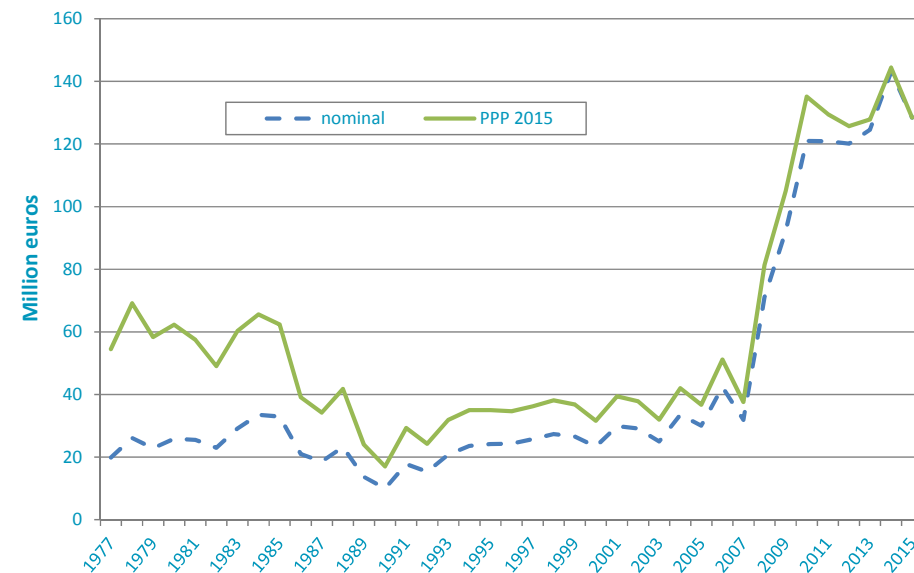
- Energy related basic research (TRL 1 - 2) represented a small yet very important portion of 5%.
- About 73% of the means were used for applied research (TRL 2 - 4).
- 14% for experimental development (TRL 4 - 7).
- First-of-its-kind demonstration (TRL 7 - 8) amounted to 8% in 2015.

TRL ... Technology Readiness Level



## Public energy R&D expenditures in Austria 1977 - 2015

- 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 2014

Topics according to the IEA code	Expenditure 2015 in euros	Changes compared to 2014 in euros	Changes compared to 2014 in %
Energy efficiency	56,956,923	-4,780,864	-7.7%
Fossil fuels	4,429,991	+3,813,458	+618.5%
Renewable energy sources	22,118,504	-10,294,518	-31.8%
Nuclear fission and fusion	1,302,226	-207,530	-13.7%
Hydrogen and fuel cells	1,695,713	-6,518,482	-79.4%
Other power and storage technologies	35,880,529	+591,676	+1.7%
Other cross-cutting technologies or research	6,031,199	+2,710,627	+81.6%
<b>Total</b>	<b>128,415,085</b>	<b>-14,685,633</b>	<b>-10.3%</b>



## „Top10“ 2015

2015 not any more  
in TOP10:

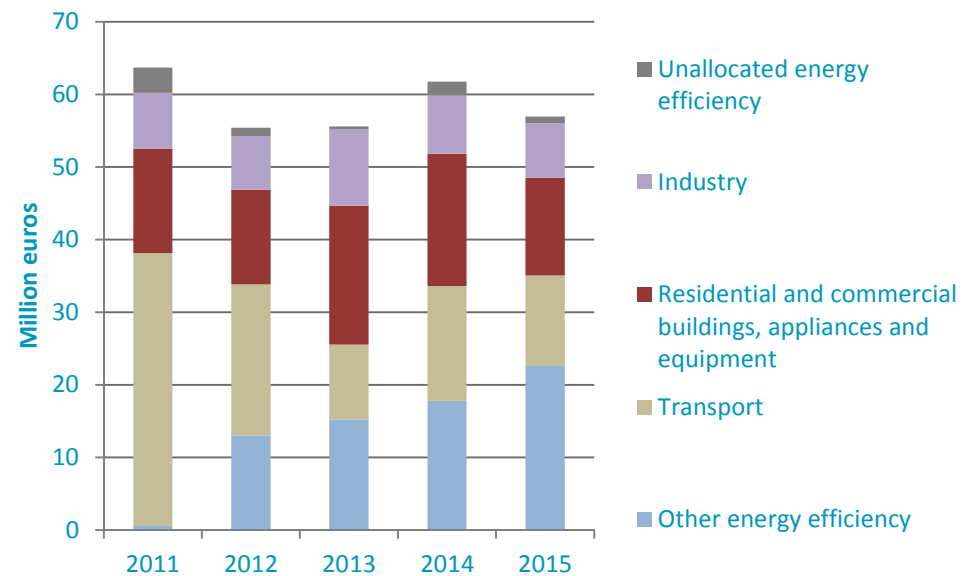
- Solar heating and cooling

- Fuel cells

Ranking 2015	Change compared to 2014	Subcategory	2015 million euros
1	0	Electricity transmission and distribution - smart grids	17,7
2	+1	Smart cities and communities	16,1
3	+2	Energy storage	13,8
4	-2	Efficient residential and commercial buildings	12,5
5	+1	Biofuels	10,1
6	+1	Hybrid and electric vehicles	8,9
7	+1	Energy efficiency in industry	7,5
8	-4	PV	7,2
9	new in TOP10	Electric power generation	4,2
10	new in TOP10	CCS	2,7

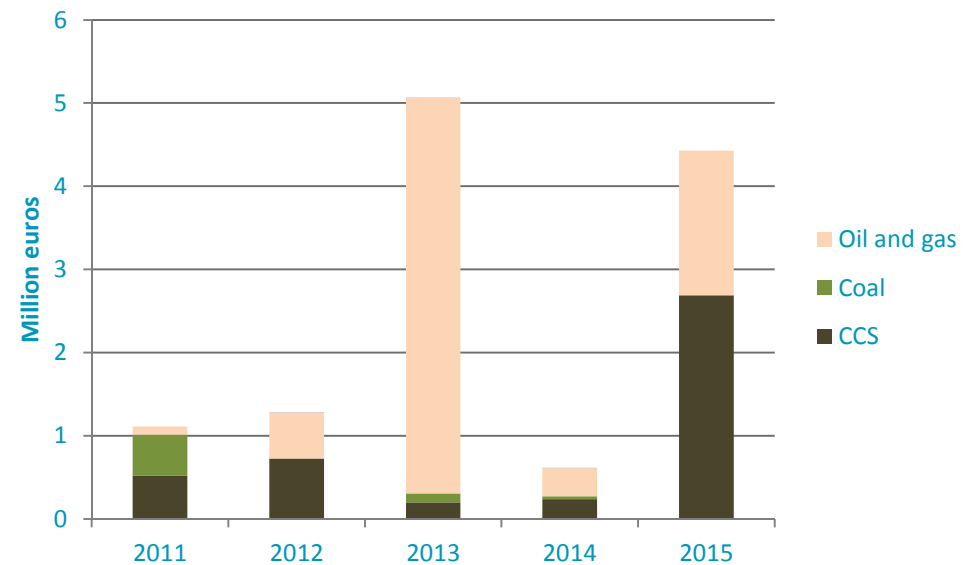
## Energy Efficiency

- 57 million euros in total for 2015, a minus of 4.8 million euros in one year.
- Top priority 2015: smart cities and communities (under "other...").



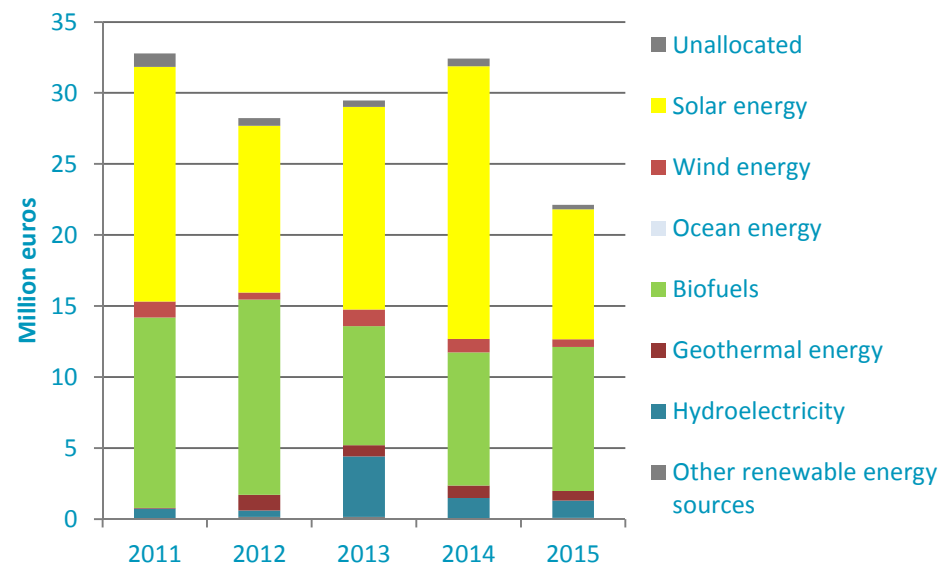
## Fossil Fuels

- 2013: RD&D activities peaked, primarily due to activities in the sector „Oil and gas combustion“.
- 2015: substantial expenditures for CCS.



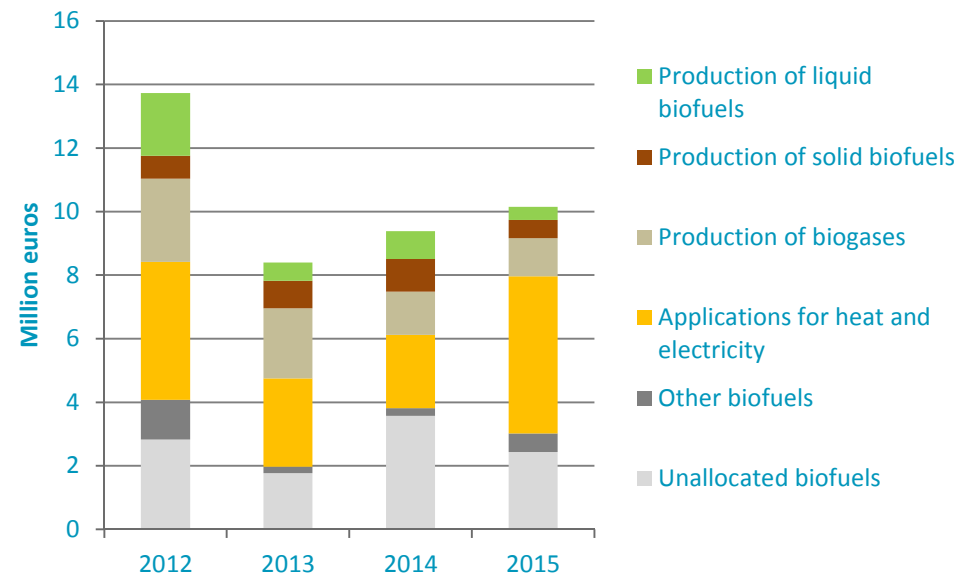
## Renewable energy sources

- Expenditures for renewable energy technologies summed up to 22.1 million euros, which was 32% below the level of 2014.
- Biofuels and solar energy provided the main share of activities.



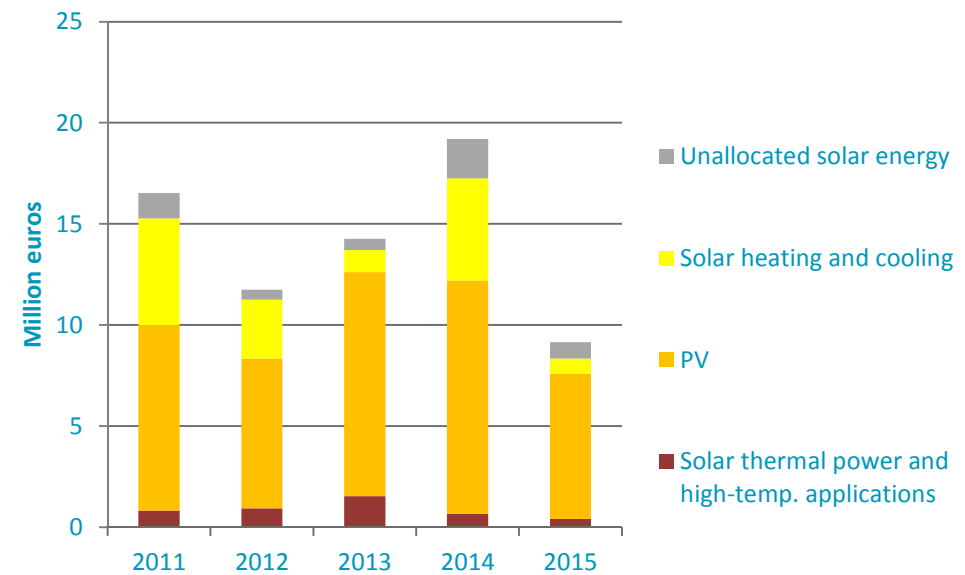
## Biofuels

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



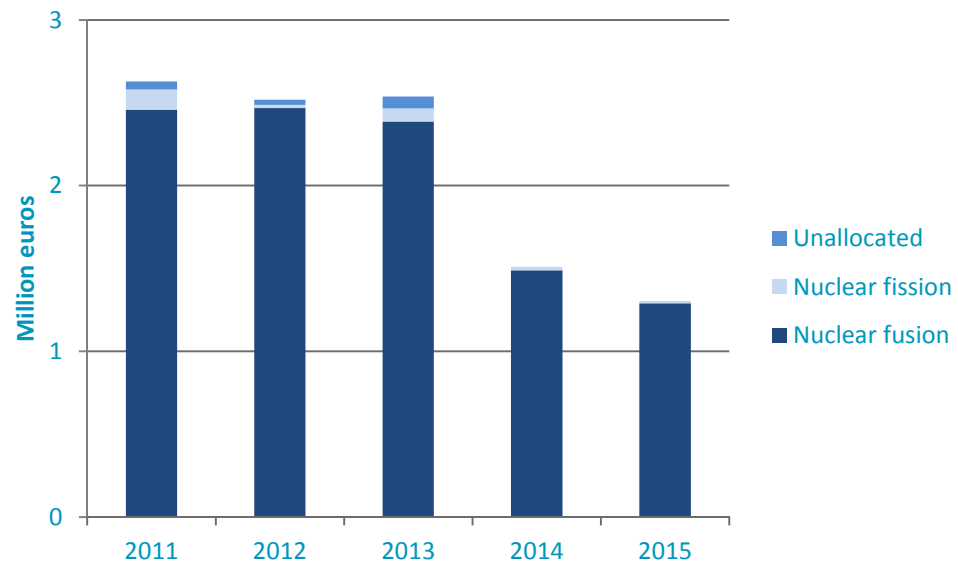
## Solar energy

- Clear focus on PV in the solar portfolio.



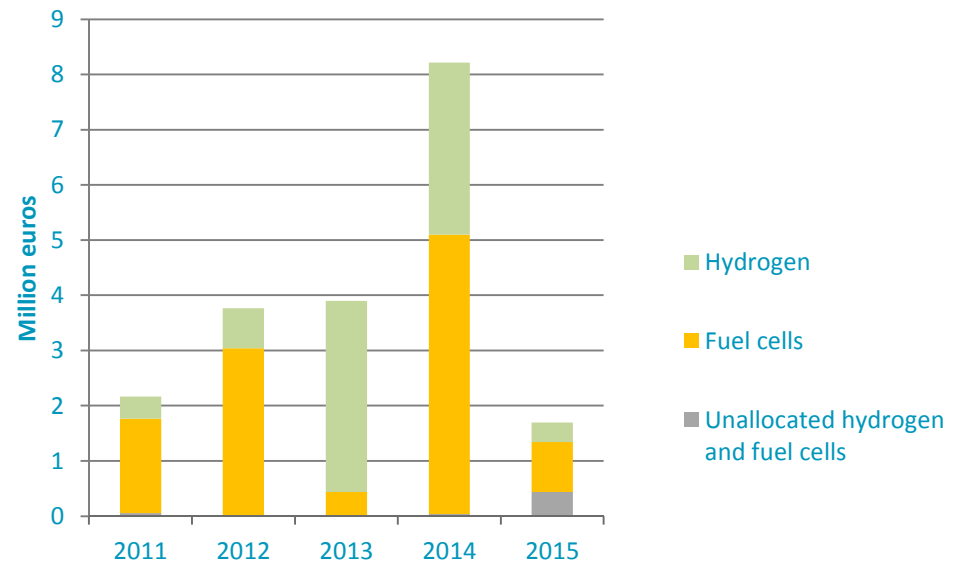
## R&D nuclear fission and fusion

- 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 (started in 2014).
- Data includes only national financial contributions.



## Hydrogen and fuel cells

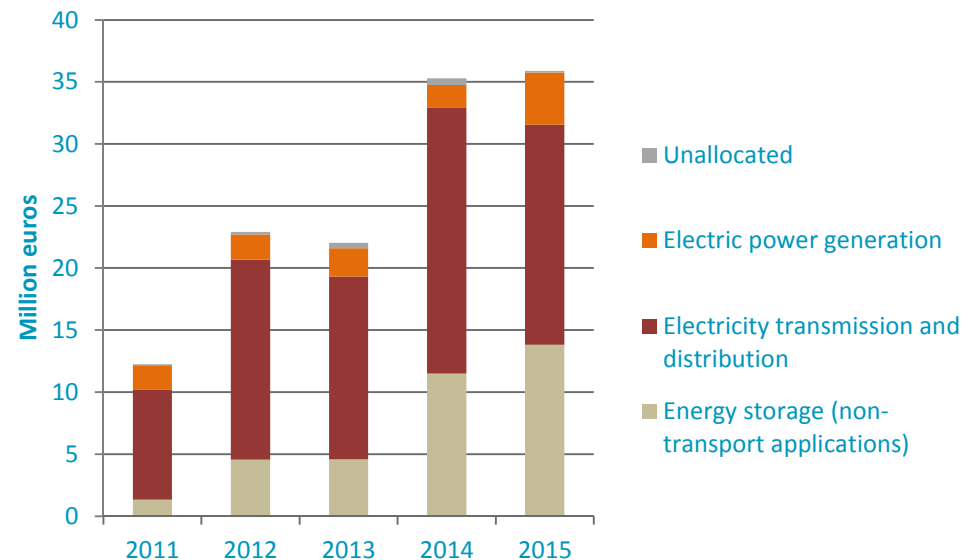
- 2015: strong decrease!





## Other power and storage technologies

- 2015: increase of 0.6 million euros in one year, totalling up to 35.9 million euros.
- Expenditures of around 17.7 million euros for electricity transmission and distribution.
- 13.8 million euros for storage (also electricity, but mainly heat).



## Who was financing in 2015?



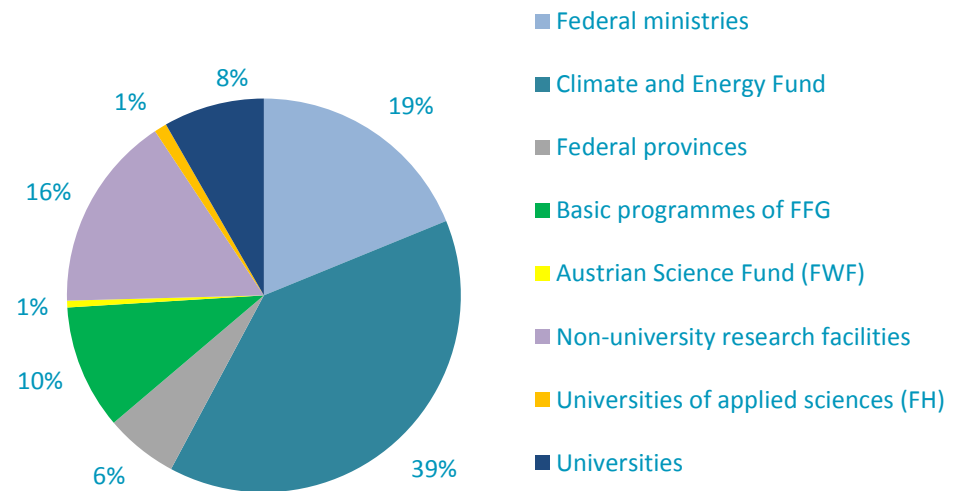
- About 75% of this expenditure were provided by governmental authorities (federal, regional, funding organizations).



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



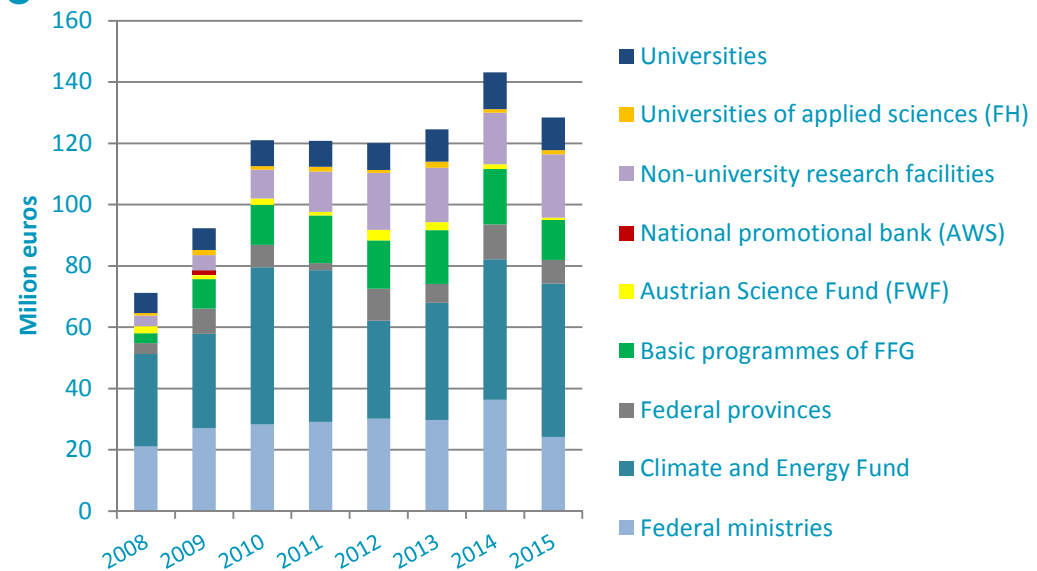
- No third party financing or EU projects were covered in this survey.



## Institutions financing RD&D

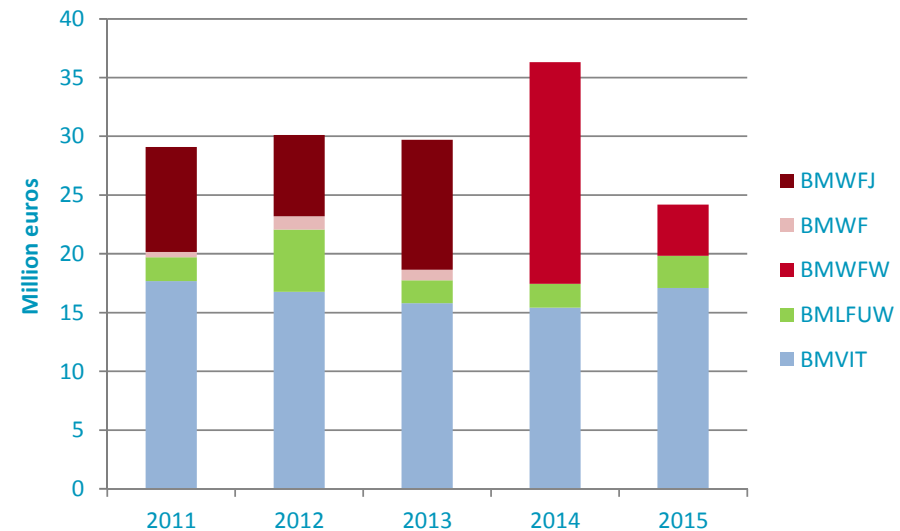
Institution	Expenditure 2015 in euros	Changes compared to 2014 in euros	Changes compared to 2014 in %
Federal ministries	24,180,533	-12,144,423	-33.4%
Climate and Energy Fund	50,049,465	+4,225,003	+9.2%
Federal provinces	7,687,752	-3,702,244	-32.5%
FFG basic programmes	13,127,307	-4,982,263	-27.5%
FWF (Austrian Science Fund)	715,063	-842,489	-54.1%
Non-university research facilities	20,697,119	+3,915,826	+23.3%
Universities of applied sciences (FH)	1,323,745	+204,888	+18.3%
Universities	10,634,101	-1,359,931	-11.3%
<b>Total</b>	<b>128,415,085</b>	<b>-14,685,633</b>	<b>-10.3%</b>

## Institutions 2008 - 2015



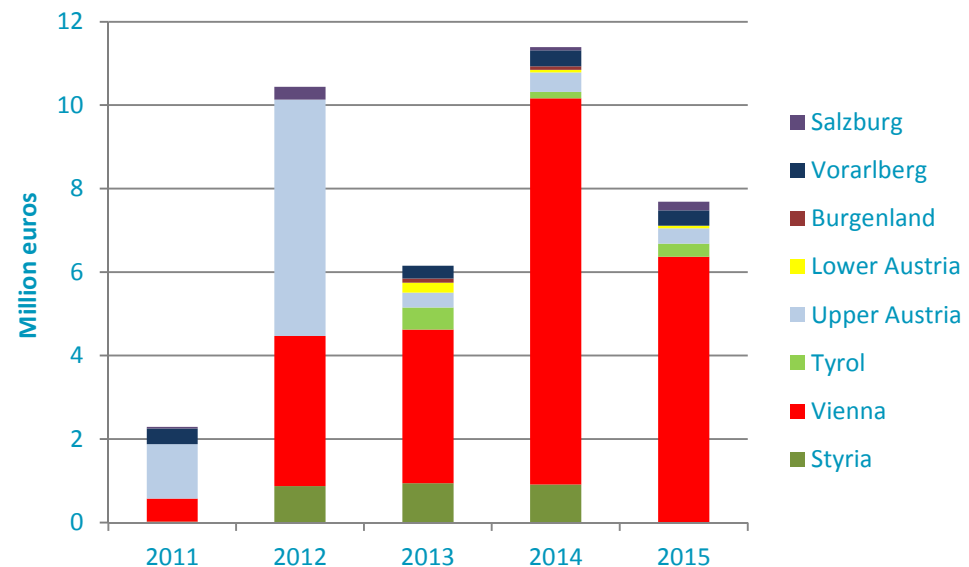
## Federal ministries

- 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 programs of FFG and the Austrian Science Fund (FWF) not included.*



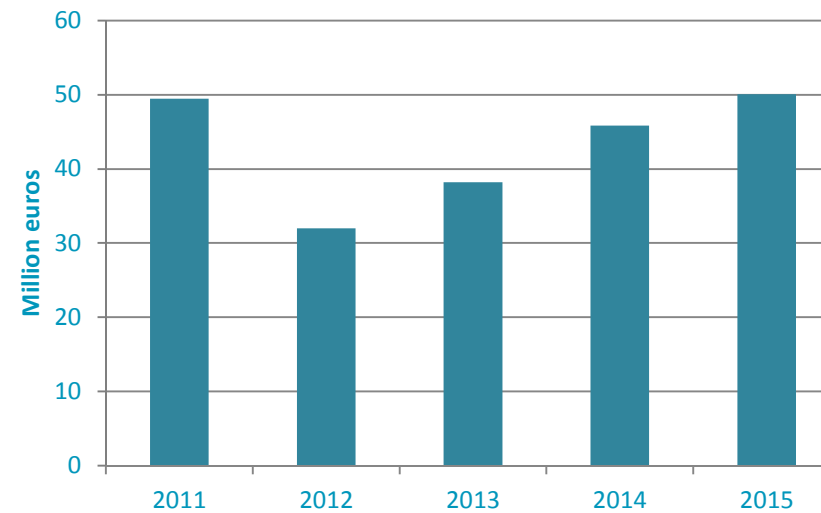
## Federal provinces

- 2014: all time high, due to strong increase of Vienna.
- 2015: the total expenditures of the nine federal provinces of Austria with Vienna still in the lead decreased to 7.7 million euros.
- High volatility of expenditures of individual federal provinces.



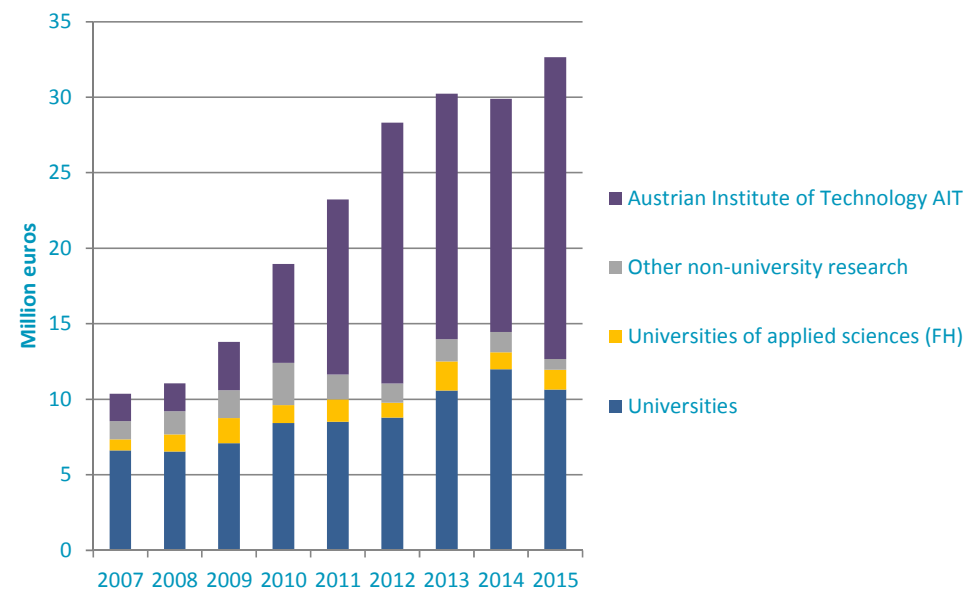
## Climate and Energy Fund

- Due to several energy research relevant programs, the Climate and Energy Fund spent 50 million euros in 2015, which was substantially more than last years' expenditures.



## Equity capital for R&D-infrastructure

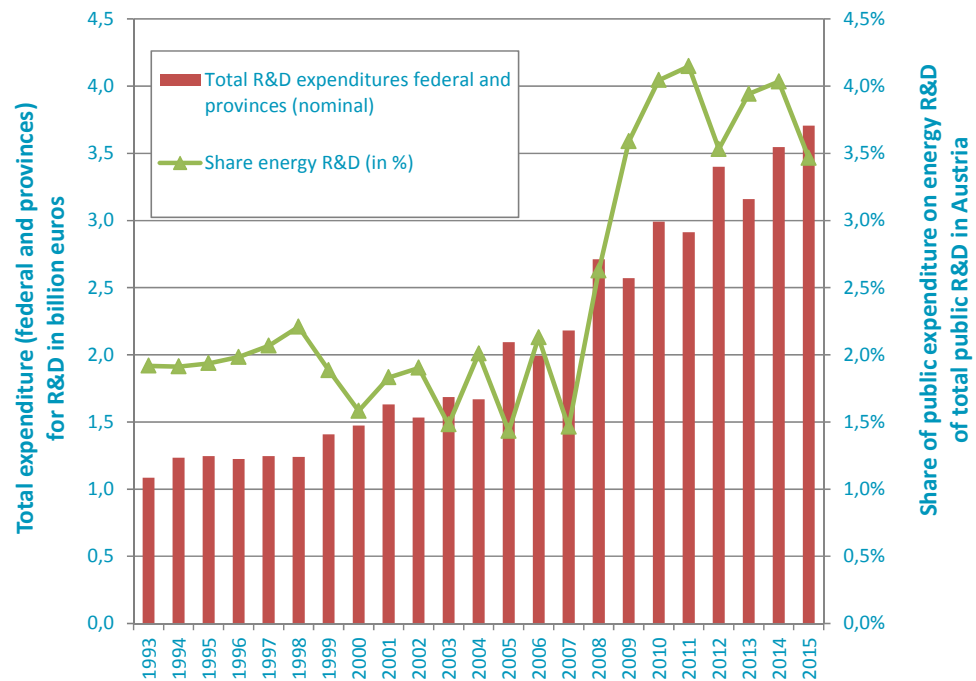
- The expenditures of the (non-university) research institutions were 20.7 million euros; almost 97% of this sum was invested by the Austrian Institute of Technology – AIT.
- The universities spent 10.6 million euros in total with equity capital (Lead: Vienna University of Technology).
- 1.3 million euros was invested by the sector of universities of applied sciences (so called Fachhochschulen or FHs).





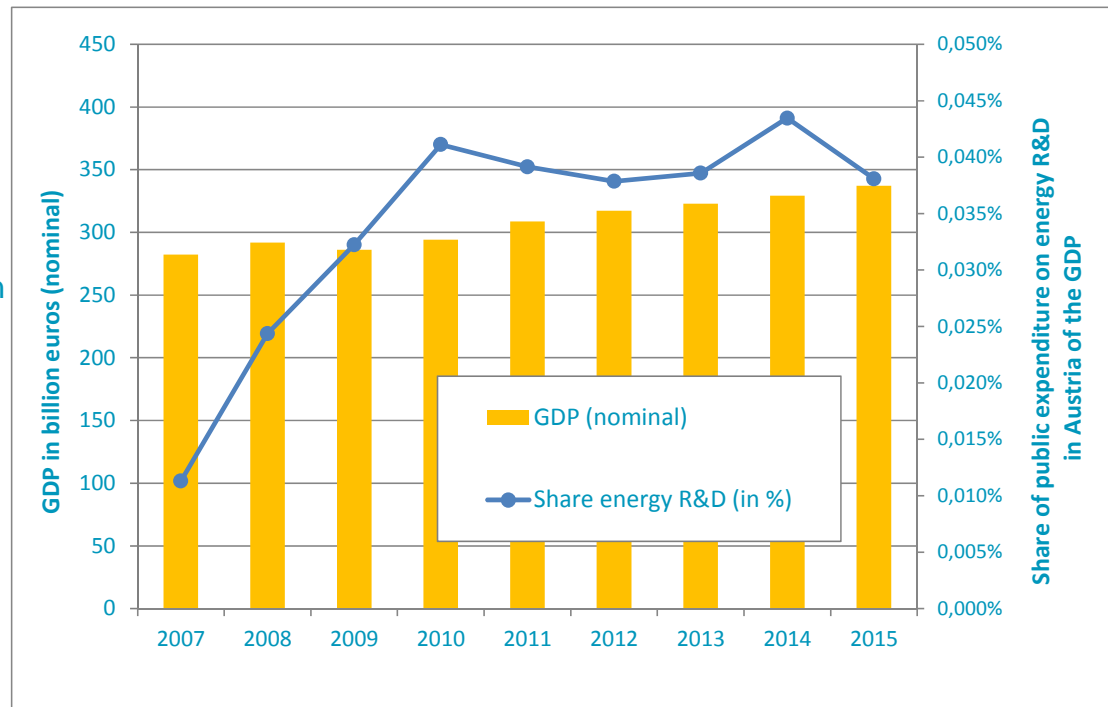
## Share in research

- 2015: Share of public expenditure on energy R&D of total public R&D in Austria at 3.5%.



## Share of the GDP

- 2015: share of public expenditure on energy R&D of the GDP decreased from 0.044% to 0.038%.



## 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

And more downloads: <http://www.nachhaltigwirtschaften.at/iea/publikationen/energieforschungserhebungen.html>