



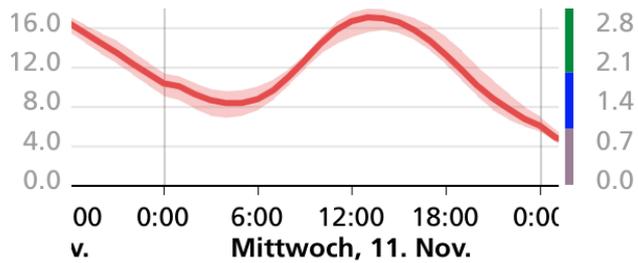
# Energy Research in Switzerland



Dr. Rolf Schmitz



# Stay in Switzerland





# New Energy Strategy of Switzerland

**11<sup>th</sup> of March 2011: Fukushima**





## Consequences for Energy Research

### Federal Council and Parliament strengthen Energy Research

- 25<sup>th</sup> of May 2011: The Federal Council...
  - ▶ *decides to phase out nuclear power*
  - ▶ *declares launch of National Research Programs dedicated to «Energy» exclusively (45 MCHF over 5 years)*
  - ▶ *decides to develop an Swiss Energy Research Action Plan*
  
- 18<sup>th</sup> of April 2012: The Federal Council...
  - ▶ *increases budget for P+D from 5 to 25 MCHF per year*
  - ▶ *launches a «light house program»: 10 MCHF per year (until 2022)*
  
- 22<sup>th</sup> of March 2013: Parliament...
  - ▶ *adopts the Swiss Energy Research Action Plan: 202 MCHF for four years*



# Action Plan Co-ordinated Energy Research Switzerland

## Promotion for the Period 2013–2016

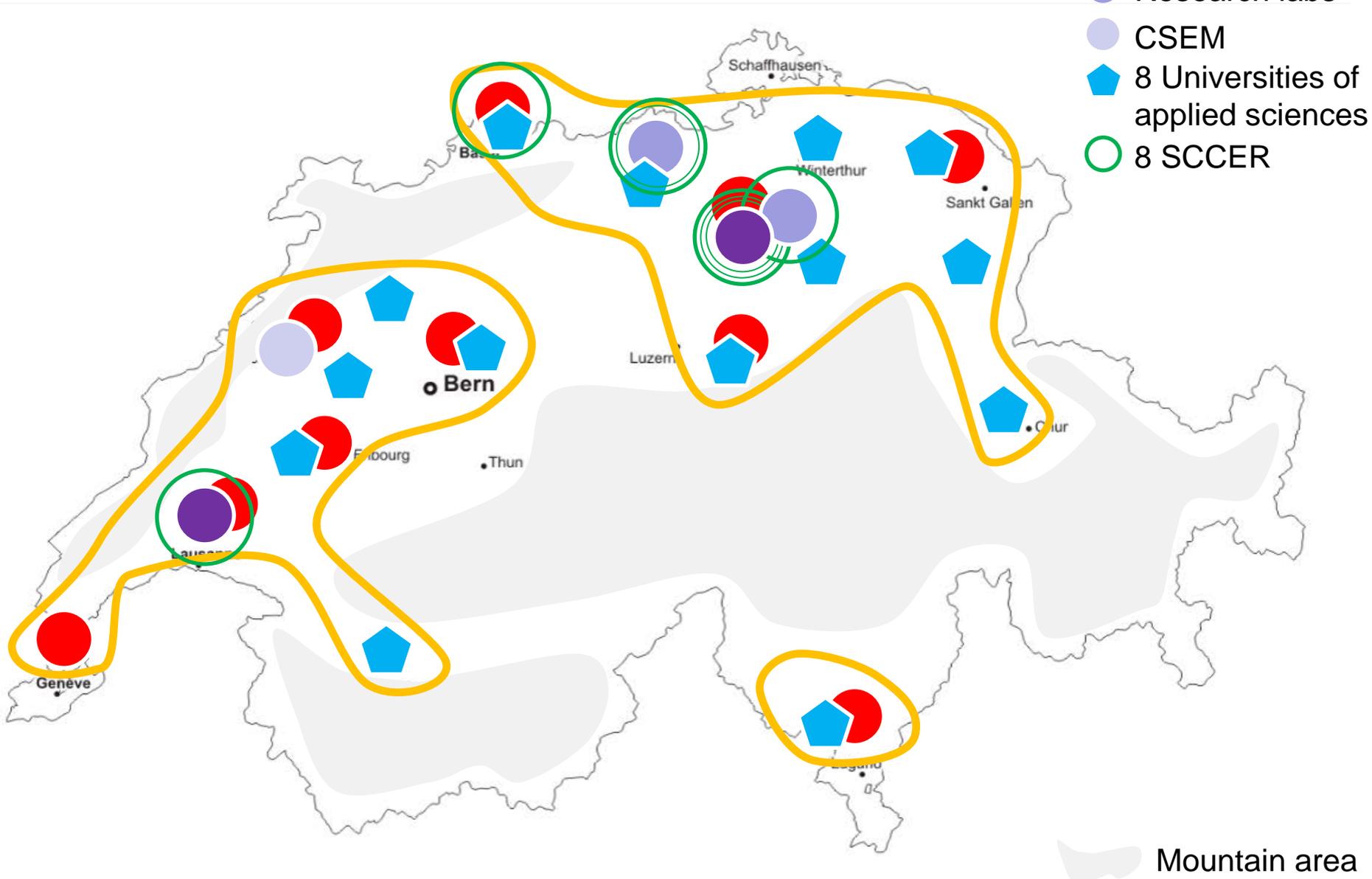
**202 MCHF**

- 8 new Swiss Competence Centers for Energy Research **72 MCHF**
  - Future Energy Efficient Buildings and Districts
  - Efficiency of Industrial Processes
  - Future Swiss Electrical Infrastructure
  - Heat and Electricity Storage
  - Supply of Electricity
  - Efficient Technologies and Systems for Mobility
  - Biomass for Swiss Energy Future
  - Competence Center for Research in Energy, Society and Transition
- Competitive promotion of projects (CTI) **46 MCHF**
- SNSF professorships **24 MCHF**
- ETH domain **60 MCHF**



# Universities with Relation to Energy Research

- 10 Universities
- ETHZ / EPFL
- Research labs
- CSEM
- 8 Universities of applied sciences
- 8 SCCER





# Public Expenditure for Energy Research

**ETH** zürich



PAUL SCHERRER INSTITUT



EMPA



193 out of 256 million Swiss Francs

Hes·SO  
Haute Ecole Spécialisée  
de Suisse occidentale



Lucerne University of  
Applied Sciences and Arts  
HOCHSCHULE  
LUZERN



Zürcher Hochschule  
für Angewandte Wissenschaften  
zhaw School of  
Engineering



Berner  
Fachhochschule



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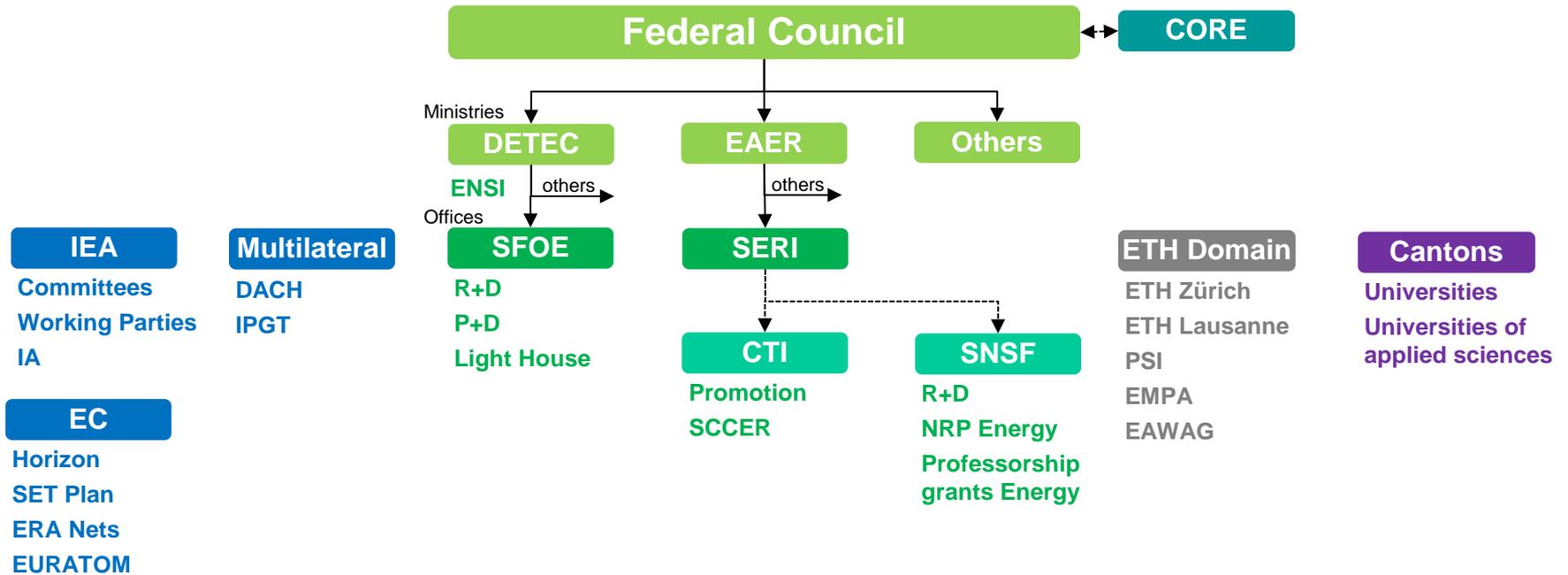
Scuola universitaria professionale  
della Svizzera italiana

SUPSI





# Overview on Public Actors in Energy Research

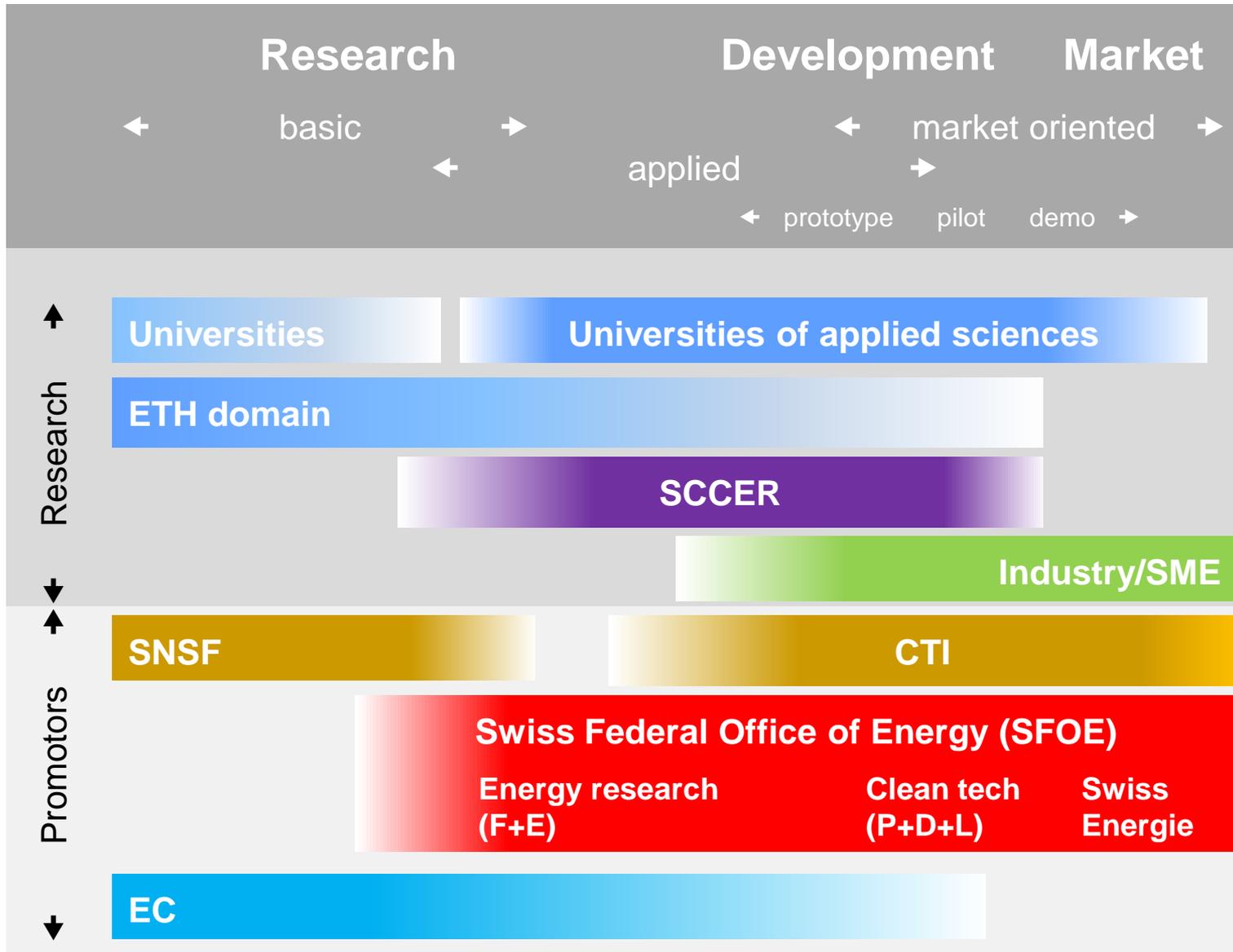


DACH: Cooperation between Germany (D), Austria (CH) and Switzerland (CH)  
 CORE: Federal Energy Research Commission  
 CTI: Commission for Technology and Innovation  
 DETEC: Department of the Environment, Transport, Energy and Communications  
 EAER: Department of Economic Affairs, Education and Research  
 EMPA: Federal Laboratories for Materials Science and Technology  
 ENSI: Swiss Federal Nuclear Safety Inspectorate  
 FP: Framework Programmes

IA: Implementing Agreements  
 IPGT: International Partnership for Geothermal Technology  
 KTT: Knowledge and Technology Transfer  
 NRP: National Research Programmes  
 PSI: Paul Scherrer Institute  
 SCCER: Swiss Competence Centers in Energy Research  
 SERI: State Secretariat for Education, Research and Innovation  
 SET: Strategic Energy Technology  
 SFOE: Swiss Federal Office of Energy  
 SNSF: Swiss National Science Foundation



# Innovation chain: from basic research to market





## Energy Research Programs of the SFOE

### Renewables ~8 MCHF

- Biomass and wood energy
- Geothermal energy
- Industrial use of solar energy
- Photovoltaic
- Solar heat and heat storage
- Hydropower
- Hydrogen
- Wind energy

### Nuclear ~0,2 MCHF

- Fusion
- Fission and nuclear safety
- Radioactive waste
- Regulatory safety research

### Energy efficiency ~9 MCHF

- Fuel cells
- Electricity technology and applications
- Energy in buildings
- Power plant 2020/CCS
- Grids
- Process engineering
- Transports
- Heat pumping technologies and refrigeration
- Combustion and CHP

### P+D+L

~35 MCHF

- Pilot-, demonstrations- and light house projects

### Weitere

~3 MCHF

- Energy–Economy–Society (EES)
- Dams (Safety)



# Implementing Agreements IEA: participation of SFOE

## **Member in 20 out of 38 Implementing Agreements**

Advanced Fuel Cells

Advanced Motor Fuels

Bioenergy

Demand Side Management

Energy Efficient End-Use Equipment

Emissions Reduction in Combustion

**Energy in Buildings and Communities**

Energy Technology Systems Analysis Programme

Gas and Oil Technologies

Geothermal Energy Research and Technology

Greenhouse Gases

**Heat Pumping Technologies**

High-Temperature Super Conductivity on the Electric Power Sector

**Hybrid and Electric Vehicles Technologies**

**Hydrogen**

International Smart Grid Action Network

**Photovoltaic Power Systems**

Solar Heating and Cooling Systems

Solar-PACES

Wind Energy Systems



# 18 weitere Implementing Agreements der IEA

**Delegate**

## **«Non nuclear» Implementing Agreements**

*Advanced Materials for Transportation*

*Climate Technology Initiative*

*District Heating and Cooling*

*Energy Storage*

*in discussion*

*Enhanced Oil Recovery*

*Fluidized Bed Conversion*

*Hydropower*

*Industrial Technologies and Systems*

*in discussion*

*Ocean*

*Renewables Deployment*

## **Implementing Agreements tackling nuclear energy**

*Environment, Safety & Economy*

*Fusion Materials*

*CH: SBFI*

*Nuclear Technology Fusion Reactors*

*Plasma Wall Interaction*

*Reversed Field Pinches*

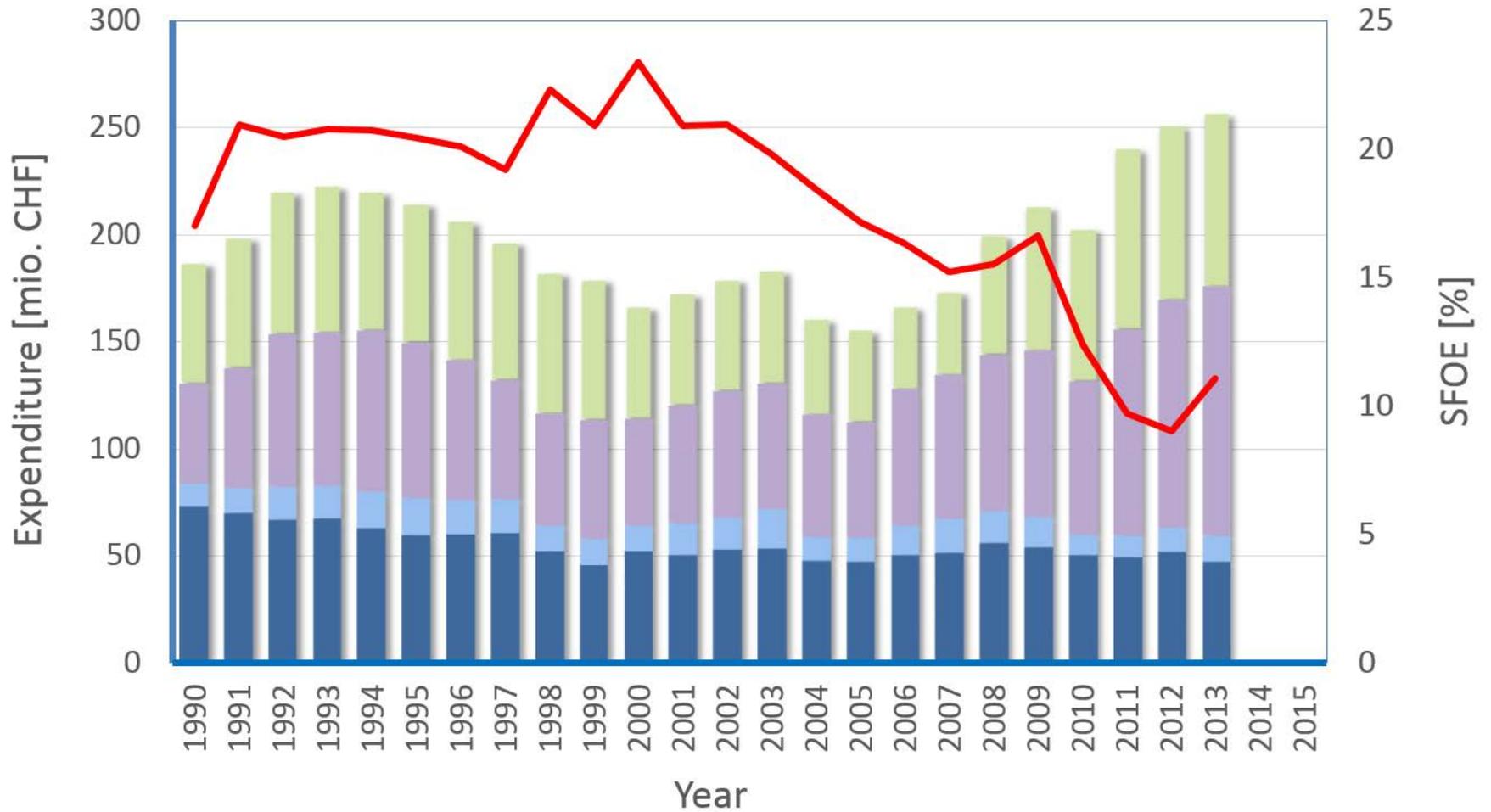
*Spherical Tori*

*Stellarator-Heliotron*

*Tokamaks*



# Expenditure of Public Sector 1990 to 2013







# Promoters of Energy Research

## Public promotion

SFOE, FOEN, ENSI, Swisstopo, FOAG, others

CTI, SNSF, Technology fund, REPIC

ETH Domain, Universities, Universities of applied sciences

Cantons, Cities (e.g. ZH, GE, BS)

EC, EUREKA, COST

## Market oriented promotion

e.g. SwissEnergy, ProKilowatt

Technology Fund

## Private promotion

FOGA, FEV, Foundations

Public promoters 2013 [MCHF]

