Sustainable Energy Systems and the Euratom Research Programme

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Contents

- EU energy policy
- EU research in nuclear fission

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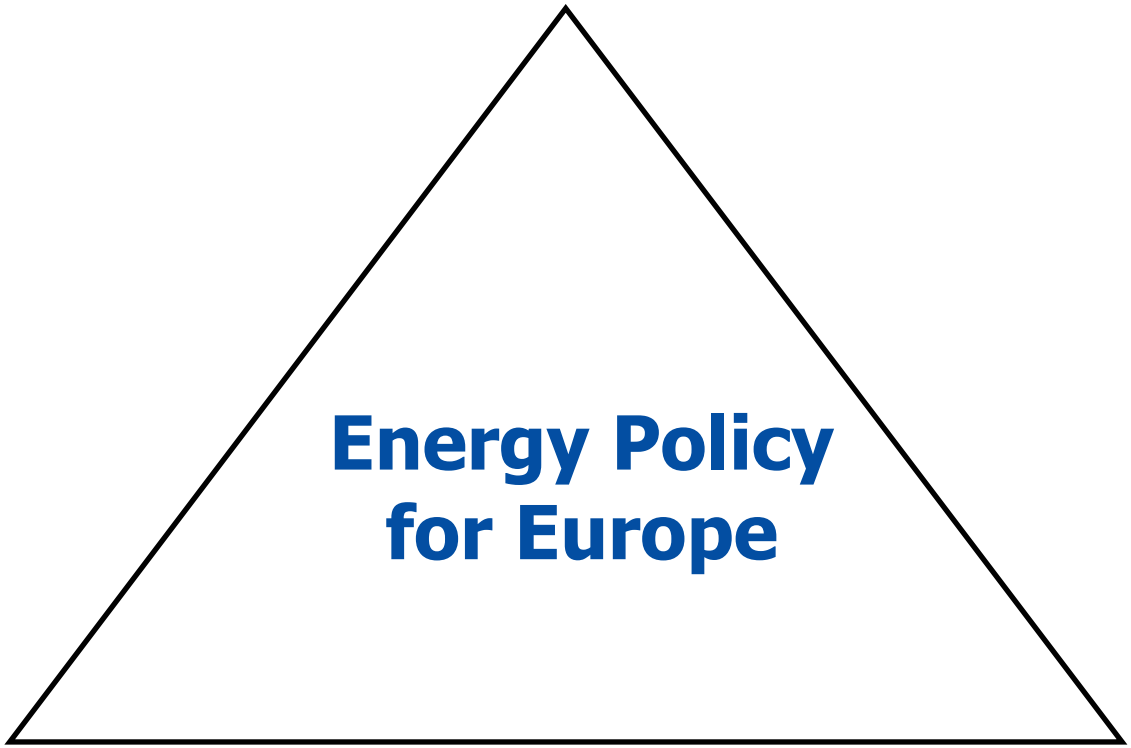
Independence / security of supply



Competitiveness

Sustainability

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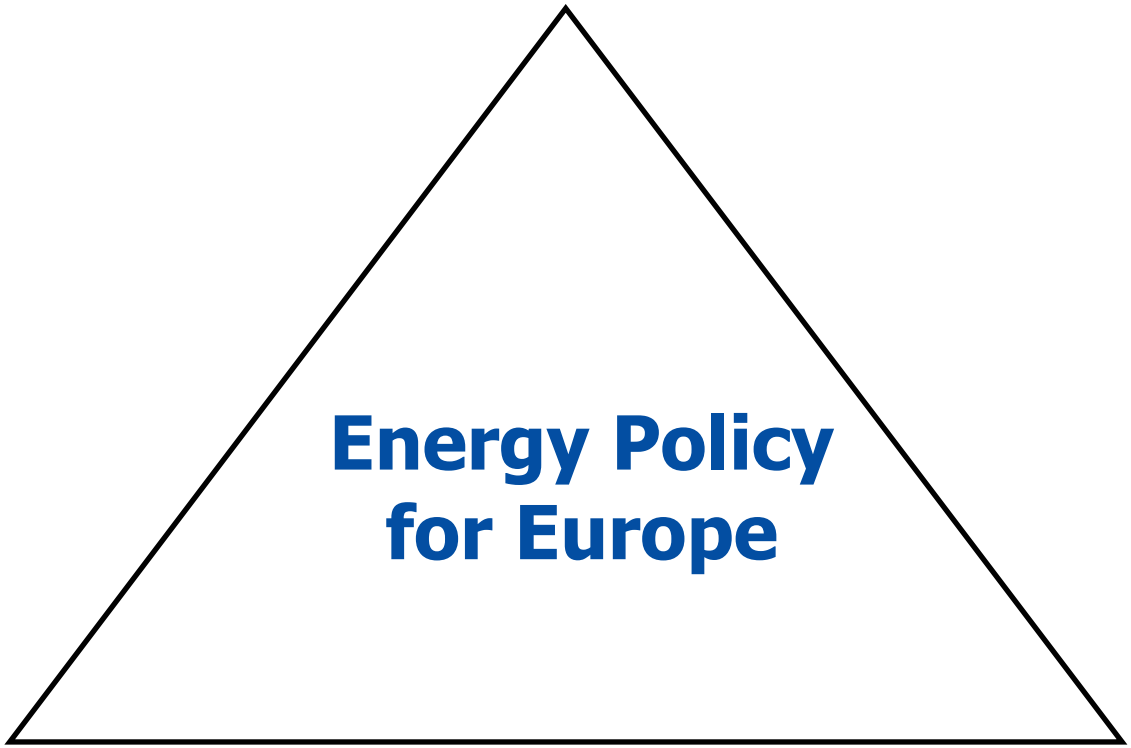

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European Council
Conclusions of summit 8-9 March

- **The answer is 20!**

  …

  - ➔ **20% cut in GHG emissions by 2020**
  - ➔ **20% renewables target by 2020**

- **Linking energy policy with climate change … the world must act to limit global average temperature increase to < 2° C above pre-industrial levels**

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ENERGY FOR A CHANGING WORLD

LIMITING CLIMATE CHANGE TO 2 ° C

GREEN PAPER ENERGY

ENERGY POLICY FOR EUROPE

ACTION PLAN 2007-2009

SPRING EUROPEAN COUNCIL 2006

ENERGY PACKAGE 2007

SPRING EUROPEAN COUNCIL 2007

SUSTAINABILITY AND LOW-CARBON ECONOMY

- RENEWABLE ENERGY ROAD MAP
- PROGRESS REPORT BIOFUELS
- PROGRESS REPORT RES ELECTRICITY
- ENERGY EFFICIENCY ACTION PLAN (19 OCT 2006)
- SUSTAINABLE FOSSIL FUEL TECHNOLOGIES
- ILLUSTRATIVE NUCLEAR PROGRAMME (PINC)

INTERNAL MARKET

- DG COMP SECTOR INQUIRY
- REPORT ON FUNCTIONING OF INTERNAL MARKET
- PRIORITY INTERCONNECTION PLAN

EXTERNAL RELATIONS

- JOINT COMMISSION/ HR /COUNCIL JUNE PAPER AND COM PAPER OCT 2006
- NEGOTIATION MANDATE FOR NEW AGREEMENT WITH RUSSIA
- DIALOGUE WITH PRODUCERS: OPEC-NORWAY-GCC-ALGERIA-CASPIAN BASIN (BAKU PROCESS)
- DIALOGUE WITH CONSUMERS: CHINA, US, INDIA, JAPAN

Seventh Framework Programme
Intelligent Energy-Europe – CIP
National Research and Innovation Programmes

→ **EUROPEAN STRATEGIC ENERGY TECHNOLOGY PLAN SET-Plan**

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Summit conclusions (contd.)

The European Council

- welcomes the establishing of a Strategic Energy Technology Plan (SET-Plan)
- notes the Commission's assessment of the contribution of nuclear energy (PINC) in meeting the growing concerns about energy supply and CO_2 emissions
- envisages the creation of a High-Level Group on nuclear safety and waste management
- suggests broad discussion takes place among all relevant stakeholders on the opportunities and risks of nuclear energy

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Why a SET-Plan?
…current efforts are insufficient!

- "Business as usual" is not an option
  - ➔ increasing dependence on energy imports
  - ➔ rising levels of CO2 emissions
- Structural weaknesses in energy R&D and innovation systems
  - ➔ long market lead times & market failures
  - ➔ locked-in infrastructure investment
  - ➔ dominant actors and network connection challenges
  - ➔ scattered and un-coordinated market incentives
  - ➔ reduction of energy research funding
  - ➔ fragmented and sub-critical R&D capabilities
  - ➔ strong international competition and weak cooperation

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EU must act …

- **JOINTLY – to develop a broad portfolio of technologies to spread risk and avoid locking-in; Member States do not have the means to act in isolation**
- **URGENTLY – to transform the research and innovation system, even though transforming the energy system will take decades**

  ➔ **Public policy has many instruments available:**
  - **TECHNOLOGY PUSH**
  - **MARKET PULL**

This is the essence of SET-Plan: matching technologies with instruments and proposing the optimal scale – "*different horses for different courses*"

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SET Plan

- "objective and neutral" perspective of the key low-carbon technologies, including nuclear fission
- actions at EU level to enable these technologies to deliver secure, competitive and sustainable energy by 2020/30/50
- current state of development, what else is needed
- key issues, barriers, bottlenecks, decision points
- deployment perspectives & timeframes
- financing/investment
- adoption by EC in Nov. ->2008 spring Council

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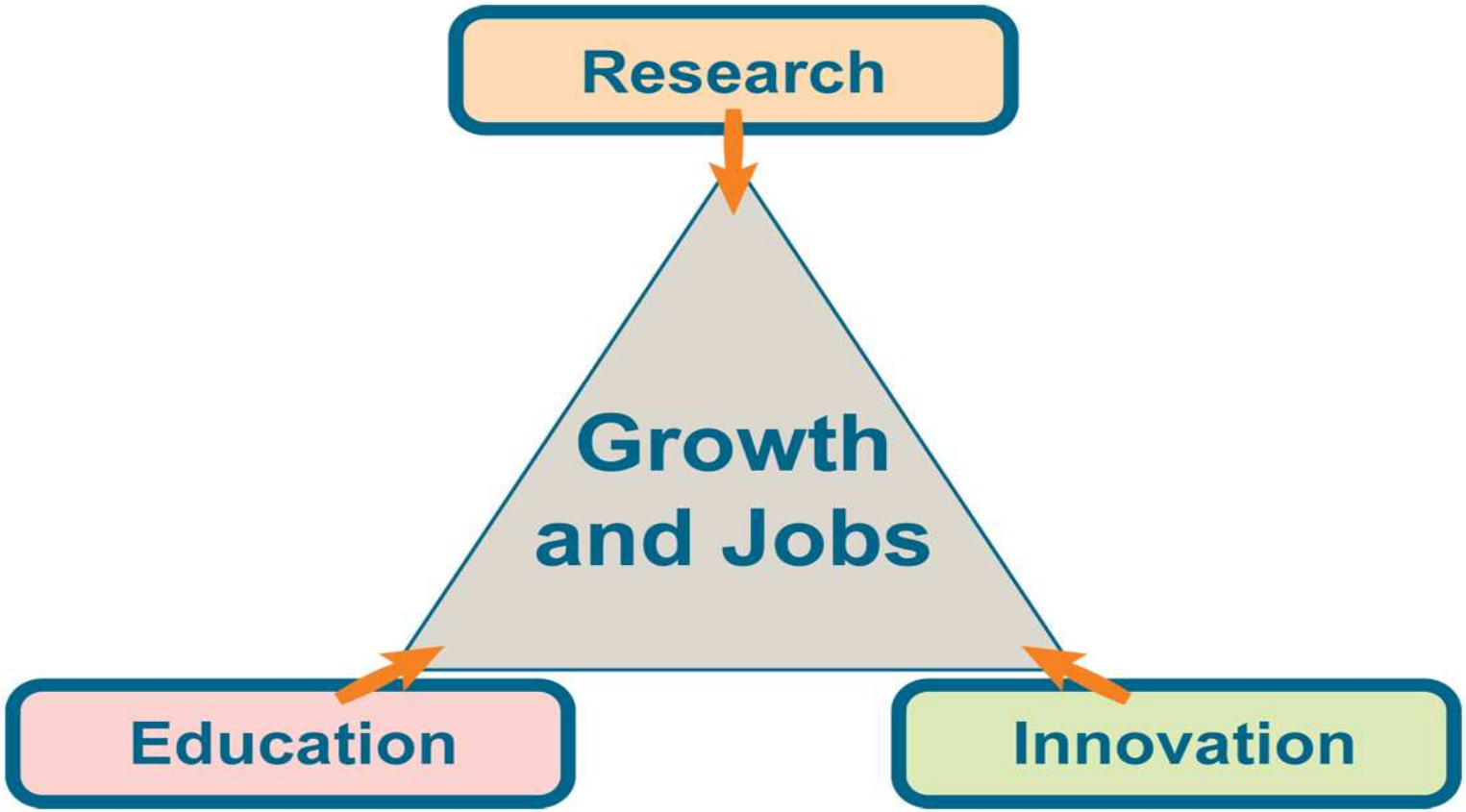
Lisbon strategy



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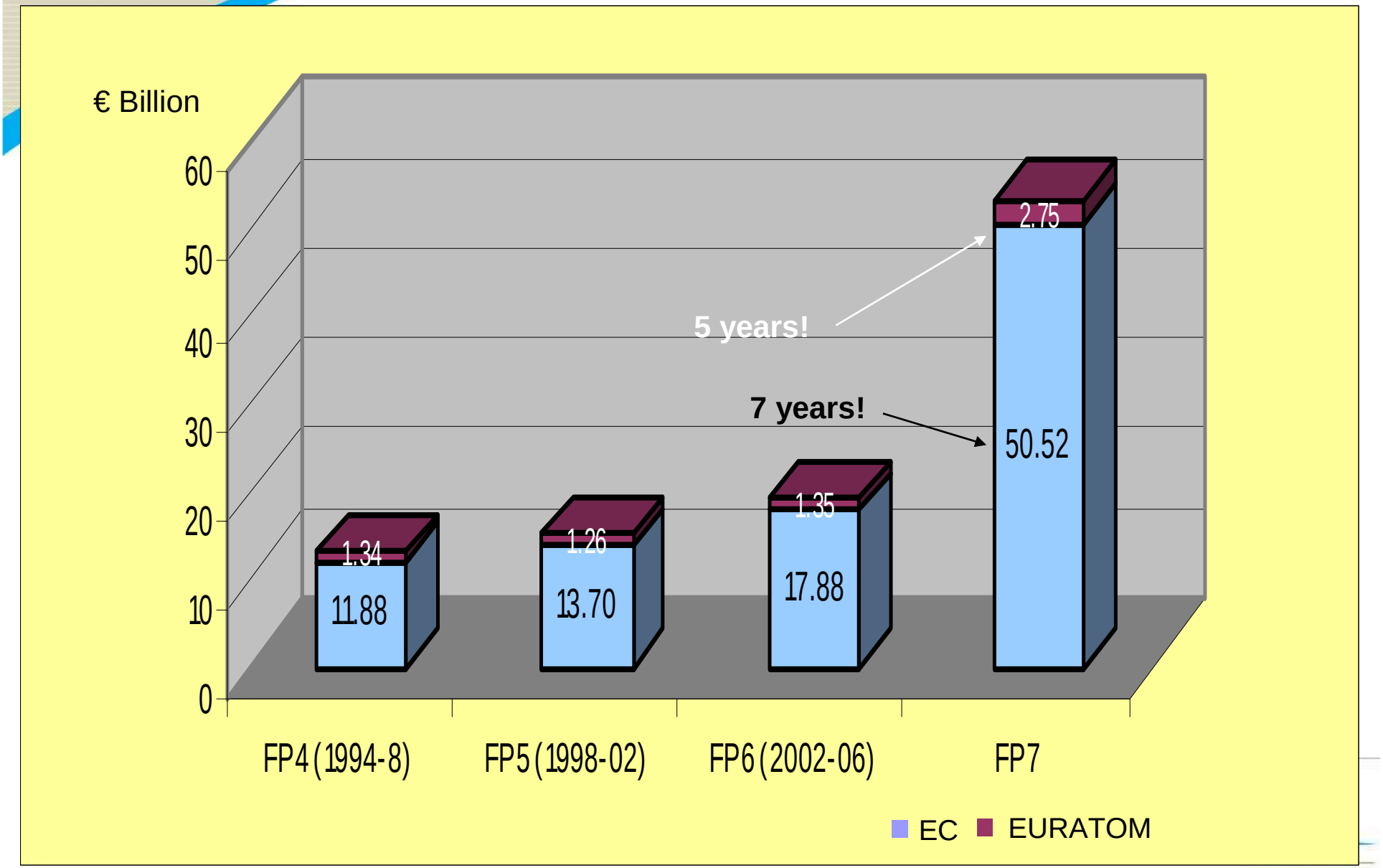
Funding of EU research programmes



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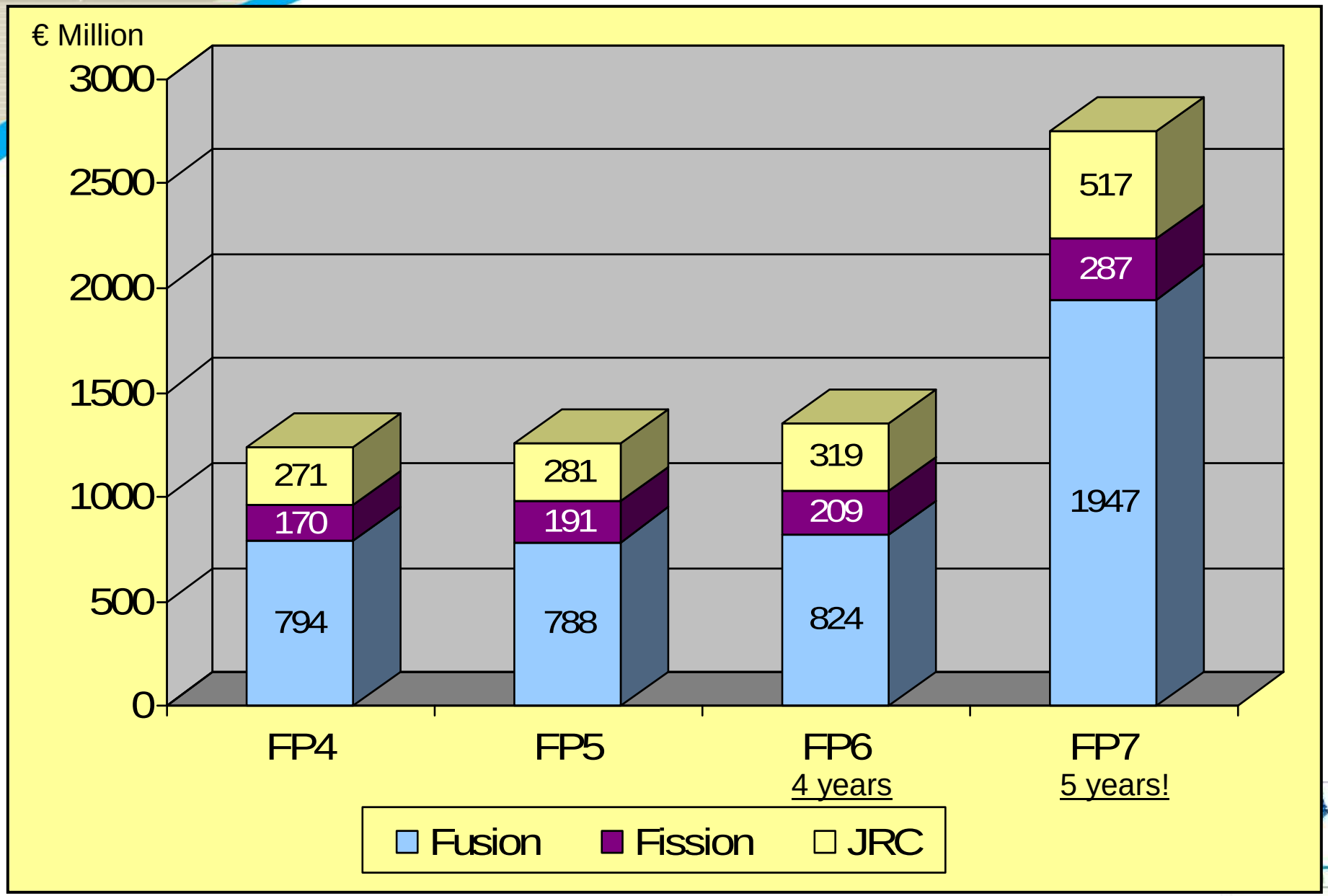
Euratom research budget



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The research challenge

- Lisbon Agenda -> growth and competitiveness
  Barcelona objective -> 3% of GDP on R&D
  - ➔ a strategic R&D approach is needed
  - ➔ research priorities aligned to needs of industry
  - ➔ transformation of R&D knowledge into marketable technologies
- European Council 2003
  - ➔ "Technology Platforms" can bring together scientific know-how (research community), industry, regulators and financial institutions

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Technology Platforms provide a forum to …

- foster a common long-term vision of stakeholders (industry, research community, academia, governmental and public bodies, users of the technologies, financial institutions, civil society…)
- reduce the fragmentation of R&D by setting priorities, joining forces, avoiding duplication …
- mobilise public and private funding sources, possibly leading to creation of public-private legal entities

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Technology Platforms
…how they work

- **"Vision" document forms basis of the platform launch – defines sector objectives, TP structure & governance**
- **Following the TP launch, stakeholders …**
  - ➔ **define a common "Strategic Research Agenda" setting out medium & long term objectives for the technology + a deployment strategy**
  - ➔ **implement the SRA with the mobilisation of significant human and financial resources of the stakeholders**
- **A TP belongs to its stakeholders, not the EC**

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"Sustainable Nuclear Energy" Technology Platform

- On-going project with 23 key nuclear R&D stakeholders (lead by CEA, industry represented by Areva, EDF, Vattenfall)
  - ➔ drafting "vision" document
  - ➔ preparing the launch event in collaboration with EC and organising committee
  - ➔ preparing initial R&D roadmaps to feed into the SRA
- Large consensus in EU fission R&D community
- Launch event will be attended by Commissioner for Research, MEPs + many high ranking representative from R&D + industry

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Euratom 7th Research FP:
fission & radiation protection

CARD

SNE-TP

Management of radioactive waste:
- **Geological disposal**
- **Partitioning & Transmutation**

Reactor systems:
- **Nuclear in...**
- **Advanced nucl...**

Platform launch date 21 Sept. 07!

Key cross-cutting activities:
- **...search**
- **...frastructures**
- **Human resources, mobility & training**

Radiation protection:
- **Risk from low doses**
- **Medical uses of radiation**
- **Emergency management**

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Generation-IV

- Gen-IV represents a revolutionary development…
  - ➔ vastly improved resource sustainability
  - ➔ even higher levels of safety (passive + intrinsic)
  - ➔ co-generation of electricity and heat
  - ➔ full actinide recycling
- Gen-IV International Forum – GIF – a global initiative coordinating "viability" R&D
  - ➔ Members: Euratom, USA, Japan, Korea, Canada, France, CH, UK with China, Russia and S. Africa set to join in 2007
  - ➔ Euratom FP6&7 projects on Gen-IV are consistent with the GIF research plans

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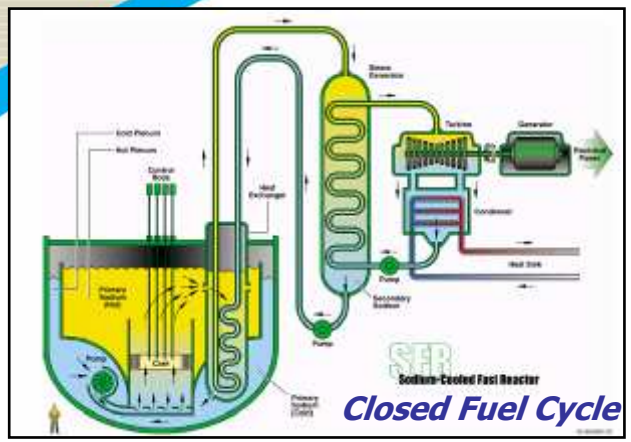
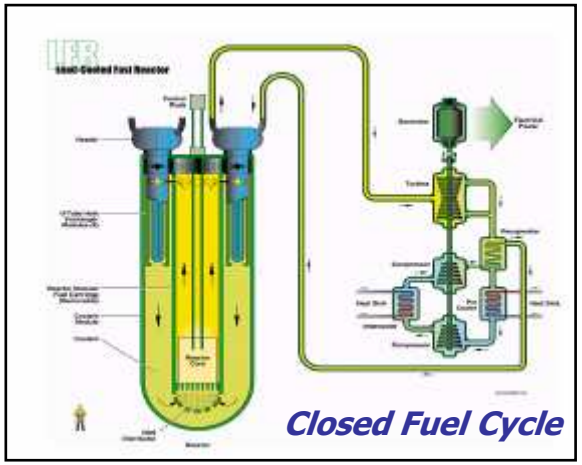
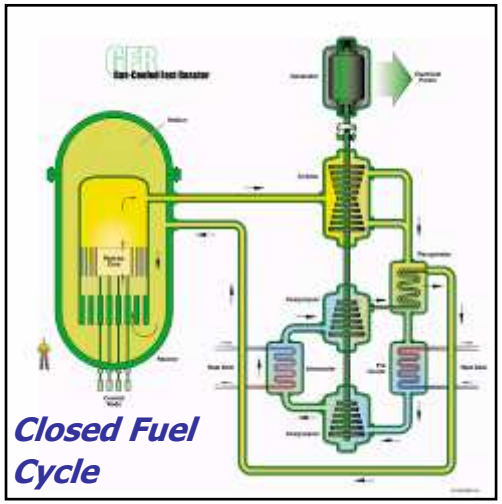
Six innovative concepts



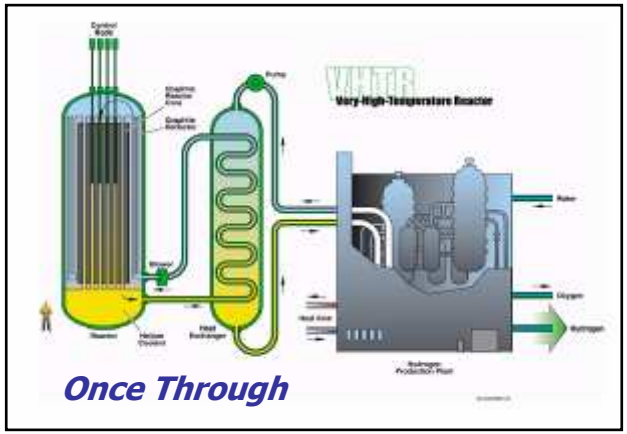
Sodium Fast reactor



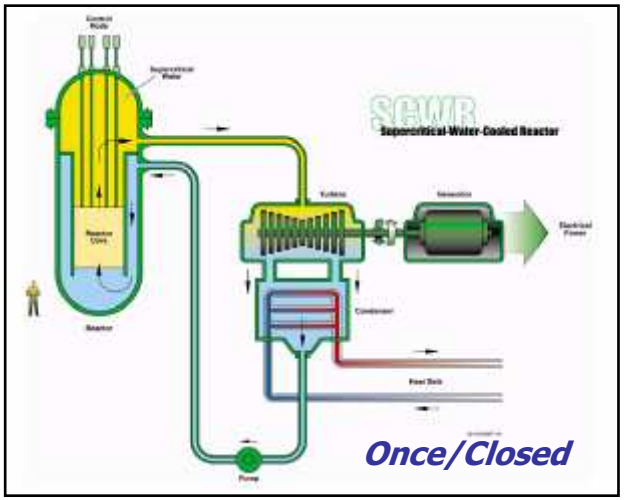
Lead Fast Reactor



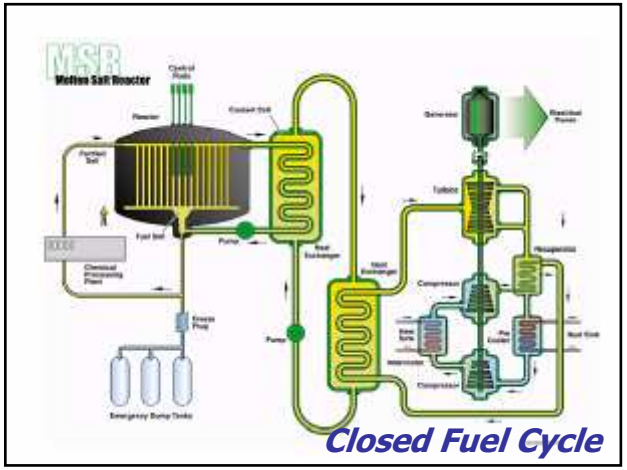
Gas Fast Reactor



Very High Temperature Reactor



Supercritical Water Reactor



Molten Salt Reactor

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Euratom funded Gen-IV R&D

Project acronym and title	Key areas of R&D	Coordinating organisation & no of partners*	Start date & duration	Total budget / EU contribution
RAPHAEL Reactor for Process Heat, Hydrogen & Electricity Generation	Performance of fuel, materials and components of VHTR	AREVA (FR) 33 partners (from 10 countries)	15/04/2005 48 months	€19.8M / €9.0M
GCFR Gas-Cooled Fast Reactor	Conceptual design, direct coolant cycles, transmutation, safety, etc.	NNC Ltd. (UK) 9 partners (from 7 countries)	01/03/2005 48 months	€3.6M / €2.0M
HPLWR Phase 2 High Performance LWR – Phase 2	Critical issues and technical feasibility of SCWR	FZK (DE) 10 partners (from 8 countries)	01/09/2006 42 months	€4.65M / €2.5M
ELSY European Lead-Cooled System	Core design, PA, main components & systems, system integration, safety, etc.	ANSALDO ENERGIA S.p.A. Nuclear (IT) 20 partners (from 12 countries)	01/09/2006 36 months	€6.5M / €2.95M
ALISIA Assessment of Liquid Salts for Innovative Applications	Support action – preparation of future activities/proposals	CEA (FR) 15 partners (from 9 countries)	Jan. 07 1 year	€250k / €500k
EISOFAR Roadmap for a European Innovative Sodium-cooled Fast Reactor	Support action – preparation of future activities/proposals	CEA (FR) 14 partners (from 9 countries)	Jan. 07 1 year	€250k / €500k

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Conclusions

- An Energy Policy for Europe must embrace security of supply, competitiveness and sustainability
- SET-Plan is a key element of this policy
  - ➔ "business as usual" not an option
- Nuclear is included, though each country is free to choose
  - ➔ HLG and Nuclear Forum being established
- EU research
  - ➔ Euratom support to fission R&D is well established
  - ➔ European research is being restructured thanks to the Euratom FP
  - ➔ next step –> set up Technology Platforms
  - ➔ Important EU-funded Gen-IV projects are in progress and others are planned
  - ➔ Euratom is coordinating Gen-IV research in Europe as part of the global GIF initiative

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Broad portfolio approach to R&D in energy

From a speech by Commissioner Potocnik:

"The EC believes that the answers to the EU's energy problems lie in developing a diverse mix of options supported by appropriate strategies and policies. That is why we are funding, through the FPs, a comprehensive research effort looking at a broad range of energy technologies; from renewables, through clean coal, to nuclear fusion and fission. Many questions are currently being asked in all these areas and society as a whole is not yet in a position to provide adequate responses. A well-focussed and effective Community research programme is helping to deliver these urgently needed answers."

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The bottom line…

From the same speech:

"Ultimately, the decision whether or not to use nuclear power – just like any other energy source – is a political and societal one taken at the national level. However, this should be a decision based on knowledge, not one taken in ignorance. Research can and must supply this knowledge."

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Thank you for your attention!

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