The Joint Programme on Nuclear Materials of the European Energy Research Alliance (EERA JPNM)

Coordinating GenIV reactor materials research for a low carbon Europe

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What is the EERA JPNM: the complex landscape of energy platforms in Europe

EU functioning Treaty

Euratom Treaty

>160 public research organisations (15 in ExCo)
TRL ≤ 5

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TRL ≥ 5

Coordination of low CO₂ energy research in EU

Industrial initiatives

Ingenuity platforms

Gen IV

Gen II/III

ESNII: European Sustainable Nuclear Industrial Initiative

17 JPs

JP energy ×

Since 2010 - Support with research on materials

www.eera-jpnm.eu
Objectives of the JPNM

Pursue better knowledge of materials behaviour in operation:
- achieve predictive capability (radiation & temperature effects, compatibility with coolants ...)
- select most suited materials for GenIV systems
- support definition of safe design rules

JPNM → improve safety & sustainability of Nuclear Energy, focusing on materials aspects

Develop innovative materials for industrial use with superior capabilities:
- resistant to high temperature and irradiation
- resistant to aggressive environments
Three grand challenges (*JPNM vision paper*)


- Elaboration of design rules and procedures for assessment and testing of the materials envisaged, at the expected operating conditions (high T, prolonged irradiation).

- Development of physical models coupled to advanced microstructural characterization to achieve high-level understanding and predictive capability.

* [www.eera-jpnm.eu](http://www.eera-jpnm.eu) → About Us → Downloads
  
  (or directly [www.eera-jpnm.eu/?q=jpnm&sq=nboard](http://www.eera-jpnm.eu/?q=jpnm&sq=nboard))
Participants: 45 (+JRC)
Full: 16 (+JRC)
Associate: 29

Involved European Countries: 17 (+JRC)
A subprogramme structure to cover all aspects of NM

Structural materials

SP1: Support to European Sustainable Nuclear Industrial Initiative (ESNII) (K.-F. Nilsson, JRC-IET)
SP2: Innovative steels (M. Serrano, CIEMAT)
SP3: Refractory materials (A. Rinaldi, ENEA)
SP4: Physical modelling of structural materials (C. Pareige, CNRS)

Technological Innovation

SP5: Advanced fuels (J. Somers, JRC-ITU)
SP6: Physical modelling of fuel behaviour (M. Bertolus, CEA)

Industrial application

Basic & Applied Research

Coordinator: L. Malerba, SCK•CEN
Deputy coordinator: A. Bohnstedt, KIT
Cross-cutting issues: J. Kalivodová, CVR
JPNM research portfolio: pilot projects

Total budget ~48 M€
Total PY ~332
Average duration of PP ~3.7 yrs
Average PY/Y ~89
Several PPs involve 2 SPs

Approved PP are due to start in January 2016
Some will hopefully receive partial EC funding
Next call in the course of 2017

PY per PP

Fuel
SP6, 74
SP5, 15
SP4, 52
SP1, 85
SP2, 43
SP3, 63
Modelling
New materials
Materials for prototypes

Budget per SP

SP1; 10.52 M€
SP2; 5.66 M€
SP3; 5.60 M€
SP4; 7.44 M€
SP5; 3.49 M€
SP6; 15.63 M€
EERA aims at boosting efficiency in energy technology research in Europe *at low TRL (1-5)*

- Identification of common issues allows cross-fertilization and better use of resources
  - Minimise duplication
  - Reduce costs
  - Accelerate delivery

Materials have a role to play in all energy technologies

- The construction of an “energy materials research front” in Europe will allow us all to have more weight

**Success in this depends a lot on us all!**
X-cutting issues in the focus

- High temperature steels/alloys
- Behaviour under aggressive environment
- Design codes for mechanical components
- Ceramic, refractory materials and composites
- Advanced steels (new alloys, novel manufacturing technologies, ...)

Behaviour under extreme conditions

Innovative materials
I wish us all a fruitful meeting