



**CONNECT - NM**



## **Coordination of the European Research Community on Nuclear Materials for Energy Innovation – CONNECT-NM**

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## What is CONNECT-NM?

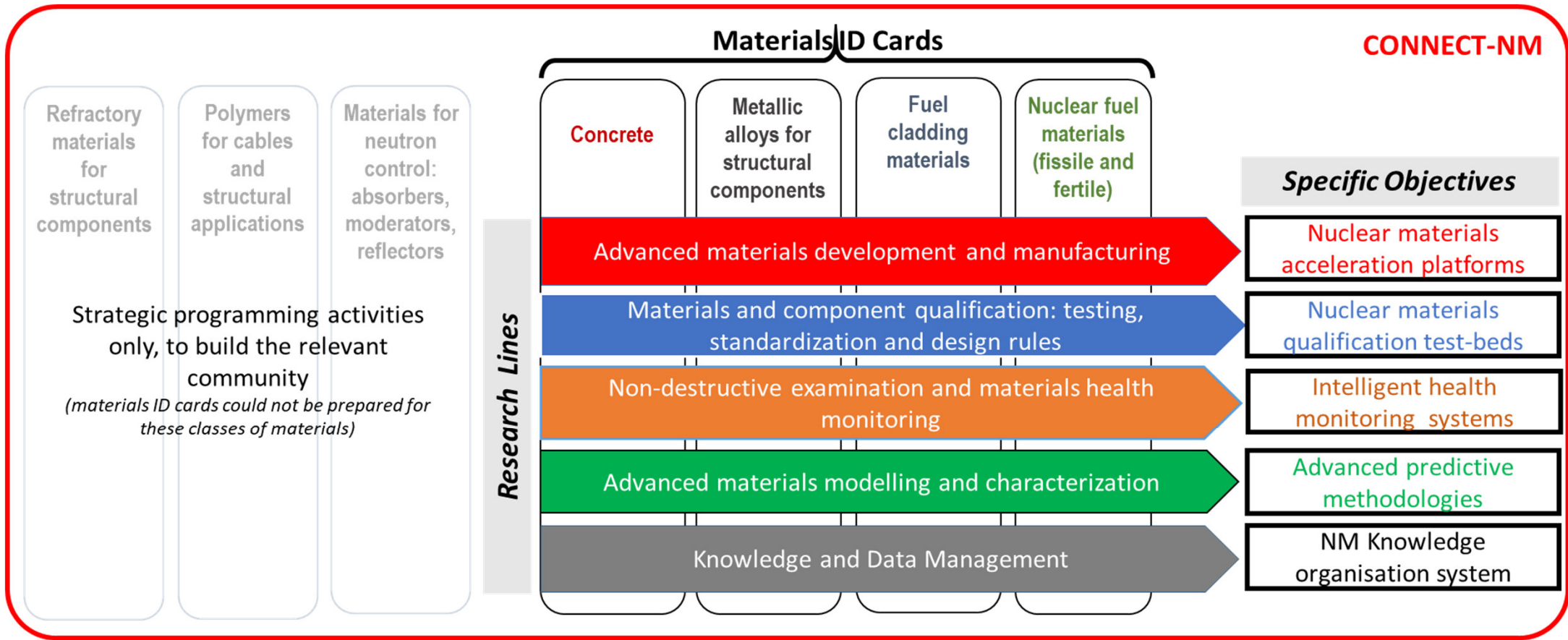
Proposal of co-funded European partnership to the Euratom work-programme 2023-2025 (nr. 101165375):

- HORIZON-EURATOM-2023-NRT-01-04
- EURATOM-COFUND

## What is a co-funded European partnership?

- **Partnership: Consortium of Member States** (and Associated Countries), represented by ministry-mandated organisations (generally research organisations, but not always, or not only) built around a specific R&D&I ambit
- **Co-funded:** money comes from the EU (55%), but also from national, regional or institutional sources (remainder)
- It is not a project, but a **framework for R&D&I-connected activities & projects**, where *the decisions about the direction of the research are taken at a level that is closer to the research, regulation and industry communities (stake-holders) than the Programme Committee*, based on a consensual Strategic R&D&I Agenda

# The strategic R&D&I agenda of CONNECT-NM in a snapshot



Research activities dedicated to “less mature” materials

Research activities strongly linked to specific designs, not focused on materials, although involving them

} Will remain outside

## Specific objectives associated with Research Lines

Research lines	Specific objectives	Final products
Advanced materials development and manufacturing	<b>SO1: To reduce drastically the time required to improve, develop, and even discover new or advanced nuclear materials and elaborate advanced manufacturing processes</b>	Nuclear materials acceleration platforms and advanced manufacturing processes
Materials and component qualification: testing, standardization and design rules	<b>SO2: To accelerate the qualification of nuclear materials for safe operation.</b>	Nuclear materials qualification test-beds and accelerated qualification paths
Non-destructive examination and materials health monitoring	<b>SO3: To enable safer and more efficient management of the lifetime of nuclear components</b>	Intelligent materials health monitoring systems
Advanced materials modelling and characterization	<b>SO4: To improve the capability of prediction of the behaviour of nuclear materials in operation</b>	Advanced predictive methodologies
Knowledge and Data Management	<b>SO5: To create the conditions for nuclear materials data to be correctly collected and stored, so as to be fruitfully analysed and used</b>	Nuclear materials knowledge organisation system

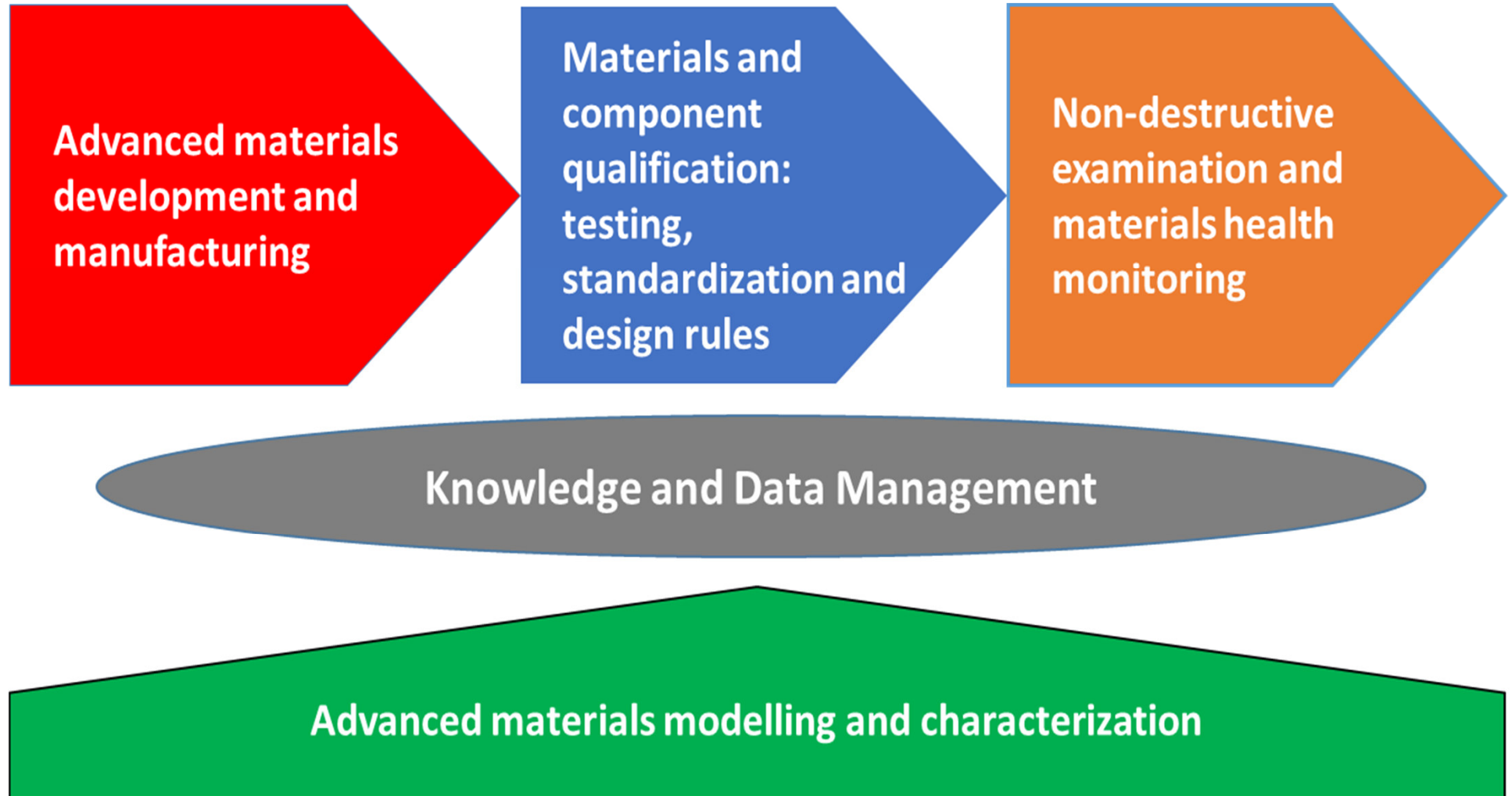
## The five specific objectives push forward a change of paradigm in materials R&D&I: from “observe and qualify” to “design and control”

→ **F4P-SSbD: fit-for-purpose, safe and sustainable by design**

<b>Nuclear materials acceleration platforms</b>	Autonomous platforms to design materials for fitness, safety and sustainability, combining advanced characterisation and modelling with modern digital techniques / Standardized processes for advanced manufacturing
<b>Nuclear materials' test-beds</b>	Integrated networked systems to apply advanced and standardized experimental procedures and methodologies for nuclear materials accelerated qualification (exposure, characterisation and testing) / need to interact also with TSOs/regulators
<b>Intelligent material health monitoring</b>	Combine non-destructive examination and testing with suitable diagnostics and simulation tools, to enable the use of digital twins and optimize safe component and plant life management through the whole materials lifecycle
<b>Advanced predictive methodologies</b>	Blending physical and data-driven (i.e., machine-learning-based) multiscale models, to combine strong physical rooting with rapidity and efficiency, for direct application at industrial level (few shot learning)
<b>European nuclear materials' FAIR database</b>	Develop ontologies and data formats to ensure efficient collection, storage, management and use of nuclear materials data, respecting IPR and following FAIR principles



## Connection between research lines



## Who participates? Four possible legal statuses

**Beneficiary** = EU (MS/AC) national organisation that is mandated by the corresponding ministry or agency (programme owner) to manage the participation of the MS/AC in the partnership (programme manager) / else: associations – *sign the grant and consortium agreements and are represented in the general assembly*

**Affiliated entity** = EU (MS/AC) national organisation that has an established link (pre-existing the partnership) with the national beneficiary – *AEs do not sign the grant and consortium agreements and are not represented in the general assembly, but are otherwise treated in exactly the same way as beneficiaries*

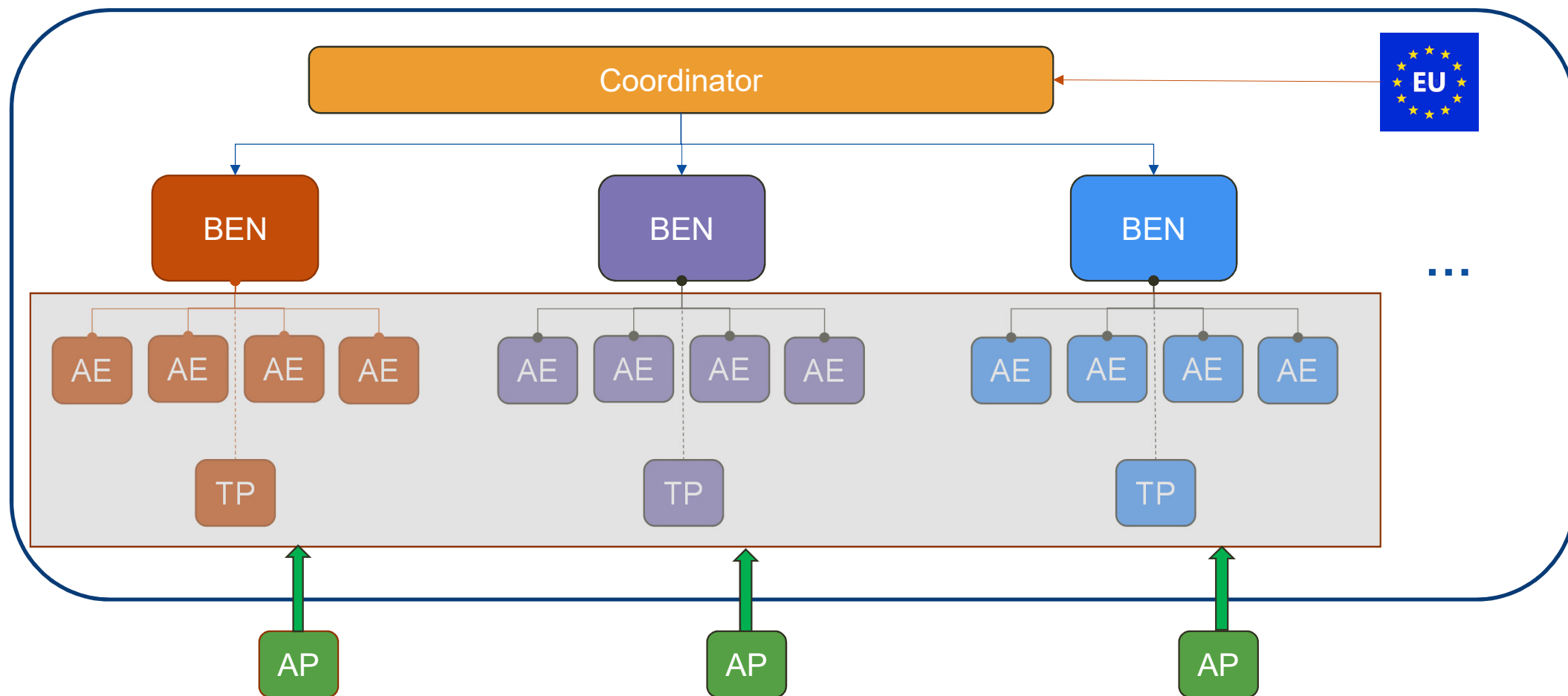
**Third party** = EU (MS/AC) national organisation that does not qualify as AE (affiliation links are evaluated by the EC, which has to accept them) – *TPs also do not sign Grant and Consortium Agreements, and can only receive a maximum of 300 k€ from the beneficiary to which they are attached; they need to provide the remaining part of the funding in-cash or, under some circumstances, in-kind*

→ **At the moment all presented as AEs, some may become TPs later**

→ **AE without a task from the beginning do not appear in the proposal, AEs & TPs enter when they contribute**

**Associated partners** = Non-EU organisations that participate in projects *entirely at their own cost*, but have access to results (e.g. CH, TR, UK)

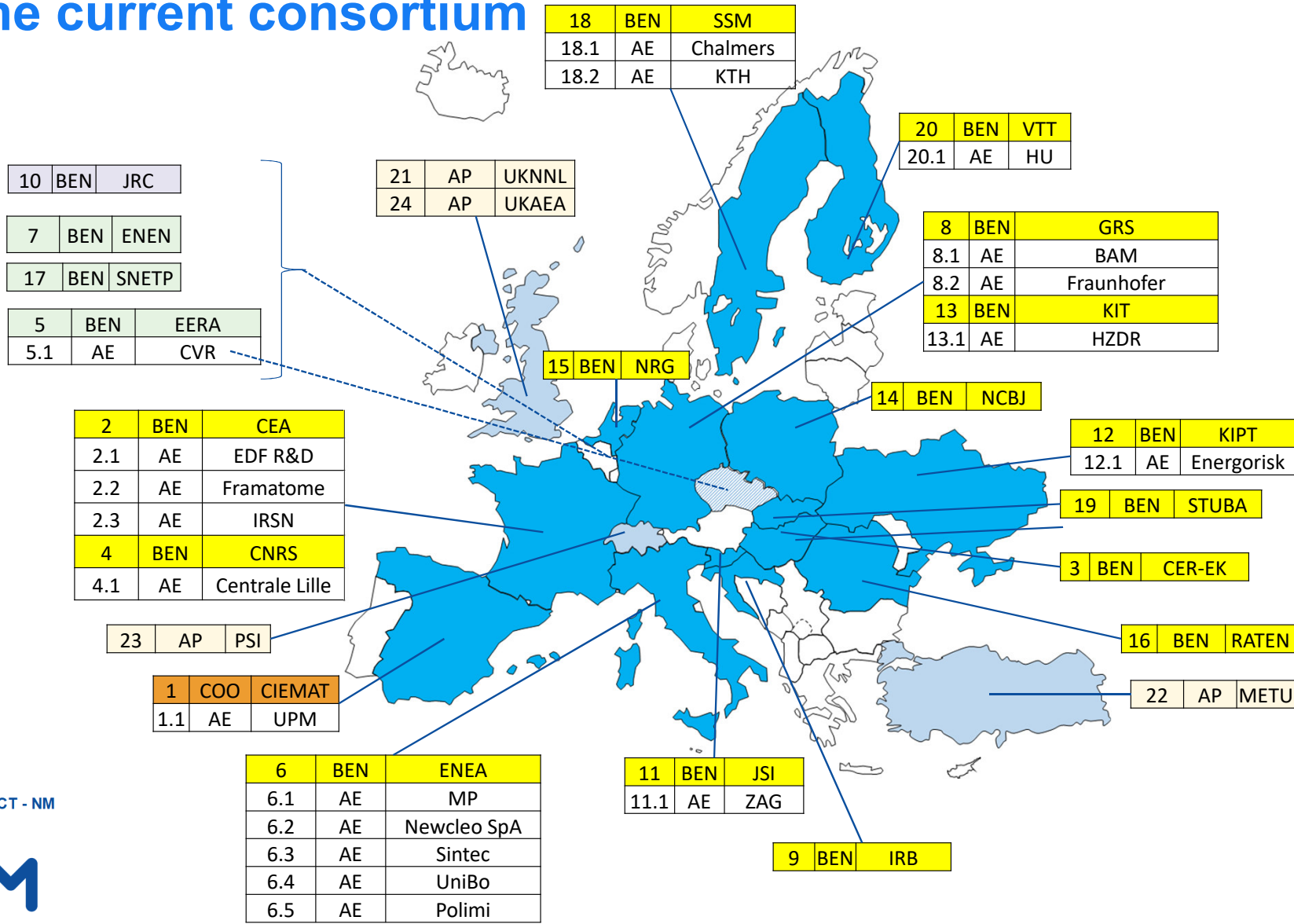
## A complex architecture, with the advantage of flexibility



The formation of national clusters is encouraged. Only beneficiaries are visible to the EC.  
**Participation is open to anyone**, although with different treatments and rights.



# The current consortium

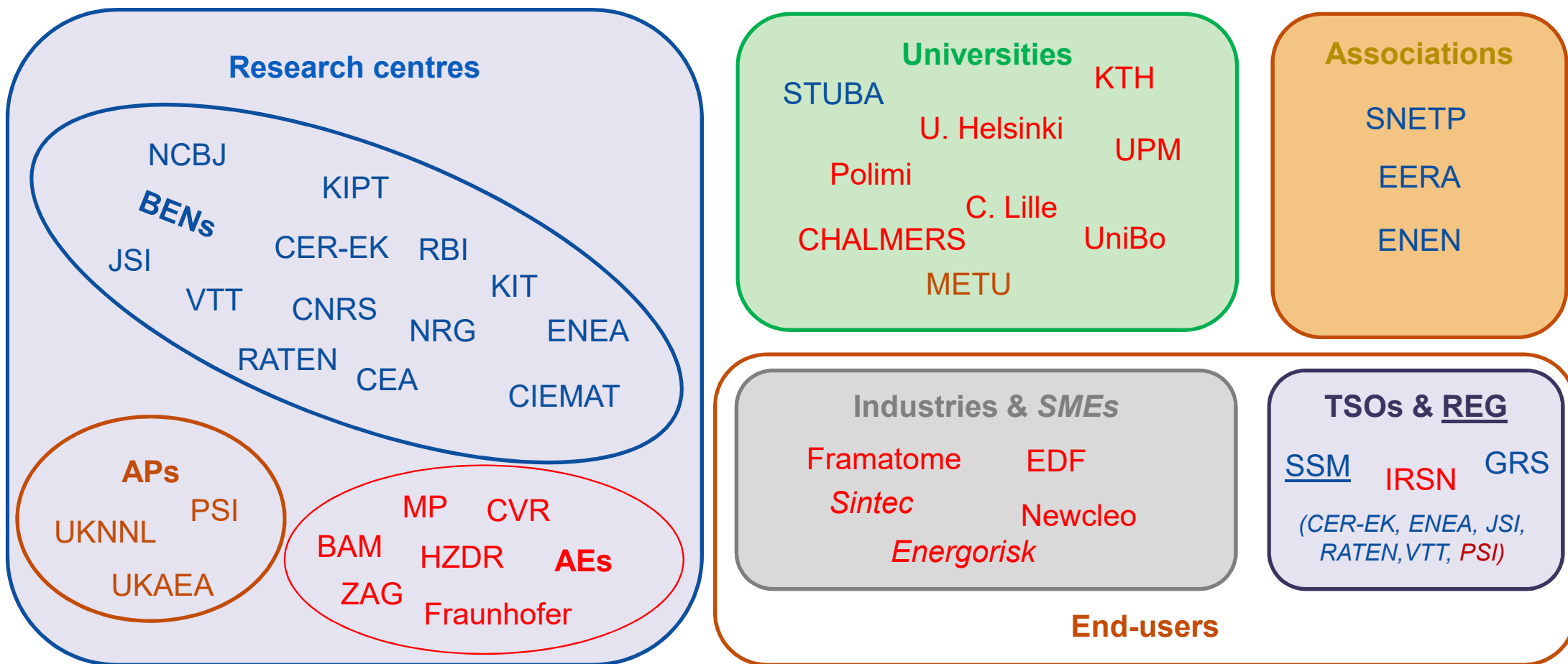


In total 18 countries are represented: 14 through beneficiaries, 3 as associated partners, 1 as affiliated entity.

Moreover, EERA, SNETP and ENEN, as well as JRC, are included as beneficiaries, too → 20 beneficiaries (and as many affiliated entities)

The list of AEs & TPs will grow

# The current consortium

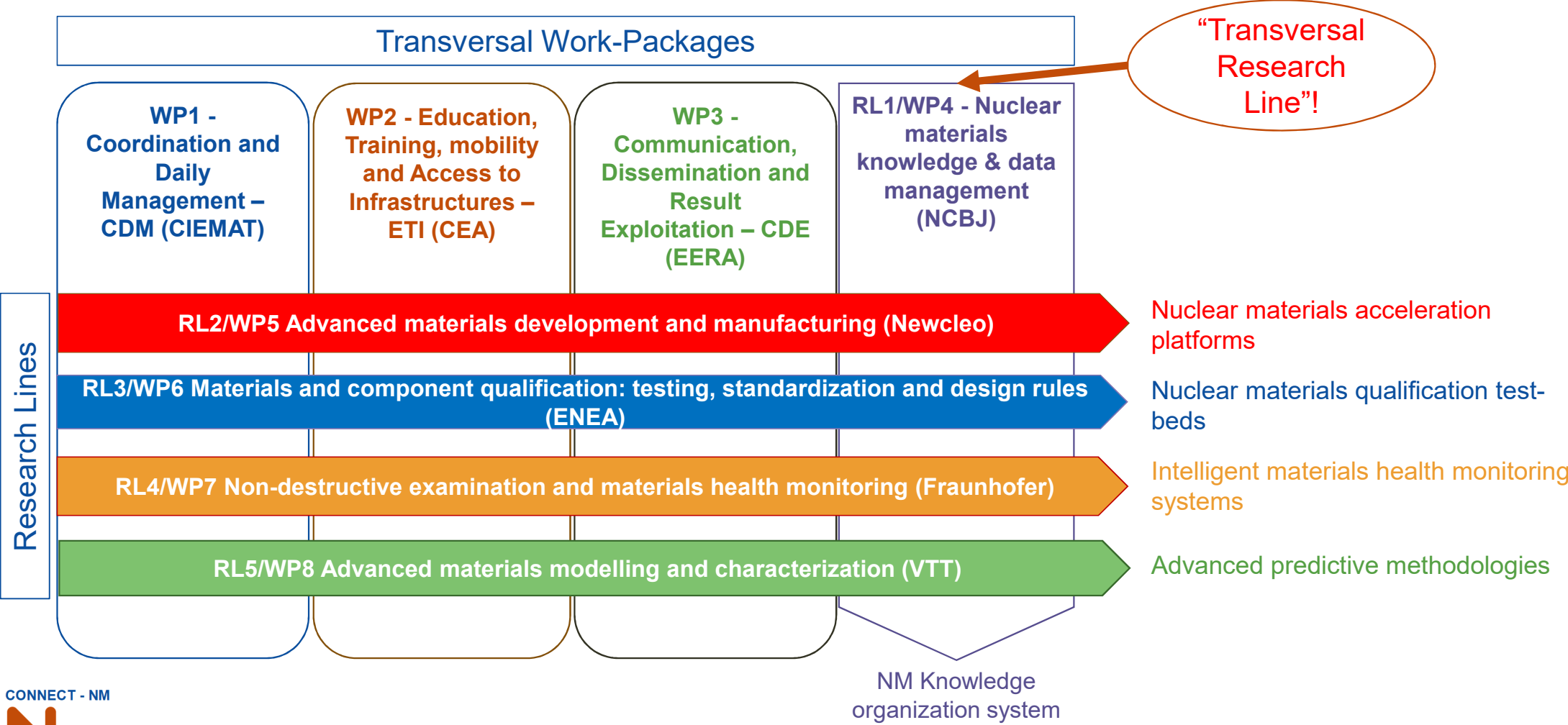


CONNECT - NM



The various possible legal statuses for participation enable diversification and inclusiveness. In particular, end-users are involved in the consortium as contributors from the start.

# CONNECT-NM work-package breakdown



## Operational objectives associated with transversal WPs

Transversal work-package	Operational objectives
WP1 – CDM – Coordination and Daily Management	OO1: Efficiently run the administrative environment and the governance system OO2: Design and apply an open and transparent procedure for the prioritization of case-studies used for the development of the methodologies within each research line. <sup>[1]</sup> OO3: Ensure the implementation of a monitoring system
WP2 – ETI – Education, Training, mobility and Access to Infrastructures	OO4: Promote access to the specific infrastructures necessary for nuclear material research activities OO5: Promote high quality and targeted education and training
WP3 – CDE – Communication, Dissemination and result Exploitation	OO6: Maximise impact

<sup>[1]</sup> This corresponds to preparing and launching project calls, managing a transparent evaluation and ranking procedure, and finally administratively enabling the start of the selected projects.

# Who is who in the transversal WPs

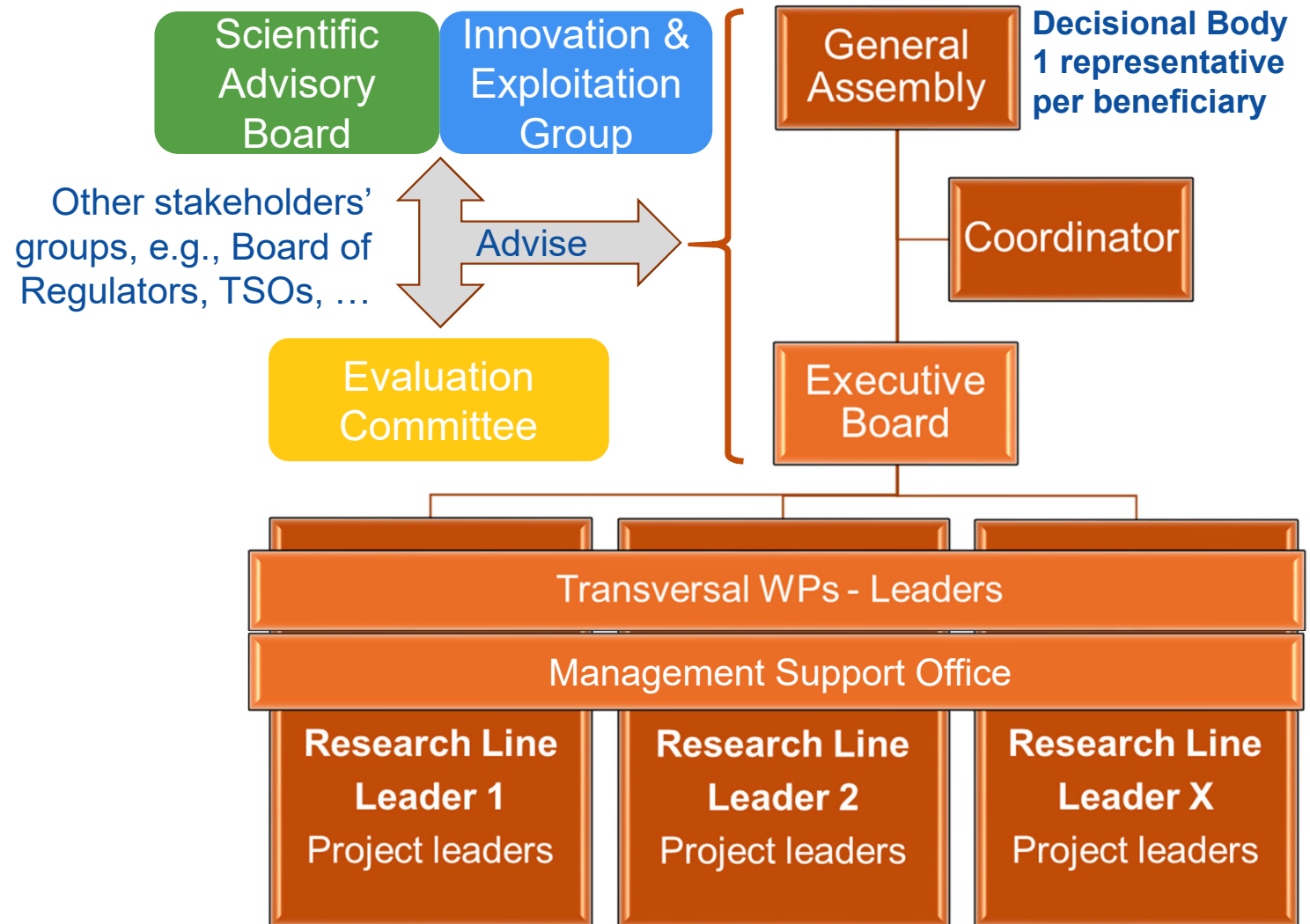
WP1 CDM - Coordination and Daily Management	<b>CIEMAT</b>	<b>Lead</b>	<b>Lorenzo Malerba</b>
	CIEMAT		Mareike Kiwitt
	ENEA/Sintec		Silvia de Grandis
	EERA		Monica de Juan
	GRS		Helena Möller
	ENEA		Simona Sarra
	EERA/CVR		Eliška Krychová / Michaela Krydová
WP2 ETI - Education, Training, mobility and Access to Infrastructures	<b>CEA</b>	<b>Lead</b>	<b>Marjorie Bertolus</b>
	ENEN		Gabriel Pavel / Roberta Cirillo
	RATEN		Denisa Toma
	ENEA/UniBo		Marco Sumini
	STUBA		Jármila Degmová
	NRG		Tjark van Staveren
	CEA/EDF		Rodrigue Largenton
	CEA/IRSN		Olivier Marchand
EERA/CVR		Marek Mikloš	
WP3 CDE - Communication, Dissemination and Result Exploitation	<b>EERA</b>	<b>Lead</b>	<b>Luisa Fernández Vanoni</b>
	JRC		Alessio Caverzan
	STUBA		Jana Šimeg Veterniková
	SSM		Elena Calota
	GRS		Klaus Heckmann
	ENEA/MP		Paolo Tassin, Aldo Romana
	CEA/EDF		Stéphane Taunier
	ENEA/Newcleo (I)		Andrea Barbensi

# CONNECT-NM structure (governance and implementation)

**SAB:** “Standard” advisory body: experts in charge for the assessment of the activities with scientific and technical background, emanation of R&D environments (SCK CEN, CEA, LANL, IRSN, Jacobs ...)

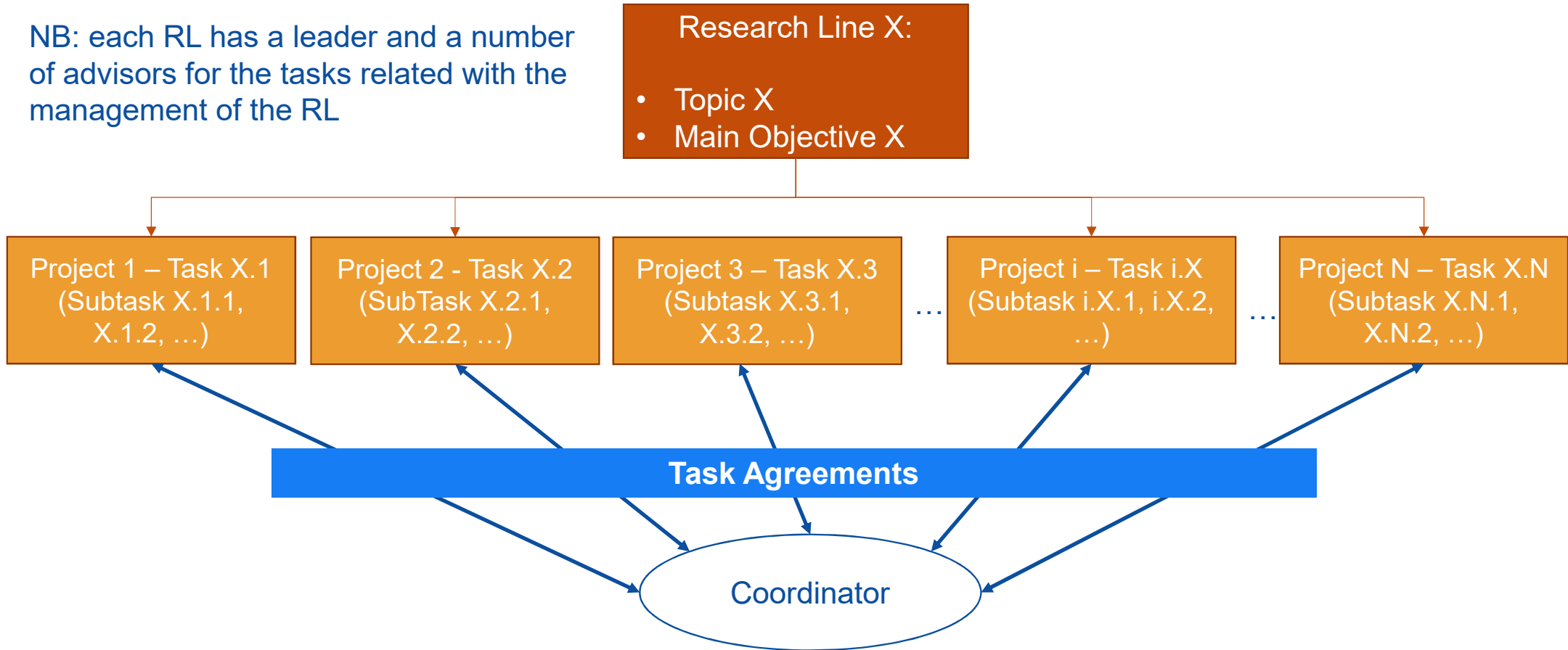
**IEG:** Experts in leading business, supporting entrepreneurship and commercializing technology, in connection with materials development and/or nuclear energy, emanation of industrial and innovation environments (EDF, Newcleo, Framatome, Ansaldo Nucleare, Engie, Tecnatom ...)

**EvaCo:** External members from SAB, IEG and ExB, according to topics perspectives from R&D, Industry, Innovation, aligned with SRA and Annual Workplan



# Research Lines and Projects

NB: each RL has a leader and a number of advisors for the tasks related with the management of the RL



NB: Projects will be selected via call(s), as the most transparent and effective mechanism to define priorities, matching top-down scope and expectations with bottom-up interests of consortia. However, (small) **pre-selected** preparatory **projects** are being defined that will start from the beginning of CONNECT-NM.

## Research line leaders and advisors form a team

### Criteria for Research Line teams formation:

- Overall geographical balance
- Overall gender balance (26 females, 31 males)
- Expertise on all materials classes
- Industrial presence as much as possible

WP4 RL1 - Nuclear materials knowledge & data management	<b>NCBJ</b>	<b>RLL</b>	<b>Michal Pecelerowicz</b>
	NCBJ	RLA	Mikko Alava
	ENEA/UniBo	RLA	Emanuele Ghedini, Ilaria Paponetti
	CIEMAT/UPM	RLA	María S. Pérez Hernández; Julián Arenas Guerrero
	ENEA	RLA	Barbara Ferrucci
WP5 RL2 - Advanced materials development and manufacturing	<b>ENEA/Newcleo (I)</b>	<b>RLL</b>	<b>Marialuisa Gentile</b>
	SSM/Chalmers	RLA	Christian Ekberg
	KIT	RLA	Alfons Weisenburger
	KIT/HZDR	RLA	Cornelia Kaden
	CEA/EDF	RLA	Nhu Cuong Tran



## Research line leaders and advisors

WP6 RL3 - Materials and component qualification: testing, standardization and design rules	<b>ENEA</b>	<b>RLL</b>	<b>Massimo Angiolini</b>
	ENEA	RLA	Serena Bassini
	JRC	RLA	Alessio Caverzan
	CEA/Framatome	RLA	Anne-Laure Kaiser
	RATEN	RLA	Alexandru Nitu
	NRG	RLA	Viktor Grismanovs
	NRG	RLA	Fitriana Nindyasari
	NRG	RLA	Sander van Til
	JSI/ZAG	RLA	Lucija Hanžič
WP7 RL4 - Non-destructive examination and materials health monitoring	<b>GRS/Fraunhofer</b>	<b>RLL</b>	<b>Madalina Rabung</b>
	CEA	RLA	Pierre Calmon
	CER-EK	RLA	Antal Gasparics
	CEA/EDF	RLA	Andreas Schumm
WP8 RL5 - Advanced materials modelling and characterization	<b>VTT</b>	<b>RLL</b>	<b>Maria Oksa</b>
	VTT	RLA	Wade Karlsen
	VTT	RLA	Jenna Järvenpää
	IRB	RLA	Tonči Tadić
	KIPT/Energorisk	RLA	Oleksiy Shumayev
	CEA	RLA	Marjorie Bertolus

## Organisation of the Call(s)

1. Preparation of the call scope and expected outcome for each research line, by the involved research line team and endorsed by the governance bodies
2. Preparation of the proposal submission procedure and system, the guidelines for Project proposers and the final call text, including suitable templates for the proposal and the financial commitment
3. Publication of the call announcement(s) using the CONNECT-NM website: two stage procedure
  1. First stage: project ideas and brokerage event – first evaluation
  2. Second stage: project proposal submission and subsequent evaluation

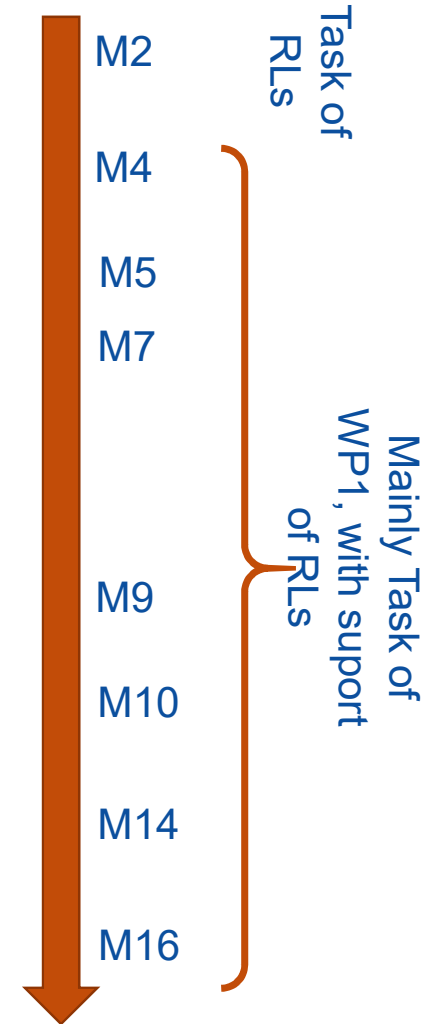
*NB: each project proposal shall be assigned to one and only one research line, upon explicit request of the proposers, because the project shall be stated to contribute mainly to the corresponding specific objective*

An evaluation committee (EvaCo) will be formed, comprised of selected experts belonging to the advisory bodies, specifically external ones, to support the executive board:

they will send the proposals to external and independent reviewers for their evaluation

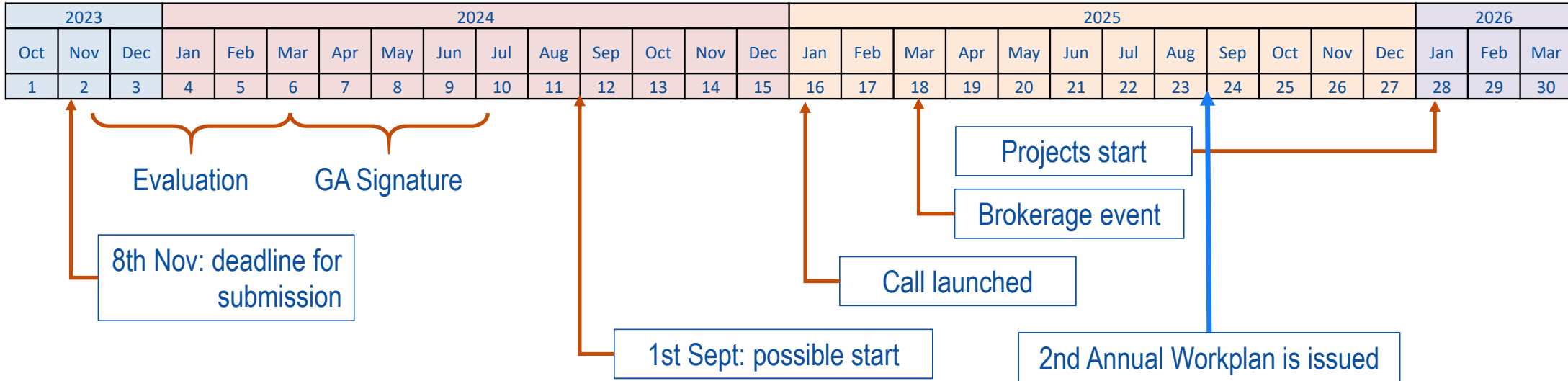
and will produce a ranking based on the reviewers' score (after signing non-disclosure agreement and no-conflict-of-interest declaration) based on which the generally assembly will decide

4. Project launching after signature of task agreement



**Very tight schedule, requires starting call definition and proposal template preparation ahead of the start of the Partnership**

# Timeline: from now to the start of the Projects



N.B. The obligation to prepare AWP provides the flexibility that is needed in order to update priorities, modify plans, move budget from task to task, ...

This flexibility is not given in normal Projects

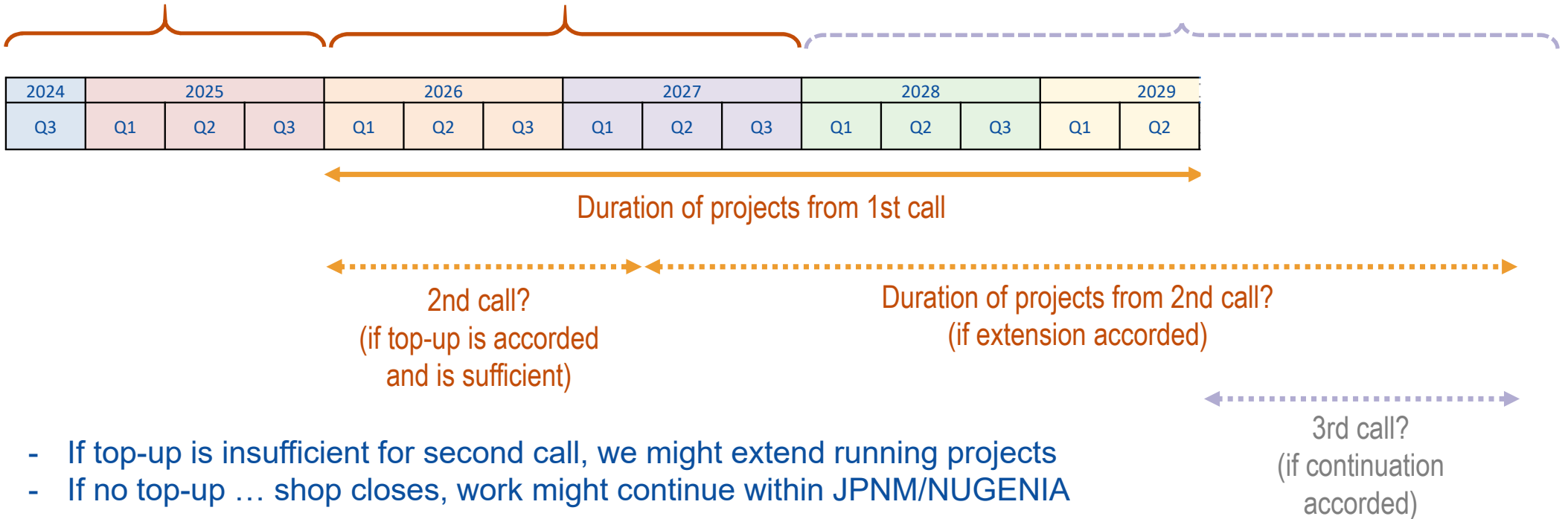


# Long term planning

Preparation of Euratom  
FP extension and WP  
2026-2027

Euratom WP 2026-2027:  
*Top-up funding accorded?*

Next Framework  
Programme



- If top-up is insufficient for second call, we might extend running projects
- If no top-up ... shop closes, work might continue within JPNM/NUGENIA

- In any case:

- Revision of SRA towards end of planned 5-year, to be implemented in possible third call
- Reflection on how CONNECT-NM can be stabilised as an entity (EERA + SNETP?)
- If continuation accorded, design, prepare and possibly perform one or several irradiation campaigns

## Foreseen effort and budget

Reimbursement rates (applied by decision of the consortium):

Type of activity	Type of organisation	Funding rate
Non-R&D&I	Association, University, SME	100%
	All others	70%
R&D&I (projects)	Any type of organization	50%

Total budget: 36.36 M€

Euratom contribution: 20 M€ (55%)

Total cost of 5 year long “transversal” activities (incl. indirect): 6.22 M€ (Euratom contribution: 4.35 M€)

**473.65 PM** (<100 PM/yr)

Total cost of ~1 year long pre-selected projects (incl. indirect): 2.25 M€ (Euratom contribution: 1.12 M€)

**222.5 PM** (>200 PM/yr)

Total left for call-selected projects (incl. indirect): **27.89 M€** (Euratom contribution: 14.53 M€)

**Thank you for your attention**

**Any questions?**

