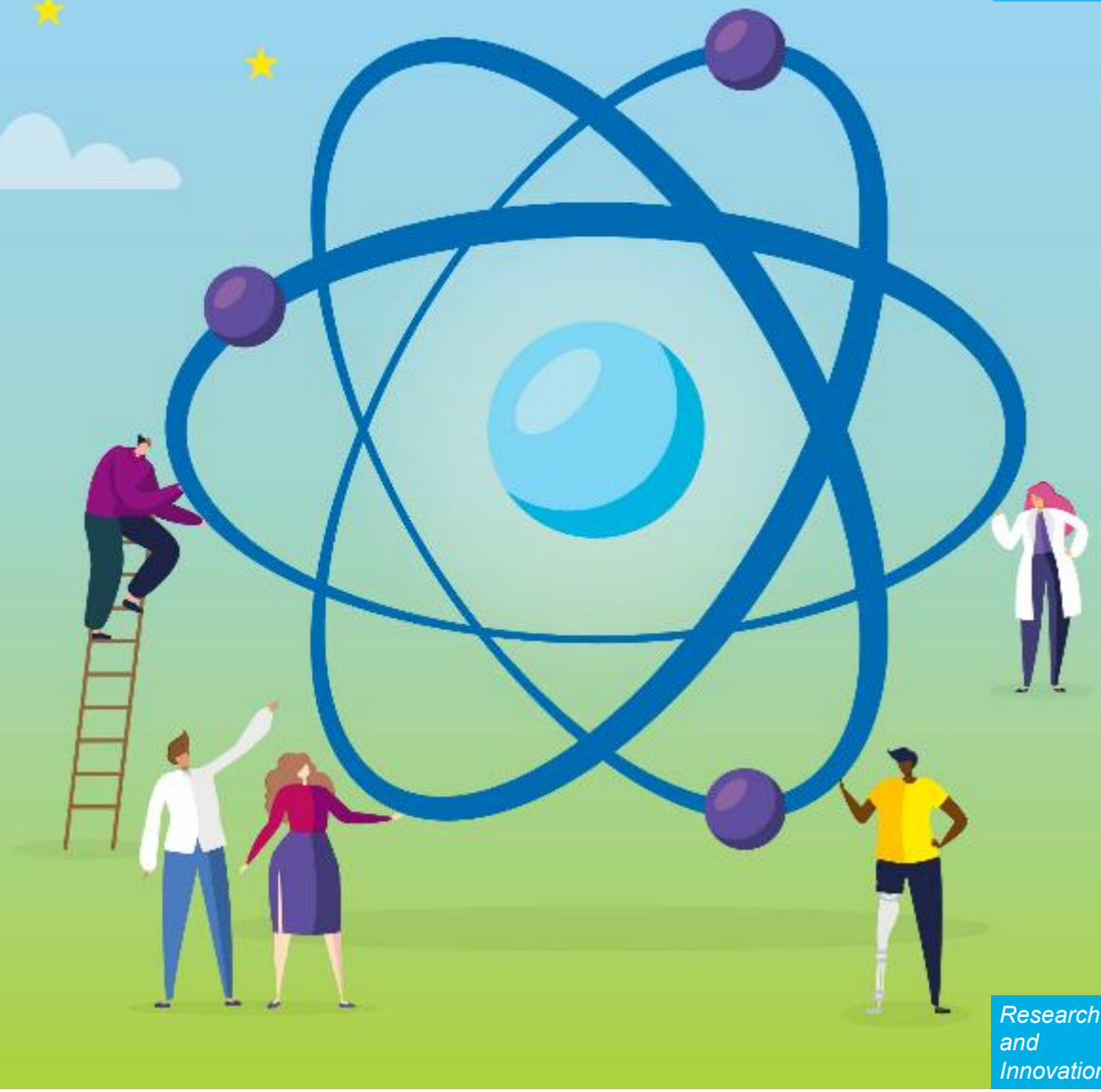
European Commission



#Euratom

EURATOM Workprogramme 2023-2025 Fusion

MUR/APRE Info Day, 23/1/2023

Francesco Romanelli, Università di Ro
“Tor Vergata”

Research and Innovation

WP EURATOM

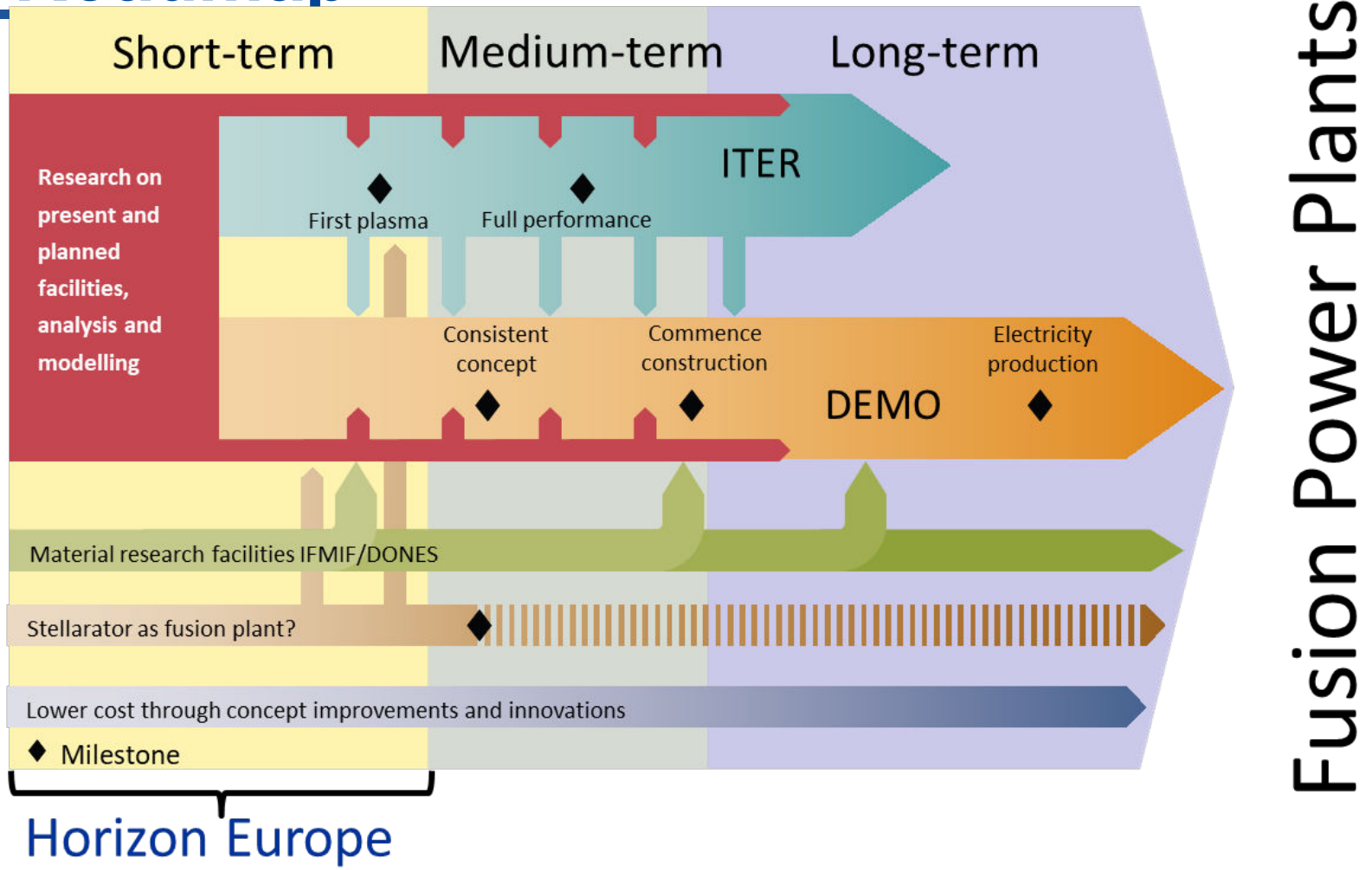
- Co-funded partnership for fusion research
- Supplementary Actions providing industrial expertise to the European Partership
- Supplementary actions supporting development of research infrastructure (2023-2025 only)
- Cross cutting actions

WP EURATOM

Co-funded partnership for fusion research

- **Preparation of operation scenarios for ITER** experimental campaigns ensuring substantia European participation in the exploitation of this facility.
- **Extending the physics/technology basis of ITER relevant fusion science** to ensure that future ITER operation will be effective and efficient;
- **Preparation of conceptual design of a demonstration fusion power plant (DEMO)**, relevant technologies and vision for transformation of the European Fusion Programme towards DEMO implementation with strong involvement of European industry.
- **Training of next generation of scientists and engineers** for the effective implementation o the European Fusion Programme through PhD support, fellowships and other instruments.
- **Establishment of technology transfer** as permanent feature of the European Fusion Programme resulting in added value for European industry, economy and society.

Fusion Roadmap



WP EURATOM

- Grant awarded to EUROfusion Consortium
- Partnership funded through a co-fund grant awarded to the legal entities designated by the Member States

Year	2023	2024	2025
Co-funded EU Partenrship (M€)	110.245	113.392	117.717

- Euratom funding rate limited to 55% of the total eligible costs

Opportunities – Fusion Science

- Fusion Science programme to prepare the ITER exploitation (**WPTE, SA, W7X, PWIE**)
  - Experimental campaigns on Tokamaks (JT-60SA, JET, ASDEX Upgrade, MAST Upgrade, TCV, WEST, and later o the Divertor Test Tokamak (DTT), Compass Upgrade), Stellarators (Wendelstein 7-X) and Plasma facing Material facilities (MAGNUM-PSI, UPP, PSI-2, Jule-PSI, …)
  - Scientific programme in support of DEMO
- Theory and simulations
  - A programme of theory, simulation, verification and to advance the understanding and predictive capabilities (**WPAC**).
  - A high-quality suite of software to interpret data from ITER and associated facilities, and reliably extrapolate to DEMO.
  - **Theory and Advanced Simulation Coordination** (**E-TASC**) includingd **5 Advanced Computing Hubs** to provide the TSVVs wit computer science and coding support.
  - 14 Specific "**Theory, Simulation, Verification, and Validation**" (**TSVV**) in association with the relevant EUROfusion Work Packages or Task Forces to ensure that all programmes complement each other.

Opportunities – ITER preparation

A dedicated WP (**WP PrIO**) will address specific activities by

- **Developing ITER data analysis tools** for ITER operational scenarios through modelling activities using tools validated on experimental facilities;
- To **create the EUROfusion Operations Network** on relevant operational competencies and coordinate joint operational studies.
- To **contribute to the activities of the ITER Neutral Beam Test Facility (NBTF)** installed at Padova and the scientific exploitation of smaller ITER-like ion sources located at IPP-Garching;
- **To improve the knowledge on nuclear technology and safety issues**, to develop and validate nuclear codes, neutronics tools to reduce the risks of ITER operations and maintenance activities

Opportunities – DEMO Design

- The Pre-Conceptual Design Phase in *Horizon 2020* is succeeded by a **Conceptual Design Phase** in *Horizon Europe* to mature and validate the baseline concept, by down-selecting key design technology solutions for the DEMO plant (**WP DES**) .

- A **DEMO Central Team** (**DCT**) is established to advance the design basis, by quick access to the expertise distributed in the EU fusion laboratories, universities and industry, the latter primarily through a dedicated Framework Service Contract.

- The DCT is composed of experienced individuals with technical skills and competences in tokamak design and nuclear plant design and integration, as well as system design of the critical systems.

- The **DCT will be in charge of the integration** of the various designs performed in the distributed project teams, and will lead the definition of the DEMO architecture, the design of systems and plasma scenario.

OPPORTUNITIES FOR ENGINEERS TO SUPPORT DCT (SPECIFIC TASKS - WPDES)

Opportunities - DONES

- R&D continuing within EUROfusion
- In addition actions are ongoing for the project consolidation phase
  - Preparatory phase concluded. Specific action launched (1.25Meuro for WP2023)
  - Spanish Consortium established. All Euratom members and international partners invited to join
  - The DONES Steering Committee is being established – Members who are willing to join, even as observer, invited to nominate representatives

Opportunities - Education and Training

- Eurofusion will continue to **support PhD programmes** in the fusion institutions and MSc student programmes across Europe

- It will directly **finance focused post-doctoral training programmes**

- Approximately 10 EUROfusion Researcher Grants (2-year postdoc grant) and 20 EUROfusion Engineering Grants (3-year training as engineer) per year

- (WPTRED, funding rate 70% as compared to 100% in Horizon 2020)

Opportunities - Industry

- **Industry experts will be involved at all levels**, from project leaders of relevant work packages, secondees to the PMU, and expert advisors during all reviews of the progress being made in the individual projects and in the programme in general.

- **Industry will be involved in the DEMO design from the beginning** ensuring that correct attention is given to industrial feasibility, plant efficiency and availability, and costs.

- Industry will be **heavily involved in the technological R&D** programme by developing solutions and providing components.

Opportunities - DTT

- **Eurofusion supports the design, qualification R&D, fabrication, assembly and installation of the divertor** (PFC+cassette body) and the related subsystems of the divertor of the Italian Divertor Test Tokamak (DTT) (WPDIV)

- **Specific tasks are assigned for the completion of DTT divertor physics design** in particular for those aspects related to plasma-material interaction, plasma exhaust and its active control, and to the preparation of its operation (WPPWIE)

Eurofusion - Italian Beneficiary

Programme Manager:
ENEA – Dipartimento Fusione e Tecnologie per la Sicurezza Nucleare
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Affilated Entities:

RFX	Consorzio RFX
CNR	Consiglio Nazionale delle Ricerche
CREATE	C.R.E.A.T.E. - Consorzio di Ricerca per l'Energia l'Automazione e le Tecnologie dell'Elettromagnetismo
UniTorVergata	Università degli studi di Roma Tor Vergata
PoliTo	Politecnico di Torino
UniRomaTre	Università degli studi di Roma Tre
UniPalermo	Università degli studi di Palermo
UniPisa	Università di Pisa
UniMiBicocca	Università degli studi di Milano-Bicocca
PoliMi	Politecnico di Milano
UniCatania	Università degli studi di Catania
UniSapienza	Università degli studi di Roma Sapienza
CSM-RINA	Rina Consulting – Centro Sviluppo Materiali SpA
ANN-Ansaldo	Ansaldo Nucleare SpA
LT Calcoli	L.T.Calcoli SRL
UniCagliari	Università degli studi di Cagliari
UniTuscia	Università degli studi della Tuscia
CINECA	CINECA Consorzio interuniveritario
INFN	Istituto Nazionale di Fisica Nucleare
DTT	Cosorzio per l'attuazione del progetto Divertor Tokamak Test - DTT SCaRL
ENI	Eni SpA