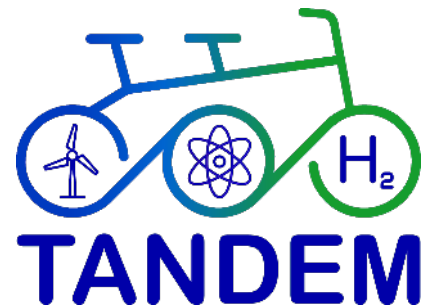


# Short overview of the TANDEM EU project

**C. Vaglio-Gaudard (CEA, France)**  
*Coordinator of the project*

*TANDEM Conference, Brussels, Belgium, July 2, 2025.*



**Funded by the  
European Union**

*Funded by the European Union.  
Views and opinions expressed are  
however those of the author(s) only  
and do not necessarily reflect those  
of the European Union or the  
European Atomic Energy Community  
(‘EC-Euratom’). Neither the European  
Union nor the granting authority can  
be held responsible for them.*

# TANDEM project to support the safe and cost-effective integration of SMRs within low-carbon hybrid energy systems

## Illustration of Hybrid Energy Systems (HES) at a local scale

### Urban area



### Industrial zone (port infrastructure)

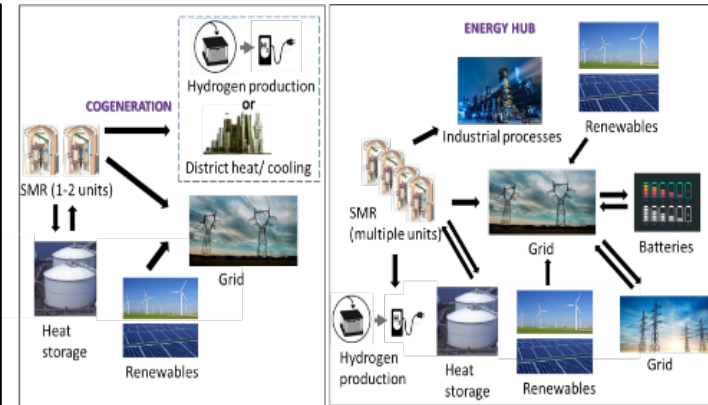


# Objectives and ambitions of TANDEM (2022-2025)

## TANDEM: Small Modular Reactor for a European sAfe aNd Decarbonized Energy Mix

### High-level objectives:

- Assess the **safety compliance** of **SMRs** to be **integrated** in the future European energy mix
- Provide **guidance in a deployment perspective** for the future integration of SMRs and AMRs into well-balanced hybrid energy systems
- **Create an enabling environment** for the development of hybrid energy systems based on SMRs and AMRs



### Ambitions of TANDEM:

- **Promote versatile SMRs integrated into hybrid energy systems** as reliable, resilient, and affordable clean energy options in Europe
- **Become a pioneer initiative** in gathering efforts and expertise around the development of SMR integration into hybrid energy systems in Europe

# TANDEM consortium



**18 partners from 8 European countries**, composed of:  
universities, RTOs, TSOs, industrials and engineering organizations

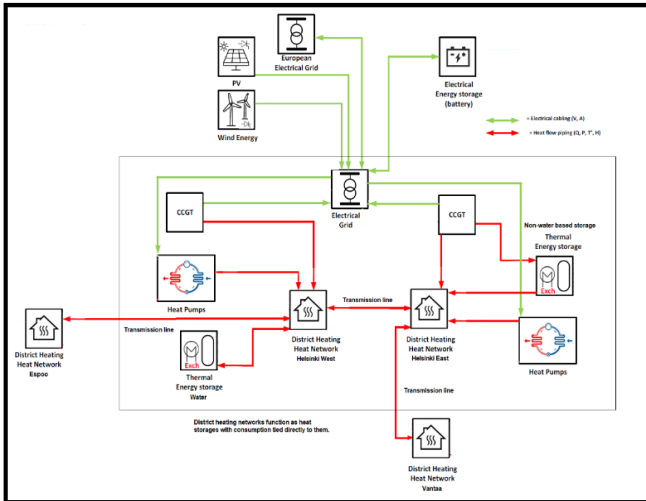


**TANDEM**

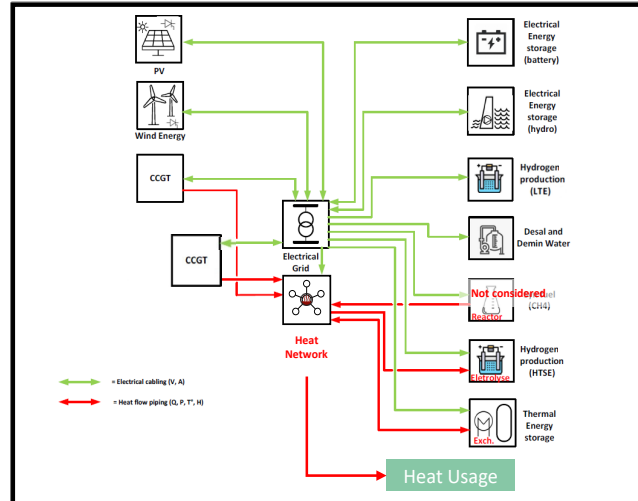
# Main TANDEM outcomes (1/3)

- Contribution to the development of an integrated vision of energy systems at a local scale: feasibility studies of nuclear HES (technical performances, safety, techno-economics, citizen engagement) for two main configurations

*District heating+electricity supply*



*Energy hub*



# Main TANDEM outcomes (2/3)

## Development of tools and methodologies to assess HES:

- ✓ **New tool: open-source modelica-based library** gathering models of HES components  
=> development of HES



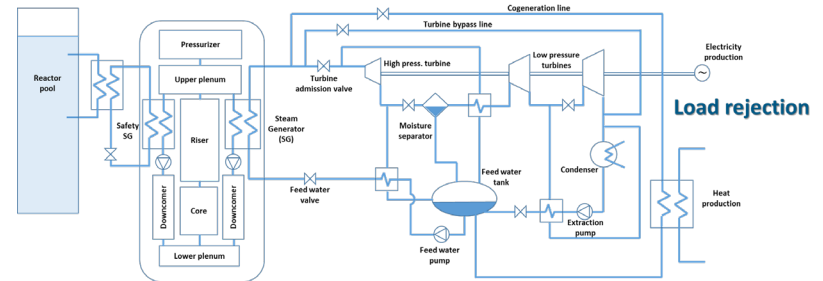
SCAN ME

simulators

- ✓ **Extension of the existing tool capabilities:** coupling between ATHLET/CATHARE (safety) and Backbone/PERSEE (techno-economics) with the modelica-based library

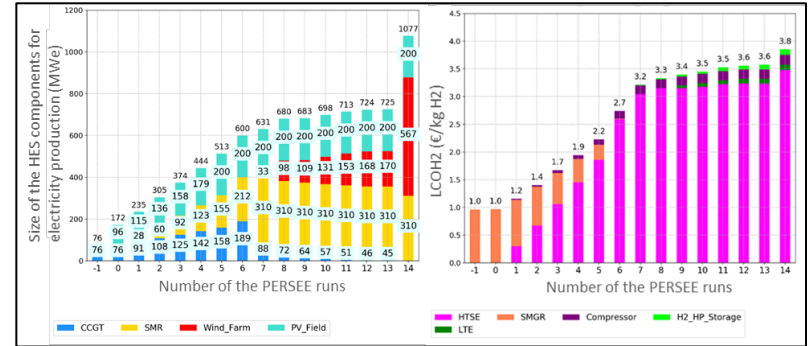
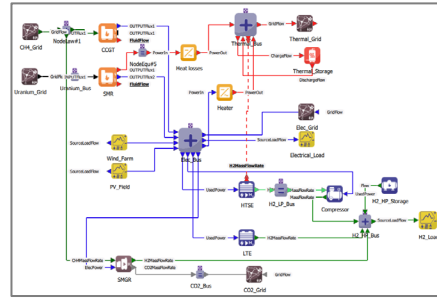
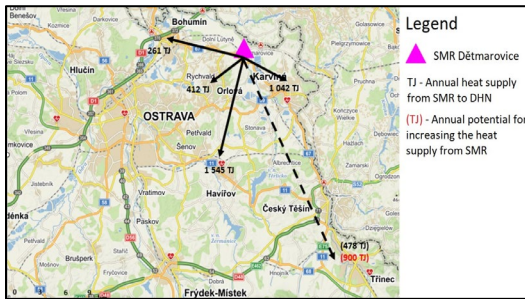
- ✓ Provision of practical insights and findings to industry and public organizations to plan and execute **effective citizen and stakeholder engagement events**

- ✓ **Extension of the safety approach** implemented for a conventional LW-SMR dedicated to electricity production to a LW-SMR in cogeneration



# Main TANDEM outcomes (3/3)

- Implementation of these tools and methodologies to assess demonstrative study cases to highlight the benefits of SMR integration into hybrid energy systems to supply heat, electricity and hydrogen



- Development of a scientific community connected to other Euratom projects on nuclear cogeneration, international initiatives, industrial stakeholders



# Connection of TANDEM with various stakeholders and international initiatives

- ❑ **A Scientific Advisory Committee (SAC):** representatives from IAEA, EC-JRC, US INL, US MIT

Objective: 1/to provide feedback and recommendations on the results, scientific choices and directions of the project; 2/ support interactions with other European and international initiatives which the SAC members are involved in and which are related to the activities of the project

- ❑ **An Industrial User Group (IUG):** a dozen of members

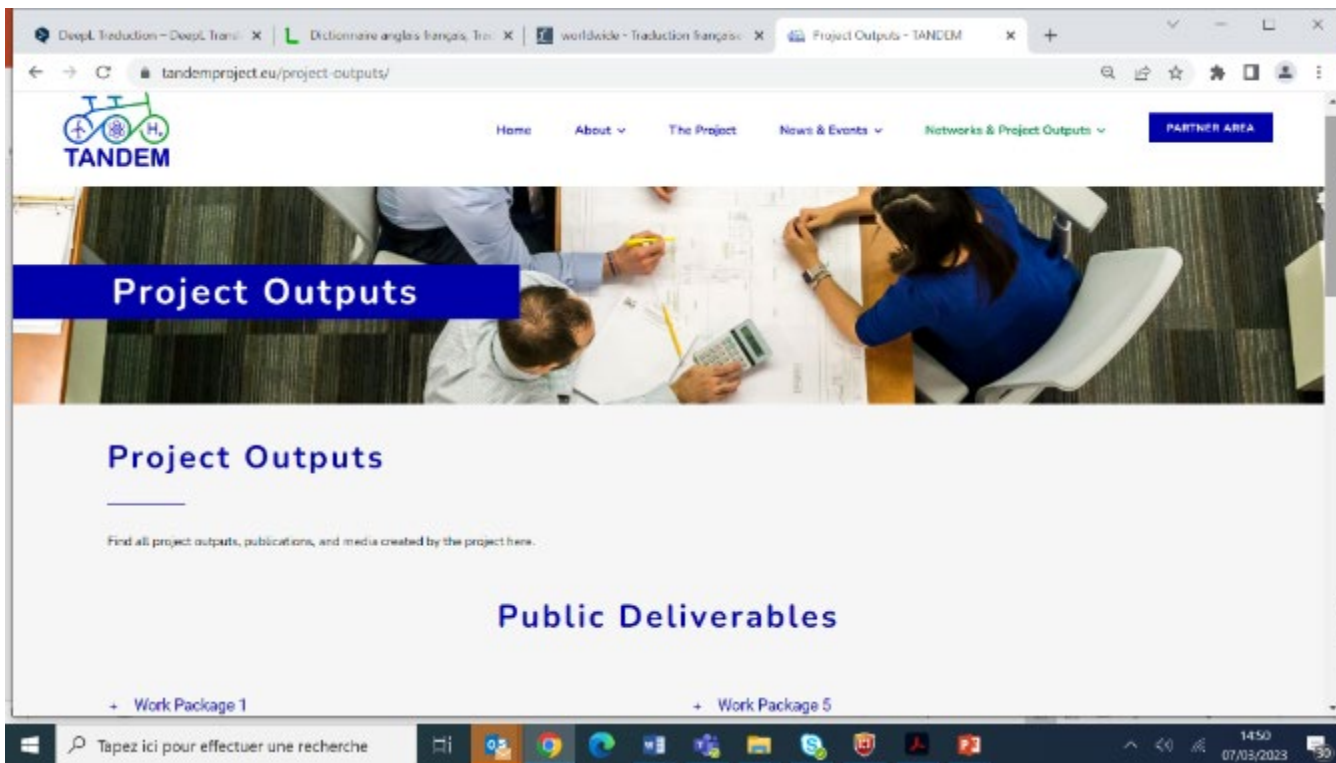
Objective: to engage in a constructive dialogue on: 1/ the technological feasibility of the hybrid energy systems incorporating SMRs, 2/ the different energy markets and their particularities, 3/ regulatory, societal and economic issues related to the implementation of such systems.

- ❑ **Other Euratom projects (mainly on reactor safety and nuclear cogeneration),** such as ELSMOR, SASPAM-SA, GEMINI 4.0, NPHyCo, ESMR-SIMPLE, ENEN2+, EASI-SMR, SANE, ENDURANCE.

- ❑ **Other international initiatives,** such as the IEA/Task Force 44 on HYdrogen from  
8 Nuclear Energy (HYNE)



# To access documents released by TANDEM



The screenshot shows a web browser window displaying the TANDEM project website. The browser's address bar shows the URL [tandemproject.eu/project-outputs/](https://tandemproject.eu/project-outputs/). The website features a navigation menu with links for Home, About, The Project, News & Events, Networks & Project Outputs, and a Partner Area button. A large banner image shows people working at a table, with a blue overlay containing the text "Project Outputs". Below the banner, the heading "Project Outputs" is followed by the text "Find all project outputs, publications, and media created by the project here." and a section for "Public Deliverables" with expandable sections for "Work Package 1" and "Work Package 5". The Windows taskbar at the bottom shows the search bar with the text "Tapez ici pour effectuer une recherche" and the system tray with the date "07/03/2023" and time "14:50".

All the TANDEM technical deliverables submitted to the European Commission are public.

The deliverables, as well as today's presentations, are available on the TANDEM website:

<https://tandemproject.eu/>



# TANDEM Partners



ansaldo | nucleare



POLITECNICO  
MILANO 1863



UNIVERSITÀ DI PISA



Italian National Agency for New Technologies,  
Energy and Sustainable Economic Development



TRACTEBEL  
ENGIE



nucleareurope

fortum



# Get in touch for more information:



**Claire VAGLIO-GAUDARD**

**Coordinator of the TANDEM project**



[claire.vaglio-gaudard@cea.fr](mailto:claire.vaglio-gaudard@cea.fr)



<https://tandemproject.eu/>



<https://www.linkedin.com/company/tandem-project-eu/>

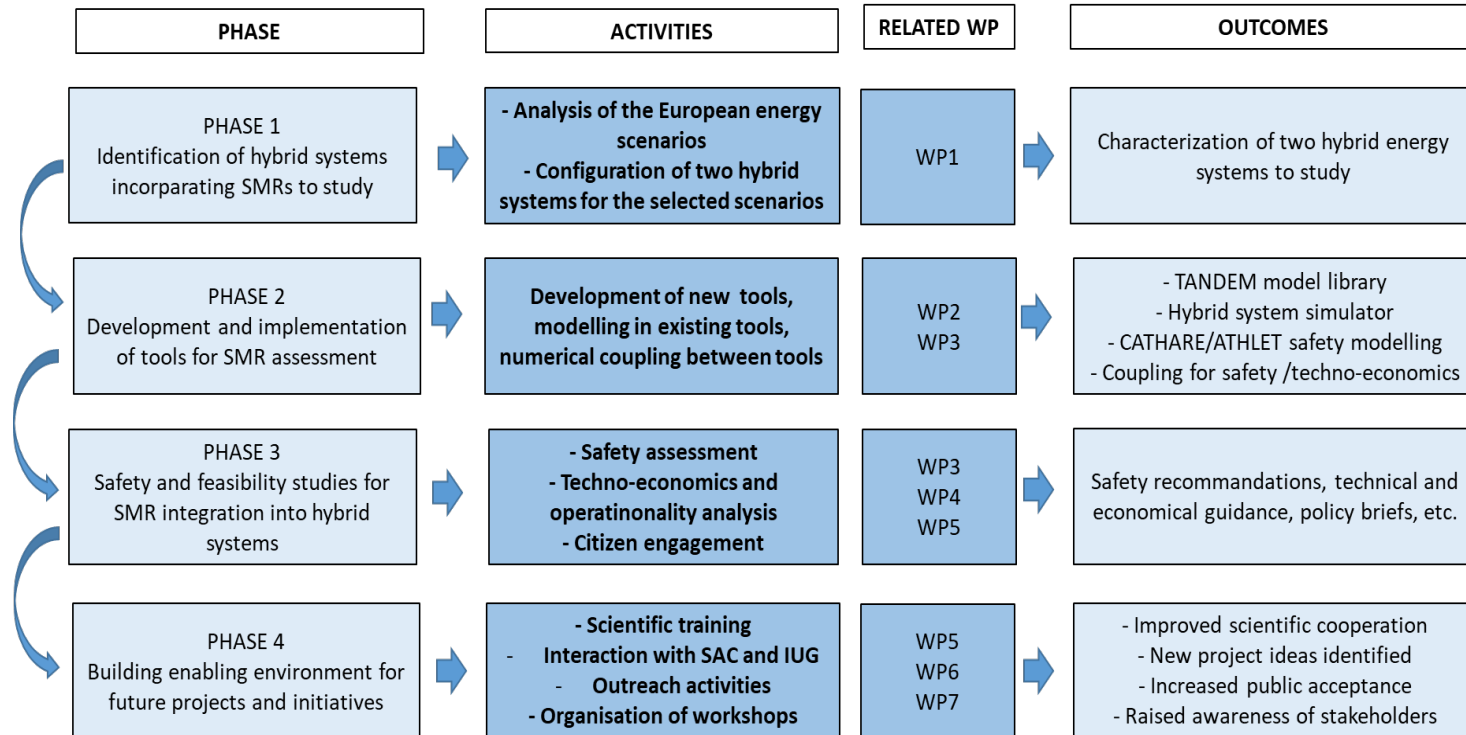
*Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Atomic Energy Community ('EC-Euratom'). Neither the European Union nor the granting authority can be held responsible for them.*



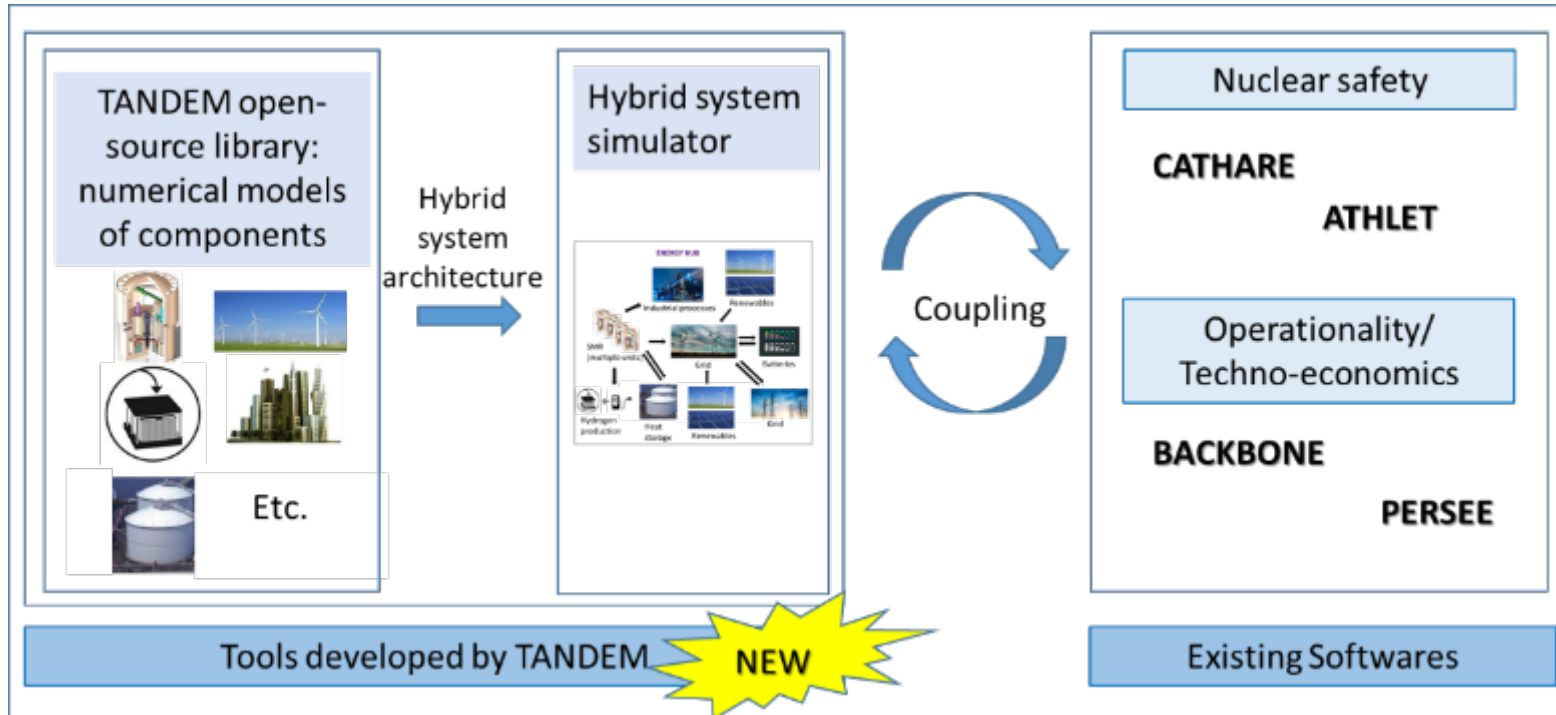
**Funded by  
the European Union**



# Overall methodology and expected outcomes



# Modeling and simulation strategy implemented in TANDEM



# Work Package breakdown

