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## PENTA RESEARCH AGENDA

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Penta is the framework for regional energy cooperation between Belgium, the Netherlands, Luxembourg, France, Germany, Austria and Switzerland. Since 2005, the participating countries have been working together on a voluntary basis. Work in the Pentalateral Energy Forum is guided by the respective ministers of energy, who regularly meet. They give guidance to the work in the Forum, to foster the integration of their domestic electricity markets, and thereby take the lead in Europe.

Early 2021, ministers of the Pentalateral Energy Forum concluded to strengthen their cooperation on the energy transition, based on an enhanced common understanding of the challenges and opportunities at stake. They decided to set up a Penta Research Agenda to provide a first of its kind multi-country source of data, facts and figures for a knowledge-based energy transition.

For a first series of studies, they decided to focus on:

- [Enhancing the Resource Adequacy Assessment methodologies](#)
- Providing building blocks for joint vision
- [Flexibility](#)

The Penta Research Agenda is embedded in the working structures of the Pentalateral Energy Forum. It is set up as a joint effort of all Penta countries. It builds on the brainpower within the Penta ministries. This is complemented by state of the art studies, for which there is the possibility to cooperate with the Benelux General Secretariat as contracting authority on behalf of the Pentalateral Energy Forum. (For more information on this Project Management Office, please contact [d.pycke@benelux.int](mailto:d.pycke@benelux.int)).



Penta Support Groups provided the **brain power** for market coupling projects and generation adequacy assessments, which contributed to **fuel the EU agenda** on flexibility, hydrogen and resource adequacy.

Increasingly intertwined electricity markets and cross-border integration of renewables **require improved data and analytics**

The Penta Research Agenda will provide a first of a kind multi-country source of data, facts and models for a knowledge-based energy transition

**Penta Vision 2050 research**

All Penta Countries need to come to a decarbonized electricity system by 2050, with intermediate steps and ambitious CO2 reduction targets in 2030 and 2040. This research project will lead to a common understanding, which serves as a basis for further market integration and political decision-making on the challenges of the Penta electricity system of the future (e.g. variable RES, flexibility, storage and hydrogen)

**Adequacy research**

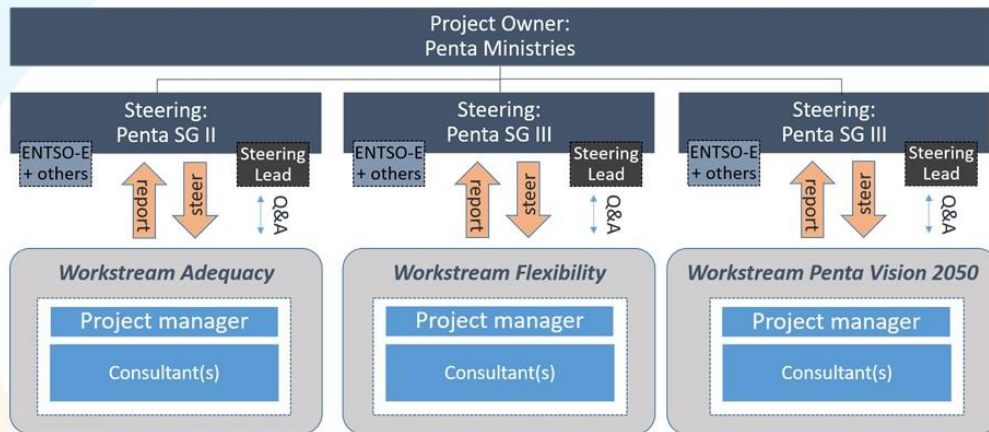
With the energy transition in full swing, robust resource adequacy assessments to ensure appropriate policies and security of supply are needed. This project will assist Penta in its efforts to enhance the methodology applied in resource adequacy assessments by providing scientific and policy-related analyses. It shall improve future Penta-regional assessments and contribute to the European debate on the implementation of the proposed methodology while reconciling different market design options.

**Flexibility research**

With the upcoming Energy System Integration to meet the European Climate Targets, the electricity system will experience major challenges. In particular, the integration of variable renewables will impose requirements on the flexibility of the system. This research project will help to build a common understanding of flexibility in Penta and will provide a blueprint for where we stand today. By identifying barriers and recommendations, it will support political decision-making and pave the way for further cooperation.



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**Deliverables:**

Data, facts and models for a knowledge-based energy transition