6. Platforms and Activities

6.1. Critical raw materials activities (Shane McHugh)

Euro-CASE workshops and follow-up

The working group led by Tim Chapman has been exploring opportunities for Euro-CASE to provide policy advice to European stakeholders on the topic of critical raw materials (CRMs), including through direct communication with the European Commission to promote the offer of Euro-CASE and the expertise within the Euro-CASE network.

Tim Chapman and Patrick Maestro have been in contact with the European Commission and sent the exhaustive list of experts proposed by the member academies in the field of CRM. Regretfully the contact changed and the new people in charge did not express a strong interest in going further.

The proposal submitted and approved by the Board on 24 September was the organisation of a workshop which took place on 20 December with the aim of identifying and defining how to address critical issues related to raw materials and circular economy, with the aim of identifying 6 to 10 crucial areas of current uncertainty.

Three reports from IVA, the RAEng and the RAI were presented at this occasion:

- Metals and minerals for sustainable development and strengthened competitiveness (Royal Swedish Academy of Engineering Sciences – IVA, Sweden)
- Critical materials - reducing demand and ensuring sustainability (Royal Academy of Engineering, UK)
- Mineral raw materials in the energy transition and in digitalization. The role of mining and metallurgy (Real Academia de Ingeniería – RAI (Spain).

An open discussion followed the presentations to explore the expectations of member academies and gather their recommendations on how Euro-CASE can make a meaningful and unique contribution in this area.

A summary of the workshop is given in annex 1. 3 subjects have been put forward as being of interest to Euro-CASE:
Strengthening process engineering for critical material refining and value chain resilience in Europe
Challenges and opportunities for recycling in electronic technologies and emerging innovations
Promoting and implementing the EU's Critical Raw Materials Action (CRMA) and developing a comprehensive EU Raw Materials Strategy

A second workshop on the cross-cutting topic of ‘skills” was organised on 30.06.2025. The summary workshop is given in annex 2.

EIT Raw Materials

Following an initial meeting held on 10 February 2025 with Bernd Schäfers, CEO and Managing Director at EIT RawMaterials and Roland Gauss, Director Innovation and Product Development at EIT RawMaterials, it was agreed to organise a second meeting with EIT Raw Materials to present the results of the first two workshops and to address the need to raise awareness about the need for critical raw material to ensure the ecological transition.

6.2. Engineering Diplomacy

During the June meeting in Paris, Board members discussed potential Euro-CASE actions on the topic and attended a presentation of the UNESCO program on Science/Engineering Diplomacy by Shaofeng Hu. The Working group has been tasked to:

- Review the 2 proposals presented in annexes 3 and 4 and explore funding possibilities
- Pursue contact with different stakeholders: UNESCO, NATO, European Commission

The Euro-CASE Working Group on Engineering Diplomacy met in Brussels on 17 September with Jan Marco Müller, EU Commission and Irina Pavlova, UNESCO. The agenda is given in annex 5. The main objective was to discuss the academies can be leveraged as a resource in Europe's strategic priorities

- Stakeholders' perspectives, interests and expectations
- Reflections on the Euro-CASE Engineering Diplomacy platform and strategic choices to be made.
- Next steps (flagship initiatives and 2nd European Science Diplomacy Conference side event)

In parallel and on the recommendation of Martin Bech, Euro-CASE has been invited to support INTREST proposal, a project focusing on "interlinkages between research security, economic security and EU's open strategic autonomy". With the approval of the Executive Committee a support letter has been sent to Tommy Shih from KTH (Annex 6).

Martin Bech and other working group members will update the Board.

6.3. Innovation Platform III

As recommended by the Euro-CASE Board in June, Stane Pejovnik (SI), Norbert Bacsan (HU), Jari Hämäläinen (FI), Robert Auer (HU) and Patrick Maestro met on 8 September to discuss a concrete follow-up to be presented to the Board meeting in Vienna on 30 September.

The group discussed the following:

<u>1. Focus on the Innovation Ecosystem and Technological Innovation</u>
While the initial impetus for the discussion stemmed from analysing innovation in "smaller economies," the group ultimately agreed that "innovation is innovation" for practically any system. The core focus should be on studying the innovation ecosystem in various economies within the European Union.

Crucially, given the nature of the organization, the platform must adopt a Euro-CASE specific approach, emphasizing engineering and technological innovation. It was stressed that Technology is the key word, not science. The overall goal is to reinforce innovativeness, technological innovativeness, and the competitiveness of Europe.

<u>2. Differentiation and Scope</u>
The initiative is intended to move beyond the scope of the former Innovation Platform 2, which concentrated mainly on European-level obstacles for SMEs and growth companies. The proposed new platform will focus more on countries and states examining country-specific differences and building upon "good practices" to uplift the entire community. The participants highlighted the need to find areas where Euro-CASE can be specific and avoid researching topics already covered by other compact initiatives, such as the EIT's focus on higher education.

3. Key Issues and Open Questions for Study
The discussion identified several critical areas where deep analysis is required, particularly regarding smaller economies:
• Brain Drain: This was identified as a "very high question" and a dangerous problem for all small countries.
• Scale Up Engineering: The lack of this skill was noted, particularly in Hungary, though it is recognized as a key blocking point for innovation in general, even in larger countries. Reinforcing and sharing existing scale up engineering capabilities was proposed as a valuable deliverable.
• Ecosystem Responsibility: In Slovenia, the word "ecosystem" is sometimes used to create "fog," where nobody is responsible for innovation output. Studying how interaction between various subsystems affects innovation is critical.
• Country Specifics (Case Studies): Participants noted significant differences between similarly ranked countries (e.g., Slovenia and Hungary having nearly identical rankings in the WIPO ranking, but drastically different input/output ratios and levels of highly educated engineers). Case studies, like comparing Estonia and Latvia, were suggested to understand these variances.
• Government Role and Globalization: Questions were raised about the danger of selling off national industries and allowing multinational companies to define local innovation agendas, emphasizing the important role of the government.

Suggestions and Next Steps
The meeting concluded with a clear set of proposed steps to move the initiative forward:

1. Immediate Action: Workshop/Seminar by the end of 2025.
The immediate next step is to organize a workshop or seminar type meeting. The primary purpose of this meeting is to:
• Exchange information about good practices.
• Define the basic issues and complex questions that need to be studied.
• Identify whether there is a common interest among participants to continue, potentially creating Platform 3 as a "place of exchange".
Potential discussion points for this seminar include the creation of startups, financing, and investing.

2. Involvement of other member Academies
The current small group must be extended by inviting all interested academies within Euro-CASE and potentially those outside it, as the initiative is open. The outcome of the seminar will determine whether the platform continues. Euro-CASE member academies willing to contribute to this type of activity are invited to inform the Working Group and the Euro-CASE secretariat.

3. Presentation to the Board members on 30 September
A brief presentation will be made to gauge the willingness of other academies to proceed with the seminar/workshop.

The leadership of this potential new platform will be discussed at a later stage, but the group really wishes to put forward the candidacy of Jari Hämäläinen.

Jari Hämäläinen and Norbert Babcsan will update the Board.

6.4. PFAS

The aim of this action would be to give a technological view of the PFAS problem at the

European level, sharing on countries individual experiences. The proposed title is: “PFAS in Europe today and tomorrow” This could be Forum activity or the drafting of a Position Statement.

Members academies have been consulted on their interest of PFAS and invited to propose names of experts to set up a working group.

On 05.03.2025 a first meeting has been organised with:
Marco Apostolo, ITATEC (IT)
Patrick Maestro, Euro-CASE
Marnik Vanclooster, ARB/KVAB (BE)
Manuel Fernando Pereira, PAE (PT)

Another meeting will be held on 7 October with a larger representation of member academies. The group will attempt to define a specific proposal in terms of leadership, time, objectives, budget, and target audience.

6.5. Proposal from acatech

acatech would like to make three proposals for activities to the Euro-CASE member academies :

- Soils: Synergizing Climate Protection and Climate Adaptation (Annex 7)
- Attitudes towards technology in Europe (Annex 8)
- Follow up activity “Energy transition in Europe: Common goals but different paths”, Euro-CASE report published in 2019.

During the September meeting Reinhard Hüttl will present these three topics to the Board members. Member Academies will be invited to give their opinion on these two proposals and their interest in contributing to them by appointing one or more representatives.

Paris, 23.09.2025

Euro-CASE
CRM workshop 20.12.2024
Summary

The meeting focused on the EU's critical materials strategy and the role of engineering expertise in implementing policies related to the green energy transition and the development of a digital society. The session began with an outline of the geopolitical challenges facing the EU in securing a stable supply of critical materials, highlighting the need for strategic action.
A presentation was made by the Royal Academy of Engineering on a recent report addressing demand-side resource efficiency measures. This report emphasised the importance of considering both supply and demand aspects, particularly in relation to technologies driving critical materials demand in energy, transport, and digital infrastructure. Key themes discussed included the need for infrastructure planning, design innovation, and circular economy approaches. A case study on offshore wind was used to illustrate the importance of better end-of-life planning and recycling capabilities.
Presentation from Real Academia De Ingenieria (Spain) covered key points from comprehensive book on mineral raw materials in the context of the energy transition and digitalisation. It underscored Europe's vulnerability in critical materials supply and the value chain from mining to processing. Specific projects in Spain related to critical materials like copper, zinc, nickel, and lithium were discussed, with recommendations emphasising the integration of mining and metallurgy into the value chain and the improvement of education and training in these fields.
Participants contributed to the discussion of key themes, identified gaps, and made recommendations for both Euro-CASE and the EU Commission regarding the advancement of the CRMA proposal.

Key themes and gaps

1. **Strengthening process engineering for critical material refining and value chain resilience in Europe**
   Gaps identified:

1.1 Limited process engineering capability:

- Europe lacks sufficient infrastructure and expertise in process engineering to efficiently treat, refine, and transform critical raw materials into final products which has resulted. This has led to over-reliance on external players, particularly China, which dominates the value chain from raw material extraction to product manufacturing.

1.2 Fragmented value chains

- The connection between different stages of the value chain—from raw material extraction, refining, and processing to final product development—is weak or fragmented which limits Europe's ability to sustain a fully localised and resilient supply chain.

1.3 Underinvestment in processing infrastructure

- Lack of investment in pilot plants and scalable processing facilities prevents Europe from advancing innovations from low Technology Readiness Levels (TRLs) to industrial-scale applications.

1.4 Slow technology adoption and innovation uptake.

- Lack of coordination between research initiatives and industrial needs exacerbates the problem of technology adoption and innovation uptake.

1.5 Skills gap in process engineering:

- A shortage of skilled engineers in refining and processing further undermines the ability to build a resilient value chain.

Insights from participants:

- Promote the advancement of process engineering in Europe with a targeted focus on decarbonisation and zero-waste practices in metal extraction, refining, and primary transformation.
- Explore and address the role of critical materials in defence and security: addressing gaps in research, policy and strategy

2. Challenges and opportunities in recycling semiconductor technologies and emerging innovations

Gaps identified:

2.1 Recycling of materials used in electronics:
- Need for research into recycling non-metallic materials like ceramics, and the necessity of incorporating recycling education into engineering curricula. Existing recycling processes focus heavily on metals, while semiconductors, particularly ceramics (e.g., gallium nitride), pose significant recycling challenges.

2.2 Regulatory gaps:
- European regulations on eco-design in the semiconductor and consumer electronics sectors largely ignore recycling, potentially due to the current lack of capability in recycling these materials.

2.3 Knowledge gaps in education:
- Graduates trained in electronics and materials science often lack the knowledge or tools to consider recycling in their designs, pointing to a broader issue of siloed education.

2.4 Lack of proactive design for recycling:
- Emerging technologies like heterogeneous integration are not being designed with recycling in mind, leading to potentially greater challenges in the future.

Insights from participants:

- There's a need for more research into the recycling of semiconductor materials, especially ceramics, as part of the broader eco-design efforts.
- Engineering education should not only recruit people into the right sectors but also broaden the knowledge base to equip engineers with the skills to tackle challenges like recycling. This should be a key focus for both policymakers and the education sector.
- There is a need to explore alternative materials and solutions to address supply chain issues, particularly for materials that are critical for renewable energy systems like wind power - given the importance of materials like gallium nitride in the energy transition.

3. Promoting and implementing the EU's Critical Raw Materials Action (CRMA) and developing a comprehensive EU Raw Materials Strategy

Gaps Identified:

3.1 Diverse regulatory frameworks across member states: The variation in national laws and regulations makes it difficult to implement the CRMA consistently across Europe.

3.2 Lack of EU-wide raw materials strategy: While individual member states have their own strategies, there is no unified, cohesive raw materials strategy at the European level, hindering coordinated action and growth.

Insights from participants:

- Advocate for EU-level regulations that mandate sustainable product design with a focus on recyclability. Additionally, collaboration with the US should be explored to create a large, unified market capable of ensuring broad industry buy-in and incentivising manufacturers to adopt these regulations
- Advocate for the creation of a comprehensive raw materials strategy at the European level, encouraging member states to create a unified strategy for large-scale recycling, sustainable manufacturing, and resource management.
    a. Example: Advocate to establish EU-wide initiatives to create recycling technologies and infrastructure for large-scale projects, such as wind turbine decommissioning. By pooling resources and expertise, member states can build shared systems and prevent siloed efforts, leading to more effective circularity practices.
    b. Push for member states to adopt strategies for raw materials exploration, emphasising the importance of local sourcing for both current and future needs.
    c. Encourage the EU to use its collective market size to influence global design standards, especially in industries with significant environmental impact, such as consumer electronics and manufacturing. As a unified entity, the EU can drive policies around end-of-life recovery, resource efficiency, and sustainable product design, which individual nations cannot influence as effectively.

Proposed actions for Euro-CASE:

1. Mapping initiative:
    - Leverage European academies to map and evaluate mining, mineral processing, and metallurgy refining capacities across Europe.
    - Provide a clear picture of regional capabilities, innovation levels, and environmental performance, focusing on emission reductions and sustainability.
2. Improving public perception/trust:
    - Promote transparency in technical practices.
    - Educate society on sustainability impacts.
    - Address talent attraction barriers through public-facing case studies, communication campaigns, and collaboration with education systems.

Annex 2

Euro CASE - CRM Workshop II
Date: 30.06.2025
Topic: Bridging the Skills Gap in the CRM Supply Chain
A technical dialogue between academia and industry on aligning talent, training systems, and innovation for Europe's critical materials resilience.

Overview:

The seminar convened experts from European academies and Kazakhstan to discuss skills development for critical raw materials (CRM). After introductions, speakers from Sweden, Belgium, and Kazakhstan presented models for multi-level training, re-industrialising engineering education, government-led scholarship and upskilling initiatives, and industry-academia hackathons. The session closed with a panel discussion on Europe's de-industrialisation, bridging geoscience and engineering disciplines, international student mobility, and partnerships (particularly with China and Kazakhstan) to address skills gaps

Academy Presentations on CRM Skills Development

1. **Swedish Academy of Engineering Sciences**

- **Progress & achievements:**
  - Rolled out a multi-level outreach model, engaging policymakers (parliamentary briefings), local communities, and secondary schools to raise awareness of CRM careers.
- **Challenges:**
  - Difficulties in measuring the long-term impact of awareness activities on actual student enrolments.
  - Securing sustainable, multi-year funding to maintain and expand these outreach programmes.

2. Belgian Royal Academy / Flemish Engineering Faculties

- **Progress & achievements:**
  - Launched the Erasmus Mundus "Emerald" joint MSc, rotating modules across partner universities to pool expertise and resources.
  - Established pilot-plant internships and cross-disciplinary hackathons, giving students hands-on experience in mineral processing and circular-economy solutions.
- **Challenges:**
  - "Boom-and-bust" staffing caused by short-term grant cycles, leading to loss of expert faculty when Erasmus funding ends.
  - Rebuilding and updating curricula from scratch each time funding renewals are required.

3. National Academy of Sciences of Kazakhstan

- **Progress & achievements:**
  - Implemented the "Serpen" scholarship programme, reserving 30 % of engineering spots for CRM-related disciplines, with guaranteed industry placements post-graduation.
  - Established an AI-driven geoscience skills centre and ran industry-academia hackathons to prototype circular-economy processes.
- **Challenges:**
  - Scaling double-degree partnerships beyond current European and Asian collaborators.

- Retaining scholarship recipients in domestic industries rather than losing talent abroad.

Discussion - Skills challenges and potential solutions
Pain points:
This section outlines the core challenges currently undermining Europe's ability to develop and retain critical raw-materials expertise across academia and industry

- **Recycling remains under-prioritised**: it's perceived as "unclean" add-on work, with engineering programmes siloing geology, metallurgy, materials science, design, and recycling; treating recycled feedstocks as secondary inputs and omitting circular-economy and end-of-life thinking from standard curricula.
- **Declining student interest in mining, metallurgy, and materials engineering:** Several speakers noted that undergraduate enrolments in raw-materials disciplines have fallen sharply over the past decade, as students perceive traditional mining and metallurgical courses to be "old-school" or environmentally unfriendly. This trend threatens the pipeline of future specialists, especially at a time when Europe is seeking to secure domestic sources of critical minerals
- **Difficulty sustaining academic staff and programmes:**
  Universities report that short-term, project-based funding (e.g., Erasmus Mundus consortia) leads to a "boom-and-bust" staffing model: when grant cycles end, departments lose key personnel and must rebuild curricula from scratch. This stop-start dynamic undermines long-term curriculum development and makes it hard to retain experienced faculty.
- **Insufficient geological capacity:**
  Multiple participants highlighted a gap in exploration expertise: Europe lacks the number of trained geologists and geoscientists needed for systematic field surveys and data-driven mineral discovery. Without robust geological mapping and data-collection skills, new CRM deposits may remain undetected.
- **De-industrialisation's regional impact**
  Traditional heavy industries such as mining, metallurgy and large-scale chemical production have largely shut down across Europe, notably in regions such as northern France and Germany's Ruhr. As a result, universities responded by phasing out classical engineering programmes in favour of "advanced" specialisations (e.g., aeronautics, biomedical engineering, big data).
- **Visa barriers for non-EU graduates**
  Even when European universities produce international graduates with CRM skills, restrictive post-study work visas and complex immigration rules make it difficult for them to stay and contribute to domestic supply chains. This "brain drain" exacerbates skills shortages.
- **European master's programmes in resource engineering and recycling struggle to attract home-grown talent**, in part because students are not aware of the opportunities. Although the EIT Raw Materials label was intended to elevate these flagship degrees and draw top European candidates complete with scholarships and mobility the initiative has underdelivered, offering only a handful of awards. Meanwhile, the Raw Materials Academy has shifted toward short, online "upskilling" courses for hundreds of thousands of learners, rather than maintaining rigorous, engineering-focused curricula.

Current Solutions
Here we review the key programmes and partnerships already in place - both

governmental and academic - that are working to fill CRM skills gaps and build capacity

- **Joint master's programmes (e.g., Erasmus Mundus "Emerald")**
  By pooling resources across multiple institutions, these programmes maintain robust, specialised curricula even when individual universities can not sustain them alone. Shared funding and faculty exchanges help smooth out staffing gaps and keep courses running seamlessly.
- **Awareness-raising seminars targeting policymakers and youth**
  Sweden's multi-level outreach model was presented as best practice: workshops for local authorities, guest lectures in high schools, and parliamentary briefings all work together to improve the public image of raw-materials careers and encourage earlier student engagement.
- **Industry-academia partnerships with practical training**
  Pilot-plant internships and joint R&D projects in mineral processing give students hands-on exposure to real-world challenges. Speakers described hackathons where engineering students, process-engineers, and recycling experts collaborate to prototype circular-economy solutions in just 48 hours
- **Government-led scholarships & career-orientation initiatives**
  Kazakhstan's "Serpen" programme guarantees that 30 percent of university places are reserved for prospective engineers, accompanied by mentorship schemes and guaranteed industry placements post-graduation. This pipeline, from primary school outreach to PhD stipends, ensures continuity in skills development.
- **International cooperation & double-degree schemes**
  Several participants stressed the value of formal agreements with partner countries. Joint research centres and reciprocal degree programmes - for example, between Belgian universities and Kazakh institutes - provide students with cross-border experience and mitigate regional capacity gaps.

Feedback & feature requests

Based on the seminar discussion, this section captures participants' asks and proposed enhancements to strengthen CRM training and collaboration

- **Re-industrialise engineering education** by **integrating and unify core disciplines**
  We should bridge geology, metallurgy, materials science, design, and recycling within a unified circular-economy curriculum that treats recycling as a core mineral-processing method which uses the same extraction and metallurgical techniques as with primary ores while explicitly mapping how recycled inputs feed into advanced-materials applications, and reintroducing mandatory modules on raw-materials life cycles, sustainable design, circular-economy principles, and end-of-life management across all engineering programmes.
- **Secure long-term structural funding for joint programmes**
  To avoid the constant cycle of reapplications, speakers recommended establishing endowments or multi-year grants, ensuring continuity of high-quality curricula without the administrative burden of repeated funding bids.
- **Include education clauses in bilateral agreements**
  By embedding student-exchange and joint-training requirements directly into diplomatic or trade accords (e.g., with China or Kazakhstan), governments can guarantee funding and institutional support for skills mobility.
- **Enhance outreach & publicity**
  A coordinated EU-wide campaign - leveraging social media, national engineering

weeks, and vocational fairs - was proposed to reignite youth interest in engineering disciplines tied to CRM.

- **Draft a concise 5–7-page working paper for the European Commission** summarising Europe's minerals and metals landscape, value-chain roles, skills gaps and circular-economy integration. Include actionable recommendations under three pillars: Awareness, Education and Policy interventions.

Annex 3

February 13, 2025

Engineering Diplomacy

Draft proposal from Luc Chefneux and the Belgian Academies

Background:

Europe is struggling to position itself as a true world power, despite its economy and its scientific and technological level. It lacks attributes it is trying to appropriate. These include a common foreign policy and a common, credible military capability.

But Europe must have a strategic vision of its role in a complex, rapidly reconfiguring world! This reflection, initiated by the 1st von der Leyen Commission, led to the choice of a geo-economic approach known as "Open Strategic Economy". This approach implies a clear vision of the geopolitics to be implemented.[1]

Cruelly lacking in natural resources (energy and raw materials) and heavily dependent on exports, needing to secure its needs as well as the necessary communication routes, it must define its area of responsibility by working towards its stability, a necessary condition for its own stability. This includes the Mediterranean and the whole of Africa. In these areas, Europe must position itself vis-à-vis the other major players: the USA, which is only concerned with its own interests, even to the detriment of its European ally; China, which is pursuing a cynical neo-colonial policy; and Russia, which is deploying its capacity to cause harm.

In a world facing enormous challenges, most of the countries in Europe's area of responsibility are lagging behind in their development to a greater or lesser extent. It is vital to accelerate their development, otherwise political instability will increase, with disastrous consequences (war, famine, population exodus). But this development must absolutely take other paths than those used by the more developed countries, which have been at the root of global warming and the degradation of the biosphere.

This is where European scientific and technological progress can play a major role.

Euro-CASE federates the various European engineering academies, each of which has considerable influence over universities and engineering schools in its own country. Euro-CASE is keen to get involved in an "Engineering Diplomacy" approach and is likely to play the role of a catalyst or even a coordinating role in supporting sustainable technological progress in countries seeking development and stability, thus playing an important role in European strategy, in support of its diplomacy.

A few exemplary initiatives that could serve as a model for technological universities illustrate the major role that engineering schools could play to the service of the European Union if a similar initiative could be set up in Euro-CASE member countries[2] and coordinated by Euro-CASE.

This should be done in synergy with other initiatives led by associations of engineers and entrepreneurs, such as "Ingénieurs sans frontières"[3] and "Entrepreneurs for Entrepreneurs"[4].

Objective:

Encourage technological universities in European countries to organize partnerships with engineering schools in countries in the European zone of responsibility, to enable the development of responsible technological innovations, adapted to the local context ("appropriate and appropriable") enabling sustainable development, different from that which our countries have experienced.

By supporting technological and industrial assistance initiatives in less-developed countries, extend these partnerships to civil society organizations in these countries, with a particular focus on economic activities that can benefit from technological support.

Support and/or coordinate these initiatives through the network of Euro-CASE members, seeking a significant impact strengthening Europe's presence and credibility and attachment to its values.

Scope:

- Initiative limited to one technological university or engineering school per Euro-CASE member country,
- Open to various engineering schools in countries within the European area of responsibility, with priority given to Africa.

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[1] EGMONT POLICY BRIEF 367 | EU STRATEGY 2025-2029: WE HAVE THE INSTRUMENTS, NOW SET THE OBJECTIVES

[2] https://uclouvain.be/fr/facultes/epl/ingenieuxsud.html

[3] https://www.isf-france.org/

[4] https://ondernemersvoorondernemers.be/en/home

Assumptions:

- Euro-CASE accepts the global animation of these initiatives, which would allow it to assume an important responsibility for Europe and contribute directly to the Sustained Development Goals (SDGs)
- A university in each country can set up such an initiative.
- The initiative will be set up with mutual respect for the partners in the target countries, and with a view to making reciprocal contributions.

Risks and opportunities:

- Opportunity for Euro-CASE to position itself in an unoccupied strategic niche.
- Support from several European Commissioners, including 2 VPs, Teresa Ribera[5] and Kaja Kallas.

Reporting:

- To be proposed to the "WG Engineering Diplomacy".

[5] Associate Fellow of the Class Technology & Society of ARB

February 2025
Martin Bech (mab@atv.dk) and Matteo Pardo (matteo.pardo@cnr.it)

ACTIVITY PROPOSAL

Engineering collaboration in Science and Technology

Following the Draghi report[6] and the EU Commission's report A Framework for European Science Diplomacy[7], Euro-CASE and its member academies propose a new program tailored to establish networks and collaboration between talented engineers in the EU, associated states and countries of interest for Europe's international strategy. The aim of the program is to strengthen EU's competitiveness through enhanced S&T collaboration with associated states and countries of strategic importance.

The key component of the program is a retreat format that is targeted towards early to mid-career engineers and technologists from academia, industry and government as a means to build strong future connections between individuals who will be leaders in fields of importance to Europe's capacity in science, innovation and technology.[8]

The program emphasis the following two elements:

- *Excellence*: the participants will be selected by technical academies according to a proven track record and to the potential to become future international leaders.
- *Interdisciplinarity*: participants from different engineering and technological sectors, as well as from different work environments such as academia, industry and government, will share their specific insights and discuss common challenges, e.g. the integration of artificial intelligence in their work.

Moreover, the program may include a small number of presentations by external experts on topics which can complement the engineering expertise, such as management, system thinking, outreach.

The program aims not only at building networks among future technology leaders for the benefit of the EU but also promotes personal and professional growth so that participants can become stronger voices in their respective organizations and communities on behalf of the engineering discipline and with a focus on developing new technologies and products more rapidly and boldly.

Target partners are neighboring countries such as the West Balkans, Turkey and northern Africa and the major engineering countries, such as Canada, China, Japan, India. In case of sufficient resources and once a successful model is developed, the program can be expanded to include other countries in Africa, Asia, and South America that the EU is seeking to develop closer Science and Engineering relations with.

The program is organized as a retreat for three days to five days, taking place alternatingly in a European country and in the partner country. The retreats are organized by Euro-CASE in collaboration with academies in the countries involved. Participants are nominated by technical academies in Europe and the partner country. Participants will have to be 30–45 years of age (or else have completed a PhD in the last 5-10 years). and their attendance will be covered though the program. Members of the academies involved may participate with their own funding.

Each retreat will be organized around three to four topics that are suitable for cross-fertilization, e.g. biotechnology and artificial intelligence, so that the expertise of the participants is complementary. During the seminar, participants will present their work and engage in moderated round tables. A social program will be part of the meetings, e.g. excursions.

The number of retreats which can be organized will depend on the allotted financing. As an example, in year one, two retreats could be organized, e.g., one with the West Balkans and one with Japan. The following year, reciprocal retreats will be organized, and two more countries will be added so that in year two a total of four retreats are organized. 6-8 retreats per year may be organized in the third and following years.

As the program develops, an alumni network is organized with the possibility to invite the alumni to future retreats.

We seek cost coverage by a sponsor, e.g., EU and NATO. Euro-CASE will coordinate the program and receive adequate funding for staff resources to take on this responsibility.

[6] The Draghi report on EU competitiveness

[7] A European Framework for Science Diplomacy - European Commission

[8] A noteworthy example of a similar program is the US Frontiers of Engineering - Euro-CASE already is partnering with the US Academy of Engineering for one meeting of the series.

Annex 5

Stakeholders workshop – Euro-CASE Engineering Diplomacy

PROGRAM
Venue: Académie royale de Belgique (Brussels, Rue Ducale)
Moderator: Martin Bech, ATV

Time	Activity
9.00	**Welcome by Euro-CASE** Patrick Maestro, General Secretary, Euro-CASE
9.10	**Presentation of academies' role in Science Advice for policy** Patrick Maestro, member of the SAPEA board
9.30	**Presentation of the Euro-CASE Engineering Diplomacy Platform** Albert Husniaux 10min presentation + 20min Q&A
10.00	**European Science Diplomacy** Jan Marco Müller, European Commission 10min presentation + 50min Q&A
11.00	**Curated discussion focusing on leveraging academies as a resource in Europe's strategic priorities** o Reflections on the Euro-CASE Engineering Diplomacy platform o Stakeholders' perspectives, interests and expectations o Potential next steps
11.45	**Conclusions and way ahead**
12.00-13.00	**Lunch**

Internal Euro-CASE meeting	
13.30	**Mutual updates** o New initiatives related to international science and technology collaboration at academies represented in the working group
14.00	**'Strategic choices to be made' - Euro-CASE Engineering Diplomacy** Discussion of responses to powerpoint slides.
14.30	**Presentation and discussion of flagship initiatives** o Side-event, 2nd European Science Diplomacy Conference o Collaboration with Technical Universities (Albert) o 'Frontiers of Engineering', European Version (Matteo & Martin) o Other?
15.15	**Next steps**
15.30	**End of program**

Participants

- Members of the Euro-CASE Engineering Diplomacy Working Group: Euro-CASE (Nadia Pipunic, Patrick Maestro), Belgium (Albert Husniaux, Luc Chefneux, Denmark (Martin Bech), France (Patrick Maestro), Italy (Matteo Pardo), UK (Shane McHugh).
- Jan Marco Müller, EU Commission
- Irina Pavlova, UNESCO

Annex 6

Euro-CASE
Academies of Engineering Sciences

Mr Tommy Shih
KTH

Paris, 15.09.2025

Dear Tommy Shih,

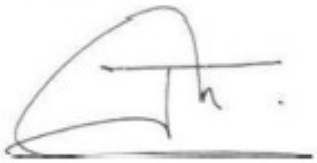
On behalf of Euro-CASE, I would like to share with you our support for the INTREST proposal. Euro-CASE is increasingly occupied with issues related to research security, economic security and Europe's strategic autonomy and we are currently developing the platform Euro-CASE Engineering Diplomacy which has several overlaps with INTERST e.g. we are exploring new formats for connecting the deep technical knowledge of our member academies' Fellows to European policy making processes.

We are particularly interested in INTREST ambition to explore the interconnections between research and economic security and open strategic autonomy as this indicates a proactive approach that takes security as well as the need to engage internationally into account. This is also the spirit of Euro-CASE.

If granted funding, we would like to look into possibilities for a Fellow from one of our member academies joining the reference group, we can also solicit the interest of our academies in joining specific activities.

Considering the above, we believe INTREST is a visionary and much-needed initiative. We therefore fully support its implementation and look forward to actively participating as a stakeholder in the project.

Yours sincerely,



Patrick Maestro
Secretary General

Members:

Austrian Academy of Sciences (ÖAW)

Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique (ARB)

Royal Flemish Academy of Belgium for Science and the Arts (KVAB)

Croatian Academy of Engineering (HATZ)

Engineering Academy of the Czech Republic (EA CR)

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National Academy of Technologies of France (NATF)

National Academy of Science and Engineering (acatech)

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Annex 7

acatech
NATIONAL ACADEMY OF SCIENCE AND ENGINEERING

Draft proposal for a Euro-CASE Working Group

Soils: Synergizing Climate Protection and Climate Adaptation

Lead: acatech, Prof. Dr. Reinhard Hüttl

Background

Soils play a central role in the global carbon cycle. Beside the oceans they are the largest store of carbon, containing 5 times more carbon than all the aboveground vegetation of our planet[9]. Despite this essential function, soils have long been largely overlooked in climate policy discussions. However, recent scientific findings show that human activities, particularly intensive agriculture, progressive soil sealing, and infrastructure measures including energy transition, are increasingly impairing soils' natural storage and sink functions[10].

Current data suggest that CO_2 emissions from soils in Germany amount to over 100 million tonnes of CO_2 equivalents per year, which is comparable to the emissions of the transport sector. Soil degrading agricultural activities, the drainage of moors and the degradation of forests are significant contributors to this situation, as is the growing use of land for bioenergy production and photovoltaic systems. Furthermore, climate change is having a clear impact on soils: rising temperatures including significantly lower numbers of days with snow cover and frost as well as changing precipitation patterns are intensifying the microbial decomposition of organic matter, resulting in accelerated humus degradation and the subsequent release of significant quantities of CO_2. Given that 80% of Germany's land area is used for agriculture and forestry, it is particularly important to consider the impact of this development on carbon stocks, particularly on the calculation of CO_2-reduction goals to finally reach climate neutrality. The amount of carbon stored in soils varies considerably between arable land, grassland and forests. While arable soils store an average of around 90 tonnes of carbon per hectare, forest soils store about 100 tonnes and grassland soils can store up to 140 tonnes, which has a significant impact on CO_2 sequestration. However, these storage capacities are under threat from overuse, erosion, compaction and climate-change-related stress factors. Without targeted countermeasures – which are indeed available – there is a risk of permanently losing this vital ecosystem service[11].

While the developments and data outlined above primarily refer to the situation in Germany, they also illustrate the complex interactions between land use, climate change and the carbon cycle. A comparable analysis is also crucial for other European countries, given the significant variations in climatic, geological, agricultural/land use and political conditions across different regions. Only with this broad understanding can effective, site-specific strategies be developed to stabilise, expand and permanently secure carbon sequestration in soils, in terms of climate protection but also for biodiversity improvement, water management and food security.

Against this background, a scientifically sound, systemic assessment of carbon dynamics in European soils is required, which could form the basis of a new Euro-CASE working group on 'Soils for Climate Protection'.

Objectives

The newly established working group aims to systematically review the scientific basis for soil carbon cycling and to contextualise this important process within the current climate policy landscape.

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[9] Rodrigues, Cristina & Brito, Luis & Nunes, Leonel. (2023). Soil Carbon Sequestration in the Context of Climate Change Mitigation: A Review. Soil Systems. 7. 64. 10.3390/soilsystems7030064.

[10] Moinet, G. Y. K., Hijbeek, R., van Vuuren, D. P., & Giller, K. E. (2023). Carbon for soils, not soils for carbon. *Global Change Biology*, 29, 2384–2398. https://doi.org/10.1111/gcb.16570

[11] Hüttl, R., Schneider, U. (2025). Unsere Böden: Kohlenstoff-Speicher oder Kohlenstoff-Quelle?: *Impuls-Studie Nr. 5*, Clean Energy Forum (CEF). https://www.clean-energy-forum.org/de/publikationen/unsere-boeden-kohlenstoff-speicher-oder-kohlenstoff-quelle?

- To this end, available soil characteristics – preferably in a broader statistical setting – that are decisive for carbon storage capacity (e.g. soil type/texture, soil structure, humus content, pH value, water retention capacity and soil temperature) shall be specified for participating EU Member States. This enables regional differences in conditions and challenges to be systematically recorded.
- In addition, the effects of land use, infrastructural interventions and advancing climate change on the carbon storage and sink function of soils in individual countries will be analysed.
- Based on this analysis, concrete action plans will be developed to preserve, strengthen and restore these functions.
- Another key objective of the working group is to use the findings to formulate scientifically sound policy recommendations that can inform decision-making by EU Member States, particularly with regard to future climate, agricultural and soil protection strategies.

Approach and structure

The working group is led by a small coordination team and operates on an interdisciplinary and transnational basis. It involves experts from the fields of soil science, environmental and agricultural policy, climate research, energy, infrastructure and relevant technological innovation. A structured approach based on four key elements is planned.

- During the course of the project, three thematic workshops will be held to facilitate interdisciplinary exchange and joint analysis of current challenges and possible solutions.
- At the same time, existing research results and relevant national and European policy strategies will be systematically evaluated.
- On this basis, a scientifically sound report with concrete recommendations will be prepared.
- In addition, a concise policy brief aimed specifically at political decision-makers will highlight key action points.

Expected impact

The 'Soils for Climate Protection' working group is expected to have several significant impacts, providing impetus at technology and political levels.

- A key objective is to make European soil and climate policy more science-based, particularly by conducting an in-depth analysis of carbon dynamics and their political relevance.
- Additionally, the project aims to contribute to the development of incentive mechanisms that specifically reward ecosystem services such as humus formation, biodiversity promotion, and water storage also aiming towards food security by maintaining or improving soil fertility.
- With regard to the Common Agricultural Policy (CAP) reform debate ending in 2027.the working group's findings will also provide technical support including options of implementation for land use practices at the European level with a special focus on climate protection.
- Lastly, transnational exchange will improve networking between European academies specialising in sustainability, climate protection and land use.

Annex 8

Draft proposal for a Euro-CASE Working Group

acatech
NATIONAL ACADEMY OF SCIENCE AND ENGINEERING

Attitudes towards technology in Europe

Background

The TechnikRadar (TechnologyRadar) of acatech is an annual, national, online-representative survey of the German population. Since 2017, TechnikRadar examines the foundational attitudes of Germans towards technologies as well as towards specific fields of technology which are opening new potential domains for conflict. Do Germans tend to associate technology in its various forms and applications with hope or unease? Which new technologies do they welcome and which do they reject? And what conditions need to be met for people to be open to technological change?

As a long-term early warning system, the TechnikRadar also identifies missteps in technological change in good time and indicates where there is a particular need for communication. At the same time, it aims to support innovation processes so that products and technologies are in tune with citizens' expectations. The results provide a sound basis for a debate about the significance of technical innovation, the associated regulatory requirements and the options for shaping future innovation.

https://www.acatech.de/publikation/technikradar-2025-schwerpunkt-digitale-transformation-und-ki/download-pdf?lang=en

Ideas behind this working group

The TechnikRadar project group wants to assess which other member academies are already involved in research on public attitudes towards technology or would be interested in this kind of research. This could open up opportunities to cooperatively develop and exchange methodologies, questionnaires and results.

As a long-term perspective, other partners (e.g., the European Commission / Eurobarometer group) may be approached with the aim of conducting a Pan-European survey in line with social science standards and validated methods of empirical social research.

Targets the working group wants to achieve in the first year

- Raise awareness for the relevance of high-quality survey research on public attitudes (e.g., as background for science and technology communication) within Euro-CASE
- Provide an overview of relevant surveys in European countries
- Determine necessary steps to reach the next action level, e.g. Pan-European survey

Time schedule for first year

- Installing the working group
  - circulation of the above project outline within Euro-CASE members (by email) to collect comments and gauge potential interest
- *Decision to establish the working group* outlined above at the Euro-CASE Board Meeting on 30 September 2025 in Vienna (provided that a sufficient number of academies have expressed their interest in participating). Nomination of experts by the interested academies starts off the working group. Discuss and decide who will coordinate the group and support infrastructure.
- *Kick-off meeting (first online meeting):* to bring together the nominated experts to establish a shared understanding of the project's goals and scope, clarify roles and responsibilities, and outline the project structure, timeline and key milestones. The meeting should also provide an opportunity to agree on communication channels and tools, discuss expectations and potential risks, and any remaining questions should be answered.
- *After kick-off meeting:* consultation of academies, collection of material;
  gather main findings of already existing surveys and open questions
- *second online meeting:* identify status quo, discuss role of academies as well as other stakeholders and determine next steps to be taken (10 – 20 participants); outline a report as main result of first year
- *working group or sub-group:* draft report
- *third online meeting:* finalize report (ca. 10 pp.)
- present results of working group at Euro-CASE meeting in 2026
- Determine the next steps to be taken by the working group

Members of working group

from acatech: Ortwin Renn, Mike S. Schäfer, Martin Bauer

other academies: to be confirmed