

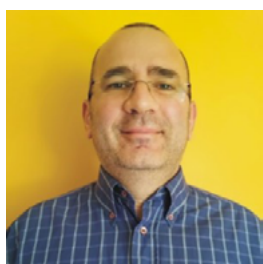


START

NEWSLETTER

RECOVER-REFORM-REUSE

for a Sustainable Future



We're excited to bring you the 6th issue of the START newsletter, marking a key moment in our journey.

We're proud to announce that START has successfully passed its Second Project Review, receiving strong recognition from the European Commission for our technical achievements and collaborative efforts.

The consortium recently gathered at RGS Development in the Netherlands (17–18 June 2025) for our Annual Meeting. It was a valuable opportunity to reflect on the progress across all Work Packages and to align our efforts as we enter the final phase of the project. The momentum is stronger than ever.

Looking ahead, we're gearing up for a key event: the START Workshop at ECT2025 (www.ect2025.com), where we'll discuss how to transfer Europe's thermoelectric research into industrial applications, a crucial step for achieving real-world impact.

In this issue, don't miss:

- Project updates on implementation and progress;
- An interview with Maarten den Heijer (RGS), offering his expert perspective on the current state of the thermoelectric industry in Europe;
- Our Virtual Tour, featuring partners BGR (Germany) and LPRC (Spain) and their essential contributions to START's mission;
- And a brand-new story from Starty, our mascot, created to help young learners understand how thermoelectric technology supports a cleaner, more sustainable future.

As always, thank you for your continued interest in our project. With strong momentum and a shared vision, START is advancing innovation for a more sustainable and resilient Europe.

Warm regards,

(F. Neves)

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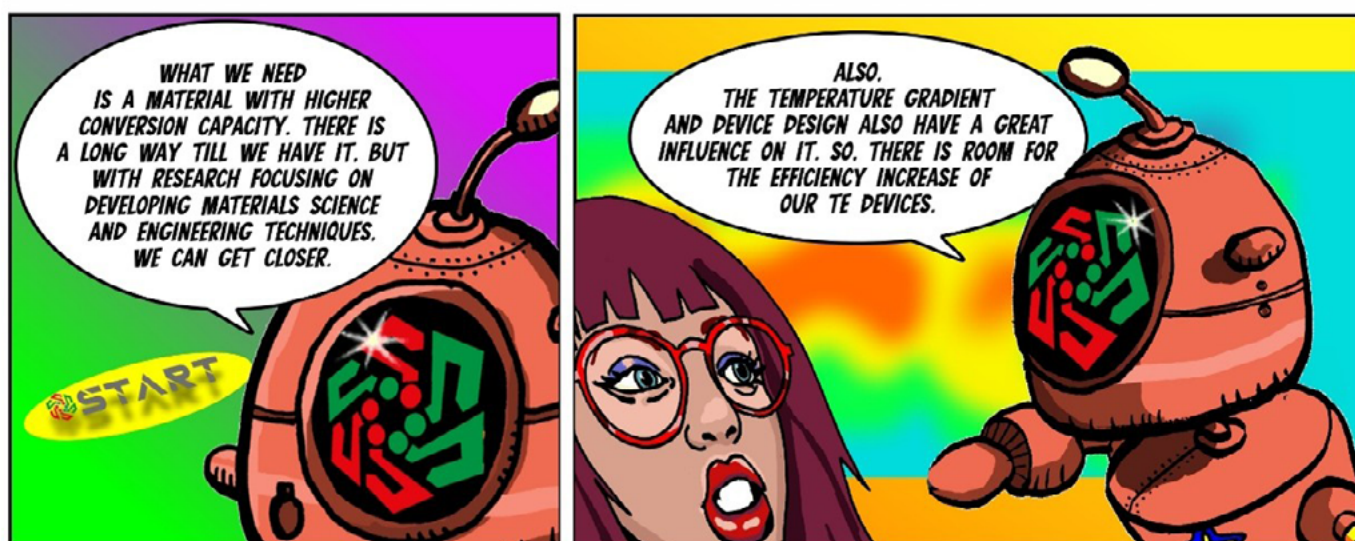
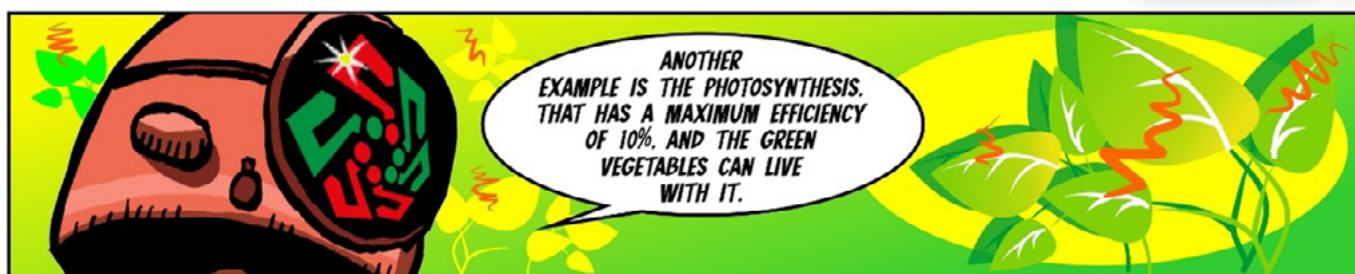
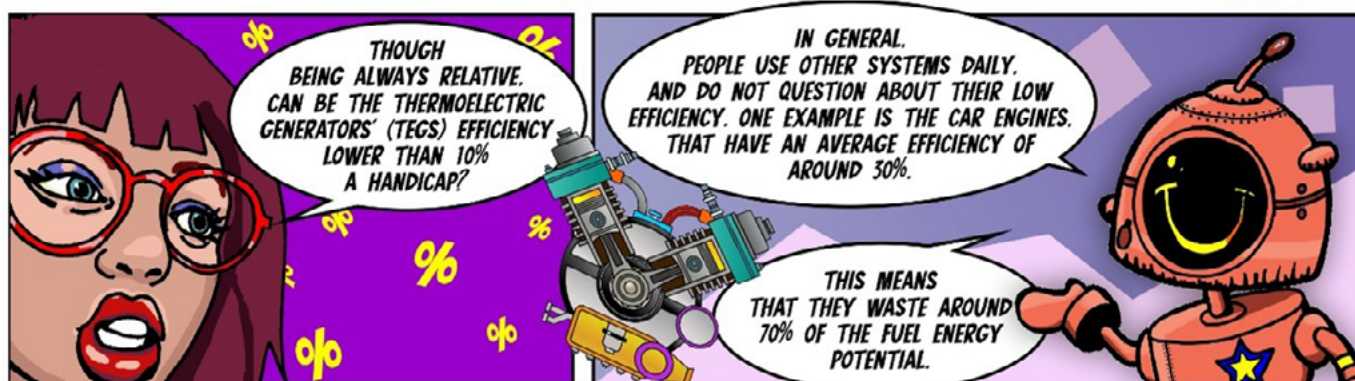


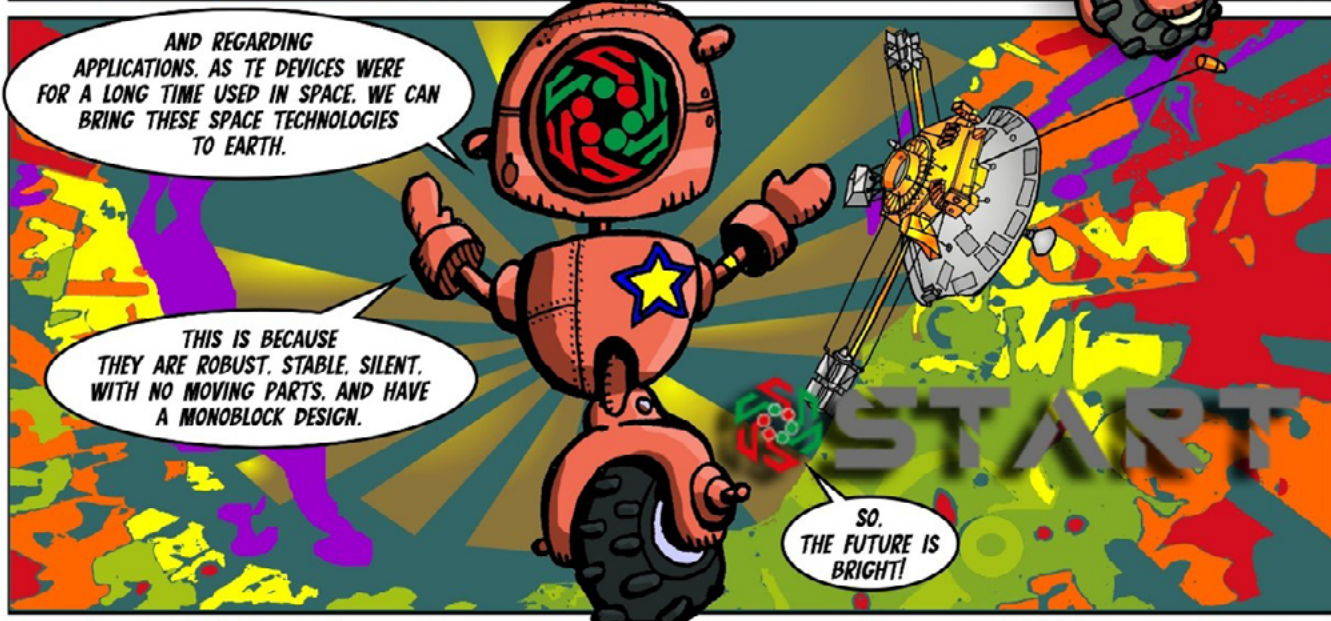
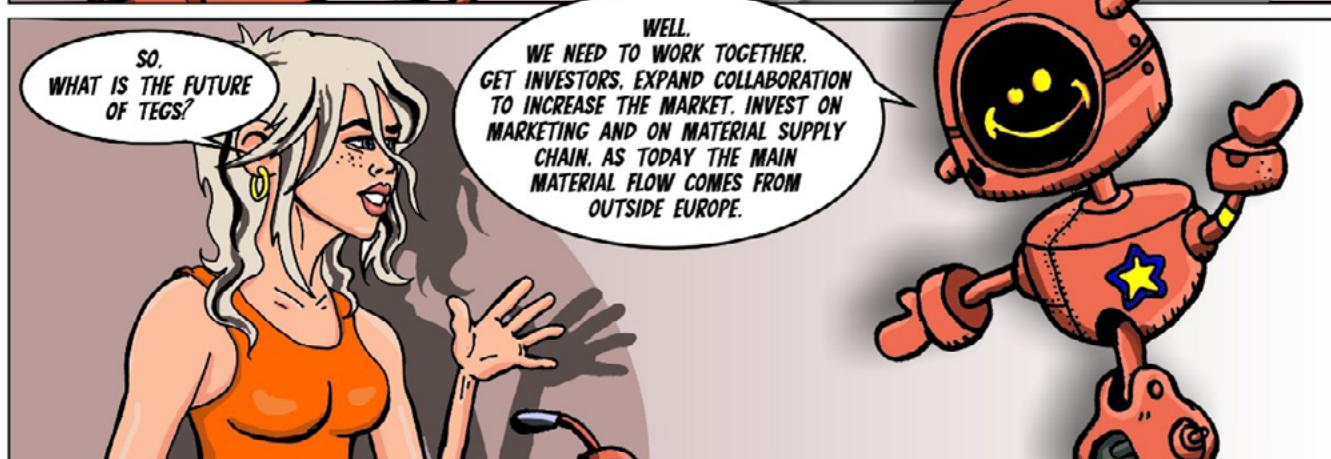
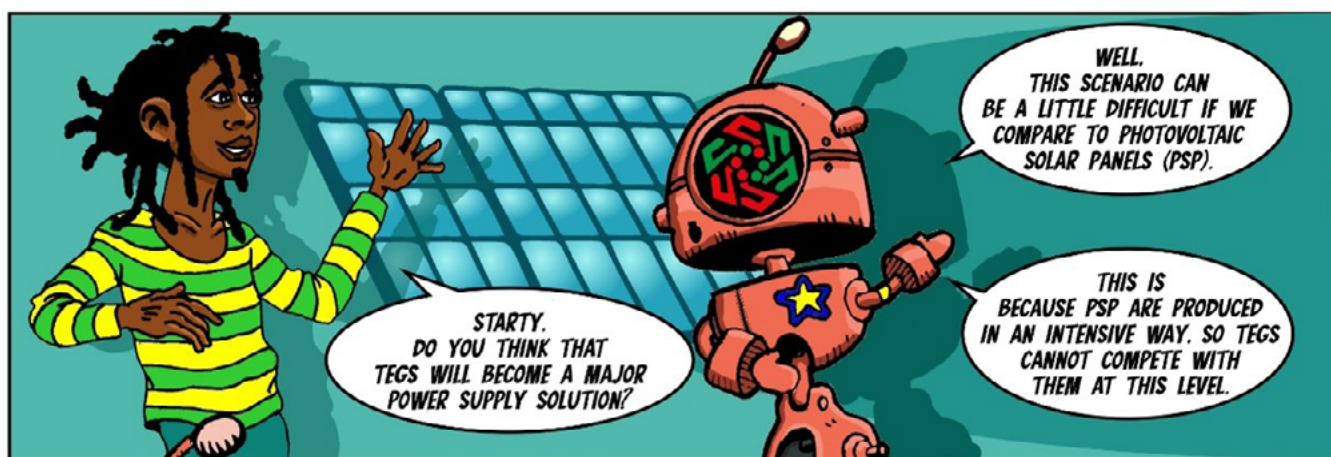
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STARTY - 6: FAQs





START CHRONICLES: GEOLOGY, THERMOELECTRICS AND MORE

News from Work Packages

Gender Analysis Report

During the first years of the START project, a follow-up of the initial gender diagnosis has been carried out to assess the progress in female participation within the consortium and the measures adopted in this area. Currently, women represent 45% of the people involved in the project, a slight increase from the initial 40%. While some teams have achieved balanced or majority female representation, several teams still show a higher proportion of male participants.

Regarding leadership roles, most women are involved as Team Members, with a slight improvement in the Team Leader category. However, access to higher-responsibility positions remains limited. Additionally, 40% of the institutions have implemented a Gender Equality Plan, and several partners have introduced initiatives to increase the visibility of women, such as mentoring programmes, flexible working hours, and support for conference participation. Nevertheless, it has been noted that some organisations lack specific actions in this area, which limits real progress towards equality.

Finally, various institutions have launched initiatives to foster more inclusive environments, such as internal gender equality analyses and the development of institutional manifestos in favour of diversity and inclusion. These actions reflect a growing commitment among project partners, although further efforts are still needed to achieve balanced participation and representation at all levels.

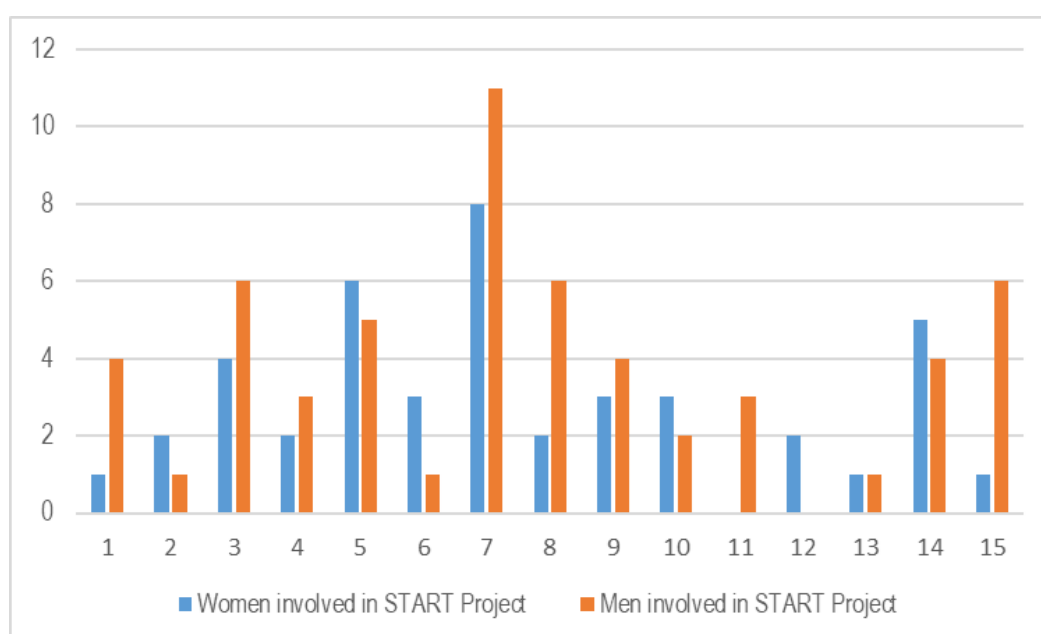


Figure 1: Distribution of genders in the staff involved in the START project per partner

NEWS FROM WORK PACKAGE 4 “Materials characterization”

Work Package 4 has focused on the ‘Thermal stabilization of tetrahedrites’ Task Force, which is aimed at providing a deeper understanding of the effect of different dopants on the oxidation and sulphur sublimation kinetics in atmospheric conditions at 350°C. The results show that the $\text{Cu}_{11}\text{Fe}_{0.5}\text{Zn}_{0.5}\text{Sb}_4\text{S}_{13}$ compound (the composition selected in START) has a relatively good thermal stability (Figure 2). This work was carried out by the trainee Catarina Quitério, during her 6-month internship at SINTEF in the framework of her master’s degree.

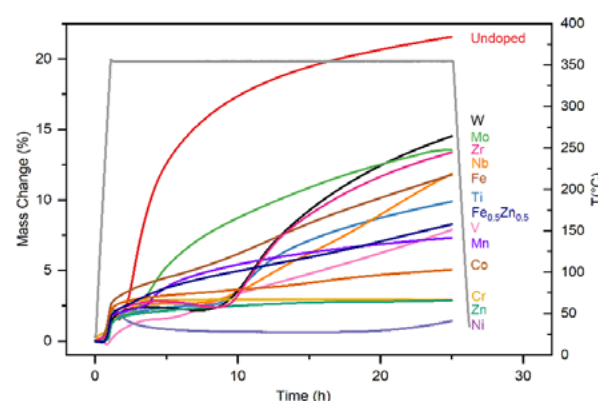


Figure 2: Gain of mass of $\text{Cu}_{11}\text{TSb}_4\text{S}_{13}$ compounds (where T is a transition metal) in air at 350°C for 24h.

NEWS FROM WORK PACKAGE 5 “Design and fabrication of prototype TE modules”

In Task 5.1, the COMSOL model developed by RGS and SINTEF was extended to include diffusion barrier layers and mechanical properties, enabling simulation of Von Mises stresses at operating temperatures (**Figure 3**). In Task 5.2, a unicouple was fabricated using diced pellets of synthetic tetrahedrite and magnesium antimonide. RGS optimized a low-temperature bonding process (<300 °C) and evaluated multiple unicouples through electrical measurements and X-ray CT scans (**Figure 4**). The next step is to scale up fabrication into modules (**Figure 5**), using the fill factor derived from Task 5.1 simulations. In Task 5.3, 3Drivers is analysing the module’s material components and developing a life cycle assessment (LCA) model, focusing on impact categories such as global warming potential, human carcinogenic toxicity, mineral resource scarcity, and fossil resource scarcity.

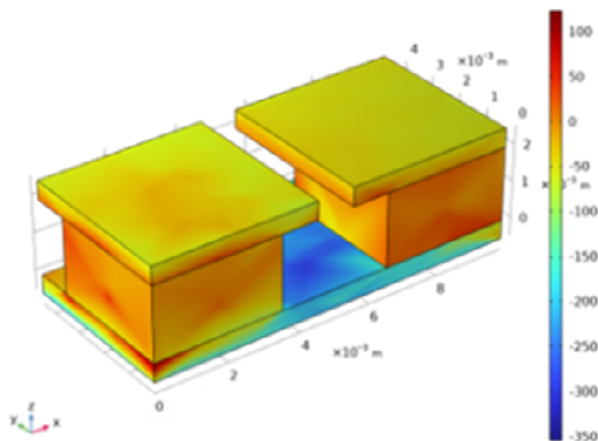


Figure 3: Von Mises stresses at operating temperatures in a unicouple.

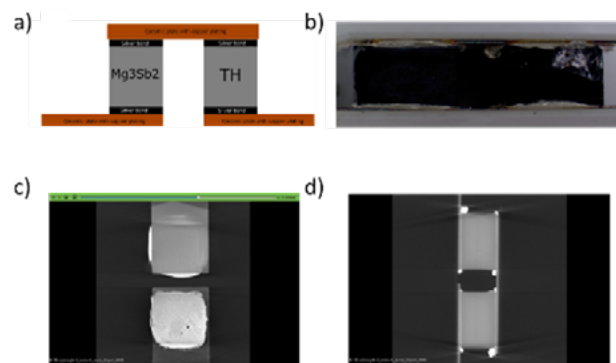


Figure 4: Analysis of fabricated unicouples.

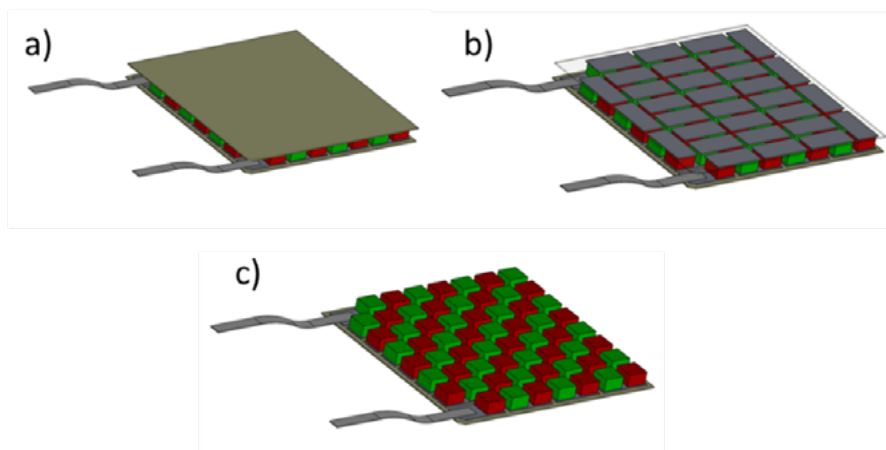


Figure 5: Design of the TE modules with optimised fill factor.

NEWS FROM WORK PACKAGE 7 “Long-term viability, scalability, and sustainability of the project outcomes”

In WP7 Innovation and exploitation strategy, parallel activities are running that aim to ensure the long-term viability, scalability, and sustainability of the project outcomes by developing robust business models, market pathways, and ecosystem-building strategies. Activities span foresight exercises, economic analysis, commercialization planning, and sustainability action design.

Since our last news communication, foresight activities continued for the development of a flexible, scalable and adaptable business case design for the START value chain by studying and summarizing the outcomes of focus group sessions, the results of the Delphi Survey as well as the outcomes of individual interviews performed with the involvement of thermoelectric experts and stakeholders. Study results and conclusions were communicated in a report (D7.1).

Furthermore, the development of the START Serious Game is in progress: the concept of the educational game, entitled “Energy from Waste Heat”, to support knowledge transfer on TE technology, sustainability of raw materials and circularity was finalised, and collaborative workshops were held for defining and testing the gameplay and its content that is now being consolidated for programming (see [Figure 8](#)).

Another key task on assessing START’s industrial viability and economics has been completed with comprehensive assessment of macro- and microeconomic analyses. The general START value chain was tested against two business cases: the START μ CHP-TEG System and the START Flex-TEG-Solar System, both focusing on enhanced energy efficiency. The findings are detailed in deliverable D7.3, that presents business modelling and decision-making tools designed to guide and support future viability assessment and sustainable strategies.

Ongoing activities entail the preparation of the START Innovation Agenda & Roadmap that builds on the results generated in completed tasks, including outcomes of technology development, foresight exercises and on activities completed on START’s industrial viability and economics assessment.

Major efforts are laid on work associated to the sustainability and deployment of the START project and its outcomes. These include the creation of the START Service Company and the elaboration of its business plan, aiming for a long lasting and viable organization that supports START consortium members in their work in relation to sustainable thermoelectrics as well as for the maintenance and evolvement of the START ecosystem. Based on the outcomes of the Lean Canvas business modelling workshop and on outcomes of discussions with all the partners, the business model and detailed business plan is under further elaboration with the overall aim of establishing the company in 2025. Strategy outlines on sustaining the project impact beyond the EC funded period are reflected in a (confidential) deliverable report (D7.5).

START passes the second project review!

The end of January marked the end of our so-called second Reporting Period. In fact, for those who are not into the formalities of a Horizon Europe project, the grant from the funding agency is split into several instalments, and during the project these are distributed to partners after the agency has successfully reviewed the activity carried out and the costs sustained and reported in each finished period. This review starts when periods end, so in February-March the consortium prepared a technical report and financial statements, that HaDEA, our funding agency, analysed, asking for clarifications where needed. There was also a Project Review Meeting with the Officer and the Expert that are following our project. At the end of all this, the quality of the work done was deemed in line with the expectations, and the project was cleared to receive the payment of the second wave of funding (actually, the third including the advance payment).

Another step towards the successful completion of our ambitious programme!

START Annual Assembly in Alkmaar and Broek op Langedijk, 17-18 June 2025

On 17-18 June, the whole START consortium met in the Netherlands to begin its fourth and last year of activity. The meeting was hosted by our Dutch industrial partner RGS Development partly in Alkmaar at The Eendracht and partly at its premises in Broek op Langedijk.

Like for the previous meetings, it was the occasion to review the work done, analyse the activities needed from now to the end and plan how to implement them. This latter aspect is now even more important as the time left to complete the programme is limited. But we are on the good path and results have been flowing in and we are totally positive about the future months.

We also tested our Serious Game on sustainable thermoelectrics, that will be available soon!

On the second day, the group had the chance to visit the RGS plants, where they produce the thermoelectric semiconductors for their devices, and where they are also now fabricating devices out of the START tetrahedrite-based solution. Find more on RGS Development in the interview to Maarten den Heijer on [page 21](#).

Needless to say, the group also enjoyed the social part, the dinner in The Eendracht, benefiting of a really warm Dutch evening, and the historic city of Alkmaar!



Figure 6: The START consortium members grouped in the garden of The Eendracht, in Alkmaar.



Figure 7: The consortium brainstorming about the roadmap to a successful thermoelectric ecosystem.



Figure 8: The START consortium members testing the START Serious Game!

A Resounding Success: "Supporting the Critical Raw Materials Act" START Clustering Workshop at Raw Materials Week 2024, Brussels (Belgium), 10th December 2024

On 10 December 2024, the Hitchcock Auditorium of the Hotel Marivaux in Brussels buzzed with activity as approximately 50 engaged participants gathered for our pivotal workshop, "Supporting the Critical Raw Materials Act: Research Projects in the European Union." This highly anticipated event, as previously communicated and prominently featured on the official Raw Materials Week (RMW) website, served as a designated side event to the main conference. The RMW itself drew an impressive attendance of roughly a thousand participants to the nearby Hotel La Plaza, underscoring the growing global focus on raw materials. You can revisit the full RMW program and other side events on the official RMW website¹.

The workshop commenced with a concise yet impactful introduction from one of the European Health and Digital Executive Agency (HaDEA) officers, setting the stage for the insightful presentations to follow. Eight distinguished speakers, representing diverse EU-funded projects, then took the floor:

- **START:** "Transforming mine wastes into valuable products – the thermoelectric example", Filipe Neves (LNEG Laboratório Nacional de Energia e Geologia)
- **GSEU:** "The need of pan-European Geological Data to exploit European CRMs", Francesco Pizzocolo (GSEU The Geological Service for Europe)
- **FutuRAM:** "FUTURAM project – Future Availability of Secondary Raw Materials", Gorazd Žibret, (Geological Survey of Slovenia)
- **CRM Geothermal:** "Raw materials from geothermal fluids: Occurrence, enrichment, extraction". Katrin Kieling (Helmholtz-Centre Potsdam - GFZ German Research Centre for Geosciences)
- **CIRAN:** "Bridging technological advances and societal expectations", Eberhard Falck (INTRAW International Raw Materials Observatory)
- **SUPREEMO:** "Developing a value chain for high strength magnet based on European rare earth minerals", Arne Petter Ratvik (SINTEF)
- **REESOURCE:** "Unlocking the Supply of Rare Earth Elements in Europe Through Responsible, Sustainable and Decarbonised Innovative Technologies". Carlos Escudero (IFE Institute for Energy Technology)

- **REPTiS:** "REPTiS: sustainable Ti alloy powder supply chain from Ukraine to meet the EU demand for CRMs", Artem Yarovinski (VELTA LLC)

Each speaker offered a unique perspective on the critical raw materials challenges their respective consortia are actively addressing. Their presentations highlighted how their groundbreaking work aims to dismantle existing hurdles and propose innovative solutions to the multifaceted issues currently confronting European industry and society. These projects are at the forefront of the EU's commitment to securing a sustainable and resilient raw materials supply, a goal deeply embedded within the Critical Raw Materials Act. For further details on the Critical Raw Materials Act and its implications, we encourage you to explore the European Commission's dedicated pages².

Following two hours of compelling presentations, the workshop seamlessly transitioned into a dynamic round table discussion, expertly moderated by our esteemed colleague, Thomas Unterweissacher of GEO Unterweissacher. This session fostered a vibrant exchange of ideas, delving into numerous topics in detail and allowing for a deeper exploration of the challenges and opportunities presented throughout the day. If a defect must be found, we discussed so much that we ran out of time and the time originally planned for networking at the end got eaten up completely!

The workshop proved to be an invaluable platform, fostering crucial connections between projects that possess significant potential for clustering. This synergy is vital not only for enhancing communication and dissemination efforts but also, crucially, for facilitating the sharing of technical solutions. By creating a unified "critical mass," these projects can amplify their collective voice, advocating for necessary support and strategic guidance from European institutions to truly advance the objectives of the Critical Raw Materials Act. We anticipate that this collaborative spirit will lead to even greater impacts in the pursuit of raw material security for Europe.



Figure 9: The presentation of SUPREEMO given by A.P. Ratvik of SINTEF.



Figure 10: The presentation of REPTIS given by A. Yarovsky of Velta.



Figure 11: The presentation of REESOURCE given by C. Escudero of IFE.



Figure 12: The presentation of CIRAN given by E. Falck of INTRAW.

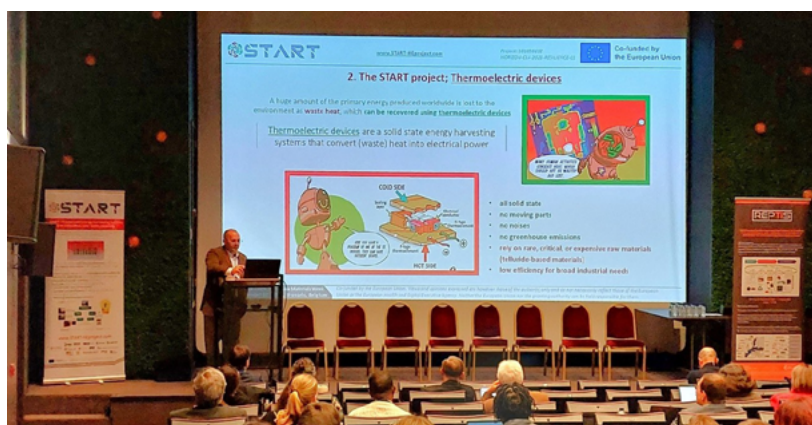


Figure 13: The presentation of START given by F. Neves of LNEG.



Figure 14: The presentation of GSEU given by F. Pizzocolo of Geological Service for Europe.



Figure 15: The presentation of CRM Geothermal given by K. Kieling of Helmholtz-Centre Potsdam.



Figure 16: The presentation of FutuRaM given by G. Žibret of the Geological Survey of Slovenia.



Figure 17: The panellists of the final round table moderated by T. Unterweissacher of GEO Unterweissacher.

A COST Action on Thermoelectrics has been approved: Welcome SUSTENET!

We are particularly happy as the main proposer is our coordinator, F. Neves! The idea of submitting the proposal came from discussions within the consortium, and many of the participants come from START and the clustering projects and initiatives!

Aligned with the European Green Deal and the EU Action Plans on Critical Raw Materials and the Circular Economy, SUSTENET will address key challenges in the thermoelectric field, including materials availability, system integration, and industrial scalability. The Action will:

- Promote interdisciplinary research and collaboration
- Engage industry to strengthen the TE value chain
- Support environmental impact assessments and sustainability
- Foster knowledge exchange and research excellence
- Provide training and career development opportunities through workshops, seminars, and schools



SUSTENET is open to participation. Researchers, innovators, and industry stakeholders from Europe and beyond are warmly invited to join the network and contribute to shaping the future of sustainable energy technologies. For more information and to get involved, follow this link to Action CA24120 - COST.

START on the December 2024 issue of the journal “CSIC investiga”

The December 2024 issue of the CSIC journal was a special issue dedicated to critical minerals³. The cover image of the whole issue is a tetrahedrite rock, and an article was dedicated to the START project: “Tetrahedrite, a key mineral for energy efficiency” (pages 22-24), describing START and IGME’s activities in the project.



Figure 18: The first pages of the article on START and tetrahedrite published on the journal “CSIC investiga”.

START presentation at “Expominerales Madrid”

Expominerales Madrid 2025, held from 7-9 March 2025, is a highly anticipated Earth materials fair in Madrid. The event, hosted by ETSIME-UPM, showcased a diverse collection of minerals, fossils, gemstones, and meteorites from around the globe, presented by international dealers. It served as a key gathering for collectors, enthusiasts, and various groups, with free admission for all. The fair's 44th edition provided an engaging and educational experience, particularly for children and young people, allowing them to explore Earth's history through its fascinating natural treasures. At Expominerales 2025, E. Boixereu of IGME gave a lecture (in Spanish) whose translated title is “Tetrahedrite: a mineral for the energy transition The START project”.



Figure 19: The announcement poster for E. Boixereu's presentation at Expominerales Madrid.

START webinar #6

On 18th March 2025 we ran another free webinar, where we put together three presentations that covered the theme “Innovative TE devices from EU Research and Innovation”. The speakers were our two partners that are already producers of thermoelectric devices, RGS Development and TEGnology, and K. Nielsch, coordinator of the THERMOS project, that is now reaching its completion.

This was the full agenda of the webinar:

Webinar “Innovative TE devices from EU Research and Innovation” – Tuesday, March 18th (14:00 - 15:50 CET)

- **14:00:** Bruno Vicenzi (European Powder Metallurgy Association) and Filipe Neves (LNEG) - Welcome and introduction
- **14:05:** Hao Yin (TEGnology / START and THERMOS projects): "Thermoelectric energy harvesting, from Materials to Applications"
- **14:35:** Aniruddha Ray (RGS Development / START project): "Thermoelectric Modules and Applications: An Industrial Perspective"
- **15:05:** Kornelius Nielsch (IFW Dresden / THERMOS project): "Durable and sustainable thermoelectric devices made from magnesium-antimony alloys"
- **15:35:** Further Q&A

We had about 40 participants in the session. The footage of the webinar is available on our YouTube channel, here.

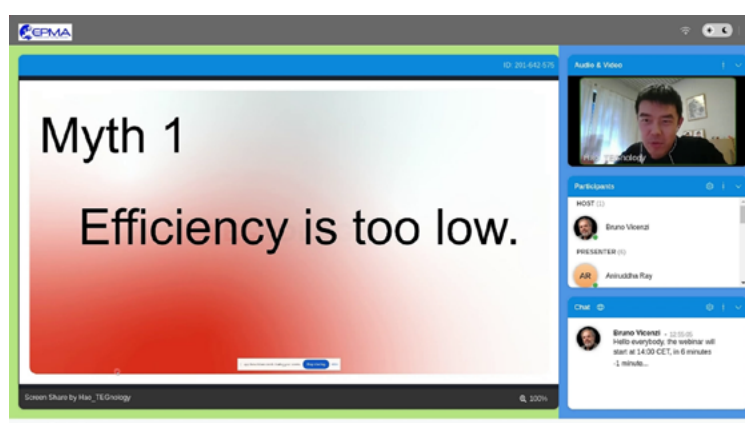


Figure 20: A screenshot from the 6th webinar footage.

START on the “El Heraldo de Aragón”

On 19 March 2025, the Spanish local newspaper “El Heraldo de Aragón” published an interview with our colleagues of IGME-CSIC. The article (in Spanish), describes the idea of the project, especially referring to a local mine, that was one of the seven that the project analysed in Spain to look for tetrahedrite deposits and their quality.

Heraldo de Aragón | Miércoles 19 de marzo de 2025

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TERUEL

Una mina de Torres, elegida para investigar el uso de nuevos materiales en el ahorro energético

● Es un proyecto europeo con participación española que persigue recuperar minerales de escombreras para fabricar dispositivos que transformen en electricidad el calor residual de los procesos industriales

TERUEL. Una antigua mina de cobre de Torres de Albarracín, ya abandonada, ha sido seleccionada junto a otros seis yacimientos repartidos por toda la península ibérica para llevar a cabo una investigación sobre la utilidad de nuevas materias primas en la consecución de un mayor ahorro energético. Los otros enclaves están en Asturias, León, Cuenca, Granada y Huelva.

Se trata de un proyecto europeo en el que participa el Instituto Geológico y Minero de España (IGME) en colaboración con el Consejo Superior de Investigaciones Científicas y que persigue obtener de las escombreras minerales de desecho que, por sus cualidades termoelectricas, sirvan para fabricar dispositivos capaces de convertir en electricidad el calor residual de procesos industriales.

En los siete yacimientos elegidos se buscan, en concreto, distintos tipos de tetrahedrita -un mineral del grupo de los sulfuros- con el objetivo de encontrar el más idóneo para la elaboración de los dispositivos mencionados. Estos instrumentos ya existen, pero se elaboran con telurio, un elemento químico muy escaso, muy caro y en ocasiones tóxico.



El científico Ramón Jiménez, en la mina de Torres de Albarracín. IZAR

Así lo explica el científico Ramón Jiménez Martínez, quien junto con las investigadoras Ester Boixereu y Paula Adánez -todos ellos del IGME- visitó el año pasado la mina de Torres de Albarracín, bautizada como Santísima Trinidad, para recoger muestras de tetrahedritas. También forman parte del equipo de trabajo las geólogas Concepción Fernández-Leyva y Dulce Gómez-Limón.

Desde el siglo XVII

Hay referencias de las minas de Torres de Albarracín desde la primera mitad del siglo XVII, no solo para la obtención de cobre, sino también de plata. El yacimiento, a unos dos kilómetros hacia el noroeste de la localidad, se explotó hasta mediados del siglo XIX mediante varias galerías de interior, para quedar después abandonada, relata Jiménez Martínez.

El aprovechamiento de minerales de desecho presentes en las escombreras abre la puerta a una futura restauración ambiental de estos vertederos, cuyos residuos pueden ser contaminantes si llegan a producir drenajes ácidos debido a la lluvia y al paso del tiempo. «La utilización de estos materiales termoelectricos resta peligrosidad a las escombreras y

contribuye a generar economía, por lo que hablamos de dos beneficios», destaca Ramón Jiménez Martínez.

El científico añade que una tercera ventaja del proceso de utilización de las tetrahedritas para convertir en electricidad el calor residual de procesos industriales es el ahorro energético que permitirían los dispositivos fabricados con ellas y la consiguiente reducción de las emisiones de gas CO₂ a la atmósfera por una menor combustión en las fábricas.

En la mina Santísima Trinidad de Torres de Albarracín la tetrahedrita aparece unida a la siderita -otro mineral- lo que ha llevado a conseguir, ya en el laboratorio, una buena metodología, mediante un imán permanente, para separar ambos materiales.

El proyecto, que recibe el nombre de Start, cuenta con una dotación de 9,5 millones de euros. Además del IGME, participan otras 15 instituciones de una decena de países de la Unión Europea y Noruega. Inicialmente se obtuvo un listado de 250 yacimientos con tetrahedrita en minas abandonadas en España, hasta que finalmente se seleccionaron siete como los más favorables para su estudio.

M.ª ÁNGELES MORENO

Figure 21: The article published on 19th March 2025 on the newspaper “El Heraldo De Aragón”.

START presentation at the “Semiconductor Materials Working Group” of Fundación COTEC

COTEC is a Spanish non-profit foundation dedicated to promoting innovation for economic and social progress. Established in 1990, it acts as an R&D&I observatory and provides innovation-related analysis and advice to Spanish companies. On 29 April 2025, within COTEC “Semiconductor Materials Working Group”, E. Boixereu gave a presentation titled “Raw materials for the semi-conductor sector: the START project”.

START presentations at the “Materials 2025”, Lisbon 1-3 July 2025, and NOVA University

P. Carvalho and C. Quiterio of SINTEF participated in the Materiais 2025 conference held in Lisbon from 1-3 July 2025. Patricia delivered an invited talk at the Energy Materials session entitled ‘Mineral tetrahedrites as the next commercial thermoelectric materials’, describing the synthesis and characterization results obtained in START thus far (Figure 22). Catarina presented a poster entitled ‘Enhancing Stability and Thermoelectric Performance of Tetrahedrites via Cu Substitution’ at the same session (Figure 23). On 4 July, Patricia gave a seminar with the same title at CENIMAT at the NOVA University in Costa da Caparica in Portugal (Figure 24).



Figure 22: Patricia Carvalho presenting START's results at the Materials 2025 conference (invited talk).

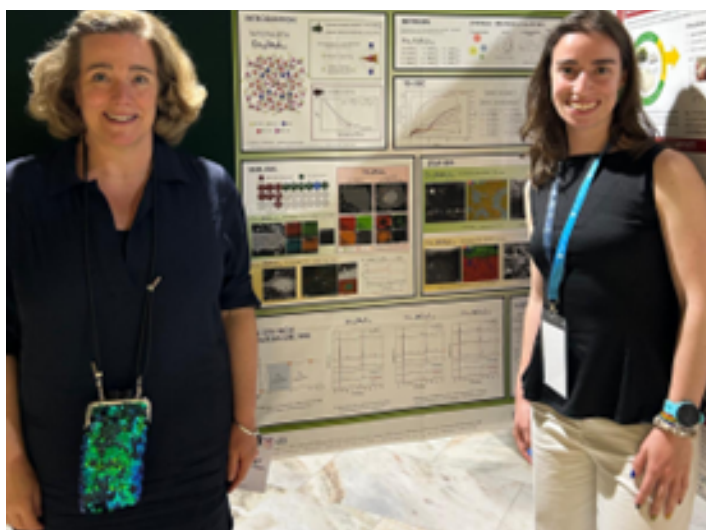


Figure 23: Catarina Quiterio and Patricia Carvalho by START's poster in Materials 2025.



Figure 24: Patricia Carvalho presenting results of START at CENIMAT NOVA University.

START talks in Spanish secondary schools

START also addressed lower-level education in the last months, to extend the awareness about our sustainable ideas for recovering mine wastes and heat waste. E. Boixereu of IGME had the chance of speaking in two different Spanish secondary schools in Madrid, on the topic (given in Spanish) “Mineral resources for the energy transition: the START Project”:

- on 14/02/2025 at the IES Blanca Fernandez Ochoa (Madrid)
- on 06/05/2025 at the IES Isidra de Guzmán (Alcalá de Henares, Madrid).

START at the Iberian Thermoelectric Workshop 2025

On 22-23 May 2025 the 4th edition of the Iberian Thermoelectric Workshop 2025, organised by TESLab and the University Jaume I and held in Castelló de la Plana (Spain), collected 33 participants and it hosted several presentations, including that by our coordinator F. Neves, on the topic “From mining waste to waste heat recovery materials: a sustainable transformation”, as an invited speaker in the session on Materials.



Figure 25: The group of participants in the 2025 edition of the ITW in Castelló de la Plana (Spain).

A START paper published on the journal “Minerals”

In early July, a paper titled "Recovery of Tetrahedrite from Mining Waste in Spain" was published on the Journal “Minerals”⁴ as part of the Special Issue “Critical Minerals for Energy Transition: Advancing Energy Security and Sustainable Manufacturing”⁵.

This work was prepared by Ester Boixereu-Vila, Paula Adánez-Sanjuán, Ramón Jiménez-Martínez and Concepción Fernández-Leyva (IGME-CSIC), and Dulce Gómez-Limón (Universidad Politécnica de Madrid). It is available online at the links of the MDPI website given in the footnotes, on our website⁶ and in our Zenodo repository community⁷.

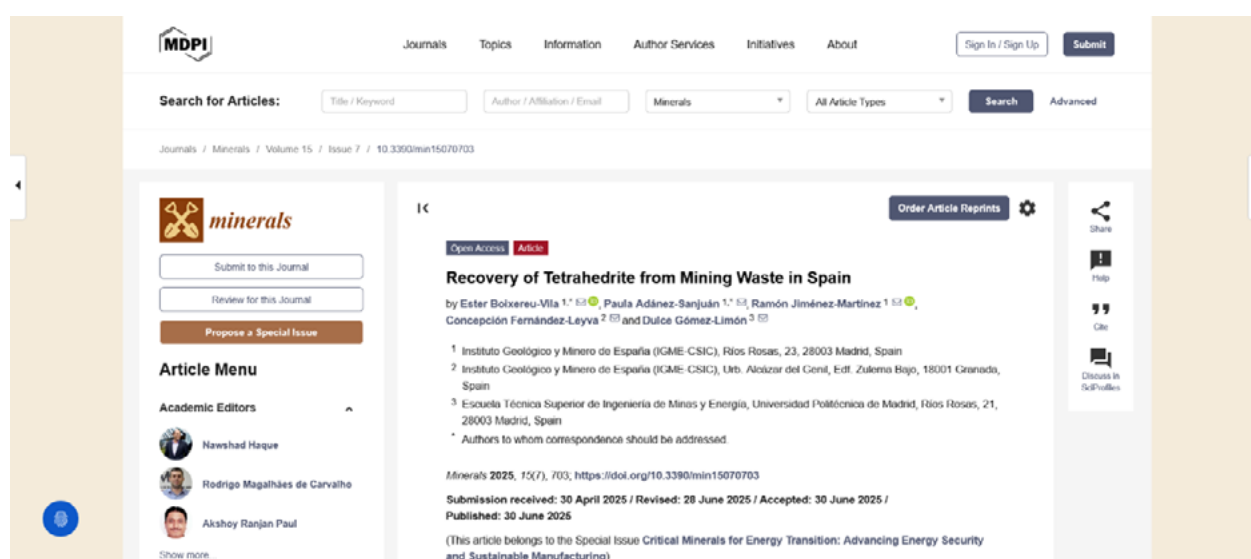


Figure 26: The paper published on “Minerals” in July 2025.

Other START dissemination events

XXX Ordinary General Assembly of ASGMI

April 2025. Cuzco, Perú

The XXX Ordinary General Assembly of ASGMI took place in April 2025 in Cuzco, Perú. The event was attended by more than 50 people, Directors of the Geological Surveys from different Ibero-American countries, as well as invited experts from the Geological Survey of Canada and the United States. During the event, a technical workshop was held in which the topic “The Role of Geological Services in Resource Management: Communication Strategies for Public Policy Decision-Making” was discussed. In this context, a presentation was also made about the activities of ASGMI's Expert Groups, ASGMI's participation in European projects, and a presentation of the START project.



Figure 27: The group of delegates at the ASGMI General Assembly.

Mercosur

The Ibero-American Association of Geological and Mining Surveys (ASGMI) actively participated in the GeoMinE 2025 event and the First Geology and Mining Conference of MERCOSUR, held from 2-6 June in Foz de Iguaçu, Brazil. The event gathered representatives from governments, scientific institutions, international organizations, and the private sector to discuss current and future challenges in the fields of geology and mining across the region.

ASGMI Secretary General, Gracia Olivenza Jiménez, took part in Panel III: Critical Minerals, Energy Transition, and Sustainability, alongside leading authorities from ASGMI member Geological Surveys. In her presentation titled “ASGMI: international cooperation for the generation of geoscientific knowledge and data that contribute to sustainable development”, she introduced several of ASGMI's current initiatives, including the START project.

The START project was highlighted as a key example of how ASGMI contributes to international cooperation and supports the circular economy through the reuse

of secondary raw materials in the context of the energy transition. ASGMI's participation in this high-level forum helped to reinforce the project's visibility and to expand collaboration networks with institutions sharing common goals around sustainability and resource security.



Figure 28: The Panel on Critical Minerals, Energy Transition, and Sustainability at the Mercosur conference.

EnSMiRT

In June, ASGMI has been invited to participate in the first in-person workshop of the EnSMiRT project (“European Network for Sustainable Mining Research and Transfer”), a new initiative funded by Una Europa that aims to establish a dedicated research group within the Una Europa alliance. EnSMiRT focuses on sustainable mineral production and ecosystem restoration during and after mining activities, with the participation of institutions such as the

Complutense University of Madrid, KU Leuven, University of Bologna, and Leiden University. During this event, ASGMI will have the opportunity to deliver a presentation on its mission and role in promoting sustainable mining practices and supporting the energy transition. The presentation will also include an overview of the START project, highlighting its contribution to secondary raw materials recovery.

Future events

START is organizing its participation in several more events in the next months.

European Conference on Thermoelectrics 2025: See dedicated chapter below.

Euro PM2025: The yearly European congress and exhibition on powder metallurgy, Glasgow, 14-17 September 2025. As usual, START will have a booth to advertise its thermoelectric solutions to PM companies. This year, EPMA, who is also our Dissemination and Communication leader, has decided to host several sessions related to Critical Raw Materials, and in addition to what is prepared inside the conference, the project RESQTOOL⁸ (EPMA coordinates it) and the project BLOOM⁹ are organising together a connected workshop on CRMs. This is the full list of activities, where START will be involved with its coordinator F. Neves as speaker and panellist:

- Sunday 14 September, 09:00-15:00, Crowne Plaza Hotel, Glasgow: **"RESQTOOL/BLOOM Clustering Workshop: "Primary and Secondary Raw Materials: how can Europe reduce scarcity risks and boost the Green Transition"**. Three blocks: "scenario" presentations from invited speakers, R&I pitches on current activities, round table on "CRM Act and 2030: where are we?", moderated

by M. Komac of INTRAW. The workshop requires a registration (see the RESQTOOL website for details) and includes refreshments and lunch.

- Monday 15 September, 13:45-15:15, inside the Euro PM2025 Exhibition (entrance free of charge): **"Critical Raw Materials Corner"** - pitches by projects and stakeholders involved in CRMs, organised by the REPTiS¹⁰ project.
- Monday 15 September, 16:00-17:30, **Special Interest Seminar Round Table "PM and Critical Raw Materials: Issues and Opportunities"**, organised by the REPTiS project, moderated by E. Koumoulos (IRES and REPTiS project). Participation is subject to registration (with fees) to the Euro PM2025 Congress¹¹.

Raw Materials Week 2025: 17-21 November 2025, Brussels. START will be participating in the event, and has also been invited to a Side Event organised by the project REESOURCE on the morning of Friday 21 November. Details will follow soon.

More events might see START participating in addition to these, and we will inform you in due time.

If you are from a similar initiative or project and would like to organise something together, please contact us!

Register for the ECT2025 and join our workshop!



Our project has the ambition of being the initiator of a sound and effective supply chain for thermoelectrics in Europe. This means not only providing the solutions in

terms of more available and sustainable materials and bringing them to the industrial level, but also helping the restructuring of the EU thermoelectric industry and make it more visible for the potential end users. We already organised a workshop in Copenhagen in September 2024, and this year we want to continue, this time pushing for more cohesion between the academic research and the European industry on the topic. To achieve this, we have agreed with the organisers of the ECT 2025, the 21st European Conference on Thermoelectrics¹², that is organised in Nancy (France) from Monday-Friday 8-12 September 2025, that one special session will be dedicated to a workshop that we have titled **"How to take TE to the market by academia-industry collaboration?"**.

The session will be on Tuesday afternoon, 15:15 to 17:00, with seven short speeches, and a final round table. The speakers and presentation titles will be (not necessarily in this order):

- **Hao Yin:** TEGnology ApS / Needs and Challenges in Reshaping TEG Supply-Chain in EU

- **Aniruddha Ray:** RGS Development / Thermoelectric Modules and Applications: An Industrial Perspective
- **Kornelius Nielsch:** IFW Dresden / Durable and sustainable thermoelectric devices made from zinc- and magnesium-antimony alloys
- **Vicente Pacheco:** Fraunhofer IFAM Dresden / Towards industrial production of high-temperature thermoelectric modules
- **Frédéric Lani:** Thermopowersystems / How to Successfully Transfer Thermoelectric Technology from Academia to Industry? The Case of Thermo Power Systems.

Coffee break

- **Filipe Neves:** LNEG / Driving thermoelectric innovation through research-industry collaboration
- **Marisol Martin Gonzalez:** CSIC / Bridging Nanoscale Thermoelectrics and Triboelectrics: From Lab-Scale Innovations to Prototypes

The full details of the programme can be found in the ECT2025 website. More details could be available later on our website.

If you are taking part in the ECT, you will also see a booth as START will be exhibiting there.

Participation is clearly subject to registration to the conference, with fees: again, all details on this are in the ECT2025 website.

See you all there!

TECHNICAL PILLS

Some useful information that covers topics that are linked to our project! In this issue, our colleagues L. Lopes, E. Karácsonyi of LPRC are explaining us what the main outcomes of the Foresight Exercise are.

Foresight recommendations/updates

Foresight is the analysis of possible future scenarios and the planning of actions based on the acquired knowledge. In foresight, several methodologies are implemented aiming at supporting stakeholders in making decisions, having considered future possibilities and outcomes. Furthermore, foresight provides unique intelligence through awareness of other people's visions and opinions about the future, sensemaking of new ideas, and shared visions of challenges and opportunities facilitating consensus and agreement.

In the START project, foresight-based exercises were realised with the support of internal and external project experts from the fields of thermoelectrics, raw materials, materials processing and sustainability. The START value chains built around the use of tetrahedrite-based thermoelectric devices are quite new and unique, they are not fully established yet and important decisions still need to be made and put into practice to bring the value chains closer to the market. And that is where foresight can help with: by providing a possible outlook of the future together with recommendations and ways to maintain the value chains in shape.

The general START value chain looks like shown in **Figure 29**.

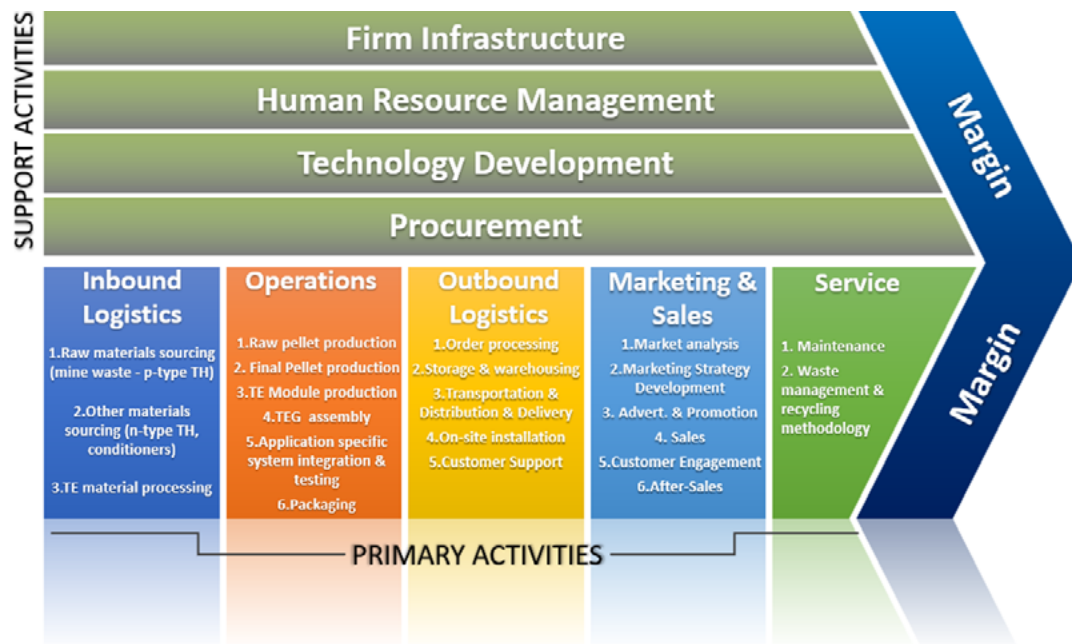


Figure 29: General START value chain.

The foresight methodology followed an iterative approach. First, a round of desk research was performed for establishing the past and current status of thermoelectric energy as well as future plans for this specific type of energy conversion technology. With this data, two exercises were prepared: Focus Groups and Delphi Survey. These exercises are built with questions and statements that the experts need to provide their answers to. Qualitative and quantitative data was collected, then reshaped into several results.

Recommendations for the future implementation of START-based value chains were identified for several value chain stages and sub-stages:

Inbound logistics

- **Material Diversity:** While tetrahedrites are promising for low to mid-temperature applications, exploring other materials could improve cost/value outputs. Flexible compositions and different source materials should be considered.
- **N-Type Materials:** Addressing the bottleneck of n-type materials by exploring alternative approaches

within the tetrahedrite group or other minerals with similar properties.

- **Supply Chain Security:** Secure a consistent supply of quality tetrahedrites from multiple mine sites with uniform properties and in necessary quantities. Ensure these materials can be processed under similar conditions.
- **Fabrication Protocols:** Develop and implement sustainable and effective fabrication protocols, such as bottom-up chemical synthesis.
- **Synthetic Tetrahedrite:** Consider using synthetic tetrahedrite beside natural tetrahedrite.
- **High zT Materials:** Invest in high zT materials alongside tetrahedrite-based TE value chains to enhance resilience and address poor power performance challenges.
- **Engineering Challenges:** Study and resolve less common engineering and material challenges, including contact resistance and temperature gradient stability.
- **Material Research:** Continue studying different materials to identify efficient options for low and medium temperature ranges.

Operations

- **Reliability and Assembly:** Prioritize the development of TE materials and devices that can withstand demanding conditions, including temperature gradients, humidity, vibration, and temperature cycles. Ensure easy assembly into large-scale TEG tiles for various applications.
- **Purposeful Design:** Adapt TE device designs to specific applications. Explore different configurations and architectures to optimize performance.
- **Physics-Guided Co-Design:** Utilize physics-guided device co-design (considering heat transfer and electrical impedance matching) to guide fabrication and enhance sustainability.
- **Manufacturing Access:** Secure access to rapid and mass manufacturing capabilities, either directly or through third parties.
- **Cost-Effective Processes:** Investigate and adopt cost-effective manufacturing and assembly processes, such as 3D printing.
- **Balancing Reliability and Performance:** Focus on both reliability and performance, with the priority depending on the application. For waste heat conversion, reliability may be more important, while performance may take precedence in high-cost heat scenarios.
- **Performance Evaluation Criteria:** Develop specific criteria for performance evaluation, even if reliability is the primary focus.
- **Thermal Efficiency:** Prioritize thermal efficiency to ensure devices can recover the energy invested in their fabrication.
- **Flexible Design:** Start with a flexible design that can be adjusted for different applications due to the high-power efficiency of thermoelectric technology.
- **Range of TE Devices:** Develop a range of TE devices covering different temperature ranges to address various applications globally.
- **Sustainable Manufacturing:** Invest in device design and sustainable manufacturing practices.
- **Complete TEG Engineering:** Focus on engineering complete TEG systems rather than just TE materials to accelerate the development of reliable harvesters.
- **Reproducibility:** Ensure high reproducibility of devices to maintain consistency and quality.
- **Temperature-Specific Devices:** Recognize that TE devices are dedicated to specific temperature ranges and cannot be optimized for a broad spectrum. Develop multiple TE devices using different materials to cover a wide range of temperatures and applications.
- **Partnerships for System Integration:** Collaborate with partners specializing in system integration to incorporate START devices into end-user applications.
- **In-House Development of Energy Conversion Equipment:** Invest in developing proprietary heat exchangers and other energy conversion equipment to enhance the ecosystem's capabilities.

Outbound logistics, Marketing & Sales, Service

- **Cost Reduction:** Investigate cost reduction at all levels, from materials to application devices.
- **Scaling and Automation:** Pursue large-scale, automated production to reduce labour costs with mass manufacturing after achieving immediate project results.
- **Market Focus:** Target mid-range temperature applications suitable for terrestrial use, map risks of competition from incumbent technologies and Explore markets with high potential, such as remote areas and standalone situations.
- **Awareness and Comparison:** Increase market awareness of TE technology, especially within the industry and Create comparisons between START's TEG and other renewable energy sources.
- **Economic Viability:** Ensure competitive payback times for customers and aim for a TE module price of no more than 1 Euro per 1W of electrical power.
- **Supply Chain and Marketing:** Develop a fully digitized supply chain to automate processes and reduce manual labour, Market TE devices as "set and forget" solutions for easy integration and continuous operation and Target applications outside of niche markets to drive widespread adoption.

These recommendations help to shape the START project and its development towards a sustainable and commercial value chain built around greener thermoelectric devices. The START team would like to thank all experts for their contributions to the foresight exercises.

MEET THE EXPERTS

In this issue we present you one interview, again to a member of the START consortium: it is Maarten den Heijer, of RGS Development (The Netherlands). Read his views on the dynamics in the TE industry in Europe.

Interview with Maarten den Heijer



Figure 30: Maarten den Heijer, of RGS Development (The Netherlands).

Q: Hello Maarten, could you introduce RGS?

A: RGS Development (NL) was founded in 2000 as a spin-off of the Dutch Energy Centre (ECN). The journey began in the field of photovoltaics, focusing on the fabrication of high throughput silicon wafer technology to support the growing demand for solar energy solutions. Following the decline of the PV industry in Europe, we successfully pivoted our expertise, specializing in silicon alloy materials technology for power storage (Li-ion batteries) and power generation (Thermo-electrics). This transition led to the inception of sister company E-Magy (www.e-magy.com) in 2019, specializing in silicon-based batteries. RGS Development continued its efforts on silicon germanium based thermoelectric generators (TEG's) for high temperature applications such as industrial waste heat recovery. Our track record in thermoelectrics brought us into the space sector, culminating in a participation in the Next Generation RTG (Radioisotope Thermoelectric Generator) program in the USA in partnership with Aerojet Rocketdyne. Today, our team of about 20 people continues to build on this foundation, committed to contribute both aerospace and terrestrial applications. We actively participate in the development of power solutions for aerospace applications in USA and Europe, aiming for future lunar or planetary missions. With respect to terrestrial applications, we develop and deploy solutions to promote the green energy transition. We consider ourselves as a small but very efficient team to develop tailored solutions that involve thermoelectric technologies, combined with the highest quality standards. For a company impression, please look at www.rgsdevelopment.nl.

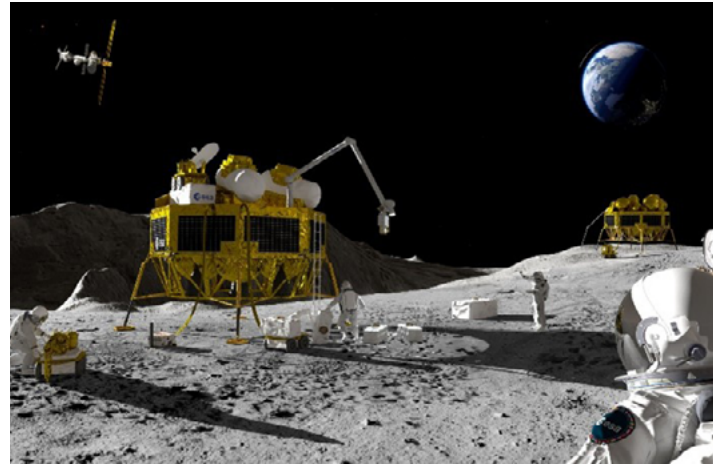


Figure 31: RGS Thermoelectric Materials Partner for NASA's next gen RTG program.

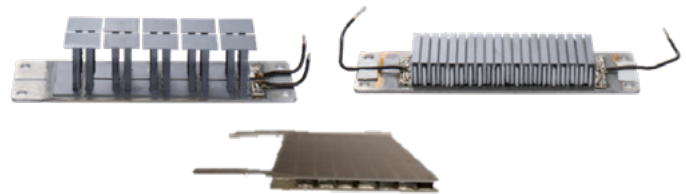


Figure 32: RGS' Thermagy products. Thermagy-Space (upper left), Thermagy-Terrestrial (upper right), START module under development (lower).

Q: How does RGS contribute to the START project?

A: The objective of the START program is to retrieve waste Tetrahedrite mining materials, to process them into thermoelectric pellets, to be assembled into thermoelectric modules. Those modules are intended to be used for waste heat recovery, contributing to the reduction of CO₂ emissions. The project has adopted a dual approach to recycling: repurposing waste from mining operations and recovering lost energy. It's a fantastic goal! Within the program, RGS is responsible for module assembly and testing. This work is driven by a future perspective of deployment into high temperature applications, such as industrial waste heat (e.g. steel and glass industries) and implementation into biofuel heating furnaces - also known as Combined Heat and Power – CHP. RGS activities are to perform simulations for these applications, into appropriate modules designs, fabricate the modules and test the modules according to the boundary conditions as followed from the application simulations. Most of the work is done in our production facility in Broek op Langedijk (near Amsterdam, in the province of Noord Holland).

Q: What is the relevance of TEG technology and how does it align with Europe's broader climate and innovation strategies, such as the Green Deal or Horizon Europe?

A: Thermoelectric heat-to-power or power-to-heat technologies have always been intriguing the scientific and industrial world, because of its obvious advantages of no moving parts, zero maintenance and extremely long endurance. The first and most impressive applications for heat-to-power was the use of TEG's in Radioisotope Power Systems in space, a typical environment where endurance and zero maintenance are key requirements. For power-to-heat the highest number of applications is found in precision cooling, for example in electronics. Both segments still exist and flourish, both are relatively niche applications – neither of them is connected to climate initiative as such. Nevertheless, in the domain of climate, thermoelectric generation supports two core objectives of Europe's climate and innovation agenda: reducing emissions through energy efficiency and advancing strategic technologies. Under the European Green Deal, there's a strong emphasis on cutting industrial energy waste — TEG offers a clean and reliable way to recover heat that would otherwise be lost. It is particularly valuable in high-temperature, hard-to-decarbonize sectors. In Horizon Europe, we see growing interest in TEG as part of a broader move toward autonomous, resilient, and efficient energy systems. This also includes autonomous sensors, and IoT solutions, indirectly contributing to energy system efficiency as well. An overview of these market segments is given in **Figure 33**.

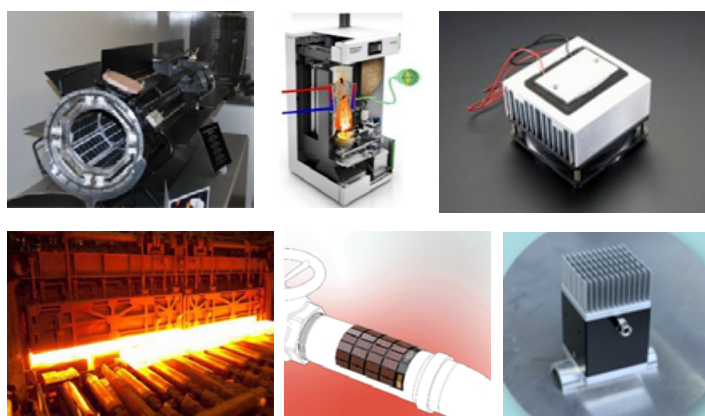


Figure 33: Recognized TEG market segments: Space, microCHP, Cooling, Waste Heat, Sensors (the two bottom left examples are from TEGnology).

At RGS, we're proud to contribute to this through our participation in projects like the START program, but also in STARTREC – led by CEA (FR) (Space, domestic and industrial applications with improved Thermoelectric Components) and BLAZETEC led by CNR (IT) (www.blazetec.eu), where we work alongside European partners to push the boundaries of TEG performance and integration. For example, Blazetec is investigating the combinations of different conversion technologies, with the aim of bringing conversion efficiencies well above current levels - disclosing new applications going forward. Interesting opportunities!

Q: What are the main challenges holding back wider adoption of TEG in Europe, and how can the EU support this?

A: Over the past decades we have seen technology innovation in energy being matured, introduced and scaled, while thermoelectric technologies have struggled. We can safely say that only Bismuth Telluride modules for lower temperatures and for Thermoelectric Cooling succeeded in wide applications, at larger scale and lower costs. Looking backwards, automotive has been the key application for a long time, driving research and research funding for TEG's at the mid temperature range. Still until today, the struggle is to mature solutions at the mid temperature range – also assuming the use of benign and abundantly available materials as a starting point. Therefore, we need to prioritise completing the market readiness of CO₂ friendly generations of TEG's for lower (up to 250°C) and medium (up to 500°C) temperatures up to Technology Readiness Level 6. This includes thorough testing at applications level. Such achievement will drive a market introduction, after which the challenges of cost and scaling will follow. When it comes to cost and scaling, it concerns not only the material (performance thermoelectric materials are often expensive and difficult to source or scale), but the entire value chain up to system integration.

The other main challenge lays in advocating the potential impact of large-scale implementation. Although thermoelectrics will not become a prime renewable technology such as solar, it should be presented as complementary to those, and instrumental for significant CO₂ savings when the "easy" reductions will be realized. While there's funding for clean tech, thermoelectrics often fall outside the spotlight compared to hydrogen or solar. We need more policy framework inclusion, visibility in Horizon Europe projects, and easier pathways for pilot programs. There's real potential here — but it requires cross-sector collaboration, and we're not quite there yet. If we can overcome current barriers, thermoelectrics could become a standard part of the energy efficiency toolkit. I see a future where waste heat recovery isn't a nice-to-have but a must-have – and where TEGs will power sensors, satellites, and even small off-grid systems across Europe. It will take time, but Europe could lead the way with the right focus and investment.

Q: How will the TEG landscape look like 5–10 years from now?

A: Longer term trends are quite difficult to predict. Who could have predicted the boom of electric cars, due to the emission frauds; the green energy accelerations coming from the issues with the Russian natural gas supply predicted the new boost in space, defence and security globally as everyone can see today. Zooming into the energy domain: all of a sudden there is a threat to the energy security of individuals, which adds to the wish to become green. People might have been pushed into buying solar because of subsidies, they might now move to a combination of solar, batteries, thermal storage, or micro-CHP solutions – and move to self-sufficiency across the year – just to be sure. Might industries have hesitated to do green energy investments; they might now move to realign their processes (including waste heat management) due to limitations in their access to utilities and fuels.

To conclude, let's just review two examples:

Domestic renewable energy. As it is a challenge for the grid, states push individuals to be the most independent possible. This can be achieved either by decoupling demand and supply, or by decentralized energy generation. The first will stimulate batterie systems and long term thermal storage technologies. The latter requires local generation of both heat and power for which TEGs are ideal since they generate electricity and evacuate hot water through their cooling systems.

Space or extreme remote. The development of Space activities, and particularly the interest to explore the moon and other celestial bodies like Mars attract more and more

attention. These missions are complex and require the most secure and long-lasting systems. TEGs may be criticized on their efficiency, but their interest is the durability and robustness of the systems. At RGS, we are working on designs to improve the efficiency while maintaining static power generation systems, able to last for decades.

My call to action is to persist. There is no closing window, however we will have to finally reach the initial level of maturity, cost and scale! Let's break the sound barrier.

CONSORTIUM TOUR

We continue our tour of consortium members: in this issue, meet the German Federal Institute for Geosciences and Natural Resources (BGR) and the La Palma Research Centre (LPRC).

Federal Institute for Geosciences and Natural Resources (BGR)



The Federal Institute for Geosciences and Natural Resources (BGR) is the central geoscientific authority providing advice to the German Federal Government in all geo-relevant questions. It is subordinate to the Federal Ministry for Economic Affairs and Energy (BMWE) and its head office is based in Hannover, Germany, with branches in Berlin, Cottbus, and Grubenhagen.

BGR is committed to sustainable use of natural resources and protection of the human habitat. As a neutral institution feeling responsible for the future, BGR advises ministries and the European Community and act as partners in industry and science. The leading motive of its daily work is "Improvement of Living Conditions by Sustainable Use of Geo-Potentials". BGR's work is supported by modern scientific-technical infrastructure.

In the field of raw materials, BGR contributes to securing Germany's sustainable supply of raw materials. Thereto, BGR continuously analyses, forecasts and evaluates global mineral resource potentials and markets for metals, industrial minerals, and non-metals. BGR builds networks for science and development through national and international cooperation. It works at the state level and with the private sector, especially with countries rich in raw materials. BGR has own scientific research of both land-locked resources and those in the marine environment. Furthermore, BGR researches and develops new exploration methods and strategies in the run-up to industrial activities, in particular for high-tech metals, what are known as "critical resources" and specific industrial minerals.

Especially relevant for START is BGR's expertise with German mining residues as well as its strong scientific expertise on the geochemical, mineralogical, and textural characterization of ores and mining residues. It has modern laboratory equipment for all relevant geochemical and mineralogical investigations (e.g. X-Ray Fluorescence (XRF) and X-Ray Diffraction (XRD)), as well as various fast 2D scanning techniques (e.g. μ -XRF) and advanced high-resolution analytical techniques (e.g. scanning electron microscopy with mineral liberation analysis (SEM-MLA), electron probe microanalysis (EPMA)).

In START, BGR is responsible for the selection and investigation of suitable mine waste sites in Germany, subsequent mineral processing of tetrahedrite-containing raw materials, as well as the geochemical and mineralogical characterization of the mining residues and obtained tetrahedrite concentrates. www.bgr.bund.de



Figure 34: Left: BGR headquarters as one of three institutes in the GEOZENTRUM HANNOVER; Right: JEOL XA-8530F Hyperprobe for electron probe microanalysis.

La Palma Research Centre (LPRC)



La Palma Research Centre (LPRC) is an independent, internationally active think-tank headquartered on the island of La Palma, Canary Islands, Spain. The company is a member of the Climate KIC and the EIT RawMaterials communities, working across a range of topics related to geosciences,

environmental and social sciences, the Blue Economy and the European Green Deal. LPRC positions itself as a leader in delivering out of the box solutions for knowledge transfer, innovation diffusion and business development, foresight and policy analysis, social sustainability studies, social media-based marketing, science communication and public engagement. Located in one of Europe's Outermost Regions, one of the main missions' of the company is actively promoting the sustainable progress of the Canary Islands, representing its interests acting not only locally, but also regionally and internationally through international cooperation actions including participation in EU-funded projects such as START.

In the START project, La Palma Research Centre leads Work Package 7 – Innovation and Exploitation strategy and its four tasks, where it is responsible for designing and delivering actions that aim at maintaining the START project's results alive and viable after the funding period (from May 2026 onwards). As part of its work methodology, La Palma Research Centre has performed several activities with the involvement of internal and external experts with the overall aim to exploit the technological potential of the adaptable mineral-derived value chain for novel TE devices based on raw materials that are readily available in Europe.

Since the beginning of START until now, LPRC has developed a foresight exercise for the definition of a flexible, scalable and adaptable business case design for the START value chain, mapped the industrial and economic viability of START's value chains and created a list of sustainability actions to be implemented. Next contributions will deliver an Innovation Agenda and a Roadmap towards commercialization for START results, and the creation of a unique company to maintain the START ecosystem running and growing. www.lapalmacentre.eu

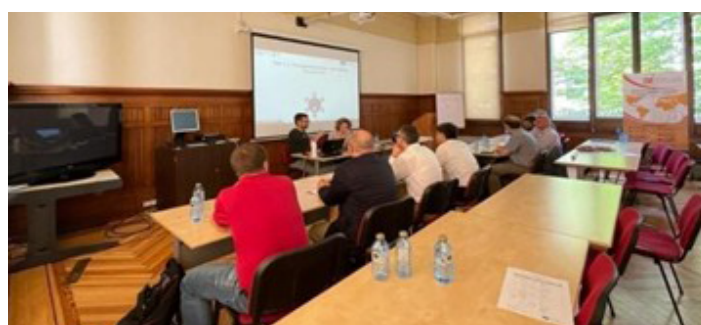


Figure 35: Focus Group 1.



Figure 36: Focus Group 2 (left) and Focus Group 3 (right).

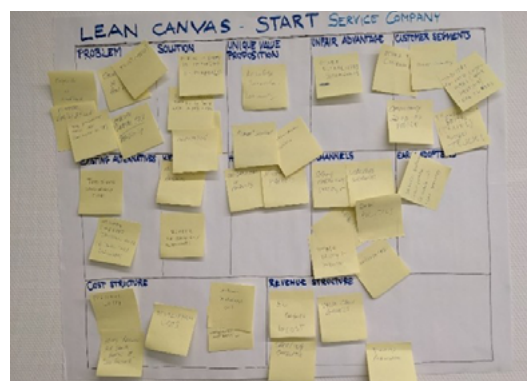


Figure 37: Lean Canvas Business Model exercise for the START Service Company creation.

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10. www.REPTiS.eu
11. www.europm2025.com
12. www.ect2025.com

CONTACTS

START regularly updates its website and social media with news about its activities, but also with more general documents and info on the topics of relevance for the project. Thermoelectricity, waste heat recovery, mine waste remining, sustainability, raw materials and critical raw materials, energy efficiency, and many others.

If you are interested in receiving this newsletter and other special news from the project directly in your mailbox, consider subscribing our mailing list on the website ("Contacts" page, "subscribe" section)! Clicking on the "Subscribe" button, you will fill a form generated by Brevo, our mailing system, and will subsequently receive an E-Mail to confirm your address. Your data will be treated and stored in accordance with the EU GDPR Regulation. And do not forget to follow all our social media accounts! Here is the list of the important links to click to reach our news:

Website: www.start-heproject.com

X: https://twitter.com/START_HEproject

LinkedIn: www.linkedin.com/company/86266991/

Twitch: www.twitch.tv/start_he_project

YouTube: www.youtube.com/channel/UCHVjEhpVz9uaEgzlCj2InPA

SlideShare: <https://es.slideshare.net/StartProject/>

Zenodo: <https://zenodo.org/communities/start-heproject/>

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