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ON THE EFFECTIVENESS OF
DEVELOPMENT PROGRAMS

In production and technology-oriented companies, development programs play a critical role in triggering innovation and transformation. These programs not only accelerate the maturation and commercialization of innovative ideas, but also support transformation and development processes by enabling organizations to adapt to changing market conditions, find solution or co-development partners, access mentoring and consultancy opportunities, and experiment with new technologies and business models. Additionally, they foster an internal culture of innovation by encouraging employees to think creatively and develop new solutions.

One of the key roles of innovation agencies is to design programs—along with diverse and effective intervention tools under these programs—in alignment with their institutional mission and in response to strategically identified needs within the current system.

Development programs are implemented to trigger transformation for the defined target audience in need, accelerate those already in transformation, deepen their scope, and enhance the quality of their progress.

The effectiveness of these programs lies in their ability to achieve predefined objectives, deliver concrete and measurable results, and create long-term value for stakeholders.

Various methods are employed to maintain a high level of effectiveness in programs. At this point, the concept of “additionality” comes into play. In this context, it is useful to examine the core modules of a development-oriented innovation program to enhance the effectiveness of intervention tools.



EVREN BÜKÜLMEZ

TTGV Geliştirme Programları Direktörü

INTRODUCTION



The program cycle consists of five main modules: i. program design, ii. mobilization of a qualified demand side, iii. evaluation and selection, iv. portfolio management, and v. analysis of program impacts. Each module includes a variety of methods, processes, and actions. Enhancing the effectiveness of each planned action directly contributes to increasing the added value generated by the program.

Improving effectiveness is directly proportional to both the **“impact level”** resulting from the specific action and the **“quality of execution”** of that action.

Ideally, the impact achieved through an action should closely align with the objective defined in the program design. During this process, the outcome may sometimes only partially meet the target or, in some cases, significantly exceed it. By analyzing the closeness to the target, we can determine whether the action taken is sufficient, what additional actions might be required, and what external factors are influencing the outcome.

When evaluating the impact of a program action, the levels of impact can be categorized as follows:

Awareness – Strategy – Operation

At the “Awareness” level of impact, the program action enhances stakeholders’ knowledge, understanding, and recognition of key issues. For example, a workshop on climate technologies can help participants become aware of related needs, regulatory requirements, and best practices in the industry.

The “Strategy” level of impact refers to a process in which participants experience long-term benefits and integrate their experiences into institutional strategies.

At the “Operations” level of impact, the program action is intended to lead to tangible, on-site changes in processes, behaviors, or systems. For instance, a manufacturing facility may shift to a highly circular and energy-efficient production system after participating in a program promoting the use of green technologies.

Each level of impact represents a form of engagement, from the stage of information generation to the stage of decision-making.

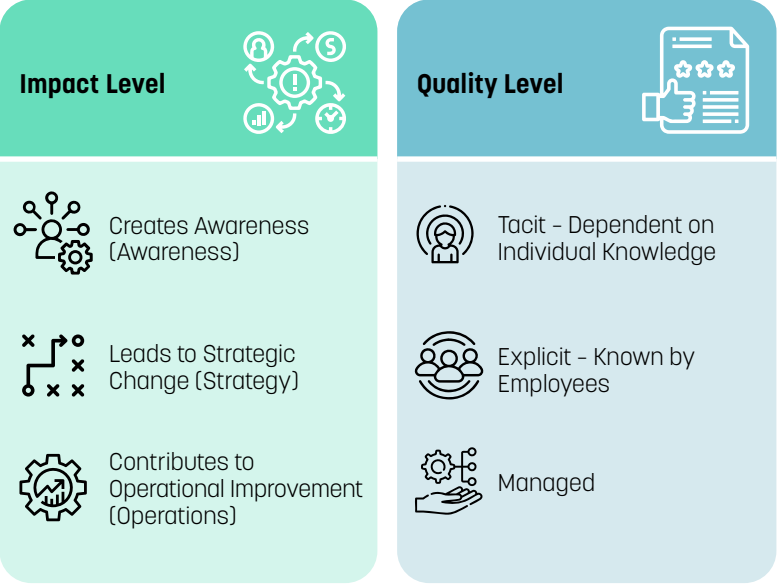
The way an action is executed also indicates its quality. Execution quality is associated with the experience of the internal and external experts and managers involved in the program, as well as the presence of established managerial and methodological processes. The quality level of a task can be categorized as follows:

INTRODUCTION

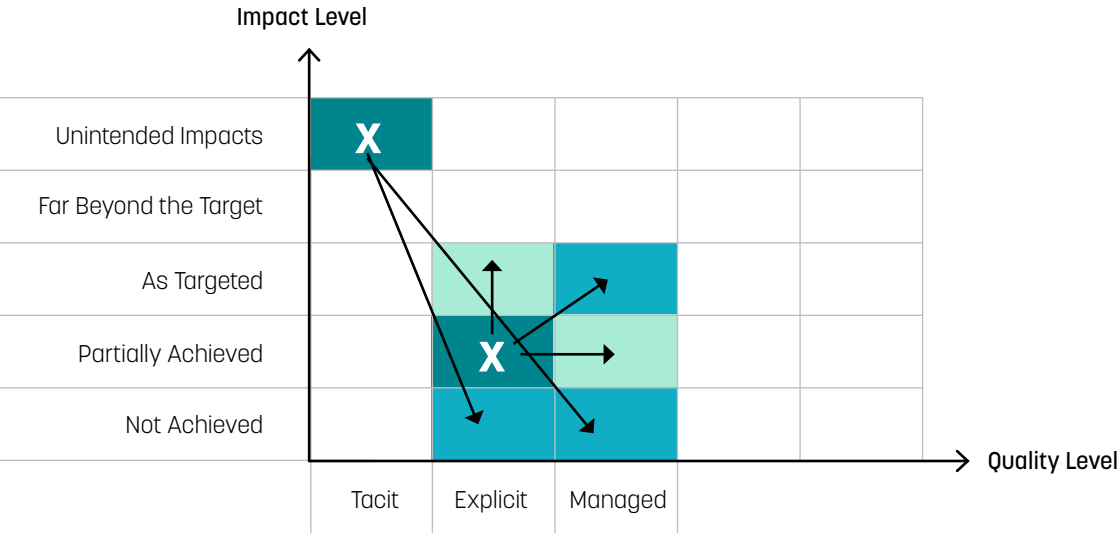
Tacit – Explicit – Managed

The tacit level emerges based on personal experience or intuition. There are no standardized processes; it relies on the skills of individuals. At the explicit level, processes are documented, but they are not systematically controlled. While formal procedures exist, consistency depends on the individuals implementing them. The managed level indicates that processes are systematically controlled, measured, and continuously improved.

The following representation can be used to analyze the “Impact Level” and “Quality Level” dimensions of an action within a program:



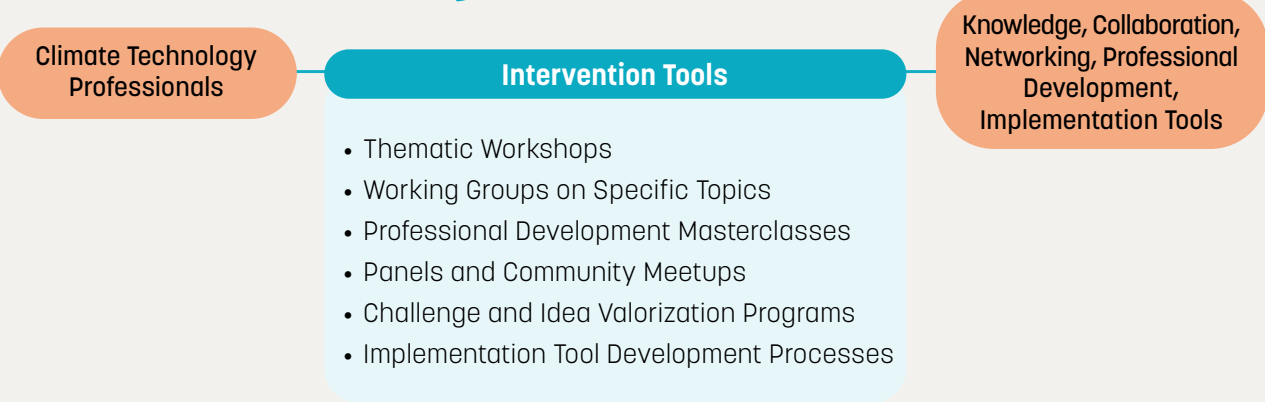
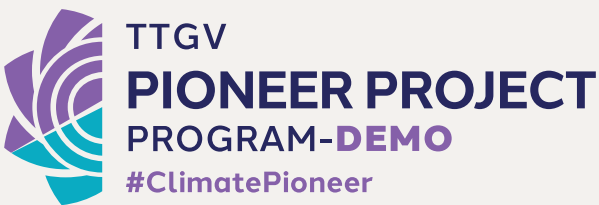
All development and transformation programs become efficient when the actions within their processes are managed at a controlled level. An innovation interface organization must consider both the impact and quality levels at every stage of its program activities.



A Brief Overview of Current Development and Transformation Programs at TTGV

TTGV conducts programs that aim to create additional value by bringing together solution providers and those in need within a defined thematic area, both in its past and current initiatives. Since 2023, in addition to its startup development programs—the Öncül Project Seed and Demo Programs—it has been implementing the Eco-Production Transformation Program, which focuses on the green transformation needs of the industry. TTGV also runs the Climate Lab Community Program, designed to contribute to awareness, professional development, and network-building processes among experts in the field of climate technologies.

The effectiveness of the methodologies and actions implemented during the development processes of the programs will play a key role in achieving successful outcomes.



OUR RECENT REPORTS



Alternative Protein Technologies Deep Dive Analysis Report - Summary

As part of the Pioneer Projects Investment Program, “Alternative Protein Technologies” was selected as the fourth deep dive analysis topic. A comprehensive research effort was conducted between November 2023 and March 2024. Through engagement with nearly 100 industry experts and organizations, the study carried out an extensive examination of alternative proteins, integrating their socio-cultural, ethical, and societal dimensions. This deep dive addressed systemic issues, opportunities, and threats associated with the current global food system, while thoroughly exploring the technological landscape of alternative proteins. In addition to a comparative evaluation of regulatory frameworks and investment trends in both global and Turkish contexts, the study also identified emerging sectoral dynamics and future directions. Based on these findings, strategic recommendations tailored to Türkiye’s ecosystem were proposed, along with potential project scenarios that reflect the transformative potential of alternative protein technologies.



Clean Hydrogen Technologies Deep Dive Analysis Report - Summary

In alignment with its 2053 net-zero carbon emissions target, Türkiye aims to establish a carbon-neutral economic model through the integration of hydrogen technologies. This strategic direction holds critical significance in terms of both decarbonization and achieving energy independence. The Clean Hydrogen Technologies report prepared by TTGV presents a deep dive into the technological advancements and challenges associated with the production, transportation, storage, and utilization of hydrogen. The analysis further explores Türkiye’s renewable energy potential and examines the country’s strategic opportunities to emerge as a global player in green hydrogen production.



Summary Report on Grid-Scale Long-Duration Electrochemical Energy Storage for Increasing the Share of Renewable Energy in Türkiye’s Energy Mix

In support of the development of Pioneer Projects, a structured process has been established—extending from idea generation to project investment and scaling. As the initial/pilot focus area within this framework, “Grid-Scale Long-Duration Electrochemical Energy Storage for Increasing the Share of Renewable Energy in Türkiye’s Energy Mix” has been selected.



Sustainable Cement Production Deep Dive Analysis Report - Summary

As part of the Pioneer Projects Investment Program, the topic “Sustainable Cement Production for the Decarbonization of the Building and Construction Sector” was selected for deep dive analysis between July and October 2023. This study examines the current landscape and ongoing projects related to decarbonization and sustainable cement production within Türkiye’s cement industry. The report provides an overview of the global and Turkish cement sectors, analyzes production methods and the associated value chain, and explores decarbonization pathways for the industry. Furthermore, the report elaborates on the contribution of innovations to emissions reduction and highlights regulatory and policy frameworks that can facilitate the scaling of these innovations.



Climate Technologies Radar - Version 3.0

Developed through an extensive literature review grounded in global trends and Türkiye’s strategic priorities, the Climate Technologies Radar (Version 3.0) presents a comprehensive mapping of key technological domains. The framework is structured around five vertical sectors: Industrial Production, Energy, Mobility and Transportation, Agriculture and Food, and the Built Environment. Cross-cutting themes are examined in detail, including water resource management, waste management and circular economy, land management, carbon dioxide removal solutions, digitalization and digital transformation technologies, climate risk management, and finance and business models.

Deep Dive Analysis Report - Carbon Capture, Utilization and Storage (CCUS) and Carbon Dioxide Removal (CDR) Solutions with Economic Value Creation Potential - Summary

Within the scope of TTGV’s Pioneer Project Program, a comprehensive deep dive analysis was conducted on the current landscape and future outlook of Carbon Capture, Utilization and Storage (CCUS) technologies and Carbon Dioxide Removal (CDR) solutions, which are expected to play a critical role in decarbonization efforts—following energy efficiency and renewable energy sources.

Prepared between April and November 2024, the study closely examines global and national developments in the field, focusing on key dimensions such as technological applications, policy frameworks, and carbon markets.

Developed from a techno-economic perspective, the deep dive report assesses the potential, feasibility, and integration pathways of CCUS technologies and CDR solutions into business models within decarbonization plans. As an executive summary, this report is intended to serve as both a strategic resource and a guiding reference for Türkiye to fully leverage the benefits of these emerging technologies.



OUR PROGRAMS



PIONEER PROJECT PROGRAM



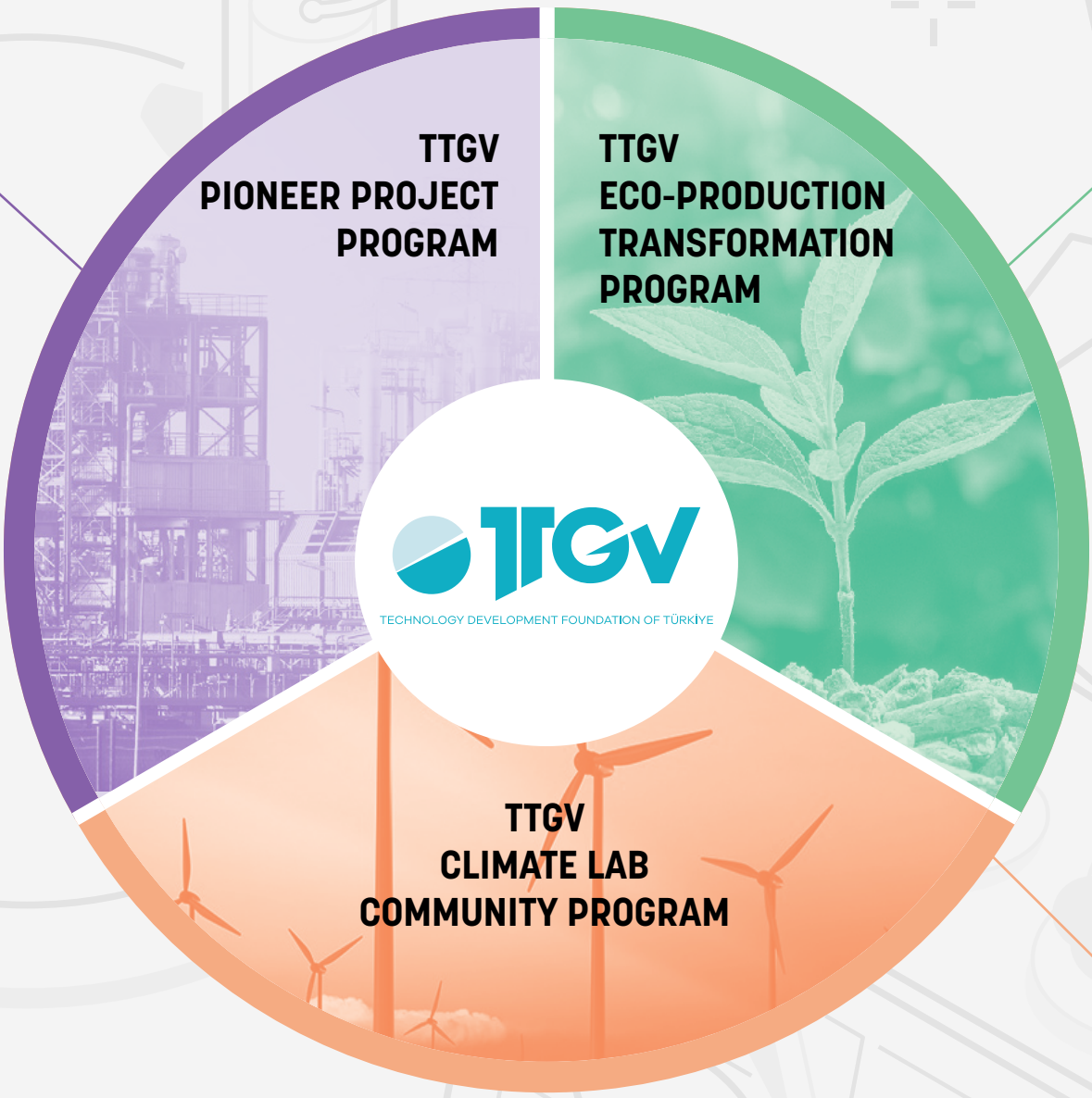
Targeting climate technologies, aims to foster capacity development geared toward early-stage technology evaluation while instilling an economic value creation perspective.



It aims to identify ventures operating in the climate technologies domain that have achieved initial functional outcomes but require support in productization and market validation, and to facilitate their access to industry-specific business development expertise while fostering the establishment of partnerships for field implementation.

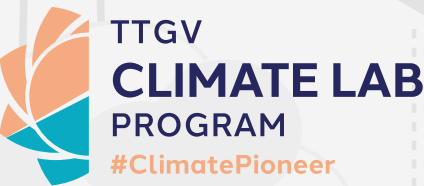


In Türkiye, the program is dedicated to supporting commercially-scaled, first-of-its-kind demonstration projects focused on climate technologies, with a Technology Readiness Level (TRL) of 7 or higher.



ECO-PRODUCTION TRANSFORMATION PROGRAM

The Eco-Production Transformation Program is designed to contribute to the sustainable transformation of the industry and the preservation of its competitiveness within the framework of the clean production paradigm. It achieves this by identifying and developing new project opportunities and by delivering a structural impact for financial institutions through the creation of a comprehensive project value chain that will permanently support the clean production transformation.



CLIMATE LAB COMMUNITY PROGRAM

The Climate Lab Community Program is designed to converge people, technology, and data with a focus on climate technologies. Its objective is to generate tangible knowledge and insights that the industry can leverage, while operating as an experimental laboratory that explores and tests various methodologies.

INTELLECTUAL PROPERTY (IP) ISSUES FOR EARLY-STAGE TECHNOLOGY OWNERS AND STARTUPS: TTGV SEED PROGRAM



ESRA KAYA

TTGV Pioneer Project Program
Program Specialist

In the world of entrepreneurship, having a good idea is only the beginning. What matters just as much is the ability to protect, develop, commercialize, and sustain that idea. This is where intellectual property (IP) rights come into play. However, for many early-stage startups, IP management often takes a backseat. With urgent priorities such as securing funding, building a team, and product development, IP processes are frequently overlooked. Yet, **establishing a sound IP strategy from the outset** is a crucial step to ensure long-term success.

At TTGV, we support this process through our Tohum Program, which aims to accelerate the commercialization of innovative technologies developed in academia. In the pilot phase of the new model we launched in 2024 (designed in 2023), we have once again observed the critical importance of IP. Although we were already aware of this, field experience has clearly shown us how neglecting IP processes can lead to serious challenges.

Why Is Intellectual Property So Important?

The most valuable assets of a technology owner or entrepreneur are their innovative ideas and technologies. Without legal protection, these assets face the risk of being copied as soon as they are introduced to the market. Delays in securing patents can pose significant risks, especially when engaging with investors or preparing for market entry.

Within the Tohum Program, we have seen that **many technology owners either ignore or significantly delay the patenting process**. However, a startup should define its IP strategy and activate basic protection mechanisms even before the first meeting with potential investors.

Another critical issue arises in university-industry collaborations, where ownership of IP rights is often unclear. If it is not clearly defined who holds the IP in joint projects between academics and industrial partners, disputes and rights losses may occur in the future. Our initial meetings under the program revealed how widespread this issue is.

Common IP Management Mistakes Among Startups

Some of the most frequent missteps in IP processes include:

- Postponing IP decisions with the assumption that they can be addressed later
- Sharing ideas with investors or partners before filing for a patent
- Failing to establish clear IP agreements with employees or co-founders
- Leaving IP ownership vague in university-industry partnerships
- Not regularly reviewing and updating IP portfolios

At TTGV, we aim to raise **awareness about IP** among early-stage startups and guide them toward building safer and more structured IP processes.

How to Protect Intellectual Property?

First, the startup or technology owner should determine which IP mechanisms best suit their innovation. The ideal protection method depends on the specific nature of the technology. If it qualifies as an invention, initiating **the patent process at an early stage is essential**. Patents provide legal protection, preventing unauthorized use of the innovation by third parties for a limited time. However, not every innovation is patentable.

If the technology is not suitable for patent protection, **trade secret management** becomes a viable alternative. For example, if key elements such as algorithms, production methods, or chemical formulations must be kept confidential, companies should implement non-disclosure agreements (NDAs) and internal procedures to limit access. In some cases, **maintaining confidentiality rather than seeking a patent** may offer a more effective competitive edge.

Therefore, technology owners should decide early on whether to apply for a patent or protect their innovation as a trade secret, and build an IP strategy accordingly.

Early patent filings are another key consideration. According to a 2023 study by the European Patent Office, startups that file patents early in their development stages tend to progress more rapidly in investment

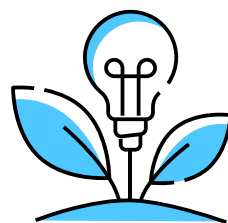
processes. This underlines the value investors place on IP protection. While patenting is not always necessary, a clear strategic plan should outline the essential steps for safeguarding the idea.

Moreover, **IP rights should be reviewed regularly**. Failure to monitor deadlines, renewals, and scope of protection may lead to unintentional loss of IP assets. The Tohum Program emphasizes routine evaluation of these elements to ensure IP portfolios remain up to date.

In addition, startups and technology owners should clearly define IP-related terms in their agreements with employees and business partners from the very beginning. When IP ownership is left ambiguous in partnerships or collaborations, significant disputes can arise down the line. That's why documenting IP rights clearly from the outset minimizes potential risks.

Considering all these processes, protecting intellectual property rights is not a luxury but a necessity for startups and aspiring entrepreneurs. Those who manage IP processes properly are viewed as **more reliable by investors and can better maintain their competitive advantage**. Therefore, every entrepreneur should act with awareness regarding IP and take the right steps from the very beginning of their journey.

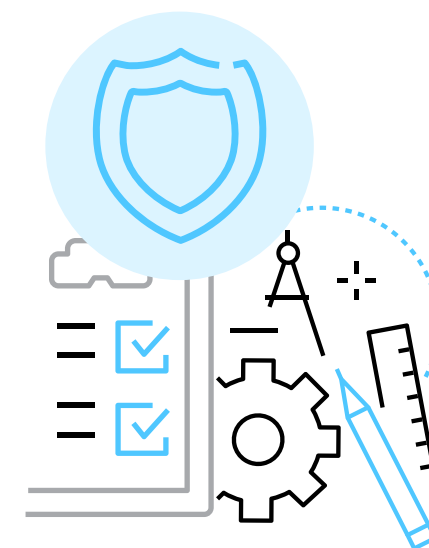
“In the Pioneer Project - Seed Program, we work with assigned domain and IP experts to develop tailored IP strategies that align with market requirements for each academic-based, licensable technology.”



IP Protection Is Not a Luxury for Startups - It's a Necessity

Safeguarding your intellectual property means securing the future of your startup. If you own a startup or have developed a technology, consulting an IP advisor or legal expert to define your IP strategy can be a critical step. Reviewing your existing IP assets and identifying any gaps is one of the most important actions you can take to protect your enterprise against future risks.

At TTGV, we approach early-stage technologies within the Tohum Program from this perspective. Before initiating any process, we examine what can be done to protect IP rights. **Protecting the IP of your startup and defining the right strategy is one of the most effective ways to maintain your competitive edge.**



A PIONEERING INITIATIVE FROM TTGV: A FIRST-OF-ITS-KIND INITIATIVE IN ITS FIELD EMPHASIZING THE LIFE CYCLE APPROACH: THE ECO-DESIGN COMMUNITY



The concept of sustainability—directly impacting the production and service sectors and becoming an integral part of daily life due to the climate crisis—has recently brought the notion of “eco-design” to the forefront, as research and development processes increasingly converge with design practices.

Eco-design is a design approach that considers the environmental impacts of a product throughout its entire life cycle—from inception to end-of-life, including disposal. This approach aims to ensure efficiency at every stage of product development and production. It encompasses a broad set of principles, such as reducing

raw material consumption, enhancing recycling, planning for upcycling processes, utilizing renewable resources, and optimizing the product life cycle.

In accordance with the European Union's *Ecodesign for Sustainable Products Regulation (ESPR)*, the goal is to reduce the environmental impact of products and align them with the principles of the circular economy. As a result, companies are now required to develop products that meet specific environmental criteria. In this context, the priority product groups and cross-cutting requirements to be addressed have been identified as follows:

Priority End Products:

- Textiles and Footwear
- Furniture
- Tires
- Mattresses
- Detergents
- Paints and Varnishes
- Lubricants
- Cosmetic Products
- Toys
- Fishing Gear
- Absorbent Hygiene Products (e.g. diapers, sanitary pads, etc.)

Priority Intermediate Products

- Iron and Steel
- Basic Chemicals
- Non-Ferrous Metals (excluding aluminum)
- Aluminum
- Plastics and Polymers
- Paper and Pulp
- Glass

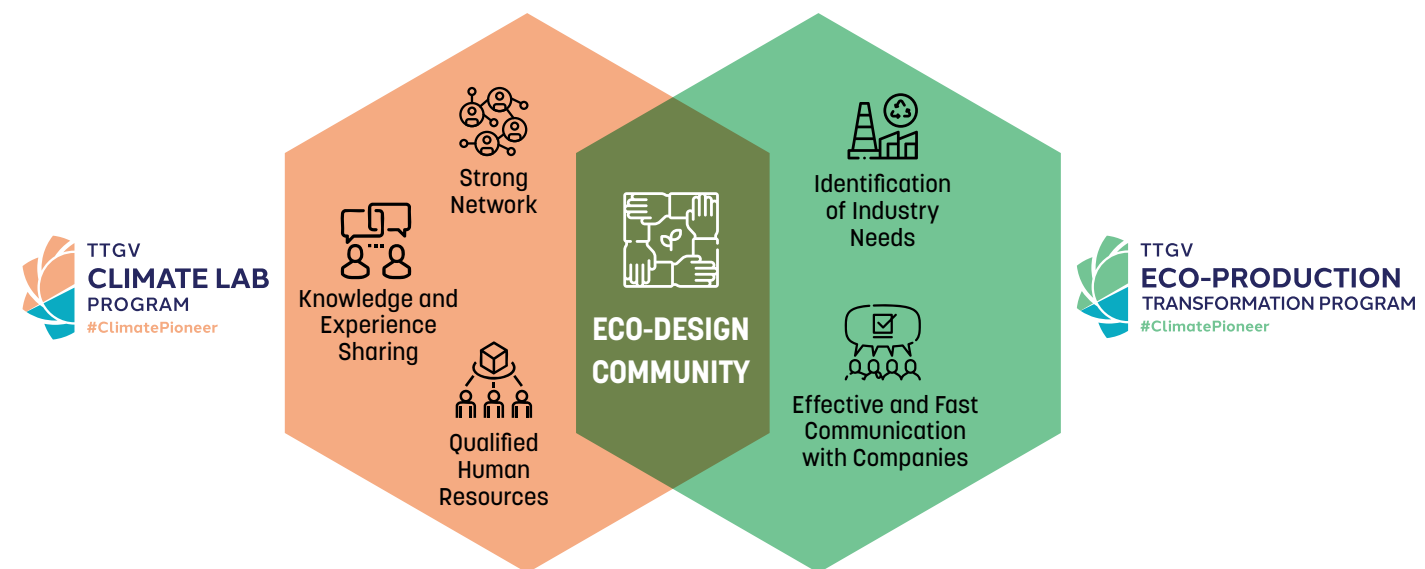
Priority Cross-Cutting Requirements

- Durability and Reparability – Establishing requirements for products to be used longer and easily repaired.
- Recyclability – Ensuring that products and components are made suitable for recycling.
- Use of Recycled Content – Making the use of a certain percentage of recycled material in products mandatory.

TTGV has designed a new structure, which will be the first of its kind, by combining the experiences of the Climate Lab Community Program and the Eco-Production Transformation Program: the Eco-Design Community.

With this pioneering initiative, an active community has been created to support the sustainable transformation of industrial enterprises, aiming to develop tools and applications within the scope of Eco-Design and to design roadmaps that can serve as references for Türkiye.

In this context, by evaluating the priority product groups and cross-cutting requirements, the target audience for the Eco-Design Community was identified, and the work has begun.





ECO DESIGN STRENGTHENS CORPORATE BRAND IMAGE WHILE CREATING A COMPETITIVE ADVANTAGE IN THE MARKET

DR. HÜSEYİN GÜLER

Kastamonu Entegre
Global R&D and Innovation Director

INTERVIEW: Esra YAZDIÇ DEMİR
TTGV Corporate Communications and Media Manager



You can watch our interview with Dr. Hüseyin Güler here.

Do products have a life cycle? Since the concept of climate alignment entered our lives, studies on sustainability have consistently answered this question with a resounding “yes.” Innovation processes—and the correct management and reprogramming of these processes with a focus on sustainability and climate technologies—continue to assert themselves as a necessary transformation in our lives. Embracing a learn-by-teaching model, the Technology Development Foundation of Türkiye (TTGV) has initiated efforts to establish a new type of community structure that will be the first of its kind in Türkiye by combining the strengths of its Climate Lab and Eco Production Transformation programs. In this process, TTGV will collaborate with experienced professionals in the field and come together with a name who blends climate technologies with innovation: **Dr. Hüseyin Güler, Global R&D and Innovation Director at Kastamonu Entegre.**

Dr. Güler emphasizes that eco-design processes in both Türkiye and around the world must be carried out not solely with concerns for aesthetics or functionality, but by taking into account fundamental environmental factors such as energy efficiency, waste management, and recycling. He underlines that companies turning to eco-design have the potential to strengthen their brand image and strategic vision, differentiate themselves in the market, and gain a competitive edge.

We talked about the meeting point and future of innovation and eco-design processes.



“TTGV’s 250K Idea Valorization Program and TÜSİAD SD2 Program can serve as inspiration for future applications.”

Since the climate crisis became central to our lives, we have been living and breathing the concept of sustainability. So much so that we also encounter those who have turned it into a fake market. If we focus on the proper management aspect, what is the relationship between innovation—which is your area of expertise—and climate technologies?

Technological solutions to the climate crisis are, in a sense, one of the most important application areas for new generation innovations. The main idea here is not only to ensure the efficient use of existing resources, but also to transform these resources into a different value proposition. Traditional management approaches often follow the path dictated by current market dynamics, which is often described as “proper management.” However, real transformation is possible by identifying the aspects of existing solutions that need to be abandoned and replacing them with innovative technologies based on environmentally friendly solutions that also achieve commercial success.

In this sense, innovative approaches that truly aim to

solve the problem should be developed, focusing on climate technologies to replace outdated, complex systems for individuals and institutions. These approaches should not only produce technology but also include how to manage these technologies and how to integrate them using eco-friendly methods. To do this, we need a flexible and constantly evolving value network that encourages collaboration among different sectors and stakeholders. In particular, creating a climate technologies vertical in corporate entrepreneurship programs will enable the discussion of climate-related business models in a company context. Therefore, practical applications are needed. TTGV’s 250K Idea Valorization Program and TÜSİAD’s SD2 Program can serve as inspiration for future applications.

To summarize, effective struggle against the climate crisis will not only involve technological advancements but also radical perspectives on how these technologies are managed and made environmentally friendly. Ultimately, this is a process that requires a transformation of mindset.



“The meeting point of eco-design and innovation lies in developing forward-looking strategies and practices that, while generating creative solutions, also make environmental and social benefit an integral part of value creation.”

As the Global R&D and Innovation Director at Kastamonu Entegre, how do you differentiate between sustainability-focused innovation and traditional innovation?

Sustainability-focused innovation aims to create long-term value by integrating environmental, social, and economic factors, whereas traditional innovation focuses more on market competition, cost-efficiency, and improving product-service performance. While traditional innovation is structured around responding to market demands—emphasizing technical adequacy, cost-benefit analysis, and competitive advantage—at Kastamonu Entegre, we adopt a holistic innovation management model that considers the differences between the two approaches and aims to combine commercial success with long-term sustainability principles. Our solution “PureBoard,” developed using bio-based adhesives instead of fossil-based ones, is an example. It entered our technology roadmap in 2017, but it took us seven years to make it valuable in terms of both commercial and sustainability aspects. Ultimately, this is a story of becoming a “Voltron”—a collective effort built through the hard work of many colleagues from different functions rather than a single superhero.



Why is the concept of an ambidextrous organization valuable?

For TTGV, which aims for agility and foresight shaped by past experience, the development of organizational capabilities is of great importance. You frequently emphasize the concept of an “ambidextrous organization” in innovation—could you elaborate on this?

The concept of an “ambidextrous organization” aims to make innovation processes more sustainable and effective by combining organizational agility with institutional memory and experience. In this approach, one wing of the organization represents an agile and flexible structure that adapts to ever-changing market dynamics, new technologies, and trends, while the other wing maintains fundamental values and strategic vision by preserving experience and resilience. This makes it possible to pursue radical innovations while also considering institutional heritage. For an organization like TTGV, which focuses on adapting to change and future trends, an ambidextrous approach ensures both rapid adaptation to change and an innovation strategy built on solid foundations informed by deep experience.

Emphasis on Integrated and Collective Transformation

You frequently say: “We don’t need a single superhero, we need to build a Voltron.” This aligns well with the green transformation processes in Türkiye. A holistic approach is essential rather than fragmented efforts. So what does Turkish industry need in its green transformation process?

In Türkiye’s industrial green transformation process, in addition to policies and strategies, one of the main needs is for integrated and collective transformation through contributions from different sectors and stakeholders rather than relying on individual “heroes.” This “Voltron-building” approach becomes possible when technologies, processes, accumulated knowledge, and strategic visions developed in fragments are harmonized. Therefore, the social aspects of the issue are also important. Collaboration among stakeholders, raising societal awareness, and integrating digital transformation into processes will lay the foundation for a sustainable and competitive industrial structure. In this context, I believe there is a need for workforce development programs and the advancement of multi-stakeholder project approaches in industrial green transformation.



Eco-Design = Life Cycle

TTGV has launched a new initiative. The TTGV Eco-Design Platform is being developed as a horizontal structure that connects the Climate Lab Community Program and the Eco-Production Transformation Program, aiming to increase the tangible impact of these programs. First of all, what is eco-design, and why has it become such a crucial topic today?

Eco-design is a design approach that aims to reduce the environmental impact of products, processes, or services throughout their entire life cycle. This approach considers not only aesthetics or functionality but also environmental elements such as material selection, energy efficiency, waste management, and recycling. Today, due to climate change, depletion of natural resources, and increasing environmental concerns, eco-design plays a critical role in industrial production and the service sector. The principles of this process are based on systematic life cycle analysis, sustainable material and energy use, environmental impact minimization, and circular economy approaches. It also brings tools like digital product passports into our agenda. The meeting point of eco-design and innovation lies in developing future-oriented strategies and practices that produce creative solutions while also making environmental and social benefits part of value creation. I believe TTGV’s step will lead to tangible impacts and new perspectives stemming from the synergy between eco-design and innovation.

What kind of gains can companies achieve in innovation processes by adopting eco-design principles? Are there any successful projects that can be cited in this field? How should success be measured?

Organizations that adopt eco-design principles, first and foremost, establish a strong bridge between environmental sensitivity and economic efficiency within their innovation processes. This, in my view, paves the way for a new approach to achieving sustainable competitive advantage, accompanied by benefits such as cost savings, enhanced brand image, and compliance with regulations. In Türkiye, I believe that companies operating particularly in the automotive, white goods, and furniture sectors will gain a significant edge by adopting eco-design principles, transitioning to environmentally friendly production techniques, and reflecting this shift in their competitive strength. We see that global companies like IKEA, through their eco-design-oriented projects, have made a clear impact and established themselves as pioneers in the fields of circular economy and environmental sustainability. At Kastamonu Entegre, we are actively involved in 11 Horizon

Europe projects, where we are building practical—albeit small—applications related to eco-design. Naturally, this has become one of the focus areas in our R&D Center. When it comes to measuring success, I believe that both environmental and economic performance should be evaluated regularly and with comparable data using criteria such as life cycle assessments, carbon footprint, energy consumption, and material efficiency. However, it's also evident that more holistic efforts are needed in this area. That's why I find TTGV's initiative particularly meaningful.

Competitive advantage, strong brand image

How do startups or companies that adopt eco-design practices gain a competitive advantage in the market?

Startups or companies that adopt eco-design practices combine environmental and economic sustainability, thereby gaining a noticeable competitive edge—albeit still niche—among customers who are sensitive to these issues. Even if demand appears boutique, I believe it will increase as we approach the 2030s. Over time, this approach will lead to cost efficiency in production processes, material usage, and energy consumption. It's also worth noting that offering environmentally friendly products and services appeals to consumers' growing environmental awareness, thereby strengthening brand image. Since eco-design focuses on minimizing environmental impact throughout all stages of a product's life cycle, it will also play a crucial role in ensuring compliance with international standards and regulations. This holistic approach has the potential to support companies' innovation capabilities and long-term strategic vision, enabling them to differentiate themselves and gain a competitive advantage in the market. Therefore, as Turkish companies, we need to understand and align with the EU's eco-design regulations.

How do you foresee eco-design-oriented innovation transforming over the next 10 years?

Over the next 10 years, it is likely that eco-design-oriented innovation will evolve into a broader, more integrated structure driven by technological transformations. In my view, this also represents a new generation of innovation

understanding. With the influence of technologies like artificial intelligence, digitalization, data analytics, and the Internet of Things, we will see an ecosystem where the environmental impacts of products and services can be measured and monitored more accurately and in real time. In this process, the integration of circular economy principles, sustainable material use, and energy efficiency into design processes will trigger a strategic transformation aimed at reducing production costs and minimizing environmental footprints. Additionally, with rising consumer awareness and the impact of regulations, companies will make their innovation processes more transparent, measurable, and stakeholder-focused—thereby enhancing their competitive advantage. Eco-design will no longer just be a method to improve a product's environmental performance; it will become an integral part of a company's strategic vision and long-term sustainable growth goals.



“Eco-design will no longer just be a method to improve a product's environmental performance; it will become an integral part of a company's strategic vision and long-term sustainable growth goals.”

What recommendations would you offer to entrepreneurs or R&D teams aiming to develop sustainable products and services?

My recommendation to entrepreneurs who aim to develop sustainable products and services is to adopt a systematic approach that considers the entire life cycle of the product or service. From the very first stage of the design process, it is essential to actively integrate environmental, social, and economic factors, as well as principles such as recycling, energy efficiency, and circular economy. During the product development phase, iterative testing processes should be implemented by activating data-driven and user-sensitive decision-making mechanisms. It is important to proceed in small steps, continuously testing our assumptions. Ambitious and large-scale beginnings, unfortunately, often lead to major failures. I particularly value the “Build-Measure-Learn” approach as emphasized in the Lean Startup methodology. Rather than pursuing utopian evaluations, the spirit of our times demands the creation of quick, practical solutions. In this process,

closely following technological developments and forming small, agile teams—those that could be fed with “two large pizzas”—play a critical role in blending innovation with sustainability. We need to use our time, focus, and energy effectively. Collaborating with experts from different disciplines not only enables the generation of creative solutions but also minimizes the risk of project failure. In this context, effectively combining fresh perspectives with experience carries us toward value-creating solutions. Those who succeed in this are paving the way for developing not only environmentally friendly but also economically competitive and long-term sustainable products and services. Our project developed in our R&D Center, where we upcycle coffee waste into board production, is a good example of this. We brought together diverse expertise and minimized constraints as much as possible by collaborating with a startup called Wastespresso.





THE INTERSECTION OF SUSTAINABILITY AND MARKETING COMMUNICATION



SERENAY EKİM ÖZKALKAN

TTGV, Corporate Communications Team
Marketing and Communications Specialist

As climate change remains at the heart of sustainability discussions, the transformative power of technology in this field is becoming increasingly significant. Climate technologies not only offer innovative solutions to environmental challenges but also take center stage in brands' sustainability and marketing strategies. **This creates a new perspective in marketing communication, making it essential to accurately convey and promote climate technologies.**

Consumers are now interested not only in eco-friendly products but also in the technologies behind them. Innovations such as electric vehicles, renewable energy solutions, and carbon capture technologies present compelling narratives that combine sustainability-focused messages with technological advancement. Communication strategies play a critical role in amplifying these stories to broader audiences and highlighting the societal impact

of technology-driven sustainability efforts.

In marketing communication, positioning climate technologies should go beyond simply highlighting the benefits of a product or service. It is equally important to emphasize which problems these technologies address. For instance, a company working on carbon capture and storage technologies should not stop at portraying itself as environmentally conscious—it must also transparently explain how its technology captures carbon emissions from industrial facilities and how the captured carbon is repurposed across different sectors. Such clarity is key to building consumer trust.

Sustainability strategies centered around climate technologies not only underscore a brand's environmental responsibility but also support a forward-looking, technology-driven vision. These strategies demonstrate that brands are not merely making claims about sustainability but are taking tangible actions. Importantly, this responsibility is not limited to protecting nature—it also involves contributing to the construction of a tech-enabled sustainable future.

These strategies highlight how brands are progressing toward a more efficient and sustainable world through innovative technologies, not just by offering eco-friendly products and services. For example, an energy company that develops technologies powered by renewable sources instead of fossil fuels fulfills its environmental responsibility while also showcasing a technological vision for meeting future energy needs. Similarly, a brand offering sustainable agricultural technologies is not only producing environmentally friendly products but also contributing to broader societal benefits by improving efficiency in the agricultural sector.

Such strategies enable brands to present a strong stance—not only in their efforts to minimize environmental impact but also in how they aim to shape a more sustainable and technologically advanced future. By balancing both environmental and technological sustainability, brands demonstrate their readiness to meet the needs of not only today but also tomorrow.

In conclusion, when marketing climate technologies, brands should aim to tell a broader story, share concrete data, and emphasize the societal value of the technology, rather than merely offering a product or service.

This way, consumers feel that brands are genuinely working toward a sustainable future and form stronger



“In conclusion, marketing communication supports the development of a technology-driven vision for green transformation. It not only helps brands gain a competitive edge but also plays a leading role in building a more sustainable world.”

emotional bonds with them. In the green transformation process, marketing communication plays a vital role in accelerating the transition—both by raising consumer awareness and inspiring investment in technology.

By adopting a transparent and impactful communication style while informing the public about sustainable technologies, brands can contribute to building consumer consciousness. For example, instead of merely claiming to reduce its carbon footprint, a company can produce content that explains which technological solutions made this possible and what innovative steps were taken during the process. As a result, consumers and investors can better understand how green technologies function and what long-term impact they may have.

Moreover, **marketing communication can help increase interest in sustainability-focused innovations, which in turn can encourage companies to invest more in R&D.** In conclusion, marketing communication supports the development of a technology-driven vision for green transformation. It not only helps brands gain a competitive edge but also plays a leading role in building a more sustainable world.

Clearly explaining how these technologies work, what problems they solve, and how they contribute to societal benefit is the key to earning consumer trust.

Communication Strategies in Climate Technologies

In a world where climate technologies are rapidly advancing, the accurate promotion and public adoption of these innovations is of great importance. Looking ahead, strategies for sustainability communication are expected to be structured around the following key areas:

- **Promotion of Innovative Technologies:** Climate technologies will be at the core of communication campaigns. Messages that simplify the complexity of these technologies, making them educational and easy to understand, will gain prominence.
- **Integration of Circular Economy and Technology:** Climate technologies offer solutions that support circular economy models. Innovations that extend the product life cycle and convert waste into energy will hold a central place in brands' marketing communications. In these processes, there will be an increasing need for visual and digital content that clearly explains the benefits of technology to consumers.
- **Transparency and Data Sharing:** Measuring the effectiveness of climate technologies and sharing these results with the public will be a fundamental element in building trust within sustainability communication. By disclosing carbon reduction data and the environmental impacts of their technologies, brands will enhance their transparency and credibility with consumers.
- **AI-Powered Communication:** Artificial intelligence will enable the personalization of climate technology communication campaigns by analyzing consumer behavior. For example, it will be possible to deliver targeted content to consumers interested in energy-saving technologies, making communication more relevant and impactful.
- **Interactive and Experiential Communication:** Augmented Reality (AR) and Virtual Reality (VR) technologies will be used to convey the operation and benefits of climate technologies in an immersive, experiential way. For instance, offering a virtual tour of how a carbon capture facility works

can make a significant impression on consumers and deepen their understanding of the technology.

- **Partnership with the Consumer:** Climate technologies offer opportunities for individuals to become active participants in the sustainability journey. For example, consumers who use smart energy management systems can be encouraged to reduce their personal carbon footprints. These kinds of approaches will enhance consumer engagement in marketing communication.

The rise of climate technologies in sustainability communication presents both an opportunity and a responsibility for brands. **Communication campaigns supported by the right strategies will not only accelerate the adoption of technological innovations but also play a significant role in building a sustainable future.** At the intersection of sustainability and technology, effective communication strategies that reach consumers will serve as powerful tools—driving awareness, encouraging action, and fostering a deeper connection between innovation and environmental responsibility.

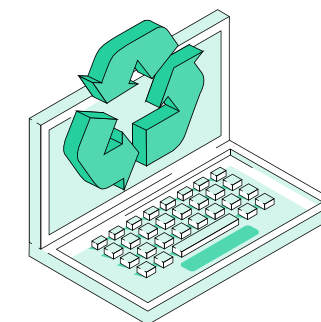
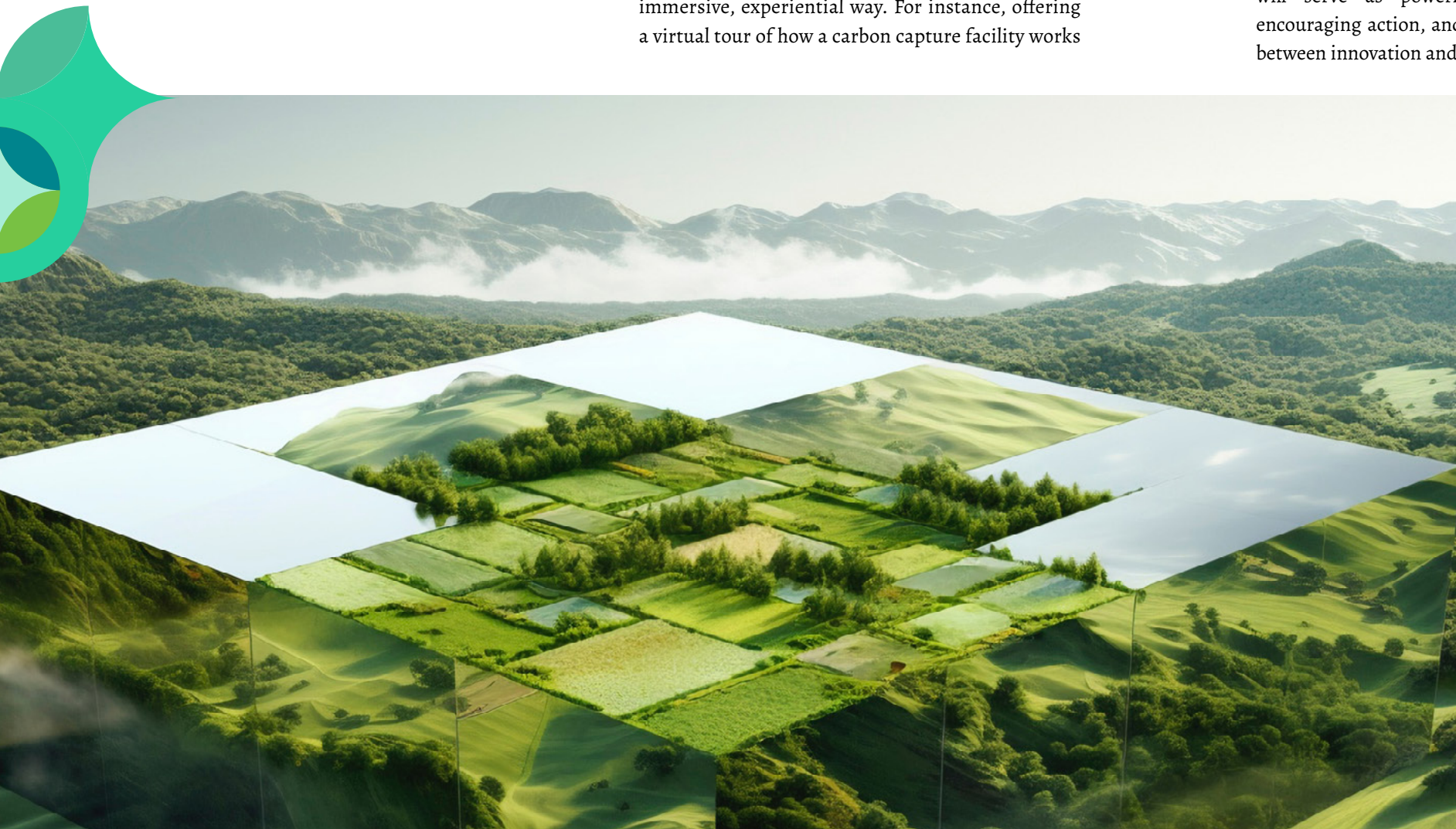
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“The rise of climate technologies in sustainability communication presents both an opportunity and a responsibility for brands. Communication campaigns supported by the right strategies will not only accelerate the adoption of technological innovations but also play a significant role in building a sustainable future.”

THE COST OF FAILING TO MEET CLIMATE TARGETS WOULD BE HIGHER THAN THE INVESTMENT IN CCS



GÜLÖREN TURAN
Global CCS Institute
Chief Impact Officer

INTERVIEW: Esra YAZDIÇ DEMİR
TTGV Corporate Communications and
Media Manager

In climate technologies, all eyes are on carbon capture processes and systems. While countries develop specific strategies to implement their models, they also continue to learn from each other to keep their efforts up to date. CCUS plays a leading role in these processes. In this context, **we met with Gülören Turan, Chief Impact Officer at the Global CCS Institute's London Office.**



“Addressing the challenges associated with CCS requires collaboration on a global scale.”



Emphasizing that government support and incentives are critical for the development of CCS, Turan underlined that the cost of failing to meet global climate targets would be much higher than investing in proven climate technologies like CCS.

What are the obstacles to carbon capture technology? How do you evaluate global climate change commitments?

As an institute, we are witnessing positive global progress in carbon capture and storage. Over the past seven years, project development has accelerated, and with new facilities under construction becoming operational, the existing capture capacity is expected to double. The 2024 CCS project pipeline has reached record levels in terms of both the number of facilities and CO₂ capture capacity.

However, some operational and financial challenges persist. One of the main issues is the lack of a strong business model for CCS in many regions. To transform CCS into a scalable business model, government climate policies and carbon markets need to align more effectively.

Uncertainties in the investment environment, political fluctuations, and inflation-driven cost increases are also significant obstacles. Large infrastructure projects, like consumer goods, are affected by economic conditions. However, we expect these costs to stabilize over time.

Social factors also play a critical role in the success of CCS. Public perception and acceptance of this technology can vary greatly. Effective communication with affected stakeholders, such as local communities, should be an integral part of all projects.

Overcoming the challenges of CCS requires global collaboration. International climate change

commitments have been a major driving force for the development and implementation of CCS technology. As governments increasingly recognize the crucial role of CCS in decarbonization and achieving net-zero targets, it has gained more prominence in climate discussions. Leading countries aim to remove barriers to CCS by implementing supportive policies, financial mechanisms, and investment incentives.

For example, in Europe and the United Kingdom, climate and industrial policies have placed CCS high on the agenda. The EU Industrial Carbon Management Strategy, the Net-Zero Industry Act, and the UK's commitment to invest £21.7 billion in carbon capture, utilization, and storage (CCUS) are among the policy incentives expected to accelerate the adoption of CCS in the region.

Additionally, multilateral government initiatives such as the Clean Energy Ministerial, Mission Innovation, and the Carbon Management Challenge are increasing global efforts on CCS, promoting knowledge sharing, and supporting its development. The Carbon Management Challenge, in collaboration with the European Commission, involves 22 countries and aims to manage 1 gigaton of CO₂ globally through carbon management projects by 2030.

What would be a reasonable carbon price to encourage climate technologies?

Since climate technologies cover a broad spectrum, we prefer not to provide a direct answer to this question. While carbon pricing is an important factor, it is not sufficient on its own.



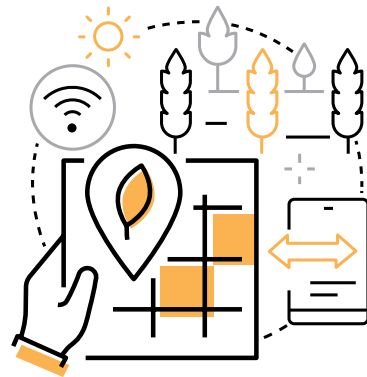
Costs Have Decreased, Processes Have Accelerated

CCUS technologies are currently quite costly. How feasible is their implementation without government support and incentives?

The costs of Carbon Capture and Storage vary depending on the sector and industry in which they are applied. As an institute, we observe that as CCS becomes more widespread, its costs decrease, and the adoption of new business models such as CCS networks accelerates this process. CCS networks are becoming a preferred application model because they have the capacity to reduce costs by sharing transport and storage infrastructure.

Government support and incentives are critical for CCS development. Comprehensive policy frameworks form the foundation for creating a business model for technologies like CCS. Without such a framework, the private sector may be reluctant to implement CCS at the necessary scale.

“According to the IPCC report, achieving global climate goals without CCS would be on average 138% more costly.”



A strong policy framework should attribute value to carbon emissions reduction and incentivize CCS through mechanisms such as carbon taxes, carbon trading, or tax credits. Additionally, other incentives and regulations, such as government grants, public procurement, emission regulations, product standards, or carbon buyback obligations, should be implemented.

For example, in the U.S., 45Q tax credits provide a financial incentive for CCS by assigning a monetary value to captured carbon. In other regions, carbon taxes and emissions trading systems are among the tools supporting CCS projects.

Nevertheless, it is important to remember that the cost of failing to meet global climate targets would be much higher than investing in proven climate technologies like CCS. According to reports from the Intergovernmental Panel on Climate Change (IPCC), achieving global climate targets without CCS would be, on average, 138% more expensive.

Commitments Must Be Translated into Action

You highlighted the importance of government policies in carbon capture processes. How do you evaluate Türkiye's approach to this issue on an international scale?

Although Türkiye's approach to carbon capture is still in its early stages, some positive developments are noticeable. The Turkish government has addressed CCS within its Nationally Determined Contribution (NDC) and has committed to reducing its emissions by 41% by 2030 compared to the Business-As-Usual (BAU) scenario.

Türkiye has integrated CCS technology into its 2024-2030 Climate Change Mitigation Strategy and Action Plan (CCMSAP). The government is working to create an environment that encourages investment in carbon capture technologies. Positive aspects of the CCMSAP include a commitment to developing a roadmap for carbon capture, utilization, and storage (CCUS), preparing a carbon storage atlas, and assessing Türkiye's carbon storage potential.

Additionally, examining the potential application of carbon capture technologies in fossil fuel power plants that cannot yet be phased out is also part of the strategy. By working on CCUS for unavoidable emissions, Türkiye aims to encourage private sector investments, establish industrial hubs with CO₂ infrastructure, and support R&D activities to reduce the costs of carbon capture.

Furthermore, the government has announced its transition to carbon pricing and alignment with European Union standards. This sends a strong market signal to project developers and investors, paving the way for CCS projects.

All these measures represent an important first step in Türkiye's efforts to combat climate change. However, translating commitments into action, public-private sector cooperation, and societal support will be critical for continued progress.

What are the main challenges related to Carbon Capture, Utilization, and Storage (CCUS) projects?

There are several key challenges that affect the feasibility of CCUS projects:

1. Costs and Financing:

- CCUS projects require significant capital investment.
- The uncertainty surrounding carbon pricing poses a risk for investors.
- The long payback period limits private sector investments.

2. Policy and Regulatory Framework:

- The lack of policies supporting carbon capture makes project implementation difficult.
- Existing emission regulations and carbon pricing mechanisms may be inadequate.

3. Infrastructure Deficiencies:

- Pipelines and storage sites are necessary for the transportation and storage of carbon dioxide.
- The construction of carbon dioxide transport networks requires long-term planning and high investments.

4. Social Acceptance and Awareness:

- There may be public concerns about the environmental and safety impacts of CCUS projects.
- The acceptance of carbon storage sites by local communities can take time.

5. Teknolojik Gelişim ve Ar-Ge:

- There is a need for more cost-effective and efficient carbon capture technologies.
- Innovative solutions for carbon utilization remain limited.

Despite these challenges, government support, public-private partnerships, and technology development efforts are gradually reducing the barriers to CCUS projects. azalmaktadır.

What is the future potential of carbon capture and storage technologies?

CCUS is considered a critical technology in the energy transition process. By 2050, CCUS is expected to play a significant role in three key areas:

1. Emission Reduction in Industrial Sectors:

- CCUS provides a critical solution in sectors where carbon emissions are unavoidable, such as cement, steel, and chemicals.
- In sectors where alternative low-carbon production methods are not yet commercially viable, CCUS becomes an essential technology.

2. Carbon Removal and Negative Emission Technologies:

- Technologies such as Direct Air Capture (DAC) and Bioenergy with Carbon Capture and Storage (BECCS) have the potential to create negative emissions by removing CO₂ from the atmosphere.
- IPCC reports emphasize that large-scale implementation of negative emission technologies is necessary to achieve net-zero targets.

3. Carbon Capture in Hydrogen Production:

- CCUS plays a crucial role in blue hydrogen production.
- As the hydrogen economy grows, demand for CCUS will also increase.

Advancements in these areas, combined with policy support and private sector investments, are expected to significantly contribute to global carbon emission reduction goals.



How are carbon capture technologies progressing on a global scale? What are the investment trends, financing methods, and implementation examples?

The Institute publishes the CCS Technologies Review every year and observes a continuous increase in the number of entries. This indicates that carbon capture technologies are making significant progress globally.

Carbon capture technology is continually evolving and becoming more efficient. Innovations in chemical and physical solvents play a critical role in reducing costs.

Globally, CCS technology is now being implemented in high-cost sectors such as electricity generation, cement production, and direct air capture. This is a direct result of both the development of supportive policies and the steady reduction in costs.

CCS networks have become the most preferred application model due to their ability to reduce costs and risks. Investments in carbon dioxide transportation and storage infrastructure can also support other carbon management technologies, such as Carbon Dioxide Removal (CDR).

From an investment perspective, the business model for CCS projects is typically dependent on regulatory frameworks that include carbon pricing or emission limits. Without supportive policies and direct financial incentives, it is difficult to realize large-scale CCS investments.

In Europe and Canada, mechanisms such as Carbon Contract for Differences (CCfDs), government procurements, investment tax credits, and direct capital injections have been implemented. Many European countries have started applying CCfDs to reduce the risks and costs associated with CCS, thereby providing financial stability for investors.

New policy commitments related to CCS are also emerging in the Global South. China has launched the Advanced Green and Low Carbon Program and the Carbon Emission Reduction Fund to provide investment support for CCS projects from the central budget.



“Without supportive policies and direct financial incentives, CCS investments are difficult to achieve at scale.”



About the Global CCS Institute

The Global CCS Institute is an international think tank dedicated to accelerating the deployment of Carbon Capture and Storage (CCS) technology, a vital solution in the fight against climate change and the journey toward climate neutrality. Headquartered in Melbourne, Australia, the institute has offices in Washington, D.C., Brussels, Beijing, London, Tokyo, and Abu Dhabi.

<https://www.globalccsinstitute.com>

SUSTAINABLE AVIATION FUEL (SAF): CURRENT LANDSCAPE AND FUTURE OUTLOOK



SEVTAP GÖKÇE

TTGV Pioneer Project Program
Program Specialist

Today, achieving national and international climate goals demands effective and reliable solutions that reduce dependence on fossil fuels across all sectors. In line with the IPCC's guidance and national net-zero policies, this transformation requires more than behavioral changes and efficiency improvements—it necessitates the broad integration of renewable sources such as solar and wind, along with low-carbon alternatives like biomass.

The aviation sector contributes approximately 2–3% of global greenhouse gas emissions, placing it in a critical position in the fight against climate change. Sustainable Aviation Fuel (SAF) has emerged as a key option for reducing carbon footprint. As a result, a wide range of stakeholders—from government agencies and refineries to aviation companies—are exploring technological pathways that replace conventional jet

fuel with renewable alternatives. These range from agricultural and forestry residues to CO₂ and green hydrogen. The goal is not only to deliver cost-effective solutions but also to accelerate aviation's transition to net-zero and raise global sustainability standards.

In recent years, several countries and regional authorities have introduced mandatory SAF blending targets to ensure progress toward aviation climate goals. The European Union has launched the ReFuelEU Aviation regulation, mandating airlines to adopt gradually increasing proportions of SAF in their fuel mix over time as part of broader climate objectives. Similarly, the United States and several Asia-Pacific countries are deploying regulatory frameworks and incentive mechanisms (tax benefits, R&D support, infrastructure investments, etc.) to boost the transition to SAF.



Global SAF Market Overview

In 2023, sustainable aviation fuels accounted for approximately 0.2% of total fuel consumption in global civil aviation, with estimates suggesting a rise to around 0.53% by 2024 due to policy interventions and industry commitments. This growth is driven by environmental regulations, airline commitments to lower their carbon footprints, and rising demand from corporate customers seeking greener travel options. **Recent test flights using 100% SAF—such as Virgin Atlantic's London–New York route—and successful adaptation of current fuel infrastructure** demonstrate the technical and operational feasibility of higher blend ratios. SAF certified under the **CORSIA program is also approved by ICAO** as part of global carbon offset mechanisms.

- **European Union:** Under the ReFuelEU Aviation initiative, the EU Emissions Trading System (ETS), and revisions to the Renewable Energy Directive (RED), SAF blending became mandatory at EU airports starting in 2025, with ratios set to increase over time.
- **United States:** The SAF Grand Challenge outlines domestic production goals of 3 billion gallons by 2030 and 35 billion gallons by 2050. Federal incentives (e.g., under the Inflation Reduction Act) and state-level programs support these targets.
- **Asia-Pacific:** Countries such as Japan, Singapore, and Australia are investing strategically in renewable energy and feedstock supply chains through public-private initiatives.
- **Middle East:** Power-to-Liquid (PtL) projects are being developed to leverage abundant renewable energy sources and reduce dependence on fossil fuels.

Outlook for Türkiye

Türkiye is increasingly focused on SAF, due to its **rising passenger traffic and the need to align with EU aviation regulations**. Gradual integration of waste oil- and biomass-based feedstocks into existing industrial infrastructure could enable near-term SAF production via the **HEFA** method. Türkiye's abundant solar and wind resources also present opportunities for pilot-scale implementation of **PtL** technologies, adding diversity to its technology mix.

By the 2030s, SAF usage is expected to rise in Türkiye, particularly at major hubs like Istanbul and Ankara. Regulatory frameworks, such as the Directorate General of Civil Aviation's Sustainable Aviation Fuel Directive (SHT-SAF), are anticipated to establish mandatory or incentivized blending rates in alignment with EU standards.

Current and Projected Production Capacity

As of 2024, global SAF production capacity stands between 1–1.5 million tons per year. The most common production route is **Hydroprocessed Esters and Fatty Acids (HEFA)**, which uses feedstocks like waste oils and animal fats.

2030 Projections:

Global capacity is projected to reach 4–5 million tons, with the EU accounting for 3.2–3.8 million tons. These estimates depend on **policy effectiveness** and **investment levels**. With the introduction of advanced methods such as PtL, total capacity could surpass 5–6 million tons.

Post-2050 Outlook:

As **sustainable biomass** and **renewable energy sources** become increasingly contested across sectors, technologies like PtL—using **green hydrogen** and **captured CO₂**—are expected to provide up to 50% of global SAF production by 2050. Meeting projected demand could require 500–800 new SAF facilities, each with an average investment of €1.8 billion.

“In countries with high renewable energy potential, such as Türkiye, it is possible to achieve high emission reduction rates with well-planned investments.”

CO₂ Emission Reductions

Depending on the feedstock, **production technology** and **energy input**, SAF has the potential to lower life-cycle greenhouse gas emissions by between **65%** and **90%** when compared to traditional fossil-based jet fuels. Countries like Türkiye, with strong renewable energy potential, can achieve high emission reductions through well-planned investments.

SAF Prices and Cost Curve

According to 2023 data from S&P Global Commodity Insights, Argus Media, and General Index:

- Conventional jet fuel: ~€816 per ton
- HEFA-based SAF: €2,700–2,800 per ton

Thus, SAF remains 2–4 times more expensive than fossil-based alternatives.

As production technologies evolve (e.g., Fischer-Tropsch, ATJ), costs may fall to around €1,600 per ton. Among SAF options, Power-to-Liquid (PtL) fuels remain the most costly, with current price estimates typically ranging between €5,000 and €8,700 per ton, largely due to high input costs associated with renewable hydrogen and CO₂ capture.

Given that fuel costs represent 20–30% of an airline's operational expenses, closing this price gap is crucial. Tax incentives, green financing, and growing corporate demand will be key enablers. In Türkiye, similar tools—such as subsidies, tax reforms, and cross-sector partnerships—can improve SAF's price competitiveness.



Key Actions Supporting SAF Adoption

- **Airlines:** Can expand “book-and-claim” systems, transferring emissions reduction credits to corporate customers who pay a premium for SAF.
- **Refineries and Fuel Suppliers:** Are converting conventional refineries to produce biofuels or PtL fuels.
- **Infrastructure Operators:** Are investing in SAF pipelines and on-site blending units at airports.
- **Governments and Regulators:** Support SAF through blending mandates, tax credits, loan guarantees, grants, and global mechanisms like CORSIA.
- **Technology Providers:** Are advancing R&D on modular Power-to-X (PtX) systems and algae-based biofuels.

Conclusion

Improving aircraft fuel efficiency and developing alternative propulsion systems (electric or hybrid) will contribute to reducing aviation's carbon footprint. However, in the short to medium term, scaling up SAF remains the most effective solution to replace conventional jet fuel.

Regulatory frameworks spearheaded by the EU, major investments in the U.S. and Asia-Pacific, and renewable energy projects in the Middle East are all strengthening the SAF market. **Türkiye's geographic proximity** to European markets and its abundant renewable energy

What is Sustainable Aviation Fuel (SAF)?

SAF is a promising alternative to fossil-based jet fuel, designed to reduce aviation-related carbon emissions. It is primarily derived from two sources:

- **Biological resources:** These include sustainable oils, lignocellulosic biomass, waste materials, sugars, and non-edible starches that meet sustainability criteria.
- **Synthetic fuels:** Produced by combining captured CO₂ with hydrogen. The hydrogen can come from renewable electricity (via electrolysis) or from nuclear/CCUS-based fossil sources. These fuels are often called “e-SAF,” “Power-to-X,” or “e-fuels.”

SAF is a drop-in fuel, meaning it can be blended with conventional jet fuel and used without modifying existing aircraft engines or fuel infrastructure. Certified pathways (e.g., ASTM-approved FT-SPK, ATJ-SPK, and HEFA-SPK) allow for blending up to 50% by volume, minimizing infrastructure costs and enabling faster adoption.

resources—solar, wind, and biomass—offer a strategic advantage in building feedstock and energy supply chains for SAF production.

To leverage this potential, Türkiye must implement incentive schemes (e.g., tax breaks, R&D support), allocate a portion of the upcoming **National Emissions Trading Scheme (ETS)** revenues to SAF projects as a “green tax,” and develop a national **SAF roadmap**. By doing so, Türkiye can position itself as a regional and global leader in sustainable aviation fuel production.

THE ISSUE IS NOT THE DISTRIBUTION OF SAF, BUT ITS TRANSPORTATION



AHMET BERKAN KORKMAZ

General Directorate of Civil Aviation – International Civil Aviation Organization (ICAO) CORSIA Carbon Offsetting and Reduction Scheme Türkiye Focal Point and ICAO Committee on Aviation Environmental Protection (CAEP) Observer

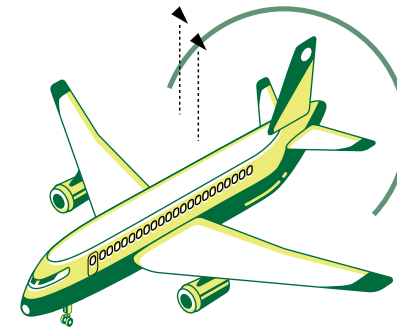
INTERVIEW: Esra YAZDIÇ DEMİR
TTGV Corporate Communications and Media Manager

In the context of the climate crisis, technologies impacting our lives have recently focused on the aviation industry. As aviation experts in both the world and Türkiye conduct meticulous studies to make air travel more sustainable in terms of carbon dioxide emissions, they are also sharing their diverse experiences with each other. In addition to measuring the scientific aspect and feasibility of their work, they are also striving to explain to the public the significance of their efforts for the planet.

Particularly in studies related to sustainable aviation fuel (SAF), the progress made involves detailed analysis of various critical aspects, from fuel properties and engine operating conditions to fuel storage requirements, ensuring that the implementation is environmentally and flight safety compliant. As part of this, a new industry is being established.

As a foundation focused on climate technologies, we wanted to ask an important figure in our country who is responsible for this issue about the topic and the process. We approached **Ahmet Berkan Korkmaz**, the Türkiye Focal Point for the ICAO CORSIA Carbon Offsetting and Reduction Scheme and Observer of the ICAO Committee on Aviation Environmental Protection (CAEP) at the General Directorate of Civil Aviation.

Korkmaz highlighted that the topic of Sustainable Aviation Fuel (SAF) has significant political and strategic implications. He shared his outlook on the issue by stating, “Countries that are successful in SAF production and produce large quantities of SAF will experience a significant decline in their imports of conventional jet fuel. As a result, I foresee a scenario where oil-producing companies will lower prices, and SAF-producing countries will ensure their energy security.” He emphasized that the problem lies not in the distribution of SAF but in the transportation of the raw materials used to produce SAF. He added, “I believe that if the economic benefits, job creation, and the importance of SAF in terms of climate change and global warming are explained in our country, there will be a positive response nationwide.”



“We can say that SAF is the only undisputed solution for the decarbonization of the aviation sector.”

Sustainability is now everywhere, and your area of expertise is sustainability in aviation. So, how have sustainability processes affected civil aviation? Why is SAF important for the world?

Just like every other sector, the aviation industry has also been impacted by sustainability. However, particularly in the last decade, studies have focused on highlighting the aviation sector’s impact on climate change. Unfortunately, it has been revealed that this sector is a “hard-to-abate” area, meaning that emission reduction is particularly difficult. In the 39th ICAO General Assembly in 2016, the International Civil Aviation Carbon Offsetting and Reduction Scheme (CORSIA) was adopted. Despite being the world’s first and only emissions reduction program applied to a single sector, the improvements that can be made within aviation—referred to as “in-sector measures”—are quite limited. As a result, CORSIA had to focus on two primary methods outside of the “basket of measures” package: offsetting and Sustainable Aviation Fuels (SAF).

Subsequently, in the 41st ICAO General Assembly in 2022, the Long Term Aspirational Goal 2050 (LTAG 2050) was adopted. Detailed studies carried out under this framework revealed that SAF is the sole solution for the decarbonization of aviation. Following these developments, significant research, development, and production investments in SAF have been made globally. Currently, the growth in the SAF sector is progressing much faster than anticipated. As a result, we can confidently say that SAF is undoubtedly the only solution for the decarbonization of the aviation industry.

How are global efforts on biofuels advancing? What is the current status in the context of policy and legal frameworks? Is there a country that can be considered an example in the field of SAF?

It can be said that different countries have varying approaches to SAF. However, in general, governments prefer to establish the necessary sustainable economic foundation for SAF production through mandatory

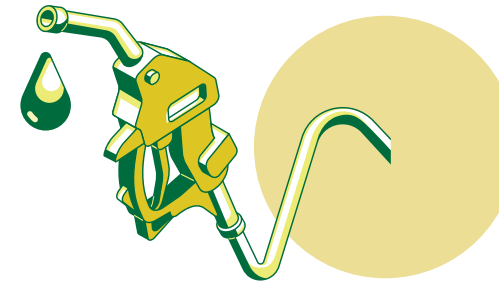


SAF usage quotas. Otherwise, no one will choose a fuel that is approximately 3-5 times more expensive than conventional jet fuel. As for Türkiye, we do not have a country from which we directly model SAF policies. However, through our observations, we are aware that the EU, with its ReFuel EU initiative, mandates the use of fuels that meet its own standards (RED), starting at 2% in 2025, increasing to 5% by 2030, and targeting 70% by 2050. Similarly, the United Kingdom and Japan require a blend ratio of up to 10% by 2030. In smaller, developed countries with aviation industries, such as Finland and Norway, targets of up to 30% by 2030 have been declared. Unlike others, the United States has stated a SAF production target of 3 billion gallons by 2030 under the US Sustainable Skies Act. Currently, there is no country that has reached an exceptional level in SAF, and as a result, we have not yet had the opportunity to model best practices from a leading example.

The Issue Lies In The Transportation Rather Than The Distribution

What are the potential policies and approaches for the distribution of SAF? What is the status of implementation support?

The transportation of raw materials for SAF, rather than its distribution, is currently causing some issues. This is because, within the scope of SAF certification, particularly in the life cycle assessment (LCA), the emissions released during the entire SAF production process negatively impact the quality of the SAF. For example, if you purchase raw materials for SAF from Singapore and produce SAF in Türkiye, you are required to account for the emissions generated from the transportation of the raw materials by ship, which will negatively affect the certification of your SAF. Another issue concerns the post-production status of SAF. Since SAF is very similar to conventional jet fuel, it does not require special transportation conditions or airport infrastructure. However, due to its typically



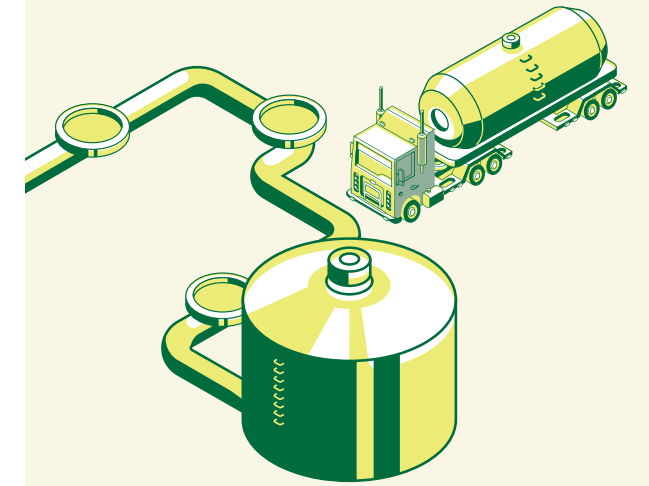
“If we consider Türkiye, achieving a blend ratio of up to 50% in the 2040s could result in savings in the billions of dollars, helping reduce the current account deficit, as well as providing an economic contribution in the scale of billions of dollars within the domestic market.”

small production quantities, it can be costly to allocate a dedicated tank for SAF at airports, and it can also lead to operational constraints. For this reason, purchasing SAF blended with jet fuel and using it in airports is often more practical.

As far as I know, there are no national supports for the implementation of SAF, but there are research and development project supports available through organizations such as the EU, the World Bank, and the EBRD. ICAO's Finvest Hub is one of these initiatives. Unfortunately, in our founding law as the General Directorate of Civil Aviation (SHGM), there are no provisions for providing such support.

What is the position of the General Directorate of Civil Aviation (SHGM) in representing Türkiye? What are the developments in this field within our country?

The General Directorate of Civil Aviation (SHGM) is a special-budgeted department under the Ministry of Transport and Infrastructure. Its significance is



Predicted scenario

How should the importance of the SAF process in aviation be communicated to the public?

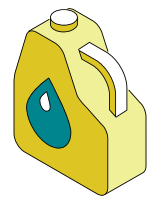
The SAF topic is actually an issue with significant strategic and political implications in aviation. This is because countries that are successful in SAF production and produce large quantities of SAF will experience a significant reduction in their imports of conventional jet fuel. As a result, I foresee a scenario where oil-producing companies will lower prices, and SAF-producing countries will ensure their energy security. If we consider Türkiye, achieving a blend ratio of up to 50% in the 2040s could lead to savings in the billions of dollars, helping reduce the current account deficit, as well as providing an economic contribution in the scale of billions of dollars within the domestic market. Of course, I have not even touched upon the employment generated by this sector, the excess SAF imports, and similar topics. Therefore, I believe that if the economic benefits, job creation, and the significance of this for climate change and global warming are communicated, it will lead to a positive national response.



considerable due to its role as the aviation authority responsible to ICAO. The aviation sector, which employs approximately 250,000 people, is fully regulated and supervised by our General Directorate. As such, we are an institution that continuously produces regulations, carries out inspection activities, and hosts numerous local and international meetings. Recently, there has been an increased focus on advancing the General Directorate, particularly in the context of digitalization, through the Corporate Transformation Model (CTM). In this regard, work is being carried out on several topics, including new training modules, the digitalization of inspection activities, software development, incident reporting, and more. In this way, we believe that the aviation sector, one of Türkiye's most important industries, will be positioned at the forefront.

What are the challenges faced by airports in Europe and Türkiye following the 2050 net-zero commitment? Specifically, when looking at the example of İGA, how would you interpret the future scenario?

In fact, in the face of the net-zero commitment, our airports are in a relatively good position. Towards the end of last year, Olivier Jankovec, the CEO of Airports Council International (ACI) Europe, visited Türkiye. He presented a success plaque to our Minister, recognizing that our country holds the highest number of ACI carbon accreditations in a single country.



“Unless synthetic fuels are produced in very large quantities, biofuels will continue to exist.”

Biofuels will continue to exist unless synthetic fuels are produced in very large quantities.

As both a representative in your position and an engineer, which do you think will prevail in the biofuel and synthetic fuel dilemma? Could you also provide a financial perspective on this?

Bio-based fuels should not be considered as a direct alternative to synthetic fuels. Yes, the long-term continuous use of biofuels may not be financially feasible, but I do not believe these fuels will be easily abandoned. I liken this to the automotive industry, where despite transitioning to the electric age, the demand for diesel vehicles remains considerable. Diesel, including in the luxury vehicle and freight

transport sectors, is still a highly preferred fuel. Biofuels should be viewed in a similar way; biofuel production has decades of experience, and there is established know-how in methods like HEFA and FT. Therefore, aside from raw materials, there is no major issue related to technology. However, synthetic fuels are still very new. There is a long way to go, and they are quite expensive. As a result, unless synthetic fuels are produced in large quantities, biofuels will continue to exist. However, if in the future, the unit cost of synthetic fuels reaches that of jet fuel, we may begin to say that the end of biofuels is near. I believe it is still too early to make such conclusions.

TEKNOLOJİ YATIRIM A.Ş.

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TEKNOLOJİ YATIRIM A.Ş.



SELİN AVŞAROĞLU DERİNÖZ
Teknoloji Yatırım A.Ş.
Associate



AYÇA UYANIK
Teknoloji Yatırım A.Ş.
Investment Analyst

Technology Investment, a subsidiary of the Türkiye Technology Development Foundation (TTGV), began operations in 2005 as one of the first companies to invest in early-stage technology companies in Türkiye. Since its establishment, it has continued to add value to the ecosystem by developing innovative tools to address the financing needs of technology startups at various stages.

To increase TTGV's innovation intensity in exports, demonstrate the positive effects of venture capital investments on innovation and exports in 2018, offer innovative financial instruments in the venture capital field, and serve the diverse needs of the ecosystem, Technology Investment launched the **Explore Investment Program**, which includes both acceleration and investment components.

In 2020, together with TTGV, Technology Investment established the Netherlands-based company **Technology Investment B.V.**, under which they began managing the **TTGV1 Co-investment and Follow-up Investment Fund**. In 2022, it established its first Opportunity Fund to increase access to follow-up investment financing for companies in Türkiye's venture capital fund portfolios with high return potential. By the end of 2024, the number of opportunity funds it had established in collaboration with various early-stage venture capital investors in the ecosystem had risen to three.

explore
Growth Beyond Borders

Explore Investment Program: Global Expansion for Technology Startups

The **Explore Investment Program**, launched to support the international expansion of technology startups, was implemented between 2020 and 2023 with the goal of accelerating the growth of startups through capital investment. Within the scope of the program, startups operating in prioritized areas were included in the development process with an international program partner.

The Explore Investment Program aimed to provide both strategic guidance and financial support during the globalization processes of startups. Over the course of **four periods, a total of 18 B2B SaaS startups** participated in the 6-week Pre-Explore Acceleration Program in collaboration with the U.S.-based program partner, ERA Global. During the program, the startups had the opportunity to validate their go-to-market strategies in the U.S., identify target customer segments, and present their ideas to foreign investors at the Demo Day held on the final day of the program. To date, four startups operating in the fields of educational technologies, cybersecurity, adtech, e-commerce, and data analytics have been included in the acceleration program. **A total of six startups have received investments with ticket sizes of 250,000 USD.**

As of today, the Explore Investment Program is no longer conducted in periods with a program partner, but **investments of 250,000 USD** each continue to be made directly in startups from various sectors, **particularly in climate technologies**, whose globalization roadmaps and maturity have been evaluated.

TTGV1
Bridging The Early Equity Gap

TTGV1 Co-investment and Follow-up Investment Fund: Strategic Investments in Technology Startups

The **TTGV1 Co-investment and Follow-up Investment Fund (TTGV1)** has been designed as an investment vehicle aimed at combining TTGV's experience and insights in venture capital with strategic partnerships established with other venture capital investors in the ecosystem. The primary goal of the fund is to **increase both the amount and diversity of investments made in technology startups in Türkiye at the scaling and early growth stages**. In this regard, financial support is provided to startups through a **co-investment and follow-up investment model** to accelerate their growth.

Startups with global scalability and technology export potential, revenue metrics demonstrating product-market fit, predictable exit potential, and a focus on global markets are among the investment priorities of TTGV1. Startups supported with investments ranging from **500,000 USD to 1.5 million USD** are encouraged to become technology firms capable of competing on a global scale. To date, TTGV1 has invested in a total of 7 startups operating in sectors such as sustainability and recycling, B2B SaaS, and healthtech, with one exit achieved.

MODEL

A fund structured with a co-investment or follow-up investment model for capital investments to be made by independent venture capital funds.

LEGAL STRUCTURE

A BV company structure established in the Netherlands by TYAŞ and jointly owned by TTGV and TYAŞ.

FUND MANAGER

Teknoloji Yatırım A.Ş.

INVESTMENT TYPE

- Equity
- Debt/Loan
- Hybrid of equity/debt
- Convertible financing instruments

FUND LIFETIME

10 years

GEOGRAPHIC FOCUS

- Investments aimed at accelerating the export of products and services by technology companies originating from Türkiye should be prioritized.
- The company's headquarters may be located outside of Türkiye.

FUND SIZE

30 Million €

Teknoloji Yatırım’s Focus on Climate Technologies

At Teknoloji Yatırımt, we aim to closely engage with startups operating in the field of climate technologies, with the goal of supporting technology-based solutions for a sustainable future and promoting innovations that provide environmental and economic benefits. In line with this goal, our portfolio includes companies such as Evreka, which develops an integrated waste management platform for both waste management companies and those generating waste, and Fazla, which develops software solutions aimed at preventing waste formation at the source and ensuring the environmental, social, and economic benefits of waste recycling into the circular economy.

In the coming periods, we hope to intersect with more startups operating in various branches of climate technologies and sustainability, and progress together on their growth journeys. While our investment programs continue, we are also working with instruments like opportunity funds to address specific needs in the ecosystem. In 2024, we aim to compile ecosystem reports on the developments in the investment and startup ecosystem related to climate technologies globally and in Türkiye, which we have included in our reviews below.

2024 General Overview of the Investment Ecosystem

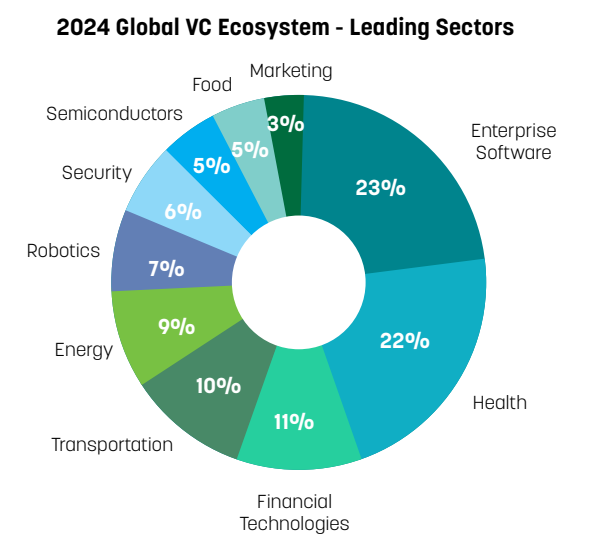
The year 2024 continues to be a critical turning point for the global investment and entrepreneurship ecosystem. The uncertainties that began with the post-pandemic recovery process, combined with global inflationary pressures, geopolitical tensions, and tight monetary policies, have created volatility in financial markets. In this challenging macroeconomic environment, venture capital investments have become more selective on a global scale. The high valuations observed in 2021 and 2022 have given way to a more cautious approach to valuation, with investors increasingly focusing on startups that promise sustainable business models and profitability. This trend, which began in the second half of 2023, has continued to show its effects throughout 2024.

In Türkiye, the investment ecosystem has been following trends parallel to the global landscape. In 2024, with the impact of tight monetary policies in Türkiye, there has been a contraction in domestic demand, which has led investors in the entrepreneurship ecosystem to prefer more cautious and rapidly scalable business models.

In summary, 2024 has been a year marked by the continued impact of macroeconomic uncertainties, during which the entrepreneurship ecosystem in both Türkiye and globally has undergone a transformation. More sustainable and profitability-focused business models have come to the forefront. Alongside startups focused on profitability and rapid growth potential, such as those in artificial intelligence and cybersecurity, ventures positioned in strategic sectors like climate technologies, renewable energy, and the circular economy have also started to gain prominence.

2024 Türkiye and Global Investment Ecosystem Data

In 2024, the global startup ecosystem increased its investment volume by approximately 7% year-on-year, reaching \$368.3 billion. Despite the rise in investment volume, the total number of investments decreased to its lowest level in the last seven years, dropping by 6% to 35,685.¹ In Türkiye’s entrepreneurship ecosystem, 2024 stands out with increases in both investment volume and the number of investments. Seed, early, and late-stage investments reached a total of \$1.1 billion, with 469 investments made. Compared to the previous year, the investment size increased by 44%, and the number of investments rose by 31%. As a result, Türkiye ranks 11th among the countries with the highest investment levels in Europe and 3rd in the Middle East.²



Source: Dealroom, Brain & Co.

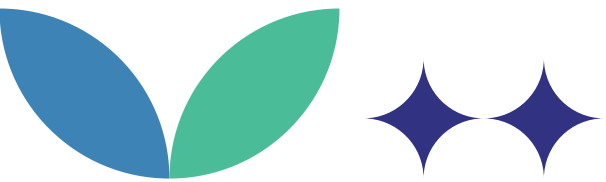
1. Turkish Startup Investments Review, 2024-KPMG Türkiye
2. Startups.watch-Turkish Startup Ecosystem-2024 Year in Review Report v1.1

2024 Venture Capital (VC) Investment Trends

Last year, the startup ecosystem was shaped by prominent sectors such as artificial intelligence, healthcare, biotechnology, cybersecurity, and alternative energy. In 2024, the sectors that received the most investments in Türkiye are as follows: artificial intelligence (75 investments), biotech (52 investments), healthtech (42 investments), SaaS (33 investments), fintech (30 investments), agritech (29 investments), sustainability (28 investments), energy (21 investments), gaming (21 investments), and IoT (17 investments). Compared to the 5 investments made in the sustainability sector and 11 investments in energy in 2023, it is observed that climate technologies and sustainability are increasing their impact in the ecosystem.³

2024 Global VC Climate Investments Changes

In 2024, early and later-stage investments in climate technologies showed a year-on-year decline in the global ecosystem (down by -20.3% and -3.8%, respectively). Particularly, climate investments at the pre-seed and seed stages experienced the largest decline (-22.1%), reflecting a reduced appetite for early-stage risk by investors. Sectorally, energy investments continued to show an upward trend across all stages. This trend is supported by the increasing attractiveness of sectors with proven scalability for investors. On the other hand, investments in the greenhouse gas capture sector showed extraordinary growth in later stages (+305.7%), indicating the growing interest in scaling carbon reduction solutions. In contrast, the decline in early-stage investments in the transportation, food, and agriculture sectors shows that investors are shifting their priorities toward sectors that are rapidly scalable and have lower market maturity risks.⁴



3. Turkish Startup Investments Review, 2023-KPMG Türkiye
4. Net Zero Insights, State of Climate Tech 2024, Net Zero Insights 2024

Yatırım Aşamasına Göre Yatırım Tutarlarında Yıllık Değişim

	Pre-seed and Seed	Early Stage	Late Stage
Energy	26.8%	11.2%	12.5%
Industry	14.8%	43.1%	-60.8%
Transportation	-32.8%	-32.4%	16.5%
Food and Agriculture	-38.3%	24.5%	-17.8%
Circular Economy	-20.0%	-39.3%	1.6%
Smart Urbanization	-31.9%	25.0%	-35.7%
Natural Environment	-22.9%	-31.2%	3.0%
Emission Control	-46.4%	-47.5%	-34.5%
Greenhouse Gas Capture	27.0%	11.0%	305.7%
Water	-33.4%	35.6%	-6.6%

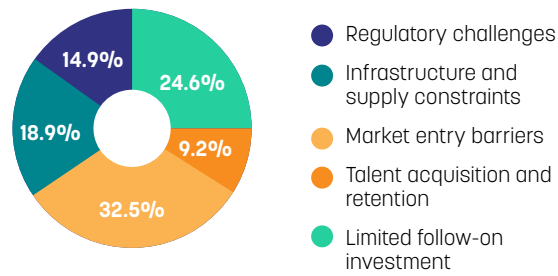
Main Barriers to the Scaling of Climate Technology Companies and Ecosystem Perspectives

Global investors identify the biggest challenges faced by climate technology startups during the scaling process as market adoption barriers and limitations in access to follow-on capital. Additionally, the slow progress of commercialization processes in some sub-sectors of climate technologies and the resulting difficulty in accessing capital are among the most critical issues in investors’ decision-making stages. On the other hand, regulations and new climate policies implemented by governments are seen as the most significant drivers of growth in climate technology investments in the coming years.⁵

Among the biggest concerns of investors regarding climate investments at the pre-seed and seed stages are long product development processes, technological

5. Net Zero Insights, State of Climate Tech 2024, Net Zero Insights 2024

risks, high market entry barriers, and entrepreneurs' expectations of high valuations. After an investment is made, the main challenges faced by investors in the growth process of portfolio companies are the long duration of acquiring the first customer, the fact that initial steps in the commercialization process often remain at the Proof of Concept (PoC) stage, the inability of the developed product to translate into a commercial purchase decision or the long time it takes to do so, the high resource requirements of the product development process, and as a result, the inability to close follow-on investment rounds at sufficient sizes.



Source: Net Zero Insights



Source: Net Zero Insights

Recommendations for Scaling Climate Technology Startups

Despite the length of all these steps for accessing financing and commercialization, the importance of climate change and environmental sustainability continues to grow each year; global demand for sustainable solutions is rising. With the shift in global awareness, the adoption of net-zero emissions targets, and the principles of the circular economy, it is expected that in the coming years, venture capital investments will prioritize climate technologies and sustainability sectors, alongside artificial intelligence technologies, such as renewable energy, carbon measurement, water conservation solutions, and sustainable infrastructure projects.

In this regard, we would like to offer some recommendations to early-stage climate technology startups so that investors can quickly and accurately access the resources they allocate to climate ventures. Firstly, the team should be carefully assembled; it should not only consist of technical experts but also include individuals who can access customer segments in the target markets where scaling is desired and who can analyze market needs and develop effective sales strategies. A balanced team structure is essential.

Moreover, to achieve product-market fit more quickly, continuous interaction with potential customers during the early stages of product development will help better and faster understand market needs. This approach will ensure that the product is developed with the right technical specifications to meet demand and contribute to accelerating the first customer acquisition process.

Additionally, it is critical for accessing VC funding to highlight not only the environmental impact of the technology but also its economic value proposition. Clearly outlining long-term capital requirements and potential investment returns for investors will play a crucial role. Finally, we would like to remind that actively tracking government incentives and climate grant programs can increase access to various funding sources, thereby strengthening the financial resilience of ventures.

TTGV NEWS



Can Climate Technologies Be Türkiye's New Narrative?

In an article entitled "Can Climate Technologies Be Türkiye's New Narrative?" authored by TTGV General Secretary **Dr. A. Mete Çakmakçı** and published in Gazete Oksijen, **Çakmakçı** emphasizes that the new narrative required by Türkiye can be constructed through an industrial policy that centralizes climate transformation, complemented by an inclusive development approach.





The Carbon-Free Future: Put Forward for Consideration in Istanbul

Experts in the field convened in Istanbul to evaluate and discuss TTGV's "Deep Analysis Report on Carbon Capture, Utilization, and Storage (KYKD) and Carbon Dioxide Removal (KDG) Solutions with the Potential to Create Economic Value." During the event, TTGV's Director of Innovative Technology Programs, **Dr. E. Serdar Gökpinar**, delineated the organization's strategic orientation in the domain of climate technologies, while Pioneer Project Program Specialist **Dr. Güniz Gürel** presented the comprehensive report that summarizes the critical role of KYKD and KDG solutions in industrial transformation.

The panel, titled "KYKD: Technologies, Applications, and Future Perspectives," was moderated by Pioneer Project Program Specialist **Dr. Ayşe Sever Akdağ**. Panelists included **Doruk Işıl**, founder of Karbonomics; Associate Professor Dr. Çağlar Sınayuç from Middle East Technical University (ODTÜ); **Uğur Gürel**, an expert from the Climate Change Department; and **Göker Avcı**, founder of Covalent Climate Tech, who evaluated the current applications, commercial potential, and future projections of these technologies.

The event concluded with a discussion on "Decarbonization of Industry" featuring **Ruan du Toit**, Senior Business Development Manager at Linde, providing participants with an opportunity to gain insights into global perspectives on the integration of hydrogen derivatives with KYKD.



Evren Bükülmez, Featured in Sanayi Gazetesi

In an interview with Sanayi Gazetesi, TTGV's Director of Development Programs, **Evren Bükülmez**, expounded upon our initiatives aimed at integrating climate technologies into the industrial sector and advancing the green transformation process. **Bükülmez** elaborated on the models developed by TTGV to secure the necessary financial support for the industrial green transformation, and he underscored the pioneering role assumed in the integration of climate technologies into industry.



Dr. Gürel Evaluated Carbon Storage Technologies on TRT Radio.



Dr. Güniz Gürel, the Pioneer Project Program Specialist at TTGV, appeared as a guest on the TRT Radio Gündem Energy Program hosted by **Mahmut Gürer**. During the program, **Dr. Gürel** addressed issues pertaining to carbon storage and management, emphasizing the necessity of a comprehensive inventory and storage atlas to ascertain Türkiye's carbon dioxide storage potential. The complete broadcast featuring her expert industry assessments is available on TTGV's YouTube channel.



TTGV Introduces the New Version of the Climate Technologies Radar!

As TTGV, we have ushered in 2025 with the new version of our Climate Technologies Radar, which serves as a significant roadmap for our stakeholders. In the third edition prepared by the İklim Lab Community Program through an extensive literature review based on global trends and Türkiye's strategic priorities, fundamental verticals such as Industrial Production, Energy, Mobility and Transportation, Agriculture and Food, and the Built Environment are examined in detail. Additionally, key intersecting areas including water resource management, waste management and the circular economy, land management, carbon dioxide abatement, digital transformation technologies, climate risk management, financing, and business models are also comprehensively analyzed.



Is the Cooperative Approach Feasible in Climate Initiatives?

In our discussion with **Dr. Emre Eren Korkmaz**, a faculty member at the International Development Department of Oxford University, we sought to answer this question. **Dr. Korkmaz**, renowned for his significant contributions in sustainability reporting and data analysis, shared his insights on the role of technology and innovation in combating the climate crisis, alternative business models, the financial challenges faced by entrepreneurs, and potential solutions to these challenges.

You can watch the detailed interview with **Dr. Korkmaz** on our YouTube channel.

İklim Teknolojileri Girişimlerinin Karşılaştığı Finansman Sorunlarını



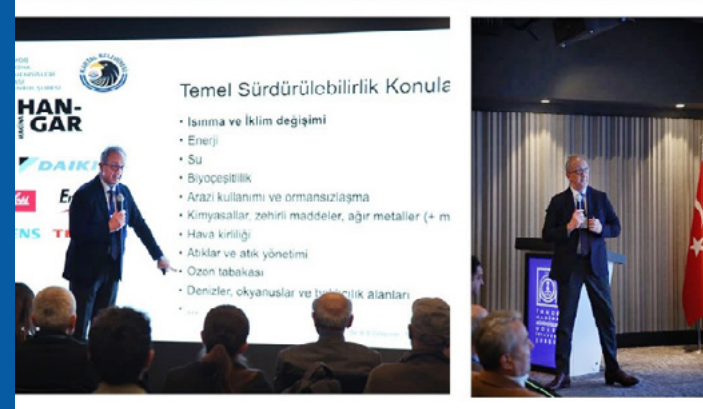
Dr. Emre Eren KORKMAZ
Oxford Üniversitesi Uluslararası Kalkınma Bilimi Öğretim Üyesi



Esra YAZDIÇ DEMİR
Kurumsal İletişim ve Medya Yöneticisi



ENERJİ VERİMLİLİĞİ HAFTASI



Energy Efficiency Congress

Dr. E. Serdar Gökpınar, Director of Innovative Technology Programs at TTGV, emphasized at the Energy Efficiency Congress that both the world and our country are on the verge of a large-scale climate transformation. Highlighting that individual efforts are important but insufficient, **Gökpınar** stressed the need for collective action and systemic change for lasting solutions to climate issues. In his speech, Gökpınar recalled significant developments in renewable energy, particularly in electricity generation from solar and wind sources. He pointed out the importance for companies to not only adapt to current conditions but also to prepare for change by investing in new technologies.

TTGV Board Chairman Usluel Was a Guest on TESİD Sohbetleri

TESİD

TESİD Sohbetleri - 15

“Üçüncü Dalga: İklim Teknolojileri, Türkiye için Fırsatlar ve İhtiyaçlar”

Canlı yayının tamamı YouTube kanalında



Değerhan US...



Vahap Munyar

TTGV Board Chairman **Değerhan Usluel** participated in the TESİD Sohbetleri program to evaluate critical issues in the technology and energy sectors. As a guest alongside TESİD Board Chairman **Yaman Tunaoglu** and **Vahap Munyar**, General Coordinator of Nasıl Bir Ekonomi Newspaper, Mr. Usluel addressed significant topics including energy efficiency, the impact of energy storage on consumer bills, and Türkiye's role in the global climate technologies market. The complete conversation is available on TESİD's YouTube channel.



REACT Website Now Live!

TTGV is pleased to announce the launch of the website for its deep technology-oriented business meetings series, REACT. The portal now hosts summary notes and evaluations from the launch event held as part of the REACT series. Additionally, visitors can access information on REACT's objectives, detailed event information, and the latest developments in the field of climate technologies. For further details, please visit: react.ttgvl.org.tr.



Support for the Management of Climate-Induced Disaster Risks



In Türkiye, the TTGV Climate Lab Community Team provided support to a conference organized with the objective of establishing a common language and fostering collaboration for reducing and managing climate-induced disaster risks. Hosted by TED University and conducted in collaboration with AFAD and the TAM Foundation, the conference brought together institutions and organizations active in the field of disaster management. The event aimed to establish a shared terminology for disaster risk management and to develop comprehensive solutions through the exchange of knowledge and experiences.



ION MEMBRANES: INNOVATIVE TECHNOLOGIES DRIVING THE GREEN ENERGY TRANSFORMATION

Sustainable energy solutions have become not merely an option but a global imperative in today's world. Emerging as one of the pioneers in this transformation, Ion Membranes was established in Istanbul in 2023 by Dr. Seda Köksal Yeğin and Haluk Akçalı. With its innovative solutions in clean energy technologies, the enterprise has garnered attention both domestically and internationally, contributing to the proliferation of sustainable technologies as part of the TTGV Investment Portfolio.

Shaping the Future with Membrane Technologies

Ion Membranes contributes to the green energy transition by developing ion exchange membranes—one of the most critical components in energy transformation technologies. Its advanced technologies, currently under patent evaluation, are utilized across various battery systems, electrolyzers, fuel cells, and diverse hydrogen technologies to enhance energy efficiency and reduce the carbon footprint. Moreover, this innovative membrane technology plays a key role in achieving the sustainability goals of the energy sector, notably by ensuring compliance with PFAS (Per- and Polyfluoroalkyl Substances) regulations that are prominent in both the European Union and the United States.

The company's core strength lies in its scientific and engineering expertise. Dr. Seda Köksal Yeğin leads the R&D processes with over 18 years of experience in membrane

technologies, while CEO Haluk Akçalı directs the company's growth strategy, leveraging 25 years of experience in material engineering and business development.

Rapid Growth and Strong Investment Support

In its inaugural year, Ion Membranes secured first place in the Falling Walls Lab Türkiye competition, demonstrating its capacity to develop groundbreaking solutions in energy storage technologies—an achievement that underscores the company's success beyond mere accolades. Bolstered by the support of prominent investors such as Fark Labs and YEO, the enterprise made a significant stride in expanding its R&D efforts and production capacity by securing a seed investment valued at USD 500,000 in 2023.

Looking ahead, Ion Membranes continues its mission to reduce megatons of CO₂ emissions by 2030. Through projects that unite industry and academia, the company is steadfast in its goal of minimizing carbon emissions by offering innovative solutions. By developing projects anchored in innovation and aimed at constructing a green energy-based future, Ion Membranes is steadily progressing towards becoming one of the leading clean energy technology companies in Türkiye and around the globe.

For further information about the sustainability-focused technologies and projects developed by Ion Membranes, please visit their official website:

<https://ionmembranes.com/>



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