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2025 STI Joint Call for Proposals: New Materials and Green Transition & Climate Resilient, Smart Agriculture using AI and IoT(10th CALL)

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Company Profile

- **Company:** Vestel Home Appliance (*Large Enterprise*)
- **Project Area:** Functional and smart materials for energy-efficient, climate-resistant and smart home appliances
- **Project Goal:** Development, scaling up and integration of next-generation nano-engineered, bio-based and functional materials into white goods
- **Our Products:**
  - Refrigerators
  - Washing machines
  - Dishwashers
  - Tumble dryers
  - Cooking appliances
  - Air conditioners
  - Water heaters

Company Profile

- **The Pinnacle of Production Power:** With a factory area of 1,3 M m2, Vestel maximizes its production power. Our wide range of products, including televisions, refrigerators, washing machines, dryers, cooking appliances, air conditioners, dishwashers, professional displays, digital solutions, electric vehicle chargers, automotive electronics, and battery solutions, reaches consumers worldwide.

- **Continuous Improvement and Innovation:** Thanks to over 1800 R&D personnel and more than 16,000 employees, we conduct continuous improvement and development studies. Our flexible production lines allow us to quickly adapt to changing needs.

- **Environmentally Friendly Products:** Designing products in the highest energy and water efficiency classes, Vestel brings user-friendly products that utilize resources efficiently to consumers thanks to the technologies it develops.

- **Europe's Largest Manufacturer:** With a revenue of $2.2 billion in 2024 and exporting to more than 160 countries, we maintain our title as the export champion for 27 years. As Europe's largest manufacturer of consumer electronics and white goods, we produce products connected to Mobility, IoT, and Smart Home devices.

- **Industry 4.0 and Digital Transformation:** Using Industry 4.0 technology, we are continuously increasing our automation level and achieving digital transformation with our fully automated factories.

- **Sustainable Development:** Vestel continues to expand its social contribution in various social and environmental areas, taking into account the needs of society. Focusing primarily on Quality Education, Gender Equality, Decent Work, and Economic Growth, among the Sustainable Development Goals, we carry out various social projects.

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Vestel A.Ş., headquartered in Manisa, Türkiye, is one of Europe's leading manufacturers of consumer electronics and home appliances, operating under Zorlu Group. With exports to over 150 countries and a strong R&D center employing over 1600 engineers, Vestel focuses on developing energy-efficient, connected, and sustainable technologies aligned with EU Green Deal objectives.

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Dr. Simge ÖZTÜRK

- Experience with EU funding programs (Horizon Europe, Eureka, Eurostars, TÜBİTAK),
- project design, evaluation, consortium formation, and
- evaluator & rapporteur experience.

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Our Mission & Vision

01

Mission
To set a new standard in energy and resource efficiency by integrating sustainable material technologies into home appliances.

02

Vision
To be a global leader in designing the smart and eco-friendly home appliances of the future with functional materials.

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Problems

01 **Energy Efficiency and Thermal Management**

As energy efficiency standards increase, current materials are not sufficiently improving system performance.

02 **Water Management and Filtration**

As the need to reduce water consumption increases, current filtration systems are not performing ideally

03 **Climate Crisis and Durability**

Rising temperatures and humidity are making product durability requirements more unpredictable

04 **Innovation and Supply Chain Challenges**

Cost and supply issues are hindering the process of scaled-up from laboratory achievements to production

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Solution

01 **Thermoelectric Materials**
It reduces the energy consumption of household appliances by converting waste heat into energy

02 **Magnetic Cooling Technologies**
Next-generation cooling systems are being developed with environmentally friendly magnetic materials

03 **Sorbents and Separation Materials**
It provides critical water savings in humidity control and water recovery processes

04 **Functionalized Surface Coatings**
It optimizes heat transfer, reduces contamination, and extends product lifespan

Project Idea

Thematic Field and Project Objectives

- The thematic field of this project is **functional and smart materials for energy-efficient, climate-resilient and intelligent household appliances**, addressing the Green Transition through advanced materials integrated into white goods.

- The project aims to **develop, scale up and validate next-generation functional, nano-engineered and bio-based materials** and integrate them into household appliances such as refrigerators, washing machines and dishwashers. The focus is on materials that actively contribute to **energy conversion, thermal management, water efficiency and system intelligence**, rather than passive structural components.

- Key activities include:
  - Development of **thermoelectric materials** for waste heat recovery and localized cooling in refrigerators and freezers.
  - Exploration of **magnetic materials** for high-efficiency refrigeration concepts and power systems.
  - Integration of **advanced sorbent and separation materials** for moisture control, water reuse and contaminant removal in dishwashers and washing machines.
  - Design of **nanostructured and functionalized surfaces** to enhance heat transfer, reduce fouling and extend component lifetime.
  - Development of **bio-based and hybrid organic–inorganic materials**, inspired by biological templates (e.g. diatom-like porous structures), for insulation, filtration and functional components.
  - Implementation of **scalable synthesis, surface modification and fabrication techniques** compatible with mass production.
  - **In situ material characterization and predictive modelling** under real appliance operating conditions to establish structure–function relationships.

Partners for the consortium

Contributions of partners

White goods company (VESTEL) contribution:

- Definition of industrial requirements and use cases
- Integration of developed materials into household appliances
- Prototype manufacturing and system-level testing
- Validation under real operating conditions
- Assessment of scalability, cost and market readiness

Identify other partners for the consortium

- There are no consortium partners yet.

THANK TOU

For watching this presentation

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