Challenge #16

Methodologies and tools for reusing pharmaceutical plastic waste materials

CONTEXT AND PROBLEM

Firm 16*, one of the top 50 pharmaceutical companies in the world, researches and develops innovative therapeutic solutions in the fields of respiratory health, rare diseases, and specialized care treatments. In line with **its sustainability strategy**, the company aims to **reduce the waste generated by its production processes**, by valorizing **two types of materials**: mixed plastic (particularly polymers) and sludge from industrial wastewater treatment. Firm 16* is therefore scouting for solutions to convert these materials into by-products. Specifically, also in line with **industrial symbiosis principles**, Firm 16* is looking for a partner that could either: 1) buy Firm 16*'s disposal materials as production inputs; 2) support Firm 16* in analyzing and transforming its waste into reusable material for new internal production. The ideal solution can be a methodology (to assess the waste properties), a tool (to transform waste into by-products to sell) or a proposal for a local network to create industrial symbiosis dynamics. The solver must be a waste management expert, as well as ensure compliance with pharmaceutical industry regulations and by-product legislation.

OBJECTIVES

- Scouting for methodologies and tools to reuse pharmaceutical waste, in particular mixed plastic and sludge from wastewater industrial treatment. The ideal solution would allow to transform waste materials into inputs for new value chains, in line with industrial symbiosis principles.
- Looking for solutions at least TRL 4 (Technology validated in lab).
- Firm 16* is open to different types of collaboration.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 15 (Life on Land).

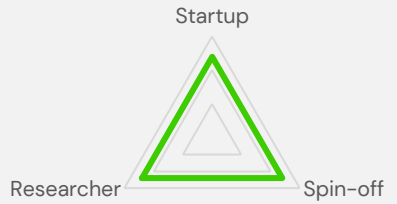
THE CHALLENGE

Methodologies and tools for reusing pharmaceutical plastic waste materials

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#WasteValorisation #IndustrialSymbiosis #Plastic #Sludge #Reuse

**Company name anonymized - will be revealed after registration to the program*

Challenge #17

Powder solution to absorb liquids of different densities facilitating their disposal

CONTEXT AND PROBLEM

Firm 17* has developed Product A*, a spray can that, through a gel, instantly thickens animal **excrement** (urine and feces), neutralizing odors and releasing a pleasant scent. This process, although effective, involves the production of additional waste, as the gel must be removed with a tissue which then needs to be disposed of.
The company is looking for an innovative powder solution (in substitution of the currently used gel) that can **absorb liquids** of different densities, allowing **excrement collection** and facilitating their disposal, without generating additional waste.
The powder should be **environmentally friendly** and **easily disposable**, allowing safe dispersion into the environment without creating pollution.
Thus, Firm 17* is seeking a Solver capable of working on the **product's chemical composition**, ensuring the same **effectiveness of the gel** while minimizing its **environmental impact**.
Additionally, the company collaborates with an **external partner** for the production of the can, and it may be necessary to **involve this third-party stakeholder** in the **development process**.

OBJECTIVES

- Scouting for a powder solution to absorb liquids of varying densities, enabling the efficient collection of animal excrements without creating additional waste.
- Looking for solutions with a TRL 3 (Experimental proof of concept).
- Firm 17* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production).

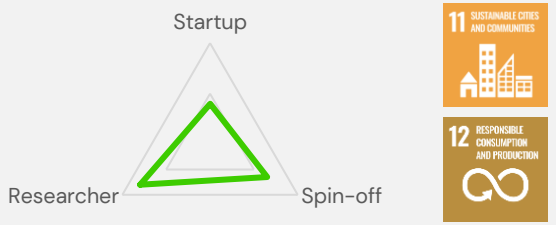
THE CHALLENGE

Powder solution to absorb liquids of different densities

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#EcofriendlyWaste
#AnimalWasteInnovation
#SustainableSolutions

**Company and product name anonymized - will be revealed after registration to the program*

Challenge #18

Sustainable materials for tunnel excavation operations

CONTEXT AND PROBLEM

Firm 18* is specialized in the design and production of advanced solutions for tunnel construction (i.e. automatic steel ribs, GFRP tubes, waterproofing membrane, etc.) . The company is looking for ways to **improve the sustainability** of the materials used in **tunnel excavation processes**. Currently, these processes involve the use of GFRP tubes that are inserted and grouted into the excavation area in order to reinforce the ground of the core-face of the tunnel before excavation.
These tubes are made of **Glass Fiber Reinforced Plastic (GFRP)**, a material consisting of **glass fibers** and **plastic (polymer resin)**. While the glass component is recyclable, the polymeric component is not.
Firm 18* aims to find **more sustainable, alternative materials** to substitute primarily polymer resins (e.g., bio-based or biodegradable polymers), but also for glass fibers.
The goal is to make the **muck** more **environmentally friendly**. In fact, during the excavation the tubes are broken right after use and fragments are mixed with the soil/rocks inside the tunnels. The ideal materials must ensure **mechanical properties** superior/equal to those of GFRP, specifically in terms of tensile strength (≥ 600 N/mm²) and tangent modulus of elasticity (≥ 30,000 N/mm²).

OBJECTIVES

- Scouting for sustainable materials to be used in tunnel excavation processes, that can replace the currently used Glass Fiber Reinforced Plastic (GFRP), while ensuring the same mechanical properties.
- Looking for solutions with TRL 5 (Technology validated in relevant environment) and above.
- Firm 18* is interested launching pilot projects with the Solver and/or, to consider a market ready solution.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure), 11 (Sustainable Cities and Communities) and 12 (Responsible Consumption and Production).

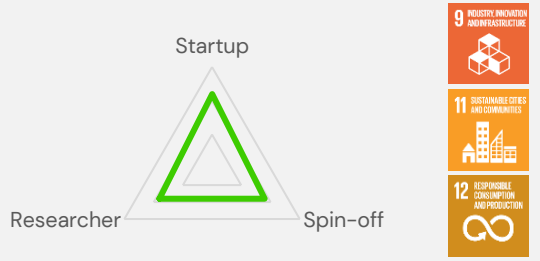
THE CHALLENGE

Sustainable materials for tunnel excavation operations

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#GlassFiberReinforcedPlastic #Tunnel #Excavation #GlassFiber #Bio-basedPolymerResin #Sustainable

ecosister **Company name anonymized - will be revealed after registration to the program*

Challenge #19

Solutions for purifying and reusing wastewater from milk production processes

CONTEXT AND PROBLEM

Firm 19* is one of the world's leading companies in the production and distribution of milk and dairy products. The company's goals it to reduce the environmental impact of its production processes (specifically, to obtain UHT milk), by **optimizing water usage**.
In the current process, the milk is heated to 145-146°C through direct **steam** injection. When the **steam**, generated from demineralized water, comes into **contact with milk**, it forms **condensate water**. The milk is then rapidly cooled down: this process leads to the evaporation of the condensate water, which is then collected as wastewater.
Firm 19* is seeking a solution to **recover** the condensate water generated during production. It is important to note that, having been in contact with the milk, this water contains organic substances such as proteins, and is at a temperature of 65-80°C.
The ideal solution would enable the recovery of this condensate water while ensuring its complete **purification** and **re-demineralization**, allowing it to be safely **reused** in the production process without compromising the quality or safety of the milk.

OBJECTIVES

- Scouting for solutions to recover condensate water generated during the milk production process, specifically from milk sterilization using direct steam injection. The ideal solution would enable the recovery and reuse of purified and demineralized water.
- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.
- Firm 19* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 6 (Clean Water and Sanitation), 7 (Affordable and Clean Energy) and 9 (Industry, Innovation and Infrastructure).

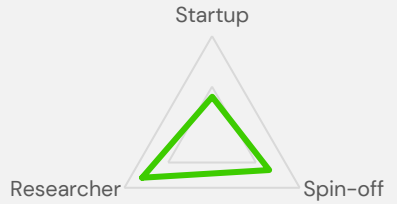
THE CHALLENGE

Solutions for purifying and reusing wastewater from milk production processes

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#CondensateWater #Reuse #MilkSterilisation #UHT #Purification#Recover

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #20

Solutions to achieve high barrier performance for cellulose-based packaging

CONTEXT AND PROBLEM

Firm 20* is a world-leading company specialized in advanced technologies for the ceramics, plastics, food and beverage, metals, packaging and advanced materials industries. The company is developing **dry molding technologies** to produce **rigid sustainable 3D-printed cellulose-based packaging** (for objects such as **caps, closures and coffee capsules**) in response to market demand for eco-friendly alternatives to plastic. Firm 20* has already developed **industrial production facilities** for dry molding technology to manufacture cellulose-based packaging. However, the current molding process does not yet allow the products to achieve the desired **performances**, especially in terms of **water and humidity resistance** (for liquid-contact applications), **aroma retention** (for sealed products like coffee capsules) and **fat resistance** (for food packaging). Firm 20* is therefore seeking an **additive** to be applied (preferably) **before the molding process** or as a **post-production coating**, that will enable the cellulose products to achieve the desired **barrier properties**. The product must be made of **95% paper**, ensuring that it is fully recyclable. The company already employs additive treatments to enhance cellulose-based materials' performance. A potential Solver may also offer **methodologies** for the **application of both existing and newly introduced additives**, thereby facilitating the integration of this technology into Firm 20*'s production processes

OBJECTIVES

- Scouting for additives, methodologies, or technologies to enhance the barrier properties of dry molding cellulose packaging against water, fats, gases and aroma preservation.
- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.
- Firm 20* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production) and 13 (Climate Action).

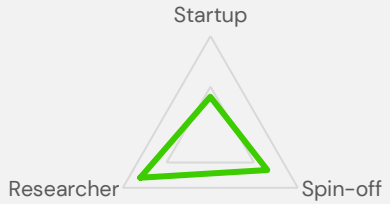
THE CHALLENGE

Solutions to achieve high barrier performance for cellulose-based packaging

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#DryMolding #Cellulose #Additives #Barrier Properties #Packaging

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #21

Materials and methodologies for compostable wood packaging suitable for food contact

CONTEXT AND PROBLEM

Firm 21* provides wooden packaging for the fruit and vegetable, seafood, and industrial packaging markets.
The company is looking for a solution to develop a **fully compostable primary packaging line** (i.e., **for food products**).
To achieve this, it plans to manufacture **trays made of poplar wood**. The manufacturing process involves the following steps: the poplar wood is debarked and peeled into thin sheets, which are moistened. These sheets are then cut and shaped into the desired dimensions before they fully dry. However, the trays resulting from this process are not suitable for food contact, primarily because they are not **waterproof**. The company is therefore looking for **innovative materials or methods** to make them waterproof. For instance, one possible solution may be applying a **bioplastic film** to the wood surface. The ideal solution ensures that the wood trays are: 1) **fully compostable**; 2) **suitable for direct food contact**; and 3) **compliant with regulations** on compostable primary packaging. This solution may be implemented at any production phase, either: during manufacturing, while the poplar sheets are still moist; or after the tray has dried completely.

OBJECTIVES

- Scouting for innovative materials and methods to produce primary waterproof wooden packaging. The ideal solution would allow the company to manufacture fully compostable and environmentally friendly wooden trays, suitable for food contact.
- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.
- Firm 21* is interested in co-developing a PoC or launching pilot projects together with the Solver.
- The resolution of this challenge contributes to the achievement of SDG 12 (Responsible Consumption and Production).

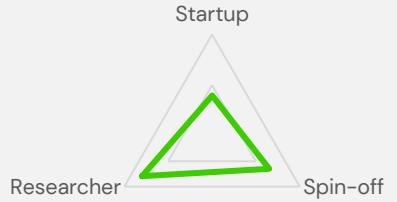
THE CHALLENGE

Materials and methodologies for compostable wood packaging suitable for food contact

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#Packaging #Wood #Primary #Food #Sustainable #Compostable #Green

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #22

Materials, methodologies and technologies for sustainable packaging

CONTEXT AND PROBLEM

Firm 22* is a **provider of temperature-controlled logistics** for the food and consumer goods sectors. It operates in Italy, offering services of cross-docking (i.e., receiving, sorting and **distributing cargo** - across all types of transportation - from producers to end customers) and outsourced logistics for distributors. For such operations, it utilizes **different materials** (e.g., plastic film, pallet supports, cardboard packaging, paper interlayers) and is looking for ways for **avoiding unnecessary** waste along the value chain, minimizing the waste for the end recipient (responsible for disposal). Firm 22* aims at **optimizing material usage**, focusing on **tertiary packaging** and **support materials**. The company is seeking a Solver who can propose ways to **reuse discarded packaging**, **identify inefficiencies in waste management** or **introduce new sustainable materials**. The solution may be an innovative material (e.g., bioplastic films for packaging) or methodologies to **improve** the company's **waste streams/utilization**. In case of a product solution, it should ensure compliance with **European regulations** (for waste management and labeling) and be applicable to at least one of these **temperature ranges**: -25 to -18°C for frozen goods; 0 to 4°C for fresh goods; 8 to 15°C for temperature-sensitive products.
Firm 22* is open to consider the adoption of a **technology to track packaging** materials along the value chain, optimizing its management and enhancing sustainability and transparency for customers.

OBJECTIVES

- Scouting for methodologies, technologies and materials to reuse and reduce waste generated in the logistics industry (particularly tertiary packaging and support materials), to reduce the environmental impact and improve the sustainability of food and consumer goods supply chains.
- Looking for solutions with a TRL 6 (Technology demonstrated in a relevant industrial environment).
- Firm 22* is open to co-developing a PoC or to analyse a ready-to-market solution.
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production).

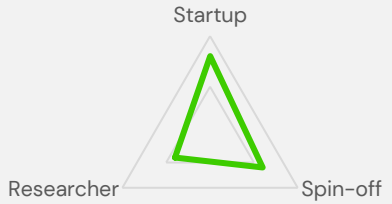
THE CHALLENGE

Materials, methodologies and technologies for sustainable packaging

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#SustainablePackaging #GreenLogistics #TertiaryPackaging #Reuse

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico

Challenge #23

Methodologies, tools and materials for sustainable packaging of industrial components

CONTEXT AND PROBLEM

Firm 23* is a company operating in the hydraulics sector, producing **cartridge valves** for all applications and technologies that require their implementation.
The company is looking for a solution to **enhance the sustainability of the packaging materials/processes** used for delivering finished products (valves) to its end customers worldwide. The valves are made of **steel** and **zinc**, with **plastic/polymeric elements**. During and after the production, to prevent oxidation over time and facilitate functional testing by customers, **mineral oil** is put into the valves. For shipment, they are placed in thermoformed **plastic (PET) trays** and wrapped with a **plastic film (VCI)**. While the packaging materials are fully recyclable, the oil leaking from the valves contaminates the trays and film, making their reuse difficult (a washing process is needed to recycle). Firm 23* is therefore exploring **innovative methodologies, tools or materials** that would allow to **maximize the recyclability of all packaging components**. Potential solutions may include: 1) the use of **alternative oils**; 2) more **sustainable materials** for trays and protective films; or 3) the adoption of new, greener **packaging methodologies**. The ideal solution should provide packaging that **maintains** the **integrity** of the valves **during transport**: i.e., securely holding them in place and ensuring they are perfectly suited for the final testing process by the customer.

OBJECTIVES

- Scouting for innovative methodologies, tools or materials that would enable the company to maximize the recyclability of packaging materials and processes used for shipping industrial components (specifically, cartridge valves).
- Looking for solutions with a TRL 3 (Experimental proof of concept) and above.
- Firm 23* is open to evaluate different type of collaboration on the base of the solution discovered (i.e,. PoC or pilot project).
- The resolution of this challenge contributes to the achievement of SDG 9 (Industry, Innovation and Infrastructure) and 12 (Responsible Consumption and Production).

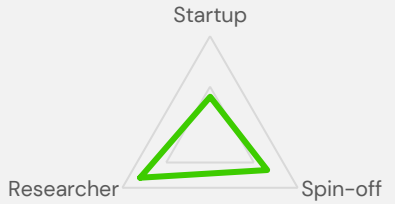
THE CHALLENGE

Methodologies, tools and materials for sustainable packaging of industrial components

THEMATIC CLUSTER

Sustainable Materials, Products & Processes

SOLVER AND KEY SDGs



KEY WORDS

#ValvesRecyclable #Sustainable #Packaging #Plastic #Oil #Shipping #Components

ecosister **Company name anonymized - will be revealed after registration to the program*

Trasferimento Tecnologico