

**IMPORTANT NOTICE**

**This is only an exemplification of an application.** It bases on a real case on which base AVEBIOM has prepared this example, using online info and inputs from the original developers. **Therefore the information bellow does not necessarily fully represent the original innovation idea or the developer position or vision.**

**USE OF THIS EXAMPLE**

This application form has been filled by AVEBIOM (as coordinator of the BioRural SW Regional Challenge) based on available information and in short contact with the original developers. The text bases on a real innovation as it were the initial point when the idea was elucidated.

**Therefore this example is not a guide to follow**, neither for the scope of each box, nor for the format or content. **Its aim is to inspire applicants by seeing how other form could look like.**

**THIS EXAMPLE IS TO MOTIVATE YOU, NOT TO DISCOURAGE!!**

**The example below is well described** as bases on mature info. It is **similar to a maximum what we expect. But we understand that applicants may have more immature info at this stage. Don't get discouraged!!** **If the idea is good it may pass and you will be able to improve it with some support of experts!!**

**Newmind – The original story**

Company	Newmind Innovation SL <a href="https://newmind.gal">https://newmind.gal</a>	<b>NEWMIND</b>
<b>About</b>	Newmind is a microenterprise founded 2022, sited in a small rural town, Barco de Valdeorras, in north-western Spain (Galicia). Its mission is helping small and medium companies improve their efficiency and productivity, putting people at the center and applying technological tools when necessary. The company is specialised in digitalisation and the marine sector. As well, as innovation promoter, Newmind vision is that there is no Innovation if there is no Impact and they therefore promote the concept of I&I, or in other words, Innovation plus Impact.	
<b>The innovation case</b>	<p>2022 the recently founded company Newmind Innovations SL had already been shortly working to think of a solution for mussel shells by-product. This involved brainstorming, design thinking, of course, and literature review and a dialogue with some actors in the sector, to solve questions about what they had no knowledge. They revised what could be a good value for this organic by-product, and realised that once cleaned from remaining flesh, mussel shells were a 95% calcium carbonate (CaCO<sub>3</sub>) material.</p> <p>2022 Coca-cola Europacific partners launched the V edition of “circular seas” award for enterprise and scientific research. Motivated by this opportunity several persons inside put heads together to propose one of the specific solutions they had identified and that implied a circularity approach. In connection with persons of different sectors they realised that calcium carbonate was being utilised in plastic production as a filler, which provides important properties to plastics. It was therefore a potential large niche to which offer a new biobased feedstock.</p> <p>The group developed the idea and applied to the contest, getting the award on December 2022. Afterwards they continued to pass from the idea to the development of a product with the adequate composition to make it commercially viable. This process is currently (2024) undergoing, in tests with clients to refine the process, and fit the client needs, who may take the decision to upscale for commercial development.</p>	
<b>Value obtained by participating</b>	The coca-cola “circular seas” (Mares circulares) initiative award, as declared by Newmind participants, “has given us the necessary support to turn the idea that we had in our heads for years into something real and create a much more sustainable economy”.	
<b>Other sources of info</b>	<a href="#">Newmind news release (December 2022)</a> [ES, EN] <a href="#">News release about awardees and status of development (June 2023)</a> [ES] <a href="#">Coca cola “circular seas” initiative</a> [ES, EN]	

## EXAMPLE OF FILLED APPLICATION FORM



Country \*

Spain

Full Address OR Region of activity \*

West coast Galicia (in Pontevedra and La Coruña provinces)

Name of applicant OR Contact person representing the candidature \*

*Note: Left blank (for the purpose of this example it is not relevant)*  
*Here name of contact person*

Contact Email \*

*Note: Left blank (for the purpose of this example it is not relevant)*  
*Here contact email*

Name of organisation / company / team \*

*Note: Responded as this application form was submitted to a contest in 2022 (Newmind recently founded)*  
Newmind IoT

Legal status OR natural person / unofficial group \*

*Note: Responded as this application form was submitted to a contest in 2022 (Newmind recently founded)*  
Microenterprise

Do you fall under the "Universities/Education Organisations/Training Organisations/Research Group" exception rule, as described in the Applicant Guide? <sup>\*</sup>  
Please, answer Yes or No.

*In case your answer is Yes, place here the main information of your candidacy as individual or team, i.e.  
number of participants, name and role of each participant*

NO

URL

*(If available)*

<https://newmind.gal/>

Name of your bio-based solution <sup>\*</sup>

Mussel shells as filler for plastics and bioplastics

Years of first ideation of your bio-based solution <sup>\*</sup>

*Note: Responded as this application form was submitted to a contest in 2022*

1 month. We had some ideas to work on mussel shells. When applied this contest we developed newly this specific idea.

Description of your bio-based solution. [300 words] <sup>\*</sup>

*What it is, what problem it seeks to solve, how does it solve it.*

*Note: Responded as this application form was submitted to a contest in 2022*

Galicia's mussel processing food industry generates around 90.000 tons of mussel shell waste each year. These by-products are subject of management by authorised waste management companies. Agroindustry and mussel producers (in cooperatives) have to deal with the costs of transporting these by-products and paying the environmental fee to the waste manager.

The accumulation of shells has been source of concerns because of the impact in local environment with odours, and in some cases with not adequate management. Furthermore the current management does not facilitate obtaining high added value products based on the mussel shell circularity.

The mussel shell is rich in calcium carbonate. Therefore it contains CO<sub>2</sub> trapped naturally in bio mineral form. Its utilisation as material, without calcination, is a path for keeping the CO<sub>2</sub> captured.

Calcium carbonate (CaCO<sub>3</sub>) is an additive used in plastic products to improve their physical properties, including strength, impact resistance, hardness, and resistance to high temperatures. The innovative idea proposed consists in obtaining calcium carbonate from mussel shells, of sufficient quality in terms of composition and particle size, to be utilised as a bio-additive into plastics and bioplastics.

What makes your bio-based solution innovative? [200 words] \*

*Technologically/ socially/ environmentally/ operationally*

*Note: Responded as this application form was submitted to a contest in 2022*

The solution is innovative because:

- It allows for the mussel shells a new path for valorisation, not previously explored
- Even though the calcium carbonate is an acknowledged additive to plastic, it is not known the dose, format, degree of milling and purification required to incorporate mussel shells
- The properties of the new plastic material have not been tested
- The capacity to adopt this additive in existing standard production lines has not been explored
- The best types of recycled plastic to be mixed with are still not evaluated
- The capacity to recycle plastics with mussel shell additives is an issue to be studied

TRL (Technology Readiness Level) of your bio-based solution \*

*Note: Responded as this application form was submitted to a contest in 2022 (when idea was still neither tested, nor developed)*

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If you have any comment on TRL, please place here

*Note: Responded as this application form was submitted to a contest in 2022 (when idea was still neither tested, nor developed)*

The mixture of the mussel shell as additive for strengthening plastics has not been tested. But other additives with similar compositions are being currently utilised. Therefore the techniques are at a higher readiness level. But the mixture share, the size of mussel shells milling, or the necessary pre-treatment require exploration and validation. Thus TRL Level < 5.

What makes your bio-based solution circular? [200 words] \*

*Circular resource management, renewable energy production/use, regenerating nature, life-cycle extension, etc*

*Note: Responded as this application form was submitted to a contest in 2022*

The use of mussel shells as additive to plastics and bioplastics facilitates an added value for a second life for the mussel shells. This allows for circularity. Plastics recycling process may take advantage to further increase the rate of circularity.

In case of addition to bio-degradable bioplastics, this addition allows to incorporate calcium carbonate to composting. As well it can be a value for soil (specially in acidic soils), being the mussel shell particles a bio-based material being reintroduced in the natural environment.

Describe the feasibility/applicability of your bio-based solution for the operating environment and problem stated. [200 words] \*

*Currently or potentially, how effective is your solution in solving the problem it seeks to solve, how feasible is it to implement it.*

*Note: Responded as this application form was submitted to a contest in 2022*

The applicability of the mussel shells as additive to bioplastics can be performed in plastic recycling facilities and in plants producing new bioplastics.

#### Plastic recycling:

The mussel shell must be converted in a powder with similar format to calcium carbonate utilised as additive to bioplastics. This involve its application in adequate dose in the pelleting units converting the separated and grinded recycled plastics into uniform plastic pellets. These pellets incorporate the recycled plastic plus additives, and are the material to be utilised by plastic moulding processes (in industries producing plastic commodities).

The material to be produced is in principle compatible with existing feeding systems for calcium carbonate. Notwithstanding the feasibility or need to adapt the feeding system, or the pelleting parameters, is an issue to be object of development to reach TRL 5.

#### New bioplastics

The adaptation would be similar, but with the possibility to introduce this additive in an early stage of the industries producing the bioplastic. Again its incorporation into existing production lines require further work.

Is your bio-based solution (currently or potentially) scalable and/or replicable? Describe. [200 words] \*

*Note: Responded as this application form was submitted to a contest in 2022*

Mussel production in Spain reaches more than 250,000 t/yr in Spain, which is circa 80% of the total aquaculture production. In Europe the total production goes above 500,000 t/year of mussels. Mussel producing areas are usually concentrated in specific geographical areas. Therefore it helps for the possibility to implement the solution with sufficient scale.

The solution can be adopted in different forms:

- By a plastic recycler, by adapting one or several lines to use this new filler (mussel shells). This could be in a regional plant, gathering mussel shells or prepared biofiller by adapting one of the lines for plastic production
- By a local company, installing a new plastic production unit, to produce plastic pellets (to be supplied to the plastic moulding industry). Lines are available in sizes from small lines of 300 t/yr to larger lines of 3,000 t/yr or more.
- Agroindustries could opt to become producers of the powder or granulated CaCO<sub>3</sub> equivalent bio-filler (based on the mussel shells) to supply it to local or regional plastic producers
- Local farmers, cooperatives or companies could produce locally recycled plastic pellets by using their own residues (mulching, packaging, etc.) in small units. Then they could use this local biofiller.

What is the (current or potential) social impact of your bio-based solution? [150 words] \*

*Note: Responded as this application form was submitted to a contest in 2022*

The solution could allow for mussel shells circularity thus solving an issue that is locally affecting areas dedicated to mussel culture and processing into agro-industries. Where not appropriately utilised, mussel shells are causing odours in the areas, either in the temporary collection sites, or in the applications to soils. The mussel shell requires sanitation before used as material or applied to soils, in order to ensure sound applications. However not always performed as current uses are of lower added value.

Furthermore, in mussel producing areas, it would reduce the existing tensions between administration and processing sector derived from the more strict regulations, which involve economic costs and a constant trouble to industry managers.

How can your bio-based solution be financially sustainable? Describe the different types of revenues or savings that it could create/attract once put in practice. [150 words] \*

*Note: Responded as this application form was submitted to a contest in 2022*

On the one hand the agroindustry producers can achieve savings in the fee for mussel shells management. In Northeast Spain it can reach 10 €/t, though depending the season, waste managers may ask for much higher fees. Furthermore costs for transport are reaching 200 / 300 €/truck with impacting 10 to 20 €/t.

A plant next to one or several agri-food mussel processing plants would radically reduce these costs, leading to direct savings of at least 20 €/t. Additionally calcium carbonate filler reaches international market prices circa 50-100 €/t for powder format, and 250 - 300 €/t for pelletised formats. Assuming 20% losses and refuses, the gains per treated ton would be about 60 €/t and 220 €/t for powder and pellet formats respectively.

A plant handling 5,000 t/year (output from a local medium sized mussel cooking industry) allows for a monetary added value of at least incomes circa 300.000 € in case of producing powder format. This would allow for economy of scale, and could supply local plastic or bioplastic producers. In case it requires marketing to longer distances, then the facility would require higher investment, but as well would get higher revenues, circa 1.1 M€/yr.

Why are you interested in participating in the regional workshop/challenge in Valladolid? [100 words] \*

*Note: Featured as it was responded in 2022 by a person from Newmind*

Participating in the final workshop in Valladolid is for us a chance to connect with other innovation brokers who can support us to go ahead with this idea. We also value dissemination, which for a small innovation company like ours, can open doors for collaborations.

Furthermore our company innovation (see at our webpage/innovation) seek to not only create innovative technology solutions, but also ensure that these solutions are open to collaboration and focused on people's needs and experiences. Thus, participating in a collaborative experience is part of our natural path.

If you are selected to participate in the regional workshop/challenge in Valladolid, how many people would travel to represent your bio-based solution? \*

*Note: Featured as it was responded in 2022 by the applicant*

Two persons would participate. The responsible of projects and the person behind the ideation of the solution of mussel shells as filler for plastic.

How did you hear about the Bioeconomy Challenge? \*

*Note: Featured as it was responded in 2022 by the applicant*

We read a press release in an innovation channel we use to be connected to.