REBUILT Project / Activity 2.4.

Business modelling for circular economy projects

Co-funded by the European Union

ReBuilt

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1. Introduction

COGREEN is a company created in 2017 specialized in building residential houses in Slovenia, with the particularity to integrate hempcrete isolution materials in order to reduce carbon emission in the construction phase.

Based on our long experience of using this type of bio-based sourced materials, we decided to expand our scope to propose this environmental friendly technology for noise barriers products, either along motorway or railway infrastructures in Slovenia.

Consequently, we are in a stage of developing a hempcrete noise barrier product available mainly for public clients, such as but not limited to State motorway companies and railway companies, or municipalities suffering from the decibels produced by the traffic.

CoGreen itself is the production facility, with hemp shives collected from Techno Kanapa, Italy. We CoGreen have so far have designed the prefab hempcrete panel system along with Gorsko d.d. The “reliable supply chain” for hempcrete raw materials likely comes through upstream hemp-processing suppliers, especially cooperatives and processors such as Techno Kanapa or larger European hemp processors.

2. Market analysis.

This new product is only dedicated to public market clients as described above. Our existing business with residential houses builders does not seen as being from a matter of interest for the solution proposed.

Therefore we did scan the potential market segments mainly in Slovenia which is our catchment current area, even such product could be also interesting for neighbouring countries where Cogreen could export this solution across neighboring countries like Austria, Croatia, Hungary, Italy and Germany.

2.1. Existing and potential markets.

There are 2 segments of potential clients for this solution :

- Either the infrastructure managers such as DARS for motorways or Slovenske Zelecnice for railways.
- Or the main cities which are impacted by the noise effect of the above mentioned inftrastructures (see hereunder with more as 10% of the population).

After a check of these potential clients, we decided to concentrate on the second segment with the following cities :

- Ljubjana,
- Maribor,
- Piran
- Grousplje
- Koper
- Nova Gorica
- Prekmurje

Other cities like Vrankso, Vodice, Kranj also are potential clients for sustainable approaches.

The approach shall be to enter to contact either through local designers operating for these cities or directly to the municipalities departments.

Our estimate is that more of 10% of the slovenian population is exposed to high level of noise and that the solution could reduce this quite significative exposure

In Ljubljana, a total of **93,600** people are exposed to night-time average sound levels of **50 dB** or higher from **road** traffic.
Number of people exposed to high levels of **road traffic noise in Slovenia (Lnight≥50dB)**

Slovenia	**207,900**
Inside urban areas	134,300
Outside urban areas	73,600

Globally we estimate that the total needs fro these clients could represent about 120 kilomters with an average hieght of 2.5 meters (protection of the first floor of neighbouring houses).

2.2. Decision making process.

Decision-Making Strategies

Selecting priority markets and targeting the local municipalities, CoGreen applied a structured decision-making approach combining:

1. **Impact-based prioritisation**, focusing first on cities with the highest population exposure to traffic-related noise.
2. **Feasibility assessment**, evaluating regulatory readiness, availability of local designers, and ease of engagement with municipal departments.
3. **Resource optimisation**, selecting opportunities aligned with existing production capabilities and minimal additional CAPEX.
4. **Scalability analysis**, favouring municipalities where early adoption can serve as reference projects and enable expansion into neighbouring countries.

2.3. Competition.

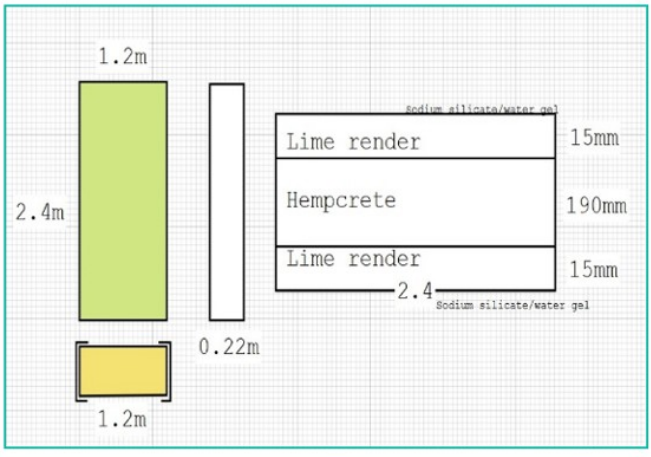
For the moment, as far as we have investigating, no similar product exist in Slovenia to reduce the noise created by infrastructures and using bio-sourced materials.

The current solutions implemented in Slovenia are based either on concrete or glass noise barriers, which are high carbon consumers.

3. The solution and its implementation.

3.1. Description of the solution.

The solution combined a high level of noise reduction together with a strong embodied carbon usage.



Highway/Railway Panels of size 2.8x2.6x0.32m

It allows to achieve high standards of noise reduction, comparable tot he existing one but with a very interesting environmental impact (see current concrete solution on the left compared to the new solution on the right

U value	0.5-0.8 w/m2k	0.2-0.3 w/m2k
Fire resistance	Class A	Class B
Noise absorption	48-54 dB	45-50 dB
Density	473 kg/m3	290 Kg/m3
Environment	High CO_2 emission	Carbon Negative Material and life time CO_2 sequestration
Cost/Panel/m2	Medium to High	Low to Medium
Railways	60-80dB	70-80dB

3.2. Certification.

We have completed with preiliminary tests on the material and timber panel, at ZAG & Department of wood science and Technology, University of Ljubljana and further for the license to the ZAG,Slovenia authority regarding the product in Slovenia. At a further stage, it is intended to extend the licence to other european countries.

Currently we estimate that a final decision could take about 1 year, i.e. for end of Q4-2026. As the EOTA has to validate the panels and certify, depends on the validation period.

3.3. Mimimum viable product (MVP).

The solution for the moment consists on a 60x60x30 panel which was built in order to initiate the ceertfication process.

The Minimum Viable Product developed for this project consists of a prefabricated hempcrete noise-barrier panel measuring 60 × 60 × 30 cm, produced using CoGreen's existing manufacturing setup and supplied with hemp shives sourced from Techno Kanapa (Italy). This prototype serves as the foundational unit for validating the acoustic performance, structural stability, fire resistance, durability, and environmental benefits of the solution.

The MVP has been designed to meet the preliminary requirements of the Slovenian certification and licensing process initiated in 2025. It enables early-stage testing and demonstration to key stakeholders—particularly municipalities and infrastructure designers—while allowing CoGreen to refine the product geometry, mix design, and installation method based on feedback and test data.

This initial 60 cm panel provides a scalable template for future full-height barrier elements and ensures that further development steps can proceed with minimal additional CAPEX or production adjustments.

3.4. Life Cycle assessment (LCA).

A preliminary Life Cycle Assessment (LCA) has been conducted to evaluate the environmental performance of the hempcrete noise-barrier solution compared with conventional concrete and glass-based barriers currently used in Slovenia. The LCA follows standard methodology based on **EN 15804** and focuses on the key life-cycle stages relevant to early decision-making: raw material extraction, production, transport, installation, use phase, and end-of-life.

The results indicate that hempcrete panels offer a significantly lower embodied carbon footprint, primarily due to the carbon sequestration capacity of hemp shives during plant growth and the reduced energy demand of lime-based binders compared with Portland cement. Preliminary estimates suggest that each square meter of hempcrete barrier can achieve a net carbon benefit, with the biogenic carbon stored in the material outweighing emissions generated during production and transport.

In addition, the low-density material reduces transportation impacts, and the prefabrication process at CoGreen's facility ensures minimal waste generation. At end-of-life, the panels can be recycled, crushed for secondary aggregates, or returned to the biosphere with minimal environmental risk, further improving their overall LCA performance.

A detailed LCA will be completed once full-scale prototypes are tested and the final product geometry, mix ratio, and installation method are confirmed. This extended analysis will quantify total global warming potential (GWP), energy use, and resource efficiency, providing robust data necessary for certification, public procurement, and future expansion into neighbouring markets.

3.5. Further development areas..

For the moment, the promotion is mainly to be done in Slovenia. Further development in neighbouring countries shall be examinated later and will consequently not be part oft he hereunder presented business plan.

4. Business plan components.

4.1. Costs and CAPEX.

No CAPEX is needed as the production unit is already existing and needs no operational changes to produce the new solution.

Minor CAPEX may only arise from optional quality-control equipment (e.g., acoustic testing tools or mould enhancements), which, if implemented, would be depreciated over a 5–7 year period according to standard industry practice.

The main operational costs associated with the product include:

- Raw material purchase (hemp shives from Techno Kanapa and lime-based binder).
- Production costs, including labour, energy, mould handling, curing, and quality control.
- Design and Planning cost (Software and cost estimation values).
- Transport to site, depending on distance and logistical requirements.
- Installation costs, including site preparation and mechanical placement of the panels.
- Warranty provisions, estimated at approximately 1% of product cost, covering potential defects or early-stage performance issues.
- Financing costs related to the Working Capital Facility, as each product requires an estimated two-month production and curing cycle before invoicing.
- Depreciation of CAPEX, if minor investments are added as described above.

This cost structure allows the solution to remain competitive with conventional noise-barrier systems while providing superior environmental performance and added value for public clients.

We assume that the commercial costs to promote the solution can be done within the existing organization.

For the design of a project of 2.8x2.6x0.32 m, the above costs are the following:

- Production cost m2: 2.200 Euros (Which differs based on the location and Transport)
- Installation cost m2: 3.500 Euros

Total cost for panelling the house : 25-30,000 euros for 20m2 POD House (Example prices, are according to the current market levels.)

4.2. Revenues.

Generally we apply of 10% mark up on costs (overheads of 7% and 3% gross margin before tax) to invoice the client which would lead to 6.300 euros per panel. Based on the current design (2.8 x 2.6 meters), it would lead to an average price of 800 euros per sqm.

After the certification (end 2026), we can expect to design a pilot project in 2027 (200 hundred meters).

Then COGREEN would target to reach with a ramp up phase about 2 kilometers per year in 2030, which would lead to a turnover of 4.5 millions euros.

Of course possible export of this solution in the neighbouring countries is envisaged but it is not considered at this stage as it would lead to strong commercial efforts (salesman,….) which is hard to support for a SME.

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The Lean Canvas

Designed for:	Designed by:	Date:	Version:	Documentation:
COGREEN		March 2026	1	Read Instructions Watch YouTube video

Problem	Solution	Unique Value Prop.	Unfair Advantage	Customer Segments
Main problem : 10% of the Slovenian population is subject to noise due to mortorways and railways, which gives an estimate of need of construct 120 kilometers of barriers. As these products are mainly produced with concrete ar glass, the carbon consumption is very highj	Promote a solution using hempcrete instead of glass/concrete, where Cogreen has already an extended experience with fabricating products for residential insulation. The product in form of a MVP is already existing and veing currently under certfication by ZAG in Slovenia	Replacing concrete/glass products with a natural bio sourced component to build the noise barriers.	No unfair advantage foreseen as this solution is only bringing less carbon comsumption for the population leaving close to the motorways/railways infrastructures.	Target Customers : 10 cities being impact by noise created by both railway or motorway traffic (Ljubljana, Maribor, Koper,….)
Existing Alternatives	**Key Metrics**	**High-Level Concept**	**Channels**	**Early Adopters**
Unknow at this stage, as the competition is not publishing their solutions.	Market share of the noise barrier with this solution by 2030.		Selection of 10 cities in Sxlovenia being impact by traffic noise. Relation either direclty to the municipalities technical departments or thier respective architects/designers.	Testing in 2027 with one of the municipalities after certification

Cost Structure	Revenue Streams
List your fixed and variable costs. Production and installation costs : 5.300 € per panel (2.8 meters long)	List your sources of revenue. Revenue : 2027 1 pilot project of 200 m (450 k€) and target of 2 kilomters per year in 2030 (4.500 k€ per year) Gross Margin : 3% of the above figures as the mark up of 10% contains also overheads (R&D, sales, project management,...)

Lean Canvas is adapted from The Business Model Canvas (www.businessmodelgeneration.com/canvas)

Excel implementation by: Neos Chronos Limited (https://neoschronos.com/)

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