Bio-concrete (pat.pend)

General Application

(The General Application applies to everyone, all applicants should complete this)

Company or organization name

Puro.earth and VTT Technical Research Centre of Finland, Research Area: Knowledge Driven Design

Company or organization location (we welcome applicants from anywhere in the world)

Finland and Finland

Name of person filling out this application

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Brief company or organization description

Puro.earth provides carbon removal by identifying projects, verifying them, issuing CO2 Removal Certificates (CORCs). VTT is a research organisation with a long history in concrete research and technical testing. In their lab VTT team has invented CO2-negative-concrete which requires demonstration and piloting on a commercial scale.

1. Overall CDR solution (All criteria)

a. Provide a technical explanation of the proposed project, including as much specificity regarding location(s), scale, timeline, and participants as possible. Feel free to include figures.

"Every pavement and road should be a carbon storage".

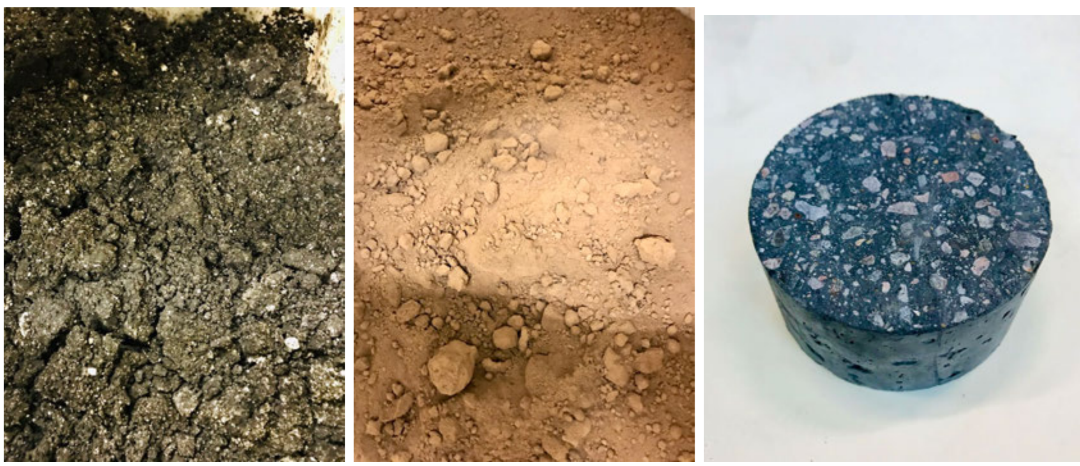
This CDR project aims at bio-concrete production, which has a net negative carbon footprint. VTT developed manufacturing process combines industrially available by-products and carbon curing technology to produce concrete-like performance with net-carbon negative material. Used mix design does not contain Portland cement which is responsible for 6-7% of global CO2 emissions.

In the current project, mix design contains green liquor dregs (pulp industry waste-stream), bio-based ashes (power plant waste), silicon/aluminium sources (absorption mass and blast furnace slag) and potentially biogenic CO2 to cure the products. With selected material combinations and carbon curing, gross carbon negativity down to -388 kg (CO2)/m3 is achievable.

Green liquor dregs is the largest waste stream from the pulp- and paper industry, corresponding approximately 500 000 tonnes annual production. Annual global production of bio-based ashes is 476 000 000 tonnes. Silicon and aluminium sources can originate from various sources, most prominent for net-negative carbon solutions are industrial by-products such as slags, thermally treated clays or refinery-based process wastes.

Production will take place in three campaigns. First production campaign will be organized in *central Finland in autumn 2021. The goal of the first campaign is to produce concrete products that bound 25 tonnes of CO2. Estimated length of the campaign is one week, and it will take place on local concrete pavement- and curb stone manufacturer premises. Produced concrete will be cured in a carbon dioxide atmosphere, using a curing unit, developed by a potential VTT spin-off (CarbonAide) . Second campaign is organized in winter 2022 in a precast company premises that is capable of producing volumes that correspond to 50 tonnes of bound CO2. Last campaign is organised in the spring 2022, with a target to bind 75 tonnes of CO2. Performance of the last campaign products should be equal to traditional Ordinary Portland Cement concrete.*

Between the campaigns produced materials are extensively studied and tested, to further develop the process, find the best optimal end-use and market price for the products. During the project, technical viability of the products will be improved and the ultimate goal is to generate an economically self-sufficient production chain.



Figures: Left: green liquor dregs, middle: bio ash, right: hardened bio-concrete with finished surface.

b. What is your role in this project, and who are the other actors that make this a full carbon removal solution? *(E.g. I am a broker. I sell carbon removal that is generated from a partnership between DAC Company and Injection Company. DAC Company owns the plant and produces compressed CO_2. DAC Company pays Injection Company for storage and long-term monitoring.)*

***Puro.earth** is a marketplace that represents an innovation project team inside VTT. Puro.earth issued CORCs are for-sale-by-owner, so the innovation project sets the price. Puro.earth charges a service fee per CORC when a sales transaction happens. We do not charge the project upfront for verification or registration or methodology development.*

***VTT Technical Research Centre of Finland** is a government owned research centre that is responsible for the technology used in this project, provides techno-economical evaluation of the products, and is responsible of general management of the project.The innovation project has partnerships with pulp & paper company, precast concrete producers, CO2-curing* *technology CarbonAide and potential end-users.*

***CarbonAide** is a VTT spin-off incubator project that aims commercialization of the carbon curing technology. CarbonAide provides pilot/demo-scale curing technology to the project.*

Pulp-and paper company is a global leader in pulp- and paper industry which green liquor dregs and bioash to the project.

Unnamed company provides silicon and aluminium source to the project.

Gas company is a domestic supplier of CO2. Biogenic CO2 will be used in the project, if it is locally available.

Concrete company A: is a small scale precast concrete manufacturer that is responsible for first campaign products. In the first campaign, a small-to-medium scale factory is desired due its capability to quickly adapt changes during the production period.

Concrete company B: is a medium-large precast concrete manufacturer that is capable of higher production volumes than company B. Concrete company B has a higher level of automation than company A and is therefore less adaptable for sudden changes.

Municipal A is a local municipality able to use products in it's infrastructure.

End-user B is a party with a desire for climate friendly concrete solutions. Buyer B would be the end-user of the products in the economically viable production chain.

c. What are the three most important risks your project faces?

1. The developed technology is not yet validated at industrial scale. It is possible that an industrially feasible solution might not provide the performance of lab-scale trials.

2. Materials used are not fully compatible to today's concrete manufacturing processes. Needed changes ranges from minor to large labour intensive changes depending on the site.

3. Performance of the produced materials might have a large variability that hinders the end-use as pavement. In the worst case scenario, end products have to be used for land construction, but the CO2 will be retained within the material.

d. If any, please link to your patents, pending or granted, that are available publicly.

- *We have a patent pending (PC19059FI_P4717FI00) for the used production which is not yet public.*

2. Timeline and Durability (Criteria #4 and Criteria #5)

a. Please fill out the table below.

	Timeline for Offer to Stripe
Project duration	*June 2021 - June 2022*
When does carbon removal occur?	*Carbon removal takes place immediately during the manufacturing process.*
Distribution of that carbon removal over time	*Carbon removal takes place during campaigns, in autumn 2021: 17%, in winter 2021-2022: 33% and in spring 2022: 50%.*
Durability	*Carbonate minerals are extremely stable and will last over 10 000 years.*

b. What are the upper and lower bounds on your durability claimed above in table 2(a)?

Minerals are extremely stable and even weathering does not release CO2. Temperatures above 600 C (1112 F) are necessary to release CO2.

c. Have you measured this durability directly, if so, how? Otherwise, if you're relying on the literature, please cite data that justifies your claim.

Carbonate minerals are extremely stable, please refer (www.webmineral.com)

d. What durability risks does your project face? Are there physical risks (e.g. leakage, decomposition and decay, damage, etc.)? Are there socioeconomic risks (e.g. mismanagement of storage, decision to consume or combust derived products, etc.)? What fundamental uncertainties exist about the underlying technological or biological process?

We have not identified any of the above mentioned risks.

e. How will you quantify the actual permanence/durability of the carbon sequestered by your project? If direct measurement is difficult or impossible, how will you rely on models or assumptions, and how will you validate those assumptions? *(E.g. monitoring of injection sites, tracking biomass state and location, estimating decay rates, etc.)*

We will measure the total carbonate content of ready-made products. We also measure the consumption of gaseous CO2 and C-containing feedstock in the curing process.

3. Gross Capacity (Criteria #2)

a. Please fill out the table below. **All tonnage should be described in metric tonnes here and throughout the application.**

	Offer to Stripe (metric tonnes CO_2) over the timeline detailed in the table in 2(a)
Gross carbon removal Do not subtract for embodied/lifecycle emissions or permanence, we will ask you to subtract this later	*-388 kg(CO2)/m3 x 390m3 = -150 000 kg(CO2)*
If applicable, additional avoided emissions e.g. for carbon mineralization in concrete production, removal would be the CO_2 utilized in concrete production and avoided emissions would be the emissions reductions associated with traditional concrete production	*117 000 kg(CO_2)* *Portland cement based concrete for the same purpose has a footprint of CO2 emissions 280 - 330 kg(CO2)/m3 (https://betong.net/nettbutikk/nb-publikasjoner/37-pdf-lavkarbonbetong-2015-gratis-nedlasting-klikk-les/)* *Every m3 of bio-concrete displaces 280 - 330 kg(CO2) (in addition to embodied carbon sequestered inside the bio-concrete material)*

b. Show your work for 2(a). How did you calculate these numbers? If you have significant uncertainties in your capacity, what drives those?

In our studies, bio-concrete consisting of our ingredients (green liquor dregs, bio ash and blast

*furnace slag) is capable of binding 140 kg(CO2)/m3 during CO2-curing. Green liquor dregs include 5-15 % of biogenic carbon. Using the exact composition of our previous lab experiments, maximum green liquor dreg content is 680 kg/m3, embodying 248 kg(CO2)/m3. Total sequestered CO2 content is (140 + 248) kg/m3 =388 kg(CO2)/m3. We offer a deployment of 26 production days, divided into three campaigns (batches), each day targeted to manufacture 15 m3 of concrete products which matches the production volume of our carbon curing unit. Total gross CO2 removal is 388kg(CO2)/m3*26*15m3=151 000 kg(CO2)/m3.*

However, there are risks related to manufacturing efficiency and applicability of the products. We might have to adjust the mix design or manufacturing process, which will affect gross CO2. In the worst case, the estimation is that only 1/3 (50 000 kg(CO2)/m3) of the total CO2 sequestration is achievable.

c. What is your total overall capacity to sequester carbon at this time, e.g. gross tonnes / year / (deployment / plant / acre / etc.)? Here we are talking about your project / technology as a whole, so this number may be larger than the specific capacity offered to Stripe and described above in 3(b). We ask this to understand where your technology currently stands, and to give context for the values you provided in 3(b).

We have developed a scalable process to use carbon curing in the precast concrete industry. The process is capable of exploiting various waste- and side streams. The curing unit used in the project is the first of a kind, but we have capability to multiply the capacity, depending on the success of the first campaign.

d. We are curious about the foundational assumptions or models you use to make projections about your solution's capacity. Please explain how you make these estimates, and whether you have ground-truthed your methods with direct measurement of a real system (e.g. a proof of concept experiment, pilot project, prior deployment, etc.). We welcome citations, numbers, and links to real data!

We have performed lab trials on various material combinations and mix designs. The amount of bound CO2 has been determined using direct carbon analysis (ASTM D 5373) of carbon cured samples and the background is subtracted using reference samples. Carbon dioxide content of the raw materials are also chemically analyzed. We assume that carbon in green liquor dregs originates solely from biomass. Mechanical properties of the samples were determined using SFS-EN 12390. Our research data is not yet public, due to the pending patent.

e. Documentation: If you have them, please provide links to any other information that may help us understand your project in detail. This could include a project website, third-party documentation, project specific research, data sets, etc.

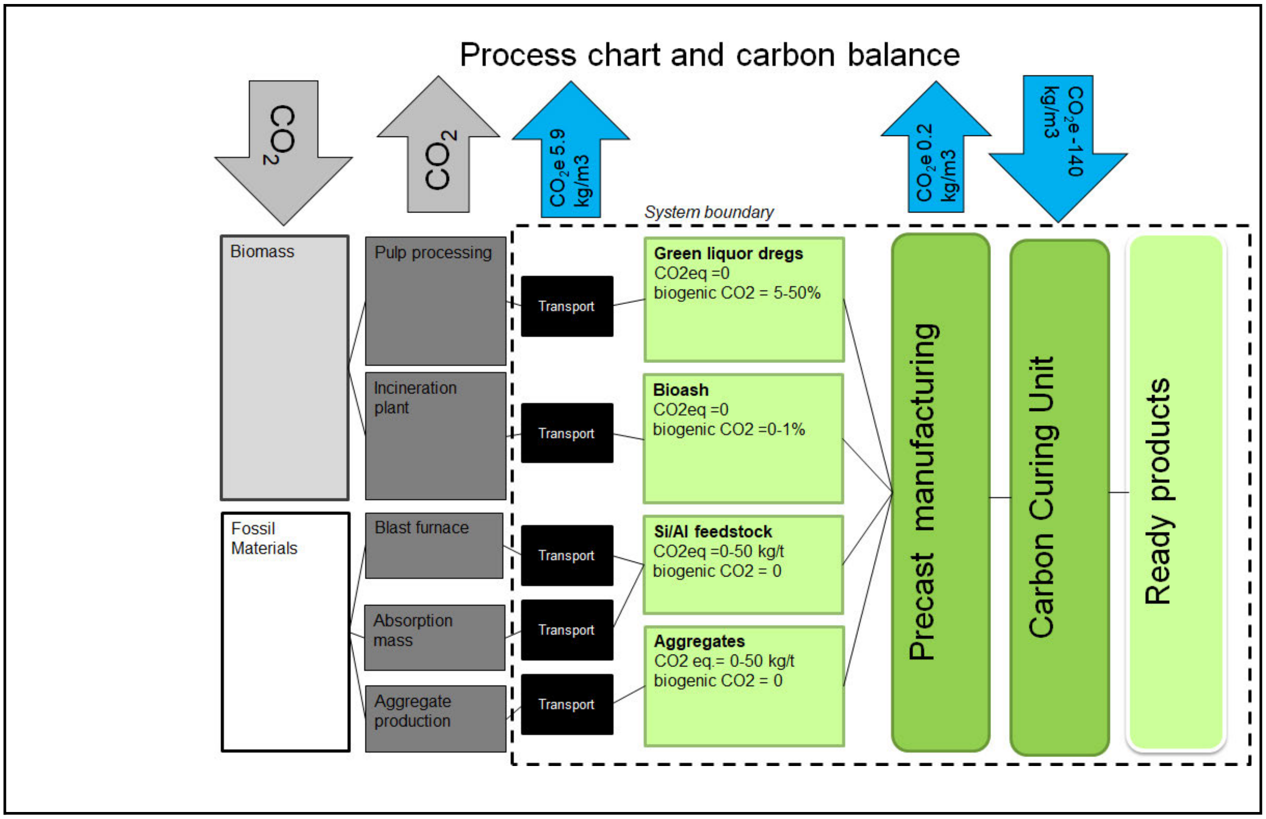
- https://research.fi/en/results/funding/26395

4. Net Capacity / Life Cycle Analysis (Criteria #6 and Criteria #8)

a. Please fill out the table below to help us understand your system's efficiency, and how much your lifecycle deducts from your gross carbon removal capacity.

	Offer to Stripe (metric tonnes CO_2)
Gross carbon removal	*388 kg(CO2)/m3 x 390m3 = 151 000 kg(CO2)*
Gross project emissions	*32 kg/(CO2/m3 x 390m3 =12 400 kg(CO2))*
Emissions / removal ratio	*32 / 388 =1/12*
Net carbon removal	*Gross carbon removal - Gross project emissions* *388 kg/m3 - 32 kg/m3 = 356 kg/m3*

b. Provide a carbon balance or "process flow" diagram for your carbon removal solution, visualizing the numbers above in table 4(a). Please include all carbon flows and sources of energy, feedstocks, and emissions, with numbers wherever possible *(E.g. see the generic diagram below from the CDR Primer, Charm's application from last year for a simple example, or CarbonCure's for a more complex example).* If you've had a third-party LCA performed, please link to it.



c. Please articulate and justify the boundary conditions you assumed above: why do your calculations and diagram include or exclude different components of your system?

Our system process emissions consist of the transportation and material production. We exclude process emission of the industry generating waste- and side streams to be used in our products. However, we do track the origin of the carbonates in raw materials as their origin is vital for gross carbon calculation.

d. Please justify all numbers used in your diagram above. Are they solely modeled or have you measured them directly? Have they been independently measured? Your answers can include references to peer-reviewed publications, e.g. Climeworks LCA paper.

Bound CO2 gas and biogenic carbonate content of raw materials are measured. Emissions are calculated using VTT's LCA database.

e. If you can't provide sufficient detail above in 4(d), please point us to a third-party independent verification, or tell us what an independent verifier would measure about your process to validate the numbers you've provided. (We may request such an audit be performed.)

Any other large research centre or university, capable to perform chemical analysis, carbon content measurements and Life cycle assessments.

5. Learning Curve and Costs (Backward-looking) (Criteria #2 and #3)

We are interested in understanding the learning curve of different carbon removal technologies (i.e. the relationship between accumulated experience producing or deploying a technology, and technology costs). To this end, we are curious to know how much additional deployment Stripe's procurement of your solution would result in. (There are no right or wrong answers here. If your project is selected we may ask for more information related to this topic so we can better evaluate your progress.)

a. Please define and explain your unit of deployment. (*E.g.* # of plants, # of modules) *(50 words)*

In an on-going commercialization project, we have learned that Portland cement is an essential component in concrete products, in order to have market acceptance. Stripe's procurement would deploy (and verify) full potential of our technology, using alternatives for Portland cement. Without Stripe's procurement, the focus of the developed technology is on market accepted products (Portland cement as binder).

Commercial unit of deployment is matched with the production capacity of existing pre-cast concrete production facilities.

b. How many units have you deployed from the origin of your project up until today? Please fill out the table below, adding rows as needed. Ranges are acceptable if necessary.

Year	Units deployed (#)	Unit cost ($/unit)	Unit gross capacity (tCO_2/unit)	Notes
2021	Pilot unit	Cost will be discovered in this project		*Becoming pilot/demo -scale hardening and curing unit.*
2020	Research phase	Capacity allocated from lab equipment		*Larger autoclaves, suitable for concrete production.*

2019	Research phase	Capacity allocated from lab equipment		*Research autoclaves*

c. Qualitatively, how and why have your deployment costs changed thus far? (*E.g. Our costs have been stable because we're still in the first cycle of deployment, our costs have increased due to an unexpected engineering challenge, our costs are falling because we're innovating next stage designs, or our costs are falling because with larger scale deployment the procurement cost of third party equipment is declining.*)

Equipment used so far is labour intensive. Becoming a pilot/demo unit will provide more automated curing.

d. How many additional units would be deployed if Stripe bought your offer? The two numbers below should multiply to equal the first row in table 3(a).

# of units	Unit gross capacity (tCO_2/unit)
At least 1.	*150 tCO2*

6. Cost and Milestones (Forward-looking) (Criteria #2 and #3)

We ask these questions to get a better understanding of your growth trajectory and inflection points, there are no right or wrong answers. If we select you for purchase, we'll expect to work with you to understand your milestones and their verification in more depth.

a. What is your cost per ton CO_2 today?

This project offered to you would be the first-of-its-kind production outside of the laboratory. The scale and production equipment are different from the lab-scale equipment. The planned project costs are 960 USD per ton CO2

b. Help us understand, in broad strokes, what's included vs excluded in the cost in 6(a) above. We don't need a breakdown of each, but rather an understanding of what's "in" versus "out."

The main cost items are 1) concrete casting capacity which we rent, 2) the curing room which

we build, 3) the cost of materials (incl. CO2), transport and warehousing 4) our work to test the strength and other features of the stones (we already have the required test equipment in the lab, that is our main business). We also need to work on the product fact sheet and sales materials, EPD, LCA, EN-standard etc. market acceptance documents.

c. List and describe **up to three** key upcoming milestones, with the latest no further than Q2 2023, that you'll need to achieve in order to scale up the capacity of your approach.

i. How do these milestones impact the total gross capacity of your system, if at all?

Milestone #	Anticipated total gross capacity prior to achieving milestone (ranges are acceptable)	Anticipated total gross capacity after achieving milestone (ranges are acceptable)	If those numbers are different, why? (100 words)
1	*First production campaign done*	*10 - 25 t(CO2)*	*First production cycle to verify process and obtain samples for performance verification.*
2	*Performance verification done*	-	*Determined product fit to performance requirements (direct test)*
3	*Second and third campaign done*	*150 t(CO2)*	*Commercial continuous production costs defined.*

d. How do these milestones impact your costs, if at all?

Milestone #	Anticipated cost/ton prior to achieving milestone (ranges are acceptable)	Anticipated cost/ton after achieving milestone (ranges are acceptable)	If those numbers are different, why? (100 words)
1	*960 $/ton*	*960 $/ton*	*Planned manufacturing costs. No value is calculated for the end product.*
2	*960 $/ton*	*405 $/ton*	*After successful performance verification, costs related to manufacturing are covered*

			with sales of the end-products.
3	*405 $/ton*	*230 - 0 €/ton*	*In the 2nd and 3rd campaign, concrete manufacturer subvents saved material prices and the process is optimized for lower slag consumption.* *Potentially higher market price for climate friendly products. For cost 0€/ton, +35% top-up on market price is needed. (finding the right customers)*

e. If you could ask one person in the world to do one thing to most enable your project to achieve its ultimate potential, who would you ask and what would you ask them to do?

EN-standard body to rewrite concrete norms to allow direct testing. Concrete industry standards are currently written so that Portland-cement use is always required. Direct testing of strength and durability should be allowed in standards for concrete-like products. It is a barrier for CO2-negative concrete to enter the markets.

f. Other than purchasing, what could Stripe do to help your project?

Can Stripe influence the CO2 origin mechanisms to come online sooner rather than later? With that we mean guarantee of origin of CO2, so that even when purchasing commercially available CO2 in containers as of today, one would know where that CO2 originates from, is it captured from fossil, biogenic or direct air source or made out or natural gas?

7. Public Engagement and Environmental Justice (Criteria #7)

In alignment with Criteria 7, Stripe requires projects to consider and address potential social, political, and ecosystem risks associated with their deployments. Projects with effective public engagement tend to do the following:

- Identify key stakeholders in the area they'll be deploying

- Have some mechanism to engage and gather opinions from those stakeholders and take those opinions seriously, iterating the project as necessary.

The following questions are for us to help us gain an understanding of your public engagement strategy. There are no right or wrong answers, and we recognize that, for early projects, this work may not yet exist or may be quite nascent.

a. Who are your external stakeholders, where are they, and how did you identify them?

Built infrastructure has many stakeholders. First we identified stakeholders related to load bearing and non-load bearing structures. We decided to focus on non-load bearing applications first and after gaining overall acceptance, widen the scope to load bearing parts.

Municipalities and cities are main stakeholders, using large quantities of concrete pavements, curb stones and other non-load bearing precast concrete. Consumers also buy concrete pavements in small quantities.

b. If applicable, how have you engaged with these stakeholders? Has this work been performed in-house, with external consultants, or with independent advisors?

We have done interviews in the value chain from manufacturing down to customer perspective. We have participated in seminars and workshops to understand needs and drivers of cities, municipalities, infrastructure owners, designers, consultants, builders, etc.

c. If applicable, what have you learned from these engagements? What modifications have you already made to your project based on this feedback, if any?

Customers interviews pointed that price and appearance are far more important factors for consumers than environmental aspects or net-negative carbon footprint. We learned that municipalities have yearly contracts related to concrete products. Those contracts define the pavements according to current standards. Concrete products not filling the standards are disqualified. Based on the learnings, we adjusted boundary conditions of our project: price parity to existing solutions and performance parity to standards (subject to direct testing being accepted).

d. Going forward, do you have changes planned that you have not yet implemented? How do you anticipate that your processes for (a) and (b) will change as you execute on the work described in this application?

Our eventual goal is to commercialize carbon net-negative concrete widely in the precast industry. First, we try to push our curing technology using traditional Portland materials, but when the carbon negative solutions become desired, our company has the capability to provide solutions. Work described in this application would accelerate the change from traditional Portland cement based technology to CO2 utilization and carbon net-negative solutions. In the project, we would be able to define the cost structure of the carbon negative *concrete production and understand the economic gap between current state and economically feasible production.*

e. What environmental justice concerns apply to your project, if any? How do you intend to consider or address them?

Our plan is to valorize waste- and side streams into technically feasible concrete. Jurisdictions related to waste material reuse are still not fully developed. In the project, our plan is to adjust the production process and mix designs to fulfil legislation. However, this might lower the amount of bound carbon dioxide in the project.

11. Legal and Regulatory Compliance (Criteria #7)

a. What legal opinions, if any, have you received regarding deployment of your solution?

Technical legislation is applicable on our curing unit. At the moment, we have identified the EU directive that must be fulfilled and we have agreement with technical consultants to perform the work.

b. What permits or other forms of formal permission do you require, if any? Please clearly differentiate between what you have already obtained, what you are currently in the process of obtaining, and what you know you'll need to obtain in the future but have not yet begun the process to do so.

Permission related to the curing unit is in progress. No other permissions identified.

c. In what areas are you uncertain about the legal or regulatory frameworks you'll need to comply with? This could include anything from local governance to international treaties. For some types of projects, we recognize that clear regulatory guidance may not yet exist.

Regulatory framework related to reuse of waste- and sidestreams is not matured.

12. Offer to Stripe

This table constitutes your offer to Stripe, and will form the basis of our expectations for contract discussions if you are selected for purchase.

	Offer to Stripe
Net carbon removal (metric tonnes CO_2)	*50-150 metric tonnes CO2*
Delivery window (at what point should Stripe consider your contract complete?)	*1st production campaign autumn 2021 (5 -25 tonnes CO2)* *2nd production campaign winter 2022 (20 - 50 tonnes CO2)* *3rd production campaign spring 2022 (25 - 75 tonnes CO2)*
Price ($/metric tonne CO_2) ***Note on currencies:*** *while we welcome applicants from anywhere in the world, our purchases will be executed exclusively in USD ($). If your prices are typically denominated in another currency, please convert that to USD and let us know here.*	*This is the price per ton of your offer to us for the tonnage described above. Please quote us a price and describe any difference between this and the costs described in (6).* *960 USD per CORC* (CO2 Removal Certificate)* *(25+50+75)*960 USD= 144.000 USD* **CORC is a registered trademark of Puro.earth. It represents one mtCO2eq removed from circulation for the long term. Subject to auditing according to Puro.earth methodology Carbonated Building Element Puro.earth will issue CORCs to VTT and those will be transferred to the ownership of Stripe.*

Application Supplement: CO_2 Utilization

(Only fill out this supplement if it applies to you)

Feedstock (Criteria #6 and #8)

1. How do you source your CO_2, and from whom?

We have cooperation with a local gas supplier that provides commercially available CO2. However, our goal is to find a production site near a biogenic CO2 source (ethanol plant, brewery) already during this proposed project for the second and third production campaign.

In the commercial phase, we are targeting to use DAC-CO2 or bio-CO2 either by co-siting with the source or through guarantee of origin of CO2 source once that becomes available. Guarantee of origin mechanisms are in use for electricity, green hydrogen, bio-gas and we expect similar development for sources of CO2 origin in the future.

2. What are alternate uses for this CO_2 stream?

Our CO2-partner currently delivers CO2 for commercial uses (medical & food industry), but it is not captured CO2. Our future DAC or biogenic CO2-sources could theoretically be used for BECCS or fuel (ethanol, kerosin) production, but the home markets in Finland are too small and the long transport distances limit the economics to European markets or CCS-storages.

3. Do you have a pathway towards sourcing atmospheric CO_2 so as to achieve carbon removal? *(e.g. Future coupling of process to direct air capture)*

We have multiple pathways in mind. Mainly focusing on bio-based sequestering of CO2 from a plant producing beer, bio-ethanol or bio-gas.

Utilization Methods (Criteria #4 and #5)

4. How does your solution use and store CO_2? What is the gross CO_2 utilization rate? *(E.g. CO_2 is mineralized in Material at a rate of X tCO_2 (gross) / t storage material).*

We use and store CO2 via two pathways and this is where we differ from other CO2-curing technologies. No 1. Our CCUS-solution deploys mineralisation like other CO2-curing methods where CO2 gas is used to harden the binder matrix by formation of various carbonates. No 2. Our other pathway to use CO2 is to mix bio-solids as aggregates (not CO2 gas) into the concrete mix. The CO2 embodied in the biosolids originates from the atmosphere through a woody residue material called green liquor dregs. The chemical compounds in that liquor and other additives are capable of replacing Portland-cement in the concrete mix.

5. What happens to the storage material (e.g. concrete), and how does that impact its embodied carbon storage over time? How do you know?

We have performed thermodynamic modelling to clarify stability of our materials.

CO2, bio ash and green liquor dregs form solid minerals similar to the ones in aged conventional concrete. These minerals are extremely stable and only temperatures above 550+ C disintegrate CO2. In our concrete technology laboratory, We have studied long term-term behavior of similar materials in various EU funded projects, within 100,000 years timespan related to Nuclear waste repositories. We have gained extensive experience on the development, manufacturing and long-term performance of such materials under harsh conditions.

6. How do you ensure that the carbon benefits you are claiming through a CO_2 utilization process are not double counted? *(E.g. If sourcing CO_2 from a DAC system, or selling your product to a user interested in reducing their carbon footprint, who claims the carbon removal benefits and how could an independent auditor validate no double counting?)*

We trust Puro.earth's procedures, where capture-stabilisation-storage steps are verified. For the offered project, the produced stones are as best used for pavement. The product fact sheet (EPD) for the pavement stone will show it as carbon neutral and the product user resigns any title to net-negativity i.e. the embodied carbon beyond net-neutrality. The Co2-net-negative attribute is managed as Puro.earth verified CORC and that will be assigned to Stripe.