



## D7.75–LIAISON TO OTHER EU PROJECTS, NATIONAL AND EU TECHNOLOGY PLATFORMS

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**Contributor:** All

**Project acronym:** ECO-CEMENT

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## 1 SUMMARY

The main areas addressed by this deliverable are the definition of the ECO-CEMENT communication policy and the presentation of a suitable dissemination strategy for diffuse the ECO-CEMENT concept, and products within the selected stakeholders and for establishing a liaison with other European projects dealing with the same topic and the European Technological Platforms.

## 2 INTRODUCTION

### 2.1 CONTRIBUTE OF PARTNERS

The consortium has contributed in the dissemination activities during the whole project according to this dissemination plan. Furthermore a list of internal and external stakeholders has been built:

**Internal stakeholders** are the members of the project consortium:

- Employees as project staff and the staff of related departments as well as
- Managers like department heads and senior staff

**External stakeholders** are organisations and people outside the consortium:

**Local Authorities & National/Regional Public Bodies** are key players as policy makers, favourable legislative framework creation, public procurements, owners and promoters of transport infrastructures.

**European Construction Associations**, such as FIEC (European Construction Industry Federation), ENCORD (European Network of Construction Companies for Research and Development), ECCREDI (the European Council for Construction Research, Development and Innovation), Euroconstruct (Europe's Leading Construction Business Research Group), ECF (European Construction Forum), ECBP (European Council of Building Professionals)

**National Associations** such as SEOPAN (Spain), AITEC (Italy) and others.

**European Technology Platforms** as ECTP (European Construction Technology Platform), and national ones such as PTEC (Spain), PTIC (Italy) and others. These organisations should be aware of new products, technologies and tendencies that will be available for building construction and concrete and cement.

**Civil Engineering Associations** such as ECCE (European Council of Civil Engineers) and national ones

Related **Materials, Manufacturing and Logistics Associations and Platforms**, such as EUMAT (European Technology Platform on Advanced Engineering Materials and Technologies), MANUFUTURE (The Technology Platform On Future Manufacturing Technologies), EPOSS (Smart systems and logistics platform) and SUSCHEM (Sustainable Chemistry Technology Platform).

**Research Community** through associations such as ENBRI (European Network of Building Research Institutes).

**Clients and users:** key actors providing their perspectives in the formulation and assessment of the project results in aspects such as, appropriate design adaptability for future requirements and value procurement through new business models.

**European Standardisation Bodies** such as CEN and National ones such as AENOR in Spain, DIN in Germany, UNI in Italy and others.

**Certification Bodies:** The European Organisation for Technical Approvals (EOTA)

**Target groups identification**

In the face of the above listed stakeholders a number of different groups can be identified as target audience regarding the project's activities. The target group concerns those who will be directly, positively influenced by the project's activities and outcomes. The consortium will ensure that the elaborated dissemination materials are customised to target audiences so that all activities can be tailored to the target groups' special information need. For the purpose of this first draft target groups, in relation to dissemination levels and related benefits, are summarised in the Table 1.

Target Stakeholder Name	Address	Fist Contact Date	Responsible
<b>CEMPC-</b> Council of European Producers of Materials for Construction	8 Boulevard du Souverain - Vorstlaan 68 - B-1170 Brussels – Belgium Tel: +32 (0)2 645 52 07 – Fax: +32 (0)2 645 52 13 - Email: info@cepmmc.org	T12-Eco Concept T30 – Eco Results	Neapolis
<b>WBCSD CSI –</b> Cement Sustainability Initiative	4 Chemin de Conches, Geneva, Switzerland - CH-1231 Tel +41 22 839 31 11 - Fax +41 22 839 31 31 - http://www.wbcdcement.org	T12-Eco Concept T30 – Eco Results	DWE
<b>Euroconstruct -</b> Europe's Leading Construction	Michael Weingärtler Telephone: (+43 1) 798 26 01- 483 e-mail: michael.weingaertler@wifo.ac.at	T12-Eco Concept T30 – Eco Results	DWE

Business Research Group			
<b>ECF</b> – European Construction Forum	<a href="http://www.ecf.be/Content/Default.asp">http://www.ecf.be/Content/Default.asp</a>	T12-Eco Concept T30 – Eco Results	DWE
<b>CEMBUREAU</b> -The EuropeanCement Association	Rue d'Arlon 55 – Brussels, BE-1040, Tel: +32 2 234 10 11, Fax: +32 2 230 47 20 <a href="http://www.cembureau.be/about-cement">http://www.cembureau.be/about-cement</a>	T12-Eco Concept T30 – Eco Results	Essentium
<b>ECTP</b> - European Construction Technology Platform	<a href="http://www.ectp.org/">http://www.ectp.org/</a>	T12-Eco Concept T30 – Eco Results	DWE
<b>ECP</b> - European Concrete Platform	<a href="http://www.europeanconcrete.eu/">http://www.europeanconcrete.eu/</a>	T12-Eco Concept T30 – Eco Results	Solintel
<b>EUCOPRO</b> - European Association for Coprocessing	<a href="http://www.eucopro.org">http://www.eucopro.org</a>	T12-Eco Concept T30 – Eco Results	DWE
<b>ECRA</b> - European Cement Research Academy GmbH	Tannenstrasse 240476 Duesseldorf, Germany Phone +49 (0) 211 23 98 38 0 -Fax +49 (0) 211 23 98 38 500, <a href="mailto:info@ecra-online.org">info@ecra-online.org</a>	T12-Eco Concept T30 – Eco Results	Solintel
<b>OFICEMEN</b> – Spanish Cement industry association	C/José Abascal, 53 28003 Madrid (34) 91.441.16.88 Fax: (34) 91.442.38.17 <a href="mailto:info@oficemen.com">info@oficemen.com</a>	T12-Eco Concept T30 – Eco Results	Solintel
<b>VDZ</b> – German Cement industry association	Headquarter: Tannenstr. 2 40476 Duesseldorf Germany. <b>Tel:</b> +49 (0)211-4578-1 <b>Fax:</b> +49 (0)211-4578-296 <a href="mailto:info@vdz-online.de">info@vdz-online.de</a>	T12-Eco Concept T30 – Eco Results	IFAM
<b>MPA</b> - British Cement Association	Mineral Products Association Riverside House, Blackwater, Camberley Surrey, GU17 9AB Email: <a href="mailto:mpacement@mineralproducts.org">mpacement@mineralproducts.org</a> Tel: +44 (0) 1276 608700 Fax: +44 (0) 1276 608701	T12-Eco Concept T30 – Eco Results	DWE

*Table 1: Target stakeholder*

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### 3 DISSEMINATIONSTRATEGY

#### 3.1 GENERAL CONTEXT

Dissemination is concerned of making the project visible, creating awareness and understanding for the project and promoting participation in the project outcomes.

#### 3.2 KEY MESSAGE

Considered to be a first priority when defining the communication policy, it is essential to establish key messages that need to be communicated in the various publications according to purpose of dissemination and target audience in terms that it will be understandable to each target group.

A Summarizing key message has been redact for its diffusion towards European targeted stakeholders and Technological Platforms (see Table 1 and Annex I).



## Bacterial at work with wastes to produce ECO-CEMENT

Details: The ECO-CEMENT project has been co-funded by the EC under the 7<sup>th</sup> framework program; grant agreement number: 282922

Website: [www.eco-cement.eu](http://www.eco-cement.eu)

Coordinator: Grupo Essentium.

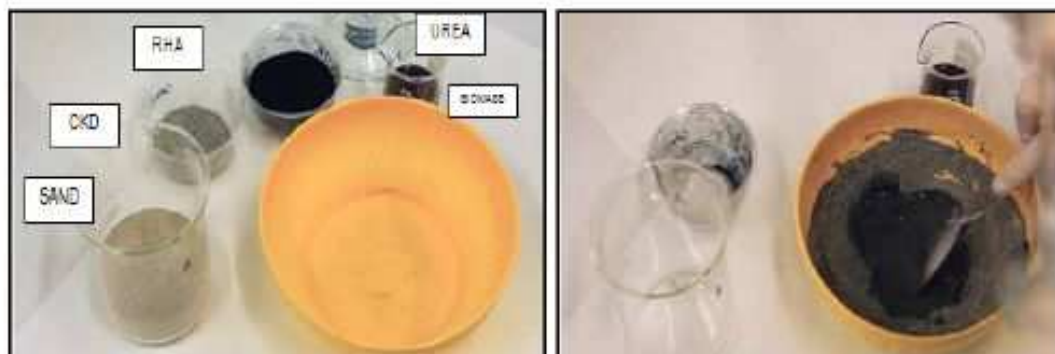
Contact email: [lsanchez@essentium.com](mailto:lsanchez@essentium.com)

About 5% of global carbon emissions originate from the manufacturing of cement. According to the IEA, cement production generates an average world carbon emission of 0.81 kg CO<sub>2</sub> per kg cement produced. As well, Industrial waste is now a global concern, causing environmental and economic harm. To mitigate these threats ECO-CEMENT allows recovering valuable resources from industry, capturing CO<sub>2</sub> and transforming both products into ECO-CEMENT that can be used in construction applications.

The idea is based on the nature's way of creating natural formations through bacterial contribution to carbonate precipitation: extensive sedimentary rock masses as limestone or marble and calcareous sandstone in marine, freshwater and terrestrial environments. Natural carbonation occurs by the reaction between atmospheric CO<sub>2</sub> and alkaline materials, which is called "weathering". The difference of ECO-CEMENT respect to nature principles is that the microbial carbonate precipitation reaction takes a relatively short period of time instead of millions of years.

ECO-CEMENT applies the "Microbial induced calcium carbonate precipitation (MICP)" by the use of ureolytic bacteria. These bacteria are widely available in the soil, can be easily controlled and have the ability to produce cementation at a comparatively much faster rate. In the MICP, the hydrolysis of urea by the enzyme urease generates carbon ions without an associated of protons. When this hydrolysis occurs in calcium-rich environment, calcite precipitates from solution forming a solid-crystalline material. The binding strength of the precipitated crystals is highly dependent on the rate of carbonate formation and, under suitable conditions; it is possible to control the reaction to generate an advanced cement-based material.

For the large scale production of ECO-CEMENT a source of inexpensive calcium is needed; Fresh Cement Kiln Dust (CKD), extracted from the by-pass dust stack is used. The bacterium selected is *Sporosarcina Pasteurii*, which produces Urease, and it is feed with Dairy industry by-products as nutrients. Urea is obtained from fertilizers. As hydraulic component; Rice Husk Ash (RHA) is applied.





*ECO-CEMENT components*

The bacterial strain *Sporosarcina pasteurii* has been selected because it has demonstrated a high level of urease enzyme activity and to be tolerant to high concentrations of calcium and ammonium ions. For the bacterial growth a suitable food source is needed. This will be assimilated by the bacteria and used as energy for its metabolism and reproduction. The most suitable nutrient source for the production of the biomass is a mixture of milk factory dairy waste and PAV, which is the final product from the FERPODE Project; ripen and dried poultry manure bio stabilized and hygienically safe.



*SP mix with PAV for dry storage*

ECO-CEMENT is a mixture of bacteria, calcite and not reactive compounds present in the CKD. If in the CKD is enough amount of available lime (> 40-50%), it can be considered as an aerial mortar (binder). Samples were collected from the alkali by-pass, which have demonstrated to be suitable for the process.

To enhance the hydraulic properties we use another source of waste resulting from the rice manufacturing industry: Rice Husk Ash (RHA). To complete the ECO-CEMENT product it is necessary to add sand as aggregate in the proportion defined by standard (usually 1 binder: 3 sand: 1water).



*Blending of the Ecocement components: CKD; RHA; Sand; Urea Solution and Biomass*

**Eco-cement Applications**

1. *Tile* – ECO-CEMENT paving tiles are made by using rice husk ash and cement wastes. These tiles do not require concrete and need just water and consolidated sand for the mixture. No bonding agent is necessary and do not

require any cement. The mixture is enhanced with revitalized urease producing bacteria that precipitate calcium carbonate through urea hydrolysis. The bacteria are revitalized in a water bath at 30°C through continuous stirring for 3 hours. The Rice Husk ash, CKD, sand and water are fed into a mixer where water is added in the required proportion for homogeneous mixing. After mixing with the revitalized bacteria, the mixture is placed on wooden pallets and transported to an area where they are dried and water cured for 28 days. Basically, the manufacture of ECO-CEMENT tiles consists of following process:

- Revitalizing urease producing bacteria in a water batch at 30°C for 3 hours through continuous stirring to avoid the formation of clumps.
- Mixing the RHA/CKD/SAND compounds in a pan-mixer to make a cementitious compound.
- Adding water and the revitalized bacteria.
- Placing the mixture in moulds.
- Removing and staking the products for curing.
- Delivering the product.

ECO-CEMENT tiles have less environmental impact when compared to similar products thanks to the recycling of waste materials. There are many benefits to using eco-friendly products. By using "green" products, pollution and the amount of waste sent to landfills is decreased. In addition to this, eco-cement does not contain any harmful chemicals. The ECO-CEMENT tiles have the aim of contributing to transform the traditional operation systems. This approach guarantees minimizing the CO<sub>2</sub> emission and meets the European policies that promote reducing the global carbon footprint.

- II. *Plaster* – Traditional plaster is a building material used for coating walls and ceilings. Plaster is manufactured as a dry powder and is mixed with water to form a paste when used or commercialised as ready-to-use, when transported by mixing trucks. The reaction with water liberates heat through crystallization and the hydrated plaster then hardens. Plaster can be relatively easily worked with metal tools. These characteristics make plaster suitable for a finishing, rather than a load-bearing material. The ECO-CEMENT mortar is ready-to-use as it will be produced in-situ and workable for a certain period. The manufacturing process is equivalent to the tiles case, only the dosage is varied.
- III. *Bedding mortar* - Typical bedding mortar is a workable paste used to bind building blocks such as stones, bricks, and concrete masonry units together, fill and seal the irregular gaps between them, and sometimes add decorative colours or patterns in masonry walls. It is normally commercialized as a dry powder but also ready-to use, as for the plaster. Similar to ECO-CEMENT plaster, ECO-CEMENT bedding mortar ready-to-use as it will be produced in-situ and workable for a certain period. The manufacturing process is identical as for the tiles, only dosage is varied.



Eco-Cement products: I) Tile – II) Plaster – III) Bedding mortar

For further details, please visit our website; [www.eco-cement.eu](http://www.eco-cement.eu)  
Contact coordinator's email: [lsanchez@essentium.com](mailto:lsanchez@essentium.com)  
Scientific responsible's email: [p.tiano@icvbc.cnr.it](mailto:p.tiano@icvbc.cnr.it)

### 3.3 DISSEMINATION TOOLS

- Project Presentation
- Leaflet
- Poster
- Website
- Workshops
- International Conferences
- Scientific publications
- E-course

### 3.4 DIFFUSION MAILING LIST

A stakeholder mailing list has been prepared by each country participating in the project (see **Annex I to DL 7.71 – Stakeholder Mailing List**). This has been used firstly for informing them about the concept of the Ecocement project, after then about the results achieved in the development of the Ecocement process.

The Key Message has been sent to this list informing the stakeholder about the next Workshop in which a practical demo of the Ecocement will be illustrated.

Dear Sir / Madam,

The partners of the Ecocement project (see pdf), are organizing an informative-demonstrative workshop at la Brilla (Pisa- Italy) for the day 26th February 2015.

It is a pleasure to invite one of your representative at such event.

Best regards

The scientific responsible

PIERO TIANO

## 4 CONCLUSION

This deliverable has presented the overall dissemination plan applied for the ECO-CEMENT project. The feedback received from the action performed had received very low impact.

**5 ANNEX****STAKEHOLDER MAILING LIST**

[info@fundacioncema.org](mailto:info@fundacioncema.org)  
[info@oficemen.com](mailto:info@oficemen.com)  
[direccion@ieca.es](mailto:direccion@ieca.es)  
[fomento@fomento.es](mailto:fomento@fomento.es)  
[director@ietcc.csic.es](mailto:director@ietcc.csic.es)  
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[internet@de.tuv.com](mailto:internet@de.tuv.com)  
[bmd@beton.org](mailto:bmd@beton.org)  
[bund@bund.net](mailto:bund@bund.net)  
[info@cement.ie](mailto:info@cement.ie)  
[gerry.farrell@irishconcrete.ie](mailto:gerry.farrell@irishconcrete.ie)  
[press.office@dcenr.gov.ie](mailto:press.office@dcenr.gov.ie)  
[buildingstandards@environ.ie](mailto:buildingstandards@environ.ie)  
[info@opw.ie](mailto:info@opw.ie)  
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[info@ecocem.ie](mailto:info@ecocem.ie)  
[Info@seai.ie](mailto:Info@seai.ie)  
[info@riai.ie](mailto:info@riai.ie)  
[mpacement@mineralproducts.org](mailto:mpacement@mineralproducts.org)  
[info@concretecentre.com](mailto:info@concretecentre.com)  
[efra.helpline@defra.gsi.gov.uk](mailto:efra.helpline@defra.gsi.gov.uk)  
[correspondence@decc.gsi.gov.uk](mailto:correspondence@decc.gsi.gov.uk)  
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[roadtecltd@cytanet.com.cy](mailto:roadtecltd@cytanet.com.cy)  
[info@betontir.it](mailto:info@betontir.it)  
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