

# Comparative LCA of an innovative aggregate production method from incineration waste and CO<sub>2</sub>

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The incineration process is currently used in many countries thanks to its ability to reduce the weight and the volume of domestic and industrial waste, as well as to sanitize many hazardous waste. This process also generates heat that can be used in households and industries, or to generate electricity. Although, environmental impacts generated by this process remain an issue, and the residual waste (clinker and ashes) need to be either used in roads or landfilled when their material composition is hazardous.

The aggregate production for the building sector also generates environmental impacts mainly due to the extraction, washing and crushing processes. This sector requires a very important amount of material, being the first mineral extraction industry in terms of weight (about 3 billion tons of aggregates are produced per year in Europe).

In order to provide alternative solutions to those two issues, the SAPICO2 project aims at using incineration waste and CO<sub>2</sub> to produce aggregates that can be used in buildings, thanks to the carbonation process. This process aims at providing a reduction of incineration CO<sub>2</sub> emissions and wastes going to landfill while creating a useful product for the construction sector. Today, this process is being tested at a laboratory scale, in France and United-Kingdom, and is being to be used at the industrial level.

The aim of this study is to assess the environmental impact of the carbonation process compared to classic aggregates production processes in order to qualify and quantify the environmental evolutions, and identify the significant environmental aspects of the innovative processes. The three principal current aggregates production processes are: loose rocks, solid rocks and recycled rocks.

The carbonation process is assessed at both levels: the current laboratory scale, thanks to actual data, and the future industrial scale, based on actual data and hypotheses for the process industrialisation. The perimeter of this study includes the manufacturing processes, as well as the impacts generated by the CO<sub>2</sub> emissions and the treatments of clinkers and ashes.