

# Residual concrete recycling as a building block for reducing CO<sub>2</sub> emissions

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**This is a problem that concerns the whole world - the far too high CO<sub>2</sub> emissions caused by the combustion of fossil resources or fuels, which are proven to damage the environment and the climate. The use of a Bibko® residual concrete recycling plant in the ready-mix concrete or pre-cast plant can help to reduce the high CO<sub>2</sub> emissions in the plant on a sustainable basis.**

The aim of the residual concrete recycling process is to achieve a closed material cycle. For this purpose, the liquid residual concrete or washing water is fed into the Bibko recycling plant. In the plant, the cement fines that are capable of binding are washed out. The excess water (residual water) together with the contained fines with a particle size < 0.2 mm enters an agitator tank. There, the fines are kept in motion and subsequently fed back into the concrete production.

The granulation components of the residual concrete (> 0.2 mm), which are also recovered in this recycling process, are also discharged and completely returned to the concrete production. This creates a closed material cycle and consumes less raw materials.

For a residual concrete recycling plant, the environmental impacts are broken down as follows: the ecological savings from the operation of a residual concrete recycling plant are calculated according to Figure 1 from the difference between savings and expenditure.

Savings result from the reuse of the material recovered in the recycling process, or from the fact that less additional emissions are caused by construction machinery, as would be the case if new raw materials were used. In addition, transport from the quarry to the concrete plant is reduced and the costs for the disposal of hardened concrete from the concrete plant to a landfill site are eliminated.

In order to operate the recycling plant, the use of energy is necessary. In terms of ecological savings, this is to be regarded as an expense.

The comparison of expenditure and savings in the operation of the recycling plant yields the ecological savings. This expresses by how much CO<sub>2</sub> the environment is less polluted.

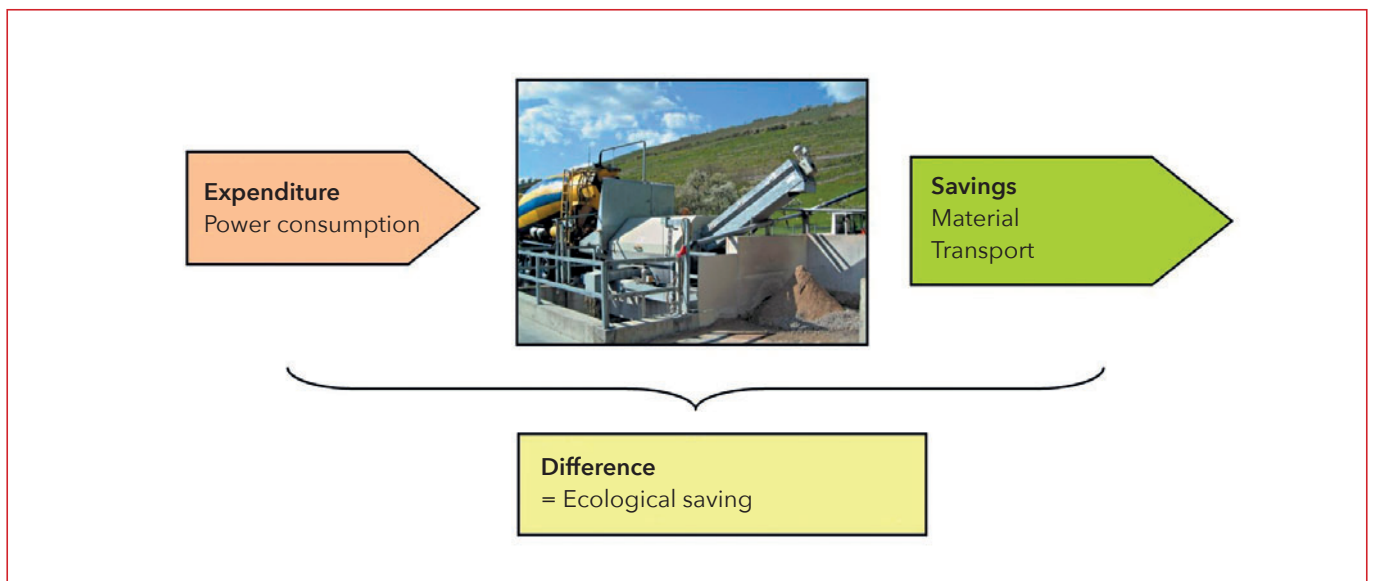


Fig. 1: Environmental impact of a residual concrete recycling plant

## Impact on the environment [2]: greenhouse effect

Solar radiation warms the earth's surface. This then releases energy in the form of long-wave infrared radiation. Greenhouse gases (e.g. CO<sub>2</sub>, water vapour) in the atmosphere limit the complete radiation into space. Part of this emitted infrared radiation is reflected back to earth by the greenhouse gases. This results in additional heating. It is thanks to this natural greenhouse effect that life is possible on earth at all. While the global average temperature was around 15° C in historical times, it would otherwise be around -18° C.

However, the concentration of greenhouse gases in the atmosphere has risen more and more rapidly in recent decades, mainly due to the increase in the amount of energy consumed by more and more companies, vehicles, households, etc. and the combustion of fossil fuels required for this.

As a consequence, an additional warming of the earth's surface is taking place, leading to the well-known effects such as melting of the polar ice caps, rising sea levels, and changes in the extent and distribution of precipitation.

If one assumes, for example, a concrete plant with a concrete production of 100,000 m<sup>3</sup>/year and a residual concrete content of 3% (average value), an ecological saving of 200 t CO<sub>2</sub>/year can result, which is equivalent to 81 t crude oil [1].

This value becomes even more significant when one considers the amount of oil (approx. 3 road tankers of oil with a payload of 26 t each per year) or kilometres travelled (approx. 1.7 million km at 120 g CO<sub>2</sub> per km), which would result in the same emissions.

These emissions can be avoided by operating a recycling plant.

The use of a recycling system makes an active contribution to reducing additional CO<sub>2</sub> emissions through the ecological savings achieved. ■

### Sources

- [1] LCA database, platform: LCA database GaBi4 - [www.pe-international.com](http://www.pe-international.com)
- [2] Federal Office for the Environment FOEN, 3003 Bern, CH - [www.bafu.admin.ch](http://www.bafu.admin.ch)

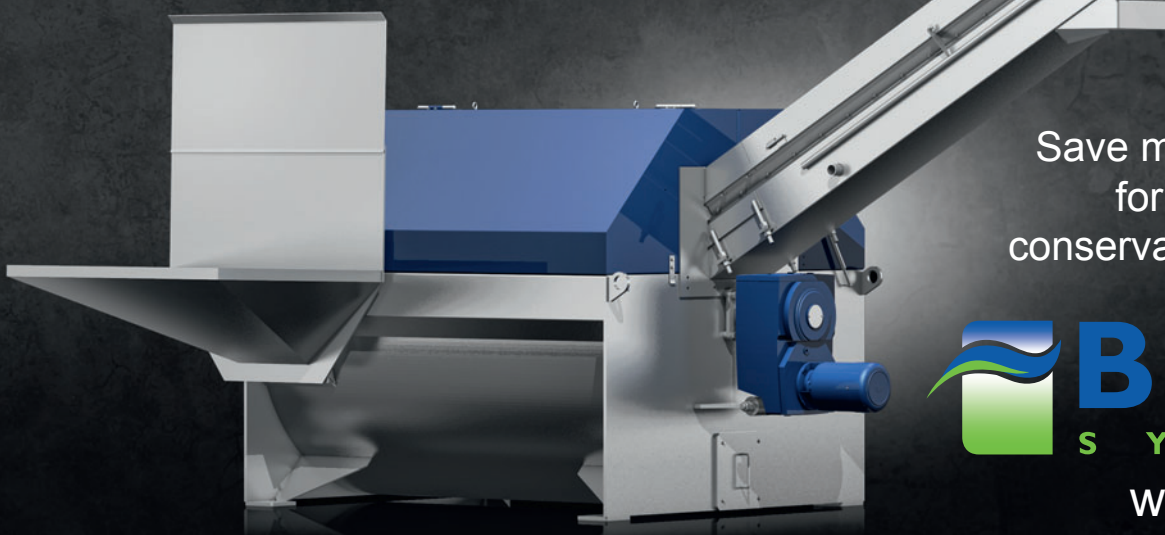
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