# Event Summary

## Industrial Symbiosis, October 11, 2016

Sirpa Pietikäinen welcomed participants and opened the meeting by asking how industrial symbiosis could contribute to the "Factor 10" objectives and how the Commission's Circular Economy package could support it.

Howard Chase (Dow Chemicals) explained how carbon-rich waste gasses from steel mills can be used by the chemical industry in the production of chemical products. Carbon monoxide is one of the byproducts of many industrial processes, including steel manufacturing. Chemical plants produce hydrogen as a by-product of steam-cracking which, combined with carbon monoxide, can be used to make hydrocarbon as a substitute chemical feedstock.

The technology is still in the pilot stage but looks promising. The benefits are that the process is resource efficient (as part of a circular economy) and saves $CO_2$ emissions (eventually stored in products (plastics) rather than emitted into the atmosphere). Demonstration projects are planned from 2020 onwards.

Materiality is equally important. $CO_2$ emissions from steel works and feedstock used in chemical processes are a substantial part of the economy. The use of CO by the chemical industry could therefore have a significant impact and the relevant regulatory framework should be considered carefully. Collaborative business models are necessary; this will not be easy but the resulting increase in resource efficiency will eventually benefit competitiveness in the EU.

Given the levels of investments required without guaranteed success, financial risk sharing should be available. Moreover, legislation should be amended to allow companies to credit the value of $CO_2$ not emitted. Finally, infrastructure should be upgraded since chemical plants are not necessarily located close to steel mills or near other sources of $CO_2$ gasses.

Questions were asked about the possible scale of the technology, the energy balance, and the longevity of the plastics used to "store" the $CO_2$. Catalysts were mentioned as an important tool to make the technology economically viable, especially when they can be regenerated. Given the amount of $CO_2$ emitted (notably by electricity utilities), the potential (materiality) of the technology is large. Keeping $CO_2$ embedded in plastics will depend on the success of recycling schemes.

Bernard Mathieu (LafargeHolcim) explained how the use of waste in cement manufacturing had its origins in the 1970s. The company used more than 50 million tons of waste in 2015 as an alternative source of energy or raw material. This amount can easily be doubled. LafargeHolcim has integrated the pre-processing of waste via a separate business unit (Geocycle) and has agreements with various companies to secure a steady supply of waste material. With limited possibilities left to increase the efficiency of cement kilns, the sector's focus will be on substituting waste for fuel and raw materials.

The situation for demolition waste is not satisfactory. Demolition waste is mostly used in low-value applications. Since access to limestone for the cement industry is becoming increasingly difficult, there is a growing interest to use recycled concrete although transportation is an issue. Rather than importing, local sourcing is therefore preferred. In London and Paris, this is already happening. Building codes and favorable public procurement could accelerate the use of demolition waste in concrete.

Questions were asked regarding the potential of using waste as an alternative source of energy in cement manufacturing. Bernard indicated that the current 35% can easily be doubled, which is already the case in some countries. As far as the potential to reduce $CO_2$ emissions are concerned, already LafargeHolcim emits 40 million tons less $CO_2$ because of its use of waste materials.

Up to 30 percent of natural aggregates can be replaced with recycled aggregates without any problem. Beyond that, a more skilled workforce is needed. The technical limitations set by the quality of the concrete also limit the use of more demolition waste. Sorting processes are very important, too.

Thinner concrete structures can contribute to lower $CO_2$ emissions but require high-strength, high-performance concrete. The challenge lies in progressively educating construction workers to use these more sophisticated materials. If the construction industry were involved in the design of buildings sooner, it could boost the adoption of high-performance concrete and market these new materials more effectively.

How can Horizon 2020 or EFSI (European Fund for Strategic Investments) contribute? The Commission's priorities are jobs and growth; investments are needed to achieve both. The

revised ETS will reward emissions reduction and thereby promote innovation. The objective of EFSI is to attract private capital to higher-risk projects by balancing the risk with public funding.

To what extend are the projects presented able to contribute to the greater ambition of net-zero emissions by 2050? Private capital will be the major driver of these projects that can contribute to large-scale emission reductions. The availability of risk sharing schemes, however, will be an important success factor.

The sourcing of waste is one of the main challenges (especially cross-border shipments). An international approach to waste collection would go a long way to improve the availability of waste materials. A more integrated approach to policy development would also help in making sure that projects based on industrial symbiosis can advance more rapidly.

Sirpa concluded by reminding participants of the importance of setting the bar high enough to avoid sunk investments. The objective of a sustainable business by 2050, taking a holistic approach, could be explored together with Bee group members, the Commission and a network of scientists.