

Circular Economy, a business case for the salt industry

1 Introduction

Circular Economy is a concept that has been around since the beginning of time, however it has resurged as a modern concept triggering new legislation and policy, as well as creating a sense of urgency to be imbedded in daily life and industrial production. Today's policy makers, due to rising pressure from the public, call upon society, policy makers and the industrial sector to change their behaviours and to overturn their normal production cycles that have been in place for many centuries. Sustainability and circular economy are the new buzzwords that circulate within public opinion. They drive the public's purchase choice and their ratings of companies. It is seemingly a closed case as circular economy is a business opportunity driven and supported by society. However, is it the same economic driver for the salt industry? Can circular economy be a driver of a business case for the salt industry?

2 Circular Economy

Circularity is not a manmade concept, but a natural process present since the beginning of time. Every cycle found in nature insures that waste becomes the food of another lifecycle, where the recycling and recuperation of nutrients is part of an eternal loop of all living creatures. We only tend to forget that there is a need to add energy to this cycle for it to become circular, namely the sun as source of energy.

As humans, we have involved circularity in every concept of our daily life. At a time when resources were scarce and the cost of manufacturing was high, which went on until the age of the industrial revolution. Driven by mass manufacturing of goods, the fact that resource were seemingly available in abundance, tilted the balance when the cost of manufacturing became lower than the cost of recycling and reuse. Which gave place to mass manufacturing built upon an economic model of constant growth, linearity and abundance. Today, we are confronted with the effects of this economic model having produced mountains of waste, environmental pollutions but also a scarcity of natural resources.

Being confronted with the effects of environmental pollution not only in nature, but also in every aspect of our lives, has created over the past decade a growing interest in the circular economy, recognising that current rates of resource consumption are unsustainable. The shift to a more sustainable model of economic growth requires a circular economy in which products are recycled, repaired, or reused, and waste from one process is used as an input into others. Therefore, society has provided a resurrection within public opinion, triggering policy makers to take the lead to include sustainability and circular economy in the policy setting. The European Commission adopted an ambitious Circular Economy Package¹, which includes measures that will

¹ http://ec.europa.eu/environment/circular-economy/index_en.htm

help stimulate Europe's transition towards a circular economy and be aligned with the European Commission's call to boost global competitiveness for European businesses, foster sustainable economic growth and generate new jobs.

The Circular Economy Package consists of an EU Action Plan for the Circular Economy that establishes a concrete and ambitious programme of action, with measures covering the whole cycle: from production and consumption to waste management, as well as a market for secondary raw materials and a revised legislative proposal on waste.

Europe is not the only region that has embraced circularity as a key area to develop policy in. The breakthrough of the circular economy in Asia is extremely important, as a significant amount of global production and consumption takes place in this region. China has embedded circular economy in its planning, and recently the restrictions on imported waste materials at the beginning of 2018 has already had a profound impact on the ability to meet recycling targets for trade partners.

3 Circular economy for salt

For many sectors circularity seems to be a natural process to be included in the lifecycle of the product and for some it is embedded in a tradition of recycling to feed resources into the production process. However, it is difficult to envisage a similar circularity in the life cycle of salt. Salt is an abundantly available resource and its production cost is not in proportion to any recycling cost.

Reflecting on the circularity of the lifecycle of salt, the production process allows many mini circular loops of the resources feeding into the production process such as water and energy. Many resource efficiency improvements in water use and energy have increased the sustainability and circularity of the salt sector over the last decade, making salt production already a very resource-efficient production process. However, the circular loop concept within the lifecycle of salt reflects upon the mineral salt as a resource. The circular concept relates to minimizing the introduction of raw materials in the production loop by including recycled and reused resources in the primary lifecycle.

However, re-used and industrial symbiosis do turn one industry's by-product into another industry's raw material. Some reuse examples have been created such as the reuse of brine stemming from cheese production as a de-icing agent². These examples however are marginal and very seasonal, hence they would not help the salt industry be considered to apply circular economy concept.

² <https://www.nytimes.com/2013/12/24/us/wisconsin-finds-another-role-for-cheese-de-icing-roads.html>

The Commission also promotes the reuse of treated wastewater as a means to tackle water scarcity. Many very promising projects funded under European Union's Horizon 2020 Research and Innovation Programme³ are focusing on re-designing the value and supply chain of water and minerals⁴. Hereby focusing on solutions to the recovery of resources from saline impaired effluent generated by process industries and reduce industrial saline wastewater streams by recovering and reusing the minerals and water from the brine in other industries. This being also the focus of the ZERO BRINE-project⁵, a 4-year Innovation Action (IA) financed by the European Commission. ZERO BRINE integrates innovative technologies to recover water and minerals such as salt and magnesium and has pilot test projects near Rotterdam Port, Netherlands, and 3 other pilot projects in Spain, Poland and Turkey.

However, in all this the obstacle to the use of secondary raw materials is that certain harmful chemicals might remain present in recycling streams, but also the quality aspects of secondary raw materials are of concern.

The Commission is in the process of developing EU-wide standards for secondary raw materials so that industries aiming to use them can be certain of their quality. There might be hurdles as e.g. salt destined for food production might also be originating from industrial chemical process raising concerns in terms of food safety and traceability. So raising not only questions of quality assurance, but also stressing the need for strict controls on traceability so as to avoid these streams of secondary raw materials being introduced in the food chain.

4 Circular economy a business opportunity for salt

In a circular economy, indeed, the waste that can be recycled is injected back as a secondary raw material in the primary product cycle or in another product cycle. At present, the salt as a secondary raw material still accounts for only a small proportion and therefor little economic profitability and viability of the materials used in the EU is to be noted. To increase the quantity and quality of these secondary raw materials, waste management must improve, for instance in terms of separate collection and sorting in recycling facilities, but it should be lead to a business opportunity for companies to consider investment in these projects, whereby the cost of extraction of a primary mineral represent only a fraction of the cost to separate a secondary raw material of an equal quality.

The business opportunity might be considering shifting focus on the recuperation of other minerals being separated from the brine or rejected during the production process of salt.

³ <https://ec.europa.eu/programmes/horizon2020/>

⁴ <https://www.wetsus.nl>

⁵ <http://www.zerobrane.eu>

Furthermore, the European Commission has reported on the necessity of considering Critical Raw Materials and the circular economy highlighting the potential to make sure the use of the 27 critical materials in our economy more circular⁶.

Today, Europe is importing many of its critical raw materials like Magnesium, mainly from China. Seawater⁷, but also other salt sources, contain some of these minerals like Magnesium but also Lithium, critical in the development of batteries and helping to make the decarbonisation of the energy mix by increasing the use of renewable energy sources possible. The earth's ocean water is full of lithium salts and getting at it will simply be a by-product of desalinating drinking water from seawater. Technologies are being developed to improve the Lithium recuperation from seawater. In the production of sea salt, the concentrated stream of minerals other than salt is rejected or disposed of by re-entering into salt caverns. This rejection could just be the future sourcing of some essential minerals making the industry indeed critical to the assurance of raw materials crucial to Europe's economy providing a reliable and unhindered access to certain raw materials in the future.

5 Conclusion

The transition to a more circular economy, where the value of products, materials and resources is maintained in the economy for as long as possible, and the generation of minimised waste, is essential to develop a sustainable, low carbon, resource efficient and competitive economy. Economic actors, such as businesses, are key in driving this process. In a circular economy, materials that can be recycled are injected back into the economy as new raw materials, however for the salt industry this circularity might not yet be providing a financially healthy balance to consider investments or driving businesses. However there might be a better business case in the recuperation of by-products, where salt production becomes a producer of critical raw materials, being a primary raw material source competing against the primary source from traditional extractive resources.

About the Author

Since 2007, Wouter Lox is Managing Director of EUsalt, the association of European and global crystallised salt producers. He is also Board member and treasurer at EFLA (European Food Law Association); Board member and Chairman of the Advocacy Committee at ESAE (European Society of Association Executives); Board member and Vice-President of SEAP (Society of European Affairs) and Member of the Advisory Board of the Zero Brine project.

⁶ http://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en

⁷ http://www.miningweekly.com/article/over-40-minerals-and-metals-contained-in-seawater-their-extraction-likely-to-increase-in-the-future-2016-04-01/rep_id:3650