

## 'We want to tackle the waste problem'

**“DSM has the scientific knowledge to develop new products that will contribute to solving the challenges of today’s society,” according to Lukas Hoex, Manager Circular Economy of this multinational manufacturer of materials and food products. “We have a long history of creating value, not just for the customer but for a broader public, the government or society as a whole. This role in society requires a new type of partnership and new business models.”**



Lukas Hoex

*Manager Circular Economy*

A large problem society faces today is the growing mountain of waste around the world. DSM has the knowledge to help tackle this problem. “DSM is at the front end of the production chains, close to the resources,” as Hoex explained. “We have known for a long time that these resources are nearing depletion. Efficiency in resource use has been a paramount focus for us for years, and

we have built up a lot of knowledge on the subject. What we see now is a growing awareness among consumers that throwing away products, emitting gases and dumping toxic waste is far from smart, and not even necessary. In fact, people are borrowing and lending products or selling used products to an increasing extent. The speed at which the Sharing Economy is spreading has taken me by surprise. This opens up opportunities for us to implement new business models. Besides cautious use of resources in production, we now need to focus on keeping resources in the economy for as long as possible and at the highest possible value, simply because that will improve the bottom line.” If companies such as DSM can successfully contribute to driving this change, this could have an impact on volume in the materials cluster. “This is exciting, obviously, and it provides an extra boost to new business models, for if we add more value while at the same time reducing the environmental burden, I do not think that it would affect our performance,” according to Hoex.

### Adhesives and paint

For the circular economy, DSM targets its research at minimizing the use of critical resources, replacing scarce and toxic materials and substances, and facilitating product reuse and life expansion. This is in line with the ambition DSM had adopted much earlier concerning the bio-based economy. Where materials are concerned, this means that DSM invests in materials that are easy to recover and can be used for a wide range of purposes. “Conditions for success are reduction of the diversity of materials used to manufacture products and a radical phase-out of toxic ingredients. The latter implies that the plastic used in laptops, for instance,

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must be so safe that in its second or third life, it can even be used to manufacture toys for children. These conditions offer not only an interesting innovation agenda for materials, but also for packaging products, paints and adhesives." DSM is conducting research into ingredients for adhesives, for example, that ensure that there are no obstacles to material separation in waste treatment. "We do need strong adhesives, of course, in order to extend the life of our products, but apart from this, we aim to ensure that the adhesives and paints form no impediment to the second life of the materials."

### Carpet

Their ambition is clearly reflected in DSM's innovative carpet technology. "Carpeting is a serious factor in today's waste problem as well as in the consumption of scarce local resources, such as water. Recycling is difficult as most carpets consist of a multitude of different materials that are interwoven. As a result, separation would be a costly affair, even though several market parties have already taken significant steps in the right direction where certain carpet ingredients and elements are concerned. However, some of the materials are of such a low grade that they can hardly be reused, if at all. Together with a start-up from the industry, DSM has developed a technology that enables the manufacturing of high-quality carpets from one single material or two at most. In the event that two materials are used, they can easily be separated as a result of an innovative interlayer. This makes the materials fully recyclable so that they can be used to manufacture new carpets, for example, or for different purposes.

DSM is furthermore conducting a range of experiments with bio-based plastics. Hoex stated: "We do not know yet which type of

plastic will prevail in the future: biodegradable plastics made from natural materials; biodurables, which are also derived from organic flows and that are not degradable but are recyclable together with traditional plastics; or the current plastics made from petroleum. Large plastic buyers increasingly demand bio-based plastics."

### Challenges

Now that the technology is available, DSM faces two challenges where carpets are concerned: a business model with the largest possible impact and the application of the technology in other products. "We see many unexpected positive side effects. Our carpets are much lighter than traditional carpets, for instance. This is an important advantage in aircraft as well as for the people who have to install or transport the carpets. Yet another side effect is that in contact with fire, there is hardly any smoke development. The circular economy as a starting point for innovation therefore seems to guide us to a path that leads to great benefits for individuals, the environment as well as the bottom line."

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Sometimes NGOs or governments can provide support to drive business change, as Hoex explained by referring to another product example. "Electronic waste still largely ends up in India or Africa, where it is burned to recover valuable resources. PVC in electronics causes a lot of damage to the environment and human health, and parties such as Greenpeace have a clear agenda to phase out PVC. DSM has an alternative material to replace PVC, but electronics

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manufacturers could be reluctant to some degree as this invisible investment in the environment entails additional adjustments. To a certain extent, the success of our solutions depends on whether we can transform a market. We want our customers to be rewarded for the social and environmental value that we enable them to create. NGOs, national governments and other organizations can play a fundamental role in this process."

### Renewable energy

Besides waste, the world is faced with an energy and material challenge. DSM also invests in broad application of renewable energy and biomass. Examples that contribute to the shift away from fossil fuels include anti-reflective coatings for solar panels and the production of bioethanol from agricultural waste. For the latter purpose, King Willem-Alexander opened a second-generation cellulosic ethanol plant in Emmetsburg, Iowa (US) in 2014. "It is remarkable that we have returned to energy," Hoex smiled, referring to the early history of DSM as a state-owned coal mine company. "This is a joint venture with the American ethanol producer Poet, in which DSM's yeasts and enzymes convert corn residues into cellulosic ethanol, an advanced biofuel."

### Scale up

For the development towards a circular economy, Hoex thinks it is important that multinational companies leverage their ability to scale up. "DSM has several technologies that have every potential to move from a conceptual success to a scalable breakthrough technology. However, we cannot afford to think that a brilliant technology or invention will sell itself. Opinions in society are often

not science-based. It is our task to explain to our stakeholders what we do. For example, in the case of cellulosic ethanol production, we need to explain how the partners we work with take care of soil quality by means of techniques including leaving sufficient corn residues on the field."

### Alliances

The company generates support by seeking alliances. Hoex explained: "In world cities such as Shanghai and Cape Town, waste and smog still constitute a problem that affects the quality of life and society as a whole, and that presents a huge concern particularly to the authorities. We want to address these problems by involving parties - both conventional and unconventional - who, like us, are deeply concerned about solving them. This means that we take things one step further than traditional stakeholder management. Rather than managing interests, this is all about advancing together, showing equal consideration for equal interests. This is a prime opportunity for companies that can contribute concrete solutions to real societal challenges. In fact, it is quite similar to the 'polder model' we used to apply in the Netherlands, in which regardless of background, people would all join in to build a dike to keep their feet dry."

