

# Brightsite

Transforming industry

Brightsite bridges gap between  
innovative technology and  
commercial application

**Proud partners**

Sitech Services

TNO

Maastricht University

Brightlands Chemelot Campus

June 2020

# Brightsite bridges gap between innovative technology and commercial application

Brightsite is the new number one knowledge centre for achieving a sustainable, competitive chemical industry. By providing a boost to the development and commercial application of innovative technologies, it is helping the Chemelot site to achieve the climate objectives. Arnold Stokking, managing director: “Our cross-sectoral way of thinking produces unique and innovative ideas.”

One of today's biggest social challenges is achieving the climate objectives. The Dutch government has set the following climate objectives: a 49% reduction in CO<sub>2</sub> emissions by 2030 and a 95% reduction by 2050 compared to 1990. The aim of the Climate Agenda and the Climate Agreement is to complete the energy transition and have a fully circular economy by 2050. The chemical industry can provide a huge contribution to reducing CO<sub>2</sub> emissions in the Netherlands, and to making society as a whole more sustainable. “These transitions are huge challenges for us, but simultaneously they also provide opportunities. Not doing enough or only acting when it is too late could lead to the closure of plants and job losses. In contrast, proper

transition management will result in economic growth and greater appeal for talent and businesses. The next couple of years will be crucial; it is important to take action right now,” emphasises Stokking.

**Brightsite has the knowledge and expertise required to enable the transition within the chemical industry**

**Arnold Stokking**, managing director Brightsite:

*“I’m proud that I can contribute to this important mission to slow down global warming together with our partners and many others. It’s a huge task that covers everything from fundamental research to developing pilot plants at the site. A fantastic assignment that combines the knowledge and expertise of all the parties. We’ll be doing everything we can to safeguard jobs and improve employment in a sustainable manner.”*

## Joint mission for a futureproof Chemelot

In early 2018, Sitech Services, TNO, Maastricht University and Brightlands Chemelot Campus decided to take on a joint mission from the Chemelot ‘field lab’ to achieve the climate objectives. The idea for Brightsite was conceived a few years earlier. For quite a while, Chemelot used to be mainly a DSM site with a lot of synergy and room for R&D. When DSM decided to sell off various plants, the emphasis shifted towards the optimised operation of individual plants. As a result of this, joint innovation was in danger of disappearing. “In combination with the Climate Agenda, this resulted in the realisation that a futureproof Chemelot requires joint, sustainable innovation. The technology required for this already exists on a small scale, but has not yet been applied anywhere at industrially relevant volumes. The knowledge required for this upscaling step cannot be found at a single party. This was the seed that grew into Brightsite,” explains Rene Slaghek, closely involved in the foundation of Brightsite and responsible for Technology.



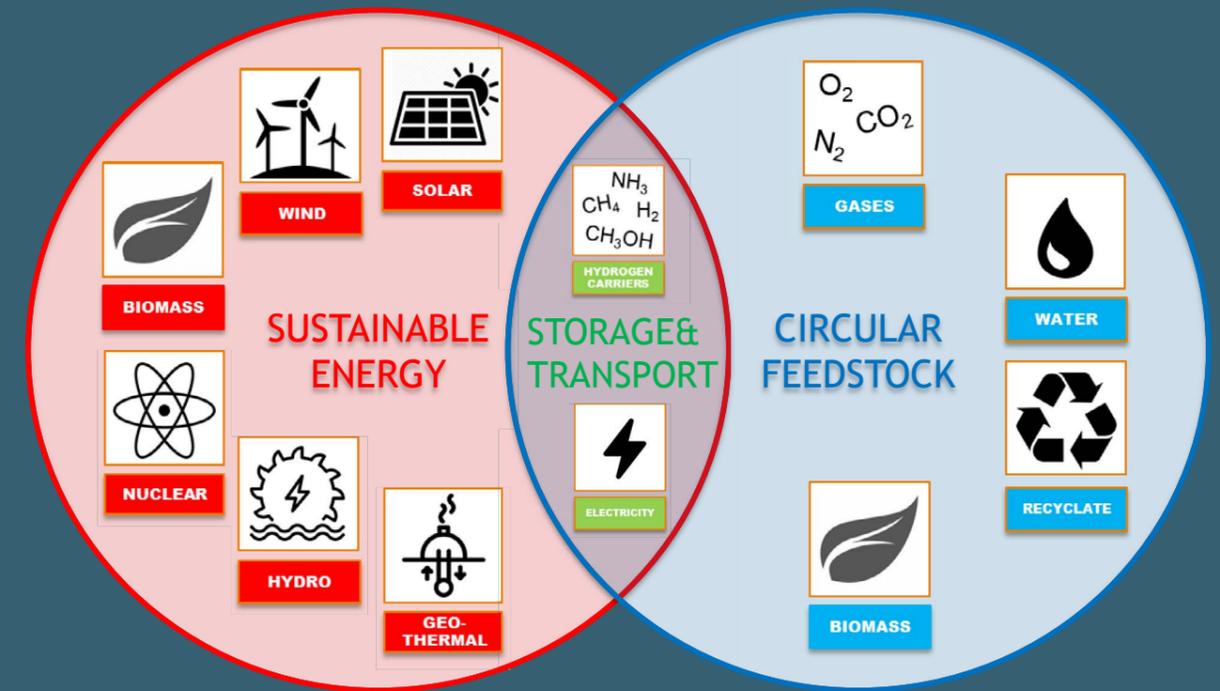
**Our aim is making Chemelot climate neutral while retaining employment**

## Climate neutral & training for the future

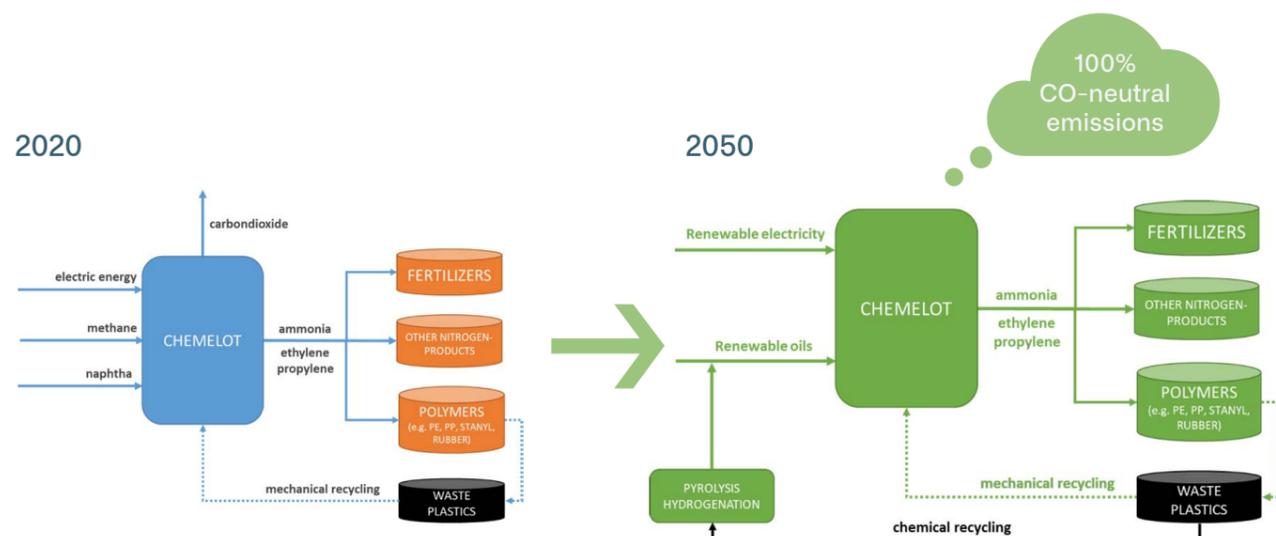
Brightsite's aim is to make the Chemelot site climate neutral while retaining employment. Our mission is two-fold: We want to demonstrate that the climate objectives for 2030 and 2050 are feasible and at the same time we're focusing on training a new generation of employees who will be able to implement these innovations. "We will prove that it's possible: increasing sustainability and making money. The chemical industry will have to switch to other sources of energy and raw materials to become climate neutral. This means that the chemical sector is about to undergo major changes. It's not a matter of simply replacing naphtha with renewable resources. This requires a new way of thinking and a new revenue model. It provides scope for open innovation and we need to grab that opportunity with both hands. And we need to do it now. If polluting plants do not become more sustainable, they will be closed at some point. Brightsite is the perfect place to combine and provide access to the knowledge required for this transition within the chemical industry," says Stokking.

## Added value of bringing different worlds together

The partnership between the four parties gives Brightsite a bird's eye view of the playing field. Sitech has extensive knowledge of and experience in the process industry, and knows the companies and installations at Chemelot better than anyone else. TNO has both knowledge of the subject matter and expertise in the field of application-oriented innovation, and is capable of managing innovation processes. Maastricht University provides academic input on the social side of innovation, conducts fundamental research and is starting engineering courses that will provide the next generation of engineers. Brightsite has the knowledge and expertise required to enable the transition within the chemical industry. "Bringing together these three worlds at Brightsite and linking them to the network and ecosystem of the Brightlands Chemelot Campus allows us to develop commercially viable technologies. We can answer the question of whether a certain technology is suitable for implementation by bridging the gap between fundamental knowledge, application-oriented innovation and commercial implementation," explains Slaghek.



## Transition Chemelot



## Unique testbed for circular economy

The transition towards a climate-neutral, circular economy places high demands on sectors such as the chemical industry. But Limburg is a region used to transition like no other. "Furthermore, we have everything we need to fulfil a pioneering role. The fact that the site has always had a high level of synergy makes us the ideal location to realise this transition. No other site in the Netherlands or Europe has such a strongly integrated innovation chain. Thanks to the collaboration that is in our DNA, our performance is 10-15% better at Chemelot compared to how the companies would do separately. At Brightsite, we have a bird's eye view of everything, allowing us to help companies make the right choice for new developments. And we make sure we implement processes that satisfy the needs of the site as a whole. In other words: system integration," explains Stokking. As an open innovation platform for sustainable process

engineering and circularity, Brightsite wants to combine the required knowledge from all kinds of parties at Chemelot. Facilities for upscaling and commercial demonstration are being provided here. "This will allow us to turn Chemelot into an internationally leading testbed. We work throughout the knowledge chain using integrated technology roadmaps that link scientific knowledge, application and use by companies," says Slaghek.

*The Chemelot site is a unique testbed due to its closely connected innovation chain*

## Brightsite works with six synergetic programme lines

Brightsite focuses on three technological pillars: electrification, recycling and process innovation. Due to the fact that the development and application of new technology requires more than just the technical aspects, Brightsite is also including safety aspects, social acceptance, legal and economic feasibility and education from the start. To safeguard successful implementation, the Brightsite activities are subdivided into six synergetic programme lines:

### 1. Reduction of emissions through electrification

replacing natural gas by using sustainable electricity

### 2. Reduction of emissions by using renewable raw materials, recycling and biomass

e.g. replacing natural oil by recycling (plastic) waste

### 3. Process innovation

reduction of greenhouse gas and process emissions by implementing new processes such as heat management, digitisation, circular water and emission improvements through savings

### 4. Safety and social acceptance

one condition is that this transition towards new processes and technologies can be performed

safely for employees and with approval from the social environment

### 5. Transition scenarios and system integration towards 2030-2050

safe, sustainable and economically sound transition of Chemelot (site and infrastructural changes) towards climate objectives for 2030 and 2050

### 6. Education and human capital

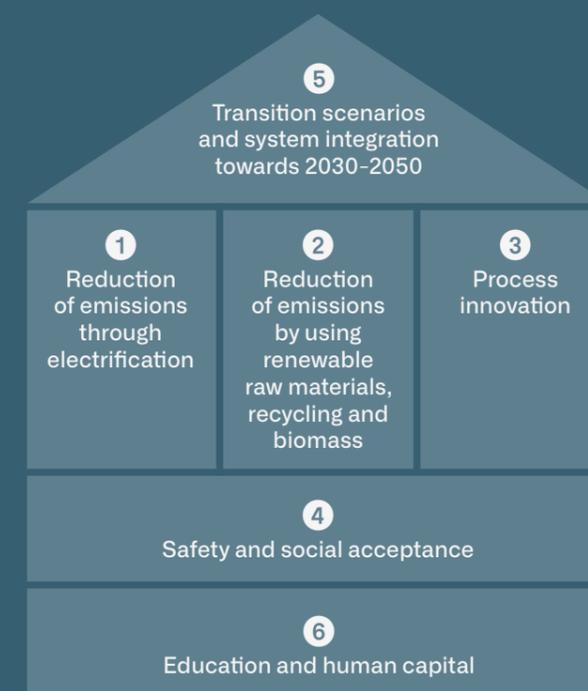
as part of this programme line, Maastricht University will be developing new curricula relating to 'circular engineering' and 'sustainable manufacturing'. Secondary (MBO) and higher (HBO) vocational training courses will follow this, characterised by continuous learning pathways and curricula.

Interesting technologies that lead to a reduction in CO<sub>2</sub> emissions and suit the Chemelot ecosystem have already been identified. Experts were found for each subject and teams were formed. "We're involving site users in the projects as early as possible, as they are the ones who will be implementing and taking over things," says Slaghek. "The authorities and local residents are also key partners for us," adds Stokking.

## More than just a technological transition

"Selecting and/or developing the right technologies (programme lines 1-3) to achieve the transition towards a green Chemelot is one thing, but safety and social acceptance are also important (programme line 4). The technology should also be integrated optimally into the Chemelot system (programme line 5) and we must ensure that we have the right people who can do this in the future (programme line 6). Due to the ageing workforce, many people will retire over the next couple of years," says Slaghek. "So training circular engineers who can think systemically is important right now. That is why we're also committing to education. It is not just about the climate, but also about continuity and employment," adds Stokking.

*We're focusing on replacing oil and gas with renewable resources and optimising processes*



*We're not only focusing on innovative technology, but also on process safety and acceptance, system integration and training a new generation of engineers*

## Demonstrating green chemistry

"Now that we've been active for a year, it's time for the next step. We're talking to investors and forming connections with new parties. The collaboration is becoming more focused; companies, authorities and public parties are showing an interest. The urge for innovation that is felt at the campus is contagious. But that shouldn't be all: we're showing that we're shaping the future here at Chemelot and that green chemistry not only can be demonstrated, but is 'the place to be' as well," says Stokking.

The ideas are already being worked out within the programme lines. Stokking: "We're focusing on replacing oil and gas with renewable resources and optimising processes. That's hardly 'rocket science', but it is important to make the right choices. Pyrolysis – on which many other projects are focusing – is not our first choice; we're opting for a different gasification method. We're also applying a different approach to electrification; we're looking into the options for plasma technology.

All in all, our cross-sectoral way of thinking produces unique and innovative ideas, and allows us to develop a green, circular system in which everything is connected," According to Slaghek, companies are gradually realising that they need to look beyond their own product. "More and more often, they're facing questions about sustainability from the chain. The playing field is changing, and it is not that easy to determine which role to play in the circular world of the future," emphasises Slaghek.

## Knowledge that can benefit everyone

Brightsite primarily focuses on improving the sustainability of the Chemelot site. However, it will be possible to apply and translate many of the results of this to similar transitions elsewhere. In that sense, Chemelot could serve as an example for the chemical sector in the Netherlands and the whole world.

## Let's collaborate to achieve the climate objectives

Green chemical industry is sustainable, innovative and competitive. At Brightsite, we are in the perfect position to boost the development and commercial application of innovative technologies that are required to achieve the climate objectives.



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Does your company recognize itself in the working method of Brightsite? Would you like to know more about how we view the transition in chemistry?

I would be delighted to meet you and discuss how we can work together.

[brightsitecenter.com](https://brightsitecenter.com)