Providing Circular Side Stream Solutions

Purifying Water and Recovering Materials with Mobile and Modular Installations

InOpSys, created in 2015 as a spin-off from the KU Leuven University, Belgium, is committed to providing on-site circular side stream solutions for the chemical and pharmaceutical industry, by building and operating mobile & modular purification installations on the customer site. Using a train of selective technology combinations, the start-up company efficiently closes water and material loops and helps the industry reach their sustainability goals by reducing waste and CO_2 emissions. The customers are unburdened as InOpSys takes ownership from start to finish and offers its service in a CAPEX-free way. Steven De Laet, founder and CEO of InOpSys, talks about his past and future journey.

Steven De Laet, InOpSys

Personal Profile

Steven De Laet, CEO and founder of InOpSys, graduated as a Master of Science in Chemical Engineering at the KU Leuven University in 2000. During his professional career he worked for companies like Bayer, BASF, ArcelorMittal, and Mondi. He also gained an executive international MBA at the Vlerick Management School (2008–2010). In 2012 he started taking his first entrepreneurial steps towards solutions for a more sustainable chemistry, with the creation of AvoRe. This was the foundation for the birth of InOpSys in 2015 which originated within the Flemish Catalisti spearhead cluster..

CHEManager: You founded InOpSys six years ago. What was your motivation to start the company?

Steven De Laet: During my career, for a large part in the chemical industry, I realized that linear destruction is a common way of processing waste or side streams. During industrial production, hazardous and toxic streams are produced. Incineration of these streams is often considered the best available technology. Imagine; we are facing global water and material scarcity and increasing pollution, and yet streams are integrally incinerated, putting extra pressure on our environment. We believe that both the water and valuable elements can be recovered by introducing circular solutions. We refused to accept the status quo and wanted to make a difference.

What is the USP or differentiating feature of InOpSys?

S. De Laet: InOpSys offers solutions that reduce CO_2, waste and associated costs and create value by the recovery of materials, e.g., precious metals like palladium or platinum.

We chose a decentralized model, creating installations on-site, close to the side stream source. This enables us to work with unmixed and defined streams, and to avoid transport as a plus.

We finance the installation via a pay-per-use model, which spares our customers an investment which is not interesting enough according to their own return-on-investment guidelines. At the end of the contract period, we take back the mobile installation and reuse it for another project.

InOpSys is a one-stop shop for the industry, because we do not focus on a single technology, but on a hybrid combination of different technologies.

What kind of support did you receive, and which obstacles did you have to master so far?

S. De Laet: At the time of the spin-off in 2015 we had the support of our first shareholders, who also provided the starting capital. The InOpSys concept originated within the Flemish Catalisti spearhead cluster, built on partnerships with research institutes, companies, the Belgian Chemical & Life Sciences Association and governments. This was an interesting ecosystem for InOpSys.

Financing the model, which requires a lot of capital and R&D, was a challenge because we had not yet been able to prove our technology on a large scale. Convincing the first customer to work with InOpSys on a circular project was also a big hurdle, because the chemical and pharmaceutical sectors are risk-averse in terms of new processes and suppliers.

When did the company enter the growth phase, and where are you now?

S. De Laet: Ever since our first successful installation at Janssen Pharmaceuticals—part of J&J—in Geel in 2017, which was awarded with the first prize at the Belgian Business Awards for the Environment in 2018, the ball started rolling faster. Thanks to this reference, we could convince new customers like Ajinomoto Bio-Pharma Services that we have the required expertise. We currently have five long-term installations running at different locations of two multinational customers. This obviously had a positive impact on our turnover, which has approximately doubled year by year.

> *"We refused to accept the status quo and wanted to make a difference."*

In 2018 and 2020, new rounds of investment funding took place, when we welcomed new shareholders. By 2018 our headcount had risen from two to seven, and currently we are 16.

In 2020, we expanded our R&D facilities to the BlueChem Incubator in Antwerpen, using state-of-the-art laboratories and extra office space.

What have been the most exciting projects so far?

S. De Laet: After our first award-winning project in 2017, we have developed five other installations for multinational customers. A number of these projects are focused on a combination of active-pharmaceutical-ingredient removal and metal recovery—e.g., precious metals—from water and solvent streams. The newest and biggest installation removes 23 APIs out of the process streams of a large formulation site for different medicines. This project was attributed the "Solar Impulse Efficient Solution" Label in 2021.

What will be the next steps to develop InOpSys?

S. De Laet: Today, InOpSys has taken good steps forward and is ready to expand to other European countries. Because we work for multinational companies, we must follow them wherever they have a presence. We are also excited about an interesting shift, where an existing customer has entrusted us to build an installation for the treatment of a product stream instead of a waste stream. This opens a completely new market for us.

Business Idea

Missing Link to Close the Loop

InOpSys is committed to providing circular waste or side stream solutions for the chemical and pharmaceutical industry by building and operating mobile and modular purification installations on the customer site. Using a train of selective technology combinations, the company efficiently closes water and material loops, thus, helping the industry reach their sustainability goals by reducing waste and CO_2 emissions.

The costs associated with waste and emissions can, thus, be reduced and value can be created by the recovery of materials, e.g., precious metals like palladium (Pd) or platinum (Pt).

InOpSys uses a decentralized model, creating installations on-site, close to the side stream source. This allows working with unmixed and well-defined side streams and avoids transport as a plus.

The Belgian company is a one-stop shop for the industry, because it does not focus on one single technology, but on a hybrid combination of different technologies. Thanks to this "relay team" of technologies, very high removal rates can be achieved in a more efficient way compared to mono-technology solutions. This also allows InOpSys to remove pollutants in a selective way, leaving easily biodegradable components untouched.

The experts tailor each installation to the specific aspects of the side stream. Every project starts with an in-depth analysis of the challenge by the InOpSys chemists, who determine the applicable technologies at lab scale, with a proof of concept as a result. Afterwards the Engineering team takes over, who eventually ensure that the mobile unit gets built, operated, and maintained on-site.

The customers are unburdened as InOpSys takes ownership from start to finish and offers its service in a CAPEX-free way. InOpSys finances the installation via a pay-per-use model, which spares customers an investment not interesting enough according to their internal return-on-investment guidelines. In summary: InOpSys designs, builds, finances, operates, and maintains (DBFOM) the circular solution.

- InOpSys NV, Mechelen, Belgium
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INOPSYS
SIDE STREAM SOLUTIONS

Elevator Pitch

Not Accepting the Status Quo

InOpSys was founded in 2015 in Belgium with the ambition to create an alternative to linear destruction, which is a common way of processing industrial waste or side streams. In times of water and material scarcity and increasing pollution, InOpSys—by now a scale-up company rather than a start-up company—wants to do better by introducing solutions to recover both clean water and valuable materials. InOpSys builds and operates mobile and modular purification installations on the customer site, helping the industry reach their sustainability goals by reducing waste, water consumption and CO_2 emissions.

Milestones

2015:
- Creation of InOpSys NV
- First round of investment funding with Gemma Frisius fund and Innovation Fund

2016-2017:
- First contract with J&J
- First installation operational

2018:
- First prize at the Belgian Business Awards for the Environment
- Round of investment funding: entry of new shareholders VMH/PMV
- Headcount increased from 2 to 7

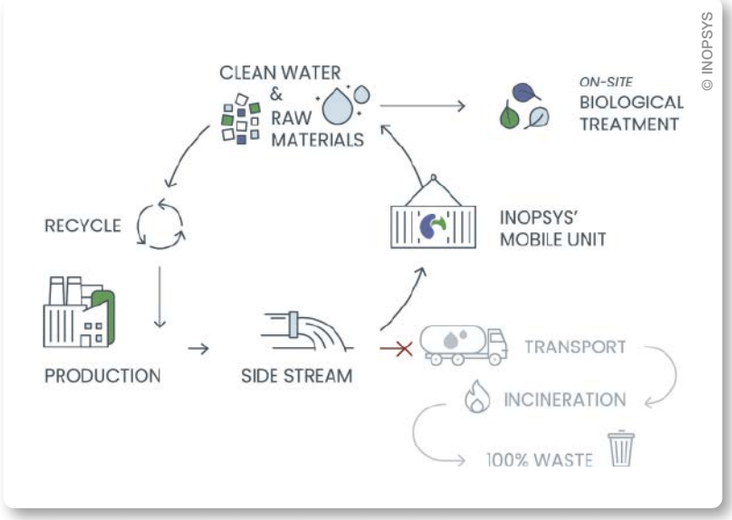
2019:
- Two new installations operational

2020:
- Expansion to the BlueChem Incubator in Antwerp, Belgium
- Round of investment funding: entry shareholders ALIAD (Air Liquide) and Telos Impact

2021:
- Headcount increased to 16
- New API removal (PIE free) installation operational: largest one so far
- "Solar Impulse Efficient Solution" Label for latest API-removal installation

Roadmap

2022-2023:
- Creation of entities in other European countries (e.g., Switzerland)
- New round of investment funding to support global growth
- Roll-out of existing concepts to other countries
- Development of new concepts (e.g., removal of PFAS, EDC)



InOpSys has the ambition to create an alternative for linear destruction, providing circular side stream solutions for the industry, by building and operating mobile installations.

One of the running on-site installations recovers valuable palladium, used as a homogeneous catalyst by the customer, and purifies the wastewater, closing the loops.