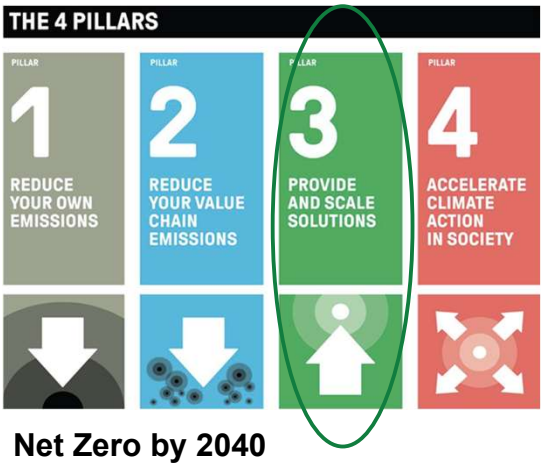
PÄR LARSHANS FROM RAGN-SELLS SPEECH AT UNFCCC CLIMATE WEEK MEETING IN ADDIS ABABA 6TH OF SEPTEMBER

How to finance mitigation activities and how circular transformations will enable to fulfil the ambitions set in the Paris agreement

Sixth global dialogue and investment-focused event under the Sharm el-Sheikh mitigation ambition and implementation work program

TRANSPORT COMPANY IN 1881, TO A RAW MATERIAL SUPPLIER AND DETOXIFIER IN A CIRCULAR ECONOMY WITH A NET ZERO GOAL



THE RAGN-SELLS STORY – PART OF THE ECO-CYCLE SINCE 1881

Every Sellberg generation has developed Ragn-Sells based on a vision of a sustainable society, where taking care of our planet goes hand in hand with business.

A third-generation family-owned business, originating from 1881, started as a hauling company and, in the 1960s, focused its operation on waste management.
In 2015, the alarm bell sounded, and the company gained insight that the emerging circular economy would make traditional waste management companies obsolete (in the perfect circular economy there's no need for waste management). It initiated a process under the leadership of our Head of Strategy, Anders Kihl, to establish a new company strategy. The new strategy, summarised in one sentence, states that "we will become a raw material supplier and detoxifier of selected urban flows in the future circular economy".

As a guiding tool, we decided to add three principles that we should always ask ourselves when investing in research, buying a company or exiting from different businesses.

1. Will this reduce the need for virgin resource production?

2. Will it detoxify?
3. And make sure that no challenges are pushed to the coming generations to deal with?

When we then delved deeply into current legislation and the guiding principles in society, we encountered a clash.

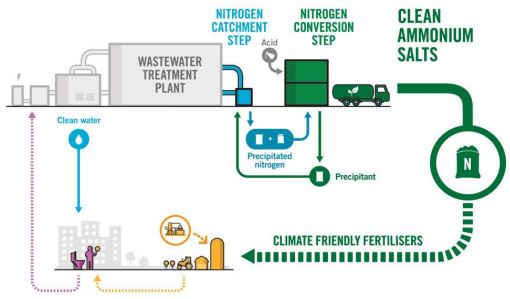
The waste hierarchy, presented in 1979, which has served our society well in reducing the negative effects of our linear economy, suddenly became a blocker. The Basel Convention, which serves a similar purpose to the waste hierarchy, makes it challenging to develop advanced processes that can, on a large scale, produce high-quality materials from what is currently defined as waste. Therefore, we decided to present an alternative that provides the possibility of producing high-quality materials the industry needs, while avoiding waste that ends up in the wrong places.

We have grown into an international business group, but our headquarters still overlooks the same quiet lake at Väderholmen. The original farm buildings convey the feeling of a small village, where innovative people from all over the world join us in our quest for new circular solutions. We try new ways, create new possibilities, learn from success and mistakes alike. Together, we shape a sustainable society that no longer hands its problems over to future generations.

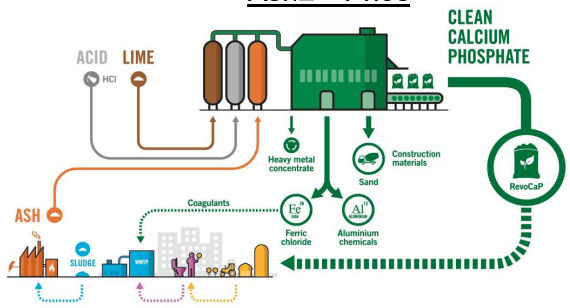
RESOURCE PLANTS REPLACING WASTEWATER TREATMENT PLANTS AS THE LONG-TERM GOAL – WEFE NEXUS

(WATER ENERGY FOOD AND ECOSYSTEM NEXUS)

Aqua2™N

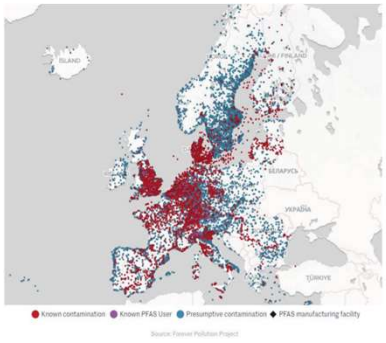


Ash2™Phos



1. Produce water for reuse in industrial applications and agriculture
2. Produce important macronutrients like phosphorus and nitrogen
3. Produce much more renewable energy
4. Avoid causing damage to our fragile ecosystem (rivers, lakes, coast)

SELPAXT Home, PFAS removal



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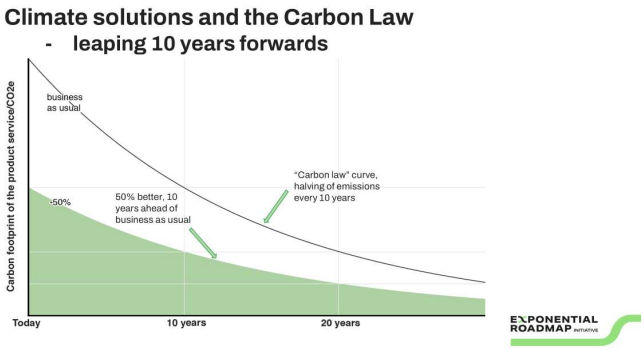
We recognize the need to reform certain societal processes, and we have focused particularly on wastewater management. Today, we set up wastewater treatment plants in order to remove contaminants. Their obligation is to minimise the problem that our linear system has created and then release the rest to different waste bodies. But what would happen if we saw them as resource plants, and producers of energy and water for agricultural and industrial use, at the same time as we produce important resources like building materials, nutrients, and energy.

Since 2015, we have developed innovations that enable wastewater treatment plants to make this shift. One example is the important role we play in removing PFAS before it enters the wastewater from hotspots. Therefore, all industrial sites, landfills, and other facilities that utilise a wastewater treatment plant as their primary source should remove PFAS from their leachate water when it reaches a critical level. We have developed a leadning solution to remove PFAS from hotspots.

However, the most significant innovation is our nitrogen and phosphorus innovation, which I will revisit later.

As a company, we have of course, a plan to reduce our own emissions according to and even with better ambitions than what is stated in the Paris agreement, we have as a member of ERi committed ourselves to becoming climate neutral already by 2040, and it means that we are reducing the impact both when it comes to Scope 1, 2 and 3. Furthermore, we are developing circular solutions that will contribute to reducing the CO2e impact in other value chains beyond our operations, and here we have the ambition to certify ourselves through Eri as climate solutions. In the following slides, I will present five different processes that are all carbon sinks and, at the same time, produce high-quality output, and discuss how to finance this transition.

CIRCULAR SOLUTION FOR SOLVENTS – ALMOST 90% CO_2e SAVINGS



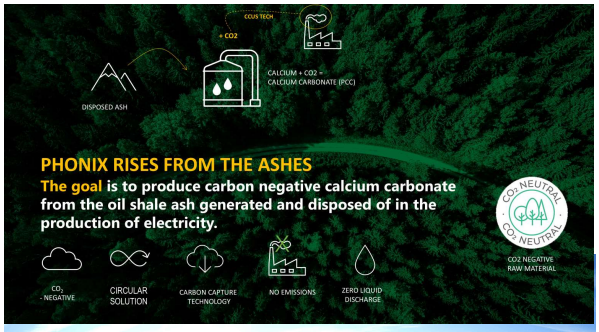
On Wednesday, September 3, 2025, we inaugurated the Solvents Recovery Solution plant in Sweden, a joint venture between Ragn-Sells and Vilokan, representing a total investment of approximately $ 30 million US dollars. The primary method of treating solvents today is incineration. When the solvents are separated and cleaned from contaminants, they are sold again as a new product. Therefore, glycol, ethanol, and other similar substances will not need to be produced from virgin resources. The total CO_2e reduction from sourcing recycled solvent is nearly 90% lower than if it were sourced from virgin fossil oil.

Does this cost more money for the companies that have dirty solvents?
No, the price is the same for them, and even if there is a substantial investment, the total profit from the operation gives a high return.
The challenges have been market acceptance, standards, and not primarily legislation. To scale this globally, national governments will need to establish a demand that solvents be recycled in a proper facility.

This is the first product that Ragn-Sells is now in the pipeline to be certified according to ERi Climate Solution.
The global CO_2e saving potential is significant when almost none of the

emissions are recirculated as new products.

CO_2 AS AN INPUT TO PRODUCE NEW RESOURCES



- In Estonia, since the 1960s, 600 million tonnes of ashes from energy production have been stockpiled (landfilled) on a large scale. The process itself is the single biggest CO_2 emitter in Europe and will be closed.
- However, there is now a potential to extract resources from the ash mountains that can store CO_2 for generations to come and also become the source of critical and strategic raw materials, such as magnesium, silica, and aluminium. To gain access to them, CaO must be removed, which we will achieve by a novel chemical process that includes the addition of CO_2

The next example is a solution that should not exist if we had followed the principles in the waste hierarchy.

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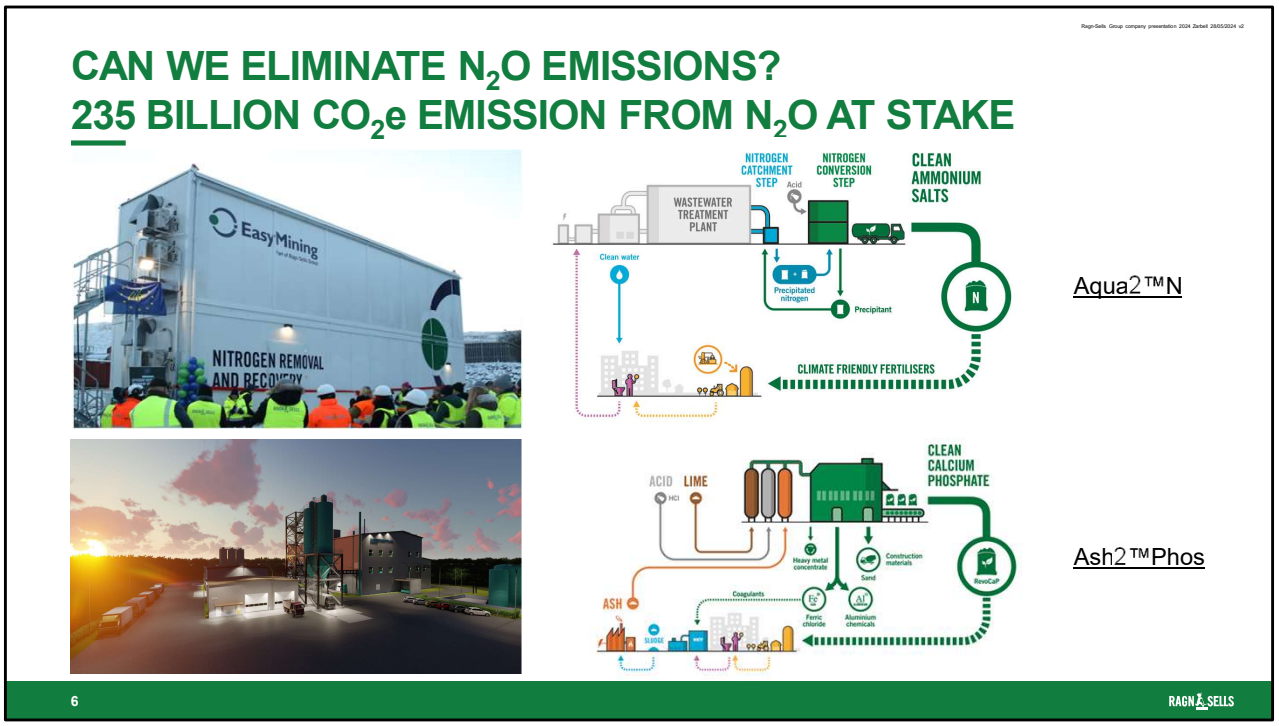
However, there is now a potential to extract resources from the ash mountains that can store CO_2 for generations to come and also become the source of critical and strategic raw materials, such as magnesium, silica, and aluminium. To gain access to them, CaO must be removed, which we will achieve by a novel chemical process that includes the addition of CO_2. The valorising process begins with the production of precipitated Calcium Carbonate ($CaCO_3$) of extremely high purity and quality, using CaO from ashes and captured CO_2, followed by the extraction of magnesium, silica, and aluminium.

Today, in our linear economy, the product PCC is produced by mining and heating limestone for incineration using fossil fuels, which is then converted from a very unsustainable linear process and replaced by combining ash and recycled CO_2.

The plan after launching the demo plant in 2026 is to have the first full-scale plant producing $CaCO_3$ by 2031, provided that EU regulations can be amended to give the use of CO_2 in raw materials for storage in its products the same status as if CO2 were put in old boreholes.
By being able to use CO2 instead of only storing it will create a double win. With one full-scale plant, the total CO_2e saving would be 1.000,000 tons of CO_2e per year.



Let's now move into the food-value-chain and primarily nutrients.

Today, to produce fertilisers in a linear way, it both pollutes the environment and incurs huge CO_2 costs. As much as 1% of the global CO2 emissions come from the production of nitrogen fertiliser, and it will consume as much as 2% of the world's energy. In these emissions, the amount of N_2O is not included, which occurs, for example, when the denitrification process is not sufficient. See the report published in 2024 by UNEP, which suggests that as much as 235 billion tonnes of CO_2-equivalent emissions by 2100 can be avoided from entering the atmosphere through mitigation actions.

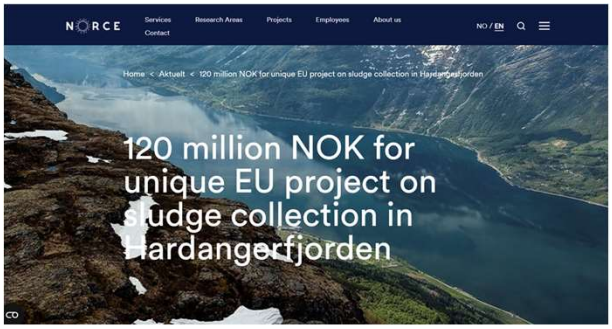
When it comes to phosphorus, besides the unsustainable mining process and its scarcity as a resource, the significant CO2 emissions stem from the large methane releases that occur during eutrophication processes, which happen when phosphorus is not removed by wastewater treatment plants or from fish farms. According to a scientific study, "The role of freshwater eutrophication in greenhouse gas emissions: A review" (ScienceDirect), we can expect a significant increase in methane emissions if we don't reduce methane emissions by as much as 100% by 2100.

We have established a robust process that can produce high-quality phosphorus products from sewage sludge or fish sludge. Not only do the products meet industry standards, but they also serve as a significant CO_2 sink. The first two phosphorus factories are now being built in Germany and Sweden and will, in addition to phosphorus for feed, also produce silica that can replace concrete in cement, precipitation chemicals (such as iron and aluminium), and heavy metal-containing minerals like copper, which can ultimately replace copper ore in smelters. This process is perfectly suited for where 70% of the world's population is expected to live by 2050, in our cities, and both solves the cities' challenge of high sewage sludge treatment costs while avoiding phosphorus, thereby preventing eutrophication.

In our Aqua2N process, we remove up to one-third of the reactive nitrogen from the wastewater in the reject water stream, enabling the plants to produce significantly more biogas and thereby reducing the risk of N_2O emissions. The product we produce is a liquid nitrogen fertiliser, based on circular chemistry, which uses very little energy. If the reduced N2O emissions are included in the LCA calculation, the farmer will even have a CO2e-negative fertiliser (less emissions than zero) compared to today's high level of emissions. Besides these benefits, we also see how this will enable the wastewater treatment plant to produce significantly more energy.

FROM FISH SLUDGE WILL ALSO BE NEEDED TO BE COLLECTED – WITH THE POTENTIAL TO PRODUCE FEED

AQUAPHOENIX - clean aquaculture | circular waste - AQUAPHOENIX



	Recovered P mg/kg	Ash mg/kg	Reduction %
As	1.5	34.6	96
Cd	0.1	5.5	98
Co	0.7	32.4	98
Cr	1.7	232	99
Cu	5.5	1 756	100
Fe	1 340	202 826	99
Hg	–	0.0526	100
Pb	3.6	344	99
Zn	45.9	6 780	99
Ni	2.6	164.6	99

WCO Brussels October 2022
"Not only rich people should be able to buy eggs in the future" (ragnsells.com)

However, sewage sludge is not the only potential source of phosphorus; we are also developing a solution to collect fish sludge from fish farms in a collaboration spanning over six countries. Already, we collect fish sludge from fish farms, transport it, and supply it to biogas plants in Norway. However, in the 4-year EU-supported project called Aquaphoenix, we are developing a circular solution that can be scaled globally, with representatives from the six countries involved. Not only can we avoid eutrophication with this solution, but we also aim to produce high-quality fertiliser or even feed. The Ash2Phos technology, developed to produce high-quality raw materials from sewage sludge, will be adopted for the fish sludge process.

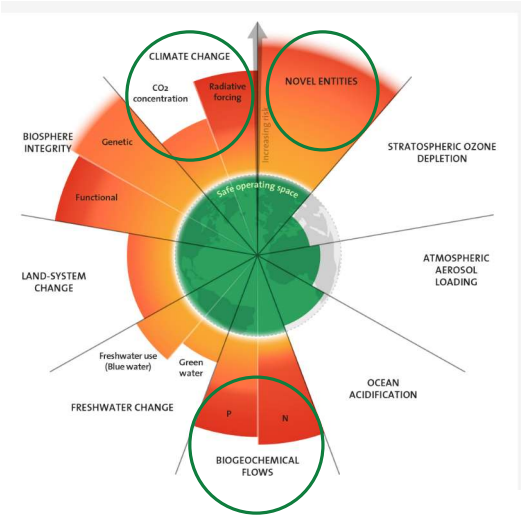
The CO_2e savings are not only that we can avoid eutrophication, but we will also produce a large amount of renewable energy. However, from a resource perspective, we can only produce up to 16,000 tons of pure P in Norway, and our ambition is to sell it based on quality, rather than origin, as today's legislation permits.

We have been able to demonstrate, through the Veterinary Institute of Sweden, that using the product poses minimal risk. Furthermore, our product has the

lowest heavy metal content on the market; however, EU legislation does not currently allow us to make this claim on a principal level. Therefore, we have initiated a collaboration with Friesen Group in Vancouver, with the goal of launching the product on the market once we receive formal approval.

The significant transformation will occur when we can sell the product based on the quality we produce, as this will enable the income from selling the raw material to become a source of revenue, allowing cities to transition from a cost to a source of income.

CIRCULAR SOLUTIONS WILL REDUCE THE RISK THAT WE OVERSHOOT OUR PLANETARY BOUNDARIES



Pressure on the planet is high

6 out of 9 planetary boundaries already breached

Extraction and processing of natural resources account for

- 50% of climate change
- 90% of bio-diversity loss
- 90% of water scarcity

Creating new circular material flows is a key enabler to reverse this and to bring back planetary stability

COP30 is around the corner, and on the 15th, we invite parties to join us in Belem, where Ragn-Sells, IKEA, Alfa-Laval, Tetra Pak, and Spowdi will host a discussion on the future of the sustainable food value chain. Possible to ask for an invitation.

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RAGN-SELLS

Conclusion

We have now studied 5 different processes that all generate large CO_2e savings; they are all based on the need to succeed in collaborating across the value chain. The Vilocan Ragn-Sells collaboration, when it comes to Solvents, is one example. At COP30, we will demonstrate how it is possible to collaborate across the food value chain, where IKEA, TETRA PAK, Alfa-Laval, Spowdi and Ragn-Sells invites to a food value chain roundtable on the 15th of November in Belem. When collaborating across the value chain, it is then that you can make a difference.

But the potential wins for the world are much more than only CO_2, it is geopolitical, it is socially related, and it is definitely something that will reduce the risk that we overshoot a majority of the planetary boundaries when scaled globally.

Pressure on the planet is high

- **6 out of 9 planetary boundaries already breached**

Creating new circular material flows is a key enabler to reverse this and to bring back planetary stability!

CIRCULARITY IS THE KEY ENABLER FOR HOW TO STAY WITHIN THE PLANETARY BOUNDARIES

The planetary boundaries framework is defined based on the Earth system science. It identifies nine processes that are critical for maintaining the stability and resilience of the Earth system as a whole.

The pressure on the planet is high. The latest assessment on the status of the planet with respect to the concept of Planetary Boundaries (September 2023) shows that six (6) out of nine (9) planetary boundaries have been breached, thus creating planetary instability that is difficult to reverse. Read more Earth beyond six of nine planetary boundaries | Science Advances 1 (https://www.science.org/doi/10.1126/sciadv.adh2458)

According to the UN, the extraction and processing of natural resources account for about 50% of climate change, 90% of biodiversity loss, and 90% of the threat to access to water. Read more: gro_2019_fact_sheet.pdf (resourcepanel.org)

Creating new circular material flows is the key enabler to reverse this and bring back planetary stability.

Noteworthy also is that IPCC, in the final text from the COP28 conference, for the first time included circularity as an important factor to mitigate climate change.

PÄR LARSHANS – CHIEF SUSTAINABILITY OFFICER WITH OTHER RESPONSIBILITIES – PAR.LARSHANS@RAGNSELLS.COM

- EuRIC – President Construction & Demolition branch in Europe
- Water Europé – member of the board
- ICC – co-chair ICC global working group on circular economy
- World Water Week – member of the science program committee
- UNEP GPNM – Member of the steering committee for UNEP work on nutrient management

- Government appointment Sweden by the minister
  - Gov board to the chemical agency of Sweden

WATER EUROPE

Interview with Pär Larshans, Ragn-Sells' Sustainability Director & Water Europe's Board Member - Water Europe

International Chamber of Commerce (Paris)

Ragn-Sells' Sustainability Director leads ICC's working group on Circular Economy (ragnsells.com)

Stockholm/Brussels 20250919

Dear Co-chairs, mitigation actions are possible to finance when it comes to CH4 and N2O through circular solutions and are very much needed.

I have worked for a decade with circular transformation, and I am happy to see that things are moving in the right direction. Still, many associate circularity with waste management, when in fact it represents a new approach to producing and consuming resources. As I explained in my speech, in 2015, we gained insight into the concept of a perfect circular economy, where there is no waste. If you are a waste actor, this insight stresses you, which is why we have focused on developing circular solutions still needed in a circular and fossil-free world.

An important aspect is that it is the output of different processes that plays a role in circular material flows, rather than the input. In a linear economy, waste is a special subject; in a circular economy, it is resources that have not yet been sorted, and the right "tool" will be needed to be used depending on the composition of the material flow. The International Chamber of Commerce

presented a model with a focus on effective resource use and detoxification, which I would be more than happy to discuss further with you.

Special thanks to you, for the" Sharm el-Sheikh mitigation ambition and implementation work programme" has integrated circularity as a potential tool in contributing to the fulfilment of the ambitions set in the Paris Agreement. But I do see some challenges in how different regions viewed the circular dimension. Several speakers referred to the waste hierarchy (WH), presented in 1979 as a tool to prioritise how waste should be handled. It was long before circularity was on the radar, and the challenge, as I presented, is that we need something else because the WH misses when it comes to;

1. There is no resource focus; the focus is on the input, where the priority is to avoid waste from occurring (good), but in practice, it means that the ambition is to maximize material recycling as much as possible, and here the challenge is that there is no specific demand on the output side, meaning that the output will hardly replace the use of virgin resources. The producing companies will continue to use virgin-sourced elements.
2. There is no detoxification step – UNEP is clear, and the scientist backing up the planetary boundaries model is clear: pollution is our biggest problem. PFAS, for example, is emerging as a potential barrier to material recycling if the input cannot be guaranteed.
3. The ambition in avoiding landfilling comes from avoiding dumping (which we should not do!), but it works in contradiction, boosting the illegal market, where Sweden has a very well-known court case ongoing. In a circular world, we would need a storage option. When is it good to store or remove unsorted resources?
    a. To reach the scale of economics, meaning that sometimes the best treatment method should be to store the resources for 5,10, 50 years. This is also related to the challenge we face with the Basel Convention; shipments of waste to produce new resources are problematic, and waste from a single country is often insufficient to reach the economic scale.
    b. Treatment methods exist in a country, but they need a large-scale operation to be financially viable.
    c. Treatment methods don't exist, but the resources are already scarce today, and we should store them while we focus on developing

methods to treat them.

b. There are resources we know are needed in the future, but it is not possible to recover from a financial perspective today.
d. There is a need to remove toxic material that should not be recirculated.

P.S. Organic material should not be stored/landfilled, but rather composted or, preferably, used for biogas production.

In my presentation, **I focused on the food value chain, specifically from the Source-to-Sea dimension**. We know that by 2050, the world will need to produce 70% more food, and 70% of this will need to be produced through aquaculture.

What we see in this value chain is that CO_2e emissions are increasing, and this is particularly evident in N_2O and CH_4. Here, circular solutions can make a significant contribution to reducing emissions and, in some cases, even eliminating them.

UNEP presented the potential to mitigate 235 billion tons of CO_2e from N_2O at COP29, and the Methane challenge is even bigger and growing. Therefore, even if we eliminate the use of fossil fuels, emissions from N_2O and CH_4 will still increase and need to be mitigated.

On the UNEP side, I would like to introduce you to Ning Liu, who is responsible for UNEP GPNM (Global Partnership on Nutrient Management), and Alex Pires, who is responsible for UNEP GWWI (Global Water Wastewater Initiative).

The most prominent researchers connected to the N_2O and CH_4 are.

Nitrogen
Professor Mark Sutton (UK CEH) – also co-chair of UNEP GPNM – specialist in nitrogen.

Methane
Professor Bryan M. Spears (UK CEH) – member of the steering group for GPNM

Dr. Will Browlie, the leading author behind the scientific publication with 100 scientists across the globe, our phosphorus future. I took the data for my speech

on the growing CH_4 emissions from Dr. Will Browlie.

The innovations I presented in the food value chain during my keynote were:

Aqua2N – produces nitrogen fertilisers that will replace Haber-Bosch production, but also has the capacity to eliminate the risk of N_2O emissions from denitrification processes. This will also generate income for the wastewater treatment plants through increased biogas production and the sale of fertiliser. On the cost reduction side, it will need less energy than today's conventional methods of denitrification. The scaling potential is for all wastewater treatment plants that produce biogas on a global level.

Ash2phos produces a high-quality phosphorus product suitable for feed and building materials, as well as coagulants, making the process a significant carbon dioxide equivalent (CO2e) sink. Scaling potential is global.

Aquaculture solution through the program Aquaphoenix. A circular solution that will produce large volumes of biogas and nutrients, the project will be presented in 2029 on how to scale it to all coastal regions around the world.

I did not present our PFAS innovation, which, in hotspots, removes both long, short, and ultrashort-chain PFAS, enabling a dramatic reduction in the amount of PFAS that reaches the wastewater treatment plant. And by doing so, enable the possibility of reusing wastewater for industrial and agricultural use. Our innovation name is Selpaxt.

There are, of course, other innovations from other companies on the market, but from a policy perspective, it is important to demonstrate that solutions exist and how to finance them. I have also initiated an active dialogue with the World Bank to understand how quickly scaling can occur, where some dialogues have already been taken with India, for example.

Yours sincerely

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