

Energy recovery from waste: Advancing circularity and climate goals

- Insights from the
ISWA Beacon Conference 2024



AVFALL SVERIGE

PREFACE

The Beacon Conference on Waste-to-Energy is a proud tradition for Avfall Sverige. This is where you find the latest news from the Waste-to-Energy (WtE) sector and where you meet people to be inspired by and network with.

2024 it was arranged in Stockholm, the 27-28th of November, co-organized with ISWA, International Solid Waste Association, for the twelfth time. This year the conference was arranged also in cooperation with the Swedish Energy Agency as well as Cewep, Confederation of European Waste-to-Energy Plants, both contributing with their expertise.

The two-day conference showed the pivotal role of Waste-to-Energy within the circular waste management system in a global perspective. Expert discussions showed the latest directives, strategies, and technological advancements aimed at achieving climate neutrality and enhancing operational efficiencies in the WtE process.

The conference raised many issues, for example operational challenges, emission control, and the recovery of valuable materials from residues. CCUS is an important topic which was of course also high-lightened.

Many examples showed that Swedish WtE-technology sector is among the leading sectors in Europe and globally, and not least our integration of district heating aroused great interest.

The many participants from countries like Ghana, the Philippines and Ukraine also proves that the Beacon Conference on Waste-to-Energy plays an important role in developing waste management world-wide.



Tony Clark,
CEO of Avfall Sverige
– Swedish Waste Management.

INTRODUCTION

The ISWA Beacon Conference on Waste-to-Energy brings together the world's expertise in technology, regulation and future visions in the field of Waste-to-Energy. The conference highlighted the role of Waste-to-Energy in circular waste management and in the energy system and after this year's conference, it was clear to everyone that the waste sector really invests in research and development. This involves both projects here and now and long-term research, all to continue to streamline energy recovery and further reduce its environmental and climate impact. The Waste-to-Energy sector offers many opportunities. The question is: to what cost and who should pay?

Swedish Waste-to-Energy is well established with a large expansion of district heating and high energy efficiency. There is also a high level of development in terms of both technology and the market.

Tony Clark, CEO of Avfall Sverige – Swedish Waste Management, opened the conference. In his introduction, he emphasized that Waste-to-Energy is not at odds with reducing waste through a higher degree of reuse and recycling. Energy recovery shouldn't be used to treat waste that can be recycled, but there's a lot of waste that isn't suitable for recycling, because it contains hazardous substances or is too low quality. Energy recovery has a large and important role in treating these waste streams. The industry needs to become better at communicating the necessity of incinerating waste, to increase understanding. But we must also reach higher up in the waste hierarchy, he stressed, there is a huge potential to increase circularity with Waste-to-Energy.



WASTE-TO-ENERGY WILL BECOME EVEN MORE IMPORTANT

This occasion marked the first time that Swedish Energy Agency participated in the conference. Gustav Ebenå, Head of Department at the Swedish Energy Agency explained that they see waste as a resource, not only as a material base, but also as an energy base. That is why the Agency considered it important to engage in this conference. Waste energy is needed to piece together both the circular economy puzzle and the energy system. In a perfect circular economy, there should be nothing left to burn once we have managed to reuse and recycle the material, but the Agency does not anticipate that this will happen in the foreseeable future.

Gustav Ebenå predicted that Waste-to-Energy will become even more important, as we will see increased competition for fuels, not least biofuel – especially from a local and regional perspective with both heat and electricity, in combined heat and power. It is also important from a preparedness standpoint, as it can contribute with storage and delivery regardless of the weather, even when more cogeneration is needed when it is cold.

Gustav Ebenå also underlined that there is a large political interest in carbon capture in Sweden, both storage and utilization. With bio-CCS you get negative emissions, which makes it an attractive solution to decision makers. The challenge is to think about how this system can be optimized. to get some kind of profitability in its different parts. It's not enough that it's a good idea, it must also be profitable for those who are going to earn their bread from this. And it's not that simple.



Gustav Ebenå, Head of Department at the Swedish Energy Agency, meant that waste is a resource, both for material and energy.

WASTE-TO-ENERGY AROUND THE WORLD

A waste incineration plant is the cornerstone of most modern waste management systems. A large part of the waste cannot be recycled due to technical or economic reasons. This residual waste can become a valuable local source of safe, stable and climate-friendly energy. It replaces fossil fuels, contributes to national energy self-sufficiency and eliminates the need for landfill.

The location of waste incineration plants is determined by specific and local conditions. They are usually situated near cities and towns to provide heat and electricity and to shorten transport distances for the waste. The location in or near the city puts an increased focus on making the buildings part of the cityscape. One of the more famous is in Copenhagen, where the exterior of the plant has been designed as a ski slope, for the enjoyment and benefit of the residents.

ISWA acts to promote Waste-to-Energy worldwide

Björn Appelqvist, Chair of the ISWA Scientific and Technical Committee, gave a global outlook from ISWA's perspective. He stressed the disparity in waste management globally, where around 2.7 billion people do not even have their waste collected. From the more than 2,000 billion tons of waste in 2020, 38 percent of the waste was inadequately disposed of and only 19 percent was recycled.



Björn Appelqvist, Chair of the ISWA Scientific and Technical Committee, presented a world-wide view on waste: Only 19 percent is recycled.

The statistics on development and waste generation are disappointing. If the current trend continues, the world could see a nearly 80 percent increase in municipal solid waste by 2050, driven by economic growth and population growth. Poor waste management affects fundamental human rights, as inadequate systems can lead to pollution and harm public health. Everyone deserves freedom from the harmful effects of waste

ISWA has recently presented a guide on managing waste sustainably. Human Rights, is one of five principles in this guide. The other four are Political Commitment, Waste Planning, Economics of Waste and Circular Economy. The guide is highlighting key principles and actionable insights to help address global waste challenges.

Mr Appelqvist also highlighted a huge global problem – plastic waste. Between 8 and 12 million tons of plastic end up in oceans every year. Among other things, due to the lack of waste collection. There is also a large leakage of microplastics into the environment, almost impossible to clean up, which clogs up our oxygen production on Earth. We are facing a serious problem if we cannot hold back the waste we produce in the future.

ISWA states that “a comprehensive approach must be taken to end plastic pollution, considering the entire life cycle of plastic” and emphasizes five key messages:

- Reduce plastic waste
- Ensure collection of all waste, especially plastics
- Upgrade illegal and open dumpsites. Ban open burning of waste.
- Increase the role and accountability of extended producer responsibility schemes
- Provide waste management solutions applicable to socio-economic and cultural conditions

Waste-to-Energy is present on every continent

Bettina Kamuk, Global Market Director at Ramboll gave a picture of the state of Waste-to-Energy around the world.



Bettina Kamuk, Global Market Director at Ramboll, explained that many countries are investing in Waste-to-Energy, but all other parts of a waste management system must develop simultaneously.

Waste-to-Energy in Northern and West-Central Europe:

This region shows strong capacity, focusing on modernizing and upgrading facilities. Carbon capture is being studied extensively as a key technology for decarbonization efforts.

Waste-to-Energy in Eastern and Southern Europe:

Eastern Europe, including Poland, Czech Republic, Slovakia, Serbia, Kosovo, and Lithuania, is expanding capacity to comply with EU landfill directives. In Southern Europe, developments in Portugal, Italy, and Greece are promising but cautious.

Despite EU taxonomy debates, Waste-to-Energy remains resilient and shows growth potential, complementing recycling as a key part of sustainable waste management.

Waste-to-Energy in the Middle East:

Countries like the UAE (with projects in Sharjah, Dubai, and Abu Dhabi), Qatar, Saudi Arabia, and Oman are focusing on landfill diversion. However, varying regulations and subsidies for fossil fuels create challenges.

Regional differences in waste management maturity, regulations, and subsidies challenge Waste-to-Energy, especially without financial or regulatory incentives.

Waste-to-Energy in Australia:

Australia is transitioning from landfills to Waste-to-Energy. Projects in Perth are near completion, and most states are planning facilities inspired by European regulations, despite slow progress due to short-term waste agreements and limited incentives.

Waste-to-Energy in Southeast Asia:

Singapore leads with established energy recovery, while Thailand, Malaysia, and Indonesia are slowly exploring possibilities. Growth is hindered by political and economic challenges, though some incentives exist.

Waste-to-Energy in Africa:

Progress is limited and varies greatly. Most projects are spontaneous and hindered by immature waste management systems. A more professional framework is needed to support Waste-to-Energy initiatives.

Waste-to-Energy in North America:

In the USA, Waste-to-Energy competes with landfills and faces limited political support, though activity is notable in Florida. Canada is seeing strong interest in regions like Ontario and Alberta, with discussions on carbon capture gaining traction.

CHALLENGES AND HOW TO MEET THE EU VISIONS, TARGETS AND STRATEGIES

Dr Ella Stengler is Managing Director of CEWEP, an umbrella association for more than 400 owners and operators of Waste-to-Energy plants in 24 European countries.

She gave the audience a picture of the relevant commissioners and EU directives to keep an eye on.



Ella Stengler, Managing Director of CEWEP, shared an analysis of EU policies. Decarbonization is a key word for the coming years.

With a new Parliament and a new Commission, the European Union is heading into a politically interesting period. The balance between different party groups has changed and the negotiations about the Commission have been hard. Finally, the EPP chose to cooperate with their former allies in this case, probably because there is a lot to do in this challenging time. But there is no formal coalition in the Parliament, so each file needs majority individually.

What to expect?

The ambition of the EU is to complete the Energy Union by lowering energy prices, achieving more clean energy and upgrading grid infrastructure. Ella Stengler shared three keywords for the upcoming period:

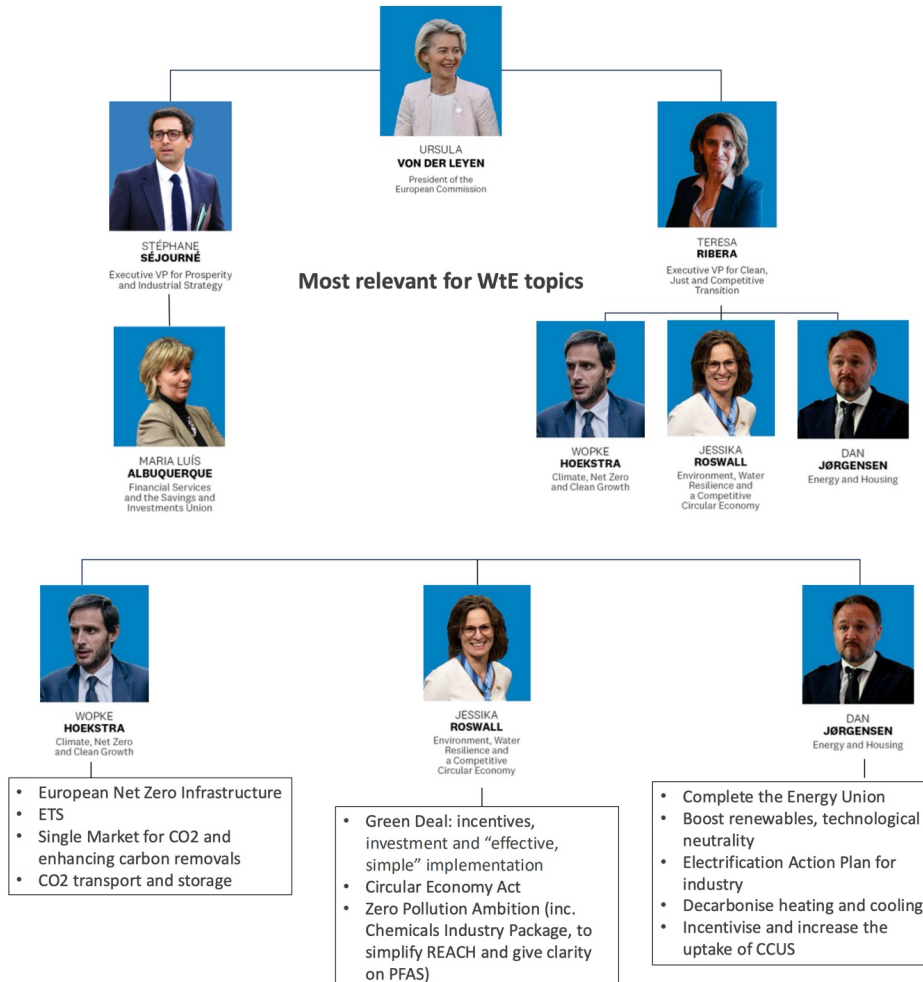
The first is competitiveness. This includes the Clean Industrial Deal (in 100 days), support to industry in implementing the Green Deal, energy security with low price and technology neutral, and through circularity (Draghi report).

The second is implementation. Most legislation is in place but needs to be implemented. The EU wants to make it simple and will have regular checks with stakeholders. The work with Waste Legislation to keep resources in the EU and the Critical Raw Materials Act are elements of this.

The third keyword is decarbonization. This is needed to stay committed to the targets and to be technology neutral. Ella Stengler predicted that the Clean Industrial Deal will be a big issue, and as a part of that carbon capture will be important. The Circular Economy Act will also play a big role.

A new European Commission

For everyone who wants to influence European politics, these are the Commissioners to memorize:



It is important to act

Ella Stengler stressed that a proper impact assessment on inclusion of WtE in the EU-ETS is an important element for the Waste-to-Energy sector, to be able to inform the politicians and help them to understand the consequences and the complexity of handling waste. In this assessment, the EU must look on the whole waste sector. It is still an open question whether the most effective way to reduce emissions will include Waste-to-Energy in the ETS (Emission Trading System)? If it gets more expensive because of ETS, what will then happen with the waste? Will it find new ways, maybe to a third country outside the EU? If society recycles more, there will be less plastic in the waste, but the plastic producers also have a responsibility. If they use less fossil oil and more recycled material, it also will reduce CO₂ emissions. Which is the most effective way?

Ella Stengler completed her presentation by concluding that Waste-to-Energy contributes to the EU's objectives and will continue to improve with the right policy framework. The industry therefore has to call on the EU to support the hygienic role of the sector and to promote the waste hierarchy. This requires the prevention of pollution at all levels and to minimize the landfilling of waste that can be used for material or energy recovery.

Furthermore, the EU must also recognize Waste-to-Energy and material recovery from IBA (Incineration Bottom Ash) in the sustainable finance legislation (taxonomy) and ensure the efficient use of Waste-to-Energy as a local, reliable and affordable energy source. The EU also needs to perform a holistic impact assessment before considering the inclusion of the waste sector in the EU-ETS and develop a clear and coherent policy framework to mitigate climate change.

EU LEGISLATION FOR THE NEXT FIVE YEARS

Implementation

Energy and Climate

- ETS (MRR – monitoring)
- Carbon-related: removals, industrial carbon management, CBAM, ...
- RED, EED: EU COM guidelines incl. waste heat from WtE; emission factor of waste heat is zero (EED); performance of buildings

Emissions

- New Industrial Emissions Directive: environmental management system incl. transition plans (how to achieve 2050 net zero)
- Updated BREF process: landfill BREF, potential decarbonization BREF (Options: horizontal, or decarbonization chapter when reviewing BREFs)?
- Industrial emissions portal

New legislation / Revisions

New legislation

- Clean Industrial Deal
- Circular Economy Act (Regulation); End-of-waste on European level (plastics, textile, C&D waste ...)

Revisions

- Waste Framework Directive (TBC 2026)
- Landfill Directive (TBC 2026)
- Chemicals Industry Package (REACH, CLP, PFAS)
- ETS: Impact Assessment by mid-2026: WtE/Landfills/Other waste treatment in?

WASTE-TO-ENERGY AND CLIMATE

Waste-to-Energy contributes to a circular economy and sustainable waste management, and offers many benefits from a climate perspective. It replaces fossil fuels in the production of electricity and heat, avoids methane emissions by reducing or replacing landfills, and enables metal recovery from bottom ash.

Household waste currently accounts for 5 percent of global CO₂ emissions. Landfills are a large source of methane emissions (more than 20 percent of global warming) and pollute soil and water. In the EU alone, around 100 million tons of waste are landfilled every year – globally, billions of tons must be diverted from landfills. With 2.3 billion tons of waste produced each year, and with an expected growth to 3.80 billion tons by 2050, there will be a need for Waste-to-Energy for a long time to come.

All combustion leads to emissions. In Waste-to-Energy, the biggest cause of carbon dioxide emissions is the plastic content in the waste. So, what to do with these emissions? In today's Waste-to-Energy industry, intensive work is being done to reduce them. One way is to reduce plastics in the waste; another is to capture the emissions. The sector works on both possibilities in various ways. During the conference, we heard from participants in several initiatives on sorting plastics and developing carbon capture.

Carbon capture, utilization and storage (CCUS) are tools to reduce emissions. They are needed to mitigate climate change and are now being planned for at several Waste-to-Energy plants. When combined heat and power (CHP) or district heating plants use biofuel (BECCS), the capture even leads to negative emissions.

The state for CCUS in the European Union

Fabio Poretti, Technical & Scientific Officer at CEWEP, gave the audience an overview of the climate contribution of the Waste-to-Energy sector in the EU policy landscape. He began by highlighting the European Commission's Industrial Carbon Management Communication, in which the Commission highlights CO₂ capture as an indispensable factor for net zero.



CCUS is high on the EU political agenda, declared Fabio Poretti, Technical & Scientific Officer at CEWEP.

The ambition for the next 25 years is enormous and unprecedented. According to the European Commission, the EU will need to collect the following annually:

- 50 million tons of CO₂ per year by 2030
- 280 million tons of CO₂ per year by 2040
- 450 million tons of CO₂ per year by 2050

“This is not a legislative proposal, but a roadmap and it brings CCUS high on the EU political agenda. I think we can expect something legislative around 2026,” Fabio Poretti said.

There are around 500 waste incineration plants in Europe, processing around 100 million tons of residual waste each year from both municipal activities and commercial and industrial activities. Waste incineration with energy recovery offers a sanitary service to communities by treating residual waste that cannot be prevented or recycled.

Various CCUS projects in the Waste-to-Energy industry have been launched across Europe in recent years and many more are under development. CEWEP estimates there are around 60 active CCUS initiatives and projects in waste incineration plants in Europe.

Fabio Poretti highlighted that the European Commission has proposed regulation of the voluntary certification of carbon removals in the EU as a necessary instrument to reach EU climate goals. Carbon removals can be either nature based or industrial based.

There are two parts: Carbon Removal Legal Framework and Technical Methodologies. The first of these will be negotiated with the Parliament and the Council, and published as a regulation. The other is being developed by an expert group, of which CEWEP is a part. With around 70 members from different backgrounds, including national authorities, businesses, NGOs, and research institutions, there is a broad representation of stakeholders. The EU Commission will translate the methodologies it develops and establish them into law via delegated acts in 2025.

Fabio Poretti concluded his presentation, by stating that Waste-to-Energy is an industry with many different purposes. In addition to providing a hygienic task, it fights pollution, contributes to the circular economy, replaces fossil fuels, and can generate CO₂ uptake. If supported by EU policies, Waste-to-Energy will be a pivotal enabler of the ambitious climate targets of the European Green Deal, while guaranteeing a key environmental service to society.

CCUS – the technology exists, but who will pay?

The participants were then given a closer look at various projects that are being developed. A crucial factor is how these projects will be financed when developed at full scale. There is a need to build a market in which these carbon reductions can be sold and bought, something that was emphasized by Johan Börje from Stockholm Exergi and Thomas Thyblad from Nasdaq. The latter highlighted four key pillars for a functioning (carbon) market: integrity transparency, liquidity and technology.

He also presented a CORC Carbon Removal Index, which is the first-of-its-kind reference price index for carbon removals. It will bring transparency to the market, help corporations understand the true cost of neutralizing their emissions and create a price signal to stimulate market growth.

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Other presentations on the CCUS were made by Rufus Ziesig (E.ON) and Jannicke Gerner Bjerckås (Hafslund Celsio). A panel with Malin Dahlroth (Sysav), Jacob Simonsen (ARC), Paul De Bruycker (CEWEP), and Jakub Bator (Krakow Waste-to-Energy), led by Johnny Stuen (ISWA WGER Chairman), ended the day with reflections on this important issue.

Let the plastic producers handle the costs for the emissions

Plastics in waste was brought up by many speakers at the conference. They all raised that it must be removed from incineration. It was also clear that this is something energy recovery plants can't control. Many called for responsibility higher up the value chain, for the plastic producers, and called on politicians to introduce regulations for plastic production and measures to establish more profitable market conditions for recycled plastics. Because the plastic problem is large and growing.

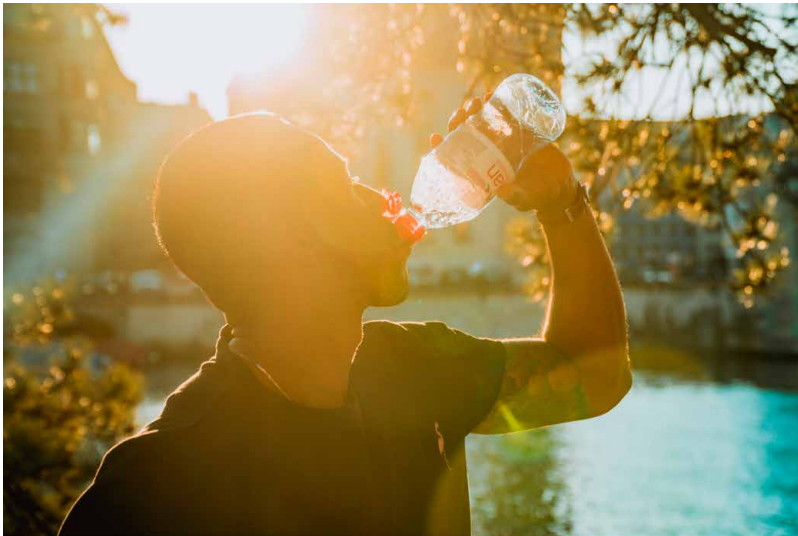


Between 8 and 12 million tons of plastic end up in the oceans every year, among other things, due to the lack of waste collection. Photo: Ocean Cleanup

Plastic waste accounts for the largest share of fossil emissions from waste incineration. It is a problem that is widely discussed and has led to intensive development work. There is a lot going on in the Waste-to-Energy industry. The industry is investing in separate plastic collection and advanced sorting of residual waste. But there is also active advocacy work from the sector to change the regulations, to get measures implemented higher up in the chain.

The Swedish Energy Agency proposes extended plastic responsibility

The Swedish Energy Agency has presented a suggestion for a new policy on extended plastic responsibility, which Gustav Ebenå also shared with the audience. He stressed that for those who profit from producing water bottles, there are no costs for the carbon it ends up emitting as waste. The cost is paid by someone else. So, the Agency suggests a tax, or a fee, for producers and suggest using the return to finance different kinds of measures to solve the problem.



A tax on plastic would make polluters pay all the way. Today Waste-to-Energy is burdened with CO₂-emissions although they rarely can control the waste flow. Photo: Pixabay

The idea is to pay for reduced emissions, regardless of whether it is by reducing the amount of plastic waste going to incineration or by CCS/CCU. The money should reward solutions higher up in the waste hierarchy and not counteract the incentives to reduce the proportion of fossil fuels in the waste. A tax differentiated by recyclability reduces the amount of plastic that must be incinerated before it can be recycled.

The Swedish Energy Agency's proposal:

- Extended responsibility, as it goes all the way to make sure no fossil carbon from plastic ends up in the atmosphere.
- Anyone producing or importing plastic pays for the new, virgin, carbon atoms that are put into the market
- A tax finances measures to prevent those atoms from entering the atmosphere
- The tax can be put on raw material as well as products
- Taxing raw materials is likely easier, especially regarding exemptions like bio-plastic or recycled carbon atoms.
- Taxing products, on the other hand, has a lower risk of carbon leakage and can be differentiated based on factors such as the possibility for recycling.

Gustav Ebenå observed that while this is not a top issue on the politicians' list, which is reflected in the EU agenda, it would be better to have an EU policy like this, so waste does not take new routes, out of the country or the EU. He encouraged the audience to spread the word about the agency's proposal, and to raise the issue with local politicians.

THERE IS A FUTURE NEED FOR THERMAL TREATMENT

Jenny Sahlin, researcher and consultant at Profu, presented a study on the future need for thermal treatment, the waste flows and how to adapt. The study had three analysis steps: policy and market research, followed by interviews with eight companies, and finally analysis.

In theory, she stated, there is an expectation that ambitious policies and targets for conversion to circular flows will lead to higher recycling rates and a decrease of recyclables going to energy recovery. In reality, we expect an increase in low-quality, mixed waste fractions, packaging and newspapers. To adapt, companies make investments in technology, sorting, flexibility and data management in the sector.

She predicted that Europe will still have a need for Waste-to-Energy in the future. The European Union has high ambitions for recycling, but there is a long way to go. It has taken long time in Sweden – how long will it take to achieve the goals throughout the EU?



Jenny Sahlin, researcher and consultant at Profu, predicted Europe will have a need for Waste-to-Energy also in the future.]

Reducing plastic in incineration is a key issue for Waste-to-Energy, mainly to lower carbon emissions and increase recycling, but also for economic reasons. They pay for the emissions and the district heating customers opt out of heat from plastics.

Jenny Sahlin gave a picture of the work to reduce plastic in the plants she studied. All the companies work with dialogue and data transfer, trying to transfer ETS costs on gate fees. A differentiation based on plastic/fossil content gives signals to the upstream plastic market. Many companies are also conducting pre-studies of CCS and CCU as a contribution to zero CO₂ emissions. Others are developing pretreatment of waste, trying to find methods for measurement, and investigating separate plastic collection at recycle centres. She concluded by stating that while Waste-to-Energy could be part of a system change, it could also take a more active role to drive change.

THE INDUSTRY INVESTS IN SORTING TO REDUCE PLASTIC

During the conference, the participants could get a closer look at examples of initiatives to minimize plastic to incineration. Henrik Lindståhl, R&D at Tekniska verken in Linköping, Sweden, presented the investments his company makes to increase sorting and to be able to find out which suppliers are responsible for the plastic content in waste. With this knowledge, they can also have these customers pay extra for the costs arising from this, and thus hopefully increase their incentive to sort.



Henrik Lindståhl, R&D at Tekniska Verken in Linköping, presented new technology that makes it possible to let customers with poor source separation pay extra for the costs this causes and thus hopefully increase their incentive to sort.

Tekniska verken in Linköping has seen great improvement potential in sorting packaging waste and has invested in a new sorting plant. The plant is partly financed by funding received from the Swedish Environmental Protection Agency through the Klimatkivet (Climate Leap investment initiative) and the European Union, through the NextGeneration EU.

There are many sorting steps in the plant, which can sort 40 tons per hour with two shifts of workers. Out of these 40 tons, the sorting process results in approximately 5 tons of plastic, 4 tons of paper, 0.5 tons of ferrous and 0.2 tons of non-ferrous metals per hour, sorted out for material recycling. 7 tons of organics are sorted out for biogas production and the rest is residual waste that ends up in Waste-to-Energy. Mr Lindståhl stressed that this is an interesting process to follow, and encouraged the audience to visit and learn more about it.

The other project is to develop a plastic scanner, called FossilEye. A consortium formed by Tekniska verken, Umeå Energi and Vattenfall Värme procured FossilEye as a pilot plant from RoboWaste in 2022, with support from Avfall Sverige. The pilot scanner is mobile, so all three companies could test and evaluate it.



The first edition of FossilEye is mobile. High tech cameras detect plastics in the batch.

Mr Lindståhl explained that the original plan wasn't to invent a machine, it was to buy one, but there weren't any available. Results are good, however. With FossilEye on a larger scale, the plastic content in incoming waste can be measured. This will reveal systematic differences in plastic content from different customers and make it possible to follow the development in the plastic content of the individual customers.

The next step is to upgrade the scanner to be able to identify black plastic and handle bulky materials. The companies will then conduct an internal assessment of the accuracy of the reported value and seek independent certification of the measurement accuracy. Then it is time to introduce FossilEye to the market and commercialize it.

“This is not the end of development; it is the start.”

RECYCLING FROM ASH

Incineration produces residues in the form of ash. In 2004, new and stricter landfill legislation was introduced in Sweden. In order to export fly ash, the authorities required that the ash should be recovered. This opened the door for the export of fly ash from Sweden to NOAH's plant on Langøya, Norway, or to old salt mines in Germany.

Today, about half of the fly ash generated in Sweden is exported to NOAH, Norway.

However, the Swedish Waste-to-Energy sector has begun to investigate the possibilities of recovering the ash and their contents in other ways. The hope is to find economic opportunities by recycling valuable content from the ash and to reduce the proportion of ash that must be sent to landfill.

Lars Jacobsson of SWECO presented the report “Commercial Methods for Treatment of Fly Ash”. The aim of the project was to identify methods available for purchase in a limited market, allowing a buyer to enter into a contract for a service or an industrial facility.



Lars Jacobsson, Senior Energy Consultant at Sweco explained how fly ash can be recycled.

Mr Jacobsson explained that oxides and carbonates can be used for the neutralization of acidic substances instead of lime. Different salts can be recycled as products. Among the metals, zinc is the only metal worth recycling. The benefits of increased material recycling are decreased chemical consumption, reduced transport needs, reduced production of non-hazardous waste material, 20–40% less landfill disposal.

In the Waste-to-Energy sector, contents from the ash are recycled in several places. Karin Karlfeldt Fedje (Chalmers, Renova), told the audience about the plant Renova has built at its Sävenäs Waste-to-Energy plant in Gothenburg to recycle zinc on a large scale. Zinc that is extracted is sold to the metal industry. This extraction reduces the need for landfilling, so there are both environmental and economic benefits to ash washing. Most of the ash becomes bottom ash after washing. After some initial problems, caused by delivery delays connected to the pandemic, and later the war, the plant is running, and working better and better.

“HERE’S WHERE EXPERTISE IS GATHERING”

The Managing Director of CEWEP, Dr Ella Stengler, has participated in the Beacon Conference since it first started.

I think here's where expertise is really gathering, she says,. It is the knowledge hub. You get to hear so many experts discuss interesting things that are going on, about obstacles, challenges and possibilities. It's also about meeting old friends, because waste businesses somehow also are a bit like family.

Dr Ella Stengler, What do you think is the best way to meet the demands of the EU and to be part of the circular economy?

It's very important for the Waste-to-Energy sector to be part of the circular economy. One major aim for the upcoming new legislative period in the EU in the next five years is to keep secondary raw materials in Europe. We also need to keep the raw materials which are embedded in the waste here. Waste-to-Energy can contribute to that.

Waste-to-Energy is a safe treatment for the residues, the rejects from recycling. The recovery from the bottom ash, the leftovers from the combustion process, as metal recycling from the bottom ash and using the mineral part for construction works, are also a win.

The other big topic of the EU in the next 5 years is the challenges to keep Europe competitive and to decarbonize. Europe must be careful to keep its competitiveness, so that the industry stays in Europe. And for that, affordable and reliable energy will be key.

Waste-to-Energy is reliable, it works 24/7, it is clean, and it is monitored with very strict environmental requirements. It is local, decentralized and affordable. It replaces fossil fuels which would otherwise be used to produce this energy, and it reduces the need to landfill. So, it contributes to all these important aims that the EU has ahead.

I think both regarding the circular economy and Waste-to-Energy, Europe is the front runner. Waste-to-Energy has gone such a long path from landfills and, as we see in some countries, open burning. With the sophisticated filter devices, improving energy efficiency and recycling, providing citizens with heat and electricity and process steam to the industry, it is an important service for the society.

How is the interest of European politicians?

Not as high as I wish it would be. In some countries, like Sweden, Waste-to-Energy is well accepted. In some countries which are not so familiar with it, it's less accepted. It's up to us to communicate, to take people to the plants, to show them how their residual waste is treated. Waste is not something you can just handle that easily; it needs knowledge to deal with it properly in an environmentally sound way. We also need to communicate and inform people about what waste to energy is making, always emphasizing that it does not compete with recycling. It's complementary to recycling.



About 150 people gathered at the Iswa Waste-to-Energy Conference in Stockholm in November 2024 to listen, learn and share experiences.



22 countries were represented at the conference, among them a delegation from Ghana.



Representatives of the Ukrainian government participated, to the right Diana Novikova, Head of Household Waste Management and Utility Services Division.



Exhibitors presented their solutions for a more efficient and environmentally customized Waste to Energy.



*Cover: Stockholm Exergi's WtE facility Brista, the goal of one of the study visits during the conference.
Text: Annika Johannesson
Main photographer: Claes Johannesson. Cover: Lars Trangius, Page 2: Andreas Offesson
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Avfall Sverige is the Swedish Waste Management Association. Our members – the municipalities and municipal companies – ensure that waste is collected and treated in a sustainable way. Our vision is Zero waste. We strive to prevent waste from occurring, to increase reuse, and to ensure that the waste that does occur is recycled and managed in the best possible way.



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