

EUROPEAN SUPPLIERS OF WASTE-TO-ENERGY TECHNOLOGY

ACTIVITY REPORT 2022



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ACKNOWLEDGMENTS

The ESWET Secretariat would like to express its gratitude to all its members for the stunning pictures which depict some of the WtE plants currently operating in Europe.

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FOREWORDS

A Changing and Demanding Waste-to-Energy Environment

Looking back at 2022, one finding is beyond dispute: it was full of surprises.

The obvious one is that a war in Europe has fundamentally changed the environment that ESWET members are to survive – and ideally to thrive – in, not least by a recurrence of inflation which is threatening the budgets of all projects under execution while also putting a question mark on financial models of future projects.

Of course, in addition to that all of us who are active in the UK are still struggling with staffing and opaque immigration rules. On the upside, we have seen diminished impacts from the Covid-19 pandemic.

We are all used to adapting to ever more challenging regulatory framework conditions meant to incrementally improve environmental conditions around our plants, whilst in recent years it has become commonplace to assume reliability of energy supply as granted throughout Europe.

Now the prerequisites have been overturned: in the new environment, a reliable supply of power and heat is regaining significance, and so will be the acceptance of our industry as a whole.

Our vision remains to contribute to society by treating and sanitising residual waste, thus producing reliable power and heat and reducing primary energy dependency. In our view, this is best realised by integrating state-of-the-art technology in Integrated Resource-Recovery facilities (IRF).

These technologies will include carbon capture (CCUS), enhanced material recovery from bottom ashes and fly ashes as well as hydrogen production.

Allow me one final remark: we are grateful for having been able to welcome a significant number of new and important members to our association during 2022. This is inspiring and motivates us for the year to come.

Mr Siegfried Scholz - President of ESWET



Waste-to-Energy's resilience in a turbulent year

The last year has been so turbulent! After the very difficult situation with the Covid-19 pandemic, we are facing a war in Europe!

Who could have predicted that a war could happen again on the old continent? History teaches us not to repeat the mistakes of the past. Unfortunately, some of us choose to ignore it.

The combination of the pandemic and this new war has been seriously affecting the European economy and the energy trading system.

The good thing is that European leaders realised that we cannot do anymore with fossil fuels and that we have to push for renewable energy, which to some extent includes Waste-to-Energy activities.

We all know that waste consists of a significant fraction of biogenic carbon and therefore could be considered partially renewable. In addition, this fuel could be even greener if upfront recycling was fostered and plastics further collected and recycled.

Because of this difficult situation, inflation has tremendously increased, reaching an all-time high rate of 10.6% in October 2022 in the Euro area.

A direct consequence is the reluctance of investors to finance such big infrastructure projects. In addition, energy prices are very volatile which does not help to clarify the situation and ensure the long-term vision for Waste-to-Energy projects.

We have seen the cost of the components of Waste-to-Energy plants increase significantly this last year, with a direct link to the cost of materials. In this context, how are public authorities and suppliers supposed to financially plan ahead for their waste treatment projects?

Last but not least, regulators would like to include Waste-to-Energy activities within the Energy Trading System, which may also change the financial framework of a project.

In other words, there are a lot of uncertainties related to our daily business but we have demonstrated the resilience of the Waste-to-Energy suppliers this last year. I am confident that we will be able to overcome this challenge altogether and focus our attention on making a more sustainable future for residual waste treatment worldwide.

Mr Désiré Bendahan – Chairman of the Technical Committee of ESWET



ESWET - WHO WE ARE

For more than 18 years, ESWET has shared the expertise of the European suppliers of Waste-to-Energy technology.

Our members are part of the constant evolution of waste management plants and by doing so, they contribute to a greener future and more sustainable treatment of our waste in Europe.

In 2022, ESWET had a total of 35 members. Currently, in May 2023 the total number of ESWET members has increased to 38. The members provide the components that are essential for the operation of the waste-to-energy plants.

The main purpose of ESWET is to highlight the key role of Waste-to-Energy in a functional waste management chain, its advantages in the safe treatment of non-recyclable waste, and the provision of local affordable energy

and materials that would be landfilled otherwise.

ESWET is an active association that regularly creates materials and events to inform the public and decision-makers.

Our activities range from organising conferences and technical webinars, to the production of reports and guidance documents to showcase the sector's know-how and our vision for a greener future.

ESWET uses these materials also to engage with EU policymakers' and provide them with the necessary information to make headway on the path to more a sustainable society.



MISSION AND VALUES

ESWET MISSION:

ESWET supports Waste-to-energy's mission of general interest:

- 1 **THE SAFE TREATMENT** of non-recyclable waste in line with the waste hierarchy,
- 2 **MINIMISING** residual waste's impact on the environment while contributing in saving resources for the circular economy.

ESWET VALUES:

- 1 **COMMITMENT** to a sustainable waste management chain and EU environmental goals
- 2 **QUALITY** to deliver accurate and reliable data on Waste-to-Energy
- 3 **TRANSPARENCY** to be a trustworthy partner in EU decision-making



WASTE-TO-ENERGY'S ROLE IN THE CIRCULAR ECONOMY

While reduction of waste at the source is the preferred solution, attaining zero waste is impossible as long as the current economic model stays the same.

Improved and increased reusability, sorting, and recycling processes already play an important role in enhancing the circular economy, but they will reach a limit.

Indeed, some residual waste streams will persist and require safe treatment. Even with the best technologies in place, recycling will not always be possible or economically viable for certain waste, especially as very few materials can be reprocessed forever.

Following the waste hierarchy, the preferred option for treating residual waste is recovery, above disposal, e.g. landfills. As such, state-of-the-art Waste-to-Energy plants contribute to closing the loop of the circular economy by maximising the use of waste as a resource.

Waste-to-Energy offers a holistic approach to resource recovery from non-recyclable, non-hazardous waste; it diverts waste from landfills, recovers metals and minerals, and produces renewable energy, thus becoming an indispensable link of the circular economy and creating value for society.

Indeed, Waste-to-Energy contributes to the circular economy by providing, first of all, a hygienic service to the community by treating non-recyclable waste, including polluted and tainted waste.

During sanitary crises such as Covid-19, thermal waste treatment is a solution to limit contamination.

Another key feature of Waste-to-Energy is the production of energy from waste, thereby clearly fitting within the scope of the circular economy. Plants generate electricity and heat, and provide a local source of partly renewable energy to citizens, businesses and industries. But energy is not the only resource recovered by Waste-to-Energy.

Indeed, even non-recyclable waste holds valuable materials that can be reclaimed from the combustion residues: iron, copper, aluminium, etc. These secondary raw materials contribute to decreasing GHG emissions by reducing the need for energy-intensive and polluting mining for example.

With the addition of innovative technologies, WtE plants will also provide hydrogen and synthetic fuels, hence fully utilising waste as a resource, while also capturing and using the CO₂ emissions to promote plant growth in greenhouses or produce carbon neutral building aggregates.

RECOVERING THE NON-RECYCLABLE

From Waste-to-Energy to the Integrated Resource-Recovery Facility

From January 2022, the ESWET Secretariat has been working with the Members to prepare a report entitled 'Recovering the Non-Recyclable: From Waste-to-Energy to Integrated Resource-Recovery Facility'.

The goal is to show how the integration of innovative technologies to current Waste-to-Energy plants will bring additional environmental benefits. Thanks to the work, support and help of its members, we were able to finalise the content by the end of the year and bring to life a new concept for the future of non-recyclable waste management.

A new concept

Aside from safely treating non-recyclable waste, the main feature of the IRF is still the generation of partly renewable energy. The production of baseload and reliable heat and electricity is crucial today in Europe as it contributes to energy security and the energy transition.

As such, increasing the efficiency of plants will help to reduce dependency on third countries, while keeping citizens warm in the winter.

However, energy is not limited to heat and electricity. Renewable and low-carbon fuels such as hydrogen and synthetic fuels like methanol also contribute to decarbonising other sectors.

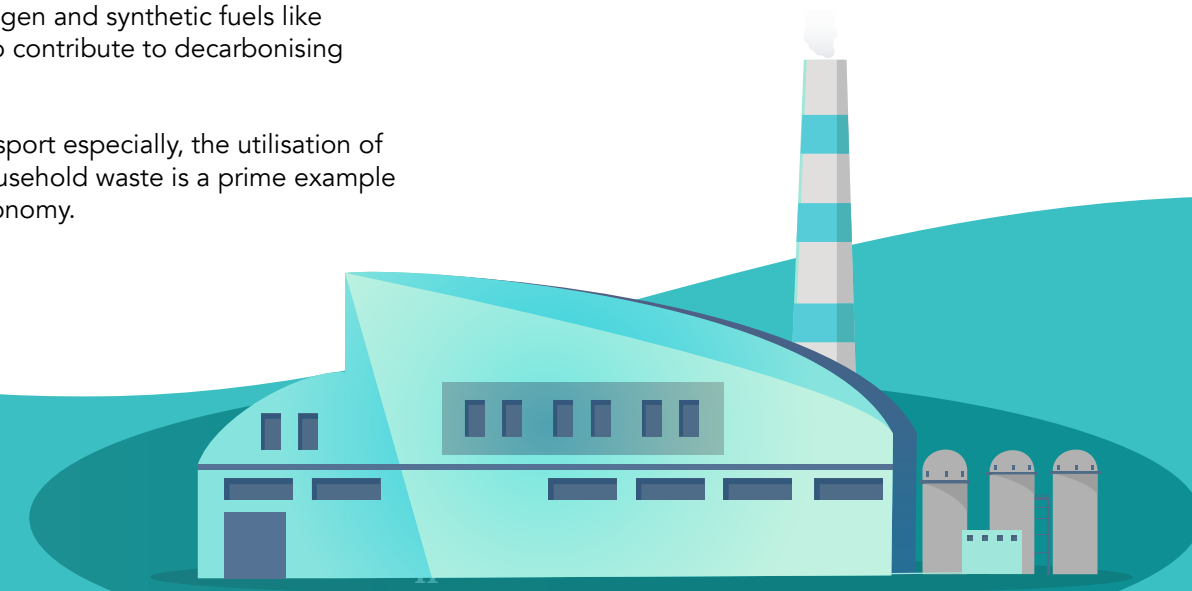
In public transport especially, the utilisation of fuels from household waste is a prime example of circular economy.

Furthermore, hydrogen can be used as intermediate storage to manage fluctuating electricity load, due to the higher penetration of renewable, intermittent sources of energy such as solar.

Given the plants' share of biogenic emissions, the deployment of carbon capture technologies has the potential to make the IRF carbon negative. Then, the utilisation of this CO₂ would also bring additional synergies, such as synthetic fuels or mineralisation.

The recovery and utilisation of incineration residues can also be maximised. By increasing the quantity and quality of bottom ash and fly ash, plants can boost the availability of secondary raw materials, essential supplies in the energy transition. Metals, minerals, salts and other chemicals are crucial for many industries.

Indeed, the Integrated Resource-Recovery Facility (IRF) represents a new model of plant and a step-change evolution in waste thermal treatment. This holistic project, first introduced by the association in its 2050 Vision, can now start to be implemented in the near future thanks to state-of-the-art European engineering.



INTEGRATED RESOURCE RECOVERY FACILITY



Advocacy Activities

In 2019, the EU Green deal set the tone of the newly elected European Commission.

With clear environmental goals set, we have witnessed an interconnection of various environmental aspects in every piece of EU regulation.

This ambitious approach, coupled with an intense legislative agenda, has created an additional layer of complexity to address in EU advocacy.

This context is a crucial milestone for every industry.

Either they jump on the bandwagon and demonstrate that they are a solution for the sustainable transition in Europe, or they take

the risk of being seen as a problem and facing long-term legislative setbacks.

That is why it is more than ever crucial to remind the contribution of Waste-to-Energy to:

- Circular economy
- Decarbonisation
- Pollution prevention
- Energy security

Accordingly, the Secretariat of ESWET has been relentless in bringing the voice of our sector and facts to EU decision-makers.

It has been able to secure solid results on many of the files that you will find described here.

Always aiming for policies that improve waste treatment in Europe and all over the world!



Weener - Germany

RENEWABLE ENERGY

Why Waste-to-Energy constitutes the link between the circular economy and renewable energy?

A large portion of the mixed waste treated in WtE plants is of biogenic nature, meaning biomass. Since biomass is recognised as a renewable energy source, then the energy resulting from this part of the waste is also renewable.

Recent studies estimate that the renewable energy output from Waste-to-Energy plants is more than 50%, contributing substantially to substituting fossil fuels in the electricity, district heating, industrial steam supply, and transport sectors.

According to CEWEP - The Confederation of European Waste-To-Energy Plants, in 2019 in Europe, Waste-to-Energy plants produced 43 billion kWh of electricity, which provided 20 million citizens with electricity. The amount of primary energy produced by WtE in 2019 was equivalent to 13.8 billion m³ of natural gas.

Depending on the WtE system infrastructure, hot water can be sent to the local district heating and cooling network to heat or cool buildings, offices, hospitals, and so on, or directly used in industrial processes regardless of a connection to a district heating network.

In fact, according to CEWEP, around 10% of Europe's energy provided to district heating networks comes from WtE - 99 billion kWh of heat, which supplies almost 17 million Europeans with heat yearly.

In addition, one of the major advantages of energy produced from waste is that the energy carrier is not subject to price fluctuations of fuels, such as gas, while being less vulnerable to relative supply problems. Moreover, WtE can provide a local source of baseload energy that complements intermittent renewable energy sources while at the same time making Europe less dependent on fossil fuel imports.

The production of energy from non-recyclable waste is now diversifying, with the generation of renewable and low-carbon hydrogen, and

synthetic fuels, which are crucial in reaching the climate objectives and the renewable energy targets set.

In the EU legislation, it is the Renewable Energy Directive (RED) (Directive 2018/2001/EU) that establishes the overall policy for the production and promotion of energy from renewable sources in the EU.

The Directive is of utmost importance for the Waste-to-Energy sector as it is the legal basis for WtE being considered a source of renewable energy, via the definition of biomass, which includes the biodegradable fraction of waste.

In essence, the RED recognises the partly renewable feature of the energy from Waste-to-Energy plants and counts this towards the EU renewable energy targets, provided that the waste hierarchy is ensured.

In July 2021 and as part of the "fit for 55" package, the European Commission proposed the revision of the RED to accelerate the take-up of renewables in the EU and to help in reaching the 2030 energy and climate objectives.

Lengthy and tough negotiations started shortly after at the European Parliament and the Energy Council, touching upon many aspects of the RED. Among these, there were provisions that sought to alter the status of energy (electricity, heat, and fuels) from waste as carriers of partly renewable energy."

Throughout 2022 and the challenging revision process, ESWET advocated strongly towards raising awareness on the contribution of Waste-to-Energy to renewable energy generation in the context of the RED, while collaborating regularly with other waste management organisations. The revision process is still ongoing in 2023.

WASTE-TO-HYDROGEN AND WASTE-TO-FUELS

Waste-to-Energy covers a wide range of different technologies with proven advantages to the European energy mix.

WtE presents a significant versatility as it may produce not only heat and electricity but also renewable and low-carbon hydrogen and fuels, i.e., Waste-to-Hydrogen (WtH) and Waste-to-Fuel (WtF), whereby WtE processes provide some or all energy required for the generation of hydrogen and fuels.

Waste-to-Hydrogen can be realised either by combining a combustion-based WtE plant with electrolysis or by certain processes based on gasification (for pre-treated waste). Waste-to-Fuel is characterised by the production of any synthetic fuel - liquid or gaseous - typically from a combination of captured carbon dioxide and Waste-to-Hydrogen.

These synthetic fuels denote a form of carbon capture and utilisation (CCU). The produced fuels include methane (gas), methanol and ethanol (both liquid), which all are formed through hydrogenation of carbon dioxide.

Hydrogen and Fuels produced from waste are covered primarily by the Renewable Energy Directive. According to the RED, fuels from WtE are considered partly biobased fuels/ biofuels/biomass fuels and concurrently partly recycled carbon fuels.

Both types of Waste-to-Fuel come with sustainability criteria, which if met, allow for the fuel to be recognised as partly renewable and partly low-carbon. That would mean they could count towards the relevant renewable energy targets set by the RED.

Following the July 2021 "fit for 55" package on energy legislation, promoting the demand and production of renewable and low-carbon gases, including hydrogen, the EC published in late 2021 a proposal for a Gas Regulation and a Gas Directive, as part of the so-called Hydrogen and Decarbonised Gas Market

Package or simply-put the gas package. The Gas Package is complementary to the other legislative initiatives of the "fit for 55" package, including the RED. Among others, the proposed revision of the Gas Directive (GD) provides definitions for low-carbon fuels and gases, as well as for low-carbon hydrogen, and it also sets the certification framework for these low-carbon fuels.

ESWET responded to the EC public consultation on the proposed gas directive in April 2022, highlighting that:

- any follow-up legislation to the RED and the Gas Directive should consider the offsets of CO₂ emissions and should not be limited to direct and indirect emissions;
- the methodology for the calculation of GHG emissions savings should be carefully designed to consider the particularities of mixed non-recyclable waste as a feedstock;
- there must be legislative consistency and coherence among the relevant pieces of the EU legislation;
- the certification framework for low-carbon fuels should mirror the one currently foreseen for renewable fuels under the RED.

In addition, pursuant to the RED obligations, the EC proposed in May 2022 a Delegated Act (DA) establishing a scheme to calculate the life-cycle emissions of recycled carbon fuels (RCFs) in order to meet the GHG emission reduction threshold of 70% set in the RED & the GD.

ESWET responded to the EC consultation and participated in a stakeholder meeting with the EC in June 2022, as well as followed up by

MHKW - Wiesbaden - Germany



expressing its concerns about the proposed DA. Among others, ESWET called on the EC to consider landfill diversion in the calculations for life-cycle emissions of RCFs.

Closely related to the RED and the GD, the EC proposed in June 2022 another Delegated Act on the methodology to calculate the share of biofuel and biogas for transport resulting from biomass (renewables) being processed with fossil fuels in a common process, which is characterised as co-processing. According to the DA, co-processing refers to an oil refinery unit processing biomass feedstock together with fossil feedstock and transforming them into final fuels.

ESWET responded to the EC consultation in July 2022, asking the Commission to explicitly extend the scope of the DA to cover WtE processes producing fuels of mixed feedstock, to provide clarity to the sector. A dedicated Waste-to-Hydrogen Working Group (WtH WG) looks at all topics pertaining to hydrogen and fuels more in detail. The scope of the WtH WG covers both Waste-to-Hydrogen (WtH) and Waste-to-Fuels (WtF) produced from WtE processes.

With 16 members, the WtH WG seeks to analyse the legislative coverage of WtH and WtF, as partly renewable energy carriers, and to monitor the deployment of WtH and WtF projects throughout Europe.

Until today, the WG has mapped the applications of WtH and WtF, it has assessed the costs and the available subsidies, and it has identified the main obstacles to the development of hydrogen projects.

The WG also seeks to analyse the GHG emissions and costs of WtH and WtF as compared to other types of H₂ and fuels, and to assess technical requirements with regard to the storage and the transportation of hydrogen, and integration in energy systems.

In addition, the WtH WG monitors the demand side of hydrogen and how this affects the positioning of Waste-to-Hydrogen in the context of circular economy and of fluctuating energy markets.

The Waste-to-Hydrogen Working Group has been contributing a lot to ESWET's advocacy work on files relating to energy, fuels and decarbonisation, highlighting the importance of WtH and WtF in various pieces of EU legislation (i.e., RED, ETD, State Aid Guidelines, Gas Directive, Delegates Acts on Fuels, etc.).

The Chairman of the WG is Dr. Kai Lieball, Director of Decarbonisation, Hitachi Zosen Inova.

CARBON PRICING ON WTE

A Story of Successful Advocacy!

From the beginning of the legislative process on the revision of the EU Emissions Trading System Directive (EU ETS) and of the Effort Sharing Regulation (ESR), ESWET supported the necessity to safeguard the efficiency and sustainability of the waste management sector.

2022 started fast on the ETS, with the draft report by the European Parliament's Rapporteur, MEP Peter Liese, arriving in January and proposing the inclusion of municipal waste incineration in the ETS from 2028.

That was already a big change for WtE, given that the sector had always been covered by the ESR along with the rest of the waste management sector.

However, ESWET approached the proposals with an open mind focusing on the true purpose of the legislation; achieving the climate and environmental objectives at stake.

In any scenario of carbon pricing for WtE, the European Waste-to-Energy sector would be committed to making all the necessary contributions towards the EU goals of 55% greenhouse gas emissions' reduction by 2030 and climate neutrality by 2050.

WtE's contribution to those targets would not be defied. With this core value in mind and with a strong yet flexible starting position on the topic already in hand, ESWET worked to understand the proposal for inclusion and to find room for improvements.

To ESWET, the most important element in the discussion was the requirement for prior and conditional Impact Assessment (IA) that would determine whether any inclusion of the Waste-to-Energy sector in the ETS should follow or not.

According to our view, only a conditional impact assessment can offer legal certainty as it is the safest tool to evaluate whether the inclusion is the best option from a climate and environmental perspective.

If the IA would find that the ESR has a lower impact for the waste management sector as a whole, then the inclusion in the ETS should not follow. In other words, the inclusion should be conditional on the outcome of the IA.

Another important reason why the IA is needed is that there is still no clear framework at EU level for the monitoring and reporting of emissions from waste incineration.

Then we made clear that, for us, the discussion on the Waste-to-Energy coverage in the EU legislation should not be about choosing between the EU ETS or the ESR, but rather about keeping the waste management chain united, and avoiding the detrimental impacts that a disruption of the chain could bring, which would ultimately hamper the waste hierarchy.

One thing should be clear for the EU policymakers: landfills come with a cost to climate, the environment, and human health.

Since a functional waste management chain relies on interdependent links, it is crucial to preserve a level-playing field and to not disrupt the waste hierarchy, with all its negative consequences. To this end, the entire waste management sector should be covered under the same piece of legislation, be it the ESR or the EU ETS.

This would ensure that there is no promotion of landfills and their associated – highly potent – methane emissions, which are inadequately regulated today, unlike CO₂ and other greenhouse gases. If Waste-to-Energy were to be included in the ETS, then, yes, other waste management sectors should be included in the ETS as well.

Besides, putting landfills in an Emissions Trading Scheme is feasible and can prove effective as well. Including landfills in emissions trading schemes would be an efficient way to limit excessive landfilling and their GHG emissions, as the ongoing experience of

New Zealand shows, and the trials in the UK and Australia confirmed. Specifically for New Zealand, landfill inclusion in the NZ ETS incentivises the reduction of their GHG emissions.

To save ETS allowances, landfill facilities are using their funds to invest in the construction, maintenance, and technology to prevent GHGs emissions by capturing over 95% of the landfill gas, which they can then convert into electricity. All these findings were illustrated in an ESWET op-ed published at EURACTIV in February 2022.

Another important element that had to be acknowledged in the legislative process was Waste-to-Energy's role as carbon sink. Waste-to-Energy plants can already be considered as carbon-neutral as they divert non-recyclable waste from landfills, produce energy and fuels, and recover secondary raw materials.

However, with Carbon Capture Usage and Storage (CCUS) technologies, the sector has the potential to further reduce its carbon footprint or even to make it carbon negative.

That is why it was vital to make sure that support for CCUS applications was also included in the EU ETS, and ESWET had been asking for this from the start of the revision process. After months of advocating for our position before the European Parliament and the Environment Council, we arrived at the Trilogues in July 2022.

Once again, ESWET worked to find a balance between the two different positions. Both offered interesting elements on the table but compromises had to be made.

After long hours of Trilogue discussions, the EU co-legislators reached a political agreement on the EU ETS on 18 December 2022. The compromise foresees that any inclusion of Waste-to-Energy plants in the EU ETS will be determined by a prior Impact Assessment (IA) and may follow from 2028, with an assessment of the need for a possibility of an opt out until 2031.

The IA will be conducted by the end of July 2026 and will also assess the possibility of including in the EU ETS other waste management processes, in particular landfills which create methane and nitrous oxide emissions in the Union.

The rules for measuring, reporting, and verifying emissions from municipal waste incineration installations will also be reviewed.

The necessity for a conditional IA as well as the need to keep the entire waste management sector under the same legal instrument (be it the ESR or the EU ETS) as means to safeguard the waste hierarchy and the circular economy, and also to achieve the climate and environment objectives at stake, had been ESWET's position since the start of the revision process in 2021 and were now officially part of the new EU ETS law.



Belgrade - Serbia

ENERGY EFFICIENCY & COGENERATION

Conforming to the European Green Deal and striving to meet the 2030 climate targets, the EU must prioritise energy efficiency.

In this direction, the EU has been working since July 2021 on the recast of the Energy Efficiency Directive (EED) (Directive 2012/27/EU), to further encourage EU efforts to promote energy efficiency and achieve energy savings in the fight against climate change.

The proposal for the revision sets new energy efficiency targets for the EU and promotes “energy efficiency first” as an overall principle of EU energy policy that is crucial both for policy and investment decisions. In addition, the proposal contained new criteria for the definition of high-efficiency cogeneration.

Cogeneration is an energy efficiency principle that has already saved more than 33 billion m³ of primary energy from various sources, with at least 15 billion m³ saved directly from natural gas (equivalent to 10-20% of the REPowerEU objective). It is crucial for ensuring energy supply security, as it accounts for 12% of power generation and covers 16% of heat demand in district heating, important industries, small and medium-sized businesses, and homes throughout the EU. (Source: COGEN Europe).

Cogeneration is uniquely positioned to save energy, maintain supply security, protect industrial competitiveness, and ensure energy system resiliency and affordability. If cogeneration were not utilised, it would be much more energy-intensive, polluting, and expensive to keep homes warm and maintain critical industrial operations during the winter.

As the energy system transitions to higher levels of renewable energy sources and increased electrification, the role of cogeneration will change but remain essential.

In the medium and long term, high-efficiency

cogeneration will be crucial as part of a diversified and increasingly renewable or carbon-neutral heat mix, with versatile applications in district heating and key European industries, including energy from waste.

Cogeneration will also play an increasing role in supporting power system adequacy by complementing intermittent renewable energy sources in power generation and electrification through flexible district heating or consumption in industries.

Regarding energy from waste, more than 60% of WtE plants in Europe are Combined Heat and Power (CHP) plants supporting Urban District Heating and Cooling (DHC) networks. Around 10% of Europe's energy provided to DHC networks comes from WtE. In cities with good district heating infrastructure in place, like Brescia, Malmö, Klaipėda, etc., WtE covers 50% or more of the heating needs (Source: CEWEP).

With this rationale, ESWET advocated throughout 2022 on the need for the EED recast to reaffirm the positive status of energy from WtE in the energy mix of efficient district heating and cooling systems and to ensure that existing investments in high-efficiency cogeneration continue contributing towards a more efficient, affordable and secure energy mix for European industry and district heating while setting higher ambition for new and refurbished installations in the years to come.

Apart from the solo advocacy efforts, ESWET worked closely with European industrial CHP organisations to raise its voice on the subject before the EU institutions.

RENEWING OUR KNOWLEDGE ON IBA

2022 was the opportunity for the association as a whole to improve its expertise and launch new activities dedicated to incineration residues.

There are still many misconceptions around the topic of incineration bottom ash (IBA) and other residues of the combustion process from Waste-to-Energy plants.

As such, it was decided at the beginning of the year to launch a new Working Group dedicated to the subject with members who benefit from good expertise in this field.

The IBA Working Group

With 14 participants from 11 companies, a first meeting was held in June, followed by one in September. This Working Group also welcomes the perspective of operators, represented during the meetings by CEWEP. The Chair is Johan Heiszwolf (Lhoist).

The objectives of the sessions are to build and share a solid knowledge of IBA as a whole, including the technologies related to its treatment and utilisation.

Indeed, despite being considered as a residue, IBA contains valuable materials such as metals and minerals that offer many opportunities for re-use and recycling.

The use of secondary raw materials such as materials from waste contributes to reducing CO₂ emissions and avoiding the energy-intensive extraction of virgin resources.

Another goal was, and still is, to gather positive information and concrete examples on the utilisation of IBA, such as its use in the construction sector. Good case studies and stories help the public opinion and policymakers to get a more accurate and comprehensive vision of a topic that could otherwise be too technical.

As such, IBA was mentioned in several articles and social media posts throughout the year. Meetings of the WG, including with an academic expert, showed that the legislative coverage of IBA is very different from one country to another.

While harmonisation of such legislation at EU level is unlikely so far, studying this possibility helps the Secretariat to better grasp all the issues related to IBA.



DECARBONISING WASTE-TO-ENERGY

With the implementation of Carbon capture, utilisation and storage technologies (CCUS), Waste-to-Energy has the potential to become carbon negative.

Since 2019, the EU announced the objective of achieving carbon neutrality by 2050 through the Green Deal, a series of revised and new legislation covering all economic sectors.

In order to reach this goal, the first priority is to significantly reduce GHG emissions by switching to renewable energy, however this is not possible for all human activities.

As such, carbon neutrality is not meant to be understood as “zero emission”, but that unavoidable emissions should be balanced with carbon removals, such as carbon farming and industrial capture and storage technologies.

Carbon capture, utilisation and storage (CCUS) will be necessary to decarbonise hard-to-abate sectors, as recognised by the IPCC.

Since it is not an option for WtE to switch to an alternative fuel, as it would mean stopping the treatment of non-recyclable waste, BECCUS (Bioenergy with CCUS) provides a solution to decarbonise thermal waste treatment.

To discuss the uptake of those technologies and its related opportunities and obstacles, a Working Group (WG) was set up in September 2021, chaired by Dr. Tom Croymans (Keppel Seghers).

With 32 participants from 19 companies, the Chair, with the support of the Secretariat, held 4 meetings in 2022.

Establishing a CCUS strategy

The purpose of this group is to assess technical, economic and regulatory challenges for the sector, as well as contribute to relevant EU policy developments.

Each meeting of the working group is an opportunity for members to discuss the deployment of CCUS as a whole, generally with an external guest speaker (EU institutions, independent expert, EU association, etc).

In 2022, discussions during the WG covered carbon utilisation technologies and policy, the revision of the EU Emission Trading System and other decarbonisation legislation, and technical and financial obstacles of carbon capture projects for existing Waste-to-Energy plants.

Participants also helped to shape content for communication documents such as factsheets or social media posts.

In March, the CCUS WG Chair had the opportunity to speak at the EfW Conference in London on the requirements needed to deliver negative emissions in the sector.

In June, a panel discussion on CCUS was the highlight of 'The Path to Net-Zero: Is WtE part of the Solution? Organised in common with CEWEP, the association representing the operators of WtE plants.

Speakers from the Commission and experts in the field had a fruitful discussion with around 80 people attending the event in person in Brussels.

Carbon removals in EU policy

In May, the Secretariat prepared and published a position paper on the Carbon Removal Certification, highlighting the need for a clear legislative framework and financial incentives to invest in capture technologies.

More broadly, the association advocated for the specificities of the Waste-to-Energy sector, i.e. the biogenic share of CO₂ emissions, to be considered in upcoming policy proposals.

This hard work paid off in November when the Commission released its final proposal.

The proposed definition of carbon removals includes biogenic emissions and most of carbon utilisation solutions that can be deployed in the sector.

The WG will keep on guiding the Secretariat in ensuring that the right policy and funding tools are made available to WtE operators who plan to invest in carbon capture technologies.

In the meantime, new projects took off in 2022, with more operators looking at carbon utilisation options for the captured emissions, such as synthetic fuels.

Overall, the full sector is looking forward and committed to reducing its impact on the environment.



Runcorn - UK

ENERGY TAXATION OF WASTE-TO-ENERGY PRODUCTS

In July 2021, the Commission presented a proposal for the revision of the Energy Taxation Directive (ETD) (Directive 2003/96/EC), as part of the “fit for 55” package.

The objective of the revision is to align the taxation of energy products with EU climate and energy objectives and policies by fostering clean energy products and technologies, removing obsolete exemptions, and reducing rates that promote the use of fossil fuels.

The proposed revised ETD sets preferential tax rates for the use of renewable and low-carbon fuels and hydrogen for end-consumers, while shifting tax incentives away from fossil fuels and towards clean technologies.

In 2022, during the revision process of the ETD, ESWET advocated for electricity and fuels produced from the biogenic part of waste treated in WtE plants to continue to be open for tax exemptions.

In addition, ESWET underlined that electricity and fuels produced from the biogenic part of WtE should continue to be under the lowest minimum rate of €0.15/GJ, and that the same should apply for fuels produced from the fossil part of the waste treated in WtE facilities for a transitional period of at least 10 years.

RESPECTING THE POLLUTER-PAYS PRINCIPLE

In late 2022, the European Commission launched an initiative to conduct a fitness check on the application and implementation of the Polluter-Pays Principle (PPP).

The Polluter-Pays Principle is a very important principle in EU Environmental Law, with applications also in the field of waste management. In essence, the PPP means that polluters pay for measures to prevent, control and remedy pollution, as well as for the cost of pollution to society.

ESWET responded to the EC public consultation in December 2022, welcoming the initiative and underlining the need for proper and adequate integration of the PPP in EU policies.

Regarding the waste management sector, ESWET called on the EU legislators to apply the PPP considering that Waste-to-Energy plants are actually given the mission to prevent pollution from non-recyclable waste and to recover its energy. They are not, themselves, the producers of the waste.

Designing environmental policies for the Polluter-Pays Principle and burdening exclusively the Waste-to-Energy sector, as if the solely responsible sector for environmental damages and not considering the responsibilities of waste producers or previous waste holders, raises concerns about the lawful application of the Polluter-Pays Principle.

Based on the scope of a specific legal instrument, the EU legislation should apply the PPP by considering waste management as part of the treatment of the problem and not the cause of pollution by itself.

In that sense, EU policies should reflect on the positive impact of Waste-to-Energy in pollution prevention and in its vital role in the waste management hierarchy.

Overall, ESWET deems that waste management does not need more burdens, but merely requires support and constructive incentives to perform its role, i.e., waste treatment, effectively and efficiently.

A correct and reinforced application of the PPP should cover costs for new infrastructure or for the refurbishment of existing infrastructure, for example through investments in Capture Carbon Utilisation and Storage, increased efficiencies in energy recovery, sorting activities, and maximisation of material recovery.

Such an approach would facilitate meeting the objectives of the EU waste legislation.



Ferrybridge - UK by enfinium

ESWET CONTRIBUTES TO UNECE GUIDELINES ON SDGS IN WASTE-TO-ENERGY PROJECTS

In 2022, ESWET actively contributed to the revision process of the UNECE Guidelines on Promoting People-first Public-Private Partnerships (PPPs) Waste-to-Energy Projects for the Circular Economy, which were first produced in 2020.

The primary objective of these guidelines is to create a connection between theoretical concepts and practical applications by promoting the circular economy objectives in the context of PPPs. Additionally, the guidelines offer concrete industry practices that can provide practical and relevant ideas for future projects.

ESWET participated in a multi-stakeholder virtual peer-review meeting in March 2022, and the association's Policy Officer for Decarbonisation, Charoula Melliou, spoke at the Waste-to-Energy session of the 6th UNECE International PPP Forum (Barcelona, 4-6 May 2022), during which she highlighted the Waste-to-Energy contribution to the circular economy, and the role of technological development in this.

The completed Guidelines were formally endorsed during the Sixth session of the UNECE Working Party on Public-Private Partnerships, in Geneva, 1-2 December 2022.

The UNECE "Guidelines on Public-Private Partnerships for the Sustainable Development Goals in Waste-to-Energy Projects for Non-Recyclable Waste: Pathways towards a Circular Economy" recognise that by adhering to the PPPs for the SDGs approach, Waste-to-Energy projects can contribute to achieving the goals of the circular economy by recovering the energy from non-recyclable waste.

At the same time, to optimise the collection and sorting of materials, Waste-to-Energy should be integrated into a comprehensive waste management system.



WTE IN THE EU ENERGY CRISIS

Waste-to-Energy has a significant potential to reduce our dependency on gas imports while participating in the efforts towards a carbon-neutral Europe.

Waste-to-Energy's role apart from treating non-recyclable waste – a service of public interest - is to use this non-recyclable waste as a resource to produce local affordable energy for homes, municipalities, public facilities, e.g., hospitals, and industries.

This energy is continuous, i.e., non-intermittent, which means that it complements other intermittent renewable sources such as wind or solar energy when they are not readily available.

In other words, Waste-to-Energy is a baseload power source that contributes to the grid reliability while ensuring that our non-recyclables do not get landfilled, which is the least preferable solution for non-recyclable waste.

The energy output of WtE is approximately 50% renewable and contributes substantially to the transition from fossil fuels in the electricity, district heating, industrial steam supply and transport sectors.

In some cities with good district heating networks such as Brescia in Italy or Malmö in Sweden, Waste-to-Energy covers up to 50% of the heat demand. The amount of primary energy generated by WtE in 2019 was equivalent to 13.8 billion m³ of natural gas.

Already today, Waste-to-Energy provides the equivalent of approximately 9% of the natural gas imports to the EU from Russia (155 billion m³ in 2021), and by 2035, WtE plants could produce 189 TWh of useful energy per year, which would be equivalent to 19.4 billion m³ of natural gas in terms of primary energy.

This WtE potential to reduce Europe's dependency on gas imports by using waste that is not suitable for quality recycling for local energy generation was highlighted in an ESWET and CEWEP common statement in April 2022.

There, the two associations suggested that EU countries with high reliance on landfilling (e.g., Central Eastern and Southern European Member States), should be supported in benefitting from WtE as a relatively low hanging fruit towards decarbonisation and achieving more self-sufficiency.

Regarding displacement of natural gas, in a scenario where all energy generated by waste incineration is used to displace gas, all energy from all waste incinerated would displace about 3.7% of EU27 consumption of gas.

But even in a stricter scenario provided by Zero Waste Europe, waste incineration still displaces about 1.1% of EU27 gas consumption.

The virtue of non-recyclable waste valorisation to respond to energy insecurity in Europe was also recognised by the European Commission in the RePowerEU Action Plan published in May 2022.

The RePowerEU is an Action Plan proposed by the European Commission to overcome EU's dependency on Russian oil & gas by 2027.

This target will be achieved with energy savings, including bioenergy applications, with the diversification of the EU's fossil fuels supply chain and the boosting of renewables.



In this respect, the Action Plan explicitly states that non-recyclable biomass waste can help Europe move away from imported natural gas. ESWET expressed its support to the RePowerEU plan by issuing a Press Release on 18 May 2022.

Following the RePowerEU, the European Commission published the "Save Gas for a Safe Winter" package in July 2022, outlining urgent and necessary actions to reduce EU's gas demand by 15% by spring 2023, and accelerate energy supply diversification and fuel switch. Yet what the package did not consider was the significance of efficient production of heat and power.

In a joint letter with five other EU associations, representing major European industries, local energy companies, and district heating operators, and ahead of the Extraordinary Energy Council of July 26th, ESWET called on Member States to prioritise the efficient production of energy through cogeneration.

This tactic would not only help reduce overall gas use, but also minimise energy waste and limit disruption to critical industries and energy services.

Undoubtedly, Waste-to-Energy can play an important role in the reduction of EU's dependency on natural gas, but it should not be understood as a panacea, rather as a complementary tool to other renewable sources supporting Europe's green transition and energy security.

WASTE-TO-ENERGY'S ROLE IN TACKLING POLLUTION FROM MICROPLASTICS

Pursuant to the Green Deal objective of microplastics reduction by 30% by 2030, the European Commission launched, in late 2021, an initiative that should lead to the adoption of a Regulation tackling microplastic pollution.

The EU legislation will focus on labelling, standardisation, certification and regulatory measures for the main sources of these plastics.

In this direction, the EC published a relevant call for evidence to gather input about addressing microplastics unintentionally released into the environment, including capturing microplastics at source, and aiming to improve monitoring of microplastics in the environment, drinking water and food.

ESWET responded to the call in January 2022, pointing out that WtE operates under stringent EU standards and complements recycling by tackling the leakage of microplastics.

Various reports and studies show that WtE is currently the most viable waste management option to treat both primary and secondary plastics. What is more, by ensuring that residual waste does not go to landfills, the sector also contributes to the circular economy.

• MICROPLASTIC POLLUTION •



REVISION OF THE INDUSTRIAL EMISSIONS DIRECTIVE

The Industrial Emissions Directive (IED) is a regulatory cornerstone for the permitting of Waste-to-Energy plants and many other industrial installations.

The IED sets core rules applicable to emissions of pollutants but also covers other aspects such as water consumption, use of raw materials, or energy efficiency. In line with the IED rules, sectoral documents called "BREF" are then drafted to define values applicable to the installations covered.

Given the scope of the IED, it is without surprise that the revision of the Directive translates the European Commission's ambitious environmental goals, including "zero-pollution" and "climate-neutrality by 2050".

Waste-to-Technology suppliers are eager to be further involved in these objectives and ESWET has participated accordingly in the public consultation process. However, ambitious goals are achievable only if they can be technically and legally complied with. In this regard, one of our main concerns is that lower emission levels lead to higher measurement uncertainty.

ESWET and its partners have repeatedly pointed out the challenge for automated measuring systems (AMSs) and standard references methods (SRMs) currently available on the market to fulfil increasingly low emission measurement requirements. In the context of the IED, this issue impacts two of the Commission's suggestions:

- The proposal of setting BATAELs (emissions thresholds) on the lower end of the value range, provided that the plant's operator is unable to demonstrate it cannot be done. While it is an understandable attempt to encourage

public authorities to reduce emissions whenever possible, we advocate for the Commission to remind public authorities about cross-media effects between plant parameters and the flexibility to design the facility's permit according to their local priorities (e.g. to reduce water consumption that would otherwise be used to improve another parameter of the plant);

- The proposal of defining a harmonised framework for compliance. For now, the design of this EU-wide method would involve only governments and Commission representatives.

Given the technical nature of the topic, ESWET advocates for the process not to rely only on a political decision and to include instead industries experts and academics.

The revised IED would also put in place a platform for innovation, INCITE, whose mission would be to monitor emerging technologies and whose work could trigger a revision of sectoral 'BREF' documents.

Once again, it has been ESWET's consistent position to ask for the close involvement of a broad range of industry experts and the thorough examination of emerging technologies to verify their performance and availability.

This highly complex file is still ongoing, now being discussed by the European Parliament and Member States, with a formal adoption at the end of 2023 at the soonest.

In the meantime, it is ESWET's duty to keep informing decision-makers so that the IED remains a coherent framework for industries and successfully delivers environmental benefits.

Communications Activities

The Communication Office of ESWET has focused its 2022 strategy on promoting the positiveness behind the different aspects that Waste-to-Energy solutions can bring for the industry and society at large.

To a fair extent, ESWET's successes are also the result of its ability to communicate efficiently on all key topics.

In addition to reports and position papers, ESWET organises communication campaigns, face-to-face events, and webinars to promote the positive role of Waste-to-Energy.

Its representatives also regularly participate in many relevant Brussels-based and international events.



NEW PERSPECTIVES

New Perspectives

This campaign aims at highlighting the positive practical societal benefits of Waste-to-Energy.

A series of articles that provide an understanding of the diverse range of technologies involved in the treatment of municipal non-recyclable waste.

1 Who said that treating non-recyclable waste must have negative connotations?



All over the world, many plants have benefited from the visionary projects of some of the most important architectural studies and artists, which made them veritable tourist attractions and iconic landmarks of industrial architecture.

2 Waste-to-Energy and Material Recovery

In the ZAV Recycling plant in Hinwil, Switzerland, materials from the bottom ash are recovered thanks to new technologies and shared solutions. In Hinwil, a small Swiss town in the Canton of Zurich, every year metal gets recycled, saving both precious resources and up to 100'000 tons of CO₂ emissions.



3 Waste-to-Energy plants contribute to district heating, fun, and art in the cities



Modern-day Waste-to-Energy plants are well integrated with their surroundings and involved in the life of the community. Not only do they treat the non-recyclable waste produced by households and industries, but by processing this waste they also generate electricity and heating for residential buildings, businesses, and nearby industries.

4 Waste-to-Energy contributes to the Circular Economy

Waste-to-Energy offers a holistic approach to resource recovery from non-recyclable, non-hazardous waste; it diverts waste from landfills, recovers metals and minerals, and produces renewable energy (from the biodegradable fraction of waste), thus becoming an indispensable link of the circular economy and creating value for society.

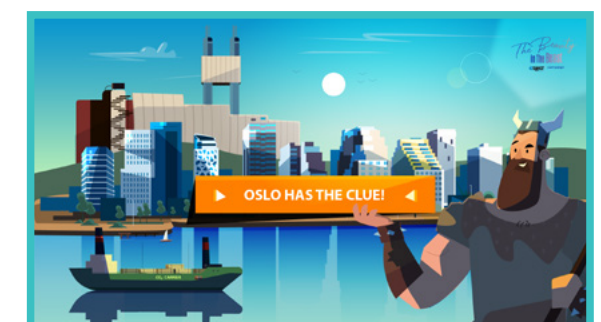
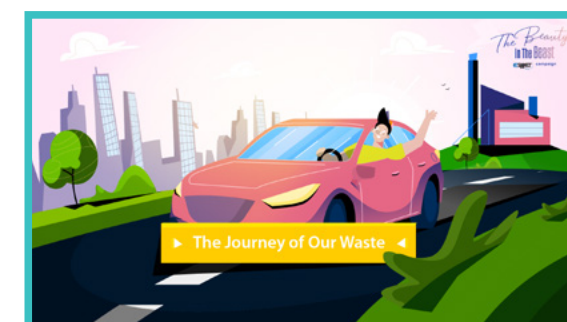
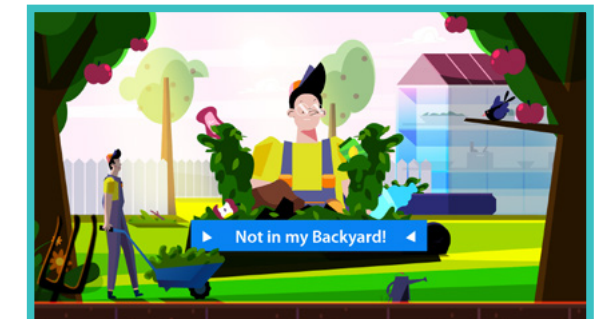
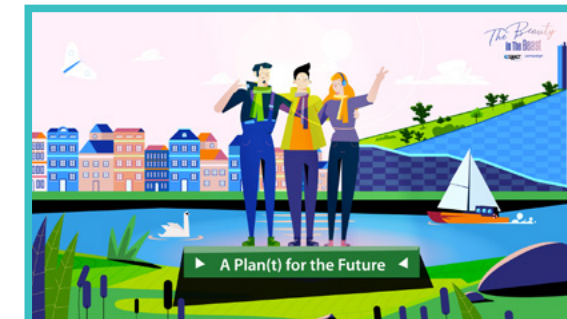
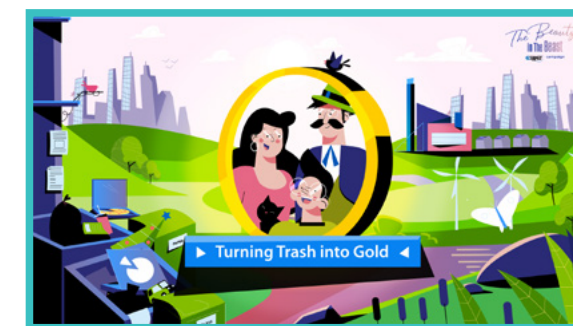


THE BEAUTY IN THE BEAST

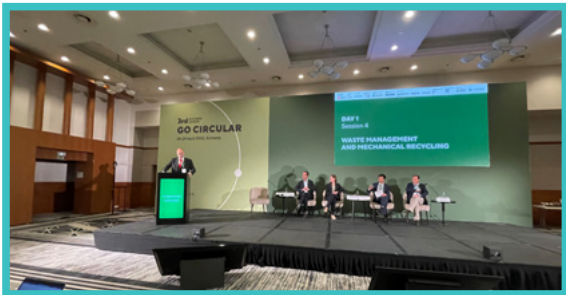
There is beauty in our waste!

Waste-to-Energy technologies manage non-recyclable waste – waste that is unfit for recycling and reuse and transform it into a resource, recovering energy and materials while avoiding landfilling.

The Beauty in the Beast campaign puts a spotlight on the unexpected solutions offered by Waste-to-Energy to support Europe's ambition to reach climate neutrality, reduce pollution, and move towards a more circular economy.



EVENTS



Globuc, April 2022, Rotterdam



ECOMONDO 2022, Rimini



IRRC, September 2022, Vienna

Other events where we have participated



PUBLICATIONS

Speaking out



Some webinars and events



ESWET ORGANISATIONAL STRUCTURE

THE SECRETARIAT

The ESWET Secretariat is in touch with the representatives of all member companies. It is the contact point for ESWET members, EU Institutions, the media, and the general public.

EXECUTIVE BOARD

The Executive Board discusses and decides the main priorities for the association. It is composed of the full members supplying main components.

GENERAL ASSEMBLY

The General Assembly, in charge of monitoring the functioning of the association, leads the longstanding policies and the general decision-making process at ESWET. It is composed by all the members.

TECHNICAL COMMITTEE

The Technical Committee (TC) oversees the policy, legal and technical work of ESWET. It implements the policy positions of ESWET and provides input to the work of the EU institutions.

PUBLIC RELATIONS COMMITTEE

The Public Relations (PR) Committee defines the way ESWET communicates. Both the TC and the PR Committees meet every four months.

CCUS WORKING GROUP

The CCUS Working Group aims to make the Waste-to-Energy sector a driver for carbon capture and utilisation technologies in Europe.

WASTE-TO-HYDROGEN WORKING GROUP

The Waste-to-Hydrogen Working Group aims to analyse the legislative coverage of Waste-to-Hydrogen and monitor the deployment of WtH projects throughout Europe.

IBA WORKING GROUP

The objectives of the Working Group is to build and share a solid knowledge of Incineration Bottom Ash (IBA) as a whole, including the technologies related to its treatment and utilisation.

JOIN THE WASTE-TO-ENERGY NETWORK

Become the next ESWET member!

The purpose of ESWET is to raise awareness of the positive results of Waste-to-Energy in terms of sustainable waste management, clean and reliable energy, and protection of the environment.

Technology from ESWET's members is the heart of most Waste-to-Energy plants in Europe and globally, allowing for the recovery of energy and materials from non-recyclable waste which would otherwise be landfilled!



ESWET's Communication office is available to hold introductory meetings with interested parties at any time.

Send an email to c.melliou@eswet.eu (Head of Policy) or to m.carbonell@eswet.eu (Communications Officer).

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