



Organised by the European Compost Network & Cré

Supported by the European Biogas Association

AD Europe 2014

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L to R, Christian Garaffa (Novamont), Martin Eves (Chairman of Cré), Dr. Stefanie Siebert (Executive Director of European Compost Network), Fergus O'Dowd (Minister of State in the Department of Communications, Energy and Natural Resource) & Ian Kilgannon (Bord Gais Networks)

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AD Europe 2014 is over. We had 193 delegates from 22 countries attending from around the world.

With 39 speakers covering topics from composting to anaerobic digestion, the conference was a vibrant forum to exchange knowledge and explore emerging techniques in the AD and composting sector. I would very much like to thank all the speakers as well as the Conference Organising Committee (Stefanie Siebert, Josef Barth, Fiacra Quinn, David McDonnell, Morgan Burke, Micheal Geary, Alan Reynolds, Dearbhail Ni Chualain & Eoin Bird) for their tremendous energy and committee work.

I would also like to thank our conference sponsors - Novamont and Bord Gais Networks (main sponsors), Komptech (Banquet sponsor), our coffee break sponsors Bekon, Kilkenny Mechanical Handling Systems Ltd, Biocycle and Anaergia, and our marketing sponsor Failte Ireland.

And in particular I would like to thank all those who attended and supported the conference. Not only did we raise €1,100 for the Irish Cancer Society during the conference, but Bord Failte also estimate that the total value to the Irish economy of international delegates staying in Ireland for the conference was approximately €140,000

The growth and development in the sector was recognised by An Taoiseach Enda Kenny (Ireland's Prime Minister), who kindly recorded a short video message for the delegates. He underlined his support for the development of anaerobic digestion/composting plants to produce renewable energy and make waste into a resource, creating sustainable jobs in the local economy and contributing to the sustainability of Ireland's farming system.

You can download the Taoiseach message at this link *http://www.youtube.com/watch?v=Hhjzgg0nDnA*

I look forward to our next conference.

Kind Regards

Percy Foster

Percy Foster Executive Cré -Composting & Anaerobic Digestion Association of Ireland



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Conference Review

Prepared by Chris Thornton, European Sustainable Phosphorus Platform

The European conference on anaerobic digestion and composting, AD Europe, Dublin 20th-21st February 2014, brought together 193 professionals in renewable energy, organic waste and agricultural residue treatment, regulators and scientists.

The conference concluded that anaerobic digestion and composting offers considerable opportunities for job creation, renewable local energy production as biogas and sustainable waste treatment, but that industry development is hindered in much of Europe by the absence of clear and stable public policies. The recycling of nutrients in digestate (nitrogen, phosphate) is essential for the sustainability of anaerobic digestion, but currently faces significant regulatory obstacles which need to be addressed.

Ireland's Prime Minister. Enda Kenny, in short video message the conference а to (http://www.youtube.com/watch?v=Hhjzgg0nDnA) underlined his support for the development of anaerobic digestion, to produce renewable energy and make waste into a resource, and so create sustainable jobs in the local economy and contribute to ensuring the sustainability of Ireland's farm system.

Fergus O'Dowd, Ireland's Minister of State in the Department of Communication, Energy, Natural Resources, opened the conference, stating that he intends bioenergy (biogas, agricultural or renewable energy crops, wood) to contribute a significant portion to Ireland's renewable energy target of 16% production by 2020, and that this necessitates coherent public policy support for biogas and coordination of waste and energy policies. Ireland's government estimates that anaerobic digestion and composting could create many 1000's of jobs

Richard Howelll from, Ireland's Ministry of Agriculture, Food and Marine, presented opportunities for funding in the EU's Horizon 2020 R&D funding programme, opened end 2013. Calls cover waste – bio-industry – food security, including cross-sectoral approaches and the local circular economy. For further information see the European Sustainable Phosphorus Platform website *www.phosphorusplatform.org* under "Opportunities".

Job creation potential from digestion and composting

Stefanie Siebert, European Compost Network, indicated that of c. 80 million tonnes of biowastes produced in Europe today (sewage sludge, household and food processing organic waste), only c. 24 million tonnes are currently recycled. If this waste is estimated to contain 1.5gP/kg, this means around 84,000 tonnes of phosphorus lost every year.

Dr Siebert indicates that there are at present some 14,000 anaerobic digestion plants in Europe, with 71,000 jobs. Current growth is over 12% per year. Biowaste composting creates around 1 job per 800 tonnes of biowaste/year, and offers a potential total of 100,000 sustainable jobs in Europe.

Martin Eves, Chair of Composting & Anaerobic Digestion Association of Ireland Cré, indicated that anaerobic digestion (AD) biogas production could generate 2,000 sustainable jobs in Ireland, but that only one new plant has been built in the last 3 years because Government's policy is inappropriate, despite Ireland's obligations under the Renewable Energies Directive 2009/28/EC.

Nora Goldstein, BioCycle, USA, indicated that the U.S.A. produces around 36 Mt/y of municipal/household food waste and 34 Mt/y of yard trimmings. Only around 3% of food waste is currently recycled. The American Biogas Council estimates that there are currently some 2,000 AD and landfill gas recovery operatons in the USA (treating sewage biosolids, manure, landfill gas, food & drink industry wastes), but that the potential is around 12,000 plants. The Innovation Center for US Dairy estimates that energy and co-products which could potentially be recovered from dairy digesters in the USA would have a value of c. US\$ 3 billion/year.

Allison Costa, US Environment Protection Agency, US AgStar programme and Global Methane Initiative, indicated that there are currently around 250 anaerobic digeston plants operating on manure in the USA, with a potential of c. 8,000 for dairy and swine manure only. Digestate solids are used as a soil amendment and digestate liquids spread as a fertiliser. AgStar's objective is to bring together actors in the water treatment, food waste, agriculture and anaerobic digestion sectors to develop dialogue between operators and regulators concerning barriers to development.

David Wilken Fachband Biogas (German Biogas Association) indicated that there are currently nearly 8,000 biogas plants operating in Germany but most are using energy crops and only around 250 are using wastes. Regions with excess animal manure nutrients now need to process digestates to produce transportable fertilisers. Digestate can be upgraded by composting and by solid/liquid separation, which modifies the nutrient partition. Solids can be dried and pelletised, or mixed with biological by-products (feathers, coconut shells) to produce balanced soil amendments. The liquid fraction can be upgraded by biological treatment, evaporation, membrane separation techniques or reverse

osmosis (not operational in the field to date) or by ammonia stripping to produce liquid fertiliser, struvite precipitation for phosphorus recovery.

Reducing and recycling food waste

Odile Le Bolloch, Ireland Environmental Protection Agency, presented work on reducing food waste. 60% of Ireland's food waste is estimated to result from mismanagement of the food chain (passing consumption date, overserving), 20% is avoidable waste (e.g. crusts, potato skins, which could be eaten) and 20% is unavoidable (e.g. banana skins). Avoidable losses are estimated to represent 700€/year/household, \in 125 million /year for Ireland's restaurants and \in 6-8 million for Ireland's hospitals.

Michele Giavani, ARS ambiente and Italian Composting Council CIC, Italy, indicated that Italy's fertiliser legislation recognises compost as a product, subject to quality scheme criteria. Digestate produced from manure is considered to be a 'product', but digestate from waste to be a 'waste'. Recent Italy policies include attractive subsidies for biogas production on condition that it is used to power transport vehicles and an additional subsidy if nitrogen is recovered from digestate or if it is used as a bio-fertiliser. Consequently, food waste collection is developing rapidly in Italy. Milan now separately collects 90 kg/inhabitant food waste, so avoiding sending 130 000 tonnes/year to waste incineration. He estimates that food waste digestion could contribute 0.82% of Italy's total transport fuel requirements (compared to 5.5% currently supplied by biofuels and a national target of 10% from biofuels).

Policy and regulation

Enzo Favoino, Zero Waste Europe, explained that "zero waste" is a methodology or a progress path, rather than an absolute number. Experience in Europe shows that losses from mixed collected solid municipal waste can be reduced by 65% (recycled fraction) by sorting, further reduced to 70-75% by adding transparent plastic bag separation of food wastes in households and further to 80% by adding PAYT (Pay As You Throw) collection systems. The total costs of collection, separation and treatment of municipal solid waste fall from c. 65/tonne at 20% sorting to 50€/tonne at 80% sorting. Incineration is not the solution, because fly ash and bottom ash generated are toxic and should go to landfill, and the installation of an incinerator results in a 'capacity which must be fed' meaning that there is no incentive to sort or recycle. Also, the calculated CO₂ reduction of incineration will progressively be reduced as incineration increasingly is replacing renewables not fossil fuels.

Dominic Hogg, Eumonia, England, outlined work currently underway to propose new Member State recycling targets under the Waste Framework Directive revision process. He underlined the difficulties posed by the absence of coherent data collecting, with different definitions of waste streams, recycling, collection, loss, and different monitoring methods, resulting in non-comparable data between Member States.

Kiara Zennaro, Renewable Energy Association, England, presented the currently-underway update of the BAT-BREF for "waste treatment", under the Industrial Emissions Directive (successor of the IPPC Directive). This covers anaerobic digestion and composting (installations above specified capacities). All new plants in Europe have to respect the BAT-BREF specifications, and all existing plants have four years to become compliant after its adoption. The BAT-BREF specifies operational criteria including best available technologies and emissions limits. Work started on this document in June 2013 and a first draft is currently out for consultation. Finalisation is expected by 2016.

Jack O'Keefe, Larchmont Consulting, explained the difficulty of financing manure anaerobic digestion development, because projects are often led by small players such as farmers or cooperatives. Long term stability of public policies and energy feed in tariffs is essential for economic viability. The UK's Green Investment Bank, which has UK£ 3.5 billion available for investment, with a priority for waste recycling and waste-to-energy is an interesting initiative. He suggested that a co-operative industry wide approach should be considered to help smaller projects to obtain funding. This could for instance see a combination of financing sources from an established program from the EIB or similar and funding contributions from public (in country) sources as well as private funding from pension/fund managers who might be more inclined to invest on a fund basis, rather than a single project basis, to spread their risk and match funding from the traditional banking sector.

Jan Stambasky, European Biogas Association, also underlined the necessity of stable and strong public policies to support anaerobic digestion development. Renewable energy FITs (Feed in Tarifs) and Feed In Premiums (Green Certificates) are effective, whereas quotas have not shown to be so to date. The reform of the EU's CAP (Common Agricultural Policy) is also important, and the CAP Rural Development Policy (RDP) funding is expected to continue to fund biogas investment from livestock manures, farm by-products or from crops which are not competing with food production.

Compost and digestate quality criteria

Susan Antler, Compost Council of Canada, indicated that key drivers for development of composting and anaerobic digestion are paucity of landfill capacity and regulations obliging diversion of organics from landfill. Compost benefits from federal guidelines for contaminant levels and for acceptance as a fertiliser product in Canada. Quality Compost Assessment specifications define how and where composts can be used.

Kristel Vandenbroek, Vlaco, Belgium, presented Flanders' experience promoting biowaste recycling, making waste a resource and in particular promoting composting. Vlaco, the Flanders quality assurance organisation for composting and anaerobic digestion, has developed quality control assurance certificates for composts and anaerobic digestates (digestate as liquid, solid, dried and died & pelletised). These criteria specify certain heavy metal and organic contaminant levels (but pesticides, for example, are not covered). Input materials to the treatment process must respect the same contaminant obligations as the final product. In 2012, over 200 quality control certificates were delivered for different products from 80 installations.

Marie Thelen-Jüngling, Bundesgütegemeinschaft Kompost (German Qualtiy Assurance Organisation for Compost BGK),Germany, indicated that quality standards today cover nearly 500 composting plants, and over 100 digestates, corresponding to 6 million tonnes of organics processed per year in Germany. Criteria cover heavy metals, organic contaminants, physical/handling specifications, stability, viable weed seeds and physical impurities (e.g. plastics – specified by dry mass and by surface area in m²/l). Only green wastes and separately collected organic biowastes are accepted in the compost quality criteria (not sewage biosolids or manures). Nutrient contents must be indicated because they contribute to the agronomic value of the compost.

Recovery of added-value products

Christian Garaffa, Novamont, Italy, presented the biorefinery model of Novamont for the production of Mater-Bi, a biodegradable and compostable polymer used to make bags used for household organic waste collection. High food waste captures are essential to divert organic waste for biogas and compost production and biobags are a key tool in achieving high participation and capture rates, especially in metropolitan areas. The case study of the city of Milan was shown, by now the largest and most successful residential food waste collection scheme on the planet.

Adrie Veeken, Attero, Netherlands, presented anaerobic digestion of source separated household organic wastes. The company processes 40% of Netherlands solid municipal wastes through incineration, composting, digestion and/or separation. The company is currently looking at innovative material recovery processes including using bacteria to produce volatile fatty acids which can then be used to produce poly hydroxyl alkonate (a biodegradable polymer with characteristics comparable to polypropylene), production of fly larvae (dried to produce high-protein and nutrient-rich animal feed), precipitation of struvite from digestate (to recover phosphorus).

Nils Finn Lumholdt, Osle Waste-to-Energy Agency, presented the advanced anaerobic digestion plant developed and now operated by the city. Input is separately collected organic wastes. This is sorted, then subject to thermal hydrolysis (KAMBI THP process, 130°C at 140 atm.) to break down cellular material and maximise availability for methane production. The plant includes digestate evaporation and odour treatment. 1 kg of food waste input generates 0.13 litres of diesel equivalent as biogas, used to power the city's buses. The plant is situated on a site where landfill gas covers energy needs. Liquid digestate is used on c. 100 local farms. Operating cost is 70€/tonne food waste treated.

Returning carbon and nutrients to soil

Florian Amlinger, Austria Compost & Biogas Association underlined the importance of soil as climate change carbon stock. Soil carbon is restored and built up mainly by changing agronomic methods (e.g. no or low tillage), but composts and digestates can also contribute. Humus in compost is important because it can store nutrients and reduce nutrient losses, improve water retention and so drought resistance, provide a support for soil microbial biodiversity. Carbon in digestate is not present as humus, so that composting of digestate solids is important to ensure that they have a real soil carbon value. The N/C balance in digestate is often too high, so that nutrient separation and recovery is necessary to enable appropriate agricultural application.

Dr. Munoo Prasad, Compost Research and Advisory (Ireland), presented a simple test kit developed to enable farmers to rapidly and cheaply, if approximately, test ammonia nitrogen concentrations in digestate (using colour strips costs $<1 \in$ each). This is important because ammonia levels may change significantly during storage.

David Tompkins, WRAP (Waste and Resources Action Programme), England, presented the use of digestates in the UK. Digestate from manures is not normally regulated as a 'waste', whereas it is a 'waste' if food waste is used as input. However, this waste status is revoked if the digestate complies with national end of waste criteria, which include a Quality Protocol. This specifies quality criteria and limits uses (e.g. digestate cannot be used in growing

media or by amateur gardeners). The commercial value of digestate is principally the nitrogen content, but this can only be applied to fields at certain periods of the year, when there is crop demand.

He presented a number of field trials of different digestates on sports fields, perennial wood and energy crops, use with compost to constitute new soil on mine restoration sites, use in growing media. Challenges identified were that ammonia in raw digestate could 'burn' plants, high variability, instability, bacterial growth on storage and irrigation equipment, potential loss of the nitrogen to air. Conclusions suggest the need for digestate to be completely stable (fully digested) and consistent. Composting of the digestate is an effective solution to improve its use characteristics.

Percy Foster (Cré) concluded the conference, underlining that there is general agreement that the efficiency of biowaste recycling must be increased, and therefore that compost and digestate use must be improved and waste-to-energy through biogas production must continue to develop.

AD Europe conference, Dublin 20th-21st February 2014 www.adeurope2014.eu



Photos from the Conference







