ZERO WASTE ALLIANCE IRELAND

Towards Sustainable Resource Management

Feedback to the European Commission on the Revision of the Regulation on the European Pollutant Release and Transfer Register (E-PRTR)

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EEB European Environmental Bureau and IEN Irish Environmental Network

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1. INTRODUCTION

The European Commission has provided an Inception Impact Assessment of the proposed revision of the existing Regulation[1] on the European Pollutant Release and Transfer Register (E-PRTR). The aim of the public consultation to which we are responding is to provide feedback on the intended revision, and to provide views on the Commission's understanding of the problem, on possible solutions, and to share any relevant information that responders may have, including information on possible impacts of the different options.

Since 2007, the E-PRTR holds data reported by some 30,000 industrial facilities covering 65 economic activities. Facility operators provide data on their annual releases to air, water and land, as well as off-site transfers of waste and pollutants in wastewater. The data cover 91 pollutants including greenhouse gases, heavy metals and pesticides. E-PRTR activities closely mirror those regulated under the Industrial Emissions Directive (IED).

In 2019 the European Commission requested [2] a review of the implementation of the E-PRTR and related Guidance Document, and the final report of the review by ICF was published on 31 January 2020.

This review of the E-PRTR identified possible amendments to the scope of E-PRTR activities and pollutants, as well as to guidance on release quantification and pollutants from different activities to be reported . The review suggested changes in E-PRTR activity definitions to ensure greater coherence with the Industrial Emissions Directive (IED), and proposed that lower capacity thresholds

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[1] Regulation (EC) No 166/2006 Of The European Parliament And Of The Council of 18 January 2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC.

[2] Service Request No. 14 under framework contract No. ENV.C4/FRA/2015/0042.

for combustion plants and waste water treatment plants would capture a greater share of industrial releases.

Thirty-eight (38) additional pollutants are suggested for inclusion in the E-PRTR pollutant list to improve alignment with the IED, other European media-specific legislation and international pollutant release and transfer registers. The review also suggested that reporting thresholds should be lowered for eleven (11) pollutants to air, and fourteen (14) pollutants to water to ensure that 90% of industrial releases of these pollutants are captured. Improvements in validation by competent authorities and revisions to the E-PRTR Guidance document are also suggested to improve data consistency and comparability, in particular with regards to the use of method classes and methodologies for quantification of releases.

In September 2020, the European Commission initiated a public consultation on the proposed changes to the E-PRTR, and the consultation requested feedback on the general issues related to the revision of the E-PRTR. The following sections of this submission are our feedback and response to this public consultation.

2. ZERO WASTE ALLIANCE IRELAND (ZWAI)

At this point we consider that it is appropriate to mention the background to our submission, especially the policy and strategy of ZWAI.

2.1 Origin and Early Activities of ZWAI

Zero Waste Alliance Ireland (ZWAI), established in 1999, is a Non-Government Environmental Organisation (eNGO). ZWAI has prepared and submitted to the Irish Government and to State Agencies many policy documents on waste management, and continues to lobby Government on the issue of using resources more sustainably, and on the implementation of the Circular Economy.

Our principal objectives are:

i) sharing information, ideas and contacts,

ii) finding and recommending environmentally sustainable and practical solutions for domestic, municipal, industrial and agricultural waste management in Ireland;

iii) lobbying Government and local authorities to implement environmentally sustainable waste management practices, including clean production, elimination of toxic substances from products, re-use, recycling, segregation of discarded materials at source, and other beneficial practices;

iv) lobbying Government to follow the best international practice and EU recommendations by introducing fiscal and economic measures designed to penalise the manufacturers of products which cannot be re-used, recycled or composted at the end of their useful lives, and to financially support companies making products which can be re-used, recycled or are made from recycled materials;

v) raising public awareness about the long-term damaging human and animal health and economic consequences of landfilling and of the destruction of potentially recyclable or re-usable materials by incineration; and,

vi) maintaining contact and exchanging information with similar national networks in other countries, and with international zero waste organisations.

2.2 Our Basic Principles

Human communities must behave like natural ones, living comfortably within the natural flow of energy from the sun and plants, producing no wastes which cannot be recycled back into the earth's systems, and guided by new economic values which are in harmony with personal and ecological values.

In nature, the waste products of every living organism serve as raw materials to be transformed by other living creatures, or benefit the planet in other ways. Instead of organising systems that efficiently dispose of or recycle our waste, we need to design systems of production that have little or no waste to begin with.

There are no technical barriers to achieving a "zero waste society", only our habits, our greed as a society, and the current economic structures and policies which have led to the present environmental, social and economic difficulties.

"Zero Waste" is a realistic whole-system approach to addressing the problem of society's unsustainable resource flows – it encompasses waste elimination at source through product design and producer responsibility, together with waste reduction strategies further down the supply chain, such as cleaner production, product repairing, dismantling, recycling, re-use and composting.

ZWAI strongly believes that Ireland should have a policy of not sending to other countries our discarded materials for further treatment or recycling, particularly to developing countries where local populations are being exposed to dioxins and other very toxic POPs. Relying on other countries' infrastructure to achieve our "recycling" targets is not acceptable from a global ecological and societal perspective.

2.3 What We are Doing

Zero Waste Alliance Ireland has prepared many policy documents on waste management, we continue to lobby the Government of Ireland on the issue of

sustainable resource management, and to express our concern at the failure to address Ireland's waste problems at a fundamental level.

In recent decades, as many older landfills were closed or became better managed (primarily as a consequence of the implementation of European Directives, Irish legislation transposing these Directives, the development of a waste licensing regime by the Environmental Protection Agency, and the establishment of the Office of Environmental Enforcement in 2003), concern about the public health effects of landfills decreased considerably.

ZWAI therefore concentrated more on the objectives of ensuring that Ireland's government agencies, local authorities and other organisations will develop and implement environmentally sustainable resources and waste management policies, especially resource efficiency, waste reduction and elimination, the promotion of re-use, repair and recycling, and the development and implementation of the Circular Economy.

As an environmental NGO, and a not-for-profit company with charitable status since 2005, ZWAI also campaigns for the implementation of the UN Sustainable Development Goals, including (but not limited to) Goal 12, Responsible Consumption and Production, and Goal 6, Clean Water and Sanitation (having particular regard to the need to avoid wasting water).

In addition to responding to many public consultations, members of ZWAI have given presentations on how the European Union has addressed the problem of plastic waste (March 2019), on single-use plastic packaging by the food industry (November 2019), and other relevant topics.

It will be clear that ZWAI is primarily concerned with the very serious issue of discarded substances, materials and goods, whether from domestic, commercial or industrial sources, how these become "waste", and how such "waste" may be prevented by re-design along ecological principles. These same ecological principles can be applied to the many ways in which we abstract and use water as a resource, and to the equivalent volumes of wastewater produced as a consequence of these uses.

ZWAI is represented on the Irish Government's Waste Forum and Water Forum (An Fóram Uisce), is a member of the Irish Environmental Network and the Environmental Pillar, and is funded by the Department of Communications, Climate Action and the Environment through the **Irish Environmental Network**.

In 2019 ZWAI became a full member of the **European Environment Bureau** (EEB); and we participate in the development of European Union policy on waste and the Circular Economy.

3. INCLUSION OF ADDITIONAL SECTORS AND ACTIVITIES IN THE E-PRTR

Section 2.2 of the final report of the review by ICF of the implementation of the E-PRTR and related Guidance Document, published on 31 January 2020, suggests a number of new activities, together with changes to existing activity definitions and capacity thresholds, to be included in a revision of the PRTR.

3.1 Agriculture, Cattle Rearing and Emissions to Atmosphere

Agriculture, in the broad sense as productive systems of crops, livestock, forestry, fisheries and aquaculture – and the resource base upon which it depends – will have to undergo an unprecedented transition by the end of the century. Between 2019 and 2050, food production must increase by almost 50 percent globally in order to provide sufficient, good quality food for almost 11 billion people. Competition for land, food, energy, infrastructure, and habitation needs will continue to intensify within finite production areas. Yet in many of the most affected regions of the world, the natural resource base of soils, water, land, and ecosystems upon which food production depends is under stress, degraded, or already significantly depleted.[3]

Agriculture that fails to protect and improve rural livelihoods, equity and social well-being is unsustainable; and the resilience of agriculture, livestock, forestry and fisheries systems is directly dependant on the quality and function of the ecosystem services on which they rely.

European agriculture and food production is generally considered to be highly productive, and in Ireland the agriculture industry has considered itself to be one of the best and most successful in Europe.

However, for several decades, these successes have produced more and more serious social and environmental impacts. In terms of health, diet-related diseases are growing at an alarming rate (diabetes, obesity, cardiovascular disease). Although we produce a lot of food in Europe, we also eat too much and our diets are unbalanced in relation to the nutritional recommendations of the European Food Safety Authority (EFSA) and the World Health Organization (WHO).

The high productivity of land in Europe is also the result of the widespread use of chemicals – pesticides and synthetic fertilisers. The former are responsible for an increase in the prevalence of numerous diseases among farmers, and there are strong concerns about their impact on our food, including drinking water. European agriculture is also threatening biodiversity, the loss of which is causing

[3] Landscapes for Life – Approaches to Landscape Management for Sustainable Food and Agriculture. Food and Agriculture Organization of the United Nations, Rome, 2017.

an extinction crisis – more than 20% of common birds have disappeared, and some regions have lost more than three quarters of all flying insects.

Key indicators include:

- Globally 50% of habitable (ecologically productive) land is occupied by agriculture, and an average of 42% of all land in Europe is used for agriculture.
- There was a 60% decline in populations of vertebrate (mammal, bird, fish and amphibian) species between 1970 and 2014 (a 60% decline in the human population would be equivalent to emptying N. and S. America, Africa, Europe, China and Oceania).
- Globally agriculture, fishing, hunting and wildlife trade is responsible for 70-80% of vertebrate biodiversity loss, and intensive agriculture and agricultural poisons are the main causes of land invertebrate (insects, etc.) loss.
- In Europe over 71 % of agricultural land is dedicated to feeding livestock. Agriculture occupies 70% of the land in Ireland – approx. 4.9 Million Hectares (Mha). A further 11% of land is used primarily for commercial forestry – 0.77 Mha (some of this is on farms). The EU average for forestry is 34%.
- According to the EPA State of the Irish Environment 2016 Report, only 7% of land-based ecosystems in Ireland are considered to be in a favourable ecological condition.
- In Ireland 97% of agricultural land is used for meat and dairy production.
- Without meat and dairy consumption, global farm land use could be reduced by more than 75% – an area equivalent to the US, China, EU and Australia combined – and still feed the world.
- Nitrogen pollution costs the European Union up to €320 billion a year and over 80% of EU agricultural nitrogen emissions to water are linked to animal agriculture.
- Ireland's farm animals produce 50 times more waste than the human population; this waste is spread untreated on our land polluting its streams, rivers, and lakes.
- 30% of Ireland's 170,000 private wells are estimated to be contaminated by *E. coli.*
- Ireland has the highest rate of groundwater VTEC (verotoxigenic E. coli, a type of the coliform bacterium that can be fatal) contamination in Europe.
- 97% of the water we use is embodied in products (87% in food).

These indicators emphasise the importance of the statement in the review by ICF of the implementation of the E-PRTR and related Guidance Document, on page 6 that;

> *"Various analyses, including most EU Member States (MS) air pollutant and greenhouse gas inventories, identify **cattle rearing as an important source of ammonia and methane releases**. Neither the E-PRTR nor the IED include the majority of these releases. Analysis during this project identified that, due to the small, dispersed and numerous cattle facilities, even a low capacity threshold of 100 livestock units would not capture a significant proportion of releases, and a disproportionate number of cattle rearing facilities would need to report."*

The review then recommends:

> *"Whilst a source of notable releases to air and water, **intensive cattle rearing does not appear to warrant addition as an E-PRTR Annex I activity**. Still, some form of simple, less burdensome farm registration and top-down reporting approach is worth consideration".*

We disagree with his recommendation, for the reason that intensive cattle rearing is an important and very significant source of ammonia and methane releases, especially in Ireland, where cattle rearing contributes to around 30% of the country's greenhouse gas emissions, and is proving very difficult to control.

Even though smaller installations or cattle farms are more numerous, and they individually release smaller amounts of polluting substances, their overall impact is very significant; and to omit them from the E-PRTR would lead to a failure to consider the total amounts of greenhouse gas emissions from agriculture.

Furthermore, the use of large quantities of nitrogenous fertilisers causes emission of nitrogen oxides to the atmosphere, thereby adding a further greenhouse gas to the overall effects of agricultural production. **By failing to add cattle rearing to the E-PRTR, the link between this regulation and the EU climate change policy is weakened**. Adding intensive cattle rearing to the list of E-PRTR Annex I activities would strengthen the EU climate change policies and actions.

3.2 Municipal Wastewater Treatment Plants – Substances of New and increasing Concern

Municipal wastewater treatment plants are already included in the list of E-PRTR Annex I activities, and the review by ICF suggests in Item 5.(f), urban waste-water treatment plants, in Table 2.1 on page 8, that the existing threshold from 100,000 p.e. to 15,000 p.e. should be lowered to include plants most likely to handle industrial releases.

While we would agree with this suggestion, we would strongly urge that the E-PRTR for wastewater treatment plants should include data on pollutants of new and increasing concern, specifically **pharmaceutical substances**, residues of such substances (e.g., partial breakdown or decomposition products); **agricultural and horticultural chemicals**, and releases of **micro-plastics** and **nano-plastics** in wastewater should be included; these are of recent and increasing concern, especially as some of these substances pass through municipal wastewater treatment plants, are found in rivers and lakes, and in drinking water supplies (e.g., glyphosate in drinking water in Ireland; nano-plastics in water).

These substances are of long-term and serious concern, with significant environmental and public health effects, and their releases to the environment should be documented and monitored.

3.3 Antibiotic Resistance in Micro-Organisms

Yet another priority area arises from the increasing problem of antibiotic resistance in the micro-organisms which provide wastewater treatment in municipal WWTPs, for the reason that many people are now excreting antibiotics in urine and faeces, and these create the optimum conditions at sewage treatment works for new emerging strains of antibiotic-resistant bacteria. This problem is very likely to increase as a result of rising water temperatures caused by climate change, so that the emergence of multiple-resistant pathogenic micro-organisms will becomes more frequent.

Our recommended response to this problem is that separate sewage treatment systems are needed to prevent antibiotics from entering the general wastewater stream, and this can best be achieved by greater and more widespread use of composting toilets and separate urine treatment systems. These systems are very necessary at hospitals and nursing homes where large amounts of antibiotics and other pharmaceuticals are being taken daily by residents and patients.

Since there is no complete or adequate method of removing pharmaceuticals from the combined wastewater stream at WWTPs, it is necessary to prevent ingested pharmaceuticals, medicines and antibiotics from entering sewage treatment systems, from which they will be discharged to contaminate groundwater and surface water bodies, and to include these substances in the revises E-PRTR, as suggested in section 3.2 above.

3.4 Distribution and Marketing of Toxic Substances

While the manufacture of toxic substances is included in the E-PRTR, we would point out that one of the principal pathways through which these substances are released to the environment is through the sale to members of the public, as well as to small business, farmers and other end users. Toxic substances, and

especially those which are non-biodegradable, enter the aquatic environment in wastewater or by disposal to surface waters or groundwater.

Obtaining such data from users would not be possible, but it could be easily obtained from wholesalers, distributors and retail shops; and it is therefore our suggestion that these sources of pollutant releases should be included in the revised E-PRTR. This addition should aim to capture data on toxic pollutants in widely marketed products; and shops selling such products should be required to submit an annual E-PRTR return.

4. ACCESS TO INFORMATION AND PARTICIPATION IN DECISION-MAKING

The EU Inception Impact Assessment, Section B, Aspect 4, asks about access to information and participation in decision making. Our response is that the format of the existing PRTR reporting is not easy to understand, and difficult to read; and therefore the way in which information is presented should be improved to provide a clearer format, so as to make it more accessible to EU citizens without the benefit of scientific training.

Even though the Aarhus Convention theoretically provides for participation in decision making, there is a lack of clarity about public participation in decisions which may result in changes in the release of pollutants, especially the release or emission of pollutants of recent and increasing concern, such as those we have mentioned in section 3.2 of our response.

This issue is of particular interest in Ireland, where public participation in decision-making (or the difficulties experienced by members of the public in such participation) have been the subject of much public debate. For example, the right of members of the public to participate in environmental decisions was recently given legal recognition in the Irish High Court and the Court of Appeal. In *North Meath Wind Farm Limited and Element Power Ireland Limited -v- An Bord Pleanála* ([2018] IECA 49), Mr Justice Michael Peart stated that:

> *"19. Unincorporated bodies or associations of individuals have a role to play in the decision-making process leading to decisions by planning authorities, local authorities and An Bord Pleanála. This role is recognised in the EU Council Directives such as that referred to, as well as in the Aarhus Convention. Indeed, it is a role that is not just recognised,* ***but is encouraged*** [our emphasis]." [4]

[4] Court Of Appeal: *North Meath Wind Farm Limited and Element Power Ireland Limited* (Applicants/Respondents) -v- *An Bord Pleanála* (Respondent) and *North Meath Wind Information Group* and *John Callaghan* (Appellants) [2018] IECA 49; Record number 2017/506.

In an EPA Research Report on developing the potential of community energy action groups in the transition to a low-carbon society, the authors Susan Byrne and Bernadette O'Regan comment that, while "*input from community groups is invaluable and, when contact and consultation were initiated at the earliest time possible, ideas and outputs were likely to be more relevant to local conditions",* a problem is that these "*community action groups increasingly find themselves out of their depth when embarking on energy transition projects. Barriers identified include a feeling of hopelessness and inadequacy among those attempting to engage in community projects"* … and … "*research has shown that many individuals view their individual efforts as useless.*" [5]

While members of ZWAI do not find themselves "out of their depth" when making submissions or advocating what they consider to be a socially or environmentally beneficial or necessary change in policy, they experience a barrier encountered by all environmental NGOs in Ireland and quite possibly in many other EU Member States: lack of resources to undertake research, to examine or investigate problem areas, and to engage with members of the public, or with local and central government representatives.

Detailed policy analysis and argument take time to produce, and they require a certain degree of expertise; and it is our experience that people of this calibre are generally very busy with other work, and unable to take on the voluntary commitment required by an environmental NGO. The result, as may be expected, is an "*uneven playing field",* on which an environmental NGO frequently has to argue an issue against the combined forces of the relevant government departments or agencies, and representatives of an industry which may be lobbying strongly against strengthening of environmental policy or regulations.

Two areas in which members of ZWAI have found it very difficult to engage with the relevant government departments in Ireland are in relation to waste and the circular economy (our principal field of action), and in our attempts to bring about any change in Regulations which would permit the separate collection and treatment of wastewater to recover dissolved nitrogen and phosphorus.

In pressing for stronger implementation of the circular economy, and urging better incentives for repairing, re-use and recycling (including deposit and return schemes which are widely adopted in other EU member states), ZWAI has been so far unable to bring about any meaningful change in current wastewater and solid waste collection and disposal practices, despite having the support of European Union policies advocating similar changes.

We can therefore understand very well the "*feeling of hopelessness and inadequacy among those attempting to engage in community projects",* identified by Byrne and O'Regan in the report quoted above; and undoubtedly experienced

[5] Susan Byrne and Bernadette O'Regan, 2020. Developing the Potential of Community Energy Action Groups in the Transition to a Low-carbon Society; EPA Research Report No. 327; introduction, page 1.

by many environmental NGOs throughout the EU. Nevertheless, the changes which we are observing, both in Ireland and in other EU member states, give us significant cause for hope.

While there have been significant improvements in recent years, it is still the case that public engagement can often fail to acknowledge the power imbalances within societies and communities, potentially leading to a lack of trust in political authority and thwarting of the broader goals of public engagement. A Briefing Note by An Fóram Uisce points out that "*where local expertise and knowledge has not been integrated in governance and management meaningfully and consistently, low levels of trust and collaboration have been found*".[6]

Recommendations by An Fóram Uisce to improve public engagement in water management in Ireland, and which are relevant to the indirect social benefits from publicising the environmental impacts of industry through a revision of the E-PRTR include:

"1. Introduce and support public participation processes which incorporate the three key principles of effective public engagement:

- *address inequity and power imbalances between different individuals and stakeholder groups;*
- *incorporate various forms of knowledge/expertise to recognise the value of lay knowledge as well as scientific expertise ;*
- *address issues of scale e.g. how pressures and processes that operate at national levels circumscribe local decision-making regarding water management.*

2. Conduct an evaluation of current engagement initiatives based on the above principles. This should also include an assessment of governance for compliance with good governance principles: accountability, transparency, equity, inclusiveness, responsiveness, effectiveness, and efficiency. This is because such governance is necessary to support public engagement.

3. Include communities and individuals in procedures and decision-making around water resources from the beginning. This recognises the value of their knowledge early in the catchment management process. It also elicits concerns, connections, and expertise early on and, vitally, it builds trust.

4. Support medium/long-term interdisciplinary research on public engagement including pilot projects, trialling a range of approaches, while integrating multiple forms of expertise (e.g. biological; sociological; lay) into scientific research in ways that produce meaningful public engagement. Because this kind of participatory research involves time to

[6] Briefing Note on Public Engagement in Managing Ireland's Waters, An Fóram Uisce, March 2020; page 1.

establish relations of trust between stakeholders and across disciplines and expertise, medium/long-term institutional and financial supports are essential".

ZWAI has not seen a better approach to the improvement of public participation and engagement in the management of water resources, and we urge the European Commission to implement similar measures to improve public participation in decision-making on pollutant emissions when revising the E-PRTR.

5. REPORTING MODALITIES

The EU Inception Impact Assessment, Section B, Aspect 5, asks about reporting modalities.

Our response is that current data on diffuse emissions and on pollutants of concern in widely distributed or marketed products are inadequate, and these data should be reported as part of the PRTR. For example, agricultural chemicals enter water from diffuse sources; while many products contain pollutants which are released only when these products are flushed into municipal wastewater collection systems.

6. THE CIRCULAR ECONOMY AND THE AIM OF ZERO POLLUTION

The final report of the review by ICF of the implementation of the E-PRTR and related Guidance Document, published on 31 January 2020, does not contain any references to the Circular Economy, which is surprising, given that this is a priority EU Policy. However, the Inception Impact Assessment, Section B, Aspect 6, refers to the contribution by the revised E-PRTR to the circular economy and to the decarbonisation of industry as well as enhancing its contribution to the zero pollution ambition.

Respondents are asked to explore the untapped potential for the E-PRTR to contribute to circular economy objectives, including options for realising that potential, such as requiring additional data on resource consumption, e.g., use of energy, water, and raw materials.

In response to the request in Section B, Aspect 6, ZWAI firmly believes that the PRTR must contribute substantially to the circular economy and to the aim of zero pollution.

From the perspective of the Circular Economy, water, including wastewater, is a valuable resource which should be conserved or re-used to the maximum extent; and the nitrogen and phosphorus removed from wastewater during the treatment

process should be recovered and re-used. There are many ways in which this may be achieved, but we would urge that the revised E-PRTR should mandate the recovery of dissolved N and P in wastewater as vital components of the circular economy, instead of currently being wasted.

6.1 Recovery and re-use of Nitrogen

Nitrogen is abundant in the atmosphere but in a non-reactive form which cannot be used by plants, and it must therefore be "fixed" by transforming it biologically or chemically. Biological fixing of nitrogen by micro-organisms in root nodules of certain plants, e.g., clover species, has been known for centuries; while the conversion of nitrogen to ammonia and urea is a relatively recent process, no more than a century old. Unfortunately, this process requires very large amounts of energy, which has until now been provided by gas or oil. As we urgently need to conserve energy use in order to mitigate climate change, all energy-intensive processes must be curtailed or heavily reduced as far as possible.

When we examine nitrogenous fertilisers, we find a strong argument for conserving these materials – they are produced from fossil fuels (primarily natural gas, but also from coal), and fertiliser production consumes large amounts of energy.

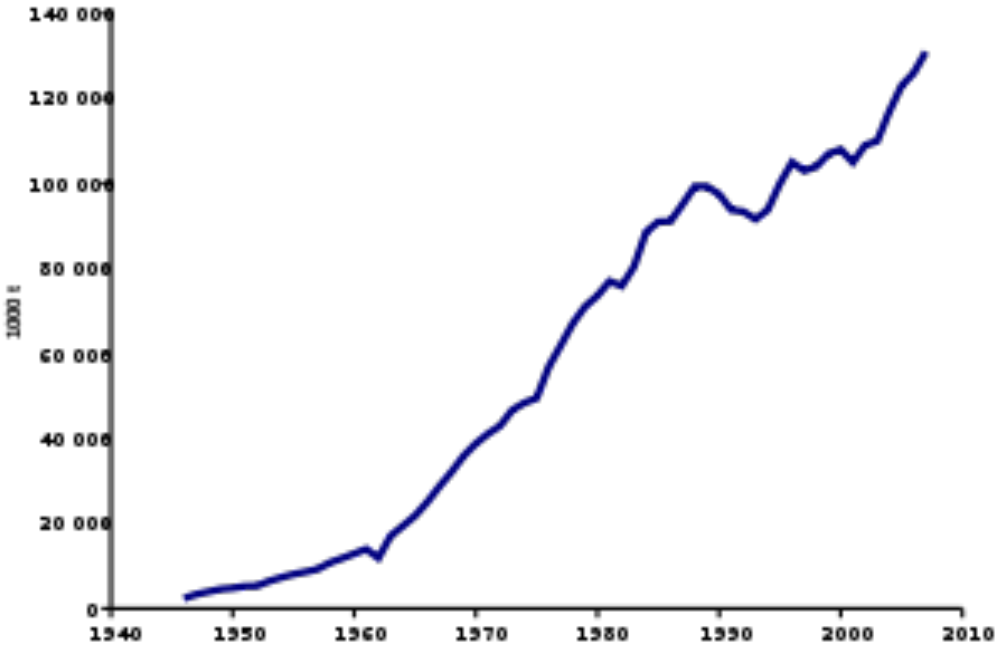

Figure 6.1 Production of ammonia between 1947 and 2007

(From Ammonia - Synthesis and production.
https://en.wikipedia.org/wiki/Ammonia and
https://en.wikipedia.org/wiki/File:Production_of_ammonia.svg).

Ammonia is one of the most important feedstocks for the production of urea and other nitrogenous fertilisers (e.g., ammonium nitrate) and approximately 88% of the world's ammonia production is used for fertilizing agricultural crops. The production of ammonia consumes around 2% of all man-made power -- a significant component of the world energy budget.

Because of its many uses, ammonia is one of the most highly produced inorganic chemicals; dozens of chemical plants worldwide produce ammonia, and the graph in Figure 6.1 above shows the huge increase in production between 1947 and 2007.

> *"About 40% of our food would not exist without synthetic ammonia (NH_3) for fertilization. Yet, NH_3 production is energy intensive. About 2% of the world's energy is consumed as fossil fuels for NH_3 synthesis based on the century-old Haber-Bosch (H.-B.) process".*[7]

The EU Joint Research Centre has been examining this issue, and two very relevant and important reports emphasise the dependence of agriculture on synthetic nitrogen fertiliser, so that while the world population increases so also does the demand for synthetic nitrogen fertilizer.[8]

These EU-funded reports concluded that:

> *"Synthetic N-fertilizers now provide just over half of the nutrient received by crops worldwide, and alternatives to reduce dependence upon mineral fertilizers while protecting the environment are receiving more and more attention. Among these potential sources of nitrogen, we wish to highlight the recycling of animal manure and human excreta, which has a large potential to substitute synthetic fertiliser use".*

The importance of sustainable production and conservation of these and other resources was also emphasised more generally by the European Commission Vice-President for Energy Union, Mr Maroš Šefčovič, when he spoke in Dublin on 09 November 2018:

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[7] Towards sustainable agriculture: fossil-free ammonia. Peter H. Pfromm, Department of Chemical Engineering, Kansas State University, Durland Hall, 1701A Platt Street, Manhattan, Kansas, 66506-5102, U.S.A. https://core.ac.uk/download/pdf/84312607.pdf

[8] NPK: Will there be enough plant nutrients to feed a world of 9 billion in 2050? Jean-Paul Malingreau, Hugh Eva, Albino Maggio. JRC Science And Policy Reports; Foresight and Horizon Scanning Series 2012. And: Anticipation Study NPK - will there be enough plant nutrients to feed a world of 9 billions? Supply of and access to key nutrients NPK for fertilizers for feeding the world in 2050 -- Maria Blanco.pdf Author: María Blanco Fonseca, Universidad Politécnica de Madrid (UPM), Department of Agricultural Economics, ETSI, Agrónomos Avda., Complutense s/n, 28040 Madrid, Spain. https://esdac.jrc.ec.europa.eu/projects/NPK/Documents/Madrid_NPK_supply_report_FINAL_Blanco.pdf

> **"***Let me conclude on our joint work to help build financial systems that are future-proof … current levels of investment are not sufficient to support an environmentally sustainable economic system that fights climate change and resource depletion.*
>
> *The Action Plan aims to achieve a number of policy goals:*
>
> 1. *Reorient private capital flows towards sustainable investment in order to achieve sustainable and inclusive growth;*
>
> 2. *Manage financial risks stemming from climate change, resource depletion, environmental degradation and social issues".*

ZWAI believes that the E-PRTR should be revised so as to be in compliance with the recommended goals as stated by the Commission Vice President Maroš Šefčovič, and with the conclusions of the EPA STRIVE Research Report No 189 by Michael P. Ryan, Angela Boyce and Gary Walsh (quoted above). Such an amendment would be an appropriately targeted way to reduce nutrient losses to surface waters.

To summarise the reasons why we should not continue to waste nitrates into surface water and groundwater:

- About 2% of the world's energy resources are used just to make ammonia and nitrate fertilizer from coal and natural gas;
- this use of coal and natural gas contributes to the creation of greenhouse gases and every opportunity must therefore be taken to reduce emissions;
- our continuing dependency on natural gas to make ammonia and nitrogen fertilizer is therefore not sustainable, especially there is only enough natural gas in proven reserves to meet 58.6 more years of global production at present rates;
- we cannot simply move to burning coal to make ammonia when the natural gas supplies become un-economic, especially as coal is a much "dirtier" fuel from a climate perspective; and,
- our current fertilizer-making, food-growing, food-transporting, distribution supply system consumes too much oil and is emitting too much greenhouse gas emissions; and we must also reduce the "food miles" and encourage more local food production based on bio fertilizers.

Recovering dissolved nitrogen from wastewater would therefore save energy, and should be an additional priority for the revised E-PRTR. Nitrogen recovery would also have the benefit of reducing eutrophication of rivers, lakes and coastal waters.

6.2 Recovery and Re-use of Phosphorus

The second essential nutrient for plant growth is phosphorus, which is not only in increasingly short supply globally, but the phosphate-rich rock is mined in only a few countries. Without a supply of phosphate fertiliser, maintaining or current level of agricultural production would be impossible; therefore conserving, recovering and re-using phosphorus should be an additional key priority.

A relatively recent Irish EPA Research report which examined phosphorus recovery technologies in an Irish context provides the essential background to our recommendations:[9]

> "*Phosphate rock is geographically concentrated, with five countries (Morocco, China, Algeria, Syria and Jordan) controlling 85 – 90% of the world's remaining reserves. Furthermore, many sources of phosphate rock are in geopolitically sensitive regions"*;
>
> "*Approximately 220 million tonnes of phosphate rock are mined worldwide every year", and "the quantity of phosphate rock currently being mined to produce fertiliser is greater than the amount that can be replaced by the slow geological cycle"*;
>
> "*Estimates for when peak phosphorus will be reached range from 2030 to 2350, with approximately 2100 being thought the most likely"*;
>
> "*Society is currently dependent on phosphate rock to produce fertiliser and other phosphorus compounds. It is generally reported that approximately 80–90% of phosphate rock is used as fertiliser in agriculture"*;
>
> "*Current wastewater treatment approaches* [in Ireland] *are driven by water pollution concerns and are "treatment orientated" with emphasis on phosphorus removal to meet discharge requirements as opposed to recovery and recycling. A recovery-focused approach viewing phosphorus as a resource as opposed to a pollutant needs to be adopted"*;
>
> "*In a survey of 197 experts from 30 countries reported by Sartorius et al. (2012)*[10]*, 68% believe that additional political measures are necessary to establish phosphorus recycling"*; and,
>
> "*It is expected that phosphorus recovery will become an established process in industrialised countries over the next 20 years for economic reasons."*

[9] Michael P. Ryan, Angela Boyce and Gary Walsh, 2016. Identification and Evaluation of Phosphorus Recovery Technologies in an Irish Context; EPA Research Report No. 189; section 1.2, page 2; section 1.3, pages 3 and 4; and section 5, Conclusions, page 49).

[10] Christan Sartorius, Jana von Horn, and Felix Tettenborn, 2012. Phosphorus recovery from wastewater -- expert survey on present use and future potential; Water Environ Res. 2012 Apr;84(4): pp 313-22.

It is therefore clear from the above research report (and other sources which we have consulted) that a key priority of the revised E-PRTR should be to help reduce, and where possible to eliminate, the wasteful discharges of nitrogen and phosphorus from wastewater treatment systems. Urban wastewater treatment plants discharge significant quantities of dissolved nitrogen and phosphorus directly to watercourses, streams, rivers and lakes. Domestic wastewater treatment systems (e.g., septic tanks and packaged single-house systems) discharge directly to the soil and to groundwater, from where the nutrients migrate through the subsoil to nearby water bodies.

The future threat and "high-risk" of phosphate shortages and increasing fertilizer costs to the European farming economy and the misery of future unaffordable food prices in supermarkets should also have been acknowledged in the review by ICF of the implementation of the E-PRTR and related Guidance Document. The potential risk of high cost phosphate fertilizer and the eventual un-affordability of supermarket food prices is one of the "high-risk" consequences associated with mineral phosphorus depletion. As pointed out in the EPA STRIVE Research Report No. 189:[11]

> *"Phosphate rock is a limited non-renewable resource concentrated in a few countries and the supply is vulnerable to future scarcity, volatile pricing and geopolitical tensions. The economic importance and high supply risk of phosphate rock led to its inclusion in the European Union list of Critical Raw Materials in 2014. Phosphorus cannot be produced synthetically and has no substitute in food production. Owing to the dependence of food security on phosphorus availability and its potential to contribute to eutrophication in the receiving environment, there is a global need to promote more efficient use of phosphorus, as well as its recovery and reuse.*
>
> *Phosphorus recycling is supported by the Circular Economy Package published by the European Commission in 2015, which proposes measures to contribute to closing the loop of product lifecycles through increased recycling and reuse, with benefits for the environment and the economy. Almost all of the 3 million tonnes of phosphorus consumed in food per year by the global population enters the wastewater sector. Municipal wastewaters, therefore, represent a major point source from which to recover phosphorus and re-establish a circular economy.*
>
> *Current wastewater treatment approaches are driven by water pollution concerns and are "treatment orientated" with emphasis on*

[11] Identification and evaluation of phosphorus recovery technologies in an Irish context. EPA STRIVE Research Report 189. Prepared for the Environmental Protection Agency by University of Limerick. Authors: Michael P. Ryan, Angela Boyce and Gary Walsh. EPA Research Programme 2014–2020. Published by the Environmental Protection Agency, Ireland. October 2016.

phosphorus removal to meet discharge requirements as opposed to recovery and recycling. A recovery-focused approach viewing phosphorus as a resource as opposed to a pollutant needs to be adopted

The European Phosphorus Platform has produced some very useful information relevant to the case we are making for the conservation of phosphorus in the revised E-PRTR:[12]

"Phosphorus is essential for worldwide food security. This irreplaceable natural resource is being used up increasingly fast. The demand for phosphorus is growing and virtually all phosphorus rock is mined in countries outside of Europe.

In Europe, phosphorus is not being treated sustainably. It disappears from the food chain as animal manure, human excreta and organic waste. However, solutions are available. We invite you to our Phosphorus Platform to participate, collaborate and innovate.

Hardly any raw phosphorus is available in Europe

Raw phosphorus is obtained from mining phosphate rock. These mines are for the largest part located in Morocco, the US and China. In Europe hardly any raw phosphorus is available, except for a very small quantity in Finland.

Therefore, virtually all phosphorus in Europe has to come from outside Europe. Due to increasing welfare in Africa, Latin America and Asia and an ever increasing world population, the demand for phosphorus is growing. The dependency of Europe on raw phosphorus from outside Europe endangers our access and threatens our future food security.

Wasting phosphorus impacts the environment

In Europe, phosphorus is being treated in an unsustainable way. Through fertilizers, sewage and animal manure, large amounts of phosphorus and other nutrients end up in ground water and water bodies.

This is a direct threat for our aquatic ecosystems due to the process of eutrophication: increased levels of nutrients resulting in oxygen depletion. The impact on biodiversity is critical, since certain fish and other aquatic animal populations do not survive or invasive new species are introduced.

A phosphorus crisis affects us all

[12] European Phosphorus Platform – Facts.
https://www.phosphorusplatform.eu/links-and-resources/p-facts

Developing countries are already facing the negative effects of the phosphorus challenge. As prices of raw phosphorus rise, access to fertilizers becomes increasingly difficult and eventually causes soil degradation. The developing world is the first victim of shortage and will be hit hardest.

For European countries, several factors already pose a serious threat for the access to raw phosphorus. Political unrest and climate change in phosphorus mining countries exert pressure on price and export security in any scenario. In the end, exhaustion of phosphorus and consequently the shortage of food will lead to political turmoil, from strikes and demonstrations to migration and war.

Call to action: participate, collaborate, innovate

Without access to raw phosphorus, Europe will be unable to feed its population unless we start to recycle more phosphorus and using it less. It is vital that we do not wait and we start taking action today. This is how we can close the phosphorus value chain:

***Use less:** food for people and animals contains more phosphorus than necessary. The surplus of phosphorus disappears through human excreta, manure and solid waste.*

***Recycle more:** The surplus of phosphorus ending up in human excreta, manure and solid waste is currently wasted. We should aim for maximum recovery and re-use of phosphorus from those waste streams".*

Since 2015 the European Commission has been calling for the end of waste and the recycling of phosphorus. A recent example of the 2007 to 2008 fertilizer price crisis occurred when oil as well as phosphate price increases occurred at the same time. This same problem will inevitably occur again.

The image below shows the projected forecast of the world supply and the world demand for phosphorus rock:

- It assumes that the growing world population will continue to increase the international market demand for phosphorus;
- It assumes that the bio-fertilizer industry will not be fully developed adequately to meet world demand;
- It assumes that the recycling of phosphates from waste water and waste food generally will not be adequate; and,

- It assumes that the known projections of the availability of economically available resources are correct, and that no major significantly new mineral resources for phosphorus will be found.[13]

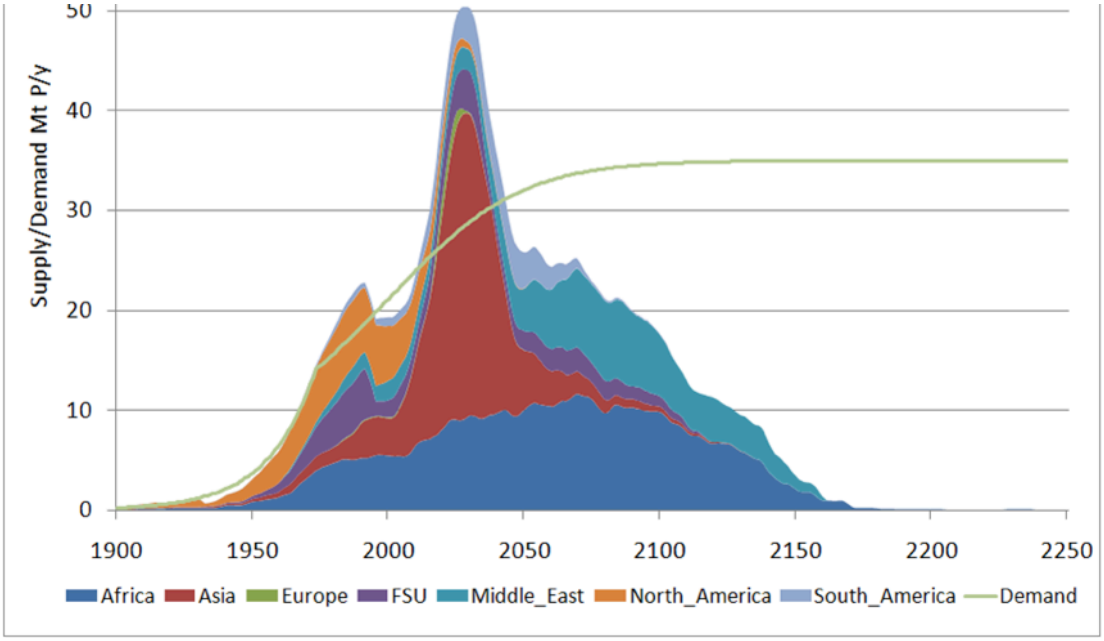

Figure 6.2 World supply and demand for phosphate rock

The above forecast shows a serious shortfall in the market supply of fertilizer to meet the growing world food demand by 2050. This would lead to increasing fertilizer and food costs. Increasing efficiency in commercial farm crop outputs might not increase fast enough to feed the world population that will still be growing. Under this not-enough-action scenario, poverty stricken nations and anyone on low incomes will eventually be struggling to buy increasingly unaffordable food.

A further paper, by Nikolay Khabarov and Michael Obersteiner, emphasises the links between the availability of phosphate fertilisers, market volatility, food insecurity, and political problems:

> *"The commodity market super-cycle and food price crisis have been associated with rampant food insecurity and the Arab spring. A multitude of factors were identified as culprits for excessive volatility on the commodity markets. However, as it regards fertilizers, a clear attribution of market drivers explaining the emergence of extreme price events is still missing. In this paper, we provide a quantitative assessment of the price spike of the global phosphorus fertilizer*

[13] New Projection Of Peak Phosphorus, by Steve Mohr and Geoffrey M. Evans, 05 September 2013. http://www.resilience.org/stories/2013-09-05/new-projection-of-peak-phosphorus/

> *market in 2008 focusing on diammonium phosphate (DAP). We find that fertilizer market policies in India, the largest global importer of phosphorus fertilizers and phosphate rock, turned out to be a major contributor to the global price spike".*[14]
>
> *"There was a global price spike for phosphate fertilizers in 2008 to 2018. More worrying is that some of the factors that caused this price increase are likely to cause a future more permanent global price increase. Phosphate depletion and its future increasing price, along with the increasing price of other key resources are all projected to rise at the same time as world population growth. This growing depletion of resources, this gradual increasing price for these key resources and this endless growth in market demand is therefore unsustainable".*[15]

In addition to the concern about shortages of phosphorus and increasing prices, a further problem is that only Morocco will eventually have the remaining economically viable phosphate rock deposits in the world. But these Moroccan deposits are already contaminated with cadmium and radioactive uranium, and this problem has already attracted concern in Europe:

> *"According to the current EU proposals, cadmium would be tightened from 60mg/kg to 40mg after three years and to 20mg after 12 years, which would require Morocco and most in Africa to invest in new technologies to lower the limits.*
>
> *Scandinavian countries together with Austria and the Baltic Republics are pushing for a lower cadmium level ranging from 20mg to 40mg, while a second group of countries, headed by Poland, Spain and U.K. are supporting much higher levels from 60mg to 90mg".*[16]

Dana Cordell who wrote the paper from which we quote below is correct – eventually the world will recognize the potential of using human urine as a "clean" source of nitrates and phosphates because it has none of the concerns caused by the quantities of toxic metals in phosphate rock.

> *"The quality of phosphate rock is declining for two reasons: the concentration of P205 in mined P rock is decreasing; and the concentration of associated heavy metals like Cadmium are increasing. The Cadmium content of phosphate rock can be very high. This is either considered a harmful concentration for application in agriculture, or, expensive and energy intensive to*

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[14] Global Phosphorus Fertilizer Market and National Policies: A Case Study Revisiting the 2008 Price Peak; by Nikolay Khabarov and Michael Obersteiner. Front Nutr. 2017; 4: 22. Published online 2017 Jun 14. doi: 10.3389/fnut.2017.00022.

[15] Nikolay Khabarov and Michael Obersteiner, op. cit.

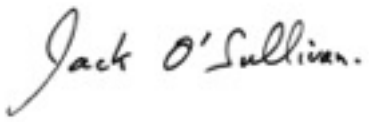
[16] Fertilizer hits the fan. The Commission's proposed new limits would oblige Morocco to heavily invest in technologies to remove cadmium https://www.politico.eu/article/europe-unexpected-conflict-the-phosphate-war-cadmium-fertilizer-russia/

remove (maximum concentrations for fertilizers exist in some regions, like Western Europe).”

Human excreta (urine and faeces) are renewable and readily available sources of phosphorus. Urine is essentially sterile and contains plant-available nutrients (P,N,K) in the correct ratio. Treatment and reuse is very simple and the World Health Organisation has published 'guidelines for the safe use of wastewater, excreta and grey water in agriculture'. More than 50% of the worlds’ population are now living in urban centres, and in the next 50 years 90% of the new population are expected to reside in urban slums. Urine is the largest single source of P emerging from human settlements.

According to some studies in Sweden and Zimbabwe, the nutrients in one person's urine are sufficient to produce 50-100% of the food requirements for another person. Combined with other organic sources like manure and food waste, the phosphorus value in urine and faeces can essentially replace the demand for phosphate rock. In 2000, the global population produced 3 million tonnes of phosphorus from urine and faeces alone.” [17]

ZWAI believes that the raw materials of nitrates and phosphates in domestic waste water that is currently going to waste in the ground must end. These nutrients should be better managed or transformed using separate treatment systems; to be recycled as a safe-to-use bio-fertilizer.



Jack O’Sullivan

Zero Waste Alliance Ireland

26 October 2020

[17] 8 reasons why we need to rethink the management of phosphorus resources in the global food system. http://phosphorusfutures.net/wp-content/uploads/2015/02/1_P_DCordell.pdf

European Commission (https://ec.europa.eu/info/index_en)

Law (http://ec.europa.eu/info/law_en)

Appendix 1

Industrial pollution – European Pollutant Release and Transfer Register (updated rules)

In preparation

Roadmap

Feedback period

28 September 2020 - 26 October 2020

Appendix 2

Feedback received on: Industrial pollution – European Pollutant Release and Transfer Register (updated rules)

Feedback (37)

Showing results 1 to 10

26 October 2020

Anonymous (/info/law/better-regulation/have-your-say/initiatives/12583-Industrial-pollution-revision-of-the-European-Pollutant-Release-and-Transfer-Register-/F806466)

Confederation of industry welcomes the proposal and accepts it as a next logical step towards better public access to relevant information in the field of environment. We understand this effort as a part of the currently ongoing review of the IED with some similar objectives in terms of the scope. In this regard we would like to emphasize a recent EEB activity which resulted in creating a web page both analysing and aggregating the...

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26 October 2020 | Business association

FNADE (France) (/info/law/better-regulation/have-your-say/initiatives/12583-Industrial-pollution-revision-of-the-European-Pollutant-Release-and-Transfer-Register-/F806370)

Feedback to the Revision of the Regulation on the European Pollutant Release and Transfer Register (E-PRTR) FNADE, the French waste management and environmental services private companies' association, welcomes the revision of the E-PRTR. Even though E-PRTR has given good results since 2007, the assessment studies have shown improvements were possible to tackle some weaknesses areas and this new initiative launched by the commission, which...

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26 October 2020 | Business association

The European Lime Association (EuLA) (Belgium) (/info/law/better-regulation/have-your-say/initiatives/12583-Industrial-pollution-revision-of-the-European-Pollutant-Release-and-Transfer-Register-/F805826)

The European Lime Association (EuLA) welcomes the opportunity to provide its feedback to the European Commission on the inception impact assessment, Regulation EC 166/2006. It is only through these assessments that regulations, such as the European Pollutant Release and Transfer Register, can be designed fit-for-purpose. Therefore, it is a priority for the lime sector to engage in a constructive dialogue with policymakers to ensure its...

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26 October 2020 | Environmental organisation

Suomen luonnonsuojeluliitto (Finnish Association for Nature Conservation) (Finland) (/info/law/better-regulation/have-your-say/initiatives/12583-Industrial-pollution-revision-of-the-European-Pollutant-Release-and-Transfer-Register-/F805653)

Suomen luonnonsuojeluliitto (The Finnish Association for Nature Conservation) is the oldest and biggest environmental non-governmental organization in Finland. We warmly welcome the E-PRTR and this work to develop it. This reporting system can help us to achieve EU environmental targets, SDGs etc. This type of reporting and monitoring is essential in this work. We think that the Aspect 1 (Baseline Scenario) is not enough. Inclusion of...

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26 October 2020 | Environmental organisation

Zero Waste Alliance Ireland (Ireland) (/info/law/better-regulation/have-your-say/initiatives/12583-Industrial-pollution-revision-of-the-European-Pollutant-Release-and-Transfer-Register-/F804774)

Zero Waste Alliance Ireland (ZWAI), established in 1999, is a Non-Government Environmental Organisation (eNGO). ZWAI has prepared and submitted to the Irish Government and to State Agencies many policy documents on waste management, and continues to lobby Government on the issue of using resources more sustainably, and on the implementation of the Circular Economy. The goal of Zero Waste, or environmentally sustainable materials management...

Appendix 3

Feedback from: Zero Waste Alliance Ireland

Feedback reference
F804774

Submitted on
26 October 2020

Submitted by
Jack O'Sullivan

User type
Environmental organisation

Organisation
Zero Waste Alliance Ireland

Organisation size
Micro (1 to 9 employees)

Country of origin
Ireland

Initiative
Industrial pollution – European Pollutant Release and Transfer Register (updated rules) (/info/law/better-regulation/have-your-say/initiatives/12583-Industrial-pollution-European-Pollutant-Release-and-Transfer-Register-updated-rules-)

Zero Waste Alliance Ireland (ZWAI), established in 1999, is a Non-Government Environmental Organisation (eNGO). ZWAI has prepared and submitted to the Irish Government and to State Agencies many policy documents on waste management, and continues to lobby Government on the issue of using resources more sustainably, and on the implementation of the Circular Economy.

The goal of Zero Waste, or environmentally sustainable materials management, requires as a basic principle, that human communities must behave like natural ones, living comfortably within the natural flow of energy from the sun and plants, producing no wastes which cannot be recycled back into the earth's systems, and guided by new economic values which are in harmony with personal and ecological values. The Zero Waste approach states that the only long-term sustainable solution is to completely eliminate the production of materials which cannot be re-used, recycled or naturally biodegraded. This will result not only in a saving of scarce resources, but will re-adjust our relationship to the earth's material assets from a linear to a cyclical one, enhancing our ability to live sustainably while reducing environmental damage.

The EU Inception Impact Assessment, Section B, Aspect 2, asks whether additional sectors or activities should be included in the E- PRTR in order to improve data capture on industrial releases/transfers. Our response is that all industrial-scale agricultural activities should be included, together with emissions or releases from municipal wastewater treatment plants, as the latter should be considered as sources of pollutants with significant environmental and public health effects. The PRTR should also capture data on toxic pollutants in widely marketed products; shops selling such products should be required to submit an annual return.

Section B, Aspect 3, asks whether additional pollutants should be included. Our response is that pharmaceutical substances, residues of such substances (e.g., partial breakdown or decomposition products), agricultural and horticultural chemicals, and releases of micro-plastics and nano-plastics in wastewater should be included; these are of recent and increasing concern, especially as some of these substances pass through municipal wastewater treatment plants, are found in rivers and lakes, and in drinking water supplies (e.g., glyphosate in drinking water in Ireland; nano-plastics in water).

Section B, Aspect 4, asks about access to information and participation in decision making. Our response is that the format of the existing PRTR reporting is not easy to understand, and difficult to read; and therefore the way in which information is presented should be improved to provide a clearer format, so as to make it more accessible to EU citizens without the benefit of scientific training. Even though the Aarhus Convention theoretically provides for participation in decision making, there is a lack of clarity about public participation in decisions which may result in changes in the release of pollutants, especially the release or emission of pollutants of recent and increasing concern, such as those we have mentioned in our response to Aspect 3 above.

Section B, Aspect 5, asks about reporting modalities. Our response is that current data on diffuse emissions and on pollutants of concern in widely distributed or marketed products are inadequate, and these data should be reported as part of the PRTR. For example, agricultural chemicals enter water from diffuse sources; while many products contain pollutants which are released when these products are flushed into municipal wastewater collection systems.

In response to Section B, Aspect 6, ZWAI firmly believes that the PRTR must contribute to the circular economy and to the aim of zero pollution. The PRTR should mandate the recovery of dissolved N and P in wastewater as vital components of the circular economy, instead of currently being wasted.