

ELLEN MACARTHUR FOUNDATION RECLASSIFIES INSULATED & PROTECTIVE EPS PACKAGING. RECYCLED AT SCALE AND IN PRACTICE!

The Ellen MacArthur Foundation reclassifies EPS insulated and protective packaging, based on submission of government data on EPS recycling rates. The data shows EPS is recycled at scale and in practice on a global level.

On January 8th, the Danish EPS Association shared data on global EPS recycling rates with the Ellen MacArthur Foundation (EMF).ⁱ

Among the data was government commissioned/ published reports documenting that EPS post-consumer packaging was recycled above 35% in the EU (incl. UK)ⁱⁱ, Japanⁱⁱⁱ and South Korea,^{iv} thereby proving that EPS packaging has been recycled globally at scale and in practice since at least 2018.

On February 9th, 2023, EMF met with the Danish EPS Association. Subsequent of the meeting EMF stated; *"The Ellen MacArthur Foundation (EMF) confirmed in a meeting on February 9th, 2023 between EMF and EPS-branchen/EUMEPS, that assuming the data provided by the EPS Industry are valid, they would show that EPS insulated and protective packaging meets the definition of 'recyclability in practice and at scale' used in the context of the Global Commitment's 2025 targets, as the data indicates it is recycled above 30% in multiple regions, collectively representing a population above 400 million people."* ^v (EPS-branchen italics and bold). Given this is official data, the

Key Insights

- Government reports document EPS post-consumer packaging has been recycled at scale and in practice in the EU, Japan, and South Korea since at least 2018.
- The Ellen MacArthur Foundation has confirmed receipt of data proving EPS insulated and protective packaging is recycled at scale and in practice on a global level.
- In the Plastics Initiative 2023 Recycling Rate Survey (published March 30th, 2023), the Ellen MacArthur Foundation no longer assesses that EPS insulated and protective packaging is non-recyclable.
- In the EU the EPS post-consumer packaging recycling rate is app. 40%, in North America the recycling rate exceeds 30%, while Japan, China and South Korea have recycling rates above 50%.
- After the EPS industry shared data with the Ellen MacArthur Foundation proving EPS insulated and protective packaging is recycled in practice and at scale for more than 2.6 billion people in 35 countries across three continents, then the Ellen MacArthur Foundation no longer claims that EPS is not recycled at scale and in practice.
- Applying Ellen MacArthur Foundation criteria, EPS post-consumer packaging is globally the second-most recycled packaging when measured by population.
- EPS insulated and protective packaging is effectively outside the scope of the EMAF Global Commitment, and going forward EMAF will no longer survey the recycling rate.
- Take away food packaging – regardless of material – is difficult to collect and recycle.

EPS Industry sees no reason to question the validity.

After this meeting and in the publication of the new recycling survey published by the **Ellen MacArthur Foundation**, the organisation **no longer claims that the EPS packaging categories insulated and protective are not recycled at scale and in practice.**^{vi}

EMF further stated: *“EMF did not verify all the submitted data by EPS Industry, nor included it in its recyclability guidance document for its Global Commitment signatories, given **EPS insulated and protective packaging is only a very marginal share of the plastic packaging of these signatories (significantly below 0.2%).**”*^{vii} (EPS-branchen italics and bold).

Consequently, EPS insulated and protective packaging is out of the scope of the work done by EMAF and its network of plastic pacts.

For the European Union, this assessment is subsequently verified by EUMEPS/Coversio report, “The EPS industry’s journey towards circularity – Progress report,” which finds EPS post-consumer recycling around 40% in the EU in 2021.^{viii} These findings align with the European Commission’s Joint Research Centre’s report; “Scoping possible further EU-wide end-of waste and by-product criteria”. In March 2022, the JRC writes; *“the polystyrene and expanded polystyrene stream, stakeholders reported higher recycling rates (a midrange recycling rate of 40% for polystyrene and expanded polystyrene)”* (EPS-branchen italics).^{ix}

EMF further stated in regards to data on EPS recycling; *“EMF encouraged the EPS Industry to continually gather recycling data in order to contribute to ever better data and transparency on EPS recycling rates.”*^x

The EPS Industry agrees and will continue to gather data on EPS recycling.

The Ellen MacArthur Foundation criteria

According to EMF;

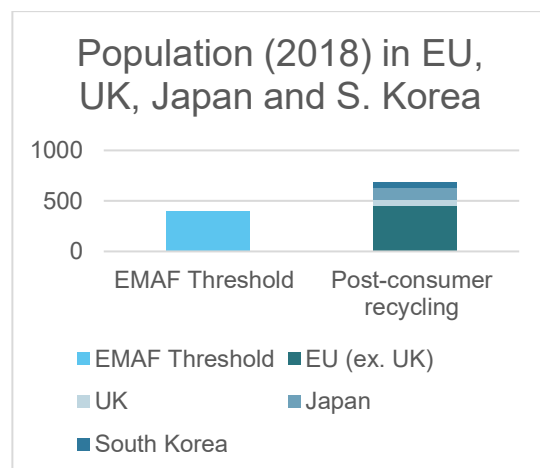
*“A packaging or packaging component is recyclable if its successful post-consumer collection, sorting, and recycling is proven **to work in practice and at scale.**”*^{xi} (EPS-branchen bold, EMF italics).

Furthermore, according to EMF, *“The test and threshold to assess if the recyclability of a packaging design is proven ‘in practice and at scale’ for the Global Commitment is: does that packaging achieve **a 30% post-consumer recycling rate in multiple regions, collectively representing at least 400 million inhabitants?**”*^{xii} (EPS-branchen italics and bold).

Finally, according to ISO 14021:2016 post-consumer materials are defined as; *“Material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain.”*^{xiii}

EPS recycling rates surpass the Ellen MacArthur Foundation criteria by 650%

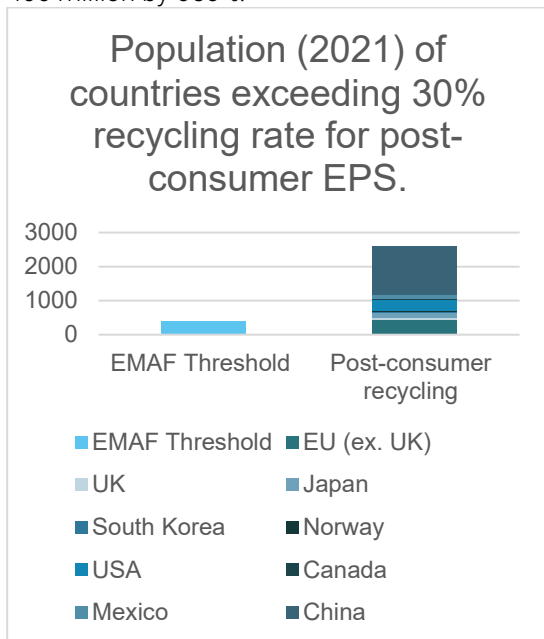
Government data documented EPS recycling rates surpassing 35% in the EU+UK^{xiv}, South Korea and Japan by 2018.



Data was further shared from the Norwegian EPR scheme proved EPS recycling rate exceeding 70%, while new data shows an even higher recycling rate of 87,4%.^{xv} Finally, data was shared from EPS Industry Associations documenting recycling rates above 50% in China,^{xvi} Denmark, Portugal, the Netherlands, Belgium, Austria and Ireland. While data showing recycling rates above 30% in the United States was also shared.^{xvii}

Subsequently, on March 28, 2023, a new study from EPS-IA was shared with EMF via mail showing EPS post-consumer recycling rates of at least 30% in North America (USA, Canada and Mexico).^{xviii} The North American data has been updated to align with the ISO-definition of post-consumer, where previous EPS-IA reports applied US EPA definition of post-consumer, which is limited to household waste.

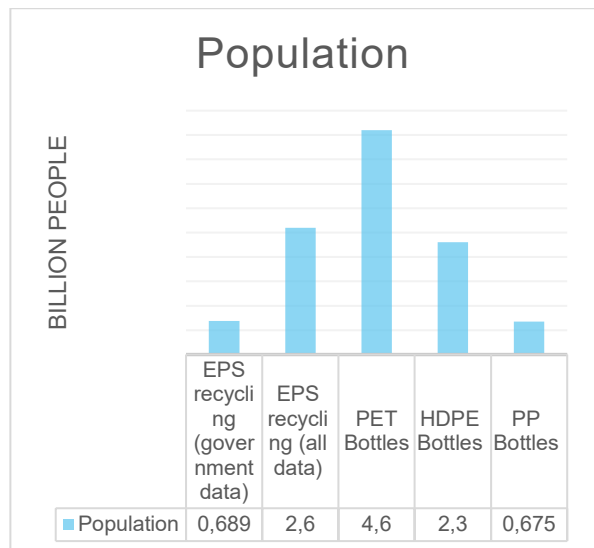
Data shared with EMF documents, via government sources recycling rate exceeding 30% in 30 countries in two regions with a population of 689 million in 2018, while all data submitted showed EPS post-consumer recycling in 35 countries in three global regions and covering a population of at least 2.6 billion people, thereby surpassing the EMF criteria of 400 million by 650%.



For 11 of these countries, the recycling rate exceeded 50%, and the population of these countries exceeded 1.7 billion people.

EPS: Second most recycled packaging globally (by population).

When comparing the population of above-mentioned countries with the assessment of recycling for other packaging materials published by EMF in the 2023 Survey, then EPS post-consumer recycling is the second most recycled plastic packaging measured by population.^{xix} If only looking at the government data and population for 2018, then EPS is the third most recycled packaging material.



Ellen MacArthur Foundation Survey Methodology.

In 2022 EMF published, “The Ellen MacArthur Foundation’s Plastics Initiative 2022 Recycling Rate Survey results summary.”^{xx} According to EMAF the survey “received a total of 30 responses from 33 organisations.” These responses gave a total of 63 data sets for countries and regions.

Given the limited number of respondents, and the documented errors made by the survey respondents, as well as the Survey Disclaimer,

then it should be clear that the Survey cannot be used to disprove material recycling. A Global Survey with 30 responses can only be used to prove recycling rates of certain packaging occurs at scale but cannot be as the basis of disproving recycling.

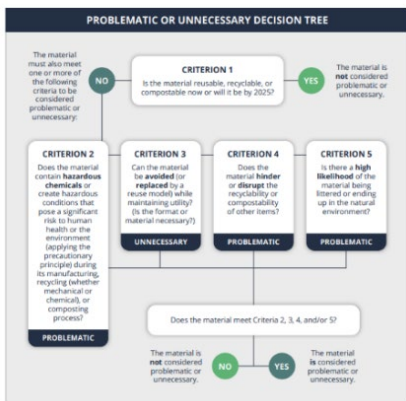
Applying EPS recycling data to assess recyclability and evaluate on “problematic and unnecessary”-criteria.

Given that EPS insulated and protective packaging “is only a very marginal share of the plastic packaging” covered by the EMF and Plastic Pact network,^{xxi} it can be argued that assessing the EPS through the EMF criteria is not applicable.

That being said the EMF Survey is designed to “help in the assessment of whether the recyclability of a given category of plastic packaging is proven, ... [to] s the Global Commitment signatory group and Plastic Pacts in the network.” (EPS-branchen italics).^{xxii}

To further assist in this evaluation a number of the plastic parts have developed decision trees to evaluate whether plastic packaging is “problematic and unnecessary” and hence should be faced out and/or banned.^{xxiii}

See the decision tree of the US Plastic Pact below:^{xxiv}



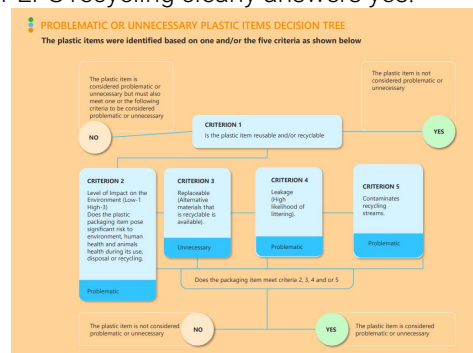
Criterion 1 reads; “It is reusable, recyclable, or compostable by 2025.2 Reusable, recyclable,

and compostable will be assessed in accordance with the U.S. Pact Definitions.”^{xxv}

The US Plastic Pact definition for e.g. Post-Consumer is fully aligned with the interpretation presented in this document; “Proportion, by mass, of postconsumer (1) recycled material in a product or packaging. Note 1. ISO14021’s usage of the term clarifies postconsumer material as material generated by households or by commercial, industrial and institutional facilities in their role as end users of the product which can no longer be used for its intended purpose. This includes returns of material from the distribution chain. Source: ISO 14021:2016 modified, Environmental labels and declarations – Self-declared environmental claims (Type II environmental labeling), Usage of terms, modified (focus on postconsumer recycled material)” (EPS-branchen italics, US Plastic Pact bold).^{xxvi}

Since EPS post-consumer packaging is recycled above 30% in North America (US, Canada and Mexico), then EPS packaging is “not considered problematic or unnecessary,”^{xxvii} when applying the US Plastic Pact decision tree. This is regardless of whether one applies the global recycling data or the North American recycling data.

The same decision tree approach (below) is applied by the Kenyan Plastic Pact, where criterion 1 is; “Is the plastic item reusable and/or recyclable?”.^{xxviii} Again, the global data for EPS recycling clearly answers yes.



According to the South African Plastic Pact, EPS packaging is not included in their “problematic and unnecessary list,”^{xxxix} while the Portuguese Plastic Pact finds the following problematic and unnecessary; “Expanded polystyrene packaging, including both takeaway (clamshells and cups) and other packaging (e.g. used for meat or vegetables).”^{xxx} The Portuguese Plastic Pact seems aligned with EPS packaging regulated by the Single Use Plastics Directive..

The UK Plastic Pact defines the following as problematic and unnecessary; “**All polystyrene packaging** – polystyrene is not recycled in the UK despite often being used for food takeaway containers and yogurt pots.” (EPS-branchen italics, original bold).^{xxxi} It is noteworthy that the UK Plastic Pact refers to food takeaway and yogurt pots, while not mentioning e.g. electronics, furniture packaging or fish boxes. In short not protective or insulated EPS packaging, which are also effectively outside the scope of the Global Commitment.

EPS recycling on every inhabited continent.

Collecting EPS recycling data is challenging as desk research as EPS is often referred to using different brand names. In Denmark, it is called Flamingo, while it is called Isopor in Norway, Frigolit in Sweden, and Styropor in Germany. And in the United States and many English-speaking countries it is often called Styrofoam, which is incorrect as Styrofoam is a brand name for XPS. And in working on further data gathering, it has been possible to find additional sources for EPS recycling.

South America: Brazil.

According to an article published by Ambipar titled; “*From villain to runner-up in recycling, Styrofoam is circulating again.*” EPS recycling is the second most recycled plastic in Brazil.

The article states: “According to Abiquim (Brazilian Association of the Chemical Industry), the country produced, last year, 119.6 thousand tons of EPS, a volume that grows year by year, a good part of which is exported. Recently released data show that, among the different types of post-consumer recycled plastics, **EPS is second only to PET in recycling percentage: in 2020, the index was 30.9% of everything that is produced** (in the case of for PET).” (EPS-branchen bold)^{xxxii}

This means that EPS is also recycled at scale and in practice in Brazil, meaning that this occurs in 36 countries with a population of 2.8 billion people on four separate continents.

Africa: South Africa

EPS is also recycled widely in Africa.

According to an article in South African Polymer Technology only 1.849 tons of EPS were recycled in 2013, however this had tripled to more than 6.300 tons in the 2017-2018 financial year. And there are concrete plans to increase recycling rate to achieve recycling rates of above 60% by 2023. ^{xxxiii}

In 2019 the recycling volumes had increased to more than 6.600 tons,^{xxxiv} and at least one of the projects planned was launched in 2021 increasing recycling volumes by an additional 300 tons.^{xxxv} It is unclear what the current recycling rate is for EPS in South Africa, however the South African PRO wrote in a recent article about EPS (March 2, 2023); “Many people believe the material is difficult or impossible to recycle and that using it is bad for the environment. **In reality, polystyrene is 100% recyclable and relatively clean to manufacture, and South Africa has a thriving polystyrene recycling industry**”^{xxxvi} (EPS-branchen bold). So, while EPS may or may not have achieved recycled at scale and in practice percentages of 30% in South Africa, it can only be a matter of time.

Africa: Nigeria

Evidence is further found of informal recycling of EPS in Nigeria, where studies focus on plastics recycling. One study identifies polystyrene as a material of value in the informal recycling sector.^{xxxvii} Another study titled; "A mini-review on expanded polystyrene waste recycling and its applications," looked only at EPS recycling.^{xxxviii}

A country such as Nigeria would likely be able to gain similar economic growth options from EPS recycling as has been in South Africa. This may actually be the case in multiple African nations, should the succeed in creating a structure similar to south Africa, where the material is recycled into products sold to the South African market.

Oceania: New Zealand

Recycling of EPS also occurs in New Zealand. According to Green Business HQ; "There are at least thirty six locations around New Zealand where you can access commercial Expanded Polystyrene recycling services. ... **Expanded Polystyrene is fully recyclable! It is easily compacted, then reground and melted to form new products like pens, coat hangers, picture frames and engineered timbers.**" (EPS-branchen, bold).

A challenge in Africa is that there seems to be a lot of informal and unregistered recycling.

Europe: Switzerland

According to the Plastic Recyclers Association in Switzerland, the recycling rate for EPS is above 90% in their monitoring report for 2021.^{xxxix} This brings EPS recycling at scale and in practice up to 38 countries.

Asia: India

According to data shared by the Indian EPS association recycling rates for EPS protective

and insulated packaging also exceeds 30% in India.^{xl}

Conclusion:

EPS protective and insulated packaging is essentially not used for goods that are covered by the global commitment. The use of these types of EPS packaging within the EMF framework, is so limited that EMF does not include the material in the recycling survey.

EPS packaging is globally recycled at scale and in practice., and when applying the decision tree approach applied by various plastic pacts, then this type of **EPS packaging is not considered problematic nor unnecessary.**

Some plastic pacts are clearly singling out EPS and other polystyrene household food contact and take-away packaging, while not addressing the protective or insulated packaging, which is recycled at scale and in practice.

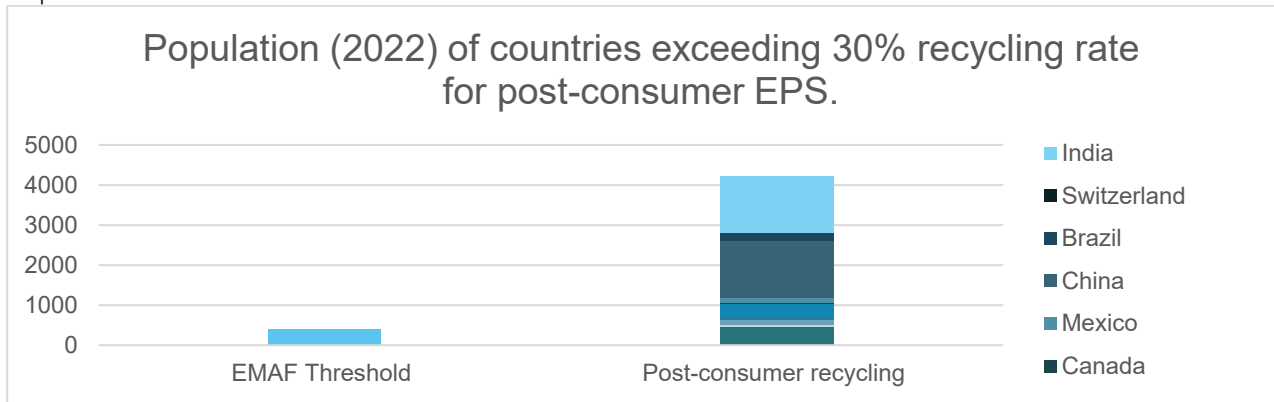
Just like recycling cardboard pizza trays, it is challenging to recycle EPS take-away packaging. However, this is a very limited amount of the total EPS packaging, as also agreed by EMF.

In 2022 EPS recycling was not limited to a few countries, it was widely recycled with recycling at scale and in practice in at least 38 countries with a total population of more than 4.2 billion people. And in 2023 South Africa may be country number 39, which would make EPS recycled in practice and at scale on 5 out of 6 inhabited continents.

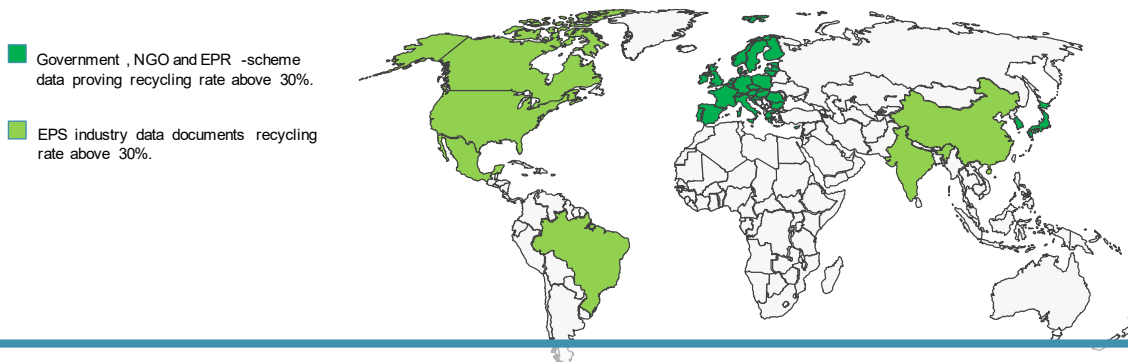
With a population of 4.2 billion living in countries where EPS is recycled at scale and in practice, then EPS exceeds the EMF criteria ten-fold and almost matches PET-bottles, where recycling covers countries with a population of 4.6 billion.

Three figures illustrate the wide range of EPS recycling globally.

The population of countries where EPS is recycled at scale and in practice compares to EMF requirements.



The countries, which were identified as having achieved recycling at scale and in practice in illustrated below.

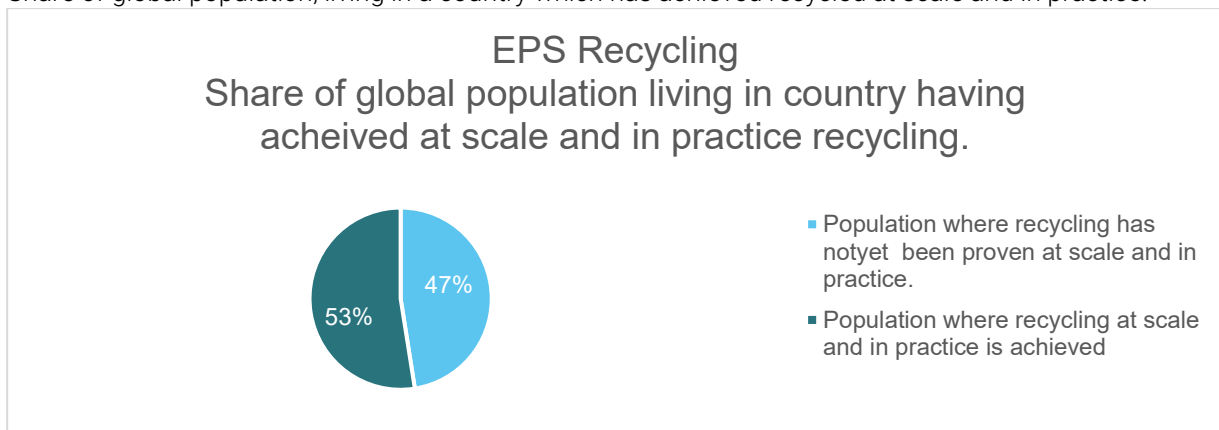


In 38 countries, with a population of 4.2 billion people and spanning four continents the post-consumer recycling rate for insulated and protective EPS packaging exceeds 30%.

This means EPS packaging meets the criteria for recycled at scale and in practice as defined by the Ellen MacArthur Foundation and proposed by the United Nations Environmental Programme

The EPS Industry has shared both government reports, NGO, data and EPR scheme data, as well as industry surveys with the Ellen MacArthur Foundation. They have confirmed that the presented data shows EPS meets the global commitment criteria. In fact the government reports shared alone documented that the recycling criteria was met

Share of global population, living in a country which has achieved recycled at scale and in practice.



Sources:

If italics or bold is changed in a quote, it is mentioned in parentheses after the quote. Note

ⁱ Email sent to the Ellen MacArthur Foundation on January 8th, 2023. The data shared was published on the Danish EPS Association website on December 23rd, 2022: <https://eps-airpop.dk/2022/12/global-genanvendelse-af-eps/>

& <https://eps-airpop.dk/wp-content/uploads/2022/12/Global-recycling-of-EPS-december-2022.pdf>

ⁱⁱ Survey of polystyrene foam (EPS and XPS) in the Baltic Sea; Danish Fisheries Agency; Ministry of Environment and Food of Denmark, 2019.

https://mfvm.dk/fileadmin/_migrated/content/uploads/Survey_of_EPS_in_the_Baltic_Sea_final.pdf

ⁱⁱⁱ METI report (<https://www.meti.go.jp/policy/recycle/main/data/pamphlet/pdf/handbook2021.pdf>) and Statista;

<https://www.statista.com/statistics/1207696/japan-styrofoam-recycling-rate/>

^{iv} The recovery of Expanded Polystyrene in Australia: Current Situation and Future Opportunities 2018.

https://www.helenmilicer.com/wp-content/uploads/2018/12/2017-18_EPS_PublicReport_OnePlanetConsulting.pdf

^v Email sent on April 17th, 2023.

^{vi} The Ellen MacArthur Foundation's Plastics Initiative 2023 Recycling Rate Survey results summary:

<https://emf.thirdlight.com/link/m9ablpb8rt0-n91rez/@/preview/2>

^{vii} Email sent on April 17th, 2023.

^{viii} <https://eumeps.org/wp-content/uploads/2022/11/the-eps-industry-s-journey-towards-circularity-progress-report-final.pdf>

^{ix}

https://publications.jrc.ec.europa.eu/repository/bitstream/JRC128647/JRC128647_01.pdf

^x Email sent on April 17th, 2023.

^{xi} The Ellen MacArthur Foundation's Plastics Initiative 2023 Recycling Rate Survey results summary:

on source links. All links verified on April 3-5, 2023. Links related to additional countries added April 26-28, 2023.

<https://emf.thirdlight.com/link/m9ablpb8rt0-n91rez/@/preview/2>

^{xii} Lic.

^{xiii} ISO 14021:2016(en)

Environmental labels and declarations – Self-declared environmental claims;

<https://www.iso.org/obp/ui/#iso:std:iso:14021:en>

^{xiv} Note that due to Brexit, January 2020. The UK population is included in the EU population in 2018. Here the UK is shown separately.

^{xv} Grønt Punkt Norge:

<https://www.grontpunkt.no/resirkulering/fakta-og-tall>

^{xvi} Note for China the recycling company INTCO reports somewhat lower recycling rate of 30%. Still meeting the EMAF threshold.

INTCO: <https://www.intcorecycling.com/How-to-Recycle-Packaging-Material.html> & Green Max: <https://www.intcorecycling.com/How-to-Recycle-Packaging-Material.html>

^{xvii} EPS-branchen Global Genanvendelse af EPS, 2022; <https://eps-airpop.dk/wp-content/uploads/2022/12/Global-recycling-of-EPS-december-2022.pdf>

^{xviii} Email correspondence. EPS-IA Recycling Survey 2019 updated version to align with ISO definitions of post-consumer.

^{xix} The Ellen MacArthur Foundation's Plastics Initiative 2023 Recycling Rate Survey results summary:

<https://emf.thirdlight.com/link/m9ablpb8rt0-n91rez/@/preview/2>

^{xx} *The Ellen MacArthur Foundation's Plastics Initiative 2022 Recycling Rate Survey results summary.* <https://emf.thirdlight.com/link/9krbr5pejly5-bxr1j6/@/preview/2>

^{xxi} Email sent on April 17th, 2023.

^{xxii} Lic.

^{xxiii} From US. Plastic Pact website;

<https://usplasticspact.org/problematic-materials/>

^{xxiv} From US. Plastic Pact website;

https://usplasticspact.org/wp-content/uploads/dlm_uploads/2022/01/U.S.-Plastics-Pact-Problematic-Unnecessary-Materials-Report-1.25.2022.pdf

^{xxv} Lic.

^{xxvi} From US. Plastic Pact website;

<https://usplasticspact.org/definitions/>

^{xxvii} From US. Plastic Pact website;

https://usplasticspact.org/wp-content/uploads/dlm_uploads/2022/01/U.S.-Plastics-Pact-Problematic-Unnecessary-Materials-Report-1.25.2022.pdf

^{xxviii} Kenyan Plastic Pact: <https://kpp.or.ke/wp-content/uploads/2022/11/KPP-TARGET-1-PRIORITY-LIST-1.pdf>

^{xxix} South African Plastic Pact website;

https://www.saplasticspact.org.za/wp-content/uploads/2021/07/SAPlasticPact_Publication_UnnecessaryItems.pdf

^{xxx} Lic.

^{xxxi} UK Plastic Pact, via WRAP:

<https://www.wastepackgroup.co.uk/2019/06/26/wrap-identify-eight-problematic-and-unnecessary-single-use-plastics-to-be-eliminated-by-pact-members-by-the-end-of-2020/>

^{xxxii} <https://ambipar.com/uk/news/from-villain-to-runner-up-in-recycling-styrofoam-is-circulating-again/>

^{xxxiii} <https://sapt.co.za/polystyrene-association-plans-to-increase-collection-recycling-rate-of-post-consumer-ps/>

^{xxxiv}

<https://infrastructurenews.co.za/2020/11/18/polystyrene-recycling-in-sa-increased-by-19-during-2019/>

^{xxxv}

<https://www.goodthingsguy.com/environment/first-polystyrene-recycling-hub/>

^{xxxvi} <https://www.ewasa.org/the-state-of-polystyrene-recycling-in-south-africa/>

^{xxxvii}

<https://www.sciencedirect.com/science/article/pii/S2772427121000036>

^{xxxviii} <https://wjaets.com/content/mini-review-expanded-polystyrene-waste-recycling-and-its-applications>

^{xxxix} https://www.plasticrecycler.ch/wp-content/uploads/2022/07/Monitoringbericht_2022.pdf

^{xl} Email correspondance.