Plastics Pipe Institute
The Voice of an Industry.

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Sustainability Definitions

1) **Advanced recycling -** processes that convert post-use polymers and recovered feedstocks into basic hydrocarbon raw materials, feedstocks, chemicals, waxes, lubricants, and other products through processes that include pyrolysis, gasification, depolymerization, solvolysis, catalytic cracking, reforming, hydrogenation, and other similar technologies. The products produced from advanced recycling include, but are not limited to, monomers, oligomers, plastics, plastics and chemical feedstocks, basic and unfinished chemicals, crude oil, naphtha, waxes, lubricants, coatings, and other basic hydrocarbons. Advanced recycling is not incineration, combustion, energy recovery, material recovery, or treatment

2) **Biomass** - Biomass means non-fossilized and biodegradable organic material originating from plants, animals and/or micro-organisms, including products, by-products, residues and waste from agriculture, forestry and related industries as well as the non-fossilized and biodegradable organic fractions of industrial and municipal wastes, including gases and liquids recovered from the decomposition of non-fossilized and biodegradable organic material

3) **Bioplastic –** plastics that are either:
    a) made from a renewable resource such as corn or sugar cane (biologically derived), or
    b) break down completely via a natural process (biodegradable), or
    c) are both biologically derived and biodegradable

4) **Bio-polymer** - a set of polymers, distinct from traditional plastics, that are biologically derived and biodegradable

5) **Built Environment** – Structures, infrastructure, and landscapes constructed or modified for human purposes

6) **Carbon footprint –**measurement of the total greenhouse gas emissions generated by a product from extraction of raw materials to end-of-life. It is measured in carbon dioxide equivalents (CO_2e)

7) **Circularity –** economic, technical, and environmental systems that aim to eliminate waste and maximize the reuse of resources

8) **Circular Economy -** economy that uses a systems-focused approach and involves industrial processes and economic activities that—
    a) are restorative or regenerative by design;
    b) enable resources used in such processes and activities to maintain their highest values for as long as possible; and
    c) aim for the elimination of waste through the superior design of materials, products, and systems (including business models)

9) **Circular Manufacturing -** regenerative model in which products and materials are kept within the economy through recovery processes including reuse, repair, refurbishment, remanufacturing and recycling

10) **Durable Good -** Tangible products that can be stored or inventoried and that have an average life of at least three years

11) **Embodied Carbon -** *greenhouse* gas emissions arising from the manufacturing, transportation, installation, maintenance, and disposal of building materials.

12) **EPD -** Type III environmental declarations that presents quantified environmental information on the life cycle of a product to enable comparisons between products fulfilling the same function. Such declarations
    a. are provided by one or more organizations
    b. are based on independently verified life cycle assessment (LCA) data, life cycle inventory analysis (LCI) data or information modules in accordance with the ISO 14040 series of standards and, where relevant, additional environmental information
    c. are developed using predetermined parameters, and
    d. are subject to the administration of a program operator, such as a company or a group of companies, industrial sector or trade association, public authorities or agencies, or an independent scientific body or other organization.

13) **ESG -** stands for Environmental Social and Governance and refers to the three key factors when measuring the sustainability and ethical impact of an investment in a business or company. It is a generic term used in capital markets and commonly used by investors to evaluate the behavior of companies, as well as determining their future financial performance

14) **Greenhouse Gas** – gasses that warm the Earth by absorbing energy and slowing the rate at which the energy escapes to space. Different GHGs can have different effects on the Earth's warming

Green House Gas (GHG)	Greenhouse Warming Potential (GWP)	Typically Recognized Sources
Carbon Dioxide – CO_2	1.0	- Combustion of fossil fuels - Industrial process technologies - Electricity generation
Methane – CH_4	25.0	- Agriculture -Emission associated with fossil fuel production, storage and transportation - Landfills
Nitrous Oxide – N_2O	298.0	- Agriculture - Fossil fuel combustion - Industrial production technologies - Wastewater processing
Perfluorocarbons – PFC's	~ 12,000	- Refrigerants - Aerosol/propellants - Various metals production - Semiconductor and electronics production - Electricity transmission and distribution
Hydrofluorcarbons – HFC's	~ 14,000	
Nitrogen trifuoride -NF_3	~ 17,000	
Sulfur hexafluoride – SF_6	~ 22,800	

15) **Green power -** a subset of renewable energy. It represents those renewable energy resources and technologies that provide the greatest environmental benefit. Within the U.S. voluntary market, green power is defined as electricity produced from solar, wind, geothermal, biogas, eligible biomass, and low-impact small hydroelectric sources

16) **LCA (Life cycle assessment)** - a method of evaluating a product by reviewing the ecological impact over the life of the product.
Discussion – At each stage, the product and its components are evaluated based upon materials and energy consumed, and the pollution and waste produced. Life stages include extraction of raw materials, processing and fabrication, transportation, installation, use and maintenance, and reuse/recycling/disposal. ISO 14040 defines LCA as the compilation and evaluation of the inputs, outputs, and the potential environmental impacts of a product system throughout its life cycle

17) **Net Zero** - consuming only as much energy as produced, achieving a sustainable balance between water availability and demand, and eliminating solid waste sent to landfills

18) **Post–Consumer** – refers to materials that are reclaimed from products that have already served their intended end-use as consumer item

19) **Pre-Consumer** - (also referred to as Post-Industrial) material that's recycled after the manufacturing process, but before reaching consumers. Post-industrial recycled content may come from material trimmings, byproducts, or defective items produced in the manufacturing process

20) **Post-Industrial –** (also referred to as Pre-Consumer) material that's recycled after the manufacturing process, but before reaching consumers. Post-industrial recycled content may come from material trimmings, byproducts, or defective items produced in the manufacturing process

21) **Recycle –** convert waste into reusable material

22) **Renewable Energy -** fuel sources that restore themselves over short periods of time and do not diminish. Such fuel sources include the sun, wind, moving water, organic plant and waste material (eligible biomass), and the earth's heat (geothermal)

23) **Renewable Resources -** resources that have the potential to be replaced over time by natural processes

24) **Repair** – to restore to a sound or good state after wear, partial destruction, or damage

25) **Repairable** – A state in which normal repair is reasonable from a standpoint of cost, accessibility, and technical involvement

26) **Reprocess -** to put a material that has been used through another industrial process to change it so that it can be used again

27) **Resilience -** Ability to prepare and plan for, absorb, accommodate, recover from, or more successfully adapt to actual or potential adverse events as appropriate for the importance of the site

28) **Rework Plastic –** a plastic from a manufacturer's own production that has been reground or pelletized for reuse by that same manufacturer

29) **Risk** - effect of uncertainty on objectives

30) **Single Use Plastic -** products typically intended to be used just once or for a short period of time before being disposed of

31) **Sustainability -** Ability of a product or system to achieve a context-specific balance between environmental health, economics, and societal considerations

References:

1. *Law Insider www.lawinsider.com*
2. *US EPA*
3. *modified version of Plastics Industry Association www.plasticsindustry.org*
4. *Closed Loop Partners "Navigating Plastic Alternatives in a Circular Economy pg. 15*
5. *ASTM E2432*
6. *Carbon Trust www.carbontrust.com*
7. *circularity.com*
8. *Save Our Seas 2.0 Act*
9. *Executive summary, pg. v, Fostering a Circular Economy of Manufacturing Materials Workshop Report, February 2023, NIST*
10. *US Bureau of Economic Analysis www.bea.gov*
11. *Carbon Leadership Forum www.carbonleadershipforum.org*
12. *ISO 14025 Environmental labels and declarations – Type III environmental declarations – Principals and procedures*
13. *Market Business News www.marketbusinessnews.com*
14. *modified EPA, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials#:~:text=Greenhouse%20gases%20(GHGs)%20warm%20the,effects%20on%20the%20Earth's%20warming*
15. *US EPA*
16. *ASTM E2114-19*
17. *EPA www.epa.gov/water-research/net-zero*
18. *ASTM E2114-21*
19. *Materials Bank www.knowledgebank.materialbank.com*
20. *Materials Bank www.knowledgebank.materialbank.com*
21. *Oxford Languages*
22. *US EPA https://www.epa.gov/green-power-markets/what-green-power#:~:text=Renewable%20energy%20includes%20resources%20that,the%20earth's%20heat%20(geothermal)*
23. *Oregon State https://forages.oregonstate.edu/nfgc/eo/onlineforagecurriculum/instructormaterials/availabletopics/environmentalissues/resource*
24. *ASTM E2135*
25. *ASTM E2135*
26. *Cambridge Dictionary*
27. *TRB AFF70(2) Resilient and Sustainable Buried Structures Subcommittee*
28. *ASTM F412*
29. *ISO Guide 73:2009(en)*
30. *Directive (EU) 2019/904 of the European Parliament and of the Council, June 5, 2019*
31. *Modified version of TRB AFF70(2) Resilient and Sustainable Buried Structures Subcommittee*