Life Is On | Schneider Electric

Guide to Assess a Commercial Product's Sustainability

White Paper 70

Version 1.1

Energy Management Research Center

by Victor Avelar and Raymond Lizotte

Executive summary

As more companies and consumers seek to reduce and report on their environmental footprint, vendors are responding with claims of environmentally sustainable products. Assessing the environmental sustainability of a product is complex and claims are difficult to ascertain without knowing the underlying assumptions and standards upon which they are made. This guide explains international standards for product environmental labels and declarations that help with product assessments. We then discuss how to read a product's environmental declaration document that helps quantify its sustainability performance. Finally, we provide guidance for how to accurately assess the environmental sustainability of similar products, providing confidence that your buying decisions are in fact reducing your organization's environmental footprint.

RATE THIS PAPER ★★★★★

Introduction

Company leaders, sustainability departments, and procurement departments are striving to improve and report on the environmental sustainability of their businesses. The products (and services) a company buys play an important role in the company's environmental sustainability goals in terms of its Scope 1, 2, and 3 CO_2e emissions. Consequently, manufacturers are responding with claims of environmentally sustainable products. Assessing the environmental sustainability of a product is complex and claims are difficult to ascertain without knowing the underlying assumptions and standards upon which they're made. This has led to questionable advertisements and claims of "green" products known as "greenwashing", as illustrated further in Figure 1. Unfortunately, the practice can undermine a decision maker's confidence that the product they're buying is in fact lowering their environmental footprint.[1,2,3,4] **While there are other environmental impacts like water use and contribution to mineral resources depletion, this guide focuses mainly on carbon emissions as a means of assessing a product's environmental sustainability.** Different types of products are assessed differently in this regard, therefore this guide relates specifically to electrical and electronic equipment (EEE) and heating, ventilation, and air conditioning (HVAC) products.

Figure 1

The image of a green earth symbolizes a green product claim (i.e., it's good for the planet), but under the surface the product is not green (i.e., it's filled with plastic). Advertisements with claims that are too good to be true, are overstated, or misguided are likely examples of greenwashing.

Also in this guide, we describe international standards for product environmental labels and declarations that help with product assessments. We then explain how to read a product's environmental declaration document that helps quantify its sustainability performance. Finally, we provide guidance on accurately assessing the environmental sustainability of similar products, giving you confidence that your buying decisions are truly reducing your organization's environmental footprint.

Standards that help with product assessments

Product manufacturers have a significant impact and influence on a product's environmental footprint. There are different ways a manufacturer can improve their product's environmental footprint throughout the product life cycle, including end-of-life. For example, a manufacturer could purchase renewable energy to run its factories, design products to use less plastic and metal, use smaller and more efficient components like wide-bandgap semiconductors, produce packaging from recycled materials, offer take-back programs for end-of-life products, and many other practices. The question becomes: **how does someone assess and validate that**

[1] FashionUnited, *42 percent of companies exaggerate sustainability claims, says new report*, 2/2021

[2] Adweek, *Brands Hit With Guidelines to End Greenwashing Amid Consumer Skepticism on Sustainability*, 4/2022

[3] The Intercept, *Bottled Water Giant BlueTriton Admits Claims of Recycling and Sustainability Are "Puffery"*, 4/2022

[4] TFL, *H&M is Being Sued Over "Misleading" Sustainability Marketing, Product Scorecards*, 7/2022

one product is more environmentally sustainable than another? The answer lies in environmental labels and declarations and their underlying *globally recognized standards.*

The International Organization for Standardization (ISO) is one of the most recognized standards bodies in the world. In the manufacturing industry it's well known for its ISO 9000 quality management standards. Similarly, in the environmental community it's known for its ISO 14000 environmental standards. These standards provide the basis for understanding the environmental sustainability labels a manufacturer applies to its products. In this paper we describe three pertinent labels:

- Type I environmental labels
- Type II environmental labels
- Type III environmental declarations

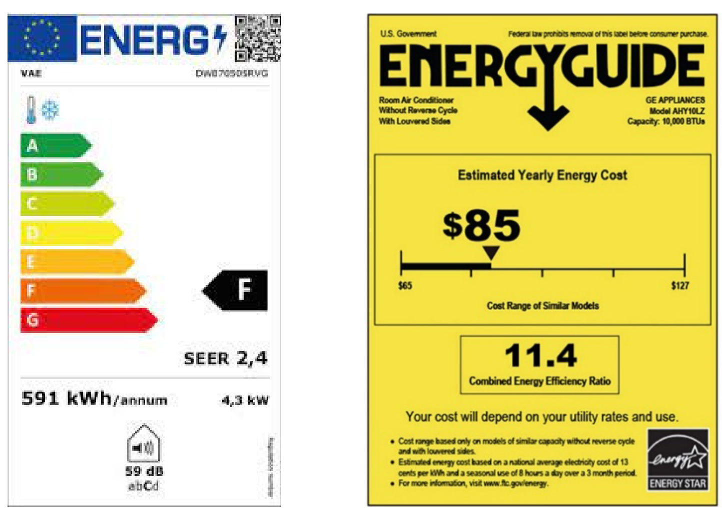
Type I environmental labels

Type I labels are governed by ISO standard 14024:2018 Environmental labels and declarations – Type I environmental labelling – Principles and procedures. These labels communicate that a particular product or service meets or exceeds specific and quantitative environmental criteria set by independent third-party organizations. As such, Type I labels require third-party verification, which makes them a credible and useful means of "narrowing down" your long list of potential products or services. However, attaining these labels can be cost prohibitive for suppliers, especially if they have many products in different categories. This helps explain why few products have them. Some examples of Type I labels are shown in Figure 2.

2a – Energy Star **2b –** Ecolabel **2c –** CELP **2d –** Carbon Trust

Figure 2

Examples of Type I labels
a) Energy Star
b) Ecolabel
c) CELP
d) Carbon Trust
e) EU Energy Label
f) Energy Guide



2e – EU Energy Label **2f –** Energy Guide

In the case of Energy Star, it verifies the efficiency of different product categories. For example, if someone were seeking an efficient uninterruptible power supply (UPS), they could use the Energy Star product finder to search for the most efficient UPS within a given topology. While Type I labels provide a convenient and valid means of comparing certain product attributes like efficiency, they aren't based on a life cycle assessment (LCA).

Type II environmental labels

Type II labels are governed by ISO standard ISO 14021:2016 Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling). Like Type I labels, they communicate that a product or service meets or exceeds specific and quantitative environmental criteria. However, as the title implies, these labels are self-declared, meaning that a product manufacturer can apply whatever claim they wish without third-party verification. Unfortunately, less reputable manufacturers take advantage of this and make false claims on their Type II labels. Therefore, due diligence is imperative if you want to use Type II labels in your assessment. It's important that the manufacturer provide the underlying documentation of their labeling program along with the data. According to ISO 14021, "The evaluation methodology used by those who make environmental claims should be clear, transparent, scientifically sound, and documented." In addition, the manufacturer should have the data available to substantiate the claim. The label should not imply that the product is certified or otherwise validated by a third-party. Some examples of Type II labels are shown in Figure 3, the first of which is Schneider Electric's Green Premium label discussed in the white paper, *Guidance on the Green Premium Eco-label*.

Figure 3

Examples of Type II labels
a) Green Premium
b) Brother Green Products

3a – Green Premium **3b –** Brother Green Products

Type III environmental declarations

Type III labels are governed by ISO standard ISO 14025 Environmental labels and declarations – Type III environmental declarations – Principles and procedures. In simple terms, an environmental product declaration (EPD) is a document that summarizes the environmental life cycle data of a product or service and is normally valid for 5 years. EPDs help specifiers make product decisions based on that product's environmental sustainability. This is similar to the nutrition facts label you see on food products which help us decide which food to buy. The main reason why food labels help shoppers compare similar foods is because the labels (in their respective countries) are standardized. Similarly, EPDs help specifiers more easily compare products of the same category, like a circuit breaker. The ISO 14025 standard "establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations."

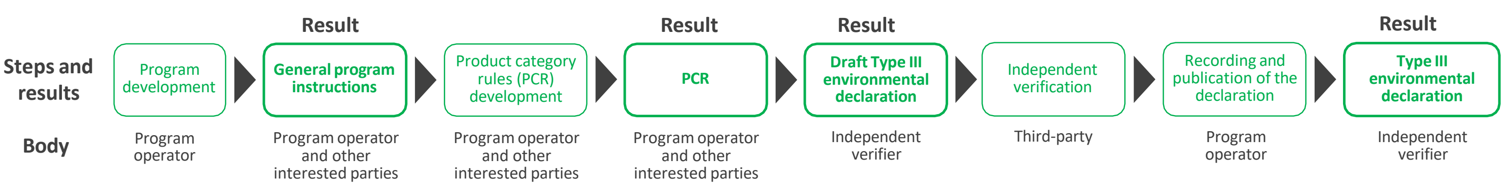
EPDs must be based on LCA data or life cycle inventory analysis data, which are themselves governed by the ISO 14040 standard. It's important to note that ISO 14040 is generic and applies to all types of products and services and therefore isn't very useful for a specific product category. Program operators help fill this gap by administering programs in compliance with ISO 14025 so that EPDs report the same type of information.

According to ISO 14020, a program operator can be "a company or a group of companies, industrial sector or trade association, public authorities or agencies, or an independent scientific body or other organization." The program operator develops, approves, and publishes *product category rules* (PCR), and *product specific rules* (PSR)[5]. PCRs are a "set of specific rules, requirements and guidelines for developing Type III environmental declarations for one or more product categories"[6]. For example, the PCR related to this paper covers electrical, electronic, and HVAC-R products and defines how manufacturers should perform the LCA. The PSRs define rules for specific products within this category like a circuit breaker, air conditioner, UPS, etc. Program operators also manage the registration and publication of the EPDs and try to ensure that manufacturers don't receive an unfair advantage by bending the rules when creating their EPD. We discuss some of these pitfalls in the "Guidance for accurate product comparisons" section.

ISO 14040 Table A.1 provides a summary of the steps and bodies involved in the development and operation of an environmental declaration program. Figure 4 illustrates this and shows that interested parties are part of the process. The standard states that "interested parties may include material suppliers, manufacturers, trade associations, purchasers, users, consumers, non-governmental organizations (NGOs), public agencies and, when relevant, independent parties and certification bodies."

Figure 4

Flow of steps to develop an EPD and the players involved



Schneider Electric provides EPDs called product environmental profiles (PEP). PEP is the term used by the program operator, P.E.P. Association, which administers the PEP ecopassport Environmental Declaration Program. This program operator supports PCRs for EEE and HVAC products. Note that product manufacturers typically develop their EPDs per the program operator's rules, but they must be independently verified by either internal[7] or external experts as disclosed in the EPD documentation. While EPDs make it easier for you to quantify the environmental sustainability of different products, they also provide the information companies need to account for their Scope 1, 2, and 3 emissions to show their progress against their corporate environmental goals. Figure 5 provides an example PEP for an arc fault detection circuit breaker.

In summary, Type III labels, i.e., EPDs, are a key tool to quantitatively assess a product's environmental impact. These documents are based on ISO standards and validated. Manufacturers should make their EPDs freely available. Type I labels are third-party verified and useful for specific performance measures like energy efficiency. Lastly, Type II labels can be helpful if the manufacturer provides the underlying documentation which provides its credibility.

[5] A product category can have only one program operator.

[6] ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures

[7] This applies to business-to-business products only

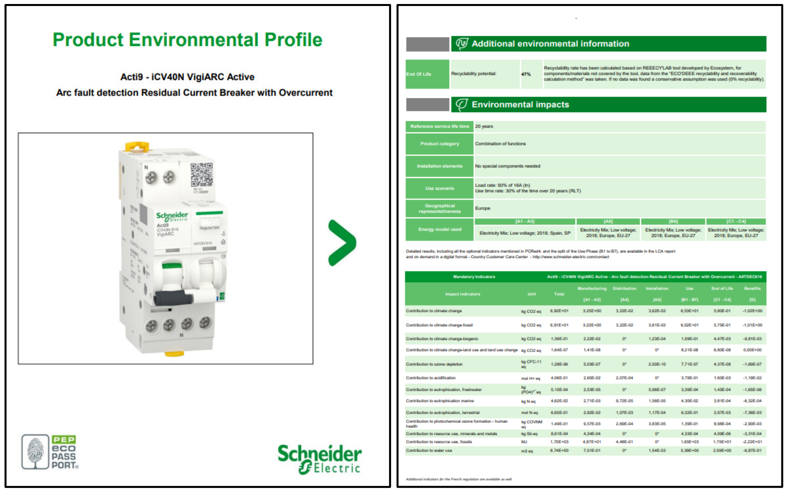


Figure 5

Example of PEP document for a circuit breaker

How to read a PEP

While all EPDs provide similar information, the templates vary by program operator. Therefore, in this section we focus on PEPs from program operator, P.E.P. Association. The PEP typically starts with a picture and description of the product followed by detailed information for a particular model. The key information needed for a product comparison is usually presented in the following order:

Reference product or representative product

This is the product upon which the sustainability information is modeled and forms the basis for your comparison. A description of the product may also be included. EPD rules allow this reference product to represent all of the models in a product range. Later, we'll discuss how you can use the reference product's data to estimate your target model's data.

Function or functional unit

This states the function of the representative product. For example, "to step down a distribution line voltage of 75kVA to voltage levels used by the end customer at the energy efficiency requirements defined by the DOE [Department of Energy] for 20 years." Sometimes the functional unit is stated per unit energy, per unit weight, etc. Note that to compare two PEPs, the functional unit and assessment methodology must be the same. See the "Guidance for accurate product comparisons" section for more information.

Constituent materials

This provides the reference product's weight as well as a percentage breakdown of its materials, including packaging. The total weight is used to proportionally scale the environmental data for a different model.

Additional environmental information

This provides information on the reference product's manufacturing, distribution, installation, use, and end of life as it pertains to its life cycle analysis. Think of these are some of the assumptions that were used in the LCA.

Environmental impacts

This section opens with some more LCA assumptions. Figure 6 shows an example of these assumptions in an environmental impacts table for an electrical busway. The last row in the table is especially important since it conveys the emission factor[8] used in the LCA. We discuss this important assumption in the next section.

[8] An emission factor is the rate of carbon emissions per MWh of electricity generated. Multiplying this factor (kg CO_2e/MWh) by the energy used (MWh) results in the total CO_2e emissions.

Reference life time	20 years			
Product category	Other equipments - Passive product - continuous operation			
Installation elements	End of Life of the Packaging			
Use scenario	Product dissipation is 22400 W at 100% Load rate and 2016 W at load rate / rated current (In): 30 % of In percentage of utilization time: 100%			
Geographical representativeness	Europe			
Technological representativeness	The Modules of Technologies such as material production, manufacturing process and transport technology used in this PEP analysis (LCA-EIME in this case) are Similar and representative of the actual type of technologies used to make the product in production.			
Energy model used	**Manufacturing**	**Installation**	**Use**	**End of life**
	Manufacturing Plant: Hungary	Electricity Mix; AC; consumption mix, at consumer; < 1kV; EU-27	Electricity Mix; AC; consumption mix, at consumer; < 1kV; EU-27	Electricity Mix; AC; consumption mix, at consumer; < 1kV; EU-27

Figure 6

Example of environmental impacts table for electrical busway

The table is followed by a list of "impact indicators" for the reference product, which measures the environmental impacts of a product. These values are usually listed in scientific notation (e.g., 2.52E+02). One key environmental impact indicator is:

- "Contribution to global warming" or "global warming," typically in units of kg CO_2e ("e" stands for equivalent). This is what most people refer to as a product's "carbon footprint."

This and other impact indicators are given for each of the five LCA stages, defined in the PCR as:

- Manufacturing – "from the extraction of natural resources to product and packaging manufacturing and their delivery to the manufacturer's last logistics platform"
- Distribution – "transportation from the last manufacturer's logistics platform to the arrival of the product at the place of use"
- Installation – "installation of the product at the place of use"
- Use – "use of the product and maintenance necessary to ensure the ability for use"
- End-of-life – "removal, dismantling, and transportation of the end-of-life product to a treatment center or landfill site, and the end-of-life treatment"

Verification information

The last section on the PEP is presented as a table that includes:

- The date the PEP was issued
- The validity period
- The PSR and version on which the PEP is based
- Independent verification of the declaration and data; the "X" indicates whether the PEP is based on internal or external verification

Guidance for accurate product comparisons

A sustainability comparison makes sense only after developing a list of products that meet your functional requirements. For example, in the case of a UPS, requirements may include runtime, capacity, size, power factor, etc. Once you have a list of products, then you can quantitatively compare their environmental characteristics. The most effective way to do this is to compare their PEP data. A key theme in this section is the concept of comparing "apples to apples". For example, it's quite easy to mistake a very inefficient transformer as the most sustainable when looking only at its total carbon footprint.

How to ensure a valid comparison

While the ISO standards provide the basis for LCAs and EPDs, they don't eliminate manufacturer mistakes or ensure valid comparisons. Therefore, end users must be vigilant when comparing PEPs for two or more products, especially if they're from different manufacturers. In this section we list the common errors people make when comparing the carbon footprint of two or more products. Note that while we focus on carbon, these mistakes tend to apply to other environmental impact indicators.

- Declaring a winning indicator that is within the margin of error
  PEP data is not precise. Therefore, if the values of a particular indicator are within 10% of each other, the two products should be considered equal for that indicator. This is due to the +/- 5% margin of error that the standards allow for a manufacturer's reported values. For example, if the carbon footprint for product "A" is 100 kg, and product "B" is 105 kg, they should be considered equal because their "+" and "–" range overlap.
- Comparing similar terms with different meanings
  PEP documents contain a lot of data, some of which is complex. Therefore, PEP documents should provide a link to definitions of the terms used within them. This is even more important when comparing products from different manufacturers because the definitions provide validation that you're comparing the same type of data.
- Comparing the "total" carbon footprint value from the PEP
  Comparing the total footprint doesn't ensure that you're comparing like for like values unless each LCA stage is assessed the same way. The next bullet demonstrates the importance of this.
- Comparing "Use stage" carbon based on different emission factors
  All electrical products have electrical losses which generate carbon emissions. However, the magnitude of these emissions is highly dependent on the emission factor which is the ratio of greenhouse gas emitted for every kWh of electricity generated. An LCA assumes a certain emission factor to calculate the carbon emissions generated during the product's "use" stage.

  If the emission factor is not the same between the products you're comparing, you can't fairly compare them. This is especially important for active electrical products like air conditioners and UPSs since the emissions during the use stage typically represent the majority of the total LCA emissions. For example, it's quite possible for a PEP of an efficient UPS (e.g., 95%) to show total emissions three times higher than a grossly inefficient UPS (e.g., 80%). As shown in Table 1, this example was calculated assuming an overall emission factor for the 27 European countries (0.231 kg CO_2e/kWh) compared to the emission factor for France (0.025 kg CO2e/kWh as of November 5, 2023). *While this doesn't appear to be fair, program operators do allow manufacturers to use specific country emission factors for models sold in that country. However, in some cases, these same models are sold globally as well.*

  Furthermore, the PEP's "energy model used" (last row in Figure 6) makes it difficult to ascertain the emission factor because it's usually stated in terms of an electricity mix code such as "<1 kV; EU-27." If you're unable to ascertain the emission factor for all products, the most effective way of assessing the use stage emissions between two or more products is to compare their efficiencies at the same load using efficiency calculators. For example, the "Single-phase UPS Efficiency Comparison Calculator" provides an effective and simple way of comparing the efficiency of two different UPSs. Note that while this method won't account for the maintenance emissions of the use stage, it can be ignored for certain products like UPSs since it represents a trivial percentage of total use (<2%).

Table 1

Example of how different emission factors skew comparisons

Variable	Efficient UPS	Inefficient UPS
Rated capacity (watts)	1,000	1,000
Full-load efficiency	95%	80%
Total power consumption at 100% load (watts)	1,053	1,250
Annual hours of operation	8,760	8,760
Annual energy consumption (kWh)	9,221	10,950
Emission factor (kg CO_2e/kWh)	0.231	0.062
Total carbon emissions (kg CO_2e)	2,130	679
Efficient UPS emissions are 3.1 times greater than inefficient UPSs		

Finally, if efficiency calculators aren't available for the product you're comparing, it's best to ask the manufacturer to provide the efficiency curve for the product which allows you to compare the efficiency of all products at the same load %.

KEY TAKEAWAY – If the emission factor is not the same between products you're comparing, you can't fairly compare them.

- Comparing "use stage" carbon emissions with different use profiles
  A use profile prescribes the % load and length of time a representative product operates during its lifetime (fourth row in Figure 6). For example, a use profile may specify 25% loaded for 20% of lifetime, 50% loaded for 20%, 75% loaded for 30%, and 100% loaded for 30%. The use profile is used to calculate the carbon emissions discussed in the previous bullet. If the use profiles are different, the values can't be compared. Finally, the use profiles are based on specific modes of operation (e.g., normal mode, economizer mode) and these modes must also be consistent in product comparisons.
- Comparing carbon of reference products with different capacities
  PEP rules allow reference products to represent models in a product range. Directly comparing reference products from two or more PEPs may mean that you're comparing the carbon footprints of products with different capacities (e.g., 100A breaker vs. 600A breaker) – an invalid comparison. Sometimes, like in the case of air conditioning equipment, the PEP provides the environmental impact indicators in normalized units (e.g., kg CO_2e per kW of cooling). If the indicators aren't normalized, you must proportionally scale the environmental indicator of the reference product using its weight (e.g., manufacturing emissions kg per kg of reference product weight). Similarly, you must proportionally scale the use data of the reference product using its rated power capacity (e.g., use emissions kg per watt of reference product capacity). Table 2 provides an example of how to calculate the manufacturing emissions for "Model B," the model you want to assess by using "Model A", the reference product in the PEP.

Table 2

Example of how to calculate scaled emissions

Reference model			Model of interest	
Model A			**Model B**	
UPS weight	19	kg	24	kg
Manufacturing emissions	318	kg CO2e	402	kg CO2e
Emissions per kg of UPS weight	17	kg CO2e / kg		
Calculations	(318/19) = 17		(17 x 24) = 402	

You must repeat this process for each environmental indicator you want to assess. These extrapolations fall within the expected accuracy of the PEP data.

- Comparing PEPs with different PSR and PCR versions
  PEPs with different PSR and PCR versions may introduce variances that invalidate the comparison. Check the table on the last page to verify the same PSR and PCR versions.
  We don't recommend comparing EPDs from different program operators (e.g., one from P.E.P. Association and one from EcoLeaf. This is mainly because the PCRs upon which the life cycle analyses are based are likely different. The proliferation of program operators[9] over the years, especially in the building and construction materials industry, has led to various efforts to harmonize PCRs. But to date, there's no single organization ensuring PCR consistency across program operators.
- Granting recycling credit without evidence of recycling program
  PCR edition four includes an additional stage referred to as Module D, "net benefits and loads beyond the system boundaries." This optional stage allows manufacturers to claim an environmental credit for "reuse, recovery, and/or recycling." For example, if 100% of a product was recycled, the manufacturer would claim a negative value equivalent to the manufacturing footprint. This is only valid if the manufacturer has a recycling program that recycles 100% of every end-of-life product to be used as raw materials. The recycling program must also apply to your location. Before blindly accepting this credit, ask the manufacturer for detailed information on their recycling program, with specific attention to how they ensure that 100% of the products are returned to them and don't end up in a landfill.
- Assuming a PEP includes expected components
  Sometimes PEPs exclude components that one would expect, thereby setting the expectation that one manufacturer has a significantly lower footprint than another. For example, a UPS PEP may exclude batteries. In most cases, switchgear or electrical panel PEPs exclude circuit breakers. To prevent this mistake, read through the entire PEP and note what's excluded.

Other criteria to assess

The following criteria are more difficult to assess and compare across similar products. However, having some of this information will aid the buyer in their final purchase decision.

- Durability
- Repairability
- Take-back

Durability

This is the ability for a product "to exist for a long time without significant deterioration in quality or value." In essence, the longer a product performs its mission, with minimal maintenance and degradation, the more sustainable it is (assuming it's also efficient and relevant). When you prolong the need to replace the product, you defer the associated resources required to manufacture it, distribute it, and the impact of disposing of the old product. Modularity can be an effective design approach to improve durability in two related ways. First, when a product is modular, you can repair the failed module by swapping it out with a new one versus replacing the entire product. Second, standardized modules allow manufacturers to quickly improve module reliability compared to an equivalent non-modular product. This means that fewer repairs are needed and consequently less waste ends up in

[9] M. Bach & L. Breuer, An institutional analysis of EPD programs and a global PCR registry, 2014, p.1

landfills. Examples of modular products include draw-out switchgear and scalable UPS systems (swappable power and battery modules).

For products with components that are “consumable” (e.g., air filters), durability also implies that the manufacturer will offer replacement parts and maintenance services for the life of the product. With this information, decision makers can be more confident in choosing products with a lower total cost of ownership (TCO), especially in cases where one product’s upfront cost is much less than the other. Durability assessment is based on standards such as European Standard CSN EN 45552, *General method for the assessment of the durability of energy-related products*.

Repairability

This describes the extent to which a product is repairable. Like durability, repairing a product allows it to stay in service longer, thereby improving its sustainability. Repairability is covered by European standard CSN EN45554, “General methods for the assessment of the ability to repair, reuse and upgrade energy-related products.” Repairability also speaks to the ease of repairing the product. For example, in the case of switchgear, repairability is significantly improved with modular components. Other examples include the use of software to alert the user of which subsystem has failed, the use of standardized parts and fasteners, and the ease of access to the most frequently replaced parts.

Take-back

This describes the possibility of sending an end-of-life product back to the manufacturer, either directly or through a service provider. The goal of take-back is to extract the maximum value out of end-of-life products versus throwing them into a landfill, which leads to more wasted resources. When manufacturers make it easy to take back an end-of-life product, it greatly increases participation in 5R programs (repair, refurbish, remanufacture, reuse, and recycle), giving manufacturers more options to extend the life of existing products by increasing inventories of spare parts and refurbished units. Those products or components which are not recoverable can then be properly recycled.

In order for a product to claim “take-back” performance, the manufacturer must approve the product for return to one or more of its service providers. This means that the manufacturer has developed a process for end-of-life returns between the user and service providers, or directly to the manufacturer’s facilities. This also means that the personnel receiving the products are trained on processing them. Returning an end-of-life product may also qualify the user for upgrades to new products.

Request for proposal (RFP) requirement

Companies looking to add sustainability requirements to their procurement processes are challenged with collecting environmental data from its suppliers. Many manufacturers will not have this information available. Other manufacturers may have some information available, but in an unstructured way. Eventually, manufactures will make their products’ environmental sustainability data transparent and available online. However, purchasing departments can expedite this by making PEPs (and EPDs in general) a required part of their RFP process[10]. While processes vary from company to company, the requirement to submit a PEP not only enables you to perform a quantitative environmental sustainability comparison, but also signals that the manufacturer is serious about environmental sustainability.

[10] While this white paper focuses on environmental sustainability, the RFP process should also account for social and governance (ESG).

Conclusion

While there are other environmental impacts like contribution to mineral resources depletion, this guide focused mainly on carbon emissions as a means of assessing a product's environmental sustainability. Type III labels, i.e., environmental product declarations (EPDs), are a key tool to quantitatively assess a product's environmental impact. These documents are based on ISO standards and validated. Manufacturers must not only make product environmental data readily available to its customers but make it easy to understand, since EPDs are generally overcomplicated and difficult to follow. Furthermore, manufacturers should provide transparency in assumptions and standards used for formulating carbon footprint and other product environmental indicators. In addition to Type III labels, Type I labels are third-party verified and useful for specific performance measures like energy efficiency. Type II labels are self-declared but can be helpful if the manufacturer provides the underlying documentation which provides its credibility.

While EPDs are meant to be standard, they can vary from manufacturer to manufacturer and product category to product category. A product environmental profile (PEP) is a version of an EPD for use with electrical and electronic equipment (EEE) and HVAC products that follow specific product category rules (PCRs). The PEP sheet should include the product's name, weight and function, and important environmental impact indicators including "contribution to global warming" which is the carbon footprint for 5 stages of the life cycle – manufacturing, distribution, installation, use, and end of life. When comparing products, it's tempting for consumers to just compare the total carbon footprint but that is not always an accurate apples-to-apples comparison. We recommend that consumers compare each of the 5 life cycle stages and look out for differences in emission factors, use profiles, components included, evidence of claims, and definitions.

About the authors

Victor Avelar is a Senior Research Analyst at Schneider Electric's Data Center Science Center. He is responsible for data center design and operations research, and consults with clients on risk assessment and design practices to optimize the availability and efficiency of their data center environments. Victor holds a bachelor's degree in mechanical engineering from Rensselaer Polytechnic Institute and an MBA from Babson College. He is a member of AFCOM.

Ray Lizotte is a Senior Sustainability Engineer and Senior Distinguished Engineer (Edison Level II) at Schneider Electric. He directs efforts to design and develop product offers that meet global regulations such as European ROHS and REACH directives. He specializes in making products more sustainable through less toxic and greener materials and the application of circular end-of-life programs. For the past few years, he has been working with the company's procurement organization to responsibly source conflict minerals including cobalt. He has been involved in sustainable product design for the past 30 years. Ray studied environmental engineering at MIT where he graduated with a BS in 1985.

RATE THIS PAPER ★★★★★

Resources

[Guide to Environmental Sustainability Metrics for Data Centers](#)
White Paper 67

[Guidance on the Green Premium eco-label](#)
White Paper

[Browse all white papers](#)

Note: Internet links can become obsolete over time. The referenced links were available at the time this paper was written but may no longer be available now.

Contact us

For feedback and comments about the content of this white paper:

Schneider Electric Energy Management Research Center
dcsc@schneider-electric.com