Working Paper

Scaling sustainability advice -

Options for generating large-scale green consumption recommendations

Author: Cathérine Lehmann
Contact: info@green-consumption-assistant.de

Abstract

Data availability on the sustainability of products is low which poses challenges for actors from all sectors dealing with promoting sustainable consumption. We describe how we currently provide users of a Chrome browser extension with general sustainability advice and with recommendations of best-in-class products in terms of sustainability. Then we outline a possible concept towards more automatisation and thus scalability of the current approach. For the latter, we discuss six different schemes for generating large-scale green recommendations on a product level, finding that currently product sustainability can be best evaluated in terms of data availability when resorting to lists of labelled products. In the future, Product Environmental Footprints and similar data should be more easily available in order to have quantifiable data for research and for showing more information to users. Overall, an integrated approach, including e.g. aspects of organizational sustainability, might help to fill data voids and/or to provide a more complete picture of a product's sustainability level.

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Introduction

The interest in sustainability is growing in many sectors and so is the interest in sustainability data. Data is needed to measure efficiency, corporate sustainability ambitions, reductions of negative impacts, etc. and also to register sustainable product alternatives. Even though there is a significant need for data regarding the sustainability of companies and products, there is also a big lack of such data. Often, companies do not know or choose not to publish this information, for example, when they had research conducted to evaluate the impacts of their products (e.g. using a life cycle assessment - LCA). At the same time, there are many stakeholders requiring such information but are struggling to find or create it.

In the field of sustainable consumption, there are several sustainability-oriented online stores and browser extensions which aim to provide consumers with sustainable alternatives. So far, they each decide individually which products can be recommended, i.e. what is sustainable from their view. This process is often done manually and with high labour intensity. One project attempting to facilitate sustainable online shopping is the Green Consumption Assistant (GCA) which is run by the Technical University of Berlin, the Beuth University of Applied Sciences, and Ecosia, the tree planting search engine. The GCA is currently implemented as a browser extension for the Chrome browser in a beta-testing phase. It not only recommends sustainable product alternatives but also proposes sufficiency-related options such as using longer and repairing, and buying used/refurbished instead of buying new products. These approaches should help to reduce overall consumption levels and they are part of a holistic view on sustainable consumption. In case users do not want to abstain from their original product choice, they can still buy it, but plant trees due to affiliate deals with online shops in line with Ecosia's business model. In this way, the negative impact of purchasing can at least be amended by a positive act for nature. The primary objective is, however, the reduction of consumption and a shift to more sustainable products.

In this paper, we describe the current approach for proposing sustainable consumption alternatives and discuss options for scaling and automating such advice in the future. It also serves as a blueprint for adding further sustainability advice for further shopping categories.

The process for generating advice needs to balance several objectives:

- *Offer reliable science-based sustainability advice* - The advice should be science-based to be trustworthy and to have a thorough approach for recommendations.

- *Be valuable to users* - If the extension or other kinds of user interface do not provide value to users or annoy them, they will not be used and thus do not create a positive impact.

- *Scale to all consumption categories* - In order to be able to give recommendations for all relevant products (and services) and overall improve sustainable consumption, a quick scalable approach is needed.

- *Have a short preparation time* - If it takes too long, competitors might be faster or the work is already outdated when it is finished. Also, human resources for doing work are often quite limited.

- *Consider dependency on external data partners and data availability* - As organizations, e.g. companies or research entities, do not have all necessary data available and often do not have the resources to compile the data themselves, they need to work with external partners who provide them with information. Yet, even the right partners cannot help in cases when such data does not exist in the first place.

The options for scaling advice thus will be evaluated against these dimensions in order to choose the best approach.
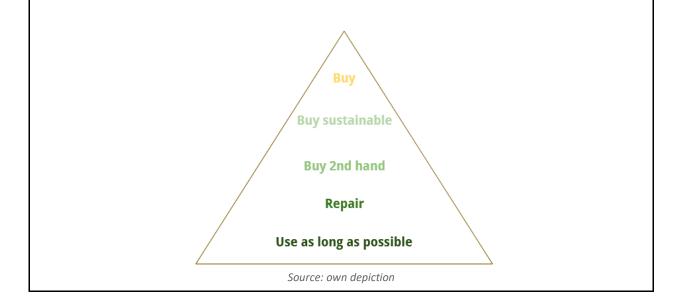
Description of current approach

General advice

The general advice - currently used in the extension for electronics and fashion products - is following a "sustainability pyramid"-like approach. In order of sustainability-level from best to worst these are:

A.   *Use* the current product longer
B.   *Repair* the current product
C.   *Buy used*/second hand products
D.   [For electronics:] Buy refurbished products
E.   *Buy new, more sustainable* products

In addition, there is the possibility to *buy anything but plant trees* via Ecosia when using an affiliate link.

Source: own depiction

The order of recommendations has been derived by reading pre-existent LCAs and other scientific publications on product categories (e.g. electronics) and sub-categories (e.g. notebooks). For all fashion products and several electronic products (e.g. smartphones), the production impact on the environment (and in terms of labour conditions) outweighs the emissions during the use phase. For example, regarding global warming potential, ca. 80% of overall CO_2eq emissions during the phones stem from the production (see Deutsche Umwelthilfe, LCA iPhone or LCA Fairphone). For bigger electronic devices, emissions in the use phase tend to outweigh those from the production. However, efficiency gains of buying new devices only cumulate after long years of use so that in most cases using a device longer can still be considered the most sustainable option.

The amount of work for evaluating the fit of these recommendations depends on how much research is done per product (sub-)category and how easily studies on the products are available.

After establishing the recommendations schema for a product (sub-)category, the advice needs to be *made accessible* for users and *provide them with value*. The extension links to external pages for each suggestion, for instance

- Use longer: descriptions on how a product's life can be extended
- Repair: shops offering repair for these products (can also be providing instructions for self-repair or showing the next repair café)
- Buy used: shops where the same product class can be bought second hand
- Buy refurbished: shops where the same product class can be bought refurbished

These links need to be found for each (sub-)category and can then often be used for several sub-categories.

Additionally, there is text ("copy") needed to explain to the users what is recommended and how they can interact with the extension. In order to motivate them to take a sustainable action, the extension shows some sustainability *facts hinting at the positive* impact this behaviour can have or which *negative sustainability impacts* are common for these products. This work also needs some time to be done properly and in a way that provides value and relevant information to the user.

Best-in-class products (BICs)

The approach to evaluate recommendations of new, but more sustainably produced products is more lengthy. In this report we refer to these products as best-in-class products (BICs). Products are considered as best-in-class products when they are *more sustainably produced than others in their product category*. This does not mean that they are entirely sustainable. Usually, those are currently products which are labelled by at least one trustworthy institution, ideally by several, to include both social and environmental aspects.

For a few categories where this approach was not feasible due to a lack of labels, we resorted to only looking at energy efficiency (TVs) and/or producers who were better rated by external sources than others (smartwatches, headphones) in theory. Sometimes this meant to follow the product offer of sustainable online stores (e.g. Avocadostore for headphones) and trusted sustainability blogs (e.g. Utopia for towels and linen). For game consoles, we could not identify either of those options which is why we decided not to include any BICs here.

For each product category there needs to be a decision on a baseline, under which no products are recommended at all. For example, strictly speaking, none of the TVs (and also none of the smartwatches) is currently sustainable as no producer is comprehensively looking into sustainability and ethics. The question then is whether the best-in-class recommendation for those products left open - as for game consoles - or if some slightly better products are still recommended and in which way. It might be helpful to define where this line is drawn for scaling into more categories to save time on this decision-making process.

For most fashion items, we chose products with complementary labels/certifications such as GOTS and Fairtrade to cover social and environmental aspects. For each sub-category, products were selected manually based on the label information provided by Project CECE. Their page makes filtering clothes for certain certifications possible.

The approach for electronics was more fragmented as labels (e.g. TCO, epeat, Blue Angel) only cover a few product categories. The US-based Energy Star label contains more categories but only focuses on energy efficiency and is thus not a very comprehensive label in terms of sustainability dimensions considered. Products with a combination of these labels were preferred.

Choosing BIC- products based on their labels, was chosen as a first approach due to data availability issues on products' sustainability. It is not straightforward to get information on labelled products, but it is still more likely than finding a detailed analysis on a product's environmental footprint. Information on social issues, e.g., for individual products is often more qualitative and also not easily available. In theory, estimations can be made by looking at the company's processes. However,e.g. CSR reports are biased as they are written by the company itself, and external organizations like NGOs might not find all necessary information.

Where available, the evaluation of the trustworthiness and comprehensiveness of labels follows the estimation by the organization Siegelklarheit; however, they lacked many label evaluations. Thus, we considered further sources such as the book on sustainable consumption by Mimi Sewalski - founder of the sustainable online shop Avocadostore -, Project CECE and Label Online. For those labels, we created our own badges to simplify understanding for users. An overview of the current badges and labels can be found in the following table:

Badge	Corresponding Labels (Selection)
Environmentally friendly	Global Organic Textile Standard (GOTS), Bundespreis Ecodesign, epeat Gold, Soil Association, Blauer Engel/Blue Angel, Nordic Swan Ecolabel, CradleToCradle
Fair traded gold	Fairtrade Gold
Ethical company	ecovadis Gold, Bcorp
Easy to repair	Ifixit Repairability Index
Lower electricity consumption	epeat Gold, Energy Star, EEK A+, Blauer Engel/Blue Angel
Better working conditions	TCO, Fairtrade Gold
Fairly produced	Fairtrade International, World Fair Trade Organization, Fairtrade Cotton, Better Cotton Initiative (BCI), fair for life, SA8000
Vegan	PETA-Approved Vegan
Recycled material	Global Recycling Standard (GRS)
Lower environmental burden	Better Cotton Initiative (BCI)
Certified wood product	Forest Stewardship Council (FSC)
No hazardous substances	OEKO-TEX, CradleToCradle, Bluesign
Recyclable	CradleToCradle, Blauer Engel/Blue Angel, TCO

Table 1: GCA's translation of product labels into own badges, based on Siegelklarheit and Label Online

The simplification from labels to badges is based on categories properly covered by labels according to Siegelklarheit and on the rating the labels are given by Project CECE. Where neither was available, we

based the badges on descriptions of the labels from their own pages or other websites describing their approaches. We also tried to select wordings and contents which are relevant and understandable for users.

The process described in this section on BICs is rather time consuming as a new approach needs to be found for each category and then again for several subcategories. Additionally, selected BIC products were not always available/in stock or well-rated. For this reason, an automated approach is required. Ideas for how such an automatisation could look like, are described in the following section.

Approaches for Scaling

General advice

In order to scale general sustainability advice, products can be clustered into broader categories / groups which have relevant communalities. Scaling the advice schema for broader categories and groups would help to skip looking for individual LCAs per subcategories. The current *schema should be true for all* **goods that do not require constant inputs**, for example:

- Clothing, textiles
- Decorations, party supplies
- Gardening utensils
- Kitchen utensils, dishes
- Handbags, wallets
- Jewellery, accessories
- Repair, handicrafts, art utensils
- Paper ware
- Books
- Sports devices
- Instruments
- Pet products
- Furniture
- Toys, baby products
- Outdoor equipment
- …

So far, it has also proven to be true for **electronic devices, white goods** etc. (things which require electricity inputs). In this group, there is some point where *efficiency gains outweigh production impact*, especially for bigger machines. However, according to several studies (see e.g. Coolproducts and Oeko), most devices *should be used longer than they currently are*. Thus, for most devices the usage time stays below the optimal lifetime (incl. washing machines, vacuum cleaners, etc.). For small electronic devices, as of now, it is rather unrealistic to reach optimal lifetime (e.g. for smartphones 25-232 years).

For **fast moving consumer goods (FMCG) and food/beverage** (single use/use-up items) the *approach would need to be different.* The advice order would probably close to the following:

A. *Use up* and/or use less of it (don't waste)
B. *Buy sustainable alternatives* which roughly fulfill the same needs (e.g. veggie burger instead of beef ones, denttabs instead of toothpaste)
C. *Buy sustainably produced* (e.g. natural cosmetics, unwrapped, organic food, etc.)

An *entirely new approach might be needed for* **'services'** such as:

- Electricity: recommend providers, mention saving potentials, …
- Housing: recommend improvements to heating, living space, …
- Mobility: trains instead of planes, etc.
- Tourism: camping, less luxurious accommodation, veggie food offers, …
- Finance/investments: ethical banks, green finance products (in future best following the new EU taxonomy, …)
- Events and freetime activities (e.g. tickets): sports, museums, zoos, cinema, concerts, ...

Regarding the scaling of sustainability facts that are displayed for the consumer, the current amount of work for facts per category is limited and could thus be kept if needed. In order to manage larger volumes, even more general facts per group (instead of per category) might be possible. However, the knowledge which is transported in the facts should be specific to the environmental impacts of the actions, otherwise they might not act as good decision aid. This is one example of a trade off between user value (specific information) and time needed for preparation (generic information).

To facilitate the copy-writing process, the content should be formulated as neutral as possible e.g. always referring to product categories instead of models to cover non-electronic products. The products' (sub-)category name should be automatically inserted into the copy at a placeholder position.

As a larger task, the generation of external links to providers or information pages remains. Potentially, automatically generated links, e.g. to Ebay (for used and/or refurbished products) or other providers that offer basically everything, could be used. Links could also, for example, lead to Google Maps e.g. for showing local repair options for this product group/category. Here, the question remains which providers should be highlighted or potentially collaborate with. Scaling links gets more difficult, when they need to be generated for several countries. To facilitate this, it would be necessary to find international providers covering all (or at least several) relevant markets and change the language of the page automatically. Else, a screening for fitting providers in all countries would be required.

Best-in-class products

For BICs, scaling recommendations is significantly more challenging than for scaling general sustainability advice. We discuss six options briefly in the following.

1. Partner with a sustainability online shop

In this option, the extension or search engine could *display products from the partner shop* in order to suggest more sustainable products. The partnerships might be set up per product category or group, as, for example, many shops do not include electronic products due to usually being produced unsustainably.

The challenge with this approach is that potentially not all products which are offered on the shop are considered sustainable by outsiders as this depends on the understanding of sustainability or values. A vegan person might not consider long-lasting, repairable leather shoes as appropriate due to animal welfare issues, for example. Also, if the extension just re-routes the user to the same shop(s), there might be a lack of unique selling proposition or relevance. Interest of shops to collaborate in this way could be low as well.

2.   Use lists of labelled products

In order to get an estimation of the sustainability level of a product, it can be evaluated whether they are labelled/certified for socially and/or environmentally beneficial production. Not all labels are trustworthy, neutral (e.g. company-own labels), transparent, comprehensive in terms of the dimensions they cover, etc. Thus, not all labels are appropriate as criteria for sustainability. However, looking at those who are well-rated by e.g. Siegelklarheit, they can help to distinguish more sustainable from less sustainable products. It should be noted that there are also sustainably produced products or sustainable brands which are not labelled due to the costs involved with such a certification. The information on products with their labels would ideally be received via an application programming interface (API) for further use within a technological application or at least as a proper list which is only static, however. In case of a static list, regular updates would be needed. This information should come from trustworthy sources such as certifiers.

APIs (application programming interface) are sometimes publicly available as the one provided by Energy Star. For electronics, Excel lists are provided by epeat and TCO. It is also possible to ask other organisations for providing an API, but negotiative can be time and resource intensive.

Such an approach requires decisions on which labels are accepted as being *good enough* and which not. Additionally, labels should cover social and environmental factors individually or when taken together. So far, we have not found a comprehensive source with labelled products for several/all product categories, however. Finding options like the ones mentioned above help to scale within one category at least.

3.   Look at brands rather than products

For scaling purposes, it is also possible to approve brands rather than products and then recommend all products by this brand/producer. The main question here is which basis for evaluation should be used in order to estimate a brand's sustainability. There are labels for companies such as B-corps. In this case, a brand's B-corp status and also their achieved points in the assessment could be displayed. However, as for the company registered at the Economy for the Common Good (Gemeinwohlökonomie), the companies do not yet cover all areas and are rather small/unknown. Such a status could serve as a partial factor or provide extra points.

Claims such as climate neutrality or 100% renewable energy-based can only be a plus not a unique criterion, because different providers use diverging approaches and such a state can also be achieved by 'dirty/unsustainable' companies. From following such an approach the companies should know their emissions per product (category), but they usually will not be published.

CSRHub is mostly focused on transparency and reporting and is thus not very strictly evaluating sustainability. Other evaluating organizations do not directly show (all) their results or they are not easy to find and evaluate (ratings/evaluations e.g. by CDP, EcoVadis, ethical consumer, eco search, etc.), but they might be asked for collaboration. One could also select products from companies which are marked with a green leaf by Ecosia.

Next to the data basis, another issue is the following question: Would brands need to only have products that match certain sustainability criteria or could they have a certain amount of outliers? For example, does it count when all clothing is made of organic cotton but they also have silken products in the portfolio, or most products are vegan but some are not, … In case they are not labelled, brands could enter by proving they are matching the criteria without a certificate e.g. showing that the whole portfolio is vegan without being PETA-Approved vegan.

4.　　Recommendations based on price/emissions approach

Several app providers and other organizations such as OFnK use a carbon footprint calculation approach building on prices paid for those products. These calculations are based on certain guidelines per sector and their emission intensity. However, they only serve as estimates for product categories and thus do not directly help to distinguish between products. A less cost-intensive smartphone might even be more environmentally damaging and socially harmful in its production than other more cost-intensive models. As there are several limitations to this approach and as it only targets emissions and no other sustainability factors, it has not been considered further.

5.　　Recommendations based on environmental product information

Concrete quantitative environmental product information might be helpful to rank products in terms of sustainability and for providing transparency. Such information can and should Include impacts such as

- Global warming potential
- Water use and pollution
- Abiotic depletion
- Land used
- Place of origin
- Chemicals/hazardous substances used

There can be various potential factors which are not all mentioned here. Such information might stem from LCAs which have been conducted and published. In the future, *Product Environmental Footprint (PEF)* data which will be required for several products in the EU would be helpful. Then, a comparison between products is possible and with the values of a baseline product which is provided with the methodology. Unfortunately, this data won't be available very soon and not for all categories, but could then partly be used.

One can also receive sustainability information from brands via a survey approach or by receiving product information sheets. There, trustworthiness of data might be an issue and there would be a value proposition needed in order for companies to provide such information.

Another issue is how to integrate information on social aspects via this approach. They are harder or impossible to quantify and information is even more scarce than for environmental measures. Social LCAs are very scarce and not yet well established. These aspects could partly be covered with labels, but then it would rather be approach no. 1) again. Else, estimating social sustainability requires in-depth screening of companies and their descriptions of production processes. For big companies, one could look at their CSR reports where they need to publish at least some figures frequently.

6.　　Come up with a set of mixed criteria

Another way to address scaling, might be to create a mix of criteria e.g. based on the approaches above. Such a set of criteria requires time, effort and a thorough setup as well as transparent explanation in the end. An advantage of a mix of criteria and provided information could be that users could also check/select which things are most important to them and thus filter to their individual preferences.

It generally should be considered if it is better to find a *one-size-fits-all strategy* for all product categories *or to merge approaches* as categories differ. A decision also needs to be made regarding what to do with categories that do not really have sustainable options e.g. game consoles and where to draw the line for recommendations. In such a case the recommendation screen could be left blank (or only show general advice) and/or state this fact of the products being unsustainable all together.

Even when BICs have been found, selecting them might be hindered by non-sustainability related factors which are also relevant for users, such as:

- Some sustainable products might have bad product evaluations.
- Often products were not easily available for purchase or not at all anymore.
- Some electronic products were considered for professional use rather than for personal use.

Coming back to the objectives mentioned in the introduction, we evaluate the described approaches against the objectives in the following table where +++ is the best rating:

	Collaboration with Sustainability Online Shop	List of labelled products	Evaluate brands instead of products	Price/ emissions approach	Environ-mental product info	Set of mixed criteria
User value	+	++	++	++	+++	+++
Science- based	+	++	++	+	+++	++(+)
Preparation time (lower better)	+++	+++	++	++	+	+
Covering env. + social sustainability	+++	+++	+++	+	+	+++
Scalability	++	++	+++	+++	++	++
Data/ partner availability	++	+	+	++	+	++

Table 2: Scaling approaches rated against objectives of sustainability recommendations with +++ being the highest and + the lowest rating

Recommendation

Overall, it can be concluded that *data availability is a major hindrance for all approaches*. As mentioned in the introduction, it would be of paramount importance to motivate companies to elaborate and publish more information, e.g. the LCAs they have conducted for the products. Transparency varies heavily between organizations. An important step could be the future requirement regarding the Product Environmental Footprint (PEF) which will be mandatory for companies selling products in the EU for some product categories (see explanations by ifu and the EU). The advantage of comparing PEFs instead of LCAs of products - in case that they are publicly available - is that there are clear rules on system boundaries and less room for different calculations. Together with a basic product which has been elaborated per category, some comparisons can be made. Regarding energy labelling, the EU has started a public database (EPREL) for products which can provide helpful information when fully established. Such approaches should be extended as they are laudable efforts to provide sustainable product information to consumers.

Until it is mandatory and common for producers to provide the public or researchers with such data, other approaches would be more feasible. For the short term, an *approach based on a list of labelled products might be the easiest and most comprehensive way to make BIC recommendations*. Here, there is at least some data available and access to this might be simplified in the future due to current discussions on the topic. So far, the existing options can be used and with partnerships the data might suffice for several product categories to make proper recommendations. The approach based on environmental (+ ideally social) product information would be potentially providing more user value and be scientifically more thorough, so aiming for this one it becomes realistic could enhance the helpfulness of the recommendations.

For easier scalability, it makes sense to *give ratings to whole companies/brands rather than individual products*. Those companies could be selected based on options mentioned above, e.g. producer based or company based labels, but also Organizational Environmental Footprints (OEF) which are also being introduced by the EU as a common framework. In the end, the development of a mixed set of criteria would be work intensive and needs thorough consideration, but could provide the best overall value on the relevant dimensions or could help to fill data voids of singular approaches. For some products and organizations, labels might be available, for others there might be PEFs published or there are estimations on the company's responsibility or form of governance. For some, several points of information might be available. *With a set of rules, more sustainable products could be distinguished on the basis of either of these information points, using the data which is there, as long as overall data availability is limited.*

In total, it can be concluded that it remains a challenge to provide users with useful, science-based information and sustainable product recommendations on a large scale as receiving or finding this data is challenging to begin with.