

ATEA SUSTAINABILITY FOCUS

Report to Responsible Business Alliance
JANUARY 2020



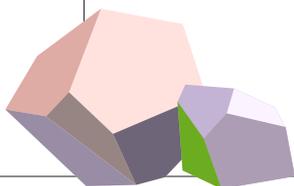
Closing the loop on materials

Five steps to close the loop on materials in the IT value chain

Atea Sustainability Focus (ASF) is an initiative that enables Nordic IT buyers to amplify their voice and set joint expectations for the global IT industry by providing annual recommendations to the Responsible Business Alliance (RBA) and its member companies.

In 2020, Nordic IT buyers and the ASF Advisory Board conclude that the global IT industry should keep focusing on circular economy and accelerate its work on closing the loop on material flows.

With the input provided from stakeholder dialogues with 639 professionals within IT, sustainability and procurement, as well as an industry analysis conducted by the sustainability consultancy firm Ethos International, the Advisory Board developed the following recommendations to RBA and its members.





1

Reach an industry-wide agreement on critical obstacles and incentives to close the loop on materials in the value chain; condense the findings in a report and invite stakeholders – including buyers – to a dialogue.

2

Through a systematic and science-based approach, identify which materials are the most significant to close the loop on in order to maximize the sustainability impact (environmental, social and economic). Share findings with the IT buyers.

3

When focusing on supply chain design for closing the loop on materials, define principles of a system for material recovery that is resource-, energy- and cost-efficient, while also mitigating social impact.

4

From a system's perspective; investigate and report on how different approaches to development and design of systems, products and services can affect the value of materials and the ability to recover them.

5

Based on points 1-4, develop recommendations to buyers on how their actions can support the progress toward a circular and climate-neutral IT industry.

The members of the Advisory Board formulated the recommendations during a two-day board meeting in November 2019. The meeting included a briefing on the stakeholder dialogues, industry analysis and themes suggested as the sustainability focus for 2020. The Advisory Board was engaged and had profound discussions that covered a wide range of perspectives, insights, and assessments before deciding on the final recommendations to the RBA.

Table of contents

Purpose of the report	5
The ASF process	6
Follow up on previous reports	7
Transparency	7
Circular economy	7
Stakeholder dialogues	9
Analysis	9
Recommendations to the Responsible Business Alliance	10
Advisory Board Statement	10
Industry analysis	12
Circular economy	12
Transparency	14
Conclusion	15
Appendix: Industry analysis – full version	16
Circular economy	16
<i>Definitions</i>	16
<i>The IT industry's performance on circular economy</i>	17
<i>Prolong the lifespan of products</i>	17
<i>Increase collection of used products</i>	19
<i>Standardization of components and accessories</i>	20
<i>Increase recycled content in new products</i>	20
<i>Decrease greenhouse gas emissions and energy use in the manufacturing phase</i>	22
<i>Identifying gaps between IT buyers' expectations and industry performance</i>	23
Transparency	25
<i>Identifying gaps between IT buyers' expectations and industry performance</i>	26
A reflection on sources used	26
Appendix II – ASF Customer dialogue	28
References	30

Uniting voices for sustainable impact



Photo: Noelle B. Miller.

Chiara Selvetti,
Head of sustainability,
Atea Sweden.

When buyers' investments align with their values, they can create large ripple effects. Engaged IT buyers in the Nordics have had this clear for some time and the global IT industry has noted their ambition. The challenge is to achieve consistency and alignment in sustainability demands. This is what drives Atea Sustainability Focus – a platform for IT buyers to unite their voices and drive responsibility in the global IT industry.

Collaboration is key for sustainability and digitization leaders in the Nordics

Through the ASF Dialogue, IT decision makers voice their views about the sustainability work of the IT industry and what efforts they want the industry to prioritize. More than double the number of decision-makers made their voices heard this year! And for the third year, a group of 13 digitization and sustainability leaders from the public and private sector were willing to invest their time and knowledge to catalyze the ASF Advisory Board recommendations. These are exciting signs that the motivation to collaborate is alive and well in the Nordics!

Our united voice takes us so much further

Harnessing the collective experience and competence of the members for a common purpose is what brings

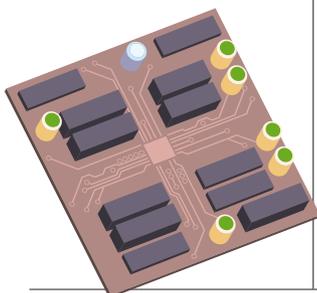
together leaders in the Advisory Board. Their recommendations, which build on the clear directions from the ASF Dialogue, are the essence of – not only this report – but the whole ASF project. It enables Nordic IT buyers to speak with one voice, which in turn has tremendous impact. A unified voice makes people listen and act, as it provides a single clear framework to unite behind. It also makes it easier to follow up progress, outlined in detail throughout this report.

At a time where the art of collaborating for a common good appears to be globally under threat, the ASF Dialogue and Advisory Board are shining examples of the opposite. Atea therefore invests in facilitating the ASF Dialogue, in supporting the work of the ASF Advisory Board and in publishing this report. Finally, we organize the conference “The ASF Forum” to discuss key findings with the global IT industry.

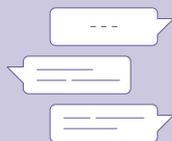
There are many people with huge passion and commitment behind this report. Your valuable input has brought us one step further toward creating a sustainable future for the global IT industry.

A handwritten signature in black ink, appearing to read 'Chiara Selvetti'.

Chiara Selvetti



The ASF process



Stakeholder dialogue
Nordic IT buyers identify key sustainability aspects through an online survey and offline dialogues.



Industry analysis
Sustainability experts conduct an industry analysis of the top three areas selected.



Recommendations
The ASF Advisory Board, comprised of leading IT and sustainability professionals from Nordic companies, municipalities and organizations, selects a focus area and formulates concrete recommendations.



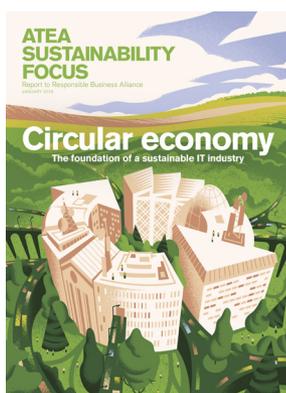
Handover to the industry
RBA and its member companies decide on specific activities to implement the recommendations from the ASF Advisory Board.

FOLLOW UP
ON PREVIOUS
REPORTS

Reporting framework for transparency and circularity task force in place



Atea Sustainability Focus –
Report 2018



Atea Sustainability Focus –
Report 2019

During the Advisory Board meeting, RBA’s vice presidents Deborah Albers and Bob Mitchell reported back to the Board about actions taken on the ASF reports on Transparency and Circular Economy. Below is a summary of the update and the Advisory Board’s thoughts on the progress.

The RBA sees the Atea Sustainability Focus initiative as a “unique voice” as it represents the customer perspective in a “leading market”, and they value the input provided by the Nordic IT buyers and the Advisory Board.

Transparency

In the first report of 2018, the Advisory Board urged the RBA to “establish and implement a uniform reporting framework for the electronics industry; covering environmental, social and governmental impact across material indicators and measurable performance over the full value chain.” In September 2019, the RBA launched “Practical Guide to Transparency in Procurement”, which lists indicators considered meaningful for the industry to report on and the buyers to ask for. The guide is based on intersections of globally recognized standards, such as GRI, SASB and OECD and has a Good/Better/Best approach that demonstrates a pathway to

increased transparency for all companies regardless of maturity. Buyers can use the guide to assess companies’ commitment to sustainability, management systems and the impact those systems have.

The Advisory Board is very pleased to see that RBA has transformed the recommendations in the first report into a concrete tool. The Board was impressed to see how fast the RBA was able to align its members around the idea of a framework and also addressed the buyers’ perspective. The guide is a great step forward and recognizes that both buyers and the industry in whole need to play a role if the guide is to be widely adopted as a reporting and procurement tool.

Circular economy

The report of 2019 focused on circular economy – the most important sustainability aspect according to Nordic IT buyers. The Advisory Board recommended the RBA to “develop and implement a 2050 climate-neutral and competitive Business Roadmap for the transition into a circular economy” by contributing to a certifiable standard, establishing a task force on circularity and to investigate how circular economy provisions could be included in the Code of Conduct and audit protocols.

While the issue of transparency caters to RBA’s core, which



“I’m impressed with the actions to assemble stakeholders to address the circular economy recommendations, and I have high expectations on the future collaboration to cover the whole industry.”

Erik Nilsson, IT sustainability manager, H&M

RBA’s circularity vision

An integrated international supply chain that supports circular material use and protects human rights and the environment.

historically has been supply chain focused, circular economy presents challenges that go beyond the scope of the RBA and thus, the Board’s recommendations are more challenging to embrace in full.

Even so, a task force on e-waste was formed already in 2018 in response to increased member interest. The group has now transitioned into a task force on circularity with the aim to address the circular economy in a way that harnesses RBA’s strengths and remains connected to e-waste. Identified areas are:

- Material reclamation and reuse
- Human and environmental impact of those processes

The task force is not focused on product design or material engineering, nor does it set goals and targets.

RBA has also initiated a collaboration with several organizations

representing the IT and electronics industry and/or qualified expertise in the circular economy. The idea is to develop a roadmap for a circular electronics value chain.

The Advisory Board was impressed with the swift actions by the RBA and appreciated the thorough reporting on how recommendations from the previous report were addressed. The Board recognizes that RBA currently has the most impact in issues related to supply chain but would like to underpin the importance of design. The statement in the report of 2019 on how circular economy must start in the design phase was meant to be viewed at a systemic level, and the Board believes the RBA can influence a mindset where resource-efficiency is a guiding principle in design. Therefore, the Board is happy to see that the recommendation to launch academy trainings in circular design is under evaluation.

“I consider the guide to be a good first step in aligning with international frameworks and it is structured in a way so that even less mature companies are not scared away. I support the scalability of the guide and consider it a valuable step in harmonizing the procurement process. With it comes the opportunity to make the process more efficient, and to inform decision making, using a common language built upon international standards (although I find that some core elements from UNGP are not covered). I am positive to see that Circular Economy as a concept is included – an area I hope will get even more focus in the next revisions of the guide.”

Maria Færgemann Eg, Sustainable Procurement Manager, Nordea

Stakeholder dialogues

Through an online survey and the conference “ASF Forum” during 2019, IT buyers in the Nordics shared their views on what they and the IT industry can do respectively to promote circular economy and transparency within the IT industry.

Analysis

In general, IT buyers want to have easy and accessible information available when procuring IT products. They want to know what brands are doing on transparency and circular economy on an aggregated level that is easy to understand. The survey showed that the most important sustainability area for IT buyers – by far – is environmental impact, and the focus on environmental impact is also common in other industries as companies have worked with environmental issues for decades. Other areas, such as human and labor rights, are on the rise as well. Corruption is ranked lowest. Perhaps not surprising, given the greater exposure of workers’ rights and environmental issues and the fact that the Nordic countries themselves traditionally have enjoyed low corruption, but still worrying.

The survey also showed that IT buyers would like to use their products for longer, send back products they no longer use and have more recycled content in their new products.

They are, however, not so interested in reusing products, which is somewhat contradictory from a circular economy perspective. This could be due to assumptions about inferior performance of used products, perceived financial risks if a product should malfunction or because they want to stay up-to-date.¹

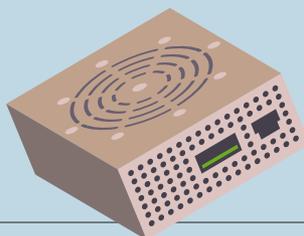
IT buyers’ expectations on the IT industry and circular economy:

1. Increase the proportion of recycled materials in products
2. Increase the lifespan of products through design (e.g. reparability)
3. Minimize e-waste

IT buyers’ expectations on the IT industry and transparency:

1. Demand that suppliers and manufacturers report according to a common reporting framework
2. Show which manufacturers that report according to a common reporting framework
3. Report industry progress on sustainability issues

¹ Meloni et al., 2019



The typical respondent:

- IT decision maker
- From a large organization (500+)
- Public or private (50/50)

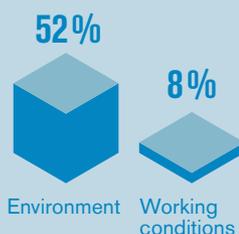
59%

Claim sustainability issues have high or very high priority in procurement of IT.

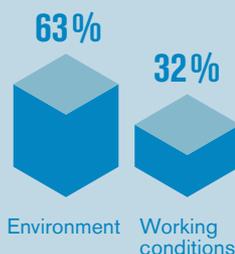
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Believe the industry does a good or very good job with sustainability.

Current priorities

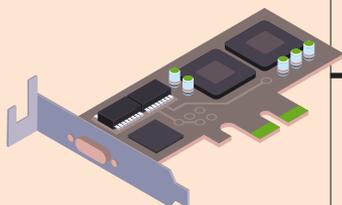


Future priorities



For more results on the ASF Customer dialogue, please see Appendix II, available in the digital version.

Recommendations to the Responsible Business Alliance (RBA)



We, the members of the Advisory Board, conclude that the most critical step to accelerate the transition toward a circular IT industry is to close the loop on materials*. The sustainability potential is vast as it contributes to:

- Reducing energy use and greenhouse gas emissions from the extraction of virgin raw materials.
- Reducing the impact on ecosystems and human health caused by the extraction of virgin raw materials and toxicity from e-waste in landfills.
- Mitigating resource depletion of critical materials.

We also believe that closing the loop on materials is an aspect the industry is able to act on directly and see clear incentives for collaboration, such as:

- Physical: Raw materials becoming increasingly scarce.
- Political: Geopolitical complexities facing the supply of crucial minerals.
- Commercial: Ensuring access to reused and recycled materials of high quality.

*In this context, closing the loop refers to enabling the re-use and re-cycling of materials that are incorporated in IT products, but not necessarily looped within the same products/industry.

- Legal: Regulations on e-waste hindering increased reuse and recycling of critical materials.

We recognize the critical role the RBA and its member companies hold in the circular transition of the IT industry and want to support this transition through the following recommendations. The recommendations are listed in a hierarchy, where the implementation of the first enables the second and so forth:

1. Reach an industry-wide agreement on critical obstacles and incentives to close the loop on materials in the value chain; condense the findings in a report and invite stakeholders – including buyers – to a dialogue.
2. Through a systematic and science-based approach, identify which materials are the most significant to close the loop on in order to maximize the sustainability impact (environmental, social and economic). Share the findings with IT buyers.
3. When focusing on supply chain design for closing the loop on materials, define principles of a system for material recovery that is resource-, energy- and cost-efficient, while also mitigating social impact.

4. From a system's perspective, investigate and report on how different approaches to development and design of systems, products and services can affect the value of materials and the ability to recover them.
5. Based on points 1-4 above, develop recommendations to buyers on how their actions can support the progress toward a circular and climate-neutral IT industry.

We acknowledge that the RBA will need to deepen its collaboration with other initiatives and stakeholders to maximize the synergies and the support available to its member companies in the transition toward a circular economy. The RBA also has a critical role in establishing a global vision for a circular and climate-neutral IT industry together with stakeholders, which goes beyond closing the loop on materials and encompasses systemic shifts in the linear production-consumption model that still prevails.

Members of the ASF Advisory Board

Annika Ramsköld, Vattenfall
Björn Sigurdson, Uppsala Municipality
Catarina Paulson, Alfa Laval
Erik Nilsson, H&M
Jessika Lind-Petrén, Stena Metall
Josefin Levander, Malmö Municipality
Kajsa Nylander, Systembolaget
Maria Færgemann Eg, Nordea
Pernilla Bergmark, Ericsson
Per-Ola Ostréus, Tetra Pak
Peter Nohrstedt, SKL Kommentar
Thomas Okke Frahm, Vestas
Åsa-Pia Folkesdotter, Ikea



Industry analysis

The purpose of the analysis is to identify gaps between IT buyers' expectations on circular economy and transparency and what the IT industry actually delivers.

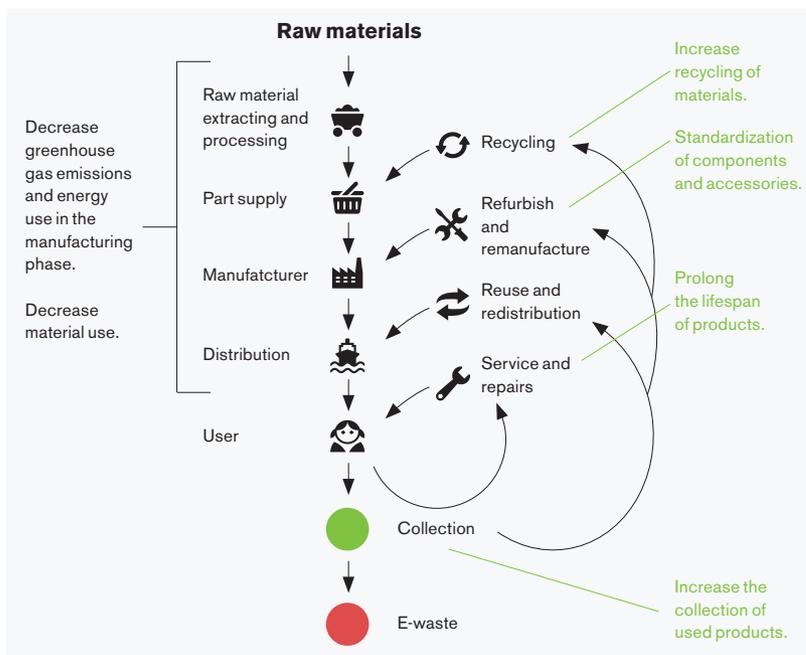
Circular economy

The industry analysis is based on actions buyers consider to be most important for the industry to implement in order to create a more circular management of IT products. Figure 1 shows the potential circular value chain of the IT industry and where the actions analyzed are situated.

This is a summary of the findings, except for the topic "Increase recycling of materials" which is covered in full as it is the one most related to the focus of this report. The complete industry analysis can be found in the appendix available in the digital version.

The development toward a circular economy in the IT industry depends on what actions brands take in the coming years, but as it is a systemic change, it is also heavily dependent on what IT buyers do. The way that products are seen needs to change, shifting focus from the product itself to the function it delivers. An important aspect is that IT buyers need to overcome their prejudice toward used products so that the second-hand market can grow. Another aspect is the difficulty for consumers to make an optimal choice of how long a product should be used. An optimal lifespan from an environmental perspective is often not ideal from a financial or operational perspective.

Figure 1. The circular value chain of the IT industry with topics for increased circularity



Increase recycled content in new products

If a product is no longer suitable for reuse and refurbishment, materials should be recycled, see Figure 1. The extraction of raw materials emits a range of different pollutants with negative impact on human health and ecosystems.² The extraction process also generates a lot of mining waste. For example, the production of one laptop generates approximately 1,2 metric tons of mining waste.³

The process of treating reused and recycled materials is less polluting, thus decreasing negative environmental and health impact of the manufacturing of products.⁴ However, out of the total amount of global e-waste, only 20 percent is documented to be recycled properly.⁵ Four percent is estimated to be thrown into the residual waste and 76 percent has an unknown handling.⁶ The undocumented waste is most likely traded, dumped or recycled under inappropriate conditions.⁷

Choice of material important to enable increased recycling

Product design is key to enable increased recycling.⁸ It is possible to increase the recycling rate substantially if products are designed for recycling at end of life.⁹ An important design aspect to enable increased recycling is to use the right kind of material. An analysis of the current feasibility of reusing and recycling three common materials in IT-products is presented in Table 2.

Glass is not feasible to reuse since the material often is damaged and has the wrong size, thickness or color;¹⁰

² OECD, 2018

³ Laurenti & Stenmarck, 2015

⁴ OECD, 2018

⁵ Baldé, C.P et al., 2017

⁶ Baldé, C.P et al., 2017

⁷ Baldé, C.P et al., 2017.

⁸ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.

⁹ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.

making recycling more suitable as it consumes less energy and causes fewer emissions than production of virgin glass. To maintain the quality of recycled glass, a well-managed supply chain is required which takes a lot of effort in relation to the value obtained. This is especially true for high-spec products, such as screens, that are sensitive to impurities.¹¹

The reuse of plastic has similar problems, since the material is often damaged or has the wrong physical properties. The reuse of plastics works best if it is looped back to the company that produced it. Recycling plastic is more feasible than reusing it, especially for pure plastic, where PC and ABS are among the plastic types that maintain much of their value as recycled.¹² There are also new plastic polymers that are similar in quality to virgin plastic when recycled.¹³ To promote a circular economy and reduce the environmental impact of plastic, it is therefore necessary to reduce the use of non-recyclable plastics. If all the plastic in generated e-waste in Europe each year was recycled, it would reduce CO₂ emissions with more than 2,5 million metric tons per year¹⁴, similar to 3,540 return flight trips between Stockholm and Bangkok.

Metals can be reused but are preferably recycled.¹⁵ Among the three materials covered in this section, metals are the most valuable and retain most of its value when recycled. The value of the global scrap and waste market almost only consists of the metal's value, even though metals only stand for around half the weight

¹⁰ EICC & Antea, 2016

¹¹ EICC & Antea, 2016

¹² EICC & Antea, 2016

¹³ Meloni et al., 2018

¹⁴ Raudaskoski et al, 2019

¹⁵ EICC & Antea, 2016

¹⁶ EICC & Antea, 2016

Table 2. The feasibility to reuse and recycle glass, plastics and metals¹⁶

	Reuse	Recycle
Glass	Not feasible	Marginally feasible
Plastics	Marginally feasible	Feasible
Metals	Marginally feasible	Feasible

Table 1. The gaps identified in the analysis

Topic	Gap	Comment
Prolong the lifespan of products	Medium	IT buyers would like to be able to use their products longer. The trend suggests that the lifespan of laptops is stabilizing and increasing for smartphones. A few brands are offering repair services, making it easier to maintain products. However, experts in the field claim that the lifespan of IT products are decreasing and that products are designed to be difficult to repair. Some brands are also accused of planned obsolescence. This results in a conflicting status of the industry performance on this topic.
Increase the collection of used products	Large	Minimizing e-waste is important for IT buyers. Major brands are offering take-back programs but the amount of IT products taken back is still low and projections suggest that e-waste is continuing to increase.
Standardization of components and accessories	Large	Standardized components and accessories is important for IT buyers. The industry has shown some progress on the standardization of accessories by moving toward a common smartphone charger. However, the overall progress on this topic is limited, especially for components.
Increased recycled content in new products	Large	IT buyers want the industry to increase the proportion of recycled content in new products and to minimize e-waste. Materials can be recycled to a larger extent with current technology and new technologies are available to increase the efficiency of recycling. However, projections suggest that e-waste is continuing to increase.
Decrease greenhouse gas emissions and energy use in the manufacturing phase	Medium	A decrease in greenhouse gas emissions and energy use is expected by the buyers. The available data on the IT industry's performance on the issues show that emissions and energy use have been stable in recent years. Therefore, the industry needs to accelerate its efforts and start decreasing its emissions of greenhouse gases and energy use.
Decrease material use	Large	Buyers want the industry to decrease its material use. However, the material use is expected to increase in the coming years, and the IT industry is one of the main drivers for the global metal consumption.

of that market.¹⁷ Figure 5 shows that the value per kilograms of metals in e-waste far exceeds the value of plastics in e-waste.

In the future, the use of primary and secondary materials is estimated to increase at the same rate, and it is projected that recycling will become more competitive than the extraction of raw materials. There are several new technologies for recycling on the rise with benefits, such as increasing efficiency and lowering environmental impact.

Transparency

Transparency drives sustainability and the IT industry is no exception. Brands' and manufacturers' awareness and maturity on social responsibility has increased in recent years. More brands are making information about their supply chain public, even though few can prove visibility beyond tier 2. The increased transparency is linked to improvements in due diligence programs for conflict minerals as well as purchasing organizations' requests for information.¹⁸

Many IT brands disclose their governance of, and performance on, sustainability as part of their annual

reporting. The EU directive on non-financial reporting, along with the pressure from stakeholders, have increased the quality of such reporting in recent years. However, it can still be hard to compare the sustainability performance of different brands since they may not disclose the same information in the same way.

Even if all brands would use a common reporting framework, it would probably be difficult to track industry progress on specific issues as the information is not compiled and summarized in one place.

Identifying gaps between IT buyers' expectations and industry performance

The industry has done progress on transparency in recent years. There is, however, still some way to go before the industry delivers what IT buyers expect. Table 3 shows the gap for each topic listed as important by IT buyers.

¹⁷ OECD, 2018

¹⁸ Baldé, C.P et al., 2017

¹⁹ Meloni, et al., 2018

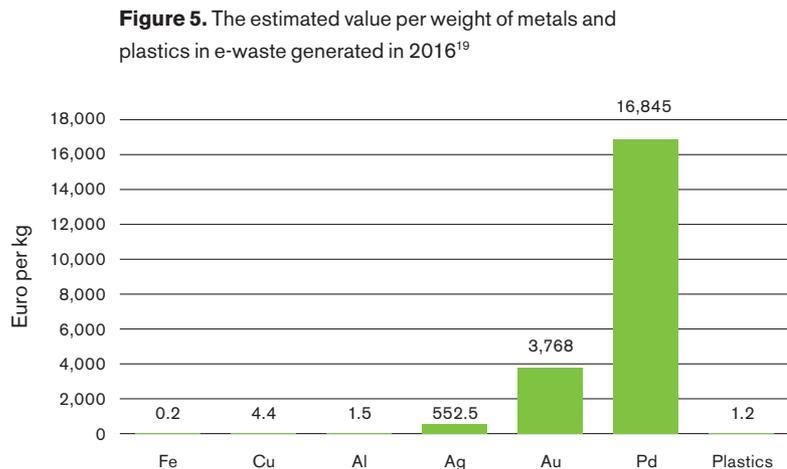
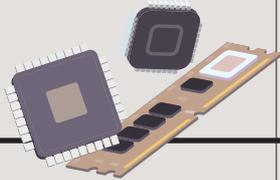


Table 3. The identified gaps on transparency

Topic	Gap	Comment
A common reporting framework	Medium	The IT industry is already reporting, to some extent, according to GRI Standards. When implemented, RBA's practical guide on transparency in procurement is going to be a good first step for an industry-specific framework. These initiatives should be further developed to ensure an easy and accessible framework for the IT industry to use and the IT buyers to understand.
Communication on industry progress	Medium	There are some reports done, for example on e-waste and conflict minerals, but several issues are currently not covered.
Compliance with international guidelines	Large	The IT buyers would like to see how many in the industry that comply with the UN Guiding Principles on Human Rights and OECD Guidelines for Multinational Enterprises. Currently, there are no industry-wide compliance assessments on these guidelines.



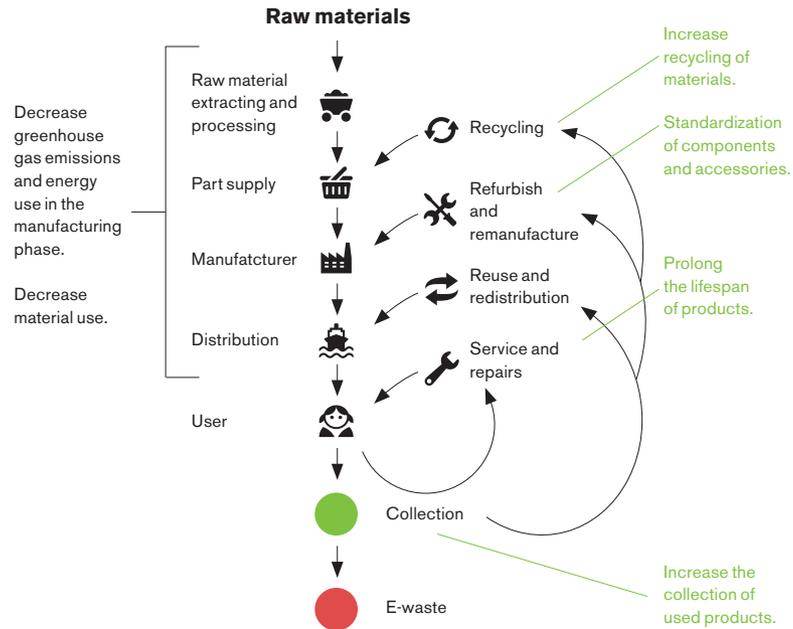
Conclusion

For the third year in a row, voices of the Nordic market have been consolidated to set the sustainability agenda for the IT industry through the Atea Sustainability Focus initiative. An Advisory Board representing the largest Nordic IT buyers has identified, with consideration to Nordic IT buyers' opinions and an industry analysis, that closing the loop on materials is the most important step toward a circular economy for the IT industry.

To support the industry in the transition toward a circular economy, the Board has developed five recommendations to the RBA and its member companies. These recommendations will help the industry to identify challenges and opportunities that lie ahead as well as how to manage them.

The report also summarizes the progress made on transparency and circular economy which were the themes of the first and second ASF report. This proves that IT buyers' requirements drive sustainability progress in the IT industry and that consolidating IT buyers' voices helps make demands clearer which supports the industry to focus their efforts.

Figure 1. The circular value chain of the IT industry with topics for increased circularity



Appendix I Industry analysis

Circular economy

The purpose of this section is to:

- Identify gaps between IT buyers' expectations on the industry to deliver on circular economy and what the IT industry actually delivers.
- Identify potential collaboration opportunities within circular economy in the IT industry to close identified gaps.

The industry analysis is based on actions IT buyers consider to be the most important for the industry to implement in order to create a more circular management of IT products.

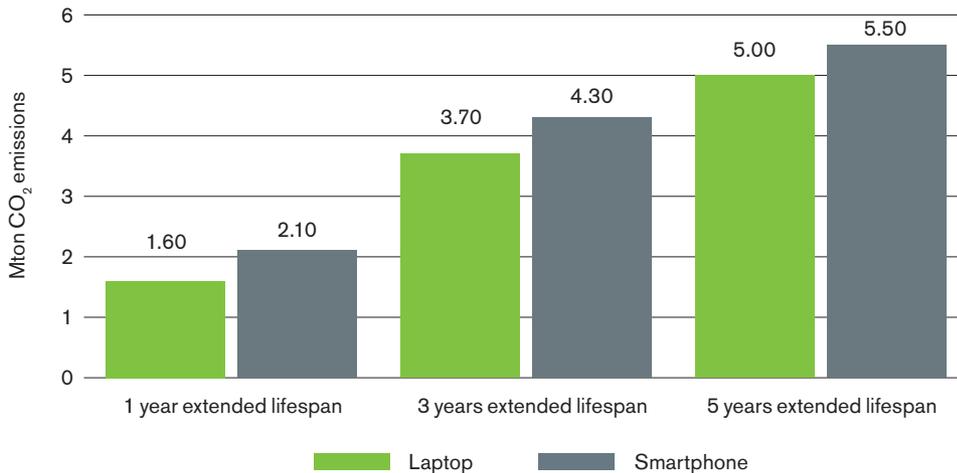
Figure 1 shows the potential circular value chain of the IT industry and where the actions analyzed are situated.

Definitions

The used definition for circular economy is developed by the Ellen MacArthur Foundation, which states that circular economy "... entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources ..."²⁰ The idea is that products, components and materials are recovered and restored. This is done by four strategies which, in order of efficiency, are:²¹

²⁰ Ellen MacArthur Foundation, 2019.
²¹ Ellen MacArthur Foundation, 2019.

Figure 2. Decrease in CO₂ emissions with increased lifespan of laptops and smartphones²⁶



1. Services and repairs, or prolonged lifespan
2. Reuse and redistribution
3. Refurbish and remanufacture
4. Recycling

The used definition of e-waste is developed by the Partnership on Measuring ICT for Development and used by the Global E-waste Monitor. It is a broad definition which covers six different e-waste categories listed below.²² In this report, the focus is on category two and six.

1. Temperature exchange equipment, such as refrigerators, freezers, air conditioners and heat pumps.
2. Screens and monitors, such as TVs, tablets and laptops.
3. Lamps, such as LED lamps and fluorescent lamps.
4. Large equipment, such as washing machines and large printing machines.
5. Small equipment such as vacuum cleaners, microwaves, electric shavers and electric toys.
6. IT products such as mobile phones, GPS, pocket calculators, routers and printers.

The IT industry's performance on circular economy

Below is a review of what the industry is doing on the topics identified by the IT buyers. The topics are presented in order of efficiency from a circular economy perspective (see definition section above). Figure 1 displays where in the value chain topics will have greatest impact.

Prolong the lifespan of products

Prolonging the lifespan of products is the most efficient measure from a circular economy perspective, as it preserves the value of the product without the need for further processing, see Figure 1. If the lifespan of all laptops in the EU were increased by one year, it would decrease carbon dioxide emissions with 1,6 megaton, which equals taking 870,000 cars off the roads, see Figure 2.²³ The public's awareness of the lifespan and reparability of appliances and IT products is increasing. Additionally, the EU is introducing new regulations aimed at extending the use of products.²⁴ However, when it comes to fast evolving technologies, prolonging a product's lifespan without having the possibility of upgrading its functionalities will often not result in the product being used for longer.²⁵

²² Baldé, C.P et al., 2017

²³ EBB, 2019

²⁴ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.

²⁵ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.

²⁶ EBB, 2019

No reliable studies on global average lifespan of IT products were found for this analysis. However, a study commissioned by the environmental agency in Germany found that the lifespan of laptops was fairly constant; approximately five to six years between 2004 and 2012. In 2004, 70 percent of laptops were replaced due to new technological developments and buyers desire to upgrade. In 2012, the number of laptops replaced by the same reason had decreased to 25 percent. At the same time, technical defects had emerged as a common reason for replacement, also standing for 25 percent.²⁶ Recent trends suggest that the lifespan of smartphones are increasing in several countries, as can be seen in Figure 3.

Researchers from the Mistra REES research program in Sweden recently wrote an opinion article claiming that the lifespan of IT products is considerably shorter than it was a decade ago. According to the article, it has become cheaper to buy new products while repairing products has become more

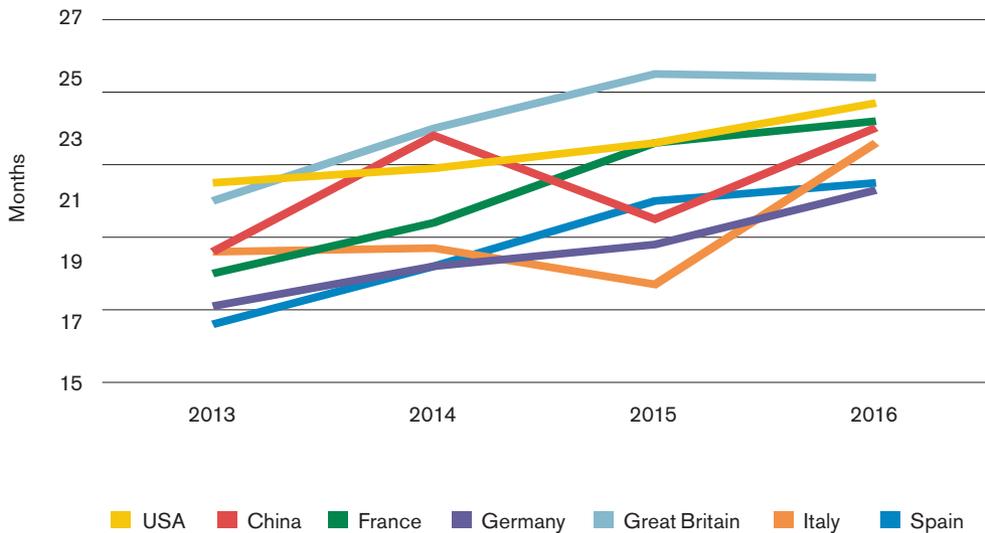
difficult and expensive. They also claim that manufacturers make products difficult or impossible to repair on purpose, accusing them of using planned obsolescence as a strategy.²⁷

Planned obsolescence receives higher attention

The issue of planned obsolescence received attention in 2018 when Apple and Samsung were accused of planned obsolescence. This resulted in a fine for both companies in Italy, over 60 lawsuits in the US and a criminal investigation in France against Apple. Since then, Apple has admitted to slowing down older smartphones as a protective measure for batteries; however, denying it had anything to do with intentionally shortening the lifespan. Samsung has also rejected the use of planned obsolescence as a strategy.²⁸

There are two main product repair strategies adopted by companies to increase product lifespan; either to have a certified technician conduct repairs or to allow anyone to do them.²⁹ Apple is an example of the first

Figure 3. The lifespan of smartphones³⁰

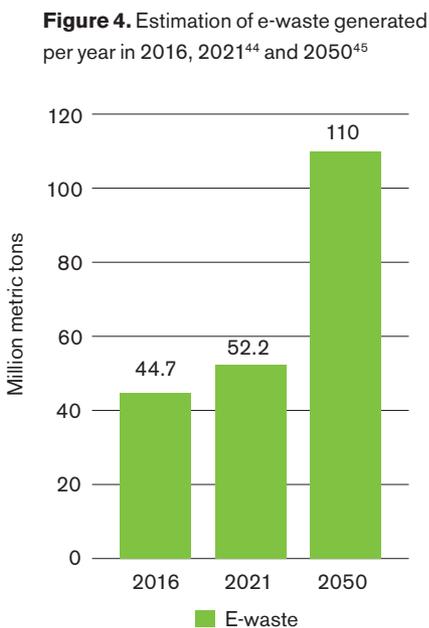


²⁶ Prakash et al., 2015
²⁷ Lindahl, M et al. 2019
²⁸ The Guardian, 2018
²⁹ Meloni et al., 2018.
³⁰ Kantar WorldPanel, 2017

strategy, where products should be repaired in Apple stores or by an Apple-service partner.³¹ Fairphone is an example of the second strategy, where the design of the phone enables an easy replacement of parts without the need of a technician.³² Recently, the EU adopted new laws that oblige manufacturers to make their products easier to repair by for example providing spare parts and repair instructions.³³ From a legal standpoint, current laws only cover large electric appliances and monitors but more products are planned to be included, starting with smartphones.³⁴

Increase collection of used products
E-waste expected to continue to increase

Collection of used products is one of the cornerstones in a circular economy as it enables redistribution, refurbishment and recycling, see Figure 1. In 2016, around 44,7 million metric tons of e-waste was generated worldwide. If current trends continue, a recent study suggests the amount of e-waste generated globally will increase by 9,3 percent to



52,2 tons in 2021,³⁵ reaching 110 million tons worldwide in 2050,³⁶ see Figure 4. The total value of raw material in e-waste generated in 2016 has been estimated to 55 billion euros, which may be on the low side since it does not take into account the increased value of material when processed into products.³⁷ Waste from IT products is estimated not to increase as much as other e-waste categories because of miniaturization. E-waste from screens will even decrease as the bulky cathode ray tube (CRT) screens have been replaced with modern flat-panel displays.

Still untapped potential with take-back programs
All major brands and retailers offer take-back programs. A take-back program is an initiative organized by a manufacturer or retailer to collect used products or materials with the purpose to reintroduce them into original manufacturing and processing.³⁸ The collection of used products varies depending on, for example, the product's condition, people's tendency to store devices at home or placing them in general waste bins, keeping devices as a potential back up, and giving them to friends and family.³⁹ For specific products, such as smartphones, a standardized collection system is essential to increase the confidence in the system.⁴⁰ Such systematic collection of used products is currently not in place to a large extent and, despite these efforts, overall collection rates remain low.

But there are good examples of the opposite. HPE is a brand that has a systematic collection of used products. Of the four million units of products taken back by HPE in 2018, nearly 90 percent were refurbished and sold as pre-owned.⁴¹ There are also some successful programs already in place for printers and toner cartridges by HP and Lexmark.⁴²

The second-hand market is mainly dominated by small and medium-sized companies. An example is Inrego in Sweden which buys used products from organizations.⁴³

³¹ Apple, 2019
³² Fairphone, 2018
³³ Anastasio, 2019
³⁴ Anastasio, 2019
³⁵ Baldé, C.P et al., 2017
³⁶ UN University, 2019
³⁷ Baldé, C.P et al., 2017.
³⁸ Circular Economy Practitioner Guide, 2019
³⁹ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.
⁴⁰ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.
⁴¹ Computereweekly.com, 2019
⁴² Meloni et al., 2018
⁴³ Inrego, 2019
⁴⁴ Baldé, C.P et al., 2017
⁴⁵ UN University, 2019

There are two main obstacles for increasing the collection of used products: the first relates to the actual take-back of used products and the second to consumer preferences toward reusing products instead of buying new, see Table 1.⁴⁶

Information of the location, condition and recovery potential of products is important to help users and manufacturers see the value of used products. This can be achieved by a material passport – connecting the product with information about its material composition. Information sharing can however be sensitive but the associated risk could decrease if there is an understanding of what information that is needed and if suitable channels for information sharing are used.⁴⁷

Standardization of components and accessories

In a circular economy, a used IT product should be collected and refurbished if needed, see Figure 1. Refurbishment can enhance the value of the product and prolong its lifecycle, but the progress toward the standardization of components is limited. Standardization of components and accessories is technically possible, but there are competitive and business strategy aspects that need to be considered.⁴⁸

One example of where the industry has moved toward a standard is the mobile phone charger. The European Commission

has been pushing for a common charger since 2009. In response to this, 14 companies including Nokia, Samsung, Huawei and Apple signed a voluntary memorandum of understanding in 2009 where they agreed to harmonize chargers for new smartphone models that were going to be released in 2011. However, not all of them did harmonize their chargers with the industry, and the European Commission is investigating other approaches in addition to voluntary actions.⁴⁹

Increase recycled content in new products

If a product is no longer suitable for reuse and refurbishment, materials should be recycled, see Figure 1. The extraction of raw materials emits a range of different pollutants with negative impact on human health and ecosystems.⁵⁰ The extraction process also generates a lot of mining waste. For example, the production of one laptop generates approximately 1,2 metric tons of mining waste.⁵¹

The process of treating reused and recycled materials is less polluting, thus decreasing negative environmental and health impact of the manufacturing of products.⁵² However, out of the total amount of global e-waste, only 20 percent is documented to be recycled properly.⁵³ Four percent is estimated to be thrown into the residual waste and 76 percent has an unknown handling.⁵⁴ The undocumented waste is most likely traded, dumped or recycled under inappropriate conditions.⁵⁵

Table 1. Obstacles for implementing take-back programs

Take-back of used products	Consumer preferences
<ul style="list-style-type: none"> • Lacking incentives for IT buyers to hand in their used products • Regulations focusing on controlling the generation of e-waste rather than enabling a circular economy • Lack of understanding of the value of uses products • Geographical spread of used products • Efficiency gap between the automated production of new products and the manual treatment of used products 	<ul style="list-style-type: none"> • Assumptions about inferior performance of reused products • Perceived financial risks if products are defective or malfunction • The wish to stay “modern” by buying the latest technology • Data security concerns

⁴⁶ Meloni et al., 2018
⁴⁷ Meloni et al., 2018
⁴⁸ Meloni, Marco; author of “Circular Consumer Electronics: an initial exploration” published by Ellen MacArthur Foundation. 2019. Interview 4th of November.
⁴⁹ Reuters, 2018
⁵⁰ OECD, 2018
⁵¹ Laurenti & Stenmarck, 2015
⁵² OECD, 2018
⁵³ Baldé, C.P et al., 2017
⁵⁴ Baldé, C.P et al., 2017
⁵⁵ Baldé, C.P et al., 2017.

Table 2. The feasibility to reuse and recycle glass, plastics and metals⁶⁵

	Reuse	Recycle
Glass	Not feasible	Marginally feasible
Plastics	Marginally feasible	Feasible
Metals	Marginally feasible	Feasible

Choice of material important to enable increased recycling

Product design is key to enable increased recycling.⁵⁶ It is possible to increase the recycling rate substantially if products are designed for recycling at end of life.⁵⁷ An important design aspect to enable increased recycling is to use the right kind of material. An analysis of the current feasibility of reusing and recycling three common materials in IT-products is presented in Table 2.

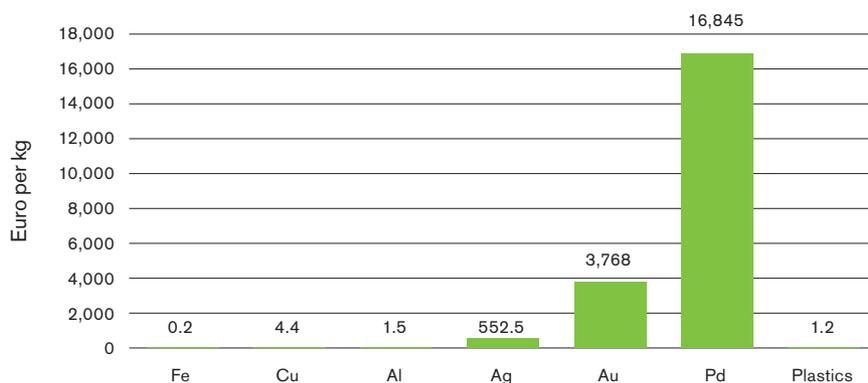
Glass is not feasible to reuse since the material often is damaged and has the wrong size, thickness or color;⁵⁸ making recycling more suitable as it consumes less energy and causes fewer emissions than production of virgin glass. To maintain the quality of recycled glass, a well-managed supply chain is required which takes a lot of effort in relation to the

value obtained. This is especially true for high-spec products, such as screens, that are sensitive to impurities.⁵⁹

The reuse of plastic has similar problems, since the material is often damaged or has the wrong physical properties. The reuse of plastics works best if it is looped back to the company that produced it. Recycling plastic is more feasible than reusing it, especially for pure plastic, where PC and ABS are among the plastic types that maintain much of their value as recycled.⁶⁰ There are also new plastic polymers that are similar in quality to virgin plastic when recycled.⁶¹ To promote a circular economy and reduce the environmental impact of plastic, it is therefore necessary to reduce the use of non-recyclable plastics. If all the plastic in generated e-waste in Europe each year was recycled, it would reduce CO₂ emissions with more than 2,5 million metric tons per year⁶², similar to 3,540 return flight trips between Stockholm and Bangkok.

Metals can be reused but are preferably recycled.⁶³ Among the three materials covered in this section, metals are the most valuable and retain most of its value when recycled. The value of the global scrap and waste market almost only consists of the metal's value, even though metals only stand for around half the weight of that market.⁶⁴ Figure 5 shows that the value per kilograms of metals in e-waste far exceeds the value of plastics in e-waste.

Figure 5. The estimated value per weight of metals and plastics in e-waste generated in 2016⁶⁶



⁵⁶ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.

⁵⁷ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019. Interview 4th of November.

⁵⁸ EICC & Antea, 2016

⁵⁹ EICC & Antea, 2016

⁶⁰ EICC & Antea, 2016

⁶¹ Meloni et al., 2018

⁶² Raudaskoski et al, 2019

⁶³ EICC & Antea, 2016

⁶⁴ OECD, 2018

⁶⁵ EICC & Antea, 2016

⁶⁶ Baldé, C.P et al., 2017

In the future, the use of primary and secondary materials is estimated to increase at the same rate, and it is projected that recycling will become more competitive than the extraction of raw materials.⁶⁷ There are several new technologies for recycling on the rise which increases recycling efficiency and lowers environmental impact,⁶⁸ for example:

- EnvironLeach has developed a treatment method for extracting both precious and base metals from e-waste using a non-cyanide, non-acid base process where all the additives are FDA approved.⁶⁹
- Ronin8 has developed a separation technology for printed circuit boards that enables separation of metals and non-metals. Current recycling technologies for printed circuit boards makes the non-metal parts unusable to extract the metal.⁷⁰
- Umicore uses a pyro-metallurgical treatment and a hydro-metallurgical process to recycle li-ion and NiHM batteries in a more sustainable way than current technologies.⁷¹

Decrease greenhouse gas emissions and energy use in the manufacturing phase

The global society is not doing enough to decrease greenhouse gas emissions, but it is harder to draw conclusions about the performance of the IT industry alone,⁷² as it is challenging to determine the historic, present and future emissions and energy use of an entire industry. It can, however, be concluded that most greenhouse gases are emitted and most energy is consumed in the manufacturing phase.⁷³

Quantifying emissions of the IT industry

Several studies have tried to quantify the global greenhouse gas emissions of the IT industry. One study looked at large historical data sets on energy and greenhouse gas emissions for the global IT industry⁷⁴ and found that energy use and emissions of greenhouse gases have leveled off. Energy consumption and greenhouse gas emissions in 2015 were roughly the same as in 2010, with a possible peak in 2012/13, even though the number of

users increased significantly. Projections of a near future show that emissions from the industry are estimated to stabilize. According to the authors of the study, this is possibly because:

- Sales of larger IT products such as TVs and PCs decrease in favor of smaller devices such as smartphones and tablets.
- Display technologies are more material- and energy efficient.
- The industry is moving toward small and energy-efficient devices, such as Internet-of-Things devices and communication modules.

Another study quantified carbon emissions from the IT industry by making an estimation based on the amount of greenhouse gas emitted throughout a product's lifecycle and an estimation of the number of products used. The study found that emissions have increased in recent years and is likely to continue to increase. In 2040, data centers are projected to be the largest emitter in the IT industry with 45 percent of total emissions, followed by communication networks with 24 percent.⁷⁵

Brands are acting to decrease emissions in their supply chains. HP Inc, formerly HP, was one of the first companies to set reduction targets for greenhouse gases and to report on their Scope 3 emissions.⁷⁶ Apple has made a commitment to use 100 percent renewable energy in its entire operations.⁷⁷ Several brands situated in the US are also committed to the Paris Agreement even though the US as a country is leaving the agreement.⁷⁸

Decrease material use

Growing population will double material consumption

It is complicated to draw any conclusions on the impact of the IT industry on material use, since there are many factors to consider.⁷⁹ The size of the global economy is estimated to increase fourfold between 2011 and 2060.⁸⁰ A growing population with higher income will drive demand for goods

⁶⁷ OECD, 2018

⁶⁸ Ellen MacArthur Foundation, 2017

⁶⁹ EnvironLeach, 2019

⁷⁰ Ronin8, 2019

⁷¹ Umicore, 2019

⁷² Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019 Interview 4th of November.

⁷³ EBB, 2019

⁷⁴ Malmmodin & Lundén, 2018

⁷⁵ Belkhir and Elmeligi, 2018

⁷⁶ Greenpeace, 2017

⁷⁷ Greenpeace, 2017

⁷⁸ We are still in, n.d

⁷⁹ Meloni, Marco; author of "Circular Consumer Electronics: an initial exploration" published by Ellen MacArthur Foundation. 2019 Interview 4th of November.

⁸⁰ OECD, 2018

and services that in turn will more than double the global material consumption from 79 gigaton in 2011 to 167 gigaton in 2060.⁸¹ Consumption and production will shift toward low- and middle-income countries that have a higher material intensity.⁸² At the same time, the growing service sector will decrease the demand for materials since it is not as material intense as other sectors.⁸³ Therefore, we will most likely see a decoupling between economic growth and material use.⁸⁴

The IT industry is less material intense than other industries but relies heavily on metals.⁸⁵ The global metal consumption, including all industries, is estimated to grow from 8 gigaton in 2011 to 20 gigaton in 2060.⁸⁶

The miniaturization trend is projected to continue, which could decrease resource use per product.⁸⁷ Cloud computing is also dematerializing the IT industry as it decreases the need for hardware.⁸⁸ Cloud computing will also enable more efficient use of computer storage and power compared to individual hardware.⁸⁹

Identifying gaps between IT buyers' expectations and industry performance

The IT industry has made efforts to become more circular. However, there is a large gap between what IT buyers expect and what the industry delivers today. Table 3 shows the gap for each topic covered in this analysis. As can be seen, the gap is large for all topics except for "Prolong the lifespan of products"

Table 3. The gaps identified in the analysis

Topic	Gap	Comment
Prolong the lifespan of products	Medium	IT buyers would like to be able to use their products longer. The trend suggests lifespan of laptops is stabilizing and increasing for smartphones. A few brands are offering repair services, making it easier to maintain products. However, experts in the field claim the lifespan of IT products are decreasing and that products are designed to be difficult to repair. Some brands are also accused of planned obsolescence, resulting in a conflicting status of the industry performance on this topic.
Increase the collection of used products	Large	Minimizing e-waste is important for IT buyers. Major brands are offering take-back programs but the amount of IT products taken back is still low and projections suggest e-waste is continuing to increase.
Standardization of components and accessories	Large	Standardizing components and accessories is important for IT buyers. The industry has shown some progress on the standardization of accessories by moving towards a common smartphone charger. However, the overall progress on this topic is, especially for components, limited.
Increased recycled content in new products	Large	IT buyers want the industry to increase the proportion of recycled content in new products and to minimize e-waste. Materials can be recycled to a larger extent with current technology and new technologies are available to increase the efficiency of recycling. However, projections suggest e-waste is continuing to increase.
Decrease greenhouse gas emissions and energy use in the manufacturing phase	Medium	Buyers expect the industry to decrease its greenhouse gas emissions and energy use. The available data on the IT industry's performance on the issues shows that emissions and energy use have been stable in recent years. Therefore, the industry needs to accelerate its efforts and start decreasing its emissions of greenhouse gases and energy use.
Decrease material use	Large	Buyers want the industry to decrease its material use. However, the material use is expected to increase in the coming years, and the IT industry is one of the main drivers for the global metal consumption.

⁸¹ OECD, 2018

⁸² OECD, 2018

⁸³ OECD, 2018

⁸⁴ OECD, 2018

⁸⁵ OECD, 2018

⁸⁶ OECD, 2018

⁸⁷ Baldé, C.P et al., 2017. Malmodin & Lundén, 2018

⁸⁸ Meloni, et al., 2018

⁸⁹ Meloni, et al., 2018

and “Decrease greenhouse gas emissions and energy use in the manufacturing phase”, where the gap is considered to be medium. The result is not unexpected as the concept of circular economy is fairly new. This shows the importance of putting pressure on the industry to accelerate the transition toward a circular economy and to be transparent about its sustainability performance.

The development toward a circular economy in the IT industry depends on what actions the brands take the coming years but, as it is a systemic change, it is also heavily dependent on what IT buyers do. The way products are seen needs to change, with the focus shifting from the product itself to the function it delivers. An important aspect is that IT buyers need to overcome their prejudice toward used products so that second-hand market can grow. Another aspect is the difficulty for consumers to make an optimal choice of how long a product should be used. An optimal lifespan from an environmental perspective is often not ideal from a financial or operational perspective.

Currently, the second-hand market is dominated by small and medium-sized companies and a systematic collection system for used products is lacking. New technologies, such as Internet-of-Things, bring great opportunities to overcome barriers that hinder the development of take-back systems. It can provide brands and manufacturers with information on the location and condition of the products they have sold, helping them understand their value. This will increase the incentive to take them back, process them and put them back on the market.

The case of the phone charger indicates how hard it is to standardize accessories and possibly also components. The industry has shown some progress when they united behind only using one type of charger for smartphones, but not all brands honored the voluntary agreement in the end. EU has adopted new legislation on product repairs, and legislation on standardized components is likely to follow.

There are new recycling technologies emerging that potentially could increase the efficiency and decrease the environmental impact of recycling. However, it is unclear if these technologies can be scaled up in the near future. Regardless, the main focus should be on increasing the share of e-waste recycled with current technologies. Cloud computing and miniaturization could be important concepts for reducing environmental impact. As the industry continues to grow it is probably safe to say that resource efficiency will be crucial.



Transparency

Transparency drives sustainability and the IT industry is no exception. Brands' and manufacturers' awareness and maturity on social responsibility has increased in recent years. More brands are making information about their supply chain public, even though few can prove visibility beyond tier 2. The increased transparency is linked to improvements in due diligence programs for conflict minerals as well as purchasing organizations' requests for information.⁹⁰

Many IT brands disclose their governance of, and performance on, sustainability as part of their annual reporting. The EU directive on non-financial reporting, along with the pressure from stakeholders, have increased the quality of such reporting in recent years. However, it can still be hard to

compare the sustainability performance of different brands since they may not disclose the same information in the same way.

Reporting frameworks, where the Global Reporting Initiative (GRI) Standards is the most dominant, have increased the quality of the brands' sustainability reporting. GRI also provides a database of all companies that report according to the GRI Standards. This provides a tool for IT buyers to see which companies in the IT industry that report according to a common standard, allowing for comparability. The analysis found that far from all the brands are reporting according to the GRI Standards, see Table 4 for a short overview. Several brands have also not submitted their sustainability report to GRI, which is a requirement to be compliant with the GRI Standards. However, some of the brands have made progress on reporting according to the GRI Standards in their 2019 Reports.

Table 4. IT brands according to the GRI database.⁹¹

Brand	2018 reporting
Apple	Not GRI Standards
ASUS	GRI Standards
Canon	No available report*
Dell	GRI Standards
Fujitsu	No available report*
HPE	Not GRI Standards
Kingston	GRI Standards
Kyocera	No available report*
Lenovo	GRI Standards
Microsoft	Not GRI Standards
NEC	No available report*
Panasonic	GRI Standards
Ricoh (Europe)	Not GRI Standards
Schneider	No available report*
Zebra	No available report*

*May have report citing GRI Standards, however not available through the GRI database.

Difficult to track progress

Even if all brands would use a common reporting framework, it would probably be difficult to track industry progress on specific issues since the information is not yet compiled and summarized in one place. There are industry reports of good quality such as the Global E-Waste Monitor for e-waste and the work done by the Enough Project on conflict minerals. Although, there are several issues that are not covered: resource use, emissions, labor and human rights. This makes it difficult for IT buyers to prioritize between different sustainability aspects when choosing suppliers. Further, IT buyers have an interest to be able to recognize brands that comply with the UN Guiding Principles on Human Rights and OECD Guidelines for Multinational Enterprises. These types of industry-wide assessments on brands and manufacturers abiding to these are currently lacking.

RBA's *Practical Guide to Transparency in Procurement* aims to address the issue of comparability of sustainability performance among suppliers. The guide allows IT buyers to better assess the level of transparency in

⁹⁰ TCO, 2019

⁹¹ GRI, 2019

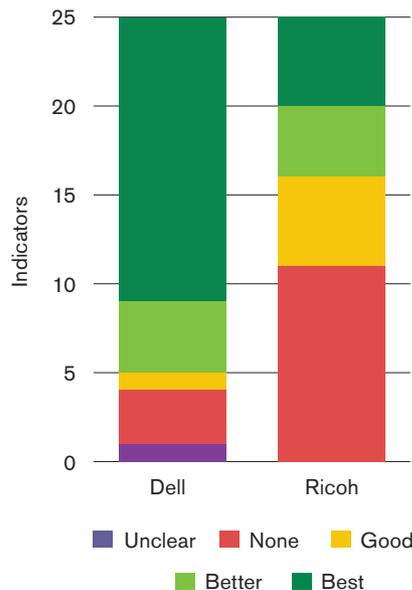
Table 5. The identified gaps on transparency

Topic	Gap	Comment
A common reporting framework	Medium	The IT industry is already reporting, to some extent, according to GRI Standards. When implemented, RBA's Practical Guide to Transparency in Procurement is going to be a good first step for an industry-specific framework. These initiatives should be further developed to ensure an easy and accessible framework for the IT industry to use and the IT buyers to understand.
Communication on industry progress	Medium	There are some reports done, for example on e-waste and conflict minerals, but several issues are currently not covered.
Compliance with international guidelines	Large	The IT buyers would like to see how many from the industry that comply with the UN Guiding Principles on Human Rights and OECD Guidelines for Multinational Enterprises. Currently, there are no industry-wide compliance assessments on these guidelines.

A reflection on sources used

In this report, studies that have conducted an assessment on the IT industry by using reliable methods and that are produced by trustworthy organizations like the UN, OECD or similar have been used. Such studies have been complemented with scientific papers, preferably from peer-reviewed journals, that include the entire IT industry in its scope. When such sources were not available, other sources have been used, such as reports that only include some countries or that have a wider scope than only the IT industry. This results in a level of uncertainty in the analysis which needs to be considered when reading this report and taking conclusions forward.

Figure 6. Result of the test of RBA's practical guide



a brand's reporting, on indicators partially based on the RBA code of conduct. Important to note is that the level of requirements in the code varies depending on sustainability area. It has strong requirements on labor rights, moderately strong requirements on human rights and limited requirements on environmental impact and anti-corruption. This means that even if a supplier reports on the highest level on the indicators, the supplier can still improve on the limited areas, comparing the level of requirements with other external frameworks or the buyer's own sustainability requirements. Here lies an opportunity for IT buyers to develop top-rated brands by defining requirements which go beyond the code.

Two companies have been tested to assess the results from the implementation of RBA's guide. The result, that can be seen in Figure 6, shows that Dell scores "Best" on a majority of the indicators whereas Ricoh does not score as well.

Identification of gaps between IT buyer's expectations and industry performance

The industry has done some progress on transparency in recent years. There is, however, still some way to go before the industry delivers what IT buyers expect. Table 5 shows the gap for each topic listed as important by IT buyers. As can be seen, two have been categorized as medium and one as large.

Table 6. Detailed results from the test of the RBA's Practical Guide

The table presents the detailed results from the test of RBA's practical guide that is the basis for Figure 6

	Indicators	Dell	Ricoh	
Commitment	Supplier Code of Conduct	Better	Good	
	Public commitment to Social and Environmental issues	Best	Best	
	Does your risk-assessment specifically look for: 1) Child Labor 2) Forced Labor 3) Human Trafficking 4) Excessive Working Hours and Poor Wages 5) Health and Safety 6) Freedom of Association	Best	Good	
	Do you have a publicly available policy to respect human rights?	Best	Better	
	Identify top suppliers	Best	None	
	Circular Economy program (at the company level)	Better	Better	
	Next steps in CSR Supply Chain Strategy (at the company level)	Best	None	
	Management system	Does the company appoint a CSR officer to monitor compliance?	Good	Best
		Do you carry out Supply Chain Risk Assessments?	Best	Best
Does your audit program specifically look for: 1) Child Labor 2) Forced Labor 3) Human Trafficking 4) Excessive Working Hours and Poor Wages 5) Health and Safety 6) Freedom of Association		Best	Better	
List of countries that include supply chain manufacturing		Best	None	
Countries audited in the last calendar year		None	Good	
VAP audits (or state equivalent independent third party) were completed in the last calendar year		Unclear	None	
Suppliers in capability-building program (suppliers below expectations)		Better	None	
An effective complaint/grievance mechanism (at the company and supplier level)		Better	Good	
Environmental Reporting (at the company level)		Best	Best	
Mineral Sourcing (at the corporate level)		Best	Good	
CSR Supply Chain Challenges (at the company level)		Better	Better	
Impact	State the material CSR Issues facing the company as a whole	Best	Best	
	# of suppliers with RBA Recognition (suppliers exceeding expectations)	None	None	
	Aggregated Audit Results	Best	None	
	% of audits with "Priority findings", "zero tolerance" issues, "core violations" or equivalent	Best	None	
	Details on Priority findings or issues associated with the company's supply chain activities and/or business relationships – both social and environmental	Best	Good	
	Summary of corrective action and impact	Best	None	
	Continuous Improvement Requirement for suppliers not meeting expectations	Best	None	
	Company progress on material issues	None	None	

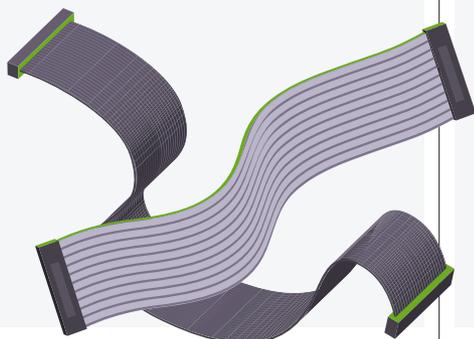
Appendix II

ASF Customer Dialogue

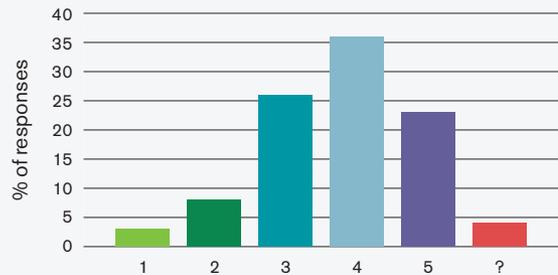
In the 2019 ASF Customer dialogue, 639 Nordic IT buyers expressed their views on sustainable IT. These are the detailed results on the questions related to their role as buyers. Please read more about the survey on page 9.

The typical respondent:

- IT decision maker
- From a large organization (500+)
- Public or private (50/50)

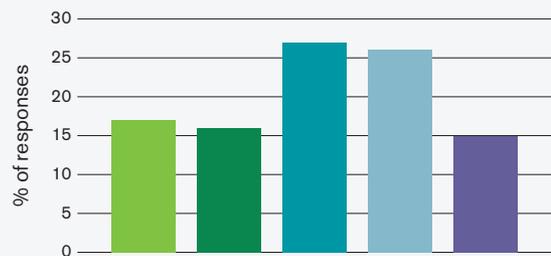


How do you work with sustainability issues in the procurement of IT?



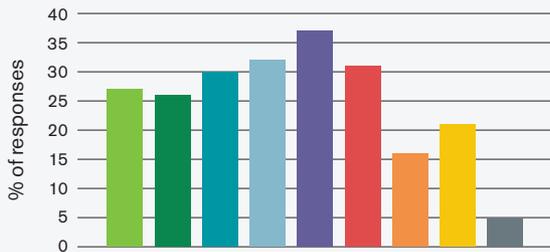
- 1 = They have very low priority
- 2
- 3
- 4
- 5 = They have very high priority
- ? = Don't know/cannot respond

Which of the alternatives best describes how you specify sustainability requirements in the procurement of IT?



- We do not specify requirements
- We specify standardised requirements in the form of Yes/No questions
- We specify standardised requirements, which are verified in the tender stage
- We specify wide-ranging requirements with a combination of qualification requirements, evaluation criteria and contract terms
- Don't know

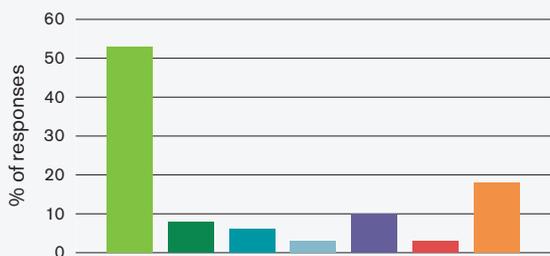
What obstacles do you see for your organisation's opportunity to prioritise sustainability in the procurement of IT? (Multiple options available)



- I see no obstacles
- It is difficult to measure the effects of the measures taken
- We lack the time and resources to follow up on the requirements
- We lack knowledge of/feel unsure about how to specify relevant and effective requirements
- It is difficult to obtain information about and to compare the sustainability performance of products
- It is difficult to obtain information about and to compare manufacturers' systematic work on sustainability
- There is poor engagement in the organisation for sustainability-related issues associated with the procurement of IT
- It is unclear who is responsible for ensuring that sustainability is considered in the procurement of IT
- Other

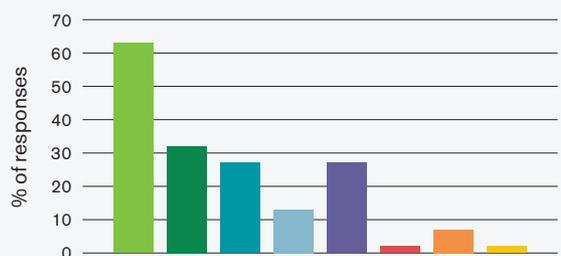


Which of the following sustainability areas have the highest priority for your organization when procuring IT?



- Environmental impact (e.g. energy consumption, emissions to air and water, waste)
- Working conditions in the production (e.g. pay, health and safety conditions)
- General impact on people (e.g. equal opportunities, diversity, freedom of expression and integrity)
- Contribution to society (e.g. increased growth, access to communication solutions, education)
- Ethics and governance (e.g. corruption, transparency)
- Other, what?
- Unsure, don't know

Which sustainability areas, if any, do you think will be given higher priority in the future?



- Environmental impact (e.g. energy consumption, emissions to air and water, waste)
- Working conditions in the production (e.g. pay, health and safety conditions)
- General impact on people (e.g. equal opportunities, diversity, freedom of expression and integrity)
- Contribution to society (e.g. increased growth, access to communication solutions, education)
- Ethics and governance (e.g. corruption, transparency)
- Other, what?
- Unsure, don't know
- Nothing

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