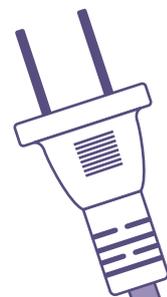


Navigating the Sustainable IT Revolution

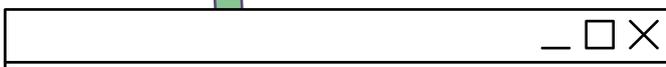
The critical role of
independent verification



Impacts and Insights



Make the sustainable choice easy with TCO Certified



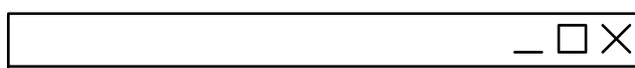
Global sustainability certification for IT products

TCO Certified is the leading sustainability certification for IT products, driving social and environmental sustainability throughout the IT product life cycle.



Comprehensive, up to date criteria

A new generation of TCO Certified is launched every three years, to meet the most pressing sustainability challenges and drive faster change.



Independent verification of compliance

Compliance is independently verified, both pre and post certification. TCO Certified also includes a system for dealing with identified instances of non-compliance.

Join the sustainable IT revolution!

Almost 30 years ago, we launched TCO Certified. The aim was to give IT users in need of better products a common voice. For the first time, the industry was challenged to take responsibility, not only for sales figures and product functionality, but also for social and environmental sustainability.

“ A robust ecolabel or sustainability certification makes cooperation possible.

Over the years, the pressure from purchasers and the clear requirements of the certification have produced great results. Working conditions have improved for thousands of workers in the manufacturing industry and a variety of harmful substances have been phased out of IT products. More recent criteria updates include a circular approach, extending product life and reducing e-waste.

My view is that the pace of change will accelerate further in the coming years. Sustainability has gone from being a niche interest to becoming something that is central for so many. For a large number of organizations, it is now essential to core business, and procurement is increasingly used as a strategic tool for meeting ambitious sustainability targets.

Those who collaborate with others have more influence. If you want to promote more environmentally friendly products and supply chains where people are given fair terms, it is wise to join together with other purchasers. Not only does it make your voice louder and clearer, it also means that positive development can happen faster. When a large number of purchasers stand behind the same set of criteria, the industry can focus on relevant improvements that make a difference, instead of trying to meet lots of different requirements that may even contradict each other.

A robust ecolabel or sustainability certification makes cooperation possible. The problem is, there are many to choose from. Some are effective and credible and some are not – resulting in confusion, and often uninformed choices. Some only cover



a single issue, while others are broader in scope. Some independently verify that products comply with your demands, while others ask you to rely on unproven claims from manufacturers that may be untrue.

This report gives you the insights you need to choose the right tool for sustainable procurement. With three fundamental questions, you will be able to evaluate and compare ecolabels and sustainability certifications, to find out which one to use.

During the last 30 years, we have seen the IT industry change in profound ways. Even though a lot of work remains before we reach our vision of having truly sustainable IT products, we are moving closer to reaching this target. As a purchaser, you can put yourself in the driver's seat.

Join us in driving continued progress toward sustainable IT products!

Sören Enholm CEO, TCO Development.

The report in a nutshell

In this report, we navigate the sustainability risks associated with IT procurement – and the tools available to help reduce them. We look into how you as a procuring organization can drive sustainable development, avoid greenwash and prove your efforts. With a few fundamental questions, purchasers get a straightforward way to evaluate and compare ecolabels and sustainability certifications, to find out which one to use.

The report offers insights based on our experience, along with expert voices: policy officials, NGOs, scientists, factory auditors, professionals at the product test labs, and IT purchasing organizations.

Chapter 1: The IT supply chain – a risky business from raw materials to end user (pp. 6-8)

Key takeaway: It is nearly impossible for a single organization to manage the many sustainability risks in IT procurement by themselves.

Chapter 2: Independent proof is needed to avoid false claims in procurement (pp. 9-10)

Key takeaway: Best practice in procurement means proving all sustainability claims and this places new demands on purchasers.

Chapter 3: Ecolabel overload? Choosing tools that can prove compliance and impact (pp. 11-13)

Key takeaway: To avoid greenwash and bluewash, purchasers need to know how to identify ecolabels with tough criteria, mandatory independent verification, and industry accountability.

Chapter 4: TCO Certified – like an ecolabel, but so much more (pp. 14-15)

Key takeaway: Verifying product claims and social responsibility in the supply chain is smart business. Using the right ecolabel saves you time and resources, reduces risks and drives progress in the IT industry.

Chapter 5: A structured approach to continuous improvement in the IT industry (pp. 16-19)

Key takeaway: Not only does TCO Certified restrict bad practices — it also provides a structure for continuous improvement, directing industry towards more sustainable alternatives.

Chapter 6: Factory verification ensures that worker rights improve (pp. 20-22)

Key takeaway: To comply with TCO Certified, brand owners and factory management must identify and solve issues related to worker health and safety, forced labor, and more.

Chapter 7: Every year – 20,000 hours of tests and assessments (pp. 23-24)

Key takeaway: Being present, where the products are made, is essential to a robust verification system. With TCO Certified, a global network of experts verifies that the criteria are being met.

Chapter 8: Choosing the right certification or ecolabel: 3 key questions to ask (pp. 25-26)

Key takeaway: By asking yourself some key questions, you can find an ecolabel or certification that delivers the rigorous verification needed to back up your sustainable procurement goals.

1. The IT supply chain – a risky business from raw materials to end user

Buying computers, displays and other IT products is a necessity for most organizations – but these purchases also involve major sustainability risks. To avoid contributing to serious issues such as harmful emissions, labor law violations or other health and safety risks for workers, traditional aspects such as price and performance must be balanced with environmental and social risk.

Supply chain risks are always a major challenge in the procurement process. The increasingly complex IT supply chain has opened access to a wide range of inexpensive yet high-performing computers and mobile devices. But IT hardware is a risky business at all phases of the life cycle — from raw materials extraction to end user and beyond. Purchasers need to handle the sustainability risks from a life cycle perspective.

Stephen Fuller, TCO Development's expert on social responsibility, links low prices to risks.

"Thousands of workers are involved in an IT device's production. A major reason why the price and value remain low is that these complex supply chains make it difficult to manage human rights risks and that they contain a high concentration of cheap labor," he says.

A notebook computer can serve as an example. Before it reaches the end user, its contents have traveled from the mines through a network of smelters, refiners, subcomponent manufacturers and factories, including final assembly. There is

” The millions of workers in the supply chain often face poverty wages, dangerous and unsafe working conditions and stand without social protections. This has clearly been identified within electronics and IT.

Parul Sharma CEO of the Academy for Human Rights in Business, President of Amnesty International Sweden



environmental and social risk at every step, which is then passed directly onto the purchaser.

Pamela Brody-Heine, Senior Director of the Clean Electronics Production Network (CEPN), explains.

“The clearest defining feature of the electronics supply chain is its complexity. It is common for over half a dozen layers to be involved in the electronics supply chain and supplier relationships are often not linear. The deeper into the supply chain, the more challenging – nearly impossible – it is to have visibility on what practices are being used,” she says.

It is extremely difficult for an individual organization to manage and track all supply risks related to electronics by themselves. Beyond the sheer number of steps involved, manufacturing can be moved to different facilities and ingredients in chemical substances used in production can change. Monitoring industry dynamics and a shifting supply chain is well beyond the capability of most purchasers and also requires specialist expertise.

What’s also important to note is that this work is also beyond the scope and capability of a large number of ecolabels as well. As a result, purchasers using ecolabels that don’t verify what’s going on in production are expected to trust unverified self

““ The clearest defining feature of the electronics supply chain is its complexity

duct before it gets shipped out? Without verification, these facts simply aren’t available.

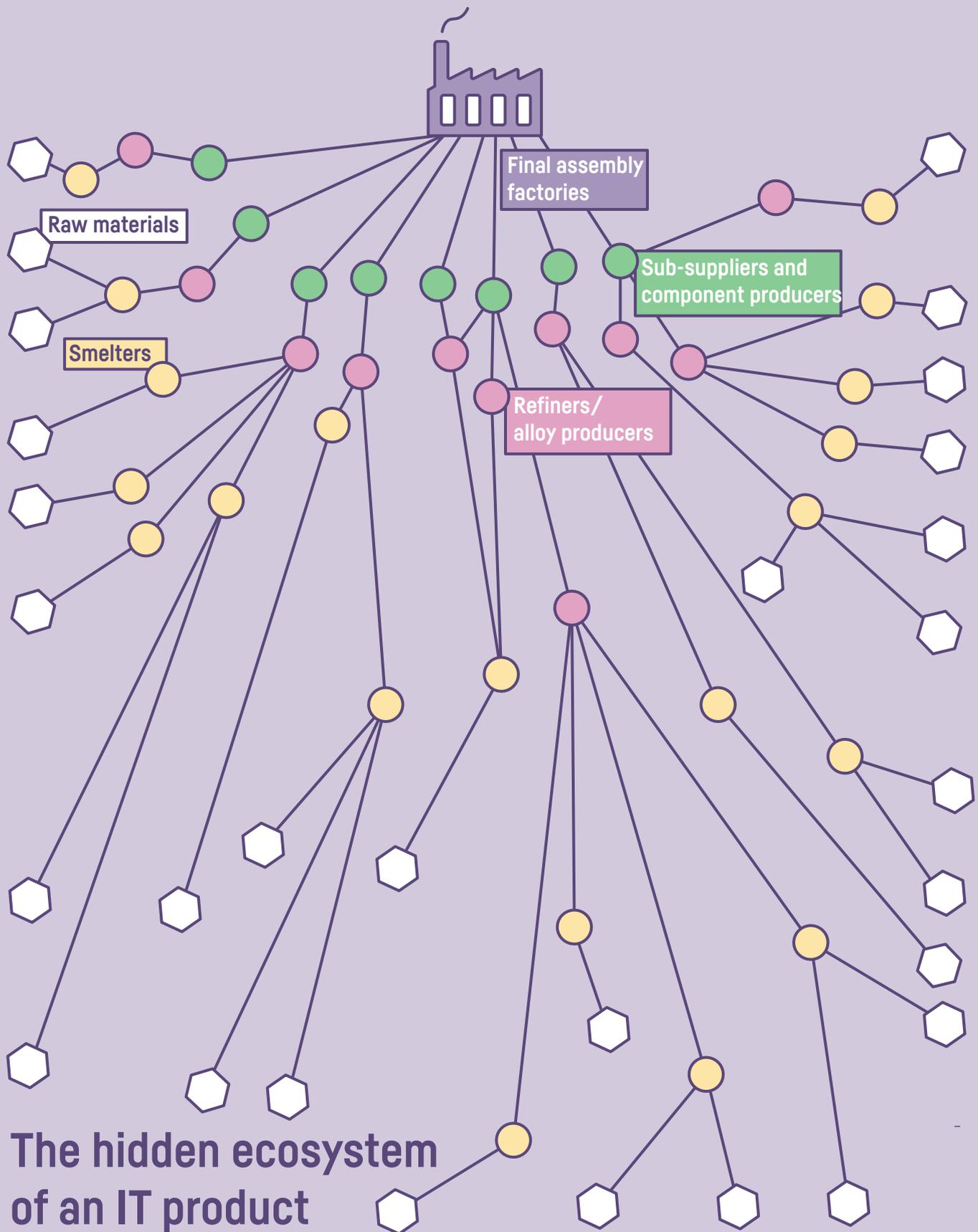
Data collection, transparency, and finding better alternatives is a major challenge, even for experienced purchasers. Environmental and social responsible demands from procurement teams make a difference in the IT supply chain, but proof is needed to not only avoid greenwash, bluewash and empty sustainability claims, but to verify that workers are protected and that safer practices are actually being put in place.

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Greenwashing: The practice of issuing false or unverified claims connected to the environmental aspects of a product

Bluewashing: The practice of issuing false or unverified claims connected to the social aspects of a product.

declarations from the manufacturers. The results are shown to be far from accurate in many cases. Without boots on the ground in factories and test labs, how can purchasers know if a product is manufactured under conditions of forced overtime or not? And how can they tell if a device contains untested, hazardous chemicals, or if a worker is coming into contact with a dangerous solvent to clean the pro-

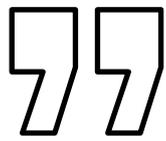


The hidden ecosystem of an IT product

The supply chain starts with the sourcing of necessary raw materials. These are then sent to refiners and smelters for further processing. The next step is the manufacture of various components and subcomponents. Final assembly takes place in specialized factories before the finished products are delivered to the end customer.

Various sustainability issues can be found throughout the supply chain, including hazardous substances, labor law violations, unsafe working conditions and toxic waste streams. Also nearly 40 percent of today's domestic conflicts are related to natural resources in some way.

¹Joakim Wohlfeil, Policy Advisor, conflict and justice, Diakonia in webinar: tccertified.com/news/webinar-conflicts-and-violence-when-smartphones-are-manufactured



The absence of independent verification can expose purchasers to higher risks.

Felice Alfieri Policy Officer at the European Commission

2. Independent proof is needed to avoid false claims in procurement

Procurement teams are increasingly responsible for ensuring product compliance with relevant regulations and their organization's sustainability policies. Both senior management and stakeholders expect sustainable IT procurement to be verifiable, measurable, and backed by evidence.

Private and public sector organizations with sustainability goals are being held to a higher standard of proof, and procurement is no exception. Therefore, lowering the risk for false claims, greenwash and bluewash is essential.

Purchasers have long been asked to rely on self-declarations, but new standards for transparency and accountability are forcing them to go deeper. New procurement guidelines, internal targets from management, and expectations from stakeholders all add up to increased responsibility for accurate impact reporting connected to procurement. This means balancing several priorities at once: cost reductions, product performance, supplier assessments, social impacts, reparability, upgradability, and reusability are some examples.

The risk associated with relying on unverified sustainability claims is real. In some cases, we have

observed that factories declaring a 60 hour work-week have in fact shown to have working hours well above 80 hours. In other cases, audits in factories claiming to provide adequate emergency exits, reveal some exits are locked or blocked. We've also discovered inaccurate battery life information stated in product specifications for notebook computers. When subject to independent tests, the capacity has been shown to be significantly lower than what the brand owner declares. Clearly, when a purchaser is asked to trust these claims and declarations, the risks are significant, and may impact both the organization's brand and bottom line.

In IT procurement, this means that suppliers must also have proven high social and environmental standards connected to the sourced product. Stakeholders demand assurance that purchases do not contribute to labor law violations in the supply chain, such as child labor, or negative environme-

ntal impacts. IT procurement organizations today are expected to be strategic and prove that they promote sustainability and mitigate risks.

Jonathan Rivin, Materials Evaluation Specialist, at the Oregon Department of Environmental Quality, explains the importance of strategic IT procurement for the State of Oregon.

“IT purchases are one of the largest categories of state, local government, and public institutional spending. Therefore, supply chain impacts can be significant and affect later stages of the life cycle. Improving sustainability practices along the supply chain reduces the potential for supply chain disruption and increases resiliency,” he says.

New regulations also hold the purchaser responsible for making sure that products are verified to comply with the criteria set in procurement. Increasingly, purchasers are expected to ask for proof of compliance to account for the sustainability claims connected to the products sourced, along with the supply chains where they are made. Current examples include the EU Green Public Procurement Criteria, and the emergence of Modern Day Slavery legislation, such as in Australia and the UK. In addition, procurement needs to ensure they are promoting fair competition among bidders, by making selection criteria clear.

Felice Alfieri is Policy Officer at the European Commission. He works with EU Green Public Procurement criteria (EU GPP) and stresses the importance of verification that purchasers need to address.

“EU Green Public Procurement criteria are written to ensure that environmental performance claims are verifiable, auditable, and comparable,” says Felice Alfieri.

Another important factor for procurement teams is non-financial reporting, such as ESG (Environmental, Social, Governance) reporting. Inaccurate or unverified ESG reporting increases reputational and brand risks that can damage relations to stakeholders, investors, customers and employees. Being exposed as a purchaser that does not take sustainability seriously costs.

“ Even the strictest sustainability criteria fall flat if there is no system in place to independently verify and monitor sustainability progress

It all comes down to proof. Even the strictest sustainability criteria fall flat if there is no system in place to independently verify and monitor sustainability progress. For procurement, a solution to avoid greenwashing is to demand independent verification of claims and proof of compliance. Specifying ecolabels that have all these systems in place is a good place to start.

3. Ecolabel overload?

Choosing tools that can prove compliance and impact

Ecolabels give purchasers an easy way to include sustainability factors in a wide variety of product categories. But many purchasers point to the overload of choice. Comparing ecolabels can be confusing. There are, however, some basic ways to assess which ones actually deliver credible, verified results.

Balancing the many priorities in IT procurement is a challenge. To get the sustainability factors right, it's far too resource-intensive to set your own criteria, pay for independent verification of compliance, and make sure that products and factories live up to the criteria and show progress over time. This is the job of a comprehensive product certification or ecolabel. Therefore, best practice in sustainable procurement starts with choosing the right tool.

Jonathan Rivin, Materials Evaluation Specialist at the Oregon Department of Environmental Quality, explains the importance of sustainability certifications for the State of Oregon.

"Using multi-attribute sustainability certifications is an important strategy for us to manage risk and drive sustainability. Not only along the supply chain, but also downstream to usage and end-of-life," he says.

But comparing ecolabels can be confusing. There are literally hundreds that claim to assess environmental and worker impact. But what makes an ecolabel or sustainability certification the "right" one?

There is a common misconception that most ecolabels include mandatory independent verification

What are the factors you must look for to ensure you can stand behind using an ecolabel?

Ecolabels with up-to-date criteria, mandatory independent verification, and a system of accountability do all the heavy lifting – so purchasers don't have to. Compared to relying on unverified manufacturer claims, this rigor significantly reduces many risks when specified in purchasing contracts. The most robust ecolabels or certifications ensure proven sustainability progress and continuous criteria compliance for the entire life of the certificate granted.



Three key questions to ask before choosing an ecolabel to ensure it has the intended effect:

1. Does it include up-to-date environmental and social sustainability criteria?
2. Does it include mandatory independent verification of compliance and proof for the purchaser?
3. Does it include a system of industry accountability and consequences?

Up-to-date criteria

One way ecolabels vary is in criteria scope. A criteria set can cover everything from a single issue, such as energy consumption, to a comprehensive set of sustainability factors: environmental, social, and economic. Some ecolabels and certifications use optional criteria to pick and choose from, while some use mandatory criteria.

Another factor is the interval for criteria updates. IT is a fast moving category, so it's critical that the sustainability criteria included are revised frequently to keep pace with technology and emerging sustainability hot spots.

The bottom line for purchasers is that a credible sustainability approach requires that you address a number of these risks in combination. For example, measuring energy efficiency is a good start, but a sustainable approach must go broader, and include a variety of environmental aspects as well as social responsibility in the supply chain.

- Environmental responsibility: reduced impact from manufacturing and use
- Social responsibility: safer working environments and fair treatment
- Product attributes: longer life, repairability, energy consumption, usability

Also, look for an independent, scientifically based process for setting and updating criteria. Consensus-based and industry-owned initiatives have been known to lower the ambition levels of criteria used and can also allow for misleading criteria, loopholes and industry minimum levels that everyone can pass. Criteria should be tough and continuously revised through an evidence-based process, in order to drive meaningful change in the IT industry. For multinational purchasers, it is also important that the same criteria apply globally.

Mandatory independent verification

There is a common misconception that most established ecolabels include mandatory independent verification of criteria compliance. This is not the case. The existence and rigor of verification vary widely among ecolabels — from mandatory independent verification, to self declarations and claims. Making an informed choice is critical for purchasers putting their trust in any label and requires some due diligence as part of the decision.

Best practice is mandatory independent verification of all criteria for each product, final assembly factory and brand owner – before and after a product is certified. With no exceptions. This complex and costly scrutiny closes loopholes, helps protect workers, and forces the industry to make improvements. This is the way to avoid greenwash and bluewash.

Independent verification is hard work, and with some ecolabels it's just not included. Or, it's optional for some criteria. The reasons for excluding verification vary — the organization behind the ecolabel may not have the specialist knowledge and industry access required to do the verification work, and relies on the ability of brands to register compliance themselves. However, while self declaration systems are fast and cheap to implement, and may even include relevant criteria, they are not credible. Many self-declaring systems allow brand owners to list their products and factories as sustainable without having an independent party verify these claims. Too often, purchasers are expected to rely on these systems, without knowing how sustainable the products actually are.

 **Prioritizing certifications that address multiple sustainability issues throughout the product life cycle is integral in advancing sustainability through IT**

Jonathan Rivin Materials Evaluation Specialist, Oregon Department of Environmental Quality



The EU GPP encourages the demonstration of specific criteria fulfillment by the use of Type 1 Ecolabels as it ensures independent verification of the declared environmental performance

Felice Alfieri Policy Officer at the European Commission

A system such as this is of course favorable to industry, but the lack of verification and transparency leaves the purchaser in the dark. Purchasers are left on their own to judge the value of the claims connected to product performance and factory conditions. Ask yourself – does a product self declaration actually give you any information on what has been verified?

Procurements relying on self declaration ecolabels face a higher risk of greenwashing or bluewashing. Claims could be true and valid, but how can you know? Unless the purchaser hires someone to audit all the factories and test the products themselves, there simply is no proof.

In our factory verification rounds we repeatedly uncover false claims around working conditions that would go unnoticed under self declaration systems. Some examples are excessive working hours, incorrect remuneration, and lack of worker representation, to name a few. If factories are not monitored on a regular basis, even purchasers with the best of intentions risk buying devices made in facilities where labor law violations are standard practice. Without the signature of an independent verification organization proving that claims are accurate, there is just no way of knowing.

Simply put, ecolabels that do not independently verify product claims are not good enough for pur-

chasers seeking to mitigate risks of contributing to harmful working conditions and negative environmental impacts.

Industry accountability and consequences for non-compliance

Increasingly, procurement teams want to see that the products they purchase meet all criteria for the entire duration of a contract. For this to happen, the ecolabel must include a robust system of industry accountability and consequences to handle found non-compliances. Instead of just labelling a product at a single point in time, the process should be systematic and include a long-term commitment to continuous improvement that also includes verification. Otherwise, there is a large risk that non-compliances are found but not corrected, or that problems are only temporarily solved, and that bad practices return. A long-term commitment for brand owners and factories is needed to ensure continued progress. Still, many ecolabels do not include systems for follow-up and industry accountability.

With the right ecolabel, purchasers get a reliable tool for driving the industry toward a sustainable practice – with fair labor conditions, low emissions, and safe chemicals.

It is common that factory conditions do not fully comply with all code of conduct and labor criteria in a first audit. Overtime could be exceeded, or emergency lighting and exit signs could be missing. What matters is that the ecolabel follows up to ensure that identified non-conformities at factories are corrected, even minor ones. Factory management must have a commitment to systematically identify and address social issues.

Factory conditions can change from one day to the next, so purchasers cannot blindly trust factories to correct non-conformities without clear corrective action plans and follow-up. If issues are revealed and not corrected on time, the ecolabel or certificate must include a system of clear consequences. These consequences could include remediation and ultimately a withdrawal of the certificate.

4. TCO Certified – like an ecolabel, but so much more

Sustainable development starts with purchaser demand. Although change does not happen overnight, sharp requirements from purchasers is the signal that sets the process in motion. TCO Certified allows multiple organizations to stand behind the same criteria and form a clear, unified voice – while at the same time getting independent proof that the products they buy are more sustainable.

TCO Certified is like an ecolabel, but so much more — it is a global sustainability certification for IT products, including both social and environmental aspects. In our 30 years of certifying more sustainable IT products, we've learned that when many purchasers issue the same demands they form a unified voice that more effectively pushes the industry towards more sustainable practice. That's another reason why using a robust ecolabel is better than setting your own criteria.

Kjell Brunnström is an Adjunct Professor and a Senior Scientist at Research Institutes of Sweden (RISE). He leads an engaged team focused on research in visual media and display quality. Together with the team member Börje Andrén he has followed TCO Certified from day one.

"TCO Certified has been a strong driving force since the beginning. When TCO Certified issued tough demands on industry, the brand owners initially said they couldn't handle them. Still, they were quickly able to meet the demands when they realized it benefited them," says Kjell Brunnström.

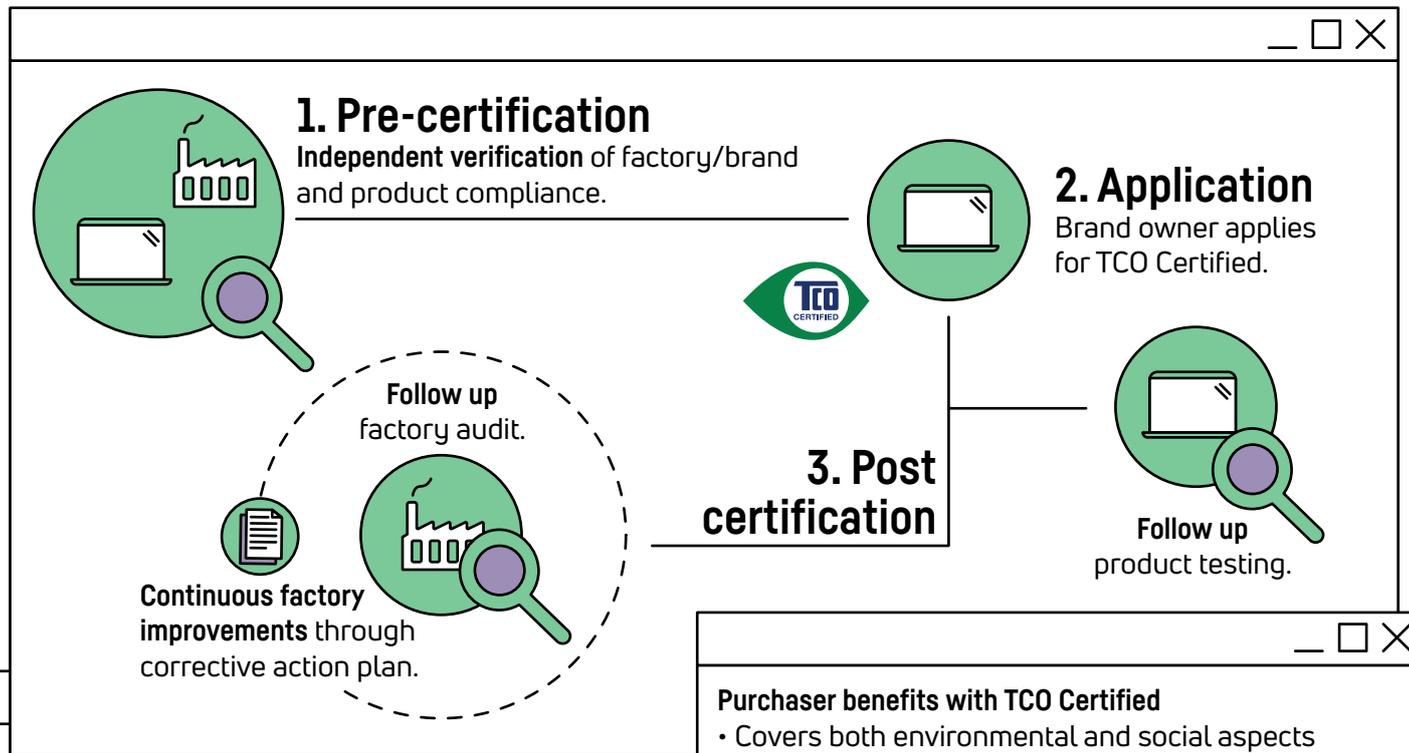
TCO Certified challenges the IT industry and is an easy to use tool for purchasers that want to include relevant and comprehensive sustainability criteria in their procurement. Most importantly, independent verification is included — it's mandatory and continuous. The purchaser does not need deep knowledge in sustainability or a network of experts that have access to IT factories all over the world. To be part of the sustainable IT revolution, you only need to write TCO Certified in your procurement specifications and ask vendors to show a product certificate as proof.

A new generation of updated criteria is launched every third year, to push sustainability where it matters most and to keep pace with technology and shifting supply chains. We know how to close the loopholes in the IT industry and how to focus purchaser efforts to drive real and lasting change in crucial areas like factory working conditions, anti-corruption, substitution of hazardous substances and circular product design.

Compliance with all criteria in TCO Certified is verified by independent verification organizations that specialize in IT products, supply chain social responsibility or other priority sustainability areas. The process is extensive and includes factory audits, product tests, and assessments proving that the brand owner's code of conduct meets certain standards and is implemented throughout the supply chain. The brand owner is by contract responsible for ensuring that certified products and the factories where they are made meet the criteria in TCO Certified throughout the certificate's full validity period. Products, factories and brand owners are followed up with spot checks based on risk assessments.

TCO Development, the organization behind TCO Certified, goes through all the proof, audits and test reports and handles all monitoring and dialog with brand owners, verifiers, and factories. The product certificate for each certified model serves as proof of compliance. Far from all ecolabels give purchasers access to this type of proof. But being able to trace all claims to an independent party's validation means knowing the true impact of your procurements. This is what reduces risk and saves you time and resources. Demanding independent verification is smart business.

Verification of compliance in TCO Certified



Purchaser benefits with TCO Certified

- Covers both environmental and social aspects
- Criteria updated every three years
- Global criteria — valid worldwide
- Independent verification of compliance is mandatory
- No optional criteria — all must be met

Independent verification is smart business

Purchasers receive independent proof

Without spending thousands of hours testing products and assessing factory conditions, purchasers get access to validated claims and a certificate as proof — information they can trust.

Effective supply chain management

Independently verified data on emissions and manufacturing conditions is proven to have an impact on the IT supply chain. Corrective actions make the IT industry more sustainable.

Confidence that your data is correct

Unproven data can be inaccurate data. Without proof, you may be subject to greenwashing or bluewashing. Independent verification builds trust and mitigates risk among stakeholders and investors.

Good reputation management

Independently verified data increases confidence in social and environmental impact data, for both internal and external use. This helps organizations build a strong reputation.

Compliance made easy

Independent verification helps purchasers stay ahead of future regulations and handle risks or opportunities in time, with help from verifiers working in the frontline of sustainable IT.

5. A structured approach to continuous improvement in the IT industry

A robust ecolabel or certification makes sure that social and environmental issues are found and solved. However, banning bad practices does not necessarily lead to positive change. To avoid a situation where restricted behaviors are replaced with those that are even worse, we need to guide the industry toward safer, fairer alternatives.

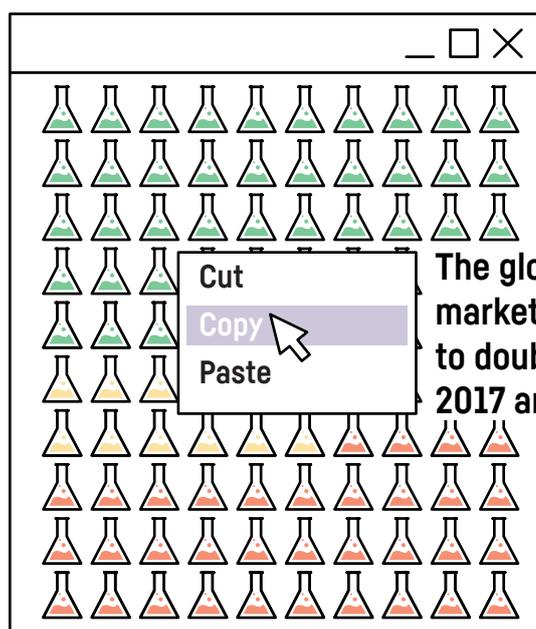
IT products may contain a number of harmful substances, and workers in the IT industry are exposed to hazardous substances such as solvents in cleaning and assembly processes. The majority of these substances are not assessed for environmental or human health hazards. Also, working conditions in factories are an ongoing problem. Continuing risk areas include health and safety protection, forced labor, and excessive working hours. Addressing these challenges requires a number of measures, including product testing and factory audits — and of course it is important to ban elements that pose sustainability risks.

However, during our near 30 years in sustainable IT, we have seen that banning what's bad is not enough. It easily turns into a game of cat-and-mouse, where what's restricted is replaced by something else — which can be just as harmful, or worse. Legislation lags behind, so you need to be one step ahead.

These insights have led to the accepted list strategy that we launched in 2015. By guiding the IT industry to better and safer alternatives, we can avoid the detour via a number of bad alternatives, and increase the pace of sustainable development. Since the launch, our accepted list strategy has expanded and today it rests on two pillars: safer chemicals and more responsible factories.

TCO Certified Accepted Substance List – making safer chemicals the mainstream choice

Nobody knows exactly how many chemicals are used in the IT industry today, but best estimates are in the tens of thousands. What we do know is that very few have been studied for their impact on



The global chemicals market is projected to double between 2017 and 2030.³

352,000 chemicals and mixtures of chemicals are in use today.²

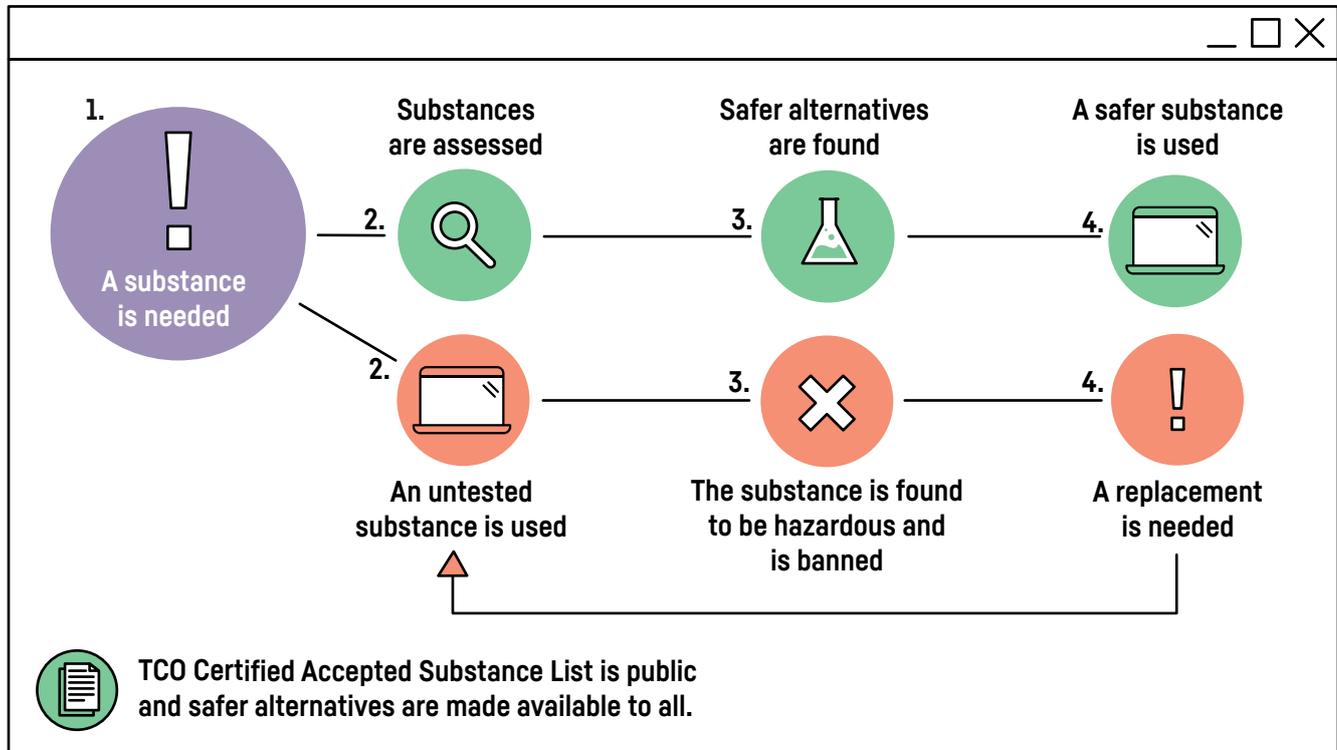
120,000 of the remaining 195,000 chemicals could not be conclusively identified. 75,000 are mixtures, polymers, and substances of unknown or variable composition.

Less than half of the chemicals on the market, or 157,000, can be fully identified by the most comprehensive global inventory to date, CAS.²

² <https://cen.acs.org/policy/chemical-regulation/Number-chemicals-commerce-vastly-underestimated/98/i7>

³ https://wedocs.unep.org/bitstream/handle/20.500.11822/27651/GCOII_synth.pdf

Assessing substances before using them is the only safe way forward



humans and the environment. The introduction of new chemicals far outpaces the development of legislation to regulate them.

Simply banning substances isn't enough. We need better information about the substances that are being used to replace them. With TCO Certified, a chemical is considered a high risk until it is proven

to be otherwise. GreenScreen® for Safer Chemicals is used to identify a pathway to safer alternatives. Only plasticizers and flame retardants that are assessed as safer alternatives by an independent toxicologist are added to TCO Certified Accepted Substance List and may be used in certified products. This way, regrettable, perhaps even more hazardous substitutions are avoided and safer

“ Over the years we have noticed a significant drop of hazardous chemicals, to the benefit of humans and the environment purchasers to higher risks.

Mr. Jammy Zhang Environmental verifier at TÜV Rheinland Shenzhen



alternatives are made the mainstream choice. Mark Rossi, Executive Director of Clean Production Action, the organization behind GreenScreen for Safer Chemicals, explains the importance of guiding the industry towards proven, safer chemicals:

“Just because a chemical is not on a restricted list does not mean it is safe. At least 1,800 known toxic chemicals and chemicals of high concern are insufficiently regulated in Europe and globally. The role of TCO Certified in moving IT companies to know the chemicals in their products and replace those chemicals with safer alternatives is critical to transforming the IT industry,” he says.

TCO Certified Accepted Substance List is dynamic and listed substances may be reassessed in the light of new scientific findings. All substances on TCO Certified Accepted Substance List are reassessed every five years to verify that the substance remains the better alternative when new data is available. If new data shows that a substance no longer meets the requirements, the substance is phased out and may no longer be used in products that are certified according to TCO Certified.

In 2021, the system for safer alternatives to hazar-

dous substances will be expanded to include process chemicals used in the manufacture of IT products.

TCO Certified Accepted Factory List turns more sustainable practices into good business

Enforcing new practices in a gigantic, multifaceted industry spread across several continents is a challenge. We wanted to quicken the pace toward sustainable manufacturing and looked to develop more efficient methods than the ones we already had. Therefore, we launched TCO Certified Accepted Factory List as part of TCO Certified in 2018.

With TCO Certified Accepted Factory List, all final assembly factories that manufacture certified products are divided into risk categories. Those that are proactive in their work with sustainability, and continuously meet the criteria in TCO Certified are placed in a low risk category, while factories with persisting sustainability issues receive a higher risk category. If major issues are not corrected within a set timeframe, the factory is removed from TCO Certified Accepted Factory List, and is no longer allowed to manufacture certified products.

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Social responsibility issues in the supply chain



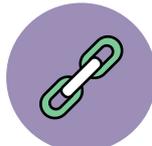
Labor law violations
Excessive working hours, underage workers, discrimination, low wages.



Health- and safety risks for workers
Inadequate protection against chemicals, poor safety measures, lack of necessary permits.

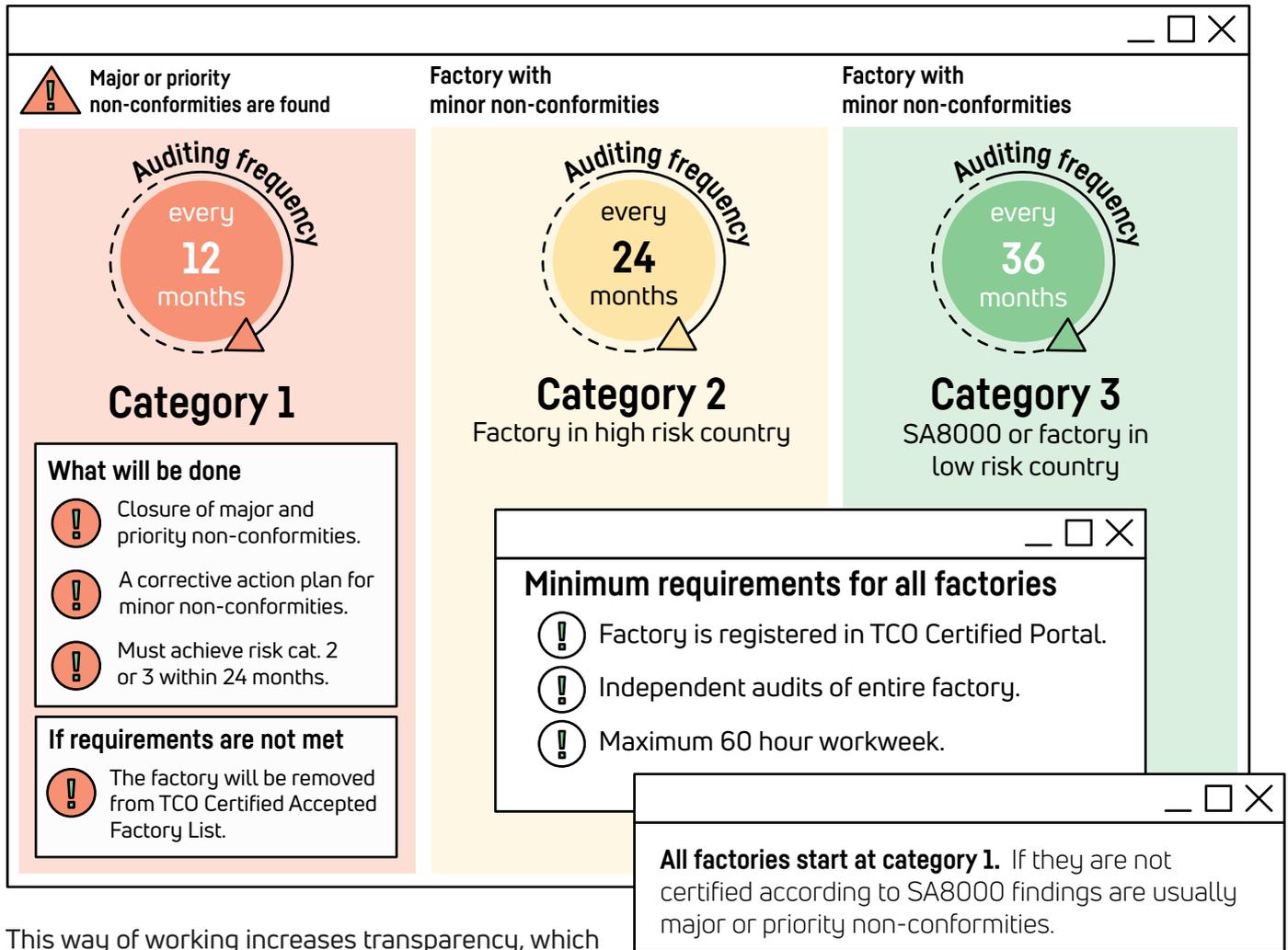


Lack of freedom of association
Employee rights to organize and negotiate with management can be restricted.



Forced labor
Human trafficking, debt slavery, threat of violence, retention of passports.

How TCO Certified Accepted Factory List works



This way of working increases transparency, which is essential for improvement, accountability, collaboration and fair competition. IT product brand owners can view the latest audit findings and corrective action progress, and choose to locate production of their products at a factory that is at the forefront of sustainability. This is groundbreaking: sustainability is now good business for factory owners. More ambitious factories get more business, which is an incentive for factory management to prioritize sustainability issues.

Another benefit is that brand owners that commit to the criteria in TCO Certified are more likely to share the same factories. Instead of trying to meet individual customer requirements that may contradict each other, the industry can then focus on making continual improvements that matter. The risk categorization also allows a more efficient scheme for auditing and follow-up, where stricter monitoring at

high-risk factories drives faster progress.

In 2021, TCO Certified Accepted Factory List includes 79 factories. Since the launch in 2018, 32 factories have been removed from the list, the majority due to non-compliance with TCO Certified criteria. We have also seen that generally, factory performance has improved significantly, with safer working environments and fewer issues with excessive overtime. More factories are also making an effort to meet stricter audit schedule requirements necessary to maintain a SA8000 certification, to improve their risk category on TCO Certified Accepted Factory List.

6. Factory verification ensures that worker rights improve

A code of conduct and independent factory audits can help structure efforts to improve factory conditions and identify non-conformities. But creating lasting change requires systematic, independent verification that holds the industry accountable, along with ongoing brand owner engagement that incentivizes continuous improvement.



With TCO Certified, factory audits must be carried out by SA8000 or RBA lead auditors at organizations accredited to ISO 17021. They are trained to identify social responsibility issues in factories – both small and large. We interviewed two factory auditors, Lisa Xie and Felix Yu from TÜV Rheinland, on their experiences from the factory floor.

What are the key elements of your methods to ensure compliance with socially responsible manufacturing criteria?

– Our social responsibility audits normally include on-site inspections, employee interviews, documents review, and selected representative samples. All to check if the factory meets the criteria on social responsibility.

What are the most important changes made in factories seeking to comply with TCO Certified?

– Factories seeking to comply with TCO Certified will usually improve issues related to personnel health and safety, unreasonable punishments, and forced labor. Management’s awareness of social responsibility requirements is also improved, and employees get a clearer understanding of their rights.

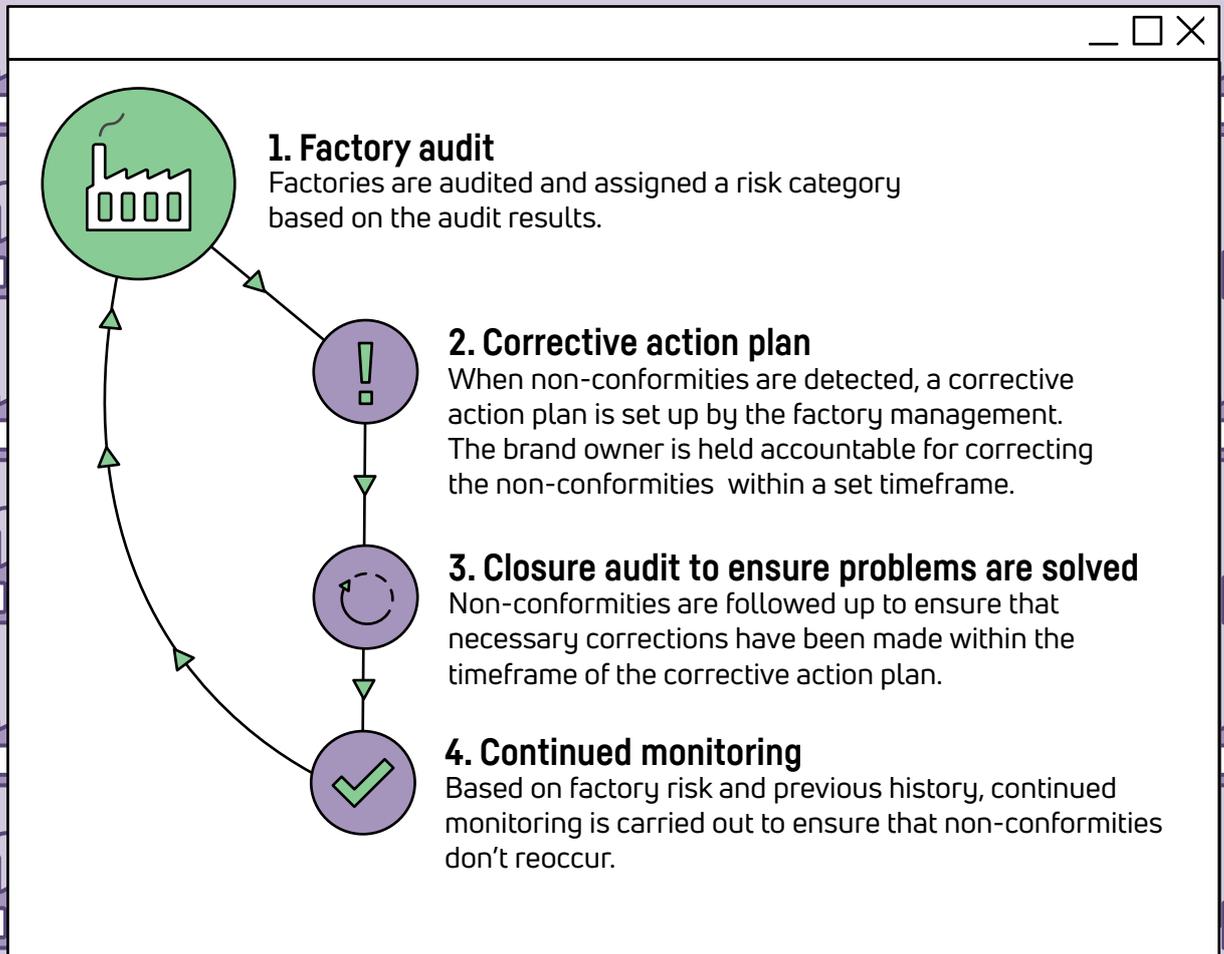
What assurance does an audit give purchasers of IT products certified according to TCO Certified?

– Social responsibility audits mean that the social responsibility performance of suppliers is evaluated. This reduces social responsibility risks, meaning that the rights and interests of workers are protected. It also promotes continuous improvement of supplier social responsibility management, and the sustainable development of the industry. All while enhancing consumer confidence in the brand.

As noted by the factory auditors, factories seeking to comply with TCO Certified will usually need to improve issues related to worker health and safety, working hours, and management’s awareness of social responsibility requirements. Still, even regularly audited factories will often have some deviations — so-called non-conformities — from TCO Certified criteria. What’s important is that the brand owner and factory management are committed and obligated to implement corrective actions. This ongoing system of accountability and dialog ensures long-term improvement of factory conditions.

When non-conformities are found, a corrective action plan with a clear deadline is set up to fix them. Factories that do not implement these corrective actions in time will no longer be permitted to manufacture certified products. This proves that the factories on TCO Certified Accepted Factory List demonstrate better practices than factories self-declaring their social responsibility standards. If this system of mandatory audits and follow up was not in place, the risk of a return to bad practices would increase.

How TCO Certified drives factory improvements



Consequences: withdrawn certificates, restricted factories
Most importantly, TCO Certified includes a system of consequences for continued non-conformities. Certificates can be withdrawn if non-conformities aren't corrected on time. If violations persist, the factory is removed from TCO Certified Accepted Factory list, and is no longer permitted to manufacture certified products.



Snapshots from a 2019 factory audit

In May, 2019, the independent verification organization TÜV Rheinland conducted a factory audit in Southeast Asia to check compliance with the social responsibility criteria in TCO Certified. The factory is on TCO Certified Accepted Factory List and is thereby permitted to manufacture certified products.

A factory audit such as this one takes between 4 and 12 person days spent on site, depending on the size and complexity of the factory. The process consists of on-site inspections, employee interviews, and document reviews to verify compliance with the criteria in TCO Certified, as well as local labor laws.

During this audit, a number of non-conformities were found:

- Weekly overtime was exceeded by 12 hours.
- The wrong type of doors were installed for exits.
- Emergency lights and exit signs were missing in the material warehouse.
- Emergency lights and exit signs were missing in the main evacuation pathway.
- Anti-fall protection guards were missing on the platform of the loading and unloading area.
- Signage, names and photographs of trained first aiders for each shift and emergency contact number near the first aid box were missing.
- There were not enough assembly points close to the production building.

Since this factory is on TCO Certified Accepted Factory List, a corrective action plan for all non-conformities was set up after the audit. According to the criteria in TCO Certified, the plan must include clear deadlines for when the issues will be solved. The corrective action plan is then followed up to ensure that necessary corrections are being implemented. Even after the closure audit, the factory will be monitored continually, to keep an eye on previous issues and make sure that bad practices don't recur. The monitoring interval varies between factories, depending on the risk category on TCO Certified Accepted Factory List. If a factory has persistent findings that are not solved, it may be removed from the list and the manufacture of certified products will have to be moved to an accepted factory.

Address	Audit date

TCO Report	Factory name	Address

7. Every year – 20,000 hours of tests and assessments

TCO Certified and its robust system of accountability helps purchasers directly influence the IT industry. The resources, industry connections and experience needed to verify and improve the IT supply chain is embedded in each certified product. Each year, approximately 20,000 hours⁴ are spent verifying claims specifically connected to the certified products that purchasers request.

So how does it all work? Before an IT product is certified, a global team of accredited experts verifies environmental and social aspects in factories and products, as well as the product's performance. Verifiers are specialized in specific areas, such as toxicology, environmental assessments, supply chain social responsibility, visual ergonomics, and product safety.

No individual party should be able to claim that a product meets all requirements. Therefore, before issuing a certificate for any IT product, TCO Certified requires sign-off from two parties: an independent, accredited verification organization that signs a

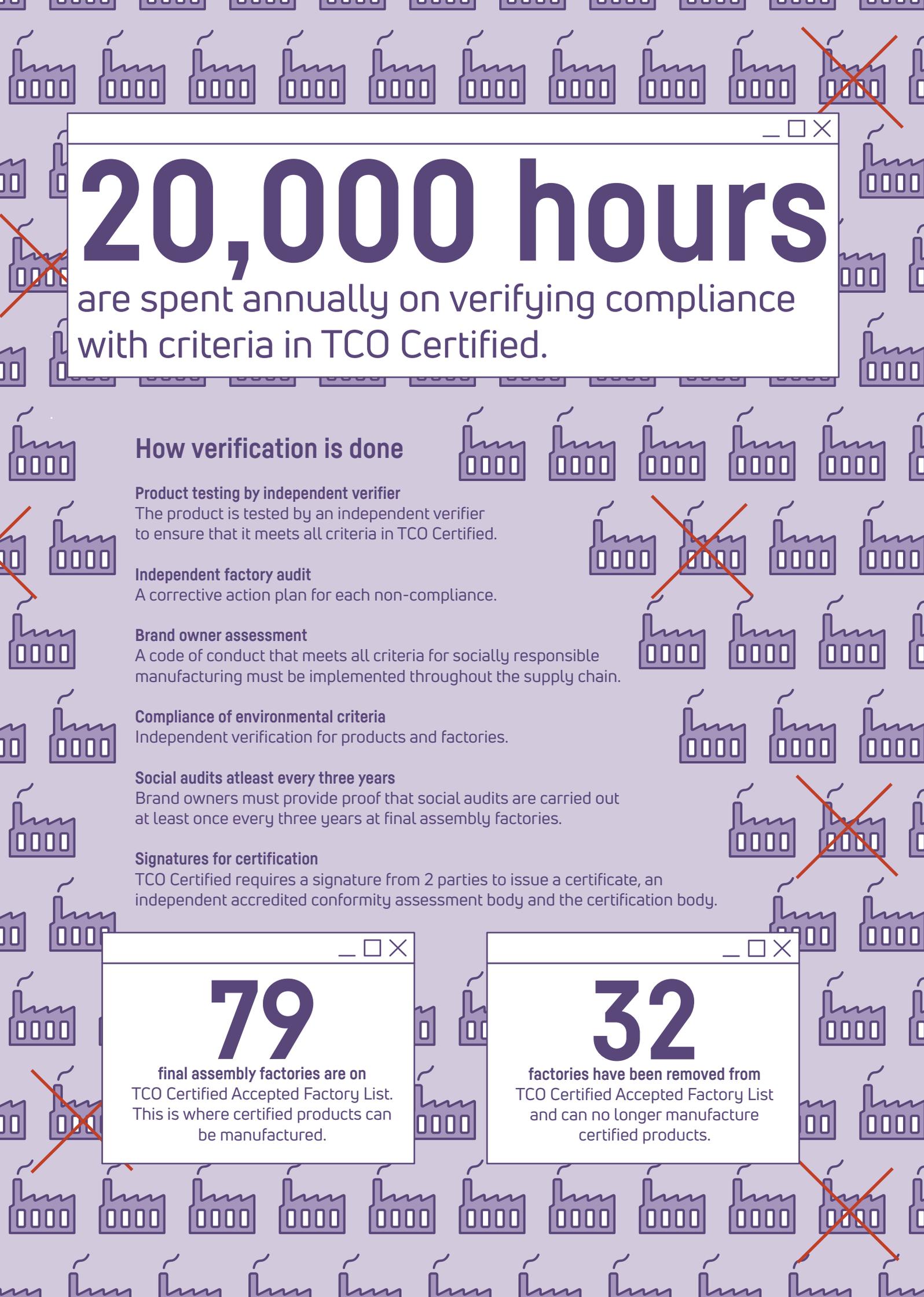
verification of compliance report (VOC), and the certification body (TCO Development).

When TCO Certified is specified in purchasing, the product certificate serves as proof of compliance with your specification. The certificate is a result of thousands of hours spent verifying that products and factories meet the comprehensive criteria in TCO Certified.

When you specify TCO Certified, a robust process of accountability is set in motion. For each certified product, this is what's included behind the scenes:



⁴Internal study, TCO Development, 2020.



20,000 hours

are spent annually on verifying compliance with criteria in TCO Certified.

How verification is done

Product testing by independent verifier

The product is tested by an independent verifier to ensure that it meets all criteria in TCO Certified.

Independent factory audit

A corrective action plan for each non-compliance.

Brand owner assessment

A code of conduct that meets all criteria for socially responsible manufacturing must be implemented throughout the supply chain.

Compliance of environmental criteria

Independent verification for products and factories.

Social audits atleast every three years

Brand owners must provide proof that social audits are carried out at least once every three years at final assembly factories.

Signatures for certification

TCO Certified requires a signature from 2 parties to issue a certificate, an independent accredited conformity assessment body and the certification body.

79

final assembly factories are on TCO Certified Accepted Factory List. This is where certified products can be manufactured.

32

factories have been removed from TCO Certified Accepted Factory List and can no longer manufacture certified products.

8. Choosing the right certification or ecolabel: 3 key questions to ask

Ecolabels and certifications can make sustainable procurement a lot easier. However, the market for ecolabels is both extensive and varied. As we have seen, it is important for purchasers to know the differences. Here's three questions that will help you select an ecolabel that has the capacity of making the impact you aim for.

As a purchaser, you don't need to know everything yourself to be strategic and successful in sustainable procurement. TCO Certified and other robust ecolabels do all the heavy lifting for you, allowing you to stay ahead, especially when legislation is lagging. But as we explain in this report, while some ecolabels include a robust system of verification, follow-up and accountability, others base product compliance on self declarations and unverified product claims. There are common pitfalls with ecolabels that risk putting you in the greenwash or bluewash trap.

These three questions will help you evaluate ecolabels, to decide which one you want to rely on in procurement.

1. Does it include up-to-date environmental and social sustainability criteria?

- Multi-attribute criteria, covering environmental, social and governance aspects (ESG)
- Criteria rigorous enough to make a measurable impact beyond legal requirements
- Science-based criteria, with clear testing thresholds and without loopholes
- Circularity criteria, demanding products are durable, repairable and upgradeable
- Supply chain responsibility criteria that include all ILO Core Conventions and require independent factory audits
- The same criteria apply globally
- All criteria are mandatory

If the answer is yes, you have chosen an ecolabel with effective, up-to-date, verifiable criteria that are relevant across all sustainability dimensions, tough enough to make a difference, without loopholes.

If the answer is no, keep searching. Don't choose an ecolabel with outdated, irrelevant or optional criteria that opens up for own interpretations, or loopholes. Criteria that are difficult to measure and verify lead to low sustainability benefits, and unfair competition in procurement.

2. Does it include mandatory independent verification of compliance?

- Verification carried out by an independent party — not brands, manufacturers or anyone representing their interests
- Verification is mandatory every time, with no exceptions
- Verification is mandatory for all criteria
- Verification includes both the product and the supply chain, especially worker impact
- You as a purchaser have access to proof of compliance

If the answer is yes, you have chosen an ecolabel that significantly reduces your sustainability risk and reputational consequences of non-conformities in products and supply chains. Claims have been verified by an independent party, reducing your risk of being accused of greenwashing or bluewashing.

If the answer is no, keep searching. Don't choose an ecolabel that does not allow you to credibly report sustainability progress. Without independent verification, you must admit that you trust industry declarations. You can be held responsible if false claims are revealed.

3. Does it include a system of industry accountability and consequences?

- A system of continued monitoring is in place, for the product and the supply chain
- Reported impact and data are traceable back to an independent test report
- A corrective action system is in place to ensure that non-conformities are corrected
- There are consequences in place if non-conformities are not corrected within the agreed time frame
- The ecolabel or certificate is withdrawn for products that are persistently non-compliant

If the answer is yes, you have chosen an ecolabel that effectively eliminates your risk of purchasing non-compliant products, as they do not retain the ecolabel. It allows you as a purchaser to monitor, evaluate and report progress while holding your vendors accountable.

If the answer is no, keep searching. Don't choose an ecolabel that forces you to rely on brand owners and factory management to ensure that improvements are made, without proof of continuous compliance. You would have no way of knowing if found non-conformities remain unsolved.

Read our previous reports on sustainability in the IT industry



Impacts and Insights: Circular IT Management in Practice

A report explaining how the linear production and consumption of IT products contribute to the climate crisis, the unsustainable depletion of natural resources and enormous amounts of toxic e-waste, but also how a circular approach can contribute to solving these sustainability issues.

Impacts and Insights: Effects of TCO Certified in the IT product supply chain

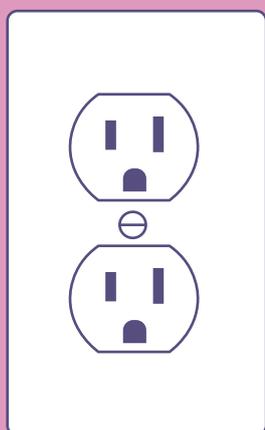
Impacts and Insights 2019 measures sustainability progress among brand owners with IT products certified according to TCO Certified, 2015-2018. The report covers three main areas: social responsibility in final assembly factories, hazardous substances and conflict minerals.



All our reports are available at tcocertified.com/impacts-and-insights

Thanks to the private and public sector organizations using TCO Certified in their IT specifications, millions of IT users around the world are supporting the shift toward a more sustainable IT product ecosystem.

Find out more on [tcocertified.com](https://www.tcocertified.com)



Toward sustainable IT products

TCO Certified is the world-leading sustainability certification for IT products. Our comprehensive criteria are designed to drive social and environmental responsibility throughout the product life cycle. Covering 11 product categories including computers, mobile devices, display products and data center products, compliance is independently verified, both pre and post certification.

Join us in driving progress toward sustainable IT products.

