UNECE Recommendation No. 49: Transparency at Scale

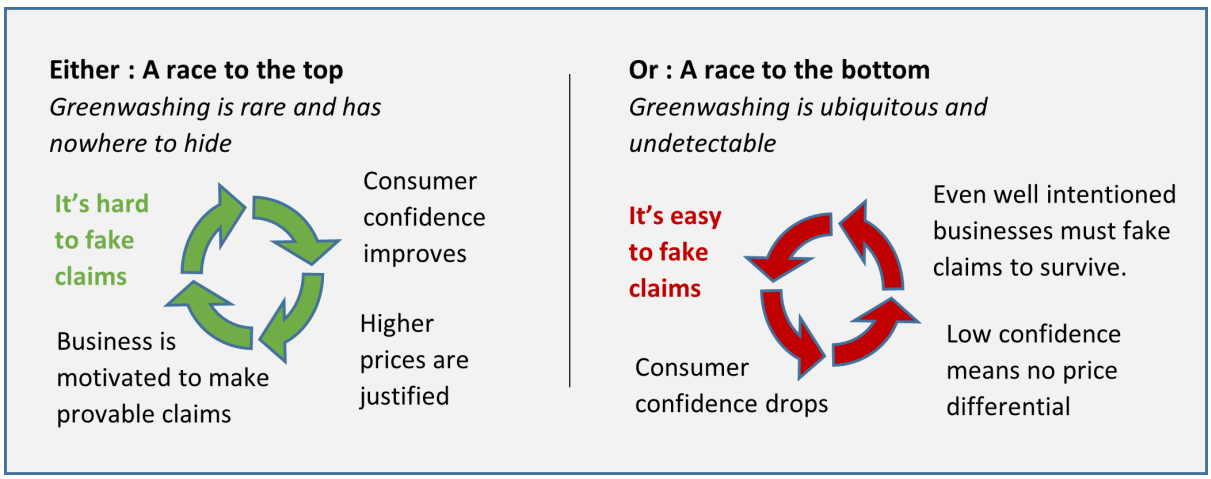
Terms of Reference - v0.8 03 Oct 2023

I. Project Purpose

As regulatory and consumer pressures drive up demand (and justify premium prices) for sustainable goods, so the commercial incentive to make fake sustainability claims will increase.

- **EC investigation** [2] : 59% of environmental claims had no evidence and 42% were deemed false or deceptive.
- **Fast Company** [3]: 68% of executives admit their company is guilty of greenwashing.
- **Survey** [4]: 78% of consumers believe that companies should be environmentally responsible and are willing to pay premiums for confidence in those claims.

At COP 27, Secretary General Guterres clearly stated that the UN has : **"Zero Tolerance for Greenwashing"** [5]**.** There is already a significant difference between consumer expectation and market Behaviour. There are two plausible pathways out:



The UN/CEFACT mission of “digital standards for sustainable supply chains” provides ideal positioning for this recommendation to nations that aim to make fake claims hard and therefore drive industry to compete in a “race to the top” where commercial motivations exist for stronger and strong evidence of sustainable products.

Building on UNECE Rec#46 [6] which defined standard processes and data structures for textile & leather traceability & transparency and guided by principles in the VC white paper [7], this new recommendation will provide guidance for nations on scaling traceability, transparency and trust in supply chains so that unsustainable practices have nowhere to hide.

1. https://www.un.org/sites/un2.un.org/files/high-level_expert_group_n7b.pdf
2. https://ec.europa.eu/commission/presscorner/detail/en/ip_21_269
3. https://www.fastcompany.com/90740501/68-of-u-s-execs-admit-their-companies-are-guilty-of-greenwashing
4. https://blog.gitnux.com/greenwashing-statistics/
5. https://www.un.org/en/delegate/%E2%80%98zero-tolerance-greenwashing%E2%80%99-guterres-says-report-launch
6. https://unece.org/trade/traceability-sustainable-garment-and-footwear
7. https://unece.org/sites/default/files/2022-09/WhitePaper_VerifiableCredentials-CBT.pdf

II. Project Objectives

Traceability & transparency in supply chains is a prerequisite for high integrity evidence of ESG compliance in supply chains. However, despite the plethora of traceability systems and pilots, none have managed to scale to the volumes (of products, participants, and transaction) necessary to have a real impact on global supply chains. We believe that there are three main reasons for this scalability challenge. Either the business incentives are wrong or the implementation models are wrong. We discuss them below.

1. **Business incentives:** The bottom line with traceability is that doing it properly requires some effort and investment of supply chain stakeholders and, unless there’s a compelling business incentive they won’t do it. That usually means that participants achieve either increased market access because traceability is part of a regulatory requirement (e.g. EU Deforestation-free regulation) or they achieve a price uplift (because buyers will pay more for certain verifiable qualities) or they avoid a cost (e.g. avoiding carbon border adjustment taxes because of verifiably carbon neutral produce). Too many traceability pilots do not pay sufficient attention to this business incentive question. Another aspect is that the incentives at the finished-product end of the supply chain need to flow all the way back to the primary producer because that’s where the environmental behaviour change often has the greatest impact. That means the cost of implementation has to be low so that the majority of incentives flow through to the actual supply chain participants and not the traceability solution providers.
2. **Implementation model:** Most traceability pilots have worked on the assumption that traceability is achieved by providing a single technology platform where all supply chain actors push their data so that an end-to-end picture can be drawn from the data in that platform. This works fine for limited pilots but can never scale to production. To explain

why, let's use an analogy with the banking system. Asking everyone to engage with the same traceability platform is like saying that we can only make payments to each other if we all use the same bank. The world doesn't work like that. There are 10,000's of banks around the world and payments move between systems because there's an international standard (SWIFT) for inter-bank transfers. It's the same with traceability. Supply chain information exists naturally in various different systems and platforms across the supply chain. The only scalable traceability solution is a decentralised one where the data stays where it is but can be linked together to form the traceability picture.

3. **Cost & complexity.** The plethora of ESG standards & regulations as well as technical standards for traceability is already overwhelming for implementers. Even if business incentives are in place and the implementation model is right, the cost & complexity of implementation could prove to be a show-stopper for implementers. This project will focus on techniques to simplify (and hence reduce cost) for implementers. This includes ideas like a simple B2B digital product passport that contains only the minimum sufficient ESG metrics for the next step in the supply chain. Also techniques like separating facts (eg farm tree coverage or production facility diesel fuel consumption) from the assessment of those facts against dozens of different compliance criteria. Keeping it simple will help accelerate uptake.

The purpose of this project therefore is to provide guidance to UNECE member states on best practice solutions to both of these scalability barriers. Nations that successfully support their domestic industries in implementing the recommendations from this project will benefit in two ways:

1. Export market access: Exporters that can provide verifiable evidence of compliance with ESG regulations and standards required by their export market customers will enjoy improved market access and potentially price uplifts. Those that cannot provide such evidence may be excluded from markets or face price penalties.
2. Border compliance: Importing economies that can verify compliance with ESG regulations and standards at their border will be able to reduce product dumping and unfair competition for their domestic industry. Strong digitally verifiable evidence will increase border intensity and reduce processing costs through automation.

III. Project Governance

A. Governance Principles

This project will follow normal UN/CEFACT governance principles:

- We will follow the UN/CEFACT Open Development Process
- We will be consensus driven, collaborative, open and transparent
- Our work will align with the UN SDGs (United Nations Sustainable Development Goals)
- Our focus will be on practical and useful ways to add value and will avoid overly abstract or un-implementable guidance.

- We will seek to build upon and avoid duplication with related work from UN/CEFACT and other organisations.
- All deliverables will become UN IP and will be made public and freely available for use by any individual, organisation or state.

B. Governance Structure

The project work is delivered by volunteer contributions from UN/CEFACT members with support from the UN/CEFACT secretariat.

1. **Project Lead** (Steve Capell): The Project Lead will coordinate the planning, implementation and monitoring of activities. The Project Lead will facilitate the implementation of the project in all its stages and provide leadership in alignment with the UN/CEFACT's goals throughout the context of the project.
2. **Project co-Lead** (Dr Wang Xiang): The project co-lead will work jointly with the project lead to facilitate project delivery. The co-lead will also facilitate stakeholder engagement in the Asian economic region.
3. **Lead Editor** (John Pabon): The Lead Editor will collate (and edit as necessary) contributions from team members / sub-editors. If there are conflicting opinions on a topic from the team, the lead editor will seek consensus wherever possible and make decisions as a design authority between possible options in accordance with the project goals & principles.
4. **Project Contributors** (TBA): Anyone may volunteer to contribute to the project deliverables. The project lead will review skills and commitment from each volunteer nomination and will invite contributors accordingly. The project lead will also seek to ensure adequate balance in representation from a diverse set of member states. All contributors must join UN/CEFACT as registered experts with the support of their national head of delegation. UN/CEFACT membership requires acceptance of the terms of the IPR policy. For those new to UN/CEFACT, please contact the project lead via slack or email once you've completed the form and we will facilitate the registration process.
5. **Project Observers (TBA)**: The project work will be completed in the public domain and anyone may observe progress, raise issues, and participate in public forum chat channels. Observers may transition to become contributors as described above. Observers do not need to join UN/CEFACT as registered experts.
6. **UN/CEFACT Bureau & UNECE secretariat**: The UN/CEFACT Bureau collectively represents the community of, the members of and contributors to UN/CEFACT. It works on the development of the Centre and its recognition at the international level as the reference entity for global Trade Facilitation and Electronic Business. The secretariat supports the UN/CEFACT program of work.
7. **Heads of Delegation:** Heads of Delegation represent their member States on a standing basis, as well as to provide a mechanism to ensure effective public-private partnership in this UNECE programme and its monitoring by member States.

IV. Project Scope

The project will provide guidance to nations in the form of a formal UNECE recommendation plus annexes plus references to relevant detailed implementation guidance materials.

The rough outline of the deliverables are defined in the next section. In this section we list some of the challenges that we hope this project will be able to address.

A. Business incentive challenges

We hope that Recommendation No. 49 will address a number of business challenges to scalable transparency such as those listed below.

1. **Benefits.** Supply chain actors need to quantify the benefit of their investment in improved ESG compliance and their participation in traceable & transparent supply chains so that they can make a business case for investment. A framework for making such business cases should consider improved market access, consumer price uplift, reduced border tariffs, and access to investment capital. Industry and/or product ESG benchmarks against which product level claims can be assessed would be valuable.
2. **Costs.** The total cost throughout the entire supply chain of implementing traceability and transparency solutions needs to be much less than the benefits. A good target would be no more than 25% of the benefit to be consumed in implementation cost of both technical solutions and compliance audit services. That's because the majority of the benefit needs to be available to supply chain actors to change their production and manufacturing processes to align with ESG standards and regulations and actually achieve the ESG outcomes. Not only does the net benefit need to fund the behaviour changes but it needs to flow through from the point of sale all the way through to the primary producer of raw materials because that's where the greatest ESG impact is achieved. Costs will be kept low when technical solutions are commoditised and implementation architectures are simplified.
3. **Materiality.** There are a plethora of ESG standards and regulations in place and emerging around the world. https://standardsmap.org/en/identify lists over 300 ESG standards just in the agricultural and textiles sectors. When combined with other sectors such as critical minerals and with national regulations, there are 1000's of ESG rulesets that an industry actor may need to consider. The key question is "which ones matter the most?". Beyond mandatory domestic regulations, the choice is bewildering. A materiality assessment model would be valuable and should consider the integrity and impact of the standard or regulation. A useful assessment framework would also allow selection based on ESG topic, industry sector, and applicable jurisdiction.
4. **Alignment.** The multitude of ESG standards and regulations often have overlapping focus on the same or similar sustainability criteria. One key question for supply chain actors is whether compliance with one standard can be considered equivalent to and re-usable against another standard. Another kind of alignment is between pace layers. For example between ESG criteria associated with a shipment vs the products in the shipment vs the facility that manufactured the products vs the legal entity that operates the facilities vs the national / international ESG reporting frameworks. A metric based

ESG reporting taxonomy that facilitates aggregation up and/or allocation down will be valuable.

5. **Trust.** Lastly, all the value of aligned and material ESG claims are of little benefit if the claims are not believable and not supported by high integrity evidence. Goods with dubious claims are more likely to be held up at borders and sold at lower prices than goods with claims supported by strong evidence. Trust is accumulated by various means including independent audits, long histories of trustworthy participation, compliance with high integrity standards, provenance traceability and high degrees of auditable transparency. A framework to assess and score these trust vectors could be an important tool to drive behaviour in sustainable supply chains.

B. Implementation model challenges

Aside from the business incentives, there are a number of implementation challenges that have faced traceability & transparency pilots. This recommendation will provide guidance on how to address each challenge.

1. **Scalability.** As described in the project objectives section, centralised traceability systems are inherently unscalable across long or complex supply chains. Users should not need to register with dozens of systems in order to construct a traceability picture. Similarly, supply chain actors should not need to have any a-priori system integration between their systems and their trading partner systems before they can trade electronically. This recommendation could define a decentralised “open traceability architecture” following the principles established in the UN/CEFACT white paper on verifiable credentials for cross border trade.
2. **Interoperability.** A decentralised traceability architecture, although inherently scalable, depends on multiple different parties and systems to adhere to some interoperability standards. This recommendation should recommend a relevant suite of standards including technical standards such as W3C VC & DID standards, product & entity identifier schemes, semantic vocabularies such as vocabulary.uncefact.org, and traceability events such as GS1 EPCIS.
3. **Complexity.** Sustainability data for various ESG criteria can become very complex very quickly. An architecture that depends on full digitalisation of all data will be costly and complex to implement, inhibiting uptake. A balanced approach that defines just the key data elements needed for automated processing and allows more complex information that support human audits to remain as un-structured PDFs is likely to achieve much faster uptake and thereby release more value. A plausible approach is to define a standard B2B digital product passport that acts as a “semantic waist” by including just the ESG metrics needed for the next actor to assess its supply chain inputs.
4. **Privacy.** There is a natural tension between transparency and confidentiality requirements of digital supply chains. The more data that is revealed for transparency purposes, the greater the risk that commercially sensitive data will leak. The real or perceived risk of sensitive data leaks is a fundamental blocker to scalable uptake by supply chain actors. Tools such as encryption and selective redaction can assist. This

recommendation should propose practical mechanisms to ensure that each supply chain actor is empowered to choose their own balance between transparency and confidentiality concerns.

5. **Integrity.** Digital credentials supporting ESG claims can be cryptographically valid but still fake because they might be issued by a party that is not authorised to make the claim. Similarly, a shipment could be accompanied by high integrity trusted digital evidence that is not about the physical goods being shipped. High integrity ESG claims are part of a graph of linked data that includes trust anchors (authorities) and physical-digital links. The physical-digital integrity challenge includes the question of mass-balance fraud and quota management. This recommendation must offer clear and concise guidance on the integrity measures that can counter greenwashing.
6. **Maturity.** Long supply chains include many different actors and each may have a different level of technical maturity or appetite for change. Any digital traceability architecture that depends on every step in the supply chain meeting a minimum technical maturity threshold is likely to fail. A chain is only as strong as its weakest link. Techniques such as paper based carriers with QR code links to digital twin data can allow digital data to bridge paper-only steps. The recommendation should provide guidance on accommodating varying levels of technical maturity.
7. **Consistency.** ESG claims such as carbon emissions intensity are typically metrics that are calculated from underlying facts based on a well defined set of rules. The rules are either enshrined in national legislation or defined by a well established ESG standard. One challenge for supply chain actors is how they can confidently and consistently make self assessments against these rules - especially when one set of facts (eg farm vegetation coverage) might be assessed against dozens of rule sets. This is both a cost efficiency (it's hard work understanding and assessing compliance against many rule sets) and a compliance challenge (deliberate mis-application of rules could change ESG performance metrics). This recommendation could define a principle that any rule publisher must also publish both a UI and API that encodes the rules so that ESG claims can be accompanied by a signed attestation from the publisher that the rules were correctly applied to a given set of facts.
8. **Proportionality.** Mass balance fraud will be an increasingly common greenwashing tactic. An example of mass balance fraud is a spinning/ weaving factory that buys 1 Ton of genuine organic and carbon neutral cotton and 9 Tons of cheaper regular cotton - then sells all woven cloth as 100% organic and carbon neutral - representing the same input evidence for each distinct sale. There are two complementary approaches to addressing this challenge. One is random DNA / Chemometric analysis on products to confirm provenance. Another is independent quota management. This recommendation should provide guidance on best practices to manage this fraud vector.

V. Deliverables

There are two core deliverables

- **The Recommendation No. 49 document itself.** This will be a similar size and detail to other similar documents such as Rec 33 (single window) and rec 46 (textile & leather traceability). Namely around 5 to 10 pages of core recommendation content plus a further 15 to 20 pages of annex information.
- **Implementation support materials.** The recommendation itself needs to be a relatively stable and largely non-technical document. However, implementers of the recommendation will need more technical and detailed supporting materials such as schema, vocabularies, and test services. These will be developed in parallel to the recommendation document and will be maintained on the UN GitHub repository https://github.com/uncefact

A. Recommendation No. 49 Outline

- **Executive summary**. 1 page. Should provide a strong call to action.
- **Purpose.** 2 pages. Should provide a clear rationale with supporting evidence.
- **Recommendations.** Approx 5 pages. A list of around 15 specific recommendations (one paragraph each) targeted at specific actors such as:
    - National regulators
    - Standards organisations
    - Accreditation authorities & Compliance assessment bodies
    - Software product vendors
    - Supply chain actors (primary producers, manufacturers, retailers)
    - Who else?
- **Annex.** Approx 15 pages. Roughly one page per recommendation made in the previous section. Expands on each recommendation to describe how it achieves transparency goals, what implementation actions are expected, ***how success / compliance is measured***, and pointers to detailed implementation support information.

Note / question - would it be useful to define specific measures of compliance with this recommendation so that they could be used to develop a ranking of nations, a rating scheme for standards, and scoring scheme for supply chain actors? This kind of thing can be an effective driver for behaviour.

B. Implementation Support Materials

Detailed tools that support each actor in implementing the recommendations in this document. We propose to use Github repositories for this purpose.

- List of repositories - TBD

VI. Success Criteria

Every UN/CEFACT project should define the metrics by which success is measured. The best measure for the success of this project would be a reduction in the incidence of greenwashing. However such a metric may be difficult to measure and also difficult to attribute to this work.

Some more concrete metrics that may serve as a proxy are

- Count of downloads - target 10,000
- Count of citations - target 1,000
- Count of compliant implementations - target 100

Note that the last metric assumes that a formalised and testable interoperability specification is established. Such detailed specifications and compliance testing services are likely to be industry specific and part of domain specific traceability & transparency projects such as https://uncefact.github.io/project-crm/. Nevertheless, each domain will follow the guidance established in this paper and so domain specific implementations can be considered as implementations of this recommendation.

VII. Related work

This recommendation does not stand alone. It is built upon existing work and has interdependencies with other programs of work. This section provides a shortlist (I'm sure there are more) of related work.

A. Other UNECE work products

Project / Output	Relationship
https://unece.org/trade/traceability-sustainable-garment-and-footwear	This recommendation builds upon the lessons learned about what worked and what didn't work in the textile & leather traceability pilot.
https://uncefact.github.io/project-crm/	The UN/CEFACT critical raw materials sustainability & resilience project is running in parallel with this recommendation and there is a close bidirectional relationship where each will inform the other. Essentially the CRM project is a test implementation of the recommendations made by this project.
https://unece.org/sites/default/files/2023-08/WhitePaper_DigitalProductConformityCertificateExchange_August2023_0.pdf	The product Digital Product Conformity white paper, together with the concurrent product conformity BRS will inform the aspects of this project that deal with formal conformity claims.
https://uncefact.unece.org/display/uncefactpublic/Digital+Identity+Standardization+for+Trade+Facilitation	The digital identity white paper will provide guidance on the implementation of globally unique, verifiable, and resolvable entity & product

	identifiers. The decentralised open traceability architecture espoused by this recommendation will depend on strong identity.
https://unece.org/sites/default/files/2023-08/WhitePaper_VerifiableCredentials-CrossBorderTrade_September2022.pdf	The white paper on verifiable credentials for cross border trade provides a key foundation for this recommendation as it describes the use of decentralised architectures for trade and introduces many ideas (eg “trust anchors”) that will be formalised in this recommendation.
https://vocabulary.uncefact.org/	The UN/CEFACT vocabulary defines all trade concepts used so far in all UN/CEFACT document & message standards. This project will reference the vocabulary and may extend it with a new sustainability vocabulary domain.
https://uncefact.unece.org/display/uncefactpublic/Business+Requirements+Specific+for+Digital+Product+Conformity+Certificate+Exchange+-+High-level+Process	The digital product conformity project will define high level requirements for the digitisation of conformity claims including accreditations of conformity assessment bodies by competent authorities. It’s the third party trust architecture for this project.
https://uncefact.unece.org/display/uncefactpublic/Sustainable+Development+and+Circular+Economy+Reference+Data+Model	The circularity project will define standardised processes and vocabularies to support the recycling processes that underpin a circular economy. This project will reference it and be informed by it.
Future traceability & transparency projects	A second iteration of the textile & leather traceability project as well as a new project on agrifood traceability will both build upon this recommendation and the experience from the critical raw materials project.
https://jargon.sh/user/unece/DigitalProductPassport/v/working/artefacts/readme/render	A very early draft of a generic Business to business digital product passport as a carrier of sustainability and traceability information throughout the supply chain.

B. Other technology standards

Standard	Relationship
https://www.w3.org/TR/vc-data-model/ and https://www.w3.org/TR/did-core/ and https://www.w3.org/TR/vc-use-cases/	The World Wide Web Consortium (W3C) has released a suite of open standards that support decentralised and high integrity data architectures. As such, it provides a core technology under-pinning for this recommendation.
https://trustoverip.org/	The trust over IP foundation builds upon W3C (and IETF) standards to define a technology architecture for decentralised trust. Many of these ToIP ideas will underpin the more business-focussed open traceability architecture defined by this recommendation.
https://www.gs1.org/standards/epcis	The GS1 EPCIS standard is a well established set of messages and vocabularies for traceability in fast moving consumer goods. It provides a foundation for a decentralised open traceability architecture that should re-use the same event architecture already defined by EPCIS
https://www.gs1au.org/digital-link	The GS1 digital link (also submitted to ISO) is a framework for discovering data about an object given the identifier of an object. Although initially based on GS1 identifiers, the architecture is extensible to any identifier type. The idea of lining the physical to the digital is a core concept in the implementation of scalable traceability architectures.

C. Other sustainability standards

Standard	Relationship
https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ and https://sasb.org/standards/	The SASB / IFRS corporate sustainability reporting standards are likely to be the most significant set of sustainability reporting drivers for large corporates around the world. A deliberate choice to align product level sustainability vocabularies with corporate reporting obligations seems like a good idea - thereby allowing roll-up from product -> facility -> legal entity.
https://sdgs.un.org/goals and https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-	Corporates often report to governments who, in-turn, have international reporting obligations. International reporting obligations are sector specific (eg the UN FCCC climate reporting) and are aligned with UN Sustainable Development Goals. By considering these framework conventions and aligning with mapping to IFRS

requirements	corporate reporting standards, there is an opportunity for a clear line of sight from product sustainability to global outcomes.
https://standardsmap.org/en/identify	Standards Map from the International Trade Centre (ITC) is one of the worlds largest databases of sustainability standards. The ITC knowledgebase may provide a useful source for the development of a sustainability criteria vocabulary that can also be aligned with IFRS and international framework convention requirements.

VIII. Work plan, including activity schedules

There are two work plans:

- The first is for the short and formal policy recommendation itself. This has an aggressive timeline in order to meet the UN plenary approval milestone in May 2024. It is also a durable and non-technical policy document and so should not contain material that will change more frequently (such as web vocabularies and passport schema etc).
- The second is for supporting technical content to which the recommendation document refers. This is the material that supports implementers of the policy recommendations in rec 49 and will be more technical. This material is developed and maintained in the un/cefact github repository.

UN/CEFACT Recommendation No. 49	
Deliverable / Activity	**Due date**
Kick off & draft purpose & ToR	3 Oct 2023 (at 41st Forum)
Draft list of recommendations (5 pages)	3 Nov 2023
Draft supporting annex material (15 pages)	1 Dec 2023
Final Draft of rec 49 for public review	31 Dec 2023
Completion of public review	End Feb 2024
UN/CEFACT Plenary approval	3 May 2024

Supporting material for implementers of Recommendation No. 49	
Deliverable / Activity	**Due date**
Establish Repository & deliverable structure	During 41st Forum in Oct 2023
Outline of decentralised open traceability architecture framework	Nov 2023
Outline of ESG standards & regulations materiality assessment framework	Nov 2023
Draft of B2B digital product passport	Dec 2023
Draft of traceability events and JSON schema	Dec 2023
Draft of sustainability topics and metrics JSON-LD vocabulary	Jan 2023
Draft of API standards for ESG compliance assessment and metric calculators.	Feb 2023
Draft of interoperability test suite	Feb 2023
Run pilots to test & iterate technical deliverables.	March & April 2023
First release of rec 49 implementation support & compliance verification tools.	May 2024 (aligned with Plenary approval of Rec 49).