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Type

- ☒ **R** Document report
- ☐ **DEM** Demonstrator, pilot, prototype
- ☐ **DEC** Websites, patent fillings, videos, etc.
- ☐ **Other**

Dissemination Level

- ☒ **PU** Public, fully open, e.g. web
- ☐ **SEN** Sensitive, limited under the conditions of the Grant Agreement
- ☐ **CI** Classified, information as referred to in Commission Decision 1001/844/EC

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Table of contents

Publishable executive summary	6
1. Introduction	8
1.1. Background and Objective	8
1.2. Synergies between WP7 and WP4	8
2. Standards for Bio-based products: focus on CEN/TC 411	9
2.1. The Standardization Framework	9
2.2. CEN/TC 411 current Business Plan	16
2.3. Bio-based products standards priorities and CEN/TC 411 possible evolution: an interview with experts	20
3. CEN Workshop Agreement: a bridge between standardization and innovation	28
3.1. Overview: what is a CWA and why it should relate to Research projects?.....	29
3.2. Steps towards a CWA	30
4. BioReCer CEN Workshop Agreement Project Plan	33
4.1. Background	33
4.2. Scope	34
4.3. Related Activities	36
4.4. Structure and rules of cooperation	37
5. Conclusions	40
6. List of abbreviations.....	41
7. References	42

List of Figures

Figure 1. Standardisation Bodies (source: UNI)	11
Figure 2. CEN/CENELEC Members (source: CEN)	13
Figure 3. Standardization deliverables (source: UNI + CEN)	15
Figure 4. Standardisation, Certification and Accreditation (source: UNI, D4.3)	16
Figure 5. CWA origin and lifetime (source: UNI)	28
Figure 6. CWA overview (source: UNI)	30
Figure 7. CWA steps (source: UNI)	31
Figure 8. Standards for biobased products, infographic (source: NEN)	36

List of Tables

Table 1. Comparison table of standardisation bodies (source: UNI)	14
Table 2. CEN/TC 411 structure (source: UNI, D4.3)	17
Table 3. CEN/TC 411 standards (source: UNI, D4.3)	17
Table 4. 4 Workshop schedule (preliminary)	39

Publishable executive summary

The transition to a bioeconomy, characterized by the sustainable use of renewable biological raw materials, should bring significant benefits to economic growth, environmental protection, and social development in the EU.

The advancement of sustainable value chains based on biological raw materials is a prerequisite for Europe's green transition; however, in order to make larger volumes and different types of biological raw materials available to various industries, stakeholders face several challenges.

Biological waste is often considered a burden and is incinerated or disposed of, despite its potential as a renewable resource capable of replacing fossil raw materials. However, insufficient certification of biological raw materials and related supply chains hinders their industrial use.

To increase the use of raw materials and products derived from bio-based waste, both by industry and consumers, the EU-funded BioReCer (Biological Resources Certification Schemes) project aims to strengthen existing certification systems by including new criteria for sustainability, origin, and traceability. This will ensure their applicability at both European and global levels. Since its launch in September 2022, BioReCer has already achieved several significant milestones for a more competitive, independent, and sustainable European bioeconomy.

This Deliverable 7.3 adds the important piece of the contribution that the project can give to future standardization activities. Standardization, especially when it comes to bio-based products, is a key enabler to ensure the market uptake of innovation, while protecting consumers and final user and ensure a level playing field.

A lot has been done at European level by the relevant CEN technical committee, but still there is a room for improvement, also based on the important insights derived from European research project like BioReCer.

This document, which is mainly intended for standardization experts and policy-makers, derives some strategic considerations to push the future standardization developments for the sector, taking into account the needs of the different stakeholders.

Structure of the deliverable

This deliverable presents the outcomes of Task7.4. "Strategic Roadmap: the possible standardization scenarios", which aimed to design the possible scenarios (in terms of standardization) to close gaps and needs identified during the project. The final aim was to codify innovative project results, so to realize the project plan for a new CWA – CEN Workshop Agreement.

Chapter 1 provides background information and outlines the objectives of this deliverable, including information on previous work within the BioReCer project relevant to this document.

Chapter 2 represents the core of the document. It starts with an in-depth description of the standardization framework to shed the light on the object of the document and deepening the preliminary framework included in D4.3. Then it highlights the current situation related to standards for bio-based products and derives some important strategic considerations that the standardization community should take into account to efficiently and effectively supporting a European bioeconomy.

Chapter 3 explores how to concretely translate the BioReCer research into a standardization output, describing what a CEN Workshop Agreement is, why it is important for research projects, and which are the necessary steps to be developed.

Chapter 4 builds on the findings from previous chapters and WPs and includes an important project legacy: a new CEN Workshop Agreement Project Plan.

Chapter 5 provides the summary and conclusion of this document.

1. Introduction

1.1. Background and Objective

The increasing use of bio-based feedstocks across industrial sectors has raised the need for clear, reliable, and transparent mechanisms to ensure that these resources are produced and managed sustainably. In response to this need, the BioReCer project aims to strengthen existing certification schemes by integrating tailored environmental and traceability guidelines. This effort seeks to improve the credibility, applicability, and acceptance of certified bio-based materials, while supporting a more sustainable and circular bioeconomy.

In this deliverable the current standardization landscape and future developments are analysed to derive strategic considerations on the priorities that European Standardization stakeholders should consider for supporting the market uptake of bio-based products.

Moreover, thanks to the extensive research carried out during the project lifetime, this deliverable leaves a standardization legacy, by providing the necessary information to official request the start of a new European pre-normative document.

1.2. Synergies between WP7 and WP4

Deliverable D7.3 outlines the main strategic standardisation considerations derived from the research activity carried out in BioReCer project. The deliverable draws on contributions from several WPs within the BioReCer project, particularly WP4, which by its hand takes contributions from WP2, WP3, and WP5.

WP7 is indeed intended to maximise the project impact amongst all the bioresources stakeholders at international level, which includes the development of a Strategic Roadmap for standardization.

This deliverable summarises the activities carried out in T7.4 and builds upon the research carried out in T4.3.1, and its outcome the D4.3, to build a strategic roadmap which starts from the state of the art to identify the possible scenarios for future standardization developments, based also on the insights from European technical experts.

The standardisation roadmap concludes by deepening how to translate the BioReCer innovative project results into a new European pre-normative document (CWA).

2. Standards for Bio-based products: focus on CEN/TC 411

2.1. The Standardisation Framework

Standards are often described as the “key” to unlocking the full potential of research achievements, as they help researchers bring innovation to the market by ensuring transparent, high-quality and comparable results; build consumer trust in new technologies by guaranteeing safety and consistent quality; and standardise technical requirements so manufacturers and consumers know what to expect, while also facilitating the interoperability of technologies and materials within increasingly connected value chains.

Beyond their technical role, standardisation is widely recognised as a powerful driver of broader societal goals¹: it improves quality of life, safeguards the environment for future generations, creates a more efficient and cost-effective economic system, promotes harmonised international trade, enables clear communication through common terms and symbols, and places strong emphasis on consumer needs and interests by ensuring health and safety in workplaces and in everyday products. Over the past century, standards have evolved significantly to reflect changing societal priorities, playing a crucial role in supporting the United Nations Sustainable Development Goals (SDGs) adopted in 2015, and leading to new standardisation deliverables in areas such as professional qualifications, organizational management, environmental protection, corporate social responsibility, sustainable development and, more recently, the circular economy.

Standardisation in Europe is a cornerstone of the Single Market. It establishes a technical framework to enable interoperability of goods, services and processes throughout the EU. This eliminates technical obstacles for trade, avoids the fragmentation of the market and enables free circulation of goods and services in the EU. As indicated in Regulation (EU) 1025/2012 the European standards contribute to facilitating the interoperability of the networks and technological development and innovation. To cooperate with ISO, IEC and ITU also supports the competitiveness of the European industry at global level.

Innovation and competitiveness

Standards also provide the base for technological innovation and R&D. They make sure that new technologies are compatible with those already in place, users gain trust in these new technologies, and additional innovative solutions can find a faster way to the market. CEN and ISO emphasize that standardisation:

- Reduces time-to-market of innovations thanks to agreed frameworks and test methods.
- Improves the international competitiveness of European enterprises by facilitating access to global markets that demand international standards.
- Standards are seen as a driver for innovation, enabling research to become an accepted part of the market.

Transfer of goods and services without restriction

European standards promote mutual recognition among Member States and facilitate the seamless movement of products and services across the EU. This results in a reduction or elimination of the need for retesting and recertification of the same products, leading to significant cost savings, especially for small and medium-sized enterprises (SMEs).

¹ Standards for the Sustainable Development Goals, UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE (UNECE)

Consumer safety and protection

Standards ensure that products and services meet minimum requirements for safety, quality, and sustainability, thereby providing certainty to consumers. They typically establish criteria for:

- Safety and reliability
- Environmental impact
- Health protection and performance levels

Organizations such as CEN, ISO, and UNI highlight that standards allow manufacturers to demonstrate the suitability and safety of their products, thereby protecting end-users and fostering confidence in the Single Market.

Environmental protection

Establishing a shared language on environmental matters is essential for the creation and implementation of coherent policies across Europe. While EU Regulations set out environmental protection requirements, voluntary standards provide the technical specifications, widely recognized and accepted, that enable industry and other actors to comply effectively.

This collaborative model, described in more detail in sections 1.3.2 and 1.3.3 of D4.3, reduces the regulatory burden on public authorities and leverages the expertise of thousands of technical experts across Europe. Voluntary standards assist organizations in meeting legal obligations and enhancing the impact of their environmental initiatives. For instance, the EN ISO 14000 series offers practical guidance for managing environmental responsibilities and is frequently referenced in legislation (e.g. Directive (EU) 2024/825, Empowering consumers). Over time, these standards have demonstrated a significant and lasting global impact.

As presented in D4.3, the standardisation system in Europe is laid down in Regulation (EU) No 1025/2012² on European standardisation that provides the rules and procedures necessary to ensure that standards are effective instruments in support of the Single Market and European Union policies. Particularly, Article 2 of Regulation 1025/2012 sets forth the main definitions on standardisation. It defines a standard as:

*"technical specification, adopted by a **recognised standardisation body**, for repeated or continuous application, with which compliance is **not compulsory**, and which is one of the following:*

- (a) 'international standard' means a standard adopted by an international standardisation body;*
- (b) 'European standard' means a standard adopted by a European standardisation organisation;*
- (c) 'harmonised standard' means a European standard adopted on the basis of a request made by the Commission for the application of Union harmonisation legislation;*
- (d) 'national standard' means a standard adopted by a national standardisation body"*

This regulatory framework provides uniform standards throughout the EU and thereby enhances standards as strategic instruments for the European Union. From the perspective set out in Regulation 1025/2012, effective and efficient standardisation can only be based

² <https://eur-lex.europa.eu/eli/reg/2012/1025/oj/eng>

on a flexible and transparent system for consensus-building between relevant interests, which is sustainable³.

Standardisation Bodies

Standardisation is a cornerstone for quality, safety, interoperability, and sustainability in all markets. It is an enabler of global trade, a catalyst for innovation, and an enabler of public policy and social requirements. To coordinate this multifaceted system, a pyramid-shaped network of standardisation organizations works at various levels: international, European, and national. While all these levels have a separate, yet interconnected function in the creation, maintenance, and dissemination of standards. The Figure below shows these levels.

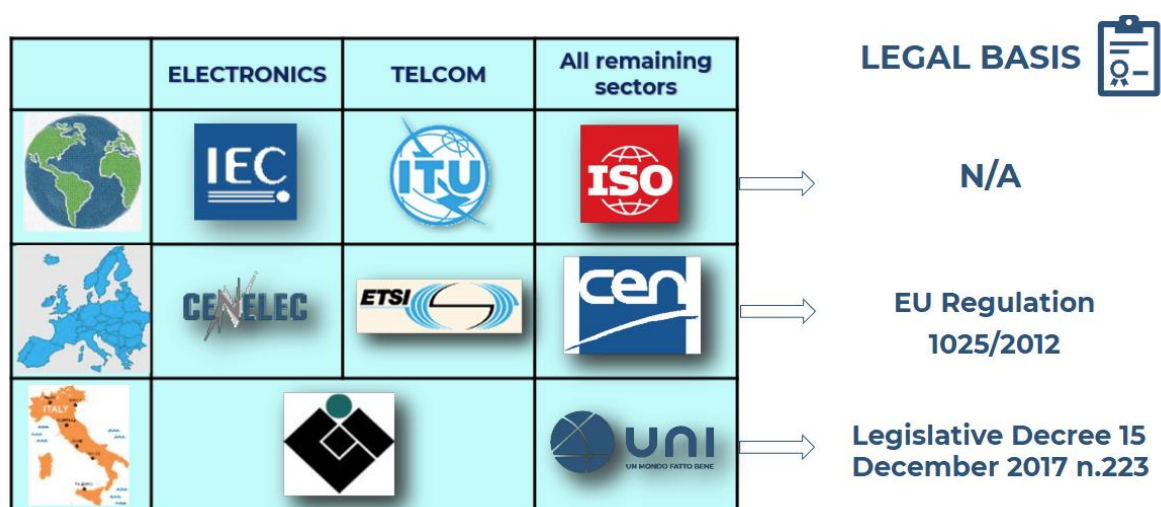


Figure 1. Standardisation Bodies (source: UNI)

International Standardisation Bodies (ISBs)

International standardisation bodies, ISBs, are at the “top” of the pyramid. They set standards designed to be used worldwide, aiding industries and markets to standardize operations across various countries and continents. This harmonization is necessary to remove technical barriers to trade and to promote international cooperation.

- **ISO (International Organization for Standardisation).** Founded in 1947 and headquartered in Geneva, ISO produces global standards and does so across a broad array of sectors, from technology and manufacturing to health and agriculture. ISO has published more than 25,900 international standards and is actively working with its 173 national members to support international circulation of products and services and stimulate innovation through consensus-based standards⁴.
- **IEC (International Electrotechnical Commission).** IEC was established in 1906 and specifically deals with international standards for electrical, electronic and related technologies. IEC counts around 170 countries involved in the standardisation process, over 10,000 standards and 30,000 experts. Its extensive catalogue includes

³ D4.3 Integrated environmental and traceability assessment framework into certification schemes

⁴ <https://www.iso.org/home.html> (data as of August 2025)

international standards, covering a wide range of technologies and ensuring global interoperability, safety, and quality across the electrical and electronic sectors. They ensure that electrical systems are safe, reliable, and compatible⁵.

- **ITU (International Telecommunication Union).** Established in 1865, ITU counts 194 Member States and more than 1000 companies. ITU is the United Nations specialised agency for information and communication technologies (ICTs). ITU produces international standards (named "Recommendations"⁶) to ensure the smooth interconnection of networks and the interoperability of communication equipment. It makes certain that networks and technologies connect smoothly all over the globe.

European Standardisation Bodies (ESBs)

At European level, the European Standardisation Bodies (ESBs) have the mandate to create the standards that support the Single Market, enabling compatibility and safety of the products and services circulating in all Member States. These bodies work in accordance with Regulation (EU) No 1025/2012 on European standardisation.

The European system is based on three known organizations that together contribute to the implementation of EU policies, to the elimination of barriers to trade among internal markets within the European Union, and to the competitiveness of European industries.

- **CEN (European Committee for Standardisation).** It covers a variety of fields except for electrotechnical and telecoms. At the start of 2025 CEN has 2263 (active) Technical Bodies and their work contributes to the free movement of goods and services in Europe, ensures product safety, and supports environmental protection and innovation. At the end of December 2024, the total number of living documents is 18,741⁷.
- **CENELEC (Comité Européen de Normalisation Électrotechnique).** Specialised in standards for electrical and electronic. CENELEC ended up the year 2024 with a total figure of 7,665 published Standards. It guarantees that harmonised technical guidelines support European markets and enable businesses to bring safe and interoperable products on the market⁸.

⁵ <https://www.iec.ch/homepage> (data as of August 2025)

⁶ <https://www.itu.int/en/ITU-T/publications/Pages/recs.aspx>

⁷ <https://www.cenelec.eu/about-cen/> (data as of August 2025)

⁸ <https://www.cenelec.eu/about-cenelec/> (data as of August 2025)



Figure 2. CEN/CENELEC Members (source: CEN)

- **ETSI (European Telecommunications Standards Institute).** It concerns telecommunications, the broadcasting sector and other electronic communications networks and services. ETSI counts more than 900 member organizations worldwide, drawn from over 60 countries and five continents. Members comprise a diversified pool of large and small private companies, research entities, academia, government and public organizations⁹.

National Standardisation Bodies (NSBs)

At the heart of the whole standardisation infrastructure are the National Standardisation Bodies (NSBs). The national bodies are responsible for the development and promotion of national standards around the world.

They are responsible for:

- representing the country at European (CEN/CENELEC) and international (ISO/IEC) level.
- Developing national standards which consider the needs of the local market, legislative requirements and industry practices.
- Ensuring the adoption of European (EN) and International (ISO, IEC) standards at national level.
- Coordinating and promoting the participation of national experts in European and International technical committees.

Some concrete examples of NSBs include:

- **UNI (Ente Italiano di Normazione)** in Italy, Standardisation in every field other than electrotechnology. Actively takes part in CEN and ISO activities to represent Italian stakeholders' interests.

⁹ <https://www.etsi.org/about>

- **DIN (Deutsches Institut für Normung)** in Germany, one of the world's most well-known national standards bodies, develops the national standards for Germany and it is also a major participant in various national, European and international committees.
- **AFNOR (Association Française de Normalisation)** in France. French standards development is overseen and participation in CEN, CENELEC, ISO, and IEC is coordinated.

The Table below summarizes a comparison between the several Standardization Bodies.

Table 1. Comparison table of standardisation bodies (source: UNI)

Body	Level	Scope / Sector	Headquarters	Main roles & functions
ISO	International	All sectors except electronics & telecom	Geneva, CH	Develops global standards to facilitate trade & innovation.
IEC	International	Electronics & electrotechnical sector	Geneva, CH	Develops international standards for electrical technologies.
ITU	International	Telecommunications & ICT	Geneva, CH	Develops technical standards (Recommendations) for global telecom networks.
CEN	European	All sectors except electronics & telecom	Brussels, BE	Develops European Standards to support EU Single Market.
CENELEC	European	Electronics & electrotechnical sector	Brussels, BE	Ensures harmonized European standards for electrical goods & systems.
ETSI	European	Telecommunications & digital networks	Sophia Antipolis, FR	Develops globally relevant standards for telecom and ICT.
NSBs	National	National priorities across all sectors	In each country	Develop national standards & represent their country in ISO, IEC, CEN, CENELEC.

Standardisation deliverables

To understand the difference between the different typologies of technical documents produced by the standardisation system, it is important to disentangle between the different standardization deliverables.

The key standardisation deliverables can be categorized into four forms:

1. Technical Standards,
2. Technical Specifications,
3. Technical Reports
4. "Light" Standards.

The figure below summarizes the differences between the various documents.

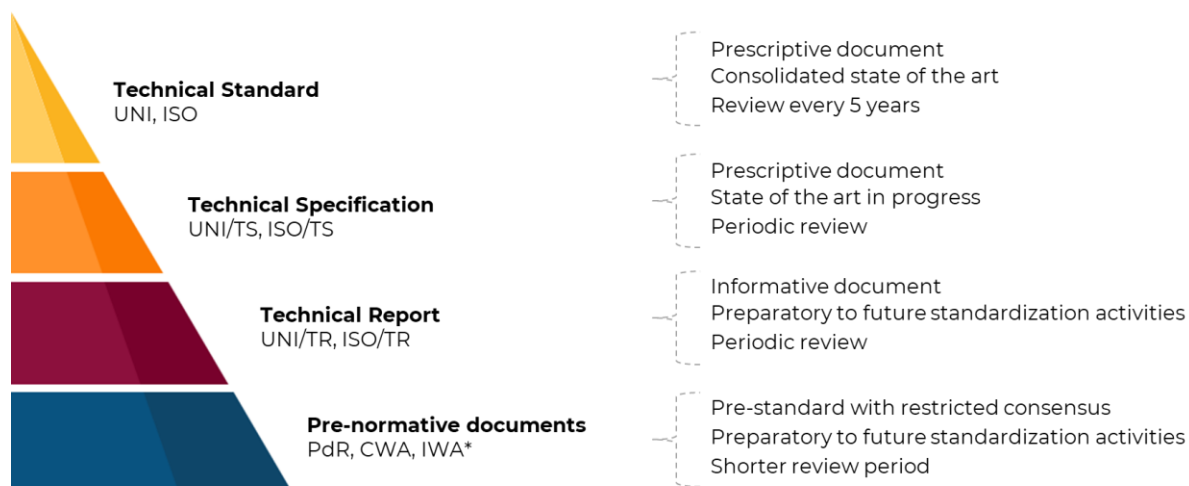


Figure 3. *Standardisation deliverables (source: UNI + CEN)*

Technical Standards constitute the most valuable output, prescriptive (although voluntary), built on a mature state-of-the-art solid and well-consolidated. They are systematically reviewed and updated every five years. A standard provides rules, guidelines or characteristics for activities or their results, for common and repeated use. Standards are created by bringing together all interested parties including manufacturers, users, consumers and regulators of a particular material, product, process or service. Each European Standard is identified by a unique reference code which contains the letters 'EN'. A European Standard is a standard that has been adopted by one of the three recognized European Standardisation Organizations (ESOs): CEN, CENELEC or ETSI. It is produced by all interested parties through a transparent, open and consensus-based process.

A Technical Specification (TS) is a normative document, the development of which can be envisioned when agreement on a European Standard (EN) is not reachable at the moment; need to coexist in anticipation of future harmonization, or for providing specifications in experimental circumstances and/or evolving technologies. No time limit is specified for the lifetime of TSs, but the Technical Body responsible shall ensure that they are reviewed at intervals of not more than 3 years, starting from their date of publication.

Technical Reports are essentially meant to be for the recording of data, studies, or envisaging matters, etc., which are then to be brought into the scope of a future prescriptive standardisation activity, and which are also reviewed periodically. A Technical Report (TR) is indeed an informative document that provides information on the technical content of standardisation work. It may be prepared when it is considered urgent or advisable to provide additional information to the CEN and CENELEC national members, the European Commission, the EFTA Secretariat, other governmental agencies, or outside bodies. No time limit is specified for the lifetime of TRs, but it is recommended that they are regularly reviewed by the Technical Body responsible to ensure that they remain valid.

Lastly, "Light" Standards, including CWAs, are pre-normative documents produced with a limited consensus base (they are developed within ad-hoc working groups, e.g. CEN Workshop), and may be designed to act quickly to meet a temporary market demand and pave the way for the formal standardisation work.

Quality Infrastructure: a summary

To close the standardisation framework, it is important to recall the Quality Infrastructure.

Quality Infrastructure (QI) refers to the **institutional framework** that supports and enhances quality in products, services, and systems. It includes:

- **Standardisation (developing standards)**
- **Conformity Assessment** (i.e. certification bodies, verifying that the products/services conform to the requirements settled in the standards)
- **Accreditation (verify Competence of Conformity assessment bodies assess whether CABs meet international standards - e.g., ISO/IEC 17000 series)**

These components work together to ensure **trust, safety, and competitiveness** in national and international market

The figure below summarises the quality infrastructure, while section 1.3.4 of D4.3 offers more insights on the topic.

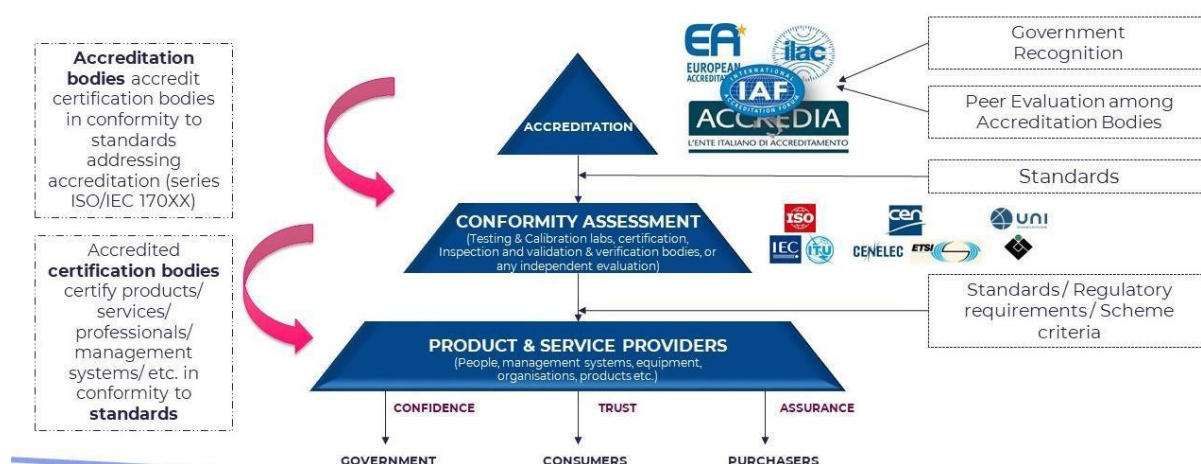


Figure 4. Standardisation, Certification and Accreditation (source: UNI, D4.3)

2.2. CEN/TC 411 current Business Plan

As introduced in D4.3, CEN/TC 411 is the CEN Technical Committee dedicated to developing standards on Bio-based products and it started its activity back in March 2011. Its origins stem from the European Commission mandate M/492 EN¹⁰ requesting CEN to establish a framework for bio-based products standards.

Based on the mentioned mandate, the main objective of CEN/TC 411 so far has been to develop standards for bio-based products covering horizontal aspects. This includes

¹⁰ MANDATE ADDRESSED TO CEN, CENELEC AND ETSI FOR THE DEVELOPMENT OF HORIZONTAL EUROPEAN STANDARDS AND OTHER STANDARDISATION DELIVERABLES FOR BIO-BASED PRODUCTS. Brussels, 7th March 2011.

consistent terminology, sampling, certification tools, biobased content, application and correlation with life cycle analysis, sustainability criteria for biomass used and for end products, as well as aspects requiring further harmonization at a horizontal level. Early in its work, the TC also developed standards for biosolvents, covering product functionality, biodegradability, and other product-specific aspects¹¹.

Experts sitting in this TC come from CEN Members and several stakeholders' categories (researchers, associations, industry, certification bodies...) to ensure the documents are well grounded and can be representative of the market.

CEN/TC 411 is structured in four focused working groups, each developing standards on specific topics and overall, from the beginning of its activity, the TC has published 15 standards (plus an amendment).

The following tables, retrieved from D4.3, list the TC working groups and the developed standards.

Table 2. CEN/TC 411 structure (source: UNI, D4.3)

Working Group	Focus area
WG 1	Terminology
WG 3	Bio-based content
WG 4	Sustainability criteria, life cycle analysis and related issues
WG 5	Certification and declaration tools

Table 3. CEN/TC 411 standards (source: UNI, D4.3)

Deliverable	Scope	WG	Publication
EN 16575	Bio-based products - Vocabulary	WG 1	2014
EN 16766	Bio-based solvents - Requirements and test methods	WG 2	2017
CEN/TR 16721	Bio-based products - Overview of methods to determine the bio-based content	WG 3	2014
EN 16785-1	Bio-based products - Bio-based content - Part 1: Determination of the bio-based content using the radiocarbon analysis and elemental analysis	WG 3	2015
EN 16640	Bio-based products - Bio-based carbon content - Determination	WG 3	2017

¹¹ BioReCer D4.3.

	of the bio-based carbon content using the radiocarbon method		
EN 16785-2	Bio-based products - Bio-based content - Part 2: Determination of the bio-based content using the material balance method	WG 3	2018
EN 17351	Bio-based products - Determination of the oxygen content using an elemental analyser	WG 3	2020
EN 16751	Bio-based products - Sustainability criteria	WG 4	2016
EN 16760	Bio-based products - Life Cycle Assessment	WG 4	2015
CEN/TR 16957	Bio-based products - Guidelines for Life Cycle Inventory (LCI) for the End-of-life phase	WG 4	2016
CEN/TR 17341	Bio-based products - Examples of reporting on sustainability criteria	WG 4	2019
EN 18027	Bio-based products - Life cycle assessment - Additional requirements and guidelines for comparing the life cycles of bio-based products with their fossil-based equivalents	WG 4	2025
EN 16848	Bio-based products - Requirements for Business-to-Business communication of characteristics using a Data Sheet	WG 5	2016
EN 16935	Bio-based products - Requirements for Business-to-Consumer communication and claims	WG 5	2017
CEN/TR 17674	Bio-based products - Use of stable isotope ratios of Carbon, Hydrogen, Oxygen and Nitrogen as tools for verification of the origin of bio-based feedstock and characteristics of production	TC	2021

	processes - Overview of relevant existing applications		
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The current TC work programme includes 2 standards under development.

The first document titles “**Bio-based products - Bio-based carbon content - Determination of the bio-based carbon content using the radiocarbon method**” (prEN 16640 rev). This European Standard specifies a method for the determination of the bio-based carbon content in products, based on the 14C content measurement. This European Standard also specifies three test methods to be used for the determination of the 14C content from which the bio-based carbon content is calculated: - Method A: Liquid scintillation-counter method (LSC) (normative); - Method B: Beta-ionization (BI) (informative); - Method C: Accelerator mass spectrometry (AMS) (normative). The bio-based carbon content is expressed by a fraction of sample mass or as a fraction of the total carbon content. This calculation method is applicable to any product containing carbon, including bio composites¹².

The second document titles “**Bio-based products - Sustainability criteria**” (prEN 16751 rev). This European Standard sets horizontal sustainability criteria applicable to the bio-based part of all bio-based products, excluding food, feed and energy, covering all three pillars of sustainability, environmental, social and economic aspects. If the product is partly bio-based, this European Standard can only be used for the bio-based part since it does not address non-bio-based (fossil, mineral) parts of a product. This European Standard can be used for two applications; either to provide sustainability information about the biomass production only or to provide sustainability information in the supply chain for the bio-based part of the bio-based product. This European Standard sets a framework to provide information on management of sustainability aspects. This European Standard cannot be used to make claims that operations or products are sustainable since it does not establish thresholds or limits. This European Standard can however be used for business-to-business (B2B) communication or for developing product specific standards and certification schemes¹³. This document will supersede the EN 16751:2016 and has been initiated on August 27th, 2025.

Since the beginning, the CEN/TC 411 has settled important reference documents for the sector. As highlighted by a technical expert, in several European legislative documents have referenced CEN/TC 411 standards:

- COM(2022)682 final EU policy framework on biobased, biodegradable and compostable plastics at art 3.1 “Biobased plastic content” reads: “There is currently no mandatory minimum biobased content nor agreed certification scheme or label for a plastic product to be labelled as biobased. The crosscutting standards developed by the European Technical Committee for Standardisation for biobased products (CEN/TC411) offer guidance on aspects such as measuring methods of biobased content, business-to-business and business-to-consumer communication. These voluntary standards are widely used by the market and their application is recommended as it ensures a consistent approach.”

¹²https://standards.cencenelec.eu/dyn/www/f?p=205:110:0:::FSP_PROJECT,FSP_LANG_ID:79994,25&cs=17AB085599C45FCF1FAA83C9C9FDCB97A

¹³https://standards.cencenelec.eu/dyn/www/f?p=205:110:0:::FSP_PROJECT,FSP_LANG_ID:82540,25&cs=1C08DBBDC88848A14AC2F538F7E8B04B9

- In Italy, the Legislative Decree No. 152 of April 3, 2006 (in Ordinary Supplement No. 96 to the Official Journal, April 14, No. 88). - Environmental regulations. Article 226 ter reads: "Accredited bodies certify the minimum content of renewable raw materials by determining the percentage of carbon of biological origin present in plastic bags compared to the total carbon present therein, using for this purpose the current international standard for determining the bio-based carbon content in plastics, namely the UNI CEN/TS 16640 standard [which has been substituted by UNI EN 16640:2017]."
- The Italian National Action Plan on Green Public Procurement (PAN GPP¹⁴) Minimum Environmental Criteria For Awarding Construction Design And Execution Services, at point 2.2.1 reads: "Plastics may also be derived from biomass, in accordance with technical standard UNI EN 16640. Permitted bio-based plastics are those whose raw material is derived from recovery activities or is a by-product generated by other production processes." (Plastics may also be derived from biomass, in accordance with technical standard UNI EN 16640. Bio-based plastics are those whose raw material is derived from recovery activities or is a by-product generated by other production processes.).
- Commission Decision (EU) 2018/1702 of 8 November 2018 establishing the EU Ecolabel criteria for lubricants (notified under document C(2018) 7125) (Text with EEA relevance.) "To demonstrate compliance with criterion 4(b) the applicant shall enclose the final product test report in accordance with EN 16807, ASTM D 6866, DIN CEN/TS 16137 (SPEC 91236), EN 16640 or EN 16785-1.

Although such important references, there is still a lot of work to do and this is why a change in the TC business plan, settling the strategic priorities of the committee, is now essential.

The following session highlights the main strategic needs emerging from discussions with technical experts.

2.3. Bio-based products standards priorities and CEN/TC 411 possible evolution: an interview with experts

CEN/TC 411 adopted its Business Plan in October 2011, which set the strategic vision for the development of horizontal standards supporting innovation, competitiveness, and sustainability in the European bioeconomy. From 2025, this plan is undergoing revision to reflect progress made and address persisting challenges.

The revision of the Business Plan acknowledges existing issues in achieving the initial goals: these challenges underline the need for stronger cooperation between standardisation bodies, research projects, and stakeholders. Results from initiatives such as BioReCer can play a vital role by providing scientific evidence, methodologies, and pre-normative research to support new standards.

Indeed, while progress is significant, for example, a standardised guidelines for certification remain incomplete (as identified also from BioReCer project), and further work is needed to ensure coherence and market relevance.

In this section it will be presented the results of the interview run to two technical experts, to highlight the strategic considerations that CEN/TC 411 (and National Standardization Bodies, broadly) should consider in the revision of the Business Plan.

¹⁴<https://gpp.mase.gov.it/Home/PianoAzioneNazionaleGPP>

The questionnaire

After an introduction of the BioReCer project, to frame the context and the objectives of the interview, the experts were asked to deepen three broad topics.

- **Need to Update the CEN/TC Business Plan**

With the first topic, it was explored the need to update the CEN/TC 411 business plan, considering it dates back several years. Also, UNI asked if there are specific areas where there is a particular need to realign goals or priorities to better support stakeholders, industry, or regulators. Finally, it was enquired whether the updated business plan may play a role in enhancing cooperation with other TCs or European/international initiatives (e.g. European projects)

- **Standardization Gaps in Certification Schemes**

With the second topic, the focus was moved to strategic standardization gaps, considering the numerous certification schemes existing on the market and if there challenges in harmonizing schemes across Europe or with global markets. Finally, a discussion was held on how standards can support innovation and industries in entering the bio-based market through clearer or more accessible certification paths.

- **Forward-Looking and Strategic Needs**

With the third topic, the attention was moved to the existence of new sectors or value chains (e.g., marine bioresources, bio-based plastics, digital traceability tools) that are emerging and require standardisation attention. The possible benefits in establishing a permanent standardisation gap analysis mechanism, involving research institutions or Horizon Europe projects, was also touched upon.

Although all the questions and topics presented above were asked to the experts, the discussions followed their own flow, then some aspects were not particularly deepened.

The experts interviewed¹⁵



Gustavo Adrián Defeo (member of CEN/TC 411, convenor CEN/TC 289 WG2 and WG3 and Scientific Director of CTC Ars Tinctoria srl)

¹⁵Biographies, source Linkedin accounts.

Gustavo Adrian Defeo began his career in Argentina in 1984, at Ciba Geigy. He later worked for Yorkshire Chemicals, Zschimmer & Schwarz, Hodgsons, moving to Italy in 1993, becoming export manager of Codyeco, partner of Codymex (Leon de Guanajuato, Mexico), later founding Genesis Ecotec in 1999. In 2003 he sold his laboratory to Bayer AG (Leverkusen, Germany) then moving to northern Europe as global technical manager for the leather dyes sector of this company and subsequently to Lanxess AG (Cologne, Germany). In 2011 he found Ars Tinctoria analytical laboratory. His deep knowledge of dyes and auxiliaries' production for textile, paper and tanning sectors, lead his laboratory Ars Tinctoria to define the molecular structures of several organic dyes, surfactants and fatliquors.

Gustavo Adrián Defeo has more than 30 years of intense international academic and research activity, starting in 1989 with his first International AIC 89 conference - Buenos Aires, FLAQITIC 92-Buenos Aires, ACOLCUR 92-Medellin, AIC 1993-Budapest. Within the International Union of Leather Chemists and Technicians Societies (IULTCS), in 1993 he presented his first poster at IULTCS 93-Porto Alegre, following London 1997, Cape Town 2001, Florence 2005, Istanbul 2013, Novo Hamburgo 2015, and Dresden 2019. He has been invited as a speaker at several international events, such as University of Northampton 2003 and 2013, AAQTIC 2008 and 2019, L.G.R. - Lederinstitut Gerberschule Reutlingen 2011, ABQTIC, Franca 2011, Freiburger Leder Tagen 2012, COTANCE 2015, Glasgow, Lorca 2016, Tokyo 2018, Iceland University of the Arts 2019, Reykjavik - Iceland, CTC Lyon, 2019, Design Museum London 2019, Lanxess-Cologne 2020 among others.

Gustavo Adrian Defeo received in 1994 the Donald Burton Memorial Prize in Northampton (England), and from S.L.T.C. the professional-grade F.S.L.T.C. (Fellow of the Society of Leather Technologists and Chemists).

Since 2014 he is a Certified Expert of the IULTCS - IUT - CPD.

He is Italian delegate at the I.U.C. - IULTCS (International Commission of Chemical Tests Normalisation for Leather) in the chemical analysis commissions of leather and tanning chemicals, Italian delegate to the CEN commission (European Standardization Commission) at the technical committee TC 289, member of the scientific committee of the AICC (Italian Leather Chemist Association).

Recognised for his analytical research in the field of False Positives, he has presented several conferences on this topic (2-naphthylamine, 4-aminobiphenyl, chlorophenols, chloroparaffins, perfluoroalkyl substances).



Carlo Brondi (Member ISO/TC 207/WG8 and UNI/CT 057, Accredia steering committee, Senior Researcher STIIMA-CNR)

Bachelor's degree at the "Federico Secondo" University - Materials Engineering-
Thesis on impact assessment due to advanced material implementation since product design phase.

Master's degree in industrial research.

Senior researcher at the Institute for Industrial Technologies and Automation (ITIA - CNR) (since 2004 to 2018).

Senior researcher at the Institute of Intelligent Industrial Technologies and Systems for Advance Manufacturing (STIIMA CNR) since 2018.

Researcher within European, National and Regional Project on the following subjects:

- Sustainable Design of Process / Product,
- Environmental Impact Assessment of Fashion products
- Foresight and Technology roadmap in the consumer goods sector

Life Cycle Assessment of advanced materials, Implementation of LCA approach in the manufacturing plant simulation, Sustainability index for company evaluation performance within supply chain cluster, LCA modularisation in the product design phase, Cradle-to-gate and gate-to-grave data integration within certification procedures, Sustainability for industrial symbiosis and circular economy, panellist expert in certification procedures (EPD, PEF schemes).

A summary of the answers

- **Need to Update the TC Business Plan**

[Gustavo Adrián Defeo]

It is a priority to increase the number of sectors involved in CEN/TC 411 because as already seen in the tanning sector, there is no awareness of the existence of this TC, neither among technical experts.

There are many sectors that are unaware of CEN/TC 411 and, considering the cross-cutting nature of the TC, it is essential that the work done becomes a cross-cutting standard that reaches all sectors that use materials derived from biomass.

The possible strategies are to liaise with sectoral TCs and finding ways to communicate with the various committees of specific sectors in order to explain the work already done by CEN/TC 411 and the standardisation possibilities that may exist in specific sectors.

But firstly, it is important to provide a simple description of the activities that have been carried out and their purpose. There is a lack of knowledge on the part of the various sectors. Even the textile sector, which is involved in textile TCs, is not aware of CEN/TC 411 and does not understand the purpose and scope of this committee.

To make an example, Gustavo (working in the CEN/TC 289 for the tanning sector) approached the CEN/TC 411 just by chance. Some sectors may not yet have reached that point. Learning from his experience, in the recent years, at every meeting of CEN/TC 289 (and the Italian mirror group), Gustavo has reported on CEN/TC 411 activities, generating interest. Now there is a lot of talk about it.

The research projects (like BioReCer) who gather experts from different fields may really support this objective.

These liaison activities are not just networking. For example, Gustavo works in close cooperation with trade associations, and he is trying to promote the standard EN 16848 since many stakeholders have realised that in France it simplifies the law against greenwashing.

CEN/TC 411 has already developed elements that are useful for the EU's legislative objectives; it is important that stakeholders and institutions are aware about them.

[Carlo Brondi]

All the standardisation gaps identified by the BioReCer project are aggregable. Companies do not understand what to do, and the management and proliferation of standards is not top-down but bottom-up. The way it works is that there is a necessity, standards are created and subsequently it is addressed the problem of aligning them with each other.

Very often, those who create standards are unaware of the others. To make a contrary example, the GRI standards are bottom-up, they have a hierarchical approach, a simple structure, and lack that type of homogenisation.

For the update of the CEN/TC 411 Business Plan we need to evaluate three strategic aspects:

- Barriers that inhibit the application of standards to the specific context: when a standard is applied, there is not only the direct cost of purchasing the standard, but especially the timing of its implementation; if there is no clear structure and if we want it to be replicable, it becomes more complicated. There is a lot of freedom now, especially in the scientific field. But those who should apply the standards have difficulties. Greater clarity is needed in standards and should be a priority to facilitate implementation and reduce indirect costs (timing to apply the standard). Providing standards that are easy to apply improves implementation times, benefitting the entire system.
- The value that the standard provides to an organization: if it applies a standard, but it is not reliable, it undermines the credibility of an entire supply chain.
- Another strategic issue is the link between standards and legislation: they overlap a lot, those who do not know the law do not know the standards. Very often, they want compliance with the law through the standards.

These three aspects are strictly interlinked. If there is a clearer standard in terms of context and verification steps, it has a higher value because those who read it know that it is the reference standard. For example, in ISO standards there are links to SDGs, but no hierarchical relationship between standards. This is a problem.

Bio-based standards cover several sectors, but also carbon footprint standards do and relate to bio-based products. Strong links should be made explicit in both legislation and standards.

Another strategic consideration that the CEN/TC 411 should consider is the importance of communicating the value of standards. ISO standards, in Carlo's perspective, are better grounded compared to proprietary standards, also to GRI standards, which have no public consultation at a global level.

Proprietary standards prevail because they are faster, more organised, and involve fewer rounds, and this aspect must be overcome. Reducing the time to develop standards is a need that standardisation bodies must address. These documents have often important limits: those who set the standards also verify them. It is often unclear whether there is third-party validation.

All TCs, like branches of islands, try to realign themselves through the creation of JTCs (Joint Technical Committee), but very often they do not talk to each other. This hamper

the possibility to reach a “critical mass”; there are several experts, and they should find a common ground. It is needed to have moments of alignment.

Something is done within ISO/TC 207 for carbon footprint and LCA. The same methodology may be replicable.

This alignment is very important for example when using methodologies/terms. Depending on the standard and the TC, there are different terms. Moreover, it is often unclear how much of the document is new and how much is old. This increases complexity, and indirect costs.

Readability, recognisability, applicability, reliability, timing are key to create successful and effective standards.

- **Standardisation Gaps in Certification Schemes**

[Gustavo Adrián Defeo]

There is fragmentation in certifications, and a cross-cutting regulatory framework should provide cohesion. For example, LCA has various calculation perspectives, depending on how we view certain provisions of CEN/TC 411, which would give priority to certain criteria (biomass, fundamental for LCA calculation). If we start from one extreme, we end up with greenwashing.

We need to look at end-of-life, what happens to these materials, are they materials we can manage? Through sustainable means. Sometimes there is a lack of logical thread and priority of parameters within these frameworks.

CEN/TC 411 is working a lot on this.

Some standards need testing, which takes time. Especially if they involve innovative methodologies.

Gustavo does not think that difficulties in using the standards for some companies/sectors are due to an economic burden, but it's more a question of informing people that CEN/TC 411 exists, and how their documents we can be linked with eco-design legislations.

There is a lack of dissemination, but when people hear about these standards, there is immediate interest from the market.

The effort in EU projects is exactly to raise awareness of the world of standardization and how the standardisation system works.

[Carlo Brondi]

The major market gaps are linked to the considerations presented in the previous step. When a standard is introduced on the market, a group of experts is created who begin to “talk to each other.” When I apply a standard, it becomes a reference practice: there is a gap because standards that can become a reference practice quickly on the market are more effective.

In some sectors, standards are quickly developed because companies agree and lobby. This is a mechanism by which one standard tends to spread on the market, becoming a reference practice.

How do we bridge the gap? With quality, by communicating what is in the standard and also highlighting the scientific importance of the standard and the process to develop that standard. Because too often, stakeholders are not aware of the process to develop a standard and consequently they do not perceive its value.

To push the standard application on the market, it would be useful to create forums with business representatives and innovation channels in which the business associations themselves participate in round tables and communicate their experience in applying the standards.

Follow-up groups to discuss the application of the standard, what worked and what not, would increase the value of the documents and their updates.

Being a reference practice, containing the costs of application, effectively communicating the quality of the documents are key enablers that all standardisation bodies should take into account.

Also getting feedback quickly, providing quick outlines and economic returns from experts; avoiding lengthy discussions on minor issues in the development of standards would reduce the time to deliver the standards, hence supporting their effectiveness.

- **Forward-Looking and Strategic Needs**

[Gustavo Adrián Defeo]

It is important to create and pursue a systemic approach: it would be great if CEN/TC 411 may create “Ambassadors” to share the work that has already been done.

There is now really a lack of dialogue and finding a way to create a more organic link between the various regulatory proposals is the more urgent strategic need.

[Carlo Brondi]

We can summarise the strategic needs in 6 points:

- 1) **Homogenisation:** avoid overlapping and reduce bias. Where there are similar standards, choose one.
- 2) **Simplification:** how to apply standards, times, methods. Focus heavily on reducing, streamlining where necessary, or unifying standards. If they are similar or complementary, make them converge.
- 3) **Standard reliability:** linked to development mechanisms. Ex-ante and ex-post methodologies, dozens of verification criteria, but no detailed standards yet on how to verify that a standard is implemented as such. It should become standard practice. The JRC sometimes has these guidelines, as does UNITO.
- 4) **Applicability:** linked to dialogue with stakeholders. Ex-post phase of implementation and feedback on the standard, which highlights any gaps that, once identified, should be considered as preparatory documents for the revision of standards. Sometimes the revision takes ten years, so the thread of why it was written in the first place is lost. Verify sectoral coverage.
- 5) **Integration into training:** training seen as something ex-post. Standards must be included in university courses. Common EU framework that also includes standards should be an integral part of university courses.
- 6) **Provide common training courses for those who verify standards:** some do not have the same background. Those who verify standards, inspectors, must have

ad hoc training that requires them to verify certain standards, and, without it, they should not be able to do so. This guarantees quality, that there are no errors or arbitrariness. A common core is needed.

3. CEN Workshop Agreement: a bridge between standardisation and innovation

Standards are the result of the collective knowledge and experience of experts who understand the needs of the organisations they represent, including manufacturers, suppliers, customers, users, trade associations and regulators.

Some practical examples are:

- Quality management standards, designed to improve efficiency and minimise product defects.
- Environmental management standards, aimed at reducing impacts, preventing waste and supporting sustainability.
- Occupational health and safety standards, to lower the risk of accidents in the workplace.
- Energy management standards, which help organisations optimise consumption and cut costs.
- Food safety standards, to ensure food is not exposed to contamination.
- Information security standards, to protect sensitive and confidential data.

Since standards reflect the state of the art, their development requires structured procedures carried out by Technical Committees (TCs), ensuring compliance with the principles of transparency, openness and consensus. This process, however, can be lengthy and often exceeds the timeframe of research and innovation projects.

To respond to this need, CEN and CENELEC have created a more agile type of standardisation deliverable that aligns well with project timelines: the CEN Workshop Agreement (CWA).

A CWA is a consensus-based document developed within an open workshop (CEN/WS), coordinated by a National Standards Body (such as UNI in Italy).

The CEN Workshop is a highly flexible platform that welcomes the participation of any interested organisation, European or non-European, with the objective of drafting a consensus-based agreement (the CWA). Participation is open globally, provided that interested parties accept the conditions set out in the Project Plan, which reinforces the inclusive and transparent nature of the process.

The figure below summarises these logic steps.

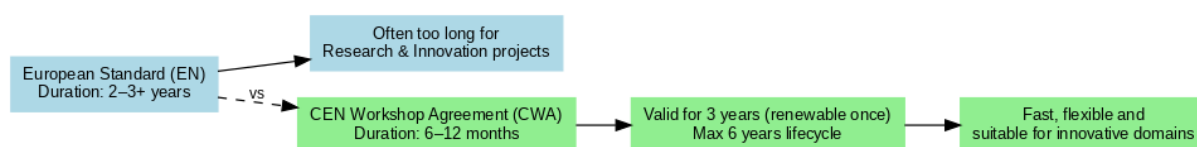


Figure 5. CWA origin and lifetime (source: UNI)

Consensus is the fundamental principle in finalising the document. It does not mean complete unanimity, but rather a general agreement that avoids persistent opposition on key issues, while making an effort to integrate the views of all participants and to reconcile different perspectives.

Unlike European Standards (EN), which may require several years to be published, CWAs are usually completed within a period of 10 to 12 months. This makes them particularly relevant in fast-developing technological domains and innovative sectors, such as R&I projects, where rapid and adaptable standardization tools are essential. In addition, each CWA has a defined lifecycle: it is valid for three years, renewable once, but after six years it must either be revised, converted into a formal standardisation deliverable or withdrawn. This ensures that the content remains up to date and aligned with the state of the art.

3.1. Overview: what is a CWA and why it should relate to Research projects?

According to CEN-CENELEC Guide 29¹⁶, a CWA is designed to be a fast-track deliverable: a document developed in an open workshop where interested stakeholders voluntarily join forces to agree on a common text.

Its purpose is to address emerging needs in areas where technologies or practices are still evolving and where a European Standard (EN) would require a longer process or may not yet be appropriate. The workshop itself is supported by a Secretariat, managed by a National Standards Body, which is responsible for the organisational and administrative tasks, including coordination, communication with participants, and liaison with the CEN-CENELEC Management Centre.

In Horizon projects, CWAs can play an important role in bridging the gap between research results and practical uptake. Research outcomes are often too early-stage or too context-specific to be transformed immediately into standards. However, a CWA offers an intermediate step: it allows results, methodologies, or specifications to be captured in a recognised and citable format, accessible across Europe through the CEN-CENELEC system. This ensures that project outputs are not only disseminated in academic or technical reports but also translated into a reference document that industry, public authorities and other stakeholders can use. The official distribution through CEN-CENELEC catalogues guarantees wider visibility and credibility compared to traditional project reports, which often remain limited in scope.

The Guide 29 also highlights the openness of the Workshop process. Participation is not restricted to CEN or CENELEC members but open to all interested parties, including SMEs, large companies, research institutes, universities, regulators and public authorities. For research projects, this inclusiveness means that the consortium can directly engage external stakeholders, enlarge its network, and validate results against real market needs. In this way, the CWA becomes not only a technical output but also a platform for collaboration, supporting cross-border cooperation and alignment with the European Standardisation Strategy.

Another aspect underlined in the Guide 29 is that CWAs are not legally binding and cannot introduce new mandatory requirements. Nevertheless, they can provide valuable feedback to regulatory bodies. For projects addressing emerging policy areas, such as circular economy, digitalisation or sustainability, this role is crucial: CWAs can serve as early indicators of market practices and technical feasibility, thus informing future regulation and standardisation priorities. This capacity to act as a bridge between research, market and regulation also reinforces the role of CWAs as a tool to increase the global relevance of European innovations.

¹⁶<https://www.cencenelec.eu/media/Guides/CEN-CLC/cenclguide29.pdf>

Overall, by embedding the development of a CWA in a Horizon project, consortia can significantly increase the visibility, credibility and exploitation potential of their results. The CWA acts as a bridge between research and market, facilitates interoperability and scalability, and strengthens Europe's competitive position in global innovation. The Guide 29 also provides a clear allocation of roles and responsibilities, which helps ensure accountability and transparency throughout the process.

The figure below summarises the main CWA aspects here described.

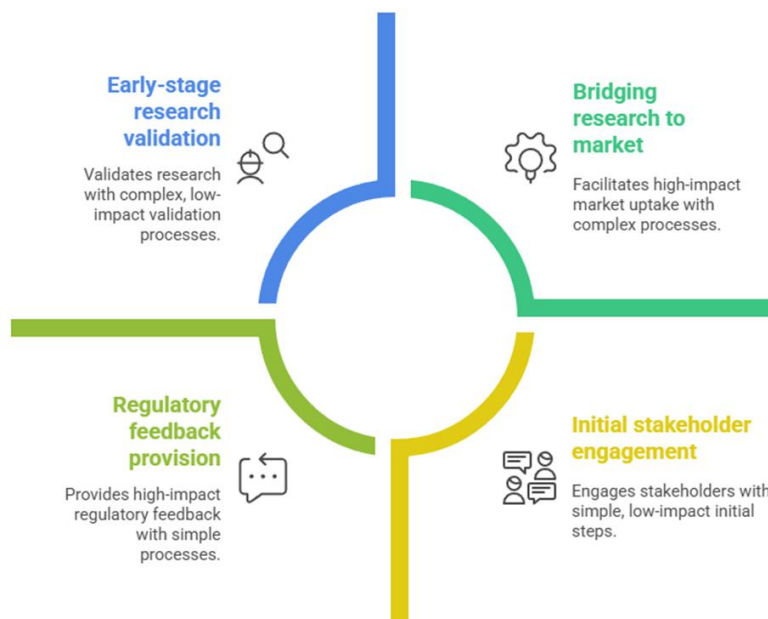


Figure 6. CWA overview (source: UNI)

3.2. Steps towards a CWA

The development of a CEN-CENELEC Workshop Agreement (CWA) follows a structured pathway designed to guarantee openness, transparency and consensus among participants. While more agile than the process leading to European Standards, it is still governed by defined stages that ensure the credibility and reliability of the outcome.

The figure below represents an overview of all these steps.



Figure 7. CWA steps (source: UNI)

The starting point is the submission of a proposal. A National Standards Body or National Committee presents the idea to the CEN or CENELEC Technical Board, outlining the scope, objectives and justification for the new CWA. This first step clarifies the relevance of the proposal and its expected impact, particularly when linked to research and innovation projects.

Once the proposal is validated, a Workshop is formally launched. This is done through the publication of a Project Plan on the CEN-CENELEC website, which sets out the scope, timeline, participation criteria and organisational details. By making this information public, all interested stakeholders are invited to take part, ensuring that the process remains inclusive and open to contributions from outside the initial proposers. At this stage, the Secretariat plays a central role in managing communications, coordinating meetings and ensuring compliance with CEN-CENELEC procedures.

The next phase revolves around stakeholder engagement and consensus building. Workshops bring together a diverse group of participants, industry representatives, SMEs, researchers, academics, public authorities, consumer groups and others, who contribute their expertise during dedicated meetings and discussions. A drafting group, usually composed of selected experts, prepares the initial version of the CWA. This draft is then circulated among all workshop participants for review and comments, with the possibility of opening an additional commenting phase to the wider community. Several iterations may take place to address feedback and refine the content until a balanced consensus is reached.

After revisions are completed, the final draft is submitted to the workshop participants for formal approval. Only once consensus is confirmed can the document move forward to publication.

The final stage is the official publication by CEN-CENELEC. The CWA is uploaded to the dedicated online catalogue and becomes publicly accessible (if they stem from R&I projects).

CWAs are protected by CEN-CENELEC copyright but some of them are publicly available, ensuring wide distribution while safeguarding intellectual property rights. From that moment, dissemination activities are encouraged to promote uptake by industry, policymakers and other relevant stakeholders, ensuring that the results of the workshop extend their impact well beyond the development phase.

Through this stepwise approach, from proposal to publication, CWAs provide research projects with a structured yet flexible framework to transform innovative results into an authoritative reference, ready to support market uptake and possibly pave the way towards more formal standards in the future.

4. BioReCer CEN Workshop Agreement Project Plan

This chapter is intended to provide all the necessary information to submit to CEN/CENELEC an official request to start a new CEN Workshop Agreement.

Although the process to develop the CWA will not be finalised during the BioReCer project timeframe, this chapter represents the legacy of the project to continue with a possible standardisation development after the end of the project.

The sections in this chapter are coherent with CEN/CENELEC official templates and comply with the relevant CEN Guides.

Starting from this Project Plan a new CWA can be indeed developed in a new Workshop (temporary body) which will be open to any interested party. All interested stakeholders like academic and research bodies; funded European Projects (i.e. Horizon 2020, Horizon Europe); industry and commerce; non-governmental organisations (NGO); and standards application and certification bodies can take part in the development of a new CWA.

4.1. Background

The European Commission has stated that the bioeconomy is a key enabler to achieve the EU's 2030 climate targets and climate neutrality by 2050, while also supporting the fight against pollution and biodiversity loss¹⁷. The bioeconomy supports indeed sustainable agriculture, forestry, and food systems, while reducing dependence on fossil fuels and strengthening rural economies.

On May 20th, 2025, the JRC updated the dataset “Jobs and Wealth in the European Union Bioeconomy” which has shown that the biomass-producing and converting sectors of the EU bioeconomy generated €812 billion in value added in 2022, representing approximately 5.0% of the EU's GDP and growing by 12% in nominal terms compared to 2021. Moreover, 17.2 million jobs were created, accounting for 8.0% of total EU employment. While the number of jobs is similar to that of 2021, some bio-based manufacturing activities, such as bio-based chemicals, pharmaceuticals, plastics and rubber or the manufacture of wood products, did show an increase in the number of persons employed¹⁸.

This is another data-based evidence that the bioeconomy is also a driver of innovation and green jobs, other than a key enabler for climate resilience and sustainable development.

Since more than 15 years, the EU is aware of the impact of bioeconomy on GDP and jobs creation, indeed in 2012 the European Bioeconomy Strategy and its Action Plan emerged from the Innovation Union and Resource Efficient Europe flagship initiatives of the EU 2020 strategy.

In 2017 it was carried out an independent review¹⁹ which concluded that “the European Bioeconomy Strategy has substantially delivered during the past years on its objectives, through a wide array of actions ranging from the EU Framework Programmes for Research

¹⁷https://environment.ec.europa.eu/strategy/biodiversity-strategy-2030_en

¹⁸<https://publications.jrc.ec.europa.eu/repository/handle/JRC137187>

¹⁹https://ec.europa.eu/research/bioeconomy/pdf/publications/bioeconomy_expert_group_report.pdf

and Innovation, to the launching of the Bio-Based Industries Joint Undertaking (BBI JU) leading to the creation of new bio-based value chains, to the development of several national bioeconomy strategies, of dedicated regional platforms and of stakeholder panels, all promoting the development of local bioeconomies valuing local resources and adapted to local needs. In particular, the Strategy succeeded in mobilising Research and Innovation funding in bioeconomy by:

- a) doubling the EU Research and Innovation funding dedicated to the bioeconomy under Horizon 2020,
- b) increasing support to private investment and public-private partnerships through the launch of the BBI JU, and
- c) encouraging Research and Innovation investments in the Member States.

Also, one of the key results of the European Bioeconomy Strategy has been to bring the bioeconomy principles and cross-cutting objectives to the attention of national and regional policymakers, as demonstrated by the number of countries that have adopted bioeconomy policies since 2012”.

Nonetheless there is still a lot to do, this is why the new strategy (EU biodiversity strategy for 2030) aims at taking full advantage of the revolution in biotechnology.

As announced by the European Commission²⁰, new EU bioeconomy strategy, expected by the end of 2025, “will focus on reinforcing circularity and sustainability, while contributing to the decarbonisation of the EU economy. It will set the framework conditions to enable bioeconomy startups, entrepreneurs and new business models to thrive. It will also propose actions to unlock the potential of bioeconomy innovations, so that they can reach the market, generating green jobs and growth”.

Despite the progress made with previous strategies, and the ongoing effort by the European Commission to take specific actions and commitments to put Europe's biodiversity on a path to recovery, there is still the feeling that fragmented policies, and inconsistent standards are limiting the full potential of bioeconomy growth.

As BioReCer project's results have highlighted (D4.3) standards inconsistencies and market confusion when it comes to certification represents a burden for a full deployment of bioeconomy potential.

4.2. Scope

The primary goal of this Workshop is to develop and formalise a CEN Workshop Agreement (CWA) focused on addressing existing fragmentation in certification schemes for bio-based products by **developing a harmonised, product-independent approach which defines key guidelines to develop and update certification schemes**. These guidelines will also integrate in the certification schemes environmental, social, and economic dimensions of sustainability, alongside enhanced traceability mechanisms.

This CWA is indeed intended to provide an “How to” document to develop certification schemes, such that they are coherent with current and upcoming European standards, and the Quality Infrastructure underpinning values. The current existence of multiple schemes on the market with divergent criteria (and scopes) creates fragmentation for the operators,

²⁰ https://environment.ec.europa.eu/news/commission-launches-consultation-eu-bioeconomy-strategy-2025-03-31_en

impeding comparability and market trust. A harmonised European approach is therefore urgently needed, particularly considering recent EU policy initiatives addressing greenwashing and information related to sustainability aspects.

This CWA is then intended to serve as a comprehensive, unified guideline designed to finally support stakeholders across the bio-based value chains (covering industries, researchers, policymakers, and investors), by providing them a certain framework they can rely upon.

This document will build upon the achievements of the BioReCer project, and potentially on other research initiatives.

In particular, the key results from BioReCer project which will be consolidated in the CWA include:

- **BioReCer ICT Tool (BIT).** This self-assessment tool allows stakeholders to evaluate feedstock sustainability, track CO₂ emissions, and check compliance with certification requirements, thereby addressing the data collection and traceability gaps in the sector. It is a useful and practical tool to enhance traceability and track environmental performance, in order to support social acceptance of bio-based products.
- **Multidimensional Assessment Framework.** The BioReCer project has developed a comprehensive framework to analyse biological raw materials and their supply chains. This framework aims to complement existing standards and certification schemes by incorporating new criteria for sustainability, origin, and traceability. This framework would represent the basis to start from to implement an holistic approach.
- **Standardisation Toolkit.** This online tool highlights existing relevant standards and certification schemes we need to start from.
- **D4.3 Report on the integration of the environmental and traceability assessment framework into existing certification schemes.** It outlines the process for integrating the BioReCer environmental and traceability assessment framework into current certification schemes. To achieve this, the deliverable builds on an in-depth analysis of both current standards and voluntary sustainability certification schemes in the agriculture, forestry, fishery, and wastewater sectors. This analysis included mapping, benchmarking and gap assessments to identify improvement opportunities and inform the development of integration guidelines.

The expected CEN Workshop Agreement (CWA) will provide a common European reference framework for certification schemes in the bio-based sector. These guidelines are indeed expected to:

- Set harmonised criteria across sectors and certification bodies.
- Incorporate all sustainability dimensions (environmental, social, and economic).
- Focus on traceability, transparency, and data reliability to support market trust.
- Facilitate alignment with EU policy initiatives, by providing a reference document to prevent greenwashing.

4.3. Related Activities

The most relevant existing European technical committees developing standards for the biobased products, is the CEN/TC 411. The image below summarises some of the main results of this technical body.



Figure 8. Standards for biobased products, infographic (source: NEN)

Not just standardisation bodies have worked in these years to support the bioeconomy strategy.

Indeed, in September 2022, it started the new project BioReCer (Biological Resources Certifications Schemes) aimed to ensure the environmental performance and traceability of the biological feedstock used by the bio-based industries, deploying guidelines to strengthen the current certification schemes and ensure their applicability at both European and global levels.

Since its launch in September 2022, BioReCer has already achieved several significant milestones for a more competitive, independent, and sustainable European bioeconomy. In particular, BioReCer developed a multidimensional assessment framework in deliverable D2.2. Modified Assessment Methodologies that represents a theoretical framework with the objective of providing a list of principles, criteria and requirements to evaluate sustainability and circularity that any certification system focused on bio-based products can include.

The deliverable D2.3 Circularity indicators further provided a comprehensive set of circularity indicators, which encompass the entire life cycle of bio-based products, from

raw material extraction to end-of-life (EoL) management, ensuring a holistic approach to circularity assessment. These theoretical frameworks were consolidated and streamlined in deliverable D2.5 Guidelines for integration to bio-based certification schemes which presented the final framework for the evaluation of sustainability and circularity of biological feedstocks and integration into certification schemes.

A dedicated work package, the WP4 has been established to integrate the environmental and traceability assessment framework into the established certification schemes. D4.3 summarises these results.

4.4. Structure and rules of cooperation

This is a standardised section in CWA Project Plan. It has been retrieved from the official CEN/CENELEC template (with some minor changes).

The workshop will be led by a chair or vice-chair, while the project leader will support them in the organisation. The CEN Workshop Chair is responsible for ensuring that the development of the CWA follows the principles and content of the adopted project plan and the requirements of the CEN Guide 29. The CEN Workshop Chair may take decisions on the conduct of the CEN Workshop on the basis of the comments expressed by the participants according to the CWA rules.

The workshop secretariat is responsible for the organisation and management of the workshops according to the CEN Guide 29. National Standards Body (as per Regulation 1025) can take the Secretariat.

CEN Workshop participants draft the CWA and take in consideration the comments after the public commenting phase. CEN Workshop participants are the CWA proposers (possibly the members of BioReCer project), plus other relevant stakeholder, identified by the proposer.

Participation in the Workshop

The Workshop will be constituted during the kick-off meeting. By approving this project plan, the interested parties declare their willingness to participate in the Workshop and will be formally named as Workshop participants, with the associated rights and duties. Participants at the kick-off meeting who do not approve the project plan are not given the status of a Workshop participant and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the Workshop.

As a rule, the request to participate in the Workshop is closed once it is constituted. The current Workshop participants shall decide whether any additional members will be accepted or not.

Any new participant in the Workshop at a later date is decided on by the participants making up the Workshop at that time. It is particularly important to consider these aspects:

1. expansion would be conducive to shortening the duration of the Workshop or to avoiding or averting an impending delay in the planned duration of the Workshop;
2. the expansion would not result in the Workshop taking longer to complete;
3. the new Workshop participant would not address any new or complementary issues beyond the scope defined and approved in the project plan;

4. the new Workshop participant would bring complementary expertise into the Workshop in order to incorporate the latest scientific findings and state-of-the-art knowledge;
5. the new Workshop participant would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
6. the new Workshop participant would ensure wider application of the CWA.

All Workshop participants who approved the publication of the CWA or its draft will be named as authors in the European Foreword, including the organisations which they represent. All Workshop participants who did not approve the publication of the CWA will not be named in the European Foreword.

Workshop responsibilities

The Workshop Chair is responsible for content management and consensus building. The Workshop Chair is supported by the Workshop Vice-Chair (if any) and the responsible Workshop secretariat, whereby the Workshop secretariat will always remain neutral regarding the content of the CWA(s). Furthermore, the Workshop secretariat shall ensure that CEN-CENELEC's rules of procedure, rules of presentation, and the principles governing the publication of CWA(s) have been observed. Should a Workshop Chair no longer be able to carry out her/his duties, the Workshop secretariat shall initiate the election of a new Workshop Chair.

The list below covers the main tasks of the Workshop Chair. It is not intended to be exhaustive.

- Content related contact point for the Workshop.
- Presides at Workshop meetings.
- Ensures that the development of the CWA respects the principles and content of the adopted project plan.
- Manages the consensus building process, assesses when the Workshop participants have reached agreement on the final CWA, on the basis of the comments received.
- Ensures due information exchange with the Workshop secretariat.
- Represents the Workshop and its results to exterior.

The Workshop secretariat, provided by a CEN and/or CENELEC Member, is responsible for organising and leading the kick-off meeting, in consultation with the Workshop proposer. Further Workshop meetings and/or web conferences shall be organised by the Workshop secretariat in consultation with the Workshop Chair.

The list below covers the main tasks of the Workshop secretariat. It is not intended to be exhaustive.

- Administrative and organisational contact point for the Workshop.
- Ensures that the development of the CWA respects the principles and content of the adopted project plan and of the requirements of the CEN-CENELEC Guide 29.
- Formally registers Workshop participants and maintains record of participating organisations and individuals.
- Offers infrastructure and manages documents and their distribution through an electronic platform.
- Prepares agenda and distributes information on meetings and meeting minutes as well as follow-up actions of the Workshop.
- Initiates and manages CWA approval process upon decision by the Workshop Chair.
- Interfaces with CEN-CENELEC Management Centre (CCMC) and Workshop Chair regarding strategic directions, problems arising, and external relationships.

- Advises on CEN-CENELEC rules and brings any major problems encountered (if any) in the development of the CWA to the attention of CEN-CENELEC Management Centre (CCMC).
- Administrates the connection with relevant CEN or CENELEC/TCs

Decision making process

The CEN and/or CENELEC Workshop Chair is responsible for ensuring that the development of the CWA follows the principles and content of the project plan described in this document and the requirements of CEN-CENELEC Guide 29. The CEN and/or CENELEC Workshop Chair may take decisions on the conduct of the CEN and/or CENELEC Workshop on the basis of the comments expressed by the participants and of CEN-CENELEC Guide 29.

Possible Workshop schedule

Below a table with a preliminary Workshop schedule.

Table 4. 4 Workshop schedule (preliminary)

CEN/CENELEC Workshop	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10
Initiation										
1. Workshop description form submission and TC response										
2. Open commenting period on draft project plan (mandatory)										
Operation										
3. Kick-off meeting										
4. CWA(s) development										
5. Open commenting period on draft CWA(s) (optional)										
6. CWA(s) finalized and approved by Workshop participants										
Publication										
7. CWA(s) publication										
Dissemination (see 6)										
Milestones										
			K	V	V	V	V	M	V	M/A
									P	D

Legend

K: Kick-off
M: Workshop meeting
V: Virtual Workshop meeting
A: Adoption of CWA
P: Publication of CWA
D: Online distribution of CWA

5. Conclusions

The bio-based sector plays a central role in Europe's transition towards a sustainable and circular economy. Recognising its potential, the European Commission highlighted in 2011 that standards are essential for supporting demand, ensuring market confidence, and guiding the uptake of new bio-based products. Standardisation and certification are thus critical instruments for sustainability, traceability, quality, and transparent communication both at the business-to-business (B2B) and business-to-consumer (B2C) levels.

The bio-based sector represents a cornerstone of Europe's circular economy strategy. Standardisation and certification are indispensable for ensuring the credibility, traceability, and market uptake of bio-based products. Over more than a decade, CEN/TC 411 has built a foundation of key standards on terminology, bio-based content, sustainability, and communication tools.

Nonetheless, challenges remain, particularly in certification, expert resources, and test validation, that must be addressed through closer collaboration with research initiatives. The revision of CEN/TC 411's Business Plan in 2025 offers a timely opportunity to integrate new scientific results, such as those from BioReCer, and reinforce the sector's role in delivering a sustainable European bioeconomy.

Looking ahead, the bio-based sector requires stronger integration between standardisation, certification, and research to ensure sustainable growth and consumer trust. BioReCer results are well-positioned to contribute to this process, particularly in:

- Supporting the creation of certification schemes.
- Providing validated methodologies for sustainability assessment.
- Offering data and evidence that bridge research and standardisation.

By feeding into CEN/TC 411's work, BioReCer and similar projects can accelerate the development of robust, science-based standards, ultimately enhancing transparency, sustainability, and competitiveness in Europe's bio-based economy.

6. List of abbreviations

IEC	International Electrotechnical Commission
ISB	International Standardisation Bodies
ISO	International Organization for Standardization
ITU	International Telecommunication Union
NSB	National Standardisation Bodies
R&D	Research & Development
TC	Technical Committee

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