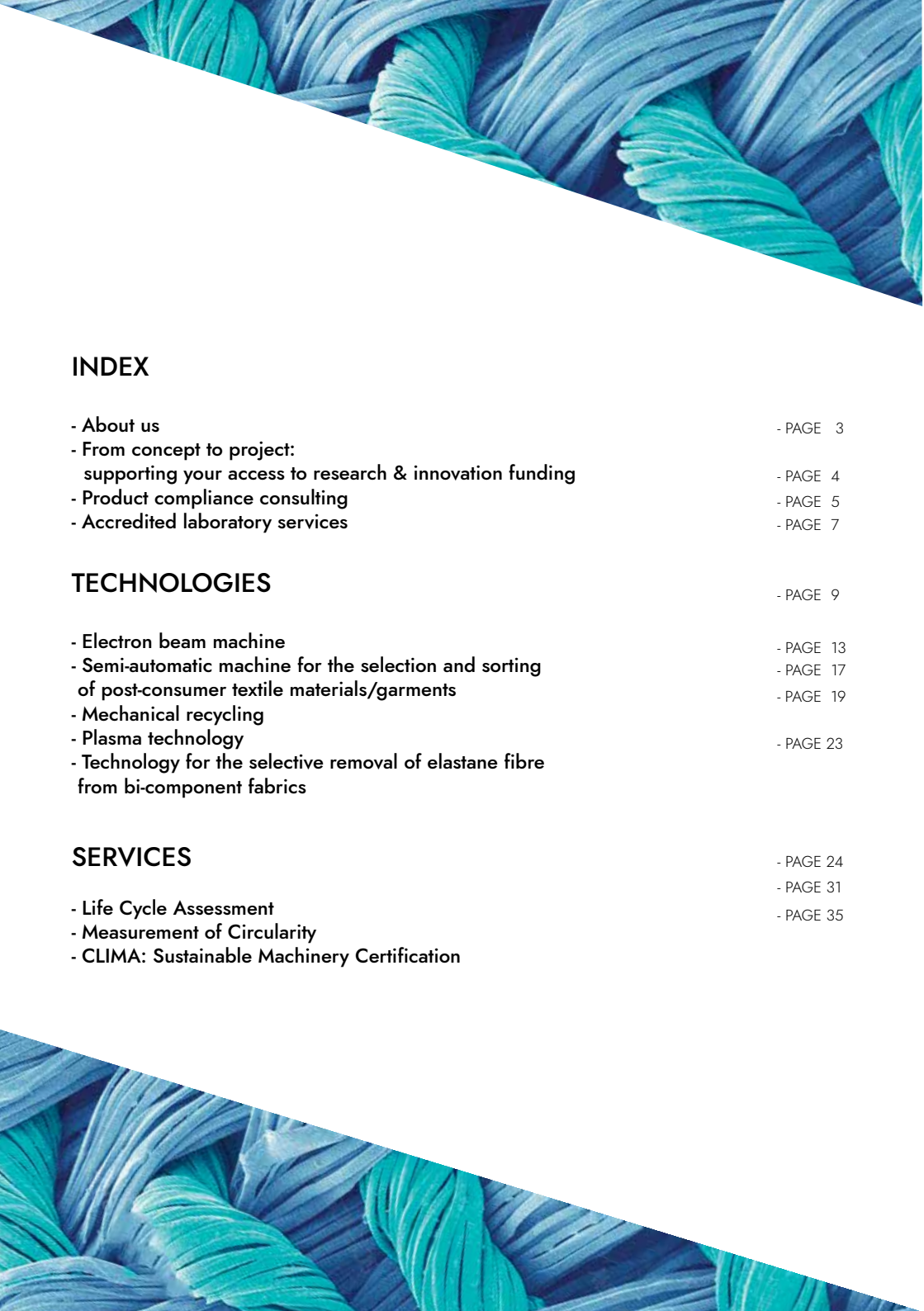




TECHNOLOGIES AND SERVICES FOR INNOVATION AND SUSTAINABILITY

NEXT
TECHNOLOGY
TECNOTESSILE
SOCIETA' NAZIONALE DI RICERCA R. L.



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About us

MISSION

Promotion

Promote applied technological research in collaboration with companies within national and regional programmes and the European Commission's Framework Programmes, facilitating access for SMEs to funding opportunities

Transform knowledge and ideas into innovation, supporting the development of new products and processes in collaboration with companies and relevant stakeholders

Development

Networking

Foster strategic partnerships between companies and knowledge providers, including research centres and universities, at national and European level

OUR HISTORY

Next Technology Tecnotessile (NTT) is an Italian private, non-profit research centre established in 1972 in Prato, Tuscany, and registered with the Italian Ministry of University and Research (MUR). For over 50 years, NTT has collaborated with European, national and regional organisations to promote technological innovation and competitiveness across sectors such as textiles, clothing, textile machinery and logistics. NTT provides tailored solutions by combining technical expertise with support in accessing public funding for R&D projects, acting as a strategic partner for companies seeking to innovate and strengthen their market position.

Since 2011, NTT has been the managing body of the **Tuscany Fashion Cluster (TFC)**, a cluster organisation promoting innovation and collaboration across key sectors of the Tuscan fashion industry.

Through its **Centre of Excellence and Quality (CEQ)**, a technology and training hub, NTT supports applied research and innovation across a wide range of sectors, including textiles, fashion, footwear, leather goods, furniture, construction, mechanics, automotive and railways. NTT supports the entire innovation cycle, from concept development and prototyping to semi-industrial-scale production.

From concept to project: supporting your access to research & innovation funding

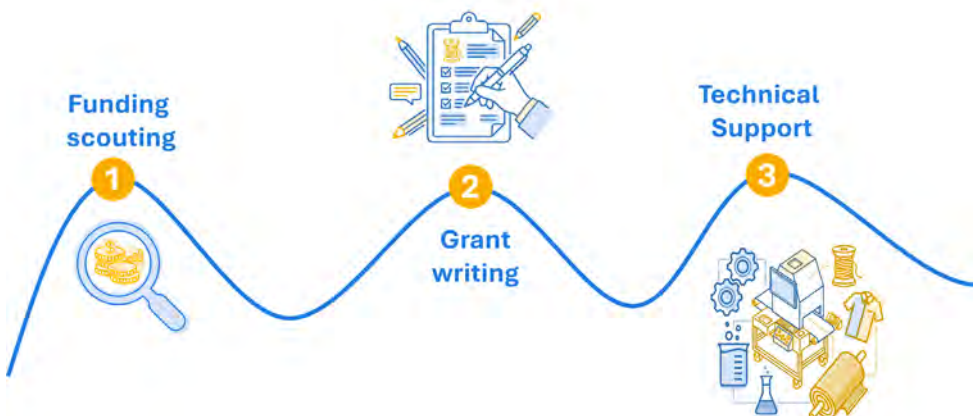
Turning an innovative idea into a successful project proposal takes more than just a good vision. It requires technical expertise and a clear understanding of public funding opportunities.

As a research center, we offer support for companies looking to accelerate their innovation roadmap, guiding them through the opportunities offered by regional, national, and European funding programs.

Our support for the project includes:

- Dedicated funding scouting to identify the most suitable calls and financial instruments aligned with your business vision
- Support in the writing and drafting phases of the research proposal
- Bringing a comprehensive set of technical, scientific, and methodological skills required to give shape, structure, and concrete rigor to your business ideas

In this way, it is possible to translate your concepts into solid, clear, and highly competitive proposals that effectively showcase the strategic value of your initiatives while fully aligning with the requirements of funding programs.



Product compliance consulting

Keeping up with evolving regulatory requirements is essential to ensure product compliance throughout the entire product life cycle. Our consulting services support companies from the early design and development stages, helping integrate regulatory requirements into the selection of materials, components, processes and technical solutions. We also assess existing products and products already placed on the market, reviewing applicable legislation, technical documentation and compliance requirements to identify potential gaps and areas for improvement. Through continuous regulatory monitoring and compliance assessment, we help companies anticipate regulatory changes, address critical issues and maintain compliance as requirements evolve.

Our expertise covers products, materials, components and packaging across different sectors and applications.

Main regulatory areas and services:

- **Regulation (EU) 2025/40 - PPWR**
Requirements for packaging and packaging waste, including packaging design, composition, recyclability and information requirements
- **Regulation (EU) 2023/988 - GPSR**
General product safety requirements, ensuring that products placed on the market are safe for consumers and users
- **Directive 2009/48/EC - Toy Safety**
Safety requirements applicable to the design, manufacture and placing on the market of toys
- **Regulation (EC) No 1907/2006 - REACH**
Requirements for the management and restriction of chemical substances in products, materials and articles
- **Regulation (EU) No 1007/2011 - Textile Labelling**
Requirements concerning fibre composition and the labelling of textile products.
- **Regulation (EU) 2017/745 - Medical Devices**
Requirements for the safety, performance, conformity assessment and CE marking of medical devices
- **Regulation (EU) 2023/1230 - Machinery**
Safety and conformity requirements for the design, manufacture and placing on the market of machinery
- **Expert assessments - Footwear, Textiles and Composite Materials**
Technical support for expert assessments, investigations and evaluations of materials and products
- **Industry 4.0 & 5.0 Expert Assessments**
Technical support in assessing and documenting requirements related to investments in advanced manufacturing technologies and production systems

The regulations and standards referenced above shall be understood as including their applicable amendments, updates, replacements and subsequent versions in force at the relevant time.

Accredited laboratory services

Testing and calibration for product development, quality control and metrology

ISO/IEC 17025:2017	PJLA Accreditation No. 127956 Mechanical Testing: L25-976 Calibration: L25-977
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The Laboratorio CEQ di Next Technology Tecnotessile provides testing and calibration services within a defined PJLA scope under ISO/IEC 17025:2017. The accreditation demonstrates technical competence for the listed activities and the operation of a laboratory quality management system.

ACCREDITED MECHANICAL TESTING

Mechanical testing for footwear, adhesives, floor coverings and sandwich panels, selected to match product and application.

AREA	REPRESENTATIVE ACCREDITED ACTIVITIES
Footwear	Upper-to-sole adhesion (UNI EN ISO 17708:2018) Outsole split tear and delamination (UNI EN 12774:2001) Footwear adhesive peel resistance (UNI EN 1392:2006)
Adhesives and bonded assemblies	Floor-covering adhesive peel (UNI EN ISO 22631:2019) Floor-covering adhesive shear (UNI EN ISO 22632:2019) Tensile lap-shear of bonded assemblies (UNI EN 1465:2009) Metal-to-metal shear (ASTM D1002-10)
Sandwich panels and composites	Flatwise tensile (ASTM C297/C297M-16) Shear (ASTM C273/C273M-20) Beam flexure (ASTM C393/C393M-20)

SCOPE AND LOCATIONS

Testing claims relate only to the activities included in PJLA certificate L25-976 and to the locations identified in the current certificate and scope supplement.



ACCREDITED CALIBRATION

Calibration for confident measurement

A multi-sector service for laboratory and production equipment

The CEQ Laboratory calibration scope covers dimensional, thermodynamic, time and frequency, mass, force and weighing devices, and mechanical calibration. It supports measurement control, equipment qualification and reliable laboratory operations.

ACCREDITED CALIBRATION SCOPE

AREA	REPRESENTATIVE ACCREDITED ACTIVITIES
Thermodynamic	Thermometers, -80 °C to 600 °C (CMC depends on the interval)
Dimensional	Thickness meters Vernier calipers
Laboratory Equipment	Martindale abrasion tester and Veslic rubbing tester, including dimensional and cycle-rate checks within scope
Mechanical	Uniaxial/universal testing machines: crosshead speed 0.5-500 mm/min; tension 1-100 N; tension/compression 0.5-20 kN

ON-SITE OPTION

Calibration may be carried out at the customer’s location for the activities identified with location code O in the current calibration scope. Contact us to confirm applicability for the instrument and measurement requested.



WHY WORK WITH CEQ

- One technical interface for both product testing and measurement assurance
- Scope-based reports and calibration certificates with documented measurement capability
- Technical dialogue close to the materials, equipment and production context of the customer

Accreditation applies only to the tests and calibrations listed in the current PJLA scope.



Electron beam machine



The electron beam is a low-energy electron accelerator machine. An electron beam (E-beam) system is a type of electron accelerator that generates a beam of electrons to irradiate material surfaces. The interaction between the electrons and the material can induce chemical and physical modifications, depending on the electron energy, absorbed dose, material properties and treatment conditions.

APPLICATIONS

The electron irradiation process allows the modification of chemical and physical properties of polymeric materials improving product quality. In our laboratories, the electron beam is used for the following applications:

- Polymerization of monomers for incorporation into textiles
- Curing and crosslinking of adhesives and adhesive laminates
- Testing of polymeric materials
- Development of prototypes
- Improvement of composite mechanical strength
- Sterilization

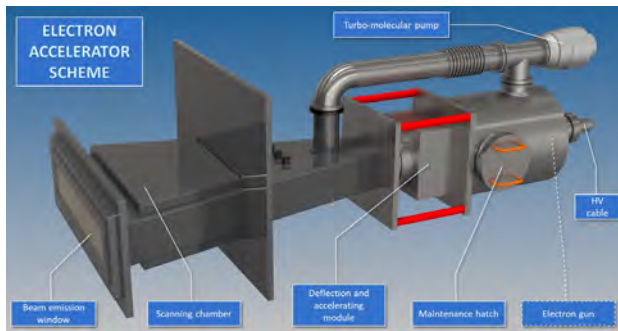
PECULIAR CHARACTERISTICS

Electron beam technology is safe, accurate, easily controlled and in contrast to radioactive sources can be switched on/off. The electron beam energy and the output power can be modulated over a wide range. Electron accelerator-based technology for modifying the material surface is more environmentally sustainable than chemical methods because it does not require solvents or toxic agents.

TECHNICAL DETAILS

An electron accelerator runs through the emission of a stream of electrons generated by thermionic emission from a cathode. This beam is properly deflected as it occurs inside a cathode ray tube of analogic television. Electron accelerators are available in a wide range of energy levels, depending on the application. The electron beam system installed at NTT is a low-energy accelerator with a maximum accelerating voltage of 300 kV and a maximum beam current of 30 mA. Two typologies of electron beam irradiation mode can be identified: scanning and non-scanning irradiation modes. The machine located in NTT represents a single triode system with tungsten cathode and Wehnelt cylinder in high vacuum chamber. The maximum voltage is 300kV with a maximum current of 30 mA. The emitted electron beam is controlled in amplitude and height by an X/Y beam deflection device that provides a useful scan at the 75 x 700 mm output window. The electron beam flows from the vacuum machine to the environment through a 10 μm -thick titanium foil, which allows the high vacuum to be kept in the cathode area, allowing the electron beam to pass through while maintaining the vacuum in the electron gun.

The vacuum system is a dual-pump structure, consisting of a turbomolecular pump and an additional rotational pump that allows vacuum conditions to be rapidly achieved and maintained within both the electron accelerator and the scanning system. High voltage is produced through a series of transformers with an average frequency of about 35 kHz and amplifier. The high voltage section is in a tank containing hermetically sealed oil for transformers. The system includes a water-cooling unit, which is needed to refrigerate the electron beam exit window, the vacuum system and the transformer. The accelerator is shielded with a composite structure consisting of a 4-millimeter-thick stainless steel sheet (support function), a lead layer (average thickness 35 millimeters), and an additional 2-millimeter-thick stainless steel sheet that prevents contact of lead oxides with the materials in the treatment chamber. The sizing of the shield structure was calculated considering the worst working conditions ($V= 300\text{ KV}$, $I= 30\text{ mA}$). Shielding is needed to screen the X-rays emitted as a result of irradiation. The electron gun is integrated into a protective structure made of stainless steel and lead, equipped with suitable devices for continuous processing of flexible materials.



E-beam machine scheme



Electron beam machine located in Next Technology Tecnotessile

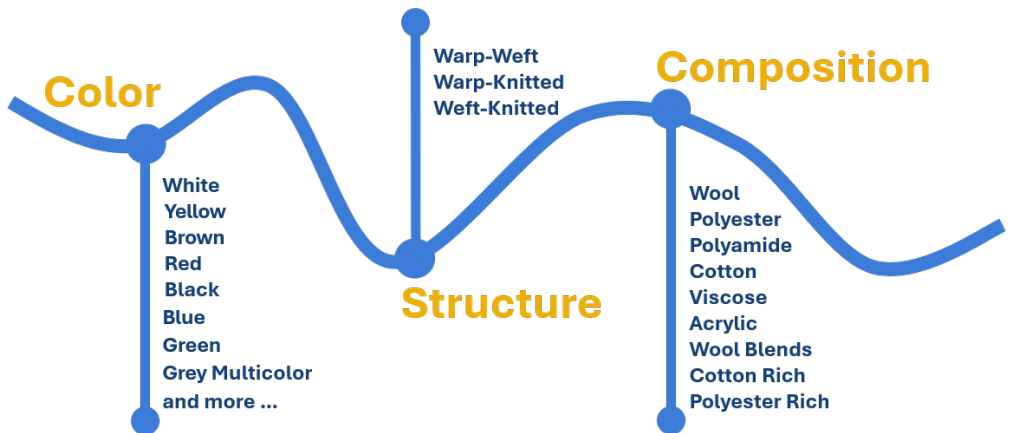
When a material is irradiated with an electron beam, energy is transferred to its molecular structures, potentially leading to the formation of free radicals and other reactive species. These species can initiate chemical reactions that modify the material, depending on its composition and the irradiation conditions. Such reactions may promote processes such as crosslinking, grafting and curing, although competing reactions, including polymer chain scission and degradation, may also occur.

The resulting effects on the molecular structure and material properties depend on the polymer type, the absorbed dose and the treatment conditions. Electron beam irradiation can modify mechanical, thermal and surface properties, potentially improving selected performance characteristics, but such improvements are not guaranteed and must be assessed for each specific application. The beam energy and absorbed dose, together with other relevant process parameters, must therefore be selected according to the material characteristics and the intended treatment outcome.



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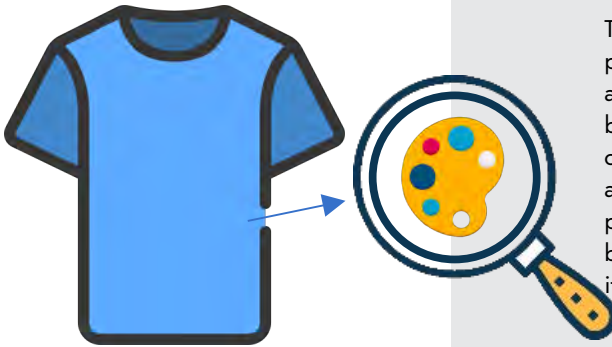
Semi-automatic machine for the selection and sorting of post-consumer textile materials/garments



SIMULTANEOUS ANALYSIS

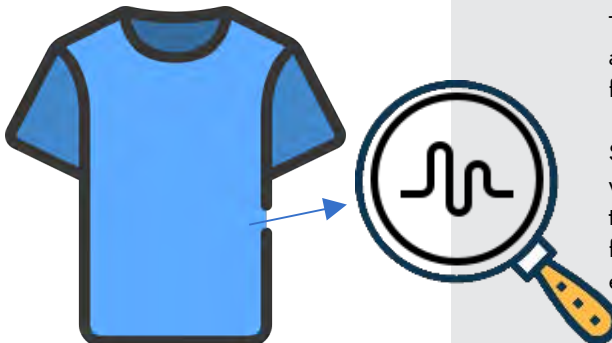
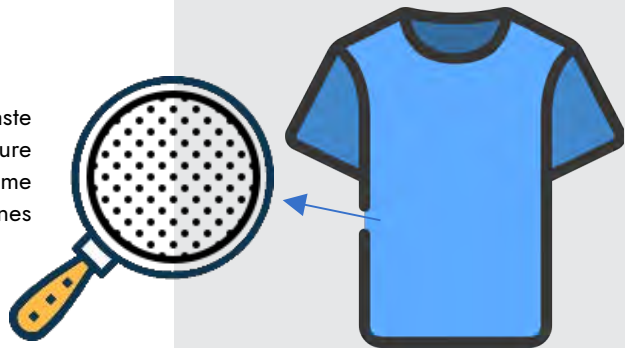
Composition and colors classes have been chosen according to arbitrary criteria and can be tailored to a customer's needs. The machine enables simultaneous analysis to identify the color, structure, and composition of textile materials. A machine training phase is required to acquire a set of standard samples. Once the learning algorithm has a sufficient set of data to ensure the required level of reliability, the system is ready to start the selection process.

WORKFLOW



The operator checks the presence of accessories such as buttons, zippers, pins, etc. to be removed. A specific camera captures an image of the samples and determines the colors or performing comprehensive color blend analyses for multicolored items

In the meantime, the textile waste is also exposed to the structure sensor, that captures a frame from the samples and determines the structure of the fabric



The textile waste is illuminated and exposed to the sensor for fabric composition identification

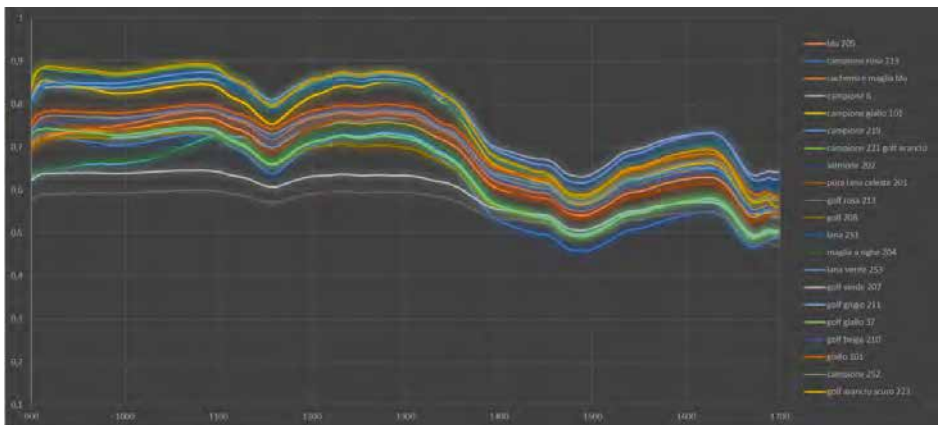
Spectrum acquisition takes place with a hyperspectral camera, that takes 'snapshots' of visual field and acquires a spectrum for each pixel in the frame

COMPLETE TAILOR MADE SYSTEM

This system is fully customizable in terms of composition and colors to be classified. The system acquires the entirety of the garment (or the fabric clipping) and displays on the monitor the reconstructed image and can process >60 garments/min.

The recognition takes place through a comparison between the analyzed textile waste and the set of data acquired during machine learning training phase. This methodology has two important advantages:

1. The machine can be trained, at any time, to recognize new colors or composition classes
2. The more the system is enriched with data, the more precise and reliable it becomes in its responses



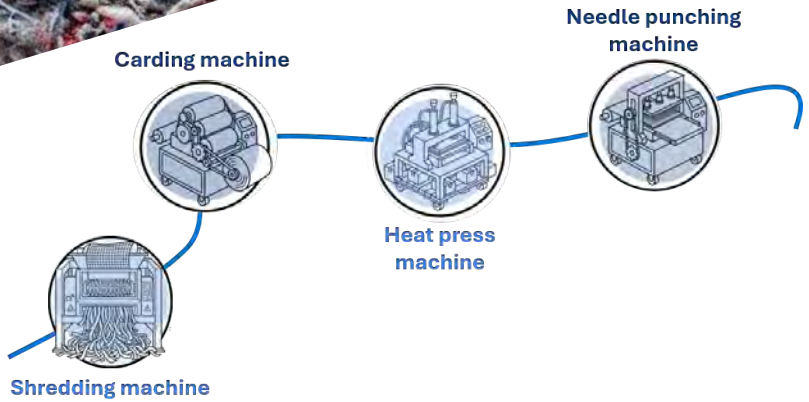
Spectra of tested wool garment.

After the recognition the system can be provided with modular unloading cells, served by a single conveyor belt that conveys the analysed fabrics. The modularity of this part allows for the addition or removal of unloading stations. These variations imply an adjustment of the development of the conveyor belt. The fabrics movement from belt to specific basket can be obtained by means of a jet of compressed air.

This system has considerable advantages:

- Rapid intervention
- High-speed conveyor belts
- Relatively simple machine system
- No complex maintenance
- No moving mechanical part
- Can be equipped with a delta robot or a robot arm





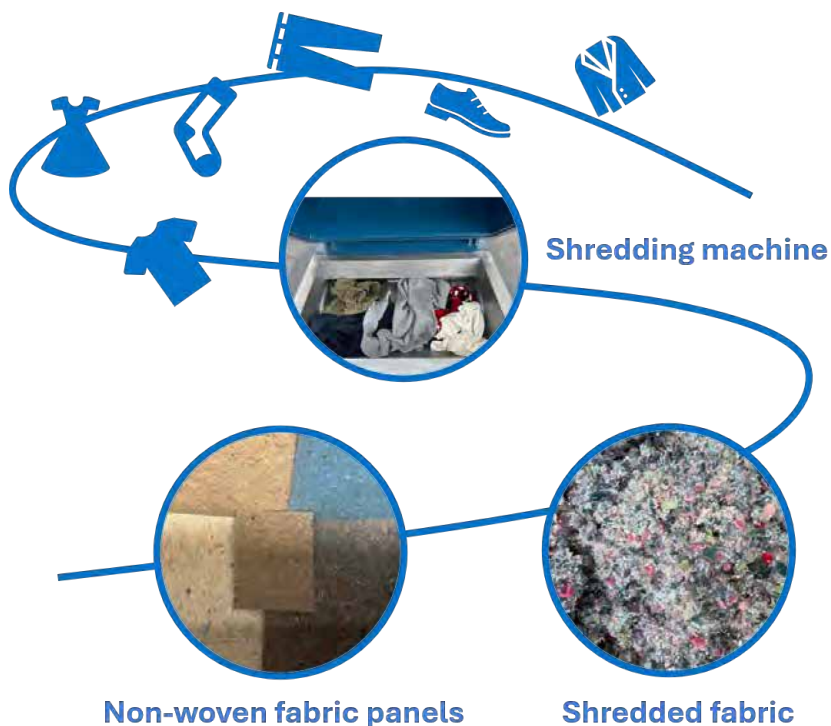
Mechanical recycling

ADDRESSING TEXTILE WASTE THROUGH MECHANICAL RECYCLING

The global surge in textile consumption has led to unprecedented volumes of post-industrial and post-consumer waste. It is estimated that less than 1% of textiles are recycled into equivalent-quality products (closed-loop), while 12% are down-cycled and 73% are landfilled or incinerated, making more sustainable End-of-Life (EoL) strategies more critical than ever. Mechanical recycling has emerged as one of the most efficient and scalable solutions to divert textile waste from landfills and reduce reliance on virgin materials. By processing waste without harsh chemicals, mechanical recycling minimizes environmental impact, lowers energy consumption, and provides a direct path toward a circular textile economy.

PILOT-SCALE EQUIPMENT FOR MECHANICAL RECYCLING AND MATERIAL PREPARATION

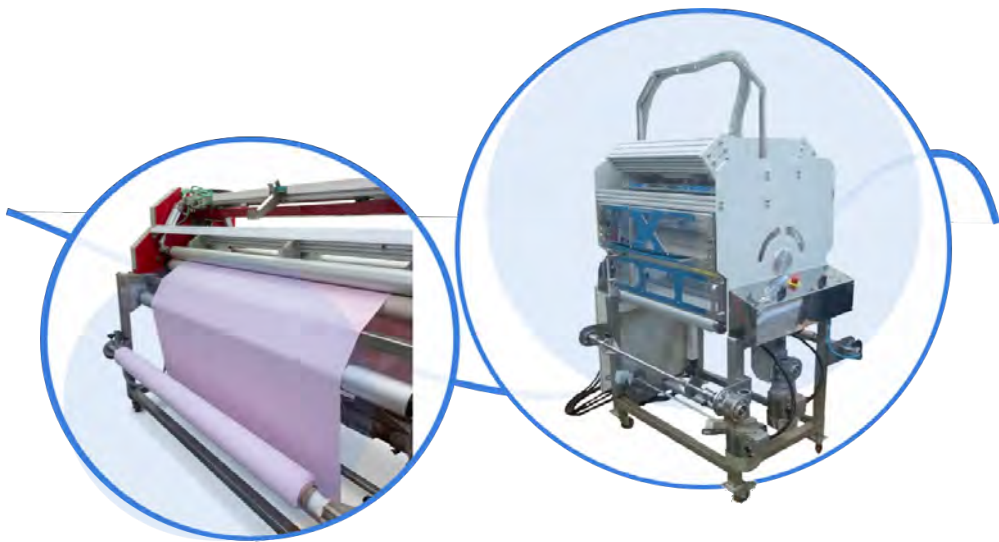
To support companies in developing more sustainable solutions, the research center operates a versatile range of pilot-scale equipment for mechanical recycling and material preparation. The facility features a semi-industrial granulator capable of processing diverse input materials (from textiles to leather) yielding ground outputs of varying particle sizes. The granulator is equipped with three interchangeable screens with different hole dimensions (5, 10 or 25 mm), allowing precise control over the final grain size, with a processing capacity of 100-150 kg per day. The granulator can be used for the preparation of material for subsequent recycling and upcycling processes.



In addition, the center houses different pilot equipment for transforming textile waste into nonwoven materials, including a shredding machine, a carding machine, a needle-punching machine, and a thermo-press machine.

- **Shredding machine:** Tears down textile waste, fabric scraps, and yarns into individual fibres through mechanical action, preparing the material for downstream carding and nonwoven processing. Alternatively, this step can be used to prepare the material for other recycling processes (e.g., chemical recycling)
- **Carding machine:** Aligns and blends the opened fibres into a uniform, cohesive web or fleece by passing them through series of fine-wire rollers
- **Needle-punching machine:** Mechanically locks the fibre web together using different barbed needles that repeatedly penetrate the material, creating a dense, durable nonwoven fabric without chemical binders
- **Thermo-press machine:** Applies controlled heat and pressure to consolidate, densify, or thermo-bond the fibre structure, finishing the nonwoven material into sheets or molded components

Plasma technology





INTRODUCTION

For many years, research centres around the world have been studying the development of plasma technology at industrial scale, since it has low environmental impact and it is potentially able to give tested material surface a great functionality.

Plasma can functionalize the surface of different materials, regardless of composition, with a well-defined energy range. Therefore, atmospheric pressure plasma (APP) equipment has been developed by Next Technology Tecnotessile with the aim of renovating the processes of textile finishing and surface modification. This equipment is available on different scales according to the final application (e.g., R&D activities or industrial validation). The atmospheric pressure plasma treatment allows continuous and uniform processing of different substrates.

DESCRIPTION OF TECHNOLOGY

Plasma is considered the fourth state of matter, the most reactive. It is a partially ionized gas composed of a combination of electrons and positively charged particles, neutral atoms and molecules. All of them are capable of triggering chemical and physical reactions on polymer surface and therefore produce alterations of the properties and morphology both temporarily and permanently. The type and the extent of the effect depend on the substrate, on the nature of gas used and on the process parameters. Thus, the APP pre-treatments provide a highly versatile, eco-friendly solution to enhance the surface properties of various textiles. In general, key benefits may include:

- Enhanced surface reactivity and roughness: the introduction of specific functional groups and the creation of a nano- or micro-roughness on the surface of the material can improve the hydrophilicity and the wettability of fabrics, as well as a more stable uptake of dye molecules in subsequent dyeing, printing and finishing steps
- Optimized cellulosic processing: Facilitates removal of sizing agents and improves scouring efficiency on cellulosic fibres
- Wool performance improvement: Enhances anti-felting/shrinkage performance of woolen fabrics

NEXT PLASMA MACHINES

Next Technology Tecnotessile, as research project activity, has studied and created a (semi)industrial prototype and a pilot prototype of an atmospheric pressure plasma machine (Next Plasma), installed in the laboratory in Prato. The prototypes are capable of continuously treating fabrics or similar materials (such as paper and polymeric films) with a maximum width of 50 cm for the pilot prototype and 150 cm for the (semi) industrial prototype, and a variable speed from 2 to 20 m/ min. An AC electronic generator, working between 30 and 100 kHz, controls the ignition discharge. This results in ionized gas and a multitude of discharge arcs forming between the electrodes. Generally, these non-uniform micro-discharges do not have the potential to generate an inhomogeneous treatment.



As the fabric slides between electrodes, one or more mixed technical gases are blown in to favor the formation of the plasma cloud and obtain different functions on the material. The Next Plasma machine consists of a series of cylinders for fabric positioning and feeding and a large diameter cylinder (counter-electrode) on which the high voltage powered electrodes work. The counter-electrode is covered with an insulating material, which forms the dielectric barrier. Each electrode is connected to the process gas distribution network. The use of the electrodes as gas diffusers and injectors allows the generation of a uniform plasma on the side of the electrode facing the fabric. This allows the machine to treat just one material surface, not necessarily both.

ADVANTAGES

Plasma offers the advantages shown in the following table, compared to conventional chemical processes for finishing and functionalization of textile and polymeric materials.

	PLASMA TECHNOLOGY	TRADITIONAL WET-FINISHING
Treatment type	It is a dry pre-treatment. Wet chemistry is not involved. Treatment by excited gas phase	Water-based
Reaction type	Complex and multifunctional; many simultaneous processes	Simpler, well established
Reaction locality	Highly surface specific, no effect on bulk properties	Bulk of the material generally affected
Technological impact	Great potential, field in state of rapid development	Very low; technology static
Energy consumption	Low	High
Water consumption	Negligible	High
Hazardous chemicals consumption	Low	Medium-High

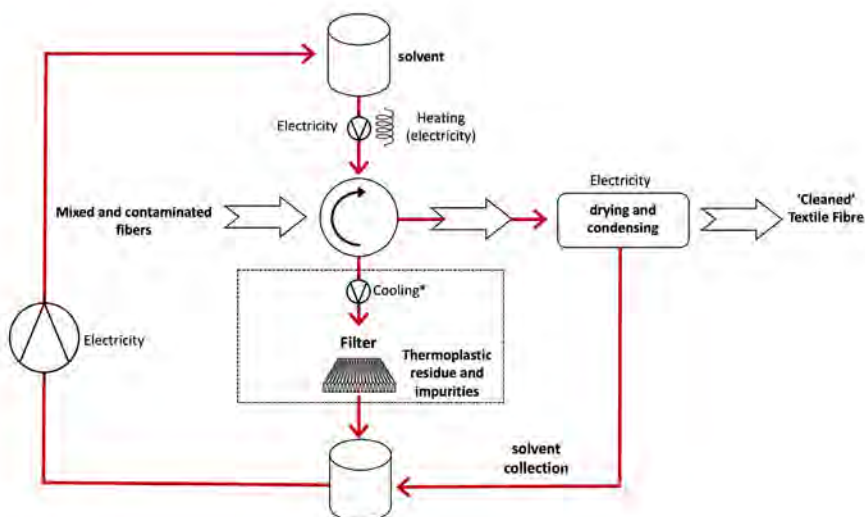
Technology for the selective removal of elastane fibre from bi-component fabrics

TECHNOLOGY

The fiber-to-fiber recycling process has very stringent application requirements. Mixed fibers and impurities affect and limit the recycling process. Some thermoplastic fibers are considered as contaminants in mixed textiles and represent an obstacle for fiber-to-fiber recycling of fabrics as they usually make the process inapplicable.

To respond to the increasing need of textile garment recycling, Next Technology Tecno-tessile realized a technology that allows the selective separation of elastane fibers from bi-component fabrics, by a thermo-chemical pre-treatment with a non-toxic organic solvent. The process is on a pilot scale and it has been tested with different types of bi-component fabrics (e.g., PET/EL and PA/EL) with various EL contents (5-20%).

For tested fabrics, the developed technology allows to recover the main textile component (e.g., PET or PA) with a high degree of purity, enough to be recycled through different approaches. Moreover, this technology allows the recovery of the elastane fiber, which could be valorized in recycling processes.





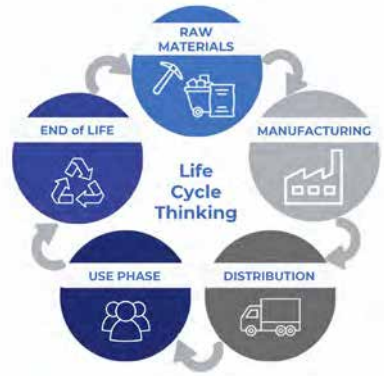
Life Cycle Assessment



INTRODUCTION

Life Cycle Thinking provides a structured approach to assess the environmental, economic and social performance of products, processes and technologies across their life cycle, from raw material sourcing to end-of-life.

NTT applies life cycle-based methodologies to support companies, research organisations and European projects in generating robust, traceable and decision-oriented sustainability information.



The main approaches include:

- **Life Cycle Assessment (LCA)** and **Carbon Footprint (CF)** for environmental performance
- **Social Life Cycle Assessment (S-LCA)** for social and socio-economic aspects across the value chain
- **Life Cycle Costing (LCC)** for the economic performance of products, processes and alternative scenarios

PURPOSE

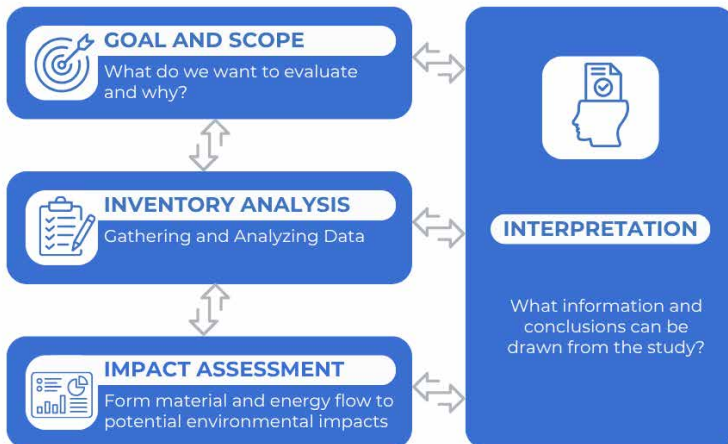
Life cycle-based assessments can support organisations in:

- Identifying environmental, social and economic hotspots across products, processes and value chains
- Comparing materials, technologies and alternative scenarios to support R&D and decision-making
- Guiding product and process improvement through measurable and evidence-based information
- Supporting sustainability strategies and European project activities, including ex-ante assessments and monitoring of improvement scenarios
- Providing robust and traceable data for environmental communication, reporting, claims and certification schemes

THE ASSESSMENT APPROACH

LIFE CYCLE ASSESSMENT (LCA) AND CARBON FOOTPRINT (CF)

LCA is an internationally standardised methodology, defined by ISO 14040 and ISO 14044, used to evaluate the potential environmental impacts associated with a product, process or service throughout its life cycle. An LCA follows four main phases: Goal and Scope Definition, Life Cycle Inventory (LCI), Life Cycle Impact Assessment (LCIA), and Interpretation. Together, these phases allow material and energy flows, emissions and other relevant inputs and outputs to be translated into environmental impact indicators, helping identify hotspots, trade-offs and opportunities for improvement.



The CF follows the same life cycle perspective but focuses specifically on climate change. While an LCA can assess several environmental impact categories, a CF quantifies greenhouse gas (GHG) emissions and removals, expressed in kg or tonnes of CO₂ equivalent. For products, CF studies are addressed by ISO 14067, while organisational GHG inventories can be developed according to ISO 14064-1.

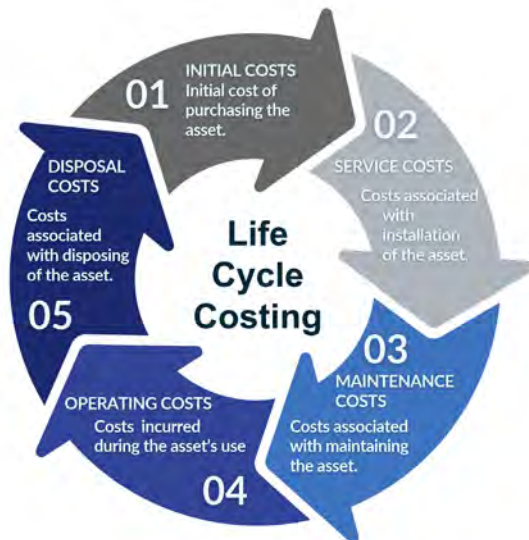
SOCIAL LIFE CYCLE ASSESSMENT (S-LCA)

S-LCA evaluates the potential social and socio-economic impacts associated with products, processes and services across their life cycle. It considers stakeholders such as workers, local communities and consumers, addressing issues including working conditions, health and safety, human rights and ethical conduct. S-LCA follows a life cycle framework, with specific guidance provided by ISO 14075 and UNEP Guidelines. Where primary data are limited, specialised databases such as the Social Hotspots Database (SHDB) can support the identification of country- and sector-specific social risks. Combined with tools such as SimaPro, this helps identify social hotspots and support more informed and responsible supply-chain decisions.



LIFE CYCLE COSTING (LCC)

LCC evaluates the costs associated with a product, process or service throughout its life cycle, including investment, operation, maintenance, transport and end-of-life costs. In particular, Environmental LCC can complement LCA by assessing the economic dimension within a consistent life cycle framework, potentially using the same functional unit, system boundaries and scenarios. Depending on the approach, environmental externalities may also be included. LCC supports the comparison of alternative materials, technologies and process scenarios, helping identify solutions that combine environmental performance and economic viability. It is particularly useful for R&D, eco-design, process optimisation, investment decisions and public procurement. Guidance on its application is provided by IEC 60300-3-3.

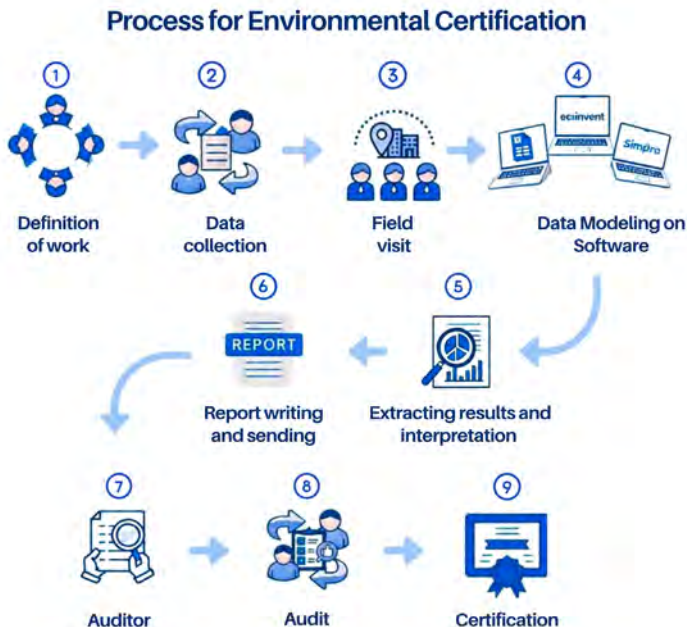


THE SERVICE

NTT provides tailored technical support for Life Cycle Assessment (LCA), adapting each study to the client's product, process and objectives. A key step is the collection of primary data from the client, including information on materials, energy use, production processes, transport, waste and other relevant flows. These data form the basis of the assessment: NTT supports the client in identifying the information needed, structuring it consistently and checking its completeness and suitability for the study. The collected data are then integrated, where necessary, with recognised secondary datasets and modelled using dedicated LCA software such as SimaPro and databases including ecoinvent. Results are analysed and interpreted to identify environmental hotspots, strengths, limitations and improvement opportunities, and are documented in a technical LCA report.

Examples include:

- **Carbon Footprint of Organization (CFO) - ISO 14064-1**
- **Carbon Footprint of Product (CFP) - ISO 14067**
- **Verified Life Cycle Assessment (LCA) - ISO/TS 14071**
- **Environmental Product Declaration (EPD) - ISO 14025**

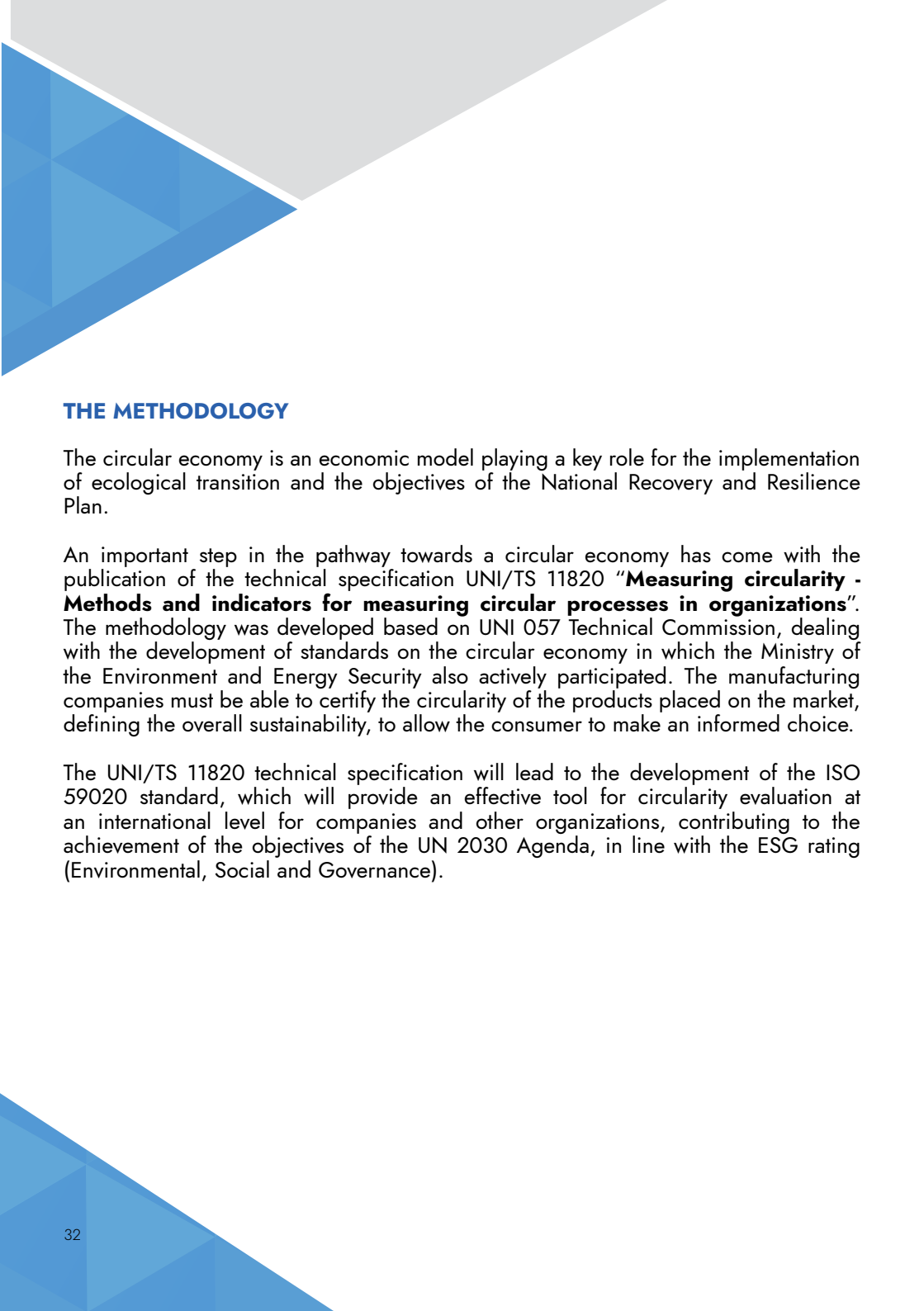


NTT ALSO PROVIDES TECHNICAL SUPPORT FOR:

- **Corporate Circularity Assessment - UNI/TS 11820**
- **Life Cycle Costing (LCC) - IEC 60300-3-3:2017**
- **Social Life Cycle Assessment (S-LCA) conducted in accordance with ISO 14075:2024**, using the Social Hotspots Database (SHDB) supported and integrated within the SimaPro software environment
- Sustainability reporting and ESG-related environmental information
- Collection and structuring of product data potentially relevant to the Digital Product Passport (DPP), based on the latest available developments under the Ecodesign for Sustainable Products Regulation (ESPR)
- Preparation for evolving EU sustainability and environmental communication requirements, through robust and traceable environmental data

Measurement of circularity



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THE METHODOLOGY

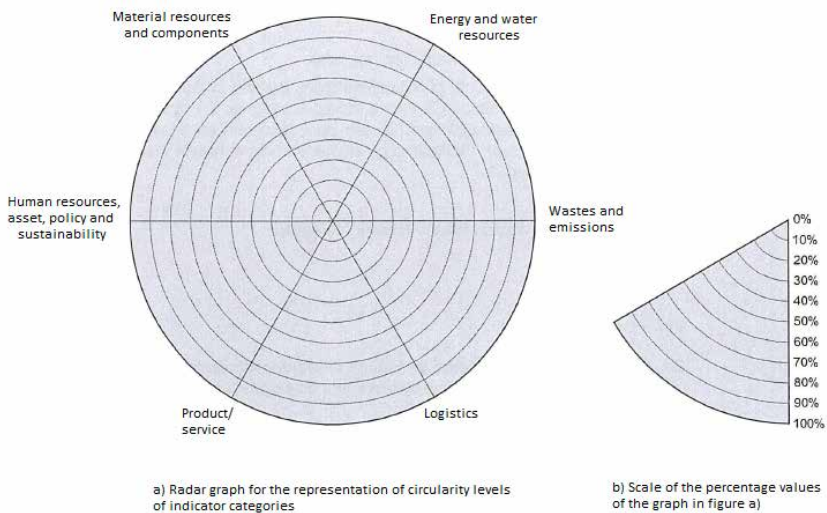
The circular economy is an economic model playing a key role for the implementation of ecological transition and the objectives of the National Recovery and Resilience Plan.

An important step in the pathway towards a circular economy has come with the publication of the technical specification UNI/TS 11820 **“Measuring circularity - Methods and indicators for measuring circular processes in organizations”**. The methodology was developed based on UNI 057 Technical Commission, dealing with the development of standards on the circular economy in which the Ministry of the Environment and Energy Security also actively participated. The manufacturing companies must be able to certify the circularity of the products placed on the market, defining the overall sustainability, to allow the consumer to make an informed choice.

The UNI/TS 11820 technical specification will lead to the development of the ISO 59020 standard, which will provide an effective tool for circularity evaluation at an international level for companies and other organizations, contributing to the achievement of the objectives of the UN 2030 Agenda, in line with the ESG rating (Environmental, Social and Governance).

The UNI/TS 11820 technical specification defines a set of circular economy indicators suitable to measure, by means of 100-based measurement system, the level of circularity of an organization or group of organizations, including Public Administrations. The requirements contained in the specification are applicable to all organizations, regardless of type or size, supplied products or provided services. In detail, UNI/TS 11820 defines how to collect information useful for circularity measurement and provides a set of useful indicators (71 in total) to verify the effectiveness of organization own strategies.

The indicators are applicable at the MICRO level (single organization, local authority) and MESO level (group of organizations, inter-organizations, industrial or territorial clusters, industrial areas and districts, production and material supply chains, territories, regions, metropolitan areas, provinces). They are divided into 6 categories: material resources and components, energy and water resources, waste and emissions, logistic, product and service, human resources, assets, policies and sustainability.



Example of radar chart representing results obtained from circularity measurement of a productive organization, as output to the calculations of its levels of circularity on the 6 categories of indicators.

THE SERVICE

NTT specialists, members of the UNI 057 “Circular Economy” technical committee, enable the measurement of circularity in accordance with UNI/TS 11820.

Organizations that decide to evaluate their circularity can obtain several benefits, including:

- Immediate reception of the numerical and graphic representation of the level of circularity
- Dissemination on the market of circularity results in a credible and reliable way
- Pursuit of concrete actions and achievement of measurable results
- Support for the development of the strategic circular economy model
- Improved positioning of the organization or group of organizations on the market
- Obtaining guarantees of credibility on the activity carried out thanks to independent third-party verifications

Once the level of circularity has been calculated, the organization can assess the conformity of the achieved level with respect to the provisions of the technical specification, by carrying out the following activities:

- Self-assessment by the organization itself
- Evaluation by the customer of the organization interested in this level of circularity
- Assessment by an independent body, accredited in accordance with UNICEIEN ISO/ IEC 17029 and UNI EN ISO 14065, as it is the verification of an assertion of circularity

The verification declaration is valid for a maximum of one year from the date of issue of the declaration itself.



CLIMA: **Sustainable machinery certification**



INTRODUCTION

New regulations and new environmental legislation have accelerated the change in the entire textile supply chain, which is now more than ever sensitive and attentive to sustainability.

Italian textile machinery manufacturers, involved in the various textile manufacturing segments play a major role in this change.

They provide technology solutions capable of:

- Reducing or eliminating the emission or the use of dangerous substances in production processes
- Ensuring greater water saving and improved energy efficiency in production processes
- Enabling post-consumer material recycling

In this context, the Italian seal “CLIMA - Committed to Low Impact Machinery” was issued as a green certification signed by ACIMIT, the association of Italian textile machinery manufacturers.

Since no internationally recognized standards exist for classifying the energy and environmental performance of textile machinery, ACIMIT is promoting the CLIMA as a tool to identify these performance standards. The parameter chosen to measure the eco-efficiency of the labelled machinery is the quantity of equivalent carbon dioxide emissions produced during operation (Carbon Footprint - CFP).

The CLIMA serves as both a quality guarantee and a tool to showcase excellence and innovation in Italian technology. It is a distinctive brand that enhances the competitiveness of Italian companies, even on a global scale. Recognition of achievements in technological excellence, including sustainability, is one of the key strengths of the Italian textile machinery sector.



THE SERVICE

Next Technology Tecnotessile can help companies to obtain CLIMA certification. Our service consists in assisting in all the steps necessary to measure the energy and environmental performance of the machines, calculated in relation to a production cycle defined by the manufacturer for the labelled machines. Next Technology Tecnotessile also assists in the compilation of the necessary documentation and the input of the data obtained into the ACIMIT tool for CLIMA certification.

- Identification of the machines to be certified and their technical specifications
- Analysis of the design data and definition of the standard reference work cycle
- Measurement of the energy consumption and calculation of the consumption of consumables (e.g. gas, oil, grease, etc.) during the standard work cycle and for scheduled maintenance
- Phonometric measurement of the noise generated by the machinery in operation
- Compilation of the required documentation
- Calculation of the carbon footprint (CFP)

All activities are carried out in collaboration with the technical team of the applicant company.





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