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GREENE 4.0

Greene 4.0

Best Practices Handbook

Solutions for Greener, Smarter Manufacturing

Introduction

This Best Practices Handbook presents the key results and insights of the **Greene 4.0 project**, showcasing how green and digital transformation can be practically supported in manufacturing SMEs through targeted pilot actions, transnational cooperation, and a growing innovation ecosystem.

The handbook brings together **two complementary types of content** that reflect both the **direct achievements of the Greene 4.0 project** and the **broader landscape of existing best practices** already implemented across Europe:

- **Success Stories** present the concrete outcomes of the Greene 4.0 pilot actions. These cases highlight how Greene 4.0 project partners actively connected solution seekers and solution providers, supported the implementation of tailored solutions, and facilitated testing and validation in real SME environments. They represent the project's hands-on contribution to enabling green and digital transformation.
- **Solutions (Use Cases)** showcase existing, market-ready green and digital solutions implemented by companies across Europe. These use cases were collected through the Greene 4.0 mapping activities and the Innovation Contest and represent best practices that were not developed within the project itself, but serve as valuable inspiration and reference material for manufacturing SMEs.

Together, these two sections form a comprehensive best practices handbook: the **Success Stories** demonstrate *what Greene 4.0 has delivered*, while the **Solutions** illustrate *what is already possible in practice* and can be replicated or adapted in other contexts.

In addition, the handbook reflects the **main findings from the development of the Regional Action Plans (RAPs)** and the **Transnational Strategy for deploying the B2GreenHub platform**. These strategic elements place the showcased practices into a broader policy and ecosystem context and outline how regional and transnational actions can support long-term impact.

All success stories and solutions featured in this handbook are also published on the **B2GreenHub platform**, which functions as a digital ecosystem connecting manufacturing SMEs, solution providers, research organisations and public authorities to support green and digital transformation across regions.

Success Stories from Greene 4.0 Pilot Actions

This section presents **Success Stories from the Greene 4.0 pilot actions**, highlighting concrete examples of how the project supported manufacturing SMEs in addressing real business challenges through green and digital solutions.

Each success story documents a pilot action in which Greene 4.0 project partners actively facilitated the connection between a **solution seeker** (typically a manufacturing SME) and a **solution provider**. The pilots were implemented following Greene 4.0 methodologies and supported by B2GreenHub services such as matchmaking, expert facilitation, structured pilot execution and validation in real operational environments.

The success stories focus on:

- the initial business challenge,
- the implemented solution,
- achieved results and measurable benefits,
- and key lessons learned for replication.

These cases represent the **core project achievements** of Greene 4.0 and demonstrate how targeted, well-structured pilot actions can accelerate green and digital transformation in SMEs.

1 / AI-Driven Digital Communication for a Micro Manufacturing Company

B2GreenHub supports AI-driven digital communication at LDK Tech

Solution Seeker: LDK Tech (Slovenia)

Sector: Metal

Solution Provider: CreativIQ (Slovenia)

Sector: Digitalization and Connectivity

Greene 4.0 Partner Involved: Pomurje Technology Park

Challenge

LDK Tech operates as a small enterprise requiring regular, high-quality digital communication and social media presence, while facing typical SME constraints related to time, resources, and marketing capacity.

Solution & Results

The piloted solution is an AI-driven Content Factory designed to automate and streamline the full lifecycle of social media content creation and publishing. The workflow generates platform-optimized text and visual content for X (Twitter), Instagram, Facebook, LinkedIn, Threads, and YouTube Shorts from a single content input.

During the pilot, the following key functional elements were implemented:

- AI-based generation of platform-specific social media posts.
- Dynamic prompt and schema management via external sources (Google Docs).
- Automated AI image generation aligned with brand guidelines.
- Approval workflows via email notifications.
- Automated or semi-automated publishing to selected platforms.
- Content and asset archiving to cloud repositories.

The entire process was supported by B2GreenHub:

- An initial qualitative assessment of LDK Tech's digital communication needs and readiness was conducted by a B2GreenHub facilitator.
- B2GreenHub supported the process with initial coordination as well as the definition of the pilot scope, objectives and timelines.

The pilot confirmed that the CreativIQ solution can be successfully implemented in an SME operational environment. Key outcomes and benefits include:

- Significant reduction in time required for social media content creation and publishing.
- Improved consistency of messaging and visual identity across platforms.
- High usability for non-technical users.
- Clear potential for scalability and replication in other SMEs.

Learning Tips and Recommendations

From the solution seeker's perspective, the pilot demonstrated tangible operational benefits and reduced dependency on manual marketing processes. From the solution provider's perspective, the pilot validated real-world applicability and strengthened market readiness.

Recommendations:

- Clearly define the operational challenge. Identify time-consuming manual processes (e.g. social media content creation) to ensure the solution addresses real business needs.
- Clearly define the pilot scope, objectives, and timelines.
- Test the solution in real SME conditions. Short pilots help confirm feasibility, usability, and operational impact before wider adoption.
- Automating social media content creation and publishing brings immediate efficiency gains.
- Use pilot results to plan next steps. Extend pilots, onboard additional SMEs, refine analytics and reporting, and prepare for broader market uptake.

2 / Digital Lifecycle of Hybrid Electric Propulsion Units

Solution Seeker: CHESCO GmbH (Germany)

Sector: Other

Solution Provider: DIREKT @ BTU Cottbus-Senftenberg (Germany)

Sector: Data Analysis and Artificial Intelligence

Greene 4.0 Partner Involved: Bautzen Innovation Centre

Challenge

- Necessary optimization of technical systems through simulation processes
- Insufficient development approaches across the entire lifecycle
- Unlocking potential through integration of key information in networked production systems within value chains
- Required data and information availability from development to operation of complex products

Solution & Results

The content is the creation of an information concept that maps the lifecycle of (hybrid-)electric propulsion systems for aviation – from design, through production planning and manufacturing, to operation. The information concept is characterized as a digital twin of both the product and its associated processes in the respective lifecycle phases. This complex approach forms the foundation for efficiency across all lifecycle phases of future sustainable aviation.

As a result of the successful implementation of a prototype at the CHESCO demonstrator labs, it was possible to validate the project's main output in a realistic operating environment, marking an important step in the development of this technological solution.

Learning Tips and Recommendations

Start small: Pick a handful of assembly steps that truly drive quality or rework, and focus your digital capture and guidance there before expanding.

Treat the first iterations as calibration rounds: Align the virtual instructions with the real workstation, then refine based on what people actually do and what the data consistently shows.

Keep the technology "in service of the team": Make it quick to use, easy to override or comment on, and ensure feedback from the shopfloor is acted on visibly.

3 / Optimisation of injection moulding processes through real-time MES

COLORplastic and Noxem to optimise injection moulding processes through real-time MES monitoring

Solution Seeker: COLORplastic, spol. s r.o. (Czech Republic)

Sector: Plastics & Rubber

Solution Provider: Noxem s.r.o. (Czech Republic)

Sector: Digitalization and Connectivity

Greene 4.0 Partner Involved: Innovation Centre of the Ústi Region

Challenge

COLORplastic operates modern ENGEL injection moulding machines for the production of plastic components for the automotive sector. In injection moulding, production efficiency is highly dependent on machine utilisation, cycle times, downtime, scrap rate and process stability.

However, the company lacked a unified digital system providing real-time visibility of machine operation and key production indicators. Data were partially recorded manually or available only at aggregate level, limiting transparency over actual machine utilisation, downtime causes and production deviations.

Without structured MES monitoring, it was difficult to identify inefficiencies, unplanned stoppages or optimisation opportunities across injection moulding processes. Management needed a simple and non-disruptive digital solution tailored to SME conditions that would provide reliable production data and support data-driven decision-making.

Solution & Results

Within the GREENE 4.0 pilot action, ICUK facilitated the matchmaking between COLORplastic (solution seeker) and Noxem (solution provider) through the B2GreenHub framework and the structured pilot methodology (D3.4.1).

The pilot focused on deploying Noxem's MES solution in selected injection moulding operations. The implementation process included:

- identification of key monitoring needs in plastic injection production,
- definition of relevant KPIs (machine utilisation, downtime, production cycles, output),
- installation of Noxem's own data-collection hardware on selected ENGEL machines,
- automatic collection of machine status and production data,
- visualisation of data in a user-friendly web interface,
- evaluation of production performance and identification of inefficiencies.

The MES system provides real-time insight into:

- which injection moulding machines are running or idle,
- duration of production cycles and downtime,
- number of produced parts,
- deviations and potential bottlenecks in the production flow.

The pilot confirmed that a scalable and easy-to-deploy MES solution can be implemented in SME plastic manufacturing without major interruption of operations. As a result, COLORplastic gained structured and transparent access to production data, enabling faster response to downtime, better control of injection moulding performance and a foundation for further optimisation of efficiency and competitiveness in the automotive supply chain. By increasing transparency of injection moulding processes, the solution also supports reduction of material waste and more efficient use of energy and production resources.

Learning Tips and Recommendations

In plastic injection moulding, start with monitoring the most critical machines and define KPIs clearly (cycle time, downtime, output per shift, scrap rate). Automatic data collection is essential to avoid inaccuracies caused by manual reporting.

For SMEs in the plastics industry, small-scale MES pilots are an effective first step towards Industry 4.0. Real-time transparency over injection moulding processes enables better planning, faster problem resolution and continuous improvement.

The pilot demonstrated that structured facilitation through B2GreenHub simplifies cooperation between manufacturing SMEs and digital solution providers and accelerates digital transformation in traditional industrial sectors.

4 / Flexible Robotic Automation for Warehouse Handling

B2GreenHub links Elettrocablaggi and Exsensia to deploy flexible robotic automation

Solution Seeker: Elettrocablaggi S.r.l. (Italy)

Sector: Machinery & Equipment

Solution Provider: Exsensia srl (Italy)

Sector: Automation and Robotics

Greene 4.0 Partner Involved: IMECH (PP7)

Challenge

Elettrocablaggi srl manages a high-mix production environment where frequent material movements between the automatic vertical warehouse and the production area are required. These loading and unloading activities were mainly manual, creating inefficiencies, dependency on operator availability, and limited scalability during peak workloads. Manual handling also introduced variability in execution, increasing the risk of delays, errors, and non-value-added time. The company needed a flexible automation approach capable of integrating with the existing warehouse system without major layout changes, while ensuring reliable operation and easy reconfiguration for SME production needs.

Solution & Results

The challenge was addressed through the deployment of a flexible robotic solution integrating a fixed robotic arm positioned near the automatic vertical warehouse and a mobile robot used to transport materials between the warehouse interface and the transfer area. The full workflow (loading, unloading, transport, synchronization, and safe states) was programmed using the Exsensia intuitive automation platform, enabling rapid configuration and easy reconfiguration without low-level coding.

The pilot was implemented following the GREENE 4.0 Pilot and Testing Methodology (D3.4.1) and supported by the B2GreenHub client journey, which facilitated matchmaking between solution seeker and provider, structured pilot execution, and validation in a real SME environment. The solution was tested in realistic conditions through functional, integration, and repeatability tests.

Results include improved process repeatability, reduced manual handling, and increased operational efficiency of warehouse-related logistics. Key performance indicators monitored during the pilot included: cycle time per warehouse operation, number of manual handling steps, operator involvement, and task repeatability. Quantitative improvements (before/after) can be reported based on site measurements (e.g., cycle time reduction, decrease of manual interventions, number of successful automated cycles).

Learning Tips and Recommendations

Start with a clear mapping of the warehouse workflow and identify the most repetitive handling steps to automate first. Design the solution around a stable handover area and ensure accurate positioning between mobile robot and fixed arm. Use modular task programming and parametric positions to simplify

future reconfiguration. Validate early with short functional tests, then move to repeatability tests under realistic operating conditions. Involve operators from the beginning to improve usability and acceptance. Finally, define a small set of KPIs (cycle time, manual interventions, success rate) and monitor them during the pilot to quantify benefits and guide scaling to additional stations or tasks.

5 / Simplification of orders and improvement of customer communication

Dudzik Ice Cream and Florian Bouron to simplify orders and improve customer communication

Solution Seeker: Dudzik Ice Cream (Poland)

Sector: Food & Beverage

Solution Provider: Florian Bouron (Poland)

Sector: Digitalization and Connectivity

Greene 4.0 Partner Involved: Krakow Technology Park

Challenge

Dudzik Ice Cream faced a growing number of repetitive inquiries from customers and partners regarding daily offers, availability, special orders, and ice cream production. All questions had to be answered directly by staff, which increased their workload and extended customer waiting times due to the lack of any self-service system. Moreover, the website did not provide easy contact options, online ordering, or clear information about event services, large individual orders, and B2B cooperation. This limited operational efficiency, slowed communication, and reduced opportunities for business growth and partnerships.

Solution & Results

The pilot solution was the implementation of a structured online contact form on the company's website. This solution enabled customers and business partners to quickly submit questions regarding availability, special orders, event services, and cooperation directly online.

The form structured inquiries into clear categories (e.g., individual orders, event catering, B2B collaboration), allowing the company to better organize and prioritize requests. By introducing this digital communication tool, the business reduced repetitive questions, shortened response times, improved customer experience, and streamlined internal workflow without overloading staff.

After introducing the online contact form, the company experienced a noticeable improvement in communication and workflow. The number of repetitive in-person and phone inquiries decreased, as customers could now submit questions and requests directly through the website.

B2GreenHub supported the process with initial coordination as well as the definition of the pilot scope, objectives and timelines.

Learning Tips and Recommendations

- Start by identifying the most frequent customer questions and operational bottlenecks.
- Implement a simple digital solution, such as a structured contact form, before investing in complex systems.
- Clearly categorize inquiries (e.g., individual orders, events, B2B) to streamline internal handling. Ensure the website provides visible, easy-to-use contact options.

Monitor response times and adjust processes regularly. Even small digital improvements can significantly reduce staff workload and improve customer experience.

6 / Joint Material Testing for Mycelium-Based Packaging

B2GreenHub connects Szimbio Lab and Ugrinpack to validate mycelium-based packaging materials

Solution Seeker: Szimbio Lab (Hungary)

Sector: Other (research of new green materials)

Solution Provider: Ugrinpack (Hungary)

Sector: Manufacturer of packaging, new green materials

Greene 4.0 Partner Involved: MGFÜ

Challenge

Szimbio Lab, a sustainable materials innovator, was developing novel packaging solutions from mycelium. While the concepts showed strong potential, the company faced challenges in validating material performance, durability, and thermal resistance, as well as assessing environmental impacts such as life cycle performance and carbon footprint. As a small innovative enterprise, Szimbio Lab lacked in-house testing infrastructure and expert capacity to comprehensively evaluate material properties and market readiness. Without validated performance data and a structured market validation plan, scaling the solution and engaging potential domestic and international partners remained a challenge.

Solution & Results

The pilot solution was delivered by Ugrinpack and focused on providing targeted technology mentoring, material performance validation, and structured market preparation for the contest winner, Szimbio Lab. The implemented activities included expert-led technology mentoring to refine material concepts, laboratory-level testing of key performance parameters such as thermal resistance and durability, and environmental assessments including life cycle assessment (LCA) and carbon footprint evaluation. These activities generated reliable, comparable data to support both technical development and sustainability claims. In parallel, Ugrinpack supported the development of a market validation plan, helping Szimbio Lab identify relevant use cases, regulatory considerations, and potential customers. The pilot also facilitated connections with domestic and international partners, strengthening the company's positioning within the packaging value chain. As a result, Szimbio Lab achieved improved technical confidence in its material solutions, enhanced credibility toward potential partners, and clearer pathways for market entry and scaling. The pilot demonstrated how targeted expert support and testing services can accelerate innovation readiness for small, sustainability-driven enterprises.

Learning Tips and Recommendations

The pilot highlighted the importance of combining earlystage innovation with expert validation and marketoriented thinking. For the contest winner, access to external testing and mentoring significantly reduced technical and sustainability related uncertainty and accelerated decision making. For the solution provider, the pilot confirmed the value of handson collaboration with innovative SMEs.

Key recommendations include clearly defining the innovation challenge and validation needs at the outset, prioritising material performance and environmental assessment early in development, and complementing technical testing with structured market validation planning. Short, focused pilots are an effective way to test feasibility, strengthen credibility, and prepare innovations for partnerships and scaling.

Solutions – Use Cases from Mapping Activities

This section presents **Solutions (Use Cases)** identified through the Greene 4.0 mapping activities and the Innovation Contest.

The purpose of this section is to complement the Greene 4.0 pilot action results by showcasing **what is already possible in practice** when manufacturing SMEs adopt green and digital solutions. The featured use cases were collected to provide additional inspiration, reference points and learning opportunities for SMEs that are exploring transformation pathways but may not yet be ready to engage in pilot actions.

The showcased solutions cover a broad range of manufacturing-related processes, including production, logistics, quality control, infrastructure management and enterprise operations. Together, they demonstrate how green technologies, digital tools, automation and data-driven approaches can be applied in real business environments to improve efficiency, sustainability and competitiveness.

By presenting these use cases alongside the Greene 4.0 Success Stories, the handbook offers a **comprehensive best practices overview**: combining concrete project achievements with a wider portfolio of proven solutions that can be replicated or adapted across regions. All solutions included in this section are also published on the **B2GreenHub platform**, where they are accessible to manufacturing SMEs and other ecosystem actors as part of a growing knowledge base.

1 / SolidLab – Digital and Automated Quality Control for Concrete Production

Solution Provider: PRIOT Digital Systems
Country of implementation: Slovenia

Problem statement

Concrete production plants face significant challenges in ensuring consistent quality control, full traceability, and compliance with increasingly strict industry standards. Traditional quality control processes are often manual, time-consuming, and prone to human error, particularly during sampling, data entry, and documentation. This leads to inefficiencies, inconsistent product quality, limited visibility across production data, and increased risks during audits and inspections. Additionally, fragmented data systems make it difficult for concrete producers to analyze production performance, material consumption, and profitability in a structured way. These challenges are especially critical for larger concrete producers operating multiple plants, where standardized processes, data security, and reliable reporting are essential to meet regulatory requirements, customer expectations, and operational efficiency goals.

Main outcome

The implementation of SolidLab at a major concrete production company operating multiple plants delivered measurable improvements in operational efficiency, quality control, and collaboration. By automating sampling and data entry processes, the company significantly reduced manual workload and data entry errors, achieving a 40% increase in operational efficiency. Digital traceability ensured consistent compliance with industry standards and improved transparency across production activities. Real-time data transfer between on-site concrete laboratories and the main laboratory streamlined communication and coordination, enabling more consistent quality control practices across locations. In addition, integrated business analytics provided valuable insights into production performance and profitability, supporting better-informed decision-making. Overall, the implementation demonstrated SolidLab's ability to enhance accuracy, efficiency, and inter-departmental collaboration in real-world concrete production operations, contributing to more reliable and sustainable manufacturing practices.

Main project features

- Automated quality control processes – Digitization and automation of concrete sampling and testing reduce manual work and minimize human errors.
- Faster and more efficient sampling – Automated procedures significantly reduce the time required for sampling and quality checks.

- Complete traceability – Full traceability of samples, materials, delivery notes, and user actions, supported by a comprehensive audit trail.
- Standards compliance – Ensures compliance with relevant concrete standards (SIST EN 206 and SIST EN 1026), supporting regulatory and audit requirements.
- Secure data management – Advanced data security with encryption and continuous system monitoring to protect sensitive production data.
- Business analytics and insights – Provides analytical tools to monitor production performance, material consumption, and profitability across plants.
- Scalable multi-plant platform – Designed for larger concrete producers and institutions, enabling standardized processes across multiple production sites.

2 / Content Factory for Social Media

Solution Provider: CreativIQ
Country of implementation: Slovenia

Problem statement

The solution addresses the complex challenge of efficiently creating, customizing, and publishing content across multiple social media platforms, each with unique format requirements, user expectations, and algorithmic behaviors. Content creators and marketing teams often struggle with time-consuming, repetitive tasks and inconsistent brand messaging due to manual adaptation processes. This solution tackles the lack of scalable, AI-powered workflows by introducing an automated system that generates optimized content tailored to platform-specific rules and delivers optimized, ready-to-use designs.

Main outcome

The solution significantly reduces time spent on content creation through AI-driven automation, enabling a 60% decrease in manual workload. Businesses gain higher productivity, more consistent brand messaging, and improved engagement across platforms due to optimized, platform-specific content. The system accelerates approval cycles, increases publishing frequency, and reduces errors through schema-based checks. Expected outcomes include higher lead generation, improved internal workflow efficiency, greater content consistency (>95%), and measurable increases in audience engagement (1.8–2.5% vs. baseline 1.2%). The solution also provides centralized archiving, better reuse of assets, and scalable processes that support growth without additional staffing.

Main project features

The solution introduces a modular, AI-driven content factory that combines dynamic prompt engineering, schema-based content structuring, and multi-platform publishing automation. It leverages external sources (e.g. Google Docs) for centralized prompt and schema management, enabling non-technical users to update content logic without code changes. The system includes an intelligent content generation agent that adapts outputs to platform-specific formats (X, Instagram, LinkedIn, etc.), AI-powered image generation with brand alignment, and real-time web search for contextual relevance. It also features workflow automation in Telegram, HTML optimization in Gmail, and automated archiving in Google Drive.

3 / Integrated Digital Enterprise Management with Odoo

Solution Provider: manaTec GmbH
Country of implementation: Germany

Problem statement

Many small and medium-sized companies struggle to integrate their business processes in a digital fashion, particularly so as they grow and push into new market areas. However, most established ERP solutions that could feasibly address these challenges are too complex or costly for the needs of smaller enterprises.

Main outcome

Multiple successful implementations, including:

- Small-Sized Bike-Lock Manufacturer (20 Employees), complete Odoo-Suite, 1 Year Odoo-Migration/-Upgrade-Phase, 1 Year Support
- Medium-Sized Solar-Module Installer (50 Employees), 1 Year Implementation-Phase
- Medium-Sized Manufacturing Digitalisation Company (50 Employees) 7-Years Upgrade and Support

Implemented functionalities: Accounting, CRM, Field-Service, Inventory, Manufacturing, Project-Management, Website etc.

Main project features

Odoo is a comprehensive ERP (Enterprise Resource Planning) solution designed to facilitate digitalization for businesses of all sizes. It offers an integrated suite of applications that address various business needs, including accounting, inventory management, sales, HR, and more, all accessible through a single platform. Odoo aims to streamline operations, improve efficiency, and enhance decision-making by providing real-time data and insights.

One of the primary problems Odoo solves is the fragmentation of business processes. By unifying disparate systems into one cohesive platform, it eliminates data silos, reduces duplication, and enhances collaboration across departments. It also automates routine tasks, freeing up resources for more strategic initiatives.

Odoo distinguishes itself with its modular design, providing over 30 integrated applications in its affordable enterprise version, which can be customized to meet specific business needs.

Its open-source nature enables a free community version, allowing for extensive customization and community-driven enhancements.

Regardless of community or enterprise, Odoo provides a user-friendly interface and seamless updates, ensuring businesses always have the latest features. Its affordability, scalability, and flexibility distinguishing it from competitors with high costs and limited adaptability.

4 / Digital Lifecycle of Hybrid Electric Propulsion Units

Solution Provider: BTU Cottbus-Senftenberg
Country of implementation: Germany

Problem statement

Challenges:

- Necessary optimization of technical systems through simulation processes
- Insufficient development approaches across the entire lifecycle
- Unlocking potential through integration of key information in networked production systems within value chains
- Required data and information availability from development to operation of complex products

Main outcome

The content is the creation of an information concept that maps the lifecycle of (hybrid-)electric propulsion systems for aviation—from design, through production planning and manufacturing, to operation. The information concept is characterized as a digital twin of both the product and its associated processes in the respective lifecycle phases. This complex approach forms the foundation for efficiency across all lifecycle phases of future sustainable aviation.

Main project features

Digital thread through the production lifecycle.

5 / Sustainable and Efficient Inventory Management with Drones

Solution Provider: ascendo Professionals Consulting GmbH
Country of implementation: Austria

Problem statement

Many manufacturing SMEs operate large warehouses or high-bay storage systems where regular inventory checks are mandatory. Traditional inventory processes are time-consuming, labour-intensive and often require the shutdown of warehouse operations. Manual counting using forklifts or lifting platforms leads to high personnel effort, increased energy consumption and potential safety risks. Additionally, inventory data is often outdated, reducing transparency and planning accuracy. SMEs are therefore looking for more efficient, safe and sustainable ways to perform inventory management without disrupting daily operations.

Main outcome

ascendo developed an automated inventory management of high-bay warehouses using drones for a customer. That revolutionized the traditional inventory process by significantly enhancing efficiency.This innovative approach not only minimized manual effort but also streamlined operations, saving valuable time and resources. With reduced energy consumption and optimized workflows, the project set a new standard for sustainable inventory management, showcasing how cutting-edge technology can drive both economic and environmental benefits.

Main project features

- Autonomous drones for indoor warehouse inventory checks
- Automated scanning of storage locations and inventory items
- Integration with existing warehouse management or ERP systems
- Reduction of manual labour and forklift usage
- Inventory checks possible during ongoing operations
- Scalable solution suitable for different warehouse sizes

6 / Autonomous Security Robots for Sustainable Industrial Sites Operations

Solution Provider: ascendo Professionals Consulting GmbH
Country of implementation: Austria

Problem statement

Industrial sites and manufacturing facilities require continuous security monitoring to protect infrastructure, assets and personnel. Traditional security approaches rely heavily on manual patrols and stationary systems, which are resource-intensive, difficult to scale and often inefficient during off-hours. Human patrols involve high labour costs, repetitive tasks and frequent travel between locations, while reaction times to incidents may be delayed. Manufacturing SMEs are therefore seeking smarter security solutions that ensure reliable site protection, reduce operational effort and support more sustainable use of resources.

Main outcome

The autonomous security robot solution significantly improved site security while reducing resource consumption. Continuous automated patrols ensured reliable monitoring without increasing personnel requirements. Manual security rounds and travel between locations were reduced, leading to lower operational costs and fewer emissions associated with transport and night shifts. Automated incident detection and reporting improved response times and overall site safety. The scalable system enabled manufacturing SMEs to enhance security coverage in a sustainable way, demonstrating how robotics can replace repetitive tasks and support greener, more efficient infrastructure management.

Main project features

- Autonomous security robots for continuous patrol of industrial and logistics sites
- Integrated sensors and cameras for real-time monitoring and incident detection
- Centralised control and monitoring platform
- Automated documentation and reporting of security events
- Reduction of manual patrols and repetitive security tasks Modular and scalable solution adaptable to different site sizes

7 / AR-Supported Maintenance and Training for Industrial Operations

Solution Provider: ascendo Professionals Consulting GmbH
Country of implementation: Austria

Problem Statement

Manufacturing SMEs face increasing challenges in maintaining complex machinery while dealing with skilled labour shortages and growing cost pressure. Maintenance tasks often depend on a small number of experienced experts whose availability is limited. Traditional training methods are time-consuming, require extensive documentation and often lead to errors during learning phases. Additionally, on-site expert visits and repeated service interventions result in high travel effort, machine downtime and unnecessary resource consumption. SMEs need a practical solution to transfer knowledge efficiently, support maintenance staff in real time and ensure reliable operations without increasing environmental impact.

Main outcome

The AR-supported maintenance and training solution significantly improved operational efficiency and sustainability. Maintenance tasks were completed faster and with fewer errors, reducing machine downtime and material waste. Remote expert support replaced many on-site service visits, leading to a measurable reduction in travel-related emissions and costs. New employees reached operational readiness more quickly through hands-on, guided training directly at the workplace. The digital documentation approach reduced paper usage and ensured that knowledge remained accessible and up to date. Overall, the solution demonstrated how augmented reality can enable greener, more resilient industrial operations while strengthening workforce skills in manufacturing SMEs.

Main project features

- Use of AR glasses to support maintenance and service tasks directly at the machine
- Step-by-step visual instructions displayed in the technician’s field of view
- Remote expert support for real-time guidance without on-site travel
- Digital training and onboarding of new employees in real production environments
- Reduction of paper-based manuals and static documentation
- Modular and scalable solution adaptable to different machines and processes

8 / Real-Time Micro-Leak Detection and Smart Water Infrastructure Management

Solution Provider: Nextdrop s.r.o.
Country of implementation: Czech Republic

Problem statement

Water utilities and industrial infrastructure operators face significant challenges in monitoring water consumption and detecting leaks in a timely manner. Traditional leak detection approaches often rely on fixed threshold values or manual inspections, which are insufficient to identify small-scale or gradual water losses. These so-called micro-leaks can remain undetected for long periods, leading to increased water losses, higher operational costs and unnecessary strain on infrastructure systems. The lack of real-time data and predictive analytics limits the ability of operators to react proactively, optimize maintenance planning and reduce resource waste. There is a growing need for intelligent, data-driven solutions that provide continuous monitoring, early anomaly detection and actionable insights for sustainable water management.

Main outcome

The implementation of the Nextdrop Control System at the Water Utility of Plzeň demonstrated the ability to detect micro-leaks smaller than 0.3 l/min in real time, a level of precision not achievable with conventional monitoring methods. Continuous data collection combined with adaptive predictive analytics enabled early identification of abnormal consumption patterns and supported faster operational response. As a result, the solution contributed to reduced water losses, improved operational transparency and more efficient infrastructure management. The real-time insights also support strategic maintenance planning and long-term sustainability goals. The use case illustrates how digital technologies and IoT-based monitoring can significantly enhance resource efficiency and resilience of critical infrastructure systems, while offering high transferability to industrial and manufacturing environments.

Main project features

- Continuous real-time monitoring of water consumption and flow parameters
- Adaptive, data-driven detection of micro-leaks below conventional detection thresholds
- Cloud-based analytics platform with predictive algorithms
- High sensitivity with reduced false alarms compared to traditional systems
- Modular and scalable solution applicable to utilities, industrial sites and buildings
- Support for preventive maintenance and long-term infrastructure planning

9 / Innovation of a Cryogenic Head Improved the Efficiency and Functionality of a Cosmetic Device

Solution Provider: Digilab
Country of implementation: Czech Republic

Problem statement

The original design of the cryogenic head showed deficiencies that negatively affected the efficiency and functionality of the device.

Main outcome

The result was improved efficiency and functionality of the device, successful validation of the innovation in real operation.

Main project features

The solution included a structural analysis, design of a new cover shape, 3D scanning, and 3D printing of a prototype.

10 / Digitization of production processes, in particular automatic collection of productiondata and its presentation through production monitoring

Solution Provider: NOXEM s.r.o.
Country of implementation: Czech Republic

Problem statement

This is a method of collecting production data. For example, which machines are working, which are idle, how long individual operations take, or where unnecessary downtime occurs. The data is automatically collected by our equipment. You can view the information in a clear format in our web application. As a result, management and employees have a clear picture of production and can respond quickly to problems, increase efficiency, and reduce costs.

Main outcome

We increase the efficiency of manufacturing companies by tens of percent at minimal cost. Our successful projects speak for themselves. Beinbauer Automotive CZ increased its production efficiency by 10% in one year. Crystalex CZ, the largest Czech glassworks for the production of utility glass, increased its efficiency by 5% within the first few weeks. The implementation took place without stopping production and without interfering with the IT infrastructure.We increase the efficiency of manufacturing companies by tens of percent at minimal cost. Our successful projects speak for themselves. Beinbauer Automotive CZ increased its production efficiency by 10% in one year. Crystalex CZ, the largest Czech glassworks for the production of utility glass, increased its efficiency by 5% within the first few weeks. The implementation took place without stopping production and without interfering with the IT infrastructure.

Main project features

- Transparency of production
- Simplicity of solutions
- Technological innovation
- Data accuracy

11 / Typelens simplifies manual handling and processing of unstructured documents in office workflows

Solution Provider: Mastranet AI
Country of implementation: Italy

Problem statement

Typelens addresses the concrete challenge of manually handling and processing unstructured documents and emails in office workflows. These documents represent a common source of inefficiency, delays, and human error in many businesses. Tasks such as registering delivery notes, purchase orders, or organizing incoming emails typically require manual data entry, verification, and cross-checking with ERP systems. Typelens uses AI technologies including LLMs, OCR, and autonomous agents to extract structured data from unstructured formats (PDFs, images, emails, etc.), even when data is incomplete, contains typos, or uses inconsistent codes. It automatically reconciles this data with internal company databases and integrates with ERP systems to trigger business actions. This reduces manual effort, increases process speed, and ensures data accuracy—enabling measurable efficiency gains across document-heavy workflows.

Main outcome

Typelens delivers measurable benefits to businesses by automating time-consuming, repetitive document-handling tasks. It significantly increases productivity by reducing manual data entry, verification, and document classification—freeing up employees to focus on higher-value activities. This leads to faster processing times, fewer errors, and better operational continuity, especially in critical workflows like order management, invoicing, and logistics. By integrating directly with ERP systems, Typelens minimizes process delays and ensures data consistency across departments. For companies handling high volumes of emails and unstructured documents, this translates into cost savings, scalability, and the ability to handle more business without increasing headcount. In turn, this unlocks new market opportunities by enabling faster response times, better customer service, and the agility to scale operations efficiently giving businesses a competitive edge in document-intensive industries.

Main project features

Typelens introduces a novel application of LLMs, OCR, and AI agents to automate complex document processing tasks without relying on predefined templates or rigid formats. It leverages semantic reconciliation to match extracted information with company master data, handling variations such as code mismatches, typos, and unit discrepancies. Its SaaS, multi-tenant, cloud-native architecture enables scalable deployment without complex setup. The platform integrates directly with ERPs, allowing automated two-way data synchronization and real-time operations. A key innovation is the "human-in-the-loop" design, combining AI automation with user oversight to ensure accuracy and control. This hybrid model empowers companies to automate intelligently while maintaining adaptability and trust in critical workflows.

12 / Intuitive Robotic Automation for Vertical Storage Systems

Solution Provider: Exsensia srl
Country of implementation: Italy

Problem statement

The solution tackles the challenge of programming and coordinating a mobile base and an industrial robot to automate the loading and unloading of a vertical storage system. Traditional methods require expert knowledge and complex coding, especially when synchronizing mobile platforms with manipulators working at variable heights and positions. We address this by enabling intuitive, visual programming of both the mobile base and the robot arm, significantly reducing engineering effort and improving flexibility in deploying such automation in dynamic environments.

Main outcome

The solution introduces an advanced software platform that enables intuitive programming and coordination of both a mobile robotic base and a stationary robot for automated interaction with a vertical storage system. Technological innovation lies in the ability to program complex, synchronized tasks involving mobile manipulation through an intuitive, no-code interface. Users can define behaviors and workflows visually, without writing a single line of code, making robotic automation accessible to operators without technical backgrounds.

Main project features

The system integrates spatial reasoning, task-level abstraction, and the ability to dynamically adapt to variable layouts and object positions. This allows for rapid deployment, reprogramming, and reconfiguration of robotic work cells in logistics and manufacturing.

The solution is designed for seamless integration into existing manufacturing environments, with a focus on modularity, interoperability, and minimal setup effort. It supports standard industrial communication protocols (e.g., OPC UA, MQTT, Modbus), enabling straightforward integration with MES, WMS, PLCs, and existing automation infrastructure. The software platform is hardware-agnostic, allowing it to interface with a wide range of robots, mobile bases, and peripheral devices, ensuring compatibility with the equipment already deployed on the shop floor. Integration is further simplified by the system's intuitive interface and Learning from Demonstration (LfD) approach, which allows operators to configure tasks through guided interactions rather than writing code. This reduces the need for long integration cycles and specialized programming, enabling fast deployment and reconfiguration. In terms of customization, the solution is fully adaptable to specific manufacturing requirements. Users can define task sequences, object types, workspace constraints, and storage configurations through parameterization and visual workflows.

From a business perspective, the solution will be commercialized through a hybrid licensing model: a one-time license fee for the core software, combined with an annual subscription that provides access to updates, support, and feature enhancements. This model ensures long-term sustainability while enabling customers to benefit from continuous improvements and maintain system performance over time.

13 / Use of environmentally friendly and sustainable materials in the manufacture of products, together with the adoption of sustainable design practices

Solution Provider: Ecopolplast
Country of implementation: Poland

Problem statement

Manufacturing companies face increasing pressure to reduce CO_2 emissions, limit the use of virgin plastics, and meet circular economy requirements while maintaining high product quality, process efficiency, and cost competitiveness. Traditional thermoplastics and many sustainable alternatives fail to meet these demands simultaneously, often requiring compromises in performance, recyclability, or production costs. Therefore, there is a clear need for a fully circular, high-performance thermoplastic made from 100% recycled content that can be processed using standard manufacturing technologies without sacrificing quality or efficiency.

1. Ecoplastomers are a Highly Tested and Precise Injection Moulding Materials – Ideal for Replacing Existing Virgin Thermoplastics.

In recent injection process trials, automotive parts made from Ecoplastomer® demonstrated equal or superior quality to their traditional counterparts. Remarkably, we achieved almost 13% reduction in injection time for one component.

2. Ecoplastomer® has Undergone Rigorous Coating Adhesion Tests, Demonstrating its Exceptional Compatibility with Various Coatings.

Test results conducted in Wrocław laboratories confirm that our product's unique structure eliminates the need for any specific pre-coating preparation, making it a highly efficient choice for coating applications. Additionally, Ecoplastomer® successful performance in these tests underscores its reliability and suitability for diverse coating needs.

3. Ecoplastomers have Undergone Successful Testing in Spray Coating to Protect Metal Step from External Factors.

The experiment on Ecoplastomer® PP 70 revealed that our 100% recycled content thermoplastic material sprays very well, and a lower consumption of materials (about 8%) was demonstrated compared to traditional polyolefin4. Ecoplastomer® Offers Optimal Balance of Durability and Elasticity: Paint Boxes Manufactured from Ecoplastomer® PP 70.

The use of our circular thermoplastic material significantly enhances the durability of paint containers. Ecoplastomer® contains recycled rubber, allowing for flexibility that prevents the lid hinge from cracking. Ecoplastomer® eliminates the need to seal the lid immediately after injection, while the product is still hot. This flexibility simplifies the production process, allowing for more efficient manufacturing without compromising the integrity of the product.

5. Successful Use of Ecoplastomers in Thermoforming.

The sample was made by thermoforming the Ecoplastomer® PP 70 from a 2 mm plate produced by a press. These parts are suitable for creating closed, hollow products using laser welding.

6. Successful Usage of Ecoplastomers for 3D Printing.

To start the process, we needed to produce the filament using Ecoplastomer®. This was achieved using a single-screw extruder. The final stage of the extrusion process involved winding the filament onto a spool with a winder. Afterward, we utilized a Prusa MK3S 3D printer to print two samples, ISO 178 and ISO 527, with a solid structure at 100% infill. The printer was equipped with a Volcano (E3D) nozzle with a 0.8mm diameter, and we designed an additional thermal shield for it.

Main outcome

- 100% Recycled Content: Ecoplastomer® is made solely from recycled content, eliminating the need for virgin plastomers and even majority of plastics made from crude oil.
- Quality on Par with Traditional Thermoplastic Materials: Density and hardness are similar to traditional (virgin) thermoplastics, making it easy to incorporate Ecoplastomer®.
- Up to 30% Reduction in Production Costs: Reduction in injection cycle time of between 10%-30% provides considerable cost savings, not achievable with virgin thermoplastics.
- Up to 69% CO_2 Reduction: Production process of Ecoplastomers emits up to 69% less CO_2 than traditional plastomers, according to the LCA analysis.
- Digital Product Passports: We provide digital product passports, allowing our clients to trace and calculate their CO_2 emissions.
- Fully Circular, Easily Recyclable: Any product made from Ecoplastomer® can be recycled repeatedly. This way, the recycled content does not go to the landfill and stays in the closed loop.
- No Chemical Additives: Ecopolplast patent technology creates strong bonding of recycled rubber and plastic without chemical additives or stabilisers.
- Zero-waste Production: Every grain of the purchased material can be returned to the production process.
- Scent-neutralised, Suitable for Indoor: It reassesses how we approach the use of recycled materials in product manufacturing, e.g. automotive, construction, sports equipment, home and garden or storage solutions.
- Performance: Currently, two types of Ecoplastomer® are available: with PP and HDPE. All composites show excellent balance of stiffness, resilience, impact and UV-light resistance as well as dimensional stability.

Easy to Implement in the Mass Production Process: Processing method is the same as for traditional materials, it is equally easy to implement in the manufacturing process.

Main project features

Ecoplastomer® is the first-of-its-kind circular thermoplastic material created by Ecopolplast. Ecoplastomers made from 100% recycled content – post-consumer recycled plastic and recycled tyre rubber crumb or EPDM, reduce CO_2 emissions by up to 69% and save production costs by up to 30%.

Ecopolplast's innovative technology creates a strong bond between recycled rubber and plastic. Lack of additives makes the Ecoplastomers easily recyclable and completely circular. Any product made from Ecoplastomer® can be flaked and reintroduced into the production cycle while maintaining quality. Furthermore, every grain of purchased materials can be returned to the production process, enabling manufacturers to achieve zero waste production.

Its density and hardness are similar to traditional thermoplastics, making it suitable for various applications including automotive, construction, home and garden, office furniture, sports equipment, and storage solutions, presenting a sustainable circular alternative to traditional plastomers and plastics.

14 / Contact and order form that collects all data necessary for a rapid quotation and speeds up replies

Solution Provider: Florian Bouron
Country of implementation: Poland

Problem statement

Many SMEs still handle enquiries and orders through scattered channels (phone calls, inconsistent emails and messages). This makes communication fragmented and key information is often missing, such as product/service type, quantity, technical specification or required delivery date. As a result, teams spend time asking follow-up questions, quotations take longer, misunderstandings appear at the offer stage, and some requests are overlooked or answered too late. This solution replaces unstructured communication with a structured website form that guides the customer step by step through an enquiry, quotation request or order. It collects the essential data in one place from the start, reducing back-and-forth and speeding up a clear response.

Main outcome

The solution is expected to shorten the time needed to handle enquiries by reducing back-and-forth questions about missing requirements and by collecting all data necessary for a rapid quotation at the beginning of the process. With complete information provided in a consistent format, the quotation stage becomes clearer and less prone to misunderstandings. The structured approach also lowers the risk that an enquiry is missed or forgotten, because requests are captured in a single place instead of being spread across different channels. Overall, automating this early stage reduces administrative effort and allows the company to respond faster with more concrete offers, improving customer service quality and increasing sales efficiency.

Main project features

A structured website form designed to replace scattered communication (phone calls and inconsistent emails) with one clear, repeatable process. The form guides the customer step by step through a quotation request or an order and ensures that the request is complete from the start. It collects the key information needed to prepare rapid quotation, including the product/service type, quantity, technical specifications and the required delivery date. Customer can receive a first indication early and the supplier can move faster toward a concrete offer with fewer missing details.

15 / Targeted Material Testing and Mentoring for Mycelium-Based

Solution Provider: Ugrinpack
Country of implementation: Hungary

Problem statement

Szimbio Lab, a micro-enterprise developing innovative mycelium-based packaging materials, faced challenges in validating the technical performance and environmental sustainability of its products. While the concepts showed strong potential, the company lacked in-house testing infrastructure and expert capacity to assess durability, thermal resistance, life cycle performance, and carbon footprint. This limited the company's ability to substantiate sustainability claims, demonstrate market readiness, and engage potential partners. Without reliable performance data and a structured validation approach, scaling the solution and entering domestic and international markets remained difficult.

Main outcome

The pilot generated reliable technical and environmental performance data for Szimbio Lab's mycelium-based packaging solutions, significantly improving technical confidence and credibility toward potential partners. Through mentoring and testing, the company refined its material concepts and strengthened sustainability claims supported by LCA and carbon footprint results. The development of a structured market validation plan clarified potential applications, customer segments, and regulatory pathways. As a result, Szimbio Lab improved its readiness for market entry and scaling, while Ugrinpack demonstrated the value of targeted testing and mentoring services in accelerating early-stage green innovation for manufacturing SMEs.

Main project features

- Expert-led technology mentoring for bio-based material development
- Laboratory-level testing of material performance (e.g. durability, thermal resistance)
- Environmental assessment including life cycle assessment (LCA) and carbon footprint analysis
- Structured market validation support, including use case identification and regulatory considerations

Facilitation of connections within the packaging value chain

16 / Eco-friendly water-soluble coating for recyclable paper packaging

Solution Provider: Ugrinpack
Country of implementation: Hungary

Problem statement

Traditional laundry bleach sachets use polyethylene (PE)-coated filter paper for heat sealing, which leaves a residual plastic layer, making the packaging non-recyclable and environmentally harmful. This practice contributes to microplastic emissions and prevents full degradation of the material. Ugrinpack addressed this issue by replacing the PE coating with a natural, water-soluble dispersion coating that provides the same heat-sealability without leaving plastic residues. This innovation enables complete recyclability and degradation of the filter paper, significantly reducing environmental impact and supporting compliance with new EU packaging directives.

Main outcome

The solution is now being implemented in cooperation with Henkel. Internationally sourced filter paper is coated in Hungary with the eco-friendly substance, enabling recyclable and degradable heat-sealable packaging. This coated material is then processed into final packaging by partner companies, demonstrating seamless integration into existing systems. Benefits include reduced microplastic emissions, improved recyclability, lower energy consumption during manufacturing, and strengthened competitiveness for Ugrinpack. The innovation supports EU environmental goals, boosts sustainable practices in the packaging industry, and opens new market opportunities across Central Europe.

Main project features

- Application of water-soluble, nature-identical coating for paper packaging
- Immediate drying technology during rewinding for stable processing
- Measurement technology ensures precise web tension and product quality
- Fully integrable into existing production lines and customizable to individual needs
- TRL 9 (fully developed, ready for commercialization)

17 / Grow, Don’t Produce: Mycelium Materials for Sustainable Design & Packaging

Solution Provider: Szimbio Lab - Dóra Márföldi
Country of implementation: Hungary

Problem statement

The construction and packaging industries face serious sustainability challenges, jointly accounting for over two-thirds of global municipal waste and GHG emissions. The EU aims to reduce packaging pollution by 15% by 2040, creating pressure for viable alternatives. Fossil-based materials dominate both industries, lacking sustainable end-of-life solutions. There is an urgent need for biodegradable, bio-based alternatives that are scalable, cost-effective, and reduce environmental impact while maintaining functional performance.

Main outcome

The project demonstrates how locally developed, bio-based mycelium composites can support the green transition. These materials offer long-term carbon sequestration and promote circular economy practices by utilizing agricultural waste. Their compostable and downcyclable nature allows for low-impact disposal or reuse. The process fosters cross-sector collaboration and supports local businesses through sustainable production models. This innovation presents a scalable, eco-friendly alternative to conventional materials in both architecture and packaging applications.

Main project features

This project develops mycelium-based composite materials as sustainable alternatives for both packaging and interior design. The solution integrates design, material science, and biotechnology by growing fungal filaments on agricultural waste like straw or wood chips. Mycelium acts as a natural binder, forming fully biodegradable materials with excellent insulation, fire resistance, and protective qualities. The cultivation process is customizable, rapid, and requires minimal post-processing, allowing materials to be grown into specific forms directly.

18 / Cloud-Based Smart Factory Platform for Predictive Maintenance and Production Optimisation

Solution Provider: Upkip AS
Country of implementation: Norway

Problem statement

Manufacturing SMEs operating CNC machinery and precision equipment face persistent challenges in maximizing production efficiency and minimizing costly downtime. Traditional manufacturing operations lack real-time visibility into equipment performance, leading to reactive maintenance approaches that result in unexpected breakdowns during production runs. Manual quality control processes and fragmented data systems across ERP, maintenance management, and production monitoring tools create information silos that prevent comprehensive analysis of operational performance. Energy consumption patterns remain unmonitored, leading to unnecessary costs and missed sustainability targets. Manufacturers struggle to calculate accurate Overall Equipment Effectiveness (OEE) metrics, making it difficult to identify bottlenecks, optimize resource allocation, and benchmark performance across shifts or facilities. These challenges are particularly acute for SMEs that lack extensive IT resources and cannot afford enterprise-grade Industry 4.0 platforms, yet face increasing competitive pressure to digitalize operations, improve quality consistency, and demonstrate compliance with environmental and industry regulations.

Main outcome

Implementation of the Upkip platform across multiple manufacturing facilities in automotive components, aerospace, and packaging sectors delivered significant operational improvements and measurable ROI. Manufacturers achieved 37% reduction in unplanned downtime through predictive maintenance capabilities that identified equipment degradation before catastrophic failures occurred, enabling maintenance interventions during planned windows rather than production runs. OEE improvements from 62% to 78% within six months resulted from comprehensive visibility into availability losses, performance gaps, and quality issues, enabling targeted optimization initiatives. Energy consumption monitoring identified equipment idling unnecessarily and inefficient operating parameters, reducing energy costs by 18% while supporting carbon reporting requirements. Real-time production quality monitoring prevented defective material accumulation, reducing scrap rates by 23% and improving customer satisfaction. Cross-functional alignment improved significantly as sales, engineering, and procurement teams gained visibility into actual factory capacity, scheduled maintenance, and realistic lead times. The pay-as-you-go model enabled SMEs to validate ROI on critical equipment before scaling, with customers reporting 6-9 month payback periods and 40% operational efficiency gains.

Main project features

- Predictive Maintenance – Data analytics and machine learning algorithms predict equipment failures before they occur by continuously monitoring equipment conditions in real-time, identifying degradation patterns and wear indicators that enable condition-based maintenance scheduling.
- Real-Time Production Monitoring – Continuous visibility into manufacturing operations through integration with ERP systems, maintenance software, tool management, inventory systems, and external sensors, enabling immediate detection of production quality deviations and bottlenecks.
- OEE Calculation and Optimization – Sophisticated Overall Equipment Effectiveness measurement integrating Availability, Performance, and Quality components at both machine and order levels, with automatic downtime categorization and root cause tracking.
- Energy Management – Real-time energy consumption monitoring correlates electricity usage with production activities, calculates energy intensity metrics (kWh per unit produced), and identifies opportunities for energy reduction to support sustainability reporting and cost control.
- Operator-Based Maintenance – Configurable asset hierarchies spanning multiple factories and departments that integrate equipment tags, alarm thresholds, historical performance data, and real-time operational statuses to maximize output and enable prioritized maintenance interventions.
- Azure Cloud Architecture – Built on 70+ Microsoft Azure services with each customer receiving an independent Azure tenant ensuring complete data sovereignty, enterprise-grade security, reliability, and GDPR compliance.
- Low-Code Configuration Tools – Customer-facing tools enable process definition and analysis without extensive programming expertise, facilitating integration across manufacturing value chains including supply chain partners, service providers, and end customers.
- Pay-As-You-Go Business Model – Consumption-based SaaS pricing reduces upfront capital requirements, enables incremental scaling from critical equipment to full facilities, and aligns costs with value realization.

19 / Data-driven LCA for Materials: Enabling Resource Efficiency and Transparency

Solution Provider: FH Kufstein Tirol, Institute Sustain & Estate
Country of implementation: Germany and Austria

Problem statement

Companies in different sectors struggle with identifying the environmental impact of their raw materials and processes. They require methods to reduce emissions and waste and align with EU Green Deal targets. A transparent and flexible solution is needed to support efficiency and decision-making.

Main outcome

The solution led to improved transparency in the supply chain and resource input. Companies achieved measurable cost savings through resource efficiency and identified specific improvement areas. The LCA calculates environmental impact metrics (e.g., GWP, CED, eutrophication, acidification , etc.) and improved recyclability tracking. The approach supports products and project development with scalability in data needs and costs.

Main project features

LCA methodology applied in an industrially relevant environment:

- Identification of material origin, emissions, and waste potential
- Enables data-driven decisions and resource transparency
- Flexible and individualized application across enterprises
- Simple integration tailored to specific company needs
- Technology is already in place at the university; only project costs are covered by companies

20 / Turning Brewery Waste into Sustainable Applications: BeSoGreat's Circular Manufacturing Breakthrough

Solution Provider: BeSoGreat Project Consortium
Country of implementation: Italy and Austria

Problem statement

The BeSoGreat project tackles the challenge of transforming brewery spent grain (BSG) – a major agro-industrial by-product – into durable, biodegradable bio-composite material. These materials must overcome limitations in processability and mechanical performance to become viable for injection molding and 3D printing. The project addresses the environmental and technological need to reduce reliance on fossil-based plastics and to valorize organic waste, contributing to sustainable manufacturing.

Main outcome

BeSoGreat introduces new, bio-based materials for use in eco-packaging, horticulture, and consumer goods. Pilot tests – such as flower pots by Deroma – demonstrate feasibility. The project enables SMEs to reduce raw material costs, cut emissions, and meet sustainability regulations. It promotes cross-border collaboration, reduces entry barriers for green production, and aligns with EU Green Deal goals by integrating circular design and advanced manufacturing technologies.

Main project features

- Develops and validates BSG-based bio-composites
- Ensures material compatibility with injection molding and 3D printing
- Tests for flowability, thermal stability, and mechanical strength
- Combines green chemistry and circular economy principles
- Integrates digital manufacturing technologies
- Provides scalable and sustainable alternatives to fossil-based plastics
- Supports localized production and resource efficiency

The Role of the B2GreenHub Platform

The **B2GreenHub platform** functions as the digital backbone of the Greene 4.0 innovation ecosystem, providing a shared transnational space where manufacturing SMEs, solution providers, research and education organisations, and public authorities can connect and collaborate. It has been designed to respond to the practical needs of SMEs that are navigating green and digital transformation but often lack access to structured support, reliable information and trusted partners.

The platform brings together multiple functions that are typically fragmented across different initiatives and institutions. These include access to market-ready green and digital solutions, visibility of successful pilot actions, matchmaking between solution seekers and providers, access to expertise and testing facilities, and information on training and support services. By integrating these elements into a single digital environment, B2GreenHub lowers entry barriers for SMEs and supports informed decision-making throughout different stages of transformation.

All **Success Stories** and **Solutions** presented in this handbook are published on the B2GreenHub platform, ensuring wide visibility, accessibility and reuse beyond the lifetime of the project. By combining concrete project achievements with mapped best practices, the platform supports knowledge transfer, replication and cross-border collaboration. In this way, B2GreenHub acts not only as a repository of information, but as an **active enabler of innovation**, supporting continuous interaction between regional ecosystems and fostering long-term impact at European level.

Main Findings from the Regional Action Plans (RAPs)

The development of **Regional Action Plans (RAPs)** across the partner regions provided valuable insights into the challenges, needs and opportunities faced by manufacturing SMEs in different territorial contexts. While each region reflects its own economic structure, policy environment and innovation ecosystem, several common directions and patterns emerged through the joint planning process.

A key finding is the presence of **shared challenges** related to access to finance, availability of skills and varying levels of digital maturity among SMEs. Many companies require tailored guidance to navigate funding opportunities, build internal capacities and adopt new technologies in a step-by-step manner. At

the same time, regions highlighted a strong need to better coordinate existing support instruments and avoid fragmentation.

Across all regions, there is a **strong demand for practical, low-barrier support services** that focus on real business needs rather than abstract strategies. SMEs value hands-on services such as matchmaking, pilot testing, access to demonstration environments and short, targeted training formats. The Greene 4.0 pilot actions and mapped solutions directly respond to these expectations and provide concrete input for regional policy design.

Another recurring finding is the importance of **regional embedding combined with transnational cooperation**. While support services must be anchored in regional ecosystems and aligned with local priorities, SMEs and solution providers benefit significantly from cross-border exchange, access to wider markets and shared learning. This reinforces the role of transnational platforms such as B2GreenHub in connecting regional initiatives and scaling impact.

Finally, the RAPs underline the need for **alignment with RIS3 priorities and existing regional innovation ecosystems**. Effective green and digital transformation requires coherence between project-level activities, regional strategies and European policy objectives. The structure and services of the B2GreenHub platform are designed to support this alignment and to serve as a practical implementation tool for regional strategies.

Key Insights from the Transnational Strategy

The **Transnational Strategy** defines the common framework for deploying, operating and scaling the Greene 4.0 / B2GreenHub platform across regions. Building on the experiences of pilot actions, mapping activities and stakeholder engagement, the strategy provides a shared vision for sustaining and expanding the innovation ecosystem beyond the project duration.

A central insight of the strategy is the **need for a permanent transnational innovation ecosystem** that supports green and digital transformation in manufacturing. Rather than isolated interventions, SMEs require continuous access to solutions, expertise and cooperation opportunities that evolve with technological and market developments.

The strategy also confirms a **strong stakeholder willingness for cross-border cooperation**, particularly among SMEs, solution providers and intermediary organisations. Stakeholders recognise the added value of transnational exchange in accessing complementary expertise, testing solutions in different contexts and accelerating innovation uptake.

In terms of service priorities, the strategy highlights the importance of **funding guidance, matchmaking, training and testing services** as core elements of the B2GreenHub platform. These services address critical

bottlenecks identified during the project and directly support SMEs in moving from interest to implementation.

Furthermore, the Transnational Strategy emphasises **alignment with European policy frameworks and RIS3 strategies**, ensuring coherence with broader objectives related to sustainability, digitalisation and industrial competitiveness. This alignment strengthens the relevance of Greene 4.0 results for policymakers and increases the potential for mainstreaming and replication.

Finally, the strategy places a strong focus on **practical implementation and long-term sustainability beyond the project lifetime**. It outlines pathways for maintaining the platform, engaging stakeholders and integrating services into existing regional and transnational structures, thereby maximising the long-term impact of the Greene 4.0 project.