



Spolufinancováno
Evropskou unií



MINISTERSTVO
PRŮMYSLU A OBCHODU



ČESKÁ TECHNOLOGICKÁ
PLATFORMA PLASTY

Digital and Green Transformation of the Plastics Industry of the Czech Republic

Action Plan for Small and Medium-sized Enterprises

Project Plastics V – support from the Ministry of Industry and Trade (OP TAK)

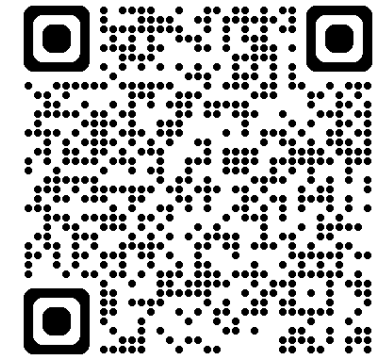
Main objectives:

- Updating the foresight, research agenda and action plan
- Digital and Green Transition Action Plan for SMEs
- Connection to European platforms and research programmes

Subject matter:

- Circular economy, secondary raw materials, chemical recycling
- Bioplastics and fossil-free materials
- Legislation of the Czech Republic and the EU (PPWR, SUPD, ELVR, ESPR)
- Pellet losses, littering, microplastics
- Standards and certification of recyclates

Outputs:



Digital and green transitions – what it's all about

A legislative-driven transition from fossil sources to a circular and digital production model – while retaining plastics as a key material.

Green transition

Non-fossil inputs:

- recycled, bio-based, CO₂-based

Legislative amendments:

Ecodesign (ESPR), Mechanical and Chemical Recycling, CCU, PPWR, SUPD, Zero Pellet Loss

Digital transformation

New approaches:

IoT, AI, digital twins, predictive maintenance

Traceability of materials, digital product passport (DPP)

New challenges:

Kybernetic production safety

Technological foresight – megatrends for 2030+



Climate and pollution

Urbanization

Demographics

Economic centers

Technology

Pollution: climate neutrality by 2050, -55% of emissions by 2030; recycling 10-14% today → 30-35% target

Urbanization: over 70% of the population in cities by 2050 → demand in construction and transport

Demography: +1 billion inhabitants by 2030, population ageing → medical and light materials

Economic Centres: Asia's Growth, Europe Loses Share Due to Energy Prices and Regulation

Technology: digitization, AI and 3D printing shorten the innovation cycle from years to months

Technology foresight – industry trends



39 %

Proportion of packaging
on plastic consumption

23 %

construction as a
The second largest segment

460–480 Mt

Global Demand
by 2030

75 %

EU companies using
AI by 2030

Innovation: CCU (CO₂ Plastics), Fermentation, Chemical Recycling, Multifunctional Materials

AI: polymer design, predictive maintenance, quality control (Czech target 21% of companies)

Regulation: PPWR, SUPD, RecyClass, PFAS Restrictions..

Energy prices: pressure for energy-saving technological solutions

Asia is growing, Europe is stagnating – competitiveness depends on costs and innovation



Key Application Sectors

Where the transformation takes effect first:

Packaging

largest segment (39%),
Pressure on recyclability

Construction

EPS/XPS insulation,
Building efficiency

Automotive

Lightweight composites
for electromobility

Electronics

Conductive plastics
and nanocomposites

Agriculture

biodegradable films,
Coated fertilizers

Healthcare

implants, polymers,
Drug carriers

- The common denominator: recyclability, lower weight and longer lifespan of products.

Future technologies for the production and use of plastics

Bioplastics

Advanced materials

Special applications

Recycling and CCU

Digitization

Bioplastics: PHA, PHB, PLA, PBS – capacity growth especially in Asia

Advanced materials: nanocomposites, plastics for 3D printing, self-healing polymers

Special applications: healthcare, flame retardant, composites for transportation

Recycling and CCU: pyrolysis, depolymerization, gasification; polymers from captured CO₂

Digitalization: digital twins, AI optimization, robotic waste sorting

Circular Plastics Economy in the Czech Republic – Where We Stand

Status according to the SME survey and EU targets:

40 %

SMEs are actively involved in
Involved in circularity

10% → 30%

Recycled content
in production vs. target

65–70 %

EU recycling target
packaging until 2030/2035

- Barriers: administrative burden, energy and raw material prices, lack of qualified people
- Lack of capacity and certification for quality recycled material
- Opportunity: secondary raw materials as a stable and local source of material

Bioplastics and fossil-free materials

Pathways to non-fossil carbon in polymers:

- Bio-based polymers: PLA, PHA, PHB, PBS, bio-PE and bio-PET
- Biodegradable applications: agricultural films, packaging, disposable medical products
- CCU: production of monomers and polymers from captured CO₂
- Prerequisite for success: clear labelling, compostability standards and separate collection
- Beware of conflict with mechanical recycling – bioplastics must not pollute waste streams
- Economy: higher input price balanced by regulation and brand demand

Chemical recycling – the key to demanding applications

Complement, not a substitute for mechanical recycling:



- Enables recyclate for food and medical applications
- Processes polluted and mixed waste that mechanical recycling cannot handle
- Pilot projects in the Czech Republic build on petrochemical infrastructure
- Open questions: energy performance and weight balance rules
- The need for a stable legislative framework and simplified authorisation

Action Plan for Transformation – SME Framework

How to connect digitalization, green transition and legislation to sustainable competitiveness.

Key legislation of the EU and the Czech Republic

PPWR, SUPD, ESPR, REACH
CSRD/ESG, ELVR, Zero Pellet Loss
Act on Waste and Waste Management of the
Czech Republic

Main barriers in the sector

Administrative burden
Energy and raw material prices
Lack of qualified people

Action Plan - Key areas

Supply Chains

New materials

Circularity

People and skills

Digital security

Competitiveness: CBAM, diversification of raw materials, RES and energy communities

New materials: biodegradable and bio-based polymers, CCU, nanocomposites

Circularity: mechanical and chemical recycling, prevention of granule leakage, eco-design

People and skills: green & digital skills, retraining, mentoring of the 50+ generation

Digital security: IEC 62443, NIST, ISO 27001

Summary of recommendations to support transformation

1 Authorisation

simplify approval
new technologies

2 Energy

support for RES and common
purchases for SMEs

3 Digitization

Cyber Standards
safety

4 VaVal

support for the TACR and MPO,
Innovation vouchers

5 Recyclates

Availability and certification
secondary raw materials

6 Education

digitalization, ESG
and recycling

The condition is the coordination of the state, associations and companies – with a clear timetable until 2030.

Recommendations for the activities of ČTP PLASTY

Research and innovation

Digitization of chains

Cooperation in the EU

Stimulate R&D&I and its commercialisation – linking academia and SMEs

Support the digitalisation of value and processing chains

Continue to participate in European platforms (CEFIC, CPA, CCA, FEAD)

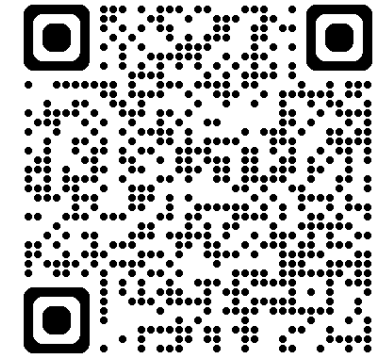
To cooperate in the creation of policies and legislation in the Czech Republic and the EU

Monitor research activities in the Czech Republic and the EU

Support the development of chemical recycling as a source of fossil-free materials

Collaborate on the circular economy strategy and its implementation

Action plan:



Thank you for your attention

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