
Recovera
Plastic recycling
Recovera Využití zdrojů a.s
by VEOLIA

Recovera

Plastic **recycling**

OUTPUT
an alternative to the raw material: oil

INPUT
plastic waste

logistics and sorting

recycling

sales

by VEOLIA

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Secondary raw material for plastic industry,
raw material substitution.

Plastic LDPE films are **not a waste** anymore.

Local material supply solution.

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Technologies of mechanical recycling in Czech Republic

12 500
metric tonnes of plastic waste recycled per year (capacity)

water
saving technology (water re-circulation)

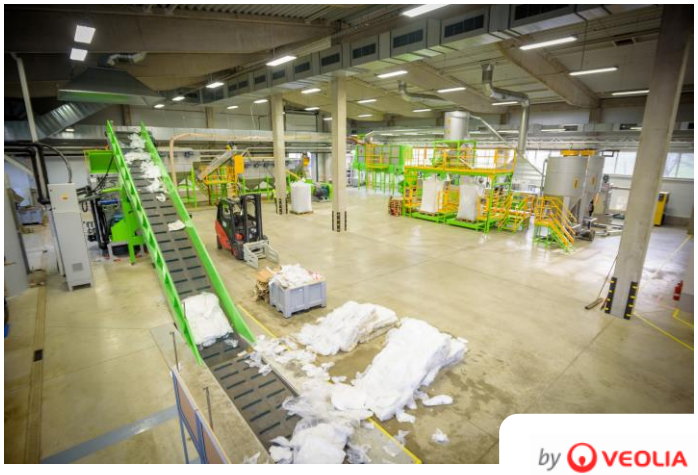
energy
saving technology energy from cogeneration unit (landfill)

100 %
European
customers

14 350
metric tonnes of CO2 cutting emissions

unique
technology in the Czech Republic

since
2016
…to ????



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Obstacles to recycling

RECYCLING PROCESS

1. **input | complex packaging**
   - composites, multiple types, difficult to separate materials, difficult to recycle “marketing“ packaging

2. **input | sorting**
   - poorly sorted raw material input
   - technological and staffing quality of sorting lines

3. **operation | business environment**
   - low emphasis on eco-design
   - inadequate legislative support of recycling in the manufacturing sector
   - excessive costs, energy

RECYCLATE SALES

1. **sales | recyclate utilization**
   - general lack of sales support
   - **GREEN PROCUREMENT** does not work
   - emphasis on the most complex food-contact packaging, need to focus on “tertiary“ packaging and other utilization

2. **logistics | other costs**
   - rising fuel costs
   - complications in global transport

3. **competitiveness within the EU**
   - more favorable conditions for recycling e.g. in Germany

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Recycled material utilization
= resource security

How to achieve it?
1. by reducing import dependency
2. by making the most of local resources

ROLE OF THE BUSINESS SECTOR

- **investments** into technologies
- effective **collection**
- technological **know-how**
- **proactive** approach in business

ROLE OF THE STATE – LEGAL FRAMEWORK

Legislation providing for

- **stimulation of demand** for domestic recyclate and domestic production and **requirements on recyclate content** in products in harmony with the EU as the minimum standard, and related support to
- **GREEN PROCUREMENT**
- **support to recycling in operation** rather than subsidies for technology acquisition (CAPEX), support focused on operation – energy, education, requalification of labor, taxation of labor in the recycling industry.
- **support of circular solutions in the energy sector**
  a complete cycle of utilization of raw materials and thermal management with massive support of utilization of raw materials unsuitable for recycling in the energy sector (e.g., utilization of RDF)

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WE RECOVER RESOURCES FOR THE FUTURE

Emerging chemical recycling opportunities:

Can chemical recycling replace the mechanical one?

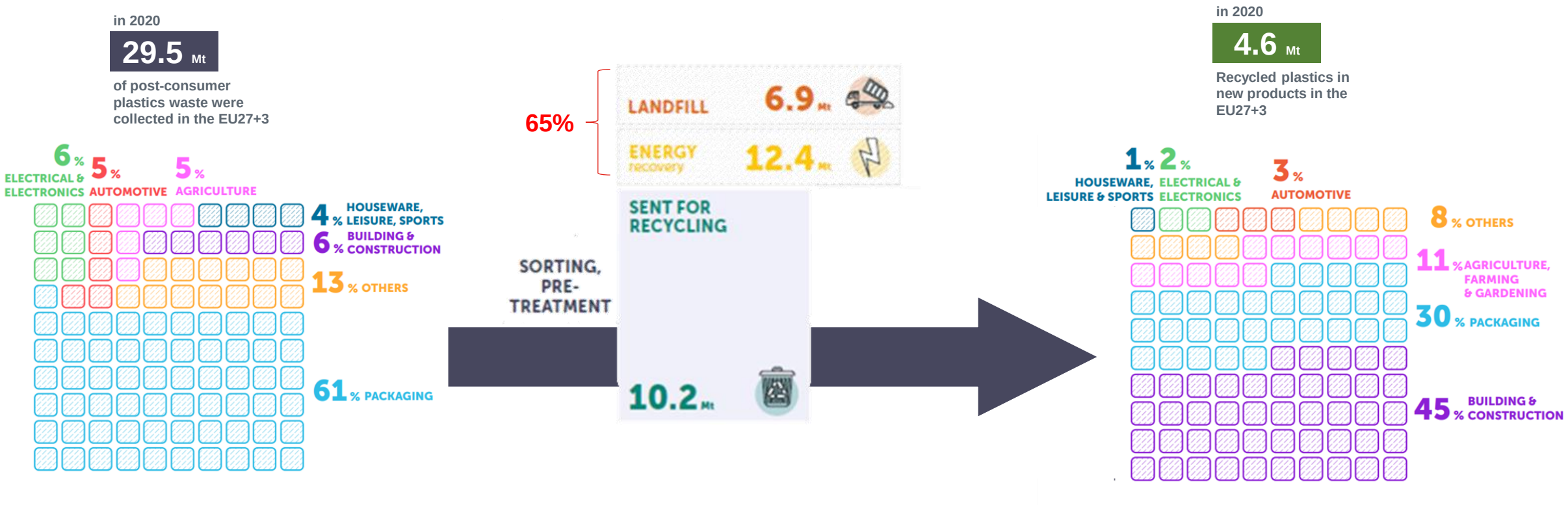
FEAD: Greater energy and material security in EU countries, Prague 2022

date: 22nd September 2022

name: Martin Růžička

ORLEN Unipetrol

In 2020, 65% of collected post-consumer plastic waste in EU 27+3 was sent either to energy recovery or to landfill

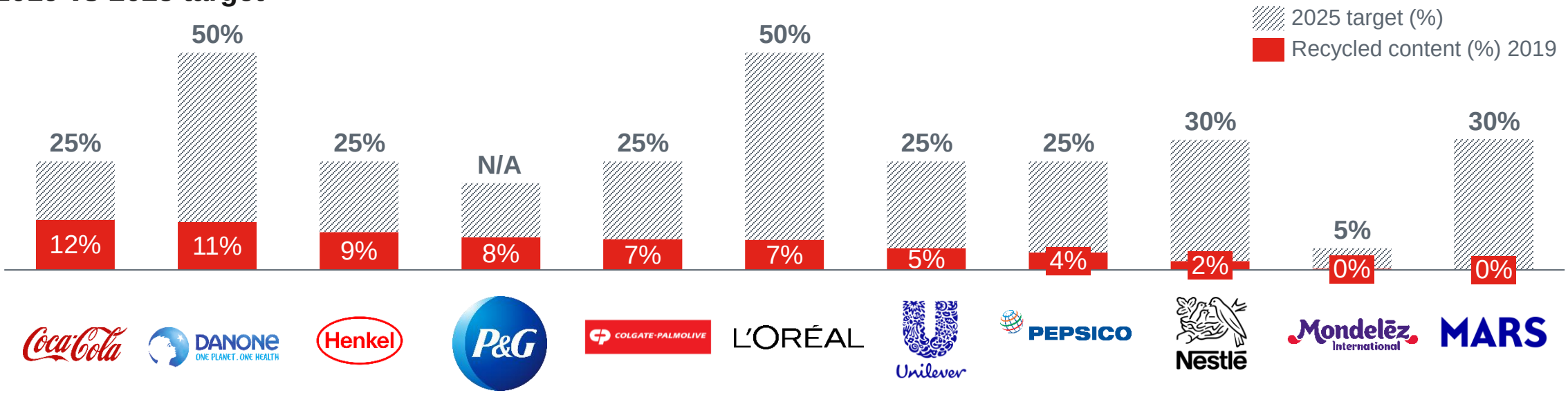


- Due to limited capability of mechanical recycling to return recycled materials back to the original applications[1].

[1] In 2020, there were collected 1.8 MT of post-consumer plastics from construction sector while 2.1 MT of recycled plastics were used in that application. On the other hand, post-consumer plastics from packaging represented 18 MT collected in 2020, but only 1.4 MT of recycled plastics in new products.
Source: Plastics Europe

Despite legislation and pledge to introduce recycled plastics in FMCG sector, current mechanical recycling supply of food grade is insufficient

Voluntary pledge of recycled content in plastic packaging of leading FMCG companies, 2019 vs 2025 target



- **Additional 2 mil. tons** of recycled plastics **by 2025** is required **to achieved voluntary pledge of leading FCMG´s**
- EU legislation **already set mandatory target of recycled content** (r-PET) in single use PET bottles to 25% by 2025 and 30% by 2030.
- **Food grade resins** represented only **10% of the global annual capacity of recycled polymers** in 2021. However, the food grade availability varied extensively among the resins: 20% of r-PET, while **only 3% of polyolefins (r-PP, r-PE)**.

ORLEN Unipetrol

Source: Ellen Macarthur Foundation – The Global Commitment 2020 Progress Report, ICIS Mechanical Recycling Supply Tracker

Chemical recycling shall not replace mechanical recycling, but could complement it to maximize material recovery rate

Chemical recycling enables:

- ✓ **production** of plastics **in virgin-like quality**
  (suitable for pharma, food packaging, hygiene applications)
- ✓ **processing of difficult to recycle plastics**
  (sorting residuals, multilayer plastics and composite materials, contaminated plastics)
- ✓ **increase of plastic waste material recovery**
  (instead of landfilling and/or energy recovery)

Challenges for chemical recycling:

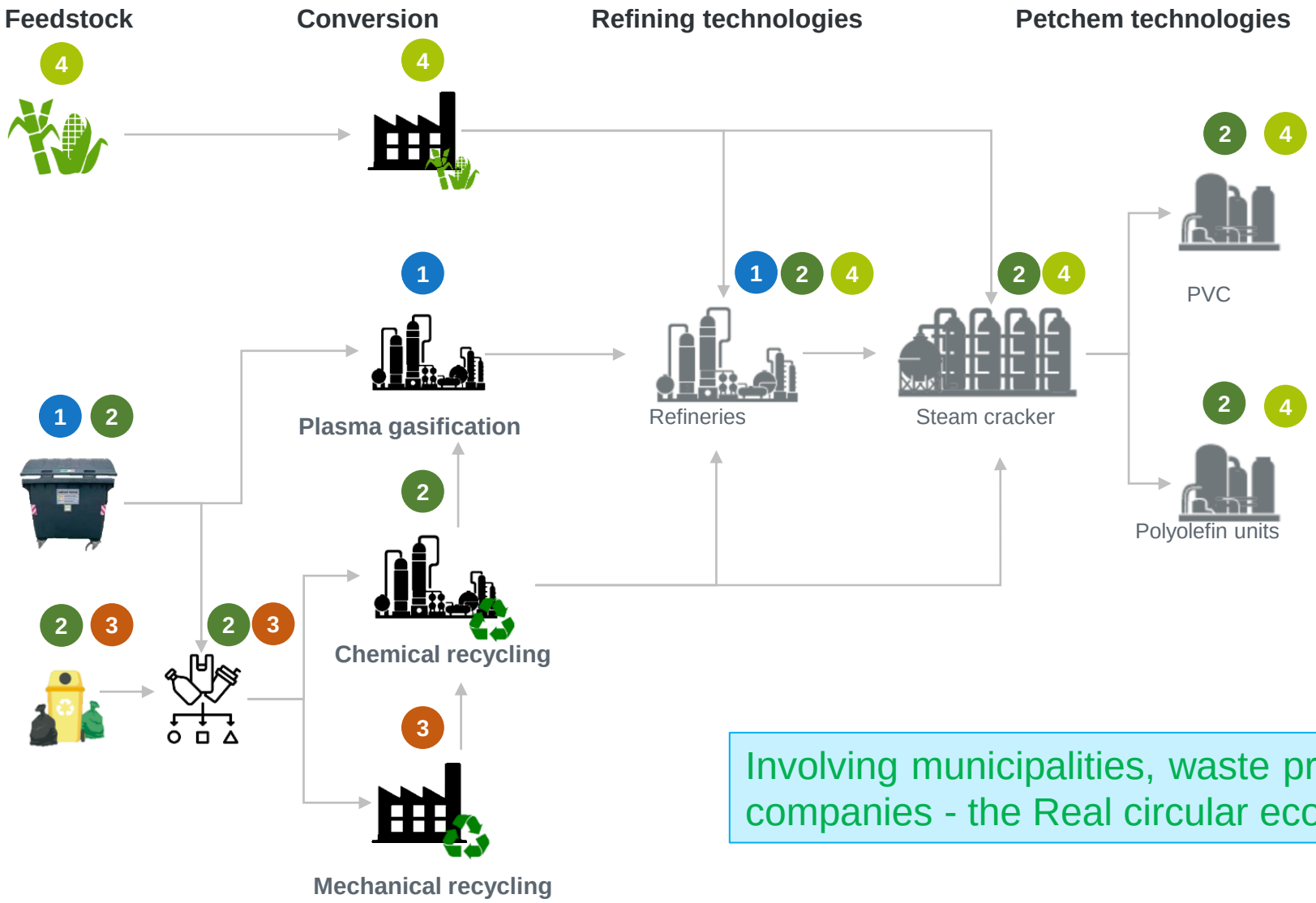
- ✘ **emerging technology**
  (first industrial scale plants in operation)
- ✘ **legislation framework still in progress**
  (lacking behind industrial development)
- ✘ **capital intensive investment**
- ✘ **energy intensive technology**
- ✘ **environmental impact** of industry scale operations **needs to be assessed by comprehensive LCAs**

- Despite those challenges, companies across the plastic value chain aligning significant investments.
  Planned **investments of EUR 2.6 billion by 2025 to produce 1.2Mt in 2025 of chemically recycled plastics**.

ORLEN Unipetrol

Source: Plastics Europe

ORLEN Unipetrol is developing projects in 4 main areas of processing alternative feedstock



1 Plasma gasification

- Plasma gasification of mixed municipal waste into synthetic gas for further processing

2 Chemical recycling (Pyrolysis)

- Thermal cracking of plastic waste into pyrolysis condensate for further processing into chemicals (olefins, aromatics, polymers)

3 Mechanical recycling

- Acquisition and/or organic growth of mechanical recycler producing polyolefin regranulates

4 Processing of bio based / bio waste based feedstock

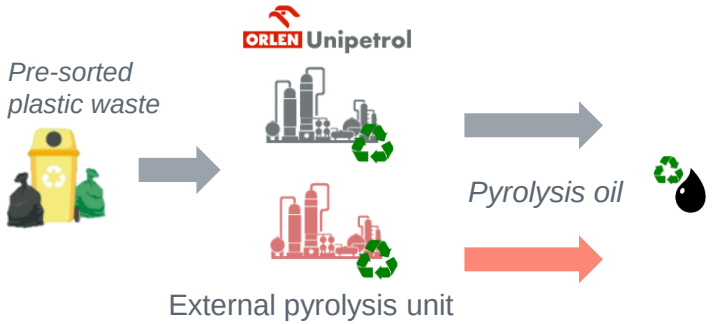
- Processing of bio based /bio waste based feedstock in our technologies to (i) decarbonize; (ii) produce biofuels; (iii) produce bio chemicals (olefins, aromatics, polymers)

Involving municipalities, waste processors and technology companies - the Real circular economy project

Strategy ORLEN Unipetrol 2030 has set ambitious target of processing waste plastic cracking oils that first volumes shall be available in 2023-2025

*Processing of at least **90 ktpa of pyrolysis condensates**[1] in steam cracker **by 2030***

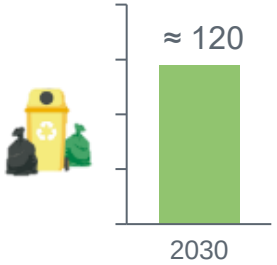
Pyrolysis units



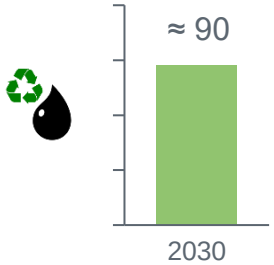
Refinery

Steam Cracker

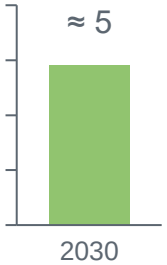
Equivalent of pre-sorted plastic waste (ktpa)



Targeted volume of processed pyrolysis oil (ktpa)



Share of recycled content in total SC feedstock[1]



- ORLEN Unipetrol plans not to rely only on internal production capacity but also on external ones (purchase pyrolysis condensates on contractual basis).

[1] Represents 5% of unit capacity – feedstock perspective

Source: Strategy ORLEN Unipetrol 2030

Thank you

Martin Růžička

Director of Development, Technology & Efficiency Division

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CIUR

nature. technology. responsibility.

A leader in the production of cellulose fibres

Ing. Mojmír Urbánek
Production and Research Director

CIUR
nature. technology. responsibility.

Since its foundation in 1991, the Czech family company CIUR a.s., belongs to world leaders in the production of cellulose fibres based on recycled paper

CIUR
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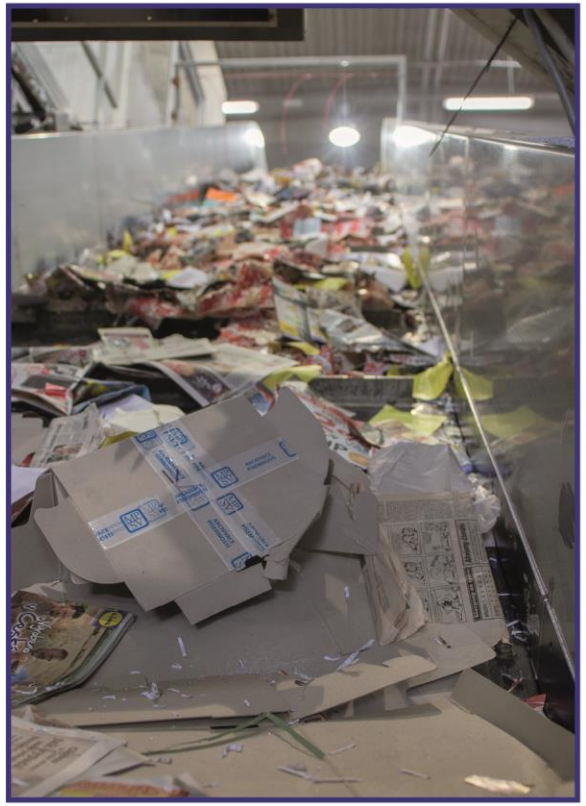
All made from recycled materials
We can produce without the use of water
Recycling packaing



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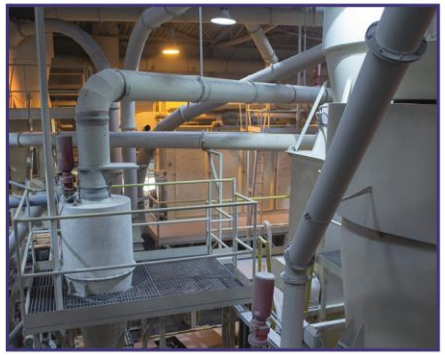
Industry – Cooperation with long term tradition
Municipalities & Towns – Assistance with developments
Productions – Certification, marketing, installer training
Training – Partnership with business partners & Customers
Installation design – Complete final house installation

Full controlled recycling cycle







– Renovations
– Low energy consumption homes
– Passive homes

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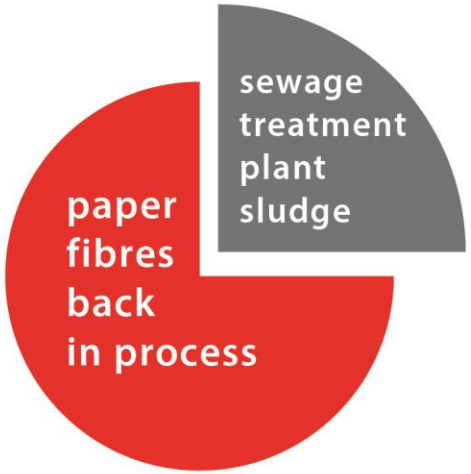
We recycle
We upcycle
We downcycle

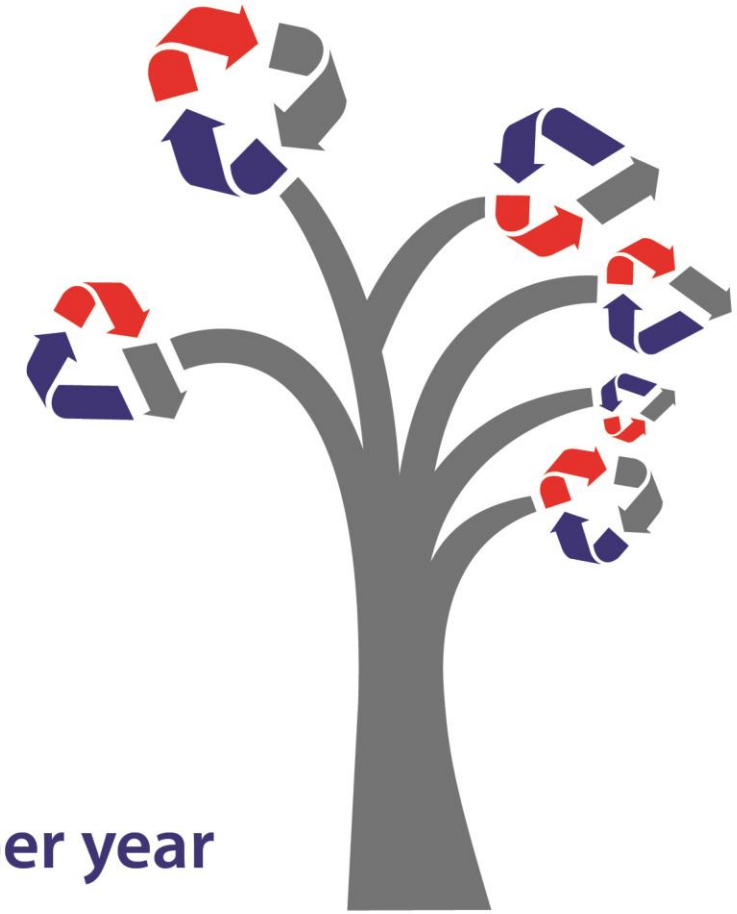


Back to paper

- High energy intensity
- Partial replacement of renewable raw material with recyclate
- Reduction of waste production, extension on the life cycle
- Degradation of fibres and leakage into waste | sludge

insulation usage

- Waste–free cycle during processing
- Low power consumption for production
- Long life cycle, secondary savings, CO_2 storage



We process 30 000 tons of secondary raw material per year

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Climatizer Plus

Global warming potential – several times lower compare to traditional insulation

Only 0,15 kWh electricity / 1 kg final product generated on energy consumption during production process

1m³ of cellulose insulation installed in the attic house is equal to approx. 35 kg of CO_2 storage

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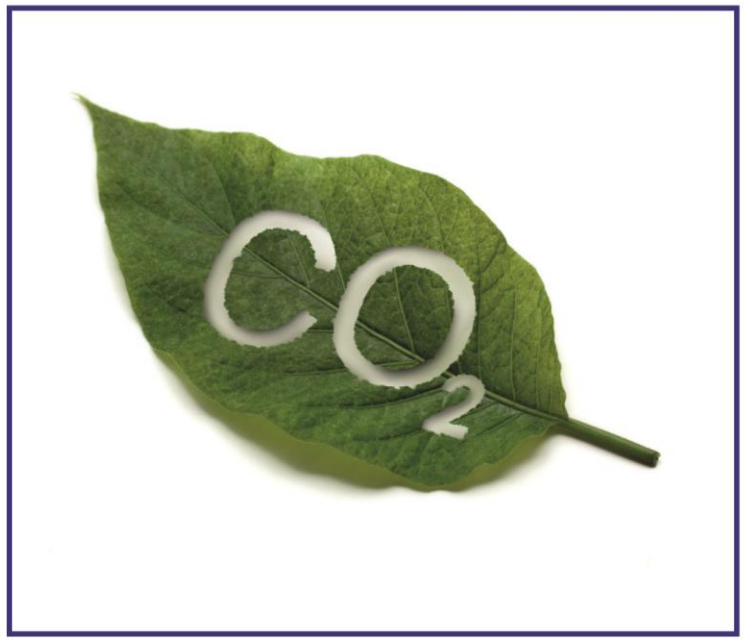
By recycling 1 kg of paper, you save almost 1 kg of CO_2 emissions and methane emissions, which would arise from its landfilling



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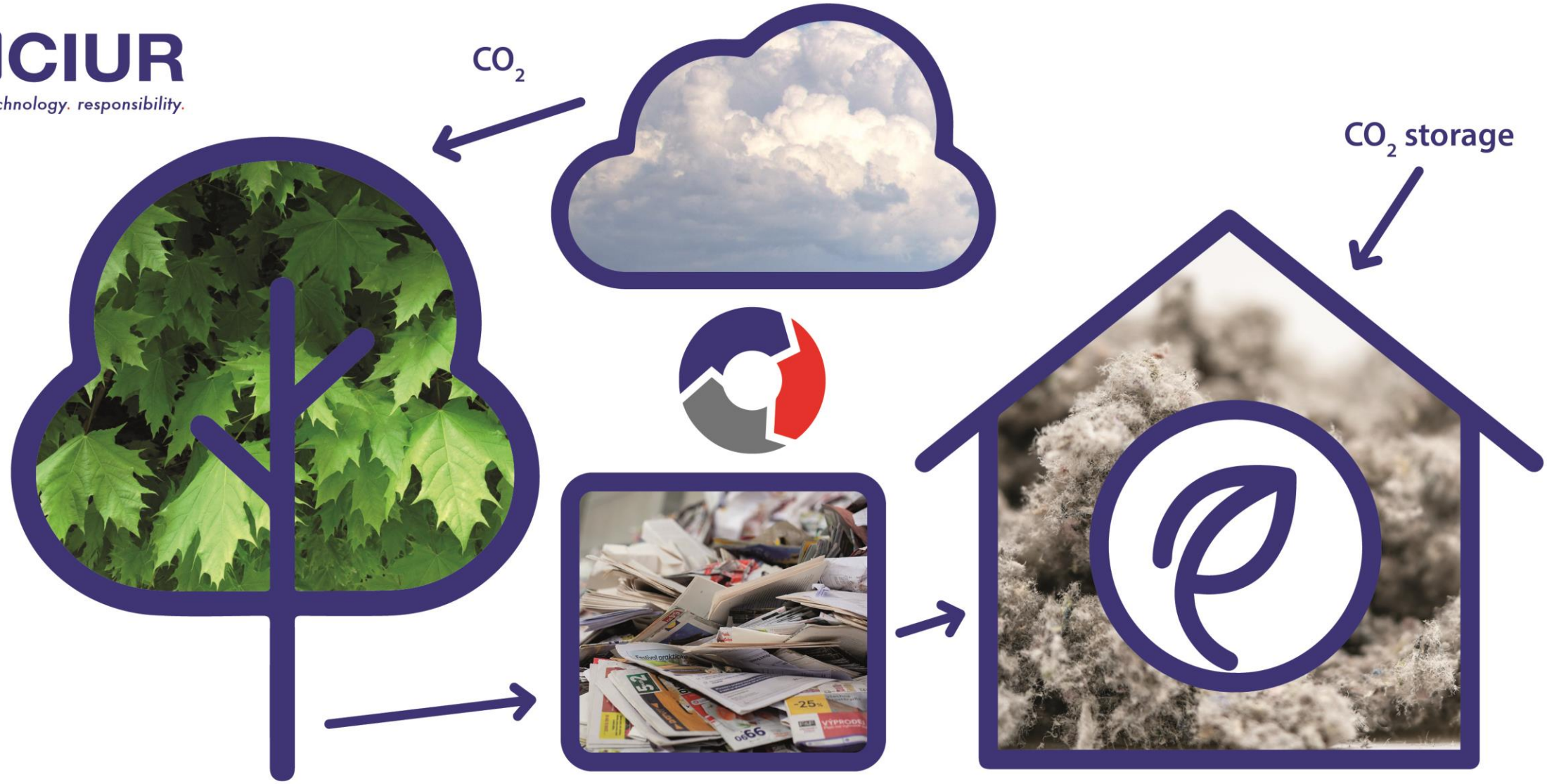

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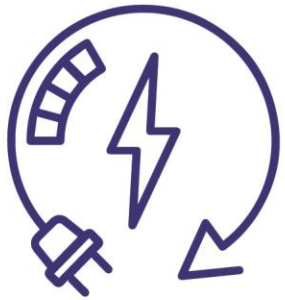
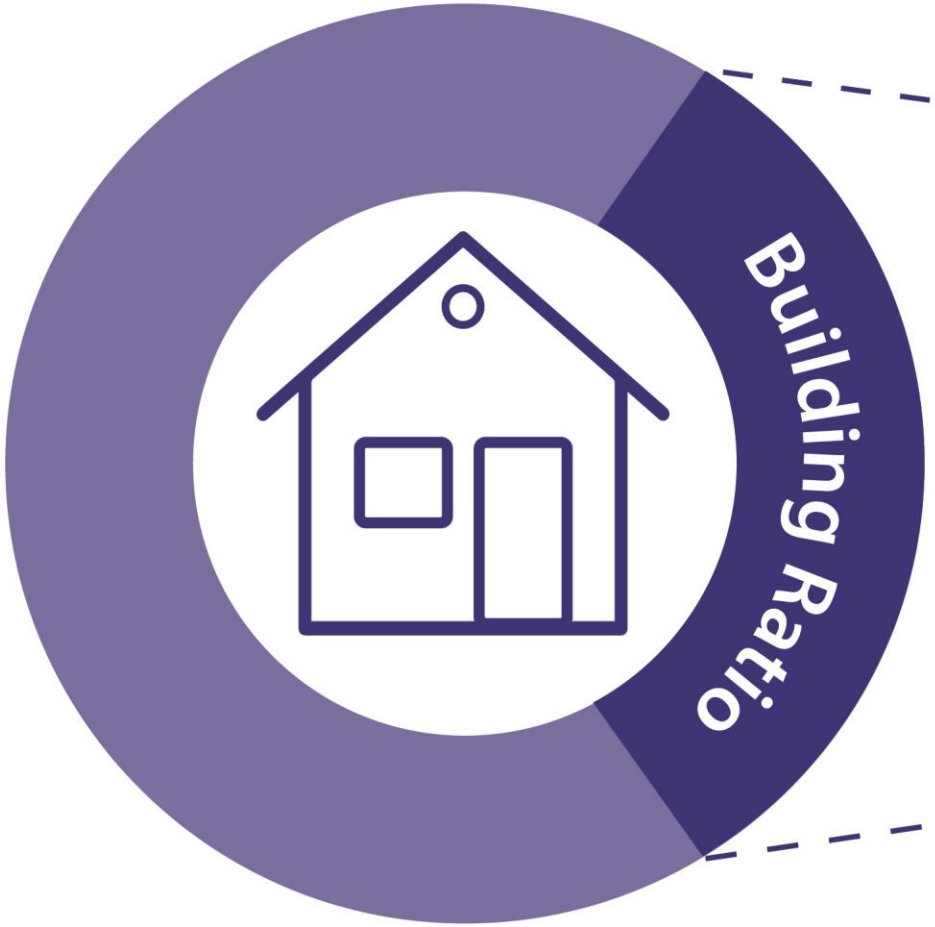
Creating a Carbon Footprint

63 %

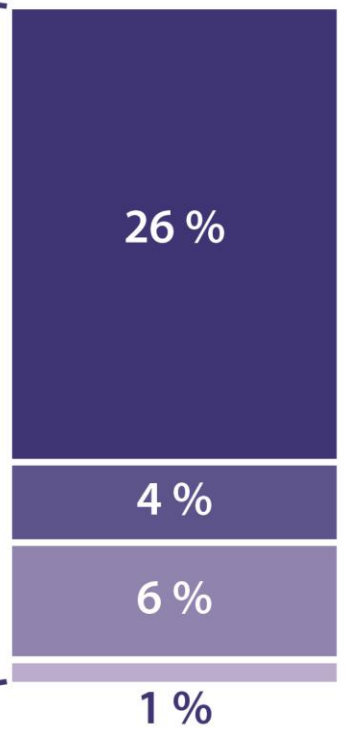


Energy Consumption of the Building



37 %

Next stage of the life cycle



Building Materials Energy Consumption

Building Construction

Building Repairs

Building Demolition

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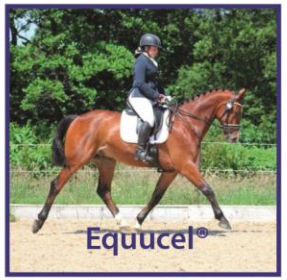
> More than 60 types of products



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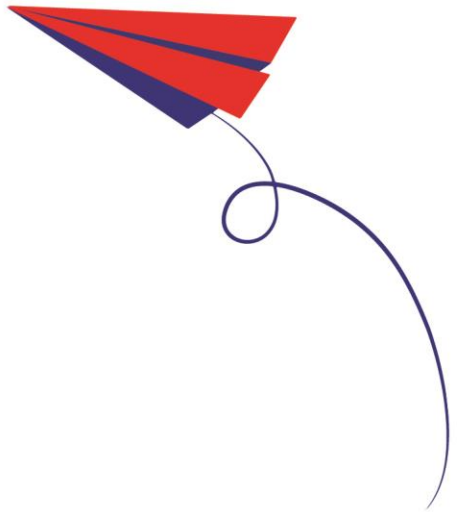

THANK YOU FOR YOUR ATTENTION

Ing. Mojmír Urbánek
Production and Research director

ELV recycling in the Czech Republic and some challenges of a seemingly simple metal recycling

DEMONTA Trade SE

Mgr. Ivo Dubš

Praha 22.9.2022

Car composition

- Car composition is mix of various materials that after the termination of life cycle has to be adjusted, prepared for further use and utilized according to maximum possibilities

  The automobile industry consumes raw materials from around the world in the production of cars and auto parts

  Steel, rubber, plastics and aluminum are four mainly utilized commodities to be found in cars

  Also, the auto industry relies on oil and petroleum products, not just for gasoline, but for the synthesis of plastics and other synthetic materials

Shredder technology

- Specially developed for ELV processing
- The shredding unit
- Vibrator Conveyor
- Hydraulic drive feed rolls
- Filling chute
- White goods/household appliances - e.g., washing machines, ovens, refrigerators (with coolant removed), etc.
- Sorted light collection scrap
- Material thickness up to 4 mm (standard steel)
- Material thickness up to 2 mm (stainless steel)

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- Pre-conditioned, end-of-life, dry vehicles with or without engines
- Parts of end-of-life vehicles that are free of fluids, pre-molded and non-preformed
- Bales of pressed metal material, made of dried end-of-life vehicles including engine, axles, and springs or sorted scrap waste
- max. density: up to 0,8 t/m3
- 16 hammers on rotor for shredding process

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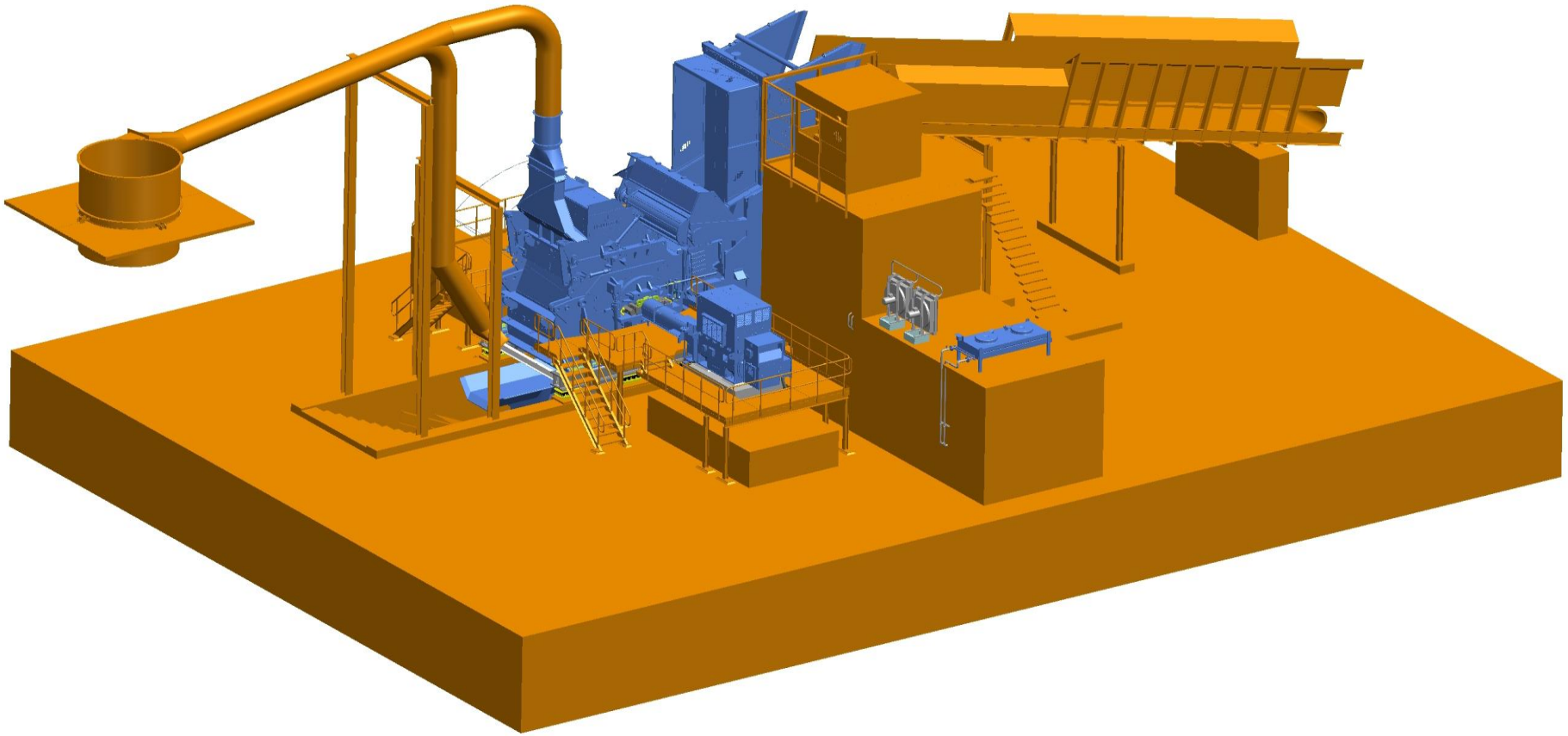

Eco-design, Eco-modulation

- Eco-design – systematic process of designing and development of the product, with functioning, economy, safety, ergonomics, technical feasibility, aesthetics etc., lays great emphasis on having minimum negative impact of the product on the environment especially from the viewpoint of its whole life cycle.

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- **A car producer´s relation with eco-design is currently not regulated by any directive**
- **A tool for eco-modulation for rewarding of use materials more friendly for environment introduced in July 2022 in Czech republic**
- **The unification of material standards during the production of vehicles (plastic, sealing, coating) is highly appreciated**
- **striving for products which make the lowest possible environmental impact throughout the product life cycle**

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ISO 14001 certification

- All steel manufacturers obtained and regularly defend a certificate according to EN ISO 14001
- The certification serves for an independent assessment
- The requirement for certification where ELV disposal is an important source of secondary raw material for industry

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Methods of vehicles recording

- vehicle weight data from car producer
- Input data in the Waste Management Information System
- no passport for recording the adjustment to the vehicle during lifetime
- tool to provide information regarding the state and development of car
- clear identifiers record adjustments and changes
- Weight upon handover for ELV processing and subsequent processing on the shredder line
- Implementation of a rule transport to the shredder line for further processing

Goals for selected vehicles		
Year	Use and Repeated Use	Recycling and Reuse
2020 and later	95%	85%

DEMONTA Trade SE

DEMONTA Trade SE is czech private family company, founded 1996 as holding company for metal recycling accross Czech republic with wide covering of collection points and processing yards – see www.demontagroup.cz

SD FEROTECH s.r.o.

Demonta T, s.r.o.
Starobělská 593/81
700 30 Ostrava-Zábřeh

SDKOVO MLADÁ BOLESLAV

METALŠROT®

aluthermčcz

DRUSO spol. s r.o.

DEMONTA Trade SE

What are the challenges in battery recycling and what are the solutions?

ecobat

GREATER ENERGY AND MATERIAL SECURITY IN EU COUNTRIES

Prague, 22/09/2022, RNDr. Petr Kratochvíl

EU legislation changing

- 2006/66/EU Battery Directive

- 2023-4 Regulation of EP and EC on Batteries
  - current Trialogue EP-Council_Comittee

Batteries as Waste

- Small quantities of many different types
- Significant reduction of toxic metals (Hg, Cd) decreasing
- **Li-Ion** rechargeable cells dominate in last years
- Strategic metals Co, Ni, Li

Challenges for recycling (LiIon)

- **Lack of capacities** (production waste is preferred to collected waste by recyclers)
- **High Grade Batteries are preferred** (laptops, mobile phones - Co)
- **Recyclers are not interested** in LG batteries like LiFePo, LiClSO2,
- **Frequent fires** – collection, recycling of batteries and WEEE – additional costs for safety measures and deactivation

How to support Li-Ion recycling?

- Clear **identification** of battery items through the whole life cycle (QR code)
- Strengthen producer responsibility for all types of LiIon batteries
- Introduce new battery group with collection target (LMT batteries – e-bikes, scooters etc.)

- Restrictions for metal Li and flammable chemicals in new batteries – missing in Draft Regulation!
- Achievable and science-based targets for recycling efficiency
- Achievable and science-based targets for recycled content in new batteries

What to avoid? DO NOT…

- Imply Transborder Shipment Regulation 1013/2006 on LiIon batteries
- Increase collection target for portable/consumer batteries without changing of calculation method
- Set minimum targets for
  - collection
  - recycling
  - content of recovery materials
- **Without responsible environmental/energy/economic assessment!**

I am ready for discussion!