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Sustainability Assessments & EcoProfiles

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Contents

- Sustainability Assessments
- EcoProfiles
- Demo: Connection between LCA and traceability tool

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PRIMUS Sustainability Manager
Experienced in sustainability, Life Cycle Assessment (LCA), data management, and communications.
Julia has a bachelors in General Engineering and a masters in Electrical Engineering focusing on Renewable Energies. She has been working with LCA for 5 years, firstly with her own startup on a platform for data and further as a consultant and researcher at GreenDelta for projects in a range of topics.

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Sustainability Assessment Results

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All round sustainability methodology

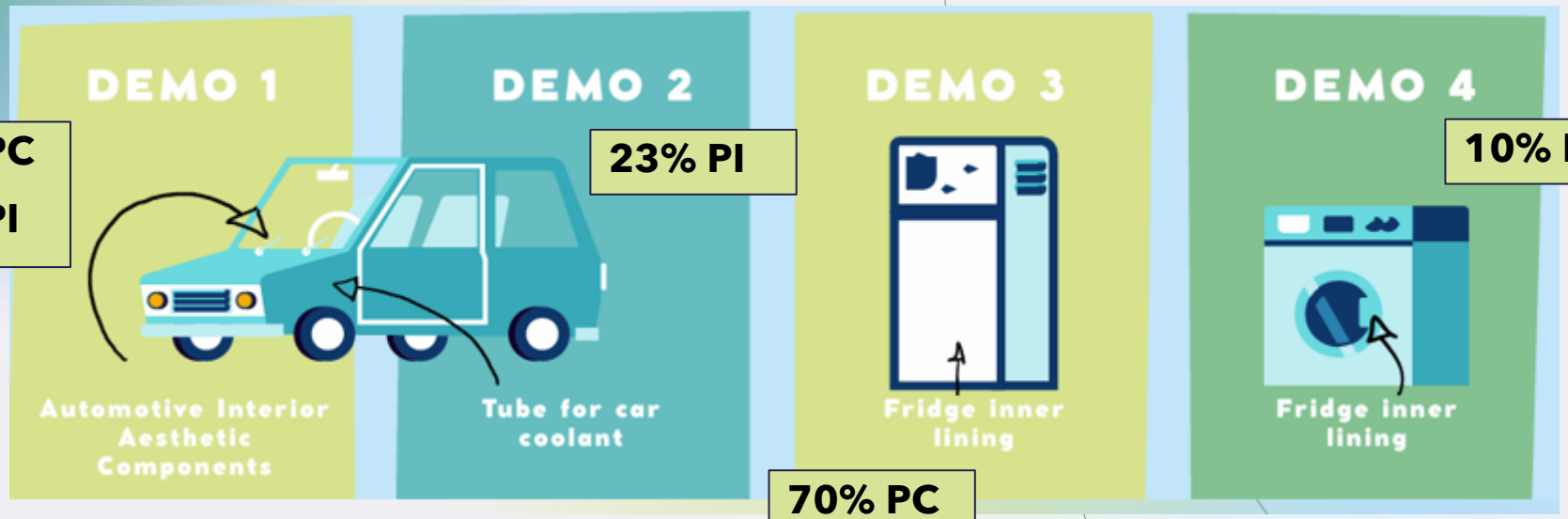
- Life Cycle Assessment (LCA)
- Social LCA
- Circularity indicators
- Plastic littering risk

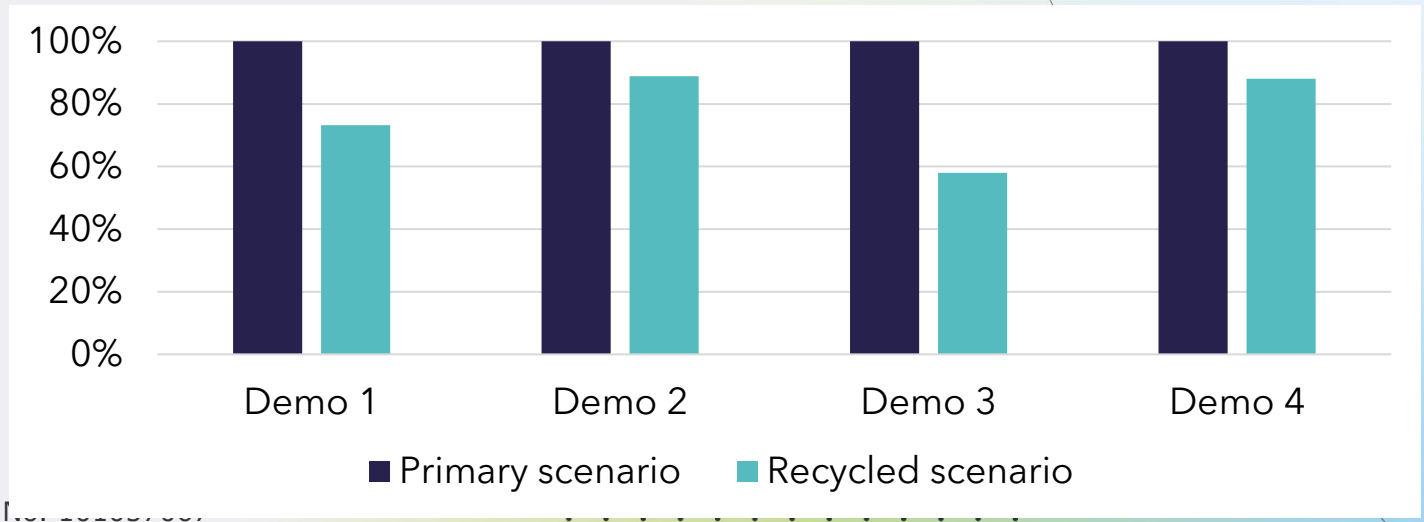
… combined!

- System Dynamics

Methodology applied to 4 demonstrator cases

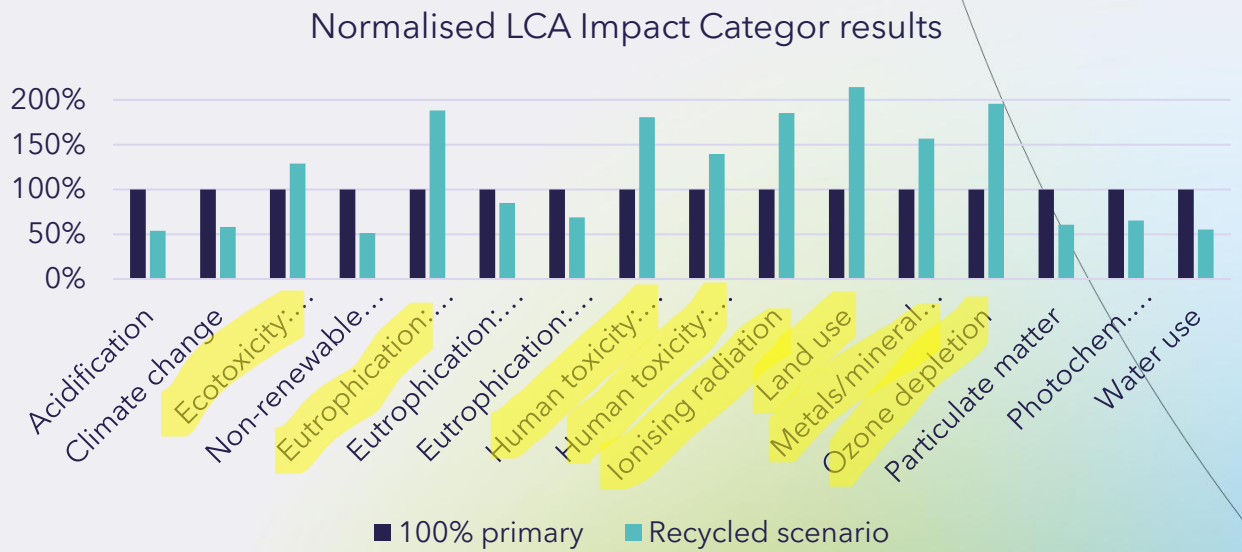
Climate Change results





Overall environmental LCA results

- General improvements in all impact categories
- Only Demo 3 shows a mix between improvements and worse results, mainly due to the large transportation distance of recycled content and intensive energy and nitrogen use in the specific demo recycling process.



Social LCA

- Differences between primary and recycled scenarios do not drastically shift overall social metrics;
- Meanwhile, **national context remains a dominant factor** in shaping social outcomes, as country-level differences, such as living wages, average weekly work hours (46 h vs. 30 h), and accident rates (496-511 vs. 56-96 per 100,000 employees), are far greater than the relatively modest variations observed between primary and recycled plastics.

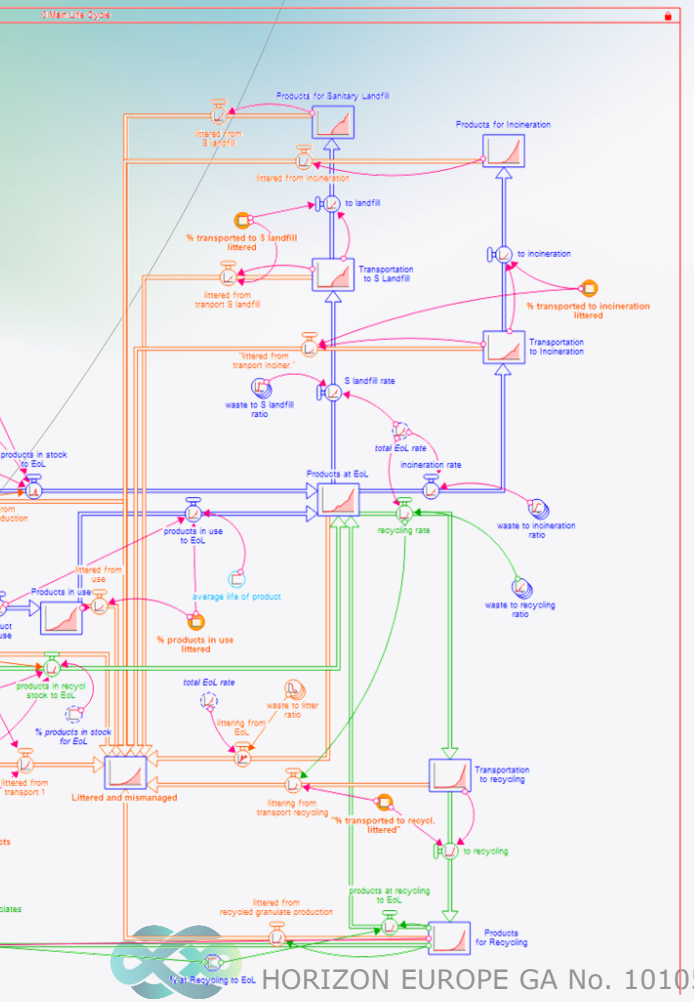
Social aspects - 1.C Automative Interior part production

Social assessment

Name	Raw value	Risk level	Activity variable	Data quality	Comment	Source
Society						
Contribution to economic development						
Contribution of the sector to economic development	14.22 [% of GDP]	Medium opportunity	0.0252777777777778 [h, work ho...	(2;3;2;1;3)	Data from PSILCA V2...	
Illiteracy rate, male	1.16 [% of male population]	Low risk	0.0252777777777778 [h, work ho...	(1;2;1;1;5)	Year: 2016	
Illiteracy rate, total	1.74 [% of total population]	Low risk	0.0252777777777778 [h, work ho...	(1;2;1;1;5)	Year: 2016	
Embodied value added total	0.33 [$/$]	Medium risk	0.0252777777777778 [h, work ho...	(1;2;2;1;2)	Year: 2015	
Public expenditure on education	4.27 [% of GDP]	High risk	0.0252777777777778 [h, work ho...	(1;2;2;1;5)	Year: 2015	
Youth illiteracy rate, total	0.37 [% of total population, age ...	Very low risk	0.0252777777777778 [h, work ho...	(1;1;1;1;5)	Year: 2016	
Youth illiteracy rate, female	0.39 [% of female population, ag...	Very low risk	0.0252777777777778 [h, work ho...	(1;2;1;1;5)	Year: 2016	
Illiteracy rate, female	2.3 [% of female population]	Low risk	0.0252777777777778 [h, work ho...	(1;2;1;1;5)	Year: 2016	
Youth illiteracy rate, male	0.36 [% of male population, age ...	Very low risk	0.0252777777777778 [h, work ho...	(1;2;1;1;5)	Year: 2016	
Health and Safety						
Health expenditure, external resources	1.03 [% of total expenditure on h...	Very low risk	0.0252777777777778 [h, work ho...	(2;3;2;3;5)	Attributed value; Yea...	
Health expenditure, total	8.97 [% of GDP]	Medium risk	0.0252777777777778 [h, work ho...	(2;2;1;1;5)	Year: 2016	
Life expectancy at birth	83.07 [Years]	No risk	0.0252777777777778 [h, work ho...	(2;1;1;1;5)	Data from PSILCA V2...	

System Dynamics

Results per demonstrator case



- A growing demand/production of plastics, and not enough recycling rates make a “Circular Economy” hard to reach.
- Primary plastics will continue to be increasing needed with an increasing demand of plastic products.
- LCA impact categories show a slight improvements for more eager recycling scenarios, but impacts increase anyhow over time.

Eager Circular Economy Scenario: all plastic products contain recycled content.

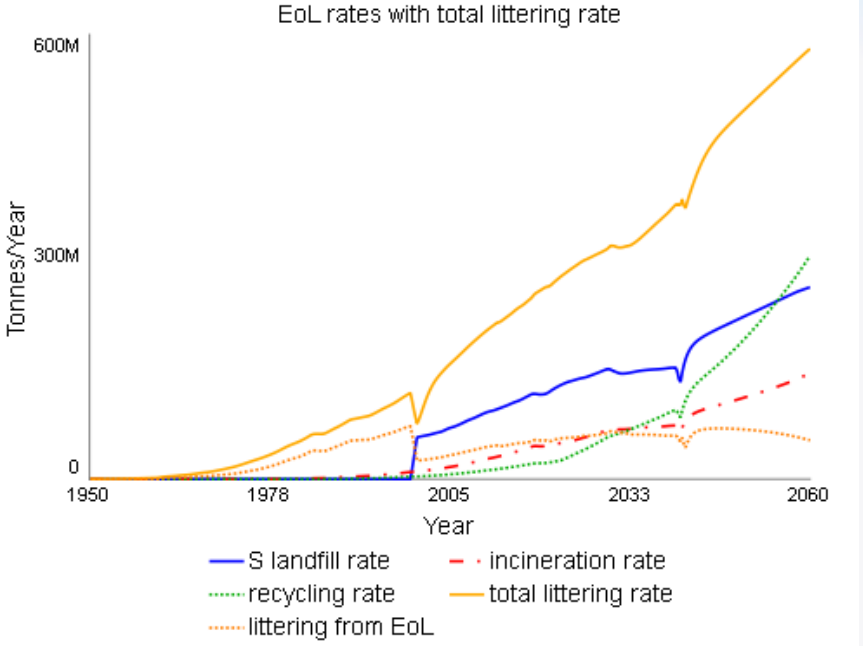
- A 50% recycled content in products scenario helps dampen environmental impacts in LCA categories, making a real change. The problem is a lack of recycled plastic supply in the market.

System Dynamics II

Littering & Unwanted substances

- **Littering** is the most common EoL fate and is often overseen in assessments.
- Increasing rate of plastics production comes with an increasing rate of littering.
- The most effective way to reduce overall littering of plastics is EoL alternatives to landfill.

- Unwanted substances in plastic products will continue to be in the use phase if we recycle products.



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EcoProfile datasets

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EcoProfiles

Public deliverable of datasets

8 core datasets

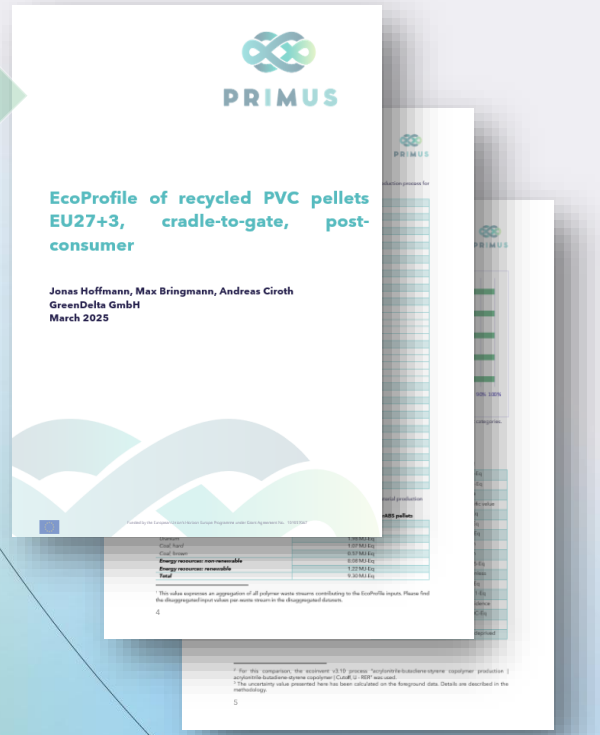
- rMPO
- rLDPE
- rHDPE
- rPET
- rABS
- rPS
- rPP
- rPVC

Regionalisation

- Cradle-to-gate
- Gate-to-gate
- EU average
- Regional average

50 EcoProfiles

- PDF
- LCA data format



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LCA tool and connection to traceability system

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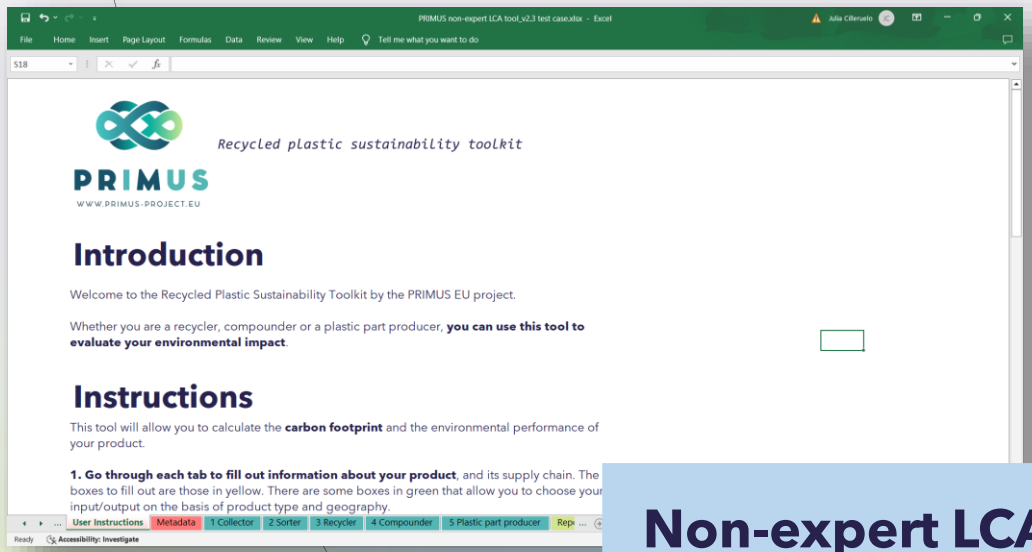
PRIMUS Sustainability Tools

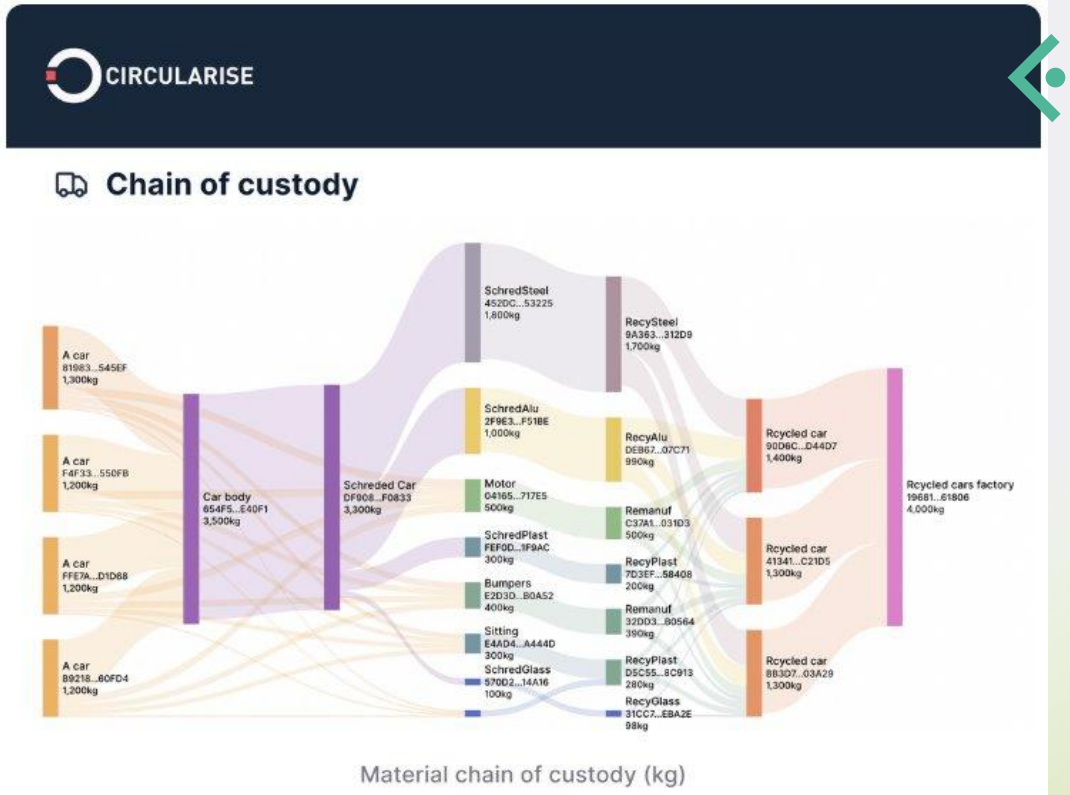
Expert LCA tool

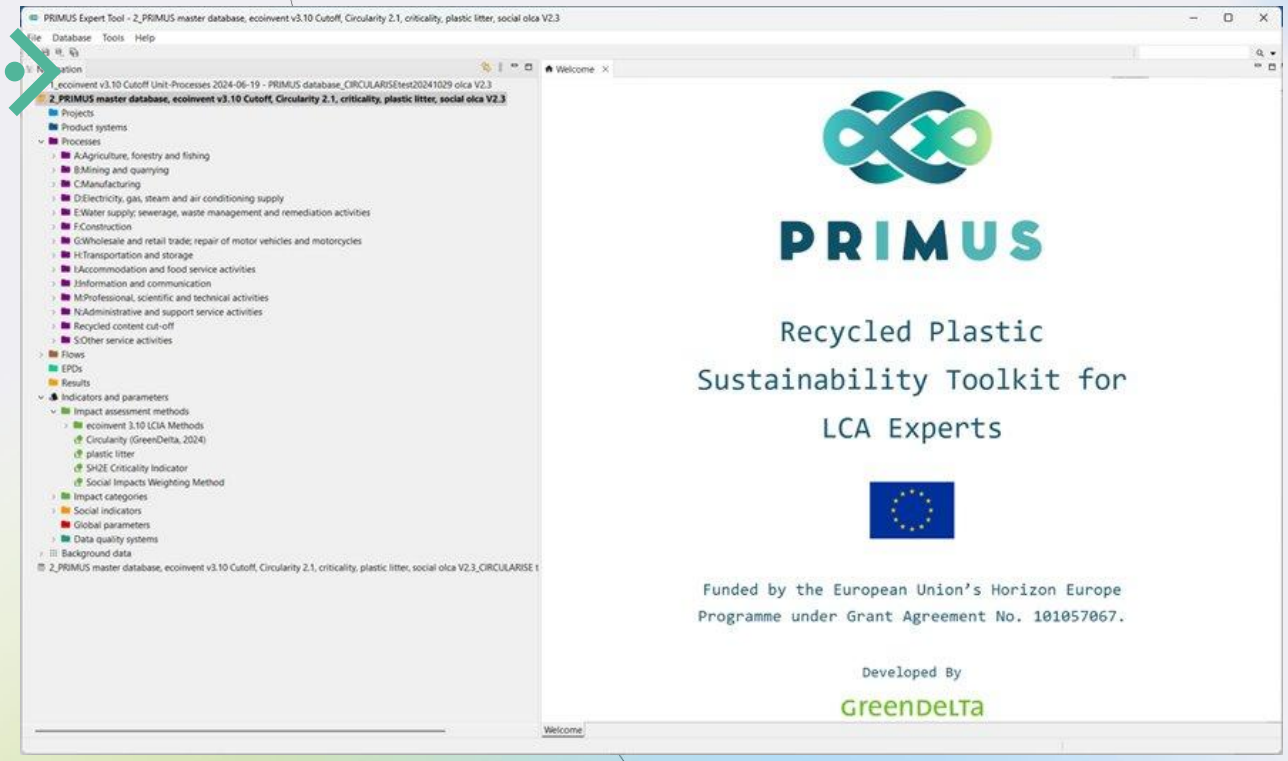


Non-expert LCA tool

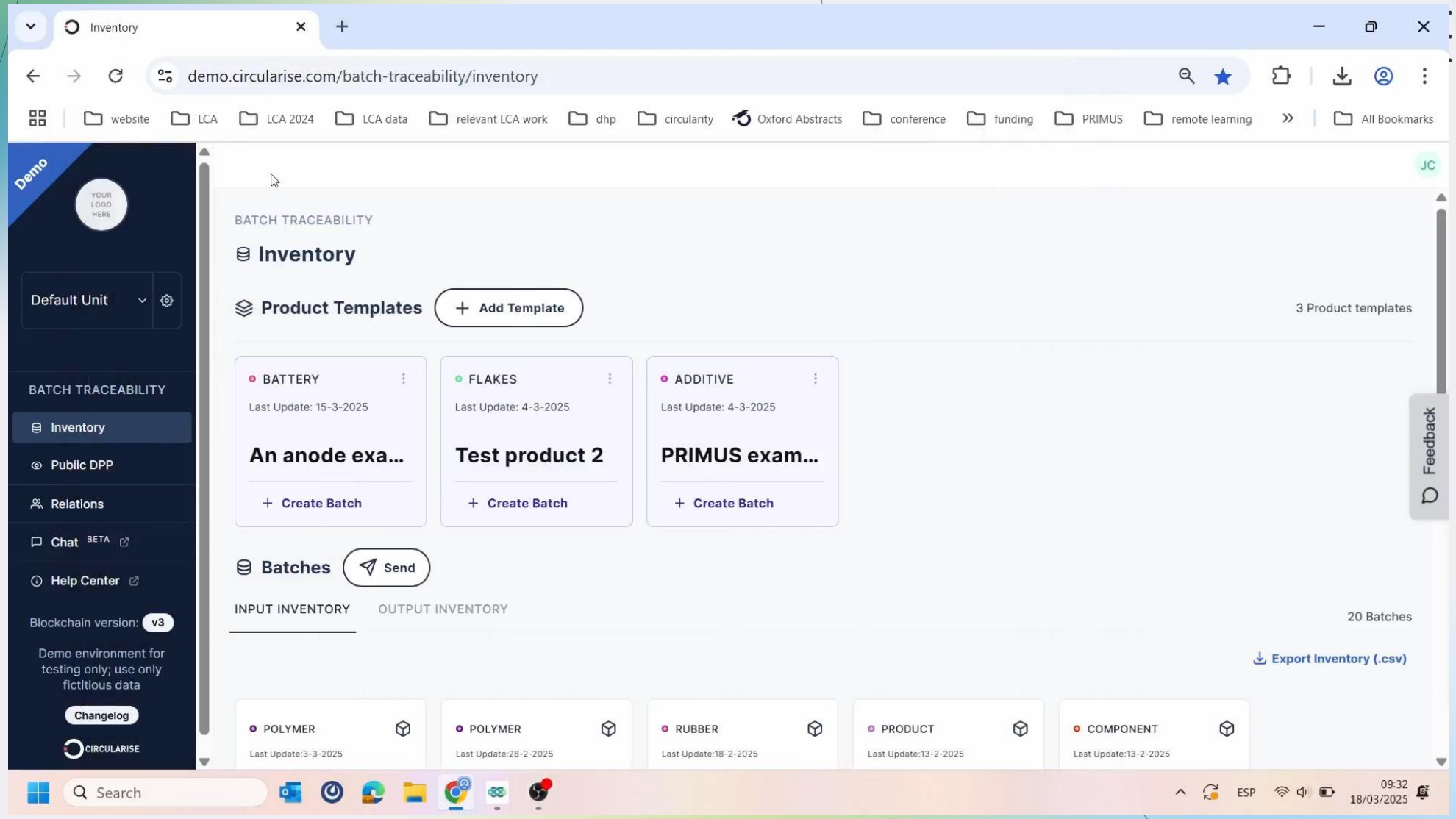
PRIMUS Expert LCA tool

Connects with circularise traceability system





PRIMUS Expert LCA tool



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Thank you!

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LUNCH TIME

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BREAKOUT SESSIONS: Stakeholders' engagement

Eve-Liis Roosmaa, Tallinn University

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Stakeholders' engagement

OBJECTIVE

Results from the **stakeholder surveys** that explored views about and experiences with recycled plastics in Europe

Stakeholders' engagement

- The PRIMUS Project focused on two stakeholder groups:
  1. **Industrial community** – home appliance and automotive parts manufacturers, recycling companies, industry trade associations and expert views from other stakeholders in the field, i.e. research professionals and consultants

     Survey: 28 in-depth interviews with 33 stakeholders from 10 European countries
  2. **Citizens/consumers community** – online panels survey in 2023 in Estonia, Finland, Germany, Spain; 1500 respondents in each country, sample representative for gender, age and regional location

     Original questionnaire with 31 thematic questions and 21 background questions

Industrial stakeholders survey

What might be the best ways for stakeholders and the society to enhance the use of recycled plastics

- The survey explored **challenges** and **perspectives** on **using recycled materials/plastics** in new products with the aim to identify barriers to recycled plastics adoption and strategies to overcome them
- According to earlier research, there are four categories of ***barriers*** and ***drivers*** for transitioning to a circular economy and increasing the use of recycled plastics among manufacturers:
  - **technical/technological** (quality issues)
  - **economic** (cost disparities between recycled and primary plastics)
  - **regulatory/legislative** (regional differences)
  - **cultural/social aspects** (consumer demand for sustainable products)

Industrial stakeholders survey results

What is sustainability and can it go hand in hand with production demands?

- One of the main contradictions was the tension between the **necessity to produce** and **sell more products** and the current **"inevitability" to produce** these products **with recycled plastics** and under the category of **"sustainable production"** → it is important to convince the consumer to buy, but to buy in a "sustainable" way in the framework of the classical growth model of economy

  "/…/ it seems that now everybody wants to be sustainable, but at the same time, we buy many things that come from other parts of the world. So, I think that if we didn't have the regulations that forced us to make this change, it wouldn't be easy, because it's quite easy to say one thing and then do another one. /…/ It's quite easy to maybe say that you are sustainable, that you want to have a greener wall, that you want to recycle, but then at the same time, we consume many, many things. And I think that if regulations will not change, it won't be easy for us to change." (APM1 [Automotive Parts Manufacturer])

Industrial stakeholders survey results

What is sustainability and can it go hand in hand with production demands?

- Also, the **"tough truth" of the importance of succeeding in the market** was emphasised, and the **role of consumer decisions**. There is uncertainty whether consumers would buy pricier products with high concentrations of recyclates:

> *"I think both for the consumer, for us, you have to find the right business case, and that's why it's called a circular economy. /…/ That means it can exist in our society where economic growth is the driver. /…/ So, you must have a business case, otherwise it won't sell, otherwise I won't buy. This is the very tough truth, I think, that we are facing. We have this whole circular concept, and all the importance that we attach to climate and environment is, of course, relevant. /…/ And the end-consumer needs to find the right business case in the market and needs to be convinced of the business case. And that's the whole difficulty of this exercise. /…/ If you ask people, I think that what they answer is different than what they actually do when they are buying. And I think that there is still a big gap between the intention and what the consumer is really doing." (HAM3 [Home Appliance Manufacturer])*

PRIMUS Citizen and consumer public opinion survey

Potential consumer behaviour: willingness to buy products containing recycled plastic

- Would you be **willing to buy** home appliances such as a refrigerator or a washing machine if they **contain recycled plastic**...?
  - In **Finland**, **Spain** and **Germany** about **30%** would be willing to buy products containing **up to 100% of recycled plastics**, respective share in Estonia 19%; overall 30-40% would buy such products if they contained 5% to 50% of recycled plastics
- Would you be **willing to pay more** for a washing machine or a refrigerator that **contains parts made of recycled plastic**?
  - About **20-25%** of respondents across four countries consider paying **up to 5% extra**; in Germany and Spain about 15%, and in Estonia and Finland about 10% would pay up to 15% more; thus, depending on a country **40-60%** would **not pay more** for such products

PRIMUS Citizen and consumer public opinion survey

Barriers: concerns about using recycled plastics and awareness about this material

- Do you personally have any **concerns** with **using recycled plastics**, compared to conventional plastics?
  - In **Finland, Germany** and **Estonia** somewhat **less than half** of the respondents have **no issues**, in **Spain** approx. **30%**
  - Concerns relate mainly to **health safety**, followed by the **lack of long-term studies** on recycled plastics (somewhat more in Estonia and Spain), and **inadequate regulations or standards** (particularly in Spain)
- Another significant barriers is relatively **low general awareness** about **recycled plastics**
  - Considerable share of the survey participants had **difficulty to answer questions** specifically **about this material** (particularly in Estonia)

Industrial stakeholders survey results

What is sustainability and can it go hand in hand with production demands?

- Another **tension** appears between **the OEMs** and their **suppliers**. **Market logic does not** seem to **benefit sustainability** as suppliers need to comply with the requirements of the OEMs to ship their products all over the world, thus generating great amounts of CO_2. Therefore, the option of producing closer to the consumers is sometimes seen as impossible or very difficult

> *"/…/ before, some years ago, you could be a local supplier. I mean, you could supply for some OEMs in Europe and then not supply in some other regions. But at the moment, you cannot do that. The OEMs want to have a global supplier that can supply for their modelling in Germany or in Romania or whatever, and then the same supplier MUST supply for the model in Asia, for the model in North America or South America. So, it's something that you need to adapt to. You cannot say, „No, I want to produce only in Europe", or „I want to produce only in China". So, at the end we are not in the position of deciding that /…/." (APM1)*

Industrial stakeholders survey results

Legislation – what kind and for whom?

- Considering these paradoxes and shortcomings, it is expected that many of the interviewees, especially from larger countries, support the creation and implementation of **clearer** and in some ways **stricter regulations by the European Union** to balance market forces and sustainability goals, while smaller manufacturers report challenges in meeting regulations designed with larger players in mind, leading to competitiveness issues

> *"/…/ we now have the microplastic regulation, which, as I understand, was primarily written to address the environmental impact of polymer producers in large European countries. But now the entire EU has to implement it. And now, /…/ the administrative burden, which is aimed at preventing microplastic leakage from raw material producers, needs to be applied even by our small manufacturers. But /…/ I know it was written with large European countries in mind. /…/ We definitely want to do this [compliance] with the least amount of burden because it's not really relevant for us. We don't have polymer production, which was the actual target. Here manufacturers only process it." (ITA1 [Industrial Trade Association])*

Industrial stakeholders survey results

Legislation – what kind and for whom?

- It was stressed that relatively vague regulations that "just exist", but are **not monitored**, can create hesitance with compliance and insecurity on the market

> *"/…/ Sometimes they [regulations] are just kind of very vague, so it leaves a lot for interpretation. I wish that the regulations were clearer in terms of what is the expectation and how we should deliver on them. And /…/ how are the regulators even going to measure the kind of impact when introducing this [regulation] /…/? Are we going to get a report to actually see the progress of the impact of those regulations within the EU, for example. Sometimes I don't see it because we have regulations like external producer responsibility, this has been around for decades. But if you try to find data about it or figure out if it has really been impactful or what kind of impact has it really had. You don't really get this kind of information or, maybe somebody has done research in academia, but not really from the /…/ EU agency itself, or from the National Agency /…/." (APM4)*

Industrial stakeholders survey

Conclusions

- Stakeholders admit that **recycled plastics are crucial for sustainable production** and recognised the urgency for transitioning to sustainable production
- Moving towards circular economy can be advanced by creating a **common vision for sustainable manufacturing in Europe**, that would highlight the role of all actors in the production-consumption circle
- There is a need for **stable** and **consistent European legislation** and **monitoring** systems
- Providing **cooperative infrastructure** and **financial incentives** for manufacturers and recyclers might help develop a stable recycling industry

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