



POLYLABS™

BIO BASED MATERIALS

for the polyurethane industry



WHY BIO?

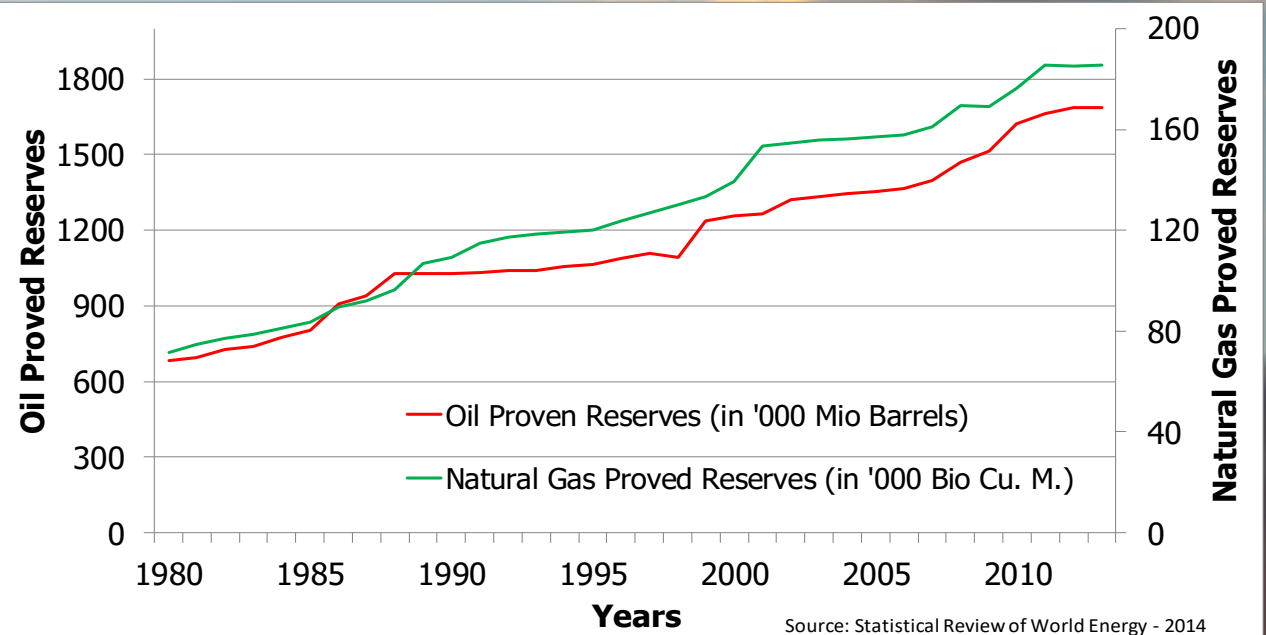
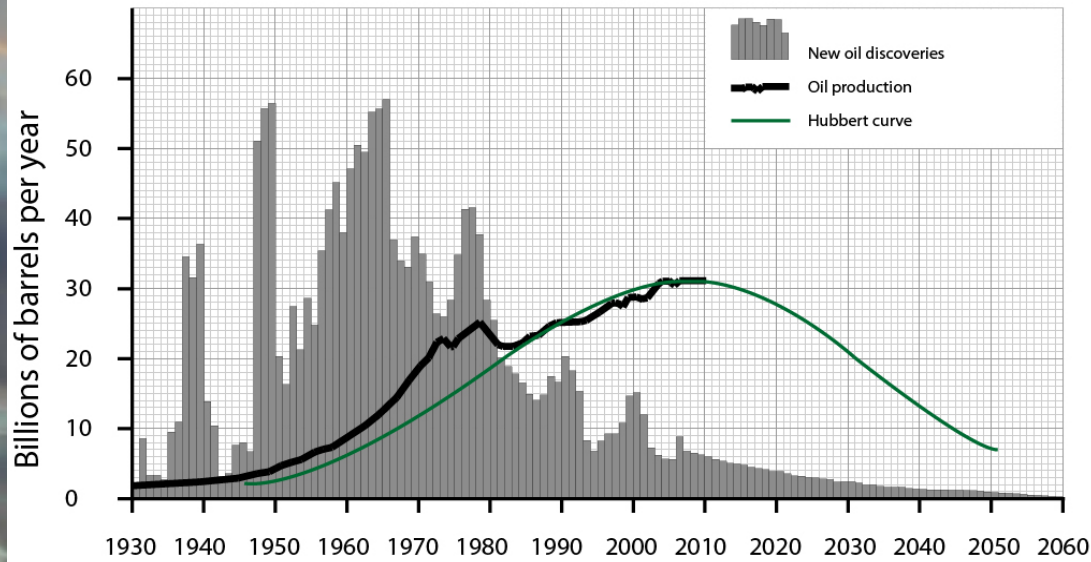
Industry can not satisfy a **growing market demand** for reasonably priced **bio based / green products**.

- **Growing Bio / green product demand**
- **Expensive** bio product alternatives
- **High CO2** footprint
- **No access** to green markets
- **No eco** certification
- **Dependance** of crude oil
- Strategic **security** issue



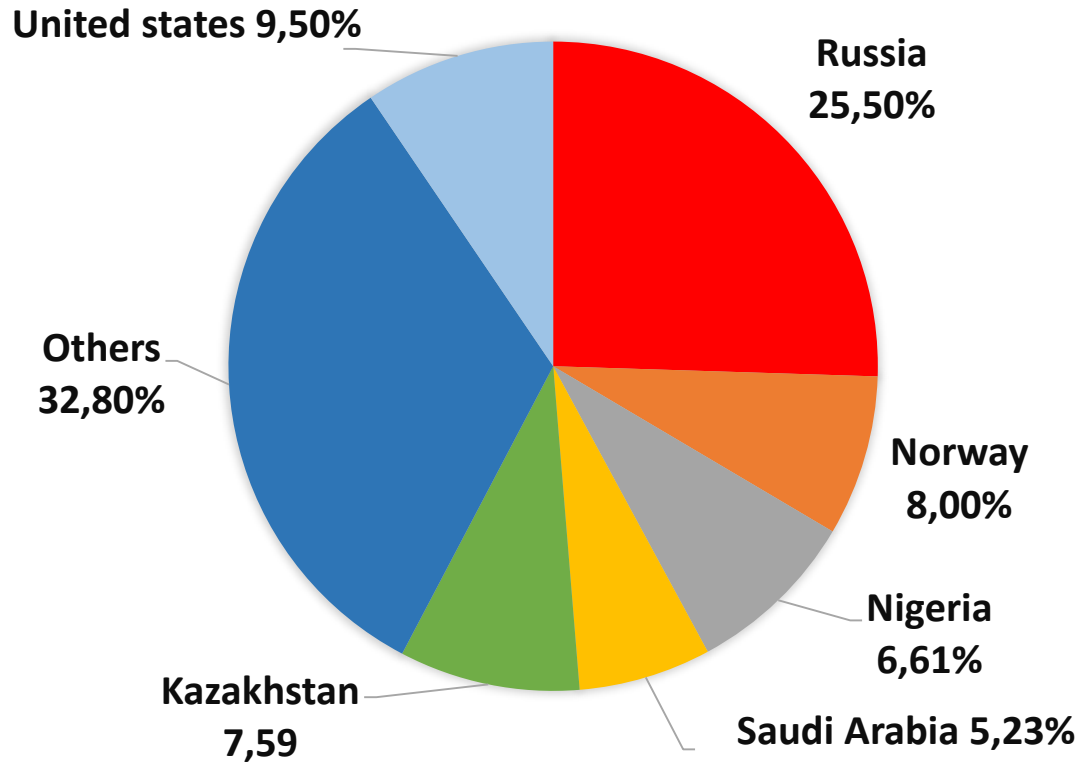
Oil production

Global oil discoveries and production, 1930-2060

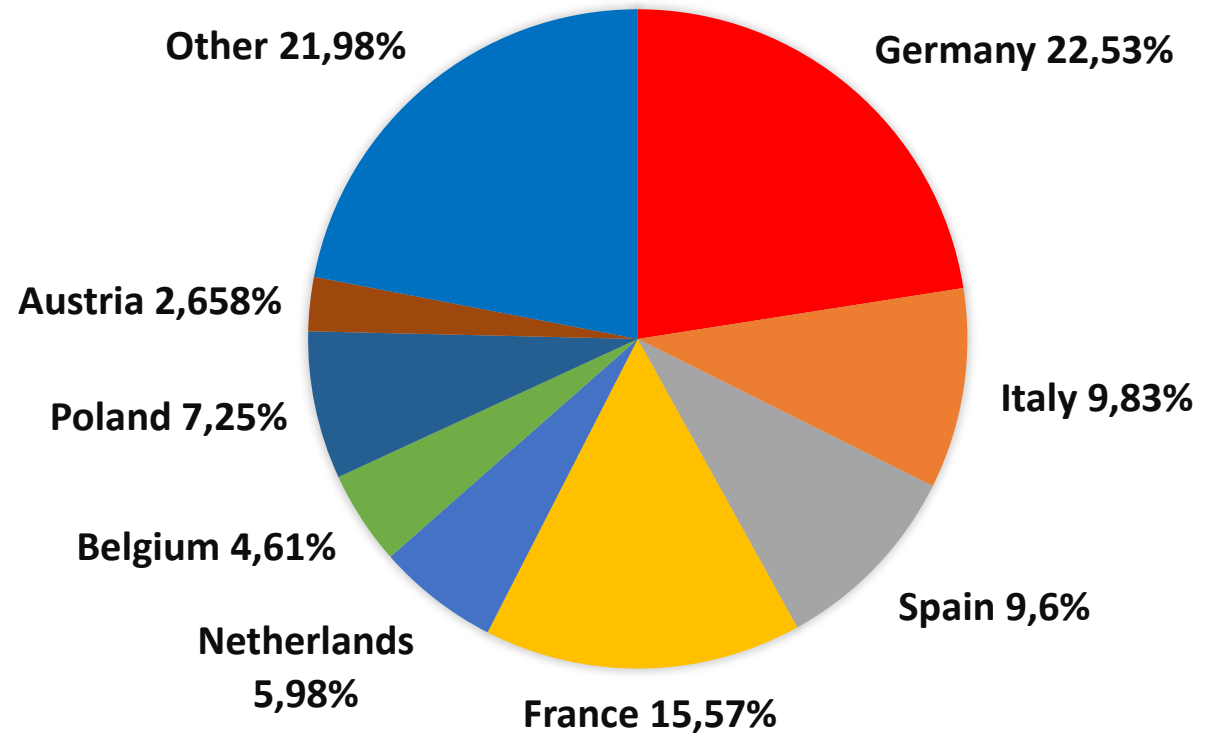


Oil dependence

Sources of EU crude oil imports 2020



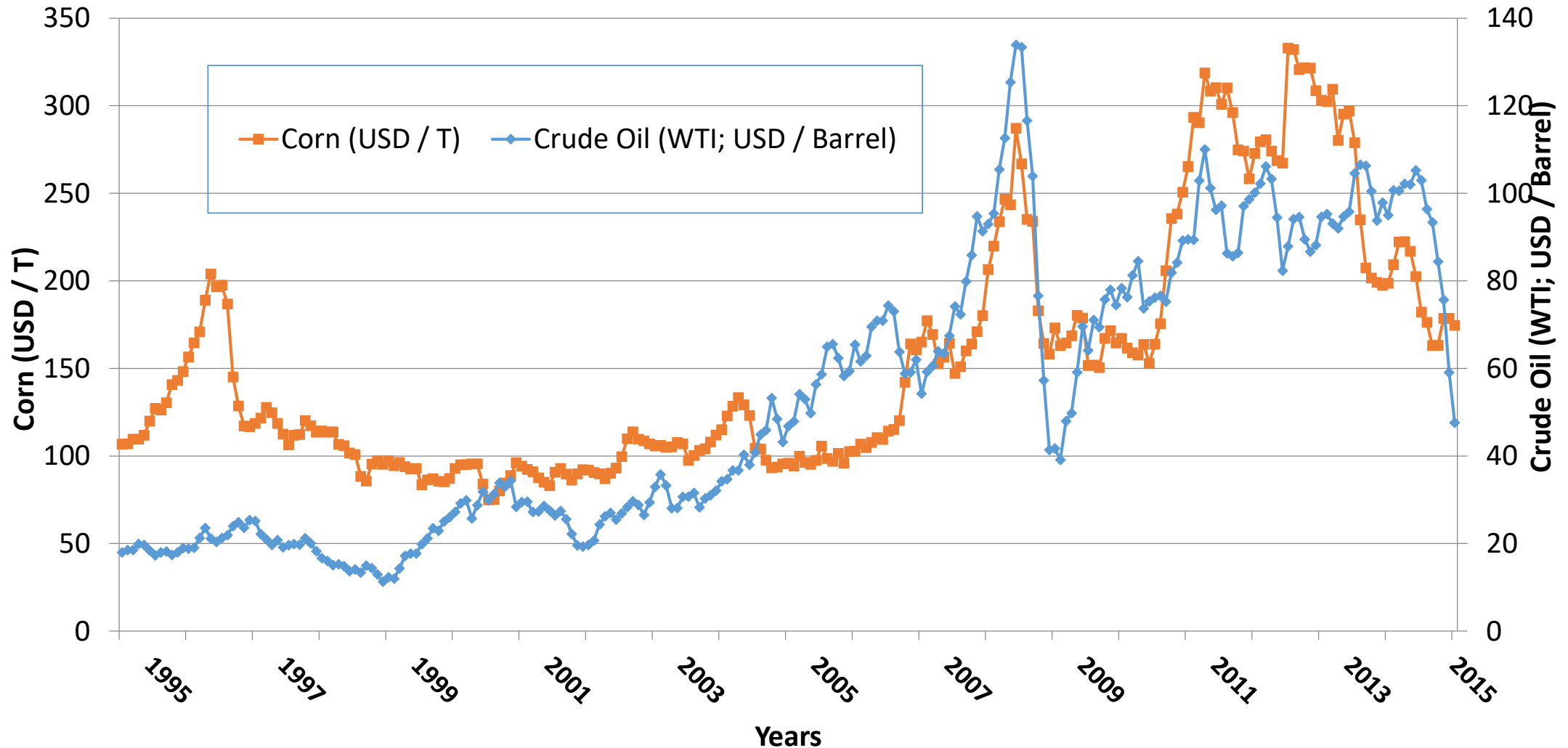
Destinations of crude oil imports in EU 2020



Challenges and solutions



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Challenges: Time to market



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Bio-based product	Drop-in product enabled	Time to plant at scale
Ethylene	HDPE, LLDPE, HDPE	2 years
Ethylene glycol	PET (partially biobased)	1-2 years
Polyols	PUR (partially biobased)	~5 years
1,3-PDO	PTT	3 years



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HOW IT STARTED



POLYURETHANE



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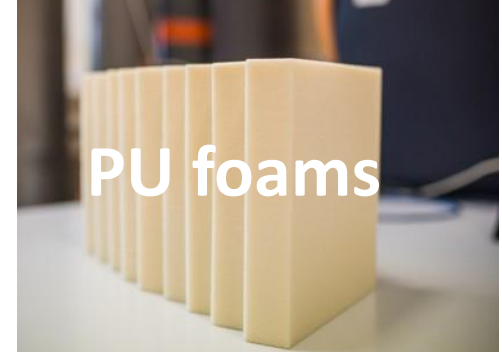
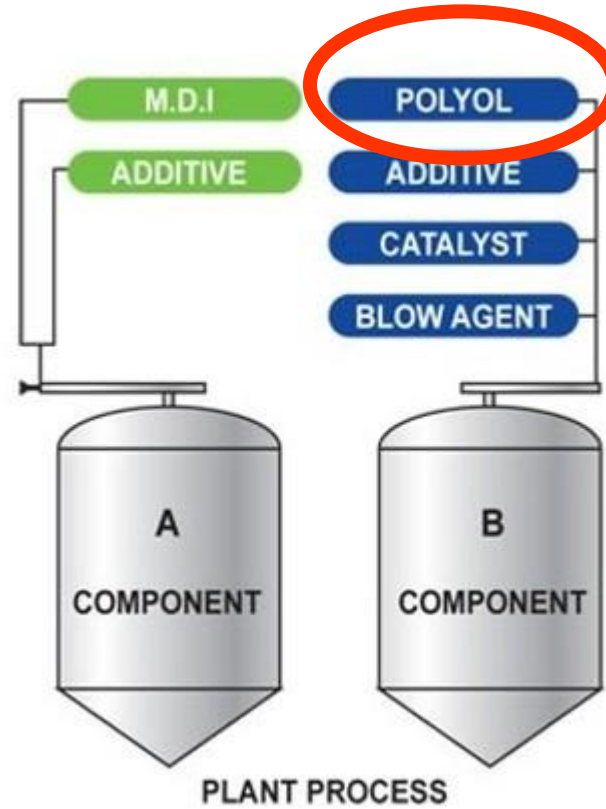
POLYURETHANE



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Liquid chemicals





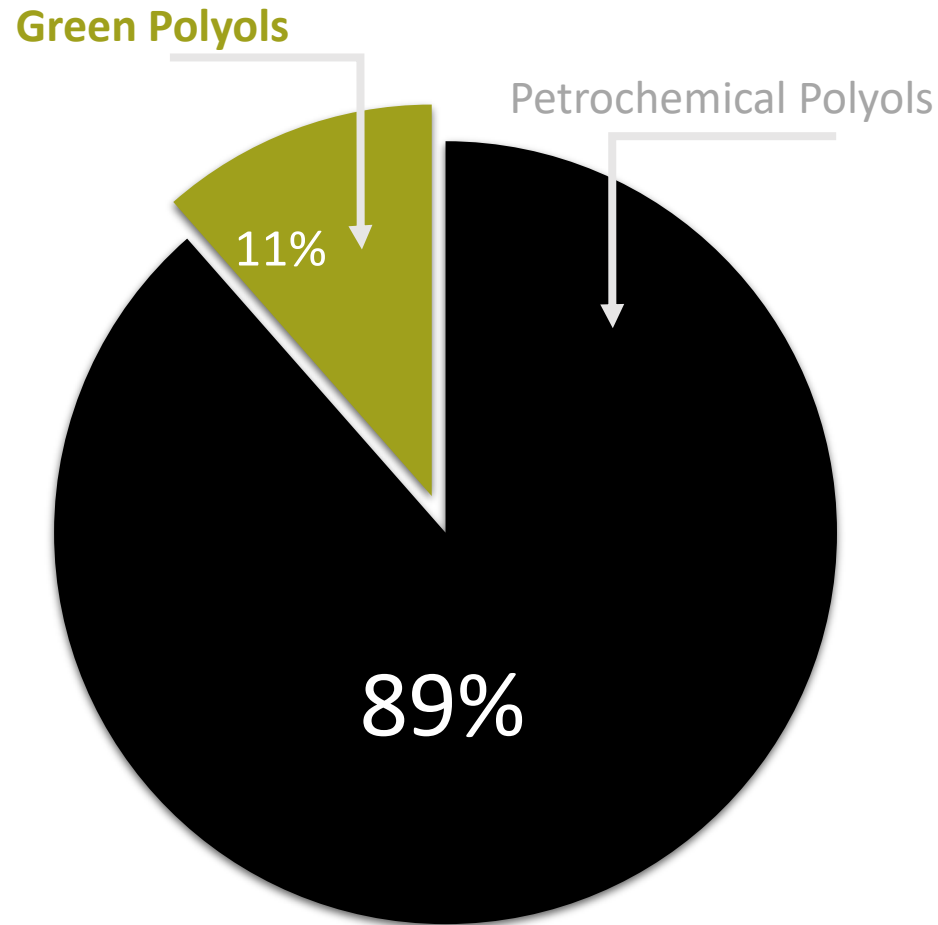
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Institute of Wood Chemistry of Latvia

- main center of wood science in Latvia
- founded in 1946
- independent government non-profit scientific institute
- over 100 employees
- more than 50 years of experience in polymer science
 - Soviet space program – space shuttle Buran
 - European space agency and Airbus in projects for European civilian expendable launch vehicles **Ariane**
 - Automotive projects with **Pininfarina** under EU FP7 programme and many more European scientific projects (Forbioplast, etc)



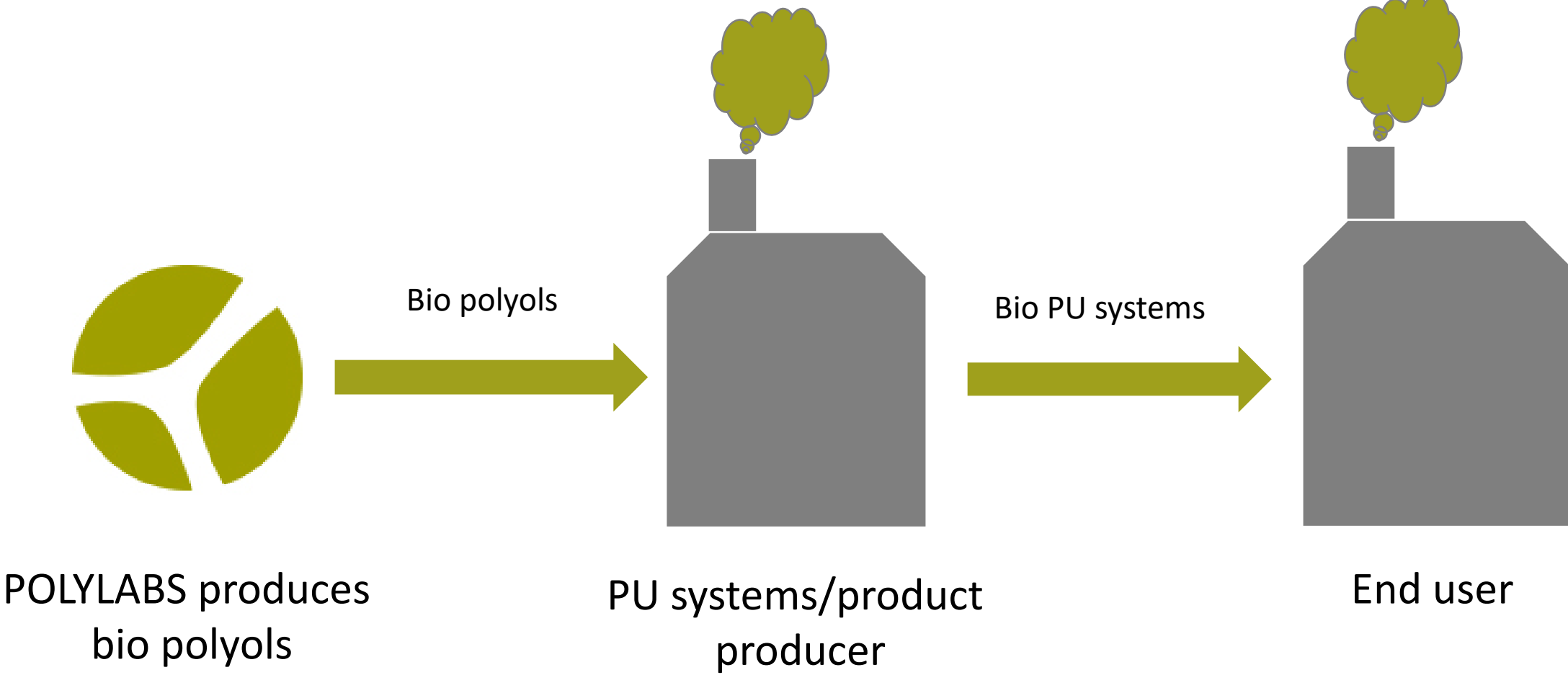
THE MARKET



- Polyol market **\$ 26 bn ***
- annual growth 6-8%

-
- **Bio polyol market \$ 3,37 bn****
 - Annual growth 7-10%
 - **Shifting market trend**

THE DEAL



POLYLABS produces bio polyols

PU systems/product producer

End user

TECHNOLOGY

NATURAL OILS



POLYLABS TECHNOLOGY



BIO POLYOLS



- Tall oil products
- Rapeseed oils
- Other natural oils

- One step process
- Wasteless technology
- Resource efficient

Polylabs Bio polyols

- High bio carbon content 70 – 83%
- Renewable resources
- 13x reduced CO2 footprint
- Technical advantages
 - High reactivity
 - Very good pentane compatibility
- Price advantage
- Access to green markets



TIMELINE

- Started in 2012
- Total investment 500 k EUR
- Production capacity 2000 t/year
- Sales channels in 19 countries
- 3 years to first sales
- Production expansion in 2024 to 10 000 t/year





Production

- Own production 2021
- REACH compliant
- 2000 t.p.a. Internal capacity
- 10 000 t.p.a. Outsourced
- 3 products ready, 4 in development





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Awards

- 2018 Top **10 most innovative companies in the Nordics and Baltics, Nordic cleantech open.** (Sweden)
- 2018 **Resource innovator 2018 award** as one of the best technologies to replace oil, **Raw material summit 2018 Farewell oil** (Germany)
- 2019 top 8 **Latvian startup ranking** www.balticbrands.eu
- 2019 **Chem Start-up of 2019 award**, (Germany)
- 2019 The Red jackets «Rising stars» award to outstanding Latvian export brands (Latvia)
- 2020 **Startup of the year** Latvia, Innoenergy PowerUP! (Latvia)

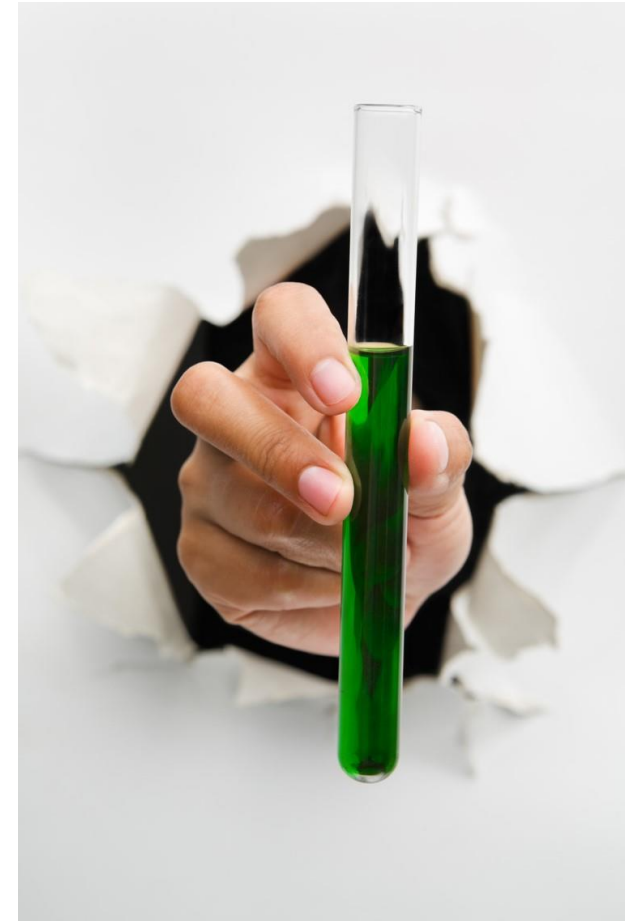




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OPPORTUNITIES

- Scientific institutes/universities
 - technology transfer
 - Ratings
 - Student business incubators
- Unused production capacities
- How government can help
 - Startup incubators/accelerators
 - Government investment programs - *LIAA*
 - Tax relief for start up's
- International/regional development programs
- Industry focused competitions



Conclusions



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- There are still very significant challenges – Oil price, bio product price, performance, bio content
- Financing emerging bio-based chemicals will be a significant challenge
- Bio based alternatives must be low cost and low volatility, should not count on green premiums
- Regulatory motivation will be pressing... in the future to change the production, cut emissions, cut crude oil usage



The image shows two rolls of bright green artificial grass laid out on a dark brown, textured soil surface. The rolls are positioned on the left and right sides of the frame, with a central gap where the text is overlaid. The grass blades are short and densely packed, giving it a realistic appearance.

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