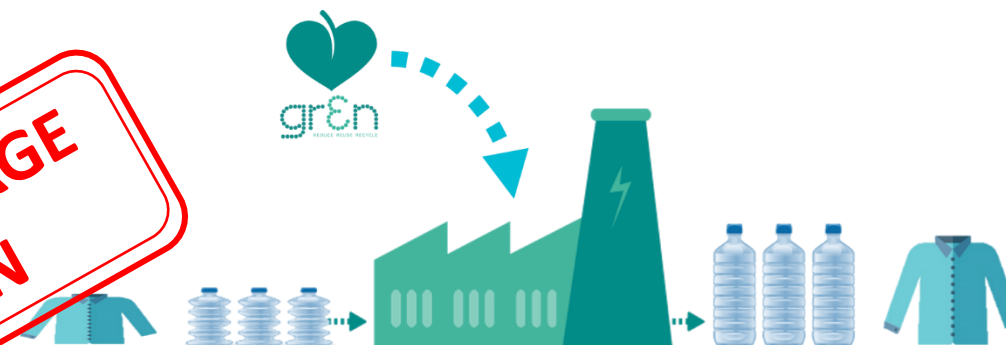




EC HORIZON2020
Project Co-Funded by the European Commission
Grant agreement: 768573
Call identifier: H2020 – SPIRE-09-2017
Project Start Date: 1st of September 2017

**LIGHT PACKAGE
VERSION**



dem&to

Modular, scalable and high-performance
DE-polymerization by MicrowavE TechnolOgy

DEMETO in Industry 4.0 and its role for the Circular Economy of PET

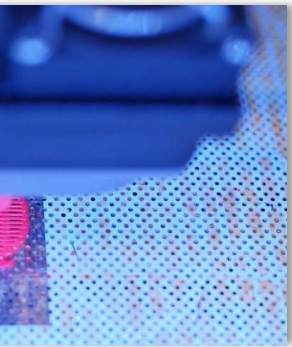


It's not just a matter of €





Plastic, the material of the new millenium



**TRADE
BALANCE**



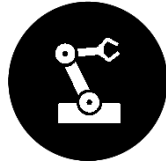
Over 16.5 billion €

COMPANIES



Close to 60.000

**INDUSTRIAL
VALUE ADDED**



7th in Europe

RECYCLING



Over 7.5 million tonnes

JOBS



Over 1.5 million

TURNOVER



Over 340 billion €

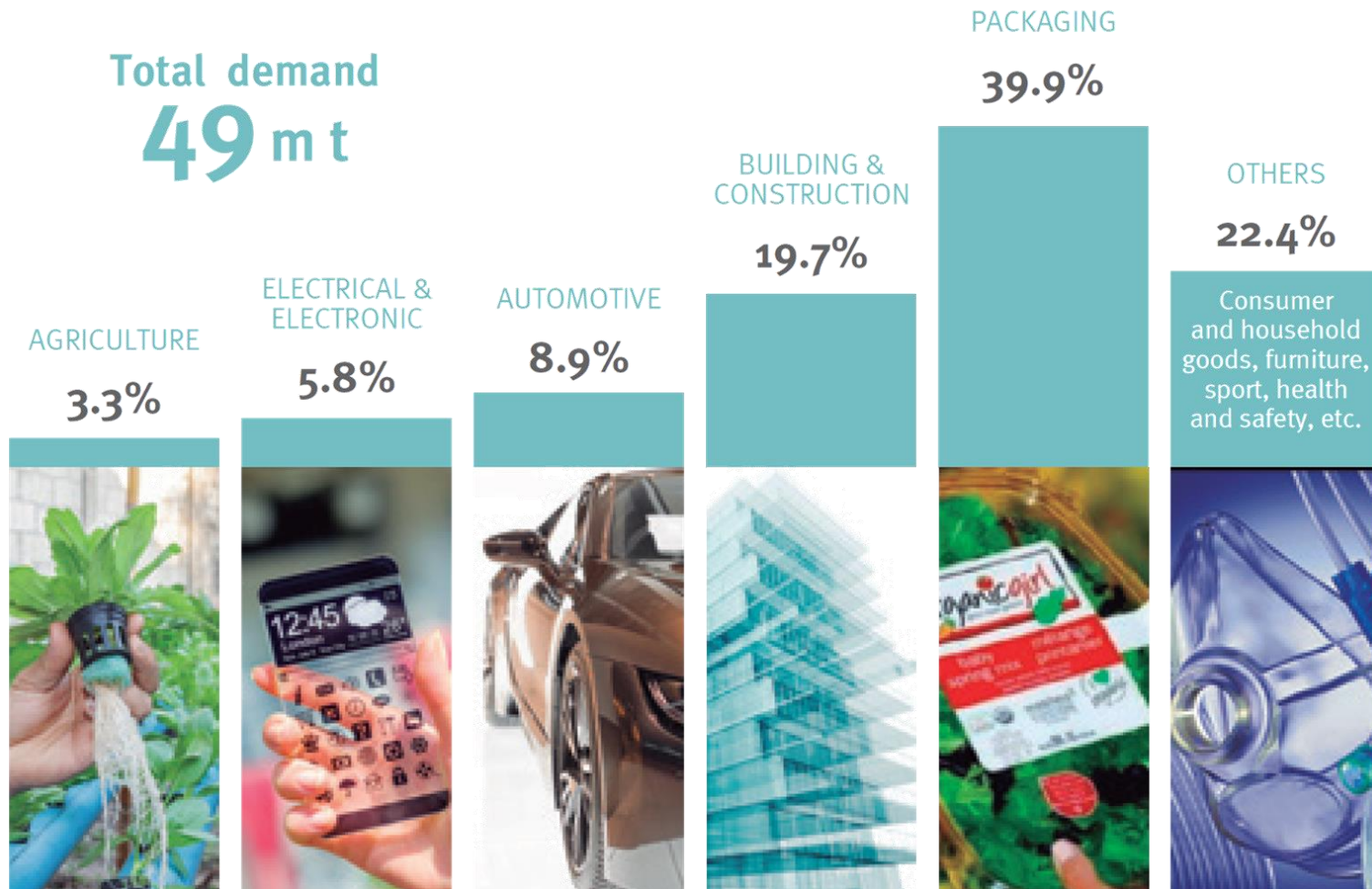




Plastic, the material of the new millenium

Distribution of European (EU-28+NO/CH) plastics demand by segment in 2015.

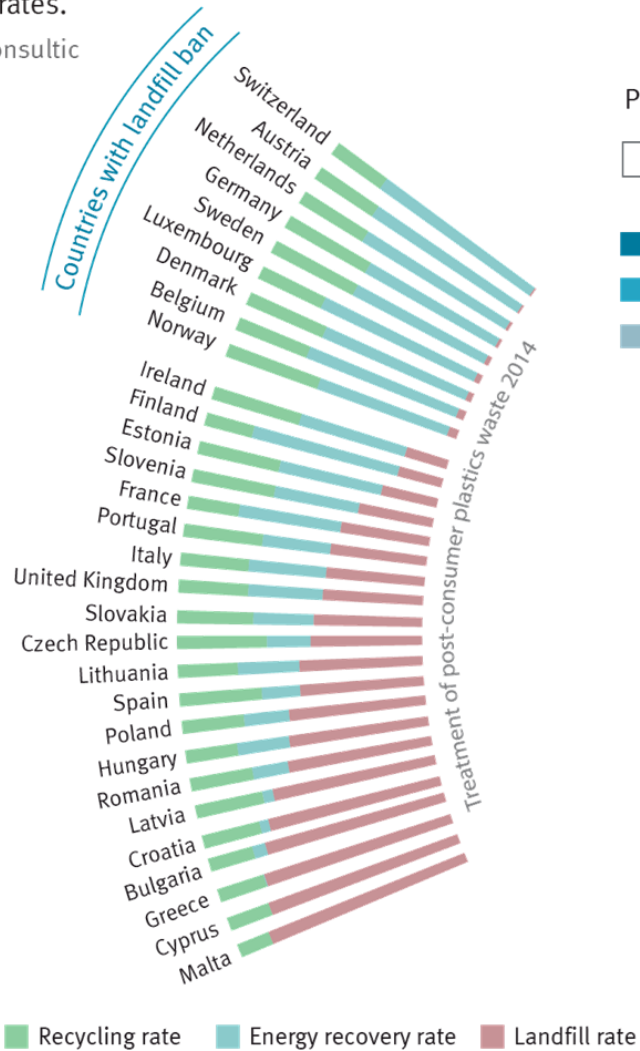
Source: PlasticsEurope (PEMRG) / Consultic / myCeppi



Plastic, the material of the new millenium

In 2014, landfilling was still the 1st option in many EU countries. In general, countries with landfill ban achieve higher recycling rates.

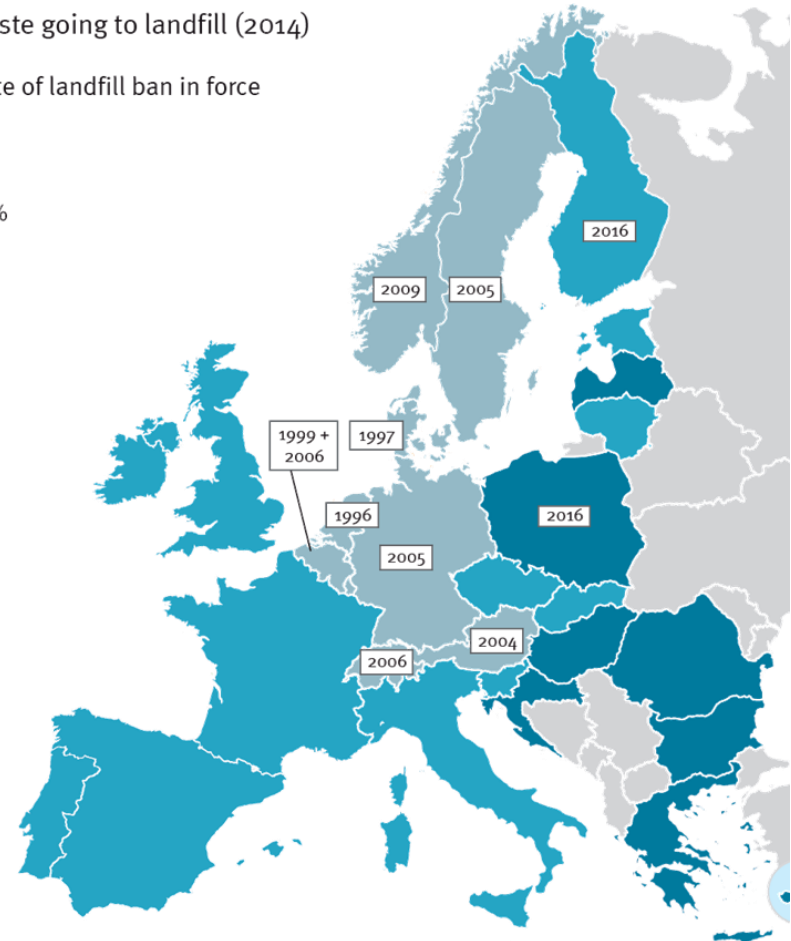
Source: Consultic



Plastics waste going to landfill (2014)

□ Date of landfill ban in force

- > 50%
- 10% - 50%
- < 10%





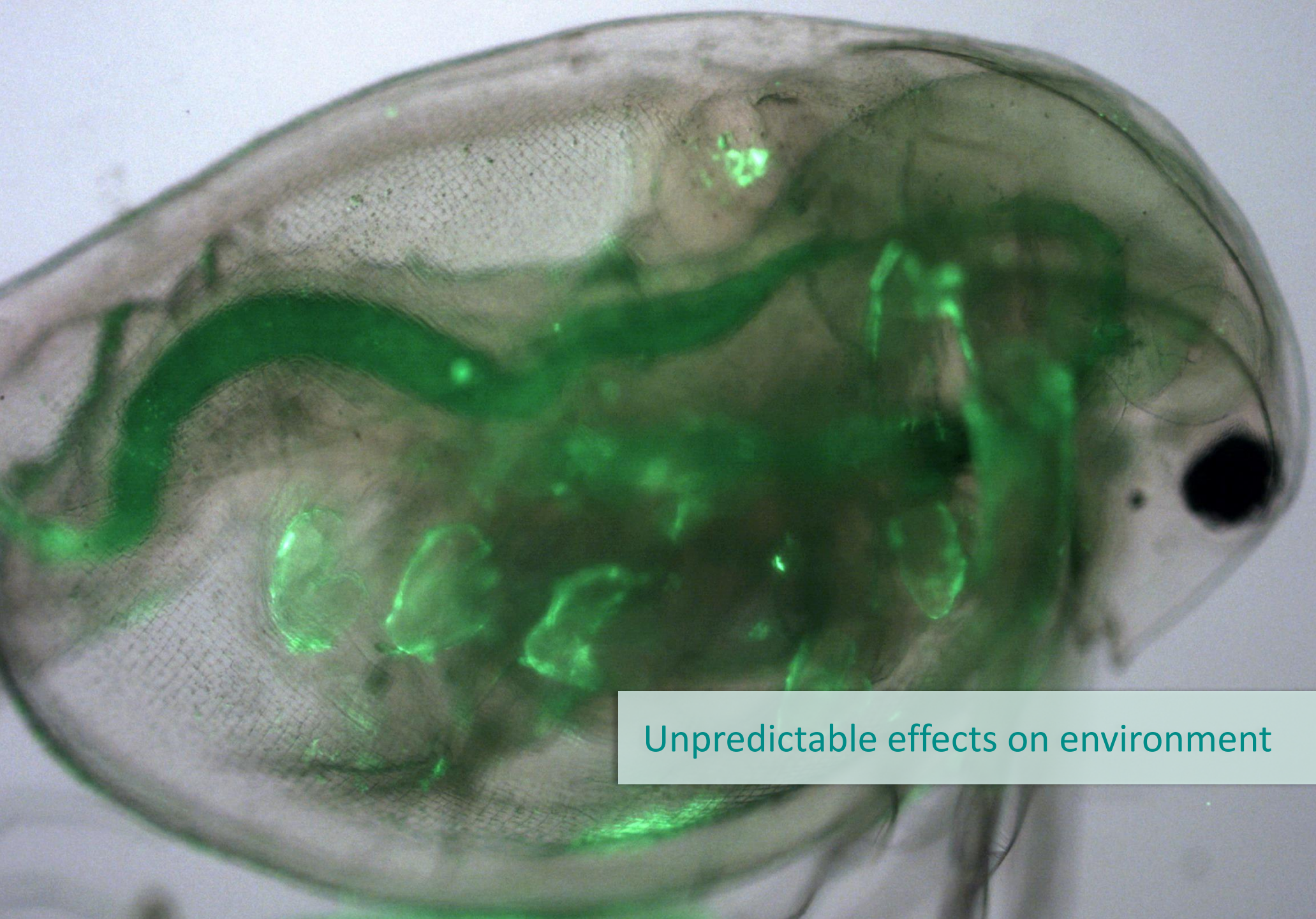
Recycling itself has an impact



Energy “recovery” is not circular



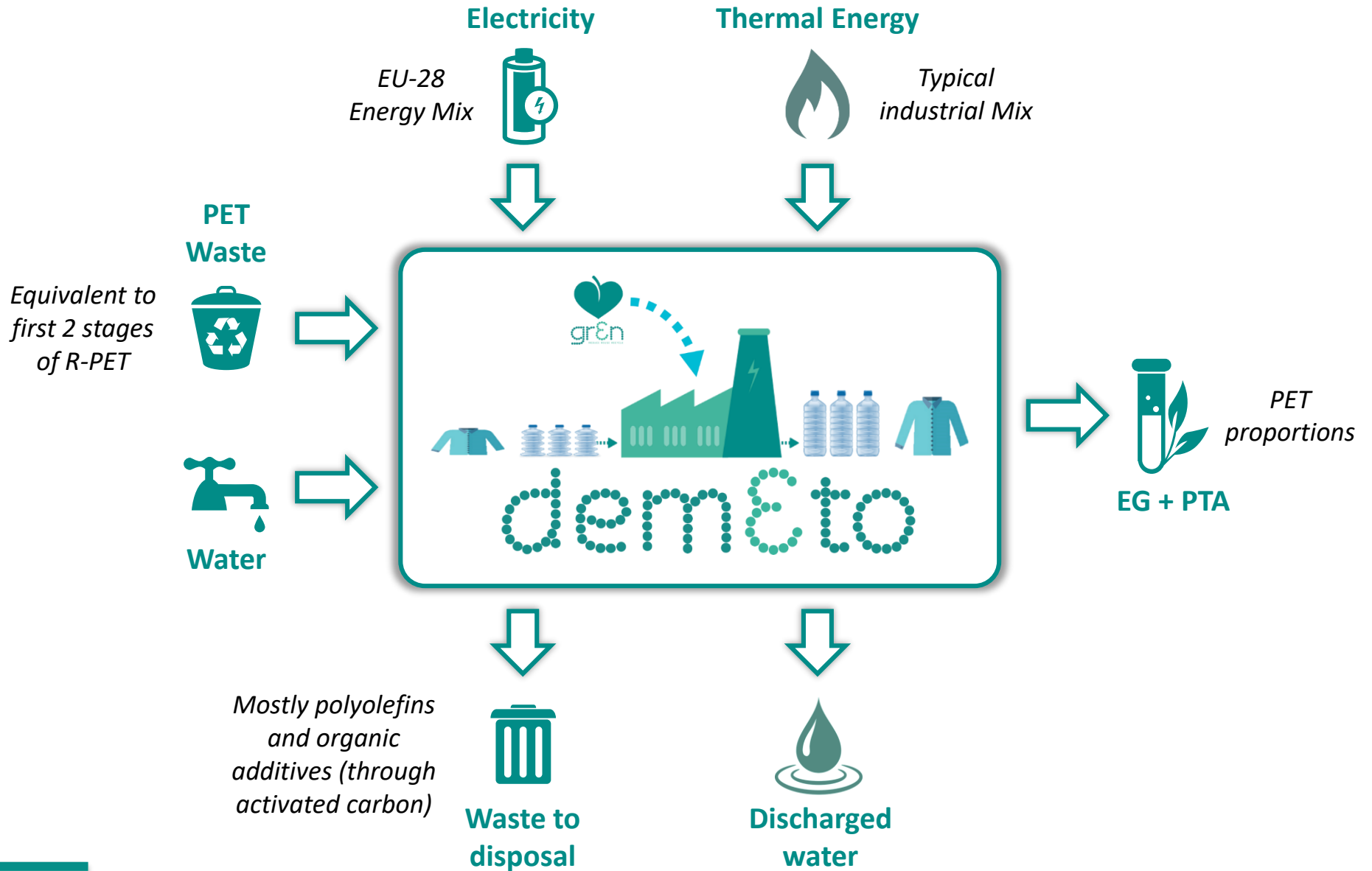
Unpredictable effects on environment



Unpredictable effects on environment


















DEMETO over the life-cycle: model








DEMETO over the life-cycle: model

		MW Depolymerization	EG Distillation	PTA Drying	Chlor-Alkali Electrolysis
PET Waste					
Water					
Electricity					
Thermal Energy					
Waste to disposal					
Discharged water					



DEMETO over the life-cycle: figures

All LCA evaluations for DEMETO have been done using the EcolInvent® Database

			
Non-renewable energy requirements (NREU) [MJ/kg _{PET} *]	66.3	21.6**	25.78
Global Warming Potential (GWP) [kg _{CO2} /kg _{PET}]	2.08	1.28	2.19
Acidification [kg _{SO2} /kg _{PET}]	0.00763	0.00571	N/A
Eutrophication [kg _{PO4} /kg _{PET}]	0.00225	0.00239	N/A
Abiotic depletion [kg _{SB} /kg _{PET}]	6.72E-6	3.84E-6	N/A






*Reference Unit is kilograms of PET produced for Oil-based production, kilograms of PET recycled for chemical recycling.

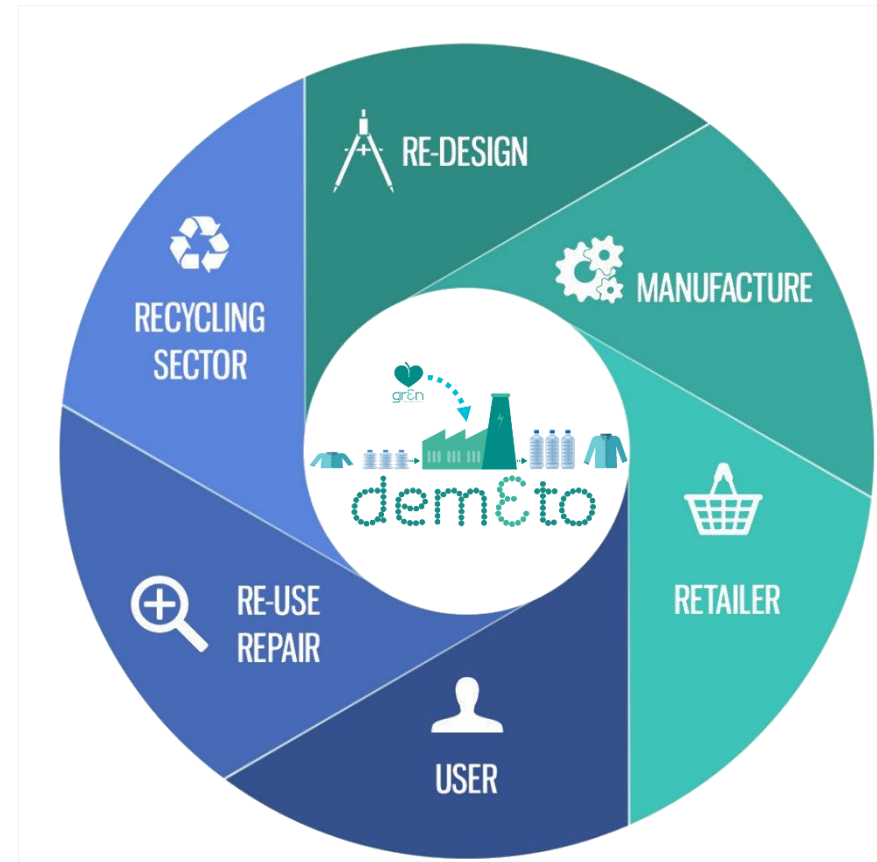
**These are preliminary data based on current assumptions about the purification process.



DEMETO over the life-cycle: hidden potential

Current Value Chain ends in either Landfill or Incineration (5 years delay)
Who is going to “win” the benefits of this additional improvement???

	Landfill and dispersed	Incinerated
	 37Mt	 16Mt
	0,0702 kg _{CO2} /kg _{PET}	1,05 kg _{CO2} /kg _{PET}
		

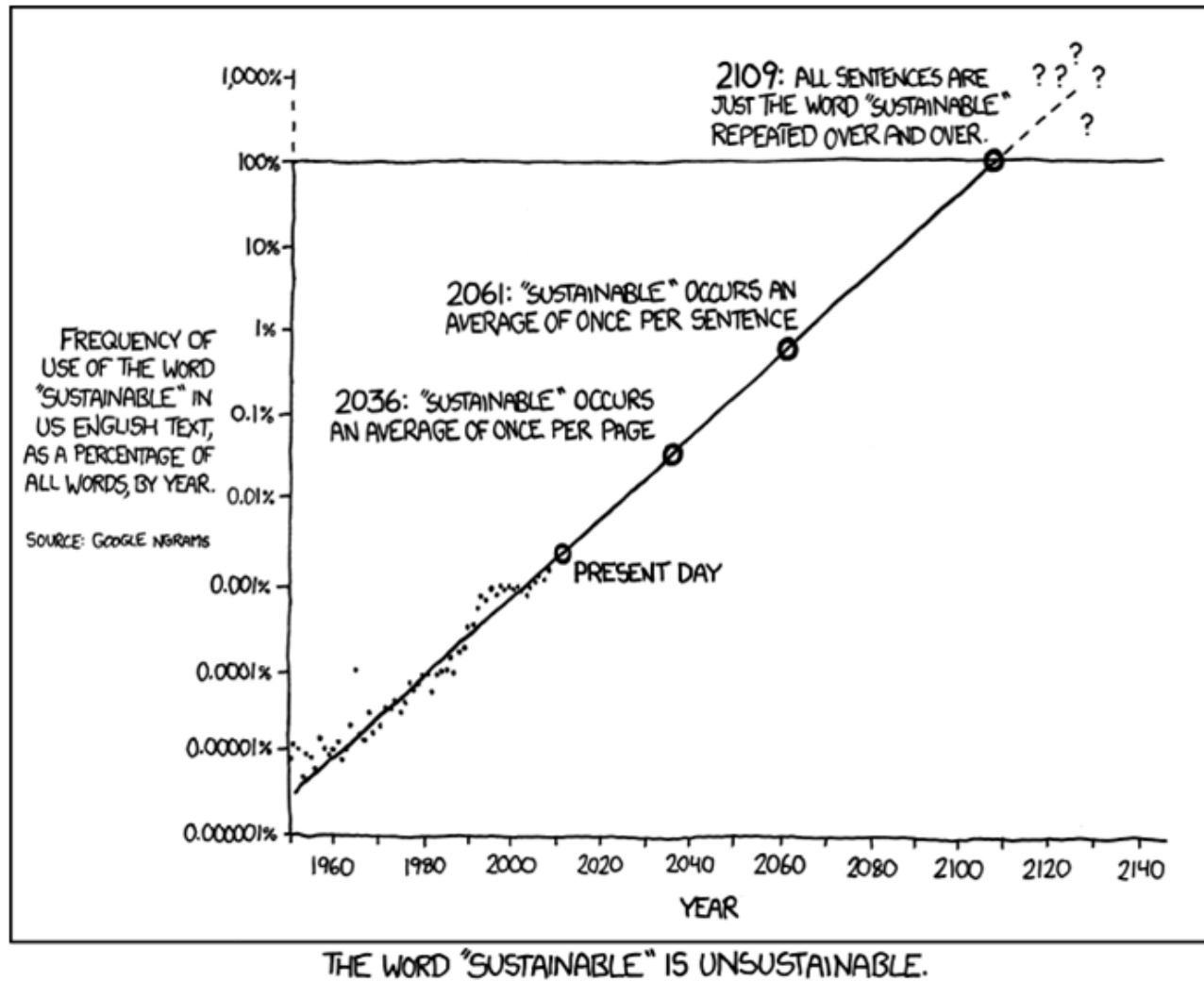




Surfing the Industrial Revolution

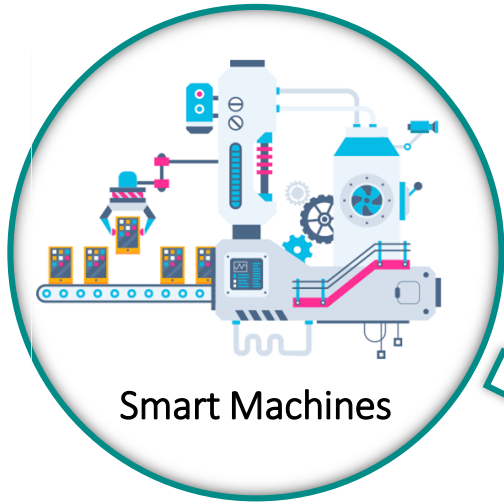


It's not just a matter of assessing!

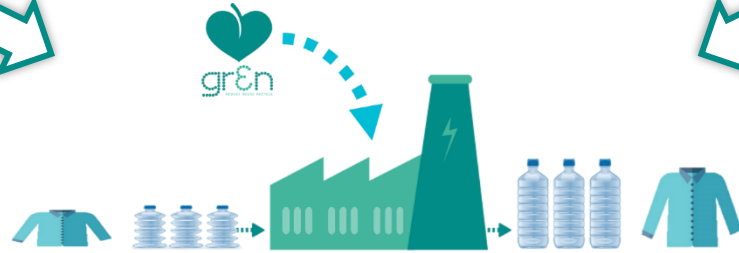
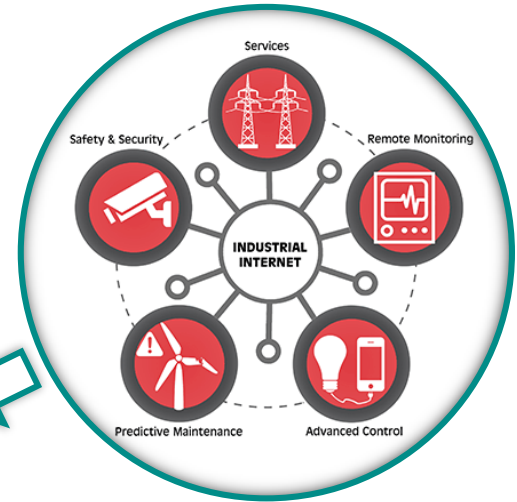


"Sustainable marketing" is in other words becoming very risky (in terms of brand reputation), if not supported by parallel strategies and concrete projects with clear objectives and tangible results.

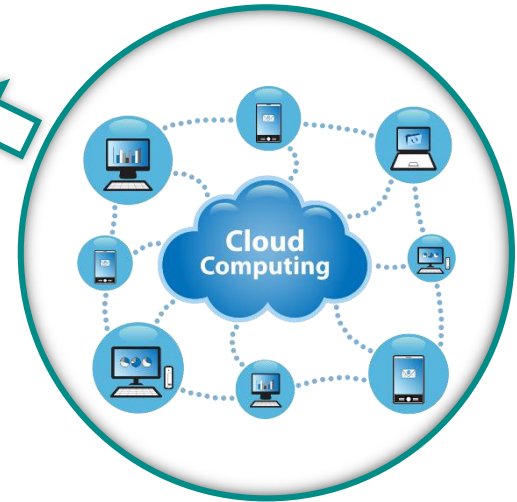
Industry 4.0 to the service of...



Smart Machines

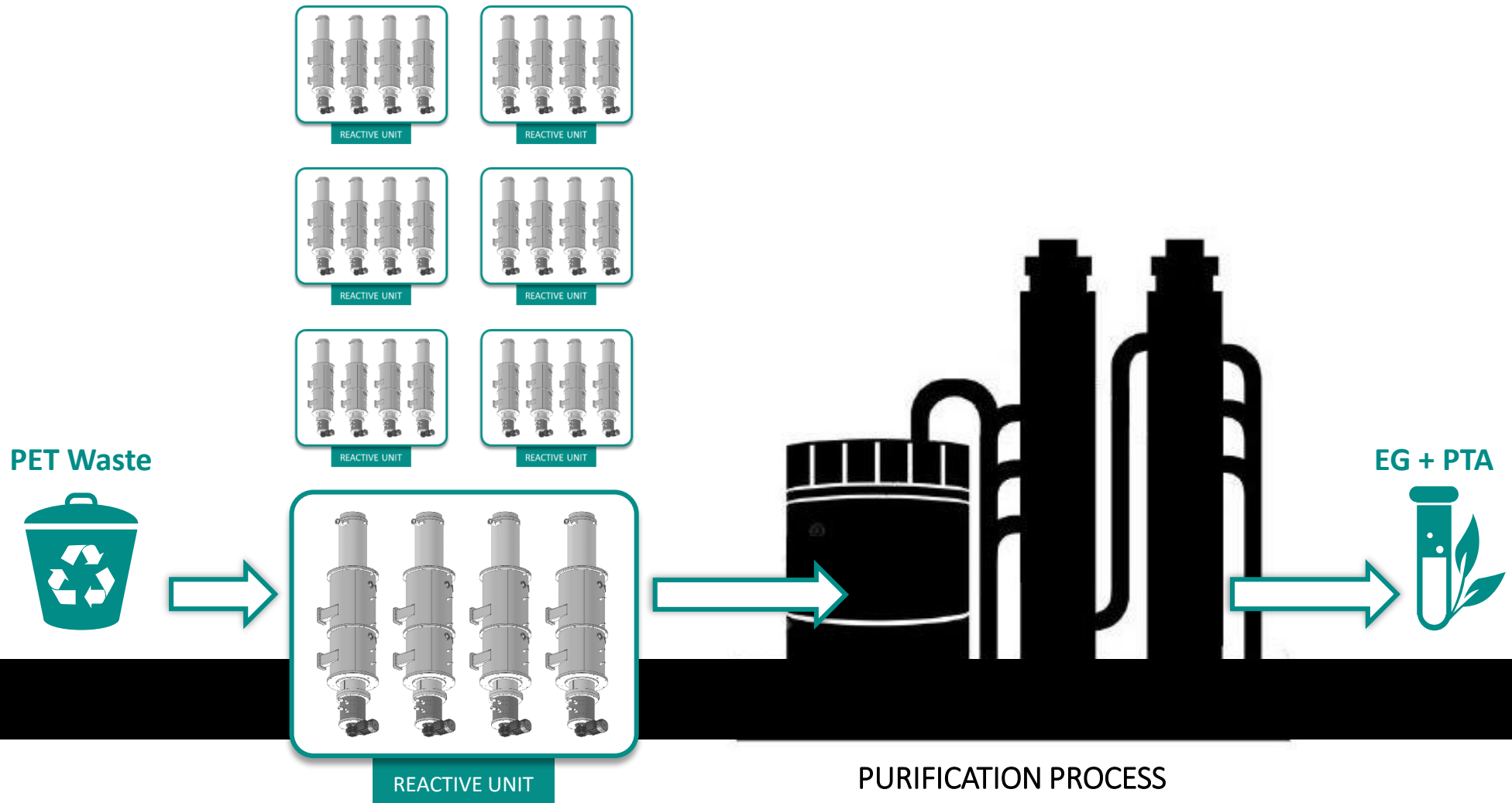


dem&to



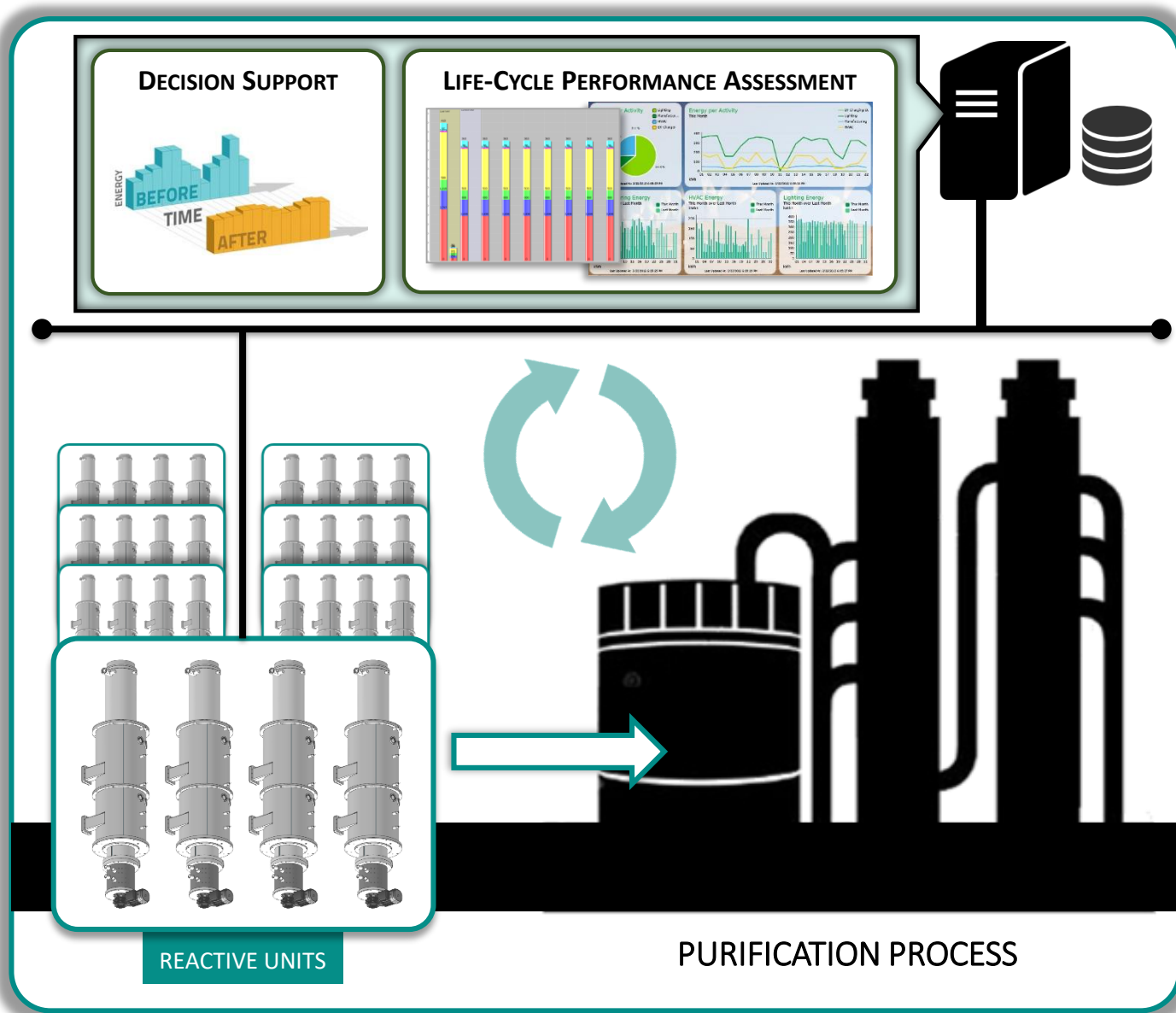
Industry 4.0 to the service of flexibility

Intrinsic adaptability of the process to varying input flows





Industry 4.0 to the service of sustainability



DECISION SUPPORT



LIFE-CYCLE PERFORMANCE ASSESSMENT



Thermal Energy



Electricity



PET Waste



Water



EG + PTA



Waste to disposal



Discharged water



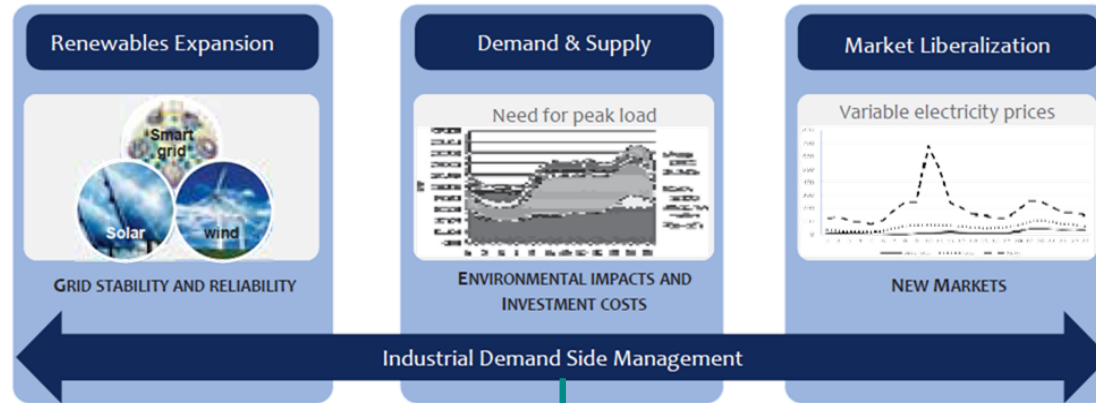
REACTIVE UNITS

PURIFICATION PROCESS



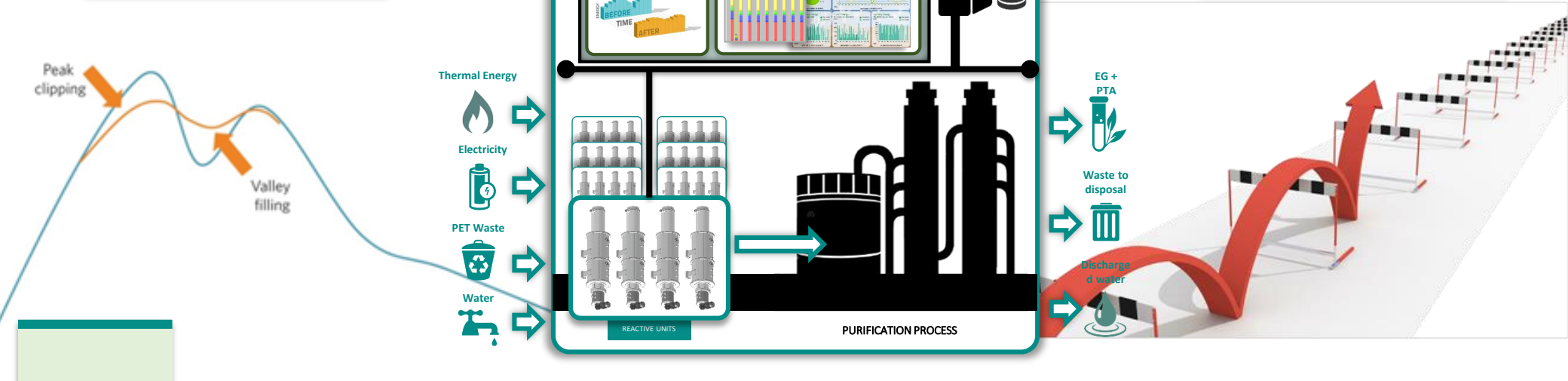
Industry 4.0 to the service of optimization

Integrated Energy and Resource management for improved efficiency



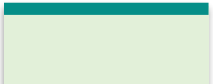
Energy-aware
Planning & Scheduling

Demand Response
strategies





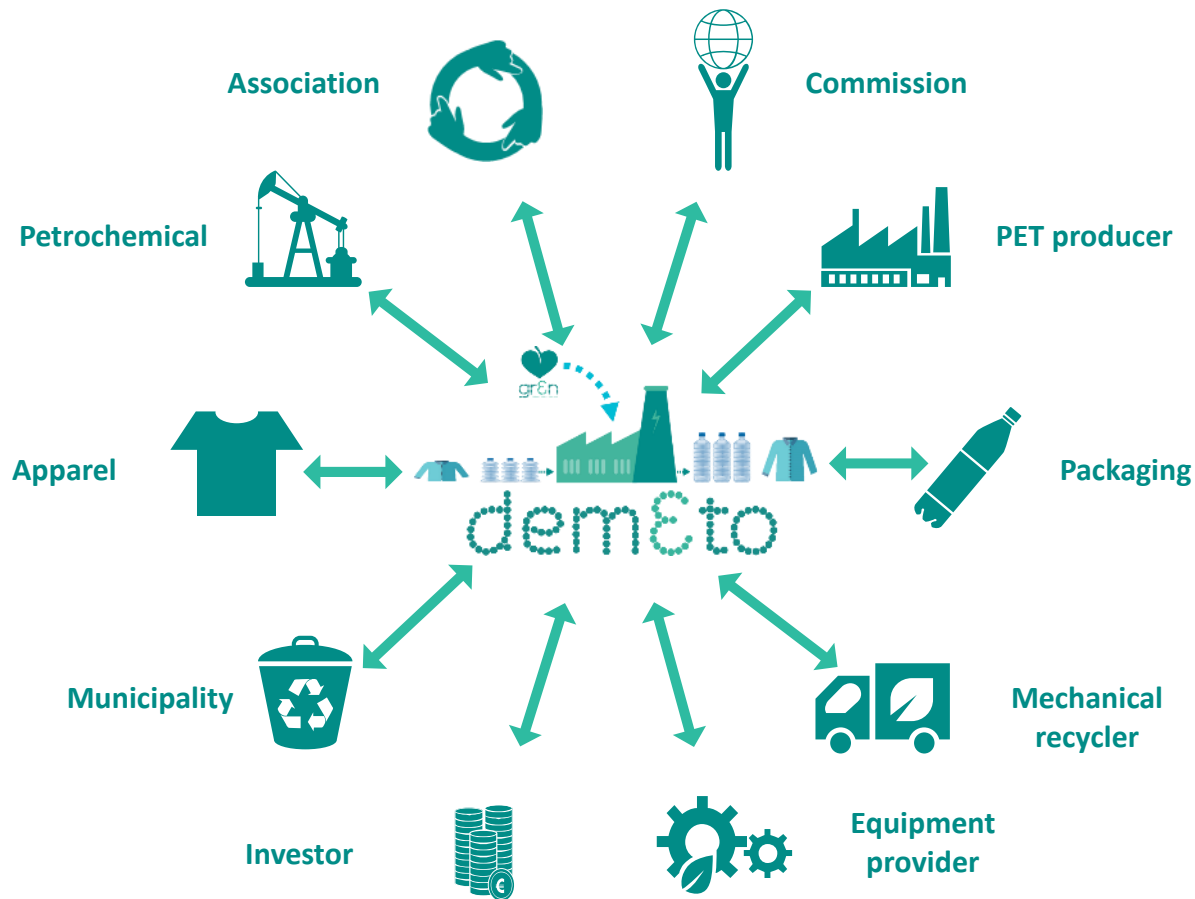
What's next? 





Open Points and IAB role

Partnership with stakeholders



Scope: Considering industrial requirements and needs during design of de-polymerization plant

We ask for: Feedback about the value chain to obtain a robust life-cycle dynamic assessment

We give: timely updates of the process performance with respect to specific application scenarios

Commitment:

- Yearly “closed doors” dissemination event
- Update conference call every 6 months
- Spot requests for information by **DEM3TO** partners