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PolyStyreneLoop – The circular economy in action

Clemens Demacsek

**SUSTAINABLE BUILT ENVIRONMENT D-A-CH CONFERENCE 2019
Graz, 13.09.2019**



Polystyrene Foam EPS and XPS

- Insulation material



98 % air

- Packaging material and safety helmets



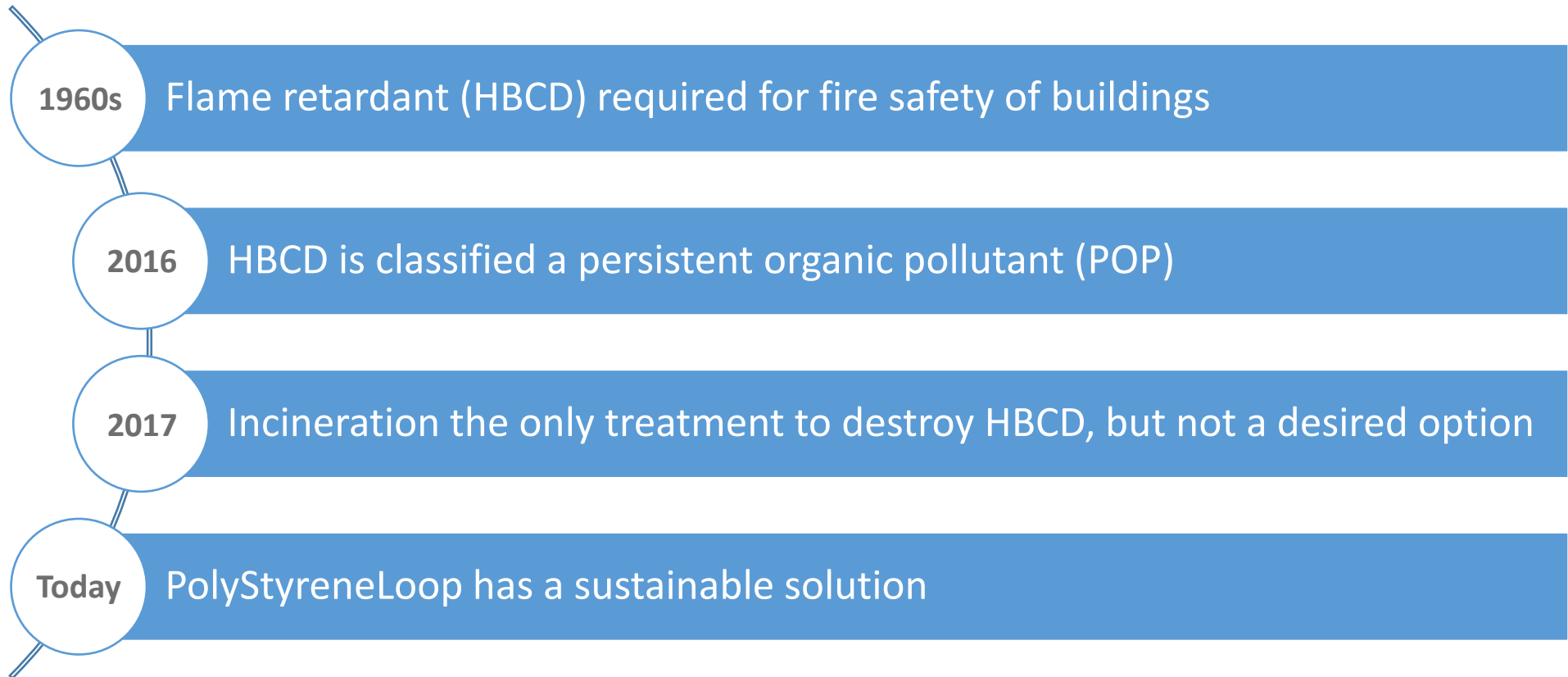
Protection

EPS ... Expanded Polystyrene
XPS ... Extruded Polystyrene

EPS and XPS Insulation Material



- Historical development of the flame retardant HBCD





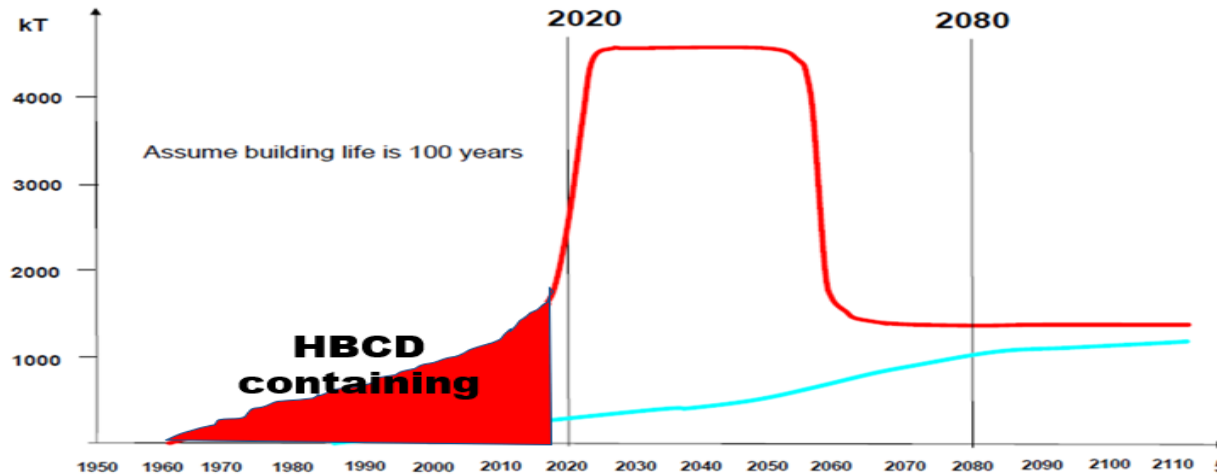
EPS Waste in Europe

- Amount of EPS construction waste

EU 28+2 2017 EPS construction waste	Waste collected in kt		Recovery in kt				Disposal in kt
	kt	%	Mechanical Recycling as EPS	Mechanical Recycling as PS	Energy Recovery	Total	Total
Installation waste	40,0	29%	9,2	2,1	12,5	23,8	16,3
Demolition waste	98,6	71%	1,0	0,3	68,6	69,9	28,7
Total	138,7	100%	10,2	2,4	81,1	93,7	45,0
			7%	2%	59%	68%	32%

No disposal of
EPS in Austria

EPS Insulation in Buildings: In and Out Flow
New Buildings, Renovation and Demolition



EU Plastics Strategy



- EUMEPS EU Voluntary Pledge – Recycling targets

Object	Polymer	Baseline	Pledge	Quantities 2025 (estimates)		Quality	New Technologies involved
				Market	Recycle		
Insulated Packaging (e.g. fish boxes)	EPS	Conversio Study 2017	50 %	140,000	70,000	High quality EPS	Food grade quality potential (EPS SURE)
Protective Packaging (e.g. appliances)	EPS	Conversio Study 2017	50 %	230,000	115,000	Standard EPS	
Building Deconstruction	FR-EPS EPS	Estimated 2025 market	27 %	150,000	40,000	High quality EPS	PolyStreneLoop – HBCD removal and recycling of bromine. Chemical recycling.
New build and renovation	FR-EPS EPS	Conversio Study 2017	80 %	40,000	32,000	Standard EPS	
Civil Engineering New build and Deconstruction	EPS		90 %				
TOTAL			46 %	560,000	257,000		

2

FR = Flame Retarded



EU Plastics Strategy

- The future for polystyrene foam: closing the loop



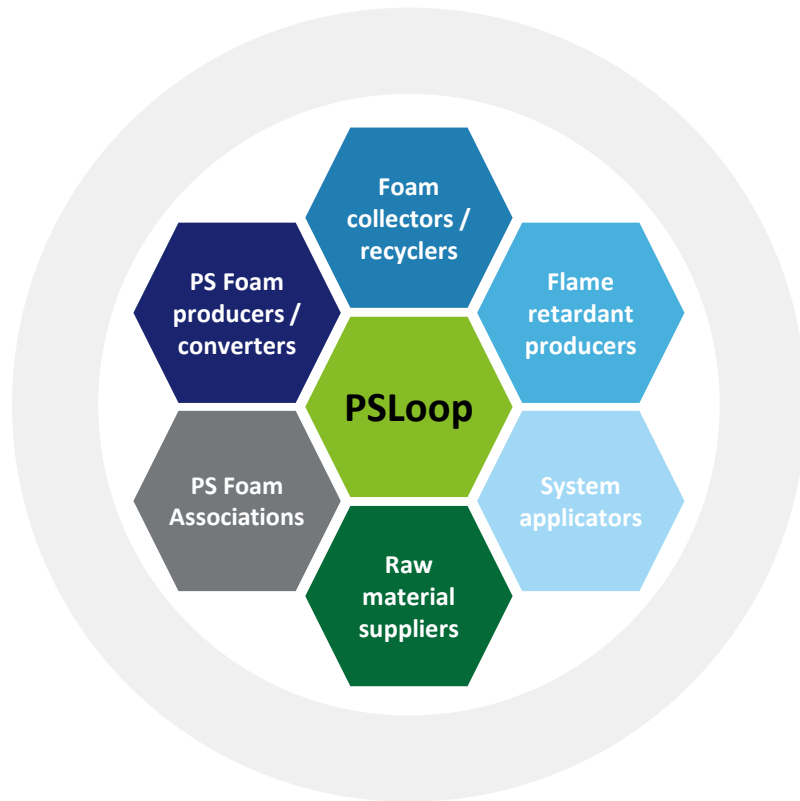
Circular economy



PolyStyreneLoop Cooperative

- Members, supporters and partners

THE ENTIRE PS-VALUE CHAIN



GEOGRAPHIC COVERAGE – 18 COUNTRIES



PolyStyreneLoop Cooperative

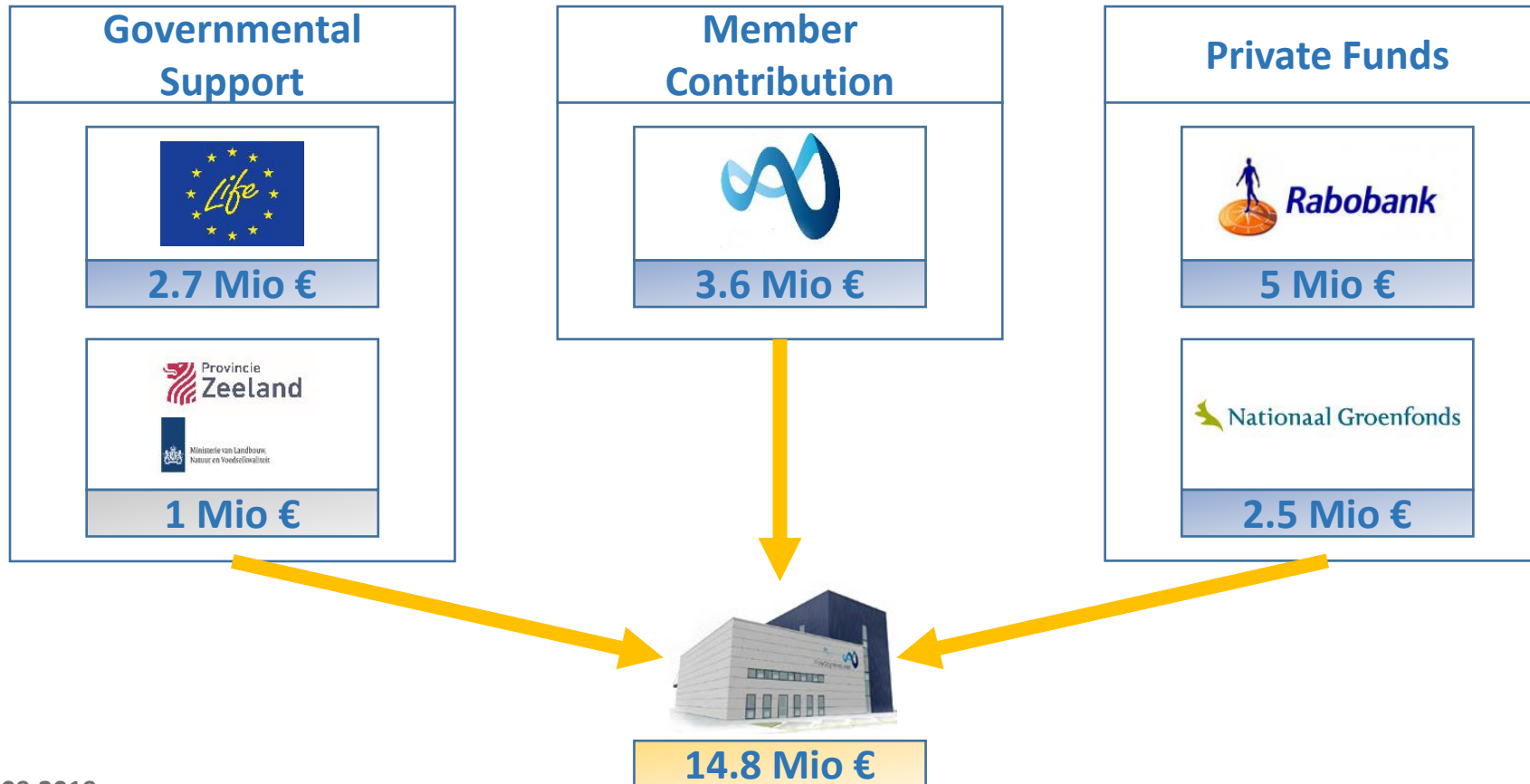
- At a glance – members, supporters, partners and allies





Financing

- Funding Cooperative, LIFE Grant and Bank Loan



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- From demolition site to recovering PS and Br





Collection and Pre-treatment

- Decentralized collection points (HUBs)
- EPS Powerbrush

Input specifications:

- water content $\leq 3\%$
- other impurities $\leq 7\text{ wt.}\%$
- no bituminous impurities!





Compaction

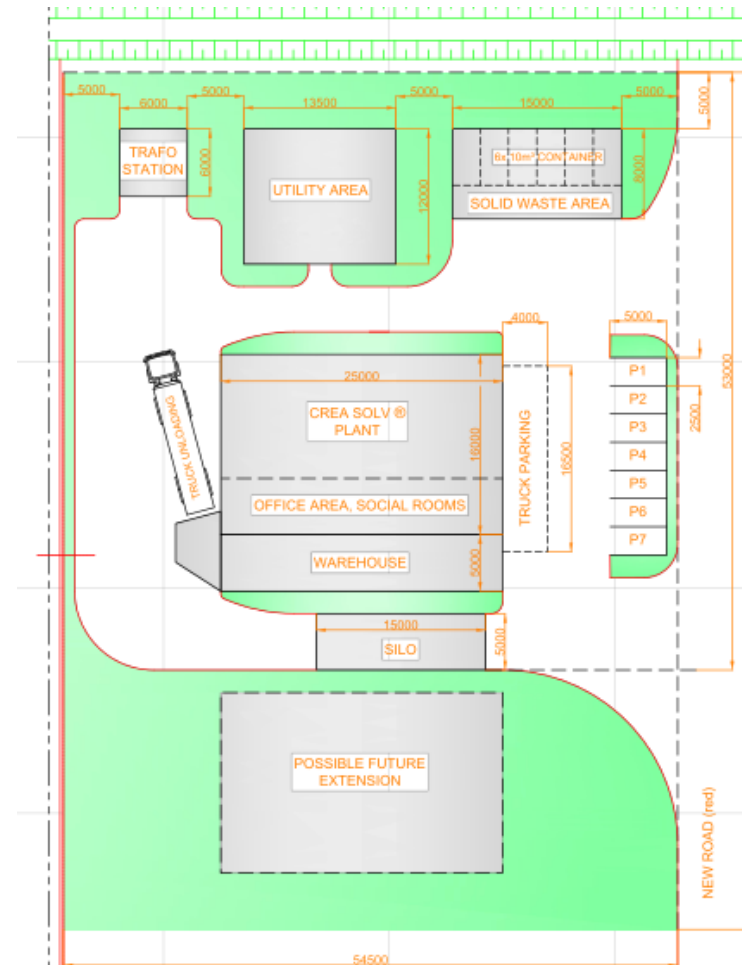
- EPS compactor



Density of briquettes:
100-450 kg/m³

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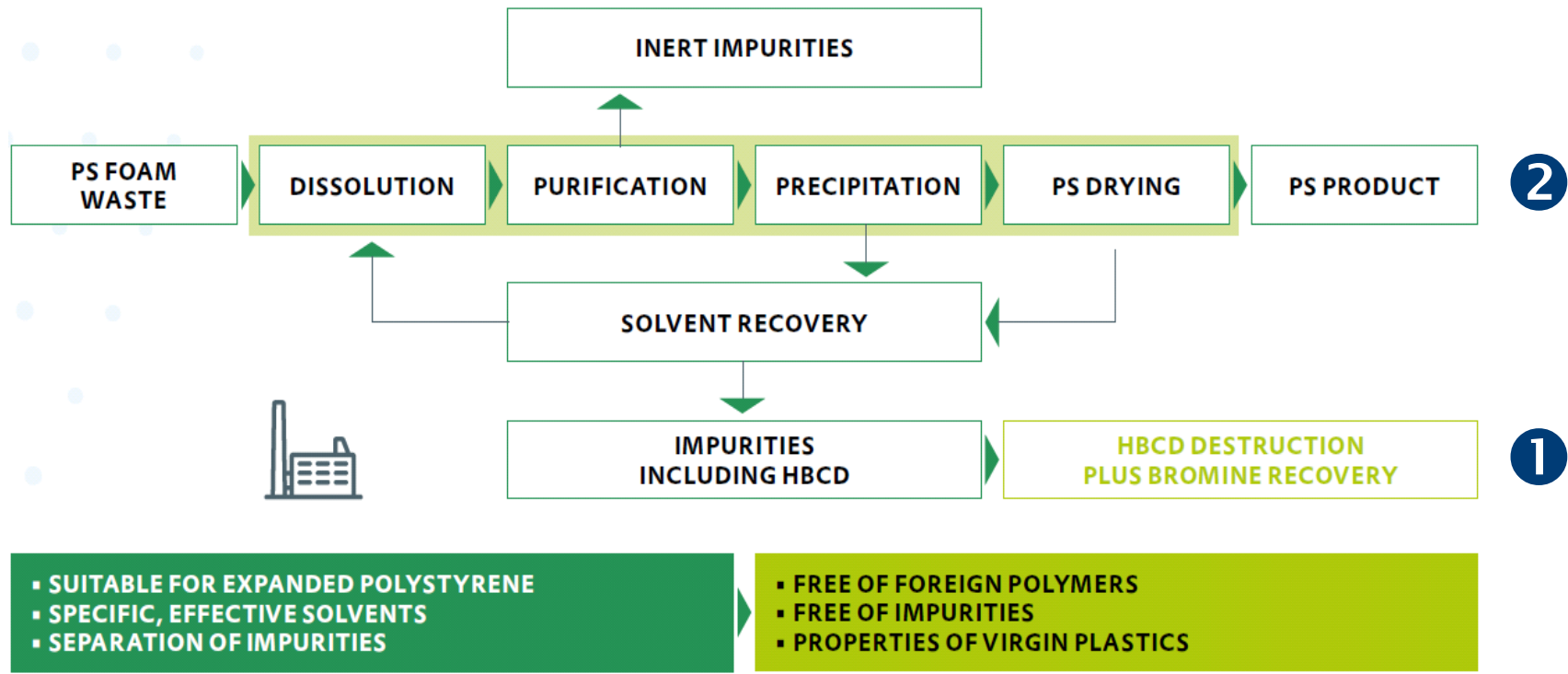
- Situational overview of PolyStyreneLoop demonstration plant in Terneuzen, Netherlands



PolyStyreneLoop



- CreaSolv[®] Technology and Bromine Recovery Unit (BRU)

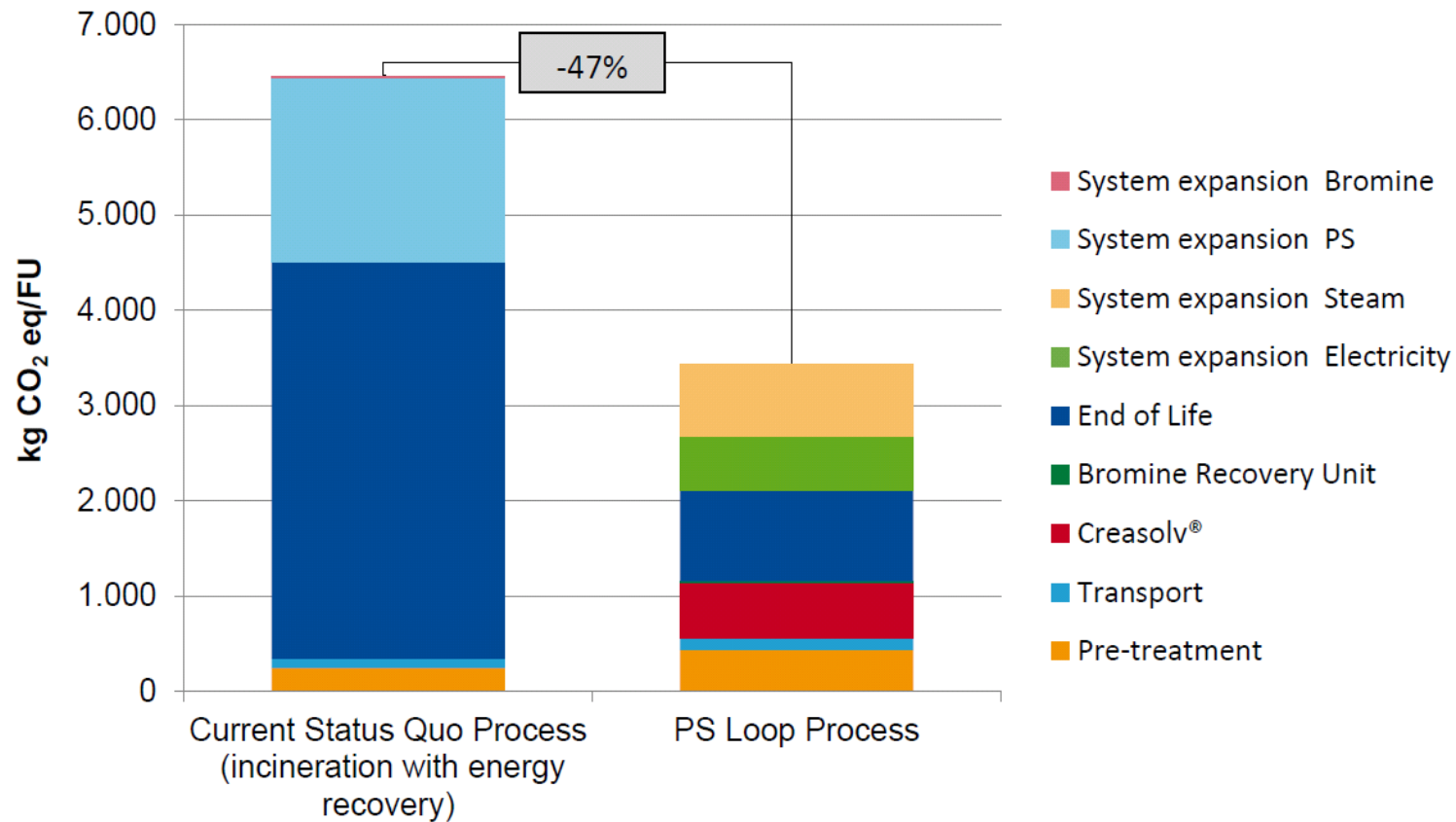


CreaSolv[®] is a registered trademark of CreaCycle GmbH



Environmental Benefits

- LCA for the end of life treatment of EPS coming from ETICS





Time Table

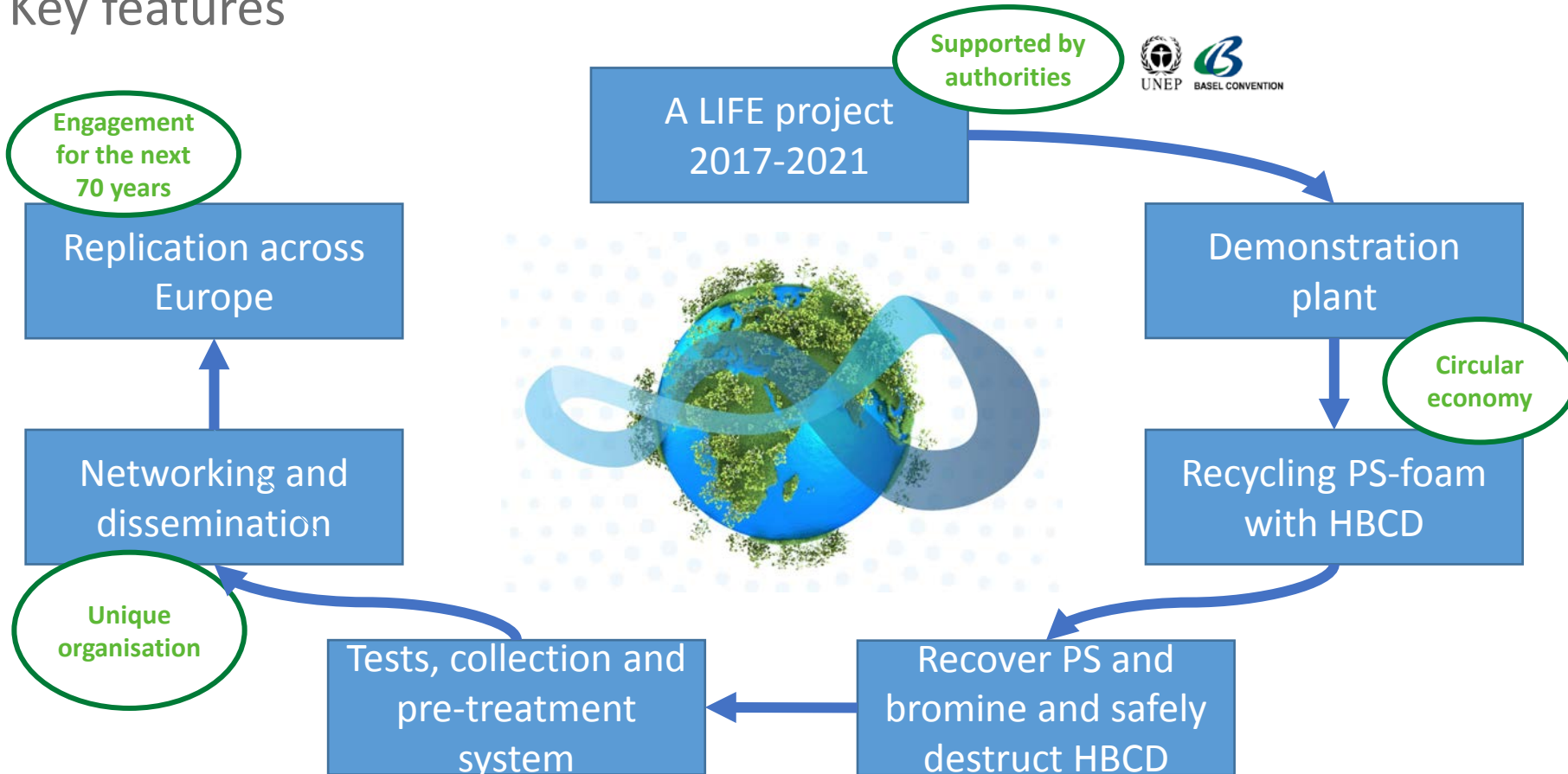
- EPS demonstration plant including XPS extension

		EPS Project timeline																		
month	Go	1	2	3	4	5	6	7	8	9	10	11	12	13	14					
Entrance road to the plant																				
Civil construction																				
Basic Engineering																				
Detail Engineering																				
Utilities and Civil Engineering																				
Hazop2 / ExRA																				
Building team operational																				
Ordering main equipment																				
Ordering other equipment																				
Construction of the plant																				
First solvent fill																				
Installation, Commissioning & Testing																				
Operational																				
		XPS Project timeline																		
month		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
XPS Permit preparation		Oct																		
Authority XPS permit application																				
Process choice		Oct																		
Budget capex																				
GO / No GO				GO																
Engineering Process and Civil																				
Hazop2 / ExRA																				
Ordering main equipment																				

Start of construction:
October 2019

Conclusion

- Key features





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Contact: info@polystyreneloop.eu



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Ministerie van Landbouw,
Natuur en Voedselkwaliteit



WWW.STYROPOR.AT

Contact: gph@gph.at