



Second Generation MethylMethAcrylate

Perspectives for PMMA recycling

The relevance and societal impact of the MMAtwo project

Simon van der Heijden



**Virtual Workshop
on Polymer
Recycling**

September 15th 2020

DOI: 10.13140/RG.2.2.36739.73765



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement N° 820687.

Who?



What is PMMA?





PMMA waste





Production waste



End-of-life waste





PMMA in Europe

European annual consumption of PMMA

2015

304 KT

2018

325KT

2023

356KT (est.)

Post production waste:

5-20%

EoL waste:

Lifespan

Carlight 5-15yr

Bathtub 10yr

Dome 15yr

Interior 5yr

Display 2-5yr

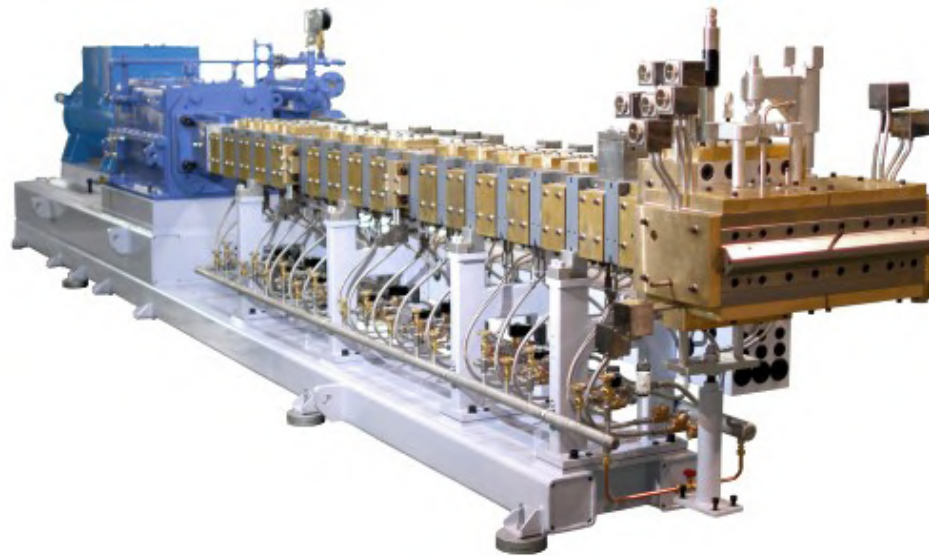
LCD 5-10yr

Coronascreen ?

What about the waste?!

- Collection
- Recycling capacity
- End markets

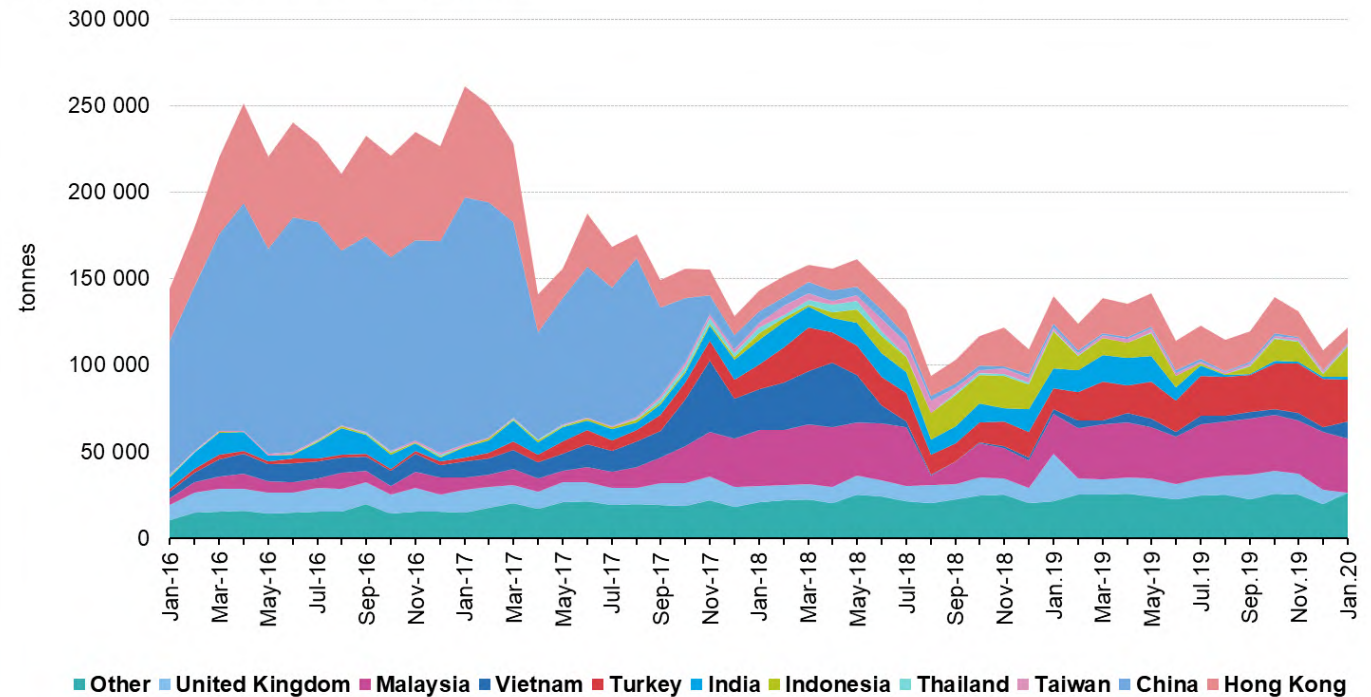
How?



Where?



Export of plastic waste for recycling from the EU to receiving countries, 2016 to January 2020



Source: Eurostat COMEXT

eurostat

INDEPENDENT

India bans imports of waste plastic to tackle environmental crisis

Tighter rules come a year after China implemented similar ban, prompting western nations to send rubbish elsewhere

Harry Cockburn | Thursday 07 March 2019 11:32



Need for recycling capacity and suitable technology

Du Vergier (UK) Plant closed (2002) Collaborated with ICI	ARKEMA (France) Plant closed (2005) 	EVONIK Para-Chemie (Austria) Plant closed in (2017) 	MADREPERLA (Italy) Plant active 	MONOMEROS DEL VALLES (Spain) Plant active 	
About 6000 t/y	About 6000 t/y (2 lines)	About 3-5000 t/y (2 to 3 lines)	About 6000 t/y	About 2000 t/y	1 st plant: 2-3 kt/y (to 27 kt in 2028)

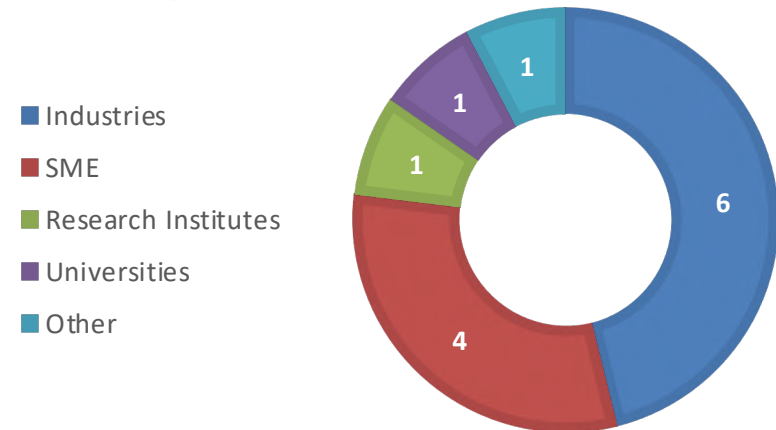
PMMA depolymerization players in Europe, and plant capacities.
AECI in South Africa **had a 2000 t/y plant**,
Mitsubishi Rayon in Japan **operated a Fluid Bed process at 2000 t/y capacity**

And several other plants in the world at various sizes: China, India, Thailand, Egypt, Brazil



MMAtwo project at a glance

- Second generation Methyl MethAcrylate
- Innovation Action – GA N° 820687
- 13 partners from 6 different countries
- 8.9 M€ budget (6.6 M€ grant)
- From 01/10/18 to 30/09/22
- Key words: Recycling, Depolymerization, PMMA, Thermal, Monomer, Polymer, MMA, Plastic waste, Plastics technologies, Sustainable design, waste management, materials engineering, Circular economy, Sustainable design





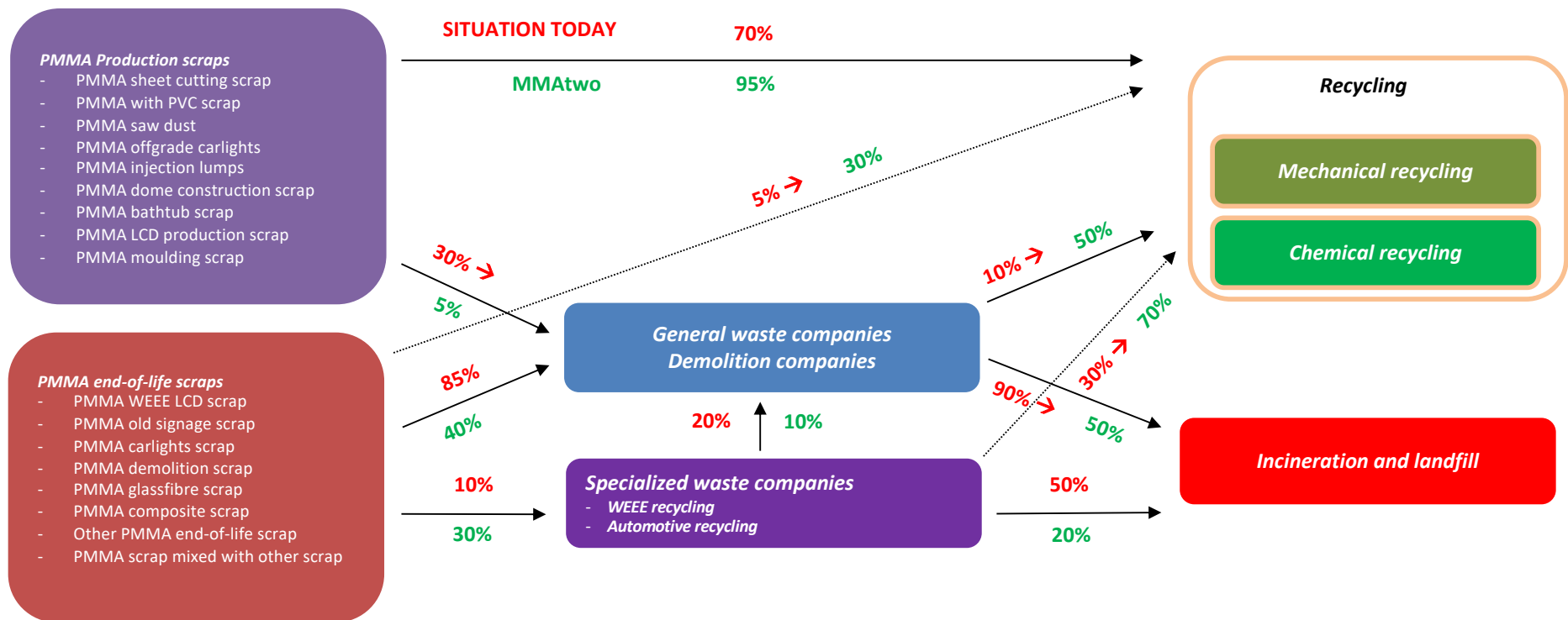
MMAtwo major objectives - methodology

- PolyMethylMethAcrylate, 'PMMA' used in optical, signage, displays, decorative, vehicles, construction, electronic screens etc.
- Production in Europe around 300.000 tons annually; recycling capacity in Europe around 8.000 tons annually.
- Objective: Construction of a new value chain for post-production and end-of-life PMMA waste recycling in collaboration with producers, waste collectors, processors, end-users and the academic community through depolymerization and recovery of MMA, using a lead free environmentally friendly and accessible technology (continuous process).
- Results to be exploited into EU PMMA recycling business(es)



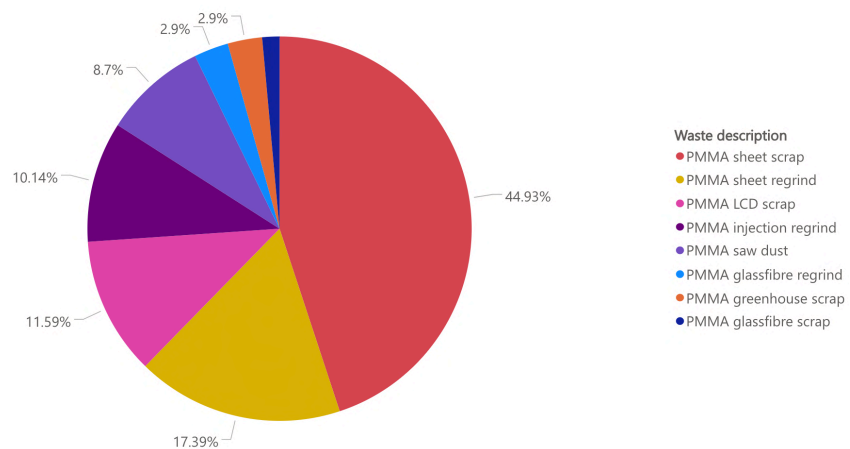


PMMA recycling today and after MMAtwo: Divert more product from landfill and incineration to recycling





Waste description



Identification rate EoL: 11%



MMAtwo workshop – 15/09/2020

Collection



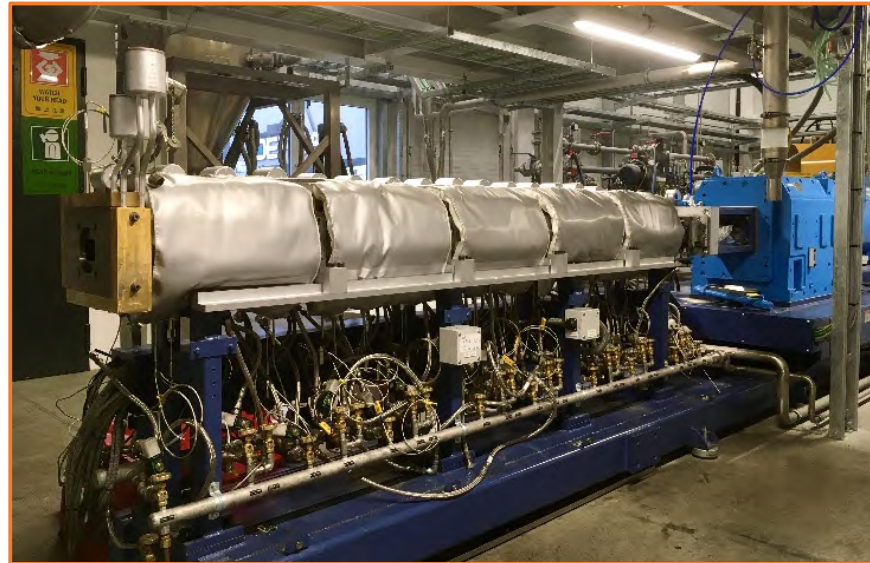


Pretreatment





Depolymerisation



Video



Purification



End use



Impacts



■ Environmental

- Waste
- Energy
- CO2
- Water



■ Health

- Technology
- Design



■ Business

- Market over 1 billion €



■ Academic





Stay in touch

Website address <https://www.mmatwo.eu>





Second Generation MethylMethAcrylate

Thank you for your attention!

Simon van der Heijden



Virtual Workshop
on Polymer
Recycling

September 15th 2020



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement N° 820687.