1 

2 

3 

4 

Your safety is KEY to us !

- Respect restricted areas
- Follow the paths/aisles
- Beware of handling & trucks
- **Stay grouped**
- **Follow the leaders instructions, especially in case of emergency**

Uw veiligheid is onze prioriteit!

- Respecteer verboden zones
- Volg de paden
- Let op: transport en vrachtwagens
- **Blijf in de groep**
- **Volg de instructies van de gids, vooral in noodsituaties**

In geval van nood: 09/368.77.77 - In case of emergency: 09/368.77.77

RECTICEL
The passion for comfort

PUReSmart

PolyUrethane Recycling Towards
a Smart Circular Economy

Bart Haelterman

Welcome plus intro in Puresmart-

Dissemination workshop
01/12/2022

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement N° 814543

History of recycling of PU foams

- **Thermoset PU**
- **Efforts for material recycling since 1980's**
  - **Production waste (Trim foam)**
  - **Alternative markets for the carpet underlay market (US and other) – fluctuating Trim foam prices**
  - **Result = # niche markets : carpet underlay, parcquet underlay, shock absorbing mats, sport mats & fields.**
- **Chemolysis**
  - **Wrong mass balance (use of high amounts of 'solvent')**
  - **Mix of chemicals, low use levels recycled content (5-10 %) mostly in flexible & rigid foams**

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Triggers for this project in 2017-2018

- **Increased attention/efforts sustainable context**
- **EPR (extended producer responsibility) schedules upcoming**
- **Barriers towards circularity**
  - **Weak product design**
  - **Limited collection**
  - **Weak demand for second-hand furniture**
  - **Poor demand recycled products (saturated ..)**
  - **Legacy chemicals**
  - **Weak over-arching policy drivers**
  - ***Difficulty to recycle PU – prove of circularity of PU foams***

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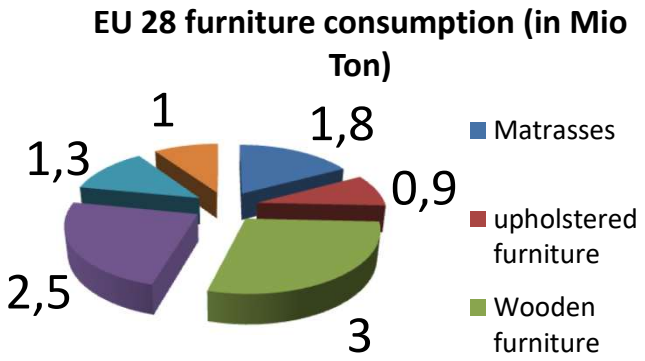
Numbers - 2018

- **EU furniture consumption = 10.6 Mio Ton**



- **End of Life furniture**
  - **2-5 % of municiple solid waste fraction (in volume much bigger)**
  - **30-35 % of mattresses & upholstered furniture = PU foam → 600-800 kTon PU foam/year**
  - **Majority of the EOL furniture is incinerated or sent to landfill**

PU foam types	Volumes / year	Mechanical recycling	Energy from incineration	Landfill
Trim foam	185 000 t	100%	0%	0%
EoL mattresses[34]	160 000 t	1%	9%	90%
EoL upholstery furniture [35]	450 500 t	0%	50%	50%
EoL automotive and transport sector[36]	112 380 t	13%	50%	38%

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Numbers – 2017 → 2022

- **France is the only country with EPR scheme**
  - Started in 2013
  - > 4000 collection points
  - 2017 :
    Collection of 530 Kton of furniture
    57% recycled
    36% incinerated
  - Recycling foams : no data

- **Other countries to come (2017 ..)**

  - Today - active:
    Valumat Belgium – Flanders (2021)
    MRN in Netherlands (2022)
  - Future:
    Spain, Italy, Greece, UK ...?

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Numbers

- **2021*: 1.475 kton slabstock PU foam production**
  - **~ 516 kton in mattresses**
  - **~ 740 kt in furniture**
- **EOL mattresses in the EU**:**
  - **49% landfilled**
  - **33% energy generation**
  - **17% recycled**
- **Estimate that only 10% of the furniture is recycled in the EU*****

*: Europur, 'The end of life of flexible polyurethane foam from mattress and furniture'
**EBIA, "A study on the European mattress market and state of play with Extended Producer Responsibility", September 2020
***: sustainable_products_circular_economy.pdf (europa.eu)

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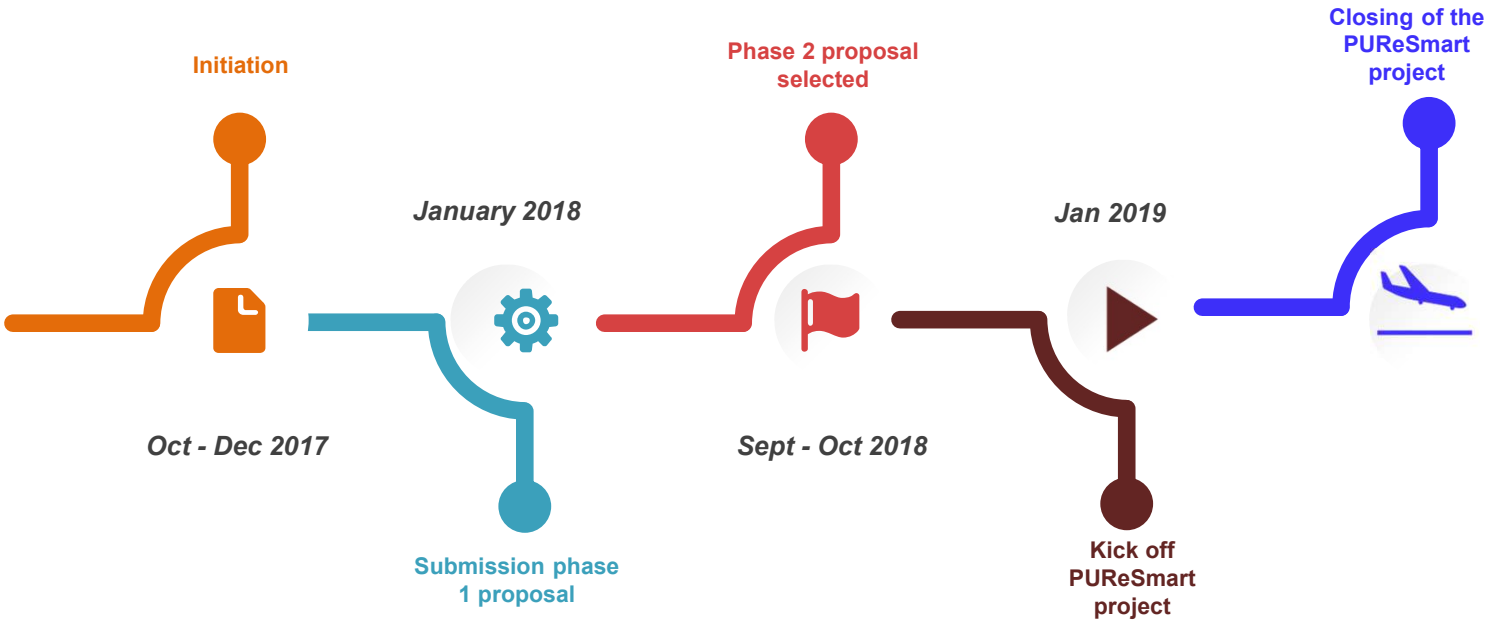
History of the project



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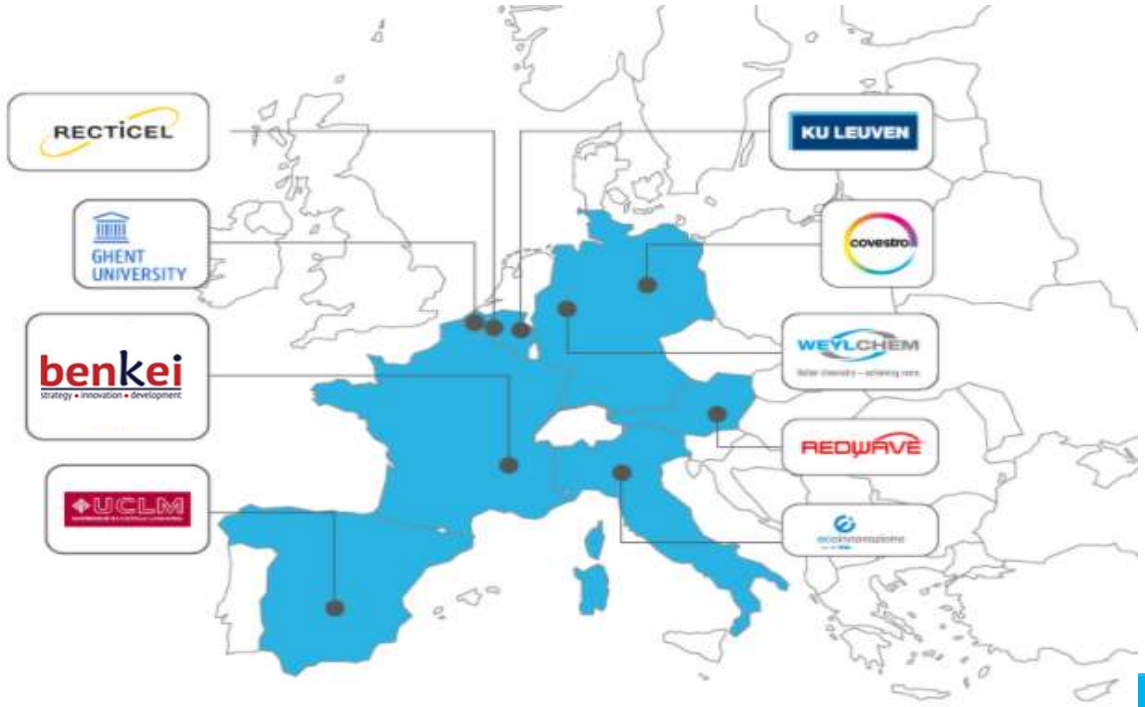
PolyUrethane Recycling towards a Smart Circular Economy

- H2020 project
  - Recticel = Project leader
  - Budget 5,8 mio €
  - Start 1/1/2019 → 1/1/2023
  - TRL 3-5



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Main objective PUReSmart

- **Reshape the value chain of PU into a closed loop, and transform PU from a long-lasting waste stream into a long-lasting raw material**

- **Our ultimate goal**
  - **Smart design :**
    develop a covalent adaptable PU
    Recyclable

  - **Smart sorting :**
    Develop sorting techniques
    Clever sorting = dedicated recycling

  - **Smart chemolysis**
    Limit increase of mass of waste
    Recover and re-use at high % the raw materials

PUReSmart

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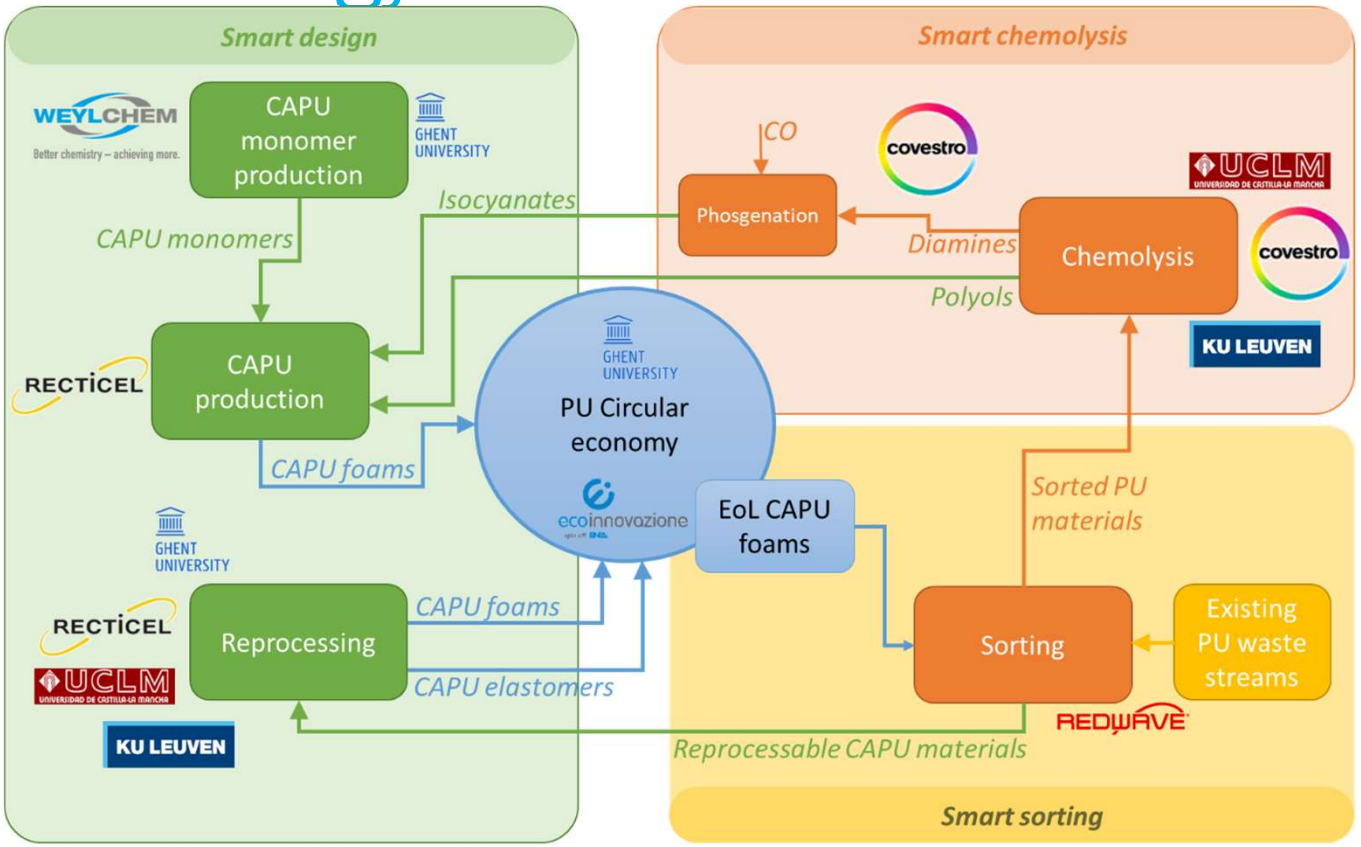
Methodology



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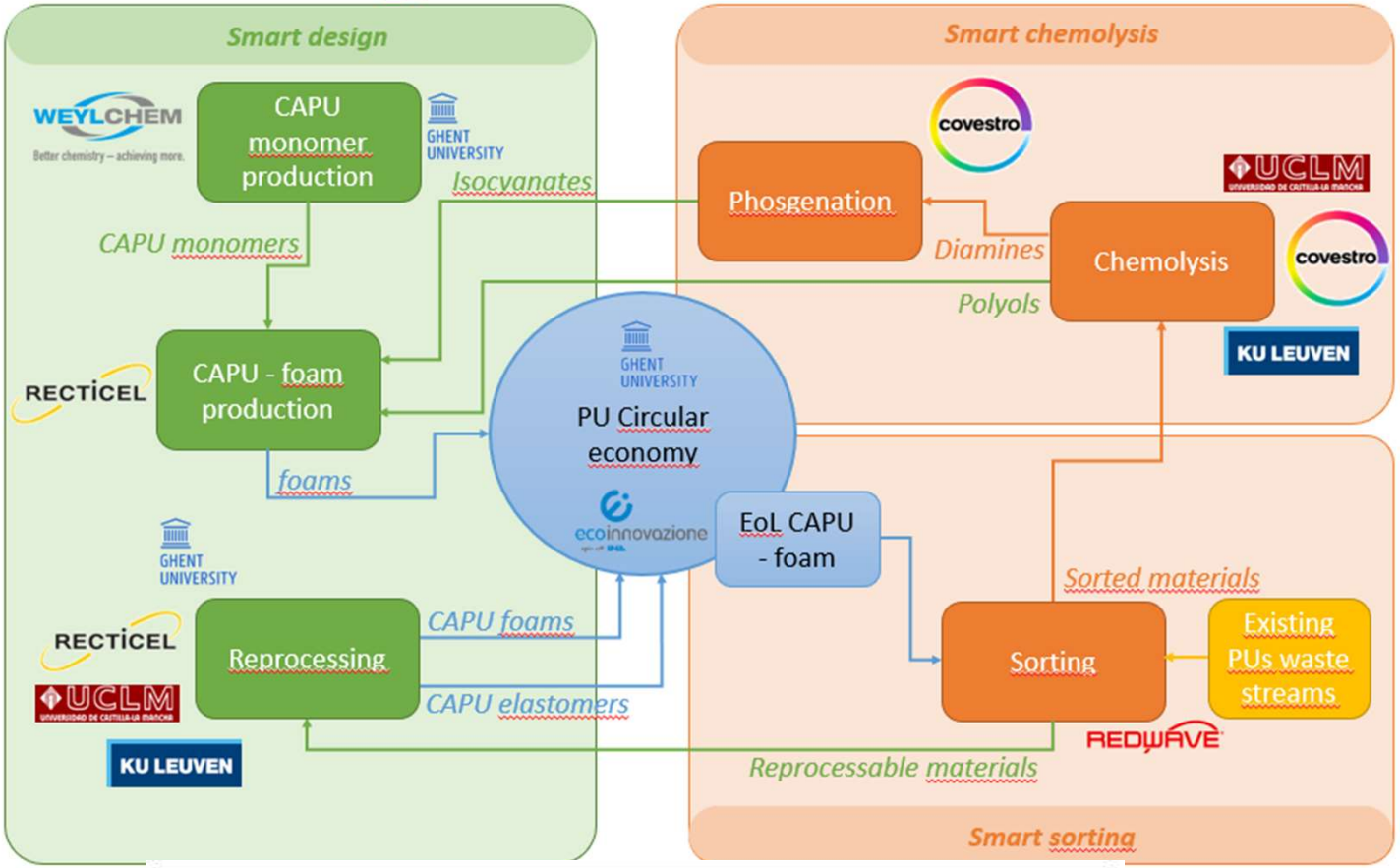
Methodology



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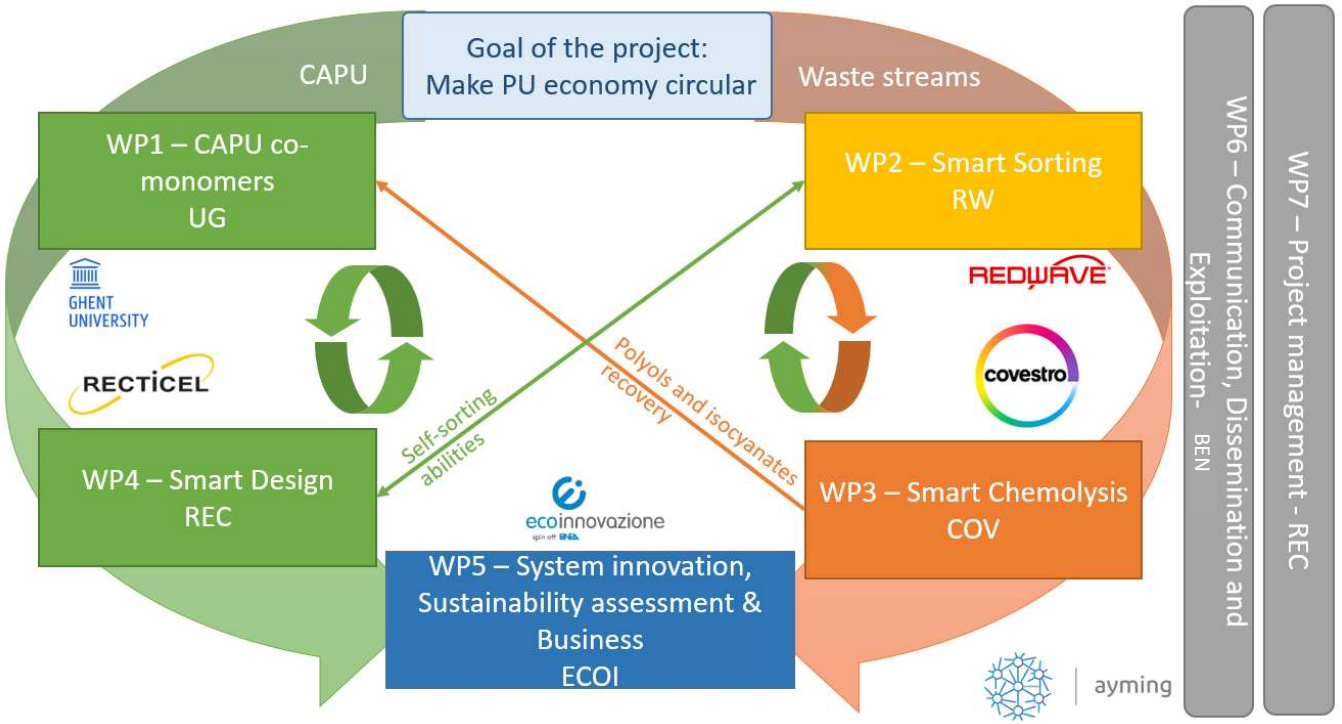
Project Organisation



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Program workshop PUReSmart :

- 10:00 - 10:30 Michel Baumgartner, Europur : "EU Green Deal and Recycling from a flexible PU perspective"
- 10:30 - 11:00 Ugent/REF Johan Winne/Lucie Imbernon: “Towards foam-to-foam recycling via the use of Covalent Adaptable Networks”
- 11:00 - 11:30 Redwave Katharina Ander: ‘Smart sorting of polyurethane foams’
- 11:30 - 12:00 Covestro Karin Clauberg “Smart Chemolysis: Recycling of polyurethane mattress foams, recovering both PUcomponents polyol and TDA”
- 12:00 - 13:30 Sandwich Lunch & networking

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Program workshop PUReSmart :

- 13:30 - 14:00 Ecoinnovazione Simone Maranghi: “The contribution of chemical recycling in achieving a sustainable circular economy - The case of PUReSmart technology”
- 14:00 - 14:30 REF – Subramaniam Iswar: “Smart Chemolysis: Valorisation of PU building blocks (recycled polyol, recycled isocyanate) in flexible polyurethane foam”
- 14:30 - 14:50 UGent Jonas Van Gaubergen : "Opportunities and barriers for scale-up: a TIS-perspective on innovation for chemical recycling of flexible PU foam"
- 15:00 - 15:20 Coffee break
- 15:20 - 15:50 External presentation - John Sewell Secretary General, Chemical Recycling Europe: “Chemical recycling”
- 15:50 - 16:05 Closing – Bart Haelterman General conclusion
- 16:05 - 17:20 Closing reception & networking

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Thank you

Any question?

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