



CHALMERS



Universiteit Leiden

The Environmental Performance of High Value Recycling for the Fashion Industry

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14.2

Annual Fashion Consumption



14.2 kg/capita



Annual Fashion Consumption



14.2 kg/capita

140000 tonnes/year



Annual Fashion Consumption



14.2 kg/capita

140000 tonnes/year



30.0 kg/capita

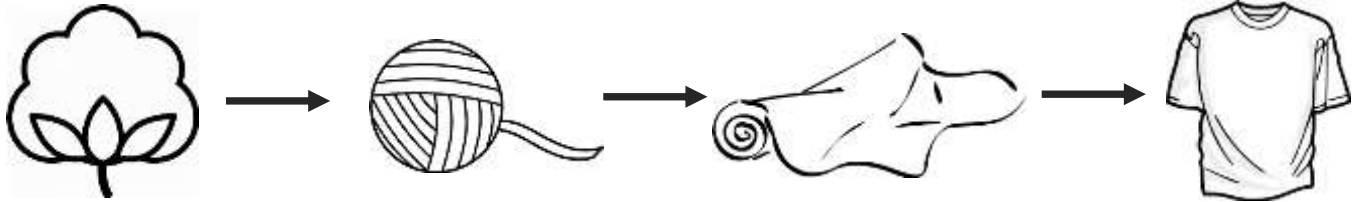
1969000 tonnes/year



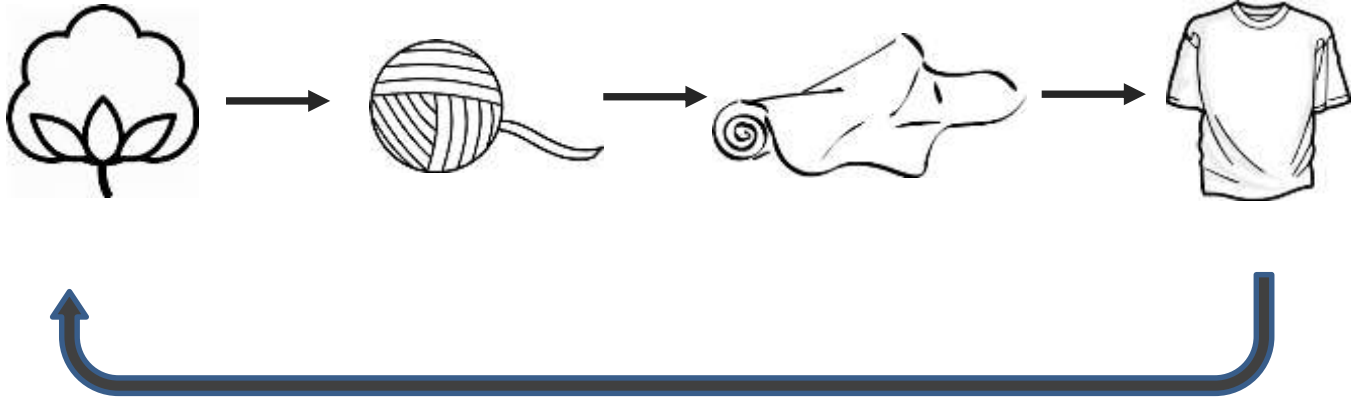




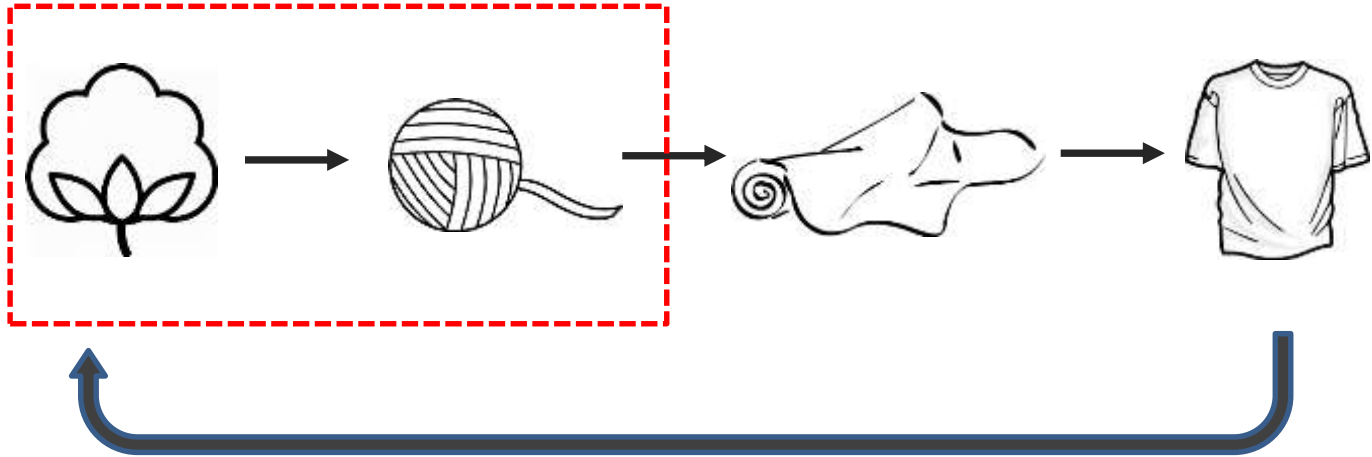
System boundaries



System boundaries



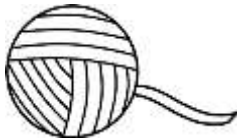
System boundaries



The Denim Case



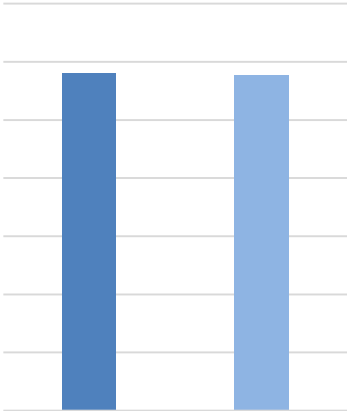
30 % (all cotton)



70 % cotton

The Denim Case

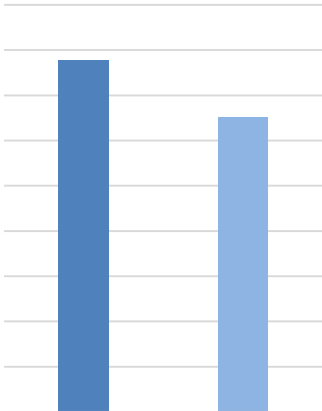
Global Warming



Virgin Yarn Recycled Yarn



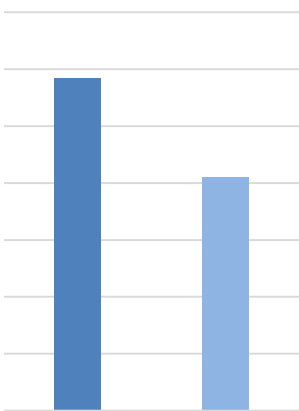
Eutrophication



Virgin Yarn Recycled Yarn



Water Consumption



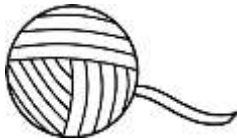
Virgin Yarn Recycled Yarn



The Blanket Case



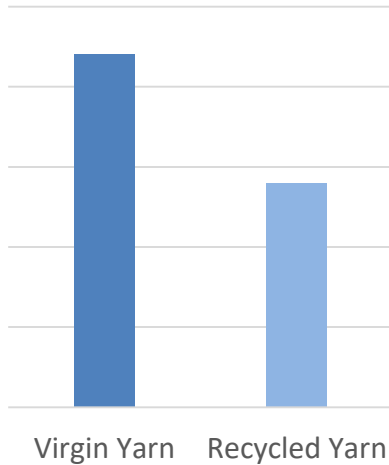
80 % (1:1 PET-cotton)



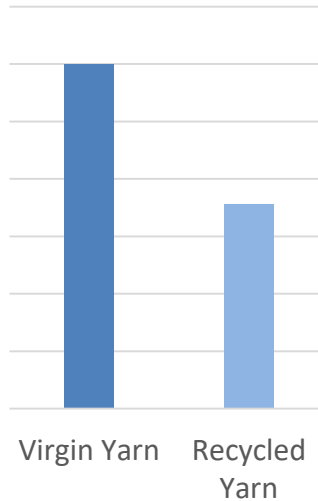
20 % PET

The Blanket Case

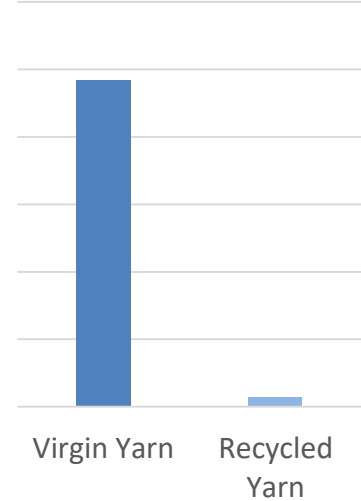
Global warming



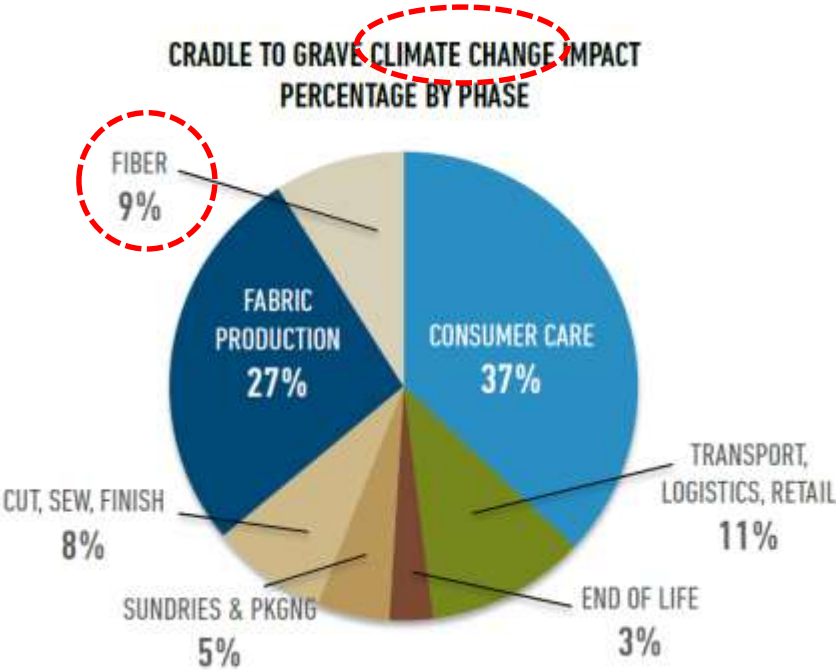
Eutrophication



Water Consumption

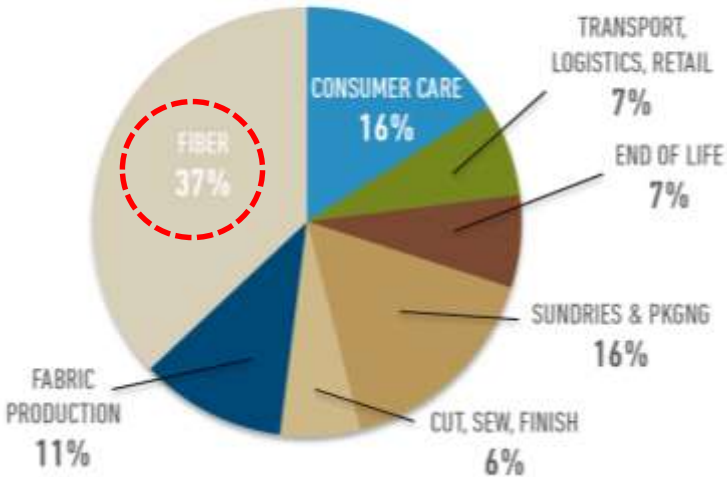


Supply Chain Analysis

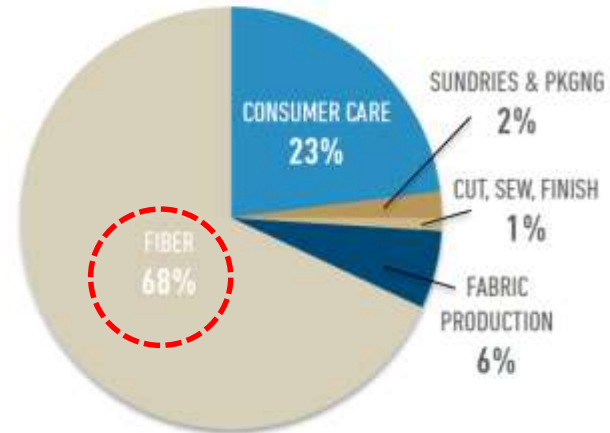


Supply Chain Analysis

**CRADLE TO GRAVE EUTROPHICATION
PERCENTAGE BY PHASE**



**CRADLE TO GRAVE WATER CONSUMPTION
PERCENTAGE BY PHASE**



Conclusions

1. Resource use
2. Global warming
3. Agricultural Impact
4. Next steps?

Q&A

Thank you!

Annex

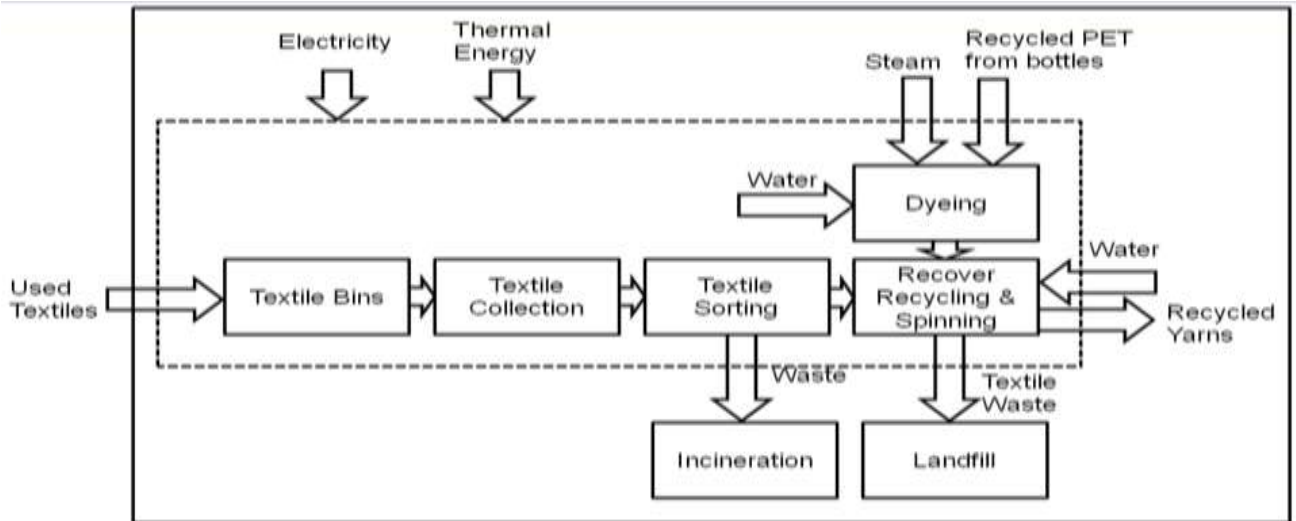
Agenda

1. Current Situation
2. High value recycling
3. The Case Studies
4. Discussion and Conclusions

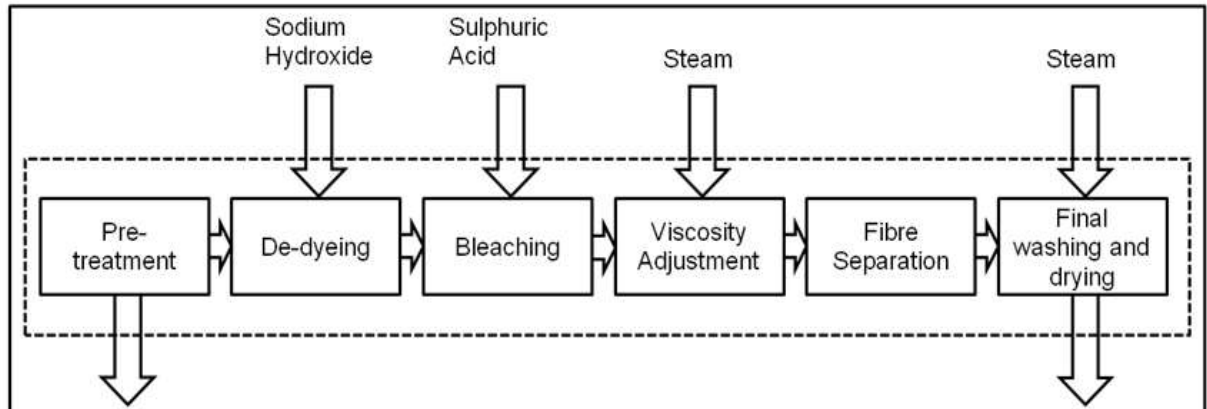
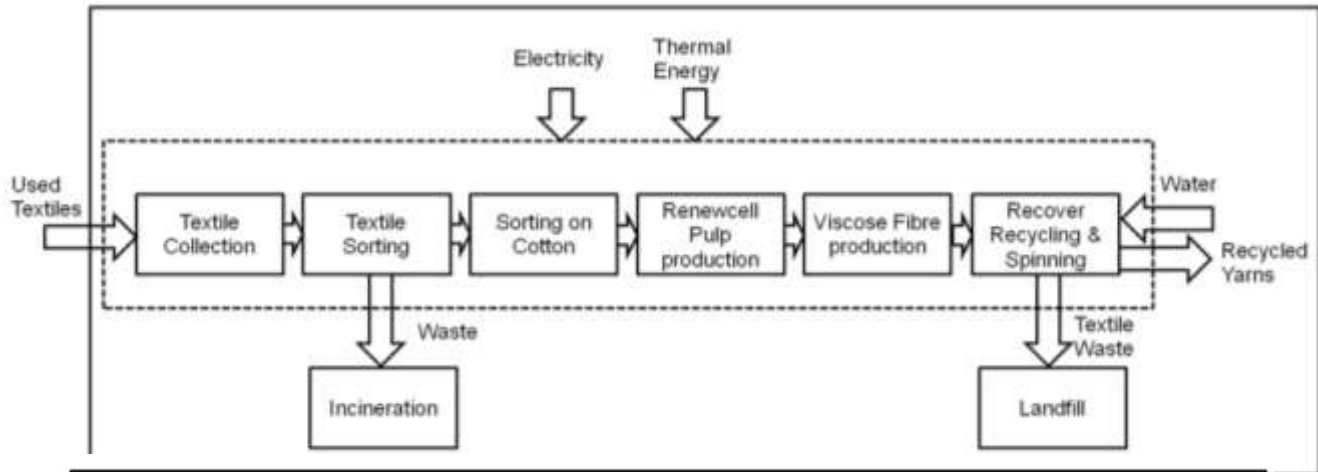
The main ingredients

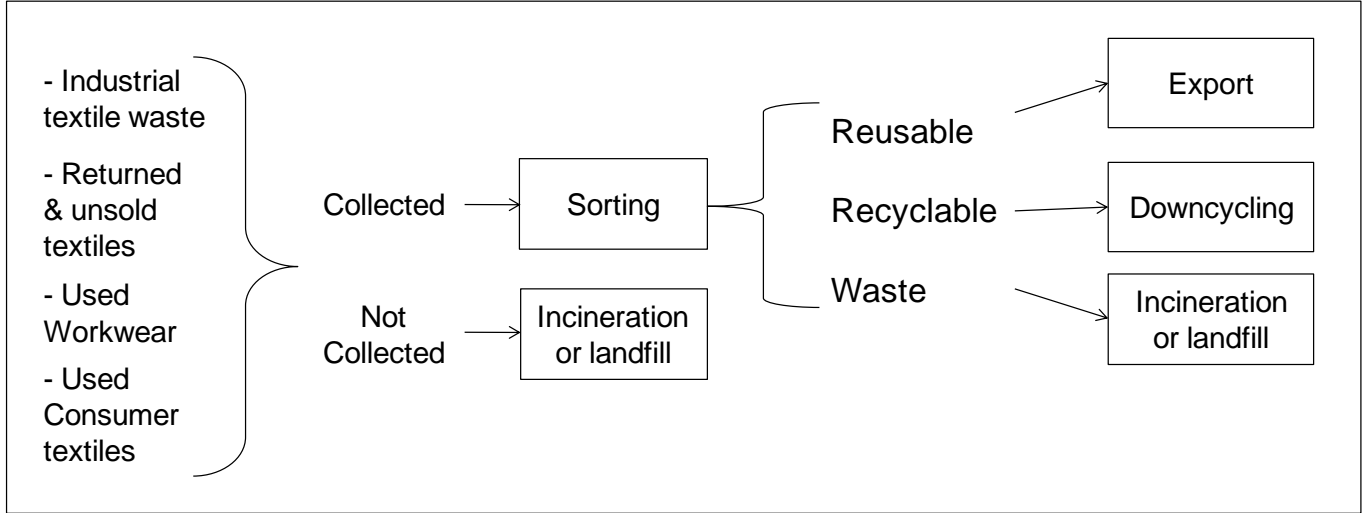


The Mixed Case

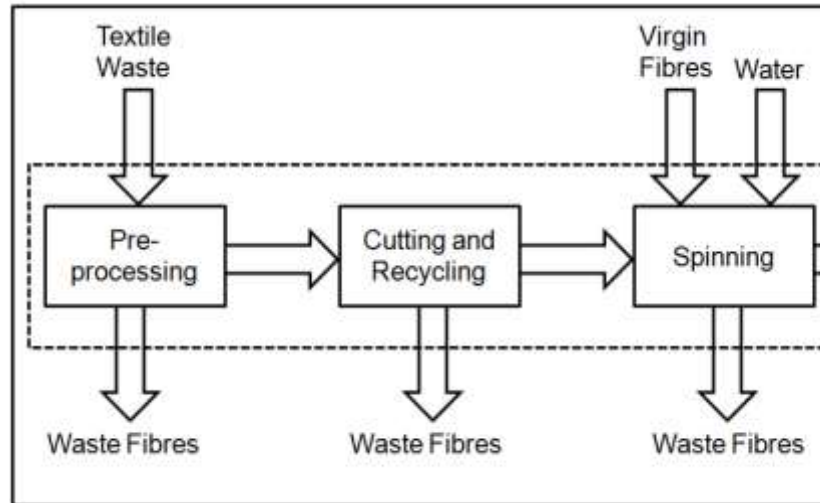
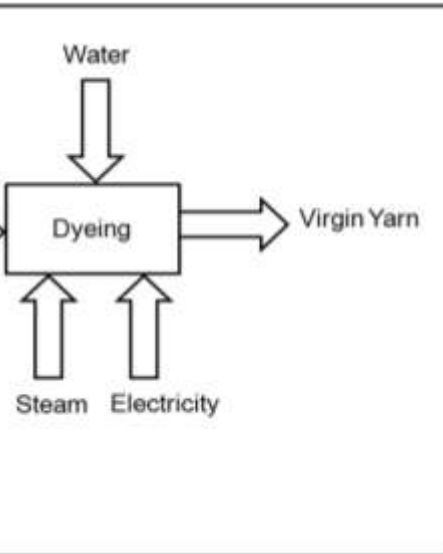


The Viscose Case

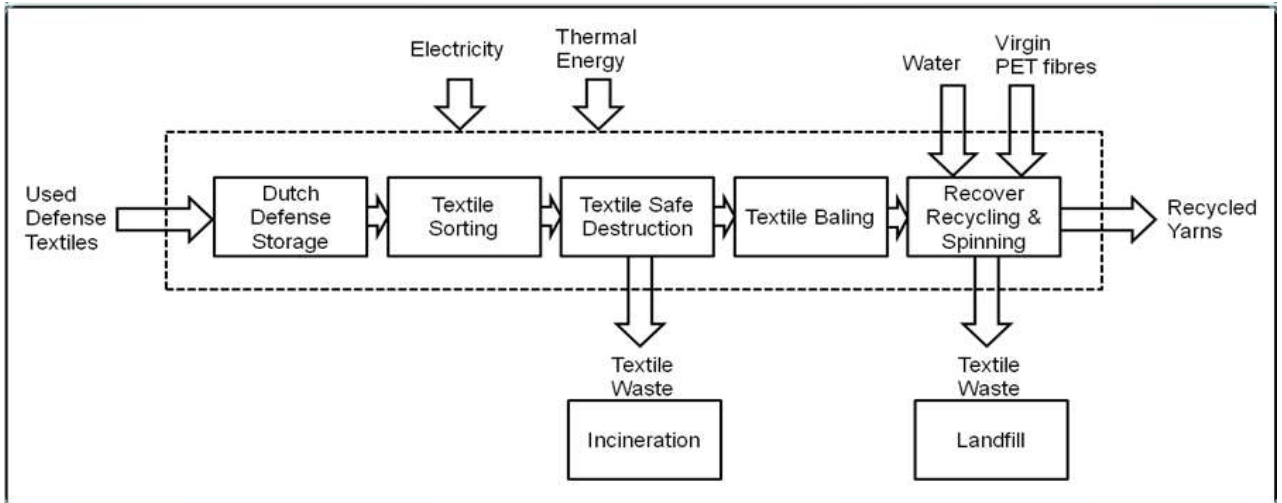




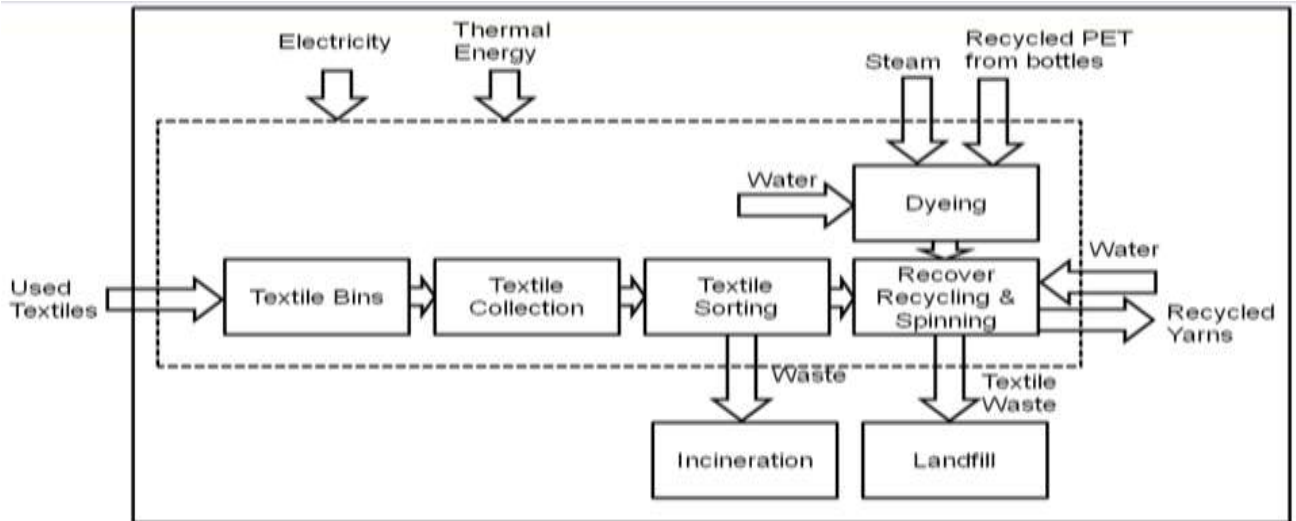
Mechanical Recycling



The Blanket Case



The Mixed Case



Discussion - Conclusions

- Agreement with other studies on reduction in:
 - Energy and resource of the virgin fibre industry
 - water use and eutrophication
 - water footprint and climate change
- Electricity from spinning is the biggest contributor to climate change
- Conclusions
- Recycled yarns were **either more environmentally sustainable** that the virgin ones, **or there were trade-offs** between the different selected environmental impact categories.
- PET fibre production, conventional cotton production, electricity and textile waste from the recycling process were identified as the **key contributors to environmental impact.**

Results

Case Studies	Recycled	Acidification	Eutrophication	Water Consumption	Global Warming
	Composition				
Denim Case	30 % Recycled	23 %	16 %	30 %	0.6 %
Mechanical Recycling	Cotton				
Mixed Case	100 % recycled	65 %	50 %	97 %	33 %
Mechanical Recycling	PET-cotton blend				
Viscose Case	100 % recycled	4.6 %	7.4 %	74. %	-32 %
Chemical Recycling	cotton				
Downcycling	80 % recycled	61 %	40 %	98 %	36 %
Mechanical Recycling	PET-cotton blend				

Thank you! 😊

Q&A