Closing the loop for paper hand towels

INGEDE Symposium
February 28th, 2018

Why recycle hand towels

- Prepare for future legislation
  - EU circular economy package – recycling 65% of municipal waste by 2030
  - Extended Producer Responsibility
  - Gewerbeabfallverordnung (GewAbfV), etc

- Customers request sustainable solution for the used paper hand towels
  - Waste reduction increasingly important among sustainability goals

- Essity sustainability strategy
  - Contribute to a Circular Society

- New recycled fiber source
  - Good fiber quality

TORK

Public
Main challenges

Recycling of used hand towels

- Quality of collected material
  - Purity: $\geq 98\%$ hand towels
  - Not mix with non-wet strong grades
- Not a defined grade, not included in EN643
- Regulatory
  - Product safety
- Logistic
  - Partnership
  - Cost efficiency
- Sustainable business model

Understanding process & behaviors

WE STUDIED WASHROOM VISITORS AND CLEANING STAFF TO UNDERSTAND BEHAVIours...

...TO BE ABLE TO DESIGN SOLUTIONS DRIVEN BY USER INSIGHTS...

...MONITORING PROGRESS BY SORTING ANALYSIS & CLOSE COOPERATION WITH STAKEHOLDERS...

...WHICH IMPROVED COMPLIANCE TO $> 98\%$ PURITY OF HAND TOWELS

NEXT STEP: SECURE SCALABILITY, REPEATABILITY AND EFFICIENCY OF SOLUTION
Waste bins and signage
How it could look

Concept A
### Sorting analysis
#### DE pilot customer example

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Baseline</th>
<th>With Concept</th>
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<tbody>
<tr>
<td>No Intervention</td>
<td>81.1%</td>
<td>98.7%</td>
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- **TRAINING & QUICK GUIDE FOR CLEANERS**
- **OPTIMIZED CLEANING TROLLEY**
- **DOUBLE BIN & STICKERS**
- **ONE PAGER IN WR**

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**Tork PaperCircle®**

*How the service works*

- Tork together with a recycling partner collects used paper hand towels from customer sites.
- Hand towels are recycled in local mills in order to minimizing transport.
- Tork ownership of entire process makes customers’ facility management easier, and guarantees that the used hand towels will be recycled into new paper products.
- Developed in close cooperation with pilot customers and our mills.
Tork PaperCircle®
What is included

- Advice and consultation on waste reduction and set up
- Training and instruction material for the cleaning team
- Advice on waste bin set up and washroom communication material (stickers) to improve sorting compliance
- Container and transportation
- Feedback on waste reduction

Let’s close the loop together
Tork offers a unique service collecting used hand towels and recycling them locally into new paper products

Our service helps you:

- **Close the loop** ensuring that your used paper towels become new recycled paper products and not waste
- **Showcase your commitment** to sustainability by providing statistics and feedback to use in communications
- **Reach your waste and carbon footprint targets** to become a more sustainable and circular business
- **Draw attention** to your sustainability initiatives through creative communication in the washroom, based on nudging and behavioral science
Environmental benefits of recycling hand towels

- **Circular society**
  Recycling of used hand towels reduces the amount of waste and contributes to the circular society.

- **Resource efficient society**
  Recycling of used hand towels creates new raw material for tissue paper and thereby releases renewable material (pulpwood) for use elsewhere.

- **Climate benefits**
  Recycling of used hand towels releases renewable material that becomes available for the renewable energy sector where it can be used to replace fossil energy. This will have a huge climate benefit.

At least **- 40%**

Carbon footprint compared to current waste handling options*

*Results of a life cycle analysis (LCA) conducted by Essity Tork and verified by IVL, Swedish Environmental Research Institute Ltd, 2017, where the avoided processes have been taken into account.

Process learnings (1:2)

Recycling of used hand towels

- **Technical evaluation in cooperation with our mills**
  - DE, Kostheim
  - NL, Cuijk

- **Combining wet strong broke line with DIP line**
  - High wet strength material requires increased pulping time/energy
  - Cleaning steps required to remove non-fiber material
  - Heating needed to insure sufficient microbial inactivation

- **Microbiology assessment**
  - Extensive MBA performed by RISE (Research Institute of Sweden)
  - Mapping of potential contaminations
  - Mapping of process conditions (time/temp curve)
  - Conclusion: the log-reductions from heat inactivation is far above what is reasonable needed
Process learnings (2:2)
Recycling of used hand towels

- **Learnings from pilots**
  - Purity of separately collected hand towels ≥ 98%
  - Microbiology measurements shows good decontamination throughout the process

- **Pros and cons compared to our other PfR grades**
  - Energy, time, complexity
  + High yield, fiber length

- **Conclusion after pilots**
  - Separately collected hand towels are well suitable for recycling into new tissue products

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Main challenges
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  - Product safety

- **Logistic**
  - Partnership
  - Cost efficiency

- **Sustainable business model**
  - Service fee on pair with current waste disposal cost
European Paper Recycling Award

- Tork PaperCircle® has been honored with special recognition award in the Information and Education category of the European Paper Recycling Awards, held on October 18th 2017 in the European Parliament.

- The awards recognize innovative projects changing and enhancing the way we do paper recycling, to help Europe achieve its goal of a 74% paper recycling rate by 2020.