



LAYMAN'S REPORT
LIFE+ CELSTAB
PROJECT

LIFE13ENV/DE/001131



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Start Date:	01/07/2014
End Date:	31/12/2018
Project Number:	LIFE13ENV/DE/001131
Project Title:	A novel and highly sustainable feminine pad product
Total Project Budget:	€ 2.840.897
EU Financial Contribution:	€ 1.420.448



Sustainable Design for Feminine Pads

The LIFE+ CELSTAB (CELLulose SusTainable ABsorbency) project aims to improve feminine hygiene (FemCare) menstrual pads throughout the product lifecycle by using less raw material, while at the same time being able to absorb more fluid for optimum protection.



less material

less waste

less greenhouse
gas

Key CELSTAB project objectives are to demonstrate an innovative multilayer absorbent technology to reduce the total material usage (10-25%) of multilayered absorbent feminine hygiene products, introducing innovative cellulose materials and reducing 10-15% T/km transport.

The clear goal: We want to achieve more with less.

This also includes sourcing raw materials as locally as possible, which reduces pollutant emissions from transport. Another goal is to accelerate the development of new products with a design based more strongly on sustainability criteria.

With the CELSTAB project, P&G is breaking new ground in upstream technology development. The initial phases of the project have already shown the great potential of networked research, collaborating with partners in the raw material supply chain. CELSTAB shows that sustainability is the right thing to do.



Functions & design of a menstrual pad

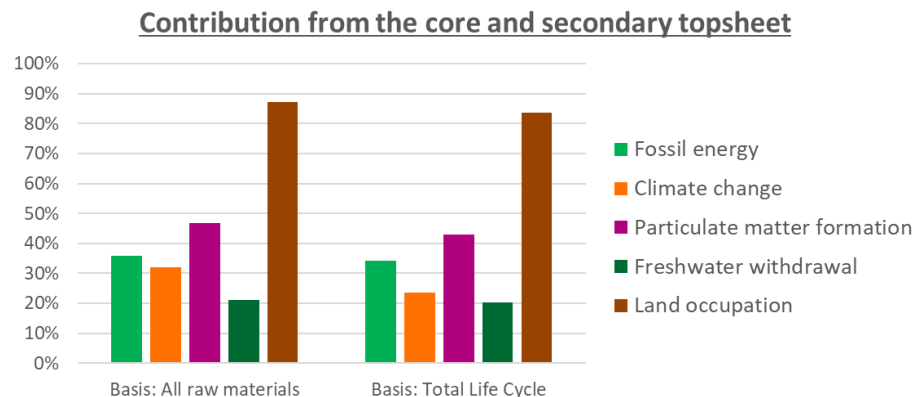
Menstrual pad key functions are rapid fluid absorption, efficient fluid transport in pad, sufficient absorption capacity, leak prevention and wear comfort.

Overall performance depends on individual material choice, and how different materials are connected. Under-design product will lead to more pads used per day and fail on sustainability because of increased replacement ultimately ending up into higher material use. On the other hand, overdesign performs well but leads to increased cost and inefficient material use.



Key drivers in menstrual pad footprint

The collective contribution of the absorbent system (storage and acquisition layer) account for an average 32% in the environmental footprint. CELSTAB focuses on the absorbent structure as main sustainability and performance drivers of menstrual pads.





LIFE+ CELSTAB objectives

- Develop new **absorbent structure** for use in P&G menstrual pad to meet consumer product and quality needs.
- Demonstrate **feasibility** to upscale and integrate **new processes** at industrial scale and speed
- Project timeline: July 1st, 2014 – Dec 31st, 2018
- Budget: €2.8 million, 50% funded by EU
- Environmental targets:
 - 10-25% material use reduction
 - 15-25% overall waste prevention
 - 10-15% greenhouse gas reduction

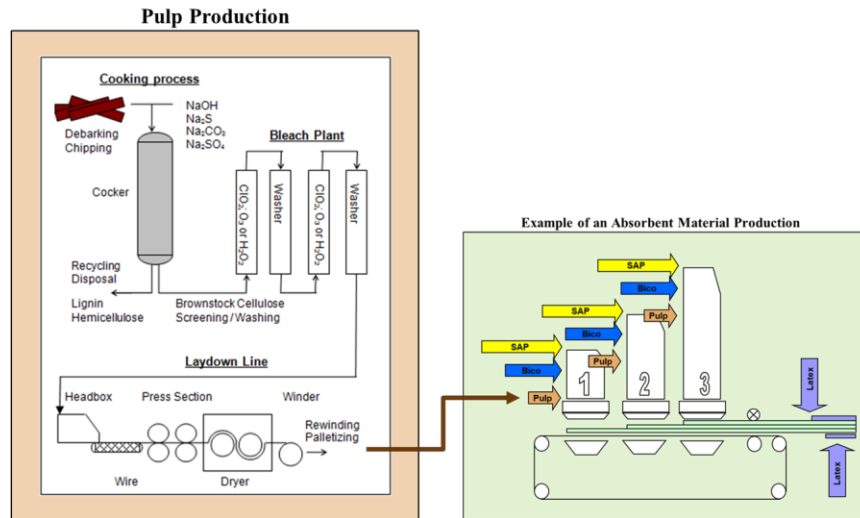
Multilayer structure optimizes menstrual pad's functions while saving material and simplifying supply chain complexity. This leads to secondary benefits such as less packaging, transport and waste avoidance.

Technology of making menstrual pads

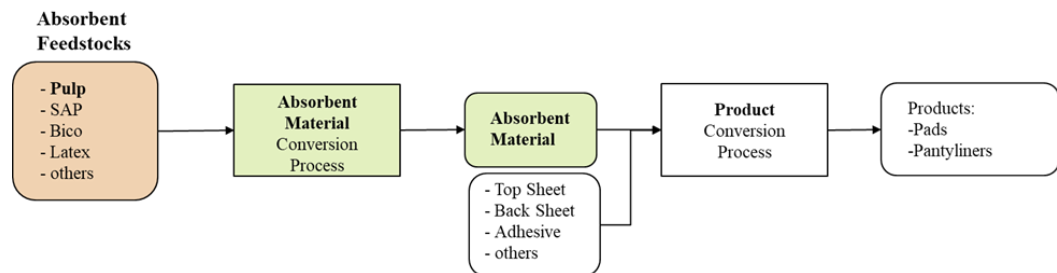
Absorbent structure of the pads consists of pulp and super absorbent particles (SAP) as main components. To improve the sustainability benefit, the project focused on developing the new absorbent structure by using natural fibers and localizing the feedstock resources (i.e. pulp, SAP).

Fluff pulp is taken from wood (round and peripheral) which more than just cellulose. The other ingredients get dissolved by chemical pulping. Pulp gets washed, bleached and moves to the laydown line to be dried and rewind. Roll goods are sent to airlaid lines disintegrated in hammermill and mixed with the other feedstocks. Laydown via forming head and compacted to final absorbent material.

Below picture shows pulp production from wood to palletizing and how it is used at absorbent material production line:



As final, absorbent material is shipped from the supplier to the P&G production lines and converted to the menstrual pad product.



CELSTAB focuses on the absorbent structure collective contribution of the absorbent system account for an average 32% of the total pad in the environmental footprint.



New Multilayer Absorbent Structure

Improved new structure:

New fibers and supplier process would have softer/cushiony and flexible materials for comfortable products

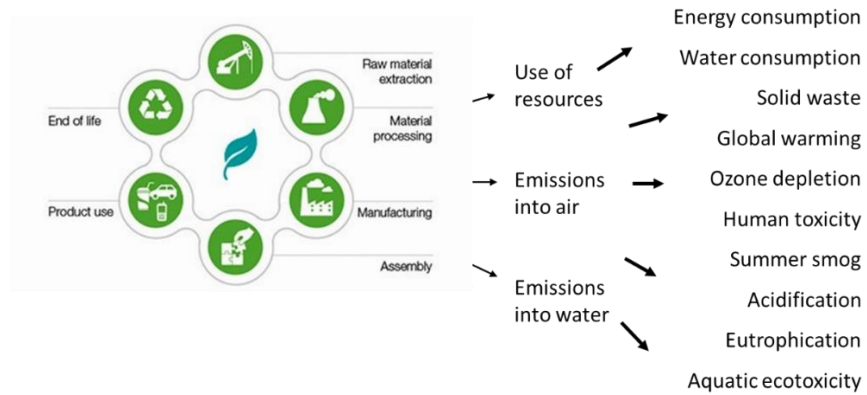
Achievements:

- **Achieves Parity/better product performance** vs reference product. Successful consumer test (90 consumers).
- **Completed local (Europe) pulp resource screening.** These pulps can replace current U.S. pulps, with equivalent good fluid handling results.
- **Successful material mass reduction** without compensating material performance. Met sustainability success criteria in grant agreement.



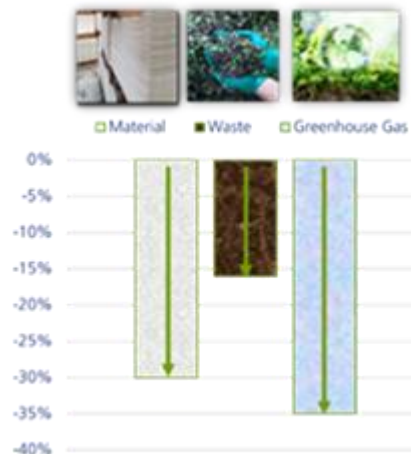
Key Deliverables & Outputs

Life Cycle Assessment has been completed for the various menstrual pad design options and analysis of the main drivers for the calculated benefits for reduced resource use and emissions. LCA shows that production of the raw materials for menstrual pads is the single most important driver for all relevant environmental indicators.



Several iterations on material design is made based on sustainability assessment of a design space. Several scenarios are built that account for all material parameter choices; basis weight, material composition and dimensions. Final design is defined depending on Performance, Consumer evaluation, Cost, Technical feasibility, Sustainability.

Figure on the right, summarizes the achievements: Current design options achieve the material use and waste prevention reduction goals and exceed the goal on greenhouse gas emissions. This is achieved by redesigning the pad's raw materials and optimizing the supply chain, while not compromising on performance and consumer acceptance.

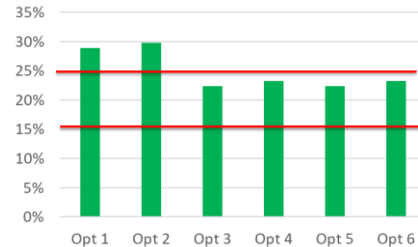




In more detailed, sustainability design space defined by 6 scenarios in a Life Cycle Assessment (LCA).

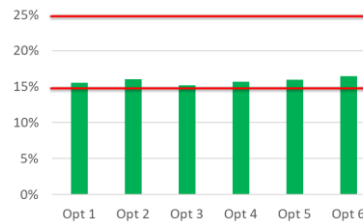
Objective 1:

The material use reduction target 10-25% is achieved for all new design absorption system options. On an annual basis, this is on average a **12,000 tons** material saving.



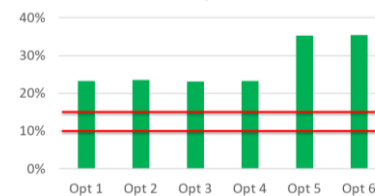
Objective 2:

The waste prevention target 15-25% is achieved for all options vs current. On an annual basis, this is on average a 14,000 tons waste saving which is led by the mass reduction of overall feedstocks in the product vs reference.



Objective 3:

GHG emissions target 10-15% is exceeded with reductions in the range of 20-30%. On an annual basis, this is on average a 45,000 tons GHG saving. The key driver is the localizing the feedstocks supply chain in EU.



Completed local European pulp resource screening. It is proven that local pulps can replace current U.S. resourced pulps, with equivalent fluid handling results. Annualized benefits from local supply are (averages from the design space):

- 1,200 tons saving of CO₂
- 400 ton of oil equivalents
- 6 ton of particulate matter (fine dust)



Conclusions

CELSTAB redesigned menstrual pads:

- Use raw materials more efficiently
- Achieve parity performance vs. current pads
- Are significantly preferred by consumers
- Achieve break-thru sustainability results