Material recovery and safe reuse

Cellulose recovery from sewage

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About CirTec

Cellulose recovery from sewage

Screening and filtration

Evaporation and scrubbing

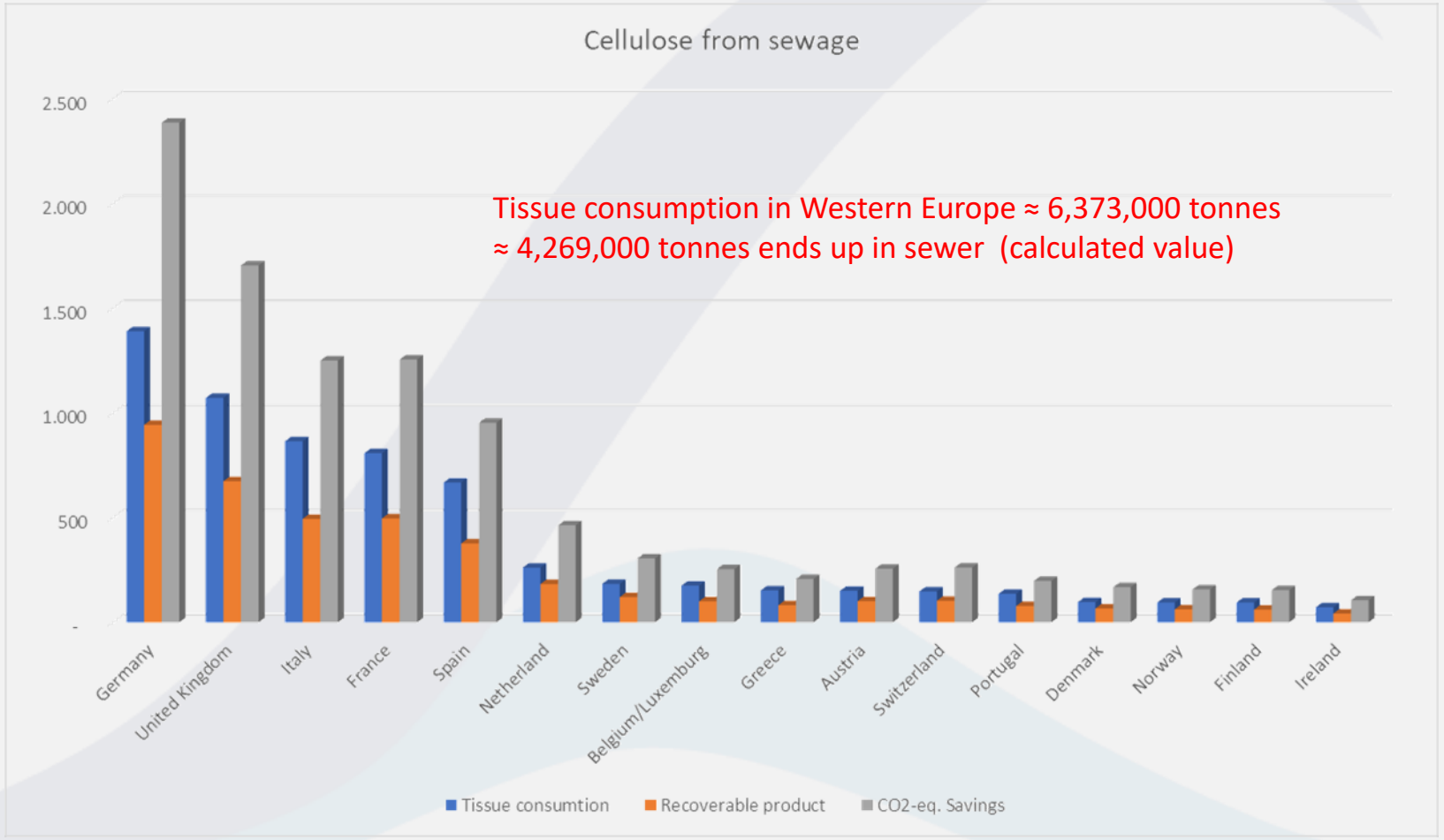
Sludge dewatering

Sludge drying

Recovery and valorisation of cellulose from sewage

What is it about?

X 1.000 tonnes



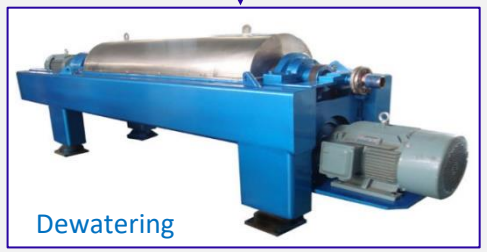
Tissue consumption in Western Europe ≈ 6,373,000 tonnes
≈ 4,269,000 tonnes ends up in sewer (calculated value)

Dynamic rotating belt finescreens for primary treatment

Saving energy by removing solids

RAS

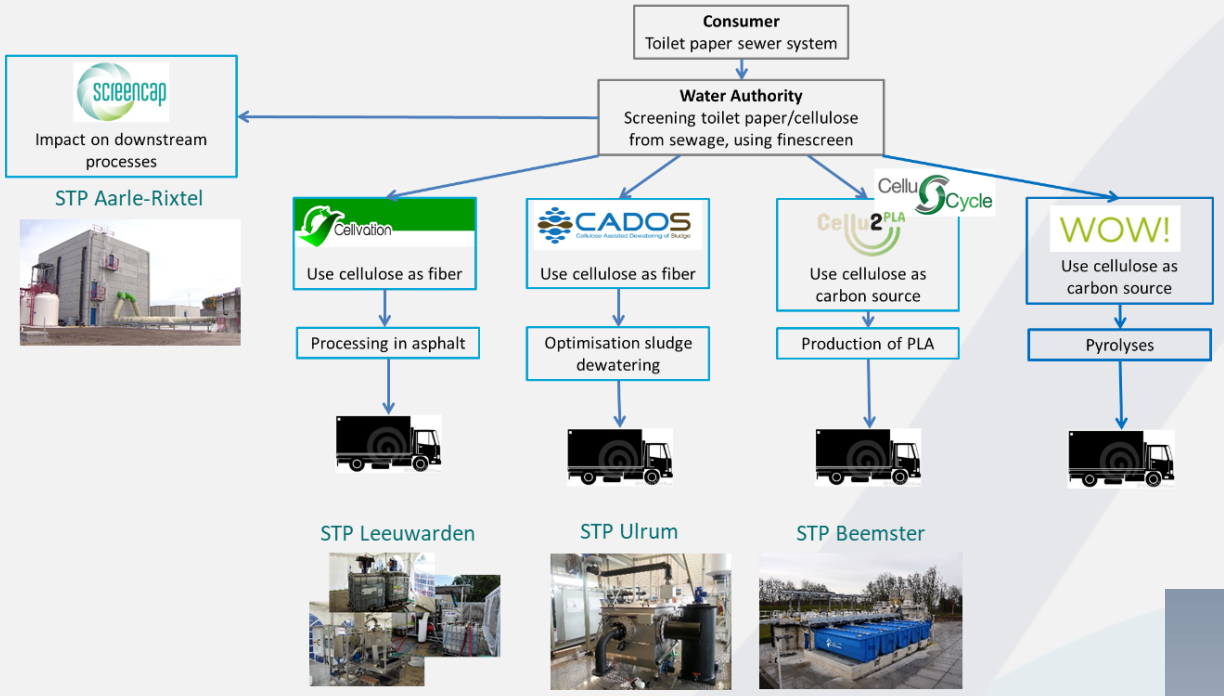
WAS

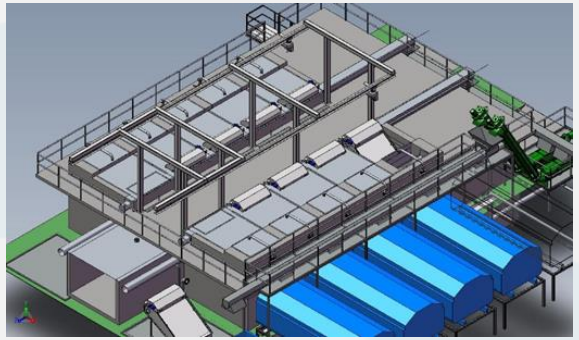


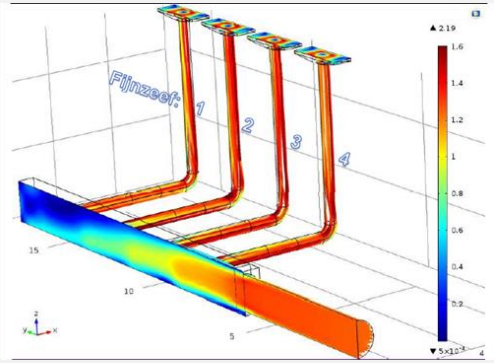
knowledge development through small and large-scale research

SMART-Plant

Impact on dewaterability, denitrification, control, flow distribution, etc







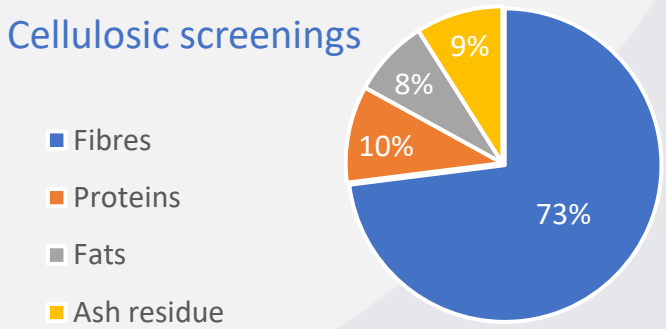
CFD analyses

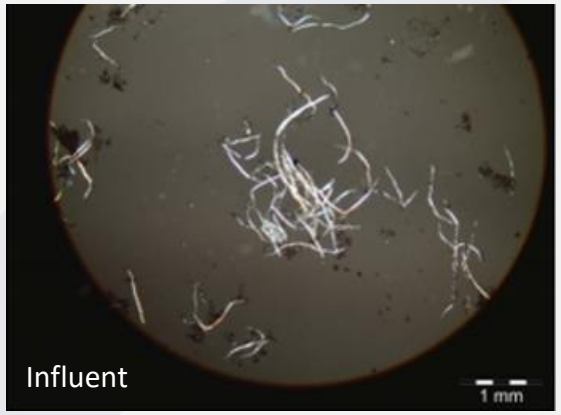
CIRTEC

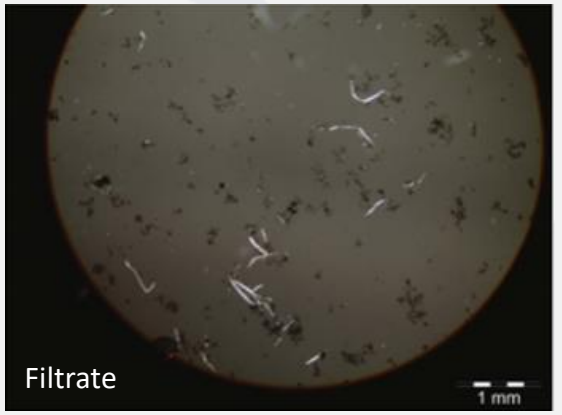
Impact of dynamic rotating belt finesieves

Application of dynamic rotating belt fine sieves for primary treatment

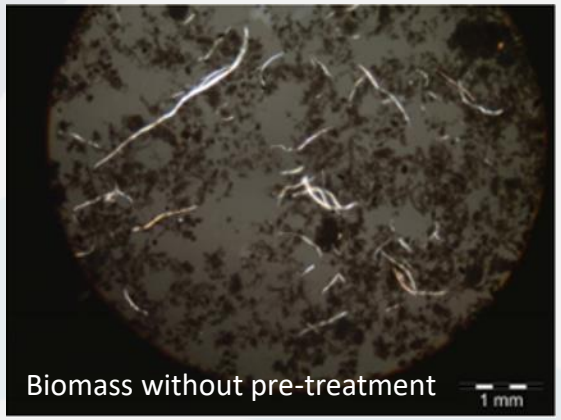
- Reduction of energy requirement (15 to 20%);
- Less sludge (20%) = less sludge dewatering;
- Reduction of chemical use (approx. 20%);
- Lower maintenance costs;
- a marketable recovered raw material;
- Reduction of the CO_2 footprint

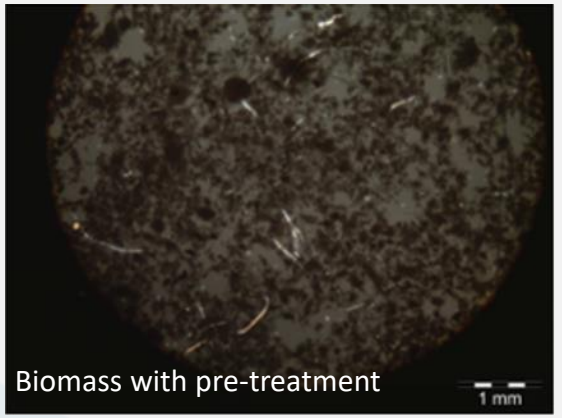






Visible reduction of fibers in raw influent





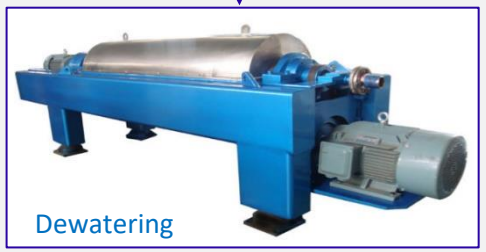
Difference in fiber content in activated sludge (after 12 months)

In-line cellulose extraction

Screenings are not salable (too many polluting components)

RAS

WAS

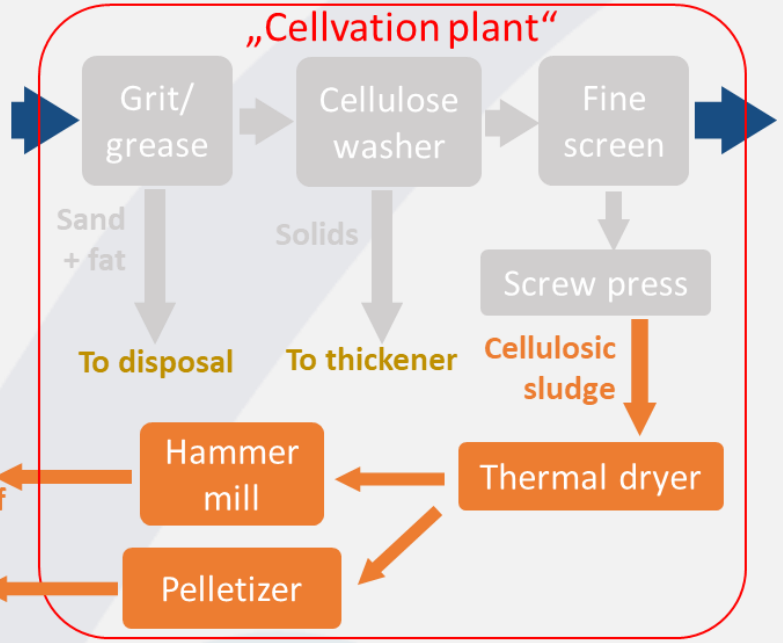


SMART-Plant: Pilot installation at a capacity of 120 m^3/h (expected 300 mg/l TSS)

In-line cellulose extraction

Screenings are not salable (too many polluting components)

TSS	360,00	mg/l
COD	604,00	mg/l
BOD	289,00	mg/l
Ntot	37,20	mg/l
PO_4-P	9,40	mg/l



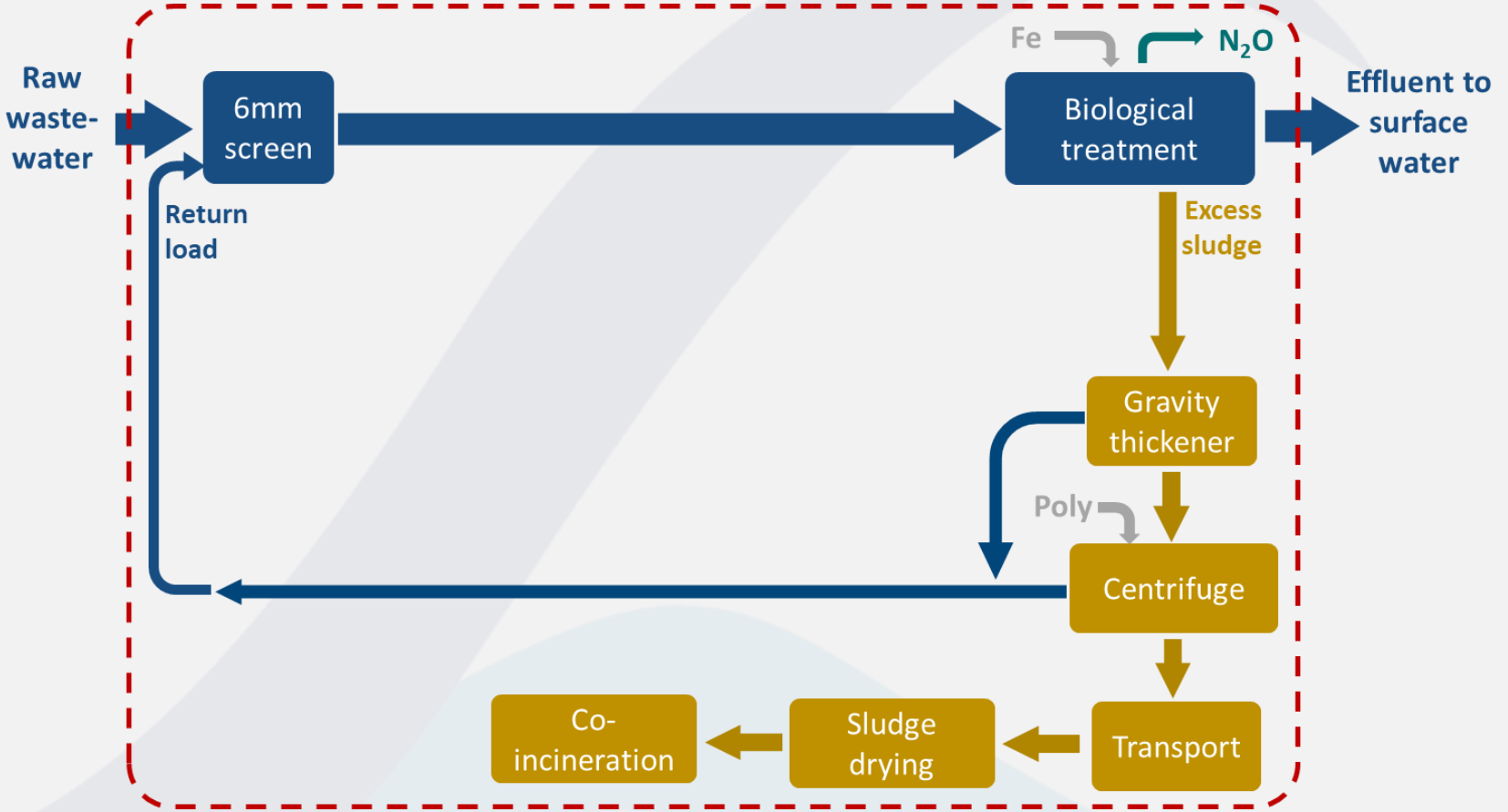
TSS	198,72	mg/l
COD	477,16	mg/l
BOD	228,31	mg/l
Ntot	35,67	mg/l
PO_4-P	9,11	mg/l

Recell®

TSS	44,80%
COD	21,00%
BOD	21,00%
Ntot	4,10%
PO_4-P	3,10%

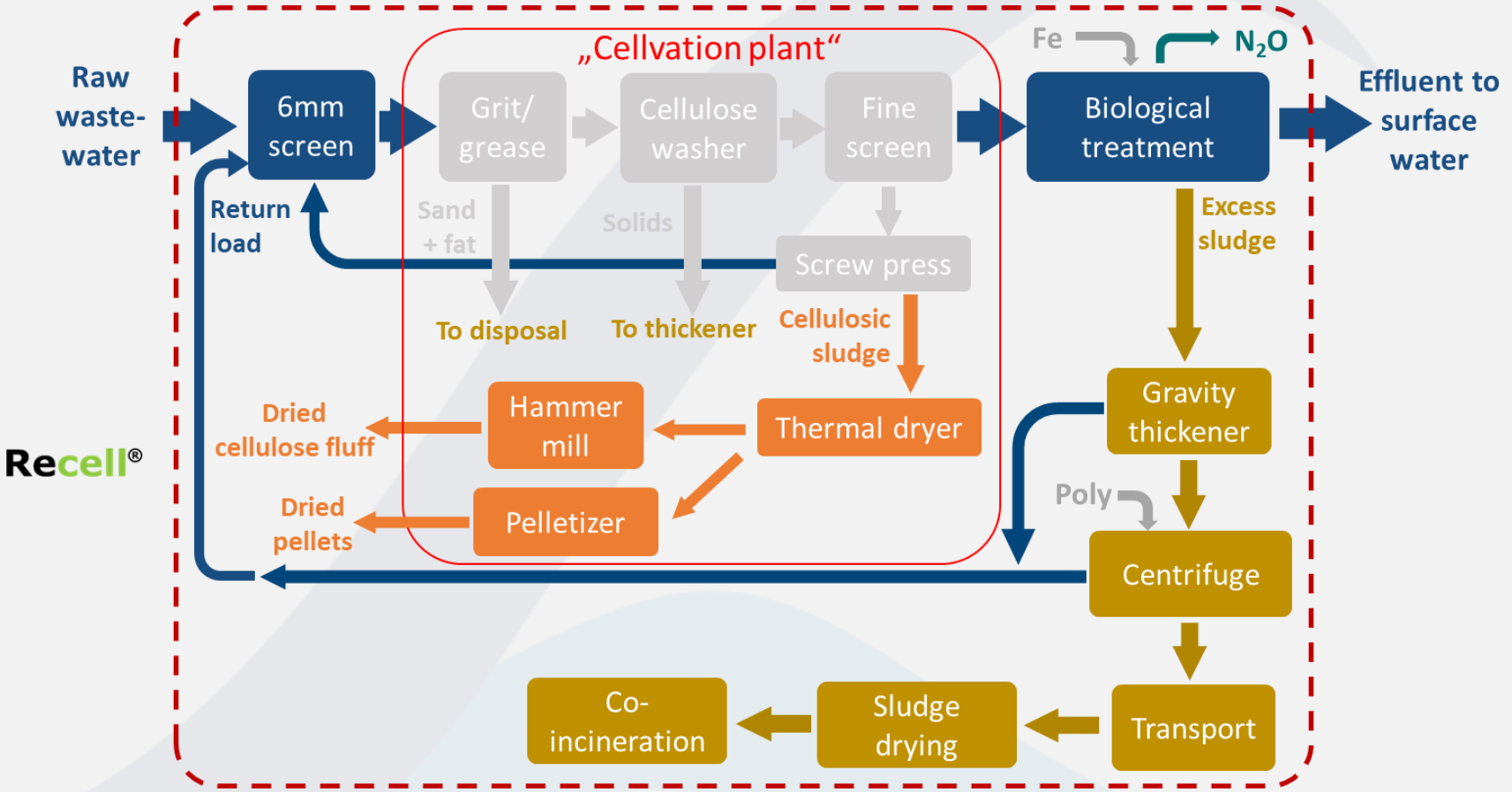
LCA of SMARTech1 - cellulose recovery

System boundaries



LCA of SMARTech1 - cellulose recovery

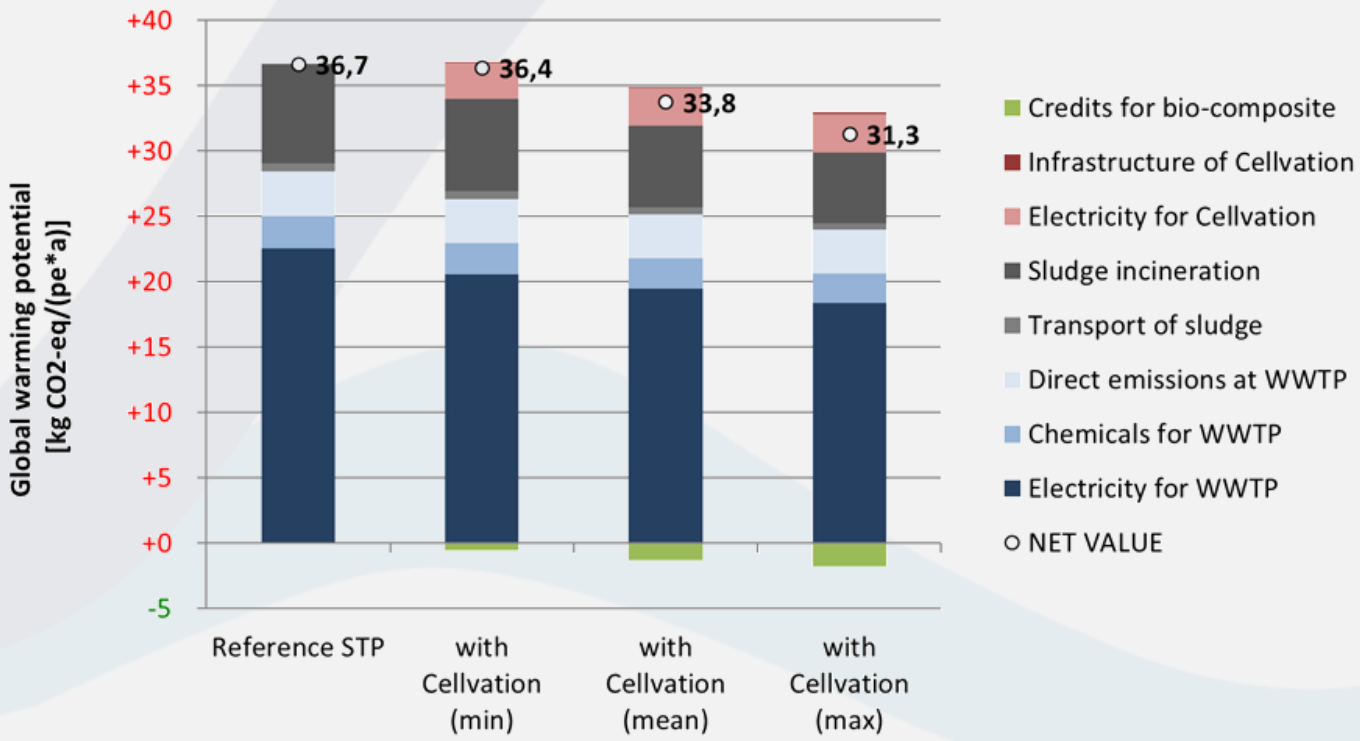
System boundaries



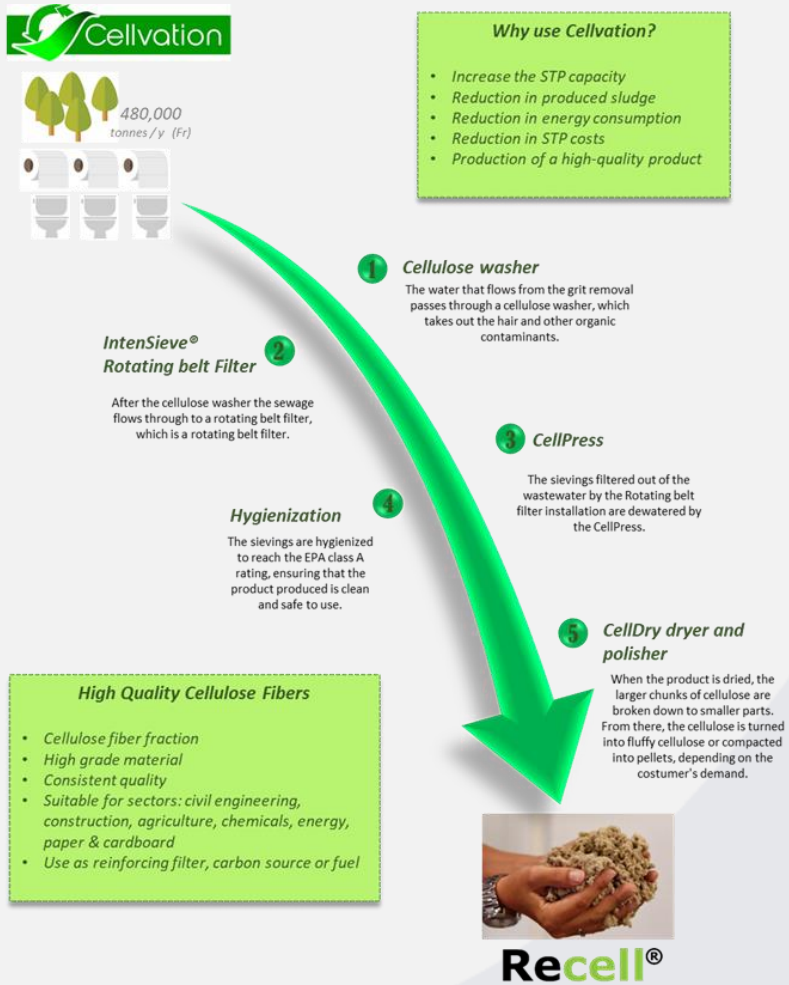
LCA of SMARTech1 - cellulose recovery

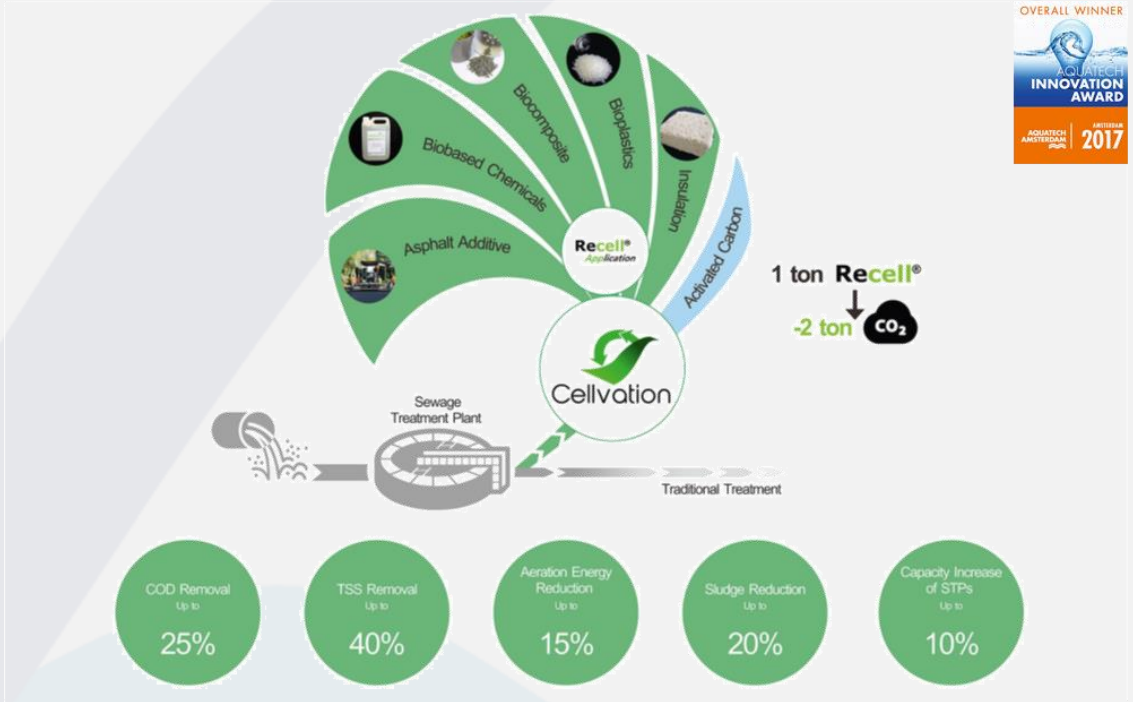
Conclusions

Parameter	Unit	Minimum value	Mean value	Maximum value
Removal of total suspended solids	%	-25	-40	-55
Removal of chemical oxygen demand	%	-10	-20	-30
Excess sludge to disposal (as dry matter)	%	-10	-20	-30
Savings in aeration energy	%	-10	-15	-20
Savings in polymer for sludge dewatering	%	-5	-10	-15



Conclusions





OVERALL WINNER AQUATECH INNOVATION AWARD AMSTERDAM 2017

SMART-Plant

CIRTEC

Cellvation

Recell-based products

Recell®

SMART-Plant


Asphalt Additive


Biocomposite granulate


Biocomposite board


Blown-in Cellulose Insolation flocs


Insulation boards


Mycelium board


Building blocks chemical industry

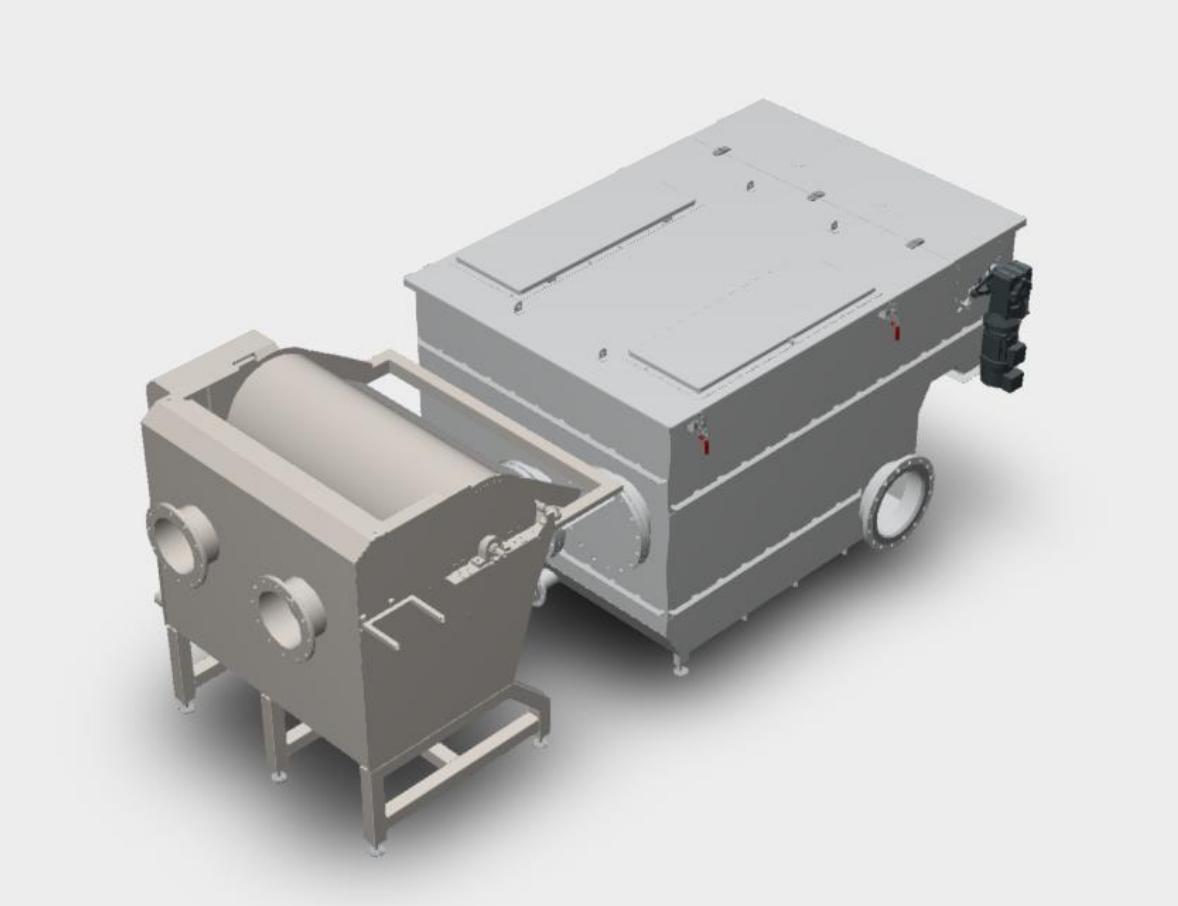

Road constructor KWS uses recycled toilet paper to improve asphalt pavement in Amsterdam


A cycling path in Utrecht with asphalt containing Recell®!

CIRTEC

Cellvation

Further development
Current state of the technology



CellCap

two-stage sieving technique consisting of, a cellulose washer and a dynamic rotating belt finesieve.

The pre-separation consists of a fine-meshed drumtype sieve where, through an inventive feedsystem, the cellulose fibers can escape, where hair, leaves, seeds and other components are caught.

Both process components are fully tuned to each other:

- No additional pumping;
- A cellulose washer can easily be fitted in (if space is provided), even when the RBF is already installed.
- The hydraulic profile hardly changes by installing the Cellulose Washer.

"We cannot solve our problems with the same thinking we used when we created them"

- Albert Einstein -

Towards a cleaner circular future

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