

Circular brewery concept



- Streams from brewery: all liquid streams (spent yeast, wastewater) and CO₂
- Technology provider Redono Oy, <https://www.redono.fi/>
- Owner and orchestrator of the circle – Redono Oy



Northern Periphery and
Arctic Programme
2014-2020



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PATENTED BIOFEED SOLUTION

Method and system for recycling and purification of industrial side streams



GIVING BACK TO NATURE



Biogas, Brewery,
Bioethanol, Aquaculture

INDUSTRIES

We offer industries solutions to recycle side streams and utilize CO₂-emissions. Purified waters can be recycled back for industrial use.

PATENTED BIOFEED SOLUTION

The BioFeed-system can process the Industrial sidestreams into biofertilizers. These fertilizers can be recycled to the Food production ecosystem.

FOOD PRODUCTION ECOSYSTEM

Connecting local food production technologies into a circular ecosystem. With help of microalgae production the recycled waters can be purified.

BIOFEED

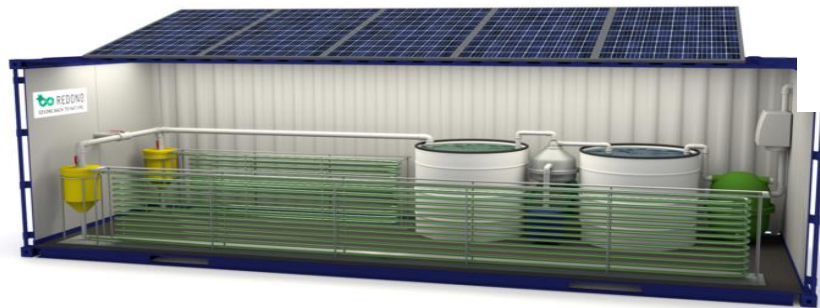


Contains:

- Removal of solids
- Electrocoagulation
- Biofilter / Nitrification
- UV-disinfection
- Control of fertilizer recipe

BioFeed system can be retailed and scaled for selected brewery

BIOALGAE



- Module size: 40' sea container (length 12 m).
- Water purification, capacity 1m³/d.
- Production of microalgae, capacity 1kg/day.
- Utilization of CO₂-emissions, capacity 2kg/day.
- Scalable solution

FARMPRO



- 80 m² growing surface (other available 50 m² or 130 000 m²).
- 1 600 to 3 600 crops per growth cycle.
- 24 000 to 60 000 crops per year.
- Own recipes for over 200+ crop varieties



HYDROHUMALA – URBAN HOPS FARM



Example solution for large breweries or shared hop farms

- Growing surface 1500 m²
- 3 000 hop plants .
- 18 000 fresh hops per year.
- Wet hops used for 1 000 000 litres of beer.
- Recycled brewery side streams 1000 m³



Key partners, activities and resources

Supply of liquid side streams and CO₂

- Reconfiguration of process stream discharge, and control of discharge process

Technology provider, REDONO Oy

- Development of solution locally with each brewery case
- Maintenance of the ecosystem units

Circular ecosystem unit operations

- Controlling and operating process
- Conversion to sellable and storable product: e.g. drying
- Quality control of outputs from the circle
- Packaging, storage, distribution of products leaving the circle
- Marketing and selling products from the circle



Value propositions

Brewery

- Fresh local sustainably cultivated hops for special beers all year round and differentiation in the market
- Less dependence on imported raw materials
- Biotech process for wastewater treatment, reuse of cleaned water and reduced CO₂ taxation
- Additional revenues from selling hops
- Evidence to commitment for being sustainable in respect to environment, society and also economically improved brand value

Consumer

- Local and sustainable products: vegetables, beers

B2B customers

Agriculture and Hydroponic cultivation

- Fertilisers from circular loops reduce dependence on mineral fertilisers

Social benefits

- Improved use of locally available resources
- Local value chains boost local prosperity by employing people, paying taxes, etc.



Customer segments and product selling channels

Fresh hops

- Beer industry → short distance, direct deliveries B2B
- Internationally (Europe) as specialty hops, premium price

Dried hops

- Internationally (Outside Europe) as specialty hops, premium price

Liquid fertiliser

- Agriculture sector → B2B, distributors
- Green houses → B2B, distributors

Algae (dried)

- Animal feed supplement → B2B for feed manufacturers, retail, e-shop
- Human food supplement → B2B for functional food manufacturers, natural product shops

Greens and vegetables

- Own brewery restaurant
- Local restaurants
- Local grocery shops
- Own shop, depends on location of ecosystem



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Whats in it 4 me?



save resources



save money



more income

MORE: 

PURE, FRESH
LOCAL
URBAN HOPS

IMAGE / STORY
BRAND VALUE



NO MORE:

- wastewater treatment costs
- CO₂-taxation

URBAN HOPS REFERENCES

” Once you go Pure Local there’s no turning back!

Kaj Kostander
Brewery of Tornio



” ”We want to be the forerunners in sustainable brewery solutions!

Samuli Huuhtanen
Rock Paper Scissors Brewery



 REDONO
GIVING BACK TO NATURE



Cost structure

Ecosystem owner (Brewery + Redono)

- Investments for selected technologies → depreciations
- Operational costs for production (staff, materials, equipment maintenance, storage, logistics etc.)
- Marketing costs

Calculation of costs should take into account reduction in cost for brewery operations,



Revenue streams and OPEX savings

- Lower cost for waste management
- CO2-reduction and local utilisation
- Production of special hops for own use and new sales income
- New product portfolio and beer products generates new revenues
- Production of other new food products and ingredients generating new revenues
- Fertiliser production for local farmers



Challenges

- Time and costs of all circular route set up are not fully clear
- Thorough market analysis, feasibility studies with techno-economical calculations for each product from the ecosystem needs to be done for economic feasibility
- Business case development and orchestrator of all circular routes – one company? ecosystem of numerous companies?
- Keeping system steady running as all the ecosystem depends on each other, how to minimize risks.
- The most cost efficiently ecosystem would operate when part or all activities are in proximity, space especially in city areas can be limited. The concept should be discussed with every new brewery being established already during choosing location of operations.