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AQUAREL

AQUATIC RESOURCES FOR
GREEN ENERGY REALIZATION

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Aquarel Concept

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Aim

- *To develop and introduce*
 - *a concept for utilizing fish processing co-streams in the Republic of Karelia,*
 - *to reduce the environmental impact caused by bio waste disposal and*
 - *to initiate an ideological change in the way bio-waste is seen as a valuable commodity.*

Mass potential



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- Fish waste
 - Small mass amounts which are scattered
 - Transportation cost
 - Collecting to centralized utilization
 - Risk of spreading fish diseases
 - Hygienization needed
- Manure
 - Good potential but not many interested farms
 - Also long distances
- Sewage sludge
 - Quite low potential
- Algae
 - Storm cast algae
 - Algae harvesting
 - High costs for collecting + long distance

Potential in Republic of Karelia



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	Fish waste
	t/a
LLC "Rayguba"	560
PE N.V. Fedorenko	150
Ltd. "Kala ja maryapoyat	150
LLC "Segozerskoye	300
Ltd. "Nordost Rybprom	500
LLC "Rainbow	100
Ltd. "RokFor	150
Kala Ranta	170
Ladozskaja Forel	500
Total	2580

- Oil (35 %)
 - 900 t/a
- Dewatered reject
 - 200-300 t/a

- Manure 340 000 t/a
 - Biogas 85 000 MWh/a
- Sewage sludge 11 000 t/a
 - Biogas 3 100 MWh/a



Technologies



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- Fish waste
 - Biodiesel
 - Anaerobic digestion
 - Fish meal production
- Integrating other waste
 - Manure and sewage sludge could be used with fish waste in anaerobic digestion
 - Investment in a large farm

Economy



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- Fish waste
 - Biodiesel production cost is rather high compared to market price
 - Market price of fish oil higher than biodiesel price
 - Existing demand for fish meal raw materials
 - fish oil and protein rich dry matter
- Fish meal production most economical

Environmental impacts



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- Biodiesel production reduces GHG emissions the most
 - When high fish oil yield
- Combination
 - Heating oil
 - Fish meal from solid residue
 - Probably almost as good from environmental point of view

Aquarel Concept

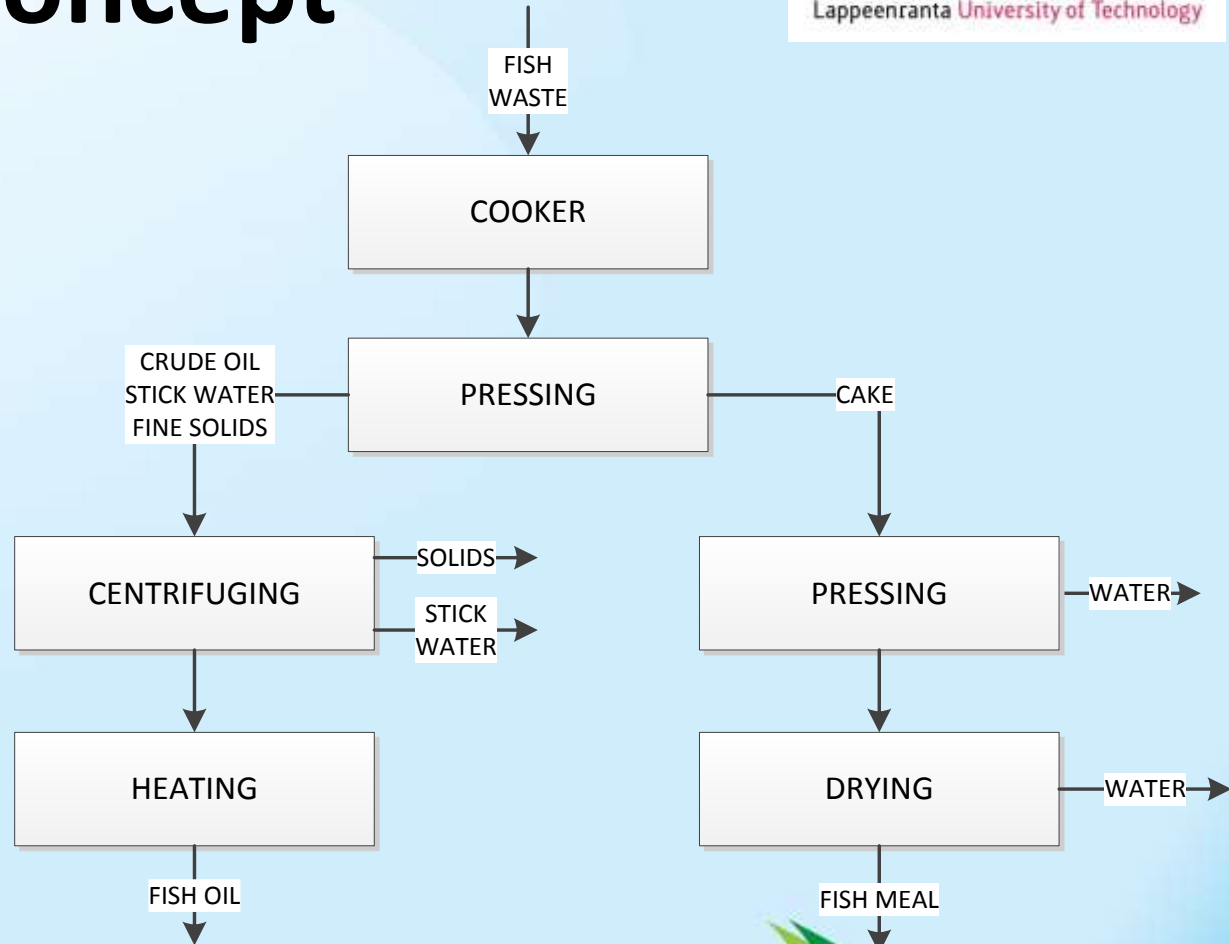


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- Anaerobic digestion – biogas production
 - Investment need high
 - Suitable waste material mostly at cattle, pig or chicken farms
 - Energy price low
 - Mostly solution for farm energy production and manure treatment
- Algae
 - Scattered material
 - Long distance from other materials
 - Separate business

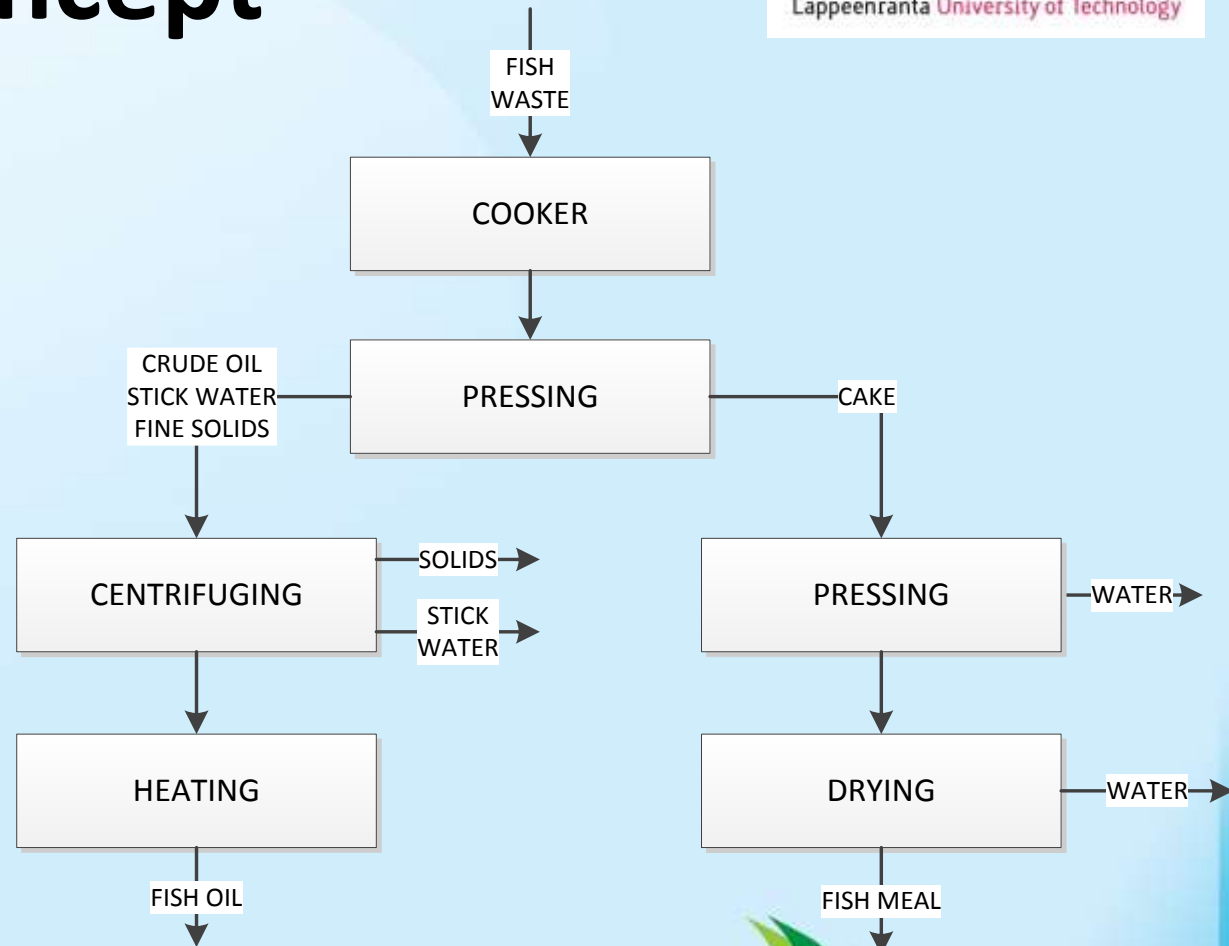
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- Producing
 - Fish oil
 - Dewatered raw material for fish meal
- Both suitable for fish meal production
- Present market prices best for fish meal raw materials



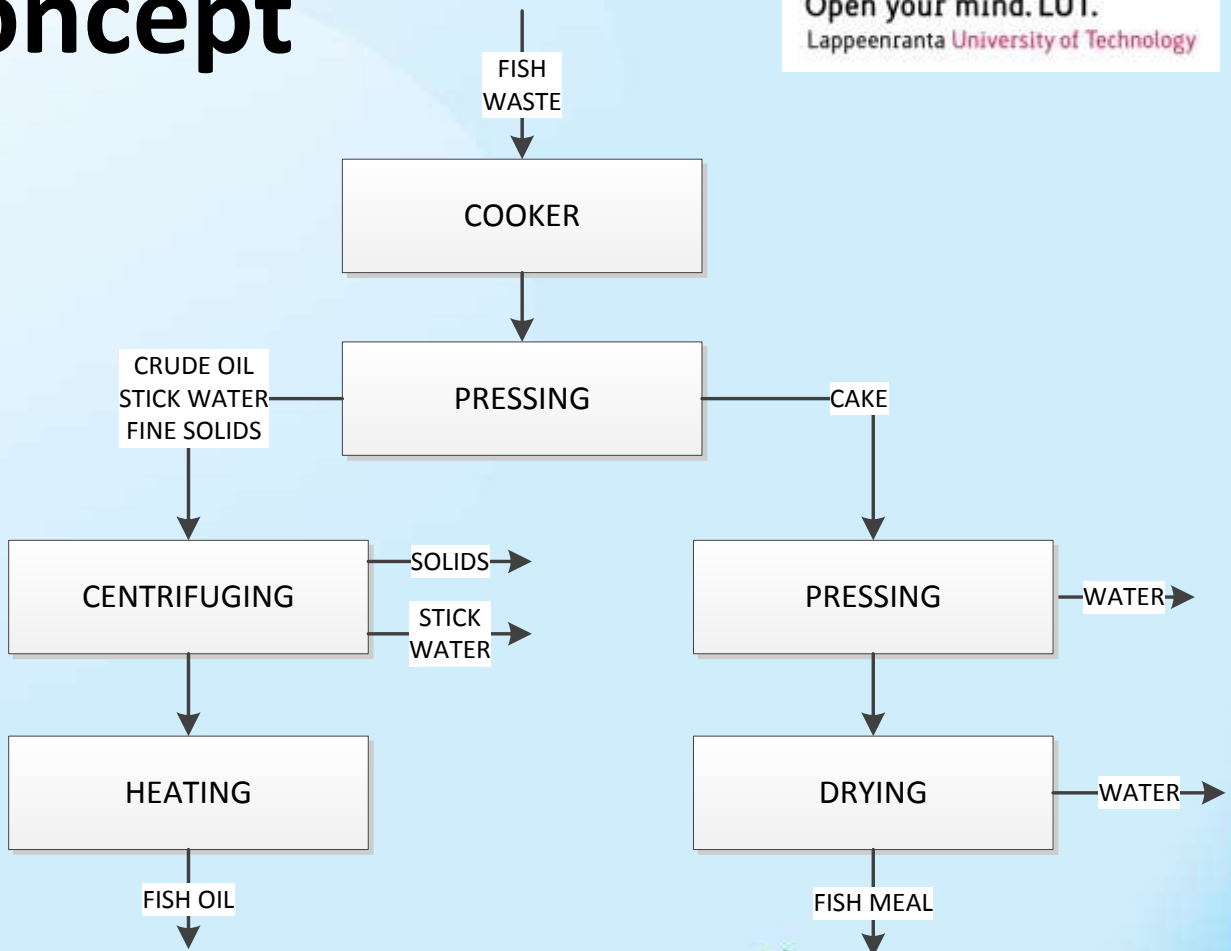
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- Fish oil suitable also for heating oil
 - Own fuel for distant locations
- Separated dry reject can still be sold for fish meal production



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- Modest need for investments
- Biodiesel production possible later
 - Market price changes
 - Selling for biodiesel producers
- Also possible to refine more valuable products
 - E.g. fatty acids





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Thank you for attention!

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