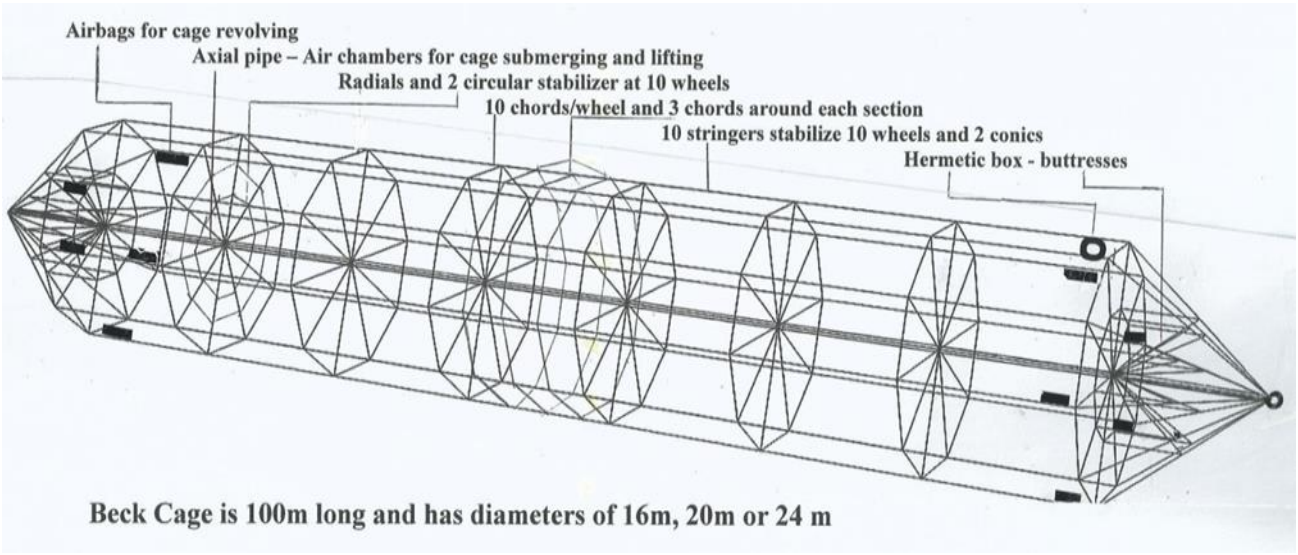
Breakthrough Ocean-Coastal Fish Farm Technology

is mobile, autonomous, sustainable and economic and considers Climate Changes and natural Habitats of Fish

Remarks: The Innovator and Patent-holder, S. Beck, is in Pension Age and focus to give and share it with an interested Decision-Maker or with a Group of Aquaculture Company and Marine Industry – contact last page.

A. Concept and Technology

1. **The patented Ocean Innovation provide natural habitat for fish and avoid climate changes.**
2. **The rupture Innovation is a "Cylindrical Cage" submerging below wave trough in fish living levels and is linked to a mobile Feeding and Service Stations like a Cargo Vessel.**
3. **Alternatively, the one point anchored and circulating cylindrical cage in coastal deep water gets directly served and fed from a land-based Service and Feeding Station.**
4. **Cage + Station + Equipment + Functional Structures are proved in Oceans and in existing Structures over decades and don´t need any further researches.**
5. **The static and prototype proved Innovation is technical ready for immediate construction.**
6. **This unique Ocean Innovation is 10-15 times cheaper than existing offshore Designs.**



B. Fish Welfare and Performances

1. **The Climate warming up decrease Oxygen in waters. Porous Hoses fixed in the cylindrical Cages provide Air/Oxygen and atmospheric Air for Fish automaticly by air chambers.**
2. **Three free-floating cages are linked to the sites and rear of the Service and Feeding Station.**
3. **Alternatively the one point anchored**
4. **Cage sizes of L 60 to 100 m x D 16 to 30 m, have volumes of 12.000 to 70.000 m^3. 3 cages on a Service Station have volumes of 36.000 to 210.000 m^3 for up to 6.300 tons of Salmon/Fish.**

C. Station. Cage, Equipment, Function, Patent

1. **Second Hand Cargo Vessels gets modified to low cost Service and Feeding Stations.**
2. **A special shield at the conical cage front make an environment in the Cage like in Fjords.**
3. **The static and prototype proved Cage and Service/Feeding Station is equipped with Silos, automatic Feeder, Facilities, computerized Programs for Autonomy and Remote-Control.**
4. **Electricity is provided by a 12 KW battery, loaded by wind/solar – no fossil energy.**
5. **The cages have no wear-out technics and are handled by Air-pressure from Air-Chambers.**
6. **Net cleaning by sun/air and dead fish collection by special systems due to cylindrical cages.**
7. **Patent in 2008. Supplementary Patents followed 2014 and 2022 - see Attachments.**

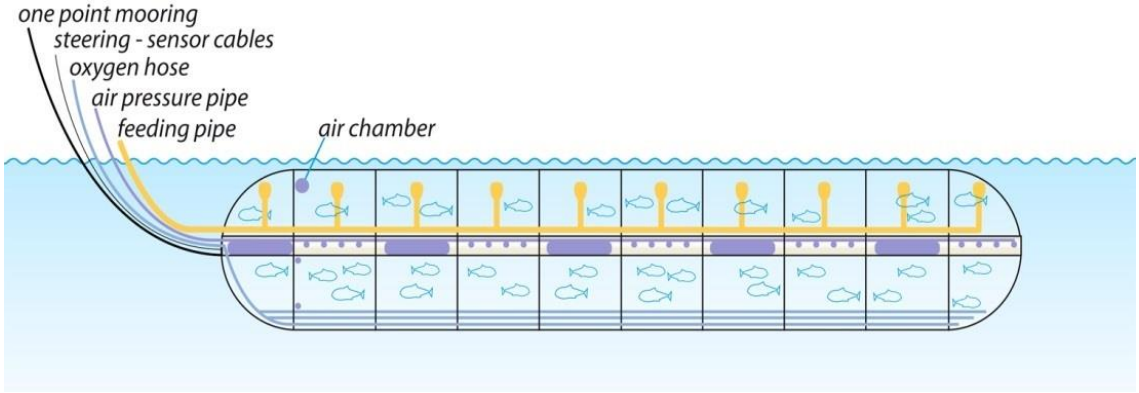
D. Promotion, Support, Costs

1. The EU-EIC Accelerator agreed to Step 1 and supports 70 % and provides EU Credits.
2. R&D and Static works for 10 m wave resistance and for a Workshop-Plan is finalized.
3. The costs of 40 - 80 €/m³ cage volume competes other Ocean Design of up to-1.500 €.

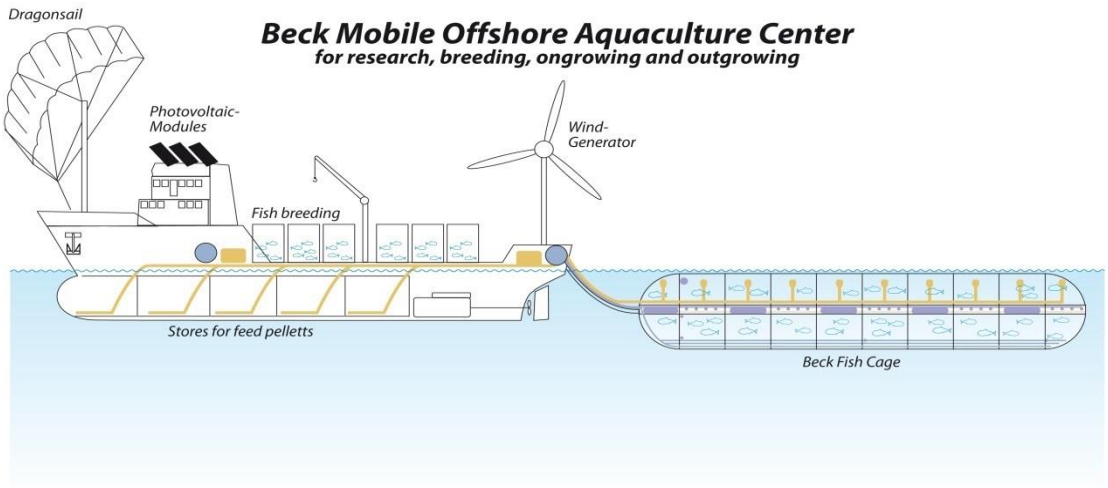
E. Factory and Marketing

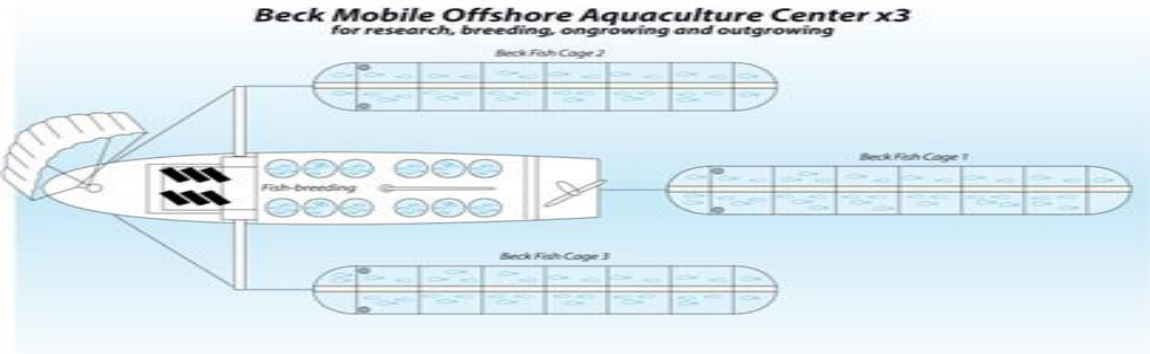
1. A Factory delivers free floating "Turn Key Ocean Farms" to any global location.
2. Market Anylyses state that hundreds of global Fish Farm Companies would buy the low cost and riskless Ocean Farm, if a <u>Demonstration Project</u> proves its great advantages.
3. The new Patent Holder has no competitors world-wide and get a global market of hundreds of Fish Farm Companies who can become Cooperatives to increase Salmon and Fish Sale.

F. Function of a cylindrical Ocean Fish Cage

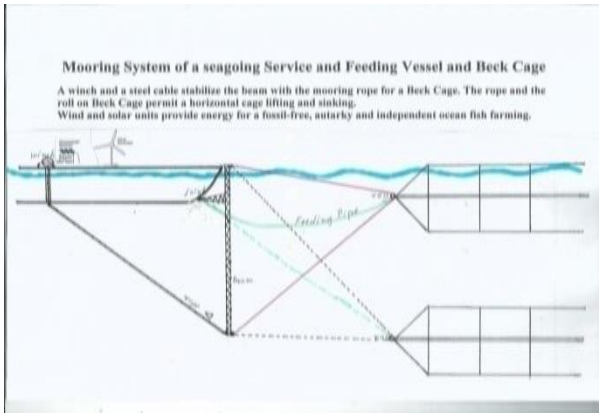


G. Ocean Fish Farm with 1 and with 3 Cages

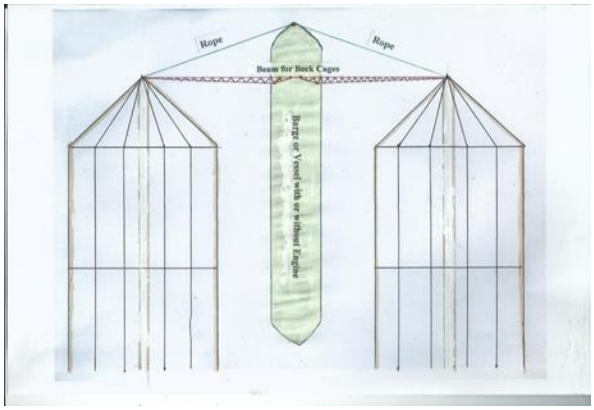




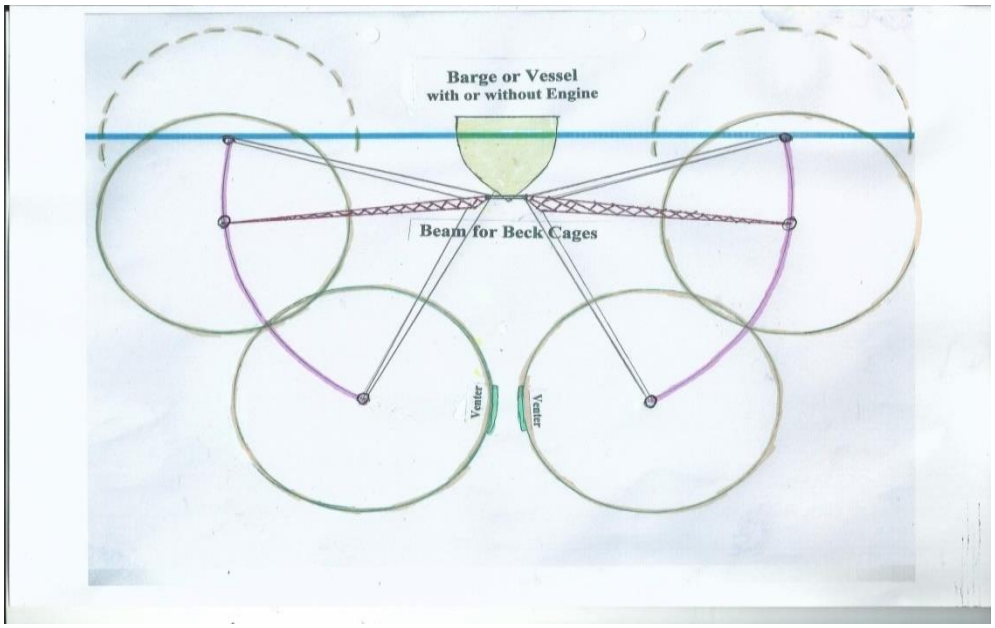
Rear-Beam for rear cage



2 Site beams for site cages



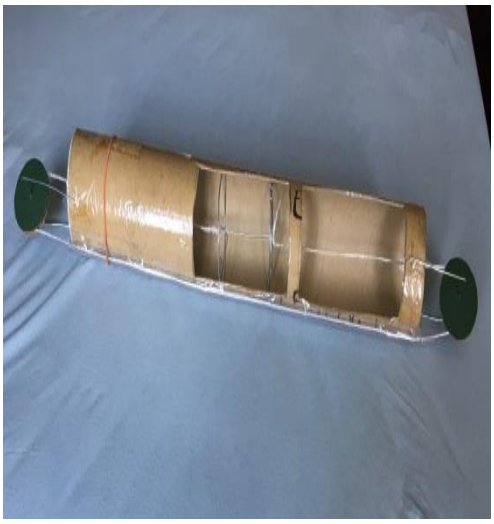
The length of the beams is the submerging depth of cages



Innovative Feeder for submerged cages

The 2 white water boxes for demonstration/tests only

Dead Fish Disposal Unit

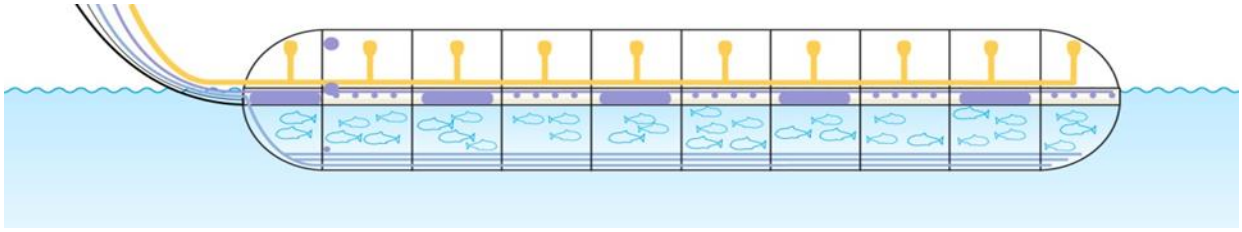


Model of Dead Fish Disposal

Annex 1

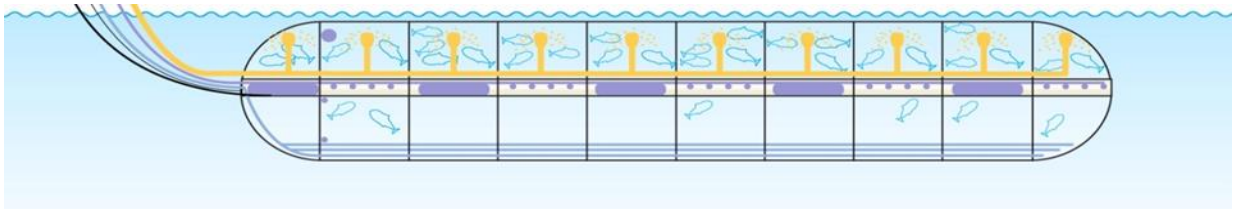
Operation of Beck Cage - Graphics

Service position and Self-Cleaning of Nets



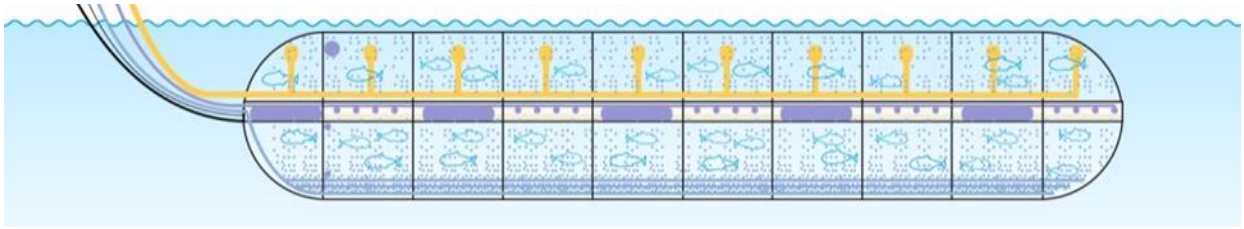
At calm weather, the cage is lifted half out of water for grading, harvesting and net cleaning. At low stocking density the cage rotates frequently, that sun and air can dry and clean nets and structure.

Feeding + Conical front



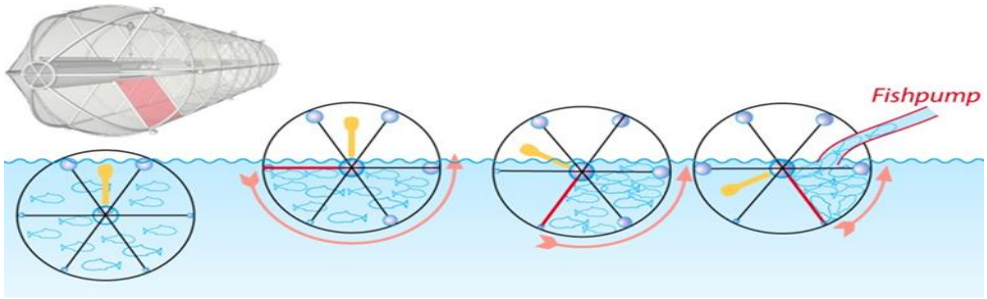
The innovative Beck Feeder press dry pellets into a water-stream and push the pellets into the sections of Beck Cage within seconds at any depth of the cage - regulated by a computer program.
The conical front with its plate-structure, regulate the strong current for fish-welfare.

Dead Fish Collection and Oxygenation



A innovative patented Unit dispose dead fish into **an out-site basket. When turning the cage till the basket is above sea level, dead fish are collected by a boat. Divers are not needed anymore.**
Diffuse-porous pipes, fixed on the 4 lowest longitude stringers, enrich the water with air or liquid oxygen if needed. Atmospheric air is provided in "Air-Bells" in each section.

Harvesting and grading of Fish



Harvesting and grading is done by section-radius nets (mesh sizes), fixed at the axial structure in each section and pulled by an endless rope to the periphery of the cage and fixed on a stringer.
The mobile fish farm moves to coastal harvest and processing plants and saves transport costs.
A vacuum pump sucks the fish out of each section as shown on the graphic.

Annex 2

Economy of Mobile, Autonomous Ocean Fish Farm

Investment - Revenue - Profit

Offshore Fish Farm Concepts

1. Service station designed like a vessel (0,5 to 1,0 Million) **1.000.000 €**
- Fish pellet silos for around 500 tons and conveying equipment
- Mooring beams for 3 cages, 2 on sites and 1 rear; vessel-anchor
- Wind/Solar Energy - Battery and screw drive Engine, ship facilities

2. Functional equipment, installed on the Service Station **350.000 €**
- Compressor-air tank, automatic feeder, emergency generator,
- Computer programs, cages with hermetic boxes, valves, installation,

3. Cages - Static, Size and Costs

Submerging Cage: Static Hs 5,0m = 10m wave resistance
- L 100m x D 16m – 20.000m³ cage volume, 420.750 € : 20.000m³ = 21,00 €/m³
- L 100m x D 20m – 31.000m³ cage volume, 537.000 € : 31.000m³ = 17,30 €/m³
- L 100m x D 24m – 45.000m³ cage volume, 622.500 € : 45.000m³ = 13,80 €/m³

4. Ocean Fish Farm – different cage sices

4.1 Fish Farm with 20.000m³ Cage x 3 Cages = 60.000m³ = 1.262.250 €
- Service station + functional equipment = 1.350.000€, total investment 2.612.250 €
- Depreciation 10 years, stocking density 20kg/m³ - (1.200 tons)
- Fixed Costs/year - 261.225€ : 60.000m³ = 4,35€/m³ : 20kg + interest = 0,25 €/kg Fish
- Variable Costs - fingerling, feed, management, unforeseen 2,50 €/kg Fish
- Sale - 4.50€/kg fish minus fixed/variable costs = profit 1,75 €/kg
- Revenue 1.200.000 kg/fish x 1,75 €/kg is net profit: 2.100.000 €

Repayment is Investment: Revenue 2.612,250 : 2.100 = 1,24 years

4.2 Fish Farm with 31.000m³ Cage x 3 Cages = 93.000m³ =1.611.000 €
- Service Station + functional equipment = 1.350.000 €, total investment 2.961.000€
- Depreciation 10 years, stocking density 20kg/m³ - (1.860 tons)
- Fixed Costs/year – 296.100€ : 93.000m³ = 3,18€/m³ : 20kg + interest = 0,19 €/kg Fish
- Variable Costs – fingerling, feed, management, unforeseen 2,50 €/kg Fish
- Sale – 4,50€/kg fish minus fixed/variable costs = profit 1.81 €/kg
- Revenue 1.860.000 kg/fish x 1,81 €/kg is net profit: 3.366.600 €

Repayment is Investment: Revenue 2.961.000 : 3.366,00 = 0,88 years

4.3 Fish Farm with 45.000m³ Cage x 3 Cages = 135.000m³ = 1.867.500 €
- Service Station + functional equipment = 1.350.000 € total investment 3.217.500€
- Depreciation 10 years, stocking density 20kg/m³ - (2.700 tons)
- Fixed Costs/year – 321.750€ : 135.000m³ = 2,38€/m³ : 20kg + interest 0,15 €/kg Fish
- Variable Costs/year – fingerling, feed, management, unforeseen 2,50 €/kg Fish
- Sale – 4,50€/kg fish minus fixed/variable costs = profit 1,85 €/kg
- Revenue 2.700.000 kg fish x 1,85 €/kg is net profit: 4.995.000 €

Repayment is Investment: Revenue 3.217.500 : 4.995.000 = 0.65 years

Local Parameters determine Economic Estimations.
The Static and Prototype proved Workshop Plans assure immediate Construction.

Innovator and Patent-Holder: Siegfried Beck is in Pension Age. He focus a serious Follower-Mediator
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