Recirculation Aquaculture Systems (RAS)
Jens Jensen - background
AKVA group: Leading in aquaculture innovations

- Cage farms
- Land Based Aquaculture
- Recirculation
- Feeding Barges
- Feed systems
- Sensors & operational Software

Your Aquaculture Technology and Service Partner
Aquaculture the only solution....
Why RAS?

- Optimal water temperature
- Optimal oxygen saturation
- Stable water parameters
- Bio-secure system
- Saves water
- Environmentally friendly

Yellowtail Kingfish

Tiger grouper
- **SOLID EXCRETIONS**: Suspended solids (SS), Phosphor (PO4), Nitrogenous compounds (N-)
- **DISSOLVED EXCRETIONS**: Phosphor (P), Ammonium (NH3, NH4)
- **GAS EXCRETIONS**: Carbon dioxide (CO2), Nitrogen (N2)
The Recirculation Aquaculture System (RAS)
Case: RAS Rompin Marine Hatchery, Malaysia

- Department of Fisheries Malaysia
- Goal to expand marine cage farming
- Securing sufficient numbers of fish fry
- 5 million fry per year – seabass, barramundi, grouper etc.
Case: RAS Salmon smolt farming, Chile

- Sealand SA, Puerto Montt
- Producing 12 million smolt per year
- All year round production
- Complete smoltification control
Case: RAS Recirculation Shrimp farming, Thailand

- The Charoen Pokphand Foods Co. Ltd. (CP), Thailand
- Bio-secure super intensive indoor shrimp production system
- Harvest output of 25 kg per m² per harvest
- Pioneering systems up and running
Case: RAS National Prawn Company, Saudi Arabia

- Land based aquaculture expansion
- Greater Amberjack, Barramundi etc.
- Broodstock and Hatchery
- Nursery and Fry
Case: RAS Bluefin Tuna farming, Australia

- The Stehr Group, Clean Seas Ltd., Australia
- Worlds 2nd best invention 2009 by TIME Magazine
- Realization of production of Bluefin Tuna fry
- Fry transferred to ocean farming cages
Case: RAS Danish Salmon, Denmark

- Saltwater recirculation
- Large salmon 4-5 kg
- 2000 tons per year
- 22 months to reach 4.5 kg
Sheikh Khalifa Marine Research Centre, UAE

- Umm al-Quwain
- Mass production of marine fry
- Construction 2014 - 2015
Fish Farm LLC, UAE

- Dubai
- Multi species marine production
- Construction 2015
Fifax

- Finland, Åland
- 3200 ton Trout production pr. year
- Construction 2015 - 2016
• Norway
• 600 kg. feed pr. day or production for 4 mill. smolt
• Construction 2014 - 2015
Nord Norsk Smolt, Hasvik

- Norway
- Smolt production. 12 mill. Pr. year
- Construction 2015
Tank room

Shown with hidden floor
Water treatment system

Easy access to the high efficiency lift pumps. To reduce the height of the building, knock-out panels for easy pump service are introduced.

Room for extra drumfilter
Pipe system in WTS

Pipes for chillers, sludge, aeration, ventilation, oxygenation, microparticle filters and several other pipes.

Designed with as few fittings & bends as possible to reduce head loss and costs.
Desktop and mobile Client

Desktop Client

Mobile Client
Fast overview of the essential processes
Selling to Clients in the Global Market

**Technology**
- Equipment
- Design
- Know-how

**Operational Support**
- The "OPEX area"
- Consultancy (EIA)
- Farm management support
- Service

**Investment**
- Business case
- Feasibility study
- Export Credit

**Market**
- Market study
- Software Processing

**Authority handling**
- Permissions
- EIA

**CLIENT/PARTNER**
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Working through the project

Preparatory work is imperative!
Thank you for your attention