

BACKGROUND

Closed Tank Technologies and Energy Consumption

Closed tank technologies offer a major step forward in fish farming practices. They eliminate several of the most important negative impacts of salmon farming and help significantly reduce others. Closed tanks have been demonstrated as technically feasible ways to grow salmon and are currently being tested to demonstrate commercial viability.

Demonstration of closed tank commercial viability and confirmation of environmental benefits will offer a significant opportunity to move towards salmon farming that protects the marine environment, human health and coastal communities.

One criticism that has been levelled at closed tanks is that they will require a large amount of energy making them economically and ecologically unacceptable.

While we clearly support testing the energy demands in any new system proposed, it is not necessarily true that overall energy demand and greenhouse gas emissions will be higher in closed tank systems. Claims of high energy consumption are most commonly made based on old data that no longer reflects current best practices. In fact, when the full lifecycle of closed tank production is considered, it is possible that closed tanks will offer improvements in energy performance over current salmon farming systems.

Land or Water Based Systems

One important point to keep in mind is that not all closed systems have to operate on land. Often those critiquing closed systems, and even some supporters, make this assumption and thus conclude that there will be extremely high pumping costs associated with bringing the water to land.

Systems designed to float in the ocean eliminate this need to pump long distances and take advantage of water pressure at depth to further reduce the energy needed for pumping.

Even some land based systems are overcoming the pumping problem through the use of high-efficiency recirculation systems that allow them to re-use water. One such system, Eco-Farm from Norway, was evaluated by BC's PriceWaterhouseCoopers. An excerpt of their conclusions is below:

Eco Farm AS - Assessment of production cost and competitive situation

PriceWaterhouseCoopers, 11 December 2003

- It seems clear that Eco Farm has moved closer to solving one of the key hindrances to profitable fish farming on land; the high cost of lifting water.
- The company has in addition addressed all the inherent risk-factors in a thorough manner.
- The test production at Rognaldavågen during 2001 and 2002 has strongly supported the assumption that profitable land based fish farming is possible.

The full evaluation is available at: www.eco-farm.no/PWC_Final_Report.pdf

Life cycle energy evaluation

In addition to the reduced energy needs of floating or re-circulating systems, the overall energy use of the production system and the types of energy used must also be evaluated.

Open net-cage salmon farms do use energy

Current open net-cage farms power pumps for feed and video monitoring, some farms are considering pumping oxygen into their open net-cages to maintain optimum growth, they power living and working quarters for crew and maintain lighting on site. In most cases with open net-cages in remote sites, these energy needs are met by diesel generators, which create greenhouse gas emissions as well as significant air pollution problems.

Energy source matters

In addition, net-cages generally require remote sites to get the water quality and flushing they need. This means that crews, feed, nets, fuel and final product all must be transported back and forth by boat or barge, using additional diesel fuel, as well as increasing the risk of accidents with the attached financial, human and environmental costs.

Closed tank systems will work best in places like Campbell River, Port Hardy, or Port McNeill where there is access to water that is the correct cold temperature, salinity and quality for salmon as well as immediate access to labour, fish processing and transportation to market. These factors eliminate the greenhouse gas emissions from transportation and shipping to remote sites, while also shifting the power needs of farm operations from diesel for open net-cages to the existing energy grid, largely powered by hydro-electric, for closed tank farms.

Improved feed efficiency favours closed tanks

As a final point, closed tank farms have demonstrated improved use of feed. The capture of wild fish and the processing to produce feed is one of the largest factors in the energy profile of salmon farming according to research from Dalhousie University (N. Pelletier, as presented to the Seafood Summit in Jacksonville, FL January 2007). Reducing the amount of feed required will have many environmental benefits, including a reduction in total energy demand for the production system.

Conclusion

Whether land or water based, closed tank farms located in coastal communities can be energy efficient and have low greenhouse gas emissions when the full lifecycle of fish farm production is considered.