Pursuing sustainable feed production

Using advanced technology to reduce, monitor and control energy usage

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Consumers are increasingly interested in knowing the sustainability story behind the food they buy, particularly when it comes to marine conservation.

The spotlight is shining brightly on the food we are eating and tracing it from the dinner table all the way back to the farm and/or fishery … and even further back to the eco-friendliness of the feed these marine animals and fish are consuming.

Seafood is widely recognised for its low environmental impact compared to alternative sources of animal protein. Yet, within the aquaculture sector, feed production - with its robust manufacturing processes and equipment - can be burdensome on the environment.

Aquafeed production is an influential link in the supply chain, and we have tremendous opportunities to lessen environmental impacts at the plant level. In this article, we will review 'green concepts' and more sustainable practices for the aquafeed facility including responsible facility design, certifications and traceability.

Making production facilities more sustainable

In the late 1980s the Brundtland Commission released a report called Our Common Future, where it defined sustainability as, "… meeting our own needs without compromising the ability of future generations to meet their needs." This definition integrates environmental, social and economic development.

Sustainability is not just for environmentalists; rather, it incorporates businesses such as feed manufacturers who strive for responsible profits, employee rights and a positive impact for the present and future.

Of course, we cannot completely escape the environmental impacts of manufacturing. aquafeed facilities, like many other industries, use ingredients harvested from the land or sea, have building and packaging materials that will one day be thrown in a landfill, consume unrenewable utilities and burn fossil fuels for transportation of goods and people - all of which impact the environment to varying degrees.

However, there are many ways to incorporate sustainably minded practices into the design and operations of your facility; and even incremental changes can add up to big improvements.

Early collaboration is crucial

When planning a new feed facility or installation, the best time to apply sustainable concepts is in the beginning stages of your project. So you should start by creating an Owner's Project Requirements document; a high-level outline of the company's requirements for the project.

This is where you can determine your sustainability goals, such as reducing energy demand, reducing water usage, reducing your target carbon footprint and target certification goals. Applying these concepts early in your project will help integrate them into the design and practices of your facility, saving you time and money in the long run as early collaboration is crucial.

Bring together your design teams, extrusion process experts, project stakeholders, architects, engineering, plant management and sustainability consultants during the predesign phase of your project. This encourages efficient feedback and reduces time loss caused by developing your project in isolation.

If you invest a great deal of effort in the project design phase, you will have a greater ability to control design changes and costs later during construction and operation. This multifunctional team should not only reference the Owner's Project Requirements but move deeper into the planning of energy and water use reduction for the manufacturing process, building and grounds.

They also should consider creating a conceptual design and utility analysis of your project, which includes the building and equipment. This will provide a visual analysis for your energy and water usage savings.

A few areas stand out as the most advantageous steps toward creating a greener production environment, which are materials, site selection and utilities. Making improvements in these areas can drastically increase the overall sustainability of your facility, so they are a critical place for your team to focus attention.

Assess material longevity

In the past, many aquafeed facilities devoted little attention to the lifecycle of their facility.

Modern projects should look beyond a price tag and recognise

how the materials are sourced, how long they may last, and what will happen to them at the end of their life.

To be more sustainable, projects should source high efficiency building materials and equipment with advanced technology to reduce, monitor and control manufacturing energy. The cost may be more upfront, but the return on investment can be much greater.

During this phase of your project, be aware of 'greenwashing' (companies professing to be environmentally friendly by words only) and find reputable suppliers who can provide efficient equipment with a long life. To help quantify longevity, you can perform a life cycle assessment (LCA). LCA models help you compare the environmental impact over the entire life cycle of your process, equipment and building materials. Having this analysis will help you make responsible decisions for your project design.

Select an eco-friendly processing site

The building site should also be considered when designing a sustainably minded project.

One strategy reducing your building's environmental impact is to reuse existing building space and materials. Obviously, this is not always possible, but when applicable it can offset the environmental impact of new material generation and reduce landfill waste.

Additionally, selecting a brownfield site saves undeveloped land that could be used for agriculture or natural purposes. Brownfield sites generally mean the site is already in an area with existing infrastructure, which can improve project cost savings and reduce emissions generated from transportation of goods and employees.

For example, if your facility is in or near a populated area, you can encourage alternative modes of transportation, such as public transportation, carpooling and biking. (Populated areas do tend to have regulations regarding the air pollution from nearby manufacturing, so be sure to select the appropriate air abatement system for your site.)

The project property also needs to be part of this planning.

Reduce your environmental impact by creating a rainwater management plant. You can control runoff on your site by incorporating bioswales, a green roof and permeable surfaces such as pavers for parking and sidewalks.

Reduce utility demands

There are multiple strategies for reducing your utility demands. A few basic suggestions for your project teams to consider relate to water, energy and waste management.

When identifying ways of reducing your process water requirements, selecting equipment with lower steam requirements, dry wash equipment and use closed loop water systems is of key importance.

Monitoring your water use with meters is crucial for identifying waste or reduction opportunities, whilst the inclusion of greywater recycling and rainwater harvesting into your water system will also enable this.

Designing your layout to be as efficient as possible is crucial when seeking to conserve energy. A more compact layout design can reduce the need for some transport equipment and utilities. When possible, try to keep the receiving, storage, processing and shipping in the same vicinity to reduce the building size, energy requirements and transport distances.

Renewable energy technology does have its limitations, but it should still be considered by your project team.

Try to identify modern equipment and technology with increased energy savings, looking for Energy Star equipment for

office furniture and appliances is one example of this, whilst using daylight-responsive controls and occupant sensors is another. Like with water usage management, tracking all energy sources with meters is the best method for identifying additional saving opportunities.

The first rule of waste management is that the collection of recyclables is a must, so developing a collection and storage program for your production and office areas should be a priority.

Similarly, for the construction phase you should implement a waste management plan with the goal of separating recyclable waste from landfill waste.

Packaging generates a considerable amount of waste for you and your clients, so you should try to package your products in recyclable or biodegradable material and demand that your suppliers do the same. You should also seek to implement waste recovery systems that can place startup material and byproducts back into the process.

Certifications and traceability

As you can see, there are many places where small changes can lead to great progress toward a more environmentally friendly production facility, putting you in a favourable position for earning desired certifications that validate your green practices.

Feed industries are continually making changes in order to comply with government mandated food safety regulations. Most recently, big shifts in consumer awareness have put even more scrutiny on the feed and food industry. Consumers not only want to know where their food came from, but also its environmental impact all along the supply chain.

Their mindsets are evolving from, "Is this fish on the menu a threatened species?" to, "Was this fish grown in a fishery with sustainable feed and fair working conditions for the labourers?" The consumer wants assurance that the food they are consuming can be traced all the way back to the beginning.

The Food and Drug Administration (FDA) in the USA, defines traceability as, "The ability to follow the movement of a food product and its ingredients through all steps in the supply chain, both backward and forward. Traceability involves documenting and linking the production, processing and distribution chain of food products and ingredients."

Traceability has been documented in feed manufacturing facilities for years, but there is a growing demand for increased ingredient transparency and proof of origin.

The sustainably minded aquafeed facility needs to show proof that their raw materials are responsibly sourced. Marine ingredients, such as fishmeal and fish oil, should be from documented suppliers that follow the responsible practices such as the Food and Agriculture Organization's (FAO) Code of conduct for responsible fisheries and feed facilities themselves should work toward certifications such as the ASC or MarinTrust to aid in traceability.

As the industry offsets some marine resources to plant-based resources, a sustainably minded company also needs to obtain these inputs from a certified source.

For example, consider soybean and palm oil usage in feed recipes. Awareness is growing of the environmental impact of soy and palm production with regards to carbon footprint, chemical use, water depletion and deforestation.

There is a wide range of certification programs available to the aquatic industry that includes both extruded aquafeed and fishmeal producers. A few of the more recognised entities include the Marine Stewardship Council (MSC), the Aquaculture Stewardship Council (ASC) and MarinTrust.

These certification entities have various programmes that focus on specific portions of the value chain, but all share the goal of reducing the environmental impacts within the aquaculture industry.

As an example, the ASC is releasing a new feed standard that will define requirements for responsible factory practices and requirements for responsible ingredients including marine ingredients, terrestrial plant ingredients and terrestrial animal ingredients. This will also address habitat loss, over-harvesting, human rights abuse and sustainable environmental indicators, such as water and energy consumption.

Navigating the complexities of the aquafeed industry

As a result of heightened consumer scrutiny, governmental regulations and a growing interest in environmental consciousness, the aquafeed industry faces increasing pressures to be 'green'.

Within the aquafeed industry, we must do our part to make our work less burdensome on the environment and that requires attention to detail and innovations that allow us to adopt more sustainable practices.

Corporate Project Services helps companies design production facilities and navigate the complexities of certification, all in pursuit of establishing a more sustainable operation overall.

Implementing and designing more sustainable practices into your aquatic feed facility impacts your community and your environment, but it also can reduce your utilities, increase your return on investment, create a comfortable space for employees and help increase sales, and qualify your company for government programs.

Corporate Project Services is a division of Wenger Manufacturing that specialises in extrusion project management and facility design. Wenger is actively developing equipment and controls solutions for sustainability in our own equipment manufacturing practices, including our systems used to produce aquafeed products.

Utilisation of closed-looped energy delivery systems for processing, elimination of discharge waste streams and energy efficient systems are key design targets in all Wenger innovations.