Moving your animal feed business from ingredients to nutrition
Sustainably, reliably and safely
Introduction

Animal feed is generally either produced on farms, or by specialist suppliers. Production processes have become more sophisticated and industrialized in recent years, but this brings with it greater reliance on energy, and makes equipment maintenance a high priority to maintain uptime and supply chains that are vital to ensuring feed security. Amid rising energy costs, producers must also ensure that equipment is efficient to ensure maximum profitability and minimum waste. Producers, whether they are based on-site or at separate facilities, must also achieve:

- **Sustainability** – where improvement comes in the form of energy savings, optimized use of water and raw materials and ventilation and protection of the local environment
- **Reliability** – where the need to reduce wear and tear on assets in use, prolong equipment life, and eliminate the risks of unplanned stoppages are all critical to profitable operation
- **Safety** – where keeping personnel safe from harm is non-negotiable, and ensuring that feed quality and safety is maintained throughout the value chain

ABB offers application-based solutions for animal feed producers and logistics providers across the entire value chain. Our domain expertise, energy efficient motors and variable speed drive / variable frequency drive (drive) technology help to substantially reduce energy costs, while programmable logic controllers (PLC) deliver integrated control systems that help to provide enhanced digital visibility and control over processes in animal feed production, and onwards to logistics – providing solutions from Ingredients to Nutrition.

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At-the-farm animal feed production

Challenges facing the animal feed production industry
Consumption of meat is increasing around the world, requiring the rearing and feeding of more cows, pigs, chickens and fish products to meet the demands of a growing global population. The average cow eats 60kg-80kg every day, requiring production of vast amounts of feed on a daily basis. Meanwhile, pet ownership has also increased significantly in recent decades. For animal feed producers, global distribution issues have led to fluctuating raw material costs, while climate change is increasing the likelihood of crop losses. Building resilient and flexible processes is therefore vital to ensure a healthy supply of feed for animals.

Ensuring process and feed safety
Applications such as pellet presses and mixers can involve heavy mechanical moving parts, which present a risk to the personnel operating the application. Ensuring that the electric motors which power these processes have appropriate safety considerations and functionality is important to ensure the safety of employees. Feed must be nutritionally balanced to ensure health and growth, while harmful contaminants must be prevented from entering the feed chain at an early stage.

Solutions across the value chain
ABB offers a suite of solutions for equipment that deliver vast benefits for animal feed producing facilities, as well as the equipment manufacturers and system integrators that supply them. Across the animal feed industry, ABB understands the applications and issues that matter, and helps industry to tackle the array of sustainability, reliability and safety challenges faced within the sector.
At-the-farm animal feed production

**Challenge**

- **SUSTAINABILITY**
  Sieving can be a high intensity process requiring large amounts of energy

- **RELIABILITY**
  Sieves vibrate rapidly, and my equipment needs to be able to withstand the process continuously

- **SAFETY**
  Ingredients must be carefully sifted to separate grades and prevent contamination

**Solution**

- **Sieves**

- **Drives, high efficiency motors and PLCs from ABB** save energy, optimize efficiency, and improve performance

- **Robust motors combined with drives** ensure maximum longevity and low maintenance requirements

- **PLC** provides precise control over processes, ensuring errors are kept to a minimum
At-the-farm animal feed production

**Challenge**

**SUSTAINABILITY**
Accurate dosing means healthy animals, so I need to carefully control consistency and quality.

**RELIABILITY**
I need to ensure optimal running of systems to prevent downtime, as feed can be spoiled very quickly.

**SAFETY**
I need to prevent risk to personnel from heavy machinery.

**Solution**

*Drive and PLC ensures accurate and precise dosing to reduce waste.*

*Motor control can be achieved with a drive, reducing wear on equipment.*

*Drive’s integrated functional safety brings equipment to a safe and controlled stop in an emergency.*

Hammermills
At-the-farm animal feed production

Challenge

SUSTAINABILITY
Mixers can consume a lot of energy, and I’m under pressure to reduce my costs

RELIABILITY
Mixers require high starting torque, putting strain on equipment

SAFETY
I have to keep my employees safe from machinery, and ensure that contaminants do not enter the feed chain

Solution

Drives, high efficiency motors and PLCs deliver substantial energy savings, optimize efficiency and improve performance

Drives provide precise speed and torque control to reduce strain on mechanical equipment

Integrated functional safety within drives reduces personnel risk, Food Safe motor can withstand harsh washdowns
At-the-farm animal feed production

**Challenge**

**SUSTAINABILITY**
Pellet presses are large energy consumers and require accurate control

**RELIABILITY**
Pellet equipment generates high amount of vibrations which can affect equipment longevity and maintenance requirements

**SAFETY**
Pellet presses have mechanical moving parts which can present a risk to personnel

**Solution**

**Drives with highly efficient motors reduce energy consumption while providing precision control of motor speeds**

**Drive and PLC gives operators the ability to carefully control motor speeds, reducing strain on equipment**

**Integrated functional safety in drives reduces risk of injury**
At-the-farm animal feed production

**Challenge**

**SUSTAINABILITY**
I need to optimize my conveyors to reduce energy bills wherever possible

**RELIABILITY**
Frequent starts and stops of augur process will cause premature wear and equipment failure

**SAFETY**
I must keep personnel safe from dangerous moving machinery

**Solution**

Drive can be used to run augur at the specific speed required, reducing energy usage

Drives provide precision control with soft start/stop for improved lifetime and lower maintenance requirements

Integrated functional safety in drives reduces risk to personnel
At-the-farm animal feed production

**Challenge**

**SUSTAINABILITY**
Fans are energy-intensive applications, and I need to reduce my energy costs

**RELIABILITY**
Blowers are the easiest way of moving materials from one point to another, and so any downtime will affect production

**SAFETY**
I need to keep fire hazards from dust and debris to a minimum

**Solution**

- Drive can reduce a motor’s energy usage by up to 25% or more
- Remote monitoring equipment ensures potential faults can be identified long before they cause failures
- Drives ensure optimal airflow, while Ex-certified motors prevent the build-up of flammable dust and other materials

Blowers
Feed production plants

Cutting wastage and reducing time to market
Feed mills are designed to achieve high throughput at the lowest cost, without compromising on product quality. Feed must be easily digestible, easy to eat, and have a high nutritional value. Recipes must be also be mixed optimally to cater for various different species.

Keeping feed nutritionally balanced
Poor quality feed results in unhealthy animals, and so consistency is also important to maintain the required levels of product quality, and deliver the necessary nutrients for animals. Precision control of motor-driven processes is key to ensuring maximum output with minimum waste. Temperature and humidity must therefore be carefully controlled to provide optimal conditions before products are shipped out to farms or retailers.

Reducing costs of high intensity processes
Processes such as hammer milling and extruding are high energy consumers, with energy accounting for a significant proportion of production costs. Even small gains in energy efficiency can make a significant difference to overall system efficiency, as well as cutting costs across the plant.

Helping to improve sustainability, reliability and safety
ABB products are designed to meet the needs of the increasingly sophisticated modern industrial animal feed production facility. From Ex-rated motors across a wide power range, to advanced industrial PLCs and energy saving drives, ABB is equipped to help animal feed producers to improve the sustainability, reliability and safety of their operations.
Feed production plants

**Challenge**

- **SUSTAINABILITY**
  Extruders are an energy-intensive application, and I need to reduce my energy costs

- **RELIABILITY**
  I need to ensure optimal running of systems to prevent downtime, ensuring product quality is important, including texture

- **SAFETY**
  I need to prevent risk to personnel from heavy machinery

**Solution**

- **SynRM motor and drive package**
  SynRM motor and drive package can achieve IE5 efficiency levels

- **More efficient motor control**
  More efficient motor control can be achieved with a drive, reducing wear on equipment

- **Integrated functional safety features**
  Integrated functional safety features such as safe torque off reduce risk of injury from moving machinery
Feed production plants

**Challenge**

- **SUSTAINABILITY**
  Ventilation systems must be run continuously, contributing to higher energy costs

- **RELIABILITY**
  Downtime of fan systems can cause production bottlenecks

- **SAFETY**
  Uptime of cooling systems is vital to prevent bacteria and contaminants from getting into feed

**Solution**

- **IE5 SynRM motors, combined with a drive, can significantly lower energy costs on centrifugal loads**

- **Drive lowers strain on equipment, reducing the likelihood of unplanned downtime**

- **Digital remote monitoring capabilities ensure early warning of any potential failures**

**Ventilation**
Feed production plants

**Challenge**

**SUSTAINABILITY**
I don’t want to change the speed of my conveyors, but I do want to make them more energy efficient

**RELIABILITY**
Each conveyor may have different maintenance requirements, while longer conveyors can require numerous motors and long cables

**SAFETY**
I must keep personnel safe from dangerous moving machinery

**Solution**

**Drives**
Drives ensure that conveyors are running at the correct speed and at optimal energy efficiency

**PLC**
PLC combined with drives and motors ensures perfect synchronization of multiple conveyors for less wear on equipment

**Integrated functional safety**
Integrated functional safety in drives reduces risk to personnel

Conveyors
Feed production plants

**Challenge**

**SUSTAINABILITY**
Pumping is a high energy process, and I need to improve efficiency wherever possible

**RELIABILITY**
Ingredients can contain oily fluids. I cannot afford for my pumping systems to go down

**SAFETY**
Pumping equipment requires regular washdown to prevent contaminants from entering the feed chain

**Solution**

**Drive and SynRM motor packages**
can achieve IE5 levels of efficiency

**ABB drive**
features pump-specific functionality to improve pump efficiency and longevity

**Paint-free motors**
make it easier to comply with hygiene requirements and keep equipment clean
Production of wet feed for pig farms

Quality and feed safety with every batch
Effective cooling and refrigeration are essential for high quality, safe-to-eat feed for swine and other animal consumers of wet feed. Hygiene is vitally important in all animal feed production, but particularly with wet feed. Products must therefore be stored carefully, and at the correct conditions to ensure that it maintains quality. Wet feed contains animal fat and so can perish quickly if not handled correctly.

Maintaining a healthy feed chain
Wet feed production manufacturing must adhere to strict safety standards to prevent contamination and ensure the safety of animals. High pressure washdowns are often required, which means that production machinery must be robust and able to withstand frequent cleaning and strong chemicals. Reliability is also key, as any downtime can result in production bottlenecks, and costs that can rapidly escalate.

Proven solutions for wet feed production
Manufacturers must squeeze every drop of efficiency out of production equipment. The use of energy efficient equipment such as ABB drives, motors and PLCs can help to lower unit costs, reduce wastage, and improve profitability.
Production of wet feed for pig farms

**Challenge**

**SUSTAINABILITY**
Pumping is a high energy process, and I need to improve efficiency wherever possible.

**RELIABILITY**
High starting torque for positive displacement pumps can cause equipment to wear prematurely.

**SAFETY**
I need to keep equipment clean to prevent contaminants from entering the feed chain.

**Solution**

Drive and SynRM motor packages can achieve IE5 levels of efficiency.

Controlled start reduces stress on equipment and improved longevity.

ABB’s selection of motors and drives built with a robust design to ensure easy cleaning and maintenance.
Production of wet feed for pig farms

**Challenge**

**SUSTAINABILITY**
Refrigeration compressors and condensers are among the biggest energy users at my facility.

**RELIABILITY**
Any failure to my cooling systems could damage products, particularly in humid environments.

**SAFETY**
Systems must be regularly washed down to prevent contaminants from reaching feed.

**Solution**

IE5 SynRM motors, combined with a drive, can significantly lower energy costs in compressors, pumps and fans in refrigeration systems.

Drive lowers strain on equipment, while remote monitoring can flag up potential issues before they lead to failures.

ABB motors are built to withstand regular cleaning and facilitate easy maintenance.
ABB Motion solutions for animal feed production

High efficiency motors

- ABB offers a comprehensive range of reliable and high efficiency motors for all animal feed production processes and logistics applications across the value chain.
- Super premium efficiency IE4 induction and permanent magnet motors can significantly reduce energy usage, while meeting and exceeding Minimum Energy Performance Standards (MEPS) around the world.
- Ultra-premium efficiency IE5 SynRM motors / NEMA EC titanium motors and VSD packages can achieve unprecedented energy savings for processing and logistics applications.
- NEMA Food Safe motors contribute to more hygienic working practices while prolonging motor lifetime.
- Ex motors ensure maximum equipment safety in hazardous and dust-affected areas.

Variable speed drives/variable frequency drives

- ABB drives are made with efficiency and performance in mind to empower productivity for animal feed producers. They provide flexibility to optimize processes and control across the value chain, while achieving high reliability for less downtime.
- Achieves substantial energy savings by delivering precision control to ensure that a motor only uses the energy it needs for a given output.
- Built-in features and functionality ideal for animal feed production processes.
- EnergySave Calculator tool allows you to predict energy performance and savings prior to investing
- Functional safety built-in

Programmable Logic Controllers (PLCs) and Human Machine Interfaces (HMIs)

- ABB automation devices deliver solutions with high performance and flexibility to be effectively deployed in applications across the animal feed value chain.
- ABB range of PLCs can provide solutions for small, medium and high-end applications.
- Ideal choice for high availability, extreme environments, condition monitoring, motion control and safety solutions.
- Constantly monitors process variables and can instruct motor and drive equipment to adjust operations instantaneously to match requirements in real-time.
- Safety PLC specifically designed for safety applications involved in machinery and process automation.
ABB Motion success stories in animal feed production

CASE STUDY
Red Range Stock Supplements manufacture quality animal feeds across Australia’s North-West, manufacturing nutritional and high quality supplements for livestock.

Their manufacturing operations consist of a combination of conveyors, augers, crushers, mixers, pumps, and fan-related applications. Ensuring accuracy of the blends is essential provide high quality produce for customers and their animals.

ABB Channel Partner Current Engineering Solutions and contractor Agtric Pty Ltd installed fifteen ABB ACS580 variable speed drives to optimise control of operations. This has enabled significant energy savings as a result.

In the first year following the installation of the ABB drives, Red Range experienced a 2,500-tonne feed output of their operations. Now into their second year utilising the ABB drives and process improvements, their feed output has increased substantially to record product levels in the tens of thousands per annum.

The breakdown of total energy saved per application equates to:

- Dust collector: Over 17,727 kWh, or more than 8.9 CO2 metric tonnes
- Liquid pump: Over 2,071 kWh, or more than 1 CO2 metric tonnes
- All three conveyors: Over 17,518 kWh, or more than 1.3 CO2 metric tonnes
- Mixer: Over 96,652 kWh, or more than 48.3 CO2 metric tonnes

The total combined 59.5 CO2 metric tonnes of energy saved, is equal to 13.2 gasoline-powered cars driven for one year.

READ THE FULL ARTICLE

FEATURE ARTICLE
Animal feed: Energy efficient technology for a vital food segment

The animal feed production industry’s top priority is to produce healthy, high-quality and ethical products to ensure that poultry, fish and other livestock are well-nurtured. However, it is also under increased pressure to improve the cost-efficiency, safety, sustainability and overall productivity of its processes.

This concern has been heightened by an ongoing supply chain crisis which has resulted in a global shortage of grains and oilseeds. It has added even greater urgency to make existing animal feed production processes as efficient as possible, with minimum wastage. The rise in oil and gas prices, along with labour shortages, has also produced an additional squeeze on costs for businesses.

Furthermore, the actual production process for animal feed – whether that’s chicken feed for poultry farms or fish feed for aquaculture – typically involves the use of various industrial machines required to run optimally at all times. These could include hammer mills, extruders, mixers, and conveyors, depending on the specific type of feed.

These applications are primarily controlled by motors, drives, and programmable logic controllers (PLCs), the selection of which is critical for several reasons.
Our service expertise, your advantage

Keep your operations running profitably, safely and reliably

- Maximize uptime, extend product life cycle, and enhance the performance and energy efficiency of your assets.
- Enable innovation and success through digitalization by securely connecting and monitoring your motors and drives, increasing reliability and improving efficiency.
- Our domain expertise is strengthened by a service offering tailored to your needs, enabling you to unlock new possibilities and achieve more sustainable outputs.
ABB Ability™ digital solutions

ABB offers a range of services and digital solutions based around the ABB Ability™ platform, which can help to make better decisions to maximize the potential of your motor-driven applications across the entire powertrain.

**ABB Ability™ Mobile Connect for drives**

It allows equipment manufacturers to communicate with drives users or service personnel on-site, helping them easily commission and troubleshoot drives remotely. Chats and sharing of images and backups via smartphone make the technical support process quick and efficient.

This increases opportunities to provide online technical support for end customers – without complex connectivity infrastructure. This is ideal for facilities in remote locations lacking in modern communications provision.

**ABB Ability™ Condition Monitoring for powertrains**

ABB Ability™ Condition Monitoring service for powertrains optimizes the performance and efficiency of rotating equipment. It enables full transparency on key parameters for drives, motors, and pumps, and can also be used in applications such as compressors, conveyors, mixers and extruder main shafts.

The powertrain is equipped with sensors and cloud connectivity and you can choose the assets you want to monitor.

Data gathered from drives’ inbuilt sensors and loggers together with that collected from ABB Ability™ Smart Sensors fitted to motors and pumps, can be aggregated, stored and further accessed via the cloud. The ability to gather and analyze this data can reveal information on the status and condition of your equipment, so that you can schedule service activities more effectively.
ABB Access and local support

ABB Access – unlocking your drives, motors, and PLCs
With ABB Access, you can unlock all aspects of your drives, motors or PLCs, from one central location: the palm of your hand. Simply scan the QR code on the ABB product to get started.

ABB Access helps you to easily find up-to-date online product data. It also provides fast access to documentation and manuals. If you happen to experience issues with your ABB product, this can be quickly and easily reported online to reach expert support from ABB.

Engage ABB support locally
As well as serving the market directly, ABB continuously develops a network of value adding channel partners including ABB Value Providers that enhance ABB’s market reach and proximity around the world. Local expertise, combined with a world leading product and service offering, can help to provide support at every stage of the animal feed value chain.

ABB Value Providers are regularly trained in the latest products, techniques and best practices, as well as being periodically assessed on their core competencies to ensure that customer expectations are always fulfilled, 24 hours a day, anywhere in the world.

The ABB Value Provider program ensures that approved third parties deliver authorized sales, support, service and engineering in cooperation with ABB, bringing ABB’s products and services straight to the customer’s front door.
Summary

Across the animal feed production value chain, from raw ingredients through to end product storage and distribution, key stakeholders face an array of challenges in ensuring maximum efficiency with minimum waste, while attempting to reduce costs wherever possible. Meanwhile, the industry is also working hard to improve its environmental footprint.

ABB’s Motion portfolio delivers solutions with tangible benefits for improving the sustainability of operations, and the reliability and safety of animal feed production processes to ensure a healthy feed chain – from Ingredients to Nutrition.

To find out more about how ABB can help you