



# Optimising feed consumption and egg yield for layers

*Whitepaper*



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# Introduction

**Feeding laying hens is an expensive business. Food is the primary ongoing cost for egg producers, accounting for up to 60% of the total for each egg sold.**

Lots of progress has been made within the industry to optimise the recipe and application of feed in order to make this link in the value chain as efficient and cost-effective as possible. However, one area for improvement is the effect of indoor house conditions – in particular temperature and air quality. Research by Vencomatic has shown how optimised conditions can deliver average savings of 6g of feed, per bird per day and in some cases up to 10g per bird per day. What's more, Vencomatic has the solution to deliver it.





# 1 Why feed is significant **for layer farmers**



Commercial laying hen feed is a complex, scientifically designed product that combines cereals, vegetable protein, trace minerals and vitamins to strict international standards. Typical average feed intake rates are between 110 to 150g per day and in most cases account for almost two-thirds of the cost of egg production. Every gram matters and is accounted for.

The price of feed has risen sharply over the last two years, is highly volatile and is likely to keep rising – putting more pressure on the poultry industry. Shortages of raw materials, caused by changing weather patterns and geopolitical crises, have driven up the commodity prices on the world market. At the same time, increasing energy costs have impacted both the

manufacturing process and transportation, driving feed price at the farm gate still higher.

Food delivery and management for large layer farms are already mechanised and highly developed. Feed nutrition and palatability are tailored to the birds' needs and flock densities are optimised for space and conditions. Food distribution within the houses is commonly carefully weighed, timed and computer controlled. It's difficult to see where any step change reduction in feeding costs might come from.



A photograph of a brown chicken eating from a long metal trough in a farm setting. The chicken is positioned in the center-right of the frame, with its head lowered into the trough. The trough is filled with dark, granular feed. The background is slightly blurred, showing other chickens and the structure of the farm. The lighting is warm and focused on the chicken and the trough.

# 2 The Opportunity

The paradigm (model) of seasonal food consumption



**There are two primary aims in the management of indoor climate in a successful laying hen house.**

- Maintain the internal temperature around the ideal of about 21C (70F).
- Provide good ventilation to remove CO2 and ammonia from the laying hen house and to keep the humidity levels low.

**Together these provide the optimal air conditions for egg production and bird welfare.**

Maintaining this healthy and productive environment in a laying hen house through the seasons is a difficult balance. Spring and autumn see a mixture of warm days and cold nights, plus spells of vastly changeable weather. This requires constant monitoring of the laying hen house conditions and frequent adjustment of the ventilation. These seasons are usually associated with a less predictable indoor climate and more frequent environmental and management challenges.

In the winter the temperature drop becomes more sustained, the weather becomes wetter and the days become shorter. The fresh air coming into the houses is colder and damper, reducing the internal temperature and with less drying effect, adding to the humidity challenge.

One option is to close some of the air inlet vents, at least for some of the time, and try to maintain the air inside nearer to the target temperature of 21C (70F). This will keep the birds warm, however without proper ventilation the birds will soon show signs of stress, become less productive and more prone to disease. The floor litter will become too wet and will stick to the birds, the eggs may become dirty and the whole environment will become unpleasant, both for the workers and the birds.

The alternative is to maintain or even increase ventilation. A good flow of fresh air is essential for the welfare of the bird – remember it's critical to control CO2, ammonia and humidity levels inside the house. A healthy flock of layers constantly adds moisture to the internal atmosphere through respiration and by their droppings which are around 70% water. This open ventilation, of course, will lower the temperature inside the house and as every poultry farmer knows, cold laying hens eat more food. When the conditions outside the house are wet, the circulating air is already damp and so has hardly any drying effect. In these circumstances the environment within the house can remain too wet even when ventilated and may actually get worse.



Trying to compensate for this influx of cold and damp air from outside the houses is an obvious step. Heating the houses in a conventional way using fossil fuel sources has always been expensive and isn't cost effective for egg production houses.

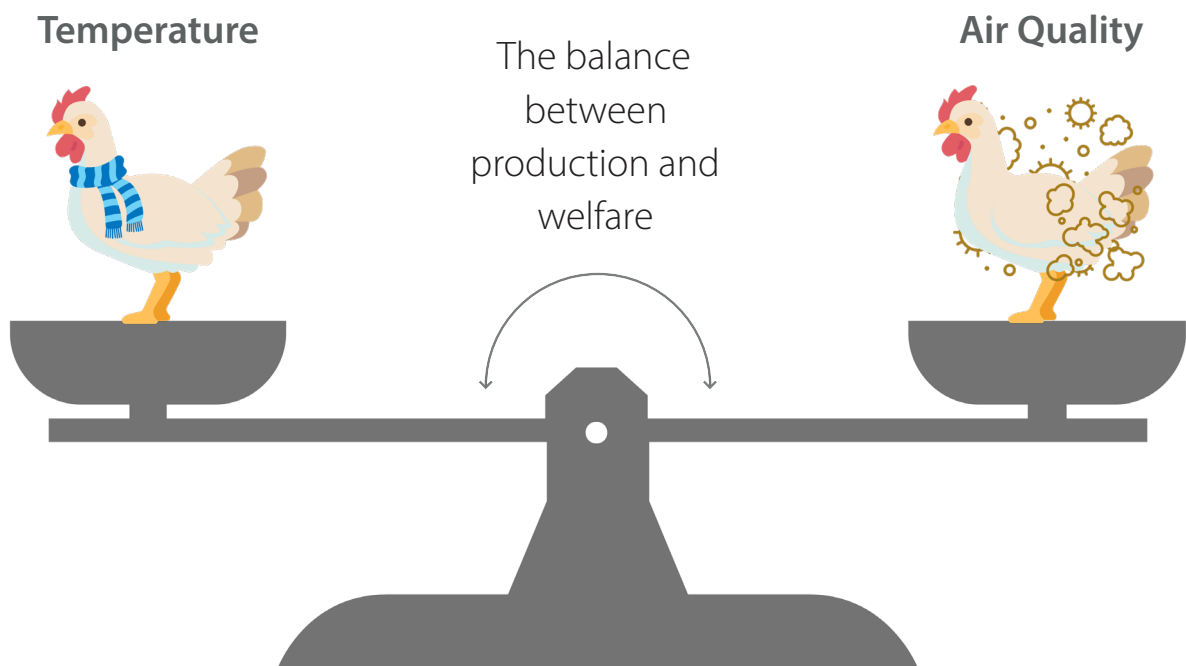
In the end farmers correctly prioritise bird welfare and the need for ventilation and put up with the negative temperature effect. It's accepted wisdom that laying hens just have to be fed more during the winter months so that the birds' metabolism can keep them warm. This is especially true as birds age and the

feather coverage becomes less dense. Without the extra feed to fill the energy gap, egg production will decline which creates other pressures on the business. In the end feed is providing the energy to keep warm but it's an expensive energy source.

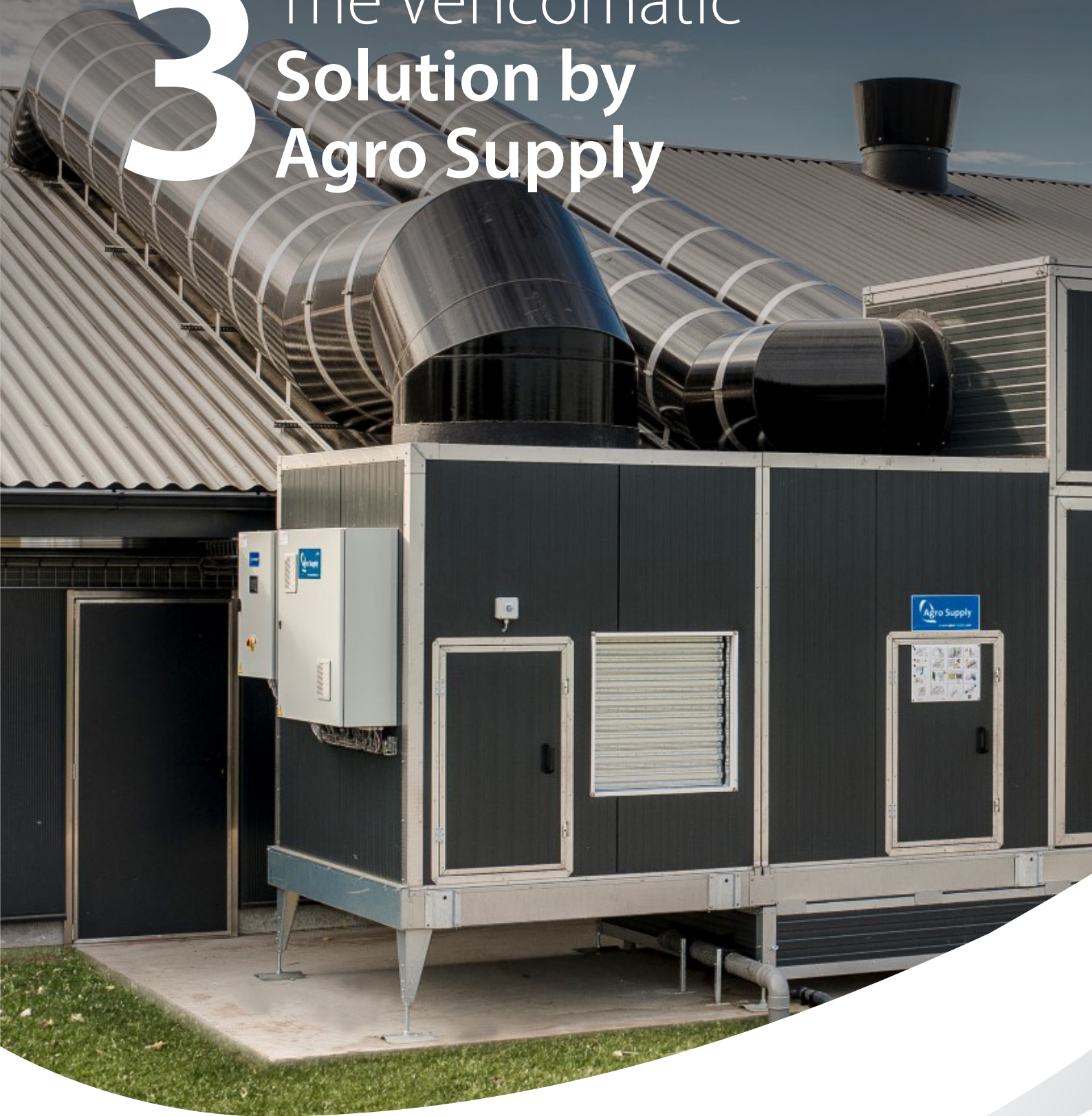
However there is another option. The Vencomatic ECO Unit offers a viable, cost effective alternative that really can provide the best of both worlds.

**“Layer farms must balance providing the optimal temperature with maintaining the optimal air quality”**

- Victor van Wagenberg Vencomatic Group Product Manager



# 3 The Vencomatic Solution by Agro Supply





**In simple terms the ECO Unit is an automated ventilation system which refreshes the air in the house but saves almost all of the warmth. House air, with high humidity, loaded with CO2 and ammonia is expelled and replaced with clean, fresh air which is much drier and crucially warmer than the ambient outside temperature.**

At the heart of the ECO Unit is a heat exchanger, a clever device that uses heat from the air being exhausted from the house to warm up the fresh air being brought in. The two airflows never mix so there is no risk of the old air being blown back in, or of cross contamination. Instead the incoming and outgoing air pass over each other in a series of thin tubes, allowing the outgoing air to warm up the air coming in. By 'exchanging' the heat energy in this way, the new air entering the house creates far less cooling than a simple venting approach of letting outside air straight in. In fact the process is so effective that it typically recovers 80% of the heat from the expelled air, which would otherwise be lost completely.

Running cost are lower than might be expected. It is far more efficient than any conventional heating system because energy is only used to move the air and the heating effect is free. This makes it a realistic option which can have a net cost benefit on commercial farms by removing the need for a cold weather food boost. Use of the ECO Unit in comparative studies has demonstrated savings, on average, of 6g of food per bird per day, simply by recycling this heat. Maintaining a house temperature closer to the 21C (70F) optimum, reducing temperature fluctuations during spring and autumn and improving the internal air quality all contribute to delivering this benefit.

### Chapter 3.1 Better by Design

The Vencomatic ECO Unit is more efficient than all comparable commercial heat exchangers on the market for poultry farms. The process within a heat exchanger is driven by basic laws of physics, so clever design can have a significant influence on the thermal efficiency. For example a counterflow heat exchanger is inherently more efficient than a crossflow heat exchanger, just because of how the air passes through. Similarly the surface area used for the heat exchange is a crucial factor in determining how much of the outgoing heat is recovered. By optimising these and other design parameters the Vencomatic ECO Unit delivers a high thermal efficiency, contributing to better air quality, improved environment and lower feed consumption.

While the food saving alone may be enough to make the ECO Unit a sound investment there are also additional benefits to consider. The overall improved climate in the layer house will have a positive impact on bird welfare. Less disease, drier litter and healthier birds.

It makes management of the layer house easier too. By actively moving the air with equal pressure, rather than relying on negative pressure airflow pattern

control, you can be confident that the air is being regularly changed. The ECO Unit comes with air distribution systems that give a more even airflow pattern helping to minimise cold or hot spots within the house. This helps to prevent layers in an aviary system from smothering or avoiding some perches. Sensors within the laying hen house can monitor the levels of CO<sub>2</sub>, ammonia and humidity, triggering the ECO Unit to take action as required. This prevents too much cooling through unnecessary ventilation and equally avoids the build-up of toxic gases by not venting enough. The levels in the laying hen house and the activities of the ECO Unit can be monitored from a remote console and the system will even raise an alert if thresholds are exceeded.

“When compared with similar flocks, we have observed **significant feed savings and improvements in egg production** by using the ECO Unit. Additionally, there have been positive impacts on the internal climate and external emissions related to ammonia and odour.”

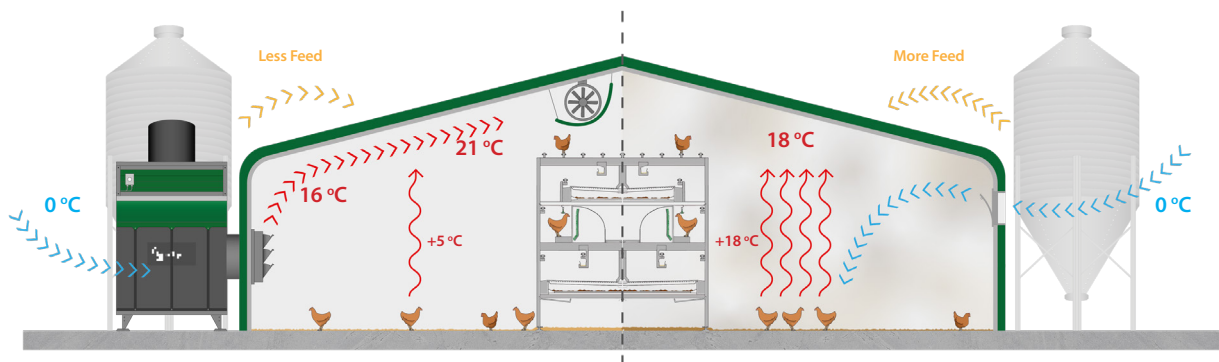
Mike Lee, Wilcox Farms, Michigan USA



The ECO Unit is fully automatic and self-monitoring with regular self-maintenance routines such as self-cleaning. If something does go wrong Vencomatic will be there to support you - we pride ourselves on our customer service as well as our products. With the right controller installed we can even remotely connect to your ECO Unit to help configure it, diagnose any issues and sometimes resolve problems remotely.

Our passionate belief is that bird welfare makes a direct contribution to the bottom line and that this is where every

successful poultry business should begin. We make that our own priority too. Through investment in scientific research and rigorous practical trials, we aim to improve our customers' profits by making good animal husbandry as efficient as possible and more sustainable. Buying Vencomatic is a long term investment - we're with you for the long haul and have customers who will vouch for that. The first ECO Units deployed are still working after 16 years!



### Chapter 3.2 Key Benefits of the Vencomatic ECO Unit

- Reduced feed consumption by on average 6g per bird per day.
- Improved, more stable and more evenly distributed temperature and humidity.
- Automated monitoring and active management of hazardous CO2 and ammonia.
- Improved bird welfare through drier litter and removal of ventilation 'cold spots'.
- Improved bird productivity; lower mortality, more eggs per bird and cleaner eggs – so more first grade eggs.
- Better working environment for farmer and stock managers.
- Remote monitoring and management of conditions, saving time and reducing stress.

### Chapter 3.3 Comparison Studies

Vencomatic evaluated the ECO Unit through a number of real-world studies based in Denmark, the Netherlands and the USA. Like all their field trials, these assessments were carried out on real farms, in partnership with real farmers to ensure that they were representative test cases. Our standard method is to compare two poultry houses of similar size in the same general location, one using an ECO Unit and one using only traditional methods. Both houses receive their birds on the same day and are raising them for the same purpose, whether that's broilers, layers or egg production. Detailed records are kept of environmental metrics, operation costs, bird losses, food consumption and resulting yield. Vencomatic also encourage direct feedback from the farmers involved and their insight and experience are often just as useful as the scientific data.

It is the results of these studies which have identified savings of on average 6g of feed per bird per day by using the ECO Unit. As a general guide Vencomatic advise that for each 1 degree below the target 21C (70F), layers will consume 1% more food.

The exact amount of feed that can be


saved varies according to a number of factors including location and position, housing type and size, weather and climate, bird age and feather coverage.

Preliminary results published in Denmark by Dansk Erhvervs Fjerkræ, (Danish Commercial Poultry), identified a 20g reduction in feed intake per hen per day. In this example two identical houses, side by side, were compared simultaneously – one with a heat exchanger and one without.

Another study was carried out by the Department of Agricultural and Biosystems Engineering, Iowa State University and Wageningen University and Research in the Netherlands. In their field test lasting only a few weeks, a reduced feed intake of 3.2 g per bird per day was recorded. This improvement was clear even though the outside temperature was a relatively warm 10.2C (50.4 F)

Saving feed through improved environmental conditions is a proven concept with over 4000 Agro Supply heat exchanger units already installed around the world. Around 130 M birds live in optimal climate conditions worldwide – enjoying better welfare, being more productive and enhancing profits.





# 1-on-1 calculation with our climate expert

and find out how much you  
could save today!

As specialists in the poultry sector, Vencomatic Group can help you optimise your layer house climate, save money and get the best results with ECO Unit - climate control. In a one-on-one calculation you will discover how the ECO Unit can help you reduce your costs significantly.

Get in touch to discover which solutions will help maximise your poultry quality for the best possible price.

[Get your free savings calculation here](#)

# About Vencomatic Group

**The Vencomatic Group was started by Cor and Han van de Ven from Eersel, the Netherlands. The story began in 1983, with Cor's breakthrough innovation for breeder housing: the first automatic breeder nest. At that time a revolutionary idea, as this was the first automatic nest box in the market.**

Based on this successful breeder nest Cor van de Ven continued and developed products for other types of poultry: turkeys, layers, ducks and broilers. All our products are developed based on a thorough understanding of the behaviour of birds and the course of business at a poultry farm. This ensures our products suit the needs of birds and poultry managers. To further complement the range of products, Prinzen (egg handling), Agro Supply (climate solutions) and Van Gent (laying nests) were added to the portfolio. Together these brands offer a full range of products for the modern poultry farmer.