INNOVATIVE FARMER SERIES

Sustainable solutions in egg farming: A case study on heat recovery systems and barn air quality

Farm overview

For over six decades Newell Colony in Bassano, Alberta has consistently embraced research and innovation to make their egg farming operation more efficient, economical and sustainable. When Jerry Hofer, Ken Hofer and Elvin Waldner invited us to visit the farm, it was an opportunity to learn about their Heat Recovery Ventilator (HRV) system and how it brought efficiency and sustainability on their farm.

Farm operations

- 48,000 laying hens in aviary housing system
- Transitioning to 32,000 organic layers
- On-farm feed mill
- Up to 60,000 pullets raised annually, supplying farms in the region

HRV system

An HRV system helps maintain a clean and comfortable environment by continuously replacing indoor air with outdoor air.[2] During the colder months, the HRV captures heat from the air leaving the barn and transfers it to the air entering the building.[3] In warmer months, the process can be reversed, with the HRV removing some heat from the incoming air to help maintain a cooler indoor

Highlights

34 tonnes
of CO_2 saved in one year, which is equivalent to the carbon sequestered by 562 tree seedlings grown for 10 years[1]

Improvements in barn **air quality** and **climate control**

Approximately **$4,500** saved per year in natural gas avoided costs

EGG FARMERS OF CANADA

Key project components

Project category	Energy efficiency: Heat recovery ventilator
Technology	ECO-800 6L
System components	Six layers of air channels stacked above each other. Each layer has a maximum capacity of 5,000m^3/h
Heat recovery efficiency	75-80% of outgoing heat recaptured[5]
Project partner	Vencomatic Group

temperature.[4] This technology allows farms to recover up to 80% of the heat that would otherwise be lost through ventilation.[3] This approach can lower energy use and associated greenhouse gas (GHG) emissions while having a positive outcome on air quality.

Research shows that poultry barns combining HRV systems with optimized insulation can reduce natural gas demand by up to 60% compared to barns ventilated without heat recovery.[5] By recovering heat from exhaust air, HRVs maintain a consistent ventilation rate that improve air quality for birds and workers, while significantly reducing the fuel required for space heating.

At Newell Colony the layer barn is divided into two sides separated by a central wall, with each side operating its own HRV unit. The system runs independently on both sides, providing consistent air exchange and heat recovery throughout the barn. Elvin mentioned that maintenance requirements are minimal, where the units are washed periodically with minor daily upkeep requirements.

Why HRV technology?

Newell Colony installed two HRVs in 2022, coinciding with the construction of their new barn. They were drawn to the system's ability to improve bird comfort, lower CO_2 and dust levels and reduce overall energy use. Project partner Vencomatic Group supported the planning process, with the majority of the installation work completed in-house.

At the time, the farm was exploring options to assist with manure drying, a critical step in maintaining air quality and minimizing the weight and volume of manure for storage or transport. Through the barn's manure drying system, air blown across the manure belts is preheated by the HRV, allowing for faster and more efficient drying.[6]

Results and impacts

Since installation, the HRV systems have become an important part of the egg farm's energy management strategy, maintaining optimal barn conditions while reducing heating costs. Each HRV handles the barn's minimum ventilation requirements, ensuring the barn receives a steady supply of fresh air without significant heat loss—even when outdoor temperatures are low. Ventilation is a core part of maintaining bird health, helping to control moisture, ammonia and dust levels while preventing drafts or sudden temperature changes.

- The two HRV units recover an average of 166,666 kWh per year. This is roughly the amount it would take to power about 15 average Canadian households for a year.[7]

> *"We took the plunge because it's about more than savings—it's about building an efficient, sustainable farm that can stand strong for future generations."*
>
> - Newell Colony

- Based on average natural gas price of $7.34/GJ and a 90% efficient heating system, recovering 600 GJ of heat annually results in estimated net savings of around $4,500 per year in natural gas costs.
- In typical Alberta weather conditions, the HRVs recover about 80% of lost heat and warm incoming air by around 13°C, cutting the barn's heating demand.
- Reducing fuel also reduces GHG emissions, contributing to a more sustainable farm operation overall.
- Elvin noted production gains beyond expectations during the first year after installation, including three to six more eggs per hen and improved feed conversion rates.
- The return on investment is estimated around seven years, assuming stable fuel prices, heater efficiency and operating conditions.

Scalability and future plans

Having gained hands-on experience with two HRV units, Elvin, Ken and Jerry know that the technology works and recommend it to others. They are glad that they invested in HRVs alongside their new barn build. Looking ahead, Ken and Elvin are preparing to transition the egg farm to organic production and are curious to see what new insights the HRVs will provide under those conditions.

Innovations at the Newell Colony continued with the installation of a combined heat and power system (cogeneration) in early 2025. This system produces heat and electricity simultaneously, capturing nearly all thermal energy for reuse. The main driver was energy cost saving, while also reducing reliance on the electricity grid and accessing carbon credits.

Advice to others

Jerry, Ken and Elvin all encourage other farmers to explore efficiency-focused innovations like HRV and cogeneration systems. They emphasize the importance of researching available technologies, understanding the financial support offered through programs such as the Sustainable Canadian Agricultural Partnership[8] and choosing solutions that strengthen both bird health and barn performance. In their view, when a farm becomes more efficient, it naturally becomes more sustainable.

References

[1] United States Environmental Protection Agency. (2024). *Greenhouse gas equivalencies calculator.* https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

[2] Natural Resources Canada. (2025). *Heat and energy recovery ventilators.* https://natural-resources.canada.ca/energy-efficiency/energy-star/products/list-certified-products/heat-energy-recovery-ventilators

[3] Dyck, J. (2023). *Ventilation heat exchangers: Save energy, save money and reduce greenhouse gases in livestock barns* [Factsheet]. Ontario Ministry of Agriculture, Food and Rural Affairs. https://www.ontario.ca/files/2023-09/omafra-ventilation-heat-exchangers-in-livestock-barns-en-2023-09-15.pdf

[4] Office of Energy Efficiency. (2012). *Heat recovery ventilators*. Natural Resources Canada. https://natural-resources.canada.ca/sites/nrcan/files/oee/files/pdf/publications/HRV_EN.pdf

[5] Grassauer, F., Arulnathan, V. and Pelletier, N. (2023). Towards a net-zero greenhouse gas emission egg industry: A review of relevant mitigation technologies and strategies, current emission reduction potential, and future research needs. *Renewable and Sustainable Energy Reviews.* 181:113322. https://doi.org/10.1016/j.rser.2023.113322

[6] Goselink, Y. and Ramirez, B. (2019). Characterization of an air-to-air heat exchanger for manure belt drying ventilation in an aviary laying hen house. *J. Appl. Poult. Res.* 28: 1359-1369. http://dx.doi.org/10.3382/japr/pfz075

[7] energyrates.ca. (n.d.). *Residential Electricity and Natural Gas Plans.* https://energyrates.ca/residential-electricity-natural-gas

[8] Alberta.ca. (2025). *On-Farm Efficiency Program.* https://www.alberta.ca/on-farm-efficiency-program

About this case study

This case study is part of Egg Farmers of Canada's *Innovative farmer series*—a collection of on-farm profiles that highlight real sustainability and innovation initiatives underway in Canadian egg farming. This series offers a first-hand look at the opportunities and challenges farmers face when adopting new practices or technologies. They reflect a long-standing commitment to continuous improvement, environmental stewardship and innovation that is rooted in science and best practices. Through this series we reinforce our shared journey and vision of a thriving Canadian egg industry that delivers high-quality food while caring for hens, the environment and our communities.

EGG FARMERS OF CANADA