Solar Heating: Farmers cut costs **p.14**

Climate Control: Extreme heat & cold **p.19**

Avian Influenza: New tools for the fight **p.23**

CANADIAN POULTRY

April 2025

canadianpoultrymag.com

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Pg 8

PM40065710

Solar savings

With rising energy costs and a push for sustainability, some poultry farmers are turning to solar air heating.

By Melanie Epp

As energy costs mount and a focus shifts to sustainable production, Canadian poultry farmers turn to innovative solutions to heat their barns efficiently. One such technology, SolarWall, is gaining ground for its ability to lower heating expenses while improving ventilation and air quality. Victoria Hollick, a representative of SolarWall, explains how the system works, its benefits, and why more farmers are adopting it.

SolarWall is a unique solar air heating system that uses perforated, dark-coloured metal panels made from 26-gauge steel that absorb solar energy and heat incoming air before it enters the building. The panels are installed on the exterior walls of barns. Using solar energy to heat incoming air reduces reliance on conventional heating methods such as propane or natural gas, and leads to significant cost savings.

The process reduces reliance on conventional heating methods such as propane or natural gas, leading to cost savings. "Heating and ventilation are some of the largest energy expenses for poultry barns," said Hollick. "Our technology preheats incoming air, reducing fuel consumption and providing fresh, warm air essential for proper humidity and temperature levels."

The SolarWall system functions under negative pressure, which means air is drawn through the perforations into the collector panel where it is heated before entering the barn.

"Instead of drawing in outside air at -10°C, for example, the system can heat it to around 10°C, reducing strain on conventional heating systems," she explained.

Although counterintuitive, solar wall technology continues to work during Canada's harsh winters.

Before and after images of a SolarWall installation showcasing the transformation.

"Even in snowy conditions, SolarWall remains effective because its surface stays warm enough to prevent snow accumulation," said Hollick. "Additionally, sunlight reflection off the snow increases solar gain, further enhancing efficiency."

For poultry farmers, SolarWall offers several advantages beyond energy savings, though. According to Hollick, the technology maintains optimal temperature, enhances bird welfare, lowers greenhouse gas emissions, and improves air quality inside barns.

Since it filters incoming air, some producers believe the system also improves biosecurity. Filtration reduces contaminants such as dust and feathers, and possibly even airborne pathogens, which could protect flocks from viral diseases such as avian influenza.

Adoption of solar wall technology on the rise

Several factors contribute to the growing adoption of solar wall technology among Canadian poultry farmers.

PHOTO CREDIT: LOWY GUNNEWIEK

Rising energy costs have made alternative heating solutions more attractive, while government incentives, such as the federal solar tax credit, provide financial support for installation.

"There is a renewed focus on sustainability, and farmers are looking for proven, cost-effective ways to reduce their carbon footprint," said Hollick. "With hundreds of installations across Canada, producers are seeing first-hand how SolarWall lowers costs and improves efficiency."

The ease of installation also makes SolarWall appealing. According to Hollick, "The system is straightforward to integrate, whether for new construction or retrofitting existing barns. In some cases, farmers can even install it themselves, further reducing costs."

Retrofitting existing barns

Adopting SolarWall technology doesn't necessitate the construction of a whole new building. The technology can be retrofitted to existing poultry barns by mounting the panels onto exterior walls.

Lowy Gunnewiek, an Alberta-based engineer who has helped involved in several SolarWall installation projects, said the job is straightforward enough that farmers can take it on themselves with minimal effort.

"It's quite simple to install," he said. "Farmers can mount the system onto a wood-framed support structure and tie it into the existing ventilation system. In most cases, warm air is drawn into the attic through existing inlets, making integration straightforward."

One challenge in retrofitting SolarWall is adapting airflow to existing ventilation setups. Some older barns may require additional ducting or modifications for proper air distribution.

"Every barn is different," said Gunnewiek. "Some have multiple exhaust fans, and integrating SolarWall means ensuring adequate air intake to balance the system."

Despite these challenges, retrofitting is worthwhile. SolarWall not only reduces heating costs but also enhances summer cooling, he said.

PHOTO CREDIT: BEN ENTZ

Ben Entz's SolarWall system channels fresh, pre-warmed air into powered inlets.

"The system acts as a thermal shield, preventing excessive heat build-up on barn walls," Gunniwiek said. "At night, it helps cool the barn by facilitating heat radiation to the sky, reducing stress on birds during hot months."

He's also seen producers use excess heat to dry manure, a move he said extends its benefits beyond winter heating.

Part of the challenge of getting producers to adopt solar wall technology is that they're often unable to visualize the end result, said Gunniwiek.

While he's able to offer visuals to show how the retrofit will look aesthetically, the results they really want to see happen in the barn. Proper ventilation and reduced ammonia levels, for instance, create a healthier environment, allowing birds to convert feed into growth more effectively.

"When ammonia levels rise, birds experience respiratory stress, which impacts their feed intake and overall growth," Gunnewiek said. 'With SolarWall maintaining better air quality, poultry farmers see improved feed efficiency and reduced waste."

Ben Entz, an egg farmer from Brownlee, Sk. and owner of Huron Poultry, installed SolarWall in 2019 during the construction of a brand new barn. With plans to expand, he initially had fewer birds in a large space, making heating a challenge.

"We built a big barn but only had it half full, so we needed a way to supplement heat efficiently," said the producer. "That's where SolarWall came in."

During extreme cold, Entz has seen impressive results. "Yesterday, it was minus 32°C outside, and the SolarWall raised the attic temperature by 18 degrees," he explained, adding that the pre-warmed air allows for better ventilation without overworking conventional heaters. This, he said, significantly reduces his heating costs.

At 4,100 square feet, the SolarWall system at the Huron Colony delivers a maximum airflow of 41,000 CFM, providing heated air for the layer barn. Each year, the wall captures approximately 176,591 kWh of solar energy and recaptures an additional 10,900 kWh from building heat loss, leading to total annual energy production of 187,491 kWh. This translates into a substantial reduction in natural gas consumption – 22,052m^3 annually, based on an 80 per cent burner efficiency rate.

Beyond savings, Entz has also noticed substantial improvements in air quality and bird health. "Before SolarWall, ammonia levels were high enough to – v sting your eyes," he said. "Now, the fresh air system keeps ammonia so low that it doesn't even register on audits."

Another unexpected benefit has been improved biosecurity. "CFIA inspectors have commented on how SolarWall acts as a filter, preventing airborne contaminants like feathers and dust from entering the attic," he said. "That's an extra layer of protection we didn't anticipate."

In summer, SolarWall provides additional advantages by preventing heat build-up on barn walls. This is done by creating a shadow, which keeps the barn cooler in the evenings, Entz said.

Finally, Entz said one of the greatest benefits of the SolarWall system is that it enables him to continue bringing fresh air into the barn during windy snowfall without running the risk of filling his attic with snow. This provides extra peace of mind, as he's seen built up snow cause barn collapses before.

With its ability to cut heating expenses, improve barn conditions, and support sustainability goals, SolarWall has proven to be a valuable investment for some Canadian poultry farmers.

As more producers recognise its benefits, experts expect solar air heating adoption to grow across the industry.

Five reasons why solar walls are growing in popularity

1. **Energy cost savings:** Solar wall technology reduces reliance on propane and natural gas, significantly lowering heating expenses.
2. **Improved air quality:** Preheated fresh air lowers humidity and ammonia levels, benefiting bird health and productivity.
3. **Sustainability:** Solar energy reduces greenhouse gas emissions, supporting environmental goals.
4. **Year-round benefits:** Solar wall technology prevents excessive summer heat build-up and aids in night-time cooling.
5. **Government incentives:** Federal and provincial programs offer financial support for solar energy adoption.