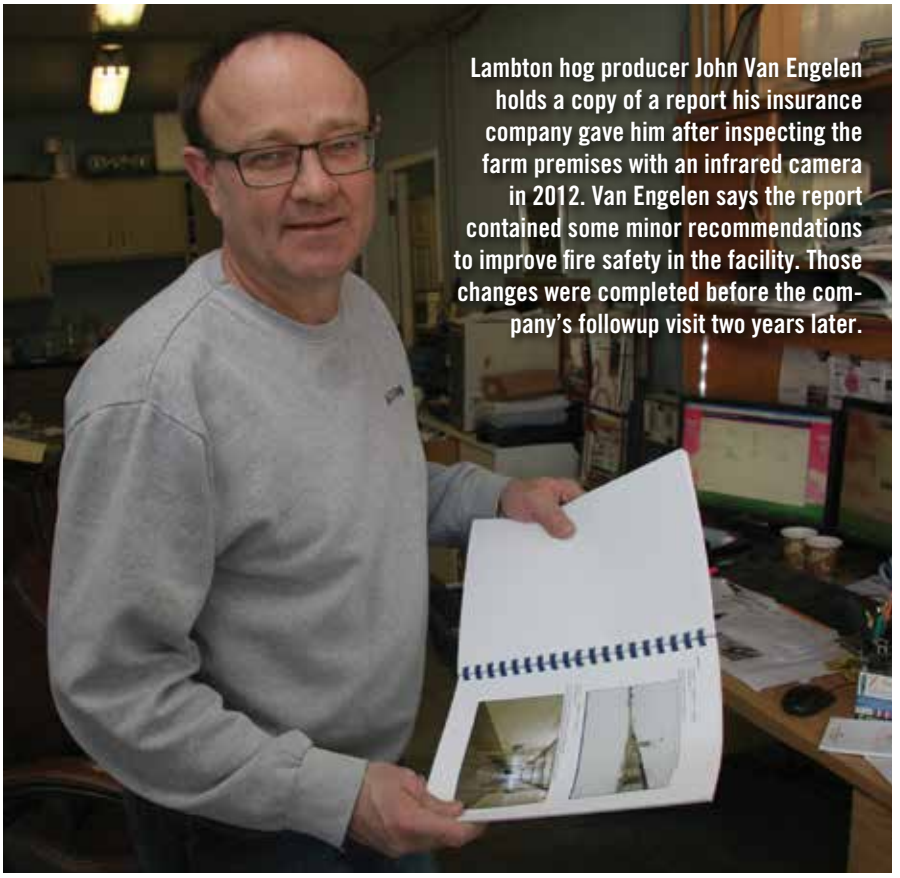
SPIKE in BARN FIRES

causes rising public concern

But farmers and builders worry that changes to the Ontario building code will not recognize the unique characteristics of farm buildings and reclassify them as industrial buildings. They want a more pragmatic approach

by MARY BAXTER



Lambton hog producer John Van Engelen holds a copy of a report his insurance company gave him after inspecting the farm premises with an infrared camera in 2012. Van Engelen says the report contained some minor recommendations to improve fire safety in the facility. Those changes were completed before the company's followup visit two years later.

John Van Engelen was 15 when the dairy barn on his parents' farm erupted in flames. "It started from a tractor," he recalls. "The muffler was close to the ceiling, where the hayloft was, and the sparks went up in the hayloft."

Ever since, the Thedford-area farrow-to-finish farmer, now 55, takes his fire prevention routine seriously.

Every farmer fears fire, says Bruce Kelly, environmental program coordinator for Farm and Food Care Ontario. "Nobody wants to lose their business in a fire. You work so hard to build your business and your barns, the plant, and the critters in them," he says. "It's a terrible life-altering event."

Industry and government, too, are aware of the risk. Insurance companies, for example, now routinely visit livestock farms and assess risks using infrared cameras. In 2011, the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) published *Reducing the Risk of Fire on Your Farm*, a manual that offers practical fire prevention steps. The manual is on the ministry's website, as are other related fact sheets and information.

Judging by the overall numbers, these initiatives appear to have had a positive effect. Total barn fire numbers are dwindling. In 2014, there were 150 incidents, down 34 from 2008. But the number of fires prompting agriculture ministry staff to issue information about dead-stock management regulations is rising. Four such fires happened in 2013. Last year there were 16 and this year the count by the end of April is 14, including two high-profile horse-barn fires.

Combined, those two fires destroyed 49 horses and their loss sparked public outcry. A Jan. 19 article in the *Toronto Star* noted that Ontario regulations do not require barns to have sprinkler systems or fire alarms. An animal rights group, Canadians for Ethical Treatment of Farmed Animals, wants the National Farm Animal Care Council to establish codes of practice for fire prevention and suppression.

The public reaction makes Van Engelen uneasy. In his barns, built in

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1961, 1983, 2000 and 2003, he and son Mitchell have introduced most of the precautions mentioned in the ministry's fire guide. Lights in the newest barn are sealed, as required by the provincial electrical code. In rooms and hallways, he uses outdoor receptacles with waterproof seals to prevent wash water from seeping in. Periodically, he clears dust from fan heaters, ceilings and other equipment that can't be cleaned with a pressure washer. A trusty leaf blower eliminates debris in areas that the air compressor hose can't reach. The blower "works really well for cobwebs and stuff like that," he says.

Precautions go beyond cleaning routines and special plugs. A heat exchanger system housed in a 40-foot room adjacent to the newest barn not only warms air but also prevents dangerous gas buildup. The hot water boiler system is less of a fire risk than other heating types. In the attic are fire stops (barrier walls). Fire extinguishers are handily located throughout the main floor, as are escape doors.

Van Engelen uses sprinklers in the newer barns to soak rooms for prewashing and cooling the pigs and also uses alarms for feed and hydro to generate alerts for power outages and equipment malfunctions. The alarms connect to his phone.

Linking a fire alarm to a sprinkler system, however, is expensive. A sprinkler system alone can cost between $100,000 and $150,000. Van Engelen estimates that integrating an alarm system with sprinkler activation would cost thousands of dollars. "Maybe in the future we might be able to use something like that, when the technology makes it simpler," he says.

Farm builders' concerns

Sprinklers pose other problems. Many barns source water from wells and use waterlines that don't have the capacity to provide the pressure such systems need, says Steven Adema, an engineer with Tacoma Engineers in Guelph. Moreover, if a fire knocks out electrical power, how are you going to pump water to the barn?

Adema's firm belongs to the Canadian Farm Builders Association and, during the association's annual meeting in January, attendees raised concerns that public pressure will foist unrealistic requirements on barn construction to address fire safety.

Beneath that concern, says Will Teron, Adema's Tacoma colleague, lurks the fear that the provincial government will remove the National Farm Building Code as the reference for barn construction in the provincial code. The national code recognizes the unique aspects of farm buildings, such as their low human occupancy, remote locations and special occupants. But its last update was in 1995 and buildings have become much larger since then. What if the province responds to public pressure by reclassifying barns as industrial buildings?

Manitoba went that route in 2010 and, under its provincial building code, barns of more than 600 square metres are classified as either medium or light industrial. The classifications contain provisions for sprinkler systems and firewalls. Facilities that have fewer than 75 employees do not need an alarm system, but both classifications require an emergency plan. A 2009 discussion

Ontario barn fires: what the statistics show*

Number of fires
2013: 4
2014: 12
2015: 16
2016 (to the end of April): 14

Volume of dead stock
2012: 180 MT
2013: 155 MT
2014: 175 MT
2015: 225 MT
2016 (to the end of April): 306 MT (70 per cent of the figure was from one fire)

These statistics reflect instances when the Ontario Ministry of Agriculture, Food and Rural Affairs had provided the farmer with information on regulatory requirements to responsibly manage dead stock. Source: OMAFRA

Fan heaters used in the newer barns at John Van Engelen's Lambton County farrow-to-finish operation help heat fresh air before it is circulated into pig rooms via the brightly coloured air returns high up on either side of the hallway's walls.

The main causes of barn fires*

According to Ontario's Office of the Fire Marshal, insurance companies and contractors, the primary sources of ignition in barn fires fall within the following categories:

- miscellaneous (chemical reactions, such as combustion and lightning)
- electrical distribution equipment (circuit wiring, distribution equipment, extension cords, etc.)
- heating equipment (central heating, flue pipe, space heaters, etc.)
- open flame (cutting/welding, blowtorch, smoking, etc.)

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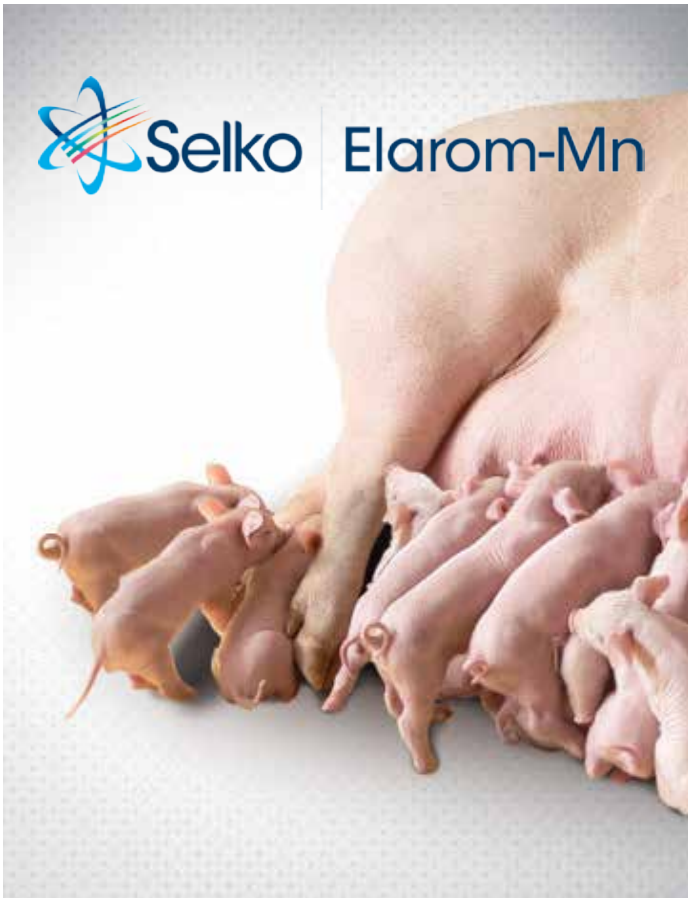

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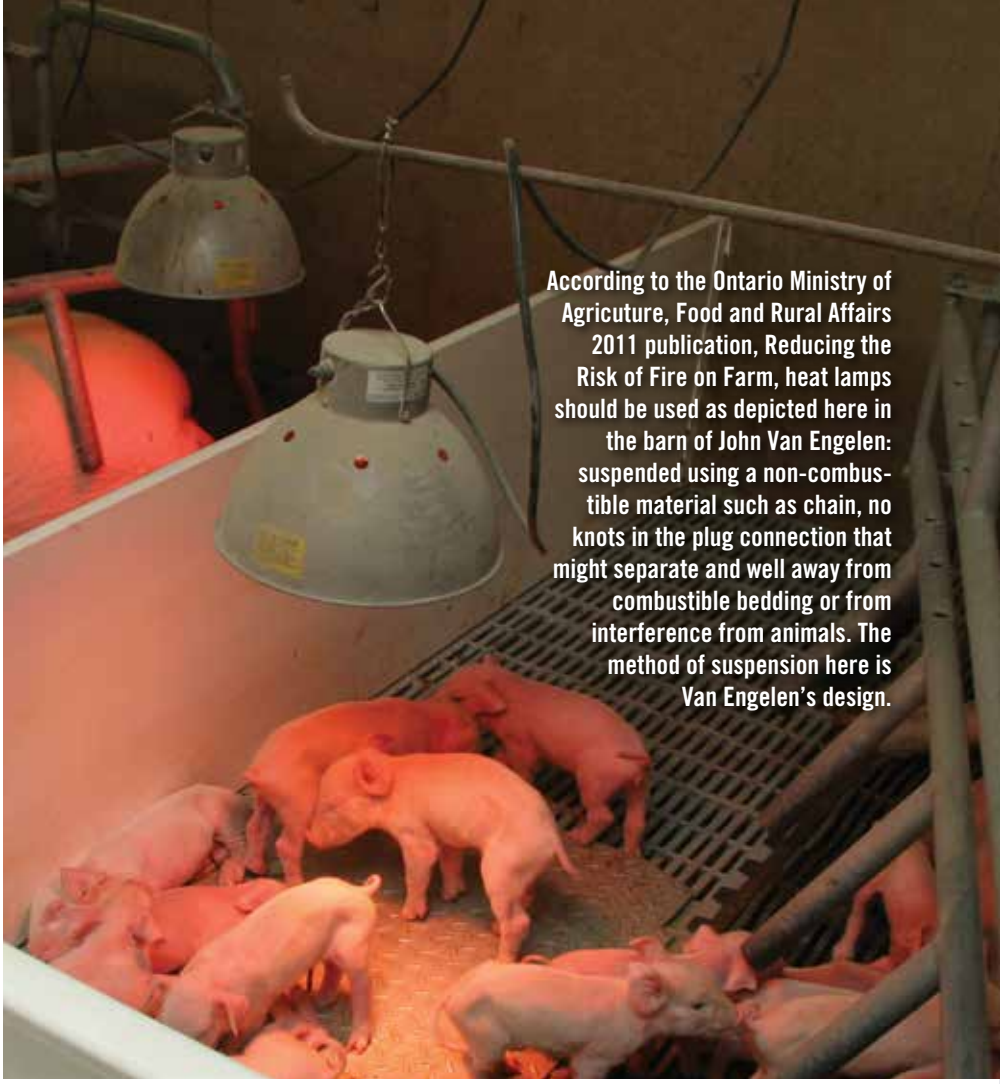
paper prepared by the Manitoba Office of the Fire Commissioner estimated the provisions would add $2.80 to $4.80 per square foot to construction costs.

Under the Ontario building code, an industrial classification would mean not only adding sprinkler systems but also establishing a fire protection access route and onsite water storage sufficient to fight a fire.

Teron sits on the nine-member Canadian Commission on Building and Fire Codes' joint task group. It spearheads the national code's update, which finally began this year. The commission is the arm of the National Research Council of Canada, which administers the codes.

He says Ontario was preparing "to go it alone" until the commission announced its plans to update the National Farm Building Code and release it in the 2020 cycle of national building codes. "My understanding now is MMAH and OMAFRA (the municipal affairs and housing and agriculture ministries) backed off a little bit when they heard that there was some real momen-



According to the Ontario Ministry of Agricuture, Food and Rural Affairs 2011 publication, Reducing the Risk of Fire on Farm, heat lamps should be used as depicted here in the barn of John Van Engelen: suspended using a non-combustible material such as chain, no knots in the plug connection that might separate and well away from combustible bedding or from interference from animals. The method of suspension here is Van Engelen's design.

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tum at the federal level," he says.

In an April email, OMAFRA spokesperson Bianca Jamieson confirmed staff involvement in the national update. They and Ministry of Municipal Affairs and Housing staff "are engaged in this process and will contribute technical information to inform the review of construction requirements for farm buildings, including advancements in modern farm practices and improved safety performance," she writes.

Teron says the federal decision to begin the code's update is unconnected to Ontario's recent spate of barn fires. "This has been developing. I've sat on some of the subcommittees as an observer. Those reports were submitted out nine months ago."

Most other joint task group members come from the commission's specialized technical subcommittees, which focus on areas such as structure, fire and hazardous materials. Teron and Gary van Bolderen, a Farm Builders director and owner of Dutch Masters Construction Services in Barrie, are the only members with barn-building experience. The group needs more, Teron says, to foster better understanding of the buildings' unique characteristics. "One member has already said, 'well, why don't we just call them industrial buildings?'" he says.

Teron anticipates eventual changes to other codes and standards that will affect barn construction. They could include new specifications for the use of explosion-reduction outlets and switches or ensuring the containment of wiring in conduits. Kara Fraser, a spokesperson with Ontario's Electrical Safety Authority, says there are no new code requirements pertaining to barns in the new Ontario electrical code, which took effect May 5.

Ultimately, however, Teron, Adema and most of those who have monitored the barn fire question say maintenance is the best solution to preventing fire. "The vast majority of these fires start from electrical," says Teron. "The farm is a harsh environment. There are chemicals, moisture, dust so when an outlet gets damaged, you can't just go and throw a 69-cent replacement off the shelf from Canadian Tire. There are higher standards that should apply."

Practical options

Several efforts are now underway in Ontario to help farmers target their maintenance routines.

"OMAFRA is working with several farm organizations to investigate practical options to monitor barns and reduce the risk of fires," writes Jamieson. She says the ministry is also evaluating new technologies. She did not offer specifics on the projects and rejected a *Better Pork* request to interview the ministry staff involved.

Kelly says his organization is exploring the feasibility of using other technologies. One possibility is training an infrared heat sensor with an alarm on equipment such as a fan. He notes that the Ontario Federation of Agriculture has also begun to work on barn fire problems.

Farm and Food Care Ontario wants funding to buy up to 10 infrared cameras to loan to farmers so they can inspect their barns on their own to find hot spots and risks. The organization already has two. The loans "will allow people in the privacy of their own barns to look at it, and also have a discussion and a dialogue with the people who work on the farm about this," Kelly says.

As well, he wants to develop "a pragmatic list" that farmers can "pull out at staff meetings a couple of times a year and just say, 'what are our risks here?' Things like using pressure washers in the winter as opposed to leaf blowers to clean down the ceilings of rooms."

Six electrical safety tips for preventing fires in barns

- Hire only a licensed electrical contractor: it's the law in Ontario. The contractor must perform all electrical work in compliance with the Ontario Electrical Safety Code and take out the necessary electrical permits so that the work is subject to Electrical Safety Authority inspection. The authority recommends hiring a licensed electrical contractor to perform an annual check of all electrical equipment in a barn to ensure that it is in good working order. Pay particular attention to cord caps, ceiling mounted outlets, light fixtures and electrical panels in areas with animals.
- Repair all damaged or malfunctioning fixtures or equipment as soon as possible. Any damaged or malfunctioning equipment should be replaced with equipment suitable for a corrosive environment.
- Regularly inspect for damaged electrical wires. Rodents are known to cause damage to electrical wires in barns. Damaged wires should be replaced immediately.
- Install arc fault circuit interrupters (AFCIs). In barn structures where the wiring is not visible, installation of AFCIs can help to prevent fires.
- Only install essential electrical equipment in the confinement area of a barn.
- Ensure the right conditions for electrical equipment. Install in locations separate from the confinement area which are supplied with clean, dry, temperature-controlled air.

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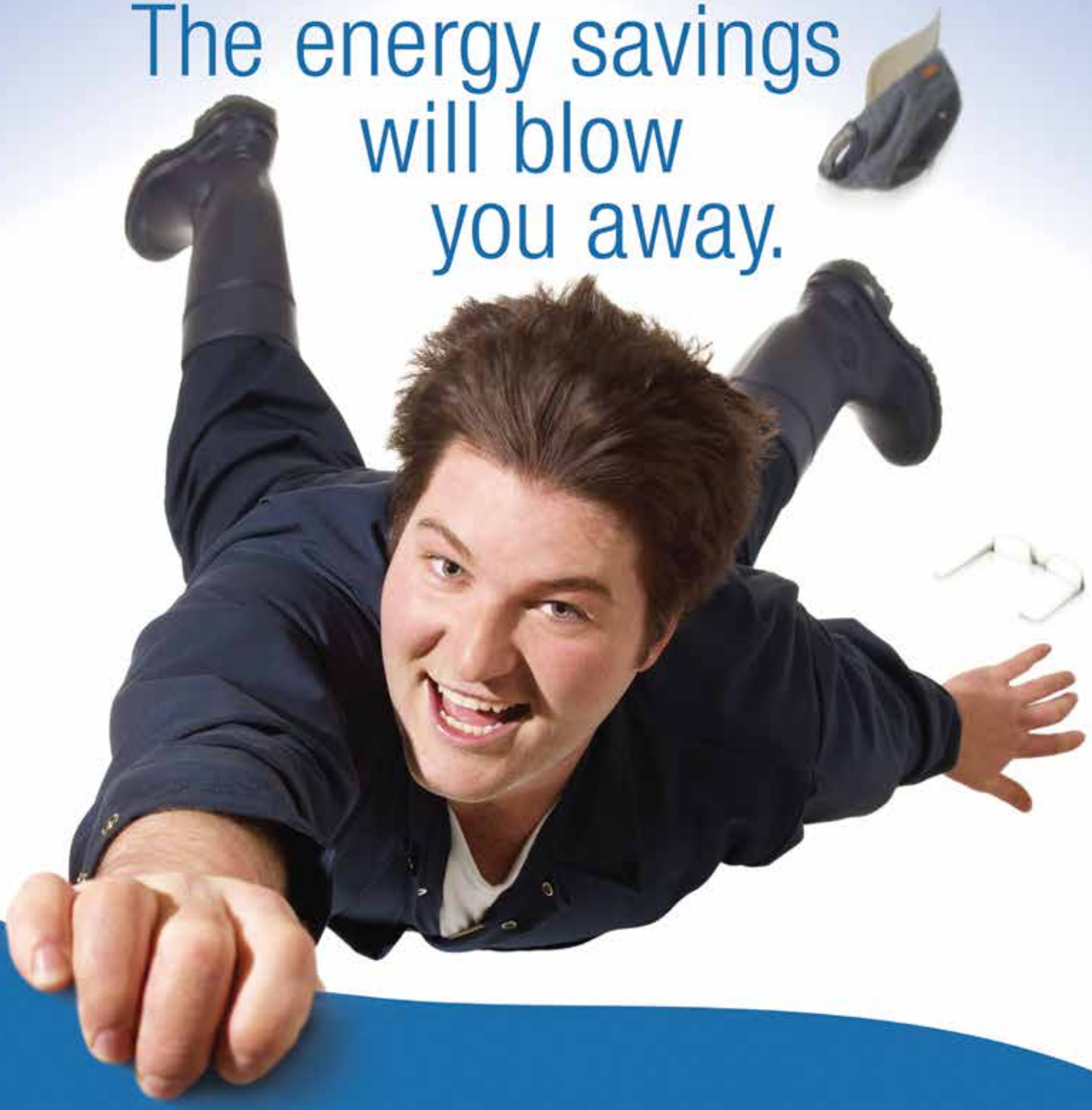

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Both Kelly and Jamieson urge farmers to develop a fire plan for emergencies. "That's of some value in terms of minimizing losses," Kelly says. Consult your local fire departments, they advise.

But Sebringville producer Doug Ahrens says it's not only farmers who need to take action. Vendors of electrical equipment and fixtures must do more to make available good quality, inexpensive equipment resistant to corrosion.

Doug Ahrens

"Farmers are concerned about what's going on and try to do their best. We're caught in a price squeeze too, but we're made out as the villain," he says. "But we've got a whole raft of villains over top of us. If they just pull it all together, we could put this thing together at a reasonable price."

Emergency plan?

John Van Engelen chuckles when he hears the idea of tying heat sensors into an alarm system and training the sensors on fans. There are so many fans. "And there's where you're talking about a big cost." Maybe developments such as nanotechnology will eventually make that strategy affordable, he says.

John Van Engelen, who owns a farrow-to-finish operation near Thedford in Lambton County, demonstrates how he uses a leaf blower to keep the fan heater in his sow loose housing unit dust-free.

Asking if he has an emergency plan for the barn elicits chuckles too, but only after a surprised silence. There are only two of them who work in the barn full time. Occasionally his daughter helps out. Everyone can navigate the facility blindfolded.

Van Engelen eyes Mitchell, seated at the barn office desk. "Did you do one when you were at Guelph?"

"No," Mitchell admits. "I know there's supposed to be one."

If there's an emergency in the barn, says the older Van Engelen, "we'd just call 911." If it's a small fire, they'd try to handle it first on their own with fire extinguishers. They've used extinguishers before (to tackle combine fires). But if it's large, they'd call 911.

What else can be done? I put that question to Larry Jacobson, professor and extension engineer in the University of Minnesota's department of bioproducts and biosystems engineering. In 2010, Jacobson headed a National Pork Board committee which explored what the 21st-century sustainable hog-finishing barn should look like.

"Let's get the manure out of the barn and let's store it outside," he says. That way, in the barn, "you still have a corrosive environment, but it's probably not as corrosive." You're going to have to have the same "level of electrical robustness in the wiring." Ventilation is still needed as well as "a lot of other things." Nevertheless, the move eliminates many of the risks.

Jacobson's solution doesn't sit well with Van Engelen for a multitude of reasons. At the top of the list is the increasing difficulty in obtaining a municipal building permit for a facility that has an exterior manure pit. Instead, try regular maintenance combined with a ventilation system like his own, he suggests.

"If you have a 100 per cent pit-ventilated barn that never lets the gas come up in the first place, that you can actually agitate and you will never smell it inside the barn, only outside the barn where the fan is, maybe that would be a lot better." **BP**