

Electricity and natural gas news for Manitoba Hydro customers

How Manitoba Hydro prepares for solar storms

In May 2024, an extreme solar storm had many folks in Canada, the United States, and even Europe looking up to see an aurora borealis light show. And though these lights ended up being beautiful and harmless, solar storms can cause serious damage to electrical infrastructure.

Even though electrical transformers are designed to handle currents, the geomagnetically induced currents from a solar storm can affect a transformer's ability to maintain their standard voltages. In extreme cases, it can cause them to burn out. In 1989, a solar storm much like this year's knocked out power to six million people in Quebec and melted power transformers in New Jersey. In 1859, telegraphs around the world

sparked and failed during the most intense storm in recorded history. Known as the Carrington Event, these auroras shone so bright they were said to turn night into day.

Thankfully, Manitoba Hydro is a leader in solar storm research and preparation.

In 2007 — long before most countries were concerned — Manitoba Hydro worked on a research and development project with the Finnish Meteorological Institute to monitor geomagnetically induced currents in locations across the province. Our studies helped us understand how solar storms could affect us — the biggest risk is on long transmission lines — and how we could better protect our system.

(story cont'd on side 2 . . .)





Northern Lights in Gillam, Manitoba – August 2023

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When a strong geomagnetic storm hits, high-voltage transmission lines can act like a radio antenna and absorb energy. If there's a path to ground, those geomagnetically induced currents flow through the transmission system to transformers. If the transformers are already carrying a heavy load, that additional energy can cause damage — at best, it can reduce the useful life of a transformer, and at worst (like in New Jersey) it can melt them and cause a power outage.

That's why the best defense against a solar storm is to relieve stress on our grid. We can do this by installing capacitors on transmission lines or reducing our spot-market power exports, for example. With today's technology and monitoring equipment, we have about four hours

of notice to prepare for incoming solar storms. Scientists around the world are working to improve solar monitoring technology to increase that notice period and give everyone more insight into solar weather.

The North American Reliability Corporation established the Geomagnetic Disturbance Task Force in 2011 to create guidelines and procedures for energy providers — and by 2018, all Manitoba Hydro's transmission equipment met their standards.

What it all means is the next time there's a big solar storm, you can go out and view the Northern Lights with confidence. Thanks to decades worth of study, preparation, continuous monitoring, and grid improvements, they won't mean a province-wide blackout.



A Manitoba summer brings a different kind of storm season. Did you know lightning strikes can happen as far as 16 kilometres away from a thunderhead? This summer, remember “when thunder roars, go indoors.” And if you see any lightning hit our equipment — or any sparking, burning, or downed lines — stay at least 10 metres away and call 911.

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