

**First Regular Session
Seventy-fifth General Assembly
STATE OF COLORADO**

INTRODUCED

LLS NO. 25-0798.01 Jery Payne x2157

HOUSE BILL 25-1260

HOUSE SPONSORSHIP

DeGraaf, Richardson, Suckla

SENATE SPONSORSHIP

Pelton R.,

House Committees
Energy & Environment

Senate Committees

A BILL FOR AN ACT

101 **CONCERNING THE RESILIENCY OF THE SYSTEMS THAT PROVIDE**
102 **ELECTRICITY IN RELATION TO GEOMAGNETIC STORMS.**

Bill Summary

(Note: This summary applies to this bill as introduced and does not reflect any amendments that may be subsequently adopted. If this bill passes third reading in the house of introduction, a bill summary that applies to the reengrossed version of this bill will be available at <http://leg.colorado.gov>.)

The bill requires the public utilities commission (commission) to evaluate electrical generation and grid resilience against geomagnetic storms (evaluation) and report the findings of the evaluation to the general assembly. The bill sets standards for the evaluation. Based on the evaluation, the commission shall adopt rules requiring an electrical utility to meet resiliency standards for geomagnetic storms. The rules include:

Shading denotes HOUSE amendment. Double underlining denotes SENATE amendment.
*Capital letters or bold & italic numbers indicate new material to be added to existing law.
Dashes through the words or numbers indicate deletions from existing law.*

- Requiring the monitoring of the space weather prediction center of the national oceanic and atmospheric administration in order to isolate large power transformers and power generation from the grid;
- Mechanically isolating critical components if or when a coronal mass ejection is likely to cause geomagnetically induced currents;
- Restricting or closing fuel pipeline valves to mitigate damage in a sectional failure;
- Installing automatic neutral ground blocking devices in large power transformers;
- Ensuring that computer equipment can be mechanically isolated from the grid and sheltered from geomagnetically induced surges;
- Requiring all networked systems that operate electrical generation and distribution to be electronically and physically separable from the outside networks; and
- Requiring the cyber-certification of hardware and software that operate electrical generation and distribution.

1 *Be it enacted by the General Assembly of the State of Colorado:*

2 **SECTION 1. Legislative declaration.** (1) The general assembly
3 finds and declares that:

4 (a) According to the federal cybersecurity and infrastructure
5 security agency, "The U.S. energy infrastructure fuels the economy of the
6 21st century. Without a stable energy supply, health and welfare are
7 threatened and the U.S. economy cannot function. Presidential Policy
8 Directive 21 identifies the Energy Sector as uniquely critical because it
9 provides an 'enabling function' across all critical infrastructure sectors.
10 More than 80 percent of the country's energy infrastructure is owned by
11 the private sector, supplying fuels to the transportation industry,
12 electricity to households and businesses, and other sources of energy that
13 are integral to growth and production across the nation."

14 (b) Coronal mass ejections and solar flares are natural and

1 unavoidable, and therefore are essential considerations for mitigation in
2 "advancing climate resilient development" that must be considered "in the
3 design and planning of settlements and infrastructure", according to the
4 Intergovernmental Panel on Climate Change Summary for Policymakers,
5 Climate Change 2021: The Physical Science Basis, Contribution of
6 Working Group I to the Sixth Assessment Report of the
7 Intergovernmental Panel on Climate Change, Cambridge University
8 Press, Cambridge, United Kingdom and New York, NY, USA, pp. 3-32;
9 and

10 (c) The participation of transmission utilities in organized
11 wholesale markets and the implementation of the "Colorado Electric
12 Transmission Authority Act", article 42 of title 40, Colorado Revised
13 Statutes, will assist transmission utilities and the Colorado electric
14 transmission authority in ensuring the resilience of the electric grid and
15 its resistance to both natural disasters and intentional attacks.
16 Accordingly, the public utilities commission should use all available
17 means to support these entities in preparing for, and documenting their
18 ability to mitigate, any threats identified in the 2016 Colorado energy
19 assurance emergency plan.

20 (2) The general assembly further finds and declares that:

21 (a) Geomagnetic storms are major disturbances of earth's
22 magnetosphere that occur when there is a very efficient exchange of
23 energy from solar wind into earth's environment. The storms transfer
24 energy into the earth's magnetosphere, resulting in major changes in
25 currents, plasmas, and fields. These changes are often preceded by
26 coronal mass ejections, which are massive eruptions of plasma expelled
27 from the sun's corona.

1 (b) Solar flares emit radiation in all bands of the electromagnetic
2 spectrum, affect little more than radio communication, and arrive in 8
3 minutes;

4 (c) Coronal mass ejections often occur with solar flares, but each
5 can take place in the absence of the other. Coronal mass ejections take
6 several days to reach the earth.

7 (d) Coronal mass ejections are large expulsions of plasma and
8 magnetic field from the sun's corona. They can eject billions of tons of
9 coronal material and carry an embedded magnetic field morphing
10 polarities as it travels in space and that is stronger than the background
11 solar wind interplanetary magnetic field strength. Coronal mass ejections
12 travel outward from the sun at speeds ranging from slower than 250
13 kilometers per second to as fast as nearly 3,000 kilometers per second.
14 The fastest earth-directed coronal mass ejections can reach our planet in
15 as little as 15 to 18 hours. Slower coronal mass ejections can take several
16 days to arrive.

17 (e) The polarity of a coronal mass ejection can usually be
18 determined at the Lagrange point, which is the gravitationally balanced
19 point between the earth and the sun and is approximately 1.5 million
20 kilometers from earth;

21 (f) At the Lagrange point, coronal mass ejections are 10 to 45
22 minutes from earth;

23 (g) If a coronal mass ejection is the same polarity as the earth's
24 geomagnetic field, the coronal mass ejection will tend to be deflected. If
25 a coronal mass ejection is opposite the earth's polarity, however, the
26 earth's magnetic field will act to draw the energy into the earth's poles,
27 creating disturbances in the earth's magnetic field, inducing electrical

1 currents in metal objects such as pipelines and electrical wires, or
2 generating destructive heat in transformers due to an offset direct current
3 charge.

4 (h) The result of geomagnetic storms is that electric current is
5 generated in the magnetosphere and ionosphere, which generates
6 electromagnetic fields at the ground level. The movement of magnetic
7 fields around a conductor induces an electrical current. The excess current
8 can cause voltage collapse or permanent damage to large transformers.

9 (i) Geomagnetic storms are classified G 1 to G 5 based on a
10 quasi-logarithmic classification system developed by the national oceanic
11 and atmospheric administration. The strongest storms are G 5 class
12 storms. The smallest ones are G 1 class storms (near background levels).
13 These levels are classified as follows:

14 (I) G 5 means extreme, which is expected to occur for 4 days in
15 each 11-year cycle, leading to widespread voltage control problems and
16 possibly protective system problems. Some grid systems may experience
17 complete collapse or blackouts. Pipeline currents can reach hundreds of
18 amps.

19 (II) G 4 means severe, which is expected to occur for 4 days in
20 each 11-year cycle, leading to possible widespread voltage control
21 problems and some protective systems mistakenly tripping. Induced
22 pipeline currents may affect preventive measures.

23 (III) G 3 means strong, which is expected to occur for 60 days in
24 each 11-year cycle, possibly necessitating voltage corrections and
25 triggering false alarms;

26 (IV) G 2 means moderate, which is expected to occur for 360 days
27 in each 11-year cycle, with long duration storms possibly causing

1 transformer damage; and

2 (V) G 1 means minor, which is expected to occur for 900 days in
3 each 11-year cycle and which may induce weak power-grid fluctuations.

4 **SECTION 2.** In Colorado Revised Statutes, **add** 40-2-125.6 as
5 follows:

6 **40-2-125.6. Electrical generation and distribution resiliency -**
7 **evaluation - report - rules - repeal.** (1) THE COMMISSION SHALL, BY
8 JULY 1, 2026, EVALUATE THE RELIABILITY OF ELECTRICAL GENERATION
9 AND GRID RESILIENCE AFTER EXPERIENCING GEOMAGNETIC STORMS. THE
10 EVALUATION MUST:

11 (a) INCLUDE ELECTRICITY GENERATION FROM MULTIPLE SOURCES;

12 (b) INCLUDE THE ENTIRE CYCLE OF ECONOMIC AND
13 ENVIRONMENTAL EFFECTS OF ALL POLLUTANTS CAUSED BY ENERGY
14 GENERATION AND DISTRIBUTION, INCLUDING MANUFACTURE, TRANSPORT,
15 INSTALLATION, DEMOLITION, AND RECYCLING, OR OTHER END-OF-LIFE
16 DISPOSITION;

17 (c) FACTOR IN THE ENVIRONMENTAL IMPACTS OF SEVERE WEATHER
18 AND OTHER CATASTROPHIC EVENTS;

19 (d) INCLUDE MATERIAL ACQUISITION AND PROCESSING FACTORS,
20 REGARDLESS OF COUNTRY OF ORIGIN, TO COMPLY WITH STANDARDS
21 PROMULGATED BY REGULATIONS OF THE FEDERAL ENVIRONMENTAL
22 PROTECTION AGENCY AND THE FEDERAL OCCUPATIONAL SAFETY AND
23 HEALTH ADMINISTRATION;

24 (e) USE FIFTY- AND ONE-HUNDRED-YEAR PROJECTIONS FOR
25 SYSTEM RELIABILITY; AND

26 (f) EVALUATE THE ABILITY OF AND IDENTIFY SHORTFALLS TO
27 RESTORING ELECTRICAL POWER OPERATION WITHIN THE FOLLOWING

1 TIMELINES FOR THE FOLLOWING TYPES OF GEOMAGNETIC STORMS:
2 (I) FOR A G 5 RATED GEOMAGNETIC STORM:
3 (A) POWER GENERATION RESUMING WITHIN FIVE DAYS;
4 (B) RECOVERY OF CRITICAL INFRASTRUCTURE WITHIN ONE WEEK;
5 (C) TRANSMISSION LINES AND NODES OPERATING WITHIN TWO
6 WEEKS; AND
7 (D) COMMUNITY DISTRIBUTION OF ELECTRICITY WITHIN TWO
8 WEEKS;
9 (II) FOR A G 4 RATED GEOMAGNETIC STORM:
10 (A) POWER GENERATION RESUMING WITHIN THREE DAYS;
11 (B) RECOVERY OF CRITICAL INFRASTRUCTURE WITHIN THREE
12 DAYS;
13 (C) TRANSMISSION LINES AND NODES OPERATING WITHIN ONE
14 WEEK; AND
15 (D) COMMUNITY DISTRIBUTION OF ELECTRICITY WITHIN TWO
16 WEEKS;
17 (III) FOR A G 3 RATED GEOMAGNETIC STORM:
18 (A) POWER GENERATION RESUMING WITHIN TWO DAYS;
19 (B) RECOVERY OF CRITICAL INFRASTRUCTURE WITHIN TWO DAYS;
20 (C) TRANSMISSION LINES AND NODES OPERATING WITHIN THREE
21 DAYS; AND
22 (D) COMMUNITY DISTRIBUTION OF ELECTRICITY WITHIN ONE
23 WEEK; AND
24 (IV) FOR A G 1 OR G 2 RATED GEOMAGNETIC STORM, NO MORE
25 THAN A BRIEF INTERRUPTION OF ELECTRIC SERVICE.
26 (2) (a) BY JANUARY 2027, THE DEPARTMENT OF REGULATORY
27 AGENCIES SHALL INCLUDE, AS PART OF ITS PRESENTATION DURING ITS

1 "SMART ACT" HEARING REQUIRED BY SECTION 2-7-203, THE RESULTS OF
2 THE EVALUATION REQUIRED BY SUBSECTION (1) OF THIS SECTION.

3 (b) THIS SUBSECTION (2) IS REPEALED, EFFECTIVE JULY 1, 2027.

4 (3) AFTER PERFORMING THE EVALUATION REQUIRED IN
5 SUBSECTION (1) OF THIS SECTION, THE COMMISSION SHALL ADOPT RULES
6 REQUIRING ELECTRIC UTILITIES TO DEVELOP A CORONAL-MASS-EJECTION
7 PLAN TO ENSURE ELECTRICAL GENERATION AND DISTRIBUTION RESILIENCE.

8 THE RULES MUST:

9 (a) SET RELIABILITY STANDARDS BUT NOT DICTATE THE METHOD
10 OF COMPLIANCE;

11 (b) REQUIRE MONITORING OF THE SPACE WEATHER PREDICTION
12 CENTER OF THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
13 IN ORDER TO:

14 (I) PREPARE TO ISOLATE LARGE POWER TRANSFORMERS AND
15 POWER GENERATION FROM THE GRID IF A CORONAL MASS EJECTION IS
16 DETECTED WITH A POTENTIAL EARTH-ORBIT INTERSECTION;

17 (II) REQUIRE, WITHIN FIVE MINUTES AFTER DETERMINING IT IS
18 NECESSARY OR ADVISABLE, THE MECHANICAL ISOLATION OF CRITICAL
19 COMPONENTS IF OR WHEN A CORONAL MASS EJECTION IS LIKELY TO CAUSE
20 GEOMAGNETICALLY INDUCED CURRENTS; AND

21 (III) REQUIRE, WHEN APPROPRIATE, RESTRICTING OR CLOSING FUEL
22 PIPELINE VALVES TO MITIGATE DAMAGE IN A SECTIONAL FAILURE;

23 (c) REQUIRE THE INSTALLATION OF AUTOMATIC NEUTRAL GROUND
24 BLOCKING DEVICES IN LARGE POWER TRANSFORMERS;

25 (d) ENSURE COMPUTER EQUIPMENT CAN BE MECHANICALLY
26 ISOLATED FROM THE GRID AND SHELTERED FROM GEOMAGNETICALLY
27 INDUCED SURGES;

1 (e) REQUIRE ALL NETWORKED SYSTEMS THAT OPERATE
2 ELECTRICAL GENERATION AND DISTRIBUTION TO BE ELECTRONICALLY AND
3 PHYSICALLY SEPARABLE FROM THE OUTSIDE NETWORKS; AND

4 (f) REQUIRE CYBER-CERTIFICATION OF HARDWARE AND SOFTWARE
5 THAT OPERATE ELECTRICAL GENERATION AND DISTRIBUTION.

6 **SECTION 3. Act subject to petition - effective date.** This act
7 takes effect at 12:01 a.m. on the day following the expiration of the
8 ninety-day period after final adjournment of the general assembly; except
9 that, if a referendum petition is filed pursuant to section 1 (3) of article V
10 of the state constitution against this act or an item, section, or part of this
11 act within such period, then the act, item, section, or part will not take
12 effect unless approved by the people at the general election to be held in
13 November 2026 and, in such case, will take effect on the date of the
14 official declaration of the vote thereon by the governor.