



CLEVELAND-CLIFFS INC.

OMB Meeting on DOE's Distribution Transformer Energy Efficiency Standards Rule

MARCH 2024

DOE'S PROPOSED RULE WOULD ELIMINATE LAST DOMESTIC PRODUCER OF GOES

- On January 11, 2023 the US Department of Energy (DOE) issued a Notice of Proposed Rulemaking (NPRM, Proposed Rule) pertaining to the efficiency for liquid-immersed distribution transformers, low voltage dry-type transformers and medium voltage dry-type distribution transformers. The proposed standards would require covered transformers to be redesigned and all manufacturing lines to be retooled to support transformer cores produced from Amorphous Metal (AM) ribbon in replacement of Grain Oriented Electrical Steel (GOES). The proposed standard would take effect in 2027.
- In its press release announcing the NPRM, DOE stated: “Almost all transformers produced under the new standard would feature amorphous steel cores...”
- Nearly 70% of the GOES that Cleveland-Cliffs produces is used in distribution transformer cores
- Accordingly, the rule as proposed would regulate GOES out of this important market by 2027 and fundamentally destroy the economics of Cleveland-Cliffs continuing to produce both GOES for transformers and NOES for electric vehicles.
- 1,400 jobs at risk at Cleveland-Cliffs' Butler Works and Zanesville Works
- Cliffs is appreciative of DOE's engagement and responsiveness to our feedback, but we remained concerned about the consequences of the DOE's final rule

UAW LOCAL 3303 PERSPECTIVE

- UAW Local 3303 represents over 1,100 men and women and has a sister plant in Zanesville, Ohio that is home to the UAW workers of Local 4104
- The men and women of Local 3303 and Local 4104 are proud to be the only workers in the United States producing both Grain Oriented Electrical Steel (GOES) and Non-Oriented Electrical Steel (NOES), thus supporting U.S. national and economic security
- The rule as proposed would jeopardize good-paying, vital union jobs and U.S. national security in return for supposed efficiency gains that total a fraction of a percentage
- Our union has worked hard to execute Cleveland-Cliffs' investments in Butler, increased production and, together, we've brought Butler and Zanesville back from the brink of closure as a result of dumped imports
- Our union was completely blindsided by DOE's proposed rule. The proposed rule would eliminate as much as 70% of current demand for GOES that we produce; that demand simply cannot be made up elsewhere, thus we are all gravely concerned for the future of our plants
- Our UAW Local has worked hard to make our concerns known, meeting with DOE numerous times, members of Congress and even the White House
- The final rule must preserve utilization of GOES for distribution transformers



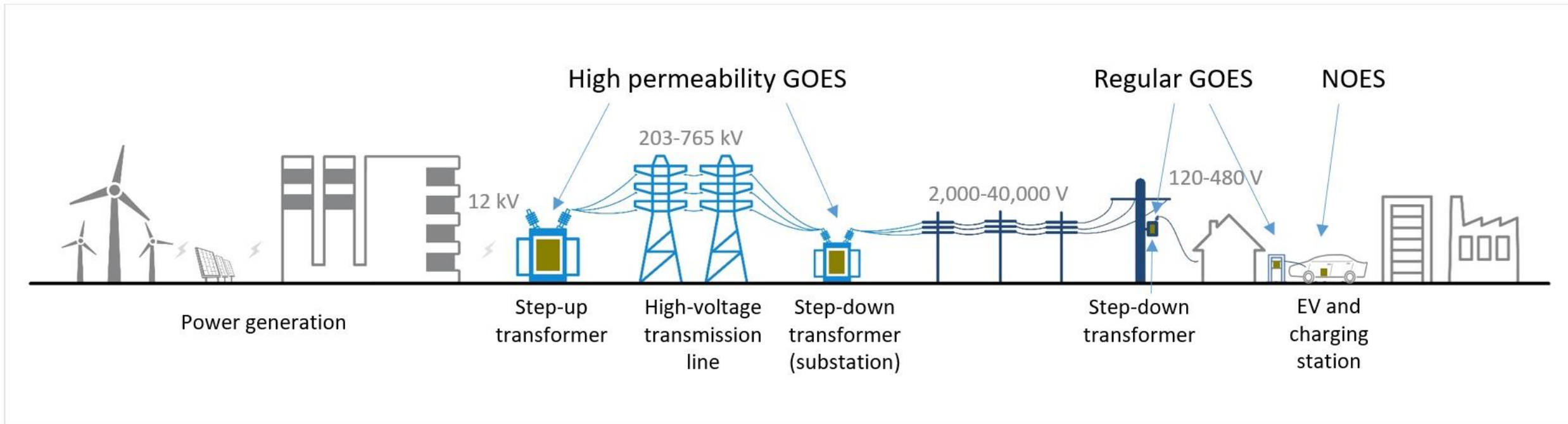
CLEVELAND-CLIFFS' ELECTRICAL STEEL PRODUCTS

GRAIN ORIENTED ELECTRICAL STEEL (GOES)

- Regular Grain Oriented (RGO)
- TRAN-COR® (TCH)

NON-ORIENTED ELECTRICAL STEEL (NOES)

- Conventional NOES
- Electric Vehicle (EV) – Grade NOES



IMPLICATIONS OF PROPOSED RULE

- Amorphous Metal (AM) is not produced in sufficient quantities (currently it only serves 5% of the domestic market) and is produced from imported billets
- Amorphous metal is categorized as a glass not a metal
- Transformer manufacturers favor utilization of GOES over AM. Use of AM will require a costly redesign of transformer production lines, exacerbating the transformer shortage
- Failure to provide for the continued use of GOES for transformers would threatens the objectives of the *Bipartisan Infrastructure Law* and the *Inflation Reduction Act* in relation to economy-wide decarbonization
- This proposed rule came about as Cleveland-Cliffs was being approached by DOE and numerous other federal agencies and being asked to increase GOES supply; if promulgated, the proposed rule would end domestic production of GOES by 2027
- Further investment by Cleveland-Cliffs in Butler Works and Zanesville Works has been on hold since January 2023 pending the outcome of this rule

UNINTENDED CONSEQUENCES

- Cleveland-Cliffs should not lose electrical steel market share because government regulation favors AM - a material that has only been able to garner 5% of the market
- Efficiency standards requiring AM will result in the electric grid becoming dependent on imported AM billets from countries including China and Japan
- The Department of Commerce has twice identified preservation of domestic electrical steel production as a national security imperative:

“If domestic electrical steel production, as well as transformer and generator production, is not maintained in the U.S., the U.S. will become entirely dependent on foreign producers to supply these critical materials and products. Without an assured domestic supply of these products, the United States cannot be certain that it can effectively respond to large power disruptions affecting civilian populations, critical infrastructure, and U.S. defense industrial production capabilities in a timely manner”

-THE EFFECT OF IMPORTS OF STEEL ON THE NATIONAL SECURITY.
U.S. Department of Commerce. 2018.

- When Cleveland-Cliffs acquired AK Steel in March 2020, AK Steel was actively planning to close Butler Works and Zanesville Works and exit the electrical steel business after the electrical steel market had been decimated by imports
- Cliffs could have gone along with the AK Steel closure plan but recognized the national security implications of not having any domestic production of such a critical material for the grid and fought to save these mills

SUPPORTING HIGHER EFFICIENCY TRANSFORMERS

- Recent investments in additional TRAN-COR® GOES capacity
- Introduction of lower loss TRAN-COR® GOES in 2024
- Potential alloy and process development to further reduce losses on TRAN-COR® products
- Planning potential investment in Slab Induction Heating Furnaces
 - Project submitted under DOE Industrial Decarbonization Program
 - \$192.7 million for the installation of electrified induction reheat furnaces
 - Enables new product development for even lower losses
 - Expected to reduce GHG intensity of reheat furnaces by 75%
 - Increase capacity by 12.5% due to increased yield and productivity
 - Secure 1,300 jobs at Butler; 220 temporary jobs during peak construction



DOE TRANSFORMER REGULATION BACKGROUND

Energy Policy Act of 1992 – amended EPCA and directed DOE to regulate distribution transformers

Three rulemaking periods to date

- 2027 proposal is under consideration
- Proposed 2027 rule is 6X increase in efficiency compared to the 2016 implementation
- Efficiency Level (EL) 1 would be a similar magnitude improvement in transformer efficiency to 2016

Impacts of DOE Transformer Efficiency Regulations on Cliffs' Products

DOE Rule	2010	2016	2027
50kVA efficiency	99.08%	99.11%	99.29%
RGO			
TCH			

AN EFFICIENCY LEVEL ABOVE TSL2 WILL BE DETRIMENTAL TO THE FUTURE OF GOES PRODUCTION

Trial Standard Level	
TSL1	• Eliminates viability of a substantial amount of GOES (RGO) products • Requires investment (\$100 million) to upgrade capacity for TCH, 4-6-year lead time
TSL2	• Major investment for additional TCH capacity (\$400 million) with 6-8-year lead time • More aggressive than past efficiency standard improvements
TSL3	• Eliminates GOES as a viable option!
TSL4	• Eliminates GOES as a viable option!

LOAD IMPACTS FOR GOES & AMORPHOUS TRANSFORMERS – DOE'S FAULTY ASSUMPTIONS

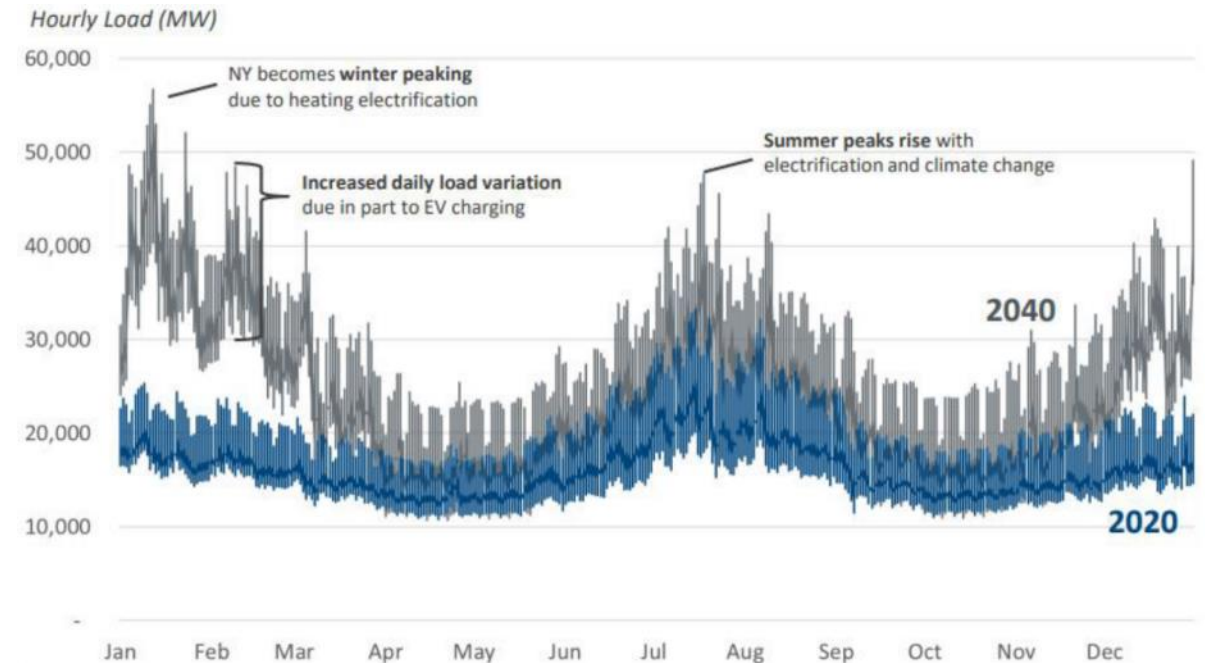
NOPR utilized historical electric system load data

EV charging and electrification of heating systems will impact transformer loading in all regions

New York Independent System Operator has modeled system loads in 2040; vastly different

- More frequent peaks
- Higher “base loads”

All aspects of the benefits calculation are inaccurate as a result



NYISO modeling presented by Deputy Secretary Alejandro Moreno “The United States’ Clean Energy Goals”

LOAD IMPACTS FOR GOES & AMORPHOUS TRANSFORMERS – DOE'S FAULTY ASSUMPTIONS

1-Phase Liquid-Immersed Transformers

25kVA Overhead	2016 GOES	2023 NOPR GOES	2016 AMORPHOUS	2023 NOPR AMORPHOUS
Efficiency 50% 55C	98.95%	99.16% (-20%)	98.95%	99.16% (-20%)
Total W @ 100%	366	288 (-21%)	484	380 (-21%)

50kVA Padmount	2016 GOES	2023 NOPR GOES	2016 AMORPHOUS	2023 NOPR AMORPHOUS
Efficiency 50% 55C	99.11%	99.29% (-20%)	99.11%	99.29% (-20%)
Total W @ 100%	643	493 (-23%)	880	673 (-24%)

Above 50% load GOES transformers are more efficient than Amorphous (higher Total W @ 100% = lower efficiency)

With higher loads from EV charging and electrified heating, GOES transformers should be regulated to save energy

From Al Traut, Howard Industries, presented at IEEE Transformers Committee Meeting, March 2023

LOAD IMPACTS FOR GOES & AMORPHOUS TRANSFORMERS – DOE'S FAULTY ASSUMPTIONS

The NOPR attributes over 65% of the benefits to environmental and health factors

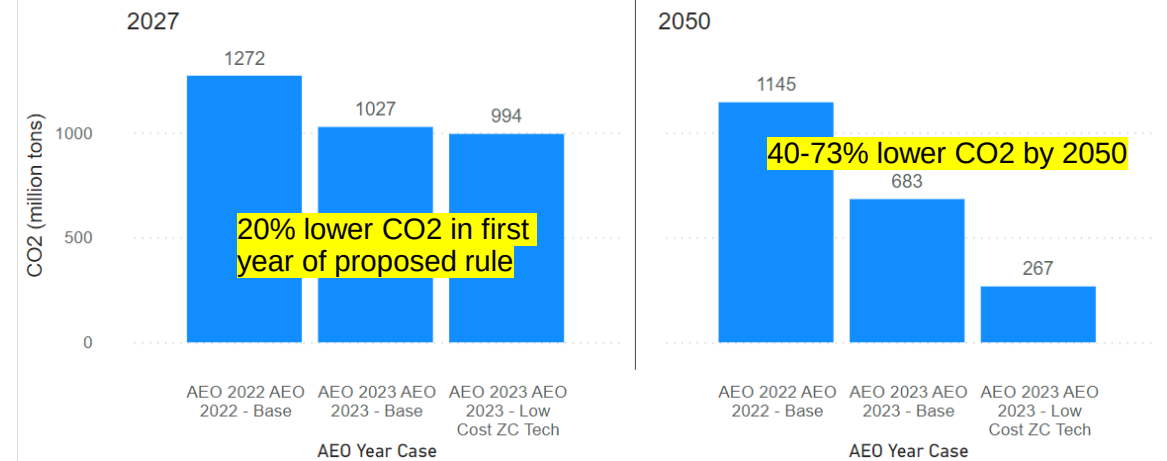
The underlying assumption is the power generating profile reflected in EIA's 2022 Annual Energy Outlook

The 2023 version reflected the current trajectory for the power generating portfolio

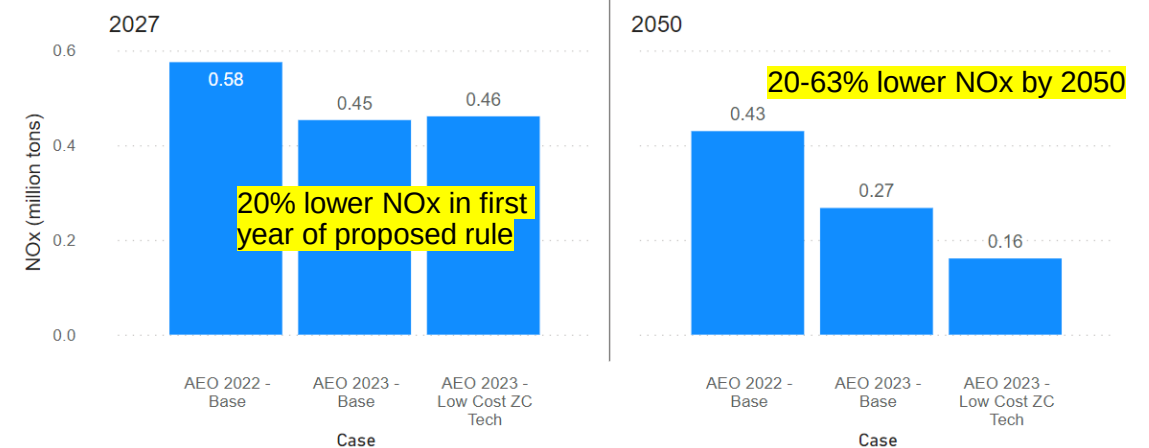
- By 2050, emissions reduced by over 40%
- In some cases, emissions are reduced by over 80%

The climate and health benefits may be overestimated by more than 50%

CO₂ (million tons) by AEO Year, Case and Year



NO_x (million tons) by Case and Year



SOLUTIONS THAT PRESERVE DOMESTIC GOES SUPPLY

- **Option 1:** Leave efficiency standards unchanged in recognition of acute transformer supply shortage; revisit increased efficiency at a future date
- **Option 2:** Finalize a rule that sets the TSL standard at TSL 1 or TSL 2 for all covered distribution transformers:
 - Provide an eight-year phase in period for the effective date of new standards
 - Bi-cameral, bi-partisan support for this approach – *Distribution Transformer Efficiency & Supply Chain Reliability Act of 2024*
 - This approach would result in:
 - Efficiency gains generally in line with the increased efficiency that resulted from the last DOE rulemaking
 - Continued utilization of GOES; preservation of a domestic supply chain
 - Continued production of NOES and EV-Grade NOES to support decarbonization
 - Support for transformer manufacturers seeking to overcome current production challenges