

Electrification

The Basics

Industrial Innovation Workshop

November 28, 2023



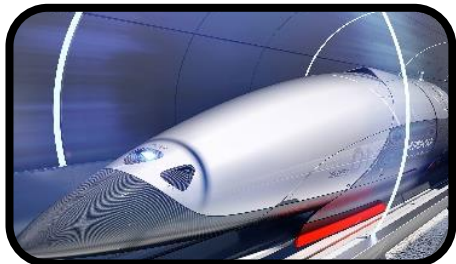
a U.S. Steel company





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Electrification



Unprecedented Spending

> \$200B in NA

What is it? *Electrical steel is steel specially alloyed with high amounts of silicon and aluminum to drive special properties when current is applied to copper windings around the steel.*

Why is it unique? *Electrical steel is a difficult product to produce requiring significant specialized technical expertise. Since the market is a niche market, few producers assume the risk of the venture.*



Non-Grain Oriented Electrical Steel: *NGO = NOES = NGOES; used in rotational equipment to turn power into motion (motor) or motion into power (generator)*

Grain Oriented Electrical Steel: *GO = GOES; used to transform electricity moving it from the grid to the consumer (distribution transformer) or from the generator to the grid (power transformer)*

The Auto Equation:

~ 15M units
~ 60kg avg/unit

33% → 300 kmT

66% → 600 kmT



Uses: Motors, Generators, Limited Transformers

Market Drivers: xEV Growth, Construction, Industrial, Oil, Small Auto

Market Hurdles: Supply Chain, Cost, Range Anxiety, Range Accuracy, Charging Time



NA Capacity:

~330 kT

NA Demand:

~400-450 kT

- Unclear concerns on USMCA.
- COVID supply chain issues are driving localization, but the weak market is causing that to ease up.

Uses: Distribution & Power Transformers

Market Drivers: Power Grid, Data Centers, Energy Storage, Renewable Energy, Charging Stations, trends with GDP

Market Hurdles: Capacity, Efficiency Standards, Transformer Lead Times

NA Capacity:

~250 kT

NA Demand:

~425 kT





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USS Enters NGO Market



INDUX

Approved Investment

~\$450M

Startup

3Q 2023

Capacity

~200k mT

Line Capabilities

Width Maximum – 1,650 mm incoming

Thickness Range – 0.10 mm to 0.80 mm

Grades – ASTM, Euronorm, Asian specifications,
Customer Specifications

Equipment

Reversing cold mill, annealing coat line,
rework & slitting lines

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