

**Power On?
OR
Power Off, for High-Perm GOES?**

A confidential report on the
Grain-Oriented Electrical Steel (GOES) Market
Specifically Focused on the Outlook
for High Permeability Material

By Charles A. Stitt & Becky E. Hites

March 2014

Information included in this report is believed to be true and both of the authors have exercised due diligence in obtaining the data from market and private sources. This report is not intended to be the sole basis for making an investment and the reader is cautioned to exercise additional independent due diligence before making any investment decision.

© 2014 Charles A. Stitt & Becky E. Hites

Table of Contents

Overview	5
Lower Barriers to Entry Have Changed the Nature of GOES Supply	5
Strong Performance in 2006-2008 Attracted New Capital	6
Steady Growth in GOES Demand Likely to Continue	7
Will Overcapacity Result in a “Shake-Out”?	9
History of the Development of GOES.....	11
History of the Development of High Permeability GOES.....	11
Global GOES Supply Grows in spurts	13
Electrical Steel Producer List.....	16
Strengths and Weaknesses of GOES Producers	18
GOES Producer Rankings.....	23
Future Total GOES Capacity Impacted by Several Factors	24
High Permeability Production Barriers Dropping.....	27
Global GOES Demand Tied to Electricity Consumption.....	28
Transformer Energy Efficiency Standards	32
Factors Effecting the Use of HP Products.....	35
Global Electricity Prices by Country	36
Amorphous Use Limited to Wound Cores	40
Supply and Demand Outlook for Major Consuming Regions.....	41
Production, Exports, Imports & Consumption by Country by Year.....	55
Supply Demand Matrix 2006, 2012, 2020f	62
Production by Country 2006-2025f.....	63
Consumption by Country 2006-2025f	64
Exports by Country 2006-2025f.....	65
Imports by Country 2006-2025f.....	66
Capacity by Country 2006-2025f.....	67
Utilization by Country 2006-2025f.....	68
Mill Production Allocation by Grade by Year	69
GOES Prices Tripled from 2001 to 2008; Have Fallen 50% Since	75
GOES Products Pricing Primer	77
Trade Cases Will Provide Some Price Support.....	78
Prices Reverse 5 Year Slide, but Rebound Only Moderately from Current Low Levels. 79	
GOES Price Tables by Region 1997-2025f.....	81
Grade Premium Historically Based On Value of Core Loss.....	86
Main Cost Differential Between RGO and HP is the Yield Loss.....	87
HP Pricing Competitive But at a Sustainable Level for the Mills	88
Pricing Outlook for Strong, Moderate and Weak Demand Electrical Steel Scenarios.....	92
Cost Estimate Methodology	94
High Silicon Hot-Rolled Band Cost Ranking by Country	95
RGO Cost Ranking by Mill.....	101
RGO Cost Build-Up from HRB by Mills Using the Old Routing.....	108
RGO Cost Build-Up from HRB by Mills Using the New Routing.....	113

APPENDIX A - Definition of Terms..... 118
APPENDIX B - Large Power Transformers and the U.S. Electric Grid, US DOE..... 120