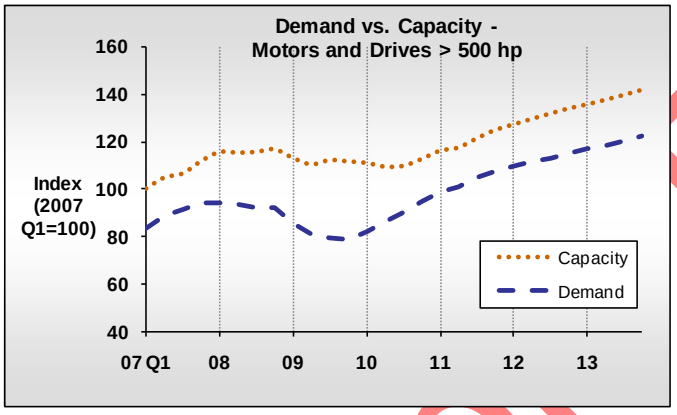
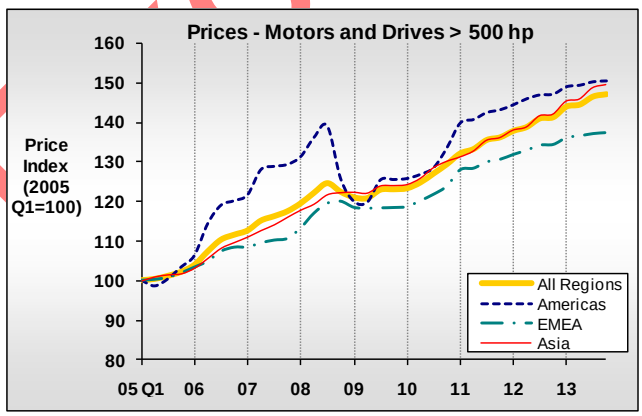
1 Motor and Drives > 500 hp

Sales rose 3.4% in Q3 on increased spending from the mining, oil & gas, and transportation sectors. Sales will increase 3% in Q4 largely driven by a 10.7% increase in the demand for railroad rolling stock. Sales will increase 13.5% by 2014, as oil & gas capital spending increases 28% and the demand for mining machinery increases 13%. The current slight decline in capacity utilization will level off at 86% in 2012 Q1. A doubling of industry backlogs will increase lead times for API 541 motors by half a week to 17 weeks in Q4, and will hold steady through 2013. Prices for Motors and Drives > 500 hp rose 1.7% in Q3 on a 4% rise in salaries for engineers, and a 3% rise in wages for production workers. Prices will rise 0.5% in Q4, in line with general inflation, despite falling commodity, energy, and manufacturing machinery costs. Prices will increase 1% in 2012 Q1 on a 6.3% rise in copper prices, and a 4.5% rise in aluminum costs.

Figure 1: Key Indicators for Motors & Drives > 500 hp

Key Indicators	2011 Q4 - 2012 Q1		2011 Q4 - 2013 Q4	
Demand	▲	1.9%	▲	13.5%
Order Lead Time	▲	0.1%	▼	-0.5%
Prices	▲	1.2%	▲	8.0%
Capacity Utilization	▲	0.0%	▼	-0.1%
Supplier Concentration	LO	0.1%	LO	1.0%





Wolong leapt from 10th to 3rd top supplier of large motors and drives after its acquisition of the ATB Group, one of the leading electric motor manufacturers in Europe. WEG acquired two manufacturers of industrial automation products (Watt Drive and Electric Machinery), which blocks GE from a monopoly over large 60Hz synchronous motors. ABB merged its US sales force with Baldor; it will now have the broadest range of industrial drives and motors in the US market.

Figure 2: Top Motor & Drives > 500 hp Suppliers

	Name	Home Country	3-Year Annual Growth Rate	Electrical as a % of Sales	2010 Motor & Drives > 500hp Revenues ($M US)	R&D % of Sales 2010	Stock Price Change Last 90 Days	Q4 News
1	Siemens	Germany	-2.3%	31%	$308	5.1%	5%	Won a major order for eight Velaro RUS high-speed trains
2	ABB	Swiss	-4.9%	67%	$268	3.4%	-7%	Merged US marketing with Baldor to harvest synergies
3	Wolong	China	20.3%	53%	$72	0.0%	-32%	Bought ATB, a European motor manufacturer
4	Toshiba	Japan	-5.8%	<1%	$135	4.9%	-3%	N/A
5	Regal-Beloit	USA	-0.2%	7%	$97	N/A	-5%	Divested its range of small domestic pump motors
6	WEG	Brazil	17.1%	26%	$91	2.3%	19%	Bought two complementary companies to expand globally
7	MHI	Japan	N/A	29%	$71	3.6%	23%	Raised servo motor prices due to cost of rare earth metals
8	EMOD	Germany	N/A	100%	$65	N/A	N/A	Will exhibit at SPS/IPC/DRIVES 2011
9	Emerson	USA	-7.9%	<1%	$35	2.2%	3%	Profit declined due to weak European economy
10	Nidec	Japan	-8.2%	<1%	$35	4.1%	5%	Launched high-efficiency furnace motor

1.1 Sourcing Recommendations – Motors and Drives > 500 hp:

1. Invite Baldor to demonstrate how the use of shaft grounding rings (SGR's) can minimize shaft voltage induced failures on its API 541 and API 547 motors. Baldor has integrated SGR's into its Super-E motors, which have power ratings ranging from 1-900 hp. Shaft grounding rings (SGRs) present a low-cost approach for reducing overall motor damage from shaft voltages, compared to Faraday shields, insulated bearings, and grounding brushes.
2. Include Wolong in the tendering process of new projects that require Motors & Drives as its recent acquisition of ATB Group has helped to increase its product offerings for the oil & gas and power generation sectors, and also placed it among the top six suppliers for Motors & Drives > 500 hp.
3. Reconfirm specification of copper windings from Xinhuang. The supplier is considering shifting to aluminum as a cheaper alternative due to rising copper prices. Copper prices reached a two year high of about $4.6/lb in 2011 Q1, and are set to increase 6.3% in 2012 Q1. However, upfront savings would be lost in higher operating costs since motors made with copper are more efficient and have reduced energy losses than those made with aluminum.

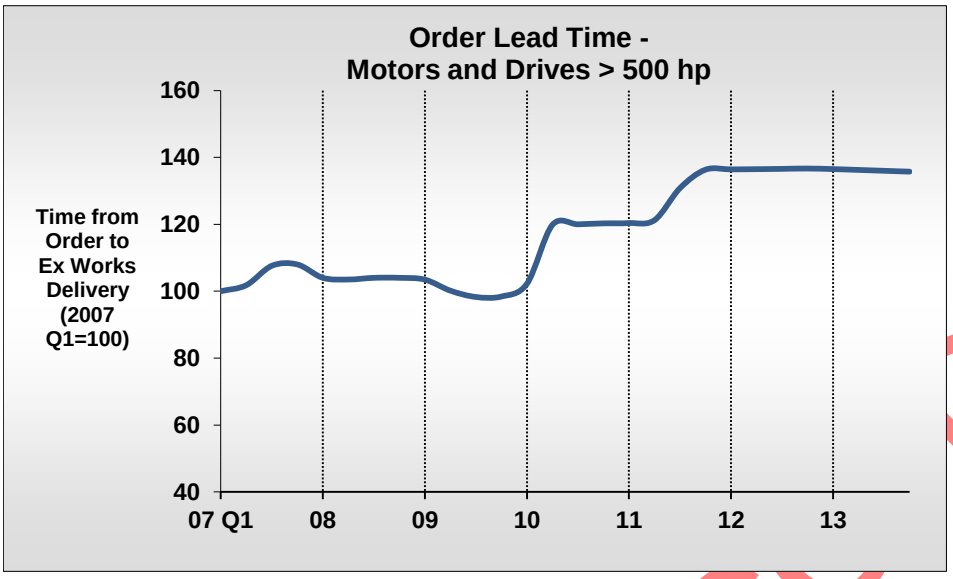
1.2 Sales will grow 3% in Q4 on a 10.7% increase in rail transport spending, a 3% increase in oil & gas mining capital spending, and a 1.5% increase in demand for mining machinery.

Demand for Motors and Drives > 500 hp rose 3.4% in Q3 on orders from the mining, oil & gas, and transportation sectors. Capacity expansions and aftermarket service in the oil & gas sector drove demand for machinery used on oil & gas production platforms up 4.5% in Q3. For example, Aker Solutions, a Norwegian oil service company, placed a $36m order for drives and transformers to be used in Statoil's Åsgard subsea oil & gas field in the Norwegian Sea. Demand was also up on continued activity in global rail development. In the Americas, Union Pacific Railroad began the construction of a $400m rail facility in New Mexico, US, and in EMEA, Russian Railways (RZD) placed a $2.7b order for the delivery of 1.2k cars of the Desiro RUS type regional trains. These projects contributed to a 16.6% global rise in demand for railroad rolling stock.

Sales will rise 3% in Q4 on a 10.7% increase in demand for trains, as projects deferred during the 2008-09 recession were sanctioned. The deceleration in demand for trains from Q3 will be largely due to declining rail construction investments in Asia, following the Chinese government's decision to put a hold on all new railway projects after a fatal collision between two high-speed trains in Q3. The type of motors used in electrically powered rail vehicles and other locomotive engines are usually traction motors and three-phase induction motors.

- RZD ordered eight Velaro RUS high-speed trains, for transporting commuters between Moscow and Saint Petersburg. The order is worth $780m and delivery is scheduled to start in 2014.
- Deutsche Bahn Regio placed a $650m order for 90 Bombardier 430 electric multiple units (EMUs) to be used on the Rhein-Main rapid transit network in Germany.

Sales of Motors and Drives in Q4 will also be driven by a 1% increase in demand for machinery used on oil & gas production platforms, and a 1.5% increase in demand for machinery used in the mining of metals & minerals.



1.5 Costs fell but OEMs are raising prices incrementally in order to recoup profit margins lost in 2009.

Prices rose 1.7% in Q3, as Motor and Drive suppliers in Asia reacted to increasing labor costs. In Asia, prices increased 2% on a 4% rise in engineering salaries and a 3% rise in production labor costs. The rise in Asian labor costs was partly due to a lack of skilled labor, and also a result of the Chinese government's plans to increase the disposable income of urban and rural residents. Labor costs in Europe and the Americas rose less than 1% due to high unemployment rates in both regions, which contributed to a 1% increase in prices in both regions.

Motor and Drive manufacturers are raising prices by 0.5% in Q4, despite overall falling energy and commodity costs, in order to regain profit margins that they were forced to concede in 2009. Supplier profit margins will rise the most in the Americas and EMEA at 4.4% and 2% respectively, as overall metal costs will decline 7-8% in these regions. However, in Asia margins will only rise 1% as the cost of metals used in the production of motors will only decline 4% there, and rising labor costs will also diminish the benefit for Asian suppliers.

Input costs fell in Q4. Industrial electric power prices fell 4.5% as a warm winter in the US drove Henry Hub natural gas prices 18.4% lower than in Q3, and natural gas prices in the UK dropped 18.7%. By the time the quarterly data is released, copper and aluminum prices will have dropped 17% and 11.6%, respectively, while on a regional level, iron and steel costs will drop 4.3% each in the US, and 7% and 2%, respectively, in Europe. Also in Europe, prices for other non-ferrous metal will drop 4%, causing a 4% overall drop in European metal costs. The declining metal costs were largely due to falling demand which was in turn caused by weak economic growth due to the sovereign debt crisis in Europe and high unemployment in the US.

Prices will increase 1% in 2012 Q1 as metal costs recover globally, and labor costs rise in Asia and Europe. In Asia, production labor costs will increase 2.7% and professional labor costs will increase 1.3%. In Europe, professional labor and benefit costs will increase 1%. Globally, copper prices will rise 6.3%, while aluminum prices will rise 4.5%.

advantages will ease Wolong's entry in the European market, and further to develop into a truly global corporation.

WEG acquired Watt Drive, an Austrian manufacturer of electric and mechanical drive technologies, and Electric Machinery (EM), which was a part of Converteam until the recent GE acquisition. The acquisitions will complement WEG's motor and drive product offerings, and will allow it to further strengthen its position in the market.

- Watt Drive designs and manufactures drive systems (including gear units, motors, and electronic drives), modular drive electronics (with frequency inverters), modular motor systems (including system motors and servomotors), and modular gear systems (for servo drive systems). The company has an extensive distribution network, and it operates industrial plants in Austria and assembly units in Germany and Singapore.
- WEG also acquired Electric Machinery (EM), a subsidiary of Converteam, from GE. The acquisition was as a result of the merger review process that GE agreed to with the US Department of Justice during its acquisition of Converteam. The Department of Justice ruled that GE may obtain monopoly power in a subsegment of the market for large synchronous motors specifically designed for 60Hz systems. Traditionally, EM, Converteam, and GE were the major actors in that market. Electric Machinery designs and manufactures customized motors, generators, and brushless exciters. It also offers aftermarket services including installation, field support, parts, repairs, upgrades, high-speed balancing, and technical support. EM primarily serves the oil & gas, power generation, metals & mining, and pulp & paper industries.

Siemens and ABB's performance improved in Q3, with higher sales due to increased demand from the energy and power generation industries.

- The revenue and profit of Siemens' Industry sector increased 9% and 36% YOY, respectively. The Industry sector consists of five divisions, with the ones relevant for Motors & Drives being the Drive Technologies and the Industry Automation divisions.
  - Between July and September 2011, its Drive Technologies segment had a 29.5% increase in new orders, 16% increase in revenues, and 14.5% increase in profits.
  - For the same period, its Industry Automation segment had a 9.5% increase in new orders, a 13% increase in sales, and a 23% increase in profits.
- ABB's Discrete Automation and Motion division had a 61% increase in orders and a 58% increase in revenues in Q3, largely as a result of strong orders received by Baldor in the US, and the continued demand for energy efficient automation solutions across all regions. On a regional basis, Europe had the best performance and it accounted for 36% of the company's revenue. It was closely followed by the Americas, which accounted for 33% of its revenue.

1.7 ABB and Baldor integrated their sales forces for industrial motors and drives following the acquisition of Baldor earlier in 2011.

ABB improved its customer service in the US by combining its marketing team with Baldor following the acquisition earlier this year. ABB now offers 24-hour local sales support and servicing of its products. ABB and its newly acquired subsidiary have transitioned to a single unit for the sale and support of their complete line of low- and medium-voltage industrial drives and industrial electric

Preventing Motor Damage from Shaft Voltages

Variable-frequency drives (VFDs) have low operating costs, and are increasingly being used to control AC motors because they can generate over 30% in energy savings and they improve performance ratings of the motor. Despite having these benefits, VFDs unfortunately also induce voltage build up on the motor shaft, causing damage to the AC motor. Motor failures caused by VFD induced shaft voltages result in unplanned downtime, lost production, and additional costs; and according to motor manufacturers, minimizing failures caused by these VFDs is their biggest engineering challenge.

The shaft voltages accumulate until they find a discharge path to the ground, and unless the charges are diverted, the path of least resistance will be through the motor bearings. This repeated stress on the bearings will cause pitting, a form of corrosion that leads to the formation of small holes in the bearing metal, and fluting, which forms ridges across the bearing race. These in turn cause the bearings to make excessive noise, and eventually to fail. This results in unscheduled maintenance as it causes the motor to fail as well. In some cases, motor bearings which have been designed to last 100k hours, can fail in as little as 2k hours if the motor is controlled by VFDs.

Strategies for mitigating this damage include using Faraday shields, insulated or ceramic bearings, conductive greases, grounding brushes, and grounding rings. Most of these techniques are either impractical due to their high costs or the additional complications derived from their usage. For example, Faraday shields and ceramic bearings are not economically viable solutions because they are very expensive, and ceramic bearings have long lead times. Grounding brushes are a more economical alternative, but they are subject to wear, collect contaminants on their bristles, and are prone to corrosion (specifically oxidation buildup). All of these reduce efficiency and increase maintenance requirements.

Shaft grounding rings (SGRs) are a more practical and low-cost approach for reducing overall motor damage from shaft voltages. A grounding brush has an initial cost ranging from $400-$1k, lifetime replacement costs of at least $4k, and yearly maintenance costs of over $500. Comparatively shaft grounding rings have an initial cost ranging from $600-$1.5k and zero replacement or maintenance costs. It involves the use of a ring made of conductive microfibers that creates a path for shaft voltages to bypass the bearings directly from the shaft to the frame (ground). Baldor and Regal-Beloit are two of the top ten Motor & Drive suppliers who have integrated these SGRs into their motors. Baldor uses the SGRs on its Super-E® motors, while Regal-Beloit uses them on its Century® motors.