Market Outlook For Commercial Vehicles
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Introductions to the Power Systems Research Team
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  - Presence in Detroit, Brussels, Tokyo, Beijing, Pune, Sao Paulo, Moscow, Riyadh & Mexico City
• Founded in 1976, Over 35 Years of Industry Experience
• Expertise in over 15 Market Segments

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**OE Link™**
Original Equipment Production Forecast & Sales with OE Model & Engine Details

**CV Link™**
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**MarineLink™**
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**Components Modules**
Emissions, Turbo chargers, Transmissions, Fuel Systems, Tyres

**PartsLink™**
Population Model

www.powersys.com
Market Forces Influencing Commercial Vehicles Growth in India
Forces Influencing Production and Demand

• **Drivers**
  – Economic Situation – GDP, Capital Spending, Consumer Confidence, Capacity Utilization
  – Increased Urbanization
  – Infrastructure Spending
  – Freight, Transportation & Technology Improvements
  – Energy Demand – Natural Gas
  – Emission Regulation

• **Challenges**
  – Total Cost of Ownership
    • Fuel Economy
    • Pricing for a new truck
    • Resale value
  – Replacement Cycles
  – Manufacturing Capacity - Global OEMs

• **Restraints**
  – Threat of Substitutes - Rail
  – Government Stability and Spending
  – Monitoring Compliance
Drivers – Economy

### Annual Compound Gross Domestic Product (GDP)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>7.2%</td>
<td>6.5%</td>
<td><strong>5.8%</strong></td>
</tr>
<tr>
<td>World</td>
<td>4.2%</td>
<td>2.9%</td>
<td>3.8%</td>
</tr>
<tr>
<td>USA</td>
<td>2.7%</td>
<td>0.8%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Canada</td>
<td>2.8%</td>
<td>1.2%</td>
<td>2.2%</td>
</tr>
<tr>
<td>European Union</td>
<td>2.7%</td>
<td>-0.1%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Asia Pacific (Rest)</td>
<td>8.5%</td>
<td>7.8%</td>
<td>6.6%</td>
</tr>
<tr>
<td>Japan</td>
<td>1.5%</td>
<td>-0.1%</td>
<td>1.3%</td>
</tr>
<tr>
<td>China</td>
<td>10.5%</td>
<td>9.3%</td>
<td>7.1%</td>
</tr>
<tr>
<td>CIS</td>
<td>7.6%</td>
<td>2.4%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>3.6%</td>
<td>3.3%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>5.8%</td>
<td>4.4%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>5.9%</td>
<td>4.9%</td>
<td>5.6%</td>
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</tbody>
</table>

**Source: IMF**

- India GDP growth is forecast to grow at a 5.8% CAGR up to 2018
- This is well above the world average over that period
- However recovery is weak and uneven in the short term when we look at the most recent PMI survey, export and the new orders index fluctuated throughout 2013.
- The market remains cautious.
- In the next five years, Indian GDP growth is unlikely to reach pre-2008 rates.

### India Purchasing Managers Index

- **Source:** Markit / Economics Limited / HSBC India Manufacturing PMI
Drivers - Emissions Regulation

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<thead>
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</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>BS III</td>
<td>BS IV</td>
<td></td>
<td></td>
<td></td>
<td>BS IV</td>
<td></td>
<td></td>
<td>BS V</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NS IV</td>
<td></td>
<td>NS V</td>
<td></td>
</tr>
<tr>
<td>US</td>
<td>EPA 10</td>
<td>CO2 standard</td>
<td>EPA 16</td>
<td>EPA 2017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td>Euro VI</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>GHG</td>
<td></td>
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</tbody>
</table>

- As in the other key markets, implementation and monitoring of regulations will drive growth. India lags behind China but will catch up in 2018 or 2019.

- USA & Europe are at the Euro VI stage. The first ever fuel standards to reduce Green House gases and improve fuel economy will be implemented.

- BS IV (Euro IV) norms implemented in October 2010 in thirteen cities and plans to expand to 50 cities by 2015. The Indian Foundation of Transport Research and Training claims more than 99% of trucks and buses are violating BS-IV norms.

- BS IV fuel requirements have been implemented by all oil companies. Now the focus will be on logistics.

- BS V implementation will probably beyond 2020.
Today natural gas pricing in India is competitive versus other key markets. India natural gas prices are due to double in 2015 and increase to US$8.4 by 2016/2017. Natural gas will be increasingly significant in the fuel mix as Indian demand for energy grows. Advantages: there are available resources, proven compliant technology to meet emission standards. Disadvantages: power is lower compared to diesel, pricing policy remains uncertain, lack of infrastructure outside urban areas.
Drivers - Infrastructure

- Infrastructure Investment and development remain positive in the short, medium and long term
- India’s 12th Five Year Plan targets infrastructure investment to 9% of GDP
- In November 2013, the World Bank approved a US$500 million loan for the National Highway Interconnectivity Project in three states
- The National Highways and Development Projects initiatives is in seven phases
- Availability of infrastructure provides good prospects for growth in commercial vehicles across the country
- The risk is delays in projects, lack of investment and political uncertainties
## Drivers – Infrastructure Progress

<table>
<thead>
<tr>
<th>Number</th>
<th>NHDP Phase</th>
<th>Length (km)</th>
<th>Status</th>
<th>Start</th>
<th>Completion</th>
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<tbody>
<tr>
<td>1</td>
<td>Phase I</td>
<td>5,846 km</td>
<td>Fully complete</td>
<td>Dec-00</td>
<td>Dec-06</td>
</tr>
<tr>
<td>2</td>
<td>Phase II</td>
<td>7,300 km</td>
<td>Award in progress</td>
<td>Dec-03</td>
<td>Dec-09</td>
</tr>
<tr>
<td>3</td>
<td>Phase III A</td>
<td>4,000 km</td>
<td>Already identified</td>
<td>Mar-05</td>
<td>Dec-09</td>
</tr>
<tr>
<td>4</td>
<td>Phase V</td>
<td>6,500 km</td>
<td>5700 km of GQ + 800 km to be</td>
<td>Nov-05</td>
<td>Dec-12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>identified</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Phase III B</td>
<td>6,000 km</td>
<td>Already identified</td>
<td>Mar-06</td>
<td>Dec-12</td>
</tr>
<tr>
<td>6</td>
<td>Phase VII A</td>
<td>700 km (430 mi)</td>
<td>Ring roads to be identified</td>
<td>Dec-06</td>
<td>Dec-12</td>
</tr>
<tr>
<td>7</td>
<td>Phase IV A</td>
<td>5,000 km</td>
<td>To be identified</td>
<td>Dec-06</td>
<td>Dec-12</td>
</tr>
<tr>
<td>8</td>
<td>Phase VII B</td>
<td></td>
<td>Ring roads to be identified</td>
<td>Dec-07</td>
<td>Dec-13</td>
</tr>
<tr>
<td>9</td>
<td>Phase IV B</td>
<td>5,000 km</td>
<td>To be identified</td>
<td>Dec-07</td>
<td>Dec-13</td>
</tr>
<tr>
<td>10</td>
<td>Phase VI A</td>
<td>400 km (250 mi)</td>
<td>Already identified</td>
<td>Dec-07</td>
<td>Dec-14</td>
</tr>
<tr>
<td>11</td>
<td>Phase VII C</td>
<td></td>
<td>Ring roads to be identified</td>
<td>Dec-08</td>
<td>Dec-14</td>
</tr>
<tr>
<td>12</td>
<td>Phase IV C</td>
<td>5,000 km</td>
<td>To be identified</td>
<td>Dec-08</td>
<td>Dec-14</td>
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<tr>
<td>13</td>
<td>Phase VI B</td>
<td>600 km (370 mi)</td>
<td>To be identified</td>
<td>Dec-08</td>
<td>Dec-15</td>
</tr>
<tr>
<td>14</td>
<td>Phase IV D</td>
<td>5,000 km</td>
<td>To be identified</td>
<td>Dec-09</td>
<td>Dec-15</td>
</tr>
</tbody>
</table>

Source: NHAI and Wiki

NHDP Projects divided into seven phases
Yellow Highlighted – Still in progress versus schedule.
Challenges – Total Cost of Ownership

• The Indian Road Freight Cost Index has been creeping up year on year and this trend is expected to continue into 2014/15.
  • The Index is a composite which includes fixed and variable costs including fuel cost per trip per tonne, toll tax, max tonnage and minor repair eg. puncture costs.
• Increases in fuel prices and road freight cost explain the cautious outlook in the short term.
• In the medium term, introduction of emissions regulated trucks will increase new truck prices.
• These factors are increasing total cost of ownership.

Source: TCIL and PSR assumptions
Drivers – Summary

Manufacturers, Fleet Operators, Owner drivers continue to focus on reducing cost of ownership.

Manufacturers

- Improve Vehicle Profit Margins
- Extended Service Intervals
- Low Cost Components
- Design for Fuel Economy
- Fuel Technology
  - Diesel, Natural Gas, Other Alternatives
- Emissions Regulations

Fleet Owners

- Price of a New Truck and Resale Value
- Driver Cost
- Repair, Maintenance
- Warranty
- Fuel Cost

- In summary, the key drivers which will shift the dynamics and composition of the India commercial vehicles market are - improved infrastructure, better road regulation, tightening emissions norms and improved cost of ownership.
- Like the regulated markets of Europe, USA, BSV compliant product will be designed to improve fuel economy.
Global Truck Market Outlook
Global Medium and Heavy Vehicles Production is expected to grow in line with economic conditions at a 5 Year Compounded Growth Rate of 3%.

- Production will increase from 5.6 million units in 2014 to 6.4 million units in 2019.
- India represents 6% of global truck production today and will increase to 9% of total global production by 2019.

Source: OE Link™ 2014
China dominates global market share and represents 38% of global production.

The pace of growth will remain uneven across all markets. USA and Western Europe will be lower versus India, Indonesia and Russia.

The prospects for India amongst the BRICS are optimistic.

Overall the future Medium and Heavy production prospects look bright for India. We are forecasting growth to expand from a 6% CAGR to 11% in the next five years.
India Truck Production By Gross Vehicle Weight

- The 16t+ segment is forecast to grow to 279K units by 2019.
- We are expecting some shifts in demand from 3.5 – 6 tonnes to less than 3.5t ie. into the Light Commercial Vehicles segment.
- Exports represent 10% of total truck production today and are forecast to double in the next five years.
- Key export markets include Sri Lanka, Bangladesh, Uzbekistan, Middle East and Africa and others where unregulated product can be sold.
Light Commercial Production in India (0-3.5t)

The Light Commercial Vehicles segment is forecast to grow to 687K units by 2019.

Other light duty segments such as Minivans an SUVs are also expected to remain strong.

Customers will increasingly shift from Medium Duty to Light Commercial Vehicles.

The key drivers are increased urbanization, hub and spoke type logistics, competitive pricing and driver regulations.

Source: OE Link™ 2014
97% of Truck Production is Diesel

- Diesel fueled engines dominate medium and heavy truck and light commercial production.
- Within the Minivans and SUV segment both diesel and gasoline are popular.
- In 2014, natural gas engines represent around 3% of total Medium and Heavy Truck production.
  - Most of this growth is in transit buses. We expect natural gas penetration to increase by 5% for buses and trucks.
  - Increases are highly dependent on the availability of natural gas fuel at a competitive price and in line with infrastructure development. Currently only available in major cities.
The market is concentrated with the top three players – Tata, Volvo, Hinduja making up 89% of total production.

Mahindra, Sumitomo, Daimler and Asia Motor Works each have 2-3% share.

Double digit compounded growth rates are projected for Tata, Daimler, Asia Motor Works and the Hinduja Group.

Volvo, Mahindra, Ros Roca and Sumitomo are also expected to strengthen in the next five years.
Since 2012 we have seen OEMs and Engine Suppliers expanding manufacturing capacity across all on-highway segments
Global OEMS Expansion Plans In India

**First manufacturing facility in Naraspora, Bangalore.** Two manufacturing units – one for truck assembly and another for buses. Truck production began in June 2013, rolling out two trucks per day and 30 trucks per month. Bus production expected to start mid 2014. Currently employs 190 with plans to expand workforce to over 800 people over the next five years. Heavy truck segment focus — 16 to 49 tonnes

Presence since 2008 but local production started in 2012. Bharat Benz vehicles are manufactured at the Chennai production facility in Southern India, opened in April of 2012. By 2014, they aim to launch a total of 17 truck models between 7 and 49t. Bharat Benz 3123 won the "Best Rigid Haulage Truck of the Year" the brand won the “CV of the Year” award.

Volvo-Eicher, announced further expansion of their Bangalore bus plant and Pithampur truck plant. This is to double both truck and bus capacity in the next few years. Current truck production capacity is 48,000 units per year and geared up to produce Euro 3, 4, 5 & t4 engines. Plans are to export 60% of the medium duty engines from the Pithampur plant into rest of Asia, Middle East and Africa.

Volvo is also bringing in the UD Truck. This will be for on and off highway applications. The final production of these trucks is under development in Thailand, India and China

Present since 2006, fully owned from 2012 as MAN Trucks India Pvt. Ltd. The company has a manufacturing facility in Pithampur, Madhya Pradesh, installed capacity of 24,000 trucks per year. Manufacture of heavy MAN CLA Trucks for the Indian Market and for export to Asian, African and CIS. The range of products manufactured includes Mining & Construction Tippers, Haulage Tractors and Multi Axle Trucks, from 16 t GVW to 49 t GCW as well as 16 tonne bus chassis for left hand and right hand drive.

In May 2011, Beiqi Foton announced plans to manufacture trucks in Pune, India. However since there’s been limited news. The first vehicle should be rolled off the line from April 2015. These products are primarily targeted for the India, Sri Lanka and Bangladesh markets.

KVML is a joint venture company between Kamaz Inc. and Vectra Group (Tatra Trucks Limited). Established the operation in Bangalore in 2010. There is limited manufacturing of heavy trucks although capacity to produce up to 5000 trucks. The product is traditional Kamaz design which includes the 8x4 and 6x4 construction trucks.

SML Isuzu Limited (Formerly Swaraj Mazda Ltd.) – established since 1983. is a joint venture between Japan’s Mazda Motor Corporation and Sumitomo Corporation. Product range above engine displacement 3.45 litres – mainly buses, ambulances, and customized vehicles. The company employs over 1,500 people. Planning on investing Rs 3,000 crore at its manufacturing plant in Andhra Pradesh over the next five years.
Local OEMs Expansion Plans

**Tata Motors is the market leader.** Total India production above 3.5t is around to 167,000 trucks per year. Their commercial vehicle market with a 60% share. The Tata-Cummins Ltd joint-venture produces 100,000 Euro 3-compliant B-Series engines annually which are supplied to Tata Motors. The new Prima platform vehicles are fitted with 200 to 500hp Euro 3-compliant engines competes with Daimler, Volvo and MAN emissionized products. Their existing platforms will be discontinued as Euro IV is implemented. Two key manufacturing hubs in India – Jamshedpur and Pune. Launching new global platforms.

Ashok Leyland produce around 130,000 trucks and buses above 3.5 tonnes in Hosur or Uttarkhand. They are the market leader in the bus chassis segment. In major Indian cities, 80% of all public transportation buses carry the Ashok Leyland badge. In January 2008, they announced its development of India’s first compressed natural gas (CNG) bus engine that met Euro 4 emission requirements. In March 2009, Ashok Leyland announced the development of a BS-4 hythane engine, which is a combination of natural gas and hydrogen for initial usage on bus applications.

Mahindra and Mahindra produce trucks and buses above 3.5 tonnes in Chakan, Pune. In December 2012, M&M purchased their joint venture partner- Navistar’s stake from two joint ventures Mahindra Navistar Automotive Ltd (MNAL) and Mahindra Navistar Engines Ltd (MNEPL) for Rs 175 crore. MNAL forecasts truck and bus production will get to 40,000 trucks by 2014. Mahindra’s current market share in LCV is 10% and HCV is 3%.

AMW Motors (AMW) is India’s third largest fastest growing manufacturer of heavy commercial vehicles. Located in Bhuj, Gujarat, they produce trucks ranging from 16 to 49 tons and has pioneered several segments in the Indian CV market and in India with an annual volume growth of over 100% for the last three years. Around 5200 trucks produced in 2013.
### Top Engine Suppliers By GVW (tonnes)

<table>
<thead>
<tr>
<th>0-3.5 (LCV only)</th>
<th>3.51-6.0</th>
<th>6.01-10.0</th>
<th>10.01-12.0</th>
<th>16.0+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tata Motors</td>
<td>Tata Motors</td>
<td>Tata Motors</td>
<td>Eicher Motors</td>
<td>Tata Cummins</td>
</tr>
<tr>
<td>Mahindra &amp; Mahindra Ltd</td>
<td>Mahindra &amp; Mahindra Ltd</td>
<td>Eicher Motors</td>
<td>Ashok Leyland</td>
<td>Tata Cummins</td>
</tr>
<tr>
<td>Ashok Leyland</td>
<td>Beiqi Foton Cummins Engine Co. Ltd</td>
<td>SML Isuzu Limited</td>
<td>Beiqi Foton Cummins Engine Co. Ltd</td>
<td>Eicher Motors</td>
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<tr>
<td>Force Motors LTD</td>
<td>Force Motors LTD</td>
<td>Mitsubishi Motors</td>
<td>SML Isuzu Limited</td>
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<tr>
<td>Greaves Cotton Limited</td>
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<td>Beiqi Foton Cummins Engine Co. Ltd</td>
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<tr>
<td>Ford Motors</td>
<td>FPT Industrial</td>
<td>Tata Cummins</td>
<td>SML Isuzu Limited</td>
<td>MAN Truck &amp; Bus AG</td>
</tr>
<tr>
<td>Hindustan Motors</td>
<td>Nissan Motor</td>
<td>SML Isuzu Limited</td>
<td>Tata Cummins</td>
<td>Cummins Engine Company</td>
</tr>
</tbody>
</table>

- Tata and Tata-Cummins dominate engine supply for light, medium and heavy trucks in India.
- Many global players now have product available in the 16t+ segment. Their presence is expected to increase due to emissions advanced technology requirements in the next five years.
Engine Trends
Engine Trends

- **Low Cost Production and Sourcing**
  - Global OEMs with emissions compliant products are strengthening their presence. This has improved vehicle quality and increased competition with traditional Indian OEMs.
  - Locally manufactured engine blocks are being exported globally – or finished in regional markets.

- **The market shift is two pronged**: there is a shift to higher tonnage tractors with four axles and to lower tonnage light commercial.
  - Transition toward tractor trailer combinations.
  - Higher power-to-weight ratio vehicles.
  - Tipper market will account for a larger portion of demand.
  - Automated Manual Transmissions (AMT) will play a key role moving forward.

- **Adoption of natural gas engines** will continue to increase.
  - Fueling infrastructure needs to expand.
  - Best opportunity is in the bus and light commercial vehicle segments (near refueling terminals).
  - Higher up-front engine cost but lower fuel cost.
  - No after treatment required for compliance.
Natural Gas Prospects: Six Stars Alignment

PROVEN TECHNOLOGY

OPERATIONAL COST

INFRASTRUCTURE

GLOBAL TRENDS

LEGISLATION

GOVERNMENT INCENTIVES

“If all these stars align – the prospects for natural gas product uptake will be even higher”
Major Engine Models launched

• **Ashok Leyland**
  – Introduced the 5 and 8 litre “Neptune” engine in 2012.

• **Tata Cummins**
  – Produce 5.9 litre B series engines.
  – Will likely upgrade to the ISB 6.7 litre during the next few years.

• **Daimler**
  – The 6.4 litre OM906 assembled and installed on Bharat-Benz trucks.

• **Volvo**
  – Global medium engine platforms.
  – Produce the 5 and 8 litre engines.
In Summary

- The outlook for the Indian Commercial Vehicles market remains optimistic in the next five years with a 11% CAGR forecasted until 2019.
- By the end of 2019, the market will have evolved significantly in line with improved infrastructure, tightening emissions and improved total cost of ownership.
- Products will be designed to improve fuel economy.
- Product will be manufactured for both the domestic and lagging regulated export markets of Africa, Middle East, Sri Lanka, Uzbekistan and Bangladesh.
- The market dynamics are expected to shift to the 16t+ and Light Commercial vehicles segments.
- Global and local manufacturers have increased capacity to fulfil market expansion.
- Natural gas penetration will continue in line with infrastructure development but primarily in bus and urban related applications.
- Implementation and enforcement of regulations will have an impact on new product pricing which will put further pressure on fleet owners.
- Expect competition to increase as global OEMs launch products and establish distribution particularly in the 16t+ segment.
- Improving the cost of ownership through low cost product technology advancements and after sales service will remain critical factors to success.
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