

Clean Transportation Market in Europe and Asia

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Alternatives to Conventional fuels

European and Asian Market

The hybrid electric car has become the most common form of electric car, combining an internal combustion engine powertrain with supplementary electric motors to run the car at idle and low speeds, making use of techniques such as regenerative braking to improve its efficiency over comparable gasoline cars, while not being hampered by the limited range inherent to current battery electric cars.

Hybrid cars are now sold by most major manufacturers, with notable models including the Toyota Prius and the forthcoming Chevrolet Volt, a plug-in hybrid which uses a fully electric drive train supplemented by a gasoline-powered electric generator to extend its range.

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As of 2009, the world's most popular battery electric car is the REVAi, also known as the G-Wiz, which is produced by an Indian company and sold in a number of countries in Europe and Asia.

Price 13,000 Euro for the Standard-Version with lead battery, and 23,000 Euro equipped with Lithium-Battery.

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The car builders are getting ingenious

The new TANGO from Woodbury are so narrow, that two of them can use one lane.

Its batteries and engine weighs 1,000 Kg. Its price is 150,000 USD.

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Electric car 1912

They did not have the vibration, smell, and noise associated with gasoline cars. Changing gears on gasoline cars was the most difficult part of driving, and electric vehicles did not require gear changes. They did not require a manual effort to start, as did gasoline cars which featured a hand crank to start the engine. Electric cars were often marketed as suitable vehicles for women drivers due to this ease of operation.

At the turn of 20th century, 40 percent of American automobiles were powered by steam, 38 percent by electricity, and 22 percent by gasoline. 33,842 electric cars were registered in the United States, and America became the country where electric cars had gained the most acceptance. Sales of electric cars peaked in 1912.

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Electric car initiative in China

Wan Gang, a former Audi engineer in Germany who is now China's minister of science and technology, portrayed the country's electric car initiative as central to China's international competitiveness, but said that there were environmental goals as well.

The Chinese government provides subsidies of \$8,800, for purchases by taxi fleets and local government agencies. \$1.46 billion) program to help the industry with automotive innovation.

In the United States, the government is providing \$25 billion to help cover Detroit's research costs in the coming years.

While electric cars are rapidly improving, they remain roughly twice as expensive as similarly sized gasoline-powered cars, which also provide greater range, higher top speeds and better records for reliability.

Car Production

Sales and production were running at an annualized rate of about 11 million cars. Mr. Miao said, indicating the previous records were narrowly beaten. In the United States last month, sales were running at an annualized rate of 10 million.

Three Problem of Transportation in China

Mr. Miao, a former chairman of Dongfeng Motor, one of China's biggest automakers, said that the ever-growing fleet of China posed three problems: air pollution, rising consumption of imported oil and traffic congestion. Alternative-energy vehicles "are the only way out to address these challenges," he said,

NYT: April 11, 2009 China Outlines Plans for Making Electric Cars

http://www.nytimes.com/2009/04/11/business/energy-environment/11electric.html?_r=1&em

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Tata Motors

New Delhi, Dec. 21: After developing the electric version of its flagship passenger car Indica, the country's largest auto maker, Tata Motors, is now working on hybrid city buses aimed at providing eco-friendly transportation solutions for Indian

Miljøbil Grenland AS, a Norwegian subsidiary of Tata Motors European Technical Centre plc., awarded South Korea-based Energy Innovation Group Ltd. (EIG) a contract to supply batteries for the Indica Vista EV project (earlier post), a development of the TATA Indica Vista.

In October 2008, battery supplier Electrovaya announced it was partnering with Tata Motors and Miljø Grenland/Innovasjon to manufacture batteries and electric cars in Norway, beginning in 2009, using Electrovaya's Lithium Ion SuperPolymer battery technology for the Indica EV.

The ePLB C020 cells, with a Li[NiCoMn]O₂-based cathode and graphite-based anode, are optimized for application in plug-in hybrid electric and full electric vehicles. Specific energy is 175 Wh/kg; energy density is 370 Wh/L, according to EIG.

As part of that deal, Electrovaya became a shareholder of Miljøbil as a joint-venture partner. Miljøbil is establishing a lithium-ion battery manufacturing facility in Norway as a licensee of Electrovaya's battery technology and process technology.

This plant will be a zero-emission production plant that meets all EU and Norwegian environmental requirements; it will take some time to have that plant setup, according to Electrovaya. Therefore, Tata Motors requires a cell supply for its initial production prior to the completion of the Miljøbil battery plant, and it needs a second source supplier, said Electrovaya, commenting on the EIG announcement.

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Prevention of Atmospheric Pollution:

Exhaust emission standards are becoming stricter in Japan, Europe, the U.S. and many other countries and regions. India introduced its first standards in 1991, and these have become progressively more stringent over the years. Tata Motors aims to respond quickly to develop new models that comply with latest national standard for domestic product and international standard relevant to countries where the products are exported.

TATA MOTORS LIMITED CORPORATE SUSTAINABILITY REPORT (2007-08)
http://www.tatamotors.com/our_world/csr-pdf/GRI-report-07-08.pdf

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The Tata Air Car

The all emissions-free car runs entirely on compressed air and can be filled again and again at any gas station that supplies compressed air pumps. So instead of filling with gasoline, which is a gas/oxygen explosion to run the car with an internal-combustion model, you fill with air, which is not only safer for you and your health, it is also better for the environment.

The Air Car as it has come to be known as was developed by ex-Formula One engineer Guy Nègre for Luxembourg-based MDI. You can pick on of these amazing air-powered cars up for about \$13,000. And it should cost about \$2-\$3 to fill the car up with the available compressed air pumps that many stations will carry with the release of these cars worldwide.

The vehicle will cost some 3,500 to 4,000 euros. Using composite materials, it will weigh not more than 330 kilos (727.5 lb) and its maximum speed is 150 kilometres (93.21 miles) per hour.

Negre is not the only inventor working on compressed air engines. Uruguay's Armando Regusci, Australia's Angelo di Pietro and South Korea's Chul-Seung Cho have also produced designs.

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Controlling these emissions

is one of the most significant technology challenges Tata Motors is tackling today. While we are working in developing fuel cells and other technologies of the future, we are also working to reduce CO₂ emissions today's vehicles through highly efficient engines and technology.

- (a) Diesel Emphasis: As diesel is a more thermodynamically efficient fuel, our product lines focus heavily on clean and modern diesel engines for automotive and stationary applications.
- (b) Multi-sector coverage: Tata Motors has been consistently developing and manufacturing products that can contribute to CO₂ reduction across all road transport segments and in shifts between segments e.g. Bus Rapid Transit System (BRTS).
- (c) Provide safe affordable transportation of people and goods with least CO₂ emissions, exemplified by Nano and Ace
- (d) Alternative fuel initiatives in the widest possible spectrum of products along two axes:
 - Blend Axis: Progressively blending of petrol with ethanol, Biodiesel with diesel and hydrogen with CNG.
 - Hybridization Axis: Hybridization from mild hybrid to full electric vehicle to hydrogen fuel cell vehicle.
- (e) Minimize CO₂ emissions by designing & developing the vehicles for Indian operating conditions rather than directly adapting the vehicles from other markets e.g. Mumbai City Fuel Efficiency Drive Cycle.
- (f) Use of energy efficient air conditioning system like Scroll compressor, smaller heat exchangers and high-efficiency condensers, low GWP refrigerants, etc. and reducing refrigerant leakage and refrigerant recovery system during servicing.

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Nano is the cheapest car in the World - retailing at little more than a motorbike. Whilst the World is getting ready for greener alternatives to gas-guzzlers, is the Nano the answer in terms of concept or brand? Incidentally, the new Land Rover and Jaguar models will cost up to 85 times more than a standard Nano!

The new global track platform is about to be launched from its Korean (previously Daewoo) plant. Again, at a time when the World is looking for environmentally friendly transport alternatives, is now the right time to move into this segment? The answer to this question (and the one above) is that new and emerging industrial nations such as India, South Korea and China will have a thirst for low-cost passenger and commercial vehicles. These are the opportunities. However the company has put in place a very proactive Corporate Social Responsibility (CSR) committee to address potential strategies that will make its operations more sustainable.

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China and USA will have the greatest demand of renewable energy.

India and Australia present best requirements for a creation of subsidies to produce hydrogen in their deserts.

CO2 emission in million Tons/year		CO2 emission Tons	
Total of world 28 400		per inhabitant	
China	6 103 21.5%	4.6 Tons	
USA	5 752 20.3%	18.6 Tons	
EU	3 914 13.8%	8.0 Tons	

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Volkswagen signed a cooperation with Suzuki to increase its power at the Indian market where Suzuki is leading with Maruti. Suzuki wants to share the hybrid technology and electric cars of VW.

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German railroad goes green

A German ICE train needs 10 GWh to travel 500,000 rail kilometres.

Six ICE trains (top speed 330 km/h) will be powered by regenerative energy.

A train moved by electricity produces 43 g CO₂/km/person, compared with more than 120 g CO₂/km of a modern car. The German railway DB tries to improve its carbon footprints and buys 59 GWh/year during two decades from a windmill park situated 50 kilometres from Berlin. This increases the amount of green energy from the electricity mix of the DB and enables to power six ICE trains for a period of one year. In 2008 DB used 16% of its energy from renewable sources. DB wants to increase it up to 30 per cent and to reduce total CO₂ emission of its engines by 20 per cent until 2020. following the introduction of modern rotary energy technique the rail road trains returned to the grid 280 GWh from brake energy.

<http://www.spiegel.de/wissenschaft/technik/0,1518,671307,00.html>

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Reliance Power Limited is part of the Reliance Anil Dhirubhai Ambani Group and is established to develop, construct and operate power projects domestically and internationally. The Company on its own and through subsidiaries is currently developing 16 large and medium sized power projects with a combined planned installed capacity of 33,780 MW, one of the largest portfolios of power generation assets under development in India. The 16 power projects are planned to be diverse in geographic location, fuel type, fuel source and off-take, and each project is planned to be strategically located near an available fuel supply or load center. The identified project sites are located in western India (12,520 MW), northern India (9,080 MW), northeastern India (4,220 MW), southern India (4,000 MW) and eastern India (3960 MW).

They include seven coal-fired projects (18,880 MW) to be fueled by reserves from captive mines and supplies from India and abroad, two gas-fired projects (10,280 MW) to be fueled primarily by reserves from the Krishna Godavari Basin off the east coast of India, and seven hydroelectric projects (4,620 MW), three of them in Arunachal Pradesh and one in Uttarakhand. Reliance Power has been successful in bagging three Ultra Mega Power Projects (3,960 MW each at Sasan in Madhya Pradesh & Tilaiya in Jharkhand and 4,000MW at Krishnapatnam in Andhra Pradesh). The 7,480 MW project to be located at Dadri in Uttar Pradesh is expected to be the largest gas-fired power project at a single location in the world.

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Wind turbin producers (global market share)

Snovel	4%
Siemens	6%
Enercon	9%
Gamesa (Spain)	11%
General Electric	17%
Vestas (DK)	18%

The End