Annals of Pure and Applied Mathematics
Vol. 5, No.1, 2013, 17-25
ISSN: 2279-087X (P), 2279-0888(online)
Published on 13 November 2013
www.researchmathsci.org

Annals of
Pure and Applied Mathematics

Introspection of GOS in Indian Automobile Industry

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Received 11 September 2013; accepted 8 October2013

Abstract. In view of the up surging fuel cost prevailing at global level coupled with its torrid radiation into Indian economy, the automobile industry has been experiencing a severe blow in terms of business and growth with special reference to Indian market. This phenomenon has created huge fiscal gap and Current Account Deficit in Indian economy in the recent past leading to POL price hike. The above price rise has been taking place due to partial lifting of subsidy by the Government and the market clearing pricing mechanism as well. The application of Green Ocean Strategy has been chosen here so as to protect environmental footprint and to safeguard the automobile industries' sinking business. A 3 – tier approach has been formulated in this article namely:

1. Prescription to the Policy makers as to boost the hybrid and electric vehicles by way of (i) increasing charging stations throughout the country by making tie ups with the petrol pump owners and petroleum companies and (ii) Providing concessional rate of import and excise duties to hybrid and electric vehicle to the manufacturers.
2. The automobile companies have to negotiate with the solar panel manufacturers both in India and abroad to build up collaborative relationships while making hybrid or electric vehicles to make the project cost effective.
3. Automakers have to collaborate with premium technological institutes for vehicle speed enhancement, better technology and using alternative materials as a door step of price reduction.

The main focus of this article is to find out ways and means as to how the automobile firms can reduce cost of the vehicles and environment pollution so as to reinforce eco friendly environment for long term sustenance. The continuous demand spike management under the current economic slowdown will also be a part of green ocean strategy formulation.

1. Introduction

The Green Ocean Strategy is a recent strategic outcome to gauge the impact of environmental footprint on human lives. From different unstructured documents like

newspapers, magazines, World Wide Web pages, it was revealed that automobile industry happened to be one of the largest contributors of environmental pollution throughout the world. India, as an emerging economy, has become a lucrative market destination due to high level global competition and as such, the economy has experienced a plethora of global automobile players crowding in this second-largest market. This phenomenon coupled with influx of other industries has blown up the environmental footprint in India leaving an adverse impact on human lives.

In the context of the above reason, this article has dealt with the recently emerged Green Ocean Strategy to combat the lethal impact and the long term sustainability of the industry.

Under the backdrop of global environmental crisis, the article has focused on different brands of hybrid and electric vehicles as a driver to contain the pollution level. The Indian scenario in terms of launching and new arrival of such vehicles has been analyzed and the possible inhibitive factors have also been exhumed to anvil an optimal solution. This breakthrough technology is unable to fetch the desired outcome due to high import duty and high manufacturing cost. It has been suggested to scale down the duty structure at a rock-bottom level to encourage the entry of such vehicles in Indian markets that will not only bring down the pollution level to a large extent but also help shrinking the alarming fiscal gap mainly generated due to high level of subsidy given to POL. The ballooning current account deficit may also be contained in view of the lower import bills on account of lesser POL importation. The major problem of e-vehicles is the charging battery through the network of petrol pumps. This may be explored by using solar panels which will also eliminate the charging time and carbon emission through curbing energy demand using renewable energy.

The premier B-Schools and the Technological Institutes may be roped in to develop the best suited device in Indian outfit.

In the event of economic growth, the disposable income of rural Indian population has gone up. This may pose to be a Greenfield market for such hybrid and electric vehicles. It will also stretch the long term sustainability of Indian automobile industry which is growing at a snail's pace in recent times due to the onslaught of high inflation and low index of Industrial Production (IIP) - as an outcome of high interest rate and stringent monetary policy band wagon.

The development of rural roads also ushers in a welcome to these vehicles to re-vitalize Indian automobile sector and the vehicles using alternative energy sources like inexpensive bio-diesel will also pave a new way to ventilate fresh oxygen to recently growth shattered Indian automobile industry.

As environment has become a headline topic in the business, the products and services should be intertwined to combat environment's tooth and claw for a greater sustainability. Adaptation of Green Ocean Strategy is inevitable for future ventures due to continuous environmental footprints on human lives and the sea change in the atmospheric condition in the form of extreme hot and extreme cold, outbreak of Tsunami and other natural disasters. It has witnessed that the business has always been changing in line with the changing market dynamics and environmental impact. Also, the stringent regulatory framework in most of the countries to obviate ecological imbalances will

propel the companies towards Green Ocean Strategy. Though the Green Product Revolution is in the nascent stage as more and more consumer awareness of Green Product is in the offing, yet the world will experience a stupendous change in the global market directions. The future sustainability and survival will largely depend on how focused a company is in terms of the Green Ocean Strategy.

It is evident from different unstructured documents like newspapers, magazines, worldwide web pages that the automobile sector is one of the most powerful vents of environmental pollution. The high emission of carbon dioxide and carbon monoxide in the environment has cautioned the regulatory authorities as a lethal weapon to human lives and as a result the necessity of less polluting vehicles has surfaced out.

In the global market many automobile manufacturers have launched or going to launch the electric or hybrid version of their existing brands but these have not gained the desired momentum in the short run due to the factors such as, cost, vehicle speed, and problems in battery charging.

Hybrid Cars Available in UK	Hybrid cars available in other markets	Hybrid cars that are expected to come soon	Forthcoming range-extended vehicles
BMW 5 Series Active Hybrid	BMW Active Hybrid 7	Audi A1 Quattro Hybrid	Vauxhall Flextreme GT/E
Chevrolet Volt	Bright Idea	Audi A3 e-tron	Cadillac Converj
Citroen DS5	Lexus HS250 hybrid	Audi Q5 hybrid and A8 hybrid	Velozzi Supercar
Fisker Karma	Toyota Camry hybrid	Audi Q7 Hybrid	Velozzi Solo
Honda Civic IMA	Ford C-Max Hybrid	Axon Automotive hatchback	Mercedes Benz E-Cell Plus
Honda Insight	Ford C-Max Energi	BMW Vision Efficient Dynamics	
Honda CR-Z hybrid	Ford Escape Hybrid	BMW X5 Hybrid	
Honda Jazz hybrid	Ford Fusion/Milan Mercury	BMW X6 ActiveHybrid	
Lexus CT 200h	Nissan Altima Hybrid	Cadillac XTS Platinum plug-in hybrid	
Lexus-GS 450h	Mercedes-Benz ML450 hybrid	Citroen DS High Rider	
Lexus-LS 600h	Toyota Sai hybrid	Citroen Metropolis	
Lexus-RX 400h	Lincoln MKZ hybrid	Connaught Type D	
Lexus-RX 450h		Hyundai iX Metro	
Mercedes E300 Blue TEC Hybrid		Hyundai i-Flow	
Peugeot 3008 HYbrid4		Hyundai Elantra/ Kia Forte hybrid	
Peugeot 508 HYbrid4		Hyundai Blue Will (plug-in hybrid)	
Porsche Cayenne S Hybrid		Hyundai Sante Fe, Sonata, Forte and Avanta hybrids	
Toyota Auris HSD		Infiniti Essence	
Toyota Yaris Hybrid		Infiniti M35 hybrid	
Toyota Prius			

Table 1: Details of Hybrid Cars world wide

In view of the increased levels of carbon footprint, toxic deposits, and Green House Gases, pollution control has become a burning issue of the society for the survival of the

human being. The up-surging fuel cost and the shrinkage of government subsidy towards Petroleum Oil and Lubricants have posed a great threat to the automobile industry by way of mounting pressure to introduce more fuel efficient units and hybrid and or electric versions in an economical way. These tantamount to be a severe blow to the Indian automobile industry. Hence, this paper seeks to provide solutions to combat the environmental footprint as well as up-surging fuel cost issue so as to ensure that the automobile industry is protected from its sinking business and the Indian consumers are provided eco-friendly cars at a cheaper rate.

2. A Front-Loaded view under Indian Perspective

In recent times, per kilometer density of vehicles in Indian roads has disproportionately increased. This has virtually contributed a great deal on environmental pollution in terms of cumulative energy demands (CED). This upsurge has also been contributing to public health hazards raising Government concern. From the view point of Government's social responsibilities, stringent regulatory framework has been clamped in to curb the onslaught of ecological imbalances.

On the other hand it will incubate the endeavor of launching hybrid and electric vehicles as a part of Green Ocean Strategy for long term sustenance. This will not only create a low pollution environment but also shrink the alarming fiscal gap and current account deficit as macroeconomic policy prescription. Almost 26 percent of our import bills constitute importation of POL. Hence the eco-friendly vehicles will ultimately give rise to lesser consumption of fossil fuel which, in turn, will arrest the foreign exchange outlay from the exchequer and bridge down the current account deficit. The quantum of subsidies towards petroleum, diesel, and LPG tantamount to be substantial. Petroleum subsidies accounted for 31.7percent of the 2011-2012 subsidy bill or 5.2percent of total expenditures.

However, this two-prong Green Ocean Strategy will contain the fiscal gap and current account deficit as well in the Indian macroeconomic outfit coupled with minimizing ecological footprint.

3. Dynamics of green cars in Indian automobile sector

The automobile industry slowly understands the necessity of Green Ocean Strategy and as such electric cars like Reva-I, Reva NXR, hybrid cars like Toyota Prius are being launched in Indian markets. Also Volvo hybrid has been announced to be launched in Bangalore roadways. But the major disadvantages for the hybrid vehicles are high cost of manufacture and import duty. The above disadvantages are reinforced with the additional problem of inadequate charging facilities. To counter this situation, constant R&D activities and active Government support are required.

In one hand, everyone is eyeing at Indian market being a lucrative destination, on the other hand, the slow withdrawal of fuel subsidy is forcing the firms to carve out a new way to bring down the cost of these vehicles and their charging problems.

As a supplement, Tata Motors is working on a family of low-cost composite cars (Composite cars are versatile and environment friendly, that does not compromise on

performance, safety and comfort) that is expected to complement the Nano, the automaker's ultra-low-cost car.

Globally, composite cars are made of carbon fibre, which make them expensive. To reduce costs, Tata composite car will use a material known as Poly-Diallyl-Phthalate (PDP) which is generally used for industrial applications. Still the car will cost slightly more than the Nano range.

Cars made of composites have their advantages because they are light-weight thereby making the vehicles more fuel-efficient and eco-friendly. Materials such as PDP is competitive as is the investment required, which would be a fraction of the cost of building a car with conventional technology. Another attempt has been made by Earth 100, a Gurgaon based firm, to launch a bio-diesel car. Bio diesel is manufactured from the oil of a plant called "Jatropha" which is inexpensive to cultivate and has a high yield of 40 percent oil making it cost effective.

Earth 100 claims to provide fully integrated green solutions, which involves modified cars, green fuel, disputing solution, servicing and maintenance, performance tracking and quality testing.

Government has taken initiative to find out a solution as to charging problems of hybrid and electric vehicles by setting up of charging stations in 42,000 petrol pumps through a network of state owned oil marketing companies (OMCs).

Over and above, the newly launched Mahindra &Mahindra's e20 which is not only priced competitively but also promises ample savings in operating costs – almost Rs. 4 lakh over 5 years (see Cost of Ownership savings below) is also aiming to create 300-500 more charging stations in the next couple of years.

Difference between e20 and petrol hatchback equivalent on-road in Delhi		
	Petrol Hatchback	e20
Rough Price	Rs. 6,00,000	Rs. 6,00,000
Km driven per month	1,200	1,200
Petrol cost/month (at 12 kmpl & Rs. 70/l)	Rs. 7,000	
Electricity cost/month (at 10 km/kWh & Rs. 5/kWh)		Rs. 600
Net savings per month		Rs. 6,400
Savings per year		Rs. 76,800
Total Savings over 5 years		Rs. 3,84,000

Table 2: Cost of Ownership Savings

Area of Savings	Percentage of Savings	Remarks
Maintenance Cost	75% (approx)	Lower for an Electric Vehicle than a petrol engine car
Oil & Air filters	100% compared to a petrol engine car	EVs have fewer moving parts so no oil and air filters
Brake Pads wear and tear	At actual	Gradual because EVs have regenerative braking

Table 3: Savings and Maintenance, **Source:** Mahindra & Mahindra

4. An all out effort of Indian Government to promote green cars in Indian market

The government has approved an investment of Rs. 14,000 crore till 2020 under the national electric mobility mission plan to promote environment friendly vehicles.

To foster the popularity of eco-friendly cars, Government has also decided to sign a deal of Rs. 230 billion ($1.4 billion) for the next 8 years, for hybrid vehicles that will be running on electricity. The government is targeting to ply 6 million hybrid vehicles on road by 2020.

As a matter of all-out effort the technological universities are coming forward to embody the government intention although the electric vehicles and hybrid cars are in nascent stage globally. Delhi Technological University has put a step forward by developing a solar power car, code named Solaris having a speed of 120 km/hr and zero carbon emission, thus making it completely eco-friendly.

To accelerate the momentum of Green Ocean Strategy, Government should also extend relief on import duty on importation of hybrid and electric vehicles or on technology transfer mechanism as means of cosmetic facelift. It should also give remission on excise duty or offer different incentive schemes to bring down the cost of the end product for the price sensitive Indian consumers.

Also premier management institutes can be hooked up with technological institutes as a prudent way of pruning unnecessary or redundant costs as a matter of value addition.

5. Prescription to the automobile manufacturers

5.1Rural demography - A target group for the green cars:

A proposed long term therapy for sustainability of the automobile industries is the launching of green vehicles in the Indian rural sectors as the income in the rural sectors is increasing.

	No of households (m)		
Demographic classification	Urban	Rural	Total
Rich (income greater than Rs 1m per annum)	4.8	1.3	6.1
Well off (income greater than Rs 0.5m per annum)	29.5	27.4	56
Total	34.3	28.7	63.0
percent of Total	54.4%	45.6%	100%

Table 4: Income distribution among Urban, Rural Demography
Source: Ministry of Communications & Information Technology, India

So, rural India is an untapped market with a moderately high disposable income. While promulgating Green Ocean strategy in rural India, the campaign should focus on the impact of ultra-low emission of Green vehicles on human lives vis-à-vis the benefits of low cost transportation by using these vehicles. Due to the spurt in rural road development through a Prime Ministers Gram Sadak Yojna, the untapped rural market can play a pivotal role in propagating Green Ocean Strategy in a higher degree.

Component Progress ending Jun 11

Length (in Km)

S.no.	State	New Connectivity (Km)		Up gradation (Km)			
		Target (2011-12)	Achievement during 2011-12	Target (2011-12)	Achievement during 2011-12		
					Up gradation	Renewal	Total
1	2	3	4	5	6	7	8
1	Andhra Pradesh	300	169.49	720	87.37	0.00	87.37
2	Arunachal Pradesh	166	8.69	0	0.00	0.00	0.00
3	Assam	250	566.31	24	3.10	0.00	3.10
4	Bihar	3200	883.21	2000	44.62	0.00	44.62
5	Chhattisgarh	1000	110.87	500	88.38	0.00	88.38
6	Goa *	0	0.00	0	0.00	0.00	0.00
7	Gujarat	462	223.27	198	119.77	284.78	404.55
8	Haryana	0	0.00	0	0.00	33.65	33.65
9	Himachal Pradesh	500	7.30	250	101.08	0.00	101.08
10	Jammu & Kashmir	500	110.35	250	48.48	0.00	48.48
11	Jharkhand	1000	356.09	0	0.00	0.00	0.00
12	Karnataka	0	0.00	0	0.00	0.00	0.00
13	Kerala	25	9.05	250	80.85	53.96	134.81
14	Madhya Pradesh	1200	321.75	2000	194.00	0.00	194.00
15	Maharashtra	400	38.08	0	0.00	55.00	55.00
16	Manipur	150	72.65	0	8.71	0.00	8.71
17	Meghalaya	100	10.07	0	0.00	0.00	0.00
18	Mizoram	100	39.86	0	0.00	0.00	0.00
19	Nagaland	20	6.00	150	2.00	15.00	17.00
20	Orissa	900	556.17	1200	564.28	210.74	775.02
21	Punjab	0	0.00	0	0.00	0.00	0.00
22	Rajasthan	250	2.90	0	0.00	280.00	280.00
23	Sikkim	154	1.00	50	0.00	0.00	0.00
24	Tamil Nadu	20	8.00	960	414.40	0.00	414.40
25	Tripura	100	13.95	215	0.00	29.88	29.88
26	Uttar Pradesh	220	9.99	780	206.28	0.00	206.28
27	Uttarakhand	333	140.64	0	0.00	0.00	0.00
28	West Bengal	650	191.48	203	16.32	0.00	16.32
	Total	12000.00	3857.17	9750	1979.64	963.01	2942.65

Table 5: Progress of Bharat Nirman during 2011 12- Roads

Source: PradhanMantri Gram SadakYojana

5.2. Future hybrid car – a cost effective approach

As solar cars and solar hybrid cars are expensive, the automobile industry is not been able to manufacture low priced solar vehicles commercially. As such, the automobile industry can set up joint ventures with the Chinese solar panel manufacturers who are cost effective so as to dip down the cost of the green cars.

As a strategic venture, the automobile companies can go for hybrid solar cars as an attempt to tackle the 'charge exhausted' syndrome.

India is encountering an upsurge in the solar energy sector with the Indian government recently announcing to install the world largest solar power plant near Sambhar Lake in Rajasthan with a capacity of 4000 MW which is estimated to be three times of India's total solar capacity. Another plan to produce 10,000 MW solar power by 2017 is on the anvil

Furthermore, the Cabinet Committee on Economic Affairs, Government of India, has approved the implementation of a scheme for setting up of 750 MW of Grid-connected Solar PV Power Projects under Batch-1 of Phase-11 (2013-17) of the Jawaharlal Nehru National Solar Mission (JNNSM) by 2017. This will enable the solar power connectivity in the solar vehicles economically.

The recent drop in prices of PV (Photovoltaic) solar panels in China and United States has coincided with the rise in prices of the grid power in India posing a new and cost effective opportunity for renewable energy source.

The enhanced generation of solar power would create an avenue to set up more charging station in India which will, in turn, encourage more production of green vehicles in the country.

7. Conclusion

Considering the emission of Green House Gases in the environment, Green Ocean Strategy has become pivotal to set right the ecological imbalances as far as possible especially focusing the automobile industry which is one of the maximum contributors to environmental pollution. In view of the present Economic scenario of India and the demands of the price sensitive Indian consumers, endeavours for producing low priced and cost effective green vehicles would pave the way for long term sustainability of Indian automobile industry. Manufacturing cost effective green cars through different ways like strategic alliance with the solar companies, targeting the rural sectors, and increased number of the charging stations in the light of increased solar power generation and distribution through solar grids would vitalize the health of the automobile industry on a long term basis. As such, a harmonious supply chain network has to be formulated for supply of cost effective input materials through collaborative vendor relationships, efficient vendor management, and active involvement of suppliers in terms of value engineering and value analysis programmes. Judicious imports will also contribute to cost effective procurement of solar panels and solar cells.

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