

Interview with Dr Partha Ghosh

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Economic development models that are urban centered with fossil fuel based energy and power, mainly petro-based feedstocks, cannot address India's developmental needs; rather it seriously undermines equitable growth. Dr Partha S Ghosh has been vehemently arguing against India pursuing, blindly, such western economic models – which unfortunately India has been engaged in. Partha Ghosh is an internationally renowned strategic thinker who advises global corporations and heads of states on strategic policy issues related to technology, energy, industry and globalisation. He has been strongly advocating to Indian leadership, a well planned and structured shift in our developmental model to an agrobased energy, power and industrial infrastructure. Such a strategic move would guarantee equitable growth with well distributed energy and industrial systems, wherein all our villages will enjoin as producers and consumers.



Ghosh, who is the Founder and Managing Director of the strategy/policy advisory firm, Partha S Ghosh & Associates in Boston, USA, spoke to Chemical Industry Digest during his recent trip to India. He enlarges on his vision for an agrobased Indian chemical industry, its technological and economic viabilities and how it would revolutionise our rural and agrarian societies for a better tomorrow.

Excerpts from the Interview

Chemical Industry Digest (CID): You have been advocating a switch to agro-based feedstocks, particularly for countries like India, which do not have intrinsic advantages in petrochemical (hydrocarbon) based industry. Since India is already into the petrochemical based feedstock structure for the chemical industry, would you suggest that we slowly disengage from hydrocarbons or shift in the fastest possible way towards agro-based chemical feed stocks?

Dr Partha Ghosh (PG): I would suggest that India should not commit to any aggressive buildup of hydrocarbon based chemical and/or energy infrastructure, as the hydrocarbon economy is going to be obsolete anyway in the next 25 years, if not

sooner. However, until we have alternative schemes worked out, and in place, we should maintain the status quo for the existing hydrocarbon industry, with marginal capacity expansions through de-bottlenecking. In fact, we must try and increase efficiency of hydrocarbon utilization from refineries to power generation to transmission and perhaps reconsider development of coal based chemical complexes. Simultaneously, we must make an aggressive push into agro-based feed-stocks by moving into castor oil, ethanol and other biomass based chemicals.

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Read the article on Alternative Feedstock Models by Dr Partha Ghosh on page 65.

We must make an aggressive push into agro-based feed stocks by moving into castor oil, ethanol and biomass based chemicals. This would lead to a more distributed infrastructure where every village could have its own feedstock depending on what the local agricultural base is and convert the biomass, either into gas or liquids. Then we could create regional trading systems which would enable the distribution of unique energy chemicals.... This would also galvanise our villages, the rural and agricultural sectors, as they will become part of this mainstream energy and manufacturing backbone. This agro based strategy would be ideal for India to jump start our rural economy in a significant way and thus reverse city focused development, which is unsustainable.

and convert the biomass, either into gas or liquids. Then we could create regional trading systems which would enable the distribution of unique energy chemicals. For instance, Maharashtra could produce ethanol from sugarcane; Bengal could produce ethanol from biomass or potatoes; other states such as Gujarat and Andhra could get into bio diesel through castor oil/jatropha.

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CID: How feasible in this agro-based chemical industry from the technology perspective and in terms of a reliable and consistent supply of feedstocks ?

PG: There are three levels of feasibilities. If you ask me whether this is scientifically feasible, the answer is yes. Is it technologically feasible? Well, almost yes and will of course depend upon the nation's commitment to develop appropriate cost effective technologies. And economic feasibility depends on the price of oil. For India, however, given its limited oil and gas reserves, it's not the price of oil alone that should drive our energy strategy. We must think of energy security, of what the next stage energy infrastructure that will be suitable for India's demography. As we are importing significant percentage of our requirements, it is one of the major

factors which is contributing to our increasing

negative trade balance; it is a serious long

term issue too and naturally limits

India's economic and political stature

in the world. So India doesn't even

have to think twice in order to

commit to new and clean, indige-

nous and innovative energy

routes. We must fully commit to

developing agro feed stocks. This

will generate substantial income

stream for our farmers. Even if these

agro based feed stocks could cost US \$ 60 a

barrel oil equivalent, we must realize it

is income generated within the

country which has the potential to

benefit the largest segment of our

population, and improve our

trade balance. Due to the new

agro base energy scheme even if our

gasoline prices for cars go up by, let's

say by 25%, it would force industry

to make cars that are more fuel

efficient, in turn eco friendly, and

most importantly limit use of cars,

which will help to partially reduce

the choking of Indian cities and

towns.

So I see a snow balling effect from various spin offs of the agro based infrastructure. If we believe that we can make a switch to agro based feed stocks

at any cost, then we should make it now. In the long term, the costs will start coming down because the experience curve effect will begin to work. Brazil's early commitment to develop alternative fuel during the oil shocks of the seventies is an excellent example how through sustained and unwavering strategic initiatives a new agro based model has developed.

India is in a better position to build on the Brazilian model than the US or other Western economies, who are strongly entrenched in the petro based industries. In the US, the car has become the fulcrum; the economics of the car drives the economics of the household. Fortunately for India, being a poor country, if we can take the right decisions and if we can shift to what is most suited for the nation's future economic model, much of the current challenges of economic development will be reduced. Of course we have to be innovative and insightful in shaping our economic strategy and energy development programs.

CID: In this agro model do you foresee huge mega sized plants being replaced by smaller sized 'village-fit' plants. Would this lead to splintering of capacities? Costlier production due to lower economies of scale ?

PG: I think "village fit" plants supported by large scale manufacturing of a few essential building blocks will be the way to go. The hybrid approach will be driven by development of new micro processes based on new process intensification technologies which will make small scale production as competitive. Future processes could well follow how nature produces various chemicals at normal temperatures and pressures in small quantities. Indian chemical industry must find ways to sponsor research so that small scale production of agro based chemicals and energy feedstocks could indeed become competitive.

CID: The supply chain logistics, both for collection of feed stocks as well as for distribution of finished products could pose major challenges ?

PG: Of course! Development of the new infrastructure will not be easy. For India however it will be relatively simpler, as the infrastructure for the current industrial paradigm relative to the advanced nations is still highly under developed. India must take strategic advantage of the situation to leapfrog

I want to draw particular attention on the role of exports. India has been in a negative trade balance mode for the last fifty years. I find that the general feeling in the country is one of elation that our foreign exchange reserves have gone up. But we must be mindful of whose money constitutes the reserves? Money from overseas is coming into India, into our software parks, into our BPOs, equity markets etc. It has to be understood that this money can exit any time it wants. In contrast, China's foreign exchange reserves, is largely based on China's own earnings. China's foreign exchange reserves is soon expected to reach the trillion \$ mark, earned by selling the output of their huge manufacturing base, globally. We ought to know that the income statement of our country has been in the negative since 1950; with one or two years as exception, every year the situation has deteriorated. Simply put, we are earning less than what we spend, and it only underscores India's declining competitiveness.

into the new infrastructure, which will essentially create a network of million villages and smaller towns, each with its unique bio feedstocks with its manufacturing and energy conversion scheme which is quasi independent and quasi dependent on national grid.

CID: Have the processes to manufacture agro-based chemicals become commercially viable?

PG : It is happening. Again lets take China, which has a huge conventional chemicals manufacturing infrastructure. Yet, it exports \$ 10 billion worth of medicinal plants, where as for India its only \$ 500 million. So, they have already made a switch. In Europe, you will find that a lot of cosmetic, perfumery and personal care products are largely becoming agro based.

We talked about Brazil earlier. See how they have developed their ethanol based industry (from

sugarcane). Even in the US, many plant based technologies have been developed and R&D is going on at MIT, Stanford, Caltech and in several private research labs. However, the US is so market driven that when the oil prices go down, this activity towards alternate renewable feed stocks reduces and goes up again when the oil prices go up.

So, new technology platforms are indeed taking shape for energy chemicals, cosmetic chemicals, specialty chemicals, plastics and polymers. What is happening is that since the old chemical industry is so developed and large, this new emerging agro based chemical industry looks so miniscule and is not getting the due attention.

However, as far as India is concerned we are at the beginning of the development curve with our chemical industry being just 1.8% of the global chemical industry and we do have the opportunity to make this switch now.

CID: How should the roadmap for switch to agrobased industry proceed ? Who should take the lead ? The Government ? The Industry? Who ?

PG: Leadership for such major changes should always come from the government. It should start with a vision document for the development of the chemical, energy and rural sectors, which are symbiotically connected. Such a document should serve what I call the **7 E's of Economic Engine** which are: Equity, Ecology, Energy, Education, Ethics, Efficiency and Exports.

If the vision document with action plans for each of the 7 E's are intelligently defined with holistic and global perspectives, then everything else will fall in place. I have offered the Planning Commission and the highest echelons of Indian Government to lead an effort which will lead to such a document. I am still waiting to engage. I do however believe, as Milton wrote in his Ode to Blindness "they also serve who stand and wait".

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In the early stage of economic development, any nation in the right growth trajectory will need to make significant investments in infrastructure building. These investments need to be financed from our earned income through a positive trade balance. India need's to find a new export route which could well be combination of the services (KPO, BPO, IT etc), handicrafts, agro based industrials and complex engineered products.

CID: What initiatives would you like the Indian chemical industry (corporates) to take towards this?

PG: I think the large chemical companies in India should organize part of their development efforts to identify agro based substitutes, while the medium and small size companies should consider forming consortiums which will enable them to look for ways by which they could improve the utilization of the raw materials and explore how agro based substitutes with similar or enhanced functionalities of currently used chemicals could be produced.

CID: For plant based feedstocks, a major issue is land. Already in India, land has become a major issue for industry and agriculture to co-exist. Would there be enough land to produce all the feedstocks we need ?

PG: The best way to take care of the land is to

manage it properly and utilize it. Although our population density is one of the highest in the world, productivity of land is only about half compared to that of China, and less than one third than that of Japan. If land is left barren, it becomes a desert. With the right irrigation system, with adequate enrichment of soil and crop rotation schemes India must commit towards getting more out of its land. We have to manage our land intelligently. It is time now, for India to shift from the 'me too' approaches to more intelligent and differentiated approaches. Today, India's sector strategies are neither innovative /original nor thought through with full perspective of the mega and micro forces at work. Playing the catch up game with the west again and again, not recognizing the limits within and limits of the 19th and 20th century models, will only help India to be in *catch up mode*.

CID: Already there are complaints of forest lands being taken up for biofuel plantations.

PG: I feel here again our thinking perhaps is bit incomplete. We must put to use all our barren lands for bio fuels and we must, at the same time, increase reforestation efforts. When you travel in trains, along the millions of miles of our rail track you can see how expanses of land is poorly used and/or unutilized. What stops us from utilizing these lands right till the rail lines? What is more important, is that India should have a clear strategy for its overall bio sphere in relation to its aqua sphere in order to on one hand protect India's forests and bio diversity, and on the other hand make Indian soil more productive, and improve the utilization of arid and semi arid lands. A green and beautiful India will emerge, which could be a model for other nations to follow.

What is needed is an appropriate policy framework with sufficient incentives to ensure that land utilization is optimum. Central and State Governments should also prod universities to come up with land management techniques and technologies suiting our weather and soil conditions in different regions of the nation. Infact, in a recent visit to IIT Kharagpur I was impressed to note a range of innovative technologies the University has developed for a full range of crops and plants, but unfortunately very small percentage of these techniques have been applied.

