

# Energy Policy

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## Abstract

*Issues on National Energy Policy comparing & covering energy sources Coal; Petroleum and Atomic Energy and overall relation to GDP and policy distortions :- by T.K.Choudhury, Deputy Adviser, (Ex- Deputy Superintending Geo-Physicist ONGC), NITI Aayog & Shri Sridhar Mishra, Ex- General Manger, ONGC VIDESH LTD.*

## INTRODUCTION

A growth rate of 8% in GDP requires a growth rate of about 6% in total energy use from all Sources. Unfortunately, our capacity to expand domestic energy supplies to meet this demand is severely limited. We are not well endowed with energy resources except for coal and the existence of policy distortions make management of demand & supply more difficult.

## MATERIALS & METHODOLOGY

Coal is the most abundant primary energy resource available in the country followed by fossil fuels Nuclear and Renewables in descending order. But most of coal resources are in forest areas Coal India was not able to meet the targets in last 7 years; again domestic coal supplies are not assured for coal based power projects coming on stream by 2017. It is absolutely essential to ensure that domestic production of coal increases from 540 million tons to 795 million tons by 2017. This increase of 255 million tons assumes an increase of 64 million tons of captive capacity with the rest being made by Coal India. However, even with this increase, we will need to import 185 million tons of coal in 2016-17.Environmental clearances often creates problems. A special mechanism for Inter-Ministerial co-ordination needs to be set up to accelerate processing of these projects in a time bound manner. Unless it is done India's energy needs will be in jeopardy and investor's sentiment would weaken further. The policy of nationalization of coal itself needs to be reviewed and like in Petroleum, private sector producers may also be allowed. Again petroleum sector suffers from a serious distortions in prices, which lead to huge under recoveries and discourage private investment. Domestic price for diesel charged by the Oil Marketing Companies was 35.3% less than trade parity prices before the recent price adjustment. Prices for kerosene and LPG are 72.6% less than what they should be. Continuation of these system indefinitely without provision of a budgetary subsidy would damage

Journal of Technology  
Management for  
Growing Economies  
Vol. 9, No. 2  
October, 2018  
pp. 163-169

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the petroleum industry limiting its ability to invest in the discovery and development of new finds. If on the other hand gap is bridged by subsidy; it will create a recurring burden on GOI necessitating sharp cut in other essential expenditure and increase in fiscal deficit. Diesel prices, hence needs to be raised. We should move to a more rationalized petroleum pricing in a phased manner.

Further the sector natural gas also faces problems of price mismanagement. At present the price of gas paid to domestic producers is almost 3 times less than international price. Expansion in this sector would be hampered if purchase price is not increased. The Govt. has appointed a committee to look into the details of New Exploration Licensing Policy (NELP\*) [Directorate General of Hydrocarbons] contracts. The NELP programme is a major initiative aimed at attracting private investment in oil & natural gas. 18 PSCs have already been signed. Besides oil PSUs (OIL, OVL, GAIL etc.) have invested some Rs.60,000 crore on acquisition of oil assets abroad.

## RESULTS

Production from overseas block needs to be stepped up from 10% to at least 20%. Besides, Govt. should also create a strategic plan to enhance crude oil storage capacity (from 15 days). Regarding other sources, a programme of 5% blending of ethanol with petrol is already underway targeting 20 states/4 UTs. This may be speeded up. ONGC has been able to contract 50% of the requirement for ethanol blending. Again the under recoveries of oil companies because of inability to adjust oil prices should be corrected. The under recoveries has been to the tune of Rs.4.50 lakh crore. There are a no. of other issues on PSCs like insulating contractors which may be helped out. There is an urgent need to align domestic oil & gas price to the market price for sound development. For alternate sources, MOU should be signed with suitable international agencies for enhanced gas hydrate programme. R&D in oil sector should also be enhanced (say for example, micro bial techniques for recovery of oil in Paleozoic age; mud chemistry, mud logging, enhanced recovery through oil flooding etc.) To help promote production by interacting with CSIR and other Private sector R&D groups and by setting up joint working Groups and other forms of MEA assistance like OADB projects. Some of the areas of R&D which can help promote production are like producing waxy crude, horizontal well completion, 4D seismic mapping, insulated pipeline for crude evacuation gas and oil shale in eastern and western offshore.

Anomalies that needed to be removed are: -

- (i) Operationalization of a roadmap for global pricing of petro products, phasing out of subsidies on domestic LPG and PDS kerosene.

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- (ii) Rationalization of tax structure and Incentivize exploration & production of domestic petro products particularly in light of current crashed oil price.
  - (iii) Promote biofuels particularly in rural bases.
  - (iv) Contracting LNG imports both on long term and short term basis.
  - (v) Concrete PAN-INDIA study on demand side management (mainly Transport & Agriculture-Diesel and Kerosene) for fractionate(s) of crude may form the central focus of the study – as crude prices are vulnerable. Such a study could be for next five years. Long term demand management study of Petroleum may not be realistic.
  - (vi) Promote right fuel for inland waterways.

And for all such to happen systematically & scientifically, the Petroleum Conservation Research Association (PCRA) may be made to be actively involved besides Automobile Association of India (AAI).

## DISCUSSIONS

1. Natural gas prices charged to producers must also be determined by market forces and there is a need for clarity on fiscal incentives on exploration of natural gas under NELP\*. The concept of uniform gas prices across consuming sector also need to be examined afresh as the desire to keep prices low for certain sector tends to distort pricing; it is inconsistent with the principle that the price of gas will be determined by market forces.
2. Coal mining lease acreages often have methane or even oil/gas deposit. Similarly, oil and gas lease/PSC acreages have the possibility of coal/methane production. The Government may put in place a policy for simultaneous exploitation of Coal Bed Methane (CBM\*\*), coal to oil, coal mine methane etc. in a unified manner wherever such resources are available. Besides new enhanced oil recovery techniques though flooding wells, mud logging, mud chemistry and microbial recovery (in Paleozoic age) etc. could be frontier areas for commercialized R&D. Other important technology to be put in place is regarding improved techniques to utilize full potential of domestic natural gas as available and thereby to curb import dependency pertaining to gas fractions and LNG (Liquid Natural Gas). The other facet of alternate source for commercialization is “Shale Gas”: - available majorly on the west coast. ONGC has already drawn out an ambitious plan to tap this. Though it may be mentioned that exploitation of Gas Hydrates is always not environmentally conducive.
3. Cost effectiveness particularly on exploitation & transportation with pricing details may have to be carried out in detail by the Directorate General of Hydrocarbons & Petroleum Regularity Authority besides its % age usability in domestic sector as well Industry.

4. Coming to specifically on various types' alternate energy sources particularly relating to power, we may note that in conventional power sector, whether it is coal based/gas based it is called power station; but in Atomic Energy -it is called reactor and the unit is MW (electrical) which is about a third of MW. In case of coal based /gas based term "criticality" is never used but in Atomic case it is said that the reactor has become operational as it has attained "Criticality"-see the difference in the entire mechanics; while the former to a great extent follows second law of thermodynamics, in the latter case quantum mechanics (Pauling's law& equation) plays the key role. In India against a production target of addition capacity of about 79,000 MW\* by 2017; hardly Nuclear is contributing in the range of 6500 to 7000 MW only. (Minuscule) whereas France depends almost 70% on it. We had a target of 10,000 MW by 2000! Where is the difficulty -availability of natural U-235 deposit; technical complications & associated delay in enriching, or conversion to U-238/ insignificant recoverable U-238 [Prognosticated/Proved reserves: Atomic Minerals Division & Uranium Corporation of India Ltd.] or gestation period; or problem in land acquisition associated with tolerable seismicity or the very basic question whether the entire Nuclear Power Corporation is only for strategic purpose adhering to the signed nonproliferation treaty or to solve other socio-economic problem .As no country wants to part with (for financial gain/marketing) their natural resources unless abundantly available; there appears to have a natural embargo on shipment of U-238 or even highly toxic Plutonium recycling is so acutely technical. Is our Plutonium availability is shrinking (produced in Pressurized Heavy water Reactor-PHWR)? So we can thus introspect multiplicity of technically ticklish issues. India even otherwise would continue to depend on Coal (billion tons of reserves still exist) &natural gas. Many of us perhaps not aware that our journey in this area started with the Canadian Boiling water Reactor (CANDU-the CIRUS) ; then came APSARA and gradually Fast Breeder Test Reactor-FBTR of 50 MWe in 1988; switching thereafter gradually to PHWR ( Heavy water moderated, Heavy water cooled or in some cases sodium as coolant ) with Russian help. Now we are venturing for Fast Breeder Reactor-FBR (essentially with Plutonium as fuel: - Uranium-Plutonium route) but yet to come out with a viable 220MWe unit. We are also going for High Temperature Reactor -for 1000 MW with again Russian assistance; gestation period is long; -capital intensive (though it attains criticality fast [ no. of neutrons generated = no .of neutrons absorbed and heat loss is less compared to FBR]; perhaps may need subsidy while putting on grid (Power grid). The third route

Thorium-Uranium/Plutonium is still being researched upon; no substantial progress even at prototype level has not been arrived at as yet. So far fusion technology is concerned; it is not only too costly but we could not develop so far the type of container which can hold the unimaginable heat. Even worldwide nuclear fusion is still at natal stage. So the very rudimentary & moot question arises why we are going for (day by day) for a perennially increasing investment in this field, when practically the India's electrical grid has not achieved much out of it so far.; is it only for clean power (Nuclear waste is teaspoon fuel and we have achieved enough expertise in waste immobilization)?. Why we are still keeping alive CIRUS and APSARA;-answer is perhaps known to a handful of few but not exactly known to people at large. We also need to compare the viability of solar power as against the Atomic one. With imported amorphous silicon cells from China (in which we still lagging in creating very high thin film coats of amorphous silica), now the cost of power on grid is about Rs.8 per Kwh. We do have an ambitious Solar Mission program [50,000 MW-in next 6-7 years] but given the indigenous technical capability; it appears unrealistic since our foundries for erecting and etching micro –chips need refinement in micron level. There is a need to develop related Electronics Hardware (Electronics industries-ELCINA, HCL SAMSUNG, SCL, Mohali may have to be motivated) Besides the policy of exchanging scientists in this frontier area across the globe needs revival which is presently rather dormant; particularly when these days, technology is opening up (except where nation would be in problem); market is open; we must therefore expand.

5. Among other alternate sources of applied research interest lies with the Methanol cracking at low temp &/high combustibility, particularly for automotive carriers and in this; Ministry of New & Renewable Energy, a select group from Scientific Advisory Committee of Prime Minister, Ministry of Petroleum & Natural gas (particularly Gas Authority of India Ltd and Petroleum Conservation Research Association) may jointly take a move. Wind energy and bio-mass constitute together not even 10% of total capacity .Diversification in these areas by upstream and downstream majors parallel with the current efforts of Ministry of New & Renewable sources of Energy may be emphasized upon. Another niche area (but a costly one) would be energy out of recycling of wastes wherein Municipal Corporation would be having a major role to play. A pilot blue print particularly on energy out of wastes may be sketched by the Technological Forecasting and Assessment Council (TFAC- DST) in association with – say – Delhi Municipal Corporation.

6. Besides above, gas hydrates is the other upcoming area where enormous potential lies. However, the environmental aspects of Gas Hydrates exploitation need to be judged thoroughly. Hence Gas cracking would automatically be the linked field to be complementarily focused. Directorate General of Hydrocarbons have initiated some research but yet to gain pace; reason being, this is initially capital intensive. Basically the Central Departments of S&T particularly Ministry of Earth Sciences, Technology Information & Assessment Council (TIFAC-DST) should take a lead with the help of Scientific Advisory Committee to PM (SAC-PM) to look for demographically compatible judicious mix of technologies and maximizing benefits out of the assets already created both physical and technological.
7. It may be highlighted in the above context that a Draft National Energy Policy—extrapolating needs & issues up to 2040 is under preparation by NITI since 2015 and is likely to be completed by would require to be taken cognizance of by the “Energy” PSUs after its due approval by the Government. This would enable transparent sectorial blue print to be surfaced out.
8. Thus, in nutshell, energy policy should balance the demand supply scenario of the country; enhance the efficiency in process though competition. The current mechanism does not allow competition in distribution of petroleum products and these have led to cartel formation by Central Public sector Units (CPSUs). The import of downstream petroleum products need to be allowed to bring true competition in pricing of petroleum products in the country. Any increase in efficiency & hence the price will have a direct impact on subsidy reduction. Synergy among pricing of various sources of energy may be the buzzword. As an example, wind park & solar park may be combined wherever feasibility of both are available like in Rajasthan and Mysore and while Light Emitting Diode (LED) lamps may be made popularized along with production Facility. (Attention: - National Physical Lab--CSIR, MSME, Central Electronic Ltd, Tata Solar etc.)
9. The Draft Energy Policy should touch all such issues. The need of hour is a three pronged strategy:
  - (i) Through Survey on availability of Energy input raw resources in totality, including the traditional, nontraditional & upcoming ones like household, natural & bio-wastes.
  - (ii) Map them in time & space & then plan to generate the energy to the nearest possible location, taking due care of waste on transport/transfer/energy partition.

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(iii) Educate people/users on avoiding losses/thefts/wastes, have an integrated Energy Policy distribution network/grid and efficient distribution/intelligence/security system to maximize energy efficiency having zero error/zero loss concept.

**ACKNOWLEDGEMENTS**

12<sup>th</sup> Five year plan: and author's own working experience in ONGC & NITI \_\_\_\_\_