But these should not deter us from going ahead with the FBR on our own. FBRs are needed for India to effectively use the uranium resources. PHWRs burn only 0.7% U-235, while FBRs can convert 99.3% U-238 to fissile Pu-239 and produce fuel for PHWRs. If the PFBR sanction had come by 1990 when the conceptual design report was ready, the firms involved in the manufacture of FBTR would have got involved with PFBR. With delays in sanctions and orders for components, the experienced manpower in Department of Atomic Energy (DAE) and industries superannuate, and the new sets of people start again from scratch. Technology management has been affected by the lack of clear Government policies. Unlike fossil-fired or renewable energy systems for which we have vendors throughout the world, for nuclear power we have to depend on local industries and unless they get substantial orders, it costs more to develop new technologies for just one component.

On the pressurized water reactors (PWR), Iyer mentions that though we have imported the Koodankulam reactors from Russia, all-out efforts must made to build upon the design of a similar reactor for the naval submarine. This can be done in a reasonable amount of time. However, it will need a huge enrichment facility.

Iyer also stresses on the importance of strictly enforcing the regulatory norms: ‘strict enforcement is possible only if the regulator is armed with sufficient powers’. To the best of the present reviewer’s knowledge, the Atomic Energy Regulatory Board (AERB) has acted with determination all these years, though it was under DAE. The Silver jubilee book of AERB (https://www.aerb.gov.in/english/publications/silver-jubilee-book) has brought out the fact that the regulation of nuclear power plants and radiation facilities has been very effective.

According to Iyer ‘Some 14 years after conclusion of the Indo-US nuclear deal, the euphoria over nuclear power coming of age in India has all but evaporated’. He has also expressed concern over the denial of entry to India to the Nuclear Supplier Group (NSG): ‘it would have completed the process of opening up the Indian nuclear industry and have complemented the two nuclear landmarks, viz., India–USA Nuclear Agreement of 2006 and the India specific IAEA Agreement of 2008.’ It may be noted that the Westinghouse Company having gone bankrupt, and delays in the European Power Reactor (EPR) construction and issues in France have worsened the situation.

Though Iyer does not mince words at the different types of technology for power production, to a reader it is clear that there are too many eggs in DAE’s basket, viz. PHWR, FBR, PWR, AHWR, molten salt breeder, Compact High Temperature Reactor, Accelerator driven systems and fusion. DAE should concentrate on establishing good coordination between R&D centres and manufacturing industries to continue with PHWRs and FBRs. Also, metal fuel development which is key to higher breeding in FBRs must be given a thrust.

One point that Iyer has not touched upon is the organizational structure of DAE. The present reviewer feels that there should be better cohesion between the R&D centres, and compartmentalization and duplication must be avoided. Areas of research which are being under taken by other laboratories need not be considered by DAE.

There needs to be an embargo on announcing ambitious targets of nuclear power production, knowing fully well the ground realities. This according to the present reviewer has caused some embarrassment to the scientists at DAE.

In conclusion, this book could be a source of information to the common man and the administrators on what has gone by and what is going on in the field of atomic energy in India. Hope the Government would make use of Mahadeva Iyer’s suggestions to speed up the nuclear power programme without affecting the strategic needs of the country.

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Announcement

It is with deep regret and profound sadness that we announce the passing away of G. Madhavan, Executive Secretary of the Current Science Association and former Executive Secretary of the Indian Academy of Sciences, Bangalore, on 1 March 2022. An obituary note will appear in the journal later.

—Editors