

Dr APJ Abdul for Renewable

A firm believer in creating and encouraging science-based solutions for the benefit of mankind and society at large, Dr A P J Abdul Kalam, was a visionary, scientist, and people's President. **Dr Anup Kumar Das** through this article presents valuable insights into Dr Kalam's views of how science can contribute to regeneration of the environmental resource base and a better energy future.

The eleventh President of India, Bharat Ratna Dr A P J Abdul Kalam (1931–2015) spoke eloquently about India's aspiration to become a developed nation by 2020. He presided over the 'Technology Vision 2020' exercise for India at the Technology Information Forecasting and Assessment Council (TIFAC), an autonomous organization under Ministry of Science and Technology, Government of India. TIFAC's 'Technology Vision 2020' had an objective of 'Transforming the nation into a developed country, wherein five areas in combination have been identified, based on India's core competence, natural resources and talented manpower for integrated action to double the growth rate of Gross Domestic Product (GDP) and realize the Vision of Developed India'. Amongst these five areas, 'Infrastructure with reliable and quality electric power including solar farming for all parts of the country, providing urban amenities in rural areas and interlinking of rivers', in particular, takes deep interest in strengthening renewable energy sources.

His book, *India 2020: A Vision for the New Millennium* (1998, co-authored with Y S Rajan) was a refinement of the TIFAC's series of 'Technology Vision 2020' documents. After his stint as the eleventh President of India (2002–2007), he further enriched the literature on 'Technology Vision' for the country, drawn from his insightful interactions with policymakers, legislators, country planners, bureaucrats, and the aspiring youth.

In all of his books, Dr Kalam advocated renewable energy sources for achieving energy security in the country, expanding electrification at the grassroots level, and reducing overdependence on fossil fuels. In his book, *Governance for Growth in India* (2014), Dr Kalam envisaged a 'New India' emphasizing on sustainable energy sources and said that, "Power generation through renewable energy has to be increased from 5 per cent to 28 per cent. Dependence on fossil fuels as a primary energy source needs to be brought to 50 per cent from the present 75 per cent."

In his book, *The Scientific Indian: A Twenty-First Century Guide to the World Around Us* (2010), Dr Kalam

described various potential renewable energy sources available in India, including solar power, wind power, biofuels, municipal waste, geothermal power, ocean tidal power, small and mini hydel power, nuclear and hydrogen power. He also prescribed an action plan for power system loss reduction. The action plan when implemented will help in improving energy efficiency, transmitting and distributing the power with minimum loss, and close monitoring of the losses.

He further suggested the need for an 'Energy Independence Vision' by 2030. He summarily narrated his ideas, "A major objective of India's Energy Independence Vision 2030 would be to bring down our dependence on non-renewable sources of energy and increase the use of renewable ones. Apart from the extensive use of solar power, this mission would involve the expansion of wind energy farms. Micro-hydroelectric power units should be set up along streams and small rivers. There should be a thrust on using municipal waste to generate electricity. All thermal power stations

Kalam's Vision Energy in India



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Dr APJ Abdul Kalam at the inauguration of a renewable energy project with the Chief Minister of Uttar Pradesh, Shri Akhilesh Yadav

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should substitute 20 per cent of their annual electricity output with electricity from renewable energy systems. Lastly, all steel plants and heavy industries should be mandated to use their waste heat to generate electricity to meet their own needs. We need to embark on launching a national solar energy policy, which promotes solar energy systems and products manufacturing in the country, and exclusive R&D for nano science and technology for solar energy systems.”

He further laid emphasis on power from municipal waste, for electricity generation as well as for effective solid waste management in cities and towns. He also indicated his concerns about biomass presently wasted in rural areas. He envisaged that, “Once these technologies are perfected, much of the agricultural produce and biomass currently wasted in villages could also go to electricity-generating plants. What a boon this would be for rural India, since the agricultural waste would feed the grids and produce power for local consumption. As of now, much of the agricultural waste is just burnt as its disposal is costly.” As a

satellite and rocket engineer, Dr Kalam had thorough knowledge about the use of solar energy in space satellites as the major source of energy. Later, he emphasized on harvesting solar energy from space. Dr Kalam and Mark Hopkins of the National Space Society (NSS) in the USA agreed to start an international space solar power feasibility study, in 2013, under the framework of Kalam–NSS Space-based Solar Power Initiative beginning in 2013. Dr Kalam described the concept of Space Solar Power in his book, *A Manifesto for Change: A Sequel to India 2020* (2014) wherein he stated that, “At a time when the world is witnessing a rapid depletion of fossil fuels, it is essential to explore the possibility of harvesting solar energy from space.

I definitely foresee the emergence of technological coherence soon in the space solar power mission, which will benefit the nation and the world in a big way.” In a speech at NSS’s International Space Development Conference in 2013 (ISDC 2013) at San Diego, California, he described the rationale for harvesting solar energy from space, “Civilization on earth will

run out of fossil fuels in this century. Oil reserves are on the verge of depletion, followed by gas and finally coal. However, solar energy is clean and inexhaustible. What better vision can there be for the future of space exploration, than participating in a global mission for perennial supply of renewable energy from space?”

Dr Kalam’s ideas and vision have been and will continue to be the guiding force towards achieving the targeted growth in renewable energy sector in India. His Technology Vision for 2020 has also been instrumental in initiating an array of renewable energy initiatives and missions across the country for a better energy future. **AU**

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