



IAEC

VIJAY K. SAZAWAL, PH.D.
INTERNATIONAL ATOMIC ENERGY CONSULTING (IAEC)

**SUCCESS FACTORS IN ENHANCING CAPACITY AND CAPABILITY OF LOCAL SUPPLY
CHAIN**

DR. VIJAY K. SAZAWAL
SENIOR FELLOW, US NUCLEAR INDUSTRY COUNCIL (USNIC)

9 OCTOBER 2018

- Prime Minister Modi launched the “Make in India” initiative on 25th September 2014, putting renewed emphasis on domestic manufacturing with particular focus on new processes, new infrastructure, new sectors and new mind-set. The program is open to both domestic and foreign investors.
- Specific to the nuclear industry, a major initiative under the “Make in India” program happened in May 2017 when the Indian Government authorized construction of 10 additional 700 MW PHWR’s, indicating that it will outsource nearly \$11 billion of engineering and construction work to industry creating 33,000 new jobs.
- Even before that program takes off, it is clear that steps are taken to increase outsourcing by NPCIL to private sector for major components and sub-components of new reactors currently under construction. The Indian Atomic Energy Act requires only the production of Heavy Water and the Nuclear Fuel to be reserved for government entities. The rest can be outsourced from public sector units (PSU’s) or the commercial industry. Examples being the supply of Steam Generators by BHEL, custom forgings to L&T, EPC contract to Reliance Infrastructure, etc.
- In so far as foreign LWR construction in India is concerned, both the pace of construction and the pace of localization has been slow. Two Russian reactors are operational, two are under construction, and two more are under negotiation. Additionally, six French reactors and six American reactors are under negotiation, and have been under negotiation/discussion for a long time.
- For Kudankulam reactors, Russians have pledged the extent of localization in the 40% range. In fact, Indian companies recently signed an agreement with Umatex (a subsidiary of Rosatom) on localizing the production of certain composite materials and high pressure containers, beginning with carbon fiber in India. Also, Russians have outsourced parts of equipment, training and

construction support for Rooppur Reactor in Bangladesh. HCC bagged a large contract on turbine island recently.

- Both French and American reactor technology providers see a tapered approach to outsourcing their equipment to local manufacturing, beginning perhaps with second or third reactor; with the 6th reactor having significant local content.
- So how do we enhance capacity and capability of local supply chain to not only incentivize the foreign reactors manufacturers to increase domestic content, but also to encourage NPCIL to use more private sector companies – both domestic and foreign – in supporting the indigenous reactor program? I recently read that Westinghouse has expressed concern that it relies on China for Zirconium supply which may be adversely affected amid the “Tariff War” between China and the U.S. I wonder if they are aware that not only is India self-sufficient in Zirconium and its alloys, but can even export if the need arises, or perhaps Westinghouse should think about setting up a nuclear fuel plant in India.
- I am not going to minimize the challenges that investors – both domestic and foreign – face in building manufacturing capacity in India. There are cultural issues (professional attitude, land ownership, and political intrusion through worker unions to name a few) and then there are business issues, namely, red tape, access to capital, limited skill sets, meagre investment in R&D, and under-developed infrastructure. There are also perception issues (liability, intellectual property, corruption) that will remain a work in progress since perceptions are very hard to change even when these may dwell on minor or non-existential matters.
- I believe this is where PM’s “Make in India” provides an entry for a paradigm shift. As you may recall, I said one of the pillars of the policy was “New Mindset,” and this is absolutely essential if various institutional hurdles are to be overcome. For example, India has to change its approach from a “cost centric” attitude to a “value centric” attitude when looking at procurements and investments. At the same time, Indian GDP is growing at a substantial rate and I expect the infrastructure challenges will be met or minimized in the due course of time.
- That leaves us with deficiencies in money, human resource development and R&D. While the domestic private sector in India is growing its share of projects outsourced by the Indian Government, it is simply not in a position to meet all its obligations and prospects alone. Besides, recent Bank scandals in India probably have adversely affected access to capital. Indian companies must therefore welcome and reach out for foreign partners to build both capacity and capability to meet the civil nuclear market that will have both

domestic and foreign reactor vendors selling reactors components and reactor services, not only in India but for export markets as well.

- I am obviously biased in favor of American companies, mainly because I know them the best. Having worked in a number of American companies over a career spanning four decades, I have no hesitation in saying that Indian companies in the civil nuclear supply chain will not find a better partner than U.S.A. We have the best-in-class technology, our training and regulatory programs are known the world over as the “Gold Standard”, and the U.S. is ready to help with financing through the US EXIM. That financing will not only cover 85% of the American company’s investment in India at a very competitive rate, but also provide financing to the Indian partner to the tune of 30% of the American investment value. I do admit that there are presently some hiccups in the system, mainly related to export control regulations imposed by the U.S. Government, but I can assure participants that the U.S. Congress has finally recognized these issues and there is a process underway in Washington to change bureaucratic rules specific to India because of growing friendship between the two countries. DOE Secretary Rick Perry has provided outstanding leadership on encouraging nuclear power exports to India.
- Let me now address the issue of cost of nuclear power because that is the main deterrent to its growth. Typically, it is the cost associated with the site preparation, civil works, installation and indirect costs such as engineering oversight, rather than the cost of nuclear technology itself, that dominate the cost of building a nuclear plant. So the countries that have mature supply chains have a distinct advantage over those starting the first time or starting it over again. It is not surprising therefore that overnight cost of reactors built by Russia, China and South Korea have a clear advantage at this time. In the U.S., we see how that experience is coming to play between the two new AP-1000 reactors under construction in Georgia, namely, Vogtle-3 and Vogtle-4, with the latter taking advantage of construction experience from the former. Additionally, the U.S. is investing in innovative technologies including 3-D printing to build nuclear components for small modular reactors (SMR’s).
- Finally, I am requesting the Indian private sector to broaden its outlook beyond India and see themselves as global suppliers in the civil nuclear commerce. A colleague working at the ASME headquarters in NYC recently gave me a list of Indian companies that have their global certification for manufacturing nuclear grade components. I was shocked to learn that only three Indian companies (two based in Gujarat, and one based in Haryana) maintain the ASME “N” stamp which is the hallmark of the highest quality in manufacturing nuclear components. I hope that Indian companies will also someday develop their vision of supplying nuclear components to American and other Western customers operating nuclear power plants. Securing

credible nuclear credentials is the first in promoting itself as a world class nuclear supplier, and with strategic tie-ins with global players, I have no doubt that Prime Minister's vision of the "Make in India" program in nuclear power will be a reality.

Thank you.

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX