

## A developing country with a developed talent – a ten-year experiment to energize our young students

In 2000, the CEO of the General Electric Co (GE), John F. Welch, visited India and made an historic statement that 'India is a developing country with a developed talent'. He was referring to the vast pool of young scientists, engineers and managers who were coming out of our large number of educational institutions. But to tap this talent, Welch did not wait for India to be a developed country in 2020. He saw the opportunity to leverage this talent globally by setting up, in Bangalore, one of the largest and most modern R&D centre for GE, the global research programme of GE. 'Why Bangalore?' No, it was not the IT hub argument! The GE management had plans to bring some of their senior technical leaders of Indian origin, back to India. They, in turn, would then attract a large number of young scientists and engineers within India to work with them in their home country. A quick survey amongst some of these potential returnees showed that Bangalore with its fast-growing cosmopolitan culture, suitable climate and good connectivity within the country, won the maximum votes. The way the location was chosen shows how GE put its employees' interest before any other political considerations. Of course, Karnataka welcomed the idea whole-heartedly. Karnataka is not parochial or regional, and this helped in getting a good mix of scientists and engineers from all parts of India and the world. Bangalore was accepted as a 'global' city for GE to set up one of its largest R&D centres in the world.

Once the choice of location was made, it took GE less than 12 months to set up the first phase ready for research. On 12 September 2000, the centre was inaugurated by Welch himself. Speaking on that occasion, addressing the hundreds of technical staff already working there, he had said: '... The promises of this institute are big as the dreams on the faces of the people that I saw while walking around here. Reach...dream...your dreams will come true if you have got the energy and the passion to make it happen. All we're here to do is support you. We're here to let you achieve everything God gave you.' Notice the focus is again on people!

Jean M. Heuschen, the first Managing Director, dedicated the centre to Welch. The John F. Welch Technology Centre, JFWTC, as it is called for short, had begun its journey in search of talent to develop global technologies.

The human story does not end there; in fact it begins here. In the same year, the GE Foundation – the philanthropic arm of the company – decided to start a major scholarship programme in India, to attract and energize the young minds that could, in future, pursue careers in science and engineering. To begin with, 14 institutions were identified where 40 scholarships were offered. The scholarship covered the entire education cost of a two-year Master's degree in engineering or management. A few undergraduate students were also covered. In the earlier days GE, in view of its business in finance, also believed in attracting talent from the management stream. This was given up soon to focus only on the technology stream. The selected students were also given the opportunity to interact with scientists and engineers from JFWTC. Mentors were identified from the centre for each of these 14 institutions. They would visit the institutions and interact with the faculty, talk to the students about the exciting R&D programmes at JFWTC and discuss the possibilities of helping them with their degree projects.

The Foundation was keen that preference must be given to the 'disadvantaged' students. As the person appointed to manage this programme in India, I justified the 'disadvantaged' argument as

being applicable to a large number of Indian students. In my view, Indian students have always been at a disadvantage when it comes to understanding the working of the corporate culture, and more so while carrying out industrial research requiring problem-solving skills. This fact has been often quoted by the professional bodies like NASCOM, when they reported that only 20% of the graduates coming out of our educational institutions are 'employable'. The atmosphere in our educational institutions just does not expose them to the culture of working in a corporate environment. The academia-industry interaction is only limited to getting funds from the industrial firms to build a hostel, laboratory, set up a 'chair' or an occasional individual consultancy. The students are not exposed to the R&D laboratory of any industry.

The GE scholarship programme provides the right opportunity for our students, faculty and even our educational institutions to be exposed to the corporate culture of a giant multinational company. The emphasis was not on the scholarship money, but how this programme could bring our students closer to the culture of working in a corporate research environment, requiring a multidisciplinary approach to solving real-life problems, working in teams and developing leadership and communication skills – qualities so essential in that environment, or for that matter in any real-life environment in any sphere of human activity.

Another corporate culture, particular to GE, is its commitment to the objective



The John F. Welch Technology Centre of the GE Company, Bangalore.

of corporate social responsibility through its employees. Each employee of GE is expected to be involved in some kind of community development work giving his/her quality time over the weekend, as part of volunteer activities. We decided to bring this element in our scholarship programme as well. While applying for the GE Foundation scholarship, every student has to write an individual, well-focused project proposal on some kind of community development work in the location where they are studying. They would have to identify the beneficiary group, decide on the nature of activity they would take up and commit at least 50 h of work during the scholarship period. We never monitored their work, nor did we ask for regular reports or log-books of their activities. We just sensitized them to this aspect of 'community development'. We gave guidelines for them to write a project proposal. At a suitable time, we would get all the scholars together and they would present their projects, answer questions raised by other scholars, explain the difficulties they faced and share their experiences. By and large it was clear that we had achieved our objective of sensitizing and energizing the scholars to their social responsibility. The fact that submitting the community development project was made mandatory was the only catalytic role we played. The young scholars were energized to the community around them and its needs. The programme that started with 40 scholarships has now completed 10 years; and 581 GE Foundation Indian scholars from 40 different institutions have now begun their careers with this exposure.

The business of GE cuts across many disciplines, ranging from aircraft en-

gines, to transportation, healthcare, energy generation, plastics and other engineering areas. As a result, JFWTC is home to state-of-the-art laboratories working on research and development in the areas of mechanical engineering, electronics and electrical system technology, ceramics and metallurgy, catalysis and advanced chemistry, chemical engineering and process, polymer science and new synthetic materials, process modelling and simulation, power electronics and analysis technologies. We therefore picked our scholars from wide range of disciplines. Each year, we grouped the students in several teams, with diverse disciplines, and introduced a major new component in the programme, when we challenged the individual teams to come up with an innovative 'product' or a 'service' which company may take up as part of its business. These teams of students operated on-line for a few months, without seeing each other face-to-face, but they knew who their team members were. Even a 'virtual team manager' was appointed. The GE mentors were identified, who would also be occasionally consulted on-line. After four months of 'virtual meetings', the scholars were physically brought together for a four-day workshop at JFWTC.

The ambience of the research environment, fun and frolic, sharing ideas on their community development projects, the secret discussions on their potential 'innovative projects', with a competitive approach, were exciting for the students. They also visited the JFWTC laboratories to meet the ever-helpful engineers. Then they were huddled into a discussion room to brain storm on their ideas amongst their teammates. This is when they are encouraged to think out of the

box and then use different disciplines to arrive at a product or a service which they have to 'develop' and also ensure that it is marketable and finally present it to the management for 'acceptance'.

This mock exercise gives them the thrill of working on challenging ideas that they have thought of themselves. This workshop is called the 'energize to innovate', which is an experience they remember for a long time. This is where they learn to work in multidisciplinary teams, take up responsibility and work on a well-defined and tight time schedule. The workshop is the climax of the GE Foundation scholarship programme, and energizes them for their future career.

The programme was not restricted to leading institutions like the IITs, but also smaller engineering colleges. We did not see a major difference between the talents that we picked from these diverse institutions. One hopes that many more corporate houses, and even perhaps our scientific agencies, undertake such innovative programmes. The educational institutions have not been themselves as enthused and participative as we would have liked them to. We did not see the imprint of the teachers on the students, but what we saw was a sense of determination and a spirit of wanting to work together as a team and finding solutions to problems. Only with such enthusiasm and team work can young Indian talent achieve bigger goals. Truly India is a developing country with developed talent. Let us nurture this talent.

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## MEETING REPORT

### Aerosols and clouds: climate change perspectives\*

The understanding of changes in climate and weather conditions, especially the

significant changes which have occurred in the past decade mainly due to anthropogenic activities, necessitates a good knowledge of all the factors contributing to the global radiation budget, aerosols and clouds being the most important ones. Aerosols, small particles suspended in air, may occur naturally, originating from volcanoes, dust storms, forest and grassland fires, living vegetation and sea

spray. Human activities such as the burning of fossil fuels also generate aerosols. These have a large impact on the radiative balance of the earth and subsequently on climate change through the scattering of incoming sunlight, cloud formation or enhanced absorption of sunlight by soot. Clouds also play a major role in climate through their direct interaction with solar radiation and also

\*A report on the 12th Biennial National Conference of the Indian Aerosol Science and Technology Association on 'Aerosols and Clouds: Climate Change Perspectives' held during 24–26 March 2010, and organized by the Bose Institute, Kolkata at its Mayapuri Centre in Darjeeling.