"Sustainable energy is the bedrock of sustainable development..."

The **World institute of Sustainable Energy (WISE)** is a not-for-profit institute established in 2004 in Pune, India, committed to the cause of **promoting sustainable energy and sustainable development**, with specific emphasis on issues related to **renewable energy**, **energy security**, **energy efficiency**, and **climate change**. In an exclusive interview with **Electrical India**, **G. M. Pillai, I.A.S., Founder Director General, WISE (Pune)**, is detailing their activities to **PK Chatterjee**. Excerpts...

Do you think now India is harnessing Renewable Energy (RE) at right pace?

The present Central Government has announced a massive increase in RE targets – 175 GW by 2022 and 40% of electricity from RE by 2030. That is a great step in the right direction. Against this, our current achievement is 42 GW, as on 31st March 2016. In order to achieve the new targets, many actions e.g., payment security to generating companies, technology upgradation, establishing a robust solar manufacturing sector, low interest debt to RE projects, uniform and forward looking RE policies across states etc., need to be put in place. Most importantly, at the state level and among the public, there is still no realization that RE is the energy source of the future and it's phased development is critical to establish an alternative energy system, by the time fossil fuel extraction peaks, decline and eventually deplete completely. I am sure the central government is seized of these issues and will evolve positive solutions.

Which form of renewable energy (solar or wind) is most suitable for our country in general, and why?

In a post-fossil fuel world – expected to be a reality by mid-21st century – we would need to tap all forms of renewable energy including 'eco-scale' and 'human-scale' hydropower. So it is unfair to declare one form of renewable energy as most suited to our country. However, in terms of universal and ubiquitous availability, abundance of the resource and the potential for diversity of applications different forms of solar energy (PV and thermal) would be the single most important renewable energy source not just for India, but for the world. Solar energy can be deployed for wide-ranging electrical, thermal and energy substitution applications. It is suitable for industrial process heat, water desalination and numerous such other applications. Such a ubiquitous source of energy is certainly superior to other kinds of RE. Let us not forget, that the world runs on solar energy. You just need to look at the MNRE assessed potential for RE in India, to appreciate this. Wind energy potential in the country is a little above one lakh megawatts. Whereas, solar energy potential is over seven lakh megawatts. Wind can increase its potential through new technologies and by foraying into new areas like offshore wind for which considerable potential exists in India. WISE, as part of EU supported global consortium is involved in studying the offshore wind potential in India. Although offshore wind is currently expensive, its price has fallen by half in Europe during the past three years. We can expect offshore wind to be commercially viable by 2020 in India also.

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What is the latest cost comparison (per kW wise) between solar and wind projects?

The latest per kWh cost of solar energy discovered through competitive processes, is down to around Rs.4.63 and is now comparable to the cost of wind power. This has happened mainly because solar power has gone through a price discovery process through competitive bidding since 2012, in India. Another contributory factor has been China's entry into the sector in a big way, toppling the technology monopoly of some western manufacturers. Wind Power, historically has not been subjected to this competitive process in India and has enjoyed a sheltered existence under the Feed-in-Tariff regime established by regulators. However, even the regulators do not have clear data on cost of production of the wind turbine or its O&M. This cost discovery is essential to ensure transparency, for increasing profitability to investors and ensuring grid parity of wind, without subsidy props, in the future. The wind industry claims to have developed more efficient technology for low-wind regimes like those in India. However, the cost of turbines, on a per megawatt basis, has seen a historical increase. The gains from decline in commodity prices (like steel etc.,) in the global market should have been passed on to investors, since wind is a heavily material intensive technology. In fact, material intensity is the Achilles heel of wind power. An average turbine of 1 MW size needs about 130 tons of material. The decline in commodity prices is a temporary phenomenon linked to low crude oil prices. When oil prices go up in the not-too-distant future, material prices will also go up. So, I foresee the possibility of solar power overtaking wind in the future. However, it is a game of the market and hence is not exactly predictable.

Are we really focused on small scale multiple projects or still looking at a few big projects? What is the threshold in this field?

The architecture of the power sector and especially the grid, will undergo huge transformations in a R.E. dominated power sector of the future. Basically, an RE dominated power system is supposed to be distributed and decentralized. However, the geographic reality of India is such that a lot of grid-friendly solar power (both PV and thermal) for example, is sitting in our desert areas in Gujarat and Rajasthan. So, mega project development would become a geo-strategic necessity to feed the grid supplying power to our industrial and urban areas, where in-situ RE generation in large quantities will not be possible. For example, the roof area of a high-rise multistoreyed building will not be sufficient to produce enough solar power necessary for the entire building. However, mega project development can face constraints relating to logistics, environmental concerns and availability of resources like water for cleaning up solar panels in desert areas. In the case of wind power, since windy sites are in specified areas of concentrated resource zones, whether the investor invests in one turbine or hundred turbines is immaterial because all turbines would be bunched together in the wind resource zone. So, in practice, most wind power generating zones would be 'mega' zones only. However, in the interior and rural areas, it would make sense to go for a decentralized architecture of mini-micro or islanded local grids by hybridizing different RE technologies. But the right kind of configuration with base load power, electricity storage, demand management and dispatch management systems would become necessary to ensure 24/7 power. It is difficult to bet on any threshold in this regard. It will be a natural evolution resulting from technology development, the market and choices people make.

What is WISE's contribution in the country's targets for achieving 15% renewable energy by 2020?

WISE was the first institution to come out with a detailed analysis of what needs to be done to achieve the 15% target, in a study supported by Shakti Sustainable Energy Foundation. We had indicated technology-wise required installation capacities, based on analysis of capacity factors etc., and projected required annual growth rates. Other policy measures required to be put in place were also indicated. The report was presented in a seminar in Delhi attended by the then Member (Energy) of the former Planning Commission. The report was also widely circulated to all stake holders in the country. We have also contributed through skill upgradation programmes, knowledge outreach to the RE industry, consultancy support to government, regulators and the RE industry. Being a research, knowledge and outreach institution, this is our role and we will continue to support the efforts of RE development in the country.

What kind of momentum have you successfully generated at the state level (Maharashtra)?

WISE is not a state level institution, even though we are located in Pune. We are active in about 14 states in the country. However, through a project supported by Shakti Foundation, when the recent RE policy of Maharashtra came out, we mounted an analysis of the policy and held seminars to propagate the findings. We also submitted our findings to the Maharashtra government, who thereafter decided to review the policy. Besides, we prepared a DPR for a canal-top solar power pilot project in Maharashtra and completed a study pointing out the potential of repowering of old wind power projects in Maharashtra. All findings and DPRs etc., have been submitted to the Maharashtra Energy Development Agency.

What kind of training programmes does WISE conduct?

WISE has over the years, trained over 4100 personnel from the RE industry and government. Our training programmes cover all cutting edge areas in the RE sector including wind power, wind resource assessment, offshore wind, solar PV and thermal power, renewable policy/ regulation and climate change mitigation. Besides, we also undertake broad spectrum training in areas of sustainable development.

What is your contribution in developing national policies on sustainable power generation?

RE policy development has been our forte. We have helped many state governments and electricity regulators in framing RE policy and regulation. Some of the states where we have been particularly active are Kerala, Karnataka, Andhra, Tamil Nadu, Maharashtra, Gujarat, Orissa and Bihar. We also provide inputs to MNRE in national policy development. Earlier, we have critiqued the Integrated Energy Policy of the Planning Commission and provided inputs for its revision. Currently we are working in Orissa to support OERC in developing a mini-micro-grid policy for the state – again an initiative supported by Shakti Foundation. Besides, as the entire country knows, WISE pioneered the concept of an RE Law for India way back in 2005 by drafting a Model RE law and articulating its advocacy through seminars and directly approaching law makers in the country. We continue to contribute in this area. We were involved in the committee appointed recently by the MNRE to draft a RE Bill for India, as per decision of the current Central Government. We believe, an overarching national legal and policy framework like an RE law will go a long way in achieving our national goals in a time-bound manner.

Please tell me something about WISE's global activities

WISE's focus has always been to undertake RE development initiatives in India. However, at the global level, we have done work in Indonesia and Lao PDR to support their governments in RE policy development. We have also trained personnel from West Asia and Africa on aspects of RE development. Besides, we have been involved in DPR preparation for solar energy projects in the Arab Gulf region. Currently, we are also a partner in a global consortium undertaking preparatory studies for offshore wind power development in India – especially in the state of Gujarat – in a project titled FOWIND, supported by the European Union.

What is your message to the nation on sustainable development?

Sustainable development is our only hope to preserve civilization and modernity in a post-fossil fuel world. Sustainable energy is the bedrock of sustainable development. Being a country of continental size, we are fortunate to be blessed with large resources of sustainable energy. As is normal, our society is neck deep into discussing contemporary problems and in the process forget to develop a national discourse on the vital issues of the future. As a nation, we need to seriously debate our future and the ways and strategies to ensure sustainability of development in a post-fossil fuel era. We need to recognize that economy is a subsystem of the ecosphere. The current energy profligacy is a boon of millions of years of solar energy stored in fossil fuels – or 'a gift of ancient sunlight' as one author called it. Fossil fuels are finite and will be extinguished one day about which there is a scientific consensus – the dispute is only about the date of such 'peaking' and depletion. My learning tells me that we will have serious fossil fuel crisis by 2050. Hence, the importance of a planned transition in the next 30 years to an alternative energy system and a development model predicated on accepting the limits of nature and a finite planet. This transition needs to be very carefully and meticulously planned to avoid sudden disruptions, collapse or unrest. Then only we can ensure sustainability of development. It is in our national interest to articulate a serious discourse on this issue.