Interview with Dr Reji Kumar Pillai

"A systemic change is needed to transform business processes"

The India Smart Grid Forum (ISGF) has been a key driving force behind the country's efforts to realise its smart grid potential. Set up in 2010, the ISGF has been working on a number of initiatives, advising policymakers, assisting utilities and providing a platform for thought leadership. Excerpts from a recent interview with Dr Reji Kumar Pillai, president, ISGF, and the newly appointed chairman of the Global Smart Grid Federation (GSGF), the umbrella organisation of smart grid associations around the world...

How would you assess the progress in smart grid development so far?

It has indeed been quite impressive from a policy perspective, but poor on the project implementation front, owing to a variety of reasons beyond the control of the government or utilities. A systemic change is needed to transform business processes and build conducive ecosystems. On the policy front, the government allotted 14 smart grid pilot projects in 2012, issued a Smart Grid Vision and Roadmap in 2013, and launched the National Smart Grid Mission (NSGM) in 2015. The Forum of Regulators approved model smart grid regulations in 2015; the Bureau of Indian Standards (BIS) has issued national standards for smart meters; 27 state electricity regulatory commissions have issued net metering regulations in the past three years; and the government, in the Tariff Policy, 2016, has mandated smart meters for all customers with a monthly consumption of above 200 kWh by end-2019. These are revolutionary steps. However, none of the 14 smart grid pilot projects has been completed till date. While four projects have been cancelled and the contract for one is still at the award stage, only two to three projects may be completed in 2017.

What have been the outcomes and learnings from the pilot smart grid projects?

The idea behind the 14 pilot projects was to undertake technology trials to prepare technology selection guidelines and build business cases in the Indian context. Since these projects could not be completed in three to four years, that objective is not relevant any more as the roll-out of large projects cannot wait any longer.

Technology trials and pilot projects cannot be successfully executed through the lowest bidding route. That was the biggest mistake in the pilot projects. The projects should have been allocated to utilities that tied up with a technology provider and a research institution, with each of them investing in the project and applying for a government grant to part-fund the project. That is how pilot projects were undertaken in other countries. Two or three projects are expected to be completed successfully this year. There is a lot to learn from what went wrong so that the same mistakes are not repeated in larger projects in the pipeline.

What have been some of the recent initiatives taken by the ISGF?

Last year, we issued a white paper, "AMI-Cost Benefit Analysis and Rollout Strategies for India", which has received accolades globally. This paper introduced the concept of smart metering as a service. In this model, there is no need for a utility to buy meters, establish complex communication and IT systems, and maintain them. The ISGF proposed the idea of engaging a metering services agency that will choose appropriate technologies, establish the smart metering system, and maintain it for 10 years at mutually agreed performance levels and a reasonable monthly fee. The paper also emphasised the concept of full-feeder implementation of advanced metering infrastructure (AMI) rather than selective implementation for customers with a monthly consumption of above 200 kWh. This point has been accepted by the MoP and been communicated to states vide a Central Electricity Authority circular in 2016.

Other important papers that we have published recently and which are making waves are: "Leveraging Smart Grid Assets for Building Smarter Cities at Marginal Cost" and "Next Generation Metering – IP Metering". In the first, the ISGF introduced the concept of extending the digital assets (automation and IT systems) of smart grids in a city to other infrastructure and service domains at a marginal cost. For example, the GIS maps, billing and collection systems, call centres, outage management systems, mobile crew management systems and communication systems built for smart grid applications can be extended to domains such as water and gas distribution, collection of municipal fees, and air quality and noise monitoring systems, at a marginal cost.

In the other paper, "Next Generation Metering", the ISGF has advocated using broadband services in buildings or cities for smart metering rather than building a

parallel communication infrastructure on radio frequency mesh or power line communication, which the utility would find difficult to maintain.

Another important piece of work done by the ISGF last year has been the formulation of the Indian Manual on Cyber Security for Power Systems, which is currently under review by the MoP. This is likely to be issued as a mandatory manual for all utilities to adopt. In 2016, the ISGF brought together various stakeholders to prepare policies and standards for electric vehicle charging infrastructure, which is still work in progress. We have also prepared a Handbook on Smart Grids with the assistance of the Shakti Sustainable Energy Foundation. The draft handbook will be released at the India Smart Grid Week in March 2017.

What are the significant global trends in the smart grid space? What are your key priorities as chairman of the GSGF?

Chairing the GSGF is a great honour. My key priorities as chairman are to widen the membership base and make the GSGF work meaningful and rewarding to utilities and other members in each country association. Currently, there are 16 countries and the European Union as members of the GSGF, whereas the International Smart Grid Action Network (ISGAN) has 27 members. We will first target the ISGAN members who are not yet in the GSGF and a few Asian and Latin American countries where smart grids are gaining momentum. The GSGF will also align with other international organisations working in the energy and climate change domains.

Globally, utilities are focusing on technologies that can enable flexibility in power systems, which is required for integrating the increasing share of renewable energy – flexibility both in supply and demand. The rapid growth of distributed renewable generation and energy storage are set to disrupt utility business models. Distribution companies in many geographies have transformed into distribution network operators, while some others are envisioning distribution service platforms, as in the case of New York's Reforming the Energy Vision strategy. The constantly falling price of solar photovoltaic (PV) and lithium-ion batteries will accelerate the transition of utilities to network operators or service platforms. During 2010 to 2016, the price of PV panels dropped by 80 per cent and that of lithium-ion batteries by 85 per cent. This declining price trend is expected to continue in the near term, while new technologies are rapidly nearing commercialisation. Utilities need to be ready for dealing with grid defection by large sections of customers in the next decade.

What are some of the emerging smart grid technologies that can facilitate large-scale renewable energy integration with the grid?

A set of technologies to achieve flexibility in both supply and demand, as well as technologies and systems to forecast schedule and despatch renewable energy accurately are the requirements. As the share of renewables has exceeded 20-30 per cent in certain geographies, they are now experimenting with MW-scale grid-connected batteries. In some places, thermal machines are run as variable plants, which will have serious implications on their life. Countries with roadmaps for retiring all the thermal power plants may find that solution cheaper than some other technologies like energy storage. Renewable energy monitoring centres equipped with weather forecasting systems and wide area monitoring systems can help system operators in forecasting, scheduling and despatching of large grid-connected wind farms and solar parks. The bigger problem will be to deal with reverse power flows in the low voltage grid as rooftop PV gets wider adoption. The government is promoting 40,000 MW of grid-connected rooftop PV by 2022, which will be connected to the low voltage distribution grid. Solutions to integrate rooftop PV on the low voltage grid and maintain stability between medium voltage and low voltage is different, and we need to focus on that front soon.

What will be the key focus areas of the ISGF in the short to medium term?

The ISGF intends to work with all stakeholders to update the Smart Grid Roadmap of 2013. Another important work we are currently doing, in association with the Centre for Study of Science, Technology and Policy and support from the Shakti Sustainable Energy Foundation, is the preparation of an "Implementation Roadmap for Electrification of Public Transportation in Kolkata and Bengaluru". These two cities are different in many ways and the models for these two cities can be replicated in others, with minor modifications. We are preparing a Smart Grid Roadmap for the Bangalore Electricity Supply Company. We will continue to work with all stakeholders on the formulation of appropriate policies and standards for EV charging infrastructure and cybersecurity, and assist AMI roll-outs in select utilities. We are also working with Indian Railways for implementing microgrids with railway stations as the base. If this model is successful, and we can build a viable business case, there are several thousand railway stations where the model can be replicated. Another important research we are involved in is for grid-interactive buildings.

What is your outlook for the power sector?

It is a great era unfolding. A host of new technologies will ensure energy security from distributed clean energy resources managed efficiently through digital technologies that will unleash a digital energy revolution. India and other developing countries, where large communities are still underserved by the present electric grid model, can leapfrog to this digital energy era. We will see disruptions in traditional businesses. Governments should remain policymakers and regulators rather than asset owners and service providers. Individuals will buy energy at prices they can afford from competing technologies and service providers. The faster governments realise this, the better it is for all. Otherwise, the goal of Power for All will continue to move like a mirage (from 2007 to 2010 to 2019 to 2022), and taxpayers will continue to underwrite billions of dollars of losses that the distribution companies will incur. ■