**Inauguration of 'Institute for sustainable development and energy studies' (In-SDES)**

**of KSEB-OA, Shornoor, May 08, 2017**

Notes for the talk on 'Indian electricity sector - current challenges', in the seminar on 'Sustainable development in power sector'

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1. It is indeed a welcome development that KSEB OA has taken the initiative to set up InSDES. On behalf of Prayas (Energy Group), I congratulate KSEB OA for this unique initiative, and assure whatever support we can extend for its success. In my talk, I plan to present a broad overview of the challenges facing the Indian electricity sector and give a few expectations we have from InSDES
2. Let me start by recounting a few recent developments.
    a. After 70 years of independence, as per government reports, 99% villages and 75% households have been electrified. Five states – Gujarat, AP, Punjab, TN and Goa report 100% household electrification. Kerala is very close to 100% HH electrification. Focus on household electrification picked up after the 2004 elections and the momentum continues even now. Production of electricity had grown significantly in the past decades (60-70%), but connections increased at a much slower rate (10-12%).
    b. India has reported power surplus for 2016-17 (1.1% energy, 3.1% peak) with some states (GJ, Mh, Pu, MP, AP, TS) having 20-30% surplus. Surplus states have heavy fixed cost burden to the tune of 1000-4000 cr/year, 25-35% of the FC burden. Not a transient phenomenon- with uncertain demand and capacity addition-surplus will grow. Mh is planning to sell power to UP, Kerala has contracted from MP and Punjab is planning to sell power to Pakistan. At the same time, it is not clear if this surplus is truly contributing to development. Many states have shortages, urban consumption is nearly double rural consumption, and daily peak in cities like Delhi/Mumbai occur at noon due to air-conditioners.
    c. In December 2016, CEA released draft National Electricity Plan covering up to 2027. Around 50,000 MW of thermal capacity is under construction and as per CEA, there is no need for any more thermal plants. CEA may also downward revise their demand forecasts.
    d. Renewable is in competition with fossil fuels and has been mainstreamed: Solar prices have fallen to one-fourth (12/U in 2011 to 3.3 Rewa- Feb 17, 3.15 Kadapa April, 2.9 Bhadla RJ Apr). It now matches coal tariff (3-4 /U) and could further drop. Wind tariffs have reached 3.46/U in the first 1000 MW bid (Feb 17) and more bids are expected soon. Price of solar, onshore/offshore wind is falling world over. Storage cost has fallen to one-fourth from 2010-2016 and is expected to fall again to one-fourth by 2030 (Bloomberg). Renewable is no

more at the margins, is mainstreamed: India 15% capacity (equal to big hydro), 6% generation. 175 GW target by 2022 – 100 solar, 60 wind. UK 25%, Germany 29% China 10%, AZ 12%. 21/4/17 GB electricity without coal. May 2016 Germany had 64%, CA 45% renewable generation. World over, there are discussions on managing high penetration of renewable. Nuclear is inflexible, hydro is seasonal, coal takes days to start up, long time to ramp – we have managed all that, so why not manage unpredictability and intermittency of renewable? Let me also add that it is too much to expect that renewable and efficiency will solve all problems. Depletion of fossil fuel and minerals; challenge of environment & livelihood and climate ; inequity in energy use and rampant consumerism are serious and not easy to address.

3. The theme of the seminar is 'Sustainable development in energy sector'. Talking about electricity, what are the challenges facing the Indian power sector and is sustainable development possible? There are many who believe that without drastic reduction in consumption, it is not possible to sustain the sector. There is some truth in this and I plan to return to this theme at the end. If our aim is to ensure that electricity becomes a necessary, if not sufficient condition to catalyse development, what are the challenges we need to face? The number of challenges is big and it is not possible to provide a complete list. I present them in 6 groups, first 5 being short or medium term and the 6$^{th}$ being a long term one.
    a. Technical: Improving efficiency in generation, distribution and operation; end use efficiency; storage; integration of renewables; energy return on energy invested etc
    b. Socio-economic – how can electricity catalyse development? Equity in distribution, subsidy, livelihood impacts on power projects, safety
    c. Resource & Environmental: depletion of fossil fuels and minerals, pollution, climate change
    d. Legal, policy and planning: role of state and central governments; centralised or distributed generation; long term integrated approach taking all linkages into account
    e. Institutional: Capacity of distribution companies, regulatory commissions, civil society organisations
    f. Limiting resource usage – powering down
4. It is clear that most of these challenges are not new. Attempts have been made in the past to address them, for example by reforms in the sector that started in early 1990s. But after 25 years of reforms, neither the state or the market seems to have delivered. Prayas has recently published a book – Many sparks but little light – the rhetoric and practice of electricity sector reforms in India. We start by saying that the normative goals of the sector are: universal access, good quality supply and service, affordable tariff, and sustainability. To meet these goals, it is important to have a robust electricity sector that is financially sustainable while also being

conscious of the concerns of equity and ecology. But goals of reforms were not always these, but inviting investment, introducing corporatisation, privatisation, independent regulation etc. Book provides a critical review of reforms covering generation, renewable, distribution, coal and gas sectors. We conclude that while the sector has made some significant strides, the reforms have generally disappointed. The stated objectives of reforms have not been fully met and India is far from meeting its socio-environmental objectives in electricity. The sector is also plagued by insufficient competition, weak institutions, and poor design and implementation of policies and laws. Public finance institutions have provided significant funding and not foreign or private capital. SEBs have been unbundled, but many private companies remain vertically integrated. Gas and coal sector are monopolised by a few big private/public companies. The book argues that the usual polarised debates of 'for and against privatisation ' or 'state Vs market' are misleading and limited. It proposes that discussions should instead be centred on how to have robust governance and institutions – within and outside government – that can achieve desirable socio-environmental goals in a transparent and accountable manner. State will continue to have a critical role in the electricity sector – as a participant as well as a non-partisan referee promoting public interest.

5. Prayas has been a co-traveller of sector reforms and hence appreciate the need of institutions like InSDES. I hope that activities of InSDES would be beyond employee interests, beyond Kerala boundaries, beyond reactions to current developments and beyond the narrow technical understanding of the electricity sector. What are my expectations from InSDES? I have many, but let me list some, by way of loud thinking.
    a. Have a core group: With due respect to hard working officers who spend spare time and the untiring energy of the retired, allow me to submit that InSDES needs a few young full time professionals for proactive analysis, as well as advocacy.
    b. Be rooted in Keralam, but do not be geographically limited to Keralam. Adopt a national perspective, and aim to be active in multi-state and national arena. Examples: auditing rural electrification programs, measurement & verification of energy efficiency drives, grid integration of small renewables (roof top – still at 1000 MW, Kerala 17 MW – target 40 GW, recent report on Mumbai 1700 MW, agriculture solar feeder), transmission planning and prudence of costs, quantifying environmental and livelihood impacts of thermal and large hydro, integrated resource planning etc
    c. Have long as well as short term goals: In the long term, work to improve the legal, policy and regulatory framework. But in the short and medium term, take a proactive approach to explore if we can stretch the boundaries to improve the system, by engaging with RCs, NITI, MoP etc. How can the governance of public institutions be improved? Can we set up model

institutions (corruption free, consumer friendly division). Deep substantive analysis and demonstrative ground action are needed to gain credibility.

d. Try to take as many people along to gather maximum insights and strengthen the public interest agenda. Have a broad inclusive vision – equity, environment, sustainability, democratisation of governance – to increase the support base. The German friend anecdote – one Indian equal to two Japanese, two Indians equal to one. Provide an environment of creative collective action, not of following a leader. We criticise the government about working in silos or neglecting some crucial aspects, and hence we should not repeat the same mistake.
e. Have a strong advocacy agenda – to communicate analysis to the common people using traditional and modern media. Marx, Capital, Vol.I, Preface to the French Edition, March 18, 1872, IP Ed, p.21 "Practice without theory is blind. Theory without practice is sterile. Theory becomes a material force as soon as it is absorbed by the masses."

6. Before I conclude, let me return to this question if renewable and efficiency can solve all our problems. What was talked so far was about the short or medium term challenges facing the electricity sector. For this scenario, increase of renewable and efficiency measures with a reducing role of fossil fuel makes sense. Challenges in the long run, say for the next generation are very different. Fossil fuel era would come to an end due to shortage of resources and climate-environment-livelihood constraints. With major changes in technology and policy like cheaper storage, demand response, rising prosumers and growing markets, there are discussions on the death of the utility or end of conventional grid operation. It is crucial to work on topics like: the future of the grid; a bottom-up approach to assess how much energy do we really need/can afford, can the available energy be equitably distributed and how we can power down. A different paradigm/approach for energy has to be developed. What we call the Reduce, Improve, and Replace approach. Quite similar to organic farming, natural resource management, preventive and social medicine or avoid, shift improve in transport. While working on such an approach, one can link with people who work in other sectors. I also hope that InSDES starts working on such long term scenarios as well. I wish InSDES all the best and hope to see a day when it is common knowledge that 'what InSDES says today on electricity sector, India does tomorrow'.