



CPRI, Bengaluru, India

International Lessons Learnt On the Development of Local Grids And Prosumer Empowerment

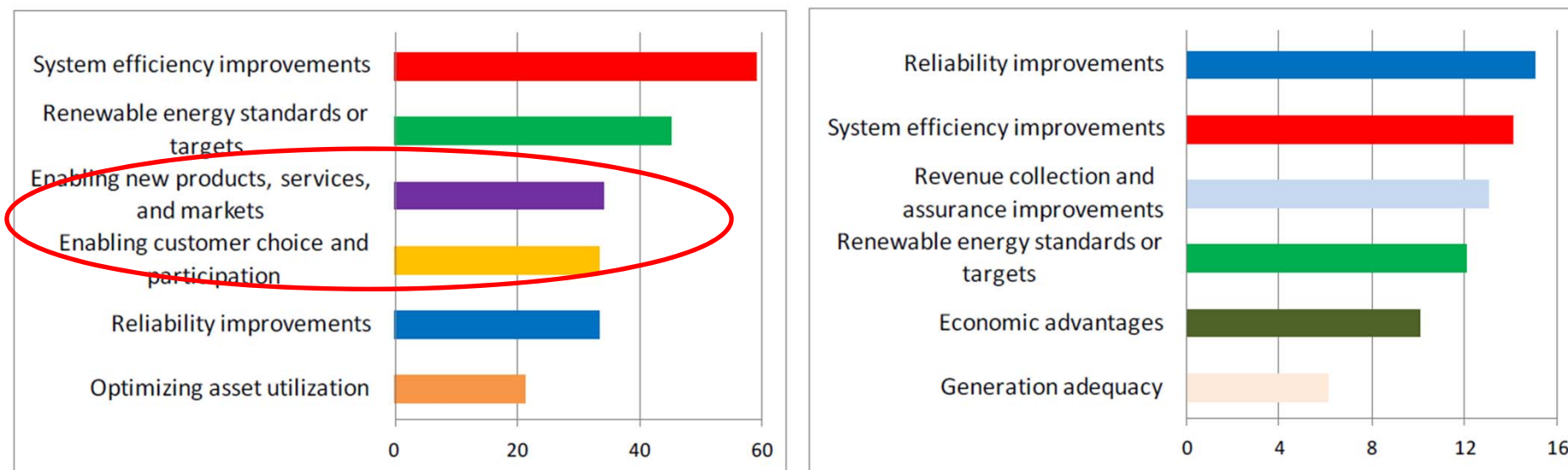
Nov 14, 2017

**Ravi Seethapathy
Canada**

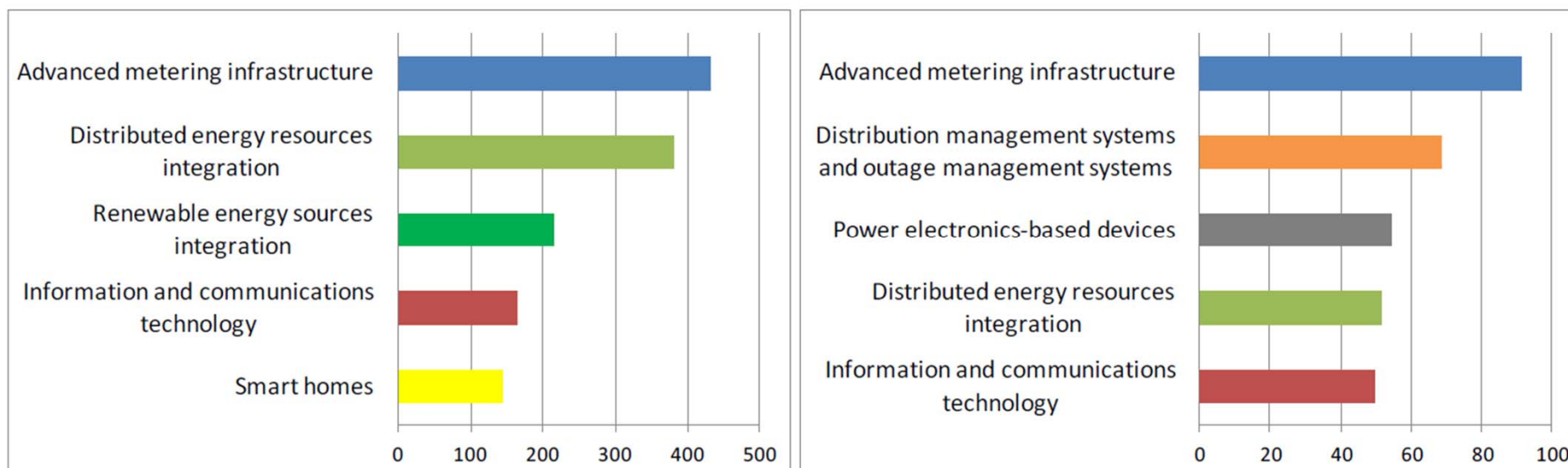
•ISGAN 2014 Survey:

•Annexe 1: “Smart Grid Drivers, Technologies by Country, Economies and Continents”

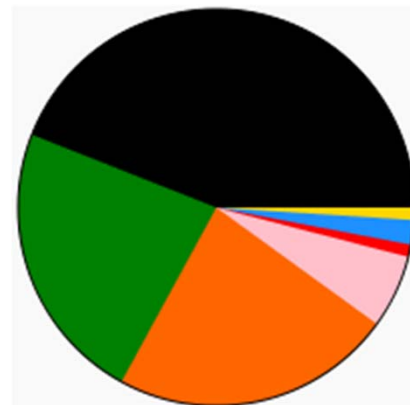
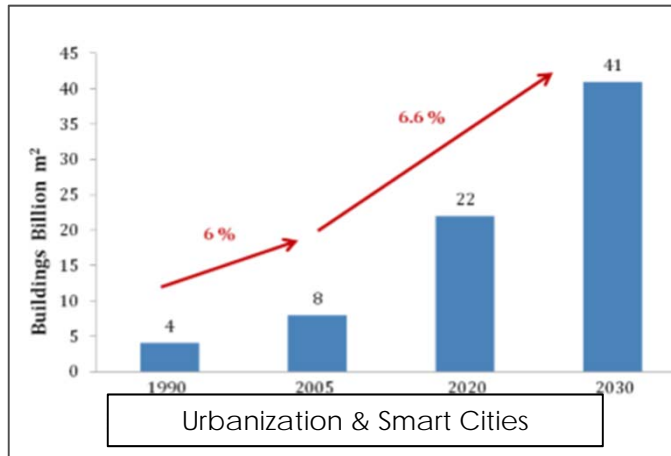
Top-6 Ranked Motivating Drivers (Left: Developed / Right: Developing Economies)



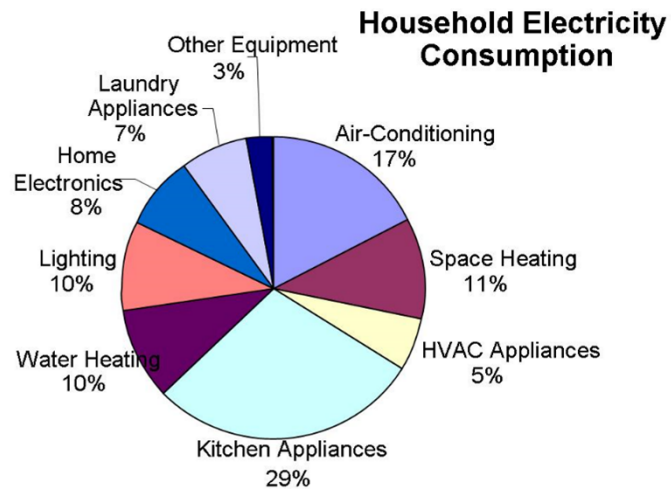
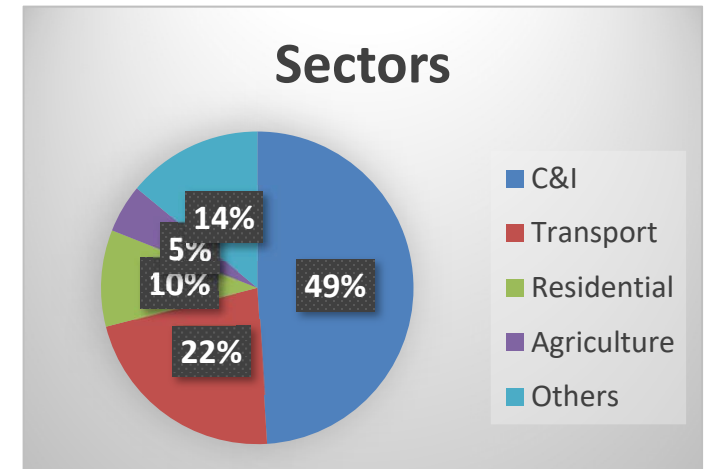
Top-6 Ranked Technology Drivers (Left: Developed / Right: Developing Economies)



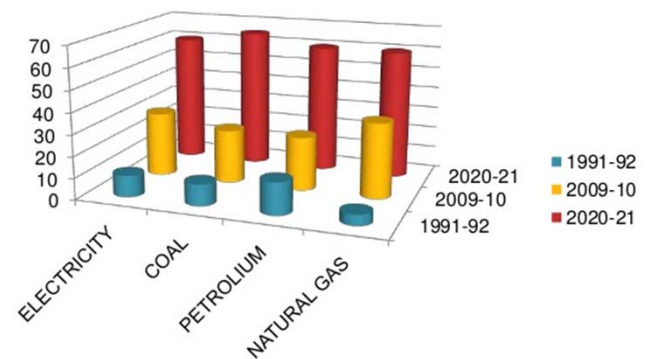
Indian Energy Growth Imperative



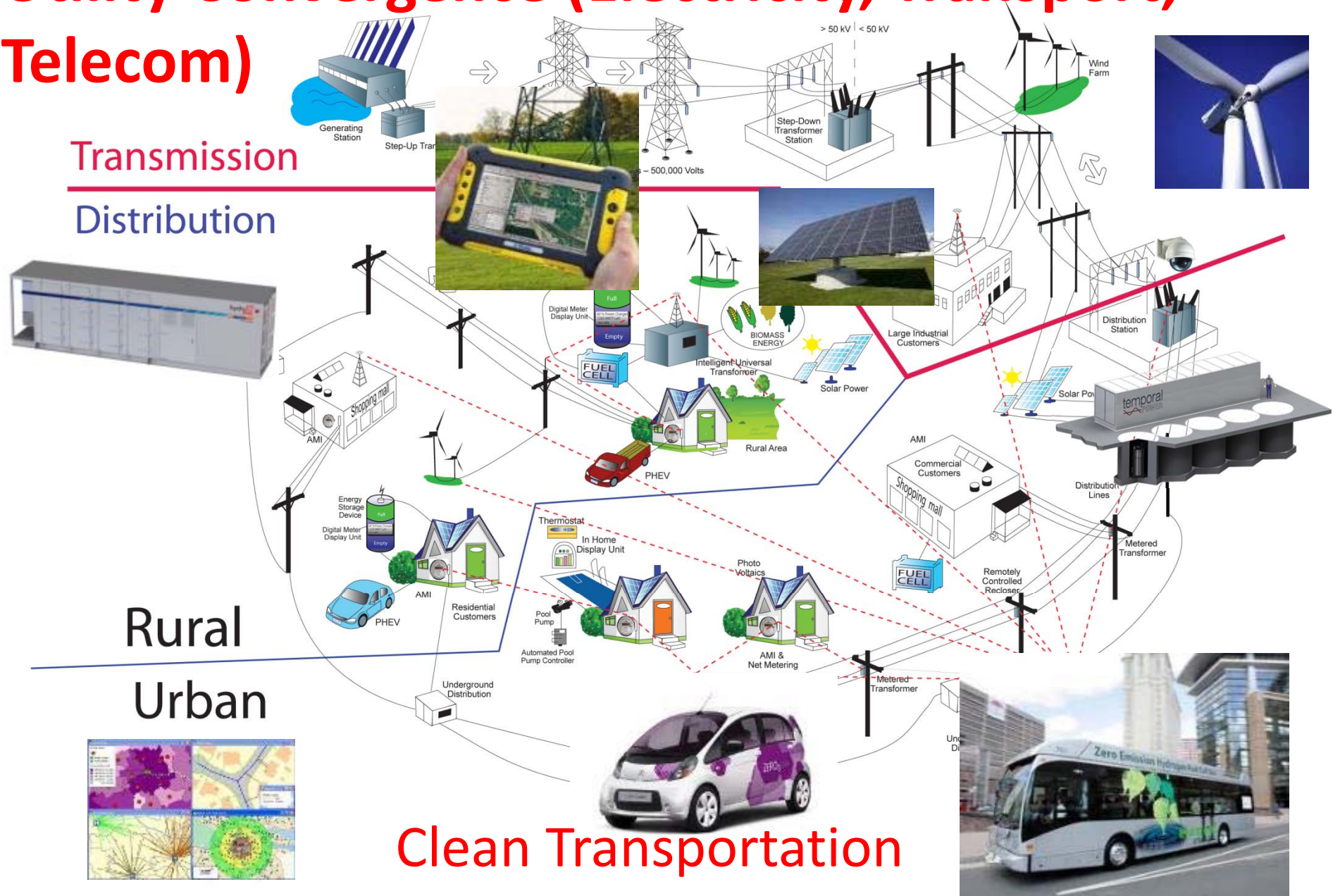
India: Total primary energy use of 775 Mtoe in 2013^{[20][21]}



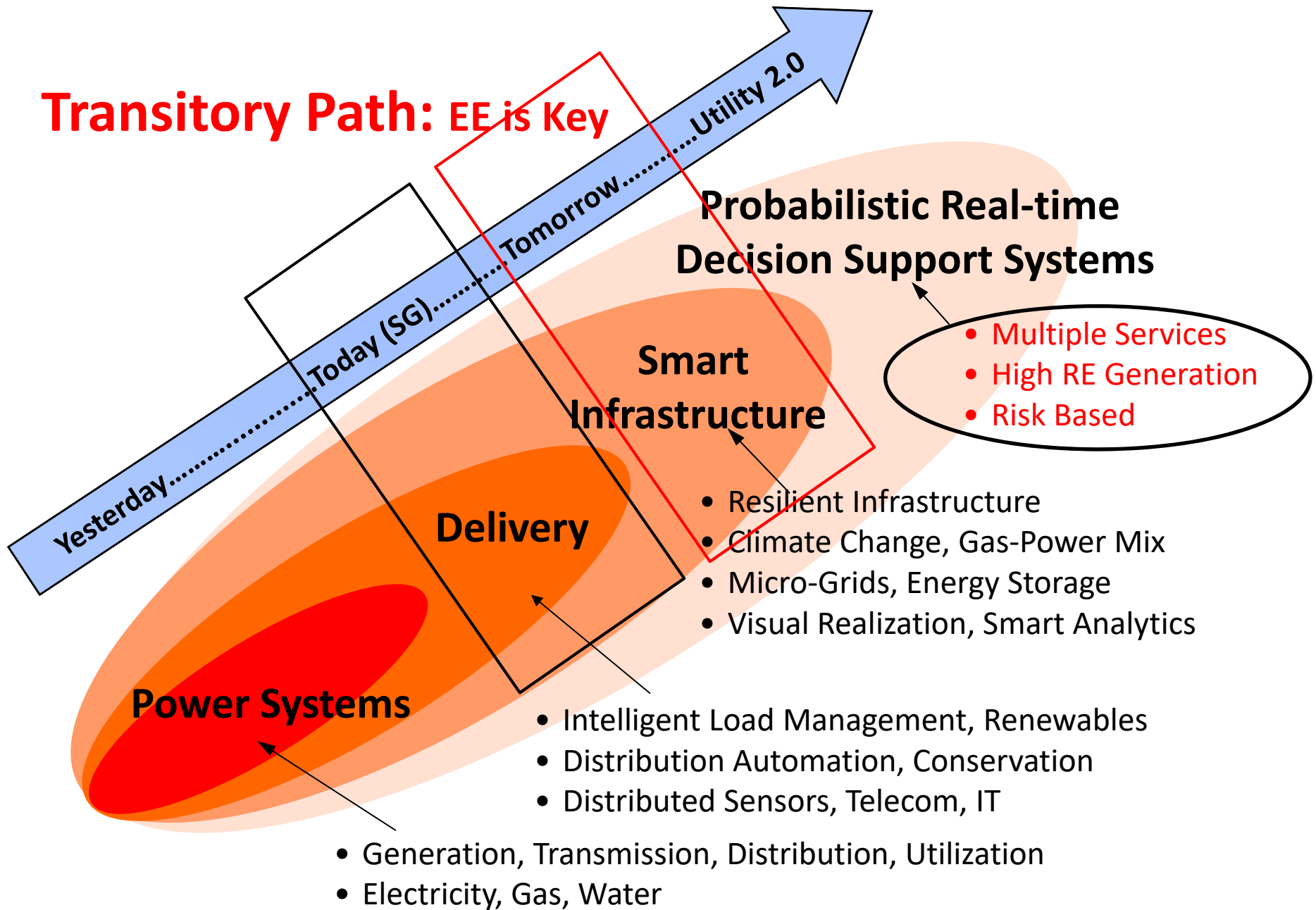
ENERGY DEMAND PROJECTION IN INDIA



Utility Convergence (Electricity, Transport, Telecom)



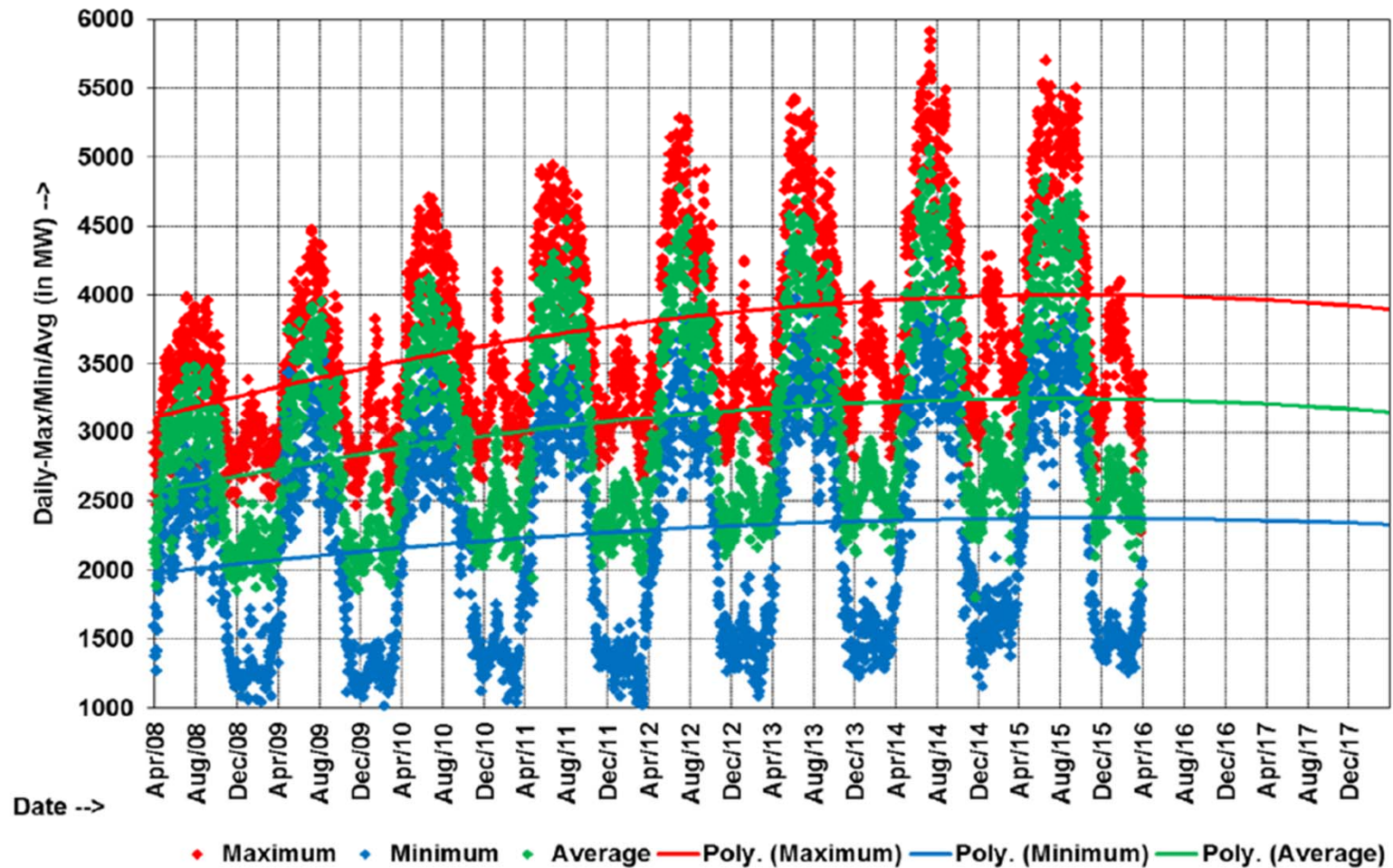
Transitory Path: EE is Key



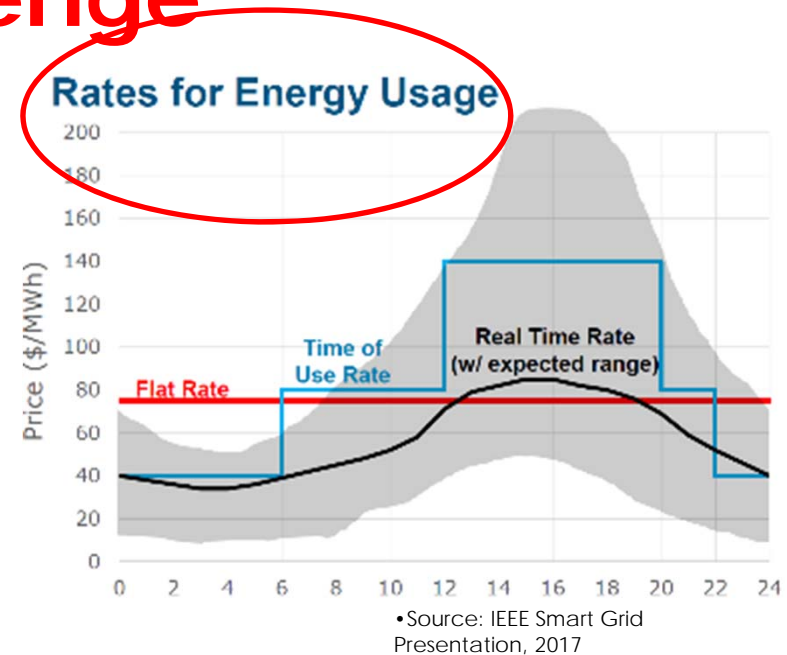
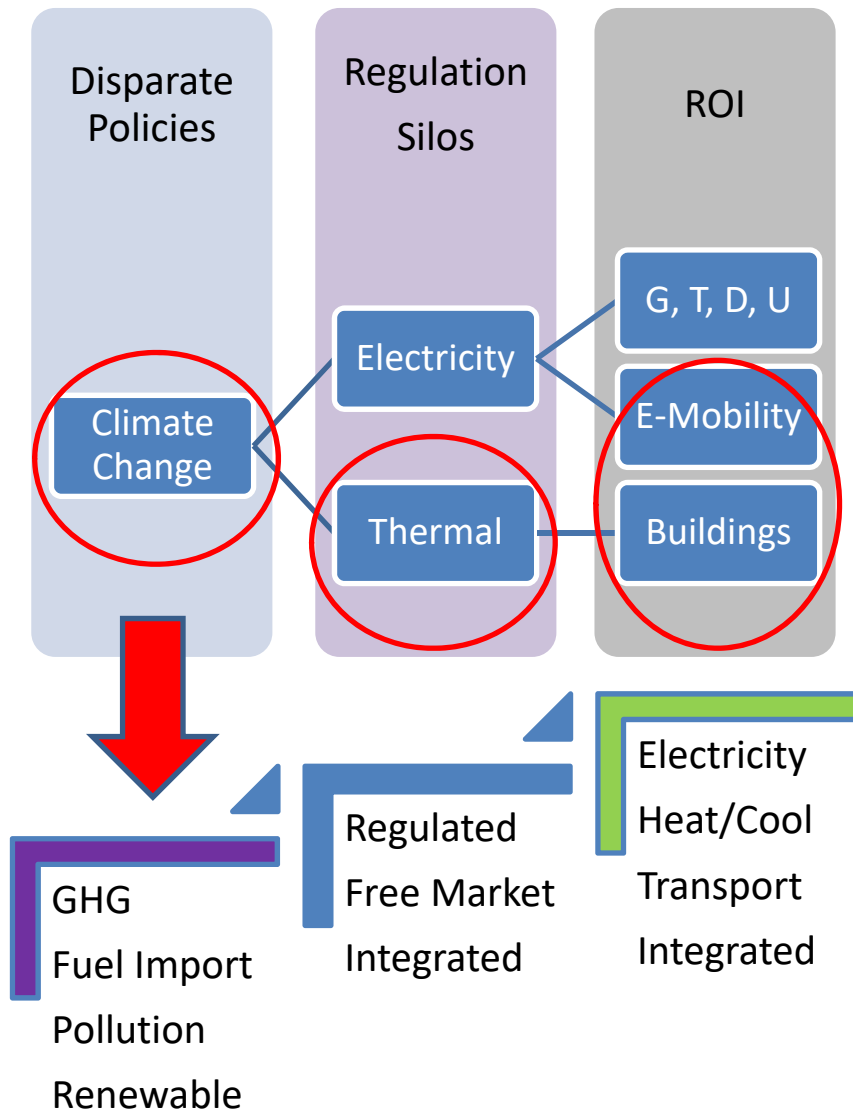
Issues

Demand Management is Key

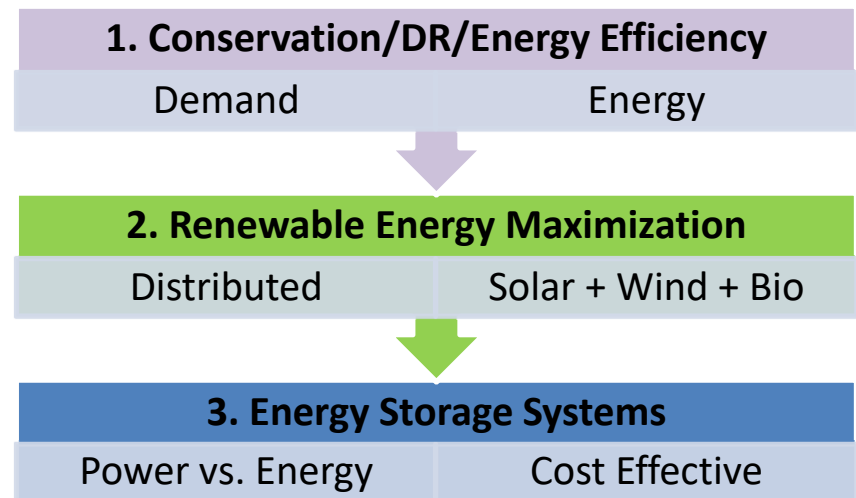
New Delhi – Max./Min./Average Load Profiles (2008-16)



Business Case Challenge

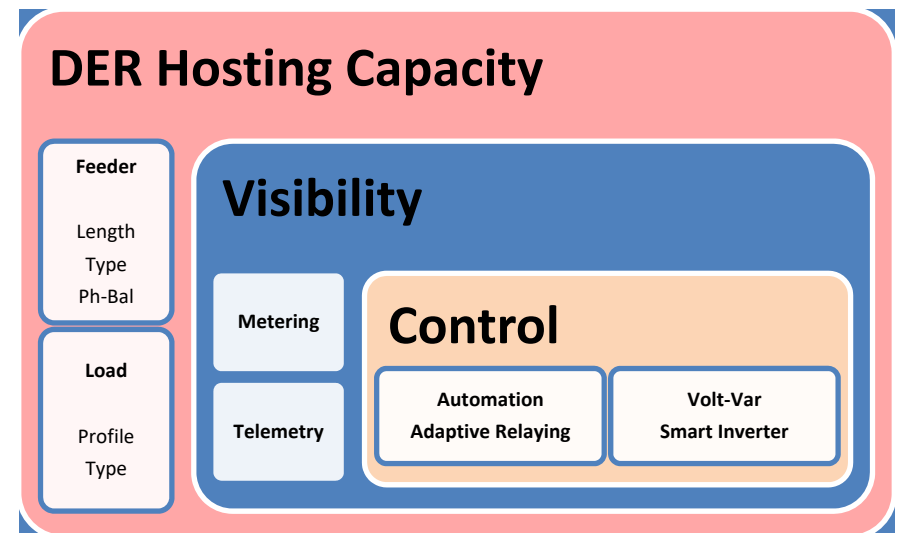
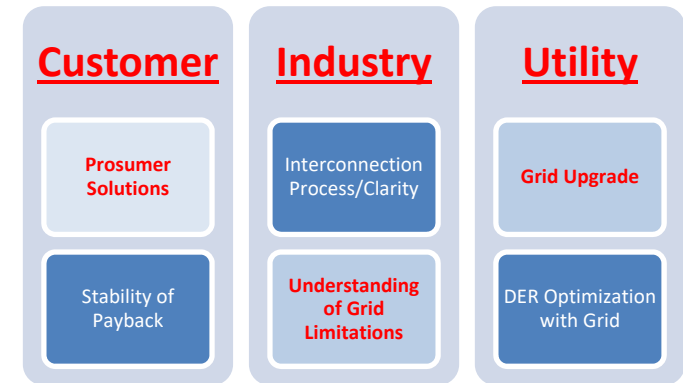


Sequencing for Best ROI



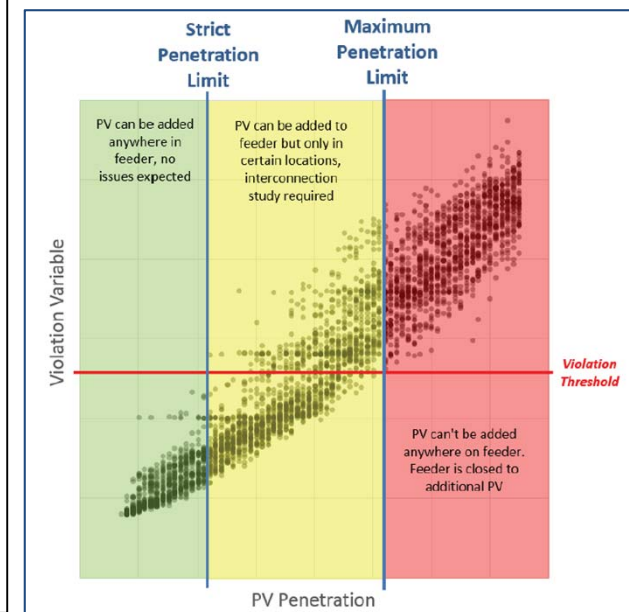
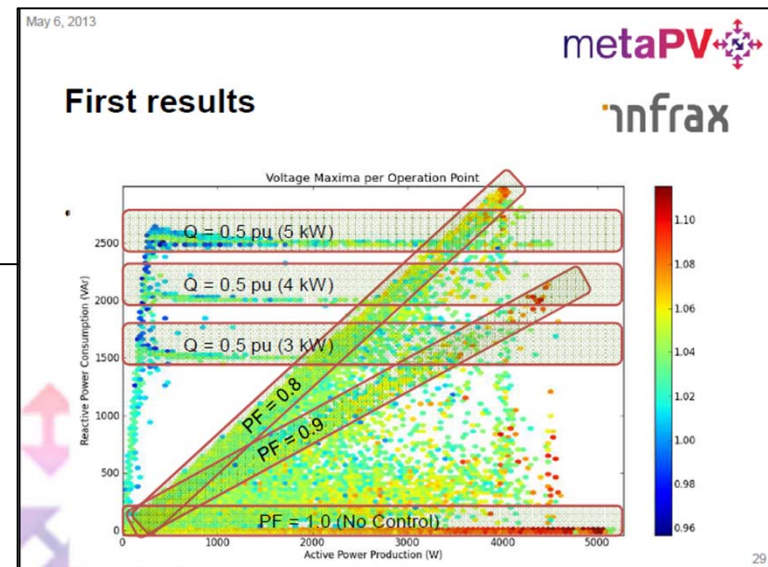
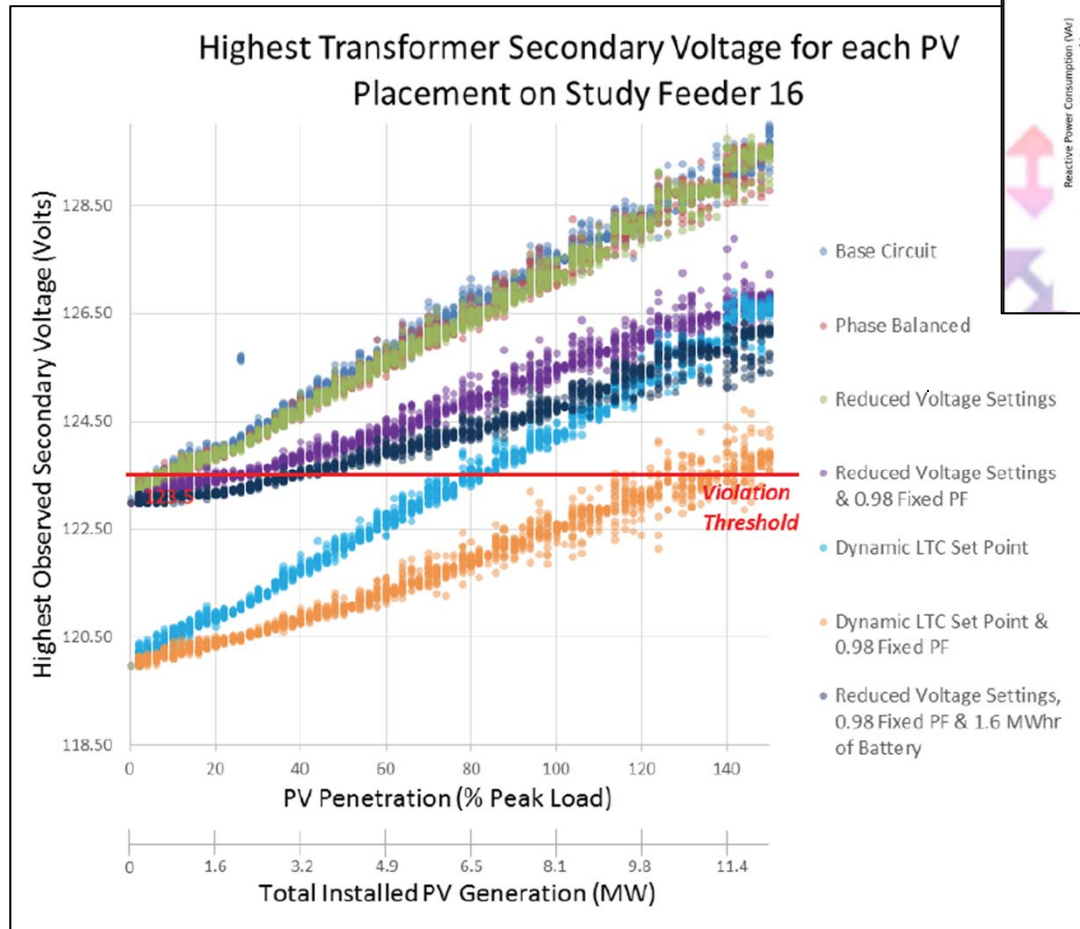
Prosumer Dilemma

- AMI Valuation
 - TOU
- T&D Grid Architecture Limitations
- Valuing DER Locational Capacity
 - Local Transactions
- Market Structure and Reform
 - Policy
 - Regulatory
- Customer Choice
 - Open Market - Products/Services
 - Micro/Nano/Pico grids



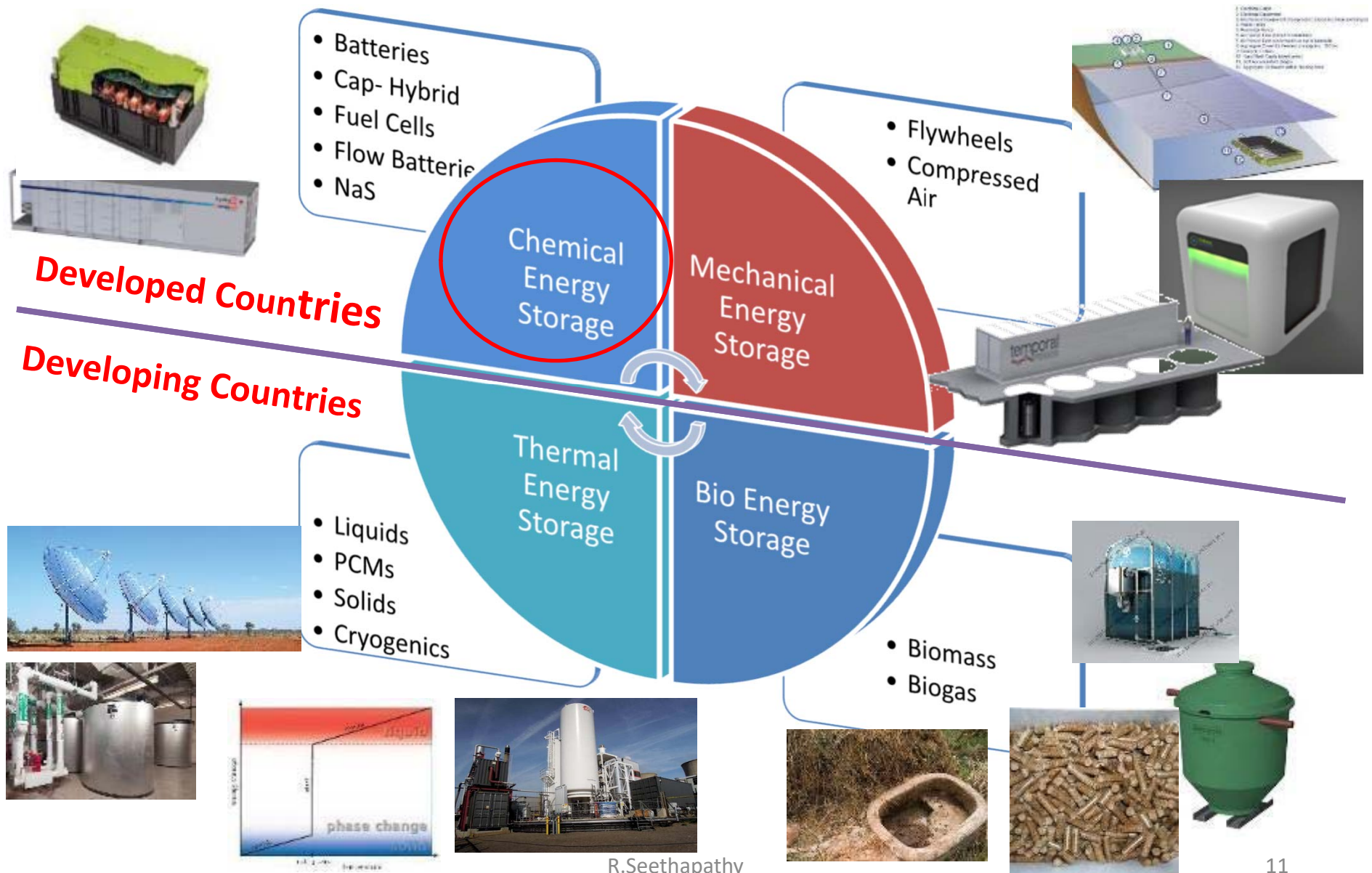
DER + Feeder Var Control

Lower KW also lowers KVAR for the same PF

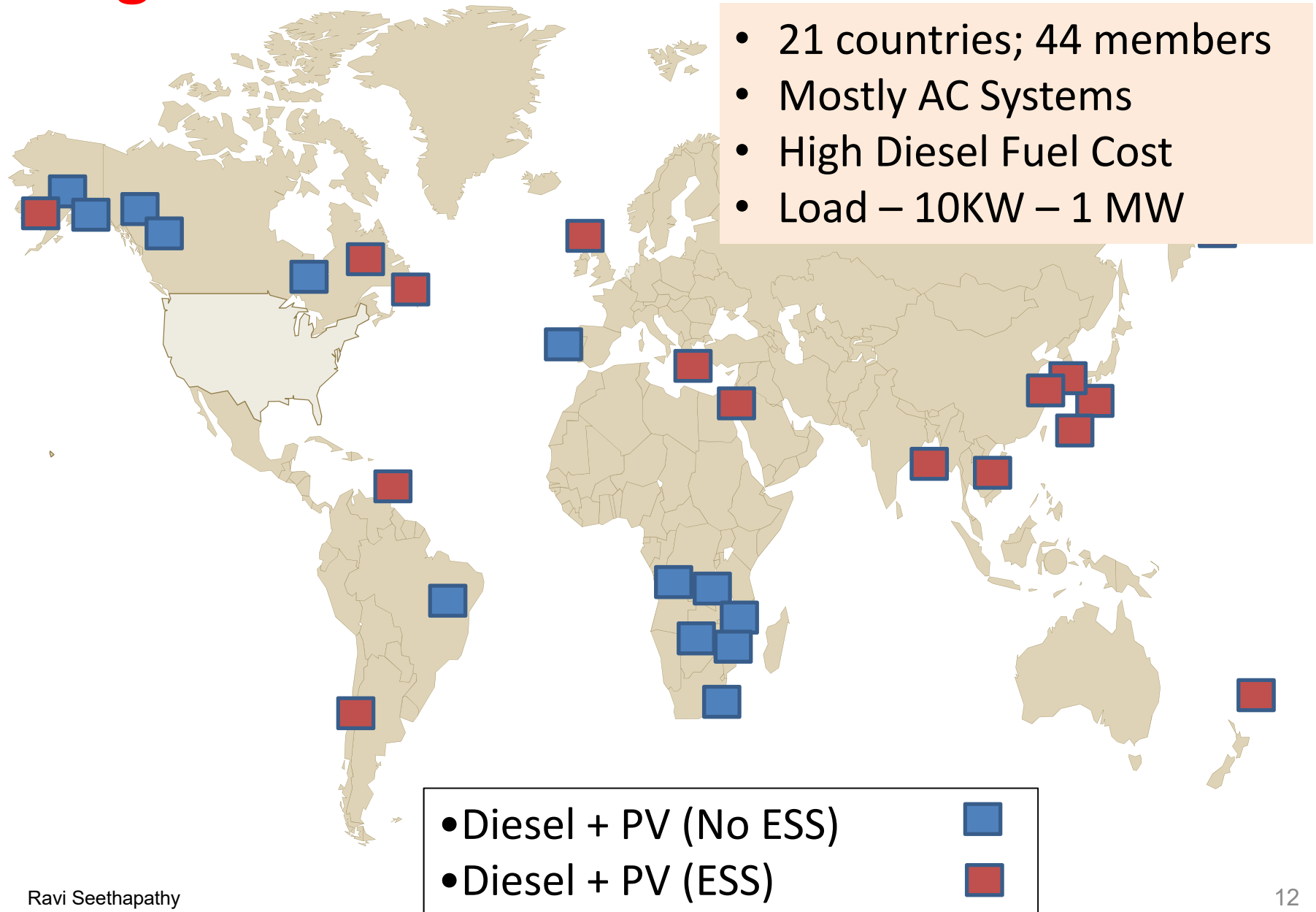


•Ref: Pepco Holdings Presentation GTM – March 3, 2016

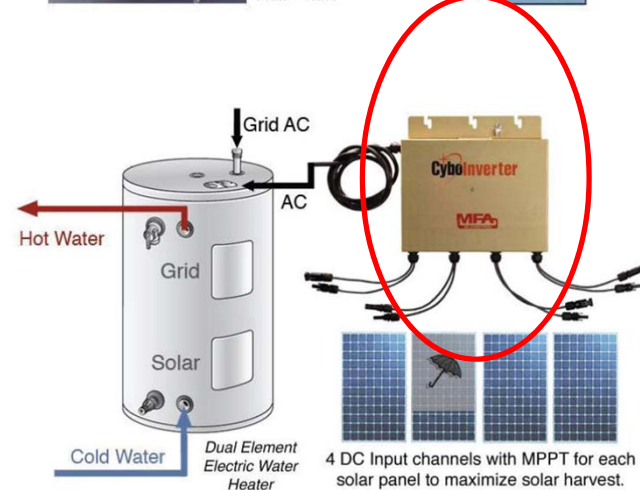
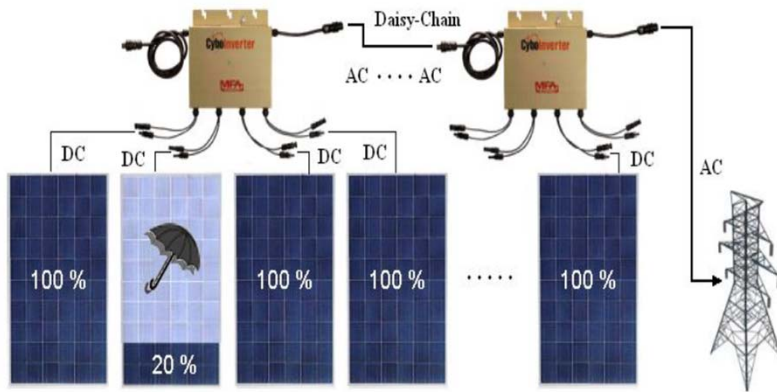
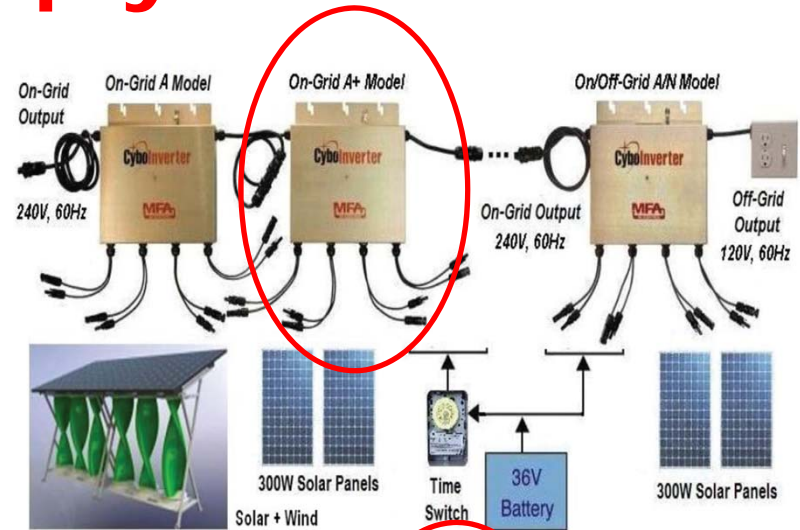
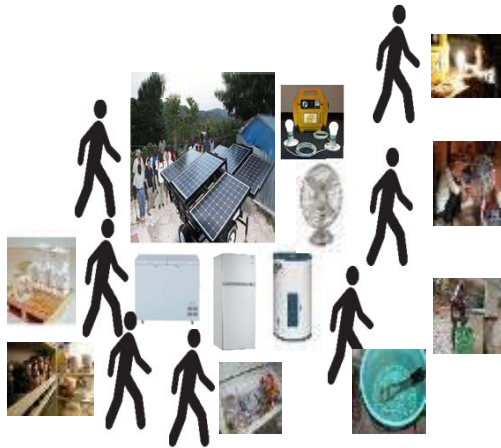
ESS: Technology Silos



Cigre WG C6.28 Off-Grid Case Studies



Off Grid Hybrid Supply



Thank You

Brief CV of Ravi Seethapathy

Fellow, Canadian Academy of Engineering
Professional Engineer, Ontario
B.Tech (Hons), M.Eng, MBA
Sr. Member IEEE
ravi.seethapathy@gmail.com



Ravi Seethapathy, sits as a Corporate Director on the Boards of Smart Grid Canada, India Smart Grid Forum and Biosirus Inc. He is an Expert Advisor to the Utilities/Industry in the Energy and Power Systems area with over 35+ years of experience. He also serves as an Advisor to India Energy Storage Alliance (IESA) and sits on the Advisory Board of Electrical Research Development Agency (ERDA), India.

He was formerly Manager – Systems Innovation & Advanced Grid Development at Hydro One Networks prior to his retirement in April 2014. At Hydro One Networks, he led the power systems technical architecture of its Advanced Grid (Smart Grid) Pilot Project from 2009-2011, the Corporate Smart Grid Strategy Taskforce in 2008 and from 2006 the initial efforts in the integration of DER in the Hydro One Distribution System. His 29+ years of experience at Hydro One/Ontario Hydro has been in almost all fields of electric utility business and he has progressively held leading positions in Protection & Control, Field Operations, Hydraulic Generation and Transmission Operations, Generation Performance, Distribution Strategy/ Planning, Mergers & Acquisition, Corporate Audit, Asset Management and Asset Strategies Divisions and most recently in Corporate Research.

•His current international technical activities include (1) Convener WGC6.28-Remote Islanded Grids; (2) IEA PVPS Taskforce 14 - Large Scale Solar Integration; (3) IEC TC 120 - Energy Storage; (4) IEC SEG4-LVDC ; (5) Chair, India Smart Grid Forum WG 9 (Renewables & Microgrid) and (6) IEEE Smart Village. He is an invited speaker in the international Smart Grid area having co-authored over 50 technical papers. He/ family have endowed an IEEE Award in "Rural Electrification Excellence". His prior professional engagements include Advisory Council of EPRI's Power Delivery and Utilization Division (2010-2014); Governing Council, Energy Research Initiative, Semi-Conductor Research Corporation (2012-2014); CEATI's Smart Grid Taskforce (2012-2014) and SOIG WG (2009-2011); Corporate Directorships at Toronto Atmospheric Fund (2015-2017), Ryerson University (2007-2010), TV Ontario (2001-2007), Scarborough Hospital (2002-2004) and as Chair of Engineers Without Borders (2000-2006), Canadian Club of Toronto (2003-2004) and President Indo-Canada Chamber of Commerce (1998-2000).

He is a Senior Member of the IEEE and a registered Professional Engineer in Ontario. He has co-authored over 50 leading technical papers in Advanced Grid systems and actively lectures at Conferences and Universities. He is a Fellow of the Canadian Academy of Engineering and was honoured with the Queen Elizabeth II Diamond Jubilee Medal in 2012. He holds a B.Tech (Hons) in Electrical Power from IIT, India, an M.Eng in Electrical Power from University of Toronto and an MBA from the Schulich School of Business, York University, Toronto. He has received several citations and awards.