



India
SMART GRID
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Bengaluru, India

Forging New Smart Grid Paths For Developing Countries

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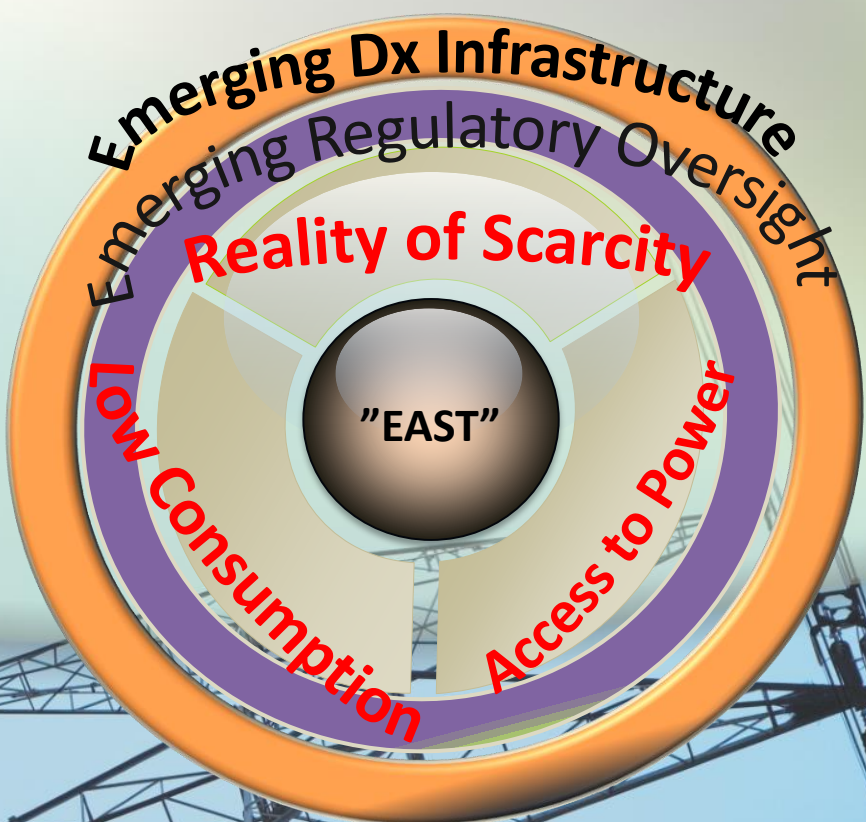
March 3, 2015
Plenary Session 1

Organisers:

ISGF
India Smart Grid Forum

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Differing Realities Differing Needs



Developing Countries SG Drivers

Access to Power

- Tanzania: 80% within 5km of Tx, only 10% have access
- South Africa: 10 LS/month x 6 hours
- Kathmandu: 7 Zones; 10 hours/day

Minimize Power Theft

- Non-Technical losses as high as 30%
- Create a culture of pay-for-service
- Make it “difficult” for thieves

Energy Efficiency

Maximize Renewables

- Long connections to Urban Centers
- Urban RE (e.g. Rooftop Solar)
- Rural Electrification
- Minimize impact of C-Fuels volatility

Create Retail / Local Markets

- Decentralized energy markets
- Reliability, Security, Segmentation
- Community owned power

Critical Elements for Success

Must Have

- Scalable, microgrid capable, Modular
- Welfare Index
- Energy Efficiency
- Maximize Renewable Resources
- Time-of-Use Tariff
- Less Fossil Fuels Price Volatility

Nice to have

- Reduced \$ (and not just \$/Kw)
- Innovation and technology development
- Financial leverage, Bankability
- Improved security and access to power
- Economical stimulus
- Distributed/Localized Energy Market

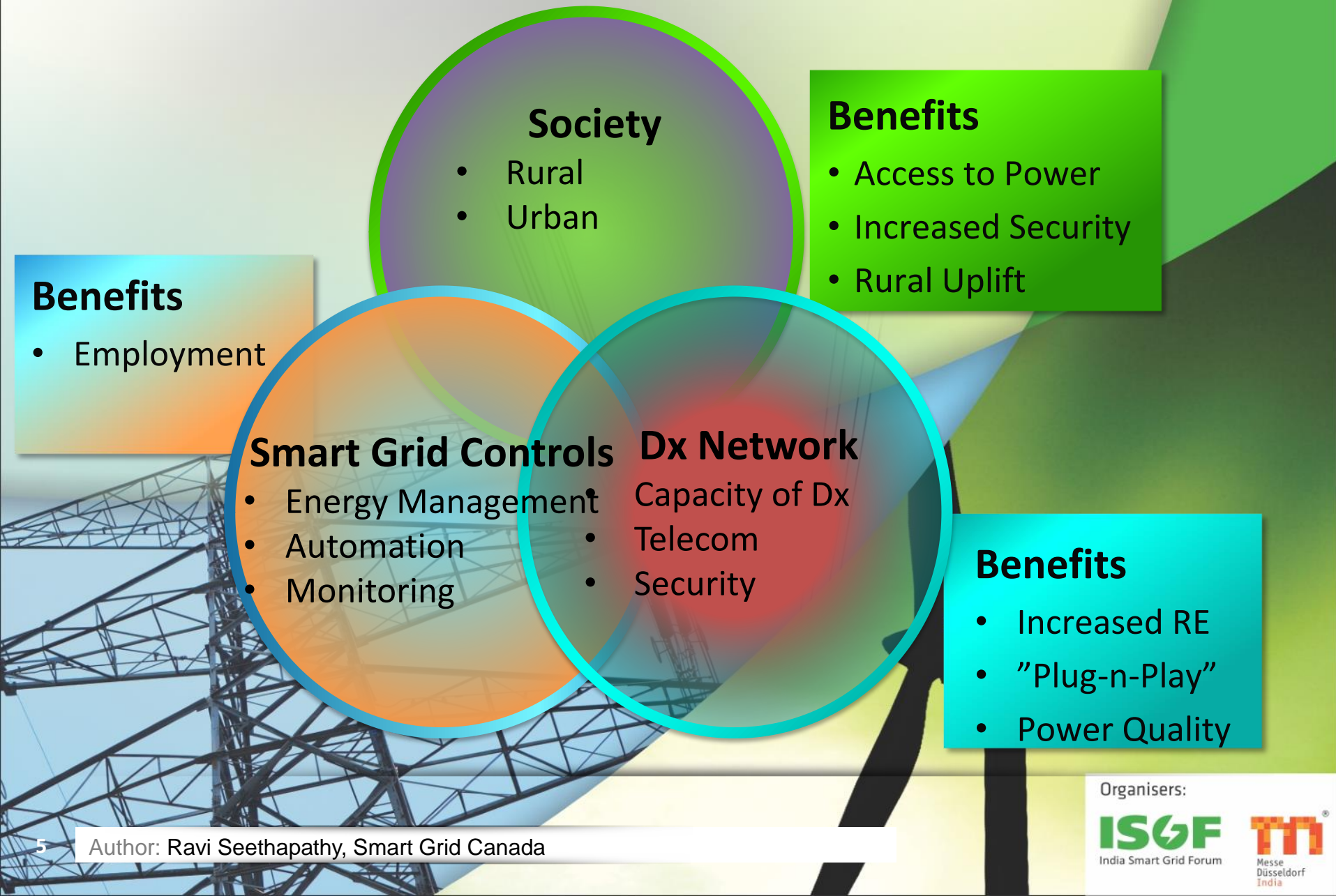
Avoid

- “Paralysis by Analysis” syndrome
- Crystalizing Product Development
- “Caste-in-Stone” Standards Development
- Specifying Architectural Details (as opposed to requirements)

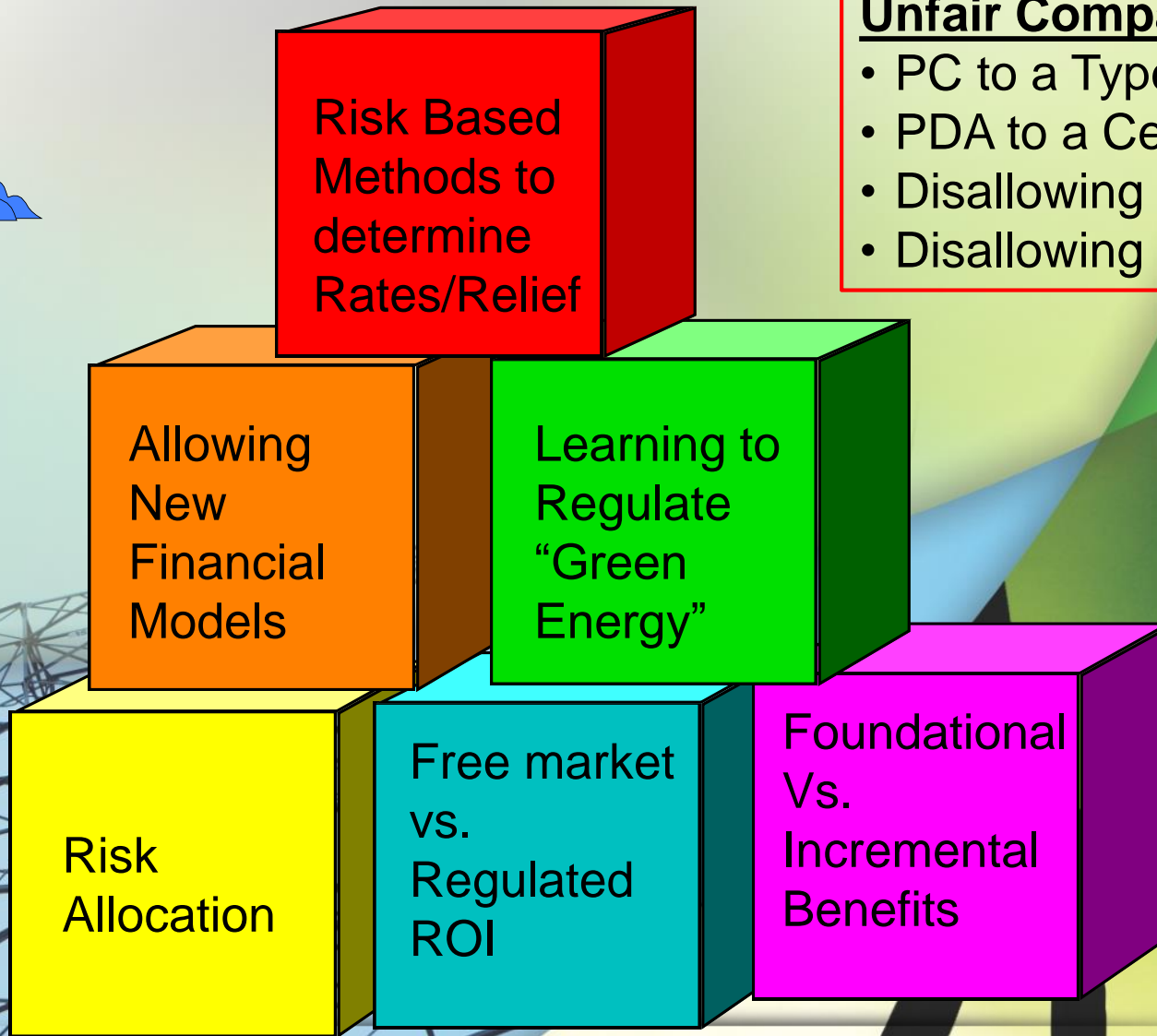
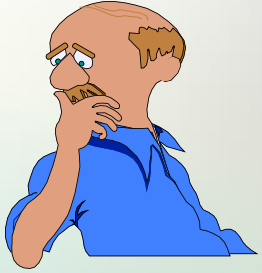
Future

- Market Optimization
- Price inflation/deflation
- Increasing competition
- New Applications

Green Power and Smart Grid Interdependence



Regulatory Framework Challenges



Unfair Comparison:

- PC to a Typewriter
- PDA to a Cell Phone
- Disallowing Convergence
- Disallowing Wires bypass

Standards Challenge –

Does Commonality Drive Lower Costs?

(Yes, But Do Not Buck Market Trends/Supply Channels)

Common Belief

“Specifying everything creates local mass-market”

Meter Interface Standards

BIS misses PLC -
“Meter & More” &
“OGSP”

IS 15959 was
developed for
AMR.....NOT HAN,
NAN and WAN

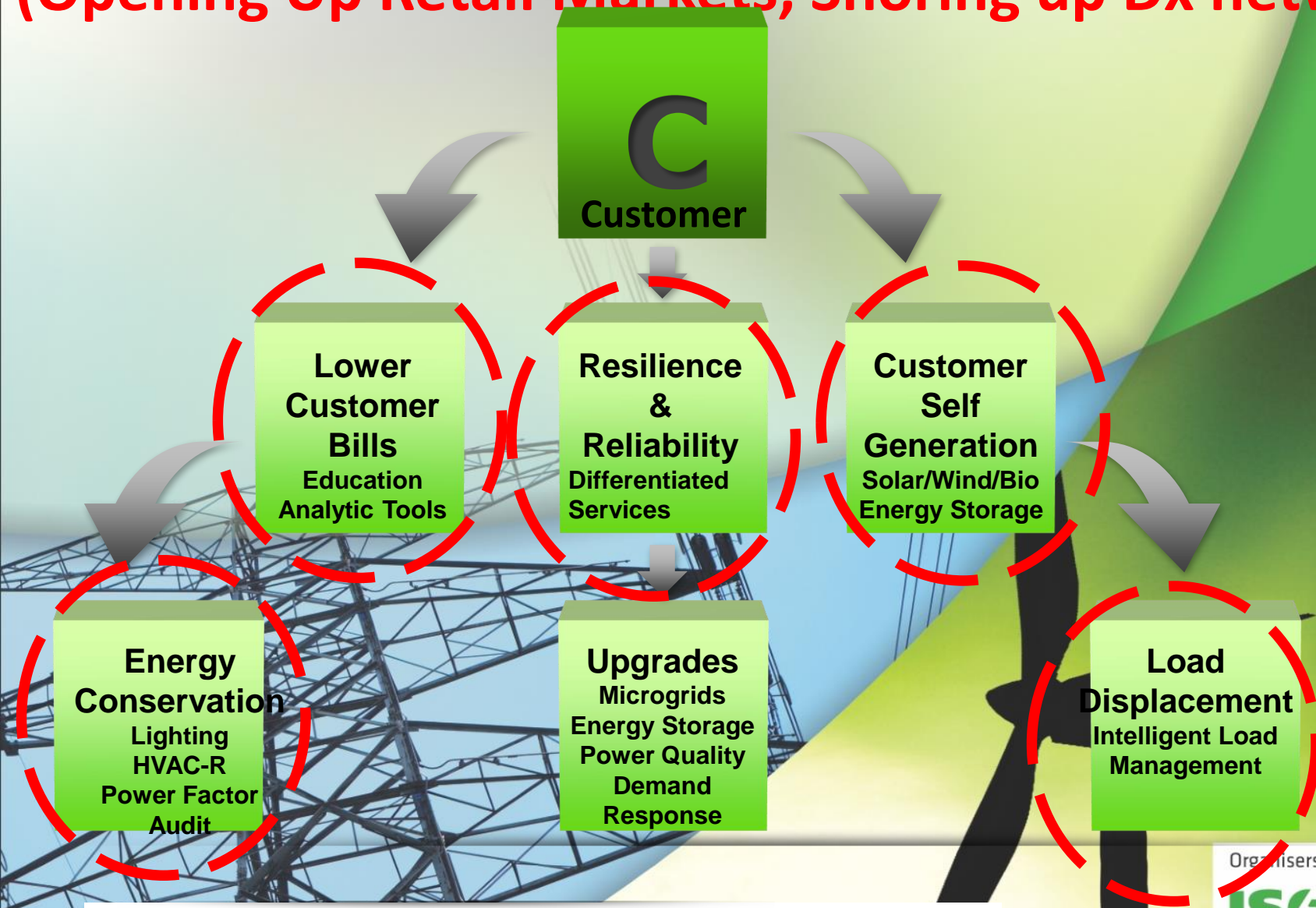
Technology will change

Recycle old to
other
locations

Gen 1, Gen 2,
Gen3 Meters

Indian Roadmap– Where should we be Focusing?

(Opening Up Retail Markets, Shoring up Dx network)



Thank-You

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Brief CV of Ravi Seethapathy

Fellow, Canadian Academy of Engineering

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Ravi Seethapathy, is an Adjunct Professor at the University of Toronto, Director Smart Grid Canada and an Expert Advisor in the Utilities/Power Systems area with over 30+ years of experience.

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.

Ravi sits as the Canadian expert on the International Energy Agency (IEA) PVPS Taskforce 14 on Large-Scale Solar Integration and on the International Micro-grid Forum. He is the Canadian Representative of CIGRE Canada on the C6 Study Committee (Dispersed Generation & Emerging Technologies) and sits on several of its sub-committees in Energy Storage, Rural Distribution, Electric Vehicles and Remote Micro-grid. 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 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 45 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.