

FORUM OF INDIAN REGULATORS

Webinar Report

(Second Quarterly Webinar)

“INTERFACE OF BLOCKCHAIN AND ENERGY SECTOR”

Date: 2nd December, 2020 (Wednesday)

Timings: 2:00PM Onwards (IST)

Organized by: -

Forum of Indian Regulators Centre, IICA



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Speakers



Dr. Jemma Green

Co-founder and Chairperson of Power Ledger



Mr. Vinod Tiwari

Head of Business Development and Sales,
Power Ledger

Convener & Moderator



Dr. Abha Yadav,

Associate Professor,
School of Competition Law & Market
Regulation

About the Speakers



Dr. Jemma Green
**Co-founder and Chairperson of Power
Ledger**

Setting her career trajectory early on, Dr Green became the voice of sustainability and corporate social responsibility in the business of big money lending while at J.P. Morgan in London. She then went on to complete a PhD in electricity market disruption and become a research fellow at Curtin University, was Deputy Lord Mayor of Perth, helped set up Australia's first fossil fuel free pension fund and has sat on numerous boards championing sustainable business such as the Water Corporation, Carbon Tracker and Climate-KIC Australia. In 2016 Jemma cofounded blockchain technology company Power Ledger and in 2018 received the EY Fintech Entrepreneur of the Year award.



Mr. Vinod Tiwari
Head of Business Development and
Sales, Power Ledger

Vinod is leveraging his network from many years working within the Australian energy sector, previously as the COO of Regen Power, General Manager Sales at Perth Energy and Senior Advisor Future Effect, to connect with client stakeholders across power and business domains, as well as across various third party providers to support the delivery of Power Ledger's blockchain offering; build new propositions and enhance existing customer experiences. His past roles also include managing technical sales and business development teams for General Electric in India. Vinod holds an MBA from the University of Western Australia and a Bachelor of Electrical and Electronics Engineering.

About the Convener & Moderator



Dr. Abha Yadav

Associate Professor

School of Competition Law & Market Regulation

Director, FOIR Centre, IICA

Dr. Abha Yadav (Ph.D) is a faculty at IICA who leads research and capacity building initiatives at the School of Competition Law & Market Regulation. She is also Director of the Forum of Indian Regulators (FOIR) Centre at IICA which is the knowledge and capacity building hub for the Central and State government regulators of the country. Dr. Yadav steers policy discussions, thematic discourses and enhancement of capacity building initiatives that are an integral and vibrant part of this unique Centre. Dr. Yadav serves as Course Director of the prestigious Certificate course in Competition Law and Advanced Professional Course in Competition Law and Market Regulation. She is faculty for Competition Law, Law and Public Policy, Freedom of Information, Regulatory Affairs, Laws for Women, Regulatory Impact Assessment, Labour laws etc. Dr. Yadav is a recipient of the prestigious Fox International Fellowship at Yale University, U.S.A. and the Lok Sabha of India Fellowship. She is an eminent scholar who has lectured widely on various legal issues in India and internationally.

Participant Profile

Regulatory officials from regulatory bodies across India, Researchers, Experts in power sector & FOIR Member Organizations.

No. of participants who attended the webinar: 73

FOIR Member & officials: 40

Others: 28



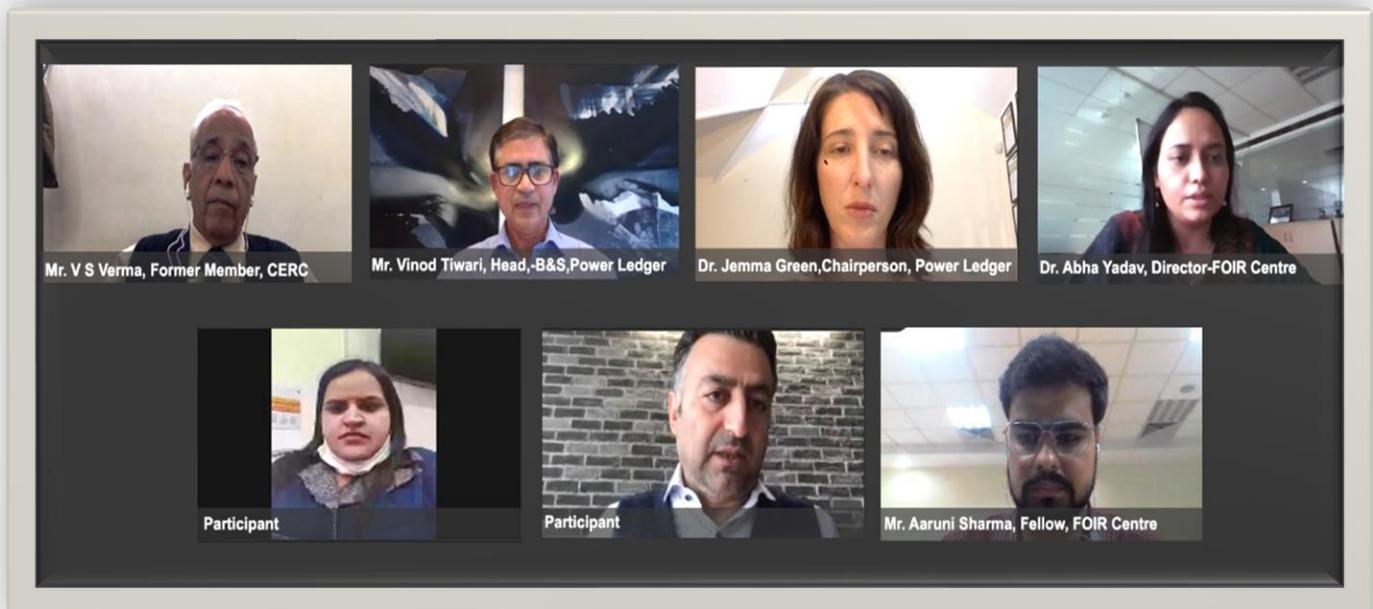
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Program Outline

The Forum of Indian Regulators (FOIR) organized the second quarterly webinar of FOIR on "Interface of Blockchain and Energy Sector" on 2nd December, 2020. The aim of the webinar is to help the energy sector regulators, it's stakeholders and others holding interest in the area to build knowledge on this innovative interface of technology and energy sector.

The participants of the webinar included members and officials from various regulatory bodies in India, researchers, experts in the power sector and FOIR member organizations.



Program Flow

The program began with a welcome speech by Dr. Abha Yadav, Associate Professor, School of Competition law & Market regulation & Director, FOIR Centre. She began by giving a brief introduction about the relevance of the topic highlighting importance of learning and adapting technological advancement. The brief on the theme of the webinar was followed by introduction of the speakers and their company 'Power Ledger'. Dr. Yadav further elaborated the format of the webinar to the participants.

The webinar began with opening note from Dr. Jemma Green, Co-founder and Chairperson of Power Ledger followed by remarks from Mr. Tiwari, Head of Business Development and Sales, Power Ledger. The presentation by Dr. Green and Mr. Tiwari was accompanied Question-Answer round, where questions were taken up from the participants by the moderator and efficiently answered by the speakers.

The participants received insights on electricity trading and usage of blockchain technology for facilitating the dispatch of electricity via virtual power plants to stabilize the grid. The speakers and participants appreciated FOIR Centre, IICA for organizing the webinar & appreciated the program's content.

The Webinar ended with a vote of thanks by Dr. Abha Yadav, Associate Professor, School of Competition Law and Market Regulations and Director FOIR Centre (IICA)

Introduction to the Webinar

Blockchain technology has the potential to revolutionize interactions between governments, businesses and citizens in a manner that was unfathomable just a decade ago. Though very often grouped with technologies such as artificial intelligence (AI) or IoT (Internet of Things), the technology is unique in its foundational nature. Unlike other technologies, which have the potential to deliver completely new services to citizens and other stakeholders alike, blockchain has the potential to revamp currently existing processes to unlock new sources of efficiency and value. In India, the Niti Ayog and the Centre for Excellence in Blockchain Technology established under the Ministry of Electronics & Information Technology has been working on pilot projects to understand the potential benefits of the emerging technology in development of critical e-Governance solutions.

The energy industry has been consistently catalyzed by innovations including rooftop solar, electric vehicles, and smart metering. Now, the Enterprise Ethereum blockchain has presented itself as the next emerging technology to spur growth in the energy sector through its smart contracts and systems interoperability. The World Economic Forum, Stanford Woods Institute for the Environment, and PwC in its joint report has identified more than 65 existing and emerging blockchain use-cases for the environment. These use cases include new business models for energy markets, real-time data management, and moving carbon credits or renewable energy certificates

onto the blockchain. This Distributed ledger technology has the potential to improve efficiencies for utility providers by tracking the chain of custody for grid materials. Beyond provenance tracking, blockchain offers unique solutions for renewable energy distribution.

Legacy energy sectors, such as oil and gas also stand to benefit from the implementation of Enterprise Ethereum solutions. Complex systems with multiple actors have the opportunity to benefit from blockchain technology. For example, petroleum is one of the most traded commodities and requires a network of refiners, tankers, jobbers, governments, and regulatory bodies. The complex network of participants suffers from siloed infrastructures and numerous process inefficiencies. Large scale oil and gas conglomerates are now seeking to invest in and implement blockchain technology because of its ability to lower costs and reduce harmful environmental impacts.

Oil and gas companies are particularly concerned about privacy and trade secrets. These private blockchain networks offer data per missioning and selective consortium access to pre-approved parties. Private and consortium blockchains provide an interim solution until public blockchains can implement the necessary privacy features that businesses demand.

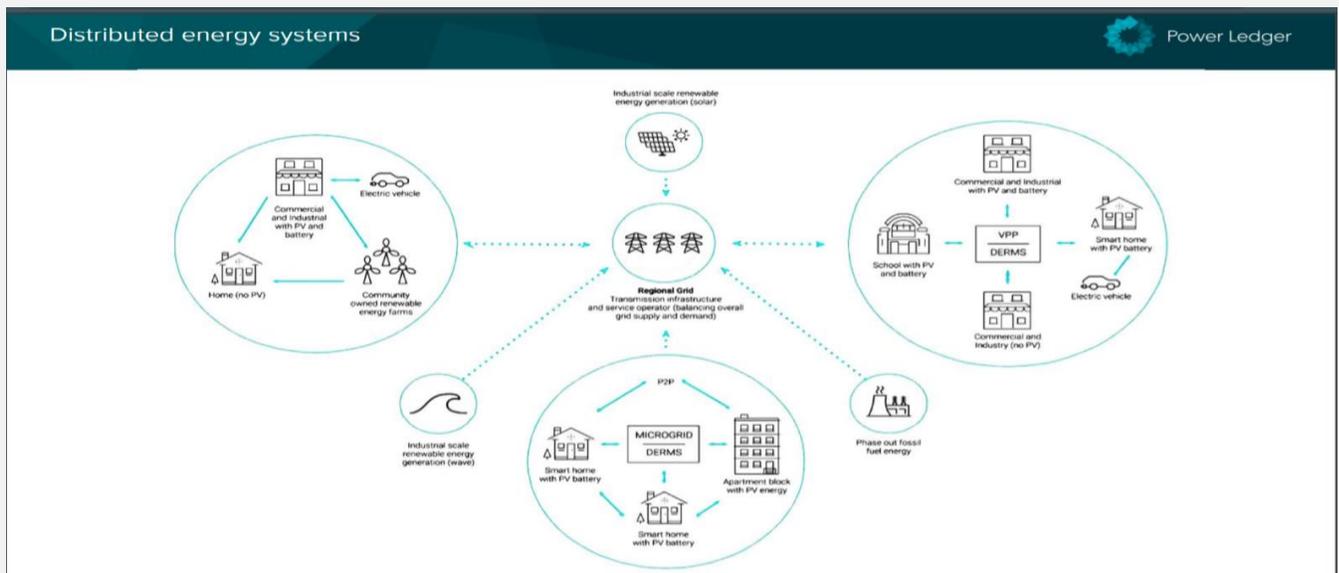
The main benefits of blockchain in the energy sector are reduced costs, environmental sustainability, increased transparency for stakeholders while not compromising privacy. A range of blockchain products that can be tailored to address various energy or sustainability applications, including the Wholesale electricity distribution, Peer-to-peer energy trading, Electricity data management, Commodity trading, Utility providers, Oil and gas resource exploration, Oil and gas resource storage and transportation.

Against the above background, this webinar would help the regulators in India especially from energy and electricity sector and the stakeholders to build knowledge on this innovative interface of the blockchain technology and the energy sector. It will also help the participants learn the application of blockchain technology in transforming e-governance and improving transparency.

Presentation by Dr. Green & Mr. Tiwari

The webinar began with the opening comments of Dr. Jemma Green, Co-founder and Chairperson of Power Ledger followed by remarks from Mr. Vinod Tiwari, Head of Business Development and Sales, Power Ledger. They both briefly highlighted the growth and development of technology overtime and its uses. Both the speakers advocated in favor of deregulation for making a grid work efficiently and enabling buyers and sellers to transact with each other directly without the need for an intermediary.

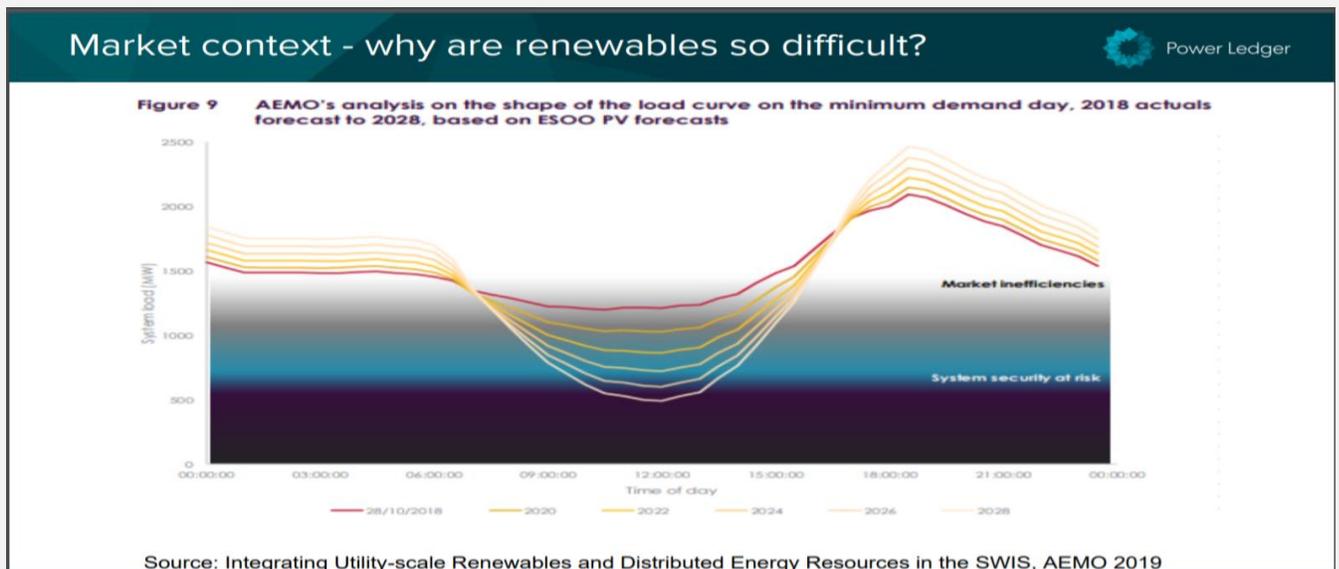
Mr. Vinod Tiwari began the presentation by explaining Distributed Energy Resource (**DER**), systems that are small-scale power generation or storage technologies (typically in the range of 1 kW to 10,000 kW) used to provide an alternative to or an enhancement of the traditional electric power system. He explained that the DER systems typically are characterized by high initial capital costs per kilowatt. Distributed energy resources have changed the power generation sector, disrupting traditional markets and distribution models.



During the course of the presentation he highlights that renewable energy sources are becoming increasingly more easily available every year. The clean energy revolution could not be timelier - with the effects of global climate change and our planet's resource scarcity coming into full view. The below, Graph is a load duration curve from Australia South-West Interconnected System which was used in the presentation by Mr. Tiwari to show, that rapid switch to rooftop solar is creating a very big "duck" curve that the grid operator is having to learn how to manage, as are others around the world where solar is a growing share of production.

The duck curve relates to the fall in demand in the middle of the day – driven by the uptake of rooftop solar – and the "ramping" needed to catch up with grid demand as it rises quickly as the sun sets in late afternoon, early evening.

The power system are not equipped to manage this "ramping" nature, Mr. Tiwari says, leading to thermal inertia being at risk, the grid face energy system security risk. The company power ledger, acknowledging the issue is into market-making technology that bridges gaps in the electricity system to make it more fluid and responsive.



Dr. Green highlighting the work Power Ledger is doing in the power sector to make electricity system more fluid continued the presentation. In the presentation, speaking on the feature of their software, Dr. Green discussed how their software is helping in energy trading. Below is the summary of the features of Power Ledger Software that may be useful in Indian context as well to save energy resources:

Power Ledger's software platform

Power Ledger

Energy and flexibilities trading

- xGrid- Sell and buy excess kilowatt hours across the grid, and help stabilise it at the same time.
- µGrid- Manage your microgrid with a real time market that optimises price.
- Balance VPP- Manage the peaks and troughs with a battery and make a profit in the process.
- MODE- Flexibilities marketplace for network operators to stabilise their grids.
- Vision- Choose the type and quality of energy you are sourcing, Wind, solar or traditional.
- PPA Vision- Manage the output, billing and settlement for commercial solar and wind farms.
- PPA Exchange: A marketplace for corporate PPAs

Environmental commodities trading

- Trace- Tracks and traces the life of renewable energy certificates (RECs).
- TraceX- Trade and settle RECs wherever you are in the world.

Source: Power Ledger platform

Mr. Tiwari highlighting solution in Indian context as India undergoes more renewable energy intake, we require more integration of Distributed Energy

resources which together can form Virtual Power Plant (VPP). In furtherance, Mr. Tiwari also spoke on how their new technological advancement, which is launching soon, “MODE: Marketplace Optimized Distributed Energy”. MODE is an ecosystem of connected industry stakeholders. The merits of this platform include, near real time settlement, blockchain record of all assets and trades etc.

Mr. Tiwari stated that Power Ledger’s technological intervention in energy sector has its presence in India as well. The UP government has introduced blockchain technology to its rooftop solar power segment and is the only state that has amended its regulatory framework to enable controlled P2P energy trading in India. The pilot project run by India Smart Grid Forum, was drafted by state power utility Uttar Pradesh Power Corporation Limited (UPPCL) and Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA). The pilot project will demonstrate the feasibility of Power Ledger’s platform to trade energy from rooftops with solar power to neighboring households/buildings. The results of the pilot project will be evaluated in order to formulate appropriate regulations to promote P2P trading of solar energy in the state.

Question – Answer Round

The presentation was followed by a question answer round, where the participants raised questions and shared several observations and opinions on the emerging blockchain technology and its application in energy sector. The speakers while answering to these questions spoke about the cryptographic token “SPOT” which is equal to the local denomination of a currency, and this is used to record the actual trading in the backend.

Answering to a question, “How do regulators envisage evolving their billing, CRM and legacy IT infrastructure as part of this energy transition to accommodate blockchain technology?” Dr. Green answered, that on the billing side, conventional billing system are not really set up, so the billing providers will change over time and in relation to the question of demand side management, Dr. Green stated that flexibilities is rooting from one or combination of three sources. First source being, curtailment of solar, the second one being batteries either dispatching electricity or consuming surplus electricity on the grid. Hence, Demand response is component of flexibilities’ market.

Vote of Thanks

The webinar ended with a vote of thanks by Dr. Abha Yadav thanking the esteemed speakers and participants for sharing their knowledge and allowing the Indian counterparts learn from their experiences. The efforts of FOIR and IICA for the webinar was also much appreciated by the panelists and the participants.

Queries and Feedback:

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