

THE BLOCKCHAIN TECHNOLOGY REVOLUTION: IMPLICATIONS FOR THE ENERGY SECTOR

November 5-6, 2018
Hyatt Regency New Orleans
New Orleans, LA

POST-CONFERENCE WORKSHOP

Blockchain-Based Cybersecurity for Energy Grids

TUESDAY, NOVEMBER 6, 2018



EUCI is authorized by IACET to offer
1.0 CEUs for the conference and
0.3 CEUs for the workshop

OVERVIEW

Blockchain is the foundational technology that enables the now famous 'bitcoin' to function. But, the technology has much greater applications than just cryptocurrency, with many experts believing it will be revolutionary for the energy sector.

This conference will dive into the business use cases of blockchain technology within the energy industry, cutting through the hype to focus on realistic applications of blockchain that many companies are already integrating. Diverse content experts will present actual data, case studies and pilot projects involving blockchain to showcase what this technology can actually do for energy companies, while evaluating the longer-term implications for business and blockchain's relationship to the evolving electric grid and other emerging technologies. This program will maintain an objective perspective of blockchain, addressing concerns about the technology, and evaluating if it is actually appropriate for every application it is being looked at for.

LEARNING OUTCOMES

- Assess the different ways and opportunities for blockchain technology to be applied in the energy industry
- Describe the regulatory and legal considerations, as well as potential barriers, challenging the adoption of blockchain technology
- Evaluate the pros and cons of blockchain technology applications for tracking systems and the environmental commodity marketplace
- Review a regulator's perspective on blockchain technology and its potential solutions
- Examine utility and industry use cases and pilot projects involving blockchain technology:
 - o Oklahoma Gas & Electric
 - o Exelon Utilities
 - o Duke Energy
 - o Pacific Gas & Electric
 - o Alectra Utilities
- Review opportunities that blockchain technology creates for automation, cost reduction, new business models, security and data optimization
- Discuss the role of blockchain technology in conjunction with:
 - o Energy storage
 - o Electric vehicles (EV) charging applications
 - o distributed energy resource (DER) optimization & management
 - o transactive energy applications
 - o improving existing systems
- Analyze business considerations for implementing blockchain and if the technology is appropriate



“High value conference. Not too big. Questions got answered and enough time to discuss with speakers.”

CEO, Blackstone Energy

AGENDA

MONDAY, NOVEMBER 5, 2018

8:00 – 8:30 am

Registration & Continental Breakfast

8:30 – 10:00 am

Opening Panel: Understanding Blockchain Technology and Its Emerging Role in the Energy Industry

- Fundamental components and operational processes of blockchain technology
- State of the blockchain market and technology growth
- Key qualities of blockchain technology and their industry applications
- Overview of blockchain technology functions and processes
- Determining if blockchain is right for the business
- How has blockchain evolved as an application in the energy industry over the past year, and even the past six months?
- Challenges to widespread adoption
 - o Regulatory hurdles
 - o Startup costs
 - o Integration issues
 - o Scaling limitations
- Overview of blockchain technology functions and processes
- Determining if blockchain is right for a specific business
- What are the applications of blockchain technology in the energy industry?
 - o Cryptocurrencies as a means for paying electricity bills
 - o Trading energy via smart contracts
 - o Oil and LNG tracking and trading
 - o Transactive energy systems/peer-to-peer markets
 - o Distributed energy resource management
 - o Renewable Energy Credit (REC) and other sustainability certificates
 - o Electric vehicle (EV) charging applications
 - o Improving existing systems
 - Utility billing
 - Demand response programs
 - Wholesale energy trading

Moderator: Ben Tejblum, Associate, K&L Gates

Kristen Brown, Principal Business Technology Specialist – Utility of the Future, Exelon

Kendrick Carroll, Sr, IT Manager, Emerging Digital – Digital Transformation, Duke Energy

Michael Mylrea, Senior Manager – Cybersecurity for Electricity Infrastructure, Pacific Northwest National Laboratory (PNNL)

10:00 – 10:15 am

Morning Break

AGENDA

MONDAY, NOVEMBER 5, 2018 (CONTINUED)

10:15 – 11:45 am

The Pros and Cons of Blockchain Technology Tracking System Applications and the Environmental Commodities Market

Currently, environmental commodities such as carbon offset credits and renewable energy credits are monitored manually and recorded on Excel spreadsheets and PDFs. They are typically reconciled quarterly, require costly auditing, and still suffer from “double-counting” issues. Blockchain applications offer a number of opportunities for this space to dramatically reduce the time and cost associated with tracking and redeeming environmental commodities. This session will evaluate possible applications and current projects in this space, discussing:

- What are current blockchain applications and pilot projects with:
 - o RECs
 - o Carbon credits and offsets
 - o Natural gas
 - o Renewable fuels
- How is blockchain emerging as a new technology in the environmental commodities marketplace?
- How could blockchain technology improve current tracking systems?
- What are the limitations of blockchain technology?
- What would be a model consumer situation?
 - o How would a tracking system vs. blockchain meet consumer demands?
 - o What speed and cost are required to achieve a certain transaction?
- How might the role evolve for third party verifiers and certifiers in incumbent systems in a blockchain-based trading system?
- How can the energy industry ensure the marketplace doesn't reinvent the wheel and keep up the credibility guard-rails, while still fostering innovation?
- What mechanisms need to be put in place to ensure consumers are getting the same value?

Moderator: Buck Endemann, Partner, K&L Gates

Alex Anich, Manager – Renewable Market Intelligence, NRG Energy

James Critchfield, Director – Renewable Energy Technology Market Development, Environmental Protection Agency (EPA)

Benjamin Gerber, Executive Director, Midwest Renewable Energy Tracking System (M-RETS)

11:45 am – 12:45 pm

Group Luncheon

12:45 – 1:30 pm

The Regulatory Opportunity: Overcoming Barriers to Activate Blockchain's Potential in Energy Markets of the Future

This session will discuss transactive energy and blockchain technology from a regulatory standpoint, evaluating:

- Current regulatory hurdles and barriers to widespread blockchain technology adoption
- Pathways to enabling federal action to reduce barriers for blockchain and digital technology in energy markets
- Blockchain's potential to:
 - o improve energy transactions and environmental commodities markets
 - o facilitate verifiable and traceable renewable energy attributes
- How could blockchain offer harmonization to the layered and complex policies in the western energy markets?
 - o Non-technical solutions – forcing large-scale agreement across jurisdictions in how to track renewable energy the same
 - o Technical solutions – ‘stacking’ of new attributes, such as capacity or flexibility value
- On the administration side, will blockchain reduce transaction costs around REC tracking and trading?

Rebecca Smith, Senior Policy Analyst – RPS + Renewable Energy Markets, Oregon Department of Energy (ODOE)

Thomas Hassenboehler, Executive Director, Energy Consumer Market Alignment Project (EC-MAP)

AGENDA

MONDAY, NOVEMBER 5, 2018 (CONTINUED)

1:30 – 2:15 pm

Oklahoma Gas & Electric: Blockchain Technology for Economic Development

This session will discuss how one utility is evaluating blockchain technology as a possible vehicle for economic development. It will consider the possible applications of blockchain projects that could promote economic development -- such as the development of smart grids, microgrids and distributed resources -- considering the role of transactive energy via blockchain in such projects. It will further discuss the regulatory parameters that need to evolve for such projects to move forward.

Richard Cornelison, Economic Development Manager, Oklahoma Gas & Electric (OGE)

2:15 – 2:30 pm

Afternoon Break

2:30 – 3:15 pm

Exelon: Enabling the Utility of the Future through Blockchain

Recently, ComEdison's "Utility of the Future" team expanded across all four of Exelon's regulated utilities. This session will address how Exelon is evaluating blockchain technology within its "Utility of the Future" vision, discussing:

- The company's current focus areas for blockchain technology:
 - o Transactive energy
 - o Demand response
 - o Electric vehicles (EVs)
- Working within the current regulatory framework to demonstrate blockchain's value
- Utilizing blockchain to enable more transparent platforms and customer/third party engagement
- Preparing for increased DER penetration — integrating blockchain into existing platforms
- Considering Exelon consists of four different regulated utilities, can a blockchain-based marketplace scale between territories?

Kristen Brown, Principal Business Technology Specialist – Utility of the Future, Exelon

3:15 – 4:00 pm

Duke Energy: Efforts to Integrate Blockchain into Operations

Duke Energy is working to lead the industry with innovative technologies; as part of this goal, the utility is actively working with blockchain technology. This session will discuss Duke Energy's blockchain use cases in development and its overall strategy to integrate blockchain into the company's business operations.

Kendrick Carroll, Sr., IT Manager, Emerging Digital - Digital Transformation, Duke Energy

4:00 – 5:15 pm

Storage and Electric Vehicle (EV) Charging – Blockchain Applications

- How can blockchain technology improve capabilities and uses of energy storage and electric vehicles?
- What role might blockchain have in optimizing the integration of distributed energy resources (DERs)?
- How might the energy industry continue to see coordination between blockchain, storage and EVs in transactive energy markets?
- Case study: Evanston IL deployment of solar carports, battery storage and EV chargers in public parking lots
- Case study: Pacific Gas & Electric – EVs, smart contracts and generating/tracking carbon credits

Moderator: Bryan Jungers, Lead Analyst, E Source

Mike Ashley, Co-founder & Vice President, CleanEnergyBlockchain

Richard Kim, Principal Product Manager – Blockchain & Vehicle Grid Integration (EVs), Pacific Gas & Electric

AGENDA

TUESDAY, NOVEMBER 6, 2018

8:00 – 8:30 am

Continental Breakfast

8:30 – 10:00 am

Cryptocurrency Mining Operations: Energy Industry Impacts

Cryptocurrencies – most notably Bitcoin— are virtual currencies that have become a global phenomenon. Bitcoin and other top cryptocurrencies operate by running powerful computers (“mining rigs”) to solve complex mathematical puzzles to win units of cryptocurrency. Running these rigs at full speed is highly energy intensive, and as cryptocurrencies have grown in popularity across the globe, their operations have required increasingly staggering amounts of electricity. This session will evaluate this phenomenon and what it means for the energy industry, discussing:

- Cryptocurrency mining and transactions 101 – why do they require energy?
- Consensus mechanism types:
 - o Proof-of-work (POW)
 - o Proof-of-stake (POS)
- Overview of most popular cryptocurrencies and their energy consumption:
 - o Bitcoin
 - o Ethereum
 - o Litecoin
 - o Ripple
- Cryptocurrency mining operation overview:
 - o Day in the life of a cryptocurrency miner
 - o Needs: electricity, internet speed, temperature
 - o Typical load profile
 - o Interconnection and transmission infrastructure needs
- The path forward: strategies for the energy industry to successfully collaborate with crypto miners and efficiently manage their load

Nicholas Amato, CEO, 803 Mine

Bryan Jungers, Lead Analyst, E Source

10:00 – 10:15 am

Morning Break

10:15 – 11:00 am

Valuation of Utility Data Through Blockchain and Artificial Intelligence

This session will discuss how energy companies can realize the value of their data with paired implementation of Artificial Intelligence (AI) and blockchain. It will focus on two specific applications:

- Predictive failure for at-risk utility assets
- Streamlining compliance filing with FERC

Colin Gounden, President & CEO, VIA Science

11:00 – 11:45 am

Solar + Storage Virtual Power Plant: The Role of Blockchain Technology

This session will present new data resulting from Alectra Utilities’ Power.House pilot in Ontario – a 20-home solar and storage deployment that launched in early 2016. Operating off blockchain technology, the pilot allows Alectra to treat the 20 homes as a single, virtual power plant (VPP) and provide demand response or electricity when outages occur. This session will give an overview of the Power.House project and how blockchain technology optimizes the performance of the VPP, discussing:

- The utility’s “Virtual Power Plant” blockchain pilot
 - o Aggregated residential solar + storage customers
 - o Managing multiple participants on a mini exchange
 - o Managing market services with real-time contract settlement
- “Tokenizing” energy transactions on a distributed ledger
 - o “Buy-in” of tokens based on value of Canadian dollar
 - o Opportunities for merchant buy-in to manage energy trading in real time
 - o Cashing out

Vikram Singh, Director – Advanced Planning, Alectra Utilities

POST-CONFERENCE WORKSHOP

Blockchain-Based Cybersecurity for Energy Grids

TUESDAY, NOVEMBER 6, 2018

12:30 – 1:00 pm **Workshop Registration**

1:00 – 4:30 pm **Workshop Timing**

OVERVIEW

The evolution of the electric grid to increased decentralization and digitalization is creating new security issues with rapid, complex energy transactions and data exchanges taking place. Blockchain-based technology could offer an array of cyber security solutions to these issues, helping enhance overall security and resiliency of the electric grid. At the same time, certain features of blockchain – such as token launches – are vulnerable to potential threats and cyber-attacks.

This workshop will evaluate security and blockchain from all angles, focusing on opportunities for blockchain technology to improve and enhance cybersecurity and resiliency of the electric grid. It will discuss key features of the technology and their applications for promotion of grid security and resiliency in the era of power grid decentralization.

LEARNING OUTCOMES

- Evaluate how blockchain technology could promote cybersecurity solutions for the evolving electric grid
- Review key features of blockchain-based grid cybersecurity and their applications
- Analyze how blockchain technology can minimize security risks for companies

WORKSHOP AGENDA

- Key Features of Blockchain Technology
 - Transaction security
 - Data storage and sharing
 - Identity management
 - Community trust
 - Decentralized applications
- The Evolving Electric Grid: Needs for Increased Cybersecurity
 - Trends in electric grid evolution
 - Decentralization
 - Digitalization
- Blockchain ‘Weaknesses’ and Security Risks
 - Areas of vulnerability
 - Potential threats
- Blockchain Opportunities for Security – What Can Blockchain Solve?
 - Secure distributed energy resources (DERs) at grid edge
 - Promote visibility, control and security to grid edge for pace and scale of real-time energy transactions
- Developing Blockchain Cybersecurity Technology
 - Keyless signature infrastructure (KSI)
 - Smart Contracts

WORKSHOP INSTRUCTORS

Michael Mylrea

Senior Manager – Cybersecurity for Electricity Infrastructure, Pacific Northwest National Laboratory (PNNL)

Michael Mylrea is a Senior Manager for Cyber Security and Blockchain lead at Pacific Northwest National Laboratory (PNNL) with over 15 years' experience working on cybersecurity, energy, technology, and national security issues. This experience includes leadership positions in industry and government, including, but not limited to: U.S. Department of Energy and Defense, Cyber Innovation Development (CSO 7 Co-Founder), Deloitte, U.S. Cyber Consequences Unit, Lakeside Oil, Harvard Berkman Center, and Good Harbor Consulting. At PNNL, he leads several cybersecurity, Internet of Things (IoT), and blockchain projects, including one of the first grid cybersecurity blockchain projects sponsored by the U.S. Department of Energy. Mr. Mylrea is also a subject matter expert on various industrial control system cybersecurity projects, leading vulnerability assessment teams and providing cybersecurity expertise to several industry and government partners. He is a cybersecurity adviser to Rocky Mountain Institute and Energy Web Foundation's Blockchain initiative, as well as representative to Washington State's Internet of Things Council.

Michael Ashley

Co-Founder & Vice President/ CleanEnergyBlockchain

Michael Ashley has a PhD in Chemical Engineering from Northwestern University with a BS from the University of Notre Dame. His thesis work was at the interface of chemistry and materials science at the nanoscale, investigating new materials for solar cells and batteries, and he will use this skill set to evaluate emerging clean energy technologies. Concurrently, Mr. Ashley has been working to develop strategies and business models to help accelerate the deployment of clean energy assets. He serves PJM, Ontario, and MISO.

INSTRUCTIONAL METHODS

PowerPoint presentations and case studies will be used in program.

REQUIREMENTS FOR SUCCESSFUL COMPLETION

Participants must sign in/out each day and be in attendance for the entirety of the conference to be eligible for continuing education credit.

IACET CREDITS



EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the ANSI/IACET Standard which is recognized internationally as a standard of good practice. As a result of their Authorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the ANSI/IACET Standard.

EUCI is authorized by IACET to offer 1.1 CEUs for the conference and 0.3 CEUs for the workshop.

EVENT LOCATION

A room block has been reserved at the Hyatt Regency New Orleans, 601 Loyola Avenue New Orleans, LA 70113, for the nights of November 4-5, 2018. Room rates are \$199 plus applicable tax. Call **1-504-613-3900** or [click here](#) for reservations and mention the EUCI event to get the group rate. The cutoff date to receive the group rate is October 14, 2018 but as there are a limited number of rooms available at this rate, the room block may close sooner. ***Please make your reservations early.***

REGISTER 3, SEND THE 4TH FREE

Any organization wishing to send multiple attendees to this conference may send 1 FREE for every 3 delegates registered. Please note that all registrations must be made at the same time to qualify.

SPONSORSHIP OPPORTUNITIES

Do you want to drive new business through this event's powerful audience? Becoming a sponsor or exhibitor is an excellent opportunity to raise your profile before a manageably sized group of executives who make the key purchasing decisions for their businesses. There is a wide range of sponsorship opportunities available that can be customized to fit your budget and marketing objectives, including: **Platinum, gold, or VIP sponsor, Reception host, Networking break host, Tabletop exhibit, Workshop sponsor, Lanyard sponsor, Luncheon host and Breakfast host.**

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PLEASE SELECT

BUNDLE PRICE: THE BLOCKCHAIN TECHNOLOGY REVOLUTION
CONFERENCE AND WORKSHOP: NOVEMBER 5-6, 2018: US \$1795
EARLY BIRD on or before OCTOBER 19, 2018: US \$1595

THE BLOCKCHAIN TECHNOLOGY REVOLUTION
CONFERENCE ONLY: NOVEMBER 5-6, 2018: US \$1395
EARLY BIRD on or before OCTOBER 19, 2018: US \$1195

**POST-CONFERENCE WORKSHOP ONLY: BLOCKCHAIN-BASED
CYBERSECURITY FOR ENERGY GRIDS**
TUESDAY, NOVEMBER 6, 2018: US \$595
EARLY BIRD on or before OCTOBER 19, 2018: US \$495

ENERGIZE WEEKLY

EUCI's Energize Weekly e-mail newsletter compiles and reports on the latest news and trends in the energy industry. Newsletter recipients also receive a different, complimentary conference presentation every week on a relevant industry topic. The presentations are selected from a massive library of more than 1,000 current presentations that EUCI has gathered during its 31 years organizing conferences.

Sign me up for Energize Weekly

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

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OR Enclosed is a check for \$ _____ to cover _____ registrations.

Substitutions & Cancellations

Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before October 5, 2018 in order to be refunded and will be subject to a US \$195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of conference cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices. EUCI reserves the right to alter this program without prior notice.