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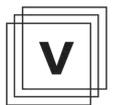
BLOCKCHAIN & ENERGY ASIA

27 NOVEMBER 2018 - SINGAPORE

PART OF THE ASIA BLOCKCHAIN WEEK

POST EVENT REPORT

CONTENT
CURATED
BY



VERTECH
CAPITAL



EXECUTIVE SUMMARY

"Success for blockchain applications in the energy sector will come, but in phases, with regulation being the biggest barrier to adoption. To prove the viability of blockchain for mainstream adoption, companies need to find workarounds in order for solutions to be deployed, tested and optimized."



- Yuan Sheng Yu,
Senior Analyst of
Lux Research

On 27th November 2018, Solarplaza and Vertech Capital organized Blockchain2Energy Asia 2018 at Suntec Singapore, a conference focused on blockchain-energy applications in Asia Pacific. The event gathered over 70 executives from Electricity Generating Authority of Thailand (EGAT), Lux Research, Bloomberg Intelligence, BCPG, Singapore Power (SP) Group, Ethereum Foundation, and Frost & Sullivan among others to discuss use cases, opportunities, and adoption barriers for blockchain innovation in the energy and utilities space.

During the opening address by the Director of Vertech Capital, Sheryl Foo highlighted the market opportunity for blockchain as Asian energy markets are beginning to liberalize. While the movement towards open energy markets is favorable for the rise of new decentralized business models, key issues hindering the digitization of the energy sector still exist, such as regulatory bottlenecks.

Over the course of the conference, there was a series of panel sessions focused on the current state of the energy blockchain market in APAC, key pilot projects, as well as challenges that will shape the future energy landscape.

Key pilots discussed during the panel sessions include:

- Transaction pricing for blockchain-based power trading by Kansai Electric Power Co. (KEPCO) and the University of Tokyo
- P2P energy trading at T77 Precinct in Thailand by BCPG and Power Ledger
- LO3 Energy's energy trading at the Latrobe Valley Microgrid in Australia

KEY INSIGHTS



THE MACRO LANDSCAPE

Blockchain is still in its infancy. The success of blockchain pilots will have high interdependency on a matrix of market-specific factors. Regulation, infrastructure limitations, incumbent players, and traditional market structures are instrumental in determining the viability of blockchain.



MARKET-SPECIFIC DEVELOPMENTS

Blockchain trials have gradually gained momentum across liberalized and decentralizing markets in Asia Pacific. However, grid operators remain cautious about piloting new technologies.

- Liberalized electricity markets: Australia
- Decentralizing markets: Singapore, Malaysia, Japan, Philippines



DEEP DIVE INTO BLOCKCHAIN PILOTS

In Asia Pacific, 4 categories of blockchain use cases are emerging.

- Wholesale energy trading
- Peer-to-peer (P2P) energy trading
- Renewable energy certificate (REC) markets
- Renewable energy financing



FUTURE GROWTH TRAJECTORY

Venture capital funds are propelling the upward growth trajectory of blockchain in Asian energy markets. The future outlook is promising but the path to mainstream adoption is fraught with uncertainty.

Real-world deployments and commercial applications are gaining unprecedented traction. There is a new urgency for regulatory reforms and prosumer-centricity in order to move towards large-scale adoption.

OPENING ADDRESS



"In order to move towards a **decentralized, decarbonized** and **digitized energy ecosystem**, energy companies will need to place consumers at the forefront of the conversation. Let us start enabling and facilitating the transparent participation of prosumers in APAC energy markets"

- Sheryl Foo, Director of Vertech Capital

OVERVIEW

STATE OF THE MARKET: ENERGY-BLOCKCHAIN IN ASIA



Most energy markets in Asia Pacific are highly regulated and centralized. While this limits the scope of several blockchain applications in the energy sector, the technology is gaining the interest of several utilities and power companies owing to its ability to carry out real-time arbitrage, put data at the forefront of all energy-related decisions, as well as track the value of energy production and consumption as the structure of distribution grids evolve.

FAR FROM MAINSTREAM?
PERHAPS NOT. IT IS PROJECTED
THAT BY 2030, BLOCKCHAIN
APPLICATIONS WILL EMERGE
INTO MAINSTREAM ADOPTION

1. The move from academic to commercial development

During the panel session, keynote speakers from Lux Research and Electrify.Asia highlighted that advances in blockchain innovation have pivoted rapidly from academic research towards industry applications and commercial opportunities.

China is one of the leading markets for knowledge production and research for blockchain.

This points to a larger trend that China will be among the first movers that aim to address the business case for blockchain while regulating the trade of tokens and cryptocurrencies.



2. Driving the digital energy revolution

Growing interest in the digitalization of the energy industry is a key factor driving blockchain's momentum in the region.

"A lot of focus in the energy sector has shifted to the consumers. Things are moving downstream and this is where we see new business opportunities being created."

- Ravi Krishnaswamy, Vice President of Energy & Environment at Frost & Sullivan

Krishnaswamy also shared that utilities are increasingly adopting digital technologies with a focus on big data analytics and artificial intelligence (AI) to optimize descriptive, diagnostic, and predictive features across the energy value chain.

Utilities in several APAC markets, such as in Singapore, Japan, and China, are leading the smart grid revolution. The focus on big data analytics positions blockchain to be an essential tool for the energy industry to allow settlement and for the value of data to be tracked in an accurate, responsible, and transparent way.

Smart grid and digital energy initiatives in APAC have witnessed success through strategic partnerships

between large energy incumbents and digitally-driven companies.

Southeast Asia is emerging as a hotbed for blockchain trials. Singapore Power has partnered with 3M for grid sensing and analytics. Malaysia's leading utility TNB is collaborating with Trilliant for advanced metering infrastructure (AMI) roll out.

Utilities and energy companies in APAC should consider employing a similar strategy for blockchain applications by partnering with innovative organizations who are leaders in the blockchain space.

3. Testing applications in the current market state

Fossil fuels will become the dominant source of energy in Asia Pacific. While the most common applications of energy blockchain are linked to renewable energy and the rise of 'prosumers', the adoption of blockchain in the energy industry can be accelerated by learning from key use cases across traditional energy sources such as supply management, energy provenance at a grid level, and oil and gas asset tracking.

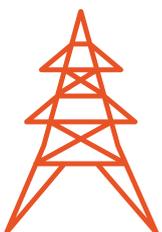
Launching applications in traditional energy sources can be a strategic channel to test and optimize the technology and financial feasibility while the renewables and solar rooftop markets develop and mature.

CHALLENGES FOR ADOPTION

In Asia Pacific, blockchain pilots and investments have been concentrated in the following 4 areas:

- Peer-to-peer (P2P) energy trading
- Wholesale grid transactions
- Renewable energy certifications
- Renewable Energy Financing

1. Peer-to-peer (P2P) Energy Trading



P2P energy trading is the most common use case of blockchain pilots in APAC.



P2P energy trading constitutes approximately 35% of the initiatives around blockchain and energy worldwide.

Benefits of P2P trading include allowing secure energy transactions between prosumers and consumers and greater transparency in energy sources to promote sustainable consumption.

However, in addition to regulatory barriers surrounding the sale of electricity in most markets in APAC, one barrier for P2P trading is the lack of economic viability in geographies where projects have been implemented.

Limited information is available on the financial benefits of P2P trading for end consumers, and several markets in APAC lack the infrastructure required for distributed energy generation, consumption, and trade.

Countries trialling P2P energy trading include Japan, Korea, Thailand, and Australia. However, its scalability and feasibility for mainstream adoption remain to be evaluated.

2. Wholesale Grid Transactions

Blockchain smart contracts can automate wholesale electricity transactions across the grid and reduces credit risk, as well as the cost per trade of electricity from production to consumption sources.

Blockchain platforms can also connect wholesale energy trading platforms used by different stakeholders, thus eliminating the need for brokers.

However, despite addressing issues such as high transactional costs and high operational costs, blockchain adoption in wholesale grid transactions will be limited by the attitude of grid operators towards innovation, which generally tends to be cautious.

Wholesale grid transactions are currently being piloted in Singapore and Japan.

3. Renewable Energy Certifications

Blockchain can streamline and automate the process of issuing, tracking, and trading environmental attributes such as renewable energy certificates (RECs).

Asia has gained significant momentum for environmental attributes, with more corporations turning to RECs to meet national generation and offset goals and key industrial markets such as China launching extensive carbon trading schemes.

Blockchain has a clear market position to bridge the various national-level REC and carbon trading platforms for cross-border trading. Compliance markets, however, tend to have deeply rooted institutions that handle transactions. Blockchain adoption will therefore depend on the willingness of these participants to move outside of existing market boundaries and structures.

Examples presented at the conference include SP Group's proprietary REC Marketplace and South Pole Group's blockchain pilot for carbon credit tokenisation in Thailand, which can reduce the cost of cross-border REC trading and thus renewable energy compliance.



THE SESSION WAS ATTENDED BY C-LEVEL EXECUTIVES, REGULATORS AND PROFESSIONALS IN THE ENERGY SECTOR

4. Renewable Energy Financing

Blockchain platforms can be used to make the process of financing renewable energy projects more cost effective, efficient, and quicker decision making by automating and standardizing due diligence, third party certificates, deal discovery, and asset management.



Over \$190 billion is predicted to be invested in renewable energy projects in Asia by 2021

Following the depreciation of cryptocurrencies after the ICO boom in 2017, regulators in APAC have adopted conservative attitudes towards cryptocurrency, which is likely to influence the speed of regulatory transformation.

While the necessity of cryptocurrencies for blockchain applications can be debated, the importance of utility token economics and user value is key for blockchain's commercialization.

INVESTMENT IN APAC (Q1 2017 - Q1 2018)



Total global blockchain project investment: USD \$16 Billion



Blockchain energy projects received approximately 7% of total global blockchain project investment



APAC received approximately 34% of overall investment in energy related blockchain projects

By addressing challenges such as high costs and communication requirements, blockchain-based platforms can lower barriers to entry in the industry and create a more inclusive investor pool.

PILOTING BLOCKCHAIN TRIALS IN APAC

150+

THERE ARE OVER 150 DIVERSE APPLICATIONS OF BLOCKCHAIN IN THE ENERGY SECTOR THAT ARE BEING PILOTED WORLDWIDE



JOSEPH JACOBELLI,
SENIOR ANALYST OF BLOOMBERG INTELLIGENCE

Across the blockchain maturity roadmap, most blockchain pilots in the Asia Pacific energy industry are still in stages 1 and 2.



PRE-COMMERCIALISATION (STAGES 1 & 2)

- EGAT NETP in Thailand
- KEPCO power trading in Japan
- South Pole REC Trading Platform
- Internet of Energy by State Grid Corporation in China
- Carbon credits by BYD, DNVGL and VeChain in China

POST-COMMERCIALISATION (STAGES 3 & 4)

- Singapore Power (SP) REC Trading Platform
- Power Ledger
- Electrify.Asia

ADOPTION BARRIERS

Regulation is the biggest barrier for blockchain adoption

Despite the benefits blockchain brings, grid operators in Asia Pacific remain conservative.

An underlying contributor to slow regulatory reform is the interdependency between blockchain technology and cryptocurrencies, which is likely to prompt a cautious attitude by early adopters until applications can be decoupled from the volatility that is associated with cryptocurrencies.

Nonetheless, an increasing number of forward-looking utilities in APAC have been launching pilot projects to assess the feasibility of blockchain technology in local markets and evaluate potential regulatory reforms.

The future outlook is optimistic. Energy blockchain applications have the potential for mass adoption if they can prove commercial viability as well as economic and financial advantage over the status quo.

Key insights from the conference about challenges to mass adoption and how they can be resolved are:

1. Change will happen in phases

Use cases vary according to market requirements and structure, and changes will materialize in phases depending on technology maturity and speed of regulatory reform. Applications such as REC trading will gain traction faster as they face fewer challenges compared to P2P energy trading that requires installation of new infrastructure and a mature solar rooftop market.

2. Cross-domain technology application is key

Blockchain must also be used collaboratively with other emerging technologies including AI and robotics to enhance its impact and accelerate the rate of blockchain adoption.

3. Assessing the viability of alternative blockchain platforms

Stakeholders are solving blockchain's scalability issue in various ways.

In the energy context, majority of the pilot projects in APAC are employing private blockchain platforms, or permissioned networks in which only a set of approved nodes can participate, to enhance scalability and privacy for microtransactions.

Various energy companies are also addressing the technical limitations of blockchain through alternative distributed ledger technologies such as Directed Acyclic Graph (DAG), a data structure that only allows topological ordering and does not have miners, and hashgraph, a data structure with distributed consensus, for full-scale adoption in the energy sector.

Energy blockchain applications will be transformative in driving decarbonization, decentralization, digitalization and electrification. Adoption will influence the current and future status of market incumbents by providing growth opportunities and revenue erosion in different ways, however it is necessary to cut through blockchain's hype to evaluate real use cases in the context of each energy market's structure and limitations.

Blockchain is predicted to be the jolt Asia's energy markets need to drive innovation, where deregulated markets such as Australia and Singapore are likely to be primary hotbeds for pilot projects in the foreseeable future.

In Thailand, the National Energy Trading Platform (NETP) by EGAT will be leveraged to drive decisions on market competition. The Thai energy sector is slowly opening up for the emergence of 'prosumers' in a new energy market

CLOSING REMARKS

“The next few years will see electricity private networks control access and editing rights to portions of their electricity market, and it does not matter if that is not recorded centrally. **Decentralized, distributed, decarbonized, democratized, deregulated, and digitized** - this is where energy sectors are heading.”

- David Butcher, Former Minister of Energy and Finance of New Zealand, Principal Consultant of David Butcher and Associates, Board Director of Vertech Capital



EVENT ORGANISERS

ABOUT SOLARPLAZA (Netherlands)

Based in the Netherlands, Solarplaza is a global knowledge platform and convener of renewable energy based in the Netherlands and has organized similar events in Europe, North America, and Latin America. Solarplaza organizes international high-level conferences and exploratory trade missions in both established and emerging markets across the globe. With a track-record spanning 5 continents, over 30 countries, 50 cities, and more than 100 events, Solarplaza is a leading platform for energy innovation events.

To learn more, visit www.solarplaza.com or contact leoncio@solarplaza.com.

ABOUT VERTECH CAPITAL (Singapore)

Headquartered in Singapore, Vertech Capital is the Local Organizer and Partner of the Blockchain2Energy Asia 2018 Conference. Committed to building an intelligent and resilient energy ecosystem through blockchain innovation, Vertech works closely with energy stakeholders across Asia Pacific and Europe to unlock the full, transformative value of blockchain. Vertech Capital is an advisory firm that provides technology consulting, product commercialization, knowledge production and strategic market advisory to energy startups, Fortune 500 and government institutions.

To collaborate, visit www.vertechcapital.com or contact lathika@vertechcapital.com.

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