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How blockchain can be utilised in agriculture

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How blockchain can be utilised in agriculture

When I started exploring how blockchain technology and distributed ledgers over five years ago, one of the first use cases I envisioned was called 'Field to Fork'. Whilst the rest of the world was thinking about how they could become millionaires from crypto-currency, I could see the power of blockchain would solve the issue of proof of provenance, amongst many other things, far beyond crypto.

If it's Columbian coffee, Manuka honey, genuine maple syrup or New Zealand lamb the principles are the same, proof of provenance is key and, the same rules apply to Prada handbags, Peruvian asparagus and yes, digital currency.

What is blockchain?

Firstly, let's explore what, in essence, blockchain is. Blockchain or distributed ledger technology (DLT) is a technological protocol that enables data to be exchanged directly between different contracting parties within a network without the need for intermediaries. The network participants interact with encrypted identities (anonymously); each transaction is then added to an immutable transaction chain and distributed to all network nodes.

The ramifications of this technology are profound. Trust is key in any transaction. To take place a transaction requires the buyer to believe that the seller will deliver their goods or services. A transaction built around Blockchain removes any element of surprise. It's the lack of surprises and the implicit trust that blockchain delivers that makes it so important for the agricultural industry.

Agriculture and provenance

I mentioned at the start of the piece some foods that rely on where they originate to drive their value. After

all, honey, not called Manuka may taste different but why the high price? Blockchain can prove provenance really quite simply. Once a product is 'made' from a jar of honey, a leg of lamb, or a bottle of fine wine, that product is then listed on a blockchain. From the point of production to the point of sale, or consumption a cryptographically secure 'key' can track its journey and, ultimately, prove what is and where it comes from.

This key doesn't need to be used for high-value foods whose place of origin is inherent to that products brands either (think Parmesan cheese), 'fake food' is becoming a problem, especially in places like China.

Blockchain and 'best before'

With many products, especially fruit and vegetables, touch, taste, and smell will tell you how old it is. But, as agri-tech innovation increases, especially around prolonging the shelf life of food, blockchain could also ensure the food we eat is fresh. It wouldn't take a huge leap of faith to imagine a consumer walking around a supermarket with a smartphone, scanning a product via a 2D barcode linked to a blockchain and seeing not only where the goods came from but when it was produced and what journey it took — from field to fork.

The value of blockchain for the food producer

Logging the production and distribution of food on blockchain needn't be only beneficial for the consumer, producers will benefit too. If we consider the fishing industry, most developed markets now place quotas on fishermen to protect stocks. With something as simple as a smartphone app the fisherman can log his catch. This 'transaction' is then logged on the blockchain and an immutable record is created. Another scenario might be a producer of Manuka Honey. If the producer logs each batch onto a blockchain and then sells to a wholesaler who then sells onto a distributor (a chain of supermarkets) he will be able to see which distribution channel performs the best and what his product retails for. Blockchain can afford instant business intelligence for the producer with total transparency.

Total control and complete transparency

If you want to make a representation of a food product or commodity with certain characteristics and track that item in a supply chain, it is important that you cannot make copies of that item. Otherwise, one could, for example, claim that you sell the same Parmesan cheese by reusing the same digital identity over and over again.

If blockchain is embedded at the heart of the production and distribution process we can be sure there is no risk of copying and "double spending" or "double selling". Each characteristic of the food such as certificates of fair trade or limited production cannot be duplicated or replicated.

A central database could, potentially, accomplish the same objective, but only if there is implicit trust in the owner of the database. On top of this factor, the parties being part of the supply chain and their actions will be public or known by those who can access the database, legitimately or by illegal means. This may not be good for competitive reasons and privacy. The distribution of goods contains sales figures that, are commercial in confidence.

Beyond Crypto

Bitcoin was the first to solve this 'double-spending' problem. There is no reason why the production of food can't be the next industry to benefit from the transparency that blockchain offers.

Gary Spence, CEO Yotta Laboratories

RETHINK AGRI FOOD INNOVATION WEEK IN SINGAPORE

as the most important platform for connecting future-focused leaders and innovators.

Singapore's first Rethink Agri-Food Innovation Week investigated the growing role of technology in building an efficient, resilient and sustainable agri-food supply chain that can deliver fresh, nutritious food to today's fast-changing consumer market.

Major global food brands, technology innovators, regional producers and investors gather for the first Rethink Agri-Food Innovation Week in Singapore.

Rethink Agri-Food Innovation Week opened in Singapore, gathering hundreds of regional and international agri-food business leaders in Singapore as they discuss key opportunities to optimise the sustainable growth of the region's food supply chain.

300 Agri-Food Leaders
Join Forces at The First Ever Rethink Agri-Food Innovation Week

Through its three-day programme, the summit addressed the growing role of technology in building an efficient, resilient and sustainable agri-food supply chain that can deliver fresh, nutritious food to today's fast-changing consumer market.

Asia is the world's largest food market, and by 2050 its population is expected to grow by 900 million people to five billion. With a growing middle class, by 2030 the region could account for 50% of the global increase in annual beef and poultry consumption, and over 75% of the rise in fish consumption. To meet demand, major and urgent changes are needed to upgrade the region's agri-food system, from precision farming to sustainable aquaculture and adoption of new alternatives to animal protein.

Singapore has its own food security challenges, being heavily dependent on 90% food imports for its sophisticated 5.2 million populations whose fast-changing demographics are driving demand for non-traditional, new and exciting food products.

In his opening address at the summit, Kai Fong Chng, Managing Director for the Singapore Economic Development Board (EDB) discussed the opportunity for the region, and the commitment of the Singapore's government to capitalise on its unique position as the gateway for global technology innovation and investments into the agri-food sector.

"Science and technology are transforming the way we grow, deliver and consume food. With our existing research and industrial capabilities, Singapore is well placed to facilitate the development of new solutions and related talent for the agri-food sector. We welcome the first Asian edition of the Rethink Conference to Singapore, and look forward to working with like-minded partners to grow Singapore into a leading hub in agri-technology," said Mr Chng.

Delegates at Rethink Agri-Food Innovation Week included senior representatives from the world's biggest food producers and technology giants: ADM, BASF, Bayer, Cargill, Coca-Cola, Corteva, Danone, Dole, DuPont, Ferrero, Fonterra, IBM, Microsoft, Monde Nissin, Nestle, Nutreco, Olam, Roquette, Tate & Lyle and Wilmar.

They were seeking opportunities for partnership and collaboration with the wealth of technology start-ups bringing breakthrough technologies to improve the efficiency and sustainability of the region's food supply chain. Also supporting them are a host of technology accelerator and investment companies including Padang & Co, SparkLabs Cultiv8, Beanstalk Agtech and Sprout X, with international accelerators The Yield Lab and Trendlines AgTech launching operations in the region.

The summit covered the full spectrum of agri-food innovation, with three themes Crops, Farming and Supply Chain Technology, Indoor Agriculture and Sustainable Aquaculture Nutrition and Health, Protein and the Future of Food.

Prakash Govindan

Prakash Govindan is the co-founder and CTO of Gradiant Corporation.

Under his technical leadership, Gradiant has developed a platform of proprietary products that target various problems in industrial water treatment. Prakash also leads all project acquisition and deployment activities in Asia, Middle East, and the South Pacific for Gradiant. Furthermore, Prakash is the leading contributor in establishing corporate offices and research and development facilities as well as leads all subsidiaries and business units in technical aspects.

While at MIT, Prakash co-developed the Carrier Gas Extraction (CGE) system which became the flagship product and foundation for Gradiant. Prakash, a holder of more than 75 patents, also invented the company's SCE system and CFRO technology. He has his PhD in Mechanical Engineering from MIT and Masters from IIT Madras.

Could you share more about some of the Zero Liquid Discharge projects Gradiant Corp is doing?

Gradiant has multiple Zero Liquid Discharge (ZLD) projects across India, China, and the USA. These projects typically involve the conversion of highly contaminated industrial wastewater, (high salinity, suspended solids, organic content, volatiles etc) into high purity fresh water and other reusable streams at our ZLD plants.

By eliminating liquid disposal/discharge from these projects, our ZLD technology is able to significantly minimise the environmental footprint for our industrial clients.

We serve clients in the textiles and tanneries, dye stuff manufacturing, chemicals, and pharmaceuticals industries in India, with opportunities in the pipeline for the food and beverage and Oil & Gas industries as well. Our ZLD plants in China mainly serve power generation and flue-gas desulphurization production, coal-to-chemical, and landfill leachate treatment. In USA, we own and operate over 20 wastewater recycling plants that have collectively saved over 50 million bbls of water for our customers in the past year.

What are the by-products of treating contaminated liquid waste water?

These by-products differ between markets, being dependent on the composition of the wastewater being treated. Through our processes, we typically see around 99.5% of the treated wastewater being converted into usable by-products, with the remaining 0.5% of solid waste being disposed of at appropriate landfills. Without Gradiant's plants, 100% of the waste water would have to be disposed of in deep-wells.

For the Indian market, the main product from our plants is high purity fresh water which can be reused by textile, pharmaceutical, and chemical

companies in their operations. This eliminates the need for locally available water resources which can otherwise be utilised for domestic human consumption or other needs such as agriculture. Another by-product from our treatment processes in India is salt (Glauber Salt/Sodium Sulphate) which is often reused within the textile industry for dyeing related operations.

Another example is the oil and gas industry in the USA, where some of the main by-products are brine and fresh water – valuable oilfield fluids especially for the process of fracking.

How did you get into this industry?

Coming from India where the scarcity of fresh water affects a majority of the population and industries, my co-founder, Anurag Bajpayee, and myself always knew we wanted to make a difference in this field.

We met at Massachusetts Institute of Technology (MIT) where we were completing our PhD's in mechanical engineering with a focus on industrial water treatment. There we invented water technologies designed to clean highly contaminated water at a fraction of the cost of current industry standards. These technologies paved the way for us into the water industry and later became our flagship product lines at Gradiant.

What are some of the barriers you face with getting businesses to adopt green waste management practices?

The greatest barrier to adoption has historically been the efficiency and cost of existing treatment technologies. To address this, we developed techniques at Gradiant which are more effective and relatively inexpensive in comparison, factors that have elevated the adoption rate of our solutions.

Moreover, a majority of industrial water treatment suppliers have yet to develop a business model that benefits their clients. In addition to the traditional capital sales model, Gradiant has implemented the use of capital effective Build Own Operate (BOO) and leasing models that reduce upfront costs, helping our clients move forward in dealing with their wastewater in a responsible manner.

In your opinion, are developing countries acceptive of these new ideas?

Absolutely. In fact, our experience has shown that it is perhaps easier to overcome barriers to adoption in emerging economies due to higher priorities typically being assigned to the idea of sustainable growth, especially if such initiatives ultimately help support an enterprise's bottom-line (through the production of usable materials through wastewater recycling).

How can businesses overcome the high costs involved in adopting these green strategies?

We feel that this is a stereotype that has come about due to the general inefficiencies found in earlier water technologies, which is often also coupled with significant cost. As Gradiant's technology and use of the Build-Own-Operate business model have proven, effective and responsible handling (including treatment) of wastewater streams does not have to be a costly affair.

Upcoming GREEN Events:

Vietnam Wind Energy Summit 2019
13-14 March 2019
Hanoi, Vietnam

The InterMET Asia Exhibition & Conference
27-28 March 2019
Suntec, Singapore

Future Energy & Tech Investment Forum
28 March, 2019
Grand Kempinski Hotel Shanghai, China
• www.fetiforum.com

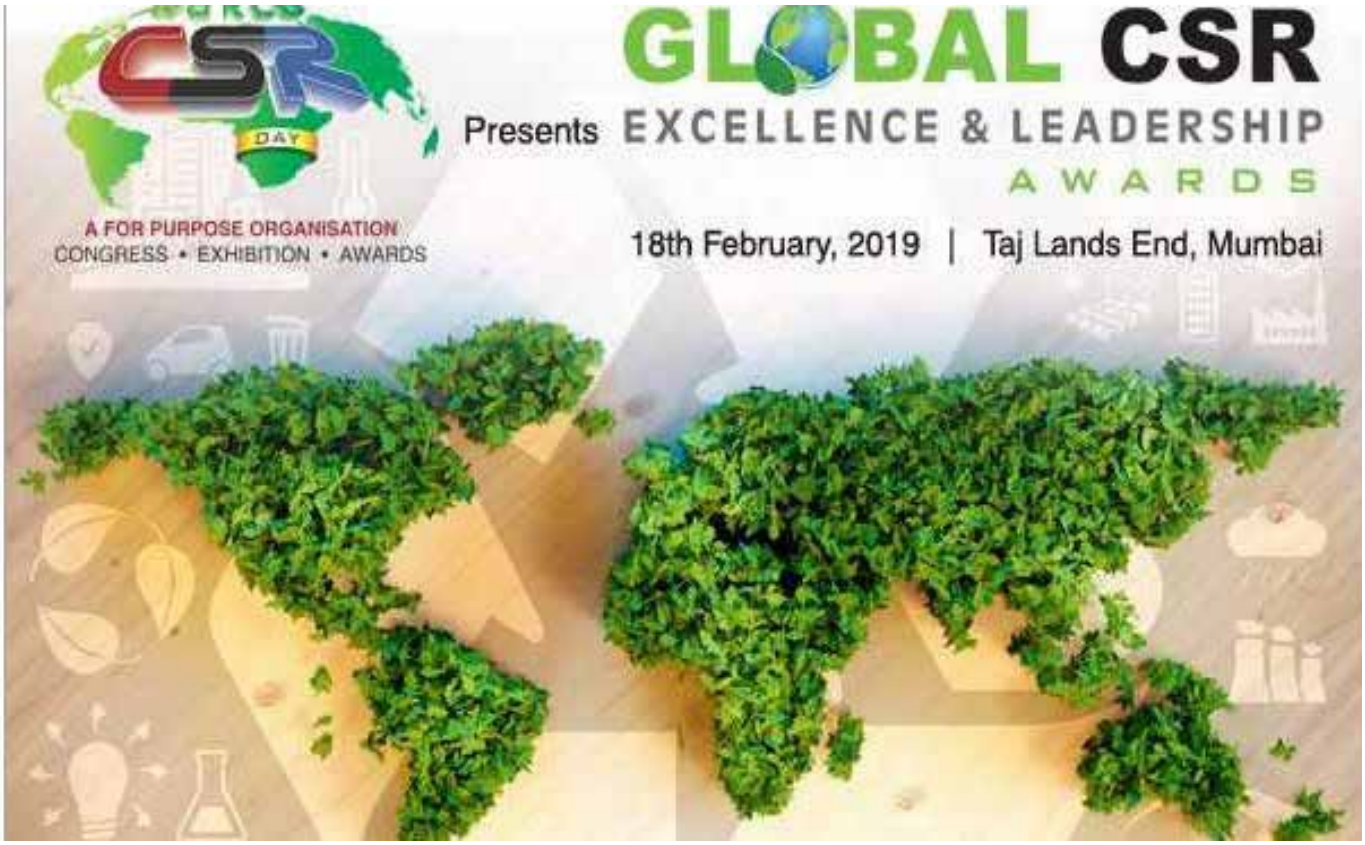
ASEAN Wind Energy 2019
1 - 2 April 2019
Ho Chi Minh, Vietnam

South Korea Renewable Energy Summit 2019
17 - 18 April 2019
Seoul, South Korea

Architect '19
30 April - 5 May 2019
IMPACT Challenger Hall 1-3, Bangkok, Thailand
• www.asa.or.th

Europe Solar + Energy Storage Congress 2019
23-24 May 2019
Rome, Italy

5th Annual Global Solar + Energy Storage Congress & Expo 2019
24-25, June 2019
Grand Hilton Seoul, Korea



Co-located Event

Vietnam Green Energy
Finance & Investment 2019

ASEAN WIND ENERGY 2019

1-2 April, 2019 | Ho Chi Minh, Vietnam

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800+
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70+
SPEAKERS


30+
MEDIAS


10+
HOURS OF NETWORKING




HDB Launches Initiatives to Boost Development of Innovative Solutions for Better Living

Minister for National Development & Second Minister for Finance, Mr Lawrence Wong, launched the inaugural HDB Innovation Festival.

At the Festival, Minister Lawrence Wong announced two new initiatives that will provide more resources to help aspiring entrepreneurs and enterprises advance the development of innovative solutions that improve HDB living:

(a) Launch of the Cool Ideas Enterprise – Aspiring entrepreneurs and enterprises with products or solutions that are ready for implementation can apply for funding and seek mentorship to help fine-tune or scale up their solutions for implementation. Where necessary, HDB may also allocate test-bedding sites for them to test-bed their solutions. Around $5 million has been set aside by Enterprise Singapore to support the programme over two years starting from November 2018. The programme is run by HDB in partnership with Enterprise Singapore, and supported by the Action Community for Entrepreneurship (ACE) and the Intellectual Property Intermediary (IPI).

(b) Development of Pulse of the Heartlands – Under a Memorandum of Understanding (MOU), HDB will collaborate with tech start-up Sentient.io, StarHub, IBM and the Infocommunications Media Development Authority (IMDA) to leverage the digital capabilities of a new Artificial Intelligence (AI) and data platform and develop an ecosystem of apps and services that would be useful to residents. As residents use these apps, data collected on social trends and lifestyle preferences can be harnessed to better understand their needs and preferences. This will in turn enable companies to develop more apps and services that benefit residents.

As an open innovation programme, Cool Ideas Enterprise welcomes ideas from aspiring entrepreneurs or enterprises to improve the HDB living environment. The programme will focus on innovative solutions for the built environment, under the domains of Energy, Urban Greenery, Living Environment, Building Technology and Waste

& Water. HDB, together with the relevant partner agencies, will support them in the following ways:

HDB will offer practical expertise and advice to help fine-tune the promising design solutions so that they are suitable for implementation in HDB estates. There are also opportunities for the solutions to be test-bedded at HDB's Centre of Building Research – our master laboratory – and where feasible, to pilot these solutions in HDB estates such as Punggol, Yuhua and Tengah.

Enterprise Singapore is supporting this programme through Gov-PACT, where it will connect enterprises with innovative solutions to HDB. Enterprise Singapore will fund up to 70% of the development cost of each innovation. An estimated S$5 million1 will be awarded to multiple projects over two years.

Successful applicants can leverage Enterprise Singapore's business networks to get their business

going. They can also benefit from business training workshops offered by ACE, on how to market their solutions and expand their business outreach.

ACE will also facilitate the expansion of innovative solutions abroad where possible, through its ACE Connected Ecosystem, a network of regional and global partners in committed to support start-ups with two-way market access and assist them in scaling beyond the local market. Successful applicants will also have access to ACE's Regional Innovation Hub, which provides corporates, small and medium enterprises, as well as local and regional start-ups with the network, resources and capabilities to drive co-innovation.

Funding support is part of the $80 million budgeted under the Gov-PACT initiative, announced at Budget 2017, to drive innovation through Government lead demand.

Regional Innovation Hub, which provides corporates, small and medium enterprises, as well as local and regional start-ups with the network, resources and capabilities to drive co-innovation.

Successful applicants can tap on IPI's technology marketplace as a resource platform to source for existing and emerging technologies to refine their products or services.

FytoSol Pte Ltd and Hocklim Engineering Pte Ltd are the first two companies to join the Cool Ideas Enterprise.

FytoSol Pte Ltd and Hocklim Engineering Pte Ltd are the first two companies to join the Cool Ideas Enterprise. They were presented Letters of Award by Minister Lawrence Wong at the launch of the HDB Innovation FestivalFirst Cool Ideas Enterprises on Board. FytoSol's invention is a nanogel that could enable more variety of plants to be grown in HDB's Prefabricated Extensive Green (PEG) Roof Tray system2, adding to the vibrancy of rooftop greenery. Called RetentSol™, it is made of highly water absorbent, non-toxic nanogel particles that promotes plant growth. Beyond PEG tray usage, the product could allow more plant species to thrive in urban conditions such as dry soil. Test-bedding will be conducted at HDB's Centre of Building Research to select suitable plant species that can withstand drought conditions with minimal maintenance Fytosol pte Ltd is designs solutions for Sustainable Future. FytoSol is a spin-off from the Nanyang Technological University and was founded by:

- Prof. Lam Yeng Ming; Dr. Goh Chin Foo, both material scientists from the School of Material Science and Engineering, NTU; Prof. Chen Zhong from the Natural Sciences and Science Education Department, National Institute of Education, NTU; and Mr Chan Kok Pun, a veteran venture capitalist.

The team is bonded by their desire to make a difference in the global fight against climate change. Sustainability in a country starts with sustainability in small communities. The team believes that healthy moist soil is foundational in preserving the flora, and this in turn helps in preserving micro-climates and the fauna that depends on the plants for survival.

COOL IDEAS ENTERPRISE

To help aspiring entrepreneurs and enterprises refine their products or solutions that are ready for commercialisation and implementation in housing estates, HDB in partnership with Enterprise Singapore (ESG) and supported by Action Community for Entrepreneurship (ACE) and the Intellectual Property Intermediary (IPI), has launched the Cool Ideas Enterprise programme to provide funding, mentorship, test-bedding and pilot implementation opportunities.

The programme is an expansion of the "Cool Ideas for Better HDB Living" initiative which seeks to encourage and develop ground-up ideas and solutions that improve the living environment and residents' quality of life.

Future Energy & Tech Investment Forum

The worlds energy market is experiencing its largest and most important shift in the modern era and is changing the way we live and travel on the back of shifting public values and government policies in an attempt to tackle climate change.

In this transition to a low carbon future, who will be the big players that will become the next global energy behemoth? From resource companies that are producing the raw materials, to the companies that are building the next generation of personal and public transport, wind turbines and solar panels, energy storage systems and everything in between. The acceleration of technology has allowed new technology to be refined and commercialised.

There are so many opportunities to invest, so where should you be looking?

The Future Energy & Tech Investment Forum will take place on the 28th of March in Shanghai. The one-day forum will focus on the future of energy worldwide, and the investment opportunities that are currently available on the market.

HIGHLIGHT

- A full day of insights, ideas and networking of future energy, tech and innovation
- Learn about the latest trends and best practices in new energy industry
- Broad media and internet platform exposure

Date: March 28, 2019
Time: 9AM-6PM
Venue: Grand Kempinski Hotel Shanghai, China
Website: https://www.fetiforum.com/

- 15+ industrial leading speakers, 200+ participants from energy resources / tech / consulting / investment companies
- Main forum, startup pitching, VIP dinner

TOPICS TO BE DISCUSSED

- Natural Resources Situation and Trends
- New Energy Planning and Investment
- Global Cooperation on New Energy Issues
- New Energy Policies, Laws and Pilot Projects
- Energy Control and Storage
- Electrical Vehicle Monitoring and Control
- Advanced Energy Technologies
- Green Supply Chain Management
- Energy Cloud Computing and Virtualization
- Blockchain Technology Empowers New Energy
- Intelligent Energy Control Systems
- Energy Network Challenge
- and more

To get more event info at https://www.fetiforum.com/

To get further details kindly send us an email to marketing@eventlinker.cn or contact Ms Sherry Chen on +86 18258056393

ENVIRONICS – The first step for making the organization healthier

Environics have created unique and innovative solutions to correct harmful effects of natural radiations (Geopathic Stresses) and man-made radiations (Electrosmog) from electronic devices.

The study of Environmental Radiations (EMR) impacting human health has lead led to the development of ENVIRONICS.

Environics makes the indoor environment healthier.

20% of any built space on this planet is affected by the negative radiations from the earth due to fissures, concentrated mineral deposits and magnetic grid lines which naturally occur. The indoors is further compromised by radiations from hundreds of wireless devices that are now essential to modern living. Environics is a radiation management service that works to change the nature of these radiations and makes them harmless to the human body. The service involves the following steps-

- Survey with scientific instruments .
- Correlation of issues faced with survey findings.
- Measuring/ recording health data and productivity data (for manufacturing)
- Correction using non intrusive meRhodes
- Recording health data again.

Environics is the result of continuous research and fine-tuning being carried out for more than two decades. The service has been available commercially for over 10 years and has been used successfully by more than 2000 clients.(instead of 450).

Product Range:

Envirochip

Purifies electromagnetic radiations emitted from personal devices and prevents negative impact on individuals.

Enviroglobe :

For protection from electrosmog in office and living spaces covering an area of 300 sq. ft. It can also be your travel companion.

PROTECTS FROM HARMFUL RADIATIONS OF:

Wi-Fi Routers, Booster Electronic Devices, Mobile Towers, High Tension Line

TESTED AND CERTIFIED BY: Max Healthcare, CE Certified DB Technology Lab, Cambridge, UK, Singapore Green Building Council, On-going research with AIIMS

For more information : info@environics.co.in
www.environics.co.in
www.envirochip.in
www.enviroglobe.in

Organized by

The Association of Siamese Architects Under Royal Patronage (ASA)

Managed by

N.C.C. Exhibition Organizer Co., Ltd. (NEO)

Show Date :

April 30th – May 5th, 2019

Date :

Tue : April 30th (10.00 - 20.00)
Wed, (Labour Day) : May 1st (10.00 - 21.00)
Thu - Fri : May 2nd - 3rd (10.00 - 20.00)
Sat - Sun : May 4th - 5th (10.00 - 21.00)

Event Title	:	**architect'19**
Event Theme	:	Green อยู่ ดี (Living Green)
Edition	:	33rd
Venue	:	IMPACT Challenger Hall 1-3 Bangkok, Thailand
Exhibit Area	:	60,000 sq.m. (Gross)
Exhibitor	:	850 Exhibitors
Visitor	:	400,000 Visitors (International & Local)

SHOW ORGANIZER

The Association of Siamese Architects Under Royal Patronage (ASA) We are a community of around 3,000 members consisting of registered architects working in Thailand, with the balance of membership made up of Thailand architects working overseas, architectural graduates, architecture students, teachers of architecture and retired architects. The Association of Siamese Architects Nationals was established in the year 1934.

N.C.C. Exhibition Organizer Co., Ltd. (NEO) is Thailand's leading exhibition organizer. NEO was previously a department within N.C.C. Management & Development Co., Ltd. which was responsible for expos. In 2004 it officially transformed into an independent expo organizer and event management company. With over a decade of experience in planning and managing more than 100 international trade expos and conventions, NEO has become respected and trusted in Thailand for its professional expertise and reliability in this area. In addition to forging partnerships with other expo organizers from both within and outside the country, NEO has also been organising more and more of its own exhibitions in Thailand and abroad.

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- Event Name: **5th Global Solar + Energy Storage Congress & Expo 2019**
- Date: **June 24-25, 2019 in Korea**
- Time: **9 AM — 6 PM**
- Venue: **Grand Hilton Seoul, Korea**
- Event's Website Link: **http://solar-storage.leader-associates.com/**

DESCRIPTION OF THE EVENT: The 5th Annual Global Solar + Energy Storage Congress & Expo 2019 is built on the success of the 4th Global Solar + Energy Storage Congress & Expo 2018 held in Shanghai, China, the most influential global industrial gathering and award ceremony in the field of solar and energy storage. It will be held in Grand Hilton Seoul, South Korea on June 24-25, 2019. With 80+ speakers and 1000+ delegates from more than 50 countries, global market updates will be addressed within the 2 days, highlighting US, Europe, Australia, ASEAN and other emerging markets.

HOST COUNTRY MARKET DESCRIPTION

South Korea is one of the most developed countries in Asia and is the eighth largest electricity consumer in the world. It has been making strong efforts to increase the renewable energy portion of its energy mix. The country is backed with a strong manufacturing industry (solar PV) as well as supportive policies.

Solar field is the core in this policy with the long-term goal of the government to cover 20% of the electricity production by renewable energy sources such as solar and wind power by the year of 2030. 63% of the plan is covered by solar power, which is expected to have a great riffle effect on the industry.

And, what's in store for storage? South Korea will create 440 billion won (US$390 million) worth of new demand for energy storage systems (ESS) by 2020, according to the South Korean government.

EVENT HIGHLIGHTS

1. Co-Located with Annual Solar + Energy Storage Awards Reception Night and WiRA
2. Market Outlook for South Korea, US, Europe, Australia, ASEAN and other Emerging Market
3. New Partnership Opportunities with Governments and Project Developers
4. Feasibility of Solar + Energy Storage Project Financing and Investment Opportunities