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Artificial Intelligence and the Future of Renewable Energy

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Abstract : Using Artificial Intelligence in renewable energy production prediction, energy grid balancing and next generation understanding of energy consumers will increasingly automate operations in the solar and wind industries, and boost efficiencies across the renewable energy sector. The research study conducted on Zorays Solar Grid ,and how it resolves to work on solving humanity's grand challenges using exponential innovative technologies such as block chain mining, Crypto mining for ICO's ,Internet of Things (IoT),machine learning and business intelligence using data-driven narrative and other ROI strategies from renewable energy.

Keywords: Next Generation Business Intelligence, Renewable Energy, Data Storytelling Wave, Internet of Things (IoT),machine learning, block chain mining, and Crypto currency mining for ICO's.

I. INTRODUCTION

Change in the energy markets is inevitable, is happening right now and standing still is not an option. Mergers and acquisitions between energy and artificial intelligence or big data companies shot up over the past year as renewable energy firms work to better manage fluctuating production. Such exponential technologies that have the potential to transform the world we live in, not necessarily have to be from Google X, or spawned by AstroTeller. A person's imagination, creativity, courage, and grit can create the difference that differentiates itself from run of the mill products and services, and helps it to rule people's imagination, and aspirations. Unfortunately, such ecosystem to support such moon shot technologies is not very common in all the geographies, and the struggle is unduly lopsided. In these uncertain times, energy businesses adapt their strategy and look to artificial intelligence and big data to improve energy forecasts (International Energy Agency, 2017).

At Zorays Solar grid they are addressing important business opportunities and necessities for automation and optimization in Energy and Utility sector, but also contribute to Global Grand Challenges within Energy, Water and Environment. Using Machine Learning ,Block chain crypto mining and Artificial Intelligence throughout the whole value chain of renewable from energy production and forecasting to automatic/algorithmic trading, offering innovative and personalized services to end consumers and health-based maintenance of the grid.

II. ARTIFICIAL INTELLIGENCE

Artificial Intelligence (AI) is the more extensive idea of machines having the capacity to do work in a way that we would consider "savvy". Machine Learning is a present subset use of Artificial Intelligence. That is, all machine learning considers AI, yet not all AI considers machine learning. Machine learning is just to let the machine have the capacity to give machines access to information and let them learn for themselves. Machine gaining came straightforwardly from psyches of the early AI swarm, and the algorithmic methodologies throughout the years included choice tree learning, inductive rationale programming, grouping, support learning etc.

Leading on climate isn't just a moral imperative—it's the practical thing to do. Purely from an economic standpoint, clean technology is winning. The momentum is undeniable. We have more effective energy-storage and we now have AI, IoT and cloud solutions that promote energy efficiency. The cost of solar continues to decline rendering fossil fuels impractical and even unviable as a future energy source. Technological progress of this size cannot be undone by a shortsighted policy reversal. We know it, our investors know it, our competitors and our customers know it. Artificial intelligence (AI) will increasingly automate operations over the next several years in the solar and wind industries and boost efficiencies across the renewable energy sector, according to a new DNV GL position paper (Ghobadi, 2017).

- **Energy Forecasting** – Industry data is used to train AI algorithms to make accurate forecasts, helping to inform power supply and demand
- **Energy Efficiency** – AI is used to track and optimize how energy efficiency
- **Energy Accessibility** – AI is used to model utility cost savings and provide recommendations for smart home investments

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III. RENEWABLES AND DERS – INDUSTRY-WIDE IMPACT

Renewable energy is undergoing a paradigm shift as more utility-scale wind and solar reach grid parity by driving lower cost curves and providing alternative energy options to traditional energy generation sources. The ability of analytics to accurately predict and maximize these sources, while balancing integration of traditional power generation, will define those who will successfully navigate this change. **The rise of intelligent grid technology, two-way power flows and greater quality power delivery is transforming the grid and fueling innovation that will challenge incumbent business models.** There will be an unprecedented number of new and innovative applications of AI for the energy industry this year, from remote monitoring of transmission assets by drones to new deep-learning capabilities for asset monitoring and performance.

These technologies can be scaled up or down for other commercial applications. The first to complete a cost effective integrated IOT energy platform for homes and business. All this technology is in one panel not fragmented. A very low cost and powerful ecosystem infrastructure. The phone, internet, TV, safety, hub router, smart programmable electrical breakers, sub metering, Utility meter and multichannel communication inside the home/ business -pioneers of smart homes/business and IOT with analytics etc. They provided a powerful low cost last mile broadband solution meshing ultra-broadband from these smart panels wirelessly without need of spectrum back haul all in one panel. These types of systems give you complete control by circuit level at very low cost. These ecosystems are able to ration power not just turn on and off. In many case eliminate rolling brown outs and blackouts. This can enable all wireless transmissions types.

IV. HOW COMPANIES ARE INVESTING IN BUSINESS INTELLIGENCE

Traditional energy players are looking to analytics and automation to improve operations and manage distributed resources. The energy sector is investing heavily in Artificial Intelligence and Big Data to better manage intermittent renewable energy generation. End users have an increasing array of choices that will lead them to seek out power providers that offer them control over their energy usage via well-designed mobile and other customer experiences. Non-utility companies and digital disruptors like Nest are poised to grab 20% of the retail energy market.

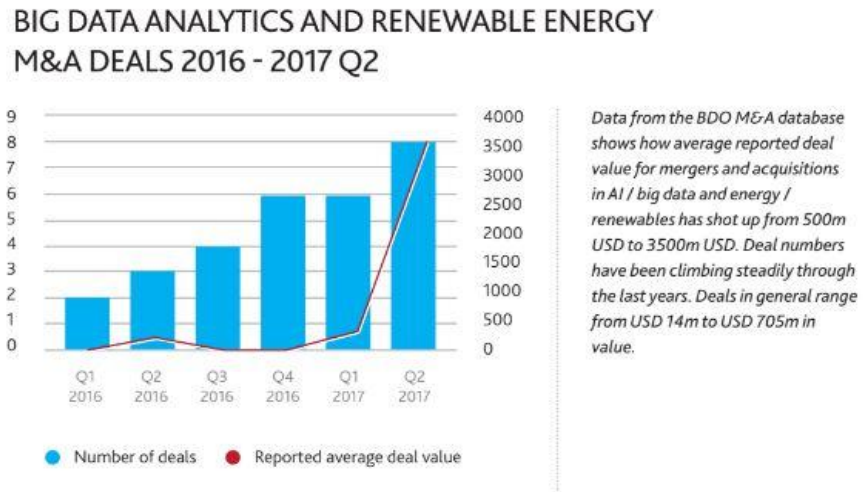

Figure 1 Source: BDO

4.1 Anticip8

Anticip8's mission is accurate, micro weather prediction that can help renewable energy producers (solar, wind). Uncertainty about tomorrow's forecast (cloud cover, rain) reduces the ability of suppliers to commit their full capacity, especially for wind farms. This leads to less renewable energy in the grid, and higher prices. Anticip8 offers low-power, low-cost field sensors with novel computing architecture and high resolution spatial and temporal modeling to increase suppliers' confidence when committing loads to the grid. They'll build better, decentralized ground-up weather models that update every 10 minutes.

4.2 Xcel

In Colorado, energy provider Xcel is implementing AI in an attempt to address these challenges. Through the National Center for Atmospheric Research's new AI-based data mining method, Xcel was able to reportedly access weather reports with a higher level of accuracy and detail. Xcel reports that wind power has doubled in Colorado since 2009. Earlier this year, Xcel reported plans to expand its wind farms by 50 percent by the year 2021 (Wind Power).

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4.3 Nnergix
Nnergix is a data mining and web-based energy forecasting platform which pools data from the energy industry. The company reportedly combines satellite data from weather forecasts and machine learning algorithms trained on industry data to make more accurate forecasts.

4.4 Verdigris Technologies
Founded in 2011, California-based Verdigris Technologies offers a cloud-based software platform that claims to leverage artificial intelligence to help clients optimize energy consumption. Designed for large commercial buildings and managers of enterprise facilities, the process begins with installation of IoT hardware.

4.5 Deep Mind
Founded in London in 2010 and acquired by Google in 2014, AI Company Deep Mind Technologies Ltd. reportedly reduced the amount of energy required to cool Google's data centers by 40 percent.

4.6 Power Scout
The company reportedly leverages data analytics to identify "smart home improvement projects" based on the unique features and energy usage in a client's home. Power Scout's algorithm appears to match clients to potential hardware installation providers in an online marketplace format to ensure competitive rates.

4.7 Verv
Verv is an AI-powered home assistant created by London-based Green Running Ltd. The system reportedly uses its technology to assist clients with energy management in their homes.

SOLAR OFF-GRID BLOCKCHAIN MINING
A revolutionary digital ledger offers a secure way to exchange funds without the mediation of a central financial authority. Trading with cryptic currency such as Bitcoin or Ethereum handeln is the digital counterpart to foreign exchange trading.

WHAT IS A CRYPTO CURRENCY?
Crypto currencies are a digital currency created by the performance of decentralized computers on the Internet. Unlike conventional money, crypto currencies payments are not issued by banknotes or other trustworthy institutions. The creation of digital coins and transactions – the sending and receiving of payments in a crypto currencies – are without "trustworthy middle-men".

BLOCKCHAIN CAN BE A BIT ABSTRACT TO UNDERSTAND AT FIRST
Through a network of distributed computers, a blockchain is a data structure that facilitates the creation of a digital ledger of transactions. Blockchain uses cryptography to let participants on the network securely manipulate the ledger without relying on a central authority.

As soon as a block of data is recorded on the ledger, it becomes extremely difficult to modify or omit. If someone wants to add to it, participants in the blockchain network—all of whom possessing copies of the existing blockchain—need to run algorithms to determine the validity of the proposed transaction. If the transaction appears valid, as verified by the agreement of nodes (in other words, the information is aligned with the history of the blockchain), then the new transaction is approved and a new block gets added to the chain.

The problem with proof-of-work is the waste it generates. We worry about climate change and yet a single bitcoin transaction uses somewhere between 70 and 240 kWh to process (amortized energy cost). That's largely produced using high carbon output mining farms in Asia. Crypto urgently needs a more efficient mining scheme.
In such scenario, rather you can go with cloud mining. Do it on your own hardware or if you have less investment than go for BTC or other crypto trading. With this regard, mining is not feasible at all in current circumstances where the difficulty levels are increasing day by day and electricity costs are too high . Actually compared to traditional banking it uses far less energy. That's after you factor in the banking locations, energy to move workers back and forth, in addition to energy used for business operations. Using renewable energies for power would be a really good solution and the mining would eventually pay for the infrastructure of the project. Install solar panels for long term solution to sustainable and cheap energy.

We would however need to put this on a Solar Power System to provide clean power. We want to be one of the first in earning on mining on algorithm x11. Such crypto currency as LiteCoin, Dash, Startcoin, Onix, Influxcoin and 150 different on the same algorithm.

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1. **Antminer D3 Technical Specifications Hashing speed:** 15 GHz / s (possible deviation of 5%) Chips 180 X11 Power consumption: 1200 W Double fans You do not need to be an expert to use this equipment, you need to plug it into an outlet, connect the Internet, prescribe a pool and see how your equipment is dripping you coins.
2. **Etherium Mining:** ETH is also asic resistant. 0.9 ETH sounds right for the hashrate at today's difficulty. Ultimately it is down to your personal risk threshold and expected ROI.
3. **Envion:** A global, highly profitable crypto infrastructure hosted in mobile containers near energy sources.

Bitcoin mining is no more a good option there are lot of politics in it on global level.

V. THE TALENT CHALLENGE

Unfortunately, digital transformation in this industry is very slow due to people's resistance who still on mission to make money, and not innovating. Utilities and the entire energy sector face a massive brain drain in the coming years as huge numbers of older workers retire and take with them their skills and experience. This challenge will require the industry to rebuild and reconfigure their workforce using multiple strategies that codify and augment worker knowledge using analytics, decision support and automation.

VI. CONCLUSION

Energy, like any other product has seen a rise in differentiation in terms of brands, usage plans and sources of energy. Digitalization, renewables and DERs, a smarter grid and rise of platform-based models mean that operators will need to better leverage data and analytics to improved operational and business performance. The competitive advantage of cloud and edge computing will eclipse the limitations of legacy systems. More power producers, utilities and grid operators are adopting strategic digital initiatives to change their business models to compete in a radically changing power market. This will further accelerate industry change and hasten the industry-wide move to digital.

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