WHY BIG DATA, AI AND RENEWABLES ARE THE PERFECT M&A STORM

OCTOBER 2017

A SELECTION OF 2017'S SIGNIFICANT ENERGY AND AI / BIG DATA M&A

AUGUST 2017: WILDAN GROUP BUYS INTEGRAL ANALYTICS FOR USD 30 MIO

SUB-TREND: DEMAND FORECASTING/SMART GRID

Why it is interesting: Integral Analytics has built a software suite that helps utilities integrate distributed energy resources. Its solutions taps sources of data like econometrics and customer-owned power assets to help understand how customers use power and how that usage could change. This helps the power utilities plan the right level of resources and be well positioned for the future.

MAY 2017: ITROM ACQUIRES COMVERGE FOR USD 100 MIO

SUB-TREND: DEMAND FORECASTING/SMART GRID

Why it is interesting: Comverge uses machine learning to improve demand forecasts. It uses data to 'train' its prediction models to find the rules themselves. Over time, as the models 'learn' from more experience (more DR events), the forecasts become more accurate. Itron strengthens its portfolio of grid solutions with the industry's leading demand response offering while also paving the way for game-changing distributed energy management applications.

APRIL 2017: EAGLEVIEW BUYS OMNIEARTH (AMOUNT UNDISCLOSED)

SUB-TREND: RENEWABLES PLACEMENT OPTIMISATION

Why it is interesting: Using detailed satellite images and machine learning, the two companies can accelerate product development in existing markets as well as enter into new markets. One market is installation of solar panels, and automatically identifying identify roof shape and condition, tree overhang, decks, pools and other notable property features will help boost that. It's also part of an ongoing trend, as its the third deal involving a company that produces or analyses satellite images in less than three months.

FEBRUARY 2017: VEPOS ACQUIRES UTOPUS (AMOUNT UNDISCLOSED)

SUB-TREND: BIG AI MOVING INTO RENEWABLES PLACEMENT AND SMART GRID FORECASTING

Why it is interesting: Actually a merger involving IBM's clean energy research team. It forms one of the premier, not to mention likely best funded and technologically advanced start-ups. The company can rely on IBM's Watson systems to create weather predictions.

FEBRUARY 2017: CASTROL BUYS ROMAX TECHNOLOGY (AMOUNT UNDISCLOSED)

SUB-TREND: AI USED TO REDUCE MAINTENANCE COSTS

Why it is interesting: Castrol and Romax partner to grow wind-turbine predictive maintenance business. The lubrication and maintenance of a wind turbine's expensive gearbox is critical to optimising its performance and reliability, and Romax's technology helps this through data-driven O&M, reducing O&M costs significantly.

AI, BIG DATA AND RENEWABLES: THE PERFECT M&A STORM

SUMMARY

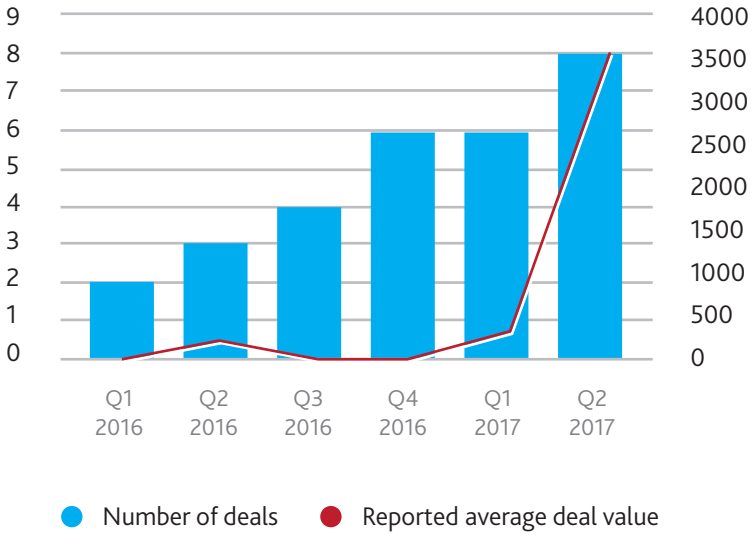
Renewables will be the fastest-growing source of electricity generation over the next five years, the International Energy Agency in Paris reports.[1] This diversification in energy sources brings about a challenge as current energy infrastructure and management systems are unfit to accommodate both the rise and irregularities that characteristise renewable power. Renewables fundamentally transform the electricity sector: fluctuating feed-ins, changed load curves and low electricity prices all present substantial challenges for incumbent players. [2] In these uncertain times, energy businesses adapt their strategy and look to artificial intelligence and big data to improve energy forecasts.[3]

The acquisitions, scores of energy start-ups and new solutions hitting the market make the marriage of machine learning and renewables a very promising space to watch and one that often leads to quick-fire M&A.

THE AI / BIG DATA ENERGY M&A UPSHOT

During 2017 an M&A trend gathered momentum, seeing energy and renewables enterprises acquire and merge with technology companies active in big data and artificial intelligence (AI). Data from the BDO M&A database shows how average deal value for these kinds of mergers and acquisitions has shot up, while deal numbers have been climbing steadily through the last couple of years. We are witnessing the early stages of what will become an M&A trend for years to come.

BIG DATA ANALYTICS AND RENEWABLE ENERGY M&A DEALS 2016 - 2017 Q2



Data from the BDO M&A database shows how average reported deal value for mergers and acquisitions in AI / big data and energy / renewables has shot up from USD 500m to USD 3500m. Deal numbers have been climbing steadily through the last years. Deals in general range from USD 14m to USD 705m in value.

TECH COST DROP PLAYED ROLE IN RENEWABLES INVESTMENT SLUMP

Renewables disrupt both grid and markets

Investment in renewable energy capacity outstrips that in fossil fuel generation for the fifth year in a row. Some 138 gigawatts of new power capacity came online in 2017 (excluding large hydro); almost 11 gigawatts more than in the previous 12 months. 2016 saw a record installation of renewable power capacity worldwide. Wind, solar, biomass and waste-to-energy, geothermal, small hydro and marine sources between them added 138.5GW, up from 127.5GW in the previous year. The 2016 gigawatt figure was equivalent to 55% of all the generating capacity added globally, the highest proportion in any year to date.

Investment at its lowest point since 2013

Contrasting this growth is a worrisome global drop of new investment in renewables, down 23% to $241.6 billion, the lowest total since 2013. However, acknowledging a funding slowdown in China, Japan and emerging markets, a 'more for less' dynamic also played its part. A technology cost plunge caused a further fall in investment in renewables in 2016, with average dollar capital expenditure per MW down by more than 10% for solar photovoltaics, onshore and offshore wind.[4] Nevertheless, availability of finance does not appear to bottleneck investment in renewables. Purchases of assets such as wind farms and solar parks reached a highest-ever figure of $72.7 billion, while corporate takeovers reached $27.6 billion, some 58% more than in 2015.[5] Asset finance for smart meters and energy storage, plus equity raised for specialist companies in energy efficiency, storage and electric vehicles, totalled a record $41.6 billion last year, up 29%.[6]

Companies will seek competitive edges to create efficiencies and win market share. A key edge will be provided by new technologies such as artificial intelligence and big data to make both production and distribution of renewable energy more efficient.

RENEWABLES CHALLENGE THE GRID

The biggest challenge associated with the increased renewables market share is the fluctuating energy production that is tied to natural phenomenon like sunshine and wind. Operating power grids is complex, and handling uncertainty in a cost-effective manner is at the core of the problem.

When demand outpaces supply, utilities turn on backup fossil fuel-powered plants, known as 'peaker plants', at a minute's notice to avoid black-out. This procedure is the most expensive and wasteful part of business for these companies, manifesting itself in higher electricity bills for consumers and enhanced greenhouse gas emissions into the atmosphere.[7] Improved energy management is expected to contribute to average net cost savings of €53 billion per year to 2035 and average CO2 emissions savings of 165 Mt CO2 per year. The industry and service sectors could save over 25% of their energy by 2035 by adopting energy management systems.[8]

Congestion

Transmission congestion is a shortage of electricity transmission capacity to supply a waiting market. The unpredictable nature of renewable energy sources, such as wind and solar are a challenge to Transmission System Operators (TSOs) who experience difficulties forecasting energy inflow from renewables.

Attempting to operate a transmission system beyond its rated capacity is likely to result in line faults and electrical fires. To maintain safety TSOs curtail production of generators to avoid local congestion.

Renewable producers with support schemes bear the inherent cost of congestion when they are re-dispatched.[9] This reduces the revenue of renewable producers and limits green energy development. In 2015, remedial actions to relieve grid congestion reached an all-time high of almost 20 TWh, amounting to costs of over EUR 800 Mio.[10] Grid adaptation is key to successfully implementing energy transition.

High-quality power forecasts are becoming increasingly important for maintaining a financially viable and secure energy system, as the proportion of weather dependent energy sources to total power production increases. In Germany the goal is to produce 35% of all power production from renewable sources by 2020.[11] In the USA, by 2025, 30% of the electricity consumed by the federal government is to come from renewable energy sources. The European Union set its 2020 goal to draw 20% of energy requirements from renewable sources.

'Prosumers' de-incentivised

An additional challenge is the rise of distributed generation, where private users generate and use their own electricity from renewable sources, such as wind and solar. In certain regions this complicates supply and demand and forces utility companies to buy excess energy from private users, who generate more electricity than they use and send the excess energy back to the grid. Since 2010, solar use has more than tripled, and this trend is poised to continue into the future as photovoltaic cells decrease in cost and increase in efficiency. [12]

CAN BIG DATA AND ARTIFICIAL INTELLIGENCE HELP?

To operate the grid more efficiently and keep fossil reserves at a minimum, operators need to have a better idea of how much wind and solar power to expect at any given time. The way to generate such insights is through using big data analytics and AI to radically improve prediction models.

Adoption is slow: utilities understandably are not the fastest-moving sector in the world given the vast scale and complexity of energy grids and power plants, tied to cross-border political negotiations. However, we are starting to see a marked shift where both the production (power plants, windmills, solar panels, etc.) and distribution sides (energy grid and storage) are adapting and start to integrate new technologies.

In Europe, grid operators are currently finalising plans to launch a digital information exchange platform that will serve as a basis for developing new digital applications to manage electricity flows and take up growing amounts of renewable energy.[13] In the meantime, many of the 2595 clean energy start-ups tracked by AngelList are already bringing their products and services to market.[14] It leads to a situation where many large companies may have to resort to M&A to avoid losing market shares to the new kids on the block.

Blockchain-based applications are also entering the market, adding flexibility to the new energy market model – A blockchain project sponsored by E.ON aims to provide prosumers with an application to balance out the market for a profit while grid operators use the software to mitigate congestion problems.[15]

In the USA, PowerScout uses machine learning and big data to find smarter ways to sell solar panels to customers, while kWh Analytics offers risk management solutions to protect investments in solar. Again, AI plays a central role in their solutions.

Major tech companies are also investing and working to establish themselves in the space. For example, IBM Research has already partnered with 200 companies that use its solar and wind forecasting technology.

One thing is competing with start-ups, but IBM is far from the only big company pursuing these solutions. For example, Google has launched its Project Sunroof. Data from CB Insights shows how the two, along with other big tech companies has been making scores of AI acquisitions.

The same goes for some of the companies specialising in technological solutions for renewable energy, such as NEXTracker, which acquired the start-up BrightBox Technologies to 'enable smart and connected solutions for the renewable energy market'. NEXTracker was itself acquired by Flextronics International for $330 million.

The acquisitions, scores of start-ups and new solutions hitting the market underline how the marriage of machine learning and renewable tech is still a relatively immature space – albeit it a very promising one. Something that often leads to quick-fire M&A.

ARTIFICIAL INTELLIGENCE'S PROMISE TO RENEWABLES

AI will allow a transition to an energy portfolio with increased renewable resource production and minimal disruptions from the natural intermittency that comes with these sources due to variable sunlight and wind intensity. For example, when renewables are operating above a certain threshold, either due to increases in wind strength or sunny days, AI powered energy management software would automatically reduce production from fossil fuels, thus limiting harmful greenhouse gas emissions. The opposite would be true during times of below-peak renewable power generation, thus allowing all sources of energy to be used as efficiently as possible and only relying on fossil fuels when necessary. Additionally, producers will be able to manage the output of energy generated from multiple sources to match social, spatial, and temporal variations in demand in real-time.[16]

Also, artificial intelligence can screen large stacks of data for a wide range of factors that may impact performance: layout and location of a site, contractual offtake agreements, type of equipment, grid connection, weather, and operation and maintenance costs can all help predict a possible financial rate of return. For example, consider a wind farm. With location data, the software can use public data sets to calculate the last few decades of wind speed and determine the project's overall performance. Location can also help determine the project's profitability in the market. California or Denmark could be a better market than, say, Texas.

Specific types of equipment and manufacturer matter, too. If an investor considers a certain type of wind turbine, data can be pulled to determine that the turbine in a given location will need $2 million of replacement parts in the next five years. It could indicate that in year seven, the probability that something is going to fail, potentially resulting in a shut-down of the site will be 50%.[17] Making the demand for electricity 'intelligent' means that vital capacity can be provided when and where it is most needed and pave the way for a cleaner, more affordable, and more secure energy system. The key lies in unlocking and using demand-side flexibility so that consumers are not impacted and are appropriately rewarded.

ABOUT THE AUTHOR

Jakob Sand is a Partner at BDO Denmark, and Leader of Technology, Life Sciences, Media & Entertainment and Telecommunication Transactions with BDO Global.

ENDNOTES

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