

ENERGY

INDUSTRY

INSIDER

Q3 2019 | Industry Pulse

Distributed Energy Management – Monitoring and Control

FutureBridge

WHAT'S INSIDE!

- Emerging trends related to distributed energy monitoring and control. It provides an insight about the trends that were captured during Q3 2019 and has a significant effect on energy industry.
- Innovative pilot projects to for Blockchain based energy trading in residential sector in Australia.
- Focus on Smarter Grid Solutions and Power Ledger

01

Pulse Themes

- a. VPP : Technology Partnership to expand horizons**
- b. Moving towards DERMS**
- c. Blockchain transforming Energy sector**

02

Quarterly review of Project Update

03

Startup Tracker highlights

01

Emerging trends

Context: VPP concept continues to spread



VPP relies upon software and a smart grid to remotely and automatically dispatch retail DER services to a distribution or wholesale market via an aggregation and optimization platform.

The major push for VPP varies from frequent blackouts, skyrocketing per unit energy cost, increasing renewable energy generation and associated grid balancing challenges.

In this quarter, major movements have been observed mainly in Australia and U.S.

VPP : Technology Partnership to expand horizons

24 September 2019



Sonne has partnered with Natural Solar to introduce sonnenFlat concept in Australia. This project involves solar plus storage VPP based on sonnenFlat electricity model.



19 September 2019



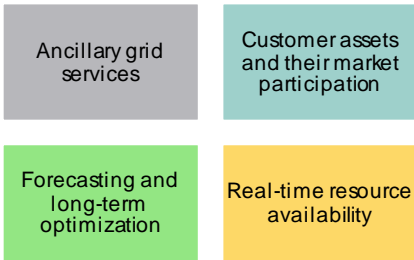
Under an Unitil Energy pilot project in Massachusetts, Eguana Technologies and ReVision Energy have launched a fleet of distributed residential energy storage systems to form an aggregated VPP.



27 August 2019



Sonne and Rocky Mountain Power launched an apartment complex of 600 homes in Herriman, Utah that will be equipped with 5MW of solar PV and a total of 12.6MWh of battery energy storage.



DEVELOPMENTS Emerging Trends



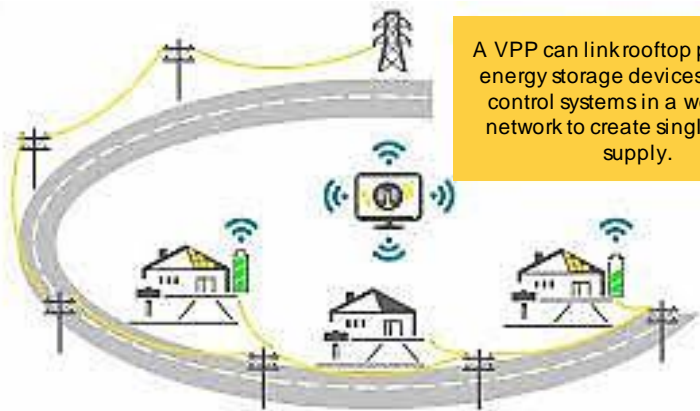
With increasing consumer-installed solar, behind-the-meter storage, demand flexibility and other DER, there is enormous energy to be tapped. VPPs are being adopted to leverage that capacity. To prepare for this transition, this sector is witnessing many partnership across the geography. Majorly solar PV system providers and battery storage solution providers are tying up with the VPP software solution providers to serve the consumers.

FutureBridge Insight & What should you investigate ?

FutureBridge Insight on VPP in future of energy sector

- The flexibility not only helps reducing the effects of larger grid failure incidents but also improves up-time for the individuals and businesses within the Utility's service area.
- VPP at residential level can automate the Peak shifts and support the utility in supplying the evening peaks. Considering this underlying fact, more market entries can be observed in Residential VPPs.
- Rooftop solar PV with storage in Residential segment is an attractive phenomenon and has huge potential to create a big difference through VPPs

A VPP can link rooftop panels with energy storage devices and load control systems in a web based network to create single energy supply.



VPP Projects: Providing flexibility from House-hold level

Sun run to provide innovative solar with storage Virtual Power Plant for Hawaii



- **Sunrun** to participate in Hawaiian Electric Company's emerging grid services market by delivering electricity via VPP composed of home solar and batteries.

Holy cross energy is piloting household-scale Virtual Power Plant in Colorado



- Colorado based four homes with solar plus storage are operating as VPP. Advanced ADMS and controllers from **Heila Technologies** are installed.

Active players this quarter



Context: DERMS to connect and control the diverse mixed-asset pools




DERMS is a software platform that can organize the operation of the aggregated DER within a power grid. The usual DERMS application is found at the distribution grid level.

Moving towards DERMS: Investments and M&A


8th August 2019



Sunverge has raised \$11 million capital led by Ecosystem Integrity Fund with Equinor Energy Ventures and EnergY Ventures. With the funding, the company will expand its platform to provide utilities with Real-time Visibility, Control and Management for DERs. 


8th August 2019



Opus One Solutions platform enables the utility to handle the increasing solar and energy storage penetration, reducing constraints at the transmission station to improve reliability, in increasing adoption of EVs and automate and integrate residential demand management. 

15th July 2019



Tendril has merged with Simple energy to form **Uplight**: A one-stop shop for utility's customer-facing software needs and will be serving a combined 100 million customers. 



EnergyHub and Oracle partnered to integrate DERs at large scale


AutoGrid collaborated with Amazon Web Services to promote global energy industry digitalization



DEVELOPMENTS
Emerging Trends

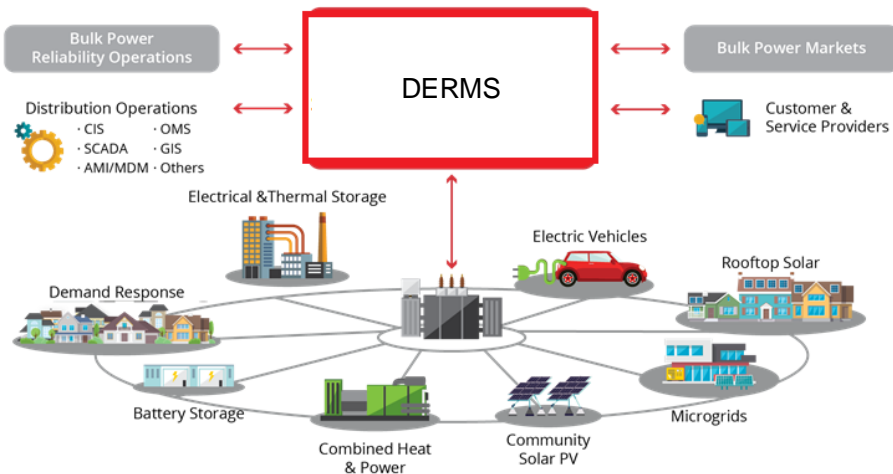


Companies are partnering with / acquiring others to gain technological expertise and expand to other geographies. DERMS is the next step and it is here with huge potential to disrupt the energy sector, offering a viable solution to modern grid challenges.

FutureBridge Insight & What should you investigate ? 

FutureBridge Insight on Various DERMS product in Market

- DERs software solution providers to play a significant role in the transition of the way utilities do their business and upgrade their network to integrate and manage flexible generation and ensuring grid stability.



DERMS Product Launch

Smarter Grid Solutions provide distributed energy resources management systems (DERMS) that deliver extremely fast, highly reliable and precise control through deterministic and autonomous dispatch.



- **Smarter Grid Solutions** has launched an open source OpenFMB device simulator to support integration of clean energy to the grid.
- **Smarter Grid Solutions** has Released the World's Most Advanced Distributed Energy Resource Management System: ANM Strata 2.0.

Active players this quarter



Context: Blockchain in Energy



Blockchain technology could potentially provide solutions to the challenges faced by the energy industry. It is expected to play a key role in metering/billing and security; decentralised energy trading; green certificates and carbon trading; grid management; IoT, smart devices, automation and asset management; E-mobility etc.

Blockchain technology witnessing Partnerships and Investments

11 September 2019



Energy Web Foundation has joined Thailand power companies for promoting Blockchain in renewables energy sector.

15 July 2019



Shell Ventures and Sumitomo Corporation Group of Japan announced investments into US firm LO3 Energy aiming to upscale blockchain technology platform for energy trading.

15 July 2019



NewX Energy aims to tokenize electricity plants into Multi-Service providers.



DEVELOPMENTS Emerging Trends

The investments and partnerships are establishing Blockchain in energy projects to build peer-to-peer energy markets. A peer-to-peer energy market is a shared network of individuals who trade and buy excess energy from other participants.

The Blockchain products can be tailored to address various energy or sustainability applications, including Wholesale electricity distribution, Peer-to-peer energy trading, Electricity data management, Commodity trading, Utility providers and Refined resource management and sale. Accelerated adoption of Blockchain in Energy sector with changing regulatory environment is expected in near future.

FutureBridge Insight & What should you investigate ?



What should you investigate ?



Role of VPP in residential segment?



How VPP platforms and DERMS can support in growing markets of developing countries?

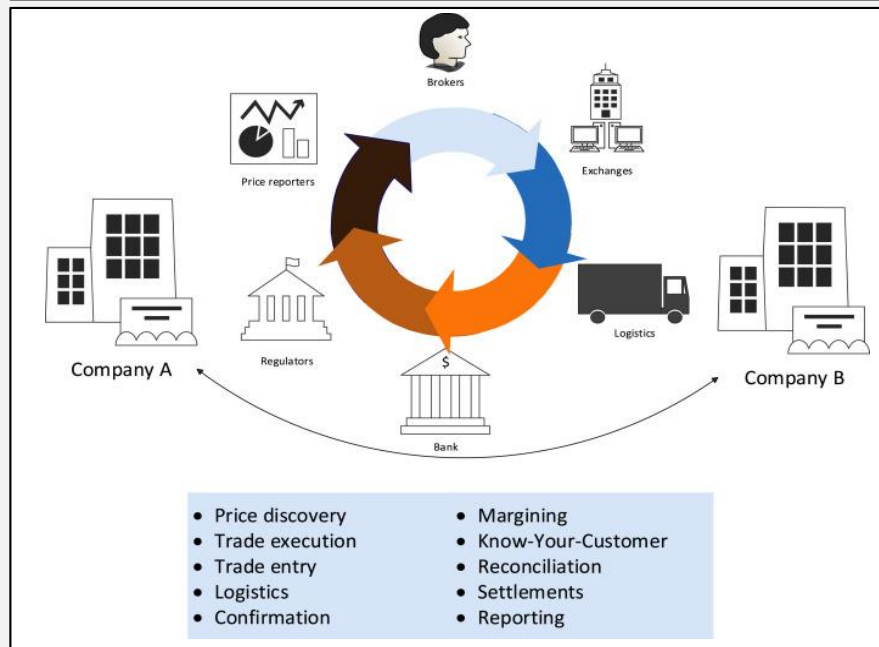


Is blockchain the solution of largely encountered challenges in power sector?

→ FutureBridge Insight on Role of Blockchain in Energy market transformation

- Blockchain technology promises transparent, tamper-proof and secure systems that can enable innovative business solutions, especially when combined with smart buyer-seller contracts.
- Block chain can disrupt the energy sector and is being tested for various applications, but before that it is necessary to understand blockchain's potential, prove its commercial viability and finally strategize its adoption in the mainstream.

Blockchain technology in Energy segment



Active players this quarter



02

Quarterly review of Project Updates

Project Update - RENEW Nexus (P2P) Plan: Power Ledger's second phase of solar energy trading trial

RENEW Nexus (P2P) Plan is a part of Australia's Smart Cities and Suburbs Program. Power Ledger is providing Blockchain platform for trial run. It allows households to trade the energy they generate from their rooftop solar PV plant.

The trial began in November, 2018 with 18 households of Fremantle, Australia which have rooftop solar PV plant. The trial run has witnessed almost 50,000 transactions Power Ledger's platform per month and tracked over 4 MWh of peer-to-peer renewable energy trades.

Considering the success of first phase, a second iteration of the trial is proposed to run till end of 2019. They target to address the pricing model challenge faced in phase 1 and expand the number of households in the second phase.

These ongoing trial will provide important insights into the challenges that needs to be addressed to support mass adoption of peer-to-peer tariff structures in Western Australia in near future.



RENEW Nexus

- Dashboard
- Transactions
- Billing
- Usage
- Pricing**
- Blockchain
- Account
- Logout

Pricing model

City of Fremantle

Currently showing rates for all meters.

Current buy rates (per kWh)		Current sell rates (per kWh)	
Peak (3pm - 5pm)	Off Peak (5pm - 3pm)	Peak (3pm - 5pm)	Off Peak (5pm - 3pm)
9c	6c	8c	5c
4c		9.9c	5.72c

Update my rates

Maximum buy rates (cents per kWh)		Minimum sell rates (cents per kWh)	
Peak (3pm - 5pm)	Off Peak (5pm - 3pm)	Peak (3pm - 5pm)	Off Peak (5pm - 3pm)
0	0	0	5

© 2018 Power Ledger. All rights reserved. Privacy Policy Terms and Conditions

Synergy everyday off-peak (All other times): 4.90c/kWh

Synergy everyday peak (3-9pm): 7.80c/kWh

Synergy buyback rate (Daily): 3.50c/kWh

Synergy capacity charge (Daily): \$1.10/day

Western Power network charge (Daily): \$2.20/day

Power Ledger transaction fee (Trading fee): 0.5c/kWh



Project highlights

1MWh
Peer-to-peer energy transacted each month

10%
Of all transactions per month are peer-to-peer

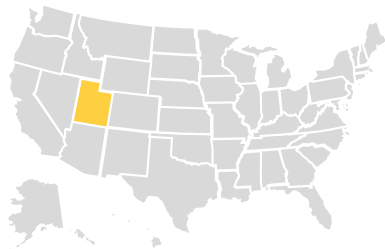
50,000
Transactions processed by Power Ledger each month

\$36
Prosumers have earned per month selling excess energy



Project Update - First of a Kind All-Electric Apartment Community with Battery Storage for Utility Grid Management, Utah

Sonnen with Rocky Mountain Power to deploy VPP in Utah



Soleil Lofts, an apartment complex of **600 homes** in Herriman, Utah, is proposed to be equipped with 5MW of solar PV and a total of **12.6MWh of battery energy storage**, aggregated together from individual units in each apartment and acting as **VPP**. The project when finished in 2020, claims to be the **largest residential segment VPP in US**.

Residents will start moving into the Soleil Lofts apartments in September 2019 and the final building construction is expected to be completed in December of 2020. Upon completion, the Soleil Lofts community will be the largest fully installed and operational residential battery demand response solution in the United States.

This is launched by **Wasatch Group, Sonnen, Auric Energy and Rocky Mountain Power**.

Wasatch is paying major cost of the project approximately \$31 million which includes the solar generation. The total cost of the Battery Demand Response Project is estimated at \$34.3 million, with approximately \$12 million for the purchase of the batteries. **RMP** will contribute about \$3.27 million toward the storage side of the project.



Battery specifications:
sonnen ecoLinX

Continuous output: 8,000 W
Usable capacity: 10 kWh - 20 kWh (in 2 kWh steps)

Dimensions (in)
W/H/D: 26/84/16

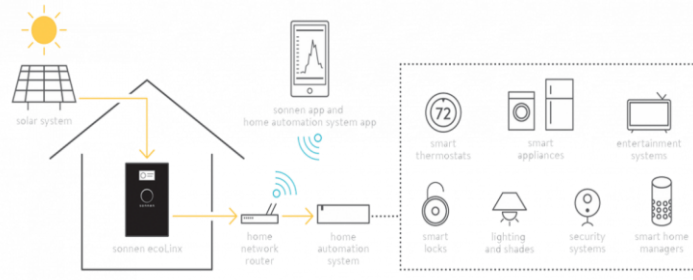
Standard lifetime of 15,000 charge cycles or 15 years.

Maximum efficiency of inverter: 93 %

Ambient temperatures: 41 – 113° F

Enclosure Rating: NEMA 12

AC Specifications: 240 VAC / split phase / 60 Hz

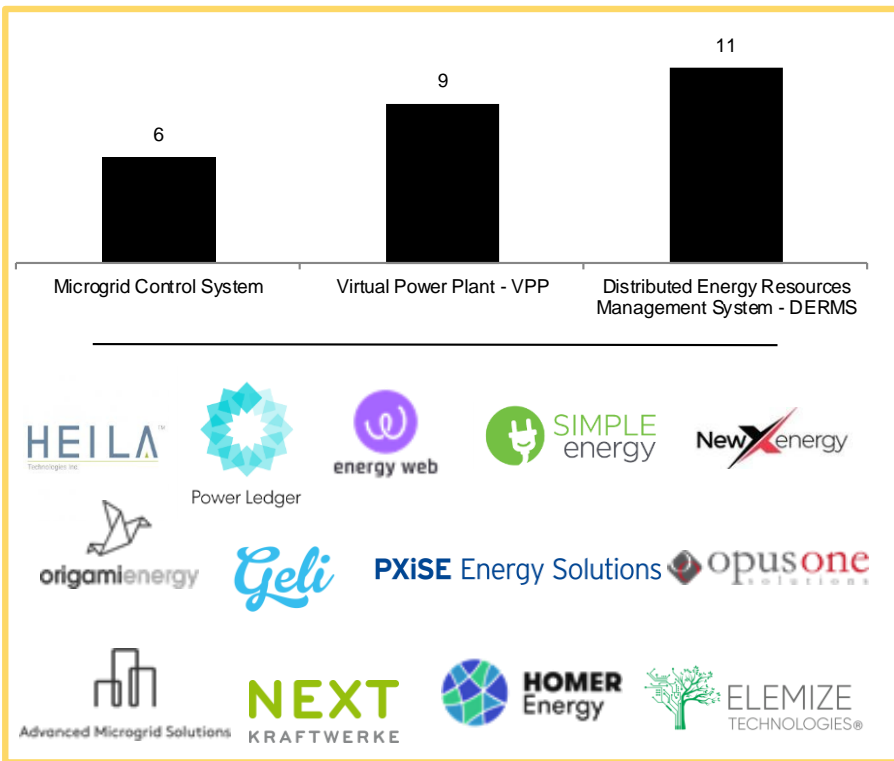


03

Startup Tracker highlights

Startup Tracker summary Q3 2019

Distribution by technology segmentation



Funding distribution & activities




sonnen
\$ 169.2 Million
 Sonnen is an intelligent lithium based energy storage provider with benefits like active energy management, smart metering and VPP integration.
 Wildpoldsried, Germany

Key Investors:



Recently acquired by Shell

simple energy
\$ 8.9 Million
 Simple Energy provides data analytics and energy management services. simple's solutions help customers to take tariff decisions and to get into the time-of-use world.
 Colorado, US

Key Investors:



Merged with Tendril Networks Inc. to form Uplight

SGS serving Distribution utilities through various features and integration options to scale to millions of DERs

Customers



Smarter Grid Solutions

Smarter Grid Solutions is a DERMS software provider, serving Distribution Utility, System Operator and Energy Asset Operator customers around the world. It operates from offices in Glasgow, New York and London, and through its global partner network.

SGS's flagship products are ANM Strata and ANM Element. Through these products SGS have enabled the connection and real-time monitoring and control of Distributed Energy Resources (DER) and delivered over \$200 million of value to its customers.

 Glasgow, UK

 100+

 300 MW DER – Monitoring and control

Solutions



Renewable and Distributed Generation



Batteries



Electric Vehicles



Energy as a Service



Load Growth and Non-Wires Alternatives



Virtual Power Plants



Microgrids

Products

ANM Strata

It Seamlessly **integrate and control DER** of any size and type and at any location.

Key functional features include:

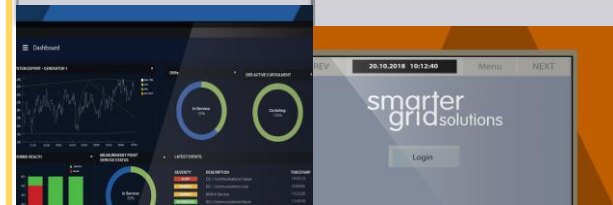
- Economic optimization, automated scheduling/dispatch
- DER portfolio management and aggregation
- Wholesale, ancillary service and flexibility market interfaces
- Operator and end-user portals
- Data visualization, analytics and reporting
- Automated configuration from online analysis.

ANM Element

ANM Element is flexible software to enable smarter monitoring and control at the grid edge. ANM Element delivers key monitoring, fail safe and local autonomous control functions

Key features include:

- Standalone local control for export limiting, locally managed interconnection
- Grid edge interface for scheduling, dispatch, visibility and data collection
- Interface and protocol options to DER control systems
- Flexible deployment options for end node devices.



North America

55 Madison Ave, Suite 400
Morristown, NJ 07960
USA
T: +1 212 835 1590

Europe

328-334 Graadt van Roggenweg
4th Floor, Utrecht, 3531 AH
Netherlands
T: +31 30 298 2108

United Kingdom

5 Chancery Lane
London EC4A 1BL
United Kingdom
T: +44 207 406 7548

Asia Pacific

Millennium Business Park
Sector 3, Building # 4, Mahape
Navi Mumbai 400 710
India
T: +91 22 6772 5700