Volttron Foundation

Creating a Vibrant Open Source Ecosystem













Energy Efficiency & Renewable Energy

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Application Scoring Results » Segmented Scores

Overall scores, segmented by percentile 25th 50th **75**th Percentile Percentile Percentile Energy Storage Optimization System **Connected Buildings** Dynamic Pricing and Demand Vehicle-to-Grid Optimization System Response Trading Market Advanced Building System Control Smart Cities **Multi-Directional Energy Systems Building Energy Advanced Data Collection & Benchmarking** Information System Virtual Power Connected Appliances Wide-Area Asset Monitoring Plant System Automated Energy Grid/Utility Services Microgrid Renewable DG Monitoring Benchmarking **Financial and Asset Exchanges** Optimization System and Forecast System Personal Data Collection Aggregated DG for Ancillary Coordinator Whole Building FDD Systems Services Aggregated DG for Capacity Retrocommissioning Sensor Suite Market Attractiveness Score Options Contracts Gas/Electric Utility Infrastructure Monitoring System Automated Load Advanced HVAC Distribution Systems Control/Sequencing EV Carsharing Monitoring System System for Black Starts Building Automation Advanced System Inventory Tracking System Safety, Security, Irrigation System and Operations Long-Range, Energy Reliability Trading Market Advance Controller for Renewable DG Whole-Building Aggregated Interconnected Optimization Incentive Load Sequencer **Building Systems** System **Building Services Trading Market** Advanced FLISR Monitoring and Control System IoT/TE Starter Kit Parking Sensor Network Renewable Energy/Carbon Non-Renewable DG **Emissions Trading Market** Optimization System AMR Enhancement Traffic/Transportation Advanced Postal System Coordination System Tracking/Delivery Water Utility Infrastructure System Water Trading Market Monitoring System

Technology Attractiveness Score

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Interviewees believe DOE and PNNL should take a lead role in developing Transactive technologies and demonstrating their opportunities to utility, regulatory, and policy stakeholders.

Opportunities for DOE/PNNL Leadership

- Many believe that a national organization, such as DOE, could create a branded program or certification to show that a Transactive product meets certain communication and connectivity criteria.
 - Eventually the market will encourage all actors to participate.
- Interviewees believe that utilities, regulators, and other policy makers need demonstrations of the value and economics of Transactive capabilities, and this is a good role for DOE and PNNL.
 - These demonstrations could help develop the energy pricing markets necessary for some TNs.
- » In addition, several interviewees identified the need for more utility ar regulator participation Volttron and Transactve development by DOE/PNNL.
 - This will help ensure that technologies operate within a utility's regulatory, security, communication, and compensation frameworks.







ENERGY



Our Starting Point: VOLTTRON in the BMS

Key Finding: There are dozens of companies investing billions into their own proprietary solutions and platforms. Partial List

New and Emerging Companies and Standards Bodies





























Mainstream Companies Expanding Their BMS, IoT, and MicroGrid Offerings





















Our Perspective: The market is highly fragmented and saturated with dozens of competitors who are investing billions in capital. Some are already using and/or are considering VOLTTRON.

Our Recommendation

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Create or join an open-source foundation to manage VOLTTRON code

What it is

A non-profit, open-source organization that is responsible for managing the VOLTTRON code base and advocating and supporting greater market adoption.

How it Operates

Not-for-profit entity that is funded through financial contributions / membership fees and staffed with business and technical VOLTTRON experts

What it Focuses on

Strengthening and expanding the VOLTTRON code base so that companies can more effectively build commercial products on the platform.

Mission / Value Proposition

Ensuring the sustainment, growth and adoption of VOLTTRON as the platform for market spaces such as transactional energy, industrial IoT and BMS, among other possibilities.

Revenue Model

Membership fees, professional services, training, conferences, technical design, customer support

Transitioning Our Vibrant Open Source Volttron Eco-system...

- PNNL developed Volttron Core internally for Future Power Grid Initiative in 2010
 BTO and PNNL agreement follows to continue with BTO support.
- DOE's committed to Volttron started in 2012 while investing in what you know it as today –
 - core development in foundational code (cybersecurity, messaging, etc.),
 - core development to build applications (cyber secure applications to deliver solutions to owners/operators leveraging building components), &
 - support for users, code, and open source distribution.
- DOE PNNL in discussions on migrating code and ownership to an Open Source Foundation.
 - DOE would continue to invest at PNNL/ORNL/Labs in core areas and contribute that code.
 - DOE would fund the initial care and feeding at the Open Source Foundation.
- DOE-PNNL will be communicating that direction in Summer 2017.

Maintaining and Supporting the Eco-system...

- We continue to need help...
 - Users to develop applications that become solutions,
 - Businesses what can we do to help build and support small businesses, new, or existing businesses,
 - Your success = Our success = Volttron's success
 - "Steal our available research" → Actually, we will give it to you
 - Contributions in code and as members commits,
 - Contributions as members for direction, and
 - Support for students, academics to increase complex control sciences.

Thank you.

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