



## SUMMARY

### UniEnergy Technologies®

#### Industry

Power, Utilities, Energy Storage,  
Batteries, Renewables, Microgrids

#### Business Value

- Performance Monitoring
- Performance Guarantees
- Automated Monitoring
- Automated Reporting
- Predictive Maintenance
- Quality Assurance
- Cost Reductions
- Service Optimization
- Connected Services

#### PI System™ Components

- PI Server™
  - Asset Framework
  - Event Frames
  - Notifications
- PI Interface™
- PI Coresight™
- PI DataLink®
- PI Manual Logger™

## Monitoring health and performance of grid-scale battery installations

Headquartered in Mukilteo, Wash., UniEnergy Technologies (UET) is a young company that manufactures and installs large-scale energy storage solutions for utility, commercial, and microgrid applications. Their core technology is a vanadium flow battery. In a talk at the 2015 OSIsoft Users' Conference, Becca Gillespie, Application Manager at UniEnergy Technologies, described how UET uses OSIsoft's Connected Services to offer capacity guarantees for their technology.

Gillespie opened the talk by describing the system. "Our half megawatt [battery] is a two megawatt-hour system, so that means you can actually use it to time-shift your electrons," she explained. The battery systems also enable customers to address other power needs, such as "frequency regulation" as well as "transmission generation deferral" and "peak shaving." "We are going to be in microgrids, especially a high penetration renewable microgrid where you need this control," she said. Because the technology will often support large-scale applications, UET offers customers a capacity guarantee on its "shipping container"—packaged systems. "We are going to continually manufacture [batteries], ship them out, monitor, and do the service," said Gillespie.

For the company's one-megawatt Avista installation in Pullman, Wash., Gillespie described the system architecture, pointing out 150 separate cells. "We are actually monitoring each and every cell," she said. "We have a lot of data," she continued. "We have process data, that's the pumps and the fans, the temperature and the pressure." Because "it's a flow battery, we are measuring everything about it: state data, state of charge. And operational data, how it's being used and how it's being charged or discharged, power, energy, so on." In the future, as systems need maintenance, field service employees will use the Manual Logger to add even more information to the system.

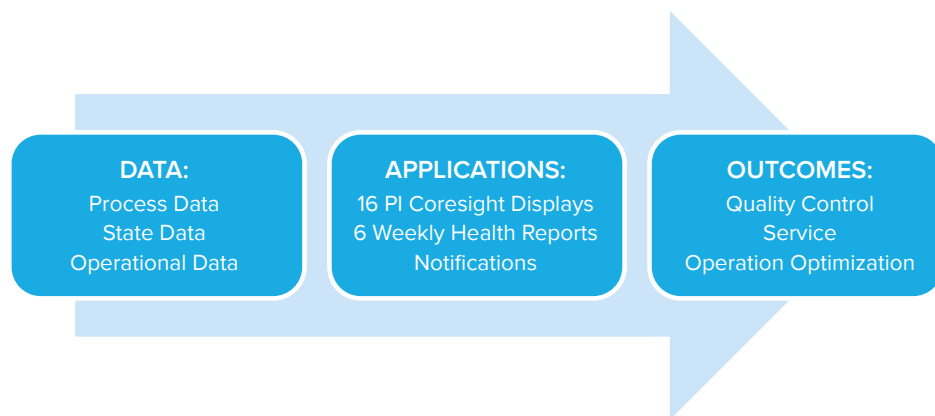
The PI System is used for both "short-term and long-term needs for service and monitoring," Gillespie said. Notifications support short-term monitoring. "What is the power, is it too high?" The system can provide "a quick look and send an email." PI DataLink also provides visibility on "things that you need a little more time to see," she explained.

To keep track of data, UET has "16 regular Coresight displays" that include everything they "need for every string, right off the bat," Gillespie said. Monitoring provides "quality control," today, mostly used "for service reports but also notifications." "Our R&D staff loves the Coresight," too, Gillespie noted.

“They love to dig into that.” “In the future,” she added, monitoring will be used for “operational optimization, so one day we can report back, do some performance reports, and say, ‘Hey, here is how you should be using your battery better.’”

For service monitoring, UET installs a PI Interface on an on-site computer to send data to a server “in UET headquarters in Mukilteo.” UET has implemented the PI System at headquarters to standardize monitoring across installations. As part of the service, UET produces weekly one-page summary health reports. Mostly, “what does everybody want out of all these KPIs?” she asked. “You just want to say that [a customer’s] system is okay, so there it is: the “OK” symbol, the green “OK.”

UET also uses Event Frames — “time-filtered data lets you sneakily” find ways to get more detailed information out of the system. For example, UET doesn’t “actually have the power for each of the cooling systems,” but they do “know the total auxiliary power.” By using Event Frames, UET can see how much additional auxiliary power can be attributed to that system. “The less instrumentation and measurements we have out in the field, the better.”



The PI System also improves the efficiency of UET’s service operations. “The idea here is to save us time,” Gillespie explained. “You can’t look at every single battery...in the field every single day. You need these automated reports.” Another “big picture benefit is to reduce trips to the field” both to reduce costs and ensure consistent service. Most microgrids exist “far away from the regular grid.” “Those are expensive to visit.” So, “we need to make sure that when we make a service visit that it is meaningful. We are taking on all the risk for our customers by guaranteeing capacity. We need to be able to get in and get out as quickly as possible.”

In closing, Gillespie said, UET is using the PI System to support other parts of its customer installations. “It’s not just those service reports,” she said. “We are using it in many, many ways.”

**“The more we can intuit using PI System data and analytics, the better.”**

– Becca Gillespie,  
*Application Manager,*  
*UniEnergy Technologies*

Gillespie, Becca, UniEnergy Technologies. *Monitoring Health and Performance of MW Scale Battery Installations Using OSIsoft’s Connected Services*, OSIsoft.com, 29 April 2015, Web. 28 June 2015  
<<http://www.osisoft.com/Templates/item-abstract.aspx?id=12376>>