Viral Content: Lessons Learned from COVID-19 for the Future

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Abstract

The Bonneville Power Administration, or BPA, Energy Smart Industrial Program has traditionally used in-person delivery methods to reach industrial end-users. With the advent of COVID-19 in early 2020, utility, ESI and many end-user staff were reassigned to telework. Energy Smart Industrial Program quickly pivoted their program-support delivery methods from in-person to primarily remote. Methods and approaches were fine-tuned based on feedback, attendance levels and results.

The Energy Smart Industrial Program team — comprising BPA and Cascade Energy staff — and utility personnel developed methods to continue driving program support and savings when COVID-19 related restrictions were put in place. Several methods had unforeseen advantages that may become permanent, including travel-time reduction for program staff and enabling more geographically distant end-user participation. The program had the technology in place to nimbly shift to remote delivery, while leveraging end-user staff and energy-management information systems to gather data and complete tasks historically done onsite by the Energy Smart Industrial Program team.

This paper describes the successes and challenges in delivering industrial energy-efficiency remotely. Various approaches and their success rates, lessons learned with technology and meeting formats are also discussed. Nearly all facets of the program, including project scoping, project assessment reports, data logging, measurement and verification, energy scans, workshops, trainings and utility-account planning sessions were shifted from in-person to remote delivery. While expectations were initially low, most aspects were surprisingly effective and successful.

Program Overview

BPA is a nonprofit federal power marketing administration that is based in the Pacific Northwest and markets wholesale electrical power from 31 federal hydroelectric projects in the Columbia River Basin to over 120 public utility customers. As part of its statutory mandate, BPA promotes energy efficiency as the lowest cost resource for meeting load growth. As such, BPA provides incentives for projects that have verifiable energy savings.

Energy Smart Industrial, or ESI, is a BPA-funded energy-efficiency program that recently celebrated 10 years of pursuing energy efficiency in the Industrial sector across BPA's service territory. Cascade Energy has been a collaborative partner in designing and implementing ESI from the start. The comprehensive program design targets the need to combine technical expertise, industrial experience, the ability to forge lasting professional relationships and exceptional communication skills to realize the long-term energy-savings potential in this diverse sector. (Eskil, Wood, and Wilcox 2011).

ESI offers a unique and fully integrated set of program offers (see Figure 1 below). Industrial end-users participate in the program through three main channels: custom capital projects, strategic energy management, or SEM projects, and trade-ally driven projects (e.g.

lighting and small industrial). The offers are facilitated and administered by a team of Energy Smart Industrial Partners, or ESIPs, who are the single point of contact for all stakeholders. If additional technical support is required for custom projects or SEM engagements, ESIPs request services from an ESI-managed pool of Technical Service Provider, or TSP, consultants.

ESIPs and TSPs historically spent a significant amount of time in the field auditing industrial sites for new upgrade opportunities, meeting with facility staff and management to help move projects forward, delivering trainings on energy-management best practices, and deploying and collecting data loggers for project measurement and verification, or M&V. The M&V approach for each project is selected based on guidance provided in the BPA M&V Guidelines for custom projects and the Monitoring, Tracking and Reporting Guidelines for SEM projects. These program documents rely heavily on standards developed by organizations such as Efficiency Valuation Organization and the Northwest SEM Collaborative to ensure validity of savings claims, while also providing the flexibility to respond to the many unique situations encountered while working in the field.

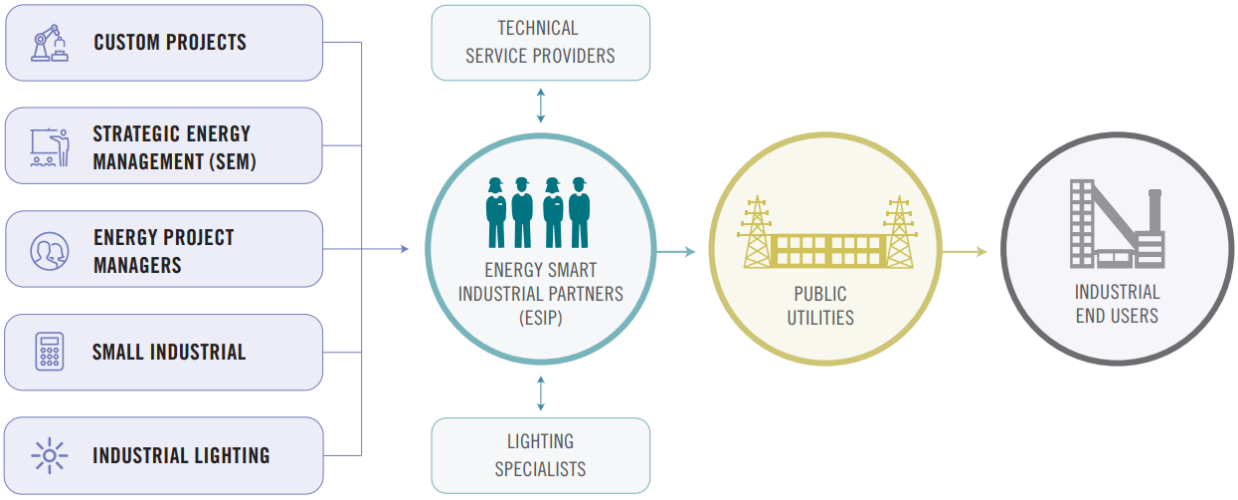

Figure 1. ESI Program Components. *Source*: Bonneville Power Administration

Capital Project Adjustments

Online Meeting Platform

ESI adopted Microsoft Teams as their primary means of remote communication several years prior to 2020. With this tool already in place, the shift to teleworking was seamless. Rather than walking to someone's office, the team quickly adapted to using *ad hoc* video calls. The tool also allowed for a relatively smooth shift to internal team meetings with all participants online.

One change in 2020 was a shift from primarily in-person meetings with site personnel to an almost complete transition to online meetings. As with most other such platforms, creating a meeting in Outlook, then adding MS Teams login/call-in information was straightforward. Some external users required assistance with using these tools. In these limited cases, the call-in option at least allowed audio communication.

A consistent platform that integrated well with email, phones, video conferencing and meetings proved crucial to maintaining successful communications when nearly all meetings were virtual.

Regular Site Meetings

There are many sites and utilities that ESI visits regularly — often bi-weekly, monthly or quarterly. New or smaller sites often had visits on an as-needed basis. In 2020, all meetings were shifted to an online format.

Challenges

Meetings with new and smaller sites were often replaced by phone calls or emails. With site visits eliminated, new project development or pipeline build was significantly reduced. For project close-out, an in-person evaluation of a new system coming online can often help identify additional energy-savings opportunities or new projects at the same site. The only projects completed for new and smaller sites were ones where the site reached out to ESI or their utility with an upcoming project.

Already occurring meetings with existing sites and utilities were replaced with Teams meetings. Teams allowed screen sharing for all participants see data or other information from the site, utility or ESI. Many people were hesitant to share their video feed and some face-to-face benefits were lost, such as understanding how people felt about information and ideas being shared or presented. Similar to smaller sites, fewer new projects were identified at larger sites. In-person meetings were typically followed by a site walkthrough, which was a great source to identify new projects. The absence of walkthroughs led to a reduction in pipeline build.

Successes

Despite the challenges above, for sites where regular meetings transferred to online, current projects continued and some ones were developed. Many sites and utilities became familiar with Teams, and were able to trade screen sharing. Site staff could easily share facility information, data and trends. ESI staff could share data analysis and utility staff could share an overview of all the projects at that site.

> *"On many bi-weekly online meetings with a paper mill in Washington, screen-sharing capabilities made meetings almost as productive as in-person meetings. At the opening of the meeting, the utility representative would share their screen and review the summary of all projects that were in progress at the site, and we would review the status of each project. For the critical current projects, the site would pull up a real-time data set from their plant historian, sharing their screen with everyone on the call. I would then be able to share my screen, and do real-time Excel calculations, based on the data and facility insight provided. If we were only doing a conference call, productivity would have been severely impacted."*
>
> *Jimmy Sauter, ESIP*

"Many times, when visiting with a utility, I would spend unnecessary time logging into their secure internet system to gain access to my project files remotely. At certain locations, remote access is not possible, so, I would have to pre-print meeting documents. When we can meet online, this is no longer an issue. With online meetings, the file sharing of meeting documents during off-site visits is a breeze!"

Christian Miner, ESIP

While in-person meetings were eliminated or significantly reduced for most of 2020, they were quickly replaced with online remote-support meetings. Through online meetings, the total site interactions, including in-person and online meetings, remained comparable to pre-2020 levels. Remote-support events shown in Figure 2 denote online support that would have been provided prior to the pandemic, through an in-person visit by the ESIP, rather than a regular phone call or other online meeting.

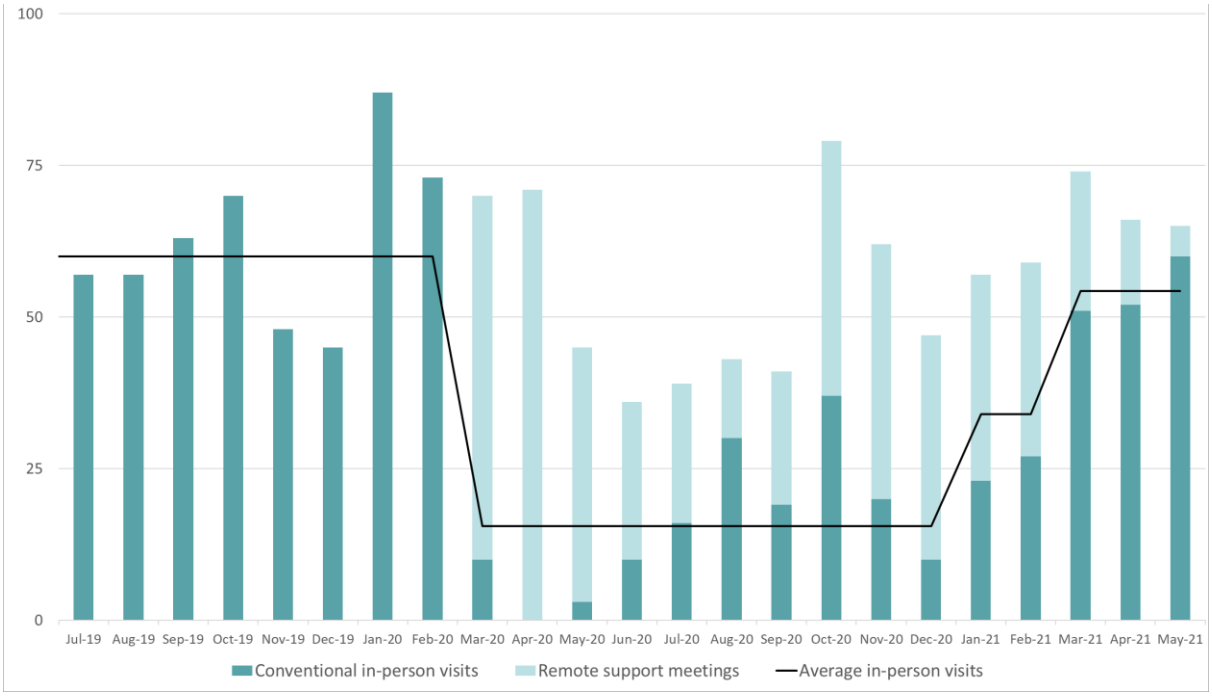

Figure 2. ESIP In-person and Remote-Support Site Visits, 2019-2021. *Source*: ESI

By maintaining site interactions, in-person and online meetings, Figure 3 shows energy-savings projects continued to be closed-out at almost the same rate as prior to 2020.

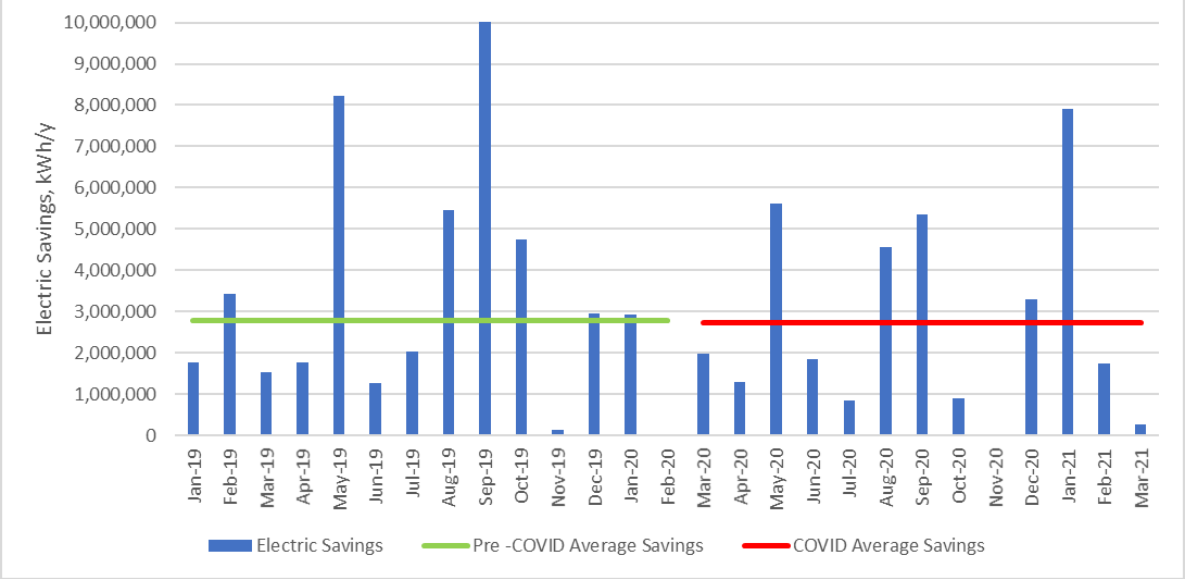

Figure 3. Monthly Custom Project Savings, Option 1 Utilities, 2019-2021. *Source*: ESI[1]

Measurement and Verification

Data loggers are a critical component in energy-savings projects. Typically, a project engineer or program delivery contractor would go to a site and work with site personnel to set-up and launch the data loggers. They would then return following a pre-determined metering period and retrieve the data, working with the site to remove the data loggers if the data looked acceptable.

Due to occasional issues with connecting the data loggers to the correct equipment, correct orientation and downloading to make sure the loggers are working properly, site staff were generally not directly responsible for deploying the metering equipment prior to 2020. In years past, program staff shipped a pre-programmed data logger to a site for connection, and site staff mailed it back in several weeks. Often, these early attempts failed to collect the necessary data in a verifiable format; therefore, the approach was rarely used.

In 2020, out of necessity, ESI and Cascade Energy launched a team to manage data loggers, including launching, shipping, receiving and downloading data. The more-focused team improved consistency in pre-programming the equipment and communications about installation. With these adjustments, the approach avoided many of the issues that occurred previously and allowed the program to successfully wrap-up projects that might have been delayed otherwise. This is still a relatively new practice and is anticipated to continue after the pandemic because of its impact on reducing travel time, and simplifying data logger management.

Online Training

In 2020, ESI offered a pilot, online training session on compressed air systems for sites served by two utilities engaged in the program. While this type of training was not new for ESI,

[1] Pre-COVID Average Savings excludes September 2019 which represents an outlier as the last month in a funding period.

the use of an entirely virtual platform for in-depth technical training was. Cascade Energy offered similar training in another program territory, with excellent success rates for new project generation. ESI adapted the material to match its customers and program offerings.

The virtual training was well attended by the more than a dozen site staff. Because it did not require any of the usual costs and hassles associated with travel, the training reached several attendees who may have been unlikely to make the investment.

As a result of the training, several sites reached out to their utility with new project ideas, including improvements to compressed air systems and unrelated end-uses. New projects were especially welcomed because they came from the new or smaller sites that were underserved during 2020. Using online trainings as a new value-added, lead-generation channel will likely continue to be part of ESI's approach to engaging hard-to-reach sites.

SEM Project Adjustments

SEM focuses on technical and behavioral training, with low- and no-cost solutions. The differences between capital projects and SEM implementation and success necessitated different approaches to maintain savings after the advent of the pandemic.

Workshops

Moving from in-person to remote-delivery workshops posed many challenges, the most prevalent being attendee participation. It is hard to keep people's attention for 4-5 hours in an in-person workshop due to naturally short attention spans, easy email and text access via smartphones, and side conversations. Moving to an online format exacerbated most of these issues.

Remote Delivery Lessons Learned

Through trial and error, and sharing workshop feedback with other SEM programs, the following lessons were learned:

- Shorter sessions improve participation. A typical one-day, 4-5 hour session was broken up into two or three shorter online sessions, with regular five-minute breaks each hour. The pace frequently changed to different activities. For example, a 30-minute lecture would be followed by a 30-minute group activity.
- Use a producer who can setup breakout rooms, manage the chat feature, keep track of time, etc. so the presenter can focus on the topics.
- At the start of each meeting, provide a brief tech overview, discussing how to screen share, and enable video, audio and chat functions. Encourage participants to test the features at this time.
- Unique online tools improve interaction. Breakout rooms — groups of 5-7 people — were used for small-group discussions and activities. Online whiteboards that allowed simultaneous collaboration, such as Mural, were used to brainstorm, discuss subsystems and enhance peer-to-peer learning. Online quizzes, such as Kahootz and Mentimeter, improved the fun element and generated friendly competition.

- Encourage participation by calling on attendees by name. Use a website, such as wheelofnames.com, that randomly cycles through each participant creating equity and helping to keep everyone's attention, in case they are called upon.
- Encourage use of video screen share, especially during breakout sessions to improve communication and make it more personal.

Through the remote-delivery lessons learned, attendance at virtual workshops was usually better than in-person ones (see Figure 4). More importantly, two new regionally-distributed SEM cohorts launched during the pandemic — with excellent savings results to date.

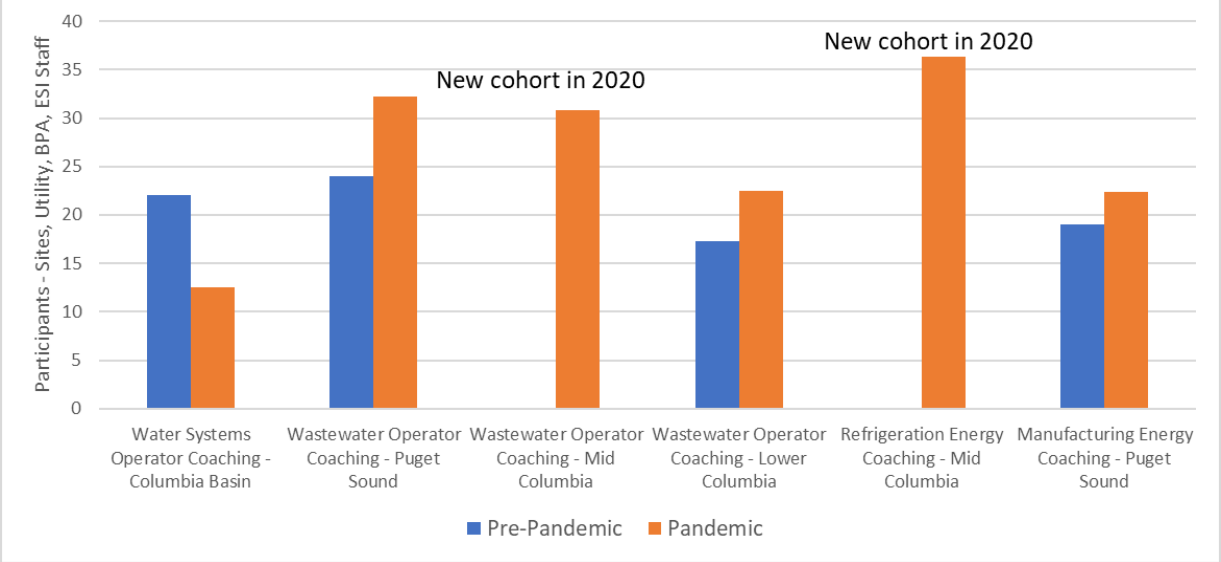

Figure 4. SEM Workshop Average Attendance, 2019-2021. *Source*: ESI

Remote delivery of workshops allows for participation from smaller and more geographically distant groups. It reduces participant costs due to lack of travel and allows subject matter experts from across the country to present. It also reduces program costs due to lack of facility rental space and eliminates the need to limit the number of attendees to the available space. Figure 5 contrasts the broad geographic spread of the wastewater cohort launched for 6 participants across 3 states during COVID with a more traditional, geographically-clustered wastewater cohort launched in 2017.

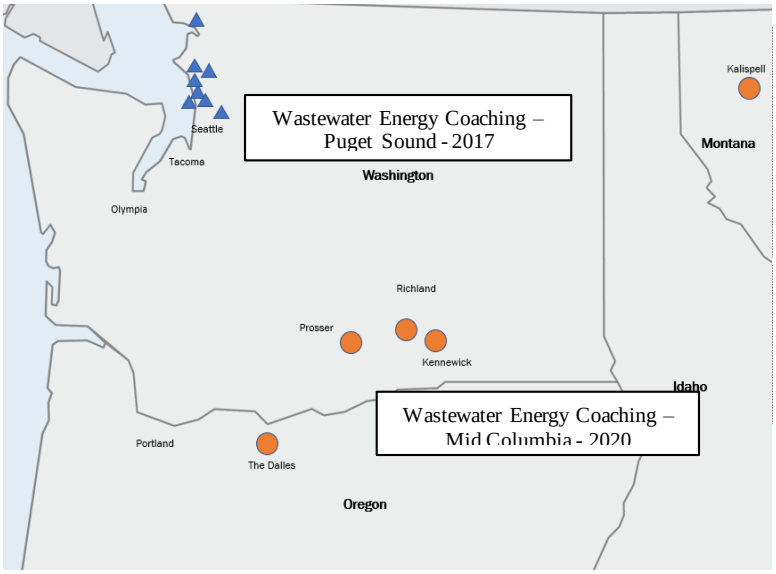

Figure 5. SEM Workshop Geographic Comparison, 2017-2021. *Source*: ESI

Energy Scans

Challenges

Without in-person site visits, it is generally difficult to identify operation and maintenance energy-efficiency opportunities. Many of these opportunities are found by physically following the process, noting technologies being used, inefficiencies, wastes, control schemes and asking many questions of site personnel. Normally ESI conducts Energy Scans — also known as Treasure Hunts — which include a PowerPoint training, facility walk through, and an Opportunity Identification meeting. These components are usually delivered in-person, with many stakeholders involved, i.e., utility staff, facility energy team and executive sponsor.

What didn't work

A few socially distanced larger-group Energy Scans were conducted live while being streamed via smartphone for remote attendees. This did not work well because remote attendees could only hear one person and were often cutoff from group discussions. It was also challenging to hear conversations because of noisy onsite conditions. Bandwidth and signal issues — especially in basements — were also a problem. All of this made for poor communication and disorganization. The photos of equipment or opportunities taken during these walkthroughs were somewhat helpful, but added substantial time and needed additional context to add value.

Successes

Through trial and error, different aspects of remote Energy Scans were incrementally improved upon with time and experience.

In-Person Delivery

When possible, onsite socially distant Energy Scans with a technical lead present were conducted. Facility walkthroughs were conducted as usual, but socially distanced (see Figure 6). The pre- and post-meetings also needed to be socially distanced; staff worked from their offices and logged into a remote platform for these portions.

Figure 6. Socially-distanced Energy Map Exercise onsite at plant. *Source*: ESI

Remote Delivery

For sites that required a completely remote delivery model, the PowerPoint energy-efficiency training was moved online to occur before the Energy Scan. During the training, opportunities associated with specific subsystems were discussed. Site personnel would then complete the actual in-person facility walk through on the subsystems later that day or soon thereafter. It was best not to wait too long to keep the material top-of-mind. Finally, an Opportunity Identification meeting took place 1-2 days following the facility walk through. During this meeting, all team members presented their opportunities and prioritized them based on the level of savings and effort required. Each opportunity was located on the Energy Value Map shown in Figure 7.

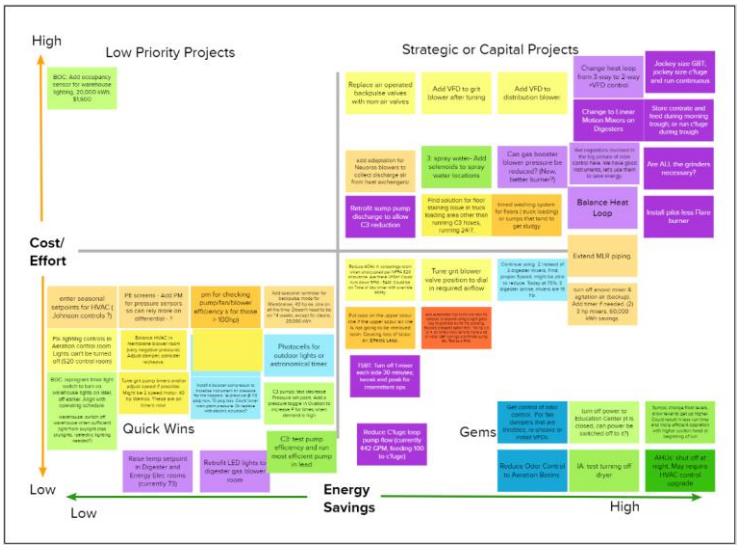

Figure 7. Energy Value Map in Mural Online Software. *Source*: ESI

The online software Mural, www.mural.com, allowed large groups to participate in this exercise. The software let each user create a sticky note and place it on the Energy Value Map. Voting tools were used to select the top opportunities, which became the first to be implemented.

Live stream walkthroughs

Good success was achieved by having an onsite person walk through the facility and share live audio/video via smartphone. A better solution was to use a wearable camera and microphone, such as the Realwear or Hololens, which are safer than carrying a smartphone (see Figure 8). This worked well because multiple offsite people could join the meeting and walk through the site together. Having a single, common line of communication assured every person's questions and suggestions were heard and discussed.

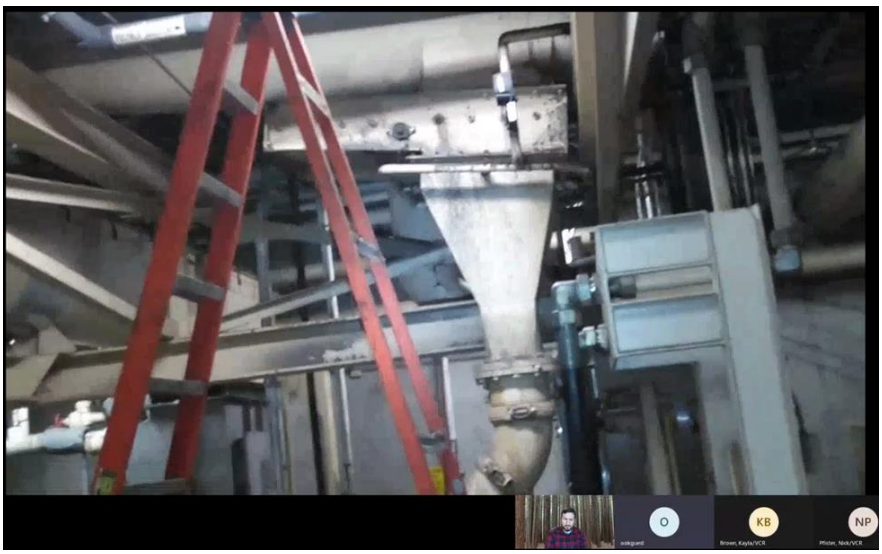

Figure 8. Realwear Head Mounted Tablet used for Energy Scan. *Source*: ESI

In one instance, a group walkthrough was conducted using headset-style walky-talkies, which allowed socially distanced communication in the noisiest settings. An added benefit was the possibility for the group to fan out in an engine room, gathering nameplate and other data, while maintaining contact. This approach made the group more productive than would otherwise have been possible.

Control-System Reviews

Walking through a facility's control system with the energy team and tech lead, particularly for unique processes such as industrial refrigeration and wastewater, was also successful. This is often done during in-person events, but with the use of screen sharing, it was made possible remotely. Typically, each subsystem screen was discussed, and key setpoints and control strategies associated with energy were reviewed (see Figure 9). Often low-cost programming, energy-efficiency improvements that could be made to the control systems were discovered. For example, an opportunity to reduce the grit-pump runtime at a wastewater treatment plant was identified during a remote SCADA review. These were equipped with a timer in SCADA, which the operator made small changes to, while monitoring for grit issues, ultimately resulting in a 1-hour per day reduction in runtime. In the absence of a live screen share, screenshots can also be used effectively.

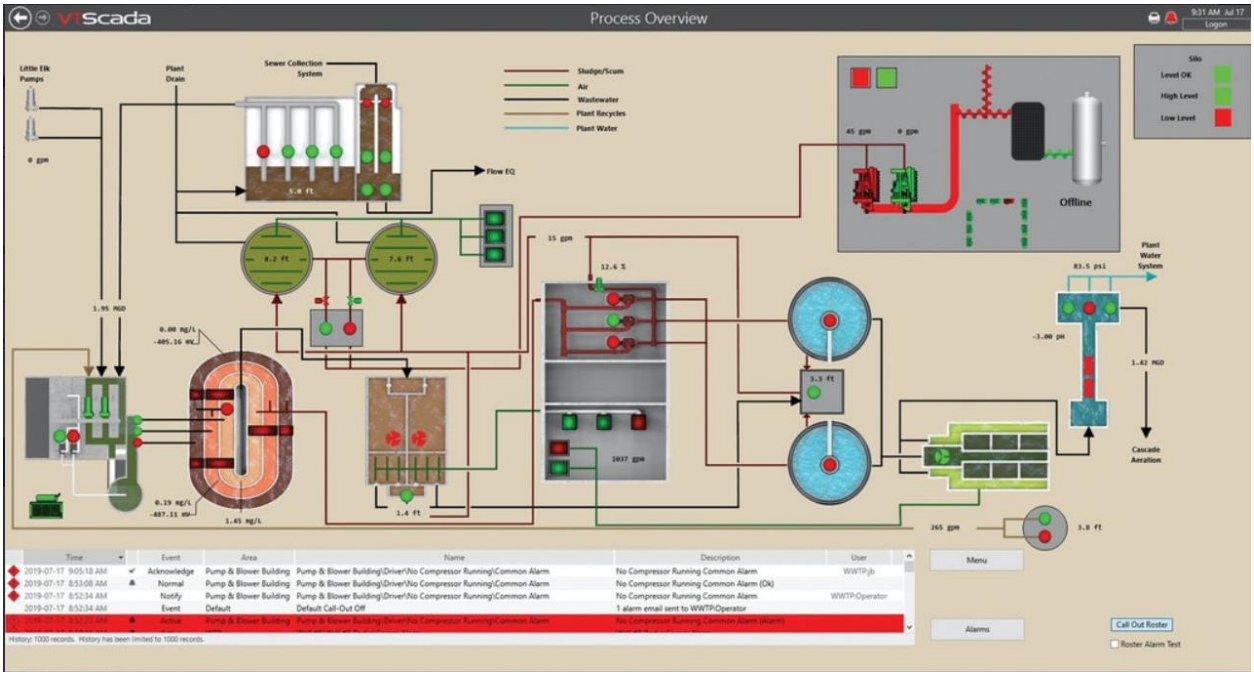

Figure 9. Example of SCADA Screen. *Source*: ESI

Subsystem Guides

We provided some customers with 2-3 page subsystem guides, which explained energy-efficiency opportunities they might see at their facility. Examples included compressed air and non-potable water systems. Customers were encouraged to walk through that specific subsystem,

noting any opportunity that may pertain to their facility, then have a follow-up conversation with their tech lead.

Conclusion

The immense impact of the COVID-19 pandemic on all aspects of life in 2020 is without question. During this period, the ESI program found that it was able to continue successfully generate significant energy savings by relying on the communication platforms it previously invested in, and making relatively minor adjustments to its approach to market. Many of these adjustments will allow the program to improve its efficiency at generating savings even after restrictions to travel and in-person meetings are removed.

Remote program delivery methods such as online coordination meetings, webinar-based trainings and control-system reviews are here to stay. With a thoughtful approach to the end-user experience, these remote delivery methods can allow many people to interact almost as well as if they were in person but without the added cost and time investment required with travel. They can also allow the program to extend its reach to geographically disbursed facilities in an efficient manner.

While the remote delivery methods developed by ESI are excellent tools to have in the program's toolbox; in-person meetings and site visits will continue to be necessary components for delivering the type of in-depth technical support at the center of programs like ESI. The remote delivery methods were most successful at maintaining momentum with sites the program had pre-existing relationships with. In-person meetings and site visits are generally preferred for developing relationships with new sites, developing new capital projects, and conducting measurement and verification activities.

References

Eskil, J., J. Wood, and M. Wilcox. 2011. "Boots on the Ground: Overcoming Staff Shortages to Work with Utilities and Industries." In *Proceedings of the 2011 ACEEE Summer Study on Energy Efficiency in Industry*, 6:64–71. Washington, DC: ACEEE.