

Schneider Electric Saves \$1.8 Million with SEP Enterprise-wide Rollout

Schneider Electric, a Fortune 500 company, can now point to 20 sites that have successfully achieved certification to Superior Energy Performance® (SEP), which includes a certified ISO 50001 energy management system (EnMS). In addition to more than \$1.8 million in energy cost savings, Schneider demonstrated significant implementation cost and internal labor reductions using a novel phased approach.

Schneider deployed SEP at its plants through three, progressively more cost-effective phases. Phase 1 included its pilot site in Smyrna, TN. Phase 2 covered four sites, which cut their implementation labor by close to half relative to the Smyrna pilot site. In Phase 3, Schneider took an enterprise-wide ISO 50001 EnMS/SEP approach that cut implementation labor by another half. Phase 3 included 19 sites, 15 new certifications and four re-certifications. While DOE has energy savings data on all 19 of these sites, it currently has cost data on only seven, and plans to update results as new data is reported.

Implementation labor reductions were driven by a couple of key factors. Since Phase 2, Schneider adopted a model that requires less site resources

| Enterprise wide Approach | Key Takeaways |
|--------------------------------------|--|
| Energy and Cost Savings | Saved 286 billion Btu in energy consumption and \$1.8 million in energy cost savings. |
| Implementation Cost Reduction | Reduced implementation labor by three-quarters to 0.3 FTE-yr per site, and implementation period from 13 months to 3-7 months. |
| Centralized Expertise | Relied on central expertise and internal consultants to promote efficiency and program continuity. |

but depends more on its Energy and Sustainability Services (ESS) group – an independent consulting group within Schneider Electric charged with performing core SEP implementation tasks and replicating best practices across sites. This trend continued in Phase 3, with the establishment of a formal Central Office to administer the enterprise-wide ISO 50001 EnMS and SEP, and integrating it into the company's existing management systems. This evolution made it possible to cut the implementation period by half (relative to the Smyrna experience), to 3-7 months.

The enterprise approach was essential to fast track ISO 50001/SEP implementation and minimize cost.

— Dennis Edwards
Schneider Electric North American Facilities Director



Figure 1: Schneider Electric's Three SEP Implementation Phases and Labor Breakdown

Business Drivers for Adopting SEP Enterprise-Wide

Adopting SEP Enterprise-wide helped Schneider streamline and fast track implementation of their energy management system, further improve its existing energy program, drive improved energy performance, and achieve internal and external goals. SEP's required targets and third-party verification of energy performance improvements also strengthen Schneider Electric's credibility as

What is ISO 50001?

ISO 50001:2011 – Energy Management Systems, is an international standard that provides a framework for the implementation of an energy management system (EnMS) for the purpose of continuously improving energy performance.

What is SEP?

DOE's Superior Energy Performance® (SEP) program drives systematic improvements in energy performance across the manufacturing and commercial buildings sectors in the U.S. Facilities certified to SEP have an ISO 50001-certified energy management system in place and demonstrate third-party verified improvement in energy performance.

What is SEP Enterprise-wide?

The SEP enterprise-wide approach enables multiple sites to share a common ISO 50001 EnMS managed by a "Central Office," though each site must still improve their energy performance and obtain third-party certification to SEP individually. This approach promotes consistency, leverages resources, and accelerates system adoption. A growing number of companies are taking up this approach to streamline EnMS implementation, make the process more cost effective, and further increase savings.

What is the SEP Enterprise-wide Accelerator?

DOE launched the Better Buildings SEP Enterprise-wide Accelerator (EWA) to test the hypothesis that ISO 50001 and SEP could be implemented at multiple sites and coordinated through a Central Office to reduce the overall implementation costs and labor per site—compared to the conventional, single-site approach. The Accelerator successfully showed that the enterprise-wide approach reduces the costs of SEP implementation.

an industry leader in energy management products and services.

Schneider Electric has operated an internally-developed energy management program since 2004. Known as the Schneider Energy Action (SEA) program, it provided the company with a platform to pilot its own new solutions, build engineering expertise, and reduce its

manufacturing energy consumption. Also, as a partner in DOE's Better Plants Challenge, Schneider Electric has completed its pledged goal to reduce its energy intensity by 25% over 10 years across 32 sites in the U.S. In 2015, the company announced a sustainability objective to be carbon neutral by 2030. Its current "Planet & Society Barometer" aims to reduce the energy consumption and CO₂ emissions at its largest sites worldwide by 10% in 2017 against a 2015 baseline.

Results

Implementation cost and labor data was collected and examined for seven of the 19 Schneider Electric sites that used the SEP enterprise-wide approach in Phase 3, and summarized in Table 1. The table also shows SEP-certified energy performance improvement and energy cost savings for all 19 SEP Enterprise-wide sites.

Energy and Cost Savings

During Phase 3, Schneider Electric had 19 SEP certified and re-certified sites in the U.S., Canada and Mexico through the Enterprise-wide approach. Those 19 sites in total saved 22 million kWh of electricity and 57 billion Btu of natural gas resulting in \$1.8M of annual energy cost reductions¹. 80% of the total energy savings came from electricity savings, and 20% from natural gas, as shown in Figure 2.

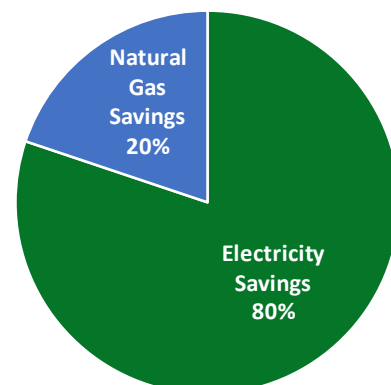


Figure 2: Energy Savings Breakdown at Schneider Electric SEP Enterprise-wide Sites

¹ 2015 U.S. industrial average rate for electricity (6.89 cents per kWh) and natural gas (3.91 dollar per Mcf) are used.

Table 1: Schneider Electric SEP Enterprise-wide Sites Summary

| Site Name | SEP Implementation Cost (\$)¹ | SEP Implementation Labor (FTE yr.)² | Annual Energy Cost Savings (\$)³ | Perf. Improvement (%)⁴ |
|-------------------------------|-------------------------------|-------------------------------------|----------------------------------|------------------------|
| Columbia, MO⁵ | \$18,000 | 0.2 | \$46,000 | 13.3% |
| Hopkins, SC⁵ | \$18,000 | 0.2 | \$64,000 | 10.2% |
| West Kingston, RI⁵ | \$18,000 | 0.3 | \$103,000 | 20.0% |
| Peru, IN⁵ | \$18,000 | 0.2 | \$193,000 | 24.9% |
| Monterrey 2, Mexico⁵ | \$18,000 | 0.4 | \$23,000 | 11.3% |
| Monterrey 3, Mexico⁵ | \$18,000 | 0.4 | \$34,000 | 7.8% |
| Tijuana, Mexico⁵ | \$18,000 | 0.5 | \$44,000 | 10.2% |
| El Paso, TX | \$18,000 | N/A | \$13,000 | 14.8% |
| Foxboro, MA | \$18,000 | N/A | \$80,000 | 6.7% |
| Greensboro, NC | \$18,000 | N/A | \$15,000 | 13.7% |
| Monterrey 4, Mexico | \$18,000 | N/A | \$22,000 | 15.0% |
| Costa Mesa, CA | \$18,000 | N/A | \$117,000 | 23.4% |
| Clovis, CA | \$18,000 | N/A | \$225,000 | 16.7% |
| Rojo Gomez, Mexico | \$18,000 | N/A | \$63,000 | 5.9% |
| Saanichton, Canada | \$18,000 | N/A | \$50,000 | 30.6% |
| Smyrna (Re-certification)⁶ | N/A | N/A | \$87,000 | 23.1% |
| Seneca (Re-certification)⁶ | N/A | N/A | \$110,000 | 16.4% |
| Lincoln (Re-certification)⁶ | N/A | N/A | \$382,000 | 22.0% |
| Lexington (Re-certification)⁶ | N/A | N/A | \$84,000 | 5.9% |

¹ SEP implementation costs (rounded to the nearest thousand dollars) only include 3rd party certification cost for Schneider Electric.

² SEP implementation labor included both site, Central Office and ESS staff time. Site labor which would have been spent on energy management under business-as-usual during the implementation period was subtracted to represent the additional labor for implementing ISO 50001 and SEP.

³ Annual energy cost savings (rounded to the nearest thousand dollars) reflect SEP certified energy performance improvement, which included results from both capital and operational projects.

⁴ SEP certified energy performance improvement was typically achieved in 2-4 years (including the reporting period) for the above sites. The Peru and Lincoln sites achieved their improvements over a 9-year and 10-year period, respectively, and certified under the SEP Mature Energy Pathway. The Columbia and Costa Mesa sites achieved their improvements in one year. The sites that used a non-standard (neither 3-year or 10-year) energy performance achievement period went through a special approval process with the SEP program administrator.

⁵ Seven of the 19 sites implementing SEP Enterprise-wide shared their implementation labor data for this case study.

⁶ Four SEP re-certified sites were not examined for implementation cost and labor or energy project details. The reported annual energy cost savings and energy performance improvement for the sites only considers the re-certification period under the Enterprise-wide approach.

Note that the SEP-certified energy savings are not entirely credited to the implementation of ISO 50001 and SEP but also include results from the company's existing energy management program. For many sites, the certified energy performance

improvement achievement periods started prior to SEP implementation. However, ISO 50001 and SEP generally drive deeper energy savings as supported by existing publications.²

² Therkelsen, Peter, et al. "Development of an Enhanced Payback Function for the Superior Energy Performance® Program." ACEEE Summer Study on Energy Efficiency in Industry, Buffalo, NY (2015).

Implementation Cost

The SEP implementation cost includes external consultants, 3rd party certification, and metering equipment. Schneider Electric relied on its Central Office and their Energy and Sustainability Services (ESS) group for expertise, thereby eliminating the need for external consultants. Metering equipment added during SEP implementation was internally sourced and simultaneously served for product testing purposes. Therefore, the metering equipment cost was not attributed to SEP implementation. Third-party certification costs (\$18,000 per site) were the only external SEP implementation cost for Schneider Electric.

Schneider Electric provided the implementation labor for seven sites certified under the enterprise-wide approach. For these seven sites, the internal labor used to implement SEP Enterprise-wide was 0.3 annual Full-time Equivalent (FTE-yr) per site on average (including 0.2 FTE-yr of site labor, 0.1 FTE-yr of ESS labor and a minimal amount of Central Office labor). SEP implementation time at these seven sites ranged from three to seven months. The staff time spent on implementing specific energy-saving action plans was excluded from these estimates. Site labor which would have been spent on energy management under business-as-usual conditions during the implementation period was subtracted to represent the additional labor for implementing ISO 50001 and SEP.

Cost Reduction

Since the Smyrna pilot, Schneider Electric was able to reduce the cost to implement ISO 50001 and SEP by \$50,000 for the SEP Enterprise-wide sites. Most of the cost reduction (\$48,000) was due to the avoided costs for external consultants. Additional savings were realized through reduced third-party certification costs (\$2,000 less per site compared to the Smyrna site).

Schneider Electric reduced internal labor needed to implement ISO 50001 and SEP in two steps: first, by 48% or 0.6 FTE-yr when they streamlined the single-facility approach for the four Phase 2 sites; second, by 49% or 0.3 FTE-yr when they established the central office and the enterprise-wide approach for the 19 Phase 3 sites. Therefore,

the 1.2 FTE-yr needed for the Smyrna site was cut by three-quarters to 0.3 FTE-yr, on average, for the seven SEP enterprise-wide sites with available implementation cost data.

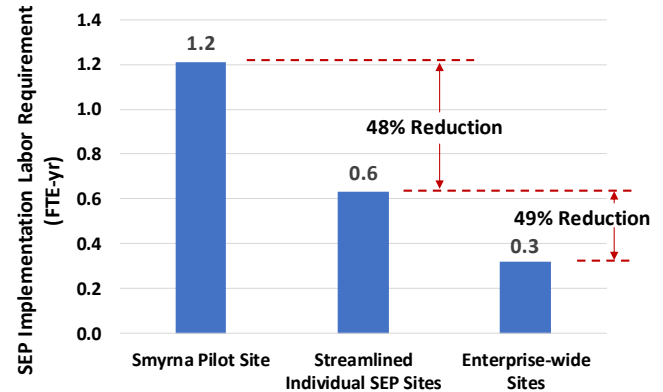


Figure 3: Trend of Schneider Electric's Internal Labor Use for Implementing SEP

The dramatic reduction in internal labor was largely attributable to Schneider Electric's highly-effective implementation model, in which a few centralized subject matter experts (SMEs) handled energy reviews and other technical aspects of SEP implementation for each site, spreading best practices and using staff resources efficiently. This model also enabled the company to reduce the implementation period from 12 months at the Smyrna site to an average of six months at the SEP Enterprise-wide sites.

Implementation Strategies

Schneider Electric created a unique approach which employs a central team to replicate ISO 50001 and SEP implementation across the individual sites. They also developed EnMS procedures integrating shared processes with ISO 14001 as the single most important tool for implementing the EnMS.

"Central Office" and Site Functions

Schneider Electric employs a "virtual" Central Office for its EnMS, which reports to the Vice President of Safety, Environment and Real Estate (the EnMS top management). The Central Office consists of three members from different geographic locations (Figure 4): the North American Facilities Director (the EnMS

Management Representative) and two Regional Facilities Managers (internal EnMS/SEP SMEs). Their responsibilities are planning, ensuring corporate procedures are followed, and supporting site SEP implementation by providing trainings and coordinating resources as needed. They meet with the site personnel and their supporting ESS consultants monthly to review site energy performance and project implementation status.

EnMS Functions of Schneider Electric Central Office



1. Planning, Program Continuity
2. Site Impl. Support, Training
3. Corp. Procedures Compliance

EnMS Functions of Schneider Electric Sites



1. Customize & Follow Procedures
2. Identify Need for Assistance
3. Action Plan, Perf. Improvement

At each site, an Energy Designee is identified to lead a facility energy team to implement SEP. This designation is typically appointed to the existing Regional/Local Facility or Safety Manager for that site. A key responsibility of this role is identifying strengths and weaknesses of his/her site and requesting support where needed. Identified gaps are addressed through staff resources and trainings provided by the Central Office and/or the ESS. The Energy Designee leads energy management trainings for the site energy team. This creates a flexible approach to meet the sites' specific training needs.

The Energy Designee and Facility Manager of each site are also responsible for the site's energy performance. They prioritize, secure and execute energy projects, which are maintained in a company database. They also maintain a five-year plan for capital energy projects. Every month, the sites update their energy consumption regression models to determine the realized energy savings from all projects implemented during that period. This is then compared to the predicted energy

savings from these projects. If there is a significant deviation between the actual and predicted energy consumption, they investigate and make corrections. This helps ensure that all energy projects deliver their intended results and improve energy performance.

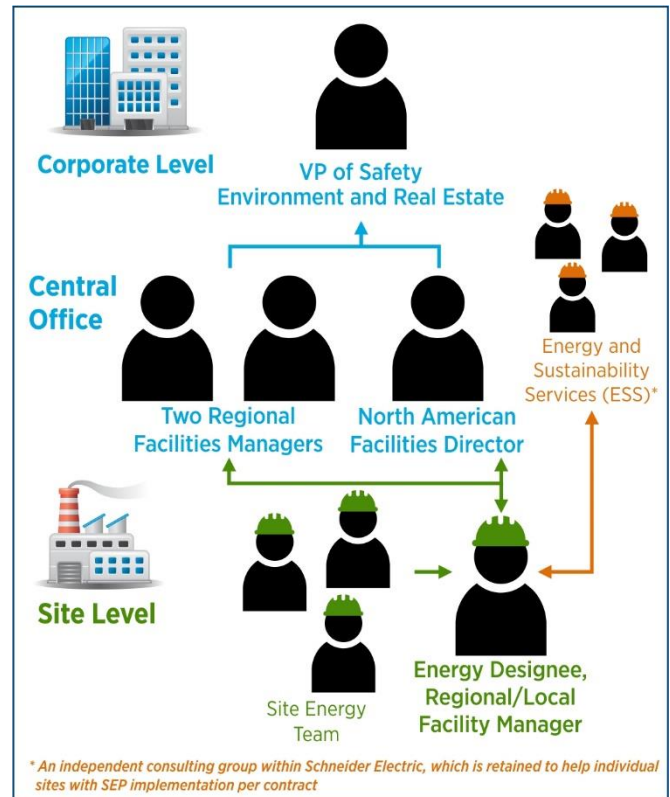


Figure 4: Schneider Electric Enterprise-Wide SEP Management Structure

Energy and Sustainability Services (ESS)

ESS is an independent consulting group within Schneider Electric, which is retained to help individual sites with their SEP implementation. Their service is coordinated through the Central Office based on the assistance solicited by the Energy Designees. The SEP Enterprise-wide sites can access the following services from ESS:

- Setting energy baselines;
- Creating energy performance metrics;
- Completing energy reviews;
- Tracking energy projects;
- Providing other assistance as needed.

Leveraging the ESS resource and expertise was a key strategy for quickly scaling the number of SEP certified sites while ensuring program continuity and reducing implementation labor. A typical SEP Enterprise-wide site hired 2-3 ESS consultants on a part-time basis for 3-6 months to facilitate SEP implementation. Using the same set of consultants at each site helped to convey best practices and avoid known errors.

Leveraging Existing Management Systems

Schneider Electric leveraged its existing ISO 14001 and OHSAS 18001 management systems for ISO 50001 and SEP; this was an important strategy to implement SEP Enterprise-wide. First, Schneider Electric used the Smyrna site to determine how to integrate ISO 50001 processes into these other management systems. Then, the company developed a framework and methodology to use existing management system processes for faster and lower-cost adoption of ISO 50001 and SEP. Key areas of management systems integration identified by this effort include local management, internal audits, management system procedures (e.g. document and record control, legal requirements) and management teams. Reusing existing processes avoided duplication of effort.

Updated corporate procedures encompassing ISO 50001 were established as a result and are used by all SEP Enterprise-wide sites. The corporate procedures serve as an effective mechanism to enforce energy management as an integral part of the company's daily management processes and practices.

Program Continuity

Centralization ensured consistency across sites; Schneider Electric centralized leadership, knowledge, project identification, project tracking, and energy performance reporting. Regular collaboration between the Central Office and the sites, in combination with centralized implementation experience among a small number of Central Office staff and ESS consultants, promoted and simplified the transfer of best practices from site to site.

To streamline reporting, Schneider Electric utilized the DOE EnPI tool to calculate energy

performance improvement percentage at regular intervals at each of its sites. This created a company-specific EnPI metric that is common to all sites. It also allowed for better performance comparison between sites, provided a common reporting platform, and reduced the effort to establish metrics.

At our two facilities, the Enterprise-wide approach streamlined access to centralized corporate expertise in energy management systems, energy modeling, and documentation. It makes sense to let our experts manage the most technical aspects of the system implementation so that we can focus on all the activities that we do best. Our facilities now have a more disciplined approach to calculating energy performance, insight into valuable synergies and best practices, and greater credibility in terms of energy savings.

— Jerry Usry
Facility Engineering Manager, Hopkins, SC and Seneca, SC

Lessons Learned

Schneider Electric started implementing ISO 50001 and SEP at its site in Smyrna in 2011. Since then, the company developed a resource-efficient approach to quickly increase the number of certified sites. This approach was tested and perfected in two steps: a batch of four sites and followed by the fully developed SEP Enterprise-wide approach. In addition to the key strategies discussed earlier, the company also attributed its success to securing support from top management and aligning ISO 50001 EnMS implementation and SEP energy performance improvement goals across all stakeholders early on.

The Central Office's leadership was also critical, especially in the areas of sharing best practices, tracking projects, supervising implementation progress, providing engineering guidance, and program continuity.

Next Steps

ISO 50001 and SEP have proven to be cost-effective approaches to achieving substantial and sustainable energy performance improvement for Schneider Electric. Inspired by these results, the company plans to maintain the current ISO 50001/SEP certifications at the 20 certified sites and ISO 50001-only certifications at 9 other sites in North America.



Schneider Electric employs 170,000 people globally to provide its customers with energy management and automation hardware, software, and services.

(Photo: Schneider Electric Seneca Site, provided by Schneider Electric)