

Engaging Supply Chains for True Energy Performance Impact

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ABSTRACT

Improving energy performance is an important goal for many leading manufacturers throughout the United States. These companies know that understanding and actively managing energy leads to improved profitability. A number of these companies are now turning to their suppliers, the source of much of the energy embedded into their products, and not only asking them to improve their energy footprints, but engaging with them to mentor or guide them toward energy performance improvement. In addition, an understanding of suppliers' energy use is important to companies compiling greenhouse gas (GHG) reports that include Scope 3 ("other indirect emissions") reporting under the WRI/WBCSD GHG Protocol.

The U.S. Department of Energy's Better Plants Program began a Supply Chain pilot with two Better Plants partners (Legrand and United Technologies Corporation) in 2014, and plans to expand this initiative in 2015. This paper will discuss the energy-efficient supply chain efforts of these two companies and DOE's role in working with these companies and their suppliers. The paper will describe how lessons learned during the pilot phase will be applied to this initiative, as well as ongoing supply chain activities of other leading manufacturers. As importantly, the authors will synthesize outcomes from the Supply Chain Pilot with noteworthy energy efficiency-related supply chain activities from other leading manufacturers in the Better Plants program and suggest evolving best practices that any manufacturer can adopt when engaging their supply chains in energy efficiency.

Introduction

Supply chains are integral to all sectors of the U.S. and global economies, but particularly to the manufacturing sector. Larger manufacturing companies have a symbiotic relationship with the smaller manufacturers that supply them with the materials and components that go into their products. The success of one is dependent on the success of the other. Larger manufacturers are now increasingly measuring the greenhouse gas (GHG) emissions of their supply chains because of customer interest, risks facing suppliers, investor and stakeholder pressure, and opportunities for joint process improvement (CDP 2010). This is especially true of companies preparing greenhouse gas emissions or sustainability reports that factor in emissions from their supply chains. These "Scope 3 emissions"¹ often comprise 40% to 60% of companies' (Brickman and Ungerman 2008) carbon footprints (and occasionally up to 80%), thus suppliers represent a significant opportunity for GHG emissions reduction. With the industrial sector accounting for 29% of GHG emissions in the U.S. (EPA 2015), improved energy efficiency and energy

¹ The GHG Protocol categorizes GHG emissions into three areas: Scope 1 includes direct GHG emissions; Scope 2 includes indirect GHG emissions from consumption of electricity, heat, or steam; and Scope 3 includes other indirect GHG emissions, such as emissions from suppliers.

management among manufacturing suppliers can result in substantial emissions reductions. As importantly, companies effectively managing their energy reduce their energy costs and improve profitability.

The desire to encourage energy improvement in their supply chains is present in most large manufacturers, however, the resources to engage their suppliers are typically limited. Also, companies that want to work with suppliers and recognize the benefits of doing so are nonetheless struggling to justify venturing into new territory and investing resources in improving energy efficiency in plants they neither own nor directly operate. The new Supply Chain Pilot provides resources and support to stimulate greater action on supply chain energy efficiency.

Background

Better Plants Program

The U.S. Department of Energy's (DOE) Better Buildings, Better Plants Program consists of over 150 industrial companies (as of May 2015), representing about 2,300 facilities and close to 11% of the total U.S. manufacturing energy footprint, as well as several water and wastewater treatment organizations. Through this voluntary program, leading manufacturers and industrial-scale energy-using organizations demonstrate their commitment to improving energy performance by signing a voluntary pledge to reduce their energy intensity by 25% over a ten-year period, or a similarly ambitious level for their sector. In return, partners benefit from DOE technical support and are able to implement cost-effective energy efficiency improvements that save energy and improve competitiveness. To date, Better Plants Partners have saved about 320 trillion British thermal units (TBtu) and almost \$1.7 billion cumulatively in energy costs.

Better Plants Supply Chain Pilot

DOE in 2014 established a Supply Chain Pilot to assist Better Plants Partners in improving energy efficiency throughout their supply chains. This pilot is in response to interest from several Partners in taking the next step on energy efficiency leadership. These partners have supply chain management programs in place, but are looking for help in integrating energy efficiency into their supply chains.

DOE's goal is to facilitate coordination of energy management practices between companies and their supply chains, with the objective of significantly improving the energy performance of the suppliers participating in the pilot. Through this Supply Chain Pilot, DOE is working with Better Plants Challenge Partners United Technologies Corporation (UTC) and Legrand North America (Legrand) to leverage existing Better Plants Program resources and the companies' own resources to encourage and mentor cohorts of suppliers in setting, tracking, and meeting energy savings goals. DOE is expanding this pilot in 2015 to include additional Better Plants Partners.

Stemming from a previously held workshop and follow up conversations with Partners, DOE learned that companies face several key barriers in working with their suppliers on energy efficiency, which can be summarized as follows:

- Partners want to work with their suppliers on energy efficiency, but are unclear on how to approach their suppliers, what types of demands to make of them, or where to direct them for appropriate resources.
- Partners are generally reluctant to ask their suppliers to make specific energy-related commitments without also providing resources to help the suppliers meet those commitments.
- Partners would like to be able to measure their suppliers' performance, but have been wary of requiring suppliers to provide energy data, due in many cases to concerns about the time burden and complexity associated with managing the data collection and analysis process.

The Supply Chain Pilot seeks to address these barriers. By becoming Better Plants Partners, the participating suppliers make the same commitments as other Partners – setting an energy baseline, setting performance improvement goals, and reporting in a standardized format. They establish a relationship with a Technical Account Manager (TAM) who can provide basic energy efficiency awareness and education, assistance in putting an energy tracking system in place, assistance in reporting, and direction on DOE and other resources of relevance to them. DOE organizes and conducts a series of energy management webinars for the suppliers. For the initial two supply chain cohorts, these webinars were scheduled to occur once every two months during the first year of each cohort, and cover Better Plants program requirements, the basics of creating a baseline and tracking energy use over time, and an overview of DOE resources and software tools. In addition, DOE provides them with priority access to free, one-day energy audits from the Department's university-based Industrial Assessment Centers (IACs). Importantly, DOE agrees to collect and analyze energy performance improvement data reported by participating suppliers. Each year, DOE will provide the Partner with a report that summarizes energy efficiency progress made by its group of suppliers. This leverages the expertise DOE has developed over the last four years managing the data collection and analysis process for the now 150-plus companies participating in Better Plants.

In addition to the technical support, Partners hosting a cohort also receive DOE recognition for their leadership in improving supply chain energy efficiency. For example, a December 2014 article on Triple Pundit (de Fontaine 2014), authored by DOE, highlighted UTC's and Legrand's participation in this pilot, as well as the energy-related supply chain activities of Johnson Controls, Inc., another Better Plants Partner. A September 2014 video² developed by Legrand in partnership with DOE, highlights Legrand's commitment to energy performance improvement, including the Supply Chain Pilot. DOE also provides recognition and opportunities for supply chain energy efficiency panel discussions and presentations at annual events such as DOE's Better Buildings Summit and the Association of Energy Engineers' World Energy Engineering Congress.

Supply Chain Cohorts

The two supply chain cohorts established to date consist of key suppliers hand-picked by UTC and Legrand. UTC selected six suppliers, and Legrand selected eight suppliers. The suppliers are listed in Table 1.

² www.youtube.com/watch?v=QLsAo2Y1QJ8

Table 1. Supplier companies participating in Better Plants Supply Chain Pilot

UTC cohort	Legrand cohort
GKN Aerospace	Chapco, Inc.
Hitchiner Manufacturing Co., Inc.	Coilplus, Inc.
MB Aerospace	Complete Design & Packaging
RIT International Metals, Inc.	Durex, Inc.
Selmet, Inc.	Lynam Industries, Inc.
Weber Metals, Inc.	Magnetic Metals Corporation
	Rowley Spring & Stamping Corporation
	Stanley Spring and Stamping Corporation

The main points of contacts at these participating suppliers represent a variety of backgrounds and job descriptions. The typical Better Plants Partner point of contact will be a corporate energy manager for the larger companies, or a facilities engineer or facilities support staff at the smaller companies. These personnel typically have a number of years of experience in facilities operations and often an in-depth understanding of their energy use. Thus far in the Supply Chain Pilot, because these companies have generally been much smaller than the average Better Plants Partner, the points of contact may be the company owner or president, or a staff person wearing a number of hats within their organization. These points of contact typically have limited exposure to energy improvement analyses or energy management, and are likely to not have an engineering background.

UTC Experience to Date

UTC has a long history of working with its supply chain and there was immediate interest in the Supply Chain Pilot when it was announced. UTC is a founding partner of the Better Plants Program and is active in all aspects of the program. The Supply Chain Pilot provides UTC an opportunity to leverage the benefits of the DOE Better Plants Program with a number of their key suppliers while reducing some of the burden on UTC staff.

Factors that impacted UTC’s decision to participate included:

- The pilot fit well with their existing supply chain sustainability program. They currently track suppliers’ energy performance, and this pilot complements the tracking by offering resources that encourage performance improvement. Specifically, the participating suppliers are putting in place energy management programs and working toward meeting performance targets.
- This pilot reduces some of the current supplier reporting requirements to UTC, since the suppliers become Better Plants Partners and report annually to DOE in a standard format. Thus in the future they may be able to curtail their internal tracking of the energy performance of these suppliers.

UTC is integrating discussion of the Supply Chain Pilot into its supplier handbook. The content will describe the program and encourage participation for those who want to achieve a “Gold” status within UTC’s supplier program.

After deciding to join the Supply Chain Pilot, UTC targeted key suppliers using a two-step process. They first narrowed down their suppliers by selecting only their most mission-critical and time-sensitive suppliers, and then from among that group, choosing the largest suppliers in terms of annual purchases. The goal was a cohort size of ten suppliers. Of the ten selected, six decided to join the pilot and commit to the Better Plants Program.

Through the DOE Supply Chain Pilot, UTC's supplier cohort has received or scheduled four industrial assessments at no cost to the suppliers. DOE has reviewed data from one assessment, which identified potential plant-wide annual energy savings of 18% with an approximate payback of 1.1 years. If the company implemented all recommendations stemming from just this one assessment it would already be within striking distance of achieving its 25% energy intensity reduction goal. All UTC's participating suppliers have created an energy baseline and established an energy intensity metric for evaluating energy performance improvement over time. Through the webinars and interaction with their TAM, the supplier companies are learning about new tools and best practices for energy management. DOE expects to collect energy performance data from these suppliers by spring-summer of 2015, which will show actual energy savings experienced over the time these companies have been participating in the pilot.

Legrand Experience to Date

Legrand has been working with its suppliers for several years, initially working to build awareness and impart their energy efficiency knowledge to their larger suppliers through tailored conferences (de Fontaine 2014). Energy efficiency and sustainability were key topics at these conferences, with Legrand sharing best practices and real-world examples with these suppliers. Legrand also created a toolkit to help their smaller suppliers identify energy improvement opportunities.

However, Legrand was looking for additional ways to inform and influence their suppliers. The Better Plants Supply Chain Pilot was a good fit for Legrand, which sees potential in the cohort approach as an effective means of engaging their smaller suppliers. Legrand contacted a number of their smaller suppliers, and eight opted to become Better Plants program and become a part of the Legrand supplier cohort. These suppliers were selected on the basis of the strength of the relationship with Legrand, the length of time they had been supplying the company, and a general sense, based on personal interactions between Legrand's head of procurement and the suppliers, that these companies would be receptive to an energy efficiency initiative. Less than a year into the pilot, all of the suppliers have set energy baselines, begun to track their energy use, and look for improvement opportunities. Through the DOE Supply Chain Pilot, Legrand's supplier cohort has received 2 industrial assessments at no cost to the suppliers, identifying potential plant-wide annual energy savings of 30% on projects with a 0.6 year simple payback at one facility and savings of 11% with a 1.4 year simple payback at the other facility.

Thus far, Legrand sees great potential in the Supply Chain Pilot as a vehicle for engaging many of their key suppliers. Even within Legrand's smaller suppliers, there is significant variation in company size, types of products manufactured, and energy awareness. Legrand realizes a one-size-fits-all approach is not ideal. Legrand feels the Better Plants program resources, combined with their own resources, can help most any small company. They see one of the challenges as finding the "sweet spot" of support that leads suppliers onto the path of continual energy improvement. Legrand's long term goal is to teach the suppliers to be self-supporting in terms of energy efficiency knowledge and actions towards energy improvement.

However, getting these companies to track and monitor their energy performance is already a significant step forward.

Legrand is looking to expand their outreach to small suppliers by inviting others into the Better Plants program and their supplier cohort. Similar to the UTC cohort, DOE anticipates collecting energy efficiency data from the Legrand suppliers in the spring and summer of 2015.

Lessons Learned So Far

The assessments performed by the IACs have been well-received by the suppliers. The IAC assessment reports that DOE has reviewed so far have identified a mix of capital measures and low cost/no cost measures with simple payback periods ranging from zero to four years. The assessments routinely find a number of projects with simple payback periods of less than one year. Boiler replacement projects are the most common capital-intensive recommendations. Other common capital project recommendations include lighting retrofits and installation of variable frequency drives on pumping systems. Typical low cost/no cost recommendations include compressed air leak repairs, installing compressed air nozzles on air guns, photosensor controls for lighting, and adding automatic doors to process ovens.

DOE plans to monitor the implementation rates of the IAC assessment recommendations for the supplier cohorts. DOE so far lacks the data to gauge the degree to which suppliers are implementing the opportunities identified by the IACs, but expects to collect this information later this year and next. Since the suppliers' personnel engaged in the Better Plants program have many duties and competing demands, the assessment reports are at times shelved before being read or fully comprehended, and thus forgotten about before action is taken. To guard against this risk, the TAMs will obtain and review future reports shortly after they are completed. They will then reach out to the suppliers, walk them through the assessment reports, and encourage timely action on the report recommendations.

The cohort webinars were meant to overview the pilot, introduce the concepts of energy baselines and energy intensity, discuss key energy management tools, and review energy management best practices. The points of contact for each supplier company were encouraged to attend each webinar as a cohort. For these initial two cohorts, webinar participation has been lower than desired, due to the frequency (once every two months) and number of scheduled webinars, as well as the fact that the company representatives from these small companies are juggling many roles within their organizations and are sometimes pulled away at the last minute to manage other responsibilities they have within their companies. This contrasts with other webinars DOE has held for Better Plants Partners, which are usually well attended by corporate energy managers, whose job it is to focus on and keep track of the latest trends and developments in energy management.

The suppliers do state that the webinars, combined with interaction with their TAM, has helped them “get on track” by creating awareness of energy efficiency opportunities and presenting a structure for tracking their energy use. Going forward, DOE will revisit the webinar approach with its supply chain cohorts and will consider the following modifications:

- Reducing the number of webinars, perhaps limiting them to four, and experimenting with their frequency. On the one hand, spacing them out on a quarterly basis may help increase participation rates as the time burden will be spread out over a longer period. On the other hand, compressing the webinars into a one or two month time frame at the

outset of the program may boost participation rates by focusing efforts when the program is most “fresh” in participants time and help “jump start their participation. DOE plans to try both approaches with future cohorts.

- Recording the webinars and making them available on the DOE web site, so suppliers can view them at their leisure, as opposed to trying to schedule these at a time that works for all six-to-eight companies, and
- Inviting guest speakers or asking for more frequent participation from the purchasing company to keep the webinars more engaging.

Given the backgrounds of the supplier points of contact and their typically limited exposure to energy analysis and energy management practices, it is clear that the type of support DOE needs to provide for these smaller companies is different than with larger manufacturers. The supplier cohorts will need additional support in the form of awareness creation and education on energy fundamentals. For most of the supplier company points of contact, this pilot is their first introduction to energy efficiency and energy management practices. As the pilot progresses, DOE will need to be sensitive to the background and experiences the supplier companies bring to the Better Plants Program. A higher degree of one-on-one communication than initially anticipated has been needed to impart energy management basics to the participating suppliers.

Another important finding is that most partners have found that the DOE software tools are generally not applicable to their facilities, and staff lack the time to become proficient in them. They would like to receive assistance in the most basic tools such as the eGuide Lite and Strategic Energy Management checklist, and then perhaps over time explore the system-specific tools. Moving forward, they prefer to “keep things basic”, at least for the near term, as they assemble their first annual energy performance report for the Better Plants program.

DOE is learning that relative to the larger Better Plants Partners, these smaller partners can benefit from assistance in creating energy awareness within their organizations, and from turning that awareness into a company culture of energy improvement. With future supply chain cohorts, DOE plans to put additional effort into assisting the companies in energy awareness-building and establishing an energy culture, while also focusing on helping the companies master the basics of energy baseline development and energy performance tracking.

Comparison to Other Engagement Activities on Energy Management

As DOE prepared to launch the Better Plants Supply Chain Pilot, several of the key DOE Better Plants Partners were queried with a range of responses. Some, although actively pursuing energy performance improvement, have not started to address energy within their supply chains, while others have begun energy-related supply chain activities. DOE is actively tracking supply chain efforts from companies and organizations not participating in the pilot to help inform its efforts going forward. One company with its own pilot supplier efficiency program is Johnson Controls, another DOE Better Plants Challenge Partner. Like Legrand and UTC, Johnson Controls has worked with its larger suppliers for several years, encouraging them to report to the Carbon Disclosure Project’s (CDP) supply chain program while providing webinars on basic energy management and carbon accounting.

For its smaller suppliers, Johnson Controls felt a more hands-on approach was necessary. This led to its own voluntary pilot program for smaller suppliers. Through this program, Johnson

Controls sends some of its own energy management professionals to these suppliers for one- to two-day training combined with facility energy assessments. The training is a simplified version of its standardized Energy Hunt process, which it has used extensively on its own manufacturing facilities. The training includes working with supplier plant personnel to create and prioritize a list of energy improvement opportunities based on the assessments. The focus is on low-cost/no-cost improvements, and facility-wide savings estimates are typically in the range of 5-10%. DOE has published an implementation model (DOE 2015) that summarizes Johnson Controls' experience so that other companies can replicate it.

Another example of small supplier energy efficiency engagement comes from CDP and the Institute for Industrial Productivity (IIP). CDP and IIP are collaborating on Action Exchange, a pilot program for the suppliers to several large multinational companies. Action Exchange takes the input from suppliers' CDP emissions reports and provides these suppliers with high-level recommendations for improvement (CDP 2013). In addition, the suppliers are connected to approved solutions providers that provide assessments, recommendations, and other services. DOE and CDP are making suppliers in their respective programs aware of the other program, and are in discussions on other ways to better collaborate.

U.S. DOE Plans for Supply Chain Engagement on Energy Management

As DOE continues to implement the Supply Chain Pilot, a couple of key near-term milestones will help inform its future efforts. This includes review of the first annual energy data reports from the suppliers, along with expansion of the pilot with new Better Plants partner-led cohorts.

Data Collection

In the spring and summer of this year, DOE will collect energy performance data from participating suppliers. This will allow DOE to see if suppliers are beginning to improve their energy performance, which, ultimately is the primary goal of this initiative. It is important, however, not to put too much stock in a single year's data. Companies that join the Better Plants program make a long-term commitment to energy efficiency improvement and performance will vary year-by-year as these companies work towards their longer-term goals. While it is true that much low-hanging fruit can be harvested in the early years of participation, it is also the case that some major projects require multiple years to develop, especially for companies like these suppliers that are completely new to energy efficiency and may have only just recently received their first energy audit through the IACs. The reporting process itself is important, though, as DOE will be able to determine how difficult it was for suppliers to collect and report the data, which may lead to different guidance or tools being provided to help the suppliers fulfill this reporting requirement.

DOE will also evaluate whether the year-end reports it provides to the customer companies (i.e. Legrand and UTC) are useful and actionable. Both companies have so far stated a preference to only receive "rolled up" data across their cohorts. This means DOE will provide average (in terms of percent improvement) and total estimated savings across each cohort. This is being done in part to alleviate concerns among some suppliers that specific energy performance data could end up being leveraged against them by their customers. In other words, if a supplier reduces its energy intensity by 3% in a given year, the customer could potentially ask for a corresponding decrease in prices of goods purchased? Neither Legrand or UTC have

expressed an interest in negotiating lower prices from suppliers as a result of this initiative, but presenting data in a rolled up manner eliminates the possibility that such an outcome could occur.

In addition to the year-end energy data reports provided by suppliers, DOE will also be tracking the recommendations in the IAC assessment reports as well as the suppliers' actions to implement those recommendations. DOE is interested in comparing IAC implementation rates among the supply chain cohorts against the larger population of manufacturers that have received these audits. This will be done to test a hypothesis that implementation rates among the suppliers will be higher due to their access to a TAM as well as the implicit pressure from their customers to implement projects to make progress toward their energy efficiency goals.

Expanding the Pilot with New Participants

The goal of the pilot is to learn from cohort and company experiences to inform future supply chain efforts. Already, DOE has learned a great deal from the experiences of Legrand and UTC, but believes it needs additional and more varied participants to understand a greater spectrum of approaches in the marketplace and determine, develop and communicate a robust set of solutions. DOE is in conversations with at least four Better Plants partners with some interest in undertaking the pilot in 2015 or early 2016. This includes some companies that have made an explicit choice of working with their larger suppliers because these represent a greater share of the total energy consumption within their supply chains. DOE will need to tailor its approach to these suppliers, many of which will already have energy management plans or programs in place, or at least have a higher-level energy efficiency awareness relative to the suppliers so far participating in the Legrand and UTC cohorts.

Addressing Longer-term Issues

On a longer term basis, DOE is facing two other issues that are somewhat inter-related. One will be how to effectively and efficiently grow the initiative. Another will be to work with other organizations to great synergies with other supply chain initiatives while avoid duplication of efforts.

Scaling the Supply Chain Pilot. Ultimately, DOE wants to encourage as many companies as possible to engage their suppliers on energy efficiency due to economic and environmental benefits available. The pilot approach, though, can be relatively resource intensive, so DOE will be looking for ways to leverage the lessons learned from the early participants to develop solutions that can be widely adopted by the market as a whole, short of participating in either the pilot or some kind of formalized expansion. This may include the publication of guidance documents and/or tool kits specifically targeting suppliers. At a minimum, DOE intends to place on its web site, recordings of future webinars it conducts for participating suppliers.

Coordinating with other initiatives and programs. Interest in supply chain sustainability continues to grow, which is good for businesses and the environment. The only drawback to this growth is the proliferation of sustainable supply chain offerings. Between individual company initiatives and programs launched by other government agencies and non-governmental organizations, DOE needs to take care that it is providing added value that complements existing initiatives rather than competes, duplicates and/or conflicts with them. Continuing conversations

with these organizations is key. Exploring possibilities around harmonizing data reporting is also important.

Conclusion

DOE is still in the early stages of this initiative, but the results so far have been promising. Suppliers are remaining engaged, and appear on track to provide performance data in the spring and summer of this year. Meanwhile, several other companies have expressed an interest in signing up some portion of their supply chains in an expansion of the initiative. The remaining months will be key in terms of analyzing the data that comes in as well as expanding the initiative to other partners. True to the spirit of a pilot, DOE will experiment with alternate approaches, some of which may be determined by the characteristics of the suppliers that join in the future, in terms of size, complexity and maturity of existing energy management systems. DOE plans to continue to share findings of this initiative as it evolves with the public to better inform efforts underway from other companies, government agencies and non-profit organizations.

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