

## **An Effective Approach to Reaching Small Industrial Savings**

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### **ABSTRACT**

When in 2007 a bar graph categorizing industrial project count by size (measured in kWh energy savings) showed a void at the small end of the project size range, Energy Trust of Oregon program managers knew they were looking at yet another example of the familiar conclusion that the small industrial energy efficiency market is hard to reach. Despite four years of industrial program availability, the “market” for energy efficiency projects in the sub 40,000 kWh range remained virtually untapped.

To address the gap, Energy Trust launched a “Small Industrial Initiative” in which the approach to outreach, analysis, administration, and communication was tailored specifically to the needs of smaller industrial customers and their equipment vendors in a cost effective manner. Compressed air was selected as the first focus area because of widespread use, potential for savings, and relatively concentrated supply chain. Irrigation measures soon followed but required modifications to the delivery structure to suit the agriculture market. Each segment provided unique and valuable lessons that were quickly integrated into further improving the delivery process. The approach includes a combination of a vendor driven calculation tools with quick turn around processing. Focusing on streamlined business processes and clear communication with rapid turnaround proved to be the keys to success.

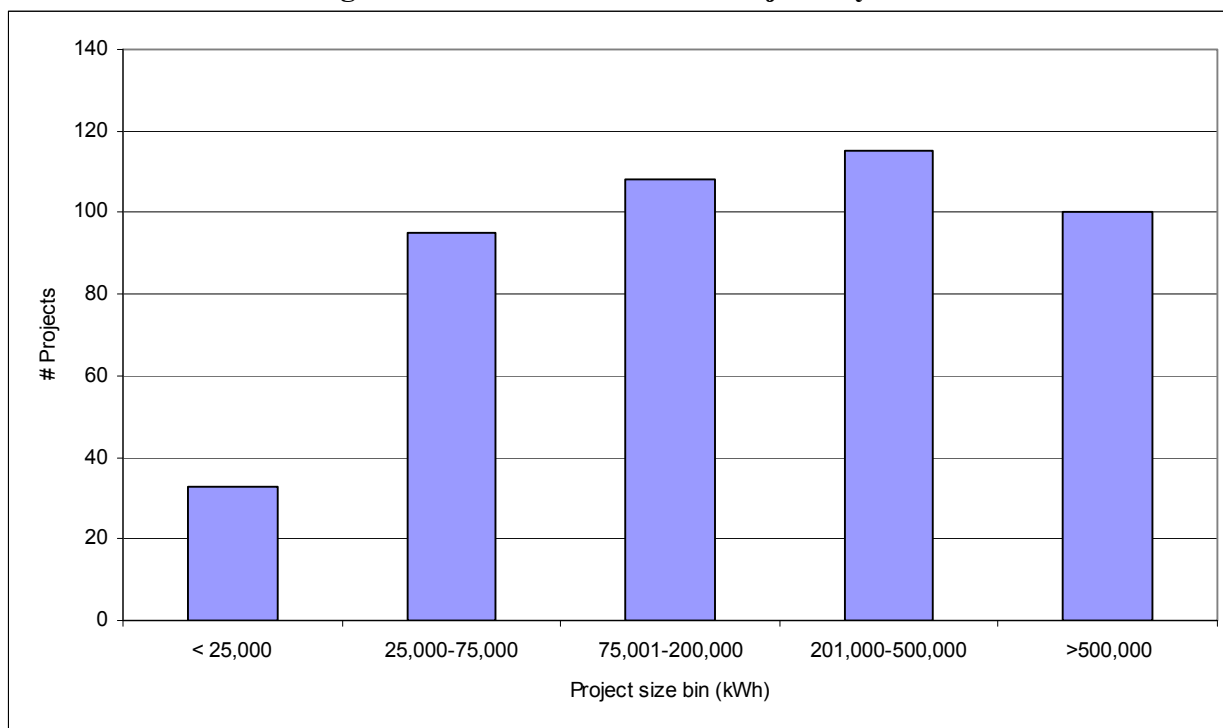
The results have been gratifying; with participant rates jumping from just a few projects in 2007 to 54 completed in 2008 using the new “Small Industrial” approach. Results, vendor feedback, and opportunities for further improvement are explored.

### **Background**

Energy efficiency programs often classify the market of small industrial energy users as “hard to reach”. Typically defined as industrial energy users consuming less than 500,000 kWh annually, the potential for energy savings at these sites (assume 5-10% or 25,000-50,000 kWh ) is not enough to warrant the expense of the customary method of delivering efficiency programs to medium to large industrial sites. For Energy Trust, the traditional delivery method involves a technical study of the custom project, an incentive payment to reduce the project capital cost, plus project assistance through a program delivery contractor who works one on one with site staff to follow the project from start to completion.

Small manufacturing facilities, although contributing to the public purpose fund administered by Energy Trust, needed more opportunities beyond prescriptive motors and lighting measures to save energy. After four years of tailoring the industrial program to the needs of large industry, the following bar chart shows program results by the number of projects completed according to size. Excluding prescriptive motor and lighting measures, the results in Figure 1 show a void at the small end of the project size range under 25,000 annual kWh.

**Figure 1. Count of 2004-2007 Projects by Size**



In 2007, Energy Trust read the writing on the wall – energy efficiency was only going to grow in importance as a key element of climate change strategy. Demand for acquiring a greater rate of energy savings meant programs had to dig deeper into their regular program offerings and find new targets where savings were yet untapped. This plot led program managers to believe that if there was a low cost method for delivering smaller scale projects, a new group of energy users could be realizing savings and the industrial program could be more effective. Thus the idea of the small industrial initiative was born.

### **Small Industrial Initiative Design**

Energy Trust and their Program Delivery Contractor, Cascade Energy Engineering, began the process of designing the small industrial initiative in three stages; the overall process, the product, and the delivery details. The expectation was that it would take time to get the initiative up and running. It would start with one or two focused measures and then gradually add on until there were several options available for participants. New prescriptive measures where equipment could be purchased and then the customer could apply for incentive funds would play a part in the initiative for lighting, premium efficiency motors, and HVAC equipment. For systems whose savings may vary widely by plant due to operating hours or loading characteristics, a new middle road analysis approach would be needed. This new type of analysis would lie somewhere in between the custom study with metering and assuming a deemed savings with weighted average operation details.

## **The Process**

The first need for the new initiative was to create a vision for a process that would cost effectively deliver non-prescriptive efficiency measures to small industrial customers. There are three key players in the existing industrial prescriptive incentive process; customers, vendors, and Energy Trust, all of which need an economic analysis to make justify their participation in the process.

End users are primarily concerned with consistent daily operations and less about long-term or even short-term savings from energy conservation (Cadmus 2008). The economic analysis for the customer depends on the life cycle cost impact with an incentive but also in how this analysis is presented to the customer. If a customer could work with their vendor to select an efficient piece of equipment and leave the vendor knowing just what the payback or return on his investment was estimated to be, their decision making process could be shortened and positively swayed. We determined that one key element of delivering to these customers would need to include a timely presentation of the business case.

The vendor needs a cost effective delivery to make a sale, and the Energy Trust needs to ensure and demonstrate wise use of ratepayer funds. In addition, all players need an administrative process with forms or agreements that clearly establish the relationship between the parties involved, define their obligations, and control risk while taking little time to understand and put in place.

This overall vision was further defined in detail by the selection of a product or measure to focus on and a delivery system.

## **The Product**

The initiative needed a measure whose savings analysis could easily be standardized and was widely applicable across the small industrial market. Because each industrial site has unique production requirements and operating hours, creating new prescriptive measures with deemed savings values per measure was considered too risky an offering, at least initially with limited project data. On the other hand, treating projects at these sites as custom projects with detailed energy studies and one on one project assistance would have been too costly. A methodology in between prescriptive and custom was preferred.

Single compressor air compression systems 75 hp and less are widely used in small industrial sites and analysis of savings from efficiency improvements can be quickly estimated with a handful of key data points to define the baseline and proposed conditions and equipment. A modified savings calculation approach provided a middle road solution without the detailed level of rigor. The Northwest Regional Compressed Air Savings Estimator is a Microsoft Excel-based application developed for use by compressed air vendors and efficiency program implementers. It provides a means of quickly estimating air compressor energy use, together with the energy savings and economic benefits of changing to a different compressor or compressor control method. Its output can be used to apply for incentive funding for projects involving compressors 75 hp and below. In addition to calculating the project savings quickly, the tool saves administrative time by generating the incentive estimate and populating program application forms as well as most of the tax credit forms automatically. The participant is still responsible for reviewing, signing and sending the forms to Energy Trust but it's no longer a time intensive process for participants.

## Key elements to product design

- Limited “extra work” – all forms are easy to fill out or auto populated
- Easy to understand due to user friendly layout
- Link to other user benefits such as tax credit application

## Designing the Delivery

The second challenge, which would later influence the product design, was the delivery model. One-on-one program assistance with individual program participants would be too costly of a strategy but with the new incentive calculation tool, it was no longer necessary. The delivery method could be reworked to take advantage of the new tool. The need for a custom study for each project and assistance with program forms was nearly eliminated.

**Participant barriers.** Understanding small business owner’s typical barriers to purchasing high efficiency equipment and participating in incentive programs, as listed below, helped to further define the strategy.

1. Too busy keeping the business in operations, the owner plays multiple roles and there’s no dedicated energy manager.
2. Lowest initial equipment investment is often the criteria for purchasing decisions, life cycle cost is not widely considered.
3. Purchase decisions are usually made when equipment needs to be replaced and replaced in a hurry to avoid holding up production.
4. There are limited off the shelf efficiency opportunities for industrial systems, few opportunities to think about energy use.
5. No central industry association for communication and group assistance.

The delivery system for this segment has to address some if not all these roadblocks to be successful. (1) If facilities are just too busy, delivery has to be a part of their existing work life. (2) Integrating our efforts with existing equipment vendor relationships seemed to be the key. These already trusted individuals could also help their customers understand the difference between first cost and life cycle cost. (3) When decisions have to be made in a hurry, having an existing vendor already familiar with the program requirements can save time. (4) Although there may be limited opportunities for high efficiency solutions, if the program teamed with the right vendors whose products can have a high impact, it can still make a big impact. (5) By teaming with the closest equipment purchase connection, maybe it’s just fine that there isn’t a central association that small industrial facilities look to. The program can still be relevant and reach these sites with this webbing network approach through vendors.

The vendors are in the right place at the right time to educate potential purchasers about energy savings opportunities. Because savings revolve around operations use energy efficient solutions may lie best in the hands of compressed air vendors (Cadmus 2008). It’s a rare user who really understands the savings to be had from a different type of control for their air compressor or irrigation pump. Vendors are able to talk up these benefits, and a calculation tool from a respected neutral party lends credibility to their vendor’s story.

Furthermore, Energy Trust program engineers review the estimates supplied by vendors in a day or two. Within a remarkably short time, a customer can be looking at a firm offer from Energy Trust for up to 50% of the project cost. In addition, in order to give the decision maker a more holistic view of his alternatives, Energy Trust program operators provide a pre-completed state tax credit application to the customer at the same time, since they already have the all the necessary information in hand. This is a voluntary added service – it's not a formal, compensated arrangement. What we are trying to accomplish via the vendor, after all, is to get the decision maker to recognize and pay now for economic benefits he will realize only in the future as years go by. Present costs loom larger in the mind than benefits off in the unknown future. By providing a comprehensive look at the economic benefits of the more efficient alternative, rather than splitting the world up into “program areas” and staying strictly within our own area, we get more of what we want and the customer and the environment are both better off.

**Recruiting and training** The prospect of teaming with vendors to have them benefit by leveraging our product to participants seemed like the most logical solution – the next challenge was how to drive them to want to team with us? We found that the biggest factor for the vendors is in the attitude we present them with. We don't hang back and wait for them to complete applications fully and completely and bring us all the information we want and if they don't we deny the application. Instead, we go to them by phone and in person and demonstrate a willingness to work with them to help get that information right the first time. This proactive approach helps them get the funding in a timely manner to help the sale. The approach helps Energy Trust as well by satisfying our need to dispense the funding. If they do send in an incorrect application, we make some calls and help them out. We don't just send it back for correction. This level of involvement was the most non-intuitive outcome of the delivery process. The first answer to streamlining and cost cutting a process is usually automation and removal of the human element. In this case, the human element in communication and technical review actually saves time in the vetting, understanding, and approval process.

The second biggest factor is turnaround time. Review and approval usually takes between 4 and 48 hours. The program team works hard so that we don't slow down their sales and installation process. A third factor is personalized training. We don't summon vendors to a conference room and hold training. We go out and see them and work through jobs with them. This seems time consuming, until all the project applications start coming in complete and correct. The whole approach is comparable to lean manufacturing, but in the service world.

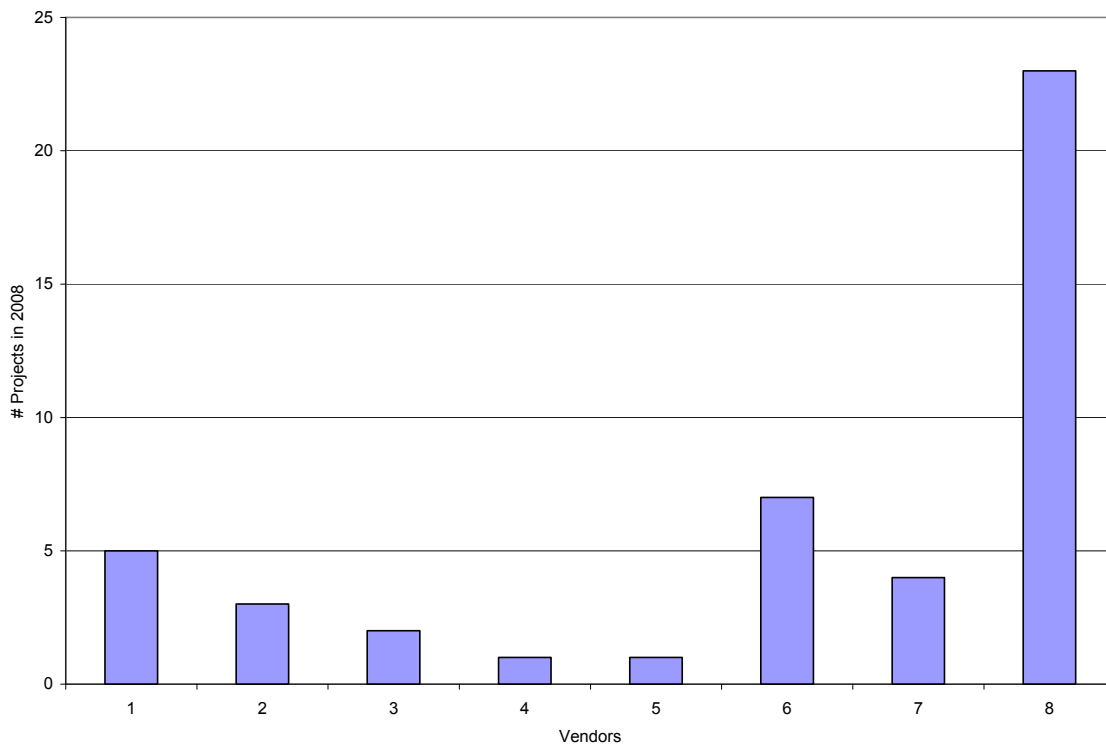
Vendors are busy people. They're looking for ways to maintain sales levels during difficult economic times by differentiating themselves from others with high quality customer service and technical knowledge. The Energy Trust program had to show the vendors that the product we were trying to roll out to the market had real value to their customers and in turn real value to them. Program representatives visited each compressed air vendor in the state to personally explain the program, the tool, and the benefits to them and their customers. The initial meeting was often followed by one or two more visits or phone calls before they were signed on. Within four months, seven vendors decided to participate.

Key benefits of participation for vendors include:

- Vendors can be the hero – Energy Trust doesn’t need to take all the credit with participants, we just want sites to participate. Vendors can use the incentive from Energy Trust to make their customers happy.
- Increased sales of higher cost equipment by leveraging program funds
- The program has very quick turnaround time, often reviewing, approving, and returning applications within 2 working days – sometimes much quicker
- Vendors can add the Energy Trust logo to their promotional materials such as ads and trade show posters.
- Energy Trust doesn’t get in the way between then vendor and the customer, they continue to own the relationship – it’s not about us.

Since the program had previously had such little market penetration with these sites, linking our offer with a known business relationship added credibility to the effort; helping the program but also helping vendors further improve their relationship with their customers. Vendors had a new product to sell; lower life cycle cost with energy efficiency. One year after launching the compressed air tool, the number of projects by vendor in Figure 2 shows varying levels of vendor engagement. In 2007, only 5 under 75 hp compressed air projects were complete by vendor #8 in Figure 2.

**Figure 2. Number of 2008 projects by Vendor**



## Iterating Product and Delivery Design

Bringing the product and delivery design together is a continuous improvement process for the program. It's not about the program needs, it's about how does the program meet participant needs which in turn brings results the program needs to see. How does the process of having the vendor run the tool and bring in savings actually work?

1. Participant has a need for a new compressed air system or vendor contacts participant and they identify a project.
2. Vendor uses the tool to describe the existing baseline and future project operating conditions including loading, efficiency, and hours of operation.
3. The tool calculates annual energy savings and an estimated Energy Trust incentive offer for the project on the spot.
4. The vendor emails the project tool file to Cascade Energy Engineering who reviews the inputs for reasonability and consistency based on their technical judgment. If Cascade has questions, they contact the vendor and talk it through.
5. Cascade approves the estimate and sends the participant a pre-completed funding agreement and instruction letter as well as a partially completed application for the state tax credit for the project.
6. The participant signs the agreement and funds are reserved for the project.
7. Once complete, the participant sends Energy Trust invoices and a project completion form. Inspections are conducted on a subset of completed projects.
8. Energy Trust sends the incentive check directly to the participant within 30 days of receiving the completed final information.

Although eight steps may seem complex, it's vastly less complex and much quicker than typical custom projects. The forms only ask for the minimum of information needed and it's all about the right information. The tool works for the vendors. They all have Excel available, are computer savvy, and technically competent – they know what they are selling already, we didn't have to teach them anything about compressed air systems that they didn't already know. What we did have to teach them was how to think about life cycle cost and how to communicate that message to their customers.

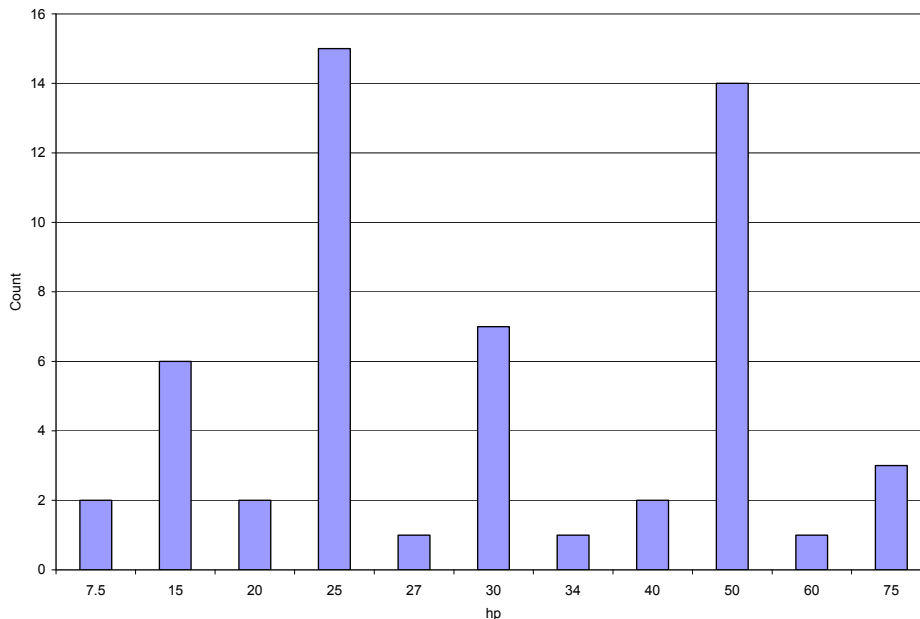
Cascade continues to build their relationship with vendors steadily over time by working through projects and giving vendors the time and attention they need. Judgment and sensibility is needed in the project review stage, human elements can't be removed from equation. Through a desire to streamline the process for vendors and participants, the typical reaction or solution is to pull out human intervention as much as possible and have the tool do everything. Through trial and error, we learned that the human element for vendors of knowing whom they're working with and how the tool calculates the savings and incentive is something we need to retain.

## Initial Results

The first year results for the compressed air tool and delivery process for the Small Industrial Initiative were gratifying. The program increased the number of small compressed air projects from only a few projects in 2007 to a total of 54 by the end of 2008. Total savings

estimated from the 54 projects was 2,650 MWh. Figure 3 shows the number of projects by system size in horsepower.

**Figure 3. Number of 2008 Projects by hp**



### **Irrigation Pump VFD Market**

A parallel effort with a different product was ongoing throughout the first year but with less all around success than with compressed air. In the agriculture market, the most widely applicable energy efficiency measure was thought to be adding a variable frequency drive (VFD) to a high efficiency pump. Again, the engineering calculations behind quantifying savings from this type of improvement are not complex but specific detailed equipment and operational data is needed in order to do so. Cascade was able to represent these calculations within a similar semi-prescriptive incentive Excel based calculation tool for irrigation vfd's. Like the Northwest Regional Compressed Air Savings Estimator, the irrigation tool requires a handful of system specific inputs and it estimates a savings value, calculates the corresponding incentive estimate and links to populate program forms and many values in the state tax credit application.

Although the calculations could be estimated quickly with a tool, the delivery system of irrigation vendors was a completely different vendor market than for compressed air. Irrigation equipment vendors tended to have additional barriers to being able to use the tools. The program learned that what works for one group does not necessarily apply across the board.

The first necessary modification to the delivery process was to step away from having the vendors fill out the Excel tool and instead, to have them fill out preprinted information sheets by hand that they can bring with them when they visit a customer. Irrigation equipment vendors spend a good amount of their time with customers on site, away from their computers. Even when they do have computers available, many were not as comfortable with using Excel as the compressed air vendors tended to be.

Irrigation vendors didn't seem to see as much value in leveraging an incentive program based on energy savings to increase sales. In general irrigation equipment vendors were less



aware or interested in energy savings, rather, they were much more focused on water savings and system improvements to reduce water loss. While compressed air vendors were already aware of the high-energy costs of operating their systems, irrigation vendors did not value energy as highly. Another factor for some was that they were already very busy and didn't see the prospect of increasing workload to be all that attractive. They were content with the current sales volume. Another modification for the irrigation market was to expand the product offering beyond the semi prescriptive VFD tool into prescriptive equipment incentives. Sprinklers, nozzles, and gaskets are often used long past the point where they apply water uniformly and efficiently. Providing a small incentive for irrigators to make their systems more water and therefore energy efficient was another simple addition to the program that proved successful. With prescriptive measures, customers go to their vendors, purchase and install the equipment, and then send in their invoice for a check.

The final main difference between the compressed air and irrigation equipment market is the even greater importance of relationships between the program and vendors. Program staff learned that soon after making contact with vendors, they are active in promoting the program to their customers and projects come in. After time, the number of projects drops off. By continuing to look for regular opportunities to check in with vendors, either at meetings, industry shows, or by dropping in to visit regularly, the project pipeline stays healthy and the vendors are engaged.

As with the compressed air tool results, the irrigation tool vastly increased the number of projects in 2008. 36 projects went through the process in 2008 totaling 1,550 MWh.

## Summary

Before the small industrial initiative started, Energy Trust's industrial program focused on large energy users whose energy efficiency improvement projects required custom analysis. This strategy was successful in bringing in large low cost savings. With the charge to expand to have cost effective measures available to all levels, the small industrial market shows savings potential but a new approach to the market was needed.

Instead of taking the typical approach in creating a product and delivery mechanism that worked best for the program budget and capabilities alone, the initiative took the time to figure out what this target market needed and how best to deliver it. The results speak for themselves. In just over one year, the program has gone from <5 small compressed air projects per year to 54 and from 6 to 36 irrigation tool projects.

Based on this experience, a successful small industrial outreach program should include the following attributes.

- Be willing to ask "who is my customer and what do they need?" This lesson may seem very basic in hindsight but it took some time to come to this full realization and design an effective process for the customer, vendor, and Energy Trust.
- Personal contact. Improving program process efficiency doesn't necessarily mean removing one on one contact with vendors and completely automating the delivery. That one on one contact is moving more projects through more quickly than ever anticipated. Keeping people involved in the processes who take responsibility for recognizing and guiding the outcome was a critical lesson learned.
- Practice continuous improvement. This operations technique is not just a practice that's beneficial to industry operations but applies to industrial efficiency programs too. Along

the way we've made many additional improvements and have been keenly aware of the value in making those changes.

- Be flexible enough to know when and how to adjust the process and tools as you go

## **References**

The Cadmus Group, Inc. *Small Compressed Air Market Assessment*. July 2008