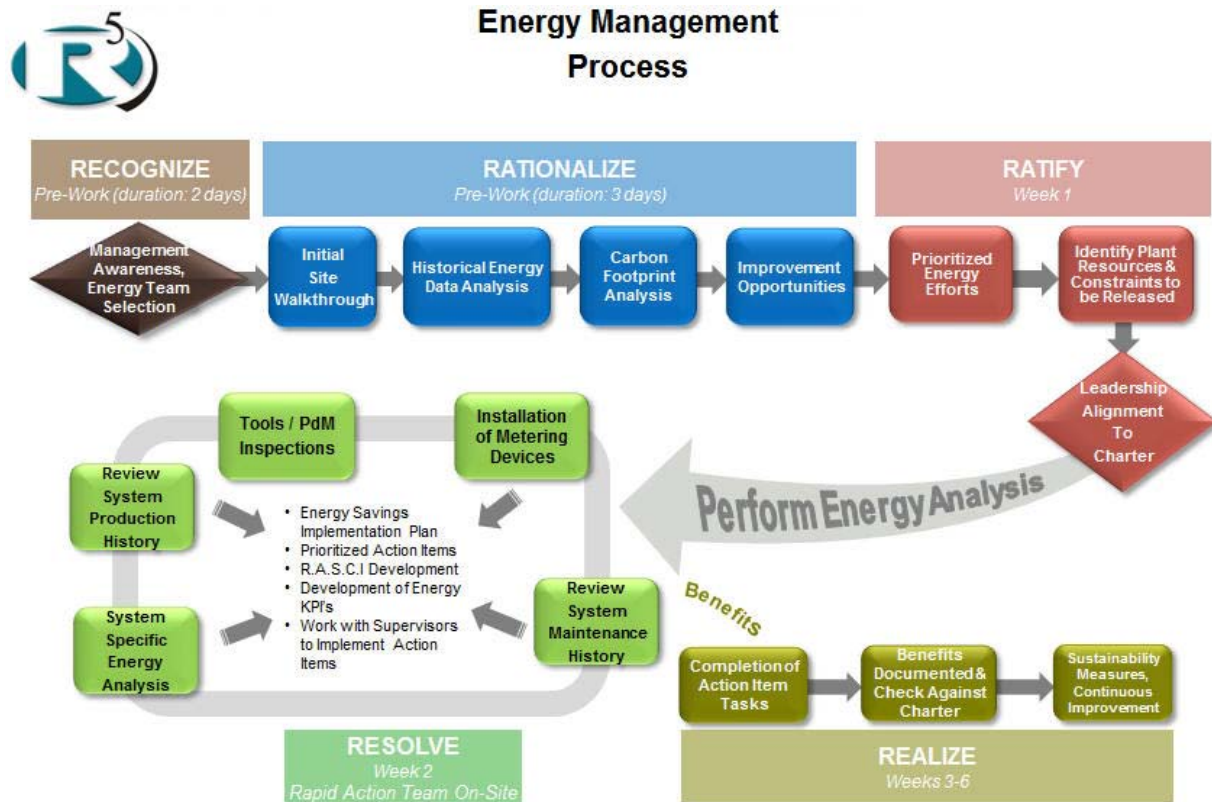


# 6 Part Series on Developing a Successful ISO 50001 Compliant Energy Management Process

## Part 1:

With the latest release of ISO 50001 and the continuing buzz around energy efficiency and sustainability it is apparent that organizations are lending an ear and considering a number of approaches and options for achieving reduced energy consumption and gain a competitive edge. This certainly is important since the cost of energy is typically one of the top three expenses of operating a business. ISO 50001 standard was developed with the intent to offer companies a proven approach to develop an energy management plan for addressing critical aspects of energy performance – specifically that which can be measured, monitored, and acted upon.

ISO 5001 is based on the Plan-Do-Check-Act approach of continuous improvement. Allied Reliability Group has approached Energy Management in a way that certainly incorporates the PDCA approach while establishing quick substantial returns to fund the ongoing process.



The model shown above depicts an improvement approach called the Rapid Improvement Process. Its design and methodology is used to help companies identify, achieve, and sustain improvement gains in energy management. The 5 phases – Recognize, Rationalize, Ratify, Resolve, and Realize closely resemble the DMAIC process which is commonly associated as one of the Six Sigma tools which is widely used in many sectors of industry.

Successfully integrating common PdM technologies will provide a company insight of potential equipment defects, which if approached proactively will improve work execution. PdM technologies are also great tools to identify significant energy savings opportunities, their related environmental impacts (Carbon Footprints), and improving overall equipment effectiveness (OEE) in Industrial Manufacturing environments.

Over the course of the next 4 parts of this series, I plan to dive into each of the R5 phases to show how this model can help organizations become ISO 50001 compliant, reduce energy costs, increase energy efficiency, and increase equipment reliability.

**Part 2:**

In the first part of this series I provided an overall strategic approach that we use to help organizations successfully implement an ISO 50001 compliant energy management process. In this and the subsequent parts of this series I intend to elaborate on each of the R5 phases, explaining high level steps and indicating direct links to the ISO standard.

Let’s get started with the first phase...Recognize. The Recognize phase is focused on awareness and understanding. High level steps in this phase are shown below:



The ISO 5001 Standard begins with a brief introduction explaining the purpose and intent of the standard. It states, *“The purpose of this International Standard is to enable organizations to establish the systems and processes necessary to improve energy performance, including energy efficiency, use and consumption. Implementation of this International Standard is intended to lead to reductions in greenhouse gas emissions and other related environmental impacts and energy cost through systematic management of energy. This International Standard is applicable to all types and sizes of organizations, irrespective of geographical, cultural or social conditions. Successful implementation depends on commitment from all levels and functions of the organization, and especially from top management.*

*This International Standard specifies energy management system (EnMS) requirements, upon which an organization can develop and implement an energy policy, and establish objectives, targets, and action plans which take into account legal requirements and information related to significant energy use. An EnMS enables an organization to achieve its policy commitments, take action as needed to improve its energy performance and demonstrate the conformity of the system to the requirements of this International Standard.”*

Keeping the intent of the standard in mind, let’s discuss the high level steps in this “Recognize” phase.

- **Management Training/Awareness** - As with all new efforts, it is critical that clear understanding of the objectives, expectations, and communication plan begins with the management team and filters through the organization. For an energy management program to be successful, it needs the commitment and support of the organization’s management and should be in synergy with the organization’s objectives.

Since a common element of a successful energy management program is leadership commitment, a Fundamentals of Energy Management workshop targeted to select management and leadership team members, union leadership (if applicable) and key stakeholders is essential. The goal is that each participant will learn the foundation of energy management, how they have an impact, and how best practice organizations select, implement, and sustain energy savings initiatives.

These activities will help create awareness and the desire to set the stage for cultural change that must occur within an organization as they move further into the energy management program. Clear objectives and goals of the program (Energy Policy) are developed during this session and will become the guiding principles of the sites energy management program.

Weaving Change Management into every new initiative/program helps to enable tangible and sustainable results. This step is important in helping communicate all efforts and address any potential concerns along with integrating the expectations with the organization’s culture.

- **Energy Team Selection/Resource Allocation** - Energy management requires a systematic approach from the selection of a suitable team to achieving and maintaining energy savings. The right people with the right attitude and motivation are instrumental to all successful initiatives.

Selecting a team with the right skills and allocating the necessary required time to lead and execute the energy management program is extremely important. In many cases, organizations may not have people with all the necessary technical expertise to implement each aspects of the energy

management program. In such situations, outside support may be required to provide engaged resources to help carry out some of the required implementation tasks.

A cross functional energy management team will be necessary for maximum sustainable improvements. Team member representatives should be selected from the following areas of responsibility: plant management, engineering, finance, operations, maintenance, and procurement.

If you are familiar with the ISO 50001 standard you will recognize that in this phase we address the key areas related to:

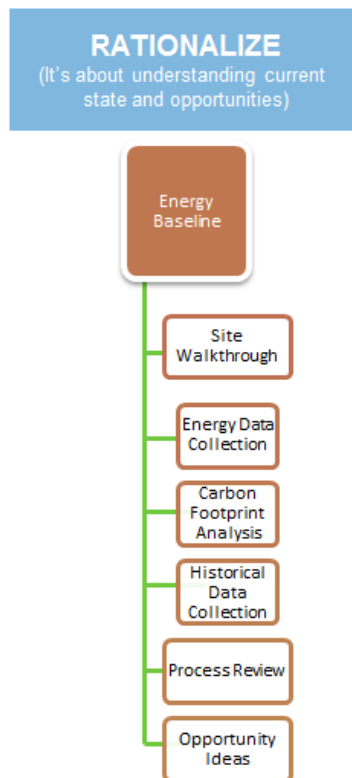
- Energy management system requirements (Section 4)
- Management responsibilities (Sections 4.2 – 4.2.2, & 4.4.6)
- Energy Policy (Section 4.3)
- Competence, training and awareness (Section 4.5.2)

It is in this “Recognize” phase that the ground work is performed to set the stage for becoming ISO 50001 compliant, reduce energy costs, increase energy efficiency, and increase equipment reliability. I hope you enjoyed this blog and will drop back by as I continue to walk through the remaining R5 Phases. As always, I appreciate the feedback so feel free to drop me a line at [colsonc@alliedreliability.com](mailto:colsonc@alliedreliability.com).

### Part 3:

It is now time to move into the “Rationalize” phase of the process to identify key improvement opportunities that will allow an organization to fully understand their current conditions and improve upon those conditions. The focus here is to understand the selected value stream in a way that makes analysis possible and, using relative processes and system data, create business case scenario simulations that will lead to a deeper understanding of the losses in the value stream and the appropriate areas of improvement moving forward.

High level steps in this phase are shown below:



Keeping the intent of the standard in mind, let’s discuss the high level steps in this “Rationalize” phase.

- **Energy Baseline** – The sole purpose of this step is to identify key opportunities for improvement and create a strategic and tactical plan to maximize the return on investment from the implementation of an Energy Management initiative. The objective is to examine and evaluate current business processes and practices as related to energy usage and determine the major energy consuming systems and equipment within the facility or plant. This analysis will serve as a baseline and foundation for the implementation activities driven in the “Ratify” and “Resolve” phases.

The many steps in this phase include; data gathering, observations, on-site interviews, data analysis, planning and building the business case. All of these steps serve to increase the awareness

throughout the organization of the impact energy management can have on the business. Participation in the process facilitates organizational alignment as the future state becomes clearer and the stake each department and individual holds in the improvement process is defined. This alignment/buy-in is critical to the effective implementation of cultural and behavioral change associated with adopting energy management best practices.

It is vital that the facility/plant operation be addressed holistically as it will promote energy management throughout the organization. Experience shows that a collaborative relationship between all functions of a business (maintenance, engineering, production, procurement, quality, finance and regulatory compliance) is critical to success. The integration and interdependencies that exist between these functions of an organization can greatly impact the potential of energy management and the overall business performance.

While the output of this phase serves as the baseline for all energy management implementation and opportunities within an organization, it is important to realize that companies must take logical controlled steps to successfully implement such initiatives or programs across their organization. To do so, I believe a prioritized effort based upon ROI is required to fully rollout. This concept will become clear throughout the next two phases, “Ratify” and “Resolve”, of the R5 process.

Similar to how I wrapped up Part 2 of this series, I want to point out where these steps align with the ISO 50001 standard.

- Energy Planning (Section 4.4)
  - General (Section 4.4.1)
  - Legal requirements and other requirements (Section 4.4.2)
  - Energy review (Section 4.4.3)
  - Energy baseline (Section 4.4.4)
  - Energy performance indicators (Section 4.4.5)
  - Energy objectives, energy targets and energy ,management action plans (Section 4.4.6)

I hope this has been informative and will you continue to follow this blog as next time I plan to discuss the “Ratify” phase of the R5 process. As always, I appreciate the feedback so feel free to drop me a line at [colsonc@alliedreliability.com](mailto:colsonc@alliedreliability.com).

#### **Part 4:**

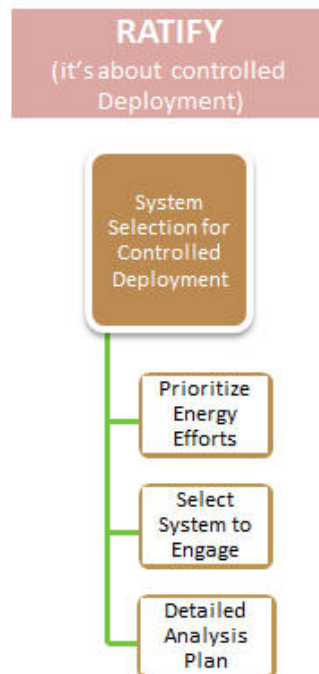
Well, it's been a couple of weeks since I last shared with you some of the details behind the R5 Rapid Improvement Process model that we use to help companies identify, achieve, and sustain improvement gains in energy management. ISO 50001 has gained much traction and attention from those looking to be responsible and gain competitive advantage by lowering their utility costs.

In this part of the series, I want to discuss and highlight some of the main steps within the "Ratify" phase of the process. The Ratify phase is used to establish the picture of the future state and rally the team around the targeted performance improvements. The site Leadership/Sponsorship Team becomes aligned around four things;

- The vision for the future
- A prioritized list of improvement opportunities
- An implementation plan
- The financial business case for change

Once these items become the focal points, it gets easier for partnership agreements to be created between operational and support functions. In this phase, the energy team performs a risk analysis to help mitigate any issues that may arise with the new processes. Also, for success it is imperative that site leadership agree to relieve the focus area of traditional constraints which allows them to follow the new process and practices designed and implemented by the R5 process.

High level steps in this phase are shown below:



Back in the Rationalize Phase we identified areas of significant energy use and consumption along with opportunities for improving our energy performance. These opportunities provide us with the areas that we intend to focus our efforts. While we have identified key areas of opportunity, it is important to take note that many of the processes and procedures that we develop along the way will be used across the organization to drive success.

Let's take a look at the high level step in this "Ratify" phase.

- **System Selection for Controlled Deployment** – Starting a new initiative/program or expanding an initiative often leads to many tasks needing to be completed with insufficient resources. Recognizing the need to prioritize efforts based upon business impact and financial savings will not only increase the potential for success but many times is necessary and required to even begin such a journey. My personal experience tells me that it is vital to implement energy management programs in a way that pays for future rollout and minimizes the strain that can be applied to an organization attempting to tackle every opportunity at the same time.

We have all been there before; anxious and excited to get started and accomplish each of our tasks and goals. Passionate about what we do and trying to accomplish everything at the speed of light. All of these are driven by our desire to achieve excellence and prove we are capable of that which we set out to do. Again, my experience says, "slow down and deploy at a controlled pace for success".

By prioritizing and selecting areas or systems to focus efforts, you will be able to create specialized teams (through competence, training, and awareness) with the expertise to evaluate, analyze, and identify real energy saving solutions that can be implemented immediately.

Some common and familiar systems to start with or begin analysis include the following:

- Compressed Air Systems
- Compressed Gas Systems Steam and Hot Water Systems
- Chillers
- Cooling Towers
- Air Handling Units and Air Distribution Systems
- Pumping Systems
- Building Electrical Systems
- Lighting Systems
- Process Equipment

I will make note of one last point before closing. If the success of the improvement initiative is dependent on employees adopting new behaviors then we must effectively communicate why the change is necessary to the business and how it will affect each employee. The focus of such communications should be to provide employees with the necessary information to make an affirmative choice to 1) embrace the change, 2) support the change process, and 3) take ownership for the changes after implementation. Ownership in this sense is when employees model those behaviors required to sustain the technical improvements.



As I noted previously, companies must take logical controlled steps to successfully implement such initiatives or programs across their organization. To do so, I believe a prioritized effort based upon ROI is required to fully rollout. I hope this concept has become clear from the discussion of the “Ratify” phase. I have no doubt that it will continue to become obvious when I write next on the “Resolve” phase of the R5 process.

Similar to how I wrapped up the previous parts of this series, I want to point out where these steps align with the ISO 50001 standard.

- Energy Objectives, Energy Targets and Energy Management Action Plans (Section 4.4.6)
- Implementation and Operation (Section 4.5)
  - General (Section 4.5.1)
  - Competence, Training and Awareness (Section 4.5.2)
  - Communication (Section 4.5.3)
  - Documentation (Section 4.5.4)

I hope this has been informative and will you continue to follow this blog as next time I plan to discuss the “Resolve” phase of the R5 process. As always, I appreciate the feedback so feel free to drop me a line at [colsonc@alliedreliability.com](mailto:colsonc@alliedreliability.com).

## **Part 5:**

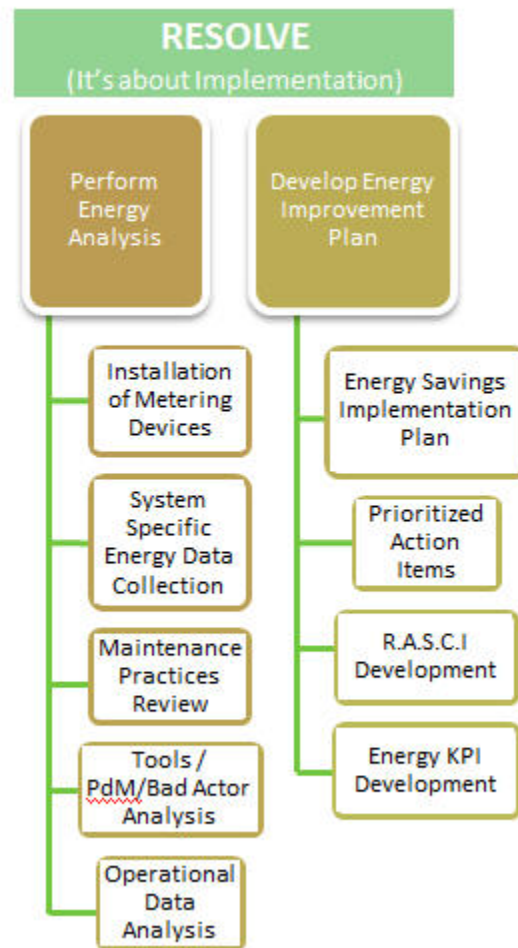
Wow, where did the last part of 2011 go? Time passes by so fast when you’re busy and having fun! I have received many emails and comments related to this topic as many of you are highly interested in this topic and our approach to Energy Management. I apologize for not updating this blog sooner and will do my very best to wrap up this 6 part series over the next couple of weeks.

For those of you that may not have been following, I am attempting to share details behind the R5 Rapid Improvement Process model that we use to help companies identify, achieve, and sustain improvement gains in energy management. ISO 50001 has gained much traction and attention from those looking to be responsible and gain competitive advantage by lowering their energy related costs.

In this part of the series, I want to discuss and highlight some of the main steps within the “Resolve” phase of the process. The Resolve phase is used to implement the strategic design and approach that is designed and developed in the previous phases. Basically, it is the portion of the process where the “rubber meets the road”.

As mentioned in Part 4, we have tailored this approach to either focus on a specific area or system within your plant (smaller implementation for controlled deployment), or it can be implemented site wide for a much wider implementation. Either way, our goal is to identify real opportunities both quick wins and long-term project based improvements to reduce energy consumption and lower operation expenses.

High level steps in this phase are shown below:



Let's take a look at these two high level steps in the "Resolve" phase.

- **Perform Energy Analysis** – Once a system or area has been selected, Allied will assemble a team of experts to conduct an onsite energy analysis. An energy analysis consists of a detailed examination of how a facility uses energy, what the facility pays for that energy, and finally, a recommended program for changes in operating practices or energy consuming equipment that will cost effectively save money on energy bills.

The analysis will assist in quantifying energy uses and losses through detailed review and analysis of equipment, systems, and operational characteristics. Onsite testing and measurements are

required during this step to ensure and quantify opportunities. Multiple tools and PdM technologies will be integrated to evaluate and capture significant energy savings and simplify ROI calculations.

Tools and PdM technologies include, but are not limited to, some of the following:

- Power Quality Meter
- Infrared Thermography
- Airborne Ultrasonic
- Data Logger
- Airflow Measurement Devices
- Motor Circuit Analysis
- Vibration Analysis
- Light meter

The many steps in this analysis including data gathering, observations, onsite interviews, data analysis, developing the energy improvement plan, help increase awareness throughout the organization of the impact energy can have on the business. Participation in the process facilitates organizational alignment as the future state becomes clearer and the stake each department/individual holds in the improvement process. This alignment is critical to the effective implementation of cultural and behavioral change associated with adopting energy management best practices.

I'll make note that while we advocate utilizing many of the available tools and technologies to identify opportunities; I also firmly believe that if you currently don't have permanently installed meters to quantify and measure your energy consumption...doing so is a must. Measurement is the first step that leads to control and improvement. If you can't measure something, you can't understand it. If you can't understand it, you can't control it. And finally, if you can't control it, you can't improve it.

- **Develop Energy Improvement Plan** - Once the analysis has been completed, energy saving measures can be identified. The measures identified vary from one facility or plant to another due to differences in equipment, system design, and operations. The energy improvement plan will provide clear, straight forward and to the point explanation of the current situation, recommended improvements, and advantages of taking recommended actions. This energy improvement plan becomes the roadmap or strategy to address the opportunities identified from the analysis.

The energy improvement plan will prioritize tasks addressing both criticality and maximum ROI. It is highly possible that when utilizing PdM technologies during the analysis that defects of the equipment will be found. These results will be reported and may lead to non-energy related benefits (i.e., scheduled repair prior to emergency breakdown repair).

As noted in my previous blogs, companies must take logical controlled steps to successfully implement such initiatives or programs across their organization. To do so, I believe a prioritized effort based upon ROI is required to fully rollout.

Similar to how I closed each of the previous parts of this series, I want to point out where these steps align with the ISO 50001 standard.

- Energy Planning (Section 4.4)
  - Energy Performance Indicators (Section 4.4.5)
- Implementation and Operation (Section 4.5)
  - Operational Control (Section 4.5.5)
  - Design (Section 4.5.6)
  - Procurement of Energy Services, Products, Equipment and Energy (Section 4.5.7)
- Checking (Section 4.6)
  - Monitoring, Measurement and Analysis (Section 4.6.1)

I hope this has been informative and will you continue to follow this blog as next time I plan to discuss the final phase, “Realize”, of the Energy Management R5 process. As always, I appreciate the feedback so feel free to drop me a line at [colsonc@alliedreliability.com](mailto:colsonc@alliedreliability.com).

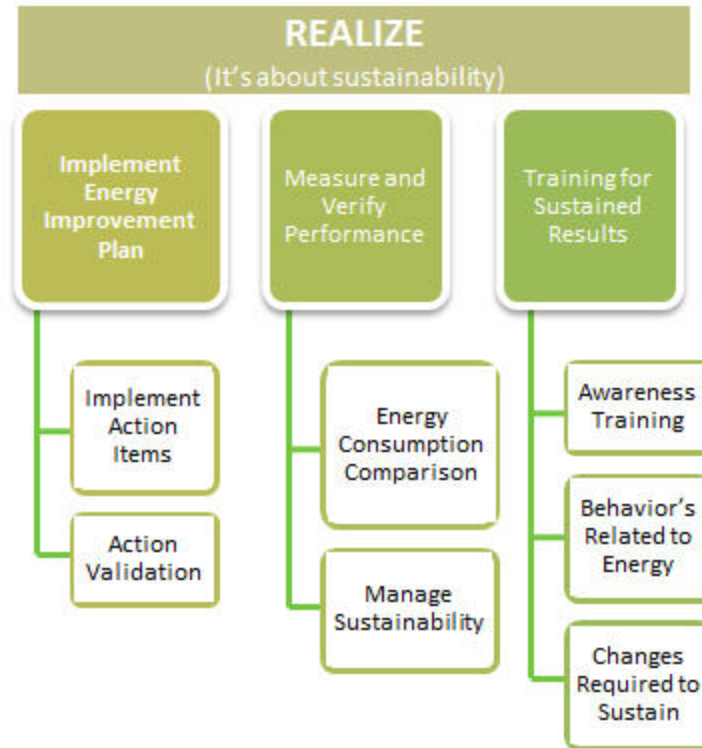
## **Part 6:**

It’s time to wrap up this 6 part series detailing the process we use to developing a successful ISO 50001 compliant Energy Management process. In this series I been sharing details behind the R5 Rapid Improvement Process model used by Allied Reliability Group to help companies identify, achieve, and sustain improvement gains in energy management. ISO 50001 has gained much traction and attention from those looking to be responsible and gain competitive advantage by lowering their energy related costs.

In the final phase of this process we focus on “Realizing” the gains and fruits of our labor. The Realize phase is used to implement, measure, and train for sustained results. Basically, it is the portion of the process where the “rubber meets the road”.

As mentioned in previous parts, we have tailored this approach to either focus on a specific area or system within your plant (smaller implementation for controlled deployment), or it can be implemented site wide for a much wider implementation. Either way, our goal is to identify real opportunities both quick wins and long-term project based improvements to reduce energy consumption, lower operation expenses, and position your company for sustained competitive advantage.

High level steps in this phase are shown below:



Let's take a look at these three high level steps in the "Realize" phase.

- **Implement Energy Improvement Plan** – Many are familiar with the typical assessment, analysis, reporting, and being left with hundreds of tasks to implement with no support or idea on how to accomplish. This one fact is the graveyard of all initiatives. Success only comes by implementing and changing the way we conduct business resulting in positive ROI's. We work hand-in-hand with your designated energy management team providing them with the support, training, coaching, and mentoring to accomplish each of the recommended tasks.

The completion of each task is critical to the success of the program. To make task implementation go as smooth as possible, each task will have an implementation plan outlining:

- What's needed
- What's to be done (to-do's)
- Who's responsible for each step
- What's the deadline

Anything less than this level of detail will slow or even derail the implementation process.

- **Measure and Verify Performance** - There is an old management adage that says, "You can't manage what you don't measure". In other words, unless you measure something you will never know if it is getting better or worse. Savings can occur in the form of either repetitive, reoccurring savings or one-time savings. Recorded before and after measurements are critical to eliminate the possibility of misrepresented or even unnoticed savings.

Measurement systems will be put into place to collect data and express results as standard Key Performance Indicating metrics. These metrics will be compared to benchmark data to help the organization evaluate and measure progress toward its defined goals. Integral inputs to the continuous improvement cycle are these Energy Management KPI's.

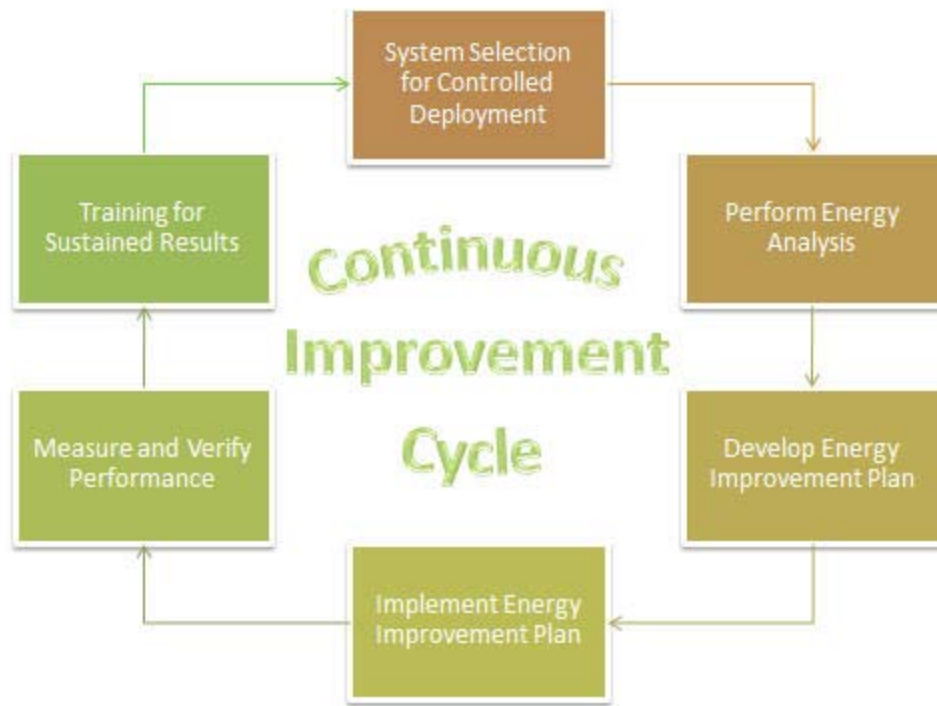
It is important to communicate these metrics and the success of the program both up and down the organization. People want to know how things are progressing and certainly like hearing the good news and how they are helping the organization become more efficient and environmentally responsible. With energy management metrics in place, your organization will begin to recognize the directly proportional relationship between Equipment Reliability and Energy Efficiency.

- **Training for Sustained Results** – It is imperative that you and your team understand the key elements in sustaining positive results. The major elements we have discovered over the years involve impacting the entire organizations beliefs and behaviors related to energy management.

Your organization must assume ownership of any improvement initiative, process, or program. To sustain culture change, everyone must be active participants in the development and implementation.

Beliefs are vital to the ability to change and must be modified prior to any behavior change. Education and knowledge transfer are keys to changing beliefs. This model incorporates education, followed by coaching and mentoring during implementation. In doing so, we help your people become self-sufficient by transferring the knowledge and ability to them.

The most effective way to sustain change in your organization is to impact each and every level of the organization. By utilizing dedicated, full-time employees trained to this Standard and the R5 model, we are able to deliver consistently and effectively instill long term successful and profitable change.



**Continuous Improvement Cycle** - The moment you stop looking to improve is the moment you open yourself up to competitors making inroads as they find ways to improve quality or reduce costs. Perfection will never be achieved, and thus improvement is always possible.

The continuous improvement cycle is an effective team-involvement tool and forms the basis for a “lessons learnt” database and best practices, which are continually reinforced at the leadership level and reflected in changed KPI’s, updated business processes, and continual modeling and monitoring. Rigorous application of the continuous improvement cycle often realizes step change while sharing lessons learnt through a knowledge management system ensures that change is sustained, despite leadership changes or staff turnover issues.

In closing this final part to this series of blogs, I want to point out where these steps in our R5 model align with the ISO 50001 standard.

- Competence, training and awareness (Section 4.5.2)
- Checking (Section 4.6)
  - Monitoring, Measurement and analysis (Section 4.6.1)
  - Evaluation of compliance with legal requirements and other requirements (Section 4.6.2)

- Internal audit of the EnMS (Section 4.6.3)
- Nonconformities, correction, corrective action and preventive action (Section 4.6.4)
- Control of records (Section 4.6.5)
- Management Review (Section 4.7)
  - General (Section 4.7.1)
  - Input to management review (Section 4.7.2)
  - Output from management review (Section 4.7.3)

I hope this entire series has been informative and will you continue to follow this blog. I plan to continue to share with you the many ways that we can improve upon our core business functions and how such improvements can lead to energy efficiency and sustainability. As always, I appreciate the feedback so feel free to drop me a line at [colsonc@alliedreliability.com](mailto:colsonc@alliedreliability.com).