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MAINTAINING EFFICIENCY WHEN OUTSOURCING MAINTENANCE ARTICLE

Outsourcing can be a good choice for some businesses as long as you don't completely let go or presume your zest for efficiency and utility cost is outsourced with the work.

1. The Problem:

When maintenance is outsourced with the assumption that the entire concern for the system is outsourced with it, things naturally end up not being tended to, including energy use. If the people doing the work are different people than the people wanting the utility bill to be lower, there will be disappointment since there is no feedback or accountability.

2. The Solution:

Whoever has accountability for the utility cost is the one who needs to exert influence in order to have an outcome. In most cases, that will be the customer. Good management of an outsourced contractor includes knowing enough about the work being paid for to make proper specific requirements, to know how to tell if the work is good or not. The outsourced maintenance contractor is best seen as extra hands to do what you know needs done. In-sourced or out-sourced, the work needs to be watched and adjusted according to results, which includes energy use.

3. Discussion:

An outsourced maintenance contractor is a helper for specific tasks and can be a viable partner. However, outsourcing the entire concern for the maintained equipment will leave a gap between the defined duties of the contractor and what is really involved in caring for and efficiently operating these systems, and that gap can be costly from utilities.

Operation and Maintenance is abbreviated as "O&M" or O/M for short. Notice it does not say "O or M." Outsourcing the maintenance is only half of O/M. Efficiency requires both. Unless outsourcing operations and maintenance entirely, simply outsourcing the "M" will leave a gap.

Fully outsourcing O/M is rare. For outsourced maintenance, there are ways to do this well. First, recognize it is the "M" and not the "O" and outsourcing maintenance is not shedding the entire concern.

Managing the ”M”

- Communicate expectations and monitor/verify the results.
- Understand the systems being worked on and use this knowledge to know key maintenance items to pursue and how to know if the contracted work is done properly.
- Facilitate training where needed so contractors are aware of maintenance activities with tangible value.
- Keep records of maintenance intervals and adjust the intervals ongoing, based on conditions found. Keep records of equipment age and expected life and plan for normal replacement.
- Maintain documents associated with equipment recommended maintenance intervals and performance values that identify a baseline ‘new’ condition, to be used to prompt maintenance and evaluate effectiveness of maintenance.
- Understand each task you are asking the contractors do and check specific points of value.
- Use key observations or measurements for predictive maintenance.
- Inject performance improvements in specifications for replacement equipment, including system changes where existing design is inherently costly to operate or when operational requirements have changed.
- Require regular tours of equipment areas and attend maintenance tours randomly.
- Maintain proactively, before things break.
- Coordinate with operations for maintenance of automatic control hardware elements (sensors, actuators) including packaged HVAC equipment.

Managing the ”O”

- Communicate expectations and monitor/verify the results
- Understand the systems being controlled and interactions with other systems, and use this knowledge to know which operational strategies to pursue
- Facilitate training where needed so contractors are aware of operating methods with tangible value
- Monitor utility usage using energy management methods and compare observed to expected values. Investigate and intervene if energy usage is higher than expected
- Maintain documents associated with equipment operation and design intent, including original design documents, sequences of operation, test and balance reports, manufacturer’s start-up reports, commissioning reports, etc.
- Monitor control settings, schedules, and overrides

Some Specific Topics

- **Eyes and ears.** Years of letting things decline into an overwhelming simultaneous repair is preventable. Make it your expectation that the maintenance contractor report things that look bad, sound bad, starting to go bad, before they fully fail, and support the work to fix things and keep the repairs from piling up.

- **Controls health maintenance.** A cross-over between O and M is the condition of the automatic controls. This equipment is used by the operations staff but maintained by the maintenance staff. Make it your expectation that controls stay working and are calibrated and are understood by the people on site, and are not taped together and bypassed or neglected, receiving service only if someone calls. This means checking controls, calibrating controls, making sure things are 'alive'. Finding documents on controls or making control documents and sequences. Proactive.

- **OK to be old.** There is nothing wrong with old equipment or not having the most efficient items – good operations and maintenance goes beyond comfort complaints and provides a service to keep whatever the equipment is as efficient as it can be for what it is. Thorough service will cost more than marginal service, but without it, and without a close eye on controls and details, higher utility bills should be no surprise.

- **Institutional knowledge and having the right people.** Customers who want to out-source their maintenance will have the best results when they understand the work involved and know what they want. One approach is to presume in-sourcing as the baseline and approach out-sourcing as emulating in-sourcing. An immediate reality when doing this is that in-sourcing tasks are not fully defined by line item tasks…there are subtle but important things outside the basic line items in a scope of work that impact the quality of care of building systems. Another facet to the emulation of in-sourcing is to require that the out-sourced people doing the maintenance know the facility and the systems and the technology being used. This includes the automatic controls and the specifics of how they work, zoning of what serves where, what equipment responds to what thermostat, etc., replicating the institutional knowledge that would exist if the work were in-sourced. The 'institutional knowledge' and 'complete scope of service' is a primary argument for in-sourcing and the right out-sourced contractor for maintenance will be the one that emulates every facet of the in-sourced baseline.

- **Training.** Whether in or out-sourcing, the people doing the work need to be properly trained. When in-sourcing, the customer is responsible to train their people and know enough about the

work to manage them. When out-sourcing the contractor is responsible to train their people but the customer still needs to know enough about the work to manage the contractor. Operations and maintenance are intertwined for efficiency so the training includes both and people doing both tasks should communicate.

- **Invite effective maintenance.** Customers can create an environment that invites the good quality maintenance that is essential for efficient operation long term. Inviting good maintenance involves many things – including beginning with equipment that is in good working order. The environment that invites successful maintenance also includes the attitude that shows a desire for it, and the support for it – saying you want to know when something is getting worn or needs calibrating or needs researching to find out where it goes, etc. If the message is 'no money' it won't take long before the issues aren't being reported and that is not the outsourced contractor's fault. And 'no money' may actually be the reality and all that means is it should be no surprise when things get neglected to their eventual ruin and 'duct tape' state.

  Some things that make sense when inviting good quality maintenance:
  - Provide enablers for maintenance such as… room to work on things, access doors at and between major coils, electrical outlets, good lighting, fixed ladders, flooring in attics.
  - Identify maintenance activities that promote reduced energy use and make those a priority. Clean heat exchangers, clean filters, water treatment, and control schedules are a few basic examples and there are more.
  - Keep mechanical spaces clean and share the expectation that they are to be kept clean.
  - Remove old equipment and do not abandon in place.
  - Make regular tours of mechanical spaces and report any unusual noises, vibrations, leaks, equipment operating that shouldn't be, equipment not operating that should be, and other anomalies.
  - Keep an organized set of documents to facilitate repairs; include equipment manufacturer contact information, original design drawings, test and balance reports, a notebook of equipment operating and maintenance instructions with tabs, records of service and repair details and dates, records of when equipment was installed, and control drawings and sequences of operation.
  - Be knowledgeable yourself in the systems that have outsourced service and attend some of the service events to be an informed consumer of the service and to project that quality and efficiency matters. Your knowledge will also help spot or anticipate things that will help or hinder efficiency and the utility bill.

- **Accountability.** In-sources maintenance has some advantages but share many of the same obstacles in achieving the level of care that creates best efficiency. The key is feedback and accountability. If the maintenance worker is tasked with "prevent hot/cold calls" then their actions will be aimed at that, following instructions. Turning things on constantly, overriding settings, etc. all can be useful in reducing hot/cold calls. Of course, they increase energy in the process.

- **Managing energy costs normally will be done by the customer.** This method provides motivation and the necessary feedback to retain interest. The closer to the building-level the energy management activity occurs, the better. For example, within a very large company there may be multiple buildings. Here, it is possible for a central entity to receive and pay the bills while the building activities and choices occur at the building level without seeing the bills. But the building level personnel do not have to physically pay the bills as long as they see them (feedback) and are accountable for them.

- **Performance contracting as a feedback example.** By contrast, outsourcing energy system maintenance to a performance contractor for their work that includes guaranteed savings would be effective since they would care very much about energy efficiency – when 'on the hook' for efficiency and the bills, they will watch all operations and maintenance choices that influence energy use and speak up or intervene when something starts to stray. Performance contractors offer this service, usually as a way for the customer of the performance contract to do their part in the guarantee. The point is not that building maintenance should be tied to performance contracts, but that energy management fundamentally won't happen without feedback and accountability. It is unconventional and unlikely that a standard HVAC maintenance contract would include accountability for energy efficiency which means the customer would take on that responsibility.

- **Energy cost monitoring.** The term 'energy management' fits here. Some very large facilities have a full time energy manager, but most facilities don't have the luxury. Activities will vary, but the goal is the same: to control cost. This is done by deciding, by some means, if the energy use is normal or abnormal, and taking steps to control it. Part of the energy audit process includes a section called 'metrics' or 'analytics' where data is charted to draw some meaning. There is middle ground between engineering and doing nothing. This utility and others like it offer a customer portal to access data from your meters.

  This data can be yearly, monthly, daily, or hourly and can point to useful trends such as:
  - This year's monthly usage compared to last year
  - This month compared to this month last year

- Weekday vs. weekend
- Usage that occurs in the middle of the night
- Usage as a function of weather

What each of these has in common is helping to know if energy use is normal or abnormal. Constantly updating charts is tedious, so pre-made charts, certain favorite metrics, streaming data, or any kind of automatic helper tools are desirable in order to keep this up over time.

- **Dollars vs. Usage.** Dollars is almost always the bottom line concern, but when looking for issues with equipment or controls, remember that a rate increase can create an appearance of inefficiency when usage has not actually changed. For this reason, good energy management will look at both usage and cost.

- **Other tools** used by energy managers to keep their finger on the building pulse include:
  - 'Pulse boards' (accessory to energy meters for real-time data) that provide a constant data stream into a building automation system or BAS – computer controlled HVAC or lighting - if you have one of those.
  - Comparative data for similar facilities
  - Data loggers for specific machines or areas, Btu meters, etc.
  - BAS trends

  With the inputs as feedback, energy managers influence actions that control energy use
  - Equipment schedules
  - Set points
  - Reset schedules, setbacks, and a variety of optimization techniques
  - …and maintenance

- **Influence projects and purchases.** When a project comes along, such as a remodel, addition, or equipment replacement, an energy management activity is to influence the project to build-in operating economy where possible. Things like 'no electric heat' or 'extra insulation' can reduce operating cost markedly for the life of the building. Saving compared to the proverbial 'what it would have been' can be substantial.

- **Prevent savings erosion.** With each project or control measure comes the natural tendency for the savings of many conservation measures to steadily decay. This savings erosion should be assumed to occur unless actively working to prevent it. Knowing that erosion is coming is an essential part of preventing it – after that comes understanding the mechanisms that cause it, what can be done to reverse or mitigate it. These things come down to Operations and

Maintenance. The O/M staff is the tool for the energy manager to hold the line on efficient operations, or to reverse an inefficient operating state. Savings from O/M also fall under the 'what it would have been' category but are real and can be demonstrated. And should be rewarded and treasured. The O/M staff is an important ally for energy management, which underscores the importance of having the right people