
Summary

ANSI/ASHRAE/ACCA Standard 180 for commercial HVAC maintenance provides requirements written in "standards" enforcement language. The Standard addresses "what" is required but not sufficient guidance on "how" those requirements might be met or implemented by responsible parties (owners), their service providers or utility program designers/implementers.

This document provides input from HVAC industry subject matter experts to address several key topics which need to be understood in order to implement the Standard.

It also includes suggestions for revisions to the current 2012 standard for Standard 180 Committee consideration. The working group plans to continue work on identified topics to develop a user guide draft.

Finalized: January 18th, 2017

Use of this document

This document provides input for development of a Standard 180 user guide.

It is based on an official [WHPA Work Product](#) of January 18th, 2017 titled "CQM Standard 180 User Guide Working Group Report – User Guide Preparation 1." This Work Product was developed by the WHPA CQM Standard 180 User Guide Working Group.

This document, and also the WHPA Work Product, may be used in part or whole at no charge. Attribution to the Western HVAC Performance Alliance is requested.

We would also ask that you inform the WHPA through info@performancealliance.org if you have made use of either document, so that we can inform and encourage the hundreds of volunteers who donate their time to providing expert HVAC advice in order to support energy efficiency objectives.

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Introduction

This WHPA CQM Standard 180 User Guide Working Group is a direct descendant of the original CQM Committee work on studying Standard 180 in 2009. This means that this Committee and Working Group have been studying this Standard for seven (7) years, often in weekly meetings. This Working Group produced three previous work products and can take credit for playing a role in getting the economizer table added in 2012 and for inspiring the current update effort.

It became clear to this User Guide Working Group that we spent seven years studying this Standard and we are still learning how to apply it. This means that others who are trying to apply the Standard could benefit from what this group has learned in that time. That led to the idea of making a User Guide for the Standard. The previous iteration of this Working Group worked on an outline or vision document for a more comprehensive “user manual” to the Standard.

This Working Group was asked to try to make a more practical, initial version of such a document. This document was produced to resolve some basic questions about the Standard and especially the value proposition. It is assumed that work on the actual user guide for the Standard will proceed from here and integrate work done by others.

It is the intent of the Working Group that the current effort is useful to a range of generally non-technical industry participants who deal with sales, planning, implementation, and reporting. (How to use the Standard in every day practice.)

Objective

The objective of this document is to think through some open questions about how the Standard is designed, what it states, and how it may be implemented in preparation for writing a user guide.

Background/Notes

The first topic that was debated was “who is the Standard 180 User Guide intended for?” The group decided that this document was intended for people who are working to implement the Standard in their approach to HVAC maintenance as well as those involved with a Standards-based incentive program. This would include people working on the customer side and the service provider side who need to know about the technical aspects as well as the spirit of the Standard.

This document is not primarily intended for a technical audience. Previous work products from the Maintenance Task Working Group focused primarily on technical issues. Their work products are posted at the WHPA website home page summary of committees and working groups (www.performancealliance.org).

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When starting to work on this project, it became clear that there was work that needed to be done as a pre-requisite to making any user guide. That included reviewing “Section 4 Implementation” of the Standard. Section 4 contained all the “rules” of the Standard. After a quick review, the decision was made to investigate five topics in preparation for the drafting of a user guide. Those five topics are:

1. Understanding performance objectives and condition indicators.
2. Making a maintenance plan.
3. Investigating unacceptable conditions and performance.
4. Communicating the value proposition.
5. Customer-facing reporting.

Because of limited resources and time, only one topic could be considered in greater depth. The topic chosen for the deep dive was #4 Communicating the Value Proposition.

Suggested Revisions to Standard 180

1. The Working Group thought the ASHRAE Standard 180 Committee should reconsider the definition of “performance objective.” The definition should include a clear definition for the term discussed in Section 4.2.2.a of the Standard rather than starting out with reference to “metrics for evaluating performance objectives” statements found in the current definition. The current “definition” doesn’t seem to provide a definition for the term as a starting point.
2. The Working Group thought there needed to be a definition for the term “condition” and also “condition indicator” added to Section 3 Definitions. The definition should support the discussion of condition indicators discussed in section 4.2.2.b of the standard.
3. The Working Group thought that the current definition for a “maintenance program” was unclear. Section 4.2 provided a better definition of a maintenance program.
4. There was no language in the Standard that triggered or required a review process for performance objectives or the implied discussion about the progress towards meeting them. Section 4.4 stated that the maintenance program should be revised if the performance objectives were not being met, but there was no stated requirement that a review take place.
5. There was nothing in the Section 4.2.2.e documentation section that required producing documentation to track status and/or progress toward the performance objectives.
6. Section 4.4 allowed for a revision of the program if the service provider recommended it, but there was no requirement or process for the responsible party to call for a revision.
7. Currently the Standard required that “Components of HVAC systems that impact the building performance shall be inventoried...” and that the inventory is “...used to establish ...” maintenance plans. The Working Group couldn’t locate any provision in the current Standard that would allow a component of an HVAC system to be exempted from the inventory or for an inventoried component to not have a maintenance plan. The Group reached a consensus that under a variety of circumstances, exempting a unit or a group of units from the maintenance program and plan requirements should be allowed, and allowing exemption from inventory was the only logical action. The Group seemed to think a more straightforward approach was desirable. This Working Group suggested that the Standard be made “opt-in” or “opt-out” somehow at the unit level.

The Users Guide – Standard 180

One of the goals of a Standard 180 User Guide should be to make it clear that the Standard was not primarily about the maintenance tasks listed for HVAC equipment and systems in Section 5. Often, current users (building

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owners, property managers, as well as service providers) skip Sections 1 to 4 and simply focus on Section 5 as if the Standard was primarily just a list of maintenance tasks. This Group believes strongly that the Standard is primarily focused on implementing a process that requires discussion and agreement between a primary decision-maker, the “responsible party,” and their staffs or service providers. This discussion should establish performance objectives—a set of measurable goals in terms of building performance. A critical part of any Standard 180-based maintenance program would be to establish a way to measure the building progress toward meeting those goals.

Understanding Performance Objectives

The Working Group suggested that making a template or other systematic process for establishing performance objectives and condition indicators was an essential tool for operationalizing the Standard.

Section 4 of the standard requires that performance objectives be established for the building. The purpose statement in the Standard references three primary objectives or overarching goals for any maintenance program. These performance objectives are to maintain:

1. Acceptable thermal comfort
2. Acceptable energy efficiency
3. Acceptable indoor air quality

The Working Group noted that the three enumerated performance objectives were important enough that the authors of the Standard called them out as the purpose of the Standard. Because of this, the consensus of the Working Group is that, unless there was a documented reason for not including one or more of the purposes, they were required performance objectives. The Working Group further concluded that there might and probably should be additional performance objectives that the various parties hoped to achieve. When there are, the Working Group suggests that they meet the same requirements as other performance objectives.

In Section 3 of the Standard (definitions), a performance objective was defined as metrics for evaluating performance. The word metrics indicated that it must be measurable; meaning a performance objective metric must be a number. This number is a target that is used to compare the actual performance to a desired performance.

Additionally, a performance objective must include an identified source for the data. The sources may be measurements by a technology like an EMS system, a utility bill, or also a collation of complaints or opinions collected from an identified person.

There may be different performance objectives for different zones in the building. As the Standard is at the building level, it has no mechanism for directly excluding systems from the maintenance program inventory. This is not currently a real limitation because the Standard is voluntary. When the Standard is implemented at the unit level, as in the present CA IOU CQM programs, there is an opportunity to bring in any unit that has been chosen to participate. Any zones conditioned by equipment excluded from the maintenance program inventory are excluded from any further requirements under that maintenance program.

The Working Group determined that Standard 180 performance objectives cover the entire facility, or whatever part of a facility that has a source of metrics like a utility bill. This means that if the thermal comfort performance objectives were applied to zones, then all zones or groups of zones shall be covered by at least one thermal comfort performance objective unless the reason this doesn't apply is documented.

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The Working Group thought that making a systematic process or a template for making performance objectives would be a task that this Group should undertake as part of the user guide development project.

Understanding Condition Indicators

Condition indicators are the standards by which, for any given task, the acceptability or unacceptability of the condition is to be determined. The condition of a belt—or if the coils are clean or not—are conditions that need indicators for determining acceptability or unacceptability.

Condition indicators include two concepts:

1. How to assess the condition? Example: visual, measurement, etc.
2. What is the criterion for judging acceptable or unacceptable condition? Example: min or max measurement, visual judgment criteria.

The Working Group thought that making a systematic process or a template for making condition indicators would be a task this Group should undertake as part of the user guide development project.

Making a Maintenance Program

Section 4.2 of the Standard clearly stated that a maintenance program consisted of (1) an equipment inventory and (2) a maintenance plan.

In the maintenance plan, the equipment is inventoried. For each equipment type a task list is defined. For each task, at least one condition indicator must be provided that the service provider will use to judge the acceptability or unacceptability of the condition of the system, sub-system, or part that is the subject of the task.

The maintenance program is a document that includes a set of performance objectives for the maintenance program, an inventory of the equipment included in the maintenance program and a maintenance plan for each piece of equipment or equipment type included in the program inventory. It also includes definitions as to who is the responsible party, the authorizing party, and who is responsible for each of the tasks defined in the maintenance program documents.

The Standard defines a responsible party and an authorizing party. The building owner is defined as the responsible party. The building owner authorizes the authorizing party to fulfil their responsibilities. If an authorizing party is defined they act as the building owner (responsible party).

The Working Group thought that developing a systematic process or a template for making a maintenance plan was a proper task for this Group to engage in the future.

Making an Inventory

An inventory is a list of all units included in the maintenance program. Each unit must be uniquely identified with at least a unique name or a serial number and the characteristics required to determine the maintenance task list (make, model).

The Standard currently has no process for excluding equipment from the inventory but utility programs do. There were comments made during recent ASHRAE Standard 180 Committee meetings that it was sometimes necessary to exclude a unit or a group of units for a variety of reasons. This Working Group concurs.

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The Working Group feels that a systematic process or a template for making an inventory would be a proper task that this Group could undertake in the future.

Making a Maintenance Plan

A maintenance plan was intended to be the defining document that identified the group of tasks appropriate for the equipment type, or in some cases a specific unit or component. Each task included:

- The party responsible for performing the task
- A minimum task frequency
- At least one condition indicator
- At least one recommended action if an unacceptable condition is found.

The Working Group thought that developing a systematic process or a template for making a maintenance plan would be a proper task that this group could undertake in the future.

Investigating Unacceptable Conditions and Performance

There is a requirement in Section 4.2.2.d of the Standard that if repeated unacceptable conditions or performance were found during inspections, an investigation into the root cause shall take place and the maintenance plan shall be modified to resolve the unacceptable issue.

The Standard has no additional suggestions or requirements should unacceptable conditions or performance continue other than this initial investigation and modification to the maintenance plan.

The Working Group thought that developing a systematic process or a template for investigating unacceptable conditions and performance would be a proper task that this Group could undertake in the future.

Customer-Facing Reporting

Customer-facing reporting in the context of Standard 180 would be a report that shows, for each performance objective, (1) the original or benchmark value, (2) what the agreed outcome should be, and (3) what the current value for that quantity is in relation to the two fixed parameters.

Commonly Heard Pushback from Service Providers

Customer-facing reporting and a review of the performance objectives doesn't necessarily require a face-to-face meeting. However, satisfactory reporting is currently not perceived as available by service providers who want to use it with their customers. Contractors do not perceive that their information technology and other business systems are capable of easily giving good customer facing reporting of the type being discussed.

Reporting from the Quarterly Inspection Data

The reporting generally derived from quarterly maintenance inspection tasking forms is generally not perceived as very interesting to customers as a table showing the date that tasking is complete or listing of condition, exceptions, or repairs done. There is a need for something that makes a point or makes a set of conclusions. Something that a customer can make decisions with. There are those that think reporting completion data is a valid report for the record.

The following reporting is what contractors think customers want, but data availability and processing expertise is perceived to be a limiting factor for them.

- Energy efficiency reporting – Change in kW and kWh usage/sqft. pre-vs-post implementation, more detail as desired and is available
- Repair history – Change in cost of service pre-vs-post implementation, more detail as desired and is available
- Comfort history – % time within set points, other
- Indoor air quality history – % time below CO₂ alarm set point, humidity, other
- Other, customer/service provider specific.

In the development of the maintenance plan at the beginning of the process, performance objectives were negotiated and metrics and data sources for those metrics were defined. Those performance objectives could be very sophisticated supported by lots of data or they could be very simple and collected by an observer. Whatever they are, the development of the performance objectives is either part of or it includes the development of the data collection plan and the reporting plan.

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The consensus of the Working Group is that a performance objectives reporting and review should take place annually as a minimum and then at other intervals as the need increases or diminishes. These reviews may be delivered in person, on a call, or via a document.

The Working Group thought that developing an example systematic process or a template for reporting conditions and performance would be a proper task that this Group could undertake in the future.

The Value Proposition

Per Investopedia (www.investopedia.com), a value proposition is a business or marketing statement that a company uses to summarize why a consumer should buy a product or use a service.

The primary value propositions for quality maintenance, often used as a single term to refer to Standard 180-based HVAC maintenance, refer to the basic purpose and goals of the Standard: energy efficiency, occupant comfort, and indoor air quality. Other value propositions include cost avoidance, the reduction in the risk of unsatisfactory comfort conditions, and other softer benefits. Each general value proposition could be described in greater detail such as:

Cost avoidance

- Reduced electric utility cost including demand charges
- Reduced unplanned maintenance costs
- Avoided replacement costs due to extended equipment life

Reduction in the risk of no comfort

- Loss of sales
- Reduced employee productivity
- Negative brand experience

Other softer benefits

- Being responsible
- Defense against criticism and second guessing
- Environmental benefits

A maintenance approach change involves potential risks and benefits. The perceived risks and benefits vary from one kind of buyer to another. That variation is related to, among other things, how sophisticated the customer is when analyzing the opportunity and how scarce resources are for them.

Additionally, the ways they measure success can be different. What is important to a buyer isn't always clear at the onset. However, there are some common elements the Working Group has determined that apply to each of several general market segments.

The following four examples are intended to serve as an overview of four market segments with some information about how they work, who makes decisions, how they buy, and some common expectations they share. The Working Group has also included some thoughts about how to help them see and then communicate internally the value of a Standard 180-based approach to maintenance.

1. Owner Occupied; Small

Characteristics:

- Small business with a single or small number of locations and a small number of units
- Local area scope
- Sometimes called “Mom & Pops”
- It is assumed that the same person pays for the service costs, energy costs, and is responsible for providing acceptable comfort.
- Financially, the numbers are small but so are the resources in many cases.
- This description includes many national accounts’ franchisees.

Decision Maker(s):

In small owner-occupied opportunities, the expectation is that the owner of the business and/or the building is the decision maker and is spending their own money. The procurement process is usually very simple and direct coming down to a decision by one person or a small number of people with no need for outside consultation.

Key Deterrents/Pain Points:

For small business owners, this is an expense they have not experienced before. Some things you might hear about the proposed service:

- It is too expensive
- I don’t need it
- I’ve never benefited from it before
- I don’t buy warranties/equipment should be good enough new
- It is too time consuming
- We need a repair, we didn’t ask for all of this
- I don’t see the value

Specific strategies to resolve the pain points:

- Think of the saying “showing is better than telling.” When presenting a feature, it is good to explain its benefit immediately. For example, “There is a utility sponsored program that establishes service criterion that addresses energy efficiency, occupant comfort, and indoor air quality. While you will incur the cost of a service contract, overall it can save you a greater amount. Let me show you with the following financial examples.”
- “Let me show you how to ‘do the math’ and understand the financial implications”
 - Presumed ROI example
 - Estimated useful life or EUL comparison
 - Cost/savings predictive maintenance model
 - Evidence of benefits
 - Pay up front smaller amount/pay larger amount down the road
- Reinforce the human costs of maintenance deferral
 - “There is a likelihood of your system going down at a bad time, producing
 - an opportunity cost of the loss of comfort and
 - a predictable impact on business”
 - “The potential of a cash payment (pay big repair bills) in an emergency situation (when there are other more important uses of time) is trying for you, your customers, and your partners versus the lower cost, more stable approach of maintaining regular service. Your benefits are customer satisfaction as well as managed cash flow.”

Key Benefits:

“It’s your money, and it’s your time. Do you want to spend it on energy and repairs or would you rather spend some on regular maintenance so that you maintain customer satisfaction and planned cash flow? These are a few of the items to think about when selecting a maintenance program.”

- Utility sponsored program confers cost reductions
- Reduce electric utility costs
- Reduce repair costs
- Don’t need to deal with comfort complaints and repair administration tasks, other hassles
- Customers want to be comfortable
- Customers don’t want to think about HVAC
- Customers want the machines to last longer
- Customers want to prevent foreseeable problems
- Customers want data for capital planning

Documentation and Resources to Support the Value Proposition/Sale:

The approach among small business owners varies. Some will want as much detail as they can acquire, others are only interested in the larger concepts. Responding to your unique customers’ needs for information is a key skill. Be prepared with the following examples based upon your customers’ needs:

- Utility program collateral
- Case studies
- Utility data analysis
- Anecdotal stories of people like them/people they may know
- Building studies data, audits of their facilities
- Customer referrals
- Savings estimation tools

2. Owner Occupied; Large

Characteristics

- Larger business with large or many locations and a larger number of units
- Perhaps wider area scope
- The owner is likely a corporation.
- Management is more sophisticated than would be expected in small owner-occupied.
- They probably need a professional facilities person on staff with full time responsibility for the buildings and its systems.
- Formal financial analysis is useful here. The resources are often available if you can prove that your project is the best use for them.
- This description includes anything large where the building owner occupies the facilities or where they have full control and responsibility for the buildings systems.

Decision Maker(s):

In large owner-occupied opportunities, the expectation is that the decision maker is a manager that is part of a management group. Data and financial analysis is key to being considered. The procurement process is usually detailed enough to make becoming a vendor difficult without a high-ranking champion internally. However,



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when a person with budget control or influence favors a project, they can usually easily override any obstacles. You may deal with an owner, a CEO, a CFO, or an individual reporting in at a lower level.

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Key Deterrents/Pain Points:

Larger business owners/managers are often analytical and must prioritize projects because of competing priorities. Ideally, this type of project is aimed at a company strategic goal or it could be hard to fund. Some things you might hear about the proposed service:

- It's not in this year's budget
- The new fiscal year starts...(at some future point but nothing need be done now)
- We are already doing that
- I must talk to my boss (gatekeeper that is hard to get past)
- We outsource that portion of the work

Specific Strategies to Resolve the Pain Points:

The assumption is that there is a problem than needs to be solved. Ideally, you will identify the person that is influential enough to close this deal.

- Due diligence to understand your customer on the front end
- Identify a champion on the front end
- Collaborate up front with the service providers
- Change from a forced buy to an informed purchase
- Pilot sites/stores incremental approach – baby steps showing the value add then selling up

Key Benefits:

The decision maker has a job to do. The facility must perform its function; and to the extent heating and cooling are important to that facility, reliability is desirable. Reliable equipment doesn't require their attention and they can do other things with their time. The decision maker or internal champion wants to be perceived as effective at their jobs and at furthering the goals of the company. Successful projects build reputations.

- Utility sponsored program – confers cost reduction
- Reduce electric utility costs
- Reduce repair costs
- No need to deal with comfort complaints and repair admin tasks, other hassles
- Don't want to think about HVAC
- Want the machines to last longer
- Want to prevent foreseeable problems
- Want data for capital planning

Documentation and Resources to Support the Value Proposition/Sale:

In this case, as in other professional organizations, the approval process is logical and is usually sensitive to data and analysis. Anything that empowers the champion to be persuasive internally is useful. You can help by providing:

- Audit of the facilities
- Energy analysis
- Business case
- Case studies
- References

3. National Accounts

Characteristics:

- Large Corporations with 100s or 1000s of locations across a wide geographic area
- They are primarily commercial tenants paying service, maintenance, and energy costs.
- They often have a facilities manager, sometimes with a small staff, and they may be using a national service broker, or they may have a larger staff and engage directly with service providers around the country.
- National accounts sometimes have facilities staff, energy managers, and construction departments; and they sometimes don't communicate or share common objectives.
- National accounts share a characteristic that drives their decision making and processes and makes them all relatively similar: That is, they represent many similar small-to-medium sized facilities spread across a wide geographic area. They range from being very simple, like a retail store averaging two RTUs, up to a convenience store with a variety of mechanical equipment, to restaurants and banks, all the way up to supercenters with a supermarket added to a big box general merchandise store, and many others. A program or process is better when it can go to scale.

Decision Maker(s):

- The finance department is looking for economic evidence.
- A common scenario might be that someone brings a proposal to the directors. That proposal needs to show a significant ROI. The cost differential between their current maintenance investments and the proposed program is critical. Utility programs are very useful in buying down the cost (risk). In the absence of outside resources, it is sometimes effective to identify incremental steps and then show measured improvement.
- The service provider can make or break the sale. If the proposal didn't originate with them, getting them on board with the process and intent of Standard 180 activities can significantly increase the likelihood of the project being approved and then succeeding.

Key Deterrents/Pain Points:

National accounts have long sales processes. There is work required on the part of both the service provider and the facilities person to make a proposal, to get it approved and budgeted, and to have project management assigned. They need solid cost and savings estimates. You should get your proposal polished and socialized around the organization prior to it being presented for approval at an annual budget meeting. If everyone needed agrees to the proposal in advance, it will pass. Otherwise it will wait. As a second chance, the project may be done as a small pilot project under existing budgets in preparation for the next annual budgeting process.

These organizations often have separate property management and energy management functions. This program may be more appealing to the energy manager, but the property manager controls the maintenance budget. In many organizations, maintenance isn't considered an energy conservation measure.

Some Things You Might Hear:

- I don't want simple maintenance that doesn't have results
- It's not in my budget
- The last contractor ended up messing things up
- I need to talk to my boss
- Our facilities don't need maintenance

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- We outsource that portion of the work
- We have a service provider who handles all the complaints
- If it's related to energy, it is not part of my job
- I have a contractor that I like
- I have a bid from someone else that is much lower
- Changing service providers is risky
- I need to bring the service provider into the conversation
- How will I employ this strategy nationally?
- There's tension between the facilities, finance, and energy management folks – they need short- and long-term ROI
- How do I split up areas and avoid vendor conflicts?
- These are expensive tasks that just delay the inevitable unit replacement; we should just replace them now.

Specific Strategies to Resolve the Pain Points:

In these opportunities, the customer is usually very busy. Any help that can be offered to empower the champion with credible data and financial projections will increase the probability of success. You can engage in the following:

- Do due diligence to understand your customer ahead of time
- Identify a champion early on
- Partner upfront with the service providers
- Change approach from a forced buy to an informed purchase
- Select pilot sites/stores based on a demonstrated opportunity for improvement. It would be a best practice to include sites with relatively high utility usage or costs, sites with high repair bills and sites with chronic comfort problems. The sites that look like the biggest opportunities, the top 10%, often end up as only replacement opportunities. The next 10-25% of sites are where the big improvements from maintenance often exist.
- Some customers require an incremental approach with small steps that show the value add of Standard 180, then upsell more services

Key Benefits:

Generally, most national account property managers know maintenance is necessary and it's usually required in their leases. The question is what kind of maintenance? From the service provider's perspective, the maintenance checklist is given to them and they are asked to bid. The low price carries a lot of weight. A national service broker likely manages the whole process. Appealing to the national account to modify their maintenance tasking and change their maintenance budgets is something that should begin a long time before the maintenance RFP goes out for bid. The following ideas are sometimes appealing to the national account property or energy manager.

- Cost reduction on utility bills and repairs
- Equipment reliability
- Thermal comfort
- Consistent operation costs
- Foreseeable problems and impact to capital planning is prevented
- Can move the needle on the entire portfolio. This means something that has a modest but measurable impact on the portfolio costs are far more attractive than a large improvement of performance of one site.

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- Improved working conditions (employee costs, sick time, productivity)
- Improved environment for customers (increased sales)
- Reporting mechanism to show activity and progress

Documentation and Resources to Support the Value Proposition/Sale:

In the national account segment, the decision-making process usually follows one of two patterns: (1) The organization will either have a powerful or influential person that makes this decision and drives the internal politics, or (2) if it doesn't have such an individual, the process is much more tentative, more data is required, and approval is likely for smaller pilots if given at all. Some documentation that may be useful in a national account sale includes:

- Customer-facing reports using collected or industry pro forma data showing opportunities or specific operational or performance problems.
- Drafted business case – financial document, assumptions, # of units, estimated savings, and estimated costs
- Past actual measured information from other sites including reduction in replaced equipment, etc.
- Case studies that tell a story, provide an illustration/photo, identify good hard numbers that are evidenced based (longevity of equipment, cost reduction, impact on employee effectiveness/efficiency)
- Use language and context that resonate with end users' priorities ($\$/ \text{Energy Savings} = \$/ X \text{ number of product/quarter}$) AND ($\$/ \text{Energy savings} = \$/ \text{increased operations profit}$)

4. Municipal, Universities, Schools & Hospitals (MUSH) (Institutional)

Characteristics:

- Municipal Universities Schools and Hospitals (Institutional Facilities) could include government and military facilities.
- They have facilities professionals and likely a small or medium in-house staff.
- These institutions persist and tend to have high commitment to the buildings.
- They have lots of detailed procedures for committing funds.

Decision Maker(s)

- Purchasing/facility assets/student housing
- School Boards
- Consulting engineers
- Town council
- Board of directors
- Building operations/mayor/city manager
- Energy managers
- Facilities managers

Decision makers aren't usually the ones who are impacted by indoor air quality (IAQ)/thermal comfort (TC) even though this may be the biggest problem.

Key Deterrents/Pain Points:

Like other large organizations, having a powerful or influential internal champion is important. In this case that person must also be skilled at working the internal politics and the resource approval process. It would be generally expected that the approval needs to come through some formal process that includes a vote of a

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board for major expenditures. All the work qualifying the opportunity and getting organizational support must be complete and the outcome decided prior to the vote.

Some initial pushback is also expected because the process is such hard work and it's too easy for the middle manager to just say no. The key is to get engagement, and then to have perseverance, and sometimes a little creativity in positioning some aspects of the plan to fit the politics or the process.

Some Things You Might Hear:

- The pricing is problematic (law for prevailing wage impacts this)
- What's the cost analysis?
- How do you issue a PO for a larger amount for maintenance and repair?
- What are the insurance components?
- What are the safety components?
- What's the timeframe between contracts (expiring/new/renewal)?
- Some of the larger cities have specific contracts with unionized labor
- I've been financing replacements with the maintenance budget
- How do I quantify savings/goals?

Specific Strategies to Resolve the Pain Points:

If you want this to happen in an institutional environment, you must either have an internal champion who has a plan to get the program approved or you need a relatively high placed person on the team pushing for approval with the ability to provide all the facts and calculations, produce the presentations, and drive the socialization process within the group of decision makers or it may never get "out of committee." The following items will prove helpful:

- Use referrals and references
- Provide performance objectives and pre-defined metrics to review with them to show YTD improvements
- Leverage (CA) Prop 39 funding
- Have very specific plans such as unit replacements and lighting
- Provide relevant, tangible savings calculations
- Reference energy bills – benchmarking to show benefits
- Create a list of target customers, identify the responsible party, and devise a plan for marketing
- Know your customer's needs and wants to provide the most relevant information—Customers don't know what they don't know
- Uncover the biggest issues and prioritize – inventory, reactive repairs, equipment age, energy costs, complaints
- Learn about their current maintenance program – what's working and what isn't
- Typically, the facilities person is not as knowledgeable as the service provider. There could be a benefit in transferring knowledge about their systems by interacting with a professional.
- Analyze building data and diagnostics – 15-minute interval/identify KPIs

Key Benefits:

In an institutional environment, the pace of change can be slower and positions are often secure so there is a less than normal need for the operators to improve in any way or to impress anyone. The people in the facilities department may be risk adverse. Change usually starts with someone with specific responsibilities and some reason to want to act.

- Meets the William's Standard – IAQ/TC/EE

Development of a Standard 180 User Guide for commercial maintenance

- Helps them with inventory, budget, asset management, reporting

Documentation and Resources to Support the Value Proposition/Sale:

Once there is engagement from a qualified internal champion, they will need all the resources they can get to make the case that maintenance of the energy using equipment is required and that this project is the best use of scarce resources.

- Referrals and references
- Vetted tools that show the best value
- Plotting kw against outdoor temp (use as examples) – baseline, balance point, slope of temperature based on energy usage
- Standard metrics for projections
- Southern California Edison (SCE) utility study
- Hear the story of your company – who your other customers are, what you've done (experience), and potentially case studies

Conclusion

This document was made to think through some key parts of Standard 180 and to document the experience of various stakeholders when selling and implementing Standard 180-based maintenance. The next step is to start producing the User Guide. The story arc of the proposed User Guide might be:

1. Introduction to and overview of Standard 180
2. Selling Standard 180-based maintenance
 - a. The value proposition
 - b. Qualifying the customer
 - c. The sales process
3. Making a maintenance program
4. Implementing a maintenance program
5. Measurement, data collection, and report making
6. Validating Standard 180-based maintenance
7. Conclusion

Given the fact that this is all volunteer work and the effort required to produce the content envisioned in the document, the Working Group makes two requests:

1. The envisioned work will need as much time to work as possible. Please allow this work to start early in the next year.
2. Because of the effort involved and skills needed to produce the content, the Working Group proposes that the effort be divided into three tasks that could be worked in parallel to produce a distributable version 1 User Guide at the end of 2017. The three tasks are:
 - a. The sales aspects of the guide, including part of the validation step
 - b. The technical aspects of the guide, the Standard, implementing, reporting, part of the validation step
 - c. The tasks of putting together a distributable document, formatting, editing, pictures and graphs, and producing the finished document.