Section: Operation

Task 17: We plan and control the processes related to our significant energy uses (SEUs) and action plans, and set operation and maintenance criteria where there are risks of significant deviations in energy performance. We operate the SEU and action-plan related processes in accordance with the criteria and communicate the criteria to relevant personnel. We control planned changes, along with outsourced processes related to SEUs.

Getting It Done

1. Create a significant energy use (SEU) operating criteria worksheet and operational controls checklist to determine and set the required criteria and controls for each significant energy use.
2. Ensure critical factors affecting energy performance are known and communicated to responsible personnel.
3. Ensure that the operational and maintenance control sections of your action plans have been completed and implemented.
4. Operate and maintain sites, equipment, systems, or processes associated with your SEUs to meet the determined criteria.
5. Establish processes to control planned changes affecting operational and maintenance criteria or controls.
6. Control outsourced SEUs or processes related to SEUs.

Task Overview

Operational and maintenance controls ensure that critical equipment, systems, processes, and sites are operated and maintained to achieve required output and performance. Properly defined and implemented controls promote the efficient and uninterrupted functioning of critical equipment. Operational and maintenance controls also are relevant to the sites, equipment, systems, and processes associated with your action plans. This will help ensure their performance is optimized and within intended parameters while concurrently working to improve it.

Determining operational and maintenance controls involves the planning of activities to ensure critical factors affecting energy performance are known, used, and communicated to responsible personnel. Operational and maintenance controls must be planned and implemented for processes related to your significant energy uses (SEUs) and to implement action plans for achieving your objectives and energy targets (see Task 13 Action Plans for Continual Improvement).

Operational and maintenance controls can take a variety of forms. They can include, for example, documented procedures and work instructions, physical controls, use of licensed or other qualified

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

personnel, or combinations of these.

This guidance is relevant to Section 8.1 of the ISO 50001:2018 standard.

Associated Resources	Short Description
no resources for this questions	

Full Description

Set operating and maintenance criteria

Your organization should have effective operating and maintenance criteria in place for all your major sites, equipment, systems, and processes. Your major systems and significant energy uses (SEUs) have optimum running conditions and maintenance practices that maximize their operational efficiency and allow them to achieve their design service life.

Operating criteria are set points where the processes related to your SEUs and action plans operate most efficiently.

Learn More: **Example operating criteria**

Example operating criteria include:

- Occupancy timer settings
- HVAC temperature settings
- Air compressor operating pressure
- Furnace and oven temperature set point
- Steam boiler pressure
- Freezer and cooler temperature set point
- Water temperature generated by chillers
- Line speeds

Operating criteria are implemented through operational controls that work to ensure processes related to your SEUs and action plans are operated within identified criteria. Some examples of operational controls are:

- Physical limits
- Mechanical and electrical controllers
- Measuring equipment and indicators
- Labeling and signage
- Documented procedures
- Operator competence and training

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Your organization must also address maintenance criteria and associated controls. Examples of relevant maintenance practices can include:

- Filter replacement
- Lubrication
- Tension adjustment
- Leak repair
- Cleaning
- Fluid levels
- Vibration analysis
- Tuning

Many organizations use a preventive maintenance (PM) system, which can be a component of the maintenance criteria and controls for an energy management system (EnMS). A PM system is an organized approach for maintaining equipment and processes by conducting systematic inspections. These inspections detect and correct anomalies to prevent failure and/or maintain peak operating condition. Both operating and maintenance criteria and associated controls influence the performance and efficiency of energy-consuming equipment.

The ISO 50001 standard requires that you develop operating and maintenance criterion for your SEUs and for the action plans you are implementing "where their absence could lead to a significant deviation from intended energy performance." Significant deviations are discussed in Task 21 Monitoring and Measurement of Energy Performance Improvement. Your organization must determine what controls are critical to avoid a significant deviation related to the operating and maintenance criteria of your SEUs and action plans. Examples of significant deviations that could be due to, at least partly, operational and maintenance control issues include:

- Equipment or systems running outside of control limits
- Energy consumption variation
- Change in efficiency
- Increased maintenance requirements
- Increased downtime
- Additional equipment requirements
- Longer run times
- Need to change settings
- Product quality issues (e.g., over- or under-cooked food)

Learn More: **Sources to help identify operating and maintenance criteria**

A variety of sources can be helpful in planning operating and maintenance criteria for your SEUs and other processes that can impact energy performance. These include:

- Manufacturer's recommendation
- Personnel who measure performance
- Minimum process or system requirements

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

- Service personnel suggested operating settings and maintenance intervals
- Statistical process control
- Benchmarking performance of similar equipment
- Industry standards

Keep in mind that you likely have some operating and maintenance criteria already in place within your organization, especially as related to efficient equipment operation. Part of the process of determining operational and maintenance controls is to examine what is already there, and incorporate it into your EnMS as it relates to energy performance. You should take stock of what's in place and take a fresh look at what else is needed for controlling operations and maintenance activities for processes related to SEUs and action plans. The optional Playbook worksheet is one example of how you can organize and record information on operating and maintenance criteria.

You may want to consider developing additional operating and maintenance criteria to address other factors related to energy performance, such as controls needed to sustain past energy performance improvements, and the maintenance of non-SEU energy systems.

Operational and maintenance controls may also be physical devices (e.g., a building automation system [BAS], occupancy sensors for lights, air compressor sequence controllers), as well as the use of certified or other specialty qualified personnel (e.g., licensed electrician, licensed boiler operator, licensed waste treatment operator).

Learn More: **Evaluation of operating and maintenance criteria**

To evaluate the operating and maintenance criteria you might need, bring together the appropriate personnel and information described above and discuss the following:

- What operating and maintenance criteria have been established for the SEUs?
- What controls are needed to operate and maintain SEUs within appropriate criteria?
- What are the operating and maintenance criteria that would indicate a significant deviation?
- Are operational and maintenance controls in place?
- Are the operational and maintenance controls effective in maintaining performance with the identified criteria?
- Are other controls needed to maintain the SEU within identified operating and maintenance criteria?
- Are other controls needed to detect or avoid a significant deviation?

Use the optional Playbook worksheet to help determine the required criteria and controls.

Once the appropriate operating and maintenance criteria are determined, they become the targeted operating and maintenance state.

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

Ensure major equipment, systems, processes, and sites are operated and maintained in accordance with criteria

Once the appropriate operational and maintenance controls and criteria are determined, you must operate and maintain the sites, equipment, systems, or processes associated with your SEUs and action plans so they meet the criteria. If the criteria and controls are new or have changed, you will have to communicate this information to appropriate personnel. If the controls are not functioning or are bypassed, you will have to implement inspections to confirm that the operational and maintenance controls are being implemented or maintained and the criteria are being met.

Learn More: **Example of not operating equipment in accordance with criteria**

An example is the disabling of the speed control of a fan's variable frequency drive (VFD), which would cause the fan to operate at full speed constantly. The VFD would not be able to reduce the fan motor speed during periods when the fan is lightly loaded, and consequently the VFD would not achieve the expected energy performance improvement.

Communicate controls to personnel

For the sites, equipment, systems, and processes associated with your SEUs and action plans to be operated and maintained using the established controls, you must ensure they are communicated to the appropriate personnel. This includes on-site contractors or suppliers performing work associated with SEUs and action plans. Robust communication processes ensure that expectations with regard to performing and following the controls are known and understood by the appropriate personnel. You can provide the controls and criteria information through training, documentation, or other communication processes as appropriate, such as:

- Shift or toolbox meetings
- Demonstrations
- E-mails
- Staff meetings
- Equipment markings
- Supplier meetings
- Contractor briefings

For complicated processes, you may need to provide training supported by appropriate documentation. Personnel who are new to the organization, or personnel for processes that require a licensed operator or maintenance technician, should be included in such training. Training may also be a convenient form of informing large numbers of personnel about operation or maintenance activities. Training can involve:

- On-the-job training
- Shift training
- Classroom training

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

- Supplier training
- Peer mentoring
- On-line training
- Training from certified bodies
- Technical training

Learn More: **Operational and maintenance control documented information**

Your organization must retain documented information (i.e., records) (see Task 16 Documenting the EnMS) on operational and maintenance controls to the extent necessary to have confidence that the processes are operating properly and in accordance with the relevant criteria. These records could include, for example, completed log sheets, logbooks or checklists; data from automated control systems; testing or other types of reports; work orders; data analyses.

Maintaining documented operational and maintenance controls (i.e., documents) is not an explicit ISO 50001 requirement, but it is a best practice. These documents can be an effective medium for communicating to or reminding appropriate personnel. You can update documents as required to ensure the information is relevant and accurate. Documents could include:

- Work instructions
- Equipment logbooks (blank)
- Equipment operating procedures
- Contractor/supplier handbooks
- Instruction sheets
- Checklists (blank)
- Work area postings
- Brochures

Use the method(s) of communication most effective for your organization. What is important is that the operating and maintenance criteria are clear and accurate, and that you make appropriate employees and contractors aware of them.

Control planned changes and review unintended changes

To maintain ongoing efficient operation of processes associated with your SEUs and action plans, it is critical that operational and maintenance controls are not unintentionally modified, bypassed, or otherwise disrupted when changes are made that impact those processes. Such changes could be planned or unplanned.

Identifying the potential and actual impacts of planned changes on your SEUs and action plans, and addressing them as appropriate, can be incorporated into your organization’s change management process. In this way, the planned changes are controlled and undesired effects on the processes, and the operational and maintenance controls that support them, are avoided.

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

When operational and maintenance controls are unintentionally affected by unplanned changes, you must review the consequences of those changes and take action to address any negative effects. This helps ensure that the processes associated with SEUs and action plans continue to operate as intended.

Control outsourced processes related to SEUs

Outsourcing is an arrangement where an external organization performs part of an organization's function or process. Although the external organization is outside the scope of the EnMS, the outsourced process or function is within the EnMS scope.

SEUs or processes related to SEUs that are outsourced must be controlled. The extent of control will vary, depending on the specifics of the SEU and the related processes. For example, an outsourced process that is actually conducted onsite at your organization could be more directly under your control than an outsourced process that is not.

Common forms of control for outsourced processes can include specific contract provisions or requirements for the following:

- Second-party audits or inspections
- Qualifications or competencies
- Operational controls, including technologies
- Monitoring and measurement
- Tests or analyses
- Records to be available

Decarbonization

When adding energy-related GHG emissions to your EnMS, determining operational and maintenance controls involves the planning of activities to ensure critical factors affecting energy performance and GHG emissions are known, used, and communicated to responsible personnel. Operational and maintenance controls must be planned and implemented for equipment, systems, and processes related to your significant energy uses (SEUs) and to implement action plans for achieving your objectives and targets (see Task 13 Action Plans for Continual Improvement).

Establishing a new EnMS prioritizing decarbonization

If you do not have an existing 50001 Ready-based EnMS and want to build one that also helps your organization manage energy-related GHG emissions, in addition to the guidance for the energy management system you should:

1. When following the guidance for this task, define operating and maintenance criteria for SEUs. The criteria should consider both energy performance and GHG emissions.

Adapting an existing EnMS to prioritize decarbonization

Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

If you have an existing 50001 Ready-based EnMS and want to adapt it to manage energy-related GHG emissions, you should:

1. Review your existing SEU operating and maintenance criteria to see if they need to be modified for GHG emission considerations. If the criteria are modified, make sure to document the new criteria.
2. If in Task 9 Significant Energy Uses (SEUs), there were equipment or processes identified that were not previously SEUs, and were determined to be SEUs because of GHG considerations, develop operating and maintenance criterion using the guidance in this task.
3. If you made any changes to operating or maintenance criteria, ensure that those changes are communicated to the appropriate personnel and implemented.

Commercial Emissions Reduction Planning Framework

No direct mention of Operational Controls in the ERP Framework. However, there are brief mentions of operational changes in some tables in Milestones 1 and 5.

Property Management, Facilities/Engineering, and Energy Management should identify operational needs and maintenance concerns, suggest and evaluate technical solutions, and provide building-level information. (Milestone 1) Assess the comparative impact to facilities operations, including maintainability, disruption, and system complexity. (Milestone 5)

Industrial Emissions Reduction Planning Framework

There is no additional guidance for this task in the ERP Industrial Framework, which does not address operational controls.

(cc) BY-SA Licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.