Better Plants
U.S. DEPARTMENT OF ENERGY

Strategic Energy Management (SEM) with ISO 50001 and 50001 Ready

ORNL 50001 Ready Training Webinar Series, Session 3
March 3, 2026
10:00 a.m. to 12:30 p.m.

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Agenda – Session THREE

- Welcome, Safety, and Housekeeping
- Review Previous Sessions
- Today's Content – ***Where Does All my Energy Go?***
  - Section 3: Planning
    - Task 8: Energy Data and Collection
    - Task 9: Significant Energy Uses (SEUs)
- Webinar Training Schedule & Preparations
- Kahoot Quiz Game
- Q&A

But first, a POLL!

Polling Question 1

Polling Question

1) Based on your current knowledge of your energy consumption, what do believe would be your significant energy users (SEUs)?
   A. Chillers for building cooling
   B. Boilers for building heating
   C. Lighting
   D. Air compressors
   E. One or more of my manufacturing processes (e.g., baking, cooking, heating, melting, curing, drying, etc.)
   F. Other

Welcome

- Welcome to the Virtual INPLT *50001 Ready* webinar training series
- Eight, 2.5-hour webinars, focused on Strategic Energy Management (SEM), in general, and the ISO 50001 standard and *50001 Ready Navigator,* in particular
- The webinars will help you understand the why and how of SEM and the *50001 Ready Navigator* tool
- Thank you for your interest!

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Safety and Housekeeping

- Please make sure your surroundings are safe
  - If you are driving, please use hands-free mode
  - If you are in a building, be sure you know the exit paths
  - If you are at home, be sure there are no distractions
- You are welcome to ask questions at any time
- When not asking a question, please mute your mic 
- We are recording these webinars, and by staying online, you are giving consent to be recorded
  - A link to the recorded webinars will be provided

Our 50001 Ready Training Group

Review of Previous Sessions

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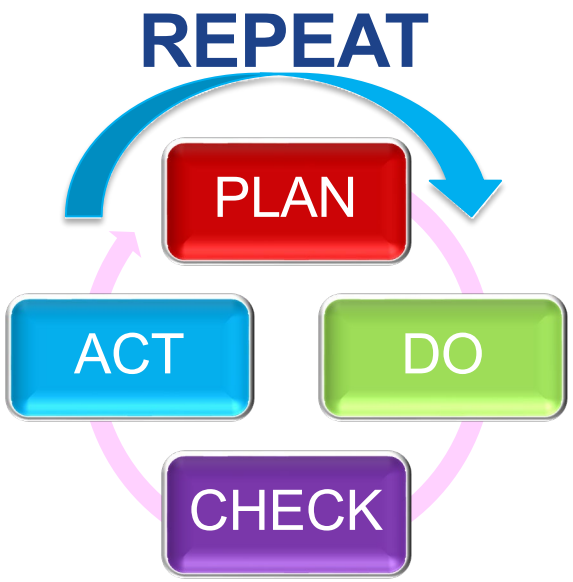
Quick List of Acronyms

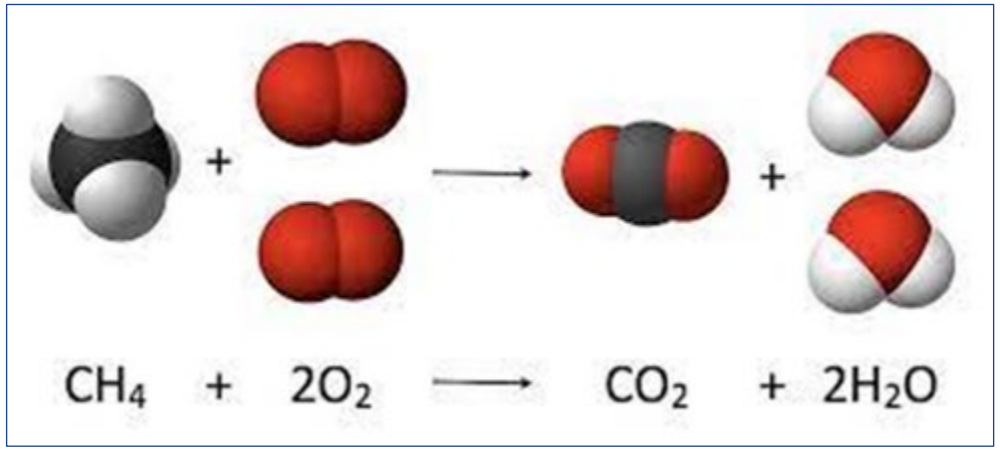
- SEM = Strategic Energy Management
- EnMS = Energy Management System
- SEU = Significant Energy Use
- EnPI = Energy Performance Indicator
- EnB= Energy Baseline
- PDCA = Plan, Do, Check, Act – REPEAT!

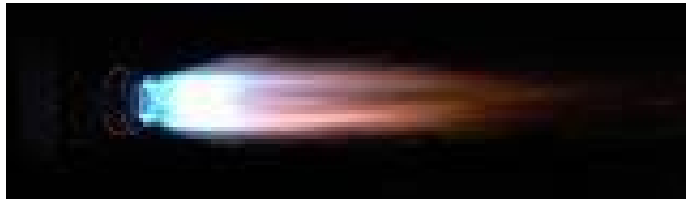


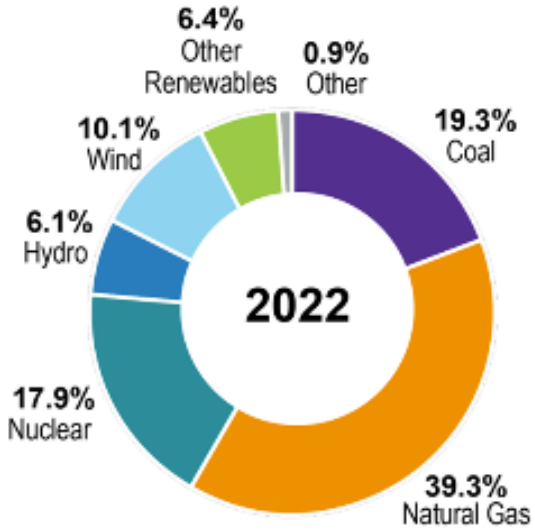
Pathways for 50001 Energy Management

Why SEM? – The Energy –Carbon Connection

- The best way to manage your carbon is to manage your energy.







Context of the Organization (Tasks 1-3) + 7

Building a foundation for your EnMS

Regarding my EnMS, what are the:

- *Risks, opportunities and strategic issues;*
- *Legal and other requirements;*
- *Interested parties;*
- *Scope and boundaries?*

Leadership (Task 4 - 6)

Commitment and guidance from the top

Is there strong top management commitment to the EnMS?
Is there a clear and well-communicated energy policy?
Are there adequate resources for the energy team to carry out the implementation of the EnMS?

50001 Ready: Review Previous Tasks

Context of the Organization	Leadership	Planning	Support	Operation	Performance Evaluation	Improvement
1. An EnMS and your Organization 2. People and Legal Requirements 3. Scope and Boundaries	4. Management Commitment 5. Energy Policy 6. Energy Team and Resources	7. Risks to EnMS Success 8. Energy Data Collection and Analysis 9. Significant Energy Uses 10. Improvement Opportunities 11. Energy Performance Indicators (EnPIs) and Baselines (EnBs) 12. Objectives and Targets 13. Action Plans for Continual Improvement	14. Competence and Training 15. Awareness and Communication 16. Documenting the EnMS	17. Operational Controls 18. Energy Considerations in Design 19. Energy Considerations in Procurement	20. Monitoring and Measurement of the EnMS 21. Monitoring and Measurement of Energy Performance Improvement 22. Internal Audit 23. Management Review	24. Corrective Action 25. Continual Improvement

Today's Content: Tasks 8 & 9

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50001 Ready Navigator: Today's Tasks

Context of the Organization	Leadership	Planning	Support	Operation	Performance Evaluation	Improvement
1. An EnMS and your Organization 2. People and Legal Requirements 3. Scope and Boundaries	4. Management Commitment 5. Energy Policy 6. Energy Team and Resources	7. Risks to EnMS Success 8. Energy Data Collection and Analysis 9. Significant Energy Uses 10. Improvement Opportunities 11. Energy Performance Indicators (EnPIs) and Baselines (EnBs) 12. Objectives and Targets 13. Action Plans for Continual Improvement	14. Competence and Training 15. Awareness and Communication 16. Documenting the EnMS	17. Operational Controls 18. Energy Considerations in Design 19. Energy Considerations in Procurement	20. Monitoring and Measurement of the EnMS 21. Monitoring and Measurement of Energy Performance Improvement 22. Internal Audit 23. Management Review	24. Corrective Action 25. Continual Improvement

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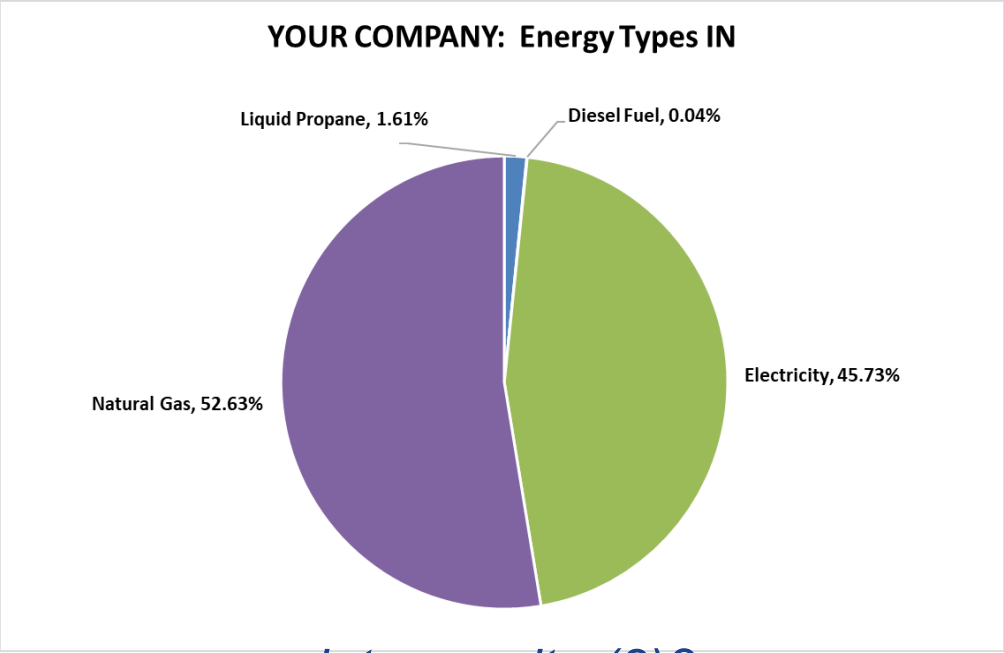
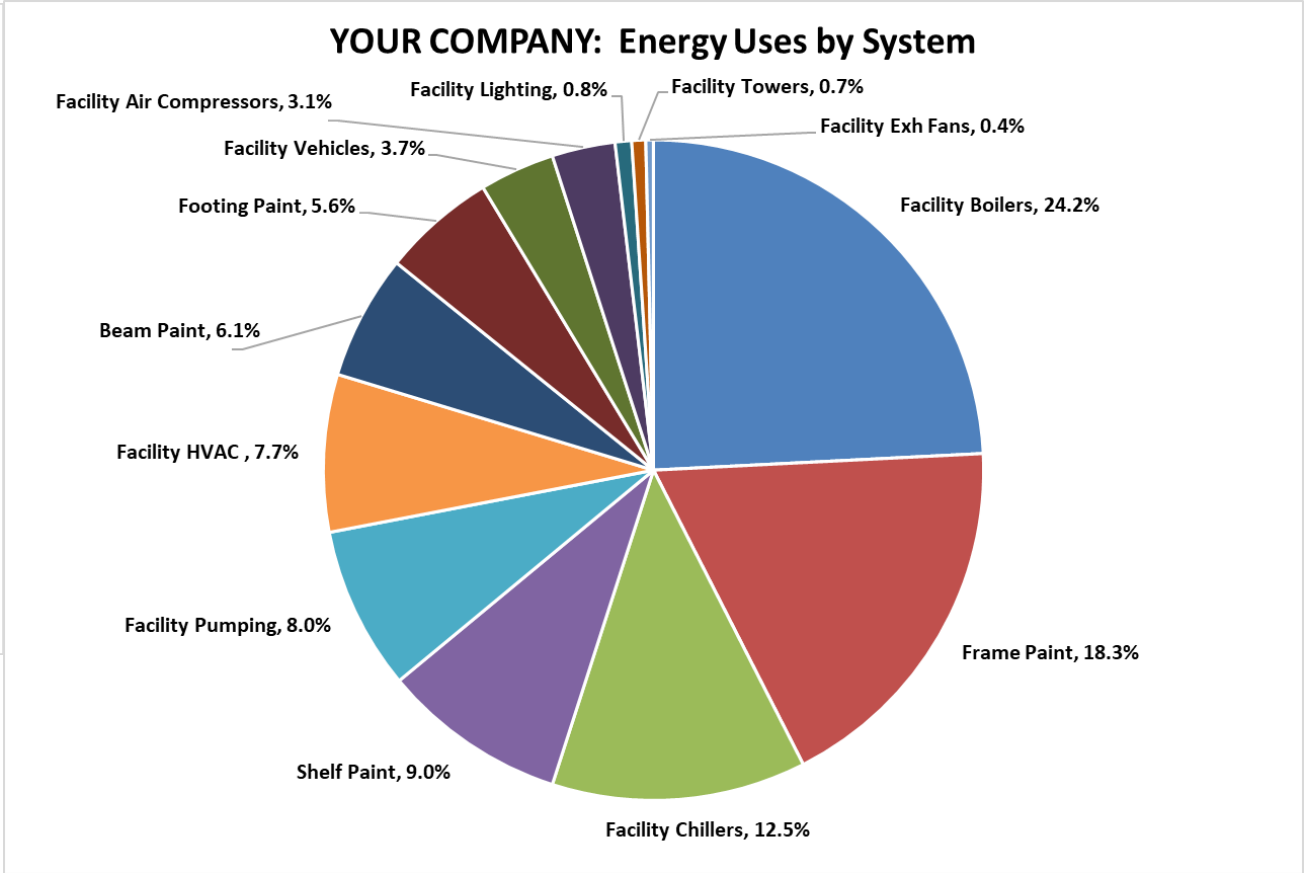
Planning (7) - Two Key Pie Charts (Tasks 7 – 13)

Understanding your energy performance





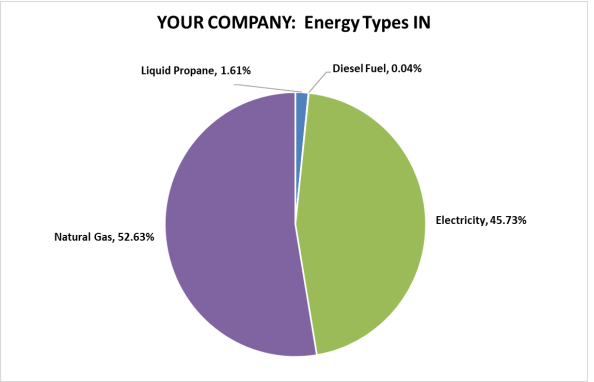
What energy comes into my site (8)?
Where does all this energy go (9)? [SEUs]
What are my energy saving projects (10)?
What are my EnPIs and EnBs (11)?
What are my objectives, energy targets & action plans (12 & 13)?

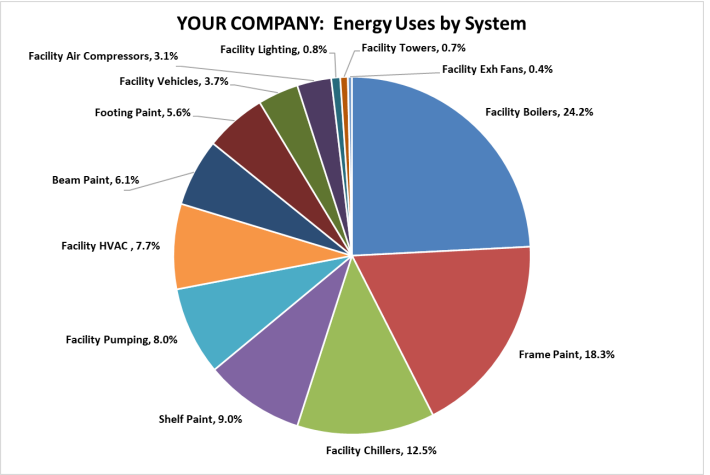
Polling Question 2

Polling Question

2) Think about the two pie charts on the previous slide. Think about your current data collection and energy evaluation processes. What level of effort would it take to produce both pie charts?

   A. I already have similar charts for both.
   B. I am close to both, just need a little tweaking.
   C. I am good on “Energy IN” but would need some effort to get “Energy USE”.
   D. It would take a significant effort to get both, especially “Energy USE”.
   E. I do not even know where to get started.





Task 8: Data Collection and Analysis

Task 8: We identify our energy sources and energy uses, have a data collection plan in place, and collect related energy and relevant variable data.

We ensure the accuracy and repeatability of measurements (e.g., calibration)

We analyze our energy use and consumption data.

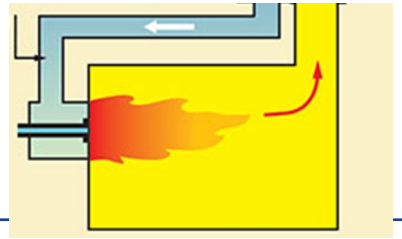
Task 8: Questions to Think About

- How do you determine, collect and analyze energy data?
  - What are your energy sources?
    - (e.g., electricity, natural gas, fuel oil, etc.)
  - What are your energy users?
    - (e.g., chillers, boilers, fans, pumps, lighting, etc.)
    - Who knows about energy uses across your site?
  - What process are already in place that you can use?
  - Who currently works with your energy data? Contractors?
- Are relevant variables understood, collected and used?
- How is all this data analyzed and results recorded?
- How do you ensure accuracy and repeatability of data?

Task 8: Key Terms

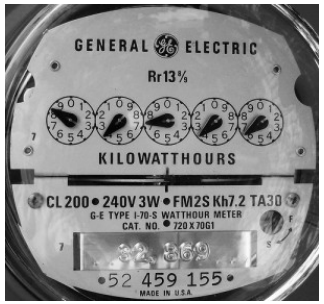
- Energy Source
  - Electricity, natural gas, fuel oil, diesel fuel, liquid propane, renewables, etc.

- Energy Use (or user)
  - Machinery, equipment, processes: Boiler, chiller, fan, pump, lighting, air compressor, paint booth, air handling unit, motors, etc.

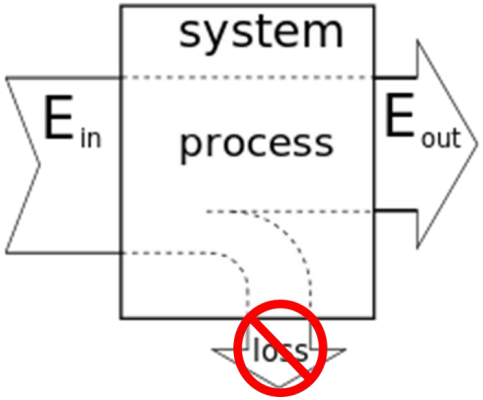


Task 8: Key Terms (continued)

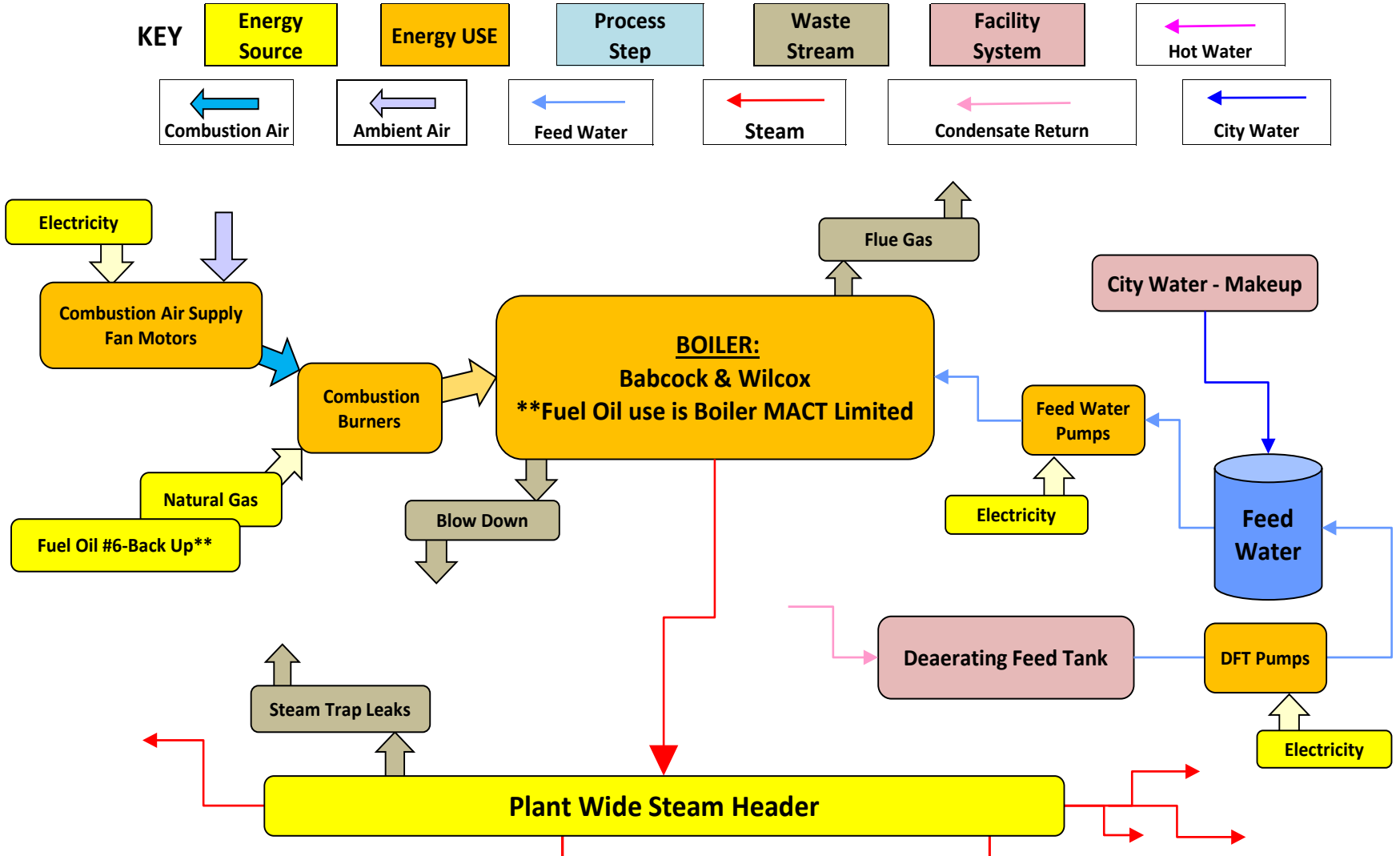
- Energy Consumption
  - A quantity of energy: kilowatt hours, dekatherms, gallons, MMBTUs, etc.



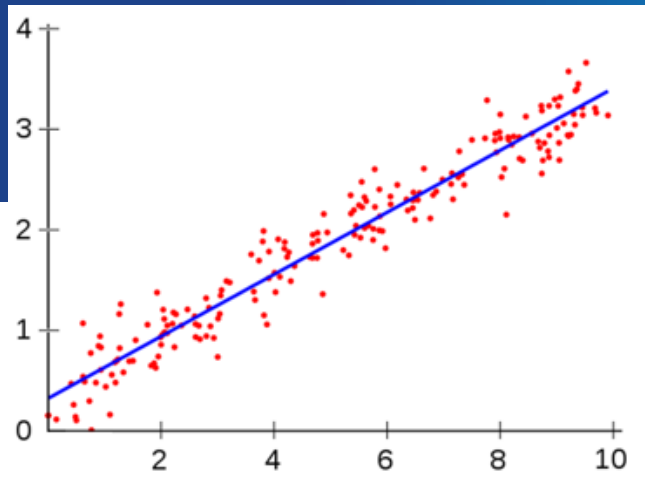
- Energy Efficiency
  - A ratio of energy output to energy input, typically expressed as a percentage



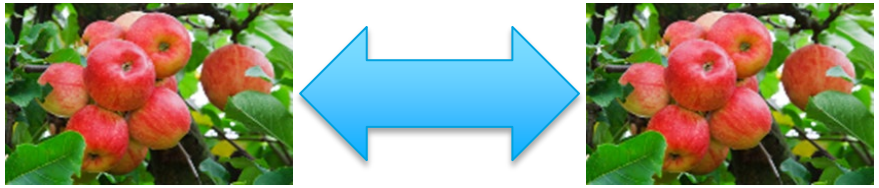
Task 8: Process Energy Maps Can be Useful



Task 8: More Key Terms



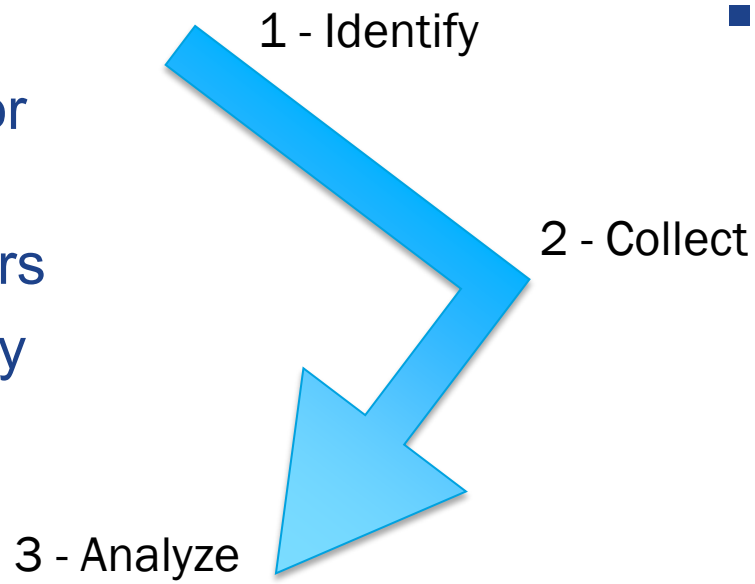
- Relevant Variables
  - Impacts energy performance, i.e., relevant
  - Typically changes, i.e., variable
  - Examples: weather conditions (heating degree days, cooling degree days, average outside temperature, humidity, working hours, occupancy, production output, etc.)
- Normalization
  - Allows for comparison of apples to apples



  - Accounts for changes so that you can properly compare energy performance to energy baselines
  - "Where the organization has data indicating that relevant variables significantly affect energy performance, the organization shall carry out normalization of the EnPI value(s) and corresponding EnB(s)." - ISO 50001: 2018 Section 6.5

Task 8: Delegating Roles

- Types of data needed
  - Total energy consumption for all sources
  - Energy consumption by users
  - Square footage & occupancy
  - Relevant variables
  - Product volumes



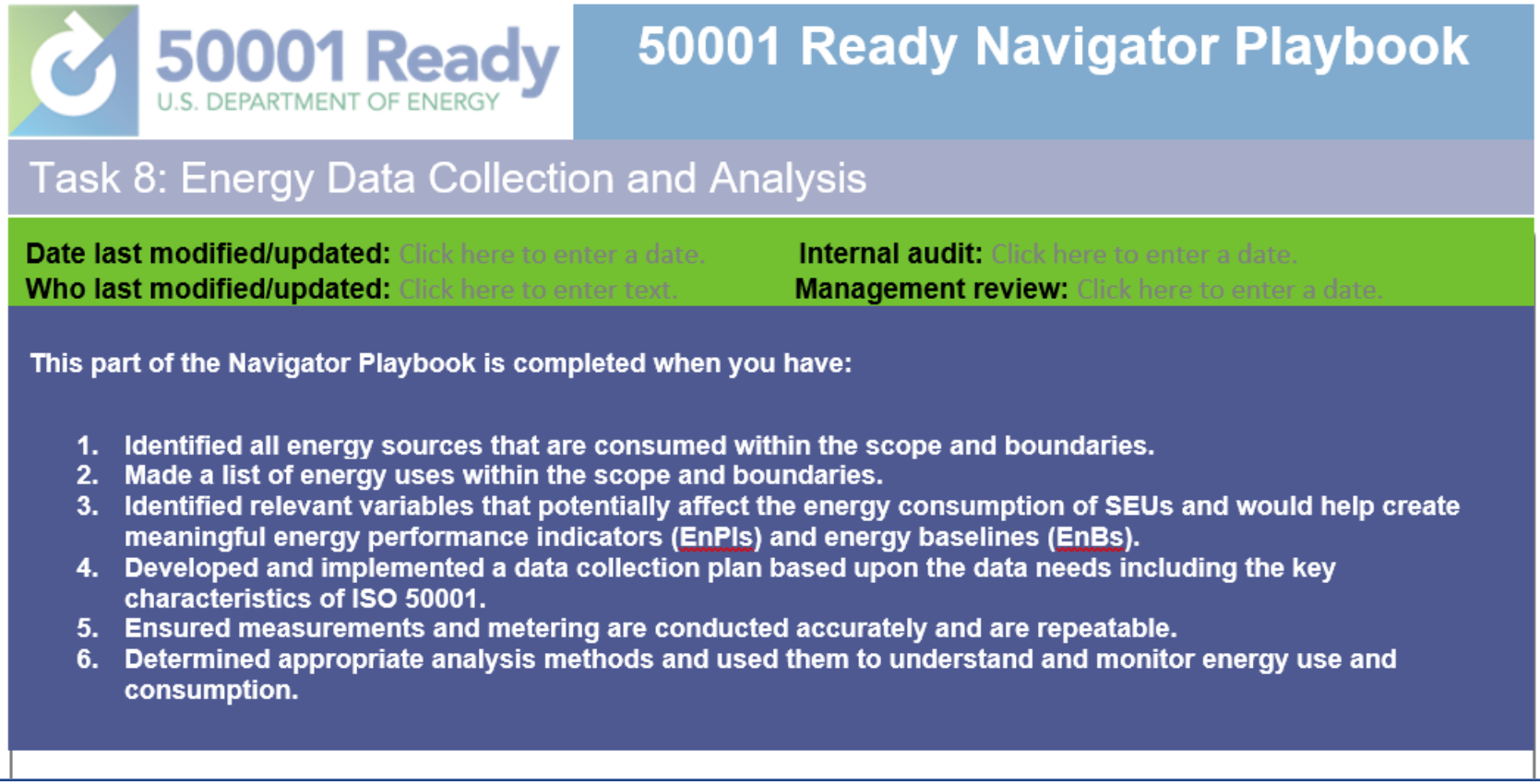
- Sources of data
  - Utility bills
  - Sub-metering
  - Site floor plans
  - Weather data
  - Process flow charts
  - Production data
  - End user equipment specs

Who will be responsible for attaining this information?
Who will be responsible for cleaning/analyzing the data?
Where will we store the data?
What is our naming convention to avoid misunderstandings about most current information?

Task 8: Playbook

Activity

- Look at Task 8 in 50001 Ready
- Look at the Task 8 Playbook



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50001 Ready Navigator Playbook

Task 8: Energy Data Collection and Analysis

Date last modified/updated: Click here to enter a date.
Who last modified/updated: Click here to enter text.
Internal audit: Click here to enter a date.
Management review: Click here to enter a date.

This part of the Navigator Playbook is completed when you have:

1. Identified all energy sources that are consumed within the scope and boundaries.
2. Made a list of energy uses within the scope and boundaries.
3. Identified relevant variables that potentially affect the energy consumption of SEUs and would help create meaningful energy performance indicators (EnPIs) and energy baselines (EnBs).
4. Developed and implemented a data collection plan based upon the data needs including the key characteristics of ISO 50001.
5. Ensured measurements and metering are conducted accurately and are repeatable.
6. Determined appropriate analysis methods and used them to understand and monitor energy use and consumption.

Polling Question 3

Polling Question

3) Think about your current data collection processes related to Task 8 in 50001 Ready. Where do you feel you are with respects to the requirements?

A. Got it all covered and it is running like a Swiss watch.

B. We have robust data collection, just needs a little tweaking.

C. We are good on incoming energy and utility bills, but we need more work on relevant variables and energy consumption.

D. It would take a significant effort to get our data collection upgraded to meet task 8

E. I do not know where our organization is with respect to data collection processes.

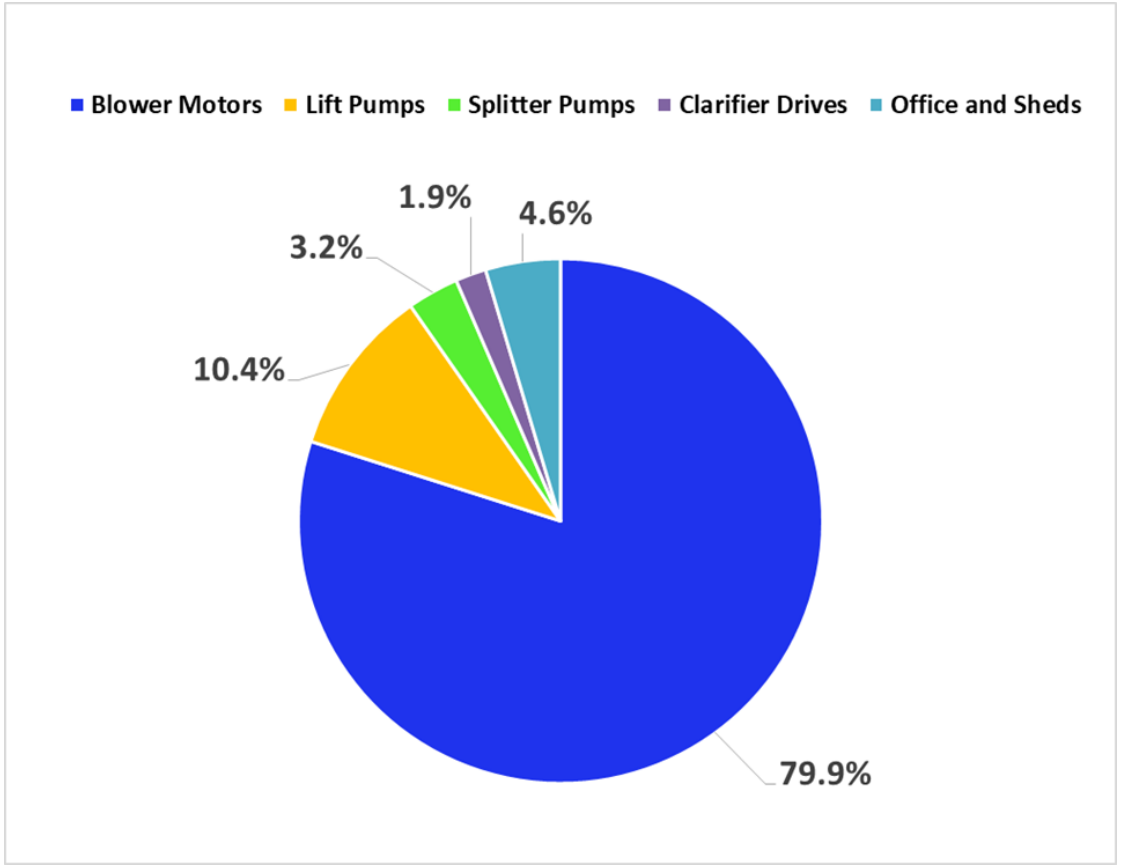
Task 9: Significant Energy Uses

Task 9: We determine our significant energy uses (SEUs), identify and monitor their relevant variables and energy performance, and identify the persons that affect the SEUs.

We have a process to review and update SEU data and related information, including our methods and criteria to determine that an energy use should be an SEU.

Task 9: Key Terms

- Significance is determined by your organization



SEUs can be facilities, systems, processes, or equipment.

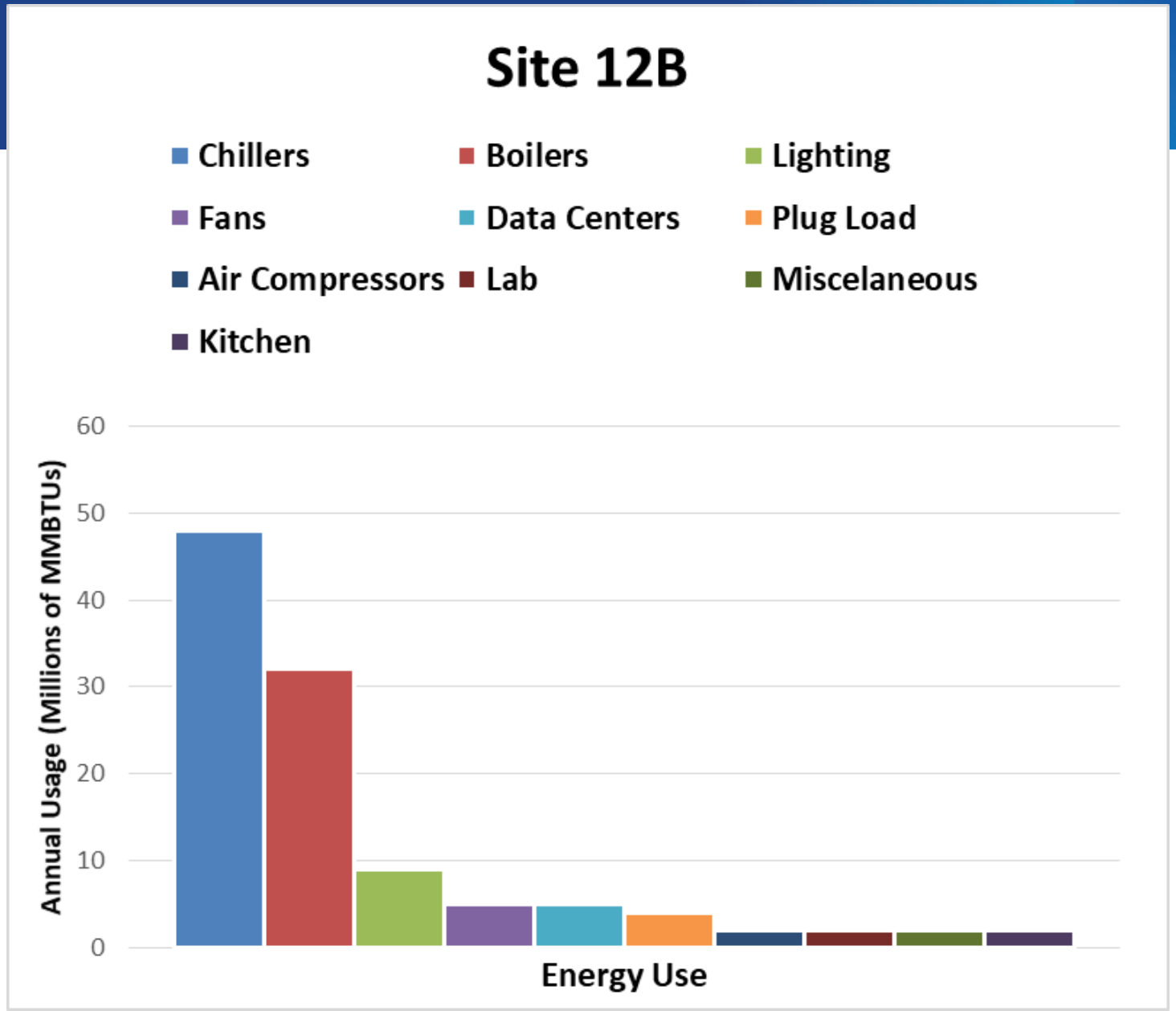
Task 9: Selecting SEUs

- **3.5.6**
- **significant energy use**
- **SEU**
- *energy use* accounting for substantial *energy consumption* **and/or** offering considerable potential for *energy performance improvement*

- Note 1 to entry: Significance criteria are determined by the *organization*
- Note 2 to entry: SEUs can be facilities, systems, processes, or equipment.

Task 9: 80-20 rule

80% of consumption from 20% of end uses

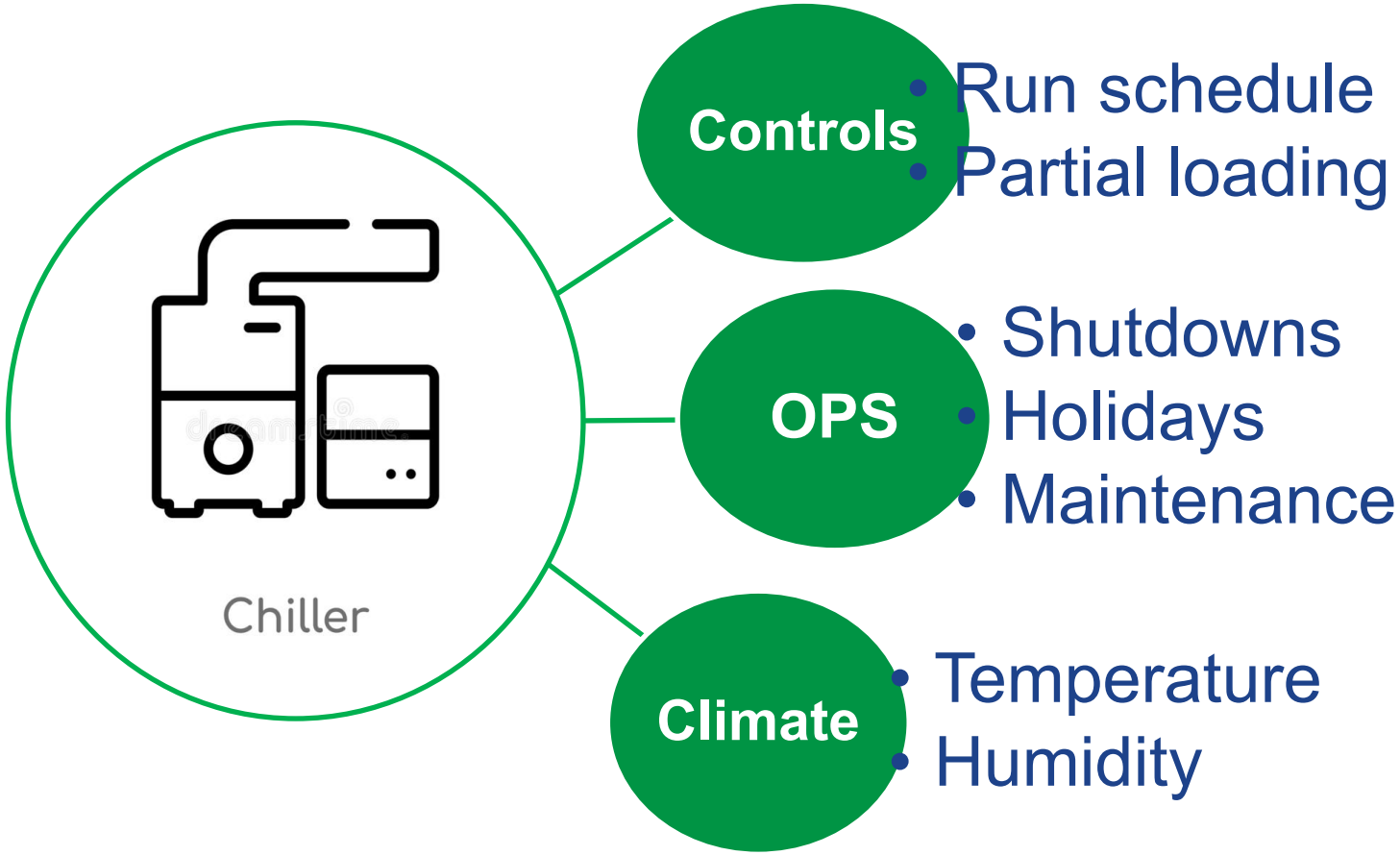


Task 9: SEUs Require Lots of Work

- Each selected SEU will require work in these areas:
  - Task 12, ISO section 6.2.2 Objectives and energy targets
  - Tasks 8 & 9, ISO section 6.3 Energy review (3x)
  - Task 8, ISO section 6.6 Planning for collection of energy data (3x)
  - Task 17, ISO section 8.1 Operational planning and control (2x)
    - This entire section is focused on SEUs
  - Task 19, ISO section 8.3 Procurement
  - Task 20 & 21, ISO section 9.1 Monitoring, measuring, analysis and evaluation of energy performance, General
    - Must include the operation of SEUs

There are at least 11 things to do for each selected SEU!!

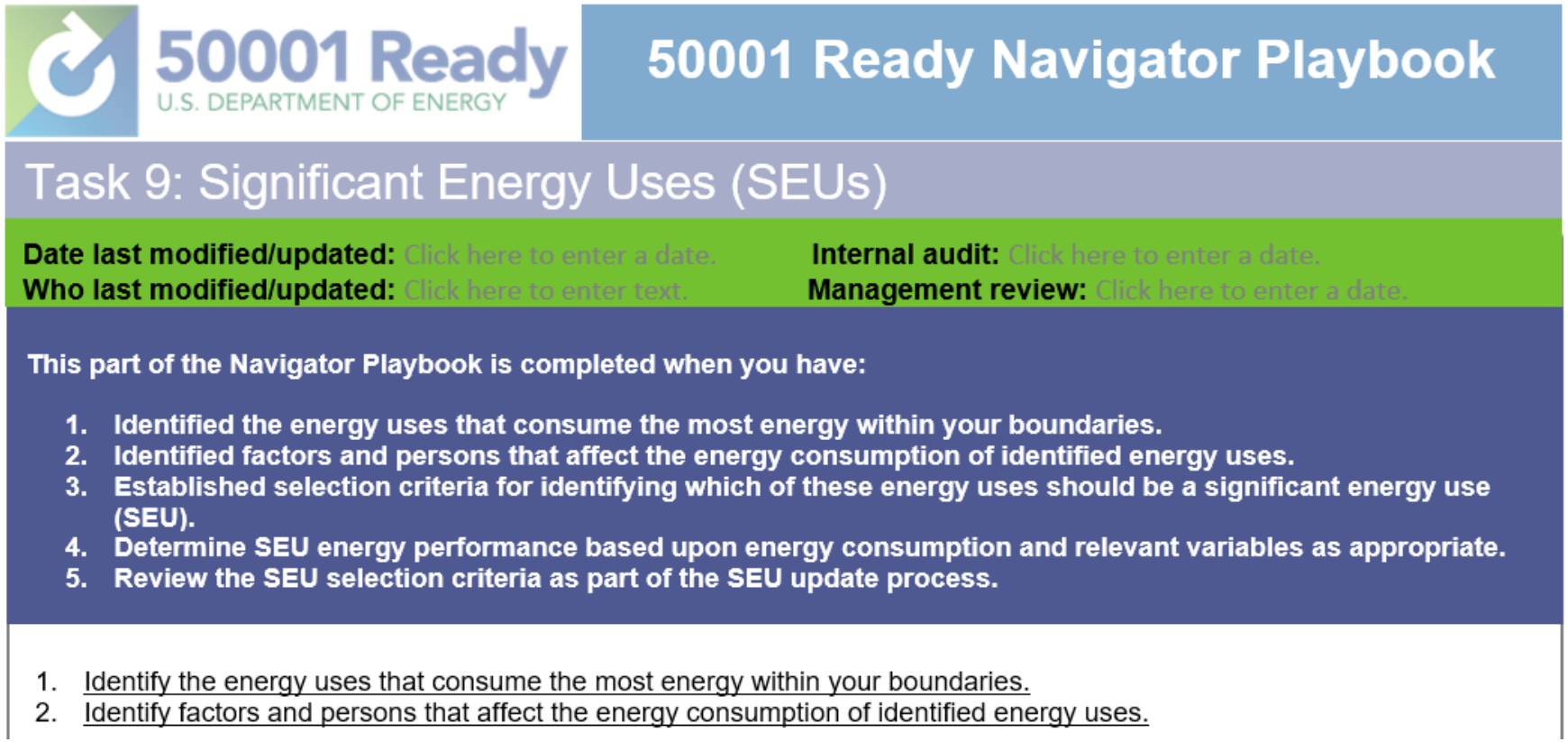
Task 9: What impacts SEU energy performance?



Task 9: Playbook

Activity

- Look at Task 9 in 50001 Ready
- Look at the Task 9 Playbook



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50001 Ready Navigator Playbook

Task 9: Significant Energy Uses (SEUs)

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Who last modified/updated: Click here to enter text.
Internal audit: Click here to enter a date.
Management review: Click here to enter a date.

This part of the Navigator Playbook is completed when you have:

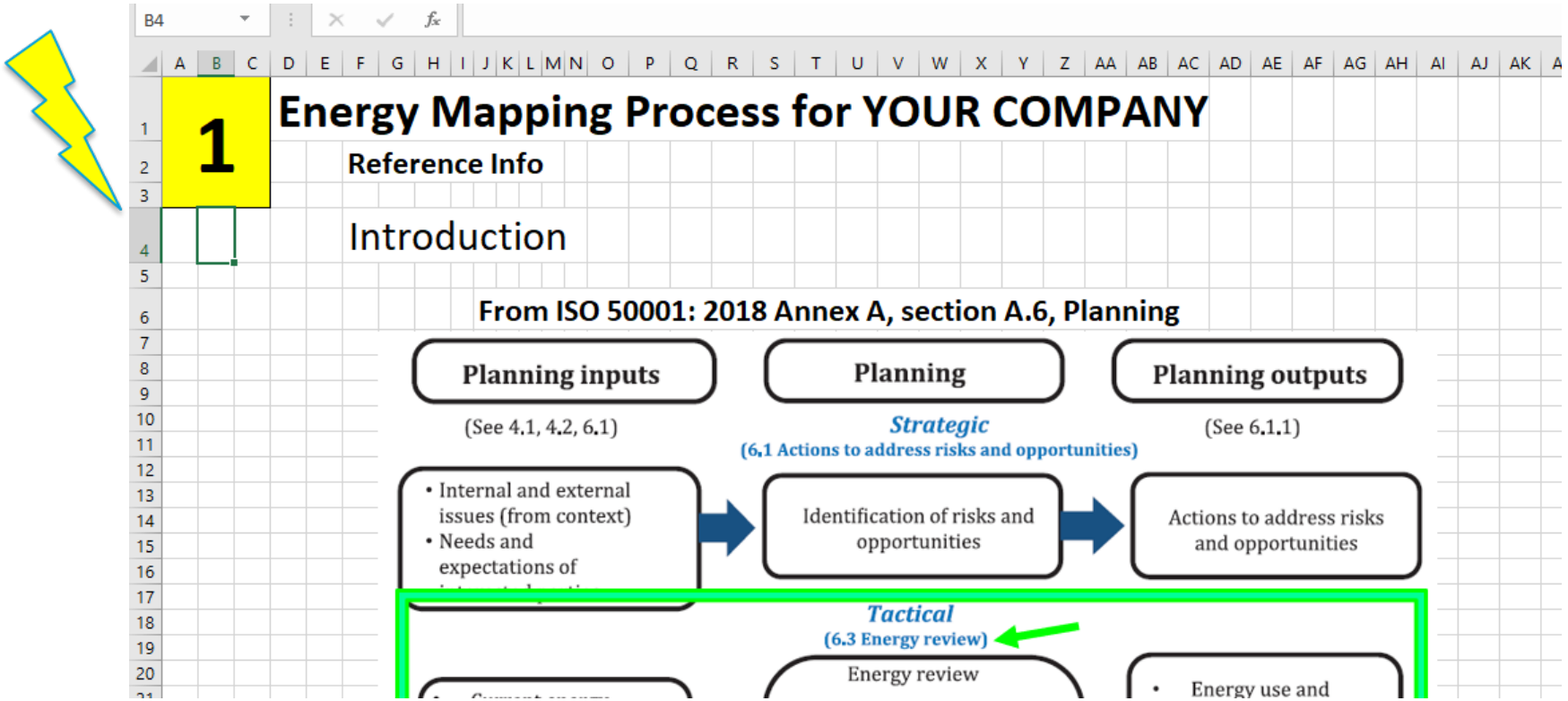
1. **Identified the energy uses that consume the most energy within your boundaries.**
2. **Identified factors and persons that affect the energy consumption of identified energy uses.**
3. **Established selection criteria for identifying which of these energy uses should be a significant energy use (SEU).**
4. **Determine SEU energy performance based upon energy consumption and relevant variables as appropriate.**
5. **Review the SEU selection criteria as part of the SEU update process.**

1. Identify the energy uses that consume the most energy within your boundaries.
2. Identify factors and persons that affect the energy consumption of identified energy uses.

Task 9: Energy Mapping Template

Activity

- Review the tabs of the Energy Mapping Template Tool



Polling Question 4

Polling Question

4) Thinking about Tasks 8 - 9:
   - Task 8: Energy Data and Collection
   - Task 9: Significant Energy Uses (SEUs)

Where do you feel your organization is relative to these two tasks?

A. We already have all this in place. Just a little tweaking is needed.
B. These make sense and my organization has some of this in place. It would not take too much effort to complete these.
C. Most of this is new to my organization, but we do have some basics in place. It would take a significant effort to get all this in place.
D. I would basically have to start from scratch to get these tasks completed.
E. I do not know where our organization is with respect to completing these tasks.

Preview of Upcoming Tasks

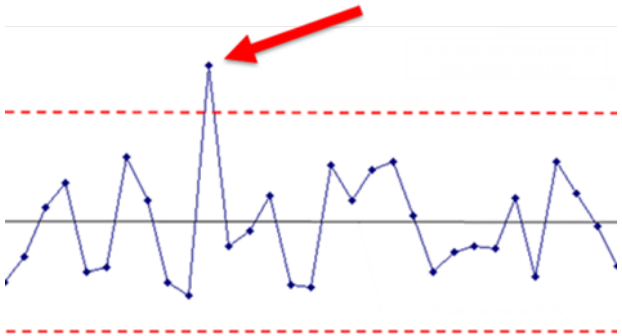
Support (3), Tasks 14 – 16

Ensure all team members who impact energy performance understand their role

Who impacts energy performance and our EnMS (14)?
Are they aware, competent, trained, documented (14 & 15)?
Is our training for them effective (14 & 15)?
Do we maintain good documentation and records of our EnMS (16)?

Operation (3), Tasks 17 - 19

Operate, maintain, design and procure to optimize energy performance



Do I have good operational and maintenance controls for my SEUs (17)?
Do my operators know what to do when energy expectations are not met (17)?
Are design and procurement teams are engaged (18 & 19)?

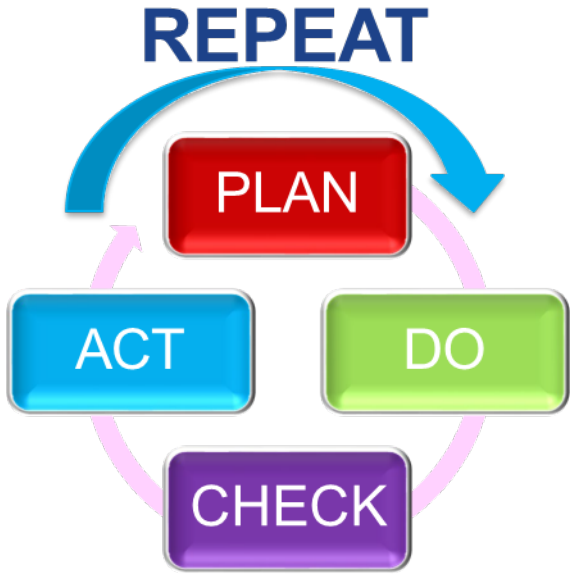
Performance Evaluation (4), Tasks 20 - 23

Check on how you are doing for both your EnMS and your energy performance improvement

Are you effectively monitoring and measuring your EnMS and your energy performance improvement (20 & 21)?
How are your tracking systems working (20 & 21)?
Are internal audits and management reviews all set up (22 & 23)?

Continual Improvement (2), Tasks 24 & 25

When we check, if things are not okay, then we act to fix them, and we do this in an ongoing method



Do you have a strong corrective action program to fix and follow up on nonconformities to your EnMS?
Do you continually improve both your EnMS and your energy performance?

Training Schedule & Preparations
Kahoot Quiz Game
Q&A

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50001 Ready Navigator Tasks: Session FOUR in RED

Context of the Organization	Leadership	Planning	Support	Operation	Performance Evaluation	Improvement
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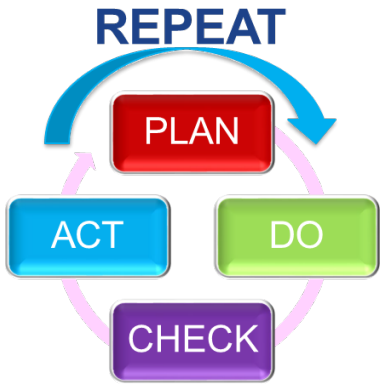

Training Schedule: By Session

1. An Overview – February 17, Done
2. Laying the Foundation of 50001 – February 24, Done
3. Where does all the Energy Go? – **TODAY-March 3**
4. Sorting out the Energy Data – **Next-March 10**
5. Engaging Other Functions – March 17 
6. Evaluating Performance – March 24
7. Ensuring Continual Improvement – March 31
8. Wrap Up and Next Steps – April 7

Always on Tuesdays @ 10:00 a.m. – 12:30 p.m. Eastern

Preparation for Session FOUR

- If desired, purchase the ISO 50001: 2018 standard
- If desired, you can still send in info so that we can help you set up your 50001 Ready account. This will help you get the most out of the training.
- Prepare for Session FOUR:
  - Review the “Getting it Done” tab for tasks 10-13 in 50001 Ready
  - What criteria do you use for prioritizing energy improvement opportunities? (Tasks 10)
  - What could you possibly use as your Energy Performance Indicators (EnPIs)? (Task 11)
  - What are your site objectives and energy targets? (Task 12)
  - Do you have process for developing action plans for implementing energy improvement projects? (Task 13)

Use Session ONE HW Questionnaire for 50001 Ready account input

Overview of 50001 Ready - Resources

- 50001 Ready Program
  - https://www.energy.gov/eere/amo/50001-ready-program
- 50001 Ready Navigator
  - https://navigator.lbl.gov/
- Energy Footprint Tool
  - https://www.energy.gov/eere/amo/downloads/energy-footprint-tool
- EnPI Lite Tool
  - https://enpilite.lbl.gov/
- 50001 Ready at Better Building
  - https://betterbuildingssolutioncenter.energy.gov/better-plants/software-tools

Polling Question 5

Polling Question

5) After listening to today's webinar session THREE, how do you feel about 50001 Ready as a resource to help you with your energy management plans:
   A. Overwhelmed.
   B. Cautiously optimistic.
   C. Very encouraged.
   D. Confident - Ready to get Ready.

And now, our Kahoot Quiz Review Game

Question and Answer Time

Thank You!

- Michael L. Stowe, PE, CEM
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