Agenda – Session FOUR

- **Welcome, Safety, and Housekeeping**
- **Review Previous Sessions**
- Today's Content – ***Sorting Out all the Energy Data***
  - Section 3: Planning
    - ○ Task 10: Improvement Opportunities
    - ○ Task 11: Energy Performance Indicators (EnPIs) and Baselines (EnBs)
    - ○ Task 12: Objectives and Targets
    - ○ Task 13: Action Plans for Continual Improvement
- **Webinar Training Schedule & Preparations**
- **Kahoot Quiz Game**
- **Q&A**

But first, a POLL!

Polling Question 1

1) Reflect on your current role within your organization. On average, about what percentage of your time do you spend working on your energy management program?

   A. 100%, it is my full-time job
   B. 75 to 99%
   C. 50 to 74%
   D. 25 to 49%
   E. 10 to 24%
   F. Less that 10%

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!

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
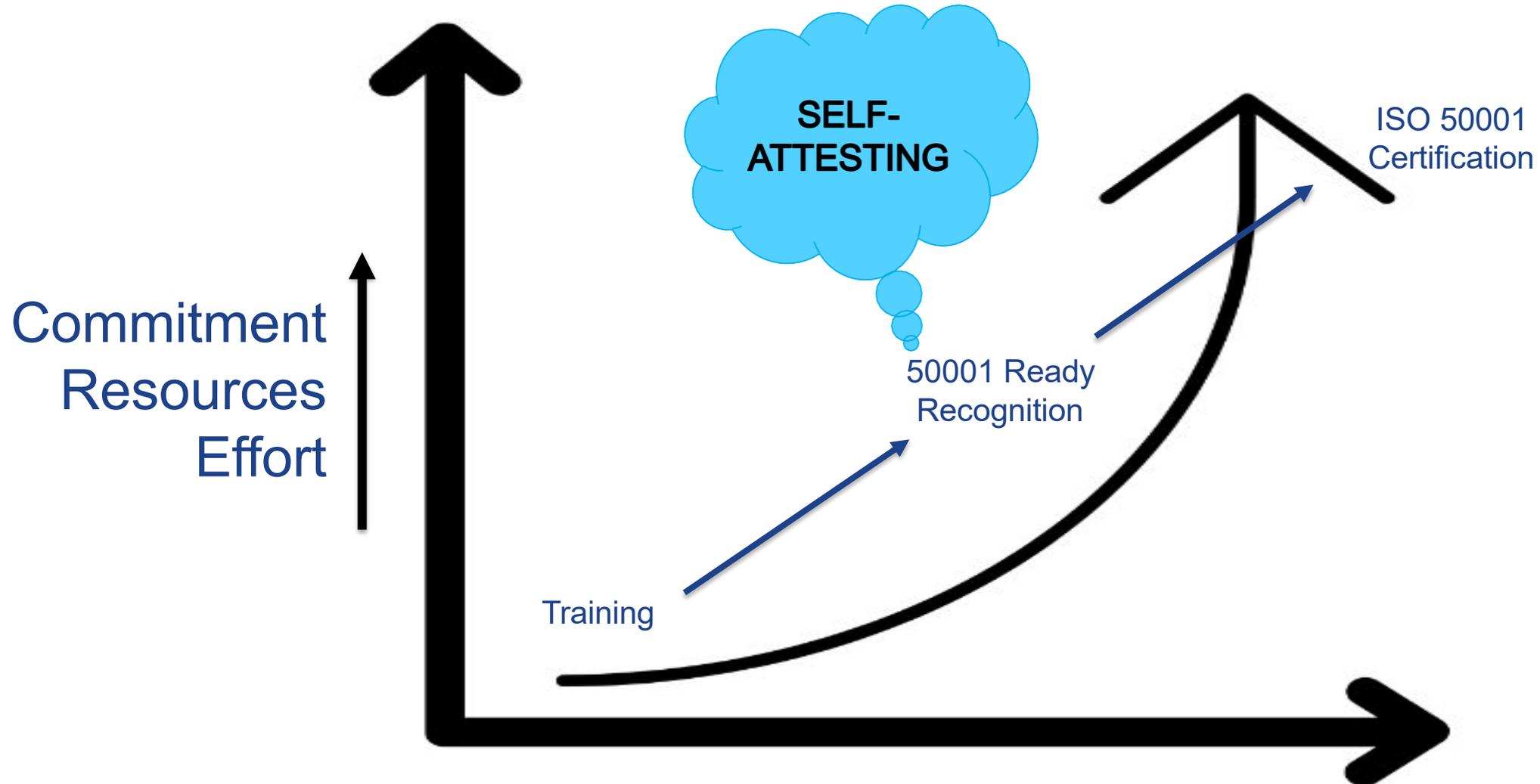 - A link to the recorded webinars will be provided

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
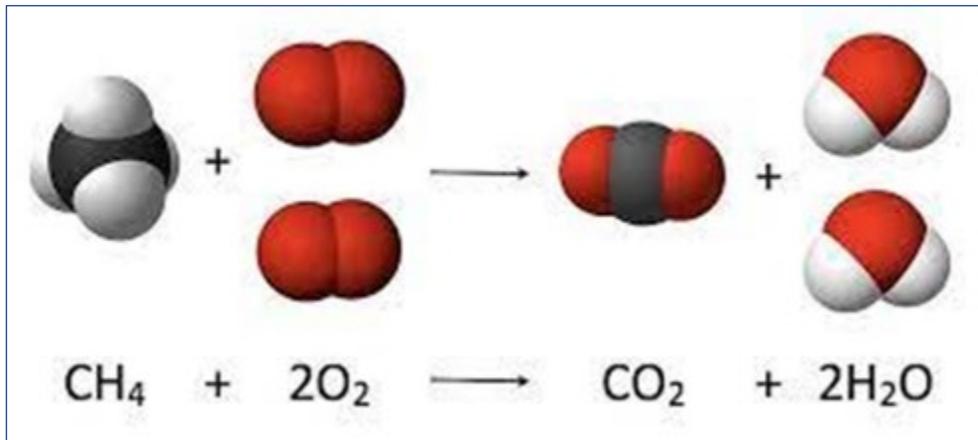- PDCA = Plan, Do, Check, Act – REPEAT!

REPEAT

PLAN

ACT   DO

CHECK

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Pathways for 50001 Energy Management

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

$$CH_4 + 2O_2 \longrightarrow CO_2 + 2H_2O$$

Electric Companies Use a Diverse Mix of Resources to Generate Electricity

EEI
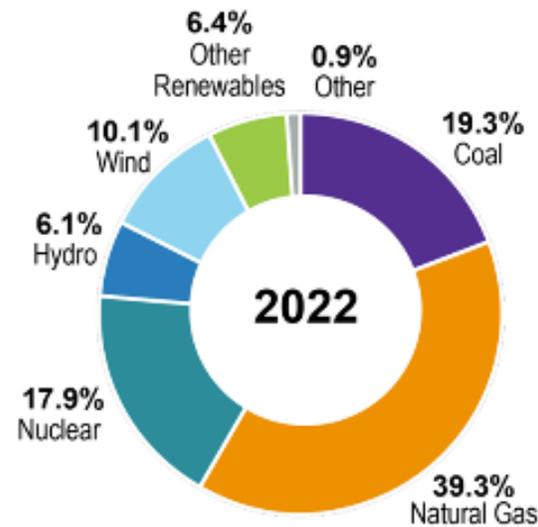
2022 National Energy Resource Mix

2022

- 6.4% Other Renewables
- 0.9% Other
- 19.3% Coal
- 10.1% Wind
- 6.1% Hydro
- 17.9% Nuclear
- 39.3% Natural Gas

CO₂

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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?

Understanding your energy performance

YOUR COMPANY: Energy Types IN

- Liquid Propane, 1.61%
- Diesel Fuel, 0.04%
- Electricity, 45.73%
- Natural Gas, 52.63%

YOUR COMPANY: Energy Uses by System

- Facility Air Compressors, 3.1%
- Facility Lighting, 0.8%
- Facility Towers, 0.7%
- Facility Exh Fans, 0.4%
- Facility Vehicles, 3.7%
- Footing Paint, 5.6%
- Facility Boilers, 24.2%
- Beam Paint, 6.1%
- Facility HVAC, 7.7%
- Facility Pumping, 8.0%
- Frame Paint, 18.3%
- Shelf Paint, 9.0%
- Facility Chillers, 12.5%

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)?

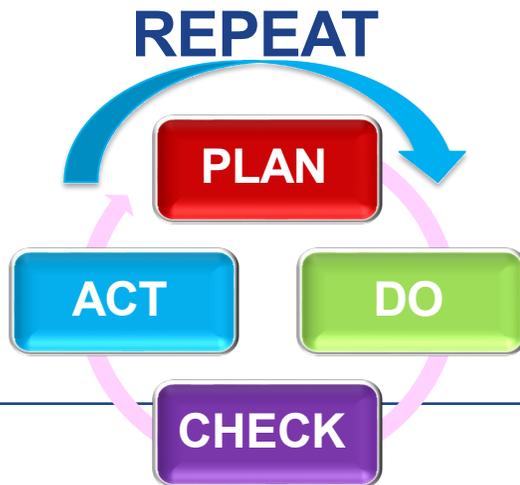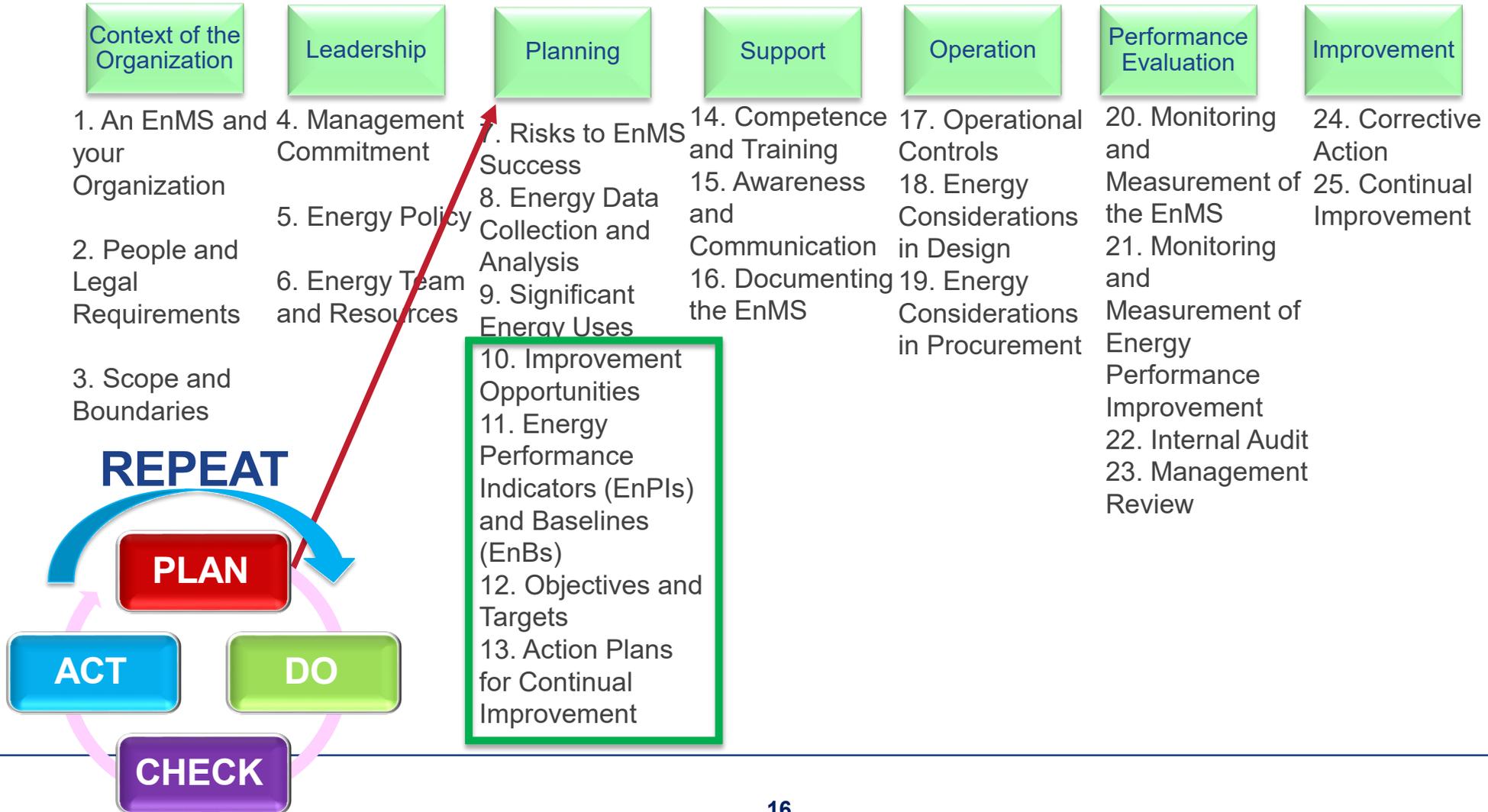| Context of the Organization	Leadership	Planning	Support	Operation	Performance Evaluation	Improvement
1. An EnMS and your Organization	4. Management Commitment	7. Risks to EnMS Success	14. Competence and Training	17. Operational Controls	20. Monitoring and Measurement of the EnMS	24. Corrective Action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

REPEAT

PLAN
ACT
DO
CHECK

Today's Content: Tasks 10 - 13

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Context of the Organization	Leadership	Planning	Support	Operation	Performance Evaluation	Improvement

Context of the Organization

1. An EnMS and your Organization

2. People and Legal Requirements

3. Scope and Boundaries

Leadership

4. Management Commitment

5. Energy Policy

6. Energy Team and Resources

Planning

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

Support

14. Competence and Training
15. Awareness and Communication
16. Documenting the EnMS

Operation

17. Operational Controls
18. Energy Considerations in Design
19. Energy Considerations in Procurement

Performance Evaluation

20. Monitoring and Measurement of the EnMS
21. Monitoring and Measurement of Energy Performance Improvement
22. Internal Audit
23. Management Review

Improvement

24. Corrective Action
25. Continual Improvement

REPEAT

PLAN

ACT   DO

CHECK

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Understanding your energy performance

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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)?

Task 10: Improvement Opportunities

<u>Task 10:</u> We identify and prioritize energy performance improvement opportunities and have processes in place to update them.
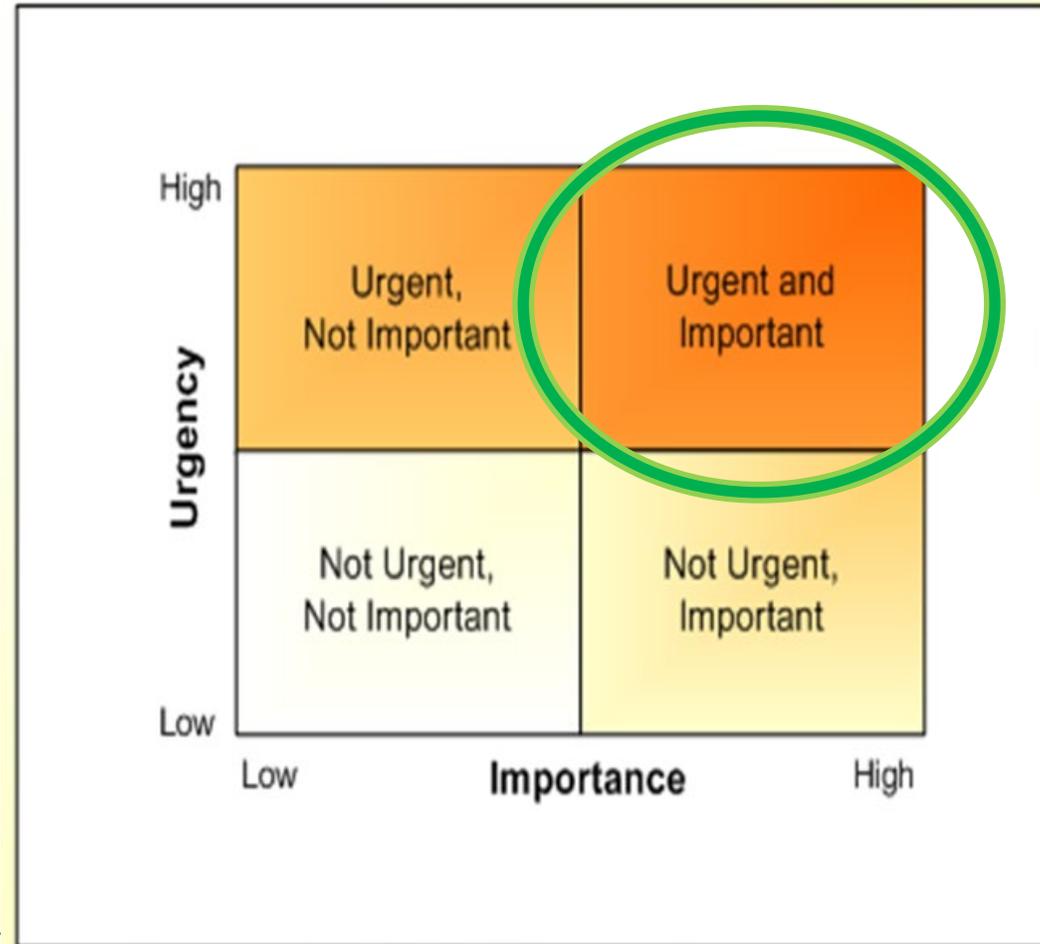
Task 10: Searching for Ideas

Cast a wide net

Search throughout the systems that support the SEUs

Search for low hanging fruit

Involve operations and maintenance personnel

Document list

Keep a comprehensive "rolling roster" of opportunities

Hold frequent brainstorming sessions

Prioritize

Develop criteria and assign these a weight to use in ranking ideas

Use input from top management and interested parties

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Task 10: Prioritization

One way to help sort out energy projects.

Task 10: Example of Scoring Criteria

Opportunity Description	Opportunity Rating				
	Criteria #1 Anticipated annual energy savings	Criteria #2 Expected time required for implementation	Criteria #3 Simple Payback	Criteria #4 Environmental, Health, or Safety Impact	Total Rating
Inspect and upgrade insulation on all steam piping	2	3	4	4	96
Install VFDs on chilled water pumps for chillers #1 - #3	3	4	3	2	72
Replace All T-12, T-8 & T-5 fluorescent lighting with LED lighting	2	2	2	3	24

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Task 10: Example of Ranking Criteria

1. Over 5 years
2. 19 months-5 years
3. 7-18 months
4. 0-6 months

1. Over $100,000
2. $50-100,000
3. $20-$50,000
4. $10-$20,000
5. Under $10,000

Payback Period

Capital Cost

EH&S Impact

Completion Time

1. None
2. Some
3. Lots
4. Home Run

1. Over 3 years
2. 2-3 years
3. 1-2 years
4. Under 1 year
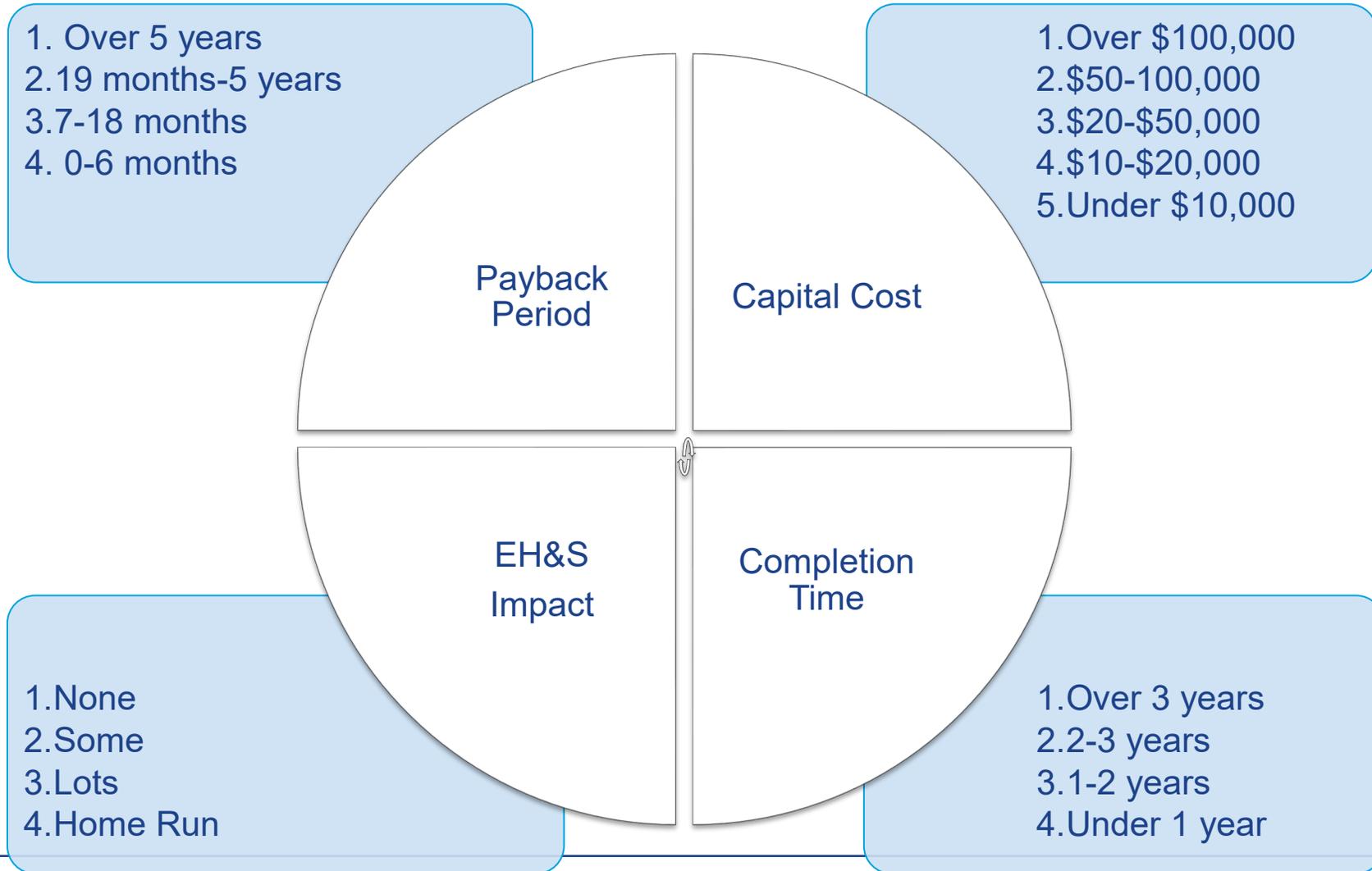
Task 10: Engage Stakeholders

Energy Manager

Site Design

Safety

Compliance

EnMS Team

Production Team

Facilities
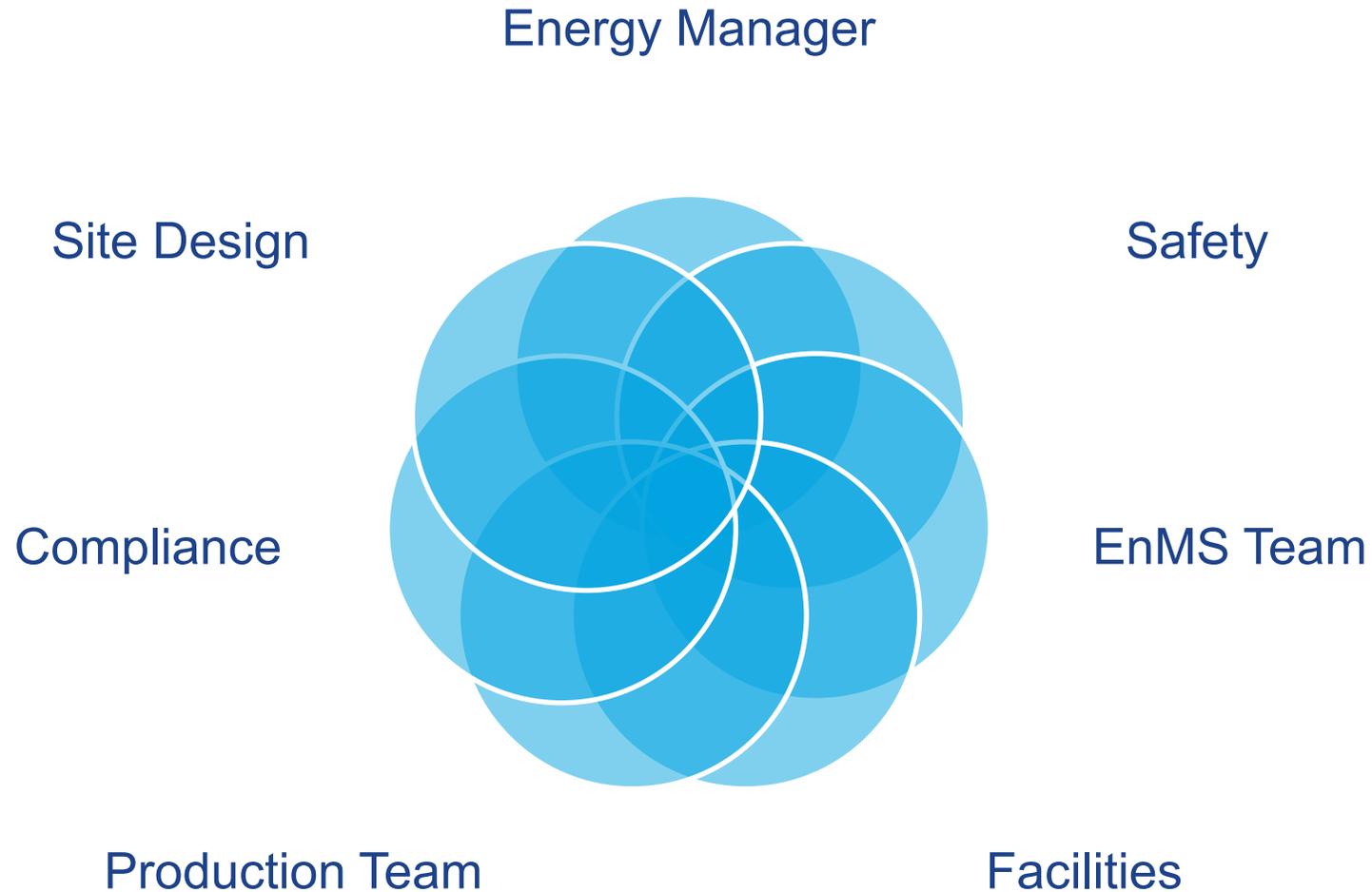
Task 10: Update Opportunities

- At defined intervals
- After major changes
- Move projects up and off the list, as needed

- Prioritize opportunities
- Select opportunities for implementation
- Create action plants to meet objectives and targets

Task 10: Relationship to SEUs

- The ISO 50001 standard <u>does not</u> require every SEU to have an active improvement project

  - SEUs often do, but it is not a requirement

<div align="center">

MAYBE

SEU ⬌ Projects

</div>

- Likewise, every improvement project <u>is not</u> required to be connected to an SEU

  - Again, they often do, but it is not a requirement

Task 10: Playbook

Activity

- Look at Task 10 in 50001 Ready

- Look at the Task 10 Playbook

![50001 Ready Navigator Playbook — Task 10: Improvement Opportunities](image)

50001 Ready U.S. DEPARTMENT OF ENERGY — **50001 Ready Navigator Playbook**

Task 10: Improvement Opportunities

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

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

1. Developed and documented a methodology and criteria for how your organization will identify, prioritize, and update energy performance improvement opportunities.
2. Applied the methodology and criteria you developed to identify, prioritize, and update energy performance improvement opportunities.
3. Updated the list of prioritized improvement opportunities at specific intervals and when major changes in facilities, equipment, systems or energy-using processes take place.

2) Think about how you currently select energy improvement projects. Do you have a process and a set of criteria you use to prioritize these projects? What level of effort would it take to get this type of process set up for your organization?

A. We already have a robust selection system with an established set of criteria

B. We are close, we just need a little tweaking

C. We have some criteria, but we do not have a consistent process

D. It would take a significant effort to get this set up and implemented

E. I do not know where my organization is with respect to the selection process for energy improvement projects.

Task 11: Energy Performance Indicators and Baselines

Task 11: We have identified energy performance indicators (**EnPIs**) and energy baselines (**EnBs**) to measure and monitor our energy performance and to demonstrate energy performance improvement.

We have a methodology for determining and updating them.

Task 11: Questions to Ask

- How will you select appropriate EnPIs?
    - What do you already measure and use?
    - What will help you to determine your overall energy performance?
    - Who currently collects and monitors this information?
    - Who will approve the selection of EnPIs?
- Do you have historic baseline data for your EnPIs?
- Do you have relevant variable data for your EnPIs, as applicable?
- Do you have good historical data for establishing EnBs?

- **Energy Performance Indicators (EnPIs)**
  - Measure or unit of energy performance as defined by the organization
    - kWh per square foot for a building
    - Total MMBTUs per pound of steam for a large central boiler
    - Total kWh per ton for a chiller
  - EnPIs can be a simple metric, a ratio, a model, or other item
  - EnPIs are tracked, recorded and trended over time

- **Energy Baseline (EnBs)**
  - Quantitative historic reference data providing a basis for comparison to determine energy performance

Task 11: EnPI Examples

You can have EnPIs for sites, buildings, facilities, systems, processes, or equipment

- **Value**
  - Chiller energy consumption (metered)
  - Air Compressors energy consumption (MCC metered)

- **Ratio**
  - Energy consumed per occupant
  - Total energy per brick

- **Regression-based Performance Model**
  - Occupancy + weather + humidity + production, etc….. = energy performance
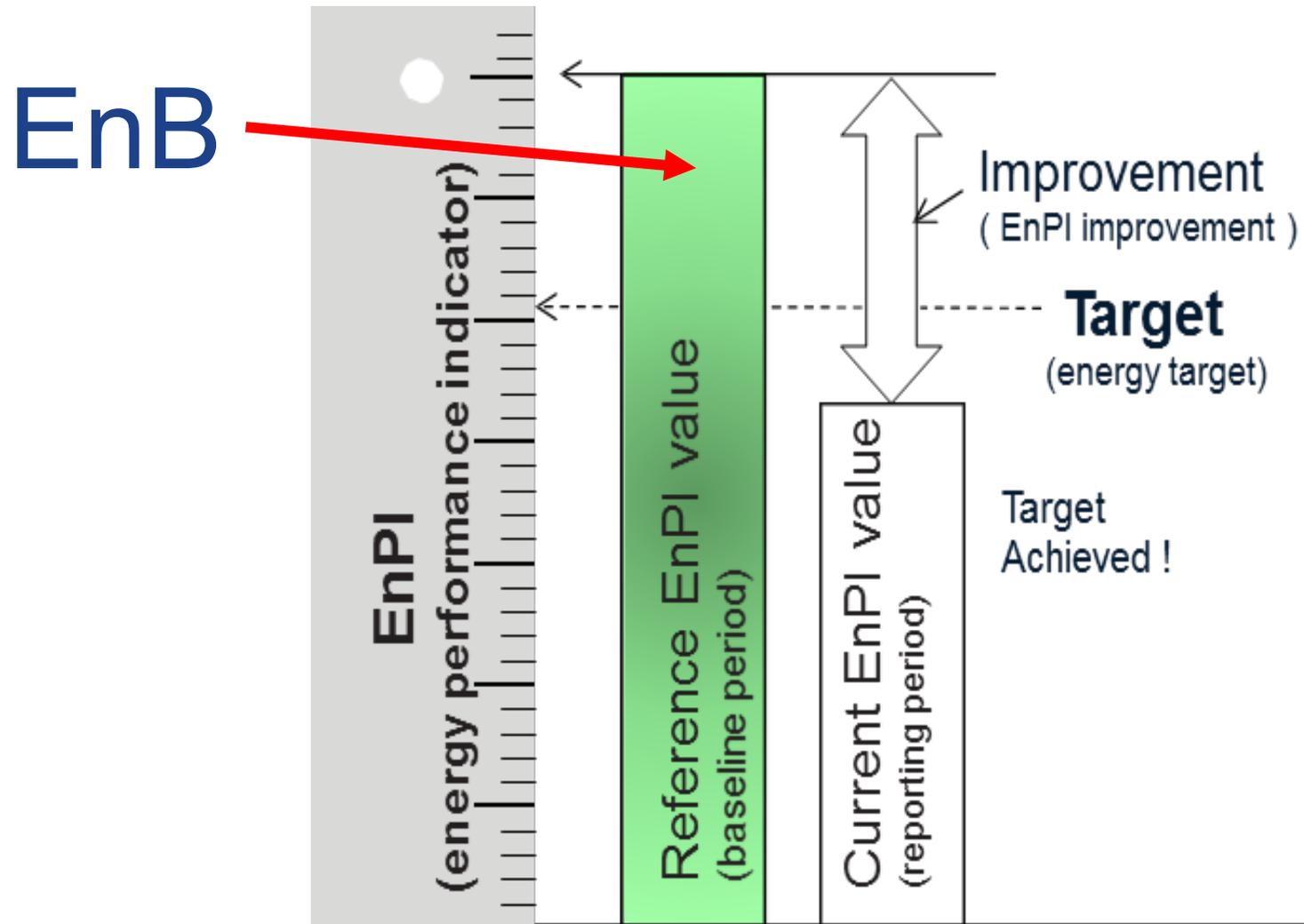
Excel tool that translates energy data into regression-based performance metrics:

$$y = a_1 x_1 + a_2 x_2 + \ldots + b$$

Input:

- Monthly energy consumption (utility) data
- Relevant Variable data
- (weather, climate, occupancy...)
- SEU meter data

Output:

- Performance indicator defined by related variables
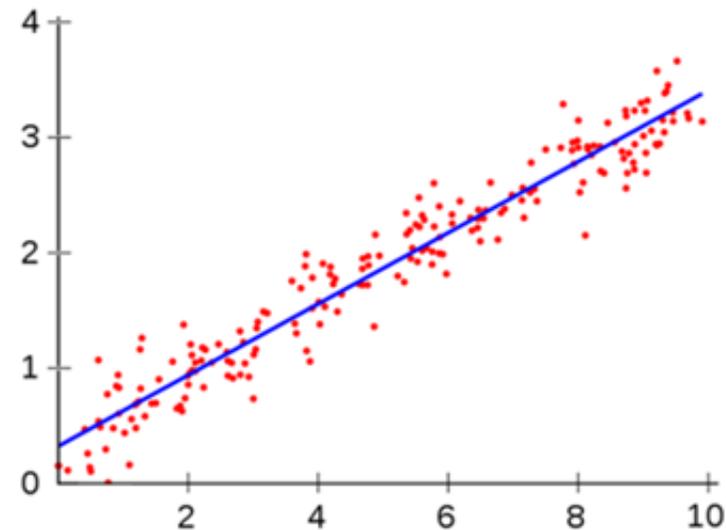
NORMALIZATION

- **P value: likelihood the data is actually random, not related**
  - **Lower is better**
- **R^2 value: how well does the relationship fit the data?**
  - **1.000 is a perfect fit**

For this graph:
- The data looks to be related = Low P value
- The data has a good fit = High R^2 value

Baseline & Modeled Monthly Energy consumption

$kWh = 471 * Product\ 1 + 308 * Product\ 2 + 92074$
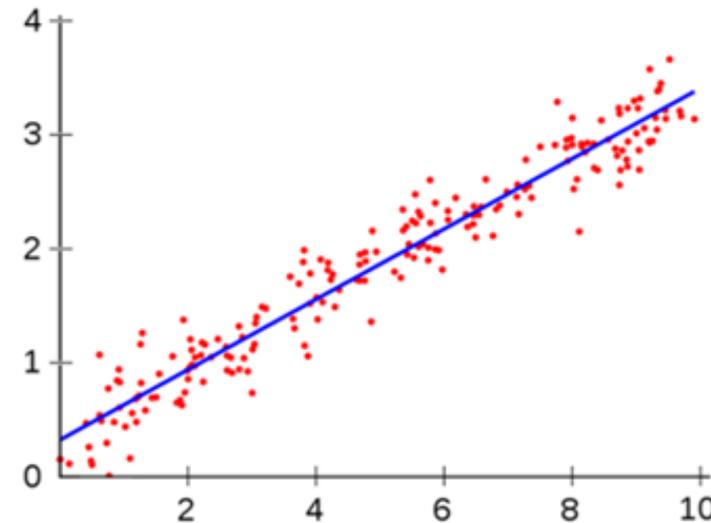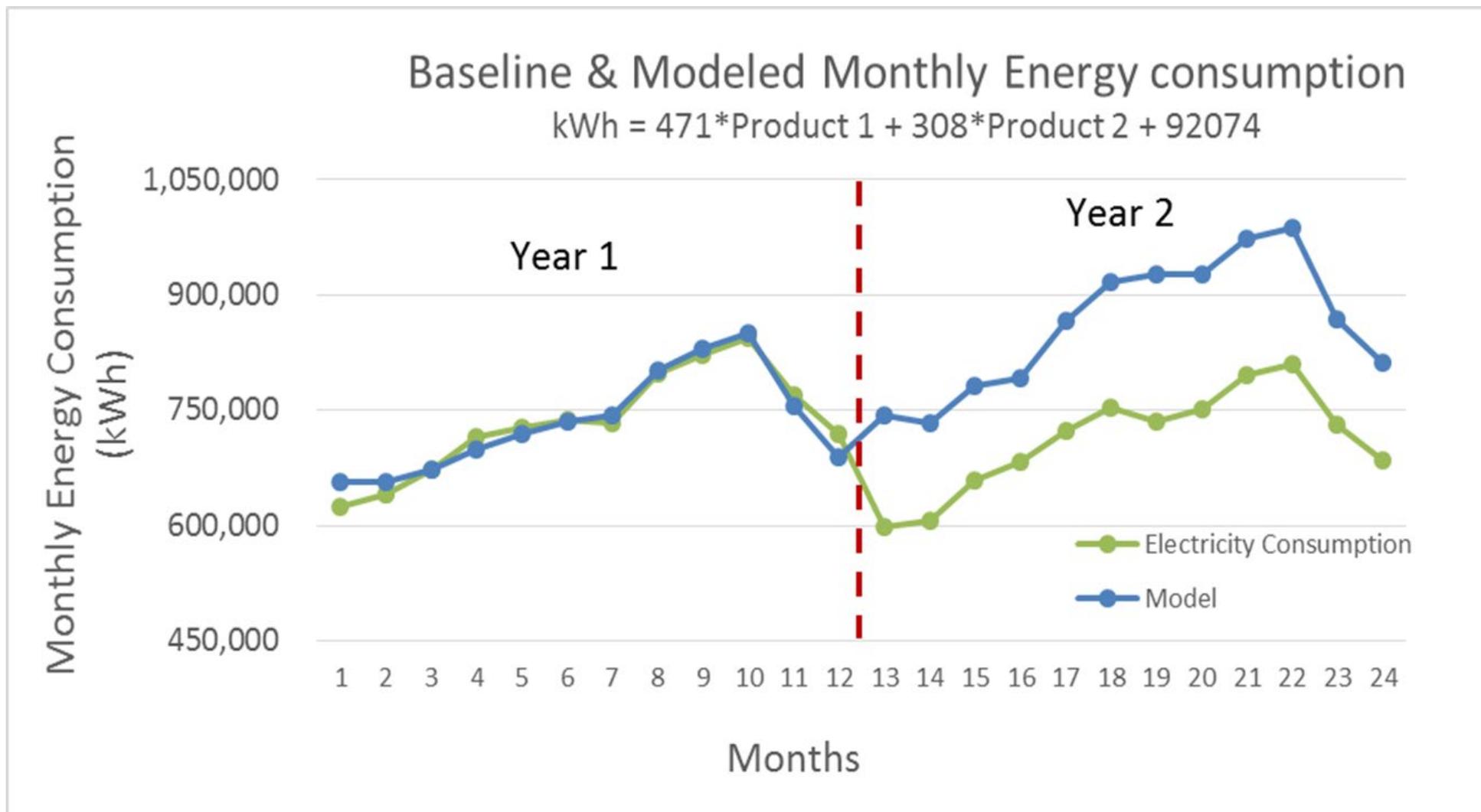
Task 11: Playbook

Activity

- Look at Task 11 in 50001 Ready
- Look at the Task 11 Playbook

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50001 Ready Navigator Playbook

Task 11: Energy Performance Indicators (EnPIs) and Energy Baselines (EnBs)

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

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

1. Developed energy performance indicators (EnPIs) for your organization including an EnPI for each SEU. If relevant variables significantly affect energy consumption, normalized EnPIs.
2. Developed an energy baseline (EnB) for EnPIs in order to later determine energy performance improvement.
3. Communicated proposed EnPIs and EnBs to top management so they can ensure the EnPIs and EnBs are appropriate for the organization.
4. Recorded and regularly reviewed the method used to determine and update EnPIs and established the conditions under which adjustments to the baseline(s) will be made.
5. Compared EnPI values to their respective EnBs on a regular basis.
6. Implemented a process for ongoing monitoring, measurement and analysis of your EnPIs, EnBs, and energy performance improvement.

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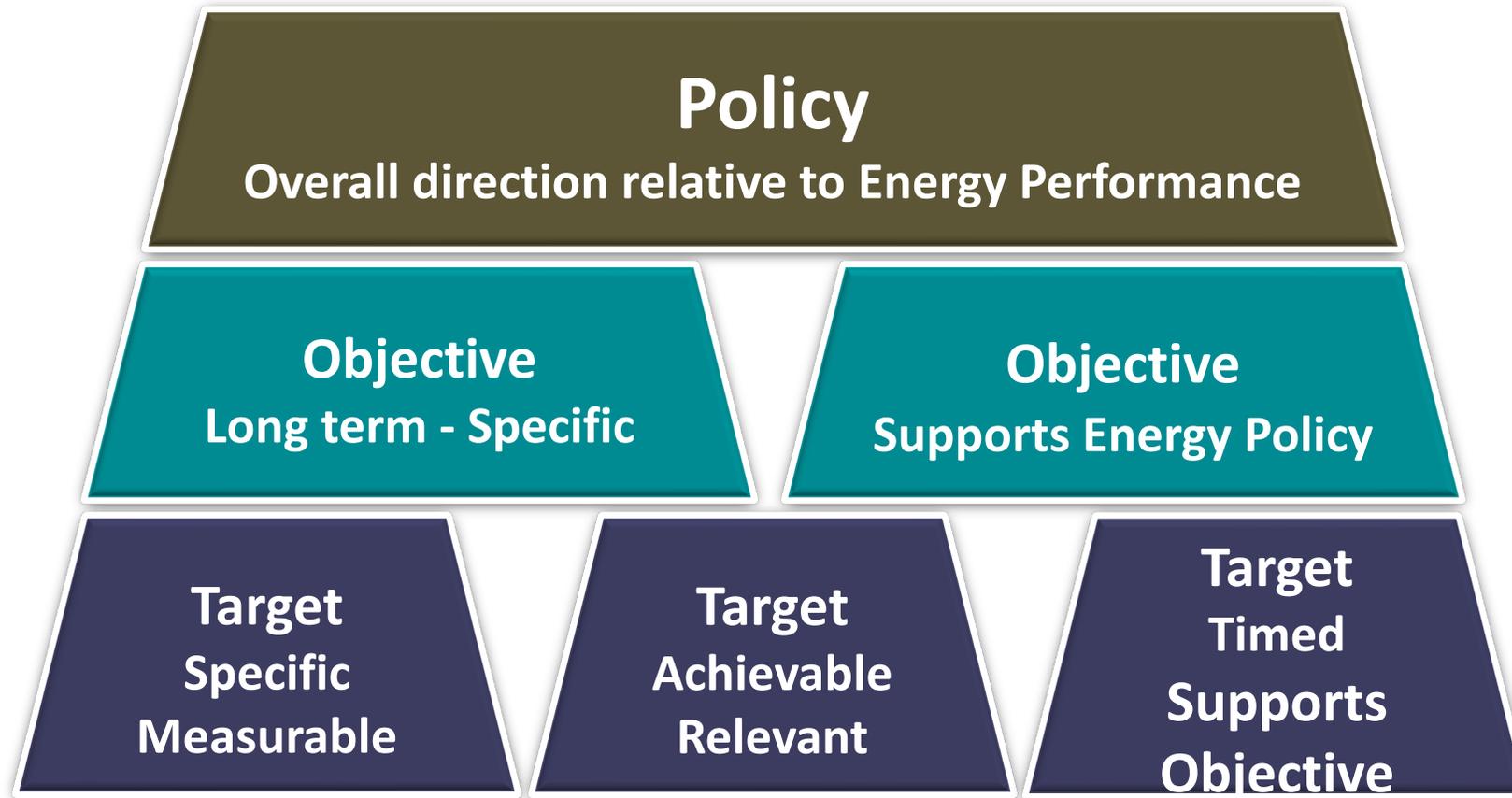U.S. DEPARTMENT OF ENERGY

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3) Establishing EnPIs and EnBs, and the analysis of their associated energy performance is particularly important. Where do you feel that your organization is with regards to establishing EnPIs/EnBs and using a methodology to determine their performance?

A. We have established EnPIs/EnBs and have a proven methodology for determining their performance.

B. We are close, we just need a little tweaking.

C. We have some EnPIs/EnBs, but we do not have a consistent process.

D. It would take a significant effort to get this set up and implemented.

E. I do not know where my organization is with respect to EnPIs and EnBs.

Task 12: Objectives and Targets

Task 12: We establish objectives and energy performance improvement targets.

Policy
Overall direction relative to Energy Performance

Objective
Long term - Specific

Objective
Supports Energy Policy

Target
Specific
Measurable

Target
Achievable
Relevant

Target
Timed
Supports
Objective

Task 12: Review SMART Goal Setting

S   Specific

M   Measurable

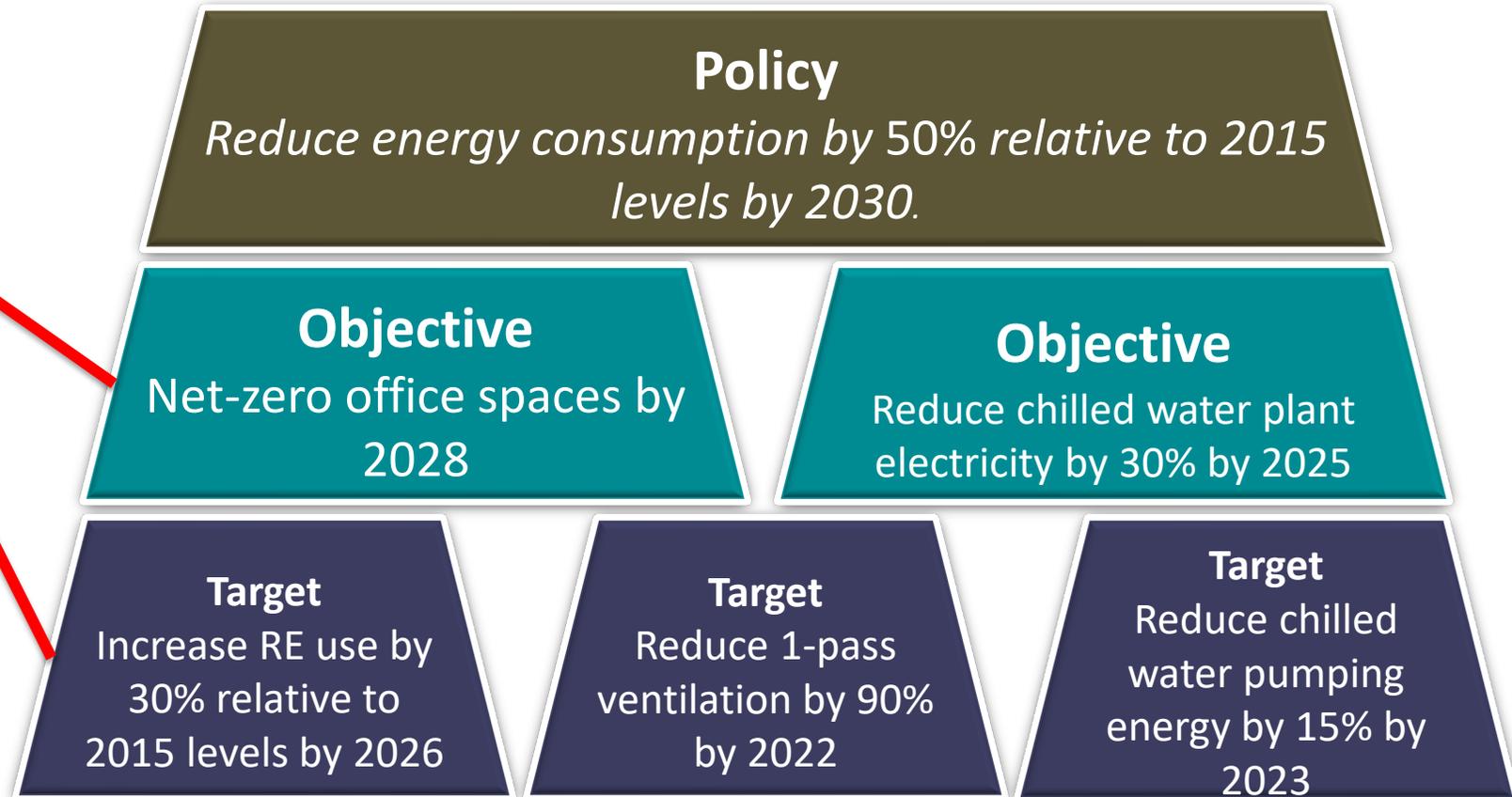**A**   Achievable

R   Relevant

T   Timed

Reduce electricity consumption by 5 percent compared to a 2019 baseline by the third Quarter of 2023.

Task 12: Performance Improvement Framework

SHALL:

- Be consistent with the energy policy
- Be measurable
- Consider SEUs
- Consider applicable requirements
- Consider opportunities for energy performance improvement
- Be monitored
- Be communicated
- Be updated

Policy
Reduce energy consumption by 50% relative to 2015 levels by 2030.

Objective
Net-zero office spaces by 2028

Objective
Reduce chilled water plant electricity by 30% by 2025

Target
Increase RE use by 30% relative to 2015 levels by 2026

Target
Reduce 1-pass ventilation by 90% by 2022

Target
Reduce chilled water pumping energy by 15% by 2023

Task 12: Approval and Communicating

- Once the objectives and energy targets are established, they shall be:

  1. Approved by management

  2. Communicated broadly across the organization

Who should know?

a. The energy team- detailed knowledge

b. Personnel who can affect the outcomes – detailed knowledge

c. All personnel in the organization should have a basic awareness

Task 12: Playbook

Activity

- Look at Task 12 in 50001 Ready
- Look at the Task 12 Playbook

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Task 12: Objectives and Targets

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

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

1. Developed and recorded your organization's objective and energy targets.
2. Obtained top management's approval of the objectives and energy targets and communicate appropriately.
3. Communicated the energy objectives and energy targets appropriately to your organization.

Task 13: Action Plans for Continual Improvement

<u>Task 13:</u> We develop action plans and implement improvement projects to achieve our objectives and energy targets.
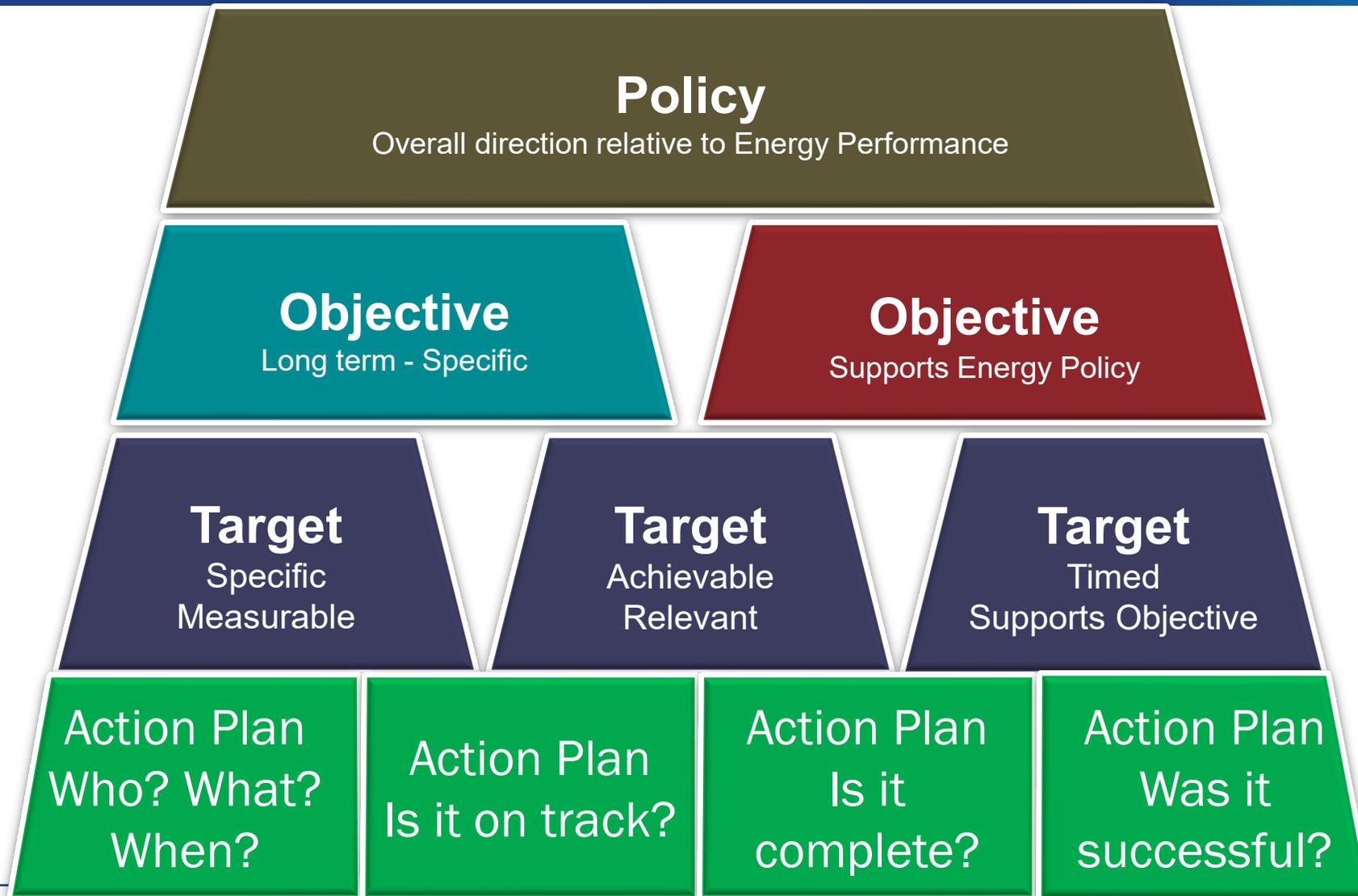
Who impacts the success of the <u>action plans </u>to ensure completion of selected projects?

- Energy Team
- Contractors
- Procurement
- Maintenance
- Finance
- Management
- Facilities
- Compliance

Policy
Overall direction relative to Energy Performance

Objective
Long term - Specific

Objective
Supports Energy Policy

Target
Specific
Measurable

Target
Achievable
Relevant

Target
Timed
Supports Objective

Action Plan
Who? What?
When?

Action Plan
Is it on track?

Action Plan
Is it
complete?

Action Plan
Was it
successful?

- 6.2.3 When planning how to achieve its objectives and energy targets, the organization shall establish and maintain action plans that include:

…….

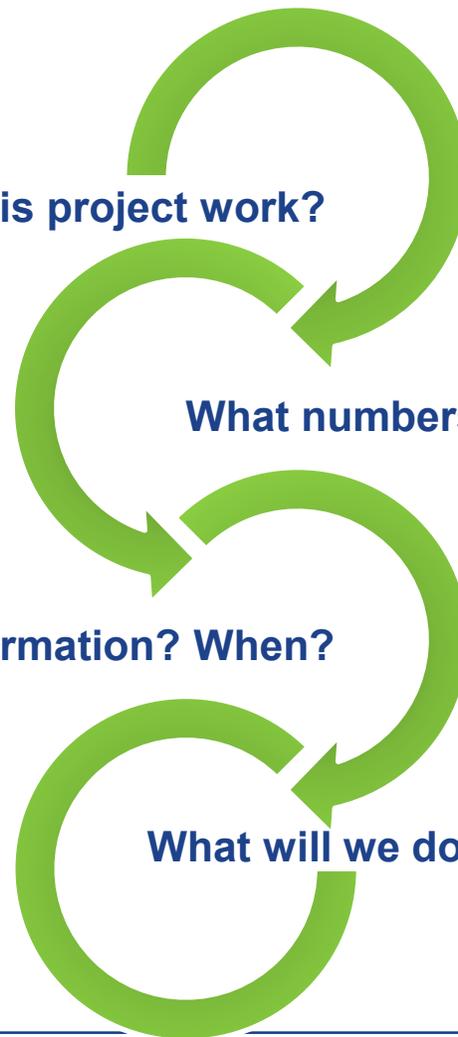— how the results will be evaluated, including the method(s) used to verify energy performance improvement (see 9.1).

Did this project work?

What numbers help us answer this?

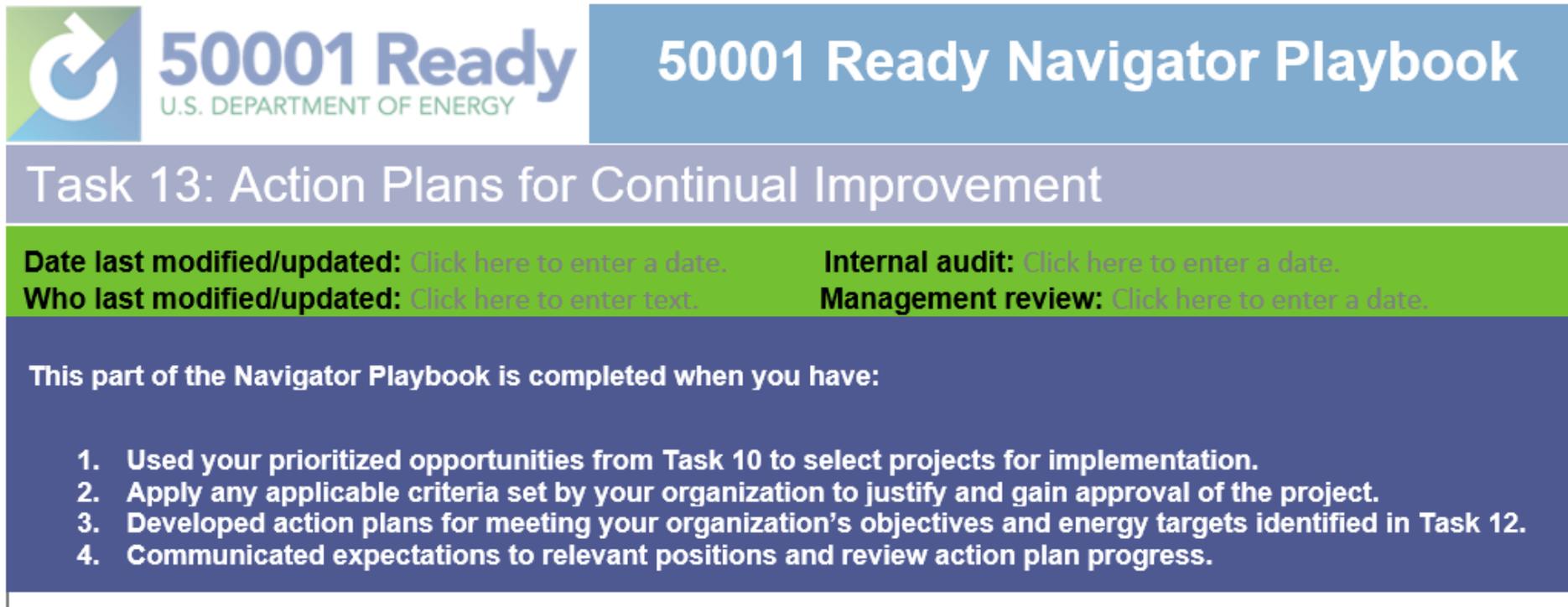**Who will collect this information? When?**

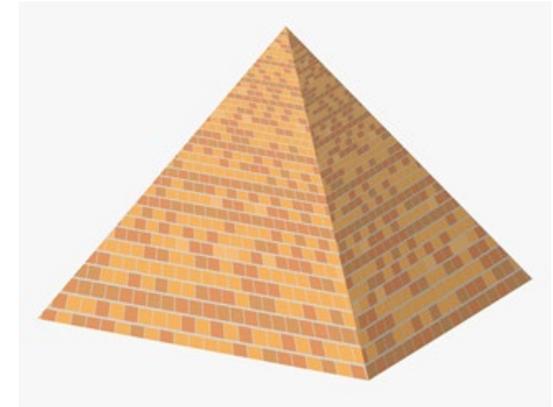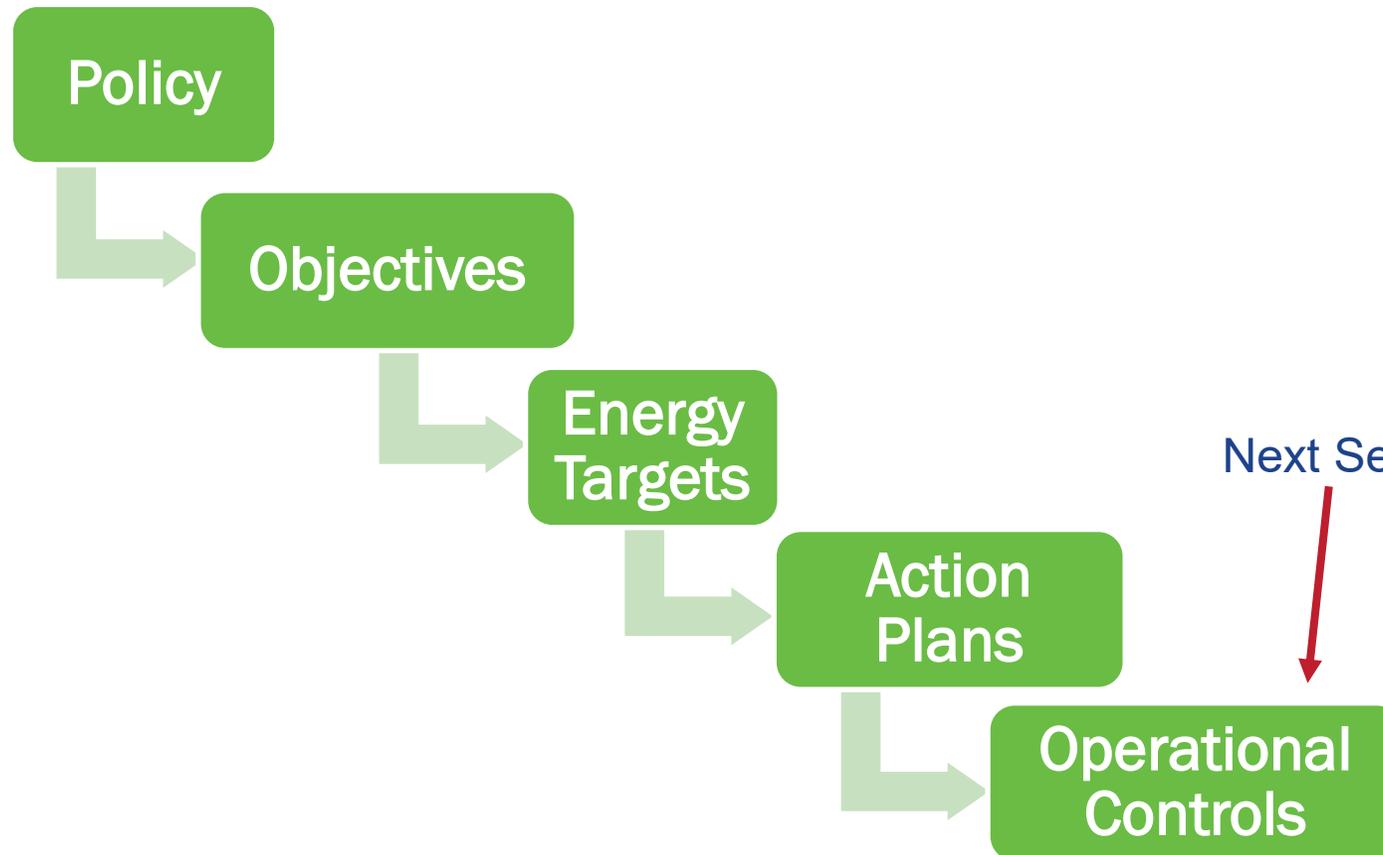**What will we do with the information?**

Task 13: Playbook

Activity

- Look at Task 13 in 50001 Ready
- Look at the Task 13 Playbook
  - Look at the Action Plan template

50001 Ready Navigator Playbook

Task 13: Action Plans for Continual Improvement

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

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

1. Used your prioritized opportunities from Task 10 to select projects for implementation.
2. Apply any applicable criteria set by your organization to justify and gain approval of the project.
3. Developed action plans for meeting your organization's objectives and energy targets identified in Task 12.
4. Communicated expectations to relevant positions and review action plan progress.

Tasks 8-13: The Big Picture
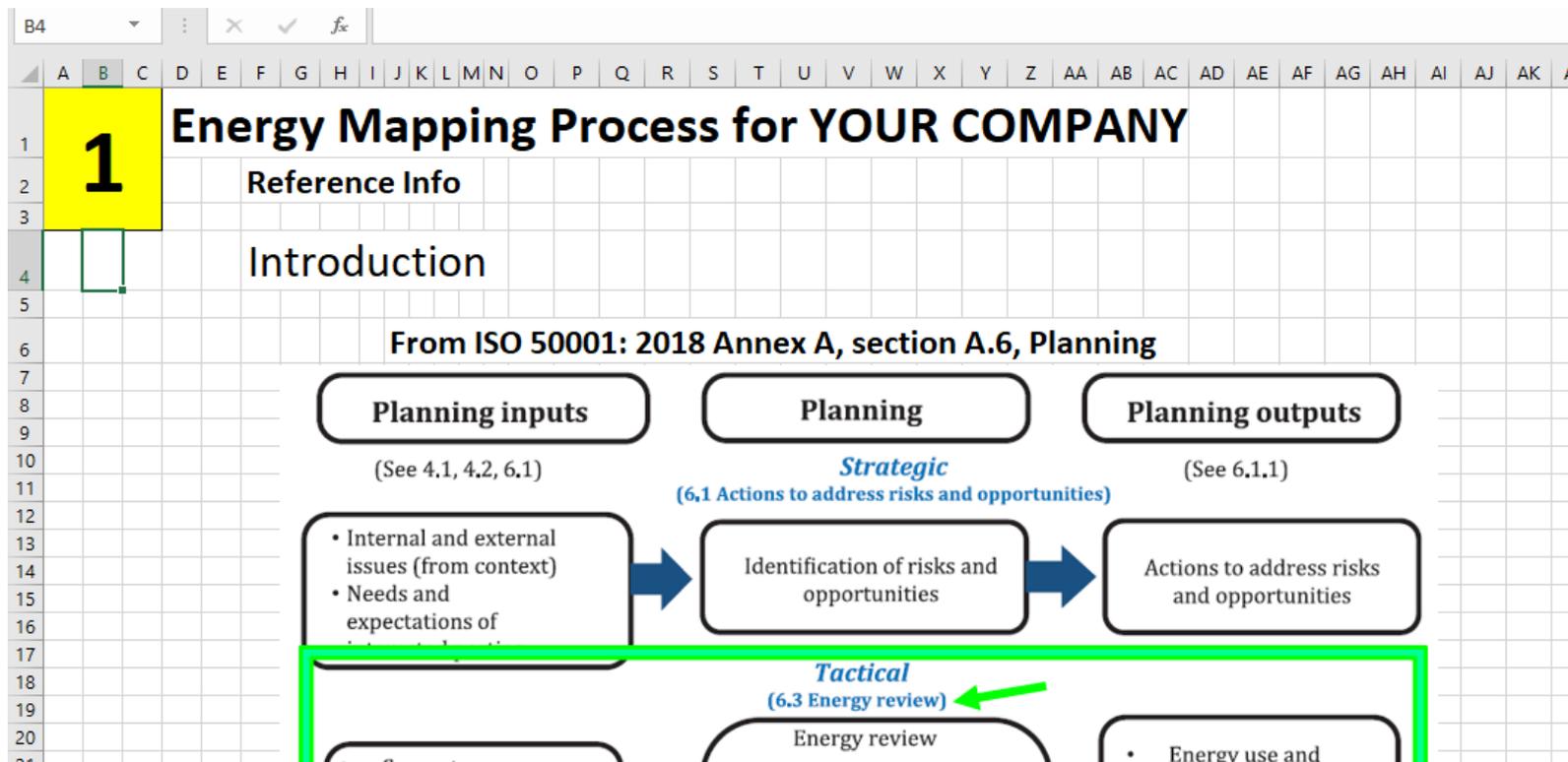
- Building the <u>energy success pyramid</u> starts with a wide base of small actions that build to the completion of energy policy

Policy → Objectives → Energy Targets → Action Plans → Operational Controls

Next Session

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Activity

- Review the tabs of the Energy Mapping Template Tool

Polling Question 4

4) Thinking about Tasks 10-13:

Task 10: Improvement Opportunities
Task 11: Energy Performance Indicators (EnPIs) and Baselines (EnBs)
Task 12: Objectives and Targets
Task 13: Action Plans for Continual Improvement

Where do you feel your organization is relative to these four 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 my organization is with respect to completing these tasks.

Training Schedule & Preparations
Kahoot Quiz Game
Q&A

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50001 Ready Navigator Tasks: Next Session in RED

Context of the Organization	Leadership	Planning	Support	Operation	Performance Evaluation	Improvement

Context of the Organization
1. An EnMS and your Organization
2. People and Legal Requirements
3. Scope and Boundaries

Leadership
4. Management Commitment
5. Energy Policy
6. Energy Team and Resources

Planning
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

Support
14. Competence and Training
15. Awareness and Communication
16. Documenting the EnMS

Operation
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18. Energy Considerations in Design
19. Energy Considerations in Procurement

Performance Evaluation
20. Monitoring and Measurement of the EnMS
21. Monitoring and Measurement of Energy Performance Improvement
22. Internal Audit
23. Management Review

Improvement
24. Corrective Action
25. Continual Improvement

REPEAT

PLAN
ACT
DO
CHECK

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? – **March 3, Done**
4. Sorting out the Energy Data – **Today-March 10**
5. Engaging Other Functions – **Next-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

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Preparation for Session FIVE

- If desired, purchase the ISO 50001: 2018 standard

- Set up and use your 50001 Ready account, if not done yet

- Prepare for Session FIVE:

  o Review the "Getting it Done" tab for tasks 14 - 19 in 50001 Ready

  o How do you determine competence of operators of SEUs (14)?

  o Is the entire site aware of energy policy and energy saving goals (15)?

  o Have you defined operational controls for SEUs and action plans (17)?

  o Are procurement and design functions currently engaged relative to energy efforts (18, 19)?

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

5) After listening to today's webinar session FOUR, and now having covered tasks 1-13, 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!

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