ADVANCED MANUFACTURING OFFICE

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

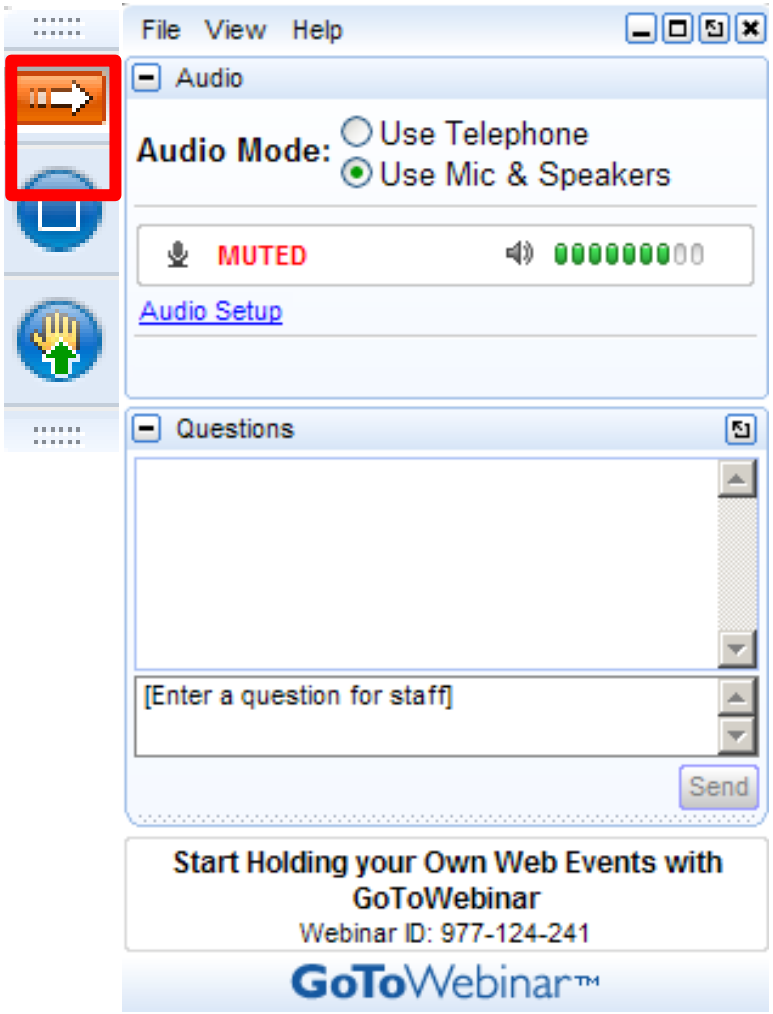
Energy Management System Implementation – Do and Check

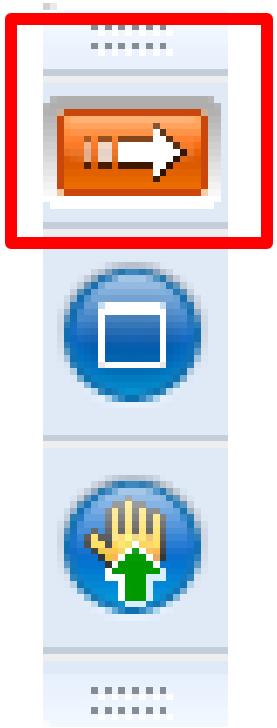
Ed Hardison
Dorothy Atwood
Deann Desai

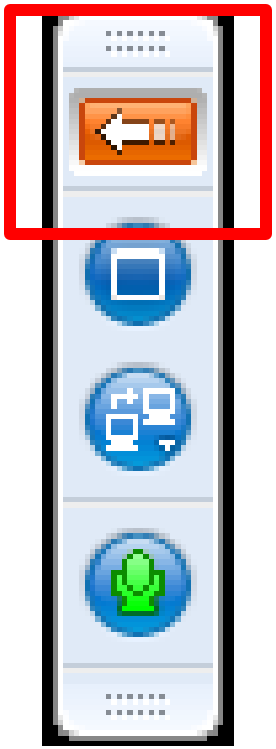
WC 4-26-12

Hide and Show the GoToWebinar Panel

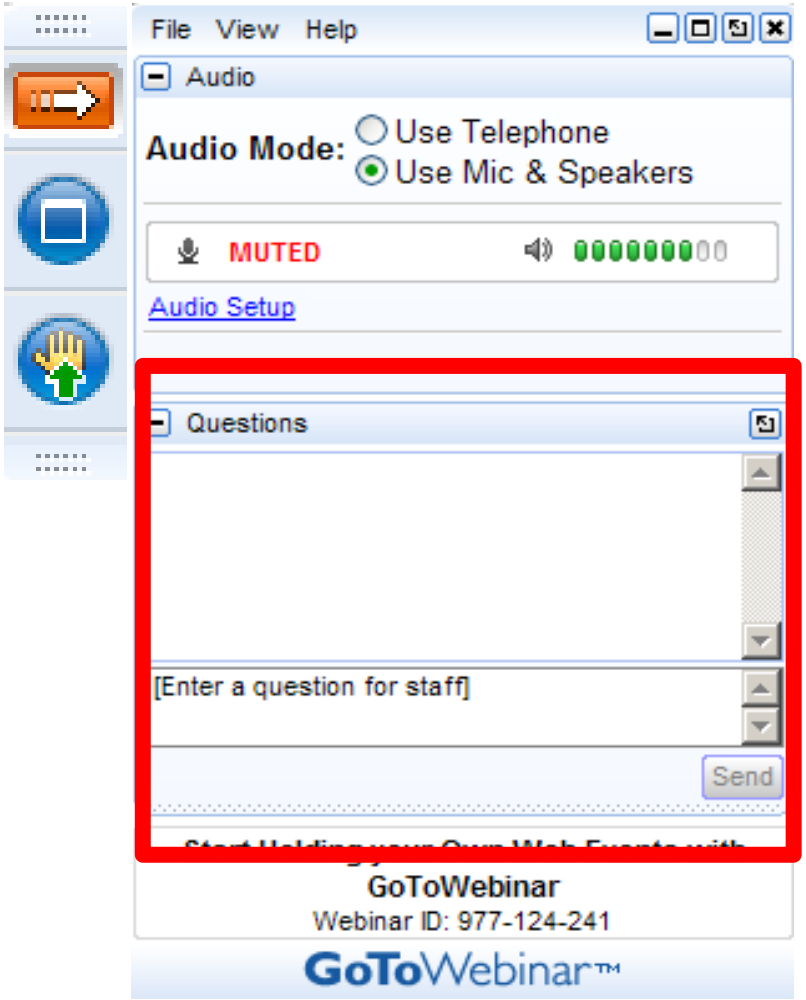
U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

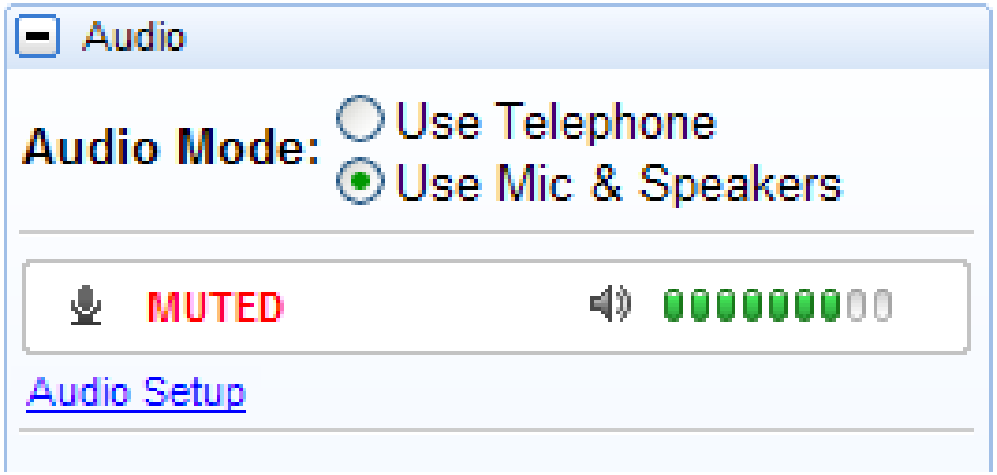




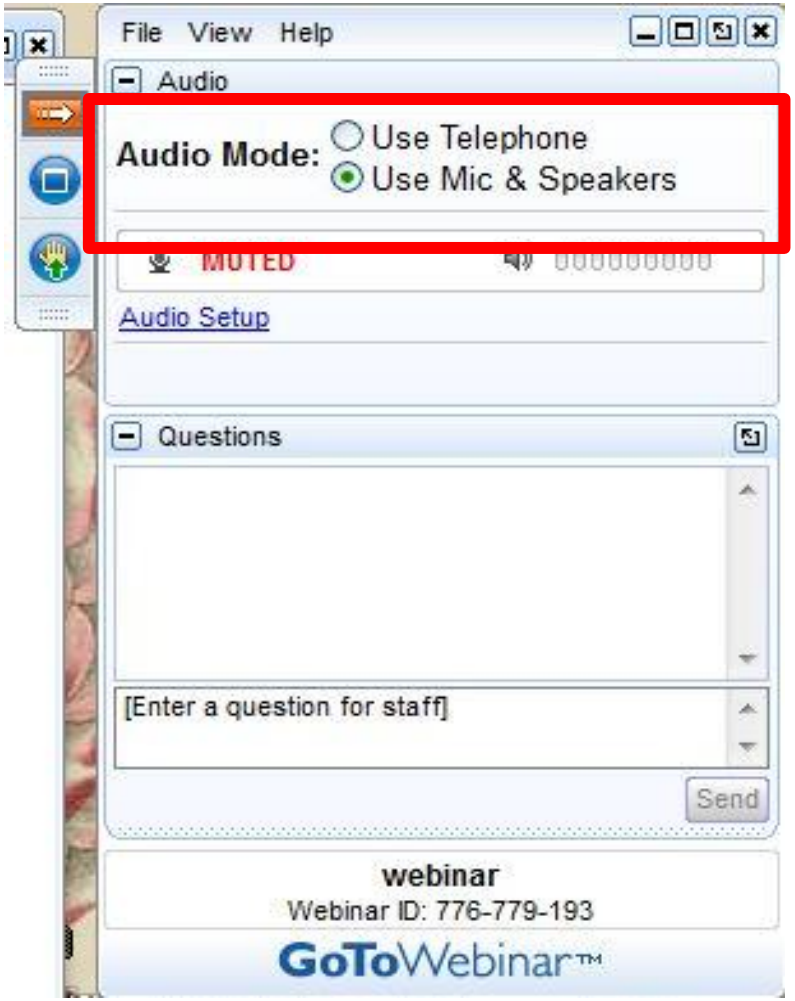


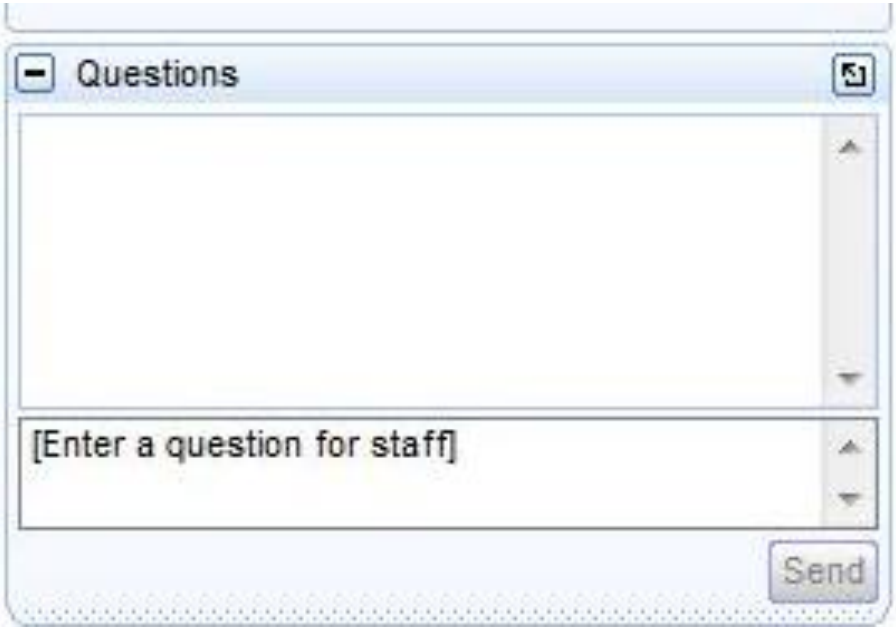
Type Questions





Audio Selection





Why Georgia Tech?

- Active participation on ISO 50001 and other international standard committees
- Trained and coached manufacturers through their implementation of management systems
  - Texas (2) Pilot
  - Northwest Pilot
  - Midwest Pilot
  - Southeast Pilot
  - Mid-Atlantic Pilot
  - Northeast Pilot
  - California Pilot
- Developed MSE 2000, precursor to ISO 50001
- Qualified specialists on DOE energy software
- Leadership role in developing the DOE eGuide content

Ed Hardison

- Food, textile, carpet, wood, furniture, housing, paper, chemical, plastics, paint, automotive, glass, brick, foundries, building materials, mineral, glass, machining
- 12 years experience as QMS Lead Auditor and EMS Auditor including 60 audits
- 30+ years experience in energy conservation
- 17 Industrial Assessment Center energy assessments
- 30 PHAST* Energy Savings Assessments
- DOE Pilots in Midwest, Southeast, Northeast, Mid-Atlantic and California
- Certified EnMS Lead Auditor

*PHAST = Process Heating Assessment Tool developed by Dept. of Energy

Dorothy Fisher Atwood

- Paper, plywood, fiberboard, sawmills, glass, wind turbines, chemical, munitions, shoes, metal foundries
- Water and wastewater facilities, state vehicle fleet, transit agency, state parks and recreation
- 15 years experience in management systems
- DOE pilots in Northwest, Midwest, and California
- Online web tools for energy management system implementation

Who are we?

Deann Desai

- Paper, chemicals, glass, military, financial organizations, electronics, automotive, ports, fleets, communities, consumer commodities, hospitals, laboratories, air sampling, transportation, munitions, metal foundries, food, pharmaceuticals, baby products.
- US TAG administrator TC 242, TC 257, WG 1 Convener JPC 2, WG 1 Convener TC 242, TAG member TC 207 and TC 176
- 18 years experience in management systems
- ISO 9001, ISO 14001, ISO 50001 Lead auditor, implementation and integration
- DOE pilots in Texas and North West

The 4-web series - Today is Web 3

- Web 1
  - Introduction to DOE eGuide
  - Building the Business Case
  - Case Studies
  - Project Planning
- Web 2
  - Establishing your Energy Picture
  - Scope and Boundary
  - Energy Baseline
  - Action Plans
- Web 3
  - Communication
  - Monitoring and Measurement
  - Checking the System
  - Internal Audit
- Web 4
  - Act
  - Management Review
  - Lessons Learned

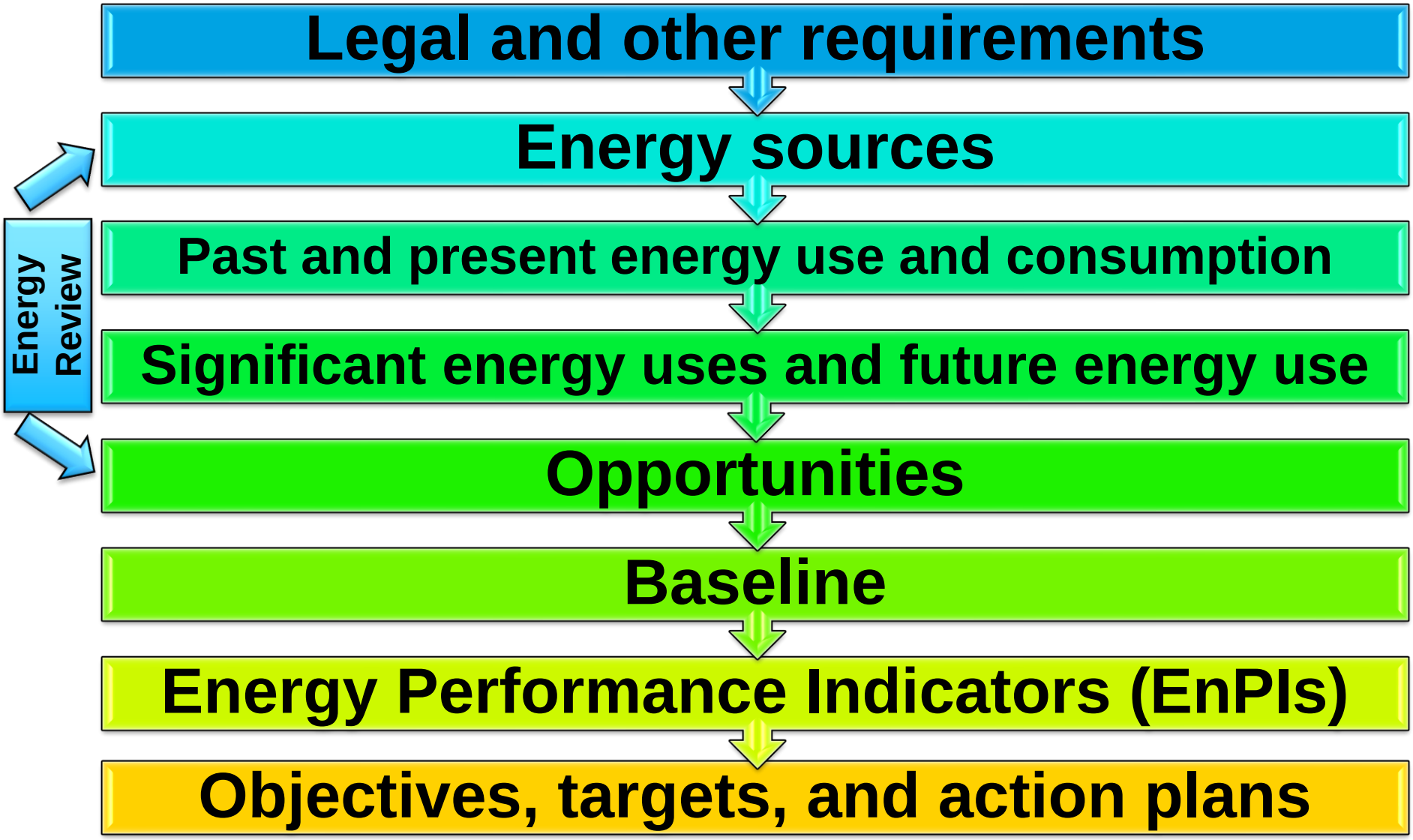
Web 1 – EnMS Overview

- Overview of Energy Management Systems
- Topics Covered Include
  - What is an Energy Management System?
  - Benefits of Energy Management System
  - Business Case
  - Plan, Do , Check , Act (PDCA)
  - Case Studies on Energy Management System
  - A Tour of the U.S. Department of Energy- Energy Portal eGuide
  - Project Planning and Management

Web 2 - Energy Planning

- Scope and Boundary
- Energy Policy
- Energy Planning Process …..

Energy Planning Process



Web 3 – EnMS Do and Check

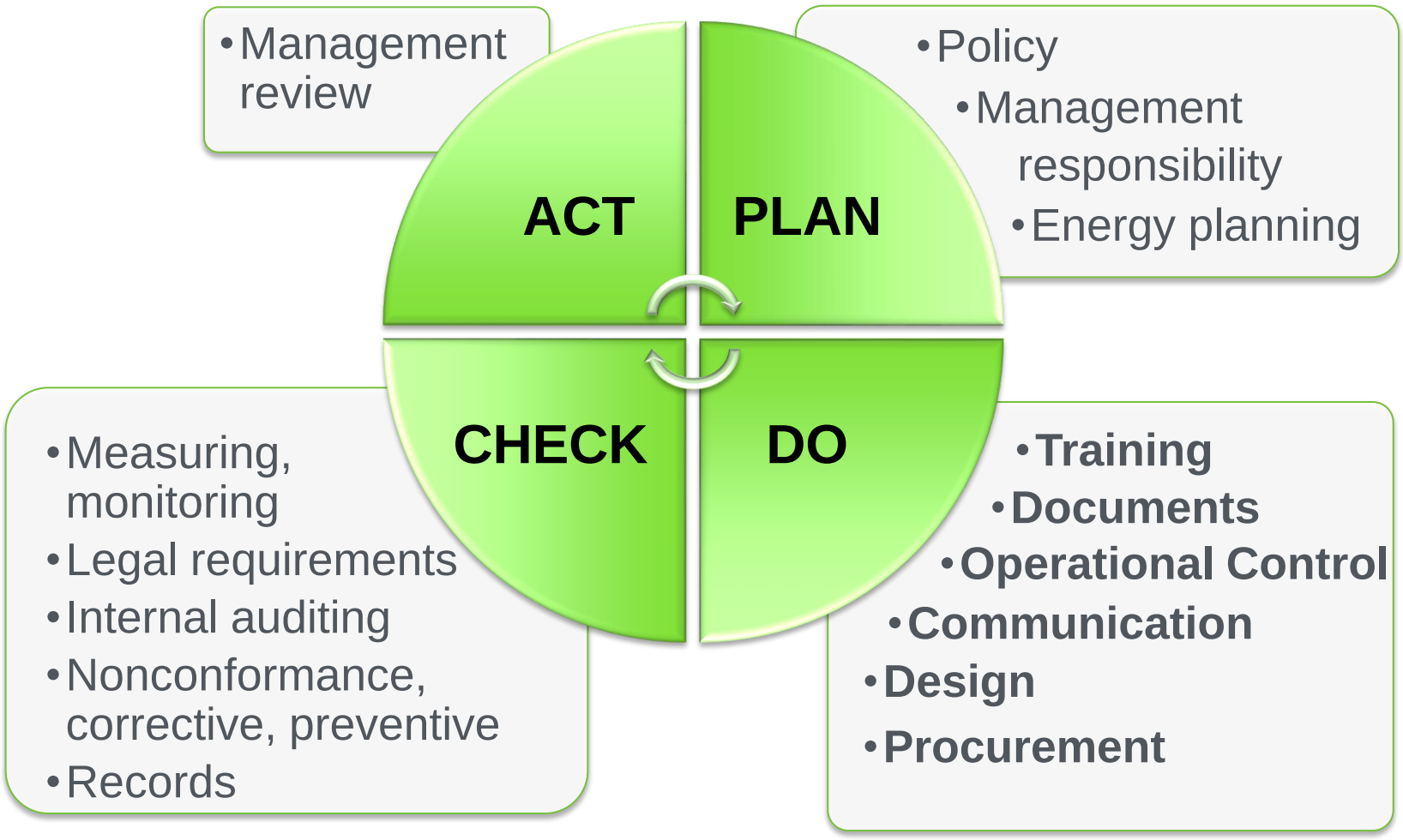
- This session will cover:
  - **PDCA-EnMS- Where Do fits, Inputs, Components**
  - Training
  - Documentation
  - Operational Control
  - Communication
  - Design
  - Procurement
  - Benefits of Do
  - **PDCA-EnMS- Where Check fits, Inputs, Components**
  - Monitoring, measurement, analysis
  - Legal
  - Internal Audit
  - NC/CPAR
  - Benefits of Check

What is DO?

DO = Implementation & Operation

- Implementation of the processes needed to deliver energy management and performance improvement results
- Integration of energy management into daily operations

DO Processes



ISO 50001 4.5.2 - Competence, training and awareness

- Competence
  - Related to significant energy uses
  - Education
  - Training
  - Skills
  - Experience
- Training
  - Identify needs
  - Provide training
  - Take other actions
  - Maintain records

ISO 50001 4.5.2 - Competence, training and awareness

- Awareness
  - Working for or on behalf
  - Policy and procedures
  - Roles, responsibilities and authorities
  - Improved energy performance benefits
  - Impact of activities

A look at the DOE eGuide

DOE eGuide Steps

- **1.2.5 Create organizational awareness**
- **5.3 Ensure competence of personnel**
- **5.4 Ensure awareness of personnel**

https://save-energy-now.org/EM/SPM/Pages/Step5_3.aspx

Tools

9 Tools

Example General EnMS Awareness Slide Show

Components of DO

4.5.4 - Documentation

- Requirements
  - Basic EnMS elements and interaction
  - EnMS scope
  - Policy
  - Objectives, targets, action plans
  - Documents deemed necessary by the organization

Components of DO

4.5.4 - Documentation

- Control
  - Approval
  - Update & review
  - Revision status and identified changes
  - Relevant versions available
  - Legible & identifiable
  - Documents of external origin
  - Obsolete documents

A look at the DOE eGuide

DOE eGuide Steps

- **1.2.1 Establish the scope and boundaries**
- **1.2.4 Define the energy policy**
- **1.4 Understand the role of documents and records**
- **5.1 Manage and control information**
- **6.1 Monitor, measure, and analyze key characteristics**

https://save-energy-now.org/EM/SPM/Pages/Step1_4.aspx

Tools

21 Tools

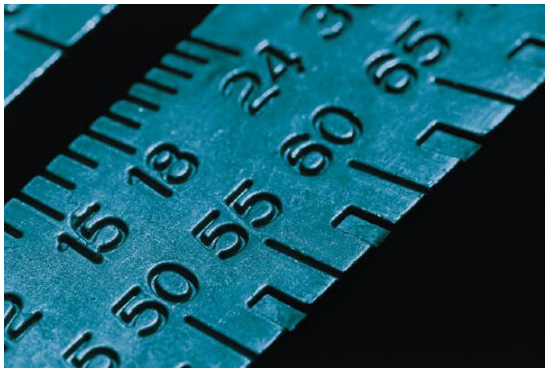
Making Decisions on EnMS Documentation Checklist

Energy Manual Guidelines

Components of DO

ISO 50001 4.5.5 - Operational Control

- Determine and plan operation and maintenance associated with significant energy uses
- Set operation and maintenance criteria
- Operate and maintain in accordance with criteria
- Communication of controls



A look at the DOE eGuide

DOE eGuide Steps

- **1.3.3 Establish communication channels**
- **5.2 Determine operational controls**
- **5.8 Communicate internally**

https://save-energy-now.org/EM/SPM/Pages/Step5_2.aspx

Tools

8 Tools

Operational Controls Checklist

Components of DO

ISO 50001 4.5.3 - Communication

- Communicate internally on energy performance and EnMS
- Implement suggestion process
- Decision on external communication
  - Document decision
  - Establish method

A look at the DOE eGuide

DOE eGuide Steps

- **5.8 Communicate Internally**
- **5.9 Decide on External Communications**

https://save-energy-now.org/EM/SPM/Pages/Step5_8.aspx

Tools

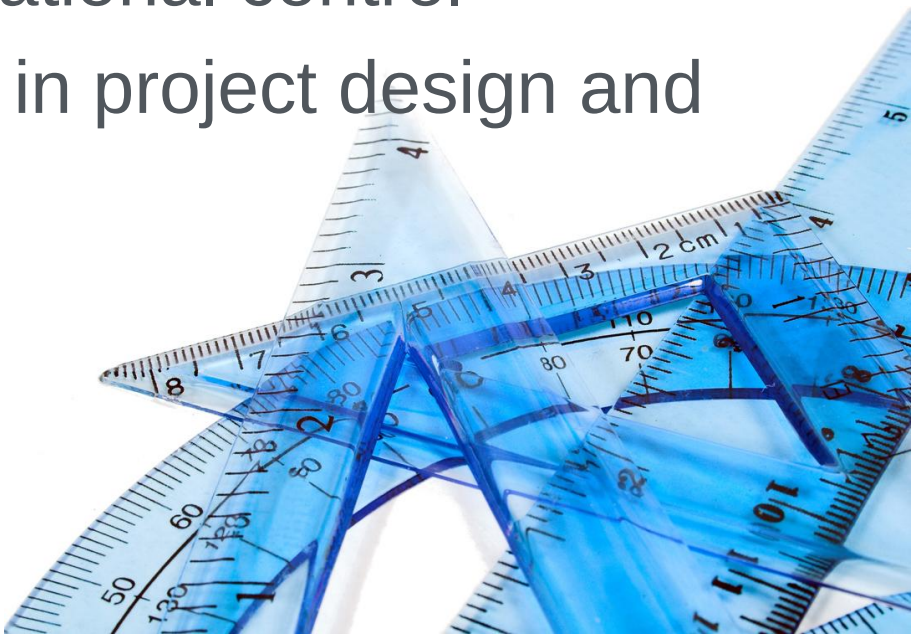
6 Tools

Example Responsibility and Authority Matrix for Energy-Related External Communications

Components of DO

ISO 50001 4.5.6 - Design

- Significant impact on energy performance
- Consider energy performance improvement opportunities and operational control
- Incorporate evaluation in project design and procurement activities
- Record results



A look at the DOE eGuide

DOE eGuide Steps

- **2.4 Identify energy opportunities**
- **5.6 Incorporate energy considerations in procurement**
- **5.7 Manage energy considerations in design**

https://save-energy-now.org/EM/SPM/Pages/Step5_7.aspx

Tools

6 Tools

Worksheet for Energy Considerations in Design

Components of DO

ISO 50001 4.5.7 - Procurement

- Service, products and equipment that impacts significant energy uses
- Inform suppliers of energy evaluation
- Define criteria for lifetime assessment
- Define and document energy purchasing specifications

A look at the DOE eGuide

DOE eGuide Steps

- **5.6 Incorporate energy consideration in procurement**

https://save-energy-now.org/EM/SPM/Pages/Step5_6.aspx

Tools

4 Tools

Procurement Checklist

Example Life Cycle Cost Assessment Worksheet

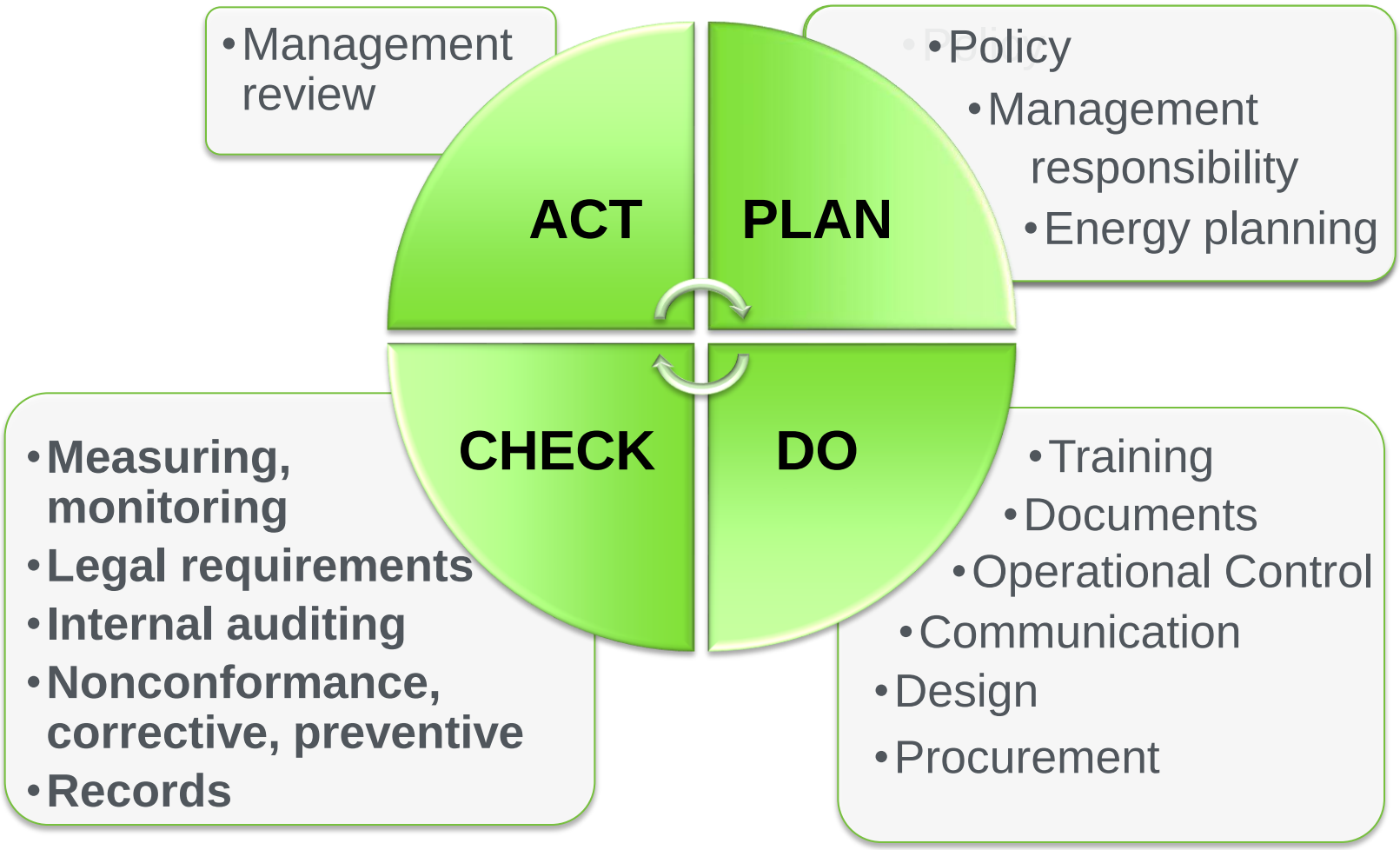
Benefits of DO

- Clear expectations for workforce and contractors
- Integration of energy management into daily work activities
- Improved management and control of significant energy uses
- Enhanced organizational interfaces and connections

Suggested Activities

- What resources will we need for this process?
  - Management commitment
  - Personnel with knowledge and time
  - Available information
  - Financial
- What are constraints for these resources?
  - Current responsibilities
  - Production requirements
  - Budget
- What pieces already exist?
  - Current management systems
  - Existing processes (purchasing, design, controls, etc.)
  - Existing documentation
  - Existing responsibilities

Checking Process



What is CHECK?

CHECK = Measure, verify, correct and record

- Measuring key characteristics and EnMS performance
- Verify conformance and EnMS operations
- Correct nonconformities
- Keep and control records

Components of CHECK

ISO 50001 4.6.1 - Monitoring, measurement and analysis

- Focus on key characteristics
  - Significant energy uses
  - Significant energy use relevant variables
  - EnPIs
  - Other outputs from energy review
  - Progress toward meeting objectives and targets
  - Expected vs. actual energy consumption evaluation

Components of CHECK

ISO 50001 4.6.1 - Monitoring, measurement and analysis

- Define energy measurement plan
- Review measurement needs periodically
- Calibrate equipment
- Respond to significant deviations in energy performance

A look at the DOE eGuide

DOE eGuide Steps

- **2.4.1 Use energy assessments**
- **6.1 Monitor, measure and analyze key characteristics**
- **6.2 Calibrate monitoring and measuring equipment**

https://save-energy-now.org/EM/SPM/Pages/Step6_1.aspx

Tools

14 Tools

Monitoring and Measurement of Key Characteristics Planning Worksheet

Equipment Energy Measurement Plan

Components of CHECK

ISO 50001 4.6.2 Evaluation of compliance with legal requirements and other requirements

- Evaluate compliance at planned intervals
- Record results

A look at the DOE eGuide

DOE eGuide Steps

- **2.1. Identify, evaluate and track legal and other requirements**
- **6.3 Evaluate legal and other compliance**

https://save-energy-now.org/EM/SPM/Pages/Step6_3.aspx

Tools

3 Tools

Generic Compliance Evaluation Checklist Format

Components of CHECK

ISO 50001 4.6.3 - Internal audit of the EnMS

- Planned intervals
- Ensures
  - Conformance with ISO 50001
  - Conformance with energy management system
  - Maintained and effective
  - Improves energy performance

Components of CHECK

ISO 50001 4.6.3 - Internal audit of the EnMS

- Audit plan and schedule
  - Considers status and importance
  - Considers results of previous audits
- Objective and impartial
- Records
- Results reported to top management

A look at the DOE eGuide

DOE eGuide Steps

- **6.4 Plan and conduct internal audits**
- **7.1 Collect information for management review**

https://save-energy-now.org/EM/SPM/Pages/Step6_4.aspx

Tools

7 Tools

Introduction to Internal Auditing Concepts

Internal Audit Plan Template

Components of CHECK

ISO 50001 4.6.4 - Nonconformities, correction, corrective action and preventive action

- Make corrections
- Investigate and determine the root cause
- Evaluate need for action and implement solution
- Consider whether the same or similar problems exist elsewhere in the organization
- Prevent the problem from occurring

Components of CHECK

ISO 50001 4.6.4 - Nonconformities, correction, corrective action and preventive action

- Evaluate effectiveness
- Appropriate to problem magnitude
- Appropriate to energy performance consequences
- Make changes to EnMS

A look at the DOE eGuide

DOE eGuide Steps

- **2.1.3 Establish a process for evaluating and updating requirements**
- **6.3 Evaluate legal and other compliance**
- **6.5 Take action to correct and prevent nonconformities**
- **6.6 Check and use the evidence**

https://save-energy-now.org/EM/SPM/Pages/Step6_5.aspx

Tools

3 Tools

Corrective Action/Preventive Action Request Form

Components of CHECK

ISO 50001 4.6.5 – Control of Records

- Establish and maintain records that demonstrate
  - Conformity to EnMS requirements
  - Conformity to ISO 50001
  - Achievement of energy performance

Components of CHECK

ISO 50001 4.6.5 – Control of Records

- Institute controls for
  - Identification
  - Retrieval
  - Retention
- Ensure records are legible, identifiable and traceable

A look at the DOE eGuide

DOE eGuide Steps

- **1.4 Understand EnMS documentation**
- **2.2.3 Formulate a process for acquiring and recording data**
- **2.3.5 Track and analyze significant energy uses**
- **6.6 Check and use the evidence**

https://save-energy-now.org/EM/SPM/Pages/Step2_2_3.aspx

Tools

12 Tools

Data Collection Management Matrix

Example EnPI Tracking

Benefits of CHECK

- Robust elimination of root causes of energy performance deviations
- Expanded data and information for management decision making
- Proactive vs. reactive system for problems and compliance issues
- Continual improvement of the energy management system, processes and performance

Suggested Activities

- What resources will we need for this process?
  - Management commitment
  - Personnel with knowledge and time
  - Available information
  - Financial
- What are constraints for these resources?
  - Current responsibilities
  - Production requirements
  - Budget
- What pieces already exist?
  - Current management systems
  - Existing processes (purchasing, design, controls, etc.)
  - Existing documentation
  - Existing responsibilities

What Comes Next?

- Web 1
  - Introduction to DOE eGuide
  - Building the Business Case
  - Case Studies
  - Project Planning
- Web 2
  - Establishing your Energy Picture
  - Scope and Boundary
  - Energy Baseline
  - Action Plans
- Web 3
  - Communication
  - Monitoring and Measurement
  - Checking the System
  - Internal Audit
- Web 4
  - Act
  - Management Review
  - Lessons Learned

Questions?