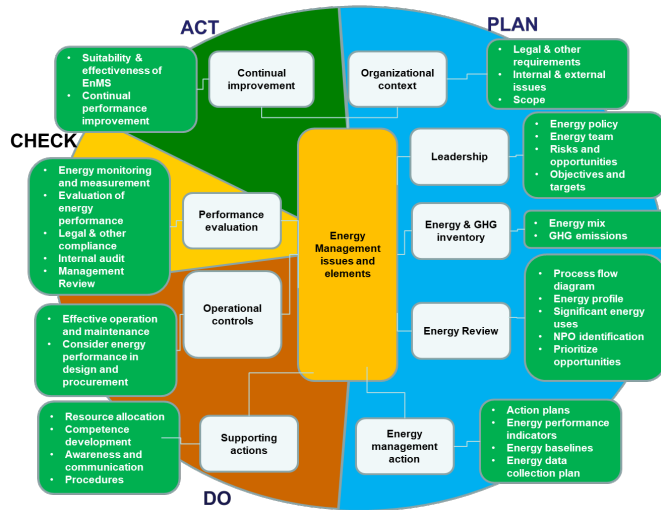




# Energy Assessment

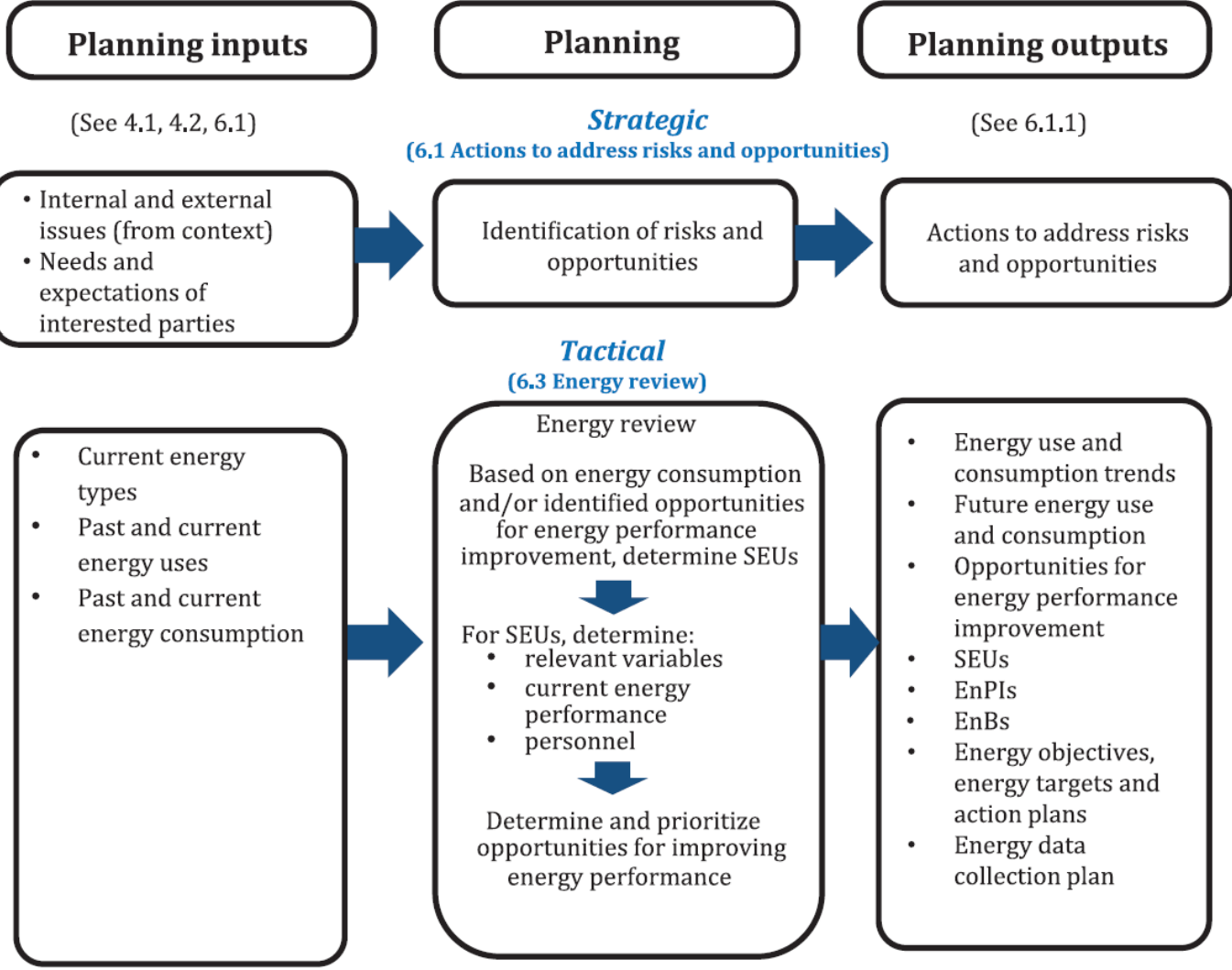
# IDENTIFYING OPPORTUNITIES FOR IMPROVEMENTS

# In this session...

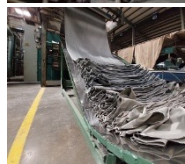


- Conducting Energy Assessment / Audits
  - ISO 50001 – Energy Review
  - ISO 50002 – Energy Audits
- Methodology / scope of deep-dive energy assessment by prominent programs like PaCT, CbD
- Exercise
- Plan your next steps

# Energy planning process as per ISO 50001



# Energy Audit – ISO 50002



## Level-1 – Walkthrough energy audit

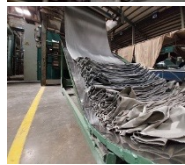
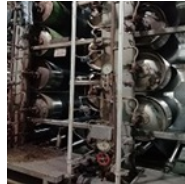
- Suitable for **small organizations** or as preliminary assessment for large organizations
- Identify focus areas, improve management awareness, **basic training** of facility team
- Data collection - **Basic** energy profile; variables for normalizing EnPIs, **list** of equipment, **estimated** loads
- Analysis – **Basic energy balance**, SEUs, **high level** energy profile, comparison with benchmarks
- Opportunities – **Low hanging fruits**, low-cost measures; basic capital requirements
- Prioritization – **Indicative savings**, typical payback, elementary implementation plan

# Energy Audit – ISO 50002

## Level-2 – Detailed Energy Audit

- Suitable for **single sites**
- Data collection – **detailed energy consumption data**; variables for normalizing EnPIs, monitoring equipment data, Design and O&M documents, future plans, production data
- Analysis – Current & historical energy profile, EnPIs, **detailed energy and mass balance**, energy performances, **evaluate design and configuration**, evaluate equipment and processes
- Opportunities – low-, medium-, and high-cost measures; **indicate non-energy gains**, further data requirements, benchmark comparison
- Prioritization – **detailed savings reconciled with balance**, basic capital and labour cost assessment, payback period, implementation plan

# Energy Audit – ISO 50002



## Level-3 – Comprehensive Energy Audit

- Suitable for **whole** site
- Data collection – detailed energy consumption data, **sub-meter load profile, consumption of key processes, detailed analysis of variables,** monitoring equipment data, Design and O&M documents, future plans, production data, **how is energy performance managed, quotes for saving opportunities from suppliers**
- Analysis – Current & historical energy profile, EnPIs, details energy and mass balance, energy performances, evaluate design and configuration, evaluate equipment and processes, **effect of variables**
- Opportunities – low-, medium-, and high-cost measures; **quantified non-energy gains, further data requirements, detailed analysis using advanced techniques, vendor evaluation**
- Prioritization – detailed savings reconciled with balance, **detailed capital and labour cost calculation, detailed economic analysis, implementation plan**

# Requirements by Higg FEM

## Level - 1 Requirements

- Track all energy sources
- Track and measure its energy use from the sources
- Standardize methods and frequency to track each energy source

## Level - 2 Requirements

- Establish energy baselines
- Identify energy intensive processes or operations
- Set targets for improving energy use
- Set targets for reduction of GHG emissions (Scope-1 and Scope-2)
- Develop implementation plan to improve energy use and reduce GHG emissions
- Demonstrated continual improvements compared to baselines

## Level - 3 Requirements (not mandatory)

- Calculate and report Scope 3 emissions
- Develop Science-Based Targets

# Deep-dive energy assessment by brands and international organizations

- Typically a trade-off between Level-2 and Level-3 Energy Audits
- Critical aspects are (i) quantification of saving potential in processes (especially investment grade), (ii) decarbonization strategy e.g. replacing fossil fuel, (iii) improving management practices, (iv) energy team formation
- Feasibility studies are usually conducted only for selected investment grade measures
- Implementation monitoring (2 – 6 months) is usually part of the scope
- Vendor evaluation is usually included in monitoring phase on need basis
- Final impact assessment on completion of monitoring period





# Vietnam National Energy Efficiency Program for the period of 2019-2030 (VNEEP 3)



## 2019 - 2025

Save 5–7% from the national energy consumption.

T&G: to reduced 5%, compared to the period of 2015-2018

# 01



# 02

## 2025 - 2030

Save 8-10% from the national energy consumption

T&G: to reduced 6.8%, compared to the period of 2015-2018

# Vietnam Regulation on EE implementation and EA - The Circular No. 25/2020/TT-BCT

4 Chapters,  
19 Articles,  
prescribes :

DEUs are responsible for mandatory energy audit every 3 years

Reports on the implementation of annual/5-year plan for economical and efficient use of energy

The DEUs must adopt energy management model in compliance with requirements specified under Article 8 of the Governmental Decree No. 21/2011/ND-CP



# Typical energy audit tasks



1- Define Audit and Energy objectives

2- Determine scope and criterion of the audit

3- Define energy audit tasks and responsibilities among auditors and facility

4- Formulate audit team based on identified tasks and required competencies

5- Secure top management support; break ice with key personnel (remember the formula for change)

6- Establish communication protocol

- Among auditors
- Between auditors and facility

7- Ensure access to

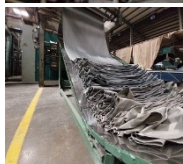
- Audit areas, processes, facilities
- Relevant personnel, systems and equipment (e.g. ensuring that measurement points are accessible)
- Documents, drawings, test reports, records, manuals etc.
- Monitoring data, calibration records,

8- Define measurement requirements and develop a measurement plan

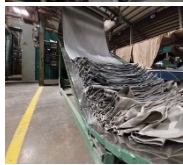
- Stage-1: Point source measurement using equipment
- Stage-2: Data logging over representative period and interval; also including data of variables like production, operating parameters etc.
- Stage-3: Preliminary data treatment / organization
- Stage-4: Calculation and data visualization

# Factors that influence Energy audit cost

- Level of uncertainty/ accuracy
- The extent to which investment grade, longer payback opportunities are investigated
- Scope and boundaries of audit
- Availability, organization, and details of energy data
- Availability of previous audit reports
- Complexity of facility
- Support provided by facility to the site
- Requirement for implementation support (monitoring, training, vendor evaluation, impact assessment)
- Distance to be travelled (Travel and accommodation)

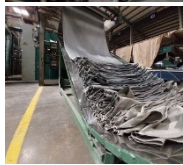


# Clean by Design 10 best practices - example



Sr.	Best Practices	Attained Score	Total Score	Comments
1	Measurement and management	19	40	Basic data management is being done. Electricity generation data is logged and live. Other data manually entered.
2	Condensate water collection and recycling	2	15	Condensate recovery is very low due to contamination in condensate from leaking heat exchangers in dyeing machines.
3	Cooling water reuse efficiency	1.5	10	Significant potential in cooling water recovery.
4	Process water and wastewater reuse efficiency	3	12	Condensate and other process water are discharged.
5	Discharged Hot water heat recovery	0	10	No wastewater heat recovery system installed. Need to separate the hot and cold water discharge lines.

# Clean by Design 10 best practices - example



Sr.	Best Practices	Attained Score	Total Score	Comments
6	Boiler efficiency improvement	11	20	Boiler rooms are very well managed. Boilers are for steam generation mainly and equipped with heat recovery systems. Potential for improving efficiency exists.
7	Steam traps and steam system performance	3.5	15	Steam traps are by-passed mainly due to back pressure on traps. Condensate discharged due to contamination.
8	Insulation Optimization	3.5	7	Steam and Oil Pipes are well insulated. Insulation of valves is proposed.
9	Setting machine efficiency optimization	5	15	Heat recovery is installed at 1 stenter and recommended on all remaining as well.
10	Compressed air system optimization	4.5	6	VFD Installed on both compressors. Need to develop leakage management program.
	<b>Total</b>	<b>53</b>	<b>150</b>	<b>35.3%</b>

# Task – The Textile Company

As an energy service provider, you have received a request for energy services from “The Textile Company”.

Your tasks as a groups are;

- Review the information provided to you
- Enlist the sustainability related requirements the company may have
- Develop a list of activities to provide required support to the company with timelines
- Identify how many experts, having which expertise, should be included in the team of service provider? And why?
- What type of equipment / gadgets you may need and why you need them?
- Enlist the key stakeholders that need to be involved in the company and identify what support is needed from the company during the project
- Enlist the information required from the company before starting the on-site assessment and other support activities

# Task

## Activity time

- Participants read the story and work on tasks (45 min)
- Present your plans to the company management (group presentations) (5 min each group)

