



ACHIEVING SUSTAINABILITY GOALS VIA CERTIFIED ENERGY MANAGEMENT SOLUTIONS



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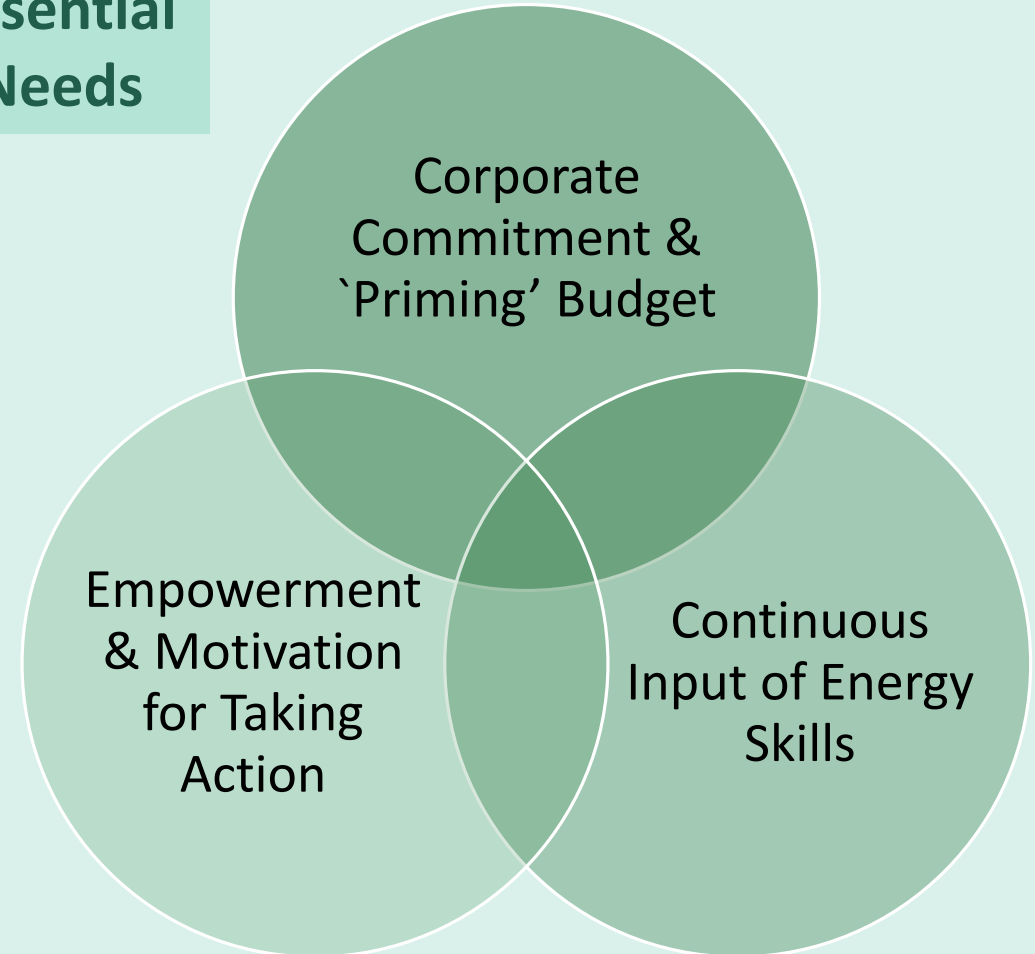
> 35 years AEM Opinion: Factors For Success in Sustaining Energy Efficiency

Best Approach



ISO 50001 Provides Good Framework

Essential Needs



Saving Energy Costs LESS THAN NOTHING !

Key Drivers to
Identify, Exploit
& Maintain
Energy Saving
Opportunities



ISO 50001 Energy Management
Systems (EnMS)

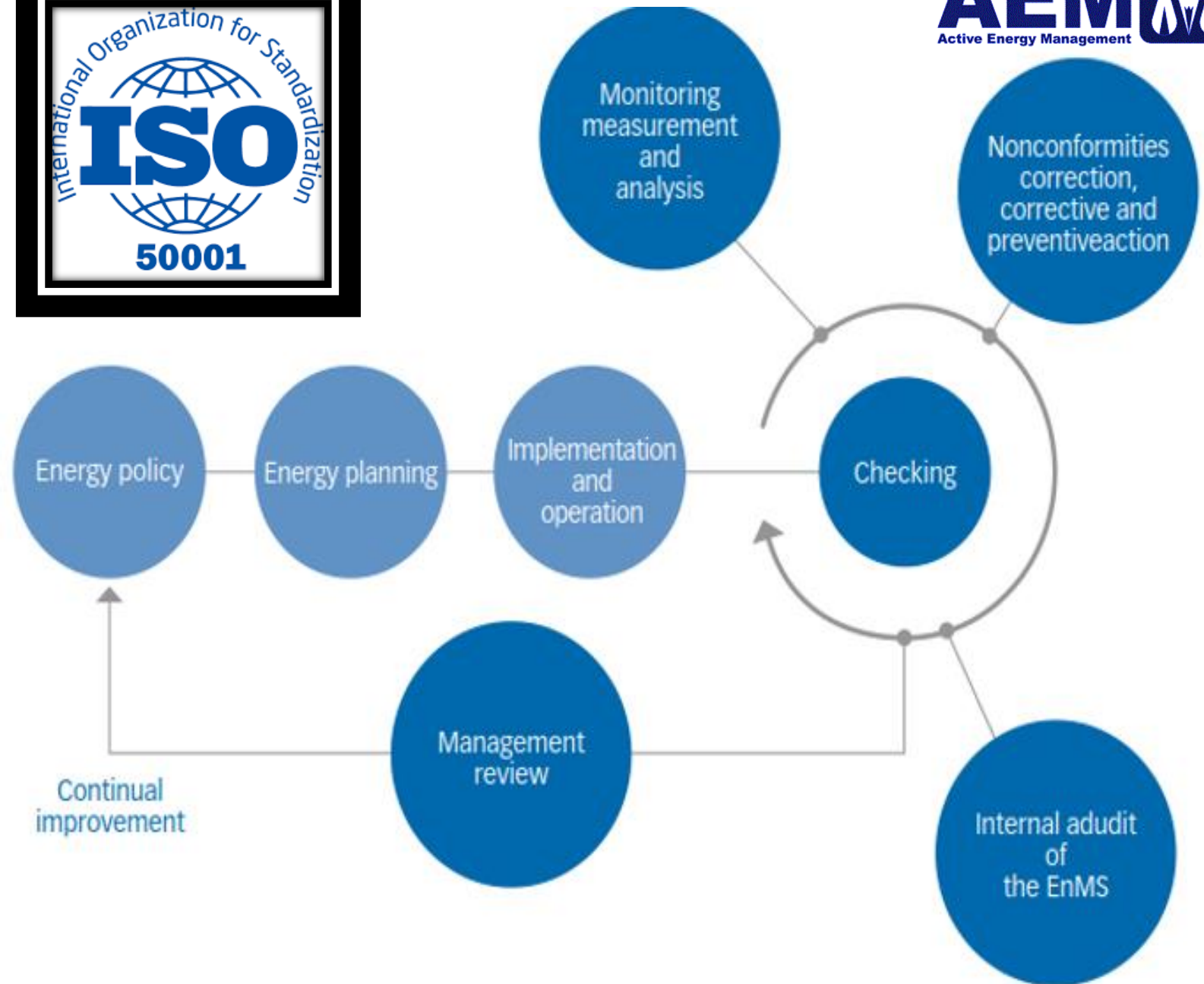


Retro-Commissioning (RCx)



ISO 50001 Overview

ISO 50001 is based on
PLAN-DO-CHECK-ACT
approach to achieve
continual improvement in
energy performance.



Business & Sustainability Benefits of Certified ISO 50001 Energy Management System



ISO 50001 certification provides systematic methodology for an organization to set up & maintain energy management system.

Business benefits include:

- Systematically achieving energy use & carbon emissions reduction
- Creating clear picture of current energy use status - focus on improvement goals
- Prioritizing progressive implementation of new energy-efficient technologies + measures (energy + economics)
- Providing framework towards energy efficiency in supply chain
- Giving guidance on benchmarking, measurement, documentation + corporate energy use reporting
- Making best use of energy consuming assets (e.g. identifying potential to reduce maintenance costs or expand performance)
- Demonstrating to stakeholders corporate commitment to comply with Best Practice to protect the environment

Management Responsibility



Key factors for successful implementation of an EnMS include:

- Top management commitment & support;
- Sufficient resources; time, finance, skilling & materials etc.
- Empowering action to change & then maintain progress

Management Representative delegation & responsibility:

Management Responsibility



- Select, train & lead Energy Management Team, to coordinate EnMS activities
- Identifying & communicate resources needed for energy management activities
- Deliver energy management awareness training internally & to external support teams
- Policy drafting for EnMS documents, strategies planning for ISO 50001 certification
- Ensuring appropriate monitoring, data collection and verification processes
- Overseeing Internal & External audit programmes
- Managing corrective / preventive action systematically.

Energy Management System / Policy



ISO 50001 needs organization commitments in the energy policy:

- Continual improvement in energy performance;
- Availability of information and of necessary resources to achieve objectives + targets
- Compliance with legislation + other requirements related to energy use, consumption and efficiency. (*Building Energy Efficiency Ordinance (Cap 610), Building Energy Code , etc.*)

Energy Planning Issues

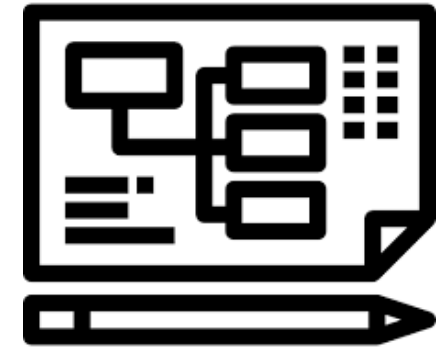
Identify applicable legal & other requirements

Ensure organization compliance with applicable requirements

Ensure key staff have the necessary knowledge to address legal and other requirements

Communication of relevant information on legal and other requirements to staff

Ensuring compliance requirements are up to date



Role of Energy Audit in Path to ISO 50001



Identify Organization's energy profile & energy management opportunities (EMO)

Energy Audit

Setting appropriate objectives & performance indicators



Assess Organization's present readiness for ISO 50001 implementation

ISO 50001 Gap Analysis

Determine where to prioritise focus

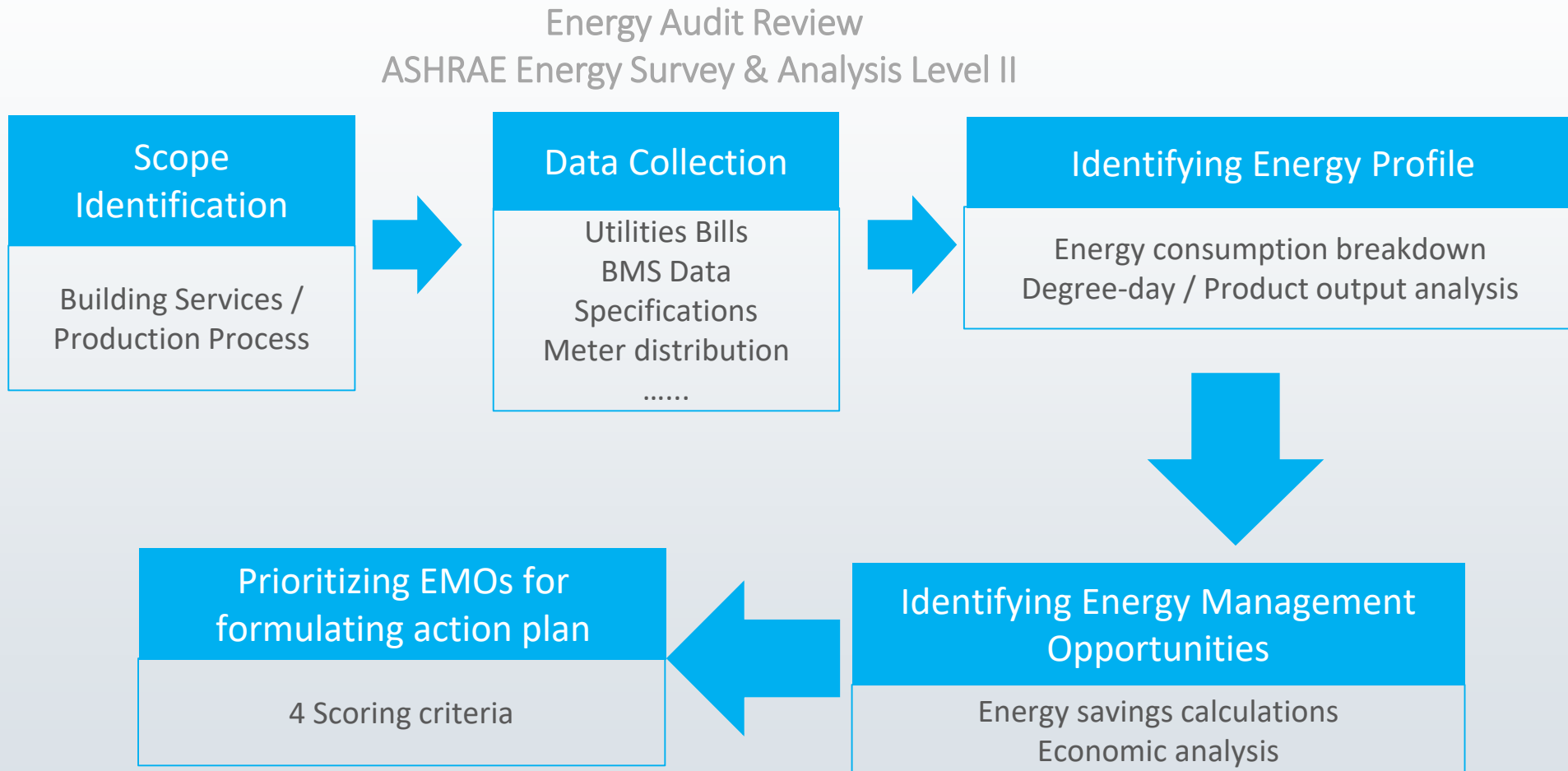


Align future actions necessary for certification

ISO 50001 Action Plan

Formulate action plan for implementation / certification

Energy Audit Objectives & Methodology



Energy Audit Objectives & Methodology

Skilling of Registered Energy Assessor in assessing EMOs



Payback
Period

Realistic appraisal of
economics / speed to
recover investment



Ease

Practicality to implement
measures (technology,
installation situation, etc.)



Visibility

Message to stakeholders
from awareness of the
measure



Scale

Size, coverage &
impact of the measure
to the facility

Energy Audit Key Objectives

Identifying energy usage – KPIs and Category Breakdowns

Locating & quantifying energy saving opportunities

Electricity Expense :

\$28,262,126 HKD

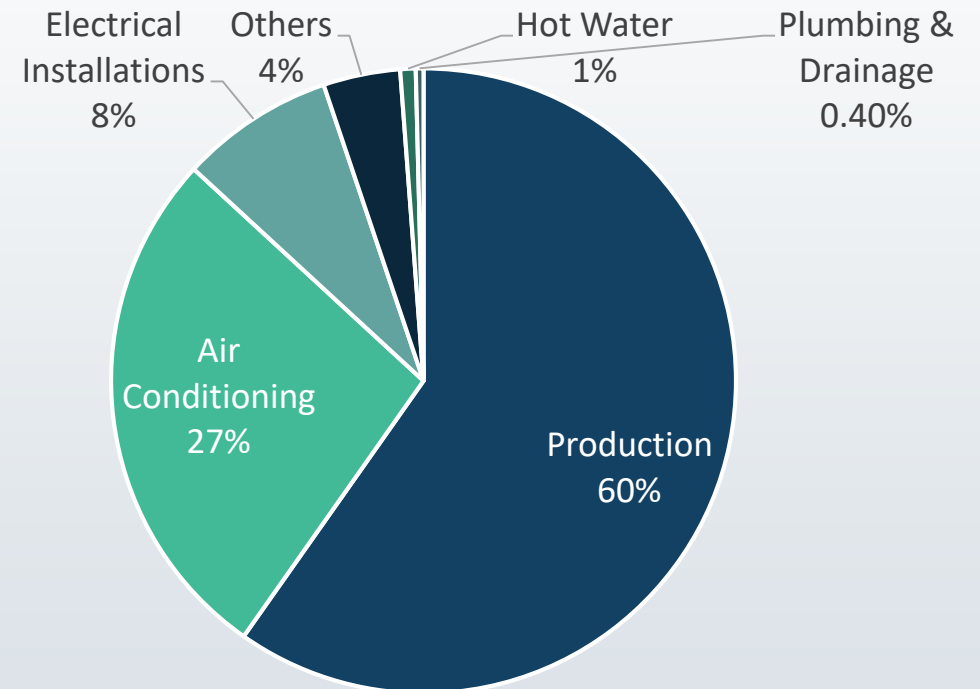
Scope of Audit:

Non-production Items

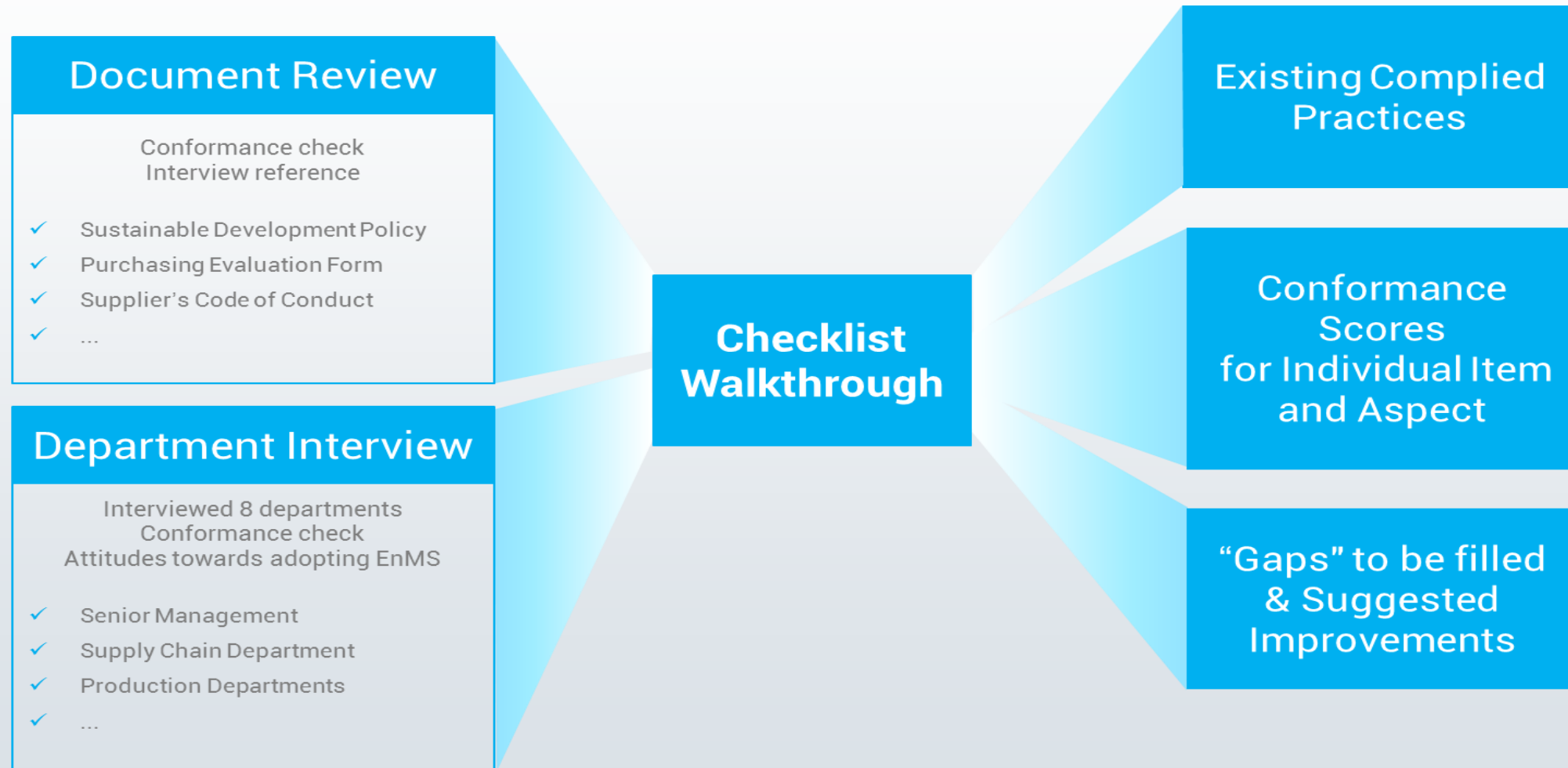
27%

Of total Consumption comes from

Air Conditioning

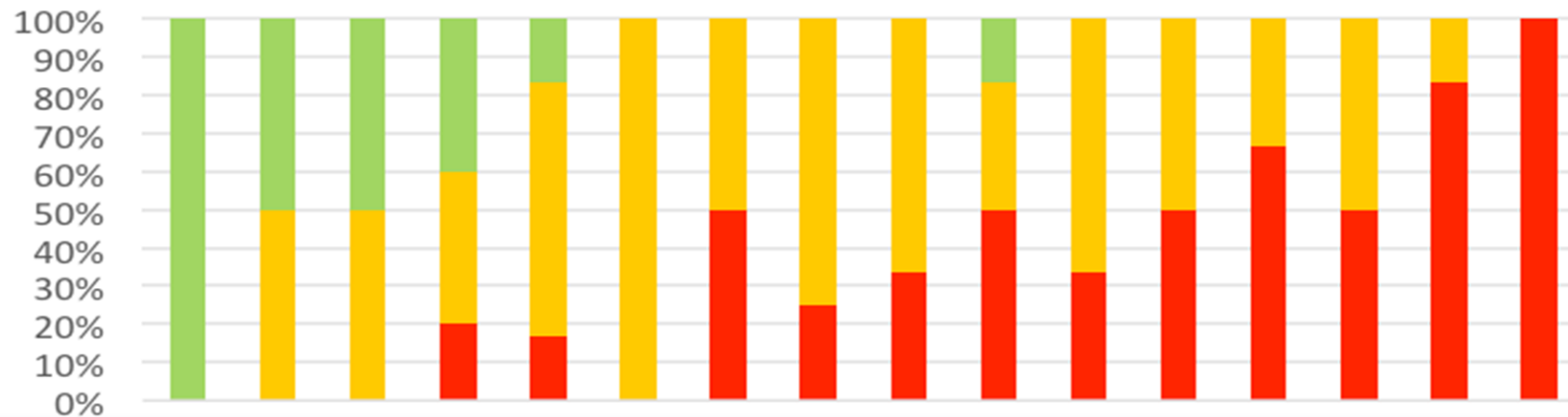


ISO 50001 Gap Analysis Processes



ISO 50001 Gap Analysis Example

Conformance Score by Item
ISO 50001 Gap Analysis Result



Organisation typically has 15-16 applicable ISO 50001 compliance categories to score



Retro-commissioning by Certified RCx Consultancy

Retro-commissioning (RCx) is a systematic process to periodically check an existing building's performance - identify operational improvements to save energy, lower energy bills and improve indoor environment.

Independent Certified RCx consultants have no sales agenda & open-minded approach to identify clients' best interests.



12% Design, Installation, Retrofit, and Replacement

16% Maintenance

72% Operations and Control

Building Lifecycle impact dominated by operations

Retro-commissioning Benefits



Multiple benefits of Retro-commissioning:

- Unlock building energy cost savings with no or low investment = short paybacks;
- Reduce Operation and Maintenance (O&M) costs;
- Reduce breakdown risks in energy consuming equipment/ systems; extend lifespan of equipment;
- Ensure energy consuming equipment/systems operate at peak efficiency & provide healthy + comfortable indoor environment.
- Increase the asset value of the building and grow the knowledge and skills of the FM team

RCx focuses on checking if energy consuming equipment/ systems operate properly per today's design or user requirements and also identifies areas of improvement.

- Change system control settings,
- Remedial sensor calibrations
- Update operational schedules
- Rebalance air & water flow rates
- Identify need for plant upgrades

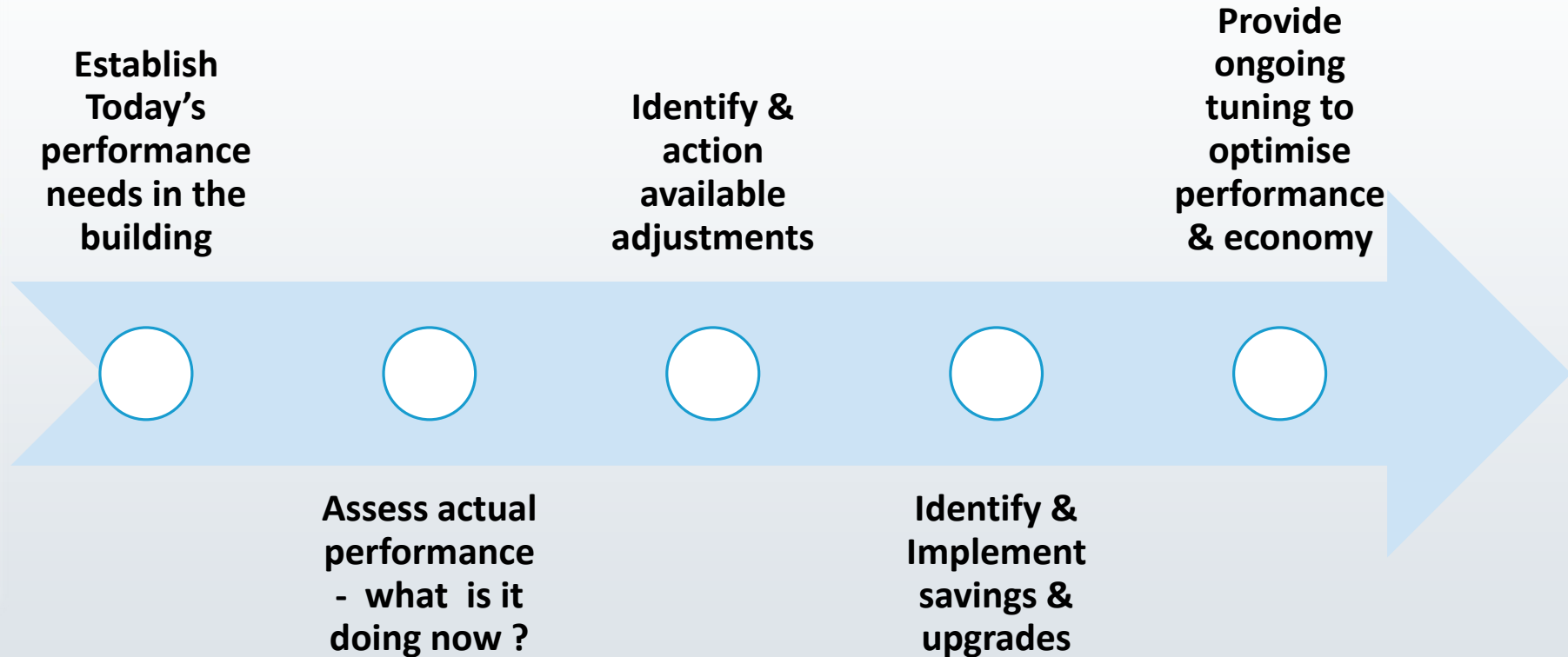
RCx also identifies Energy Saving Opportunities (EMO) & provides ongoing commissioning plan.

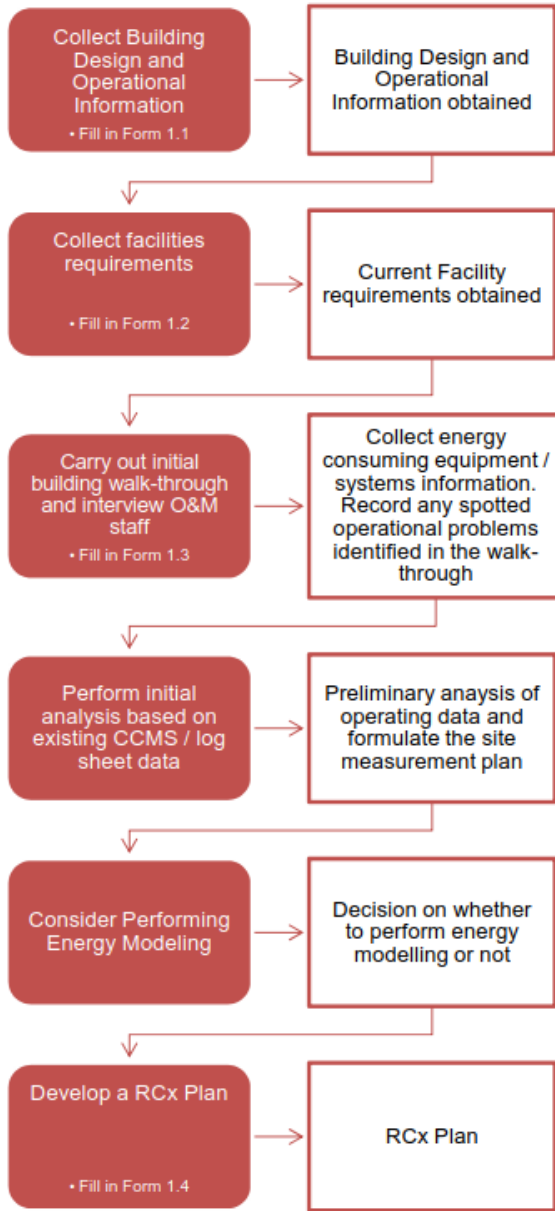
Enables building owner/operators to maintain future performance to high levels of energy efficiency.

Difference between Retro- Commissioning and Energy Audit ?



Maximising Gains in Retro-commissioning





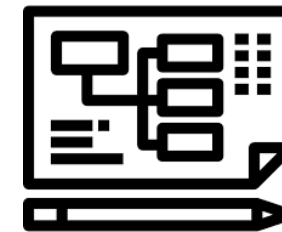
To obtain sufficient information:

Operation and maintenance manual

Site measurement








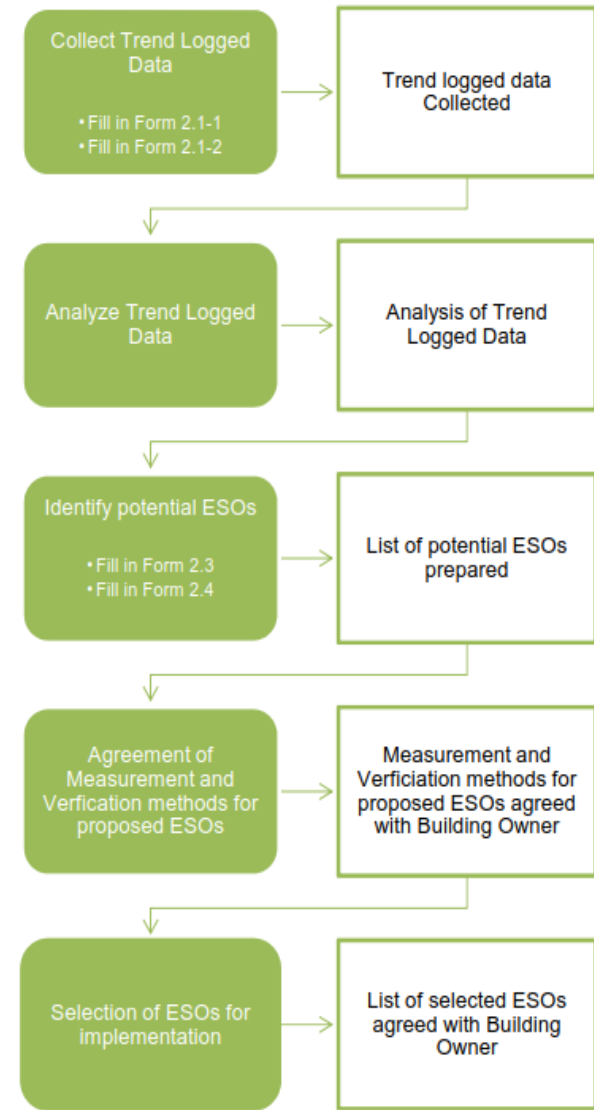
Planning Stage

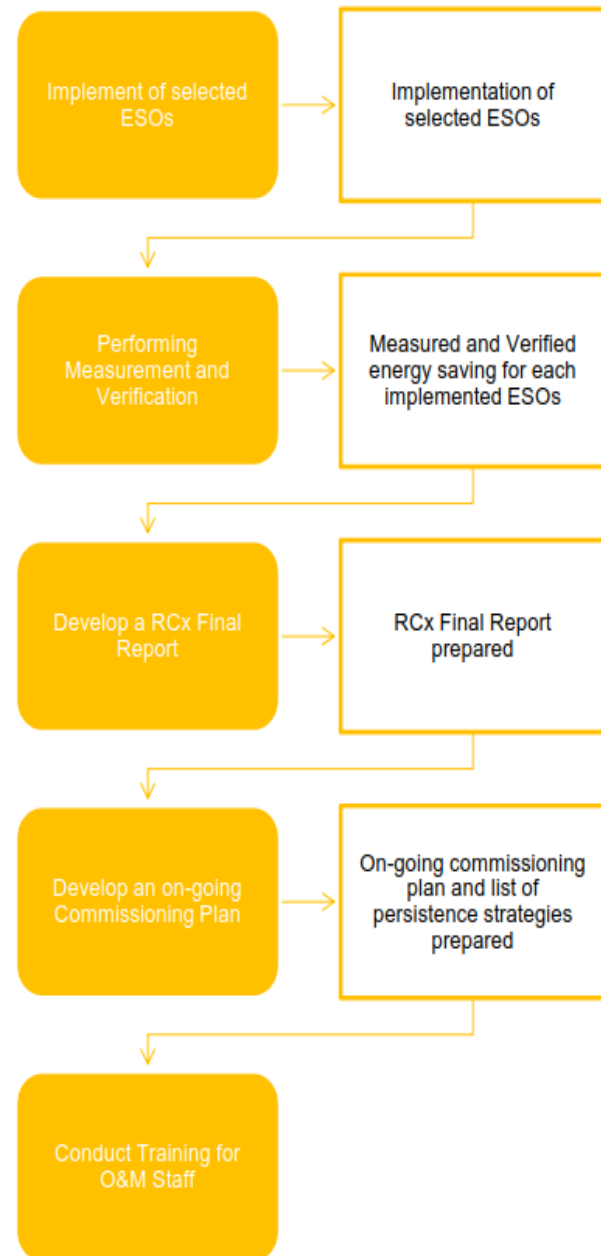



Investigation Stage




-  Identifying any existing operational problems
-  Identifying energy saving opportunities (ESOs)
-  Re-Commissioning Procedure and modification method statement
-  Assess operational disturbance
-  Provide Investigation Report




Execute re-commissioning / modification work / operational optimization process

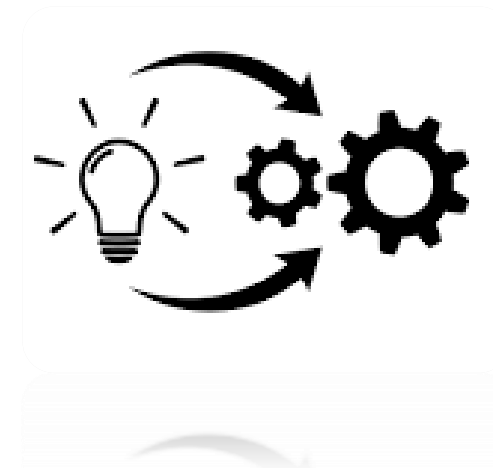


Verifying the operational functional performance and energy saving



Provide testing commissioning report

Implement Stage

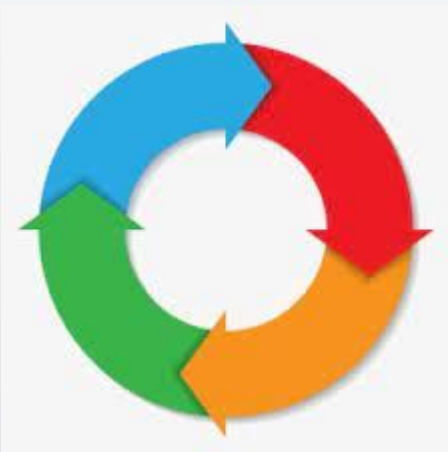


On-going commissioning

Continuous monitoring & tuning of systems
(Calibrate KPIs & track performance)

Re-investigations as facility usage & plant evolves

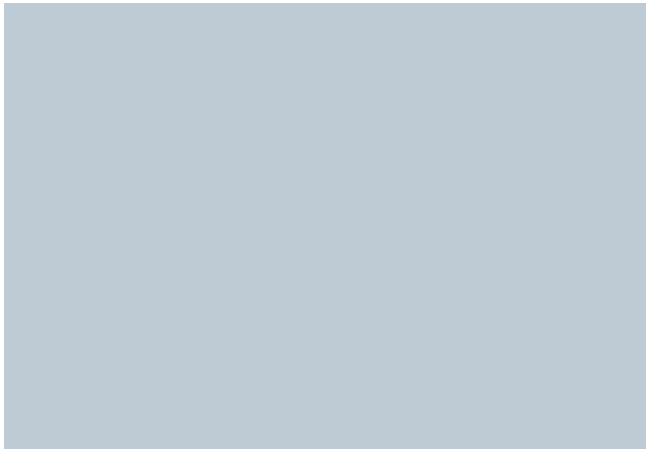
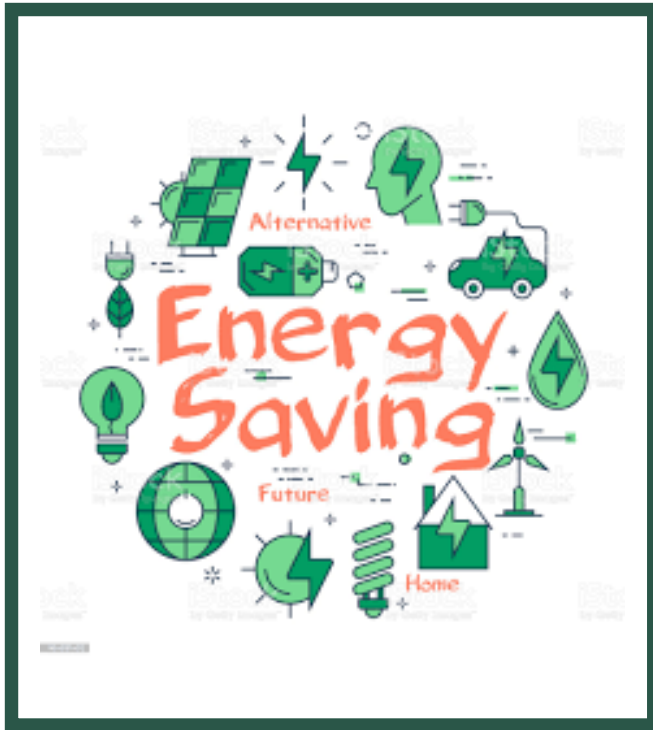
Continual commissioning if required where subject to drift



Implement
Ongoing
Commissioning
Plan



On-going
Commissioning



Conclusion



ISO 50001 and Retro-commissioning are powerful approaches to achieve energy conservation.

Certified ISO 50001 provides framework & guidance for continuous improvement.

RCx by certified independent consultancy provides neutral & cost-effective approach to maximise existing building potential & identify improvement to suit today's operational & sustainability objectives.

Wrap-Up

