

# Making Ghanaian Industries Competitive Through Energy Efficiency Interventions

By

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**GIZ LONG TERM ENERGY EFFICIENCY EXPERT**



# The Concept

An Equipment or Process is energy efficient if it:

1. Uses less energy to deliver same performance as the traditional Equipment or Process;
2. Reduces / Eliminates energy waste.

Ultimately, energy efficiency means doing more with less energy without compromising. Look for the Mark!!



# Why Energy Efficiency

Energy Efficiency:

1. Increases profitability;
2. Reduces / Eliminates energy waste.

Energy efficiency limits growth in energy consumption. Saves wildlife & habitats, safeguard the planet. Energy Efficiency is a practical way to demonstrate sustainability.



# Implementation

Energy Efficiency is implemented by:

1. Establishing an Energy Management Systems e.g. ISO 50001:2014
2. Conducting energy audits ISO 50002:2014
3. Changing equipment & Processes.

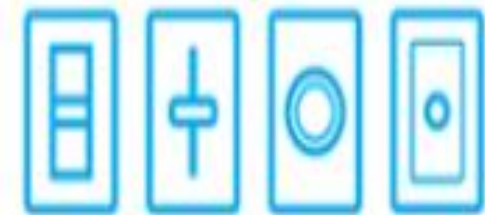
Always think how can we do better



Most ENERGY STAR certified LED bulbs are  
**DIMMABLE.**

Check out the package to be sure.  
Visit the manufacturer-provided URL  
for a list of recommended

**DIMMERS.**



# Introduction to Energy Audit



# ❖ The Energy Audit

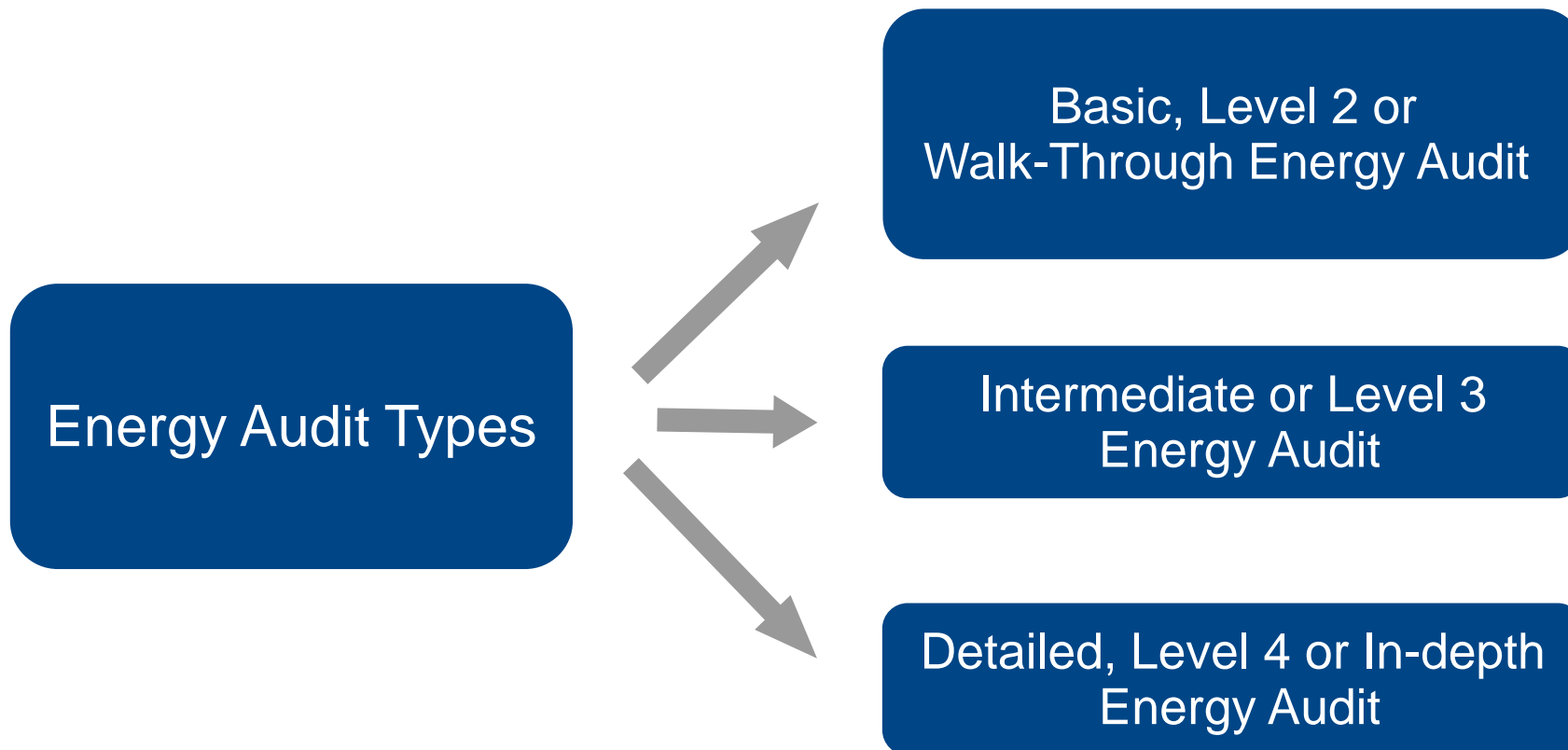
□ **Energy Audit** is an important first step towards implementing energy efficiency in any medium or large sized company or eEstablishment.

□ **In EN 16247-1 Energy Audit is defined as:**

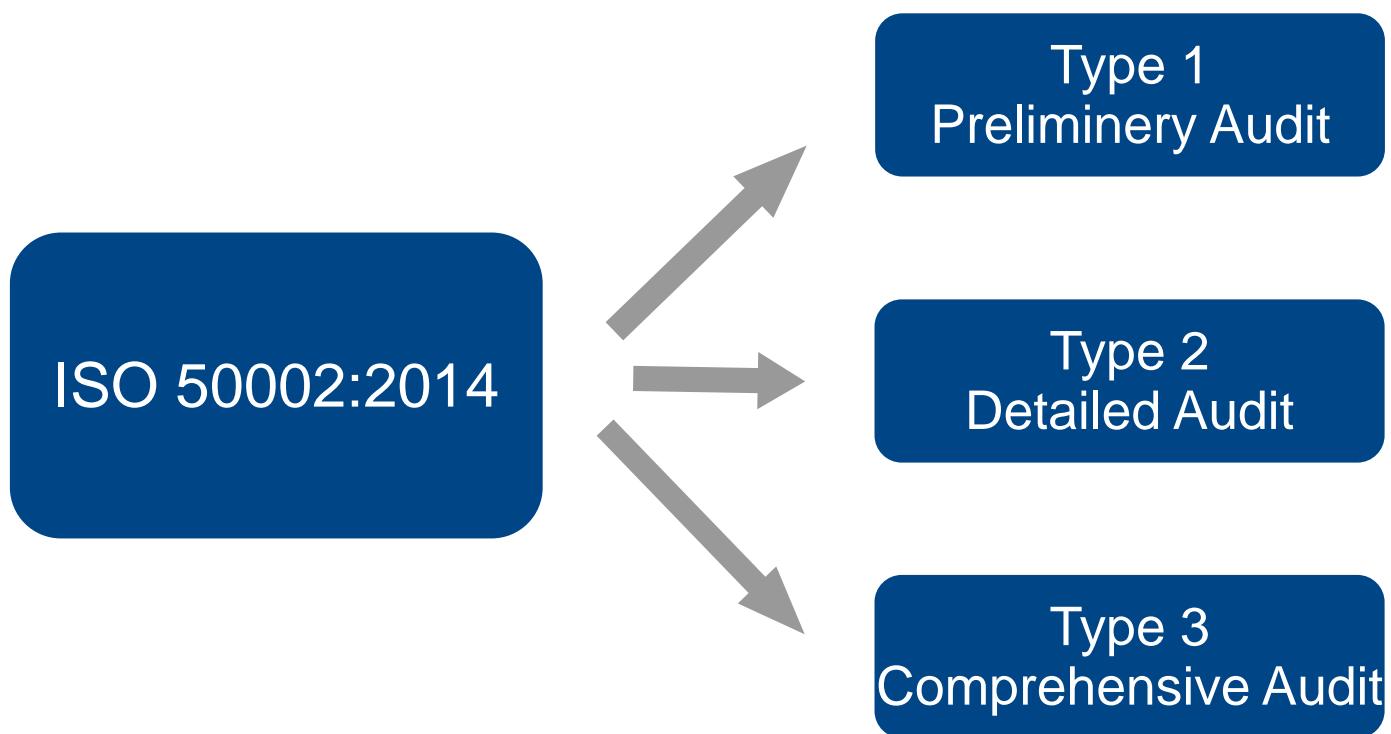
- “Systematic analysis of energy-use within a defined scope, in order to identify, quantify and report on the opportunities for improving energy performance“



# ❖ TYPES OF ENERGY AUDITS



# ❖ ISO Names for Energy Audit Types



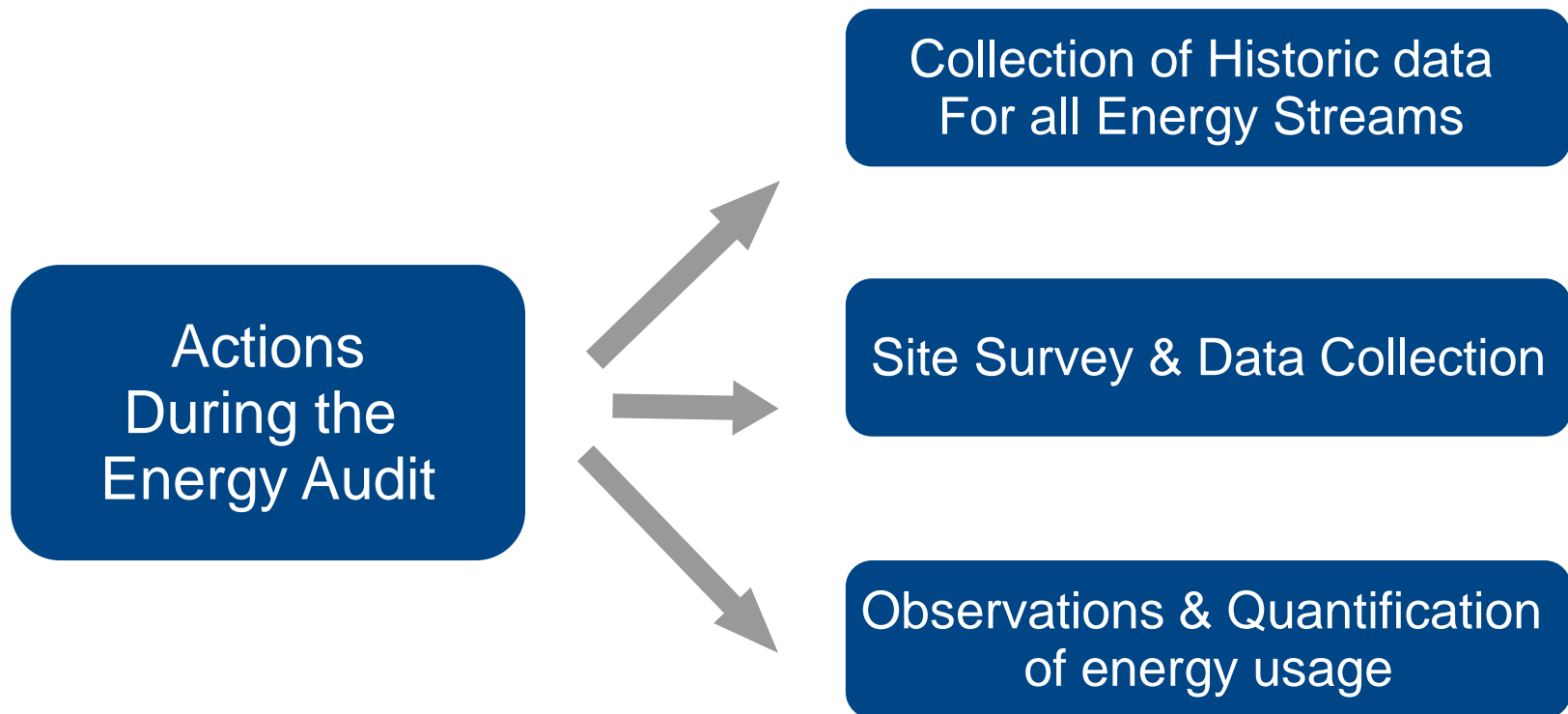


# ❖ Energy Audit Level Requirements

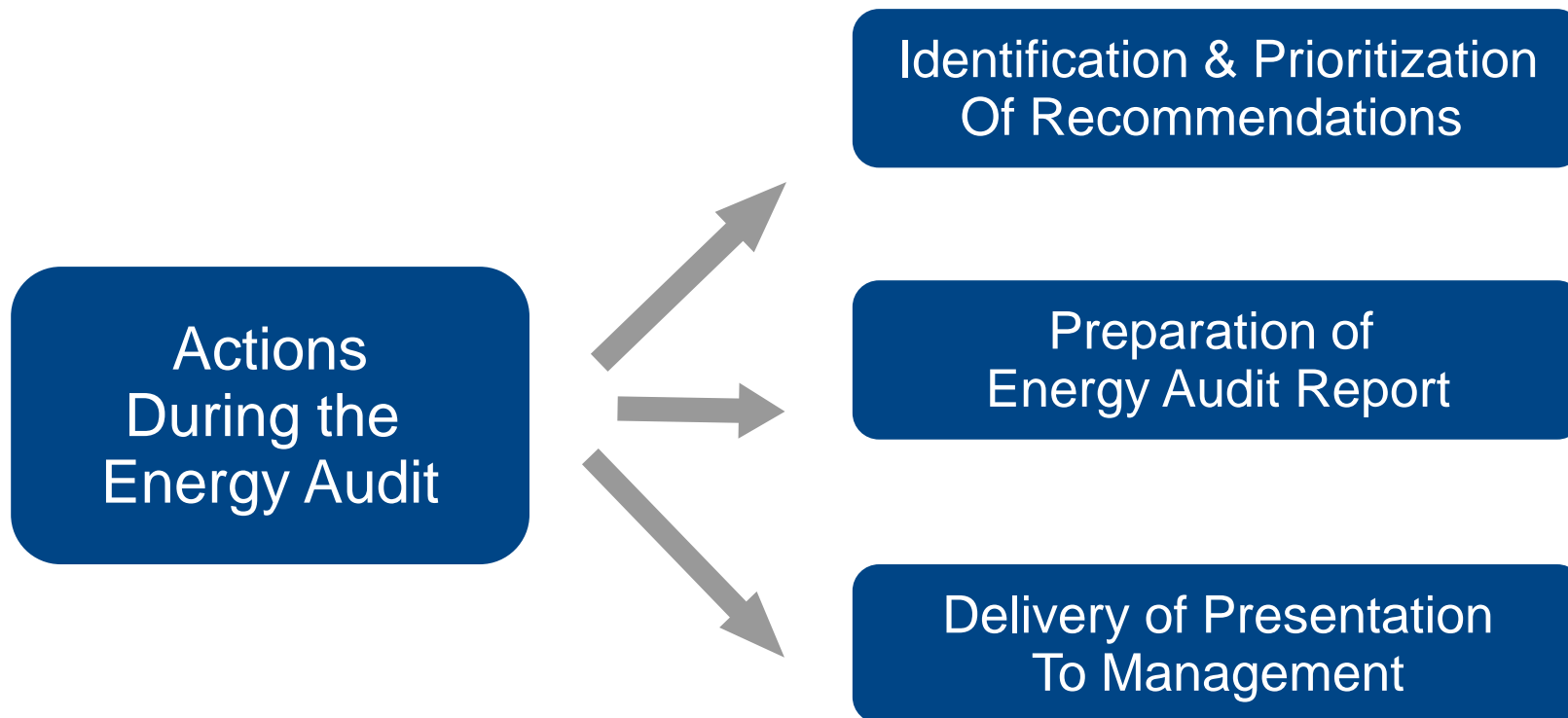
Analysis	Type 1	Type 2	Type 3
Review of current and historical data	X	X	X
Review of daily, monthly, seasonal energy profiles to identify anomalies	X	X	X
Factory level energy flow and identification of SEUs	X	X	X
Comparison with available benchmarks to identify inefficiencies	X	X	X
EnPIs at plant, system, process or equipment level		X	X
Mass and energy balance of significant energy users, systems, processes		X	X
Energy balance reconciled with sub-metering data		X	X
Variation of energy consumption with relevant variables		X	X
Recommendation for additional data or investigations			X



# COMPONENTS OF THE ENERGY AUDIT 1

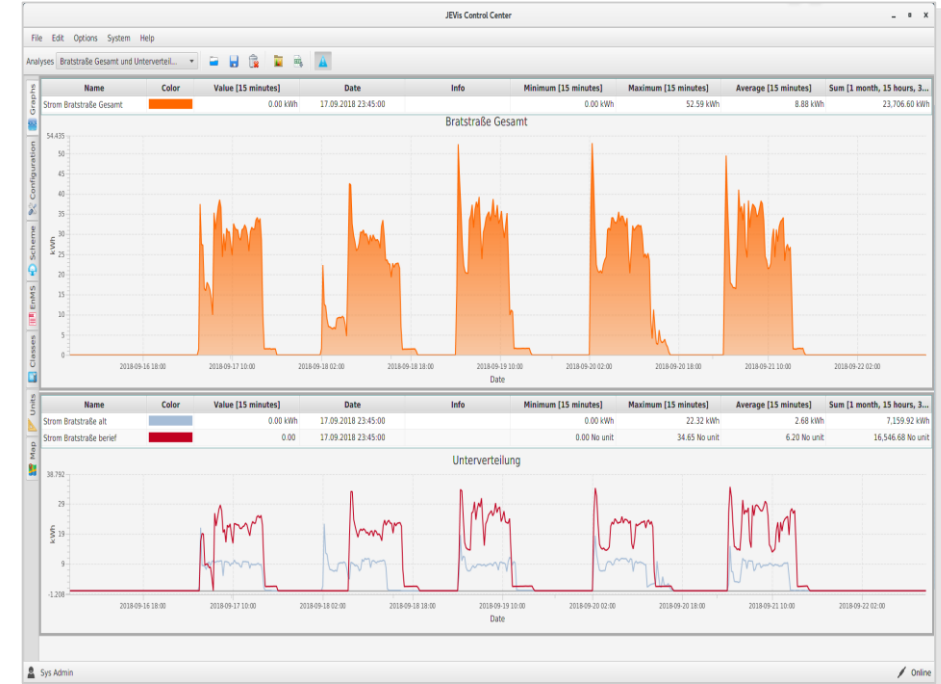
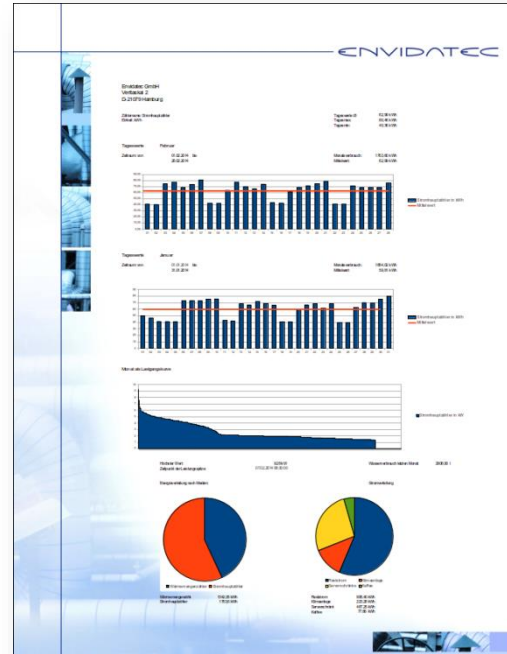


# COMPONENTS OF THE ENERGY AUDIT 2



# ❖ Application of MM&T Solutions

- ❑ M = Measurement
- ❑ M = Monitoring
- ❑ & T = and Targetting



# ❖ Audit Process – Opportunity Identification

Opportunity Identification	Type 1	Type 2	Type 3
Identification of low cost and easily quantifiable EE measures	X	X	X
Identification of cost intensive measures	X	X	X
Detailed evaluation of cost intensive measures		X	X
Identification and evaluation of suite of specific and implementable EE measures		X	X
Energy savings of EE measures reconciled against detailed energy balance		X	X
Presentation of draft list of opportunities to the organization for discussion		X	X
Detailed analysis, techniques, experimental approaches used			X
Discussion with vendors to identify or verify latest technologies for energy performance improvement			X



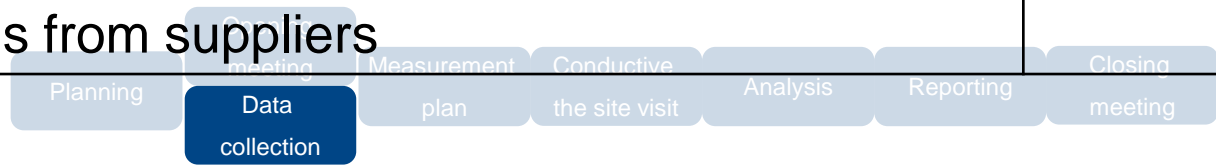
# ❖ Audit Process – Opportunity Evaluation

Opportunities Evaluation	Type 1	Type 2	Type 3
Savings calculated using common thumb rules	X		
Savings calculated using technology specific opportunities reconciled with energy balance		X	X
Evaluation of non-energy gains associated with EE measures		X	X
Interaction of EE measure with other systems considered			X
Savings calculated from information from vendors			X
Savings calculated from detailed analysis, techniques, experimental approaches			X
Preliminary equipment design for EE measures			X
Cost estimate based on standardized costs or readily available quotes		X	
Cost estimate based on quotes provided by suppliers			X
Presentation of agreed economic analysis, typically including simple payback but may include methods such as IRR or NPV		X	X

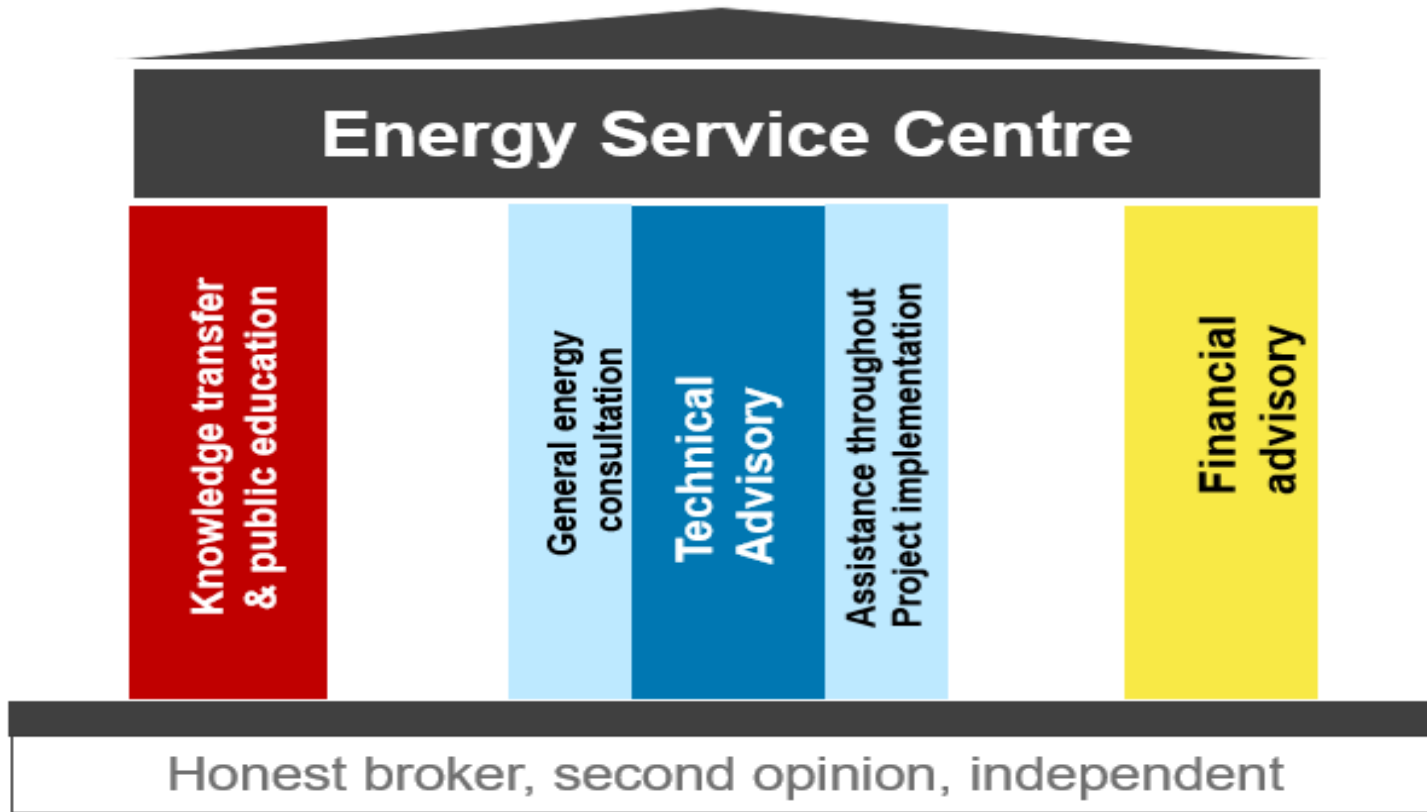


# ❖ Audit Process – Data Collection

Data	Type 1	Type 2	Type 3
Historical Energy and relevant data	X	X	X
Daily Load Profile	X	X	X
Sub-metering data	X	X	X
List of Equipment including basic data	X	X	X
Detailed data on energy consumers and processes		X	X
Site measurements to obtain relevant variables		X	X
Design operation and maintenance documents		X	X
Future plans affecting energy usage		X	X
Information of management of energy		X	X
Data logging for extended period of time			X
Quotations from suppliers			X



# The Services provided at the ESC



- Plattform for orientation, news and technical information
  - Seminars, workshops
  - Providing research services on RE/EE
- Inhouse expertise, contact to external experts (linkage between service providers and customers)
  - On-site audits
  - Assistance for development of business strategies and project implementation
- Advise customers on financing options
  - Connect to financial institutions





# AGI Energy Service Centre

North Ridge, Accra.

AGI Energy Service Centre  
Association of Ghana Industries

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In cooperation with:



Implemented by:





Thank you

