Energy Management System & Energy Digitizing

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ISO 50001 Energy Management System (EnMS)

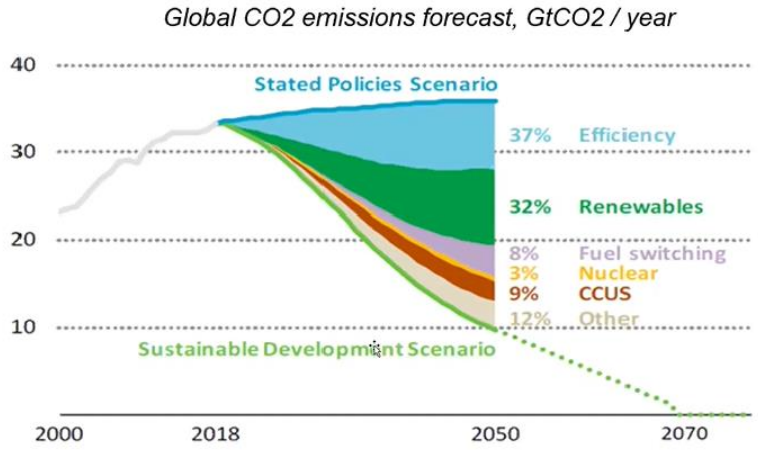
- ISO 50001 supports organizations to use energy more efficiently, through the development of an EnMS.
- EnMS is planning and operation of methods to control both energy production and energy consumption.
- EnMS offers a structured and comprehensive approach to improve energy efficiency.

ISO 50001 Energy Management System (EnMS)

Why organizations should be certified for ISO 50001?

- Energy reduction.
- GHG emissions reduction.
- Cost Reduction (Maintenance/Man hours/Fuel)
- Assist in compliance with energy efficiency regulations.
- Improve organizations image and credibility among stakeholders.
- Globally recognized International Standard.
- Increase energy awareness among employees & contractors.
- Improve operational efficiencies and maintenance practices.

Global CO2 emissions and Energy Efficiency

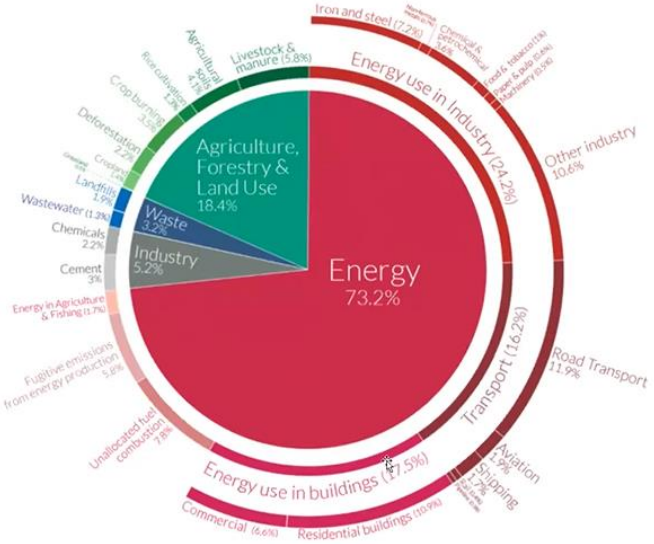


Source : International Energy Agency – 2019 Report

Global CO2 emissions and Energy Efficiency

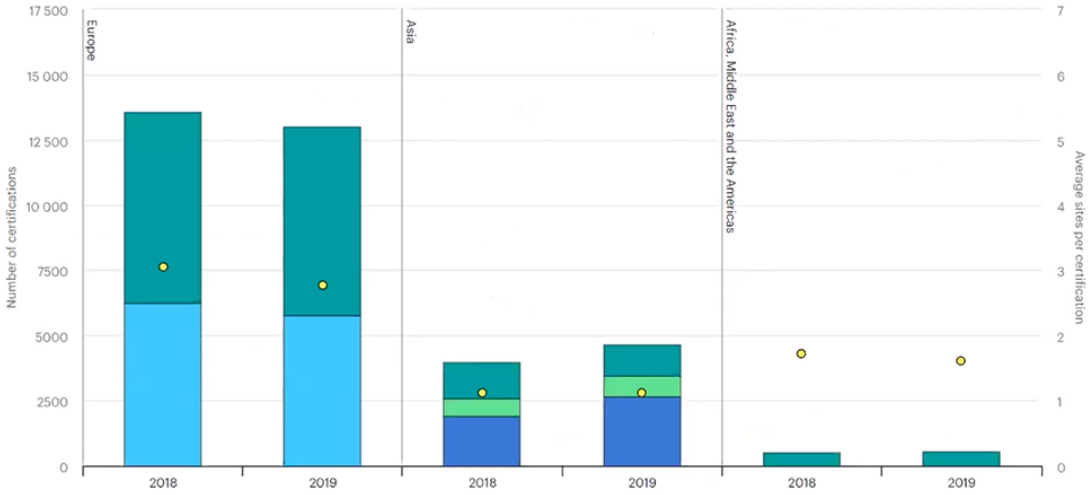
Global greenhouse gas emissions by sector

2016 data – global greenhouse emissions were 50 billion tonnes CO_2eq.



Source : International Energy Agency – 2019 Report

ISO 50001 Certifications in Selected Regions, 2018-2019



Source : International Energy Agency – Energy Efficiency 2020, Fuel Report – December 2020

ISO 50001 Requirements

4 Context of the organization
5 Leadership
6 Planning
  6.3 Energy review
7 Support
8 Operation
9 Performance Evaluation
10 Improvement

ISO 50001 Requirements

6.3 Energy review

To develop the energy review, the organization shall:

a) analyze energy use and consumption based on measurement and other data, i.e.:
  1- identify current types of energy;
  2- evaluate past and current energy use(s) and consumption;
b) based on the analysis, identify Significant Energy Use (SEUs);
c) for each SEU:
  1- determine relevant variables;
  2- determine current energy performance;
  3- identify the person(s) doing work under its control that influence or affect the SEUs;
d) determine and prioritize opportunities for improving energy performance;
e) estimate future energy use(s) and energy consumption.

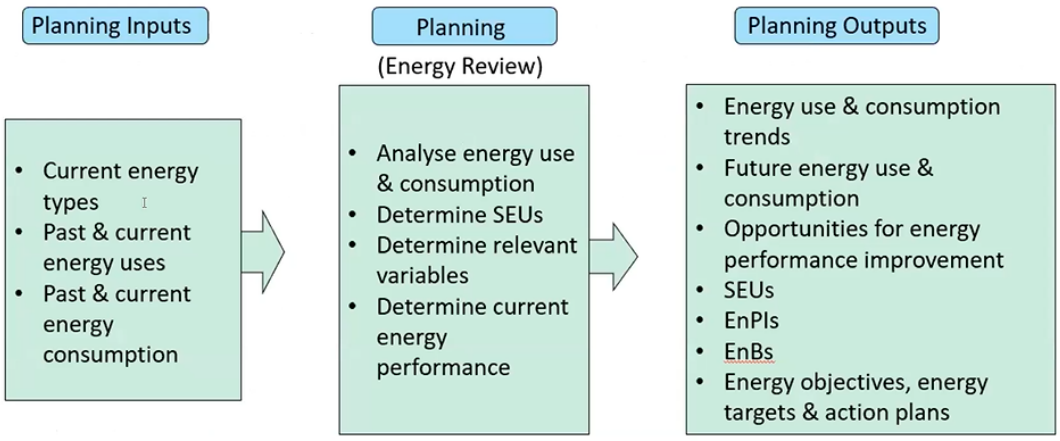
Energy Review Steps (ISO 50001)

Step 1: Identify energy sources within determined scope and boundaries
Step 2: Identify energy uses from energy sources.
Step 3: Compile available energy data from previous 12 months.
Step 4: Calculate the energy profile for each energy use.
Step 5: Identify Significant Energy Use (SEU) criteria.
Step 6: Identify Significant Energy Use (SEU).
Step 7: Identify the people that work with the Significant Energy Use (SEU).
Step 8: Identify variables that could affect the energy performance (Enp) of Significant Energy Use (SEU).

Energy Review Steps (ISO 50001)

Step 9: Segregate variables into static factors and relevant variables.
Step 10: Compile relevant variable data from the same previous 12 months.
Step 11: Analyse the energy consumption against relevant variable.
Step 12: Consider variables to establish Energy Performance Indicators (EnPIs) if significantly effect EnP.
Step 13: Normalize the EnPI value(s) and corresponding Energy Baseline (EnB).
Step 14: Decide when should the EnB(s), EnPI(s) and EnPI value(s) be reviewed.
Step 15: Identify a list of energy performance improvement opportunities.
Step 16: Prioritize a list of energy performance improvement opportunities.
Step 17: Estimate the future energy use and consumption.

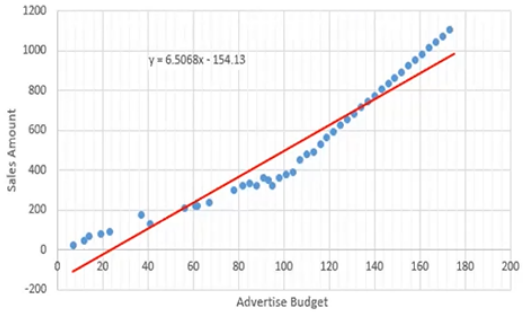
Energy Planning Process (ISO 50001)



Energy Baseline (EnB) Calculations

Linear regression models are **used to** show or predict the relationship between two variables or factors.

Regression analysis is used to find equations that fit data. Once we have the regression equation, we can use the model to make predictions.



The equation has the form

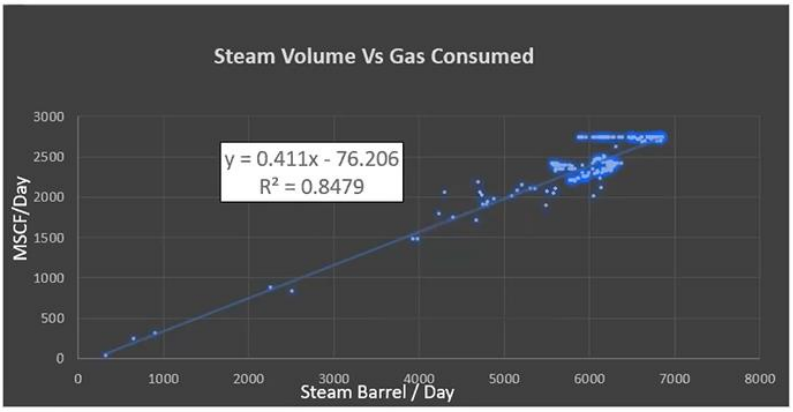
$$Y = bX + a$$

"Y" is the dependent variable (Y axis), ***gas***
"X" is the independent variable (X axis), **steam**
"b" is the slope of the line and "a" is the y-intercept (constant).

Energy Baseline Calculations

Date	Boiling Feed Water (BW)	Fuel Gas (MSCF)	Pure Steam (BS)	Steam Quality (%)	Pressure (PSIg)	Boiling Feed Water Temp (F)	Steam Outlet Temp (F)	Running Hours (HRS)
15-Jan-2019	4819	2748	6826	69	1066	104	554	24
16-Jan-2019	4811	2748	6802	69	1075	104	552	24
17-Jan-2019	4800	2703	6792	71	1079	103	548	24
18-Jan-2019	4795	2748	6775	71	1019	104	553	24
19-Jan-2019	4802	2748	6768	71	1070	104	556	24
20-Jan-2019	4812	2748	6779	70	1092	103	556	24
21-Jan-2019	4820	2748	6793	70	1092	102	554	24
22-Jan-2019	4825	2748	6804	70	1082	103	554	24
23-Jan-2019	4821	2748	6811	70	1073	103	554	24
24-Jan-2019	4807	2748	6806	70	1079	104	554	24
25-Jan-2019	4812	2748	6786	71	1072	104	554	24
26-Jan-2019	4794	2748	6792	71	1074	104	555	24
27-Jan-2019	4787	2748	6768	71	1079	104	556	24
28-Jan-2019	4778	2748	6758	71	1091	104	556	24

Energy Baselines Calculations

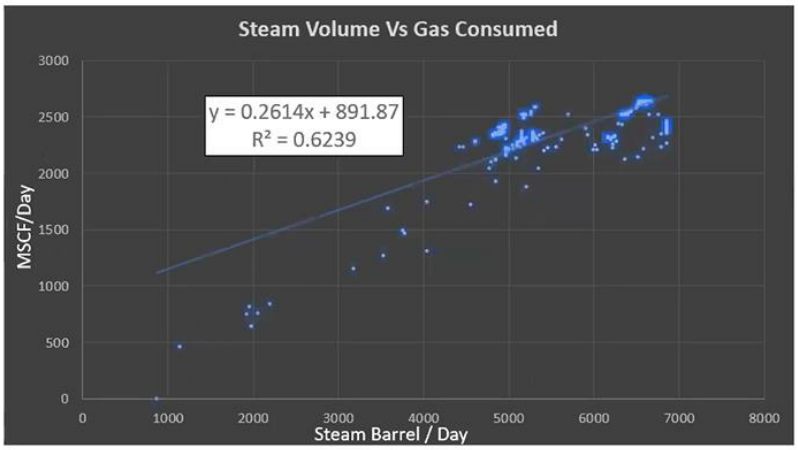


Strong Relationship

Gas volume = (0.411) 5000 -76.206 = 1,979 MSCF

Energy Baseline is (5000/1979) = **2.52 BS/MSCF**

Energy Baselines Calculations



Weak Relationship

Thank You