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"Improving the Use of Energy in Buildings"

ISO 50006: The new ISO standard for energy baselines and performance indicators

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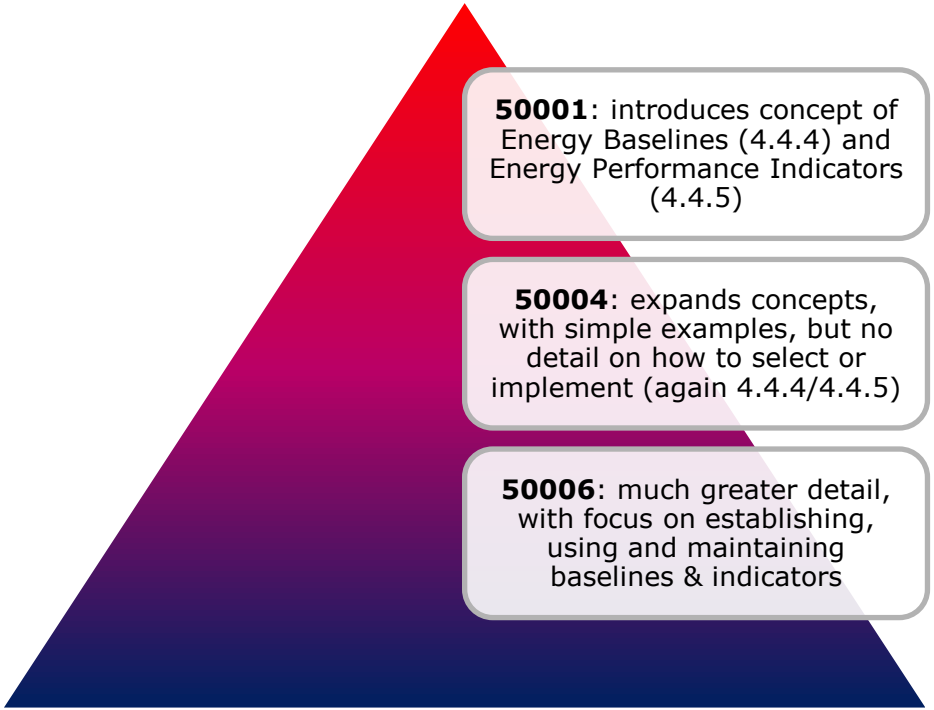
ISO 50001 was incomplete...

- ISO 50001 is a Management Systems standard
- As such it focuses on process, including how to develop a PDCA cycle, but in some ways lacks specificity to energy
- The relevant ISO committee recognised this, so is drawing up supporting standards
- So far:
  - 50002 – Energy audits - Requirements with guidance for use
  - 50003 – Requirements for bodies providing audit and certification of energy management systems
  - 50004 – Guidance for the implementation, maintenance and improvement of an energy management system
  - 50006 – Energy Baselines and Energy Performance Indicators
  - 50015 – Measurement and verification of energy performance of organizations - General principles and guidance

So where does it fit in?

Energy Management System Standards



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So what does ISO 50001 say?

"

4.4.4 Energy Baselines

- The organization shall establish an energy baseline(s) using the information in the initial energy review, considering a data period suitable to the organization's energy use and consumption. Changes in energy performance shall be measured against the energy baseline(s).
- Adjustments to the baseline(s) shall be made in the case of one or more of the following:
  - EnPIs no longer reflect organizational energy use and consumption, or
  - there have been major changes to the process, operational patterns, or energy systems, or
  - according to a predetermined method.
- The energy baseline(s) shall be maintained and recorded.

"

- *Note "shall" imposes a requirement*
- *Determination follows energy review & may be adjusted*

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So what does ISO 50001 say?

"4.4.5 Energy Performance Indicators

- The organization shall identify EnPIs appropriate for monitoring and measuring its energy performance. The methodology for determining and updating the EnPIs shall be recorded and regularly reviewed.
- EnPIs shall be reviewed and compared to the energy baseline as appropriate."

- *Again "shall"; linked to baseline, but otherwise little guidance on what or how.*

ISO 50004 expands both sections to around half a page, and gives examples of types of indicators:

- energy consumption (in total or broken down by energy use) (e.g. kWh, GJ);
- simple ratio such as energy consumption per unit of output (e.g. kWh per tonne, kWh per man hour worked);
- statistical model (e.g. linear and nonlinear regression);
- engineering based model (e.g. simulation).

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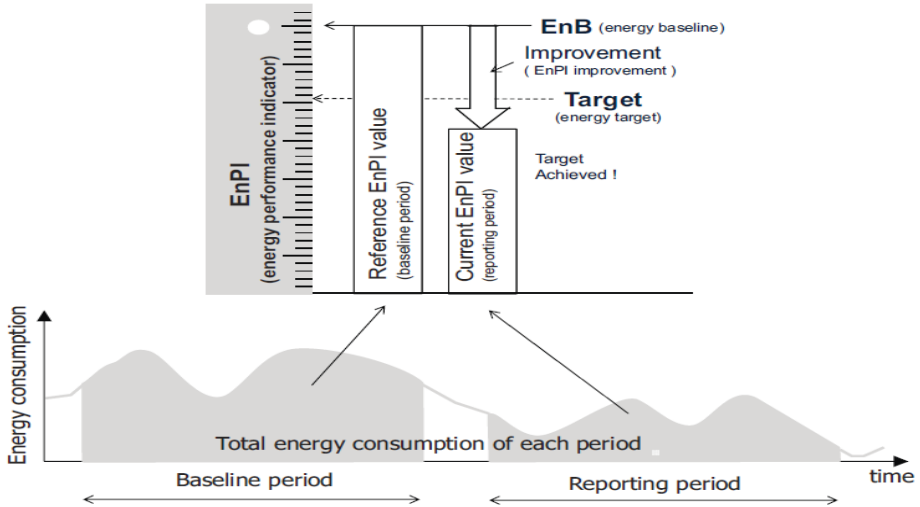
So we need more guidance in 50006

- Like ISO 50004, a guidance standard (no requirements)
  - Designed to be practical; ISO 50001 *is* normative
  - Use of Help Boxes dispersed within text
- Focus on establishing, using and maintaining baselines & indicators
- Starts with a general overview
- Suggests how to use the Energy Review to obtain relevant energy performance information
- Then identifies suitable energy performance indicators...
- ...and establishes matching baselines
- Considers how to use them...
- ...and how to maintain and adjust them as circumstances change

General Overview

- Reminds users of distinction between energy consumption and use, and the various meanings of energy efficiency
- Shows how measuring energy performance fits into a PDCA cycle
- Introduces Energy Performance Indicators (EnPIs) and Energy Baselines
- Places these into the context of quantifying energy performance



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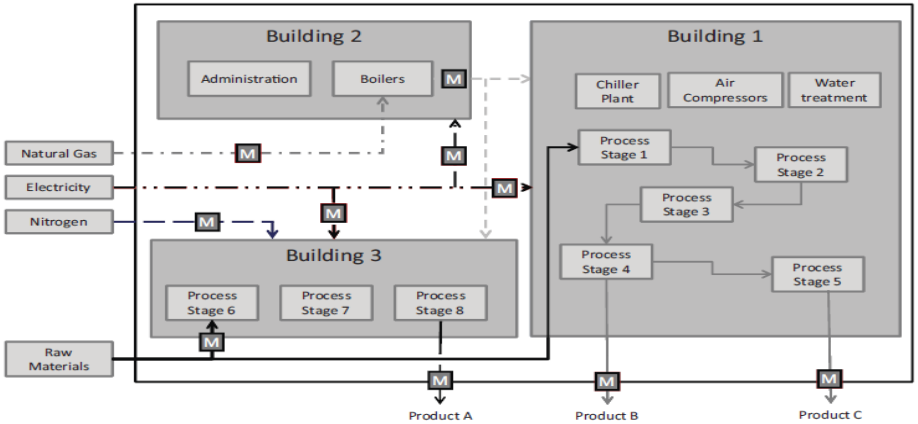
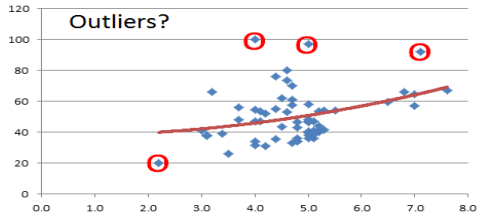
Obtaining information from Energy Review

- Start by defining EnPI boundaries
  - Individual facility/process
  - System
  - Organization
- Fence diagrams & energy flows
- Define & quantify relevant variables and static factors
- Collect the data
  - Measurement & metering
  - Frequency
  - Quality
  - Outliers





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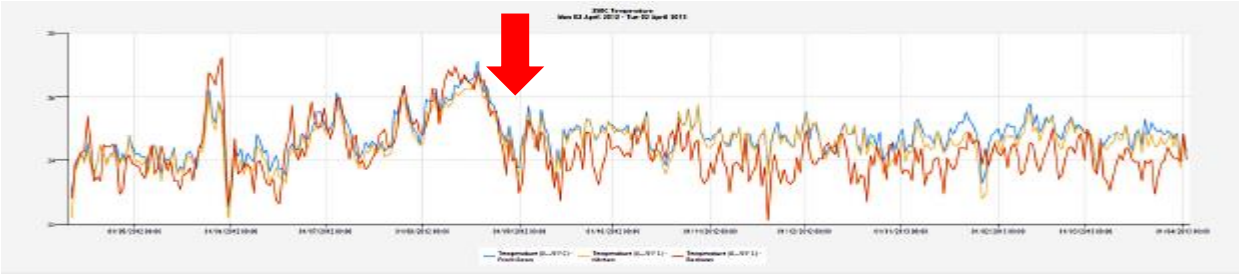
Identify Energy Performance Indicators

- Links to Energy Management System & Objectives
- Ensure appropriate to users (may need multiple indicators)
- Four broad types of EnPIs:

EnPI Type	Examples
Measured Energy Value	kWh, GJ, peak demand (kW)
Ratio of measured values	MWh/tonne, GJ/unit, kWh/m^2, litres/passenger-km
Statistical Model	Base load; multiple variables
Engineering model	Simulations; whole building models

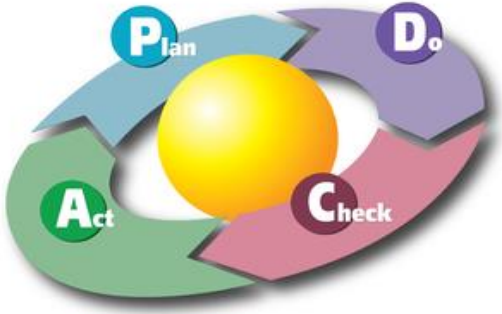
Establish Energy Baselines

- The value of the EnPI during the Baseline period
- Identify the purpose for which it will be used
- Determine a suitable data period
  - One year most common, effects of weather periodicity or seasonal demand
  - Can average over several years
- Collect data and determine and test the EnB



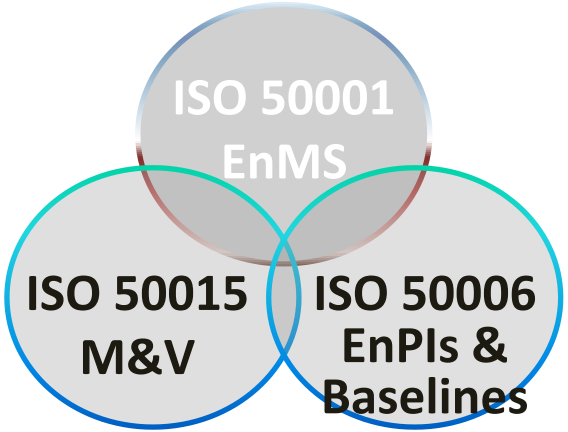
Using Energy Performance Indicators

- Normalisation
- Calculating energy performance improvements
  - EnPI difference
  - Percentage change
  - Current ratio (reporting period value/baseline)
- Communicating changes in energy performance
- Maintaining EnPIs and baselines
  - Tests for continuing validity
  - Necessary adjustments to baselines
  - Changes due to static factors, improved data availability, revised EnPI targets, regular (rolling) baselines, management review



Relationship to other standards

- In addition to 50001 & 50004, ISO 50006 links to other standards:
- ISO 50015 – Measurement and verification of energy performance of organizations
- ISO 14064-3 – Greenhouse gases — Part 3: Specification with guidance for the validation and verification of greenhouse gas assertions *also*
- ISO 17747 (in preparation) – Determination of energy savings in organizations
- EN 16231 – Energy Efficiency Benchmarking



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Thank You!

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