Savings calculation standard as a tool for international evaluation

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Subjects

- Savings to be evaluated
- Standard on savings calculation
- Role at international level
- Progress on indicator based methods in standard
- More with less with standard.
Type of savings to be calculated

Change in energy use

Volume / structure effects
Total energy savings

Autonomous savings
Policy induced savings

Policy measure 1
Policy measure 2
Policy measure 3

E.g. IEA country savings
E.g. IEA priority policies
CEN/ISO standard on savings calculation

Characteristics EN16212/ISO 17742:

- Geographical scope: country, region
- Energy end-use (not supply)
- General approach (concrete examples included)
- For policy evaluation at:
  - national / regional / city level
  - international level (EU, OECD, UN?)
- To be used ex-ante (planned) and ex-post (realised)
- Two methods:
  - top-down / indicator based > total savings
  - bottom-up / measure based > policy savings
Savings type and standardized methods

Change in energy use

- Volume / structure effects
- Total energy savings

- Autonomous savings
- Policy induced savings

CEN/ISO Indicator-based
CEN/ISO Measure-based

Policy measure 1
Policy measure 2
Policy measure 3
Why standardization of savings calculation?

Status of methods:
- Worldwide stakeholder consent
- Endorsed by national governments

Application:
- agreements on targets (total/indicators)
- agreements on means/efforts (policy/measures)

Relation to existing activities:
- Building on current methods
- Formalization of methods
- Requirements on transparency, reliability, data management
Possible role at international level

IEA:
- formalizing the use of indicators for savings calculations
- exporting the approach to non-OECD
- evaluation of effect of 25 priority policy measures

UN:
- FCCC: facilitating agreements on energy efficiency goals per country
- SUS4ALL: evaluation of progress as doubling energy efficiency rate
- UNIDO: facilitating agreements on energy efficiency in industrial branches

JI-CDM/Projects:
- Providing generalized baselines for project evaluations
Indicator based methods: indicators

\[ \text{IND}(t) = \frac{\text{NEC}(t)}{\text{DV}(t)} \]

**NEC** is Normalised Energy Consumption
**DV** is Driver quantity

**Type of indicators:**
- Specific energy consumption per subsector > driver = output
- Specific energy consumption for system > driver number or size
- Penetration of energy saving systems (diffusion indicators)

**Choice of indicator, e.g.:**
- Fuel use per person-km travelled
- Fuel use per vehicle-km
- Annual fuel use per car
Indicator based methods: savings

ESPI(t) = [IND(t0) – IND(t)] \times DV(t)

ESPI is energy savings per indicator

Choice of calculation rules:
- Fixed base year (period) or moving base year (stepwise) approach
- Driver value from base year or end year
- Energy use in final or primary terms
- Moving average for indicator values

Reliability of results:
- Appropriateness of indicator
- Coverage of end-use with indicators
- Length of evaluation period
- Data (trend) quality
Progress as to indicator based methods

Standard now ready for final comments

Final standard adopted in 2014

Concrete indicator-based methods to be set up according to general standard, e.g:
- Average energy use per dwelling
- Average electricity use per appliance
- Average energy use per m2 of offices
- Energy use per ton of steel, cement, etc.
- Fuel use per km driven per car
- Shift between transport modes (car > train)
- Fuel use per ton-km transport of goods
Doing more with less with standards

An international standard avoids:
- Double work on creating indicators
- Explanation of differences
- Gathering of data for indicators not used
- Gathering of more national data than needed

An international standards provides:
- International framework for evaluation
- Higher chance on national application
- Higher chance on obligatory application as part of international agreement
- Stronger commitment of governments
- More support for (focused) data gathering
Annex (not shown)
Factors defining quality of TD saving figures

Quality top-down figures defined by:

– Margins in energy consumption data
– Margins in data on ERG-variable
– Appropriateness of ERG for determining energy-use-without-savings (des-aggregation, choice of ERG)
– Length of analysis period
Margins total savings Netherlands

![Graph showing average yearly national savings and margin of average yearly savings from 2001 to 2009. The graph indicates a steady increase in savings over the years, with a slight decrease in the margin of savings towards the end of the period.]
## Scope of TD methods

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overview
What are standards?

A document, established by consensus and approved by a recognised body, that provides for common and repeated use: rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Properties:

- Agreements on definitions, specifications, factors, calculation rules, practices
- Formulated in a discussion process open for all stakeholders
- Content dependent on consensus building

Organisation:

- National (NEN) > European (CEN) and worldwide (ISO)
- Committees per field (activity, issue, technology)
- Standards formulation process 2-3 years
- Voluntary application unless part of regulation (e.g. EC directives)
Relevant ISO standards

Terminology
- 13273-1 (energy efficiency)

Energy Management Systems:
- 50001 (basis)
- 50002 t/m 50005 (supporting)

Savings calculations:
- 17743 (General)
- 17742 (Regions)
- 17744 (Projects)
- 17747 (Organisations)
Applications of CEN/ISO standard

**Top-down / indicator based methods:**
- Indicators on energy use and savings for *countries or sectors* (IEA)
- Benchmark for *sub-sectors* (cement, steel, power plants)
- Efficiency indicators for *stock of cars*, to be checked with minimum standards

**Bottom-up / measure based methods:**
- Evaluation of saving *policy* of countries
- Evaluation of saving *programs* of energy companies
- *Audits*: expected savings of measures in dwellings/buildings
- Evaluation of *policy measures*, e.g. effect of subsidy scheme
- Energy *Performance Contracting*: realised savings
Role in policy implementation

Policy regards obligations and agreements on:

- **Goals** (targets on savings, energy use or emission reduction)
- **Means** (policy measures, actions of actors)
- **Results** (amount of realised savings or emission reduction)
- **Actors** (“large” energy companies, end-users)
- **Systems** (appliances with minimum efficiency)

Agreements & obligations ask for:

- Definitions, rules, (correction) factors, exceptions, etc.
- Harmonised over branches, sectors, countries.
- Agreed or accepted by relevant actors
- Practically applicable

Which are provided by standards (EN16212 and ISO 17742)!
## Application of standards per level

<table>
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Role of standards in society

**Policy makers**: supporting compliance to regulations and legislation

**Countries**: facilitating trade and communication

**Manufacturers**: common performance specifications, testing, sampling, materials and quality assurance/control

**Investors & funding**: confidence and trust, clearly specify what is being funded and to verify and audit

**Verification bodies**: processes, procedures and specs to audit, consistency, harmonised approach and protocols

**Users**: confidence, trust, consistency, understanding performance, safety, etc

Source: IRENA