

Savings calculation standard as a tool for international evaluation

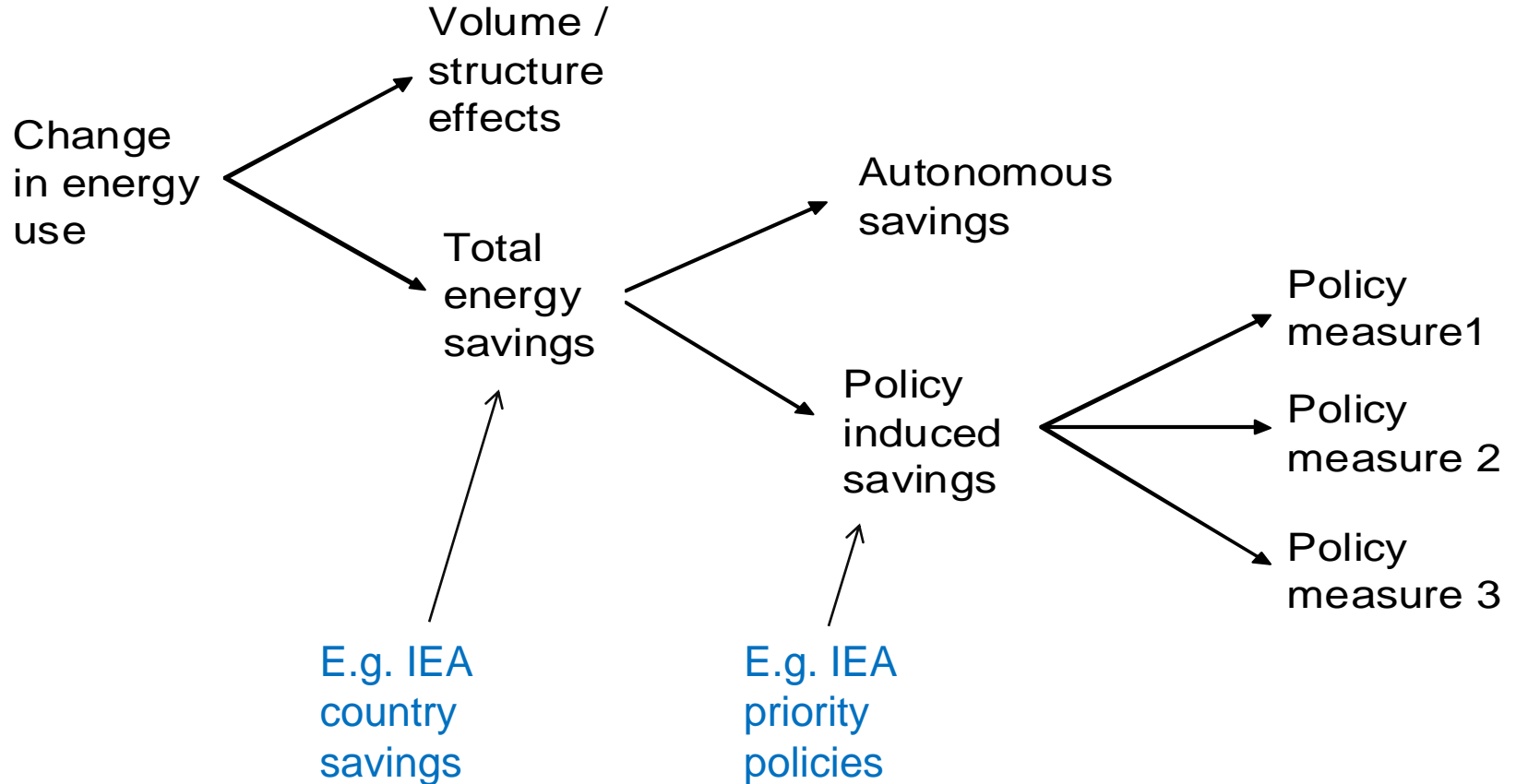
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Subjects

- 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

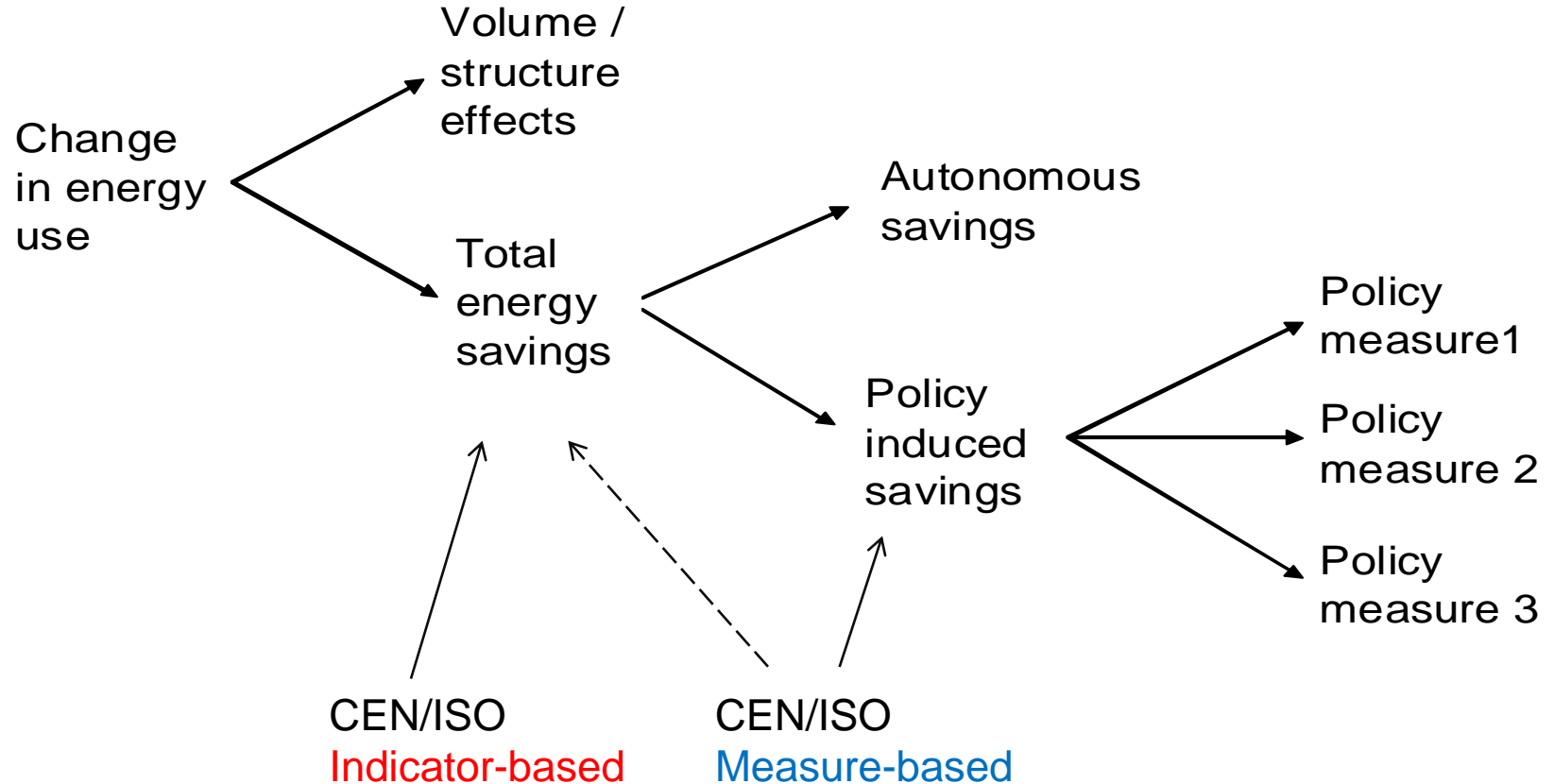


CEN/ISO standard on savings calculation

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



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

$$\text{IND}(t) = \text{NEC}(t) / \text{DV}(t)$$

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

$$\text{ESPI}(t) = [\text{IND}(t_0) - \text{IND}(t)] * \text{DV}(t)$$

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

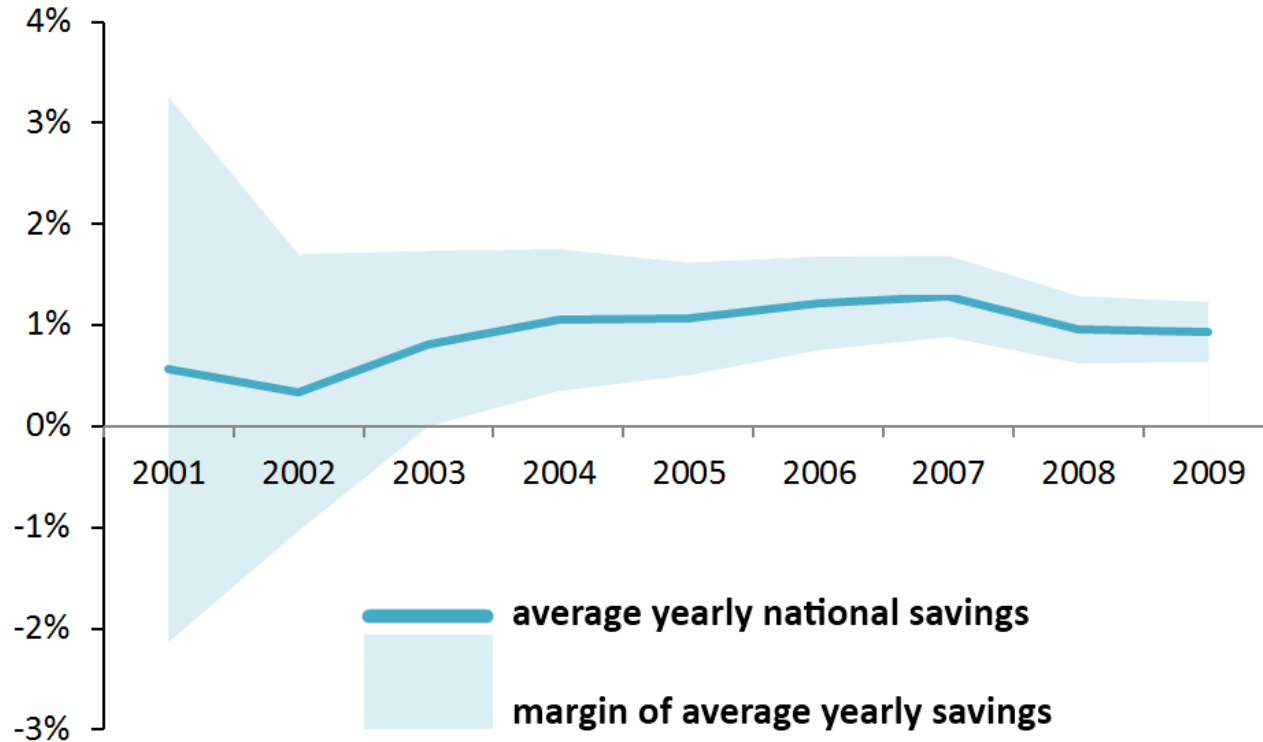
Annex (not shown)

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



Scope of TD methods



Energy use type

Households

Space heating
Hot water
Large appliances
Other electricity
Cooking, etc.
Conversion

Tertiary

Space heating
VAC
Lighting
Office appliances
Other electricity
Conversion

Industry

Space heating
Process heat
Electric drives
Other electricity
Conversion

Transport

Road-passengers
Train/bus/metro
Other pass.modes
Road-goods
Other goods-modes

Agriculture

Space heating
Lighting
Other uses
Conversion

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Space heating	X	x												X
Hot water		x		X										x
Large appliances		X	X											X
Other electricity	x	X												x
Cooking, etc.		X												x
Conversion														x
Space heating					X	x								X
VAC						X								x
Lighting						X								X
Office appliances						X								x
Other electricity					x	X								x
Conversion														X
Space heating							X							X
Process heat							X	x						
Electric drives								X						x
Other electricity								X						x
Conversion									X					X
Road-passengers										X	X	X		X
Train/bus/metro												X		
Other pass.modes												x		
Road-goods											X		X	X
Other goods-modes												X	X	x
Space heating					X									X
Lighting						X								X
Other uses						x								x
Conversion														

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



- World(regions):
 - Countries CEN-TD Saving agreements
 - Countries/sectors CEN-TD Sectoral Agreements
 - Sub-sectors/process CEN-TD Benchmarking / country
 - Appliance/cars/technology CEN-General ISO Standard manufacturers
 - Cross-sector technology BU Electric motors
- Country:
 - Sector/energy-use CEN-TD/BU National evaluation
 - Policy measures CEN-BU Policy evaluation Effort sharing
 - Programmes BU Market based instruments
 - Energy using products BU Minimum efficiency standard
 - Products/services BU Footprint
- Individual energy users
 - Facility/process CEN-General Permit / BAT
 - Process industry TD Benchmarking / site
 - End-use/ESCO BU Energy Performance Contract
 - New building BU Energy performance
 - Project BU JI/CDM

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