



Long Term Agreements (LTA)
on energy efficiency in industry

Monitoring methods:
present and future

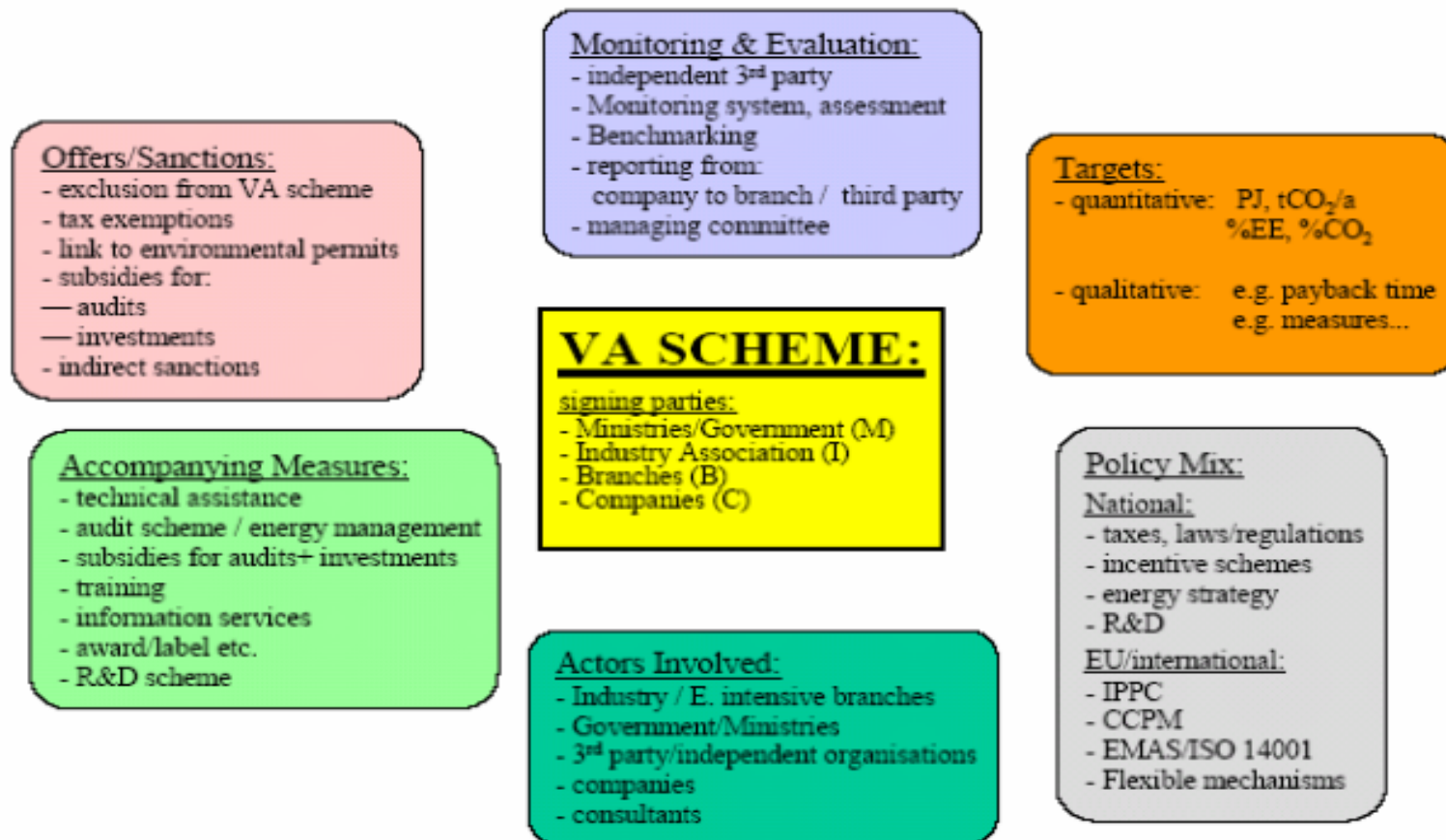
Annemie Loozen, senior advisor SenterNovem
September 25th, 2007

Outline of the presentation

- Reasons for (monitoring) LTA
- Energy use, energy saving and energy efficiency
- Monitoring methods
 - At present in the Netherlands
 - In the future in the EU (ESD)
- Monitoring process in the Netherlands
- Recommendations for monitoring energy saving
- Summary

IEA 'evaluation guidebook': 7 key elements

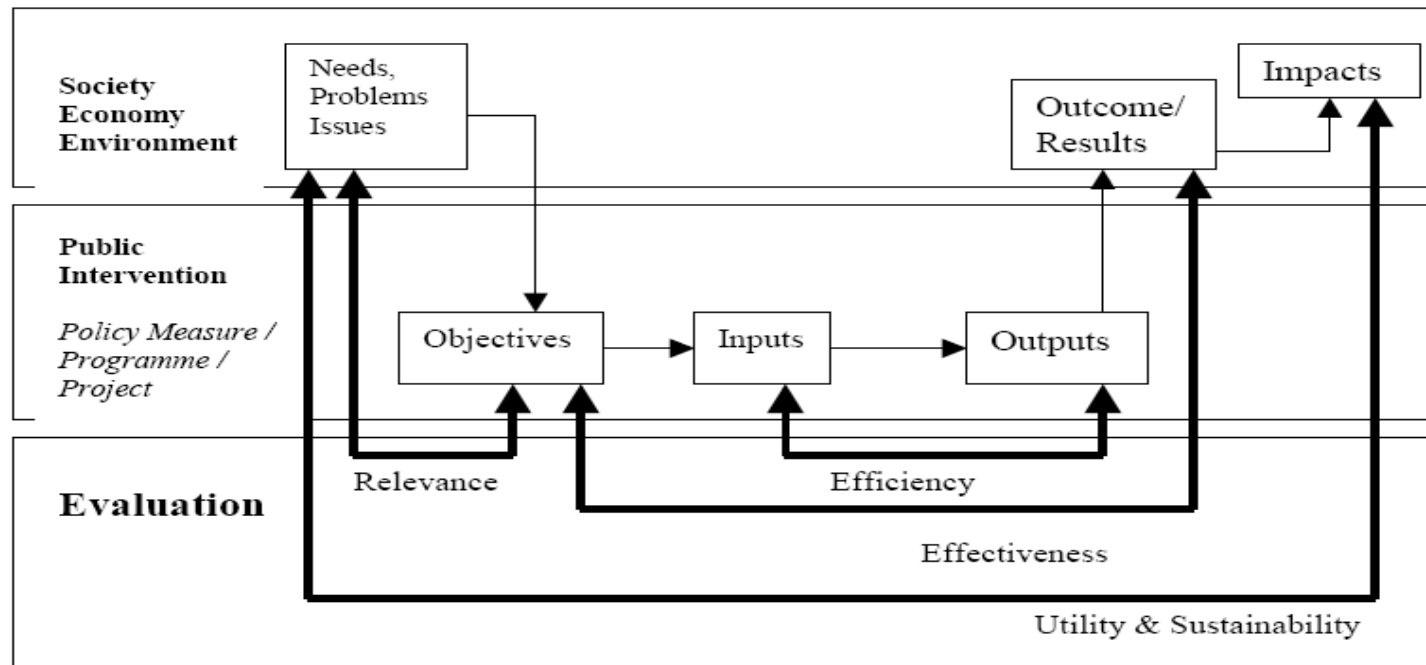
Figure 6.4 Crucial elements in a Voluntary Agreement



Source: Starzer, 2001

IEA 'evaluation guidebook': monitoring and evaluation

Evaluation framework for a normative evaluation



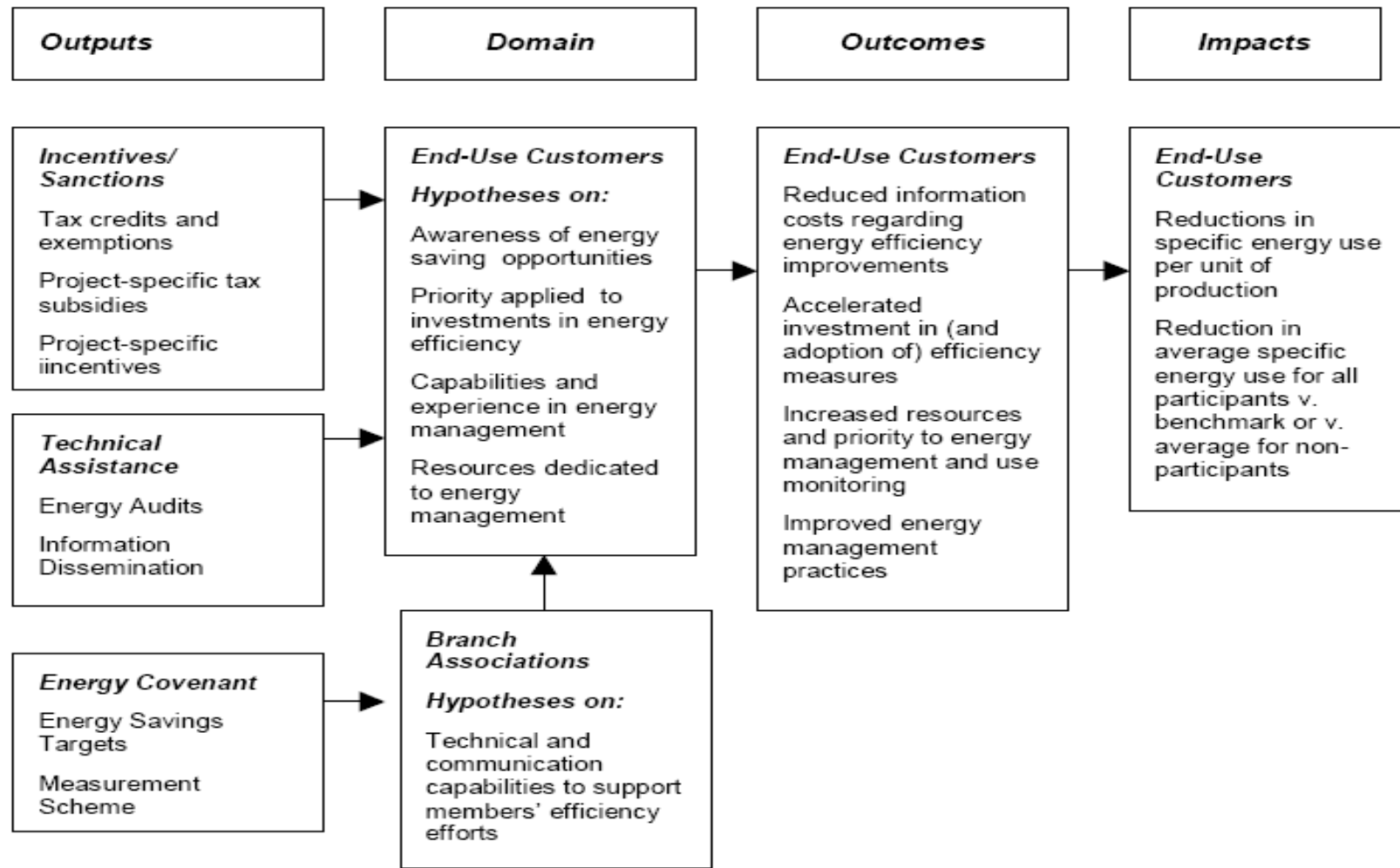
Evaluation Questions

- *Relevance:* To what extent are the objectives justified in relation to needs?
- *Effectiveness:* To what extents have the expected objectives been achieved?
- *Efficiency:* Have the objectives been achieved at lowest cost?
- *Utility & Sustainability:* Do the expected or unexpected effects contribute to a net increase in social welfare and sustainability?

Adapted from European Commission 1999 and Technopolis France 2001

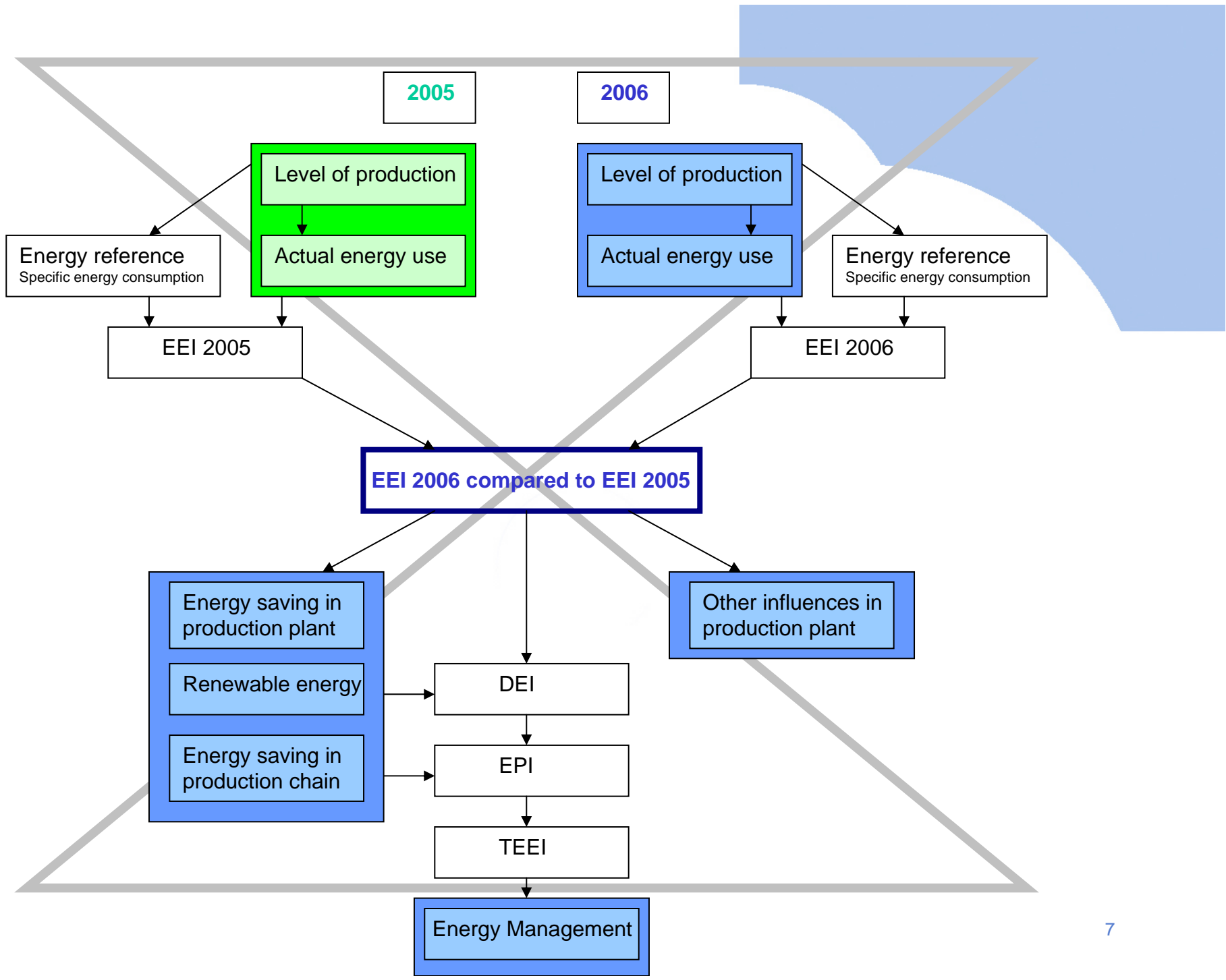
IEA 'evaluation guidebook': why monitoring?

Figure 5.2 Model of Voluntary Agreement Theory



Energy end-use, energy saving and energy efficiency

- Energy end-use / Energy consumption
 - Measurement
 1. Energy sales data: bills from distribution companies or retailers
 2. Sales of equipment and appliances
 3. End-use load data
 - Data and methods based on estimates
 1. Simple engineering estimated data: non-inspection
 2. Enhanced engineering estimated data: inspection
- Energy saving: absolute figure
 - Fulfilling the same activities by consuming less energy
 - Measurement of energy saving is impossible
- Energy efficiency: relative figure (economic growth combined with less environmental pollution)
 - The useful production per unit of energy used
 - Measurement of energy efficiency is also impossible



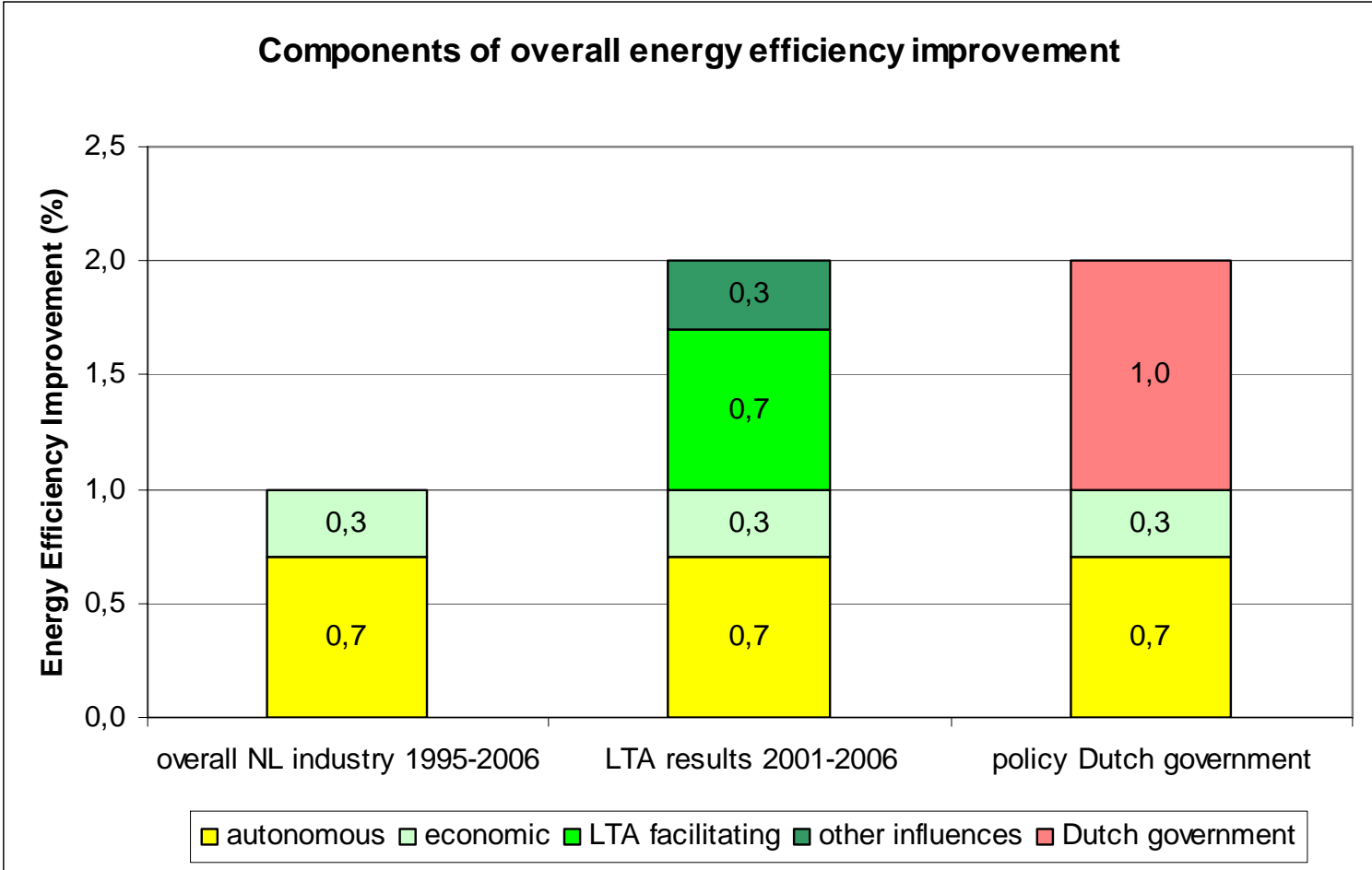
Energy efficiency improvement at present: an example (1)

- Year 2005
 - Level of production: 100 products
 - Energy use: 200 GigaJoules (GJ)
 - Energy use per product: 2,0 GJ
- Year 2006
 - Level of production: 140 products
 - Energy use: 210 GigaJoules (GJ)
 - Energy use per product: 1,5 GJ
- The energy efficiency improves in 2006
 - The energy efficiency index in 2005 = 100 (200 GJ / 200 GJ)
 - The energy use in 2006 would have been $140 * 2,0 = 280$ GJ, the actual energy use in 2006 was 210 GJ
 - The energy efficiency index in 2006 = $210 \text{ GJ} / 280 \text{ GJ} = 75$, the energy efficiency improvement in 2006 = $100 - 75 = 25$

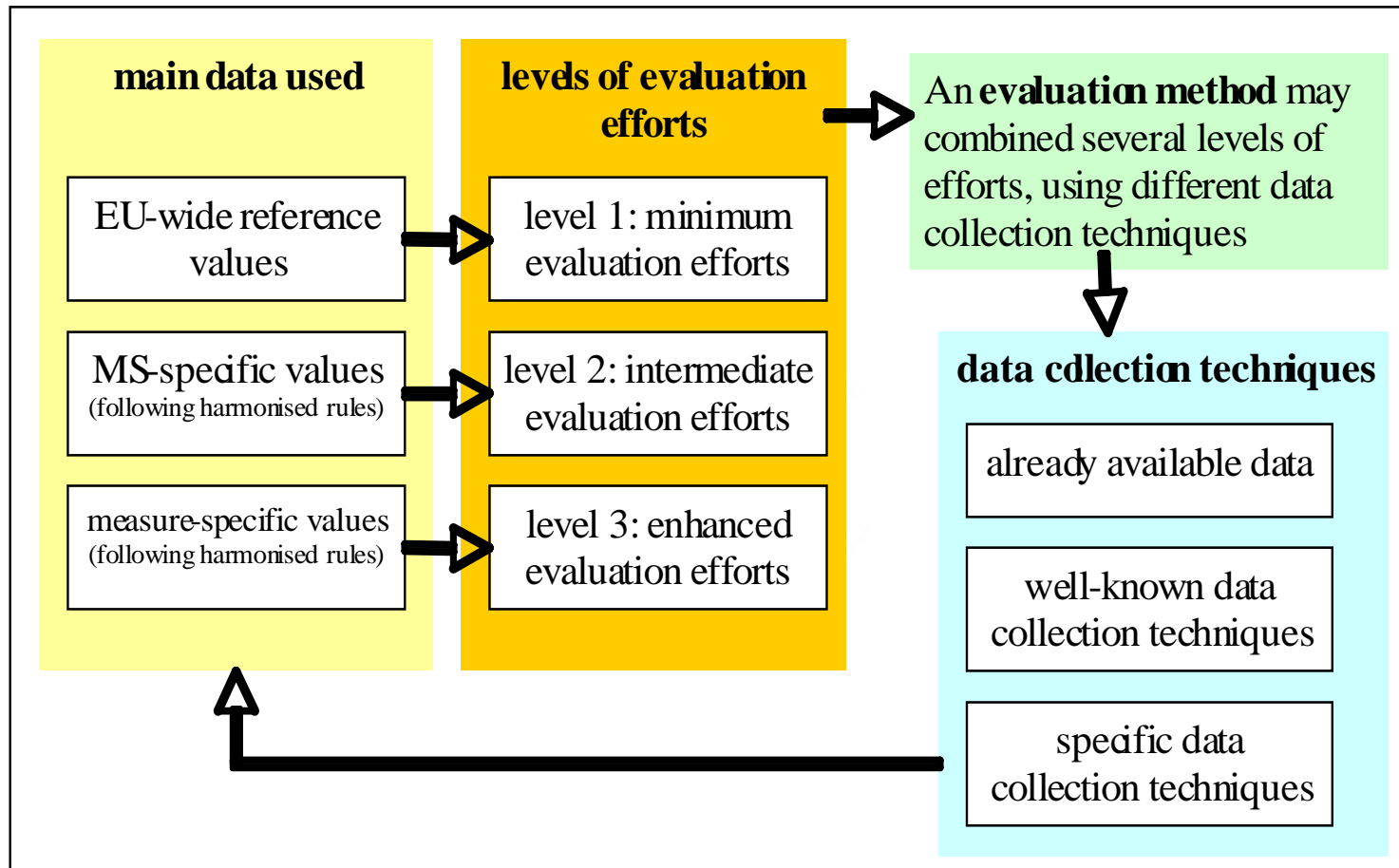
Energy efficiency improvement at present: an example (2)

- The energy efficiency improvement of 25% means less energy use of 280 GJ – 210 GJ = 70 GJ, caused by (for example):
 - Energy saving by continuous energy management: 8 GJ
 - Energy saving by installing more efficient equipment: 12 GJ
 - Other influences: 50 GJ, consisting of changes in
 - Changes in raw materials (e.g. cement): 15 GJ
 - Occupancy level: 25 GJ
 - Product specifications: -10 GJ
 - Operating hours due to maintenance of equipment: -5 GJ
 - Other changes, that cannot be accounted for: 25 GJ
- In the above mentioned monitoring method
 - 45 GJ (8+12+15+25-10-5) out of 70 GJ can be explained (65%), whereas 25 GJ or 35% cannot be explained
 - 20 GJ (8+12) out of 70 GJ energy efficiency improvement is due to energy saving measures (30%)

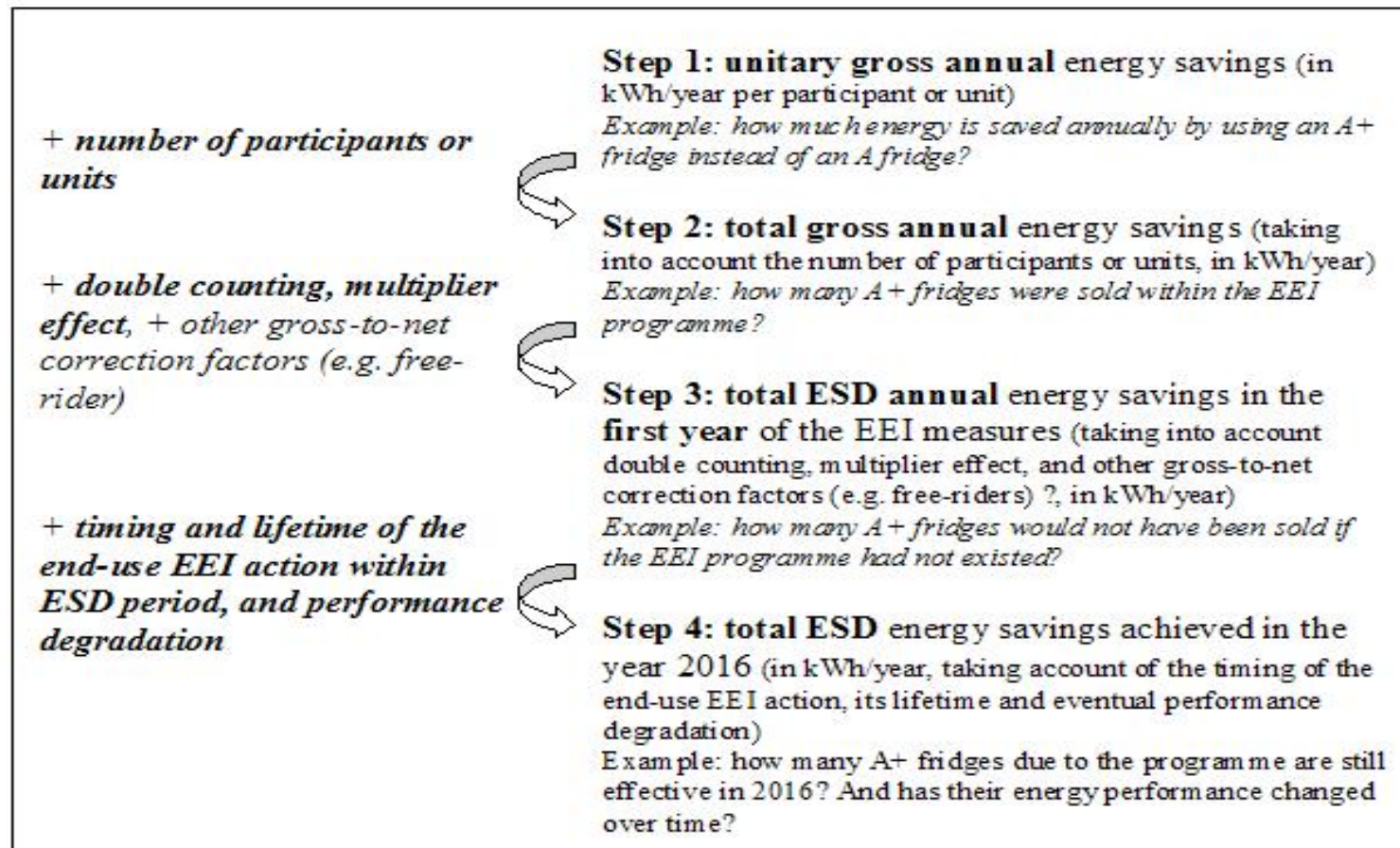
Components of energy efficiency improvement

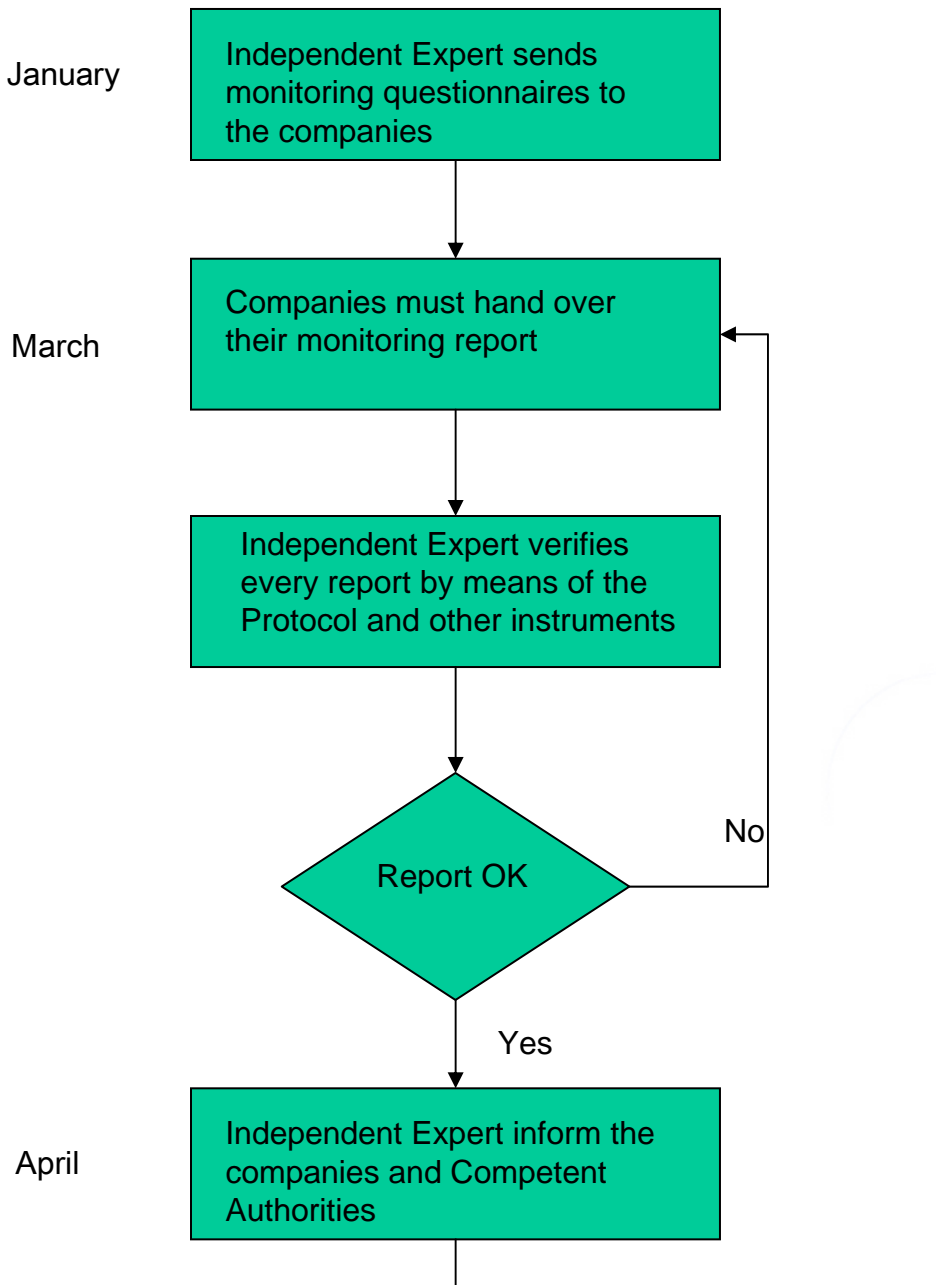


Future: 3 levels of evaluation in ESD

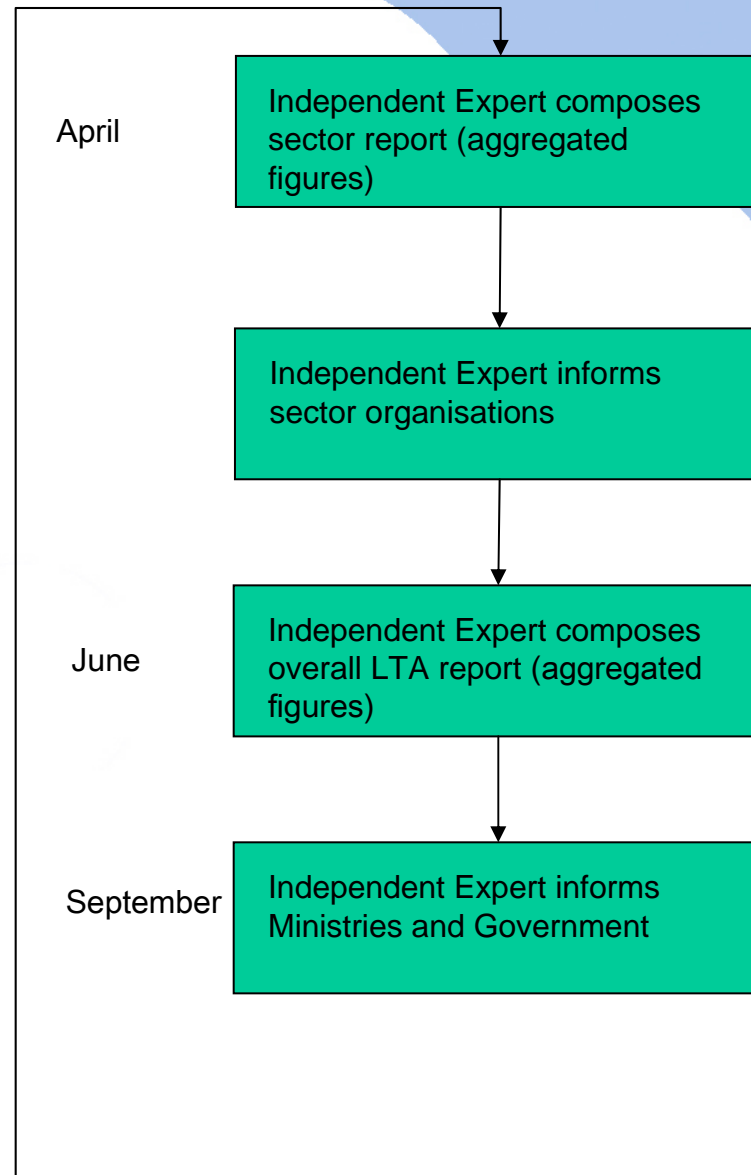


ESD: 4 steps to calculate the energy saving (1)

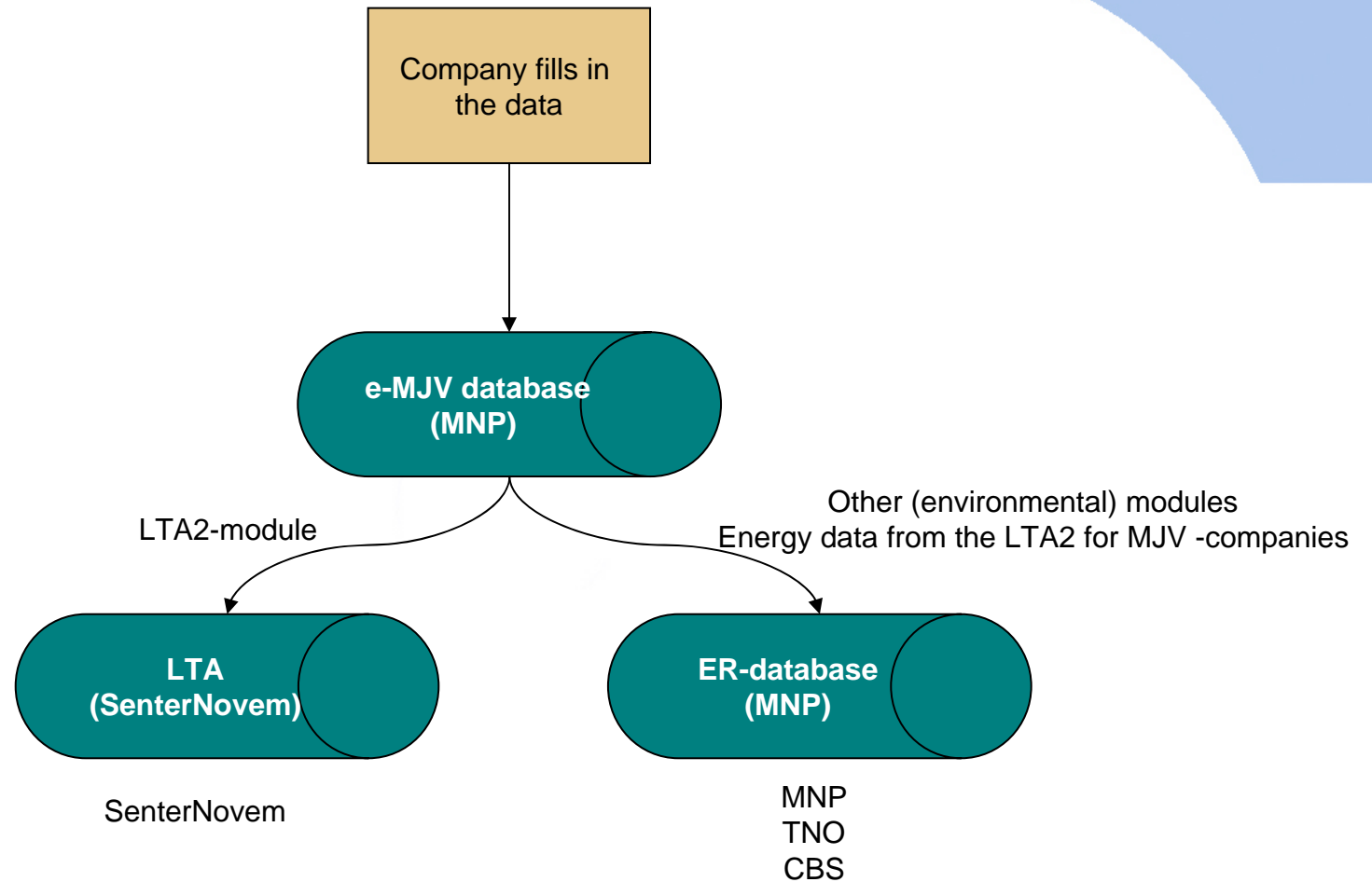




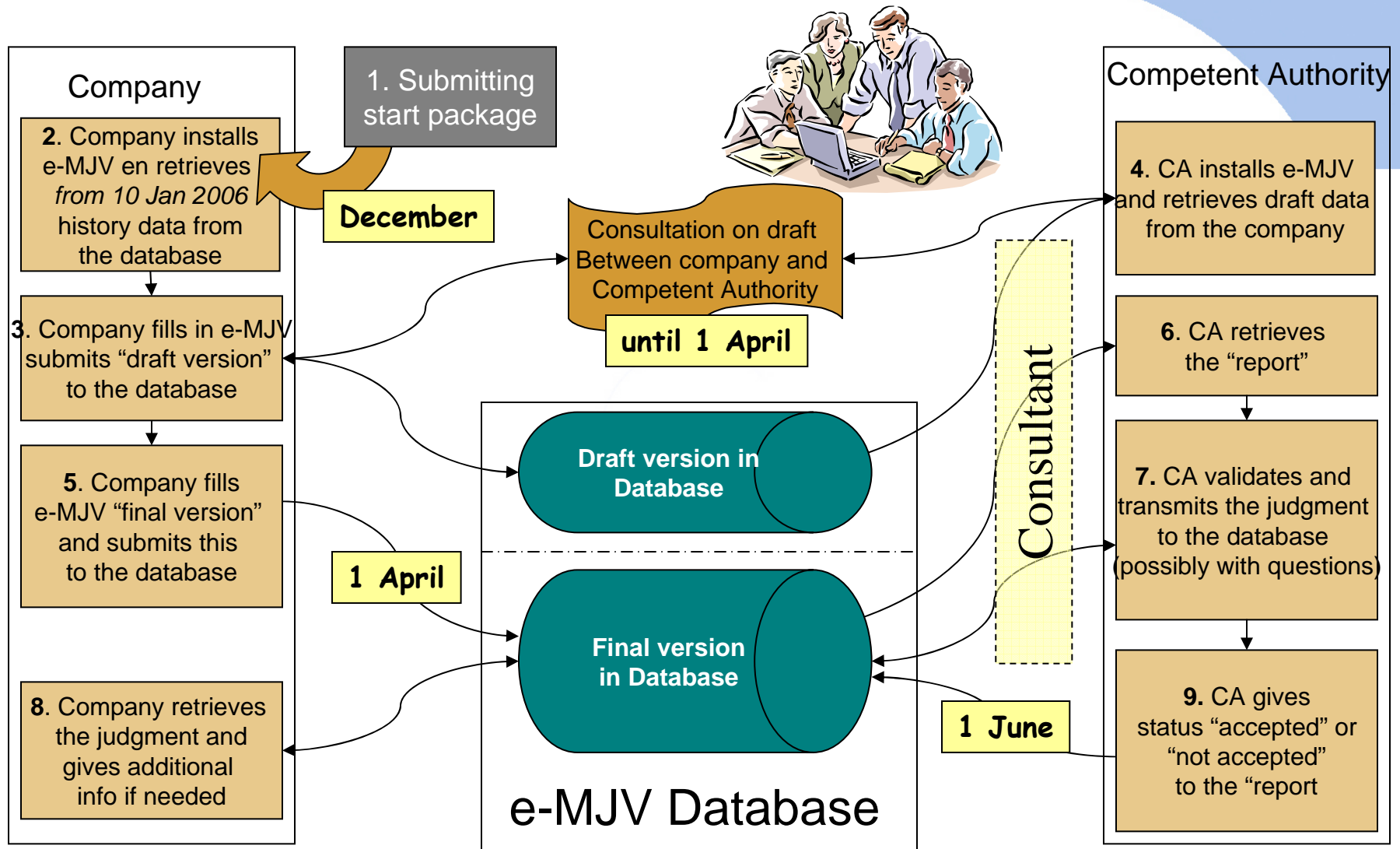
Monitoring Process



LTA-data in the e-MJV database



Route submitting and verification



Recommendations

- Regard monitoring as a key element of LTA
- Collect data on energy use on an annual basis, by measurement or by estimation
- Start by using the (conservative) EU default for measuring energy saving due to the LTA
- If desired, be more specific in monitoring and go for an MS-specific method of energy saving
 - that will provide you with a higher level of energy saving and energy efficiency improvement
 - at acceptable cost
 - by dealing with the 4 ESD steps
- Check once every ? years whether or not your MS-specific method can be used as a MS-default without measuring on an annual basis

Summary of the presentation

- Reasons for (monitoring) LTA:
 - Reduction of costs, learning and communication & knowledge diffusion
 - IEA-'evaluation guidebook', with monitoring as one of seven key elements
- Past and present
 - Energy consumption, energy saving and energy efficiency
 - Important items in monitoring energy saving
- Future
 - Energy Services Directive calls for a different way of monitoring
 - Defaults on EU level and Member State specific monitoring if desired
- Monitoring process
 - Several months of collecting and checking monitoring data
 - Several parties concerned: company, local authority, SenterNovem
- Recommendations
 - Measurement of energy saving by using the EU default
 - Be more specific in monitoring and give proof of a higher level of energy saving, but at acceptable cost