Towards more integrated approaches in assessing benefits of energy efficiency

Case in point: EU mandatory audits & energy management systems (EMS) & resulting industrial & macro-level action & benefits

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Main points

- Example: EU mandatory audits & EMS in Energy Efficiency Directive & their impacts
- How benefits are assessed & quantified
- Lessons learned, recommendations & conclusions
## Directive on Energy Efficiency

- **In force 12. 2012; transpose 5.6.2014**

- Framework Directive: sets objectives

- Covers energy supply & demand

- Includes “Article 8’ on Energy Audits & Energy Management Systems (EMS)

- Mandatory audits for large enterprises (≥250 employees & > Euro 50 M turnover)
Art. 8 on Energy Audits & EMS

☞ To identify, quantify & report cost-effective savings opportunities regularly

☞ Member States to promote high quality audits to all final customers (HH & SME)

☞ Member States ensure audits every 4 years for larger enterprises; by 5.12 2015

☞ Ensure training, certification schemes
To ensure quality of audits

☞ Member States to ensure by 31.12.2014 qualification, accreditation & certification schemes for energy auditors

☞ Schemes publicly available, reported

☞ In-house auditors to be checked

☞ Audits to use measured, traceable operational data on energy consumption
Additional quality requirements

- Life-cycle cost analysis (LCCA) instead of Simple Payback Period (SPP) in audits
- Representative, allow full performance picture & identification of possible action
- Detailed savings calculations replicable
- Data storable for historical analysis
Net present values: micro- & macro-investment valuation method

\[ C_g(\tau) = C_I + \sum_j \left[ \sum_{i=1}^{\tau} (C_{a,i}(j) \times R_d(i)) - V_{f,\tau}(j) \right] \]

- \( C_g(\tau) \): global cost (referred to starting year \( \tau_0 \))
- \( C_I \): initial investment costs
- \( C_{a,i}(j) \): cost during year \( i \) for energy-related component \( j \) (energy costs, operational costs, periodic or replacement costs, maintenance costs and added costs)
- \( R_d(i) \): discount rate for year \( i \)
- \( V_{f,\tau}(j) \): final value of component \( j \) at the end of the calculation period (referred to the starting year \( \tau_0 \))
The principle of cost effectiveness

![Diagram showing the relationship between costs, insulation thickness of piping, investment costs, and energy savings.](image)
How regulations drive industrial level action & macro-benefits

☞ Member State to set penalties for non-compliance by enterprises

☞ Member States report to Commission on total nr. large enterprises, total audits done & total audits in large enterprises

☞ Includes buildings, transportation, processes & peripherals (holistic, coordinated)
Share of energy costs in production costs in energy intensive industries
(Bars are sub sectors, with lowest, highest Member State values & EU avg)
New Savings Potentials Study

- 40% total savings possible 2005 - 2030
- 61% Residential sector
- 41% savings in transport
- 38% tertiary sector
- 26% industry
Lessons learned, benefits, recommendations & conclusions

- EN ISO 50001 + min. criteria = exemption

- EMS = CEOs, policy, plans, follow-ups, review

- Harmonisation, quality databases, standards key; need Eco-design *periph* & system requirements

- Public consultation State Aid Rules key: Allow voluntary agreements, tax rebates, incentives

- Public sector to implement audit’s measures
END.

THANK YOU FOR YOUR ATTENTION.