

**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 publically 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  $\tau_0$ )

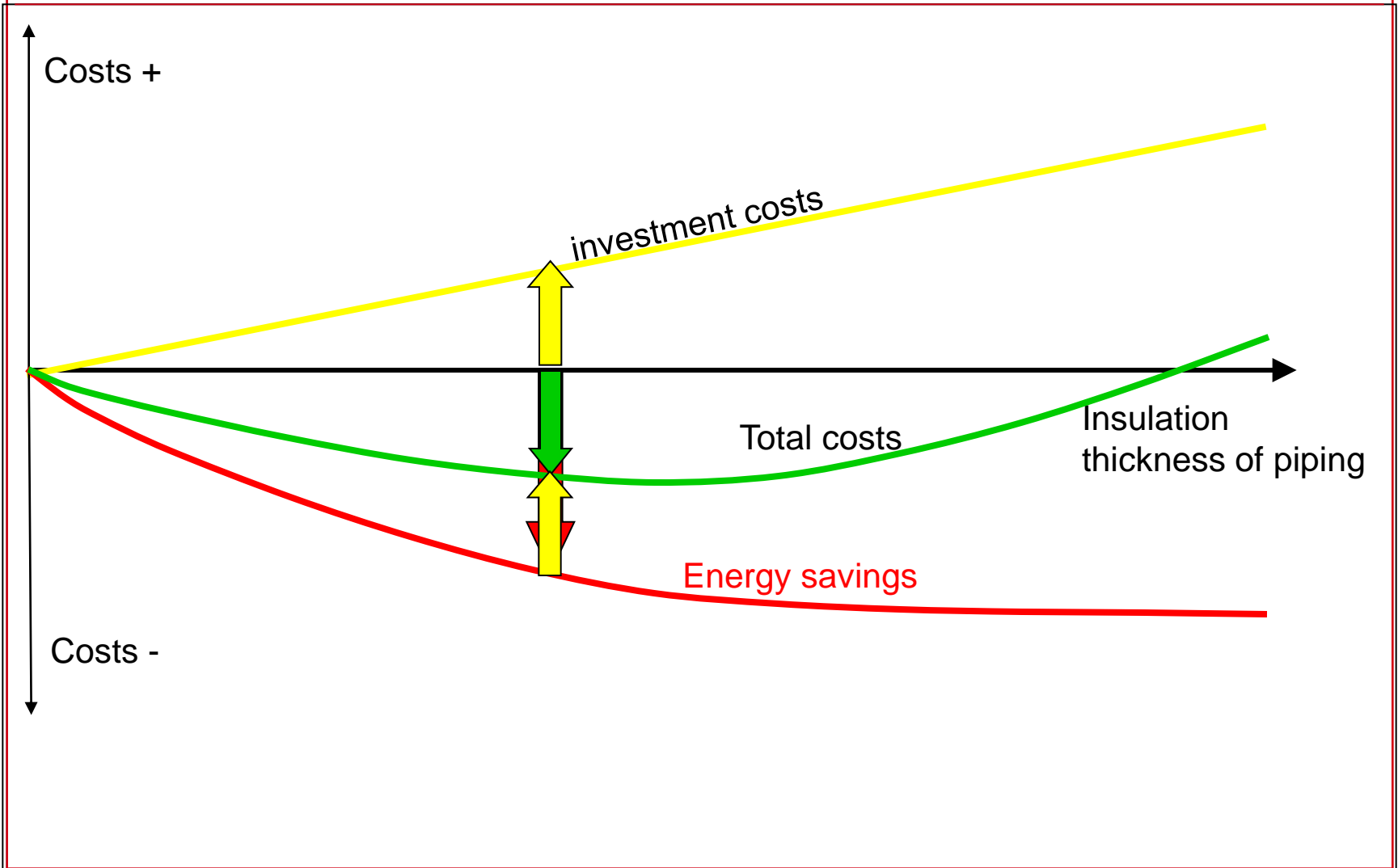
$C_I$  initial investment costs

$C_{a,i}(j)$  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

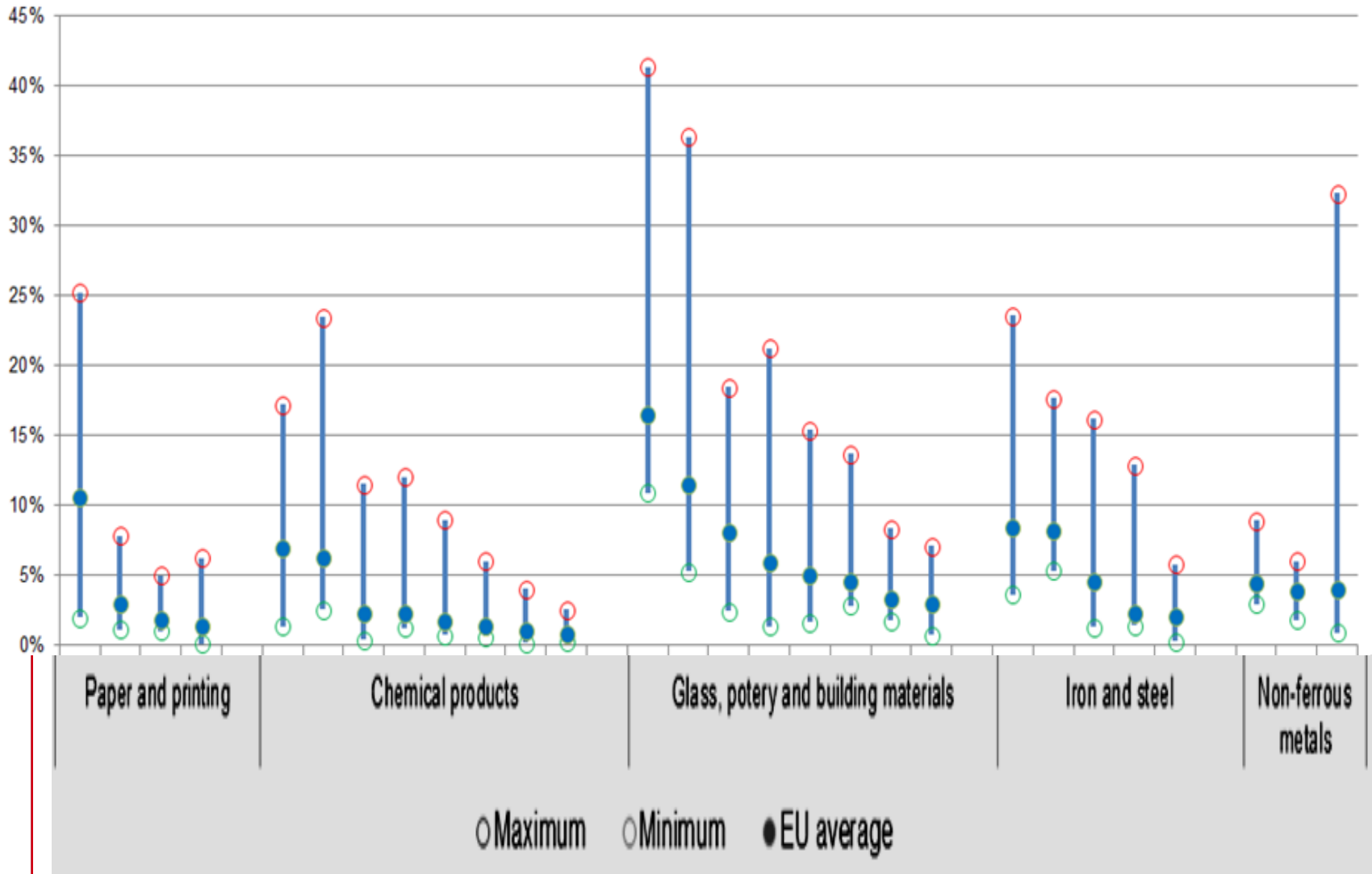




# How regulations drive industrial level action & macro-benefits

- ➡ 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, re-commendations & 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.**