European Experience With Energy Management

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EM in Europe traces it roots to the 1970s

- Following the 1970s oil shocks many countries promoted energy audits in industry
- Mixed outcomes as audit recommendations were often not acted upon; however, energy efficiency improved
- The need to address organisational culture regarding the management of energy became clearer and in particular to address the split incentive between capital equipment procurement account holders and O&M account holders
- National EM practices where developed from 1990 to 2010
- National standards began to be merged into European standards from about 2005 onwards
- These informed ISO's EM standards beginning with ISO 50001 in 2011

Enabling policy environments

- Green energy taxes in many EU Member States from ~2000 onwards
- EU Emissions Trading Scheme from 2005
- Support for audits
- Support for energy efficient investments
- Long term agreements
- Energy efficiency networks
- Energy efficiency Directive

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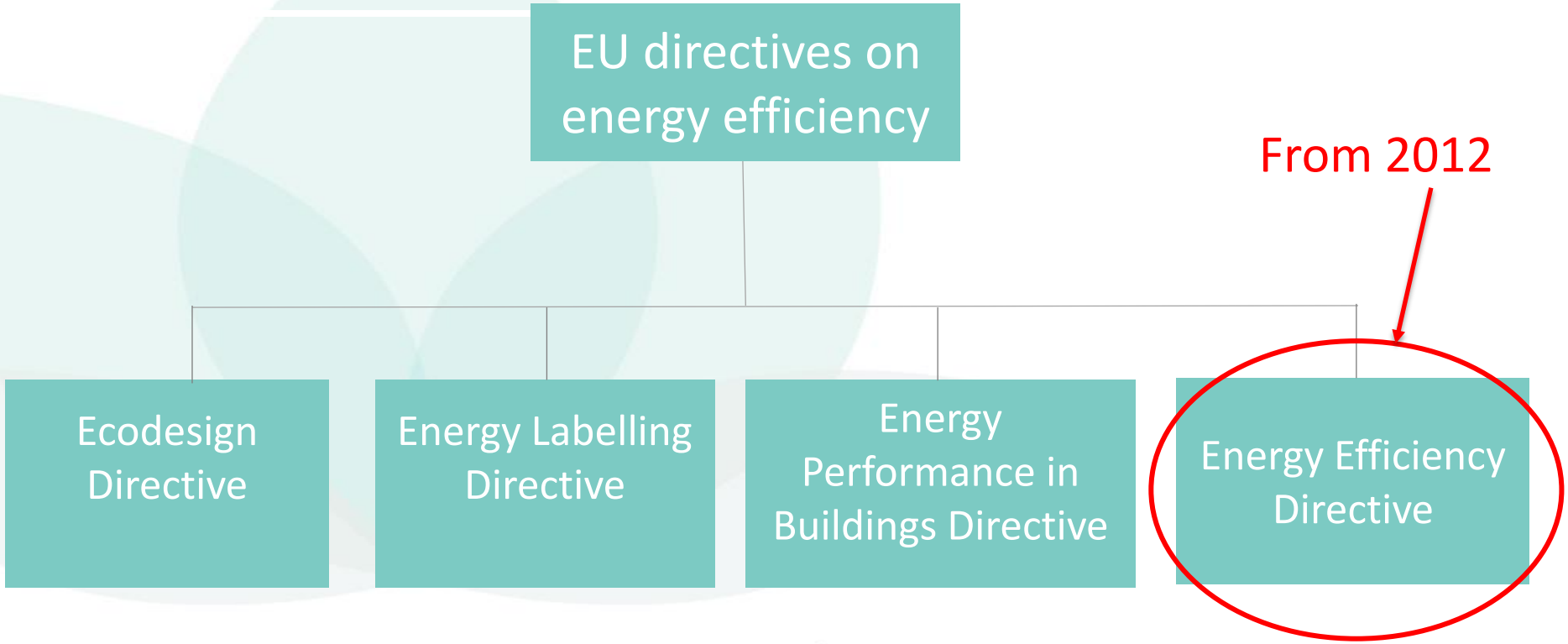
Policy - The four principal EE Directives



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EED Article 8 and audits

The EED requires Member States to make energy audits mandatory for large enterprises and gives the possibility for enterprises that have implemented broader energy management schemes such as ISO 50001 to be exempt. It also provides incentives for SMEs to have audits.

Nonetheless it leaves several important gaps:

a) it does not oblige or encourage affected enterprises to implement an energy management system (just to conduct audits)

b) it does not oblige or encourage affected enterprises to implement cost effective measures identified in the audits

c) it does not create a system to support the adoption and implementation of energy management systems

d) mandatory audits only apply to large enterprises

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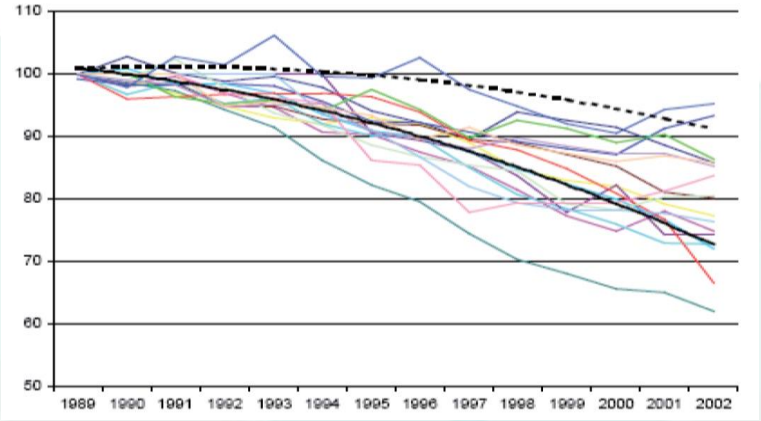
Other policies implemented at MS level

Incentives and obligations feature in the most visibly effective programmes

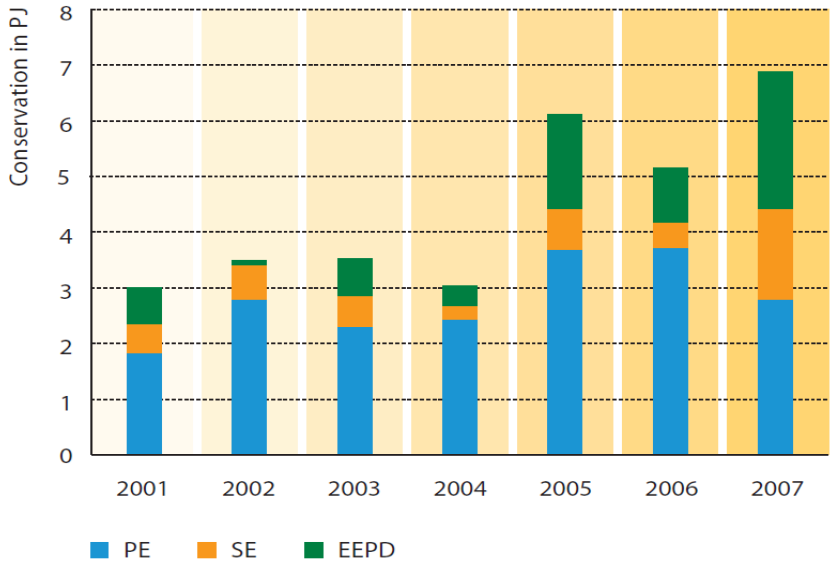
- long term voluntary agreement (LTAs) schemes operated by Denmark, Finland, Flanders, Ireland, Netherlands, Sweden and UK, wherein participating enterprises agree to reduce their energy intensity or CO_2 emissions by pre-agreed amounts over a certain period
- In each case the authorities have created an incentive to participate in these schemes through access to more favourable tax regimes; often via lower energy or carbon taxes

Example - the Dutch Long Term Agreements

Energy efficiency improvement for various sectors under LTA1



Annual energy savings under the LTA2 by type (PE= process efficiency, SE = systems efficiency, EEPD = supply chain efficiency)



	DK	IE	NL	Sweden	Flanders	Finland	UK
Programme name	LTA	Large Industry Energy Network (LIEN) and SEAI Energy Agreements Programme	Long-Term Agreements	Programme for improving energy efficiency, PFE	Energy policy agreements with energy-intensive companies	Energy efficiency agreements	Climate Change Agreement
Period of operation	1996-2013		1992 to now	2004-12 (repealed due to contravention of EU rules on state aid)	2012-2015	2008-now	2001-now
Incentives to participate	Rebate in Energy Savings Tax	Subsidised audits and support	Participants pay a lower Energy Tax	Five-year exemption from energy tax on electricity (SEK 0.005/kWh)	Required to attain the environmental license to operate	20% subsidy of EE related capital costs (€22.5m of subsidies in 2011)	Reduction of up to 90% on the Climate Change Levy
Other features	Implement-ation of identified cost-effective EE measures is binding for a 3 year period	Agree to work towards ISO50001 implementation	Businesses must draw up an EE plan every four years and implement cost-effective measures. Also road-maps to reduce CO2 by 50% by 2030	Must implement EM, do audits and invest in measures with payback <3 years	Participants cover 82% of industrial energy use in benchmarking agreement and 6% in the audit agreement		
Sectors covered	Industry	Industry - sites cover >50% of industrial energy use	Industry, services and agriculture. Covers 80% of Ind. energy	Industry	Industry	Industry, Services, Energy	Energy intensive industries and over thirty smaller sectors
Reported impacts		3.26 TWh in2012 from all industrial EE measures (not just LTA)	Average efficiency saving of 22.3% from 1992-2000 = 2%/year From 2009-12 average savings of 1.6%/year.	13.7 TWh from 2007-11 (electricity savings of 1.45 TWh/year)		All industrial EE measures. (Agreements + audits) produced savings of 7.5% in 2010	9,600 facilities have signed up to CCAs accounting for 268 TWh in 2010. Savings target to 2020 of 11%

Summary of mandatory energy efficiency investment programmes by MS

	DK	NL	Flanders
Mandatory EE investments linked to EM	Yes if entity has entered into the LTA	Yes	Yes
Programme name	LTA	Environmental Management Act	VLAREM
Description	Must implement all EE measures with a payback of < 3 years	Must implement all EE measures with a payback of < 5 years	Must implement all EE measures with a payback of < 3 years
Sectors covered	Industry	Companies and buildings	Industry
Other features		Entity size limits apply. Local authorities can oblige audits to be done.	Mandatory approved energy plan

Germany's energy tax incentives

- A tax on electricity payable by firms was introduced in Germany in 2007 and set at €205/MWh
- Until 2012 companies that paid more than €1000/year for this tax were eligible to apply for a 90% reduction; however, in 2013 the exemption eligibility rules were amended such that companies are now obliged to prove that they have an energy management system certified to DIN EN 16001 or DIN EN ISO 50001 in place to be eligible to receive the tax discounts
- As of 2014 about 25000 firms were eligible to receive tax reductions that totalled 2.3 billion Euros in value, and about 3000 EN ISO 50001 certifications were undertaken in early 2014
- DE has the highest certified uptake of EN ISO 50001 in the world

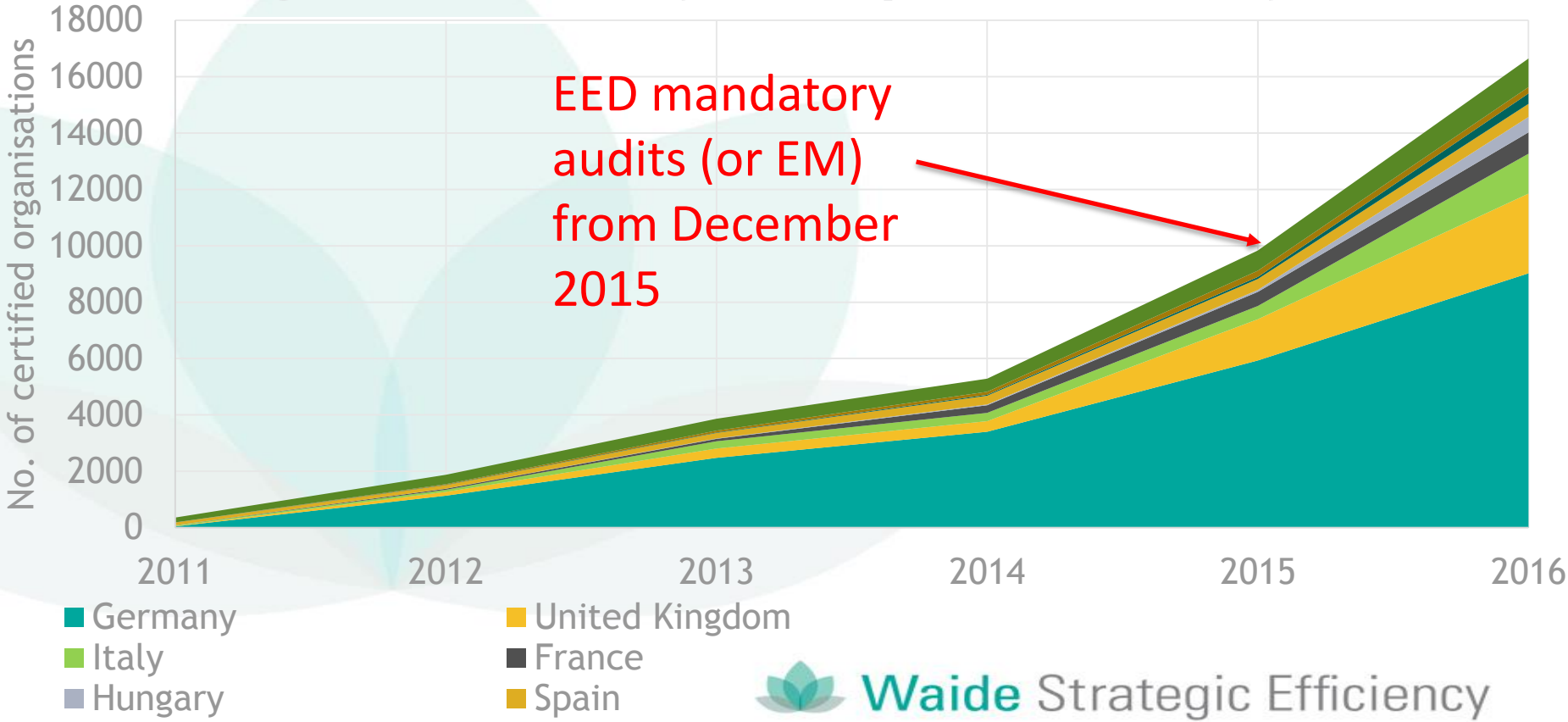
Audit incentives and EE networks

- France, Finland, Germany, Norway, Sweden and the UK amongst others have provided direct financial and technical assistance to conduct energy audits and implement energy savings measures in the industrial sector and sometimes the service sector
- Germany, Ireland and Sweden operate extensive (subsidised) energy efficiency networks to provide peer to peer support in implementing EE in businesses

Energy efficiency obligations – summary by MS

	DK	FR	EE	IE	IT	LV	LT	LU	MT	ES	SI	PL	UK
EEO type	Yes	Yes - White certificate scheme	Yes	Yes	Yes - White certificate scheme	Yes	Yes	Yes	Yes	Yes	Yes	Yes - White certificate scheme	Energy Company Obligation (ECO)
Year introduced	2006	2006	2015	2014	2005	2014	2014	2015	2015	2014	2014	2013	2003/2015
Sectors where savings measures can be made	Domestic Industry Commerce	Domestic Industry Commerce		Domestic Industry Commerce	Domestic Industry Commerce			All		Industry buildings transport	All	All	Domestic
Scale of savings	3% of all non transport energy use	2.5 Mtoe per year in 2013	Target of 6.5 TWh cumulative by 2020	0.55 TWh per year	1.2 Mtoe in 2012	0.979 TWh in 2020	Target of 11.7 TWh cumulative by 2020	Target of 6 TWh in 2020	Target of 0.22 TWh in 2020	Target of 0.571 Mtoe/year	0.75% of energy supplied by 2018	0.55 Mtoe/year	
Allocations of savings by end-use sector	39% Industry, 8% services, 53% domestic	6% industry		Unspecified	53% Industry, 4% services, 43% domestic			Unspecified		54.6% Industry, 15.3% buildings/equipment, 25.3% transport, 4.8% public/agriculture	Not specified	Unspecified	

Trends in the no. of EN ISO 50001 certified organisations by European country



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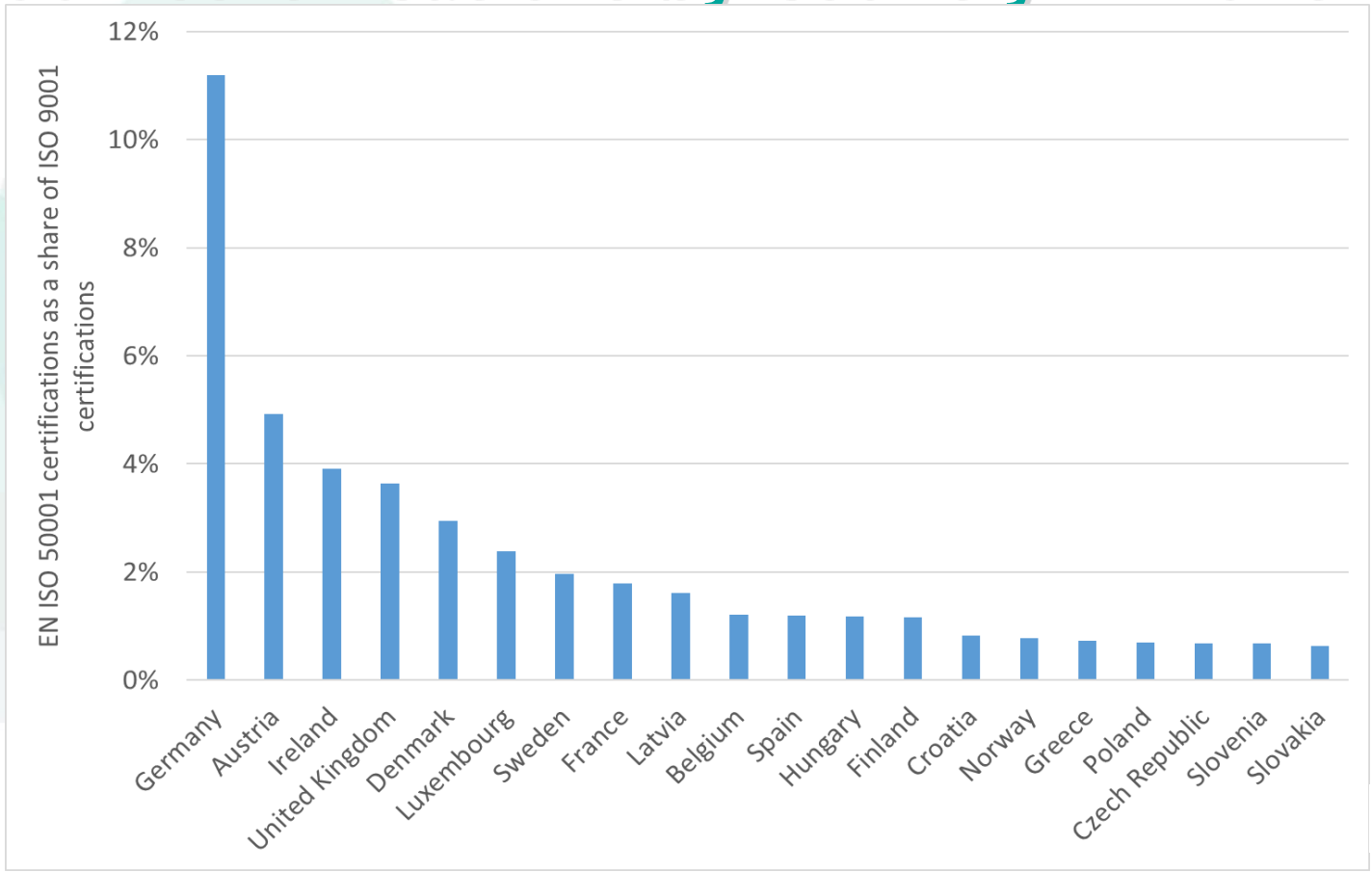
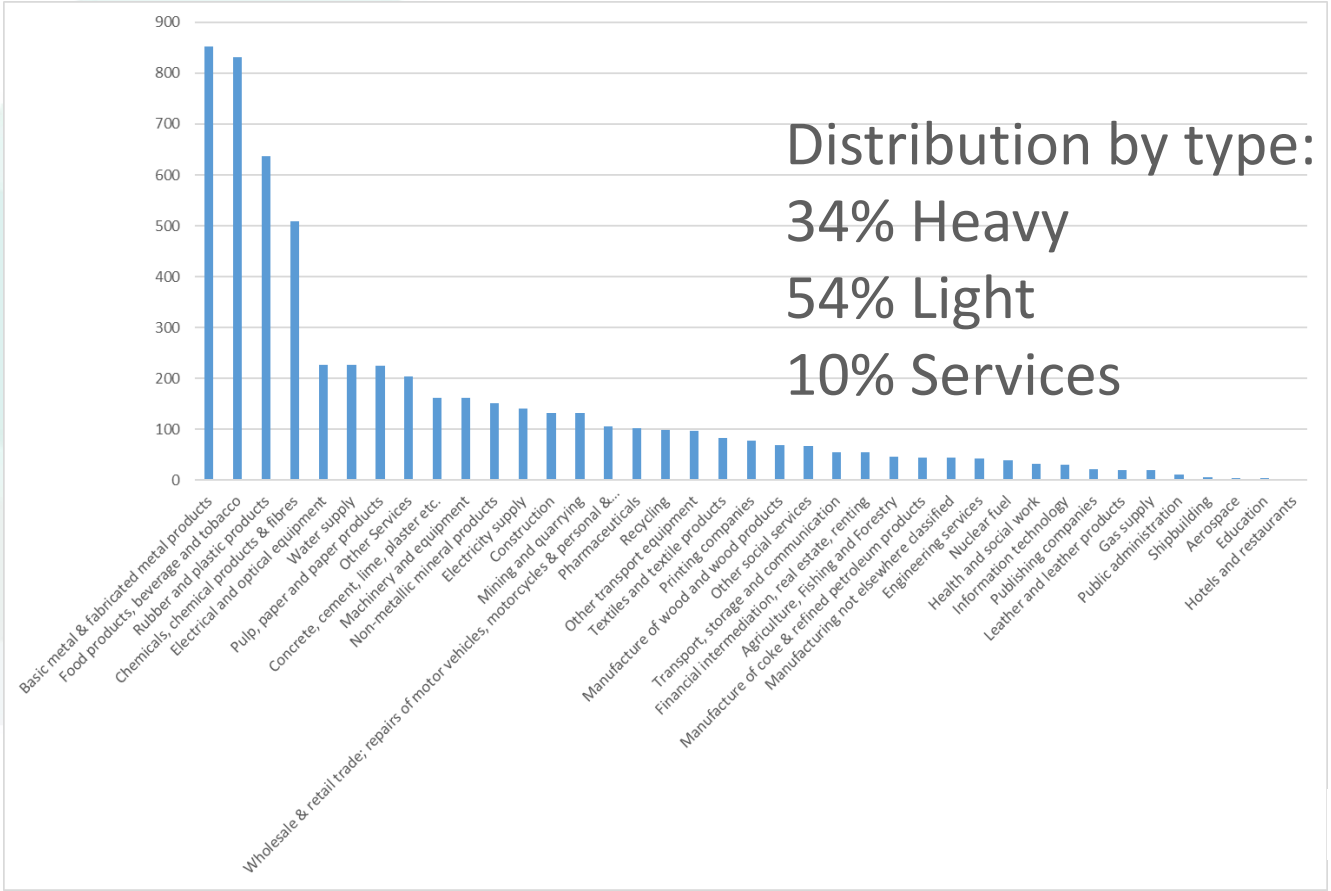
EN ISO 50001 certifications as a share of ISO 9001 certifications by country in 2015



Distribution of EN ISO 50001 certification by European industry sector in 2015



Overall levels of adoption of EM

5.2% of medium to large European companies had adopted EN ISO 50001 in 2016 (up from 2.8% in 2015)

- The no. of EM certified organisations grew by 69% in 2016
- Many organisations have EM but are not certified or don't use ISO50001
- there is a broad spectrum of behaviours currently seen but on average EM adoption is still well below economically rational levels
- energy intensive and larger organisations are much more likely to have adopted proactive energy management strategies
- very few organisations adopt strategies to realise all financially attractive measures and even less to optimise their climate impact
- the case of no systematic energy planning predominates in SMEs
- short term profit maximisation is most common in other commercial enterprises such that measures with payback periods of beyond 2 years are seldom considered

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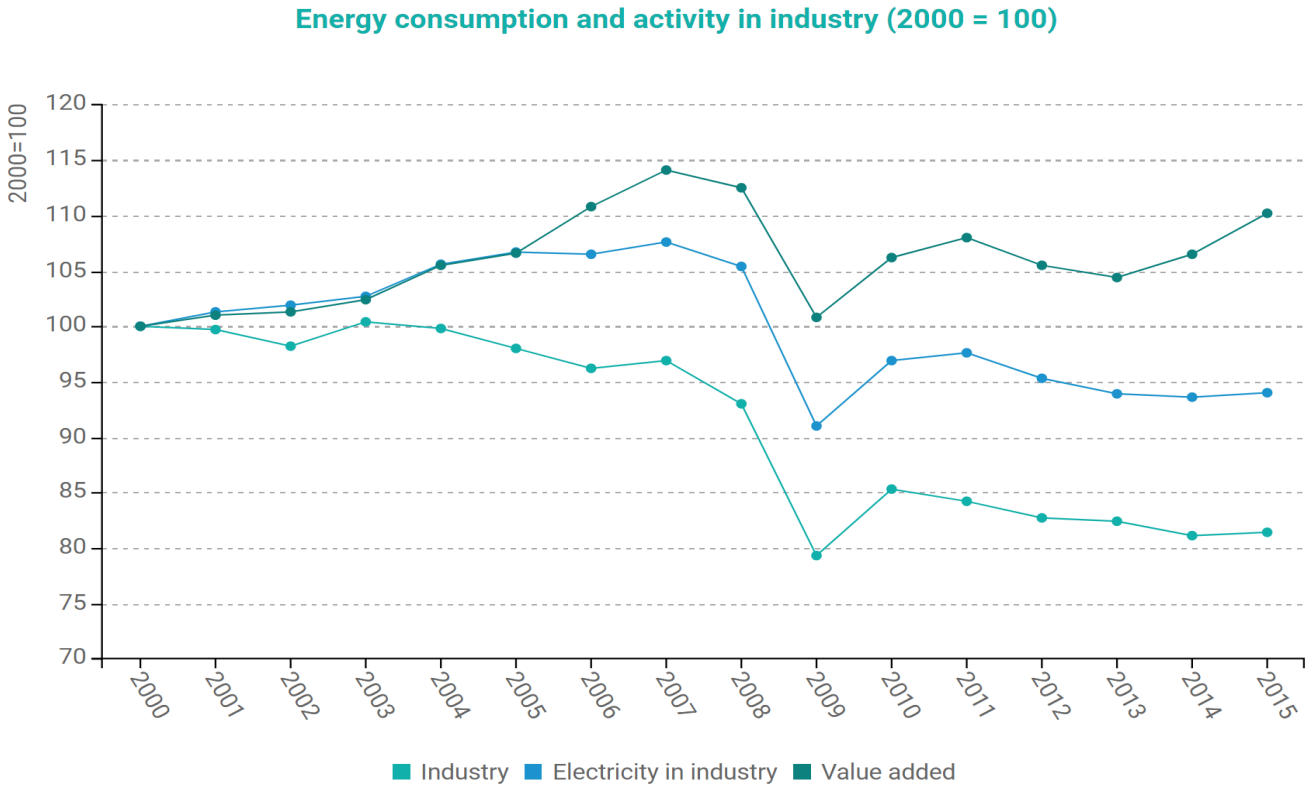
EU industrial energy consumption trends



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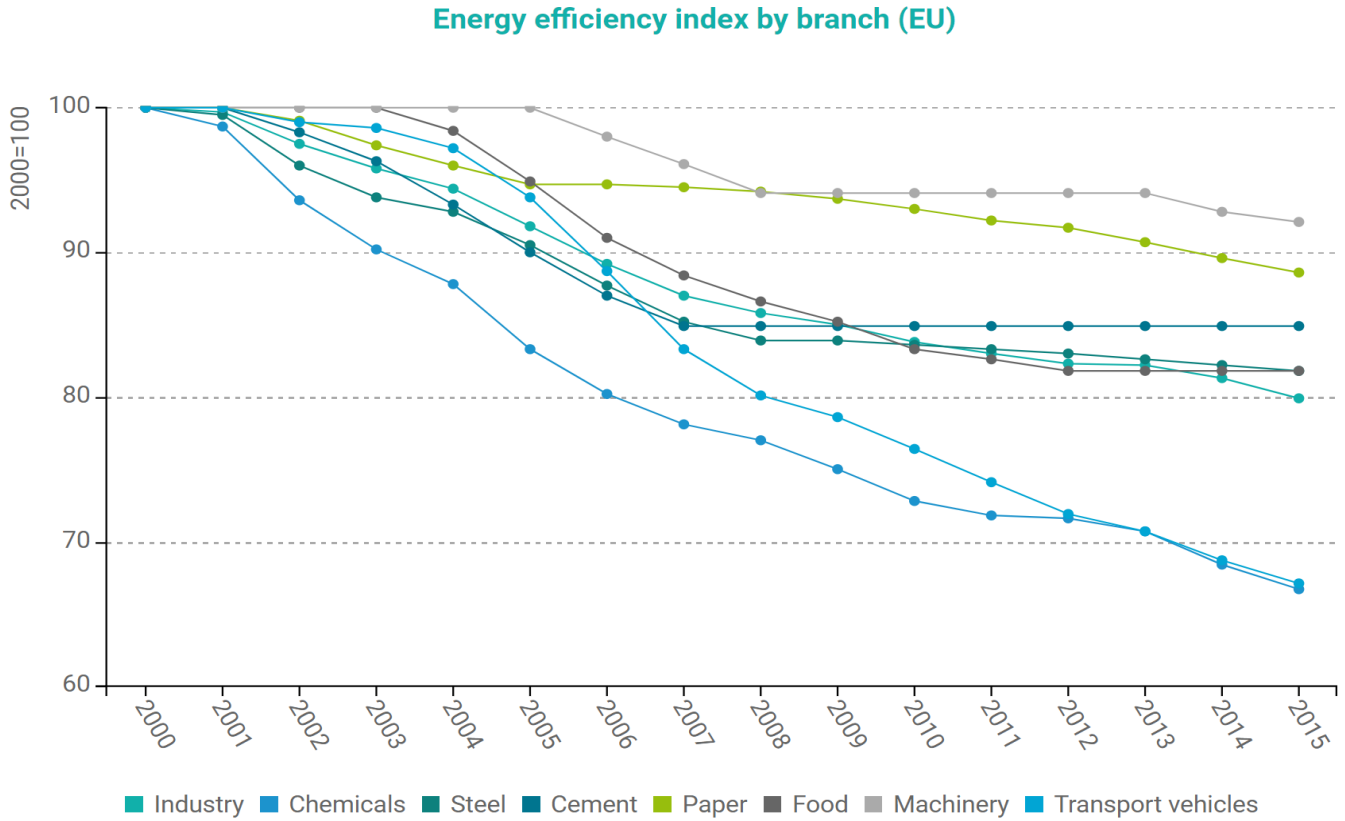
Source: http://www.odyssee-mure.eu

EU industrial energy consumption trends



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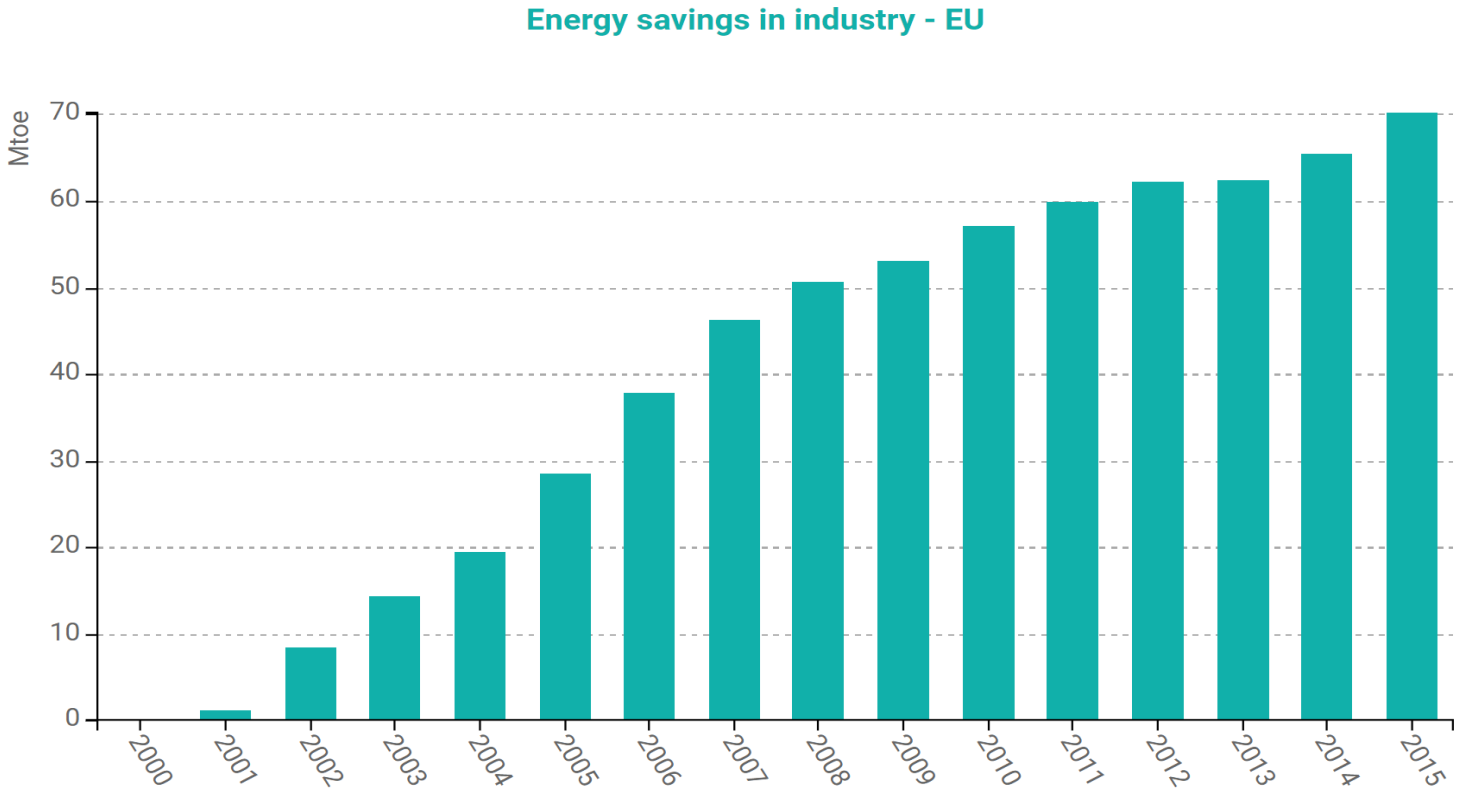
EU industrial energy savings trends



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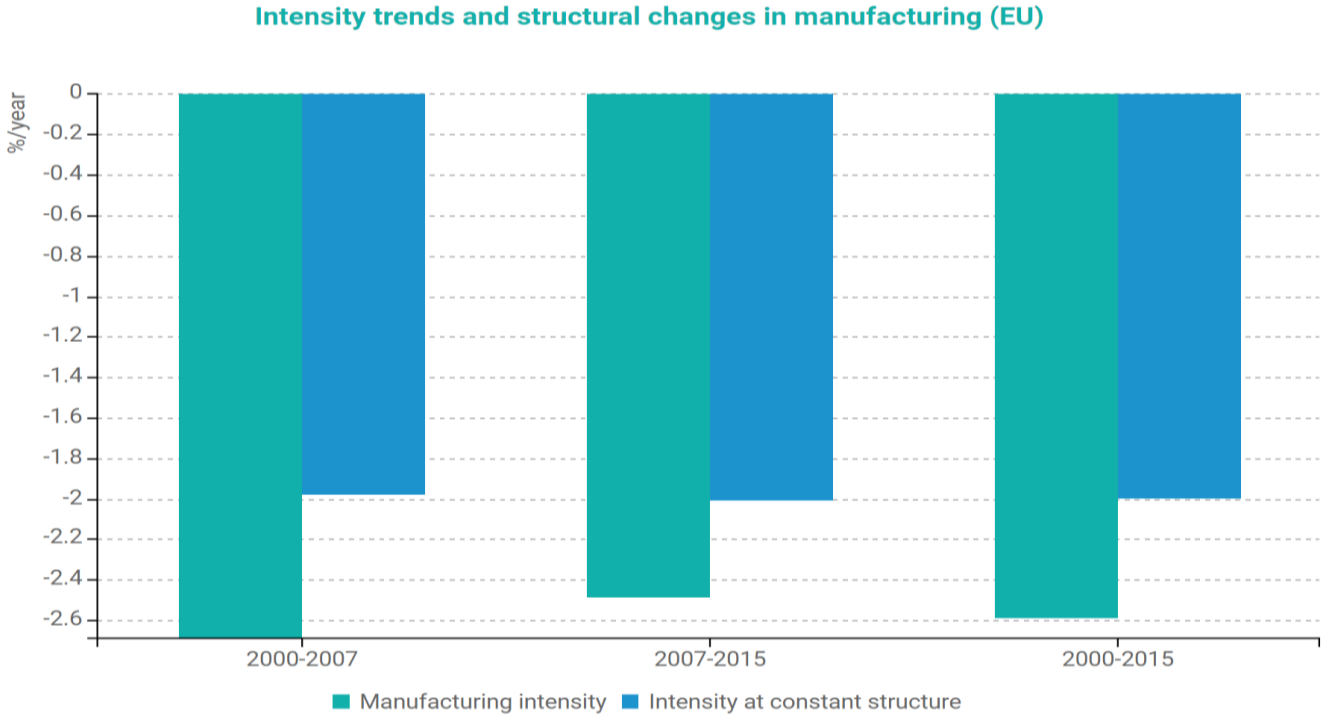
2% p.a. average improvement in EU industrial energy intensity since 2000



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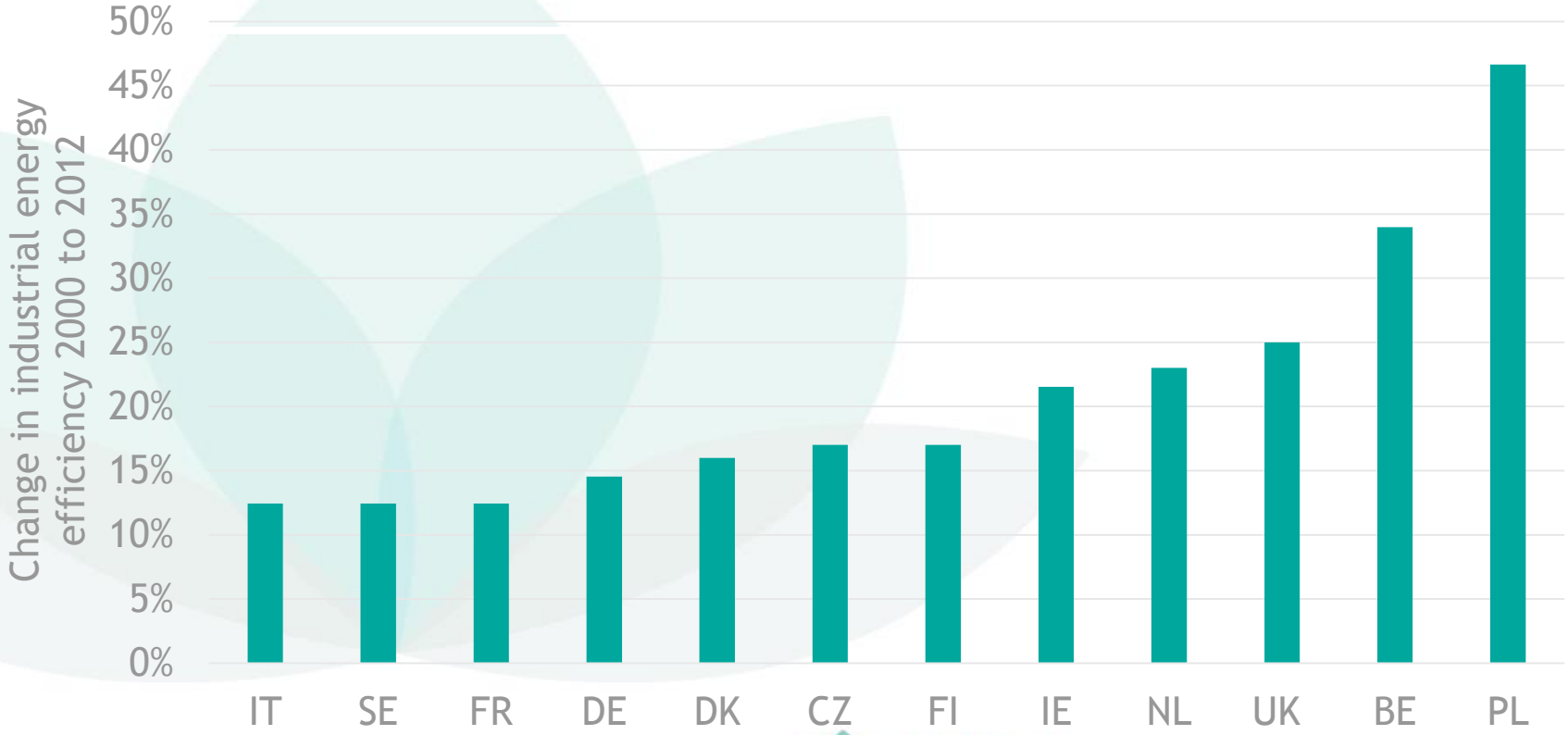
Industrial energy efficiency improvement from 2000 to 2012



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Conclusions

- certification to EN ISO 50001 is growing quite rapidly from a low base
- motivation to be certified is driven by economic incentives (stimulated by public policy) resulting in a major asymmetry in the level of certification by EU Member State
- awareness of energy management and its significance is increasing yet most organisations are struggling to implement it effectively
- they tend to operate conservative, risk-averse strategies that avoid deflecting time and effort from core business activities
- given this situation there remains a considerable scope to develop more sophisticated EM strategies that mine the cost effective savings potentials more fully

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Complementary slides

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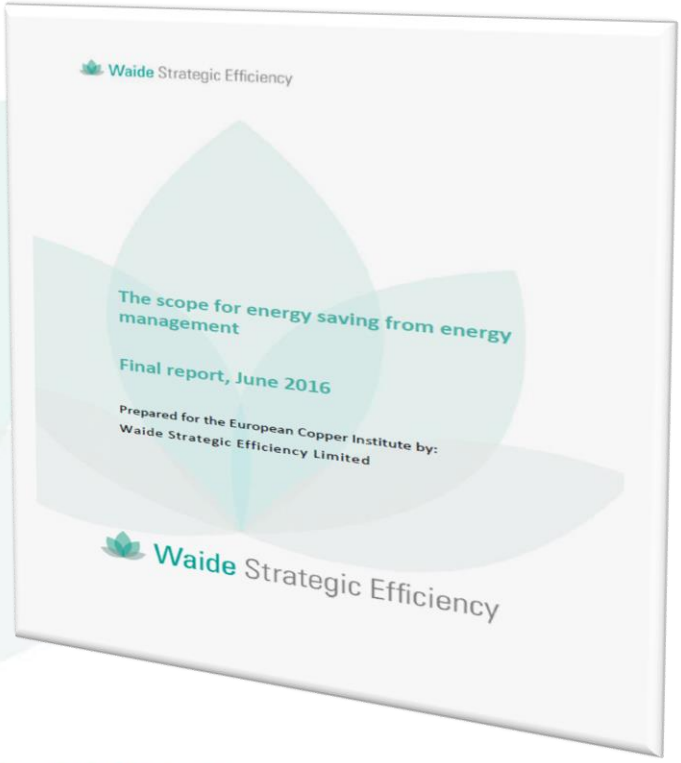
Findings from a recent study published on Leonardo Energy

Assesses the state of EM in the EU covering:

- industry and building sectors
- adoption levels and current practice
- drivers and barriers
- impacts, costs and savings potentials
- policy experiences



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Summary of key findings

- EM accesses systemic energy savings opportunities that are very difficult to capture through other means
- Current EM adoption rates are far below cost-effective levels
- Better and more widely adopted Energy Management has the potential to save ~26% of EU combined energy use in the industrial and service sectors of which 19% could be delivered through more robust policies
- Average net cost savings of €53 billion per annum to 2035 and average CO_2 emissions savings of 165 Mt CO_2/year
- Current policy frameworks, such as the encouragement for audits in the Energy Efficiency Directive are helpful but need to be strengthened to deliver
- More robust and holistic policy approaches are required

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Optimal Scenario - summary

- The *Optimal Scenario*, which assumes economically-optimised EM, leads to some 1 728 Mtoe of cumulative energy savings from 2016 to 2035 of which:
- 807 Mtoe of savings are in industry and 931 Mtoe of savings are in the tertiary sector
- This equates to estimated cumulative CO_2 savings of 4.8 gigatonnes over the same period with annual savings of 383 million tonnes of CO_2 in 2035
- Extra investments of €119 billion in equipment and related services are needed at an average of €6.0 billion per year to deliver these savings
- These are over fourteen times less than the value of the energy bill savings, which total €1 684 billion over the period, at an average of €84 billion per year

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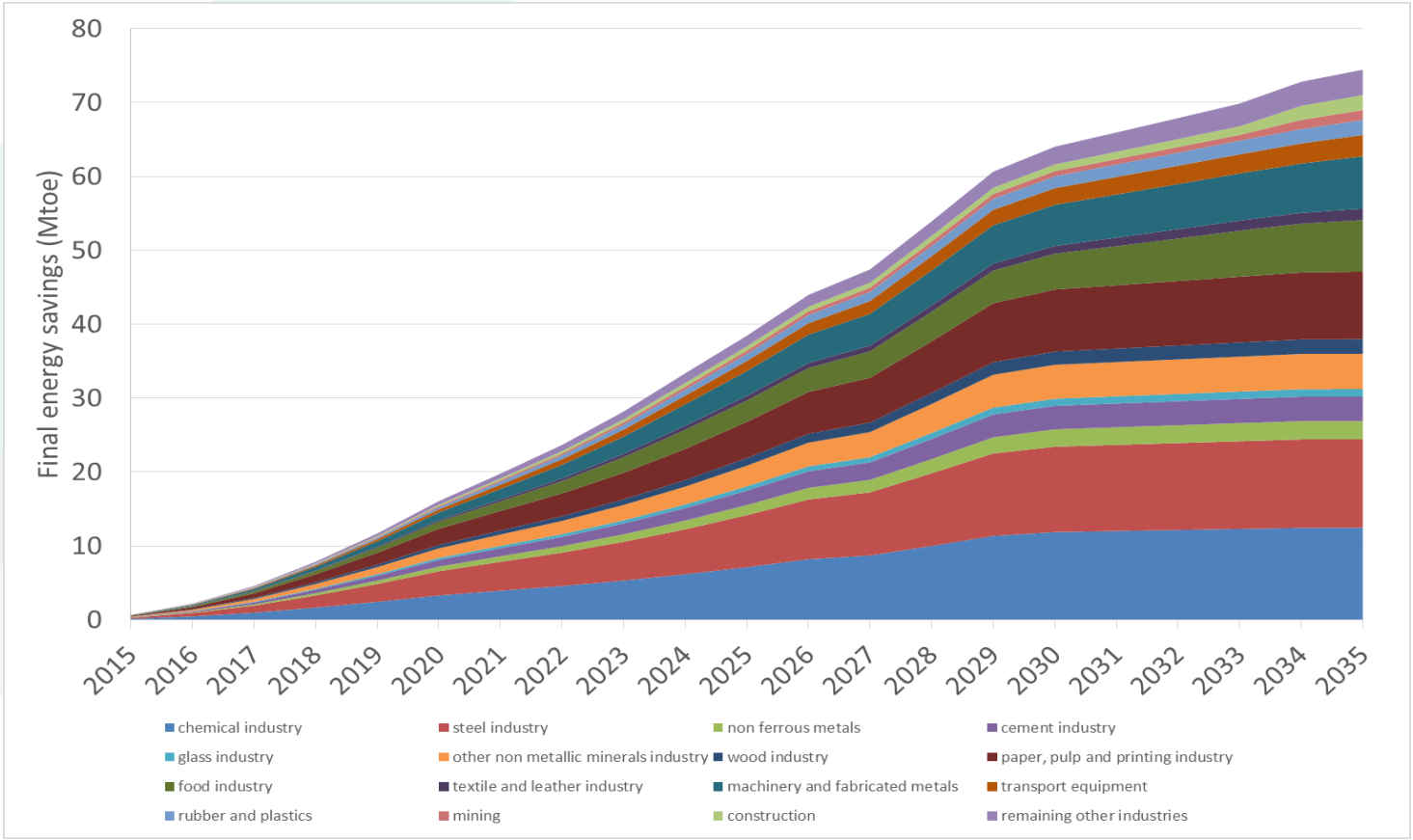
Industrial sector savings under the Optimal Scenario compared with the Reference Scenario



An energy action plan for Europe

Following review of the EED the Commission and MS should consider amending the provisions which currently exclusively concern energy audits to:

- introduce MS level targets for the share of enterprises that have adopted EM and where the targets are set based on the proportion of enterprises of a given size and energy intensity within each MS
- consider amending the EED energy audit obligations to become an obligation to adopt a full energy management system for enterprises using more than a minimum prescribed energy consumption or energy intensity level and above a minimum size
- set MS targets for the number of certified energy managers, wherein the targets are proportional to the economy's size and energy intensity and increase to a plateau with time

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Links and Contacts

THE SCOPE FOR ENERGY SAVING FROM ENERGY MANAGEMENT

http://www.leonardo-energy.org/resources/66

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