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Enhancing the impact of energy audits and energy management in the EU

A review of Article 8 of the Energy Efficiency Directive



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2 February 2016. Updated with corrected formatting.

Disclaimer

eceee has initiated this work and the report reflects the importance that eceee attributes to the Energy Efficiency Directive. However, the views expressed herein are those of the authors and do not necessarily reflect those of eceee or its members, or those of the report's funders.

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One of eceee's principle events is the five-day Summer Study held in June every odd year, which attracts more than 450 participants from governments, industry, research institutes and citizen organisations. Since 2012, eceee also arranges a biennial event devoted to industrial energy efficiency.

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Enhancing the impact of energy audits and energy management in the European Union

A review of Article 8 of the Energy Efficiency Directive

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Karlsruhe, 2nd of February 2016

1 Introduction

The Energy Efficiency Directive 2012/27/EU (EED) is one of the core pieces of European energy legislation which intends to foster the increase of energy efficiency. Article 8 EED aims to increase the number of energy audits in industry and the commercial sector. For large enterprises, mandatory energy audits are required. For SME¹ Member States are encouraged to establish appropriate instruments to support energy audits.

The EED entered into force in December 2012; Member States were expected to fully transpose the Directive, including Article 8, into national legislation within a period of roughly 18 months, by June 2014. By now, most of the European Member States have transposed Article 8 into national legislation; the level of transposition and concretization of requirements, however, varies across Member States.

Within this paper, policy recommendations for a further development of Article 8 are derived based on the current situation. In a first step, an analysis of the energy use and enterprise structures in the relevant sectors is presented. Complementary, the aspect of competitiveness and multiple benefits is highlighted briefly.

Subsequently the requirements of Article 8 are described, followed by a short analysis of the directive's transposition in the Member States. Based on the actual implementation, potentials for improvement are identified. From this analysis, the policy recommendations are derived in the summarizing section.

2 Energy consumption in Industry and Tertiary Sector

Industry and Services in the EU are responsible for ~18 EJ (~430 Mtoe) final energy consumption (excl. non energetic uses), of which ~11.5 EJ (275 Mtoe) are used in industry. This energy demand represents ~40% of the EU's total final energy consumption including the buildings in those sectors².

Within the industry, energy demand is dominated by the energy intensive industries, which are responsible for nearly 80 % of industry's final energy demand:

- primary metals
- chemical industry
- non metallic minerals
- paper, pulp and printing industry
- food industry

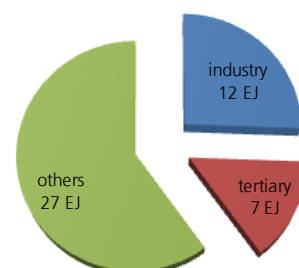


Figure 1: Final Energy demand of industry and the tertiary sector

Within those industries (with the exception of the food industry)

¹ SME are defined with a double criteria related to employees (up to 250) and turnover.

² [Statistical data is based on processed data from Eurostat.](#)

more than two thirds of the employees work in large enterprises (> 250 employees). This figure is significantly higher than the average of one third in industry and tertiary.

Employees in industry

Employees in the tertiary sector



Figure 2: Split of employees in SME and large enterprises in industry and the tertiary sector

Half of the employees in industry work in large enterprises³, in the tertiary sector only a quarter of the employees are employed by enterprises with more than 250 employees. Within some of the energy intensive sectors (pulp and paper, chemicals, primary metals), the share of large enterprises is significantly larger than in the other sectors, whereas in the food industry smaller enterprises are more common. Among the EU countries, the size distribution is comparable within the sectors; due to the large structural differences, the resulting structure of company sizes for the whole countries is heterogeneous.

Companies with less than 250 employees represent 99% of the EU's companies with 60% of the overall employees and 35% of the total annual turnover.

Assuming the specific energy demand per employee is independent of the company size, ~ 40% of the energy demand in both sectors is used by large enterprises, more than 60 % by SME enterprises with less than 250 employees.

3 Competitiveness through multiple benefits of energy efficiency

As many studies have shown, energy saving potentials in industry and the tertiary sector comprise highly economical measures with short payback times⁴. The implementation of such measures is reasonable even from a strictly micro-economic perspective. Nevertheless the update of such measures is often delayed or prevented by non-economic barriers and lack of priority. A fallback in competitiveness is feared due to initial investments and production breaks due to the implementation of the efficiency measures.

Nevertheless, it is widely acknowledged, that the positive effects of energy efficiency go far beyond energy savings. Increased productivity is the most prominent among them for industry.

³ Due to the lack of statistical information, only the employee criterion is used in the following considerations. As the financial sector is excluded in some of the employment statistics, the figures may not be 100% accurate.

⁴ E.g: Contribution of Energy Efficiency Measures to Climate Protection within the European Union until 2050, Fraunhofer ISI 2012; Adoption of low-cost energy efficiency measures in the tertiary sector—An empirical analysis based on energy survey data, Schlomann, B. 2015; Analysis of energy saving potentials in selected EU countries based on a sectorial best-practise approach, Dansk Energi 2014

Complementary effects include reduced maintenance and operational costs, improved product quality, less resource consumption etc.

According to the International Energy Agency IEA study⁵ on multiple benefits the monetary value of those benefits can exceed the pure energy conservation effects (direct cost savings) by 250%.

Therefore energy efficiency measures induced by the audits are a driver and not a barrier to competitiveness of the European Union's economy, to businesses and to job creation and increased welfare.

4 Requirements of Article 8

Article 8 and Annex VI EED in conjunction with the general EED Guidance Note and the Guidance Note, that deals particularly with Article 8, define several requirements with regard to both large companies and small and medium-sized companies (SME). These requirements have to be addressed by Member States in their national legislation. The most important requirements of Article 8 and Annex VI with a focus on industry can be summarized as follows:

- Art. 8 (1): promotion of independent, supervised, high-quality audits based on minimum requirements
- Art. 8 (2): development of programmes for SME to undergo energy audits and implement their recommendations
- Art. 8 (4): mandatory energy audits for non-SME by 5th December 2015 and thereafter every four years
- Art. 8 (5): implementation of energy audits under voluntary agreements
- Art. 8 (6): exemptions for companies implementing an energy or environmental management system
- Annex VI (a): on up-to-date, measured, traceable operational data on energy consumption
- Annex VI (b): detailed review of the energy consumption profile of buildings, industrial operations or installations, including transportation
- Annex VI (c): data based on life-cycle cost analysis (LCCA)
- Annex VI (d): proportionate and sufficiently representative energy audit

5 Current implementation of Article 8

The specific implementation of these requirements varies across the 28 EU Member States. In the following, insights into the current status of implementation in the Member States including example of differences for some of the implementations are provided. Note that the given examples regarding the national transposition of Article 8 are not exhaustive and intended for illustration only.

5 "Capturing the Multiple Benefits of Energy Efficiency" IEA 2014
http://www.iea.org/publications/freepublications/publication/Captur_the_MultiplBenef_ofEnergyEfficiency.pdf

5.1 Large Enterprises

In the EED, the definition of large enterprises is implicitly based on the definition of SME (Art. 1 (26) EED). Large companies are defined as companies not being SME. Based on this, a company is considered as large if it has 250 or more employees (primary criterion). If a company has fewer than 250 employees, but more than 50 million Euro annual turnover and more than an annual balance sheet total of 43 million Euro, it is also considered a large company and covered by the mandatory audits of Article 8. While some Member States directly rely on the non-SME definition from the Directive, others have developed their own explicit definition of large enterprises (e.g. Croatia modified the financial thresholds) and partly added additional criteria (e.g. Bulgaria added specific energy thresholds). Further delimitations of linked companies apply. The majority of Member States decided to calculate the thresholds for the assessment of the 'SME status' based on data of all parts of the company located inside and outside the national territory. If a multi-site and/or multi-national operating company has been assessed as non-SME, the majority of Member States limited the obligation to conduct an energy audit to parts of the company located inside the national territory and thereby excluded international parts of the company. The obligation could also be fulfilled by the introduction of an energy or environmental management system according to Art. 8 (6). Some Member States such as Denmark (3 months), Germany (12 months) and Ireland (6 months) extended the deadline for the implementation of an energy or environmental management system while others strictly required the 5th of December as the transposition date.

The technical and structural requirements resulting from Annex VI EED focus among others on the data collection process. Some countries such as e.g. Austria stress the proactive submission of the energy audit data towards a monitoring institution. To ensure the representativeness of the energy audit some Member States also defined minimum percentage rates of the company's total energy consumption which have to be covered by the energy audit (e.g. Germany and United Kingdom 90%). Regarding Annex VI (b) Member States oblige auditors to consider transportation across borders in the energy audit, which may lead to a double-coverage of the same energy demand by different Member States. Concerning buildings, the energy consumption is often split across several parties. Thus, some Member States hold the landlord responsible for the audit in the building.

To guarantee compliance, Member States imposed penalties on both companies and/or energy auditors (Art. 13). However, the total amount and the person and/or institution addressed by the penalty vary across Member States. In Hungary the penalty is imposed on the energy auditor whereas in Ireland and Croatia the management of the company is addressed directly. In Spain, for example, the amount of the penalty is limited to a maximum of EUR 60,000, but not more than 10% of the company's turnover.

5.2 SME

To comply with Article 8 (2) Member States apply different approaches to support the implementation of energy audits in SME. Some Member States such as Finland, the Netherlands and the United Kingdom directly adopt the voluntary approach (VA) suggested by Article 8 (5). For this purpose, the design of programs varies across Member States: VAs in Finland focus on energy audits including their funding while in the Netherlands companies are obliged to develop

and implement energy efficiency plans. The approach taken by the UK is based on an energy tax discount in return for the implementation of an energy management system. Other countries such as Germany, Austria or Croatia focus on financial incentives consisting of subsidies for energy audits or tax reductions in return for an energy audit. In Germany for example, SME have to conduct an energy audit under the German eco tax cap for the manufacturing industry or the German special equalization scheme to get tax reductions. Furthermore, funding is provided for SME for the implementation of an energy audit and/or energy management system. In Austria different regional programs provide funding for SME. Information-based approaches are applied for example by Denmark ('energy management light', which is a version of an energy management system which is especially targeted at SME) or Sweden ('Hackefors model' as a commercial network approach). In sum, a broad range of different approaches is used in the various Member States.

6 Improvement potentials of Article 8

Article 8 of the EED provides a helpful framework for improving energy efficiency by requiring large companies to conduct mandatory audits and by encouraging SME to realize them and their recommendations. However, there still is a considerable opportunity to further enhance the competitiveness as well as the contribution of both large enterprises and SME towards the European energy and climate goals, which is also to the benefit of the growth and job agenda.

6.1 Large Enterprises

With regard to large enterprises, improvement potentials especially lie in the following areas:

- Currently, the mandatory audits only apply to those that qualify as non-SME according to the Directive. While the identification of large companies based on the present three criteria in conjunction with the information on the ownership structure is challenging to the Member States, the EED does not consider energy demand as a criterion for mandatory energy audits⁶. In turn, this leads to a situation where companies with comparatively little energy demand may be subject to mandatory energy audits (e.g. financial institutions with a high turnover) while those with a considerable amount of energy consumption may not be subject to the audit as they still qualify as SME.
- Article 8 requires large companies to carry out audits, but there is no need to implement any measures emerging from these audits. However, only implementation will yield energy savings and improved competitiveness in the end. If implemented in connection with a planned maintenance stop, it will not add additional costs or a burden on the industries.
- Article 8 furthermore requires the Member States to have companies carry out mandatory audits or implement energy or environmental management systems by 5 December 2015. The transposition process, however, left companies in many Member

⁶ Although the European Commission has introduced a clear definition with additional clarifications in the guidance note, member states have implemented the scope quite differently. Anyway, following the clear definition of the directive, Member States should be able to implement the directive correctly.

States very little time to do so. Especially setting up a management system usually takes longer than arranging an energy audit due to the more fundamental changes to an organization's management approach. The current implementation of the EED, however, does not explicitly take this into account.

- Penalties for non-compliance vary considerably with regard to the corresponding ceilings as well as with regard to who is penalized. Currently, penalties for non-compliance are not further detailed for Article 8.
- The monitoring process for gathering information on the implementation of audits and the resulting recommendations by the Member States is very heterogeneous and is dealt with in various ways by the Member States. This could further be harmonized by the EED.

6.2 SME

Further areas for improvement concern small and medium-sized companies which are currently addressed by encouraging mechanisms. As compared to large companies, their energy consumption and consequently their energy saving potentials tend to be lower. However, as mentioned earlier in the report, there are high consuming SME as well. In turn, they usually have no dedicated personnel who deal with energy issues and their absorptive capacity in the area of energy efficiency is generally lower. With regard to current practice addressing SME, especially the following areas seem therefore to yield potentials for improvements:

- Information for SME on energy audits and energy/environmental management is often spread across various different public institutions. This makes it difficult for SME to find the appropriate information on funding opportunities, measures and auditors. This situation could be improved through "one-stop shops" to reduce the prevalence of barriers to energy efficiency.

7 **Regular energy management systems can be too burdensome for SME. Providing light-weight energy management systems for SME could help to anchor a continuous improvement process on energy efficiency also within SME. Policy recommendations for Art. 8**

Based on the above, we think that the following specific policy recommendations should enhance the impact of Article 8 of the EED.

- **A stronger consideration of energy demand is needed with regard to energy audits and energy management systems.** At the current stage, the distinction of companies in Article 8 is based on financial and employment criteria. It should be discussed whether this distinction alone is effective. SME with a high energy consumption could for example be particularly addressed, for example by special incentivisation or particular information support, while companies classified as large ones with a negligible energy demand could also be subject to special requirements.

7.1 Large Enterprises

With regard to large companies, these recommendations are as follows:

- **Large companies should be obliged to implement recommended measures with a payback-time of up to 3 years.** Alternatively, large companies should implement and report bottom-up efficiency improvements of 1.0 % per annum by other means as an average value over the last 3 years before a mandatory energy audit. If the latter is chosen, the achievement of the bottom-up savings should be verified as part of the forthcoming mandatory audit. This could help to assure that companies improve their competitive situation while also improving energy efficiency.
- **Penalties should be proportionate to the economic situation of a company and exceed at least twice the typical costs of an energy audit.** These costs should both take the external costs (i.e. costs of auditor) and internal costs (i.e. staff involvement for the audit) of the audit into consideration. Furthermore, management could also be made liable for non-compliance with the EED. This would help to avoid that companies respectively their management speculate on paying a fine below the actual costs of an audit in case that non-compliance is actually revealed.
- **A reporting system should be established where companies or auditors have to proactively submit aggregate data on a company level.** This submission should include information a) on the company structure, b) their energy consumption profile, c) measures suggested during a mandatory audit. The submission should further require d) an update on the implementation of measures suggested in earlier mandatory audits along with e) aggregate information on the resulting efficiency improvement on a company level. Such data has to be available due to the requirements of Annex VI of the EED. In case a company opted to implement a management system, the overall energy efficiency improvements as well as corresponding information on measures and savings could be published. For the reporting process, the required information should be collected in a sufficiently aggregated way that no confidential information can be derived from this data. Setting up a corresponding reporting system would allow obtaining profound data on the impact of energy efficiency improvements as a consequence of energy audits and management system. Such information could serve companies (e.g. to convince management of certain efficiency measures; to learn best-practice approaches in other companies) but could also serve as a basis for future policy making (e.g. to provide credible information on audits and to monitor the impact of the EED and its contribution to policy targets).
- **Member States should be required to set up adequate monitoring systems for the implementation of measures as suggested during the energy audits.** In this framework, audit reports should regularly be sampled and the quality of the reports should be verified independently by a qualified third party. In case of insufficient quality, the auditor should be penalized. This would help to avoid low-quality reports or poorly elaborated recommendations.
- **Large companies that intend to implement an energy or environmental management system should receive a sufficiently long period to properly set up this system.** To do so, companies should be required to hand in a well-funded time-schedule for the implementation of such a system in the company. This would help to

avoid a situation where companies dedicate their resources to a poorly used energy audit just to be compliant with the formal requirements.

7.2 SME

Additionally, the following recommendations can be provided with a special view to SME:

- **Member States should be required to establish and promote a central information hub on energy audits, related best-practice and to identify energy auditors.** Setting up such a hub on energy audits in the Member States (e.g. as a common web platform) could contribute to minimizing information barriers for SME. Next to information about funding mechanisms, such platforms should also provide best-practice information on the successful and cost-effective implementation of energy audits and energy/environmental management. This would help to avoid that SME need to search for information in different places.
- **Member States should be required to regularly monitor their encouragement mechanisms.** The framework conditions for improving energy efficiency are in constant evaluation. To make sure that nationally used mechanisms are efficient and effective, their utilization by companies, as well as their cost-effectiveness should regularly be monitored. This could help the Member States to improve their policy measures.
- **Member States should be encouraged to suggest 'light-weight' energy management systems for SME.** By introducing systems with a reduced set of formal requirements, the accessibility of these systems to SME could be enhanced. This could also serve as a first step for SME towards more elaborated energy management systems, thus lowering the barrier to introducing these systems.
- Supporting energy audits in SME through energy service providers, e.g. in energy saving tenders or energy saving obligations could **generate scale effects** which help SME accessing such schemes more easily.