Ecodesign regulations for industrial equipment: opportunities and challenges

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Abstract
Regulations developed under the EU Ecodesign Directive (2009/125/EC) set minimum energy performance requirements for products placed on the European market. Such product specific policies – implemented in many countries – have proved their worth primarily for household appliances. However, particularly in the commercial, professional and industrial sectors a huge energy savings potential remains untapped under current market conditions. The scope of the Directive also includes products from these sectors.

The first related Ecodesign measure on motors - adopted in 2009 - should achieve an estimated saving of 135 TWh of electricity per year by 2020, three times more than what is triggered by the ban of incandescent lightbulbs. Ongoing processes assess the options for product groups such as machine tools, professional refrigeration and air conditioning units, water pumps, industrial furnaces, electric transformers, etc.

Industrial products and equipment pose specific challenges, which need to be taken into account in order to design effective minimum performance requirements. This paper discusses some of these challenges, frequently experienced during preliminary investigations.

For instance, adequate scoping and access to quality data is a first issue, especially for poorly monitored sectors. The debate on component versus system approach is also a recurrent concern. Addressing products with a high level of design and installation customisation requires new and creative approaches. Verification and enforcement of regulations set on large industrial equipment may as well be a specific barrier. Last, identifying and limiting the overlap between Ecodesign measures and other EU industrial policies is important.

Lessons learned and examples from former and on-going preparatory studies and consultations are used to support the discussion and our general recommendations.
Introduction

Industrial energy consumption is mostly driven by the processes and energy-intensive equipment used in factories. Saving energy requires to increase their energy efficiency, as well as optimise the systems and controls. The purchase of equipment is a key decision in this respect. There is a wide range of intrinsic efficiency and upfront price for products proposed to industrial purchasers, and the energy performance is not always a clear or well-informed motivation.

The first highly visible energy saving policy introduced by the EU in the 90's has been the energy labelling for household goods, on an A to G scale displayed at the point of sale. This label has never been extended to professional or industrial equipment. The perception has always been that such an instrument would be too simplistic and irrelevant for purchasers of complex machineries used in factories. The drawback is that little has been done by policy makers to stimulate the energy efficiency at the level of products in this sector. As highlighted in a 2011 study by the Collaborative Labelling & Appliance Standards Program (CLASP) on the harmonisation of appliance energy efficiency ‘policy coverage is particularly incomplete for the commercial and industrial sectors and large cost-effective energy savings remain untapped in each’. Emphasis has rather been put on the more holistic overall performance of industrial plants (through e.g. the EU Directive on Industrial Emissions or the Emission Trading Scheme).

The EU Ecodesign Directive adopted in 2005 offers a new opportunity to drive the efficiency of industrial products. Its principle is to prohibit from the market the worst performing products, through a sequence of dynamic steps. Its implementation has mainly started with priority household goods (televisions, fridges, lighting products, etc.). However, a list of industrial equipment is also targeted. In the meantime, other countries (such as the US, Australia, China) also pay increasing attention to industrial products under their own Minimum Energy Performance Standard policy schemes.

At this stage in the EU process, when several preparatory studies have been completed and some Ecodesign measures adopted or discussed, what lessons can be learned regarding the opportunities and challenges of setting such regulations on industrial products?

Industrial equipment under the EU Ecodesign policy

Principles of the Ecodesign policy

The Ecodesign Directive for Energy-Related Products (adopted in 2005 and revised in 2009 under the reference 2009/125/EC) establishes a framework for the setting of eco-design requirements for energy-related products. The major aim is to improve the environmental impact of products throughout their life-cycle, by setting measurable and enforceable provisions that manufacturers have to take into account when designing a product.

The European Commission, in association with the EU Member States and involving stakeholders and other interested parties, selects the product groups to be covered by the policy in three-year working plans. The full list already includes product groups identified as priorities in the text of the Ecodesign Directive back in 2005, as well as products included in the 2009-2011 Working Plan (published in October 2008), to which other product categories will be added under the second Working Plan for the period 2012-2014 (still under discussion).

In order to create the evidence base for the development of appropriate Ecodesign requirements, preparatory studies are carried out for every product group covered. On the basis of the findings, the European Commission develops Implementing Measures that are usually adopted as binding regulations directly applicable in all 27 Member States. An alternative are voluntary agreements when an industry sector prepares a sufficiently robust proposal.

The working plans and Ecodesign measures are discussed in a transparent process by stakeholders grouped in the so-called Ecodesign Consultation Forum. The road to the finalisation of product-specific requirements involves an environmental, economic and social impact assessment, a vote by Member State representatives (Regulatory Committee) and a scrutiny right by the European Parliament.

Products covered so far

At the time of drafting this article (April 2012), 13 product specific regulations are in force under the Ecodesign policy and about 15 draft measures are under discussion. In addition, for 3 product groups preparatory studies are just finalised, while for a dozen product groups the studies are ongoing or only recently launched.

The list of product groups already regulated or under discussion mainly includes household, office and tertiary products, such as heating equipment (boilers, water heaters, circulators, solid fuel stoves, local heaters), cooling
and ventilation equipment, appliances (fridges, freezers, washing machines, dishwashers, tumble dryers, vacuum cleaners, ovens, hobs, coffee machines), electronics (set-top boxes, computers, monitors, printers, copiers, televisions, power supplies) and lighting products (street lighting, office lighting, household lamps, directional lamps). Some other product groups specifically cover commercial and professional equipment, such as supermarket refrigerators, restaurant refrigeration cabinets, cold rooms, laundry washing machines and dryers, etc. Last, a number of product groups are specifically targeting industrial equipment or products used in industrial environments. These are the focus of this paper and more detailed information is provided in table 1 below.

It has to be noted, however, that the line between end-user-oriented, commercial and professional products is not always crystal clear. Therefore product definitions and scoping not always clearly differentiate between the application of the products.

Table 1. State of implementation of Ecodesign measures for specific industrial products and equipment

<table>
<thead>
<tr>
<th>Product group (Lot number by European Commission)</th>
<th>Status quo</th>
<th>Scope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard electric motors (ENER Lot 11)</td>
<td>Regulation 640/2009 adopted and published in 2009 - Revision foreseen in 2016</td>
<td>Electric single speed, three-phase 50 Hz or 50/60 Hz, squirrel cage induction motors that have 2 to 6 poles, a rated voltage up to 1000 V, and a rated output between 0.75 kW and 375 kW</td>
</tr>
<tr>
<td>Non-residential fans (ENER Lot 11)</td>
<td>Regulation 327/2011 adopted and published in 2011 - Revision foreseen in 2015</td>
<td>Fans for ventilation in non-residential uses, driven by motors with an electric input power between 125 W and 500 kW</td>
</tr>
<tr>
<td>Standard water pumps (ENER Lot 11)</td>
<td>Regulation voted by Member States, to be adopted and published in 2012 - Revision foreseen in 2016</td>
<td>Water Pumps used for clean water duty in commercial buildings, drinking water pumping, food industry and agriculture (excluding pumps which may have special features)</td>
</tr>
<tr>
<td>Pumps for waste water and fluids with solids (ENER Lot 28)</td>
<td>Preparatory study launched in 2012</td>
<td>Pumps for use with non-clear waters and fluids</td>
</tr>
<tr>
<td>Large pumps (ENER Lot 29)</td>
<td>Preparatory study launched in 2012</td>
<td>Pumps larger than those under ENER Lot 11</td>
</tr>
<tr>
<td>Special motors and motor systems (ENER Lot 30)</td>
<td>Preparatory study launched in 2012</td>
<td>Motors outside the scope of Regulation 640/2009</td>
</tr>
<tr>
<td>Compressors (ENER Lot 31)</td>
<td>Preparatory study launched in 2012</td>
<td>Products in motor systems outside the scope of the Lot 30 and the Regulation 640/209, in particular compressors, including small compressors, and their possible drives</td>
</tr>
<tr>
<td>Professional refrigerating equipment, incl. chillers and condensing units (ENTR Lot 1)</td>
<td>Draft regulations discussed in January 2012 - Adoption and publication expected in 2012 or 2013 - Revision foreseen 4 years later</td>
<td>Of industrial relevance: refrigeration process chillers and remote condensing units</td>
</tr>
<tr>
<td>Electrical transformers (ENTR Lot 2)</td>
<td>Draft regulation discussed in April 2012 - Adoption and publication expected in 2013 - Revision 6 years later</td>
<td>Small, distribution and power transformers with a minimum power rating of 1 kVA used in 50Hz electricity transmission and distribution</td>
</tr>
<tr>
<td>Industrial and laboratory furnaces and ovens (ENTR Lot 4)</td>
<td>Preparatory study in finalisation stage</td>
<td>Covers different types of small and large industrial furnaces and ovens</td>
</tr>
<tr>
<td>Machine tools (ENTR Lot 5)</td>
<td>Preparatory study in finalisation stage - Voluntary agreement proposed and developed by CECIMO</td>
<td>Assembly for geometric shaping of workpieces made of arbitrary materials, forming, cutting, physico-chemical processing or joining; for professional use; including related machinery</td>
</tr>
</tbody>
</table>

High energy saving opportunities

In the preparatory studies and impact assessment studies for Ecodesign regulations, best available technologies, ecodesign improvement options and energy saving potentials for individual product groups are estimated. The evaluation of the savings is done by comparing one or different scenarios of entry into force of Ecodesign requirements against a business-as-usual scenario (BAU).
Table 2 provides an overview of some of the outcomes for the product groups already assessed. These simplified figures and indications are extracted from the relevant studies but should be considered with precaution (as we are not including all the background explanations and assumptions, and the calculations are sometimes based on incomplete or arguable data, not taking into account overlaps between product groups, etc.). These should just be considered as estimates for a rough order of magnitude.

Table 2. Indications from most advanced analysis of products covered by the Ecodesign policy

<table>
<thead>
<tr>
<th>Product group</th>
<th>Energy consumption in the EU in reference year</th>
<th>Indication on best available technologies</th>
<th>Content of the adopted or draft Ecodesign measure</th>
<th>Saving potential with the Ecodesign measure (compared to BAU)</th>
</tr>
</thead>
</table>
| Standard electric motors | In 2005: 1067 TWh of electricity, corresponding to 229 Mtoe of primary energy | Permanent magnet (IE4) motors, that can be 10% more efficient than base cases. Using variable speed drives significantly increases system efficiencies | - IE2 level mandatory since 2011  
- By 2015 (2017 for smallest motors), motors will have to be of IE3 efficiency or be equipped with variable speed drives | 135 TWh/year of electricity by 2020, corresponding to 29 Mtoe/year of primary energy |
| Non-residential fans | In 2005: 344 TWh of electricity, corresponding to 74 Mtoe of primary energy | Axial and centrifugal backward curved fans of efficiency grade over 70% | Minimum requirements for efficiency grade according to 6 fan categories and applied in 2 tiers (2013 & 2015) | 34 TWh/year of electricity by 2020, corresponding to 7 Mtoe/year of primary energy |
| Standard water pumps | In 2005: 109 TWh of electricity, corresponding to 23 Mtoe of primary energy | Pumps with minimum efficiency index over 70% | Minimum efficiency index should be at least 10% by 2013 and 40% by 2015 | 3.3 TWh/year of electricity by 2020, corresponding to 0.7 Mtoe/year of primary energy |
| Remote condensing units and chillers | In 2007: 244 TWh of electricity, corresponding to 53 Mtoe of primary energy | Highly energy efficient equipment using low-GWP refrigerants | Minimum energy efficiency levels applied in two tiers (2014 and 2017) | 23 TWh/year of electricity by 2020, corresponding to 5 Mtoe/year of primary energy |
| Transformers | In 2007: 73 TWh of electricity, corresponding to 16 Mtoe of primary energy | Optimised designs and materials, in particular amorphous metals | Maximum levels of load and no-load losses applied in two tiers | 17 TWh/year of electricity by 2025, corresponding to 4 Mtoe/year of primary energy |
| Industrial laboratory furnaces and ovens | In 2009: 142 Mtoe of primary energy (of which 123 for large industrial furnaces) | Optimised furnaces (incl. better controls, insulation, heat recovery, etc.) | Not known yet (discussion needed on coherence with other EU policies) | According to draft preparatory study: 15 Mtoe/year of primary energy by 2025 (of which 13 from large furnaces) |
| Machine tools | In 2010: 15 Mtoe of primary energy | Optimised combination of light moving parts, efficient software, energy recovery from drives, efficient cooling, etc. | Not known yet | According to draft preparatory study: 2 Mtoe/year by 2025 |

When looking only to the first row, the Ecodesign regulation applying to motors is expected to save as much as 135 TWh of electricity per year by 2020, which is three times more than what will be gained through the iconic ban of incandescent lightbulbs in the EU, a measure that has triggered much more policy and media attention. The sum of the primary energy consumption from all these equipment is about 550 million tons of oil equivalent per year (however, a more refined calculation should take overlaps into account). The combined energy saving potential through Ecodesign measures just launched or to be launched is estimated to be in the order of 63 million tons of oil equivalent per year after 8 to 10 years of implementation. This potential is a bit more than 11% of the actual consumption of the products. This is a substantial saving, however it is still far from what could be achieved by enforcing best available technologies more swiftly. This is why regular review and dynamism is a key condition for successful and ambitious Ecodesign policies.
these Ecodesign measures are revised, further more demanding requirements should be set to foster technological development.

As an illustration, this potential saving of 63 million tons of oil equivalent corresponds to nearly 4% of the overall primary energy consumption of the EU and as much as the consumption of Sweden and Denmark combined. Achieving this reduction potential would be as efficient as a building renovation program aiming at decreasing by 25% the energy consumption from all central-heating boilers in Europe. (These figures are based on calculations using Eurostat and other official data).

This rough analysis shows that setting performance requirements on industrial equipment can be very pertinent and provides a significant contribution to industrial energy efficiency. Table 2 also shows that the energy saving potential differs widely from one product group to the other. This can be explained by technical reasons, but also by limitations in some of the adopted or draft Ecodesign measures leading to sub-optimal impact on the market. The next chapter discusses some of the causes of these limitations and suggests solutions.

Challenges and recommendations

The experience with the adoption of the Ecodesign measures for motors and fans and discussion of others has shown a number of recurrent challenges and barriers to overcome. Some are specific to industrial products, mainly because these are usually very different from simple household goods. In this chapter, we discuss several of these aspects and provide recommendations to limit the risks of insufficient ambition and delays in the development of future Ecodesign measures for industrial equipment.

Scope and product definitions

The preparatory studies for Ecodesign measures include a first chapter on the scope and definitions of products. A general objective is to use as much as possible the scopes and definitions included in official industry standards. However, this is not always fully possible and there are sometimes substantial variations in the scope until the final adoption of the measures. The following shortcomings may be experienced:

- With a too narrow or insufficiently refined scope, the preparatory study can miss important product types in the analysis. This makes their inclusion in Ecodesign measures trickier at a latter stage. As regards water pumps for instance, the European Commission had to limit the first Ecodesign measure adopted in 2011 to standard pumps, while additional studies are now required for larger pumps, pumps for waste water, aquariums, fountains and pools. This postpones the development of useful Ecodesign requirements and leads to a more complex regulation portfolio. On the other hand, the scope may sometimes be chosen very wide. This is the situation for machine tools, where the scope covers from e.g. highly complex laser cutter machines to small wood panel saws and welding equipment. While this approach allows a comprehensive overview, there is a risk that the preparatory study can only provide a superficial analysis of a high number of base cases and consequently lacks detailed evidence base needed for deducing political decisions.

- Important modifications of the scope of an Ecodesign measure along the policy process can trigger opposition from some stakeholders, and this may stall the final adoption. This has been experienced with non-residential fans. The initial preparatory study was limited to ventilation fans (in contradiction with an ISO standard under development at that time). Later in the process the European Commission aligned the Ecodesign regulation with the ISO definitions (i.e. widening the scope), however industry stakeholders expressed a strong complain about this modification since the original scope was modified.

- The use of the scope and exemptions defined in industry standards can sometimes lead to creating loopholes. This has been experienced with electrical motors. The scope and exemptions of standard IEC/EN 6000-34 was used, triggering the risk that manufacturers just indicating on the rating plate or declaring that a motor operates over 40°C (even if it was essentially designed to work in normal conditions) could be exempted from Ecodesign requirements. The European Commission had to prepare an amendment to the regulation adopted in 2009 to close the loophole.

A recommendation for these scoping problems would be to spend sufficient time very early in the process to clarify the scope (at the launch of the preparatory study) and in early collaboration with standardisation organisations. The scope and budget allowed to the preparatory study consultants should be coherent (i.e. for complex and wide scopes, the budget could be higher so that consultants can dedicate more resources).

Another suggestion is that exemptions should always be treated with great care, and if possible limited in time of validity. This would avoid loopholes or close them automatically after some time.
Access to quality and credible data

Comprehensive and quality data on product performance is an essential pre-requisite to designing effective Ecodesign measures, as well as for raising the awareness of purchasers. Data is needed for decision-makers on aspects such as market trends, environmental impact, improvement potentials, etc. Purchasers also need credible data on a product performance as well as indication on the performance of the rest of the market. The way to collect and ensure the access to such quality data has been a recurrent challenge. This is particularly true for complex products for which performance may not be measured by proper methodologies, or for which harmonised measurement standards are missing. Also, the systematic centralisation of data (for instance through an EU industrial federation) may be inexistent.

Some examples of data challenges:

- When consulting on professional and industrial refrigerating equipment, European decision-makers have been faced with reactions from manufacturers challenging the data used in the preparatory study, complaining that it was not representative of the actual market and that it was even going ‘beyond the laws of physics’. They claimed that the performance data for remote condensing units and chillers were not credible, although it can be noted that manufacturers in principle have time and opportunities to submit good quality data during the preparatory study process.

- A similar experience has been reported for industrial furnaces: the preparatory study for this product group suffered, besides other challenges, particularly from a lack of data on industrial furnaces. Since these products are complex and standards are missing, it is generally difficult to get information on their energy efficiency. Industry associations were not able to provide the most basic data. Only a limited number of manufacturers replied to a questionnaire to provide input for the study.

- On machine tools, considering the difficulty of assessing and measuring the performance of a complex and sometimes tailor-made equipment, the idea of considering some simplified ‘checklists’ has been suggested. Instead of providing a single artificial performance metric data, manufacturers could report what improvement options have been implemented on each machine or why specific options were not technically feasible.

A first obvious recommendation would be to encourage the consultants in charge of Ecodesign preparatory studies to pay much more attention to this data issue. It has sometimes been neglected, thus leading to insufficiently substantiated or too rushed analysis and policy recommendations at the end of the studies.

The availability of data supposes that data collection is facilitated. As soon as a new preparatory study starts, manufacturers should be requested to provide most recent available data and flag out any potential difficulty with data collection. Industrial associations should be encouraged to set up effective data collection schemes as early as possible. A parallel necessity is for European decision-makers to develop more robust market monitoring tools to get access to regularly and automatically updated data on the performance of products on the market. An EU product registration system would definitely help. Manufacturers could be requested to provide the technical fiche of any new product placed on the market in a centralised database.

Ecodesign regulations should be put at use to this aim. Clear and effective mandatory information requirements should be set in these regulations, and the data collected regularly and at least one year before an Ecodesign or labelling measure is to be revised. This early collection could leave time to conduct some external cross-checking in catalogues to verify the quality and credibility of the data.

Another key recommendation is to generally improve the consistency between the development of Ecodesign measures and the standardisation agenda, in order to ensure the availability of unequivocal and appropriate measurement and assessment methods. This is an area which has seen too slow progress since the adoption of the Ecodesign Directive in 2005. The recent development by the European Commission of a horizontal mandate to European standardisation CEN and CENELEC in the field of Ecodesign (M/495) is a promising sign of improvement.

When it comes to developing ways of informing purchasers on the performance of complex or customised products, checklists indicating improvement options could be further investigated as an addition to more quantitative metrics. A matrix could be used to allow some form of comparison of the environmental performance of different products or different specific conditions of use.

Component versus system approaches

The Ecodesign Directive targets products placed on the market (regardless of their future application). In many cases, industrial products are installed as part of wider systems or made of diversified components. Focusing on the energy efficiency of the product itself sometimes misses a substantial part of the energy savings achievable
through better optimisation of the system. However, an Ecodesign measure needs to remain enforceable and verifiable by compliance checks at the level of the product. This dilemma has probably been one of the most recurrent issues raised during Ecodesign consultations (especially by industrial stakeholders), however often leading to theoretical debates.

- The most exemplary file is probably electric motors: the preparatory study prepared in 2006 for the Ecodesign regulation had only considered improvements at the product level. Coping with systemic dimensions through the Ecodesign policy was considered unrealistic at that time. Considering the limited saving potential (in the range of only 6 Mtoe/year compared to a consumption level of 229 Mtoe in 2005 for the product category), the European Commission supported by some stakeholders then spent considerable efforts trying to find a solution to infuse a system approach in the legislation, in the form of the promotion of variable speed drives. The elegant solution finally adopted in 2009 – requiring more stringent efficiency levels if the motor is not supplied with a drive – could still raise some implementation questions but is certainly an important and concrete step towards an ‘extended product approach’, if not a full system approach.

- In the field of machine tools, a frequent issue raised during discussions is the appropriate level for Ecodesign requirements. Should they be set on whole machines considered as systems, or through a modular approach of machine tool components? There are pros and cons for each option, and some lessons should be learned from this product category to better anticipate the challenges with similarly complex products. The same discussion is for instance taking place for walk-in cold rooms (also to be regulated with professional and industrial refrigerating equipment).

The motivation from the European Institutions to promote more systematically a system or extended product approach for products part of systems should be encouraged. This approach is further refined by the European Commission and is currently suggested for the new pump, motor and compressor product groups (for which preparatory studies have just started). The ‘extended product approach’ is a new paradigm that encompasses not only the product but also its immediate interconnected devices (drives, controls, etc.). It could be applied to many product categories whenever a system can be considered (for industrial products and beyond, e.g. heating and cooling equipment, lighting, even computing technologies). For this, a parallel involvement of decision-makers, standardisers (to prepare the adequate measurement and interoperability standards covering products, controls and their interaction) and legal experts (ensuring the legal applicability of requirements) is necessary, and prefigures a very exciting opportunity to grasp substantial additional energy savings.

Another suggestion going along these lines would be to make a greater use of the possibility of setting generic requirements under Ecodesign measures (i.e. qualitative provisions). Some generic requirements could be used to facilitate and promote the good interoperability of a product or controls operating in a system with a view to increasing the efficiency of the whole. The practical refinements could be delegated to standardisation bodies.

Last, information requirements could also be put at use to facilitate and promote the proper installation and smooth operation of products in systems, through for example requiring adequate instructions in the technical fiche of a product or on the product itself.

**Verification and enforcement**

In the European policy regime, the 27 Member States are in charge of verification and enforcement activities with respect to EU rules applying to products placed on the common market. National authorities are responsible for making tests and checking the compliance of products. Several studies have reported issues with insufficient levels of market surveillance on Ecodesign regulations. For instance, an evaluation study on the Ecodesign Directive conducted in 2011 mentions that it is widely believed that most Member States have not dedicated the necessary resources for effective monitoring and enforcement. The limited number of tests actually carried out is likely to target in priority iconic products such as household appliances.

Industrial products pose specific challenges in this matter:

- Most of them are big and expensive machines (except for small motors, fans and pumps). If market surveillance authorities need to purchase several models to have them tested according to sophisticated measurement standards, the costs could be prohibitive. Some Member State authorities have already raised the problem in consultation meetings.

- When products such as machine tools or industrial furnaces are customised or tailor-made to the user, the notion of testing a batch of products off-site becomes tricky.

- If a large industrial equipment already installed in some sites is identified as non-compliant, what kind of effective sanctions could be applied?
The enforcement experience with large equipment is rather limited under the EU Ecodesign regime. No regulation has been adopted yet on such products. In the current discussions and circulated drafts, it is interesting to note that for instance for process chillers, remote condensing units (or even walk-in cold rooms), the usual verification procedure applied for smaller and simpler products is suggested without modification (i.e. the test of one unit and then a batch of three units if the first unit failed). The only example of a diverging approach is in a recent draft of the Ecodesign regulation for transformers, where it is proposed that the test of one unit (with a measurement tolerance of up to 5%) is sufficient to conclude on non-compliance.

Recommendation can be made to the European Commission and Member States to launch a specific consultation and discussion on this matter. Designing an adequate verification and enforcement regime for industrial products is an essential step in ensuring a credible framework. In some cases it will be necessary to deviate from usual verification procedures designed for small products and create a more clever approach, for instance involving on-site verification, testing of parts or components, simulation software, ‘checklists’, etc.

Part of this challenge lies in the ability to set sufficiently smart Ecodesign requirements that can be verified without entailing excessive costs. For instance, instead of purely quantitative requirements based on complex performance metrics (that require a lengthy testing procedure in a laboratory), generic requirements could be more widely used to cover complex industrial machineries. For example through the prohibition of certain inefficient components or technologies and the mandatory prescription of energy efficient features on some equipment (e.g. heat recovery features, efficient controls and interfaces, power management features, etc.). Creativity will be an essential condition of success in this still virgin area.

**Risks of overlaps with other EU policies**

When discussing product specific regulations of the Ecodesign Directive, the EU has regularly come across the fear of double-regulation. EU decision-makers are very keen on avoiding any risk of setting contradicting requirements on the same product through different policy instruments. The potential overlaps between Ecodesign and the Energy Performance of Buildings Directive (EPBD), the Waste Electrical and Electronic Equipment (WEEE) Directive, the Restriction of Hazardous Substances (RoHS) Directive, the Registration Evaluation Authorisation and Restriction of Chemicals (REACH), the Regulation on certain Fluorinated Gases (F-gas) and the Electromagnetic Compatibility (EMC) Directive have been discussed several times. Incidentally, a report commissioned by the European Environmental Bureau (EEB) in 2010 has shown how this interplay of Directives sometimes leads to a ‘passing the buck’ syndrome, stalling or preventing the setting of environmental requirements on products.

In the field of industrial products, there are specific potential interactions with other EU industrial policies to consider:

- The Machinery Directive (2006/42/EC) provides the regulatory basis for the EU harmonisation of essential safety and health requirements for industrial machineries. Overlaps with Ecodesign could materialise if for example Ecodesign requirements on hazardous content or noise are proposed, or if some requirements to increase the energy efficiency have some influence on the ergonomics of industrial machines.

- The Greenhouse Gas Emission Trading Scheme (ETS) launched in 2005 aims at stimulating the EU’s large plants and industrial sites to reduce their emissions, thus indirectly reducing energy consumption. This scheme applies only to the largest installations and does not specifically target equipment such as furnaces or machineries, however these can be large contributors to a site’s emissions.

- The Industrial Emission Directive - IED (2010/75/EU) sets out the main principles for the permitting and control of industrial plants. It prescribes the application of best available technologies under so-called BREF (Best Available Techniques Reference Documents) and lays down specific environmental requirements for certain industrial installations. There are energy efficiency considerations in sectoral BREFs (e.g. for cement, steel, paper production, etc), as well as a specific horizontal BREF on energy efficiency adopted in 2008 (which does not contain quantitative limit values but several process optimisation techniques). It is not in the scope of this paper to provide more details on this Directive. However, it is clear that there are concrete challenges with respect to potential overlaps with Ecodesign requirements for product groups such as industrial furnaces or process equipment.

It is early to provide specific recommendations on how best to avoid and solve such overlaps, while still ensuring the setting of adequate and ambitious requirements on the energy efficiency of industrial products. The most significant available experience originates from the still ongoing preparatory study for industrial furnaces and ovens. The consultants in charge of this study have categorised the installations according to their coverage by IED and ETS and discussed their coverage by Ecodesign. It is interesting to note that they ‘generally consider that the IED effectively controls emissions of hazardous substances but does not seem to be very effective in
maximising energy efficiency so far.’ Besides ‘the implementation of IED up to 2008 has been reviewed by the European Commission who found that many States were not fully compliant with this legislation (...). One problem is that some installations have permits that are not based on best available techniques and the reasons given for allowing this were not justified’. As far as ETS is concerned, there are also some doubts about the effectiveness of the whole scheme to induce significant energy savings. Several studies have reported design flaws and excessive distribution of emission permits, thus criticising the scheme for not achieving its goals. This generally casts doubts as to whether the energy efficiency of specific industrial equipment is actually ambitiously optimised through ETS and IED only.

Among the instruments mentioned above, the Ecodesign Directive seems the best suited to elaborate very specific requirements taking into account the individual characteristics of the respective products placed on the European market and triggering a continuous dynamic improvement of the performance of products (beyond business as usual trends). Therefore it should be seen as an effective complement – rather than overlap with – more horizontal and unspecified legislation.

**Conclusions**

The Ecodesign Directive is a powerful tool to achieve environmental and energy efficiency improvements at EU level. It is recognised as one of the silver bullets in this area. The successful experience with the measure for motors has demonstrated the feasibility of covering not only iconic household appliances but also some industrial products and equipment.

The European Commission, with the active support from some Member State experts and stakeholders, has started considering solutions to some of the challenges posed by the regulation of industrial products. The better synchronisation with technical standardisation as early as the launch of preparatory studies or the concept of ‘extended product approach’ to grasp more savings from system optimisation are promising illustrations of this. However, some other key challenges are probably still insufficiently considered, such as the need for better quality data and market monitoring or the potential difficulties with enforcement procedures for large industrial equipment.

One underlying condition to solve many of these challenges is the ability of different stakeholders to work together in order to find creative answers to the aforementioned issues. The willingness and preparedness of European industrial manufacturer federations to cooperate constructively with decision-makers, NGOs and independent experts in these Ecodesign discussions is a key aspect. Industrial manufacturer federations are usually less familiar with these policy and regulatory processes than household appliance federations who have a long record of using energy labels or engaging in self-commitments on energy efficiency in the past. The birth of the eceee summer study on industrial energy efficiency in 2012 is certainly an excellent and relevant opportunity to stimulate networking and exchanges between the various stakeholders to further discuss Ecodesign opportunities and challenges.

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Endnotes
The aforementioned regulations, draft regulations and preparatory studies can be downloaded from:
http://www.coolproducts.eu (information website put in place by European environmental NGOs)
A monitoring of the Ecodesign consultations and regulations is also available on the eceee website at
http://www.eceee.org/Eco_design