WELCOME TO THE EPEE SEMINARS

Circular Economy
Ecodesign

15 September
The A-Z of the Ecodesign process and how industry can best support EU and national authorities

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Senior attaché Product policy
Health, Food Chain Safety and Environment,
Belgium Federal Public Service (FPS)
EPEE Secretariat
The process at a glance

1. Preparatory study
2. Consultation Forum
3. Inter-Service Consultation
4. WTO scrutiny
5. Regulatory Committee (only for Ecodesign)
6. Council’s and European Parliament’s scrutiny
7. Entry into force & Implementation
1. Preparatory Study

**Timing**
- 2 years on average

**What**
- Draft and final reports
- Stakeholders’ meetings
- Website with key documents

**Main targets**
- Commission – lead DG
- Member States experts
- Consultants

**Key activities**
- Technical input
- Position paper
- Bilateral meetings

**Opportunities**
- High
2. Consultation Forum

**Timing**
- 3 months after final report

**What**
- Working document
- Explanatory Memorandum
- Commission – lead DG
- Member States experts

**Main targets**
- High

**Opportunities**

**Key activities**
- Position paper
- Personal meetings
- Coalitions with other stakeholders
- Targeted contacts with Member States
3. Inter-Service Consultation

**Timing**
- 2 weeks/1 month

**What**
- Draft Regulation Impact Assessment
- Commission’s DGs: ENER, GROW, CLIMA, ENVI

**Main targets**
- Medium

**Key activities**
- Position paper
- Bilateral meetings
- Coalitions with other stakeholders
- Targeted contacts with Member States
4. WTO scrutiny

- **Timing**: 3 months

- **What**: Final draft Regulation

- **Main targets**: None

- **Opportunities**: None

- **Key activities**: None
5. Regulatory Committee

- **Timing**: After WTO scrutiny
- **What**: Final draft Regulation
- **Main targets**: Member States Experts
- **Opportunities**: High
- **Key activities**: Position paper, Bilateral meetings, Coalitions with other stakeholders, Targeted contact with Member States
6. Scrutiny by Council and Parliament

Timing
- 3 months

Main targets
- Final Regulation
- European Parliament Council (Energy Attachés)

Key activities
- Monitoring (except if critical issue)

Opportunities
- Low
7. Entry into force and implementation

**Timing**

N/A

**What**

Publication in the Official Journal
FAQs, guidance

**Main targets**

Commission – lead DG

**Opportunities**

Low

**Key activities**

Raising critical issues for correct understanding on the Regulation and compliance
## Case study: Professional Refrigeration

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2011</td>
<td>Preparatory Study</td>
<td>- Unsatisfactory</td>
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<tr>
<td></td>
<td></td>
<td>- Coalition building (JIEG)</td>
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<tr>
<td>Jan 2012</td>
<td>Consultation Forum</td>
<td>- Draft measure still not satisfactory</td>
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<td></td>
<td></td>
<td>- EC decided to contract a new consultant for the Impact Assessment</td>
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<td></td>
<td>Re-assessment of preparatory study</td>
<td>- Industry coalition (JIEG) worked closely together with new Consultant</td>
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<tr>
<td></td>
<td></td>
<td>- Revised version of draft measure</td>
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<tr>
<td>April 2014</td>
<td>Regulatory Committee</td>
<td>- Just before the RC, some corrections still needed to be made</td>
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<td></td>
<td></td>
<td>- Industry input given via Member States</td>
</tr>
<tr>
<td>July 2015</td>
<td>Publication in OJ</td>
<td>- Further delays occurred due to new Commission</td>
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<td></td>
<td></td>
<td>- EPEE letter to Commissioner Bienkowska</td>
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<td></td>
<td>July 2015 onwards</td>
<td>- EPEE questions on the implementation in view of potential Commission’s guidelines</td>
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</table>

... From an unsatisfactory study to an acceptable measure
Key takeaways and trends

- System approach
- Coalition building
- Brexit
- Political vs. technical
- Resource efficiency
- Horizontal issues
- Better Regulation
The link between Ecodesign and standardization

Matthias Meier
Matthias Meier Technical Consulting
Q&A session
The future of ecodesign: a focus on the “system approach”

Paul Waide
Director, Waide Strategic Efficiency
The future of ecodesign: a focus on the “system approach”

Paul Waide - Waide Strategic Efficiency Ltd

The EPEE Circular Economy and Ecodesign Seminars
Brussels, September 15th, 2016
What has been done via Ecodesign regulations thus far?

- 31 Ecodesign regulations now issued
- Addresses products covering over 48% of all EU energy use
- They aim to attain energy savings by ensuring no regulated product can be sold that at levels that are inconsistent with the average least lifecycle cost (e.g. minimum total cost of ownership) for end-users
- Thus far they have applied mostly to:
  - packaged products where all components and sub-assemblies are sold within the products packaged boundary
  - to product energy performance
Energy flows in the EU

ENERGY-USING PRODUCTS
EU-27 (2007)

Total 1792 TWh
- Oil 646 TWh
- Gas 433 TWh
- Coal 370 TWh
- Nuclear 241 TWh
- Renew 145 TWh
- Misc 33 TWh

Heat fuel 555 Mtoe=24.720 PJ
- Low Temperature (-100°C)
  - 15.375 PJ
- Medium Temperature (100-600°C)
  - 4.760 PJ
- High Temperature (>600°C)
  - 4.585 PJ

- Components & products 4.760 PJ
- Raw materials & waste 4.585 PJ
- Blast furnace 1.642 PJ
- Cement (668 PJ, alums (206 PJ, ceramics (104 PJ, brickm/kiln (100 TJ)
- Insulation & protective panels
- Coal product boilers:
  - Misc. gas & HR app (1.172 PJ)
  - Steam boilers (40% to 60% of 1.172 PJ)
- Other boilers: district heating

- Heat generation
  - Hot water & cooking 2.150 PJ
  - Space heating 13.225 PJ
  - Hot water & heating gas 2.806 PJ
  - Solid fuel 600 PJ
  - Oil CH boilers 1.350 PJ
  - Dist. heating 2.000 PJ
  - Gas CH boilers 7.000 PJ

- Other electricity
  - Renew 64 PJ
  - Gas 117 PJ
  - Oil 20 PJ
  - Coal 211 PJ

- Feedstock
  - E. loss 379 PJ
  - T. loss 33 PJ

- Other
  - H. loss

- Alprod/dip/depol/battery 100 PJ
- Data/voice communication 106 PJ
- TV/radio/day/night 100 PJ
- Induction & arc ovens 100 PJ
- Ind. heat trolleys & gas mains 100 PJ
- Wash & others space heating 100 PJ
- Other heat coil 600 PJ
- Lighting 140 PJ
- Other heat 140 PJ

- Electroplating 540 PJ
- Electronics 100 PJ
- Semiconduct 100 PJ
- Motors 1.360 PJ
- Pumps 3.390 PJ
- Compressors 3.158 PJ

- Materials & waste
  - Paper/pulp 1.186 PJ
  - Textile 1.006 PJ
  - Plastics 1.186 PJ
  - Wood 1.186 PJ
  - Rubber 1.186 PJ

- Other
  - Corrosion/heat 100 PJ
  - Noise control 100 PJ
  - Water supply 100 PJ
  - Water treatment 100 PJ
  - Pumps & controls 100 PJ
  - Pumps & controls 100 PJ
  - Gas distribution 100 PJ
  - Heat distribution 100 PJ
  - Air conditioning 100 PJ
  - Heating gas 750 PJ
  - Solid fuel boilers 1000 PJ
  - Oil CH boilers 1350 PJ

- Other energy production
  - Oil 106 PJ
  - Gas 16 PJ
  - Fuel cells 100 PJ
  - Warm ash (and others) 100 PJ

- Other energy consumption
  - Heat & power 100 PJ
  - Nuclear 100 PJ

- Other energy storage
  - Pumped storage 100 PJ
  - Batteries 100 PJ

- Other energy distribution
  - Natural gas 100 PJ
  - Electric power 100 PJ

- Other energy consumption
  - District heating 100 PJ
  - Other heating 100 PJ
Ecodesign regulated product groups

- Water heaters
- Power transformers
- Professional refrigerated storage cabinets
- Refrigerators and freezers
- Simple set-top boxes
- Solid fuel boilers
- Standby and off-mode of household and office equipment
- Network standby
- Televisions
- Vacuum cleaners
- Ventilation units
- Water pumps
- Sound & imaging equipment
- Air conditioners and comfort fans
- Circulators
- Computers
- Domestic cooking appliances
- Electric motors
- External power supplies
- Household dishwashers
- Household tumble driers
- Household washing machines
- Industrial fans
- Lighting products in the domestic and tertiary sectors
- Local space heaters
- Space heating equipment
## Products in the pipeline

<table>
<thead>
<tr>
<th>Lot</th>
<th>Product</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Displays</td>
<td>Working document issued</td>
</tr>
<tr>
<td>7</td>
<td>Battery chargers and external power supplies</td>
<td>Working document issued</td>
</tr>
<tr>
<td>12</td>
<td>Commercial refrigerators and freezers</td>
<td>Working document issued</td>
</tr>
<tr>
<td>15</td>
<td>Solid fuel small combustion installations</td>
<td>Draft regulation issued</td>
</tr>
<tr>
<td>20</td>
<td>Local room heating products</td>
<td>Draft regulation issued</td>
</tr>
<tr>
<td>21</td>
<td>Central heating products using hot air to distribute heat</td>
<td>Working document issued</td>
</tr>
<tr>
<td>24</td>
<td>Professional washing machines, dryers and dishwasher</td>
<td>Working document issued</td>
</tr>
<tr>
<td>27</td>
<td>Uninterruptible power supplies (UPS)</td>
<td>Prep study completed</td>
</tr>
<tr>
<td>28</td>
<td>Wastewater pumps</td>
<td>Prep study completed</td>
</tr>
<tr>
<td>29</td>
<td>Clean water pumps (larger than those under Lot 11)</td>
<td>Prep study completed</td>
</tr>
<tr>
<td>30</td>
<td>Motors and drives (outside scope of Regulation 640/2009)</td>
<td>Working document issued</td>
</tr>
<tr>
<td>31</td>
<td>Compressors</td>
<td>Working document issued</td>
</tr>
<tr>
<td>32</td>
<td>Windows</td>
<td>Prep study ongoing</td>
</tr>
<tr>
<td>33</td>
<td>Smart appliances</td>
<td>Prep study ongoing</td>
</tr>
<tr>
<td>ENTR1</td>
<td>Refrigerating and freezing equipment (non-domestic)</td>
<td>Draft regulation issued</td>
</tr>
<tr>
<td>ENTR4</td>
<td>Industrial and laboratory furnaces and ovens</td>
<td>Working document issued</td>
</tr>
<tr>
<td>ENTR5</td>
<td>Machine tools</td>
<td>Draft voluntary agreement</td>
</tr>
<tr>
<td>ENTR7</td>
<td>Steam boilers</td>
<td>Prep study completed</td>
</tr>
<tr>
<td>ENTR8</td>
<td>Power Cables</td>
<td>Prep study completed</td>
</tr>
<tr>
<td>ENTR9</td>
<td>Enterprise Servers</td>
<td>Prep study ongoing</td>
</tr>
<tr>
<td>JRC</td>
<td>Taps and showers</td>
<td>Prep study ongoing</td>
</tr>
</tbody>
</table>
EU Ecodesign approach - some key features

- Among all the major economies the EU’s Ecodesign Directive has taken the broadest approach to analysing and attempting to capture energy savings through regulation (or negotiated voluntary agreements)

- End-uses are assessed at the major service provision or functional level and “horizontal” measures are often set e.g.:
  - 1W standby power limit across all products
  - The requirement for electric motors to reach a higher efficiency level if sold without an integrated variable speed drive than with one
  - The fans regulation, which covers all electric fans from 500kW to as little as 150W
  - The lighting regulations that cover all domestic light sources or all tertiary lighting sources
EU primary energy consumption from 1990: BAU and projected Ecodesign scenarios

Source: Van Holsteijn en Kemna - Ecodesign Impact Assessment 2014
Projected Ecodesign impacts by 2020

- ~1930 TWh primary energy savings, i.e. a saving of 19% for the average product
- 320 Mt CO₂ equivalent (7% of 2010 EU-total) reduction in greenhouse gas emissions
- 336 million m³ of drinking water savings and 0.4 Mt printer paper saving; 214 kt less NOx emissions
- €110 bn net saving on consumer expenditure (ca. € 170 bn gross saving, € 60 bn extra acquisition)
- €54 bn extra revenue for industry, wholesale and retail sector
- 0.8 million extra direct jobs for industry, wholesale and retail sector
What has Ecodesign struggled to do?

The main limitations are:

- stimulating **energy savings from product systems** made up from product components that are assembled on the site of use
- dealing with **complex products**

Other weaknesses concern:

- addressing savings opportunities related to **user behaviour**
- ensuring test procedures capture the pertinent performance improvement options in ways that are representative of real use
- addressing data deficiencies that could lead to sub-optimal thresholds being set
- addressing all pertinent aspects of the circular economy
Example of system aspects

**EXAMPLE:** Ventilation from product=strict to product=systems

- Motor
- Drive + Motor
- Fan + Drive + Motor
- **Central Ventilation Unit:** Casing, Filters, Unit Controls, Heat exchanger (recovery), Fan(s) + Drive(s) + Motor(s)
- **Mechanical Ventilation System:** Central Ventilation Unit(s) + Ductwork + Terminals + Distribution controls + possibly additional functionality (pre-heat, humidification, etc.)
- **Natural Ventilation (or hybrid) Systems** ↔ **Mechanical ventilation systems**
What attributes of product systems are pertinent for energy savings?

- Key characteristics of product systems are: they are assembled from product components, they are installed on site in accordance with a systems specification or design process.
- How the ensemble of product components work together within the installed product system as it is used in situ affects the overall systems level performance.
- Sizing, part-load performance, control and distribution losses/energy recovery are all important as is the efficiency of each component in the system.
- Individual components may be efficient but do not always lead to efficient outcomes within the system.
- Currently Ecodesign measures are usually set on key individual components but not the system.
Which product systems are most pertinent?

Energy using product systems within buildings:

- heating system and controls
- cooling system and controls
- ventilation system and controls
- lighting system and controls
- water heating system and controls
- water pumping/distribution system and controls
- ICT systems
- power cables and circuits

Energy-related product systems within buildings

- windows/glazing
- insulation
- shading and controls
Which product systems are pertinent?

Energy using product systems within industry:

- motor systems (most importantly those involving fluids, obeying a cubic power law and having variable demand e.g.: pumping, compressors, fans/ventilation)
- ventilation and fans (see above)
- data centres
- machine tools
- process heating systems

Other product systems

- outdoor lighting
What is the extra potential from optimising systems?

- A crude synthesis of recent studies indicates there is a potential to save at least an *additional 16% of total EU energy consumption* from the optimisation of how products are designed, installed and operated as systems in Europe’s buildings and industry.

- > 3375 TWh of primary energy savings (compared to ~3123 from existing Ecodesign measures in 2030)

- > 541 Mt CO2 equivalent *(12% of 2010 EU-total)* reduction in greenhouse gas emissions
The value proposition from optimising product systems by 2030

Energy savings of 16% of all EU energy use* equates to:

- **€192 bn net saving on consumer expenditure** (ca. €297 bn gross saving, €105 bn extra acquisition costs)
- **€94 bn extra revenue** for industry, wholesale and retail sector
- **1.4 million extra direct jobs** for industry, wholesale and retail sector

*Based on an assumption of linear scaling from the impacts estimated in the 2013 VHK Ecodesign Directive impact assessment
What is unquestionably within the legal scope of the Ecodesign Directive?

- Any packaged energy-related product is clearly legally eligible for the imposition of Ecodesign implementing measures, where “packaged” means that all the sub-components are assembled within a single product and sold within an exterior casing.

- This is true even for challenging and complex products such as:
  - machine tools - where there could be shared energy flows (e.g. electricity, pneumatic energy, cooling energy, etc.)
  - large products such as large fans or power transformers
  - products whose characteristics have energy implications beyond the boundary of the product’s own direct energy use e.g. network standby and servers, windows, showers, etc.
Case of motor (systems): IE3 or IE2+VSD

Impact Assessment Scenarios compared savings for:

- IE3 (green); and
- IE2+VSD/IE3 (purple)

The effect this has had on the uptake of VSDs, driven by the differentiated motor efficiency requirements, is not yet clear.

Source: Robert Nuij
What about products where more than one commercial actor is involved in their design, production and installation?

• For products which are designed by one party, put together and installed by another party using components manufactured by another party (e.g. lighting systems, power circuits, ventilation systems, motor systems, etc.) the question is who is the “manufacturer”?

• If a manufacturer is someone that “makes” something then all of the above parties are involved in the “manufacture” of the product

• Eligibility for implementing measures under Ecodesign would appear then to be permissible from a legal perspective providing the other necessary criteria are met

• It would thus be permissible to set Ecodesign requirements for product system designers and installers and not just component producers
Conclusion re the legal applicability of the Ecodesign Directive

On this reading of the Directive it would appear that:

- **Product systems could be subject to implementing measures under Ecodesign within the existing legal scope of the Directive**
- Implementing measures could be set equally for product system designers, installers and component producers i.e. on all those involved in making the final product
- Implementing measures could be applied to product systems, unless other (non-legally orientated) reasons prevent it
- Measures could potentially apply to the design and installation process (i.e. generic requirements) and not just to specific requirements (e.g. limits)
Lot 37 Ecodesign preparatory study on Lighting Systems

**Efficiency**

- **LPDi** = \[
\frac{W}{(1x \text{m}^2)}
\]  
  \[
  \frac{W}{\text{lm}}
\]
  \[
  \frac{W}{\text{Watt}}
\]

- **U** = Utilance  
  Note for luminance requirements:  
  \[
  R = \frac{E(\text{lux})}{L(1cd / \text{m}^2)}
\]
  = reflection related conversion factor (e.g. 16 for asphalt)

- **LOR** = Light Out Ratio (standard conditions)!
  \[
  UF = LOR \times U = \text{Utilization Factor}
\]

- **LMF** = Luminaire Maintenance Factor

- **ηlamp** = lamp efficacy in standard conditions (e.g. 100 h)
  \[
  LLMF = \text{Lamp Lumen Maintenance Factor (CIE 154 or 97)}
\]

- **BGF** = Ballast Gain Factor (due to dimming)

- **ηgear** = gear efficiency in standard conditions

**Installation**

- **UF = LOR \times U**
  \[
  \text{UF} = \text{utilization factor}
\]

**Luminaire**

- **LER = LOR \times ηlamp**
  \[
  \text{LER} = \text{Luminaire Efficacy Rating}
\]

**Lamp**

- **BGF = Ballast Gain Factor**

**Control System**

- **ηgear** (ratio <1)

**Control Gear**

Source: Lot 37 preparatory study
Can extended products and product systems be treated under ED/ELD?

E.g. 'Installer label' for space heaters

- Label for 'packages' of heaters, temperature controls and solar devices
- Based on 'simple' calculations
- Tools provided to assist installers make the calculation
- Entered into force: September 2015

Source: Robert Nuij
# Generic barriers to energy savings

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Effect</th>
<th>Remedial policy tools</th>
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<tbody>
<tr>
<td><strong>VISIBILITY</strong></td>
<td></td>
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<tr>
<td>EE is not measured</td>
<td>EE is invisible and ignored</td>
<td>Test procedures/measurement protocols/efficiency metrics</td>
</tr>
<tr>
<td>EE is not visible to end users &amp; service procurers</td>
<td>EE is invisible and ignored</td>
<td>Ratings/labels/disclosure/benchmarking/audits/real-time measurement and reporting</td>
</tr>
<tr>
<td><strong>PRIORITY</strong></td>
<td></td>
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<tr>
<td>Low awareness of the value proposition among service procurers</td>
<td>EE is undervalued</td>
<td>Awareness-raising and communication efforts</td>
</tr>
<tr>
<td>Energy expenditure is a low priority</td>
<td>EE is bundled-in with more important capital decision factors</td>
<td>Regulation, mechanisms to decouple EE actions from other concerns</td>
</tr>
<tr>
<td><strong>ECONOMY</strong></td>
<td></td>
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<tr>
<td>Split incentives</td>
<td>EE is undervalued</td>
<td>Regulation, mechanisms to create EE financing incentives for those not paying all or any of the energy bill</td>
</tr>
<tr>
<td>Scarce investment capital or competing capital needs</td>
<td>Underinvestment in EE</td>
<td>Stimulation of capital supply for EE investments, incubation and support of new EE business and financing models, incentives</td>
</tr>
<tr>
<td>Energy consumption and supply subsidies</td>
<td>Unfavourable market conditions for EE</td>
<td>Removal of subsidies</td>
</tr>
<tr>
<td>Unfavourable perception and treatment of risk</td>
<td>EE project financing cost is inflated, energy price risk underestimated</td>
<td>Mechanisms to underwrite EE project risk, raise awareness of energy volatility risk, inform/train financial profession</td>
</tr>
<tr>
<td><strong>CAPACITY</strong></td>
<td></td>
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<tr>
<td>Limited know-how on implementing energy-saving measures</td>
<td>EE implementation is constrained</td>
<td>Capacity-building programmes</td>
</tr>
<tr>
<td>Limited government resources to support implementation</td>
<td>Barriers addressed more slowly</td>
<td></td>
</tr>
<tr>
<td><strong>FRAGMENTATION</strong></td>
<td></td>
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</tr>
<tr>
<td>EE is more difficult to implement collectively</td>
<td>Energy consumption is split among many diverse end uses and users</td>
<td>Targeted regulations and other EE enhancement policies and measures</td>
</tr>
<tr>
<td>Separation of energy supply and demand business models</td>
<td>Energy supply favoured over energy service</td>
<td>Favourable regulatory frameworks that reward energy service provision over supply</td>
</tr>
<tr>
<td>Fragmented and under-developed supply chains</td>
<td>Availability of EE is limited and it is more difficult to implement</td>
<td>Market transformation programmes</td>
</tr>
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Broad policy issues to be addressed

Observations

• installed product systems: energy savings potential is often squandered due to poor design and implementation

• the adoption of efficient product systems is far below the levels that are economically and environmentally justified

Therefore policy and programmatic measures are needed that will:

• increase the reliability of the savings from product systems

• increase the adoption of energy efficient product systems

Actions on both aspects are needed to create a virtuous circle, build confidence and drive demand
Type of actions which could be considered

Increase demand and deployment of efficient systems

• raise awareness in the market of the value proposition
• overcome first cost barriers and risk aversion
• prohibit poor solutions

Increase reliability of savings

• strengthen interoperability and standardisation
• build capacity among building/industrial energy service providers and engineers e.g. systems designers, specifiers and installers
• promote high-quality commissioning (continuous- and re-commissioning)
• educate and strengthen the supply chain
## Measures supporting product systems energy savings within an ideal framework

### Enhancing visibility

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<table>
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<tbody>
<tr>
<td><strong>a)</strong> Standardisation - ensuring currency and adequacy of technical and professional standards for all products systems</td>
<td></td>
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<tr>
<td><strong>b)</strong> Product system labelling based on quality/functionality and whether or not performance is certified so that no product system can be installed without the procurer knowing its impact on the building/site energy performance and the potential to save energy from adoption of the best product systems and that no building/site ownership/occupation transfer can occur without the impact of the product systems being made clear to the new party</td>
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</tr>
<tr>
<td><strong>c)</strong> Accreditation &amp; certification of services - giving visibility/recognition to high quality product systems services (design, specification, installation, commissioning and re/continuous commissioning)</td>
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### Promotion of awareness and value proposition

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<tbody>
<tr>
<td><strong>a)</strong> Awareness raising among: policymakers, EMs/FMs, industry/building owners, company boards, building/industrial service engineering sector</td>
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### Capacity building

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<tbody>
<tr>
<td><strong>a)</strong> training and certification of accredited product systems engineers</td>
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</tr>
<tr>
<td><strong>b)</strong> development of sophisticated commissioning markets for more complex product systems and portfolios</td>
<td></td>
</tr>
<tr>
<td><strong>c)</strong> monitoring of performance and feedback</td>
<td></td>
</tr>
</tbody>
</table>
# Measures supporting product systems energy savings within an ideal framework

| Enhancing usability | a) ensuring controllability of product systems  
b) ensuring interoperability of all product systems  
c) ensuring user friendliness |
|---------------------|--------------------------------------------------------------------------------------------------|
| Minimum requirements | a) ensuring that all new product systems meet **minimum energy performance requirements**  
b) ensuring product systems professional parties meet **minimum quality requirements** |
| Funding, finance and incentives | a) Ensuring adequate programmatic funding is available to fund all the programmatic activity needed (i.e. the steps outlined above)  
b) Ensuring incentives and finance are in place to raise capacity in the supply chain  
c) Ensuring incentives/finance mechanisms of an adequate scale are in place to help remove the incremental first cost barrier associated with good quality product systems and services - at least in early years of market development |
| Energy management | a) creates an organisational culture, decision making process and competence that supports optimisation of energy using systems |
Policy - The four principal EE Directives

- Ecodesign Directive
- Energy Labelling Directive
- Energy Efficiency Directive
How are Ecodesign and Labelling currently addressing product systems?

- Space heating - boundary (boilers + controls on the boiler) - system label (exc. distribution and associated controls)
- Water heating - boundary (water heater + controls on the heater) - system label (exc. distribution and associated controls)
- Motor systems - on the motor but an undifferentiated link with VSDs
- Air conditioning - component level only
- Lighting systems - under investigation (Lot 37)
- Ventilation - component level only
- Professional refrigeration - component level only
- Commercial refrigeration - component level only
- Power cables and circuits - standardisation only
- Enterprise servers - under investigation
Ecodesign and Energy Labelling Directives: the example of BACS

No measures so far but the recent study for the 2015-17 working plan found that Ecodesign requirements for BACS could help to reduce environmental impacts by:

- ensuring sensors are accurate
- increasing user friendliness and thus helping BACS to be installed and operated better: e.g. working on the display, or using alert-related check lists for the installation
- increasing re-commissioning of the system: e.g. an alarm could alert the user periodically as a reminder that the efficiency of the system should be reassessed
- strengthening interoperability through use of open protocols

Asserted that the eu.bac product certification and labelling scheme aims to assure the user a high level of performance of the products and systems and could be mandated via the ELD
BACS in Ecodesign and ELD — current overlap with Ecodesign/ELD component measures

BACS in the Ecodesign WP: A separate product group is needed to access savings

 BAT/BACS 146.2 Mtoe/y
energy savings potential

Lot 1
Boilers
79.3 Mtoe/y

Lot 2
Water heaters
35.2 Mtoe/y

Lot 33
Smart Appliances
19.2 Mtoe/y

Lot 37
Lighting Systems
7.74 Mtoe/y

(*) Portion of the energy savings potential (in Mtoe/year) that is potentially accessible via addressing controls in other product group ErP regulation

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**EPBD recast**

Requires:

- **setting of cost-optimised building energy performance codes**

- **financing instruments** to be created to support implementation of the Directive’s goals - Article 10

- either savings through regular inspection of heating or AC systems or alternative approaches that will achieve the same intended result - Articles 14 and 15

Little evidence from national implementation plans that any of these have incorporated measures focused on BACS except for a few MS building codes that only apply for whole buildings/major renovations

At current rates of construction and renovation these will take many decades to influence much of the stock
EPBD recast: Article 8 - Technical Systems

Requires Member States (MS) to:

- develop requirements for technical building systems and specifically for (a) heating systems; (b) hot water systems; (c) air-conditioning systems; and (d) large ventilation systems
- Depending on how they are specified they could be designed to apply to each case systems are replaced or newly installed
- BACS are not specifically mentioned in this list but rather the article states “Member States may furthermore encourage, where appropriate, the installation of active control systems such as automation, control and monitoring systems that aim to save energy”
- Thus while MS are required to specify measures for the building energy systems that BACS control they are not for the BACS themselves
EPBD Article 8 Implementation - Technical Building Systems:

- 14 MS with no measures for heating
- 18 MS with no measures for hot water
- 16 MS with no measures for cooling
- 22 MS with no measures for ventilation
- Only 8 MS with any measures for controls
EPBD recast: Article 8 - Technical Systems

What’s the maximum savings effect of current Art. 8 measures?

- Even if the minimum measures currently implemented by MS under Article 8 achieve the full techno-economic potential they would only save about 5.7% of EU building energy use
- This is probably less than a quarter of the full potential from optimum product systems
- More probably they are on course to save about 1-2% of EU building energy use due to sub-optimum specifications and limits of codes
- Implementation weaknesses could reduce this further

Thus at present there appears to be little reason to think Article 8 is accessing a significant proportion of the energy savings potential for product systems within EU buildings although it has potential to
Energy Efficiency Directive - 2012/27/EU

Includes:

- NEEAPS (National Energy Efficiency Action Plans)
- Energy efficiency obligations - Article 7
- Building renovations and public sector buildings - Article 4
- Energy audits and SMEs - Article 8
- Public procurement - Article 6
- Metering/Billing and information
- Heating and cooling (DHC, CHP/cogeneration, microgeneration)
- Energy services
- Transformation, transmission and distribution
- Training, accreditation, certification - Article 16
- Funding and financing - Article 20
The scale of effort implied is considerable

Measures are needed that will:

• **increase the reliability of the savings** from Product Systems
• **increase the adoption** levels of efficient Product Systems

Actions on both aspects are needed to **create a virtuous circle, build confidence and drive demand**

For BACS alone the cumulative cost of delivering a large-scale and effective programme is estimated to be €136bn to 2035

• about **2.5 times current planned investments in smart meters**
• the value of the energy savings over the same time frame are **nine times greater** at ~€1200bn
• i.e. about **17 times greater than expected from smart meters**
• Supporting policy packages would need to be **thinking big** to capture this opportunity

Source: Building Automation: the scope for energy and CO2 savings in the EU, Waide Strategic Efficiency
Adapt existing policy levers: EPBD, EED, ELD/ED

Current review of the EPBD and EED might be an opportunity for an holistic strategy to address energy savings in product systems

- EPBD Article 8 could ensure all new product systems meet minimum energy performance requirements and have suitable functionality
- EED Article 7 could provide large scale funding via energy efficiency obligations on energy suppliers or via alternative measures
- EED Article 16 could help ensure quality in the supply chain
- EED Article 5 could be adapted to promote more energy management targeted at product systems
- Concerted Action groups for the EPBD and EED could be convened to hold joint meetings/working groups on this topic to see whether a common approach across the policy instruments could be created

How should this work with Ecodesign and ELD measures?
Recommendations

• Europe should consider developing a **coherent strategy** to access the energy savings potential from **optimised product systems**

• This would aim at ensuring available policy levers are applied coherently both at EU and MS level to achieve the potential

• The process could be similar to that followed for the Heating and Cooling strategy

• It may also warrant the establishment of a dedicated concerted action process, to bring together representation from the EPBD and EED CA groups with the Ecodesign/ELD Consultation Forum
Additional slides
INTRODUCING DG GROW’S STUDY ON ESTABLISHING AN ECODESIGN “POINTS BASED” METHOD FOR SETTING GENERIC ECODESIGN REQUIREMENTS

1st Stakeholder meeting - June 30th 2016, Brussels
Origins of the project

» Commission (DG GROW) issued a call within the multi-framework contract 409/PP/2014 Lot 2 in September 2015

» Tender called for bids on a:

  “technical assistance study for the assessment of the feasibility of using “points system” methods in the implementation of Ecodesign Directive (2009/125/EC)”

» Work begun in 2016 with a kick-off meeting between the consultants and the Commission
PROJECT TEAM

FWC Manager: Arnoud Lust
Deputy FWC Manager: Sarah Bogaert

FWC Management team

VITO

Contract Manager:
Name: Carolin Spirinx

Quality control:
Language/terminology check:
Name: Wai Chung Lam

EC DG Growth

Project Team for a specific request

VITO

Experts:
Name: Karolien Peeters

Fraunhofer

Experts:
Name: Clemens Rohde

Viegand Maagøe

Experts:
Name: Jan Viegand

Van Holstein en Kemna

Experts:
Name: Rene Kemna

Waide Strategic Efficiency

Technical Team Leader:
Name: Paul Waide

van holstein en kemna
research - design - engineering

Waide Strategic Efficiency

viegand maagøe
ergy - people

Fraunhofer
Details of the project can be found at:

http://www.points-system.eu
AIMS AND APPROACH

Broad summary

» Objective - to develop and verify one or more methodologies that could be used to set Ecodesign requirements for complex products

» Approach is to compile, classify and assess existing literature on points-based methods and other relevant methods that could be applied for this purpose

» Develop the best methodology or methodologies based on this assessment

» Test the viability through two case studies for complex products
Product systems:

» are complex in that they may have more than one functional unit (i.e. the quantified performance of a product system for use as a reference unit in a life cycle assessment study) due to the variety of functions the product is capable of performing

» the functional units may be inherently difficult to assess due to measurement or methodological difficulties

» it is common for the product groups concerned to have varying degrees of heterogeneity that complicate their assessment against common metrics and measurement methods

» however, as savings potentials from the adoption of appropriate Ecodesign technologies can be significant, and these technologies are theoretically capable of being assessed on a modular basis, the Commission is interested in evaluating whether it is feasible to devise an assessment methodology for product systems comprised of technology/design modules that considers the ensemble of modular technologies deployed
AIMS AND APPROACH - SOME CONSIDERATIONS

A “Points systems” approach

» was first explored within the Ecodesign process in the case of machine tools within a working document put forward by the Commission at the May 2014 Consultation Forum

» this proposed one potential Ecodesign assessment option based round a points systems approach

» discussion highlighted the potential of this notion but also the need to explore options in greater depth and to produce a rationale that will allow the most viable approach to be identified and its strengths and limitations to be assessed
AIMS AND APPROACH - SOME CONSIDERATIONS

Examples of some of the options to be explored:

- Adaptation of points system à la BREEAM/LEED
- Life Cycle Assessment method (*Selection of impact categories*, category indicators and characterisation models; *classification*: assignment of inventory data to impact categories; *characterisation*: calculation of category indicator results; *normalisation*: calculating the magnitude of the category indicator results relative to a chosen reference information dataset; *grouping*: sorting and possibly ranking of the impact categories; *weighting*)
- E.g. Product Environmental Footprint (PEF)
DIFFERENT TASKS

0. • Inception phase - kick-off

1. • Task 1 - Stakeholder Consultation

2. • Task 2 - State of the Art Methods

3. • Task 3 - Method development

4. • Task 4 - Case studies
Prospective methods will be assessed against key performance criteria:

- Effectiveness
- Accuracy
- Reproducibility
- Enforceability
- Transparency
- Ease and readiness of application
- Capacity to be implemented
- Equitability

But also for:

- compatibility with the MEErP process;
- appropriateness and fit with the way of setting Ecodesign requirements
- how they address resource efficiency aspects specified within Annex 1 Part 1 and Parts 2 and 3 of the Ecodesign Directive;
- that the stated parameters are measureable via standards;
- the appropriateness with which the stated parameters incorporate requirements that build upon existing Ecodesign requirements specified at the modular and component level (e.g. for motors and fans)
PROJECT PLANNING

- Website up and running - done
- Stakeholder registration - done
- Draft Task 2 report issued - done
- First stakeholder meeting - June 30th
- Draft Task 3 report issued - date tbc
- Draft Task 4 report issued - date tbc
- Second stakeholder meeting - date tbc
- Study is to be concluded by end February 2017

1st Stakeholder meeting - June 30th 2016, Brussels
What is meant by a complex product?

No standard definition (yet) but common elements are:

- may have **multiple functions** and hence multiple functional units
- may be **modular**
- may be **assembled at the user's site**,
- may have different **performance levels** dependent on the **operating conditions** at the user's site
- may have functional parameters that are inherently **difficult to measure**
- is often a **customised product**, adapted to a specific application
- may be **difficult to establish boundaries** on energy and resource flows
- high **heterogeneity**
Examples of complex products

- Machine tools = multiple functions and hence multiple functional units. May be modular, may be customised, may not provide a standard configuration, may be difficult to determine product boundaries etc.

- Lighting systems and power cables (circuits) = usually assembled at the user's site

- Pumping systems = may have different performance levels dependent on the operating conditions at the user's site

- Network standby and large/industrial fans - may have functional parameters that are inherently difficult to measure
<table>
<thead>
<tr>
<th>Ecodesign</th>
<th>Labelling</th>
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<tbody>
<tr>
<td><strong>Boundary</strong></td>
<td><strong>System level treatment?</strong></td>
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<tr>
<td><strong>Motive power</strong></td>
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<td>Motors</td>
<td>component</td>
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<td>pumps</td>
<td>component</td>
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<td>industrial fans</td>
<td>component</td>
</tr>
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<td>compressors</td>
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<td>other</td>
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<td><strong>Space heating</strong></td>
<td>component</td>
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<td><strong>Circ. pumps</strong></td>
<td>component</td>
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<tr>
<td><strong>Ventilation</strong></td>
<td>component</td>
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<tr>
<td><strong>AC</strong></td>
<td>component</td>
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<td><strong>Water heating</strong></td>
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<td><strong>Power circuits</strong></td>
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<td><strong>Data centres</strong></td>
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<tr>
<td><strong>Enterprise servers</strong></td>
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<td><strong>BACS</strong></td>
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A rough and incomplete estimate of product systems savings potentials

<table>
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<th></th>
<th>Approximate savings potentials by 2030</th>
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<tbody>
<tr>
<td></td>
<td>Final Energy</td>
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<td></td>
<td>TWh</td>
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<td>BACS</td>
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<td>Industrial motor systems</td>
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<td>Lighting</td>
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<tr>
<td>Power cables and circuits</td>
<td>30</td>
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<td>Data centres and servers</td>
<td>17</td>
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<tr>
<td>Other (HVAC, Machine tools, etc.)</td>
<td>NA</td>
</tr>
<tr>
<td>Total</td>
<td>2215</td>
</tr>
</tbody>
</table>

~ 16% of all EU Energy Use under a BAU scenario
How do the technically achievable savings potentials of product systems in buildings compare with those from deep renovations?

Assumes:
- 2.5% of stock renovated per year
- 40% of floor area per renovation
- 60% average energy savings per renovated area

Assumes:
- 17 year average replacement rate for 85% of product systems equipment
- 24% average savings in product systems energy use above current Ecodesign levels
Can extended products and product systems be treated under Ecodesign?

- MEERp methodology already accommodates an extended products and systems approach:
  - A strict product approach
  - An extended product approach
  - A technical system approach
  - A functional system approach
- Addressed on a case-by-case basis
- The on-going Lot 37 Lighting Systems study is a classic example of the analysis of such systems within the Ecodesign rubric
MEErP Part 1 distinctions: System aspects - use phase, for ErP with direct impact

- Strict product/component scope: e.g. at steady state operation, nominal load
- Extended product approach, i.e. anticipating real-life use: e.g. part loads, misc. operating modes, frequency of use, best/worst use, power management settings
- Technical systems approach, i.e. interaction with other products with similar function (‘hybrids’), controls, distribution components (ducts, pipes), local components (in case of central systems), synergies or disadvantages from combined functionality, consumer interaction (e.g. comfort)
- Functional systems approach: compare technical system using the ErP in question with technically different configurations that could fulfil the same function (stepwise innovation)
General Ecodesign eligibility criteria

According to paragraph 2 of Article 15 of Ecodesign Directive 2009/125/EC, energy-related products have to:

- represent a significant volume of sales and trade, indicatively more than 200 000 units a year within the Community;
- have a significant environmental impact within the Community as specified in the Community strategic priorities as set out in Decision No 1600/2002/EC considering the quantities placed on the market and/or put into service;
- present significant potential for improvement in terms of its environmental impact without entailing excessive costs, taking into account in particular:
  - the absence of other relevant Community legislation or failure of the market forces to address the issue properly; and
  - a wide disparity in the environmental performance of products available on the market with equivalent functionality.
Definitions under Ecodesign Directive

- ‘Manufacturer’ means the natural or legal person who manufactures products covered by the regulation and is responsible for their conformity with the regulation in view of their being placed on the market and/or put into service under the manufacturer’s own name or trademark or for the manufacturer’s own use. In the absence of a manufacturer as defined in the first sentence of this point or of an importer, any natural or legal person who places on the market and/or puts into service products covered by the regulation shall be considered a manufacturer;

- ‘Placing on the market’ means making a product available for the first time on the Community market with a view to its distribution or use within the Community, whether for reward or free of charge and irrespective of the selling technique;

- ‘Putting into service’ means the first use of a product for its intended purpose by an end-user in the Community;
Definitions under Ecodesign Directive

- ‘supplier’ means the natural or legal person who supplies products covered by the regulation and is responsible for their conformity with the regulation in view of their being placed on the market and/or put into service under the supplier’s own name or trademark or for the supplier’s own use. A supplier may be a manufacturer, an importer, or any natural or legal person who places on the market and/or puts into service products covered by this Regulation shall be considered a supplier;
The implementing measure must specify, in particular:

... 

4. the requirements on installation of the product where it has a direct relevance to the product’s environmental performance considered;
Building Automation: the scope for energy and CO2 savings in the EU

http://www.leonardo-energy.org/white-paper/building-automation-scope-energy-and-co2-savings-eu?mkt_tok=3RkMMJWWf9wsRonvavOZXXonjHpfsX87OUuUKOg38431UFwdcjKPmjr1YIE TMB0aPyQAgoGbP5l5FEKTbnYSBZjt6QKWA%3D%3D

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Q&A session
Discussion

EPEE Members
Wrap up

EPEE Secretariat
Thank you very much for your attention!