Explanatory Note

accompanying the up-dated working document on the Review of Regulation (EC) No 278/2009 regarding External Power Supplies

1. Context

A Consultation Forum was held on 18 April 2013 which discussed the Review Document for External power supplies.

It was concluded that

1) given the comparably moderate additional saving potential of less than 3 TWh of the range of revision options initially assessed, the review should focus on those options that would realise most of the potential;
2) the EU Code of Conduct (CoC) was a good reference; however more information on impacts, especially cost impacts, of the most recent modifications within the EU CoC-process and on parallel initiatives (in particular rulings of the US department of Energy/DOE) was needed;
3) a requirement for active energy efficiency at 10%-load should not be included at this stage. Instead, an information requirement on the efficiency at this load should be included. The potential for requirements at 10%-load should be reassessed at the next review;
4) regarding the inclusion of product subgroups into the scope;
    - multiple output voltage EPS should be included (combined with a modification of the definition for EPS established in Article 2.1)
    - for High Power EPS, incoming data from DOE should be used when addressing High power EPS under the next review.
    - the potential to address wireless chargers should also be further explored during the next review.
5) regarding Low voltage EPS;
    - issues linked to the exemption of Low voltage EPS should be addressed in the context of the review of Regulation 1275/2008 (by 2016).
6) regarding material efficiency, the data was considered insufficient to include a requirement for weight or other resource efficiency aspects in this review but that a strong message on the intention to address material efficiency should be included in the revision clause.

2. Developments following the Consultation Forum

In view of the conclusions and further written comments received after the Consultation Forum, the Commission decided to carry out an additional study (final report attached) focusing on (economic) impacts, which was launched in September 2013.

Also, **industry** (Digitaleurope) made a strong case that, given that EPS are internationally sourced products, the provisions should be aligned with any rulings issued by the US government.

a) Assessment of the DOE-ruling

DOE-rulings were issued on 10 February 2014 (more information in Annex I)

Initial analysis showed that tier 1 requirements aligned with EU CoC tier 1 instead of the US DOE rulemaking would require fewer products to be changed. Nevertheless, industry comments indicated that they favoured harmonisation with US DOE as a means of reducing costs (...)".[1]

US DOE rulemaking requirements are slightly more ambitious than the Tier 1 provisions of the EU CoC for the smaller voltages (below 49 Watt), but less ambitious than the Tier 2-provisions of the Code of Conduct. See the graph below.

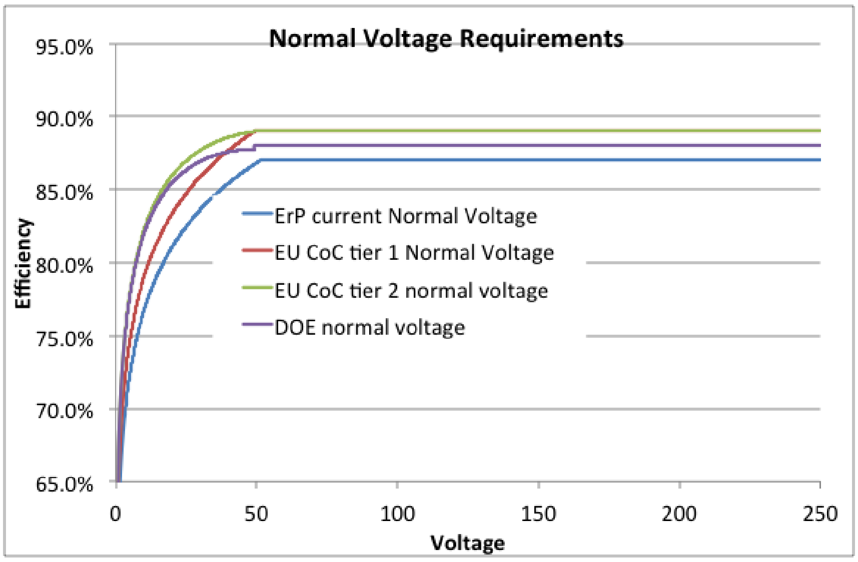

Figure 1 – Comparative ambition of efficiency requirements[2]

At the same time, further analysis showed (see Table 2) that including a second tier in line with the EU CoC Tier 2 results in significant additional savings of nearly 40 % in 2025 compared to a single tier based on US DOE alone, and would only require changes (in terms of redesign or resourcing) to approximately 5 % of the market, and relatively low additional costs above the costs already incurred in tier 1 in most cases (see LLCC section).

[1] Page 11 of *Additional Assessment In The Frame Of The Review Study On Commission Regulation (EC) No. 278/2009 External Power Supplies, Final Report, (ENER/C3/2012-418 LOT 2/04/SI2.659515)*, Viegand Maagøe, March 2014,

[2] *Additional Assessment In The Frame Of The Review Study On Commission Regulation (EC) No. 278/2009 External Power Supplies, Interim report*, Viegand Maagøe, August 2013 ¬ September 2013

Savings (TWh/year)	2020	2025	2030
Tier 1 (based on US DOE)	0.93	0.99	0.99
Tier 2 (based on EU CoC Tier 2)	1.19	1.35	1.36

Table 1 – Savings potentials for the scenarios analysed[1].

b) Economic impacts

Against this background, the assessed scenario for revision of the regulation was based on a Tier 1 in 2016 harmonising with requirements in the final version of US DOE EPS rulemaking, and a Tier 2 in 2018 harmonising with EU Code of Conduct Tier 2 requirements, taking into account reduced scope as discussed in the Consultation Forum.

The analysis confirmed that a tightening of requirements as proposed would lead to lower life cycle costs for all analysed product models except for the highest powered notebook EPS (120W) for which market volumes are very small – as shown below.

Lifecycle savings with mark up	Policy scenario[3]	
EPS MODEL EXAMPLES	**Tier 1 Savings (from ErP)**	**Tier 2 Savings (from ErP)**
a. Low voltage EPS (mobile phone charger) (2.5 W DOE, 3.5 W DE)	€ 0.99	€ 1.13
b. 18 W normal voltage EPS (router/gateway) (10 W DE, 18 W DOE)	€ 4.26	€ 4.14
c. Normal voltage notebook computer EPS (40 W DE, 60 W DOE)	€ 0.25	€ 1.82
d. Normal voltage notebook computer EPS (No DE case provided, 120 W DOE)	-€ 3.70	-€ 0.55
e. Multiple voltage output EPS for game console (90 W DE, 203 W DOE)	€ 4.68	€ 4.68
f. Low usage EPS (electric shaver)	€ 0.14	€ 0.24
Extra base case – 10 W tablet EPS	N/A	N/A

Table 2 - Summary results of lifecycle costing analysis[4].

[3] Tier 1 Doe ruling/Tier 2 EU CoC, on the basis of DOE-data

[4] Table 9 of *Additional Assessment In The Frame Of The Review Study On Commission Regulation (EC) No. 278/2009 External Power Supplies", Final Report, (ENER/C3/2012-418 LOT 2/04/SI2.659515), Viegand Maagøe, March 2014*, Note: It is expected that more recent data will show lower costs for 120W notebook EPS.

c) Measurement method

There is a European test standard and a US test standard for external power supplies.

The European test standard EN 50563:2011 covers no-load power and average efficiency of active modes for external ac-dc and ac-ac external power supplies. It has been referenced in the OJEU as a harmonised standard.

The US test standard is "2011-06-01 Energy Conservation Program for Certain Consumer Appliances: Test Procedures for Battery Chargers and External Power Supplies; Final rule."

In terms of alignment, there are no substantive differences in approach between the EU and US. Both test standards are based on the original EPRI test method previously referenced under ENERGY STAR, and both use the loading points of 25, 50, 75 and 100%. Where there are gaps in the European standard, the US DOE test procedure is likely to be able to fill them (in particular with a view to multiple voltage output EPS). For EPS using the USB 3.1 specification, which enables charging at different voltage and power levels, there are test methods in development by the USB power delivery specification working group to address the need to test at both the lowest and highest possible voltage and power combinations.

3. The way forward:

In view of these developments and the further analysis, the Commission proposes the following approach:

- to align the Tier 1-provisions with the DOE-rulings while maintaining the scope as established in Regulation 278/2009 (including the minor scope amendments as outlined above). Tier 1 should come into force by January 2017.
- To establish a second tier based on the values of the EU Code of Conduct-Tier 2. Target Date July 2018.

This two step approach ensures both, that compliance costs for industry are kept to a minimum while potential savings are maximised.

Next steps

The reviewed provisions will be subject to an impact assessment for which a study has already been launched.

A vote in the Regulatory Committee could be envisaged for 12/2015.

Annex I: DOE-ruling – explanation and requirements

Annex II: EU Code of Conduct – explanation and Tier 2 -requirements

Annex III: Draft Final Report – additional assessment

Annex I

DOE ruling - Direct Operation EPS Standards

In February 2014, US DOE published rulings for Battery Chargers and External Power Supplies. These rulings include only one tier, which comes into force in February 2016. The provisions include requirements for multiple voltage and high voltage EPS.

Differences in scope and definitions of the US rulemaking

There are major differences in the way that the US DOE defines external power supplies and battery chargers. The US definition of "battery charger" includes all devices that include a rechargeable battery, such as mobile phones and laptops. The US DOE approach also exempts what they define as "indirect EPS"[5] from the updated requirements to prevent EPS that would be addressed under their battery charger requirements from being subject to double regulation.

As the current Commission Regulation (EC) No. 278/2009 does not regulate battery chargers, and considers mobile phone and laptop EPS within scope, the separation of direct and indirect EPS is not relevant. Harmonisation with US DOE definitions is therefore considered inappropriate.

Requirements

All direct operation external power supplies manufactured on or after two years after the final rule's date of publication (10 Feb 2014) in the Federal Register shall meet the following standards:

Direct Operation External Power Supply Efficiency Standards		
Single-Voltage External AC-DC Power Supply, Basic-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W]**
$P_{out} \leqq 1$ W	$\geqq 0.5 \times P_{out} + 0.16$	$\leqq 0.100$
$1 \text{ W} < P_{out} \leqq 49$ W	$\geqq 0.071 \times \ln(P_{out}) - 0.0014 \times P_{out} + 0.67$	$\leqq 0.100$
$49 \text{ W} < P_{out} \leqq 250$ W	$\geqq 0.880$	$\leqq 0.210$

[5] The US DOE identifies whether or not an EPS is indirect based upon the results of a test. They estimate that just over 20% of what they categorise as EPS are indirect.

P_{out} > 250 W	≧0.875	≦0.500
Single-Voltage External AC-DC Power Supply, Low-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W]**
P_{out} ≦1 W	≧0.517 × P_{out} + 0.087	≦0.100
1 W < P_{out} ≦49 W	≧0.0834 × ln(P_{out}) - 0.0014 × P_{out} + 0.609	≦0.100
49 W < P_{out} ≦250 W	≧0.870	≦0.210
P_{out} > 250 W	≧0.875	≦0.500
Single-Voltage External AC-AC Power Supply, Basic-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W]**
P_{out} ≦1 W	≧0.5 × P_{out} + 0.16	≦0.210
1 W < P_{out} ≦49 W	≧0.071 × ln(P_{out}) - 0.0014 × P_{out} + 0.67	≦0.210
49 W < P_{out} ≦250 W	≧0.880	≦0.210
P_{out} > 250 W	≧0.875	≦0.500
Single-Voltage External AC-AC Power Supply, Low-Voltage		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W]**
P_{out} ≦1 W	≧0.517 × P_{out} + 0.087	≦0.210

1 W < P_{out} ≦ 49 W	≧ 0.0834 × ln(P_{out}) - 0.0014 × P_{out} + 0.609	≦ 0.210
49 W < P_{out} ≦ 250 W	≧ 0.870	≦ 0.210
P_{out} > 250 W	≧ 0.875	≦ 0.500
Multiple-Voltage External Power Supply		
Nameplate Output Power (Pout)	**Minimum Average Efficiency in Active Mode** ***(expressed as a decimal)***	**Maximum Power in No-Load Mode [W]**
P_{out} ≦ 1 W	≧ 0.497 × P_{out} + 0.067	≦ 0.300
1 W < P_{out} ≦ 49 W	≧ 0.075 × ln(P_{out}) + 0.561	≦ 0.300
P_{out} > 49 W	≧ 0.860	≦ 0.300

Annex II EU Code of Conduct (CoC) Tier II-Requirements

The EU Code of Conduct (CoC) on External Power Supplies is a voluntary initiative initiated by the European Commission Joint Research Centre, for setting ambitious commitments on energy efficiency through an ongoing dialogue on market developments and product and system performance between the EC, manufacturers, larger purchasers and Member States. The Code of Conduct, Version 5 was finalised on 29 October 2013, and includes requirements for no load power consumption, four-point average efficiency in active mode, and efficiency at 10% load of full rated output current, in two tiers (January 2014 and January 2016).

No-load Power (not to exceed Wattage) – Jan 2016		
Nameplate Output Power (P_{no})	Standard Voltage	Low Voltage
$0.3\ W \leq P_{no} < 49\ W$	≤ 0.075 W	≤ 0.075 W
$50\ W \leq P_{no} < 250\ W$	≤ 0.150 W	N/A
$250\ W < P_{no}$	N/A	N/A
Four Point Average Active Efficiency (not less than %) – Jan 2016		
Nameplate Output Power (P_{no})	Standard Voltage	Low Voltage
$0.3 \leq P_{no} \leq 1.0\ W$	$\geq 0.50 \times P_{no} + 0.169$	$\geq 0.517 \times P_{no} + 0.091$
$1.0\ W < P_{no} \leq 49.0\ W$	$\geq 0.071 \times \ln(P_{no}) - 0.00115 \times P_{no} + 0.670$	$\geq 0.0834 \times \ln(P_{no}) - 0.0011 \times P_{no} + 0.609$
$49\ W < P_{no} \leq 250\ W$	≥ 0.890	≥ 0.880
$250\ W < P_{no}$	N/A	N/A
10% Load Average Active Efficiency (not less than %) – Jan 2016		
Nameplate Output Power (P_{no})	Standard Voltage	Low Voltage
$0.3 \leq P_{no} \leq 1.0\ W$	$\geq 0.50 \times P_{no} + 0.060$	$\geq 0.517 \times P_{no}$
$1.0\ W < P_{no} \leq 49.0\ W$	$\geq 0.071 \times \ln(P_{no}) - 0.00115 \times P_{no} + 0.570$	$\geq 0.0834 \times \ln(P_{no}) - 0.00127 \times P_{no} + 0.518$
$49\ W < P_{no} \leq 250\ W$	≥ 0.790	≥ 0.780
$250\ W < P_{no}$	N/A	N/A