Input on draft Task 7 and supplementary report
Preparatory study on Smart Appliances (Lot 33)

October 2017

We would like to make the following comments on the publication of draft task 7 and the supplementary report on chargers for electric vehicles:

- In the suggested policy options, the authors have discarded a mandatory inclusion of smart functionalities in all appliances on the market, a decision we fully support. Considering the immature state of demand-side flexibility (DSF) services and still unclear benefits, this would lead to negative overall consequences such as adding in many households some standby consumption with little or no added-value.
- We generally support the idea of a smart icon to be added on the Energy Label when a product has DSF capability. But the report does not clearly list in paragraph 7.1.3 the criteria needed to be fulfilled to allow to use the icon. Would it be all or a part of the technical requirements mentioned at the end of the chapter? (from page 58 onwards)
- We see the Internal measurement feature as essential and think that it should be looked at in closer detail, as it is an essential tool of cybersecurity and grid stability, alongside kWh transparency. This transparency is especially needed in the case of Electric Vehicles, which will be the single biggest electrical appliance in future households.
- The issue of obsolescence needs to be looked at seriously. The availability of software updates should be mandatory for a minimum number of years, for cybersecurity reasons and so that smart features do not lead to shorter lifetime of products. Smart devices should be able to work with and without smart functionality.
- Preservation of energy performance is also an important topic. Regulatory provisions should be defined so that software updates do not harm the declared performance of the product.
- In the analysis of the impacts on the energy system (p18), little is said about the impact of the network infrastructures needed to operate DSF functionalities. The latter require not only additional electronics in appliances themselves, but also an entire chain of network communications from energy providers/aggregators to households. This chain also entails some electricity and resource consumption (servers, commuters, etc.).
- We welcome and strongly support the functional requirements listed in page 63, in particular 7.8.1, 7.8.2, 7.8.8, 7.8.9, and 7.9.4. We believe they should be mandatory provisions applying to all smart appliances put on the market.

We have put forward more detailed comments below.

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Ecodesign Preparatory study on Smart Appliances

Template for comments and consortium observations on strategic decisions

Date: 23/10/17	Document: **Task 7 – Strategic decisions**

1	2	3	4	5	6	7
SH[1]	**Strategic decision**	**Reference to section in Task 7 report**	**Reference to slides**	**Do you agree with the decision (yes/no)**	**Comment (justification for your standpoint) by the Stakeholder**	**In case of disagreement, proposed alternative decision by the Stakeholder**
ECOS	Internal measurement interface: OUT of SCOPE	7.5.5.	„04 Context and Strategic Decisions“, page 49	No	We see the Internal measurement feature as essential. Technically this capability would be already present if the recommended *“Horizontal option 4: Logging of the historical power consumption profile and instructions”* is implemented. Internal measurement is very similar to one of the documented best available techniques, called “Grid sensitive operation (GSO)”, which the JRC-BAT report listed for the cybersecurity protection of smart metering systems. The same technique should be applied to energy smart appliances. For security purposes the approach of “Figure 13” (simulating internal measurement with the direct interface”) cannot be used. If it technically comes for free, and if it is the most robust security-by-design option in order to detect fraudulent remote commands (direct or indirect), then it should be considered a mandatory feature. However, it cannot replace the other two interfaces, **but it rather should be seen as “Red Phase demand response”.**	Internal measurement interface: MANDATORY (for “Red Phase” demand response in the context of “cybersecurity by design”)

ECOS	Recommendation "… the recommendation is that the appliance keeps measurements and records its historical power consumption in memory with a to be defined resolution and time scale."	7.8.7.5		Yes	This is a very important point. Some appliances are already providing such features (e.g. Miele EcoFeedback) and in our view, it provides transparency and could serve as an important tool to understand energy consumption in homes, and provide intelligence about performance degradation such as loss of efficiency of a fridge. Some standards could serve as a basis for this functionality (e.g EU Mandate M/541).	Add a reference to EU Mandate M/541.

1 **SH** = Stakeholder (enter the abbreviation of the organization)
NOTE All columns are compulsory (column 7 may be left blank in case of agreement with the decision).

Ecodesign Preparatory study on Smart Appliances

Template for comments and consortium observations

Date: 23/10/17	Document: **Task 7 – Policy and Scenario analysis**

1	2	(3)	4	5	(6)
SH[1]	**Section No./ Subsection No./ Annex** (e.g. 3.1)	**Page and Paragraph/ Figure/Table/ Note** (e.g. p 6 para 5)	**Type of com-ment**[2]	**Comment (justification for change) by the Stakeholder**	**Proposed change by the Stakeholder**
ECOS	7.1.3.1	p.8	ge	In the 7.1.3.1 paragraph on Ecodesign policy options, a point c) is missing on Ecodesign *functionality requirements* on smart appliances. Ecodesign can and should be the place to enforce the relevant technical requirements that are described at the end of the chapter from page 58 onwards. Some of these technical requirements deserve to be enforced on all smart appliances and not only those that will decide to show the 'smart' icon. A horizontal Ecodesign measure can be used for this, that would specify the requirements that DSF functionalities should meet in all smart appliances.	In the 7.1.3.1 paragraph on Ecodesign policy options, add a point c) on Ecodesign *functionality requirements* on smart appliances.
ECOS	7.1.4	p.10	ge	Similarly, paragraph 7.1.4 should have an additional point 4 at the end, stating for instance: "*4. A horizontal Ecodesign Regulation can ensure that all appliances with smart functionalities (be they bearing the smart icon or not) meet a set of basic functionality requirements including XXX.*'	Add an additional point 4 in paragraph 7.1. as described.
ECOS	7.2	p.13, Table 1	ed	Table 1 does not list the "home batteries" under the "Residential energy storage systems" category	Add the "home batteries" to Table 1

ECOS	7.3.1.2	p.16	te	The assumption that: "*If the appliance is equipped with extra energy smart specific electronics, then the operation of these may cause a small to negligible surplus electricity consumption"* is in our view too optimistic and too vague (as said in our previous comments). This clearly does not apply to: Electric vehicle supply equipment (EVSE) and Electric Vehicles (EV) which can have considerable standby consumption. However, not much research has been done so far. One publication (DGS e.V: Sonnenenergie 2013-03, "e-Mobiles Ladeverhalten", http://www.sonnenenergie.de/sonnenenergie-redaktion/SE-2013-03/Layout-fertig/PDF/Einzelartikel/SE-2013-03-s044-Mobilitaet-E_mobiles_Ladeverhalten.pdf) shows that some EVs, if always connected to the EVSE, might consume more energy while standing than during daily driving.	An estimation of the **increase in standby consumption** due to DSF should be included in all scenario analysis. As an example, a 2W extra standby consumption for DSF translates into 17.5 kWh/year which for some appliances is as much as 5 to 10% of their yearly consumption. This is not negligible, and should be compared against the expected benefits of DSF functionalities. In addition, the report says very little about the **additional material resources** that will be associated with DSF development (more electronics in products) and the end-of-life challenges (on dismantability, repairability, recyclability, etc.). The report also says little about the potential **impact of additional electromagnetic fields due to DSF functionalities** (only one mention is made on p. 63 'Upgrading an appliance with energy smart functionality can increase the electromagnetic emissions, especially in the case when wireless communication technologies are used'). We regret that despite our previous comments, the health aspects related to this have not been investigated or even mentioned at all in the study.
ECOS		p. 18	te	In the analysis of the impacts on the energy system, not much is said about the impact of the network infrastructures that will be needed to operate DSF functionalities.	Mention that the latter require not only additional electronics in appliances themselves, but also a whole chain of network communications from energy providers/aggregators to households. This chain also entails some electricity and resource consumption (servers, commuters, etc.).

ECOS	7.5.1.4	p.46	te	The following sentence is not a proper description of the use case: *“The washing machine switches off the heating and motor and waits till the grid frequency recovers in order to proceed its program.”* “Switching off” would not be a desired response, as those hard changes actually are more likely to cause the biggest problems to the grid (especially if they happen at hard limits, see 50,2 Hz problem). The goal is to “adjust the power level”, as the introduction to section 7.5.1.4 correctly explained.	Change the sentence to: “*The washing machine adapts its power demand, by adjusting the heating or motor control, by a small percentage in order to match the level of drift in the grid frequency. The washing program continues without interruption and without any loss of comfort for the customer, even when the duration of the washing cycle might be slightly longer or shorter than normal.”*
ECOS	7.5.1.4	p.47	ed, te	The examples section misses reference to some relevant European projects in that area. They should be added or the US example should be replaced with European projects.	Add the following European projects: PiVo (“Tanken im Smart Grid”) - netzoptimierte on-board Ladetechnik (DE, 2016) http://piv-o.de GridSense (CH) - Onboard Energy Management for the HEMS and smart appliances http://www.gridsense.ch
ECOS	7.5.3	p.48	ed	The figure contains the FRRa, FRRm, RR abbreviations are not defined in the documents "LIST OF ACRONYMS" section	Add the FRRa, FRRm and RR abbreviations to the "LIST OF ACRONYMS" section
ECOS		p.52	te	Because of the essential role which the “internal measurement” plays in order to implement cybersecurity-by-design and grid stability via the GSO technique (see our other comment on section 7.5.5) we would not agree with the sentence: *“Due to its very specific nature, the different interaction with the consumer and mandatory character, standalone demand response use cases with internal measurement interface are not further assessed.”* While it is correct, that the “internal measurement” interface cannot be used to achieve all targeted use cases and business models, it should be evaluated with a more holistic approach.	Change the sentence to: *“Due to its very specific nature, the different interaction with the consumer and mandatory character, standalone demand response use cases with internal measurement interface are not further assessed. However, the internal measurement technique (GSO) shall be considered as a policy requirement for the purpose of cybersecurity-by-design and the energy smart demand response in the power grids “red phase” scenarios (see section 7.9.3).”*

ECOS	7.6.3	p.55	te	The sentence says: *"This reasoning will be used to focus in the policy recommendations on a common data model and not on a common or a list of common communication protocol."* The word "common communication protocol" is not clearly specified in this context. Furthermore, customers expect "plug-n-play" for energy smart products. A common data model is not sufficient to guarantee such functionality. Any real-world implementation will require at least a well-defined application protocols with well-defined standards which map the protocol to low level communication protocol. Section 7.9.2 does mention the need for an application protocol. Interoperability has been formally defined by the EC expert group on the smart grid in the document "Interoperability, Standards and Functionalities applied in the large scale roll out of smart metering" (2015). The findings should also be applied to energy smart appliances and the goal should therefore be a well-defined (set of) interoperability profile(s). Such profiles are defined as references to standards where all potential options have been clearly defined with mandatory values. This is necessary to enable conformity testing.	Extend the sentence as follows: "*This reasoning will be used to focus in the policy recommendations on a technical standard, which defines a data model, application protocol and mappings to common communication protocols (HTTPS XML REST APIs, CoAP bJSON APIs, etc.). The standard should allow to meet the requirements of an interoperability profile, as it has been defined by the ECs expert group on interoperability (see: … reference)*" This should be aligned with section 7.9.2
ECOS	Part II	p.58	ed	The sentence says: "*… and a final recommendation can be found in 0*."	Replace "0" with a proper reference.
ECOS	7.8.7.4	p.69	te	The list of advantages should mention the benefits to privacy concerns. If a "Settlement information" is documented inside the device and "communicated afterwards and in larger blocks" it allows for merging information and thereby a reduction of invasive activity tracking … which could raise the acceptance on the customers side.	Add another bullet to the advantages section: "- *Local recording of historical power consumption could allow the reduction of the data that needs to be communicated to periodic sum values or proof-of-work signatures. This would help to reduce the privacy concerns and thereby increase the adoption rate*."
ECOS	7.9.2.	p.73	te	Add a sentence to the list of recommendations which provides a link to the concept of "interoperability profiles". see our comment on section 7.6.3 for more details	Add the following sentence: "*The standards which define the data model and application protocol shall be complete enough to allow to meet the requirements and the definition of an interoperability profile, as it has been defined by the European Smart Grids Task Force Expert Group 1 on interoperability (see: … reference). Such an interoperability profile will be needed to test the energy smart interface.*"

					https://ec.europa.eu/energy/en/topics/markets-and-consumers/smart-grids-and-meters/smart-grids-task-force
ECOS	7.9.3	p.74	te	The current paragraph does not mention the very high risk which energy smart appliances pose to the electrical grid. 10 Mio. tumble dryers, with 1kW each represent a 10 GW thread. If they get activated at exactly the same time (e.g. if an attacker breaches into the cloud backend control system or successfully penetrates the firmware upgrade process) the 10 GW can very likely bring down the European power grid. This is a very likely, serious scenario.	Add the following sentences after: "… used for large-scale network attacks": "*Due to the very high number of the connected appliances they especially pose a very high risk to the European power grid, as coordinated activation can easily exceed the 10 GW power level which would result in major cross-border blackouts.*" Add the following sentences after: "… objects, more cyber- secure.": "*It is recommended that techniques which have been collected for cyber security of smart meters within the JRC-BAT report (2016) get adopted for connected energy smart appliances. Especially the Grid Sensitive Operation (GSO) technique shall be considered, as it can be implemented in appliances with internal power consumption measurement (see recommendation 7.8.7.5) without additional cost and GSO provides a robust protection of the European power grid against all potential cyber-attack scenarios.*"
ECOS	7.9.4	p.74	te	The importance of this section is very high and should be stressed even more. We would especially support a general call for a horizontal requirement, which would make Open Source strategies mandatory under certain circumstances.	Modify the first sentence to: "*Appliances have a typical lifetime length of around 20 years, which surpasses that of software manifold. Especially in the context of cybersecurity software requires a fundamental upgrade at least every 5 years, and frequent vulnerability hot fixes with a very short lead time of sometimes a few weeks or month*." Add the following paragraph: "*Especially due to the desired long lifetime length for appliances the generic requirements for cybersecurity should cover the aspects of liability in the case of unresolved known vulnerability. It should be evaluated, in accordance with other EU activities in the context of "planned obsolescence", if manufactures could reduce their level of liability if they release all exposed software interfaces via an Open Source strategy, so that vulnerabilities can be fixed and new Demand Side Flexibility interfaces could be supported even after the official support period from the manufacturer has ended*."

1 **SH** = Stakeholder (enter the abbreviation of the organization)
2 **Type of comment:** **ge** = general **te** = technical **ed** = editorial