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 From : Paul Van Tichelen Annex(es): Powerpoint presentations of the meeting
 (https://ecodesignbatteries.eu/documents)

To : Cesar Santos; Stakeholders
 Copy : Project team

Minutes of stakeholder Meeting for Ecodesign Preparatory Study on Industrial Rechargeable Electrochemical Batteries – Second Stakeholder Meeting on 02/05/2019

Albert Borschette Centre, Rue Froissart 36, Brussels, Belgium

Participants

European Commission

DG GROW Cesar Santos (CS)

Project Team

ISI Fraunhofer	Antoine Durand (AD)
ISI Fraunhofer	Tim Hettesheimer (TH)
ISI Fraunhofer	Cornelius Moll (CM)
ISI Fraunhofer	Clemens Rohde (CR)
Viegand Maagoe	Jan Viegand (JV)
VITO	Paul Van Tichelen (PVT)
VITO	Tatiana Pasquel Garcia (TP)
VITO	Grietus Mulder (GM)
VITO	Wai Chung Lam (WL)

Stakeholders

Organisation	Name	Acronym
ACEA	J. Warsen	ACEA - JW
Amnesty International	N. Meyer	Amnesty - NM
ANEC/BUEC, Oeko-Institut	R. Priess	ANEC/BUEC - RP
APPLiA	G. Zilla	APPLiA - GZ
BEIS (UK)	A. Barker	BEIS - AB
BEIS (UK)	M. Taylor	BEIS - MT
BEUC ANEC	A. Maigret	BEUC ANEC - AM
Blue Solutions	D. Coucharrière	Blue Solutions - DC
CircularTree	G. Walden	CircularTree - GW
Danish Energy Agency	J. Ditlefsen	Danish Energy Agency - JeD

Organisation	Name	Acronym
DG ENV	B. Lorz	DG ENV - BL
DG Grow	M. Galatolla	DG Grow - MGa
Digital Europe	T. Barillot	Digital Europe - TB
DTI/Danish Energy Agency	J. Hardang Vium	DTI/Danish Energy Agency - JHV
Eaton	N. El Mrabet	Eaton - NEM
EGMF	M. Guajardo	EGMF - MG
EGMF	M. Pawlowski	EGMF - MP
EIT Raw Materials	R. Gauss	EIT Raw Materials - RG
Enel	A. Díaz	Enel - ADí
EUROBAT	F. Gattiglio	EUROBAT - FG
European Copper Institute	H. De Keulenaer	ECI - HDK
European Environmental Bureau	J. P. Schweitzer	EEB - JPS
European Environmental Citizens Organisation for Standardisation	A. Orfanos	ECOS - AO
European Environmental Citizens Organisation for Standardisation	M. Zill	ECOS - MZ
European Portable Battery Association	H. Craen	EPBA - HC
Federal Institute for Material Research and Testing (DE)	A. Simo	BAM - ASi
Global Battery Alliance	A. Deadman	Global Battery Alliance - ADe
Greenfish	A. Nikolian	Greenfish - AN
Helmholtz Institute Ulm	J. Peters	HIU - JPe
Honda Motor Europe	B. Li Pira	Honda Motor Europe - BLP
IEA-HEV Task40	B. Witkamp	IEA-HEV Task40 - BW
iFixit	M. Depypere	iFixit - MD
JRC-EC	A. Villanueva	JRC-EC - AV
JRC-EC	D. Blagoeva	JRC-EC - DB
JRC-EC	F. Mathieux	JRC-EC - FM
JRC-EC	J. Sanfelix	JRC-EC - JS
JRC-EC	M. Bielewski	JRC-EC - Mbi
JRC-EC	V. Ruiz	JRC-EC - VR
KU Leuven	M. Abdelbaky	KU Leuven - MA
LG Electronics	R. el Bawab	LG Electronics - RB
Ministerio de industria (ES)	T. de la Fuente	Ministerio de industria - TdIF
Ministry of Ecology (FR)	T. Legoupil	Ministry of Ecology - TL
Orgalim	I. Jakovljevic	Orgalim - IJ
RECHARGE	C. Chanson	RECHARGE - CC
Renault-Nissan	L. Fleuret	Renault-Nissan - LF
RREUSE	M. Rama	RREUSE - MR
SAFT	P. de Metz	SAFT - PdM
SolarPowerEurope	R. Rossi	SolarPowerEurope - RR

Organisation	Name	Acronym
Solarwatt, BVES	T. Timke	Solarwatt, BVES - TT
sonnen	F. Dembski	Sonnen - FD
Swedish Energy Agency	P. Bennich	Swedish Energy Agency - PB
Techtronic Industries	M. Wieler	Techtronic Industries - MW
Tesla	J. Dings	Tesla - JoD
Toshiba Corporation	Y. Kobayashi	Toshiba - YK
Transport & Environment	L. Mathieu	Transport & Environment - LM
Umicore	J. Tytgat	Umicore - JTy
VARTA Storage	F. Ermer	VARTA Storage - FE
VDMA	F. Krebs	VDMA - FK
Volta	W. Stinissen	Volta - WS
Volvo Car Corporation	A. Ahlberg Tidblad	Volvo - AAT
Vorwerk	C. Müller	Vorwerk - CMü
ZVEI	C. Eckert	ZVEI - CE

Objective of the meeting

The intention of the meeting was to serve as a second stakeholder meeting for the Ecodesign preparatory study on Batteries. Stakeholders were informed that updated reports of Task 1 to 5 and the draft reports of Tasks 6 to 7 were publicly available before the meeting on the project website (<https://ecodesignbatteries.eu/documents>). The purpose of this meeting was to present the key comments to and updates of the Task 1 to 5 reports, to discuss the initial findings on Task 6 and 7, and to hear the views of the stakeholders on the findings so far. Stakeholders were invited to provide written comments. The deadline for written comments on Task 6 is 22/05/2019 and on Tasks 7 is 24/05/2019.

Note: complementary to these minutes, the meeting PowerPoint presentation can be consulted

Agenda

- 9h30: Registration desk opens
- 10h00-10h05: Welcome and introduction to the study (DG GROW)
- 10h05-10h20: Tour de table, agenda and MEERp task structure (VITO)
- 10h20-10h35: Task 1 - key comments and updates (VITO)
- 10h35-10h50: Task 3 + 4 - key comments and updates (ISI)
- 10h50-11h10: Task 6 - design options (ISI)
- 11h10-11h20: Coffee Break
- 11h20-11h35: Q&A on Tasks 1, 3 + 4 (ISI/VITO)
- 11h35-11h50: Task 5 + draft Task 6 - LCA results (VITO)
- 11h50-12h15: Q&A on Tasks 5 & 6 (VITO/ISI)
- 12h15-12h30: Task 2 update and Draft Task 7 scenario calculations/sensitivity (ISI)
- 12h30-13h30: Lunch Break
- 13h30-13h40: Q&A on Task 2 and scenario calculations/sensitivity from Task 7 (ISI)
- 13h40-14h00: Task 7 - policy options on performance in the use phase (ISI/VITO)
- 14h00-14h30: Q&A
- 14h30-14h50: Coffee break
- 14h50-15h10: Task 7 - policy options on sustainability for manufacturing/EoL (ISI/VITO)
- 15h10-15h40: Q&A
- 15h40-16h20: AOB, conclusion and next steps (VITO/DG GROW)

Minutes

10h00 Welcome and introduction to the study

Cesar Santos (CS), commission official in charge of this ecodesign study on batteries, welcomes the participants and explains the political context and process for this study.

Political context

There have been internal discussions within the Commission about the initiative behind this study. What already can be said at this stage:

- The decision on the legal basis for the Commissions regulatory proposal and how it will fit with the revision of the Batteries Directive will in all likely hood be taken by the next Commission.
- It will likely not be an Ecodesign implementing Regulation.
- Working assumption = it will probably be a self-standing regulation for rechargeable batteries, still to be confirmed as soon as the new Commission takes office. (Dis)advantages: we can still have a core of Ecodesign type of requirements, but we can also go wider in terms of sustainability requirements, e.g. requirements related to the carbon footprint of the manufacturing of batteries and responsible sourcing of raw materials.
- Another possibility which we cannot exclude: integrating all this work in the revision of the Batteries Directive in the end, so this work will not be wasted.
- The Commission Services and the relevant cabinets are discussing this option, but as already said it is very likely that the final decision will not be taken before the next Commission.

Process

- The working assumption opens new possibilities to go wider than a classic Ecodesign implementing regulation.
- To make this possible, additional funding will be made available for a top-up study. Today you will already see some elements of carbon footprinting and responsible sourcing of raw materials, but this needs to be investigated in more depth in an additional study which should be launched in the coming weeks.
- In parallel, a public open consultation (POC) will also be prepared that hopefully will be launched in the coming weeks.
- All this evidence and data will be fed into the preparation of the impact assessment, which will presumably start after the summer break.
- In addition, the duration of the contract of this preparatory study has been prolonged. This gives us the possibility to digest and accommodate the feedback that we expect today. This also opens the possibility of perhaps having a third stakeholder meeting after the summer and in any case to have additional consultations with stakeholders. This still needs to be contractually figured out with the study team. In the light of todays discussion, we are very likely that we will come back to you at some point in Autumn.
- The contractors have been working hard. On their behalf CS needs to say that the work asked to be done is normally done in 18 of 24 months and in a classical Ecodesign preparatory study in 9 months. Thus you will see that some of the policy recommendations and conclusions still perhaps need further refinement. At the current stage the reports and presentations is still the opinion of the consultants, but it constitutes the main input for the preparation of the Commissions regulatory proposal and impact assessment. So this together with your feedback will be the main input.

We do not have to agree with everything today. We can agree to disagree. You are more than welcome to submit your position papers. If you think that the scope and requirements go too far or not far enough, please let us know as it is precious information for us. So please by all means complement the findings and the recommendations of the consultants with your position papers.

10h05 Agenda and MEerP Task structure

The tour the table was skipped due to the number of participants. The participants list is included at the beginning of this minutes.

Paul Van Tichelen (PVT):

- Presented the agenda and the study team (see PowerPoint – Introduction).
- In addition to the given feedback during this meeting, comments can also be send in to the following email address: edbatteries@vito.be.
- Comments will be treated confidentially and our feedback will be given individually. This was also done in the previous round of commenting.
- All the documents we are discussing today are on the project website (<https://ecodesignbatteries.eu/documents>).
- The main objectives of this study (slide 5) and the MEerP methodology that is applied within this preparatory study (slide 6) were briefly presented.
- **Stakeholders are invited to comment especially Task 6 and 7, preferably with the comments form that can be downloaded from the project website.**
- The study planning (slide 7) was presented. The study team needed to elaborate Task 6 and 7 in parallel due to time restraints instead of in a normal way in which each task is done after each other. This resulted that not every policy option within Task 6 is matched one to one to a scenario calculation within Task 7. We are aware of this and we are planning to align the tasks in the final edit in June.
- Stakeholders have time to comment Task 6 until 22nd of May and Task 7 until 24th of May.

10h20 Task 1 - key comments and updates

Grietus Mulder (GM) and Paul Van Tichelen (PVT) presented Task 1 (see PowerPoint).

10h35 Task 3 + 4 - key comments and updates

Cornelius Moll (CM) presented Task 3 and Tim Hettesheimer (TH) Task 4 (see separate PowerPoints).

10h50 Task 6 - design options

Tim Hettesheimer (TH) presented the first part of Task 6 on the design options (see PowerPoint) the second part, the LCA and LCC, of Task 6 was presented later.

11h15 Q&A - Tasks 1, 3 + 4

After the coffee break w/o coffee, a discussion took place on Task 1, 3 and 4:

Acronym	Comment/answer
Solarwatt, BVES - TT	<p>Did you already received any comments regarding Tasks 1 to 4 and partly 5, especially Task 3, regarding the general statements made on the cells and cathode materials, especially NCM and LFP? That it was too general? Because what you have written was mainly based on secondary sources. If you would use primary sources and a wider range of cell samples, this would lead to different results.</p> <p>The effect of the cathode materials is overestimated. In all the tasks, it is correctly mentioned that there are differences in safety, cycle life and in ageing behaviour but this does not match with comprehensive cell tests. It might look like this if you only use cells that are easily available, but it does not reflect the whole range of cells.</p> <p>In the IEC working groups for stationary storage, which I do not represent, it is always wondered why there is so much online research that are not based on own research or own cell tests, and always fall on secondary sources of people who write something in general. Even though that every cell specialist know that the effects of just the family of cathode materials without considering cell geometry, material purity, and all other characteristics is</p>

	<p>taken so general. If this study was written by a small research institute in any other country, we would not care. But this is the EU and therefore it should be done right, and what is written in the reports is far away from the truth.</p>
TH	<p>We did not use any arbitrary cell, but cells that are commonly used in electric vehicles and thus have a high market share. For the bill-of-materials (BOM), we used this industrial available cells. For LFP cells we considered those produced by BYD, which are also commonly used. Furthermore, we have also provided our spreadsheet including all technical data to all stakeholders after the 1st stakeholder meeting and asked to comment on it. But we have not received any response from the stakeholders. So if you have any better data and values, you are more than welcome to share it with us.</p>
Solarwatt, BVES - TT	<p>OK, we will do that.</p>
CM	<p>Well the question we then have is if you have a specific cell that you have tested in your laboratory, how representative is it for the overall picture that we need here. We cannot look at only certain specific cells, just because there were some test results. We need to have general assumptions and draw more or less general conclusions. I totally agree with that different cells have different characteristics and parameters, but I do not know how deep we need to dig into certain specific cells of certain cell manufacturers.</p>
Solarwatt, BVES - TT	<p>The point is that the primary sources are not easily open for you. Because on test fields, there are many different cells which are mainly tested under NDAs and those tests are expensive. Also data on large format cells for the automotive are not easily to come by due to the large research institutes that have few test channels, like the KIT. There are cell manufacturers, who are doing tests on competitor cells, that have really large test fields with several hundreds test channels. I'm talking about using their results and not just online available data sheets or secondary stuff. Meanwhile this let call it LFP propaganda have spread so wide within Europe, which is completely different compared with Japan or Korea, where cell manufacturers would not allow such nonsense. The independency of cathode material is so overestimated which is not acceptable. So yes, I will provide you with primary sources and the correct data. What is reported now is hardly acceptable. This is not an offence, we totally understand the difficulties of gathering data. Again, on EU level it should be done right, without quoting secondary sources and by preventing any further publication of wrong information by the next researcher who is only doing online research.</p>
ANEC/BUJC - RP	<p>Two questions for clarification:</p> <ol style="list-style-type: none"> 1- You mentioned that the depth of discharge (DOD) did not changed over lifetime which you received as feedback. My understanding is that if the discharge is very large and after a certain number of years you will reach lower charge statuses. Would that not diminish the lifetime of the battery? Or in the other hand would that not be an opportunity to limit this steady DOD over lifetime and to increase the overall durability of cells? If that is the status quo, I do not fully understand the implications. 2- You mentioned that light commercial electric vehicles (LCVs) are not a specific Base Case (BC) but that it is included the passenger Battery Electric Vehicles (BEVs)? Are LCVs included, excluded or merged in any of the other BCs? Because they should be in there somehow.
CM	<p>Regarding your first question, the yearly DOD is almost the same over the whole lifetime. But the state of health (SOH) decreases over lifetime. At the beginning you have let say 100 kWh and 80% DOD means you withdraw 80 kWh, but then the maximum capacity of the battery decreases. But still 80 kWh of the battery will be withdraw until the battery reaches its end of life. That is the main basic facilitating approach. However, we have talked to battery</p>

	<p>manufacturers and their batteries have more battery capacity than they actually state, e.g. they state 100 kWh but in reality it is 110 kWh, to have some buffer for more battery utilisation of discharging it entirely. I agree that oversizing the battery perhaps might have some potential to increase the overall efficiency. Because oversizing the battery means more material use which has a negative effect on the BOM. This is definitely an issue.</p>
ANEC/BUJEC - RP	<p>If the aim is to have the same DoD over the lifetime than to my understanding this might compromise the durability. Because I would reach lower charge statuses. You showed that it goes below 20% and this might not be desirable to have when increasing the lifetime. If this is the common or current practice, this might not be the best practice in the interest of long durability of batteries.</p> <p>I have raised this point because this hints the need of requirements.</p>
CM	<p>Regarding your second question: we finally excluded LCVs, because of some received comments that gave the direction that the consumption, the platform and the battery of LCV's will be pretty similar to a passenger BEV. The only thing that might be different is the user profile and annual mileage, which will be little bit higher. Because of this we saw no reason to still include LCVs.</p>
ANEC/BUJEC - RP	<p>But if you say that they are similar and covered by another BC, then you should mention that they are considered to be the same as a certain BC and not excluded fully. It is a difference in connotation that should be mentioned.</p>
CM	<p>Indeed, we can add that.</p>
HIU - JPe	<p>Two remarks/questions:</p> <ol style="list-style-type: none"> 1- A certain table stated 100% recyclability for graphite. For battery use 100% purity of graphite is needed, because of contamination. Therefore be careful of this. 2- In the technical scope solid state batteries are mentioned in the description. Perhaps these solid state batteries should be considered as a different technology, because of differences in parameters, like efficiency and lifetime. At least, they currently are performing differently and are not measurable with the same requirements of lithium ion (Li-ion) batteries. If this study is limited to only Li-ion batteries with liquid electrolytes, then solid state batteries should be excluded. And if not, then the requirements need to be changed so they are acceptable for new batteries, not only polymer solid state batteries but also batteries with ceramic separators. The description of the scope should not be misleading.
TH	<ol style="list-style-type: none"> 1- We used secondary sources, so we will check this again. If you have another source, let us have contact to share that with us, so we can correct this accordingly. 2- Solid state batteries are a part of the current battery technology. The technological description would not be complete if we did not included them. But for our analyses we currently concentrated ourselves on the cell technologies with the highest market share, which are Li-ion based batteries. It is just rational for this study with its limited timeframe to concentrate on the most important issues. Of course, solid state is a technology we will have to consider and which will become more and more important in the future. So at a certain moment they need to be incorporated and dealt with.
ECOS - AO	<p>Two questions:</p> <ol style="list-style-type: none"> 1- I can understand your connotation why only EV applications are considered in the scope. But I'm more puzzled on the pertinence of only considering Li-ion batteries, does not this exclude a big part of hybrid vehicles? 2- What have you done with the remarks made in the first stakeholder meeting on the energy density aspect of the scope to include a threshold of 100 Wh/kg?
GM	<ol style="list-style-type: none"> 1- Currently, nickel metal hydride (NiMH) batteries in hybrid EVs are decreasing and being replaced by Li-ion. 2- The 100 Wh/kg threshold would in principle only limit NiMH batteries. Other batteries

	that could be included are sodium sulphur, sodium nickel chloride, and lithium sulphur batteries. For the general scope based on our quantitative criteria those batteries would be in, but from practical reasons we decided to only focus on Li-ion batteries for the moment due to lack of information on the other type of batteries.
ECOS - AO	If the scope is kept restricted to Li-ion, would their still be a reason to keep the 100 Wh/kg restriction?
GM	The 100 Wh/kg threshold is to exclude alkaline batteries and lead acid batteries.
ECOS - AO	Aren't the two restrictions too demanding?
GM	The most important criteria is the increase in the market share. For the EV and stationary applications, this is mainly lithium based and maybe high temperature sodium batteries.
ECOS - AO	Our comment in the first meeting was that introducing an energy density threshold could have an unwanted effect. That is why we believe that the scope restrictions should be either chemistry based or application based and not energy density based. This was our initial comment and I am still afraid that introducing an energy density threshold, especially if it is not needed, could give the wrong message.
CS	The intention of the Commission is to have a regulation that is as technology neutral as possible. It is unlikely that the regulation establishes thresholds for energy densities to carve out the scope of the regulation. I see that some issues need to be resolved. Perhaps this could be included in the top-up study that is being considered.
sonnen - FD	<p>Energy storage is the key technology in the energy transition and there is a worldwide race for the technological leadership, so it is paramount that we get this right in the EU otherwise European companies are out of the game. For us this means, there is no need to rush this. E.g. residential storage is still a ultra-niche super-early adopters market. Even we as a market leader in residential home storage systems barely understand it sometimes. Our business innovation department is roughly the same size as our technology innovation department, and still we only sometimes get it right. When we look at scientific publications, they even barely get it right. So at this point, we think that policy makers cannot get it right to regulate this very early stage technology.</p> <p>To give an example from Task 3, it includes an assumption on the number of cycles per year by a residential storage system. This assumption has a huge effect on the rest of the implications for the study. That number is to our opinion arbitrarily set to 250 cycles a year. We understood that number comes from Germany, coming from a scientific publication. However, we do an European approach and I'm very sure that that number will not be correct for other European countries with different climates. So why pick 250 cycles, a number from Germany? If you would take a rational active approach, you would simply literally cycle the life out of each battery one or two times a day. More and more manufacturers try to do that actually, so we provide frequency controlled grid operators.</p> <p>The cycle numbers set in this study is not suitable, it must be higher. How much higher, we do not even know. We appeal to the commission, at least for the technology of home and commercial energy storage systems (ESS), to give more time for research and analyses of these markets as they are still in their infancy. It will take 2-4 years to see how these systems are developed and used.</p>
CS	OK, we count on your support to get it right.
Tesla - JoD	I do not know how important the numbers are going to be for the selection of policies in the end. But the numbers for the different types of vehicles on how long the batteries and how long the vehicles are going to last looks weird from a vehicle manufacturers point of view. E.g. for cars, the batteries will outlast the vehicle, but as for trucks, the vehicle will outlast the battery as you have assumed a smaller battery than we recommended. What we try to do as a vehicle manufacturer is to make sure that the vehicle does not run out of its lifecycle before the battery and vice versa. So the assumptions make no sense. We try to design those things

	as one integral concept. If your numbers does not match up with that, I do not know if we are wrong in trying to designing these things as one concept.
CM	We are testing trucks in several projects with customers, like logistics and city logistics companies, in which we collected their requirements and we do not see the requirements that you see. Based on that we do not see why 800 or 1000 kWh batteries should be needed. You are welcome to provide us your market research on this.
Tesla - JoD	It is not the kWhs but it is just quite strange to see the assumption that the battery will outlast the car but a truck will outlast the battery. Every OEM (original equipment manufacturer) tries to design their vehicle and battery as one concept, to make sure that no component will structurally outlast another component. From our perspective, the outcome of your calculations seems strange.
CM	What we have as lifetime of the vehicle is how they are currently used or displaced. Those figures comes from internal combustion engine (ICE) vehicles and we assumed that EVs are used as that as well. Of course it might be possible that electric cars, as they have less moving parts and need less maintenance, that their lifetime might be higher. For the current state we do not have much other data nor experience on how long EVs actually last. So taking the ICE figures was the best we could do.
ECOS - AO	Coming back on what was earlier said on lithium. If we restrict ourselves to lithium, is there no danger that future technologies will be excluded?
PVT	Yes, but there is nothing else than lithium yet. We need to agree on lithium first before we can look what can be done for other batteries. Lithium is already challenging enough. We need to make the remark that there is much uncertainty in the values we have calculated. A lot is already build on assumptions. Another route could be to test batteries in our labs, but that would be a complete different type of project. Then we would need to agree on the test cycles and start testing products to build our work on evidence. But that is not possibility for this study.
GM	In addition, the timeframe of our scope is until 2025. In Task 4 the best available technology (BAT) and best not yet available technology (BNAT) are described. Fraunhofer has included a table of the BAT and BNAT until 2025 and no post-lithium batteries have been identified before 2025.
AD	Also the other technologies are not banned they are only not covered by the study.
CS	As a quick reaction from the Commission I can say that the regulation will not only be on Li-ion. It will as already said as technology neutral as possible. I speak under the control of technology providers in this room that I can imagine when new technologies and chemistries are introduced on the market, in terms of performance requirements they will not have problems in meeting the requirements which are tailored around Li-ion chemistries.
EEB - JPS	Regarding the justification that was given in the beginning of this meeting on why certain aspects like greenhouse gas emissions during production and sustainable sourcing of raw materials are potentially not easily covered by Ecodesign, I was thinking of some of the other products that are on the Ecodesign workplan such as smart phones, computers and notebooks, in which sustainable sourcing is also an important issue. Is this really the justification why Ecodesign would not be applied to that or are there other reasons as well? Because they are valid impacts to be considered and we still need to reflect on the effectiveness of Ecodesign on addressing the environmental impacts of products compared to other instruments that have been applied at EU level. Assessing different policy options in terms of effectiveness should be taken into account. Will this be considered in the top-up study?
CS	The justification is that there is a risk associated with the legal basis under the Ecodesign framework directive, where means of transport are off limits. In internal reflection in the commission, when with the risk of litigation, it means that we need to look at an alternative

	<p>legal basis. That comes with a silver lining because then we are not being bound by the Ecodesign framework itself, which makes it easier to consider on top of Ecodesign type of requirements a superset of Ecodesign. So there will be a set of Ecodesign type of requirements and additional requirements that look into carbon footprinting and responsible sourcing. Take it as a one-off regulation of this type. Although if it works, it might pave the ground for similar regulations for other products of finding a way of a framework regulation in the future. This has no implications for the work that has been done under Ecodesign for other products and there we are restricted by the Ecodesign regulation framework.</p>
BEUC ANEC - AM	<p>Following up on the comment of EEB and the introductory comments made at the beginning of the meeting regarding the fact that the follow-up will not be under Ecodesign: we appreciate that more time and resources will be allocated to look into this very important topic. We want to highlight that it is a bit unfortunately that we had to rush so much, be it by the study team and also the stakeholders for the comments, which leads to a lower quality of draft reports and also of stakeholders comments. I know it is independent of all the persons around the table, while there are legal aspects but surely there are also political aspects.</p> <p>Three main points regarding Tasks 1 to 4:</p> <ol style="list-style-type: none"> 1- As there is more time and resources for this study, it would be an excellent opportunity to extent the scope, be it for smaller vehicles but also portable batteries used in ICT. At least that it should not be concluded that it is not looked into because it is not relevant, or a lack of standards or comparable issues. Also to included recommendations for to be further looked at in other studies or Ecodesign. 2- Thank you for including ultrafast charging and the effect of durability of EV batteries in Task 3, but we fear that is not reflected to the same extent as in Task 7. We will provide additional written comment to this important point. 3- In the previous round of comments we mentioned that vehicle to grid, demand side flexibility and its effect on the lifetime of the battery are upcoming and important aspects. We received your feedback and your response was that only few grids provide this service, meaning the potential is low. For us this answer is not enough, as the study we are doing now is a projection of the future and many stakeholder are currently looking into these aspects, be it manufacturers but also us as a consumers organisation. So we will also provide additional comments to this aspect.
PVT	<ol style="list-style-type: none"> 1- ICT was in the working plan, we are aware of the issue. It is partly covered in some of the Ecodesign measures, but I do not know the state of play of that. 2- We still need to look into ultrafast charging for Task 7. We developed the tasks in parallel. 3- We know that demand side flexibility is an issue which needs to be researched. Many of these things are also connected to the previous remark of sonnen. We need to have a crystal ball to know where we have to go. We have generic ideas and I must admit that the research has already last since ten years, but I am still missing crystallisation in demand side management solutions and what the user business cases will be. It is an horizontal issue, so maybe we can address that somewhere else.
ANEC/BU EC - RP	<p>An important consideration that should be made in this study is, which also goes back to the comment made by Tesla: ‘what is the actual lifetime of batteries?’. We should not get too messed up in ‘what is it specifically?’ but understand that lifetime is an issue that needs to be looked at carefully. And that we introduces requirements that will ensure that the lifetime of the battery is achieved for the majority of the applications we have in mind, given the circumstances that it is operated under certain influencing factors like demand side flexibility services. Understanding the uncertainty around lifetime is important, but then really carefully considering which requirements are helpful to achieve the lifetime at applications that we have in mind. This is what the focus should be on for the moment, and not on the specific numbers like the number of cycles.</p>
CS	<p>More easily said than done.</p>

11h55 Task 5 and draft Task 6 LCA results

Wai Chung Lam (WL) presented the environment and economics of Task 5 and draft Task 6 (see PowerPoint).

Afterwards the Q&A on Task 5 and 6 took place:

Acronym	Comment/answer
ACEA - JW	1- Based on the results of Task 6, I am a bit concerned of including Life Cycle Costing (LCC). There is not much difference. Has a sensitivity analysis been done on this? I would expect that the error margins would show that you cannot distinguish these cases based on LCC. 2- Why the small differentiation between lifetime of 13 and 14 years?
WL	We did not do a sensitivity analysis yet. We followed the methodology and the methodology requires an LCC.
PVT	We know that there is a large margin of error, potentially larger than the differences we see. When we make policies, it is something that we should take care of that. This is also related to the statements made, that we lack some data and made assumptions. All the assumptions seems logic but lead to flat results.
CM	The differentiation of 13 and 14 years in service life only relates to the application and not to the battery. But this is a point that can be argued about.
RECHARGE - CC	You considered reuse as not business as usual (BAU) and took reuse as an example of extended lifetime. Can we expect when batteries can still provide service, that they will be not further used than in a second-hand car, where only the battery need to be reset or refitted. How can we differentiate on what is the BAU? I fully agree with that today it is too early to say that reuse of batteries does exist and what the business will be. But can we say that if we do not regulate this, not taken as an extended lifetime example, that it will never be naturally considered as BAU as long as the battery can be used and is fitted for its purpose? My point is that reuse is not really an example case of extended lifetime.
TH	First, we just wanted to analyse the effect of such a prolonged lifetime. Then, I am not quite sure if we can consider it as BAU. It is not simply working out of itself, some modifications have to be made. If you want to use the battery in another car, you have to know what the condition of the battery is, for instance the SoH. This type of information need to be extracted from somewhere like the battery management system. It's not just BAU like using it as long as it works, when putting it in another application some tests should be made before.
sonnen - FD	How do you extend the lifetime of a residential ESS? Because we compete with other manufacturers regarding longevity and if we just could add 20%, we would do that. What is the use case?
TH	We did not consider that for stationary application, as said in my presentation: reuse <u>might</u> be an issue for stationary.
sonnen - FD	But we have just saw a chart that it is the most attractive design option.
WL	Yes, it was on extending the first use of the battery system. Not sure about details behind it anymore.
TH	Was it not repurposing automotive batteries as stationary batteries?
WL	We will look in more detail on this, probably this was a result of working too much in parallel.
sonnen - FD	Let us follow up on that.
CS	I would like to reassure you that the intention of any eventual regulation is to put order in those electromobility batteries that are used in their second life in stationary applications, if at all, obviously not the other way around.
Danish Energy Agency - JeD	Question for clarification: you propose to have a database with the history of use parameters for the purpose of second life applications. Could this be transformed into a web-based market place for used batteries?

CS	First we need to put in place this product database and then we might consider commercial exploitation. It is a bit farfetched for the time being.
ECOS - AO	<p>Some fundamental questions on the scenarios chosen:</p> <ol style="list-style-type: none"> 1- On the pertinence in relevance to what they refer to, I think they are more adapted to EVs than stationary applications. For example energy density, very relevant for electromobility applications but not for stationary applications. Same as for, as already mentioned extended lifetime. 2- Regarding the higher energy density scenario, is it not already the biggest objective from the industry? And is not there already enough incentive to drive this. For me regulating this is questionable whether it will not be rather restrictive for something else, as it is already a big driver for industry. 3- Regarding the extended lifetime, I agree it is a big driver but I have trouble with a BC being reused rather than repurposed. Reuse fundamentally goes to the opposite of the scenario of a higher energy density. If we promote this like having batteries with less capacity but with the same weight in vehicles, then we have a lower energy density by definition. For me this is not the most pertinent scenario and not the most efficient either. In the results we see a lifetime extension of 3 to 4 years, whereas it is known that stationary applications can extend the lifetime of 10 years or more. I would really reconsider the BC for the extended lifetime scenario. 4- Regarding the low carbon energy mix for the production, is this not something that is too much an externality to be integrated in a product regulatory directive? I do not know of any precedent either of studying or treating the energy mix used to produce any good, and fixing any rules on that. Plus the difficulty, what was already mentioned by VITO, to identify the energy mix of every part of the production chain, indeed it is very difficult. Although I agree with the fact that the energy mix is probably the important factor of environmental impact of the battery, I am not sure this is something that can be put in a directive for a product. 5- Another point on the reuse design option, there is no argument for why we should take this BC. There is a graph mentioning the tripled distance travelled by vehicles compared to the age of the vehicles, I do not think this is pertinent either. A battery in a EV reaches end-of-life (EOL) not because it can go as far as in the beginning, but because it cannot have the same discharge rates. It has no point in reusing a battery in a car that does less kilometres, it is better to reuse it in a car that goes slower.
CS	Some words about the intention of an eventual regulation, that will not be to decide for the market but to help economic operators that want to reuse, recycle or repurpose batteries to take more informed decisions, without placing unreasonable big burdens on manufacturers. There is a balance their that needs to be striking, which we will attempt to do.
ANEC/BU EC - RP	<ol style="list-style-type: none"> 1- A quick response to sonnen about the lifetime, I think we need to consider that you offer a long warranty to your customers. It is part of your business model which might not be the case for other companies. So how can we make sure that all companies offer a long warranty to customers? 2- The design options in general are OK, but it would make sense lifetime extension not only as a second life extension but in general in a longer lifetime also of the first use of the battery. It is important to consider overall durability 3- I was wondering why you are focussing on only these three design options? Why not considered options like recycling and recovery of materials at the end are considered in Task 7 but not in 6. Perhaps partly due to limitations of the EcoReport and life cycle assessment (LCA) modelling of the end-of-life. It would be interesting to add a design option that deals with the benefits of better recycling and recovery. 4- The selection of the main leading impact category seems like a fast and rough selection based on some external cost assumptions. I would like see a better interpretation and

	reflection on the importance of different impact categories that goes beyond the fast selection that has been made.
Volvo - AAT	<p>I want to raise caution when talking about cycles, because they mean a lot of different things. Typically when we discuss this we have a clear view on what it is. Is it a constant current which comes from fully charged to fully discharged? This typically not how batteries are used in reality at all, definitely not in the automotive sector. And there is a big difference between hybrid and more electric-drive. If you insist of using cycles when talking about durability, then you have to define the cycle and its relevance to the application. Otherwise it is completely meaningless. What does it means when driving the car in another climate? Life and durability need to be looked at from a more complex perspective. Additionally as already pointed out by someone else, capacity fade if not the only EOL criteria: power fade, changes in electric efficiency, swelling, and other things are also aspects of durability.</p> <p>Regarding the comment of ANEC/BU EC of the state of charge window that we open, it actually is very determined by the lifetime and the modelling of lifetime we do. In terms of that, that has already been covered.</p>
ANEC/BU EC - RP	Cycles has been defined very clearly by the study team in the beginning and not according to the definition of a cycle you have just mentioned. There is of course a correlation between the cycles as defined within this study, not as how you just defined them and the overall lifetime of the battery.
HIU - JPe	Regarding the use phase, the results are very small compared to the overall. I was surprised because this does not fit with our results. I saw you have used a roundtrip efficiency of 96%, what seems very high to me very high actually. I would also like to ask the OEMs here if this roundtrip efficiency can be considered realistic.
Solarwatt, BVES - TT	<p>If I understood it correct that it is mainly for the end consumer market and no for commercially used large battery systems. For the end consumer market there is strong competition. If we would put out something here which would give an incentive to the manufacturers, then we also need to compare safety aspects. Safety aspect is missing at all, I know it is Ecodesign and not safety design but safety is not measurable today. It fulfils the safety standards or not.</p> <p>But following this, I would have a fantastic battery if I would use a high energy density, with less as material possible, so a round battery, So I would have a complete different incentive than when I want to build a save product.</p> <p>There is no consideration yet of the dramatically increase risk of cell internal failures. Which is currently the holy grail in battery safety worldwide.</p> <p>So I agree with the comment made earlier by sonnen that it is too early for this: you are raising and overlapping topics without considering safety, except for some comments when doing comparisons of the cathode materials. This really a concern.</p> <p>In addition in response to the comment by Volvo: you are right, the cycle topic not well taken into account. They say it is defined but it is definitely not. What you call cycles is a kind of an accumulation of cycle kWhs to full cycle equivalents without taken into account sub and micro cycles, and that the increase of cycles during a lower DoD is dramatically higher than the information you get from the better university.</p> <p>I am totally with you it is a very early stage where the standardisation guys are learning. The efficiency guideline was mentioned in one of your reports and in that context it took two years and a lot of research only to determine the cycles and the cycle profile.</p> <p>So I am really concerned when I look at your reliability of secondary sources. It will set the wrong incentive and motivation for battery designers, especially concerning safety.</p>
CS	We do count on standardisation community into help finding answers to some of the points.
Solarwatt, BVES - TT	A final comment on that, some definitions are not yet ready, as some are not easily to define, or some are so application specific that it makes no sense to write a standard. It is a critical

	approach.
CS	We have been here before with other products and standardisation requests sometimes do miracles.

12h50 Lunch break

13h55 Task 2 update and draft task 7 scenario calculations/sensitivity

Clemens Rhode (CR) presented updates of Task 2 and Antoine Durand (AD) Task 7(see PowerPoint)
 No questions were raised after this part.

14h20 Task 7 - policy options on performance criteria in the use phase

Grietus Mulder (GM) presented Task 7.1 policy measures regarding the use phase (see PowerPoint).
 Afterwards a discussion took place:

Acronym	Comment/answer
VARTA - FE	Question on the cycles of the residential ESS, you said you have to test 2000 cycles. So how long is the duration of the test? I calculated it roughly that it would take about 2 years to test. 2000 cycles to 0.5C is that until the system reaches EOL?
GM	We used the standard, in the standard there is a duration proposed of 12 hours/cycle. Based on that you can calculate.
VARTA - FE	But you have to come to 2000 cycles? The fastest time to get 2000 cycles is to permanently charging and discharging. Home storage systems have C-rates of 0.5 or something.
GM	By the way the way to perform the cycling is referred to the standard for stationary batteries, so it is not just about 0.5C. There it is about power and energy. There are criteria on how to do it, what their real EOL criteria are, and that you have to continue until EOL. We do not go until EOL, we say you need to perform a number of cycles at a certain moment.
VARTA - FE	But based on your slide, I understood that after 2000 cycles you will know the efficiency of the battery, so you will have to cycle the battery 2000 times. This will take 2 years or longer.
PVT	The test standard cycles might be too long, so maybe we have to recommend a review of these test cycles to go faster to a conclusion with another C-rate.
Tesla - JoD	These performance requirements, they look to me like solutions in search of the problem at least for E mobility. The use of auxiliary equipment is part of the battery pack performance, as such part of the energy performance of the vehicle, as such as mentioned by the cycle, as such influences the range and the costs of the vehicle, so there is already a big drive to internalize and minimize this as much as possible. So it would be would be double regulation and quite unnecessary. When looking durability, it is actually the same, manufacturers are falling over each other with offering warranties to convince people to buy EVs and if something is happening to the battery the manufacturer will take care of it. When looking at the warranty given by OEMs, they are very long which is not for nothing, because that is the way to sell EVs. For our first models we even had unlimited mileage on the battery pack. That is why my remark is this solution not in search for a non-existing problem?
GM	We agree on the fact that manufacturers are giving warranty at the moment although there is a lot of difference. We first thought about test methods for calendar life, but that would even take much more than two years. Or accelerating testing within two years, but without having the promise that it is really representative for what you want to do. That is the reason why we want to work with a warranty method.
Tesla - JoD	When you talk about warranty, the number of cycles is not really relevant. The real method is how long will the car last in terms of years and kilometres. So you can have a good battery and a terrible inefficient vehicle, but then you want get far with your battery due to the

	vehicle. If you want to regulate durability, then start with a matrix that actually address consumers' trust issues which is not cycles but the lifetime in terms of years and kilometres. So even conceptually how the proposal is written now, at least for E mobility, it should be more written towards a consumer-orientated way.
PVT	We proposed a dual approach based on warranty and battery pack testing. The cycles are only used for the battery pack tests. We think manufacturers already do those before bringing their products to the market. What we want to know are these test cycles really necessary? On the other hand we have the warranty per kWh delivered. Also Recharge stated, if I'm correct, to keep it simple, to keep it on the kWh or Wh, which is a possibility. But the thoughts on internal resistance of cars was related to the acceleration, the peak power that you can get, so it is not only about driving the mileage but also driving it comfortably. The efficiency was mainly for ESS, where we think if it is not efficient anymore, it is not useful to store energy anymore. Maybe we have to split this. The comment we also received ahead of this meeting was rather to simplify requirements than to make it more complex.
RECHARGE - CC	In support of what just has been said: it is probably too complex for two reasons. Firstly, to get the objective, because if you have a good performance on one criteria, a bad performance on the other one, and both are supposed to improve the lifecycle. How will you judge what is best? The number of criteria does not help, it would only make it more complex. Secondly, in addition to the complexity for the calculation, is the fact they maybe conflicting internally. Imagine that you have a very efficient thermal management system, which of course will use more energy, then you could say this energy management system is not good because it uses more energy. Because of this you will getting 30% life duration, because it is much better in managing energy. But what will you judge to each other as you have two internal conflicting criteria? That is why we say that the customer service is the most important, and the level of customer service that can be judge of a battery is the kWhs. Then the manufacturers can decide for themselves in which criteria they want to invest, it is not something to be decided by regulation.
GM	An answer to the heating and cooling, we covered that by the carbon footprint. That is what I raised as an important issue in the beginning of my presentation: that more energy will be used in the use phase but then the use phase could be longer. This will come out of the carbon footprint. You will have to show it as a selling point. You have to show that is worthwhile to do so. So it is taken into consideration.
Danish Energy Agency - JeD	I would like to support idea from Tesla that what we regulate is the end result rather than some specific details of a battery that no one can relate to. So it makes sense, to require a guaranty of the EV manufacturer in terms of years and kilometres. I do not know whether there should be a minimum but it should be visible what this guaranty is. And in terms of efficiency to copy what is available from ICE cars similar to how many kilometres per litre petrol or diesel, to have how many kilometres per kWh.
ECOS - AO	We believe that regulating warranty is something that already exists, it is not a new invention. It already exist for other electronic equipment, regulation asks for a two year warranty. It does make sense for us to have this, which should be established against specific criteria.
HIU - JPe	Maybe it is easy to just combine these two aspects. We know more or less what the CO2 emissions are of battery production. We can break this down into a maximum CO2 emission per kilometre during the warranty period.
PVT	This, linking carbon footprint to life time requirements, was also an idea we had, but we did not publish this. Because it would be too complex as a bonus-malus, but indeed it could work.
Solarwatt, BVES - TT	Only to compliment, it is not too different for ESS. It is also an matter of kWhs. This is the philosophy behind and stimuli to safety and other standards. It is about the objective and not the how to. It is strictly forbidden in safety standards to write how to. Here what counts for the costumer is definitely the kWh, if it needs protection than it would be from let us say

	<p>overestimations of start-ups that can have a funny view on battery aging when the use internet as a sort of conformation machine for whatever they believe. Cycle life and especially cycle tests that are taking longer has become a difficult issue. Accelerated aging has also become a difficult issues, as manufacturers even do not know how to perform them while they are the most advance in that.</p>
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14h50 Task 7 - policy options on sustainability for manufacturing/EOL

Paul Van Tichelen (PVT) presented Task 7.1 policy options on a broader scope viewing from the whole life cycle point of view (see PowerPoint).

Afterwards a discussion took place:

Acronym	Comment/answer
CS	<p>I would like a few words to the slide on the product database, i.e. on the candidate requirements for the product database. First of all, the opportunity to propose such a product database will be discussed in the impact assessment, which will included a cost-benefit analysis. Not a classic corporate cost-benefit analysis but a social-economic cost-benefit analysis where the cost impacts the manufacturers and the benefits are for the repairers, recyclers, consumers, and market surveillance inspectors. If the overall benefits outweigh the costs, the intervention will justified.</p> <p>Second of all, we realise that this information is commercially sensitive and the question is who will have access to what needs to be discussed. I will anticipate a discussion, perhaps in this formation, where we discuss with the stakeholders who has access to what information based on which needs.</p> <p>The good thing is that we do not need to start from scratch. There are precedents from DG ENER on a product database for energy labelling regulation for a number of products. The database is practically operational. If you are curious, in the energy labelling framework regulation there is the legal basis for the product database and has a short description of who has what access to what on a needs to know basis. So that is a good starting point for the discussions here for a potential product database for batteries placed on the market.</p>
Danish Energy Agency - JeD	<p>I see possible advantages of having this database, also because there is already something similar, except I have a question on the scale of the existing database. If I remember correctly, the existing database is for a number of types of products or product models, i.e. hundreds or thousands of data points per particular product. In this case it is for each individual battery that will have its particular information in the database, meaning millions of data points resulting in an enormous database. And that in itself of course could be a problem.</p>
Umicore - JTy	<p>Question on the link between the product environmental footprint (PEF) and CO2 use. If I remember well, RECHARGE can correct me if I am wrong, one conclusion of the PEF study was that the reliability or accuracy of the data was not good enough to use for policy measures, What do you intend to do to improve this quality? What would be the requirements to use the PEF as such in your approaches?</p>
DG Grow - MGa	<p>I formally lead the PEF exercises for the Commission, so I am interested where this reference comes from, because this is not what we have gathered as a conclusion from the 22 PEF pilots. To which data are you exactly referring to?</p>
Umicore - JTy	<p>I would like to ask Claude how was leading the project, was the problem on the use of proxies?</p>
RECHARGE - CC	<p>What can be said of the battery pilot is that we identified a lack of data for the real manufacturing processes of some of the battery components. And already mentioned by Jan (Umicore), we had to use proxies and based on very early sensitivity analysis that it might have a big impact or can be misleading on the real process impact particularly for several impact categories. A specific example is the lithium-hexafluorophosphate used in electrolytes,</p>

	currently there is no public available database that has the information on the required energy for the production.
CS	We are assuming that battery manufacturers and material suppliers are supportive of having this sort of requirements. If that is not the case, we need to know as soon as possible.
Umicore - JTy	I can confirm we are supportive but I think it is important to look at the embedded CO2 when the products come to the market. It should be reliable and also possible for crosschecks with non-EU producers.
DG Grow - MGa	To put the comment in context, so the problem is not the accuracy of the carbon footprinting profile of for example the energy mix of different countries. It is on the activity data of some of the specific processes which is missing.
PVT	To compliment, simplifying and focussing on carbon footprint can help and maybe identify some priority areas on which we need to agree. But we also are aware that LCA data is never used in such a policy context and we need to be very careful about it.
ANEC/BUFC - RP	<p>Going back to the question on the database, in general I think we can agree on having this information that is proposed can be important to facilitate lots of the actions we are talking about, especially with the regard to recycling but also on reparability. It is important that this proposal is included and that certain information requirements are needed.</p> <p>Regarding the comment that was given on the complexity of this kind of database is much higher than current energy labelling database, the way I understand is that the information that would be in this database is really per type of battery and not per specific battery performance. So it would not be on a different scale as the energy labelling database. But that the information of the specific battery performance will be available on the battery management system (BMS) and can be read as openly available information. So not in a central database, but information that can be read in the equipment itself. This is an important distinction to make it more feasible.</p>
CS	<p>Indeed the preliminary thinking is that the information will be per model of batteries placed on the market.</p> <p>Coming back on the carbon footprint, there is still a lot of thinking that needs to be done to accommodate this type of requirements in regulation. There are not many precedents. Issues related to data availability and quality and the type of verification need to be addressed and what the final legal solution would be is still unknown. A self-declaration is not an option. It will probably be a some kind of third-party submission system.</p>
ECOS - AO	<p>We strongly support the provision of an open BMS. We also suggest an alignment with existing and future standards created for battery reuse. There is very specific information of the UL 1974 requirements where Grietus talked about at a workshop on second life in Düsseldorf. We should make an effort to align with standards that allow to lift up barriers to battery reuse.</p> <p>We especially support providing this type of information, especially the carbon footprint to consumers.</p>
ECOS – MZ	An additional comment, about the minimum recyclability index. You mentioned that there are still standards that need to be developed. But what about the standards currently developed under Joint TC 10, the material efficiency mandate, why can that not be used?
JRC-EC - FM	Indeed the work of TC 10 will be useful for that, but there is still work needed on the database that is used for the calculations. Data on the recycling rate is needed for this specific product group.
Transport & Environment - LM	A comment on the metric for the carbon footprint, I was surprised it was not considered to have the footprint in grams CO2 per battery capacity. Because we want the standard on the production and it would be bit redundant to have the warranty period to look at the functional unit. This would be more adapted to an LCA approach when a typical use case is used. There is no guaranty on how this battery will be used. I think having a footprint in grams

	CO2 per battery capacity is more robust with less uncertainty than per kWh delivered. Secondly, I agree with RECHARGE and Umicore, that the PEF methodology should also be improved. So we welcome additional research on this topic for a wider regulation, where the scope could be extended and improved and includes also responsible mining.
PVT	Having the carbon footprint per battery capacity is a good approach, this information is included in the proposal.
HIU - JPe	Question regarding the focus on CO2 emissions and carbon footprint, as it is just one issue of environmental friendly technology and batteries. As far as I know the key sources of environmental impact is the mining phase, where it is not only CO2 that has a significant impact but also toxicity impacts. Secondly regarding EOL, when thinking in analogies with conventional vehicles, second and third life is talked about. But what actually happens with second or third life vehicles is that they are being exported to developing countries, where they are recycled and dismantled. Do you have any idea how to deal with this? Because of the toxics contained in batteries. For me a part of Ecodesign is also to ensure that these batteries are not exported for recycling and dismantling but are recycled under good environmental conditions. Lead acid batteries when they are dismantled in developing countries is really horrible. It should be thought about this.
PVT	Ideas on focussing on other aspects are welcome, but we need to know how we can make impact with a specific policy measure. We probably will look at more ethical issues in the top up study, so having a broader perspective than a traditional Ecodesign can be done with the top-up study. LCA has more aspects than the MEERp.
WL	When looking at environmental LCA these aspects are not included, but in a social LCA (S-LCA) it is. I was recently in a workshop on S-LCA and JRC told there are starting an S-LCA project on the sourcing of raw materials of batteries.
DG ENV - BL	Just on the aspect of third countries, there is already a legal framework. There are other directives and legislation that they cannot be exported according to the legal framework. This is an issue on the one hand of implementation. There are some provisions that are still missing. In the Batteries Directive, it is the requirement to be fulfilled to specify more what the conditions for equivalent treatment are in third countries where they are allowed to be exported to. To have another legal instrument that would not lead to changes in this aspects. There are certainly still discussions that need to be held, also because this is an international problem.
RECHARGE - CC	<p>Three comments:</p> <ol style="list-style-type: none"> 1- For the carbon footprint, as RECHARGE we still consider the PEF as the best scientific approach to assess the environmental impacts. We very much support the need to simplify and make it more robust for regulation. Not only to be charged to European countries but also countries outside of Europe that place batteries on the European market. 2- Regarding BMS with open data, I like to underline that some of the presented sentences here can be considered misleading. We do not say that we do not need information from the BMS, but we cannot consider that any information can be provided for free or can be read publicly. Which would not be sufficiently to enable recycling or refurbishing process. We are not saying that a BMS need to be completely closed, what type of information that can be disclosed need to be discussed. It should be based on much more professional information and safety information that cannot be disclosed publicly from the BMS. 3- Regarding the link in the table between design and construction requirements and the recycling, I do not think that it is realistically enough for today. We have to recognize that the recycling industry is still in its beginning, We are not in a position yet for deciding on the criteria for the design of a battery that will help or hinder the recycling of the battery. Some of the specific examples you have presented, like dismantling requirements or

	standardising interfaces, we think it is a very optimistic objective and we cannot agree with setting up some of these specific things.
CS	I am looking at some of the recycling companies in the room. Umicore, what do you expect from this regulation or anything to facilitate the recycling?
Umicore - JTy	<p>The revision of the Batteries Directive is a good tool for us to look at the possibilities to improve the recycling. What we put forward is that we first need to focus on the real issues. Today the objective is a weight percentage without specifying what the critical materials are that have to be recycled. So it seems is that today it is possible to reach the legal objective of 50%, we are recycling oxygen, carbon and irrelevant metals, and we are rejecting cobalt, nickel, etc. So we say you have to look at the metals that are important, lithium, cobalt, nickel and copper, which are the main objectives.</p> <p>Secondly, you can only recycle what have been collected. I know this project is about batteries for mobility, but for instance less than 10% of mobile phones and electronics are collected and recycled. A battery of a mobile phone has much more cobalt than an EV battery. You can have 3-5 times more of EV batteries in terms of kWh with 1 ton of electronic device batteries. Thus it is important to have more collection and to focus on real issues. These are our two major objectives, which can be dealt in the Batteries Directive. We do not think that Ecodesign has to solve these problems.</p>
DG ENV - BL	We just online published an evaluation report of the Batteries Directive. It includes issues you have just spoken of, like collection. Related to the current objective and how it fits in the current real framework is addressed. We need to see how to address future batteries. Regarding the bonus-malus, it is an aspect which is under the waste legislation that has been reviewed. Other aspects that are being reviewed: the extended responsibility roles of producers and modulated fees, meaning that producers need to pay in function of the recyclability. We need to see how the different instruments can work as a whole which is a hard exercise.
CS	On that, taken the advantage of the presence of legislators of some member states, notably France and the UK, if we were to introduce a recyclability index in the regulation to make modulated fees possible taken in the extended responsibility schemes under the Batteries Directive, would you be supportive of that idea? You do not have to give an answer now.
BIES - MT	As you said Cesar, we are not in a position to answer that in this precise moment. It will be something that we have to sit on.
Ministry of Ecology - TL	I have the same comment. What is the deadline to send in our comment on this topic?
CS	There are different deadlines to comment on the reports. What I am trying to make out is whether it makes sense to pursue requirements related to the recyclability of batteries having heard what we have heard from Umicore. If neither recyclers nor member states are interested, this would be a pure cost on manufacturers for the benefit of no one, to put this bluntly as a kind of take away I got from this discussion.
Tesla - JoD	We are best known as a manufacturer, but we have not always made it clear from the beginning that we are interested in closing at least our own loop. So we are also looking at recycling obviously and through that lens looking at this as well. When we look at recycling it is feedstock agnostic is a keyword. A proper recycling facility should be able to deal with anything. I am not sure if you impose requirements to battery packs sold in Europe so that they can be recycled whether that would be an incentive to create a world class recycling industry in Europe as well if they are only for battery packs made according to European specifications and not packs from elsewhere with no or other recyclability requirements. It is a question whether you are really helping. I completely agree with Umicore, the issue is not recyclability, it is fact that so many batteries and vehicles escape the system.

EEB - JPS	<p>Two points:</p> <ol style="list-style-type: none"> 1- I want to challenge the idea that the recycling industry can be products feedstock agnostic. We know of many other waste streams, which are much simpler than batteries, that it is more in the differences in the design of products that determines how much they can be recycled. This is something that colleagues from DG ENV can support. 2- Regarding inclusion of other environment impact categories within the consumer information, one option could be if we do use the PEF Category Rules to do this, is to provide a sheet of malus where batteries that perform well on the carbon footprint and potentially badly on other impact categories. So you can check this against the benchmark for other batteries on the market and if a battery performs badly that they can receive a malus. But there is an issue related to that, that some EOL aspects, like EOL vehicle exports, are not well captured in the current PEF method and need improvement.
CS	<p>You made an implicit reference to the weighting of different environmental impacts, which is a matter of other discussions but we will not go there today.</p>
SAFT - PdM	<p>There is already a big incentive to design, to some extent, for effective recycling. Why is this through extended producers responsibility that producers have to pay for the recycling? Right now, which is already going on for some time, the revenues from the metals we speak about are revenue generating streams when you recycle batteries. Those revenues do not cover the cost associated with collection, take back, dismantling and the actual recycling, so it is a net cost for entities that place batteries on the market. These entities try to cover those costs with their revenue, they do this by pushing the recyclers that are working for them to increase the amount of cobalt, nickel, copper extracted from the batteries to 90-99%. And they try to minimize the costs, the way to do so is to, to some extent, design in a way either to transport or dismantle the battery faster with less time and difficulties. Hopefully at some point in time the revenues will exceed the costs. So, build in an incentive to increase the recyclability through that mechanism of EPR (extended producer responsibility).</p>
CS	<p>That is all very well, but the idea that batteries which are less recyclable pay more into the EPR schemes still stands and is worth further discussions.</p>
DG ENV - BL	<p>We still have to adopt guidelines on the waste revision related aspects with the review of the EPR. So on one hand, yes, this is what is happening de facto. The idea that is implemented now is that the Commission establishes guidelines to support not only for batteries. We need to see what is said here, what is relevant and possible for batteries.</p>
ECOS - MZ	<p>Here we are looking at recyclability index but looking at disassembly is also useful. We have only heard one part of the story when listening to Umicore and it would indeed be interesting to have design features to enable easier disassembly.</p>
SAFT - PdM	<p>Yes and no, in the sense that disassembly is only a benefit if it brings value, either with easier recycling or easier maintainability. Disassembly per se is not a value, it is only a value if it creates savings somewhere. There is already to a large extent a big incentive to facilitate dismantling to the level that is necessary either for maintenance or recycling. It is not a necessity to go to the last screw. You disassemble for a goal.</p>
ANEC/BUCC - RP	<p>I have a comment on the scope, also taking the comment of Umicore mentioning the portable batteries and the importance having there and the challenge of collecting. It was decided to leave them out, because there were not relevant or so in this study. But they are obviously relevant. We need to make sure that this study is not framed in way that portable batteries are not relevant but just have been excluded from the scope of this study due to resource constraints or whatever but that it may very well be important to look at them in more detail in another study</p> <p>Second point, I understand the importance of looking closely at the relationship with the Batteries Directive and how they will work together. But maybe there is room for Ecodesign to complement.</p>

<p>Global Battery Alliance - ADe</p>	<p>Picking up on the comments around looking beyond just the carbon footprint and to inform you about some of the initiatives the alliance is working on: One is key performance indicators for sustainable or responsible battery management, looking at factors that already were mentioned, like sourcing of materials, recycled content, circular design, and design for reuse and recycling. Also social environmental factors around the sourcing of the materials, the working conditions, as well as greenhouse gas emissions are included. The alliance is currently working on a draft and we will share it with the study team. Also there is work around which links in with the battery information item in the report. The alliance is looking into a potential, that the alliance calls ‘battery material passports’ that hopefully will address some of the information about battery history, charging, etc. It is still a draft, so we welcome comments and more involvement from the stakeholders.</p>
<p>APPLiA - GZ</p>	<p>Coming back to the comment made by ANEC/BU EC and the recommendation made by the consultant at the beginning, we like to support and reinforce it for the following reasons: We do understand the need of ANEC/BU EC to investigate the small capacity battery, however it is pretty clear from this study that the real energy and environmental benefit relies on high capacity batteries and even if there is a need to investigate small capacity batteries other products that should be done in a separate preparatory study where all stakeholders can be involved and where the scope is clear. We would like to enforce that, as all our products are covered by other Ecodesign requirements. So we also see the risk of encountering double regulation if this is not communicated in the correct way.</p>
<p>CS</p>	<p>The impressions I get is that there is more support for some of the sustainability requirements than performance requirements. This is in line with our preliminary vision on how this regulation could look like in the sense that we are aware that this is an emerging market where technologies are being developed fast. The matter of the regulation will not be prescriptive of how batteries should be build but more about rewarding batteries that are more sustainable. If we get that right then the regulation will be an enabling interface with other policies, whether this are EPR schemes, fiscal incentives or any other policies measures on other levels that do not have to be necessarily on EU level.</p>

16h00 AOB, conclusion and next steps

- PVT: the deadline for comments are on the website <https://ecodesignbatteries.eu/>: 22th of May for Task 6 and 24th of May for Task 7. Please use the form but we also welcome position papers. We will make descriptions of the position papers.
- CS: as mentioned at the beginning, there is a top-up study on its way. Key words are: carbon footprinting, responsible sourcing and technology neutrality. There probably will be an additional stakeholder meeting around those tasks. The intention is to combine that meeting with another go to discuss the reports of this study in the Autumn. The announcement will be made via the project website.
- CS: We will also start the work on standardisation request to the European standardisation organisations in the coming weeks. How this works: this will co-evolve with the findings of the study, drafting of the regulation, and accompanying impact assessment. It takes a good part of one year to have a standardisation request adopted by the colleagues and accepted by CEN-CENELEC-ETSI. So it is time to get started. Not every is clear yet about what needs to be standardised. There will be opportunities for stakeholders to get involved in the drafting of the standardisation request, notably through a sectorial consultation and consultation through CEN-CENELEC-ETSI. This should happen in second half of this year.

Acronym	Comment/answer
BEUC ANEC - AM	Do I understand correctly that the next study will be launched in the coming weeks, and if so, does it fall under the same system of consultation that Ecodesign falls under, will we be

	invited to sit together for providing comments, how does it work?
CS	Yes and no. It will not be an Ecodesign type of study. We need additional evidence and data on the additional aspects of carbon footprint, responsible sourcing, and technology neutrality. So we are making additional resources available to produce that evidence and data. There will be at least one stakeholder meeting, presumably before the end of the year. We will take advantage of that meeting to come back to some of the findings of the other study.
ZVEI - CE	Will the standardisation be linked to what we say today, what will it be about? We heard so many things today.
CS	From past experience, the list of requirements in the regulation tends to be a subset of the requirements we saw today. Only some of the requirements will make it to the final cut, not yet knowing which ones it will be as it requires more discussions inside the Commission but also with stakeholders. There are obvious candidates. I think we need some sort of European standard to determine the SoH. We probably need an European standard to determine roundtrip efficiency and a number of the other requirements we saw. The same about access to the BMS, what does it means that the access is partially open and on which basis. However, for the carbon footprint, we still need to take a decision. It probably will not go into the direction of a harmonised standard. We will find an another instrument to accommodate that in the regulation. To answer your question we may play safe by including more requirements in the standardisation request than you will find in the final regulation.

16h05

Cesar Santos thanked the participants for their contributions and closed the meeting.

Annex

The PowerPoint presentation of the meeting are available at the project website: <https://ecodesignbatteries.eu/documents>