**Terms of Reference: Assessing the environmental and social impact of rising demand for minerals for battery technology**

**Background**

WWF and Greenpeace are promoting greater uptake of electric vehicles (EVs) in the UK and across Europe, to both reduce carbon emissions in line with the ambition of the Paris Agreement, and to support the reduction of air pollution to safe and legal limits.

The Paris Agreement requires the near-total decarbonisation of the energy sector, with increasing contributions from variable wind and solar technologies balanced out by a range of behavioural and technical solutions, including battery storage.

Batteries are therefore a critical technology for the UK’s low carbon transition, for both EVs and stationary power storage. They will also be important in many other countries around the world as they seek to meet their Paris Agreement commitments and air quality objectives.

However, battery production requires minerals, such as cobalt and lithium for lithium ion batteries, and mineral extraction can often have detrimental social and environmental impacts. It is important to manage the increase in demand for batteries to minimise the risk of undermining broader sustainable development objectives.

This research project will assess the potential risks for people and nature arising from a surge in battery demand, and inform policy recommendations to mitigate these risks.

**Project scope and purpose**

This project seeks to assess the risks for people and nature arising from a surge in battery demand. WWF and Greenpeace have already undertaken desk-based research into the subject (which we will make available to the supplier), highlighting concerns with lithium ion battery production, particularly the environmental impacts of lithium extraction in South America and the social impacts of cobalt extraction in the Democratic Republic of the Congo (DRC). This project will determine the scale of these risks and inform policy recommendations to mitigate them.

We expect the assessment to be delivered in the form of a written report (pdf) and summary presentation (ppt). We may opt to publish the report in full, and/or to produce separately branded materials highlighting the report’s key conclusions.

**Project specification**

This project will answer the following questions. We anticipate the research involving literature review, spatial analysis and stakeholder interviews, but we are open to considering other research methodologies as well. WWF will offer access to the WWF-SIGHT tool to support spatial analysis. WWF-SIGHT monitors extractives information for mining claims in 72 countries and mining projects in 159 countries (but does not include artisanal mining).

1. **Battery technology**
	1. What is the expected demand for various battery technologies (e.g. lithium ion, solid state, etc.) over the next 5, 10, 20, 30 years? The research should consider global, European and UK demand, taking into account anticipated technology developments e.g. potential for reduced need for cobalt in future battery designs.
	*[Suggested research method: literature review]*
	2. What are the main technical differences (if any) between EV batteries and batteries designed for stationary storage (either domestic or grid scale)? *[Suggested research method: literature review]*
	3. What are the natural resource requirements for each of these battery types, and is supply of these resources likely to be able to meet demand?
	*[Suggested research method: literature review]*
	4. Where are these resources (e.g. lithium, cobalt) likely to be sourced, both at present and in the coming years as demand for battery storage increases?
	*[Suggested research method: spatial analysis supported by WWF-SIGHT]*
	5. Which are the key private and public sector entities undertaking and setting the conditions for extractive activity for the target resources in these areas?
	*[Suggested research method: literature review]*
2. **Environmental and ecological impacts**
	1. Which areas identified in 1d overlap with areas of ecological importance? We propose defining such areas according to the [IUCN Protected Area Categories](https://www.iucn.org/theme/protected-areas/about/protected-area-categories) and the [World Database of Key Biodiversity Areas](http://www.keybiodiversityareas.org/home).
	*[Suggested research method: spatial analysis supported by WWF-SIGHT]*
	2. What are the main direct and indirect environmental risks associated with extraction of the target resources (e.g. lithium) in these areas?
	3. How can extractive activity for the target natural resources (e.g. lithium) in these areas be undertaken so as to minimise environmental damage?
3. **Social, ethical and human rights impacts**
	1. Which areas identified in 1d fall are associated with a risk of social, ethical and human rights abuses in the supply chain (e.g. child labour)?
	*[Suggested research method: literature review]
	[Spatial analysis would be useful but WWF-SIGHT does not include social risk categories]*
	2. What are the main direct and indirect social risks associated with extraction of the target resources (e.g. cobalt) in these areas? Indirect risks include, for example, financing of deforestation and armed conflict.
	*[Suggested research method: literature review]*
	3. How can extractive activity for the target natural resources (e.g. cobalt) in these areas be undertaken so as to minimise social harm (and avoid a “resource curse” situation)?
	*[Suggested research method: literature review]*
4. **Policy recommendations**

*[Suggested research methods: literature review and stakeholder interviews e.g. Amnesty International]*

* 1. What criteria should EV purchasers (including governments) place upon their suppliers to ensure that batteries have been sustainably produced?
	2. What approaches have a realistic chance of improving the environmental and social performance of extraction?
	3. Should responsible corporations and civil society focus on shifting battery technology away from problematic supply chains, or on improving these supply chains?
	4. Are existing best practice guidelines and certification schemes sufficiently robust to effectively address these concerns, or are new ones needed?

**Key deliverables and indicative timeline**

* Wednesday 20 June: Deadline for proposals
* Tuesday 26 June: Communication of chosen proposal
* Friday 29 June: Terms agreed between project group and supplier
* W/C 2 July: Kick-off meeting
* 2 July- 30 July: Research period – fortnightly check-ins with project group
* Tuesday 31 July: Delivery of draft report (pdf and ppt)
* 1 August- 15 August: Review period for project group
* 16 August- 30 August: Revision of draft report to address comments
* Friday 7 September: Delivery of final report (pdf and ppt)
* Tuesday 11 September: Zero Emission Vehicle Summit at which the project group may choose to use evidence from the report.

**Payment arrangements**

We invite respondents to indicate their budget requirements for this project in their proposals, ideally itemised according to the various questions in the Project Specification. Our normal process is to make 100% of payment upon delivery of the products requested.

**Contact details**

* WWF
	+ Dani Bates, Climate & Energy Specialist: DBates@wwf.org.uk
	+ Laura Garcia-Velez, Spatial Intelligence Analyst: LGarciaVelez@wwf.org.uk
* Greenpeace
	+ Paul Morozzo, Clean Air Campaigner: pmorozzo@greenpeace.org
	+ Barbara Stoll, Clean Air Now Campaign: barbara.stoll@greenpeace.org

**Reading list**

* Amnesty International 2017: The Dark Side of Electric Cars: Exploitative Labor Practices. Available at: <https://www.amnesty.org/en/latest/news/2017/09/the-dark-side-of-electric-cars-exploitative-labor-practices/>
* CoG3 Consortium: Investigating the recovery of cobalt. Available at: <http://www.nhm.ac.uk/our-science/our-work/sustainability/cog3-cobalt-project.html>
* Levin Sources 2017: GREEN ECONOMY SERIES: SOLAR PHOTOVOLTAIC AND ENERGY STORAGE IN THE ELECTRIC GRID. Available at: <http://www.levinsources.com/publications/green-economy-solar-panels-energy-photovoltaic-minerals-metals>
* MarineE-tech. Available at: <http://projects.noc.ac.uk/marine-e-tech/>
* World Bank 2017: The Growing Role of Minerals and Metals for a Low Carbon Future. Available at: <http://documents.worldbank.org/curated/en/207371500386458722/pdf/117581-WP-P159838-PUBLIC-ClimateSmartMiningJuly.pdf>
* WWF 2014: Critical materials for the transition to a 100% sustainable energy future. Available at: <http://awsassets.panda.org/downloads/critical_materials_report___jan_2014_lr.pdf>