

# DELIVERABLE REPORT

**VALHALLA**



## Ethics assessment of the consortium

**Deliverable D7.4  
June-2023**

**PREPARED BY  
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VALHALLA aims to develop perovskite solar cells and modules with power conversion efficiencies above 26 % (modules > 23 %) and extrapolated operational lifetime > 25 years, following an eco-design approach: employing harmful-solvent-free perovskite deposition, optimized use of materials, circularity, recyclability, scalable and low-cost manufacturing processes, to create a viable economic pathway for the European commercialization of this sustainable technology.

VALHALLA is formed by a multi-disciplinary consortium: 12 partners from 8 European countries; 3 industrial partners & 9 RTOs, covering the whole value chain of innovation from research centres to technology providers, end-users and market and policies.

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ICARES CONSULTING	BI	BE
ARK METRICA LTD	ARKM	UK
CSEM CENTRE SUISSE D'ELECTRONIQUE ET DE MICROTECHNIQUE SA - RECHERCHE ET DEVELOPPEMENT	CSEM	CH



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### 1. Executive Summary

#### 1.1. Description of the deliverable content and purpose

The aim of this document is to describe the outcome of the ethics self-assessment of the VALHALLA consortium and project. As such, it is based on the Horizon Europe “How to complete your ethics self-assessment” (version 2.0 from May 13th 2021). Three main areas were identified as relevant for VALHALLA, namely; “Personal data”, “Non-EU countries” and “Environment, health and safety”. Finally, we also assessed the “potential of misuse of results”.

#### 1.2. Relation with other activities in the project

The ethics assessment has relationship with all other activities of the project, but most notably with WP1, WP5 and WP6.

## 2. Results of the ethics self-check

### 2.1. Personal data

Under the ethics provisions of the Grant Agreement, personal data must be processed in accordance with principles and conditions that aim to limit the negative impact on the persons concerned and ensure fairness, transparency and accountability of the data processing, data quality and confidentiality, as set out by EU General Data Protection Regulation 2016/679 (GDPR).

Personal Data is information relating to an identified or identifiable natural person and can include names, email addresses, online identifiers or refer to characteristics specific to an individual.

With regards to the Ethics Issues Checklist for EU Grants, for Personal Data, we can declare the following:

Our activity DOES NOT involve:

- the processing of special categories of personal data (e.g. sexual lifestyle, ethnicity, genetic, biometric and health data, political opinion, religious or philosophical beliefs).
- profiling, systematic monitoring of individuals, or processing of large scale of special categories of data or intrusive methods of data processing (such as, surveillance, geolocation tracking etc.).
- the processing of personal data related to criminal convictions or offences.

It is NOT planned to:

- export personal data (data transfer) from the EU to non-EU countries
- import personal data (data transfer) from non-EU countries into the EU or from a non-EU country to another non-EU country.

Our activity DOES involve a limited amount of:

- processing of personal data
- further processing of previously collected personal data (including use of pre-existing data sets or sources, merging existing data sets).

The use of Personal Data is not for direct research purpose, but is rather related to Management, Communication, Dissemination and Exploitation tasks. Principles of GRDP will be respected and data will only be used for its specified purpose.

#### **Types of personal data collected.**

The main types of personal data that will be collected are First and Last Names, email address, Organisation name. Digital video and audio recordings may be made.

#### **Processing of personal data.**

Within the Valhalla project, Personal Data will be collected, processed and/or accessed in different contexts. All personal data is managed according to EU GDPR and national data laws. Specific usage of personal information is detailed below and concerns:

- Personal non-sensitive data of project partners
  - o for managing access to meetings, project resources and tools
  - o digital audio and video recordings of project meetings
- Personal data of other individuals
  - o for managing access to the project website, project newsletters and project events
  - o as written, digital audio and video recordings and documentation of project events

Project partners mailing list

- The project partners mailing list, [valhalla@llestes.uv.es](mailto:valhalla@llestes.uv.es), is managed by UVEG and hosted on

Microsoft Teams. As a Microsoft service, it is compliant with EU GDPR policies.

- Personal information is collected and processed for the purpose of allowing efficient communication to all partners on project partners and information storage is limited to the duration of the project and audit period.

#### Project Website

- The project website is accessed via <https://valhalla-solar.eu/> and is managed by BI.
- Personal data collected on the website are stored on the servers of the host as detailed in the Privacy Policy: <https://valhalla-solar.eu/privacy-policy/>. The website external service provider (host) is OVH Cloud (France).
- Personal information is collected and processed for the purpose of guaranteeing the error-free provision of the website. Other data may be used to analyse user patterns or subscribe users to the project newsletter or project events. Information storage is limited to the duration of the project and audit period.

#### Project newsletter recipients

- The project newsletter is sent to project partners subscribed to the project mailing list, but also to individuals that have requested a subscription through an opt-in link (on the project website, and included in the newsletter). The subscription list and email addresses are managed by BI.
- Personal information is collected and processed for the purpose of allowing efficient communication to individuals that opt-in to the newsletter and information storage is limited to the duration of the project and audit period.
- Project events participation lists
- Workshops and conferences are planned within the project. For these events, personal data will be collected and processed to manage attendance. Email correspondence with participants is managed through each partner organisations email service in accordance with company standards and will comply with EU data privacy policies. Each partner organising an event is responsible for managing personal data collected and processed when organising project events. Previously collected data sets (contact lists) will be used to invite people in relevant positions and industries to events.
- Personal information is collected and processed for the purpose of allowing efficient communication to individuals registered for an event and is limited to the duration of the project and audit period.
- Personal information may also constitute digital video and audio recordings. All participants recorded will be required to authorise (or not) the project to record and, if appropriate, transmit their video or audio recordings. Event organisers will track and maintain consent procedures and forms for the duration of the project and audit period.

#### Personal Data Storage and Protection

Personal Data will be stored for no longer the duration of the project and audit period, as necessary, on project partner data storage (Microsoft for UVEG, BI, the main collectors of personal data for the project) that are compliant with security and protection requirements.

#### Ethics Self Assessment

4 PROTECTION OF PERSONAL DATA	YES/NO	Documents to be provided on request
Does your activity involve processing of personal data?	YES	1) Informed consent forms and information Sheets (if relevant). 2) Data management plan (if relevant). 3) Data protection impact assessment (if relevant).

Does it involve the processing of special categories of personal data (e.g. sexual lifestyle, ethnicity, genetic, biometric and health data, political opinion, religious or philosophical beliefs)?	NO	
Does it involve processing of genetic, biometric or health data?	NO	1) Declaration confirming compliance with the laws of the country where the data were collected
Does it involve profiling, systematic monitoring of individuals, or processing of large scale of special categories of data or intrusive methods of data processing (such as, surveillance, geolocation tracking etc.)?	NO	1) Opinion of the data controller on the need for conducting data protection impact assessment under art 35 GDPR. (if relevant).
Does your activity involve further processing of previously collected personal data (including use of pre-existing data sets or sources, merging existing data sets)?	YES	1) Confirmation that the data controller has a lawful basis for the data processing and that the appropriate technical and organisational measures are in place to safeguard the rights of the data subjects 2) Permission by the owner/manager of the data sets (e.g. social media databases) (if applicable). 3) Informed Consent Forms + Information Sheets + other consent documents (if applicable)."
"Is it planned to export personal data (data transfer) from the EU to non- EU countries? Specify the type of personal data and countries involved"	NO	1) Confirmation that data transfers will be made in accordance with Chapter V of the General Data Protection Regulation 2016/679
Is it planned to import personal data (data transfer) from non-EU countries into the EU or from a non- EU country to another non-EU country? Specify the type of personal data and countries involved	NO	1) Confirmation of compliance with the laws of the country in which the data was collected.
Does your activity involve the processing of personal data related to criminal convictions or offences?	NO	1) Opinion of the data controller on the need for conducting data protection impact assessment under art 35 GDPR (if relevant).

## 2.2. Third countries

The consortium includes three partners from outside the EU. These are CSEM (Switzerland), University of Oxford (UK) and Arkmetrica (UK). The participation of these partners in the project is essential to successfully carry out the project due to their expertise in deposition methods upscaling and module fabrication, which was pivotal for the success of our previous PERPTV project and is not available otherwise in the consortium. All these partners will maintain the same rigorous ethics standards as the

EU partners. This will be ensured by the coordinator. There is no risks in visiting either of these countries in the framework of the project. Sample exchange between these partners and the EU partners is foreseen but will be limited to semiconductor films on glass and flexible substrates and thin film small area solar cells. These research samples will be shipped in specially designed sample holders. The sample holders are designed to prevent the samples to get in contact with ambient atmosphere and will be sealed inside inert conditions and only opened at the partner site when again in inert conditions. In this way we can exclude that the samples will get in direct-contact with any non-qualified person that may be involved in the shipping of the samples.

6 THIRD COUNTRIES	YES/ NO		Information to be provided in the proposal	Documents to be provided on request
<p><b>Will some of the activities be carried out in non-EU countries?</b> <i>Specify the countries: Switzerland and UK</i></p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>1) Countries involved. 2) Risk-benefit analysis. 3) Details on activities are carried out in non-EU countries.</p>	
<p><b>In case non-EU countries are involved, do the activities undertaken in these countries raise potential ethics issues?</b> <i>Specify the countries Switzerland and UK</i></p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>1) Details on the materials and the countries involved.</p>	<p>1) Copies of ethics approvals and other authorisations or notifications (if required).  2) Confirmation that the activity could have been legally carried out in an EU country (for instance, an opinion from an appropriate ethics structure in an EU country).</p>
<p><b>Is it planned to use local resources (e.g. animal and/or human tissue samples, genetic material, live animals, human remains, materials of historical value, endangered fauna or flora samples, etc.)?</b></p>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<p>1) Details on the type of local resources to be used and modalities for their use.</p>	<p>1) For human resources: copies of ethics approvals. 2) For animals, plants, micro-organisms and associated traditional knowledge: documentation showing compliance with the UN Convention on Biological Diversity (e.g. access permit and benefit sharing agreement).</p>
<p><b>Is it planned to import any material (other than data) from non-EU countries into the EU or from a non-EU country to another non-EU country? (n/a for EDF)</b></p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<p>1) Countries involved. <i>Switzerland and UK</i> 2) Details on the type of materials to be imported.</p>	<p>1) Copies of import licences/ Material Transfer Agreement (MTA).</p>



For data imports, see <a href="#">section 4</a> .				
For imports of human cells or tissues, see <a href="#">section 3</a> .				
Specify the material and countries involved			UK, Switzerland Thin semiconductor films, small area solar cells for testing	
Is it planned to export any material (other than data) from the EU to non-EU countries? (n/a for EDF) For data exports, see <a href="#">section 4</a> .	X	<input type="checkbox"/>	1) Countries involved. 2) Details of the type of materials to be exported.	1) Copies of export licences/ Material Transfer Agreement (MTA).
Specify the material and countries involved			UK, Switzerland Thin semiconductor films, small area solar cells for testing	
Does your activity involve <u>low and/or lower-middle income countries</u> ? (n/a for DEP)	<input type="checkbox"/>	X	1) Details on the benefit sharing measures.	
If yes, detail the benefit-sharing actions planned			2) Details on the responsiveness to local needs.	
			3) Details on the procedures to facilitate effective capacity building.	
Could the situation in the country put the individuals taking part in the activity at risk? (n/a for DEP)	<input type="checkbox"/>	X	Samples will be shipped using specially designed sample holders that prevent any contact with ambient air.	1) Insurance coverage (if relevant)

### 2.3. Environment, health and safety

This section concerns:

- the health and safety of the persons involved
- the protection of the environment

With regards to the Ethics Issues Checklist for EU Grants, for Health Safety and the Environment, we can declare the following:

Project activities DO NOT involve the use of

- deal with endangered fauna and/or flora / protected areas

Project activities DO involve the use of

- substances or processes that may cause harm to humans, including those performing the activity during the implementation of the activity, or during the deployment of the technology

### **Health and Safety for humans**

The project develops novel semiconductors, both organic and inorganic in nature which involves the use of chemical synthesis in well-equipped laboratories operated by skilled and trained scientists. In view of the presence of lead in the inorganic semiconductors additional safety protocols have been developed by the project partners. Disposal of chemicals including lead containing products will be done in accordance with the national legislation of the consortium partners.

Standard personal protective equipment will always be used; in the case of handling of hazardous chemicals, these will be adapted following the indications in the respective safety datasheets. These will be examined prior to the activity and filed in the lab to be readily accessible to any researcher in the working place. Only authorized users will be granted access to the lab and allowed to use research equipment and handle hazardous chemicals.

#### Minimising exposure in the labs

All materials and device preparation will take place in chemical flow hoods, fume hoods, glove boxes or in vacuum chambers, minimising risk of exposure to researchers. Personnel will wear personal protective equipment (gloves, clean room suits and goggles) to minimising the risk of exposure to lead and other chemicals employed. Waste chemicals will be disposed of following standard safe practices in the countries in which the research is taking place and will not be put into domestic waste. Because of the nature of the materials used, specific attention will be given to the lead leaching tests to ensure that all national and European safety precautions and regulations are met.

### **Environmental impact**

Our project strongly supports the “do no significant harm” ambitions concerning all six environmental objectives of the EU Taxonomy Regulation No 2020/852. The projects goals aim to produce perovskite devices with lesser environmental impacts than current state of the art perovskite solar devices through a series of actions including:

- Use of less harmful solvents
- Use of less indium per kWh generated
- Manufacturing processes with lower GHG emissions
- Better fixing of lead in encapsulants to ensure zero leaching of lead during use phases
- Circularity design to recover and re-use lead
- Longer lifetimes

The project will assess the impact of lead on the environment, as detailed in WP5 “Environmental hotspots, Circularity”.



7 ENVIRONMENT, HEALTH AND SAFETY	YES/NO		Information to be provided in the proposal	Documents to be provided on request
<p>Does this activity involve the use of substances or processes (or technologies) that may cause harm to the environment, to animals or plants (during the implementation of the activity or further to the use of the results, as a possible impact)?</p> <p>For activities involving animal experiments, see <a href="#">section 5</a>.</p>	<input type="checkbox"/>	<b>X</b>	<p>1) Risk-benefit analysis. 2) Show how you apply the precautionary principle (if relevant). 3) Details on safety measures to be implemented.</p>	<p>1) Safety classification of laboratory. 2) Copy of GMO and other authorisations (if required).</p>
<p>Does this activity deal with endangered fauna and/or flora / protected areas? (n/a for DEP)</p>	<input type="checkbox"/>	<b>X</b>	<p>1) Details on endangered fauna and/or flora / protected areas.</p>	<p>1) Specific authorisations (if required).</p>
<p>Does this activity involve the use of substances or processes (or technologies) that may cause harm to humans, including those performing the activity (during the implementation of the activity or further to the use of the results, or the deployment of the technology as a possible impact)?</p> <p>For activities involving human participants, see <a href="#">section 2</a>.</p>	<b>X</b>	<input type="checkbox"/>	<p>1) Details of the health and safety procedures.</p>	<p>1) Safety classification of laboratory. 2) Host Institution safety procedures.</p>

#### 2.4. Crosscutting issue: potential misuse of results

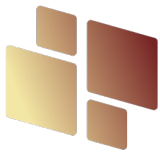
This section concerns projects with activities that involve or generate materials, methods, technologies or knowledge that could be misused for unethical purposes.

Project activities that could in an unforeseen manner lead to a potential unethical misuse of results are:

- the development of materials/methods/technologies and knowledge that could harm humans, animals or the environment if they were released, modified or enhanced

The project performs a life cycle analysis to identify potential risks and methods to prevent this as specified in WP5 of the project.

The only other risk is the mis-use of chemicals from a chemistry laboratory of one of the partners. This is a very low risk as it is very unlikely this would happen. Hazardous materials are monitored and materials income and outcome is registered. Additionally, only scientist with a working contract will



participate in the research of the project. The contractual terms ensure that misuse of hazardous compounds is very unlikely.

### 3. Conclusions

The consortium has done an extensive self-assessment of the ethical standards focussing on the following areas; “Personal data”, “Non-EU countries” and “Environment, health and safety”. The consortium has concluded that it does abide to the ethical criteria are met. To prevent risk of any harm coming to humans working in relation to the project, safety and disposing measures are in place. To prevent contamination with toxic substances when transferring research samples from one partner to the other a specially sealed transfer container has been designed that ensure zero contact with persons handling the shipment. The project has as an important outcome, the evaluation of the effect on the environment, which is described in detail in WP5.

### 4. References

IEEE style (<https://ieeauthorcenter.ieee.org/wp-content/uploads/IEEE-Reference-Guide.pdf>)  
example:

- [1] T. P. White, N. N. Lal and K. R. Catchpole, "Tandem Solar Cells Based on High-Efficiency c-Si Bottom Cells: Top Cell Requirements for >30% Efficiency," in *IEEE Journal of Photovoltaics*, vol. 4, no. 1, pp. 208-214, Jan. 2014, doi: 10.1109/JPHOTOV.2013.2283342.