

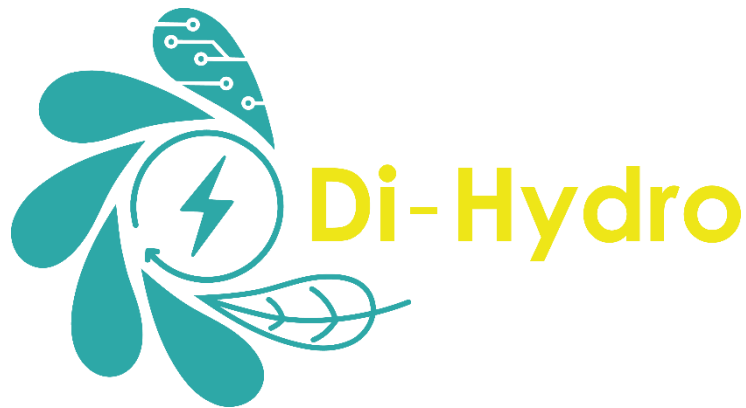


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**HORIZON EUROPE FRAMEWORK PROGRAMME – TOPIC HORIZON-CL5-2022-D3-03**

*Sustainable, secure and competitive energy supply*



### **Di-Hydro**

*Digital maintenance for sustainable and flexible operation of HYDROpower plant*

*Grant Agreement No. 101122311*

*Starting date: 1<sup>st</sup> October 2023 – Duration: 36 months*

### **Deliverable D7.2**

**Social, Ethical, Legal, Privacy issues identification and monitoring**

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1	30.09.2024	Alkiviadis Tromaras, CERTH Vasilios Kappatos, CERTH	Final review, version ready for submission

## SHORT ABSTRACT FOR DISSEMINATION PURPOSES

### Abstract

D 7.2 Social, ethical, legal, privacy issues and identification and monitoring, provides an overview of ethical issues' requirements related to activities of the Di-Hydro project and provides the framework for compliance.



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## ABBREVIATIONS

Acronym	Description
AI	Artificial Intelligence
D	Deliverable
DT	Digital Twin
EU	European Union
GDPR	General Data Protection Regulation
GPAI	General Purpose Artificial Intelligence
HP	Hydropower
HPP	Hydropower Plant
WP	Work Package

## EXECUTIVE SUMMARY

The current deliverable provides the first iteration for D 7.2 Social, ethical, legal, privacy issues and identification and monitoring. The document provides an overview of any ethical issues related to the activities of the Di-Hydro project (within its lifecycle and beyond) and describes how regulatory compliance will be ensured.

Activities of the project include data sharing and storage either of private (limited cases) or confidential hydropower power plant data as well as usage of general purpose artificial intelligence AI (GPAI) systems. An internal ethical assessment has been carried out leading to the identification of the ethical considerations within each project work package and its related tasks. Finally, the deliverable describes the implications of using general purpose AI systems or using in general AI models in the project and what considerations need to be taken by the project when users interact with such systems, according to the new European AI Act.



## 1. INTRODUCTION

Europe possesses significant hydrodynamic potential due to its diverse altitude landscape and surrounding seas. However, only a small fraction (13.8%) of the EU's net electricity generation comes from hydropower plants (HPP). This low utilisation is primarily attributed to inadequate digital management, handling, and maintenance of HPPs compared to other energy generation methods. To fully harness this potential and bolster renewable energy production for a climate-neutral economy, Di-Hydro aims to digitise HPPs by developing smart devices and data acquisition techniques to predict and control operations and maintenance. Digital Twins (DTs) will facilitate real-time data exchange, alongside an intelligent decision-making tool for optimal coordination of power generation considering societal, weather, water flow, environmental, and biodiversity data.

The current document, Deliverable 7.2 “Social, Ethical, Legal, Privacy issues identification and monitoring”, provides the first iteration of an overview of social, ethical, legal and privacy requirements related to activities of the Di-Hydro project and provides the framework for ethics compliance. A second iteration of D 7.2 will be delivered at the end of the project (M36) on September 2026.

### **1.1 AIMS & OBJECTIVES OF THE DELIVERABLE**

The aim of D 7.2 is to identify the obligations and responsibilities of the Di-Hydro project consortium towards social, ethical and legal restrictions, concerning compliance with responsible ethical or private data sharing, usage or re-use, including other aspects related to digital twins, decision support systems and use of general purpose AI systems. The deliverable identifies the ethical principles and standards, that the project and the people involved, must adhere to in the project’s lifecycle and beyond.

## 2. Identification of social, ethical, legal and privacy issues

Di-Hydro project has social, ethical, legal and privacy issues which are related to the implementation of the project. These will be discussed both within this deliverable, as well as its 2<sup>nd</sup> iteration at the end of the project. Another relevant deliverable is D 7.1 “Project, data and risk management plan” also covers issues regarding data confidentiality, security, protection, storage and handling. The Di-Hydro project does not envisage any ethical or data privacy issues to arise in relation to personal data collection as well as Consortium dissemination activities (e.g., podcasts, potential interviews with stakeholders or any specialised workshops). Any activities involving and engaging people outside the Consortium will abide to the European and national guidelines with considerable focus on recent General Data Protection Regulation (GDPR) as well as other European or national regulations.

The user groups of Di-Hydro consists of the three main power generation partners, that provide the different HPPs for the project technical activities, TSOs (transmission system operators), other energy operators and hydropower companies, industrial and professional associations, academia, local communities and associations, ETIP Hydropower projects cluster (D-HYDROFLEX, iAMP-Hydro, STORE2HYDRO, HYDRO4U, ReHYDRO as well as other projects that will join the cluster in the future), PEN HYDROPOWER network, etc., as well as other groups that can potentially arise in the duration of the project and have not been foreseen.

Involvement of human participants is ethical and vital for the implementation of Di-Hydro project. Thus, information will be provided at each stage of involvement for all the phases that they will be part of. Involvement of stakeholders is central in Di-Hydro project. These activities and the overall ethical conduct of the project will be supervised by the General Assembly team.

Core ethical issues within Di-Hydro are related to:

- Privacy protection and confidentiality
- Informed consent
- Transparency of the data management and handling of the collected information
- Risk assessment (Insurance)
- Delegation of control
- Incentives (Financial inducements, etc.)
- Use of AI based tool

## ***2.1 General ethical principles***

The main general ethical principles to be addressed within the project are presented below:

### **Data Security**

Di-Hydro project will consider the cybersecurity aspects of users' data from potential unauthorised access. User data may rise from the involved consortium members (people directly involved in the project or indirectly i.e. employees that might provide information/process or use data etc) and their organisations (company details i.e. private and/or financial information), third parties (i.e. stakeholders that might participate in the activities of Di-Hydro). Private data may also rise from members of the public or stakeholders who have participated or may participate in surveys/questionnaires as well as through the newsletter subscription. In addition, historical data and other sensitive information from the hydro power plants will be treated in the same manner.

### **Data avoidance & minimisation**

Data avoidance refers to avoiding the collection of information that may be private or sensitive in case they are not required by the project activities and tasks. This principle will reduce the amount of potential sensitive information that might need to be handled and stored. In addition, data minimization refers to reducing the collection of sensitive information to only what is necessary for the execution of certain project tasks. Information that is no longer required during or beyond the project's timeline can be destroyed to minimise any potential storage/handling of data or further risks.

### **Data Privacy & confidentiality**

Di-Hydro will consider data privacy and securing access to personal data of any type including historical data and other sensitive data from the hydropower plants. Data protection is a fundamental human right while also being a central issue in research ethics in Europe (European Commission, 2021a). Access to data in the project has already been described in D 7.1 "Project, data management and risk plan". However, personal data from research subjects will be handled by the Coordinator (CERTH) and potential access to them will be provided to consortium members in case this is deemed necessary for the project activities. Consortium members carrying out research that involves personal data may provide information to the Coordinator only if this is necessary for the project's activity. Personal data can be defined as any data that allow the identification of an individual. All research subjects will be fully informed about the aspects of the research, potential use of their data any potential risks that they might face. In addition, access to historical data and other sensitive/confidential data regarding the operation of the hydropower plants is only available between specific consortium members as described in the Consortium Agreement.

Di-Hydro understands that there might be data associated with the use of AI technologies for modeling & simulation, decision-making, data sharing, prediction and forecasting of various types associated within the project. Thus, data processing of personal or non-personal data could arise from the use of the project's results (digital twins, platforms, or any other tool where a user might need to provide personal data) which may lead cross referencing of individuals with specific data sets. Therefore, Di-Hydro is committed to protecting the privacy of such data and ensuring that the management of the aforementioned data is done according to relevant legal laws and standards.

### **Accountability**

Accountability goes above responsibility and entails that someone is held accountable for their actions. While project activities have certain responsibilities such as ensuring their completion, accountability goes beyond this stage, into providing why certain actions or decisions were taken. In the Di-Hydro project the main accountability concerns can be relevant to private data being misused or falling into wrong hands. Accountability related to AI is also described in the next section.

## **2.2 Ethical principles for AI**

Since, Di-Hydro project will employ artificial intelligence (AI) solutions and models, it is important to state that the final decision-making process will rely to Human in the Loop intervention and such systems will not be autonomous to take any action in any form. In simple terms, any AI solutions used in the project will only assist managers and technical staff in a hydropower plant by displaying plant analytics, it will provide warnings, run simulations, and provide scenarios (based on human input) for decision making without taking any actions themselves in any manner.

According to the EU AI Act an AI system is defined as: *“AI system’ means a machine-based system that is designed to operate with varying levels of autonomy and that may exhibit adaptiveness after deployment, and that, for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions that can influence physical or virtual environments.”* European Commission (2024b;46).

The European Commission in 2019 through the High-Level Expert Group on AI presented for Ethics Guidelines for Trustworthy Artificial Intelligence (European Commission, 2024). These guidelines offered seven key requirements that AI should meet, in order to be deemed trustworthy and will be taken into account during the Di-Hydro project.

The seven key requirements for trustworthiness are summarized below (European Commission, 2024a):

- Human agency and oversight: AI systems should empower humans, while allowing them to make informed decisions and ensuring their fundamental rights. However, human-in-the-loop, human-on-the-loop, and human-in-command approaches must be in place in the decision-making process.
- Technical robustness and safety: AI systems need to be resilient and secure allowing mechanisms for fall back in case something goes wrong in order to prevent and minimize unintentional harm.
- Privacy and data governance: AI systems must ensure data privacy and protection while data governance mechanisms must be in place to ensure quality and integrity of the data.
- Transparency: AI data, system and business models should be transparent through the use of traceability mechanisms. Users of such systems must be informed that they are interacting with an AI system and must be informed about capabilities and limitations.
- Diversity, non-discrimination and fairness: AI systems must be accessible to all people, without any discrimination. Any potential unfair bias must also be avoided.
- Societal and environmental well-being: AI systems should take into account sustainability principles and ensure that any societal or environmental impacts are considered. This is also a fundamental principle of Di-Hydro project since its aim is

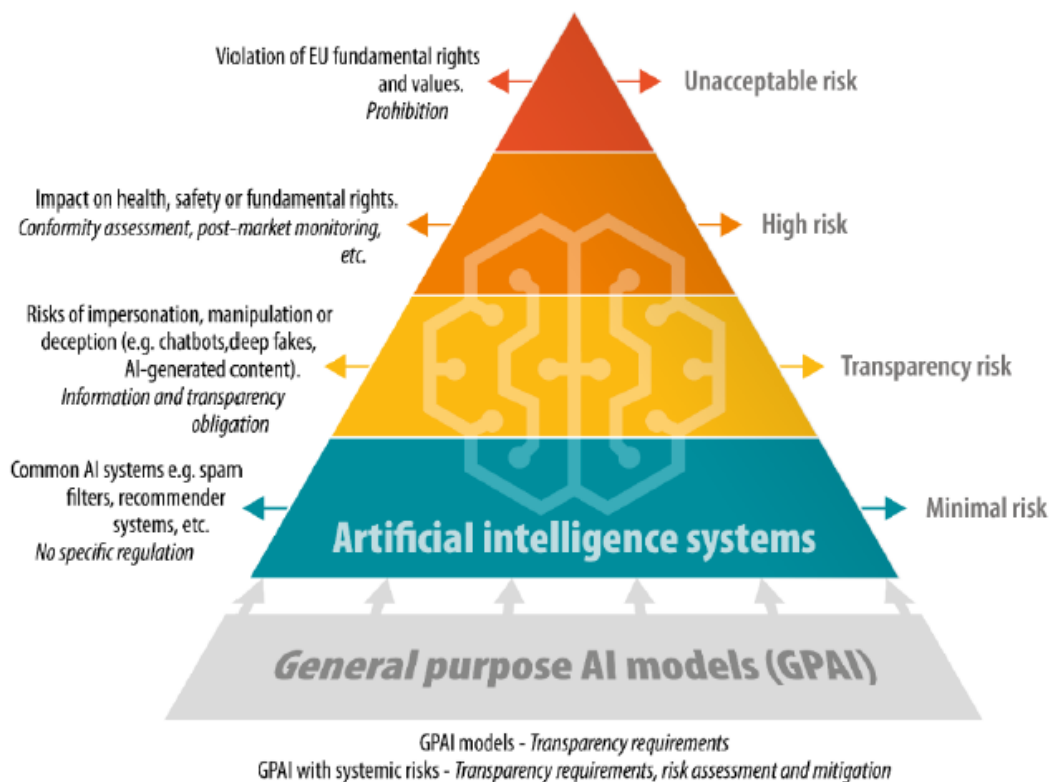
to improve operation and maintenance of hydropower plants through digitisation and making hydropower plants more sustainable.

- **Accountability:** AI systems must have mechanisms ensuring that they are able to be audited (auditability) and inspected in terms of their algorithms, data and design processes, in order to identify the people responsible, for the AI making any potential critical errors along the chain, as a measure of taking corrective actions.

Following the aforementioned principle the European Union has signed in June 2024 the AI Act (European Commission, 2024b). It is the first worldwide regulation on AI and proposes a framework for the use and supply of AI system in the EU. The AI Act came into force in August 2024.

This act introduces risk-based categorisation of AI systems, classifying them into the following four categories presented in Figure 1.

### EU AI act risk-based approach



**Figure 1. EU AI act risk-based categories**

Source: Madiega (2024; 8)

The work carried out within Di-Hydro falls into the minimal risk and general-purpose AI models (GPAI) category, where no specific regulation is required beyond current legislation i.e. General Data Protection Regulation (GDPR). GPAI is defined as an “AI system which is based on a general-purpose AI model and which has the capability to serve a variety of

*purposes, both for direct use as well as for integration in other AI systems” (European Commission, 2024b; 50).*

However, under the EU AI Act Article 53, providers of GPAIs still have obligations such as:

1. to provide technical documentation for the use of the GPAI, comply with the Union law on copyright and related rights (Copyright Directive) and make publicly available a detailed summary containing the content for training of the GPAI.
2. Providers of free and open license GPAIs, providers of such systems will need to comply with Union law on copyright as well as provide training data summary unless they pose system risks<sup>1</sup>.
3. Any providers of GPAIs either open/ free or closed that may pose a systemic risk are still required to conduct an evaluation for cybersecurity protection.

**Di-Hydro activities do not pose any systemic risk.** Hence, the above are not applicable. Any tools/platforms created within Di-Hydro project will remain confidential and a matter of Intellectual Property Rights of the partners as described in the Consortium Agreement. Thus, any AI tools created within the project will not be open or free. Further, information regarding the obligations and the technical documentation required to be provided by GPAI providers are described in ANNEX XI of the EU AI act (European Commission, 2024b; 141) and are provided in Appendix 2 for the convenience of the reader.

### **2.3 Legal framework**

Di-Hydro is aware of ethical rules and standards covering Horizon Europe practices, European Regulations as well as national laws relevant to the countries where the project partners are based. The general ethical principles are the right of privacy, the right to data protection, right to physical and mental integrity of a person, right of non-discrimination and insurance of human health protections (European Commission, 2021b).

The European Union has its own legal framework related to data protection and privacy aiming to ensure that processing of personal data and the free movement of such data adheres to certain rules. Specifically, Regulation (EU) 2016/679 also referred as the General Data Protection Regulation (GDPR), is the essential step for strengthening and treating individual rights in the digital age by clarifying rules for companies and public bodies in the digital single market. The GDPR regulation applies to the entities that are established within the EU that may process personal data. In addition, it may include entities that are outside the EU but may offer services to entities within the EU.

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<sup>1</sup> systemic risk’ means a risk that is specific to the high-impact capabilities of general-purpose AI models, having a significant impact on the Union market due to their reach, or due to actual or reasonably foreseeable negative effects on public health, safety, public security, fundamental rights, or the society as a whole, that can be propagated at scale across the value chain (European Commission, 2024b;50)



In addition, Di-Hydro project consortium takes into account the following legislation:

**Table 1. Related legislation to Di-Hydro activities and ethical issues**

<b>Human dignity and integrity</b>	<ul style="list-style-type: none"> <li>• Convention for the Protection of Human Rights and Fundamental Freedoms (Council of Europe)</li> <li>• European Charter of Fundamental Rights</li> </ul>
<b>Privacy of data</b>	<ul style="list-style-type: none"> <li>• Directive 95/46/EC of the European parliament and the Council (1995) on the protection of individuals about processing of personal data and on the free movement of such data</li> <li>• Directive 2006/24/EC of the European Parliament and of the Council of 15 March 2006 on the retention of data generated or processed in connection with the provision of publicly available electronic communications services or of public communications networks and amending Directive 2002/58/EC</li> <li>• Directive 2002/58/EC of the European Parliament and of the Council, concerning the processing of personal data and the protection of privacy in the electronic communications sector</li> <li>• Addresses and incorporates developments of Reform of the legislative framework for personal data protection (In January 2012, the European Commission proposed a reform of the Directive 95/46/CE, which constituted until now the basic instrument for personal data protection, in the form of a global Regulation on data protection 2012/001 (COD), supplemented by Directive 2012/0010 (COD) concerning the processing of personal in the area of police and judicial cooperation in criminal matters)</li> <li>• Art.29 Data Protection Working party: Working Document on Privacy on the Internet</li> </ul>
<b>New technologies</b>	<ul style="list-style-type: none"> <li>• Directive 98/34/EC of the European Parliament and of the Council of 20 July 1998 amended by Directive 98/34/EC laying down a procedure for the provision of information in the field of technical standards and regulations and of rules on information society services.</li> </ul>

### **Consent**

Any person participating in interviews, surveys, podcasts, videos, usage or evaluation of Di-Hydro tools such as the Decision Support Platform, the digital twin or any other project research tool that might require the use of personal data or which may to lead cross referencing of individuals with specific data sets, will require informed consent prior to engaging. Consent must be given in an easy way either through a tick box or a consent form as described in APPENDIX 1- INFORMED CONSENT FORM.

**Information**

Participants must be informed about the purpose of the project and its objectives in a concise and comprehensive way. In addition, participants must be informed of the purpose of the research, that personal data will be stored, who will process their data and how as well as their individual data protection rights (i.e. right to: be informed, access, rectification, erasure- right to be forgotten, restriction of processing data, object, data portability, not be a subject to a decision based on automated processing). According to these data protection rights, the project partners or data controller (CERTH-coordinator) handling such data will need to give the option to the participant to withdraw their consent.

**Right to access and data portability**

Participants must be given access to their personal data in case a contract or consent form is signed. Under these rights, participant may ask for their data to be returned or transmitted to another company. Although such cases are not foreseen under Di-Hydro project activities, these rights still need to be taken into consideration.

**Right to rectification**

In cases where a participant has given wrong data, they have the right to amend them accordingly.

**Right to erasure**

Participants have the right to ask from the data controller to erase their data in case they are no longer needed for research purposes. The data controller may comply in case the data are no longer required.

**Right to data protection**

The data controller shall ensure that the aforementioned rights and principles of data protection are implemented using appropriate methods for data processing, ensuring data privacy.

The proper management of these issues will be carefully investigated and addressed throughout the project. In addition, apart from the Coordinator, the General Assembly team will act as supervisors of the ethical activities taking into consideration both European and national ethical and legal requirements.

**Table 2 Considerations on Ethical Risk Management in Di-Hydro project**

Ethical and Social risks	Description	Ethical Risk Management in Di-Hydro
<b>Ethical and legal framework applied</b>	All relevant legislation, regulation and ethical codes will be considered and will be further defined within the duration of the project (i.e., how they are met in	Di-Hydro General Assembly team will oversee any arising or potential ethical concerns related to any aspects of the project.



	<p>terms of processes, timing and responsibilities; Social, Ethical, Legal, Privacy issues identification and monitoring (D7.2) will be delivered in M12 and updated in the end of the project M36).</p>	
<p><b>Transparency and consent of stakeholders</b></p>	<p>Informed consent process aims at ensuring stakeholders (participants) accept participation and that they are informed about all relevant aspects of the research project; it should be given in written form after stakeholders have been provided with clear and understandable information on their role (including rights and duties), the objectives of the research, the methodology used, the duration of the research, the possibility to withdraw at any time, confidentiality and safety issues, risks and benefits.</p>	<p>The basic elements of the Di-Hydro informed consent will include:</p> <ol style="list-style-type: none"> <li>1. The objective of the event/workshop/interview, its duration and methodology.</li> <li>2. Possible risks, discomforts (if any).</li> <li>3. Privacy and data protection procedures.</li> <li>4. The possibility to decline participation and to withdraw at any point of the process (and without consequences).</li> <li>5. Responsible partner contact details.</li> </ol> <p>Information about how Di-Hydro deliverables will abide to the project’s ethical and data privacy rules (i.e., D7.1- Project, data management and risk plan &amp; D7.2- Social, Ethical, Legal, Privacy issues identification and monitoring. These documents will be aligned, and project teams involved in their preparations will do so jointly).</p>
<p><b>Participants’ engagement</b></p>	<p>Research aims to be inclusive and representative of different stakeholder user groups and backgrounds. The selection and recruitment of participants is a crucial part of the involvement process, as it will impact the outcomes’ quality as well as the</p>	<p>Diversity in stakeholder engagement and involvement entails: i) different age groups, ii) balanced female/male ratio iii) various professional, social, and cultural backgrounds.</p>

	<p>sustainability of the research or policymaking process. An adequate number of users and combination of professional backgrounds is sought; gender balance and equality are addressed.</p>	<p>The General Assembly team of Di-Hydro will oversee the selection of participants.</p>
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### 3. Ethical issues in Di-Hydro project

In the Di-Hydro project, ethical issues that could or might arise are related to data security, privacy and protection, confidentiality and in some cases use of AI. An internal assessment has been carried out and the ethical issues that have been identified in the following tasks and are described below:

**Table 3. Ethical issues in Di-Hydro project**

Work package	Ethical issues
<p>WP1- Digital transformation tools for HP O&amp;M<sup>2</sup></p>	<ul style="list-style-type: none"> <li>- Confidentiality and security of HPP historical or potentially real time data, regarding operations, maintenance and environment. Data may also include schematics of power plant,s or any other information deemed confidential that will be provided by the HPPs (Task 1.1- HPP digital transformation in O&amp;M).</li> <li>- Confidentiality, privacy and security of personal data gathered from external respondents that participated in D 1.1 survey (Task 1.1- HPP digital transformation in O&amp;M).</li> </ul>
<p>WP2- Innovative sensor technologies for HP digitalization</p>	<ul style="list-style-type: none"> <li>- Confidentiality and security of data that will be collected from the sensors developed under Di-Hydro project. Such sensors will be installed in HPPs as part of their initial testing process within WP2 (Task 2.1- Research and development of sensor technologies and automation).</li> <li>- Confidentiality and security of data modelled as part of collecting, storing and exchange of Di-Hydro sensor data (Task 2.3-Processing, storing and exchange of Di-Hydro sensor data).</li> </ul>

<sup>2</sup> Operation & Maintenance

WP3- HP digital modeling for optimal O&M

- Confidentiality and security of data used to construct the Digital Twin (DT) of one of PPC’s hydropower plants, including any secondary data that will feed into the DT (Task 3.1- Reliable, secure and interoperable HP data from various sources (i.e., sensors, historical and satellite), Task 3.5- Di-Hydro DT).
- AI related ethics issues from development and deployment of AI-based models which will be used in modeling the meteorological and hydrological chain in the Italian pilot use case (Task 3.2- Weather, flow monitoring and AI-based forecasting models).
- AI related ethics issues from the development of Machine Learning/ AI models that will detect/identify and predict failures in HPPs (Task 3.4- Diagnostic and prognostic AI-based models for proactive HP structural and machinery health). Minimal risks are foreseen in this task because the AI models will simply provide a form of prediction/ early warning that will feed into the Di-Hydro Decision Making Platform, that will be created in WP4 and specifically Task 4.3- Integrated platform for HP management (Di-Hydro Decision Making Platform) and advanced visualization assessment.

WP4 – Pilot optimized system for digital HP O&M

- Confidentiality and security of data from HPPs related to implementation of the three pilot use cases under WP4 (Task 4.1: Deployment and performance assessment of stand-alone HPP O&M pilots).
- Confidentiality, privacy and security of personal data from HPP personnel that might participate in the D-Hydro use case pilots (Task 4.1: Deployment and performance assessment of stand-alone HPP O&M pilots).
- AI related ethics issues from the development of the Di-Hydro Decision Making Platform. The AI system, by combining forecasts (e.g.: water inflows, prices and maintenance schedules) and technical data (e.g. maximum flow rate, energy efficiency, basin capacity) will be able to compute the optimal production schedule for the HPP. The results will be heavily influenced by the input data, which, as forecasts, may differ from what will actually occur in real life. To mitigate this risk, the system will be able to contain and compute the results over a varied spectrum of

	<p>input scenarios in a time-effective manner. This will provide to the end-user a comprehensive risk-analysis of future production schedules. The data provided will not be public but only selected users of the DSS will be able to access them through a system of users' profiles. In addition, the system will not interact with personal data nor work in any degree of autonomy. Human users will be required to provide the input data to the DSS. Moreover, the DSS will not be capable of taking autonomous actions, but will display the results computed to the end users, which will then be required to evaluate the results and take actions/decisions accordingly. The interaction with the AI will take place into two dedicated pages of the DSS, one where to request a new computation and the second where to access the results of previously requested computations. No generative AI will be present in the DSS to interact with the user with a natural language (Task 4.3- Integrated platform for HP management (Di-Hydro Decision Making Platform) and advanced visualization assessment).</p>
<p>WP6- Dissemination, communication and exploitation</p>	<ul style="list-style-type: none"> <li>- Confidentiality, privacy and security of personal data of participants in the stakeholder group, newsletter subscribers, interviews and workshops (Task 6.2- Dissemination and communication activities, Task 6.3- Stakeholders' engagement and consultation).</li> </ul>
<p>WP7- Project management</p>	<ul style="list-style-type: none"> <li>- Confidentiality, privacy and security of personal and company data of project partners (Task 7.1- Project coordination and management).</li> </ul>

According to the aforementioned information presented in Table 3, participants and end-users will be informed about their interaction with these AI systems, which are employed for specific tasks. In each case, the systems will clearly outline the abilities and limitations of these AI technologies, ensuring that end-users understand the risks and benefits involved, particularly with regard to decision-making processes supported by data-driven insights. Potential ethics risks have been carefully evaluated, and risk mitigation strategies are applied throughout the development, deployment, and post-deployment phases.

Continuous monitoring of AI-driven processes will help prevent any unintended consequences. It is also important to note that no generative AI technologies are used in Di-Hydro project.

## 4. Conclusions

The current deliverable provides a first overview of the framework to be followed by the Di-Hydro project regarding social, ethical, legal, privacy issues. The deliverable describes the ethical principles that will be followed by the project consortium and identifies potential ethical issues and legal obligations. A second iteration of the deliverable will be provided at the end of the project.

## 5. APPENDIX 1- INFORMED CONSENT FORM

### Di-Hydro – Digital Maintenance for Sustainable and Flexible Operation of Hydropower Plant

Di-Hydro (Digital Maintenance For Sustainable And Flexible Operation Of Hydropower Plant) aims to digitise hydropower plants by developing smart devices and data acquisition techniques to predict and control operation and maintenance (O&M). Digital Twins (DTs) will facilitate real-time data exchange, alongside an intelligent decision-making tool for optimal coordination of power generation considering structural health/condition monitoring, societal, weather, water flow, environmental and biodiversity data. Three pilot use cases of the aforementioned technological developments will be carried out at different hydropower plants at PPC (Greece), A2A (Italy) and EPS (Serbia).

#### Use Cases

##### 1. **PPC (GR)**

Di-Hydro DTs will be integrated into a hydropower (HP) digital cluster for the Public Power Corporation (PPC) in Greece, focusing on optimizing operation and maintenance (O&M) of three multi-purpose HP plants. Real-time data collection through sensors facilitates continuous monitoring and experimentation for efficient HP maintenance and continuous operations. Challenges include data gathering disparities among HP plants and installation time for sensors.

##### 2. **A2A (IT)**

The focus lies on inflow forecasts for two hydropower plants (HPPs) in specific Italian locations, crucial for efficient plant management and safety. Digital approaches utilising various data sources and AI techniques enhance forecast accuracy. Challenges include modelling complexity of the water cycle and uncertainty in meteorological forecasts.

##### 3. **EPS (RS)**

The development of a real-time water quality monitoring system for the EPS (RS) Međuvršje hydropower plant in Serbia addresses environmental impacts and socio-economic sustainability. Challenges include pollution mitigation and data sharing reluctance.

#### Contacts

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## Disclaimer Rights

Your participation in the *Advisory Board/ Stakeholder group /survey/ interview or any other Di-Hydro research activity*, is voluntary. You have the right to withdraw from any of the aforementioned activity at any time.

If you decide to participate in the *Advisory Board/ Stakeholder group /survey/ interview or any other Di-Hydro research activity*, you consent to the collection and processing of your personal data. Your general personal information (i.e. first and last name, organisation name, role, email address) will only be used by the Di-Hydro consortium for the purposes of the project's research activities. The information you may provide during any project related activity, is expected to provide input to our research and can be used in deliverables, presentations (public or internal), or any publications. Only in case you declare your interest and provide consent, your information may also be used to invite you to participate in any future project activities.

Interviews/ Stakeholder group or Advisory Board discussions may be recorded for further processing and extraction of information. References to the participant's name will not be made. Personal data and affiliation will not be made public. Any dissemination material (deliverable, publication, presentation etc) will protect the participant's identity using pseudonyms i.e. participant X,Y,Z from organisation X,Y,Z to make reference to the information provided by the participant. Sharing of the recording or minutes from these interviews/discussions will remain for internal project usage and will not be made public.

The interview/ focus group discussion may be recorded using a recording device and notes may be kept in a handwritten form, without making reference to your name. No one outside the project will be allowed access to the original recordings or notes. To protect your anonymity, your name and other personal details will not be disclosed in any deliverable, publication or presentation, and pseudonyms will be used instead. Your responses will be used either in aggregate form or in quotations. In quotations, your name will not appear and you will be referred to as 'participant from organisation X'. It is noted, however, that despite these protocols, it might be still possible that you are identifiable by persons who are familiar with your organisation and its structure.

The personal data collected may be shared with third parties, only in case this is necessary for the fulfilment of the processing purposes (e.g. with project partners, whose contribution is necessary for the evaluation of the survey results) or is required for the fulfilment of obligations by law, in compliance with the obligations arising from the applicable legislation.

Any stored data will be kept online in a secure location, with limited access by specific users, for a period of 36 months, as required for the implementation of the research project, unless their keeping, in whole or in part, is required by law or is necessary for the recognition, exercise or defence of legal claims.

As data subjects, you have the right to access, correct, delete, object and restrict processing, as well as to withdraw your consent at any time.

### **Data controller**

In case you need any further information about the above-mentioned Di-Hydro research activities, the processing of your personal data or the exercise of your rights, please, contact the Alkiviadis Tromaras, Centre For Research and Technology Hellas (CERTH) /Hellenic Institute of Transport (HIT), 6th km Charilaou-Thermi Rd, P.O. Box 60361, GR 57001 Thermi, Thessaloniki, Greece, email: [atromaras@certh.gr](mailto:atromaras@certh.gr)

After reading the information provided above, I voluntarily agree to participate in the Di-Hydro.

#### **I declare that:**

**By ticking the boxes below you declare your consent with each statement.**

I have read the provided text and understood the provided information.

I had the opportunity to ask any questions and clarification of the purpose of my participation in this research activity.

I agree to participate in the activity [add name here] that I have been asked to contribute to. I am free to decline answering any questions that I do not wish to.

I have the right to access, correct, delete, object and restrict processing, as well as to withdraw my consent at any time.

I consent to the processing of my personal data for the purposes of the project's activities.

I understand that the information that I will provide may be published in project dissemination material.

I wish to be contacted by the project consortium for my potential participation in future research i.e. workshops or provide any further information (only if necessary).

Signature:

Date:





## **6. APPENDIX 2- Technical documentation required for providers of GPAIs**

Technical documentation referred to in Article 53(1), point (a) – technical documentation for providers of general-purpose AI models

### **Section 1**

#### **Information to be provided by all providers of general-purpose AI models**

The technical documentation referred to in Article 53(1), point (a) shall contain at least the following information as appropriate to the size and risk profile of the model:

1. A general description of the general-purpose AI model including:
  - (a) the tasks that the model is intended to perform and the type and nature of AI systems in which it can be integrated;
  - (b) the acceptable use policies applicable;
  - (c) the date of release and methods of distribution;
  - (d) the architecture and number of parameters;
  - (e) the modality (e.g. text, image) and format of inputs and outputs;
  - (f) the licence.
2. A detailed description of the elements of the model referred to in point 1, and relevant information of the process for the development, including the following elements:
  - (a) the technical means (e.g. instructions of use, infrastructure, tools) required for the general-purpose AI model to be integrated in AI systems;
  - (b) the design specifications of the model and training process, including training methodologies and techniques, the key design choices including the rationale and assumptions made; what the model is designed to optimise for and the relevance of the different parameters, as applicable;
  - (c) information on the data used for training, testing and validation, where applicable, including the type and provenance of data and curation methodologies (e.g.

cleaning, filtering, etc.), the number of data points, their scope and main characteristics; how the data was obtained and selected as well as all other measures to detect the unsuitability of data sources and methods to detect identifiable biases, where applicable;

- (d) the computational resources used to train the model (e.g. number of floating point operations), training time, and other relevant details related to the training;
- (e) known or estimated energy consumption of the model.

With regard to point (e), where the energy consumption of the model is unknown, the energy consumption may be based on information about computational resources used.

## Section 2

Additional information to be provided by providers of general-purpose AI models with systemic risk

1. A detailed description of the evaluation strategies, including evaluation results, on the basis of available public evaluation protocols and tools or otherwise of other evaluation methodologies. Evaluation strategies shall include evaluation criteria, metrics and the methodology on the identification of limitations.
2. Where applicable, a detailed description of the measures put in place for the purpose of conducting internal and/or external adversarial testing (e.g. red teaming), model adaptations, including alignment and fine-tuning.
3. Where applicable, a detailed description of the system architecture explaining how software components build or feed into each other and integrate into the overall processing.

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