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DELIVERABLE D1.3

DATA MANAGEMENT PLAN

DISSEMINATION LEVEL: PUBLIC

Grant Agreement (GA) N. 85284

Research and Innovation Actions (RIA) project

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Document Control Sheet

Project	**BLAZE** - Biomass Low cost Advanced Zero Emission small-to-medium scale integrated gasifier-fuel cell combined heat and power plant
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Version	Date	Description
1	26/07/2019	The Data Management Plan provides the main elements of the data management policy to be used by the Consortium regarding its complete research data cycle. It describes: types and formats of data to be generated or collected and how, the standards to be applied, the data-reservation methods, the data-sharing policies for re-use.
2	30/08/2019	The deliverable revised by EUBIA

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1 EXECUTIVE SUMMARY

The BLAZE Data Management Plan follows the Horizon 2020 DMP template that was designed to be applied to any Horizon 2020 project that produces, collects or process research data. This first Data Management Plan describes the data management principles and strategies, tools and BLAZE data: data set, “Open Research Data Pilot” (ODRDP) and BLAZE Demonstrator that will be produced as part of the project activities and that are relevant to be included in the DMP. The consortium will also aim at open access when publishing papers and articles.

The DMP is a living document to be updated as the implementation of the project progresses and when significant changes occur.

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2 INTRODUCTION

2.1 Objectives and scope of the document

The Data Management Plan (DMP) describes the data management life cycle for the data to be collected, processed and/or generated by BLAZE project, as a Horizon 2020 project. The DMP aims at defining the management strategy of data generated during the project with the purpose to making research data findable, accessible, interoperable and re-usable (FAIR).

2.2 Structure of the deliverable

The document is structured following the guideline of H2020 programme on FAIR Data Management in Horizon 2020 including the following information:

- Data Management Plan (DMP) guiding principles and strategy
- Description of BLAZE type of data
- Description of FAIR DATA characteristics including DMP Review Process & data inventory
- Allocation of resources
- Data Security
- Ethical Aspects
- Conclusions

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3 DATA SUMMARY

The BLAZE Data Management Plan (DMP) aims to provide a strategy for managing key data generated and collected during the project and optimize access to and re-use of research data. The DMP is intended to be a 'living' document that will outline how the BLAZE research data will be handled during and after the project, and so it will be reviewed and updated at regular intervals.

All European Union funded projects must try to disseminate as much information as possible and on top of that the BLAZE project was signed up to the "Open Research Data Pilot" which means that we are committed to give open access to data generated during the project unless it goes against our legitimate interests. In this regard, the main purpose of the DMP is to ensure the accessibility and intelligibility of the data generated during the BLAZE project in order to comply with the Guidelines of the "Open Research Data Pilot". Each data set created during the project will be assessed and categorized as open, embargo or restricted by the owners of the content of the data set.

All the data sets, regardless of their categorization, will be stored in each of the participant entities databases and in the Google Drive folder created as internal database of the partners. In addition, those categorized as open or embargo will be publicly shared (in the case of embargo, after the embargo period is over) through the public section of the project website and **ZENODO** (https://zenodo.org/).

ZENODO is an open access repository for all fields of science that allows uploading any kind of data file formats, which is recommended by the Open Access Infrastructure for Research in Europe (OpenAIRE).

3.1 Data Management Plan (DMP) guiding principles

The Data Management Plan of BLAZE is realized within the Work Package 1.

The BLAZE project data management plan follows the principle of Open Access according to the Horizon 2020 guideline summarized in the diagram here below.

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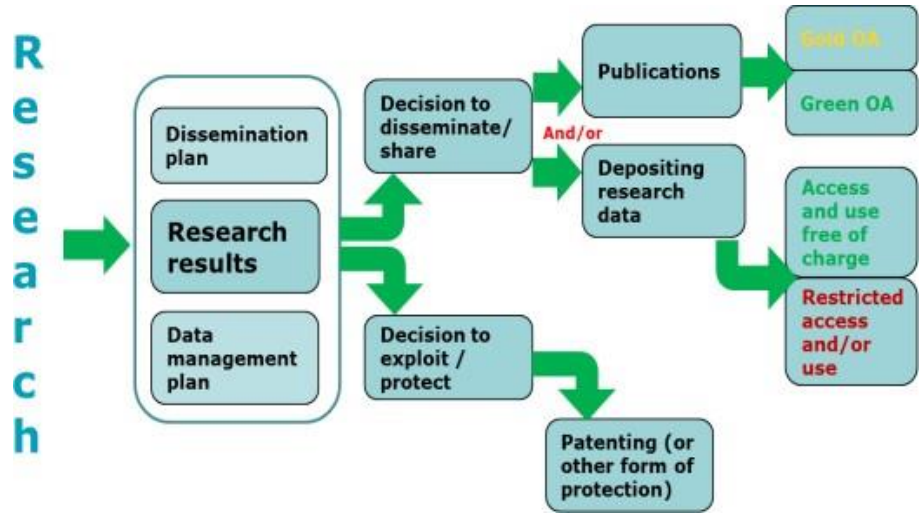

Figure 1. Open access to research data and publication decision diagram (from Guidelines to the Rules on Open Access to Scientific publications and Open Access to Research Data in Horizon 2020)

The others main principles for the BLAZE project DPM are the following:

I. This Data Management Plan (DMP) has been prepared by taking into account the template of the "Guidelines on Data Management in Horizon 2020" http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-data-mgt_en.pdf
II. The DMP is an official project Deliverable (D1.3) due in Month 6 (August 2019), but it will be updated throughout the project. The first initial version will evolve depending on significant changes arising and periodic reviews at relevant reporting stages of the project.
III. The consortium complies with the requirements of Regulation (EU) 2016/679 and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). Guidance on how these regulations interact with open-access data policy can be found here: https://www.openaire.eu/ordp/
IV. Type of data, storage, confidentiality, ownership, management of intellectual property and access: procedures that will be implemented for data collection, storage, access, sharing policies, protection, retention and destruction will be in line with EU standards as described in the Grant Agreement and the Consortium Agreement.

3.2 BLAZE Data Management strategy

As a project participating in the Open Research Data Pilot (ORDP) in Horizon 2020, the DMP's Data Management strategy of BLAZE project is focused on the observation of FAIR (Findable, Accessible,

Interoperable and Reusable) Data Management Protocols. This document addresses for each data set collected, processed and/or generated in the project the following elements:

Dataset reference and name: Internal project Identifier for the data set to be produced. This will follow the format:

PNumber_TaskNumber__PartnerName_DataSubset_DatasetName_Version__DateOfStorage, where the project name is BLAZE, the Partner Name represents the name of the data custodian (WP Lead/ Task Leader).

Dataset description: description of the data generated or collected, including its origin (in cases where data is collected), nature and scale and to whom it could be useful, and whether it underpins a scientific publication. Information on the existence (or not) of similar data and the potential for integration and reuse.

Standards and metadata: reference to existing suitable standards. If these do not exist, an outline on how and what metadata will be created.

Data sharing: description of how data will be shared, including access procedures, embargo periods (if any), outlines of technical mechanisms for dissemination and necessary software and other tools for enabling reuse, and definition of whether access will be open or restricted to specific groups. Identification of the repository where data will be stored, if already existing and identified, indicating the type of repository (institutional, standard repository for the discipline, etc.). In cases where the dataset cannot be shared, the reasons for this will be stated (e.g. ethical, rules of personal data, intellectual property, commercial, privacy-related, security-related).

Archiving and preservation (including storage and backup): description of the procedures to be put in place for long-term preservation of the data, including an indication of how long the data should be preserved, the approximate end volume, associated costs, and how these are planned to be covered.

3.3 BLAZE type of data

Among project datasets and deliverables, following categories of outputs are declared “ORDP” that will be made “Open Access” (to be provided free of charge for public sharing). These will be included in the Open Research Data Pilot and thus be managed according to the present DMP:

- Project deliverables D2.2., D3.2, D5.4
- Articles published in Open Access scientific journal
- Conference and Workshop abstracts/articles

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Once generated (or collected), these data will be stored in several formats, which are: Documents, Images, Data, and Numerical codes.

In particular the following project deliverables are relevant:

D.2.2. "Bio-syngas composition and contaminants that affect SOFC and related gasifier parameters and bed materials to reduce SOFC hazardous effects"

Bio-syngas composition and contaminants that affect SOFC operation, and related gasifier parameters and bed materials to reduce SOFC hazardous effects. . It refers to Task 2.2. Identify the operating conditions in terms of S/B, ER, olivine/dolomite ratios and amounts of sorbents to be added in order to obtain at the exit of the gasifier the produced gas with the best characteristics, i.e. the highest CGE and carbon conversion (90%), as well as the lowest contents of tar (a few grams/Nm3dry) and inorganic contaminant vapours (tens of ppm) connected to the use of in-bed additives. [ENEA – M12]

D.3.2 "Report summarising the literature review"

This report aims to select, via literature review, the most representative syngas composition and contaminants. The indicators of success are the identification of at least 5 experimental and 5 simulative international peer reviewed papers on gasifiers/hot gas conditioning systems within select (possibly experimental data) at least 2 representative compositions and 2 organic and 3 inorganic representative contaminants levels (with the respective gasification and hot gas conditioning systems) that can fed the SOFC with acceptable SOFC efficiency, power density and durability.

D.5.4 “Assembled CHP system”

The system, starting from the Hot Syngas Conditioner, will be assembled incorporating the 25 kWe SOFC-stack from SP_YV (Task 5.2), the heat-driven anode gas recirculator from EPFL (Task 5.4) and the steam generator. For a proper integration, all interfaces between the various sub-systems and components will be described in detail by the different supplying partners. It will be possible to by-pass the SOFC stack and anode gas recirculator during testing. Before its delivery the new upscaled gas recirculation device is characterised and extensively tested in the laboratory at EPFL. Electronic hardware for system control and the electronic control unit as developed in Task 5.5 will be integrated. A full i/o test will be done. After completion of the installation, a phase of checks on each unit will be undertaken, separately and when needed using auxiliary/synthetic gaseous streams, in order to verify the functionality of the components, control systems and data acquisition. All components are manufactured and integrated. The system is successfully tested for its operability.

Summarising, BLAZE generates and collects the following research data relevant for the DMP:

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TITLE	WP No	LEAD BENEFICIARY	NATURE	DISSEMINATION
D2.2. Bio-syngas composition and contaminants that affect SOFC and related gasifier parameters and bed materials to reduce SOFC hazardous effects	WP2	ENEA	data sets, microdata, etc.	Public
D3.2 Report summarising the literature review	WP3	SP	ORDP: Open Research Data Pilot	Public
D5.4 Assembled CHP system	WP5	HyGEAR	Demonstrator	Public
Articles published in Open Access scientific journal	WP8	EUBIA	Articles/ Research data	Public
Conference and Workshop abstracts/articles	WP8	EUBIA	Articles/ Research data	Public

Table 1. BLAZE research data

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4 FAIR DATA

4.1 Making data findable, including provisions for metadata

Metadata is data on the research data themselves. It enables other researchers to find data in an online repository and is, as such, essential for the reusability of the dataset. By adding rich and detailed metadata, other researchers, can better determine whether the dataset is relevant and useful for their own research. Metadata (type of data, location, etc.) will be uploaded in a standardized form. This metadata will be kept separate from the original raw research data.

As described in the project Grant Agreement (Article 29.2), the bibliographic metadata include all of the following:

- the terms “European Union (EU)” and “Horizon 2020”;
- the name of the action, acronym and grant number;
- the publication date, and length of embargo period if applicable
- a persistent identifier

BLAZE open data will be collected in an open online research data repository: **ZENODO**. Its repository structure, facilities and management are in compliance with FAIR data principles. ZENODO is an OpenAIRE that allows researchers to deposit both publications and data, providing tools to linking them to these through persistent identifiers and data citations. ZENODO is set up to facilitate the finding, accessing, re-using and interoperating of data sets, which are the basic principles that ORD projects must comply with. Zenodo repository is provided by OpenAIRE and hosted by CERN. Zenodo is a catch-all repository that enables researchers, scientists, EU projects and institutions to:

- Share research results in a wide variety of formats including text, spreadsheets, audio, video, and images across all fields of science.
- Display their research results and get credited by making the research results citable and integrating them into existing reporting lines to funding agencies like the European Commission.
- Easily access and reuse shared research results.
- Integrate their research outputs with the OpenAIRE portal.

Search keywords

Zenodo allows to perform simple and advanced search queries on Zenodo using the keywords. Zenodo also provides a user guide with easy to understand examples.

Naming conventions

Files and folders at data repositories will be versioned and structured by using a name convention consisting as follow: **BLAZE_Dx.y_YYYYMMDD_Vzz.doc**

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Version numbers

Individual file names will contain version numbers that will be incremented at each revision (Vzz).

4.2 Making data openly accessible

In order to maximise the impact of BLAZE research data, the results are shared within and beyond the consortium. Selected data and results will be shared with the scientific community and other stakeholders through publications in scientific journals and presentations at conferences, as well as through open access data repositories.

The BLAZE project datasets are first stored and organized in a database by the data owners (personal computer, or on the institutional secure server) and on the project database (project website). All data are made available for verification and re-use, unless the task leader can justify why data cannot be made openly accessible. To protect the copyright of the project knowledge, Creative Commons license will be used in some cases. The BLAZE dataset deliverables are both public (data access policy unrestricted) and they will be accessible by:

- BLAZE project web site
- Partners database
- OpenAIRE
- ZENODO (https://zenodo.org) for ORDP data and datasets
- Open access journals

All data deposited on ZENODO are accessible without restriction for public. For other data, potential users must contact the IPR team or the data owner in order to gain access. If necessary, appropriate IPR procedure (such as non- disclosure agreement) will be used.

4.3 Making data interoperable

Partners will observe OpenAIRE guidelines for online interoperability, including OpenAIRE Guidelines for Literature Repositories, OpenAIRE Guidelines for Data Archives, OpenAIRE Guidelines for CRIS Managers based on CERIF-XML. These guidelines can be found at: https://guidelines.openaire.eu/en/latest/. Partners will also ensure that BLAZE data observes FAIR data principles under H2020 open-access policy: http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/oa_pilot/h2020-hi-oa-datamgt_en.pdf

In order to ensure the interoperability, all datasets will use the same standards for data and metadata capture/creation.

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As the project progresses and data is identified and collected, further information on making data interoperable will be outlined in subsequent versions of the DMP. In specific, information on data and metadata vocabularies, standards or methodology to follow to facilitate interoperability and whether the project uses standard vocabulary for all data types present to allow interdisciplinary interoperability.

4.4 Increase data re-use (through clarifying licences)

Creative Common Licensing with be used to protect the ownership of the datasets. Both Share-Alike and NonCommercial-ShareAlike licenses will be considered for the parts of datasets for which the decision of making that part public has been made by the Consortium.

However, an embargo period may be applied if the data (or parts of data) are used in published articles in "Green" open access journals. The recommended maximum embargo period length by European Commission is 6 months.

For datasets deposited on a public data repository (ZENODO) the access is unlimited.

Restrictions on re-use policy are applied for all protected data (see Figure 1: Open access to research data and publication decision diagram), whose re-use will be limited within the project partners.

Other restrictions could include:

- the "embargo" period imposed by journals publication policy (Green Open access);
- some or all of the following restrictions may be applied with Creative Commons licensing of the dataset:
    - Attribution: requires users of the dataset to give appropriate credit, provide a link to the license, and indicate if changes were made.
    - NonCommercial: prohibits the use of the dataset for commercial purposes by others.
    - ShareAlike: requires the others to use the same license as the original on all derivative works based on the original data.

Internal process of Quality evaluation is activated throughout the entire project duration to assess both project data /products and project process (See the D1.2 Quality Assurance Plan and Report for project monitoring and risk management). An internal peer review is performed for the main project deliverables to guarantee the deliverable is developed with an high level of quality. Each WP leader has to submit all the produced documents to another partner assigned as internal reviewer to check for the quality of the documents produced.

The project data will remain re-usable for at least 1 year.

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4.5 DMP Review Process & data inventory

Internal process of quality evaluation and reporting is activated throughout the entire project duration to assess both project data /products and project process (See the D1.2 Quality Assurance Plan and Report for project monitoring and risk management). Results data will be also analysed and collected throughout the project entire duration. To this purpose the Dissemination and Communication Report (See the D8.3 Communication and Dissemination Plan) will also be filled in by each partner about every six months: it includes the description of articles, papers and scientific publications too. Thus, all research data generated and publications will be analysed and described by using the Data Inventory Table (Annex I), WP leaders and partners authors of publications are required fill in periodically.

Further updating of the Data Management Plan will include the eventually updating of online research data repository where data are collected and shared and the data the description of dataset and research data gradually generated and collected.

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5 ALLOCATION OF RESOURCES

Costs related to open-access to research data in Horizon 2020 are eligible for reimbursement under the conditions defined in the H2020 Grant Agreement, in particular Article 6 and Article 6.2.D.3, but also other articles relevant for the cost category chosen. Project beneficiaries will be responsible for applying for reimbursement for costs related to making data accessible to others beyond the consortium.

The costs for making data FAIR includes:

- Fees associated with the publication of scientific articles containing project's research data in "Gold" Open access journals. The cost sharing, in case of multiple authors, shall be decided among the authors on a case-by-case basis.
- Project Website operation: to be determined
- Data archiving at ZENODO and on other on line data base: free of charge
- Copyright licensing with Creative Commons: free of charge

The project member of General Assembly are also responsible of the Data Management of BLAZE dataset and research data in accordance with each organization internal Data Protection Officer (DPO).

Each partner is responsible for the data they produce. Any fee incurred for Open Access through scientific publication of the data will be the responsibility of the data owner (authors) partner(s).

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6 DATA SECURITY

The following guidelines will be followed in order to ensure the security of the data:

- Store data in at least two separate locations to avoid loss of data;
- Encrypt data if it is deemed necessary by the participating researchers;
- Limit the use of USB flash drives.
- Label files in a systematically structured way in order to ensure the coherence of the final dataset.

All project deliverables and data will be stored and shared in the Google Drive folder restricted to the project consortium. As an initial step, only the Consortium Partners will have access to the cloud storage where dataset and metadata are filed. Following, scientific publications and articles, the dataset deliverables and the final demonstrator research results will be shared through ZENODO and other database to promote the data making FAIR.

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7 ETHICAL ASPECTS

The work package 9 aims at to ensuring that ethical requirements are met for all research undertaken in the project, including data management aspects, in compliance with H2020 ethical standards. All partners will assure that the EU standards regarding ethics and data management are fulfilled in compliance with the ethical principles (see Article 34) and confidentiality (see Article 36 as set out in the Grant Agreement). In addition:

1. In accordance with the General Data Protection Regulation 2016/679, the data controllers and processors are fully accountable for the data processing operations.

2. Templates for informed consent forms and information sheet are also available. More details in relation to Ethics (and Security) in relation to Data Management can be found in Section 5 of the Grant Agreement.

3. The BLAZE consortium also includes the Switzerland as Non-EU consortium member and project data will be exchanged between the partners at all times during the project.

See the following deliverables for more details:

- D.9.1 H - Requirement No. 1
- D.9.2 POPD - Requirement No. 2
- D.9.3 EPQ - Requirement No. 3

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8 CONCLUSIONS

This documents describes the man principles and guidelines for the Data Management for the BLAZE project. As living document it will be updated throughout the project lifetime. Further updating of the Data Management Plan will include the eventually updating of online research data repository where data are collected and shared and the data the description of dataset and research data gradually generated and collected.

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9 ANNEX 1 - DATA INVENTORY TABLE

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DATA INVENTORY TABLE

Dataset Code/N.	Dataset Name	Open/ Restricted	Data Types	New/ Existing data	File Formats	Method of Data capture	Size	Data Utility- who outside of the project consortium might use the data?	Type of IP/ protection sought	How will data be re-us	Ethical issues? Y/N