

(Example 1 – Hydrogen, metals, embrittlement)

HyWay Multiscale Characterisation and Simulation for Hydrogen Embrittlement Assessment: Development of an Open Knowledge Platform to Foster Capability Integration

Example - part 1 Projects Outputs which included Standards within their exploitation strategy.

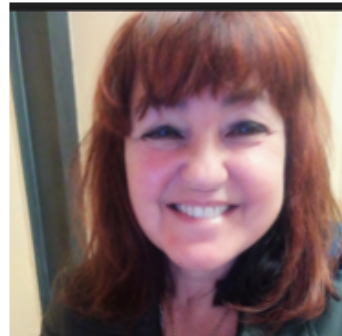
Dr PAOLA AMATO, Architect, S&T independent expert



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the European Union

Paola Amato

Paola is a consultant for the EUAA in Belgium, Spain and Cyprus and an expert in clean energy. She supported climate adaptation for Italian cities with the Covenant of Mayors and has expertise in circular economy, clean energy and EU funds.

**Field of expertise**

Project identification and development · Capacity building for key stakeholders · Stakeholder mobilisation · Circular economy · Clean and affordable energy · Research and innovation

Country of residence

Italy

Languages

English · Italian · Spanish

Regional experience

Japan · Spain · Cyprus · China · Korea · Indonesia · South Africa

Paola is an international consultant, currently contracted senior expert for the European Union Agency for Asylum (EUAA) in Brussels (Belgium), having held similar positions for the EUAA Operations in Madrid (Spain) and Nicosia (Cyprus) from 2022 to January 2025. She earned a PhD in Energy and Sustainability from the University of Perugia in 2025, with a dissertation on "Energy transition and decentralization in Japan: a way towards sustainability". She holds a Master's degree in Lobbying and EU legislation from the School of Law at Rome 2 University. Her expertise includes the post-Lisbon participation of elected national assemblies of Member States in the EU legislative process.

She is currently engaged as a contracted Horizon Result Booster expert specialising in clean energy (with a focus on hydrogen) and raw materials, bringing geographical expertise that includes China and several African countries. She previously contributed as a member of the REGIO Community of Practitioners (CoPs), providing guidance on State aid and the European Regional Development Fund (ERDF). In addition, she possesses expertise in circular economy, clean and affordable energy, and research and innovation.

She has vast experience managing EU-funded projects related to cohesion policy and the energy transition, with specialised expertise in complex administrative procedures, EU budgetary State aid, audits, Simplified Cost Options, procurement processes, one2one negotiation with EU and national authorities.

Public profile published by the EC DG REGIO
– [EC JTPeers AMATO](#)

- PhD in Energy & Sustainability
(University of Perugia)

- Master's degree in Lobbying
and EU legislation (School of
Law, Rome 2 University)

- Licensed Architect (School of
Architecture Napoli Federico II)

Hydrogen Metals Embrittlement

4 meetings with research teams across the service

The screenshot shows the CORDIS project page for the project 'Multiscale Characterisation and Simulation for Hydrogen Embrittlement Assessment: Development of an Open Knowledge Platform to Foster Capability Integration'. The page is part of the 'CORDIS - EU research results' section and is categorized under 'Horizon Europe'. The project is highlighted as a 'WINNER!' of the 'EUROPEAN EXCELLENCE AWARDS 2025'. The page includes a navigation menu with options like 'Home', 'Thematic Packs', 'Projects & Results', 'Videos & Podcasts', 'News', 'Datalab', and 'Search'. The project title is prominently displayed, along with a 'Fact Sheet' tab. The 'Objective' section describes the project's goal to develop adaptive multiscale material modelling and characterisation suites for assessing interactions between hydrogen and advanced metallic materials. The 'Project Information' sidebar on the right provides details such as the project name 'HyWay', grant agreement ID '101135374', project website, DOI '10.3030/101135374', EC signature date '14 November 2023', start date '1 January 2024', end date '31 December 2027', funded under 'Digital, Industry and Space', total cost '€ 6 947 437,50', and EU contribution '€ 6 947 437,50'.

CORDIS - EU research results

CORDIScoverypodcast

EUROPEAN EXCELLENCE AWARDS 2025 WINNER!

Home | Thematic Packs | Projects & Results | Videos & Podcasts | News | Datalab | Search

Home > ... > Horizon Europe >

Multiscale Characterisation and Simulation for Hydrogen Embrittlement Assessment: Development of an Open Knowledge Platform to Foster Capability Integration

Multiscale Characterisation and Simulation for Hydrogen Embrittlement Assessment: Development of an Open Knowledge Platform to Foster Capability Integration

Fact Sheet | Reporting | Results

Objective

HyWay aims to develop adaptive multiscale material modelling and characterisation suites for assessing interactions between hydrogen and advanced metallic materials and demonstrate their capabilities on hydrogen storage and transport components.

Advanced materials application like hydrogen technologies is essential for achieving the EU carbon neutrality goal. However, deploying hydrogen technologies needs a tremendous effort to complete the infrastructure, requiring efficient material assessment suites, enabling industries to be more effective in developing and working with materials. Furthermore, since hydrogen is stored and transported in several forms, the material assessment suites must be flexible and capable of revealing hydrogen-material interactions in various conditions.

The HyWay suites contain 3 key modules: Physical realm, Virtual world, and Data and knowledge management platform (DKMP). The Physical realm will advance experimental capabilities to reveal hydrogen-material interactions by compiling characterisation methodologies across length scales. The Virtual world will develop a multiscale and multiphysics materials modelling framework for disclosing how hydrogen alters changes in advanced materials under various service conditions. The Physical realm and the Virtual world are interdependent and complement each other through the data exchange between modules. We will establish the DKMP to facilitate the data exchange and merge material research disciplines.

HyWay will ensure the productive allocation of investments required in constructing the hydrogen infrastructure. We will strengthen European capability in steering green transition with digital technologies and future emerging enabling technologies and ensure an open strategic autonomy by supporting the transformation of the EU energy mix to be dominated by hydrogen. The consortium comprises renowned experts from academia and industries across the EU and will support Ukraine as its European partner.

Project Information

HyWay
Grant agreement ID: 101135374

Project website [🔗](#) [✕](#) [in](#)

DOI [10.3030/101135374](#)

EC signature date
14 November 2023

Start date
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EU contribution [📄](#)
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CORDIS: <https://cordis.europa.eu/project/id/101135374>

• **Type of SUPPORT requested emerging from meetings with the expert - for the elaboration of activities mentioned in the GA (WP9 tasks 9.4)**

a) General support to effective dissemination, communication and exploitation of project results

2 main domains

- a 1) General orientation on the EU legal framework behind standards and cooperation with SDOs to improve the single market
- a 2) General orientation to understand the state of the art and the complex standard landscape on hydrogen in an EU evolving scenario for aspects relevant to the beneficiary

b) Identifying specific areas worth of new standards / revised standards and Standardization Organizations to engage with relevant to the beneficiary

2 main domains:

- b. 1) Technical standards related to hydrogen across the overall value chain (production, transportation, storage...) from generation to consumption.
- b. 2) Technical standards related to Data Management and Platform Development.

c) Identifying training opportunities on standards due to the complexity of hydrogen transition as both at legal and technical level

APPLICANTS' ORIGINAL REQUEST and links to the effective service provided by the HSBooster expert

- How to choose appropriate types of standardisation for an R&I project
- How to select relevant Standardisation Organisations to engage with
- Information on the standardisation landscape in a certain technical field
- How to search for and select appropriate standards
- (a, b)

- Understand the basics on standardisation including basic terms
- (c).



HyWay_ Visualization of Service delivery



a 1) General orientation on the EU legal framework behind standards and cooperation with SDOs to improve the single market

Orientation -
EU legal
framework –
cooperation
with SDOs

Orientation
- EU
evolving
scenario on
hydrogen

a 2) General orientation to understand the state of the art and the complex standard landscape on hydrogen in an EU evolving scenario for aspects relevant to the beneficiary (2/2)

Effective Communication,
dissemination

Cooperate for future
development

Identify SDOs
for possible
future
collaborations

Research of new/improved
standards

Identify
relevant
areas of
standards

Technical
standards
(materials,
components
etc)

Data
management
and Platform
development

Effective Communication, dissemination

Orientation - EU legal framework – cooperation with SDOs

Orientation - EU evolving scenario on hydrogen

a 1) General orientation on the EU legal framework behind standards and cooperation with SDOs to improve the single market

a 2) General orientation to understand the state of the art and the complex standard landscape on hydrogen in an EU evolving scenario for aspects relevant to the beneficiary

•THE ROLE OF EUROPEAN STANDARDIZATION ORGANIZATIONS IN THE EU DECISION MAKING PROCESS

•STATE OF PLAY ON ACCELERATION ON HYDROGEN AT EU LEVEL - SOME FOR FOOD

•STATE OF ART AND EU WIDE PROGRESS IN POLICIES RELATED TO STANDARDIZATION IN THE HYDROGEN APPLICATIONS

Effective Communication, dissemination



Orientation
- EU
evolving
scenario on
hydrogen

a 1) General orientation on the EU legal framework behind standards and cooperation with SDOs to improve the single market

PRELIMINARY RECOMMENDATIONS:

- Review the EU decision process as it is essential to understand how the relationship among EU institutions and SDOs has evolved and is evolving.
- Such information should be incorporated in WP XY (and Deliverable under Task X.X) to strengthen the importance of the EC in the standardization process and in supporting innovation and decarbonization at the EU and international levels.
- More specifically this information will contribute to strengthen communication&dissemination as well as awareness on the part of the large public in areas of research and application of high experimental value.

•THE ROLE OF EUROPEAN STANDARDIZATION ORGANIZATIONS IN THE EU DECISION MAKING PROCESS

•“The European standardization organizations are defined in Article 2, point 8 and Annex I to the Standardization Regulation (main reference Regulation (EU) No 1025/2012). There are three European standardization organizations: CEN, CENELEC and ETSI. They have an exclusive role to carry out standardization work requested by the Commission in support of EU legislation and policies. The European standardization organizations now cooperate with a wide range of stakeholders, including from third countries, and allow them to participate not only in the technical work but also in their internal policy- and decision-making.” (Excerpts from COM (2022) 32 final. Explanatory note)

•MAIN DOCUMENTS

- [EU Code of Practice on standardization](#) (EUR_Lex)
- [COM \(2022\) 32 final](#) - Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL amending Regulation (EU) No 1025/2012 as regards the decisions of European standardisation organizations concerning European standards and European standardization deliverables.
- [Standard essential patents regulation](#) [EU Legislation in Progress], EPRS, Nov 2023

Effective Communication, dissemination



Orientation
- EU
evolving
scenario on
hydrogen

a 2) General orientation to understand the state of the art and the complex standard landscape on hydrogen in an EU evolving scenario for aspects relevant to the beneficiary (1/2)

•STATE OF PLAY ON ACCELERATION ON HYDROGEN AT EU LEVEL - SOME FOOD FOR THOUGH

•Since 2022, transition to hydrogen as a possible alternative to fossil fuels has got an acceleration with a new impulse and the latest strategies/initiatives/targets set by the EC. However, **many aspects are still to be negotiated at the policy, normative level** which overall pose quite a challenge for new experimental projects and new technologies such as to catch up and to close the gaps along the value chain from generation to consumption.

Among the main issues under negotiations in the EU decision making process are:

- 1) **establishing which sources of generation makes for Green hydrogen** (see the recent **EP ruling on France nuclear-powered electric grid to be classified as "low carbon"**),
- 2) the problems with the use of existing gas networks (**due to embrittlement even with low concentration of hydrogen**) and the necessity to phase them out, whereby given the urgency of transition, hydrogen would require building a new infrastructure;
- 3) “how to ensure that green hydrogen production via electrolyzers does not use renewable energy that would otherwise have been used to provide zero-carbon electricity to the grid”, a key controversial concept known as “**additionality**” (*);
- 4) **Lack of specific standards, an issue now high on the EC agenda, where hydrogen is one of the priority of the 2023 WP of the Union**, a process that will however require more time to be adopted and to have an impact on the market;
- 5) **Technology uncertainty on availability and readiness of the Technology (TRL) at the moment;**

•(*) Source: <https://www.hydrogeninsight.com/policy/european-commission-finally-publishes-definition-for-green-hydrogen-providing-the-certainty-required-for-investment-to-begin/2-1-1403136> (Feb 2023)



Orientation
- EU
evolving
scenario on
hydrogen

a 2) General orientation to understand the state of the art and the complex standard landscape on hydrogen in an EU evolving scenario for aspects relevant to the beneficiary (2/2)

•STATE OF ART AND EU WIDE PROGRESS IN POLICIES RELATED TO STANDARDIZATION IN THE HYDROGEN APPLICATIONS

•Below reference to some of the main and most up-to-date publications and documents (legislative and quasi legislative) by the EP, EC and other institutions on hydrogen and on the standard priorities informing the EC 2023 Work Programme (reaffirmed in the WP 2024 and in draft as well as in early 2025), provided by the expert to directly engage and contribute to the standardization process at EU levels.

(VERY IMPORTANT. Recent comprehensive document on EU policies and initiatives) [Renewable and low-carbon hydrogen State of play and outlook](#), EPRS Feb 2025)

Commission notice of 15/02/2024 C(2024) 1210 final " [“The 2024 annual Union work programme for European standardization \(C/2024/1364\)](#)”, that reiterates hydrogen as a priority (15.02.2024)

“Hydrogen technologies and components: the Commission reiterates the 2023 policy priority on hydrogen technologies and components that aims to improve the development and maintenance of hydrogen infrastructure and technological components in the single market.” (Citation pg 1, Policy priority n. 7)

[EPRS Fiche on Hydrogen directive and networks](#) (April 2023)

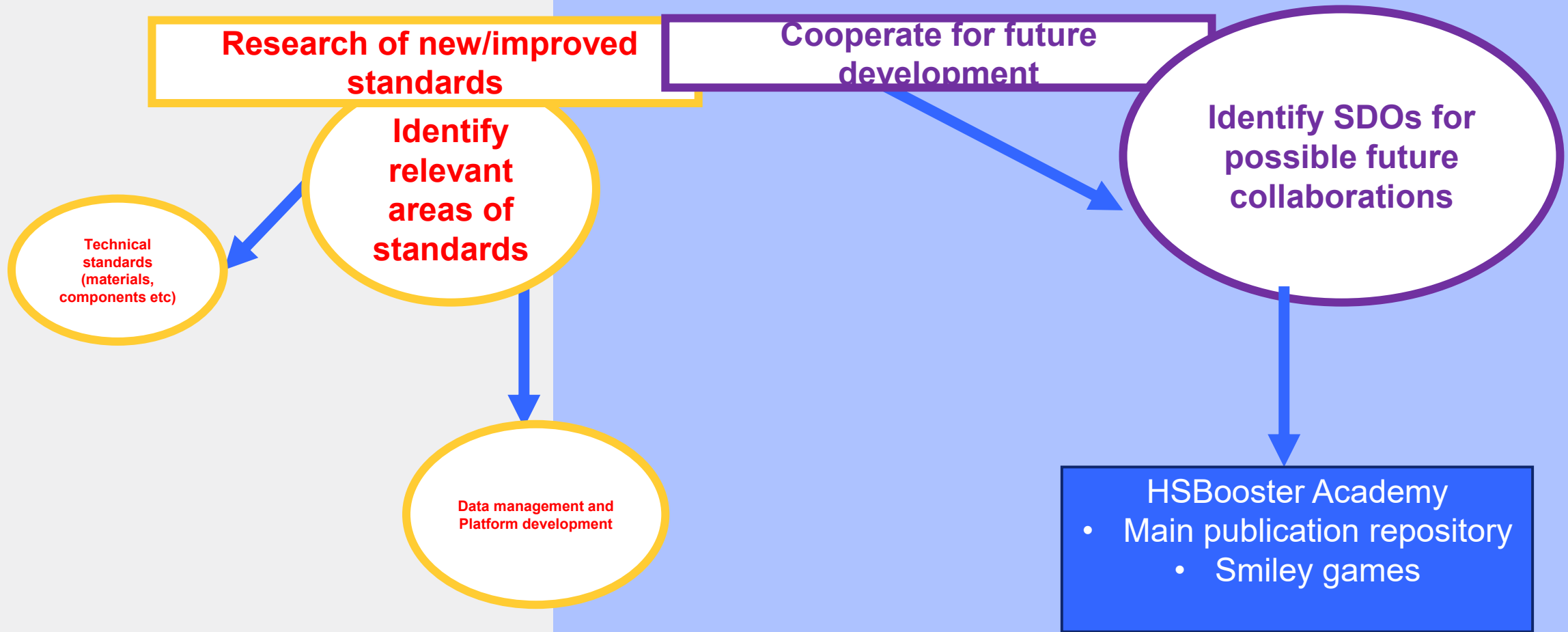
Report by the European Clean Energy Alliance (ECHA) and the latest publication on hydrogen standards "[ROADMAP ON HYDROGEN STANDARDISATION](#)" Published by the EC DG Internal Market on 2/3/2023 (no new version)

[Commission sets out rules for renewable hydrogen](#) (Press release 3/2/2023)

[Scoping study for supporting the development of a-KI0722020ENN.pdf](#) (EC, DG R&I – 2022)

• **OTHER SOURCE**

➤ [STANDARDIZATION ROADMAP, HYDROGEN TECHNOLOGIES](#), 2024 (supported by the German Government)





Research of new/improved standards

Identify relevant areas of standards

Identify SDOs for possible future collaborations

- **Identifying specific areas worth of new standards / revised standards relevant to the beneficiary and Standardization Organizations to engage with, relevant to the beneficiary**

1) Technical standards related to hydrogen across the overall value chain (production, transportation, storage...) from generation to consumption.

2) Technical standards related to Data Management and Platform Development.

•1) **MAIN STANDARD ORGANIZATIONS OF INTEREST**

- ISO/TC 197 - Hydrogen technologies
- CEN/CLC/JTC 6 - Hydrogen in energy systems (Joint Technical Committee)

•**OTHER INITIATIVES BY SDOs OF INTEREST in relation to ONTOLOGY**

- "CEN Workshop Agreement" (CWA 17815) which introduced a standardised terminology and the Characterisation Data (CHADA) documentation scheme

•2) **PRELIMINARY STANDARD ORGANIZATIONS OF INTEREST** referred to smart cities

- [ISO/DIS 37156\(en\) - Guidelines on data exchange and sharing for smart community infrastructures](#)

Thank you for your attention!

Dr PAOLA AMATO



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(Example 2 – Energy and agriculture)

REFFECT – AFRICA RENEWABLE ENERGIES FOR AFRICA: EFFECTIVE VALORIZATION OF AGRI-FOOD WASTES

Example - part 2 Projects Outputs which included Standards within their exploitation strategy.

Dr PAOLA AMATO, Architect, S&T independent expert



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Energy Agriculture Water recycling/reuse

4 meetings with the expert

- 1st - Orientation meeting
- 2nd - Maturity of the technology, status of the demonstrators and issues related to procurement
- 3rd - Standards related to water treatments as indicated in WP1
- Last meeting (June 2023) – general recap and final advice

The screenshot shows the CORDIS website interface. At the top, there is the European Commission logo and navigation links for 'Log in' and 'English'. A search bar is located on the right. Below the header, the main navigation bar includes 'Home', 'Thematic Packs', 'Projects & Results', 'Videos & Podcasts', 'News', 'Datalab', and 'Search'. A banner for 'CORDIScoverypodcast' and 'EUROPEAN EXCELLENCE AWARDS 2025 WINNER!' is visible on the right. The breadcrumb trail reads: 'Home > Projects & Results > H2020 > RENEWABLE ENERGIES FOR AFRICA: EFFECTIVE VALORIZATION OF AGRI-FOOD WASTES'. The project title is 'RENEWABLE ENERGIES FOR AFRICA: EFFECTIVE VALORIZATION OF AGRI-FOOD WASTES', with a 'HORIZON 2020' logo. Below the title are tabs for 'Fact Sheet', 'Reporting', and 'Results'. The 'Project description' section includes language selection icons (DE, EN, ES, FR, IT, PL) and the title 'Powering Africa with biomass wastes'. The description text states: 'The number of people without access to electricity in Africa had dropped in recent years, from 860 million in 2018 to 770 million in 2019. However, the COVID-19 pandemic is reversing this positive trend. In this context, the EU-funded REFFLECT AFRICA project will develop innovative, reliable and adapted sustainable energy solutions based on the valorisation of biomass wastes from agriculture and the food industry through biomass gasification. Full-scale demonstrators will be built in Morocco, Ghana and South Africa to consider both urbanised and rural contexts on the continent. The project will propose solutions for on-grid and off-grid communities, such as the generation of renewable energy, its transmission and the use of storage systems.' A 'Show the project objective' button is partially visible. On the right, the 'Project Information' sidebar shows: 'REFFLECT AFRICA', 'Grant agreement ID: 101036900', a 'Project website' link, 'DOI 10.3030/101036900', 'EC signature date: 1 September 2021', and a timeline with 'Start date: 1 November 2021' and 'End date: 31 October 2026'. At the bottom, it says 'Funded under SOCIETAL CHALLENGES - Secure, clean and efficient'.

CORDIS: <https://cordis.europa.eu/project/id/101036900>

REEFFECT AFRICA –Key goals and abstract

- **REEFFECT AFRICA - Key goals**

- To increase access to electricity in Africa, by developing innovative, reliable and adapted sustainable energy solutions based on the valorisation of biomass wastes from agriculture and the food industry through biomass gasification.
- Project abstract: REEFFECT AFRICA intends to contribute to reversing recent drop in electricity access in the Africa continent, by developing **innovative, reliable and adapted sustainable energy solutions based on the valorisation of biomass wastes from agriculture and the food industry through biomass gasification**. Full-scale demonstrators will be built in **Morocco, Ghana and South Africa** to consider both urbanised and rural contexts on the continent. The project will propose solutions for **on-grid and off-grid communities**, such as the generation of renewable energy, its transmission and the use of storage systems.



REFLECT AFRICA - Expert orientation and support

Original requested HSBooster support

- How to choose appropriate types of standards for an R&I project.

MAIN ACTIVITIES CARRIED OUT

1) Identifying specific areas worth of new standards/revised standards relevant to the beneficiary.

For each area, the expert has identified:

- main standardization organizations of interest to the beneficiary and for future action.
- documents and initiatives to understand standards and policy frameworks

Additional expert SUPPORT and orientation to support the original request:

2) Advice on training opportunities to increase awareness and knowledge in standards within the partnership

Zoom in: How to choose appropriate types of standards for an R&I project.

Help the beneficiary to:

- Understand the complex standard landscape and identify relevant areas where standards can play a key role in future development of proposed technologic innovation by EU partners in Africa.
- Identify and address bottlenecks that can delay the project (Procurement)
- Identify training opportunities to align partners on standardization organizations and new or existing standards.

To better understand the complex standard landscape and identify relevant areas where standards can play a key role



General orientation on the EU legal framework behind standards and cooperation with SDOs to improve the single market

•**THE ROLE OF EUROPEAN STANDARDIZATION ORGANIZATIONS IN THE EU DECISION MAKING PROCESS**

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[EU Code of Practice on standardization](#) (EUR_Lex)

To better understand the complex standard landscape and identify relevant areas where standards can play a key role

RECOMMENDATIONS

COMMISSION RECOMMENDATION (EU) 2023/498

of 1 March 2023

on a Code of Practice on standardisation in the European Research Area

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 292 thereof,

Whereas:

- (1) Standards help researchers and innovators bring their innovation closer to the market and spread technological advances by establishing uniform criteria and by developing methods, practices and procedures which are publicly available in a formal document. European and international standards provide access to large global and regional markets for innovative new products and services.
- (2) Standards offer a basis for the integration of diverse technologies into complex, innovative systems and solutions, and enable interoperability between components, products and services thereby avoiding vendor lock-in and providing more choice for customers globally – a critical role in a world undergoing digital transformation across all industries and sectors.
- (3) Standards enable the free movement of goods, services and data by removing technical barriers. They serve to set minimum safety requirements to the development, transport and use of these goods and services, to protect the public and workers. Standards directly address the UN Sustainable Development Goals and can help strengthen resilience of the economy of the Union. They play a key role in the Union's ambitions towards a climate neutral, resilient and circular economy and in strengthening its open strategic autonomy. Having a strong global footprint in standardisation activities and leading the work in key international fora and institutions will be essential for the Union to remain a global standard-setter.

How to choose appropriate types of standards for an R&I project.

- **Identifying specific areas worth of new standards / revised standards relevant to the beneficiary**
- Reviewing the AF, the expert has identified **4 main areas** where SDOs activities and standards can complement current project activities and specifically can strengthen the project innovative technologies within emergent markets in Africa and beyond.
- **MAIN AREAS:**
 - 1) STANDARDS RELATED TO BIOGAS and BIOMASS FOR ENERGY APPLICATIONS.
 - 2) Guidelines/standards for BIOCHAR
 - 3) Standards for WATER:
 - a) wastewater generated by agri-food waste value chain (referred to WP1 and in primis Del 1.3).
 - b) wastewater treatment in biomass power plants (somehow referred to WP2 /WP3 and activities for the realization of the 3 demonstrators)
 - 4) Standards related to PROCUREMENT

Guidelines/standards for BIOCHAR

BIOCHAR is a challenging new area that is still to be fully explored. Long regarded as sludge, research and use in agriculture of BIOCHAR got a significant acceleration from 2015 and more recently from 2020. Agricultural applications range from soil conditioners, composting additives and carriers for fertilisers to manure treatment and stable bedding, silage additives and feed additives.

- At present the main reference organizations for standards and certification are the following:
 - [EUROPEAN BIOCHAR CERTIFICATION](#), and in particular [new 2023 Guidelines](#)
 - [INTERNATIONAL BIOCHAR INITIATIVE](#) and in particular [IBI Biochar Standards V2.1 Final-2.pdf \(biochar-international.org\)](#)
- **Other documents:**
 - [CEN CENELEC document of interest concerning Sustainable chemicals](#) (2018)
 - [The European Biochar Certificate \(EBC\) \(european-biochar.org\)](#)

Recommendation: Review activities and standards carried out by the SDOs identified by the expert and of interest for the project. This area is one of the most challenging mentioned in the AF with best potential for the future action

Thank you for your attention!

Dr PAOLA AMATO



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