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Proposal Evaluation Form

EUROPEAN COMMISSION

Horizon Europe (HORIZON)

Evaluation Summary Report - Innovation actions

Call: HORIZON-KDT-JU-2023-1-IA

Type of action: HORIZON-JU-IA

Proposal number: 101139790-2

Proposal acronym: ECS4DRES

Duration (months): 36

Proposal title: Electronic Components and Systems for flexible, coordinated and resilient Distributed Renewable Energy Systems

Activity: HORIZON-KDT-JU-2023-1-IA-Focus-Topic-4

N.	Proposer name	Country	Total eligible costs	%	Grant Requested	%
1	INFINEON TECHNOLOGIES AG	DE	3,447,812.5	12.15%	861,953.13	9.97%
2	INFINEON TECHNOLOGIES DRESDEN GMBH& CO KG	DE	1,121,163.75	3.95%	280,290.94	3.24%
3	DEVOLO AG	DE	1,262,500	4.45%	315,625	3.65%
4	Ingenics Digital GmbH	DE	1,337,500	4.71%	334,375	3.87%
5	CEUS UG	DE	665,327.5	2.34%	232,864.63	2.69%
6	FRIEDRICH-ALEXANDER-UNIVERSITAET ERLANGEN-NUERNBERG	DE	984,523.75	3.47%	344,583.31	3.99%
7	TECHNISCHE HOCHSCHULE KOLN	DE	732,848.75	2.58%	256,496.63	2.97%
8	ENERGY WEB DEVHUB GMBH	DE	2,212,500	7.80%	774,375	8.96%
9	STICHTING ELAADNL	NL	920,000	3.24%	322,000	3.72%
10	HELIOX BV	NL	250,313.75	0.88%	62,578.44	0.72%
11	GREENFLUX ASSETS BV	NL	2,254,750	7.94%	563,687.5	6.52%
12	Krachtwerk BV	NL	206,750	0.73%	72,362.5	0.84%
13	TECHNISCHE UNIVERSITEIT EINDHOVEN	NL	775,548.75	2.73%	271,442.06	3.14%
14	TECHNISCHE UNIVERSITEIT DELFT	NL	1,239,247.5	4.37%	433,736.45	5.02%
15	IQUADRAT INFORMATICA SL	ES	300,000	1.06%	105,000	1.21%
16	ACONDICIONAMIENTO TARRASENSE ASSOCIACION	ES	341,250	1.20%	119,437.5	1.38%
17	UNIVERSIDAD DE GRANADA	ES	581,375	2.05%	203,481.25	2.35%
18	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	ES	778,236.25	2.74%	272,382.69	3.15%
19	EPIC POWER CONVERTERS SL	ES	701,375	2.47%	245,481.25	2.84%
20	STMICROELECTRONICS SRL	IT	1,860,433.75	6.56%	465,108.41	5.38%
21	ENEL X WAY S.R.L.	IT	115,000	0.41%	28,750	0.33%
22	POLITECNICO DI BARI	IT	570,000	2.01%	199,500	2.31%
23	CONSORZIO NAZIONALE INTERUNIVERSITARIO PER LA NANOELETTRONICA	IT	1.25	0.00%	0.44	0.00%
24	ALMA MATER STUDIORUM - UNIVERSITA DI BOLOGNA	IT	771,250	2.72%	269,937.5	3.12%
25	UNIVERSITA DEGLI STUDI DI PADOVA	IT	532,500	1.88%	186,375	2.16%

26	UNIVERSITA DI PISA	IT	632,500	2.23%	221,375	2.56%
27	POLITECNICO DI TORINO	IT	190,000	0.67%	66,500	0.77%
28	UNIVERSITA DEGLI STUDI DI MESSINA	IT	375,000	1.32%	131,250	1.52%
29	UNIVERSITA DEGLI STUDI DI CATANIA	IT	402,468.75	1.42%	140,864.06	1.63%
30	LONGVISION SRL	IT	379,830	1.34%	132,940.5	1.54%
31	HIGH PERFORMANCE ENGINEERING SOCIETA A RESPONSABILITA LIMITATA	IT	1,238,238.75	4.36%	309,559.75	3.58%
32	SLOVENSKA TECHNICKA UNIVERZITA V BRATISLAVE	SK	326,000	1.15%	114,100	1.32%
33	R-DAS, SRO	SK	875,000	3.08%	306,250	3.54%
	Total:		28,381,245		8,644,663.94	

Abstract:

ECS4DRES targets the ambitious objective of pursuing flexible, coordinated, and resilient distributed energy systems developing several innovation activities, specifically:
- realization of a multi-modal energy hub
- exploiting renewable energy sources
- realized by means of dedicated high-efficiency power electronics converters
- multi-modal energy storage devices
- sophisticated energy management algorithms enabling the local balances between energy production, storage, and consumption

ECS4DRES will strengthen the long-term reliability, safety, and resilience of DRES by developing advanced monitoring and control technologies including integrated sensors provided with energy harvesting functions, capable of different types of detection for safety purposes, and for monitoring of energy transfers. ECS4DRES will also achieve interoperable and low-latency communication systems, as well as algorithms, AI tools and methods, enabling the widespread interconnection, monitoring and management of a large number of DRES, subsystems, and components to realize optimal energy management between sources, loads, and storages, to improve power quality and to enable resilient system operation. Most of all, ECS4DRES commits to perform a thorough validation of all the above with a set of 5 relevant use cases and demonstrators.

By exploiting the project results, ECS4DRES will generate a wide range of scientific, technological, economic, environmental and societal impacts of global scale, fulfilling the needs of e.g., OEMs, DSOs, grid operators, EV charging station aggregators, energy communities, end customers, academia. ECS4DRES will provide interoperable and tailored solutions in the form of electronic control systems, sensor technology and smart systems integration for the deployment and efficient and resilient operation of DRES including integration of hydrogen equipment and components.

Evaluation Summary Report

Evaluation Result

Total score: 14.10 (Threshold: 11)

Criterion 1 - Excellence

Score: **4.70** (Threshold: 3 / 5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the KDT JU work programme / ECS SRIA:
- Clarity and pertinence of the project's objectives, and the extent to which the proposed work is ambitious, and goes beyond the state of the art.

The proposal addresses well the future energy system based on distributed renewable energy sources, DRES, and the project is clearly motivated by the necessary transition of the electricity grids with dominating intermittent DRES on the generation side and upcoming massive loads with e.g EV charging and heat pumps. It defines three innovation domains to be addressed – hardware components and subsystems, algorithms and software and secure and low latency communication. It is well aligned with the call topic 4, fully inline with the objectives of the Green Deal and has the potential to contribute to achieving CO2-zero electricity supply.

The proposal defines a set of well elaborated objectives for each innovation domain. However, in innovation domain 3 related to communication the necessity of the proposed work compared to existing technologies is not clearly motivated.

A strong point of this proposal is the clear KPIs defined for the evaluation of the proposed solutions grouped in 5 use cases.

This is a highly ambitious project, the progress beyond state-of-the-art is evident, especially regarding integration of hydrogen storage and sensing as part of DRES and predictive maintenance of DRES.

The proposal presents a comprehensive list of relevant technologies together with the information how the project will increase TRL. The project meaningfully builds on the results and experiences of several previously funded relevant ECSEL projects.

- Soundness of the proposed methodology, including the underlying concepts, models, assumptions, inter-disciplinary approaches, appropriate consideration of the gender dimension in research and innovation content, and the quality of open science practices, including sharing and management of research outputs and engagement of citizens, civil society and end users where appropriate.

The overall methodology and concept to further develop an electronic management and control system for efficient and resilient operation of DRES is sound. It is based on well justified needs (i) to develop DC power conversion for efficient and flexible grid-integration of DRES, (ii) to develop ICT condition-based monitoring systems, and (iii) to develop intelligent energy/power management and control algorithms. All three areas are underpinned with well justified planned research work of the partners.

The project use cases are convincingly selected and well described including the link to the project objectives, involved partners, expected results, planned advancements with measurable KPIs. This is a good approach and will ensure a proper validation of the concept.

The multi-disciplinary approach is well addressed with the proposed team involving device engineers with fabrication and processing expertise, communications engineers to integrate metering circuits, systems developers of electronic systems and computer and network engineers to develop a common platform for hardware and software requirements of the end applications in the use cases.

Open science is well addressed and the proposal gives a clear commitment to the open science practices including open access publishing.

The data management plan is adequate but rather generic. Data sets for validation and data set to be published are only vaguely described.

Gender dimension is appropriately considered.

The proposal comprises work on artificial intelligence. The proposed work is based on robust technologies and does not give rise to ethical concerns about human rights.

Criterion 2 - Impact

Score: **5.00** (Threshold: 3 / 5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the KDT-JU work programme /ECS SRIA. The extent to which the outputs of the project should contribute at the European and/or International level to:
- Credibility of the pathways to achieve the expected outcomes and impacts specified in the work programme, and the likely scale and significance of the contributions from to the project.

The expected impacts to the main objectives and expected outcomes specified in the KDT work program are well addressed. The two main impacts are expected in (i) novel solutions in the form of electronic control systems, sensor technology and smart systems integration for the deployment and efficient and resilient operation of DRES, and (ii) integration of hydrogen equipment and components.

Target groups are well specified, and the scale and significance of the addressed markets are well argued and quantified.

A highly important pathway to generate impact is related to the five use cases. However, expected benefits and impacts on partners level are not specified with enough details.

The barriers to impact are not properly identified in terms of different regulations and market situations across Europe.

- Suitability and quality of the measures to maximise expected outcomes and impacts, as set out in the dissemination and exploitation plan, including communication activities.

Dissemination and communication strategies are well described with different phases from awareness formation up to global outreach together with well-quantified target values for the individual categories. Target groups are adequately specified for the different dissemination & communication channels and tools.

Relevant target journals, conferences, workshops and exhibitions are listed, and further educational activities (M.Sc. and PhD theses, tutorials, schools) are mentioned. Adequate communication channels and tools are listed including project website, social media, brochures and newsletter and video clips.

The exploitation strategy and plans are excellent, presenting a draft exploitation map which will be refined in the project´s exploitation plan. The map of commercially exploitable actions presents very detailed information and plans for each of the planned innovations. Furthermore, the path to market is well elaborated for each of the planned innovations. The exploitation strategy per academic partner is well described. Standardization activities with planned contributions to standardization bodies are well presented.

IP provisions within the consortium are well explained.

Criterion 3 - Quality and efficiency of the implementation

Score: **4.40** (Threshold: 3 / 5.00 , Weight: -)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the KDT -JU work programme /ECS SRIA:
- Quality and effectiveness of the work plan, assessment of risks, and appropriateness of the effort assigned to work packages, and the resources overall.

The workplan is well elaborated with enough details provided for workpackages and their breakdown into logical tasks. The technical work packages WP 1-4 logically follow the uses case structure of the project. The Gantt chart gives a good overview on WPs and tasks with their timing. Furthermore, a collaboration matrix clearly shows the involvement of all partners in the different tasks and work packages.

Requirements are mainly technically driven, but an elaborated analysis of who the users and stakeholders are, and what their need and pain points are, is missing in WP1.

The planned effort assigned to the work packages is appropriate considering the wide range and the complexity of the planned developments and innovations. The overall resources are appropriate. However, efforts allocated to the project management work package are significantly too low for a project of this size and complexity.

Risk management is comprehensive and mitigation measures are mostly reasonable. However, some of the risks, for instance risk 5, are not described as risks but rather as requirements or design decisions that need to be taken.

Furthermore, AI-related risks are underestimated with vaguely defined mitigation approaches given the importance of AI for the envisioned project outcomes. Also, the work on hardware accelerators for AI to be mainly performed by participant 25 is rather detached from other tasks and not clearly linked to any objective or market need.

- Capacity and role of each participant, and the extent to which the consortium as a whole brings together the necessary expertise.

The consortium is a well-composed group of strong academic and industrial partners including SMEs. The partners have strong and complementary expertise; the consortium has all competencies, infrastructure and knowledge to successfully execute the project plan.

The core group has already worked together for many years in the frame of previous ECSEL projects. However, the consortium has limited presence of actors from the energy sector such as energy service aggregators and virtual power plant operators.

Scope of the application

Status: **Yes**

Comments (in case the proposal is out of scope)

Not provided

Exceptional funding

A third country participant/international organisation not listed in the General Annex to the Main Work Programme may exceptionally receive funding if their participation is essential for carrying out the project (for instance due to outstanding expertise, access to unique know-how, access to research infrastructure, access to particular geographical environments, possibility to involve key partners in emerging markets, access to data, etc.). (For more information, see the HE programme guide)

Please list the concerned applicants and requested grant amount and explain the reasons why.

Based on the information provided, the following participants should receive exceptional funding:

Not provided

Based on the information provided, the following participants should NOT receive exceptional funding:

Not provided

Use of human embryonic stem cells (hESC)

Status: **No**

If YES, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please state if it cannot be assessed whether the use of hESC is necessary or not, because of a lack of information.

Not provided

Use of human embryos

Status: **No**

If YES, please explain how the human embryos will be used in the project.

Not provided

Activities excluded from funding

Status: **No**

If YES, please explain.
Not provided

Do no significant harm principle

Status: **Yes**

If Partially/No/Cannot be assessed please explain
Not provided

Exclusive focus on civil applications

Status: **Yes**

If NO, please explain.
Not provided

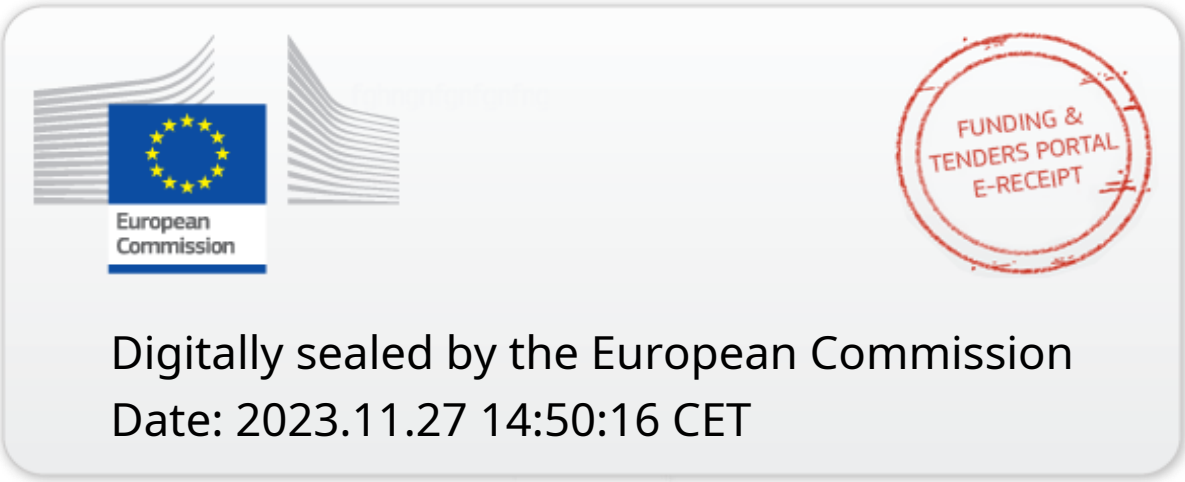
Artificial Intelligence

Status: **Yes**

If YES, the technical robustness of the proposed system must be evaluated under the appropriate criterion.

Overall comments

Not provided



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