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EoCoE-II

Energy Oriented Center of Excellence:
toward exascale for energy

Grant Agreement Number: 824158

D6.4

Assessment report on dissemination, communication and networking
(includes contributions from all tasks)

Project and Deliverable Information Sheet

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Content

Executive Summary

This deliverable is the final report that describes the main EoCoE-II activities regarding communication and dissemination that were carried out during the second half of the project, and outlines updates and adaptations to the plan that was set out in the proposal and in Deliverable D6.3.

The aim of the Energy Oriented Centre of Excellence is to develop and promote a wide range of HPC technologies to contribute to accelerate the transition to a carbon-free economy. To this end, several dissemination and communication actions were put in place to reach the most extensive possible audience during the project timeframe.

The general dissemination and communication of results and knowledge was delivered by means of a wide range of instruments, already described in the previous deliverable:

- the project website (first reference for the project documentation)
- a periodical newsletter (350 subscribers),
- the LinkedIn company profile (more than 655 followers),
- a YouTube channel for storing project results and webinars (more than EoCoE-II 50 videos are available, plus 50 more from EoCoE-I).

Moreover the dissemination and communication activities were strengthened by:

- Strong collaboration with the European Energy Research Alliance (EERA). EoCoE is leading the HPC subprogram of the transversal Joint Programme “Digitalization for Energy”;
- Preparation of a position paper on HPC for energy;
- Availability of a SaaS portal to allow non-expert users to access easily to a friendly environment to run real HPC applications on a large supercomputer.
- Educational activities (summer school and webinars)
- Publication of high-level scientific papers covering both EoCoE’s technical and scientific activities. More than 56 papers are already published on international high-impact journals;
- Participation and organization of workshops and meetings.

Last but not least, the Italian company META Group was hired to raise the awareness of EoCoE-II partners in the field of exploitation. META Group provided the consortium with a professional external support to maximize the impact of EoCoE activities.

Acronyms and Abbreviations

CFD	Computational Fluid Dynamics
ECG	Exascale Co-design Group
ECP	EoCoE Collaborative Platform
ECRA	European Climate Research Alliance
EERA	European Energy Research Alliance
EMMC	European Materials Modelling Council
EOSC	European Open Science Cloud
ETP4HPC	European Technology Platform for HPC
GPU	Graphical Processing Unit
HPC	High Performance Computing
HPC3	HPC CoE Council
IEA	International Energy Agency
JP	Joint Programme (EERA)
LES	Large Eddy Simulation
PRACE	Partnership for Advanced Computing in Europe
PEC	Project Executive Committee
SaaS	Software as a Service
SC	Scientific Challenge
SRA	Strategic Research Agenda
TC	Technical Challenge

Introduction

The purpose of this document is to report accurately about the dissemination, communication, networking and education activities performed during the second part of the EoCoE-II project.

In order to communicate effectively about EoCoE-related activities and achievements, we designed a complete, exhaustive, frequently updated website. The website is the common starting point for any information about EoCoE. Newsletters and LinkedIn profile are tools that are used to reach out beyond the audience of the website. This strategy is confirmed to be a successful one, as testified by the statistics of the website and of the LinkedIn profile.

Dissemination activities are mainly based on conferences and scientific papers. Dissemination activities were severely curtailed due to the COVID-19 pandemic, but restarted during 2022. On the contrary, the number of scientific papers has steadily increased during the project time-frame. The number of EoCoE-II papers now exceeds the number published during EoCoE-I. This is due to the greater maturity of the scientific and technological achievements in the second phase of the project.

The information system is supported by a common repository platform (every project member can access all sections) where all information and documents are collected. A HowTo has been constantly updated to adapt it to the new project needs.

The dissemination and networking activities were further supported by specific actions:

- Networking with, disseminate and widely communicate information about the project, its results and its impacts to targeted end-users, regulators, other stakeholders and the general public;
- Putting in place a stable collaboration with EERA, seen as a key stakeholder in the project's topics of interest;
- Organizing and holding Project Meetings and Workshops, also extended to students, researchers and industrial stakeholders;
- Collaborating with PRACE/PATC and other organizations/projects, to address the skills gap in computational science by specialised training and capacity building measures to develop the human capital resources for increased adoption of advanced HPC in academia and industry.

Work Package 6 is structured in five tasks devoted to different but complementary activities of dissemination and communication:

Task 6.1: Dissemination and Communication of results and knowledge
Task 6.2: Establishment of a collaboration with EERA
Task 6.3: Networking with stakeholders and EU HPC landscape
Task 6.4: Design, specifications and implementation of services
Task 6.5: Education and training

In the following sections, the contribution of each task to the EoCoE-II dissemination will be described in details. For each task, the activities done in the second period of the project are reported with a detailed discussion of what the main achievements are.

Dissemination and Communication of results and knowledge (Task 6.1)

Website

In order to communicate effectively about EoCoE-related activities and achievements, we designed a complete, exhaustive, frequently updated website. The website is the reference for any information about EoCoE. All public documents are uploaded on the website: description of the consortium, the project breakdown and committees, deliverables (including EoCoE-I deliverables). Moreover a People@EoCoE page is added to facilitate connections with project participants and the experts of every technical and scientific challenge. In the following figure, only some of the participants are reported, the others can be found on the website.

Due to the increasing number of the scientific and technical achievements, a “success stories” box was added to the homepage in the second part of the project.

Thus, on the homepage there are two main boxes to provide the following information:

- "news and events", constantly updated with project initiatives;
- "success stories" to give the highest visibility to the EoCoE scientific and technical achievements.

The core part of the website are the sections devoted to the description of the scientific and technical challenges. For this reason two central sections are devoted to both technical and scientific challenges. It is possible to navigate trough the main activities and achievements and find the right reference to get more information.

The website, in the last six months before the end of the project, was visited about 1,700 times. This means that on the average 300 visitors browsed the site each month looking for information. Only 10% of them did not look for further information on the site, while the remaining 90% downloaded about 7000 EoCoE pages. This can be considered a good result, since users often prefer to browse social media rather than read websites.

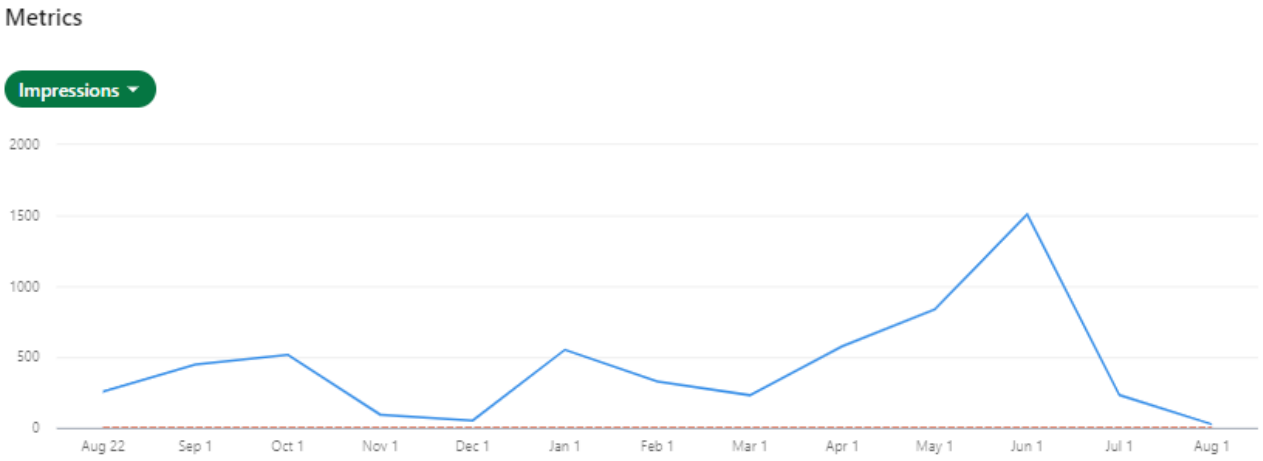
Project repository

The information system is supported by a common repository platform (every project member can access all sections) where all information and documents are collected. On the homepage of the website the link to the project repository can be found. The project repository is an instance of the OnlyOffice service managed by ENEA in collaboration with GARR. The repository has 100 active users and is storing more than 10 GB of documents.

Social network: LinkedIn

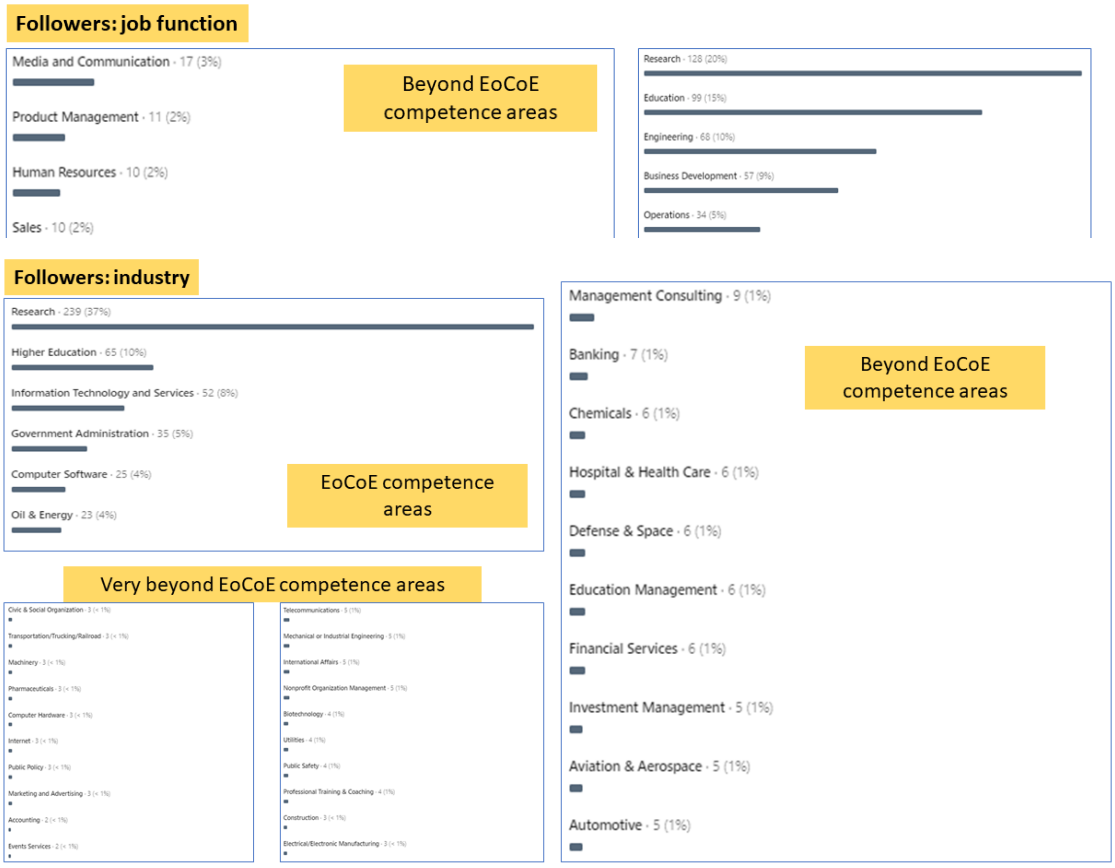
The LinkedIn page has been used for continuous dissemination of information about project activities and events. A company profile was opened in the mid of 2019 and now it has collected over 650 followers. The LinkedIn profile and has shown very good results in terms of interest, particularly among people not belonging to research and academia. Indeed it represents the most important tool to keep in touch with professionals, institutions and companies.

In the following figure the "impressions" are reported. Impressions are recorded when a generic LinkedIn visitor stops scrolling the posts to read the EoCoE-II post for more than 300 milliseconds. In the following figure the last year impressions are reported. In the month of June 2022 about 1500 LinkedIn visitors read an EoCoE-II post.



LinkedIn visitors interested in receiving notifications from EoCoE-II can choose to be followers of the EoCoE-II page. Till now the EoCoE-II LinkedIn page has more than 655 followers. In the following figures it is reported that the followers are not only from the traditional scientific areas of EoCoE but from a very ample set of industries and job functions.

The EoCoE-II followers have job functions that are not only in the field of research but they are in other industrial and governmental area. Looking to job functions, it is possible to find in the "Beyond



EoCoE competence areas" the following: media and communication, product and management, human resources, sales, military and protective services, marketing, administrative, finance, art and design, entrepreneurship.

For what concern the industry of the followers, it is possible to find in the box "Beyond EoCoE competence areas" the following: management consulting, banking, chemicals, hospital and health care, defence and space, education management, financial services, investment management, aviation and aerospace, automotive.

Newsletters

A periodical newsletter is sent to a group of 350 subscribers. The aim of the newsletter was to reach out to interested people with the last updates of EoCoE-II activities.

To this end, in the second half of the project, 3 newsletters were delivered focusing on the best scientific achievements and on the main EoCoE events.

Newsletters n.4 content:

- *News*
- *New Joint Programme in EERA: "Digitalization for Energy"*
- *Success stories*
    - *SHEMAT Suite*
    - *Quantum Monte Carlo applications*
    - *Functionalized electrolytes*
    - *Perovskite solar cells*
- *EoCoE events*
    - *Webinar: "Parallel Matrix-free Multigrid for Extreme Scale Computing"*
    - *Workshop: "EoCoE: getting ready for using results"*
    - *Workshop: "EoCoE & EXA2PRO Joint Workshop"*
- *Follow EoCoE in meetings*

Newsletters n.5 content:

News

- *The EoCoE School*
- *EoCoE – EERA Position paper*
- *FocusCoE impact brochure*
- *EoCoE-III submitted*
- *Second year EERA Joint Programme "Digitalization for Energy"*
- *EoCoE Linkedin page at the top!*

Success stories

- *Implicitly Extrapolated Geometric Multigrid on Disk-Like Domains for the Gyrokinetic Poisson Equation from Fusion Plasma Applications*
- *Next steps in the footprint project: A feasibility study of installing solar panels on Bath Abbey*
- *Reducing hydrological modelling uncertainty by using MODIS snow cover data and a topography-based distribution function snowmelt model*
- *Tuning the Electronic Properties of Graphane via Hydroxylation: An Ab Initio Study*
- *MetalWalls: A classical molecular dynamics software dedicated to the simulation of electrochemical systems*
- *BootCMatchG: An adaptive Algebraic MultiGrid linear solver for GPU*

Meet the EoCoE experts
Follow us online

Newsletters n.6 content:

Foreword by Edouard Audit
News

- *The EoCoE-II project meeting in Naples (20-21 June 2022)*
- *EERA – EoCoE position paper on HPC for energy*
- *EoCoE in the EERA Joint Programme "Digitalization for Energy"*
- *SaaS portal up & running*
- *New EoCoE brochure*

Success stories

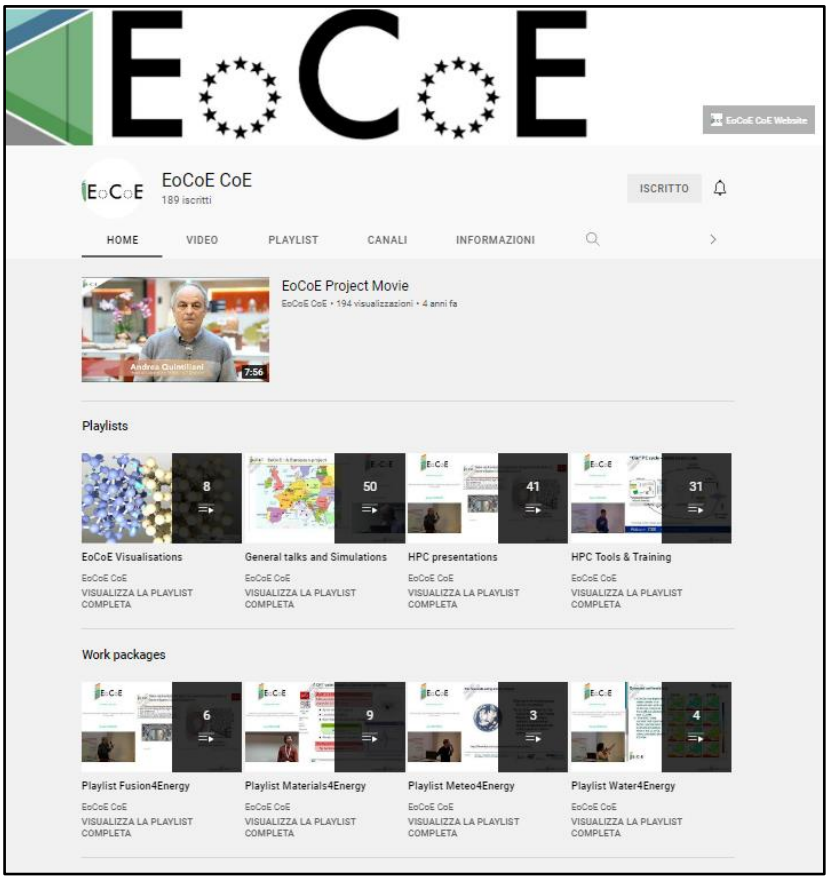
- *Enhancing the electronic properties of VLS-grown silicon nanowires by surface charge transfer.*
- *Analysis of high streamflow extremes in climate change studies: how do we calibrate hydrological models?*
- *An elastic framework for ensemble-based large-scale data assimilation.*
- *Effect of Doping, Photodoping, and Bandgap Variation on the Performance of Perovskite Solar Cells.*
- *Evaluation of a lattice Boltzmann-based wind-turbine actuator line model against a Navier-Stokes approach.*

Follow us online

EoCoE YouTube channel

A strong YouTube channel is available to store EoCoE videos, from webinars, meetings and courses. To date the channel offers 106 videos, more than half of them of which were uploaded during EoCoE-II. All EoCoE-I videos are stored here too. The number of followers increased constantly during EoCoE-II: to date the channel has almost 200 followers and more than 17.000 visualizations.

To better access the videos, the YouTube channel has 8 playlists: EoCoE visualisations, general talk and simulations, HPC presentations, HPC tools and training, fusion4energy, materials4energy, water4energy and meteo4energy.



Brochure

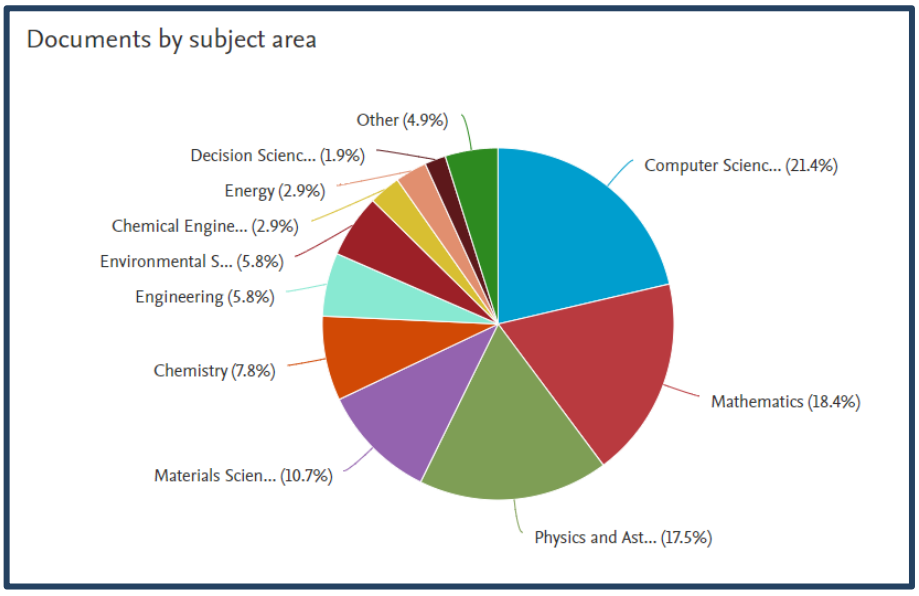
A digital brochure is available on the website for a quick and complete overview of the project. The brochure is divided into sections to better describe scientific and technical activities. If needed, the brochure can be printed and distributed at conferences and workshops.

Scientific papers

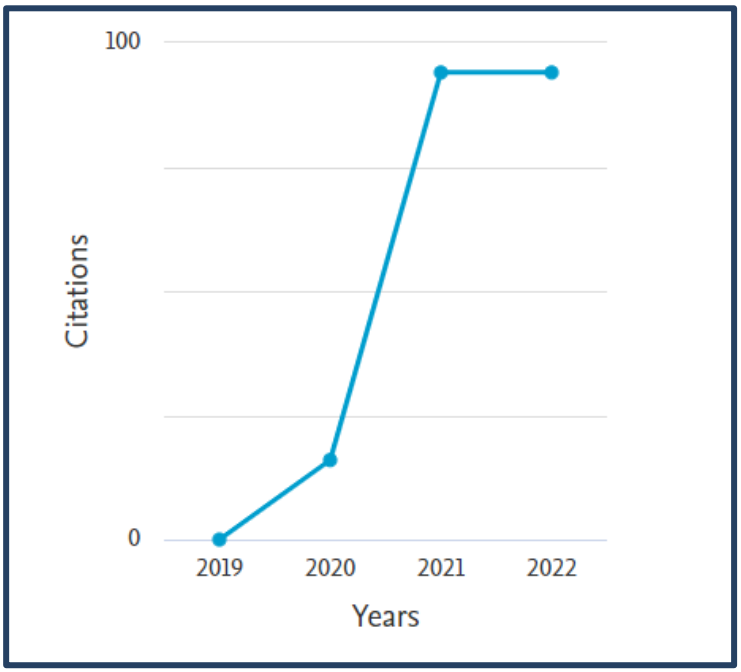
In the following table the number of scientific papers published on international journals with referee is reported. To better qualify the EoCoE-II performance, a comparison with EoCoE-I is performed. EoCoE-I 67 papers were published from year 2016 to year 2021. On the contrary EoCoE-II has already 56 papers and we expect this figure will greatly increase in the next two years.

Year	EoCoE-I	EoCoE-II
2016	7	
2017	11	
2018	18	
2019	22	4
2020	6	19
2021	3	20
2022 June		13
Total	**67**	**56**

The EoCoE-II papers cover many technical and scientific fields. Most of the papers are in the field of computer science (21,4 %) and many others papers are in the fields of: Mathematics (18,4 %), Physics and Astronomy (17, 5 %), Materials Science (10,7 %), Chemistry (7,8 %) and Engineering (5.8 %).



Number of citations of the EoCoE-II papers. It is clear a growing interest in the EocoE-II papers: more than 200 papers cite and use EoCoE-II results. EoCoE-II papers are already cited several times: about 100 citations in both 2021 and 2022 (even if 2022 is considered till June only).



Further dissemination activities supported by META Group.

In June 2020, the Second Phase of the Contract started with the focus on dissemination plan support. The core of this part is:

- the support in dissemination of the results to the target groups of identified users outlined in the First Phase;
- identification of early adopters (potential customers outside the partnership) interested in taking part in tests and in acting as industrial testimonials for the use of services;
- identification of the unique value proposition, what makes the novel solution much better than current ones, the pivot to be used for the messages to be delivered during dissemination activities and the finalisation of the most suitable distribution channels to reach customers/users out.

In the Second Phase, the following items were addressed:

- the Lean Canvas tool that can help in these crucial activities. It focuses on problems, solutions, key metrics and competitive advantages. It is a powerful tool to be used to further develop the characterization of key exploitable results, prepare the materials to be discussed at meetings and draft the exploitation/business plan for a exploitable result.

- The FactSheet, used to collect the information needed to disseminate project results. It is recommended to use it in order to maximise the potential impact of selected key exploitable results. The idea of the FactSheet is to present/describe comprehensively in an easy-to-understand way the exploitable result and to generate appealing 2-pages and/or to invite the solution owners to pitching events or exhibitions.

Activities carried out in Phase 3 (01.2021 – 06.2021)

- FocusCOE Sustainability workshop
- Exploitation Workshop
- How to Pitch Seminar
- Collection of Pitch
- EoCoE results pitching event
- Support to ENEA on dissemination
- Reporting

After the second phase, and having illustrated to KER Leading Partners the Lean Canvas and the Exploitation Roadmap, META and ENEA agreed that the KER Leading Partners should present the Key Exploitable Results identified in the Exploitation workshop on the 2nd of February 2021.

The five selected KERs were presented at the Workshop:

- Herbert Owen (BSC, SP) "ALYA - High Fidelity Simulator for wind energy applications"
- Yvan Notay (Bruxelles, BE) "AGMG - Software Library"
- Pasqua D'Ambra (CNR, IT) "PSBLAS and AMG4PSBLAS Software Libraries"
- Francesco Buonocore (ENEA, IT) "Calculation protocol for electronic transport simulation in nano devices"
- Paweł Wolniewicz (PSNC, PL) " SaaS Portal"

As Pasqua D'Ambra and Francesco Buonocore were involved in the process at the end of the second phase and they had worked just on the Characterisation Table, on the 16th of February 2021 was set up a telco with them in order to instruct how to fill the Exploitation Roadmap properly and plan actions needed to ensure the use of the results, after the end of the project.

The roadmap was developed by the two groups and discussed:

- on the 4th of March with Pasqua D'Ambra (CNR);
- on the 18th of March with Francesco Buonocore (CNR, FZ JUELICH).

On the 13th of April META delivered the Workshop "How to present your results in 3 minutes", the workshop was focused on the introduction of the key elements to present the research result and rise interest in a very short time. On the same day was shared with the KER Leading Partners the "How to pitch" Guidelines to start preparing their results' pitches.

The discussion on the pitches was carried out virtually with the KER Leading Partners willing to present research result in a pitch:

- on the 25th of January with Paweł Wolniewicz (PSNC);
- on the 28th of May with Pasqua D'Ambra (CNR);
- on the 31st of May with Herbert Owen (BSC);

- on the 8th of June with Francesco Buonocore (ENEA).

On the 16th of June, the KER Leading Partners presented their results in "Pitching EoCoE results" workshop. This was the outcome of the EoCoE-II – META cooperation in order to find out the key exploitable results of the EoCoE project. The event's focus was specifically on how the project's participants can pitch their results.

The presented pitch were the following ones:

- H.Owen (BSC, SP) "ALYA - High Fidelity Simulator for wind energy applications".
- P. D'Ambra, F Durastante (CNR, IT), S. Filippone (UNITOV, IT) "PSBLAS and AMG4PSBLAS - Software Library".
- Pecchia (CNR, IT), E. Di Napoli (Juelich, DE), F. Buonocore, M. Celino (ENEA, IT) "Calculation protocol for electronic transport simulation in nano devices".
- P. Wolniewicz (PSNC, PL) "The EoCoE SaaS Portal".

A jury took part at the event, and all the members gave precious feedback to the speakers and at the end was chosen the most effective pitch.

The jury was composed of experts from different sectors:

- Massimo Fedeli, Head of Technology and Digital Transformation of Industrial Management Systems in Solvay.
- Marco Franchin, one of the founders of a local BAN in northern Italy.
- Maike Gilliot, CEA, Start-up- and SME development for European Technology Platform for HPC.
- Luca Longo, Scientific communicator and disseminator in ENI External Communication.
- Alessia Melasecche Germini, COO at META Group, Expert Evaluator, Reviewer and Rapporteur for EC.
- Francesca Natali, Fund managing director at META Ventures.
- Diego Parimbelli, Innovation Manager of E.ON in Italy.

"Calculation protocol for electronic transport simulation in nano devices" was awarded as the most effective pitch.

After the virtual interactions, META Group prepared a document with all the information discussed and the outcomes of the EoCoE-II – META cooperation, that will be included in the final EoCoE-II deliverable on dissemination, communication and networking.

It includes recommendations for the next steps and background materials for further developing and disseminating the selected key exploitable results (KERs).

Moreover, on the 21st of January META took part in the Seminar "Boosting the use of results & sustainability and experience within EoCoE". The event was organised by the coordinating and supporting action FocusCoE. META presented the approach implemented by EoCoE to define Key Exploitable Results and capitalise on the project's results. This event contributed to the dissemination of the project results.

Establishment of a collaboration with EERA (Task 6.2)

As aforementioned, EERA has officially launched the transversal Joint Programme (tJP) 'Digitalisation for energy' (DfE) in March 2022 with the approval by the alliance General Assembly. This has been a major step forward for the consolidation of the collaboration between EERA and EoCoE-II and represents a continuity as well.

DfE (https://www.eera-set.eu/component/projects/projects.html?id=183) is structured in several subprogrammes under a modular basis and counts on the participation and even coordination of several EoCoE-II partners such as CEA, FZJ, ENEA, CIEMAT. Thus, EoCoE-II representatives hold managerial responsibilities in DfE, i.e. tJP Coordinator, tJP Deputy Coordinator, and SP1 Leader.

SP1 is devoted to develop HPC activities in the digitalisation of the energy sector and, this way, is much based on EoCoE-II. This fact is not trivial as, DfE pursues consolidated initiatives to form their specific subprogrammes and EoCoE-II is the one in charge of HPC activities. Hence, a mutual benefit has been established by the two initiatives and several research and dissemination activities have been carried out (see below).

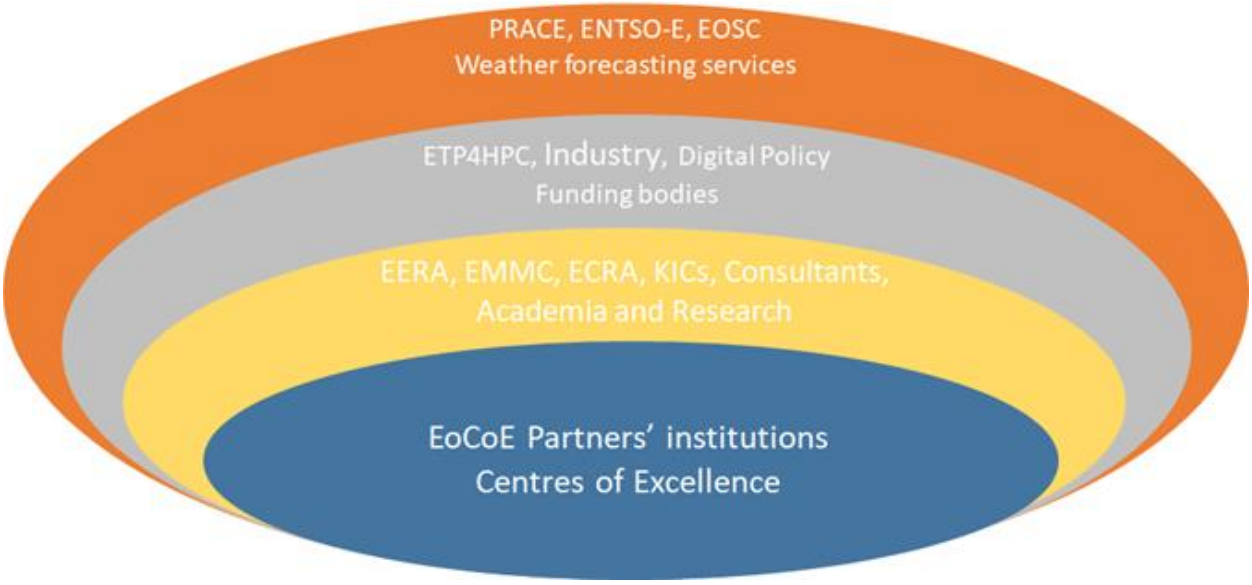
From previous information reading in previous WP6 related deliverables on the topic, it is important to pinpoint the recently launched European Commission Action Plan for the digitalisation of the energy sector, in which DfE is being consulted and the EoCoE-II activities and services, mainly, have been deeply promoted. The project catalogue of services and the SaaS portal have been disseminated in this context and hopefully will be cornerstone for the future actions to be developed as part of the Action Plan.

Another future activity should be highlighted such as the task force carried out by EERA to define the nature and outcomes that a potential energy oriented centre of excellence should have. DfE is part of this process and has already promoted EoCoE-II capacities in some of the candidate ones (energy system integration, wind, etc.). This process is still on the way and it will be crucial for the potential EoCoE third phase.

Last but not least, DfE and EoCoE have already published a position paper entitled 'Exascale, a great opportunity for Clean Energy Transition in Europe', which is not only an official EoCoE-II deliverable, but a solid proposal for setting up HPC in the forefront of the digitalisation of the energy sector with a proper and rationale funding.

Networking with stakeholders and EU HPC landscape (Task 6.3)

The work of Task Force 6.3 comprises three subtasks reported below. This schema describes the main EoCoE-II project stakeholders starting with the network of the Centres of Excellence funded in the same call (blue ellipse).



Main categories of EoCoE-II Stakeholders: in blue color are the primary stakeholders, in yellow color the key participants, in grey color the Tertiary stakeholders and in orange color are represented the Extended Stakeholders.

Advertise EoCoE's services to stakeholders

After the thorough dissemination actions on this theme performed in the first reporting period, dissemination actions in the second half of the project were related mainly to the dissemination of the recommendations of the EERA and EoCoE-II joint position paper to EoCoE stakeholders (deliverable 6.5). The following is a brief tracing of such actions.

Action 1: Identify policy events, workshops and conferences where to present the recommendations stated in the Position Paper. Full alignment with EERA events.

Events per target group:

Policy Makers	○ EuroHPC Summit Week 2022, Paris, France. From 22/03/2022 to 24/03/2022. *Edouard Audit, EoCoE's coordinator, chaired a round table discussion on "European HPC CoEs: perspectives for a healthy HPC application eco-system and Exascale". Several EoCoE team members joined in on the discussion, including Ani Anciaux Sedrakian*

	(IFPEN) and Bruno Raffin (INRIA). During the exchanges, Ms. Sedrakian presented the joint paper, insisting on its being an important milestone and basis for future collaborations. o Event associated to EERA workshop on Promoting cooperation between digitalisation of energy centres of expertise and (Energy) Digital Innovation Hubs (25 Febr. 2022) o Adel El Gammal (sec. general of EERA) shared the Position Paper of EoCoE-II and EERA with the following EU staff: o Juan Pelegrin (HPC Unit, DG Connect) o Vincent Berrutto (Head of Unit, DG Energy, Research, Innovation, Competitiveness, Digitalisation - DG Energy) o Published in the April newsletter of the JSC (FZJ) and followed by an HPCWire article (May, 2, 2022) o Participation as a speaker of Rafael Mayo-Garcia in the e-IRG Workshop under French EU Presidency (30-31.05.2022) in the session on **The twin "green and digital" transition in e-Infrastructures**. The presentation is foreseen to address the activities of the "Digitalisation for energy" EERA Joint Programme, namely the position paper and its implications with the e-Infrastructure domain. o There was an EoCoE-II participation at the EERA Annual Strategy Meeting (June 2022). The Alliance invited the project to be present and discuss about the future of important European actions such as REPowerEU. o The European Commission launched its Action Plan for the digitalization of the energy sector. The first bunch of activities was a series of workshops to discuss about the different strategies that should be followed. EoCoE-II and EERA participated in the "Promoting cooperation between digitalisation of energy centres of expertise and digital innovation hubs" one o 12.10.2021. Organization of the workshop "Towards High-Performance Computing (HPC) and the FAIRification of energy data with EERA on October the 12th. It was an online event with the participation of Vincent Berrutto (Head of Unit 'Innovation, clean technologies and competitiveness', DG ENER, EC) and Adel El Gammal (Secretary General EERA). The workshop was jointly organized by EoCoE, EERA DfE and EERAdata project. Partecipation of several EERA Joint Programme coordinators. M. Celino (ENEA)

	chaired the session and E. Audit (CEA) presented the EoCoE HPC activities in the frame of EERA.
Academia/Research peers	○ EM4I - Final conference, Sept/oct, Brussels 2022 – Online, Responsible: *Rafael M. Garcia* ○ Solar Cells Conference, 23-25 May, Valencia, ES. Responsible: *Alison Walker* ○ Spanish SuperComputing Network – User Forum. Sept 12-15, ES. Responsible: *Rafael M. Garcia* ○ EERA transversal Joint Programme "Digitalization for Energy" (DfE) is coordinated by Rafael F. Garcia (CIEMAT) and supported by a deputy coordinator Massimo Celino (ENEA). The subprogramme "SP1 HPC" is coordinated by Edouard Audit (CEA). The Joint Programme DfE is transversal to all Joint Programmes in EERA and based on EoCoE activities and achievements. Thus EoCoE through DfE can keep in touch with all EERA Universities associated to the EERA Joint Programme. We recall that EERA brings together 250 universities and public research centres in 30 countries. EERA's joint research programmes cover the whole range of low-carbon technologies as well as systemic and cross-cutting topics.
Industry	ISC 2022, Hamburg, Germany (29/05/2022-02/06/2022) The position paper has been highlighted as part of the film shown at one of the monitors. The film has news presented as 30 seconds "appetizers" and is shown at the Booth of the Gauss Supercomputing Centre related to a simulation result done at FZJ/JSC by the Integrated Modelling of Terrestrial Systems Group (FZJ/IBG-3) titled "Atmospheric Motion and Water Vapor - Feasability study with convection permitting resolution". Link for Twitter: https://go.fzj.de/eera The position paper was presented at the end of a talk at Workshop on Software Co-Design Actions in European Flagship HPC Codes (EU-SW-CODESIGN-22), half-day workshop at ISC2022 on Thursday, June 2, 2022 2:00 PM to 6:00 PM 02/02/2021 EoCoE organized the workshop "EoCoE innovations toward exploitations".

	The workshop was organized jointly with META Group to discuss how EoCoE innovations can be enhanced to exploitation. The major EoCoE innovation were presented and it was organized an handson session. 04/02/2021 FocusCoE workshop online: "Opportunities and Challenges for Industrial Applications". EoCoE-II presentations: "Working with the SME MaterialsX on the design of new energy materials", Alison Walker "Use of R&D results and impact". Massimo Celino, ENEA & Andrea Di Anselmo, META Group 26/10/2021 EUSEW 2021: Energy Talk "HPC and Big Data as key enablers of the Clean Energy Transition". M. Ramahlo, A. Walker, M. G. Rafael. 16/06/2021 EoCoE organized the workshop "Pitching EoCoE results". The workshop was organized jointly with META Group to present to industrial stakeholders the best EoCoE innovations. An industrial jury examined the EoCoE innovations. The jury was composed by Massimo Fedeli (Solvay), Luca Longo (ENI), Diego Parimbelli (E.ON), Marco Franchin (startup investor) Alessia Melasecche Germini and Francesca Natali (META Group). Teratec Forum 2022, Palaiseau, France 14/06/2022-15/06/2022 As a professional forum that focuses on digital technologies, HPC/HPDA, simulation, artificial intelligence and quantum computing, Teratec was a logical place to showcase EoCoE's work. The EoCoE II team was present on CEA's institutional stand, to distribute flyers and discuss EoCoE's scope, goals and approach with key actors of the HPC and energy sectors.

Action 2: Announce participation to events on LinkedIn and on EoCoE-II's and EERA's websites

LinkedIn: on this social media a constant flow of information is published as soon as EoCoE partners send their news to the LinkedIn manager. Dozen of news are published about events, publications, conferences and webinars. Moreover on the LinkedIn page it is possible to visualize the YouTube video that are related to the EoCoE event. The main characteristic of the LinkedIn posts is that they are published just before and then updated just after the event.

On the contrary news published on EoCoE website are characterized to be announced several weeks before the event. Moreover the website is used to store all documents and information related to the project. In summary the EoCoE website is the reference to store the story of the project, its achievements and its participants.

Given the large set of activities performed in collaboration with EERA, some of them are also reported on the EERA's website. The collaboration activities are usually performed through the DfE Joint Programme in which public events, webinars and internal EERA meeting are organized.

Action 3: Launch of a Press Release by project EoCoE-II

Every partner in its country has promoted by press releases the EoCoE launch and activities. For example, in France, as part of the media coverage linked to the French presidency of the Council by CEA.

Action 4: Institutional announcements by EoCoE-II partners

The news regarding the EoCoE-EERA position paper has been published in:

- the CIEMAT website and JSC website
- EoCoE-II and EERA websites
- JSC's newsletter April 2022
- EoCoE-II Newsletter April 2022
- EoCoE-II Newsletter September 2022

The following is a listing of actions aimed at further enlarging the network of experts in EoCoE-II with experts from academia, industry and SMEs

- Participation at EUSEW 2021, ISC 2020, ISC 2021, SC 2020, SC 2021, ISC 2022
- Participation to EuroHPC Summit 2021 (the EuroHPC Summit of 2020 was postponed to 2021)
- Participation to scientific conferences in the fields covered by EoCoE-II
- Participation to policy events organized by DG Energy and DG Connect

Several industries were interested to EoCoE activities and kept in touch with the EoCoE experts. Among the others we can recall EDF R&D, Iberdrola, Amprion, TenneT TSO, 50 Hertz Transmission, Vestas, Vortex Bladeless.

An example of fruitful collaboration was given by the application of Alya in the field of wind energy. Alya, coupled with the mesoscale WRF, has been used to study wind turbine damage due to extreme wind conditions at two Iberdrola wind farms in Spain. Both LES and RANS turbulence models have been used. The advantage of scale resolving simulations developed within EoCoE-II was quite clear in both cases. With the advent of exascale computing, such simulations can significantly help understand and avoid wind turbine damage.

- DDN presented EoCoE's work during Supercomputing 2021, at the DDN User Group meeting. The presentation focused on storage acceleration in a modular supercomputing environment, and having FZJ's Sebastian Lührsn EoCoE's WP3 leader, as a guest speaker (https://www.ddn.com/blog/storage-acceleration-in-a-modular-supercomputing-environment).
- DDN also communicated about EoCoE II when they attended SC22, promoting the project's results towards a more industry-focused group of stakeholders.
- They also had a joint academic publication at the CHOPS workshop in 2021.

Establish and maintain links with EU HPC projects

The actions described below concern the co-operation with related projects on HPC technology at EU level. Where possible, meetings with representatives from these and any other complementary projects were organised in the framework of the project FocusCoE (Coordination and Support Action of the Exascale Centres of Excellence). The meetings aim at discussing and exchanging best practice regarding scientific, standardisation and economic issues related to projects' results. Networking and exchange of best practices with similar initiatives have also taken place throughout the project during conferences and other events.

- *FocusCoE*: E. Audit is the chair of G.A. of the HPC CoE Council (HPC3)
- *DEEP-IO* and *DEEP-SEA* are linked to the TSMP (alias TerrSysMP) application suite for which ParFlow is the principle software component
- Massimo Celino (ENEA) is the principal investigator of the *TEXTAROSSA* (Towards EXtreme scale Technologies and Accelerators for HW / SW Supercomputing Applications for exascale) project. CNR and PSNC are also partner of the project.
- *EOSC*: participation as a user of the EOSC portal via eInfraCentral and EOSC Enhance projects
- *PRACE-6IP*: granted computing hours for several actions in EoCoE-II
- Other CoEs namely *MAX, Hidalgo, PoP, CECAM*: collaboration in participation in conferences and organising session at European Union Sustainable Energy Week (EUSEW) event.
- *EXA2PRO* : one of the main use cases of EXA2PRO is the Metalwalls code. Metalwalls has been ported under the EXA2PRO technology and a joint workshop with EXA2PRO is planed in Q2 2021.
- *MAESTRO*: T Smolders at University of Bath that collaborates also in EoCoE-II is funded by this project to work in KMC/DMC.
- *ENERXICO*: joint project between Europe And Mexico to develop exascale apt simulation toolsin the energy sector. Code Alya is used in this project.
- *PARSEC*: project partly financed by several European countries. Code Alya is used in this project.
- *COMPBIOMED* and *EXCELLERAT*: Collaborations via the BSC-CSE department in the context of research on code Alya.
- *MAESTRO* Innovative Training Network: T Smolders at University of Bath is involved in MAESTRO network (MAking pErovskiteS TRuly explOitable).

- *EERAdata* project: Co-editing the terms of reference of the new transversal Joint Programme "Digital for Energy" of the EERA association.
- *RAISE* COE – Development and testing on full rotor simulations with Alya done within EoCoE-II are now being used by RAISE.
- Herbert Owen from EoCoE has been guiding colleagues at BSC working in the Combustion COE (COEC) on adapting the GPU optimization he has developed for the incompressible Navier Stokes equations with the help of FAU University to the combustion module in Alya.

Link with international initiatives in Exascale and HPC simulation

These are actions to seek to build collaboration links with other research countries outside Europe and include the following aims:

- Build networks of experts related to HPC and to Energy domains;
- Enhance the visibility of the flagship codes in EoCoE towards researchers from other countries/regions outside Europe;
- Organise side events (e.g. "birds-of-a-feather" type of events) at large international conferences to assess the interest in the topic of HPC for Energy, or on a specific energy-related area (participation for example to Super Computer Conferences series in US).
- Participation to the Japan-EU workshop (10-11 November 2021) on HPC applied to materials science and how to effectively support the collaboration. Organization by EU commission with RIKEN and Kobe Universities in Japan.
- RIKEN (Japan): Identification of common topics of interest. A postdoctoral researcher from RIKEN will port the EoCoE flagship code Gysela on the FX64 architecture. Gysela is now running on the Fugaku Supercomputer. Significant achievement: Gysela is one of the first codes to be used on this machine.
- Joint Laboratory on Extreme Scale Computing: this event was due to happen in April 2020 but was cancelled due to COVID-19.
- Collaboration with two US projects related to the WIND task: *ExaWind* and *Atmosphere to Electrons*. The purpose is to benchmark the code Alya with the code NALU developed in the ExaWind project.

Design, specifications and implementation of services (Task 6.4)

The tasks 6.4 consists of two parts, the first is related to dissemination activities and concerns the preparation of the EoCoE portal which will be used do showcase EoCoE simulation applications. The second part focuses on preparation of Data Management Plan.

Development of a SaaS Portal

In order to user EoCoE simulation application users need to know:

- what is the most appropriate applications to run simulations and solve their problems,
- how to start the job with all the technical and procedural details for accessing applications,
- how to set simulation parameters and what are the typical examples to run,
- how to apply for a computation grant on a supercomputer.

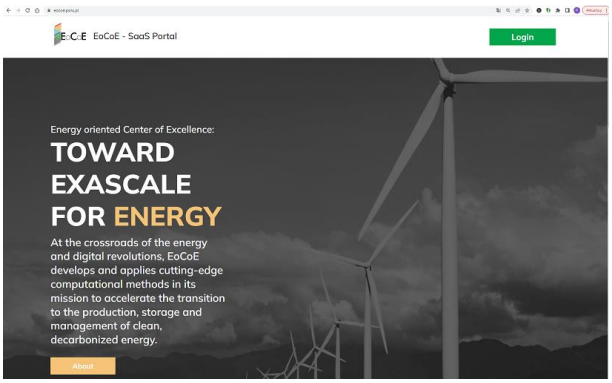
The EoCoE SaaS portal was prepared as a response for the above problems and provide a single point of access to all EoCoE validated simulation software. It showcases simple and clear use cases (with a limited number of parameters) that users can run as example jobs with limited resources. The portal functionality includes:

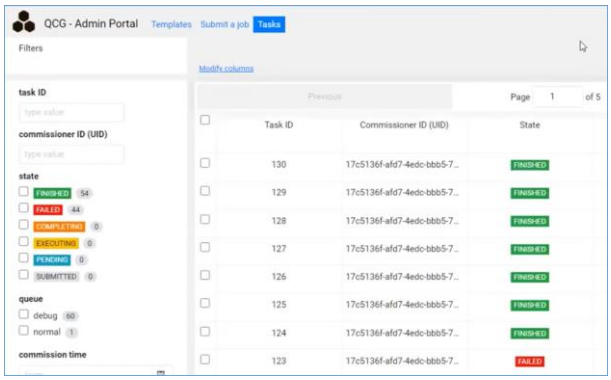
- Trial access to high performance computing – Altair supercomputer listed in Top500 list. (position 145 in June 2022). Dedicated pool of resources is available for EoCoE portal users. This allows to run typical test and example jobs to try the efficiency of simulations. In individual cases users can be granted access to more resources on requests.
- Demonstration of EoCoE results: Alya, ESIAS-met, ParFlow, amg4psblas, DFTB+;
- EoCoE SaaS portal serves as a tool for dissemination and training activities – successfully used in EoCoE Summer School
- The forms user to submit simulation jobs include some predefined examples to show the basic functionality of the hosted software solutions and their usability. Users can modify the parameters and/or provide own input files to check how it influences the simulation.
- Registration of users is simplified. (but for security and licensing purposes, all users must be registered and validated)
- Submission and monitoring of test jobs ;
- Transfer of input data and output results

More application can be integrated easily with EoCoE SaaS portal, both from EoCoE projects and from other providers. The portal can be a good opportunity for energy related software owners to prepare a demonstration version of their applications in an easy and efficient way. In cooperation between software authors and PSNC staff the software can be installed in Altair supercomputers and can be made available for EoCoE Portal users.

The portal is available for users at https://eocoe.psnc.pl/ .

The SaaS portal was user as a main tool for EoCoE Summer School.





Data management plan for EoCoE Community and scientific communities at large

This task is not strictly related to dissemination activities, but rather focuses on preparing Data Management Plan handbook explaining how scientific data should be organised on the long term and how scientific communities should describe, manage and share the data. EoCoE II provides dedicated expertise, guidelines and best practices to all its partners and to the energy community at large. The detaile description of the tasks and its results is included in deliverable D6.6.

Education and training (Task 6.5)

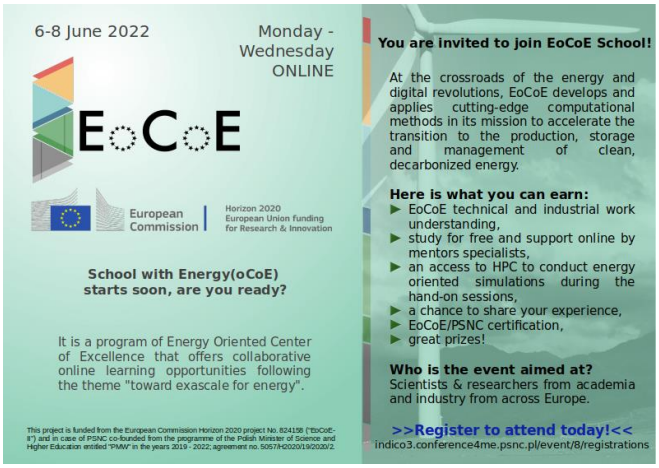
Training events

EOCOE SUMMER SCHOOL

Organization

This three-day event included in-depths training on the flagship EoCoE codes and solvers, which focus on HPC simulations applied to energy domains. Also, the EoCoE SaaS Portal was used in order to ease calculations and promote also this project outcome. Our team of brilliant researchers, from several prominent European research centres, hosted the training sessions on material science, weather forecast, climate change and the software and algorithm expertise.

In order to communicate the summer school organization, event information in the form of flyer and official announcements was created and forwarded to:



- EoCoE official website,
- EoCoE Social channels (LinkedIn, Twitter),
- Main list of EoCoE project members,
- Project Partners contact person to share it on their mailing lists,
- Countries which shared contact details from the NCC list. This list gathers the central points of contact for HPC and related technologies for each countries. A few answered add shared ads on their website, LinkedIn, FB and Twitter.
- Internal PSNC list of HPC users,
- FocusCoE what result in notes added to the website calendar and Twitter,
- PSNC representative on ISC High Performance (29 May - 2 June). Event info were shown on presentation and flyers shared on the exhibition stand.
- PRACE training portal.

Work on the event organization included also creating official event website. It gathers all necessary information, supports registration of participants, sends automatic notifications to certain people after configuration and helps to manage feedback from attendees. The website was prepared with the use of Indico Conference Management System instantiated by Poznan Supercomputing and Networking Center.

Additionally, mobile application was set to ensure easy access to the up-to-date agenda, solution to send push notifications in case of any technical problem and having all event information available at hand. Both website and mobile app provided links to sessions streaming via Zoom that was used as a communication tool for lectures.

Having active cooperation of Leaders in the role of lecturers and mentors, the following content could be prepared and shared with attendees: details of agenda, prerequisites list with short tutorials when necessary, mentors profiles. Our experts worked hard to prepare their talks and presentations that was being recorded and are put together as training materials.

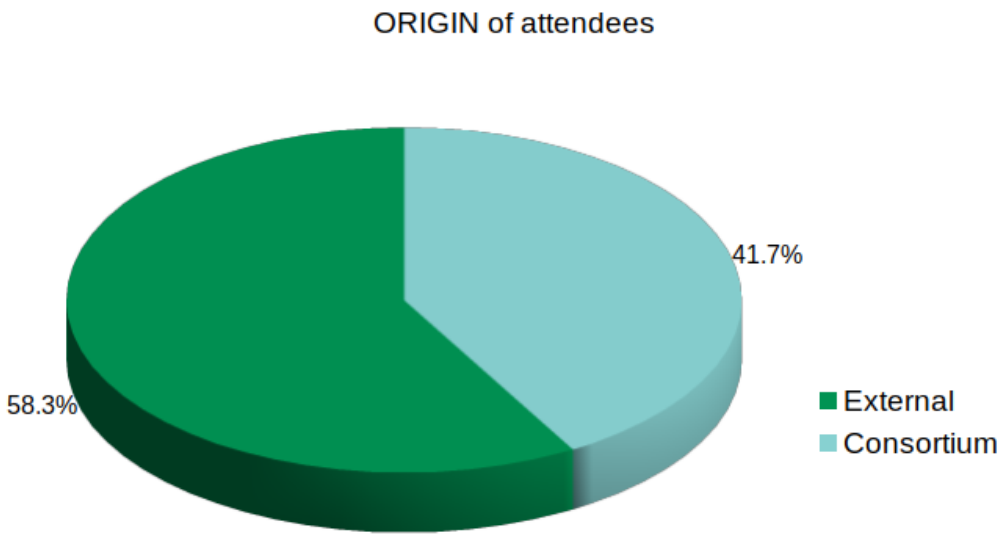
Hands-on part of lectures required setting up SaaS Portal accounts for participants and performing integration of applications with this platform. Thus in the course of event preparation, the support for AMG4PSBLAS, ESIAS-met and DFTB+ had been created and enhanced.

Conclusion

The school was aimed at scientists and researchers from academia and industry from across Europe, performed online. It allowed participants to test their mastery of these codes, share their experience and learn more about EoCoE technical and industrial work .

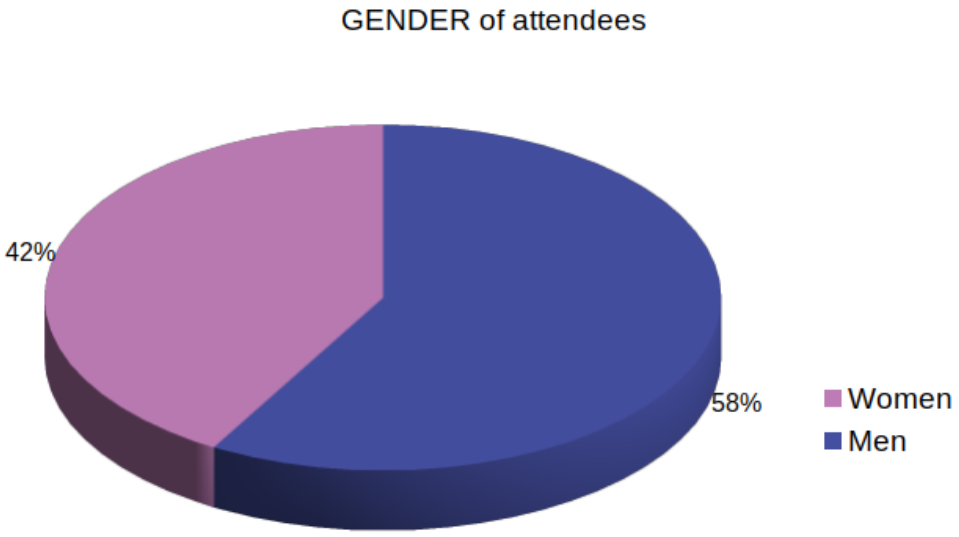
Participation to the EoCoE School was rewarded with certification and four of participants were also offered to have covered full expenses for three-day trips to Naples to join our project's members for our final consortium meeting in Naples. Certificates had been designed both for attendees and mentors to express appreciation for their perfectly done work.

Structure of attendees in terms of origin and gender is as following:



Origin of the EoCoE School attendees

The majority of participants are from outside of the consortium (58,3%).



Gender of the EoCoE School attendees

The percentage of women that took part in the event accounts for approximately 42%. The majority (58%) of participants are men.

Webinars

Webinars were announced both on EoCoE website, mailing list and The Community Research and Development Information Service (CORDIS) website up to its closure in the end of June 2021.

Speaker	Name	Date	Webinar views	Post-webinar views	Webinar + post-webinar views
José Fonseca	Paving the way to AMR groundwater simulations with Parflow+p4est	01/07/2020	30	107	137
Christie L. Alappat Dr. Georg Hager	The A64FX processor: Understanding streaming kernels and sparse matrix-vector multiplication	18/11/2020	~100	785	785+

Ulrich Rüde	Parallel Matrix-free Multigrid for Extreme Scale Computing	28/01/2021	54	110	164
EoCoE / META Group	Joint webinar - Maximizing the exploitation of scientific results	02/02/2021	18	109	127
Mathieu Salanne	Modeling supercapacitors at the molecular scale	07/07/2021		-	-
Gerard Guillamet	Aeroelastic simulation of a wind turbine blade using Alya HPC	11/01/2022	-~10	61	61
Mathieu Salanne	Modelization of supercapacitors at the molecular scale	11/01/2022	~10	26	26+
		Sum:	102+	1198+	1300+

Other related initiatives

Speaker	Name	Date
Matthew Wolf, Mathieu Salanne, Alessandro Pecchia, Francesco Buanocore	NanoInnovation 2020	16/09/2020
Kai Keller, Leonardo Bautista Gomez	PRACE Summer of HPC: Precision based differential checkpointing for HPC applications	02/2021
EoCoE members	EoCoE Consortium F2F meeting	14-16/06/2021
Alessandro Pecchia, Pasqua D'Ambra, Paweł Wolniewicz, Herbert Owen	Pitching EoCoE results	16/06/2021
Pasqua D'Ambra	SIAM Conference on Mathematical & Computational Issues in the Geosciences (GS21): Performance Modeling of Renewables Production: Facing the Exascale	21/06/2021

EoCoE members	F2F Remote	15-17/12/2021
EoCoE members	Final EoCoE F2F meeting	20-22/06/2022

Documentation

THE EOCOE BASIC TRAINING COURSE takes the form of educational materials to be used for the following purposes:

- to leverage the dissemination of the acquired knowledge and expertise - also the one that was developed during the first phase of the project,
- to help laboratories and industry to access and use HPC methods and code,
- to reach also PhD and young researchers.

The course enables to acquire basic EoCoE II concepts, methodology, technology components and computational aspects of selected EoCoE codes and tools has been set-up. It includes training on material science, weather forecast and climate change plus the software and algorithm expertise. Leaders of the above-mentioned challenges provided workshop presentations and input to the SaaS portal.

Courseware is available for users and developers in the dedicated 'Basic Training Course' sub-tab via the Learn@EoCoE menu tab of official EoCoE website. It includes video recordings of sessions that concerns both the theory and practical tasks presentation supplemented by comments of EoCoE experts in the field.

Also, in collaboration with EOSC-synergy (European Open Science Cloud project under H2020 programme), the course materials were made available as an open teaching material on the EOSC training platform. The platform is based on the container's technologies, that allows for combining together in a suitable learning setup for students/training participants. Link to the catalogue with training materials:
https://learn.eosc-synergy.eu/product/eocoe-school-basic-training-course-on-flagship-codes-and-solvers/

From the set of tools for the creation and conduction training courses, a Massive Open Online Courses (MOOC) platform based on the worldwide most popular Moodle platform was chosen in order to provide interactive courses capabilities with user forums to support community interactions among students and tutors as well as immediate feedback to quick quizzes and assignments.

Webinars

Project materials in form of video recordings are captured during each webinar. These videos are gathered on EoCoE project YouTube channel and available via the Learn@EoCoE tab of official EoCoE website.

Acknowledgements

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