EoCoE, toward exascale for energy

The EoCoE (Energy Oriented Center of Excellence) project was officially awarded funding for another three-year period by the European Commission along with nine other Centers of Excellence in supercomputing.

During this new period, EoCoE will channel its efforts into 5 scientific exascale challenges in the low-carbon sectors of Energy Meteorology, Materials, Water, Wind and Fusion. This multidisciplinary effort will harness innovations in computer science and mathematical algorithms within a tightly integrated co-design approach to overcome performance bottlenecks and to anticipate future HPC hardware developments.

At the crossroads of the energy and digital revolutions, EoCoE will develop and apply cutting-edge computational methods in its mission to accelerate the transition to the production, storage and management of clean, decarbonized energy. EoCoE is anchored in the High Performance Computing (HPC) community and targets research institutes, key commercial players and SMEs who develop and enable energy-relevant numerical models to be run on exascale supercomputers, demonstrating their benefits for low-carbon energy technology. The present project will draw on a successful proof-of-principle phase of EoCoE-I, where a large set of diverse computer applications from four such energy domains achieved significant efficiency gains thanks to its multidisciplinary expertise in applied mathematics and supercomputing.

EoCoE is built upon a world-class consortium of 18 complementary partners from 7 countries from a unique network of expertise in energy science, scientific computing and HPC, including 3 leading European supercomputing centers. New modelling capabilities in selected energy sectors will be created at unprecedented scale, demonstrating the potential benefits to the energy industry, such as accelerated design of storage devices, high-resolution probabilistic wind and solar forecasting for the power grid and quantitative understanding of plasma core-edge interactions in ITER-scale tokamaks. These flagship applications will provide a high-visibility platform for high-performance computational energy science, cross-fertilized through close working connections to the EERA and EUROfusion consortia.

For the new period, EoCoE has an increased budget of 8,5M€. The project is led by Maison de la Simulation, a joint lab between CEA, CNRS and the universities of Paris-Sud and Versailles-St Quentin and rely on a strong collaboration with the Jülich Supercomputing Centre. Key European institutions of the energy and HPC sectors, such as ENEA and BSC are also central to the project.

CNR, with the Institute for Applied Computing (IAC) in Naples, participates to the EoCoE project as leader of the WP on “Scalable Solvers” focused on algorithmic issues that are strongly linked to parallel numerical linear algebra. Indeed solving linear algebra problems is a core task in four out of five scientific challenges and thus the availability of exascale-enabled linear algebra solvers is fundamental in preparing the flagship applications for the new exascale ecosystem.

For more information, please contact Dr. Pasqua D’Ambra, senior scientist at IAC and EoCoE II WP Leader.