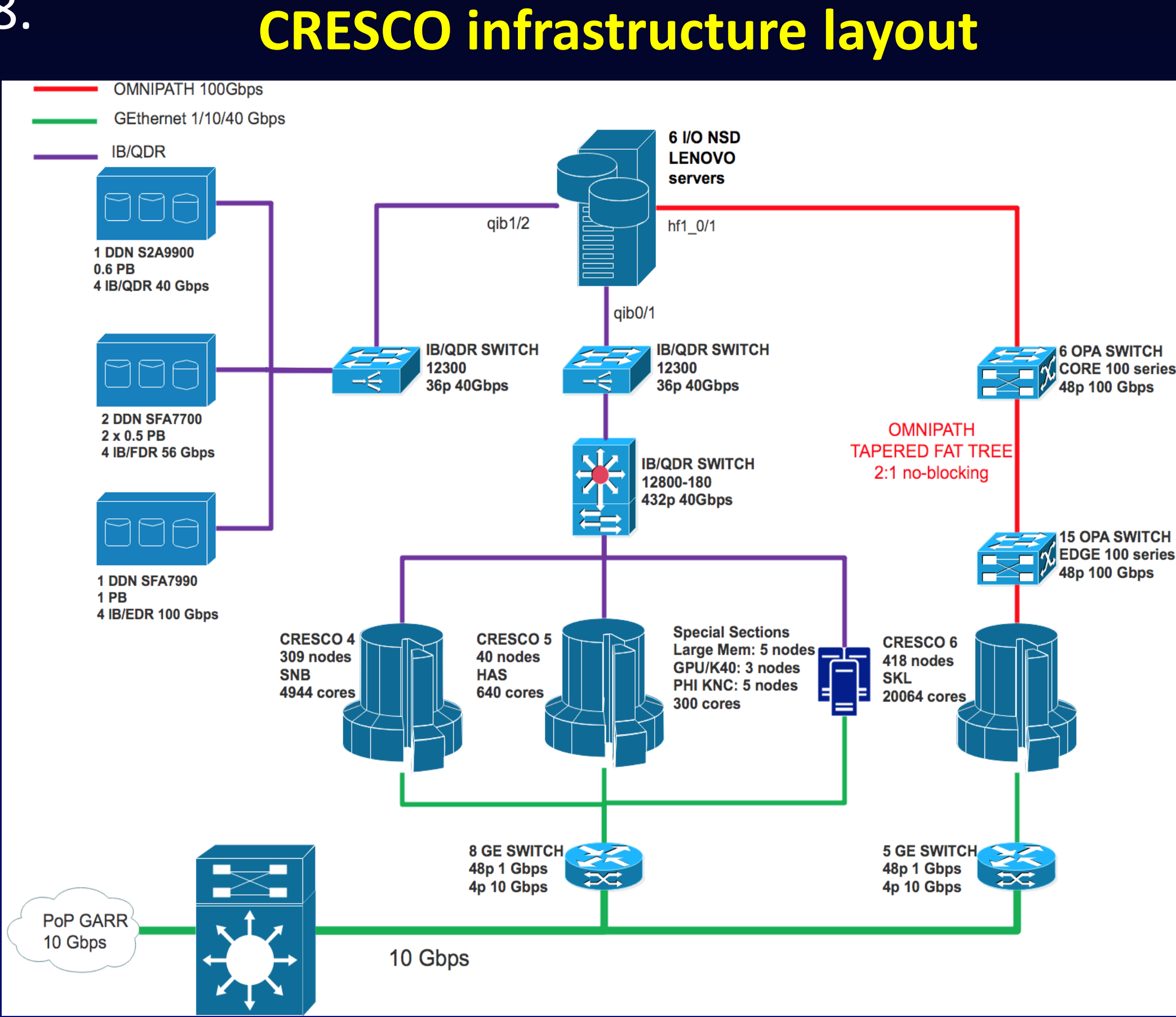


CRESCO6: ENEA, the Italian National Agency for New Technologies, Energy and Sustainable Economic Development operates in a range of R&D sectors, including energy technologies, new materials, life and environmental sciences. In support of the institutional research activities, the ENEA IT division provides computing and storage resources. The computing core of ENEAGRID is represented by the HPC CRESCO clusters. In May 2018 a new PC cluster, CRESCO6, was inaugurated at ENEA Portici. CRESCO6 is a 1.4Pflop/s machine. It ranked 420th in the TOP500 list of Nov. 2018.

Hardware Details: CRESCO6 has 434 nodes for a total of 20,064 cores. It is based on the Lenovo ThinkSystem SD530 platform, an ultra-dense two-socket server in a 1/2U rack form factor inserted into a 2U four-mode enclosure. Each node is equipped with:

- 2 Intel **Xeon Platinum 8160** CPUs, each hosting 24 cores with a clock frequency of 2.1GHz;
- 192 GB RAM memory: 4GB/core one low-latency **Intel Omni-Path 100** Series Single-port PCIe 3.0 x16 HFA network interface;
- Nodes interconnected via an Intel Omni-Path network with 21 Intel Edge switches 100 series of 48 ports each, bandwidth 100GB/s, latency 100ns.
- Consumption of electrical power in massive computing workloads amounts to 190kW.

Cluster name (Linux x86_64)	Network	Cores/Tflops
CRESCO6 INTEL/SKL	OPA	20064/~1400
CRESCO4 INTEL/SNB	IB QDR	4944/~100
CRESCO5 INTEL/HAS	IB QDR	640/~25
Total		~25650/~1500



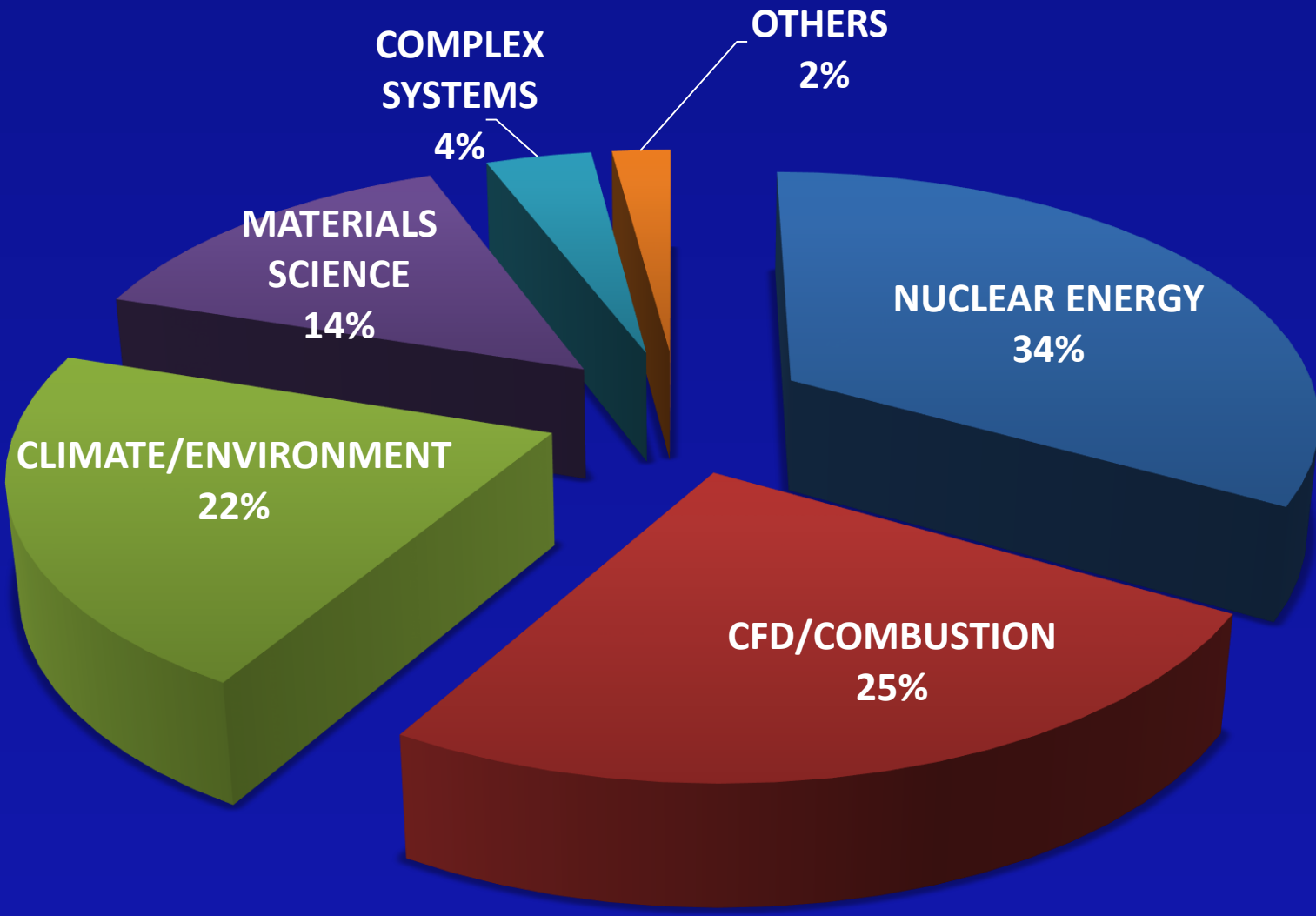
CRESCO Storage

High performance storage systems based on DDN Infiniband QDR/FDR/EDR and GPFS Spectrum Scale as parallel filesystem.

Storage Systems	Bandwidth GB/s	network	Capacity
1 x DDN SFA7900	20	EDR	1 PB
1 x DDN SZA9900	6	IB QDR	0.6 PB
2 x DDN SFA7700	19	IB FDR	1 PB
2 x Dot-Hill 3730	8	FC/8Gbps	0.5 PB
3 x RAID Servers	1.25	10 GEth	72 TB
1 x Dot-Hill 3000	1.25	FC/8Gbps	12 TB
1 x DS 4700	0.8	FC/4bps	26 TB
Total			~3.2 PB
TAPE LIBRARY IBM TS3584	1	FC/8Gbps	~2.5 PB

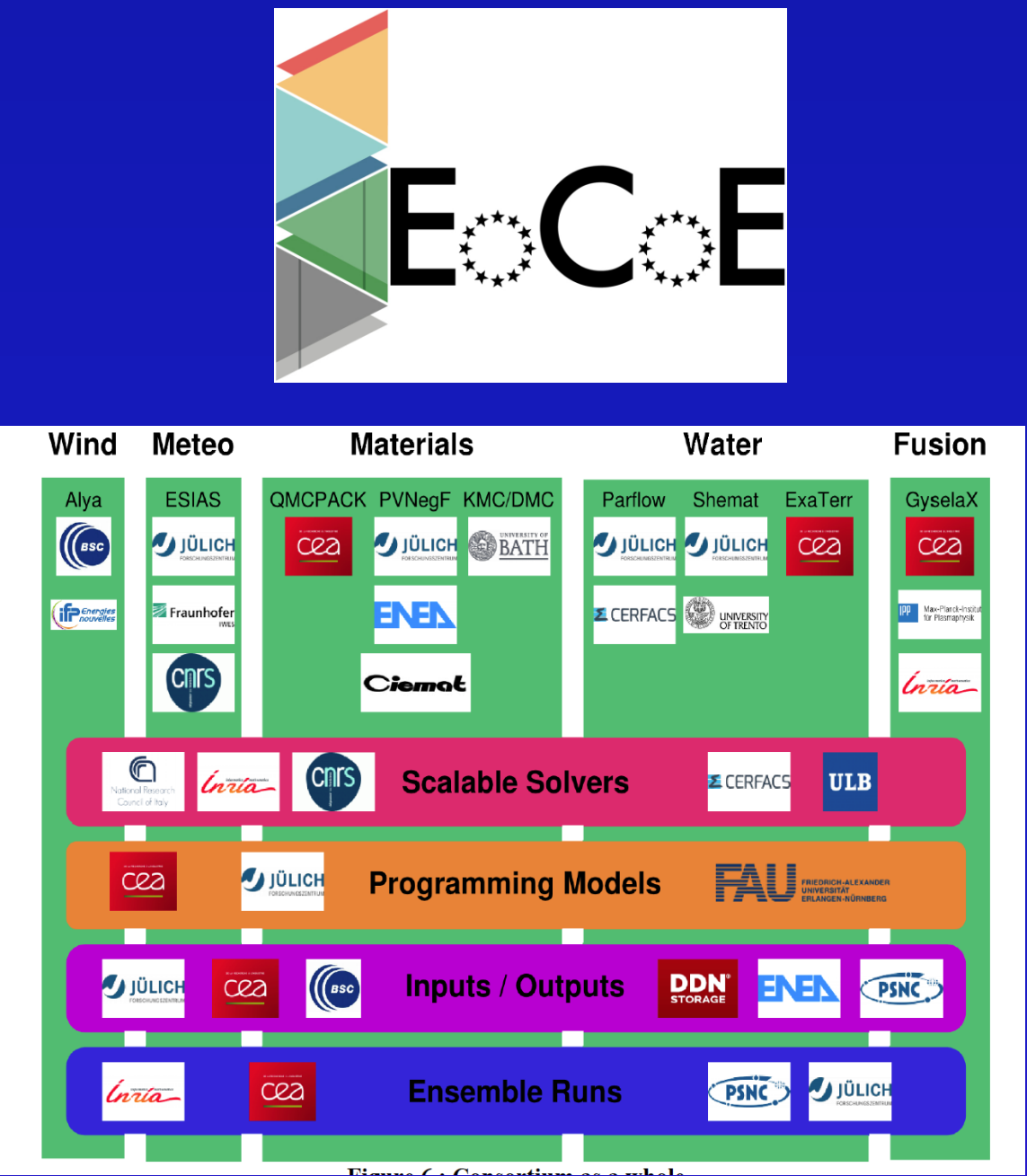
CRESCO Usage: Currently 400 active users. About 300 users submit serial or embarrassingly parallel jobs. About 100 users submit highly parallel jobs In 2019 the total WCT of jobs running on CRESCO was about 5.8×10^7 hours . The type of users, the research areas and the trend of the CRESCO usage on the years, are as following:

Type of users 2019	% wall clock time
ENEA	82%
Italian Univ./Inst.	14%
Foreign Univ./Inst.	1 %
Enterprises	1%
Tot Mcore*hour	58
Total # users	123



	2016			2017			2018			2019 (8 months)		
Cluster	#jobs	(Mcore*h)	wait queue average (hours)	#jobs	(Mcore*h)	wait queue average (hours)	#jobs	(Mcore*h)	wait queue average (hours)	#jobs	(Mcore*h)	wait queue average (hours)
CRESCO3	21871	9	21	42177	6	6	10371	0.7	3	-	-	-
CRESCO4	47141	29	18	438458	24	1	1041223	21	0.5	864744	9	1
CRESCO5	3333	3	5	10785	3	2	46632	0.3	5	20961	0.7	10
CRESCO6	-	-	-	-	-	-	18652	17	8	135405	48	13
CRESCOF	687066	1	8	16813	1	0.45	25761	1	3.5	38884	0.5	0.3
Total	759411	42		508233	34		1142639	40		1059994	58	

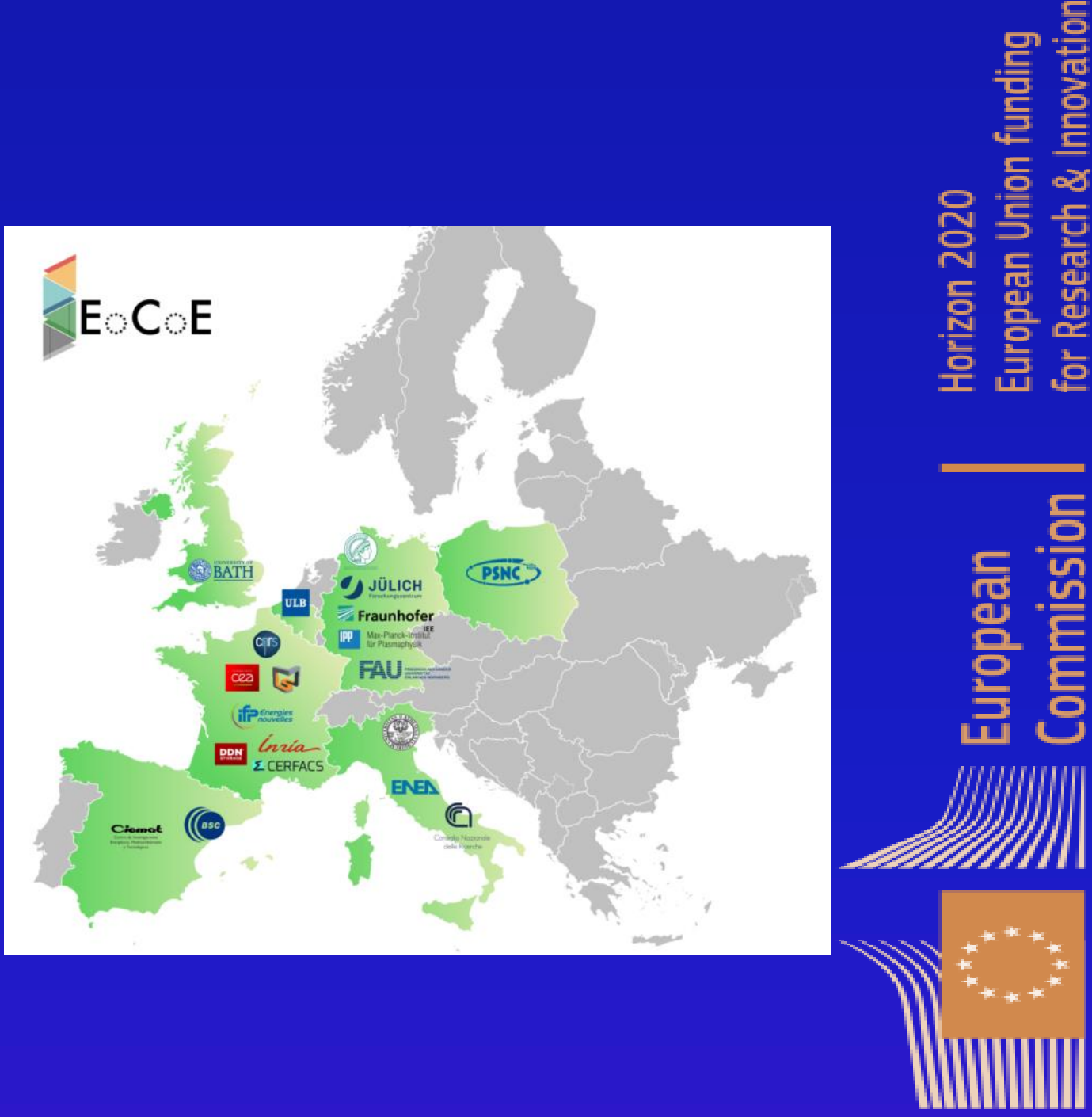
Supported Project: Energy oriented Centre of Excellence in computing applications



EoCoE (read as “Echo”) has been funded from 2015 to 2018 to exploit the tremendous potential offered by the HPC computing infrastructures to foster and accelerate the European transition to a reliable low carbon energy. In 2019, EoCoE has been refunded till 2021.

Five vertical Scientific Challenges (Meteorology, Materials, Water, Wind and Fusion) are targeted toward exascale by 4 horizontal multidisciplinary Technical Challenges providing high-end expertise in HPC infrastructures.

www.eocoe.eu



Supported project: FOCUS COE



FOCUS COE – CONCERTED ACTION FOR THE EUROPEAN HPC COES

FocusCoE contributes to the success of the EU HPC Ecosystem and the EuroHPC Initiative by supporting the EU HPC CoEs to more effectively fulfil their role within the ecosystem and initiative: ensuring that extreme scale applications result in tangible benefits for addressing scientific, industrial or societal challenges. (<https://www.focus-coe.eu>)

OBJECTIVES

- To create a platform, the EU HPC CoE General Assembly, that allows all HPC CoEs to collectively define an overriding strategy and collaborative implementation for interactions with and contributions to the EU HPC Ecosystem.
- To support the HPC CoEs to achieve enhanced interaction with industry, and SMEs in particular, through concerted out-reach and business development actions.
- To instigate concerted action on training by and for the complete set of HPC CoEs: providing consolidating vehicle for user training offered by the CoEs and by PRACE (PATCs) and providing cross-area training to the CoEs (e.g. on sustainable business development)
- To promote and concert the capabilities of and services offered by the HPC CoEs and development of the EU HPC CoE brand raising awareness with stakeholders and both academic and industrial users.

Supported project: EUROfusion

In 2015 ENEA and CINECA signed a strategic partnership agreement aimed at providing supercomputing and data storage services to EUROfusion, the European consortium for the Development of Fusion Energy. The agreement signed with ENEA aimed at promoting the joint development of research activities in the field of HPC.

