

## IS-ENES3 Deliverable D2.4

### Final report on governance activities

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#### ABSTRACT

D2.4 summarises four years of advisory group inputs and the key outcomes of the task force activities over the duration of the project. It identifies issues faced in community governance for infrastructure, and the lesson learned. It also details how these feeds into the ENES-RI implementation.

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## Executive Summary

After four years of project, this deliverable provides an overview of the functioning and achievements of our four main governance activities in IS-ENES3: the Scientific Advisory Board, the Data Task Force, the HPC Task Force and the Stakeholder Board turned into the Sustainability Working Group. Key outcomes are detailed for each activity, mainly engaging in the coordination and exchange of information among partners and relevant international programmes. The terms of reference of both Task Forces are currently being reviewed to improve their functioning and make them fit-for-purpose to serve the future ENES-RI, also reflecting on the lessons learned during the IS-ENES3 project.

# 1 Objectives

This deliverable aims to summarise four years of advisory group inputs detailing the scope and mission of the relevant bodies as well as the key outcomes of the different activities carried out over the duration of the project. It also identifies issues faced in community governance for infrastructure, and extracts the lesson learned before detailing how these feeds into the ENES-RI implementation.

## 2 Introduction to governance activities in IS-ENES

In the IS-ENES3 project, there were four main bodies meant to be involved in governance activities: the Data and HPC Task Forces (already established and running since previous project phases), the Scientific Advisory Board (established at proposal stage) and the Stakeholder Board (to be established during the project). We detail the scope and mission of each governance body and present the adjustment made for the Stakeholder Board.

### 2.1 The Data Task Force

#### *Scope*

The ENES Data Task Force (DTF) is part of the ENES governance set-up prior to the start of the project. It plays an advisory role in the specification and operation of the ENES Climate Data Infrastructure (CDI). The CDI comprises both contributions from national data service infrastructures and dedicated jointly managed elements, all of which are operated in a collaborative framework by ENES partners to deliver data services supporting output from coordinated climate simulations. The DTF supports the objective of turning the CDI into a component of a sustainable European Research Infrastructure.

#### *Mission*

More specifically, the ENES Data TF is expected to be instrumental in:

- Coordinating the relevant European data infrastructure: defining and assigning responsibilities, agreeing on common rules and procedures, and maintaining a living roadmap listing actions and priorities.
- Promote interactions between data providers and users to interact with the European data strategy.
- Promoting interoperability of climate model data archives within Europe and beyond and promoting those interfaces necessary to maximise their impact beyond the modelling community.
- Coordinating the development and deployment of software tools to enhance climate model data services and efficiency of service delivery.
- Coordinating common European activities supported by EU projects and Copernicus services with national activities.
- Coordinating the European and ENES response to data infrastructure requirements arising from international activities convened under the auspices of the World Climate Research Programme.

In this context, coordinating means discussing, influencing, establishing community views, but not necessarily deciding, as many decisions belong elsewhere (e.g., ESGF executive committee, national bodies, etc.).

#### *Functioning*

The Data Task Force meets as often as appropriate, normally once a month, virtually.

## **2.2 The HPC Task Force**

#### *Scope*

The ENES HPC Task Force (HPC TF) is part of ENES governance and was set prior to the start of the project. It tackles community issues related to the use of the European HPC ecosystem, in particular with regards to the PRACE and EuroHPC European facilities, as well as issues related to software developments. The HPC TF also follows and coordinates ENES activities with respect to most of the European initiatives in HPC. The HPC Task Force serves ENES projects like, today, IS-ENES3 and ESiWACE2. It is intended to be part of the governance of the soon-to-be-established ENES Research Infrastructure (ENES-RI).

#### *Mission*

More specifically, the ENES HPC TF is instrumental in:

- Facilitating networking and knowledge sharing on HPC and model performance
- Facilitating community governance on existing tools and services
- Advising on HPC requirements for the ENES infrastructure strategy
- Following and advising on ENES involvement in HPC projects
- Ensuring the liaison with other international projects and activities

#### *Functioning*

The HPC Task Force meets as often as appropriate, normally every 3 months, virtually.

## **2.3 The Stakeholder Board turning into the Sustainability Working group**

#### *Scope*

At the proposal stage, it was decided to set up an IS-ENES Stakeholder Board in the early phase of the project to foster communications with both stakeholders and other major projects and infrastructures. The proposed Stakeholder Board responsibilities were to include representing both the institutional providers of the infrastructure, and the key users of the IS-ENES infrastructure, including the major modelling groups and representatives of large funded science projects. It was meant to provide a forum for engagement around strategic scientific objectives, their infrastructural consequences, and the long-term sustainability of the infrastructure.

During the process of establishing the Terms of Reference for the Stakeholders Board, we realised that this specific governance task was so tightly linked to the sustainability process and that the Stakeholders Board should be set up in a way that it is adapted to the infrastructure that

the community chooses to sustain in the future. It thus seemed natural to associate these tasks and make the Board emerge from the institutions' representatives involved in the scientific scoping phase of the sustainability task (see Milestone M2.1). Although we didn't name it "Stakeholder Board", the Sustainability Working Group has taken up the mission of a Stakeholder Board.

#### *Mission of the Sustainability Working Group*

The Sustainability Working Group (WG) consists of representatives of the key users and providers of the IS-ENES3 infrastructure, including, major and smaller modelling groups. Among other tasks, the Sustainability WG serves at:

- Providing a forum for engagement around strategic scientific objectives, their infrastructural consequences, and the long-term sustainability of the infrastructure;
- Providing advice on prioritisation around funding and opportunities given available information;
- Representing institutional interest and expectations;
- Engaging in the brainstorming activities to design the future sustained infrastructure, the "ENES-RI".

The Sustainability WG has met regularly throughout the whole project, led by the Scientific Officer and the WP2 co-leaders. The occurrence of the meeting was rhythmised by the nature of the activities of the different phases of the sustainability process (see Milestone M2.3 & Deliverable D.2.2).

## **2.4 The Scientific Advisory Board**

### *Scope, mission and functioning*

The Science Advisory Board (SAB) was set up at the proposal stage. It was meant to review on a regular basis the scientific achievement of the project and give strategic advice on prioritisation.

## **3 Key outcomes**

### **3.1 The Data Task Force**

At the end of 2022, there were 14 members in the DTF representing data producers, data consumers and data infrastructure developers. The DTF meets regularly once a month virtually for one to two hours discussing ENES-CDI governance, the European contribution to ESGF, integration of WCRP climate modelling projects (like CMIP6, CORDEX and CMIP7) and the integration of the ENES-RI into more general European research infrastructures (EGI, EUDAT, EOSC, Copernicus, etc.).

Significant activities include

- Discussion and specification of the next generation ESGF architecture. The currently existing ESGF infrastructure is more than ten years old. Requirements

from users, system maintenance and software security make this new architecture development necessary.

- Engagement with the development of the US ESGF 2.0 proposal, in which the ENES DTF has communicated, and continues to communicate, a strong coordinated European perspective on the scope, outcome, and prioritisation of ESGF action items.
- Elaboration of objectives and requirements for the ENES-CDI (Climate Data Infrastructure) in the context of the IS-ENES sustainability process. The ENES-CDI is one central part of the ENES-RI (Research Infrastructure).
- Continuous support of the ENES-RI sustainability process through the specification of ENES-RI tools and services in the scoping process, discussion of responsibilities and in-kind contributions of ENES-CDI partners and the revision of DTF objectives and mission statements.
- Coordination of future ENES-CDI funding opportunities at the European level.
- Contribution to WCRP CMIP7 planning, especially the integration of CMIP6 data publication and application experience.

### 3.2 The HPC Task Force

At the end of 2022, there were 19 members in the HPC TF. During the IS-ENES3 project period (2019-2022), the ENES HPC TF met 17 times (1 time face-to-face at the IS-ENES3 kick-off meeting, 16 times virtually). Minutes that include the resulting list of actions and further reporting of their results were produced after each HPC TF meeting. In general, one of the central roles of the HPC TF was to provide advice to IS-ENES3 and ESiWACE2.

Among the various specific actions conducted under the HPC TF:

- within IS-ENES3, it brought its expertise on the community and technology tracking in support to the organisation of the 6th & 7th editions of the ENES HPC workshops #2020 (funded by ESiWACE2, Hamburg, virtual) & #2022 (funded by IS-ENES3, Barcelona, hybrid). It was also involved in the preparation of the “Virtual workshop on new opportunities in ML/AI for weather and climate” (jointly funded by IS-ENES3 and ESiWACE2, March 2021);
- some individual members of the HPC TF participated in the preparation of the access policy to EuroHPC machines;
- it followed the transformation progress from the previous “Extreme Earth” project (not granted) into the “Destination Earth” programme; and organised regular exchanges between European modelling groups on this topic during this period;
- it provided input on HPC issues for the preparation of the ENES-RI;
- it organised a survey among the European modelling groups to summarise the main issues for the transition to exascale. This included - among other - sharing of information about the use of GPU for climate and weather simulations;
- it prepared, from the data collected under deliverable D3.4, a synthesis paper to summarise the number of simulated years produced by the participating groups in CMIP6, the amount of data which have been sent to ESGF or which remained stored locally, and the corresponding amounts of compute resources (core hours). This

synthesis paper, under final internal review, also shows the trend in resource commitment between CMIP5 and CMIP6, an information of high interest for a foresight toward CMIP7.

### **3.3 The Sustainability Working Group**

The Sustainability Working Group has carried out the sustainability work throughout the IS-ENES3 project. This task consisted of 3 phases: the scoping phase summarised in the Sustainability Scoping Report (M2.3), the design phase that led to the ENES-RI Sustainability Plan (D2.2) and the current and last implementation phase that consists in the preparation of the legal aspects together with the potential host institution and the potential members. At the start of the Design phase the Sustainability WG membership has been extended to further institutional representatives to ensure a tight institutional engagement in the co-design and implementation processes.

### **3.4 The Scientific Advisory Board**

After an initial meeting at the project kick-off, we had a very useful meeting in May 2020 where it was decided to increase the frequency of SAB/PLT meetings. Since then, the IS-ENES3 Project Leader Team (PLT) has unfortunately had only very little contact with the SAB. This lack of engagement does not reflect a poor willingness to take advantage of useful advice the SAB could bring to the consortium, it was rather due to (1) the virtual meeting overload that happened after Covid kicked and (2) the delays happening in many project activities, making unfortunately the interaction with SAB dropping down the list of priorities. All members of the SAB were invited at each General Assemblies. Most of them attended at least partially. They were also invited to engage in key activities of the Sustainability process, such as the Sustainability Scoping Workshop held at the end of the Sustainability Scoping phase.

## **4 Lessons learned and input for the ENES-RI implementation**

### **4.1 Issues faced**

#### *Task Forces*

At times it was difficult to sustain momentum within the HPC Task Force due to a combination of issues, the most significant of which was the interregnum between PRACE and EuroHPC. During this period, we were also able to make use of the ESiWACE2 meetings and activities, which meant that a lot of the HPC task force business happened elsewhere. However, as ESiWACE2 (and ESiWACE3 to come) has been concentrating on high resolution modelling, there is a role for the HPC Task Force going forward to try and avoid a potential bifurcation in the HPC modelling community between those who can go to high resolution and hence make use of the GPU accelerated computing, and those with different science needs (e.g., lower resolution) requiring HPC, but cannot efficiently use GPU accelerated machines. The move towards high resolution has also brought the NWP and climate communities closer together, with consequences for joint agendas. As a consequence, the terms of reference of the Task Force are being currently reviewed to clarify its role and revisit the membership.



### *Sustainability WG*

Regarding the sustainability process, it took us a long time during the scoping phase to determine the right contact persons to act as institutional representatives for our sustainability working group. It turned out to be persons with technical competences but also scientific understanding at mid-hierarchical level that were best suited to get involved. But this also created delays in this process.

## **4.2 Integration to the future ENES-RI**

Both Task Forces will be part of the ENES-RI coordination. An adjustment of their Terms of Reference will thus be needed since the TFs will have a specific key role in advising the new structure.

Regarding the HPC TF, partly because of the issue raised in the previous paragraph, but also because it would be beneficial to advise on the overall content of the ENES-RI, we are considering enlarging the HPC Task Force to reinforce the “models and tools” aspects. Constructive discussions at the final project General Assembly (Toulouse, January 2023) have led to this recommendation. The governance / strategy of some community tools or components could thus be covered in the Task Force meetings. The terms of reference of this Task Force will be reviewed accordingly to be adopted by the ENES-RI council at a later stage.

The terms and conditions of the Data Task Force will also be reviewed to make sure it further serves the needs of advising the future ENES-RI adequately. No major change is expected though. As for the other TF, the updated Terms of Reference will need to be adopted at Council level.

The Sustainability Working group is expected to act as an interim Council in the transition phase from IS-ENES3 to ENES-RI, and some of its members might become official council members, keeping in mind that the choice is left to the institutions themselves to name their official council representative once the ENES-RI structure is in place.

## **5 Conclusions**

After 4 years of the IS-ENES3 project, we have taken a critical look back on our main governing activities, with the aim of adjusting those to the sustained ENES-RI, expected to come live soon. The Task Forces will both remain central to the coordination of the ENES-RI, and their terms of reference will be reviewed accordingly by the ENES-RI Council. Besides, the Sustainability WG will be crucial during the transition into the ENES-RI beyond IS-ENES3, acting as an interim Council.