



# The LNGS-FUTURE project

## LNGS Facilities Upgrade To Unveil Rare Events

Carlo Bucci

Acronym	LNGS-FUTURE
Applicant	INFN
Operating Unit	LNGS 
Co-applicant	GSSI 
Scientific Coordinator	Carlo Bucci (INFN-LNGS)
Technical Coordinator	Augusto Goretti (INFN-LNGS)
Infrastructure Manager	Antonio Di Ludovico (INFN-LNGS)
Financial Officer	Franca Masciulli (INFN-LNGS)
Budget	20'058'826,53 Euro (98% INFN, 100% Sud)
Start date	1 September 2022
Duration	30 months

# The idea: modernization and strengthening

The LNGS are universally recognized as the world's leading laboratory in Astroparticle Physics

- dimensions
- easy of access
- geografic location
- quality of support to the experiments

Many nations (including United States, Canada, Japan, China and South Korea) are investing relevant resources in building new underground laboratories or upgrading existing ones

LNGS is 37 years old; the infrastructure is beginning to be obsolete and modernization is desirable

To continue to be attractive for cutting-edge experiments, some improvements in specific areas and implementation of new technologies are needed

The PNRRR-IR call refers to the PNIR, which identifies the Research Infrastructures (IR)

131 “Italian” IRs (including 54 in the PSE sector) categorized with respect to:

- priority (74 high, 35 medium, 22 low)
- size and impact (21 global , 60 EU, 50 national)
- site (single, distributed, e-IR)
- locations in the south regions

LNGS were perfectly framed in the PNRRR-IR call for proposals.

High-priority IR, with global impact and single site in the south region



The Laboratori Nazionali del Gran Sasso (LNGS) of INFN are universally recognized as the most important research center for astroparticle physics. Since the end of the 1980s, when the experimental activities began, the role, results and international impact of LNGS have been constantly growing. Every year over a thousand scientists, from the most renowned universities and research institutions in the world, come to LNGS to participate in experiments devoted to the study of the great mysteries of the universe.

The study of the properties of neutrinos, the search for dark matter and the understanding of the mechanisms underlying the functioning of stars are the main strands of the articulated LNGS research program.

Thanks to their size, ease of access and their geographical location, LNGS are the ideal place to carry out complex experiments. Moreover, the success of LNGS is closely linked to the ability to provide integrated services and scientific support of excellence in the fields of mechanics, electronics, the selection of radio-pure materials, analytical chemistry and scientific computing.

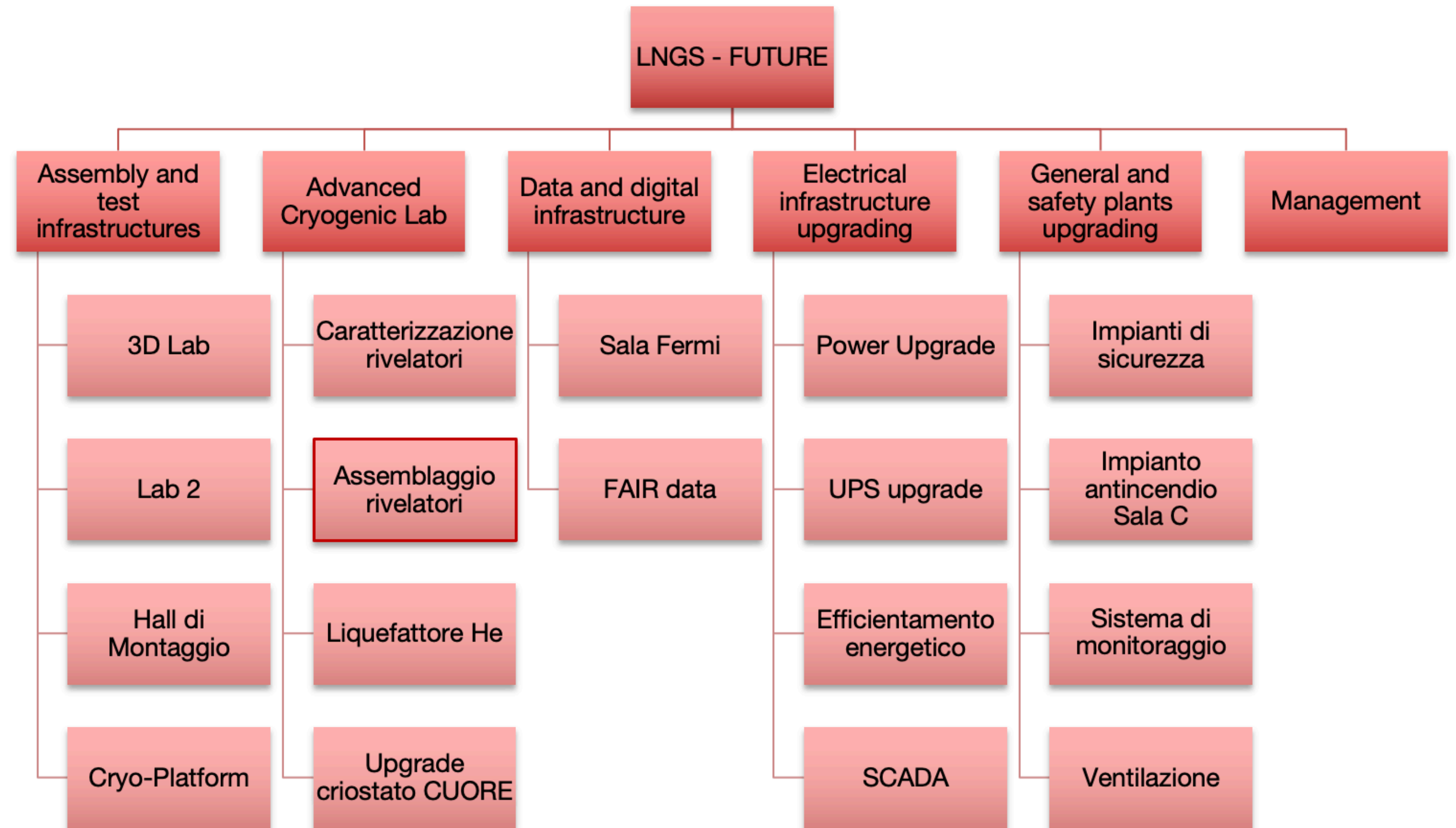
The growing relevance of astroparticle physics, repeatedly emphasized by authoritative international organizations, is attested by increasingly fierce competition: many nations are today investing considerable resources in the construction of new infrastructures or in the requalification of existing underground laboratories. To maintain the pre-eminent role of LNGS, constant improvement is required to keep LNGS in step with international competition.

The LNGS upgrade project, object of the PNNR-IR call, aims at the modernization and strengthening of the laboratory's technical and safety services and at the creation of support for advanced cryogenics, a technique increasingly used by new generation experiments.

The ultimate goal is to host the most important experiments designed to study the Majorana nature of the neutrino, thus maintaining the world leadership in astroparticle physics for the LNGS for the next decade.

The project consists of 5 Working Packages (WP) + 1 Management WP

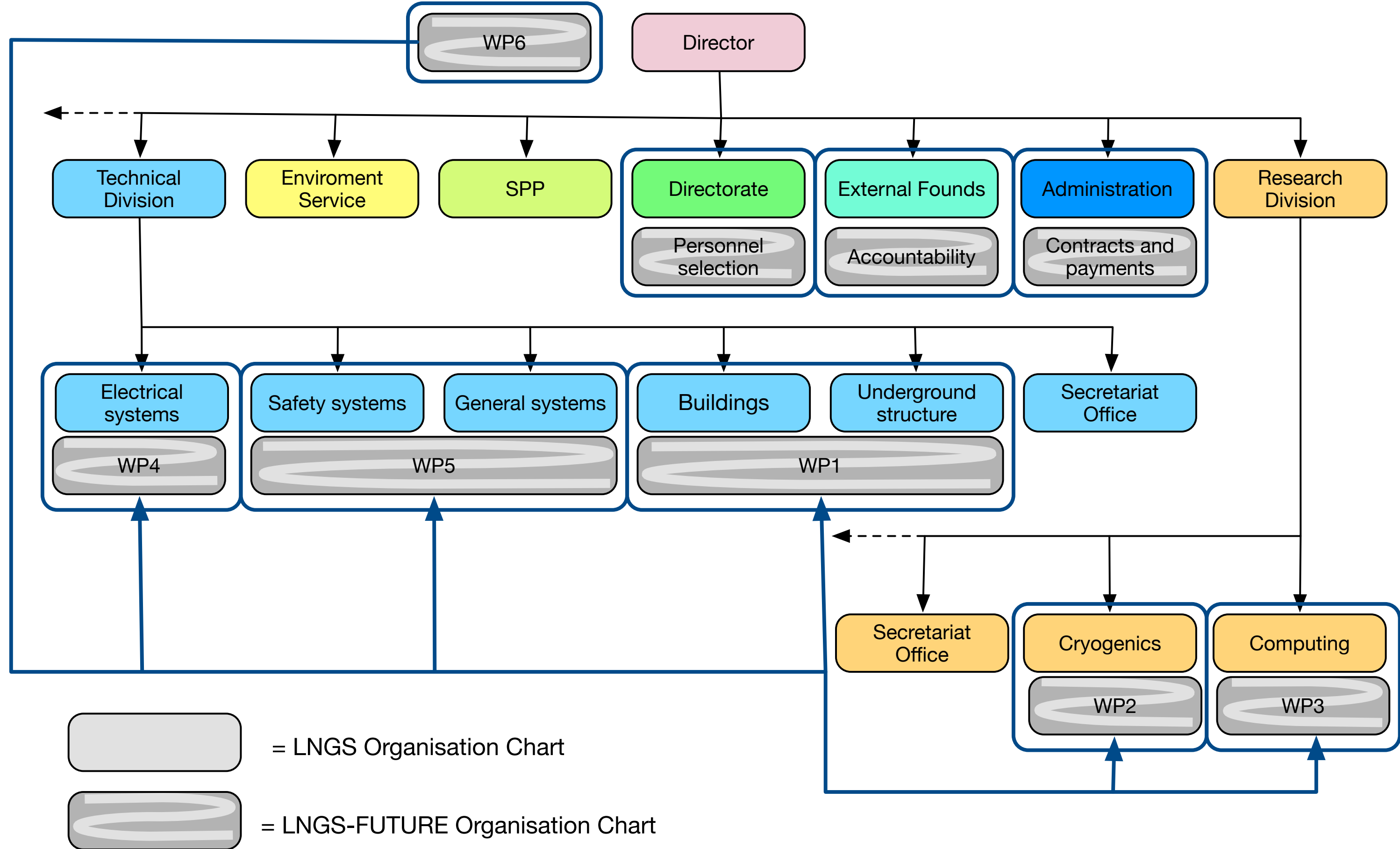
- 18 Activities
- 89 Intermediate Objectives



# Organization chart

The LNGS-FUTURE organization chart is hinged on the current LNGS organization chart.

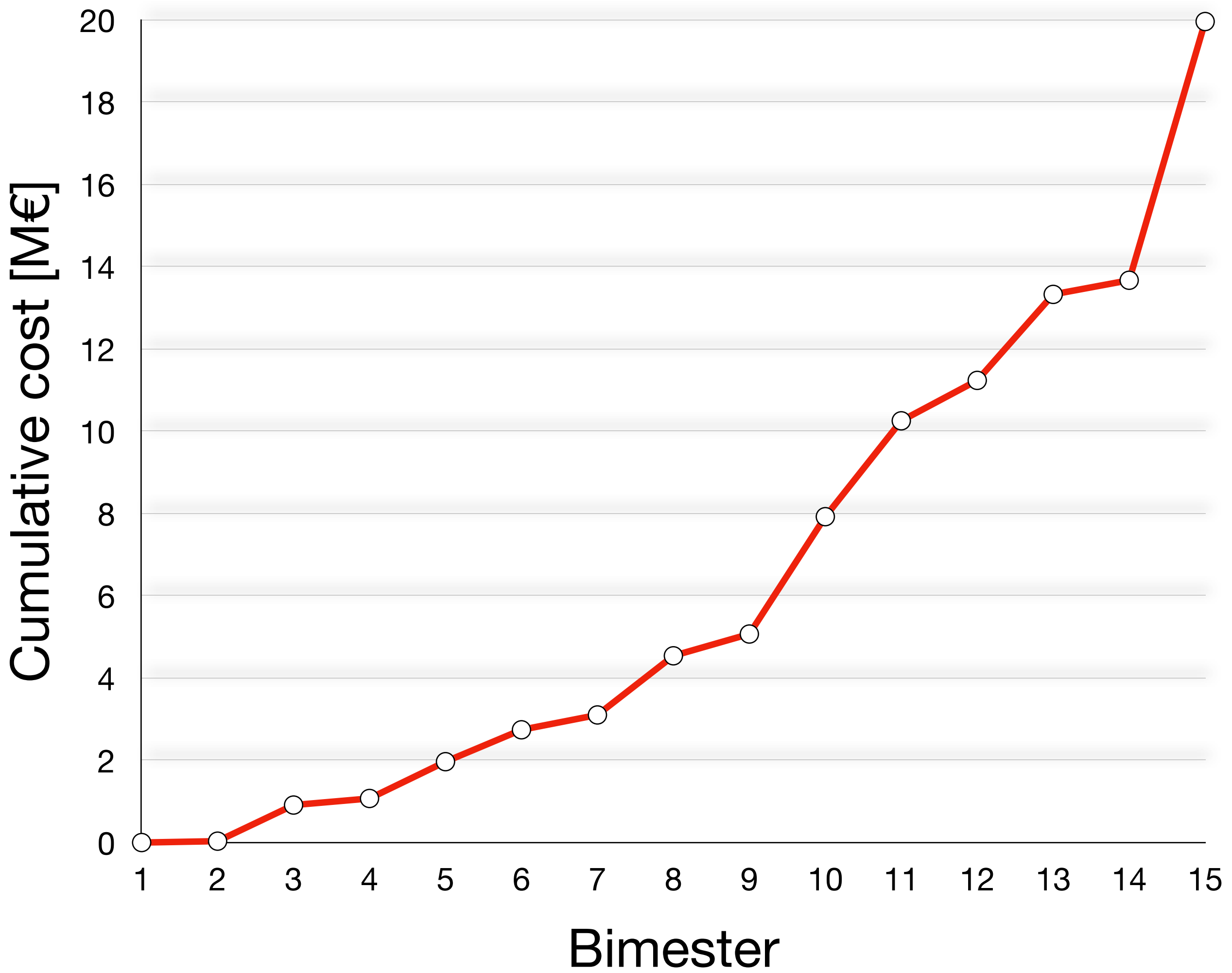
- The Infrastructure Manager ensures the coordination and monitoring of the project





# Planned spending profile

Bimestre	# Obiettivi Intermedi	Valore	Cumulativo
2	2	€ 33.860,00	€ 33.860,00
3	11	€ 882.225,43	€ 916.085,43
4	2	€ 160.740,00	€ 1.076.825,43
5	4	€ 898.710,11	€ 1.975.535,54
6	3	€ 779.110,67	€ 2.754.646,21
7	2	€ 362.974,43	€ 3.117.620,64
8	10	€ 1.444.908,42	€ 4.562.529,06
9	4	€ 532.157,16	€ 5.094.686,22
10	12	€ 2.867.116,77	€ 7.961.802,99
11	6	€ 2.342.249,01	€ 10.304.052,00
12	6	€ 987.481,97	€ 11.291.533,97
13	7	€ 2.101.068,26	€ 13.392.602,23
14	2	€ 345.089,44	€ 13.737.691,67
15	18	€ 6.321.134,86	€ 20.058.826,53
<b>Totale</b>	<b>89</b>	<b>€ 20.058.826,53</b>	<b>€ 20.058.826,53</b>





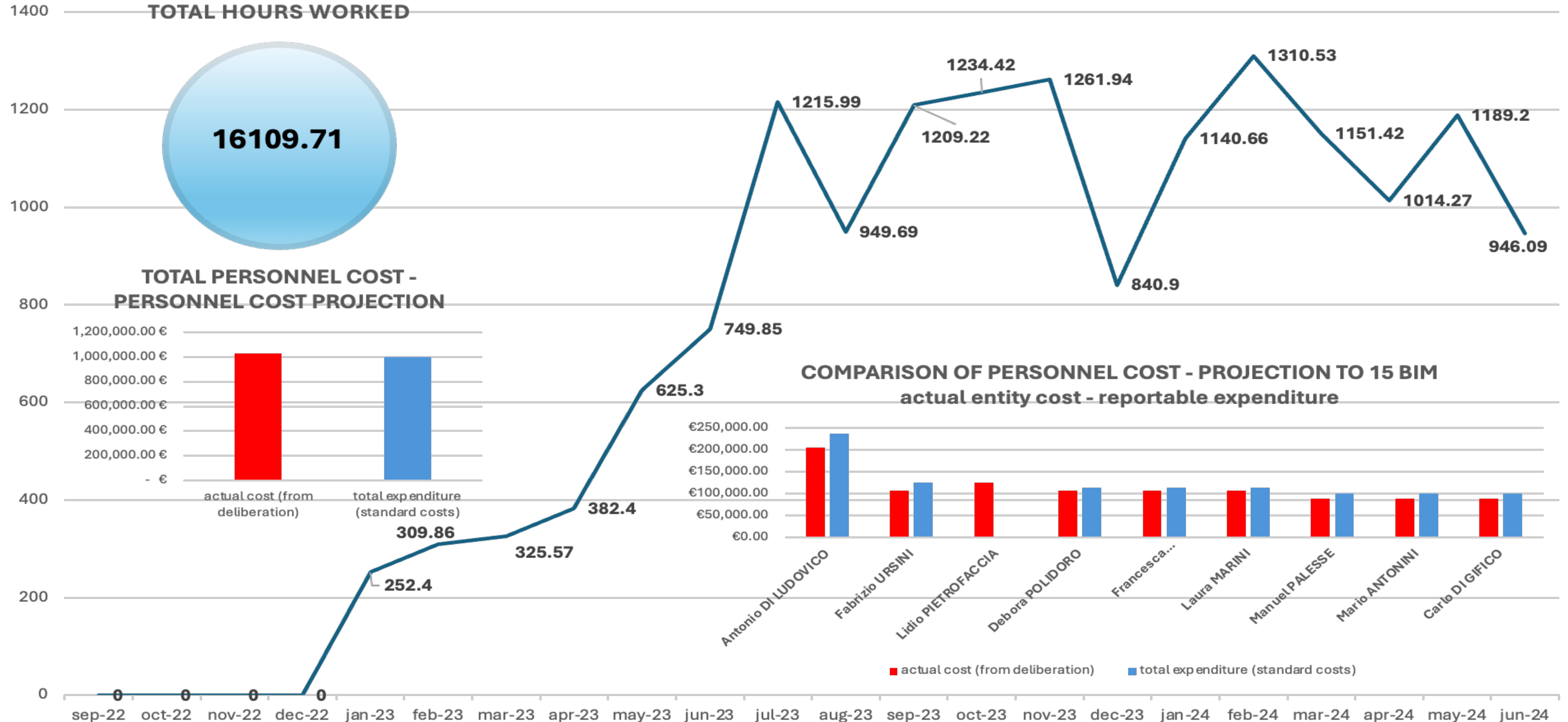
# Recruited personnel

“Ad hoc” reinforcements of LNGS Services to carry out project activities while ensuring LNGS operation

- Infrastructure Manager (A. Di Ludovico)
  - 3 Technologists (F. Marchegiani, L. Marini, D. Polidoro)
  - 4 Technicians (M. Antonini, C. Di Gifico, M. Palesse, F. Ursini)
- 
- Gender balance almost respected (5 M, 3 F)
  - All have been assigned to existing LNGS Services
  - 5.8% of the budget LNGS-FUTURE budget
  - Contracts issued from January to June 2023

# Hours worked

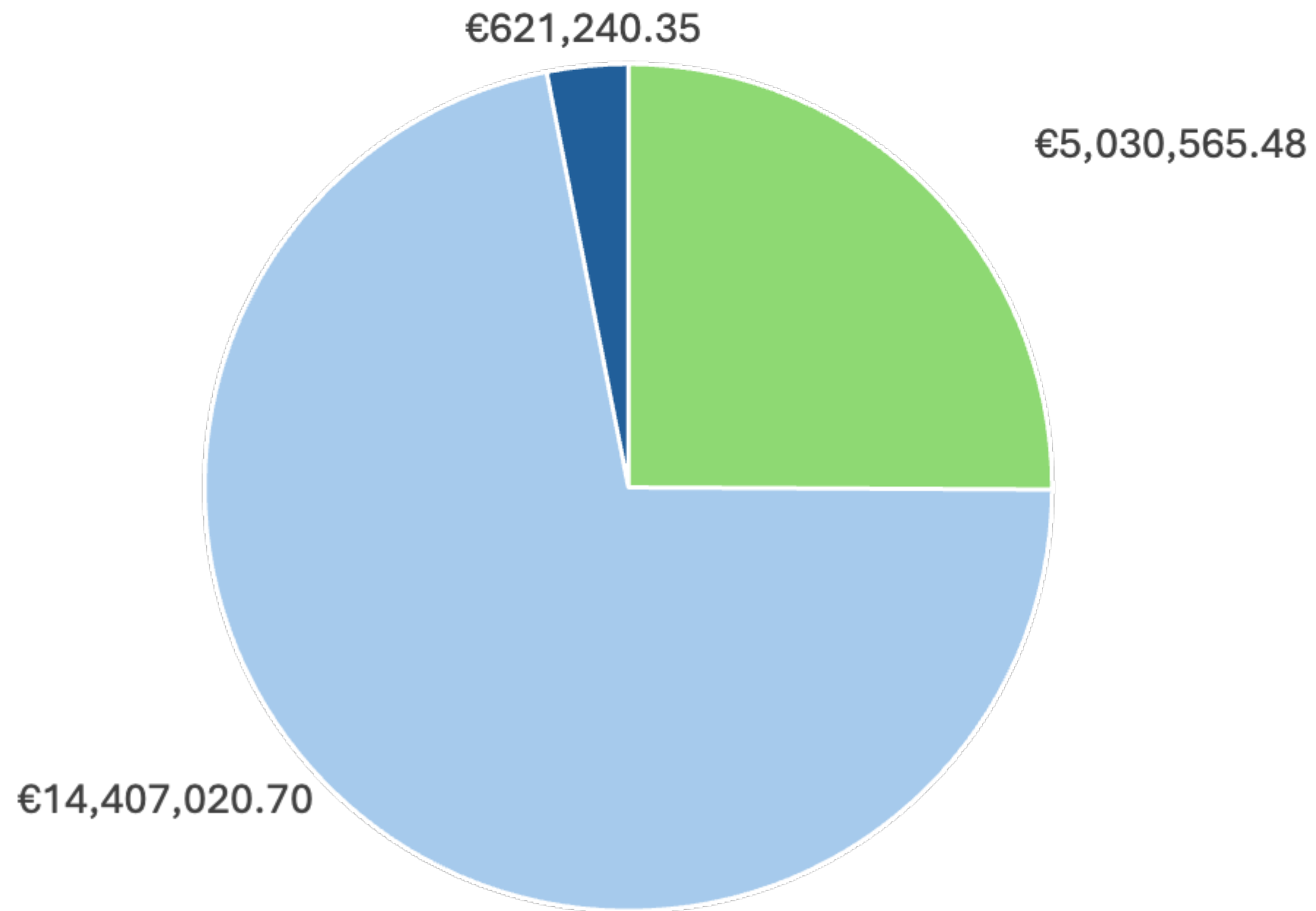
September 2022 - June 2024



# Funds status

**YEAR 2023**

■ to be committed   
 ■ committed 2023   
 ■ amounts paid



**STATUS 11 BIM**

■ committed 2024   
 ■ amounts paid 2024  
■ to be committed 2024   
 ■ remaining cost 2023

