

|                                                                                          |                                                             |                          |                |
|------------------------------------------------------------------------------------------|-------------------------------------------------------------|--------------------------|----------------|
| <br>DTT | <b>Piano Annuale delle Attività<br/>2024 Work Plan 2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 1/<br>31 |
|                                                                                          |                                                             | External ID:<br>N.A.     | Rev. 1.2       |

|                                                                                                                           |                                                                                                               |               |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|---------------|
| Access: <input type="checkbox"/> contractual <input type="checkbox"/> open <input checked="" type="checkbox"/> restricted |                                                                                                               |               |
| <b>Piano Annuale delle Attività 2024<br/>Work Plan 2024</b>                                                               |                                                                                                               |               |
| <b>Project<br/>Details</b>                                                                                                | <br>DTT S.c.a r.l.           |               |
|                                                                                                                           | <i>This document is issued for the execution of the DTT project</i>                                           |               |
|                                                                                                                           | DTT ID Number                                                                                                 | PMO-GEN-03014 |
|                                                                                                                           | External ID Number                                                                                            | N.A.          |
|                                                                                                                           | DMS ID Number                                                                                                 | DTT2024_00305 |
| <b>Authors &amp;<br/>Contributors</b>                                                                                     | G. Trovato, G.M. Polli, M. De Santis, G. Granucci.                                                            |               |
| <b>Distribution<br/>List</b>                                                                                              | CdA/PRE/CFO/CE/WPM/SI                                                                                         |               |
| <b>Abstract</b>                                                                                                           | <i>The present report describes the DTT Consortium work programme and defines the relevant budget for the</i> |               |

|      |            |                         |             |                                                         |              |               |
|------|------------|-------------------------|-------------|---------------------------------------------------------|--------------|---------------|
| 1.2  | 07/03/2024 | Issued for CdA Approval | G. Trovato  | G.M. Polli<br>G. Granucci<br>M. De Santis<br>V. Vaccaro | E. Di Pietro | CdA           |
| 1.1  | 23/01/2024 | Issued for CdA Approval | G. Trovato  | G.M. Polli<br>G. Granucci<br>M. De Santis<br>V. Vaccaro | E. Di Pietro | CdA           |
| 1.0  | 17/11/2023 | DRAFT for CTS review    |             |                                                         |              |               |
| Rev. | Date       | Issuing Description     | Prepared by | Checked by                                              | Approved by  | Authorized by |

|                                                                                   |                                             |                             |                              |
|-----------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|------------------------------|
|  | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>2/</b><br><b>31</b> |
|                                                                                   |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                     |

| Rev. | Summary of Modifications      |
|------|-------------------------------|
| 1.0  | Issued for CTS review         |
| 1.1  | Issued for CdA Approval       |
| 1.2  | Title of the document changed |

|                                                                                          |                                             |                             |                              |
|------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|------------------------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>3/</b><br><b>31</b> |
|                                                                                          |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                     |

## Index

### Sommario

|       |                                                                                                   |    |
|-------|---------------------------------------------------------------------------------------------------|----|
| 1.    | Introduction .....                                                                                | 5  |
| 2.    | Construction costs (Works and Supply of Goods) .....                                              | 5  |
| 2.1   | Work-package Tokamak Hall .....                                                                   | 7  |
| 2.1.1 | Magnets (MAG) .....                                                                               | 7  |
| 2.1.2 | Vessel and Out-of-Vessel Components (OVC) .....                                                   | 9  |
| 2.1.5 | Assembly (ASS) .....                                                                              | 14 |
| 2.1.6 | Remote Handling Systems (RHS) .....                                                               | 15 |
| 2.1.7 | Divertor and In Vessel Components (IVC) .....                                                     | 16 |
| 2.2   | Work-package Heating and Current Drive.....                                                       | 18 |
| 2.2.1 | Electron Cyclotron Heating (ECH).....                                                             | 18 |
| 2.2.2 | Ion Cyclotron Heating (ICH) .....                                                                 | 20 |
| 2.2.3 | Neutral Beam Injectors (NBI).....                                                                 | 21 |
| 2.3   | Work-package Balance of Plant.....                                                                | 22 |
| 2.3.1 | WBS AUX-Auxiliary Plan Systems .....                                                              | 22 |
| 2.3.2 | WBS BUI-Building and Services.....                                                                | 23 |
| 2.3.3 | WBS ENS-Electrical Network System.....                                                            | 24 |
| 2.3.4 | WBS AUT-Control, Safety, Security and Telecommunication Systems .....                             | 24 |
| 3     | Consortium Running Costs .....                                                                    | 25 |
| 3.1   | Costs for DTT personnel and assigned personnel by the shareholders .....                          | 25 |
| 3.2   | Costs for technical services to be supplied through shareholders agreement and external contracts | 26 |
| 3.3   | Costs for External Facilities utilization and R&D .....                                           | 27 |
| 3.4   | Operating costs.....                                                                              | 27 |
| 4     | ENEA's Activities assigned to DTT.....                                                            | 29 |
|       | Attachments.....                                                                                  | 31 |

|                                                                                                         |                                             |                             |                              |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|------------------------------|
| <br><small>DTT</small> | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>4/</b><br><b>31</b> |
|                                                                                                         |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                     |

## Acronyms and abbreviations

|       |                                                                                               |
|-------|-----------------------------------------------------------------------------------------------|
| BOP   | Balance of Plant                                                                              |
| CODAS | Control & Data Acquisition System                                                             |
| Dlgs. | Legislative Decree                                                                            |
| HCD   | Heating & Current Drive                                                                       |
| ICT   | Information and Communication Technology                                                      |
| M€    | € million                                                                                     |
| NRRP  | National Recovery and Resilience Plan (Next generation EU funds)                              |
| PY    | Persons per Year                                                                              |
| RUP   | Responsabile Unico del Procedimento (Contract Holder as per Italian code of Public Contracts) |
| SIM   | System Integration Management                                                                 |
| THM   | Tokamak Hall Management                                                                       |

|                                                                                                         |                                             |                          |                |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|----------------|
| <br><small>DTT</small> | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 5/<br>31 |
|                                                                                                         |                                             | External ID:<br>N.A.     | Rev. 1.2       |

## 1. Introduction

This document describes the work-program of the DTT Consortium and defines the relevant budget for the year 2024.

The report is divided in 2 sections:

- The first section describes the so-called “construction costs” that include all the expenses for the procurement and installation of the goods needed for the completion of the DTT facilities.
- The second section provides an insight of the so-called “running costs” of the consortium that include the design activities and the operating costs needed for the functioning of the company.

The focus is on the 2024 plan, however, a complete list of construction contracts which award is forecasted during the 2024-2026 triennium is provided. This allows for a detailed examination of the progression of these cost commitments over the three-year period addressing the need to provide input data to the three-year plan, as required by Italian law for a public entity.

It was not possible to finalize the information on running costs for the three-year period because the calls for services issued at the beginning of 2022 need to be updated following the accounting reporting for 2023, which has not yet been provided by the shareholders. Nevertheless, an economic estimate of the activities that DTT intends to develop in 2024 has been provided for each individual project in support of the contract awarding plan. Therefore, the design costs and other technical services provided by the partners will undergo review in the first quarter of 2024.

All the monetary value reported are in Euro and before VAT (where applicable).

## 2. Construction costs (Works and Supply of Goods)

The present section provides information relevant to the works and supply of good contracts for which activities are planned to be executed during the year 2024. The spending allocation has been defined in accordance with the planned receipt of the invoices from contractors and suppliers.

The estimate-at-completion of the construction costs have already been developed in accordance with the contract award plan and will be submitted for approval by the board as soon as the new project baseline is approved

The budget has been allocated in accordance with the project Work Break-down Structure and with the Product-Break-down Structure (PBS).

|                                                                                                         |                                             |                          |                |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|----------------|
| <br><small>DTT</small> | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 6/<br>31 |
|                                                                                                         |                                             | External ID:<br>N.A.     | Rev. 1.2       |

The following information is provided in attachment:

- List of all contracts to be awarded and signed in 2024 and their estimated value
- List of all contracts placed till 31 Dec 2023 and their actual value
- List of all payments foreseen in 2024 for all contracts (already placed and to be placed in 2024)
- List of all contracts in three-years span (2024-2026)

The break-down of costs and new commitment for each work-pack are provided in the following table:

| WBS-1        | 2024 New Commitment (M€) | 2024 Spending (M€) <sup>1</sup> |
|--------------|--------------------------|---------------------------------|
| THM          | 173.87                   | 56.39                           |
| HCD          | 23.68                    | 21.71                           |
| BOP          | 84.02                    | 9.4                             |
| <b>TOTAL</b> | <b>281.57</b>            | <b>87.5</b>                     |

The breakdown for each work-pack and level 2 WBS item is reported in the following sections including a narrative describing the scope of work ongoing, to be contracted in 2024 and to be prepared for contracting in year 2025.

To enhance the understanding of the document and the logical flow of activities, for each second level WBS, design costs and technical services provided by partners or outsourced (i.e. ANN) are also listed at the end of each section. These are the costs anticipated in 2024 and are necessary to prepare the technical documentation required to issue calls for tenders and to progress the design for the components that will be contracted in the following years. The breakdown of running costs, which includes design expenses and technical services, is then presented in a consolidated manner in the dedicated section.

---

<sup>1</sup> The figures reported include also activities funded by PNRR and Divertor and First wall activities that will be contracted by ENEA and provided in-kind to DTT. Details are provided in the attachments.

|                                                                                          |                                             |                          |                |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 7/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2       |

## 2.1 Work-package Tokamak Hall

In the following table is shown the summary information of construction costs in € million for each WBS-2 level:

| WBS-2            | 2024 New Commitment (M€) | 2024 Spending (M€) |
|------------------|--------------------------|--------------------|
| MAG              | 63.20                    | 19.7               |
| OVC              | 30.00                    | 6.00               |
| PSS              | 38.75                    | 11.77              |
| DIA              | N/A                      | 2.33               |
| ASS              | 19.00                    | 3.80               |
| RHS              | 8.83                     | 2.65               |
| IVC              | 14.10                    | 10.15              |
| <b>TOTAL THM</b> | <b>173.87</b>            | <b>56.39</b>       |

- Total new commitment in 2024: 173.87 M€
- Total payment in 2024: 56.4 M€ (including 7.1 M€ funded by PNRR)

### 2.1.1 Magnets (MAG)

The construction costs information for Magnets are:

- Total new commitment in 2024: 63.2 M€
- Total payment in 2024: 19.7 M€

Below is a list of the main activities planned for 2024, along with a brief description of key information:

|                                                                                          |                                             |                          |                |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 8/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2       |

- Nb3Sn strands for the CS and PF conductors. The original tender, awarded to Luvata, was unsuccessful, therefore the contract has been cancelled and a new tender shall be launched. Only advance payment for 20% of the contract is expected (3.9 M€).
- TF casings: due to the negative outcome of the negotiations with SIMIC, the contract for the manufacturing of the casings has been cancelled. A new specification and a subdivision of scope of procurement had been prepared and two new calls for tenders shall be launched. The contracts activities are expected to start in the second half of 2024. Only advance payments for 20% of the contract are expected (4.2 M€).
- Feeders: having completed the conceptual design of the feeders inside the cryostat, with the choice of the conductor performance, the supply of the conductor can start. In mid-2024, the call for tender for the feeders will be launched.
- PF coils: the call for tender is about to be launched. The start of the contract activities is expected in the first half of 2024. Only advance payment for 20% of the contract are expected (3.92 M€).
- Current leads: since the 30 current leads needed to feed the superconducting magnet system must be tested before they assembly, the procurement is expected to take more than 3 years from the start of the contract activities, therefore the contract for their supply together with the associated cryostats will be launched by the end of 2024. Only advance payment for 20% of the contract are expected.
- Cryoplant: the procurement of the cryogenic system would take about 4 years from the start of the contract activities including the commissioning phase. Since the relative tender will be based on a competitive dialogue scheme, the sole tender may last more than 6 months. Therefore, the invitation to participate shall be launched as soon as possible at the beginning of 2024. The contract is going to be awarded and signed in 2025.

The following, already contracted, activities are going to continue or be completed in 2024:

- TF coils: the contract for the fabrication of the winding packs (WP) and subsequent integration in the casings, awarded by ASG, is proceeding. In summer 2024, the first complete WP is expected. Thanks to the availability of several other TF conductors already delivered to ASG, the fabrication of the remaining WP will proceed, and the second WP shall be completed by the end of 2024. The total payments foreseen in 2024 are 1.4 M€.

|                                                                                                         |                                             |                          |                |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|----------------|
| <br><small>DTT</small> | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 9/<br>31 |
|                                                                                                         |                                             | External ID:<br>N.A.     | Rev. 1.2       |

- Conductors: production of the TF conductors (ICAS) continues after the 25 units lengths already delivered so far. Also, the production of the NbTi conductors for the PF coils (ICAS) will start. The total payments foreseen in 2024 are 5.83 M€.

The following preparatory activities are going to be performed in year 2024:

- CS coils: the additional experimental activities planned in 2024 will allow to get a final judgment on the CS coils winding layout. The call for tender shall be launched in the second half of 2025.

The contracts for Nb<sub>3</sub>Sn for TF (supplier KAT), Nickel-Chromium CU (Supplier Luvata) Nb-Ti (PF2 to PF5, supplier Furukawa) strands are completed.

Regarding Services (MAG) the total commitment for 2024 is 800 K€ for the resources provided by DTT Shareholders for follow-up of the supply contracts and to continue the design activities of the systems whose design has not yet been finalized.

Furthermore, in support of the engineering activities of the MAG WBS, additional 60 pm (corresponding to 500 k€) resources within the framework contract with ANN are expected to be activated for 2024.

Finally, external contracts shall be prolonged for:

- SULTAN facility: testing of conductors and qualification joints proceed in parallel to the manufacturing of the coils (420 k€)
- CEA support in cryogenics: support in the set-up and management of the competitive dialogue for the cryogenic system (350k€).

### 2.1.2 Vessel and Out-of-Vessel Components (OVC)

Summary of construction costs:

- Total new commitment in 2024: 30 M€
- Total payment in 2024: 6 M€

Below is a list of the main activities planned for 2024, along with a brief description of key information:

- CRS Cryostat Structure: The cryostat (CRS) consists of the Cryostat Base (CBS) with seismic isolators, the Cryostat Cylindrical Body (CCB), and the Cryostat Top Lid (CTL). This call for tender will be

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 10/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

launched at the end of 2024 and will secure the availability of first equipment and materials for the assembly operation as early as end of 2026. No payments foreseen in 2024

- VVP Vacuum Vessel and Ports: The call for tender will be relaunched after the unsuccessful result of the call in 2023. Only advance payment for 20% of the contract are expected (6.000 M€).
- THS Thermal Shield: The THS consists of the Vacuum Vessel Thermal Shield (VVTs), Ports Thermal Shield (PTS), Cryostat Thermal Shield (CTS). This tender follows that of the vacuum vessel with which shares the same delivery plan since the assembly foresees that each VV sector shall be covered by the proper thermal shield before insertion of the TF coils. The call for tender will be launched in mid-2024; no payments foreseen in 2024.
- Cryogenic pumps: the procurement of the cryogenic pumps need a relatively long period of qualification, followed by 18 months of manufacturing therefore, in order to have the pumps delivered by mid-2027, by the end of 2024 the relative call for tender shall be launched. No payments foreseen in 2024.

Regarding Services (MAG) the total commitment for 2024 is 875 K€ (105 pm) for the resources provided by DTT Shareholders for follow-up of the supply contracts and to continue the design activities of the systems whose design has not yet been finalized. Additionally, 12 pm for completion of the cryogenic pumps design by KIT within EUROfusion will be spent. Also, in support of the engineering activities of the OVC WBS, additional 72 pm (corresponding to 600 k€) resources within the framework contract with ANN are expected to be activated for 2024

### 2.1.3 Power\_Supply\_Systems (PSS)

Construction:

- Total new commitment in 2024: 38.75 M€
- Total payment in 2024: 11.767 M€

Below is a list of the main activities planned for 2024, along with a brief description of key information:

- PF power supply: with the launch of the call for tender for the PF coils also the call for tender of the related power supply can start. Only advance payment for 20% of the contract are expected.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 11/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

- In-vessel coils power supply (VSS, DIS, NAS): the call for tender for the in-vessel coils power supplies has been already published in 2023. The contract signature and related activities will start at the beginning of 2024. Only advance payment for 20% of the contract are expected.

The following, already contracted, activities are going to continue or be completed in 2024 for a total payment of 2.217 M€:

- TF Transformers and AC/DC Converters: The delivery of the converters shall be completed at the beginning of 2024.
- TF FDUs Fast Discharge Units (including Prototype for CTF): the delivery of the first FDU is expected in the second half of 2024.

The following preparatory activities are going to be performed in year 2024:

- CS power supply: the preparation for the call for tender will proceed following closely the final design of CS and associated technical details and parameters.
- Design and specs preparation for:
  - Dc Busbars
  - Other Ps Components (Dummy Loads)
  - Reactive power compensation system

Services (PSS) (total commitment in 2024: 600 K€)

- Resources within Shareholders services for 48 pm (corresponding to 400k€) for 2024 are expected for the follow-up of the contract or to continue the design activities of the systems whose design has not yet been finalized.
- Also, in support of the engineering activities of the PSS WBS, additional 24 pm (corresponding to 200 k€) resources within the framework contract with ANN are expected to be activated for 2024.

#### 2.1.4 Diagnostics (DIA)

The scope of DIA WBS 2 is the design, integration and realization of DTT Diagnostic Equipment. As integration activities and interface issues are demanding on DTT, a diversified strategy for the PHASE1 and PHASE2 diagnostic equipment has been adopted. In particular, the planning of both design and implementation activities is conveniently differentiated. Indeed, the construction planning of diagnostics to be ready at

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 12/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

beginning of Phase 1 (classified as “machine protection” or as “essential for operation”) must be strictly aligned to that of the machine assembly. This applies as well to the installation of diagnostic parts with an impact on the in-vessel components.

Other diagnostics for Phase 2, classified as for the “scientific program”, are anyhow expected to have a complete conceptual design before the start of Phase 1 (with specific attention to the solution of integration and interface issues).

The strategy presently envisaged foresees the realization of DTT diagnostic equipment by assigning the final design, procurement and realization to one or more DTT shareholders.

For 2024 the construction costs expected from shareholders are 2.33 M€

The present organization of WBS DIA level 4 is shown in the table below. The Phase 1 and Phase 2 (only design) diagnostic equipment should be procured, in the 11 assignments, depending on the skills of the shareholder(s):

|     |                                              |
|-----|----------------------------------------------|
| DTI | Tomography and SXR imaging                   |
| DSP | Active and Passive Spectroscopy              |
| DWI | Embedded, IR/VIS cameras and PWI Diagnostics |
| DIP | Interferometry and Polarimetry               |
| DTS | Thomson Scattering systems                   |
| DEE | ECE Diagnostics                              |
| DRE | Reflectometry                                |
| DMA | Magnetic Sensors                             |
| DGN | Neutrons and Gammas                          |
| DRA | Run Aways Diagnostics                        |
| DPF | Fast Particles Diagnostics                   |

The table above includes, for each assignment, in general, diagnostics both for Phase 1 and Phase 2.

Phase 1 Diagnostics: The Conceptual Design of the diagnostics for the Phase 1 equipment (including C-DRMs) is expected to be completed by March 2024 - June 2024. This conceptual design (utilizing also the engineering from Framework Contract with ANN - L4 specific contract) will include: an estimation of the costs, schedule of activities and needed professional resources, up to the completion of the integrated commissioning.

Once completed the Conceptual Design, procurement assignments to the shareholders could be planned according to the indicative schedule shown in the following table:

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 13/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

| <b>March 2024</b>                                   | <b>June 2024</b>                                       |
|-----------------------------------------------------|--------------------------------------------------------|
| Magnetic sensors EX-Vessel                          | VIS/IR cameras                                         |
| Interferometry and Polarimetry                      | Visible, VUV and SXR Passive Spectroscopy              |
| Thomson Scattering systems                          | Plasma Position Reflectometer, waveguides and antennas |
| REIS Run-Away Electrons Spectrometer                | SXR and Bolometers sensors                             |
| Neutron Yield monitor and Neutron Activation System | Embedded First Wall and Divertor                       |
| HARD-X and Run-Away Electrons Monitor               | Magnetic Sensors, IN Vessel, Divertor and First Wall   |
|                                                     | Electron Cyclotron Emission Diagnostics                |

DTT will continue to provide central engineering support for the E-DRMs and machine integration with additional 24 pm (corresponding to 200k€) resources within the framework contract with ANN to be activated for 2024.

Phase 2 Diagnostics: Regarding the activities of the Phase 2 diagnostics only design activities are foreseen and budgeted. Based on 2023 Preliminary Design Reports that are expected to provide for:

- an assessment of allocations
- interfaces
- diagnostic layout
- integration of preliminary design in the configuration model (in particular in-vessel)

In the above-mentioned assignment, the deliverable for 2024 include:

- progress in allocation
- progress in analysis and solution of interface issues regarding IN-vessel components, Vacuum Vessel and Ports, RH activities, Torus Hall path
- progress in list of cables & fibers
- Progress on integration analysis and insertion of diagnostic CAD drawings into the main CAD of the project

In the following table the professional resources for Phase 2 for 2024 are summarized:

|                                            |    |     | PM  | k€ <sup>2</sup> |
|--------------------------------------------|----|-----|-----|-----------------|
| Bolometers and SXR Tomography, SXR imaging | 01 | DTI | 3,0 | 25              |
| Interferometers and Polarimeters           | 02 | DIP | 3,0 | 25              |

<sup>2</sup> The Professional Man Year, for budget purpose only, is assumed as 80k€/PMY + 25% overhead= 100 k€/PMY (actual cost are on detailed accounting)

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 14/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

|                                           |    |     |      |       |
|-------------------------------------------|----|-----|------|-------|
| Active and Passive Spectroscopy           | 03 | DSP | 7,0  | 58.3  |
| Neutrons and Gammas                       | 04 | DGN | 2,0  | 16.7  |
| Magnetic Sensors                          | 05 | DMG | 1,0  | 8.3   |
| Embedded, IR/VIS cameras<br>and PWI Diag. | 07 | DWI | 10,0 | 83.3  |
| ECE Diagnostics                           | 08 | DEE | 3,0  | 25    |
| Reflectometry                             | 09 | DRE | 3,0  | 25    |
| Thomson Scattering Systems                | 10 | DTS | 1,0  | 8.3   |
| Run Aways Diagnostics                     | 11 | DRA | 2,0  | 16.7  |
| Fast Particles                            | 12 | DPF | 5,0  | 41.7  |
|                                           |    |     | 40   | 333.3 |

The design activity for Phase 2 diagnostic equipment will proceed in the following years with specific year by year assignment up to the completion of the conceptual design in order to meet the development of the overall integration activities.

### 2.1.5 Assembly (ASS)

Construction:

- Total new commitment in 2024: 19 M€
- Total payment in 2024: 3.8 M€

DTT Assembly Contract: In 2024, the technical specifications for the DTT assembly contract will be completed. In the second half of 2024 it is expected to launch the relative call for tender that will be characterized by three contract stages in preparation of the assembly:

- the engineering for the assembly procedure will be carried out
- the tooling for the pre-assembly and assembly phase will be procured
- the qualification activities to be carried out in an existing building in preparation of the assembly shall start. Afterwards, the assembly will start in the torus hall building.

The contract for the assembly will include:

- Procurement and installation of the FW/DIV and VV Water coolant system including pipes, bellows, support structure, valves and instrumentation

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 15/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

- Engineering design, manufacturing and procurement of all the tools and frames to support the assembly of all the components inside the torus all (building 185)
- Qualification activities to be carried out, in an existing building, and assembly of all tokamak machine.

Only advance payment for 20% of the contract is expected (3.8 M€).

Note: EUROFUSION will financially support the assembly contract from the beginning with the support of the engineering phase and the procurement of the tools and frame for the assembly.

Services (ASS) (total commitment in 2024: 1 M€): In support of the engineering activities of the ASS WBS, 96 pm (corresponding to 800 k€) resources within the framework contract with ANN are expected to be activated for 2024:

- ASP-A (High Level Assembly Schedule and conceptual design of tools and frame): 24pm
- ASP-B (Design Water coolant System and Cryoline design): 24 pm
- ASI (Design Package Integration, Global modelling for EM, seismic, structural and thermomechanics analyses): 48 pm

In addition to the activities described above, resources within Shareholders services for 24 pm (corresponding to 200k€) for 2024 are expected for the set-up of the metrology procedure in acceptance and the preparation of the workshop in support of the assembly activity within DTT site.

### 2.1.6 Remote Handling Systems (RHS)

Construction:

- Total new commitment in 2024: 8.833 M€ (all costs funded by PNRR)
- Total payment in 2024: 2.65 M€

In 2024 the following procurement activities, belonging to WBS Level 2 - RHS, are expected to be tendered:

- Hyrman. The call for tender of two hyper redundant manipulators (Hyrman) has been published. The contract activities will start at the beginning of 2024. Only advance payment for 20% of the contract are expected.

|                                                                                                         |                                             |                          |                 |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br><small>DTT</small> | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 16/<br>31 |
|                                                                                                         |                                             | External ID:<br>N.A.     | Rev. 1.2        |

- Cassette multifunctional mover. The call for tender of three Cassette multifunctional movers (CMM) has been published. The contract activities will start at the beginning of 2024. Only advance payment for 20% of the contract are expected.

Services (total commitment in 2024: 600 k€):

In addition to the procurement activities described above, resources within Shareholders services for 48 pm (corresponding to 400 k€) for 2024 are expected for the follow-up of the contract or to continue the design activities of the systems whose design has not yet been finalized. Specifically, part of the resources shall be devoted to finalizing the design of the cutting and welding system and to insure the layout optimization of the casks. In this respect, additional 12 pm for proceeding with the casks design by IST in Lisbon within EUROfusion will be spent.

Also, in support of the engineering activities of the RHS WBS, additional 24 pm (corresponding to 200 k€) resources within the framework contract with ANN are expected to be activated for 2024.

### 2.1.7 Divertor and In Vessel Components (IVC)

During 2023 the procurement activities for divertor and first wall have been delayed due to technical reasons. In particular, the divertor design has been delayed by the optimization of the poloidal profile and toroidal shaping. Therefore, no divertor prototyping has started. On the other hand, the FW design has been affected by the analysis of the thermal load local concentration and runaway electrons impact. This has affected the typology, segmentation and shaping of some FW panels. Therefore, also the FW prototyping has not started.

It is noted that all costs of engineering, Prototyping, and fabrication are directly contracted by ENEA and paid activities as an in-kind Shareholder contribution. The only contribution of DTT Scarl is limited to engineering services included in the ANN framework contract.

For homogeneity in reporting, the planned costs for Construction and Services in year 2024 are reported hereinafter.

Construction (IVC) (total commitment in 2024: 14.1 M€, total payments in 2024: 10.15 M€):

- Activities for the fabrication of DTT divertor prototypes, namely the PFCs prototypes (inner and outer vertical target and dome) and the cassette prototype.
- Activities for the fabrication of the FW prototypes, namely the FW limiter and standard modules, the top first wall and one panel of the outer first wall.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 17/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

- Divertor materials (mono-blocks tungsten)

Services (IVC) (total ENEA commitment in 2024: 1000.00 k€, total DTT Scarl commitment through ANN in 2024: 300.00 k€):

- Engineering activities for DTT divertor: this includes Shareholder's services (for 60 pm) for the setup of manufacturing drawings and specification, performance of tenders finalized to the Divertor prototype and once the prototype procurement has started the check of the qualification procedures, the follow-up of qualification activities, the monitoring of fabrication activities. The divertor prototype includes the PFCs prototypes (inner and outer vertical target and dome) and, eventually, the cassette prototype. Total commitments in 2024: 0.5 M€ (ENEA Commitment).
- Engineering activities for DTT first wall: similarly, to divertor, this includes Shareholder's services for 60 pm for the setup of manufacturing drawings and specification, the performance of tenders finalized to the FW prototypes and, once the prototypes' procurement has started, the check of the qualification procedures, the follow-up of qualification activities and the monitoring of prototypes' fabrication. The FW prototypes include the FW limiter and standard modules, the top first wall and one panel of the outer first wall. Total commitments in 2024: 0.5 M€ (ENEA Commitment).
- Also, in support of the engineering activities of the IVC WBS, an additional 36 pm (corresponding to 300 k€) resources within the DTT framework contract with ANN are expected to be activated for 2024.

|                                                                                                         |                                             |                             |                               |
|---------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|-------------------------------|
| <br><small>DTT</small> | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>18/</b><br><b>31</b> |
|                                                                                                         |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                      |

## 2.2 Work-package Heating and Current Drive

In the following table is shown the summary information of construction costs in € million for each WBS-2 level:

| WBS-2            | 2024 New Commitment (M€) | 2024 Spending (M€) |
|------------------|--------------------------|--------------------|
| ECH              | 21.28                    | 13.75              |
| ICH              | 2.40                     | 7.96               |
| <b>TOTAL THM</b> | <b>23.68</b>             | <b>21.71</b>       |

- Total new commitment in 2024: 23.86 M€
- Total payment in 2024: 21.71 M€ (including 7.65 M€ funded by PNRR)

### 2.2.1 Electron Cyclotron Heating (ECH)

Construction:

- Total new commitment in 2024: 21.28 M€
- Total payment in 2024: 13.75 M€

Below is a list of the main activities planned for 2024, along with a brief description of key information:

- HVPS for gyrotron: Technical Specification completed in 2023. In 2024 S-DRM and tender up to the signature of the contract.
- AUX for gyrotron: preparation of technical specification, S-DRM and possible start of the tender in 2024.
- RF Load Bolometric system for the RF Loads to be developed, hardware to be acquired in 2024.
- Transmission Line connection between Gyrotron and RF Load to be procured in 2024 and tested at FALCON. First single mirror unit printed in 2023.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 19/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

- Control System: support to the activity on HW procured under NRRP (Next Generation EU) for the ECH Test Bed, development of required SW and prototype HW will be implemented and completed. In 2024 the payment amounts to 110 K€.

The following, already contracted, activities are going to continue or be completed in 2024:

- GYROTRON: pre-series gyrotron in under conditioning at FALCON facility, some delays due to the production of the Super Conducting Magnet (SCM); Interim FAT to demonstrate gyrotron performance, by using the Matching Optic Unit (MOU) and SCM of EPFL, has been achieved in November 2023. In 2024 the FAT of the pre-series will be done in the final configuration (with new MOU and SCM) and then ownership formally transferred to DTT. The pre-series gyrotron will be left at FALCON and used (by DTT and F4E) to test high power components for DTT and ITER US (agreement under preparation). The contract for 15 series gyrotrons has been signed in December 2023 and enters into force at final FAT of the pre-series. In 2024 the total payments amount to 8.979 M€.
- RF Load: tender awarded, contract to be signed in 2024. SAT of the first unit in 2024 at FALCON using the pre-series gyrotron. Schedule to be confirmed at KOM. In 2024 the total payments amount to 0.408 M€.

Services (ECH) (total 2024 commitment 1.313 M€), key activities are listed here below:

- Transmission Line: activities under L4 contract with ANN started, completion of Conceptual Design (C-DRM) in Q2-2024 and start of preliminary engineering activity to design: containment vessel, alignment solution and combiner/splitter mirrors unit. PhD on universal polarizer started in November 2023, first prototype design in 2024.
- Launcher: activities under L4 contract with ANN started, completion of Conceptual Design (C-DRM) in Q4-2024 and start of engineering activity to define mechanical plug-in structure and mirrors/drivers support.
- In 2024: Selection of actuator solution (piezo motor or standard ones); Procurement of prototype units for finalization of R&D activities.
- Support activity at FALCON to share solutions implemented by F4E and SPC.

In Q1 2024 C-DRM for the ECH Plant Control System (PCS). Preparation of Technical Specification for PCS and prototype development

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 20/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

Test Bed ECH: a strong need and interest to set-up an ECH Test Bed facility on-site has been verified for DTT and for the ECH European community. Cost & benefit evaluation is on-going and will be completed in 2024. Proposal to be submitted in 2024 for approval.

### 2.2.2 Ion Cyclotron Heating (ICH)

- Total new commitment in 2024: 2.4 M€
- Total payment in 2024: 7.96 M€ (7.34 M€ funded by NRRP)

The new contracts to be awarded in 2024 are funded by NRRP managed by ENEA and are:

- Transmission line and matching
- Auxiliaries' components to arrange for the transmitters testing.

Services (ICH) (total new commitment in 2024: 610 k€):

- Solid State Transmitter: Follow-up of transmitter contract.
- Transmission Line. Final assessment of the conceptual design (C-DRM) and follow up of the procurement of the first batch of components (under NRRP).
- Feedthrough: Selection of baseline solution and start of prototype design and procurement.
- Antenna: the antenna type has been selected (3-strap), in 2024 the activity will be focused on assembly procedure and technical choices for faraday screen and limiter (materials and cooling).
- Control System: definition functional requirement and start of the conceptual design. Engineering design, specification and procurement for hardware and software for the part of the system under NRRP (Transmitters test).
- ICH Diagnostics: inter-machine survey of ICRH diagnostics / definition of diagnostics for DTT / preliminary design of arc detection systems / technical support to antenna task for integration.
- Auxiliary Units and Structures: definition of the complete layout of the Test Bed and of the whole ICH system (after awarding transmitter tender), specification and procurement of auxiliary components for NRRP ICRH testbed.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 21/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

### 2.2.3 Neutral Beam Injectors (NBI)

In 2024 the R&D activities will be finalized in several C-DRM to start the engineering phase for a total amount of services of 1 M€ provided in-kind by shareholders. No construction costs are foreseen since NBI realization has been de-scoped and will be executed in a second phase after first plasma.

NBI INJECTOR: in 2024 the objectives are the C-DRM for the Beal Line Components, the Vacuum Vessel, the magnetic shielding of the injector and of the vacuum system.

NBI ACCELERATOR: in 2024 the engineering phase will be started with the qualification of full size prototype grids made by 3-D printing and construction of insulating rings prototype to be tested at high voltage.

NBI POWER SUPPLY: in the period the activity on the High-Voltage Test Bed will be started in order to benchmark the simulation for the design of the transmission line and other HV components.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 22/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

## 2.3 Work-package Balance of Plant

In the following table is shown the summary information of construction costs in € million for each WBS-2 level:

| WBS-2            | 2024 New Commitment (M€) | 2024 Spending (M€) |
|------------------|--------------------------|--------------------|
| AUX              | 2.60                     | 0.60               |
| BUI              | 81.42                    | 8.80               |
| ENS              | 0                        | 0                  |
| AUT              | 0                        | 0                  |
| <b>TOTAL THM</b> | <b>84.02</b>             | <b>9.4</b>         |

- Total new commitment in 2024: 84.02 M€
- Total payment in 2024: 9.4 M€

### 2.3.1 WBS AUX-Auxiliary Plan Systems

Construction:

- total commitment in 2024: 2.6 M€
- total payments in 2024: 0.6 M€

The activities foreseen are relevant to Building 89 for ICH preparation for the ICRH Cooling System funded by PNRR.

For WCS-Water cooling System and OAS-Other Auxiliaries Systems there are no construction activities in 2024

Services (total new commitment and payment in 2024 540 K€):

- 400 K€ to complete the concept design of the water cooling and other auxiliaries' systems
- 140 K€ to prepare the PFTE for Building 89 preparatory activities for ICH under PNRR (engineering consulting company already identified).

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 23/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

### 2.3.2 WBS BUI-Building and Services

The issue of the state-owned area of the Vaccaro has been solved (pending the actual acquisition of the area by ENEA) and the new buildings works that are now planned to be contracted in 2024. Formal actions of transfer of ownership to DTT Scarl of the construction area and associated service areas is planned to be completed and formalized by 30/07/2024.

Construction (BUI) (total commitment in 2024: 81.42 M€, total payments in 2024: 8.8 M€):

- THB-Tokamak Hall Buildings:
  - total commitment in 2024: 80 M€
  - total payments in 2024: 8 M€ (10% advance payment)
- OCW-Other Civil Works:
  - total commitment in 2024: 1.42 M€ (0.2 M€ new gates and 1.22 M€ demolitions and deconstruction building 73)
  - total payments in 2024: 0.8 M€ (0.2 M€ new gates and 0.6 M€ demolitions and deconstruction building 73)

Here following the status of the preparatory activities to launch the above tenders is reported:

- Tokamak Hall and New Buildings: the updated “Progetto definitivo” post-value engineering has been completed in December 2023. The necessary documents to launch the tender (Contract scheme, Tender specifications and relevant invitation to tender are going to be prepared to issue the call for tender on 31st of May 2024 and the award date is foreseen in December 2024. In parallel, January-March 2024) the third-party project verification will be performed (Contractor identified and contract signing scheduled for January 20, 2024).
- Construction of Site Gates (Site Preparation): The engineering design is going to be assigned within 31/01/2024. The construction activities for the opening of new gates are going to be contracted by 25/08/2024 to be completed within December 2024
- Deconstruction of the buildings 73; The engineering design is going to be assigned within 15/01/2024. Deconstruction works are planned to start within 16/09/2024 to be completed within 15/05/2025.

|                                                                                          |                                             |                             |                               |
|------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|-------------------------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>24/</b><br><b>31</b> |
|                                                                                          |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                      |

- Demolition of building 90 The engineering design is going to be assigned within 15/01/2024. Demolition works are planned to start within 31/05/2024 to be completed within 30/09/2024

Services (BUI) (total new commitment in 2024: 320 k€, total payments in 2024: 320 k€)

- 120 K€ for the completion of THB tender specifications (shareholders services)
- 200 K€ for the engineering of gates, demolitions and deconstruction

### 2.3.3 WBS ENS-Electrical Network System

The “Progetto definitivo” for the merge of the 2 scopes (HVS extra EPIC assigned to DTT by ENEA which estimated cost is 19 M€ and EDS included in EPIC which estimated cost is 30 M€) is under preparation by DBA group and the final design is forecasted to be completed in March 2024. Accordingly, the procurement activities for the HVS and EDS are expected to be launched in 2024, for an estimated total costs of 49 M€. The contract award is foreseen in February 2025 therefore no construction spending is planned in 2024.

Services (total new commitment in 2024: 100 k€, total payments in 2024: 250 k€):

- 100 K€ for the follow up of design by shareholders
- 150 K€ the design by DBA already committed in 2023

### 2.3.4 WBS AUT-Control, Safety, Security and Telecommunication Systems

No construction costs are foreseen in 2024.

75 K€ of Services will be provided by shareholders to complete the engineering phase for control room and the fire&gas system.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 25/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

### 3 Consortium Running Costs

The running costs of the consortium are borne by the partners as per their share in the consortium. The total running costs have been estimated in 130 M€ and the detailed breakdown and phasing, including the previous years actual costs, will be included in the full life plan of the project.

The running cost have been divided into 4 groups:

- Costs for DTT personnel and assigned personnel by the shareholders
- Costs for technical services to be supplied through shareholders agreement and external contracts
- Costs for external Facilities utilization and R&D
- Operating Costs

In the following sections a detailed description of each cost item is provided.

#### 3.1 Costs for DTT personnel and assigned personnel by the shareholders

In this item the cost of the personnel working for the consortium is included, namely:

- Seconded personnel from shareholders.
- Available personnel from shareholders, covering coordinating roles (part-time).
- Direct hired personnel (including fixed-terms consultancy contracts).

In the following table a summary of personnel foreseen in 2024 for the consortium and the relevant estimated costs are shown.

| DTT Personnel - Internal PY           | Personnel already available | New Personnel in 2024 | Total PY    | Estimated cost (K€) |
|---------------------------------------|-----------------------------|-----------------------|-------------|---------------------|
| Seconded Personnel by Shareholders    | 34,6                        | 0,0                   | 34,6        | 2.768,00            |
| Available Personnel from Shareholders | 10,0                        | 0,0                   | 10,0        | 799,20              |
| DTT Direct Hired Personnel            | 15,0                        | 18,8                  | 33,8        | 2.700,00            |
| <b>Total</b>                          | <b>59,6</b>                 | <b>18,8</b>           | <b>78,3</b> | <b>6.267,20</b>     |

The total number of person-years indicated for 2024 is to be understood as equivalent. The individuals made available from shareholders are, in most cases, part-time. The staff to be hired in 2024 (total headcount 42) has been calculated by considering the positions that remained vacant in the recruitment process published during 2023 (staffing plan 2023-2025) and the new positions outlined in the staffing plan 2024-2025 currently in preparation. For the former (19 positions left uncovered), hiring is expected in June, while for the new

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 26/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

positions (estimated at 23), it is anticipated to take place in ~~August~~ September, once the entire approval process of the plan, publication of the announcement, and candidate evaluation have been completed.

In order to estimate the cost of the internal personnel an average cost of 80 K€/PY has been used for both secondees and available personnel from shareholders ~~while the~~ and DTT direct hired personnel ~~cost has been calculated in accordance with the real wages and social security contributions~~ including personnel with consulting contracts. Such average cost, based on the actual costs from previous years, is a good approximation for the purpose of budget definition.

### 3.2 Costs for technical services to be supplied through shareholders agreement and external contracts

This item includes all the technical services provided by the shareholders, the framework contract with Ansaldo Nucleare and other external contracts.

The following table shows the 2024 budget values for Technical Services for each specific area, divided into Shareholders Services, Ansaldo Nucleare Framework Contract and other engineering contracts. It is important to note that the budget for physics activities should be considered as an additional cost beyond the overall approved budget of 130 million euros.

|                   | Shareholders services (K€) | ANN Framework Contract (K€) | Other Engineering Contracts (K€) | Total Technical Services (K€) |
|-------------------|----------------------------|-----------------------------|----------------------------------|-------------------------------|
| <b>Physics</b>    | 1.000,00                   |                             |                                  | 1.000,00                      |
| <b>Management</b> | 3.695,90                   |                             |                                  | 3.695,90                      |
| <b>SIM</b>        | 1.550,00                   |                             |                                  | 1.550,00                      |
| <b>THM</b>        | 4.075,00                   | 2.800,00                    | 450,00                           | 7.325,00                      |
| <b>HCD</b>        | 2.625,00                   | 331,00                      |                                  | 2.956,00                      |
| <b>BOP</b>        | 695,00                     |                             | 489,87                           | 1.184,87                      |
| <b>Total</b>      | <b>13.640,90</b>           | <b>3.131,00</b>             | <b>939,87</b>                    | <b>17.711,77</b>              |

In the attachment “Technical Services”, the budget details for each individual project included in the Work Breakdown Structure (WBS) are provided. The planning for 2024 has been developed by the work-package managers and their WBS coordinators based on the progress status of activities at the end of 2023 and the construction plan presented in the previous chapter. Shareholders services include both personnel and their missions, as well as any hardware purchases and industry contracts. Currently, the preparation of a project execution plan for each WBS element is underway, which will contribute to the update of the overall project's lifetime plan expected in the early months of 2024.

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 27/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

Once the present WP&B is approved and the aforementioned project plans are finalized, the project leaders, as per procedure, will develop the proposals for each project in line with the approved budget. The individual contribution of each shareholders will then be included in the revision of the WP&B2024 as soon as all proposals are completed and approved according to the calls procedure.

### 3.3 Costs for External Facilities utilization and R&D

Regarding THM area this item includes the cost for the use of the ENEA Coil cold Test Facility for a total of 5.4M€ (estimated as 27 tests at a cost of 200k€ each) and the cost of the Remote Handling Facility. The latter is not part of the scope of construction but will be financed through the PNRR grant. It is expected that ENEA will officially request DTT to take charge for the DTT facility in the next months. This will require an update of the construction contract.

For 2024 no use of the Coil cold Test Facility is expected.

The expenditure forecasted in 2024 are:

- qualification of the cable in-conduit conductors at SULTAN facility at EPFL in Switzerland: 420 K€.
- In-vessel components Mock-Up's fabrication: 340 K€

No cost for HCD and BOP are forecasted in 2024.

### 3.4 Operating costs

This item includes the cost for the corporate bodies, management (Data Protection Officer, legal assistance, insurances, incentives to the personnel, and various small contracts), ICT, missions for the supervision of tasks and contracts by DTT personnel only, participation to conferences and other institutional events.

In the following table the 2024 budget for above mentioned activities is shown while in the continuation of the chapter a brief description of main items is reported.

Note that for completeness, the costs for DTT direct Hired personnel (HRO-Human resources Outsourcing) and External Technical services have been included in the table because they are costs directly paid by DTT (not provided in-kind by Shareholders), but they have been described and included in the previous paragraphs. The same is valid for the costs for External Facilities utilization and R&D.

|                                                                                          |                                             |                             |                               |
|------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|-------------------------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>28/</b><br><b>31</b> |
|                                                                                          |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                      |

| Consortium Operating Costs Costs                       | WP&B2024         |
|--------------------------------------------------------|------------------|
| <b>President</b>                                       | <b>4.070,50</b>  |
| ACC_Administration Company Costs                       | 605,00           |
| EXP_Expositions                                        | 95,00            |
| HRO_Human Resources Outsourcing                        | 2.700,00         |
| PHD_Borse di Studio e Dottorato                        | 498,00           |
| COU_Training and Updating Courses                      | 53,50            |
| INC_Incentives                                         | 119,00           |
| <b>Chief Finacial Officer</b>                          | <b>181,00</b>    |
| CIN_Internal Consultancy (Legal, Administrative, etc.) | 121,00           |
| INS_Insurance                                          | 60,00            |
| <b>Management</b>                                      | <b>4.726,37</b>  |
| MIS_Missions                                           | 75,00            |
| EXS_External Technical Services                        | 4.070,87         |
| PER_Permitting                                         | 50,00            |
| CLI_Internal Legal Consultancy (DPO, 231)              | 41,00            |
| CLE_Externa Legal Consultancy                          | 34,00            |
| TEN_Tender Notices                                     | 110,00           |
| ICT_Information Communications & Technology            | 345,50           |
| <b>System Integration</b>                              | <b>1.150,00</b>  |
| CCM_Configuration Control Models Management            | 290,00           |
| DTA_Design and tenders assesements                     | 730,00           |
| CHS_Codas Hardware and Software licences               | 130,00           |
| <b>THM_Tokamak Hall Management R&amp;D</b>             | <b>760,00</b>    |
| MFT_Magnets Factory Tests                              | 420,00           |
| IMU_In-vessel components Mock-Up's                     | 340,00           |
| <b>TOTAL</b>                                           | <b>10.887,87</b> |

- Administration and Company costs include:
  - Logistic and renting services: K€ 340
  - Corporate Bodies: K€ 227
  - Other Company Costs: K€ 38
- Incentives include technical incentives and provisions under Legislative Decree 36/2023
- Internal Consultancy costs include
  - Legal review: K€ 46
  - Other management costs: K€ 75
- ICT costs include:
  - Framework agreement for Alfresco maintenance

|                                                                                          |                                             |                             |                               |
|------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|-------------------------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>29/</b><br><b>31</b> |
|                                                                                          |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                      |

- ICT actions for compliance with Anti-Corruption Law 231HW/SW Purchase
- HW for MEPA network infrastructure
- Office 365 licenses and configuration
- Primavera SW licenses, HW and services
- SIM costs include:
  - 3D experience licenses
  - Third party verification for new buildings design, electrical network system design, water cooling system design and Assembly project
  - WinnCC-OA licenses and HW, Enterprise Architect Licenses and HD (joint development with F4E)

## 4 ENEA's Activities assigned to DTT

The consortium is carrying out some preliminary activities assigned by ENEA. The forecasted spending for 2024 is reported in the following table. Further to the activity included in the appendix 2 of the EPIC new activities are now under DTT responsibility:

- MV connection to INFN Enel substation: this activity needs close coordination with the EDS and HVS projects
- Revamping of ENEA electrical distribution system: only design is under DTT responsibility
- Waterproofing of the roof of the buildings 84, 88, 89, 26 and 11: the bid of this part of the existing buildings preparation has accelerated due to the entry into force of the new Italian Code of Public Contracts (Legislative Decree 31/03/2023, n. 36) that foresees new requirements for the qualification of the Contracting Authority; accordingly DTT shall award a work contract above 500 K€ by the end of this year to fulfill with the new requirements.
- Refurbishment of Building F23

The details of the agreement between ENEA and DTT are reported in the following letters:

- ENEA/2022/ 17445 /ISER
- ENEA/2023/46032/FSN

|                                                                                          |                                             |                          |                 |
|------------------------------------------------------------------------------------------|---------------------------------------------|--------------------------|-----------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014 | Page: 30/<br>31 |
|                                                                                          |                                             | External ID:<br>N.A.     | Rev. 1.2        |

- ENEA/2023/82269/FSN

| Activites on behalf of ENEA                            | WP&B2024<br>(K€) |
|--------------------------------------------------------|------------------|
| HVS_High Voltage System                                | 100,00           |
| RFB_Refurbishment of existing Buildings                | 575,52           |
| IFN_MV connection to INFN                              | 200,00           |
| ERE_ENEA Electrical Distribution Revamping Project     | 250,00           |
| IMP_Waterproofing roof of buildings 84-88-89-11 and 26 | 522,46           |
| F23_Refurbishment building F23                         | 140,00           |
| <b>Total</b>                                           | <b>1.787,99</b>  |

In 2024, the definitive project for the high-voltage electrical substation will be completed and verified by a third party. The project is developed in conjunction with the electrical distribution of DTT, and the works will be tendered through a single procedure; this budget exclusively includes the portion for the design and verification of the HV electrical substation.

The refurbishment of existing buildings includes the engineering of the project plus the final payment for the Structural assessment and the historical-critical assessment provided to DTT for final review in the month of December 2023.

Regarding the project for the new connection of the ENA center to the MV, the plan is to complete it in 2024, similarly to the design of the ENEA center electrical distribution revamping project.

Finally, the waterproofing of the buildings, for which the contract has already been signed, will be executed and completed in 2024.

These activities are financed 100% by ENEA and put on a specific budget order in the DTT budget.

|                                                                                          |                                             |                             |                               |
|------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------|-------------------------------|
| <br>DTT | <b>DTT Work-program and Budget<br/>2024</b> | DTT ID:<br>PMO-GEN-03014    | Page: <b>31/</b><br><b>31</b> |
|                                                                                          |                                             | External ID:<br><b>N.A.</b> | Rev. 1.2                      |

## Attachments

- Attachment 1 - List contracts to be awarded in 2024
- Attachment 2 - List of contracts awarded
- Attachment 3 - Projected Invoicing for 2024
- Attachment 4 - List of Contract in the 3-years span 2024-2026
- Attachment 5 - Technical services