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APPLICATIONS

EuPRAXIA@SPARC_LAB: schedule and cost review

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TDR Review Committee 26/06/2024

EuPRAXIA Program

EuPRAXIA is consolidating its position in the RI landscape as a European Program.

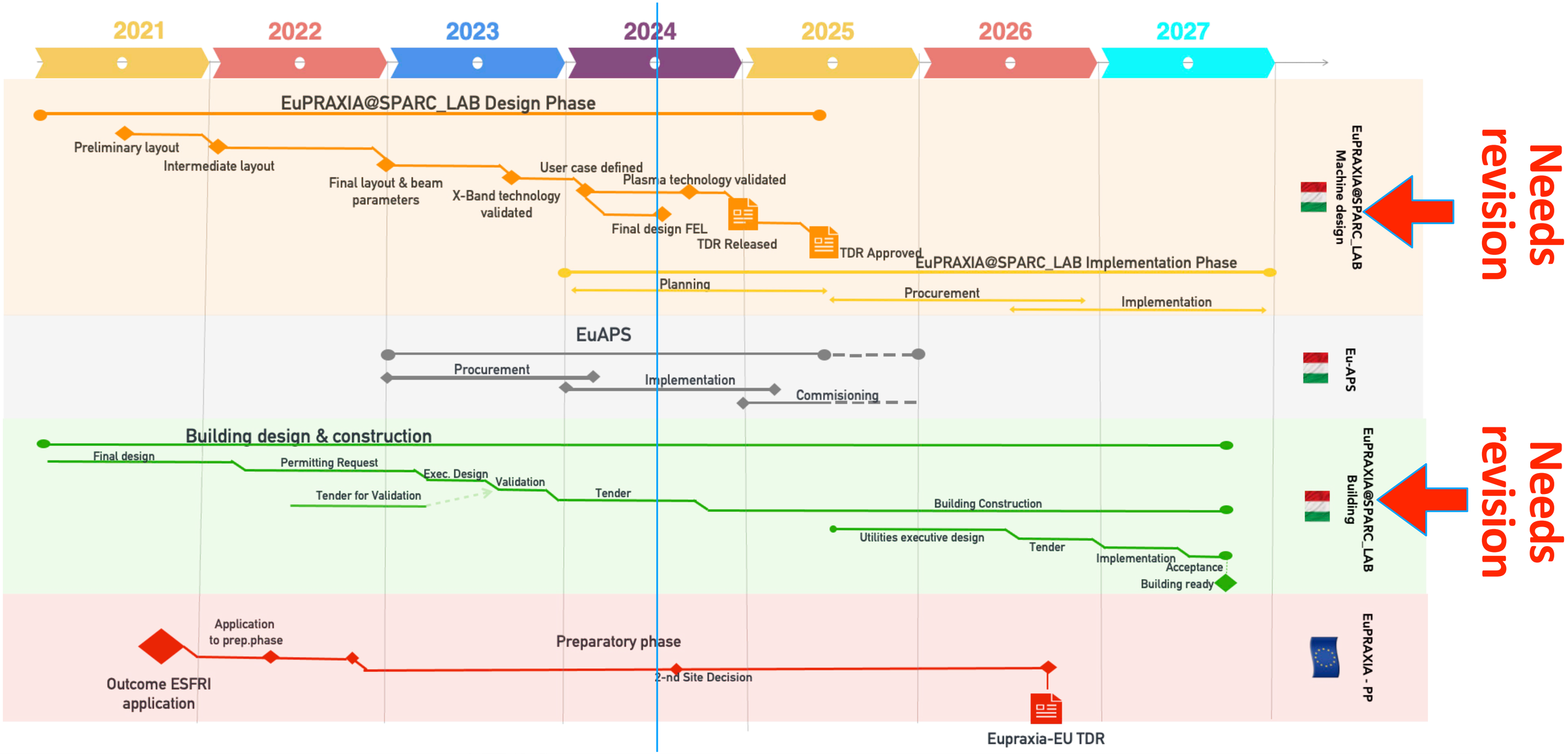
INFN-LNF is the leading institute.

At the moment several correlated projects are ongoing —> EuPRAXIA@SPARC_LAB is the main pillar of the program and the Beam Driven pillar of the future Distributed Research Infrastructure.

EuPRAXIA Program

	EuPRAXIA@SPARC_LAB. & EuPRAXIA Building		EuAPS	EuPRAXIA-Preparatory Phase	EuPRAXIA - Doctoral network
Scope	Redaction of the TDR of the Beam Driven Pillar	Design and construction of the building that will house the facility	Betatrone Source High Power Laser High Repetition Rate Laser	Definition and design of EuPRAXIA as distributed RI (legal, governance, financial model)	10 PhD programs across Europe on plasma accelerator science
Duration	TDR is expected at the end of 2025	Mid-2029 (approx)	30months (+6) Not later than 31/12/2025	48 months 30/10/2026	48 months 31/12/2026
Budget	9 M€	To be assessed. O(40M€)	22,3 M€	2,7 M€ (+ In kind contribution)	2,5 M€ (+ In kind contribution)
Funding source	Internal funding through GE	Internal funding through GE	PNRR	Horizon Europe	Horizon Europe
R&D required	Yes	NO	Some	NO	NO
Partner	Mainly internal LNF with some partnership with Elettra, ENEA UniTOV, Uniroma1, INFN-MI	Internal LNF	LNF, LNS, INFN-MI (INFN) CNR UniTOV	25 Partner + 9 Associated	23 Partner + 15 Associated

EuPRAXIA baseline updating



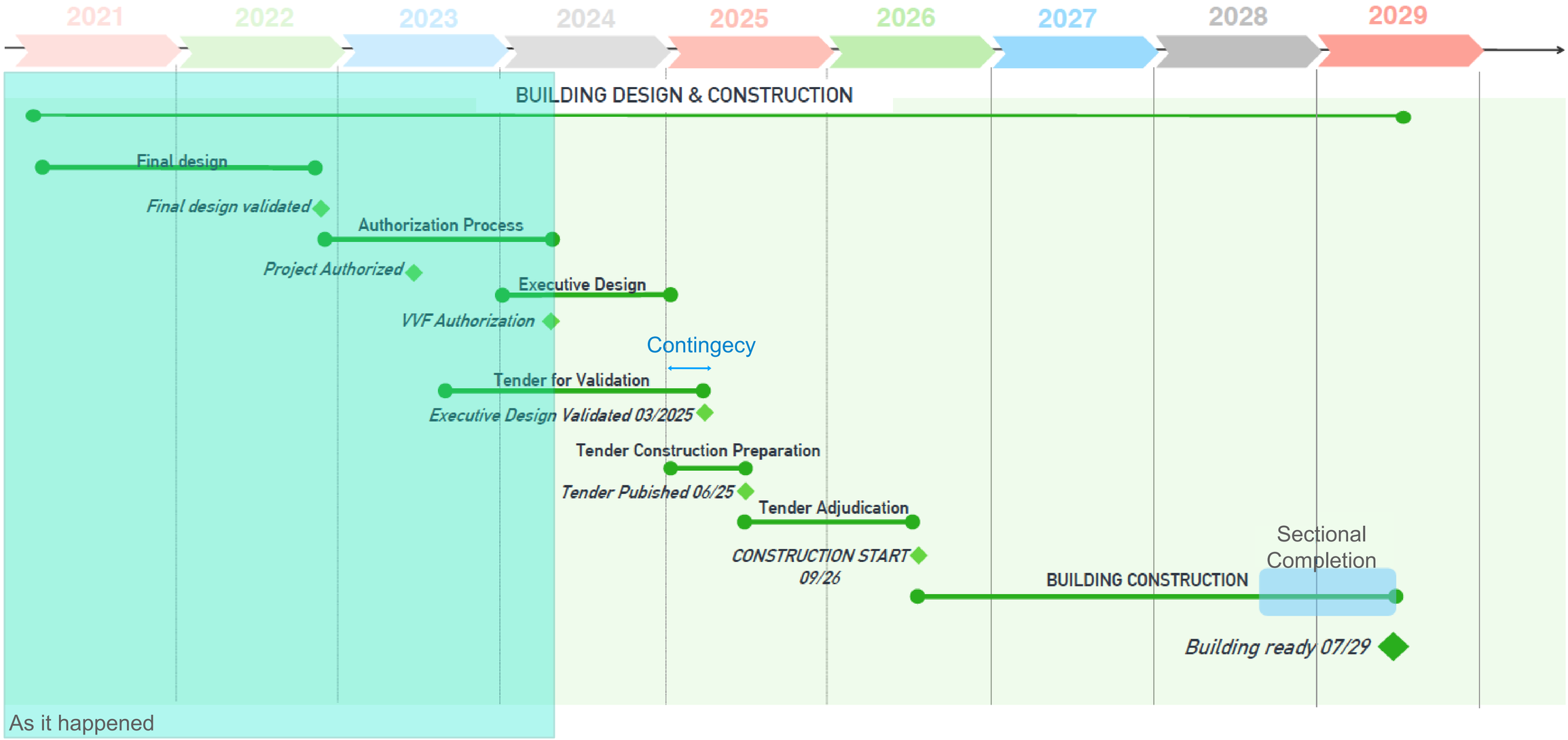
EuPRAXIA baseline updating

- Several delays accumulated —> time for a realistic update of the baseline

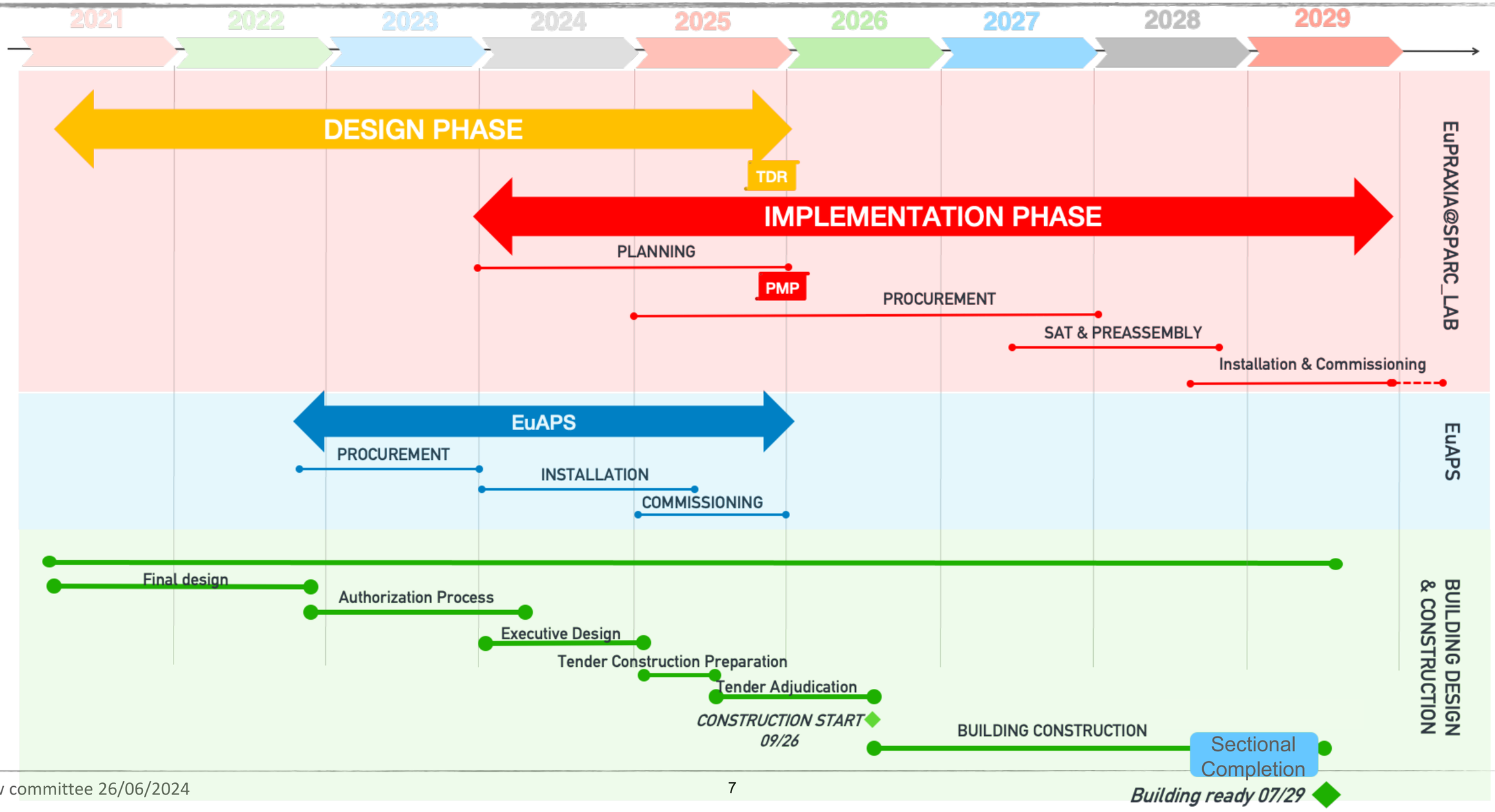
- Building availability is a super-critical milestone:
  - More knowledge and expertise on the upcoming steps to be done
  - Realistic scenario based on the advancement of the executive design
  - Authorization process is now concluded and therefore the upcoming baseline can be considered much more realistic.

- Based on these considerations a new baseline is being discussed. At the moment we have updated the building construction schedule and we are working on the machine implementation baseline update.

EuPRAXIA baseline updating - building



EuPRAXIA baseline updating



EuPRAXIA baseline updating

- This high level strategic approach is being implemented through a detailed schedule.

- Basically big tenders should be launched in 2025 (RF, Injector and maybe Undulators).

- Storage and pre-assembly space is being organized to allow a fast integration at least for the first stage of the implementation.

EuPRAXIA@SPARC_LAB Cost Review

- 1st Cost&Schedule Review 11 and 12 December 2023.
- Overall we have presented a sound cost estimation that needs to be refined though.
- Overbudget that needs to be managed (definition of a bottom line minimum requirements)

Are there specific critical areas which might endanger the correct implementation of the project?

The present budget is not sufficient to cover the full scope of the project, nor its partial implementation with only one photon line. It is therefore necessary to secure the full budget as soon as possible.

Resources are not time-profiled, therefore it is not clear that enough resources will be available in due time. Developing a risk register as planned in beginning 2024 is important to consolidate the budget and schedule estimate and eventually identify corresponding mitigation measures.

Answers to the charge questions

The techniques used to evaluate the costs and the time schedule of the project are correct and effective?

Yes for cost. For schedule, the evaluation is technically limited, since it is assumed that resources will be available at the right moment.

The monitoring tools in place are adequate to follow the progress and level of expenditure?

Yes, partially. AC cannot be attributed to WPs as yet. An optimization of the organizational structures to reduce the number of interfaces, for the implementation phase, could be beneficial in consolidating the monitoring.

The procurement strategy is well defined and realistic?

The procurement schedule has been presented and seems compatible with the timeline of the project. A good experience is provided from ongoing and past projects like SABINA, LATINO and EuAPS. A Make or Buy plan exists for some critical deliverables, it would be beneficial to extend it to the whole project.

The overall costs estimate is realistic?

Yes, however a risk register has not been developed yet. Knowing that the project is still in the design phase, uncertainties may result optimistically evaluated.

The overall implementation schedule is realistic?

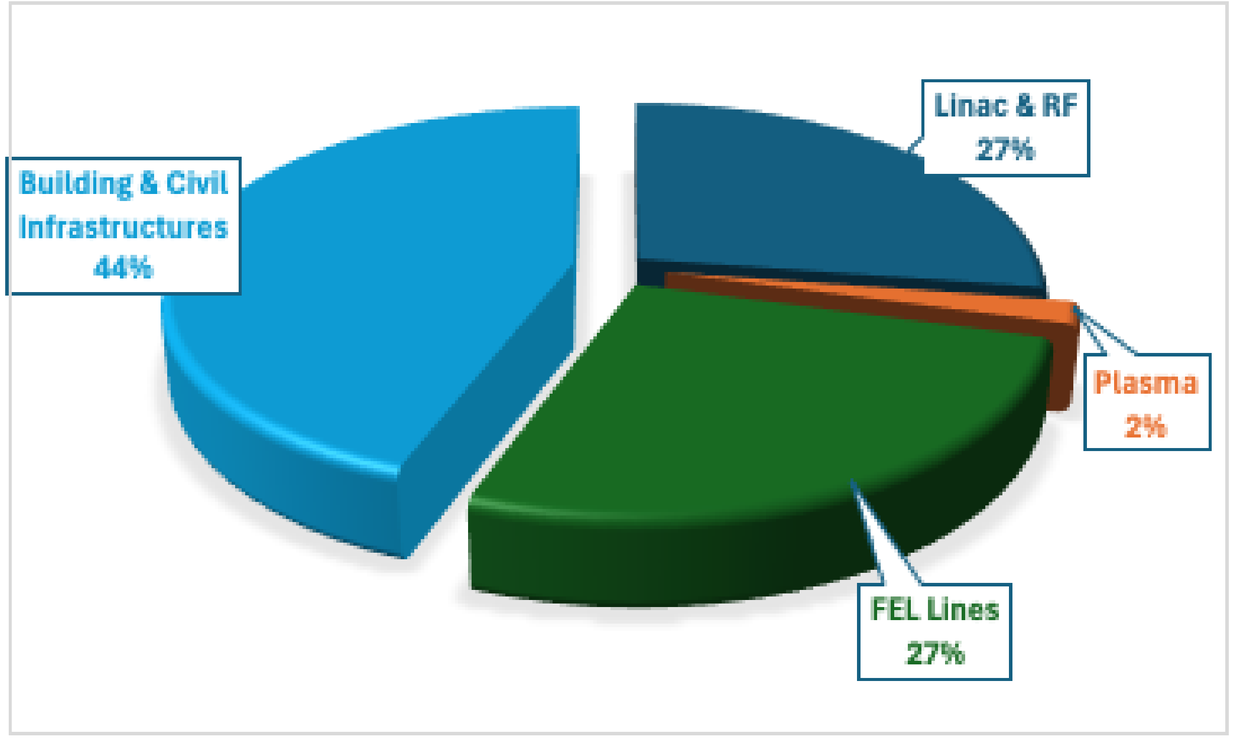
Yes, provided that the expected resources are available at the required time. Under this condition, the schedule might be further optimized. A contingency of 3 years is declared wrt the ESFRI roadmap.

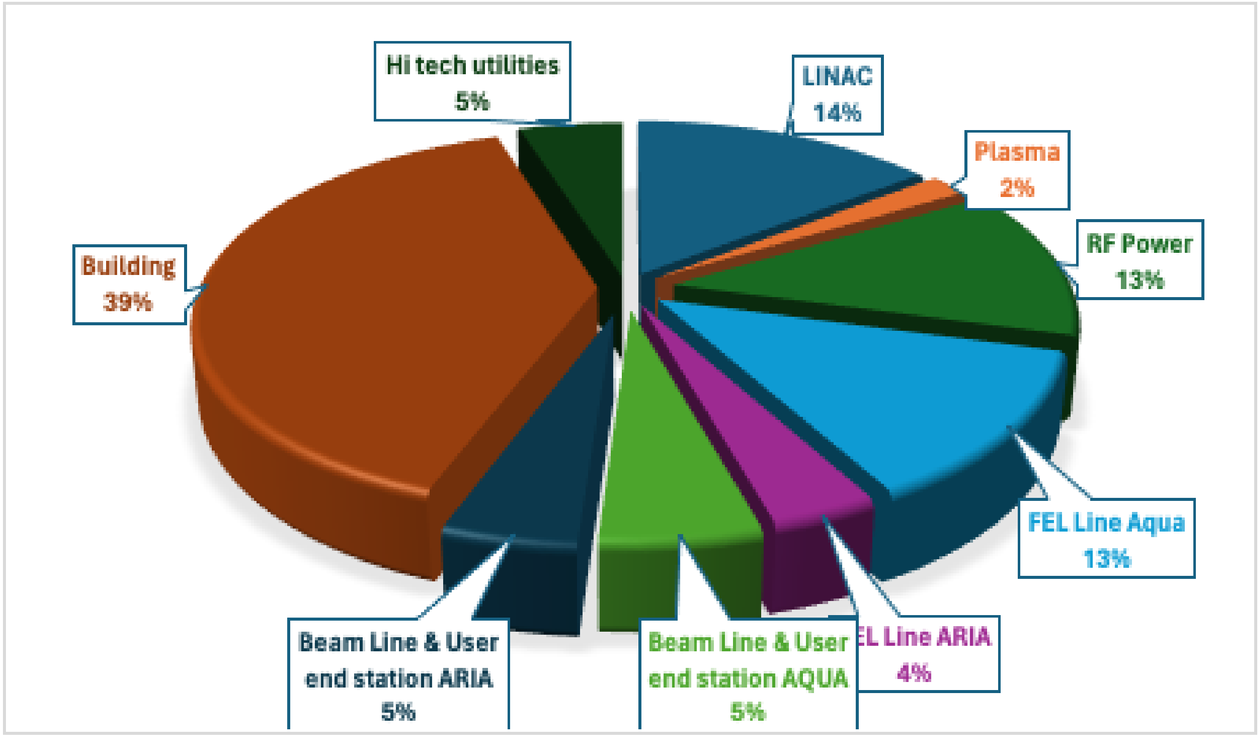
EuPRAXIA@SPARC_LAB Cost Review

- Since December we have monitoring the cost-estimation and make a comprehensive review (which is still in progress).
- Some errors detected & some cost updated (e.g. LLRF based on formal and final quotation).
- Additional updates are expected in the next weeks.
- AACE standard for cost estimation to assess expected range based on maturity level.

ITEM	Expected Cost	Best Case	Worst Case
LINAC	19.751.540	18.798.976	21.105.428
RF Power	15.760.000	14.972.000	17.336.000
FEL Line Aqua	15.425.000	13.882.500	18.510.000
FEL Line ARIA	4.476.000	4.028.400	5.371.200
Beam Line & User end station AQUA	6.670.000	6.003.000	8.004.000
Beam Line & User end station ARIA	5.590.000	5.031.000	6.987.500
Building & Hi Tech utilities	53.945.500	51.248.225	56.642.775
TOT	121.618.040	113.964.101 (-6%)	133.956.903 (+10%)

EuPRAXIA@SPARC_LAB Cost Review





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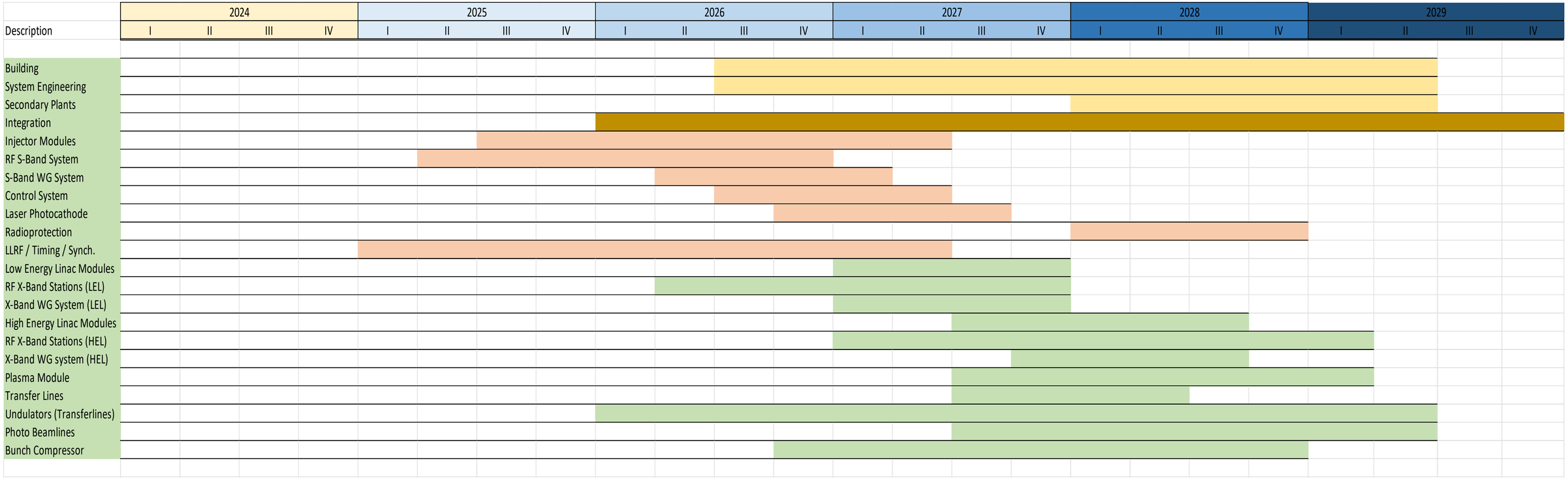

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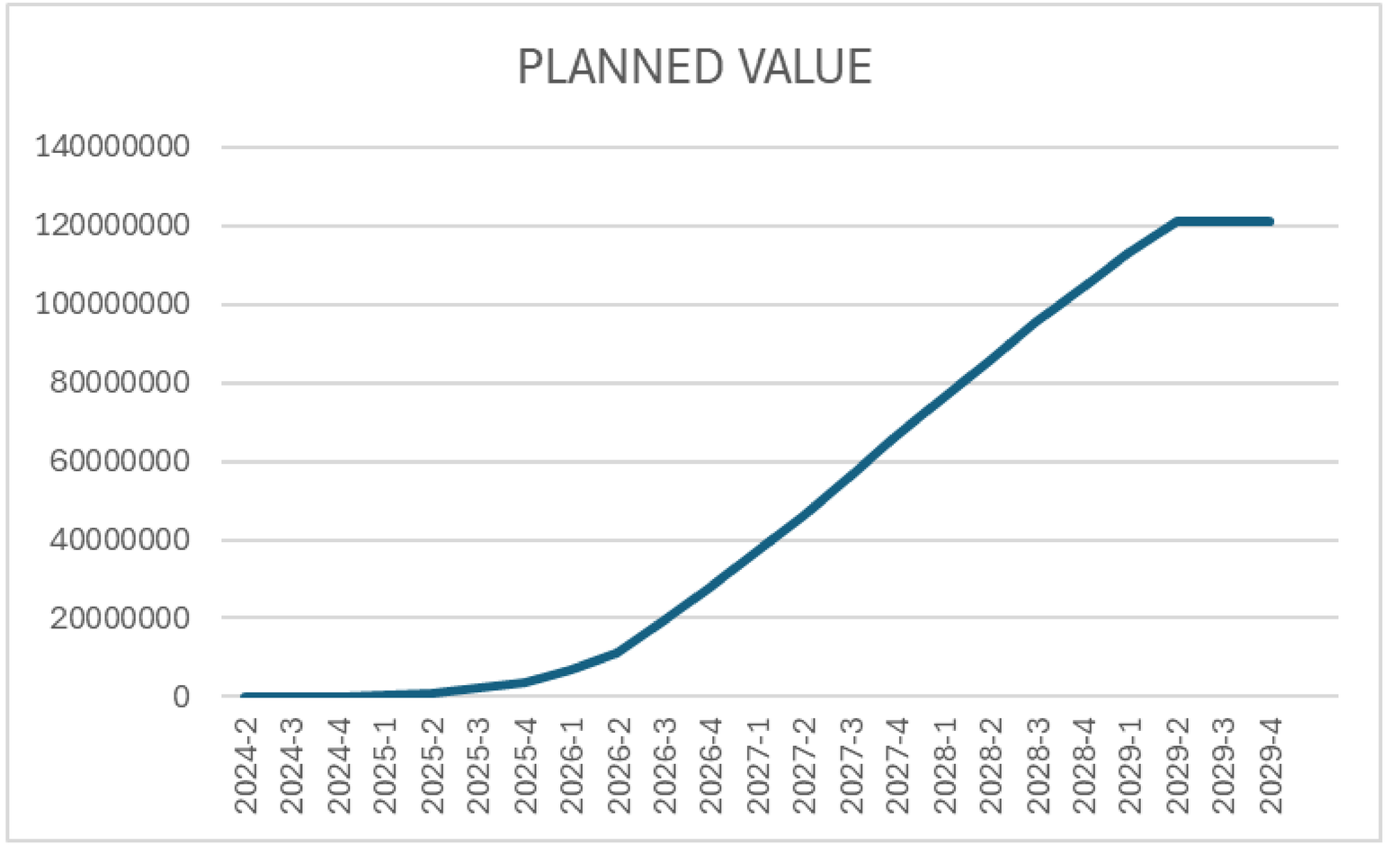

EuPRAXIA@SPARC_LAB Cost Review

- We are currently updating the costs and schedule in detail.

- We are also working in light of the suggestions received during the Cost & Schedule review held in Frascati last December.

- The new Cost & Schedule review will be set by the end of the year, hopefully in November 2024.

CONCLUSIONS

- TDR. We are approaching the first draft. Final release during 2025.
- Schedule: The Schedule is being updated. The building construction is expected to begin mid-2026.
- Costs: We are now updating the costs, taking into account the new estimates also in light of the latest changes to the layout. Bottom-up WBS based approach.
- Funding: We are looking for additional funding lines.

THANKS

Thank you all for your attention