

TPC costing



Costing is based on a study done in 2012 and updated in 2018.

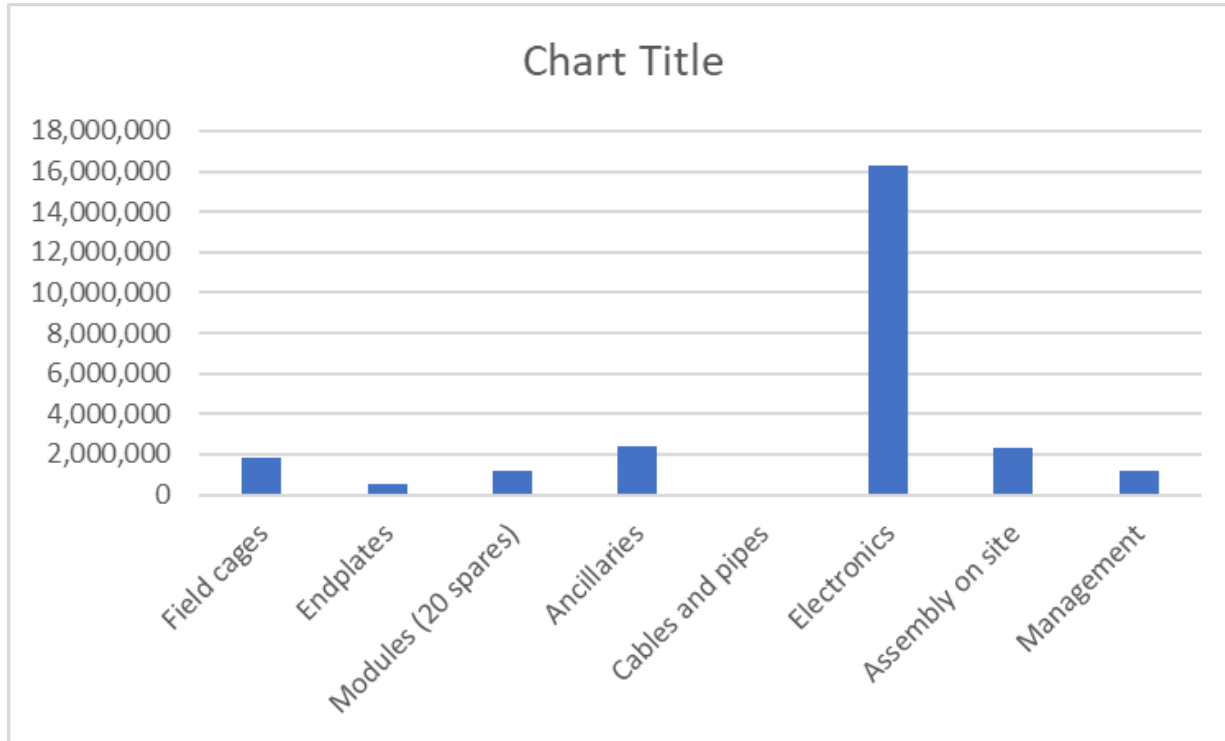
Part of the cost estimates are based on prototype costs

- Field cage cost is extrapolated from fieldcage constructed in industry in 2016
- Electronics is extrapolated from existing prototype electronics and from ALICE experience (but only a very conservative cost scaling has been applied)
- Tooling costs are highly speculative
- Institutional personpower is not included in the costing

To be done:

- Cross check costing with recently built TPC/ upgraded TPC (ALICE, TPC at RHIC)
- Update electronics cost

Costing



Cost dominated
by readout electronics

Total cost (2019 numbers)
25 Mio EUR without
personpower

Numbers clearly
need an update

Costing description in the IDR

Since the ILC TDR two TPC projects with similar technologies are progressing towards construction : ALICE with GEM readout, and T2K/ND280 High Angle with resistive anode Micromegas readout. The T2K/ND280 project has allowed to update the TPC costing in the Micromegas option with many details, including manpower and taking into account requirements imposed by Japanese regulations. Similarly the ALICE project has allowed an update for the GEM option. The construction of a new field cage for the DESY TPC test setup (section 5.2.3) has also strongly modified the estimate of the field cage cost. The costs can be split into a technology-independent part and a technology-dependent part.

The technology independent part comprises the electrostatic system for 5.8 ME (including test and shipping), the ancillaries for 2.7 ME (CO2 compressor, TPC gas system, laser system, power supplies, their packing and shipping) and the overall management for 1.2 ME. The total technology independent cost estimate is therefore 8.5 ME.

The technology-independent part comprises the electrostatic system for 1.8 MEur~ (including test and shipping), the TPC hanging system for 0.2 MEur~, the ancillaries for 2.7 MEur~ (CO2 compressor, TPC gas system, laser system, power supplies, their packing and shipping) and the overall management for 1.2 MEur.

The total technology-independent cost estimate is therefore 4.8 Meur.

The technology dependent part consists of everything which is sensitive to the pad size and the module size. It includes the end plates, the readout modules, the electronics, the cables and pipes as well as the assembly.

In total the cost of the TPC (without personpower) amounts to 25 MEUR. Adding an estimates 5 Mio Eur Personpower results in the final cost estimate of 31 Meur.