

# Costing the Target

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# Introduction

- Costing of the target for the RDR needs to be done using the CERN costing tool.
  - The tool was originally designed to cost CLIC but is being used for EUROnu.
- The tool is mainly for accounting and reporting, so we need to provide it with the right information!
  - Broken down into 3 project phases with associated costs and man-power.
- Costing workshop on 25<sup>th</sup> May at CERN
  - Plan is to discuss Project Breakdown Structures (PBSs).

## Costing the Target

# CERN Costing Tool

Property	Unit	Estimate	Uncertainty	Comments / references
<b>Industrialisation and tendering</b>				
Start date (relative to project start)	months	6.00	-	
Duration	years	3.00	-	
Material cost	CHF	100.00	Not specified	Simple guess!
Manpower - Tech.	man-years	2.00	Not specified	
Manpower - Eng.	man-years	300.00	Not specified	
<b>Procurement</b>				
Start date (relative to project start)	years	0.00	-	
Duration	years	0.00	-	
Fixed cost	CHF	0.00	0.00	
Proportional cost	CHF	0.00	0.00	
Manpower - Tech.	man-years	0.00	0.00	
Manpower - Eng.	man-years	0.00	0.00	
<b>Reception</b>				
Start date (relative to project start)	years	0.00	-	
Duration	years	0.00	-	
Fixed cost	CHF	0.00	0.00	

- Project has 3 phases
  - Industrialisation
  - Procurement
  - Reception (i.e. commissioning)
- Each phase has a start date, duration, costs and manpower

- It's an Oracle database with a web interface.
- An Excel spread sheet input has been developed to facilitate data entry.
- I'm developing another tool to store the engineering design and calculations and it will interface to the tool.
- CERN Tool links to the CERN document sever (EDMS) to store things like invoices, engineering drawings, etc, to document how costs are derived.

# Costing the Target

## Spread Sheet

- I'd like to use this spread sheet to store the information needed for the costing and also a way of specifying the current design of the target.
- It was primarily designed with beamlines in mind but I think it is also suitable for the target.
  - Will have a separate sheet for the liquid, solid and powder options.

Type	No.	Size	Relative Location	Relative Rotation	Name	Other Parameters
		x y z	x y z	x y z		
Building	1	6.0000000				
upper module	1	3.0000000	0.5000000			
monitor		0.0010000	0.0000000			
solenoid		1.0000000	0.2010000		ks =	-1.4100000000E+00
Coils		1.0000000	0.0000000			
rfcavity		0.7448260	1.4010000		DELTA E =	1.1172390000E+01 PHIO = -2.0371833330E-01 FREQ = 2.0124999530E+08
monitor		0.0010000	2.9995000			
upper module	1	3.0000000	3.7000000			
monitor		0.0010000	0.0000000			
solenoid		1.0000000	0.2010000		ks =	-1.4100000000E+00
Coils		1.0000000	0.0000000			
rfcavity		0.7448260	1.4010000		DELTA E =	1.1172390000E+01 PHIO = -2.0371833330E-01 FREQ = 2.0124999530E+08
monitor		0.0010000	2.9995000			

- Example shows the muon linac.
- Rows and columns are grouped to provide different levels of detail. Current view shows the lattice design.

# Costing the Target Spread Sheet

The screenshot shows an Excel spreadsheet with a data table. The table has the following columns: No., Name, Relative Start, Duration, Value, Units, Name\*, Multiplicity\*, Date Of Estimate, Tech. Uncertainty, Expected Offers, Type, Unit, Industrial Index, Technical Responsible, Technical Expert, External link, Comments, and Other Parameters. The rows are color-coded: row 9 is green, row 10 is blue, row 22 is blue, row 23 is light blue, row 24 is blue, row 25 is light blue, row 26 is green, row 27 is blue, row 28 is light blue, row 29 is blue, and row 30 is light blue. The 'No.' column contains the value '1' in rows 8, 9, and 26. The 'Comments' column contains 'ks =' in rows 22, 28, and 30. The 'Other Parameters' column contains 'DELTAE =' in rows 23, 29, and 31.

No.	Name	Relative Start	Duration	Value	Units	Name*	Multiplicity*	Date Of Estimate	Tech. Uncertainty	Expected Offers	Type	Unit	Industrial Index	Technical Responsible	Technical Expert	External link	Comments	Other Parameters	
1																			
1																			
																			ks =
																			DELTAE =
1																			
																			ks =
																			DELTAE =

- Additional details gives project start date, duration, link to EDMS, etc

# Costing the Target Spread Sheet

The screenshot shows an Excel spreadsheet with the following data:

	Type	No.	Name	Relative Start	Duration	Value	Units	Name*	Multiplicity*	Date Of Estimate	Tech. Uncertainty	Expected Offers	Type	Unit	Industrial Index	Technical Responsible	Technical Expert	External link	Comments
8		1	Building																
9		1	upper module																
10			monitor																
11			IND MF																
12			IND PPT																
13			IND PPE																
14			PROC MF																
15			PROC MP																
16			PROC PPT																
17			PROC PPE																
18			RECEPT MF																
19			RECEPT MP																
20			RECEPT PPT																
21			RECEPT PPE																
22			solenoid																
23			Coils																
24			rfcavity																
25			monitor																

- Sections in red correspond to costs and manpower for the different phases of the project.
- A VBA macro is used to generate the input for the costing tool.

## Costing the Target

So ...

- I'd like to know how you think the target should be broken down?
  - What information is required for each of these parts?
  - My naïve idea of a first level breakdown is something like
    - Proton beam transfer line
    - Target delivery system
    - Capture Solenoid
    - Shielding (including containment and maintenance access details)
- We have limited engineering effort, so we should try to base costs on similar built parts where possible.
- Are there any problems with using the spread sheet to store this information?