CLIC Cost & Schedule WG: mandate, organization, activities 2009

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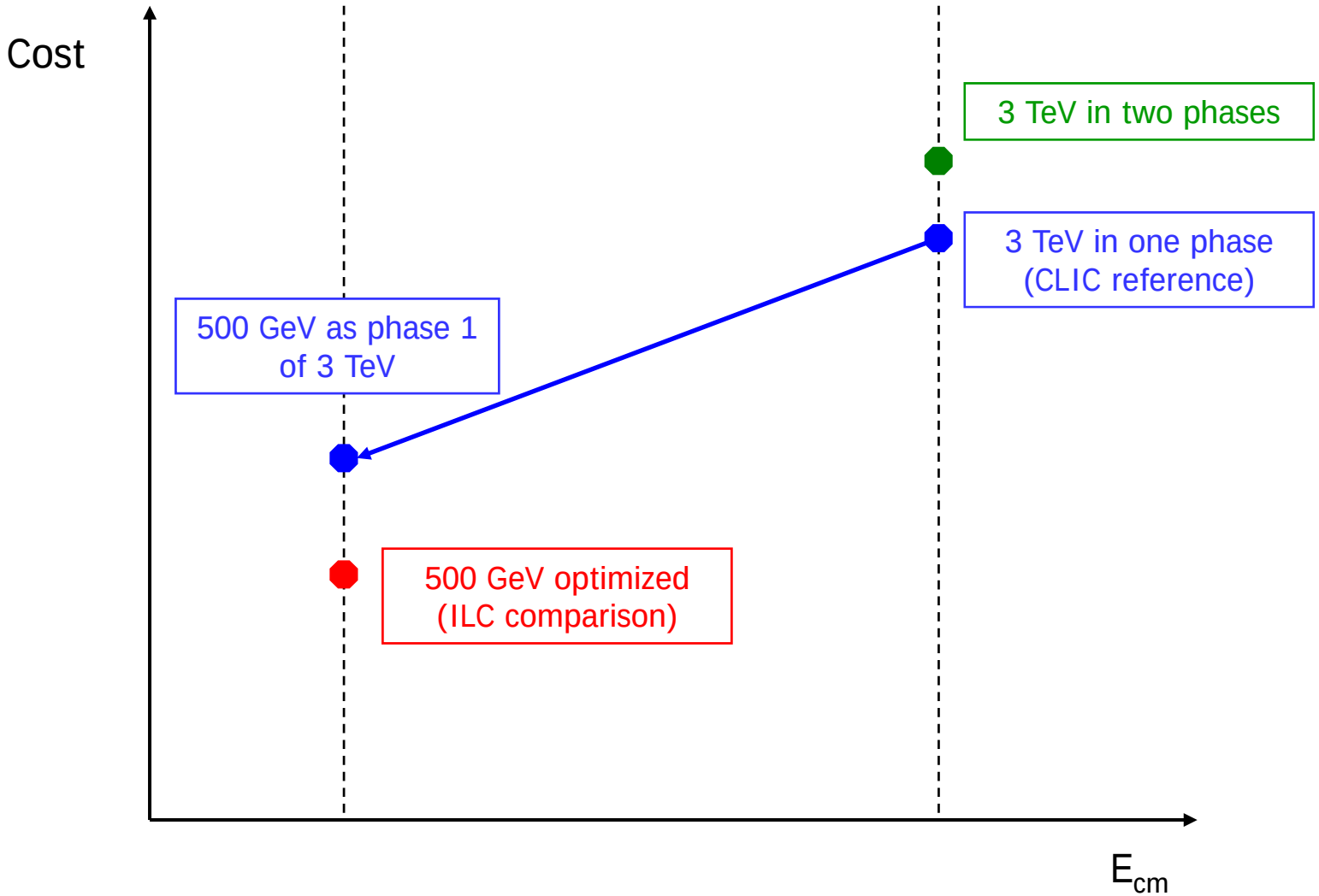
Mandate

- Establish and optimize the cost of the CLIC complex at the nominal colliding beam energy of 3 TeV, as well as that of an optional first phase with a colliding beam energy of 500 GeV
- Define and optimize the general schedule for the 3 TeV and 500 GeV projects defined above
- Estimate the electrical power consumption of the 3 TeV and 500 GeV projects defined above
- Identify possible modifications of parameters and/or equipment leading to substantial capital and/or operational cost savings, in order to define best compromise between performance and cost
- Develop collaboration with ILC project on cost estimate methodology and cost of common or comparable systems, aiming at mutual transparency
- Document the process and conclusions in the CDR in 2010

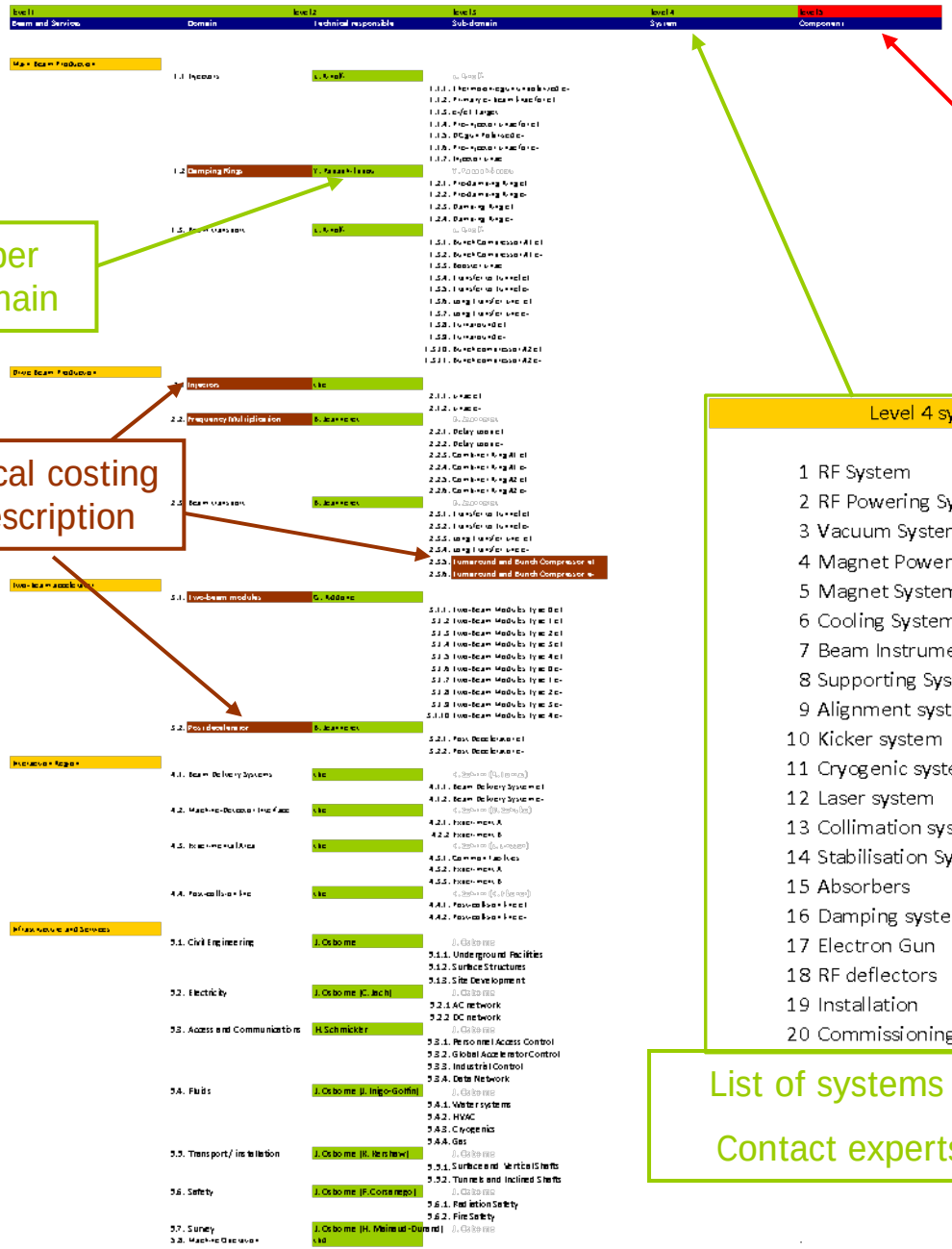
Cost vs energy
What are we comparing?



Methodology

- Establish rules & practices for cost estimation
  - Analytical based on PBS at system/component level per subdomain
  - Synthetic estimators when detailed PBS not available
  - Key actors are PBS domain/subdomain coordinators
  - Address system experts through corresponding group leaders
  - Currency conversion & price escalation
  - Use of cost software tool
- Identify major cost drivers & impact of alternative solutions and technological breakthroughs
- Whenever possible, define a parametric model for estimating variation of cost upon main technical parameters
- Identify sources of variance & conduct cost risk analyses
- Organize, maintain & update documentation with restricted access
- Report periodically to CLIC Steering Committee

Analytical basis is PBS



Coordinators per domain/subdomain

Identified for analytical costing based on level 5 description

Component level not yet defined

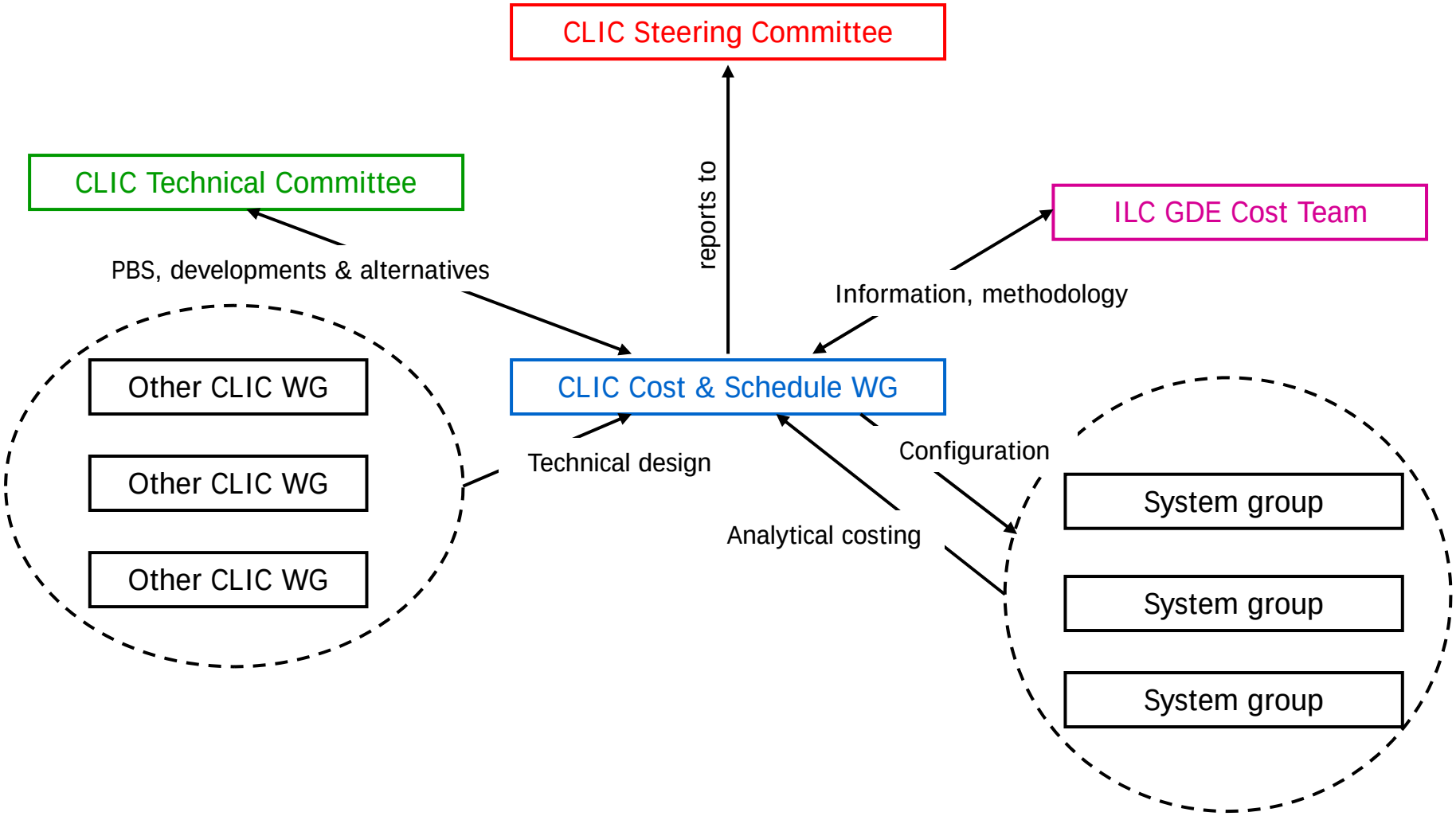
Level 4 system

1 RF System
2 RF Powering System
3 Vacuum System
4 Magnet Powering System
5 Magnet System
6 Cooling System
7 Beam Instrumentation System
8 Supporting System
9 Alignment system
10 Kicker system
11 Cryogenic system
12 Laser system
13 Collimation system
14 Stabilisation System
15 Absorbers
16 Damping system
17 Electron Gun
18 RF deflectors
19 Installation
20 Commissioning

List of systems standardized

Contact experts per system

Communication & reporting lines



Activities 2009

- Reception specified cost tool, including currency conversion & price escalation procedures, and start applying it
- Establish responsibilities, procedures & workpackages in cost assessment
- Identify domains of analytical costing and perform estimates
- Identify areas of potential cost reduction and perform studies
- Conduct proper technical/cost scaling of first phase at 500 GeV
- Refine general schedule and derive manufacturing/reception testing/installation constraints
- Update estimates of power & energy consumption, including part load operation
- Collaborate with ILC on previously defined cost topics
  - Cost risk analysis
  - Cost of normal conducting magnets
- ...

Costing Tool v 0.1 - Windows Internet Explorer provided by CERN

http://localhost:8080/clic/gwt/cern.ppt.wbs.WBSTree/WBSTree.html

Costing Tool v 0.1

Costing Tool v 0.1

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Project Structure

Name

- 1.1. Injectors
  - 1.1.1. Thermoionic gun unpolarize
  - 1.1.2. Primary e- beam linac for e+
  - 1.1.3. e-/e+ Target
  - 1.1.4. Pre-injector Linac for e+
  - 1.1.5. DC gun Polarised e-
  - 1.1.6. Pre-injector Linac for e-
  - 1.1.7. Injector Linac
- 1.2. Damping Rings
- 1.3. Beam transport
- 2. Drive Beam Production
  - 2.1. Linac
  - 2.2. Frequency Multiplication
  - 2.3. Beam transport
- 3. Two-beam accelerator
  - 3.1. Two-beam modules
  - 3.2. Post decelerator
- 4. Interaction Region
  - 4.1. Beam Delivery Systems
  - 4.2. Machine-Detector Interface

General | Estimates

Domain:	Injectors
Sub-Domain:	Thermoionic gun unpolarized e-
EDMS Link to element documentation:	http://www.cern.ch
Date of the estimate:	26/03/2009
Technical Responsible:	rino

- RINO CASTALDI (PH-UCM)
- RINO BRUNO DEGLI-AUGELLI
- LOUIS RINOLFI (BE-ABP-CC3)
- RINO SPIGATO

Log

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Project Structure

Name

- 3. Two-beam accelerator
  - 3.1. Two-beam modules
  - 3.2. Post decelerator
- 4. Interaction Region
  - 4.1. Beam Delivery Systems
  - 4.2. Machine-Detector Interface
  - 4.3. Experimental Area
  - 4.4. Post-collision line
- 5. Infrastructure and Services
  - 5.1. Civil Engineering
    - 5.1.1. Underground Facilities
      - 5.1.1.1. Shafts
      - 5.1.1.2. Tunnels
      - 5.1.1.3. Experimental Area Cav
      - 5.1.1.4. Caverns
      - 5.1.1.5. Miscellaneous works
    - 5.1.2. Surface Structures
    - 5.1.3. Site Development
  - 5.2. Electricity
  - 5.3. Access and Communications

General | **Estimates**

Property	Unit	3 TeV	500 GeV	Uncertainty	Comments / references
Industrialisation and tendering					
Start date (after project start)	years (months / weeks / years)	0.00	0.00	C1	
Duration		1.00	0.00	C1	
Material cost		10,000.00	0.00		see EDMS doc 12345
Manpower - Tech.		1.00	0.00		details in EDMS docume...
Manpower - Eng.	man-years	2.00	0.00		
Procurement					
Start date (after project start)	years	0.50	0.00		
Duration	years	2.00	0.00	C1	
Fixed cost	CHF	15,000.00	0.00		
Proportional cost	CHF	16,500.00	0.00		
Manpower - Tech.	man-months	24.00	0.00		
Manpower - Eng.	man-months	36.00	0.00		
Reception					
Start date (after project start)	years	0.00	0.00		
Duration	years	0.00	0.00		
Fixed cost	EUR	20,000.00	0.00		
Proportional cost	CHF	0.00	0.00		
Manpower - Tech.	man-years	0.00	0.00		

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