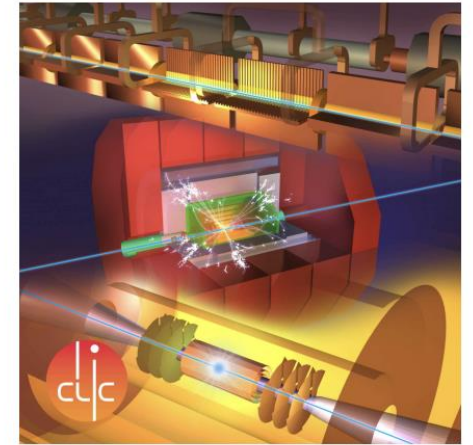


CLIC Readiness Report (RDR) Project Meeting Update

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and all contributors

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ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH



**THE COMPACT LINEAR COLLIDER (CLIC)
READINESS REPORT**

GENEVA
2024



What to deliver

As support to the ESPPU, and as a future reference for CLIC:

The CLIC readiness report (RDR). Long document.

- Much **based on the 2018 Project Implementation Plan (PIP)**
- Updated where needed (parameters, energy options, new developments)
- Completed with implementation details not found in the PIP
- RDR will be **published as an European Physical Journal** article (template)
- **Author list** – still TBD – but will be inclusive :
 - current collaboration?
 - + earlier lists from PIP+Snowmass with an **opt-out?**

As input to the ESPPU:

A 10 pages summary.

- Based on the updated RDR.

Baseline vs options

- Baseline: 380 GeV machine - “low-energy machine”
 - Main parameters, system overview and technology details should primarily refer to **380 GeV**. Base luminosity **50% higher** than in the PIP (see next talk)
 - Keep details on klystron options, no further development planned
 - Option: **100 Hz**, with 65% higher power
 - At 100 Hz: two **BDS and IPs**
- Option: 250 GeV
- High-energy machine: 1.5 TeV
 - Re-use previous studies
 - Mention up to 2 TeV with a single drive-beam, 3 TeV with two drive-beams
 - No work planned for the 3 TeV machine, but one can refer to the CDR when needed

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Workflow

- One master document
- Copy to all authors for specific updates
- Plan is to merge...

All Projects

🔍 readiness report x

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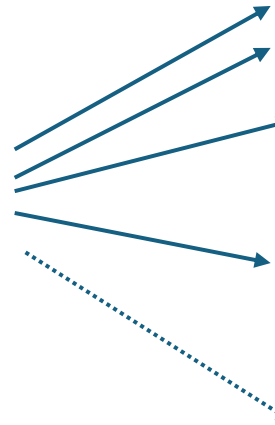
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2 CLIC accelerator design and performance

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Addition of component overview

- Details of subsystem component exist, but are sometimes not included in PIP (or any other formal doc)
- Goal: add a subsection with component summary for each subsystem
 - magnets
 - RF (# structures, klystrons, modulators)
 - instrumentation
 - etc.
- Example: magnet system summaries in

[2018 CLIC PBS External Review](#)

Examples:

Main Beam – Damping Rings (1/2)

- Based on inputs from Y. Papaphilippou
- PDR

| Magnet Type | Quantity | Cost Avg Unit (kCHF) | Total cost (kCHF) | Comment |
|--------------|----------|----------------------|-------------------|--------------------|
| D17 | 38 | 208.2 | 7911 | |
| Q30L20 | 36 | 63.7 | 2292 | |
| Q30L28* | 128 | 72.9 | 9327 | Scaled from Q30L20 |
| Q30L35* | 32 | 75.8 | 2426 | Scaled from Q30L20 |
| S300 | 110 | 36.4 | 3999 | |
| ST03 | 156 | 18.2 | 2836 | |
| SKQ5 | 38 | 20.0 | 760 | |
| TOTAL | | | 29551 | |

*Q30L28 and Q30L35: new types in 380 GeV baseline

Main Beam – Beam Transport (RTML)

- Based on inputs from A. Latina
- Includes e- and e+ beams
- No specifications for corrector magnets yet, considered initial amount of 5 kCHF/magnet

| Element name | Units | Cost/unit [kCHF] | Total cost [kCHF] | Comment |
|--------------|-------------|------------------|-------------------|------------------------------------|
| D1 | 6 | 38.9 | 234 | |
| D2T1 | 29 | 46.4 | 1345 | |
| D2T2 | 659 | 49.2 | 32404 | |
| D3 | 16 | 122.0 | 1951 | |
| D4 | 8 | 87.7 | 702 | |
| Q1 | 292 | 39.3 | 11593 | |
| Q2 | 144 | 27.8 | 3997 | |
| Q3T1 | 89 | 17.2 | 1532 | |
| Q3T2 | 34 | 20.5 | 699 | |
| Q3T3 | 280 | 23.6 | 6615 | |
| Q4T1 | 36 | 8.0 | 287 | |
| Q4T2 | 357 | 10.1 | 3622 | |
| Q4T3 | 354 | 11.8 | 4164 | |
| Q5 | 87 | 5.6 | 485 | |
| SK1 | 12 | 19.7 | 236 | |
| SK2 | 529 | 12.4 | 6572 | |
| Correctors* | 1673 | 4.1 | 6940 | Preliminary estimate 5 kCHF/magnet |
| Total | 4605 | | 82976 | |

*One per quadrupole, no parameters defined yet

Main Beam – Beam Delivery System (2/2)

| Magnet Type | Quantity | Cost Avg Unit (kCHF) | Total cost (kCHF) | Magnet Type | Quantity | Cost Avg Unit (kCHF) | Total cost (kCHF) | Magnet Type | Quantity | Cost Avg Unit (kCHF) | Total cost (kCHF) |
|-------------|----------|----------------------|-------------------|-------------|----------|----------------------|-------------------|--------------|----------|----------------------|-------------------|
| B3A | 48 | 15.06 | 723 | QF5A | 4 | 48.82 | 195 | TQD5B | 2 | 111.06 | 222 |
| B3B | 48 | 15.06 | 723 | QF5B | 4 | 46.01 | 184 | TQD5A | 2 | 104.08 | 208 |
| B4A | 48 | 10.00 | 480 | QF6 | 2 | 10.00 | 20 | TQD5B | 2 | 104.08 | 208 |
| B4B | 48 | 20.00 | 960 | QF6COL | 36 | 51.1 | 1840 | TQD6A | 2 | 111.99 | 224 |
| BTQ1 | 2 | 222.65 | 445 | DFEC | 16 | 53.07 | 849 | TQD6B | 2 | 111.99 | 224 |
| BTQ2 | 2 | 149.22 | 298 | DM011 | 2 | 116.02 | 232 | TQD5 | 2 | 131.88 | 264 |
| BTQ3 | 2 | 155.06 | 310 | DM012 | 2 | 178.69 | 357 | TQD6A | 2 | 35.33 | 71 |
| BTQ4 | 2 | 171.39 | 343 | DM013 | 2 | 150.35 | 301 | TQD6B | 2 | 35.33 | 71 |
| FQD | 2 | 131.88 | 264 | DM014 | 2 | 85.3 | 171 | TQD7A | 2 | 35.33 | 71 |
| FQD2 | 2 | 48.8 | 98 | S00 | 2 | 335 | 670 | TQD7B | 2 | 35.33 | 71 |
| FQF | 2 | 164.61 | 329 | S04 | 2 | 60.5 | 121 | TQD8 | 2 | 179.13 | 358 |
| FQF2 | 2 | 161.48 | 323 | S05 | 2 | 134.06 | 268 | TQD9 | 2 | 228 | 456 |
| QFBCOL | 36 | 78.22 | 2744 | S06 | 2 | 50.06 | 100 | TQF | 2 | 184.61 | 369 |
| QD0 | 4 | 335 | 1340 | S05B | 2 | 10.00 | 20 | TQFA | 2 | 112.99 | 226 |
| QD1BC | 16 | 51.1 | 818 | SF1 | 2 | 43.83 | 88 | TQF2B | 2 | 112.99 | 226 |
| QD2 | 2 | 31.23 | 62 | SF5 | 2 | 38.69 | 77 | TQFA | 2 | 72.33 | 145 |
| QD4A | 2 | 29.8 | 60 | SF6 | 2 | 57.47 | 115 | TQF3B | 2 | 72.33 | 145 |
| QD4B | 2 | 29.8 | 60 | SF6B | 2 | 10.00 | 20 | TQFA | 2 | 112.99 | 226 |
| QD6B | 4 | 35.2 | 141 | SF6R2 | 20 | 11.05 | 221 | TQF4B | 2 | 112.99 | 226 |
| QD6C | 2 | 36.62 | 73 | SF6B1 | 20 | 13.8 | 276 | TQFA | 2 | 72.33 | 145 |
| QD7 | 2 | 47.66 | 95 | SF6B1B | 20 | 11.05 | 221 | TQF5B | 2 | 72.33 | 145 |
| QD8COL | 16 | 98.38 | 1574 | SF6A | 20 | 10.00 | 200 | TQFA | 2 | 61 | 122 |
| QD9C | 16 | 25.94 | 415 | SF6B1 | 80 | 10.00 | 800 | TQF6B | 2 | 61 | 122 |
| QF1 | 2 | 87.71 | 175 | SF6B1A | 20 | 10.00 | 200 | TQFA | 2 | 35.33 | 71 |
| QF1BC | 8 | 73.44 | 588 | SF6B1B | 20 | 10.00 | 200 | TQF7B | 2 | 35.33 | 71 |
| QF2BC | 8 | 37.21 | 298 | SKEC2 | 16 | 10.00 | 160 | TQFA | 2 | 35.33 | 71 |
| QF3A | 2 | 27.06 | 54 | SKEC2 | 32 | 10.00 | 320 | TQF8B | 2 | 35.33 | 71 |
| QF3B | 2 | 20.81 | 42 | TQD | 2 | 187.47 | 375 | TQF9 | 2 | 210.28 | 421 |
| | | | | TQD5A | 2 | 111.06 | 222 | TOTAL | | | 27483 |

Deadlines

- Status report from (some) authors: Wed 11 Dec, 2024
- **Completed input from authors: January 15, 2024**
- Complete draft of RDR: February 15, 2025
- Final draft of 10 page summary: Mar 1, 2025
- 10 page summary submission: Mar 31, 2025
 - Complete RDR available together 10 page summary as supporting document
- EPJ review process starts for RDR
- Submission of RDR by Summer 2025