# Summary of Expenditure for CMS Construction for the Period from 1995 to 2005

## INTRODUCTION

From 1995 to 1997, the CMS Collaboration worked on R&D, design, prototyping and pre-industrialization as required to accomplish the set "Milestones" and to submit the Technical Design Reports; this period was covered by the Interim Memorandum of Understanding.

In 1998, once the CMS Memorandum of Understanding for the Construction (MoU) had been signed by most of the CMS Funding Agencies, the detector construction started, apart from Tracker and Trigger/DAQ.

An amendment to the MoU was presented to the October 2000 RRB for the Tracker, and approved. By the end of 2000, the Tracker construction started. The Technical Design Report (TDR) for the Trigger was submitted in December 2000 and its construction started soon after.

The TDR for the Data Acquisition was submitted in December 2002 and its construction started as soon as the TDR was approved by the LHCC (May 2003).

The Cost to Complete of CMS has evolved since October 2000 and the RRB has been kept informed of the changes. The cost estimates and funding figures used in the following tables are based on the latest available information, which is presented in the CMS Status Report (cf. CERN-RRB-2006-031).

**By the end of 2005, the total commitments reported reach 87% of the current cost estimate while payments total to 77%.**

This document only contains expenditure for items listed in the CMS Cost Estimate Version 9 breakdown, that is the reference for the CMS MoU. The cost estimate figures are presented at **current prices**. For ease of comparison with the values of deliverables shown in the MoU, payments and commitments in expenditure statements are detailed to the same level as for the MoU (Level 3 of Cost Estimate). Note that all expenditure in the present report, as for past reports, is shown at **current prices**.

The expenditure compiled in this document has been gathered from a large number of participating institutes, which manage their budgets according to their own policy of making commitments. In this report “commitment” is understood as the total amount for which commercial contracts or any other legally binding documents were signed. Some institutes prefer to report payments only, in which case “commitments” are assumed to be equal to the reported “payments”. This implies that whilst all payments figures are precise in this report, the total level of financial commitments is likely to be larger than that shown herein.

# 1. COMMITMENTS

A detailed overview of all the financial commitments (expenditure) for items or activities covered by the CMS Memorandum of Understanding is compiled in **Annex 1.**

**Annex 1.A** gives the summary of the commitments by Funding Agency to each subdetector.

**Annex 1.B** further shows the individual commitments made by the different Funding Agencies/institutes for procurements through their institutes ("payments to contracts") or for "in-kind contributions", as well as their total commitments (including payments to the Common Funds).

## 1.1 Magnet, Offline Computing and Commissioning & Integration (Common Funds)

**Magnet**: The remaining open commitments in 2005 mainly concerned the re-installation of the cold box in the USC after the magnet test (contract with Air Liquide, France) and for the rental of the 2000 t crane for the lowering of CMS (so called "heavy lifting" contract with VSL, Switzerland).

Smaller amounts remain committed in relation with the re-installation of the Coil and its services (control and racks in particular) in the USC and UX after the test on the surface.

**Offline:** Offline Computing provides a central service servers and software for the entire CMS Collaboration.

**C&I:** The year 2005 was the fourth for Commissioning and Integration (C&I). The work has concentrated on the items on the critical path: surface commissioning facilities and detector access and installation.

## 1.2 Sub-detectors and Infrastructure

**Tracker:** the procurement of sensors for the Silicon Strip Tracker (SST) has been essentially completed in 2005 and over 98% of the total cost was committed. The production of other key components of the SST modules (front-end hybrids, frames, module electronics) was completed as well and final commitments were taken. An agreement has been signed between CERN and RAL for the production of 500 FED boards; the production started in 2005 and will be completed in 2006. About half of the off-detector electronics has been procured. A contract has been placed by INFN for the production of SST Power Supplies and commitments extending to 2006 have been taken. The procurement of the final cables has started. New commitments for the barrel and forward pixel detectors have been created.

**Electromagnetic Calorimeter (ECAL):** in 2005, important commitments have been made to complete the ECAL Barrel crystals, and for the Endcaps crystals. Orders for the barrel crystals amount to 15 MCHF. A first order concerns 18k barrel crystals from Russia, with an optional 1700 additional crystals for supermodule 37. A second order has been created for 2655 crystals from China.

For the Endcaps, the total value is of about 15 MCHF. A total of 4750 Endcap crystals have been ordered from Russia. Another 7000 crystals, are expected to be provided by Russia as in kind contribution. From China, 3000 crystals have been ordered.

Another noticeable commitment concerns the Barrel Motherboards and associated ribbon cables (0.5 MCHF).

**Hadron Calorimeter (HCAL):** total commitments for HCAL by the end of 2005 include essentially all the mechanics, optics, photodetector, front-end electronics and pre-production prototypes costs and a large fraction of the readout electronics costs. Only some 3% of the total estimated cost, principally for the remaining readout electronics and installation and cabling costs, remain uncommitted.

**Muon Detector:** the total commitments are now well over 95% of the funding available. Major 2005 commitments cover:
- the procurements for Drift Tubes chamber production and installation, mass production of the electronics and the final commitment for the LV-HV power supplies;
- Barrel Resistive Plate Chamber procurements for mass-production, electronics and installation;
- Muon system alignment.

**Trigger and Data Acquisition:** the CMS Trigger/DAQ project is proceeding on schedule according to the CMS planning.

In 2005, the construction expenditure of the Regional Calorimeter Trigger and of the DT Track Finder was concluded. A large fraction of the boards for Global Trigger and Global Muon Trigger systems were fabricated. Expenditure relative to RPC Trigger final components was pursued.

The production of DAQ Data to Surface components and the purchase of the DAQ Preseries was concluded in 2005.

**Infrastructure:** Open commitments were mainly connected with fire protection system, the cooling plant, the vacuum chamber, with the electrical distribution and rack installation.

The low voltage system has been committed as well as the Uninterrupted Power Supply (UPS) system for CMS

Other two contracts, which have still open commitments, are for the Cooling plant in the USC and for the Gas piping distribution.

# 2. PAYMENTS

A detailed overview of all payments for items or activities covered by the CMS MoU is given in **Annex 2**.

**Annex 2.A** gives the summary of the payments by Funding Agency to each subdetector.

In addition to the origin of payments to the Common Funds, **Annex 2.B** also shows the payments made by the Funding Agencies/Institutes for procurements through their institutes to Common Projects as well as their total payments (including the payments to the Common Funds).

## 2.1 Magnet, Offline Computing and Commissioning & Integration (Common Funds)

**Magnet:** the final payments mostly concerned the vacuum tank of the Coil, the construction and installation on site of the thermal screens, the first payments for the "heavy lifting crane" contract as well as the continuation of the Protocol of collaboration with CEA Saclay.

Smaller payments were related to the assembly of the coil at SX5 and its insertion in the vacuum tank.

**Offline:** the major payments made in 2005 were in the areas indicated in the commitments section above.

**C&I:** the major payments made in 2005 were in the areas indicated in the commitments section above.

### 2.2 Sub-detectors and Infrastructure

**Tracker:** An important fraction of the expenditures made in 2005 follows commitments taken in previous years, related to the procurement of silicon sensors and of components for the optical link. Initial payments for the procurement of Power Supplies and FED were made. The payment of the mechanical components to be used for the Inner and Outer Barrel and of the TEC was essentially completed in 2005.

**Electromagnetic Calorimeter (ECAL):** payments in 2005 for ECAL construction amount to 14.5 MCHF: 35% of which relate to the PWO crystals and to their handling in the Regional Centers. Electronics represents the highest share of the expenditures, with 43%. Mechanics decreases with only 8% of the expenses. Payments for the preshower are also of 8% of the total. The remaining corresponds to the Assembly/Installation and to the monitoring. In 2005, the expenditures corresponding to the Endcaps represent 27% of the ECAL payments.

**Hadron Calorimeter (HCAL):** in 2005 the largest payments were for photodetectors and readout electronics, and for endcap mechanics, and forward mechanics and optics.

**Muon Detector**: the major payments made in 2005 were in the areas indicated in the commitments section above.

For ME1/1, Cathode Strip Chambers were mounted and tested in SX5. The commissioning of ME1/1 chambers for both endcaps was started. The ME4/1 Cathode Strip Chambers were assembled at PNPI (St. Petersburg), delivered to CERN and mounted in SX5.

The Barrel RPC has completed the procurement of components for the detector. While the procurement of mechanical parts was a Bulgarian responsibility, the rest was Italian. The entire budget for detector construction has been invested. Some additional funding, in addition to that already used in 2004, was needed in 2005 to re-build gaps and chambers, which has failed the quality control tests. Also a technical trigger for cosmic muons has been designed and some related electronic boards have been procured.

During 2005, the endcap muon system continued installing chambers and commissioning them. All 72 ME1/1 chambers were installed along with the services. Ninety chambers were installed on YE3 and YE1 along with most of their cabling and services. Almost all the off-chamber electronics were delivered. The slice test made significant progress reading out multiple chambers and writing files.

**Trigger/Data Acquisition:** the 2005 payments arose from works initiated during the same year and detailed in the Commitments section above.

**Infrastructure**: payments for infrastructure have followed the installation of CMS and some delays in payments are related with the slippage of installation activities. The payments were also related to the advancement of the installation of services underground. In particularly affecting the termination of the additional requests for civil engineering works, the installation of the metallic structure in the UX, the 20 t crane, as well as the installation of racks and the electrical distribution in the USC.

These expenses will continue in 2006 according to the progress of installation.

## 3. SUMMARY AND COMPARISON WITH THE COST ESTIMATES

A detailed overview of the expenditure (commitments and payments) is compared with the current cost estimate in **Annex 3.** This shows that some 77% of the latest cost estimate has been committed.

We can also observe that the level of commitments for the various CMS subprojects is a fair reflection of the state of progress.

## 4. PLURI-ANNUAL COMMITMENTS AND PAYMENTS

**Annex 4** and **Annex 5** show the pluri-annual evolution of Commitments and Payments, respectively. The bars (left axis) depict annual data and the curves show cumulative data. Note that the figure given for the year 2006 is the budget as approved by the October 2005 RRB (cf. CERN-RRB-2005-107).

The figure given for the year 2007 is the one from the document Preliminary Draft Budget for 2007 (cf. CERN-RRB-2006-033).

**Annex 4** indicates that the present level of commitments is higher than what was planned early in 2005: this is mostly the effect of the Crystals contract.

**Annex 5** on the other hand, indicates that the actual payments are about 20 MCHF less than what was planned early in 2005. This is linked with payments having moved from 2005 to 2006, without direct consequences on deliveries. We did not experience during 2005 problems with funds availability.

# ANNEXES

The structure of the Annexes is the same as last year.

The summary tables give an overview of the total expenditures by Funding Agency (Annexes 1.A and 2.A) as well as an overview of payments to all Common Funds.

Full details by Sub-detector and Funding Agency are available in Annexes 1.B and 2.B.

**Annex 1 :** Tables - Total Accrued Commitments by Item and Funding Agency.

- **Annex 1.**A: Summary of CMS Commitments
- **Annex 1.**B: Detailed CMS Subdetectors Commitments

**Annex 2 :** Tables - Total Accrued Payments by Item and Funding Agency

- **Annex 2.**A: Summary of CMS Payments
- **Annex 2.**B: Detailed CMS Subdetectors Payments

**Annex 3 :** Table - Summary and Comparison with Cost Estimates

**Annex 4 :** Plot - Annual and Pluri-Annual Commitments

**Annex 5 :** Plot - Annual and Pluri-Annual Payment

# ANNEX 1.A

## Summary Commitments vs. Funding 1995-2005 (in kCHF)

| Commitments | | Contributing / Funding Agency | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | System | Austria | Belgium | Bulgaria | CERN | China | Croatia | Cyprus | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Iran | Italy | Korea | Pakistan | Poland | Portugal | RDMS-DMS | RDMS-Russia | Serbia | Spain | Switzerland-ETHZ | Switzerland-PSI | Switzerland-Universities | Taipei | Turkey | United Kingdom | USA-DOE | USA-NSF | Grand Total |
| Expense | 1. Magnet | 1,163 | 1,572 | | 16,908 | 1,215 | 87 | 200 | 112 | 1,480 | 3,447 | 6,300 | 5,441 | 1,010 | 328 | 1,078 | | 17,300 | 815 | 625 | 940 | 650 | | | | 2,140 | 25,034 | 2,610 | | 866 | 343 | 2,857 | 26,527 | 2,852 | 123,900 |
| | 2. Tracker | 1,639 | 3,990 | | 17,462 | | | | | 2,917 | | 7,452 | 9,109 | | | | | 20,532 | | | | | | | | | | 1,033 | 2,197 | | | 3,081 | 563 | 994 | 70,969 |
| | 3. ECAL | | | | 34,284 | | 175 | 276 | | | 2,308 | 6,494 | | 1,122 | | 468 | | 3,318 | | | | 904 | 80 | 2,263 | 56 | | 40,175 | 1,720 | | 755 | | 2,728 | 3,713 | 4,257 | 105,095 |
| | 4. HCAL | | | | | | | | | | | | | | 491 | 2,203 | 510 | | | | | | 5,715 | 5,645 | | | | | | | 690 | | 26,385 | 6,554 | 48,193 |
| | 5. Muon Detector | 43 | | 600 | 2,128 | 2,990 | | | | | | | 5,950 | | 55 | | | 19,197 | 400 | 610 | | | 1,000 | 3,671 | | 5,168 | | | | | | | 24,395 | 2,112 | 68,319 |
| | 6. Trigger-DAQ | 766 | | | 2,014 | | | | | 571 | | | | | | | | | | | 741 | | | | | | | | | | | 122 | 9,035 | | 13,249 |
| | 7. Offline Computing | 100 | 100 | | 200 | | | | | 100 | | 160 | 200 | 60 | | | | 500 | | | | | | | | 100 | 350 | 70 | | | | 200 | | 1,130 | 3,270 |
| | 8. Infrastructure | | | | 20,983 | | | | | | | | | | | | 700 | | | | | | | 1,476 | | | | | | | | | | | 23,159 |
| | 9. Commissioning & Integration | | 40 | | 12,267 | 500 | | | | | | | 543 | | | | | | | | | | | | 400 | | | | | | | | | | 13,750 |
| *Expense Total* | | 3,711 | 5,702 | 600 | 106,245 | 4,705 | 262 | 476 | 112 | 5,068 | 5,754 | 20,406 | 21,243 | 2,192 | 874 | 3,749 | 1,210 | 60,847 | 1,215 | 1,235 | 1,681 | 1,554 | 6,795 | 13,055 | 456 | 7,408 | 65,560 | 5,433 | 2,197 | 1,621 | 1,033 | 8,988 | 90,618 | 17,899 | 469,903 |
| *Funding* | | 4,500 | 5,775 | 600 | 103,500 | 5,115 | 329 | 706 | 112 | 6,170 | 7,732 | 23,700 | 20,809 | 5,000 | 1,058 | 5,000 | 1,210 | 67,127 | 1,962 | 2,594 | 3,000 | 2,440 | 6,815 | 22,084 | 450 | 7,800 | 75,500 | 8,500 | 2,700 | 2,740 | 1,058 | 11,318 | 103,111 | 16,479 | 526,994 |

# ANNEX 1.B

## Total Commitments 1995-2005 (in kCHF)

| System | 1. Magnet |
|---|---|

| Commitments | | | CF | Contributing | | | | | | | | | | | | | | | | | | | | | | | | Contributing Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Funding Agency | Austria | Belgium | CERN | China | Croatia | Cyprus | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Italy | Korea | Pakistan | Poland | Portugal | Spain | Switzerland-ETHZ | Switzerland-PSI | Taipei | Turkey | United Kingdom | USA-DOE | USA-NSF | |
| Type | Subsystem | Item | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Expense | 1.0. Magnet Common Fund | 1.0.1 MoU | | 1,100 | 1,500 | 15,760 | | 80 | 90 | 1,480 | 1,760 | 6,000 | 1,886 | 1,010 | 290 | 900 | | | | 940 | 423 | 1,790 | | 500 | 730 | 285 | 2,650 | | | 39,174 |
| | | 1.0.2 CtC | | 63 | 72 | 1,006 | | 7 | 16 | | | 300 | 290 | | 38 | 178 | | | | | 20 | 350 | | | 136 | 58 | 207 | | | 2,741 |
| | | 1.0.3 CtC2005 | | | | | | | 6 | | | | | | | | | | | | | | | | | | | | | 6 |
| | *1.0. Magnet Common Fund Total* | | | 1,163 | 1,572 | 16,766 | | 87 | 112 | 1,480 | 1,760 | 6,300 | 2,176 | 1,010 | 328 | 1,078 | | | | 940 | 443 | 2,140 | | 500 | 866 | 343 | 2,857 | | | 41,921 |
| | 1.1. Barrel Yoke and Vacuum Tank | 1.1.01 Barrel Rings and Vacuum Tank | 5,505 | | | | | 200 | | | | | 2,163 | | | | | | | | | | 7,133 | 2,110 | | | | 7,615 | 2,852 | 22,072 |
| | | 1.1.02 High Tension Bolts | 241 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.03 Hydraulic Tensioners | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.04.A Support Feet - Outer - Material (Plates) | | | | | | | | | | | | | | | | | | | | | 338 | | | | | | | 338 |
| | | 1.1.04.B Support Feet - Outer - Material (Welding) | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.05 Support Feet - Outer - Transport to Karachi | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.06 Support Feet - Outer - Manufacture | | | | | | | | | | | | | | | | | | 625 | | | | | | | | | | 625 |
| | | 1.1.07 Support Feet - Outer - Transport to CERN | 62 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.08.A Manufacture Follow-up | 557 | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| | | 1.1.08.B Photogrammetry and Survey | 45 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.09 Moving Beams | 383 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.10 Jacks and Air Pad System | 262 | | | | | | | | | | 1,103 | | | | | | | | | | | | | | | | | 1,103 |
| | | 1.1.11 Grease Pad Systems | 211 | | | | | | | | | | | | | | | | | | 207 | | | | | | | | | 207 |
| | | 1.1.12 Hydraulic Rotator | 276 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.13 Drilling Machine | 822 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.14 Rails | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.15 Assembly on Surface | 2,248 | | | | | | | | | | | | | | | | | | | | 1,200 | | | | | | | 1,200 |
| | | 1.1.16 Rigs and Scaffolds | 191 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.17 Ancillaries and Coupling Devices | 120 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.18 Design and Follow-up | 174 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *1.1. Barrel Yoke and Vacuum Tank Total* | | 11,273 | | | 2 | | 200 | | | | | 3,265 | | | | | | | 625 | 207 | | 8,671 | 2,110 | | | | 7,615 | 2,852 | 25,547 |
| | 1.2. Endcap Yokes | 1.2.01.A KHI Contract (6 disks, 2 noses and ancillaries) | 633 | | | | | | | | | | | | | | | | | | | | | | | | | 8,209 | | 8,209 |
| | | 1.2.01.B FCI Contract (assembly of disks on surface) | | | | | | | | | | | | | | | | | | | | | | | | | | 803 | | 803 |
| | | 1.2.02 Superbolts | | | | | | | | | | | | | | | | | | | | | | | | | | 868 | | 868 |
| | | 1.2.03 HE Supports | 126 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.2.04 Design and Follow-up | | | | | | | | | | | | | | | | | | | | | | | | | | 932 | | 932 |
| | | 1.2.05.A Carts Weldments (In-kind from China) | | | | | 1,215 | | | | | | | | | | | | | | | | | | | | | | | 1,215 |
| | | 1.2.05.B Carts Weldments (payment from Common Fund) | 245 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.2.07 Ancillaries and Coupling Devices | 155 | | | | | | | | | | | | | | | | | | | | | | | | | 142 | | 142 |
| | | 1.2.09 Engineering, Supervision, Quality Control | 35 | | | | | | | | | | | | | | | | | | | | | | | | | 829 | | 829 |
| | | 1.2.10 Manufacture Follow-up | 8 | | | | | | | | | | | | | | | | | | | | | | | | | 12 | | 12 |
| | | 1.2.11 Support System | 275 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *1.2. Endcap Yokes Total* | | 1,477 | | | | 1,215 | | | | | | | | | | | | | | | | | | | | | 11,795 | | 13,010 |

| Commitments | | | | Funding Agency | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CF | Contributing | | | | | | | | | | | | | | | | | | | | | | | | | | | | Contributing Total |
| Type | Subsystem | Item | | Austria | Belgium | CERN | China | Croatia | Cyprus | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Italy | Korea | Pakistan | Poland | Portugal | Spain | Switzerland-ETHZ | Switzerland-PSI | Taipei | Turkey | United Kingdom | USA-DOE | USA-NSF | |
| | 1.3. Coil | 1.3.01.A Superconducting Strands | 6 | | | | | | | | | | | | | | | | | | | | | | | | | 4,036 | | 4,036 |
| | | 1.3.01.C Cabling Strands into Rutherford Cable | 1 | | | | | | | | | | | | | | | | | | | | 978 | | | | | | | 978 |
| | | 1.3.01.D Pure Aluminium (99.998 %) | 11 | | | | | | | | | | | | | | | | | | | | | | | | | 1,255 | | 1,255 |
| | | 1.3.01.E Co-extrusion of Insert | 42 | | | | | | | | | | | | | | | | | | | | 3,474 | | | | | | | 3,474 |
| | | 1.3.01.F Strands for Tests and Prototypes | | | | | | | | | | | | | | | | | | | | | 322 | | | | | | | 322 |
| | | 1.3.02.A Alloy for Reinforcement | 198 | | | 19 | | | | | | | | | | | | | | | | | | | | | | 1,072 | | 1,091 |
| | | 1.3.02.B EB Welding Reinforcement | 123 | | | 17 | | | | | | | | | | | | | | | | | 7,657 | | | | | | | 7,674 |
| | | 1.3.03 Conductor - Quality Assurance | 432 | | | 2 | | | | | | | | | | | | | | | | | 3,932 | | | | | | | 3,934 |
| | | 1.3.04 Module Assembly, Swiveling Tooling | 383 | | | | | | | | | | | | | | 17,300 | 815 | | | | | | | | | | | | 18,115 |
| | | 1.3.05 Process Qualification and QA Winding | 320 | | | 97 | | | | | | | | | | | | | | | | | | | | | | | | 97 |
| | | 1.3.06 Thermal Shields | 961 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.07 Cold Supports | 871 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.08 He Circuits | 871 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.09 Cold Mass Instrumentation | 223 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.10 Vacuum System | 318 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.11 Power Supply and Bus Bar | 1,620 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.12 Dump Resistor | 660 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.13 Magnet Safety System | 376 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.14 Magnet Control System | 111 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.15 He Refrigeration External Plant | 8,197 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.16 Components Testing | 547 | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| | | 1.3.17 Coil Assembly | 961 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.18 Coil Surface Tests | 210 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.19 Studies and Supervision | 13,051 | | | | | | | | | 1,687 | | | | | | | | | | | | | | | | | | 1,687 |
| | | 1.3.20 Consumables | 248 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.21 Coil Transfer into Underground Cavern | 819 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.22 Implantation and Integration | 206 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *1.3. Coil Total* | | 31,765 | | | 139 | | | | | | 1,687 | | | | | 17,300 | 815 | | | | | 16,363 | | | | | 6,363 | | | 42,668 |
| | 1.4. Magnet Installation | 1.4.01 2'200 t Crane Rental | 1,471 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.4.02 Rigging Equipment | 295 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.4.03 SX Infrastructure | 363 | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.4.05 Field Mapping | 15 | | | | | | | | | | | | | | | | | | | | | | | | | 755 | | 755 |
| | *1.4. Magnet Installation Total* | | 2,144 | | | | | | | | | | | | | | | | | | | | | | | | | 755 | | 755 |
| *Expense Total* | | | 46,659 | 1,163 | 1,572 | 16,908 | 1,215 | 87 | 200 | 112 | 1,480 | 3,447 | 6,300 | 5,441 | 1,010 | 328 | 1,078 | 17,300 | 815 | 625 | 940 | 650 | 2,140 | 25,034 | 2,610 | 866 | 343 | 2,857 | 26,527 | 2,852 | 123,900 |
| *Funding* | | | | 1,240 | 1,645 | 16,908 | 1,215 | 129 | 235 | 112 | 1,770 | 3,447 | 6,300 | 5,440 | 1,480 | 368 | 1,000 | 17,300 | 815 | 625 | 940 | 730 | 2,140 | 25,000 | 2,610 | 866 | 368 | 2,857 | 26,527 | 2,852 | 124,919 |

| System | 2. Tracker |
|---|---|

**Commitments**

| | | | Funding Agency | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CF | Contributing | | | | | | | | | | | | Contributing Total |
| Type | Subsystem | Item | | Austria | Belgium | CERN | Finland | France-IN2P3 | Germany | Italy | Switzerland-PSI | Switzerland-Universities | United Kingdom | USA-DOE | USA-NSF | |
| Expense | 2.1. Pixel Detectors | 2.1.01 Detectors (incl. Pre-series) | | | | | | | | | | 473 | | 110 | 100 | 683 |
| | | 2.1.02 Electronics (include. Engineering) | | | | | | | | | 481 | 1,064 | | 154 | 135 | 1,834 |
| | | 2.1.03 Module Mechanics | | | | | | | | | 531 | | | 45 | | 576 |
| | | 2.1.04 Support Structures & Assembly | | | | | | | | | 10 | | | 115 | | 125 |
| | | 2.1.05 Monitoring | | | | | | | | | 11 | | | 11 | | 22 |
| | | 2.1.06 Service Systems | | | | | | | | | | 160 | | 128 | | 288 |
| | *2.1. Pixel Detectors Total* | | | | | | | | | | 1,033 | 1,697 | | 563 | 235 | 3,528 |
| | 2.2. Silicon Detectors | 2.2.01 Procurement of Sensors | | 1,020 | 810 | 5,495 | 534 | 3,100 | 3,313 | 6,504 | | | | | | 20,776 |
| | | 2.2.02 Capton | | | | 194 | | | 323 | 87 | | | | | | 604 |
| | | 2.2.03 Frames | | | 1,551 | | | | 225 | | | | | | | 1,776 |
| | | 2.2.04 Pitch Adapters | | | 776 | 686 | | | | | | | | | | 1,462 |
| | | 2.2.05 FE Hybrid | | | | 514 | | 1,510 | 11 | | | | | | 49 | 2,084 |
| | | 2.2.07 Tooling and Box | | | 41 | | | 55 | | 211 | | | | | | 307 |
| | | 2.2.08 Interconnect Board | | | | 461 | | | 475 | 511 | | | | | 100 | 1,547 |
| | | 2.2.09 Module Preseries | | 49 | 304 | 559 | | 75 | 349 | 205 | | | | | | 1,541 |
| | *2.2. Silicon Detectors Total* | | | 1,069 | 3,482 | 7,910 | 534 | 4,740 | 4,696 | 7,518 | | | | | 149 | 30,098 |
| | 2.3. Electronics for Si Detectors | 2.3.01 Module Electronics | | | | 342 | | | | 1,204 | | | 1,132 | | | 2,678 |
| | | 2.3.02 Analogue Link | | | | 4,193 | | 1,416 | 1,308 | 4,718 | | | 500 | | | 12,135 |
| | | 2.3.03 Digital Link | | | | 1 | | | 130 | | | | | | | 131 |
| | | 2.3.04 Analogue Optohybrid | | 570 | | | | | | 277 | | | | | | 847 |
| | | 2.3.05 Digital Optohybrid | | | | 80 | | | | | | | | | | 80 |
| | | 2.3.06 FED | | | 233 | 976 | 754 | 576 | 110 | | | 500 | 1,449 | | 610 | 5,207 |
| | | 2.3.08 FEC | | | | 98 | | | | | | | | | | 98 |
| | *2.3. Electronics for Si Detectors Total* | | | 570 | 233 | 5,689 | 754 | 1,992 | 1,548 | 6,199 | | 500 | 3,081 | | 610 | 21,176 |
| | 2.4. Power Supplies for Si Detectors | 2.4.01 Power Supplies | | | | 496 | | | | 3,689 | | | | | | 4,185 |
| | | 2.4.02 Cables (installed) | | | | 395 | | | 35 | 914 | | | | | | 1,343 |
| | *2.4. Power Supplies for Si Detectors Total* | | | | | 891 | | | 35 | 4,603 | | | | | | 5,528 |
| | 2.5. Mech. Struct. & Cooling for Si Detectors | 2.5.01 Inner Barrel | | | | | | | | 1,033 | | | | | | 1,033 |
| | | 2.5.02 Inner Endcap | | | | | | | | 358 | | | | | | 358 |
| | | 2.5.03 Outer Barrel | | | | 22 | 409 | | | | | | | | | 430 |
| | | 2.5.04 Outer Barrel Rods | | | | | 1,220 | | | | | | | | | 1,220 |
| | | 2.5.05 Endcaps | | | | | | 520 | 740 | | | | | | | 1,260 |
| | | 2.5.06 Endcaps Petals | | | 175 | | | | 841 | | | | | | | 1,015 |
| | | 2.5.07 General Cooling | | | | 1,593 | | | | 400 | | | | | | 1,993 |
| | | 2.5.08 Integration (st, ts, etc.) | | | | 850 | | | 70 | | | | | | | 920 |
| | *2.5. Mech. Struct. & Cooling for Si Detectors Total* | | | | 175 | 2,464 | 1,629 | 520 | 1,650 | 1,791 | | | | | | 8,230 |
| | 2.6. Monitoring for Si Detectors | 2.6.01 Position Monitoring Systems | | | | 23 | | | 600 | | | | | | | 623 |
| | | 2.6.02 Temperature Control | | | | 362 | | | | | | | | | | 362 |
| | *2.6. Monitoring for Si Detectors Total* | | | | | 385 | | | 600 | | | | | | | 985 |
| | 2.7. Data Acquisition for Si Detectors | 2.7.01 Test Stands | | | 100 | | | 200 | 580 | 421 | | | | | | 1,302 |
| | *2.7. Data Acquisition for Si Detectors Total* | | | | 100 | | | 200 | 580 | 421 | | | | | | 1,302 |
| | 2.8. Installation of Si Detectors | 2.8.01 Installation Manpower | | | | 123 | | | | | | | | | | 123 |
| | *2.8. Installation of Si Detectors Total* | | | | | 123 | | | | | | | | | | 123 |
| | 2.9. Integration Facilities | 2.9.01 Clean Room | 836 | | | | | | | | | | | | | |
| | | 2.9.02 Integration Manpower | 101 | | | | | | | | | | | | | |
| | *2.9. Integration Facilities Total* | | 938 | | | | | | | | | | | | | |
| *Expense Total* | | | 938 | 1,639 | 3,990 | 17,462 | 2,917 | 7,452 | 9,109 | 20,532 | 1,033 | 2,197 | 3,081 | 563 | 994 | 70,969 |
| *Funding* | | | | 1,810 | 3,990 | 17,700 | 3,280 | 7,950 | 8,820 | 24,300 | 3,600 | 2,500 | 2,700 | 2,730 | 990 | 80,370 |

| System | 3. ECAL |
|---|---|

**Commitments**

| Type | Subsystem | Item | Contributing / Funding Agency | CERN | Croatia | Cyprus | France-CEA | France-IN2P3 | Greece | India | Italy | Portugal | RDMS-DMS | RDMS-Russia | Serbia | Switzerland-ETHZ | Switzerland-PSI | Taipei | United Kingdom | USA-DOE | USA-NSF | Contributing Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expense | 3.1. Barrel | 3.1.1 Crystals | | 28,888 | | 5 | | 250 | | | 776 | | | | | 24,321 | | | 4 | | | 54,244 |
| | | 3.1.2 Electronics | | 264 | 175 | 231 | 304 | 2,764 | | | 1,351 | 664 | | | 44 | 2,428 | 1,720 | | | 2,661 | 4,202 | 16,809 |
| | | 3.1.3 Mechanics | | 1,035 | | | | 3,162 | | | 1,123 | | | | | 2,743 | | | | | | 8,063 |
| | | 3.1.4 Assembly and Installation | | 1,114 | | | | | | | 68 | | | | | 1,126 | | | | | | 2,308 |
| | | 3.1.5 Monitoring | | | | | 1,613 | | | | | | | | | | | | | 837 | | 2,450 |
| | *3.1. Barrel Total* | | | 31,301 | 175 | 236 | 1,917 | 6,176 | | | 3,318 | 664 | | | 44 | 30,618 | 1,720 | | 4 | 3,498 | 4,202 | 83,875 |
| | 3.2. Endcaps | 3.2.1 Crystals | | 844 | | | | | | | | | | 27 | | 8,710 | | | 72 | | | 9,652 |
| | | 3.2.2 Electronics | | 124 | | 40 | | 318 | | | | 240 | | 19 | 12 | 654 | | | 890 | 215 | 54 | 2,567 |
| | | 3.2.3 Mechanics | | | | | | | | | | | | 1,560 | | | | | 1,762 | | | 3,322 |
| | | 3.2.4 Assembly and Installation | | | | | | | | | | | | | | 193 | | | | | | 193 |
| | | 3.2.5 Monitoring | | | | | 390 | | | | | | | 13 | | | | | | | | 403 |
| | | 3.2.6 Preshower | | 2,015 | | | | | 1,122 | 468 | | | 80 | 645 | | | | 755 | | | | 5,084 |
| | *3.2. Endcaps Total* | | | 2,982 | | 40 | 390 | 318 | 1,122 | 468 | | 240 | 80 | 2,263 | 12 | 9,557 | | 755 | 2,724 | 215 | 54 | 21,221 |
| *Expense Total* | | | | 34,284 | 175 | 276 | 2,308 | 6,494 | 1,122 | 468 | 3,318 | 904 | 80 | 2,263 | 56 | 40,175 | 1,720 | 755 | 2,728 | 3,713 | 4,257 | 105,095 |
| *Funding* | | | | 22,700 | 200 | 471 | 3,121 | 9,250 | 1,360 | 1,500 | 5,100 | 1,315 | 100 | 10,947 | 50 | 47,900 | 1,720 | 1,874 | 4,711 | 13,246 | 2,015 | 127,580 |

| System | 4. HCAL |
|---|---|

**Commitments**

| | | | Funding Agency | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Contributing | | | | | | | | | Contributing Total |
| Type | Subsystem | Item | Hungary | India | Iran | RDMS-DMS | RDMS-Russia | Turkey | USA-DOE | USA-NSF | |
| Expense | 4.1. Barrel | 4.1.01 Mechanics | | | | | | | 12,162 | | 12,162 |
| | | 4.1.02 Optics | | | | | | | 2,417 | 199 | 2,616 |
| | | 4.1.03 Read-out Boxes | | | | | | | 412 | 121 | 533 |
| | | 4.1.04 Photodetectors | | | | | | | 471 | 1,690 | 2,162 |
| | | 4.1.05 Front-end Electronics | | | | | | | 1,618 | 497 | 2,114 |
| | | 4.1.06 Calibration Systems | | | | | | | 334 | 11 | 344 |
| | | 4.1.07 Trigger/DAQ Electronics | | | | | | | 1,017 | 791 | 1,808 |
| | | 4.1.08 Voltage Supply Systems | | | | | | | 151 | 126 | 277 |
| | | 4.1.09 Detector Control Systems | | | | | | | 162 | | 162 |
| | | 4.1.10 Pre-production Prototypes | | | | | | | 2,141 | 61 | 2,202 |
| | *4.1. Barrel Total* | | | | | | | | 20,885 | 3,494 | 24,380 |
| | 4.2. Outer Barrel | 4.2.01 Mechanics | | 184 | | | | | | | 184 |
| | | 4.2.02 Optics | | 1,761 | | | | | 33 | 14 | 1,808 |
| | | 4.2.03 Read-out Boxes | | | | | | | 138 | 139 | 277 |
| | | 4.2.04 Photodetectors | | 98 | | | | | 154 | | 252 |
| | | 4.2.05 Front-end Electronics | | | | | | | 24 | 38 | 62 |
| | | 4.2.06 Calibration Systems | | | | | | | 50 | | 50 |
| | | 4.2.07 Trigger/DAQ Electronics | | | | | | | 155 | 263 | 418 |
| | | 4.2.08 Voltage Supply Systems | | | | | | | 0 | 64 | 64 |
| | | 4.2.09 Detector Control Systems | | | | | | | 2 | | 2 |
| | | 4.2.10 Pre-production Prototypes | | 160 | | | | | 9 | 6 | 174 |
| | *4.2. Outer Barrel Total* | | | 2,203 | | | | | 565 | 524 | 3,292 |
| | 4.3. Endcap | 4.3.01 Mechanics | | | | 5,240 | 2,693 | | | 1,289 | 9,222 |
| | | 4.3.02 Optics | | | | 150 | 624 | | 405 | 170 | 1,349 |
| | | 4.3.03 Read-out Boxes | | | | | | | 125 | 96 | 221 |
| | | 4.3.04 Photodetectors | | | | | | | 70 | | 70 |
| | | 4.3.05 Front-end Electronics | | | | | | | 12 | 81 | 93 |
| | | 4.3.06 Calibration Systems | | | | | | | 261 | | 261 |
| | | 4.3.07 Trigger/DAQ Electronics | | | | | | | 80 | 445 | 526 |
| | | 4.3.08 Voltage Supply Systems | | | | | | | 0 | 90 | 90 |
| | | 4.3.10 Pre-production Prototypes | | | | 325 | 200 | | 35 | 4 | 564 |
| | *4.3. Endcap Total* | | | | | 5,715 | 3,517 | | 988 | 2,176 | 12,396 |
| | 4.5. Forward | 4.5.01 Mechanics | | | 510 | | 1,856 | 677 | 8 | | 3,051 |
| | | 4.5.02 Optics | 477 | | | | | | 2,049 | | 2,526 |
| | | 4.5.03 Read-out Boxes | | | | | | | 91 | | 91 |
| | | 4.5.04 Photodetectors | | | | | | | 791 | | 791 |
| | | 4.5.05 Front-end Electronics | | | | | | | 81 | 135 | 216 |
| | | 4.5.06 Calibration Systems | | | | | 42 | | 311 | | 353 |
| | | 4.5.07 Trigger/DAQ Electronics | | | | | | | 39 | 224 | 263 |
| | | 4.5.08 Voltage Supply Systems | | | | | | | 103 | | 103 |
| | | 4.5.09 Detector Control Systems | | | | | | | 5 | | 5 |
| | | 4.5.10 Pre-production Prototypes | 14 | | | | 230 | 13 | 469 | | 726 |
| | *4.5. Forward Total* | | 491 | | 510 | | 2,128 | 690 | 3,946 | 360 | 8,124 |
| *Expense Total* | | | 491 | 2,203 | 510 | 5,715 | 5,645 | 690 | 26,385 | 6,554 | 48,193 |
| *Funding* | | | 500 | 2,500 | 510 | 5,715 | 5,701 | 690 | 26,698 | 7,380 | 49,694 |

| System | 5. Muon Detector |
|---|---|

**Commitments**

| Type | Subsystem | Item | CF | Contributing Funding Agency | Austria | Bulgaria | CERN | China | Germany | Hungary | Italy | Korea | Pakistan | RDMS-DMS | RDMS-Russia | Spain | USA-DOE | USA-NSF | Contributing Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expense | 5.1. Barrel Drifttubes | 5.1.1 Detectors and Components | | | | | | | 2,518 | | 5,894 | | | | | 1,972 | | | 10,384 |
| | | 5.1.2 Electronics | | | | | 853 | 800 | 2,621 | | 7,077 | | | | | 1,761 | | | 13,112 |
| | | 5.1.3 Mechanical Structure and Supports | | | | | | 350 | 186 | | 520 | | | | | 152 | | | 1,208 |
| | | 5.1.4 Assembly and Installation | | | | | | | 84 | | 214 | | | | | 76 | | | 374 |
| | | 5.1.6 Service Systems | | | | | 315 | | 542 | | 299 | | | | | 105 | | | 1,261 |
| | *5.1. Barrel Drifttubes Total* | | | | | | 1,168 | 1,150 | 5,950 | | 14,004 | | | | | 4,066 | | | 26,338 |
| | 5.2. Forward ME 1/1 | 5.2.1 Detectors and Components | | | | | | | | | | | | 80 | 1,685 | | | | 1,765 |
| | | 5.2.2 Electronics | | | | | | | | | | | | 700 | 121 | | 1,781 | 600 | 3,202 |
| | | 5.2.3 Mechanical Structure, Supports | | | | | | | | | | | | | 210 | | | | 210 |
| | | 5.2.4 Assembly and Installation | | | | | | | | | | | | 170 | 155 | | | | 325 |
| | | 5.2.5 Monitoring | | | | | | | | | | | | 50 | | | | | 50 |
| | | 5.2.6 Service Systems | | | | | | | | | | | | | 100 | | | | 100 |
| | *5.2. Forward ME 1/1 Total* | | | | | | | | | | | | | 1,000 | 2,271 | | 1,781 | 600 | 5,652 |
| | 5.3. Endcap CSC | 5.3.1 Detectors and Components | | | | | | 1,500 | | | | | | | 1,400 | 8,855 | | | 11,755 |
| | | 5.3.2 Electronics | | | | | | | | | | | | | | 11,361 | 674 | | 12,034 |
| | | 5.3.3 Mechanical Structure and Supports | | | | | | | | | | | | | | 430 | | | 430 |
| | | 5.3.4 Assembly and Installation | | | | | | | | | | | | | | 260 | | | 260 |
| | | 5.3.5 Monitoring | | | | | | | | | | | | | | 323 | | | 323 |
| | | 5.3.6 Service Systems | | | | | | | | | | | | | | 1,183 | | | 1,183 |
| | *5.3. Endcap CSC Total* | | | | | | | 1,500 | | | | | | | 1,400 | 22,411 | 674 | | 25,985 |
| | 5.4. Barrel RPC | 5.4.1 Detectors and Components | | | | 600 | | 320 | | | 2,582 | | | | | | | | 3,502 |
| | | 5.4.2 Electronics | | | | | | | | | 1,868 | | | | | | | | 1,868 |
| | | 5.4.3 Mechanical Structure and Supports | | | | | | | | | 100 | | | | | | | | 100 |
| | | 5.4.4 Assembly and Installation | | | | | | 20 | | | 40 | | | | | | | | 60 |
| | | 5.4.5 Monitoring | | | | | | | | | 30 | | | | | | | | 30 |
| | | 5.4.6 Service Systems | 245 | | | | | | | | 573 | | | | | | | | 573 |
| | *5.4. Barrel RPC Total* | | 245 | | | 600 | | 340 | | | 5,193 | | | | | | | | 6,133 |
| | 5.5. Forward RPC | 5.5.1 Detectors and Components | 615 | | | | | | | | | 400 | 190 | | | | | | 590 |
| | | 5.5.2 Electronics | 10 | | | | | | | | | 0 | 300 | | | | | | 300 |
| | | 5.5.3 Mechanical Structure and Supports | | | | | | | | | | 0 | | | | | | | 0 |
| | | 5.5.4 Assembly and Installation | 210 | | | | | | | | | | 120 | | | | | | 120 |
| | | 5.5.6 Service Systems | 360 | | | | | | | | | | | | | | | | |
| | *5.5. Forward RPC Total* | | 1,196 | | | | | | | | | 400 | 610 | | | | | | 1,010 |
| | 5.6. Alignment | 5.6.1 Barrel | | | 43 | | 959 | | | 55 | | | | | | | | | 1,057 |
| | | 5.6.2 Forward | | | | | | | | | | | | | | 78 | 203 | 838 | 1,119 |
| | | 5.6.3 Link | | | | | | | | | | | | | | 1,024 | | | 1,024 |
| | *5.6. Alignment Total* | | | | 43 | | 959 | | | 55 | | | | | | 1,102 | 203 | 838 | 3,201 |
| *Expense Total* | | | 1,441 | | 43 | 600 | 2,128 | 2,990 | 5,950 | 55 | 19,197 | 400 | 610 | 1,000 | 3,671 | 5,168 | 24,395 | 2,112 | 68,319 |
| *Funding* | | | 1,485 | | 50 | 600 | 2,300 | 3,100 | 5,806 | 100 | 19,827 | 500 | 1,820 | 1,000 | 3,810 | 5,560 | 24,395 | 2,112 | 70,980 |

| System | 6. Trigger-DAQ |
|---|---|

**Commitments**

| | | | Funding Agency | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CF | Contributing | | | | | | | | | | | | | | Contributing Total | Grand Total |
| Type | Subsystem | Item | | Austria | CERN | Finland | France-CEA | Greece | Hungary | Italy | Korea | Poland | Portugal | Switzerland-ETHZ | Switzerland-PSI | United Kingdom | USA-DOE | | |
| Expense | 6.1. Trigger | 6.1.1 Calorimeter Trigger | | | | | | | | | | | | | | 122 | 4,382 | 4,504 | 4,504 |
| | | 6.1.2 CSC Trigger | | | | | | | | | | | | | | | 1,683 | 1,683 | 1,683 |
| | | 6.1.3 DT Trigger | | 504 | | | | | | | | | | | | | | 504 | 504 |
| | | 6.1.4 RPC Trigger | | | | 571 | | | | | | 741 | | | | | | 1,312 | 1,312 |
| | | 6.1.5 Global Trigger | | 262 | | | | | | | | | | | | | | 262 | 262 |
| | *6.1. Trigger Total* | | | 766 | | 571 | | | | | | 741 | | | | 122 | 6,065 | 8,264 | 8,264 |
| | 6.2. Data Acquisition | 6.2.1 Event Filter | 2,000 | | | | | | | | | | | | | | | | 2,000 |
| | | 6.2.2 Readout Builder | | | 5 | | | | | | | | | | | | | 5 | 5 |
| | | 6.2.3 Data to Surface | | | 1,343 | | | | | | | | | | | | 2,370 | 3,713 | 3,713 |
| | | 6.2.5 Preseries | | | 403 | | | | | | | | | | | | 600 | 1,003 | 1,003 |
| | | 6.2.6 DAQ Integration | | | 263 | | | | | | | | | | | | | 263 | 263 |
| | *6.2. Data Acquisition Total* | | 2,000 | | 2,014 | | | | | | | | | | | | 2,970 | 4,984 | 6,984 |
| *Expense Total* | | | 2,000 | 766 | 2,014 | 571 | | | | | | 741 | | | | 122 | 9,035 | 13,249 | 15,249 |
| *Funding* | | | | 1,300 | 7,470 | 1,020 | 840 | 2,060 | 90 | 100 | 500 | 2,060 | 255 | 2,000 | 500 | 850 | 9,515 | 28,560 | 28,560 |

| System | 7. Offline Computing |
|---|---|

**Commitments**

| Type | Subsystem | Item | CF | Contributing Funding Agency | Austria | Belgium | CERN | Finland | France-IN2P3 | Germany | Greece | Italy | Spain | Switzerland-ETHZ | Switzerland-PSI | United Kingdom | USA-NSF | Contributing Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expense | 7.0. Offline Common Fund | 7.0.1 MoU | | | 100 | 100 | 200 | 100 | 160 | 200 | 60 | 500 | 100 | 246 | | 200 | 1,130 | 3,096 |
| | *7.0. Offline Common Fund Total* | | | | 100 | 100 | 200 | 100 | 160 | 200 | 60 | 500 | 100 | 246 | | 200 | 1,130 | 3,096 |
| | 7.1. Offline Infrastructure | 7.1.1 File Servers | 738 | | | | | | | | | | | | 35 | | | 35 |
| | | 7.1.2 Information Servers | 105 | | | | | | | | | | | | | | | |
| | | 7.1.3 Computing Power | 185 | | | | | | | | | | | 104 | 35 | | | 139 |
| | | 7.1.4 Spares | 20 | | | | | | | | | | | | | | | |
| | | 7.1.5 System Assembly | 92 | | | | | | | | | | | | | | | |
| | | 7.1.6 Software Licenses | 79 | | | | | | | | | | | | | | | |
| | | 7.1.7 System Management | 816 | | | | | | | | | | | | | | | |
| | *7.1. Offline Infrastructure Total* | | 2,034 | | | | | | | | | | | 104 | 70 | | | 174 |
| *Expense Total* | | | 2,034 | | 100 | 100 | 200 | 100 | 160 | 200 | 60 | 500 | 100 | 350 | 70 | 200 | 1,130 | 3,270 |
| *Funding* | | | | | 100 | 100 | 200 | 100 | 200 | 200 | 100 | 500 | 100 | 600 | 70 | 200 | 1,130 | 3,600 |

| System | 8. Infrastructure |
|---|---|

**Commitments**

| Type | Subsystem | Item | Contributing CERN | Funding Agency Iran | RDMS-Russia | USA-DOE | Contributing Total |
|---|---|---|---|---|---|---|---|
| Expense | 8.1. Access and Survey | 8.1.1 Gangways, Stairs | 2,094 | | | | 2,094 |
| | | 8.1.2 Structures on Yoke | 906 | | | | 906 |
| | | 8.1.3 Personnel Access Equipment | 798 | | | | 798 |
| | | 8.1.4 General Survey | 376 | | | | 376 |
| | *8.1. Access and Survey Total* | | 4,175 | | | | 4,175 |
| | 8.2. General Installation | 8.2.1 Counting Room Structures | 344 | | | | 344 |
| | | 8.2.2 Racks with Cooling | 491 | | | | 491 |
| | | 8.2.3 Electrical Distribution from Outlets | 2,568 | | | | 2,568 |
| | | 8.2.4 Gas Systems and Primary Distribution Racks | 1,697 | | | | 1,697 |
| | | 8.2.5 Beam Pipe | 545 | | | | 545 |
| | | 8.2.6 Cable Trays to Counting Rooms | 177 | | | | 177 |
| | | 8.2.7 Control Room and Cabling to Surface | 13 | | | | 13 |
| | | 8.2.8 General Piping | 169 | | | | 169 |
| | *8.2. General Installation Total* | | 6,005 | | | | 6,005 |
| | 8.3. Cooling and Ventilation | 8.3.1 Detector Cooling Plant | 3,892 | | | | 3,892 |
| | | 8.3.2 Detector Specific Ventilation | 205 | | | | 205 |
| | | 8.3.3 Detector Primary Cooling System | 231 | | | | 231 |
| | *8.3. Cooling and Ventilation Total* | | 4,329 | | | | 4,329 |
| | 8.4. Safety | 8.4.1 Safety Installations | 367 | | | | 367 |
| | | 8.4.2 Safety Equipment Control | 371 | | | | 371 |
| | | 8.4.3 Hard-wired Safety System | 9 | | | | 9 |
| | | 8.4.4 Inertion System | 354 | | | | 354 |
| | *8.4. Safety Total* | | 1,100 | | | | 1,100 |
| | 8.5. Fixed Cranes | 8.5.1 80 ton /100 m | 857 | | | | 857 |
| | | 8.5.2 80 ton /100 m Double Beam System | 1,676 | | | | 1,676 |
| | | 8.5.3 20 ton Crane | 219 | | | | 219 |
| | | 8.5.4 3 ton Lift | 271 | | | | 271 |
| | *8.5. Fixed Cranes Total* | | 3,024 | | | | 3,024 |
| | 8.6. Shielding Systems | 8.6.1 Rotating Shielding | 738 | | 1,476 | | 2,213 |
| | | 8.6.2 Vertical 400 ton Lifting System | 504 | | | | 504 |
| | | 8.6.3 Mechanics and Shielding for Forward HCAL | 1,109 | 700 | | | 1,809 |
| | *8.6. Shielding Systems Total* | | 2,351 | 700 | 1,476 | | 4,526 |
| *Expense Total* | | | 20,983 | 700 | 1,476 | | 23,159 |
| *Funding* | | | 23,955 | 700 | 1,476 | | 26,131 |

| System | 9. Commissioning & Integration |
|---|---|

**Commitments**

| | | | | Funding Agency | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **CF** | **Contributing** | | | | | | | | | | **Contributing Total** |
| Type | Subsystem | Item | | | **Belgium** | **CERN** | **China** | **France-CEA** | **Germany** | **Korea** | **Portugal** | **RDMS-Russia** | **Serbia** | **Switzerland-Universities** | |
| Expense | 9.0. C&I Common Fund | 9.0.1 CtC | | | 40 | 12,267 | | | 543 | | | | | | 12,850 |
| | *9.0. C&I Common Fund Total* | | | | 40 | 12,267 | | | 543 | | | | | | 12,850 |
| | 9.1. Additional facilities for Commissioning on surface | 9.1.01 Mixed Water Cooling | 1,036 | | | | | | | | | | | | |
| | | 9.1.02 Gas Distribution | 147 | | | | | | | | | | | | |
| | | 9.1.03 Control Room | 50 | | | | | | | | | | | | |
| | | 9.1.04 Smoke Detection | 61 | | | | | | | | | | | | |
| | | 9.1.05 LV System (1 generator) | 190 | | | | | | | | | | | | |
| | | 9.1.06 20t lifting equipment | 253 | | | | | | | | | | | | |
| | | 9.1.07 Extra Electric & Optical Cabling | 892 | | | | | | | | | | | | |
| | | 9.1.08 Common Electronics | 204 | | | | | | | | | | | | |
| | | 9.1.09 Pre-cabling, pre-testing & related facilities | 1,445 | | | | | | | | | | | | |
| | | 9.1.10 Basic DSS for Equipment Protection | 49 | | | | | | | | | | | | |
| | | 9.1.11 Semi-clean areas | 131 | | | | | | | | | | | | |
| | *9.1. Additional facilities for Commissioning on surface Total* | | 4,458 | | | | | | | | | | | | |
| | 9.2. Detector Installation, Opening and Access Facilities | 9.2.01 Installation and access tooling | 244 | | | | | | | | | | | | |
| | | 9.2.02 Dummy End Flanges (EB, EE, SE) | 206 | | | | | | | | | | | | |
| | | 9.2.03 Magnet Closing System | 772 | | | | | | | | | | 400 | | 400 |
| | | 9.2.04 Control for Magnet and Magnet Power Supply | 35 | | | | | | | | | | | | |
| | | 9.2.05 Beampipe Vacuum Tooling & Support Structure | 78 | | | | | | | | | | | | |
| | | 9.2.06 Floor Plates for UXC | 12 | | | | 500 | | | | | | | | 500 |
| | | 9.2.07 Cherry Pickers & Access Platforms | 149 | | | | | | | | | | | | |
| | *9.2. Detector Installation, Opening and Access Facilities Total* | | 1,496 | | | | 500 | | | | | | 400 | | 900 |
| | 9.3. General Services | 9.3.01 Workshops | 161 | | | | | | | | | | | | |
| | | 9.3.02 Heavy Transport | 685 | | | | | | | | | | | | |
| | | 9.3.03 Survey | 237 | | | | | | | | | | | | |
| | | 9.3.04 Storage Infrastructure | 348 | | | | | | | | | | | | |
| | | 9.3.05 Extra Engineering for Integration of Magnet & Detectors | 625 | | | | | | | | | | | | |
| | | 9.3.06 Technical Support Team | 2,581 | | | | | | | | | | | | |
| | *9.3. General Services Total* | | 4,636 | | | | | | | | | | | | |
| *Expense Total* | | | 10,589 | | 40 | 12,267 | 500 | | 543 | | | | 400 | | 13,750 |
| *Funding* | | | | | 40 | 12,267 | 800 | 324 | 543 | 147 | 140 | 150 | 400 | 200 | 15,011 |

# ANNEX 2.A

## Summary Payments vs Funding 1995-2005 (kCHF)

| Payments | | Contributing / Funding Agency | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | System | Austria | Belgium | Bulgaria | CERN | China | Croatia | Cyprus | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Iran | Italy | Korea | Pakistan | Poland | Portugal | RDMS-DMS | RDMS-Russia | Serbia | Spain | Switzerland-ETHZ | Switzerland-PSI | Switzerland-Universities | Taipei | Turkey | United Kingdom | USA-DOE | USA-NSF | Grand Total |
| Expense | 1. Magnet | 1,163 | 1,572 | | 16,908 | 1,215 | 87 | 200 | 112 | 1,480 | 2,590 | 6,300 | 5,441 | 1,010 | 328 | 1,078 | | 17,300 | 815 | 625 | 940 | 650 | | | | 2,140 | 23,210 | 2,610 | | 866 | 343 | 2,857 | 26,374 | 2,852 | 121,066 |
| | 2. Tracker | 1,104 | 3,510 | | 15,930 | | | | | 2,349 | | 6,307 | 7,725 | | | | | 16,519 | | | | | | | | | | 1,033 | 2,197 | | | 2,765 | 563 | 235 | 60,236 |
| | 3. ECAL | | | | 29,484 | | 175 | 276 | | | 2,308 | 6,494 | | 56 | | 468 | | 3,318 | | | | 904 | 80 | 2,263 | 56 | | 16,575 | 1,720 | | 755 | | 2,728 | 3,713 | 4,257 | 75,629 |
| | 4. HCAL | | | | | | | | | | | | | | 491 | 2,203 | 510 | | | | | | 5,715 | 5,645 | | | | | | | 690 | | 26,385 | 6,549 | 48,187 |
| | 5. Muon Detector | 43 | | 600 | 2,128 | 2,375 | | | | | | | 5,950 | | 55 | | | 19,197 | 400 | 610 | | | 1,000 | 3,671 | | 5,168 | | | | | | | 24,395 | 2,112 | 67,704 |
| | 6. Trigger-DAQ | 766 | | | 1,590 | | | | | 571 | | | | | | | | | | | 741 | | | | | | | | | | | 122 | 9,035 | | 12,825 |
| | 7. Offline Computing | 100 | 100 | | 200 | | | | | 100 | | 160 | 200 | 60 | | | | 500 | | | | | | | | 100 | 350 | 70 | | | | 200 | | 1,130 | 3,270 |
| | 8. Infrastructure | | | | 14,322 | | | | | | | | | | | | 700 | | | | | | | 1,476 | | | | | | | | | | 16,497 |
| | 9. Commissioning & Integration | | 40 | | 12,267 | 500 | | | | | | | 543 | | | | | | | | | | | | 400 | | | | | | | | | | 13,750 |
| *Expense Total* | | 3,176 | 5,222 | 600 | 92,828 | 4,090 | 262 | 476 | 112 | 4,500 | 4,897 | 19,261 | 19,859 | 1,126 | 874 | 3,749 | 1,210 | 56,834 | 1,215 | 1,235 | 1,681 | 1,554 | 6,795 | 13,055 | 456 | 7,408 | 40,135 | 5,433 | 2,197 | 1,621 | 1,033 | 8,672 | 90,465 | 17,135 | 419,166 |
| *Funding* | | 4,500 | 5,775 | 600 | 103,500 | 5,115 | 329 | 706 | 112 | 6,170 | 7,732 | 23,700 | 20,809 | 5,000 | 1,058 | 5,000 | 1,210 | 67,127 | 1,962 | 2,594 | 3,000 | 2,440 | 6,815 | 22,084 | 450 | 7,800 | 75,500 | 8,500 | 2,700 | 2,740 | 1,058 | 11,318 | 103,111 | 16,479 | 526,994 |

# ANNEX 2.A

## Summary of Payments to Common Funds 1995-2005 (kCHF)

**Payments**

| | | | Contributing | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Funding Agency | | | | | | | | | | | | | | | | | | | | | | | | | | Contributing Total | DAQ Staging | Interest |
| Type | Subsystem | Item | Austria | Belgium | CERN | Croatia | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Italy | Poland | Portugal | Spain | Switzerland-ETHZ | Switzerland-PSI | Taipei | Turkey | United Kingdom | USA-NSF | | | | | | | |
| Expense | 0.0. Other Common Funds Income | 0.0. Other Common Funds Income | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1,626 |
| | *0.0. Other Common Funds Income Total* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 1,626 |
| | 1.0. Magnet Common Fund | 1.0.1 MoU | 1,100 | 1,500 | 15,760 | 80 | 90 | 1,480 | 1,760 | 6,000 | 1,886 | 1,010 | 290 | 900 | | 940 | 423 | 1,790 | | 500 | 730 | 285 | 2,650 | | | | | | | 39,174 | | |
| | | 1.0.2 CtC | 63 | 72 | 1,006 | 7 | 16 | | | 300 | 290 | | 38 | 178 | | | 20 | 350 | | | 136 | 58 | 207 | | | | | | | 2,741 | | |
| | | 1.0.3 CtC2005 | | | | | 6 | | | | | | | | | | | | | | | | | | | | | | | 6 | | |
| | *1.0. Magnet Common Fund Total* | | 1,163 | 1,572 | 16,766 | 87 | 112 | 1,480 | 1,760 | 6,300 | 2,176 | 1,010 | 328 | 1,078 | | 940 | 443 | 2,140 | | 500 | 866 | 343 | 2,857 | | | | | | | 41,921 | | |
| | 6.0. DAQ Common Fund | 6.0.1 DAQ Staging | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2,000 | |
| | *6.0. DAQ Common Fund Total* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 2,000 | |
| | 7.0. Offline Common Fund | 7.0.1 MoU | 100 | 100 | 200 | | | 100 | | 160 | 200 | 60 | | 500 | | | | 100 | 246 | | | | 200 | 1,130 | | | | | | | 3,096 | | |
| | *7.0. Offline Common Fund Total* | | 100 | 100 | 200 | | | 100 | | 160 | 200 | 60 | | 500 | | | | 100 | 246 | | | | 200 | 1,130 | | | | | | | 3,096 | | |
| | 9.0. C&I Common Fund | 9.0.1 CtC | | 40 | 12,267 | | | | | | 543 | | | | | | | | | | | | | | | | | | | | 12,850 | | |
| | *9.0. C&I Common Fund Total* | | | 40 | 12,267 | | | | | | 543 | | | | | | | | | | | | | | | | | | | | 12,850 | | |
| *Expense Total* | | | 1,263 | 1,712 | 29,233 | 87 | 112 | 1,580 | 1,760 | 6,460 | 2,919 | 1,070 | 328 | 1,078 | 500 | 940 | 443 | 2,240 | 246 | 500 | 866 | 343 | 3,057 | 1,130 | | | | | | | 57,867 | 2,000 | 1,626 |

# ANNEX 2.B

## Total Payments 1995-2005 (kCHF)

| System | 1. Magnet |
|---|---|

Payments

| Type | Subsystem | Item | CF | Contributing Funding Agency | Austria | Belgium | CERN | China | Croatia | Cyprus | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Italy | Korea | Pakistan | Poland | Portugal | Spain | Switzerland-ETHZ | Switzerland-PSI | Taipei | Turkey | United Kingdom | USA-DOE | USA-NSF | Contributing Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Expense | 1.0. Magnet Common Fund | 1.0.1 MoU | | | 1,100 | 1,500 | 15,760 | | 80 | | 90 | 1,480 | 1,760 | 6,000 | 1,886 | 1,010 | 290 | 900 | | | | 940 | 423 | 1,790 | | 500 | 730 | 285 | 2,650 | | | 39,174 |
| | | 1.0.2 CtC | | | 63 | 72 | 1,006 | | 7 | | 16 | | | 300 | 290 | | 38 | 178 | | | | | 20 | 350 | | | 136 | 58 | 207 | | | 2,741 |
| | | 1.0.3 CtC2005 | | | | | | | | | 6 | | | | | | | | | | | | | | | | | | | | | 6 |
| | *1.0. Magnet Common Fund Total* | | | | 1,163 | 1,572 | 16,766 | | 87 | | 112 | 1,480 | 1,760 | 6,300 | 2,176 | 1,010 | 328 | 1,078 | | | | 940 | 443 | 2,140 | | 500 | 866 | 343 | 2,857 | | | 41,921 |
| | 1.1. Barrel Yoke and Vacuum Tank | 1.1.01 Barrel Rings and Vacuum Tank | 5,505 | | | | | | | 200 | | | | | 2,163 | | | | | | | | | | 6,794 | 2,110 | | | | 7,615 | 2,852 | 21,733 |
| | | 1.1.02 High Tension Bolts | 241 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.03 Hydraulic Tensioners | 28 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.04.A Support Feet - Outer - Material (Plates) | | | | | | | | | | | | | | | | | | | | | | | 338 | | | | | | | 338 |
| | | 1.1.04.B Support Feet - Outer - Material (Welding) | 100 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.05 Support Feet - Outer - Transport to Karachi | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.06 Support Feet - Outer - Manufacture | | | | | | | | | | | | | | | | | | | 625 | | | | | | | | | | | 625 |
| | | 1.1.07 Support Feet - Outer - Transport to CERN | 62 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.08.A Manufacture Follow-up | 461 | | | | 2 | | | | | | | | | | | | | | | | | | | | | | | | | 2 |
| | | 1.1.08.B Photogrammetry and Survey | 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.09 Moving Beams | 379 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.10 Jacks and Air Pad System | 262 | | | | | | | | | | | | 1,103 | | | | | | | | | | | | | | | | | 1,103 |
| | | 1.1.11 Grease Pad Systems | 140 | | | | | | | | | | | | | | | | | | | | 207 | | | | | | | | | 207 |
| | | 1.1.12 Hydraulic Rotator | 275 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.13 Drilling Machine | 822 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.14 Rails | 19 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.15 Assembly on Surface | 2,208 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.16 Rigs and Scaffolds | 147 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.17 Ancillaries and Coupling Devices | 111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.1.18 Design and Follow-up | 171 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *1.1. Barrel Yoke and Vacuum Tank Total* | | 10,999 | | | | 2 | | | 200 | | | | | 3,265 | | | | | | 625 | | 207 | | 7,132 | 2,110 | | | | 7,615 | 2,852 | 24,008 |
| | 1.2. Endcap Yokes | 1.2.01.A KHI Contract (6 disks, 2 noses and ancillaries) | 625 | | | | | | | | | | | | | | | | | | | | | | | | | | | 8,209 | | 8,209 |
| | | 1.2.01.B FCI Contract (assembly of disks on surface) | | | | | | | | | | | | | | | | | | | | | | | | | | | | 803 | | 803 |
| | | 1.2.02 Superbolts | | | | | | | | | | | | | | | | | | | | | | | | | | | | 868 | | 868 |
| | | 1.2.03 HE Supports | 101 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.2.04 Design and Follow-up | | | | | | | | | | | | | | | | | | | | | | | | | | | | 932 | | 932 |
| | | 1.2.05.A Carts Weldments (In-kind from China) | | | | | | 1,215 | | | | | | | | | | | | | | | | | | | | | | | | 1,215 |
| | | 1.2.05.B Carts Weldments (payment from Common Fund) | 170 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.2.07 Ancillaries and Coupling Devices | 153 | | | | | | | | | | | | | | | | | | | | | | | | | | | 142 | | 142 |
| | | 1.2.09 Engineering, Supervision, Quality Control | 35 | | | | | | | | | | | | | | | | | | | | | | | | | | | 829 | | 829 |
| | | 1.2.10 Manufacture Follow-up | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | 12 | | 12 |
| | | 1.2.11 Support System | 275 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *1.2. Endcap Yokes Total* | | 1,366 | | | | | 1,215 | | | | | | | | | | | | | | | | | | | | | | 11,795 | | 13,010 |

| Payments | | | | Funding Agency | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CF | Contributing | | | | | | | | | | | | | | | | | | | | | | | | | | | | Contributing Total |
| Type | Subsystem | Item | | | Austria | Belgium | CERN | China | Croatia | Cyprus | Estonia | Finland | France-CEA | France-IN2P3 | Germany | Greece | Hungary | India | Italy | Korea | Pakistan | Poland | Portugal | Spain | Switzerland-ETHZ | Switzerland-PSI | Taipei | Turkey | United Kingdom | USA-DOE | USA-NSF | |
| | 1.3. Coil | 1.3.01.A Superconducting Strands | 6 | | | | | | | | | | | | | | | | | | | | | | | | | | 4,036 | | 4,036 |
| | | 1.3.01.C Cabling Strands into Rutherford Cable | 1 | | | | | | | | | | | | | | | | | | | | | 978 | | | | | | | 978 |
| | | 1.3.01.D Pure Aluminium (99.998 %) | 11 | | | | | | | | | | | | | | | | | | | | | | | | | | 1,255 | | 1,255 |
| | | 1.3.01.E Co-extrusion of Insert | 42 | | | | | | | | | | | | | | | | | | | | | 3,474 | | | | | | | 3,474 |
| | | 1.3.01.F Strands for Tests and Prototypes | | | | | | | | | | | | | | | | | | | | | | 322 | | | | | | | 322 |
| | | 1.3.02.A Alloy for Reinforcement | 198 | | | | 19 | | | | | | | | | | | | | | | | | | | | | | 1,072 | | 1,091 |
| | | 1.3.02.B EB Welding Reinforcement | 123 | | | | 17 | | | | | | | | | | | | | | | | | 7,372 | | | | | | | 7,389 |
| | | 1.3.03 Conductor - Quality Assurance | 432 | | | | 2 | | | | | | | | | | | | | | | | | 3,932 | | | | | | | 3,934 |
| | | 1.3.04 Module Assembly, Swiveling Tooling | 383 | | | | | | | | | | | | | | | 17,300 | 815 | | | | | | | | | | | | 18,115 |
| | | 1.3.05 Process Qualification and QA Winding | 320 | | | | 97 | | | | | | | | | | | | | | | | | | | | | | | | 97 |
| | | 1.3.06 Thermal Shields | 737 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.07 Cold Supports | 838 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.08 He Circuits | 871 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.09 Cold Mass Instrumentation | 223 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.10 Vacuum System | 241 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.11 Power Supply and Bus Bar | 1,504 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.12 Dump Resistor | 660 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.13 Magnet Safety System | 376 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.14 Magnet Control System | 111 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.15 He Refrigeration External Plant | 7,071 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.16 Components Testing | 545 | | | | 5 | | | | | | | | | | | | | | | | | | | | | | | | 5 |
| | | 1.3.17 Coil Assembly | 961 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.18 Coil Surface Tests | 210 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.19 Studies and Supervision | 10,327 | | | | | | | | | | 830 | | | | | | | | | | | | | | | | | | 830 |
| | | 1.3.20 Consumables | 246 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.21 Coil Transfer into Underground Cavern | 568 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.3.22 Implantation and Integration | 206 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | *1.3. Coil Total* | | 27,211 | | | | 139 | | | | | | 830 | | | | | 17,300 | 815 | | | | | 16,078 | | | | | 6,363 | | 41,525 |
| | 1.4. Magnet Installation | 1.4.01 2'200 t Crane Rental | 251 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.4.02 Rigging Equipment | 295 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.4.03 SX Infrastructure | 307 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 1.4.05 Field Mapping | 15 | | | | | | | | | | | | | | | | | | | | | | | | | | 602 | | 602 |
| | *1.4. Magnet Installation Total* | | 868 | | | | | | | | | | | | | | | | | | | | | | | | | | 602 | | 602 |
| *Expense Total* | | | 40,445 | | 1,163 | 1,572 | 16,908 | 1,215 | 87 | 200 | 112 | 1,480 | 2,590 | 6,300 | 5,441 | 1,010 | 328 | 1,078 | 17,300 | 815 | 625 | 940 | 650 | 2,140 | 23,210 | 2,610 | 866 | 343 | 2,857 | 26,374 | 2,852 | 121,066 |
| *Funding* | | | | | 1,240 | 1,645 | 16,908 | 1,215 | 129 | 235 | 112 | 1,770 | 3,447 | 6,300 | 5,440 | 1,480 | 368 | 1,000 | 17,300 | 815 | 625 | 940 | 730 | 2,140 | 25,000 | 2,610 | 866 | 368 | 2,857 | 26,527 | 2,852 | 124,919 |

| System | 2. Tracker |
|---|---|

**Payments**

| | | | | Funding Agency | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **CF** | **Contributing** | | | | | | | | | | | | **Contributing Total** |
| Type | Subsystem | Item | | | **Austria** | **Belgium** | **CERN** | **Finland** | **France-IN2P3** | **Germany** | **Italy** | **Switzerland-PSI** | **Switzerland-Universities** | **United Kingdom** | **USA-DOE** | **USA-NSF** | |
| Expense | 2.1. Pixel Detectors | 2.1.01 Detectors (incl. Pre-series) | | | | | | | | | | | 473 | | 110 | 100 | 683 |
| | | 2.1.02 Electronics (include. Engineering) | | | | | | | | | | 481 | 1,064 | | 154 | 135 | 1,834 |
| | | 2.1.03 Module Mechanics | | | | | | | | | | 531 | | | 45 | | 576 |
| | | 2.1.04 Support Structures & Assembly | | | | | | | | | | 10 | | | 115 | | 125 |
| | | 2.1.05 Monitoring | | | | | | | | | | 11 | | | 11 | | 22 |
| | | 2.1.06 Service Systems | | | | | | | | | | | 160 | | 128 | | 288 |
| | *2.1. Pixel Detectors Total* | | | | | | | | | | | 1,033 | 1,697 | | 563 | 235 | 3,528 |
| | 2.2. Silicon Detectors | 2.2.01 Procurement of Sensors | | | 522 | 645 | 5,361 | 500 | 2,734 | 2,636 | 5,223 | | | | | | 17,620 |
| | | 2.2.02 Capton | | | | | 194 | | | 322 | 87 | | | | | | 603 |
| | | 2.2.03 Frames | | | | 1,546 | | | | 214 | | | | | | | 1,760 |
| | | 2.2.04 Pitch Adapters | | | | 776 | 686 | | | | | | | | | | 1,462 |
| | | 2.2.05 FE Hybrid | | | | | 506 | | 1,497 | 11 | | | | | | | 2,014 |
| | | 2.2.07 Tooling and Box | | | | 41 | | | 55 | | 211 | | | | | | 307 |
| | | 2.2.08 Interconnect Board | | | | | 451 | | | 472 | 511 | | | | | | 1,435 |
| | | 2.2.09 Module Preseries | | | 49 | 304 | | | 75 | 349 | 205 | | | | | | 982 |
| | *2.2. Silicon Detectors Total* | | | | 571 | 3,311 | 7,199 | 500 | 4,361 | 4,004 | 6,236 | | | | | | 26,183 |
| | 2.3. Electronics for Si Detectors | 2.3.01 Module Electronics | | | | | 342 | | | | 1,204 | | | 916 | | | 2,461 |
| | | 2.3.02 Analogue Link | | | | | 3,968 | | 1,416 | 1,308 | 4,718 | | | 400 | | | 11,810 |
| | | 2.3.03 Digital Link | | | | | 0 | | | | | | | | | | 0 |
| | | 2.3.04 Analogue Optohybrid | | | 533 | | | | | | 277 | | | | | | 810 |
| | | 2.3.05 Digital Optohybrid | | | | | 80 | | | | | | | | | | 80 |
| | | 2.3.06 FED | | | | | 516 | 220 | | | | | 500 | 1,449 | | | 2,685 |
| | | 2.3.08 FEC | | | | | 98 | | | | | | | | | | 98 |
| | *2.3. Electronics for Si Detectors Total* | | | | 533 | | 5,003 | 220 | 1,416 | 1,308 | 6,199 | | 500 | 2,765 | | | 17,943 |
| | 2.4. Power Supplies for Si Detectors | 2.4.01 Power Supplies | | | | | 493 | | | | 2,099 | | | | | | 2,592 |
| | | 2.4.02 Cables (installed) | | | | | 286 | | | 35 | 198 | | | | | | 518 |
| | *2.4. Power Supplies for Si Detectors Total* | | | | | | 778 | | | 35 | 2,297 | | | | | | 3,110 |
| | 2.5. Mech. Struct. & Cooling for Si Detectors | 2.5.01 Inner Barrel | | | | | | | | | 1,033 | | | | | | 1,033 |
| | | 2.5.02 Inner Endcap | | | | | | | | | 358 | | | | | | 358 |
| | | 2.5.03 Outer Barrel | | | | | 22 | 409 | | | | | | | | | 430 |
| | | 2.5.04 Outer Barrel Rods | | | | | | 1,220 | | | | | | | | | 1,220 |
| | | 2.5.05 Endcaps | | | | | | | 450 | 648 | | | | | | | 1,098 |
| | | 2.5.06 Endcaps Petals | | | | 99 | | | | 841 | | | | | | | 939 |
| | | 2.5.07 General Cooling | | | | | 1,593 | | | | | | | | | | 1,593 |
| | | 2.5.08 Integration (st, ts, etc.) | | | | | 850 | | | 59 | | | | | | | 909 |
| | *2.5. Mech. Struct. & Cooling for Si Detectors Total* | | | | | 99 | 2,464 | 1,629 | 450 | 1,548 | 1,391 | | | | | | 7,581 |
| | 2.6. Monitoring for Si Detectors | 2.6.01 Position Monitoring Systems | | | | | | | | 338 | | | | | | | 338 |
| | | 2.6.02 Temperature Control | | | | | 362 | | | | | | | | | | 362 |
| | *2.6. Monitoring for Si Detectors Total* | | | | | | 362 | | | 338 | | | | | | | 700 |
| | 2.7. Data Acquisition for Si Detectors | 2.7.01 Test Stands | | | | 100 | | | 80 | 492 | 396 | | | | | | 1,068 |
| | *2.7. Data Acquisition for Si Detectors Total* | | | | | 100 | | | 80 | 492 | 396 | | | | | | 1,068 |
| | 2.8. Installation of Si Detectors | 2.8.01 Installation Manpower | | | | | 123 | | | | | | | | | | 123 |
| | *2.8. Installation of Si Detectors Total* | | | | | | 123 | | | | | | | | | | 123 |
| | 2.9. Integration Facilities | 2.9.01 Clean Room | 740 | | | | | | | | | | | | | | |
| | | 2.9.02 Integration Manpower | 101 | | | | | | | | | | | | | | |
| | *2.9. Integration Facilities Total* | | 841 | | | | | | | | | | | | | | |
| *Expense Total* | | | 841 | 1,104 | 3,510 | 15,930 | 2,349 | 6,307 | 7,725 | 16,519 | 1,033 | 2,197 | 2,765 | 563 | 235 | | 60,236 |
| *Funding* | | | | 1,810 | 3,990 | 17,700 | 3,280 | 7,950 | 8,820 | 24,300 | 3,600 | 2,500 | 2,700 | 2,730 | 990 | | 80,370 |

| System | 3. ECAL |
|---|---|

**Payments**

| | | | Funding Agency | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Contributing** | | | | | | | | | | | | | | | | | | **Contributing Total** |
| Type | Subsystem | Item | **CERN** | **Croatia** | **Cyprus** | **France-CEA** | **France-IN2P3** | **Greece** | **India** | **Italy** | **Portugal** | **RDMS-DMS** | **RDMS-Russia** | **Serbia** | **Switzerland-ETHZ** | **Switzerland-PSI** | **Taipei** | **United Kingdom** | **USA-DOE** | **USA-NSF** | |
| Expense | 3.1. Barrel | 3.1.1 Crystals | 24,088 | | 5 | | 250 | | | 776 | | | | | 8,821 | | | 4 | | | 33,944 |
| | | 3.1.2 Electronics | 264 | 175 | 231 | 304 | 2,764 | | | 1,351 | 664 | | | 44 | 2,428 | 1,720 | | | 2,661 | 4,202 | 16,809 |
| | | 3.1.3 Mechanics | 1,035 | | | | 3,162 | | | 1,123 | | | | | 2,743 | | | | | | 8,063 |
| | | 3.1.4 Assembly and Installation | 1,114 | | | | | | | 68 | | | | | 1,126 | | | | | | 2,308 |
| | | 3.1.5 Monitoring | | | | 1,613 | | | | | | | | | | | | | 837 | | 2,450 |
| | *3.1. Barrel Total* | | 26,501 | 175 | 236 | 1,917 | 6,176 | | | 3,318 | 664 | | | 44 | 15,118 | 1,720 | | 4 | 3,498 | 4,202 | 63,575 |
| | 3.2. Endcaps | 3.2.1 Crystals | 844 | | | | | | | | | | 27 | | 610 | | | 72 | | | 1,552 |
| | | 3.2.2 Electronics | 124 | | 40 | | 318 | | | | 240 | | 19 | 12 | 654 | | | 890 | 215 | 54 | 2,567 |
| | | 3.2.3 Mechanics | | | | | | | | | | | 1,560 | | | | | 1,762 | | | 3,322 |
| | | 3.2.4 Assembly and Installation | | | | | | | | | | | | | 193 | | | | | | 193 |
| | | 3.2.5 Monitoring | | | | 390 | | | | | | | 13 | | | | | | | | 403 |
| | | 3.2.6 Preshower | 2,015 | | | | | 56 | 468 | | | 80 | 645 | | | | 755 | | | | 4,018 |
| | *3.2. Endcaps Total* | | 2,982 | | 40 | 390 | 318 | 56 | 468 | | 240 | 80 | 2,263 | 12 | 1,457 | | 755 | 2,724 | 215 | 54 | 12,055 |
| *Expense Total* | | | 29,484 | 175 | 276 | 2,308 | 6,494 | 56 | 468 | 3,318 | 904 | 80 | 2,263 | 56 | 16,575 | 1,720 | 755 | 2,728 | 3,713 | 4,257 | 75,629 |
| *Funding* | | | 22,700 | 200 | 471 | 3,121 | 9,250 | 1,360 | 1,500 | 5,100 | 1,315 | 100 | 10,947 | 50 | 47,900 | 1,720 | 1,874 | 4,711 | 13,246 | 2,015 | 127,580 |

| System | 4. HCAL |
|---|---|

**Payments**

| | | | Contributing | | | | | | | | Contributing Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Funding Agency | | | | | | | | |
| Type | Subsystem | Item | Hungary | India | Iran | RDMS-DMS | RDMS-Russia | Turkey | USA-DOE | USA-NSF | |
| Expense | 4.1. Barrel | 4.1.01 Mechanics | | | | | | | 12,162 | | 12,162 |
| | | 4.1.02 Optics | | | | | | | 2,417 | 194 | 2,611 |
| | | 4.1.03 Read-out Boxes | | | | | | | 412 | 121 | 533 |
| | | 4.1.04 Photodetectors | | | | | | | 471 | 1,690 | 2,162 |
| | | 4.1.05 Front-end Electronics | | | | | | | 1,618 | 497 | 2,114 |
| | | 4.1.06 Calibration Systems | | | | | | | 334 | 11 | 344 |
| | | 4.1.07 Trigger/DAQ Electronics | | | | | | | 1,017 | 791 | 1,808 |
| | | 4.1.08 Voltage Supply Systems | | | | | | | 151 | 126 | 277 |
| | | 4.1.09 Detector Control Systems | | | | | | | 162 | | 162 |
| | | 4.1.10 Pre-production Prototypes | | | | | | | 2,141 | 61 | 2,202 |
| | *4.1. Barrel Total* | | | | | | | | 20,885 | 3,489 | 24,375 |
| | 4.2. Outer Barrel | 4.2.01 Mechanics | | 184 | | | | | | | 184 |
| | | 4.2.02 Optics | | 1,761 | | | | | 33 | 14 | 1,808 |
| | | 4.2.03 Read-out Boxes | | | | | | | 138 | 139 | 277 |
| | | 4.2.04 Photodetectors | | 98 | | | | | 154 | | 252 |
| | | 4.2.05 Front-end Electronics | | | | | | | 24 | 38 | 62 |
| | | 4.2.06 Calibration Systems | | | | | | | 50 | | 50 |
| | | 4.2.07 Trigger/DAQ Electronics | | | | | | | 155 | 263 | 418 |
| | | 4.2.08 Voltage Supply Systems | | | | | | | 0 | 64 | 64 |
| | | 4.2.09 Detector Control Systems | | | | | | | 2 | | 2 |
| | | 4.2.10 Pre-production Prototypes | | 160 | | | | | 9 | 6 | 174 |
| | *4.2. Outer Barrel Total* | | | 2,203 | | | | | 565 | 524 | 3,292 |
| | 4.3. Endcap | 4.3.01 Mechanics | | | | 5,240 | 2,693 | | | 1,289 | 9,222 |
| | | 4.3.02 Optics | | | | 150 | 624 | | 405 | 170 | 1,349 |
| | | 4.3.03 Read-out Boxes | | | | | | | 125 | 96 | 221 |
| | | 4.3.04 Photodetectors | | | | | | | 70 | | 70 |
| | | 4.3.05 Front-end Electronics | | | | | | | 12 | 81 | 93 |
| | | 4.3.06 Calibration Systems | | | | | | | 261 | | 261 |
| | | 4.3.07 Trigger/DAQ Electronics | | | | | | | 80 | 445 | 526 |
| | | 4.3.08 Voltage Supply Systems | | | | | | | 0 | 90 | 90 |
| | | 4.3.10 Pre-production Prototypes | | | | 325 | 200 | | 35 | 4 | 564 |
| | *4.3. Endcap Total* | | | | | 5,715 | 3,517 | | 988 | 2,176 | 12,396 |
| | 4.5. Forward | 4.5.01 Mechanics | | | 510 | | 1,856 | 677 | 8 | | 3,051 |
| | | 4.5.02 Optics | 477 | | | | | | 2,049 | | 2,526 |
| | | 4.5.03 Read-out Boxes | | | | | | | 91 | | 91 |
| | | 4.5.04 Photodetectors | | | | | | | 791 | | 791 |
| | | 4.5.05 Front-end Electronics | | | | | | | 81 | 135 | 216 |
| | | 4.5.06 Calibration Systems | | | | | 42 | | 311 | | 353 |
| | | 4.5.07 Trigger/DAQ Electronics | | | | | | | 39 | 224 | 263 |
| | | 4.5.08 Voltage Supply Systems | | | | | | | 103 | | 103 |
| | | 4.5.09 Detector Control Systems | | | | | | | 5 | | 5 |
| | | 4.5.10 Pre-production Prototypes | 14 | | | | 230 | 13 | 469 | | 726 |
| | *4.5. Forward Total* | | 491 | | 510 | | 2,128 | 690 | 3,946 | 360 | 8,124 |
| *Expense Total* | | | 491 | 2,203 | 510 | 5,715 | 5,645 | 690 | 26,385 | 6,549 | 48,187 |
| *Funding* | | | 500 | 2,500 | 510 | 5,715 | 5,701 | 690 | 26,698 | 7,380 | 49,694 |

| System | 5. Muon Detector |
|---|---|

**Payments**

| | | | | Funding Agency | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **CF** | **Contributing** | | | | | | | | | | | | | | **Contributing Total** |
| Type | Subsystem | Item | | | **Austria** | **Bulgaria** | **CERN** | **China** | **Germany** | **Hungary** | **Italy** | **Korea** | **Pakistan** | **RDMS-DMS** | **RDMS-Russia** | **Spain** | **USA-DOE** | **USA-NSF** | |
| Expense | 5.1. Barrel Drifttubes | 5.1.1 Detectors and Components | | | | | | | 2,518 | | 5,894 | | | | | 1,972 | | | 10,384 |
| | | 5.1.2 Electronics | | | | | 853 | 385 | 2,621 | | 7,077 | | | | | 1,761 | | | 12,697 |
| | | 5.1.3 Mechanical Structure and Supports | | | | | | 150 | 186 | | 520 | | | | | 152 | | | 1,008 |
| | | 5.1.4 Assembly and Installation | | | | | | | 84 | | 214 | | | | | 76 | | | 374 |
| | | 5.1.6 Service Systems | | | | | 315 | | 542 | | 299 | | | | | 105 | | | 1,261 |
| | *5.1. Barrel Drifttubes Total* | | | | | | 1,168 | 535 | 5,950 | | 14,004 | | | | | 4,066 | | | 25,723 |
| | 5.2. Forward ME 1/1 | 5.2.1 Detectors and Components | | | | | | | | | | | | 80 | 1,685 | | | | 1,765 |
| | | 5.2.2 Electronics | | | | | | | | | | | | 700 | 121 | | 1,781 | 600 | 3,202 |
| | | 5.2.3 Mechanical Structure, Supports | | | | | | | | | | | | | 210 | | | | 210 |
| | | 5.2.4 Assembly and Installation | | | | | | | | | | | | 170 | 155 | | | | 325 |
| | | 5.2.5 Monitoring | | | | | | | | | | | | 50 | | | | | 50 |
| | | 5.2.6 Service Systems | | | | | | | | | | | | | 100 | | | | 100 |
| | *5.2. Forward ME 1/1 Total* | | | | | | | | | | | | | 1,000 | 2,271 | | 1,781 | 600 | 5,652 |
| | 5.3. Endcap CSC | 5.3.1 Detectors and Components | | | | | | 1,500 | | | | | | | 1,400 | | 8,855 | | 11,755 |
| | | 5.3.2 Electronics | | | | | | | | | | | | | | | 11,361 | 674 | 12,034 |
| | | 5.3.3 Mechanical Structure and Supports | | | | | | | | | | | | | | | 430 | | 430 |
| | | 5.3.4 Assembly and Installation | | | | | | | | | | | | | | | 260 | | 260 |
| | | 5.3.5 Monitoring | | | | | | | | | | | | | | | 323 | | 323 |
| | | 5.3.6 Service Systems | | | | | | | | | | | | | | | 1,183 | | 1,183 |
| | *5.3. Endcap CSC Total* | | | | | | | 1,500 | | | | | | | 1,400 | | 22,411 | 674 | 25,985 |
| | 5.4. Barrel RPC | 5.4.1 Detectors and Components | | | | 600 | | 320 | | | 2,582 | | | | | | | | 3,502 |
| | | 5.4.2 Electronics | | | | | | | | | 1,868 | | | | | | | | 1,868 |
| | | 5.4.3 Mechanical Structure and Supports | | | | | | | | | 100 | | | | | | | | 100 |
| | | 5.4.4 Assembly and Installation | | | | | | 20 | | | 40 | | | | | | | | 60 |
| | | 5.4.5 Monitoring | | | | | | | | | 30 | | | | | | | | 30 |
| | | 5.4.6 Service Systems | | 245 | | | | | | | 573 | | | | | | | | 573 |
| | *5.4. Barrel RPC Total* | | | 245 | | 600 | | 340 | | | 5,193 | | | | | | | | 6,133 |
| | 5.5. Forward RPC | 5.5.1 Detectors and Components | | 560 | | | | | | | | 400 | 190 | | | | | | 590 |
| | | 5.5.2 Electronics | | 10 | | | | | | | | 0 | 300 | | | | | | 300 |
| | | 5.5.3 Mechanical Structure and Supports | | | | | | | | | | 0 | | | | | | | 0 |
| | | 5.5.4 Assembly and Installation | | 192 | | | | | | | | | 120 | | | | | | 120 |
| | | 5.5.6 Service Systems | | 340 | | | | | | | | | | | | | | | |
| | *5.5. Forward RPC Total* | | | 1,102 | | | | | | | | 400 | 610 | | | | | | 1,010 |
| | 5.6. Alignment | 5.6.1 Barrel | | | 43 | | 959 | | | 55 | | | | | | | | | 1,057 |
| | | 5.6.2 Forward | | | | | | | | | | | | | | 78 | 203 | 838 | 1,119 |
| | | 5.6.3 Link | | | | | | | | | | | | | | 1,024 | | | 1,024 |
| | *5.6. Alignment Total* | | | | 43 | | 959 | | | 55 | | | | | | 1,102 | 203 | 838 | 3,201 |
| *Expense Total* | | | | 1,347 | 43 | 600 | 2,128 | 2,375 | 5,950 | 55 | 19,197 | 400 | 610 | 1,000 | 3,671 | 5,168 | 24,395 | 2,112 | 67,704 |
| *Funding* | | | | 1,485 | 50 | 600 | 2,300 | 3,100 | 5,806 | 100 | 19,827 | 500 | 1,820 | 1,000 | 3,810 | 5,560 | 24,395 | 2,112 | 70,980 |

| System | 6. Trigger-DAQ |
|---|---|

**Payments**

| | | | | Funding Agency | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | CF | Contributing | | | | | | | | | | | | | | | Contributing Total | Grand Total |
| Type | Subsystem | Item | | Austria | CERN | Finland | France-CEA | Greece | Hungary | Italy | Korea | Poland | Portugal | Switzerland-ETHZ | Switzerland-PSI | United Kingdom | USA-DOE | | |
| Expense | 6.1. Trigger | 6.1.1 Calorimeter Trigger | | | | | | | | | | | | | | 122 | 4,382 | 4,504 | 4,504 |
| | | 6.1.2 CSC Trigger | | | | | | | | | | | | | | | 1,683 | 1,683 | 1,683 |
| | | 6.1.3 DT Trigger | | 504 | | | | | | | | | | | | | | 504 | 504 |
| | | 6.1.4 RPC Trigger | | | | 571 | | | | | | 741 | | | | | | 1,312 | 1,312 |
| | | 6.1.5 Global Trigger | | 262 | | | | | | | | | | | | | | 262 | 262 |
| | *6.1. Trigger Total* | | | 766 | | 571 | | | | | | 741 | | | | 122 | 6,065 | 8,264 | 8,264 |
| | 6.2. Data Acquisition | 6.2.1 Event Filter | 2,000 | | | | | | | | | | | | | | | | 2,000 |
| | | 6.2.2 Readout Builder | | | 5 | | | | | | | | | | | | | 5 | 5 |
| | | 6.2.3 Data to Surface | | | 1,217 | | | | | | | | | | | | 2,370 | 3,587 | 3,587 |
| | | 6.2.5 Preseries | | | 246 | | | | | | | | | | | | 600 | 846 | 846 |
| | | 6.2.6 DAQ Integration | | | 122 | | | | | | | | | | | | | 122 | 122 |
| | *6.2. Data Acquisition Total* | | 2,000 | | 1,590 | | | | | | | | | | | | 2,970 | 4,560 | 6,560 |
| *Expense Total* | | | 2,000 | 766 | 1,590 | 571 | | | | | | 741 | | | | 122 | 9,035 | 12,825 | 14,825 |
| *Funding* | | | | 1,300 | 7,470 | 1,020 | 840 | 2,060 | 90 | 100 | 500 | 2,060 | 255 | 2,000 | 500 | 850 | 9,515 | 28,560 | 28,560 |

| System | 7. Offline Computing |
|---|---|

**Payments**

| | | | | Funding Agency | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **CF** | **Contributing** | | | | | | | | | | | | | | | **Contributing Total** |
| Type | Subsystem | Item | | | **Austria** | **Belgium** | **CERN** | **Finland** | **France-IN2P3** | **Germany** | **Greece** | **Italy** | **Spain** | **Switzerland-ETHZ** | **Switzerland-PSI** | **United Kingdom** | **USA-NSF** | |
| Expense | 7.0. Offline Common Fund | 7.0.1 MoU | | | 100 | 100 | 200 | 100 | 160 | 200 | 60 | 500 | 100 | 246 | | 200 | 1,130 | 3,096 |
| | *7.0. Offline Common Fund Total* | | | | 100 | 100 | 200 | 100 | 160 | 200 | 60 | 500 | 100 | 246 | | 200 | 1,130 | 3,096 |
| | 7.1. Offline Infrastructure | 7.1.1 File Servers | 736 | | | | | | | | | | | | 35 | | | 35 |
| | | 7.1.2 Information Servers | 105 | | | | | | | | | | | | | | | |
| | | 7.1.3 Computing Power | 185 | | | | | | | | | | | 104 | 35 | | | 139 |
| | | 7.1.4 Spares | 20 | | | | | | | | | | | | | | | |
| | | 7.1.5 System Assembly | 84 | | | | | | | | | | | | | | | |
| | | 7.1.6 Software Licenses | 79 | | | | | | | | | | | | | | | |
| | | 7.1.7 System Management | 816 | | | | | | | | | | | | | | | |
| | *7.1. Offline Infrastructure Total* | | 2,025 | | | | | | | | | | | 104 | 70 | | | 174 |
| *Expense Total* | | | 2,025 | | 100 | 100 | 200 | 100 | 160 | 200 | 60 | 500 | 100 | 350 | 70 | 200 | 1,130 | 3,270 |
| *Funding* | | | | | 100 | 100 | 200 | 100 | 200 | 200 | 100 | 500 | 100 | 600 | 70 | 200 | 1,130 | 3,600 |

| System | 8. Infrastructure |
|---|---|

**Payments**

| | | | Funding Agency | | | | |
|---|---|---|---|---|---|---|---|
| | | | **Contributing** | | | | **Contributing Total** |
| Type | Subsystem | Item | **CERN** | **Iran** | **RDMS-Russia** | **USA-DOE** | |
| Expense | 8.1. Access and Survey | 8.1.1 Gangways, Stairs | 1,788 | | | | 1,788 |
| | | 8.1.2 Structures on Yoke | 906 | | | | 906 |
| | | 8.1.3 Personnel Access Equipment | 793 | | | | 793 |
| | | 8.1.4 General Survey | 376 | | | | 376 |
| | *8.1. Access and Survey Total* | | 3,864 | | | | 3,864 |
| | 8.2. General Installation | 8.2.1 Counting Room Structures | 251 | | | | 251 |
| | | 8.2.2 Racks with Cooling | 266 | | | | 266 |
| | | 8.2.3 Electrical Distribution from Outlets | 1,273 | | | | 1,273 |
| | | 8.2.4 Gas Systems and Primary Distribution Racks | 886 | | | | 886 |
| | | 8.2.5 Beam Pipe | 166 | | | | 166 |
| | | 8.2.6 Cable Trays to Counting Rooms | 161 | | | | 161 |
| | | 8.2.7 Control Room and Cabling to Surface | 13 | | | | 13 |
| | | 8.2.8 General Piping | 169 | | | | 169 |
| | *8.2. General Installation Total* | | 3,186 | | | | 3,186 |
| | 8.3. Cooling and Ventilation | 8.3.1 Detector Cooling Plant | 1,056 | | | | 1,056 |
| | | 8.3.2 Detector Specific Ventilation | 165 | | | | 165 |
| | | 8.3.3 Detector Primary Cooling System | 204 | | | | 204 |
| | *8.3. Cooling and Ventilation Total* | | 1,425 | | | | 1,425 |
| | 8.4. Safety | 8.4.1 Safety Installations | 367 | | | | 367 |
| | | 8.4.2 Safety Equipment Control | 202 | | | | 202 |
| | | 8.4.3 Hard-wired Safety System | 8 | | | | 8 |
| | | 8.4.4 Inertion System | 66 | | | | 66 |
| | *8.4. Safety Total* | | 642 | | | | 642 |
| | 8.5. Fixed Cranes | 8.5.1 80 ton /100 m | 857 | | | | 857 |
| | | 8.5.2 80 ton /100 m Double Beam System | 1,676 | | | | 1,676 |
| | | 8.5.3 20 ton Crane | 219 | | | | 219 |
| | | 8.5.4 3 ton Lift | 271 | | | | 271 |
| | *8.5. Fixed Cranes Total* | | 3,024 | | | | 3,024 |
| | 8.6. Shielding Systems | 8.6.1 Rotating Shielding | 596 | | 1,476 | | 2,071 |
| | | 8.6.2 Vertical 400 ton Lifting System | 504 | | | | 504 |
| | | 8.6.3 Mechanics and Shielding for Forward HCAL | 1,082 | 700 | | | 1,782 |
| | *8.6. Shielding Systems Total* | | 2,182 | 700 | 1,476 | | 4,357 |
| *Expense Total* | | | 14,322 | 700 | 1,476 | | 16,497 |
| *Funding* | | | 23,955 | 700 | 1,476 | | 26,131 |

System: 9. Commissioning & Integration

**Payments**

| | | | | Funding Agency | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | **CF** | **Contributing** | | | | | | | | | | **Contributing Total** |
| Type | Subsystem | Item | | | **Belgium** | **CERN** | **China** | **France-CEA** | **Germany** | **Korea** | **Portugal** | **RDMS-Russia** | **Serbia** | **Switzerland-Universities** | |
| Expense | 9.0. C&I Common Fund | 9.0.1 CtC | | | 40 | 12,267 | | | 543 | | | | | | 12,850 |
| | *9.0. C&I Common Fund Total* | | | | 40 | 12,267 | | | 543 | | | | | | 12,850 |
| | 9.1. Additional facilities for Commissioning on surface | 9.1.01 Mixed Water Cooling | 931 | | | | | | | | | | | | |
| | | 9.1.02 Gas Distribution | 118 | | | | | | | | | | | | |
| | | 9.1.03 Control Room | 50 | | | | | | | | | | | | |
| | | 9.1.04 Smoke Detection | 57 | | | | | | | | | | | | |
| | | 9.1.05 LV System (1 generator) | 160 | | | | | | | | | | | | |
| | | 9.1.06 20t lifting equipment | 253 | | | | | | | | | | | | |
| | | 9.1.07 Extra Electric & Optical Cabling | 816 | | | | | | | | | | | | |
| | | 9.1.08 Common Electronics | 194 | | | | | | | | | | | | |
| | | 9.1.09 Pre-cabling, pre-testing & related facilities | 1,403 | | | | | | | | | | | | |
| | | 9.1.10 Basic DSS for Equipment Protection | 49 | | | | | | | | | | | | |
| | | 9.1.11 Semi-clean areas | 131 | | | | | | | | | | | | |
| | *9.1. Additional facilities for Commissioning on surface Total* | | 4,163 | | | | | | | | | | | | |
| | 9.2. Detector Installation, Opening and Access Facilities | 9.2.01 Installation and access tooling | 170 | | | | | | | | | | | | |
| | | 9.2.02 Dummy End Flanges (EB, EE, SE) | 206 | | | | | | | | | | | | |
| | | 9.2.03 Magnet Closing System | 769 | | | | | | | | | | 400 | | 400 |
| | | 9.2.04 Control for Magnet and Magnet Power Supply | 35 | | | | | | | | | | | | |
| | | 9.2.05 Beampipe Vacuum Tooling & Support Structure | 16 | | | | | | | | | | | | |
| | | 9.2.06 Floor Plates for UXC | 12 | | | | 500 | | | | | | | | 500 |
| | | 9.2.07 Cherry Pickers & Access Platforms | 149 | | | | | | | | | | | | |
| | *9.2. Detector Installation, Opening and Access Facilities Total* | | 1,356 | | | | 500 | | | | | | 400 | | 900 |
| | 9.3. General Services | 9.3.01 Workshops | 161 | | | | | | | | | | | | |
| | | 9.3.02 Heavy Transport | 681 | | | | | | | | | | | | |
| | | 9.3.03 Survey | 212 | | | | | | | | | | | | |
| | | 9.3.04 Storage Infrastructure | 325 | | | | | | | | | | | | |
| | | 9.3.05 Extra Engineering for Integration of Magnet & Detectors | 620 | | | | | | | | | | | | |
| | | 9.3.06 Technical Support Team | 2,095 | | | | | | | | | | | | |
| | *9.3. General Services Total* | | 4,094 | | | | | | | | | | | | |
| *Expense Total* | | | 9,613 | | 40 | 12,267 | 500 | | 543 | | | | 400 | | 13,750 |
| *Funding* | | | | | 40 | 12,267 | 800 | 324 | 543 | 147 | 140 | 150 | 400 | 200 | 15,011 |

# ANNEX 3

## Summary and Comparison with Cost Estimates (kCHF)
## Expenditure 1995-2005

| Year | 2005 |
|---|---|

| System | Subsystem | Cost Estimate | Payments | Payment % | Commitments | Commitment % |
|---|---|---|---|---|---|---|
| 1. Magnet | 1.1. Barrel Yoke and Vacuum Tank | 34,433 | 35,008 | 102% | 36,821 | 107% |
| | 1.2. Endcap Yokes | 14,615 | 14,376 | 98% | 14,486 | 99% |
| | 1.3. Coil | 70,873 | 68,737 | 97% | 74,433 | 105% |
| | 1.4. Magnet Installation | 6,820 | 1,470 | 22% | 2,899 | 43% |
| *1. Magnet Total* | | 126,741 | 119,590 | 94% | 128,639 | 101% |
| 2. Tracker | 2.1. Pixel Detectors | 8,240 | 3,528 | 43% | 3,528 | 43% |
| | 2.2. Silicon Detectors | 29,284 | 26,183 | 89% | 30,098 | 103% |
| | 2.3. Electronics for Si Detectors | 21,578 | 17,943 | 83% | 21,176 | 98% |
| | 2.4. Power Supplies for Si Detectors | 8,600 | 3,110 | 36% | 5,528 | 64% |
| | 2.5. Mech. Struct. & Cooling for Si Detectors | 9,936 | 7,581 | 76% | 8,230 | 83% |
| | 2.6. Monitoring for Si Detectors | 950 | 700 | 74% | 985 | 104% |
| | 2.7. Data Acquisition for Si Detectors | 1,680 | 1,068 | 64% | 1,302 | 77% |
| | 2.8. Installation of Si Detectors | 1,000 | 123 | 12% | 123 | 12% |
| | 2.9. Integration Facilities | | 841 | | 938 | |
| *2. Tracker Total* | | 81,268 | 61,077 | 75% | 71,906 | 88% |
| 3. ECAL | 3.1. Barrel | 91,962 | 63,575 | 69% | 83,875 | 91% |
| | 3.2. Endcaps | 37,797 | 12,055 | 32% | 21,221 | 56% |
| *3. ECAL Total* | | 129,759 | 75,629 | 58% | 105,095 | 81% |
| 4. HCAL | 4.1. Barrel | 24,166 | 24,375 | 101% | 24,380 | 101% |
| | 4.2. Outer Barrel | 4,116 | 3,292 | 80% | 3,292 | 80% |
| | 4.3. Endcap | 12,896 | 12,396 | 96% | 12,396 | 96% |
| | 4.5. Forward | 8,514 | 8,124 | 95% | 8,124 | 95% |
| *4. HCAL Total* | | 49,692 | 48,187 | 97% | 48,193 | 97% |
| 5. Muon Detector | 5.1. Barrel Drifttubes | 26,545 | 25,723 | 97% | 26,338 | 99% |
| | 5.2. Forward ME 1/1 | 5,691 | 5,652 | 99% | 5,652 | 99% |
| | 5.3. Endcap CSC | 26,085 | 25,985 | 100% | 25,985 | 100% |
| | 5.4. Barrel RPC | 6,910 | 6,378 | 92% | 6,378 | 92% |
| | 5.5. Forward RPC | 3,995 | 2,112 | 53% | 2,206 | 55% |
| | 5.6. Alignment | 3,729 | 3,201 | 86% | 3,201 | 86% |
| *5. Muon Detector Total* | | 72,955 | 69,051 | 95% | 69,760 | 96% |
| 6. Trigger-DAQ | 6.1. Trigger | 11,847 | 8,264 | 70% | 8,264 | 70% |
| | 6.2. Data Acquisition | 25,372 | 6,560 | 26% | 6,984 | 28% |
| *6. Trigger-DAQ Total* | | 37,219 | 14,825 | 40% | 15,249 | 41% |
| 7. Offline Computing | 7.1. Offline Infrastructure | 3,600 | 2,199 | 61% | 2,209 | 61% |
| *7. Offline Computing Total* | | 3,600 | 2,199 | 61% | 2,209 | 61% |
| 8. Infrastructure | 8.1. Access and Survey | 2,765 | 3,864 | 140% | 4,175 | 151% |
| | 8.2. General Installation | 12,330 | 3,186 | 26% | 6,005 | 49% |
| | 8.3. Cooling and Ventilation | 4,200 | 1,425 | 34% | 4,329 | 103% |
| | 8.4. Safety | 1,700 | 642 | 38% | 1,100 | 65% |
| | 8.5. Fixed Cranes | 3,180 | 3,024 | 95% | 3,024 | 95% |
| | 8.6. Shielding Systems | 4,530 | 4,357 | 96% | 4,526 | 100% |
| *8. Infrastructure Total* | | 28,705 | 16,497 | 57% | 23,159 | 81% |
| 9. Commissioning & Integration | 9.1. Additional facilities for Commissioning on surface | 4,160 | 4,163 | 100% | 4,458 | 107% |
| | 9.2. Detector Installation, Opening and Access Facilities | 4,164 | 2,256 | 54% | 2,396 | 58% |
| | 9.3. General Services | 6,900 | 4,094 | 59% | 4,636 | 67% |
| *9. Commissioning & Integration Total* | | 15,224 | 10,513 | 69% | 11,489 | 75% |
| *Grand Total* | | 545,163 | 417,570 | 77% | 475,697 | 87% |

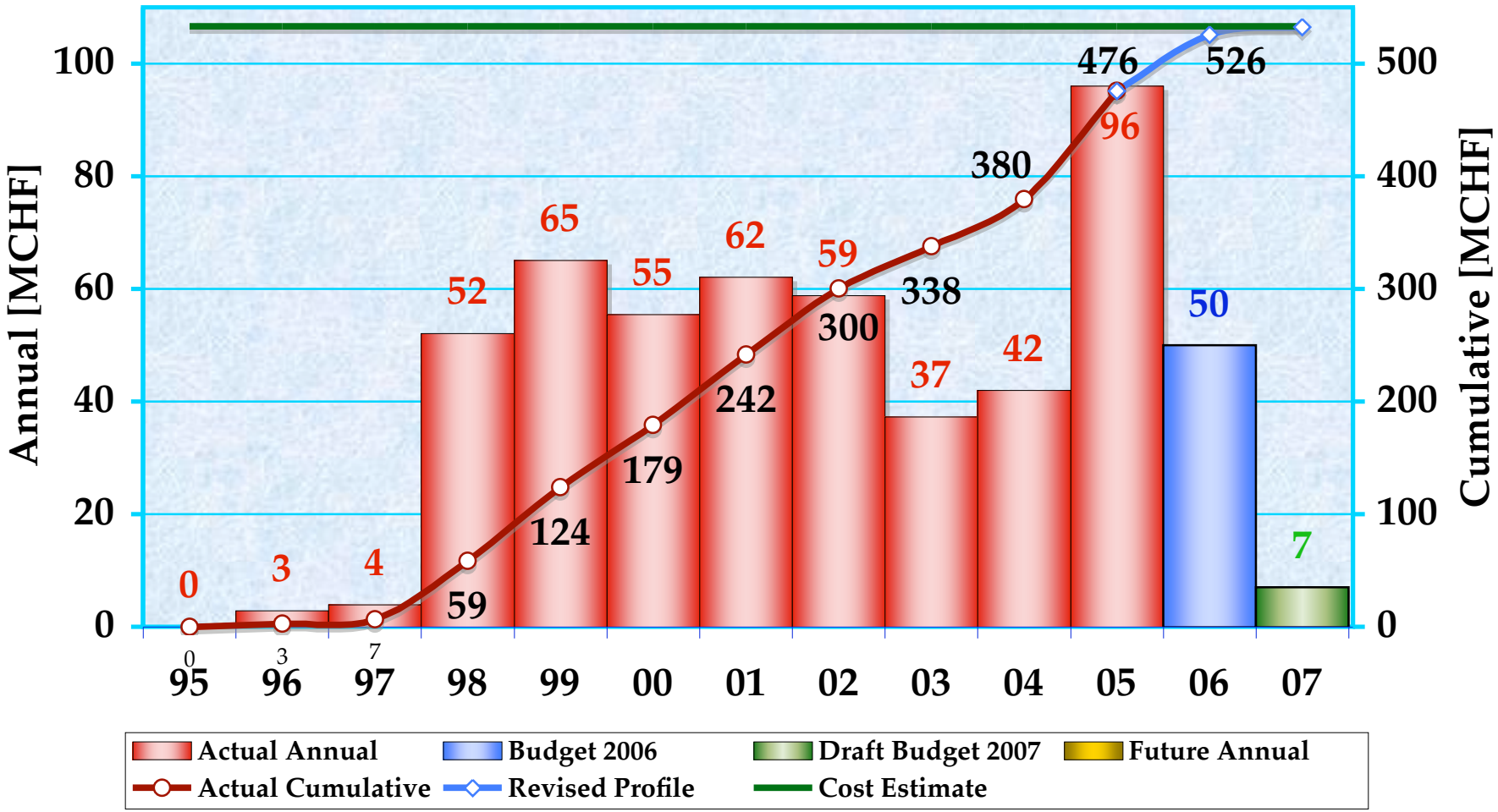
**Notes**

**1. Magnet, 7. Offline Computing, 9. Commissioning & Integration** Reflects Payments and Commitments from the Common Fund and thus differs from the total amounts paid by the Funding Agencies to the Common Fund

**5. Muon Detector** Payments and Commitments include the Common Fund loan and thus differ from the total amounts paid by the Funding Agencies to the Muons detector

# ANNEX 4

## Commitments for CMS Construction



# ANNEX 5

## Payments for CMS Construction