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

Action to be taken		*Voting procedure*
For information	**SCIENTIFIC POLICY COMMITTEE** 266th Meeting **14 June 2010**	—
For recommendation	**FINANCE COMMITTEE** 330th Meeting **16 June 2010**	Simple majority of Member States represented and voting and at least 51% of the contributions of all Member States
For approval	**COUNCIL** 155th Session **18 June 2010**	Simple majority of Member States represented and voting

Annual Progress Report

of the Organization

for the fifty-fifth financial year

2009

GENEVA, May 2010

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I. Executive Summary

When it approved the new CERN governance principles in 2008, the Council introduced the practice of the Annual Progress Report (APR), which is to be presented in March each year and replaces the budget out-turn document. The purpose of the APR is to compare, by activity, the achievements with the objectives agreed by Council and also to compare actual expenses by objective and activity with resources planning.

Dedicated information is provided on scientific progress and publications, core information on human resources and training, and on health and safety. The financial summary tables include the expense breakdown by nature.

This second APR is the first in which specific targets (i.e. those approved by the Council in June 2008 for the year 2009) can be directly compared to the results achieved. Following the LHC incident in September 2008, the Management submitted to the Council in June 2009 a revised set of 2009 targets and budget (CERN/FC/5346), all of which are also reported in this document.

Compared to last year's report, this document includes the additional information requested by Council and its Committees, such as information on scientific publications, education & training, User statistics, quantitative figures, health & safety as well as financial information on the carry-forward and details on the European Union-supported projects.

The main achievements and progress for 2009 can be summarized as follows:

- The highlight of the year was the successful re-start of the LHC with beam on 20th November, and soon after, first collisions delivered to the experiments with centre-of-mass energies of up to 2.36 TeV corresponding to the world record beam energy. The first physics measurements at the LHC of the multiplicity and transverse momenta spectra of minimum bias events at 900 GeV and 2.36 TeV centre-of-mass energies were carried out successfully.

- This success followed the repair of the Sector 3-4 and the resulting LHC consolidation, made necessary by the incident of September 2008. The LHC activities were partitioned in five phases: Sector 3-4 repair, consolidation, hardware commissioning, preparation for beam and beam operation. A key example of the work carried out was the design and construction of the new Quench Protection System (nQPS), supported by scientists from other particle physics laboratories and institutes around the world.

- The re-start of LHC operation demonstrated the readiness of the LHC experiments and computing for data-taking. The injectors were prepared on time and are also ready for the 2010 LHC proton and ion runs.

- Preparations are ongoing for the upgrade of the Tier-0 centre, with several options under study.

- Due to the focus of the technical and scientific staff on the additional work for the repair and re-start of the LHC machine, the studies and projects in the framework of the 2006 new initiatives have been further delayed. Comparison of the revised 2009 budget with the actual 2009 expenditure shows that further delays were accumulated, essentially due to the LHC re-start at the end of November instead of September, as had originally been foreseen.

- Consolidation work was also carried out on the LHC injector chain, which will need to be further enhanced in the future to ensure reliable LHC operation.

- The non-LHC physics programme was highly successful at all facilities - SPS, PS, AD, nTOF, ISOLDE - and at the axion search experiments. The number of protons delivered to fixed-target experiments was at least at the agreed level. The integrated proton flux on the CNGS target was about 10% higher than the target for 2009. The highlights for the physics results include the best world measurement of $K_{e2}/K_{\mu2}$ ratio (0.64%) by NA62; the best laboratory limit on axion search in the mass range 0.02-0.39 eV by CAST; the most precise determination of the a_0 and a_2 scattering lengths from combining Ke4 and Kπ3 data by NA48/2; and evidence for an exotic 1^{-+} state at 1.66 GeV/c^2 in 3π data as well as the helicity density for valence and sea quark distributions by COMPASS. Highlights of the ISOLDE programme include the observation of spin inversion in Ga and Cu isotopes around N=50 as evidence for the tensor interaction, observed in laser spectroscopy experiments made possible by the new radiofrequency cooler and buncher ISCOOL. Furthermore, surprising evidence for beta-delayed asymmetric fission was found in 180Hg, which could have important consequences for the understanding of nucleo-synthesis of heavy elements in stellar explosions.

- More than 50 scientific publications were submitted to international journals by the LHC experiments, including the first paper reporting LHC collision data. The LHC experiments have also made close to 1,000 presentations at international conferences. For the fixed-target experiments, the corresponding numbers were about 50 publications and 236 conference presentations. The accelerator sector published about 285 papers while the CERN information technology groups made about 140 presentations at international conferences.

- Around 450 paid visitors came to the Theoretical Physics Unit for periods of one to two weeks to collaborate with theoretical physicists and with the experiments. The Unit published about 300 scientific papers in international journals.

- In order to promote scientific diversity, CERN organized two workshops in 2009: a) New Opportunities in the Physics Landscape at CERN and b) The European Strategy for Future Neutrino Physics, the latter being organized with the SPC Neutrino Panel. The scientific initiatives from these workshops are being followed up by the corresponding scientific committees and the Research Board.

- The CLIC Test Facility (CTF3) was completed and the installation of the Test Beam Line in the CLIC Experimental Area (CLEX) is well underway. Preparation of the Conceptual Design Report is progressing well and is scheduled to be submitted at the end of 2010. Management also launched the start of the Linear Collider Detector R&D and this activity is advancing well.

- The incoming Management introduced an extensive programme aimed at consolidation of the general infrastructure, with enhanced support to staff and Users as its main objective. A global survey of Staff and Users was launched to identify the areas related to logistics, services and infrastructure where improvements were needed in order to set priorities and develop solutions. Work started in 2009 and a number of key services were enhanced. These improvements will continue over the coming years.

- A total of 838 teachers attended the CERN Teacher Programmes, with 688 coming from the Member States and the remainder from 19 Non-member States, and attended either the international programme or one of the many sessions held in a national language. Many teachers returned to CERN with their classes, and this along with the introduction of general public visits on a daily basis resulted in a significant increase in the number of visitors from an average of 25,000 in recent years to more than 40,000 in 2009.

- The LHC start-up was professionally covered through the new CERN public pages. The average daily traffic is about 10,000 individual visitors and on 21 November 2009 this number peaked at 48,484. Visitors during the LHC start-up period were from essentially all countries around the world. Moreover, CERN successfully launched its website intended for the local communities and a specially-designed kids' zone.

- A new contract policy was introduced in August and data collection for the five-yearly review started. Furthermore, Management created the Graduate Engineer Training programme (GET) within the CERN Fellowship status.

- The new e-recruitment initiatives proved very successful, with the number of page views, registrations and received applications being more than double the average outside the LHC start-up period. The most popular staff categories were Technicians, Engineers and Computer Scientists.

- The enhanced mandate of the CERN Knowledge and Technology Transfer (KTT), which now includes the knowledge element, was implemented. KTT reported seven invention disclosures in 2009 compared to five in 2008 and eleven R&D licenses in 2009 against six in 2008.

- Agreements were concluded with several States and institutions, including the following:

    - The Tripartite Agreement between CERN and its Host States on safety regulations was approved by all parties and its signing is imminent.

    - The Memorandum of Understanding between CERN and the European Commission was signed on 17 July 2009, providing a framework for co-operation between the parties in the development of the European Strategy for Particle Physics and the European Research Area.

- The VIP and Protocol Office managed 138 VIP visits to CERN.

- The Medical Service launched a number of successful health campaigns. An extensive plan to handle the H1N1 pandemic was set up in collaboration with the World Health Organization.

- There was a successful end to the LEP arbitration, with no further risk to the Organization for payment of compensation to the LEP civil engineering consortium.

Additional information following the discussions in SPC, FC and comments by the External Auditors

- The SPC suggested some changes to the presentation of the scientific progress, which were submitted to the Management and included in the document.
- Following the suggestions by delegates in SPC and FC, the layout of the figures are improved to better understand the financial variations and references in between the financial figures.
- Some suggestions received from the External Auditors are already taken into consideration in this June version of the Annual Progress Report 2009. This concerns the layout of the figures as well as cross-references in between the various figures. Finally, some more explanation is added to the overview of EU supported activities.

II. Progress Report

Summary of Revenues and Expenses

Figure 1: Summary of Revenues and Expenses

2009 Budget CERN/FC/5304/Rev. (2009 prices)	(in MCHF, rounded off)	2009 Revised Budget CERN/FC/5346 (2009 prices)	2009 Out-Turn CERN/FC/5412 (2009 prices)	Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
(a)		(b)	(c)	(d)=(c)-(a)	(e)=(d)/(a)
1,177.4	**REVENUES** (details figure 10)	**1,185.9**	**1,196.4**	**19.0**	**1.61%**
1,098.6	Member States' contributions	1,098.6	1,098.6		
22.3	Additional contributions from Host States	22.3	18.5	-3.8	-16.99%
12.8	EU contributions	18.6	19.3	6.5	50.74%
43.8	Various	46.4	60.1	16.3	37.15%
879.7	**OPERATING EXPENSES**	**937.7**	**863.4**	**-16.2**	**-1.84%**
252.0	**LHC programme** (figures 2, 3, 12)	**264.0**	**243.5**	**-8.5**	**-3.39%**
156.6	**Other programmes** (figures 4, 5, 12)	**164.1**	**145.7**	**-10.9**	**-6.95%**
349.0	**Infrastructure and services** (figures 6, 13)	**361.5**	**346.6**	**-2.5**	**-0.71%**
122.0	**R&D studies and projects** (figures 7, 8, 14)	**148.1**	**127.7**	**5.7**	**4.67%**
20.9	**OTHER EXPENSES** (details figure 9)	**27.1**	**26.6**	**5.6**	**26.91%**
900.6	**TOTAL EXPENSES**	**964.8**	**890.0**	**-10.6**	**-1.17%**
	BALANCE				
276.8	Annual balance	221.1	306.4	29.6	10.68%
-14.0	Capital repayment allocated to the budget (Fortis, FIPOI 1 and 2)	-14.0	-14.0		
262.8	Annual balance allocated to budget deficit	207.1	292.4	29.6	11.24%
-518.3	**-Cumulative Balance- - 781.1**	**-574.0**	**-488.7**	**29.6**	**-5.70%**
	For information:				
200.0	Capital repayment to EIB	200.0	200.0		

Explanations to Figure 1:

The summary of revenues and expenses as shown in Figure 1 shows higher revenues under the various headings notably stemming from sales and in-kind contributions, partially offset due to other expenses. Due to the focus on the LHC repair, some less expenses than foreseen occurred on other programmes (non-LHC), whereas the initiative for consolidation of both, infrastructure and induced consolidation from the LHC incident, resulted in an increase of the heading “R&D studies and projects”.

More detailed summary figures are given in Figure 9.

Figure 2: LHC Programme: LHC Machine and Injectors

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
LHC Machine and Injectors	**78,540**	**39,255**	**117,795**	**70,985**	**64,810**	**135,795**	**66,339**	**53,760**	**120,098**	**2,303**	**1.96%**
LHC machine and experimental areas	76,495	38,770	115,265	69,615	36,770	106,385	59,619	40,152	99,771	-15,494	-13.44%
Sector 3-4 repair					*27,505*	*27,505*	*4,396*	*10,291*	*14,687*	*14,687*	
Spares							*890*	*3,261*	*4,151*	*4,151*	
LHC injectors (for heavy Ions)	*2,045*	*485*	*2,530*	*1,370*	*535*	*1,905*	*1,434*	*56*	*1,490*	*-1,040*	*-41.09%*

Figure 2 (cont.): LHC Programme: LHC Machine and Injectors

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	LHC Machine and Injectors			
1	LHC Machine and Injectors	Increase luminosity and stabilize operation, ramp up to 14 TeV.	Sector 3-4 repair including consolidation .	Repair Sector 3-4 Replacement of 14 quadrupole magnets and 39 dipole magnets, the repair of 54 electrical interconnections (150 more needing only partial repairs), and the cleaning of over 4 km of vacuum beam tube spoiled by soot, metallic debris and super insulation material. The cleaning and final checks using endoscopic technology (up to 100 m in length) were completed by end of April 2009 allowing for the final closure of the magnet cryostats. This milestone was achieved despite the complexity of the cleaning which required the resources to be doubled to cope with the increased number of cleaning passages required to achieve the appropriate cleanliness level. In total, an equivalent length of 50 km was cleaned at a speed of 300 m (linear)/day/team (8-10 passages and 5 minutes average stay at the RF interconnection positions). The last magnet was lowered on 30 April 2009 and the last interconnection was closed on 17 June 2009 allowing for re-start of the machine commissioning in line with the schedule. The work to re-establish the spare parts inventory was started in parallel with the setting up of the Magnet Facility (started in 2008 and in 2009 the vertical tower for quadrupoles was installed in Building 181, amongst other activities). Magnets that were removed from Sector 3-4 were sorted by seriousness of the damage to allow repair as from the beginning of 2010. Orders have been placed for spare components (bellows, support posts, vacuum chambers, etc.). For consolidation please see achievements under 21a.
			Beam from September 2009.	Recommissioning of LHC During the repair and consolidation of the machine, work continued in the control room to prepare all equipment for operation. Throughout the spring and summer of 2009, system integration tests were scheduled to check out the control of the accelerator components. These “dry-runs” played a crucial part in ensuring that all parts of the machine were ready for first beam. As the sectors of the machine were cooled and powering tests began, the dry-run activities continued. The powering tests themselves were completed in roughly half the time taken in 2008. All the main circuits were commissioned to 2 kA while many of the smaller circuits were commissioned to operate at nominal current. During this phase the nQPS system was fully deployed and tested as a detection system. Specific powering tests were included in the sequence to allow the complete mapping of the superconducting splices. During September and October 2009 the transfer lines were commissioned with beam to the downstream stoppers, and during two weekends sector tests were performed with beam injected into the LHC. Beam commissioning began on 20 November 2009. Circulating beam, captured by the RF system, was achieved for both beams within a few hours of starting. In the days that followed the machine was progressively commissioned. Three days after starting, the first colliding beams at injection energy were provided for the experiments and soon after a beam was accelerated to 1.18 TeV.
			First collisions at the end of October 2009 at 10 TeV.	Operation of LHC During the 26 days of operation, the machine protection and collimation systems were qualified to allow stable physics beams at injection energy and periods of ‘quiet’ beam operation at 2.36 TeV centre-of-mass. The intensity in the machine was also progressively increased. Starting with a single bunch of $2x10^9$ protons and ending with two beams of 16 bunches and a total intensity of $1.9x10^{11}$ protons.

Figure 3: LHC Programme: LHC Detectors and LHC Computing

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
LHC Detectors and Computing	**84,490**	**49,750**	**134,240**	**85,685**	**42,510**	**128,195**	**85,516**	**37,885**	**123,401**	**-10,839**	**-8.07%**
ATLAS detector	22,270	5,140	27,410	22,840	4,055	26,895	22,529	3,523	26,051	-1,359	-4.96%
CMS detector	22,515	3,775	26,290	20,725	3,725	24,450	19,780	3,581	23,361	-2,929	-11.14%
Alice detector	9,595	2,390	11,985	9,630	2,320	11,950	9,228	2,102	11,330	-655	-5.46%
LHCb detector	9,810	2,755	12,565	9,795	2,590	12,385	9,940	2,602	12,542	-23	-0.18%
Common items, other experiments (inc. Totem)	4,485	1,375	5,860	5,970	3,520	9,490	6,547	2,658	9,206	3,346	57.09%
Detectors re-scoping		10,460	10,460		7,185	7,185		8,697	8,697	-1,763	-16.86%
LHC computing	15,815	23,855	39,670	16,725	19,115	35,840	17,492	14,721	32,214	-7,456	-18.80%

Figure 3 (cont.): LHC Programme: LHC Detectors and LHC Computing

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	LHC Detectors and Computing			
2	ATLAS detector	Physics run at initial luminosity and nominal energy.	Detector improvements and repairs, preparing upgrades, cosmic-ray run until start of physics with first collisions.	Excellent performance of the detector and software. The whole detector was operational and recorded 350 million cosmic-ray events before beam start-up and 500k collisions at 900 GeV centre-of-mass energy and about 35k at 2.36 TeV centre-of-mass energy during LHC running in November and December 2009. Thirteen publications submitted to international journals and more than 370 presentations at international conferences in 2009. First papers on LHC collision data are being prepared.
3	CMS detector	Physics run at initial luminosity and nominal energy.	Detector improvements (step 2) and repairs, cosmic-ray run until start of physics with first collisions.	Installation of ECAL Preshower detector and CASTOR Calorimeter completed. All CMS sub-detectors operational and recorded about 522 million cosmic-ray events (about 322 million with magnetic field on and about 200 million with magnetic field off) before beam start-up and about 380k collisions at 900GeV centre-of-mass energy and about 25k events at 2.36 TeV centre-of-mass energy during LHC run. Twenty-three publications submitted to international journals, three publications under preparation with LHC collision data, and 394 presentations given at international conferences in addition to the 110 posters. Water leaks were detected during the summer and emergency repairs have been carried out during the end-of-year break. Repairs on schedule and to be terminated by February 2010 with no impact on LHC restart.
4	Alice detector	Proton-proton physics data-taking. Continuation of installation of detectors (PHOS, TRD, EMCal) and systems (DAQ) during long shutdown.	Continuation of detector completion and preparation for data-taking in October 2009.	Extensive shutdown program of activities were executed according to plan. This included re-cabling of ITS and TPC services on the miniframe, repair of two TRD and one PHOS module, and installation of modules for TRD, PHOS, and EMCAL. Experiment has been operating under stable conditions. About 600 million cosmic-ray events taken for calibration and alignment. All sub-detectors were operational at beam start-up. About 500k collisions recorded at 900 GeV centre-of-mass energy and 30k at 2.36 TeV centre-of-mass energy during LHC running in November 2009. Fourteen publications submitted to international journals. One publication submitted and several more are under preparation with LHC collision data. Ninety presentations given at international conferences and a similar number at national meetings.
5	LHCb detector	Physics run at initial luminosity and nom. energy to explore measurements, where large new physics effects are not excluded, down to the level of Standard Model expectation.	Continuation of detector completion and preparation for data-taking in October 2009.	All subdetectors operational for the initial LHC run in November 2009. About 350K collisions recorded at 900 GeV and 2.36 TeV centre-of-mass energies. Several publications submitted to international journals. A "road map" paper, which includes analysis of six key physics measurements that will be made by the LHCb experiment with early data, was prepared. More than 100 presentations were given at international conferences.
6	Common items, other experiments (inc. Totem and LHCf)	Complete detector installation and commissioning; Global commissioning with all subsystems; Perform the measurements as foreseen.	Compl. of constr. in co-operation with CMS and machine safety system teams; and prep. for data-taking.	The TOTEM Roman Pots at 220m were integrated and the T2 detectors installed inside CMS. Both operational and recorded data during LHC initial running. The calorimeters of both arms of the LHCf detector are operational and first electromagnetic showers have been observed with LHC collisions at LHC intersection Point 1.
	Detectors re-scoping			
7	LHC computing	First extended production run. Need to ensure a certain level of service and capability of withstanding planned and unplanned incidents.	Production run with cosmic rays until first collisions, Implementation of impact of new LHC schedule with long run from end 2009 onwards without shutdown.	During the large-scale computing challenge (STEP'09) in mid-2009, data transfer rates close to 4 GB/s were achieved and Tier-1 sites were able to accept and process the data in excess of required rates. By end 2009 LHC collision data sucessfully collected and distributed by the experiments. Confirmation by end 2009 that LHC Computing Grid is ready for full-scale data taking. In the past two years the existing computer centre has benefitted from the gains in power efficiency of newer computer systems and there has been an aggressive replacement of older computers with such newer machines. This, coupled with the delay in the start of the accelerator have meant that there has been a gain of a year or so in the time when the existing centre will run out of power. In 2009 a decision on the construction of a new Computer Centre at CERN in Prévessin was suspended pending a clearer view of the costs and issues associated with some of the possible alternatives. These include using containers to house computing resources and understanding the possibilities for hosting resources externally to CERN in commercial or private facilities. In addition, the postponement of the decision allows time to gain a better understanding of the long term computing needs of the experiments. However, the limitation on the availability of redundant power is now critical and must be treated urgently. In the light of these considerations, the strategy now is 3-fold. An initial contract with a hosting company will allow to locate 100kW of capacity requiring redundant power. This will ease the most urgent problem and allow to gain some experience in operating machines remotely. Secondly there will be a consolidation of the existing computer centre building infrastructure to provide additional redundant power capacity, possibly up to 600kW total. Finally the use of containers is being investigated at least as stop gap solutions. The final strategy must be decided in 2010.

Figure 4: Other Programmes

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
Other Programmes	**49,245**	**14,655**	**63,900**	**49,030**	**18,220**	**67,250**	**41,375**	**12,918**	**54,294**	**-9,606**	**-15.03%**
Non-LHC physics	4,655	1,270	5,925	3,480	2,990	6,470	3,347	2,455	5,802	-123	-2.08%
Theory	10,325	1,525	11,850	10,320	1,685	12,005	9,647	1,509	11,156	-694	-5.86%
Physics analysis centre	2,995	2,090	5,085	3,825	2,300	6,125	3,956	1,462	5,418	333	6.55%
Scientific support	31,270	9,770	41,040	31,405	11,245	42,650	24,426	7,492	31,918	-9,122	-22.23%

Figure 4 (cont.): Other Programmes

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	Other Programmes			
8	Non-LHC physics	Continuation of data taking according to plan.	Non-LHC diversif. workshop in May and neutrino workshop in September.	New initiatives: follow up of the New Opportunities workshop: 1. HiE-Isolde proposal - approved by RB. 2. ELENA decelerator for AD - all experiments working on plan, and partial support collection from collaborations, RB recognized scientific motivation, more to be discussed in June. 3. Individual experiments LoI and proposals in preparation for scientific committees (SPSC, INTC). 4. Continuation and advancement in discussions on the light ions in SPS (NA61 program). SPS: NA58- Compass: published results on the gluon polarization from open charm and on flavour-separated quark helicity distributions; successful data taking with hadron beams for the spectroscopy programme, analysis in progress. NA61- Shine: 3-month run with hadron beams for T2K and cosmic-ray reference measurements as well as the energy scan with p+p interactions for physics of strong interactions; preparation for the ion runs; preliminary pion spectra for T2K. NA62- (preparation for 2012 run) tests of detectors and electronics, progress in installation in experimental area. NA63- with data taken in 2009 it has successfully completed approved program, addendum for extension for run in 2010 and later was submitted. UA9 - Crystal: promising results for usage of crystals in collimation system after observation of channeling and reflection in data collected during 2009. Experiments finished, but analyzing data and publishing results: NA48, NA49, NA60, Merit. CNGS: CNGS1- Opera: long successful run, data analysis progressing well following the automated emulsion scanning; charm decay events observed; progress in the evaluation of efficiencies and BGs based on real data and improved simulations reported to SPSC; request for beam until 2012 approved by RB. CNGS2 - Icarus: progress in preparation for data taking, detector tested and vacuum of 10-4 reached filling with argon foreseen before startup of CNGS beam in 2010. PS: PS215- Cloud: finished commissioning of the chamber, first data collected. PS212- Dirac: observation of improved signal/background ratio for πK production in 2008 data after commissioning of scintillating fibre tracker and increase of the statistics obtained in 2008 by a factor 1.6. AD: AD running was extended by two weeks in November and was very successful. AD2 - Atrap: progress toward anti-hydrogen production and trapping, improved capture rate. AD3 - Asacusa: improved precision of spectroscopy with anti-protonic He used for the determination of fundamental constants (mass ratios, magnetic moment), progress towards anti-hydrogen production. AD4 - ACE: progress in understanding of peripheral damage and relative biological effect of antiprotons. AD5 - Alpha: demonstration of evaporative cooling for anti-protons, progress in techniques for mixing of low temperature positron and anti-proton plasmas. ALPHA made significant progress towards antihydrogen trapping in 2010. Fully commissioned silicon detector AD6 - Aegis: experiment in preparation, finalizing detailed design and TDR, progress towards establishing feasibility of positronium production with suitable characteristics, of laser-excitation of positronium and of the required plasma manipulations in the suitable cryogenic environment. n-ToF: in 2009 restarted data taking after target upgrade. During the 2009/2010 winter shutdown modification of experimental area to meet requirements of Work Sector Type A. This will allow the extension of the physics program to include highly requested nuclear data on radioactive isotopes. ISOLDE: successful run, 40 scheduled experiments on Isolde run, 9 on Rex-Isolde, 25 targets used. Broad user community with stable participation from other fields like: biology and medicine, astrophysics, atomic and solid state physics. non-accelerator (axion searches) CAST: published results from axion searches with He(4), improvement of the detector and scanning procedure with the goal to reach axion mass limit of ~1.1 eV by the end of 2010. CAST is preparing also for the future. Osqar: restarting after break due to non-availability of spare dipole magnets, update of the time lines and data taking plan in preparation for SPSC.
9.a	Theory	Support physics run.	Support physics run / partic. in studies on scientific risks and discovery potential.	Around 450 paid visitors came in 2009 for periods of 1-2 weeks to collaborate with TH physicists and with the experiments. About 300 articles in international publications.
9.b	Physics analysis centre		Creation of physics analysis centre.	The heading Physics Analysis Centre combines the previously existing heading additional manpower for computing in experiments and the new computing centre called LPCC, with some 250kCHF expenses in 2009.LHC The conceptual framework was set up and the first concrete initiatives were planned. These included the organization of the two LHC status reports on 6 November and 16 December, two forthcoming workshops ("Readiness of Monte Carlo Tools" and "Quarkonium Production"), and the formation of a joint working group of the four large experiments on "Minimum Bias and the Underlying Event Properties".
9.c	Scientific support	Additional manpower support for physics data handling / support physics run.	Support for detector repairs, prep. of long LHC run from late 2009 onwards.	In PH department: the two support groups (PH-DT, PH-ESE) have continued their strong support for the LHC and non-LHC experiments. The PH-SFT group maintains the application tools such as ROOT and GEANT4 used by the whole community. The PH groups are also involved at a low level in generic R&D to prepare for the use of new technologies in electronics, instrumentation and software.

Figure 5: Other Programmes (cont.)

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
Other Programmes	**58,395**	**34,290**	**92,685**	**64,115**	**32,700**	**96,815**	**59,710**	**31,692**	**91,402**	**-1,283**	**-1.38%**
Low and medium accelerators, PS and SPS complexes, accelerator technical services	58,395	34,290	92,685	64,115	32,700	96,815	59,710	31,692	91,402	-1,283	-1.38%
Low and medium accelerators	*5,645*	*2,635*	*8,280*	*5,520*	*2,470*	*7,990*	*5,440*	*2,319*	*7,760*	*-520*	*-6.28%*
PS and SPS complexes	*31,620*	*20,640*	*52,260*	*31,835*	*17,560*	*49,395*	*29,882*	*17,151*	*47,033*	*-5,227*	*-10.00%*
Accelerator technical services	*21,130*	*11,015*	*32,145*	*26,760*	*12,670*	*39,430*	*24,388*	*12,221*	*36,609*	*4,464*	*13.89%*

Figure 5 (cont.): Other Programmes (cont.)

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	Other Programmes			
10	Low and medium energy accelerators, PS and SPS complexes, accelerator technical services	PS and SPS: Reliable run as LHC injector chain.		Linac2, PS Booster: Excellent operation, no major breakdowns, and high overall efficiency. A new way of preparing the 50 and 75ns beams was arranged in the Booster, allowing the LHC beam for transfer to the PS to be prepared in a single Booster cycle. This allows for time saving in the overall machine cycle as well as more beam to be delivered to ISOLDE in parallel to LHC filling. PS: Very successful year with high efficiency and relatively low fault rate. As usual a variety of beams were provided to the users. In addition to the beams delivered to the SPS, PS provided physics beams for the East Hall, n-TOF and AD. The East Hall ran throughout the year with beams delivered as scheduled to DIRAC, test beams and irradiation experiments. SPS: For CNGS a total of 3.53×10^{19} protons on target were delivered. The beam delivered to the North Area and to CNGS comfortably exceeded the agreed request. A new way of cycle switching was put into operation allowing more flexible modes of operation and optimization of the beam delivery to the various users. The automatic economy cycle system was improved and resulted in significant savings in electricity consumption when beam was not available.
		ISOLDE: resolve ventilation problems in ISOLDE target area, construct and test two new target prototypes for production of new isotopes for approved scientific programme, R&D on SC linac upgrade.	As planned, with corrected total number of protons.	AD: The AD ran for 26 weeks in 2009, two weeks more than scheduled in order to allow for the completion of data-taking by the experiments. This was the longest-ever AD run, with 4460 hours of physics, the beam availability for the users was 79%. With continued optimization, a new extracted antiproton intensity record was set with over 4x107 antiprotons per cycle extracted on average over a week. ISOLDE: ISOLDE ran for 31 weeks of physics in 2009 giving 30 runs and more than 300 radioactive beam shifts to the users. New types of sources have been tested. In particular, the VADIS type target has provided an excellent improvement to the production efficiency. The issue of radioactive release in air from the ISOLDE building to the atmosphere has been resolved by re-organizing the ventilation flows, in particular for the target area where the air is activated. Presently, the emissions to atmosphere are monitored continuously by the Radioprotection Group and they fully comply with the limits. Cost study and planning for HIE ISOLDE have been performed and the project has now been approved. RILIS, the new solid state laser successfully provided all the requested beam, and therefore it has been decided to dismantle the old copper vapor laser. Substantial progress was made in the associated LARIS laboratory where for the first time a complete ionization spectrum of an element, manganese, was used for several runs this year.
				nTOF: Smooth running with the new target with a total of 7.45×10^{19} protons delivered. The corrosion issue that stopped the facility in 2004 is now resolved. Ventilation flows have been tuned in order to reduce to the minimum the radioactive release to the atmosphere. The emissions are now below detection levels and well below the legal limits. Detailed mechanical design and manufacturing of the new target beam was tested at the end of 2009. CLOUD: The installation and first operation of the CLOUD experiment was performed in the East Area. Ions: Lead-ion beams were successfully produced with the nominal LHC characteristics. The most important event of the ion commissioning was the successful injection of Pb82+ into the LHC during the first LHC sector test. The first beam to re-awaken the LHC in 2009 was one of heavy ions - the fully stripped nuclei of the ^{208}Pb isotope of lead. They were injected from the SPS and passed immediately through one sector of the LHC before being stopped. Proton beams were later found to behave identically, confirming the expectation that much of the LHC setup will be valid for both species of beam. This was the culmination of work to prepare the ion injector chain (comprising the ECR ion source, Linac3, the LEIR cooling ring, PS and SPS) to provide the beams required for the first heavy-ion physics run expected in late 2010. The LHC should initially provide the first laboratory nuclear collisions at an energy of 2.76 TeV per colliding nucleon pair, more than an order of magnitude beyond any previous machine.

Figure 6: Infrastructure and Services

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
Infrastructure and Services	**171,000**	**178,025**	**349,025**	**182,705**	**178,805**	**361,510**	**178,770**	**167,780**	**346,550**	**-2,475**	**-0.71%**
Manufacturing facilities	11,080	2,210	13,290	17,815	2,305	20,120	14,384	4,395	18,779	5,489	41.30%
General facilities and logistics	19,690	39,375	59,065	23,400	36,415	59,815	18,995	32,455	51,450	-7,615	-12.89%
Informatics	23,710	16,530	40,240	25,160	18,145	43,305	24,473	14,979	39,452	-788	-1.96%
Safety, health and environment	20,400	7,480	27,880	21,260	9,440	30,700	18,499	6,341	24,839	-3,041	-10.91%
Administration	28,915	7,080	35,995	30,545	6,850	37,395	30,647	7,098	37,745	1,750	4.86%
Outreach and KTT	8,175	9,245	17,420	8,695	8,655	17,350	7,253	10,165	17,417	-3	-0.02%
Outreach and scientific exchanges	*6,640*	*7,440*	*14,080*	*6,755*	*6,055*	*12,810*	*5,381*	*8,422*	*13,802*	*-278*	*-1.97%*
Knowledge and technology transfer	*1,535*	*1,805*	*3,340*	*1,940*	*2,600*	*4,540*	*1,872*	*1,743*	*3,615*	*275*	*8.23%*
Centralized expenses (incl. interest)	59,030	96,105	155,135	55,830	96,995	152,825	64,520	92,347	156,868	1,733	1.12%

Figure 6 (cont.): Infrastructure and Services

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	Infrastructure and Services			
11.a	Manufacturing facilities	Technical instrastructure maintenance increase after LHC project	As planned	Excellent progress was made in the repair of Sector 3-4. This included the design and manufacturing of the immediate mechanical safety protection of the damaged zone in the tunnel to allow safe interventions; the full reconditioning of the cryostating bench in Building 180, de-cryostating of 39 cryodipoles; the qualification of the welding procedure of the pressure release ports on the vacuum vessels of the dipoles; the supply of the 900 release ports; the mechanical engineering, design and manufacturing of the anchoring reinforcement for the cryomagnets; the manufacturing and supply campaign of components for the reconstruction of the inventory of spares; extensive metallurgic analysis and component failure diagnosis. Design and prototyping works for new projects are on schedule. The main design achievements were: 3 RFQ segments for LINAC4, the test cryostat for HIE ISOLDE, the SPL Niobium RF cavities, the SPL plasma generator compatible with LINAC4, CLIC nano-stabilization studies, and the support and assembly tooling for the new LHC inner triplets. Another achievement was the design and fabrication follow-up of the CLOUD experimental chamber. Concerning the PCB workshop, extended support was given to the experiments for high-technology components (modules, GEM and Micromegas, CAN PSU frame) as well as support to subcontracting.
11.b	General facilities and logistics		More transport related to LHC repair	The maintenance contracts for electrical services, cooling and ventilation were re-tendered. More than 9000 transport and handling requests were performed, incl. the shutdown works for the accelerator complex (replacement of 97 SPS and 10 PS magnets), the final assembly of the CMS detector (Preshower detectors, forward pixels), the assembly works for CLOUD, AMS and POPS as well as the erection of many additional shieldings to protect the LHC electronics from radiation damage.
11.c	Informatics		As planned	Preparations were made for hosting some IT servers offsite to partially relieve the pressure on power and air conditioning requirements in the CERN Computer Centre. Initial steps were made in the introduction of ITIL procedures for all of IT's activities. 2009 was the first year of Openlab Phase 3 which saw the arrival of a new corporate sponsor, Siemens. In the engineering and equipment data management domain the efforts concentrated on providing support for the repair, operation and maintenance of the accelerator complex. Large-scale asset tracking and maintenance management issues are now coming to the forefront as CERN moves to an operation phase. The concept of project lifecycle management has now been readily taken up. The CAD support was re-organized in 2008/2009 and has now reached a stable phase supporting towards 200 professional designers in all departments. The 5-yearly review and new contract policy implied extensive changes to a number of software applications.
12	Safety, health and environment	Reduction in personnel incl. provision for early retirement of fire fighters	As planned	Some 14000 safety training sessions were followed of which ~11000 (78%) were Web based. Preliminary 2009 accident statistics show about the same low numbers as for 2008. The 2009 collective personal dose was broadly within the fluctuation bandwidth from the last years. Emergency preparedness: *Plan d'urgence* of CERN was revised, crisis management structure and procedures defined. All safety measures recommended by the Safety Task Force for the 2009/2010 LHC physics run were implemented. Technical agreement reached with ASN (F) and OFSP (CH) on a tri-partite agreement on radiation safety and radiation protection. A proposal to reinstate a staff level of 57 active fire-fighters and officers was agreed; recruitment is actively on-going. The fire brigade contributed to the CERN emergency plan. A special room for the ambulance has been set-up to increase hygiene levels. In 2009 a project of renovation of the communications system was launched. The medical service's personnel data management software is in the process of being upgraded to a modern system, compatible with systems used by the local hospitals and medical services. Several health campaigns were launched and met with success. An extensive plan to handle the H1N1 pandemic was put into place in collaboration with the WHO.
13	Administration		As planned	Completion of new organizational structure; new contract policy was successfully introduced, KPIs project started to cover full administration, new governance cycle was implemented. Focus on supporting the new structure, preparing the five-yearly review of salaries and employment conditions and finalising the new governance implementation; major effort to enhance services while maintaining the same staffing level.
	Outreach			
14a	Outreach and scientific exchanges		As planned	Organized 498 media visits on-site, and handled heightened media interest around the LHC re-start. CERN was awarded the 2009 AlphaGalileo Research Public Relations Award for its communication of the LHC start-up process. Organized media event in conjunction with Sony pictures to launch the film Angels & Demons. Launched CERNland Web-site for children. Launched CERN YouTube channel, and regularly updated it with short films about CERN. Produced new brochures for LHCb, LHCf and on antimatter in several languages; German edition of LHC Guide also produced. 838 teachers attended the CERN Teacher Programmes.
14b	Knowledge and technology transfer		Enhance mandate to include knowledge transfer	1) Draft policy for the management of CERN Intellectual Property (IP). The policy includes a redistribution scheme for revenues from KTT activities, yielding financial incentives for KTT projects, and it states the general principles regulating the support measures that CERN aims to put in place in order to help companies based on CERN technologies. 2) Moderate increase in the number of technology disclosures. 3) Good progress towards the launch of the CERN Global Network project, which is going to yield a framework to enhance knowledge exchanges across the community of former and current members of the CERN personnel, companies from CERN Member States and research institutes.
15	Centralized expenses	Scaling with staff strength, impact having repaid EIB loan	As planned	In line with planned expenses. This covers electricity, centralised personnel expenses and internal taxation, interest, insurances and postal charges. The paid but not available staff is now charged centrally following IPSAS implementation.

Figure 7 : Projects

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
Projects	**35,275**	**40,050**	**75,325**	**39,305**	**47,055**	**86,360**	**40,556**	**25,096**	**65,652**	**-9,673**	**-12.84%**
CLIC	12,165	8,520	20,685	12,180	10,080	22,260	10,890	7,223	18,113	-2,572	-12.44%
Linear collider detector				330	240	570	1,158	128	1,287	1,287	
Linac4	5,370	14,705	20,075	7,080	18,230	25,310	7,519	11,649	19,169	-906	-4.51%
Focus quadrupoles	755	4,335	5,090	1,045	3,765	4,810	3,022	925	3,946	-1,144	-22.47%
R&D accelerators	3,330	525	3,855	4,390	1,490	5,880	2,118	740	2,858	-997	-25.87%
Other R&D	7,445	1,285	8,730	7,545	1,345	8,890	6,999	1,042	8,040	-690	-7.90%
LHC upgrade (PS2, SPS, SPL studies, detectors)	6,210	10,680	16,890	6,735	11,905	18,640	8,850	3,390	12,240	-4,650	-27.53%

Figure 7 (cont.): Projects

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	Projects			
16.a	CLIC	Complete CLIC Test Facility (CTF3) instal. to adress major CLIC technical issues and demonstrate performance of accelerating structures with nom. parameters (100 MV/m at 10^-7 breakdown rate).	As planned, but CDR delayed by several months.	CLIC Test Facility installation completed except for the Test Beam Line in CLIC Experimantal Area (CLEX). 28 Amp Drive beam generation fully demonstrated including intensity and frequency multiplication by a factor 8. Nominal field (100 MV/m) achieved with acceptable breakdown rate in a few Accelerating Structures. Nominal RF Power generation of 130 MWatts at 12 GHz demonstrated in prototype PETS structure. Progress made possible due to the improved CLIC/CTF3 collaboration, nowcomprising 34 Institutes from 19 countries. Structures fabrication and tests with RF power through by close collaboration with SLAC and KEK making available Test Facilities. The CLIC-ILC collaboration is now well-established and further improving.
16.b	Linear collider detector	LCD project did not exist yet.	Start of integration into the world wide study.	Simulation tools for two CLIC detector concepts in place, based on validated ILC detector concepts. Detector R&D plans for 2010 and beyond were set up. It is important to note that the detector R&D is closely linked to the ILC community.
17	Linac4	Finish machine tunnel constr., start constr. of all accelerator components, place all large RF contracts, finish construction of low-energy front-end.	Tunnel construction and preparation for machine construction.	Tunnel completed, procured material for accelerating structures, progress in prototyping, signed agreement for construction of CCDTL (Cell-Coupled Drift Tube Linac). Linac4 was the testcase for the new risk assessment at CERN. This yielded not only the expected outcome, but also new points to improve project management.
18	Final focusing quadrupoles	Completion of TDR report, completion and test of the model magnet of the low-b quadrupole.	Completion of TDR now in 2010 but collaborations established.	Studies of the SLHC optics and the new layout of the ATLAS and CMS insertions progressed and two versions were released. Several design options for the MQXC low-beta quadrupole and triplet correctors were thoroughly analysed and preferred options chosen. The baseline designs are now established. The design and fabrication of the tooling for the MQXC quadrupole and the correctors progressed well and first assembly tests were performed. A baseline cryogenic cooling scheme was established that covers the full triplet string, the superconducting link and DFX feedbox. Technical requirements established for a number of systems and corresponding functional specifications were completed. The collaborations with the European and US laboratories, which bring in their expertise and resources, were formalised and came into force.
19.a	R&D accelerators	Start of theme 3 R&D studies.	As planned.	Please see achievements under LHC Upgrade.
19.b, c, d	Other R&D	Last full year of EGEE3, Increased heading from theme 3 support	As planned.	R&D computing supported by EU: CERN's involvement in EC projects expanded the geographical scope of the Grid infrastructure and increased its functionality. Links between HEP and other research disciplines increased through the use of a common Grid infrastructure and issues for long-term sustainability were addressed.
	LHC upgrade			Low-power SPL Project: design choices being made, allowing progress as foreseen in the overall design of the accelerator and its most demanding components, e.g. the geometrical beta of the superconducting cavities, the specification of the necessary high-order modes damping, the choice of doublet focusing, the number and location of the warm/cold transitions and decisions concerning the architecture of the high-power RF system. Five technical meetings with international participation were organized to review these issues and document the decisions. An official world-wide SPL collaboration was set-up to formalize the relations with the numerous laboratories and institutions that are interested in the SPL technology. PS2 Project: progress of studies in the optimization of the synchrotron arc lattice with negative momentum compaction and, following comparative analysis of several different lattices, a clearly preferred variant was identified and further optimized. Integration studies started to correctly account for magnet space requirements as well as vacuum- and beam-instrumentation equipment. The cell-structure and optics for the long straight section, housing all injection and extraction elements, were optimized and the transfer lines, linking PS2 with SPL and SPS, were designed. The integration of PS2 in the existing accelerator complex was revised accordingly. On the hardware side, prototypes for the dipole vacuum chamber were built to understand production issues and to perform mechanical stability tests. The designs of the main dipole and quadrupole magnets were further optimized, minimizing the sum of production and operation cost. Phase 2 of the LHC Collimation System: first iteration of the conceptual system design completed; a formal project review was held which validated the proposed R&D path; and a collimator prototype with second-generation technology was constructed and tested in the laboratory. The SPS Upgrade project concentrated on electron cloud effects which are a major limitation for the operation of the SPS with LHC beam above nominal intensity. Three 6 m long SPS dipoles were coated. Measurements based on microwave transmission techniques with LHC beam have confirmed the electron cloud suppression in the coated magnets. Different aspects of anti electron cloud coatings were also examined, as well as possible modifications of the existing SPS 200 MHz RF system to cope with higher beam intensities.

Figure 8: Projects: Consolidation

Activity	2009 Budget CERN/FC/5304/Rev (2009 prices) kCHF			2009 Revised budget CERN/FC/5346 (2009 prices) kCHF			2009 Out-Turn CERN/FC/5412 (2009 prices) kCHF			Variations of Out-Turn with respect to Budget (kCHF)	Variations of Out-Turn with respect to Budget (%)
	Personnel	**Materials**	**Total**	**Personnel**	**Materials**	**Total**	**Personnel**	**Materials**	**Total**		
			(a)			(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
Consolidation	**9,240**	**37,425**	**46,665**	**7,795**	**53,975**	**61,770**	**14,746**	**47,293**	**62,039**	**15,374**	**32.94%**
Accelerator consolidation	3,015	10,110	13,125	3,295	11,500	14,795	3,504	5,938	9,443	-3,682	-28.06%
LHC reliability and consolidation	6,225	22,080	28,305	3,335	25,060	28,395	8,098	28,332	36,429	8,124	28.70%
General infrastructure consolidation		5,235	5,235	1,165	17,415	18,580	3,144	13,023	16,166	10,931	208.81%

Figure 8 (cont.): Projects: Consolidation

Fact sheet	Activity	2009 Targets CERN/FC/5258	2009 Targets Revised CERN/FC/5346	2009 Achievements
	Consolidation			
21.a	Accelerator consolidation	Continuation of additional accelerator consolidation to ensure reliable LHC operation (PS access control, SPS 18kV substations, beam controls)	Recuperate delays from 2008 in consolidation projects (carry-forwards)	During the 2008/2009 shutdown the consolidation programme of the PS magnets was completed. The last refurbished magnet, the 51st out of the 100 operating in the machine, was installed on 3 February 2009. In parallel, the renovations of the vacuum control systems of the PS Booster, LINACs and LEIR were successfully completed allowing for full operation on the start date. The repairs of the SPS main dipole water manifolds were completed during the SPS shutdown 2008/2009, during which 90 main dipole magnets were removed, repaired and re-installed in the SPS tunnel.
21.a	LHC reliability and consolidation			Installation of pressure relief valves, and diagnostic and repair of resistive splices on half of the machine. Four jumpers of QRL service modules were repaired. The cryogenic capacity of the magnet test station was increased by connecting the LHC refrigerator of Sector 12 to the test station allowing the test rate of the spare magnets to be increased. The cryogenic risk analysis was reviewed and a new protection scheme of the machine cryostat defined. Safety relief valves were added accordingly on the vacuum enclosure of the machine cryostats which were warmed-up during the 2009 long shutdown. In total, four sectors as well as the eight long straight sections were consolidated. The long machine stop allowed several modifications to the installation of the 155 normal conducting magnets in the LHC in order to prepare possible future interventions on these magnets. In particular, all magnets installed at Points 3 and 7 were individually equipped with flow-meters and their access for possible replacement was simplified. It also allowed for the repair of the connection cryostats and the safety consolidation of the current leads. Following a highly condensed design phase for the development of the enhanced quench protection facilities, including the main crates and the electronics cards for the distributed busbar detection and the aperture-symmetric quench protection, the first months of 2009 were dedicated to the production and assembly in industry of the more than 6'000 printed-circuit boards and the associated auxiliary equipment. Two design and performance reviews (one internal, the other international) gave an encouraging endorsement of the CERN concept and system implementation, providing at the same time a series of recommendations and advice. In parallel, a campaign was launched for production, installation and testing of the large network of new signal, power and controls cables linking the elements of the new and existing QPS systems as well as the interfaces with the main magnets. In total, more than 14600 cable segments and hundreds of patches were manufactured and integrated into the new system. Finally, 900 triple-voltage power supplies for the nQPS systems were manufactured according to a CERN-made design and prototype. To complete this work within six months would have been impossible without assistance from outside the QPS team. A CERN-wide collaboration, crossing the borders between sectors, was established for the purpose, involving 8 groups in 5 departments, with people from 22 countries on 5 continents. This partnership was extended to cover also the design, elaboration and operation of a number of dedicated test benches used for validation of the equipment arriving from industry. For the subsequent installation and commissioning of all the new equipment, the major part of the world community of quench protection specialists joined the CERN QPS team, such as had also been the case during the commissioning in 2008. With the new equipment in place and operating according to specification, a complete mapping was made of the ohmic resistance of the superconducting busbar joints in all the main magnet interconnections of the machine. At the same time the intra-magnet conductor joints were measured with the original QPS systems. The conclusive results of these precision measurements allowed a safe re-start of the LHC. The initial limitation of the energy to 1.17 TeV per beam was only determined by the time required for commissioning of the nQPS systems in all the sectors. This final stage for operation at an energy of 3.5 TeV per beam will be performed early 2010, following a repair of the connectors of the voltage signal cables, for which the original version had shown weakness due to manufacturing flaws.
21.b	General infrastructure consolidation		Bringing forward funds from 2011 for most urgent repairs	The main objectives were achieved. The new water treatment facility was commissionned end 2009, the demineralized water production plant for the regeneration of water mixed-bed cartridges is now operational and the consolidation programme for handling and lifting equipment has started. Additional projects were launched to resolve urgent safety issues (renovation of lighting in the main workshop and safety access platforms on overhead travelling cranes) and to improve machine reliability. Modifications on cooling and ventilation control systems for an automatic re-start of LHC cooling stations, increase of the accelerator optical fibre capacity, dry transformer spare units, on-line monitoring of the vibration of rotating machines in the LHC underground pumping stations, and the retrofitting of the SPS magnet transport vehicle were also completed.

III. Additional Information

1. Scientific Progress and Publications

The highlight of 2009 was the successful re-start of the LHC at the end of the year, with first collisions delivered to the experiments of up to 2.36 TeV centre-of-mass energy, corresponding to the world record beam energy. The LHC experiments were installed and commissioned and were operational for the first LHC run. Moreover, by the end of the year the LHC Computing Grid was used for LHC collision data and it was also shown to be ready for full-scale data taking. The outstanding performance of the LHC accelerator, experiments and computing led to the first physics measurements at the LHC of the multiplicity and transverse momenta spectra of minimum bias events at 900 GeV and 2.36 TeV centre-of-mass energies to be carried out successfully.

The non-LHC physics programme was also highly successful. Several experiments ran at all CERN's fixed-target facilities – SPS, PS, AD, nTOF and ISOLDE – as well as at the axion search experiments. The accelerator complex delivered an integrated number of protons at least to the agreed level and in the case of CNGS surpassed by 10% the aim for 2009. At the SPS, the best world measurement of $K_{e2}/K_{\mu 2}$ ratio (0.64%) was made by NA62; the most precise determination of the a_0 and a_2 scattering lengths from combining Ke4 and Kπ3 data was made by NA48/2; and evidence for an exotic 1^{-+} state at 1.66 GeV/c^2 in 3π data as well as the helicity density for valence and sea quark distributions was provided by COMPASS. At the PS, CLOUD completed its commissioning and collected its first data, while DIRAC improved its measurement of πK production. The AD run was extended by two weeks during which all experiments took data. The ISOLDE physics run was successful with a broad participation of experiments from nuclear physics, biology, medicine, astrophysics, atomic physics and solid-state physics. Highlights of the ISOLDE programme include the observation of spin inversion in Ga and Cu isotopes around N=50 as evidence for the tensor interaction, observed in laser spectroscopy experiments made possible by the new radiofrequency cooler and buncher ISCOOL. Furthermore, surprising evidence for beta-delayed asymmetric fission was found in 180Hg, which could have important consequences for the understanding of nucleo-synthesis of heavy elements in stellar explosions. Experiments at nTOF re-started data-taking following the upgrade of the target. Finally, the best laboratory limit on axion search in the mass range 0.02-0.39 eV was provided by CAST.

The AMS experiment assembly was carried out at CERN with the support of the technical and engineering services and is now on its way to the International Space Station (ISS). AMS data will be transmitted from the ISS via Houston to CERN, where the detector control centre will be located.

2. Human Resources

Status

The personnel FTE numbers paid on CERN accounts (including EU supported and other external revenue sources) in 2009 contain 2,266.9 FTEs staff, 306.1 FTEs fellows, 43.6 FTEs paid associates, 90.4 FTEs technical students, 75.1 FTEs doctoral students, 110.5 FTEs project associates, 22.1 FTEs apprentices, and 26.5 FTEs summer students.

Without staff paid on EU, TT and OpenLab funds, the FTE number reduces to 2,218.7 FTEs i.e. within the 2,250 FTEs target. The manpower plan aims to respect and to reach the 2,250 FTEs in 2010. For that purpose, Management held a dedicated retreat in Autumn 2009 to assess the manpower requirements and to adjust the recruitment such as to achieve the objectives as laid out in the MTP.

Work has been ongoing for the code of conduct. Furthermore, preparations were finalized to start a new recruitment cell as of 2010 to enhance CERN's diversity in the recruitment process. As of 31.12.2009, 21.03% of the staff were women (compared to 77.89% in the administration).

Training information

On average, each staff member spent 2.5 working days on training in 2009. This figure does not contain the training hours spent for the series of academic lectures or training courses that are not organized by CERN. Students spent some 2.8 working days on training, Fellows around 2 working days (not counting conferences or workshop participation).

Total training hours for staff members amounted to 45,000, and more than twice that amount - almost 98,200 hours - for all members of personnel and contractors. These break down as follows: 41,400 hours for language training, 32,600 for technical training (without the academic lectures), 14,700 hours for safety training and 9,500 hours for management and communication.

A total of 838 teachers attended the CERN Teacher Programmes, with 688 coming from the Member States and the remainder from 19 Non-member States, and attended either the international programme or one of the many sessions held in a national language.

Users

CERN has enhanced its services to its Users, whose number exceeded in 2009 for the first time 10,000. Following a User questionnaire, additional shuttle services were put in place, and more video conference rooms were finalized.

3. Health and Safety

In January 2009, the "Task Force on Safety of Personnel in the LHC underground areas following the incident in sector 3-4 of 19th September 2008" received from the CERN Director General the mandate to investigate the impact of the incident on the safety of personnel working in the LHC underground areas. The conclusions and recommendations were reviewed by an external advisory committee of safety experts (reports: CERN-ATS-2009-002/003) and fully endorsed by the Director General. All measures necessary for the 2009/10 physics run were implemented.

Following lessons learned from the September 2008 incident, and based on international standards the "Plan d'Urgence CERN" was fully revised and a programme to establish all necessary organizational measures, procedures and infrastructure defined. The draft collaboration agreement with the host state emergency services was updated accordingly.

The preliminary collective personal dose for the year amounts to 400 person-mSv. This represents a slight increase with respect to 2008 [320 person-mSv], but is largely within the fluctuation bandwidth of the last years [250 to 550 person-mSv]. The fluctuation essentially depends on the maintenance schedule of the accelerator complex. Progress has been achieved on the procedural integration of the ALARA principle [As Low As Reasonably Achievable] into the maintenance work preparation.

The preliminary accident statistics for the year 2009 shows 390 days of sick leave for the CERN members of personnel and paid associates. The respective statistics for contractors' staff are not yet available. These numbers confirm the positive trend over the last years [2006: 1009 days; 2007: 817.5 days; 2008: 464 days] in line with the phasing out of the LHC construction/installation activities. Following an increase in accidents on the journey to and from work, two road safety campaigns were undertaken at the end of 2008 (cars) and in spring 2009 (2-wheels).

13,695 individual safety courses were followed in 2009, of which 3,032 were classroom-taught and 10,663 web-based. This increase in safety trainings with respect to previous years [2006: 7,562 - 2007: 6,296 - 2008: 8,045] is in line with the phasing-in of the start-up of the LHC. The number of web-based safety training courses provided increased as far as possible in order to smooth out the training and in particular for the users. In view of the LHC start-up particular emphasis was given to the radiation protection courses (1,385 classroom participants) and to the training for oxygen masks used in the LHC underground facilities (816 participants; classroom and simulator).

A new tri-partite convention for Radiation Protection and Radiation Safety was concluded with the respective Host State bodies, ASN in France and OFSP in Switzerland. This will replace the existing bilateral agreements, once agreed by the governmental bodies and ratified by the French and Swiss Parliaments and by the CERN Council. The agreement will facilitate the radioactive waste handling at CERN, and improve the legal framework for inter-site transport of radioactive material as well as the import, handling and export of sealed and non-sealed radioactive sources.

IV. Financial Tables and Explanations

1. Summary of Revenues and Expenses

Figure 9: Summary of Revenues and Expenses

2009 Budget CERN/FC/5304/Rev. (2009 prices)	(in MCHF, rounded off)	2009 Revised Budget CERN/FC/5346 (2009 prices)	2009 Out-Turn CERN/FC/5412 (2009 prices)	Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
(a)		(b)	(c)	(d)=(c)-(a)	(e)=(d)/(a)
1,177.4	**REVENUES**	**1,185.9**	**1,196.4**	**19.0**	**1.61%**
1,098.6	Member States' contributions	1,098.6	1,098.6		
22.3	Additional contributions from Host States	22.3	18.5	-3.8	-16.99%
12.8	EU contributions	18.6	19.3	6.5	50.74%
	In-kind contributions		6.4	6.4	
7.7	Personnel paid on team accounts *	9.9	11.3	3.5	45.59%
0.4	Personnel on detachment	0.7	0.8	0.4	82.24%
24.0	Internal taxation	24.0	24.7	0.7	2.97%
2.6	Knowledge and technology transfer	1.6	1.4	-1.2	-46.70%
9.0	Other revenues (including financial revenues)	10.1	15.5	6.5	72.16%
879.7	**OPERATING EXPENSES**	**937.7**	**863.4**	**-16.2**	**-1.84%**
757.7	**Running of scientific programmes and support**	**789.6**	**735.7**	**-21.9**	**-2.89%**
408.6	**Scientific programmes**	**428.1**	**389.2**	**-19.4**	**-4.75%**
252.0	*LHC (including s. 3-4 repair and new initiatives support to detectors)*	*264.0*	*243.5*	*-8.5*	*-3.39%*
63.9	*Non-LHC physics and scientific support*	*67.3*	*54.3*	*-9.6*	*-15.03%*
92.7	*Accelerators and areas*	*96.8*	*91.4*	*-1.3*	*-1.38%*
349.0	**General infrastructure and services**	**361.5**	**346.6**	**-2.5**	**-0.71%**
193.9	*Infrastructure and services*	*208.7*	*189.7*	*-4.2*	*-2.17%*
28.8	*Centralised personnel expenses*	*31.1*	*28.8*	*0.0*	*0.09%*
24.0	*Internal taxation*	*24.0*	*24.7*	*0.7*	*2.97%*
6.2	*Paid but not available*		*9.4*	*3.2*	*51.25%*
	Personnel on detachment	*0.7*	*1.1*	*1.1*	
69.8	*Insurances and postal charges, energy and water*	*69.8*	*68.4*	*-1.3*	*-1.93%*
2.9	*Housing fund*	*3.8*	*3.6*	*0.7*	*22.43%*
23.4	*Interest and financial costs*	*23.4*	*20.8*	*-2.6*	*-11.27%*
122.0	**Projects, R&D and consolidation**	**148.1**	**127.7**	**5.7**	**4.67%**
20.7	*CLIC*	*22.3*	*18.1*	*-2.6*	*-12.44%*
	Linear collider detector	*0.6*	*1.3*	*1.3*	
20.1	*LINAC 4*	*25.3*	*19.2*	*-0.9*	*-4.51%*
5.1	*Focus quadrupoles (NbTi)*	*4.8*	*3.9*	*-1.1*	*-22.47%*
12.6	*R&D studies*	*14.8*	*10.9*	*-1.7*	*-13.40%*
16.9	*LHC upgrade (PS2 & SPL studies, detectors)*	*18.6*	*12.2*	*-4.7*	*-27.53%*
46.7	*Consolidation and new buildings*	*61.8*	*62.0*	*15.4*	*32.94%*
20.9	**OTHER EXPENSES**	**27.1**	**26.6**	**5.6**	**26.91%**
7.7	Personnel paid on team accounts *	9.9	11.3	3.5	45.59%
13.2	Various	17.2	15.3	2.1	15.94%
	Reversal of sector 3-4 provision		*-13.6*	*-13.6*	
	In-kind		*10.8*	*10.8*	
	Stores activity	*0.2*	*0.8*	*0.8*	
13.2	*Budget amortization of staff benefits accruals*	*17.0*	*17.3*	*4.1*	*31.35%*
900.6	**TOTAL EXPENSES**	**964.8**	**890.0**	**-10.6**	**-1.17%**
	BALANCE				
276.8	Annual balance	221.1	306.4	29.6	10.68%
-14.0	Capital repayment allocated to the budget (Fortis, FIPOI 1 and 2)	-14.0	-14.0		
262.8	Annual balance allocated to budget deficit	207.1	292.4	29.6	11.24%
-518.3	**-Cumulative Balance- - 781.1**	**-574.0**	**-488.7**	**29.6**	**-5.70%**
	For information:				
200.0	Capital repayment to EIB	200.0	200.0		

* In 2009 Budget (CERN/FC/5304/Rev.), this number relates only to Staff.

2. Total Revenues

Figure 10: Total Revenues

2009 Budget CERN/FC/5304/Rev. (2009 prices)	(in kCHF)	2009 Revised Budget CERN/FC/5346 (2009 prices)	2009 Out-Turn CERN/FC/5412 (2009 prices)	Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
(a)		(b)	(c)	(d)=(c)-(a)	(e)=(d)/(a)
1,177,429	**REVENUES**	**1,185,916**	**1,196,403**	**18,974**	**1.61%**
1,098,567	Member States' contributions	1,098,567	1,098,567		
22,275	Additional contributions from Host States	22,275	18,491	-3,784	-16.99%
16,575	*Cash*	*16,575*	*16,575*		
5,700	*In-kind*	*5,700*	*1,916*	*-3,784*	*-66.38%*
12,778	EU contributions	18,643	19,261	6,483	50.74%
	In-kind contributions		6,382	6,382	
7,750	Personnel paid on team accounts *	9,940	11,283	3,533	45.59%
444	Personnel on detachment	700	809	365	82.24%
24,015	Internal taxation	24,015	24,729	714	2.97%
2,600	Knowledge and technology transfer	1,633	1,386	-1,214	-46.70%
9,000	Other revenues	10,142	15,495	6,495	72.16%
2,000	*Sales and miscellaneous*	*2,000*	*7,268*	*5,268*	*263.39%*
800	*Openlab revenues*	*1,364*	*1,593*	*793*	*99.15%*
200	*Financial revenues*	*200*	*656*	*456*	*228.00%*
6,000	*Housing fund*	*6,578*	*5,977*	*-23*	*-0.38%*

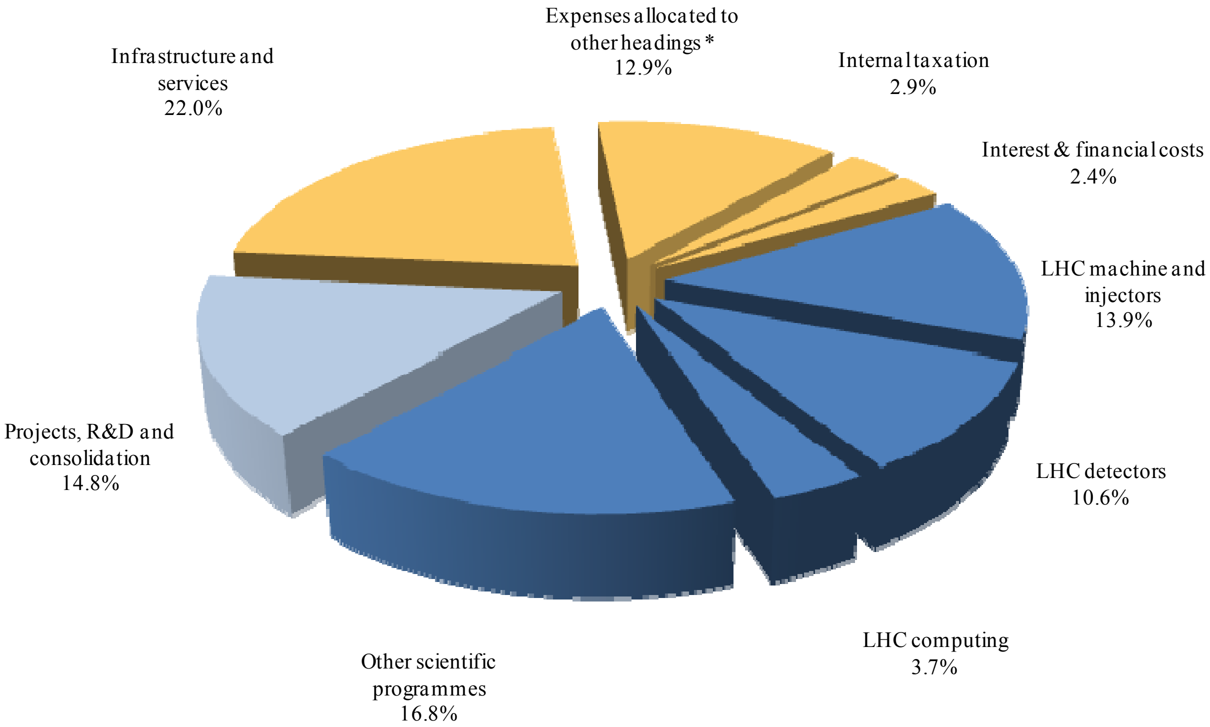
* In 2009 Budget (CERN/FC/5304/Rev.), this number relates only to Staff.

Explanations on Figure 10:

The revenues increased further since the Revised Budget, essentially due to extra EU contributions and sales within Other revenues.

3. Operating Expenses by Scientific and Non-Scientific Programmes[1]

Figure 11: 2009 Budget (Personnel, Materials and Interest & Financial costs)



* Including Centralised personnel expenses, Personnel on detachment, Paid but not available (4.6%), Energy and Water (7.1%), Insurances and postal charges (0.8%), Housing Fund (0.4%)

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[1] Please note that this Section only details the operating expenses. Other expenses not linked to the scientific and non-scientific programmes are summarized in Figure 9.

3.1. Experiments (CERN's contribution to the collaborations and experiments on site) and Accelerators

Figure 12: Scientific Programme

2009 Budget CERN/FC/5304/Rev. (2009 prices)				Fact Sheet	Activity	2009 Revised Budget CERN/FC/5346 (2009 prices)				2009 Out-Turn CERN/FC/5412 (2009 prices)				Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
FTE	kCHF					FTE	kCHF			FTE	kCHF				
Personnel	Personnel	Materials	Total			Personnel	Personnel	Materials	Total	Personnel	Personnel	Materials	Total		
			(a)						(b)				(c)	(d)=(c)-(a)	(e)=(d)/(a)
948	**163,030**	**89,005**	**252,035**		**LHC programme (incl. projects)**	**903**	**156,670**	**107,320**	**263,990**	**899**	**151,855**	**91,644**	**243,499**	**-8,536**	**-3.39%**
469	**78,540**	**39,255**	**117,795**	**1**	**LHC machine and injectors**	**424**	**70,985**	**64,810**	**135,795**	**421**	**66,339**	**53,760**	**120,098**	**2,303**	**1.96%**
457	76,495	38,770	115,265		LHC machine and experimental areas	417	69,615	36,770	106,385	385	59,619	40,152	99,771	-15,494	-13.44%
					Sector 3-4 repair			27,505	27,505	23	4,396	10,291	14,687	14,687	
					Spares					5	890	3,261	4,151	4,151	
12	2,045	485	2,530		LHC injectors (for heavy Ions)	8	1,370	535	1,905	8	1,434	56	1,490	-1,040	-41.09%
395	**68,675**	**25,895**	**94,570**		**LHC detectors**	**388**	**68,960**	**23,395**	**92,355**	**386**	**68,024**	**23,163**	**91,187**	**-3,383**	**-3.58%**
130	22,270	5,140	27,410	**2**	ATLAS detector	129	22,840	4,055	26,895	125	22,529	3,523	26,051	-1,359	-4.96%
132	22,515	3,775	26,290	**3**	CMS detector	120	20,725	3,725	24,450	118	19,780	3,581	23,361	-2,929	-11.14%
55	9,595	2,390	11,985	**4**	ALICE detector	53	9,630	2,320	11,950	50	9,228	2,102	11,330	-655	-5.46%
55	9,810	2,755	12,565	**5**	LHCb detector	53	9,795	2,590	12,385	55	9,940	2,602	12,542	-23	-0.18%
24	4,485	1,375	5,860	**6**	Common items, other experiments (inc. Totem, LHCf)	34	5,970	3,520	9,490	38	6,547	2,658	9,206	3,346	57.09%
		10,460	10,460		Detectors re-scoping			7,185	7,185			8,697	8,697	-1,763	-16.86%
85	**15,815**	**23,855**	**39,670**	**7**	**LHC computing**	**91**	**16,725**	**19,115**	**35,840**	**93**	**17,492**	**14,721**	**32,214**	**-7,456**	**-18.80%**
621	**107,640**	**48,945**	**156,585**		**Other programmes**	**658**	**113,145**	**50,920**	**164,065**	**629**	**101,085**	**44,610**	**145,695**	**-10,890**	**-6.95%**
27	**4,655**	**1,270**	**5,925**	**8**	**Non-LHC physics**	**21**	**3,480**	**2,990**	**6,470**	**19**	**3,347**	**2,455**	**5,802**	**-123**	**-2.08%**
71	**10,325**	**1,525**	**11,850**	**9.a**	**Theory**	**70**	**10,320**	**1,685**	**12,005**	**64**	**9,647**	**1,509**	**11,156**	**-694**	**-5.86%**
16	**2,995**	**2,090**	**5,085**	**9.b**	**Physics analysis centre**	**20**	**3,825**	**2,300**	**6,125**	**24**	**3,956**	**1,462**	**5,418**	**333**	**6.55%**
170	**31,270**	**9,770**	**41,040**	**9.c**	**Scientific support**	**172**	**31,405**	**11,245**	**42,650**	**149**	**24,426**	**7,492**	**31,918**	**-9,122**	**-22.23%**
33	**5,645**	**2,635**	**8,280**	**10**	**Low and medium accelerators**	**34**	**5,520**	**2,470**	**7,990**	**33**	**5,440**	**2,319**	**7,760**	**-520**	**-6.28%**
184	**31,620**	**20,640**	**52,260**	**10**	**PS and SPS complexes**	**189**	**31,835**	**17,560**	**49,395**	**191**	**29,882**	**17,151**	**47,033**	**-5,227**	**-10.00%**
121	**21,130**	**11,015**	**32,145**	**10**	**Accelerator technical services**	**153**	**26,760**	**12,670**	**39,430**	**149**	**24,388**	**12,221**	**36,609**	**4,464**	**13.89%**
1,569	**270,670**	**137,950**	**408,620**		**Grand Total**	**1,561**	**269,815**	**158,240**	**428,055**	**1,528**	**252,940**	**136,254**	**389,194**	**-19,426**	**-4.75%**
	22.99%	11.72%	34.70%		% of total revenues		22.75%	13.34%	36.09%		21.14%	11.39%	32.53%		

Explanations on Figure 12:

The change from a full luminosity run to essential Sector 3-4 repair resulted in less expenses for LHC operation and detectors.

Concerning the Sector 3-4 repair, a large part of the spares needed will arrive in 2010 only hence reducing the allocation for Sector 3-4 in actual expense with respect to the revised budget.

The expenses for detectors are essentially in line with the forecast. With respect to the final 2009 Budget the detector re-scoping (full LHC detectors) is slightly late in implementation.

For LHC computing, less consumables such as tapes were purchased due to the delay in data taking start-up.

For the other programmes, one should note the 7% less expense with respect to the Final Budget, essentially due to less expense in the support activities such as Scientific Support, PS and SPS complexes and Accelerator Technical Services, mainly due to the LHC repair instead of a luminosity run.

The heading Physics Analysis Centre combines the previously existing heading "additional manpower for computing in experiments" and the new computing centre called LPCC, with some 250 kCHF expenses in 2009.

3.2. Non-scientific Programme (Infrastructure and Supporting Services)

Figure 13: Infrastructure and Services

2009 Budget CERN/FC/5304/Rev. (2009 prices)				Fact Sheet	Activity	2009 Revised Budget CERN/FC/5346 (2009 prices)				2009 Out-Turn CERN/FC/5412 (2009 prices)				Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
FTE	kCHF					FTE	kCHF			FTE	kCHF				
Personnel	Personnel	Materials	Total			Personnel	Personnel	Materials	Total	Personnel	Personnel	Materials	Total		
			(a)						(b)				(c)	(d)=(c)-(a)	(e)=(d)/(a)
714	**171,000**	**178,025**	**349,025**		**Infrastructure and services**	**757**	**182,705**	**178,805**	**361,510**	**780**	**178,770**	**167,780**	**346,550**	**-2,475**	**-0.71%**
69	**11,080**	**2,210**	**13,290**	**11.a**	**Manufacturing facilities**	**110**	**17,815**	**2,305**	**20,120**	**101**	**14,384**	**4,395**	**18,779**	**5,489**	**41.30%**
126	**19,690**	**39,375**	**59,065**	**11.b**	**General facilities and logistics**	**150**	**23,400**	**36,415**	**59,815**	**120**	**18,995**	**32,455**	**51,450**	**-7,615**	**-12.89%**
130	**23,710**	**16,530**	**40,240**	**11.c**	**Informatics**	**152**	**25,160**	**18,145**	**43,305**	**152**	**24,473**	**14,979**	**39,452**	**-788**	**-1.96%**
141	**20,400**	**7,480**	**27,880**	**12**	**Safety, health and environment**	**128**	**21,260**	**9,440**	**30,700**	**135**	**18,499**	**6,341**	**24,839**	**-3,041**	**-10.91%**
174	**28,915**	**7,080**	**35,995**	**13**	**Administration**	**175**	**30,545**	**6,850**	**37,395**	**184**	**30,647**	**7,098**	**37,745**	**1,750**	**4.86%**
41	**8,175**	**9,245**	**17,420**	**14**	**Outreach and KTT**	**41**	**8,695**	**8,655**	**17,350**	**43**	**7,253**	**10,165**	**17,417**	**-3**	**-0.02%**
35	**59,030**	**72,690**	**131,720**	**15**	**Centralised expenses**	**3**	**55,830**	**73,580**	**129,410**	**46**	**64,520**	**71,571**	**136,092**	**4,372**	**3.32%**
	28,815		28,815		Centralised personnel expenses		31,115		31,115		28,842		28,842	27	0.09%
	24,015		24,015		Internal taxation		24,015		24,015		24,729		24,729	714	2.97%
35	6,200		6,200		Paid but not available					39	9,377		9,377	3,177	51.25%
					Personnel on detachment	3	700		700	5	1,132		1,132	1,132	
		62,795	62,795		Energy and water			62,795	62,795			61,721	61,721	-1,074	-1.71%
		6,995	6,995		Insurances and postal charges			6,995	6,995			6,722	6,722	-273	-3.91%
		2,900	2,900		Housing fund			3,790	3,790	3	440	3,128	3,569	669	23.06%
		23,415	**23,415**	**15**	**Interest and financial costs**			**23,415**	**23,415**			**20,776**	**20,776**	**-2,639**	**-11.27%**
	14.52%	15.12%	29.64%		% of total revenues		15.41%	15.08%	30.48%		14.94%	14.02%	28.97%		

Explanations on Figure 13:

The total expenses on infrastructure and services were as foreseen, however some variations in between the sub headings occured:

The repair resulted in higher allocations to manufacturing facilities, thus taking resources away from general facilities.

Informatics sub-programme is essentially in line with the final budget. Safety and health related expenses are lower due to accumulating funding for radioactive waste management.

Administration expenses are in line with the revised budget.

Centralised expenses stays in line with the final Budget, with less expense for interest but slightly higher expenses for renovation works on the housing fund.

3.3. Projects (construction, R&D)

Figure 14: Projects

2009 Budget CERN/FC/5304/Rev. (2009 prices)				Fact Sheet	Activity	2009 Revised Budget CERN/FC/5346 (2009 prices)				2009 Out-Turn CERN/FC/5412 (2009 prices)				Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
FTE	kCHF					FTE	kCHF			FTE	kCHF				
Personnel	Personnel	Materials	Total			Personnel	Personnel	Materials	Total	Personnel	Personnel	Materials	Total		
			(a)						(b)				(c)	(d)=(c)-(a)	(e)=(d)/(a)
266	**44,515**	**77,475**	**121,990**		**Projects**	**290**	**47,100**	**101,030**	**148,130**	**309**	**55,302**	**72,389**	**127,691**	**5,701**	**4.67%**
64	**12,165**	**8,520**	**20,685**	**16.a**	**CLIC**	**75**	**12,180**	**10,080**	**22,260**	**61**	**10,890**	**7,223**	**18,113**	**-2,572**	**-12.44%**
				16.b	**Linear collider detector**	**2**	**330**	**240**	**570**	**4**	**1,158**	**128**	**1,287**	**1,287**	
32	**5,370**	**14,705**	**20,075**	**17**	**Linac 4**	**43**	**7,080**	**18,230**	**25,310**	**42**	**7,519**	**11,649**	**19,169**	**-906**	**-4.51%**
7	**755**	**4,335**	**5,090**	**18**	**Focus quadrupoles (NbTi)**	**6**	**1,045**	**3,765**	**4,810**	**14**	**3,022**	**925**	**3,946**	**-1,144**	**-22.47%**
66	**10,775**	**1,810**	**12,585**	**19**	**R&D**	**73**	**11,935**	**2,835**	**14,770**	**60**	**9,117**	**1,782**	**10,898**	**-1,687**	**-13.40%**
20	3,330	525	3,855	19.a	R&D accelerators	30	4,390	1,490	5,880	16	2,118	740	2,858	-997	-25.87%
46	7,445	1,285	8,730	19.b, c, d	Other R&D	44	7,545	1,345	8,890	45	6,999	1,042	8,040	-690	-7.90%
45	**6,210**	**10,680**	**16,890**		**LHC upgrade (PS2, SPS, SPL studies, detectors)**	**46**	**6,735**	**11,905**	**18,640**	**48**	**8,850**	**3,390**	**12,240**	**-4,650**	**-27.53%**
17	**3,015**	**10,110**	**13,125**	**21.a**	**Accelerator consolidation**	**19**	**3,295**	**11,500**	**14,795**	**22**	**3,504**	**5,938**	**9,443**	**-3,682**	**-28.06%**
37	**6,225**	**22,080**	**28,305**	**21.a**	**LHC reliability and consolidation**	**20**	**3,335**	**25,060**	**28,395**	**42**	**8,098**	**28,332**	**36,429**	**8,124**	**28.70%**
		5,235	**5,235**	**21.b**	**General infrastructure consolidation**	**8**	**1,165**	**17,415**	**18,580**	**16**	**3,144**	**13,023**	**16,166**	**10,931**	**208.81%**
	3.78%	6.58%	10.36%		% of total revenues		3.97%	8.52%	12.49%		4.62%	6.05%	10.67%		

Explanations on Figure 14:

Less manpower than planned have been deployed to CLIC due to the ongoing efforts for LHC and the start-up of the Linac 4 and the LHC Inner Triplet Quadrupoles projects.

Linac 4 staff was redeployed from generic accelerator R&D. The reduction in materials expenses is due to delays in the civil engineering.

With respect to the presentation in the 2009 Budget document, the heading consolidation has been more detailed in the table to distinguish the various areas. Whereas materials expenses for accelerator consolidation are less than foreseen (essentially LHC injectors), more expenses occurred for the induced LHC consolidation following the sector 3-4 incident. The scope was enhanced notably for the new quench protection system as described in the fact sheets. The new Management's initiative towards general infrastructure resulted in higher expenses for the heading aiming to start bringing CERN's infrastructure back into shape.

Figure 15: Energy and Water

(in MCHF, rounded off)

2009 Budget CERN/FC/5304/Rev. (2009 prices)	Activity	2009 Revised Budget CERN/FC/5347 (2009 prices)	2009 Out-Turn CERN/FC/5412 (2009 prices)	Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
(a)		(b)	(c)	(d)=(c)-(a)	(e)=(d)/(a)
22.24	**Energy and water (baseload)**	**22.30**	**22.11**	**-0.14**	**-0.61%**
9.56	Electricity	9.60	10.68	1.11	11.64%
4.73	Heating oil and gas	4.70	4.62	-0.11	-2.29%
7.95	Water and miscellaneous	8.00	6.81	-1.14	-14.34%
40.55	**Energy for basic programmes**	**40.54**	**39.61**	**-0.93**	**-2.31%**
1.88	Particle physics	1.90		-1.88	-100.00%
	Experimental areas [1)]		8.14	8.14	
1.18	Data handling	1.20	1.17	-0.01	-0.84%
12.41	Accelerators:	12.34	15.71	3.30	26.59%
0.48	*AD*	*0.50*	*0.54*	*0.05*	*11.09%*
2.15	*PS*	*2.06*	*3.91*	*1.76*	*81.93%*
9.78	*SPS (including CNGS)*	*9.78*	*11.26*	*1.49*	*15.20%*
25.08	LHC	25.10	14.59	-10.49	-41.82%
62.79	**Grand Total Energy programme**	**62.80**	**61.72**	**-1.07**	**-1.70%**

1) This includes particle physics (PS and SPS fixed target), ISOLDE, LHC experiments and LHC test beam into East, West and North Area.

Explanations on Figure 15:

The repartition of the electrical power circuits has been redefined, resulted a larger part for the LHC and fixed target experiments, which is now grouped under the heading “Experimental Areas”. This heading also includes the energy for LHC test beams. With respect to past operation, PS and SPS have now higher power consumption due to LHC needs.

Figure 16: Expenses for Fixed Assets Projects

(in kCHF)

2009 Budget * CERN/FC/5304/Rev. (2009 prices)			Activity	Project	2009 Revised Budget * CERN/FC/5346 (2009 prices)			2009 Out-Turn * CERN/FC/5412 (2009 prices)			Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
Personnel	Materials	Total			Personnel	Materials	Total	Personnel	Materials	Total		
		(a)					(b)			(c)	(d)=(c)-(a)	(e)=(d)/(a)
29,325	114,465	143,790	Programme	Projects	27,755	164,280	192,035	51,540	107,574	159,114	15,324	10.66%
1,020	**485**	**1,505**	**LHC programme** Included in figure 12	**LHC machine and injectors**	**820**	**28,040**	**28,860**	**6,264**	**12,831**	**19,096**	**17,591**	**1168.81%**
				Sector 3-4 repair		27,505	27,505	4,396	10,291	14,687	14,687	
				Liquid helium additional storage tanks					635	635	635	
				Rebuilding Spares Stock after 3-4				890	1,850	2,740	2,740	
1,020	485	1,505		LHC injectors	820	535	1,355	978	56	1,034	-471	-31.27%
	11,330	**11,330**		**LHC detectors**		**8,125**	**8,125**	**534**	**9,360**	**9,894**	**-1,436**	**-12.67%**
	145	145		Alice detector		185	185	534	-62	472	327	225.63%
	725	725		LHCb detector		755	755		725	725	0	0.07%
	10,460	10,460		WP LHC Experiment final implementation		7,185	7,185		8,697	8,697	-1,763	-16.86%
115	**19,110**	**19,225**		**LHC computing**	**1,185**	**14,715**	**15,900**	**1,278**	**10,412**	**11,690**	**-7,535**	**-39.19%**
115	19,110	19,225		LHC Computing Grid	1,185	14,715	15,900	1,278	10,412	11,690	-7,535	-39.19%
			Other programmes Included in figure 12	**NA62 construction**	**80**	**890**	**970**		**259**	**259**	**259**	
	1,035	**1,035**		**Electronics pool**		**2,510**	**2,510**	**204**	**-1,082**	**-878**	**-1,913**	**-184.80%**
	1,860	**1,860**		**Magnet rescue facility**	**1,105**	**4,380**	**5,485**	**1,033**	**2,816**	**3,848**	**1,988**	**106.91%**
	7,645	**7,645**	**Infrastructure and services** Included in figure 13	**Extension building 40**	**180**	**7,865**	**8,045**	**168**	**3,300**	**3,468**	**-4,177**	**-54.64%**
295	**1,920**	**2,215**		**Radioactive waste management**	**295**	**4,360**	**4,655**	**256**	**80**	**336**	**-1,879**	**-84.83%**
11,960	**8,445**	**20,405**	**Projects** Included in figure 14	**CLIC**	**10,025**	**10,060**	**20,085**	**10,800**	**7,219**	**18,019**	**-2,386**	**-11.69%**
				Linear collider detector R&D	**60**		**60**	**86**		**86**	**86**	
3,605	**14,705**	**18,310**		**LINAC 4**	**5,315**	**18,230**	**23,545**	**7,511**	**11,649**	**19,160**	**850**	**4.64%**
400	**3,775**	**4,175**		**Focus quadrupoles (NbTi)**	**700**	**3,205**	**3,905**	**2,455**	**595**	**3,049**	**-1,126**	**-26.96%**
				SLHC		**300**	**300**	**2,718**	**202**	**2,919**	**2,919**	
				High field magnets (HFM)		**170**	**170**	**333**	**313**	**646**	**646**	
				Fast cycled magnets (FCM)		**150**	**150**	**273**	**304**	**577**	**577**	
				PS2 studies				**976**	**71**	**1,047**	**1,047**	
2,690	**6,730**	**9,420**		**LHC upgrade**	**195**	**7,305**	**7,500**	**1,956**	**1,954**	**3,911**	**-5,509**	**-58.49%**
175	3,745	3,920		RF 200 MHz system	195	3,835	4,030	202	40	242	-3,678	-93.83%
2,515	2,985	5,500		LHC detectors upgrade		3,470	3,470	1,754	1,915	3,669	-1,831	-33.29%
3,015	**10,110**	**13,125**		**Accelerator consolidation**	**3,295**	**11,500**	**14,795**	**3,515**	**5,938**	**9,453**	**-3,672**	**-27.98%**
6,225	**22,080**	**28,305**		**LHC reliability and consolidation**	**3,335**	**12,380**	**15,715**	**5,176**	**13,080**	**18,256**	**-10,049**	**-35.50%**
				Induced consolidation following 3-4 incident		**12,680**	**12,680**	**2,861**	**15,251**	**18,112**	**18,112**	
	5,235	**5,235**		**General infrastructure consolidation**	**1,165**	**17,415**	**18,580**	**3,144**	**13,023**	**16,166**	**10,931**	**208.81%**

* Excluding EU projects.

Explanations on Figure 16:

Figure 16 summarises the non-recurrent activities and approved projects. Please note that these do not include expenses covered by EU projects and related revenues.

The variations are essentially related to LHC Computing policy of buying as late as possible to profit from general price reductions for IT equipment. Personnel expenses on CLIC varies between the recurrent and non-recurrent headings. As explained under Figure 14, materials expenses for consolidation as well as the new initiatives and the civil engineering projects were delayed due to the personnel have been focused on the LHC re-start.

4. Operating Expenses by Nature

Figure 17: Materials Expenses by Nature (including Interest and Financial costs)

(in kCHF)

2009 Budget CERN/FC/5304/Rev. (2009 prices)	Nature	2009 Revised Budget CERN/FC/5346 (2009 prices)	2009 Out-Turn CERN/FC/5412 (2009 prices)	Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
(a)		(b)	(c)	(d)=(c)-(a)	(e)=(d)/(a)
367,135	**Materials expenses [1)]**	**410,870**	**351,716**	**-15,419**	**-4.20%**
156,495	Goods, consumables and supplies	181,797	141,064	-15,431	-9.86%
62,795	Electricity, heating gas and water [2)]	62,795	61,883	-912	-1.45%
60,895	Industrial services (service contracts) [3)]	57,900	63,677	2,782	4.57%
35,170	Repair and maintenance (other indus. services contracts) [3)]	42,140	29,677	-5,493	-15.62%
24,345	Third party payments and consultants	32,510	26,155	1,810	7.44%
27,435	Other overheads [4)]	33,728	29,260	1,825	6.65%
23,415	**Interest and financial costs**	**23,415**	**22,674**	**-741**	**-3.17%**
14,570	Fortis bank	14,570	14,572	2	0.02%
1,255	EIB	1,255	1,241	-14	-1.11%
	In-kind (FIPOI interest 0%) [5)]		1,898	1,898	
6,980	Short-term interest	6,940	4,374	-2,606	-37.34%
400	Ppbar indexation [6)]	400	401	1	0.20%
210	Bank charges	250	188	-22	-10.36%
390,550	**TOTAL MATERIALS**	**434,285**	**374,390**	**-16,160**	**-4.14%**
2,900	Housing fund [7)]	3,790		-2,900	-100.00%
	Stores activity [7)]	163			
393,450	**TOTAL materials incl. housing fund and stores activity**	**438,238**	**374,390**	**-19,060**	**-4.84%**

1) 2009 Budget (CERN/FC/5304/Rev.) and 2009 Revised Budget (CERN/FC/5346) referred only to the operating expenses, excluding housing fund and stores activity. In the Out-Turn (CERN/FC/5412), this heading includes housing fund, stores activity and reflects also the in-kind contributions.

2) This heading for 2009 Budget (CERN/FC/5304/Rev.) and 2009 Revised Budget (CERN/FC/5346) referred to the Energy programme, whereas the 2009 Out-Turn comprises also the expenses for Housing Fund.

3) Variation for total of industrial services: -2,711 kCHF.

4) Including insurances and postal charges, CERN contributions to collaborations, depreciation expenses, reversal of sector 3-4 provision.

5) Theoretical interest at market rate for FIPOI 1 and 2 loans at 0%. This heading is compensated by the corresponding revenue line "In-kind contributions".

6) In 2009 Budget (CERN/FC/5304/Rev.) and 2009 Revised Budget (CERN/FC/5346), this amount was included under interest.

7) In the Out-Turn these headings are included in Materials Expenses, please see note 1.

Figure 18: Breakdown of Materials Expenses by Nature

Materials expenses: 93.9%

Interest and financial costs: 6.1%

* Total of industrial services: 17% + 7.9% = 24.9%.

** Including insurances and postal charges, CERN contributions to collaborations, depreciation expenses, reversal of sector 3-4 provision.

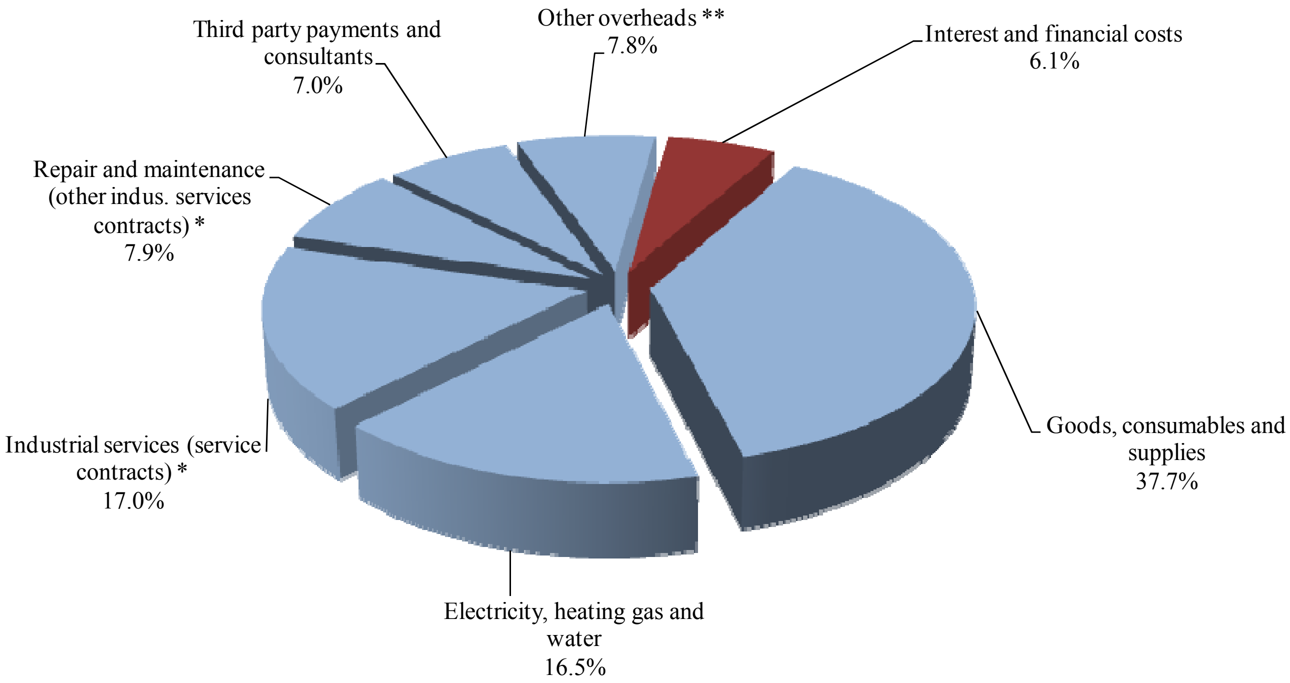


Figure 19: Personnel Expenses by Nature

(in kCHF)

2009 Budget CERN/FC/5304/Rev. (2009 prices)	Nature	2009 Revised Budget CERN/FC/5347 (2009 prices)	2009 Out-Turn CERN/FC/5412 (2009 prices)	Variations of Out-Turn with respect to Budget	Variations of Out-Turn with respect to Budget (%)
(a)		(b)	(c)	(d)=(c)-(a)	(e)=(d)/(a)
451,160	**Staff members**[1]	**458,035**	**456,915**	**5,755**	**1.28%**
254,645	***Basic salaries*** [2]	***260,007***	***264,332***	***9,687***	***3.80%***
60,115	***Allowances***	***56,635***	***57,977***	***-2,138***	***-3.56%***
19,430	Non-residence	18,975	19,372	-58	-0.30%
21,280	Family allowances	21,350	22,361	1,081	5.08%
3,765	Special allowances	3,310	3,922	157	4.17%
2,350	Overtime	1,905	2,228	-122	-5.18%
11,105	Various allowances	10,230	10,393	-712	-6.41%
2,185	Termination indemnities	865		-2,185	-100.00%
	Variation termination indemnities[3]		-299	-299	
	Variation paid leave [4]		***-5,477***	***-5,477***	
83,570	***Social contributions***	***86,264***	***86,436***	***2,866***	***3.43%***
65,100	Pension fund	65,890	67,776	2,676	4.11%
18,470	Health insurance	20,374	18,660	190	1.03%
28,815	***Centralised personnel expenses***	***31,114***	***28,919***	***104***	***0.36%***
5,310	Installation, recruitment and termination of contracts	6,623	6,404	1,094	20.60%
4,235	Additional periods of membership in the pension fund for shift work	4,050	1,884	-2,351	-55.51%
19,270	Contribution to health insurance for pensioners	20,441	20,630	1,360	7.06%
24,015	***Internal taxation***	***24,015***	***24,729***	***714***	***2.97%***
34,525	**Fellows and Associates (including overhead for students)**[1]	**41,165**	**40,961**	**6,436**	**18.64%**
500	**Apprentices**	**420**	**419**	**-81**	**-16.25%**
486,185	**TOTAL PERSONNEL**	**499,620**	**498,296**	**12,111**	**2.49%**
13,192	Budget amortization of staff benefits accruals	17,000	17,328	4,136	31.35%
499,377	**TOTAL PERSONNEL after amortization of staff benefits accruals**	**516,620**	**515,624**	**16,247**	**3.25%**
7,750	Personnel paid on team accounts (included in Personnel costs in 2009 Out-Turn)[5]	9,940		-7,750	-100.00%
507,127	**TOTAL PERSONNEL including personnel paid on team accounts**	**526,560**	**515,624**	**8,497**	**1.68%**

1) 2009 Budget (CERN/FC/5304/Rev.) and 2009 Revised Budget (CERN/FC/5346) referred only to staff / fellows and associates on CERN accounts. In the Out-Turn (CERN/FC/5412), staff / fellows and associates paid on team accounts are included under this heading.

2) Including the withheld salary for short-term SLS participation.

3) Following IPSAS a provision was made for the termination indemnities. In 2009, 1,235 kCHF were paid as termination indemnity, the variation on the provision is 299 kCHF.

4) Introduced as a consequence of IPSAS.

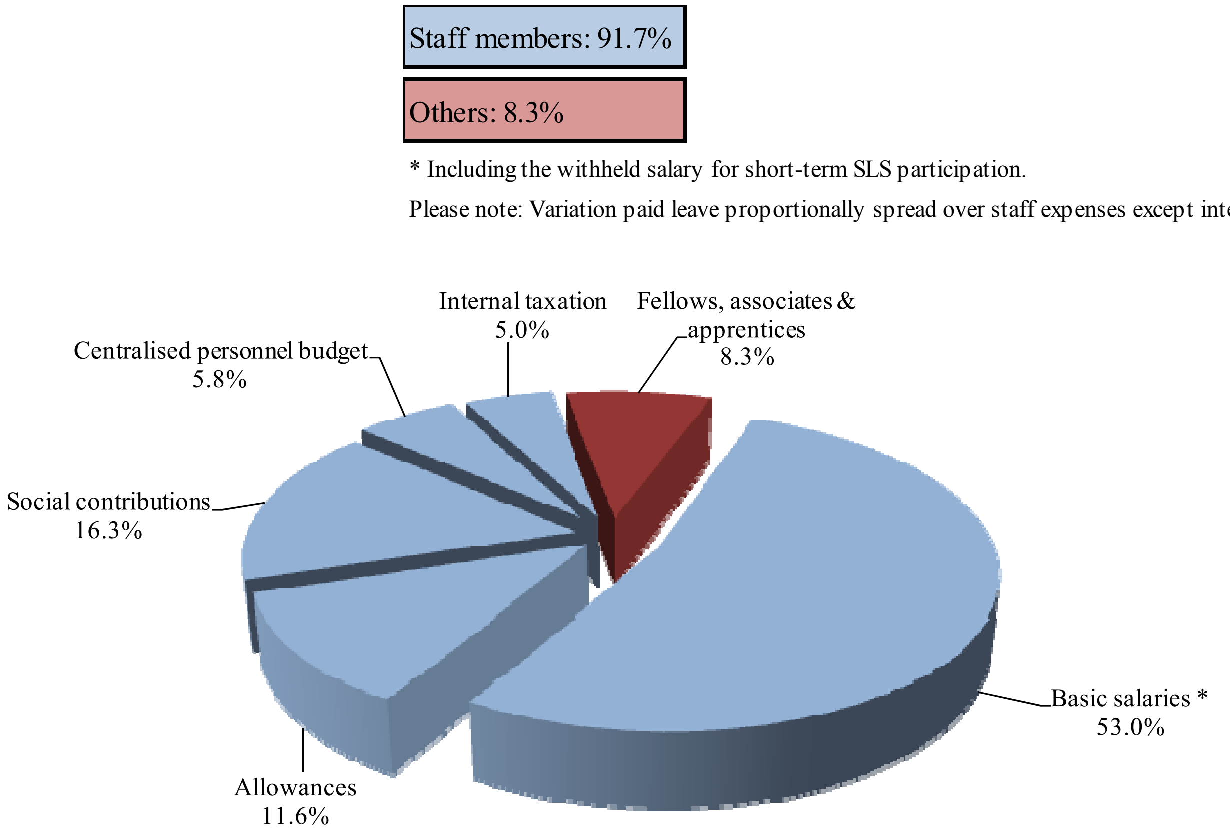
5) In the Out-Turn this line is included in the Staff and Fellows & Associates headings, please see note 1). In addition, in 2009 Budget (CERN/FC/5304/Rev.) this number relates only to Staff.

Explanations on Figure 19:

The total staff strength of CERN in 2009 was 2,322.4 FTE, of which 2,266.9 FTE staff members paid on CERN accounts and 55.5 FTE staff members paid on team accounts. For fellows and associates the total staff strength was 375.1 FTE comprised of 306.1 FTE fellows paid on CERN accounts, 24.2 fellows paid on team accounts, 43.6 FTE associates paid on CERN accounts and 1.2 FTE associates paid on team accounts. The total staff strength of apprentices was 22.1 FTE, all paid on CERN accounts. The total number of employed members of personnel on CERN accounts was 2,638.7 FTE.

In the Personnel expenses in the budget, personnel paid on team accounts was excluded from the table. For 2009, personnel paid on team accounts is 11.283 MCHF.

Figure 20: Breakdown of Personnel Expenses by Nature



5. Carry-forward

Figure 21: Carry-Forward

(in MCHF, rounded off)	Variations of Probable Expenses (CERN/FC/5397) with respect to Out-Turn (CERN/FC/5412) (2009 prices)	Carry-forward to 2010	Deficit reduction
Operation	**9.1**	**4.7**	**4.4**
LHC programme	4.8	3.1	1.7
Other programmes	3.9	2.7	1.2
Infrastructure and services	0.4	-1.1	1.5
R&D studies and projects	0.1	0.0	0.0
Project	**42.3**	**41.5**	**0.8**
LHC programme	8.5	8.3	0.1
Other programmes	5.1	5.0	0.1
Infrastructure and services	6.9	6.7	0.2
R&D studies and projects	21.9	21.5	0.4

Explanations on Figure 21:

The financial rules state in Article 9: “The budget amounts shall be compared with the amounts of the final budget outturn. The positive balance of that part of the budget which is allocated to multi-annual projects shall be carried forward to the following year within the cost to completion. The unused part of the budget allocated to operation shall be carried forward to the following financial year, provided that it relates to commitments open when the accounts for the financial year concerned are closed. Any excess budget expenditures shall be carried forward to the next financial year.”

The figures under the Operation heading do not include the impact of advanced payments for licences, subscriptions, etc.

6. EU Supported Projects

Figure 22: EU Projects

Contract		Start date	End Date	Total EC contribution (kEUR)	EC contribution to CERN (kEUR)	2009 expenses (kCHF)	2009 EU expenses (kCHF)	2009 additional expenses* (kCHF)
ASPERA	Implementation Of Astroparticle Physics European Coordination	01-Jul-06	30-Jun-09	2,584	227	60	60	
Aspera II	Deepening And Broadening Of Astroparticle Physics European Coordination	01-Jul-09	30-Jun-12	2,383	196	52	52	
BalticGrid II	Baltic Grid Second Phase	01-May-08	30-Apr-10	2,998	185	101	101	
Cosmo@LHC	Cosmology At The Cern Large Hadron Collider	01-Jul-08	30-Jun-13	800	800	201	201	
D4Science	Distributed Collaboratories Infrastructure On Grid Enabled Technology For Science	01-Jan-08	31-Dec-09	3,150	435	227	227	
D4-Science II	Data Infrastructure Ecosystem For Science	01-Oct-09	30-Sep-11	4,300	859	133	133	
DIRAC	Internal Target Experiments With Highly Energetic Stored And Cooled Beams At The International Facility For Antiproton And Ion Research Fair	01-Feb-05	31-Jan-09	9,000	182			
EFNUDAT	European Facilities For Nuclear Data Measurements	01-Nov-06	31-Oct-10	2,400	188	36		36
EGEE III	Enabling Grids For E-Science III	01-May-08	30-Apr-10	32,000	7,958	5,881	5,881	
EGI-DS	European Grid Initiative - Design Study	01-Sep-07	31-Dec-09	2,497	516	335	335	
EnviroGRIDs	Building Capacity For A Black Sea Catchment Observation And Assessment System Supporting Sustainable Development	01-Apr-09	31-Mar-13	6,223	268	59	59	
ETICS-2	E-Infrastructure For Testing, Integration And Configuration Of Software Phase 2	01-Mar-08	28-Feb-10	2,672	837	646	646	
EUCard	European Coordination For Accelerator Research And Development	01-Apr-09	31-Mar-13	10,000	2,269	873	270	603
EUDET	Detector R&D Towards The International Linear Collider	01-Jan-06	31-Dec-09	7,000	303	415	57	358
EURISOL	European Isotope Separation On-Line Radioactive Ion Beam Facility	01-Feb-05	31-Jul-09	9,162	1,797	655	335	320
EUROnu	A High Intensity Neutrino Oscillation Facility In Europe	01-Sep-08	31-Aug-12	4,000	621	847	280	567
GridTalk	Co-Ordinating Grid Reporting Across Europe	01-May-08	30-Apr-10	500	188	130	130	
Health-e-Child	Health-E-Child	01-Jan-06	30-Apr-10	12,186	400	179	179	
ILC-HiGrade	International Linear Collider And High Gradient Superconducting Rf-Cavities	01-Feb-08	31-Jan-12	5,000	350	161	161	
ILIAS	Integrated Large Infrastructures For Astroparticle Science	01-Apr-04	31-Mar-09	7,480	71	15	15	
MassTeV	Mass Hierarchy And Particle Physics At The Tev Scale	01-Dec-08	30-Nov-13	2,000	1,226	173	173	
OpenAIRE	Open Access Infrastructure For Research In Europe	01-Dec-09	30-Nov-12	4,170	309			
Parse.insight	Insight Into Issues Of Permanent Access To The Records Of Science In Europe	01-Mar-08	28-Feb-10	1,250	240	192	192	
SEEGRID-SCI	See-Grid Einfrastructure For Regional Escience	01-May-08	30-Apr-10	2,500	156	103	103	
SET-Routes	A Pan-European Women Ambassadors Programme Bringing Role Models To Schools And Universities To Stimulate And Mobilise Girls And Young Women For Studies And Careers In Set	01-Nov-06	30-Apr-09	533	167	134	134	
SLHC-PP	Preparatory Phase Of The Large Hadron Collider Upgrade	01-Apr-08	31-Mar-11	5,200	3,087	3,285	1,429	1,856
SOAP	Study Of Open Access Publishing	01-Mar-09	28-Feb-11	810	265	127	127	
Superfields	Supersymmetry, Quantum Gravity And Gauge Fields	01-Jun-09	31-May-14	1,700	689	21	21	
Ulice	Union Of Light-Ion Centres In Europe	01-Sep-09	31-Aug-13	8,400	824	38	38	
Correction for projects closed in 2009**						-363	44	-407
TOTAL						**14,716**	**11,383**	**3,333**

* Direct costs declared to the European Commission only; does not take into consideration other direct support and administrative costs.

** Final accounting balance of terminated EU projects bookclosed on 2009.

Figure 23: Marie Curie Projects

Contract		Start date	End Date	Total EC contribution (kEUR)	EC contribution to CERN (kEUR)	2009 expenses (kCHF)	2009 EU expenses (kCHF)	2009 additional expenses* (kCHF)
ACEOLE	Data Acquisition, Electronics, And Optoelectronics For Lhc Experiments	01-Oct-08	30-Sep-12	3,469	3,469	1,359	1,359	
ELACCO	Electronics, Acquisition And Controls Developments For Physics Experiments	01-Jun-06	31-May-10	2,315	2,315	896	896	
MC-PAD	Marie Curie Training Network On Particle Detectors	01-Nov-08	31-Oct-12	4,670	1,070	422	422	
Partner	Particle Training Network For European Radiotherapy	01-Oct-08	30-Sep-12	5,601	1,200	414	414	
EUROTHEPHY	Training In Theoritical Physics	01-Jan-06	31-Dec-09	1,498	1,498	405	405	
DitaNet	Novel Diagnostic Techniques For Future Particle Accelerators: A Marie Curie Initial Training Network	01-Jun-08	31-May-12	4,163	690	246	246	
MITELCO	Microelectronics, Telecommunications And Controls Developments	01-Feb-05	31-Jan-09	1,550	1,550	24	24	
COFUND	Cofunding Of The Cern Fellowship Programme	01-Apr-09	31-Mar-13	4,996	4,996	575	230	345
RADENV	Radiation Protection And Environmental Impact Of Future Accelerators	01-Sep-06	31-Aug-10	580	580	203	203	
HIGHINT	Research Into High Intensity Accelerators And Radioactive Ion Production	01-Feb-05	31-Jan-09	772	772			
HICSCERN	Heavy Ion Collisions And Strings At Cern	01-Oct-08	30-Sep-10	173	173	122	122	
Cloud	Cloud Initial Training Network	01-Aug-08	31-Jul-12	2,385	297	120	120	
CMSMuReco TrigBSM	Muon Reconstruction And Trigger Optimization Towards Early Beyond The Standard Model Discovery At The Lhc With The Cms Detector.	01-May-08	30-Apr-10	180	180	120	120	
LATQCD-CHIPT	Robing Chiral Perturbation Theory From Realistic Two-Flavour Lattice Qcd Simulations	01-Mar-09	31-Aug-10	137	137	115	115	
MCnet	Monte Carlo Event Generators For High Energy Particle Physics	01-Jan-07	31-Dec-10	1,793	477	50	50	
LQCDLIGHTQUARKS	Lattice Qcd With Light Dynamical Quarks	01-Feb-07	31-Jan-09	174	174	2	2	
Universenet	The Origin Of Our Universe: Seeking Links Between Fundamental Physics And Cosmology	01-Oct-06	30-Sep-10	3,533	158	46	46	
Lepton Pairs	Determination Of Proton Parton Densities Using Early Lhc Data And Of Contrains On New Physics Beyond The Standard Model	01-Sep-09	31-Aug-11	189	189	43	43	
HeavyRib	Nuclear Structure Studies Of Neutron-Deficient Nuclei In Light Pb Region Using Radioactive Ion Beams	01-Sep-09	31-May-11	188	188	42	42	
HEPTOOLS	Tools And Precision Calculations For Physics Discoveries At Colliders	01-Dec-06	30-Nov-10	3,900	13	6	6	
UNILHC	Unification In The Lhc Era	01-Oct-09	30-Sep-13	3,674	460	3	3	
TOTAL						**5,213**	**4,868**	**345**

* Direct costs declared to the European Commission only; does not take into consideration other direct support and administrative costs.

Figure 22 and 23 show all EU supported projects at CERN still active in 2009. 2009 figures are split into EU funded expenses and additional expenses funded by CERN's core budget in line with the specific contract signed separately for each project. Most of the EU supported projects support mainly training (Marie-Curie projects like COFUND, MITELCO, etc), IT developments (like EGEE and ETICS) or R&D for accelerators and detectors (like SLHC-PP and EUCARD).

The "correction for projects" line in Figure 22 shows costs incurred in 2009 that relate to 2008 activities. It is due to 2009 costs for 2008 activities on CARE (+25 kCHF) and personnel cost regularization at projects bookclosing for CARE, EUROTEV and DIRAC (cancelation of provision on paid leaves, - 432 kCHF).