CERN/SPC/948/Rev.
CERN/FC/5450/Rev.
CERN/2915/Rev.
Original: English
10 August 2010

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE

CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

Action to be taken | *Voting procedure*

For discussion	**SCIENTIFIC POLICY COMMITTEE** 267th Meeting **24 August 2010**	–
For recommendation to Council	**FINANCE COMMITTEE** 331st Meeting **25 August 2010**	Chapter I and II: Simple majority of Member States represented and voting (abstentions are not counted) and 70% of the contributions of the Member States represented and present for the voting (abstentions are counted as votes against) and at least 51% of the contributions of all Member States Chapter IV: Two-thirds majority of Member States represented and voting (abstentions are not counted) and 70% of the contributions of the Member States represented and present for the voting (abstentions are counted as votes against) and at least 51% of the contributions of all Member States
For approval	**COUNCIL** 156th Session **16 September 2010**	Chapter I and II: Simple majority of Member States represented and voting (abstentions are not counted) Chapter IV: Two-thirds majority of Member States represented and voting (abstentions are not counted)

Medium-Term Plan for the period 2011-2015 and Draft Budget of the Organization for the fifty-seventh financial year 2011

GENEVA, August 2010

Finance Committee is invited to recommend the Council and Council is invited:

- **To approve the overall strategy for the reference period as presented in Chapters I and II;**
- **To take note of the Resources Plan for 2011 to 2015 in Chapter III;**
- **To approve the 2011 Draft Budget in 2010 prices as proposed in Chapter IV.**

Table of contents

I. Overall Strategy

Introduction

Following the discussion of the proposed Medium Term Plan (MTP) for the years 2011-2015 and the Draft Budget 2011 in June, the Management has reviewed the plan and all its activities. It submits herein a revised version taking into account comments, suggestions and recommendations of the Council and its Committees.

The guiding principles of this review of the MTP are:

a) not to change the objectives of the plan as they were presented in June and are repeated in the observations of the Director General;

b) to maintain the scientific diversity of the Laboratory;

c) to arrive at a scenario where research and consolidation are done with reduced pace which is adjusted to the reduction in the research budget resulting from reduced income and increased consolidation of the social security headings.

It is evident that the reduced pace entails a higher risk for all activities of the Laboratory; however, given the constraints, the Management considers this additional risk not to be unacceptable.

This revised MTP:

a) cuts the expenses by an integral (years 2011 to 2015) of 343 MCHF;

b) assumes a reduction of Member States' contributions by an overall integrated amount of 135 MCHF;

c) results in a cumulative budget deficit of 330 MCHF at the end of 2015.

The above-mentioned measures of this revised MTP yield a lower cumulative budget deficit at the end of the projection period compared to that presented in the June 2010 MTP. Details of the changes with respect to the June MTP are given below.

Revenues

1. A reduction of Member States' contributions of 15 MCHF in 2011;
2. A reduction of Member States' contributions of 30 MCHF p.a. as of 2012, giving a cumulative reduction of Member States' contributions of 135 MCHF over the years 2011 to 2015.

Expenses

1. Reduce the pace of additional accelerator consolidation by 10 MCHF from 30 MCHF p.a. to 20 MCHF p.a. (integral over the period 48.4 MCHF, 0.8 MCHF in 2011); (fact sheet 15, figure 3)
2. Reduce the pace of LHC spares procurement and consolidation (34.2 MCHF, zero in 2011); (fact sheets 1, 7, figure 2)
3. Re-profile PS Booster extraction energy and SPS upgrades to 2016 (i.e. over six years instead of five) (10.5 MCHF, 2.1 MCHF in 2011); (fact sheet 30, figure 5)
4. Reduce the allocation for HP-SPL R&D from 3 MCHF p.a. to 2 MCHF p.a. (5 MCHF, 1 MCHF in 2011); (fact sheet 28, figure 5)
5. Reduce pace of HL-LHC detector preparations in the framework of the current MTP (19.3 MCHF, 3.9 MCHF in 2011); (fact sheet 31, figure 5)
6. No new Restaurant 3 (6.5 MCHF, 4 MCHF); (fact sheet 22, figure 4)
7. No earmarked funding for Building 33bis (60 MCHF, zero in 2011); (fact sheet 22, figure 4)
8. No active asbestos removal (20 MCHF, zero in 2011); (fact sheet 22, figure 4)
9. No increased resources for CLIC from 2011 onwards (106.1 MCHF, 3.4 MCHF in 2011); (fact sheet 24, figure 5)
10. Reduce materials for linear collider detector R&D (2.8 MCHF, 0.4 MCHF); (fact sheet 25, figure 5)
11. Reduce materials for LCG and desktop computing services (12 MCHF, 3.1 MCHF in 2011); (fact sheet 9, figure 2)
12. Reduce funds earmarked for diversification and generic R&D (12.9 MCHF, 2.5 MCHF in 2011); (fact sheet 29b, figure 5)
13. Delay start of HIE-ISOLDE and reschedule completion to 2014 instead of 2013 (zero on integral, 3.3 MCHF in 2011); (fact sheet 27, figure 5)
14. Reduction in energy consumption in 2012 due to a complete shutdown of the accelerator complex (25 MCHF); (fact sheet 23, figure 4)
15. Shutdown delayed to 2016, higher energy consumption in 2015 (impact -20 MCHF on savings; this amount will be saved in 2016); (fact sheet 23, figure 4).

The cumulative impact of these reductions over the period 2011 to 2015 yields 343 MCHF, resulting in a cumulative budget deficit of about 180 MCHF at the end of the period compared to the 388 MCHF presented in the June 2010 MTP. The impact in 2011 is -15 MCHF on revenues and -24.5 MCHF on expenses, i.e. the budget deficit reduces by 9.5 MCHF for that year.

In order to aim to restore full funding within the next 20 to 30 years as decided by the Council in June 2007, the capital injection should be on average about 60 MCHF instead of 30 MCHF p.a[1]. Therefore, this MTP proposes to inject an additional amount of 30 MCHF p.a. as a contribution from the Member States by accepting that the cumulative budget deficit at the end of the MTP period stands at 330 MCHF (180 MCHF plus 5x30 MCHF), which is still lower than the one presented to the Council in June, which included a proposed capital injection of 30 MCHF p.a.

The changes in this MTP with respect to the June version have an impact on all Figures and fact sheets 1,7,9,15,22,23,24,25,27,28,29b,30,33.

The fact sheets have been updated to include the additional information requested on the new projects for the start and end dates as well as cost-to-completion (CtC). In accordance with the Financial Rules, Article 5[2], cost-to-completion amounts are given for projects with a cost-to-completion in P+M of at least 3% with respect to the annual budget. This concerns the new surface technology building, the PS Booster energy extraction and SPS upgrades, the LHC collimation system under LHC reliability and HIE-ISOLDE (about 50% of the resources for HIE ISOLDE are covered by external revenues).

The consolidation headings for LHC reliability, accelerators (i.e. injectors and technical infrastructure) and general infrastructure are of a non-recurrent nature but ongoing without an end date since they are comprised of many smaller-scale items. For this reason, there is no cost-to-completion but a foreseen funding level. It is the Management's intention to maintain the scheduled funding level for consolidation in this revised MTP to ensure operational reliability but not to allow uncommitted budgets to be carried forward from one year to another.

The individual consolidation items are broken down into work packages and are funded with defined resources as a function of priority and availability of manpower. The list is regularly updated following the risk assessment so as to improve the overall operational reliability. New items are constantly being added to the list of consolidation items due to equipment approaching or reaching the end of its useful life. As an example, the current list of reviewed items that have to be replaced, repaired or refurbished for the injector complexes amounts to more than 400 MCHF in capital investments. The reduction of the funding for additional accelerator consolidation to 20 MCHF p.a. means that it will take 20 years to carry out all the items on this list.

As mentioned by the Management in June, any positive balance between the budget and actual expenses plus open commitments that are not related to projects with a defined cost-to-completion will be used to further reduce the cumulative budget deficit in the coming years.

Last but not least, the personnel allocations to the various projects activities have been reviewed within the overall total personnel numbers of 2250 FTAs.

Observations of the Director-General

The LHC has marked a great step in the evolution of CERN and now that it has started operations, CERN is entering a new era of research. It is the right time to prepare the Laboratory for the coming decades during which the LHC will be operated and upgraded. In parallel, the Laboratory must be prepared for major roles in the new, even more global projects that are emerging. The next years will be decisive in determining the future of CERN beyond 2030, i.e. beyond LHC and its luminosity upgrade. The goal of the Management is to:

1. position CERN as the laboratory at the energy frontier;

2. have CERN ready to bid for the next large project in particle physics;

and

3. prepare for European participation in neutrino physics.

Therefore, although this MTP covers the period 2011 to 2015, it lays the foundation for the next decades of high-energy physics at CERN. The research programme until around 2030 is determined by the full exploitation of the LHC physics potential, consisting of the design luminosity and the high-luminosity upgrade (HL-LHC), together with focused R&D for a Linear Collider (machine and detectors) and for a higher-energy proton collider

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[1] The Management's proposed overall strategy aims to restore full funding of the Pension Fund, namely in the context of this document the increase in the contribution rate and the injection of capital into the Pension Fund, is naturally subject to a separate Council decision.

[2] CERN/FC/5305 - CERN/2822; Article 5 "Where their scale so warrants, projects may be subject to separate approval by the Council."

(HE-LHC). This will position CERN as the laboratory at the energy frontier. Dedicated R&D for neutrino projects will prepare for European participation in neutrino physics at CERN or elsewhere. This programme is complemented by a unique world-class fixed-target programme.

The years 2010 and 2011 are seeing the start of the LHC physics exploitation leading to important input for the update of the European strategy for particle physics planned for 2012.

This MTP addresses all areas of CERN's activities, from science to infrastructure and user-friendliness, aimed at achieving the above-mentioned goals.

This MTP is science-driven, firstly by the LHC, i.e.:

- exploitation of the physics potential of the LHC up to design parameters by adjusting energy and luminosity values in the light of running experience and by optimizing the schedule for physics;
- preparation of the LHC for a long operational lifetime through appropriate modifications and consolidation to the machine and detectors and through the build-up of an adequate spares inventory;
- improvement to the reliability of the LHC through the construction of LINAC4, which will reduce the risk to LHC operation by replacing the ageing LINAC2, which first came into operation in 1978;
- the R&D and subsequent implementation necessary for a significant luminosity increase of the LHC beyond the design luminosity, i.e. HL-LHC, if necessitated by the physics and/or running experience; in particular it includes the focusing elements in the interaction regions and the upgrades of the injector chain;
- LHC detector modifications to make optimum use of the design LHC luminosity;
- the detector R&D necessary for the luminosity upgrade HL-LHC and the corresponding modifications of the existing LHC experiments.

This MTP is also driven by the necessity to bring the LHC injector chain (as mentioned above) and the technical and general infrastructure up to the high standards required for a world laboratory. In order to ensure reliable operation of the CERN complex, the implementation of these measures necessitates earmarked consolidation funds for the most urgent repairs.

This MTP is science-driven secondly by the preparations for the future of CERN as the main global accelerator laboratory at the energy frontier:

- R&D for CLIC in the framework of a world-wide collaboration, mandatory to arrive at a Conceptual Design Report, and potentially followed by a Technical Design Report for the machine;
- enhanced CLIC – ILC collaboration;
- Linear Collider detector R&D in the framework of a world-wide collaboration, mandatory to arrive at a detector Conceptual Design Report for a Linear Collider potentially followed by a detector Technical Design Report for it;
- R&D for superconducting high field magnets for a possible higher energy proton collider HE-LHC if necessitated by the physics.

This MTP is also driven by the R&D for high-power proton sources, such as the high-power superconducting proton linac (HP-SPL), in line with European participation in neutrino physics.

This MTP is science-driven thirdly by a unique, world-class fixed-target programme, which will consist of:

- the SPS, PS, AD, n-TOF and ISOLDE experiments as already planned; which also includes the neutrino beam to the Gran Sasso laboratory;
- new projects that will emerge as a result of the two events:
  a) the physics diversity workshop held in May 2009 ("New Opportunities in the Physics Landscape at CERN") devoted to general non-LHC topics, and
  b) the dedicated neutrino workshop held in October 2009, and that are subsequently approved by Council following presentation to the SPC.

However, following the non-approval of the MTP presented in June, the amounts earmarked for this diversification have had to be substantially reduced. As a result, CERN will presently not be in a position to consider the proposal to reconstruct the neutrino beam line at the PS to finally clarify the LSND anomaly.

In order to compare the current plans for the LHC with earlier scenarios, it should be underlined that the estimates for the LHC luminosity evolution (made in 2006) assumed rather optimistically the collection of 100 fb^{-1} of collision data by the experiments by 2011. The timescales for the LHC luminosity upgrades were correspondingly hopeful, with the installation of the new inner triplet planned for the 2011/2012 shutdown and the operation of the new injection chain consisting of the low-power SPL (LP-SPL) and PS2 scheduled for 2014/2015. Since this planning, the start-up of the LHC was firstly delayed for various technical reasons to September 2008 and then by the incident of 19 September 2008 to November 2009. Investigations following this incident highlighted the urgent need for many improvements and consolidation work, such as the quality of the superconducting inter-magnet joints; the quality of the copper-stabilizer joints; the increased dimensions of the pressure rupture disks; improvements in the magnet quench protection system (QPS) for inter-magnet splices and for the protection against "symmetric" quenches; and improvements and re-design of the anchorage of magnets. These new requirements have changed completely the allocation of resources (materials budget, manpower and shutdown needs).

During 2009, the LHC plans were re-examined using realistic assumptions about the evolution of luminosity and the impact of the design shortcomings and operational failings. These studies culminated in the LHC Performance Workshop in Chamonix (held at the end of January 2010), where technical evaluations of the current state of the LHC were presented. The technical recommendations resulting from this Workshop have been taken into account by the Management in this MTP.

As a result, the Management made the following decisions that will allow the LHC to provide substantial physics in 2010-2011 and be technically capable of operating at the design energy and high intensities as of 2013 until the HL-LHC upgrade around 2020, during which period several hundred fb^{-1} of data are to be collected:

- The LHC will be operated at 3.5 TeV/beam during 2010 and 2011, with a target integrated luminosity of $1fb^{-1}$, with heavy-ion runs at the end of both years of about 4 weeks each, and a technical stop of about 2 months around Christmas.
- This extended operations period will be followed by a long shutdown (of the order of 15 months) in 2012 to early 2013 to repair and consolidate the inter-magnet copper-stabilizers (splices) to allow for safe operation up to 7 TeV/beam for the lifetime of the LHC.
- In the shadow of the inter-magnet copper stabilizer work, the installation of the pressure rupture disks (DN200) will be completed and between two and five magnets which are known to have problems for high energy will be repaired or replaced. In addition, SPS upgrade work will be carried out.
- During that shutdown, the collimation system will also be upgraded at point 3.
- The LHC experiments will use the shutdown as follows:
  - ATLAS: consolidation and installation of a new forward beam pipe;
  - ALICE: commissioning of TID and some calorimeter modules;
  - CMS: Forward Muons Upgrade + works on the infrastructure and consolidation;
  - LHCb: improvements, exchange of the bigger part of the conical beam pipe.
- In the years 2013, 2014 and 2015, the LHC will be operated towards 7 TeV/beam with increased intensities.
- In 2016 (rather than 2015), a long shutdown is scheduled to connect Linac 4, to complete the PS Booster energy upgrade, the collimation system enhancement and install LHC detector improvements. After this shutdown, a further period of three years of LHC operation at 7 TeV and at least design luminosity is planned (with technical stops around the end of each year).
- The ambitious longer-term plans include a total integrated luminosity of the order of 3000 fb^{-1} (on tape) by the end of the life of the LHC. This implies an annual luminosity of about 250-300 fb^{-1} in the second decade of running the LHC. It also calls for a new strategy to optimize the integrated luminosity useful for physics. Therefore, the LHC operation schedule will henceforth be over a multi-year cycle, with a short technical stop around Christmas at the end of every year and a longer shutdown following the end of the second or third year. Such a schedule is more efficient for the operation of a superconducting accelerator. Following the non-approval of the MTP in June, the long-term planning has been reviewed, which results in a postponement of the shutdown scheduled for 2014-2015 to connect the LINAC 4 to 2015-2016. The energy budget will oscillate and the necessary increases in the energy budget have been introduced for the years 2011, 2013, 2014 and 2015. It should be noted that the two-month technical stop around Christmas allows this energy cost increase to be minimised. It needs to be stressed that the high luminosity upgrades as presented here are much more cost effective without compromising the performance of the LHC compared to the possible construction of PS2 and SPL envisaged in earlier plans.

In light of the above developments, additional changes with respect to last year's MTP and, where relevant, with respect to the MTP presented in June, are as follows:

- The Chamonix workshop in January 2010 identified the need for a complete refurbishment of all copper-stabilizer joints of the main LHC magnets for safe running at 7 TeV/beam. The copper-stabilizer repair and consolidation is scheduled throughout 2012 (long shutdown) and is funded within the LHC reliability consolidation introduced last year.

- To ensure reliable operation of the LHC in the coming years, there is a need to consolidate intensively the existing LHC injector chain. This is due to the fact that even if it were to be approved immediately, the LP-SPL and PS2 would realistically not be available until 2020 at the earliest. The assessment of a task force set up to study the consolidation of the existing LHC injector chain identified a need to invest an additional amount of more than 400 MCHF. The Management proposed to invest up to 30 MCHF p.a. in June, now reduced to 20 MCHF p.a., which reduces the pace of the consolidation.
- In order to optimize the strategy towards the HL-LHC, with the goal of maximizing the integrated luminosity useful for physics, the Management has set up a task force. A preliminary recommendation from this task force is to delay the inner triplet replacement to a single HL-LHC upgrade around 2020. The complete HL-LHC upgrade has been defined based on the requirements of the experiments, such as luminosity levelling and use of crab cavities, in order for the LHC to operate reliably at luminosities of about 5×10^{34} cm^{-2} s^{-1}.
- Furthermore, the bottlenecks of the injector chain need to be tackled and hence upgrades are being studied with a view to increase the extraction energy of the PS Booster as well as upgrades to the SPS, the latter currently being a significant bottleneck for increasing the LHC intensity beyond design. These new projects are presented in the fact sheets. Following the start of the general infrastructure consolidation, the Management has identified further urgent items. These relate to the construction of the new surface technologies building (and demolition of the old one), the need to re-group the workshops handling radioactive materials, asbestos removal, site urbanization, insulation of façades, replacement of heating plants, etc. This programme will be ongoing for many years and was estimated in June to cost on average at least an additional 15 MCHF p.a. This heading has been reduced since June by excluding the active asbestos removal, such that the average funding is now limited to 10-11 MCHF.
- As part of the overall aim of ensuring reliable LHC operation, the Management has strengthened the Radiation Protection Group in both manpower and budget. In addition, the Fire Brigade will be maintained at 57 fire fighters. Both items mean that CERN's staff complement could slightly exceed the number of 2,250 active full-time equivalents (FTAs) paid from CERN's Member State contributions.
- CERN continues to submit successful proposals for EU support. As such, 17 Marie-Curie projects have been approved recently. As a consequence of this ongoing success, this MTP anticipates that CERN will continue to obtain EU support worth at least some 8 MCHF p.a. throughout the MTP period up to 2015.
- Following the discussion of the Draft MTP in the SPC in May, the Management presents a prioritised scenario that is not only science-driven but also affordable given the budgetary constraints. Thus, the MTP assumes the feasibility of the energy upgrade of the PS Booster and excludes the start of the LP-SPL and PS2 construction as of 2013. However, the list of conceptual design studies includes the proper termination of the LP-SPL and PS2 studies which will allow these projects to remain possible fall-back solutions for the HL-LHC upgrade.

In line with the priorities of the Management to establish CERN as the laboratory at the energy frontier, the MTP assumes a continuation of the CLIC studies albeit without an increased allocation of resources from 2012 onwards, which represents the largest saving during the period of this MTP.

In order to facilitate the discussions, the activities are grouped into the following categories:

- Reliable operation of the LHC and the approved non-LHC physics programme, and the related infrastructure of the Laboratory. This includes both pure operation as well as the consolidation activities necessary for reliable operation.
- Approved R&D studies and projects. These include the approved enhanced collimation system and the approved studies such as those on the LP-SPL, PS2, CLIC Conceptual Design Report and common efforts towards the ILC, Linear Collider Detector R&D, the ongoing EU-supported R&D activities and projects launched to modify the LHC detectors to be ready for an increase in luminosity. Following the physics diversity and neutrino workshops held in 2009, this category also includes the cost to the Laboratory associated with the activities related to HIE-ISOLDE, NA61, NA62 and n-TOF.
- R&D for future projects. This covers all projects and studies related to the LHC luminosity upgrades for both the machine and the experiments, which are subject to Council approval after the delivery of the R&D studies outcome in 2011/2012. It also includes amounts earmarked for the continuation of the CLIC efforts towards a Technical Design Report subject to evidence of feasibility in the

ongoing CLIC Conceptual Design Report or, alternatively, the collaboration efforts towards the ILC. Finally, the first cost estimate of R&D for a HP-SPL with a CERN contribution towards neutrino physics is included.

The first category amounts to about 910 MCHF on average over the years of this MTP compared to the 940 MCHF presented in June by reducing the pace of consolidation. It cannot be further reduced since this amount is crucial for reliable operation of the LHC (machine, detectors, computing), the approved runs of the non-LHC physics programme and the infrastructure of the Laboratory. The last MTP produced by the previous Management anticipated for this category some 800 MCHF in 2010 prices (770 MCHF in 2008 prices). The difference per annum can be explained as follows:

a) The need for LHC spares (reduced from 25 MCHF p.a. in last year's MTP to 11 MCHF following the non-approval of the MTP in June); more operations materials budget (taking into account the real cost-to-completion instead of the 1996 estimate, 15 MCHF); additional consolidation for LHC reliability induced by the sector 3-4 incident (some 10 to 15 MCHF); and the newly-identified need for LHC injector consolidation (up to 20 MCHF as of 2013), entailing overall some 61 MCHF for reliable LHC operation from 2013 onwards.
b) The move from full-time equivalent (FTE) to active full-time equivalent (FTA), some 17 MCHF and in line with IPSAS implementation. This move also takes due account of the increased manpower needs for reliable LHC operation.
c) Consolidation of the technical infrastructure (of about 10 MCHF) introduced in 2009 and additional 10 to 11 MCHF per general infrastructure introduced in 2010.
d) Re-establishing the Radiation Protection Group required for LHC operation and maintaining the Fire Brigade at 57 fire fighters (7 MCHF).
e) Increased energy budget to enhance the integrated luminosity (around 20 MCHF every two years, i.e. an average of about 10 MCHF).
f) The other additional work, such as improved services to users and the continuation of non-LHC physics programme, are absorbed.

As mentioned above, the reduced pace of consolidation will inevitably compromise operational reliability. However, given the constraints, the Management considers that the associated level of operational reliability is not unacceptable.

This MTP allocates some 2,075 FTAs out of the 2,250 FTAs for this category.

Whereas the category "approved R&D studies and projects" is in line with last year's MTP - including the HIE-ISOLDE project, NA61 and NA62 - the category relating to R&D for future projects includes the first estimates of all new projects under consideration.

Finally, CERN will have to 'consolidate' its social security system and to finance the outcome of the ongoing 5-yearly review. This MTP includes a prudent approach for these headings, for which the details are under evaluation and are to be decided upon by the Council. This revised MTP includes 55+30 MCHF p.a. of which 30+30 MCHF p.a. are earmarked as a direct payment to the Pension Fund to stabilise the funding level and of which 15 MCHF p.a. corresponds to the Organization's share of the proposed increased contributions to the social security schemes. This scenario makes it possible to balance the health insurance scheme and to start recapitalizing the Pension Fund to restore full funding as decided by Council in June 2007.

The results from the LHC will be vital to decide the direction that particle physics will take in the future. In order for CERN to be ready to play an appropriate role in the next large project in particle physics at the energy frontier, diverse but focused R&D for future projects is mandatory for the future of the Laboratory. However, this is not compatible with the assumption of balancing of the cumulative budgetary deficit in 2013.

The revised MTP presented here combines reduced revenues, reduced spending on research and consolidation by a careful and responsible adjustment of the pace originally foreseen, and an increased injection of capital into the social security systems with an acceptable decrease of the budget deficit, lower than anticipated in June.

II. Scientific and Non-Scientific Programmes

LHC Programme

1. LHC Machine and Injectors

Goal	Operation of the LHC as a 7 TeV centre-of-mass energy pp collider until end 2011. After the incident in sector 3-4 during September 2008, the repair has been completed and the consolidation programme has been partially done. Measures have been undertaken to prevent a similar occurrence, and also to mitigate the impact of a pressure build-up in the insulating vacuum of the cold parts of the machine. This heading also includes the continuing studies to improve the performance of the LHC and its injector complex. Included here are the specific injector machines for the LHC heavy-ion programme (LINAC3 and LEIR).
Approval	1996
Start date	R&D 1990, Construction 1998
Costs	Total costs of the consolidation programme and of the continuing studies to improve the performance of the LHC and its injectors are under evaluation.
Running conditions	Operation of the LHC at 7 TeV centre-of-mass energy. Following initial operation, the LHC will progressively increase its luminosity, by increasing the number of bunches and the proton intensity per bunch as well as by implementing stronger focusing in the interaction points, with the aim of accumulating 1 fb^{-1} of integrated luminosity by the end of 2011. At the end of the proton runs a period of operation with collisions of Pb^{82+} ions are scheduled in both 2010 and 2011. Long shutdowns are foreseen in 2012 (for splice consolidation and collimation enhancement) as well as in 2016 (connection to Linac4). In between the machine will be running for 3 years, with every year a 2-month technical stop (to minimise the increase in energy consumption).
Competitiveness	Highest centre-of-mass energy collisions worldwide.
Organisation	CERN, through the departments within the accelerator and technology sector manages the resources and technical operation. Technical management via a specific committee structure. Overall organization under the Directorate for Accelerators and Technology.
Risks	The stored energy in the magnets and the beam require sophisticated protection systems which must be qualified by a thorough and complete hardware testing and commissioning. The number and complexity of the accelerator components increase the risk for reliable operation. A review of the situation concerning spares has been launched. In many critical areas insufficient spares exist. Due to prioritisation for the LHC consolidation program, less funds are available for spares than originally foreseen in last years' MTP. As the luminosity is increased, the risk of radiation effects on electronics installed in the machine will increase. Studies are underway, as are measures to mitigate against operational problems resulting from single event upsets. **Failure of the PS motor generator set:** A new PS power supply is under commissioning and will be put into service in 2012. In parallel, an emergency solution with reduced efficiency was developed by which the PS could be powered directly from the 18kV supply to fill the LHC. **Failures in Linac2:** A consolidation of the RF tanks in Linac2 has already been undertaken to reduce the risk of a vacuum failure. A study to address the possible failure of a magnet in the drift tubes is underway.
2011 targets	Following initial operation, the LHC will progressively increase its luminosity, by increasing the number of bunches and the proton intensity per bunch as well as by implementing stronger focusing in the interaction points, with the aim of accumulating 1 fb^{-1} of integrated luminosity by the end of 2011. For the injector complex the commissioning of the initial Pb82+ ion beam through the complex to the extraction from the LHC has been completed and at the end of the LHC proton runs a period of operation with collisions of Pb82+ ions is scheduled in both 2010 and 2011.
Future prospects	Progressive increase in the centre-of-mass energy and luminosity towards the nominal values of 14 TeV and 10^{34} cm^{-2} s^{-1}.
Longer term	A technical design review on the spares has been completed and a corresponding heading has been introduced in this MTP. A programme for the LHC luminosity upgrade is under study. For the machine a project to upgrade the high- luminosity interaction regions is underway. For the injectors complex a new chain of machines is under study with the first element (LINAC4) approved and under construction and with the long-term consolidation of the LHC injector chain foreseen.
Specific Health and Safety issues	Losses throughout the accelerator produce some activated equipment. The beam-cleaning areas and the high luminosity insertions will become particularly activated. Sites are identified for the treatment and storage of this equipment. Budget is set aside to deal with the disposal of the radioactive waste. RP plans and surveys all such operations following the ALARA principle.
Outreach	The LHC is highly visible in the press and public domain.
CERN budget for 2011	LHC Machine: Personnel: 71.1 MCHF, Materials: 48.2 MCHF. LHC Spares: Materials: 7.8 MCHF. LHC Injectors: Personnel: 1.9 MCHF, Materials: 1.1 MCHF for heavy ions.

LHC experiments

2. ATLAS detector

Goal	Verify the Standard Model and search for new physics.
Approval	January 31st, 1996
Start date	1998
Costs	Total CERN share of Materials for ATLAS construction: 128.8 MCHF; Total Personnel and Materials (CERN share, project, tests and operation until 2008 incl.): 509.2 MCHF.
Running conditions	Runs up to full design luminosity. Ready to use any luminosity provided.
Competitiveness	Together with CMS, very competitive compared to existing facilities.
Organisation	A total of 173 institutions from 37 countries with 3452 authors with PhD (or equivalent), students included. *Governing body*: Collaboration Board (one representative per member institution) and Chair. *Executive bodies*: Management: Spokesperson and two Deputies, Technical Coordinator, Resource Coordinator. Executive Board chaired by the Spokesperson. Subsystem Projects led by Project Leaders. Physics Working Groups with two co-conveners per working group. Interface with CERN through a dedicated CERN team.
Risks	No major managerial and financial risks identified. Technical: no specific risks identified. General risk related to the operation of a very complex detector system including many different detector technologies.
2011 targets	Data-taking with the complete detector at luminosities up to a few 10^{32} $cm^{-2}s^{-1}$ or higher (depending on the machine performance) with CERN physicists playing an important role. With a few 10 pb-1 of accumulated data, ATLAS will perform first measurements of Standard Model physics processes (e.g. W&Z bosons, top-quark production). With one fb-1 ATLAS could discover supersymmetric particles with masses beyond the present Tevatron sensitivity, as well as start to explore several scenarios for physics beyond the Standard Model.
Future prospects	Physics run at high energy and luminosity in 2013 and beyond.
Longer term	ATLAS is already planning for detector upgrades in view of LHC luminosity upgrades. ATLAS plans to add an extra layer in the Pixel (Insertable b-layer) layer before 2016. A TDR is being prepared. Work on the LoI to benefit from normal luminosity is proceeding and is expected to be submitted in the course of 2011. For HL-LHC, the whole Inner Detector might need to be replaced.
Specific Health and Safety issues	/
Outreach	Organized by the Collaboration and documented in the ATLAS Communication Plan.
CERN contribution	Infrastructure in the experimental area. Strong contribution towards the technical coordination of the experiment including the subsystem installation. Providing Tier-0 centre as well as some analysis capability. Important contributions to all sub-systems (CORE 33 MCHF) and non-CORE support (68 MCHF). A total of 128 MCHF was spent. At present, a total of 81 FTE (physicists and engineers 68, technicians 12, secretariat support 1).
CERN budget for 2011	Personnel: 20.8 MCHF, Materials 4.1 MCHF, of which M&O: 1.5 MCHF (cash contributions).

3. CMS detector

Goal	Verify the Standard Model and search for new physics.
Approval	April 29, 1998
Start date	1998
Costs	Cost-to-Completion (CERN share of Materials): 127.8 MCHF; Total Personnel and Materials (CERN share, project, tests and operation until 2008 incl.): 488 MCHF.
Running conditions	Runs up to full design luminosity. Ready to use any luminosity provided.
Competitiveness	The CMS detector is a very versatile scientific instrument, capable of outstanding performances in hadron runs as well as in heavy ion runs.
Organisation	A total of 157 institutes finance the CMS experiment, funded by 42 Funding Agencies from over 40 countries with 1929 signing scientists with PhD (or equivalent). *Governing body*: Collaboration Board (one representative per member institution) chaired by an elected Chairperson (2-year mandate). *Executive bodies*: Management Board, Executive Board, Finance Board. Spokesperson (2-year mandate), Technical Coordinator, Resources Manager, Subsystem Project Leaders. Interface with CERN through a dedicated CERN team.
Risks	No major managerial and technical risks identified. Financial: The last financing round, which covers the totality of the funds already committed, has not been fully subscribed. Some 3.1 MCHF are still to be secured. General risk related to the operation of a very complex detector system including many different detector technologies.
2011 targets	Physics run at initial luminosity and 7 TeV energy, achieve high data-taking efficiency. Measure Standard Model processes. Search for “new” physics.
Future prospects	Install YE4 and 4th Forward RPC station.
Longer term	Upgrades beyond 2011: Luminosity upgrade (HL-LHC) planning has started. A management structure has been set up. The Collaboration has endorsed the re-scoping of the Forward Resistive Plate Chambers muon detectors and the 4th shielding disks, YE4. A Pixel detector upgrade is being studied and costed with installation foreseen for the years 2014/2015. An infrastructure upgrade has been studied and costed.
Specific Health and Safety issues	/
Outreach	Organized by the Collaboration and regularly reported to the Scrutiny Group for the activities financed by M&O-A. Linking regularly with CERN Outreach efforts.
CERN contribution	Complete responsibility for the experiment infrastructure. Leading role in the DAQ, financially and technically. Other very important contributions to ECAL, Tracker and Muon. Providing the CMS Centre infrastructure and TIER-0 facilities. Strong contribution to software tools and data analysis. Currently the CERN-CMS team is 86 FTE strong.
CERN budget for 2011	Personnel: 20.0 MCHF, Materials: 3.7 MCHF, of which M&O: 1.26 MCHF.

4. ALICE detector

Goal	Study of heavy ion collisions: measuring properties of strongly interacting matter at extreme energy densities where the formation of a quark-gluon plasma is expected. Study of proton-proton (pp) collisions: establishing reference data for the study of the quark-gluon plasma and studying properties of pp collisions where ALICE has unique capabilities thanks to particle identification and low-p_t acceptance.
Approval	1997
Start date	1998
Costs	Cost-to-Completion (CERN share of Materials): 28.6 MCHF; Total Personnel and Materials (CERN share, project, tests and operation until 2008 incl.): 182.9 MCHF.
Running conditions	Dedicated heavy ion running and systematic pp running.
Competitiveness	ALICE is the only general-purpose detector dedicated to heavy ion physics at the LHC. Complementary to experiments at RHIC (BNL, USA).
Organisation	117 Institutes from 32 countries with 568 participants with PhD (or equivalent). *Governing body*: Collaboration Board with one representative each of the participating institutes, chaired by an elected Chairperson. *Executive bodies*: Management Board: Spokesperson plus two deputies, Technical Coordinator, Resources, Computing and Physics Coordinators, Project Leaders, and elected members. Interface with CERN through a dedicated CERN team.
Risks	No major managerial and financial risks identified. *Technical*: No specific risks identified. General risk related to the operation of a very complex detector system including many different detector technologies.
2011 targets	pp physics data-taking and 2nd Pb-Pb physics data-taking. Physics analysis. Preparation of 2012-2013 shutdown to complete the detector and carry out detector maintenance tasks.
Future prospects	Heavy ion data-taking for one month per year and pp physics data-taking for the rest of the year. Completion of the installation of PHOS, TRD and EMCal modules.
Longer term	R&D started to prepare upgraded or new detectors to be installed during LHC major shutdowns for the luminosity upgrade.
Specific Health and Safety issues	Nothing specific identified.
Outreach	Organized by the Collaboration, in collaboration with ALICE CERN Team. Effort to increase visibility of ALICE.
CERN contribution	Overall scientific, technical and financial coordination, including safety. Experimental infrastructure and responsibility for installation and planning and execution of shutdown activities. Participation in detector construction projects: Si Pixel detector and level zero trigger, TPC (field cage, electronics, technical coordination), HMPID and Muon Arm (magnet). Contribution to PHOS and EmCal electronics. Financial contribution to Si Strip detector. Participation in other systems: responsibility for ACT, ECS, DAQ, DCS, electronic logbook, ALICE-LHC interface and infrastructure/installation, including test beam areas. Electronics coordination. Coordination of offline computing, including simulation and data processing. Development of offline computing framework, Physics coordination. Currently the CERN-ALICE Team is 36 FTE strong.
CERN budget for 2011	Personnel: 9.5 MCHF, Materials: 2.1 MCHF, of which M&O: 0.683 MCHF.

5. LHCb detector

Goal	Search for physics beyond the Standard Model in CP violation and rare decays of beauty and charm hadrons.
Approval	September 1998
Start date	1998 (construction)
Costs	Cost-to-Completion (CERN share of Materials): 20.5 MCHF; Total Personnel and Materials (CERN share, project, tests and operation until 2008 incl.): 121 MCHF.
Running conditions	Modest luminosity of few times 10^{32} $cm^{-2}s^{-1}$, compared to the LHC nominal luminosity of 10^{34} required (less focused interaction point locally tuneable). Displaced collision point in order to accommodate the spectrometer without enlarging the existing cavern at IP8.
Competitiveness	Large number of B_s mesons produced by LHC compared to the existing facilities. Efficient inclusive heavy flavour trigger and hadron particle identification compared to the other LHC experiments.
Organisation	A total of 54 institutes from 15 countries with 737 participants with PhD (or equivalent), students included. *Governing body*: Collaboration Board (one representative per member institute) and Chair. *Executive bodies*: Management: Spokesperson and Deputy, Technical Coordinator, Resource Coordinator. Interface with CERN through a dedicated CERN team.
Risks	The operation of such a complex detector inherently comprises risks; two particular risks identified: damage (mechanical or beam-related) to the beam pipe and the VELO detector. For both, mitigation actions are under way (replacement components under construction).
2011 targets	Normal data-taking with complete detector at close to nominal luminosity. Physics to explore measurements where large new physics effects are not excluded, down to the level of the Standard Model expectation. With ~1 fb^{-1} of data expected during 2011, LHCb will significantly improve on the world limits for $Br(B_s \rightarrow \mu^+\mu^-)$ and ϕ_s (phase of the B_s oscillation amplitude).
Longer term	Following the submission of an "Expression of Interest" LHCb will submit a "Letter of Intent for an LHCb Upgrade". We envisage this upgrade to enable the LHCb experiment to operate at 10 times the design luminosity, i.e. at about 2×10^{33} cm^{-2} s^{-1}, to improve the trigger efficiency for hadronic decays by a factor of two and to collect a data sample of ~100 fb^{-1}.
Outreach	LHCb is placing an increasing emphasis on information services and communication networks from the experiment to the general public as well as to specifically targeted interest groups, such as students, schools and journals.
CERN contribution	CORE contribution 13.5 MCHF plus iron blocks for the Muon Filter. Total cash investment to the experiment 23.1 MCHF, which also includes providing infrastructure and R&D. A total (2010) of 47 FTE (31 physicists and engineers, 13 technicians, 3 secretariat support).
CERN budget for 2011	Personnel: 10.3 MCHF, Materials: 1.8 MCHF, of which M&O: 0.350 MCHF.

6. Common items, other experiments

6.a Totem detector

Goal	Measurement of total cross-section, elastic scattering and diffractive phenomena.
Approval	Research Board decision from July 2004.
Start date	2005 construction, physics with first LHC stable beams
Costs	Cost-to-Completion (CERN share of materials): 2.7 MCHF. Total Personnel and Materials (CERN share, project, tests and operation until 2008 incl.): 10.8 MCHF.
Running conditions	Special runs with large β^* of 90 m and 1540 m and normal LHC running conditions.
Competitiveness	The total cross-section and elastic scattering measurements have almost no competition. Diffractive studies are complementary to ATLAS and CMS, but TOTEM has the most complete proton measurements.
Organisation	A total of 10 institutes from 7 countries with 70 participants with PhD (or equivalent). *Governing body:* Collaboration Board (one representative per member institute) and Chair. *Executive bodies:* Management: Spokesperson and Deputy, Technical Coordinator, Resource Coordinator. Technical Board chaired by Technical Coordinator. Subsystem projects led by project leaders. Physics group chaired by physics coordinator.
Risks	Technical risk: Roman Pot detectors very close to the beams; forward detectors close to the beam pipes with almost unknown background. For both exposure to strong radiation.
2011 targets	Complete detector installation and commissioning; Global commissioning with all subsystems; Perform the measurements as foreseen in the proposal.
Longer term	Common runs with CMS; possible upgrades: installation of a few more radiation hard Roman Pot detectors. Installation of a large GEM detector in forward region. Installation of Roman Pots in IP3.
Outreach	Spin-off from the TOTEM development of edgeless silicon detectors and VFAT chips (front-end readout and trigger) for industrial applications.
CERN contribution	Overall technical coordination for the experiment including the subsystem installation; Infrastructure in the experimental area; Leading responsibility in the Roman Pot system including silicon detectors; Some responsibility in online (incl. DCS) and offline computing. The CERN-TOTEM Team is 6 FTE strong.
CERN budget for 2011	Personnel: 1.3 MCHF, Materials: 0.4 MCHF, including Totem M&O: 0.2 MCHF.

6.b LHCf detector

Goal	Measurement of forward production spectra of pi0's and neutrons at the LHC energy for the purpose of verification of hadron interaction models for cosmic-ray physics.
Approval	June 2006
Start date	2006
Costs	Total Personnel and Materials : 2 MCHF.
Running conditions	Short low luminosity (~ 10**29) runs with < 43 bunch operations foreseen at the beam commissioning. Wish to run with a beam crossing angle to enhance the covered Pt region. Runs with different energy would be also interesting to verify interaction models.
Competitiveness	Other zero degree hadron calorimeters in LHC experiments, but complementary to each other since the LHCf is dedicated to measure EM components.
Organisation	32 members from 6 countries participating (incl. 8 PhDs, 4 students); spokesperson, deputy spokesperson, technical coordinator, GLIMOS.
Risks	Manageable risk of radiation damage: Since the LHCf detectors are not radiation hard, degradation of detectors is planned to be monitored and controlled.
2011 targets	Complete physics analysis with data taken. Physics run at the highest possible energy in 2011.
Future prospects	Physics run at the highest possible energy.
Longer term	Dedicated run to cover complete Pt region with a beam crossing angle. Also plannning for possible data-taking in ion collisions.
Outreach	Open the information to the public using web, publicity and press releases, etc. to create interdisciplinary connection between cosmic ray physics and particle physics.
CERN contribution	Overall technical coordination for the experimental infrastructure, installation, planning and execution of shutdown activities. General interface to the machine before and during data-taking. GLIMOS, Computer administration and Outreach activities (2 people from EN/MEF: ~ 0.7 FTE).
CERN budget for 2011	No direct CERN contribution for Materials.

6.c MoEDAL (new fact sheet)

Goal	Monopole and Exotics Detector At the LHC (MoEDAL). The prime motivation of this experiment is to search for the direct production of magnetic monopole at the LHC.
Approval	December 2009
Start date	2010
Running conditions	The MoEDAL detector will consist of layers of plastic attached to the walls and ceiling of the cavern that houses the VELO detector of the LHCb experiment.
Competitiveness	Unique research for magnetic monopoles.
Organisation	Physicists from Canada, CERN, the Czech Republic, Germany, Italy, Romania and the US.
2011 targets	Installation of a substantial subset of the detector for the 2011 physics run.
Future prospects	Another physics aim is the search for exotic, highly ionizing, stable (or pseudo-stable) massive particles (SMPs) with conventional electric charge.
CERN contribution	No direct CERN contribution for Materials.

7. LHC machine and areas reliability and consolidation (old fact sheet 21.a)

Goal	The consolidation of the LHC itself and a program to build up a full stock of spare parts for the LHC machine . It covers the renovation of the existing LEP infrastructure (Cooling, ventilation, electricity supply), which was re-used for the LHC, as well as a number of new items such as protection of LHC underground equipment against radiation damage and the upgrade of the collimation system.
Approval	Starting in 2007 with new initiatives, since 2010 LHC Consolidation and LHC Spares items (=sub-projects) have started.
Costs	The consolidation heading for LHC reliability is of non-recurrent nature but ongoing without an end date since it is comprised of many smaller scale items necessary for reliable LHC operation. Cost-to-Completion has been defined for the enhancement of the collimation system from 2010 until 2013 (35 MCHF materials) to enhance the LHC performance towards design paramaters. The splices repair CtC is 24.7MCHF. The CtC for the Radiation to Electronics consolidation is still under review.
Running conditions	This activity consists of many multi-annual projects. Thus the quantum is a sub-project, not the yearly budget.
Competitiveness	Without increasing investments in CERN's accelerator, technical and general infrastructure, the operation of the scientific programme is endangered. Renovating the general infrastructure is necessary to reduce operation and maintenance costs (heating, lightning, etc.).
Organisation	The existing consolidation projects (internally called PS-CONS, SPS-CONS & AB-0801) have been re-organised and combined with the new LHC Consolidation and LHC Spares activities to create 4 consolidation projects: PS-CONS and SPS-CONS (under Accelerator Consolidation), and LHC-CONS and LHC-SPARES (under LHC consolidation). Three consolidation activities: collimation (see above), splices repair (in 2011-2013) and electronics protection to radiation (R2E) as of 2010 at least to 2016 are managed with a separate budget. See http://en-dep.web.cern.ch/en-dep/Groups/MEF/Projects/consolidation.htm.
Risks	Since LHC approval, and until 2003, CERN operated in a repair mode instead of a preventive maintenance mode. This has resulted in a backlog of outstanding investments for infrastructure items at the end of their lifetime. Without renovation of the accelerator infrastructure and equipment, LHC operation would be severely compromised. Scarcity of personnel which will determine the capacity to carry out the consolidation items.
2011 targets	Consolidation will cover mainly the old LEP infrastructure that has been re-used for the LHC (Cooling Ventilation, Electrical networks...) and a major campaign to build up the necessary LHC spare parts that were not included in the final cost to completion. Also preparations are made for the consolidation of the splices and the enhancement of the collimation system (both to be carried during the shutdown 2012).
Future prospects	This MTP includes continuing funding for LHC consolidation to be able to address upcoming consolidation projects in various domains (e.g. splice reinforcement, HVAC systems, controls, electronics) and spares.Collimation enhancement beyond 2013 will be necessary.
Longer term	Full consolidation of old LEP technical infrastructure, ensuring reliable LHC operation at design parameters.
Specific Health and Safety issues	More reliable equipment reduces the interventions needed in radioactive areas.
CERN budget for 2011	Personnel: 7.9 MCHF, Materials: 35.1 MCHF (of which 9.8 MCHF for the enhancement of the collimation system, 8 MCHF for R2E project and 1 MCHF for the splices).

8. LHC detectors consolidation (new fact sheet)

Goal	The overall aim is to improve the reliability and redundancy of infrastructure and common equipments for the detectors to ensure their efficient operation during the period following the 2012 shutdown.
Approval	This is a consolidation program for the approved detectors at LHC.
Running conditions	This activity consists of many projects which will take place in the next 3 years. Thus the quantum is a sub-project, not the yearly budget. The requested budget corresponds to the CERN share on a large effort from all funding agencies.
Competitiveness	The higher luminosity running at the nominal energy of 14 TeV will establish the CERN leadership in the high energy frontier and define the future roadmap of High Energy Physics.
Organisation	The projects are organized and coordinated for each individual experiment by the Technical Coordination Office.
Risks	Without consolidation of the detectors infrastructure and equipment, their operation would be less efficient and could even be severely compromised in the case of key elements such as the magnets.
2011 targets	Procure all the necessary equipment for the consolidation effort during the 2012 shutdown and prepare for it. Main domains of consolidation work are: magnets cryogenics; electrical, UPS, cooling & ventilation equipment; shielding; networks; preparation of assembly and maintenance areas; finalisation of TOTEM Roman pots.
Future prospects	This MTP includes pluriannual funding to be able to address the planned consolidation projects.
Longer term	/
Specific Health and Safety issues	/
CERN budget for 2011	Detector consolidation: Materials: 7.6 MCHF, manpower will be deployed from operation and maintance headings.

9. LHC computing (old fact sheet 7)

Goal	Build and maintain a data storage and analysis infrastructure for the worldwide LHC physics community.
Approval	2001
Start date	2002
Costs	Total Personnel and Materials (CERN share, project and operation): 214.7 MCHF up to end 2009.
Running conditions	- Service to run 24hrs x 365 days a year, distributed infrastructure allows individual external sites to be down while maintaining overall service. - Typical data rates up to 1.5 GB/s from CERN to Tier 1s, equivalent rates between Tier1/2 sites. - In 2010-11 plan to manage approaching 1M jobs per day.
Competitiveness	Largest ever computing endeavour to store and analyse massive amounts of physics data for access world-wide.
Organisation	- CERN + 11 Tier1 sites + 64Tier 2 federations (~126 sites). - Dedicated boards (C-RRB, OB, MB, GDB, CB) and committees (LHCC, C-RSG, AF). - Resources mainly in IT Department, some PH, and external in the collaborating institutes. - Collaboration established with a Memorandum of Understanding signed by 34 countries.
Risks	- Uninterruptable power in CERN Computer Centre will no longer be sufficient during 2011. - Additional Tier 0 capacity and power required from 2012; solutions proposed as alternatives to a new building (containers, local hosting) are expensive; remote hosting of a major facility carries unknown management risks. - EGEE-III successor projects currently being defined, the impact on financial resources available not yet known rendering manpower planning difficult. - External resource planning for 2011 and later awaits clarification of LHC schedule. Risk that funding agencies do not plan sufficient capacity without this information on likely running scenarios.
2011 targets	Extended production run ensuring: - Sustained transfer of LHC data (raw and processed) to tape at 1.5 GB/s (2GB/s for heavy ion running), - Data export to Tier 1 centres of up to 2 GB/s, - Successful support for chaotic data analysis, especially support for many hundreds of users, - And more generally providing a service capable of withstanding planned and unplanned incidents: improving recovery procedures.
Future prospects	Increased workloads and data rates as accelerator reaches design luminosity.
Longer term	Dependent on LHC performance, experiment needs and available resources.
Outreach	- International Science Grid This Week (ISGTW) support, - Working with OpenLab partners to improve knowledge and technology transfer, - GridCafe and frequent Computer Centre tours, - LCG Public website http://lcg.web.cern.ch/LCG/public/ and updated LCG dissemination material.
CERN contribution	Tier 0 and Analysis facility to provide ~15% of total computer and storage resources. Project management and coordination of all activities.
CERN budget for 2011	Personnel: 18.1 MCHF, Materials: 24.1 MCHF.

Other Scientific Programmes

10. Non-LHC Physics (fixed-target programme) (old fact sheet 8)

Goal	SPS fixed-targets -NA 62 is a new experiment to study the rare decay of charged K mesons. In 2011, the experiment is expected to produce the Giga Tracker elements and to construct the Straw Chambers Tracker while finishing the installation of the beamline. - NA 61: proton running and first test with a Boron ion beam obtained by lead fragmentation in parallel with LHC ion running. - NA 58, COMPASS: Muon DIS programme. PS fixed-targets - PS212 (DIRAC): Running will depend on consideration by SPSC of an addendum to measure long-lived pi-pi atoms. - PS 215 (CLOUD): continued exploitation of the newly commissioned state-of-the-art large volume chamber to study the influence of cosmic rays on climate. AD, ISOLDE, n-TOF - AD: use decelerated anti-protons and positrons to measure differences if any between hydrogen and anti-hydrogen. The new AD-6 experiment (to measure the gravitational interaction of antimatter) will be in construction and pre-installation phase. - ISOLDE: Study the structure of short-lived (exotic) nuclei and employ them in neighbouring disciplines (nuclear astrophysics, weak interaction studies, condensed matter physics, life sciences). - n-TOF: Measure neutron induced reaction cross sections of relevance for nuclear astrophysics, advanced nuclear technologies and fundamental nuclear physics. CNGS measuring Tau-neutrino appearance. Non-accelerator-based experiments - CAST: search for axion particles from the sun, will run until 2011 with 3HE cold bore. - OSQAR: an optical research for QED vacuum magnetic birefringence, axion and photon regeneration. Each of the two experiments uses a decommissioned LHC prototype dipole.
Approval	**ISOLDE**: first approved in 1964, latest approval for continuation in June 2007. **n-TOF**: first approved April 1999. **AD**: latest approval for continuation in December 2008.
Start date	**ISOLDE**: first beam 1967, at present location first beam June 1992. First post-accelerated beam October 2001. **n-TOF** first beam November 2000 until 2004, resume operation end of 2008. **AD**: first beam July 2000.
Competitiveness	All experiments, after approval by the dedicated committee (SPSC or INTC, and Research Board), are quite unique in the world. The facilities at CERN (SPS, PS, ISOLDE, nTOF, AD) support the requirements of substantial communities and provide unique conditions for numerous experiments.
Organisation	Each experiment or facility has a specific organisation, similar for all collaborations. Each is controlled by a specific MoU.
Risks	The total number of protons which can be delivered to the experiments is lower by design of the accelerator chain than expected by the experiments.
2011 targets	Reach goals defined in the experiment proposals and approved by scientific committees and Research Board.
Future prospects	**A complete stop of data taking due to the accelerator complex shutdown in 2012** **AD:** adding a cooling ring (ELENA) to the anti-protons beam. **ISOLDE**: in the context of the HIE-ISOLDE project, further increase of REX energy. Installation of spectrometer at REX. Upgrade of the target area to meet LINAC4 intensities. **n-TOF**: The construction of a second experimental area (EAR-2) at 20 m from the spallation target has been proposed and will give unprecedented beam intensities and characteristics. Implementation of the outcome of the non-LHC diversity workshops in 2009.
Specific Health and Safety issues	**ISOLDE**: Some experiments involve handling of open radioactive sources. For these cases individual training by RP is done. **n-TOF**: Safety issues related to the use of radioactive sample material for measurements, in particular for actinides; these have been cleared by CERN safety authorities. **AD**: Safety issues related to the use of radioactive sources; these have been cleared by CERN safety authorities.
Outreach	Continue diversity workshops.
CERN contribution	General support in line with the General Conditions applicable to experiments performed at CERN.
CERN budget for 2011	Personnel: 3.8 MCHF, Materials: 7.1 MCHF.

Note that information on the ISOLDE and n-TOF facilities, as operated by the BE and EN Departments, is included in fact sheet 14.

11. Theory (old fact sheet 9.a)

Goal	Participate in the analysis of data generated by the LHC and other experiments at CERN. Provide high quality theoretical research and a general service to the Theory Community.
Competitiveness	Maximal sharing is encouraged. We also continue to be one of the top 5 Theory groups in the world.
Organisation	Group PH-TH.
2011 targets	Support experiments and TH community.
Future prospects	Help and support initial analysis of LHC data. We are running the TH Theory Institute programs with world-wide participation not only in the study of BSM prospects, but also Top Physics at the LHC and Astroparticle implications.
Longer term	Theoretical excellence, and in-depth analysis of the prospects provided by full data-exploitation of the LHC. In 2011 we have already some TH-Institute programs being proposed. Among them, to have a meeting of world experts and local ones on radiative correction tools in order to better understand event generators and reconstruction, as well as recognition of backgrounds. CERN is also dedicated to get funding for Theoretical Astroparticle Physics activities which have direct connection with the LHC. This includes the prospect of hosting a particle/astroparticle theoretical physics institute.
Outreach	The PH-TH group participates actively and systematically in the Organization's outreach activities in the form of public lectures in the Member States and whenever required by the visits on-site. Studies concerning scientific risk and discovery potential.
CERN contribution	Logistics and general support. Budget for TH visitors has been restructured in a more efficient way to run the TH-Institute in terms of focussed programs most of which are related to LHC data and prospects. 18 research physicists and 4 administrative assistants provide the necessary coordination and support for the visiting and associates programme of about 50 fellows and 400 visitors per year.
CERN budget for 2011	Personnel: 10.1 MCHF, Materials: 2.0 MCHF.

12. LHC physics centre (old fact sheet 9.b)

Goal	Coordinate and optimize existing resources, and introduce new initiatives, dedicated to the best possible exploitation of the LHC data.
Approval	The initiative to create the Physics Center was first introduced in 2009.
Start date	Coordination of the activities implemented in December 2009.
Competitiveness	The LHC Physics Centre at CERN will be complementary to LHC analysis centres world-wide, and will provide scientific support to the whole LHC community.
Risks	/
2011 targets	Provide resources needed to operate the Centre; organize scientific activities centered on the LHC physics programme (Workshops, Lectures and working groups).
CERN budget for 2011	Materials: 0.7 MCHF (mainly for subsistences for visitors and some equipment).

The formerly included manpower for LHC physics exploitation from the 2006 white paper is reported under LHC detectors re-scoping in figure 2.

13. Scientific Support (computing and technical support; old fact sheet 9.c)

Goal	Support to the various experiments at CERN on: Scientific computing tools, detectors mechanics and electronics development, design, construction, installation and maintenance (including associated services) and provision of administrative and logistics service to the community of users.
Running conditions	General scientific computing, technical, logistics and administrative support for experiments. The engineering (PH-DT) and electronics (PH-ESE) groups are involved in the operation of the experiments and provide on-call services. The resources are shared between operation and new initiatives, the sharing being adapted to the requests for operation and shut-down periods of the experiments.
Competitiveness	The resources are used on a multi-projects basis focusing mainly on common activities for all experiments.
Organisation	Groups of PH involved: AGS, DT, ESE and SFT. Steering boards involving representatives from experiments and PH management periodically review the current activities, agree on new common or specific activities, and define the priorities.
Risks	No financial, technical or managerial risks identified, provided that the level of resources are kept at least at the present level to preserve expertise and to provide support to the community of users.
2011 targets	Assure a safe, efficient and reliable operation of the experiments. Provide support to the community of users.
Future prospects	Support operation, consolidation for running experiments. Support new initiatives and upgrade activities. Consolidate computing tools for the analysis of LHC data.
Longer term	Involvement in R&D activities for LHC upgrades and Linear Collider detectors.
Outreach	Publication and regular updating of activities on Web sites. The expertise developed in the support groups is regularly consulted by external institutes (computing, detector technologies and electronics). Participation to R&D collaborations and KTT activities.
CERN contribution	Administrative, logistics, computing, technical and general support.
CERN budget for 2011	Personnel: 28.3 MCHF, Materials: 9.8 MCHF.

14. Low and medium energy accelerators / PS and SPS complexes / Accelerator technical services (old fact sheet 10)

Goal	This heading comprises the non-LHC accelerators forming the CERN complex. Included are Linac2, PSB, PS, AD and SPS. These machines provide a range of beams to several experimental facilities including ISOLDE, the PS fixed-targets, n-ToF, AD, the SPS fixed-targets and CNGS. LINAC2, PS Booster, PS and SPS also form the main injector chain for the LHC. Concerning the low- and medium-energy accelerators the goal is to deliver the requested intensities for the experiments. This includes 3.75 x 10^{19} protons for CNGS, 2.5 x 10^{5} spills for SPS North Area (COMPASS), 0.96 x 10^{19} protons for n-ToF, 1.1 x 10^{6} spills for East Area (DIRAC), and a duty cycle of 34% for ISOLDE. To reduce losses, a new extraction and transfer system has been built in the PS (the Multi-turn Extraction). Commissioning is complete and the system will be put into full operation during 2010. The initial urgent consolidation of the complex is well underway, but more consolidation will be required from 2012 onwards in order to keep the machines working at optimum performance until the proposed new LHC injector chain can be put into operation. The heading also includes accelerator technical services, generic expenses for accelerator engineering, controls and operation.
Approval	A new experiment for AD (AEGIS) has been approved and is scheduled to start data-taking during 2011. A light-ion programme has been approved for NA61 to allow for possible operation with light ions as of 2012. Preparations for the installation of NA62 is in progress with the dismantling of NA60 having started. The intensity and energy upgrade for ISOLDE (HIE-ISOLDE) has been approved.
Start date	/
Costs	/
Running conditions	The number of facilities, together with the diversity of beams to be delivered, means that there is an overall shortage of protons available. Very dynamic optimization of the operational machine cycles is needed to maximize the availability of beam to all experiments. A prioritization between the different facilities will be needed and is under discussion between the management and the relevant scientific committees.
Competitiveness	The CERN accelerator complex represents a unique facility over a range of particle energies.
Organisation	Specific organization of each facility with CERN in charge of technical operation. Overall organization under the Directorate for Accelerators and Technology.
Risks	Specific risks have been identified and mitigation measures are underway. **Failure of the PS motor generator set:** A new PS power supply is under commissioning and will be put into service in 2012. In parallel, an emergency solution with reduced efficiency was developed by which the PS could be powered directly from the 18kV supply to fill the LHC. **Failures in Linac2:** A consolidation of the RF tanks in Linac2 has already been undertaken to reduce the risk of a vacuum failure. A study to address the possible failure of a magnet in the drift tubes is underway. **Radiation in target areas**, especially in CNGS represents a risk for the performance of the installed equipment. **The spares situation** has been studied. In certain critical areas insufficient spares currently exist in case of failure (e.g. CNGS Horn and Reflector). The total number of protons which can be delivered to the experiments is lower through the accelerator chain than expected by the experiments.
2011 targets	Delivery of beams to all users with the maximum overall efficiency. All of the non-LHC physics programmes are done in parallel with operation for LHC injection. The total beam to each user will be limited by the overall scarcity of protons.
Future prospects	Preparation for the new AEGIS experiment on the AD will begin in 2010 for first beam in 2011. Preparations for NA61 and NA62 will continue. Continued studies to further enhance the beams for all users. Following the non-approval of the budget in June: a complete stop of the entire accelerator complex in 2012 to allow for redeploying manpower to the consolidation work packages
Longer term	LINAC4 will provide an increase in beam intensity and brightness. The construction schedule for ISOLDE (HIE-ISOLDE) will be driven by the available resources. AD is considering a new post decelerator (ELENA) to increase the intensity and brilliance of the antiprotons delivered to the users.
Specific Health and Safety issues	Losses throughout the accelerator complex produce some activated equipment. Sites are identified for the treatment and storage of this equipment. Budget is set aside to deal with the disposal of the radioactive waste, especially the treatment of the used ISOLDE targets. The Radiation Protection group plans and surveys all such operations following the ALARA principle.
CERN budget for 2011	Low- and medium- energy accelerators: Personnel: 5.7 MCHF, Materials: 4.3 MCHF; PS and SPS complexes: Personnel: 35.3 MCHF, Materials: 24.4 MCHF; Accelerator technical services: Personnel: 18.1 MCHF, Materials: 12.8 MCHF.

15. Accelerator consolidation (old fact sheet 21.a)

Goal	The overall aim is to consolidate the existing injector chain such that it can be used for the next 25 years for running of the LHC.
Approval	2005 and 2008; 2007 new initiatives. The addional consolidation needed to keep the existing complex running for the next 25 years is for Council Approval in 2010.
Costs	The consolidation heading for accelerators (i.e. injectors and technical infrastructure) is of non-recurrent nature but ongoing without an end date since they are comprised of many smaller scale items. For that reason, there is no Cost-to-Completion but a foreseen funding level that was reduced since June to a steady-state of 20MCHF p.a. instead of 30 MCHF p.a.
Running conditions	This activity consists of many multi-annual projects. Thus the quantum is a sub-project, not the yearly budget.
Competitiveness	Without increasing investments in CERN's accelerator, technical and general infrastructure, the operation of the scientific programme is endangered. Renovating the general infrastructure is necessary to reduce operation and maintenance costs (heating, lightning, etc.).
Organisation	The existing projects PS-CONS, SPS-CONS & AB-0801have been re-organised and combined with the new LHC Consolidation and LHC Spares activities to create 4 consolidation projects: PS-CONS and SPS-CONS (under Accelerator Consolidation), and LHC-CONS and LHC-SPARES (under LHC consolidation). See http://en-dep.web.cern.ch/en-dep/Groups/MEF/Projects/consolidation.htm.
Risks	Since LHC approval, and until 2003, CERN operated in a repair mode instead of a preventive maintenance mode. This has resulted in a backlog of outstanding investments for infrastructure items at the end of their lifetime. Without renovation of the accelerator infrastructure and equipment, LHC operation would be severely compromised. Scarcity of personnel which will determine the capacity to carry out the consolidation items.
2011 targets	Continuation of the existing accelerator consolidation to ensure reliable LHC operation, e.g. start of consolidation PS Access System, 18kV cables SPS, and SPS power convertors.
Future prospects	This MTP includes continuing funding for accelerator consolidation to be able to address upcoming consolidation projects (e.g. completion of the PS control access system, CERN-wide Electrical networks).
Longer term	In addition to accelerator infrastructure, the technical and general infrastructure requires major repair and replacement, as for example new cabling and ventilation for the PS Booster, including possibly the replacement of older buildings. The current list of new items identified in 2010 to be consolidated exceeds 400 MCHF and will thus take up to 20 years.
Specific Health and Safety issues	CERN infrastructure has to be upgraded so as to become more energy-efficient. More reliable equipment reduces the interventions needed in radioactive areas.
CERN budget for 2011	Personnel 2.5 MCHF, Materials: 22.1 MCHF.

Infrastructure and Services

16. Manufacturing facilities (old fact sheet 11.a)

Goal	Provide specific engineering solutions combining mechanical design, production facilities and material sciences. Prototyping and feasibility developments. Design and manufacture of high complexity PCBs where the production time and cost in industry would be too long/high.
Start date	Big re-organisation where the projects started paying for the services provided: 1992.
Running conditions	Projects at CERN pay for the development and production.
Competitiveness	Projects at CERN not obliged to pass by the workshops so in real competition with private industry.
Organisation	Mechanical design and production in the EN-MME group. Design and production of PCBs using either conventional or fine-pitch photolithography techniques is carried-out in a section with the EN-ICE group. Both managed by the Engineering Department under the Directorate for Accelerators and Technology.
Risks	Production may be on the critical path of the projects, which puts enormous focus on priorities and resources.
2011 targets	Avoid any delays in projects where the design/production is on the critical path. Launch the project of the removal of the fine-pitch photolithography workshop to a new building.
Future prospects	Keep the know-how of mechanical construction of beam accelerators and physics detectors and PCBs within CERN. Let the outside industry produce the “standard components”.
Longer term	Establish long-term refurbishing of the tools.
Specific Health and Safety issues	Comply with the international standards of safety. A study is under way to improve the long-term working conditions in the workshops.
Outreach	Collaborating with outside industry. Development at CERN, production of standardized products outside.
CERN contribution	/
CERN budget for 2011	Personnel: 14.2 MCHF, Materials: 2.5 MCHF.

17. General facilities and logistics (old fact sheet 11.b)

Activities	This consists of technical infrastructure (i.e. cooling and ventilation, electrical distribution, heavy handling); site facility management (cleaning, guards, green areas, site management, registration services); and logistics (i.e. stores, shipping, goods reception and mail services). The materials cover essentially industrial service supplies and maintenance contracts. This heading is a stable baseload over time.
Risks	The functioning is more and more compromised by the urgent need for consolidation of both technical and general infrastructure (see fact sheet 22 at the end of their lifetime. Some examples of the ageing infrastructure are building 102 (to be replaced with building 107), pipes to be urgently replaced, leaking roofs and buildings in general.
2011 targets	The increased budget with respect to 2008 aims to further improve services to the users and staff as well as the maintenance of the site for reliable operation.
CERN budget for 2011	Personnel: 22.2 MCHF, Materials: 35.5 MCHF (of which 15.6 MCHF are technical infrastructure, 19.2 MCHF are for site facility management and 0.7 MCHF are for logistics).

18. Informatics (old fact sheet 11.c)

Activities	Informatics include the Computing Infrastructure (internal & external networking, telephony, databases, computer centre operation, helpdesk), desktop support (pc support, mail, web, collaborative tools and windows services), administrative computing services and scientific information services for CERN users & staff, which means the support of significantly more than 10'000 people.
Risks	Some external funding is secured at short notice, consolidation and upgrading of the network infrastructure as well as the communication system become more and more urgent.
2011 targets	Ensure adequate level of availability of the Informatics services including data loss protection (backups) against accidental errors or human mistakes for its user base, as well as perform capacity planning to anticipate the needs. Ensure prompt corrective actions in case of service failures. Protect and educate against the risks of computer security vulnerabilities.
CERN budget for 2011	Personnel: 24.7 MCHF, Materials: 16.1 MCHF.

19. Safety, health and environment (old fact sheet 12)

Activities	Services and expenses for the implementation of CERN Safety Policy aiming at the continuous improvement in risk prevention, emergency preparedness and incident/crisis management covered by the following domains: **Occupational Health and Safety:** - Workplace safety including monitoring of specific risks such as asbestos - Advice and expert support in matters of safety - Safety training & campaigns **Occupational Medicine:** - Medical service (two doctors, three nurses) - Preventive health campaigns **Radiation protection:** - Operational radiation protection - Design studies/estimates/simulations on radiological impacts (activation, doses, shielding) - Services: Spectrometry, Personal Dosimetry, Radioactive sources and Import/export of radioactive material - Radiological ambient monitoring - RAMSES, ARCON (machine, workers, public, environment) - Radioactive waste management (storage, conditioning, evacuation) - Radiation protection instrumentation calibration service **Safe operation, maintenance and consolidation of CERN beams facilities:** - LHC safety improvements following 19th Sept. 2008 incident (outcome of the LHC Safety Task Force) - General and continuous LHC Safety consolidation **Environmental protection:** - Protection of air, water, soils and noise emissions (measurement, analysis, improvements) - Waste management (conventional, industrial, special wastes) - Noise limitation - Environmental incident preparedness (monitoring, reporting) **Emergency preparedness and incident/crisis management:** - Fire brigade (57 fire fighters) - Firefighting equipment **Technical inspections and safety coordination**
Targets for 2011	**Occupational Health and Safety:** - Reduction of the # of injuries (incl. towards more complete incident reporting) - Safety training and safety training refreshment - Towards a systematic risk analysis (workplaces, operation of equipment/facilities) - Towards a systematic elaboration of safety files and related procedures - Exercises (evacuations, emergency plan, etc) **Radiation protection:** - Limit and monitor prompt radiation - Limit induced activity (reduce beam losses, shielding, studies, …) - RP optimisation - ALARA - Rad. waste management: towards elimination of waste **Safe operation, maintenance and consolidation of CERN beams facilities:** - Implement Chamonix 2009 recommendations to improve safety of LHC operation. **Environmental protection:** - Reduce/limit environmental impact in air, water, soil releases and noise emission
Risks	Fire. Legal non-conformities, general health & environment, impact on public relations. Safety of personnel; environmental protection; safety of equipment and installation.
CERN budget for 2011	Personnel: 21.1 MCHF, Materials: 14.1 MCHF (out of which radioactive waste management amounts to 4.6 MCHF).

20. Administration (old fact sheet 13)

Activity	Generic expenses of the Director-General's office and dedicated services, human resources management, financial services (accounting, planning, controlling) and purchasing. It also includes the expenses related to Council and its committees.
Goal	Improve administrative processes to fulfil the needs, transparent, service-oriented and high quality whilst limiting the total P+M cost not to exceed the current level with respect to total expenses.
2011 targets	Balance central/non-central administration, final implementation of Key Performance Indicators in a CERN wide common software, review in-house versus outsourcing. For Human Resources: implementation of 5-yearly review outcome; implementation of the risk assessment unit, support to Council initiatives.
CERN budget for 2011	Personnel 33.4 MCHF; Materials 8.2 MCHF.

21. Outreach & KTT (including Scientific Exchanges)

21.a Outreach and Scientific Exchanges (old fact sheet 14.a)

Goal / activities	To promote the public understanding of particle physics, cosmology, and related technologies through activities such as the visits, teachers and exhibition programme. To foster the engagement of CERN with society and key-target audiences through a range of activities on and near to the CERN sites and through European countries. To foster support for CERN and its missions. CERN Teacher Programmes (between 3 days and 3 weeks): to update the knowledge and to enthuse school teachers, so that they can better motivate their students to continue their scientific studies at secondary level; to raise more interest and inspire young people to continue their scientific studies at secondary level; to make school teachers ambassadors for CERN. The goal is to organize programmes for 800+ teachers per year. Visits and exhibitions: to inform the outside world about the science that is done at CERN by providing the opportunity to visit the Laboratory, meet scientists, and visit experimental facilities, aiming to reach 50,000+ visits per year. The new permanent exhibition in the Globe of Science and Innovation will be inaugurated in 2010 and should become the centre of CERN visits; the travelling exhibition will tour Europe (2010: Italy and Denmark) to inform citizens in the Member States about CERN research. The CERN Communication group's mandate is to increase awareness of and foster support for CERN and its activities, and to promote the interaction of science with society in Europe. Working with a number of key-target audiences, the group aims to generate public engagement in science, to produce and distribute information, to foster community building and to build support for CERN and its missions. The group seeks to ensure that CERN communicates a coherent message of CERN's missions to key-target audiences using a variety of tools, and to establish a consistent recognisable identity for CERN with all audiences, both internal and external. This heading also includes the scientific exchanges programme, which funds the summer student programme as well as the central funding for the technical and doctoral students.
CERN budget for 2011	Personnel: 6.0 MCHF, Materials: 7.8 MCHF.

21.b Knowledge and Technology Transfer (old fact sheet 14.b)

Goal	To maximize dissemination of CERN technologies and know-how. To demonstrate that, through KTT activities, CERN is making a positive and durable impact on global and societal issues. To foster knowledge exchange across a number of European networks as well as through a new worldwide network of people and institutions associated with CERN (which includes an Alumni programme).
Activities	Identification, protection and dissemination of CERN's Intellectual Property (IP). Implementation of the new policy for IP Management at CERN, including an incentive scheme for CERN units involved in KTT projects. Further development of the CERN Global Network as a facilitator for knowledge exchange in Europe and beyond. Additional networking activities, in particular in relation to medical applications of CERN technologies and know-how (including the management of several European projects in the domain of Hadron Therapy).
Risks	Being perceived as not dealing in an equitable way with different external partners (will be mitigated by the new IP Management policy). Loss of data, e.g. in the framework of the CERN Global Network. The amount of external revenues and expenses will depend on CERN's success to conclude new partnerships and TT contracts.
CERN budget for 2011	Personnel: 2.4 MCHF, Materials: 1.3 MCHF.

22. Infrastructure consolidation, buildings and renovation (old fact sheet 21.b)

Goal	General infrastructure covers machine, experimental and tertiary buildings, caverns and tunnels. Machine-specific infrastructures such as electrical power distribution and cooling systems are not included. Over the years since the LHC project approval, the maintenance of this infrastructure has been kept to a strict bare minimum. Only vital repairs have been executed. During the next few years a major consolidation programme will be executed to permit the organization to face the challenges that the LHC operation in terms of site usage will bring. In addition the evolution of sustainable development and responsible energy usage in tertiary applications, i.e. heating/air conditioning, etc., will have to be taken into account in line with developments in society in general. After the non-approval of the proposed MTP in June, this activity was scaled back not to plan for an active asbestos removal anymore.
Costs	The consolidation headings for general infrastructure are of non-recurrent nature but ongoing without an end date since they are comprised of many smaller scale items. Cost to Completion is defined for Building 107 (new surface technology building) of 30 MCHF (materials), and for building 867 (concentrating the CERN radiation workshops) of 13.9 MCHF (materials).
Running conditions	This activity consists of large-scale multi-annual projects and multiple short projects.
Risks	Not pursuing the infrastructure consolidation entails serious risks for both the functioning of the accelerators and working conditions for the staff. Carbonation has started to undermine the stability of buildings (notably building 30). Pollution may be generated by oil rejects from transformers, exceeding the legal PCB concentration limit. Scarcity of personnel which will determine the capacity to carry out the consolidation items.
2011 targets	Refurbishment of accelerator-related buildings and office buildings threatened by concrete carbonation. Completion of the approved project for the Building 867 (grouping of all workplaces for radioactive equipment) and start of the new building 107 for all surface finishing activities to comply with safety and environmental directives. The global consolidation project is spread over at least 10 years and will then have to be maintained at a consistent level to avoid further deterioration. Additional office buildings are also planned to be able to host an increasing number of users. For technical infrastructure the main items are consolidation of handling equipment, treatment or replacement of transformers with PCB concentration exceeding the new legal limit, upgrade of the gas distribution system for experiments, infrastructure for the new metrology machine for CLIC, new SPS magnet transport vehicle, safety access platforms.
Future prospects	Refurbishment of accelerator-related buildings and office buildings threatened by concrete carbonation. Some additional funds for computing infrastructure refurbishments and renewals. Asbestos removal.
Specific Health and Safety issues	As in the 1950s and 1960s many buildings on the sites were constructed using asbestos technology, their future refurbishment or demolition will entail major costs.
CERN budget for 2011	Personnel 4.3 MCHF, Materials: 26.6 MCHF (of which 5.0 MCHF for building 107 and 9.6 MCHF for building 867).

23. Centralised expenses, Interest and financial costs, Annual balance (old fact sheet 15)

Centralised Personnel Expenses, which are expenses related to previous and future staff such as the CERN share for pensioners health insurance, pre-retirement of shift workers, arrival and departure entitlements and unemployment benefits. As from 2011, this heading includes also a 25 MCHF provision for the CERN share for social security and the 5-yearly review outcome. Please note as well the heading of 17 MCHF under other expenses to amortize over 10 years the provision for acccruals of staff's paid leaves and shift worker compensation and the Special Contribution to the Pension Fund under other expenses of 60 MCH per annum to recapitalize the Pension Fund
Internal taxation related to the amount of basic salaries of CERN personnel (25.0 MCHF estimate for 2011).
Personnel internal mobility is a central fund of 2 MCHF per annum to ease the transfer from one organic unit to another
Personnel on detachment is linked to staff working in other organisations for which CERN receives the costs as revenues, the heading is assumed to stay similar over time, around 0.8 MCHF.
Energy and water: 87.3 MCHF for 2011.
Central insurance and postal **charges** of 7.3 MCHF for 2011.
Housing fund relates to the expenses of the hostel and apartments (4.3 MCHF covered by revenues).
Interest and financial costs inludes the interest for the FORTIS bank loan and short-term loans as well as bank charges. The reduction is linked to the completed EIB loan repayment in April 2009 and reducing short-term loans. The 2011 estimate amounts to 14.8 MCHF.
Any positive **annual balance** of the budget is used for capital repayment according to the schedule agreed with FIPOI and FORTIS banks and as a function of the cash position to minimize the short-term loans.

Please note that the June version included 55 MCHF p.a. under Centralised Personnel Expenses. As the direct payment to the Pension is now separately identified, this heading reduces to 25 MCHF p.a.

Projects

24. CLIC / Linear Collider (old fact sheet 16.a)

Goal	Design of a e+/e- multi-TeV Linear Collider based on a novel Two Beam Accelerator scheme and address all feasibility issues documented in a draft CLIC Conceptual Design Report (CDR) by 2011. A test facility (CTF3) is built and run by a multi-lateral collaboration of 34 institutes providing additional (M&P) resources. Due to reduced funding, the possible Technical Design report is postponed to 2020. Develop a close collaboration with the International Linear Collider (ILC) based on RF Superconducting Structures for a LC in the TeV energy range aiming at: - an optimum use of resources, - developing by the CLIC and the ILC teams a set of complementary Linear Collider technologies in preparation for the next HEP facility best adapted to the favoured Physics scenario based on LHC physics results as soon as they will become available, - fostering a common Linear Collider Community.
Approval	Accelerated CLIC R&D by CERN Council in 2004
Start date	July 2004, Rome
Costs	Total from 2004 to 2010: 112.1 MCHF. Spent from 2004 to 2007 = 56 MCHF (24.9 MCHF Materials + 31.1 MCHF Personnel). Spending from 2008 to 2010 = 56.1 MCHF (27 MCHF Materials + 29.1 MCHF Personnel). The amounts earmarked for 2011 beyond were reduced following the non-approval in June which will significantly delay the possible achievement of Technical Design Report.
Running conditions	CLIC/CTF3 Collaboration of 34 Institutes from 19 countries organised like a physics experiment with members represented in a Collaboration Board and by a Spokesperson. The contribution of each member is described in a specific MoU addendum with a total external contribution of 15 MCHF and 110 FTE.
Competitiveness	Collaborative competition with the International Linear Collider (ILC) based on RF Superconducting Structures for a LC in the TeV energy range. CLIC design complementary to ILC by extending LC into the multi-TeV energy range. A constructive collaboration between CLIC and ILC has been launched with 8 common working groups on subjects with strong synergies between the two studies. This collaboration is evolving towards developing common strategy and synchronised scenarios concerning Linear Colliders. Both CLIC and ILC workshops will be joined in a common Linear Collider Workshop hosted by CERN in October 2010.
Organisation	CLIC nucleus study team hosted at CERN and reporting to the CLIC/CTF3 Collaboration Board with representatives of all collaborating institutes. Distribution and follow-up of work packages by the CLIC Steering Committee to CERN groups and external collaborators. Overall organization under the Directorate for Accelerators and Technology.
Risks	Failure to address all CLIC technical issues by 2011.
2011 targets	Complete CLIC Test Facility (CTF3) installation to address major CLIC technical issues and demonstrate performances of accelerating structures with nominal parameters (100 MV/m at 10-7 breakdown rate) and fully equipped. Complete final version of Conceptual Design of a 3 TeV Linear Collider in stages for presentation at CERN council mid 2011. Develop plans for a future phase of CLIC Technical Design for proposal at CERN by 2011
Future prospects	Technical Design around 2020 pending approval by the Council in 2011/2012 (due to reduced resources delayed from 2016).
Longer term	Possible construction of a Multi-TeV Linear Collider based on CLIC technology once a TDR will hav been completed
Specific Health and Safety issues	High beam power and radiation issues.
CERN contribution	Overall coordination of the CLIC study and CTF3 project. Host of the CLIC/CTF3 Collaboration. Validation, distribution and follow-up of the work-packages. Contribution to the ILC design through the CLIC/ILC collaboration.
CERN budget for 2011	Personnel: 14.2 MCHF, Materials: 12.9 MCHF.

25. Linear Collider Detector R&D (old fact sheet 16.b)

Goal	Physics and detector studies for a future e+e- linear collider up to 3 TeV (CLIC or ILC) in a world-wide collaboration.
Approval	Preparatory studies, no formal approval by a scientific committee yet.
Start date	January 1st 2009
Costs	For the development phase, reduced pace to around 3-4 MCHF per annum (P+M).
Running conditions	Preparatory studies, not a running experiment.
Competitiveness	In collaboration with world-wide linear collider physics/detector studies. A future linear e+e- collider is generally seen as the best tool to expand the particle physics discovery potential, after LHC.
Organisation	CERN
Risks	Not yet applicable.
2011 targets	Publish the conceptual design report on the CLIC physics/detector by April 2011. Detector simulation studies; technical design of detector elements and concepts; targeted hardware R&D for linear collider detectors with emphasis on CLIC.
Future prospects	Detector R&D for the technical design phase, as well as detector concept studies.
Longer term	Participation in the construction of an experiment at a future e+e- linear collider.
Specific Health and Safety issues	None for the moment.
Outreach	http://lcd.web.cern.ch/LCD/.
CERN contribution	In 2011: simulation studies, engineering and integration studies, solenoid development, R&D on particle detectors and associated electronics.
CERN budget for 2011	Personnel: 2.6 MCHF, Materials: 0.5 MCHF.

26. LINAC 4 (old fact sheet 17)

Goal	Build a 160 MeV H- linear accelerator to inject particles into the PS Booster and improve the PSB beam brightness.
Approval	CERN Council June 2007
Start date	January 2008
Costs	100.3 MCHF CtC (material), 182.3 FTE (personnel). There is a contingency reserve of some 5% in 2014
Running conditions	Funding essentially by CERN. Contributions from Non-Member states and external organisations at the level of 3 to 4 MCHF (2010: 1 MCHF contribution signed, 1 MCHF in preparation, 1-2 MCHF in discussion). In-kind contribution from France (special White Paper contribution) of 1.75 MEUR and 3 FTE.
Competitiveness	No competition with other projects.
Organisation	Project composed of 218 Work Units distributed into 30 Work Packages assigned to CERN Groups. Management by Project manager supported by 6 sub-managers and a Technical Coordinator. Progress of Work Units controlled via an EVM tool. Project baseline updated in May 2010. Overall organization under the Directorate for Accelerators and Technology.
Risks	Technical: some accelerator components are of novel design and require prototyping. In the case of the failure of prototypes, alternative solutions exist but could lead to delay in the schedule. Financial: uncertainties on the cost of large contracts with industry (corresponding to 10-15% of the budget), which depend on fluctuations of exchange rates, on the price of commodities and on commercial strategies. Overall risk analysis for the project conducted in October 2009.
2011 targets	Complete the first series of accelerating structures. Complete the tendering of main accelerator components. Complete the installation of services in the building. Commission the 3 MeV injector on the Linac4 test stand.
Future prospects	Injection into the main accelerator chain (PSB-PS-SPS) after the shutdown 2015/2016 (instead of 2015 as presented in June).
Longer term	Possibility to upgrade to high beam power if required by future physics programmes.
Specific Health and Safety issues	Standard health and safety issues for accelerators.
CERN contribution	Project fully controlled by CERN, integrating in-kind contributions from Member and Non-member States.
CERN budget for 2011	Personnel: 9.9 MCHF, Materials: 29.9 MCHF.

27. HIE-ISOLDE (new fact sheet)

Goal	Build a 10 MeV/A SC Linac to post-accelerate radioactive ion beams from ISOLDE, design study for ISOLDE target intensity upgrade.
Approval	CERN Research Board September 2009.
Start date	January 2010. The project has been delayed to start the second half of 2011 to finalize in 2014/2015 following the June 2010 non-approval of the MTP.
Costs	CtC 35.3 MCHF for materials (of which 17.5 MCHF CERN funded), 173 FTE (Personnel).
Running conditions	Project funded partly by Member States, with 6 MeV/A intermediate stage almost fully funded. 10.3 MCHF materials and 73 FTE already found externally (4.8 MCHF and 6 FTE already spent for the beam quality improvement and part of the Linac design study and prototyping from 2008-2009). - Additional 1.8 MCHF and 20 FTE requested within Spanish program "Industry for Science". - 1 to 2 MCHF requested within Scandinavian Interregional Program IV of the European Union. - 1 to 2 MCHF in kind contribution under discussion within KoRIA accelerator project.
Competitiveness	All 700 radionuclides produced at ISOLDE from 1.4 GeV PSB beams can be post-accelerated efficiently up to 10 MeV/A. This capability will be unique world-wide.
Organisation	Projects composed of 60 Work Units distributed into 50 Work Packages assigned to CERN groups. Project managed by Project Leader supported by 6 deputy managers and a Technical Coordinator. Progress of work units controlled via EVM tool. Overall organization under the Directorate for Accelerators and Technology.
Risks	Technical: some accelerator components are of novel design and require prototyping (Nb sputtered superconducting copper cavities). In case of failure, alternative solutions exist but could lead to delay in the schedule. Financial: SC Linac financed entirely through external funds.
2011 targets	Completion of civil engineering work. Launch series production of high-beta superconducting RF cavities. Complete tendering of cryomodules. Arrival of 20 Marie-Curie fellows.
Future prospects	Provision of accelerated ions A=6 to A=238 between 0.7 and 10 MeV/A to ISOLDE users by 2014.
Longer term	Beam intensity and selectivity upgrades to take advantage of upgrade of CERN injector chain.
Specific Health and Safety issues	Standard health and safety issues for accelerators including cryogenics.
CERN contribution	Project fully controlled by CERN, integrating in-kind contributions from Member and Non-Member States.
CERN budget for 2011	Personnel: 3.9 MCH, Materials: 4.9 MCHF.

28. R&D accelerators (old fact sheet 19.a)

Goal	Studies for LHC upgrade not being shown explicitly (i.e. PS Booster, SPS); generic High Power SPL R&D as possible support to neutrino physics, various EU supported projects (S-LHC, EUCARD, etc).
Start date	High Power SPL R&D: pending Council approval of the proposed MTP.
Costs	Total costs under evaluation. The HP-SPL R&D activity earmarked funding was reduced from 3 to 2 MCHF per year as of 2011 following the non-approval of the MTP in June.
Running conditions	R & D partly integrated in EU Programmes (“SLHC” CNI-PP and EuCARD IA) in partnership with other European laboratories. Direct contributions from USLARP, APUL and from multiple collaborations.
Competitiveness	To maintain and subsequently to significantly improve the unique features of the LHC, the ageing injector chain must be renewed and the LHC accelerator and detectors need major improvements.
Organisation	Along the lines of the CERN department structure with project leaders managing contributions from most CERN departments and external laboratories in Europe, Canada and USA. Overall organization under the Directorate for Accelerators and Technology.
Risks	Technical and financial: quality and completeness of the R&D until 2012 will directly impact on the options of CERN's scientific programmes and facility update strategy.
2011 targets	Launching of High Power SPL study.
CERN budget for 2011	Personnel: 2.8 MCHF, Materials: 4.7 MCHF.

29. Other R&D

29.a R&D computing supported by EU (old fact sheet 19.b)

Activities	End of the following projects by April 2010 at the latest: EGI_DS, Health-e-Child, EGEE-III, D4Science, ETICS2, BalticGrid-II, GridTalk, SEE-GRID_SCI. Start-up during 2009 of OpenAIRE, D4Science-II, EnviroGrids. The project figures for EGI-INSPIRE, EMI are yet finalised and thus not included in this MTP.
Goals	Enhance Grid technology in Europe.
CERN budget for 2011	Personnel: 0.5 MCHF; Materials: 0.1 MCHF.

29.b R&D for detectors

Activities	Seed funding and support for generic R&D activities on gas, solid state, silicon and crystal detectors. Operation of R&D facilities. Investigate radiation-hard technologies for detectors and optical links, detector power management, micropattern gas detectors, detector cooling, parallelization of software frameworks, portable analysis environment, general development of detector components, coordination through CERN of European programmes.
Goals	Prepare for a LHC luminosity upgrade in line with the LHC machine upgrade schedule and for future generation of detector systems. Due to reduced funding capacity no more generic R&D for HL-LHC detector R&D for the years 2020 following is foreseen. HL-LHC detector R&D seed funding is foreseen.
CERN budget for 2011	Personnel: 1.6 MCHF; Materials: 2.9 MCHF.

30. High luminosity machine upgrade (partly old fact sheet 18)

Goal	Finalise the studies and cost-estimates for the low power SPL and PS2; Update of the PS Booster extraction energy and SPS performance as luminosity upgrade in the LHC. Studies for substantially increasing the LHC luminosity (i.e. new inner triplets, crab cavities, etc).
Approval	Council approval of the proposed MTP for the PS Booster and SPS upgrade projects.
Start date	Following Council approval of the MTP, anticipated 2010
Costs	Total costs including new inner triplets until 2020 are under evaluation, the baseline scenario assumes the feasibility of the PS Booster energy upgrade and hence does not include anymore the start of LP-SPL and PS2 construction from 2013 onwards. - PS Booster upgrade CtC 26.4 MCHF (materials) until 2016, - SPS Upgrade CtC 50 MCHF up to 2016 with a likely continuation until 2018 (materials only, still in preliminary phase). - Generic R&D for new inner triplets (see also High Field Magnets), no project costs for replacing the inner triplets are included in this MTP.
Running conditions	R & D partly integrated in EU Programmes ("SLHC" CNI-PP and EuCARD IA) in partnership with other European laboratories. Direct contributions from USLARP, KEK, CEA, APUL and from multiple collaborations. For the LHC Machine upgrade stable material funds are allocated to allow for continuation of some High Luminosity R&D.
Competitiveness	To maintain and subsequently to significantly improve the unique features of the LHC, the ageing injector chain must be renewed and the LHC accelerator and detectors need major improvements.
Organisation	Along the lines of the CERN department structure with project leaders managing contributions from most CERN departments and external laboratories in Europe, Canada and USA. Overall organization under the Directorate for Accelerators and Technology. The former Inner Triplets project phase 1 will be stopped in 2012 to be merged with the R&D on High Field Magnets aiming for new inner triplets towards 2020 (i.e. outside this MTP projection period).
Risks	Technical and financial: quality and completeness of the R&D until 2012 and feasibility of PS Booster energy extraction upgrade. These will directly impact the LHC upgrade design and cost estimates. Shortage of manpower is an issue.
2011 targets	Detailed analysis of SPS and PSB upgrades. Detailed design of subsystems and components. Establishing the plans for rearrangement of the matching sections, high field magnets for the interaction region, crab cavities, possibly new cyro-plants needed for HL-LHC.
Future prospects	Put in place a detailed plan to substantially increase the LHC luminosity after reaching design luminosity at the end of the projection period.
Longer term	Implemention and reliably operation with a substantially increased LHC luminosity.
Specific Health and Safety issues	Modifications will be made to the LHC injector complex and the corresponding health and safety issues will be respected taking into account the ALARA principle.
CERN budget for 2011	Personnel:12.0 MCHF, Materials: 17.6 MCHF.

31. High luminosity detectors upgrade (new fact sheet)

Goal	The overall aim is to improve the performance of the detectors for the bulk LHC running (yielding typically 300 fb^{-1} at nominal energy) expected during the last 5 years of this decade.
Approval	The upgrade program of approved detectors is under continuous review by LHCC.
Running conditions	This activity consists of many projects which will take place in the next 4 to 5 years. Thus the quantum is a sub-project, not the yearly budget. The requested budget corresponds to the CERN share on a large effort from all funding agencies. Due to lack of funding, no phase 2 HL-LHC detector R&D
Competitiveness	The high luminosity running at the nominal energy of 14 TeV will enable to fully exploit the discovery potential of the LHC accelerator.
Organisation	The projects include contributions from many different institutions. They are organized by the management of the experiments, reviewed by the LHCC committee and technically coordinated by the Project Office led by the Technical Coordinator of each experiment.
Risks	Without these upgrades, the performance of the detectors would not be optimal and would not allow to take full profit of this unprecedented step in the Energy Frontier domain.
2011 targets	Continue R&D and in some cases start procurements and construction of components which will be installed during shutdowns planned around 2014-2016 before the bulk LHC run. The planned CERN participation will mainly focus on: DAQ and TPC readout for ALICE, Insertable B Layer (IBL) for ATLAS, New pixel detector, luminosity telescope and 4th RPC station for CMS, new electronics for a 40 MHZ trigger for LHCb.
Future prospects	This MTP includes pluriannual funding to be able to address the planned upgrade projects during the next 5 years.
Longer term	Large upgrades are expected to take place at the end of the decade to take profit of the HL-LHC.
Specific Health and Safety issues	/
CERN budget for 2011	Detector R&D: Personnel: 1.3 MCHF, Materials: 3.9 MCHF; Detector upgrades: Materials: 2.2 MCHF.

32. High field magnets (new fact sheet)

Goal	Development of High Field Magnets for the LHC Luminosity upgrade and later high energy proton collider.
Approval	HFM plan approved by council in the White Paper in June 2007 but rephased in 2008. New re-inforced HFM plan included in this MTP pending approval by Council of the MTP. FP7-EuCARD-WP7 part signature in December 2008. The part in the In-kind French contribution signature in December 2008.
Start date	Following Council approval of the proposed MTP FP7-EuCARD-WP7 start date 1 April 2009. In-kind French contribution start date 1 January 2009.
Costs	The estimated initial cost of the project for CERN was 21 MCHF and 63 FTE. This generic R&D heading was reinforced with the freed resources from ending the Inner Triplets phase 1 and aims to prepare new High Field inner triplet magnets towards 2020 for the HL-LHC and later high energy proton collider (HE-LHC).
Running conditions	R&D partly integrated in EU FP7 program EuCARD. Direct in-kind contribution from France. In close contact with US-LARP.
Competitiveness	High Field Magnet technology with Nb3Sn conductors (and HTS conductors) is needed to upgrade the LHC. CERN needs to have the basic technical competences in order to lead the upgrades. This technology required also for other acelerators (CLIC wigglers, medical accelerators)
Organisation	Mainly in the TE department with support from other departments under one project leader and with contributions from external laboratories in Europe, US and Japan. Part of the program is integrated in FP7-EuCARD with the same project leader.
Risks	Delays in the objectives caused by possible inherent difficulties, conductor deliveries or budget cuts from partners could impact on the readiness for the magnet design and the consequent luminosity upgrade. The availibility of manpower will be challenging due to the splices consolidation work in the 2012 shutdown.
2011 targets	Small length of prototype 1 mm Nb3Sn conductor; First Short Model Coil test; First SMC coil with ceramic insulation; EuCARD dipole design study.
Future prospects	2013: 13 T Nb3Sn dipole magnet, HTS dipole insert coil, operational Nb3Sn conductor supply from industry
Longer term	Prototype magnets for the LHC Luminosity upgrade and collimator upgrade.
Specific Health and Safety issues	None.
CERN contribution	Project fully controlled by CERN, integrating EU and in-kind contributions from France.
CERN budget for 2011	Personnel 2.2 MCHF; Materials 3.7 MCHF.

33. Revenues

Assumptions and targets:

- Following the request by Finance Committee and Council in June, this revised MTP reduces the Member States' contributions by 15 MCHF in 2011 and by 30 MCHF p.a. as of 2012, resulting in a cumulative cut in revenues of 135 MCHF (in 2010 prices).

- The heading "additional contributions from Host States" will stop at the end of 2011. It should be noted that the in-kind part of the French additional contribution has only been agreed up to a total of 17.1 MCHF. The assumed profile is subject to change.

- As a prudent approach, the MTP assumes ongoing support from the EU of about 8 MCHF p.a. (with the corresponding amount under expenses plus the additional CERN commitments).

- In-kind contributions are assumed to remain constant. This amount covers the theoretical interest of the FIPOI loan and other loans (advantage from free use of land). The heading is kept at the 2009 level for the future years.

- The revenues to cover personnel paid on team accounts and on detachment are aligned to the contractual end dates of the paid members of personnel concerned. These headings will be updated regularly with the contractual changes.

- Internal taxation is calculated for the book-closing every year and will be adjusted (no impact on balance due to the identical heading under expenses).

- Knowledge and technology transfer revenues are assumed to be around the previous level of about 2.5 MCHF p.a.

- Other revenues:
  - OpenLab revenues will be adjusted.
  - A prudent approach is taken with regard to sales and miscellaneous. In the past this heading turned out to be significantly higher.
  - Financial revenues will depend on when Member States' contributions are paid (the earlier they are settled, the higher this heading will be).
  - The housing fund revenues are assumed to remain constant over time.

34. Other expenses

This heading covers expenses not linked to the operating activities and covered by other revenues, thus not impacting the annual balance:

- Personnel paid on team accounts and on detachment,

- In-kind expenses related to the free use of land and the interest free loans.

Furthermore it includes the amortization of staff benefits accruals, 17 MCHF p.a.

The start of recapitalizing the Pension Fund is shown in a dedicated heading in Figure 6 of 60 MCHF p.a. as of 2011.

III. Resources Plan for the years 2011 to 2015

1. Revenues plan

Figure 1: Anticipated revenues

(in kCHF, 2010 prices)	2010 Revised Budget	2011	2012	2013	2014	2015	Total 2011-2015
REVENUES	**1,205,322**	**1,191,070**	**1,141,775**	**1,139,805**	**1,138,085**	**1,135,770**	**5,746,505**
Member States' contributions	1,112,155	1,097,155	1,082,155	1,082,155	1,082,155	1,082,155	5,425,775
Additional contributions from Host States	22,375	29,060					29,060
Cash	*16,675*	*19,575*					*19,575*
In-kind *	*5,700*	*9,485*					*9,485*
EU contributions	15,805	9,250	8,495	8,200	8,155	8,000	42,100
Additional in-kind contributions (for LINAC 4, HIE-ISOLDE)	685	3,310	3,935	4,480	3,970	2,385	18,080
Personnel paid on team accounts	13,350	10,600	6,090	3,935	2,770	2,190	25,585
Personnel on detachment	955	810	695	705	705	710	3,625
Internal taxation	24,015	25,015	25,015	25,015	25,015	25,015	125,075
Knowledge and technology transfer	1,270	2,500	2,500	2,500	2,500	2,500	12,500
Other revenues	14,712	13,370	12,890	12,815	12,815	12,815	64,705
Sales and miscellaneous	*2,927*	*2,000*	*2,000*	*2,000*	*2,000*	*2,000*	*10,000*
Openlab revenues	*970*	*555*	*75*				*630*
Financial revenues	*200*	*200*	*200*	*200*	*200*	*200*	*1,000*
In-kind **	*4,560*	*4,560*	*4,560*	*4,560*	*4,560*	*4,560*	*22,800*
Housing fund	*6,055*	*6,055*	*6,055*	*6,055*	*6,055*	*6,055*	*30,275*

* The 2011 amount comprises the remaining in-kind contributions from France due in 2009 (3,785 kCHF).

** The theoretical interest of the FIPOI loan and advantage from free use of land.

The overview of the various revenues headings is shown in Figure 1 in constant 2010 prices. The Member States' contributions are reduced in 2011 by 15 MCHF with respect to 2010 and for the period 2012-2015 by 30 MCHF per year. This results in 135 MCHF less revenues over the projection period and takes due account of the expectations and instructions received during the June Finance Committee and Council meetings.

The other headings are updated according to latest information available (i.e. internal taxation, personnel paid on team accounts and in-kind contributions).

2. Resources allocations and expenses

Figure 2: LHC Programme

Fact Sheet	Old fact sheet number	(in MCHF, 2010 prices, rounded off)	2010 Revised budget	2011	2012	2013	2014	2015	2011-2015 Total
		LHC programme (incl. projects)	**319.8**	**307.9**	**338.3**	**291.1**	**289.0**	**307.4**	**1,533.6**
1	1	**LHC machine and injectors**	**138.8**	**130.1**	**138.5**	**130.3**	**130.8**	**140.1**	**669.8**
		LHC machine and experimental areas	**121.8**	**119.3**	**124.3**	**116.4**	**117.0**	**126.2**	**603.3**
		Personnel	71.3	71.1	71.3	70.8	71.6	73.0	357.8
		Materials	50.5	48.2	53.1	45.6	45.4	53.2	245.5
		Spares	**14.5**	**7.8**	**10.9**	**10.9**	**10.9**	**10.9**	**51.4**
		Personnel	0.7						
		Materials	13.7	7.8	10.9	10.9	10.9	10.9	51.4
		LHC injectors (for heavy Ions)	**2.5**	**3.0**	**3.3**	**3.0**	**2.9**	**2.9**	**15.0**
		Personnel	1.7	1.9	2.4	2.3	2.3	2.3	11.1
		Materials	0.8	1.1	0.9	0.7	0.6	0.6	3.9
		LHC experiments	**96.3**	**84.9**	**80.8**	**79.7**	**79.5**	**79.5**	**404.6**
2	2	**ATLAS detector**	**26.2**	**24.9**	**24.7**	**24.3**	**24.2**	**24.2**	**122.3**
		Personnel	22.2	20.8	20.7	20.2	20.2	20.2	102.1
		Materials	4.0	4.1	4.0	4.0	4.0	4.0	20.2
3	3	**CMS detector**	**25.1**	**23.8**	**23.5**	**23.3**	**23.2**	**23.2**	**117.0**
		Personnel	21.2	20.1	19.8	19.6	19.5	19.5	98.5
		Materials	3.8	3.7	3.7	3.7	3.7	3.7	18.5
4	4	**ALICE detector**	**11.1**	**11.5**	**11.6**	**11.4**	**11.4**	**11.4**	**57.2**
		Personnel	8.8	9.5	9.5	9.4	9.3	9.3	46.9
		Materials	2.3	2.1	2.1	2.1	2.1	2.1	10.3
5	5	**LHCb detector**	**11.1**	**12.2**	**12.1**	**11.9**	**11.9**	**11.9**	**59.8**
		Personnel	9.4	10.3	10.2	10.0	10.0	10.0	50.6
		Materials	1.7	1.8	1.8	1.8	1.8	1.8	9.2
6	6	**Common items, other experiments (inc. Totem, LHCf)**	**9.9**	**7.4**	**8.1**	**7.8**	**7.8**	**7.8**	**39.0**
		Personnel	6.3	5.5	6.2	5.9	5.6	5.6	28.9
		Materials	3.6	1.9	1.9	1.9	2.2	2.2	10.1
		Detectors re-scoping	**13.0**	**5.2**	**0.8**	**1.2**	**1.1**	**1.1**	**9.3**
		Personnel	4.7	5.2	0.8	1.2	1.1	1.1	9.3
		Materials	8.3						
7	21.a	**LHC machine and areas reliability and consolidation**	**39.5**	**43.0**	**72.2**	**36.4**	**34.5**	**46.0**	**232.0**
		Personnel	6.8	7.9	4.6	4.2	3.4	3.4	23.5
		Materials	32.7	35.1	67.6	32.2	31.1	42.6	208.5
8		**LHC detectors consolidation**		**7.6**	**5.3**	**0.3**			**13.2**
		Materials		7.6	5.3	0.3			13.2
9	7	**LHC computing**	**45.2**	**42.2**	**41.6**	**44.4**	**44.1**	**41.8**	**214.0**
		Personnel	17.9	18.1	18.1	18.1	18.1	18.1	90.6
		Materials	27.3	24.1	23.5	26.3	26.0	23.7	123.4
		% of total revenues	26.53%	25.85%	29.63%	25.54%	25.39%	27.06%	

Explanations to Figure 2:

Figure 2 shows the costs directly related to the LHC programme.

Overall, the ongoing operation and maintenance of the LHC programme in the period 2011-2015 results in very similar amounts, slightly increasing in the year 2012 for the shutdown and towards the end of 2015 in view of preparations for the 2016 shutdown.

In addition to the direct costs shown in Figure 2, the LHC programme has indirect costs that are included in Figure 3 ("Other Scientific programmes" as for Scientific Support, the PS and SPS complexes, the manpower from the physics analysis and the accelerator technical services) as well as the largest part of Figure 4 (Infrastructure, services and investments). Overall, the direct and non-direct LHC share amounts to some 80% of the total expenses, the remaining 20% being dedicated to non-LHC physics and support. This distinction into direct and indirect costs enhances transparency and allows benchmarking of the various headings. The impact of the decision on the pluri-annual schedule is mainly visible under central expenses for energy in Figure 4.

The resources for exploiting the **LHC machine** are essentially stable since the normal luminosity runs started. Some variations are linked to the phasing-in of the spares initiative that started in 2009. In the years 2012 and 2015 there is a higher demand for material resources which is related to the long shut downs in 2012 and in preparation for the 2016 shutdown. During this period major overhauling will be carried out and there is an increased activity in various domains such as survey and radiation control. These costs are compensated by lower expenses on the LHC machine in the years when the machine is running. A large part of the manpower in 2012 will in fact be deployed for consolidation activities as the accelerator complex will not be running.

With respect to the CERN share of contributions to **the LHC experiments**, the personnel strength reduces in Figure 2, since technical support staff is re-allocated from scientific support to the individual experiments in the course of the year for a particular task.

The heading "Detector re-scoping" ends in 2010 including the integral 24 MCHF in materials (2008 to 2010) earmarked as the CERN contribution (at the level of 20%) to the Collaborations' plans for the final implementation of the LHC experiments (also known as re-scoping) from 2008 to 2010. These plans were discussed in the collaboration boards and were endorsed in the RRB meetings.

LHC reliability and consolidation is now included in Figure 2 as part of the baseload. This sub-programme contains the machine consolidation including the new QPS, DN200, splice consolidation, measures to protect radiation damage to electronics and work on the collimation system. This results in peak expenses in 2012 as most of the work is concentrated in the shutdown. The amount peaks again in 2015 for the foreseen consolidation work with the start of connecting LINAC 4. LHC detectors consolidation covers the necessary repairs and improvements for the LHC detectors and experimental areas which will be carried out such as to benefit from the long shutdown in 2012. This activity also includes the upgrade of collimators to allow for ultimate luminosity.

From 2009 onwards **LHC computing** is in production with constant improvements. The materials expenses essentially include CERN's share of the expenses on the required additional equipment, renewal of computer and data services, software development, licenses and a Computer Centre capacity increase. With respect to last year, the materials heading includes the cost assessment with a view to the new strategy towards a computing upgrade (i.e. aimed at an external contribution while renting capacity in the meantime).

Figure 3: Other Scientific Programmes

Fact Sheet	Old fact sheet number	(in MCHF, 2010 prices, rounded off)	2010 Revised budget	2011	2012	2013	2014	2015	2011-2015 Total
		Other programmes (LHC support and non-LHC programmes)	**186.7**	**186.9**	**189.8**	**192.8**	**193.8**	**197.3**	**960.5**
10	**8**	**Non-LHC physics**	**7.6**	**10.9**	**10.0**	**6.5**	**5.5**	**5.5**	**38.2**
		Personnel	3.0	3.8	3.6	3.3	3.2	3.2	17.1
		Materials	4.7	7.1	6.4	3.2	2.2	2.2	21.1
11	**9.a**	**Theory**	**12.5**	**12.1**	**11.8**	**11.4**	**10.9**	**10.8**	**57.1**
		Personnel	10.6	10.1	9.8	9.6	9.5	9.5	48.5
		Materials	2.0	2.0	1.9	1.8	1.5	1.3	8.6
12	**9.b**	**LHC physics centre**	**1.5**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**3.6**
		Materials	1.5	0.7	0.7	0.7	0.7	0.7	3.6
13	**9.c**	**Scientific support**	**42.2**	**38.1**	**37.7**	**37.3**	**37.8**	**38.1**	**188.9**
		Personnel	31.9	28.3	29.0	28.4	28.9	29.2	143.8
		Materials	10.3	9.8	8.7	8.8	8.8	8.8	45.0
14	**10**	**Low and medium energy accelerators**	**9.9**	**9.9**	**8.4**	**8.8**	**8.5**	**8.9**	**44.5**
		Personnel	5.7	5.7	5.4	5.6	5.6	6.0	28.2
		Materials	4.2	4.3	3.0	3.2	2.9	2.9	16.3
14	**10**	**PS and SPS complexes**	**56.8**	**59.6**	**60.8**	**62.3**	**62.5**	**64.7**	**309.9**
		Personnel	34.2	35.3	36.1	37.6	37.9	39.6	186.4
		Materials	22.7	24.4	24.7	24.8	24.6	25.1	123.5
14	**10**	**Accelerator technical services**	**36.2**	**30.9**	**29.7**	**31.2**	**30.8**	**30.5**	**153.1**
		Personnel	20.1	18.1	17.2	18.3	17.9	17.9	89.5
		Materials	16.2	12.8	12.5	12.9	12.9	12.7	63.6
15	**21.a**	**Accelerator consolidation**	**19.9**	**24.6**	**30.7**	**34.6**	**37.2**	**38.1**	**165.2**
		Personnel	3.3	2.5	2.8	3.1	4.0	5.8	18.2
		Materials	16.6	22.1	27.9	31.5	33.1	32.3	147.0
		% of total revenues	15.49%	15.69%	16.62%	16.91%	17.03%	17.37%	

Explanations to Figure 3:

Non-LHC physics:

This heading (including the research allocation to AD, ISOLDE, COMPASS, CAST, NA62, etc.) is assumed to continue over time. Although a limited number of experiments have been approved for data-taking in 2010, the resources allocation earmarked for this programme is maintained following the diversification and neutrino workshops to allow CERN to contribute its share to future extensions of the already running experiments and newly approved experiments. The heading is higher in 2011 and 2012 due to the NA62 project.

Theory

The allocation maintains a stable workforce in line with the current personnel commitments and constant materials funding. The reduction is due to ending EU funds for which CERN will actively submit new proposals such as to maintain the number of visitors (about 400 annually) and fellows (around 50 per year). It should be noted that a large fraction of the personnel budget shown covers the fellows of the theory group whereas the materials budget pays for the visitors' subsistence.

LHC physics centre:

This heading covers the materials allocation for setting up the Physics Analysis Centre. The previously included manpower from the new initiatives for data analysis in the experiments is now included under the LHC programme, detectors re-scoping.

Scientific support:

After a reduction from 2010 to 2011 due to the end of external funding and carry-forward from 2009 to 2010, this heading stabilises to allow for constant support for detector technologies and data handling as well as general services for research from 2011 onwards.

Low- and medium-energy accelerators:

This heading comprises the AD, n-TOF and ISOLDE facilities and the allocations earmarked for their operation. It should be noted that the costs shown here are the direct costs, and do not include the share of the cost of proton cycles in the PS or SPS complexes. Including these would significantly increase the indirect costs charged to the low- and medium-energy facilities and hence reduce the indirect costs for the LHC.

PS and SPS complexes / Accelerator technical services:

This constant heading includes all costs for the operation and technical groups linked to these complexes. The Management decided to continue identifying the operation costs of the PS and SPS complexes instead of distributing these on a pro rata share to the various facilities since the costs for these injectors and the accelerator technical services are unavoidable when delivering beams to experimental areas.

The accelerator technical services mainly includes the costs of accelerator controls in P+M, fluids for non-LHC operation, travel costs, temporary work and allocations for items that are common to all accelerators at CERN.

Accelerator consolidation:

This heading includes several projects (for example the PS power supply) with different profiles, which explains the variation over time. Due to the need to ensure reliability of the accelerator complex over a longer period, the materials heading is enhanced as from 2011 to reach a constant level from 2013 onwards. However, the enhancement is limited due to available personnel resources as a consequence of the limit on staff numbers.

Figure 4: Infrastructure, services and investments – indirect costs to the scientific programme

Fact Sheet	Old fact sheet number	(in MCHF, 2010 prices, rounded off)	2010 Revised budget	2011	2012	2013	2014	2015	2011-2015 Total
		Infrastructure and services	**407.5**	**436.5**	**375.7**	**426.1**	**421.9**	**411.1**	**2,071.3**
16	11.a	**Manufacturing facilities (workshops, etc.)**	**16.5**	**16.7**	**16.5**	**17.1**	**17.4**	**17.0**	**84.8**
		Personnel	14.2	14.2	14.0	13.7	14.7	14.7	71.3
		Materials	2.3	2.5	2.5	3.4	2.7	2.3	13.5
17	11.b	**General facilities and logistics (site maintenance, transport)**	**64.0**	**57.7**	**57.0**	**57.6**	**58.0**	**58.2**	**288.6**
		Personnel	22.2	22.2	20.9	21.5	22.0	22.1	108.7
		Materials	41.8	35.5	36.1	36.0	36.1	36.2	179.9
18	11.c	**Informatics**	**43.5**	**40.8**	**41.6**	**41.7**	**41.6**	**41.7**	**207.4**
		Personnel	26.1	24.7	25.0	24.8	24.7	24.7	123.9
		Materials	17.4	16.1	16.6	16.9	16.9	17.0	83.5
19	12	**Safety, health and environment**	**37.6**	**35.2**	**33.7**	**33.0**	**33.4**	**33.5**	**168.8**
		Personnel	21.1	21.1	21.6	21.4	21.9	21.9	107.7
		Materials	16.5	14.1	12.2	11.6	11.6	11.6	61.1
20	13	**Administration**	**42.2**	**41.7**	**40.7**	**40.3**	**39.5**	**39.4**	**201.5**
		Personnel	32.7	33.4	33.0	32.8	32.2	32.1	163.6
		Materials	9.6	8.2	7.7	7.5	7.3	7.3	38.0
21	14	**Outreach and KTT**	**16.4**	**17.4**	**16.9**	**16.8**	**16.8**	**16.8**	**84.8**
		Personnel	8.6	8.4	8.0	7.9	7.9	7.9	40.0
		Materials	7.8	9.1	8.9	8.9	8.9	8.9	44.8
22	21.b	**Infrastructure consolidation, buildings and renovation**	**25.4**	**30.8**	**28.8**	**31.5**	**20.8**	**20.4**	**132.3**
		Personnel	2.8	4.3	4.1	3.7	3.7	3.7	19.5
		Materials	22.6	26.6	24.8	27.8	17.1	16.7	112.9
23	15	**Centralised expenses**	**145.5**	**181.3**	**127.1**	**175.7**	**182.6**	**173.1**	**839.9**
		Centralised personnel expenses (inc. social sec.)	**31.1**	**54.6**	**54.6**	**54.6**	**54.6**	**54.6**	**273.0**
		Internal taxation	**24.0**	**25.0**	**25.0**	**25.0**	**25.0**	**25.0**	**125.1**
		Personnel internal mobility		**2.0**	**2.0**	**2.0**	**2.0**	**2.0**	**10.0**
		Personnel on detachment	**1.0**	**0.8**	**0.7**	**0.7**	**0.7**	**0.7**	**3.6**
		Energy and water	**77.6**	**87.3**	**33.2**	**81.8**	**88.7**	**79.2**	**370.3**
		Insurances and postal charges	**7.3**	**7.3**	**7.3**	**7.3**	**7.3**	**7.3**	**36.4**
		Housing fund	**4.5**	**4.3**	**4.3**	**4.3**	**4.3**	**4.3**	**21.5**
23	15	**Interest and financial costs**	**16.4**	**14.8**	**13.3**	**12.5**	**11.7**	**10.9**	**63.3**
		% of total revenues	33.81%	36.65%	32.91%	37.38%	37.07%	36.20%	

Explanations to Figure 4:

Manufacturing facilities (engineering, workshops and fabrication, CAD and CAE support). This heading remains almost constant over time on the assumption that the accelerator and experimental areas will need continuous support during the shutdowns.

General facilities and logistics include site facility management and technical infrastructure (such as electrical distribution). With the introduction of the new and enhanced user services in 2009, the heading is almost constant over time, apart from the materials carry-forward from 2009 to 2010.

Informatics covers IT infrastructure and desktop computing as well as administrative computing. The heading highlights a constant efficiency gain given the increasing number of CERN users and visitors. It assumes a continuation of the OpenLab activity with constant amounts.

Safety health and environment covers the fire brigade, CERN wide safety, safety training, medical service as well as the part of the RP and safety inspections that cannot be allocated to the various programmes. The higher materials amount in 2010 is due to the carry-forward from the radioactive waste management project from 2009.

Administration: The centralised administrative staff allocation (i.e. for the DG office and services, HR and FP Departments) was reduced to refinance some 170 FTEs over 2008 to 2011 for new initiatives. The variation in materials is due to the provision for the upcoming 5-yearly review from 2010 to 2011 as well as the management overheads of the approved Marie-Curie fellowship programmes.

Outreach and Knowledge & Technology Transfer (KTT): This heading covers outreach to the general public, education and knowledge & technology transfer. The core funding from the CERN budget is constant. The CERN Management enhanced the role of these activities by including knowledge transfer as a dedicated item. This heading is likely to be further developed in the future with additional partnerships and revenues. As a result, the materials budget is increased from 2011 onwards, in expectation of an equivalent increase in revenues from KTT partnerships.

General infrastructure consolidation: With respect to last year's plan, as of 2011 the Management aims to enhance the programme to renovate the CERN site (technical and general items) in order to enhance efficiency, energy savings, reliability, and, last but not least, safety. The extension of Restaurant No 1 (Meyrin) is funded. With respect to the MTP presented in June 2010, the refurbishment of Restaurant No 3 (Prévessin) and the new auditorium and Users' Office building (Building 33bis) can no longer be covered. Other changes in the profile with respect to the MTP presented in June are due to the implementation in the plan of the approved projects for Building 867 (grouping together of all workplaces for radioactive equipment) and the new Building 107 for all surface treatment activities to comply with safety and environmental directives.

Centralised personnel expenses: This mainly covers the CERN contribution to the health insurance premiums for pensioners, arrival and departure indemnities, and unemployment benefits, etc. As from 2011, this heading includes also a 25 MCHF provision for the CERN share for social security and the 5-yearly review outcome.

Internal taxation: The estimate for 2011 and the following years in both revenues and expenses has changed with respect to the June MTP, in line with the actual staff numbers and their position in the salary grid.

Personnel internal mobility is a central fund to ease the transfer from one organic unit to another.

Personnel on detachment relates to staff on detachment to other organisations. The expenses are covered by revenues.

Energy and water: The amount earmarked for electricity consumption is adjusted in constant prices to reflect the new running schedule. In 2012 the entire injector complex will be shut down for 15 months, which reduces the energy consumption by about 25 MCHF with respect to the MTP presented in June. The 2015 shutdown will be postponed to 2016. As a consequence, the expected energy consumption will be 20 MCHF higher in 2015 than assumed in the June MTP. The heading is dominated by the electricity consumption for the general infrastructure, running of the accelerator complex and the Computer Centre as well as the water and heating expenses. Currently, CERN is exempt from water taxes in the Canton of Geneva.

Insurances and postal charges: The budget estimates are constant (no significant increase of assets with respect to the LHC during the planning period).

Housing fund relates to expenses for the hostel and apartments (covered by revenues).

Interest and financial costs: After the repayment of the EIB loan, this heading covers the remaining interest for short-term loans and the interest stemming from the long-term FORTIS loan.

Figure 5: Projects

Fact Sheet	Old fact sheet number	(in MCHF, 2010 prices, rounded off)	2010 Revised budget	2011	2012	2013	2014	2015	2011-2015 Total
		Projects	**105.2**	**134.4**	**133.4**	**123.4**	**120.9**	**98.9**	**611.0**
24	**16.a**	**CLIC / Linear collider**	**24.2**	**27.0**	**28.7**	**29.9**	**29.9**	**29.9**	**145.4**
		Personnel	12.8	14.2	11.9	11.1	10.9	10.9	58.8
		Materials	11.3	12.9	16.8	18.8	19.0	19.0	86.6
25	**16.b**	**Linear collider detector R&D**	**2.2**	**3.2**	**3.6**	**3.6**	**3.6**	**3.6**	**17.5**
		Personnel	1.6	2.6	3.1	3.0	3.0	3.0	14.8
		Materials	0.7	0.5	0.5	0.5	0.5	0.5	2.6
26	**17**	**LINAC 4**	**34.7**	**39.8**	**28.7**	**13.7**	**12.3**	**0.5**	**95.1**
		Personnel	8.7	9.9	10.4	7.0	5.2	0.3	32.8
		Materials	26.0	29.9	18.3	6.7	7.1	0.2	62.2
27		**HIE-ISOLDE**	**2.9**	**8.8**	**14.2**	**13.1**	**8.7**	**2.8**	**47.6**
		Personnel	2.2	3.9	4.4	3.3	1.1	0.4	13.1
		Materials	0.7	4.9	9.8	9.8	7.6	2.4	34.5
		R&D	**10.5**	**12.7**	**16.0**	**16.3**	**18.3**	**18.3**	**81.7**
28	**19.a**	**R&D accelerators**	**6.0**	**7.5**	**4.8**	**3.5**	**3.4**	**3.4**	**22.6**
		Personnel	2.7	2.8	1.7	1.4	1.4	1.4	8.6
		Materials	3.3	4.7	3.1	2.1	2.1	2.1	14.0
29	**19.b, c, d**	**Other R&D (computing supported by EU, detectors)**	**4.5**	**5.2**	**11.2**	**12.9**	**14.9**	**14.9**	**59.1**
		Personnel	3.4	2.1	5.1	5.1	5.1	5.1	22.6
		Materials	1.1	3.1	6.0	7.8	9.8	9.8	36.5
30		**High luminosity machine upgrade**	**19.7**	**29.6**	**24.0**	**22.0**	**24.1**	**24.1**	**123.9**
		PSB upgrade		**5.5**	**5.9**	**6.2**	**6.6**	**6.6**	**30.8**
		Personnel		1.0	1.4	1.7	2.1	2.1	8.3
		Materials		4.5	4.5	4.5	4.5	4.5	22.5
		SPS upgrade		**10.4**	**11.3**	**11.9**	**12.6**	**12.6**	**58.8**
		Personnel		2.0	2.9	3.5	4.2	4.2	16.8
		Materials		8.4	8.4	8.4	8.4	8.4	42.0
		LHC machine upgrade	**4.8**	**4.3**	**4.8**	**3.8**	**5.0**	**5.0**	**22.8**
		Personnel	3.2	3.1	3.6	2.6	3.8	3.8	16.8
		Materials	1.6	1.2	1.2	1.2	1.2	1.2	6.1
	18	**LHC inner triplet**	**10.8**	**5.3**	**1.1**	**0.0**			**6.5**
		Personnel	2.9	2.6	0.9	0.0			3.5
		Materials	7.9	2.7	0.2				2.9
		Low power SPL and PS2 studies	**4.1**	**4.1**	**0.8**	**0.2**			**5.0**
		Personnel	2.3	3.3	0.3				3.6
		Materials	1.9	0.8	0.5	0.2			1.4
31		**High luminosity detectors upgrade**	**6.9**	**7.4**	**8.4**	**12.9**	**13.7**	**9.3**	**51.6**
		LHC detectors R&D	**6.0**	**5.2**	**5.2**	**5.2**	**5.2**	**5.2**	**25.8**
		Personnel	2.7	1.3	1.3	1.3	1.3	1.3	6.4
		Materials	3.3	3.9	3.9	3.9	3.9	3.9	19.4
		LHC detectors upgrade	**1.0**	**2.2**	**3.2**	**7.8**	**8.5**	**4.1**	**25.8**
		Materials	1.0	2.2	3.2	7.8	8.5	4.1	25.8
32		**High energy LHC studies / High field magnets**	**4.0**	**5.9**	**9.8**	**12.0**	**10.3**	**10.4**	**48.3**
		Personnel	2.1	2.2	3.8	4.6	4.8	4.9	20.3
		Materials	1.9	3.7	6.0	7.4	5.5	5.5	28.0
		% of total revenues	8.73%	11.28%	11.69%	10.83%	10.62%	8.70%	

Explanations to Figure 5:

CLIC/ILC: This heading includes the total funding for CTF3, the CLIC study and the CLIC/ILC collaboration. Following the postponement of the possible CLIC Technical Design Report to 2020, the foreseen additional resources have been taken out and the project has been stabilized at around 30 MCHF per year. With respect to the June MTP, this heading is therefore reduced by some 106 MCHF.

Linear collider detector: This constitutes CERN's participation in the detector R&D specific to a future linear collider. With respect to the MTP presented in June 2010, the materials expenses have been reduced by 2.8 MCHF.

LINAC 4: The project started in 2008, notably with the civil engineering. With respect to last year's plan, the project has now an EVM baseline consistent with the total allocation until 2014 but with a different profile, respecting the CtC of 2009. Outside of the CtC, there is a contingency reserve of some 5% in 2014.

HIE-ISOLDE: The heading includes the CERN share of the costs for the infrastructure relating to this project as well as the expenses for which in-kind and external cash revenues are received. The overall CtC is 35.3 MCHF. With respect to the June MTP the personnel resources have been added to the project stemming from the allocations to LHC and operation of the other accelerators. The project has been delayed to start in the second half of 2011 to be completed in 2014 (commissioning in 2015).

R&D:

Accelerator R&D: This heading includes the funds allocated to EUCARD and other EU-supported activities, most of which are linked to the LHC upgrade and thus explain the higher allocations until 2011. The heading also includes a small but constant part for CERN contributions to the ILC and some seed funding for neutrino factories. Some 6 MCHF integral are earmarked as CtC for the radiation test facilities (HiRadMat). Furthermore, the initiative of generic high power SPL with 2 MCHF materials p.a. is included (instead of 3 MCHF as presented in the June MTP).

Other R&D: This includes computing R&D focused on the EU-supported projects (like EGEE-3 and ETICS-II), which will end in 2010 (an extension without additional funding for EGEE-3 is under discussion). The Management aims for a continuation of EU support (a strategic need for CERN and therefore the assumed revenues from EU for the future are allocated here).

With respect to the June MTP, earmarked funds for diversification have significantly reduced by 17.6 MCHF. As a consequence, proposed diversification activities that have not yet been approved but are under consideration cannot be funded within this MTP.

High luminosity upgrade: This activity covers the various design studies with the aim to allow for decision taking by Council in 2012 such as the **LP-SPL and PS2 studies.** This MTP assumes the feasibility of the PS Booster energy increase **(PSB upgrade)** and hence does not include any construction costs of a LP-SPL or PS2 until 2015. However, the need for the **SPS upgrade** as the bottleneck is taken into consideration. The planning anticipates to finalise the upgrades in the 2016 shutdown when connecting LINAC 4.

With respect to the June MTP, the **LHC inner triplets** project will be stopped at the end of 2012 merging the so-called phase 1 and phase 2 upgrades. Resources will be deployed to the high field magnets/high energy LHC. For the LHC Machine upgrade, stable material funds are allocated to allow for continuation of some High Luminosity R&D.

High luminosity detectors upgrade: This activity contains generic R&D for a future luminosity upgrade (HL-LHC, **LHC detectors R&D**) as well as the detector enhancements foreseen to be installed until 2015 (**LHC detectors upgrade**) to benefit from the nominal luminosity. The manpower for the detectors upgrade will stem from the allocations to the LHC detectors' operation. The materials heading of the LHC detectors R&D has been halved with respect to the June MTP (no phase 2 HL-LHC detector R&D).

High field magnets (High energy LHC, HE-LHC): The R&D and prototyping for the high field magnets aims on focused research of Nb3Sn superconductors to allow for the construction of high field dipole and quadrupole magnets which will be necessary for both HL-LHC for new inner triplets and possible HE-LHC at a later stage.

3. Estimated budget balances

Figure 6: Estimated budget balances

Fact sheet	(in MCHF, 2010 prices, rounded off)	2010 Revised Budget	2011	2012	2013	2014	2015	Total 2011-2015
	REVENUES	**1 205.3**	**1 191.1**	**1 141.8**	**1 139.8**	**1 138.1**	**1 135.8**	**5 746.5**
33	Member States' contributions	1 112.2	1 097.2	1 082.2	1 082.2	1 082.2	1 082.2	5 425.8
	Additional contributions from Host States	22.4	29.1					29.1
	EU contributions	15.8	9.3	8.5	8.2	8.2	8.0	42.1
	Additional in-kind contributions (for LINAC 4, HIE-ISOLDE)	0.7	3.3	3.9	4.5	4.0	2.4	18.1
	Personnel paid on team accounts	13.4	10.6	6.1	3.9	2.8	2.2	25.6
	Personnel on detachment	1.0	0.8	0.7	0.7	0.7	0.7	3.6
	Internal taxation	24.0	25.0	25.0	25.0	25.0	25.0	125.1
	Knowledge and technology transfer	1.3	2.5	2.5	2.5	2.5	2.5	12.5
	Other revenues (including other in-kind, housing fund, sales)	14.7	13.4	12.9	12.8	12.8	12.8	64.7
	OPERATING EXPENSES	**1 019.2**	**1 065.7**	**1 037.3**	**1 033.4**	**1 025.5**	**1 014.6**	**5 176.4**
	Running of scientific programmes and support	**914.0**	**931.3**	**903.9**	**909.9**	**904.6**	**915.7**	**4 565.4**
	Scientific programmes	**506.6**	**494.8**	**528.1**	**483.9**	**482.7**	**504.6**	**2 494.1**
1, 2, 3, 4, 5, 6, 7, 8, 9	*LHC (including spares and new initiatives support to detectors)*	*319.8*	*307.9*	*338.3*	*291.1*	*289.0*	*307.4*	*1 533.6*
10, 11, 12, 13	*Non-LHC physics and scientific support*	*63.9*	*61.8*	*60.2*	*55.9*	*54.9*	*55.0*	*287.8*
14, 15	*Accelerators and areas*	*122.9*	*125.1*	*129.6*	*136.9*	*138.9*	*142.2*	*672.8*
	Infrastructure and services	**407.5**	**436.5**	**375.7**	**426.1**	**421.9**	**411.1**	**2 071.3**
16, 17, 18, 19, 20, 21	*General infrastructure and services*	*220.2*	*209.6*	*206.5*	*206.4*	*206.8*	*206.6*	*1 035.8*
22	*Infrastructure consolidation, buildings and renovation*	*25.4*	*30.8*	*28.8*	*31.5*	*20.8*	*20.4*	*132.3*
23	*Centralised personnel expenses*	*31.1*	*29.6*	*29.6*	*29.6*	*29.6*	*29.6*	*148.0*
	CERN share for the Social security and 5-yearly review outcome		*25.0*	*25.0*	*25.0*	*25.0*	*25.0*	*125.0*
	Internal taxation	*24.0*	*25.0*	*25.0*	*25.0*	*25.0*	*25.0*	*125.1*
	Personnel internal mobility		*2.0*	*2.0*	*2.0*	*2.0*	*2.0*	*10.0*
	Personnel on detachment	*1.0*	*0.8*	*0.7*	*0.7*	*0.7*	*0.7*	*3.6*
	Insurances and postal charges, energy and water	*84.9*	*94.6*	*40.5*	*89.1*	*96.0*	*86.5*	*406.6*
	Housing fund	*4.5*	*4.3*	*4.3*	*4.3*	*4.3*	*4.3*	*21.5*
	Interest and financial costs	*16.4*	*14.8*	*13.3*	*12.5*	*11.7*	*10.9*	*63.3*
	Projects (including R&D)	**105.2**	**134.4**	**133.4**	**123.4**	**120.9**	**98.9**	**611.0**
24	*CLIC / Linear collider*	*24.2*	*27.0*	*28.7*	*29.9*	*29.9*	*29.9*	*145.4*
25	*Linear collider detector R&D*	*2.2*	*3.2*	*3.6*	*3.6*	*3.6*	*3.6*	*17.5*
26	*LINAC 4*	*34.7*	*39.8*	*28.7*	*13.7*	*12.3*	*0.5*	*95.1*
27	*HIE-ISOLDE*	*2.9*	*8.8*	*14.2*	*13.1*	*8.7*	*2.8*	*47.6*
28, 29	*R&D and studies*	*10.5*	*12.7*	*16.0*	*16.3*	*18.3*	*18.3*	*81.7*
30	*High luminosity machine upgrade*	*19.7*	*29.6*	*24.0*	*22.0*	*24.1*	*24.1*	*123.9*
31	*High luminosity detectors upgrade*	*6.9*	*7.4*	*8.4*	*12.9*	*13.7*	*9.3*	*51.6*
32	*High energy LHC studies / High field magnets*	*4.0*	*5.9*	*9.8*	*12.0*	*10.3*	*10.4*	*48.3*
	OTHER EXPENSES	**35.1**	**32.3**	**27.8**	**25.7**	**24.5**	**23.9**	**134.2**
34	Personnel paid on team accounts	13.4	10.6	6.1	3.9	2.8	2.2	25.6
	Various	21.7	21.7	21.7	21.7	21.7	21.7	108.6
	In-kind	*4.6*	*4.6*	*4.6*	*4.6*	*4.6*	*4.6*	*22.8*
	Stores activity	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.8*
	Budget amortization of staff benefits accruals	*17.0*	*17.0*	*17.0*	*17.0*	*17.0*	*17.0*	*85.0*
	TOTAL EXPENSES	**1 054.3**	**1 098.0**	**1 065.1**	**1 059.0**	**1 050.0**	**1 038.5**	**5 310.6**
	BALANCE							
23	Annual balance	151.0	93.0	76.6	80.8	88.1	97.3	
	Capital repayment allocated to the budget (Fortis, FIPOI 1 and 2)	-15.1	-21.2	-21.9	-22.6	-23.3	-24.1	
	Recapitalising the Pension Fund		-60.0	-60.0	-60.0	-60.0	-60.0	
	-Cumulative Balance- - 488.7	**-352.7**	**-340.9**	**-346.1**	**-347.9**	**-343.1**	**-329.9**	

For information:						
Capital repayment to FIPOI 3	0.2	0.2	0.2	0.2	0.2	0.2

For information:						
Cum. balance without special contribution to the Pension Fund (deterioration)	-352.7	-280.9	-226.1	-167.9	-103.1	-29.9
Cum. balance with special contribution of 30 MCHF p.a. to the PF (stabilisation)	-352.7	-310.9	-286.1	-257.9	-223.1	-179.9
Cum. balance with special contribution of 60 MCHF p.a. to the PF (recapitalisation)	-352.7	-340.9	-346.1	-347.9	-343.1	-329.9

Explanations to Figure 6:

Figure 6 compares the expected revenues with the estimated expenses for the years 2010 (including the carry-forward from 2009) until 2015. Expenses headings are shown in P+M. The indexation of the Member States' contributions by 2% from 2008 to 2009 prices did not cover the real cost of expenses indexation, resulting in some 45 MCHF less for science in the period of this MTP.

The LHC programme is clearly accorded overall priority. Together with the indirect share and the approved running of the non-LHC physics programme, some 910 MCHF per annum are incompressible. Due to the integration of the 25 MCHF p.a. provision for social security and 5-yearly review outcome, 60 MCHF p.a. direct payment to the Pension Fund and the need for additional consolidation of the LHC injectors and the infrastructure, the LHC loans cannot be repaid as was planned last year and the cumulative budget remains negative although CERN continues to reduce the overall indebtedness.

The non-LHC physics programme gets the support from CERN to allow it to operate (mostly interface with the infrastructure and accelerators), on the assumption that the cost of providing beams cannot be supported and shared between the different experiments. Some of these experiments, such as ISOLDE, AD and n-TOF, need new investment, requested by their respective communities, which have long made use of CERN facilities. New proposals for projects emerged during the Physics Diversity and the dedicated neutrino workshops in 2009, of which some are likely to be approved by the Council following presentation to the SPC.

The staff strength ceiling of 2,250 active staff FTEs results in a delay of the outcome of R&D studies for the new initiatives and projects due to allocation of the highest priority to the LHC run.

"Other expenses" covers the personnel charged to team accounts, the usual balance of the stores activity and the budget amortization of staff benefits accruals. This point is linked to the implementation of IPSAS; CERN charges as budgetary expenses only the hours actually worked. A new heading was introduced and accepted last year for a provision equivalent to the amortisation costs of future obligations for saved leave and shift worker compensation amounting to some 170 MCHF in the annual accounts over ten years (amounting to some 17 MCHF as additional expenses per annum).

As mentioned above, this MTP assumes the feasibility of the PS Booster upgrade and the necessity to upgrade the SPS, to enhance the accelerator consolidation and the general and technical infrastructure consolidation. It furthermore includes the HIE-ISOLDE project and the runs of NA61 and NA62 but neither the start of a LP-SPL or PS2 construction nor the construction start of high field magnets for new inner triplets (HL-LHC).

This scenario results in a reduction of the end 2009 budget balance of -488.7 MCHF to -329.9 MCHF.

Should these assumptions not be valid, the construction of a LP-SPL and PS2 is a fallback solution which will not be fundable within the normal operating budget.

Figure 6 shows the impact of reducing the Member States' contributions by 135 MCHF, cutting expenses by 343 MCHF and thus reducing the deficit from -387.7 MCHF presented in June to -179.9 MCHF. In discussions with various delegations, the Management received positive feedback to increase the direct payment to the Pension Fund from 30 MCHF p.a. to 60 MCHF p.a. as of 2011. The proposed set of measures allows for recapitalizing the Pension Fund rather than just stabilising the funding level[3]. It should be noted that this is only one out of many measures currently discussed to consolidate the Pension Fund. With this change, the cumulative budget deficit is anticipated to reach -329.9 MCHF at the end of the projection period being significantly less than the -387.7 MCHF proposed in the MTP in June. As mentioned above, any uncommitted budget will be used to further reduce the budget deficit such as to balance the funding status until the early 2020s.

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[3] Aiming to restore full funding by 2033, the set of measures for the Pension Fund (indexation policy, contributions, contribution and benefits plans) will continue until an actuarial projection will have confirmed that the fund shall be fully funded.

IV. 2011 Draft Budget

1. Overview of Revenues and Expenses

Figure 7: Overview of Revenues and Expenses

Fact sheet	(in MCHF, 2010 prices, rounded off)	2010 Revised Budget	2011 Draft Budget	Variations of 2011 Draft Bud. with respect to 2010 Rev. Bud.
	REVENUES	**1 205.3**	**1 191.1**	**-1.2%**
	Member States' contributions	1 112.2	1 097.2	-1.3%
	Additional contributions from Host States	22.4	29.1	29.9%
	EU contributions	15.8	9.3	-41.5%
	Additional in-kind contributions (for LINAC 4, HIE-ISOLDE)	0.7	3.3	383.2%
33	Personnel paid on team accounts	13.4	10.6	-20.6%
	Personnel on detachment	1.0	0.8	-15.2%
	Internal taxation	24.0	25.0	4.2%
	Knowledge and technology transfer	1.3	2.5	96.9%
	Other revenues (including other in-kind, housing fund, sales)	14.7	13.4	-9.1%
	OPERATING EXPENSES	**1 019.2**	**1 065.7**	**4.6%**
	Running of scientific programmes and support	**914.0**	**931.3**	**1.9%**
	Scientific programmes	**506.6**	**494.8**	**-2.3%**
1, 2, 3, 4, 5, 6, 7, 8, 9	*LHC (including spares and new initiatives support to detectors)*	*319.8*	*307.9*	*-3.7%*
10, 11, 12, 13	*Non-LHC physics and scientific support*	*63.9*	*61.8*	*-3.2%*
14, 15	*Accelerators and areas*	*122.9*	*125.1*	*1.8%*
	Infrastructure and services	**407.5**	**436.5**	**7.1%**
16, 17, 18, 19, 20, 21	*General infrastructure and services*	*220.2*	*209.6*	*-4.8%*
22	*Infrastructure consolidation, buildings and renovation*	*25.4*	*30.8*	*21.2%*
	Centralised personnel expenses	*31.1*	*29.6*	*-4.8%*
	CERN share for the Social security and 5-yearly review outcome		*25.0*	
	Internal taxation	*24.0*	*25.0*	*4.2%*
	Personnel internal mobility		*2.0*	
23	*Personnel on detachment*	*1.0*	*0.8*	*-15.2%*
	Insurances and postal charges, energy and water	*84.9*	*94.6*	*11.4%*
	Housing fund	*4.5*	*4.3*	*-4.7%*
	Interest and financial costs	*16.4*	*14.8*	*-9.3%*
	Projects (including R&D)	**105.2**	**134.4**	**27.8%**
24	*CLIC / Linear collider*	*24.2*	*27.0*	*11.9%*
25	*Linear collider detector R&D*	*2.2*	*3.2*	*41.7%*
26	*LINAC 4*	*34.7*	*39.8*	*14.6%*
27	*HIE-ISOLDE*	*2.9*	*8.8*	*201.5%*
28, 29	*R&D and studies*	*10.5*	*12.7*	*21.1%*
30	*High luminosity machine upgrade*	*19.7*	*29.6*	*50.5%*
31	*High luminosity detectors upgrade*	*6.9*	*7.4*	*6.3%*
32	*High energy LHC studies / High field magnets*	*4.0*	*5.9*	*46.1%*
	OTHER EXPENSES	**35.1**	**32.3**	**-7.8%**
	Personnel paid on team accounts	13.4	10.6	-20.6%
	Various	21.7	21.7	
34	*In-kind*	*4.6*	*4.6*	
	Stores activity	*0.2*	*0.2*	
	Budget amortization of staff benefits accruals	*17.0*	*17.0*	
	TOTAL EXPENSES	**1 054.3**	**1 098.0**	**4.1%**
	BALANCE			
23	Annual balance	151.0	93.0	-38.4%
	Capital repayment allocated to the budget (Fortis, FIPOI 1 and 2)	-15.1	-21.2	40.6%
	Recapitalising the Pension Fund		-60.0	
	-Cumulative Balance- - 488.7	**-352.7**	**-340.9**	**-3.4%**

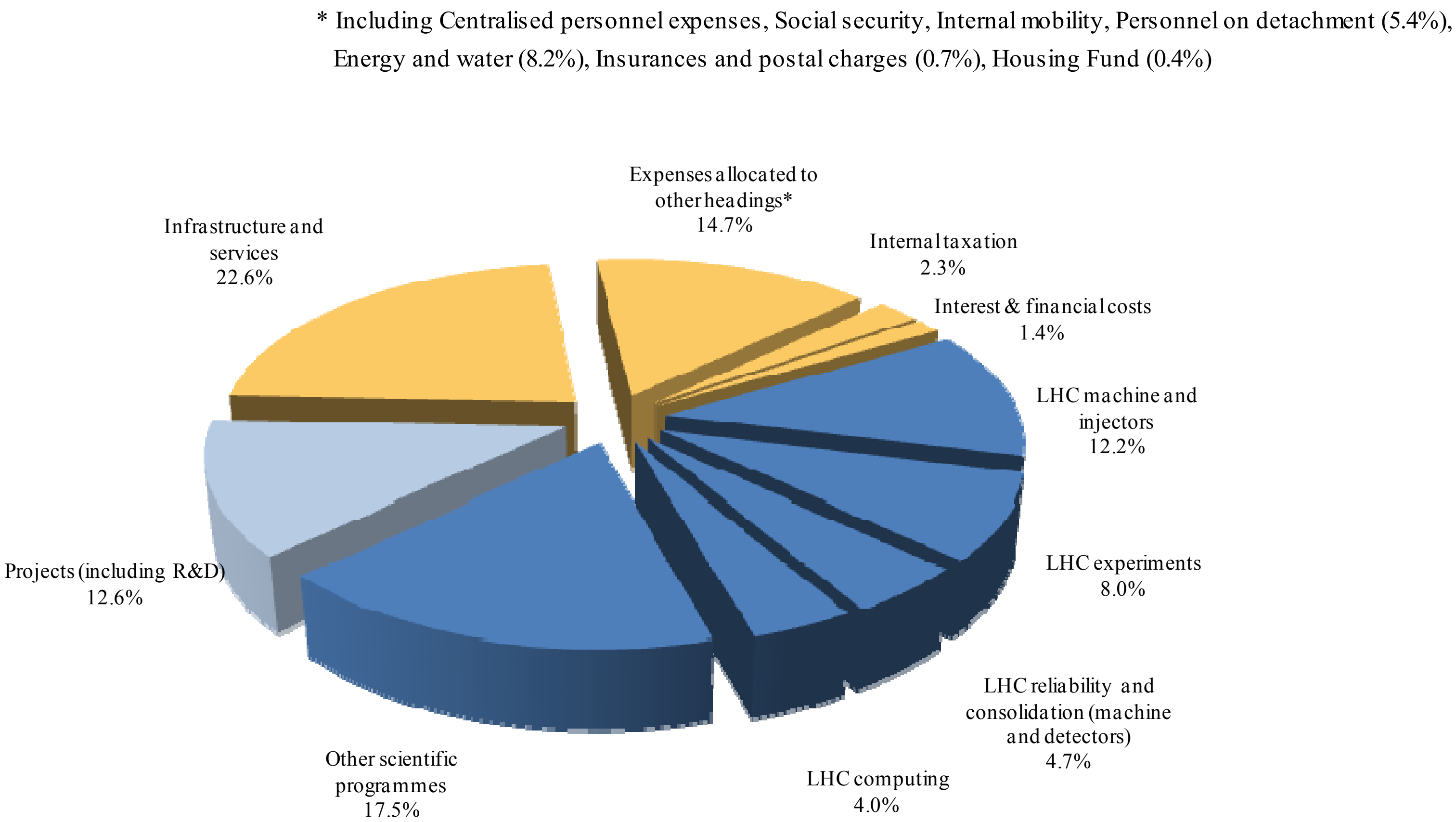
For information:		
Capital repayment to FIPOI 3	0.2	0.2

2. Revenues

The scale of Member States' contributions for 2011 will be calculated in September provided that preliminary data for 2009 are available. The final scale will be computed for the December Council session and included in the Final Budget for 2011. The contribution basis in 2010 prices as well as the other revenues headings, which show a reduction of 15 MCHF with respect to the Draft Budget presented in June, are presented in Figure 7.

3. Expenses by Scientific and Non-Scientific Programmes[4]

Figure 8: 2011 Budget (Personnel, Materials and Interest & financial costs)



[4] 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 7.

Figure 9: Scientific Programme

2010 Revised Budget (2010 prices) FTE Personnel	2010 Revised Budget (2010 prices) kCHF Personnel	kCHF Materials	kCHF Total	Fact sheet	Old fact sheet number	Activity	2011 goals	2011 Draft Budget (2010 prices) FTE Personnel	2011 Draft Budget (2010 prices) kCHF Personnel	kCHF Materials	kCHF Total	Variations of 2011 Draft Bud. with respect to 2010 Rev. Budget
987	**171 045**	**148 765**	**319 810**			**LHC programme (incl. projects)**		**988**	**170 360**	**137 515**	**307 875**	**-3.7%**
445	**73 775**	**64 985**	**138 760**	**1**	**1**	**LHC machine and injectors**	Progressive luminosity increase, with the aim of accumulating 1 fb-1	**440**	**72 930**	**57 180**	**130 110**	**-6.2%**
431	71 340	50 475	121 815			LHC machine and experimental areas	of integrated luminosity by the end of 2011.	429	71 075	48 230	119 305	-2.1%
4	710	13 740	14 450			Spares				7 840	7 840	-45.7%
10	1 725	770	2 495			LHC injectors (for heavy Ions)		11	1 855	1 110	2 965	18.8%
406	**72 575**	**23 750**	**96 325**			**LHC experiments**		**404**	**71 395**	**13 550**	**84 945**	**-11.8%**
125	22 190	3 990	26 180	**2**	**2**	ATLAS detector	Data taking, first measurements of Standard Model physics processes.	117	20 800	4 050	24 850	-5.1%
120	21 240	3 840	25 080	**3**	**3**	CMS detector	Achieve high data taking efficiency. Measure Standard Model processes.	112	20 065	3 695	23 760	-5.3%
47	8 770	2 320	11 090	**4**	**4**	ALICE detector	pp physics data-taking and 2nd Pb-Pb physics data taking. Physics analysis.	52	9 475	2 055	11 530	4.0%
51	9 405	1 700	11 105	**5**	**5**	LHCb detector	Data taking, improvement on the world limits for $Br(B_s \rightarrow \mu^+\mu^-)$ and f_s.	57	10 305	1 845	12 150	9.4%
38	6 310	3 610	9 920	**6**	**6**	Common items, other experiments (inc. Totem, LHCf)	Totem: global commissioning. LHCf: physics run at the highest possible energy.	39	5 525	1 905	7 430	-25.1%
25	4 660	8 290	12 950			Detectors re-scoping		26	5 225		5 225	-59.7%
41	**6 825**	**32 720**	**39 545**	**7**	**21.a**	**LHC machine and areas reliability and consolidation**	Consolidation old LEP infrastruct, prep. splices, collimation enh., radiation to electronics	**48**	**7 905**	**35 100**	**43 005**	**8.7%**
				8		**LHC detectors consolidation**	Procure all the necessary equip. for the consolid. in 2012 shutdown and prepare for it.			**7 600**	**7 600**	
96	**17 870**	**27 310**	**45 180**	**9**	**7**	**LHC computing**	Sustained transfer of LHC data to tape at 1.5 GB/s, data exp. to Tier 1 of up to 2 GB/s	**97**	**18 130**	**24 085**	**42 215**	**-6.6%**
638	**108 670**	**78 070**	**186 740**			**Other programmes (LHC support and non-LHC programmes)**		**601**	**103 760**	**83 150**	**186 910**	**0.1%**
19	**2 980**	**4 665**	**7 645**	**10**	**8**	**Non-LHC physics**	Reach goals defined in the experiment proposals and approved by Research Board.	**23**	**3 830**	**7 055**	**10 885**	**42.4%**
68	**10 560**	**1 965**	**12 525**	**11**	**9.a**	**Theory**	Support experiments and TH community.	**65**	**10 070**	**2 025**	**12 095**	**-3.4%**
		1 500	**1 500**	**12**	**9.b**	**LHC physics centre**	Coordinate and optimize resources for the best possible exploitation of the LHC data.			**720**	**720**	**-52.0%**
178	**31 875**	**10 325**	**42 200**	**13**	**9.c**	**Scientific support**	Assure a safe, efficient and reliable operation of the experiments. Support to users.	**151**	**28 290**	**9 810**	**38 100**	**-9.7%**
34	**5 680**	**4 215**	**9 895**	**14**	**10**	**Low and medium energy accelerators**	Delivery of beams to all users with the maximum overall efficiency.	**34**	**5 665**	**4 280**	**9 945**	**0.5%**
200	**34 155**	**22 660**	**56 815**	**14**	**10**	**PS and SPS complexes**	All of the non-LHC physics programmes are done in parallel with operation	**205**	**35 255**	**24 390**	**59 645**	**5.0%**
118	**20 095**	**16 150**	**36 245**	**14**	**10**	**Accelerator technical services**	for LHC injection.	**108**	**18 135**	**12 760**	**30 895**	**-14.8%**
20	**3 325**	**16 590**	**19 915**	**15**	**21.a**	**Accelerator consolidation**	Continuation of the existing accelerator consolid. to ensure reliable LHC operation.	**16**	**2 515**	**22 110**	**24 625**	**23.7%**
1 625	**279 715**	**226 835**	**506 550**			**Grand Total**		**1 590**	**274 120**	**220 665**	**494 785**	**-2.3%**
	23.21%	18.82%	42.03%			% of total revenues			23.01%	18.53%	41.54%	

Explanations to Figure 9:

The LHC machine and injectors expenses will reduce from 2010 to 2011 due to a reduced pace of spares procurement whereas the LHC detectors allocation reduces due to the end of the Detectors re-scoping for materials. LHC reliability and consolidation used to be included in the Figure 11 but is now reported under the baseload. The increase stems from the new activity LHC detectors consolidation.

Non-LHC physics is increased to allow CERN contributing its share for projects such as NA61 and NA62.

Following the discussion in SPC, the heading LHC physics centre includes only the allocations for the new centre whereas the previous white paper heading manpower is included now under detectors re-scoping.

The ongoing support activities, such as theory with its large fellows and visiting programme, the scientific support, low- and medium- energy accelerators and PS and SPS complexes and accelerator technologies are similar in 2010 and 2011.

Accelerator consolidation increases with the aim to use the existing injector chain for the next 25 years for reliable LHC operation but the slope increase is reduced as of 2011 onwards with respect to the Draft Budget presented in June.

Figure 10: Infrastructure and services

2010 Revised Budget (2010 prices)				Fact sheet	Old fact sheet number	Activity	2011 goals	2011 Draft Budget (2010 prices)				Variations of 2011 Draft Bud. with respect to 2010 Rev. Budget
FTE	kCHF							FTE	kCHF			
Personnel	Personnel	Materials	Total					Personnel	Personnel	Materials	Total	
781	**184 120**	**223 375**	**407 495**			**Infrastructure and services**		**778**	**211 055**	**225 485**	**436 540**	**7.1%**
86	**14 225**	**2 300**	**16 525**	**16**	**11.a**	**Manufacturing facilities (workshops, etc.)**	Avoid any delays in projects where the design/production is on the critical path.	**86**	**14 180**	**2 535**	**16 715**	**1.1%**
139	**22 175**	**41 805**	**63 980**	**17**	**11.b**	**General facilities and logistics (site maintenance, transport)**	Further improve services to the users and staff and the maintenance of the site.	**139**	**22 170**	**35 530**	**57 700**	**-9.8%**
154	**26 070**	**17 405**	**43 475**	**18**	**11.c**	**Informatics**		**144**	**24 695**	**16 110**	**40 805**	**-6.1%**
146	**21 090**	**16 530**	**37 620**	**19**	**12**	**Safety, health and environment**	Safe operation of CERN beam facilities, reduce environmental impact, radiat. prot.	**146**	**21 090**	**14 125**	**35 215**	**-6.4%**
193	**32 670**	**9 570**	**42 240**	**20**	**13**	**Administration**	Balance cent./non-cent. admin., final impl. of KPIs, review in-house vs outsourcing.	**195**	**33 435**	**8 245**	**41 680**	**-1.3%**
39	**8 620**	**7 770**	**16 390**	**21**	**14**	**Outreach and KTT**		**37**	**8 390**	**9 055**	**17 445**	**6.4%**
17	**2 810**	**22 635**	**25 445**	**22**	**21.b**	**Infrastructure consolidation, buildings and renovation**	Grouping of surface treatment (build 107), bld. 867 refurb(radiation workshop), roofs, etc.	**27**	**4 265**	**26 565**	**30 830**	**21.2%**
6	**56 460**	**88 990**	**145 450**	**23**	**15**	**Centralised expenses**		**5**	**82 830**	**98 475**	**181 305**	**24.7%**
	31 095		31 095			Centralised personnel expenses (inc. social sec.)	Adjust as function of 5-yearly outcome		54 605		54 605	75.6%
	24 015		24 015			Internal taxation			25 015		25 015	4.2%
						Personnel internal mobility	Enhance internal mobility		2 000		2 000	
3	955		955			Personnel on detachment		3	810		810	-15.2%
		77 610	77 610			Energy and water				87 310	87 310	12.5%
		7 275	7 275			Insurances and postal charges				7 275	7 275	
2	395	4 105	4 500			Housing fund		2	400	3 890	4 290	-4.7%
		16 370	**16 370**	**23**	**15**	**Interest and financial costs**	Reduce short term loans.			**14 845**	**14 845**	**-9.3%**
	15.28%	18.53%	33.81%			% of total revenues			17.72%	18.93%	36.65%	

Explanations to Figure 10:

The baseload of the ongoing infrastructure and services results in an overall constant budget allocation. The increase from 2010 to 2011 is due to two items:

- Energy increase: the run throughout the winter 2011 will increase the costs after the longer technical stop this year;
- Centralised personnel expenses: Whereas this heading for 2010 includes the normal assumptions for CERN's contribution to the health insurance for its pensioners, the arrival and departure costs and unemployment fees, the amount for 2011 covers an additional 25 MCHF as provision for the CERN share for social security and the outcome of the ongoing 5-yearly review.

Whereas manufacturing facilities, informatics and administration have a constant budget, general facilities and logistics reduce due to less transport and general services during the long run throughout 2011. The allocation to safety is higher in 2010 due to the carry-forward from the radioactive waste management project from 2009.

Outreach and KTT increases due to the expected rise of the external revenues and equivalent increase of expenses on TT projects back to the level of 2008.

The increase in infrastructure consolidation, buildings and renovation is due to the identification of urgent needs relating to the renovation of the surface technologies building, the need to re-group the workshops handling radioactive materials, asbestos removal, site urbanization, insulation of façades, replacement of heating plants, etc.

Interest and financial costs reduce due to an expected reduction of short-term loans by the end of 2011.

Figure 11: Projects

2010 Revised Budget (2010 prices) FTE	kCHF			Fact sheet	Old fact sheet number	Activity	2011 goals	2011 Draft Budget (2010 prices) FTE	kCHF			Variations of 2011 Draft Bud. with respect to 2010 Rev. Budget
Personnel	Personnel	Materials	Total					Personnel	Personnel	Materials	Total	
273	**44 510**	**60 665**	**105 175**			**Projects**		**282**	**50 910**	**83 470**	**134 380**	**27.8%**
79	**12 835**	**11 315**	**24 150**	**24**	**16.a**	**CLIC / Linear collider**	Complete CTF3, complete final version of Conceptual Design of a 3 TeV Lin. Collider.	**89**	**14 150**	**12 870**	**27 020**	**11.9%**
10	**1 590**	**650**	**2 240**	**25**	**16.b**	**Linear collider detector R&D**	Detector simulation studies; technical design of detector elements and concepts.	**17**	**2 640**	**535**	**3 175**	**41.7%**
53	**8 700**	**26 025**	**34 725**	**26**	**17**	**LINAC 4**	Complete the first series of acceler. struct. Commiss. the 3 MeV inj. on the test stand.	**55**	**9 865**	**29 925**	**39 790**	**14.6%**
12	**2 200**	**725**	**2 925**	**27**		**HIE-ISOLDE**	Launching of CE work. Start prep series prod. of high-beta superconduct. RF cavities.	**23**	**3 880**	**4 940**	**8 820**	**201.5%**
39	**6 085**	**4 410**	**10 495**			**R&D**		**24**	**4 935**	**7 775**	**12 710**	**21.1%**
20	2 710	3 265	5 975	**28**	**19.a**	R&D accelerators	Launching of High Power SPL study.	17	2 790	4 715	7 505	25.6%
20	3 375	1 145	4 520	**29**	**19.b, c, d**	Other R&D (computing supported by EU, detectors)		7	2 145	3 060	5 205	15.2%
50	**8 310**	**11 375**	**19 685**	**30**		**High luminosity machine upgrade**	Detailed analysis of SPS and PSB upgrades. Detailed design of subsyst. and components.	**52**	**11 980**	**17 640**	**29 620**	**50.5%**
						PSB upgrade			1 000	4 500	5 500	
						SPS upgrade			2 000	8 400	10 400	
18	3 155	1 600	4 755			LHC machine upgrade		17	3 070	1 240	4 310	-9.4%
19	2 905	7 885	10 790		**18**	LHC inner triplet	Complete the prot. MQXC low-beta quadrupole. Merge with High Field Magnets.	16	2 595	2 715	5 310	-50.8%
13	2 250	1 890	4 140			Low power SPL and PS2 studies		19	3 315	785	4 100	-1.0%
17	**2 690**	**4 245**	**6 935**	**31**		**High luminosity detectors upgrade**	Continue R&D and start some procur. and construct. of comp. to be inst. in 2014-16.	**10**	**1 300**	**6 070**	**7 370**	**6.3%**
17	2 690	3 295	5 985			LHC detectors R&D		10	1 300	3 870	5 170	-13.6%
		950	950			LHC detectors upgrade				2 200	2 200	131.6%
13	**2 100**	**1 920**	**4 020**	**32**		**High energy LHC studies / High field magnets**	Small length of prototype 1 mm Nb3Sn conductor; First Short Model Coil test.	**13**	**2 160**	**3 715**	**5 875**	**46.1%**
	3.69%	5.03%	8.73%			% of total revenues			4.27%	7.01%	11.28%	

Explanations to Figure 11:

All projects experienced a delay in terms of meeting scheduled objectives due to substantial amounts of manpower still being focused on LHC start of physics. Following the non-approval of the Draft Budget in June, the pace is further reduced.

The allocations for 2010 and 2011 were reprofiled to respect the baseline planning in the EVM tools for the LINAC 4. The project Focus quadrupoles (NbTI) will end and be merged with R&D on high field magnets with a view to an inner triplet upgrade at a later stage.

Accelerator R&D increases as a consequence of the EUCARD project, whereas other R&D reduces, mainly due to the ending of EU-supported IT R&D programmes such as EGEE-3.

The activities 'high luminosity machine upgrade' with specific R&D studies for the LHC injector upgrade and high luminosity detectors upgrade (including the EU project S-LHCPP).

The amounts increase with respect to last year's plan since a first estimate for the upgrades of the existing LHC injectors and CERN's share to LHC detectors upgrade by 2015/2016 is included. The first estimated needs are earmarked to start the R&D for a major machine and detector upgrade towards 2020 (HL-LHC) and for high field magnets studying the possible high energy LHC upgrade (HE-LHC).

Energy and water

Figure 12: Expenses – Energy and water

(in MCHF, rounded off)

Activity	2010 Revised Budget (2010 prices)	2011 Draft Budget (2010 prices)	Variations of 2011 Draft Bud. with respect to 2010 Rev. Bud.
Energy and water (baseload)	**25.4**	**27.0**	**6.02%**
Electricity	12.1	13.5	11.81%
Heating oil and gas	5.5	5.7	3.64%
Water and miscellaneous	7.9	7.8	-1.17%
Energy for basic programmes	**52.2**	**60.3**	**15.68%**
Experimental areas[1)]	10.5	10.4	-0.44%
Data handling	1.3	1.3	4.66%
Accelerators:	19.0	27.0	41.97%
AD	0.6	0.5	*-13.49%*
PS	4.6	5.3	*16.29%*
SPS (including CNGS)	13.8	21.2	*52.93%*
LHC	21.4	21.6	0.85%
Grand Total Energy programme	**77.6**	**87.3**	**12.51%**

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

Explanations to Figure 12:

With respect to 2010, the amount for 2011 takes due account of the estimated electricity consumption throughout the 2011 luminosity run. As mentioned in the Annual Progress Report 2009, the repartition of the electrical power circuits has been redefined, resulting in 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 the past split amongst the accelerators, the PS and SPS complexes have now higher power consumption due to LHC needs.

Fixed assets projects

Figure 13: Expenses – Details on projects included in the activity headings[5]

(in kCHF)

2010 Revised Budget * (2010 prices)			Activity	Project	2011 Draft Budget * (2010 prices)			Variations of 2011 Draft Bud. with respect to 2010 Rev. Budget
Personnel	Materials	Total			Personnel	Materials	Total	
45,560	**182,970**	**228,530**	**Programme**	**Projects**	**56,745**	**183,005**	**239,750**	**4.9%**
870	**14,510**	15,380		**LHC machine and injectors**	**1,080**	**8,950**	10,030	**-34.8%**
0	4,800	4,800		LHC spares	0	7,840	7,840	63.3%
0	8,940	8,940		Rebuilding Spares Stock after 3-4 incident	0	0	0	-100.0%
870	770	1,640		LHC injectors	1,080	1,110	2,190	33.5%
6,650	**29,605**	**36,255**		**LHC machine and areas reliability and consolidation**	**7,740**	**24,955**	**32,695**	**-9.8%**
5,035	18,275	23,310		LHC consolidation	5,550	15,300	20,850	-10.6%
170	2,255	2,425		Induced consolidation following 3-4 incident	380	**0**	380	**-84.3%**
0	7,015	7,015	**LHC programme** Included in figure 9	Liquid helium additional storage tanks	0	0	0	-100.0%
1,445	2,060	3,505		Collimation system enhancements	1,810	9,655	11,465	227.1%
0	2,135	2,135		Radiation to electronics (R2E)	0	8,985	8,985	320.8%
0	700	700		Splice consolidation and repair	0	1,000	1,000	42.9%
0	**0**	**0**		**LHC detectors consolidation**	**0**	**7,600**	**7,600**	
4,660	**8,290**	**12,950**		**LHC experiments**	**5,225**	**0**	**5,225**	**-59.7%**
4,660	8,290	12,950		Detectors re-scoping	5,225	0	5,225	-59.7%
0	**22,425**	**22,425**		**LHC computing**	**0**	**19,480**	**19,480**	**-13.1%**
0	22,425	22,425		LHC Computing Grid	0	19,480	19,480	-13.1%
0	**925**	**925**		**AEGIS**	**120**	**275**	**395**	**-57.3%**
0	**2,140**	**2,140**		**NA62**	**0**	**4,340**	**4,340**	**102.8%**
0	**415**	**415**	**Other programmes** Included in figure 9	**Isolde robots**	**0**	**1,800**	**1,800**	**333.7%**
635	**3,015**	**3,650**		**Magnet rescue facility**	**360**	**0**	**360**	**-90.1%**
0	**940**	**940**		**AD consolidation**	**0**	**1,120**	**1,120**	**19.1%**
3,325	**15,650**	**18,975**		**Accelerator consolidation**	**2,515**	**20,990**	**23,505**	**23.9%**
170	**8,060**	**8,230**		**Extension building 40**	**175**	**0**	**175**	**-97.9%**
0	**860**	**860**		**Radio Infrastructure upgrade for firefighters**	**0**	**1,500**	**1,500**	**74.4%**
0	**770**	**770**		**High radiation material test facility ****	**0**	**165**	**165**	**-78.6%**
30	**120**	**150**		**Isolde robots ****	**115**	**485**	**600**	**300.0%**
0	**2,595**	**2,595**	**Infrastructure and services** Included in figure 10	**Ramses II light**	**0**	**980**	**980**	**-62.2%**
440	**6,085**	**6,525**		**Radioactive waste management**	**480**	**1,480**	**1,960**	**-70.0%**
2,810	**22,635**	**25,445**		**General and technical infrastructure consolidation**	**4,265**	**26,565**	**30,830**	**21.2%**
0	4,300	4,300		Building 867 (radiation workshop)	0	9,595	9,595	123.1%
0	0	0		Building 107 (surface treatment)	120	4,955	5,075	
580	12,545	13,125		Surface infrastructure consolidation (roofs, facades, etc)	1,695	9,200	10,895	-17.0%
2,230	5,790	8,020		Technical infrastructure consolidation (heating, electricity, etc)	2,450	2,815	5,265	-34.4%
12,315	**11,130**	**23,445**		**CLIC**	**13,660**	**12,800**	**26,460**	**12.9%**
1,540	**395**	**1,935**		**Linear collider detector R&D**	**2,590**	**320**	**2,910**	**50.4%**
7,905	**26,025**	**33,930**		**LINAC 4**	**9,565**	**29,925**	**39,490**	**16.4%**
0	**2,040**	**2,040**		**High radiation material test facility**	**60**	**2,175**	**2,235**	**9.6%**
185	**1,045**	**1,230**	**Projects** Included in figure 11	**RF 200 MHz system**	**205**	**1,235**	**1,440**	**17.1%**
0	**0**	**0**		**PS Booster upgrade**	**1,000**	**4,500**	**5,500**	
0	**0**	**0**		**SPS upgrade**	**2,000**	**8,400**	**10,400**	
0	**950**	**950**		**LHC detectors upgrade**	**0**	**2,200**	**2,200**	**131.6%**
1,825	**1,620**	**3,445**		**High field magnets (HFM)**	**1,710**	**3,425**	**5,135**	**49.1%**
2,200	**725**	**2,925**		**HIE-ISOLDE**	**3,880**	**4,940**	**8,820**	**201.5%**

* Excluding EU projects.

** Refers to the Radioactive waste management activities of the project.

The strategy towards a new computing centre is still under discussion, the Management will report on the progress. The strategy for radioactive waste management was reviewed. The future profile was adjusted for the construction of the new waste treatment centre at CERN and the actual waste disposal. The allocation for 2010 is higher due to the carry-forward of unspent project budget in 2009.

5 Upon completion the amounts of these projects will be activated as fixed assets in the financial position.

4. Summary of Expenses by Nature

Figure 14: Materials expenses by nature (including interest and financial costs).

(in kCHF)

Nature	2010 Revised Budget (2010 prices)	2011 Draft Budget (2010 prices)	Variations of 2011 Draft Bud. with respect to 2010 Rev. Budget
Materials expenses [1]	**497 330**	**517 600**	**4.08%**
Goods, consumables and supplies	254 170	265 060	4.28%
Electricity, heating gas and water [2]	77 815	87 540	12.50%
Industrial services (service contracts) [3]	60 875	58 000	-4.72%
Repair and maintenance (other indus. services contracts) [3]	36 120	37 000	2.44%
Third party payments and consultants	30 995	33 000	6.47%
Other overheads [4]	37 355	37 000	-0.95%
Interest and financial costs	**18 270**	**16 745**	**-8.35%**
Fortis bank	14 120	13 585	-3.79%
In-kind (FIPOI interest 0%) [5]	1 900	1 900	
Short-term interest	1 590	595	-62.58%
Ppbar indexation [6]	410	415	1.22%
Bank charges	250	250	
TOTAL MATERIALS	**515 600**	**534 345**	**3.64%**

1) Previously this heading referred only to the operating expenses, excluding housing fund and stores activity. Since the 2009 Out-Turn (CERN/FC/5412), this heading includes housing fund, stores activity and reflects also the in-kind expenses.

2) This heading comprises also the expenses for Housing Fund whereas the line "Energy and water" in the figures 4, 10, 12 refers to the Energy programme.

3) Variation for total of industrial services: -2.29 %.

4) Including insurances and postal charges, CERN contributions to collaborations.

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".

6) Previously, this amount was included under short-term interest. We assume the indexation rate of 2% p.a.

Figure 15: Breakdown of materials expenses by nature

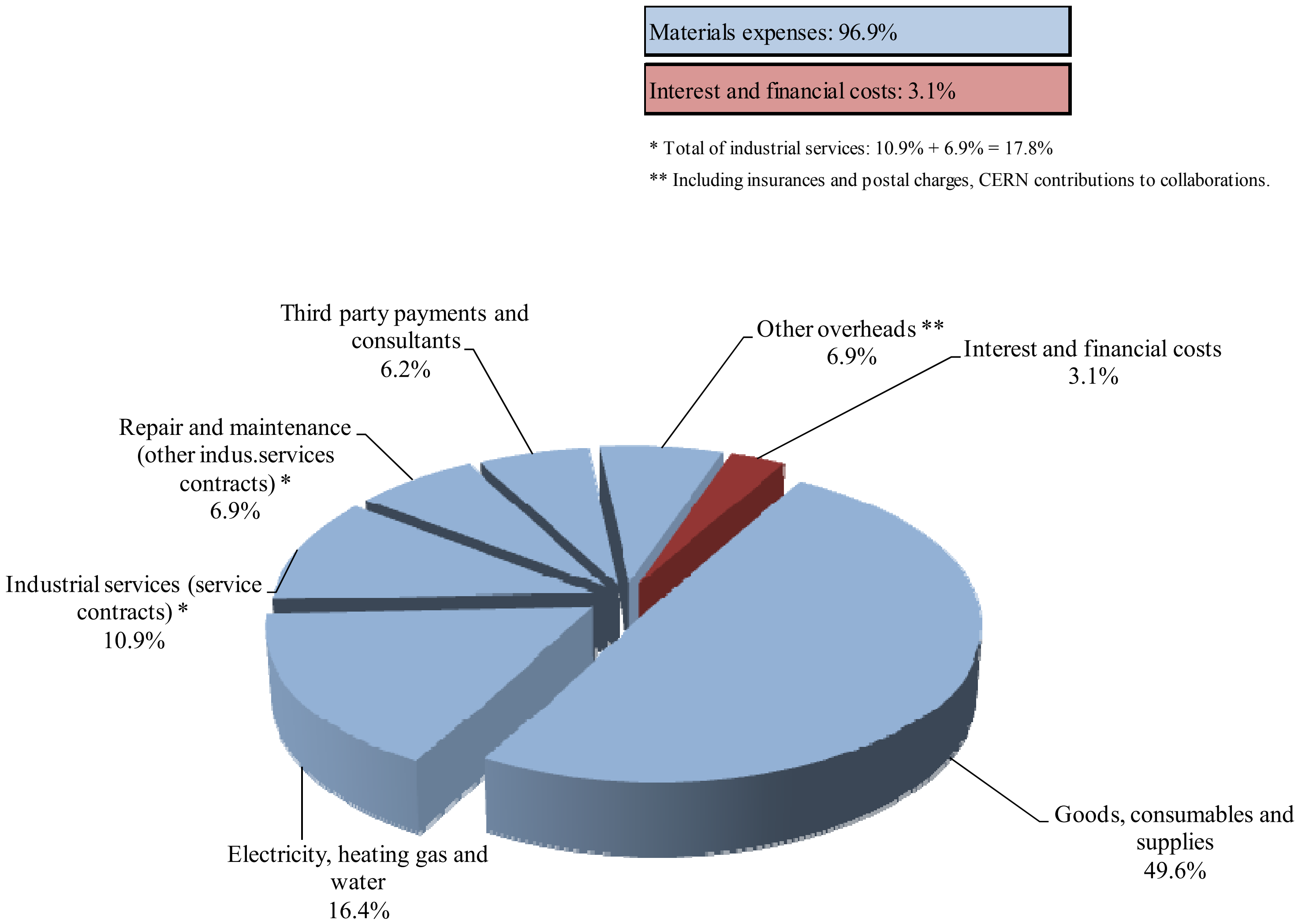


Figure 16: Personnel Expenses by Nature

(in kCHF)

Nature	2010 Revised Budget (2010 prices)	2011 Draft Budget (2010 prices)	Variations of 2011 Draft Bud. with respect to 2010 Rev. Budget
Staff members [1)]	**467 210**	**497 935**	**6.58%**
Basic salaries [2)]	***265 595***	***269 200***	***1.36%***
Allowances	***58 090***	***59 765***	***2.88%***
Non-residence	19 470	19 600	0.67%
Family allowances	22 490	22 805	1.40%
Special allowances	3 480	3 970	14.08%
Overtime	2 180	2 650	21.56%
Various allowances	10 470	10 740	2.58%
Termination indemnities [3)]			
Social contributions	***88 415***	***89 350***	***1.06%***
Pension Fund	68 965	69 650	0.99%
Health insurance	19 450	19 700	1.29%
Centralised personnel expenses	***31 095***	***54 605***	***75.61%***
Installation, recruitment and termination of contracts	6 975	6 355	-8.89%
Additional periods of membership in the Pension Fund for shift work	2 935	1 900	-35.26%
Contribution to health insurance for pensioners	21 185	21 350	0.78%
CERN share for the social security and 5-yearly review outcome [4)]		25 000	
Internal taxation	***24 015***	***25 015***	***4.16%***
Fellows & Associates (including overhead for students) [5)]	**54 065**	**48 325**	**-10.62%**
Apprentices	**425**	**425**	
TOTAL PERSONNEL	**521 700**	**546 685**	**4.79%**
Budget Amortization of staff benefit accruals	17 000	17 000	
TOTAL PERSONNEL excl. personnel paid on team accounts	**538 700**	**563 685**	**4.64%**

1) Including staff paid on team accounts. For 2010 staff paid on Team Accounts is 10.1 MCHF, for 2011 8.7 MCHF.
2) Including the withheld salary for short-term SLS participations.
3) Following IPSAS a provision was made for the termination indemnities. As for the paid leave, the variation will be shown in the Annual Progress Report of each year.
4) This provision will not stay under the Centralised personnel expenses, but shown under the various expenses headings depending the outcome Council's discussions and decisions.
5) Including fellows and paid associates paid on team accounts. For 2010 fellows and paid associates paid on Team Accounts is 3.2 MCHF, for 2011 1.9 MCHF.

Overall complement: The 2011 budget will cover 2,327 FTEs staff (2,264 FTEs on CERN’s core budget, 8 FTEs on EU projects, 55 FTEs on team accounts) and 392 FTEs fellows and paid associates (319 FTEs on CERN’s core budget, 52 FTEs on EU projects, 5 FTEs on Openlab activities and 16 FTEs on team accounts).

Explanations to Figure 16:

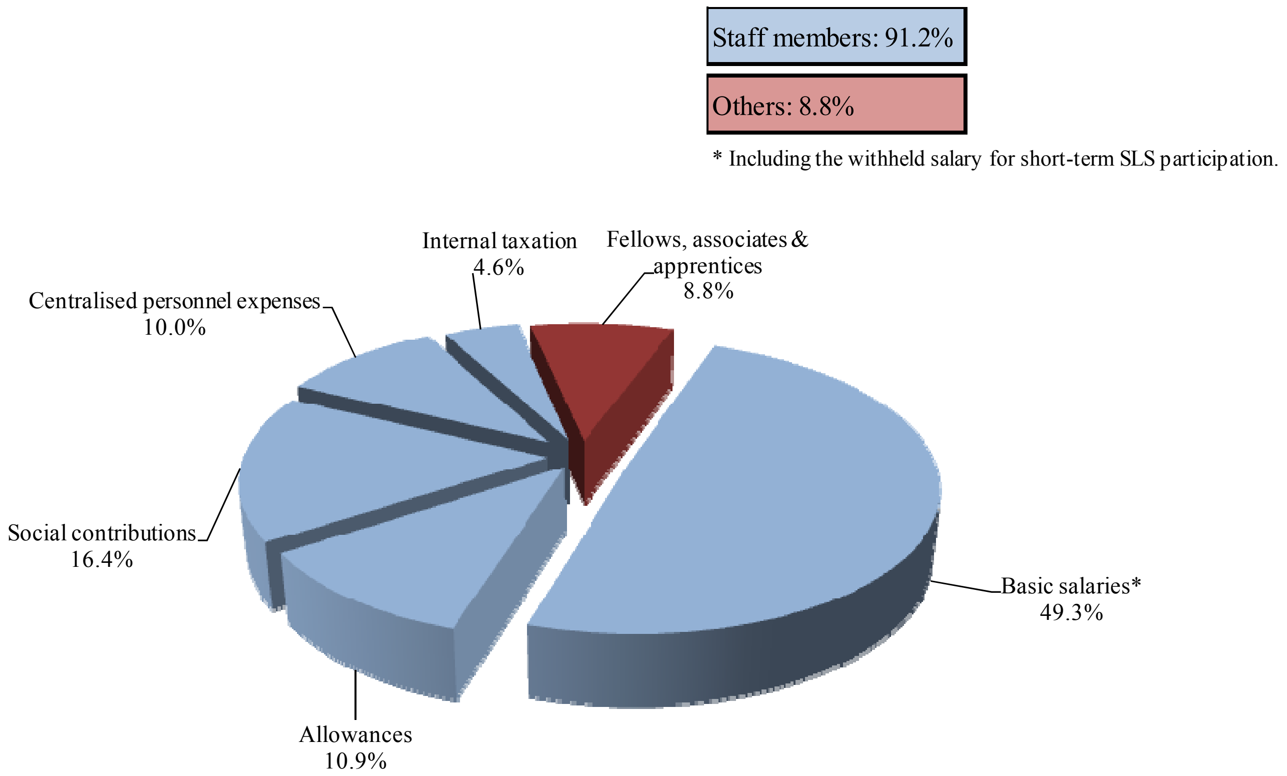
The total CERN Personnel Budget for 2011 amounts to 546.7 MCHF. This includes 10.6 MCHF for staff, fellows and associates paid on team accounts.

The budget (including centralized expenses) for staff members totals 497.9 MCHF.

The Centralized Personnel Expenses totals 54.6 MCHF excluding compensation to former firemen for shift work (this is included in the budget for total man-year costs). Removal and installation expenses, contract terminations and unemployment indemnities are expected to amount to about 6.3 MCHF. Additional periods of membership in the Pension Fund for shift work should amount to some 1.9 MCHF and contributions to pensioners' health insurance should amount to 21.35 MCHF. The CERN share for the social security and 5-yearly review outcome will not stay under the Centralised personnel expenses but shown under the various expenses headings according to the outcome of Council's discussions and decisions.

Internal taxation is expected to amount to 25.0 MCHF and is also shown as revenues for the Organization, the amount depending on the staff positions in the salary grid.

Figure 17: Personnel expenses breakdown by nature



5. Estimated Financial Position of the Organization
Statement of Cash Flow

Figure 18: Estimated statement of Cash Flow for Financial Years 2010 and 2011

(in MCHF, rounded off, estimated as at 01/08/2010)	2010 (2010 prices)	2011 (2010 prices)
(A) START OF THE YEAR		
Liquid assets brought forward	27	
Outstanding short-term loans	290	* 109
(1) CASH INFLOW	**1,269**	**1,238**
Contributions	1,087	1,097
Special cash contributions	17	20
Teams and collaborations	137	100
EU, KTT, other revenues	28	21
(2) CASH OUTFLOW	**1,115**	**1,217**
Expenses	974	1,021
Teams and collaborations	110	100
Interests and financial costs	16	15
Capital repayment Fortis + FIPOI	15	21
Recapitalisation of the Pension Fund		60
(3) VARIATION OF CASH POSITION	**154**	**21**
(B) END OF THE YEAR		
Estimated outstanding short-term loans	**109**	**90**

* For 2011, it is an estimated amount.

The Cash Flow statement is an estimate, the balance of short-term loans will depend on the actual carry-forward, the in- and outflows on team accounts and the inflow of the Member States' contributions.

Loan from FORTIS bank

The outstanding amount to Fortis Bank amounts to 405.8 MCHF at the end of 2010 and will reduce to 385.5 MCHF by the end of 2011. The loan will be fully reimbursed by the end of June 2026.

Short-term bank loans and overdrafts

As mentioned in Figure 18, short-term loans and bank overdrafts are estimated to amount to 90 MCHF at the end of 2011. The estimated short-term interest and bank charges will amount to some 0.8 MCHF as shown in Figure 14.

Loan from FIPOI

The FIPOI loans are interest-free, the capital repayment for the existing two FIPOI loans amounts to 880 kCHF per year. In addition, a further FIPOI loan was granted for the Building 40 extension (building 42). By the end of 2009, a total of 5.5 MCHF was received. The capital repayment of 226 kCHF per year for this new loan will start once the building construction is completed.