Overview of CERN controlling principles

Presentation for the Korean Government Supporting Research Centre

Kasia Pokorska, 8 November 2018

Presentation of the central planning unit

Group Resources Planning and Control in the Finance and Administrative Processes department: FAP-RPC

Resources planning @CERN (1) – core planning documents: MTP and Final Budget

- Medium Term Plan (MTP) including Draft Budget
  - Overall underlining strategy (objectives) for the next 5 years
  - Draft Budget for next year in the current prices
  - Targets for next budget year (to be measured against these)
  - Submitted to the approval by the Council
  - E.g. MTP 2018: covers planning period 2019-2023 and introduces Draft Budget for the year 2019
- Final Budget
  - Implements
    - The approved indexation to the expenses and revenues budget
    - The allowed transfers of unspent budget between years (carry forward, carry back, reprofilings)
  - Includes the information on the Probable Revenues and Expenses
  - For information only, no formal vote required from the Council
- Long Term Plan (LTP)
  - More general and concise
  - Key strategic objectives
  - Time-frame 10 years
    - last time proposed in June 2007: 2007-2016 at the end of the LHC construction
  - A budget consideration is a part of the MTP (10-year projection for revenues and expenses)

Resources planning @CERN (2) - Principles

- Financial Rules and Regulations
  - Document approved by Council
  - Last revision 15/06/2017: CERN/FC/6129/RA
  - Stipulate (Article 15):

*CERN's accounts shall be drawn up in accordance with the International Public Sector Accounting Standards (**IPSAS**).*

These standards and the way in which they are implemented shall be explained in the notes attached to the annual accounts of each financial year.

  - Planning and budget: Article 5 to 9
- IPSAS implementation
  - Since 2007
  - Only accounts, budget follows the cash-based principle

Resources planning @CERN (3) - Revenues

- Member States' contribution
  - 90% of the whole revenues
- Contributions from Associate Member States
  - Transition phase, a percentage of the full amount, minimum 1 MCHF
  - Ramping up to 100% over a few years
- Participation in EU projects
- In-kind and cash contributions to specific projects and facilities, from
  - Countries (e.g. US for HL-LHC)
  - Institutes (e.g. ITER)
  - Private Industry (e.g. Siemens, Intel, Oracle, Huawai for OpenLab project)

(in MCHF, 2018 prices, rounded off)	Revised 2018 Budget	2019 Draft Budget
REVENUES	**1,266.2**	**1,264.0**
Member States' contributions	1,122.9	1,122.9
Associate Member States' contributions	25.3	27.3
Contributions anticipated from new Associate Member States		0.5
Special contributions to HL-LHC	2.4	16.0
EU contributions	18.0	8.0
Additional contributions	3.7	1.9
for HIE-ISOLDE, ELENA, AWAKE, FAIR	*3.7*	*1.9*
Personnel paid from team accounts	11.3	8.5
Personnel on detachment	0.4	0.2
Internal taxation	33.0	32.8
Knowledge transfer	2.0	1.6
Other revenues	47.1	44.3
Sales and miscellaneous	*26.5*	*25.5*
SCOAP3 revenues	*8.8*	*8.8*
OpenLab revenues	*1.8*	
Financial revenues	*2.0*	*2.0*
In-kind[1]	*2.0*	*2.0*
Housing fund	*6.0*	*6.0*

Resources planning @CERN (4) – Expenses in general

- Expenses are broken down by
  - Activity / Project
  - Organic Unit (Department)
  - Funding
  - Nature / Account
- => Impact IPSAS
  - Accrual accounting

  The expenses are recognized when an actual physical delivery takes place and not the payment!

(in MCHF, 2018 prices, rounded off)	Revised 2018 Budget	2019 Draft Budget
EXPENSES	**1,304.3**	**1,263.8**
Running of scientific programmes and support	**1,026.0**	**975.9**
Scientific programmes	**522.2**	**543.0**
LHC (machine, detectors, computing, including spares and consolidation)	*260.0*	*283.7*
Non-LHC physics and scientific support	*86.2*	*85.2*
Other accelerators and areas (including consolidation)	*175.9*	*174.0*
Infrastructure and services	**302.9**	**297.9**
General infrastructure and services (incl. admin, international relations, safety)	*270.0*	*277.2*
Infrastructure consolidation, buildings and renovation	*32.9*	*20.7*
Centralised expenses	**200.9**	**135.0**
Centralised personnel expenses	*36.3*	*36.3*
Internal taxation	*33.0*	*32.8*
Internal mobility, personnel on detachment, paid from team accounts	*12.0*	*8.9*
Budget amortisation of staff benefit accruals	*17.3*	
Energy and water, insurance and postal charges, miscellaneous	*90.9*	*46.5*
Interest, bank and financial expenses, in-kind [1]	*11.3*	*10.4*
Projects and studies	**278.4**	**288.0**
LHC upgrades	**206.5**	**232.4**
LHC injectors upgrade (LIU)	*56.1*	*56.8*
HL-LHC construction	*107.8*	*117.2*
LHC detectors upgrade (Phase I) and consolidation	*25.3*	*30.0*
HL-LHC detectors, including R&D (Phase II)	*17.3*	*28.4*
Preparation for the future	**39.2**	**26.9**
Linear collider studies (CLIC, ILC, detector R&D)	*16.2*	*15.3*
Future Circular Collider study	*16.8*	*8.1*
Proton-driven plasma wakefield acceleration (AWAKE)	*4.1*	*2.6*
Physics Beyond Colliders study	*2.2*	*0.9*
Scientific diversity activities	**32.7**	**28.7**
CERN Neutrino Platform	*12.4*	*13.3*
R&D (incl. EU support) for accelerators	*20.4*	*15.4*

Resources planning @CERN (5) – Personnel

- Employed Member of Personnel (MPE)
  - Staff
    - Different categories, grades; salary level depends solonely on the grade
    - No incentives, the MERIT system for evaluation
  - Fellows
- Budgeted at standard cost
  - An overhead factor calculated at the beginning of each year
- Carry-forward
  - Unspent budget can be carried to the next year only to cover the existing commitments
- Limit on Full Time Active (FTA) – 2450 FTAs in 2017
- Conversion from Limited Duration contract to Indefinite Contract (LD->IC)
  - Impact on the budget
- Advancement exercise
  - New career structure to limit the increase of personnel cost
  - Built in the budget, around 1.6% per year (under review)
  - Compensated by expensive departures

(in kCHF, rounded off)

Nature	Revised 2018 Budget (2018 prices) (a)	2019 Draft Budget (2018 prices) (b)
Staff members [1]	**516,120**	**515,000**
Basic salaries (incl Saved Leave)	***342,590***	***342,440***
Basic salaries	344,335	344,215
Performance payment (non-pensionable)	4,325	4,480
Contribution to Saved Leave schemes	-6,070	-6,255
Allowances	***53,775***	***52,930***
Non-resident allowances / International indemnities	21,250	20,935
Family and child allowances	26,220	25,905
Special allowances	2,600	2,555
Overtime	2,710	2,675
Various allowances	995	860
Social contributions	***119,755***	***119,630***
Pension Fund	92,395	92,300
Health Insurance	27,360	27,330
Fellows [2]	**74,475**	**50,265**
Apprentices	**140**	**60**
Centralised personnel budget	**69,370**	**69,170**
Centralised personnel expenses	***36,335***	***36,335***
Installation, recruitment and termination of contracts	6,260	5,985
Installation and removal costs	*1,840*	*1,675*
Termination allowances	*4,420*	*4,310*
Additional periods of membership in the Pension Fund for shift work		
Contribution to Health Insurance for pensioners incl. Long-term care	30,075	30,350
Contribution to Health Insurance for pensioners	*27,265*	*27,530*
Contribution to Long Term Care for pensioners	*2,810*	*2,820*
Internal taxation	***33,035***	***32,835***
TOTAL PERSONNEL	**660,105**	**634,495**
Budget Amortization of staff benefit accruals	17,330	
TOTAL PERSONNEL incl bud. amort. of staff benefit accruals	**677,435**	**634,495**

Resources planning @CERN (6) – Materials

- Various categories, including workforce
  - Associated Members of Personnel (MPA)
  - Industrial services
- Carry forward of unspent budget
  - Recurrent activities – NONE, only in the limit of committed amounts
  - Projects
    - Unspent budget can be carried forward to the next year without limits
    - If project is advancing faster, funds can be also carried back from future years without limits.

(in kCHF, rounded off)

Nature	Revised 2018 Budget (2018 prices)	2019 Draft Budget (2018 prices)
	(a)	(b)
Materials expenses	**615,695**	**618,990**
Goods, consumables and supplies	281,310	304,825
Electricity, heating gas and water	66,165	21,840
Industrial services[1]	163,935	180,870
Service contracts	*157,135*	*174,070*
Temporary labour	*6,800*	*6,800*
Associated members of the personnel	47,885	53,275
Other overheads	56,400	58,180
Consultancy	*11,885*	*11,885*
Contributions to Collaborations	*6,075*	*7,855*
Miscellaneous[2]	*38,440*	*38,440*

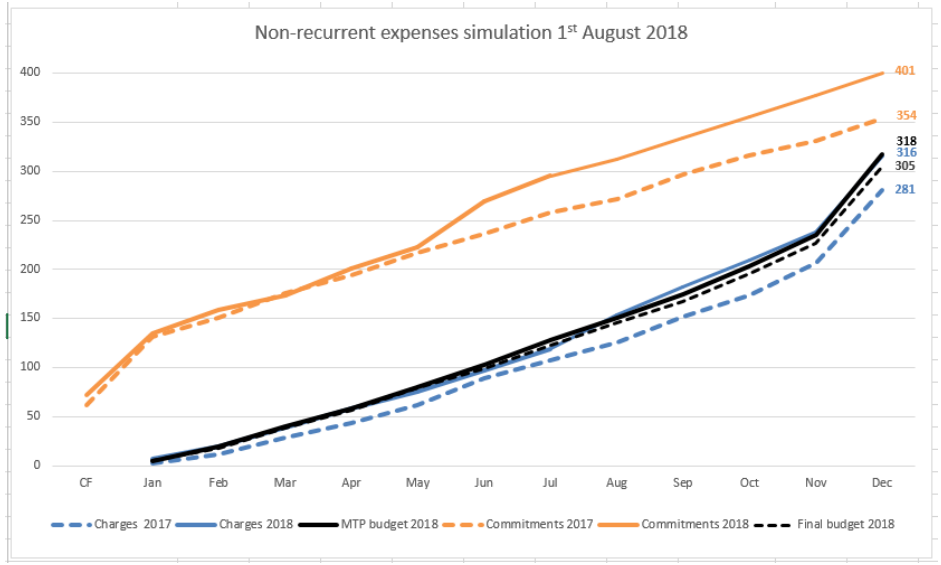
But also possible to do M to P transfers

Resources controlling @CERN (1) - Personnel

- Staff
  - For each post opening for limited duration contract
    - Verification whether within FTAs limit
    - Check the implication on cost
  - LD to IC exercise
    - Budgetary consequences
  - Advancement exercise
    - Monitor the cost
- Real cost versus standard
  - Follow-up on monthly basis
  - Readjustment if needed
- Fellows
  - Follow up of the commitments (in kCHF) versus budget
  - Regular reports on the recruitment margin

Resources controlling @CERN (2) - Materials

- Sophisticated budget control structure set up in Qualiac
  - Different criteria
    - Per department / project / recurrent activity
  - All extra commitments / expenses exceeding allocated budget are coming to FAP-RPC for approval
- Big construction projects use EVM
- Internal monthly reports forecasting expenses and comparing to the budget



Tools (1) – planning: Activity Planning Tool APT

		2018				2019			
		PERSONNEL	MATERIALS	COSTFI	***2018 Total***	PERSONNEL	MATERIALS	COSTFI	***2019 Total***
LHC-PROG	Target A	148,807	111,782		**260,589**	139,510	141,746		**281,256**
	APT	152,648	105,535		**258,183**	147,364	110,595		**257,960**
	A-B	-3,841	6,247		**2,406**	-7,854	31,151		**23,296**
OTH-PROG	Target A	156,346	109,667		**266,013**	146,834	114,432		**261,266**
	APT	182,132	121,705		**303,838**	170,014	137,228		**307,241**
	A-B	-25,786	-12,038		**-37,825**	-23,180	-22,796		**-45,975**

- Top-down approach:
  - Management decision
  - Implemented in budget / target figures
- Bottom-up approach
  - Group / Project leader requests (“APT”)
  - Consolidated into departmental proposals
- Arbitration and approval during MTP preparation

Tools (2) – personnel forecast: Staff Monitoring Tool SMT

- SMT allows to
  - Simulate number of FTAs
  - Calculate the corresponding cost
- Deterministic tool
  - All events are expressed with a probability
- Using different scenarios and hypothesis
  - All LD leave
  - All LD stay
  - Various retirements / advancement / replacement models
  - Different LD to IC ratio
  - Etc.

Simulation result

	2018	2019	2020	2021	2022	2023	*Grand Total*
[redacted]	0.90	0.90	0.90	0.90	0.90	0.90	5.40
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
[redacted]	1.00	1.00	1.00	1.00	1.00	1.00	6.00
Grand Total	7.90	7.90	7.90	7.90	7.90	7.90	47.40

Tools (3) – controlling and reporting: CERN Expenses Tracking CET (Qualiac)

CET Summaries

19 Sep 2018 / POKORSKA, Katarzyna Ms.

Last Extraction:	19-Sep-18
Book-closed for:	July (Stores: August)
Last Book-closing:	27-Aug-18

Search Criteria: Project **LIU** and Category of Accounts **Materiel** and Time Period **This Year + Carry Over**

	Charged to Budget Code (CHF)	Carry Over (CHF)	Annual Commitment (CHF)	Annual Open Commitment (CHF)	Payment Budget (CHF)	Commitment Budget (CHF)	Pipeline (CHF)
ATS	-687,263.88	28,408.25	-646,269.92	40,993.96	12,000.00	12,001.00	124,999.00
BE	5,360,049.59	3,153,744.69	8,529,493.89	3,169,444.30	10,469,000.00	10,470,046.00	465,771.15
EN	1,261,879.81	1,597,754.36	5,723,796.33	4,461,916.52	5,058,000.00	5,007,459.00	529,155.34
HSE	0.00	0.00	11,767.61	11,767.61	52,000.00	52,005.00	0.00
SMB	162,509.11	77,762.90	387,991.91	225,482.80	374,000.00	434,020.00	166,577.00
TE	9,247,961.03	3,147,623.96	15,629,062.66	6,381,101.63	16,962,000.00	16,921,697.00	206,568.41
Grand Total:	15,345,135.66	8,005,294.16	29,635,842.48	14,290,706.82	32,927,000.00	32,897,228.00	1,493,070.90

Specific questions

How many support staff are per budget and researcher?

	2016						2017					
	Staff		Fellows & MPA (excl. Users)		Total		Staff		Fellows & MPA (excl. Users)		Total	
Professional Category	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1. Research Physicists	81	*3.16*	998	*40.13*	**1,079**	*21.38*	86	*3.27*	1,079	*40.52*	**1,165**	*22.00*
2. Scientific & Eng. work	1,090	*42.58*	1,224	*49.22*	**2,314**	*45.85*	1,143	*43.41*	1,325	*49.76*	**2,468**	*46.60*
3. Technical work	889	*34.73*	155	*6.23*	**1,044**	*20.69*	890	*33.80*	147	*5.52*	**1,037**	*19.58*
4. Manual work	61	*2.38*	17	*0.68*	**78**	*1.55*	57	*2.16*	19	*0.71*	**76**	*1.44*
5a. Prof. Admin. work	161	*6.29*	51	*2.05*	**212**	*4.20*	175	*6.65*	45	*1.69*	**220**	*4.15*
5b. Office and Admin. work	275	*10.74*	42	*1.69*	**317**	*6.28*	280	*10.63*	46	*1.73*	**326**	*6.16*
5c. Office work	3	*0.12*			**3**	*0.06*	2	*0.08*	2	*0.08*	**4**	*0.08*
Total	2,560	*100*	2,487	*100*	**5,047**	*100*	2,633	*100*	2,663	*100*	**5,296**	*100*

Is there any support for foreign researchers?

Definition:

At CERN foreign would translate to “from a non-member state”

- Programme for students
  - Technical, PhD

	2013	2014	2015	2016	2017	Total
NMS	6	10	6	6	6	34

  - Summer student programme: 154 in 2017
- Collaboration agreements for Associated Members of Personnel

How's the bottom-top and top-bottom ratio of R&D projects?

(in MCHF, 2018 prices, rounded off to 0.1 MCHF until 2023, 1 MCHF thereafter)	Revised 2018 Budget	2019	2020	2021	2022	2023	Total 2018-2023	2024	2025	2026	2027	2028	Total 2018-2028
EXPENSES	**1,304.3**	**1,263.8**	**1,188.9**	**1,172.2**	**1,173.5**	**1,159.3**	**7,262**	**1,156**	**1,112**	**1,104**	**1,087**	**1,065**	**12,786**
Running of scientific programmes and support	**1,026.0**	**975.9**	**924.6**	**935.9**	**946.5**	**923.8**	**5,732**	**914**	**888**	**932**	**953**	**928**	**10,347**
Scientific programmes	**522.2**	**543.0**	**518.4**	**495.0**	**515.8**	**502.6**	**3,097**	**511**	**501**	**502**	**506**	**492**	**5,609**
LHC (machine, detectors, computing, including spares and consolidation)	*260.0*	*283.7*	*279.3*	*270.0*	*289.1*	*285.9*	*1,668*	*294*	*281*	*289*	*302*	*288*	*3,122*
Non-LHC physics and scientific support	*86.2*	*85.2*	*82.0*	*74.2*	*77.7*	*76.7*	*482*	*81*	*82*	*76*	*79*	*79*	*879*
Other accelerators and areas (including consolidation)	*175.9*	*174.0*	*157.1*	*150.9*	*149.0*	*139.9*	*947*	*137*	*138*	*136*	*125*	*125*	*1,608*
Infrastructure and services	**302.9**	**297.9**	**273.0**	**271.0**	**261.8**	**253.2**	**1,660**	**253**	**252**	**272**	**282**	**271**	**2,989**
General infrastructure and services (incl. admin, international relations, safety)	*270.0*	*277.2*	*257.2*	*252.5*	*235.9*	*236.2*	*1,529*	*235*	*234*	*234*	*231*	*231*	*2,694*
Infrastructure consolidation, buildings and renovation	*32.9*	*20.7*	*15.8*	*18.5*	*25.9*	*17.0*	*131*	*18*	*18*	*37*	*51*	*40*	*295*
Centralised expenses	**200.9**	**135.0**	**133.2**	**169.9**	**168.9**	**168.0**	**976**	**150**	**135**	**159**	**164**	**164**	**1,748**
Projects and studies	**278.4**	**288.0**	**264.3**	**236.3**	**227.1**	**235.5**	**1,530**	**242**	**225**	**172**	**134**	**137**	**2,439**
LHC upgrades	**206.5**	**232.4**	**200.9**	**173.5**	**170.3**	**178.7**	**1,162**	**187**	**168**	**113**	**19**	**11**	**1,661**
LHC injectors upgrade (LIU)	*56.1*	*56.8*	*32.3*	*8.6*	*0.2*		*154*						*154*
HL-LHC construction	*107.8*	*117.2*	*122.6*	*133.8*	*137.7*	*150.3*	*769*	*168*	*149*	*104*	*8*	*0*	*1,199*
LHC detectors upgrade (Phase I) and consolidation	*25.3*	*30.0*	*21.9*	*4.7*	*2.9*	*2.6*	*87*	*3*	*2*	*2*	*2*	*2*	*99*
HL-LHC detectors, including R&D (Phase II)	*17.3*	*28.4*	*24.1*	*26.4*	*29.5*	*25.7*	*151*	*17*	*17*	*6*	*9*	*9*	*209*
Preparation for the future	**39.2**	**26.9**	**35.2**	**40.5**	**35.5**	**36.0**	**213**	**35**	**36**	**39**	**97**	**106**	**527**
Linear collider studies (CLIC, ILC, detector R&D)	*16.2*	*15.3*					*31*						*31*
Future Circular Collider study	*16.8*	*8.1*					*25*						*25*
High-energy frontier			*21.6*	*28.0*	*28.0*	*28.0*	*106*	*28*	*28*	*28*	*80*	*90*	*360*
Proton-driven plasma wakefield acceleration (AWAKE)	*4.1*	*2.6*	*1.4*	*1.0*	*0.7*	*0.7*	*10*	*0*	*0*	*0*	*0*	*0*	*11*
Physics Beyond Colliders study	*2.2*	*0.9*	*1.0*	*1.0*	*1.0*	*1.0*	*7*	*1*	*2*	*5*	*10*	*10*	*35*
R&D for future detectors			*11.2*	*10.4*	*5.8*	*6.3*	*34*	*6*	*6*	*6*	*6*	*6*	*65*
Scientific diversity activities	**32.7**	**28.7**	**28.2**	**22.4**	**21.3**	**20.9**	**154**	**20**	**20**	**20**	**19**	**19**	**251**
CERN Neutrino Platform	*12.4*	*13.3*	*12.1*	*6.7*	*6.6*	*6.6*	*58*	*7*	*6*	*6*	*7*	*7*	*90*
R&D (incl. EU support) for accelerators	*20.4*	*15.4*	*16.2*	*15.6*	*14.7*	*14.3*	*97*	*13*	*13*	*13*	*12*	*12*	*161*


CERN