

The Gas Team and the LHC gas systems: introduction

Outlook

- Gas Systems Team organization
- Experiment/detectors contact persons, egroups
- M&O Budget update
- Other CMS projects/activities
- Conclusions

Gas Systems Team organization

First level contacts for non urgent matters:

Gas system sites responsible:

- ALICE: Louis-Philippe De Menezes
- ATLAS: Mattia Busato
- CMS: Andrea D'Auria
- LHCb: Patrick Carriè

They are your first contact for any gas system issue

If you write an email, please put in cc gassystems.support@cern.ch :

- we will treat your email in case of absence of the site responsible
- your email will create a jira ticket that will allow (you and us) to follow the issue reported

Second level contacts for non urgent matters:

M&O contact persons: Beatrice Mandelli, Gianluca Rigoletti

Project leader: Roberto Guida

1st contact for any urgent issue: gas piquet 162516

Gas Systems Team organization

Roberto
Project leader



Students: Doct, Tech, Trainee

Maria Cristina
Analytical chemistry



Amin, Damiano
Gas recuperations



Stefania
R&D



Bonaventura
Maintenance analysis,
EAM/Infor and Pumps



Kacper
ATLAS and Pumps



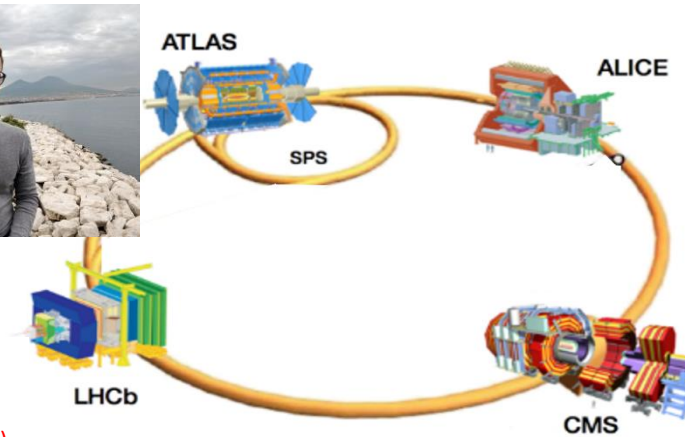
Gianluca
Software, LHC-M&O,
ATLAS and R&D



Patrick
LHCb and electrical
Spare parts (electrical)



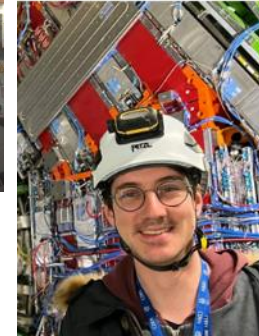
Pieter
LHCb, R&D



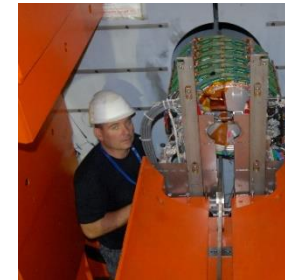
Louis-Philippe
ALICE, CLOUD



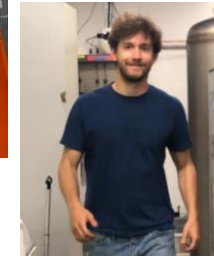
Mattia V.
ALICE, R&D



Andrea
CMS



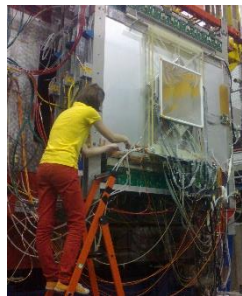
Mattia B.
CMS, CLOUD
and R&D



Gianluca
Software, LHC-M&O,
ATLAS and R&D



Beatrice
R&D and LHC-M&O



Frederic
Gas & Cooling workshop
Spare parts (mechanical)



Gas Systems Team organization

Roberto
Project leader



Mattia B.
ATLAS, CLOUD
and R&D



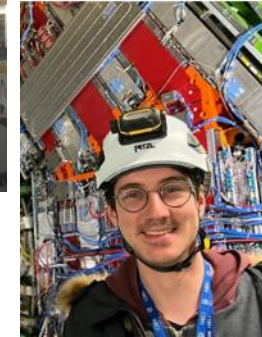
Gianluca
Software, LHC-M&O,
ATLAS and R&D



Louis-Philippe
ALICE, CLOUD



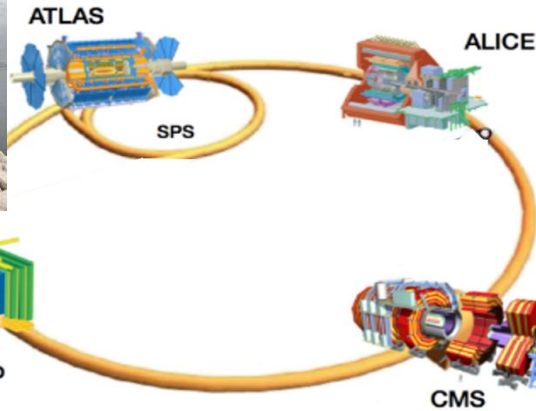
Mattia V.
ALICE, R&D



Gianluca
Software, LHC-M&O,
ATLAS and R&D



Fellow, Doct, Tech, Trainee



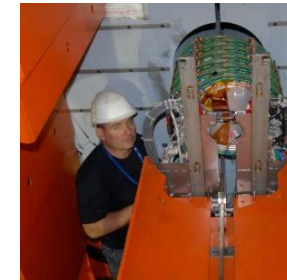
Patrick
LHCb and electrical
Spare parts (electrical)



Pieter
LHCb, R&D



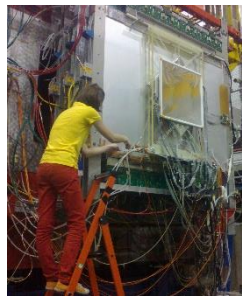
Andrea
CMS and
workshop



Maria Cristina
gas analysis
and CMS



Beatrice
R&D and LHC-M&O



Maria Cristina
gas analysis,
and CMS



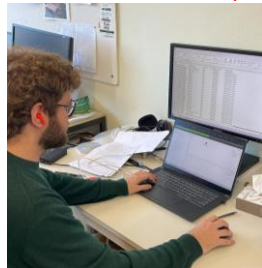
Amin, Damiano
Gas recuperations



Stefania
R&D



Bonaventura
Maintenance analysis,
EAM/Infor and Pumps



Detector contact persons

M&O Workpackage Run3 (EDMS 2779718)

8 Annex 1: List of detector gas system experts

List of detector gas system experts for 2022.

8.3 CMS Gas Systems

Detector	Detector gas system expert
CSC	Xiaofeng Yang;
DT	Daniel Francois Teyssier; Archana Sharma
GEM	Daniel Francois Teyssier; Davide Fiorina
RPC	Aleksandar Aleksandrov;
ID flushing	Nicola Bacchetta
CF ₄ recuperation	EP-DT Gas piquet

Knowledge base for Gas Systems Home - Knowledge base for Gas Systems - Global Site

CMS GENERAL IMPACT 2025: 241257			
CSC	✓ON	Mixture CO2 55% / AR40/ 5% CF4 fresh	Xiaofeng Yang 160270
CSC SX5	✗OFF	Normal Mixture CO2/AR 60/40	Victor Pereygin 162185
RPC	✓ON	Normal mixture. Minimum mixer R-134a fresh setpoint is 320 l/h + 25% 134a recuperated (113.4 l/h)+ 4.35% fresh isobutane Normal mixture (95.4%freon+ 4.3%lc4H10+ 0.3%SF6)+ humidifier Total flow: 230 l/h NO PURIFIERS 25.11.2024 OFF	Anto Dimitrov 162692, Aleksandar Aleksandrov 169837
RPC SX5	✗OFF	Normal mixture (C2H2F4i/C4H10/SF6 95.2/4.5/0.3)	Mehar Ali Shah +41754112144
DT	✓ON	(Nominal run: open loop with humidifier + air (0.038%)) Fill humidifier: https://eloggas.web.cern.ch/Procedures/11 CLOSE LOOP 26.11.2024	Ignacio Redondo 168661, Daniel Francois Teyssier 162680
DT SX5	✓ON	RUN AR/CO2 81.5/18.5	Ignacio Redondo, Domenico Dattola 164268
GEM	✓ON	CO2 70% AR 30% 100% CO2 from mixer 70/30 27.11.2024 (manual bypass valve opened in mixer to supply CO2 also in Argon line)	Michele Bianco 160307
CF4 RECOVERY	✓ON	RUN	Andrea d'AURIA 160021 Roberto Guida 162146
R-134a RECOVERY (CMSFGR)	✗OFF	In case of alarms relative to the humidity see https://eloggas.web.cern.ch/Procedures/14	Andrea d'AURIA 160021 Roberto Guida 162146
Flushing	✓ON	RUN	Nicola Bacchetta 165337

Detector contact persons

Egroup for communications between gas team and experiments.

Free subscription and unsubscription (to facilitate the detector contact persons in keeping the list updated)

For CMS:
[gas-users-CMS](#)
 Members are:

Name	Type	Login	Email	
ALEKSANDROV, Aleksandar (EP-UCM)	Person	AALEKSAN	aleksandar.aleksandrov@cern.ch	
BALL, Austin (EP-UCM)	Person	AUSTIN	Austin.Ball@cern.ch	
BIANCO, Michele (EP-CMX-SCI)	Person	MBIANCO	michele.bianco@cern.ch	
BORGONOV, Lisa (EP-CMX-SCI)	Person	LBORGONO	lisa.borgonovi@cern.ch	
BUONTEMPO, Salvatore (EP-CMX)	Person	BUONTEMP	Salvatore.Buontempo@cern.ch	
COLALEO, Anna (EP-UCM)	Person	ACOLALEO	Anna.Colaleo@cern.ch	
D'AURIA, Andrea (EP-DT-FS)	Person	DAURIAA	Andrea.D'Auria@cern.ch	
DIMITROV, Anton (EP-UCM)	Person	ANTON	Anton.Dimitrov@cern.ch	RPC Technical Coordinat
FASANELLA, Daniele (EP-UCM)	Person	TZIE	Daniele.Fasanella@cern.ch	
FLORENT, Alice Helene	Person	ALFLOREN	alice.florent@cern.ch	Self added member
GUIDA, Roberto (EP-DT-FS)	Person	GUIDAR	Roberto.Guida@cern.ch	
MANDELLI, Beatrice (EP-DT-FS)	Person	BMANDELL	beatrice.mandelli@cern.ch	
MARIN BARBANCHO, Pablo (EP-CMX-SCI)	Person	PMARINBA	pablo.marin.barbancho@cern.ch	Self added member
MORSE, David (EP-UCM)	Person	DMORSE	david.morse@cern.ch	Self added member
OLIVERI, Eraldo (EP-DT-DD)	Person	EOLIVERI	Eraldo.Oliveri@cern.ch	
PELLECCHIA, Antonello (EP-CMG-DS)	Person	APELLECC	antonello.pellecchia@cern.ch	Self added member
PUGLIESE, Gabriella (EP-UCM)	Person	PUGLIESE	gabriella.pugliese@cern.ch	
REDONDO FERNANDEZ, Ignacio (EP-UCM)	Person	REDONDO	ignacio.redondo.fernandez@cern.ch	
TEYSSIER, Daniel Francois (EP-CMX-SCI)	Person	TEYSSIER	Daniel.Francois.Teyssier@cern.ch	Self added member
TROPEA, Paola (EP-CMX-SCI)	Person	PTROPEA	Paola.Tropea@cern.ch	
TURINI, Nicola (EP-UCM)	Person	NTURINI	Nicola.Turini@cern.ch	
VAI, Ilaria (EP-UCM)	Person	IVAI	ilaria.vai@cern.ch	Self added member
WANG, Jian (EP-UCM)	Person	WANGJIAN	Jian.Wang@cern.ch	Self added member
YANG, Xiaofeng (EP-UCM)	Person	XYANG	Xiaofeng.Yang@cern.ch	
ZEUNER, Wolfram (EP-UCM)	Person	ZEUNER	Wolfram.Zeuner@cern.ch	

To facilitate communication add:

- *detector*

- *On-call numbers*

names to add/remove?

Gas systems elog

Egroup for elog notification

Free subscription and unsubscription (to facilitate the detector contact persons in keeping the list updated)

For CMS:

[gas-users-CMS-ELOG](#)

Members are:

Name	Type	Login	Email	Comments
ALEKSANDROV, Aleksandar (EP-UCM)	Person	AALEKSAN	aleksandar.aleksandrov@cern.ch	Self added member
BIANCO, Michele (EP-CMX-SCI)	Person	MBIANCO	michele.bianco@cern.ch	
BIANCO, Stefano (EP-UCM)	Person	SBIANCO	Stefano.Bianco@cern.ch	Self added member
BORGONOV, Lisa (EP-CMX-SCI)	Person	LBORGONO	lisa.borgonovi@cern.ch	Self added member
CABRERA MORA, Andres Leonardo (EP-UCM)	Person	ANDRESIB	andres.leonardo.cabrera.mora@cern.ch	Self added member
DIMITROV, Anton (EP-UCM)	Person	ANTON	Anton.Dimitrov@cern.ch	Self added member
FALLAVOLLITA, Francesco (EP-UAT)	Person	FFALLAVO	francesco.fallavollita@cern.ch	Self added member
FASANELLA, Daniele (EP-UCM)	Person	TZIE	Daniele.Fasanella@cern.ch	Self added member
FLORENT, Alice Helene	Person	ALFLOREN	alice.florent@cern.ch	Self added member
MANDELLI, Beatrice (EP-DT-FS)	Person	BMANDELL	beatrice.mandelli@cern.ch	Self added member
MARIN BARBANCHO, Pablo (EP-CMX-SCI)	Person	PMARINBA	pablo.marin.barbancho@cern.ch	Self added member
MORSE, David (EP-UCM)	Person	DMORSE	david.morse@cern.ch	Self added member
PELLECCHIA, Antonello (EP-CMG-DS)	Person	APELLECC	antonello.pellecchia@cern.ch	Self added member
PUGLIESE, Gabriella (EP-UCM)	Person	PUGLIESE	gabriella.pugliese@cern.ch	Self added member
TEYSSIER, Daniel Francois (EP-CMX-SCI)	Person	TEYSSIER	Daniel.Francois.Teyssier@cern.ch	Self added member
VAI, Iliara (EP-UCM)	Person	IVAI	iliana.vai@cern.ch	Self added member
YANG, Xiaofeng (EP-UCM)	Person	XYANG	Xiaofeng.Yang@cern.ch	Self added member

M&O budget

M&O budget ([EDMS 2779718](#)):

Material and personnel costs covered by the M&O agreement

MFCs maintenance

Consumables (lab, tools, connectors, pipes, ...)

Gas analysis (calibration gases for lab, materials, O2 cells, maintenance, ...)

Pump maintenance 2000 h and 30000 h

Purifier maintenance (absorbers: mol.sieve, catalysts, ...)

Safety valve maintenance

Pneumatic controls

PLC and Power Supply

Pressure sensors (last production of old generation sensors radiation tolerant)

-

Maintenance organization (procedures, reports, ...)

Analysis modules and operation

R&D for upgrade/consolidation

→ about 800 orders processed

For CMS:

Up to 2024

→ 238.9 kCHF

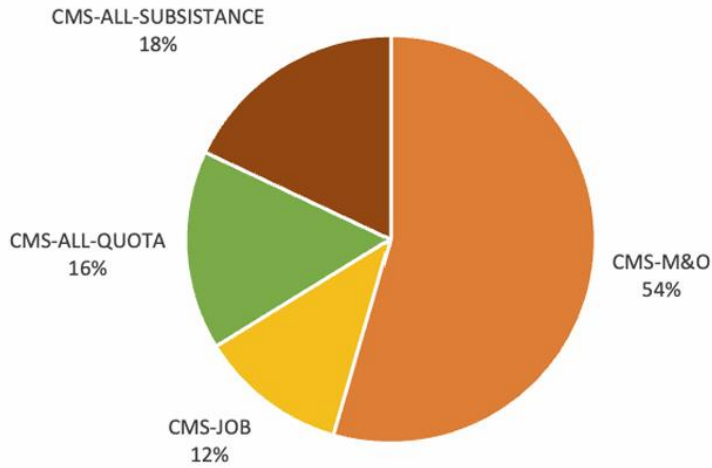
From 2025

→ 289.9 kCHF ([Update to M&O Workpackage \(EDMS 3088231\)](#))

M&O budget 2022, 2023 and 2024

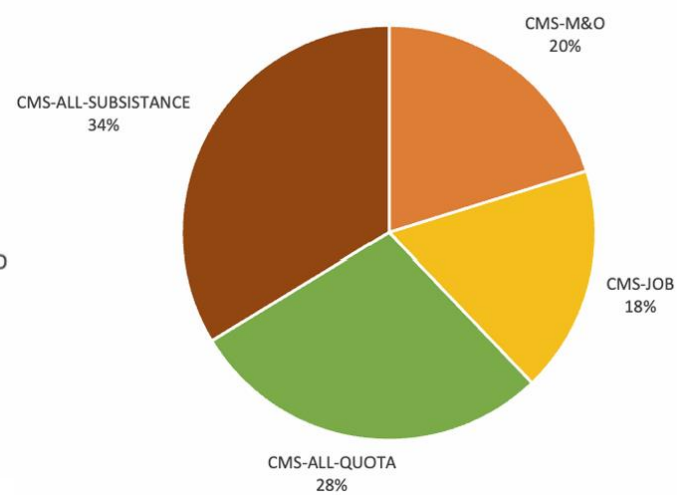
2022

122% budget used



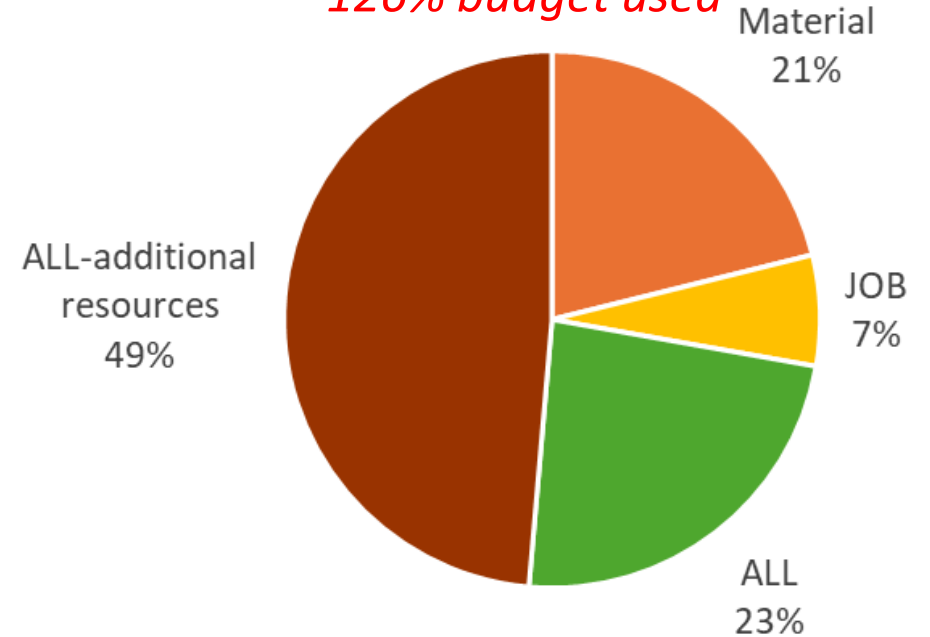
2023

135% budget used



2024

126% budget used



- 1 staff (controls) paid on EP budget (from 2025 back to EP budget thanks to a new LD)
- +1 fellow (controls) paid on M&O (same as above, **from 2025 back to EP budget thanks to a new LD**)
- +1/3 fellow (**3D drawings**) paid on M&O
- +1 fellow for **gas systems operation and flowcells**
- +1/2 fellow for **gas systems operation and gas recuperation**
- +1 tech. student/Doctoral for **EAM/Infor, risk assessment and reliability analysis**
- 1.5 staff technical (**opening of a new LD technical under discussion**)

Other CMS projects/activities

Consolidation/upgrade:

Material and manpower costs in general not covered by the M&O agreement

- ID flushing ([EDMS 2884256](#))
- Surface
 - Material 116.6 k
 - Human resources 44.5 k
- Underground → Estimated cost 310.2 k
 - Material 104.5 k
 - Human resources 44.5 k

Payments:

2023:

[TID/9790882](#) HGAL Flushing system - Material 1st – 127.8 k

[TID/9797770](#) ETL Flushing system - Material 1st – 32.4 k

[TID/9797776](#) 2PACL Flushing system - Material 1st – 13.4 k

2024:

[TID/10347837](#) ETL Material + FSU surface – 18.8 k

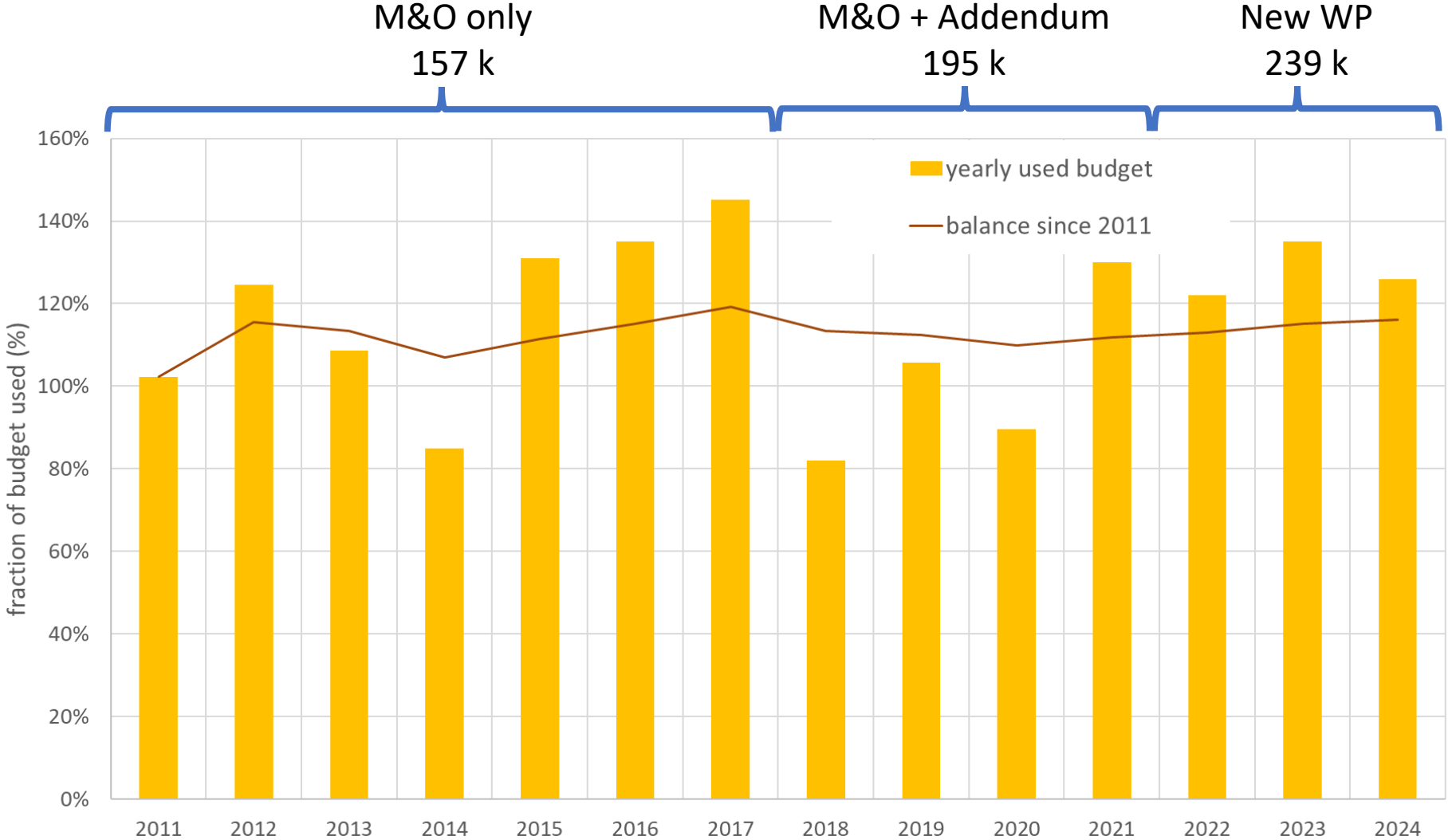
[TID/10347987](#) HGAL Material + FSU surface – 72.1 k

Total: 266.3 k (some FSU personnel to be paid in 2025 and material?)

→ Real cost under finalization
Balance 2023+2024: -93.7 k
Missing 2025

Budget history since 2011

- CMS gas system budget status since 2011:



Conclusions

LHC M&O

- LHC M&O activities are well defined and supported by the M&O agreement.
- budget situation will normalize from 2025 thanks to “update” to M&O workpackage and 1 LD (controls) replacing a fellow
- ~5 fellow, doctoral, technical for new competencies needed:
 - . 3D drawings
 - . EAM/Infor, maintenance and spare parts organization
 - . Flowcells
 - . Operation of gas systems and gas recuperation

Other ALICE projects/activities

- Others? New needs?

Beyond M&O budget

- CEPS budget for R&D on new system to optimize GHG usage (examples: improvement of gas systems to cope with new detector needs and R134a, CF4, SF6, C4F10 recuperation plants)
- HostLab for construction of R134a recuperation plants for ATLAS and CMS

LS3

- We need to collect detector needs asap: to anticipate any potential resource issue