

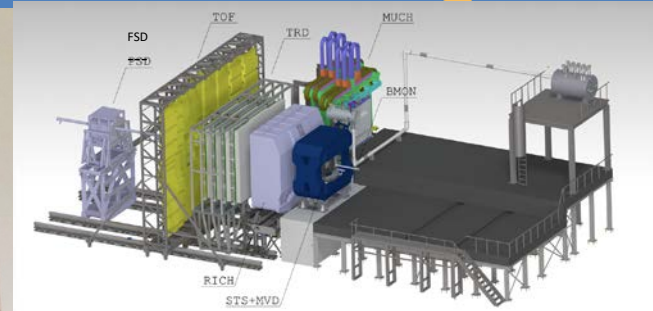
Addendum Construction MoU and update Construction Common Fund for the CBM experiment

12th CBM Resource Review Board meeting

6th June 2023

Report CBM and HADES Resource Coordinator

Jürgen Eschke



RRB process → Construction MoU

1st meeting of FAIR RRBs
04 – 05 July 2013



11th RRB



2012 2013 -----2020 2022

RRB process →

signing CBM C-MoU

M&O MoU

Content presentation

- Status Signing C-MoU
- updated Construction timeline CBM
- Construction Common Fund / Status payments
- new Spending profile Common Infrastructure/Procurements for Common Infrastructure
- CBM proposal for Addendum to C-MoU on Common Fund
- Outlook CBM Maintenance & Operation MoU
- CBM Construction Team Accounts

Status CBM Construction MoU



- The CBM C-MoU was evaluated by the ECSG/ECE (18.3.20)
→ recommendation to RRB to agree on start of signing
- Final submission to Funding Agencies in RRBs in April 2020
- Final ok for signing of Funding Agencies in 24 June 2020
- Signing of C-MoU by FAIR, GSI and CBM spokesperson in August 2020
- Start of distribution to Ministries and Funding Agencies and to the CBM full member institutions in October 2020



Country	Funding agency	Signature received
China	Central China Normal University (CCNU)	✓
China	Tsinghua University (THU)	✓
China	University of Science & Technology (USTC)	✓
Czech Republic	Ministry of Education, Youth and Sports (MSMT)	✓
Germany	Bundesministerium für Bildung und Forschung (BMBF)	✓
Germany	GSI Helmholtzzentrum GmbH	✓
Hungary	WIGNER RCP	✓
India	Department of Science & Technology (DST)	
Korea	Pusan National University	✓
Poland	Ministry of Higher Education in Poland	expected
Romania	Atomic Physics Institute (AFI) for Ministry of Research, Innovation and Digitalization	✓
Russian Federation	ROSATOM	
Russian Federation	National Research Centre Kurchatov Institute	
International Organisation	Joint Institute for Nuclear Research (JINR)	✓
Ukraine	NASU / State Agency of Ukraine	expected

The majority of the funding agencies and of the CBM member institutions have signed the CBM Construction MoU already!

clarification with ministry in India

→ causes delay in signing of CBM C-MoU

no signing of CBM C-MoU, since membership of Russian Institutions (plus JINR) is terminated

Institute	Country	Signed page received
Tsinghua (THU)	China	✓
USTC	China	✓
CCNU	China	✓
Uchongqing	China	expected
CTGU	China	✓
CTU	Czech Republic	✓
NPI-CAS	Czech Republic	✓
ZIB	Germany	✓
FAIR	Germany	✓
GSI	Germany	✓
IKP-TUD	Germany	✓
HZDR	Germany	expected
FIAS	Germany	✓
IKF-UFra	Germany	✓
IRI-UFra	Germany	✓
UGiessen	Germany	✓
PI-UHd	Germany	✓
KIT	Germany	expected
ZITI-UHd	Germany	✓
UMuenster	Germany	✓
UTuebingen	Germany	✓
UWuppertal	Germany	✓
ELTE	Hungary	✓
WignerRCP	Hungary	✓
AMU	India	
IOPB	India	
NISER	India	
UPanjab	India	
UGauhati	India	✓
IIT-I	India	
UJammu	India	
IIT-KGP	India	
Bose	India	
UCalcutta	India	
VECC	India	
UKashmir	India	
UBanaras	India	

PNU	Korea	✓
AGH	Poland	expected after ministry has signed
UJagiellonian	Poland	expected after ministry has signed
TUWarsaw Institute of Electro.	Poland	expected after ministry has signed
TUWarsaw Faculty of Physics	Poland	expected after ministry has signed
UWarsaw	Poland	expected after ministry has signed
IFIN-HH	Romania	✓
UBucharest	Romania	✓
JINR-LIT	Russia	✓
JINR-VBLHEP	Russia	✓
PNPI	Russia	not expected anymore
INR	Russia	not expected anymore
ITEP	Russia	not expected anymore
MEPhI	Russia	not expected anymore
NRC-KI	Russia	not expected anymore
SINP-MSU	Russia	✓
KINR	Ukraine	✓
UKyiv	Ukraine	expected
number of signatories:		29

membership
in CBM
Collaboration
terminated

Signatures of Indian and Polish
CBM member institutes expected
after
clarification with ministries in
India and Poland
on additional funding for FAIR
construction

expected

CBM building & cave



- Shelling work completed, rooms in upper floor levels are being finalized
- External walls are sealed before the soil around the building is restored
- The internal crane in the CBM cave is fully operational
- Floor of the Cave is sealed and painted
- **upstream platform installed in May 2023 (Czech In-Kind contribution)**

First USER installation at FAIR



CBM Common (cave) infrastructure

[illegible]

CBM Common Fund

Breakdown of the annual contributions to the CBM Common Fund for the member institutes of the

CBM collaboration (CBM data base 13th November 2019 is bases for calculation of due amounts):

2020: 1000€ /PhD holder

2021: 3265€ /PhD holder

2022: 4469€ /PhD holder

2023: 4184€ /PhD holder

2024: 1130€ /PhD holder

in total per PhD holder:

14049 €

(2810 €/year on average)

→ flexible payment possibilities included in final C-MoU text

Institute	Country	all CBM members	PhD-Students	PhDs + Profs	common fund 2020 [€]	common fund 2021 [€]	common fund 2022 [€]	common fund 2023 [€]	common fund 2024 [€]	Total [€]	Total per country [€]	Fraction per country [%]
					1000,00	3265,22	4468,70	4184,35	1130,43	14048,70		
					EURO per PhD/Prof	EURO per PhD/Prof	EURO per PhD/Prof	EURO per PhD/Prof	EURO per PhD/Prof	EURO per PhD/Prof		
Tsinghua (THU)	China	6	1	5	5.000	16.326	22.343	20.922	5.652	70.243		
USTC	China	10	5	2	2.000	6.530	8.937	8.369	2.261	28.097		
CCNU	China	11	3	8	8.000	26.122	35.750	33.475	9.043	112.390		
Uchongqing	China	3	0	2	2.000	6.530	8.937	8.369	2.261	28.097		
CTGU	China	4	1	3	3.000	9.796	13.406	12.553	3.391	42.146	280.974	8,70
CTU	Czech Republic	2	0	1	1.000	3.265	4.469	4.184	1.130	14.049		
NPI-CAS	Czech Republic	3	1	2	2.000	6.530	8.937	8.369	2.261	28.097	42.146	1,30
IPHC (associated member)	France				0	0	0	0	0	0	0	0,00
ZIB	Germany	4	0	3	3.000	9.796	13.406	12.553	3.391	42.146		
FAIR	Germany	3	0	3	3.000	9.796	13.406	12.553	3.391	42.146		
GSI	Germany	52	5	36	36.000	117.548	160.873	150.637	40.696	505.753		
IKP-TUD	Germany	3	2	1	1.000	3.265	4.469	4.184	1.130	14.049		
HZDR	Germany	5	0	4	4.000	13.061	17.875	16.737	4.522	56.195		
FIAS	Germany	10	5	5	5.000	16.326	22.343	20.922	5.652	70.243		
IKF-UFra	Germany	20	6	9	9.000	29.387	40.218	37.659	10.174	126.438		
IRI-UFra	Germany	4	2	1	1.000	3.265	4.469	4.184	1.130	14.049		
UGiessen	Germany	12	4	5	5.000	16.326	22.343	20.922	5.652	70.243		
PI-UHD	Germany	7	3	2	2.000	6.530	8.937	8.369	2.261	28.097		
KIT	Germany	8	1	3	3.000	9.796	13.406	12.553	3.391	42.146		
ZITI-UHd	Germany	1	0	1	1.000	3.265	4.469	4.184	1.130	14.049		
UMuenster	Germany	13	3	3	3.000	9.796	13.406	12.553	3.391	42.146		
UTuebingen	Germany	7	5	2	2.000	6.530	8.937	8.369	2.261	28.097		
UWuppertal	Germany	7	2	3	3.000	9.796	13.406	12.553	3.391	42.146	1.137.944	35,22
ELTE	Hungary	2	0	1	1.000	3.265	4.469	4.184	1.130	14.049		
WignerRCP	Hungary	2	1	1	1.000	3.265	4.469	4.184	1.130	14.049		
AMU	India	4	1	3	3.000	9.796	13.406	12.553	3.391	42.146		
IOPB	India	3	0	2	2.000	6.530	8.937	8.369	2.261	28.097		
NISER	India	4	0	4	4.000	13.061	17.875	16.737	4.522	56.195		
UPanjab	India	2	0	2	2.000	6.530	8.937	8.369	2.261	28.097		
UGauhati	India	2	1	1	1.000	3.265	4.469	4.184	1.130	14.049		
IIT-I	India	3	1	2	2.000	6.530	8.937	8.369	2.261	28.097		
Ujammu	India	4	0	2	2.000	6.530	8.937	8.369	2.261	28.097		
IIT-KGP	India	1	0	1	1.000	3.265	4.469	4.184	1.130	14.049		
Bose	India	10	3	6	6.000	19.591	26.812	25.106	6.783	84.292		
UCalcutta	India	3	0	3	3.000	9.796	13.406	12.553	3.391	42.146		
VECC	India	11	7	4	4.000	13.061	17.875	16.737	4.522	56.195		
UKashmir	India	6	0	3	3.000	9.796	13.406	12.553	3.391	42.146		
UBanaras	India	4	1	3	3.000	9.796	13.406	12.553	3.391	42.146	505.753	15,65
PNU	Korea	1	0	1	1.000	3.265	4.469	4.184	1.130	14.049	14.049	0,43
AGH	Poland	8	1	7	7.000	22.857	31.281	29.290	7.913	98.341		
UJagiellonian	Poland	6	0	5	5.000	16.326	22.343	20.922	5.652	70.243		
TUWarsaw	Poland	8	3	5	5.000	16.326	22.343	20.922	5.652	70.243		
UWarsaw	Poland	2	0	2	2.000	6.530	8.937	8.369	2.261	28.097	266.925	8,26
IFIN-HH	Romania	5	0	4	4.000	13.061	17.875	16.737	4.522	56.195		
UBucharest	Romania	9	1	8	8.000	26.122	35.750	33.475	9.043	112.390	168.584	5,22
JINR-LIT	Russia	7	1	6	6.000	19.591	26.812	25.106	6.783	84.292		
JINR-VBLHEP	Russia	17	1	7	7.000	22.857	31.281	29.290	7.913	98.341		
PNPI	Russia	15	0	11	11.000	35.917	49.156	46.028	12.435	154.536		
INR	Russia	10	3	3	3.000	9.796	13.406	12.553	3.391	42.146		
ITEP	Russia	18	2	9	9.000	29.387	40.218	37.659	10.174	126.438		
MEPhi	Russia	11	2	8	8.000	26.122	35.750	33.475	9.043	112.390		
NRC-KI	Russia	5	0	3	3.000	9.796	13.406	12.553	3.391	42.146		
SINP-MSU	Russia	6	2	3	3.000	9.796	13.406	12.553	3.391	42.146		
IHEP	Russia	7	0	1	1.000	3.265	4.469	4.184	1.130	14.049	716.483	22,17
KINR	Ukraine	6	2	1	1.000	3.265	4.469	4.184	1.130	14.049		
UKyiv	Ukraine	4	0	4	4.000	13.061	17.875	16.737	4.522	56.195	70.243	2,17
Total:		401	82	230	230.000	751.000	1.027.800	962.400	260.000	3.231.200	3.231.200	100,00

Status payments into CBM Construction Common Fund

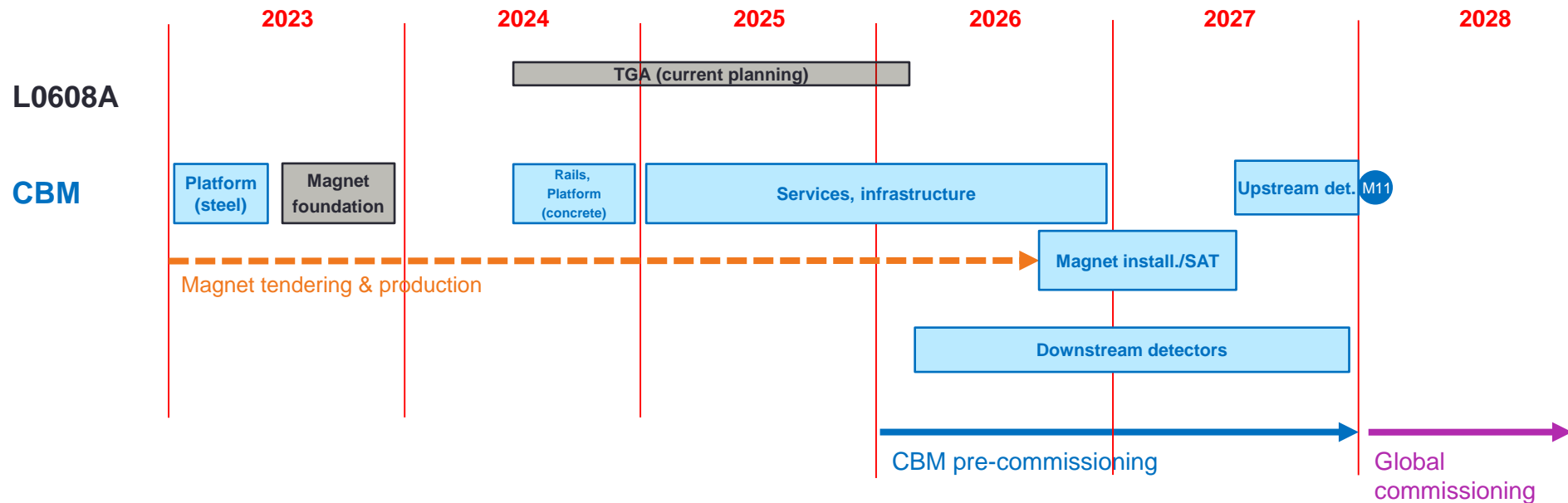
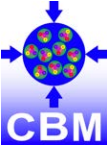
Institute	Country	(2810€/y) Common Fund due amount Total [€]	down payments until end 2021	down payments in 2022
		14048,70		
		EURO per PhD/Prof		
Tsinghua (THU)	China	70.243	} payment request in preparation	
USTC	China	28.097		
CCNU	China	112.390		
Uchongqing	China	28.097		
CTGU	China	42.146		
CTU	Czech Republic	14.049	42.146	
NPI-CAS	Czech Republic	28.097		
IPHC (associated member)	France	0		
ZIB	Germany	42.146	0	
FAIR	Germany	42.146		
GSI	Germany	505.753	505.753	
IKP-TUD	Germany	14.049	0	
HZDR	Germany	56.195		
FIAS	Germany	70.243	0	
IKF-UFra	Germany	126.438	100.000	
IRI-UFra	Germany	14.049	0	
UGiessen	Germany	70.243	100.000	
PI-UHd	Germany	28.097	91.000	
KIT	Germany	42.146	0	
ZITI-UHd	Germany	14.049	0	
UMuenster	Germany	42.146	92.000	
UTuebingen	Germany	28.097	0	
UWuppertal	Germany	42.146	0	100.000
ELTE	Hungary	14.049		
WignerRCP	Hungary	14.049	14.049	

AMU	India	42.146		
IOPB	India	28.097		
NISER	India	56.195		
UPanjab	India	28.097		
UGauhati	India	14.049		
IIT-I	India	28.097		
UJammu	India	28.097		
IIT-KGP	India	14.049		
Bose	India	84.292		
UCalcutta	India	42.146		
VECC	India	56.195		
UKashmir	India	42.146		
UBanaras	India	42.146		
PNU	Korea	14.049		
AGH	Poland	98.341		
UJagiellonian	Poland	70.243		
TUWarsaw	Poland	70.243		
UWarsaw	Poland	28.097		
IFIN-HH	Romania	56.195	17.061	17.875
UBucharest	Romania	112.390	22.500	17.400
JINR-LIT	Int. Organization	84.292	39.000	
JINR-VBLHEP	Int. Organization	98.341		
PNPI	Russia	154.536	} membership in CBM Collaboration terminated	
INR	Russia	42.146		
ITEP	Russia	126.438		
MEPhI	Russia	112.390		
NRC-KI	Russia	42.146		
SINP-MSU	Russia	42.146		
IHEP	Russia	14.049		
KINR	Ukraine	14.049		
UKyiv	Ukraine	56.195		
Total / year:			1.023.509	135.275
Total:				1.158.784

Addendum to CBM C-MoU required

- update on Common Fund contributions (without Russian institutes) and according to new CBM timeline
- update on In-Kind contributions and responsibilities (without Russian institutes) according to new timeline for construction

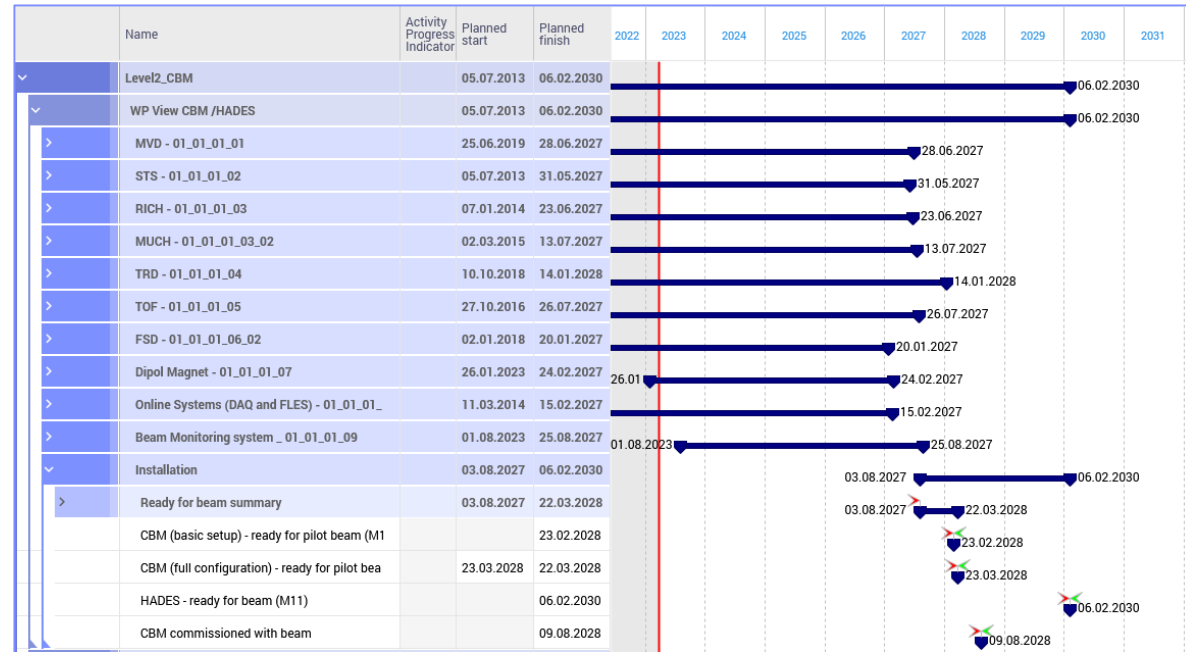
Installation/commissioning



- We plan CBM to be ready for beam by the end of 2027
- ~1y contingency until SIS100 “ready for physics” (used for CBM global commissioning)
- Critical path: magnet, to be clarified after tendering

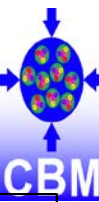
CBM baseline 2023

- CBM Ready for beam in 01.2028,
before SIS100 commissioning
with beams (contingency
+ time for CBM global commissioning)
- Major condition for most of the plans:
budget available on time
- All subsystems considered for Day-1



- New timelines for all CBM subsystems provided by the end of February and implemented in the project management software
- Few links to the FAIR project (Site & Buildings, Site Management, Commons) still missing → re-baselining ongoing
- Important decisions to be taken in the upcoming Council and of Funding Agencies regarding CBM funding

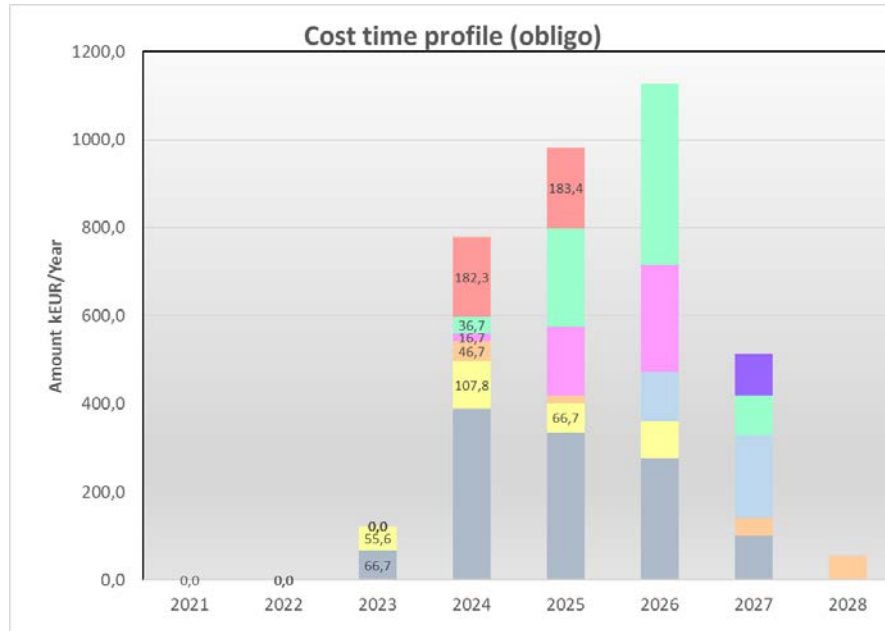
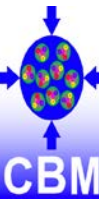
updated (May 2023) spending profile for CBM Common (cave) Infrastructure



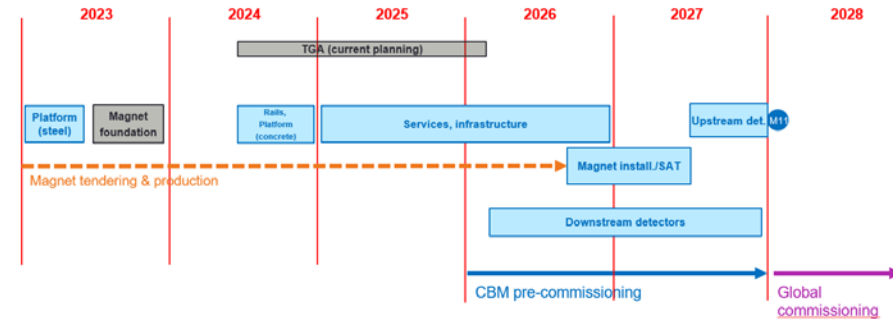
*(C-MoU: 3,23 M€ (2019 prices) - escalated amount (2023 prices) 3,58 MEURO

Work Package	*[k€] Price	2021	2022	2023	2024	2025	2026	2027	2028		
Rail System - Rails	329,5			55,6	222,3	51,7				Mechanical structures	1168,6
Rail System - Subframes	222,3				55,6	55,6	111,1				
Upstream Platform - Concrete	300,1			11,1	111,1	177,8					
Upstream platform - Cryo platform	116,7					50,0	66,7				
RICH-MUCH foundation	200,0					0,0	100,0	100,0			
Survey tools	83,4				55,6	27,8					
Tools, scaffolding, hoisting gear	216,7			55,6	38,9	38,9	83,4				
Safety gear	13,3				13,3	0,0					
Control room	95,6					0,0		40,0	55,6	E40 equipment	158,9
Preparation area (E40)	46,7				46,7	0,0					
Gas container (E40)	16,7					16,7					
Gas alarm system (E30/E40)	44,5					0,0	22,2	22,2		Gas infrastructure	300,5
Gas lines (E40-E30)	97,7					0,0	33,3	64,3			
Gas lines (E30-E10)	158,4					0,0	55,6	102,8			
Racks E40	328,0					111,1	216,8			Racks	417,0
Racks E30	38,3					11,1	27,2				
Racks E10	50,7				16,7	34,0					
Cable trays	31,1				8,9	22,2				Data transfer infrastructure	761,4
Cooling water distribution	76,9				27,8	49,1					
Optical fibers (E10-E40)	469,7					136,3	333,4				
Optical fibers (E40-IT)	133,7					0,0	44,5	89,2			
Control system back end	50,0					16,7	33,3				
Target Box+Holder	77,8				38,9	38,9				Beam transfer infrastructure	365,6
Beam pipes	77,8				38,9	38,9					
Vacuum pumps	87,8				43,3	44,5					
Beam diagnosis box	33,3				16,7	16,7					
Beam abort system	88,9				44,5	44,5					
CBM beam dump (rest)	38,9							38,9		Beam dumps	94,5
HADES beam dump	55,6							55,6			
Sum	3580,0	0,0	0,0	122,3	779,1	982,4	1127,6	513,1	55,6		

updated (2023) spending profile for CBM Common (cave) Infrastructure

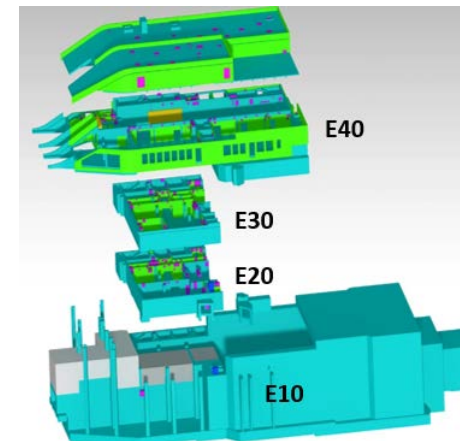


CBM installation – timeline re-baselining (2023)



*(C-MoU: 3,23 M€ (2019 prices) - escalated amount (2023 prices) 3,58 MEURO

		2021	2022	2023	2024	2025	2026	2027	2028
Mechanical structures	1168,6	0,0	0,0	66,7	389,0	335,1	277,8	100,0	0,0
E10 equipment etc.	313,4	0,0	0,0	55,6	107,8	66,7	83,4	0,0	0,0
E40 equipment	158,9	0,0	0,0	0,0	46,7	16,7	0,0	40,0	55,6
Gas infrastructure	300,5	0,0	0,0	0,0	0,0	0,0	111,1	189,4	0,0
Racks	417,0	0,0	0,0	0,0	16,7	156,3	244,1	0,0	0,0
Data transfer infrastructure	761,4	0,0	0,0	0,0	36,7	224,3	411,2	89,2	0,0
Beam transfer infrastructure	365,6	0,0	0,0	0,0	182,3	183,4	0,0	0,0	0,0
Beam dumps	94,5	0,0	0,0	0,0	0,0	0,0	0,0	94,5	0,0
	3580,0	0,0	0,0	122,3	779,1	982,4	1127,6	513,1	55,6



Critical for success: Common Fund procurements

- CBM Common Fund (CF) was established for the financing of the CBM common infrastructure (evaluated by ECSG and ECE)
- **1.16 M€ collected to date** (Critical for success: sufficient budget for CF procurements)
- ~22% Russian contribution to CF (~0,7 M€) to be accommodated by other institution
 - Construction period will be 2 year longer

Proposal of CBM Collaboration (endorsed at CBM Collaboration Board)

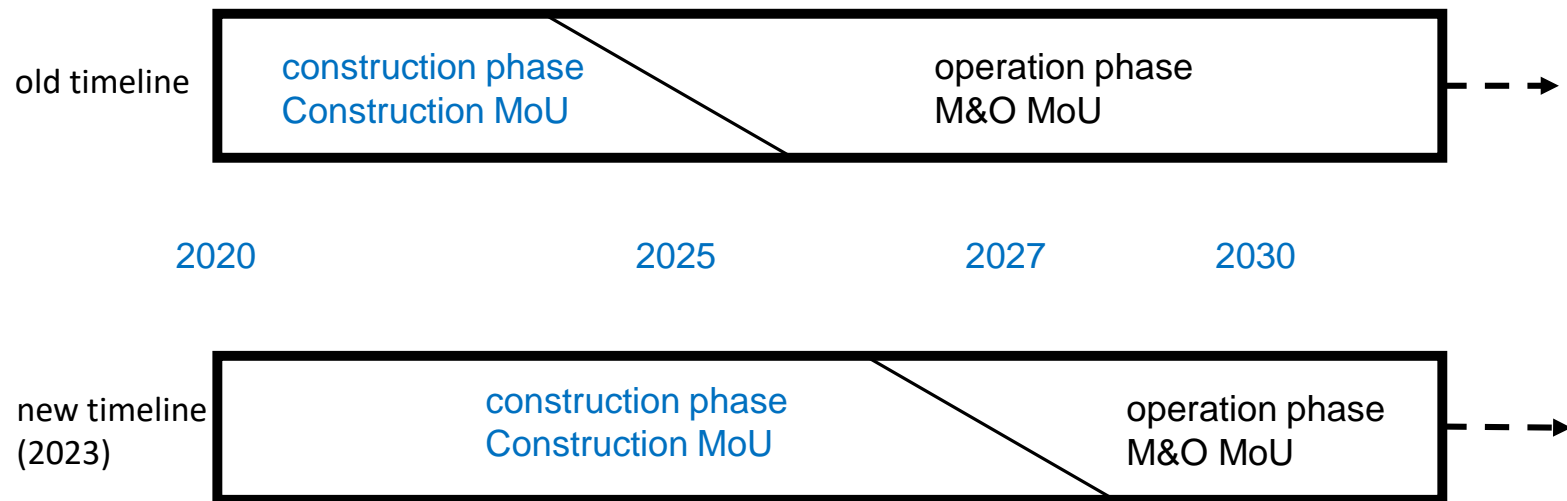
- no increase of annual due amounts
- collect same annual due amount (2810 € per year and PhD holder) for 2 additional years
- this will also compensate the cost increase by inflation (~0,3 M€)
- **~ 1 M€ in addition needed**



update CBM Common Fund (Addendum C-MoU)

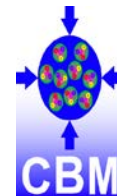
Due to the termination of the membership of the institutions in Russia contributions to the Common Fund of about 0,7 M€ (~22%) are not covered at present. The **CBM Collaboration Board has endorsed at its meeting in March 2023 the strategy to collect the annual due amounts per institute as defined in the CBM Construction MoU for 2 additional years**, since the construction period will be about 2 years longer, as anticipated in the signed C-MoU. This procedure would assure that the annual contributions per CBM member institute remain unchanged. Only the transition of the construction phase to the operation phase of the CBM experiment will be shifted by about 2 years.

The annual due amount per PhD holder to the Common Fund in the CBM construction phase will be 2810 EURO. The annual due amount per PhD holder in the operation phase of CBM has to be determined. The M&O costs will be subject of the CBM Maintenance and Operations (M&O) MoU. Moreover, about 0,3M€ compensation for inflation have to be collected.



Common Fund: Annual due amount per PhD holder in construction phase is 2810 EURO

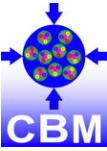
update CBM Construction Common Fund (Addendum C-MoU)



due amounts per institute in the years 2025 and 2026 for closing of funding gap

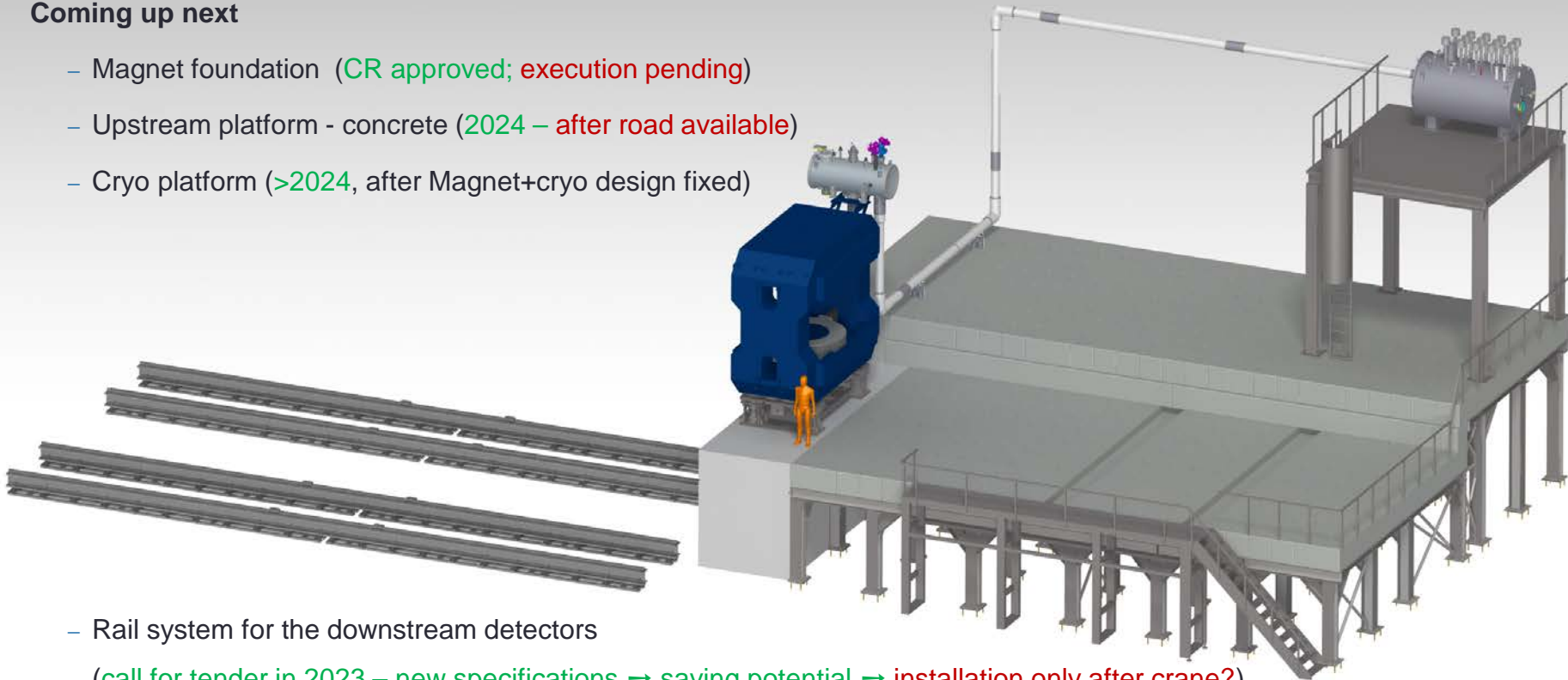
Institute	City	Country	all	phd students	D+P (PhD holder)	D+P% (PhD holder %)	due amount per PhD holder (2810€) in 2025	due amount per PhD holder (2810€) in 2026	sum 2025 & 2026 [EURO]	per country [EURO]	
THU	Beijing	China	7	2	5	2,8%	14.050	14.050	28.100		
UChongqing	Chongqing	China	3	0	2	1,1%	5.620	5.620	11.240		
USTC	Hefei	China	8	4	3	1,7%	8.430	8.430	16.860		
CCNU	Wuhan	China	8	2	6	3,3%	16.860	16.860	33.720		
CTGU	Yichang	China	4	1	3	1,7%	8.430	8.430	16.860	106.780	
CTU	Prague	Czech	6	0	3	1,7%	8.430	8.430	16.860		
NPI-CAS	Řež	Czech	2	1	1	0,6%	2.810	2.810	5.620	22.480	
ZIB	Berlin	Germany	3	0	2	1,1%	5.620	5.620	11.240		
FAIR	Darmstadt	Germany	11	0	10	5,5%	28.100	28.100	56.200		
GSI	Darmstadt	Germany	58	7	40	22,1%	112.400	112.400	224.800		
IKP-TUD	Darmstadt	Germany	4	3	1	0,6%	2.810	2.810	5.620		
HZDR	Dresden	Germany	2	0	1	0,6%	2.810	2.810	5.620		
FIAS	Frankfurt	Germany	14	7	5	2,8%	14.050	14.050	28.100		
IKF-UFra	Frankfurt	Germany	16	5	8	4,4%	22.480	22.480	44.960		
IRI-UFra	Frankfurt	Germany	5	4	1	0,6%	2.810	2.810	5.620		
UGiessen	Gießen	Germany	8	4	2	1,1%	5.620	5.620	11.240		
PI-UHd	Heidelberg	Germany	7	2	3	1,7%	8.430	8.430	16.860		
ZITI-UHd	Heidelberg	Germany	1	0	1	0,6%	2.810	2.810	5.620		
KIT	Karlsruhe	Germany	7	1	3	1,7%	8.430	8.430	16.860		
UMuenster	Münster	Germany	15	5	3	1,7%	8.430	8.430	16.860		
UTuebingen	Tübingen	Germany	9	5	3	1,7%	8.430	8.430	16.860		
UWuppertal	Wuppertal	Germany	10	4	4	2,2%	11.240	11.240	22.480	488.940	
ELTE	Budapest	Hungary	1	0	1	0,6%	2.810	2.810	5.620		
WignerRCP	Budapest	Hungary	2	0	2	1,1%	5.620	5.620	11.240	16.860	
AMU	Aligarh	India	6	3	3	1,7%	8.430	8.430	16.860		
IOPB	Bhubaneswar	India	3	0	2	1,1%	5.620	5.620	11.240		
NISER	Bhubaneswar	India	3	0	3	1,7%	8.430	8.430	16.860		
UPanjab	Chandigarh	India	1	0	1	0,6%	2.810	2.810	5.620		
UGauhati	Guwahati	India	2	1	1	0,6%	2.810	2.810	5.620		
IIT-I	Indore	India	3	1	2	1,1%	5.620	5.620	11.240		
UJammu	Jammu	India	4	0	2	1,1%	5.620	5.620	11.240		
IIT-KGP	Kharagpur	India	1	0	1	0,6%	2.810	2.810	5.620		
Bose	Kolkata	India	8	2	6	3,3%	16.860	16.860	33.720		
UCalcutta	Kolkata	India	4	0	4	2,2%	11.240	11.240	22.480		
VECC	Kolkata	India	12	8	4	2,2%	11.240	11.240	22.480		
UKashmir	Srinagar	India	5	0	2	1,1%	5.620	5.620	11.240		
BHU	Varanasi	India	4	1	3	1,7%	8.430	8.430	16.860	191.080	
PNU	Pusan	Korea	1	0	1	0,6%	2.810	2.810	5.620	5.620	
AGH	Kraków	Poland	6	0	6	3,3%	16.860	16.860	33.720		
UJagiellonian	Kraków	Poland	7	0	6	3,3%	16.860	16.860	33.720		
IF-WUT*	Warsaw	Poland	3	0	3	1,7%	8.430	8.430	16.860		*joined after C-MoU for 2020-2024 42150€
ISE-WUT	Warsaw	Poland	7	2	3	1,7%	8.430	8.430	16.860		
UWarsaw	Warsaw	Poland	2	0	2	1,1%	5.620	5.620	11.240	112.400	
IFIN-HH	Bucharest	Romania	6	0	4	2,2%	11.240	11.240	22.480		
UBucharest	Bucharest	Romania	5	1	4	2,2%	11.240	11.240	22.480	44.960	
KINR	Kyiv	Ukraine	6	1	1	0,6%	2.810	2.810	5.620		
TSNU-Kyiv	Kyiv	Ukraine	5	0	4	2,2%	11.240	11.240	22.480	28.100	
Sum-All			315	77	181	100,0%	508.610	508.610	1.017.220		

Cave: common infrastructure, installation



Coming up next

- Magnet foundation (CR approved; execution pending)
- Upstream platform - concrete (2024 – after road available)
- Cryo platform (>2024, after Magnet+cryo design fixed)



- Rail system for the downstream detectors
(call for tender in 2023 – new specifications → saving potential → installation only after crane?)

Addendum to CBM C-MoU required

- update on In-Kind contributions and responsibilities (without Russian institutes)
 - update on Common Fund contributions (without Russian institutes) and according to new CBM timeline (update on duration of C-MoU required as well)
- preparation of addendum to CBM Construction MoU in writing after council decision regarding FS+ are made

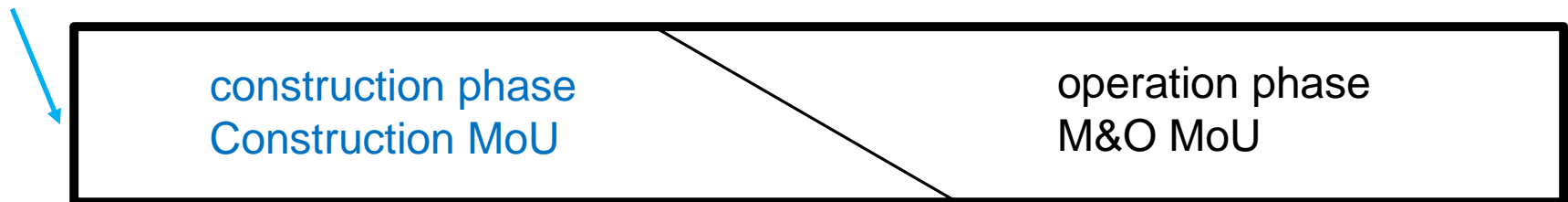
Article 3 Duration of this MoU and its Extension

3.1 This **C-MoU is valid for the construction period of the CBM detector, from 1st April 2020** to a date not earlier than 31 December 2025. The actual termination date will be set by the CBM RRB no later than 31 December 2024. The construction phase ends after all construction workpackages are completed and the equipment is installed in the cave.

3.2 The responsibilities for the maintenance and operation of the CBM detector is planned to be laid down in a separate MoU on maintenance and operation procedures, which will come into force in the operation phase of the CBM Experiment. The actual start date of the operation phase will be set by the CBM RRB no later than 31 December 2023. **The M&O-MoU will be prepared by the CBM Collaboration together with FAIR GmbH, in consultation with the CBM RRB and will be signed by all the parties participating in the operation phase of CBM.**

- Operation phase will be regulated by a **separate M&O MoU**

Start: 01.04.2020



Memorandum of Understanding
for Maintenance and Operation of the ATLAS Detector
between
The EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH,
hereinafter referred to as CERN, Geneva, as the Host Laboratory
on the one hand
and
a Funding Agency/Institution of the ATLAS Collaboration
on the other hand.

Memorandum of Understanding
for Maintenance and Operation of the ALICE Detector
between
The EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH,
hereinafter referred to as CERN, Geneva, as the Host Laboratory
on the one hand
and
a Funding Agency/Institution of the ALICE Collaboration
on the other hand.

Article 6 : Responsibilities of the Institutes for the Maintenance and Operation of the ALICE Detector, and of CERN as Host Laboratory

- 6.1 Responsibility for the M&O of the ALICE detector rests jointly with the Collaboration as a whole and with CERN as Host Laboratory, within the **General Conditions for Experiments Performed at CERN**.
- It is a **fundamental principle** that each **Institute** within the Collaboration shall participate in both maintenance and operation and contribute a fair and equitable share of **common costs**.
- 6.2 It is also a **fundamental principle** that an Institute, which has contributed a component of equipment, will also contribute to the necessary scientific and technical manpower support to operate that component and maintain it in good working order.

Article 7 : Maintenance and OperationCategories

7.1 The M&O expenses can be divided into the following three categories :

- 7.1.1 **Category A**. M&O expenses that are **shared by the entire Collaboration** (cf. Article 6.3.1 above). **Annex 9** lists the headings under which Category A costs are categorised.
- 7.1.2 **Category B**. M&O expenses that are **borne by part of the Collaboration**, i.e. **by single Institutes or groups of Institutes**, and their Funding Agencies (cf. Article 6.3.2 above). The headings in this category are defined with reference to the distribution of responsibilities amongst the various Institutes for the construction of the ATLAS Detector as given in Annex 8. **Annex 10** lists the headings under which Category B costs are categorised and the Institutes concerned.
- It is agreed that an Institute having responsibility under a Category B heading will contribute to providing the necessary financial, scientific and technical support, as well as replacement or spare parts, for normal operation of that equipment and for the routine maintenance needed to keep it in good working order. If problems arise that require major modifications, responsibility will lie with the Collaboration as a whole. The Collaboration will propose on a case-by-case basis the events to which this provision will apply. The proposal will be submitted for approval to the next RRB meeting, which will also be asked to approve the provision of the necessary resources.

7.1.3 **Category C**. **General maintenance and operation expenses** that are provided to the Collaboration by CERN, acting in its role as Host Laboratory. Subject to the General Conditions for Experiments Performed at CERN (Annex 3), these are more precisely described in the list given in **Annex 11**.

CBM has started to discuss the M&O MoU and will present a first draft at one of next CBM RRB meetings

CBM Construction Team Accounts

CBM Construction Team Accounts are set up at FAIR GmbH with the same principle as the CBM Common Fund

Purpose:

- CBM Construction Team Accounts are needed in the construction/installation phase.
- Visiting teams of the CBM member institutes need to be able to withdraw items from the GSI stores, or to purchase equipment via the GSI/FAIR procurement department.
- The purchased items become part of the CBM experiment (with PSP code) and are owned by FAIR GmbH

Status:

Until now CBM Construction Team Accounts for several CBM member institutes have been established at FAIR GmbH. The following CBM groups have opened CBM Construction Team Account and transferred

Several hundred thousand EUR to FAIR GmbH, which are available for procurements:

Goethe Universität Frankfurt, IKF, AG C. Blume
Goethe Universität Frankfurt, IKF, AG J. Stroth
Goethe Universität Frankfurt, IRI, AG U. Kebschull
Justus-Liebig-Universität Gießen, II. Physikalisches Institut, AG C. Höhne
Institute for Particle and Nuclear Physics Wigner RCP, Budapest G. Wolf
EKUT Universität Tübingen, Physikalisches Institut, AG H.R. Schmidt
Nuclear Physics Institute, Rez, Czech Republic
Universität Heidelberg, PI, AG N. Herrmann

→ first procurement for GU Frankfurt on Mimosis Sensor for MVD and for Univ. Tübingen for the STS are done

CBM RRB action items

- Acknowledge the strategy of the CBM collaboration how to collect the uncovered contribution (~22% due to missing contributions from Russia) to the Common Fund.
- Acknowledge the strategy of the CBM collaboration for the Addendum to the CBM Construction MoU

**Thank you for your
attention!**

