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RAMIRI 2012 Learning Programme

Trieste

17-20 June 2012

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Management and control of in-kind contributions
Case study: European XFEL Facility

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Overview

- Place of IKCs in the construction phase of the European XFEL Facility
- Process of IKC and documents involved
- IKC follow-up:
  - Milestones validation
  - Milestones control
- Examples of difficulties encountered
- Finance and controlling aspects
- Conclusions

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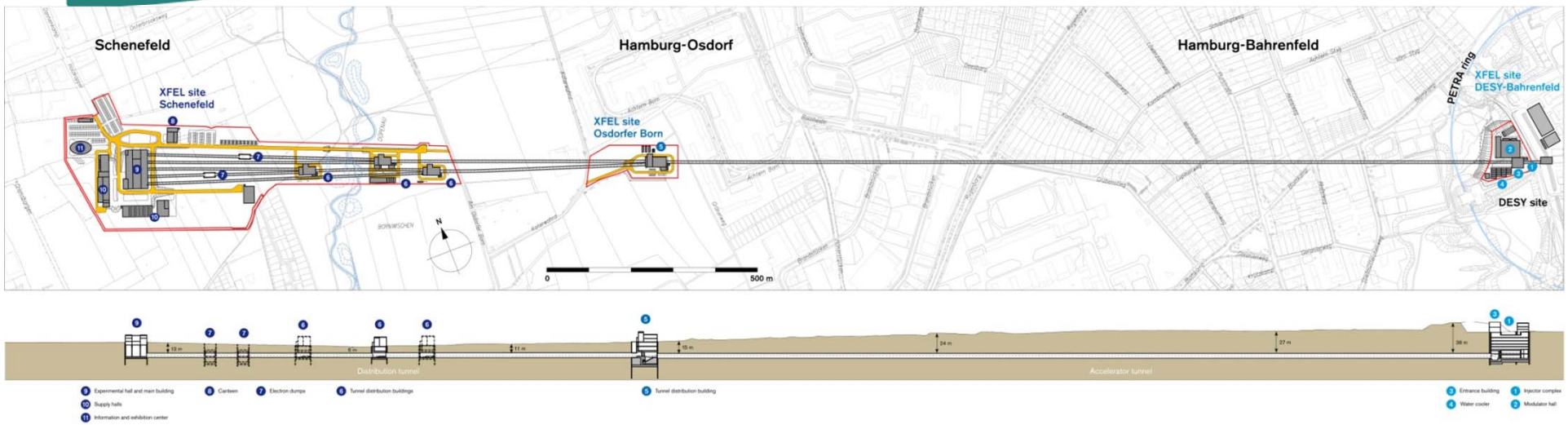
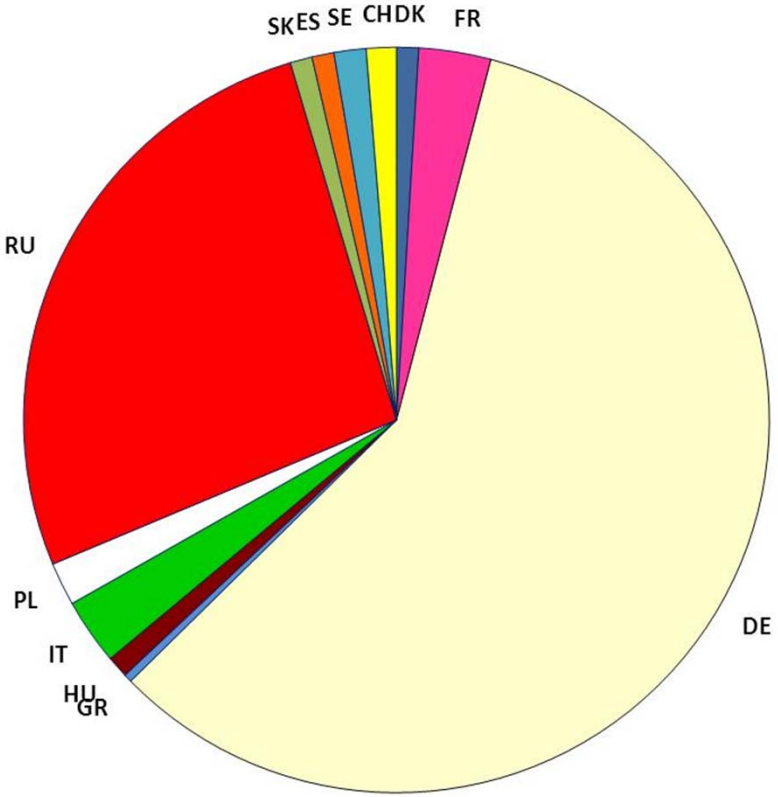
Description of the project



The European XFEL Facility in Hamburg is an applied research facility
Generation of X-ray flashes: 27 000/s
Superconducting linear accelerator for electrons (energy level 17.5 GeV)
3.4 km long machine in 5.8 km underground tunnels
3 sites above ground and 5 experimental stations

Construction :
Cost 1 147 M€ (2005 level)
12 countries participate in the construction through 21 institutes
48 Work Packages
77 in-kind contributions
Lifetime 15 to 20 years starting in 2016

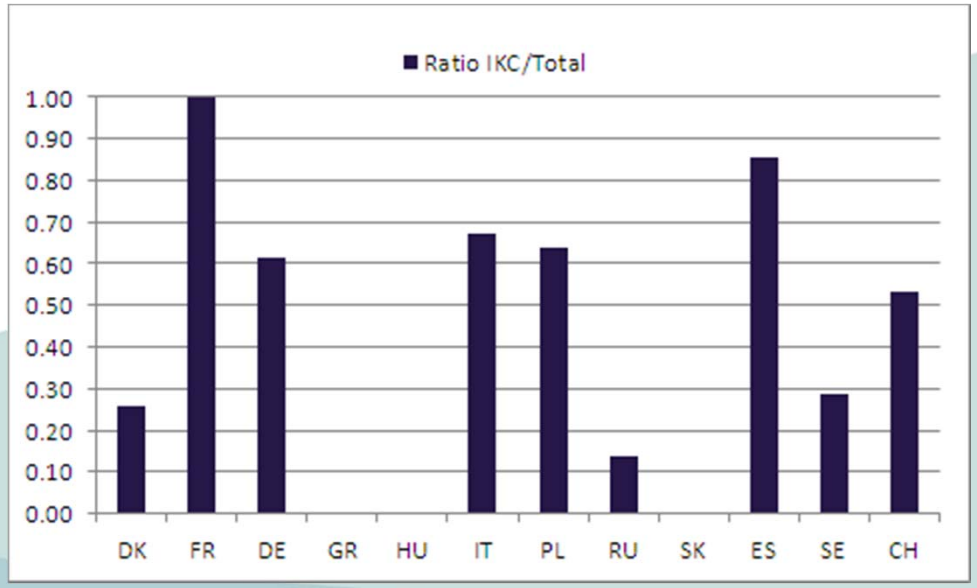
12 countries contribute to the European XFEL Facility



<u>In-Kind contributions represent a non-cash benefit transfer of:</u>

- A technical component, and the personnel needed for its installation and integration on site, or
- Personnel made available for specific tasks during the construction phase (seconded staff)

Each country contributes either in cash, in-kind, or both



In-Kind contributions for the construction

Budget of the European XFEL Facility:

- In-Kind contributions 50%
- Cash 50%

Reasons why IKCs are an attractive solution:

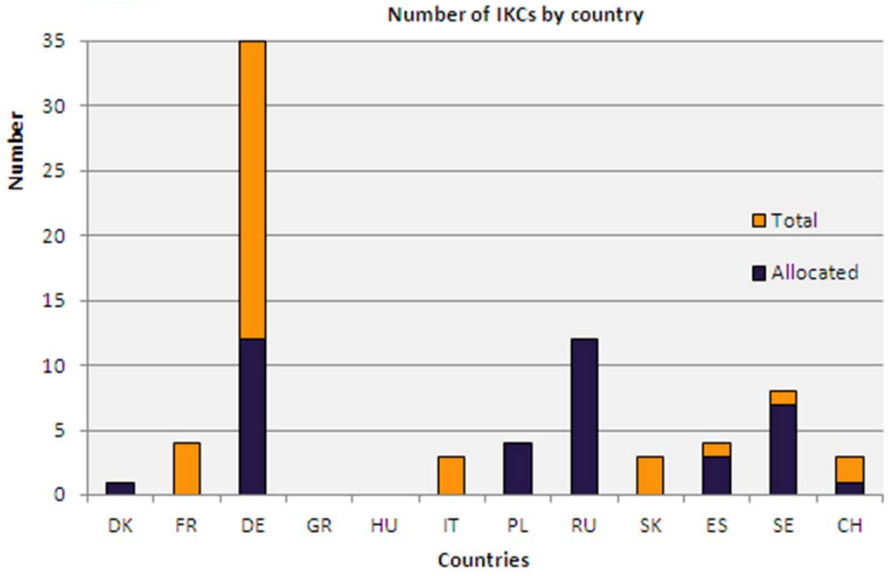
- for the contributing institute and country:
  - Implementing and developing its know-how
  - Participation of national industries
  - Image and reputation
- for the project:
  - Delegation of responsibilities (technical, management)
  - Delegation of risks (technical, costs)

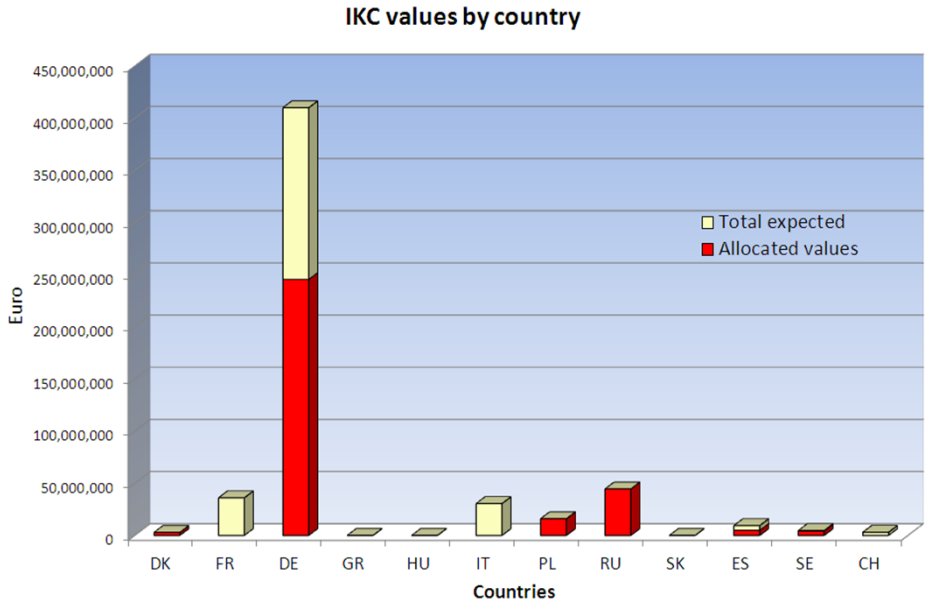
21 institutes
77 IKCs
600 milestones

efforts →

Coordination
Interfaces
Schedule
Control

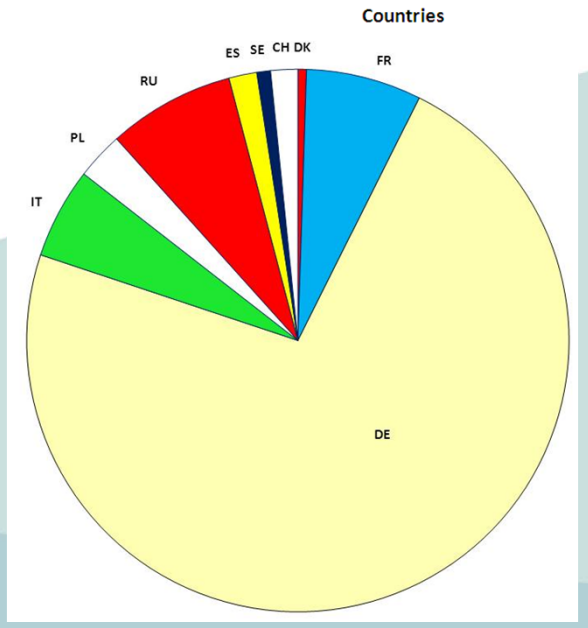
IKCs status June 2012





Total number of IKCs: **77**

Allocated by Council: **40**



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Work Packages in the construction phase

WPG1 Linac	WPG1 Linac	WPG2 Accelerator Subsystems	WPG4 Control & Operation	WPG5 Infrastructure	WPG3 Photon Beam System	WPG3 Photon Beam System	WPG6 Sites & Buildings
WP01 RF System *Stefan Choroba*	WP07 Freq. Tuners *L. Lilje / A. Bosotti*	WP12 Warm magnet *Bernward Krause*	WP28 Acc Control Sys. *Kay Rehlich*	WP10 AMTF *Bernd Petersen*	WP71 Undulators *Joachim Pflüger*	WP74 X-Ray diagnostics *Jan Grünert*	WP31 Sites & Civil Cons *H-J Christ*
WP02 Low Level RF *Holger Schlarb*	WP08 Cold vacuum *Lutz Lilje*	WP14 Injector *Klaus Flöttmann*	WP29 Operab. & Reliab *NN*	WP13 Cryogenics *Bernd Petersen*	WP72 Ph. Fields Simul. *Gianluca Geloni*	WP75 Detector Dev. *Markus Kuster*	WP41 Site Lot 1 *H-J Christ*
WP03 Acc. Modules *O. Napoli / K. Jensch*	WP09 Cav. String Assy. *B. Visentin A. Matheisen*	WP15 Bunch compress. *Torsten Limberg*	WP35 Radiation Safety *Norbert Tesch*	WP32 Survey & Align. *Johannes Prenting*	WP73 X-Ray Optics & Tr *Harald Sinn*	WP76 DAQ & Control *Chris.Youngmann*	WP42 Site Lot 2 *H-J Christ*
WP04 SC Cavities *W. Singer P. Michelato*	WP11 Cold Magnets *HD Brück / F. Toral*	WP16 Lattice *Winfried Decking*	WP36 General Safety *Andreas Hoppe*	WP33 Tunnel Installation *Norbert Meyners*	WP78 Optical lasers *Max Lederer*	WP81 FXE Instr. *Christian Bressler*	WP43 Site Lot 3 *H-J Christ*
WP05 Power Couplers *A. Falou / WD Möller*	WP46 3.9 GHz System *E. Vogel / P. Pierini*	WP17 St. e-b diagn. *Dirk Nölle*	WP38 Pers. Interlock *Brunhilde Racky*	WP34 Utilities *J-P. Jensen*	WP79 Sample Environ. *Joachim Schulz*	WP82 HED Instr. *NN*	WP44 Site Engineering *H-J Christ*
WP06 HOM Couplers *J. Sekutowicz / E. Plawski*		WP18 Spec. e-b diagn. *Christopher Gerth*	WP39 EMC *Herbert Kapitza*	WP40 Info & Proc. Supp *Lars Hagge*	WP85 SQS Instr. *Michael Meyer*	WP83 MID Instr. *Anders Madsen*	WP45 AMTF Hall *H-J Christ*
		WP19 Warm vacuum *Sven Lederer*			WP86 SCS Instr. *NN*	WP84 SPB Instr. *Adrian Mancuso*	
		WP20 Beam Dumps *Norbert Tesch*					
		WP21 FEL Concepts *Mikhail Yurkov*					

DK FR IT PL RU ES SE CH

Process of an IKC in the construction phase

- **Input**
  - Extent of contribution
  - Value
  - Specifications
  - Interfaces
  - Schedule
  - Standards & QA requirements

Agreement + Technical annex

Allocation by XFEL Council

AFC
financial recommendation

IKRC
technical recommendation

XFEL technical groups

EoI by Institute

Contributor's responsibility

Work
- Management
- Engineering
- Production
- QA control
- Tests
- Shipment
- Assistance

Resources
- Manpower
- Factory, halls
- Machines & equipment
- Offices
- Budget

- **Output**
  - Hardware
  - Services
  - Manpower
  - Software
  - Documents

WPn
- Acceptance tests
- Integration
- Commissioning

Reference documents and IKC agreements

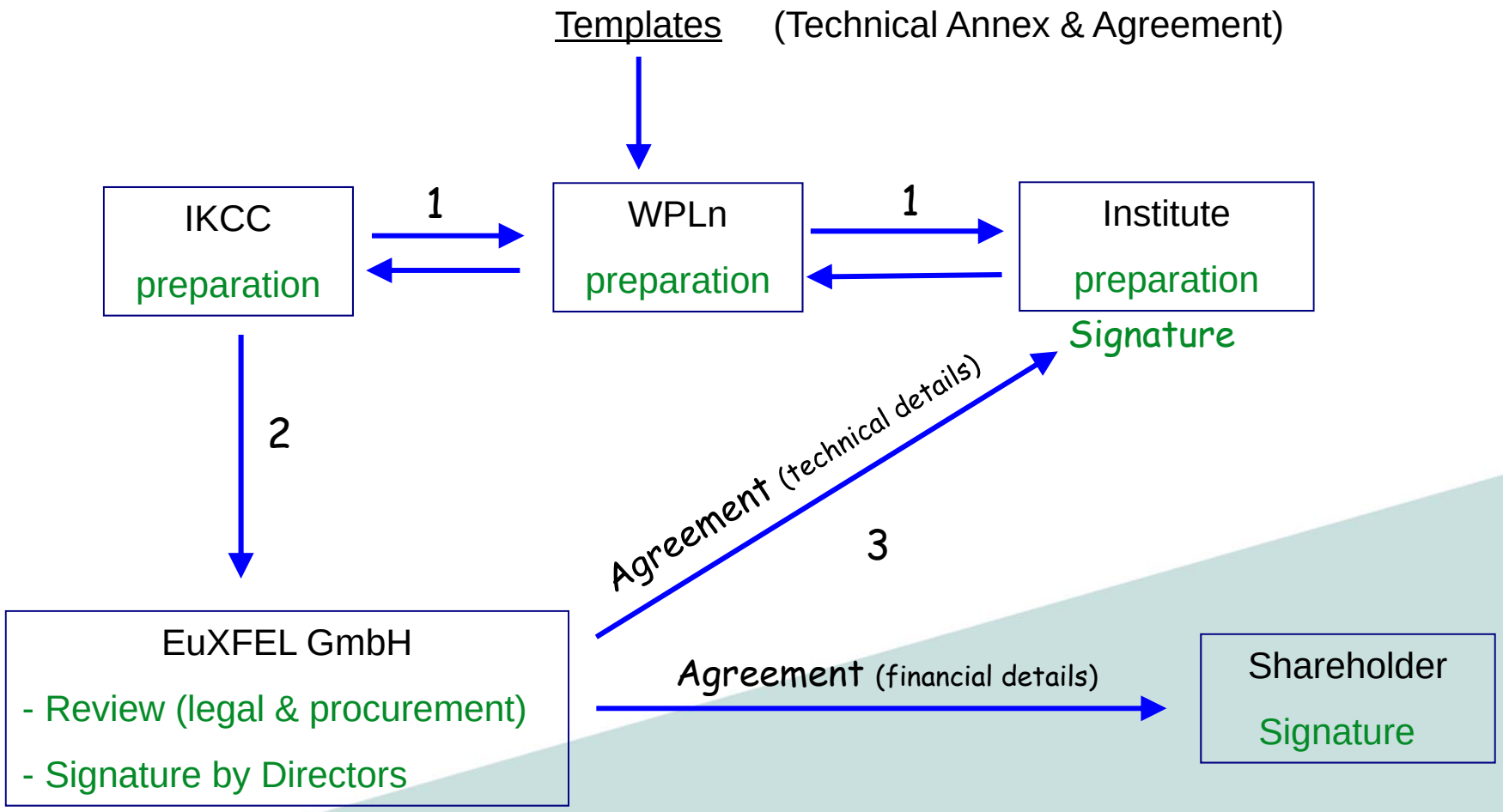
Reference documents:

- XFEL Convention (between countries)
- List of shareholders
- Cost book 2005 (detailed cost estimate)
- Basic rules and procedures for IKCs
- Internal provisions on IKCs

Documents needed for each **IKC**

- **Agreement with Institute**
  - Technical description of deliverables
  - Specifications
  - Schedule
  - Conditions of acceptance
  - Intellectual Property clauses
  - Quality Management issues
- **Agreement with Shareholder**
  - Value of IKC
  - Crediting milestones
  - Legal clauses and provisions

Preparation of annexes and agreements



Allocation of In-Kind Contribution

IKC allocation report — 10 November 2011
CH03 Contribution by PSI to WP17
Page 1/2

1	**Contracting Party**	Swiss Confederation
2	**Shareholder**	State Secretariat for Education and Research (SER)
3	**Institute**	Paul Scherrer Institut (PSI), Villigen
4	**Title of IKC**	Beam Position Monitor System
5	**Responsible persons**	at PSI: Boris Keil WPL17: Dirk Nölle WPG2: Winfried Decking ACC: Hans Weise European XFEL Scientific Director: Andreas Schwarz
6	**Reference documents**	- Presentation to 4th Pre-XFEL IKRC meeting on 19 May 2008: "Joint proposal on Beam Position Monitor System by PSI, DESY and CEA-Saclay" by Boris Keil - Positive recommendation by IKRC - Technical Annex 17 to the ACA (Draft)
7	**Main deliverables**	Deliverables are the following: - Modular BPM electronics system The work includes: - Design of a custom crate - Analogue front-ends for button and cavity BPMs - ADCs and digital back-end including firmware and software - Integration - Interface to the control system - Installation and commissioning.
8	**Milestones**	M1: Conceptual design — Dec. 2010 M2: Tests of prototypes — Mar. 2012 M3: Production Readiness Review — Jan. 2013 M4: Procurement of components — Jan. 2014 M5: Installation completed — Jun. 2014 M6: Commissioning completed — Jul. 2015 M7: Final acceptance — Dec. 2015
9	**Cost book value (2005)**	Cost book budget of the complete WP17: **20 761 518 €** Cost book value of the joint collaboration PSI, DESY, and CEA for BPM system: **9 697 410 €** Cost book value of this contribution by PSI: **6 138 000 €**
10	**Contribution value (2005)**	PSI proposes this contribution at the 2005 value: **6 138 000 €**
11	**Value (2005) attribution schedule**	Crediting scheme: M1: 600 000 € M2: 800 000 € M3: 800 000 € M4: 2 100 000 € M5: 600 000 € M6: 600 000 € M7: 638 000 €

IKC allocation report — 10 November 2011
CH03 Contribution by PSI to WP17
Page 2/2

12	**Value analysis**	This contribution includes: 2 850 000 € for equipment, 3 288 000 € for personnel
13	**Value difference**	There is no difference between the value of the proposed contribution and the cost book value.
14	**Target date**	The overall design work has already started at the 3 partner institutes DESY, PSI and CEA, and the production of prototypes is on-going. The objective is to allocate this contribution at next Council's meeting on 8.02.2012.
15	**Comments by the IKC coordinator**	The allocation of this contribution to PSI as described and under the present conditions is acceptable.
16	**Management Board recommendation**	The Management Board recommends the allocation of this contribution to PSI.

1. Presentation to the AFC (Administrative and Finance Committee)
2. Recommendation by the AFC
3. Allocation by the European XFEL Council

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List of IKCs (Status May 2012) 1/2

Country	Institute	Description IKC	No	WP	IKRC date	Allocation target date	WP value Cost Book € (2005)	IKC value Cost Book € (2005) V1	IKC Expected or calculated value € (2005) V2	IKC Allocated value € (2005)	Δ / costbook V2 - V1	Contract price €	Documents in work	Reviewed by MB	Approved by Council	Signed by EuXFEL	Signed by DESY	Sent to shareholder	Signed by shareholder
Denmark	DTU	FXE beam line	DK01	81	Apr. 2012	Jun. 2012	6,044,053	-	2,860,000		0								
		Subtotal							2,860,000		0								
France	CNRS (LAL)	800 Power couplers	FR01	5	Sep. 2007	2012	26,404,540	19,076,700	19,525,000		448,300								
	CEA (IRFU)	103 cavity strings assembly	FR02	9	Sep. 2007	2012	5,363,090	4,631,490	7,861,000		3,229,510								
	CEA (IRFU)	103 cryomodules assembly	FR03	3	Sep. 2007	2012	22,560,720	5,933,000	10,948,800		5,015,800								
	CEA (IRFU)	Re-entrant cavity BPMs	FR04	17	May 2008	2012	20,761,520	465,000	465,000		0								
		Subtotal						**30,106,190**	**38,799,800**	**0**	**8,693,610**								
Germany	DESY Hamburg	RF system	DE01	1	Sep. 2010	Jun. 2012	75,368,760	75,368,760	75,365,500	75,365,500	-3,260								
		LLRF	DE02	2	May 2009	Q3 2012	17,200,840	17,200,840	17,200,840		0								
		Accelerator Cryomodules	DE03	3	Sep. 2007	Q3 2012	22,560,720	9,593,000	9,593,000		0								
		Superconducting cavities	DE04	4	Sep. 2007	Q3 2012	55,201,220	37,344,320	36,737,000		-607,320								
		Power couplers	DE05	5	Sep. 2007	Q3 2012	26,404,540	7,327,840	7,400,000		72,160								
		Frequency Tuner	DE07	7	Sep. 2007	Jun. 2012	8,303,200	8,303,200	8,303,200		0								
		Cold vacuum	DE08	8	Sep. 2007	Q3 2012	7,783,750	7,021,310	7,021,310		0								
		Cavity string assembly	DE09	9	Sep. 2007	Q3 2012	5,363,090	931,600	931,600		0								
		AMTF cryogenics and shielding	DE10	10	Jan. 2008	Feb. 2011	34,731,000	9,030,300	9,030,300	9,030,300	0								
		AMTF test components in vacuum, RF and controls	DE10b	10	May.2011	Jun. 2012	34,731,000	8,781,150	8,781,000		-150								
		Cold Magnets	DE11	11	Sep. 2007	Q3 2012	4,525,480	2,123,300	2,347,000		223,700								
		Warm Magnets	DE12	12	Apr. 2012	Q3 2012	13,156,580	972,228	972,000		-228								
		Cryogenics for Linac	DE13	13	Jan. 2008	Feb. 2011	35,007,600	22,907,600	22,907,600	22,907,600	0								
		Injector	DE14	14	May.2011	Q3 2012	3,241,800	2,581,929	2,582,600		671								
		Bunch Compressor	DE15	15	May 2009	Q3 2012	1,447,200	1,447,000	1,447,000		0								
		Lattice: Beam Optics Design & Beam Kickers	DE16	16	May 2009	Q3 2012	6,180,990	3,669,660	3,670,000		340								
		BPM System: vacuum components & part cabling	DE17	17	May 2008	Feb. 2012	20,761,518	3,094,410	3,094,410	3,094,410	0								
		Standard beam diagnostics	DE17b	17	Oct. 2011	Feb. 2012	20,761,518	10,814,588	11,195,960	11,195,960	381,372								
		Special Beam Diagnostics	DE18	18	Apr. 2012	Q3 2012	13,744,030	10,233,782	10,234,000		218								
		Warm vacuum	DE19	19	Jan. 2011	Jun. 2011	21,932,180	16,767,320	16,767,320	16,767,320	0								
		Beam dumps	DE20	20	May 2008	Q3 2012	4,816,950	1,016,950	1,016,950		0								
		FEL Concepts	DE21	21	May.2011	Q3 2012	2,362,000	2,362,000	2,355,000		-7,000								
		Control System	DE28	28	Apr. 2012	Q3 2012	20,885,750	19,734,000	22,031,000		2,297,000								
		Operability	DE29	29			3,531,650	3,531,650	0		-3,531,650								
		Survey / Alignment	DE32	32	Jan. 2011	Q3 2012	4,830,300	4,830,300	4,830,000		-300								
		Installation	DE33	33	Jan. 2011	Q3 2012	16,287,120	16,287,120	16,287,000		-120								
		Utilities	DE34	34	Oct. 2011	Feb. 2012	84,602,400	78,336,502	75,852,808	75,852,808	-2,483,694								
		Networks in the tunnels	DE34b	34	Apr. 2012	Q3 2012	84,602,400		3,569,191		3,569,191								
		Radiation safety	DE35	35	Apr. 2012	Q3 2012	3,266,100	3,266,100	3,266,100		0								
		General safety	DE36	36	Oct. 2011	Feb. 2012	6,325,565	6,325,565	6,265,380	6,265,380	-60,185								
		Personnel interlock	DE38	38	May.2011	Q3 2012	4,399,000	4,399,000	4,395,000		-4,000								
		EMC	DE39	39	May.2011	Q3 2012			823,000		823,000								
		Information and Process Support	DE40	40	Apr. 2012	Q3 2012			2,645,000		2,645,000								
		AMTF Hall + Technical infrastructure	DE45	45	-	Apr. 2010	157,792,500	5,361,000	7,844,000	7,844,000	2,483,000								
		3.9 GHz system	DE46	46	Apr. 2012	Q3 2012	3,979,680	2,031,500	3,180,040		1,148,540								
		Subtotal						**402,995,824**	**409,942,109**	**228,323,278**	**6,946,285**								

List of IKCs (Status May 2012) 2/2

Country	Institute	Description IKC	No	WP	IKRC date	Allocation target date	WP value Cost Book € (2005)	IKC value Cost Book € (2005) V1	IKC Expected or calculated value € (2005) V2	IKC Allocated value € (2005)	Δ / costbook V2 - V1	Contract price €	Documents in work	Reviewed by MB	Approved by Council	Signed by EuXFEL	Signed by DESY	Sent to shareholder	Signed by shareholder
Italy	INFN	Nb cavities (50%)	IT01	4	Sep. 2007	???	55,201,220	15,000,900	22,627,000		7,626,100								
	INFN	25 Cryomodule pressure vessels and cold masses	IT02	3	Sep. 2007	???	22,560,720	3,700,000	4,814,760		1,114,760								
	INFN	3.9 GHz accelerator module	IT03	46	Apr. 2012	Q3 2012	3,979,680	1,948,180	3,050,600		1,102,420								
		Subtotal						**20,649,080**	**30,492,360**	**0**	**9,843,280**								
Poland	NCBJ Swierk	HOM couplers and Beam Line Absorbers	PL01	6	Sep. 2007	Mar. 2011	2,827,800	2,828,000	3,507,700	3,507,700	679,700								
	WUT / WPT Wroclaw	Transfer line XATL1 + 2 vertical cryostats for AMTF	PL04	10	Jan. 2008	Feb. 2011	34,731,000	2,200,000	2,115,550	2,200,000	-84,450								
	IFJ Cracow	Tests of Nb cavities and cryomodules in AMTF	PL05	10	Jan. 2008	Dec. 2010	34,731,000	9,368,309	9,368,309	9,368,309	0								
	IFJ Cracow	Tests of Cold magnets	PL07	11	Jan. 2008	Dec. 2010	4,525,480	900,830	900,830	900,830	0								
		Subtotal						**15,297,139**	**15,892,389**	**15,976,839**	**595,250**								
Russia	JINR Dubna	3 MCP-based detectors	RU03	74	Sep. 2010	May 2011	8,944,360	700,000	631,367	655,711	-68,633	782,000							
	IHEP Protvino	Cryogenics for Linac	RU07	13	Jan. 2008	Oct. 2011	35,007,600	8,300,000	7,514,192	8,171,185	-785,808	9,313,000							
		Beam dumps: Main, INJ, BC1&2, exchange tools	RU08	20	May 2008	Dec. 2010	4,816,950	3,800,000	3,526,384	3,716,407	-273,616	4,320,000							
		BLM diagnostics: mech. components & scintillators	RU09	17	EoI	Aug. 2011	20,761,520	249,500	248,937	249,520	-563	307,727							
	NIIEFA Efremov St Petersburg	710 Warm magnets	RU11	12	Jan. 2008	Oct. 2010	13,156,580	10,821,000	11,536,100	11,862,000	715,100	14,234,000							
	BINP Novosibirsk	127 quadrupole magnets type XQA	RU17	12	Jan. 2008	Oct. 2010	13,156,580	877,500	1,007,763	1,039,736	130,263	1,194,000							
		Cold vacuum	RU18	8	May 2008	Feb. 2011	7,783,750	841,260	831,010	876,978	-10,250	1,012,600							
		Warm vacuum	RU19	19	May 2008	Feb. 2011	21,932,180	5,269,600	5,191,385	5,476,473	-78,215	6,358,700							
		3 cryomodule test benches for AMTF	RU20	10	Jan. 2008	Dec. 2010	34,731,000	3,100,000	3,229,486	3,363,530	129,486	3,844,000							
		Power supplies for Utilities	RU21	34	Apr. 2012	Jun. 2012	84,602,400	1,915,500	1,909,871		-5,629	*2,416,355*							
		Cryogenics for Linac	RU24	13	Jan. 2008	Aug. 2011	35,007,600	3,800,000	3,998,965	3,999,781	198,965	4,969,000							
	INR Moscow	3 Transverse Deflecting Structures	RU22	18	May 2009	Dec. 2010	13,744,030	3,066,000	3,035,067	3,189,742	-30,933	3,680,400							
		Subtotal						**42,740,360**	**42,660,527**	**42,601,063**	**-79,833**	**52,431,782**							
Spain	CELLS	7 Mechanical support systems for undulators	ES01	71	May 2008	Jun. 2011	47,871,100	1,225,000	1,085,385	1,291,200	-139,615								
	CIEMAT	Cold magnets	ES02	11	Sep. 2007	Jun. 2012	4,525,480	1,501,350	2,129,100		627,750								
	Universidad Politécnica de Madrid	240 power supplies (same type) for cold magnets quadrupoles & dipoles	ES03	34	May 2009	Jun. 2012	84,602,400	1,448,000	1,448,000		0								
	CIEMAT	Undulators intersections: 91 phase shifters and 91 quadrupole movers	ES04	71	May 2008	Q4 2012	47,871,100	4,718,500	4,718,500		0								
		Subtotal						**8,892,850**	**9,380,985**	**1,291,200**	**488,135**								
Sweden	Uppsala University	Sample injector and diagnostic system	SE01	79	-	Dec. 2011	4,307,600	360,000	520,000	520,000	160,000								
	KTH Stockholm BIOX	Heat load investigations on diffractive optics	SE02	73	Sep. 2007	Apr. 2010	22,015,500	481,000	481,000	481,000	0								
	Uppsala University	Laser heater system for injector	SE03	14	Jan. 2008	Nov. 2010	3,241,800	660,000	850,000	850,000	190,000								
	Manne Siegbahn Lab	Fiducialization of undulator quadrupoles type XQA	SE04	12	Jan. 2008	Apr. 2010	13,156,580	300,000	335,000	335,000	35,000								
	Stockholm University (PhySto)	Timing & synchr. System + configuration managt	SE05	28	Jan. 2008	Oct. 2010	20,885,750	1,151,000	1,220,600	1,220,600	69,600								
	Manne Siegbahn Lab	Temperature Measurement System for undulators	SE06	71	May 2009	Nov. 2010	47,871,100		220,000	220,000	0								
	Uppsala University	Diamond Detector for Photon Beam Diagnostics	SE07	74	EoI					0	0								
	Uppsala University	Secondment of Physicist for structural biology	SE08	84	Sep. 2010	Oct. 2010	4,172,567		565,000	565,000	565,000								
	Stockholm University (PhySto)	Radiation Dose Measurement System	SE09	71	Apr. 2012	Q3 2012	47,871,100		421,190	0	0								
		Subtotal						**2,952,000**	**4,612,790**	**4,191,600**	**1,019,600**								
Switzerland	PSI	BPMs Electronics	CH03	17	May 2008	Feb. 2012	20,761,520	6,138,000	6,138,000	6,138,000	0								
	PSI	Intra-Bunchtrain Feedback System IBFB	CH04	16	May 2009	Q3 2012	6,180,990	2,511,330	2,939,000		427,670								
		Beamline commissionning	CH05																
		Subtotal						**8,649,330**	**9,077,000**	**6,138,000**	**427,670**								
					Total			**532,282,773**	**563,717,960**	**298,521,980**	**27,933,997**								

Specific issues in in-kind contributions

Coordination of several different actors in space and time needs a big effort:

Technical difficulties:

- Different environment (procedures, language, CAD software, units…)
- Different standards
- Different raw materials (same quality ?)
- Different style of management
- Follow-up is difficult

Financial:

- Budget is in current prices, but IKCs are in 2005 prices
- Controlling: follow-up of IKC milestones

Logistics:

- Transports
- On-time delivery and temporary storage
- Integration plan

Legislation:

- National legal rules are different
- Procurement rules are different
- Customs from outside EU

IKC follow-up: Validation of Milestone's achievement

- The progress of a contribution is monitored through specific contractual milestones detailed in the agreement:
  - o name, date expected, validation criteria
- About 600 milestones will cover all IKCs of European XFEL

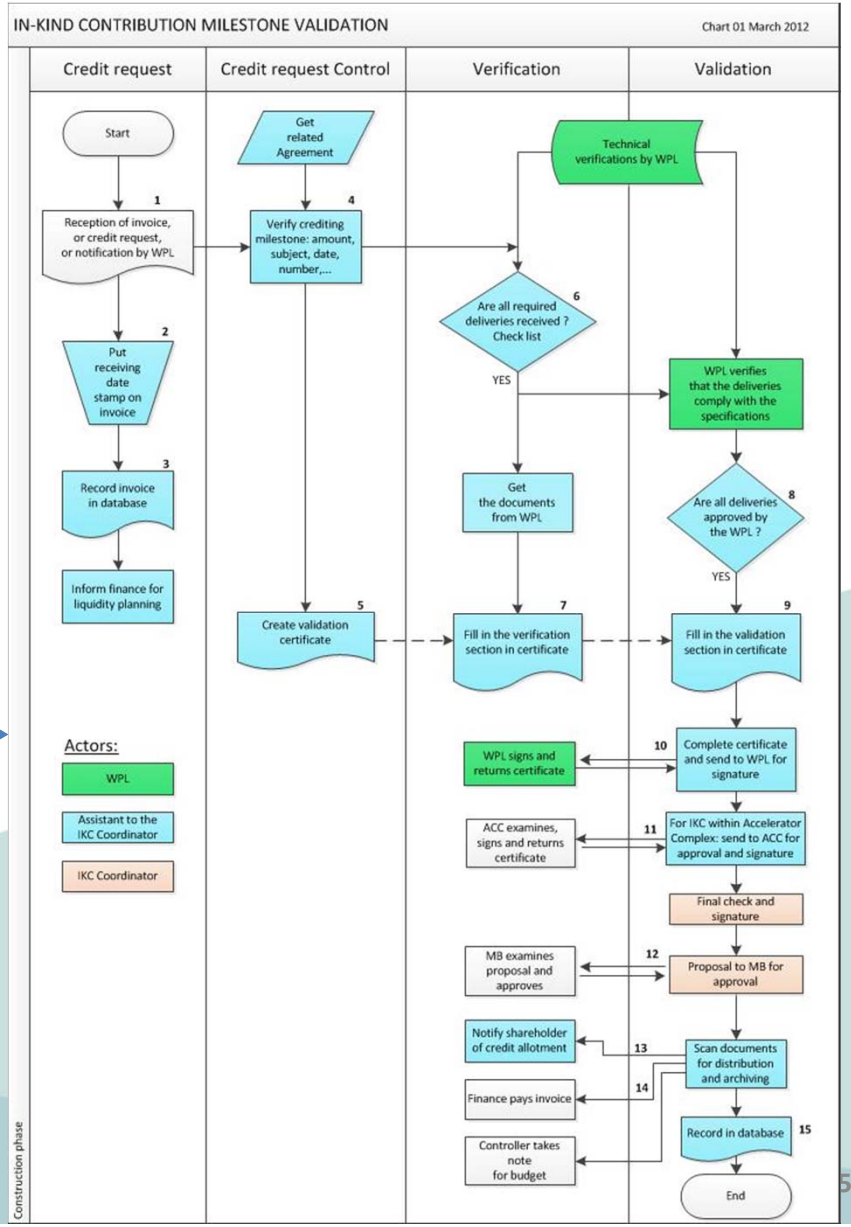
For each milestone,

when corresponding task is completed:

- Institute or WPL → notifies European XFEL
- WPL → evaluates the deliveries / criteria:
  - o Documents
  - o Test reports
  - o Equipment

→ gives his approval of satisfactory achievement

- European XFEL → validates the milestone
  → notifies the shareholder



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IKC follow-up: Certificate of Validation (example)

European XFEL

Certificate of validation of payment milestone P4/2 RU22 for WP18

European XFEL GmbH, Albert-Einstein-Ring 19, 22761 Hamburg, Germany

Contractor:	**Institute for Nuclear Research of the Russian Academy of Science** 7a, 60th October Anniversary Prospect 117312 Moscow, **Russian Federation**		
Contract	**Design, production, delivery and installation of the Transverse Deflecting Structures and High Power RF Systems for the TDS Systems**		
Work package and responsible person	**WP18 – Special diagnostics** Christopher Gerth	**WPG2** Winfried Decking	**INR** Leonid Kravchuk
Reference document	Contract European XFEL-INR for WP 18 Dated on 16 December 2011		
Invoice No & date	# 4/2		10 February 2012

Terms of references

Contract amount	3 580 400 €	Art.4.1 of the contract
Payment No	**P4/2:** Production Readiness Review of TDS and High Power RF Systems for the TDS Systems INJ, BC1 and BC2	Art. 4.2 of the contract
Payment amount	**179 020 €**	
Validation criteria	Successful passage of Production Readiness Review	

Verification operations

Verification	INR submitted the requested reports: - Production Readiness Review Report – Rev 0 - Process Control Plan – Rev 1	**Provided by INR:** **13 February 2012**
Detail of verification	XFEL TDS - PRR RU22 WP18 INR P4.p PROCESS CONTROL PLAN rev1.pdf	
Result of the verification	Verification complete: all requested documents received	PSP Number P.02.02.18.51.6327
Verified by: Name and signature	Christopher Gerth	Date: 12.3.2012

Validation involves the approval by:

- WPL
- Technical coordination
- IKC Coordinator
- Administrative Director

- Management Board gives a formal approval
- Shareholder is notified

Validation operations

Validation	The Production Readiness Review was passed successfully.	**Performed by WPL**
Completeness of validation	WPL approved the documents from INR delivered on February 13, 2012.	
Validation by: name and signature	Christopher Gerth	Date: 12.3.2012

Conclusions

Payment	**Payment of 179 020 € is authorized**	
Approval by IKCO	The contractual milestone P4 is now fully validated, the corresponding balance payment can be made.	Date: 14.03.2012
Signed by the Administrative Director		Date: 15.03.2012

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IKC follow-up: Milestones database

Excel table of all contractual milestones:

- represents the up-to-date status of achievements
- Allows to control the milestones:
  - At achieved milestones: link to certificates of validation and associated documents
    - At delayed milestones: send a reminder to responsible persons (automatic e-mail sent by macro)

Country	Institute	IKC No	Group	IKC Name	WP	WPL	IKC value (2005) €	Milestones	Milestone name	Validation criteria	Allotment value (2005) €	Date planned	Date of validation	Date of notification to shareholder	Delay (days)	Delay of non-validated milestones (days)	Late ?	Completed milestones	Remaining milestones	Number of delayed	% Progress indicator
PL	WUT	PL04	AC	Cryogenic transfer line XATL1 and Two vertical test stands and accessories	10	B. Petersen	2,115,550	M1	Manufacturing drawings of XATL1	Drawings approved by DESY and certified by TUV	125,000	28/02/2011	02/12/2011	07/12/2011	274	0		1	0	0	17
PL	WUT	PL04	AC		10	B. Petersen		M2	Delivery & installation of XATL1	All XATL1 modules delivered and installed successfully	625,000	30/11/2011			188	188	late	0	1	1	17
PL	WUT	PL04	AC		10	B. Petersen		M3	Acceptance of XATL1	Final acceptance approved by ACC	165,550	31/12/2012			0	0		0	1	0	17

Summary				
Number of milestones	Milestones Completed	Remaining milestones	Number of delayed milestones	% completed
260	66	194	51	25

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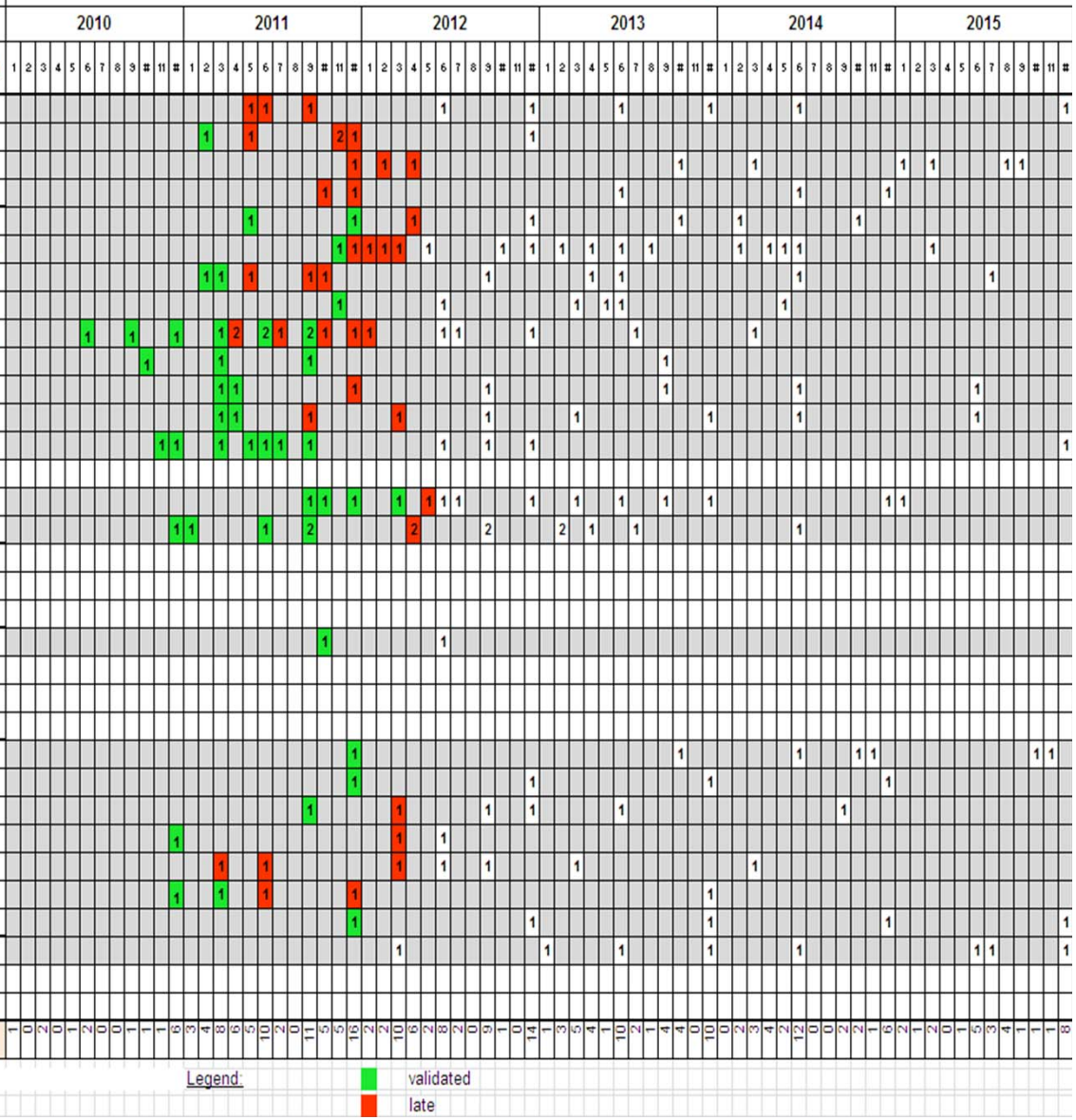
IKC follow-up: Milestones progress indicator

Country	Institute	Description IKC	No	WP	Milestones		
					Validated	Late	Total
PL	NCBJ Swierk	HOM couplers and Beam Line Ab	PL01	WP06	0	3	9
	WUT / WPT Wroclaw	Transfer line XATL1 + 2 vertical c	PL04	WP10	1	4	6
	IFJ Cracow	Tests of Nb cavities and cryomod	PL05	WP10	0	3	9
	IFJ Cracow	Tests of Cold magnets	PL07	WP11	0	2	5
RU	JINR Dubna	3 MCP-based detectors	RU03	WP74	2	1	8
	IHEP Protvino	Cryogenics for Linac	RU07	WP13	1	4	19
		Beam dumps: Main, INJ, BC1&2	RU08	WP20	2	3	10
		BLM diagnostics: mech. compon	RU09	WP17	1	0	6
	NIIEFA Efremov St	710 Warm magnets	RU11	WP12	8	6	20
	BINP Novosibirsk	127 quadrupole magnets type XC	RU17	WP12	3	0	4
		Cold vacuum	RU18	WP08	2	1	7
		Warm vacuum	RU19	WP19	2	2	9
		3 cryomodule test benches for Al	RU20	WP10	7	0	11
		Power supplies for Utilities	RU21	WP34	0	0	0
		Cryogenics for Linac	RU24	WP13	4	1	15
	INR Moscow	3 Transverse Deflecting Structure	RU22	WP18	5	2	14
SL		Manpower for installation of high	SK01	WP73	0	0	0
		SC coils & magnets			0	0	0
		Radiation detectors, dosimeters			0	0	0
ES	CELLS	7 Mechanical support systems fo	ES01	WP71	1	0	2
	CIEMAT	Cold magnets	ES02	WP11	0	0	0
	Universidad	222 power supplies (4 types) for	ES03	WP34	0	0	0
	CIEMAT	Undulators intersections: 91	ES04	WP71	0	0	0
SE	Uppsala University	Sample injector and diagnostic s	SE01	WP79	1	0	7
	KTH Stockholm BIOX	Heat load investigations on diffrac	SE02	WP73	1	0	4
	Uppsala University	Laser heater system for injector	SE03	WP14	1	1	6
	Manne Siegbahn Lab	Fiducialization of undulator quadr	SE04	WP12	1	1	3
	Stockholm University	Timing & synchr. System + confi	SE05	WP28	0	3	7
	Manne Siegbahn Lab	Temperature Measurement Syste	SE06	WP71	2	2	5
	Uppsala University	Secondment of Physicist for stru	SE08	WP84	1	0	5
CH	PSI	BPMs Electronics	CH03	WP17	0	0	8
	PSI	Intra-Bunchtrain Feedback Syste	CH04	WP16			0
		Beamline commissionning	CH05				0
		Total			66	51	260

Milestones progress



Examples of difficulties encountered (1)

Raw material specified in IKC description is not available at the contributor

- Look for local equivalent material, or
- Buy the material and send it to the contributing institute (it implies a shift from IKC to cash → accounting)

Special component specified in IKC description is not available at the contributor

- example: cryogenic valves unavailable in Russia

  - Buy the component and send it to the contributing institute
  - It implies a shift from IKC to cash → accounting

Loss of competences

- example: qualified welders have left, so the institute cannot produce the equipment

  - The IKC must be re-allocated to another actor, or
  - Contract the equipment to industry

Example of difficulties encountered (2)

Lack of motivation and commitment by a contributor

- When a contribution consists only in producing an equipment according to manufacturing drawings and without possible alternative:
  - Intellectual added value is negligible
  - No possibility of implementing its know-how
  - Loss of motivation

Cases when financial commitment of contributor is not assumed

- Very high increase of material cost: copper, steel…
  - Procedure for exceptional cost increase:
    - Panel of experts analyses the case & reports to Council
    - Council decides on higher value of IKC

- The cost estimate made in 2005 is wrong, and the contributor does not (cannot) take the responsibility of cost overrun
  - Case is brought to the Council for discussion among shareholders and decision

  At European XFEL a funding shortfall was discovered in 2011, and 4 main shareholders decided to increase their cash contribution to the project

Example of difficulties encountered (3)

Delayed achievements

- one contributor does not deliver on-time → delay of whole project
  - Preventive actions:
    - Define precise responsibilities (agreements and internal provisions)
    - Close follow-up and reporting
    - Risk analysis (think of plan B in case of high risk)
  - Corrective actions:
    - Provide assistance to the contributor to find a solution
    - Decide on an alternative

Default in quality

- the equipment delivered does not satisfy the specified performance
  - Preventive actions:
    - Close follow-up and reporting
    - Risk analysis
  - Corrective action:
    - Provide assistance to the contributor to find a solution

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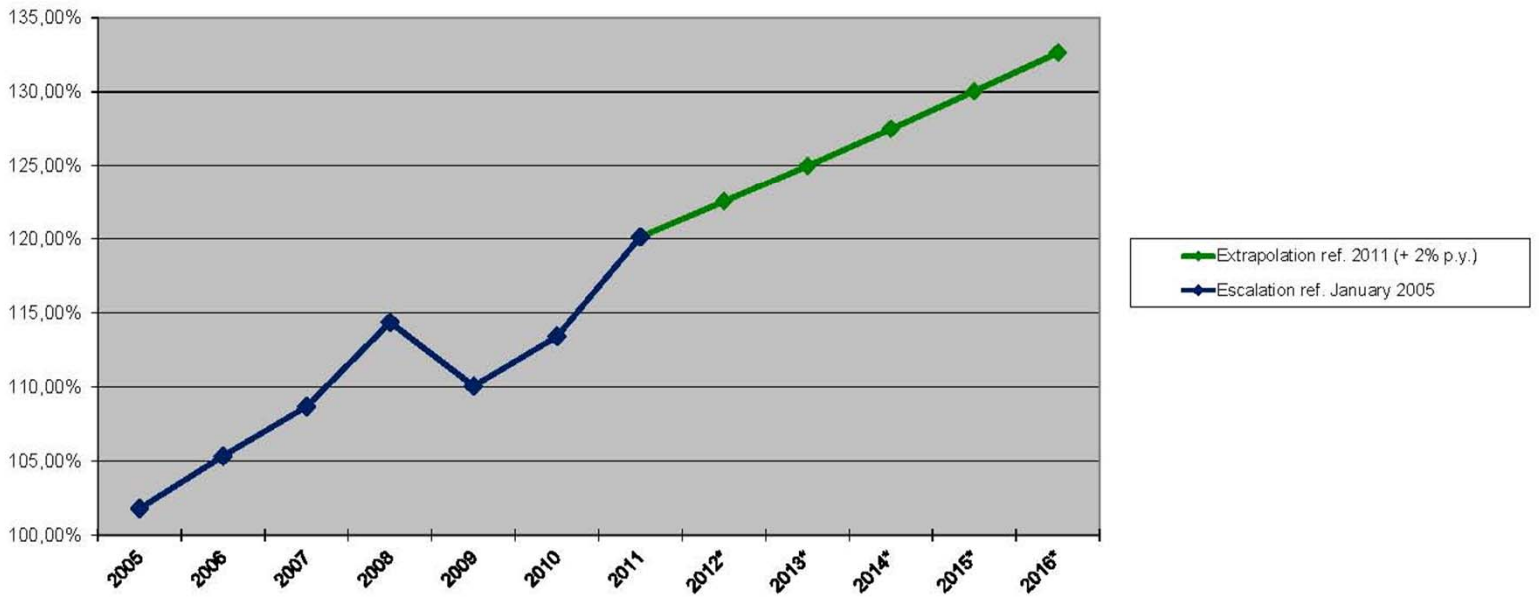
Finance and controlling aspects of IKC and cash contributions

Calculation of 2005 value from current value

By Council decision, de-escalation is done using EU27 PPI index published by EUROSTAT: *producer price index for manufactured products for EU27, 'domestic market', must be used to deflate cash contributions and all types of expenditures to the 2005 price level.*

- Index changes every year → regular updates of balance sheet must be made

updated: 06.02.2012	EUROSTAT Industry producer prices index for manufacturing, domestic market, EU27, based on empirical data								Extrapolated data (+2 % p.y.)				
	Jan. 2005	2005	2006	2007	2008	2009	2010	2011	2012*	2013*	2014*	2015*	2016*
Escalation ref. previous year		101,80%	103,48%	103,17%	105,24%	96,23%	103,06%	105,92%	102,00%	102,00%	102,00%	102,00%	102,00%
Escalation ref. January 2005	100,00%	101,80%	105,34%	108,68%	114,37%	110,06%	113,43%	120,14%	122,55%	125,00%	127,50%	130,05%	132,65%



Finance and controlling aspects of IKCs (2)

- **The guideline for the budget is the financial estimate of the project, in the sense of an agreed cost limit**
- **A close follow-up of IKCs must be performed by the IKC coordinator, the finance group and the controller**

  - When a new IKC is presented to the AFC:
    - The controller checks value, compares with what is foreseen in the budget, and confirms if it is in line
    - If its value is not in line with the budget (not included or with a higher value than foreseen), controller informs that additional budget is needed to fund the IKC, then a decision by management is needed
    - The controller includes the value into his project reports

  - Case of a new IKC originally foreseen as cash (or the opposite case): the controller is involved to take care of shifted value

Finance and controlling aspects of IKCs (3)

- **At milestones achievements**
  - All milestones achievements are reported by the IKC Coordinator (see procedure)
  - For each completed milestone the accrued value is notified to the shareholder
  - In case of delivery of a single tangible object:
    - It implies the transfer of ownership
    - It must be shown in the balance sheet as “fixed assets under construction” with its milestone value
  - In case a milestone is reached without transfer of ownership, no entry in the balance sheet is made although the accrued value is notified to the shareholder
  - Prototypes and intangible objects (like design drawings, reports and documents) are to be seen as part of the complete IKC in which case the transfer of ownership will only take place at the completion of this IKC
  - When the contribution is completed:
    - The transfer of ownership of the complete IKC is effective after final acceptance
    - The remaining value must be added to the balance sheet
  - Booking entry in the balance sheet:
    - Debit is entered as “fixed assets under construction”
    - Credit is entered as “capital reserve of the involved shareholder” as counterpart of the IKC delivery

Finance and controlling aspects of IKCs (4)

- **More difficult case**
  - When a single tangible object is delivered by Institute **A** to Institute **B** for integration into a whole assembly:
    - The transfer of ownership of the single object to the project is still effective through an acceptance certificate
    - In addition there is a transfer of responsibility of the object from **A** to **B**, and
    - The transfer of ownership of the whole assembly (except for the single object) takes place at the delivery of the assembly by **B**
  - Such cases should be checked and the procedure validated by the legal group in order to avoid legal problems

- **Important issues**
  - The transfer of ownership should be precisely defined in the IKC agreement
  - Specific cases should be checked and validated by the legal group (watch out for different local laws)

- **Index of completion**
  - It would be good to define an index of completion based on physical achievements, apart from the financial status

Conclusions

- **Management and control of IKCs needs significant efforts → enough staff**
- Define precise processes
- Motivation and commitment of contributors is a must
- IKC must be defined by performance specifications, not by manufacturing specifications
- Continuous dialogue (all forms) and regular reporting is a must
- Team spirit in the coordination is essential

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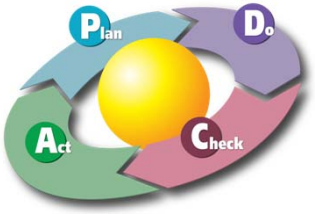

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Kai zen

Thank you for your attention !