



**Building a research infrastructure and synergies
for highest scientific impact on ESS**

H2020-INFRADEV-1-2015-1

Grant Agreement Number: 676548

brightness

Deliverable D2.5: 2nd Annual IKC Progress Assessment



1 Project Deliverable Information Sheet

BrightnESS Project	Project Ref. No. 676548	
	Project Title: BrightnESS - Building a research infrastructure and synergies for highest scientific impact on ESS.	
	Project Website: brightness.esss.se	
	Deliverable No.: 2.5	
	Deliverable Type: Report	
	Dissemination Level: Public	Contractual Delivery Date: 31.01.2018
		Actual Delivery Date: 14.05.2018
	EC Project Officer: Mina Koleva	

2 Document Control Sheet

Document	Title: 2nd Annual IKC Progress Assessment	
	Version: 1.0	
	Available at: https://brightness.esss.se	
	Files: 1	
Authorship	Written by	Marie-Louise Ainalem (Interim WP2 Leader, ESS) Carlo Bocchetta (WP2 Leader, ESS)
	Contributors	Anne-Charlotte Joubert (ESS) Ute Gunsenheimer (ESS)
	Reviewed by	Anne-Charlotte Joubert (ESS)
	Approved by	BrightnESS Steering Board on 02.05.2018



3 List of Abbreviations

BP	Best Practice
ERIC	European Research Infrastructure Consortium
ESS	European Spallation Source
FC	Field Coordinator
IK	In-Kind
IKA	In-Kind Agreement
IKC	In-Kind Contribution
IKRC	In-Kind Review Committee
ICS	Integrated Control Systems
NSS	Neutron Scattering Systems
TA	Technical Annex
WP	Work Package

Contents

1	Project Deliverable Information Sheet	2
2	Document Control Sheet	2
3	List of Abbreviations.....	3
4	Executive Summary	4
5	Report on Implementation Process and Status of Deliverable	5
5.1	Introduction	5
5.2	IKC Progress Assessment.....	6
5.3	Progress Assessment of the IKC Information System	10
5.4	Progress Assessment of the IKC Network of Regional Hubs	10
5.4.1	Best Practice Workshop in Bilbao.....	12
5.4.2	Best Practice Workshop in Catania.....	13
5.4.3	Best Practice Workshop in Lund Planned for 2018	14
5.4.4	Additional WP2 Training and Communication Opportunities.....	14
5.4.5	Activities in the Hubs	15
5.4.5.1	North-West Hub (United Kingdom, Netherlands).....	15
5.4.5.2	Central Hub (Germany, Czech Republic, Switzerland)	15
5.4.5.3	Iberia Hub (Spain).....	16
5.4.5.4	Gallia Hub (France).....	17
5.4.5.5	South East Hub (Italy, Hungary).....	18
5.4.5.6	Nordic-Baltic Hub (Denmark, Sweden, Norway, Estonia, Poland).....	19
5.4.5.7	Iceland, Lithuania and Latvia	20
5.5	Status of Deliverables and Milestones	20
6	Conclusions on 2nd Year ESS IKC with BrightnESS Involvement	21



4 Executive Summary

This document is Deliverable 2.5, the 2nd Annual IKC Progress Assessment. This deliverable is a overview of the In-Kind Contributions developed by institutes from Partner Countries¹ of the European Spallation Source ERIC during the year 2017. The document highlights the impact of BrightnESS Work Package 2 to these contributions.

During the 2nd year of BrightnESS the number of Technical Annexes approved by Council has continued to increase. Twenty-one were approved in 2017, representing €55M. Furthermore, the In-Kind Review Committee increased (IKRC) the number of Technical Annex endorsements (which are then subject for approval by Council) by twenty (€53 M) compared to the previous year. The 2nd year of BrightnESS also saw the first final reviews of delivered and completed IKCs. Upon approval, the Member Country is accredited the In-Kind Contribution value as part of its total contribution to the ESS. An overview of the IK status for the ESS member countries is given. Data shows the intended IK target value as well as the allocated IK to be endorsed by the IKRC (for approval by ESS Council) or already approved by ESS Council. Data on the number of Technical Annexes and In-Kind Agreements signed and in preparation is also included. Overall the commitments of the ESS Member Countries have increased leading to the timely completion of the ESS facility in Lund.

Highlights of the contributions made by the four tasks of BrightnESS workpackage 2 towards successful implementation of IK processes are presented. The important development and implementation of the IKC information system (BrightnESS WP2 task 2.2), XRM+, provided a centralised platform to support the management ESS In-Kind Contributions. At the end of the 2nd year of BrightnESS the information system was operational and developments continued as planned to further increase its capability. This essential software tool is now used daily for managing the In-Kind Agreements. XRM+ centrally contains all the functionality of separate past systems and is more user friendly, stable and responsive. XRM+ has greatly assisted the management and reporting of ESS IK status.

The second BrightnESS Work Package 2 Best Practice workshop on IK activity took place in 2017 in Catania, Italy: *“Installation aspects of large-scale In-Kind projects”*. Through this and the previous workshop (see below), BrightnESS has assisted in the coordination of roles on the design, manufacture and delivery of IK, and has maximised the common knowledge of how to best execute IKC activities and ensure standard approaches and implementation of technical scope. A third workshop is planned for mid 2018.

This document also highlights the IK support provided by Work Package 2 Field Coordinators located in the BrightnESS Hubs. Each Hub has adopted roles and responsibilities best fitting their specific needs, challenges and level of maturity of the In-Kind contributions. The reports from the IK FCs illustrate how BrightnESS WP 2 has facilitated and supported the transition toward claiming or implementing In-Kind technical packages. Regular communication between the ESS, Field Coordinators and the training they have undergone have strengthened the established FC network and reinforced the role of the hubs at international and inter-regional levels. Of note is the focused work addressing activities between hubs for the realisation of common IK technical deliverables.

¹ The term ‘ESS Partner Countries’ as used throughout this report, includes every country with a formal participation in the ESS project, either as: (1) full ESS Member State (e.g. Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Norway, Poland, Sweden, Switzerland, United Kingdom), (2) Observer State (countries with the intention of becoming full members In-Kind).



5 Report on Implementation Process and Status of Deliverable

This document provides an overview of the In-Kind Contributions (IKCs)² being contributed by (combinations of) institutes from the ESS Partner Countries³ between September 2015 and December 2017. Specifically, the deliverable compares the progress made for the 1st and 2nd years of BrightnESS and provides IKC statistics between the start of Q4 2015 and the end of Q4 2017. The deliverable also gives a status update of the In-Kind (IK) support offered by the Work Package (WP) 2 ‘Field Coordinators’ (FC) in the BrightnESS IKC Hubs. The FC network supports activities across institutes and across borders and identifies potential technical risks to ensure that ESS can maintain synchronicity between construction activities in Lund and the delivery schedule of the various IKC WPs. Each Hub has adopted roles and responsibilities best fitting their specific needs and challenges, determined by the level of maturity of the IK work.

5.1 Introduction

BrightnESS WP2 monitors the coordination and technical progress of IKCs between IK Partners and ESS and maximizes the possibility for all to deliver value during the Construction Phase according to the ESS IKC process. This approach – which largely centers around optimising communications at all levels – helps to minimise and mitigate risks associated with those IKCs. The activities of BrightnESS WP have greatly assisted both partners and the ESS by augmenting the cross-flow of information, highlighting risks and their potential mitigation, enhanced the collaboration process between partners in the realization of complex IK deliverables composed of multi-partner components and generally improved communication at all levels. WP2 is composed of four tasks:

1. Preparation of project implementation and training of resources needed.
2. Development and implementation of an In-Kind information system for the coordination of IKC activities.
3. Development of an IKC 'Best Practice' system and standards (web based) with the organisation of collaboration meetings.
4. Creation of an IKC network of regional hubs.

WP2 continues to provide additional resources to both ESS and partners for many IK actions. Three examples of these are:

1. The developed IK Information System (XRM+) streamlines data, keeps ESS participants up to date on actions, and provides support for partner-partner interactions.

² In-Kind Contributions are non-cash contributions in labour or material to ESS. An IKC may cover technical components as well as personnel needed to perform testing, installation, and integration. IKC may also include R&D work needed during the Construction Phase. Other products or services relevant for the completion of the ESS facility may be included as well, as long as it is a planned part of the construction project and agreed between ESS, the Partner institution and the Partner Country.

³ The term ‘ESS Partner Countries’ as used throughout this report, includes every country with a formal participation in the ESS project, either as: (1) full ESS Member State (e.g. Czech Republic, Denmark, Estonia, France, Germany, Hungary, Italy, Norway, Poland, Sweden, Switzerland, United Kingdom) or (2) Observer State (countries with the intention of becoming full members).In-Kind



2. The Field Coordinators track activities highlighting risks and provide support on a wide range of topics. With this network of skilled multitasking people inter-regional partner communication is strengthened and new opportunities for IK work are catalysed.
3. The IK Best Practice Workshops lead to shared knowledge and recommendations on the extremely important areas of engineering, testing, component assembly and installation.

5.2 IKC Progress Assessment

Figure 1 shows the IKC objectives identified from the ESS cost book for the four respective ESS sub-projects: Integrated Control Systems (ICS), Target, Neutron Scattering Systems (NSS) and Accelerator. These objectives sum up to be 40,5% of the ESS Construction cost €1.843 B (2013). The overall IK goal has been limited (~70%) to retain a portion of the contribution from members as a cash contribution. The IKCs forecasted by the ESS Member countries to each project by the end of Q4 2017 were 26% (€18.8 M) for ICS, 51% (€79 M) for Target, 59% (€302 M) for Accelerator and 65% (€226 M) for NSS. These forecasts sum up to €626 M which is equal to 34% of the €1.843 B (2013) construction cost.

The total current value of signed and agreed IKCs, at the time of writing this report, is 19% of the construction cost. The challenges connected to realising IKCs in the fast-paced and multi-faceted project that ESS is also emphasises the importance of BrightnESS. BrightnESS ensures that key challenges associated with partner and ESS assistance are met in order to deliver high impact scientific and technological knowledge.

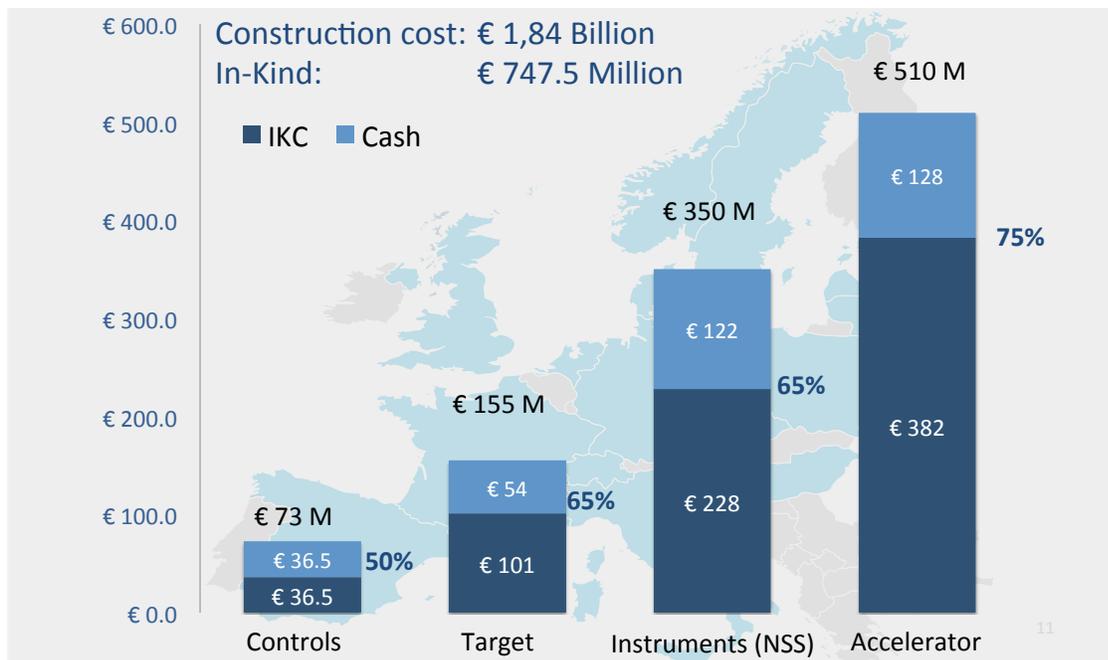


Figure 1: ESS In-Kind Contribution goals per subproject. Vertical axis in Millions.

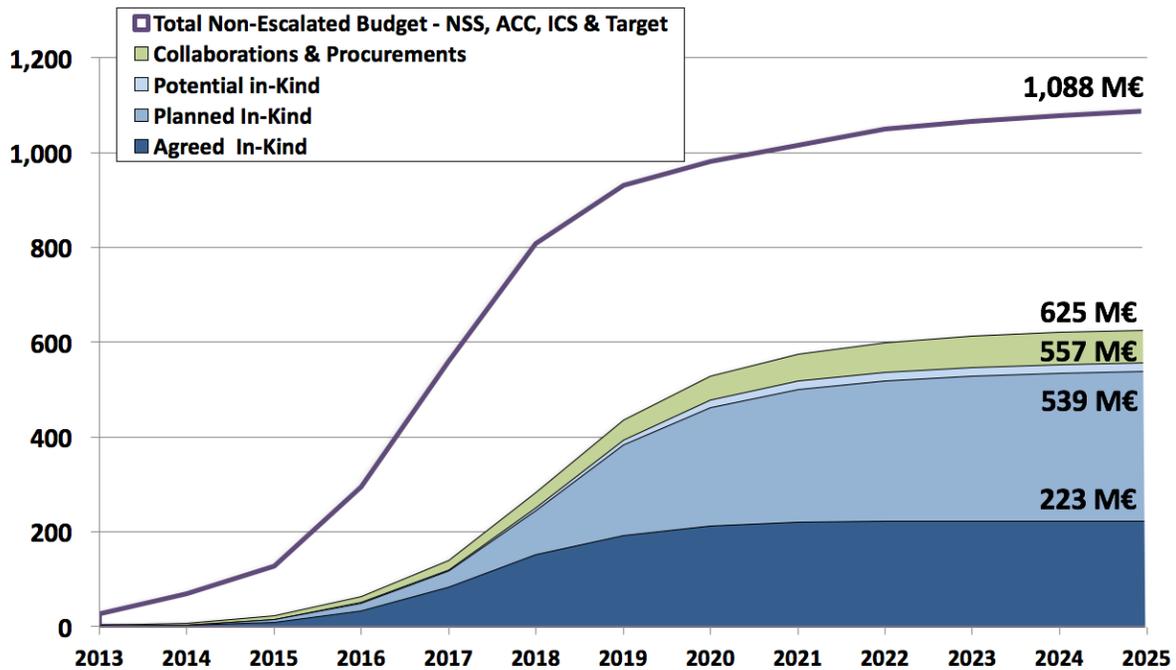


Figure 2: Overview of possible, agreed and planned IKC vs total budget over the construction years.

To put the growth of IKC into perspective, Figure 2 shows the agreed, planned and potential IK budget profile vs. Total Budget & Objective for the ESS construction years at the end of Q4 2017.

Tables 1 to 4 highlight the yearly progress and current status of IKCs from ESS member countries. Nearly all members have remaining IK funding to increase the IK value. Poland has reached its goal. Collaboration agreements between ESS and the Host countries, that follow a similar process as IKCs but are paid for by ESS, are not included in Tables 2 to 4. By the end of Q4 2017 Sweden and Denmark had nine collaborations each approved by Council, worth in total €14.3 M and €4.0 M, respectively. An additional four Danish collaborations worth €6.7 M are planned.

In order to assess the IKC progress during BrightnESS data is presented for each ESS Partner Country. Table 2 presents the number of endorsed TAs by the ESS IKRC (for approval by the ESS Council) or already approved by the ESS Council per ESS Partner Country at the time of Q4 2017. For comparison Table 3 and 4 present the same type of information as Table 2 but at the time of the start of Q4 2016 and end of Q4 2015, respectively. In that way it is possible to follow the evolution of IK over three years.



Country	Intended IK M€	% of total national contribution	Allocated IK M€	Remaining funding M€
Czech Republic 	30,40 M€	82,2 %	25,97 M€	4,43 M€
Estonia 	3,23 M€	70 %	2,20 M€	1,00 M€
France 	132,70 M€	90 %	125,15 M€	7,55 M€
Germany 	123,27 M€	66 %	55,06 M€	68,21 M€
Hungary 	12,30 M€	70 %	4,19 M€	8,11 M€
Norway 	18,43 M€	40 %	16,92 M€	1,51 M€
Italy 	89,39 M€	81 %	77,59 M€	11,8 M€
Poland 	25,21 M€	76 %	26,41 M€	0 M€
Spain 	50,30 M€	100 %	47,14 M€	3,16 M€
Switzerland 	41,73 M€	65 %	35,22 M€	6,51 M€
United Kingdom 	129,00 M€	70 %	99,35 M€	29,65 M€

Table 1: IK status overview for the ESS Member Countries showing the intended IK target value as well as the so far allocated IK, in the pipeline of being endorsed by IKRC (for approval by ESS Council) or already approved by ESS Council.

End of Q4 2017	No. TAs (cumulative) endorsed by IKRC, not yet approved by Council	Value (cumulative M€) endorsed by IKRC, not yet approved by Council	No. TAs (cumulative) approved by Council	IK value (cumulative M€) approved by Council
Czech Republic	0	0	5	18,5
Estonia	2	0,2	8	2
France	7	0,9	14	96
Germany	0	0	0	0
Hungary	0	0	12	3,4
Norway	1	0,2	13	6,6
Italy	8	1,9	6	61,3
Poland	0	0	9	26,4
Spain	13	33,7	0	0
Switzerland	6	12	5	8,6
United Kingdom	9	51,9	0	0
TOTAL	46	100,8	72	222,1

Table 2: Summary overview of endorsed TAs by the ESS IKRC (for approval by the ESS Council) or already approved by the ESS Council. Status Q4 2017.



End of Q4 2016	No. TAs (cumulative) endorsed by IKRC, not yet approved by Council	Value (cumulative M€) endorsed by IKRC, not yet approved by Council	No. TAs (cumulative) approved by Council	IK value (cumulative M€) approved by Council
Czech Republic	0	0	5	18,5
Estonia	0	0	7	1,5
France	10	4,6	10	92
Germany	0	0	0	0
Hungary	2	0,25	9	3,1
Norway	0	0	10	5,2
Italy	12	41,8	2	21,3
Poland	0	0	8	26
Spain	9	20,9	0	0
Switzerland	9	9,59	0	0
United Kingdom	5	25,9	0	0
TOTAL	47	103,04	51	167

Table 3: Summary overview of endorsed TAs by the ESS IKRC (for approval by ESS Council) or already approved by ESS Council. Status start of Q4 2016.

Start of Q4 2015	No. TAs (cumulative) endorsed by IKRC, not yet approved by Council	Value (cumulative M€) endorsed by IKRC, not yet approved by Council	No. TAs (cumulative) approved by Council	IK value (cumulative M€) approved by Council
Czech Republic	0	0	0	0
Estonia	1	0,2	0	0
France	0	0	0	0
Germany	0	0	0	0
Hungary	0	0	0	0
Norway	0	0	0	0
Italy	0	0	0	0
Poland	0	0	0	0
Spain	0	0	0	0
Switzerland	0	0	0	0
United Kingdom	0	0	0	0
TOTAL	1	0,2	0	0

Table 4: Summary overview of endorsed TAs by the ESS IKRC (for approval by the ESS Council) or already approved by the ESS Council. Status end of Q4 2015.



Tables 2 to 4 show the progress of the IK value and the number of TAs approved by Council over time. The past two years also saw an increase in completed IKCs as the number of Final Reports endorsed by IKRC increased from zero and one in 2015 and 2016 respectively, to 12 by the end of Q4 2017, worth in total €1.7 M. By the end of Q4 2017 seven of those, worth in total €0.6 M, had been approved by Council. From the above information combined with the Hub reports (see below) it is clear that the ESS Partner Countries have been supported through BrightnESS WP2 both for claiming and implementing IK technical packages that make up the different TAs.

5.3 Progress Assessment of the IKC Information System

As the number and quality of interactions between ESS and IKC Partners represent a significant management challenge, the development of an In-Kind information system for the coordination of IKC activities has been of high importance. ESS IKC activities entail interactions between more than 50 Work Packages (WP) and Project Leaders in the ESS alone, along with multiple corresponding partner representatives for each WP. Elettra - Sincrotrone Trieste (Italy) and the ESS have collaborated on the development of a centralised platform providing this kind of support to the In-Kind Management Coordination Office.

The information system, XRM+, by the end of the 2nd year of BrightnESS is operational and widely used. Some development (work in progress), as well as the transfer from Elettra to the ESS, remains to be done to further increase its capability. XRM+ is an essential software tool used every day for managing the IKAs. It stores data such as; contract name, description, approval status, value, comments, partner, country, percentage completed, project revisions, milestones amongst many more. It has built in reports based on contracts per country, per project, per Council and IKRC meetings as well as defined reports for the quarterly reports which are used in communication on the status of IK at all stakeholder levels. It allows the management of “Call for In-Kind funding” (funds from country’s ministries to ESS) and “call for in-kind” (transfer from ESS to the partners). The country sheets are also automated.

Before BrightnESS, the management was done using single Excel files for the contracts, for the Call-Offs, and many more for the Country sheets. In comparison XRM+ houses all the functionality in one place and at the same is more user friendly, stable, powerful and most importantly quicker. XRM+ is an essential tool for tracking and reporting the ESS IK status.

The XRM+ also has a contacts database which stores all data for each contact in one place creating a unified record for each contact/partner. In general the aim of XRM+ is to provide a unified contact management system/platform for the extended ESS partners and stakeholders. As planned, further development for 2018 is focusing on connecting XRM+ to other platforms used at the ESS. Transfer of the code to ESS servers has been agreed and activities started.

5.4 Progress Assessment of the IKC Network of Regional Hubs

With the main aim to maximise the overall ‘Earned Value’ of ESS IKC WPs the IKC network of regional hubs serve ESS in providing a more direct and continuous way of collaborating with its Partners around Europe. Five regional hubs were established during the first year of BrightnESS to act as main point of contact for all ESS IKC Partners in the region and enable effective regional quality control. Figure 3 shows the European distribution of the BrightnESS Regional Hubs which are defined as follows:

- ESS HQ: SE, DK, NO, Baltics managed by the ESS in Lund
- North-West: UK managed by STFC, NL managed by TUD
- Central: DE, CH, CZ, PL managed by FZJ
- Iberia: ES managed by ESS Bilbao
- Gallia: FR managed by CEA
- South-East: IT managed by INFN; HU managed by BNC-Wigner

The 1st year of the project focused mainly on establishing the regional hubs and selecting the candidates for the FC positions. FCs fully took on their operational roles by the start of the 2nd year of BrightnESS. The two main objectives for the FCs are to:

1. Align activities across institutes and across borders,
2. Identify potential technical risks that would prevent ESS from maintaining synchronicity between construction activities in Lund and the delivery schedule of the technical IKC WPs.

Major activities by the FCs in the different hubs during the 2nd year of the BrightnESS project are described at the end of this section.

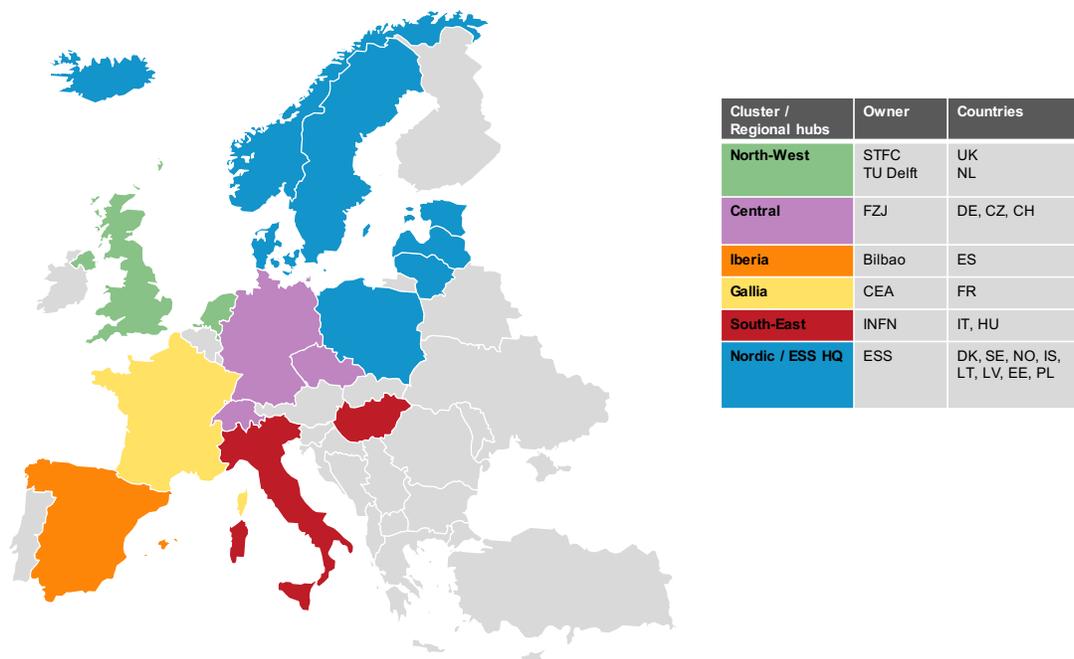


Figure 3: European distribution of the BrightnESS Regional Hubs which supervise the timely and qualitative delivery of IKC in their region.

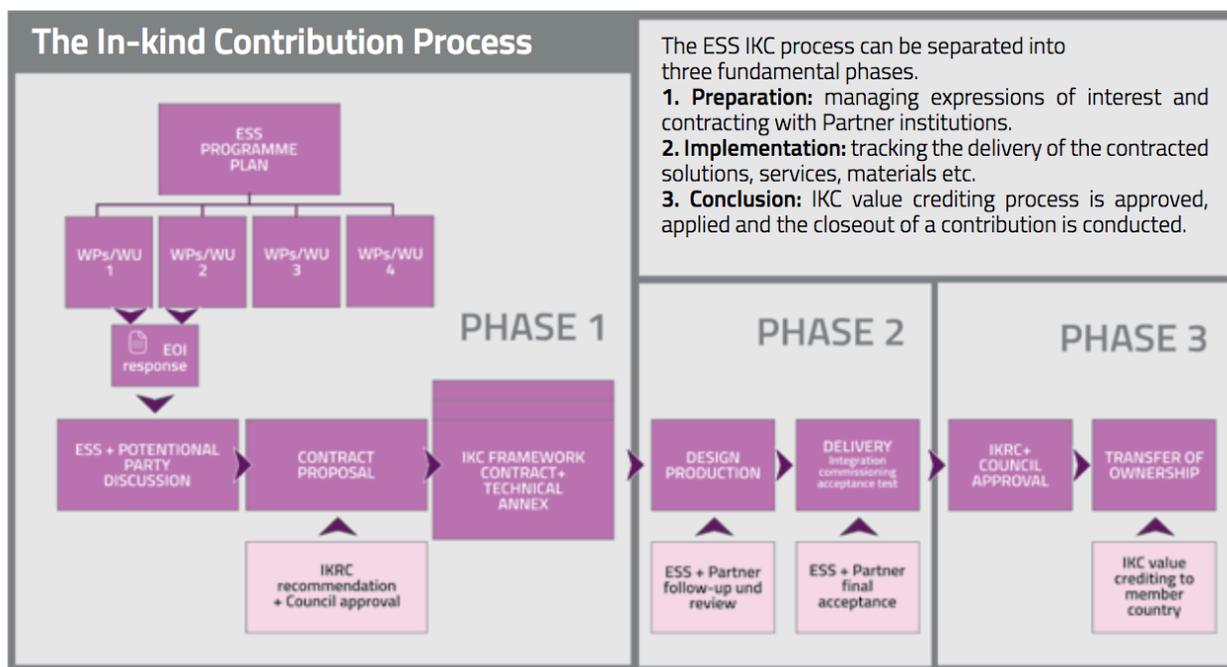


Figure 4: The three phases of the In-Kind Contribution Process: Identification of work/contributions, the implementation of the work and finally the conclusion phase and accreditation.

Out of the three phases (see figure 4) of the ESS IKC process: identification, implementation and conclusion of IKCs, the 2nd year of BrightnESS has primarily involved support for the latter two as most of the IKCs have now been identified. As ‘translators/mediators’ between the IK partner institutes and the ESS, FCs need to keep themselves up-to-date with the procedures, processes and methods for IKC that are applied within the ESS in order to monitor and help maintain technical progress relative to schedule. As for the 1st year of BrightnESS this has meant that significant time has been invested under BrightnESS getting the FCs trained in the procedures, processes and methods for IKC that are applied within ESS. FCs have a generous and broad list of tasks and activities but the largest part of their work is to monitor and help maintain technical progress relative to schedule on IKCs. Thanks to BrightnESS, FCs are additional resources for the IK processes and their tasks amongst others, is assisting in the addressing of risks and risk mitigation related to IK processes. They also facilitate the flow of critical information between partners, strengthening interfaces, reinforcing quality, standards and best practices.

To facilitate the dissemination of critical information two successful IKC Best Practice (BP) Workshops have taken place during the first two years of the project and a third one is planned for June 19-20 2018. Through these workshops BrightnESS has assisted in the coordination of roles on the design, manufacture and delivery of IKC, and has maximised the common knowledge of how to best execute IKC activities and ensure standard approaches and implementation of technical scope. The two successful workshops that have already taken place were dedicated to “*Engineering aspects of large-scale In-Kind projects*” and “*Installation aspects of large-scale In-Kind projects*”. The third workshop will focus on “*Practicalities and rules related to installations on the ESS construction site*”.

5.4.1 Best Practice Workshop in Bilbao

The 1st BP Workshop was held in Bilbao November 2016 and was organised and supported by the partners ESS-Bilbao, Elettra-Sincrotrone Trieste and ESS. Over 80 participants attended the event. The workshop



was dedicated to sharing experience and proposing improvements on engineering requirements and constraints of IKCs to large-scale research infrastructure projects, such as the ESS and included four sessions with 22 speakers:

- Plenary
- Standardization
- Integration
- Project Information Management.

Projects based on IKC have unique aspects associated with the management and sharing of project information, the adoption of standards and the consequent approaches to interfaces and integration. Partner contributions are often the result of work from national teams that have long standing knowledge of specialized design, manufacturing and operation. Partners have their own extensive expertise with in-house engineering protocols and standards which may differ from other collaborating partners and the host project. Whenever protocols, conventions and engineering practices differ between partners, the project and/or the contribution may have integration overheads that will impact both schedule and costs. During the event, experience was shared from other large-scale projects, from partners and the ESS itself and proposed improvements to the engineering practices when working on IKC.

5.4.2 Best Practice Workshop in Catania

As the assembly and installation of the many cutting edge hardware and software technologies constituting the ESS is a delicate and complex procedure the 2nd BrightnESS IKC BP Workshop was chosen to focus on the installation aspects of large-scale In-Kind projects. Hosted by ESS IK Partner INFN-Laboratori Nazionali del Sud the 2nd BP workshop was held in Catania, Italy in June 2017. Specifically the workshop was dedicated to the processes, requirements and preparation for the installation of IKCs to large-scale research infrastructure projects with focus on the ESS. The two-day workshop, which had about 100 participants, started off with a plenary session followed by three topical sessions:

- Design, Integration and Preparation for Installation with focus on safety and Swedish regulations, survey and alignment, logistics and storage, cable coordination and preparations for installation, including document and procedures, planning and sequences.
- Installation which covered its organisation and the required services, the coordination and planning of IKCs including concurrent activities with the installation of conventional facility and cryogenic plants and ESS partner considerations for an In-Kind installation.
- Systems Commissioning which covered the ESS commissioning strategies, the switch and system commissioning of the controls systems, initial beam commissioning and asset and maintenance management.

The plenary session reviewed international projects and their experience with preparation, installation and system commissioning. The talks highlighted best practices adopted and provided a forum for recommendations.

The Design, Integration and Preparation session focussed on safety and Swedish regulations, survey and alignment, logistics and storage, cable coordination and preparations for installation, including document and procedures, planning and sequences. The session on Installation covered its organisation and the required services, the coordination and planning of In-Kind contributions including concurrent activities



with the installation of conventional facility and cryogenic plants and ESS partner considerations for an In-Kind installation. Systems Commissioning covered ESS commissioning strategies, the switch on and system commissioning of the controls systems, initial beam commissioning and asset and maintenance management.

5.4.3 Best Practice Workshop in Lund Planned for 2018

The ESS project has started major installation of IK contributions which sees a merging of a multitude of partner components, their mutual interfacing and their integration with conventional facilities and control layers. The third BrightnESS IKC BP workshop will focus on practicalities and rules related to installations on the ESS construction site. This workshop is a restricted event as it strives to gather those amongst ESS In-Kind Partners and staff that will either lead or take part in installation activities. The expected outcome of the workshop is to give each IK Partner a good understanding of ESS plans, rules and available services during installation and to build preparedness and collaboration between ESS installation coordinators/Installation package leaders and In-Kind teams. It is also aimed to identify areas where the ESS needs to be better prepared prior to the installation. Around 80 participants are expected and the event will take place in Lund to allow for visits to the ESS construction site.

5.4.4 Additional WP2 Training and Communication Opportunities

Initiated during the 1st year of the project, the biweekly video meetings with IK FCs have shown to be an efficient and effective communication tool for discussions and the sharing of lessons learnt and have continued in the 2nd year. These meetings are particularly important as the responsibilities of the different IK FCs are defined by a geographical basis.

The training of FC's has continued in the second year and a workshop dedicated to Quality (Norms, Procedures and Processes) took place in Lund, March 2017. The scope of the meeting was to inform the FCs on ESS concepts, procedures and processes for Quality Management and its impact on installation (and eventually operation). The training event included presentations by ESS experts on quality, risk management, logistics and installation. The 22 participants also had the opportunity to join a guided tour of the construction site. As a follow-up to the event the information gained was to be transferred to IK partners in the respective Hubs and/or verify that Partners have the necessary knowledge to allow a smooth and effective installation of IKCs.

In addition WP2 organised a CE Marking and Conformity Training Session in Lund on November 30 2017. The session had 24 participants and included an overview of the major directives and how to work with them. It also included IK and ESS specific talks and a presentation of the ESS strategy on CE Markings by ESS Head of Quality Division. An external Swedish expert on CE norms gave an overview and participated in discussions on interpretation and impact. The ESRF was also invited to share their experience in applying regulations for CE markings on their equipment.

5.4.5 Activities in the Hubs

Major activities in the different hubs during the 2nd year of the BrightnESS project:

5.4.5.1 North-West Hub (United Kingdom, Netherlands)



The North-West hub is composed of the United Kingdom and the Netherlands. Each country has one or more representatives as FCs.

The FC and assistants in the UK have continued to run a project office to carry out coordination activities and support the UK IK project managers in best practice project management. Emphasis has been on monitoring progress on UK IKCs. The FC team has contributed to risk mitigation by communicating identified risks and other issues in either the ESS or the UK. One example of the team’s contributions to solving risks and issues includes facilitating approval of the agreement between the Science and Technology Facilities Council (STFC) and the University of Huddersfield to deliver the Radio Frequency Distribution System (RFDS) WP, which was at risk of causing delay if not in place.

The FC team has supported UK IK Partners in the preparation of TAs and in navigating ESS processes by disseminating information gathered from training (eg. quality training), and other Hubs (eg. how to get access to work on the ESS construction site in Sweden). They have also interacted with other Hubs to facilitate resolution of issues and sharing of lessons learnt and best practice, for example with a visit to the French Alternative Energies and Atomic Energy Commission (CEA) to aid the FCs understanding of the interface between STFC and CEA for the high beta cavities and the risks associated with this as well as discussing and learning from CEA’s Project Management Office and risk management processes.

Although the Netherlands is at present not a Member of the ESS, its intent is to become one. Since December 2016 the ESS has been included in the strategic National Roadmap of the Dutch government, thus bringing the Netherlands one step closer to full ESS membership. The Dutch FC has assisted in communication between the ESS and Dutch institutes for the promotion of future ESS membership. Actions also include liaison with industry for ESS involvement and innovation. The FC is gathering information and participating at all training events for a rapid inclusion of Dutch participation in the ESS project once a decision to become member is taken. To this end the FC supports the identification of suitable IKCs.

5.4.5.2 Central Hub (Germany, Czech Republic, Switzerland)



Composed of three countries (Germany, Switzerland and Czech Republic) and six IK Partners, the Central Hub has been challenging to coordinate. IK Partners within this Hub contribute with a total amount of 140 M€ divided into 58 TAs. Many of these are dedicated to ESS instrumentation, and 10 out of the 15 instruments receive IKCs from Partners within the Central Hub. As a result of that nine of these

instruments are realised in consortia, and also involve other BrightnESS Hubs, the FC played an important role in facilitating communication within the consortia partners, and between IK Partners and ESS. In addition to the Central Hub IKCs with the NSS sub-project there are also IK Partners collaborating with the ESS Target sub-project.

By the end of the 2nd year of BrightnESS a documentation managing system as well as a quality management plan is in place in the Central Hub. The FC is furthermore working on recently arisen challenges related to CE markings and is involved in the discussions and negotiations between the ESS and Germany aimed at reaching an agreement on the IKA.

The FC and assistants (Controller and Quality Manager) are a part of the FZJ's Programme Office managed by Dr. Andreas Wischnewski, which is responsible for coordinating the German contributions to the ESS. The team is involved in regular internal meetings, among both German partners as well as instrument consortia partners, involving France and Italy.

5.4.5.3 Iberia Hub (Spain)



The Spanish government, in the final Council of Ministers meeting of 2017, authorised modifications in its agreement with the Basque regional government to move Spain forward in its process to become full member of ESS. Spain is expected to complete the formal membership process before the end of April 2018. At the same meeting, a loan of 18 MEUR from the Spanish General State Administration to ESS-Bilbao, an important IK partner for the Target and Accelerator sub-projects, was approved for 2018. Together the agreement and loan are critical to allow ESS Bilbao's important contributions to the Accelerator, Target and Instruments to advance in a timely manner.

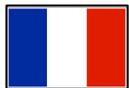
In addition to the above-mentioned progress to which the Iberia Hub FCs dedicated effort during the past year, the Iberia IK FCs served as a link between the ESS and ESS Bilbao WP leaders and also actively took part in the training of ESS procedures such as QA/QC and CE marking. The main activities revolved around negotiations on potential IKCs and preparation of TAs such as for example the medium-energy beam transport (MEBT), RF for warm linac, Proton Beam Instrumentation plug, Miracles Phase 1 and an updated design of the monolith vessel. The FCs have continued to monitor the technical progress made in the ongoing IKCs to the ESS. They have established and developed a ESS-Bilbao Risk Management procedure that has made it possible to identify and mitigate important risks in the following WPs:

- MEBT Buncher coupler manufacturing problems
- MEBT Transport and installation issues
- Design of RF WGs through the stubs
- Target Monolith Vessel atmosphere
- Target Monolith Vessel Installation
- Target cooling pressure drop
- Target RCCM class changes



The Iberia Hub FCs have furthermore dedicated effort to future Installations at the ESS. Specifically they have been involved in cross-checking technical specifications from both the ESS and ESS-Bilbao and have supported the preparation of delivery schedules. Here the FCs have coordinated with ESS logistics personnel for the preparation of transportation of IK deliverables to the ESS construction site. The FCs also supported Spanish Industry in becoming suppliers to the ESS and coordinated activities with the Spanish ILO to the ESS. Support has been provided in the preparations of a number of tenders including the Bunker system, Monolith Vessel and Neutron Beam Extraction Systems. Inter-hub collaborations have included the Gallia Hub (bunker project), the South-east hub (DTL installation) and the North-West hub (RF installation).

5.4.5.4 Gallia Hub (France)



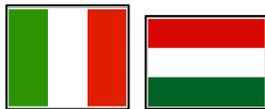
For the Gallia Hub, efforts have continued to focus on improving and strengthening liaison with industry with the aim to increase the number of French suppliers to the ESS project. The FCs have thus supported French industry in the submission of calls for tender launched either by the ESS or ESS IK Partners. One specific example is the effort dedicated to informing, encouraging and advising French companies on the Pre-Qualification phase for the ESS Bunker.

As a result of the identified lack of knowledge related to IKCs within French industry, the Gallia Hub FCs organised a workshop to assist engineers from French companies in the achievement of best IK practices. The workshop took place at the ESS construction site on September 25-26 2017. In total, 23 participants took part and 12 French companies were represented. Covered topics included quality assurance and control, vacuum technology, alignment technology, system interfaces and integration tools among others.

Two of the largest research organisations in France, CNRS and CEA, are highly involved in IKCs towards the Accelerator, the NSS and the Integrated Control Systems sub-projects. While the IKAs between French IK Partners and the Accelerator are in place, those related to the Instruments are not yet finalised. For the Gallia Hub FCs, time has therefore also been dedicated to promoting best practices amongst French IK Partners to ESS.

Other activities of importance include liaison with the Hubs and the sharing of information and documents, for example related to the handling of VAT and the requirements connected to working on the ESS construction site in Sweden. The Gallia Hub also hosted a Best Practice meeting with the FCs from UK and Germany where topics such as how to best handle a Project Management Office were discussed.

5.4.5.5 South East Hub (Italy, Hungary)



Originally the South-East hub only had a single FC. As it became clear that the Hungarian institutes would be more efficiently served by having an FC in Hungary the model was revised. Today the South-East Hub is thus served by two FCs, one based at INFN Torino, Italy, and one based at BNC Wigner, Hungary.

For the Italian FC the main objectives of the past year have been related to the following four areas:

- Maximise the possibility for ESS and IT Hub to deliver value during the implementation phase of the project.
- Minimise and mitigate risks associated with IT IKCs.
- Verify a match between ESS schedule and IT partner delivery schedules.
- Minimise lack of communication between IK Partner institutes and ESS organisation.

Significant work by the FC was contributed to the monitoring of technical progress relative to the schedule established for the on-going Italian IKCs for the ESS. The FC has actively supported the compilation of IK monthly reports that serve to verify schedules and help in the identification of possible emerging delays. The IT FC also supported the intra-partner network devoted to the management of the INFN IKC. Support has been given to the completion of a number of call for tenders, for example related to the procurement of Niobium sheets. Support has furthermore been given to potential industrial suppliers to update them on the progress of technical work at the ESS and to inform them of the scope of Italian IKCs.

Another important example of where the Italian FC has been of high value is the support connected to the completion of a major IKC for the ESS, namely the design, construction and commissioning of the ion source and the low-energy beam transport (LEBT) line from INFN-Catania. Together these systems will produce and deliver the ESS proton beam at the front end of the LINAC. The components arrived in Lund in December 2017 and constituted the first machine installations for the ESS. Specifically the Italian FC supported the IKC WP Leader in drafting the engineering, safety and quality documentation in support of the Ion Source and LEBT.

Regular communication with other FCs has been of high importance for the sharing of knowledge and information, for example the requirement of CE Markings and working on the ESS construction site in Sweden. The Italian IK FC also organised the 1st South-East Hub meeting in March 2017 dedicated to the activities linked to IKCs from Italy and Hungary.

In the past year the Hungarian FC has focused on supporting the implementation of existing TAs as well as in the planning of future TAs. Existing TAs of focus for Hungarian partners include the Wigner–ATOMKI (Institute for Nuclear Research) TA on the RF Local Protection System, the Wigner–BRC (Biological Research Centre of Szeged) TA on NMX Control System Architecture and the Wigner–CER (Centre for Energy Research) TA on NMX Shielding Design. New TAs developed with support of the Hungarian FC include a detector simulation effort by CER, secondment of an automation engineer for ESS Motion Control & Automation Group and secondment of an instrument scientist to support the NMX instrument

construction. The FC furthermore gave support in the delivery of three Hungarian IKC Final Reports concerning instruments NMX, Bifrost and Miracles.

In addition the Hungarian FC has given support to the preparation of procurement documentation such as the NMX Chopper System for Wigner and the RF Local Protection System for Atomki. The FC has also been an active participant in several BrightnESS meetings such as the South-East Hub meeting in Trieste and the BrightnESS IKC BP Workshop in Catania.

5.4.5.6 Nordic-Baltic Hub (Denmark, Sweden, Norway, Estonia, Poland)



The Nordic-Baltic Hub is composed of Sweden, Denmark, Norway, and Estonia. In addition to IKC WPs the contributions from these countries also come in the form of Collaborations.

As this hub is managed by the ESS HQ the Nordic-Baltic FC assumed a three-fold role during the second year of BrightnESS. Firstly, the FC was engaged in external stakeholder management. These tasks included participation in the BrightnESS general meetings, support in organising and executing ESS related workshops as well as ESS Governance meetings such as the IKRC. One example of support was the organisation of the CE Markings workshop. Emphasis was also put on communication with other FCs and hubs around Europe. Topics of collaboration include CE Markings, Warranty, Country Sheets, Legal Documentation, as well as other day-to-day tasks. The interconnectivity of ESS and BrightnESS roles allows the Nordic-Baltic Hub FC a unique approach in executing the role – particularly having in mind the overlap of FC and In-Kind Officer functions.

The second task revolved around Internal Stakeholder support and collaboration. Most of the internal collaborative efforts in the hub are tied to two ESS sub-projects – Neutron Scattering Systems and Integrated Control Systems. As a result, the Nordic-Baltic Hub FC had spent most of the time supporting these two projects and their new, as well as ongoing, collaborations with partner institutes in hub countries. An increase in planned and signed In-Kind Scope with Hub Partner Institutes is a good example of the impact BrightnESS WP2 has made in the past year on ESS In-Kind efforts.

The third task concerns the design, analysis, and implementation of the WP2 Task 2.2 – the XRM+ Software. In collaboration with the ESS In-Kind Contribution Management Team, the FC engaged in the planning and implementation of the software solution for In-Kind Management at ESS, developed by BrightnESS partner Elettra Sincrotrone - Trieste. After two years of effort from both ESS and Elettra, the software is used by many different external and internal stakeholders every day, offering a wealth of features, including In-Kind accounting, Partner Countries information, Call-Off information, as well as integration with CHESS (ESS Project Lifecycle Management Software of choice).

5.4.5.7 Iceland, Lithuania and Latvia



Out of the Nordic and Baltic countries Iceland, Lithuania and Latvia are neither ESS Member Countries nor Observer Countries. Of these three countries Latvia continues to show interest in becoming a member and has been involved in activities related to WP6 of BrightnESS with support from the Nordic FC.

5.5 Status of Deliverables and Milestones

The tables below present the status of the deliverables and milestones in WP2. All deliverables and milestones for the 1st and 2nd year of the project were submitted on time and have been approved by the EC project officer. All approved deliverables are available on the BrightnESS website (<https://brightness.esss.se/about/deliverables>).

The remaining pending deliverables and milestones will be delivered during the 3rd and last year of the project, including the present report.

Deliverables

Del. No	Title	Due Date (M)	Est. date	Del. date	Receipt Date	Approval date
D2.1	Risk assessment and mitigation plan	3	30.11.2015		01.12.2015	10.12.2015
D2.2	Launch of IKC Best practice online platform	6	29.02.2016		04.03.2016	11.03.2016
D2.3	Deployment of Management Information System	12	31.08.2016		04.10.2016	13.10.2016
D2.4	1 st Annual IKC Progress Assessment	13	28.02.2017		24.02.2017	18.09.2017
D2.5	2 nd Annual IKC Progress Assessment	24	31.01.2018			
D2.6	Revision of IKC Best Practice Online Platform	30	28.02.2018			
D2.7	IKC Work Package Assignment Plan	36	31.08.2018			

Milestones (MS)

MS	Title	Due Date	Delivery Date
1	Establishment of Regional Hubs	01.01.2016	15.12.2015
2	Definition of workflows	01.03.2016	29.02.2016
3	1 st Organisation of annual IKC conferences	01.03.2017	16.11.2016
4	2 nd Organisation of annual IKC conferences	01.02.2018	14.06.2017
5	3 rd Organisation of annual IKC conferences	31.08.2018	



6 Conclusions on 2nd Year ESS IKC with BrightnESS Involvement

During the 2nd year of BrightnESS FCs have continued to provide support to the ESS IK processes and have played an important role in the coordination of IKCs. The activities of the FCs for the past year have contributed to the signing of IK agreements and TAs and towards the clarification of procedures for the final stages of IK implementation.

The FCs have participated at several training sessions organized at ESS and have acquired deeper understanding of ESS IK processes and procedures. The knowledge gained has been shared with IK Partners in the Hubs. The FCs provide support on a wide range of topics. By strengthening inter-regional partner communication risks were mitigated and new opportunities for IK work and support opened. With the FCs fully operational, observations related to potential delays, misconfigurations and cost increases have been reported and addressed.

The number of TAs approved by Council (72, worth in total €222 M) as well as the number of TAs endorsed by IKRC (118, worth in total €323 M) by the end of 2017 compared to the numbers at the end of 2016 are a clear indication that the ESS IKC model works and that technical progress toward completion of ESS construction is moving along.

The 2nd year of BrightnESS saw the first final reviews of delivered and completed IKCs. These reviews, during which the IKRC endorse the delivered and completed IKC for final acceptance by the ERIC Council, will increase over the coming years. Subject to this approval, the Member Country is accredited the In-Kind contribution value as part of its total contribution to ESS.

All major objectives of BrightnESS WP2 have been attained during this second year and efforts will continue during the 3rd year of the project and beyond.