

Plan results (30 min)

K. Foraz (EN-AE)

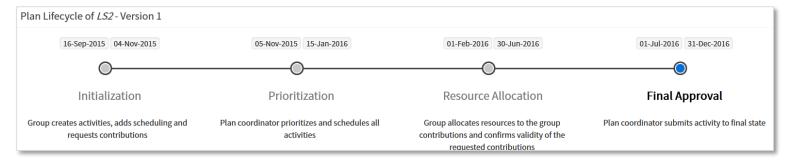


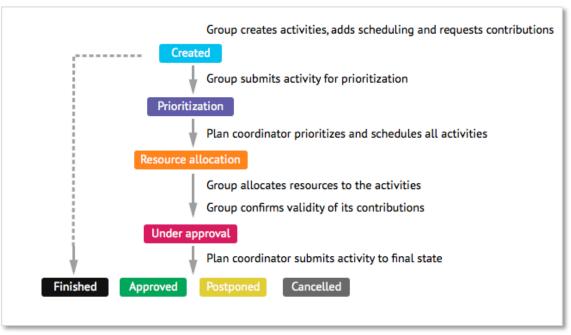
Contents

- Deadlines
- Approval phase
- Provisional results
- Next phase & Plan tool development
- Conclusions



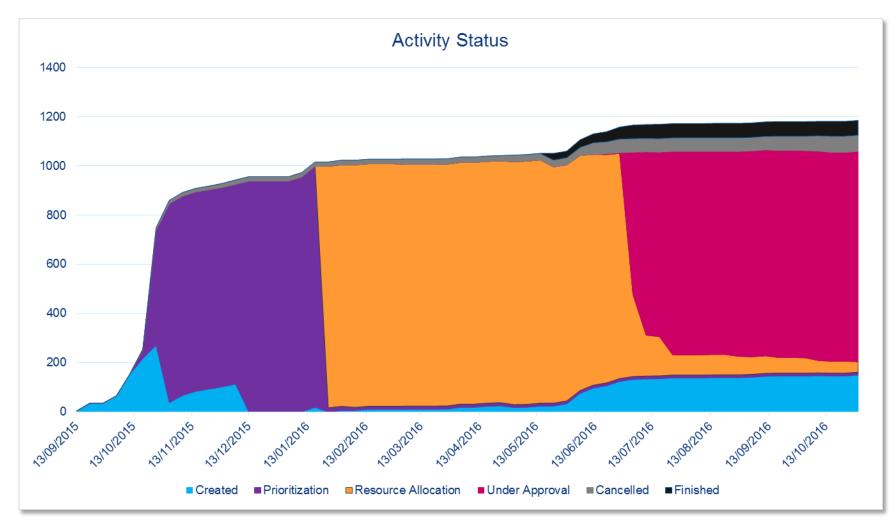
Deadlines







Deadlines

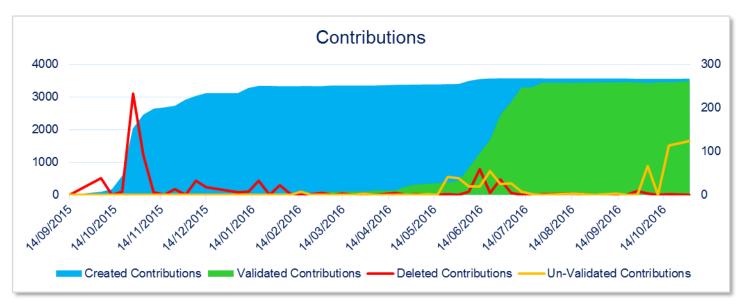




7th & 8th November 2016

Resource allocation phase

Prior to the start of an LS, we need to define which works will be achieved and which are the potential options, based on priorities given to activities and the resources we have.





Reports

 Reports are available through PLAN tool or Pentaho and on request

| | | & Reports | | | | | | | |
|-----|--|---|---------------------------------|---|------------------------------|------------------------|---|----------------------------|-------------------|
| | FTE/Weeks for TE-MSC | | | | | | | | Search |
| | | | 15 | Description | E | | | | Actions |
| 600 | | | group | Lists the ac | ivities, grouped by respons | ible group. | | | C Open rep |
| 400 | | | e group and period | Number of | activities per responsible g | oup and period. | | | C Open rep |
| 000 | | | cies (contribution unit) | Number of | contributions per responsit | le group and contribut | tion unit. | | C Open rep |
| 200 | ينهي أبالت ألوالت أوالت | cies (responsible group) | Number of | contributions per responsit | le group and contribut | tion unit. | | C Open rep | |
| 0 | | sible group (contribut | sible group (contribution unit) | unit) Number of contributions per responsible group and contribution unit with period informa | | ormation. | C Open rep | | |
| | Sum of 2015Sum of 2016Sum of 2017Sum of 2018Sum of | f 2019Sum of 2020 | sible group (responsible group) | Number of | contributions per responsit | le group and contribut | tion unit with period info | information. | |
| | Personnel - 1 coordinateur technique Personnel - 1 Engineer | Activity list <u>Status</u> : Reso C Refresh Table Reset Filte | | | | ≣ Bulk (896) | ± Export → Show/Hic | de columns → Searc | :h by ID, title |
| 10 | 007 CHARM target upgrade | 15 | Under App | roval | Priority | Facilities | Group contribution | Validated contributions | Status |
| | EN-STI | | | ivity t | ype - Select a priority | Facility 👻 | Select the contrib | Range 👻 | Select a status 🕶 |
| | WBS: SEC-BEAM-AREAS-PS | | | ade | 3. HL-LHC and LIU | LHC Machine, SPS | BE-ABP, EN-EL, | 10 of 10 | Under Approval |
| | Priority: 4a. Approved project if budgeted Facilities: East Hall Target | | | | projects | | EN-HE-HH, EN-MME, HSE-RP, TE-VSC-BVO | | |
| | Goal | Impact if not done/postpon | ed_ | ade | 3. HL-LHC and LIU | SPS | BE-ABP-HSC, | 13 of 13 | Under Approval |
| | Simplification for easier installation of test samples in Charm | Higher personnel doses | | | projects | | EN-ACE-COS, EN-ACE-INT, | | |
| | Supports - Preparation | Design completed. | | 2016 | | | EN-ACE-SU, EN-CV, EN-HE-HH, EN-MME, HSE-RP, SMB-SE-CEB, | | |
| | EN-MME design and manufacturing Supports - Installation | No known request for fabri LS2 | cation. | | | | SMB-SE-FAS, TE-VSC-BVO | | |
| | EN-EL cable installation | | on about EN-EL contribution | ada | 3. HL-LHC and LIU | PS Booster | BE-ABP-HSC. | | Under Approval |
| _ | HSE-RP intervention support | | | | projects | - 5 booster | EN-ACE-SU, EN-EL-FC, EN-HE-HH, EN-MME, | 7 of 7 | onaer Approvar |
| | | | | | | | TE-VSC-BVO | | |



L S 2

Days

Approval phase

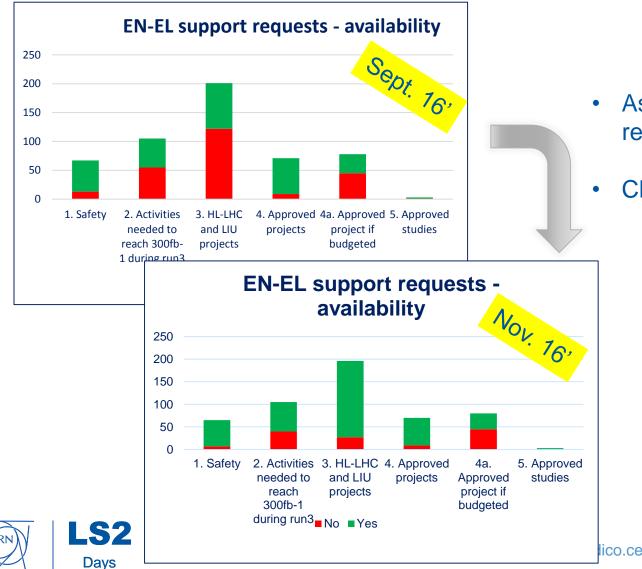
• Meetings were held with key groups in order to understand their issues and to encourage them to clarify their requests

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- Lot's of meetings were held between groups
 - Missing technical information (but still)
 - Wrong group requested to contribute
 - Missing contribution groups

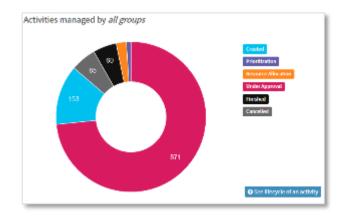
Days

Approval phase – EL example



- Assuming same level of resources as during LS1
- Clarification with users

Provisional results - Summary

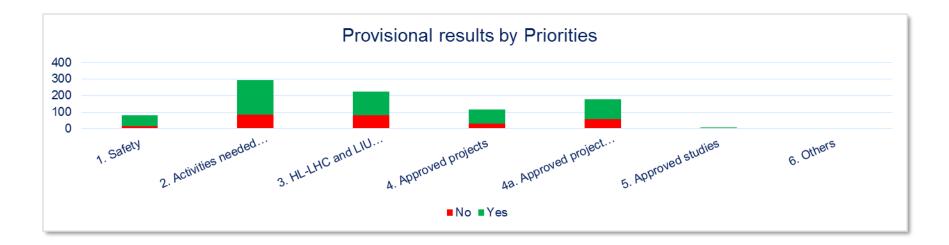


897 PLAN requests being scrutinized (under approval & Resource allocation)670 for which all resources are available

- 227 for which resources are unavailable

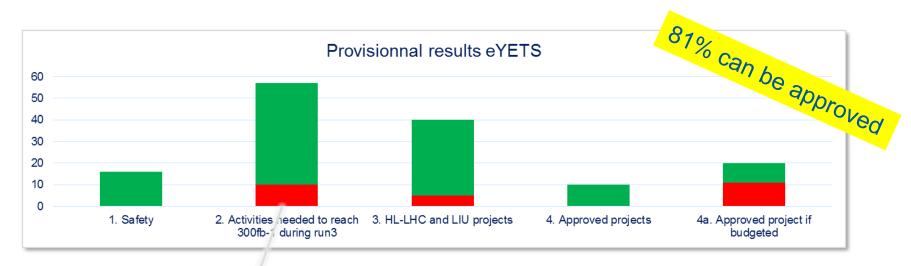
12 PLAN requests under prioritization ◀ Never get answers on data quality from responsible!

153 PLAN requests created – will be treated in version 2





Provisional results for eYETs



| Priority 2 | | |
|------------|---|----------------------|
| • 10294 | LHC- MKB Vacuum Pumping Scheme Consolidation BTD62.DR | EL Not needed |
| • 10596 | Replacment of 7 BCTs in LINAC2V | ABT not needed |
| • 10854 | Replace one injection kicker magnet (MKI) | ABT not needed |
| • 10393 | Replacement of obsolete SEMs in the PS | Missing Info |
| • 10466 | Replace the existing 35 kW cooling system for cryogenics installation in PM18 | Missing Info |
| • 10489 | Consolidate the ventilation system in the SR buildings | Missing Info |
| • 10332 | Consolidate PSB Septa Electronics & Controls | WIC installed in LS2 |
| • 10389 | Linac3 source micro-wave generator | No EL resources |
| • 10590 | Replacement of 10% (100) of VPIA pumps [EYETS2016] | VSC resources |
| • 10847 | General Maintenance kicker systems in Accelerator Complex (2016-YETS-2017 |) HSE resources |



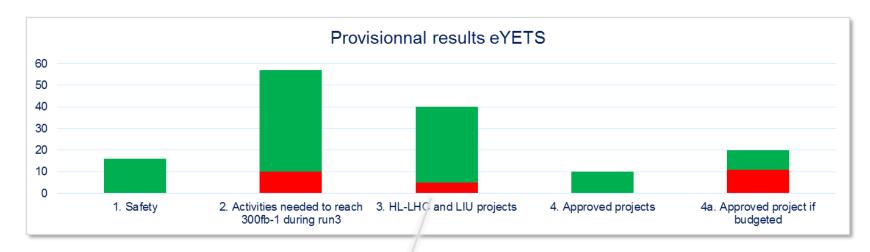
LS2

Days



11

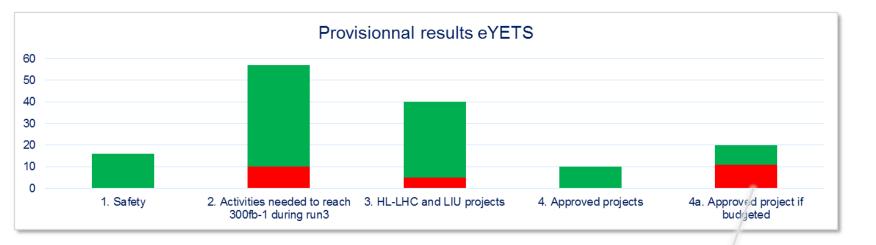
Provisional results for eYETs



| Pr | iority 3 - LIU | | |
|----|---|-----------------------|------------|
| • | 10068 Installation of new Wideband Pick-up in PSB | ABP not needed | |
| ŀ | 10070 Installation of new housing for BTV30 in the BI line of the PSB | ABP not needed | |
| Pr | iority 3 - HL | | |
| • | 10843 HL-LHC Crab-cavity cryomodule in SPS | Wrong group | |
| • | 10906 Wire collimators TCTW for EYETS | EL Missing Info & MME | |
| • | 10082 18kV LHC18 Extension et consolidation de la sous station SE18 | HSE resources | wrong Prio |



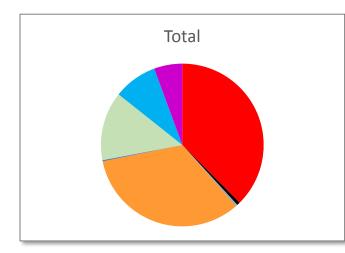
Provisional results for eYETs



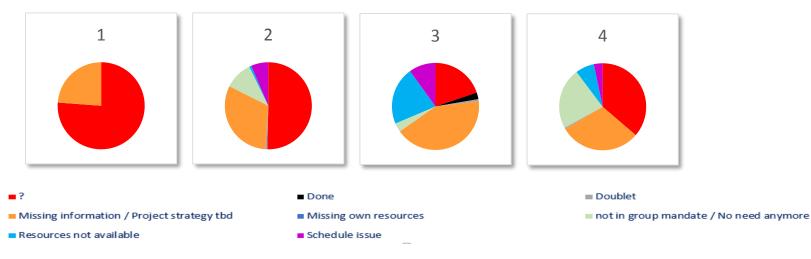
| riority | 4 | |
|---------|---|---|
| | 4 | |
| 10381 | Consolidation of the Fibre Infrastructure in Prevessin | wrong group |
| 10382 | Consolidation of the Fibre Infrastructure in Meyrin | wrong group |
| 10386 | Fibrotheque Database | wrong group |
| 10278 | ALICE O2 infrastructure | CV missing info |
| 10280 | ALICE fibersduring LS2 | EL – project strategy tbd |
| 10391 | Provide Electronics & Controls for restart of AD Horn Test | EL missing info |
| 10481 | Consolidate the NA underground ventilation | EL missing info |
| 10646 | BSRTR for Beam 2. | EL & MME missing info |
| 10649 | LHC orbit system DOROS | Missing info |
| 10174 | CMS GCS new Gas system (GEM) | ICS resources |
| 10484 | Consolidate the NA chilled water network | HSE resources |
| | 7th & 8th November 2016 | http://indico.cern.ch/event/564604/ 1 |
| | 10381 10382 10386 10278 10280 10391 10481 10646 10649 10174 10484 | 10381 Consolidation of the Fibre Infrastructure in Prevessin 10382 Consolidation of the Fibre Infrastructure in Meyrin 10386 Fibrotheque Database 10278 ALICE O2 infrastructure 10280 ALICE fibersduring LS2 10391 Provide Electronics & Controls for restart of AD Horn Test 10481 Consolidate the NA underground ventilation 10646 BSRTR for Beam 2. 10649 LHC orbit system DOROS 10174 CMS GCS new Gas system (GEM) 10484 Consolidate the NA chilled water network |

Days

Unavailable support

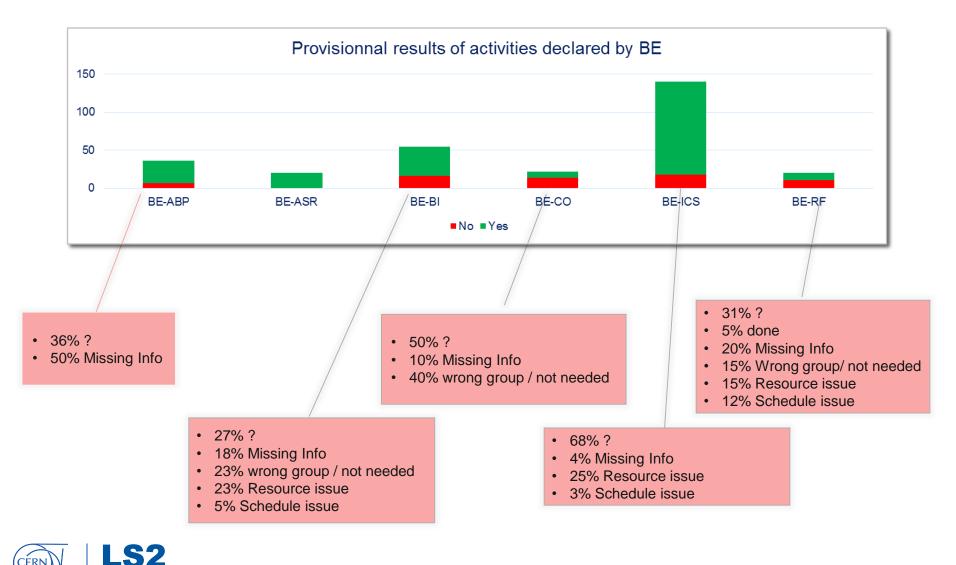


- 38% No information
- 33% Missing information
- 14% Not in group mandate / not needed anymore
- 9% Missing resources
- 6% schedule issue



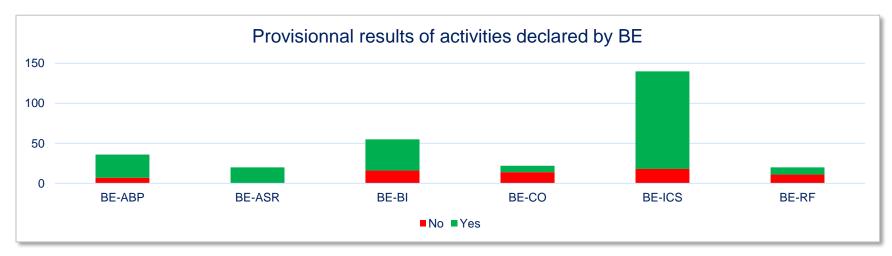


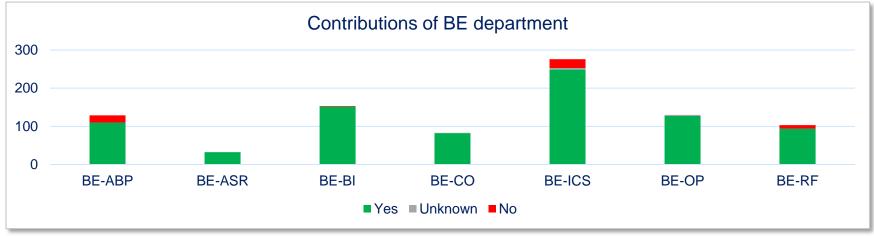
Summary BE



Days

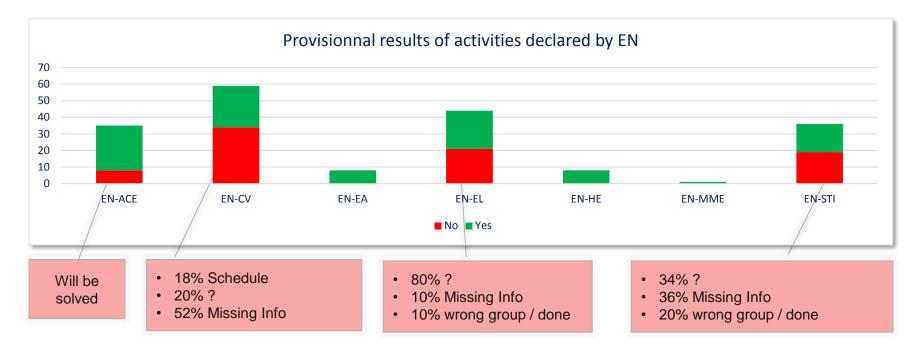
Summary BE





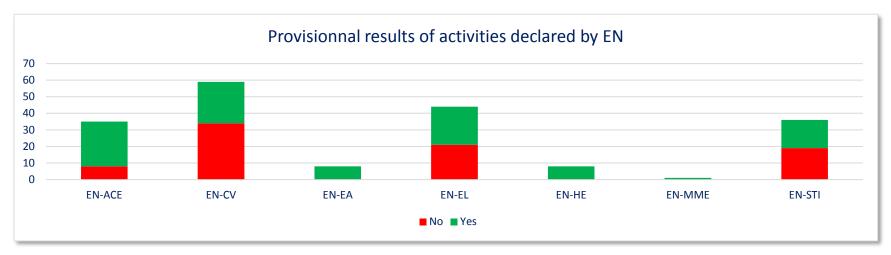


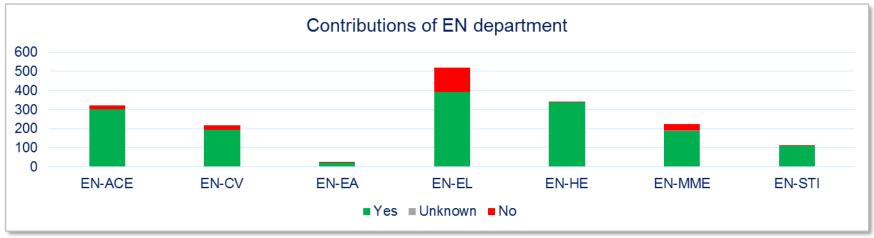
Summary EN





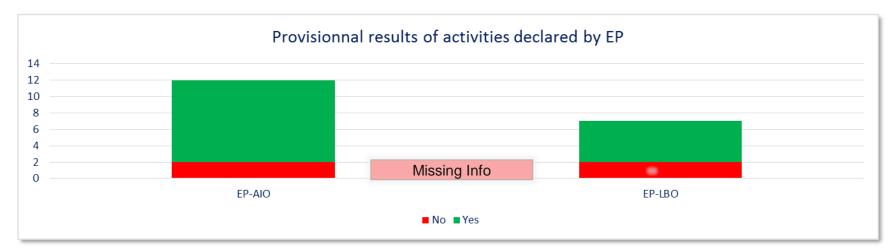
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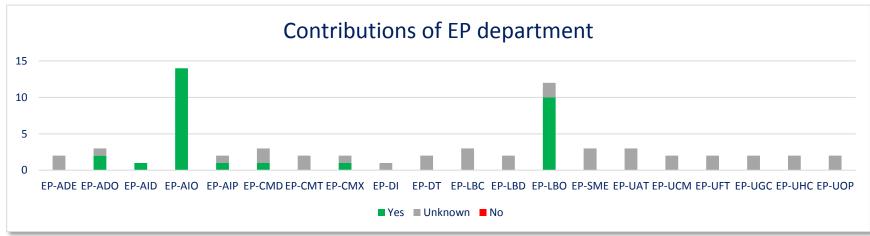






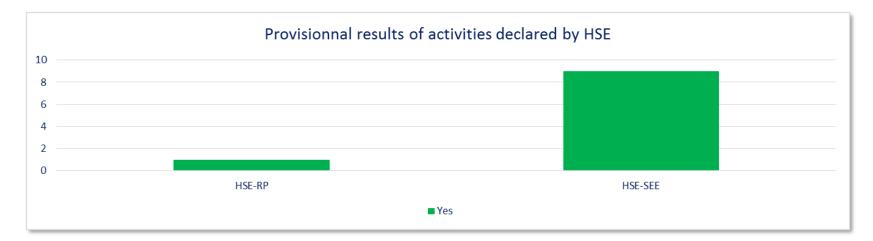
Summary EP







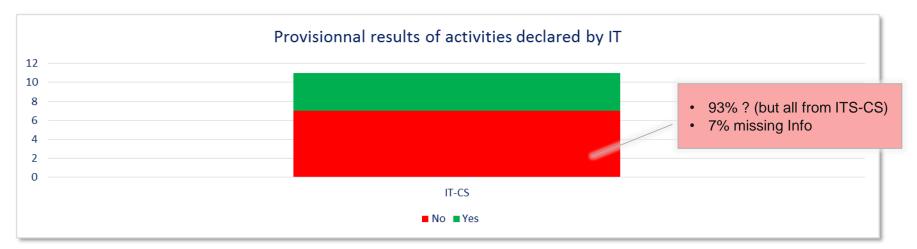
Summary HSE







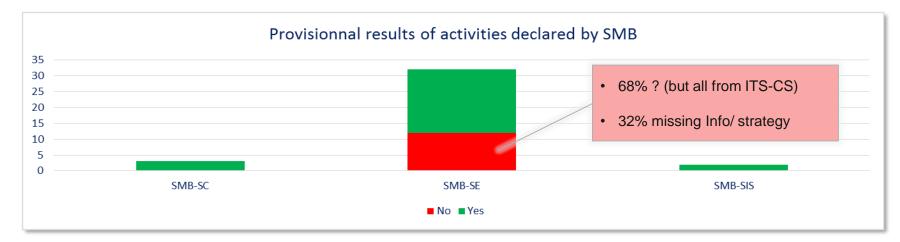
Summary IT

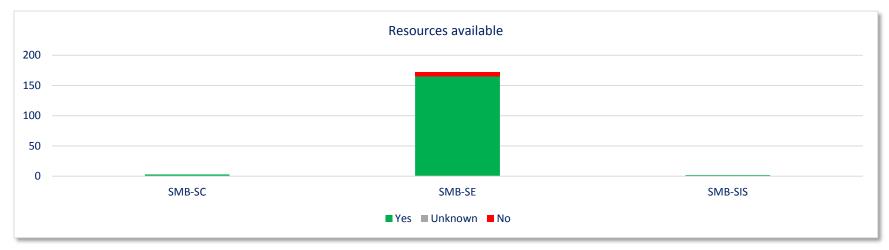






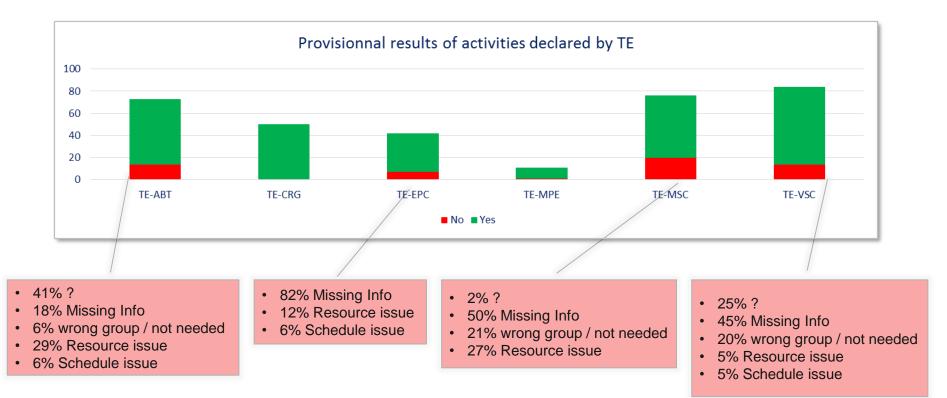
Summary SMB





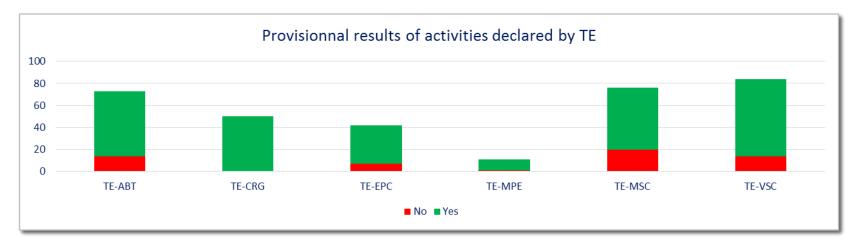


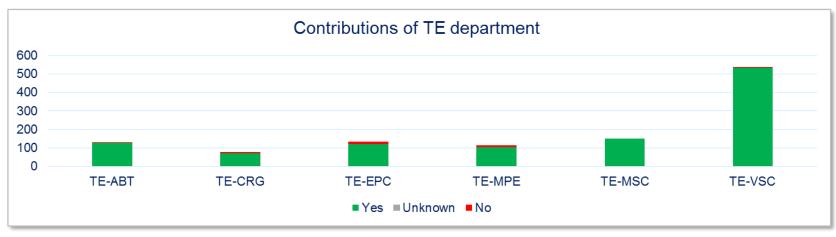
Summary TE





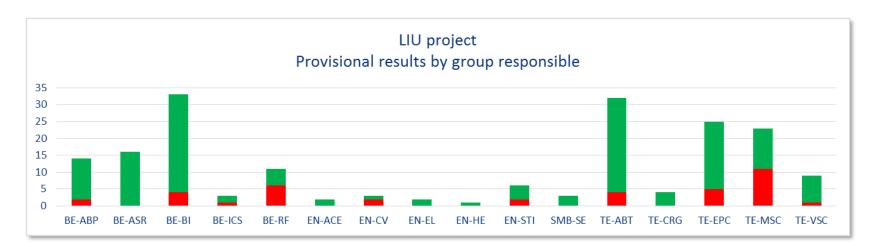
Summary TE

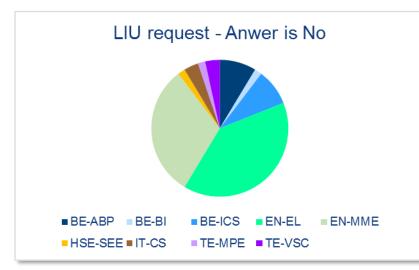






Summary LIU



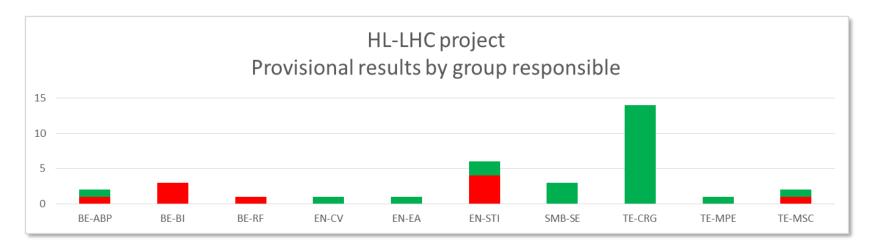


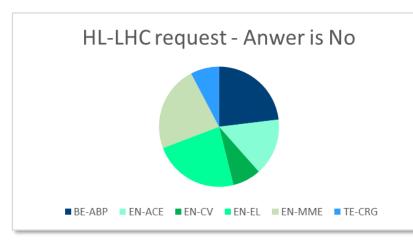
- In September first results showed that 54% of the PLAN requests related to LIU couldn't be accepted!
- Today, thanks to LIU pro-activity only, but still 20%.
- Mainly due to Missing information (45%) and unknown reasons (20%)



25

Summary HL-LHC

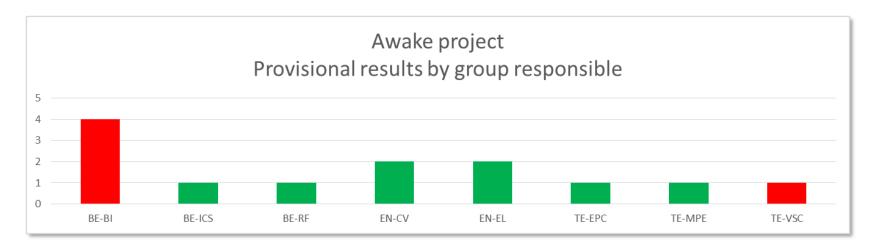




Answered no mainly because of Missing information



Summary Awake



- BE-BI: Resources issue being solved
- TE-VSC: to follow wrt vacuum chamber fabrication



Next phases

- 1. Still some works for groups
 - Unavailable information in PLAN Mainly EP (35 over 59!)
 - Missing technical information
 - Responsible groups to provide information to their contributors, else the request might be postponed
 - Deadline : Nov. 20th
 - (please keep Mirko & Katy in the loop)
 - Not in group mandate / not needed anymore. Could request responsible group let us know on their final decision
- 2. Approved / Postponed
- 3. Final results Mid January
- 4. Version 2 (see next slide)

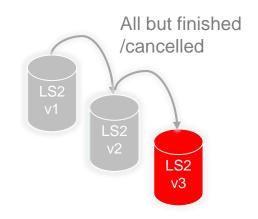


| 81 Deploy - Beam Imminer | t Warning & Evacuation system - new line in nTOF EAR2 | Under Approva |
|--------------------------|---|--|
| BE-ICS | | |
| WBS: | SEC-BEAM-AREAS-PS | |
| Priority: | 1. Safety | |
| Facilities: | nTOF | |
| | Goal | Impact if not done/postponed |
| | Deploy BIW in nTOF EAR2 | Safety compromised. |
| Supports - | Installation | 2019 |
| | | Subjected to further evaluation of planning, co-activities and |
| EN-EL | Control cabling | access constraints |
| Supports - | Commissioning | 2019 |
| | | |
| | | - An HSE-SEE Safety correspondent is already following this |
| | | project (NTOF EAR2) together with the project leader. His |
| | | participation is not limited to the commissioning of the |
| | | detection systems. The HSE-SEE Safety correspondent will |
| | | identify the need for other HSE services during the project |
| | | (e.g. inspection services, safety training, safety expertise, |
| | | reception of alarm systems,). The identified needs shall be supported by the project if they are not available. |
| | | - At this stage not all the project are inserted in the PLAN too |
| | | (i.e. HL-LHC, ATLAS upgrade, CMS upgrade, ¿), so once these |
| | | projects are inserted in the tool and the priorities defined, we |
| | | may need to rearrange the resources accordingly, and the |
| | | project maybe affected if its priority changes. |
| HSE-SEE | Safety validation | All the above points should be taken into account. |
| H3E-SEE | Safety valuation | An the above points should be taken into account. |

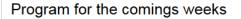


Version 2

 Version 2 will be in production as soon as version 1 exercise will be complete



Small working group to review PLAN tool



- 1. Workflow by-pass & which data can be updated by whom
- 2. Phase per phase:
 - a. review of fields and ergonomic
 - b. Mandatory fields and not optional fields (statistics on filled fields)
 - c. Excel upload (or not)
 - d. Standardization of support requests
- 3. Communication: notifications, mails...
- 4. Reference with other systems: JMT, edms, APT
- 5. Customization: specific forms
- 6. Filters and ergonomy
- 7. Report

 $_{S2}$

Days





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Version 2 - open questions

- In order to get the same level of granularity:
 - Project leaders will be from now on, invited to declare the activities for their project
- Maintenance activities Do we need them in PLAN?
 - Most of them concerns only the responsible group
 - But some groups need to include them to have an overview of resource load
- Shall we consider, in the future, one year to perform the exercise
 - What do we do in the meantime with approved project during the year
 ?
- Shall we suggest some key support / checking list ? RP, HE....



30

Conclusions

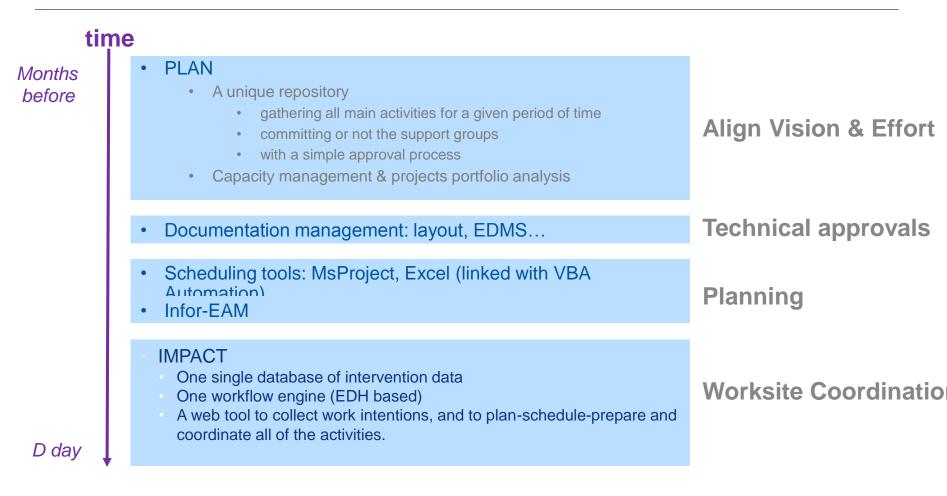
- PLAN «LS2» version 1
 - Huge effort from groups to complete PLAN «LS2» version 1
 - 75% of requests have no show-stopper (81% for eYETS)
 - From June to now, most of requests were clarified between groups (in September, only 61% = no show-stopper)
 - Support groups have a clearer picture of the resources needed, but not all are in PLAN !
- PLAN «LS2» version 2
 - Will start after Chamonix
 - It's crucial to include all requests needing support, and we know there are more, in order to align our effort, especially in matter of resources.
 - Support groups will have a better view w.r.t. to version 1 results



Back-up



Which tool is for what





Show-stoppers for LIU 2016 & 2017

- 10068 Installation of new Wideband Pick-up in PSB
- 10070 Installation of new housing for BTV30 in the BI line of the PSB
- 10132 Installation of a new Beam Gas Ionisation monitor (BGI)
- 10001 TCDI SPS to LHC transfer line collimator renewal for LIU
- 10171 Linac3 source oven design
- 10274 Provide high voltage pulsed generators, ... for PSB BI.KSW
- 10311 Supply new converters for Booster Main Magnets ...
- 10448 Install new cooling towersof point 18 SF18
- 10675 Modification of the injection and extraction. Dismantle and rebuild
- 10924 PS 80 MHz Fast Tuner.
- 10964 Cooling plant for BAF3 and RF equipment
- 10004 LBE Dump shielding for LIU
- 10334 Replacement of upgraded ZS and installation of ZS interconnects
- 10439 Wire scanners for LIU in the SPS (BWSRE) x5
- 10835 LIU-SPS RF power upgrade BAF3
- 10836 LIU-SPS RF power upgrade LSS3
- 10921 PS Longitudinal Damper
- 10923 PSB Finemet RF Systems

ABP not needed ABP not needed ABP – done wrong group & EL missing info MME warning on schedule EL missing info (LS2) EL missing info (2017-2018) EL missing indo, ICS schedule MME missing info **MME** schedule EL & ICS missing info EL resources (LS2) BI? MME ? (2017-2018) ICS schedule & MME? MME? & VSC MME ? (LS2) ABP done & MME ?



Show-stoppers for HL-LHC 2016 & 2017

- 10677 Installation of 2 cryo-assemblies with 11T Magnets
- 10545 New TCAP passive absorber
- 10843 HL-LHC Crab-cavity cryomodule in SPS
- 10544 Installation of four new robust TCTPH
- 10627 Prototype Head-Tail Monitor
- 10643 2 TCLD (DS collimator) for P2
- 10645 Second BGV Detector for HL-LHC
- 10834 Beam gas curtain profile monitor
- 10905 replacement of 8 TCP by TCPP
- 10906 Wire collimators TCTW for EYETS

EL missing info MME schedule ACE wrong group ABP ? MME ? CV missing info & ABP ACE resources (LS2) CRG ? ABP ? EL missing info & MME



Show-stoppers for 2016 & 2017 – P1 (excl. LIU & HL)

| • | 10083 | ME9 JURA : Renovationsous station18 kV NORMALMeyrin | HSE ? |
|---|-------|---|---------------|
| • | 10747 | Renovation - Fire Detection - SURFACE LHC & AWAKE | ICS resources |
| • | 10748 | Renovation - Fire Detection & Evacuation N.VEGA Zone 9 (ECN3-BA82-EHN2) | ICS resources |
| • | 10749 | Renovation - Fire Detection & Evacuation(TDC2-TCC2-BA80) | ICS resources |
| • | 10776 | Install - Automatic Fire Extinguishing - SPS - TA, Shaft & High Rad | EL? |
| • | 10777 | Renovation - Beam Imminent Warning & Evacuation - SPS | HSE ? |



Show-stoppers for 2016 & 2017 - P2 (excl. LIU & HL)

| • | 10294 LHC- MKB Vacuum Pumping Scheme Consolidation BTD62.DR | EL not needed |
|----------------|---|---------------------------------|
| • | 10296 LHC- MKB Vacuum Pumping Scheme Consolidation BTD68.DB | EL not needed |
| • | 10596 Replacment of 7 BCTs in LINAC2 | ABP not needed |
| • | 10854 Replace one injection kicker magnet (MKI) | ABP wrong group |
| • | 10012 Replace 8-10 LHC TCS for TCSPM | ABP schedule, MME schdeule |
| • | 10161 Survey the ALICE experiment | ACE resources |
| • | 10162 Survey the CMS experiment | ACE resources |
| • | 10163 Survey the ALICE experiment 2018 | ACE resources |
| • | 10164 Survey the CMS experiment 2018 | ACE resources |
| • | 10219 Consolidation of 400 kV protection system | ACE wr. group & CV missing info |
| • | 10319 ATLAS New Small Wheel Installation | MME missing info |
| • | 10466 Replace the existing 35 kW coolingin PM18 | EL missing info |
| • | 10489 Consolidate the ventilation system in the SR buildings | EL missing info |
| • | 10524 Build and instal the new detector cooling station for RICH 1 & 2 – LHCb | EL missing info |
| • | 10526 Build and install the new detector cooling station for SCiFi – LHCb | EL missing info |
| • | 10819 WIC in the transfer lines PSB to PS | EL schedule |
| • | 10821 Consolidation of the Oasis Trigger network | EL & MPE missing info |
| • | 10829 Renovation of the Oasis VXI systems | EL missing info |
| • | 10226 LHC Tunnel monitoring system installation | SMB resources |
| • | 10092 SPS BA2 renovation reseaux et sous stations HT/BT | HSE ? |
| • | 10093 SPS BA3 renovation reseaux et sous stations HT/BT | HSE ? |
| • | 10094 SPS BA4 renovation reseaux et sous stations HT/BT | HSE ? |
| \overline{N} | 10095 SPS BA5 renovation reseaux et sous stations HT/BT | HSE ? |

Days

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Show-stoppers for 2016 & 2017 - P2 (excl. LIU & HL)

| • | 10097 | SPS BA7 renovation reseaux et sous stations HT/BT | HSE ? |
|---|-------|--|--------------------------|
| • | 10393 | Replacement of obsolete SEMs in | MME ? & EL missing info |
| • | 10414 | Consolidate the cooling plant of the PS central building | EL missing info, & HSE ? |
| • | 10424 | Consolidate the cooling plant of the PS main magnet | EL missing info, & HSE ? |
| • | 10427 | Consolidate the PSB chilled water cooling plant | EL missing info, & HSE ? |
| • | 10430 | Consolidate the PSB cooling plant | EL missing info, & HSE ? |
| • | 10332 | Consolidate PSB Septa Electronics & Controls | EL res. & MPE wr. group |
| • | 10389 | Linac3 source micro-wave generator the PS | EL resources |
| • | 10493 | Execute the maintenance of CV installations in the PS complex & Meyrin | HSE ? |
| • | 10494 | Execute the maintenance of CV installations in the SPS complex & Prevessin | HSE ? |
| • | 10495 | Execute the maintenance of CV installations in the LHC and its Experiments | HSE ? |
| • | 10508 | Upgrade the ventilation system in UX15 | CV resources |
| • | 10590 | Replacement of 10% (100) of VPIA pumps [EYETS2016] | VSC resources |
| • | 10608 | Replacement of 5/10% (50/100) of VPIA pumps [YETS2017] | VSC resources |
| • | 10654 | Alice Experiment routers hardware upgrade | ICS resources |
| • | 10661 | Atlas Experiment routers hardware upgrade | ICS resources |
| • | 10664 | CMS Experiment routers hardware upgrade | ICS resources |
| • | 10782 | Preventive Maint. 2015-LS2- Fire Detection & Evacuation | HSE ? |
| • | 10783 | Preventive Maint Fire Detection & Evacuation | HSE ? |
| • | 10837 | Replacement of Linac3 101 MHz amplifiers | RF res.& CV miss. info |
| • | 10847 | General Maintenance kicker systems in Accelerator Complex | HSE ? |
| • | 10848 | General Maintenance kicker systems in Accelerator Complex | HSE ? |
| | | | |



LS2

Days

Show-stoppers for 2016 & 2017 – P3 (excl. LIU & HL)

- 10015 TDIS for HL-LHC
- 10082 18kV LHC18 Extension et consolidation de la sous station SE18

EL mssing info (LS2) HSE ?



Show-stoppers for 2016 & 2017 – P4 (excl. LIU & HL)

| • 10020 | Replace n_TOF spallation target | ABP wrong group |
|---------|--|-------------------------|
| • 10133 | Installation of 7 BTV beam monitors for AWAKE | AP wrong group |
| • 10981 | Adapt to changes in public interfaces due to consolidation of widely | EPC not needed |
| • 10450 | Install new cooling and ventilation systems in the new 311 building | EL missing info |
| • 10889 | SPS- Consolidation VSC racks electrical distribution | EL missing info |
| • 10991 | Adapt to suppression of COPUB specific database account | HSE ? & ABT wrong group |
| • 10993 | Adapt to changes in Logging Service data extraction API. | HSE ? & STI ? |
| • 10994 | Adapt to changes in the Layout Service. | CV, HE; MME, ABT ,EPC ? |
| • 11079 | AWAKE phase II vacuum system installation | MME schedule |
| • 11096 | Diagnostics for AWAKE electron-proton line | ACE resources |
| • 11097 | Diagnostics for AWAKE Spectrometer line | ACE resources |
| • 11098 | Diagnostics for AWAKE electron line | ACE resources |
| • 10035 | Deploy pilot installation of new SPS PPS (Personnel Protection System) | EL resources |
| • 10036 | New SPS PPS (Personnel Protection System) | EL & ICS resources |
| • 10899 | Installation and commissioning of CM4 | RF resources |



Show-stoppers for 2016 & 2017 – P4a (excl. LIU & HL)

| • | 10028 | Booster Head/Tail clipper | MME not needed |
|---|-------|--|-----------------------------------|
| • | 10194 | ISOLDE Frontends | MME not needed |
| • | 10381 | Consolidation of the Fibre Infrastructure in Prevessin | ACE wrong group |
| • | 10382 | Consolidation of the Fibre Infrastructure in Meyrin | ACE wrong group |
| • | 10386 | Fibrotheque Database | ACE wrong group |
| • | 10006 | AD target area renewal | ABP wrong group & EL missing info |
| • | 10007 | CHARM target upgrade | EL missing info |
| • | 10023 | renew AD beam stopper | EA wrong group & EL missing info |
| • | 10278 | ALICE O2 infrastructure | CV missing info |
| • | 10280 | ALICE fibers | EL missing info |
| • | 10390 | Consolidate Isolde target modulator & power supplies | EL resources |
| • | 10391 | Provide Electronics & Controls for restart of AD Horn Test Bench,, | EL missing info |
| • | 10453 | Install demineralised water skid in SM18 | EL missing info |
| • | 10481 | Consolidate the NA underground ventilation | EL missing info |
| • | 10485 | Consolidate the cooling system of the AD hall | EL missing info |
| • | 10491 | Consolidate the compressed air production system of Meyrin | EL missing info |
| • | 10549 | Consolidate the compressed air production system in Prevessin | EL missing info |
| • | 10633 | EN-EL Long distance Optical fibers installation for LHCb | EL missing info |
| • | 10646 | BSRTR for Beam 2. | EL not needed & MME missing info |
| • | 10649 | LHC orbit system DOROS | EL missing info |
| • | 10650 | New BCTs for AD | ABP wrong group & EL missing info |
| • | 10750 | LHCb PC farm - data center | CV, EL, SMB missing info |
| 1 | 10960 | SPS Underground toilet | CV & EL missing info |
| Ŷ | | 2016.07.29 avs | LS2C - K. Foraz EN-ACE |

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Show-stoppers for 2016 & 2017 – P4a (excl. LIU & HL)

| • | 10037 | CHARM Target and conveyor upgrade | CRG? |
|---|-------|--|---------------------------------|
| • | 10077 | 18 kV _liaisons 18 kV MEYRIN | HSE? |
| • | 10078 | 18 kV ME65 _ nouvelle sous station ME65 | MPE? |
| • | 10174 | CMS GCS new Gas system (GEM) | ICS resources |
| • | 10237 | CMS - Extension of assembly hall SX5 (1000 m2) | SMB resources |
| • | 10247 | Consolidation of site infrastructure programme | HSE? |
| • | 10250 | Civil Engineering works for the PS TT2 bld 269 renovation | HSE? |
| • | 10251 | Civil Engineering works for the New Online/Offline computing farm (O2) | HSE? |
| • | 10252 | Civil Engineering works for the New cleanroom in bld 167 200m2 | HSE? |
| • | 10253 | Civil Engineering works for the New cleanroom in bld SXL2 | HSE? |
| • | 10254 | Civil Engineering works for thefor UPS upgrades | HSE? |
| • | 10369 | Consolidate PS Septa Electronics & Controls | EL resources |
| • | 10392 | Consolidate the Linac 3 HVAC system | EL missing info & HSE? |
| • | 10484 | Consolidate the NA chilled water network | CV resources & HSE? |
| • | 10516 | Upgrade of the cooling power at the chilledby 1.5 MW | CV res. & ICS & EL missing info |
| • | 10595 | Consolidate the main ventilation system of the computing centre | CV resources |

