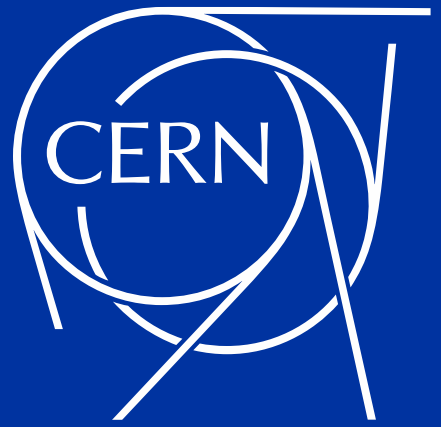


# Electrical Safety Project

# WP5 Electrical Distribution Network

G. Podoleanu on behalf of WP5
15.12.2023

# WP5 Team

WP5
Electrical Distribution Network

WPL: G. Podoleanu
EN-EL

WP5.1: Equipment Responsibility
(WPL: K. Papastergiou SY-ABT)

WP5.2: Drawings & Schematics
(WPL: K. Zielinski EN-EL)

WP5.3: Identification in field
(WPL: C. Mugnier – ESP CT*)

| WP5 Contributors | Dept. Group |
|---|---|
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| P. Lelong | EN-ACE |
| A. Andersen, S. Deleval | EN-CV |
| K. Papastergiou | SY |
| M. Pezzetti | TE-CRG |
| G. d'Angelo | TE-MPE |
| t.b.d. | TE-MSC |
| G. Pigny, R. Ferreira | TE-VSC |
| J. Fernandez | On behalf of ATS DSOs |
| C. Mugnier, A. L. Perrot, | ESP Project Office |

# Content

- WP 5 Scope, mandate and deliverables
- WP 5.1 Equipment Responsibility: Objectives, strategy, activity status, roadmap
- WP 5.2 Drawings & schematics: Objectives, strategy, roadmap
- WP 5.3 Objective and roadmap
- WP 5 Links with other WPs
- WP 5 Resources
- WP 5 Outcome

# WP5: Electrical Distribution Network


## Mandate:

- Determine **along the distribution network** the different **area of responsibility between EN/EL and the equipment groups**; ensure corresponding **identification in field**.
- Define and implement a **system to represent a constantly updated diagram** of the CERN **distribution network**.

## Deliverables:

D5.1.: - Define area of responsibility between EN/EL and the equipment groups;
- Make an inventory and identify locally the disconnecting devices placed at the limit of the EN-EL distribution network.
- Indicate the Group responsible for the operation if different from EN-EL.
- Define to which Equipment Group belongs the installation directly supplied by a switching device (18KV cubicle, disconnector, circuit breaker...) placed at the limit of the EN-EL distribution network.
- Technical notes to be produced.

D5.2.: Production / maintenance of the electrical distribution schematics and electrical equipment location.

D5.3.: Identification / Tag in field each component of the distribution network.

## Contributors:

BE: OP-TI;
EN: EL, CV;
SY: ABT, BI, EPC, RF;
TE: MSC, MPE, CRG, VSC.

# WP5.1 Equipment responsibility

After discussions within the ESP team, it was concluded that the tasks of WP5.1 can be summarized in a document known as “Operation Agreement“.

The project management team and WP5 propose that these agreements be produced at ATS level.

The operation agreements should be concluded between:

- EN-EL, as supplier group and operator of the CERN’s electricity distribution network, and the other groups, as users of the network.

- the supplier groups, other than EN-EL, and their client groups (users).

# WP5.1 Equipment responsibility
## Scope of an operation agreement

Delimitation of responsibility:

- By the operation agreement, the *supplier group* authorizes the *client group* to operate FPs. These are the electrical separation points between groups along the electrical network.

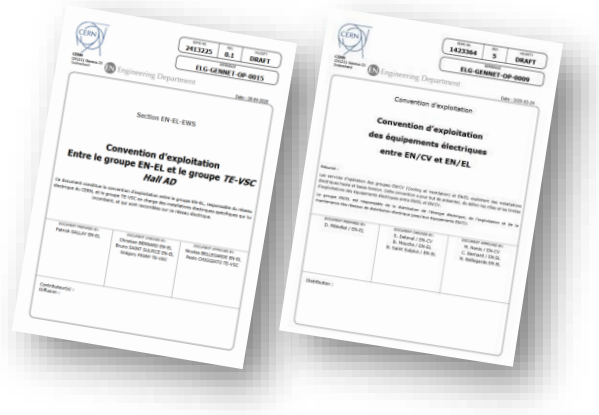
Conditions of operation and maintenance of the FPs:

- The operation agreement defines which group is responsible for the operation and maintenance of the FPs corresponding to the electrical separation points.
- Help defining technical and organizational health and safety measures at work and the conditions for carrying out works (lock-out procedures).

# WP5.1 Equipment responsibility
## Objectives and strategy

### Where are we?

Operation agreements already exist between some groups, and they have to be produced at ATS level.
An operation agreement template was prepared by EN-EL in 2020.




### What is the end objective of WP5.1?

To give the users the possibility to easily identify the group responsible for the operation and maintenance of the FPs representing the electrical separation points.

To standardize the operation agreement template at ATS level.

In addition, WP5.2 will develop a tool to help users to identify the supply tree.

# WP5.1 Equipment responsibility
## Objectives and strategy

### Strategy

Update the operation agreement template to cover the 2nd layer users:

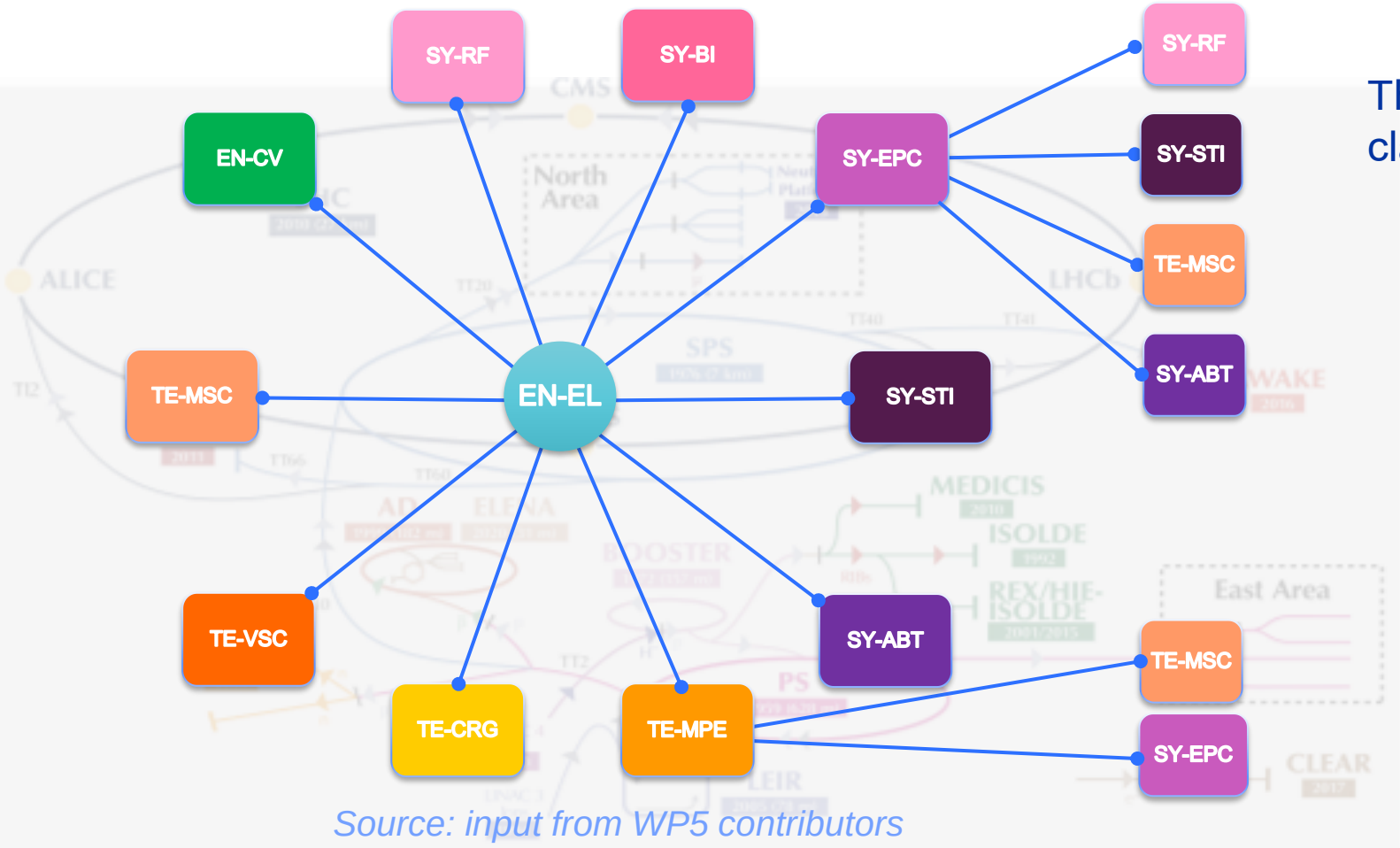
- Identify the electrical dependencies between groups along the electrical network.
- Identify the supply scenarios between the supplier groups and the client groups (WP 5.1) and draw SLDs accordingly (WP 5.2).
- Review and agree the template with WP2 from the HSE point of view

Approval of the operation agreements between groups:

- Preparation of FPs lists to be included in the operation agreements. Data source: existing in databases? Excel files? Other?
- Validation of the lists between groups.
- Integration of the validated lists as annexes to the operation agreements.
- WP5 contributors and WP6 support needed

# WP5.1 Equipment responsibility

Electrical dependencies between groups along the electrical network




*Source: input from WP5 contributors*

The electrical dependencies can be classified into two “layers”:

- 1st layer, between EN-EL and the 10 client groups
- 2nd layer, between SY-EPC, TE-MPE and their client groups

*Thanks to the contributors for their replies at the questionnaire sent mid-October 2023.*

# WP5.1 Equipment responsibility

Proposed process

The proposal is to prepare an operation agreement by area/machine with its annexes, between a supplier group and a client group. An annex will contain the FPs, corresponding to the electrical separation points, operated by the client group in each area/point.

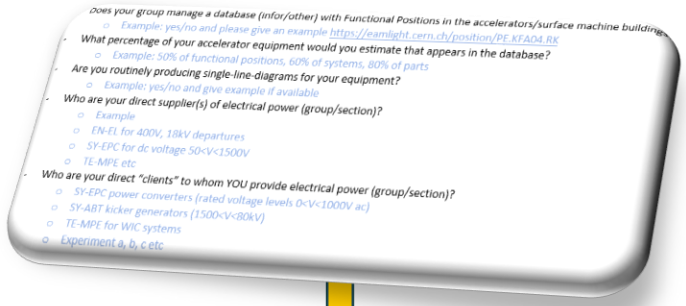
Example: for the LHC Operation agreement between EN-EL and SY-EPC, an annex for each LHC point.

Estimated operation agreements to be prepared:

- Approximately 12 for the 1st layer users
- Approximately 6 for the 2nd layer users

The preparation of the operation agreements will require resources from all concerned groups.

# WP5.1 Equipment responsibility
## Status of activities




WP5 - WPL bi-weekly meetings starting on October 17.

**October 2023**

We sent a questionnaire to our contributors for gathering initial information.

**November 2023**

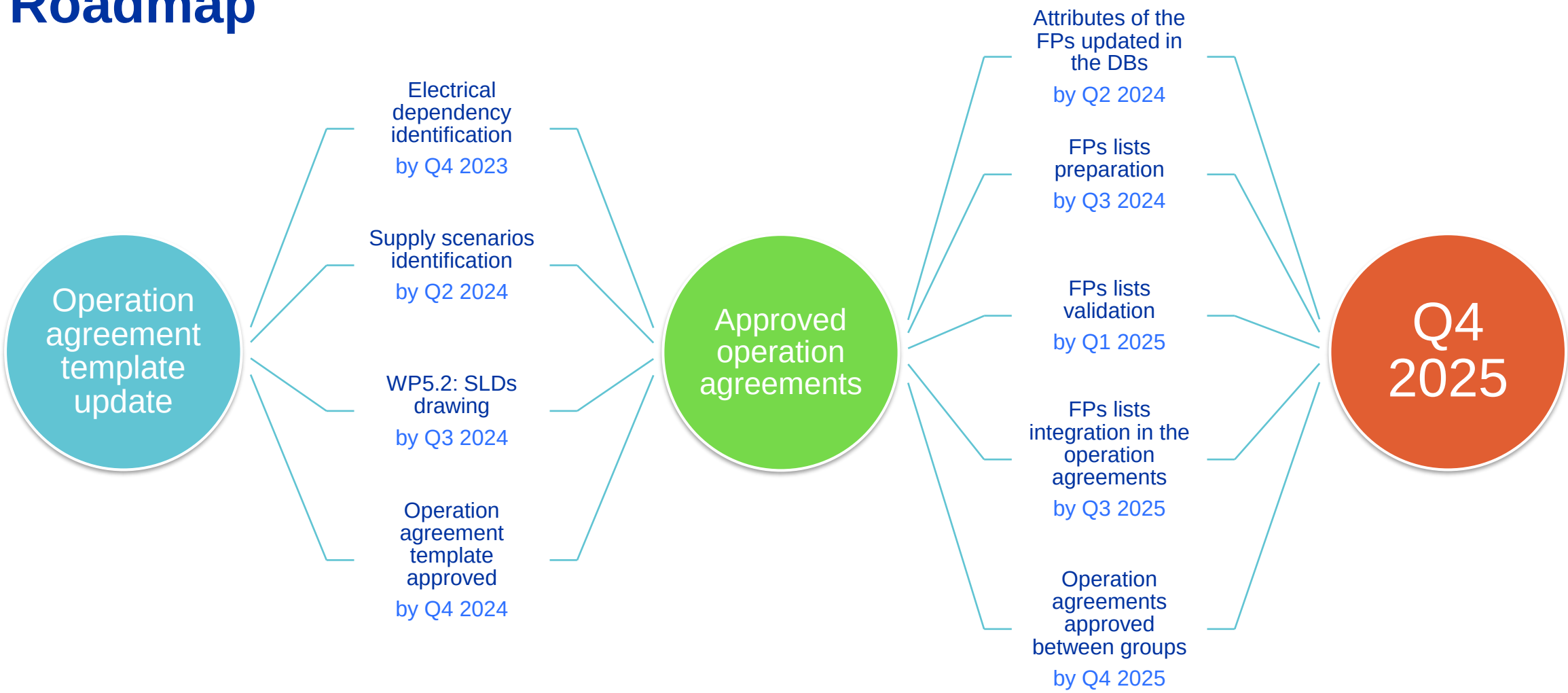
We organized several bilateral meetings with our contributors.

**Early December 2023**

We organized a meeting with all the contributors to:

- discuss the detailed mandate of the WP 5 and strategy proposal
- discuss the timeline for the deliverables of our collaboration
- to try to identify the resources needed

# WP5.1 Equipment responsibility
## Roadmap

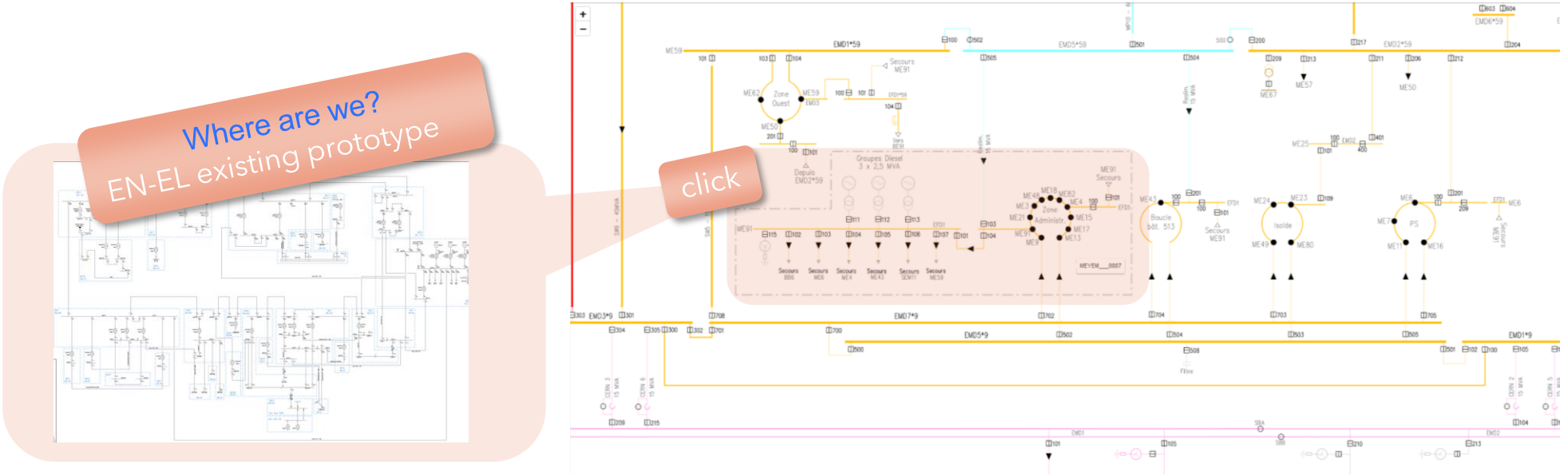


# WP5.2 Drawings & Schematics
## Objective and strategy

Objective: Production / maintenance of the electrical distribution schematics

Strategy: Development of an *interactive SLD tool* which will allow:

- to browse the electrical zones and give users the possibility to identify the supply tree. The tool will be based on EN-EL SLDs.
- to select electrical zones and browse the electrical layers from High Voltage to Low Voltage.




We have 67 general SLDs covering CERN's distribution network from 400 kV to 400 V.

# WP5.2 Drawings & Schematics

We need the electrical dependencies between FPs corresponding to the electrical separation points:

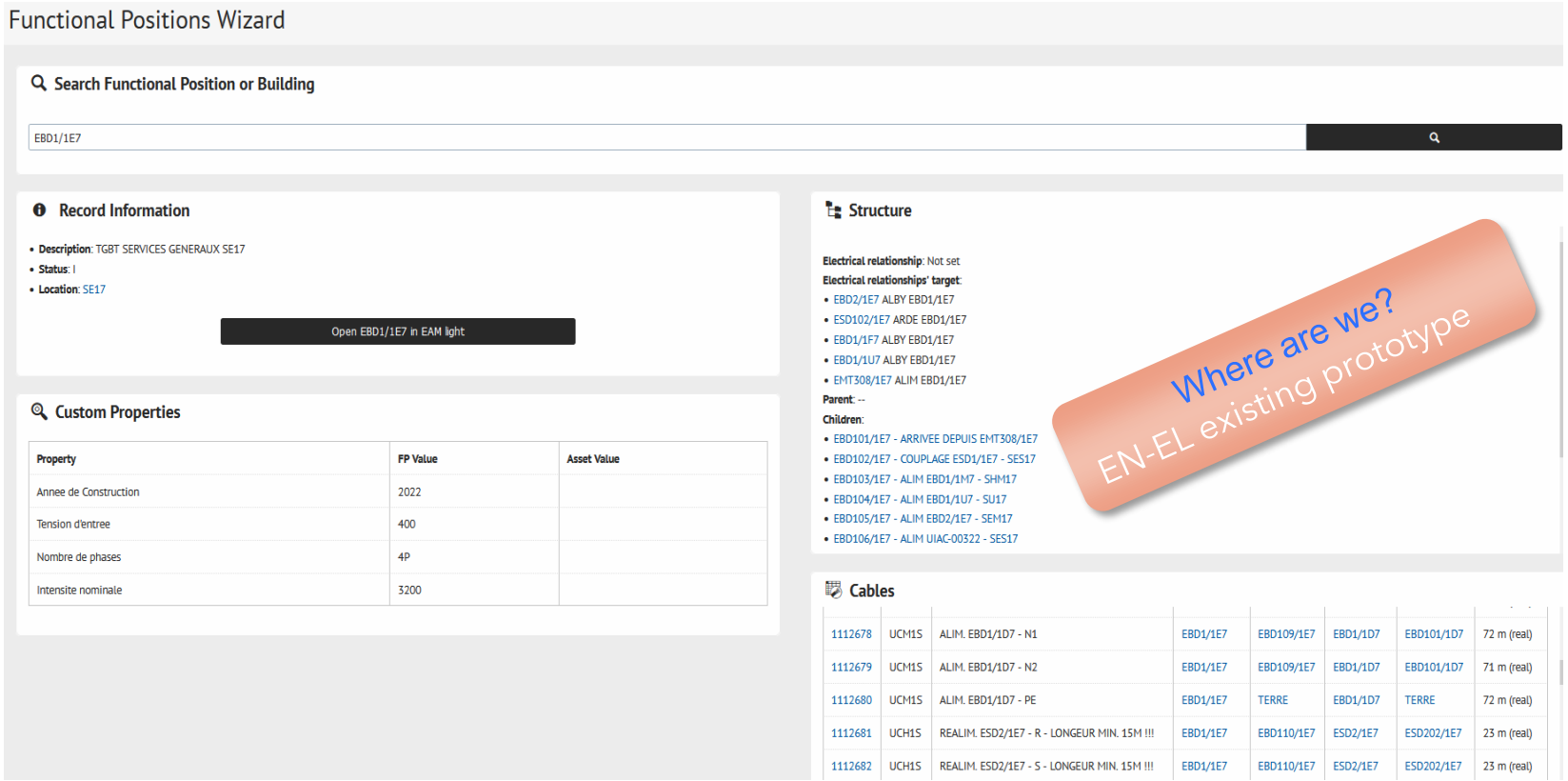
- Within EN-EL partially existing
- EN-EL to 1st layer to be developed
- Supplier groups to 2nd layer to be developed

Support needed from all concerned groups:

- big effort to identify electrical dependencies and update the data in the database
- WP6 and IT support is very important
- common need with WP 5.1

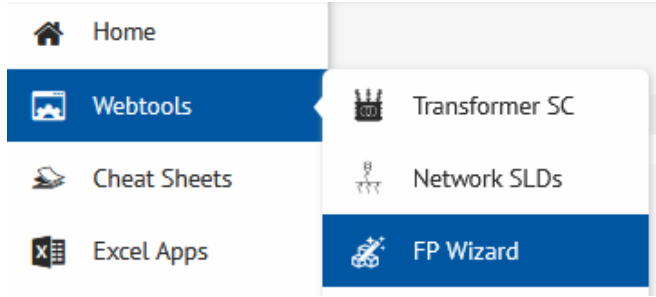
# WP5.2 Drawings & Schematics
## Strategy

Development of the *FP wizard tool* to give the users the possibility to identify the electrical supply for their FPs.

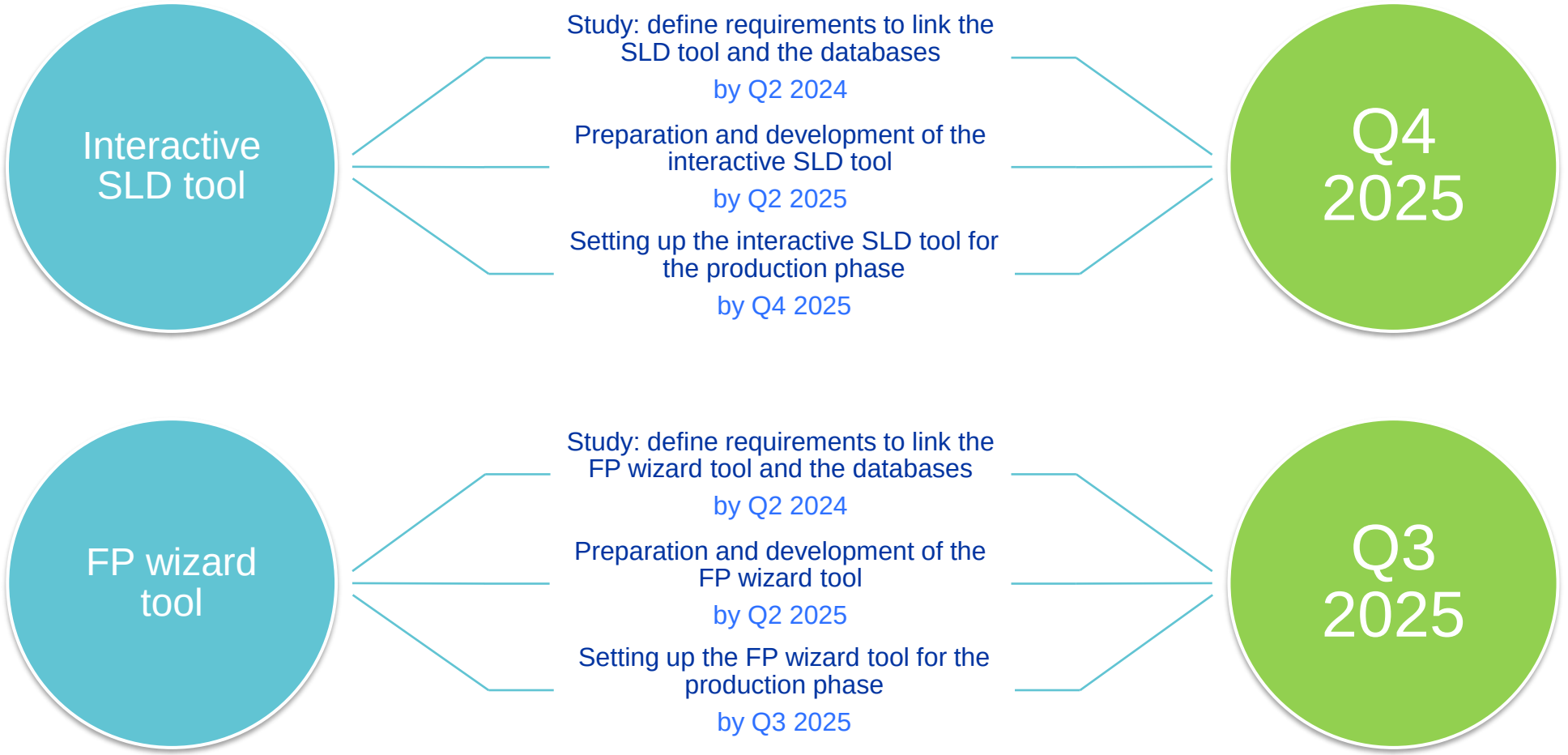



Tool's features:

- FPs electrical dependencies will be displayed
- Technical related documents
- Cable related information



# WP5.2 Drawings & Schematics
## Roadmap



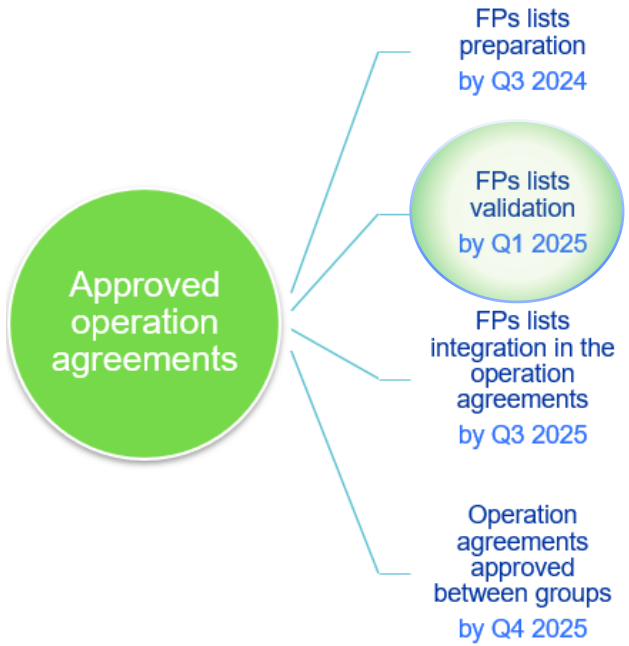
# WP5.3 Objective and roadmap

Objective: Identification/Tag in field the separation points of the distribution network.

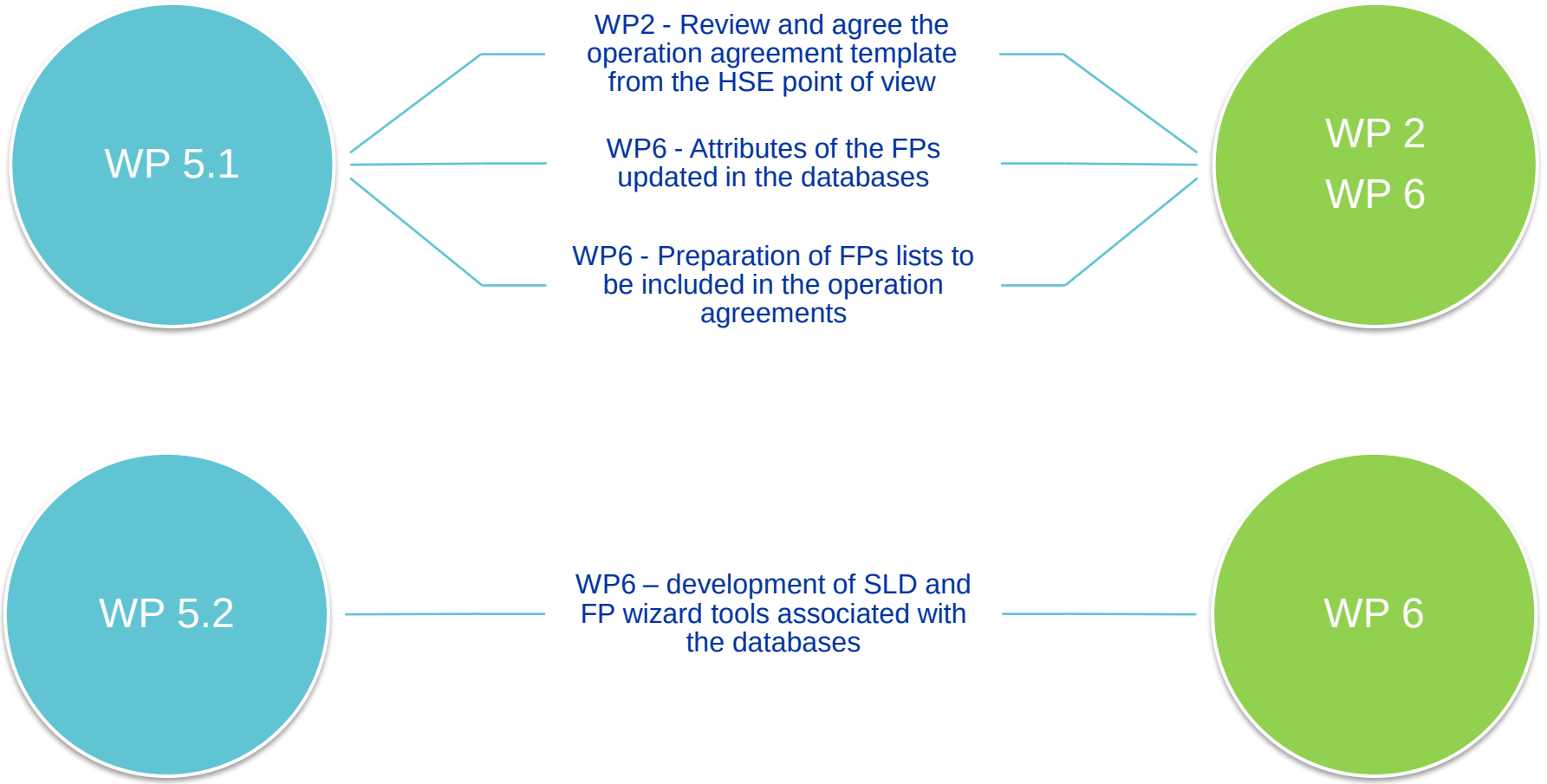
Development of a color-based code for labeling of each group's FPs at the limit of electrical responsibility.

Identification and labeling on site of FPs listed in the annexes of the operation agreements.

- Contributors support is needed for the labelling activity
- Activity can start in Q2 2025, once the FPs lists are validated between groups



# WP5 links to other WP



# Resources

Contributor groups: SY-RF, SY-BI, SY-EPC, SY-ABT, SY-STI, TE-MSC, TE-CRG, TE-VSC, TE-MPE, EN-CV, EN-EL

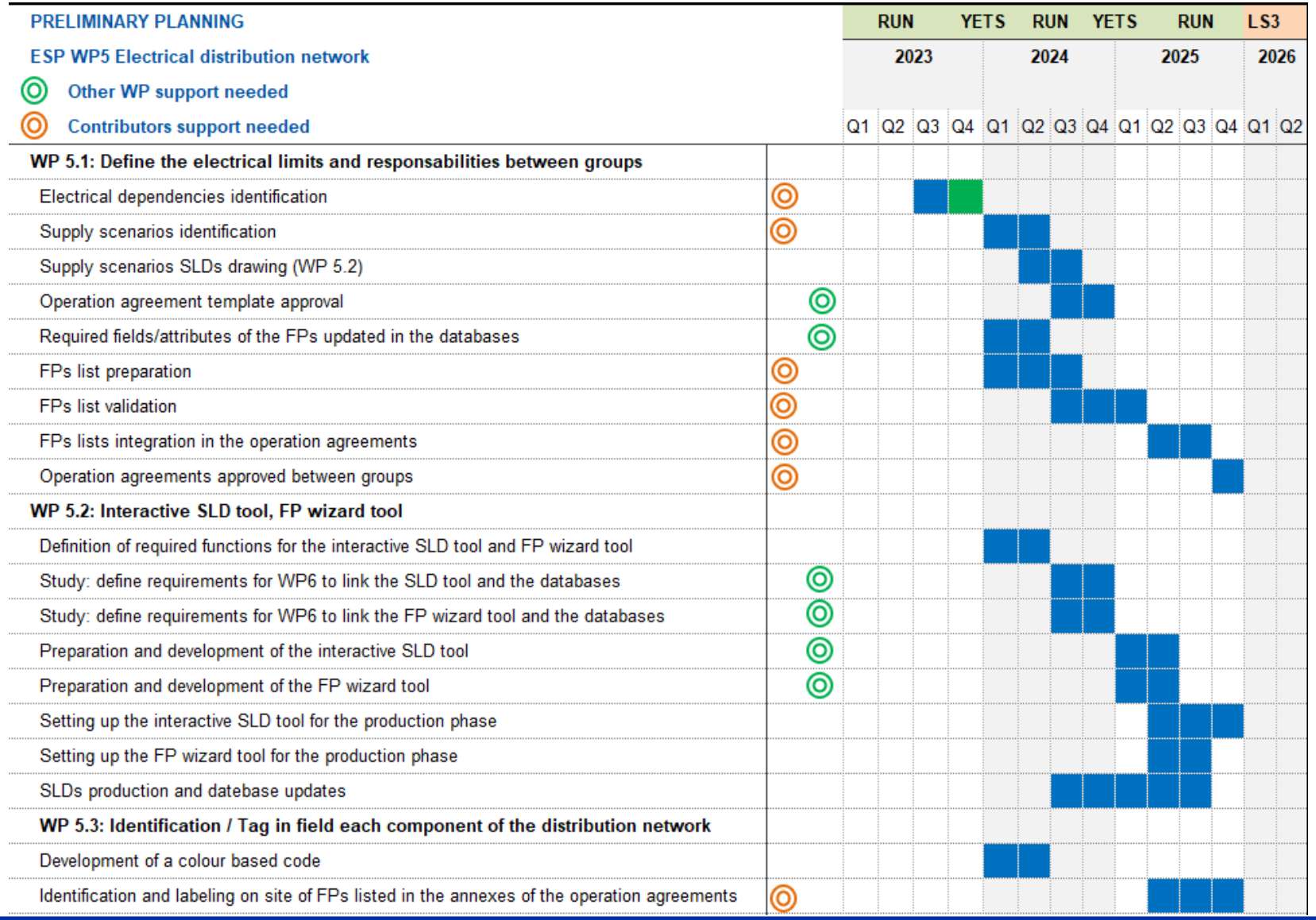
| Group/section | 2024 | | 2025 | | 2026 |
|---|---|---|---|---|---|
| | RUN | YETS | RUN | YETS | LS3 Q1 |
| EN-EL-MO | 10 x 0.1 | 10 x 0.1 | 10 x 0.1 | 10 x 0.1 | Spare time |
| EN-EL-EPM+DDO | 2 x 0.2 | 2 x 0.2 | 2 x 0.2 | 2 x 0.2 | |
| EN-CV | 0.5 | 0.5 | 0.5 | 0.5 | |
| SY-RF | 0.2 | 0.2+ 1 new graduate | 0.2+ 1 new graduate | 0.2+ 1 new graduate | |
| SY-BI | | | | | |
| SY-EPC | | | | | |
| SY-ABT | | | | | |
| SY-STI | | | | | |
| TE-MSC | tbc | tbc | tbc | tbc | |
| TE-CRG | tbc | tbc | tbc | tbc | |
| TE-VSC | 0.1 | 0.2 | 0.1 | 0.2 | |
| TE-MPE | 0.1 | 0.2 | 0.1 | 0.2 | |

EN-EL needs 1.5 FTE to compensate for the involvement of the existing staff

Being in the YETS period, the contributors did their best to estimate and agree within their groups the resources needed. To be confirmed by mid-January 2024.

This is a first guess. With the advancement of the project, the necessary resources can be adjusted

# WP5 Outcome



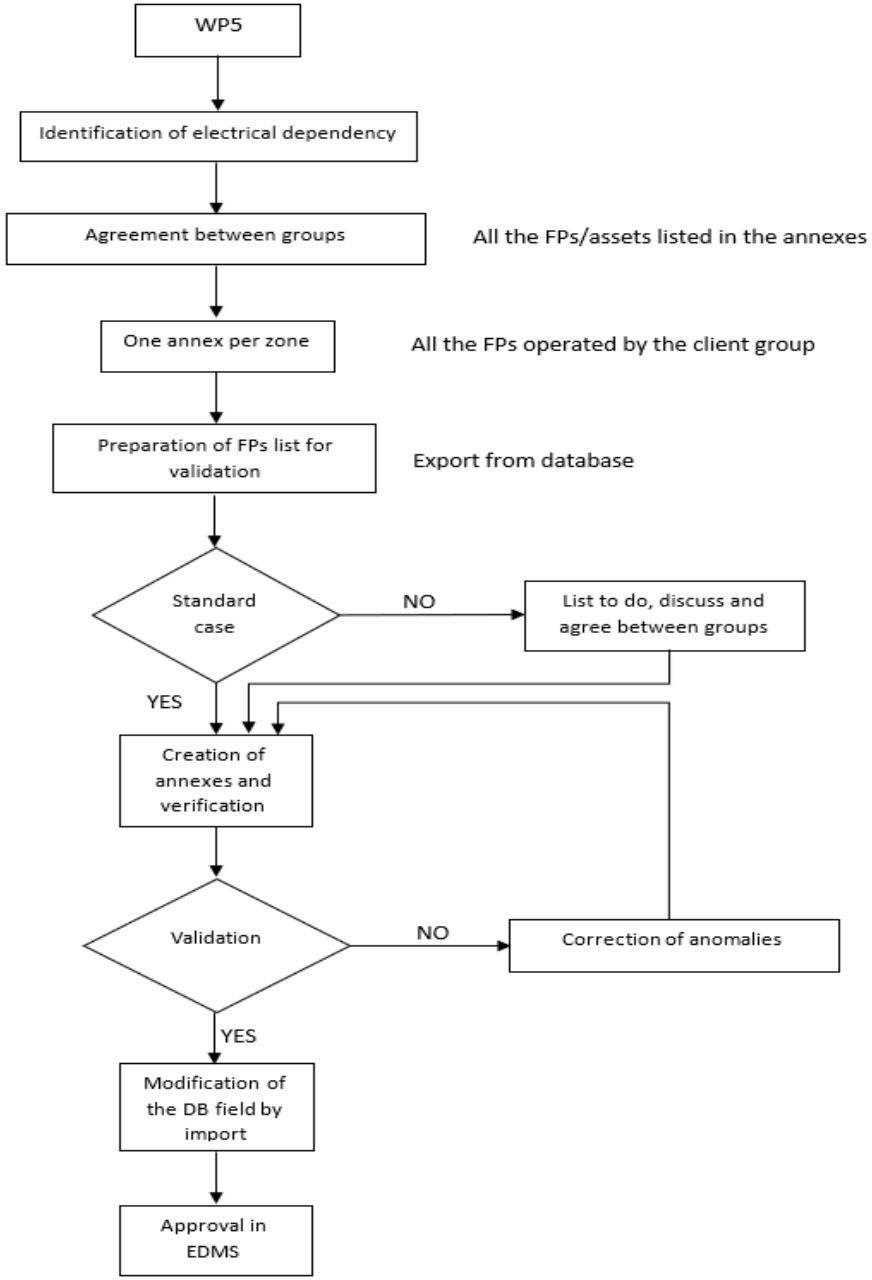

The involvement of each group is crucial to the progress and achievement of objectives!

Thank you for your attention!

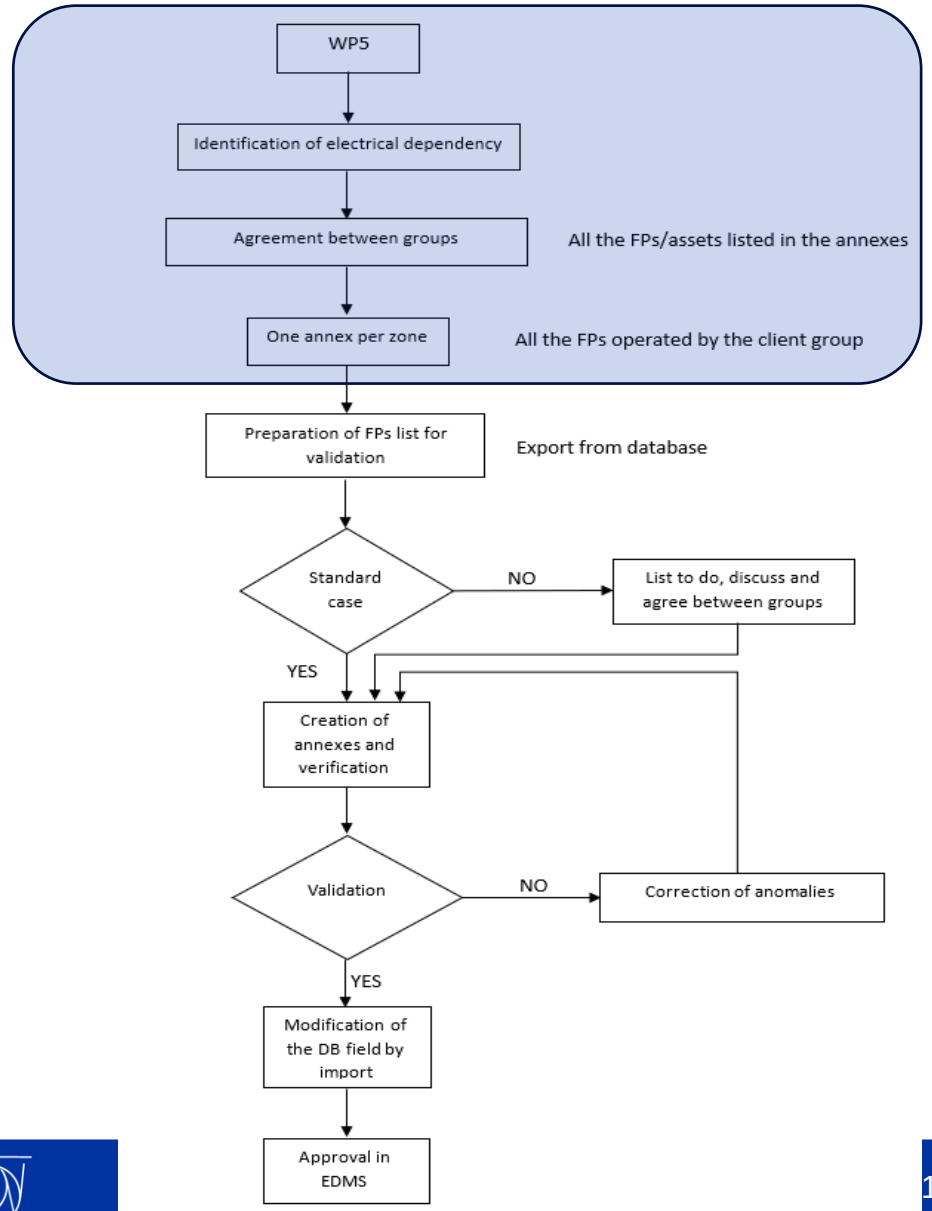
# Spare slides

# Working procedure

Proposed workflow for operation agreement preparation



# Steps of the working procedure(1/3)

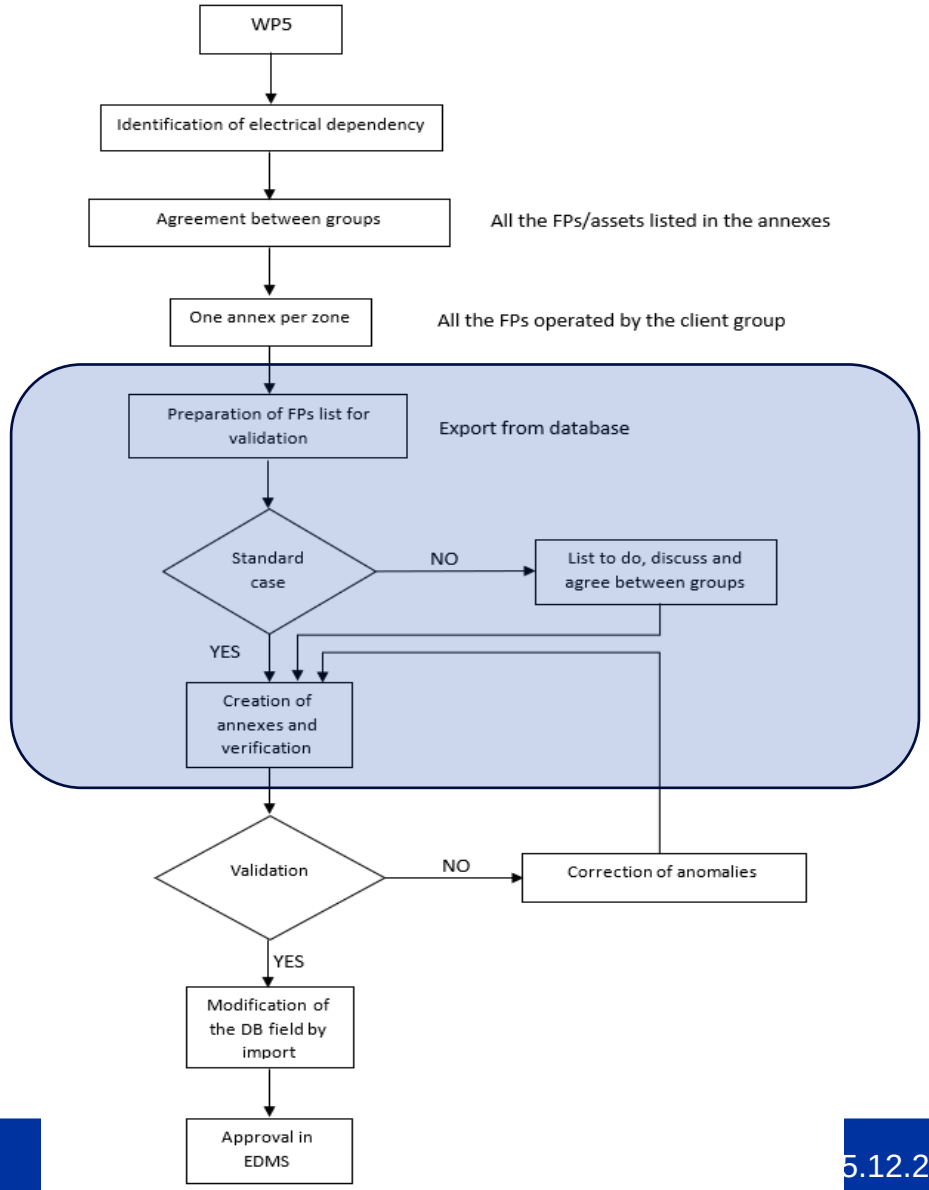



1. Identify, by site, the groups which are the responsible for the operation of their FPs/assets.

2. Establish the list of FPs/assets allowing that the total number of annexes to be identified. The goal is to be able to prepare the planning and measure the progress

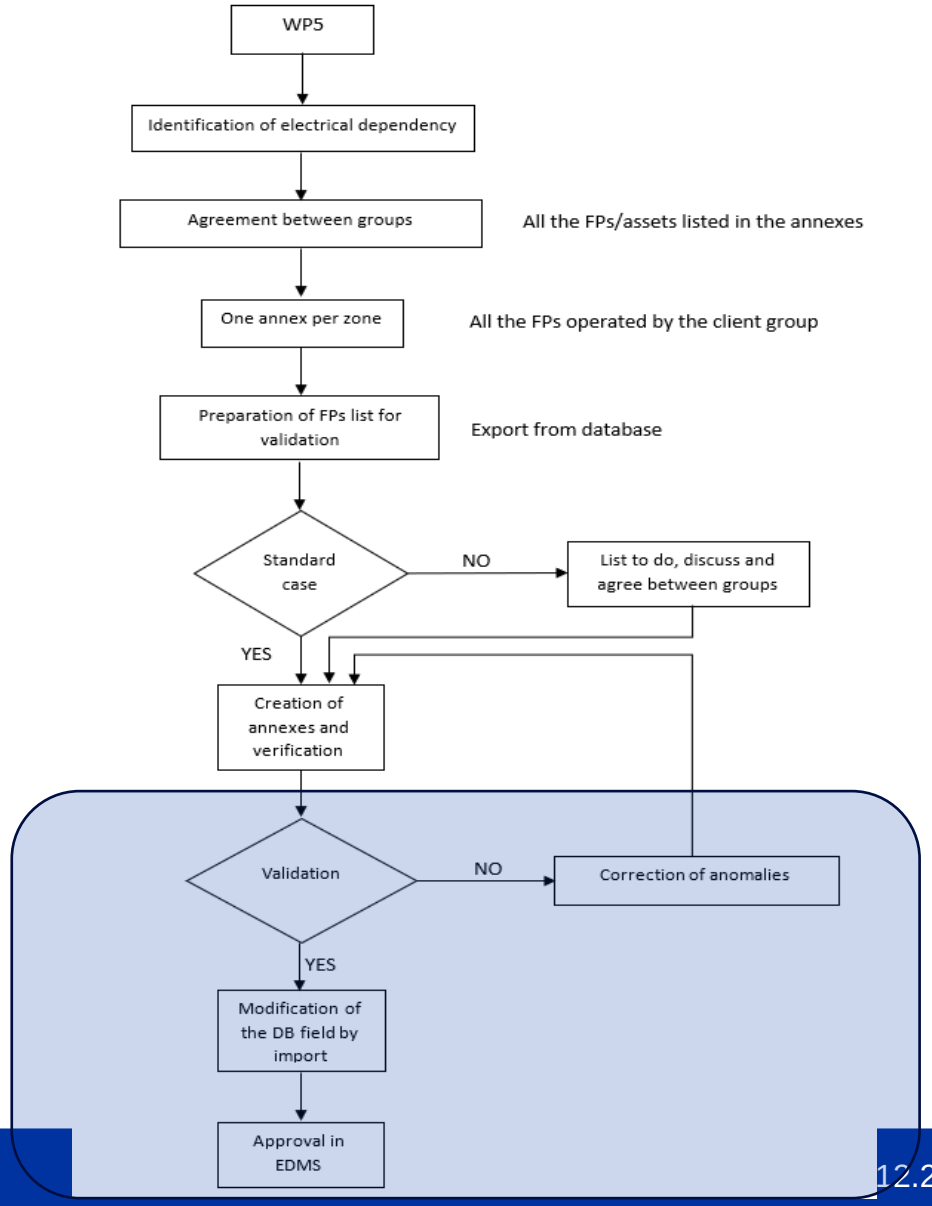
- An annex will contain all the FPs/assets operated by the client group in each zone. An operation agreement will be prepared with its annexes, by group and by zone.
- Example for SY-EPC: for the LHC Operation Agreement, an annex for each LHC point; for the SPS Operating agreement, an annex for each SPS point, etc.
- Contributors help needed to agree the planning and follow the progress in their groups

# Steps of the working procedure (2/3)




- The list of FPs/assets not operated by EN-EL/supplier group will be accessible in Excel format. This list will contain the FPs/assets as export from the database (where is possible).
  - In this list will be identified :
    - the FPs/assets which are operated by a group, other than EN-EL/supplier group.
    - the cases where, from a bus-bar, there are electrical separation points operated by different groups.
    - both situations above will be treated at the same time to avoid additional trips to the field.
- The cases where it is not easy to identify the group responsible for the operation of FPs/assets, will be treated in a second phase (canalis, LV switchboards)
- Contributors help needed for the preparation of the lists

# Steps of the working procedure (3/3)




3. Validation of each annex between EN-EL/supplier group and the client group. Contributors help needed

4. Update the database by filling the "Operated by" field in the database

- Example: The "Operated by" field in InforEAM would be filled in automatically, so no manual entry is required for each FP/asset
- For this step WP6 will analyse the possibility of standardizing the attributes associated with FPs/assets, even if they are in different databases

5. Completion of the agreement and follow-up the approval circuit in EDMS. Contributors help needed

6. Keep annexes up to date (by equipment responsible)

- A procedure which will specify, from the project phase, who is responsible for operation of FPs/assets will be established. This will be done when creating a new FP. Contributors help needed