



Transmission Grid Development Plan 2021- 2026

June 2022

1. REDEIA's global vision.
2. Transmission Grid Development Plan.
3. Strategic Requirements Planning.

redea



1. REDEIA's global vision

REDEIA

REDEIA is a **worldwide essential infrastructure operator** that handles electricity transmission grids in Spain, Peru, Chile, and Brazil, as well as telecommunications grids (dark fibre optic and satellites), with a focus on **innovation, technological development, and sustainability.**



REDEIA Structure (Red Eléctrica Corporación Dec'21)



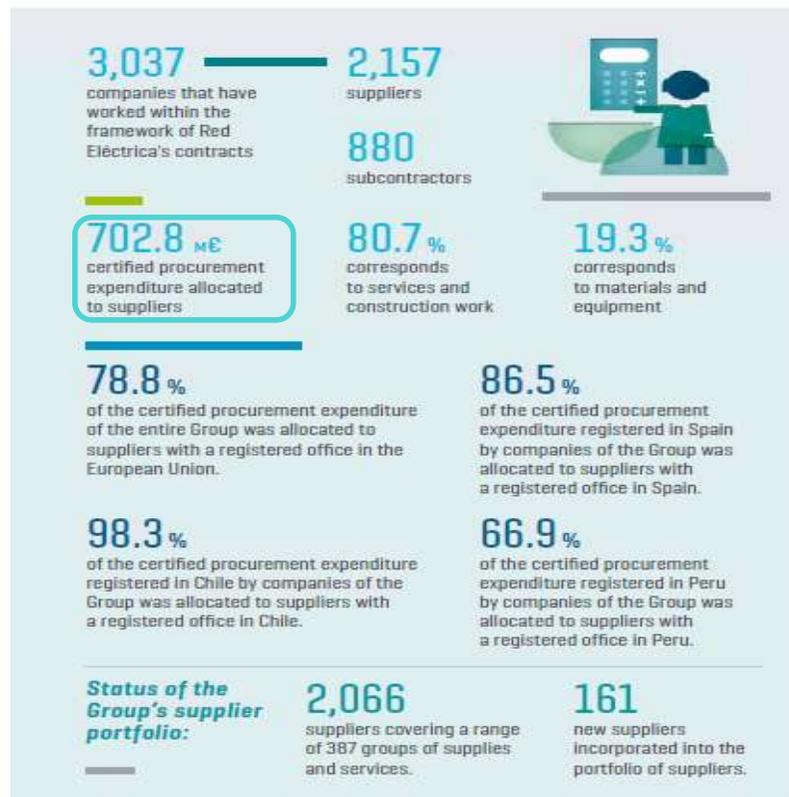
In Spain, the Electricity Business is involved in the implementation of the 21-26 Plan.

Supply chain



Certification of Red Eléctrica's suppliers in 2021

Year 2021



redeia



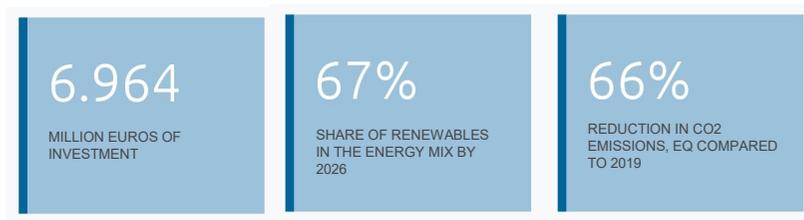
2. Transmission Grid Development Plan

Introduction

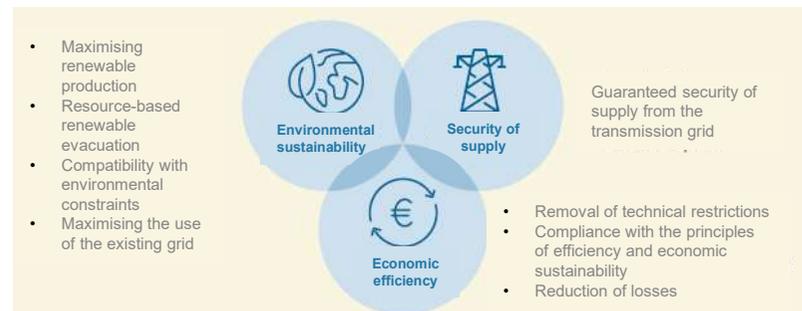
- ✓ **The Ministry for Ecological Transition and Demographic Challenge** leads the development of the transmission grid planning process.
- ✓ Its goal is to allow for the massive integration of new **renewable energy sources** while maintaining and improving the **security of supply** of the Spanish electricity system. It will do so by **removing grid structural limitations**, adequating it to the needs of **international interconnection** and **non-mainland territory connections**.
- ✓ The 2015-2020 Plan has been completed, and the new **Plan for 2021-2026 was authorised** (April '22).
- ✓ Implemented by REDEIA.

Subject to future modifications

Key Figures



Guiding Principles



Investment

- Meeting the commitments of the **Integrated National Energy and Climate Plan (NECP)** for the electricity system requires careful planning: Decarbonisation, Efficiency, and Reinforcement of Interconnections.

- New grid advancements** that benefit the whole system, such as easing the utilisation and integration of renewable energy sources.



NEW LINES

2,681 km of new overhead lines

- Intensive use of **existing transmission corridors** through grid upgrading and technology that allows them to function at increased transmission capacity.



TRANSMISSION GRIDS ON WHICH THE TRANSMISSION CAPACITY WILL BE INCREASED

7,057 km of lines updated

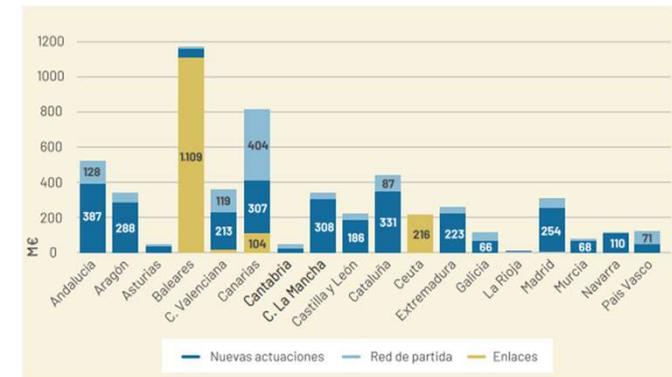
- The **penetration of renewable energy sources** will improve as a result of the aforementioned, with a relevant level of installed renewable generation capacity predicted to be attained.



RES INTEGRATION

67% of the installed renewable generation capacity vs 2021 **+11.4%**

Distribution of costs of the 2021-2026 Plan by Autonomous Communities.



TRANSMISSION GRID DEVELOPMENT PLAN 21-26

Investment Breakdown

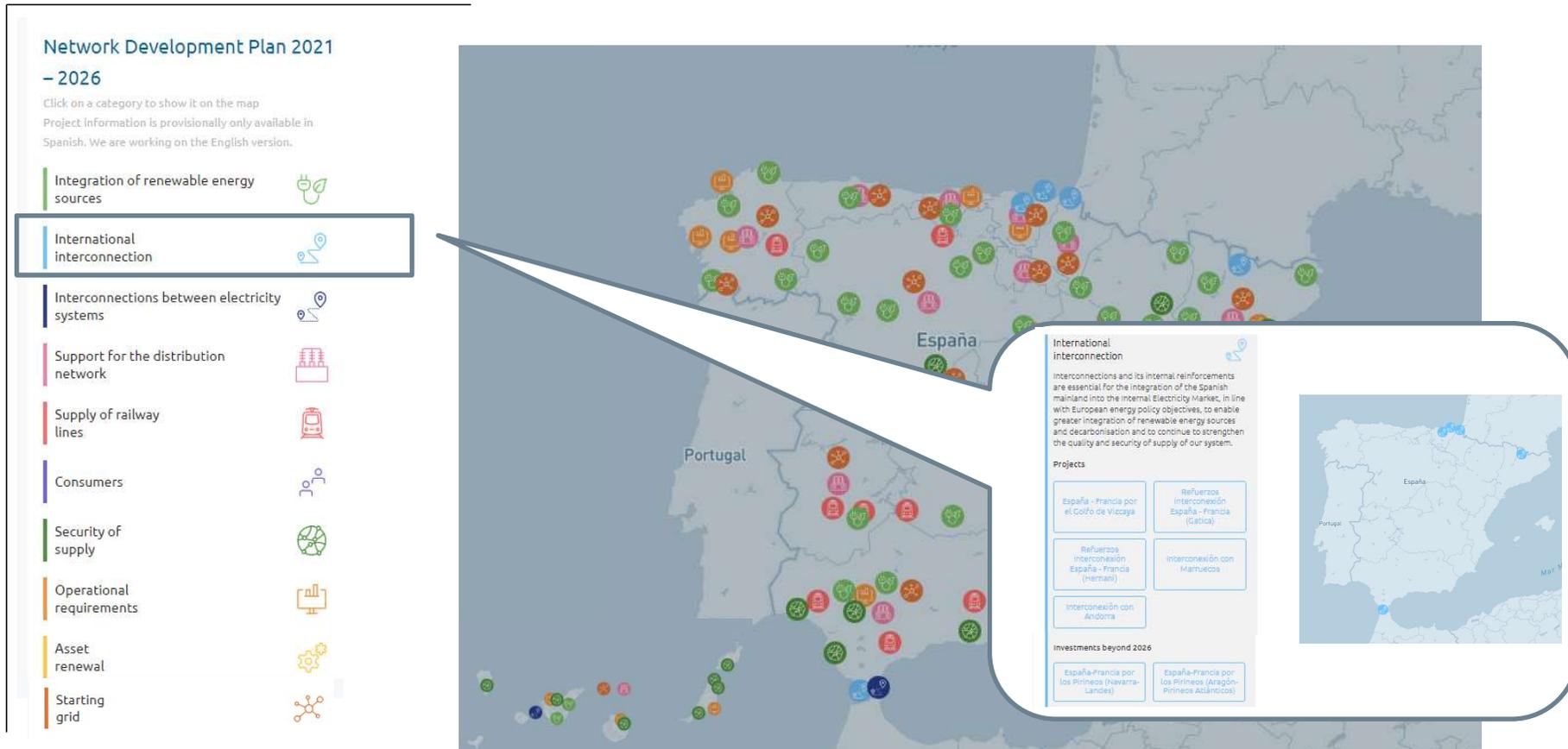
TOTAL INVESTMENT
€6,964 MM

Main initiatives and projects considered in the Plan

€1,872 MM (27%)	<p>RES integration and resolution of technical restrictions</p> <ul style="list-style-type: none"> • La Mancha-Madrid Transmission Corridor (€453 MM) • Andalucía Transmission Corridor (€362 MM) • Aragón-Levante Transmission Corridor (€247 MM)
€1,487 MM (21%)	<p>Interconnections with inter island and island systems</p> <ul style="list-style-type: none"> • Spanish Mainland-Baleares 2nd Link (€1,164 MM) • Spanish Mainland-Ceuta Link (€221MM) • Tenerife-La Gomera Link (€104 MM)
€1,251 MM (18%)	<p>Reinforcement of international interconnections</p> <ul style="list-style-type: none"> • Spain-France via the Bay of Biscay (€934 MM) • Morocco Interconnection (€235 MM) • Galicia-Portugal Interconnection (€51 MM)

€820 MM (12%)	<p>Support for the Distribution grid, as well as the supply of railway axles</p> <ul style="list-style-type: none"> • Madrid (€109 MM) • Valencian Community (€102 MM) • Henares Transmission Corridor (€72 MM) • Extremadura (€67 MM)
€729 MM (10%)	<p>grid meshing to reinforce supply security</p> <ul style="list-style-type: none"> • Reinforcement of the Tenerife West Ring (€61 MM) • Reliability of supply South Madrid (€32 MM) • Reinforcement of Ibiza southern grid (€33 MM)
€405 MM (6%)	<p>Operational requirements to improve grid performance</p> <ul style="list-style-type: none"> • Adequacy of the transmission grid to satisfy additional system demands, such as those resulting from compliance with national and European legislation, or those resulting from the usage of new technologies.
€346 MM (5%)	<p>Renewing grid elements</p> <ul style="list-style-type: none"> • The partial or entire renewal of assets is aimed at making better use of existing infrastructures, enhancing supply security, and limiting the environmental effects of potential grid accidents.
€54 MM (1%)	<p>Generation and Storage</p> <ul style="list-style-type: none"> • Connection of generation or storage at existing or planned substations. 15-20 (€43 MM)

Geographical distribution of projects





3. Strategic Requirements Planning

3.1 Services and works.

3.2 Equipment and materials.

3.3 Particularities:

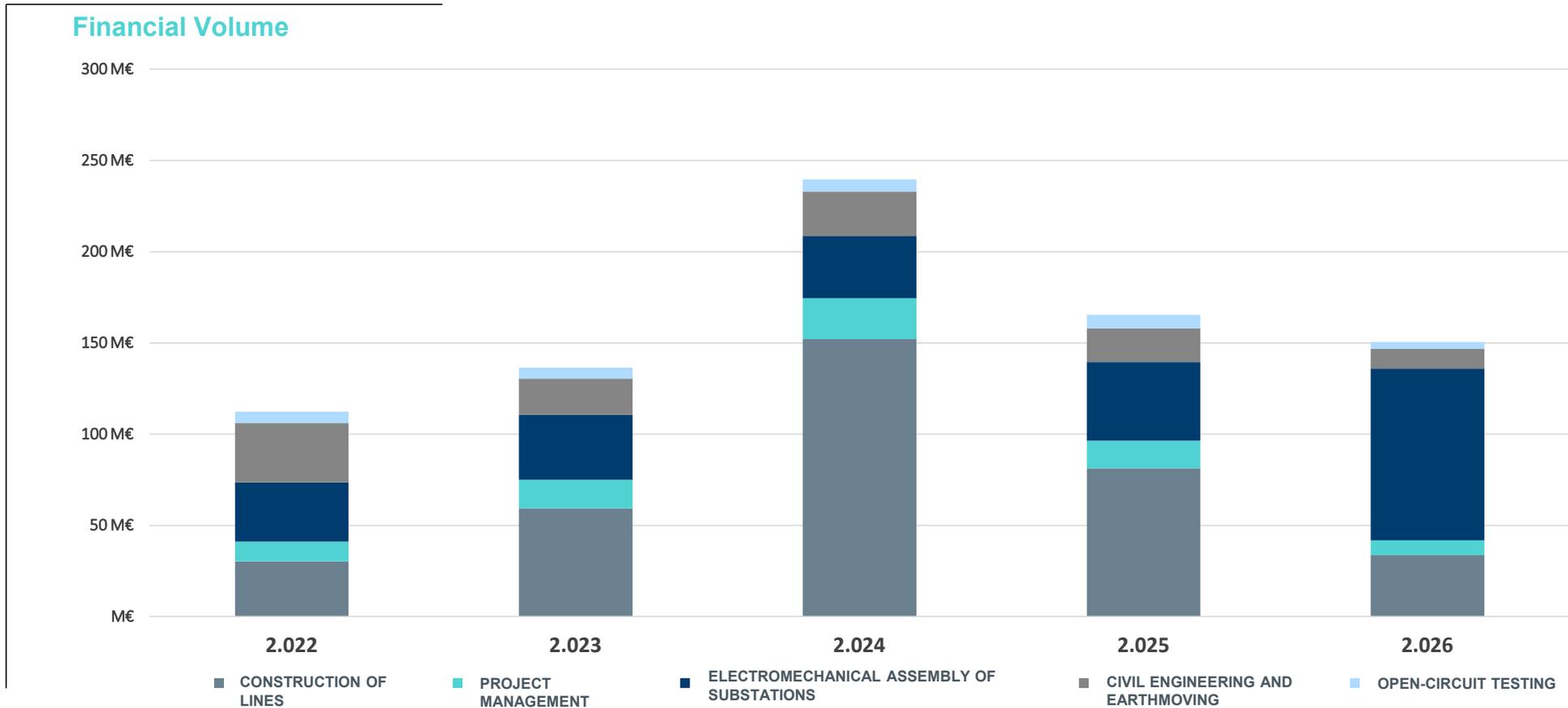
- Geographical Distribution
- Projects

Strategic Requirements

- ▶ 1. Construction of lines
- ▶ 2. Project Management
- ▶ 3. Electromechanical assembly of substations
- ▶ 4. Civil engineering and earthmoving
- ▶ 5. Open-circuit testing
- ▶ 6. Auxiliary transformers
- ▶ 7. Overhead conductors
- ▶ 8. Underground cable
- ▶ 9. Gas Insulated Switchgear (GIS)
- ▶ 10. Metal structure of lines
- ▶ 11. Instrument transformers
- ▶ 12. Disconnectors
- ▶ 13. Switches
- ▶ 14. Substation metal structure

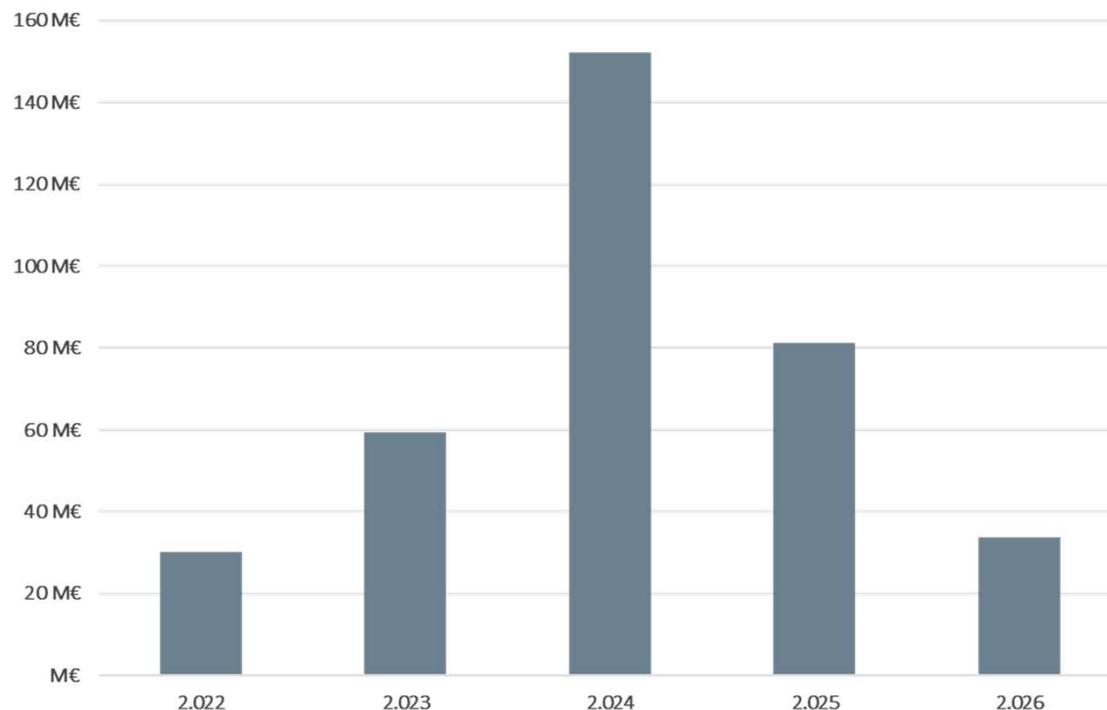


3.1 Services and works



Strategic Requirements

1. CONSTRUCTION OF LINES



REDEIA predicts...

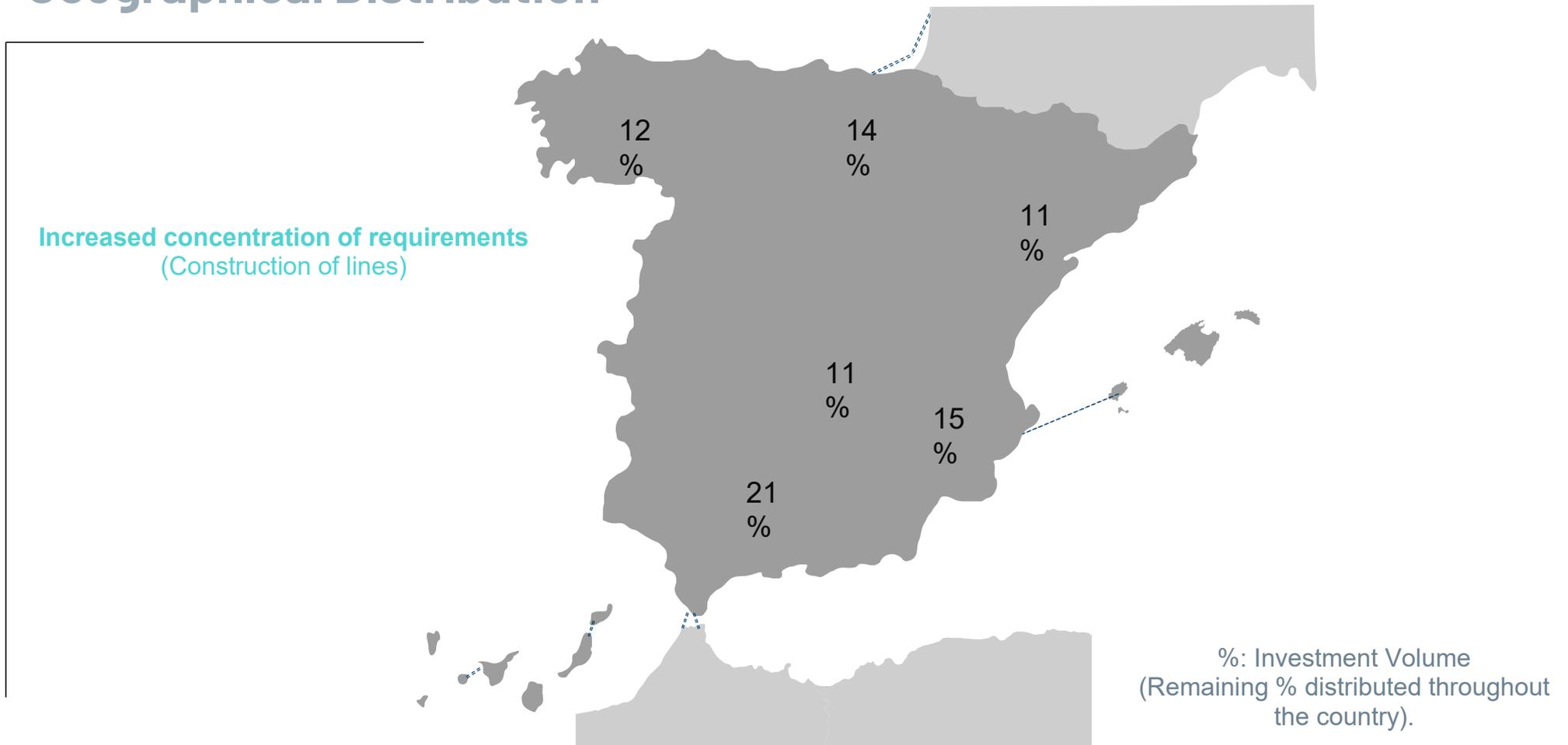
- Very significant **increase in requirements**. 68 facilities affected during the 22/26 period.
- Changes to the **scale and addition of new services**.
- Requirement of **expert human capital** (security clearance of Managers)
- **The scope of the Plan will be expanded** to include new investment activities.
- In 2022, almost €17 MM is still up for grabs.



Supplier collaboration in...

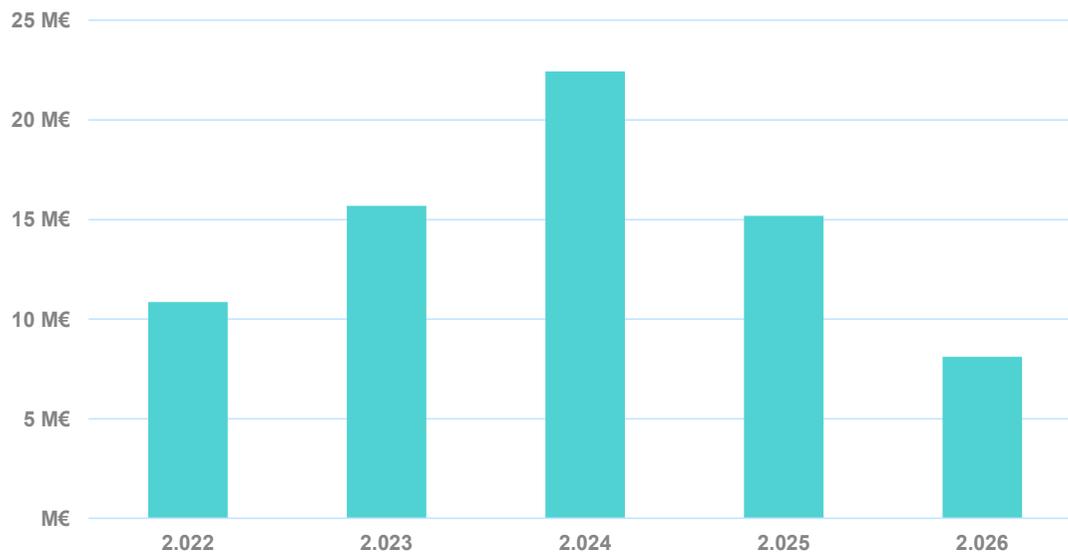
- Capabilities and obligations in terms of **meeting deadlines**.
- Identifying potential **obstacles** to ensuring these greater supply levels.
- Preparation for the resolution to any prospective issue with **personnel qualification**.

Geographical Distribution



Strategic Requirements

2. PROJECT MANAGEMENT (Monitoring + Technical M. + Security Coordination)



Transmission Grid Development Plan 2021 – 2026. June, 2022.

REDEIA predicts...

- **Very significant increase in requirements.** 504 facilities affected during the 22/26 period.
- Significant amount of **human capital** required (knowledge, experience, specific skills, etc.).
- **Deadlines adherence, response,** talent retention, etc.
- Revision of the **basic standards** for service qualification and **contracting scope.**
- From an average of €8.4 MM in 19/21 to €14.4 MM in 22/26.
- Under the present framework agreement, the requirements for 2022 to Sept-2022 (€8.5 MM approx.) have already been distributed.

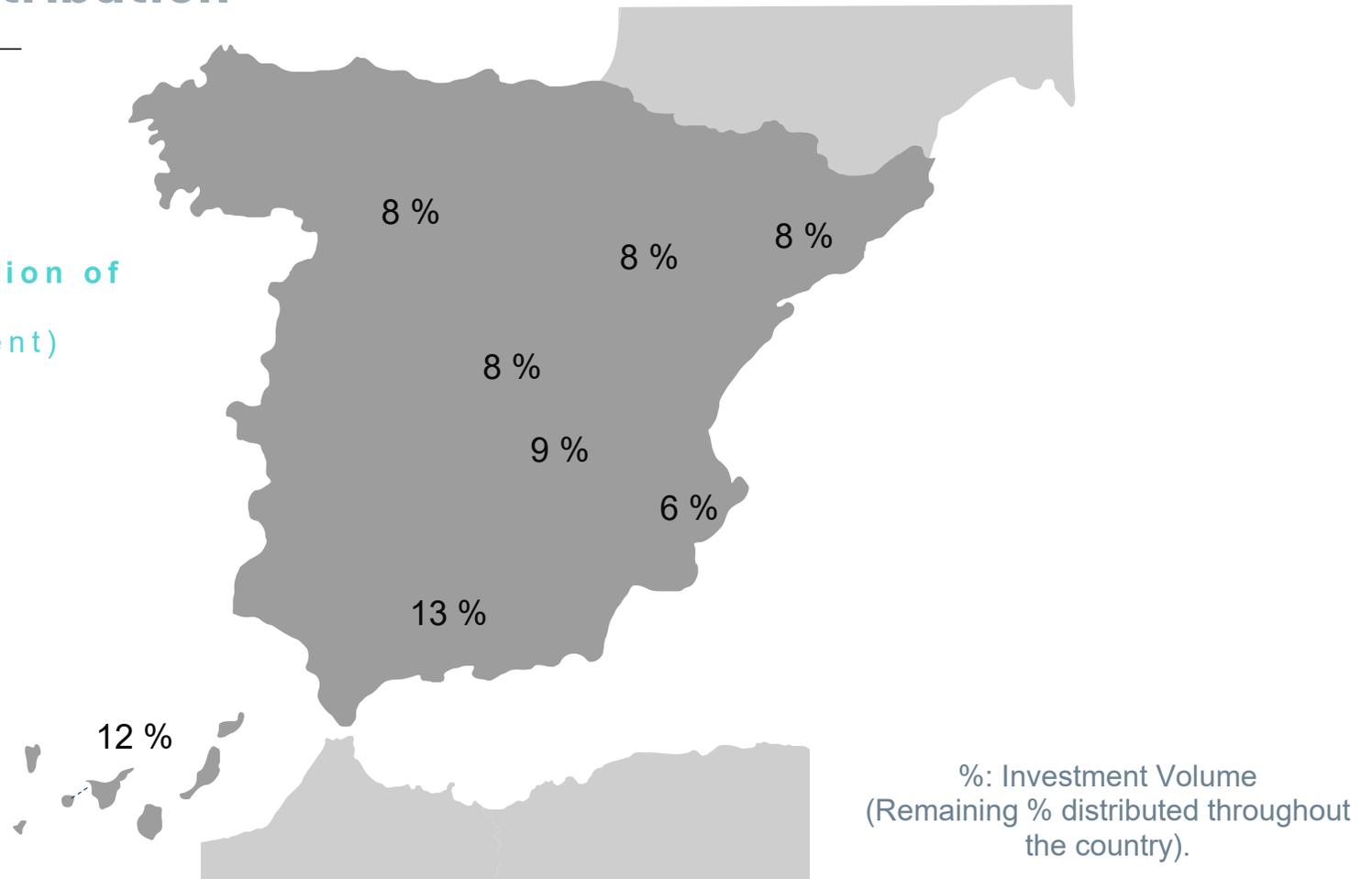
Supplier collaboration in...

- When needed, **enough and sufficient capability.**
- Identifying **challenges** in ensuring greater supply levels.



Geographical Distribution

Increased concentration of requirements
(Project management)



Strategic Requirements

3. ELECTROMECHANICAL ASSEMBLY



REDEIA predicts...

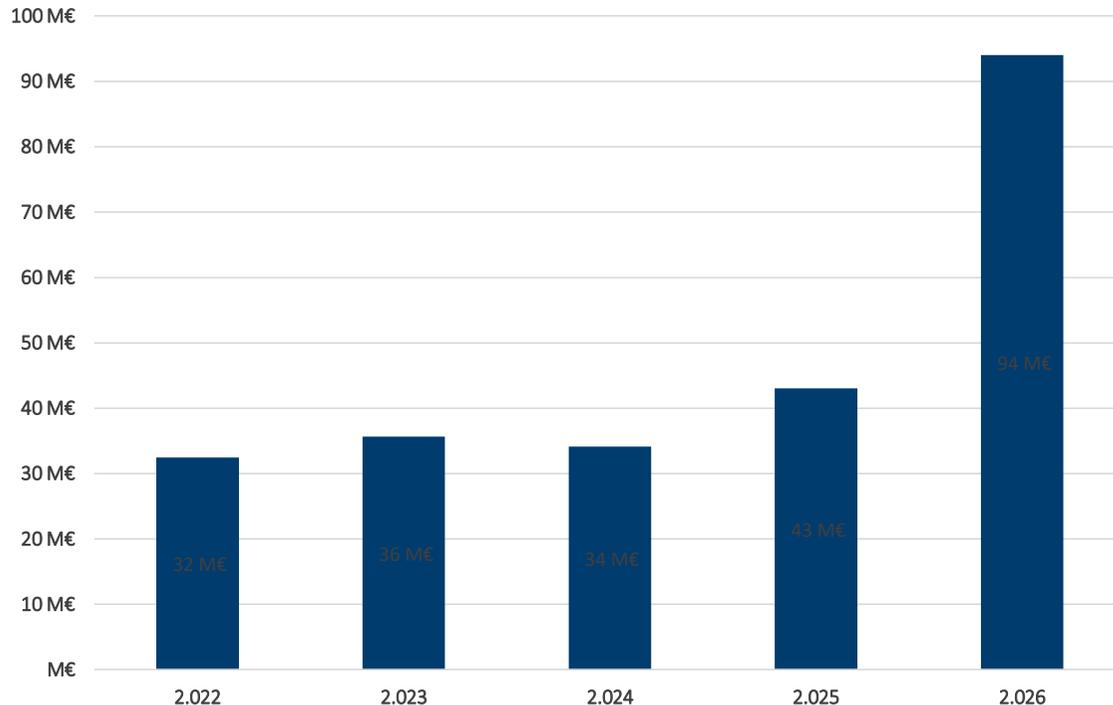


- **Hefty increase** in contracting volumes. 329 facilities were impacted in 22/26 timeframe.
- A constant quantity is anticipated in 2023–2024, followed by a **substantial increase** in demand in **2025 and particularly in 2026**.
- Only around **7% of the requirements still need to be met outside the existing framework agreement**.
- Between 19–21 and 22–26, the average value increased from €11.4 million to €42.6 million.
- Under the present framework agreement, the requirements for 2022–2023 and 2024 (up to February) have already been awarded.

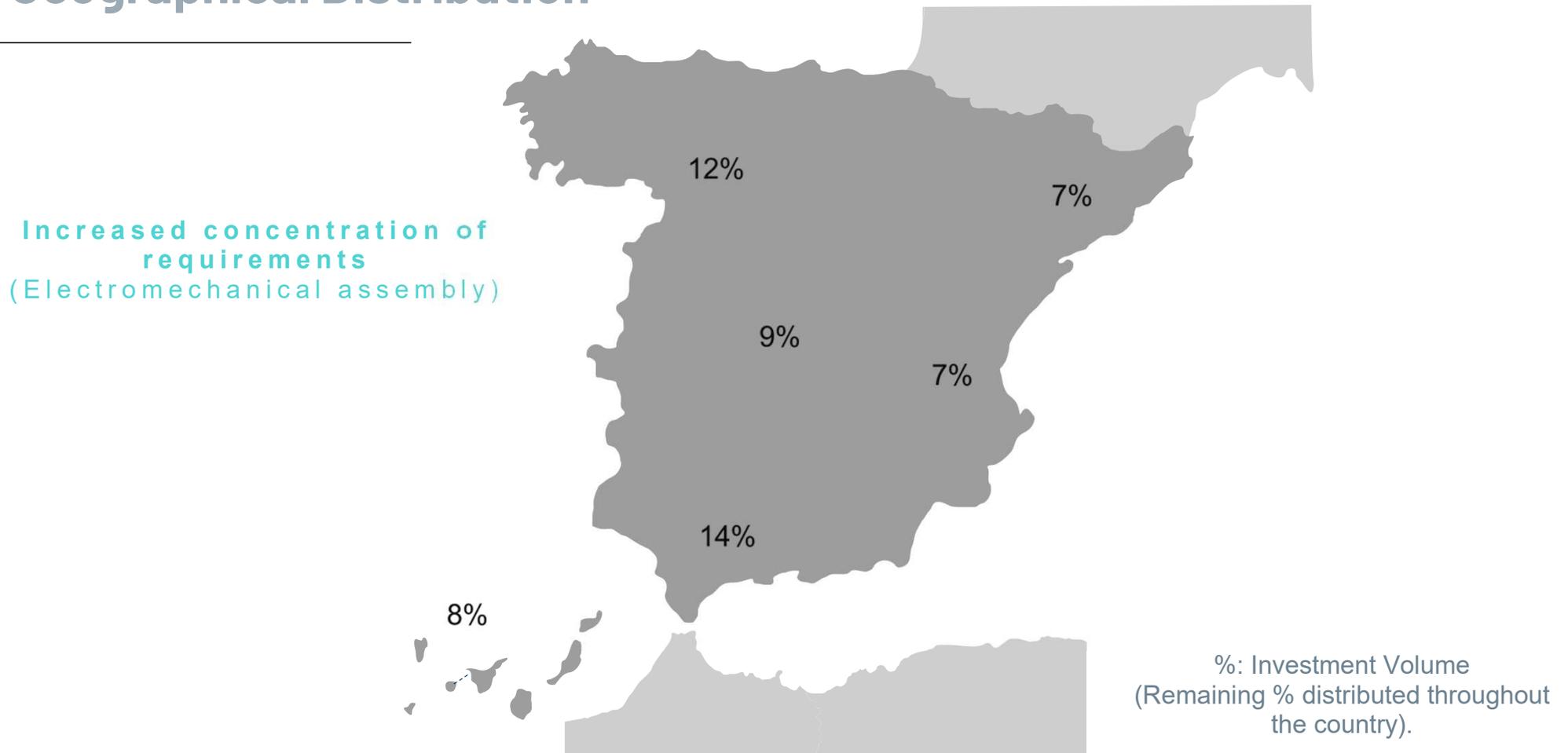


Supplier collaboration in...

- Determine strategies to increase supplier loyalty so that they devote more resources to our business.
- How to improve the appeal of tenders for non-FA works (grouping, etc.).

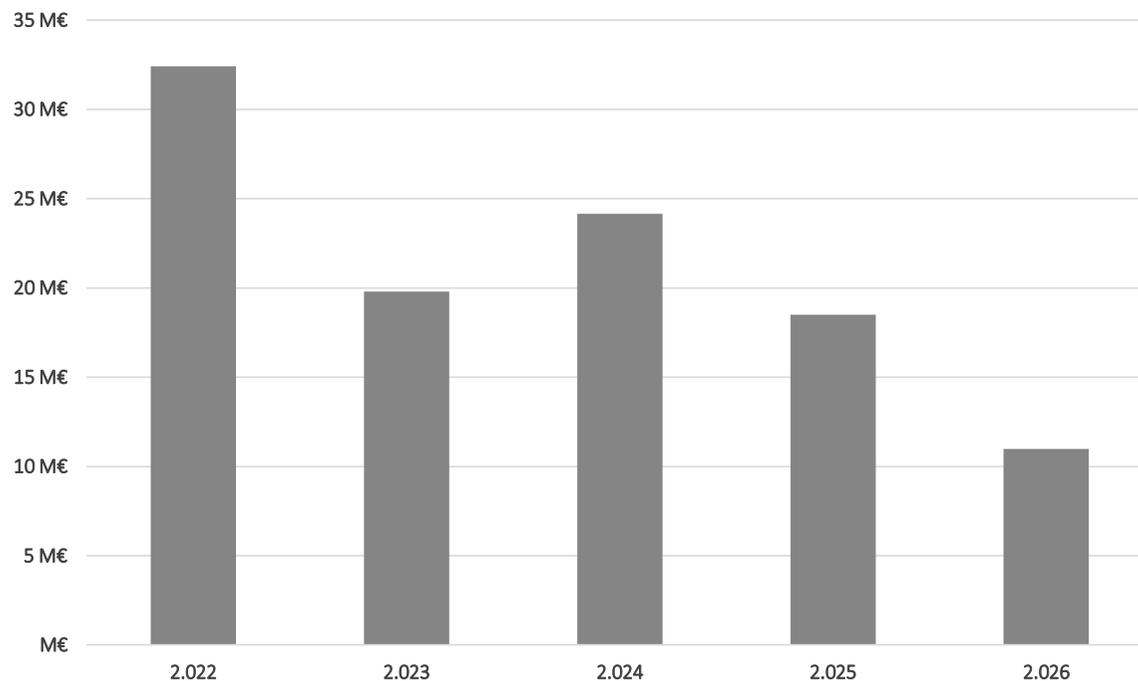


Geographical Distribution



Strategic Requirements

4. CIVIL ENGINEERING AND EARTHMOVING



REDEIA predicts...

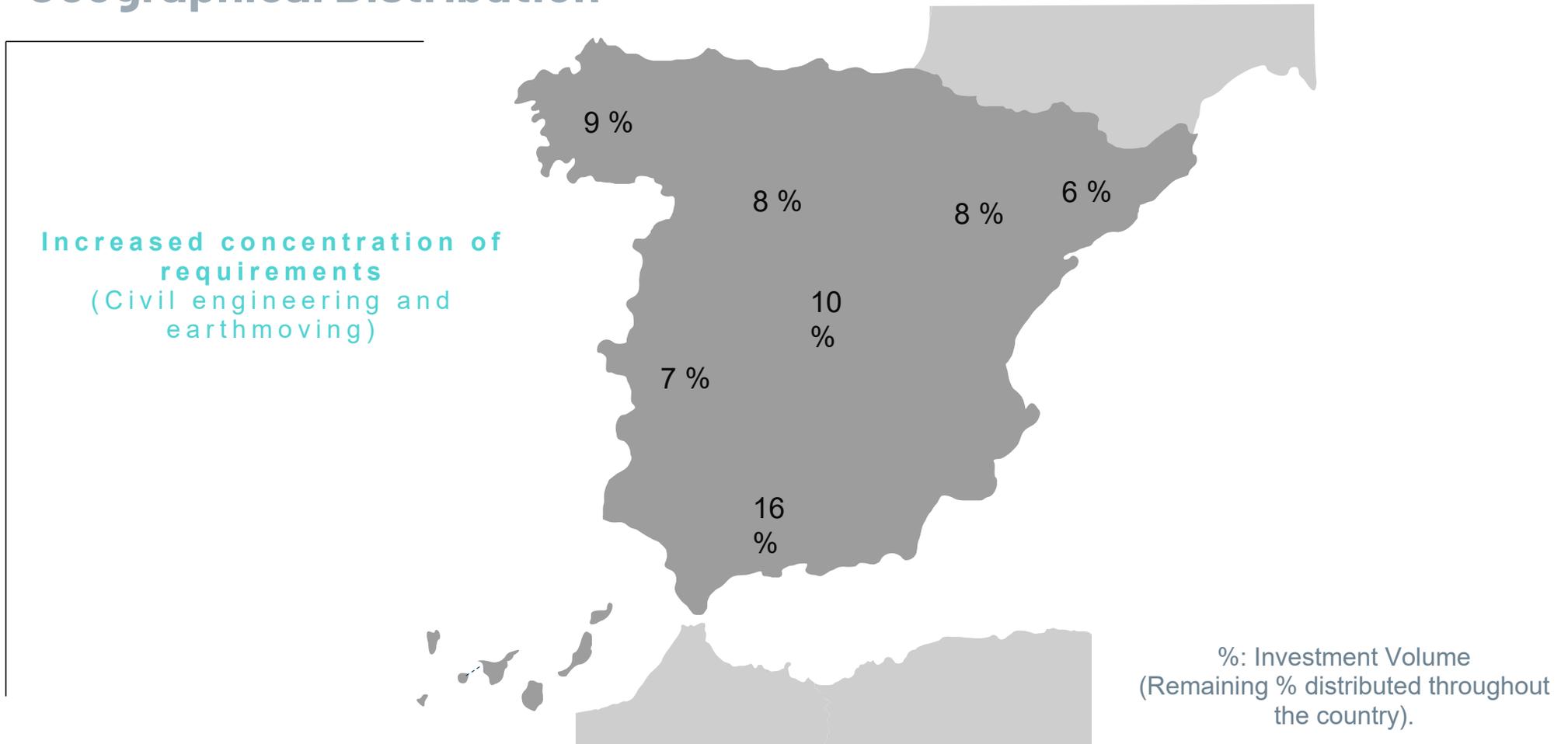
- **High volumes of recruitment.** 313 facilities affected during the 22/26 period.
- In 2023, there will be a **small rise** in requirements, followed by a **significant increase** in 2024.
- **Only relevant activities will be tendered ad hoc.**
- From an average of €19.4 MM in 19/21 to €21.1 MM in 22/26.
- About €23 million more will be given out in 2022.

Supplier collaboration in...

- Identification of the causes of their **limited participation** and refusal to submit bids.
- Gathering of **ideas and proposals** (on possible regrouping of needs, etc.).

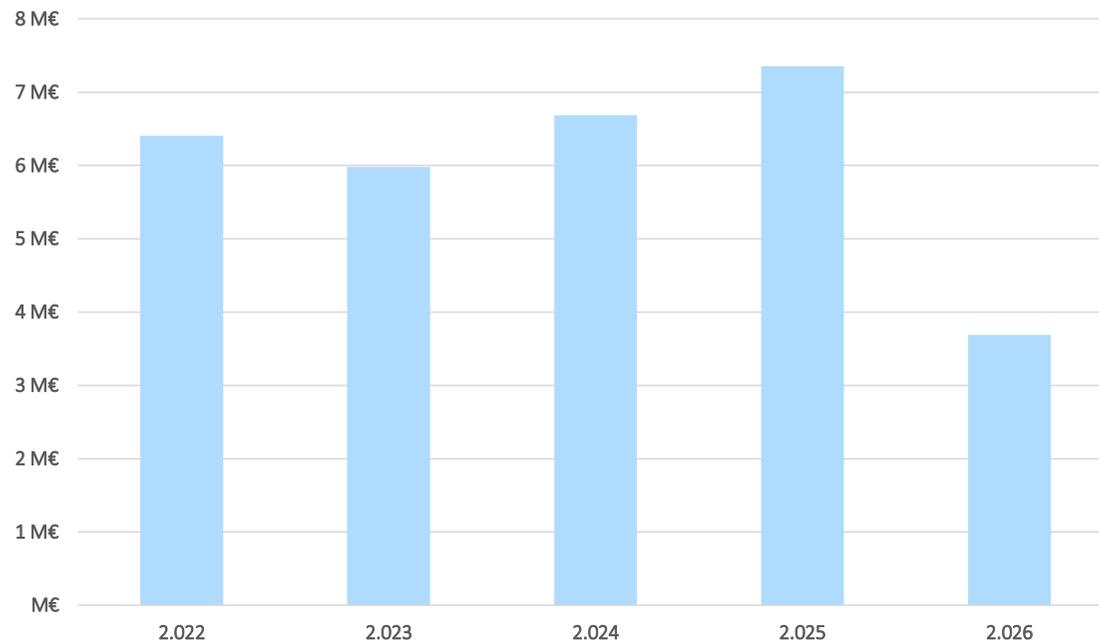


Geographical Distribution



Strategic Requirements

5. OPEN-CIRCUIT TESTING



REDEIA predicts...

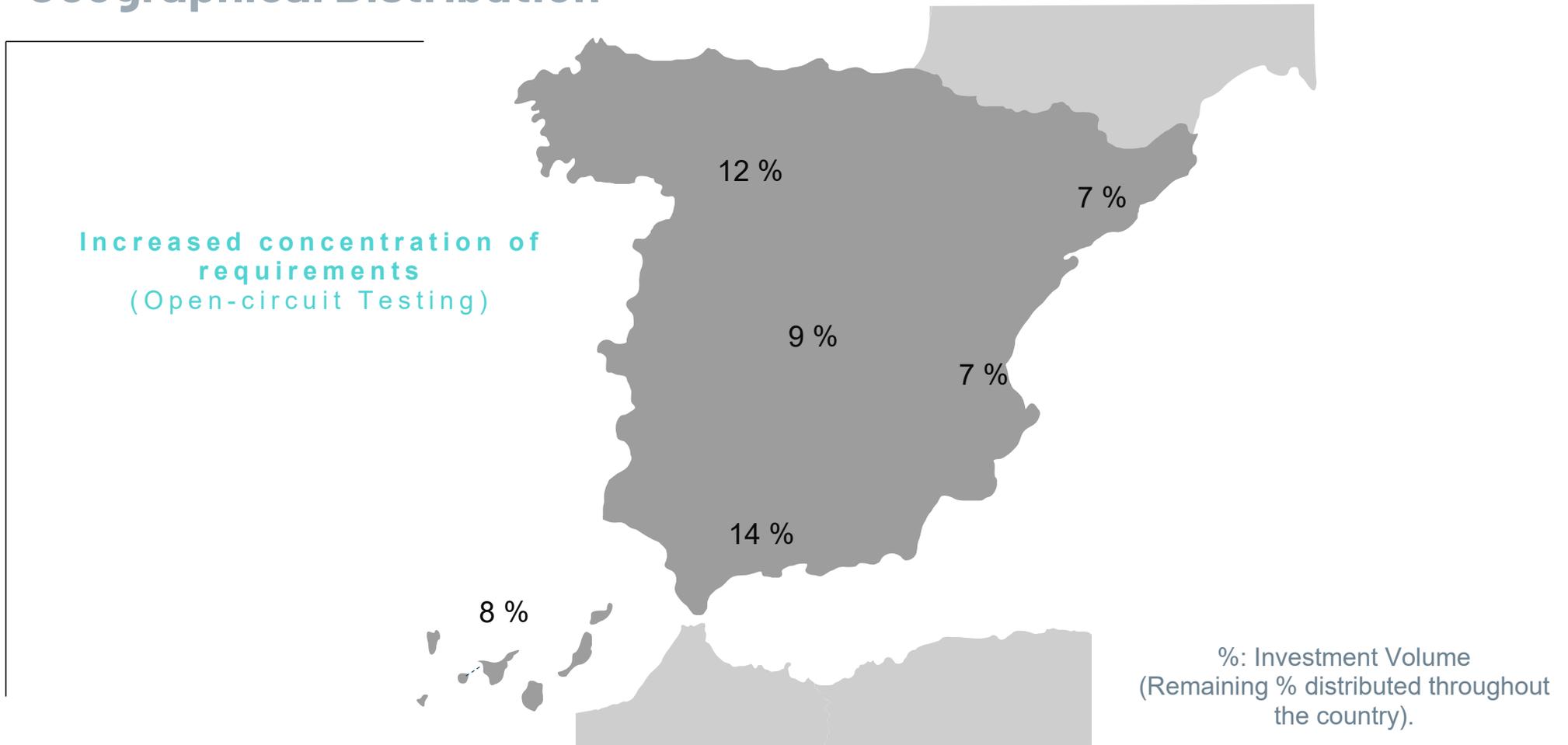
- **Significant rise** in requirements in comparison to the 2019/2020 period.
- **High demand for needed work teams** (especially for senior professionals). This is a **specialized field** where specialists are hard to come by (high specificity).
- From an average of €1.9 MM in 19/21 to €6 MM in 22/26.
- The €1.5 million for 2023, and all the 2022 have already been given out.

Supplier collaboration in...

- Capabilities and obligations in terms of **meeting deadlines**.
- Anticipation of obstacles to **ensure that the needed expectations** are met by the teams, particularly from the most experienced members.



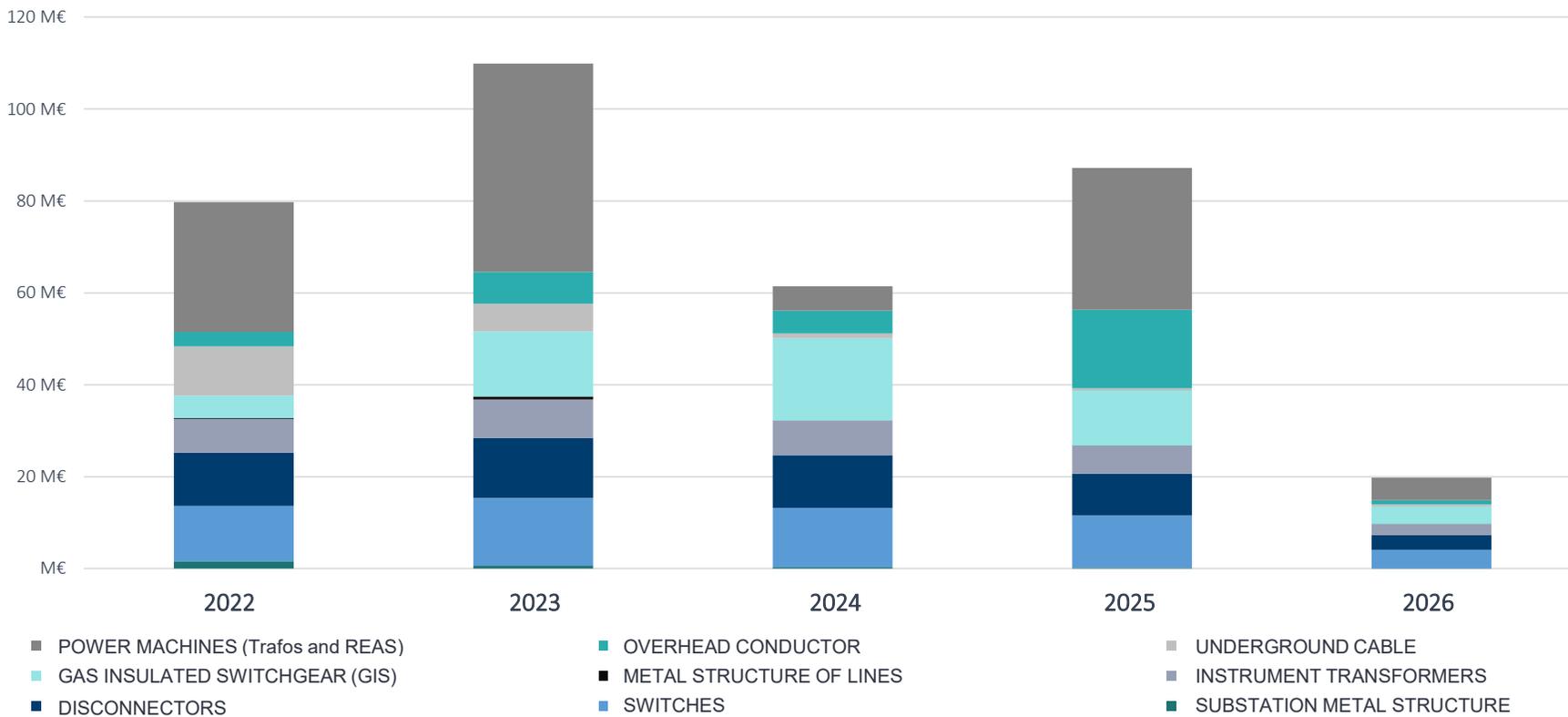
Geographical Distribution



3.2 Equipment and materials



Financial Volume



Strategic Requirements

6. POWER MACHINES

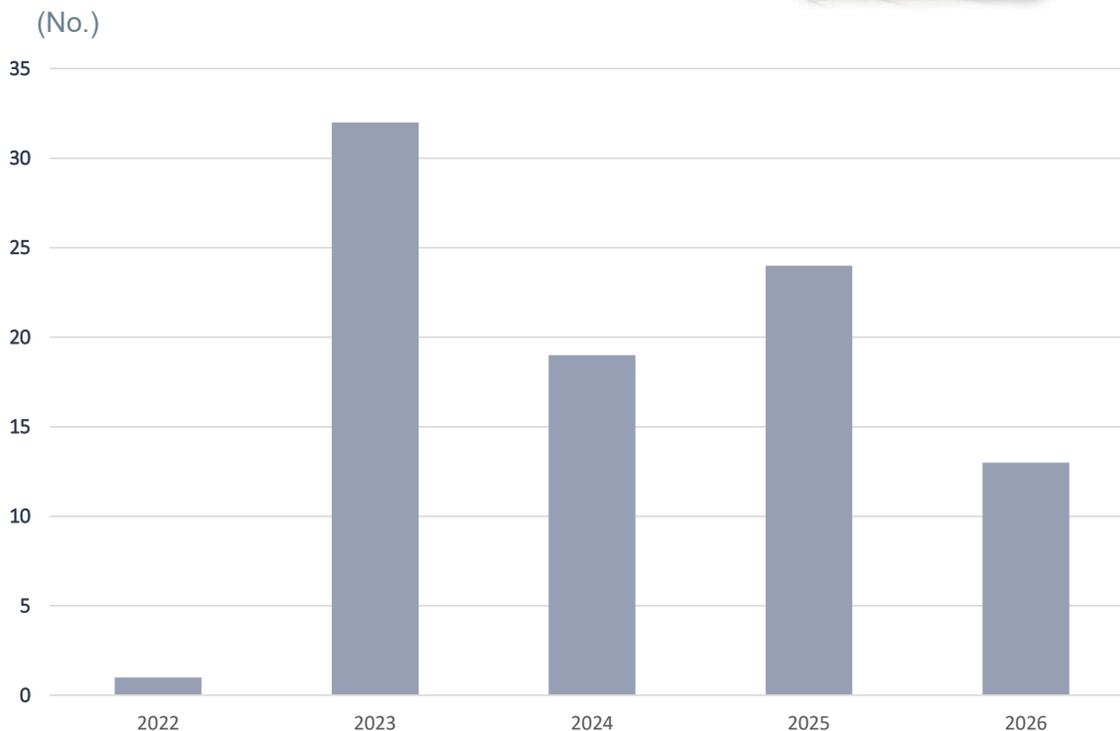


REDEIA predicts...

- In 2023, there will be a sharp increase in requirements (Trafos and REAS).
- **Changes to technical specifications** for future tendering may be made in order to explain all design requirements.
- There is now a **framework agreement in place for the most immediate needs**, and the company is considering how to tender for future needs.
- 17 machines have been allocated or are up for tender for 2022 and 2023.
- Average of 18 machines in the 22-26 period.

Supplier collaboration in...

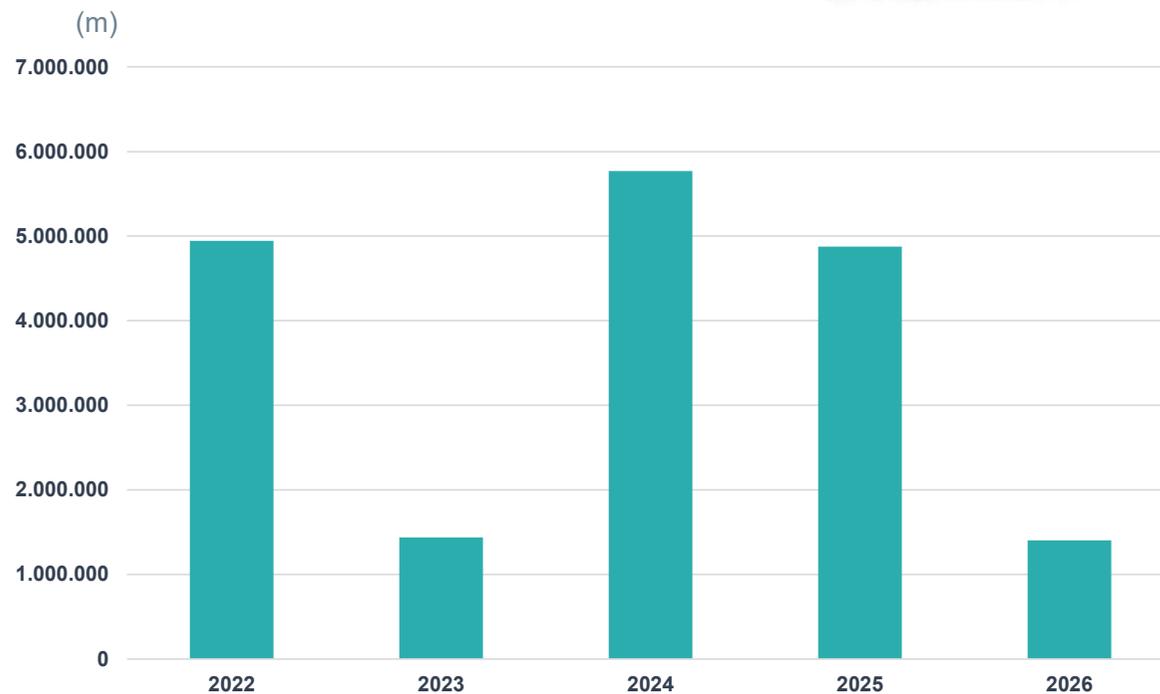
- Anticipation of potential **difficulties** in meeting the **supply quantity and deadline requirements**.
- **Solutions** for identifying a **drop in the quality of delivered items**.



Strategic Requirements



7. OVERHEAD CONDUCTOR



REDEIA predicts...

- In 2024–2025, there will be a sharp increase in requirements (with respect to 2022).
- A Framework Agreement is in force until the end of 2023, after which a new one will be offered in the second part of the year.
- Average of 3,686,000 m in the period.

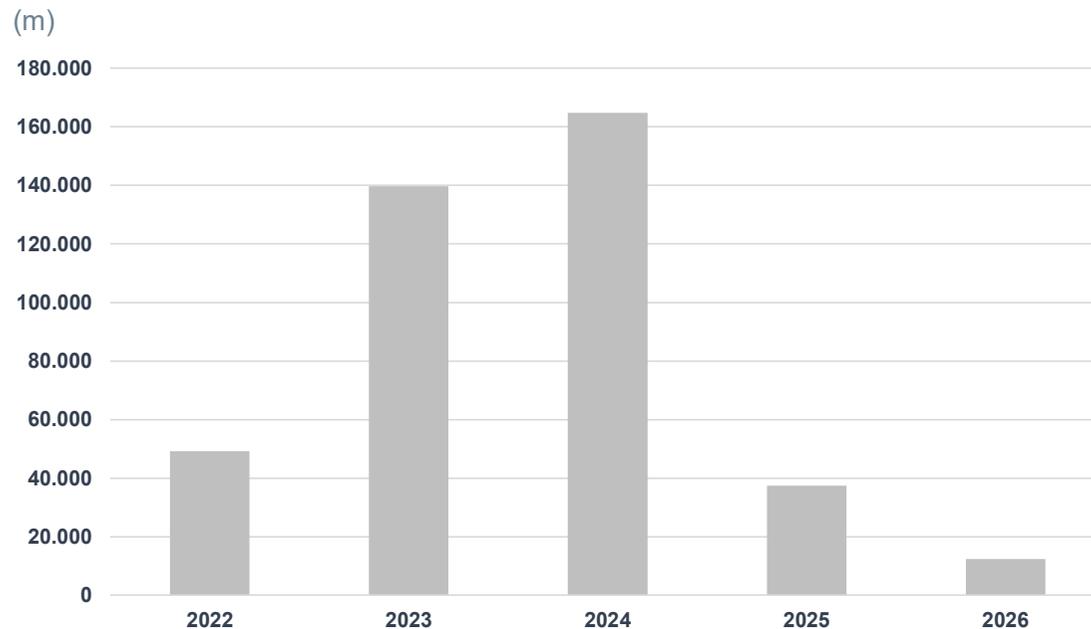
Supplier collaboration in...

- Problems with production (shortage of raw materials, etc.).
- Meeting deadlines.



Strategic Requirements

8. UNDERGROUND CABLE (including wiring)



REDEIA predicts...

- In 2023–2024, there will be a significant increase in requirements with respect to 2022.
- In 2025–2026, there was a significant drop, with an average of 80,684 m in the 22/26 period.
- Consider the **installation and commissioning times**.
- **Coordination between cable fabrication and installation.**
- **2 projects out of the Framework Agreement:** Ceuta Spanish Mainland and Gran Tarajal.
- The present Framework Agreement is nearly depleted, and a study is being conducted to determine how to tender future projects (possible new framework agreement).

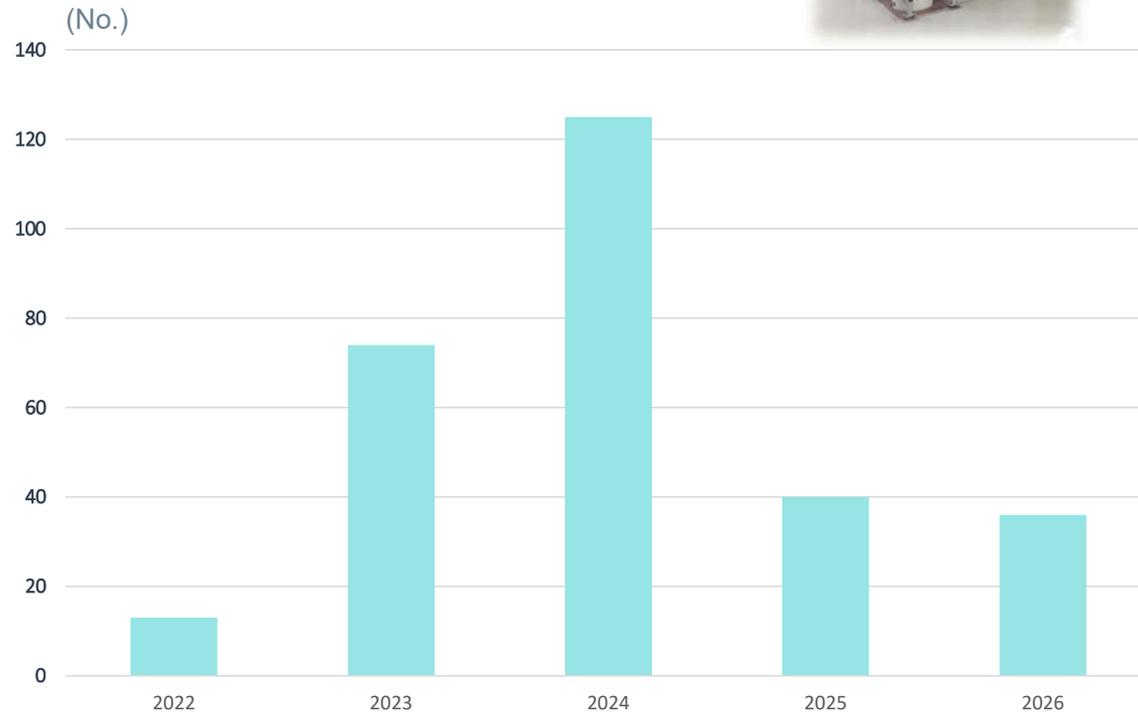
Supplier collaboration in...

- **Problems with production** (shortage of raw materials, etc.).
- Meeting **deadlines**.



Strategic Requirements

9. GAS INSULATED SWITCHGEAR (GIS)



REDEIA predicts...

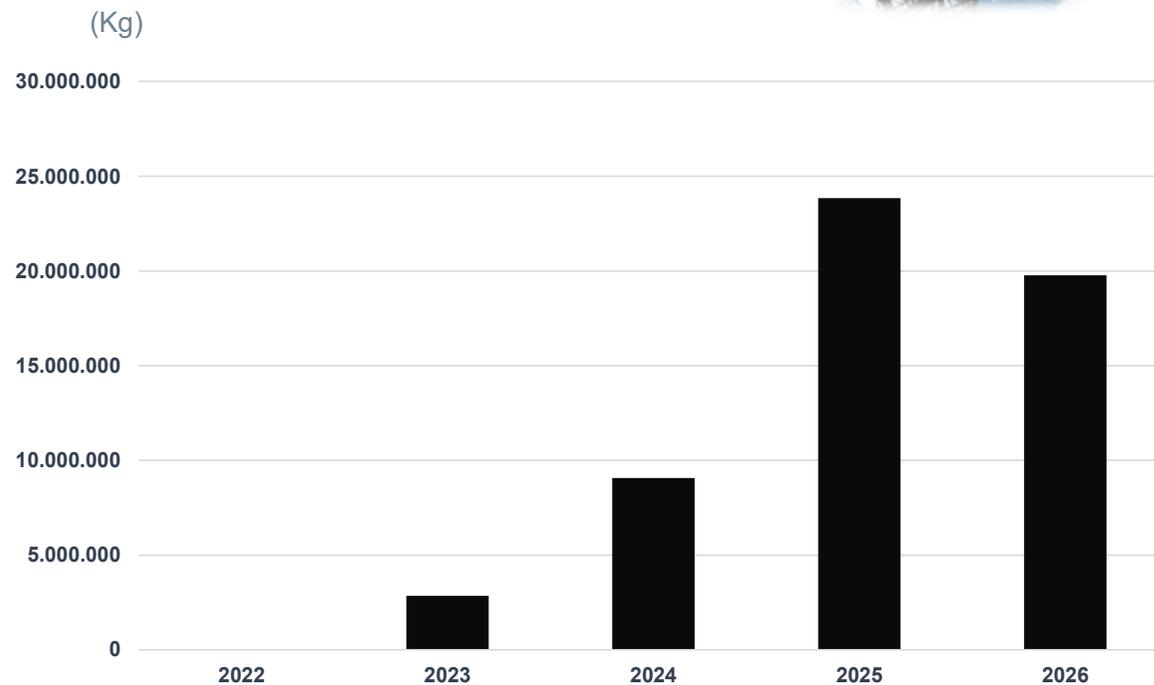
- **Very high volume of requirements**, mainly for extensions.
- Sharp increase in 2024. Average of 58 machines in the 22-26 period.
- **New framework agreement** for substation expansions that includes the most requested types (55 cells for 2023 and 2024), with specific tenders for the remaining requirements.
- 51 GIS cells have either been awarded or are in the tendering process for 2022 and 2023.
- Particularities: Extensions with technological constraints.

Supplier collaboration in...

- **Delivery time capacity.**
- Meeting **technical specifications.**
- Identification of **dangers** (raw materials, etc.).

Strategic Requirements

10. METAL STRUCTURE OF LINES



REDEIA predicts...

- **Sharp increase in requirements.** Peak demand is expected around 2025.
- Purchase under a **Framework Agreement** (2022-2025). A tender will be issued for 2026.
- Average of 11,700,000 kg in the period.

Supplier collaboration in...

- Anticipation of **potential challenges** in meeting deliveries within the stipulated **periods**.



Strategic Requirements



11. INSTRUMENT TRANSFORMERS



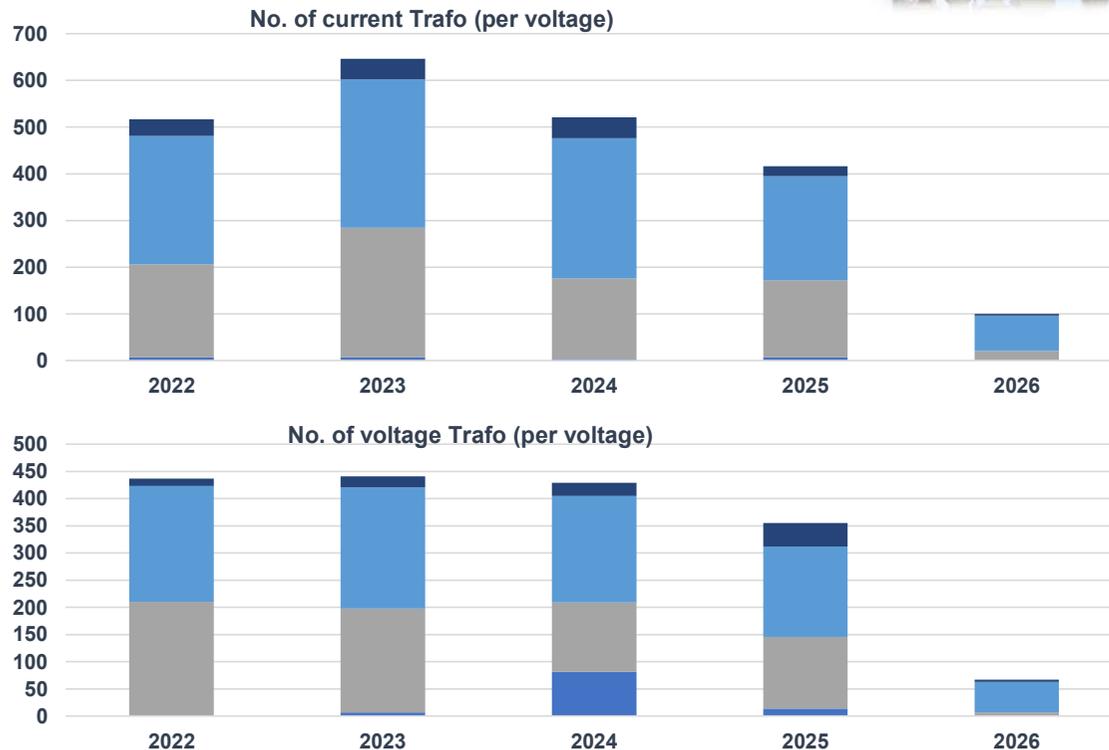
REDEIA predicts...

- Peak demand is expected around 2023.
- Slight rise in requirements in 2023. Gradual decline from 2024.
- Purchase under a **Framework Agreement** (until 2023). The first half of 2023 will see the tendering of a new deal.
- At the time, there were an average of 440 IT units and 346 voltage transformers.



Supplier collaboration in...

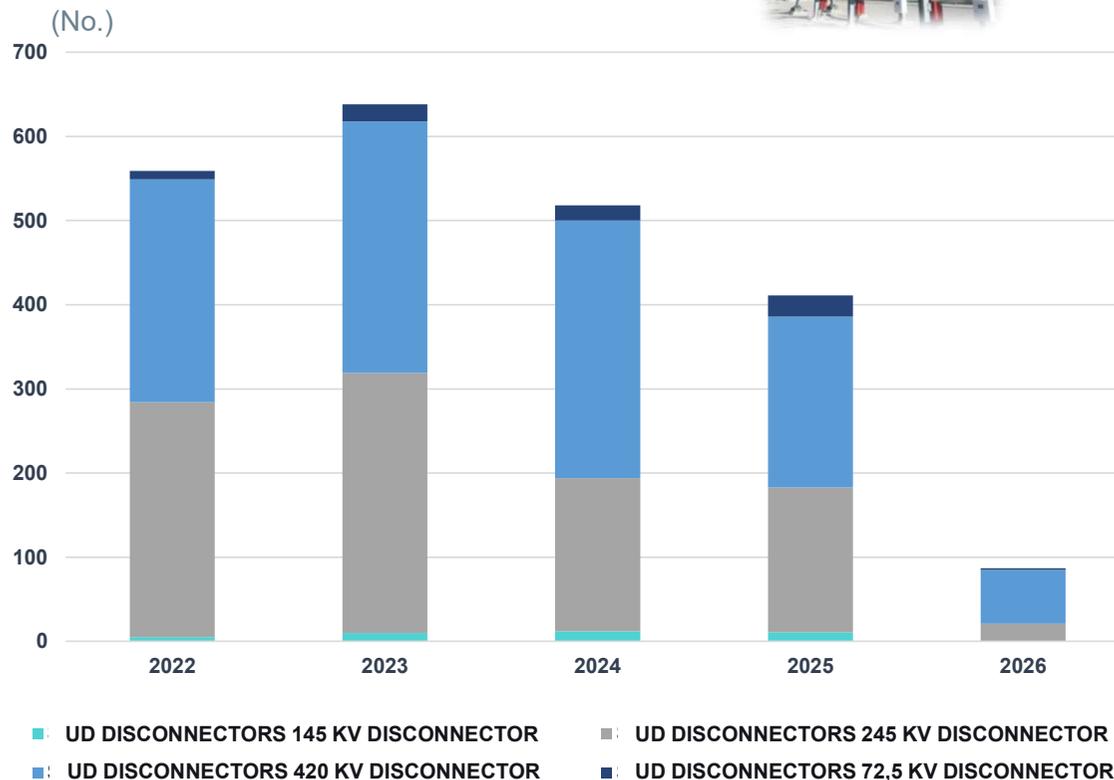
- Anticipation of **potential challenges** in meeting deliveries within the stipulated **periods**.



Strategic Requirements



12. DISCONNECTORS



REDEIA predicts...

- Slight rise in requirements in 2023. Gradual decline from 2024.
- Purchase under a **Framework Agreement** (2022 – 2024).
- Average of 443 in the period.

Supplier collaboration in...

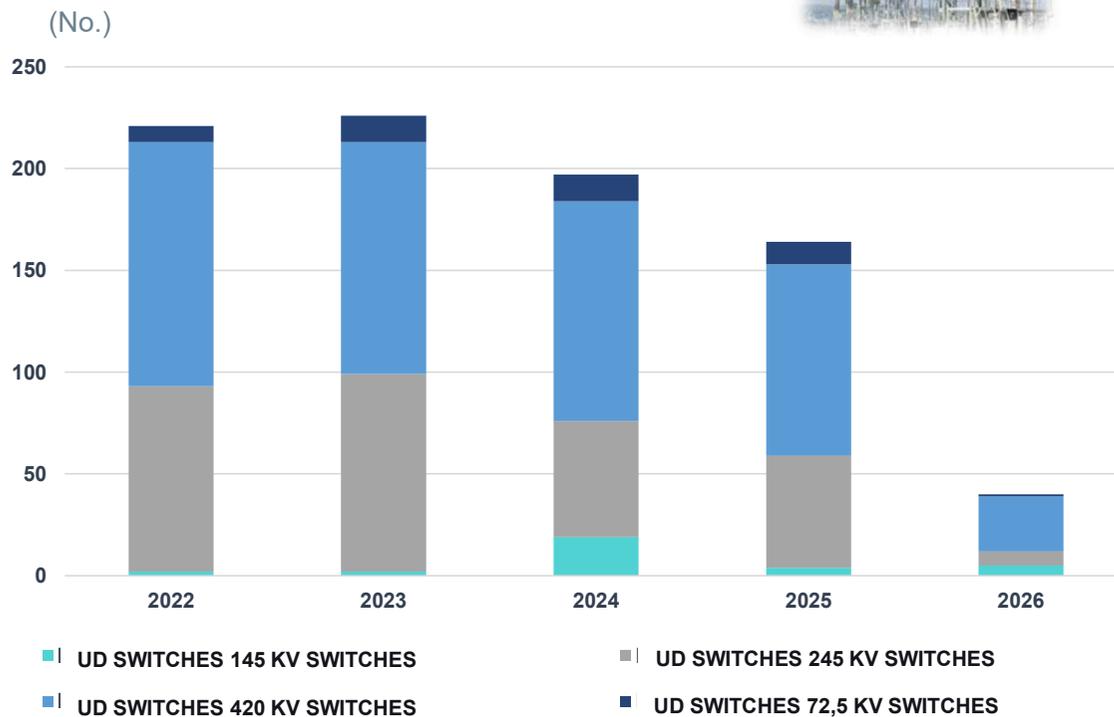
- Anticipation of **potential challenges** in meeting deliveries within the stipulated **periods**.



Strategic Requirements



13. SWITCHES



REDEIA predicts...

- Peak demand is expected around 2023.
- Demand will gradually decrease from 2023
- Purchase under a **Framework Agreement** (2022– 2024).
- Average of 170 units in the reporting period.

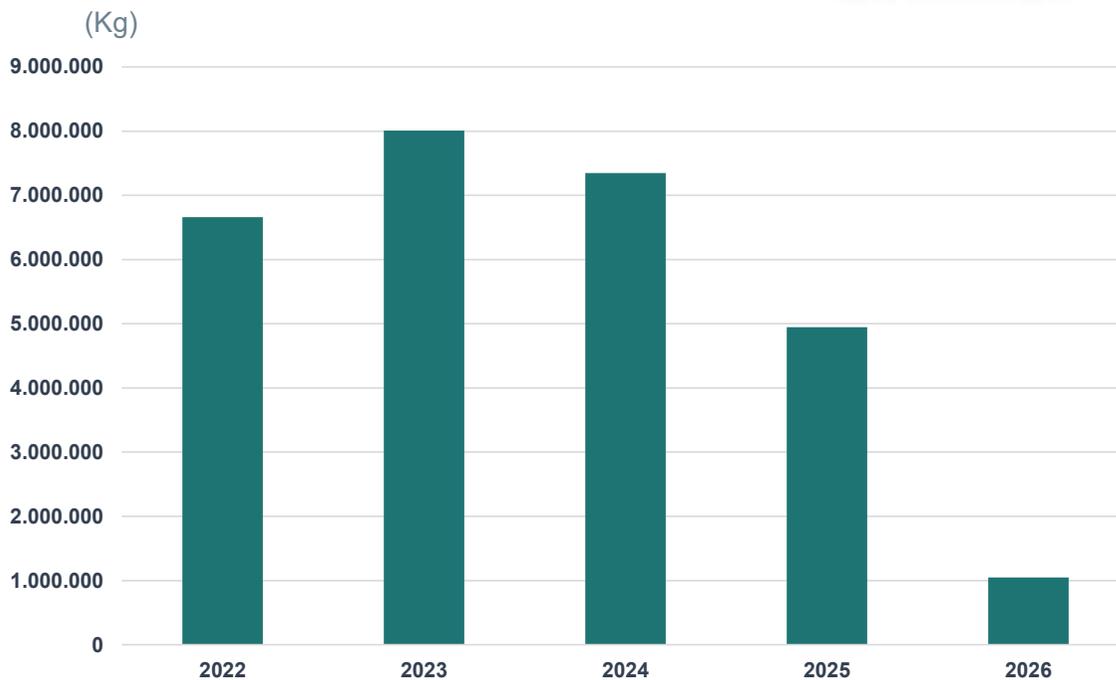
Supplier collaboration in...

- Anticipation of **potential challenges** in meeting deliveries within the stipulated **periods**.



Strategic Requirements

14. SUBSTATION METAL STRUCTURE



REDEIA predicts...

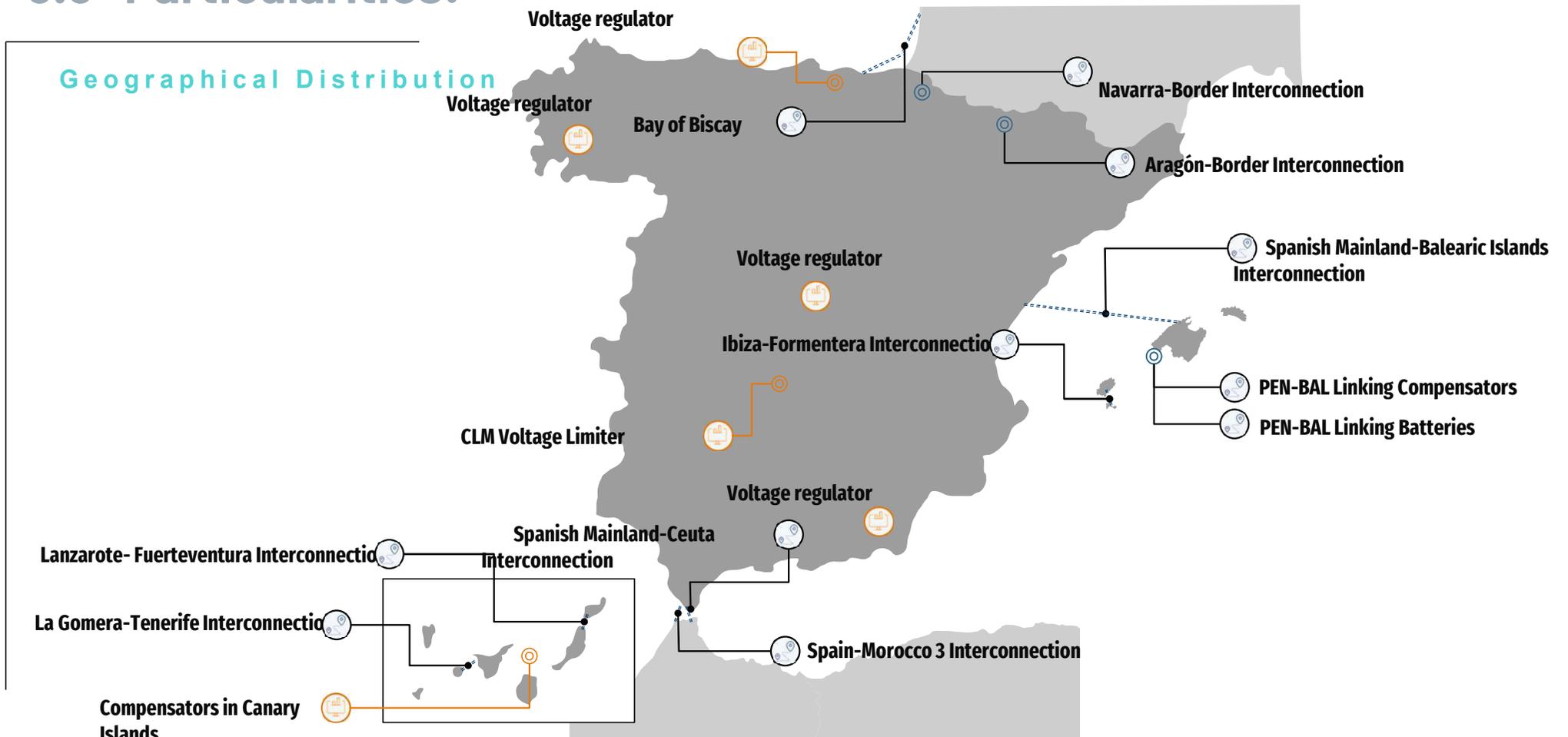
- Peak demand is expected around 2023.
- Demand will gradually decline in 2024-2026.
- Purchase on the basis of a **Framework Agreement**. (2022 – 2024) already awarded
- Average of 5,600.00 kg in the reporting period.

Supplier collaboration in...

- Anticipation of **potential challenges** in meeting deliveries within the stipulated **periods**.



3.3 Particularities:



3.3 Unique Projects (I)

Underwater

Focus	Project Name	Tender year	Estimated Commissioning	EVPI (€ MM)
MAINLAND-BALEARIC ISLANDS INTERCONNECTION	L/ Fadrell - San Martín 220 kV (C.Sub)	2023	>2026	729
BAY OF BISCAY	L/ Interconnection Gatika - Frontera Fran	2022	>2026	715
MAINLAND - CEUTA INTERCONNECTION	L/ Algeciras-V. Africa 132 kV (C.Sub)	2022	2025	184
MAINLAND - CEUTA INTERCONNECTION	SE/ Algeciras 132 kV	2022	2025	23
MAINLAND - CEUTA INTERCONNECTION	SE/ Virgen de Africa 132 kV	2022	2025	15
SPAIN-MOROCCO 3 INTERCONNECTION	L/ Puerto De La Cruz-Fardioua 400 kV	2025	>2026	110
LA GOMERA - TENERIFE INTERCONNECTION	L/ Chío-La Gomera 66 kV (c. sub.)	2022	2025	92
IBIZA - FORMENTERA INTERCONNECTION	L/ Torrent-Formentera 132 kV (C.Sub)	Given	2023	84
LANZAROTE-FUERTEVENTURA INTERCONNECTION	L/ Playa Blanca-La Oliva 132 kV (C.Sub)	Given	2022	32
NAVARRA- BORDER INTERCONNECTION	L/ Inter. Navarra-Frontera 400 kV	2027	>2026	1313
ARAGON- BORDER INTERCONNECTION	L/ Interconnection Aragón -Frontera 400 kV	2027	>2026	1271
Grand total				4,568

The expected value of perfect information (EVPI) of each facility is assessed in line with the wording of Royal Decree 1073/2015, Article 11 Paragraph 11.

3.3 Unique Projects (II)

Others

Focus	Project Name	Tender year	Estimated Commissioning	EVPI (M€)
PEN-BAL LINKING COMPENSATORS	SE/ Valldurgent 220 kV (Compensators)	2026	>2026	27
PEN-BAL LINKING COMPENSATORS	SE/ Santa Ponsa 220 kV (Compensators)	2026	>2026	55
PEN-BAL LINKING COMPENSATORS	SE/ San Martín Bal 220 kV (Comp.)	2026	>2026	27
PEN-BAL LINKING BATTERIES	SE/ Mercadal 132 kV (Batteries)	2024	2026	47
PEN-BAL LINKING BATTERIES	SE/ San Antonio 66 kV (Batteries)	2024	2026	81
VOLTAGE REGULATORS	Statcom Vitoria	Given	2024	18
VOLTAGE REGULATORS	Statcom Moraleja	2022	2025	22
VOLTAGE REGULATORS	Statcom Tabernas	2022	2025	25
VOLTAGE REGULATORS	Statcom Lousame	2022	2025	23
CASTILLA-LA MANCHA VOLTAGE LIMITERS	SE/ Picón 220 kV (Limiter Aceca Cto 1)	2024	2025	4
CASTILLA-LA MANCHA VOLTAGE LIMITERS	SE/ Picón 220 kV (Limiter Emp Cto.1)	2024	2025	4
COMPENSATORS IN CANARY ISLANDS	SE/ Arucas 66 kV (Compensators)	2024	2025	13
COMPENSATORS IN CANARY ISLANDS	SE/ Jares 132 kV (Compensators)	2024	2025	13
COMPENSATORS IN CANARY ISLANDS	SE/ Drago 66 kV (Compensators)	2024	2025	13
Grand total				372

The expected value of perfect information (EVPI) of each facility is assessed in line with the wording of Royal Decree 1073/2015, Article 11 Paragraph 11.

Diapositiva 37

- PS0** revisar esto. El statcom de vitoria se licito en 2021
Este año esta previsto licitar 3 Statcom. Incluir.
Puente Jabardo, Sonia; 2022-06-07T15:25:33.792
- DVTPO 0** Pendiente incluir año de licitación de compensadores Canarias
De Vicente Trapiello, Pilar; 2022-06-14T11:10:55.802
- PS0 1** [@Isabel Mira, Gonzalo] sigue pendiente actualizar esta planificacion
Puente Jabardo, Sonia; 2022-06-14T16:13:52.245

redeia

El valor de lo esencial

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