

Fisuel Seminar – 07-08 of October 2026

Rome - Italy

ELECTRIC VEHICLES IN SENEGAL

Which electrical safety standards and requirements are needed to support their development?

Présentation:
M. Moustapha DIEYE, Directeur Général



PROQUELEC

CONTENTS

1. Introduction & Energy Context

2. State of Electromobility in Senegal

3. The Technical Challenges of Charging

4. Security Chain & Standardization

5. Regulatory Framework & Roadmap

1.1 Senelec: an electrical infrastructure set to integrate new uses (2024)

7 469,54
GWh

Gross production + purchases

1 158,61
MW

RI Peak load

6 063,46
GWh

Energy sales

2 370 925

Customers

41 678 km

HVA + LV network

11 441

MV/LV Substations

The development of electric vehicles is part of a large-scale electrical system, which will gradually be supplemented by electromobility

Source : Senelec, Chiffres clés 2024.

1.2 Senelec & PROQUELEC: a convergence around electrical safety

SENELEC

Distribution of electrical energy

MV/LV infrastructure

New uses

NOUVEL USAGE

Electric vehicle



Charging infrastructure



Electrical installation

PROQUELEC

Standards and safety

Consulting & diagnosis

Compliance check

Certification

Training / Accreditation

Senelec is one of the founding members of PROQUELEC. EVSE (Electric Vehicle Supply Equipment) creates a new field of application for the quality and safety of electrical installations.

2.1 Electromobility is already a reality in Senegal

TER

Electric rail transport – a first experiment in large-scale electromobility.

BRT

Electric urban mobility — a new step forward with a 100% electric public transit system.

TER + BRT → Today

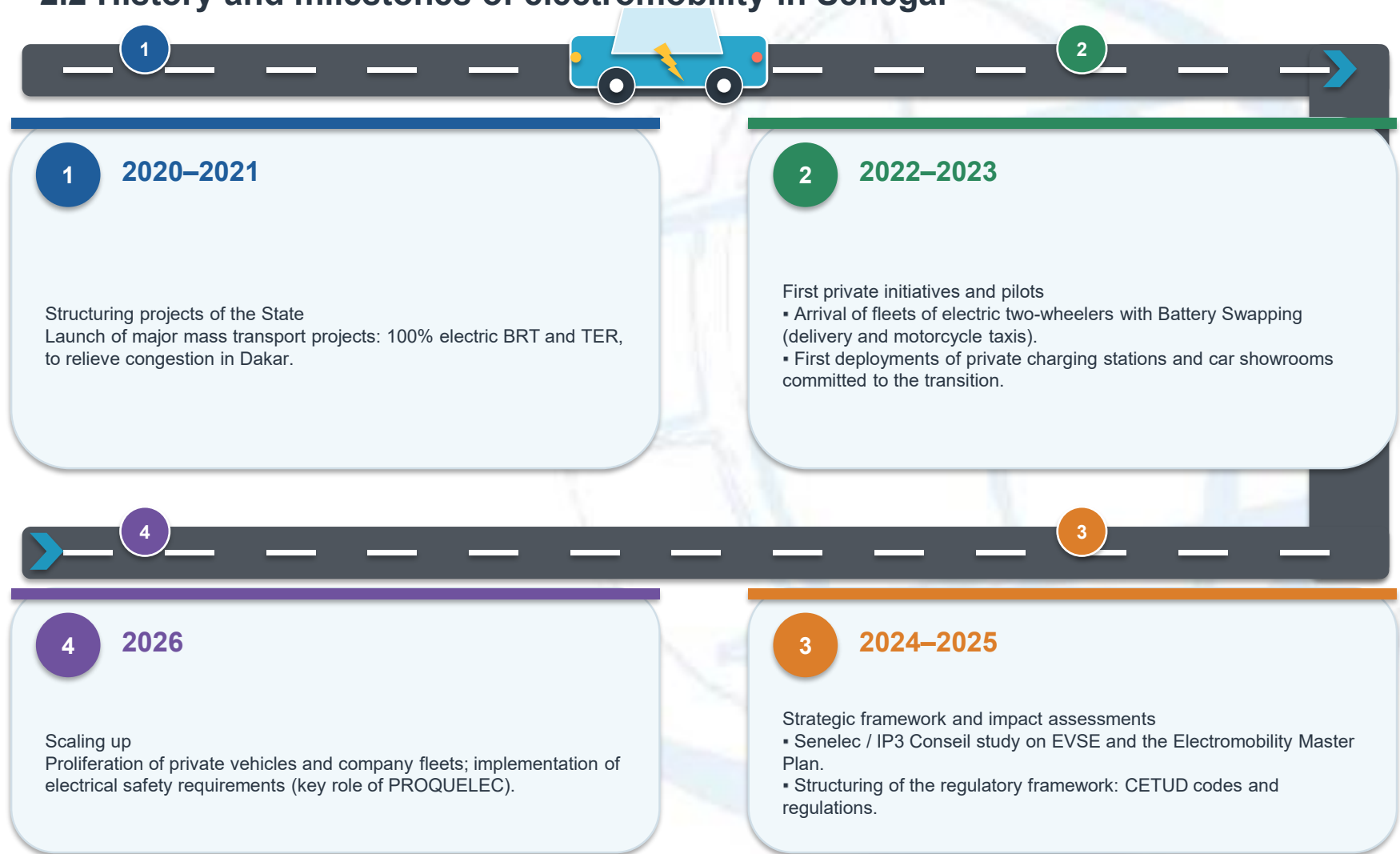
→ Tomorrow: Massive deployment and diversification of uses

 2/3 Wheels (Battery Swapping)

 Fleets & Individuals (AC/DC Charging Station)

Senegal is already committed to electromobility. The next challenge is to support its extension under controlled conditions of electrical safety.

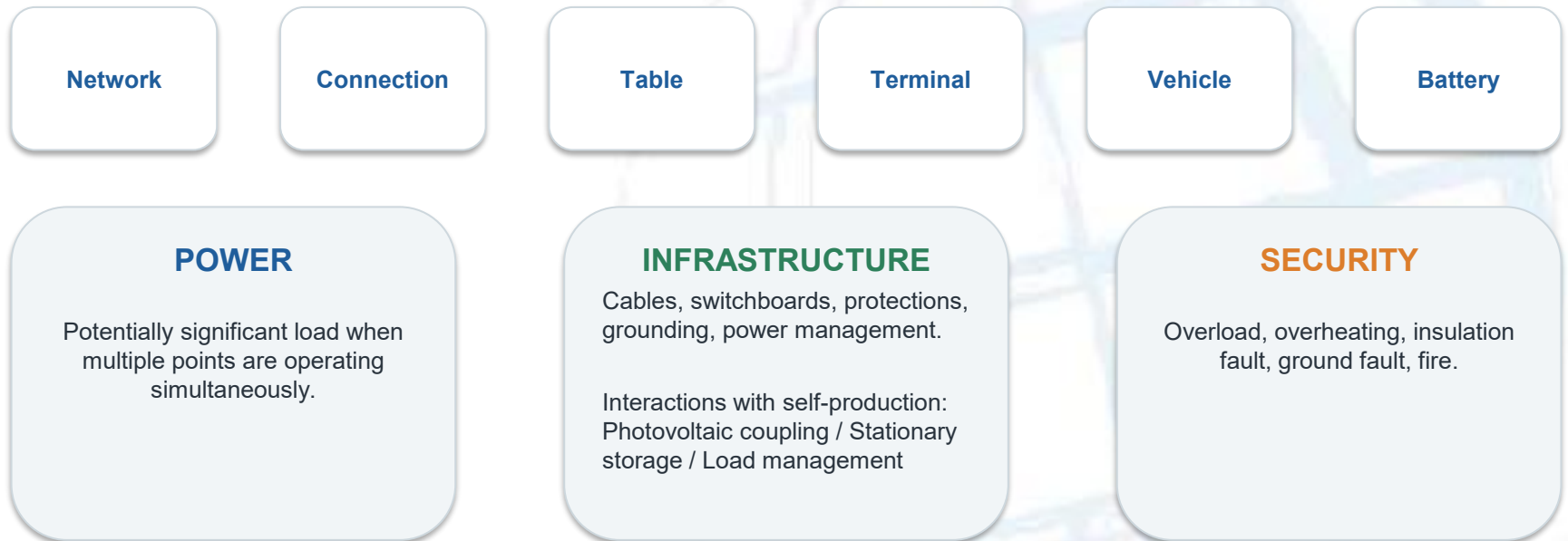
2.2 History and milestones of electromobility in Senegal



2.3 Statistics & Dynamics of the National Electricity Fleet

- **Public Transport (The drivers of the transition):**
 - **BRT (Dakar):** 121 100% electric buses put into service (transport capacity of more than 300,000 passengers/day).
 - **TER:** Regional Express Train running on electric energy (Dakar-AIBD axis).
-
- **Light Vehicles & Professional Fleets:**
 - **2/3 Wheeled Fleet:** Segment with the strongest urban growth (estimate > 1,500 to 2,000 units on the road or in the deployment test phase via swapping).
 - **Passenger / Business Vehicles:** Fleet estimated at a few hundred vehicles (strong acceleration observed since 2024 with the import of GB/T and CCS standards).
-
- **Charging Infrastructures (EVCI):**
 - **Network still emerging:** Estimated need for several hundred public/semi-public charging points by 2030 to cover the Dakar-Thies-Mbour axis and the national network.
 - **Finding of the 2023 study:** Only 3% of informed users knew the location of a public charging station, highlighting the challenge of networking and signage.

3.1 La recharge : le maillon critique de l'électromobilité



Location of the charging stations:

3% of the 530 respondents who knew about EVs were aware of the location of charging stations in Senegal (2023 study).

3.2 Une borne de recharge n'est pas une simple prise électrique

RECHARGE AC

- 230 V single-phase / 400 V three-phase
- 3.7 to 22 kW
- Conversion mainly in the vehicle
- Connector: Type 2 commonly used

**Hotels, Showrooms, Malls, CICES
Home / Business Depot**

RECHARGE DC

- 200 0 800V AND ABOVE
- 50 kW to several hundred kW
- Conversion at the charging station
- Connectors:
CCS Combo (European/Western Standard)
GB/T (Chinese Standard: BYD, Geely, Dongfeng, etc.)

Highway and petrol stations

Swapping Station (2/3 roues)

Swappin of an empty battery for a 100% charged battery in less than 2 minutes (Battery Swappin)

Urban hubs & dedicated stations

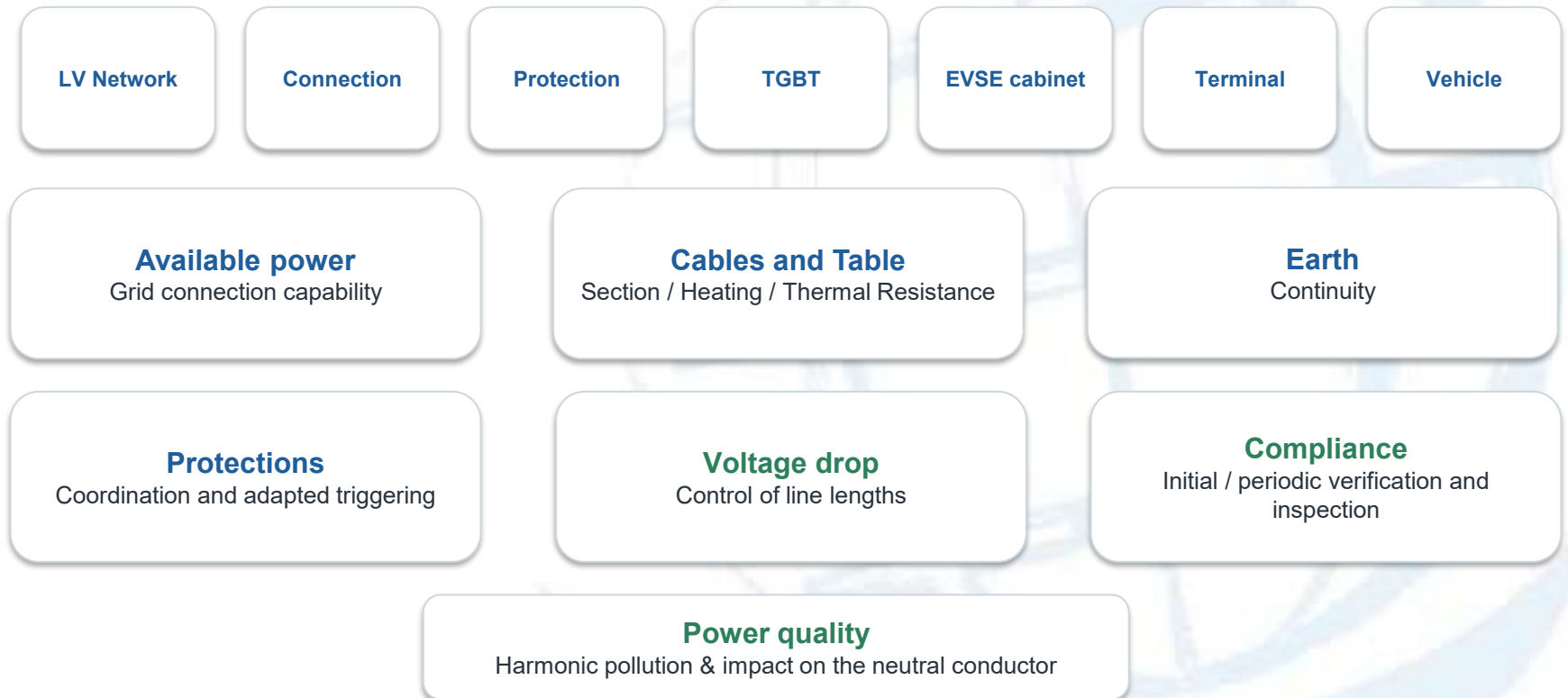


SAFETY POINT OF VIGILANCE: The rise of GB/T standard vehicles leads to the frequent use of adapters (GB/T ↔ CCS). An uncertified or undersized adapter constitutes a major risk of heating and electric arc at high power.

As power increases, so do the requirements for sizing, protection, wiring, grounding, and control.

Source : étude Senelec / IP3 Conseil, 2023.

3.3 De la borne au réseau : toute la chaîne électrique doit être sécurisée



The safety of the EVSE chain goes beyond the risk of electric shock: it includes the preservation of the Senelec network and the quality of the energy distributed.

4.1 The challenges of EVSE security

The risk depends on the quality of design, installation, protection, operation and maintenance.

1

Conception



- Suitable sizing
- Choice of equipment
- Standards compliance
- Taking into account uses

2

Installation



- Compliant implementation
- Quality of connections
- Respect for the rules of the art
- Qualifications of the speakers

3

Protection



- Suitable protective devices
- Coordination of protections
- Defect detection
- Protection of people and property

4

Exploitation



- Supervision and follow-up
- Usage management
- Compliance with instructions
- User awareness

5

Maintenance



- Periodic checks
- Preventive maintenance
- Treatment of anomalies
- Sustainability and safety of the facilities

4.2 Du risque à la sécurité : le rôle de la normalisation



**Standardising does not mean slowing down the development of electric vehicles.
It means creating the technical conditions for its safe development.**

4.3 Que faut-il exactement normaliser ?

1 — Electric vehicle

2 — Battery

3 — Connector

4 — Terminal

5 — Installation

6 — Protection &
communication

7 — Exploitation &
maintenance

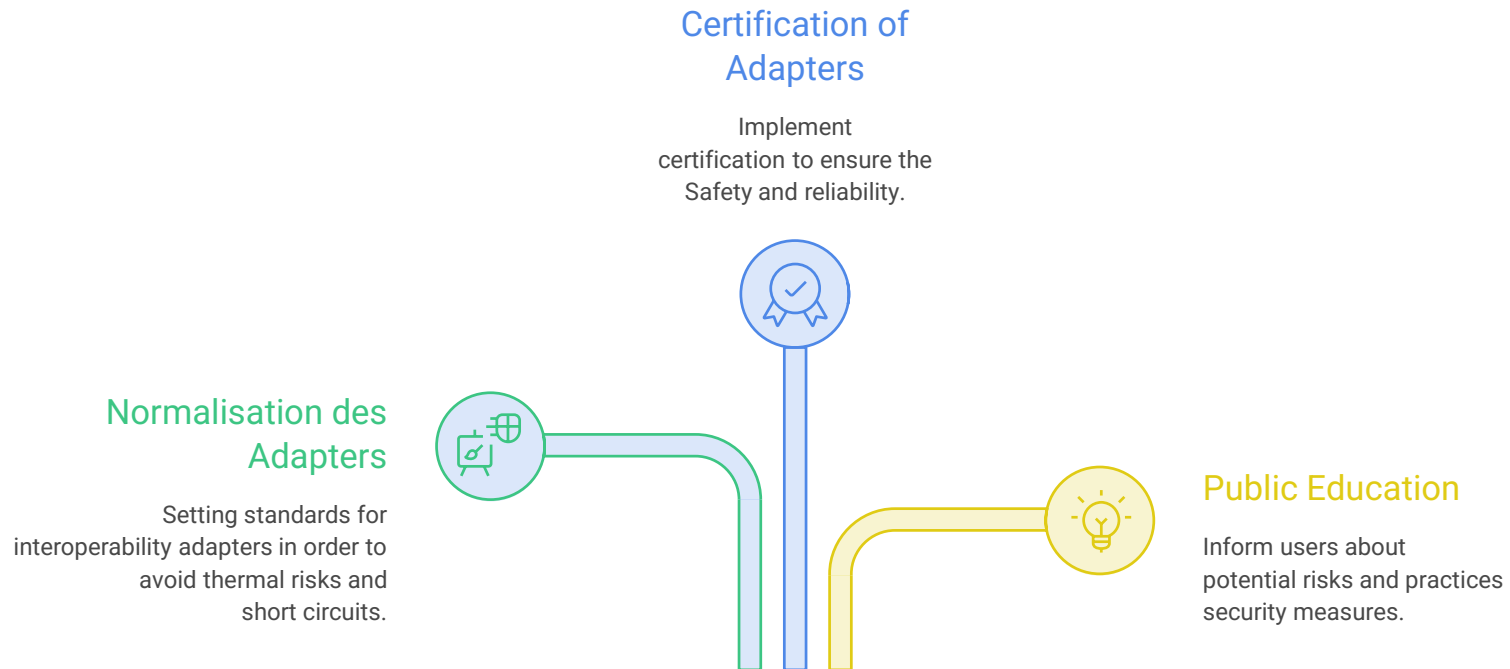
The security of a charging infrastructure is a chain security: vehicle + charging station + installation + protection + operation.

4.4 Les principales normes de référence

Charging / charging stations	IEC 61851
Connectors/Sockets	IEC 62196 (Type 2, CCS Combo) • GB/T 20234 (Chinese Standard) ⚠ Framing & Standardization of Charging ADAPTERS (GB/T ↔ CCS)
Electrical installations	IEC 60364
Batteries	IEC 62619 · IEC 62620 · IEC 62660
Vehicle Safety	ISO 6469 · ISO 12405 · ISO 17409
Vehicle Safety	UNECE R100 · R12 · R94 · R95

Ces références internationales constituent une base technique à considérer pour construire un cadre national adapté au contexte sénégalais. **Proquelec s'est positionnée pour accompagner ce processus**

How to ensure the safety and interoperability of EV adapters?



Made with  Napkin

4.5 Safe installation starts with proper sizing

CASE STUDY

Parking
60 seats
Charging infrastructure

PUISSANCE DE REFERENCE RECOMMANDEE

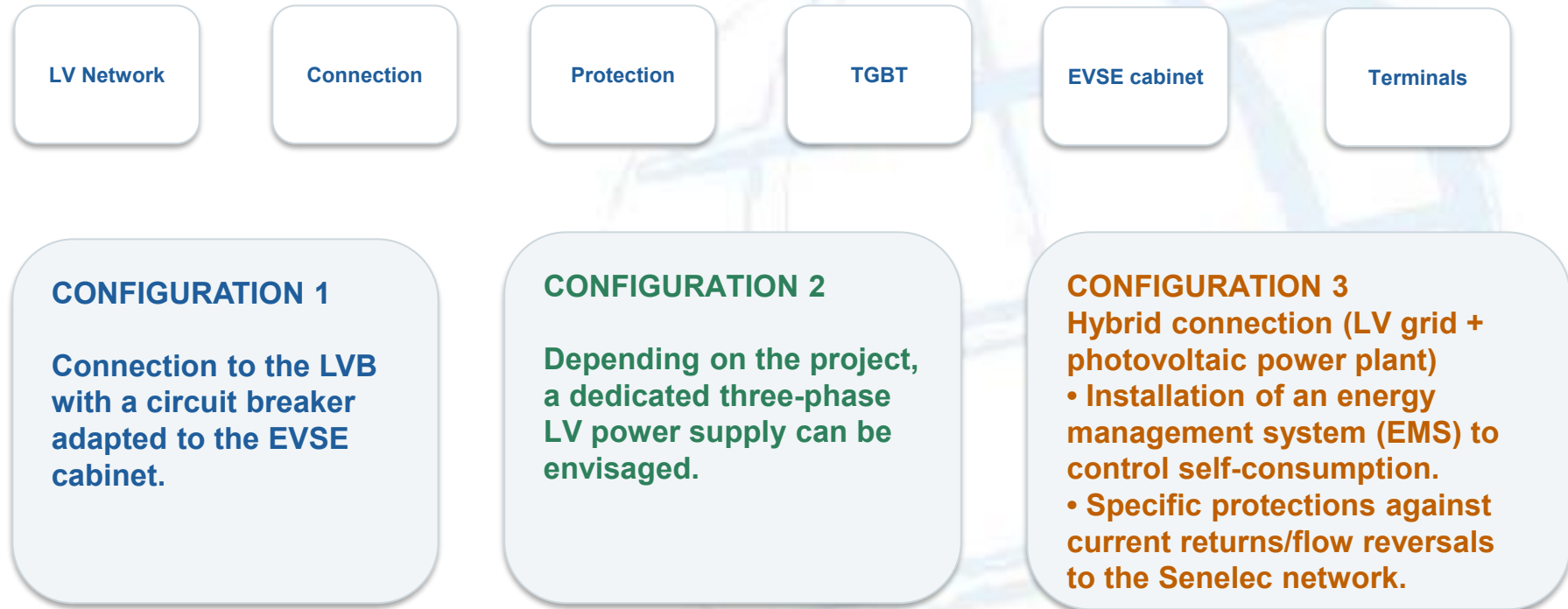
150 to 600 kVA
(depending on usage)

CHECK OUT

- What use
- What power?
- Which cable?
- What protection?
- What picture?
- What is the connection capacity per charging station?

The first safety act is sizing.

4.6 Connection: a decisive step for safety



The connection of an EVSE must be considered as a real electrical project.

Étude Senelec / IP3 Conseil, 2023.

5.1 The Senegalese framework: where do we stand?

IDENTIFIED TEXTS

Law No. 2022-04 — Highway Code
Law No. 2021-31 — Electricity Code
Law No. 2022-05 — CETUD
Law No. 2020-25 — Land transport

ONGOING ACTIONS

Regulations under development with the
MITTA and MPE ministries
Electromobility Master Plan under
development with Senelec

The challenge: to define how technical references are adopted, applied, controlled and integrated into the national system.

5.2 Towards a national framework for the electrical safety of EVSE



The objective is not to create a parallel system, but to adapt the quality and electrical safety mechanisms to the new charging infrastructure.

PROQUELEC: standards • diagnostics • control • certificates • training

5.3 Five priorities to support the development of EVSE in Senegal

- | | | |
|-----------|------------------|---|
| 01 | DEFINE | National technical reference framework |
| 02 | QUALIFIER | Competent professionals |
| 03 | CONTROL | Facility Verification |
| 04 | ANTICIPER | Power and PV-EVSE connection and coupling
-Peak demand management & intelligent charging management
National Framework and Responsibilities
-Integration of solar energy (self-consumption, reinjection, flow reversals) |
| 05 | STRUCTURE | National Framework and Responsibilities |

ANTICIPATING NORMALIZATION MEANS ANTICIPATING SAFETY.

EV → EVSE → compliance → safety requirements



PROQUELEC

MERCI

