European Organization for Nuclear Research
Organisation européenne pour la recherche nucléaire

Group Code: ATS-DO
MS-5093 /ATS

Market Survey

Technical Description

Supply of Aggregation services for Photovoltaic Corporate Power Purchase Agreement

Abstract

This Market Survey concerns the supply of aggregation services for Photovoltaic Corporate Power Purchase agreement. It will be followed by the issue of several invitations to tender to qualified and selected firms. The future invitations to tender will be issued during the period 2025-2027.

A price enquiry will be issued for the supply of aggregation services for 20 GWh of electrical energy procured from CERN's first photovoltaic (PV) corporate power purchase agreement (CPPA) for 2026. The electrical energy needs to be integrated into CERN's main electricity contract to contribute to the operation of CERN's accelerators, experiments, technical infrastructure and tertiary facilities.

The Price Enquiry is planned to be issued in May 2025. The adjudication basis for this Invitation to Tender is intended to be the lowest compliant.

The supply will be delivered to CERN starting 1 January 2026. The contract will have an initial duration of one year, with an option to extend for an additional two years (2027-2028). CERN has two additional CPPAs where aggregation is foreseen from 1 January 2027. This Market Survey will also serve as qualification for the Invitation to Tender for aggregation for these.

Table of Contents

1. INTRODUCTION

1.1 Introduction to CERN

CERN, the European Organization for Nuclear Research, is an intergovernmental organization comprising Member States[1], with its seat in Geneva, Switzerland. Its facilities are located on either side of the border between Switzerland and France (http://cern.ch/fplinks/map.html).

CERN's mission is to enable international collaboration in the field of high-energy particle physics research and to this end it designs, builds and operates particle accelerators and the associated experimental areas. At present, more than 11 000 scientific users from research institutes all over the world are using CERN's installations for their experiments.

The accelerator complex at CERN is a succession of machines with increasingly higher energies. Each machine injects the beam into the next one, which takes over to bring the beam to an even higher energy, and so on. The flagship of this complex is the Large Hadron Collider (LHC) as presented on the CERN website: http://cern.ch.

1.2 Introduction to CERN's electrical network

Under normal operating conditions, CERN's electrical network is powered from the French electrical grid, via two 400 kV lines. These connections, owned and operated by RTE (Réseau de Transport d'Electricité), are located in the Bois-Tollot substation, near the CERN Prévessin site in France.

CERN has eight 20 kV backup connections in France, managed by Enedis, used only for emergencies if power fails and diesel generators malfunction, consuming under 200 MWh annually. Additionally, a 130 kV backup connection from the Swiss grid, operated by SIG, supports emergencies and maintenance. CERN also runs its own high-voltage distribution network at 66 kV and 18 kV. An illustration of all the aforementioned elements is provided in Figure 1.

1.3 Typical annual consumption and distribution per major system

CERN's electrical consumption is mostly used in the powering of the equipment and infrastructure of the accelerators, namely the Large Hadron Collider (LHC), the Super Proton Synchrotron (SPS), the Proton Synchrotron Complex (PS) and their respective experiments. CERN operates on an approximate six-years cycle, four years of operation and two years of "Long Shut-down". During operational years, its accelerators consume around 1,300 GWh annually. However, during the subsequent Long Shutdown (period when accelerators shut down to allow for maintenance and upgrades), energy consumption drops to 500 GWh per year. Figure 2 illustrates the annual energy consumption distribution for 2024, the most recent year of full operation at CERN.

[1] http://home.web.cern.ch/about/member-states; except where stipulated otherwise, the term "Member State(s)" shall mean full member state(s) of CERN, associate member state(s) of CERN and associate member state(s) in the pre-stage of accession to membership of CERN.

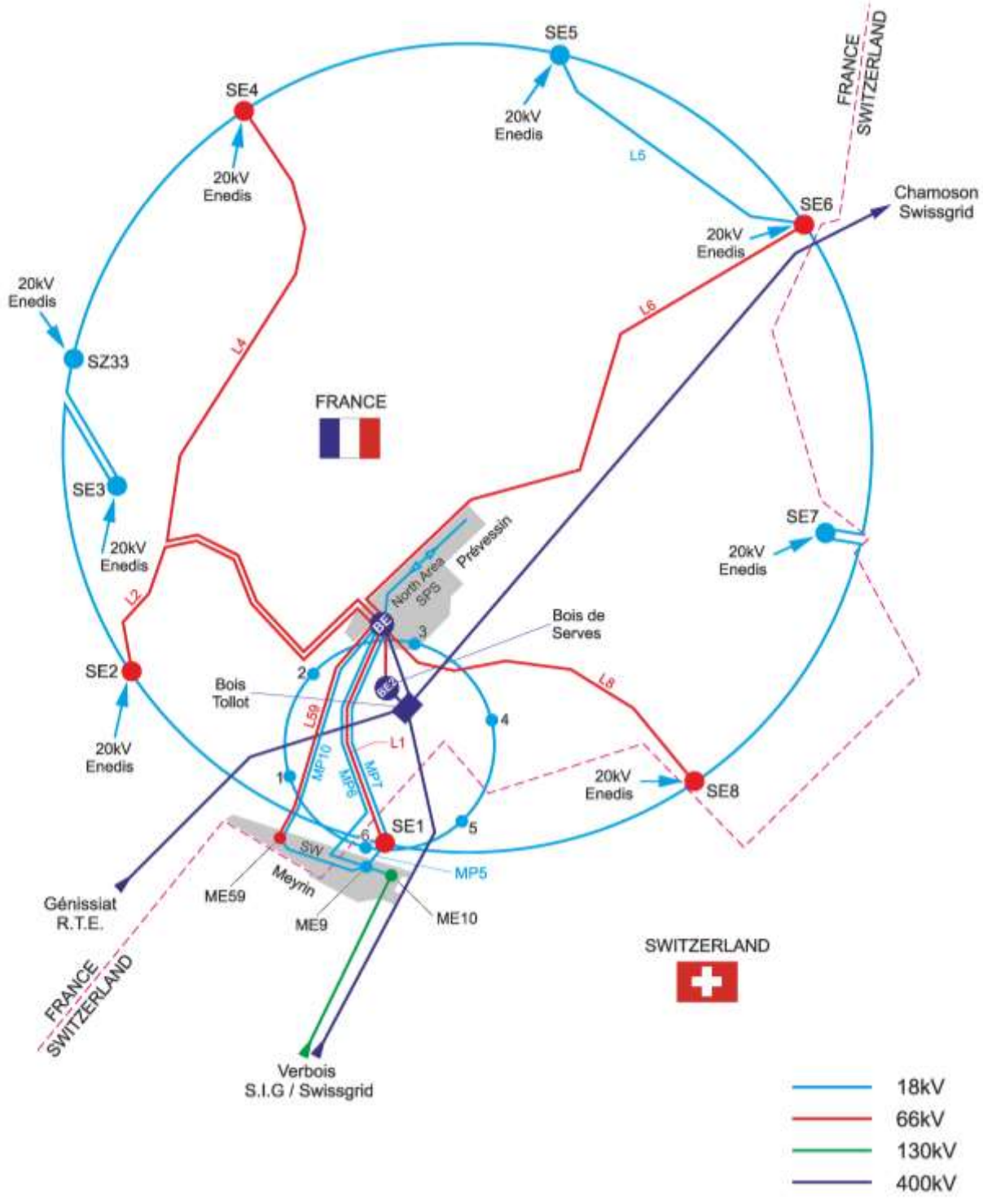

Figure 1: Overview of CERN's electrical network.

CERN	Yearly Electricity Consumption	Peak Power (daily-averaged power)
LHC	699.16 GWh	100.03 MW
SPS and Prévessin site	392.34 GWh	75.22 MW
PS Complex and Meyrin site	197.77 GWh	16.53 MW
Total	**1,289.27 GWh**	**199.74 MW**

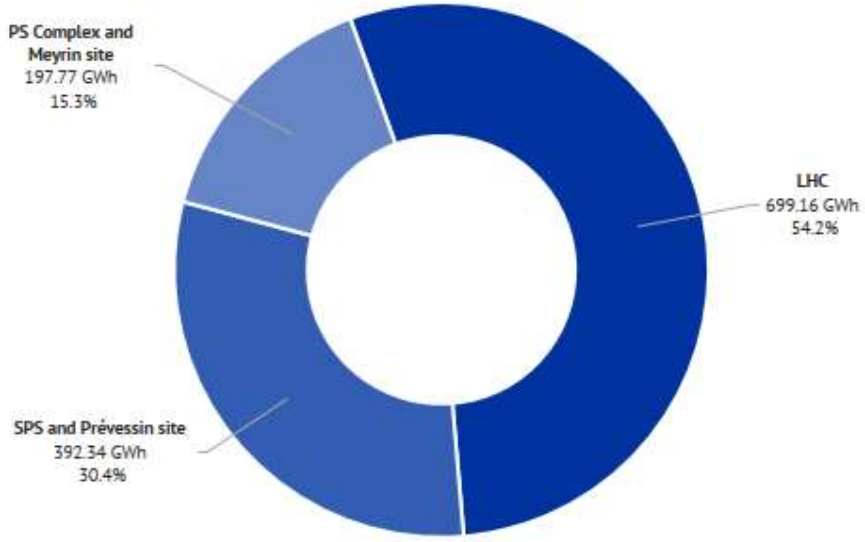

Figure 2: Distribution of CERN's annual consumption (2024).

1.4 Introduction to CERN's CPPAs

In 2024, CERN signed three corporate power purchase agreements (CPPAs) with 15 years duration. These three will allow to cover almost 10% of its nominal energy needs in a year of operation (140 GWh/year) from the photovoltaic (PV) plants. During a Long Shutdown year these will cover approximately 25% of its nominal needs. These plants will be built in the south of France in the regions shown in Figure 2. The first PV plant, located in the Bouches du Rhône department of France, should be able to provide CERN with energy as of January 2026 based on the latest schedule. At the moment, CERN has a contract with EDF and has secured 98% of its electricity supply for 2026 (estimated to be in the order of 1.1 TWh in total), leaving the remaining 2% to be covered by this first CPPA. Hence, the energy produced by the PV plant, estimated at 20 GWh (P50) for the whole year, will have to be integrated into the main electricity contract via an aggregator.

Figure 3: The power purchase agreements will secure electricity from planned solar power plants in the Lozère, Bouches-du-Rhône and Var departments in southern France.

2. SCOPE OF THE SUPPLY

CERN intends to place a Contract for the supply of aggregation services for 2026 for the electrical energy produced by the PV plants of its CPPAs. For 2026 and the scope of this Tender, 20 GWh (P50) need to be aggregated and integrated into CERN's main electricity contract. The aggregation of the electrical energy from the first CPPA is hereinafter referred to, in whole or in part, as the "Supply", as defined in this Technical Description, and in accordance with the criteria defined in the Qualification Questionnaire.

The adjudication basis for this Invitation to Tender is intended to be the lowest compliant. The detailed adjudication rules will be defined in the Invitation to Tender.

Table 1: PV plant specific details.

CPPA #1	**Parc Solaire de Terres Salée**
Estimated production [MWh/an] – P50	20
Estimated installed power [MWp]	10.5
Department	Bouches du Rhône
Commune	Port Saint Louis du Rhône
Latitude	43,41419 N
Longitude	4,77562 E
Estimated starting date	01.01.2026
Technology	PV with tracker (of 1 direction)

In 2027, the two additional CPPAs are foreseen to enter into the production phase and together with the first one will have to be aggregated and integrated into CERN's main electricity contract.

3. TECHNICAL REQUIREMENTS

The Supply shall comply with the following parameters and conditions:

- The aggregator shall be authorized to operate in the French electricity markets and capacity mechanism and act as Balance Responsible Party.
- The aggregator shall be capable of certifying and managing Guarantees of Origin (GOs) from the CPPA within the national register. The aggregator shall be capable of certifying capacity guarantees from the CPPA and enabling their sale on the market.
- The aggregator shall be able to demonstrate at least three years of experience in the field of aggregation with at least ten solar power installations in France in their portfolio.
- The aggregator shall be able to demonstrate at least 75 MW_p of solar power capacity under its management in France.
- CERN has signed an as-produced scheme with the PV plant energy producers.
- The aggregation shall be done on an as-guaranteed scheme as shown in Figure 4 meaning that the aggregator shall take the as-produced electrical energy from the PV plant and shall transform it to a fixed solar bell.
- The fixed solar bell shall be guaranteed independently of the weather conditions or the season as the aggregator is expected to compensate for the hourly, daily and annual PV production forecasts.

Figure 4: Integration of CPPAs into the main electricity contract.

- Figure 5 below shows CERN's forecast electricity consumption schedule for the 2026-2028 period. It must be noted that the actual consumption may be subject to considerable changes, depending on modifications of the schedule of the operation of the accelerators. The total energy consumption forecasts for 2026, 2027 and 2028 are provided in Table 2.

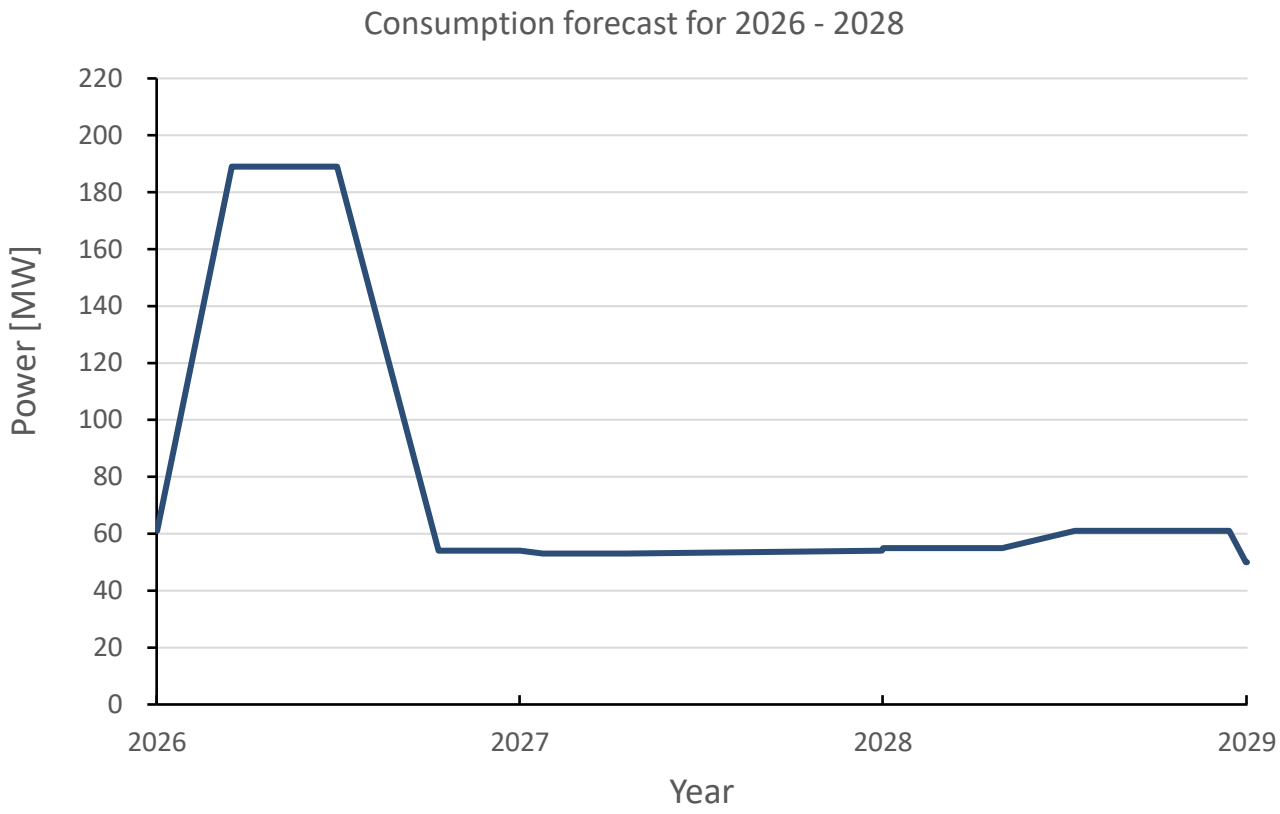

Figure 5: CERN's indicative expected electricity consumption for the 2026-2028 period.

Table 2: Forecast of CERN's electricity consumption

Year	Forecast of electricity consumption [GWh]	Operational mode
2026	1100	1/2 RUN, 1/2 Long Shutdown
2027	460	Long Shutdown
2028	500	Long Shutdown

4. PERFORMANCE OF THE CONTRACT

4.1 Delivery Schedule

A Price Enquiry will be issued in May 2025 with the subsequent Contract scheduled to be awarded by end of Q2 2025.

The Supply shall be continuously delivered to CERN as of 1 January to 31 December 2026.

4.2 Option for 2027-2028

CERN may request as an option to extend the aggregation of the initial 20 GWh (P50) CPPA from 2026 to include 2027 and 2028.

5. CERN REPRESENTATIVES

All administrative, commercial and technical correspondence concerning the Market Survey shall be communicated to the CERN Procurement Officer and in copy to the Technical Officer. Any communication by or to any other person than the CERN Procurement Officer / Service shall not be valid and have no effect.

Procurement Officer	**Tel**	**Email**
Bjorn Jenssen	+41 22 767 4405	bjorn.jenssen@cern.ch
In case of absence:		
Cristina Lara Arnaud	+41 22 767 8486	cristina.lara@cern.ch
Technical Officer	**Tel**	**Email**
Nicolas Bellegarde	+41 22 766 2475	nicolas.bellegarde@cern.ch
In case of absence:		
Nikolaos Sapountzoglou	+41 22 766 7926	nikolaos.sapountzoglou@cern.ch