



COORDINADOR
ELÉCTRICO NACIONAL

INTERNATIONAL TENDER PROCESS FOR THE HVDC PROJECT KIMAL - LO AGUIRRE

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NATIONAL ELECTRIC COORDINATOR

DECEMBER 9th, 2020

National Electric Coordinator



Independent technical organization responsible for the reliable, secure and economic operation of the national electric system

- ✓ Guarantee a secure and economic operation of the power grid
- ✓ Ensure open access to transmission system
- ✓ Other functions:
 - Administer energy, capacity and ancillary services markets
 - Planning expansion of the transmission system
 - International tender process for transmission projects
 - Monitoring market competition conditions
 - Promote innovation, research and development
- ✓ Annual budget of US\$ 50 million and 300 employees

Energy Transition



- ✓ Decarbonization & Renewable Energy
- ✓ Infrastructure Development
- ✓ System Security & Flexibility
- ✓ Digitalization & Smart Grids



Transmission Development in Chile



2011 - 2019

170 projects

US\$ **2,800** millions



2020

56 projects

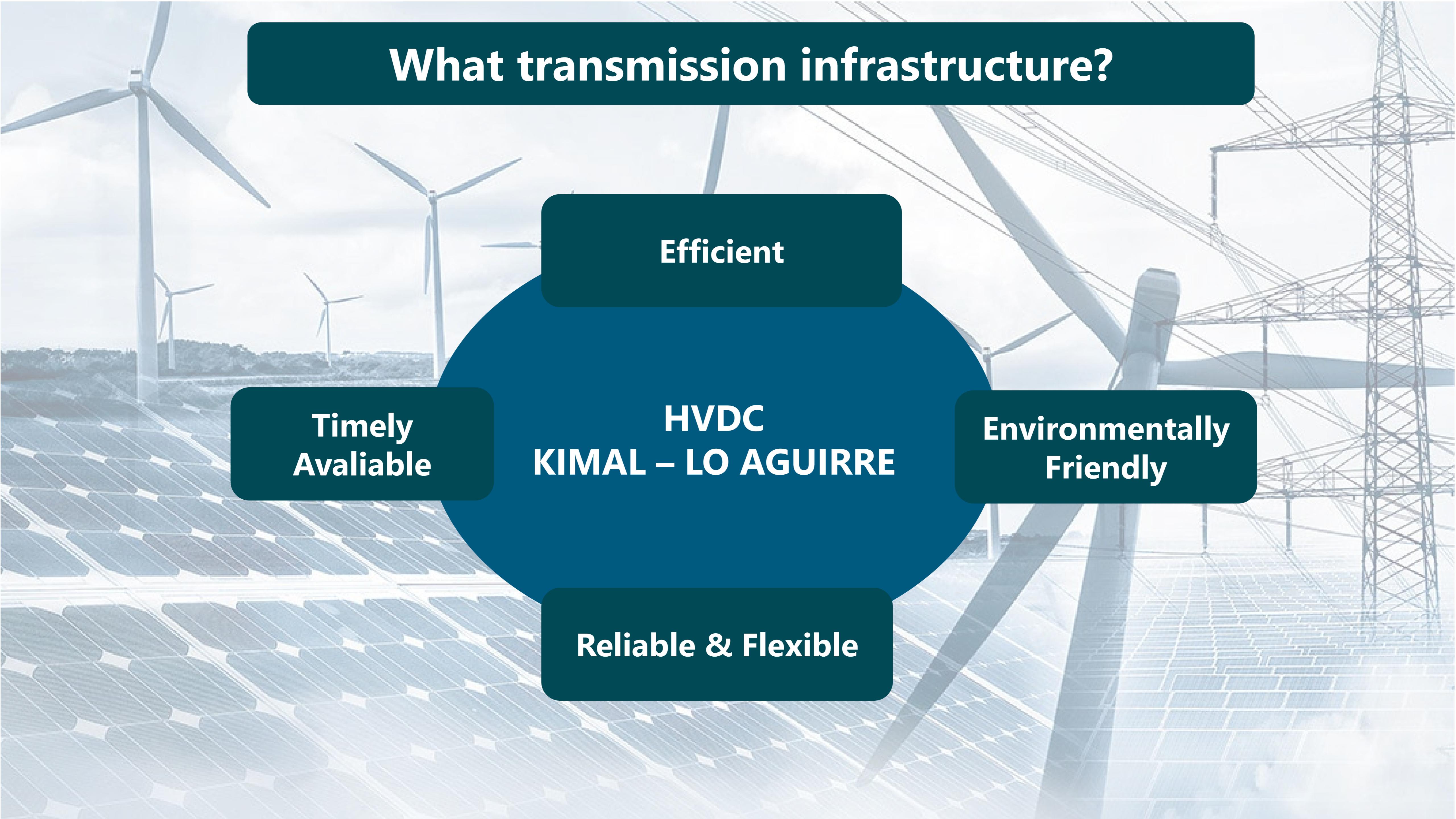
US\$ **473** millions



2021 - 2025

300 projects

US\$ **3,200** millions



What transmission infrastructure?

**Timely
Available**

Efficient

**HVDC
KIMAL – LO AGUIRRE**

**Environmentally
Friendly**

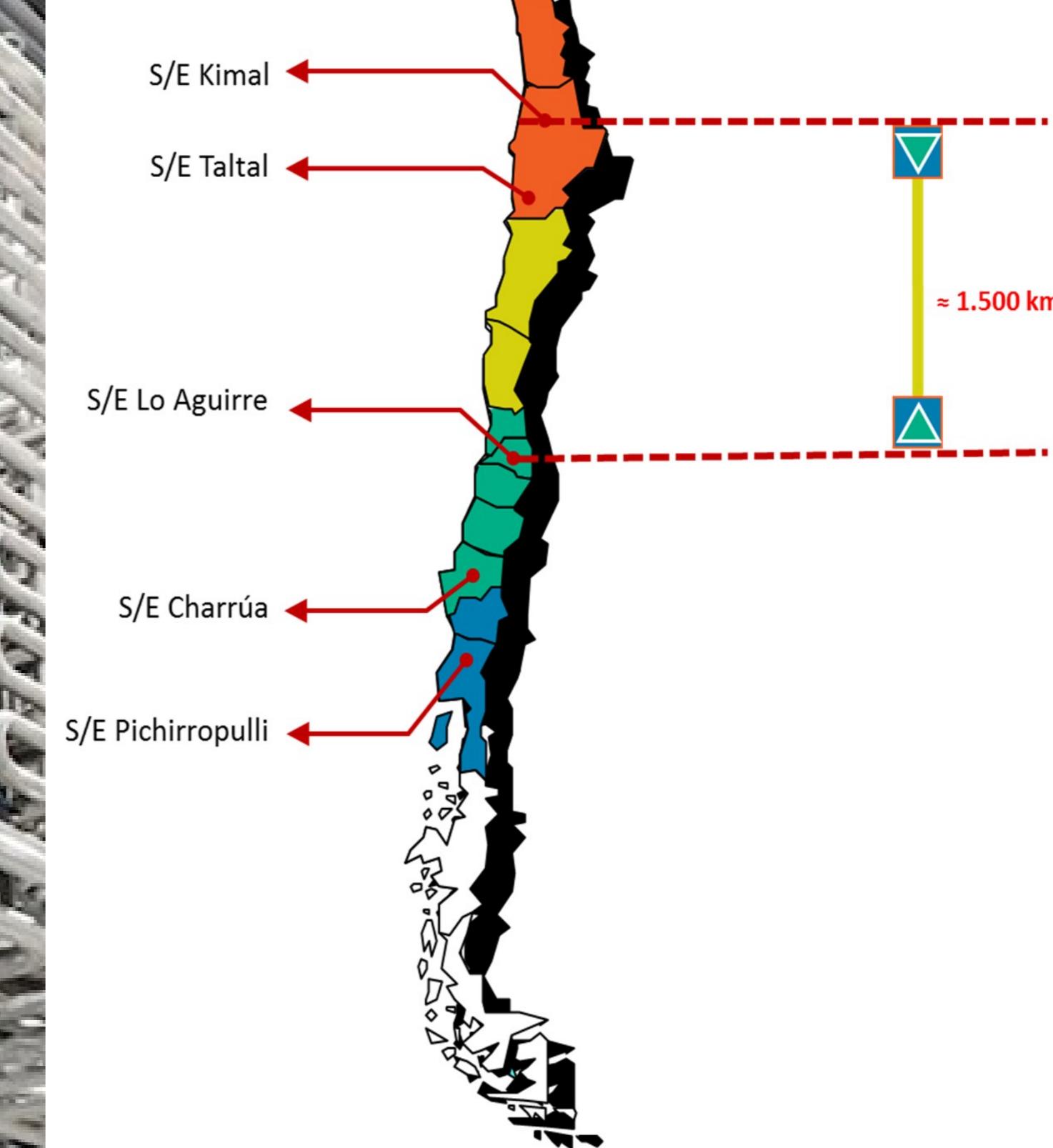
Reliable & Flexible

Benefits of the HVDC Project

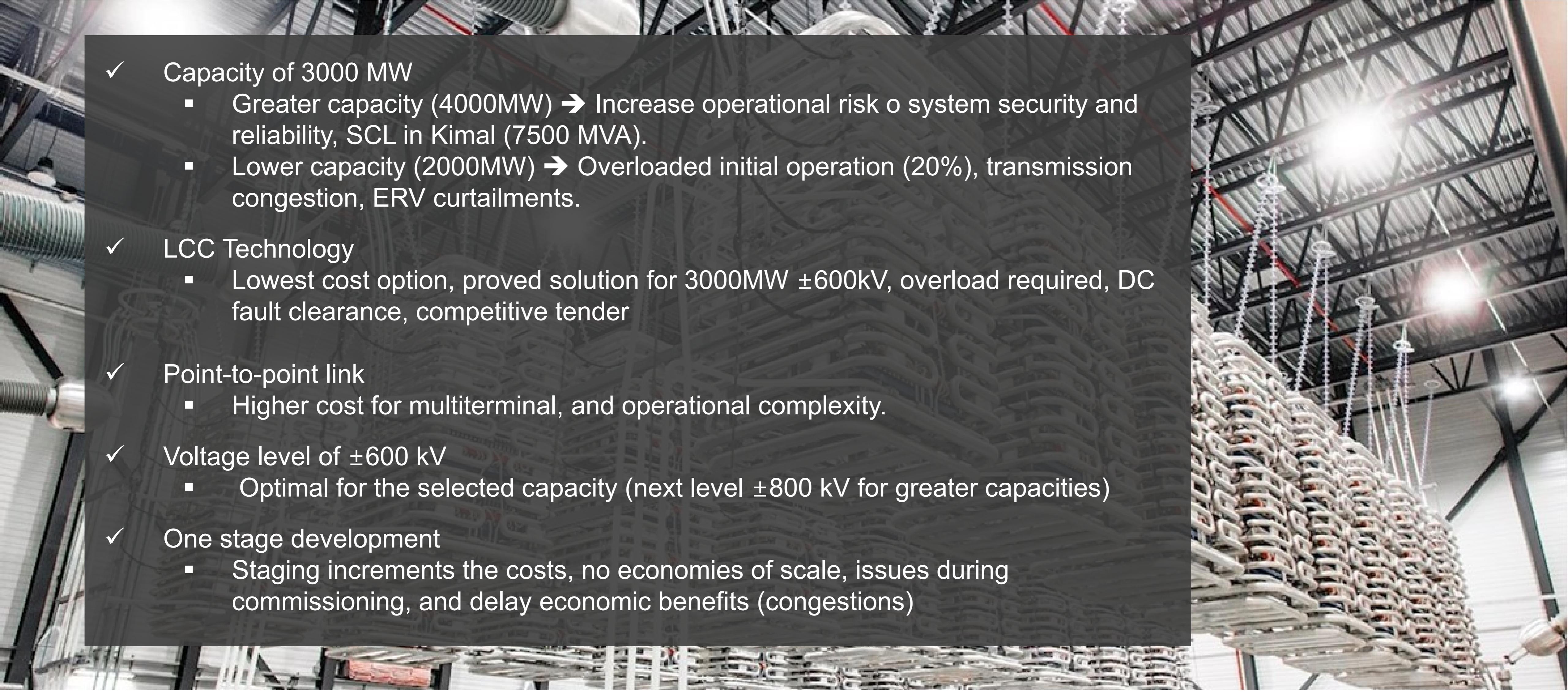
- ✓ Integration of large amounts of renewable energy
- ✓ Enable decarbonization process
- ✓ Allow energy exchange between main load centers
- ✓ Make the grid more robust and resilient
- ✓ Improve grid stability against faults
- ✓ Enable future regional interconnections
- ✓ Environmentally friendly, less use of land, and lighter structures

General Characteristics of the Project

- ✓ LCC Technology
- ✓ Bipolar system with dedicated metallic return
- ✓ Nominal capacity of 3000 MW (Overload TBD)
- ✓ Point-to-point of 1500 km long
- ✓ DC Voltage level of ± 600 kV
- ✓ Construction period 84 months
- ✓ Start of Operation in December 2028



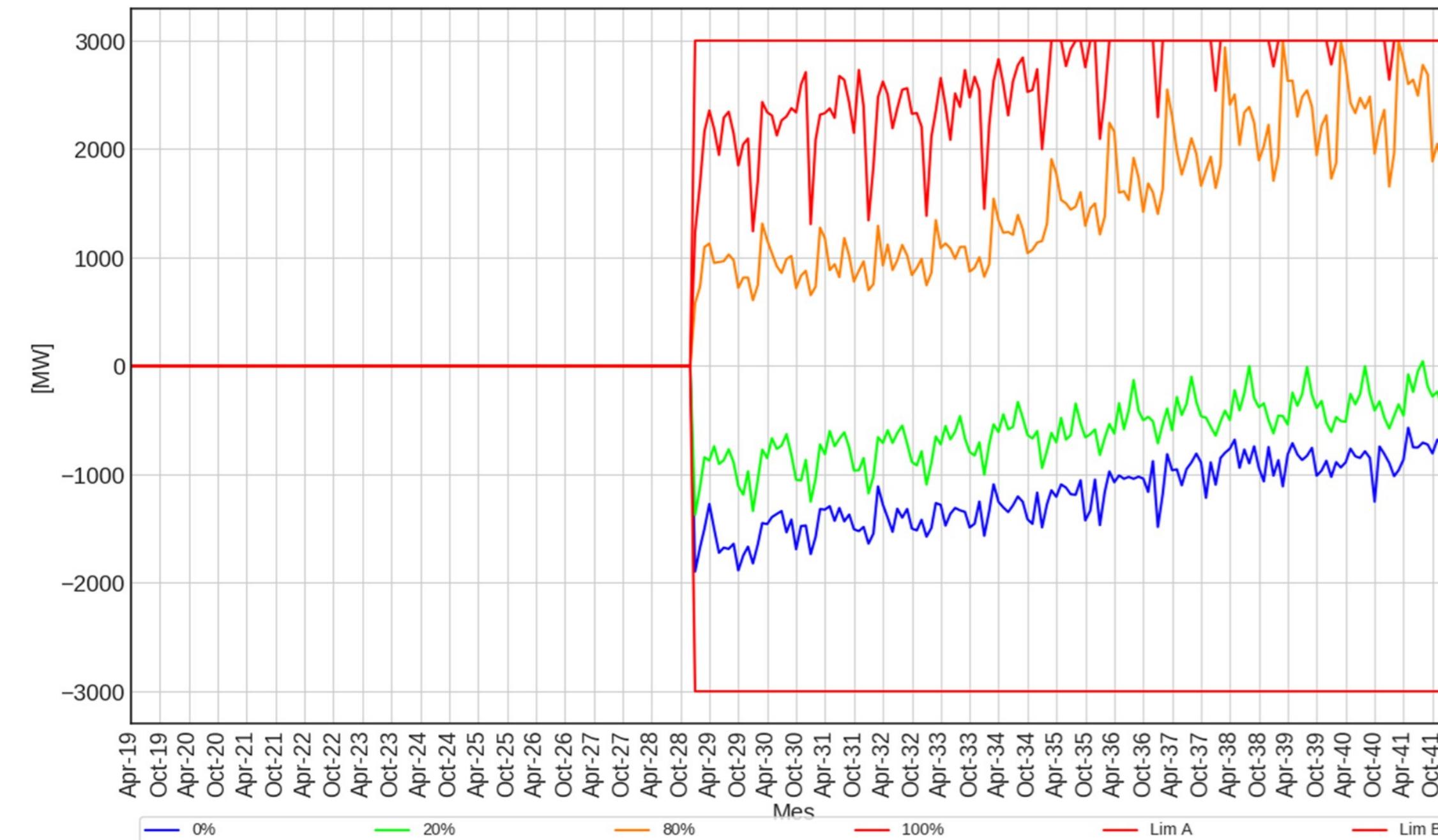
General Characteristics of the Project

- 
- ✓ Capacity of 3000 MW
 - Greater capacity (4000MW) → Increase operational risk o system security and reliability, SCL in Kimal (7500 MVA).
 - Lower capacity (2000MW) → Overloaded initial operation (20%), transmission congestion, ERV curtailments.
 - ✓ LCC Technology
 - Lowest cost option, proved solution for 3000MW ± 600 kV, overload required, DC fault clearance, competitive tender
 - ✓ Point-to-point link
 - Higher cost for multiterminal, and operational complexity.
 - ✓ Voltage level of ± 600 kV
 - Optimal for the selected capacity (next level ± 800 kV for greater capacities)
 - ✓ One stage development
 - Staging increments the costs, no economies of scale, issues during commissioning, and delay economic benefits (congestions)

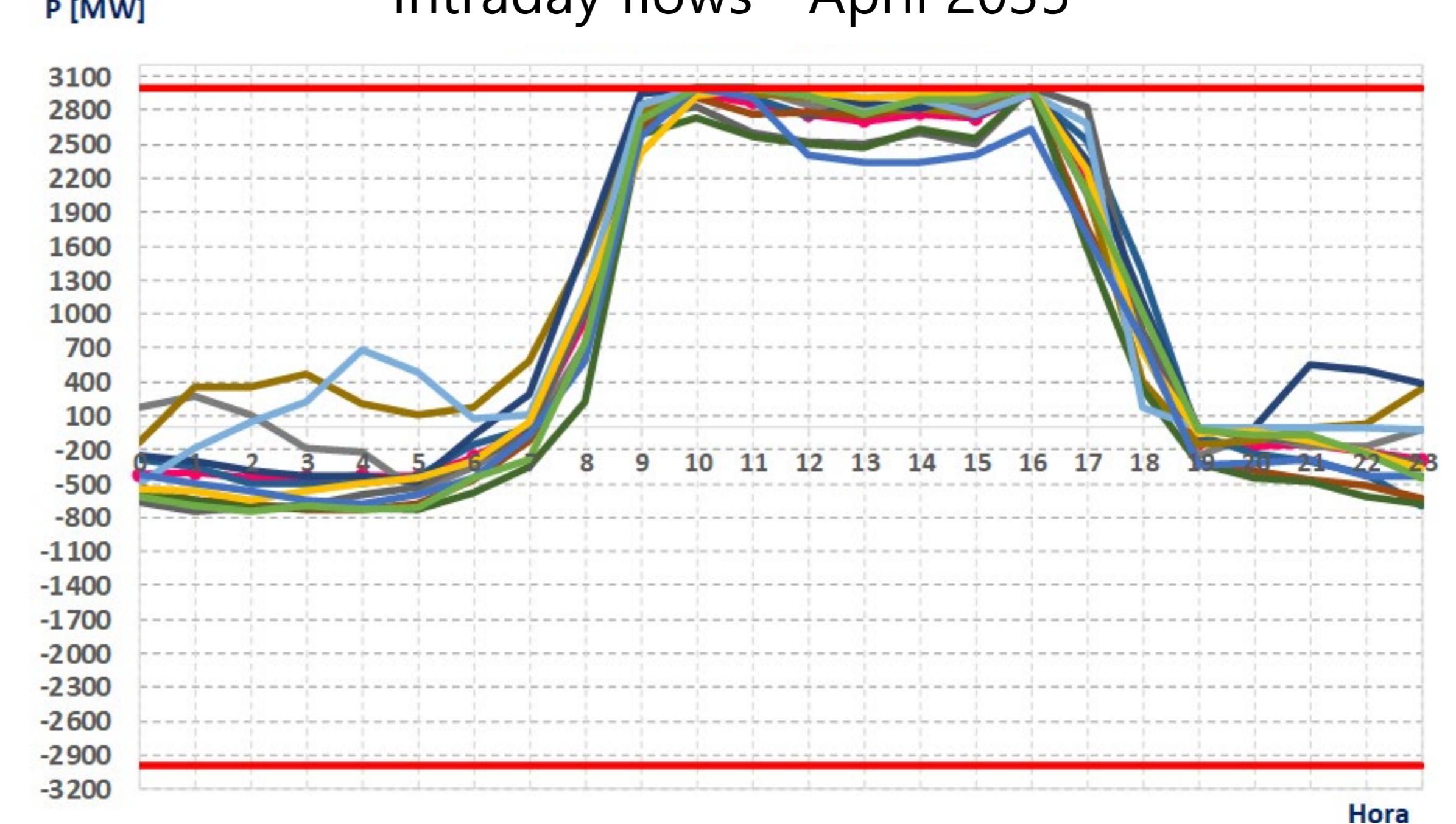
HVDC PROJECT KIMAL – LO AGUIRRE

Maximum power transfers and intraday flows (Capacity 300MW)

Max. power Kimal -> Lo Aguirre

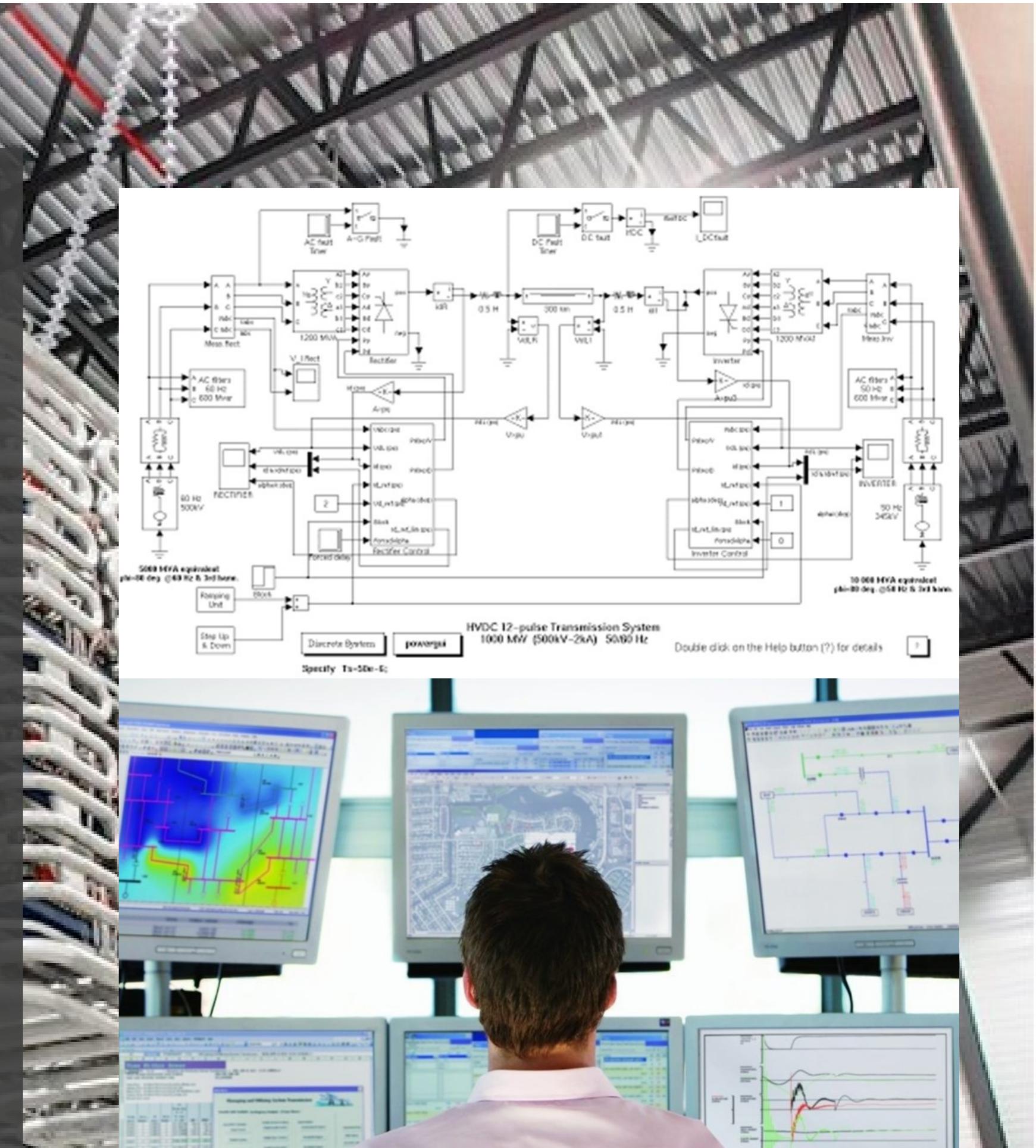


Intraday flows - April 2035



Activities in progress

- ✓ Specialized system studies
 - Finalizing power system studies
 - HVDC technical specifications
 - DC line investment costs and schedule
- ✓ Collect system data and requirements
- ✓ Preparing DigSilent DB to be provided for bidding phase studies
- ✓ Update data on harmonic impedances
- ✓ Background harmonics measurements at Kimal & Lo Aguirre



Bidding Process Schedule

No	Stage	Deadlines
1	Preliminary Bidding Terms & Conditions	October 26 th , 2020
2	Preliminary Technical Specifications	November 23 rd , 2020
3	Participant Registry, Definitive Terms & Conditions, and Specifications	February 1 st , 2021
4	Bidding Terms Acquisition	Until June 18 th , 2021
5	Questions and Answers Period	From February 1 st to April 22 nd , 2021
6	Period of Answer to Questions	May 5 th , 2021
7	Maximum deadline for modifications and Amendments to the Terms	May 12 th , 2021
8	Period for Proposal Submission by Bidders	August 2 nd to 4 th , 2021
9	Opening of Admin. And Technical Offers	August 5 th , 2021
10	Opening of Economic Offers	October 25 th , 2021
11	Project Awarding	October 29 th , 2021

132 interested parties

Preliminary Bidding Terms & Conditions

- ✓ General Characteristics of the Project
- ✓ Guarantees and Policy Bonds
- ✓ Offer Requirements and Evaluation
- ✓ Opening and Awarding
- ✓ Guaranteed Performance
- ✓ HVDC Experience
- ✓ Project Milestones
- ✓ Consortia and Minimum Capital
- ✓ Technical Attachments
- ✓ Spanish and English version (reference)



Preliminary Bidding Terms & Conditions

Guarantees Policies and Performance Bonds

- ✓ During bidding process
 - Seriousness of Bid – 2.5% of ref. VI: USD 29.4 millions.
 - Incorporation promise – USD 2 Millions
- ✓ During project execution
 - Milestone compliance – 2% of ref. VI: USD 23.5 millions.
 - Effective execution and penalties for delay of Start of Operation – 8% of ref. VI: USD 94.1 millions.
 - Penalty for delays in the start of operation of the Project: 0.068% of ref. VI per day.
- ✓ During Operation (36 months)
 - Performance and correct operation – 3% of ref. VI: USD 35.3 millions.
 - Availability and Reliability (98.5%)
 - Converter Station Losses (0.7%)
 - Pending issues (Punch list) solved within 12 month from SoO



Preliminary Bidding Terms & Conditions

Consortia

- ✓ SAGET (Exclusive transmission business) 99,9%
- ✓ At least during construction and up to 36 months
- ✓ Incorporated 30 days from Award Decree
- ✓ Financial background must have 30% of participation.
- ✓ Minimum Capital/Equity of 1/3 of ref. VI: USD 392 millions.
- ✓ Risk Classification (minimum BB int. scale or BBB nat. scale).
- ✓ At least one legal entity must have HVAC/DC experience.

Experience

- ✓ 30% participation in SAGET
- ✓ Operation of HVAC (220kV or 500kV), and
- ✓ Operation or Execution of HVDC-LCC
 - Similar characteristics
 - Performance EA >97%
 - Commissioned within the last 15 years



Preliminary Bidding Terms & Conditions

Bids

- ✓ Administrative
- ✓ Technical
- ✓ Economic → VATT = Annuity of VI+COMA

Scope of work

- ✓ Design, engineering, procurement and construction, testing and commissioning.
- ✓ Lands, easement, ROW and permitting
- ✓ Compliance with environmental regulation (RCA)



Preliminary Technical Specifications (Annexes 4-6)

✓ General Technical Specifications

- Two double circuit AC 220kV Lines (<5km) to Kimal
- One double circuit AC 500kV Line (<5km) to Aguirre
- Existing SE upgrades (bays, positions)

✓ HVDC Functional Technical Specifications

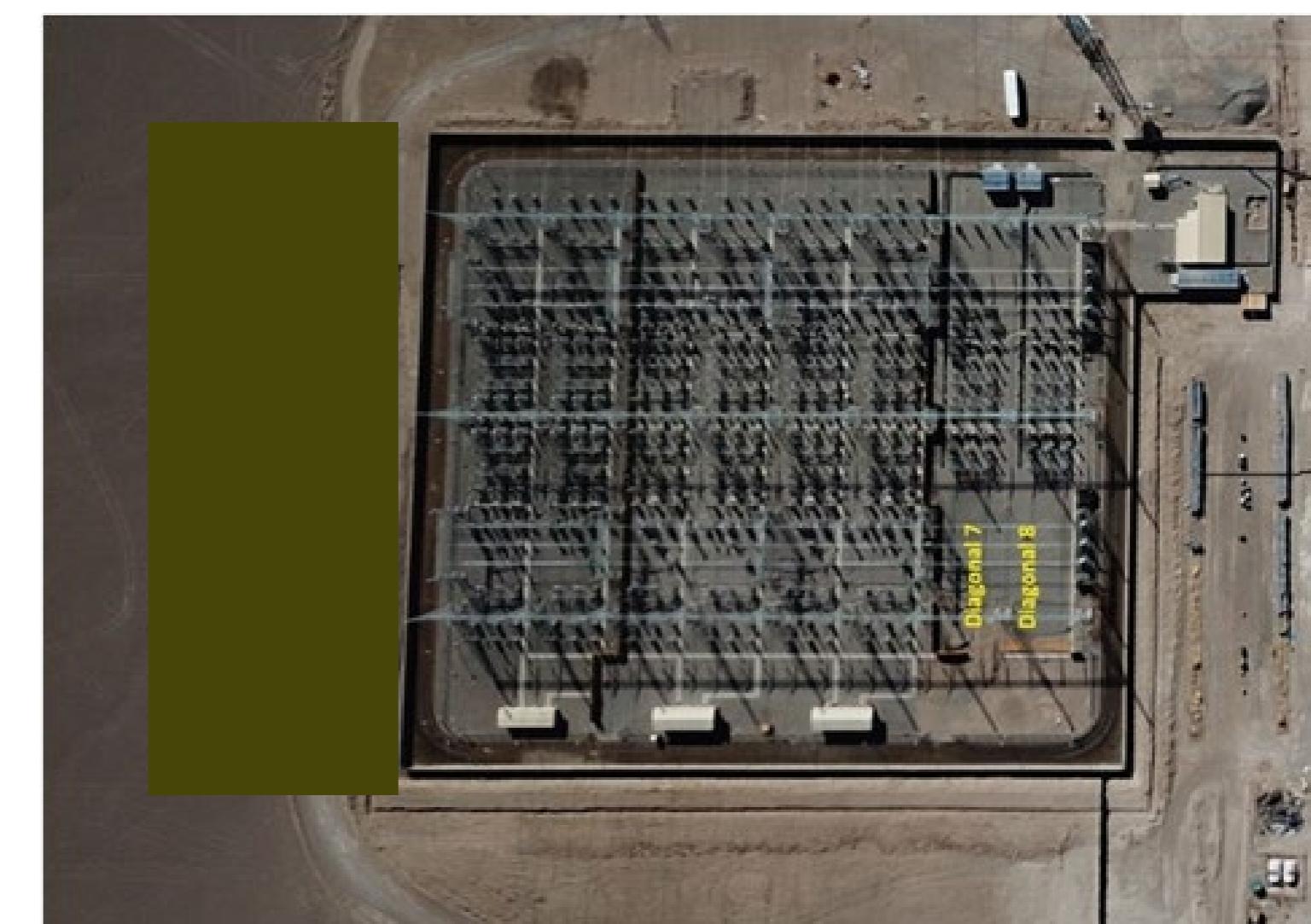
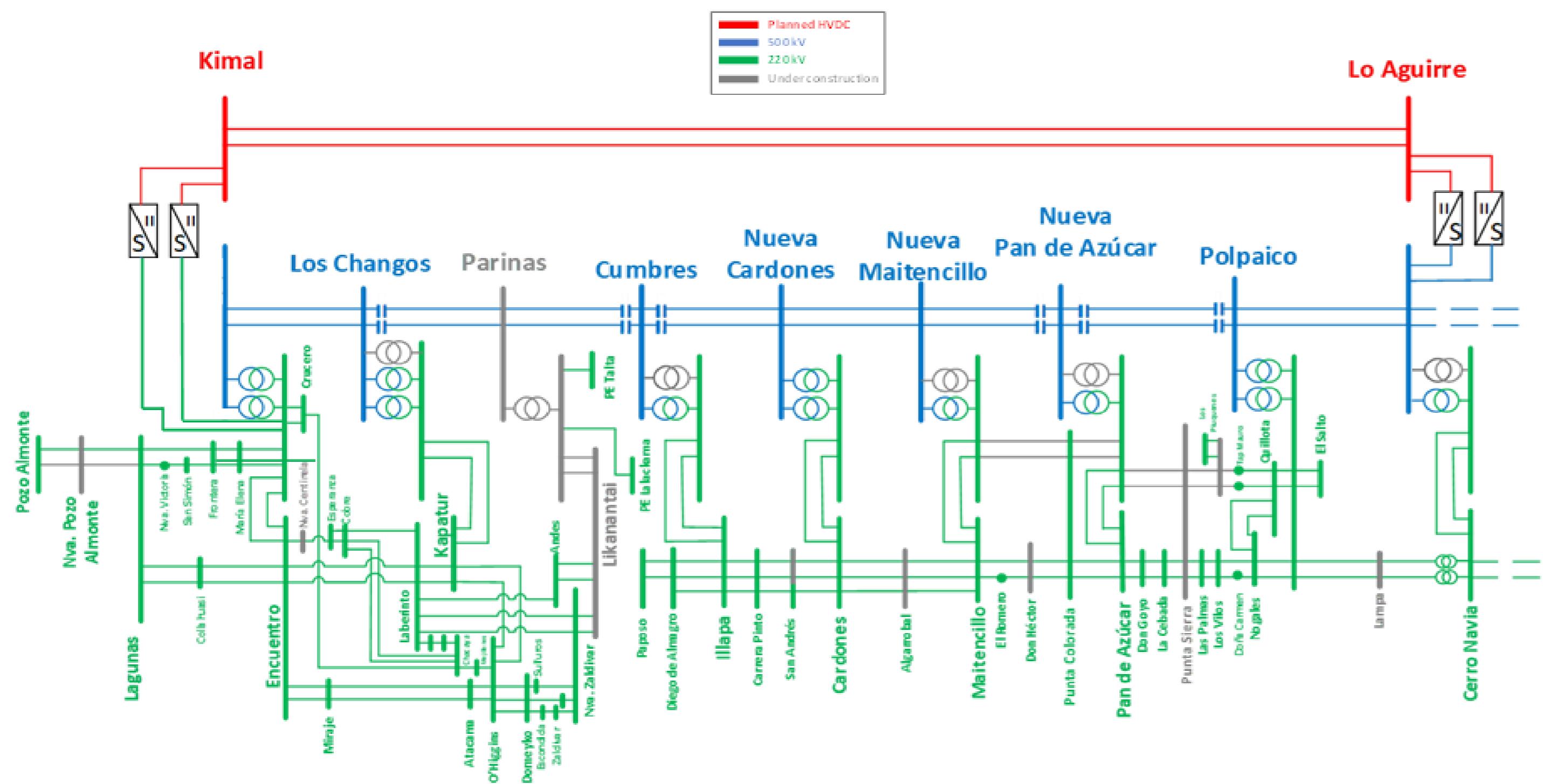
- Technical requirements for converter stations and DC line
- System data
- Studies to be provided (Bidding & Design stages)

✓ Technical Datasheets

- AC/DC Equipment and performance



Electric System Diagram





Bidding Process Information

www.coordinador.cl

licitacion.hvdc@coordinador.cl



Thanks for your
Attention