High-Capacity 115 kV / 34.5 kV Private Substation

Centenario Industrial Park, Torreón – Engineering Brief

1 . Interconnection & Topology

• Primary tie-in: 115 kV loop-fed connection to Mexico's National Transmission Grid (CFE), designed for N-1 contingency compliance (no single-element failure compromises service).

• Step-down transformation: 3 × 40 MVA, 115/34.5 kV, ONAN/ONAF power transformers in N+1 configuration; positive-sequence impedance ≈ 8 %, neutral grounding via high-resistance reactor.

• Installed firm capacity: 80 MVA (two units in service, one on hot standby) → contracted take-or-pay block: 30 MVA.

• Ultimate build-out: 4th bay pre-stubbed; seamless up-rate to 120 MVA with zero-downtime cut-over.

2 . 34.5 kV Private Distribution Network

Feature	Specification
Topology	34.5 kV radial-mesh with normally-closed tie breakers; permits sectionalising and live-load transfer
Conductor sizing	35–250 mm² Al/XLPE per feeder, ≤ 2 % voltage drop worst-case
Phasing	Three-phase, 60 Hz standard; single-phase taps permissible for specialty loads
Protection	SEL / GE digital relays (ANSI 50/51, 50N/51N, 67, 27, 59) with IEC 61850 process bus

3 .Reliability & Monitoring

• SCADA / EMS: Redundant RTUs feeding a cloud-hosted historian (1 s resolution) with PQ modules to EN 50160 & IEEE 519.

• Breaker clearing time: ≤ 50 ms; arc-flash mitigation to IEEE 1584-2018.

• Predictive analytics: Condition-based maintenance (oil DGA, partial-discharge, breaker duty cycle) integrated in dashboard.

• Service availability target: 99.985 % (SAIDI < 1 h yr^{-1}).

4 . Modular Scalability

1. Phase 0 (in place): 120 MVA yard civil works, three transformer bays energized.
2. Phase 1 (+40 MVA): Plug-and-play addition of fourth 40 MVA transformer, no major civil works, outage-free energization.
3. Demand management: Grid-code-compliant load shedding logic; ability to re-dispatch load to public grid during peak periods.

5 .Commercial Framework

Capacity right
USD 238 per kVA one-time weighted fee

Energy charge
Pass-through of CFE wholesale price (T21 wheeling)

Tariff structure
Fixed capacity block + variable energy; no “demand penalties” above contracted block if notice ≥ 15 days

Billing
Monthly, itemised, SCADA-verified; historical data archive ≥ 36 months

6 . Operational Support

• 24 × 7 Network Operations Center with bilingual engineers.

• Quarterly infrared and SF_6 gas-quality inspections; annual coordination & short-circuit studies updated.

• One-hour on-site spare transformer oil and critical spares inventory; disaster-recovery plan audited every 12 months.

Why Site at Centenario's Substation?

Uninterrupted production
N+1 hardware redundancy, ring-bus topology, live-swapping capability

Lower total-energy cost
Wholesale wheeling tariff + fixed $/kVA block; eliminates retail mark-ups

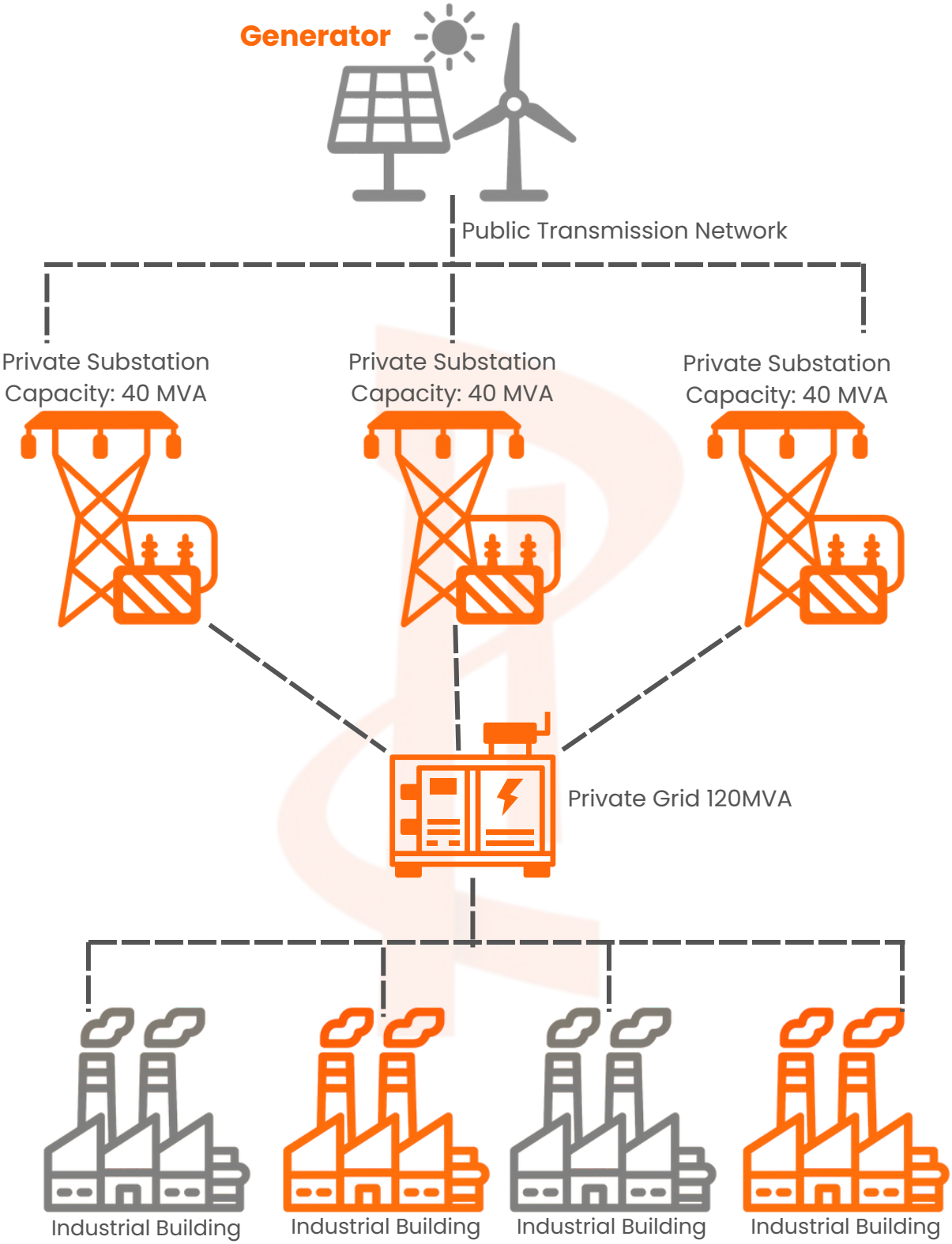
Growth headroom
Civil/primary equipment already rated for 120 MVA; expansion accomplished by "bolt-in" modules

Power quality
Continuous THD, flicker, unbalance & sag/swell surveillance with automatic mitigation

Transparent governance
All measurements, alarms & invoices tied to SCADA data—full traceability for audits

Centenario Industrial Park delivers utility-grade power without the utility bureaucracy—engineered, priced and administered for high-duty manufacturing and data-intensive operations.

Detailed single-line diagrams (SLDs), relay coordination curves and harmonic studies are available upon NDA execution.


Generator
Public Transmission Network
Private Substation
Capacity: 40 MVA
Private Substation
Capacity: 40 MVA
Private Substation
Capacity: 40 MVA
Private Grid 120MVA
Industrial Building
Industrial Building
Industrial Building
Industrial Building