VERTIV.

Case study

Leading India telecom operator achieves scalable network expansion with modular DC power architecture.

India · Telecommunications



Background

One of India's leading telecom operators is executing a large-scale rollout of 4G and 5G tower infrastructure across urban, peri urban, and rural markets spanning multiple states.

With an expanding network footprint that includes co located and rooftop installations, the operator required a DC power solution capable of starting at lower capacity and growing in place as site traffic demands increased.

A multiyear, multi state rollout programme meant that purchasing decisions made at initial deployment would directly determine total cost of ownership across thousands of sites over time.

Company profile:

Industry: Telecommunications

Region: India (multi state)

Deployment type: Tower infrastructure

Network type: 4G and 5G

Organisation type: Leading national operator

Challenges

The operator faced three compounding challenges with their existing approach to tower power infrastructure:

Forced overcapacity purchasing: Conventional SMPS platforms require operators to purchase the full rectifier capacity at initial deployment. Sites with initially low traffic demands were routinely over-provisioned, locking capital into power assets that would sit idle for months or years before utilisation caught up with installed capacity.

Costly cabinet replacement at expansion: When traffic grew and additional rectifier capacity was needed, the existing cabinet typically could not accommodate expansion. Operators were required to procure and install a second cabinet, duplicating hardware, civil works, and logistics costs.

Separate battery cabinets increasing footprint: Battery backup was housed in a separate standalone cabinet at most sites, consuming additional floor space at space-constrained outdoor and rooftop locations, increasing civil infrastructure costs, and complicating servicing.

Together, these constraints were driving up total cost of ownership and slowing deployment velocity across the operator's tower portfolio.



Solution

The operator selected a modular, phased expansion DC power platform engineered to eliminate the forced overcapacity model. The platform is designed to start at 12.9 kW on day 1, using three 4.3 kW rectifier modules, and scale to 25.8 kW on day 2 by adding three additional rectifier modules within the same cabinet, with no civil works or cabinet replacement required.[1]

Integrated battery compartment. A 3U 19" integrated battery compartment supports up to five batteries within the same cabinet enclosure,[2] eliminating the need for a separate battery cabinet and reducing site footprint.

Intelligent monitoring and control. An intelligent controller with integrated monitoring supports both VRLA and lithium-ion battery technologies and provides enterprise grade network visibility. A solar ready architecture enables future integration of alternative energy sources at sites with favourable conditions.[3]

The day one configuration allows operators to commission a site with precisely the capacity required at that point in the network lifecycle. The day two upgrade path is designed to support doubling of capacity within the existing cabinet, reducing the capital and operational cost of expansion.

Simpler deployment, centralised service, and scalable growth

This architecture is designed to transform how telecom operators approach power infrastructure investment, enabling a shift from full upfront provisioning to a pay-as-you-grow model aligned to actual site demand.



Solution overview:

Platform: Modular phased expansion DC power

Day 1 capacity: 12.9 kW (3 x 4.3 kW)

Day 2 capacity: 25.8 kW 6 x 4.3 kW)

Battery compartment: 3U 19" integrated; up to 5 batteries

Battery types: VRLA and lithium ion

Alternative energy readiness: Solar ready architecture

Key design benefits:

- Pay-as-you-grow capacity
- No cabinet replacement needed
- Integrated battery backup
- Reduced site footprint
- VRLA and lithium-ion support
- Solar ready architecture

Target outcomes and objectives for upcoming deployments

The following outcomes are projected targets based on the platform's engineering design and the operator's deployment programme. These represent anticipated benefits; verified post-deployment measurement data will be reported separately.[4]



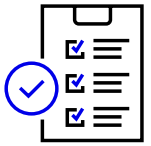
- **Reduced initial capital expenditure:** The modular architecture is designed to reduce upfront hardware expenditure by allowing operators to purchase only the rectifier capacity needed at commissioning, rather than the full site capacity.



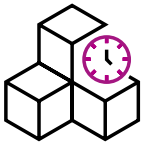
- **Reduced site footprint:** Integrating battery backup within the power cabinet is engineered to reduce the space required at each site, particularly valuable at space-constrained rooftop and outdoor locations.



- **Lower expansion costs:** Day 2 expansion is engineered to minimise cost by adding rectifier modules to the existing cabinet rather than procuring a complete replacement cabinet, eliminating duplication of hardware and installation expenditure.



- **Simplified inventory and training:** A single platform architecture across all deployed sites enables standardised inventory management and a unified field technician training programme, reducing operational complexity at scale.



- **Accelerated deployment timelines:** The consolidated cabinet design and simplified installation process are intended to accelerate both initial commissioning and future expansion activities at each site.

ROI analysis

The following table presents a comparative ROI framework for the modular phased expansion architecture versus a conventional full capacity deployment. All figures are illustrative projections based on the platform's engineering specifications and typical deployment cost structures; they do not represent verified post-deployment financial results.[5]

Dimension	Conventional full capacity	Modular phased expansion
Initial capital expenditure	Full rectifier capacity at commissioning	Day 1 capacity only (12.9 kW); day two modules added as required
Expansion approach	New cabinet plus civil works required	Add three rectifier modules to existing cabinet: no civil works
Site footprint	Power cabinet plus separate battery cabinet	Single integrated cabinet (battery built in)
Expansion deployment time	Multiple site visits; cabinet installation	Single field visit; module swap in existing cabinet
Inventory complexity	Multiple platform types across portfolio	Single platform; standardised spares and training
Battery integration	Standalone battery cabinet	Integrated 3U 19" compartment; VRLA and lithium ion



Recommendations for similar deployments

Operators considering a modular phased expansion architecture for tower DC power are advised to evaluate the following factors during planning and procurement:

- **Prioritise space-constrained sites for early adoption.** Rooftop and compact outdoor sites stand to gain the greatest immediate benefit from an integrated battery design, eliminating the separate battery cabinet and reducing civil footprint.
- **Align day two expansion timing with traffic forecasts.** Establish clear capacity thresholds tied to site-level traffic data that trigger procurement of day two rectifier modules, ensuring expansion happens in response to actual demand.
- **Evaluate battery technology by site condition.** VRLA remains cost-effective for standard temperature-controlled environments. Lithium ion may offer lifecycle and footprint advantages at high-temperature or space-constrained outdoor sites.
- **Assess solar integration opportunities.** The solar ready architecture allows operators to incorporate alternative energy inputs at sites with suitable conditions, potentially reducing diesel generator run time and associated operational expenditure.
- **Standardise the platform across the rollout programme.** Deploying a single platform type across the entire tower portfolio maximises inventory, logistics, and training benefits. Mixed platform environments reduce these advantages and increase field service complexity.
- **Plan multiyear rollouts in cohorts.** For large portfolios covering multiple states, grouping sites into deployment cohorts by geography and capacity tier allows procurement, logistics, and commissioning teams to be optimised for each phase.

Project milestones

Phase	Timing	Activity
1	Month 1	Requirement analysis, site survey, and solution design for pilot batch
2	Month 2 to 3	Pilot deployment across selected sites; commissioning and acceptance testing
3	Month 4	Pilot performance review; go or no-go decision for full rollout
4	Month 5 to 9	Full rollout phase 1: urban and peri urban sites across primary states
5	Month 10 to 12	Full rollout phase 2: rural and secondary state expansion
6	Month 13 to 14	Day 2 expansion activation at sites reaching defined capacity thresholds
7	Month 15 onwards	Ongoing monitoring, performance reporting, and solar integration assessment for eligible sites

This case study is intended for informational purposes only. Technical specifications and projected outcomes are based on engineering design and should be validated against verified deployment data before use in procurement decisions. Customer approval is required prior to external distribution.

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SL-80714 (11/26)