HUIJUE GROUP



Telecom DC Power Systems: Can the DC Power Plant Telecom Engineers Inherited Support Another Radio?

Assess a proposed radio addition against the retained DC plant. A worked before-and-after comparison exposes feeder, recovery-output and backup-duration limits that require coordinated upgrades.

PRODUCT KNOWLEDGE

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Find the limiting part of an existing DC plant before approving a new radio load—and turn failed capacity checks into a defined upgrade scope.

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Existing plant expansion
Approx. 10 minute read

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Define the additional demand
Follow the existing power path
Compare before and after
Why a feeder upgrade is insufficient
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Price the missing capacity

An existing telecom DC plant can support another radio only when the enlarged load fits the available conversion, distribution and battery capability in the operating states the project requires. The addition must also leave acceptable voltage at the new radio and preserve the agreed backup and recovery duty.

For a purchasing team, the useful answer is a before-and-after comparison of the retained plant—not a quotation for one extra module. A plant may have sufficient rectifier output while its common feeder is already near its continuous limit. It may carry the radios during normal supply yet run out of output when depleted batteries begin charging. Those are different reasons to hold the same expansion request.

What must be known about the additional radio load?

Use the proposed equipment’s DC input demand for the intended radio configuration, together with its accepted voltage window and relevant transient behavior. Add the auxiliary demand and distribution losses that fall within the selected calculation boundary. RF transmit power, an average energy bill or a single quiet-hour current reading cannot substitute for that load case.

Begin with the existing site’s measured demand and operating records, then reconcile

them with the installed equipment list. Identify which radios, transport equipment, cooling loads and other auxiliaries are on the same DC system. Record the conditions represented by the measurements; a logger that misses short events or an unusual traffic period does not establish the full operating envelope.

The **radio power demand** also depends on what the rollout actually changes. An added radio may require another DC/DC converter, a longer feeder or additional DC-powered cooling. Count each item once at the appropriate boundary. If a quotation states only a typical input value, obtain the applicable equipment data before treating the remaining plant margin as available.

Keep continuous capacity, transient performance and stored energy separate. The U.S. Department of Energy’s storage overview distinguishes energy capacity in kWh from power capacity in kW and notes storage losses. Here, the continuous load case checks sustained current and power; short-duration demand needs the equipment’s declared transient requirements. Usable battery energy determines supported duration, not whether a cable or protective device can carry the load.

Editorial illustration of an expansion review. The equipment, workshop and flag do not identify a real Chilean project or an approved product configuration.

Where does the extra load use the existing plant’s headroom?

The new load uses every shared component between the available sources and its connection point. Check the identified bus segment, common feeder and new branch against their applicable continuous limits, then check source output, terminal voltage and battery duty. The most restrictive applicable condition governs whether the addition can proceed.

Trace the proposed connection on the existing drawing rather than relying on the cabinet’s headline rating. A busbar, a distribution assembly, a contactor and its terminals can have different limits. Use ratings released for the actual installation conditions, including relevant derating; do not replace them with a larger value printed on one component. The DC distribution guide explains the underlying branch and protection arrangement.

For a constant-power planning case, current increases as supply voltage falls: current equals power divided by voltage. Check the applicable lower operating voltage instead of using the normal float-voltage display for every current calculation. This does not mean every radio behaves as an ideal constant-power load across every condition; use its actual input characteristics where the approximation no longer applies.

A separate check follows the feeder to the equipment terminals. ETSI EN 300 132-2 V2.8.1 addresses the DC interface for nominal −48 V ICT equipment. It does not approve a particular expansion. Apply the connected equipment’s permitted input conditions after accounting for the actual path’s voltage drop and the site’s source and protection settings.

Next establish how much qualified DC output remains in the project’s required source-loss or maintenance state. An empty shelf position contributes nothing until the proposed rectifier, shelf, controller, AC input and cooling arrangement support it. Use the existing rectifier redundancy guide for the module-count calculation; this review uses its resulting available output as an input.

Before and after: one expansion request in Chile

Consider a hypothetical site team in Chile requesting another radio. These figures are invented planning inputs, not Huijue specifications, local grid data or a customer case. Existing demand is 6.0 kW; the proposed addition raises it to 7.2 kW. Both values are defined at the plant DC-bus load boundary and include the agreed DC auxiliaries and feeder-loss allowances.

The project has accepted 9.0 kW of DC rectifier output in the selected source-loss state. An identified load-side bus segment is permitted to carry 180 A continuously, while its downstream common feeder is limited to 140 A. These are assumed limits after installation-specific derating, not suggested breaker sizes. This part of the path supplies the loads; battery charging does not pass through that common feeder.

Use 46 V as the declared lower bus-voltage planning point for the current screen. Recovery is evaluated separately at 54 V with a 40 A battery-charge demand. Both are voltage magnitudes for this example, not universal setpoints. The battery has 18.0 kWh of accepted usable energy delivered at the same load boundary under the stated conditions, and the required autonomy is three hours. For this simplified comparison, that usable-energy allowance is assumed valid at both load levels.

Capacity check	Declared allowance or requirement	Before addition	With the new radio	Result for the addition
Rectifier output, loads only	9.0 kW available in the selected source-loss state	6.0 kW; 3.0 kW remaining	7.2 kW; 1.8 kW remaining	Within this output limit.
Rectifier output during recovery	9.0 kW available; charging at 54 V × 40 A = 2.16 kW	6.0 + 2.16 = 8.16 kW	7.2 + 2.16 = 9.36 kW	Exceeds available output by 0.36 kW.
Identified load-side bus	180 A continuous limit	6,000 ÷ 46 = 130.4 A	7,200 ÷ 46 = 156.5 A	23.5 A of continuous margin remains at this point.

Capacity check	Declared allowance or requirement	Before addition	With the new radio	Result for the addition
Existing common load feeder	140 A continuous limit	130.4 A; 9.6 A remaining	156.5 A; 16.5 A above the limit	Cannot carry the proposed continuous duty.
Battery autonomy	18.0 kWh net usable energy; three hours required	18.0 ÷ 6.0 = 3.0 hours	18.0 ÷ 7.2 = 2.5 hours	Falls 0.5 hour short of the requirement.

The initial decision is to hold connection of the new radio. The load-only rectifier result and the bus result pass their individual screens, but the common feeder, recovery-output case and backup requirement do not. None of the passing rows cancels a failed row. The new radio’s own branch protection, terminal voltage, transient behavior and thermal effects also remain part of the project review.

The energy row assumes usable energy, not nominal battery capacity. A real review must establish that energy at the new discharge duty, temperature, ageing condition, cutoff and permitted state-of-charge range. The battery backup-time calculation guide covers those adjustments. Do not deduct losses twice if the accepted net-energy figure already includes them.

Can a feeder upgrade alone release this radio addition?

No. In the example, increasing the common feeder’s permitted capacity would resolve only one of three failed checks. The project must also restore the required battery duty and reconcile the combined radio and charging demand with available rectifier output. Any modification needs its own confirmed equipment and protection compatibility.

Suppose an engineered feeder replacement is released for 180 A continuously. The proposed 156.5 A duty would then leave 23.5 A on that path. That result is conditional on the complete cable, terminal and protective-device arrangement supporting the revised duty; installing a higher-rated breaker alone is not the upgrade.

The backup calculation requires 7.2 kW × 3 hours = 21.6 kWh of usable energy at the declared boundary, compared with the assumed 18.0 kWh available. The 3.6 kWh difference is a net-energy shortfall, not the nominal capacity of a battery module to order. Check the proposed battery arrangement’s usable energy and current capability, controller support, charging limits, protection and physical accommodation.

For the **battery recovery load**, one possible engineering option is a lower authorized charge-current limit. At 30 A and 54 V, charging requires 1.62 kW, making the combined demand 8.82 kW. This sits 0.18 kW below the stated 9.0 kW ceiling, but that small arithmetic margin is not an acceptance criterion. The responsible engineer still needs an agreed operating margin and control behavior.

Reducing charging current can lengthen recovery, potentially leaving less reserve for the next outage. Compare that option with additional qualified rectifier capacity and any upstream supply changes it requires. Do not alter a live charge limit simply to make the worksheet pass. Neither a linear energy calculation nor a controller setting establishes the complete battery recharge time.

Which operating states must pass before connection?

Check normal supply, the required source-loss or maintenance condition, battery-supported operation and recovery with the larger load. Identify the sources and load priorities active in each state. A normal-operation measurement cannot demonstrate capacity in a state that disables a source or adds charging demand.

In the worksheet, accepting 9.0 kW of available output permits the 7.2 kW load-only case; it does not permit simultaneous 40 A recovery charging. A proposal using 30 A must show that the controller can enforce the intended allocation and that the slower replenishment still meets the accepted recovery objective. Additional rectifier capacity is another possible route, but only if its supply, shelf and thermal dependencies are included.

Also decide whether the new radio must remain powered throughout the outage. Under the simplified energy assumptions, shedding that 1.2 kW addition would return demand to 6.0 kW and restore the calculated three-hour duration. It would not provide three hours of service from the enlarged radio installation. If that compromise is acceptable, specify the trigger, priority and service consequence; otherwise the backup-energy shortfall still needs correction.

The review defines what authorized commissioning personnel must demonstrate; it is not a procedure for connecting to an energized plant or creating a fault on a serving site. Agree the safe verification method and recovery plan through the site’s responsible engineering and operations teams.

Turn the failed rows into a priced expansion scope

A **plant expansion** quotation should distinguish equipment retained unchanged from the work needed to close each failed check. For this example, request a coordinated proposal for the common feeder, the usable backup-energy shortfall and the chosen rectifier/charging solution. Include the new radio branch rather than assuming a spare position includes its protection, cable and terminations.

Ask for separate prices and dependencies for those changes. A rectifier addition can require shelf, controller, AC-supply or cooling work; a battery addition can require another enclosure or revised charge control. If a proposal replaces most of the plant,

identify that larger retrofit openly instead of presenting it as the cost of one extra radio connection.

For the example worksheet, a completed disposition reads: “Hold the new 1.2 kW addition. Resolve the 140 A common-feeder limit, three-hour usable-energy shortfall and 40 A recovery case; retain the identified 180 A load-side bus only if its existing qualification remains valid.” That gives procurement and the project manager a defined change request while preserving engineering responsibility for the final configuration.

Keep the accepted before-and-after sheet with the revised equipment list and operating settings so a later tenant addition starts from the enlarged plant, not the original 6.0 kW baseline. The value of **telecom DC power** expansion planning is knowing which capacity has actually been committed and which remains available for the next change.

Request an addition-specific power proposal

Send Huijue the current drawing, installed rectifier/controller and battery identities, existing demand record, proposed radio input duty and required backup interval. Request a proposal showing retained equipment, changed equipment and the operating cases each change supports. Huijue’s integrated cabinets, rectifiers and storage portfolio provides the supply starting point; compatibility and expansion approval remain specific to the actual plant.

Discuss the radio-addition power scope

Related power-system decisions

Understand the retained rectifier platform
Review DC distribution and protection
Qualify a replacement power module

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