

Tower-Integrated Solar PV: Saving Space at Microwave Sites

Use tower-integrated solar PV to reduce separate array space and support materials at microwave sites, with structural, radio and maintenance checks.

PRODUCT KNOWLEDGE

Tower-Integrated Solar PV: Saving Space at Microwave Sites

Use the telecom tower structure to accommodate solar panels, reduce separate mounting requirements and preserve the space needed to operate the site.

Updated October 20, 2026

Tower-integrated solar PV

Approx. 8 minute read

Contents

The Hekou reference

Where space and material savings arise

Keep the radio path clear

Check movement as well as strength

Walk the maintenance route

Keep the panels integrated and accessible

Tower-integrated solar PV places photovoltaic modules within the communications tower structure or on engineered supports attached to it. The purpose is to add solar generation while using the tower and its occupied space, reducing the need for a separate ground-mounted array and duplicated support materials. At a space-constrained microwave site, this can make solar practical without creating a second equipment area.

The opportunity comes from sharing a structure that already serves communications. A workable design must still carry the added loads, protect the microwave path and leave the equipment accessible. Solar generation supplies electricity; microwave backhaul carries data toward the wider network. Integrating their physical arrangement does not remove either system's design requirements.

Conceptual illustration in China; not a photograph of the reported Hekou project or a completed Huijue installation.

A mountain microwave site brings the space problem into focus

On October 1, 2026, CCTIME reported a solar microwave deployment in Hekou County, Yunnan, China . The report describes a tower-integrated cabinet and a combination of

5G access, solar generation, lithium storage and microwave backhaul at a location without grid electricity or optical fibre. It provides a useful starting point for discussing compact site construction.

For a mountain site, the question is where the solar modules can go when usable ground is limited. Tower-integrated PV uses positions within or on the tower structure rather than automatically allocating another plot to a freestanding array. The Hekou report remains attributed context; its results do not establish the performance of another installation or a Huijue product.

The relevant drawing must show the real mounting arrangement. Modules can occupy selected lower-frame positions, with local rails and brackets connecting them to approved structural members. A cabinet may occupy part of the same lower space, but its location does not define the PV arrangement. Record which members support the modules, which support the cabinet and where their loads reach the foundations.

How can tower-integrated PV save space and mounting materials?

Tower-integrated PV can save space by using suitable positions within or on the communications structure, reducing the additional ground area needed for an independent array. It can also reduce duplicated supports when the tower carries loads that would otherwise require separate posts and foundations. New module rails, brackets and any necessary strengthening must be included before claiming a net material saving.

Compare two layouts that meet the same required solar contribution and equipment-access needs. On the site plan, measure additional occupied ground, module overhang and the reserved working routes. In the structural schedule, compare the independent rack and its foundations with the integrated design's complete rails, connections, reinforcement and foundation work. Sharing steel only counts as a saving when the accepted design actually uses less material for the required function.

A **shared tower structure** also connects three engineering paths that must stay clear:

- The electrical path runs from the PV array through the selected conversion and protection equipment to storage and the telecom loads.
- The traffic path runs from the access equipment through the microwave radio and antenna to the far-end network connection.
- The mechanical load path runs from each module and its rack through the approved tower connections, structural members and foundation, alongside the existing antenna and equipment loads.

These paths explain both the attraction and the limits of the arrangement. A short DC route is useful, but a panel placed over the cabinet door may make routine servicing impossible. A shared attachment can avoid a separate post while transmitting additional wind-driven movement into the antenna-supporting structure. Keep the space and material objective visible as those interfaces are resolved.

For the complete power-system architecture, use the solar power guide for microwave towers . This article addresses the physical integration choice; electrical sizing must establish whether the available module area provides the required solar contribution.

Can tower-mounted solar panels obstruct the microwave link?

Tower-mounted solar panels can obstruct the microwave link if modules, support members or later additions intrude into the required propagation clearance. The check must use the antenna locations and the path profile, rather than a ground-level impression that the panels are below the dish.

A visible line to the far end is only the starting geometry. Radio planning also considers the space around that line, terrain and propagation conditions. ITU-R P.530-19 provides prediction methods for terrestrial line-of-sight links under clear-air and rainfall conditions. The suitable clearance and fade allowance depend on the actual path; one generic gap or dish-height rule cannot establish them.

Place the PV edges, cabinet, rails, cable trays and anticipated vegetation on the same elevation drawing as the antenna. Use their actual positions along the path: the clearance needed near a terminal is not simply the clearance at the middle of a hop. Include the space needed to adjust or replace the antenna without temporarily leaning equipment into the working radio aperture.

This makes **microwave path clearance** a layout constraint before the array is frozen. If a module wing conflicts with it, test a different position or independent support first. Raising the antenna also changes the structural and access problem, so it should be an evaluated alternative rather than an automatic fix.

A structure can remain standing and still lose antenna alignment

Once the radio geometry is clear, check what happens when the shared installation moves. Wind acts on PV surfaces as well as on the tower, cabinet and dish. Module tilt, projected area, attachment position and distance from the support affect the forces and moments delivered to the structure. An existing tower's spare capacity cannot be

inferred from its appearance or unused mounting space.

The review needs both structural resistance and movement at the antenna mount. A frame may satisfy a strength check yet rotate or deflect enough to reduce microwave alignment margin. The relevant limit follows the selected antenna, mount and link requirements, together with the applicable structural design basis; there is no universal allowable movement for every microwave station.

Follow the load path into the connections and foundation. Adding PV to a tower leg can affect local connections and the overall structure even when the modules are light. Cabinet mass, including the proposed battery arrangement, must be assigned to its actual supports. Moving the battery to ground level may reduce elevated mass, but changes cable routes, environmental exposure and the space required at the base.

Coordinating those choices early avoids designing the PV rack and then asking the tower to absorb whatever remains. Test different module positions, rack geometry or an engineered strengthening scheme against the original space and material objective. If a safe tower-supported arrangement is unsuitable, a separately supported array remains an alternative; include its additional space and materials in the comparison.

Walk the maintenance route before filling the remaining space

The space left between tower legs is not automatically usable PV area. Reserve the cabinet door sweep, component withdrawal path, technician working position, ventilation openings and access to disconnects. Use the selected equipment's requirements and the site's applicable safety rules to set the dimensions.

Check **cabinet service access** with the door open and the largest replaceable item in motion. A battery module may fit inside the enclosure but still be impossible to remove around a PV rail. A maintenance visit should not depend on stepping on modules, blocking an escape route or dismantling an unrelated structural member.

The same exercise applies to the array. Identify how a technician reaches clamps and connectors, cleans the modules where necessary and replaces a damaged module. Avoid an arrangement in which PV maintenance requires loosening a member that also establishes the microwave antenna's alignment.

Those maintenance choices feed back into solar performance. Moving a row to create access can move it into the tower's seasonal shadow. Include the tower, antenna and rack geometry in the shading assessment before accepting the revised array. The PV string-design and tower-shading guide covers the electrical consequences of that shadow pattern.

New metal supports and cable routes also change bonding and protection interfaces. Carry the final layout into the tower, cabinet and PV bonding design , rather than treating a shared steel frame as proof that every required connection already exists.

A compact retrofit: reserve access, then arrange the tower-mounted panels

Consider a hypothetical retrofit with a cabinet between the lower tower legs and two proposed PV wings attached to the lower frame. The drawing fits everything inside the leased boundary. During a maintenance walk-through, one wing prevents the cabinet door from reaching its required open position and also obstructs the planned battery withdrawal route. The antenna engineer has separately requested a review of movement transmitted through the shared support.

The next drawing should reserve the complete door sweep and battery withdrawal route first. Then test whether the required modules can be divided between approved tower mounting positions on either side of that corridor. The aim is to retain the space benefit through a better panel arrangement. Reducing the battery quantity merely to make the door usable would sacrifice required storage capacity to accommodate a layout error.

Layout choice	What changes	What determines the decision
Keep the original continuous tower-mounted PV wing	Retains structural sharing, but blocks the identified service route	Reject this arrangement until the door and battery movements are resolved
Divide the modules between approved tower mounting positions around the reserved corridor	Tests whether the required array can remain tower-supported while preserving access	Confirm module fit, usable solar yield, local connections, tower and foundation capacity, radio clearance and antenna movement
Move the conflicting module group to a separate low rack	Reduces tower-supported integration and adds separate support and ground-space requirements	Consider if the integrated alternative cannot satisfy access and engineering constraints; recalculate the complete footprint and material balance

The divided, tower-supported layout is the first candidate to investigate, not an assumed solution. It succeeds only if the required modules fit, the service movements are clear and the combined structural, radio and solar checks pass. If those conditions cannot be met, the separate rack offers a transparent fallback rather than a reason to force panels into unusable space.

Once a candidate is accepted, compare its complete footprint and mounting-material schedule with the standalone-array baseline. Record avoided posts and foundations alongside added rails, connections and strengthening. That gives the site owner a defensible space and material result instead of applying a generic saving percentage to every tower.

Bring a site layout to the equipment discussion

Huijue's published telecom energy offering includes configurable outdoor cabinets, conversion and control equipment, storage and engineered PV racking. Start an integration discussion with the available site dimensions, tower information, proposed antenna position and direction, equipment load and the required maintenance routes.

Ask for a preliminary tower-integrated PV arrangement showing the module positions, mounting interfaces, cabinet access and structural review boundary. Compare it with an independently supported array using the same solar requirement. That is a practical way to establish whether the proposed integration saves space and support materials at this site.

Discuss a tower-integrated solar layout

Contact Us

For catalog requests, pricing, or partnerships, please visit:
<https://www.thesolartelecom.com>



Tower-Integrated Solar PV: Saving Space at Microwave Sites