**How Drone Solutions Are Powering the Future of Solar Energy**

We explore how resources such as solar energy can benefit from the technology of the future, specifically drone based solutions. We’ll explore how each stage of setting up solar power stations can use drone solutions to bring light to the future we live in, but first, a brief history lesson.

Hope is on the horizon

To put it mildly, the time for renewable resources to become a major contributor to the energy needs around the world is nigh. With the growth in population and GDP driven consumption, the world is bracing up to face a challenging energy mix. Hoping to create an equitable balance between development and environment and ensuring that everyone has access to enough sustainable energy rests in resources such as solar, hydro, wind and geothermal. To be honest, they [have a lot going for them](https://www.ucsusa.org/clean-energy/renewable-energy/public-benefits-of-renewable-power#bf-toc-5) like the fact that they never run out, cause lesser deaths, require little maintenance and are steadily becoming cheaper.

In particular solar energy along with wind has emerged to be the darling of environmentalists and new age economists [around the world.](https://bnef.turtl.co/story/neo2018?teaser=true) Remember when we told that new resources spurn new industries? Well, it looks like humanity has taken a “leaf” out of the nature’s playbook and turned to the Sun as the new resource to shed light on the path to the future and cheaper energy around the world.

Drone based solutions and the future of solar

As with emerging resources one of the key driving factors for their adoption is the decline in cost of capital that goes into monetising these resources, the purpose of this post is to enlighten the reader on how drone solutions can serve as a driving factor to making the planning, building and sustenance of solar energy more profitable and efficient. Solar energy is captured in many forms, primarily it is captured in two ways, utility grade plants and rooftop. We want to focus this post exclusively on utility grade plants, why you may ask? Please see below.

As a drone solution provider in one of the fastest growing energy consumers in the world, we naturally gravitate towards building solutions for large-scale plants, also, there is another crucial factor at play here. With the release of the [Digital Sky](https://factordaily.com/indian-digital-sky-system-for-drones-takes-shape/) regulations, aspects of secure scalability such as integrating drone registrations and flight operations management, drones are going to play a significant part of the civilian and commercialisation industry.

Drones are beginning to make a huge difference in the planning, construction, and operational phases. In short drones and the solution built on the data from drones bring a powerful synergy to a sector that needs to grow fast and perform well in the years to come. So how do drone solutions make solar energy more viable? We start from the ground up.

Drone solutions for faster planning

A year of strong growth is predicted for 2018 with new installations expected to surpass the 100 GW mark for the first time, representing 6 percent annual growth, with an increase of [about 15% to ~ 113 GW](http://www.fi-powerweb.com/Renewable-Energy.html), up from 98.9 GW in 2017. India’s total capacity in particular is expected to grow from [9.5 GW in 2016 to 76 GW by 2021](https://en.wikipedia.org/wiki/Solar_power_in_India), which means it will be installing 66 GW from 2017–2021, or more than 13 GW annually, on average, using the standard thumb rule of 5 acres needed for every 1 MW of solar energy means about 65,000 acres of solar panels to be set up every year. That requires quite a bit of planning and surveying.

To gather topographical information for a prospective site of a future solar farm, you traditionally have two options: rely on publicly available data (like Google Maps) or conduct new ground surveys, neither of which is ideal for large-scale projects like solar farms. In solar farm prospecting, it’s challenging to generate purchase bids quickly. By surveying land and creating contour maps and digital terrain models with drone solution, this process can be cut down to a few days. The result: faster turnaround times and a leg up on competition.

Drones can also reduce the design cycle of solar energy projects by [as much as 70%](https://blog.dronedeploy.com/isolara-improves-solar-design-workflow-and-expedites-sales-process-with-drone-maps-3ecc6a543041), and increase team productivity along the way.

Drone solutions help field engineers visualise their project in a paradigm shifting manner, think of them shifting from old hand-drawn portraits to digital photography. These detailed orthomosaics and digital twins take into account factors that a human engineer might did not have access to before like [hydrology and shadow analysis](https://www.downtoearth.org.in/news/energy/with-regulations-in-place-solar-sector-will-look-to-use-drones-to-improve-productivity-61682), accurate material quantity estimates, manpower needs, and safety assessments, all of which contribute massively to the overall project plan. These solutions enable engineers to design and implement a project [90% faster](https://www.theguardian.com/sustainable-business/2017/feb/26/drones-robots-solar-power-plant-energy) too!

Every pixel on a drone map captures down to 2cm.

Drone solutions for better construction monitoring

Once a suitable project site has been selected and the project is being constructed, drones can be the “eyes” of project managers on-site, saving plenty of time and money on transportation. Project visits in person can become much less frequent, and if a project manager wants to “visit” the project it is as simple as logging in remotely to one of the web-based portals to take a tour or generate reports on construction completion rates and project how long before the plant starts to generate power.

There are two critical ways drones are lowering worker and business risk by improving operational efficiency for solar energy companies.

Saving time:

Drone solutions can “elevate” construction site monitoring and reporting (counting number of rigs, modules mounted etc) to the point of being able to remotely verify if each individual installation is complete, safe, aesthetically acceptable and all components of the installation are robust and permanent.

Saving money:

Digitised assets through drone solutions also mean that if the planned layout and setup of solar panels are in line with as-built conditions, these kinds of insights allow EPC stakeholders to conduct, complete and generate acceptance documentation.

Module mounting measurements

Drone solutions for ensuring performance

With an exponential level of growth, current methods of operation and maintenance are simply not sustainable nor is it economically feasible to deploy poorly trained manpower. Two field engineers spending 30 days, doing handheld IR analysis, spot checks and IV curves on a 100 MW plant just doesn’t make sense. Imagine if you could lift these sensors above the ground and do the same site in 24 man-hours, and discover up to [3,500 anomalies in 423,000 solar panels](https://pv-magazine-usa.com/2018/06/22/ai-infused-drone-om-for-solar-farms-50-minutes-per-mw/), now that makes a whole lot of sense.

Dust detection for directing O&M operations

The use of drone solutions can prevent and pre-emptively predict the spread of degradation of solar panels and determine which panels need cleaning or repair. Drone solutions that detect hotspots and drop in energy outputs are able not only to increase the PV plant efficiency but also reduce the cost of its maintenance since they practically require any human participation in work. Drone solutions in this way help teams pinpoint problem areas and fast-track repairs to keep solar operation running at peak efficiency and reduce the number of manpower per MW needed for the upkeep in performance.

Future of drones : beyond the horizon

Drone solutions have unimaginable possibilities to revolutionise energy industries by automating the way we plan, build and maintain sustainable energy sources, and completing tasks faster, cheaper, and more safely than humans ever could, or even performing functions that could never have been dreamed of in the first place without drone technology.

Solar energy’s overall share of global power generation remains low, but is about to witness a major increase with the onset of drones into the sector. With technologies like thermal imagery and 3D modelling, drone solutions are set to cause a major paradigm shift as a growing number of companies are accommodating drone based outputs into their workflows, as the world shifts to new resources and companies are built to harness the resources so will solutions that enable this shift, stay tuned to understand in even more depth how drone solutions can be used in each stage of the project lifecycle.

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