PowerAlpha®: How AI-Driven Software Can Pick the Best Land and Configurations to Drive the Highest Project Returns

OVERVIEW

As renewable energy projects grow in number and size, finding suitable and desirable land is becoming more complex and competitive across the globe. Using advanced analytics, modeling software, and integrating multiple datasets allows better insights and better returns. With its AI-enabled software platform, PowerAlpha, BrightNight can identify the best land and configuration that drive best-in-class returns for projects.

THE CHALLENGE

The hunt for land that is physically and economically viable for building a renewable power plant has always involved assessing the terrain in terms of slope, hydrography, vegetation, environmental factors, and proximity to transmission infrastructure for power production and delivery. In addition, solar and wind power projects require sites with nuanced geographical constraints, such as slope orientation, as well as quality historical weather data. Other factors to consider are restrictions such as roads that pass through the land parcels, existing buildings, and local municipal restrictions. The task of finding land must also consider local landowners who need detailed information about a project before they commit to leasing or selling their properties for renewable energy plants.

THE POWERALPHA® SOLUTION

BrightNight's proprietary software platform PowerAlpha integrates AI-driven data analytics with our proprietary geographic information system (bnGIS) to identify optimum land parcels for renewable-energy projects, assessing both buildability and energy-generation potential.

PowerAlpha's Land Score -

a unique geoprocessing tool with a patent pending – which runs on the PowerAlpha platform.

Similar to the way that Google Maps can show a variety of geospatial "layers" (roads, satellite images, etc.), PowerAlpha's bnGIS integration utilizes multiple datasets to assess the buildability of land, taking into account all of the 'trade-off factors' outlined above. This assessment of buildability analyzes the suitability of a given parcel of land to deploy solar modules or wind turbines. Each parcel being assessed gets a PowerAlpha's Land Score based on its buildability, making it easy to identify the most lucrative land for renewable project development.

PowerAlpha's Energy Score -

which is a component of Land Score – takes in typical meteorological (TMY) weather data and along with geospatial information and computes energy generation potential for each parcel. The tool's proprietary algorithms evaluate a variety of layout options for PV modules and simulate power generation over the lifetime of the project. These layouts - driven power generation values are compared to a reference flat terrain, yielding the PowerAlpha Energy Score, which is used to find the optimal layout resulting in the best-in-class levelized cost of energy (LCOE).

Together these PowerAlpha tools deliver AI-driven qualitative and quantitative insights around the key factors for renewable energy builds. They enable BrightNight to de-risk projects in the early stages of project development lifecycle, accelerating the speed of decisions and elevating confidence in project performance.

Best-in-class Land utilization

Using the buildable-area layer, PowerAlpha's Land Score calculates the acreage available for arrays of PV modules. Energy Score dives deep to calculate actual energy generation, augmenting array layouts to optimize power generation from solar energy. PowerAlpha's Land Score and Energy Score tools can zoom in and out of areas of the bnGIS map across a property, analyzing the buildability and generation prospects of areas. Using these unique capabilities, BrightNight can reduce the complexity of finding and utilizing land, gaining a competitive edge as an Independent Power Producer (IPP).
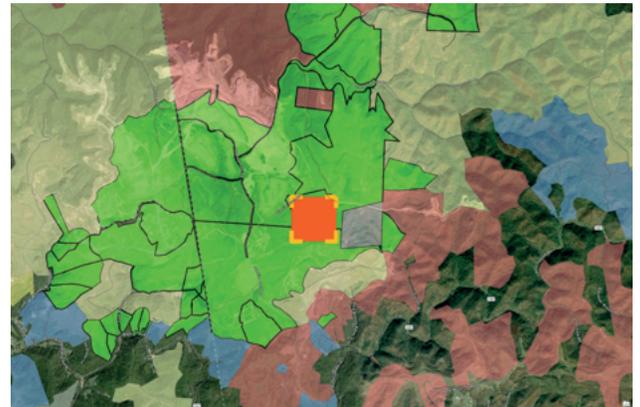
Single source of truth for Land management

PowerAlpha's bnGIS tools don't just deliver invaluable land insights, they also organize this information for easy access by integrating with BrightNight's internal customer relationship management system (bnCRM) database. The PowerAlpha energy and land analysis, as well as other key information pertaining to land parcels under consideration by BrightNight, is available as a single source of truth through bnCRM across the company – from land teams to engineering to finance. bnCRM gives BrightNight a digital view of land that the company has already leased, land being actively pursued and land under consideration. It enables the teams to compare the relative potentials of different sites quickly and accurately. Decisions are made collaboratively and based on complete, up-to-date information, rather than operating in silos with fragmented facts.

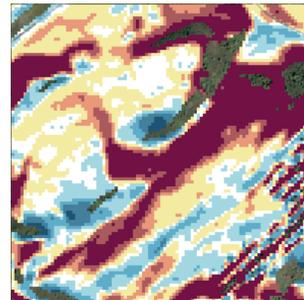### Laying the footprint for digital asset management

With PowerAlpha's suite of powerful features and bnGIS it can create a detailed digital capture of the land and assets such as the PV arrays, batteries, and the point of interconnection, laying the foundation for digital twins for projects once they are operational. Through bnGIS, the digital map can visualize all the assets in a three-dimensional scene.

The integration of bnGIS with PowerAlpha gives BrightNight the ability to design and optimize projects to deliver best-in-class returns from evaluation to operation.

PowerAlpha brings the intelligence to deliver affordable, reliable renewable power when it's needed.

Single source of truth for land management

Energy score:
energy generation
potential of land

Land score guides
PV array layouts for best
in class project returns

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BRIGHTNIGHT
Power when you need it