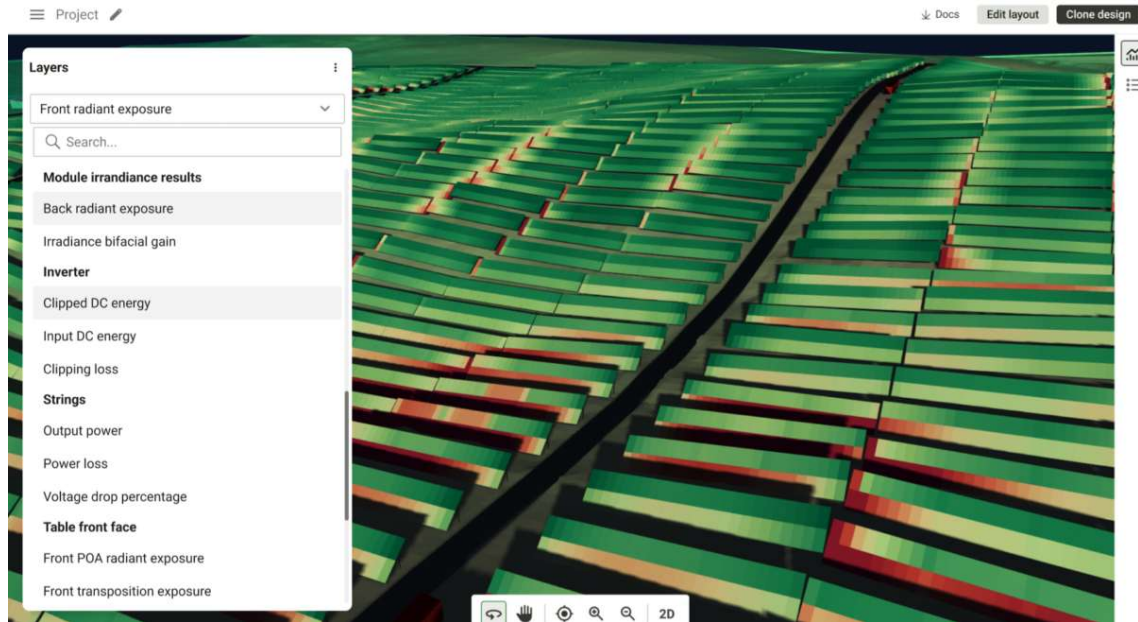


RatedPower pvDesign software: Utility-Scale Solar & BESS Design at Speed



Utility-scale solar projects don't fail because of lack of ideas—they fail due to slow iteration, poor layout optimization, and disconnected engineering workflows. RatedPower's pvDesign platform addresses this directly by automating feasibility, layout engineering, and early-stage optimization for Solar PV and co-located Battery Energy Storage Systems (BESS). This piece breaks down how pvDesign works, why it's gaining traction globally, and where it fits in a bankable project pipeline.

I. Introduction

In today's solar market, speed and accuracy are competitive advantages. Developers are expected to evaluate dozens of sites, optimize layouts, and present technically sound proposals—fast. pvDesign is built for exactly this phase: early-stage to pre-construction design, where decisions have the highest financial impact.

Unlike bankability-focused tools such as DNV SolarFarmer, pvDesign is not about probabilistic yield validation—it's about engineering optimization, layout automation, and rapid techno-economic iteration.

II. Industry Context

Traditional solar design workflows rely heavily on:

- Manual CAD drafting
- Fragmented simulation tools
- Iterative back-and-forth between design and finance teams

This creates bottlenecks in feasibility studies and slows down project pipelines.

pvDesign changes this paradigm by:

- Automating layout generation using algorithms
- Integrating terrain, electrical, and financial constraints
- Enabling rapid scenario comparisons

It aligns well with modern development cycles where speed-to-decision is critical for land acquisition, permitting, and bidding.

III. What Is pvDesign?

pvDesign is a **cloud-based engineering platform** that:

1. Generates optimized PV layouts automatically
2. Designs electrical infrastructure (DC & AC)
3. Integrates BESS sizing and placement
4. Simulates energy production
5. Outputs bankable-ready pre-engineering reports

It is particularly strong in **utility-scale solar + storage hybrid projects**, where layout and electrical complexity increase significantly.

IV. Core Components

A. Automated Site Layout Optimization

At its core, pvDesign uses algorithm-driven layout generation:

- Terrain-aware module placement (slope, elevation, constraints)
- Tracker spacing and tilt optimization
- Land boundary and exclusion zone handling
- Road and inverter station positioning

Instead of drafting layouts manually, engineers define constraints—the software generates optimal configurations.

Impact: Cuts layout design time from days to hours.

B. Electrical Design Engine

pvDesign automates both DC and AC system architecture:

- String sizing and inverter matching
- DC/AC ratio optimization
- Medium-voltage network routing
- Substation-level aggregation

It ensures designs are not just geometrically feasible but **electrically coherent and cost-efficient**.

C. BESS Integration

One of pvDesign's differentiators is native BESS support:

- Battery sizing based on energy and power requirements
- Co-location strategy (shared vs independent infrastructure)

Works. For You.

- Integration with PV production profiles
- Grid export smoothing and peak shifting

This is critical as hybrid PV+BESS projects become standard in markets like the US, Australia, and Europe.

D. Energy Simulation

While not as uncertainty-heavy as bankability tools, pvDesign includes:

- Irradiance-based production modeling
- Loss assumptions (temperature, wiring, inverter efficiency)
- Capacity factor estimation

These outputs are sufficient for **feasibility-stage financial modeling**, before transitioning to tools like SolarFarmer for bankability.

E. Cost & Yield Optimization

pvDesign enables **multi-scenario comparisons**:

- Different module/inverter combinations
- Tracker vs fixed tilt
- Land utilization strategies
- CAPEX vs yield trade-offs

This allows developers to answer critical questions:

- “What layout maximizes IRR?”
- “What DC/AC ratio gives optimal returns?”

F. Reporting & Outputs

The platform generates:

- Layout drawings (CAD-compatible)
- Bill of Quantities (BoQ)
- Energy yield summaries
- Electrical single-line diagrams (SLDs)
- Financial input datasets

These outputs are structured for **handoff to EPC teams, consultants, or bankability tools**.

V. Why pvDesign Is Gaining Adoption**1. Speed at Scale**

Developers can evaluate multiple sites in parallel without expanding engineering teams.

2. Reduced Engineering Bottlenecks

Automation minimizes manual CAD work and repetitive calculations.

3. Early-Stage Optimization

Better layouts early = higher project IRR later.

4. Cloud Collaboration

Teams across geographies can work on the same project simultaneously.

5. BESS-Ready Design

Native hybrid project capability aligns with market direction.

VI. Practical Workflow

A typical pvDesign workflow looks like:

1. **Site Import**
भूमि boundaries, topography, and constraints
2. **Technology Selection**
Modules, inverters, trackers, BESS specs
3. **Constraint Definition**
Setbacks, spacing rules, electrical limits
4. **Automated Layout Generation**
Software produces optimized plant design
5. **Electrical Design Execution**
DC strings → inverter blocks → MV network

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6. **Simulation & Optimization**
Run multiple scenarios for yield vs cost
7. **Export Deliverables**
CAD files, BoQs, SLDs, financial inputs

This compresses weeks of work into a **few iterative cycles within hours.**

VII. Benefits and Limitations**Benefits**

- Massive reduction in design time
- Scalable for multi-site development pipelines
- Integrated PV + BESS design capability
- Strong early-stage financial alignment
- Reduces dependency on manual CAD workflows

Limitations

- Not a full bankability tool (limited uncertainty modeling)
- Requires engineering judgment for constraints and assumptions
- Cloud dependency (performance tied to connectivity)

Bottom line: pvDesign accelerates development—but **final bankability still requires tools like SolarFarmer.**

VIII. Where pvDesign Fits in the Project Lifecycle

Stage	Tool Role
Site Screening	High-speed layout feasibility
Pre-Feasibility	Optimization of design scenarios
Development	Engineering baseline creation
Financing	Input provider (not final authority)
Due Diligence	Complementary, not primary

Think of pvDesign as the **front-end engine**, and SolarFarmer as the **validation engine.**

IX. Use Cases

pvDesign is widely used for:

- Greenfield solar project development
- Hybrid PV + BESS design
- Competitive bidding preparation
- Land acquisition decision-making
- EPC pre-engineering

X. Conclusion

RatedPower pvDesign software is not about proving bankability—it's about **getting to the optimal design faster than your competition.**

In a market where speed, accuracy, and hybrid capability define success:

- pvDesign accelerates development
- SolarFarmer validates risk
- Together, they form a complete pipeline

If your pipeline depends on evaluating multiple utility-scale opportunities quickly, pvDesign is no longer optional—it's a strategic advantage.

References

1. RatedPower – Official product documentation and pvDesign platform resources
2. Industry benchmarks for utility-scale PV and hybrid system design workflows
3. DNV SolarFarmer – Bankability and yield validation standards