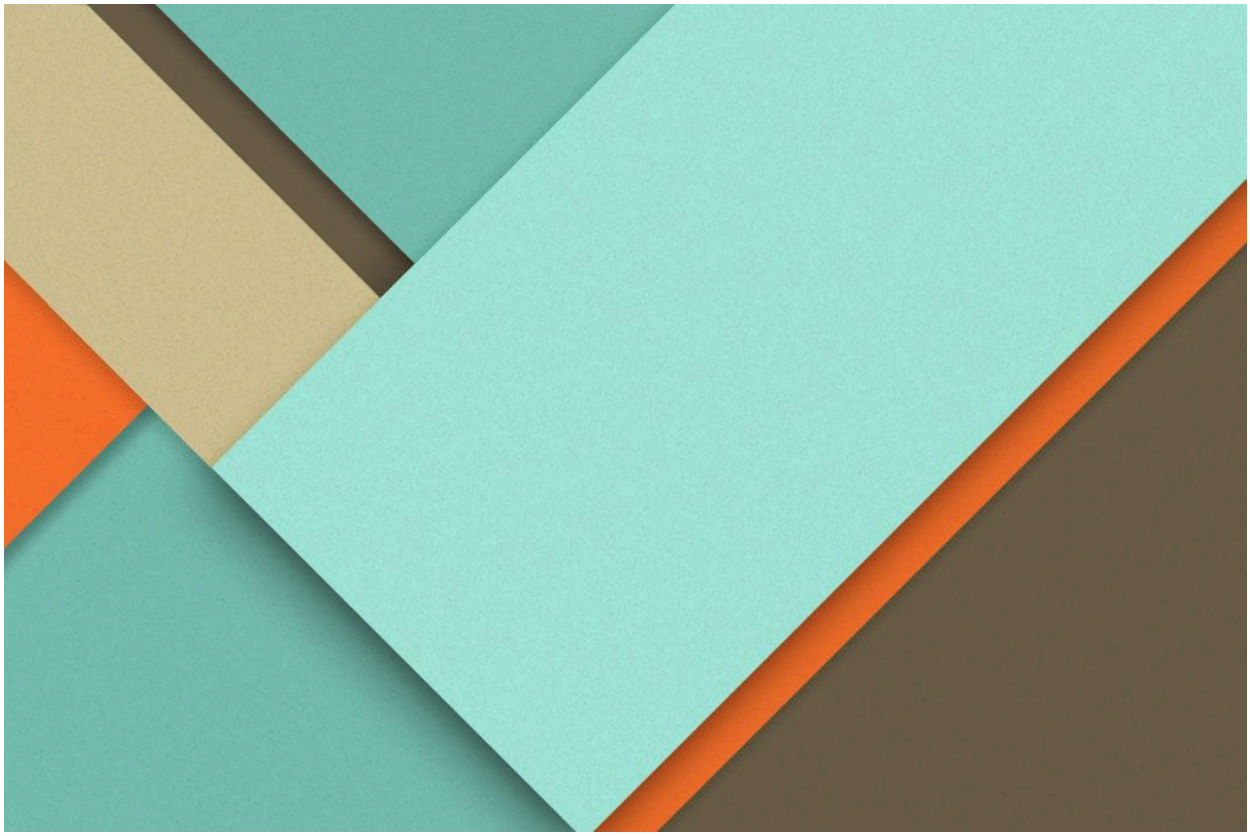

NovaSol Solar Farm Construction

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Overview

NovaSol Energy proposes construction of a **50 MW ground-mounted solar farm** in a designated rural site in Oyo State to support regional renewable power requirements and strengthen NovaSol's generation portfolio. The project will deliver a grid-tied solar installation including site preparation, civil works, mounting structures, PV module and inverter procurement and installation, substation and grid interconnection, and full testing & commissioning. The solar farm is designed for utility-scale reliability, regulatory compliance, and operational scalability.

Goals

1. Deliver a 50 MW operational solar farm, grid-connected and commissioned within an evidence-based project timeframe.

2. Achieve seamless grid interconnection with required permits and technical approvals.

3. Minimize construction risks and environmental impact through best practice site management.

4. Deliver within approved budget and meet NovaSol's quality, safety and performance standards.

5. Enable commercial operation and first-power handover to the off-taker with full documentation and training of operations staff.

Specifications

- **Capacity:** 50 MW DC (utility-scale), with design to meet local grid code requirements.

- **PV Technology:** Crystalline silicon modules mounted on fixed-tilt frames (design adjustable to site orientation).

- **Power Conversion:** Central or string inverter architecture sized to meet plant AC capacity and reactive power requirements.
- **Substation & Grid:** Onsite step-up substation sized per grid operator specifications and protection relays for safe interconnection.
- **Civil & Site Works:** Access roads, drainage, fencing, foundation works for mounting structures, and temporary construction facilities.
- **Testing & Commissioning:** Pre-commissioning checks, performance testing, protection coordination, and handover documentation.
- **Standards & Compliance:** All works per applicable Nigerian grid code, IEC, and local permitting requirements.

Scope of Work

- Site survey, permitting and environmental clearance.
- Procurement and delivery of PV modules, inverters, mounting systems, and balance-of-plant equipment.
- Site clearing, grading and foundation works.
- Construction of on-site substation and grid interconnection works.
- Mechanical and electrical installation, wiring and cable routing.
- Testing, commissioning and handover including staff training.
- Post-construction documentation and defects liability period.

Key Assumptions & Constraints

- Land access and permits will be secured within the estimated timelines.

- Supply chain for modules and inverters remains stable; lead times reflected in estimates.
- Grid operator approvals (feasibility & connection agreement) follow normal timelines without extraordinary delay.
- Weather and force majeure events are not accounted for beyond standard contingency.
- Project financing and budget approvals are in place before major procurements.

Risks & Mitigation

- **Supply chain delay:** Mitigate through early procurement and alternate supplier options.
- **Regulatory delay:** Early engagement with permitting authorities and submission of complete documentation.
- **Site ground conditions:** Conduct geotechnical surveys early; provision for contingency in foundation design.
- **Grid connection issues:** Initiate feasibility study and continuous liaison with the grid operator (NEPA/Disco) from project start.

Stakeholders

1. NovaSol Energy Executive Team (Sponsor)
2. Project Manager & Delivery Team (NovaSol Projects)
3. EPC Contractor(s) (Procurement, Civil & Electrical)
4. Equipment Suppliers (Modules, Inverters, Transformers)
5. Local Government & Permitting Authorities

6. Off-taker / Grid Operator
7. Local Communities & Landowners

Deliverables

1. Approved permits and land rights documentation.
2. Procured PV modules, inverters and BOS equipment on site.
3. Constructed and wired PV arrays and substation.
4. Grid interconnection and operational handover.
5. As-built drawings, O&M manuals, test certificates and staff training records.

Project Activities (PERT estimates provided)

Below is the activity breakdown used for planning and PERT analysis. Each activity includes optimistic (a), most-likely (m) and pessimistic (b) time estimates (weeks), expected time (TE) computed by PERT, and variance.

Notes: TE and variance are calculated using PERT formulae:

$TE = (a + 4m + b) / 6$

$Variance = ((b - a) / 6)^2$

Activity	Predecessor(s)	a (weeks)	m (weeks)	b (weeks)	TE = (a+4m+b)/6 (weeks)	Variance = ((b−a)/6)²	Task Description
A	—	2	2	8	**3.0**	**1.000**	Land Survey & Permitting
B	—	1	2	3	**2.0**	**0.111**	Procurement of PV Panels
C	—	1	5	9	**5.0**	**1.778**	Grid Connection Feasibility Study
D	A	1	2	9	**3.0**	**1.778**	Site Clearing & Grading
E	B	1	2	3	**2.0**	**0.111**	Inverter Installation
F	B	1	2	3	**2.0**	**0.111**	Mounting Structure Assembly
G	C	1	4	7	**4.0**	**1.000**	Substation Construction
H	D, E, F, G	6	7	8	**7.0**	**0.111**	Solar Panel Installation & Wiring
I	F, G	1	2	9	**3.0**	**1.778**	Testing & Commissioning

Milestones (high-level)

- **Milestone 1 — Permitting & Survey Complete:** End of Activity A (TE ≈ 3 weeks).
- **Milestone 2 — Major Equipment Ordered & in Transit:** After Procurement (B) and initial approvals (approx. week 3–4).
- **Milestone 3 — Site Prepared & Foundations Complete:** Following D (TE ≈ 3 weeks) and mounting assembly readiness (F).
- **Milestone 4 — Substation Ready & Grid Feasibility Complete:** After G (TE ≈ 4 weeks) and C (TE ≈ 5 weeks).
- **Milestone 5 — Array Installation Complete:** After H (TE ≈ 7 weeks).
- **Milestone 6 — Testing & Commissioning Complete; Handover:** After I (TE ≈ 3 weeks).

Project Budget Summary (high-level)

Detailed budget figures to be provided in the full cost estimate. Key budget categories include: equipment procurement, civil works, electrical works, substation & grid interconnection, EPC contractor fees, project management & consultancy, contingency (recommended 8–12%), and commissioning costs.

Next Steps

1. Approve this business case and budget envelope.
2. Freeze site selection and immediately commission detailed topographical & geotechnical studies.
3. Initiate grid connection application and feasibility study (Activity C).
4. Issue RFQs/RFPs for major equipment and EPC services.
5. Prepare a detailed project schedule (Gantt/PERT network) and cashflow forecast.

Project Management Questions (for PERT analysis & reporting)

These are the analytical tasks to complete once the sponsor approves moving to planning:

1. Construct the full project network (activity-on-node) using the activity dependencies above.

2. Using PERT, compute the expected time (TE) and variance of each activity (table above includes TE & variance).

3. Determine the project critical path and expected project completion time (sum of TE on the critical path).

4. Calculate the probability of completing the project on or before **19 weeks** (use critical path mean and standard deviation).

5. If required probability = **0.85**, compute the required scheduled completion time (i.e., mean + z×σ where z corresponds to 0.85) and report schedule recommendation.