Power Configurator Quick Start Guide

How the configurator chooses your power plant, and how to complete the 7 steps.

The Power Configurator scopes a power plant for an industrial, mining, utility or telecom site in Africa in about ten minutes. You describe the site in seven short steps. The configurator then sizes up to **six types of power plant** for it, keeps only those that can reliably carry your load, and recommends the one that best matches **your priority**. The first pass is free; the detailed report adds the full breakdown, permitting map, feasibility memorandum and financial plan.

1

Complete the 7 steps

Most fields are pre-filled for your country, so the defaults already give a valid first pass. Refine what you know.

2

Read your free first pass

The recommended plant, its cost range and an indicative payback, plus the best plant for each priority side by side.

3

Unlock the detailed report

The full scope for one project, in English or French, as PDF and CSV, with a link you can share with your team.

The 7 steps at a glance

Step	What you enter	What it changes
1 · Sector & application	Industrial, Mining, Utilities or Telecom; the type of site	The daily load shape and a starting load factor
2 · Location	Country; optional project name	Costs, sun, fuel price, grid tariff, permits
3 · Load & demand	Peak demand (kW), daily energy or load factor	Plant size, firm-capacity target, energy needed
4 · Site & ambient	Altitude, design temperature, solar irradiance	Generator derating and solar output
5 · Grid situation	On-grid, weak grid or off-grid; outages; diesel price	What the project is compared against; whether the grid counts as firm
6 · Ownership model	Captive, IPP, BOO, PPP, ESCO or lease	The permits and licences listed
7 · Priority & fuel supply	Your priority; gas and diesel availability; optional thermal settings	Which plant types are built and which one is recommended

In this guide

1. How the configurator chooses your plant
   Six plant types · reliability check · why no solar + battery only · priorities · comparison case · savings
2. How to use the tool and how to complete the 7 steps in detail
3. Reading your first pass
4. Quick reference: how your choices move the result
5. What you get, and pricing

1 How the Power Configurator chooses your plant

1.1 Six plant types, each sized for your site

From the same inputs, the configurator builds and sizes up to six types of power plant. Which ones it builds depends on the fuels your site can receive (Step 7) and on your grid situation (Step 5).

#	Plant type	What it is	Built when
1	**Solar + battery + diesel**	Solar PV and battery storage, with diesel generators for nights, cloudy periods and firm capacity.	Diesel is **Available**.
2	**Solar + battery + gas engines**	Solar PV and batteries with a bank of gas engines (N+1) and a small diesel set to restart the engines after a blackout (black-start).	Gas is pipeline, virtual pipeline (LNG/CNG) or **Unknown**.
3	**Solar + large gas engines** no battery	Solar PV feeding the load directly, with gas engines running whenever the sun is not enough.	As for type 2.
4	**Full-thermal baseload**	Gas generation only. Gas engines in most cases; open-cycle turbines (OCGT) only from about 5 MW; combined cycle (CCGT) only from 30 MW, with pipeline gas and a steady load.	As for type 2.
5	**Diesel gensets**	Diesel generators only (N+1): the conventional solution, and the yardstick for off-grid sites.	Diesel is **Available**.
6	**Solar + grid backstop** no battery	Solar PV to cut the electricity bill, with the grid covering nights and cloudy hours.	On-grid and weak-grid sites. It counts as reliable only where the grid is reliable.

Wind is not sized automatically. After the first pass you can add it yourself in the Adjust panel (Part 3).

1.2 The reliability check every plant must pass

A plant is considered only if it can carry your site at any hour. Two tests apply:

- **Firm capacity of at least 120 % of your peak demand**, from sources available at any hour: generators, the share of the battery that solar can reliably recharge, and the grid where it is reliable. Step 3 shows your target under the peak field.
- **A low-sun test:** with no solar output and the battery only 20 % charged, the plant must still cover that target.

Plants that fail are dropped. If every plant fails, for example on an off-grid site with no gas and no diesel, the result says **Not viable** and suggests talking to an FEV engineer about a custom design.

1.3 Why there is no “solar + battery only” plant

A site that runs day and night needs power through every night and through cloudy spells that can last several days. Without generators or a reliable grid, that takes a battery large enough to last for days, which is very costly, and a plant with only solar and batteries cannot pass the low-sun test above. For that reason the configurator does not offer a solar + battery-only plant.

The closest options today:

- On a site with a **reliable grid**, the solar + grid plant needs no generators: the grid covers nights and cloudy days.
- After the first pass you can set the generators to zero in the **Adjust panel** to see the cost; the results page then warns of a firm-capacity shortfall.

A solar + battery option with a stated level of reliability is under consideration for a future version.

1.4 How the recommendation is chosen: your priority

Among the plants that pass the reliability check, the configurator recommends the one that best matches the priority you choose in Step 7:

Priority	The configurator recommends…
Lowest upfront cost	the smallest investment today. Plants whose 20-year cost is more than twice the cheapest are ruled out.
Lowest lifetime cost	the lowest total cost over 20 years: investment plus fuel, maintenance and grid bills, discounted. This is the default.
Lowest emissions	the lowest CO_2 per kWh, provided its 20-year cost stays within 25 % of the cheapest option.
Maximum reliability	the cheapest plant over 20 years that covers 120 % of your peak with firm capacity and leaves no demand unserved.

“Best” therefore means best for your priority: change the priority and the recommended plant can change. The first pass shows the best plant for each of the four priorities side by side, so you can compare them before deciding.

1.5 What the plant is compared against

Every saving and return is measured against what you would do without the project. This depends on your grid situation:

Your situation	Comparison case
Off-grid	A diesel-only power plant sized for the same load: investment, fuel and maintenance.
Weak grid	Grid supply plus diesel back-up to cover the outages.
On-grid (reliable)	Buying the same energy from the grid at the national tariff. Grid connection costs are not included.
No comparison	When you set the plant’s sizes yourself, or when an off-grid site can use diesel only for black-start or not at all. The plant is still sized and costed, with its cost per kWh (LCOE), but no savings, payback or returns are shown.

1.6 How savings and returns are calculated

Annual savings = the yearly running cost of the comparison case (fuel, grid bills, maintenance) minus the yearly running cost of the recommended plant, not fuel savings alone. The free first pass shows an indicative payback. The detailed report adds NPV and IRR: the plant’s full investment is repaid by these savings over 20 years, at a 12 % discount rate, with savings rising 3.5 % a year and, for plants with batteries, a battery replacement in year 10.

2 How to use the tool and how to complete the 7 steps in detail

Before you start, have at hand

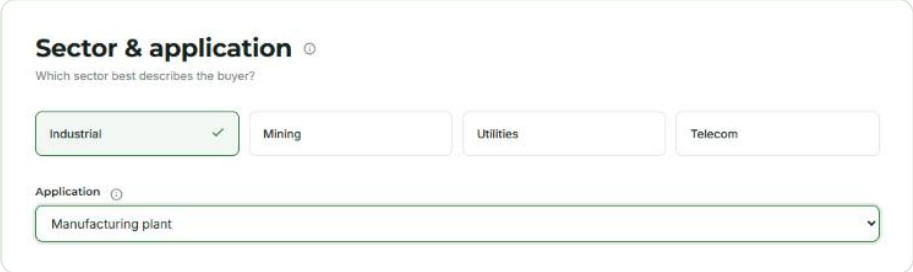
- Peak demand in kW (meter data, bills, or the sum of the large loads)
- Daily energy use in kWh/day, if you know it
- How the site runs: round the clock, daytime only or seasonal
- Your grid situation and, on a weak grid, the average outage hours
- The delivered diesel price, and whether gas or diesel can reach the site

How the wizard works

- Open **app.futureenergyventure.com** and click **Free first pass**. No account is needed.
- One step per screen; **Next** and **Back** move between steps; "Step x of 7" shows where you are.
- Fields are pre-filled for your country; change only what you know better.
- Click or tap ⓘ beside any field for a short explanation.
- The **EN / FR** switch changes the whole tool and the report language.

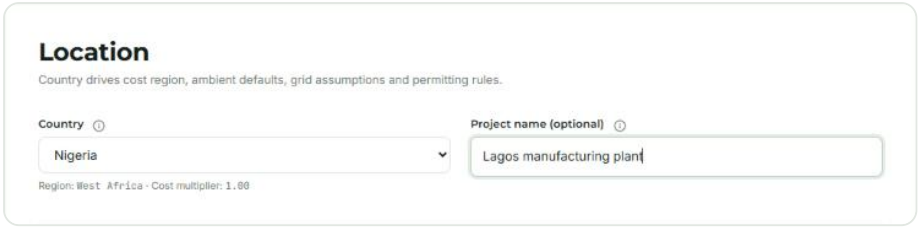
The screenshots follow one example: a 1,000 kW manufacturing plant in Lagos, Nigeria, on a weak grid, with the priority "lowest lifetime cost".

STEP 1 OF 7 Sector & application



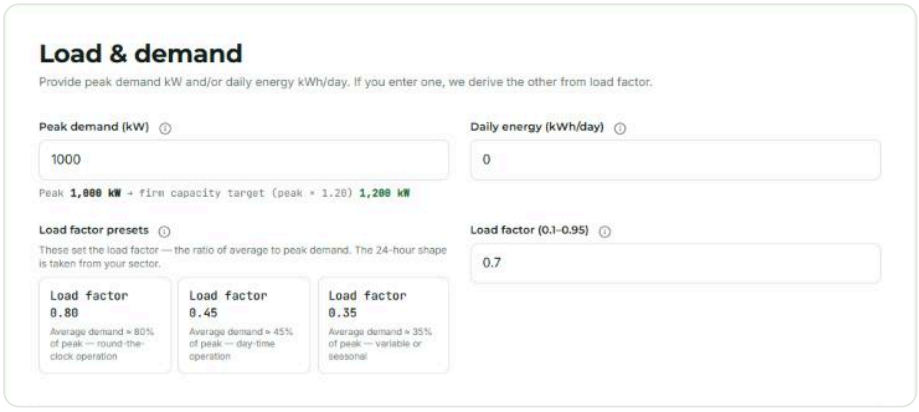
Field	How to fill it	Effect on the recommended plant
Sector	Pick the sector that best describes the site: **Industrial**, **Mining**, **Utilities** or **Telecom**.	Sets the typical 24-hour load profile and a starting load factor: Industrial 0.70, Mining 0.85, Utilities 0.60, Telecom 0.75. A daytime-heavy profile favours solar; a flat, round-the-clock profile favours generators and storage. You can change the load factor in Step 3.
Application	Choose from the list for your sector: **Industrial**: manufacturing plant, warehouse / logistics, agro-processing, cement / heavy industry, cold chain / food. **Mining**: open-pit mine, underground mine, processing plant, camp & offices, exploration site. **Utilities**: IPP, distribution utility, mini-grid operator, grid-connected renewable. **Telecom**: macro tower site, regional aggregation site, data centre / edge, fibre network hub. If nothing fits, pick **Other** and describe it.	Describes your site in the results and in the report. It does not change the sizing.

STEP 2 OF 7 Location



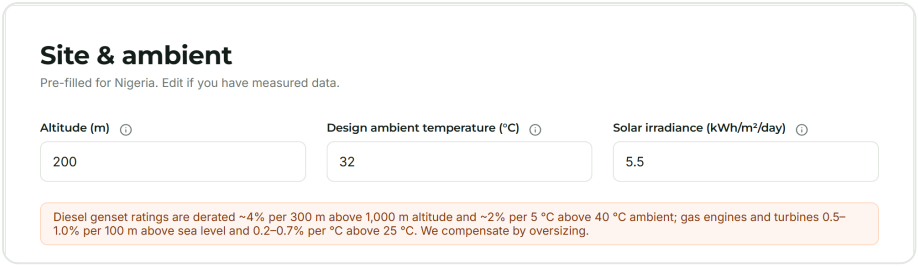
Field	How to fill it	Effect on the recommended plant
Country	Choose from the 31 African countries covered. The region and the cost multiplier appear under the field.	Sets the regional cost level, the default solar resource, diesel price, grid tariff and typical outage hours, the default grid situation, and the permits listed in the report. Sunnier countries make solar plants more competitive; a high diesel price or grid tariff raises the savings of any plant.
Project name optional	A name you will recognise, e.g. “Lagos manufacturing plant”.	None. It names the project in My projects and on the report.

STEP 3 OF 7 Load & demand



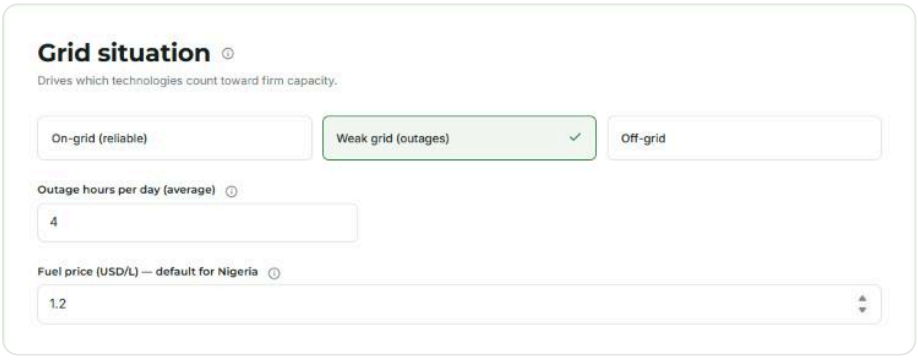
Field	How to fill it	Effect on the recommended plant
Peak demand kW	The highest power the site draws at any moment, in kW (1 MW = 1,000 kW). The firm-capacity target (peak × 1.20) appears under the field.	Sets the size of every plant and the firm-capacity target. It also decides which gas technologies are possible: turbines only from about 5 MW, combined cycle only from 30 MW. From 1,000 kW, the optional thermal panel appears in Step 7.
Daily energy kWh/day	Total energy used on a typical day, from bills or meter data. Leave **0** and it is calculated as peak × load factor × 24 h. If you enter it, the load factor is derived from it. The wizard warns you if it is more than peak × 24 h or less than one hour at peak: usually a kW/MW or kWh/MWh mix-up.	Sets how much energy the plant must produce, and so how much solar, storage and fuel it needs.
Load factor presets	Shortcuts that set the load factor: **0.80** round-the-clock operation; **0.45** daytime operation; **0.35** variable or seasonal. Pick the closest to how your site runs.	As for the load factor below.
Load factor 0.1–0.95	Average demand divided by peak demand, pre-filled from your sector. 0.80 means the site runs close to its peak around the clock; 0.35 means short peaks and a low average.	A high load factor (steady, 24-hour demand) favours gas or diesel generation and larger batteries; a low or daytime load favours solar.

STEP 4 OF 7 Site & ambient



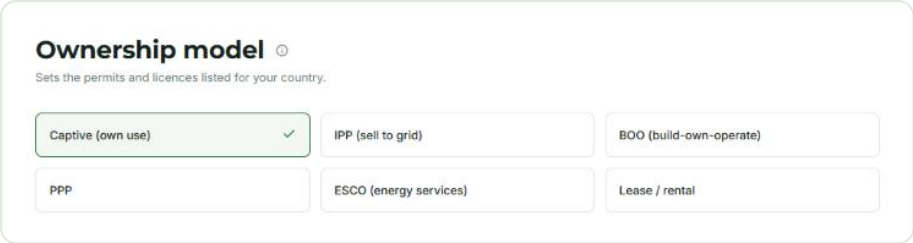
Field	How to fill it	Effect on the recommended plant
Altitude m	Site height above sea level, pre-filled for your country.	Diesel generators lose about 4 % of their rating for every 300 m above 1,000 m; gas engines and turbines lose 0.5–1.0 % for every 100 m above sea level. The configurator oversizes them to compensate, which adds cost.
Design ambient temperature °C	The highest temperature the plant must run in.	Diesel generators lose about 2 % of their rating for every 5 °C above 40 °C; gas engines and turbines lose 0.2–0.7 % for every °C above 25 °C, turbines the most. Very hot sites also get slightly less output from each solar panel.
Solar irradiance kWh/m²/day	Average daily solar energy on a flat surface, pre-filled for your country. Replace it with measured or satellite data (for example the Global Solar Atlas) if you have it.	The higher it is, the more energy each kW of solar produces, and the more likely a solar plant is recommended.

STEP 5 OF 7 Grid situation



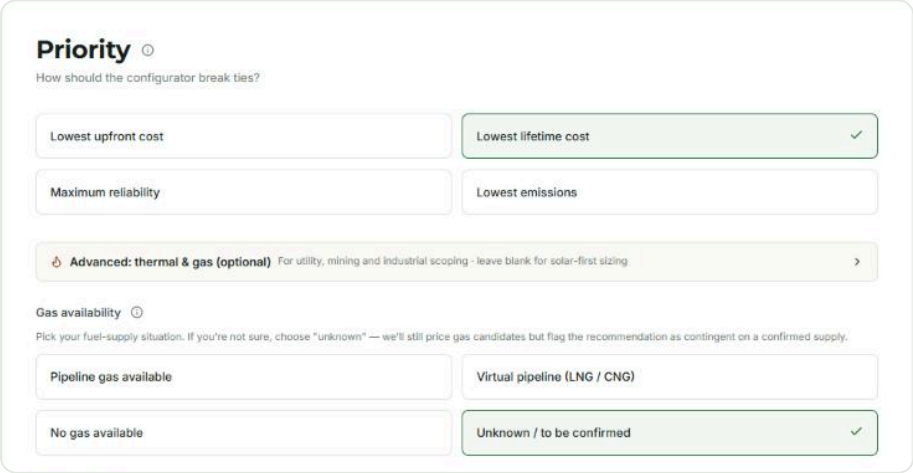
Field	How to fill it	Effect on the recommended plant
Grid situation	**On-grid (reliable)**: the grid supplies the site reliably. **Weak grid (outages)**: connected, with regular outages. **Off-grid**: no grid connection. Pre-selected from your country.	Decides the comparison case (section 1.5) and whether the grid counts toward firm capacity. Only a reliable grid does. On a reliable grid the solar + grid plant needs no generators; on a weak grid or off-grid, every plant must carry the site on its own.
Outage hours per day weak grid only	Average hours per day without grid power.	Recorded with your project. In this version the comparison uses FEV's country estimate of outage hours; the report says so, and you can replace it with metered figures at the feasibility stage.
Fuel price USD per litre	The delivered diesel price at your site, pre-filled for your country.	Sets the fuel cost of diesel generators and of the diesel comparison case. A higher price makes diesel plants dearer, raises the savings of the alternatives and usually shortens the payback.

STEP 6 OF 7 Ownership model

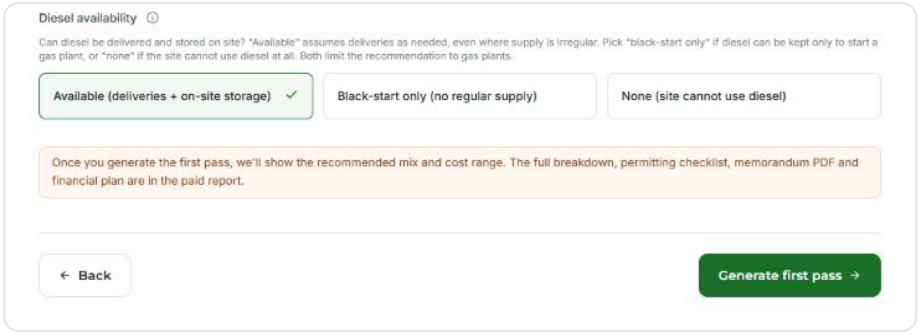


Field	How to fill it	Effect on the recommended plant
Ownership model	**Captive**: you own the plant and use the power on site. **IPP**: an independent producer sells the power to the grid or a utility. **BOO**: a developer builds, owns and runs the plant and sells you the power. **PPP**: a partnership between a public body and a private company. **ESCO**: an energy service company supplies the power or the savings under a long-term contract. **Lease / rental**: you rent the equipment for a fixed fee.	Sets the permits and licences listed for your country. In this version the financial model uses the same indicative financing structure for every ownership type, so this choice does not change the plant.

STEP 7 OF 7 Priority and fuel supply



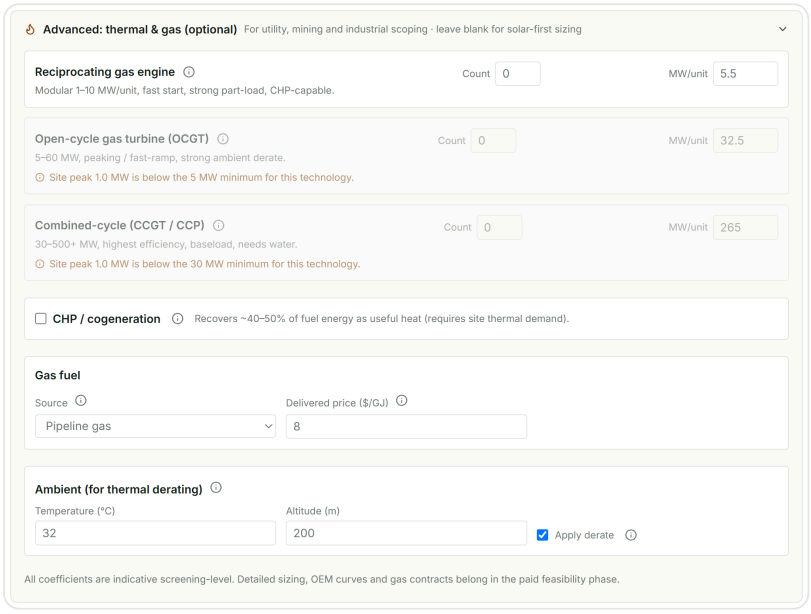
Field	How to fill it	Effect on the recommended plant
Priority	**Lowest upfront cost**, **Lowest lifetime cost** (default), **Maximum reliability** or **Lowest emissions**.	Decides which of the plants that pass the reliability check is recommended (section 1.4). The first pass also shows the best plant for the other three.
Gas availability	**Pipeline gas available**; **Virtual pipeline (LNG / CNG)**; **No gas available**; **Unknown / to be confirmed** (default). If you are not sure, keep "Unknown".	"No gas" removes the three gas plants (types 2–4). "Unknown" keeps them, but a gas plant recommendation is marked as conditional on confirming the supply. Combined cycle needs pipeline gas; a virtual pipeline suits gas engines and open-cycle turbines.



Field	How to fill it	Effect on the recommended plant
Diesel availability	**Available** (deliveries and on-site storage, even if supply is irregular) is the default. Pick **Black-start only** if diesel can be kept only to start a gas plant, or **None** if the site cannot use diesel at all.	"Black-start only" and "None" remove the diesel plants (types 1 and 5), so the recommendation is limited to gas plants, which keep a small diesel black-start set in their price. Off-grid sites with either choice get no comparison case.

Advanced: thermal & gas (optional)

This panel appears for sites with a peak of 1,000 kW or more. Leave it closed and the configurator chooses the thermal plant itself. Open it to test your own thermal plant or to describe a gas or heat situation in more detail.



Field	How to fill it	Effect
Gas engines, OCGT, CCGT count · MW per unit	Enter a number of units and the size of each to test your own plant. Leave the count at 0 to skip it. Technologies below their minimum size for your peak are greyed out (OCGT 5 MW, CCGT 30 MW). If you choose "No gas available" under Gas availability, all three are greyed out.	Your units are costed as a separate thermal scenario, shown alongside the recommendation. They do not replace it.
CHP / cogeneration	Tick it only if the site has a steady heat demand (process heat, hot water or absorption cooling), and enter that demand in kW thermal.	Recovers about 40–50 % of the fuel energy as useful heat.
Gas fuel	Source (pipeline, LNG, CNG or LPG) and the delivered price in US$/GJ. To convert from US$/MMBtu, divide by 1.055.	Used when you enter a unit count, CHP or a heat demand. Otherwise gas is priced at the default of US$8/GJ; you can test other gas prices with the slider on the results page.

Field	How to fill it	Effect
Ambient for thermal derating	Temperature and altitude used to derate the gas units. They show your Step 4 values and follow them if you change Step 4; type other values only to test different site conditions. Keep “Apply derate” ticked unless you have site-specific manufacturer ratings.	Your own values and the tick count only when you enter a unit count, CHP or a heat demand; otherwise every unit is derated at your Step 4 values. Gas turbines lose more output than gas engines in heat and at altitude.

Generate first pass. When the seven steps are complete, click **Generate first pass**. The result appears after a few seconds, and you can always go back, change a field and generate again.

3 Reading your first pass

On the results page	What it tells you
Recommended mix Optimised power model	The plant that best fits your priority: solar (kWp), battery (kWh and kW), generators (number × unit size), firm capacity against the target, renewable share, CAPEX range (low · expected · high), cost per kWh (LCOE) and an indicative payback against the comparison case.
Priority tiles	The best plant for each of the four priorities (lowest upfront, lowest lifetime, lowest emissions and maximum reliability), with its CAPEX, 20-year cost, yearly running cost and CO_2 per kWh. The tile for your priority is marked YOURS. This is where you compare the plant types side by side.
Sensitivity	Sliders and curves show how the cost per kWh moves with the fuel or gas price and, for plants with solar, with the solar resource.
Adjust panel Your configuration	Change the solar, battery or generator sizes, or add wind, then **Recalculate** to compare your plant with the recommendation; **Reset** returns to it. An adjusted plant is costed but not compared (no savings or payback). If it falls short of the firm-capacity target, the page shows a “Firm capacity shortfall” warning.
Messages to know	**Conditional on confirmed gas supply**: you chose “Unknown” for gas and a gas plant is involved; confirm the supply before feasibility. **Not viable**: no plant passes the reliability check with your fuel options. Review gas and diesel availability, or talk to an FEV engineer about a custom design.
Unlock the detailed report	Buy the report by card (Paddle) or PayPal, or use a prepaid bundle credit. A promo code, if you have one, goes in “Have a promo code?” under the Buy buttons. Sign in to save your projects; the report is available in English and French, as PDF and CSV, with a share link.

4 Quick reference: how your choices move the result

If you…	The configurator tends to…
Increase the peak demand	Size every plant up. Gas turbines become possible from about 5 MW, combined cycle from 30 MW with pipeline gas.
Raise the load factor (steady, round-the-clock demand)	Favour gas or diesel generation and larger batteries.
Lower the load factor or choose daytime operation	Favour more solar.
Enter a higher solar irradiance	Make solar plants cheaper per kWh and more likely to be recommended.
Choose a hotter or higher site	Oversize the generators; gas turbines are affected most.
Raise the diesel price	Make diesel plants dearer, raise savings against a diesel comparison and shorten the payback.
Choose “No gas available”	Build no gas plants.
Choose diesel “Black-start only” or “None”	Build no diesel plants. Off-grid sites then get no comparison case.
Choose “On-grid (reliable)”	Count the grid toward firm capacity and compare against the grid tariff.
Choose “Weak grid” or “Off-grid”	Require the plant to carry the site on its own; compare against grid plus diesel back-up, or against a diesel-only plant.
Change the priority	Recommend a different plant among those that pass; see the four priority tiles.
Change the ownership model or the application	Change the permits listed or the labels only, not the plant.

5 What you get, and pricing

What you get in a detailed report

Optimised power model
The generation mix sized to your load and site.

Equipment configuration
Recommended technology, type and layout.

Budgetary costs
Indicative CAPEX and OPEX, and the cost per kWh.

Permitting & regulation
The authorisations that apply in your country.

Feasibility memorandum
A structured basis for your feasibility study.

Initial project & financial plan
A programme and financial outline to build on.

In English or French, as PDF and CSV, with a share link for your team. To take the project forward, appoint Future Energy Venture to develop it: your report credits count towards the engagement.

Pricing

Plan	Price	Includes
First pass	Free	Sector, country and load in 7 steps; generation mix; firm-capacity check and renewable share; CAPEX range.
Detailed report	US$99 launch price	The full scope above, for one project.
2 reports	US$180 ≈ $90 each	Reports + nine-tab Excel model + comparison CSV.
3 reports	US$249 ≈ $83 each	As above + a complimentary 30-minute engineer call*.
5 reports	US$375 ≈ $75 each	As above + a complimentary 1-hour engineer call*.
10 reports	US$650 ≈ $65 each	As above + a 2-hour engineer call and a development-mandate outline*.
20 reports	US$1,100 ≈ $55 each	As above + a 4-hour engineer call, a development-mandate outline and a pre-feasibility study pattern*.
Custom project development	By arrangement	For larger, more complex or multi-project needs: a dedicated end-to-end engagement.

* Complimentary, arranged by email after purchase. Prepaid report credits are redeemable within 12 months.

> **Need help?** Use “Talk to an engineer” on the results page, or write to **contact@futureenergyventure.com** with your project name.

The Power Configurator provides indicative, screening-level outputs for information only and does not constitute engineering, financial or investment advice. A financeable feasibility study requires detailed engineering and sign-off by qualified engineers, which Future Energy Venture provides.