

The Real Cost of Backup Power

Redde R1 vs. a Standard Generator — A 15-Year Comparison

When the power goes out, most homeowners compare backup generators by sticker price alone. But the sticker price is only the first year of a fifteen-year cost, and fuel and maintenance keep adding up long after the installer leaves the driveway. This white paper compares the total cost of ownership of the Redde R1 fuel cell system to a standard 22kW propane home standby generator over a fifteen-year horizon. The result: Upgen costs less to buy, needs no scheduled maintenance, and burns a fraction of the fuel — a homeowner comes out ahead starting on day one.

How We Ran the Numbers

We sized the Upgen system to a home using 30 kWh of electricity per day — typical for a single-family home — and assumed the homeowner's battery and inverter are already in place (for example, from an existing solar installation), so this comparison isolates the cost of the fuel cell itself against a standalone generator. We modeled one grid outage per year lasting 48 hours, plus the routine testing a generator needs to stay ready (a one-hour weekly run); Upgen needs no scheduled maintenance. Both systems run on propane at \$3.00 per gallon. And to keep this comparison conservative, we assumed no federal tax credit applies to either system — where the 30% federal Investment Tax Credit is available, Upgen's advantage below is even larger.

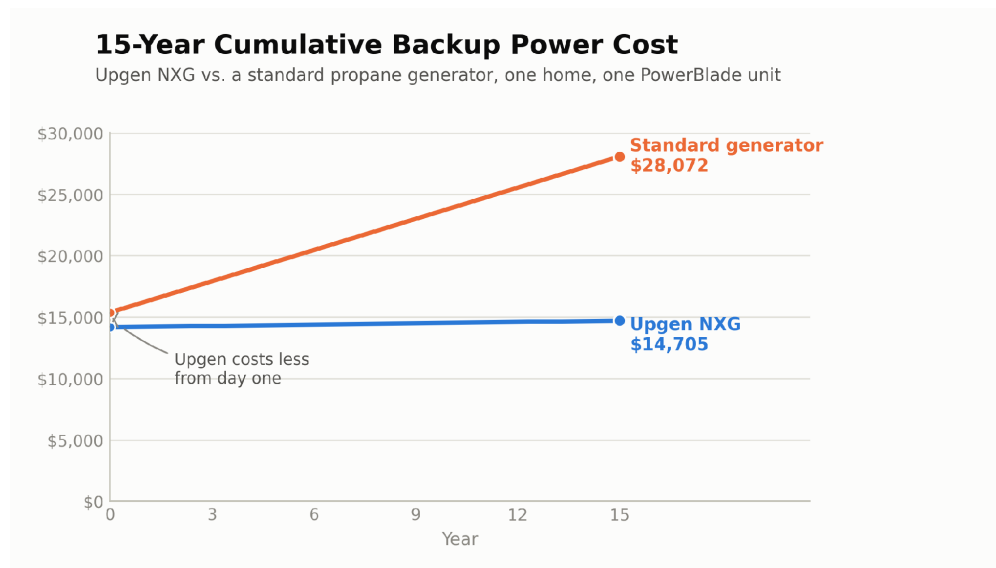


Figure 1. Cumulative cost over 15 years. Upgen starts cheaper than a standard generator and stays cheaper throughout, since it costs less to buy and has almost nothing to run or maintain.

The Bottom Line

Over 15 years, Redde R1 costs \$14,705 to own and operate — \$13,367 less than the \$28,072 total cost of a standard generator, a savings of roughly 48%. Start with maintenance: because Upgen has no combustion engine to service, it needs no scheduled annual maintenance in typical backup use, saving the entire \$7,500 a generator's engine needs in service visits over 15 years. Fuel adds another large gap on top of that — Upgen's 15-year propane bill comes to just \$540, next to \$5,203 for the

generator. And because Upgen costs less to buy in the first place, there's no payback period to wait out: it's the lower-cost choice from the day it's installed.

	Redde R1	Standard generator
Upfront cost (equipment + install)	\$13,500	\$15,369
15-year maintenance	\$0	\$7,500
15-year fuel cost	\$540	\$5,203
15-YEAR TOTAL	\$14,705	\$28,072

Why the Gap Grows

A generator's internal combustion engine has dozens of moving parts — oil, filters, spark plugs, belts — that wear out and need regular service to stay reliable for the next outage. Upgen's solid oxide fuel cell has far fewer moving parts, so Upstart Power doesn't call for scheduled maintenance on a fuel cell running in typical residential backup duty. Fuel tells a similar story: a generator is only efficient at or near its full rated output, but a home backup system spends nearly all its running time far below that, covering a modest household load during a monthly test or an outage. At that light load, a generator burns fuel far less efficiently than its nameplate rating suggests — in Upstart Power's own field testing, a 22kW-class generator running at a typical home's average draw consumed fuel at roughly five times the rate, per kWh delivered, of full-load operation. Upgen is designed to run efficiently at exactly this kind of light, continuous load, which is why its 15-year fuel bill comes in at a fraction of the generator's.

Quieter, and Without the Fumes

The savings above are just the financial side. Upgen generates electricity electrochemically rather than by burning fuel in an engine, so it runs far more quietly than a standard generator — no engine roar, no exhaust rumble — and it produces no carbon monoxide, removing a real safety risk that comes with running a combustion generator near a home. For a system that may run for days during a long outage, that difference is worth as much as the dollars.

Every home's energy use, outage risk, and local fuel prices are a little different, so your numbers will vary from the ones above. Upstart Power can build a personalized cost comparison for your home — contact us to get started.

Methodology: comparison assumes a 15-year ownership horizon, one Redde R1 PowerBlade sized to a 30 kWh/day average home electrical load, one grid outage per year lasting 48 hours, propane at \$3.00/gallon, and no federal Investment Tax Credit applied to either system. Assumes the homeowner's battery and inverter are already installed and are not included in either total. Upgen is assumed to require no scheduled annual maintenance in backup-only residential use. Generator fuel consumption is modeled from a two-segment curve anchored to manufacturer spec-sheet data and Upstart Power's own field testing at light load. Individual results will vary with home energy use, local fuel prices, outage frequency, and equipment pricing at time of purchase.