STGHC-400 Series

Centralized Solar-Mechanical District Cooling — 4-Zone System

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Executive Summary

Direct Conversion

Converts solar-thermal energy directly into mechanical work — no dual-stage losses like PV-battery systems.

24-Hour Operation

Decouples energy collection from cooling delivery for round-the-clock climate control — no chemical batteries.

60% Lower CapEx

Achieves 60% lower entry cost vs. equivalent solar-PV-lithium cooling configurations.

25-Year Asset

98% recyclable components, near-zero grid dependency, and stable 25°C environment even at 40°C+ ambient.

The 24-Hour Operational Cycle

1

☀️ Charging Phase

14 m^2 parabolic array concentrates heat to lift a 4,000L water reservoir to 4-meter height during daylight.

2

🌙 Discharge Phase

4,000 kg mass descends under regulated gravity, driving a high-torque motor to spin the compressor at night or overcast.

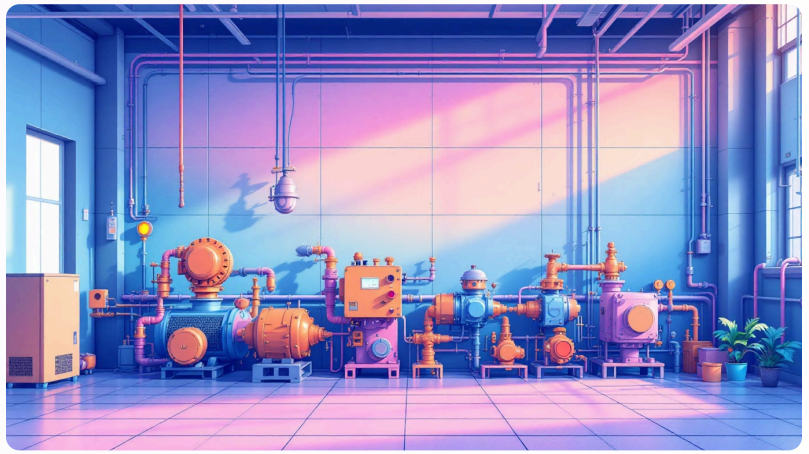
3

💧 Hydronic Buffer

4,000L water acts as a "Cold Sink," smoothing demand spikes across all 4 rooms continuously.

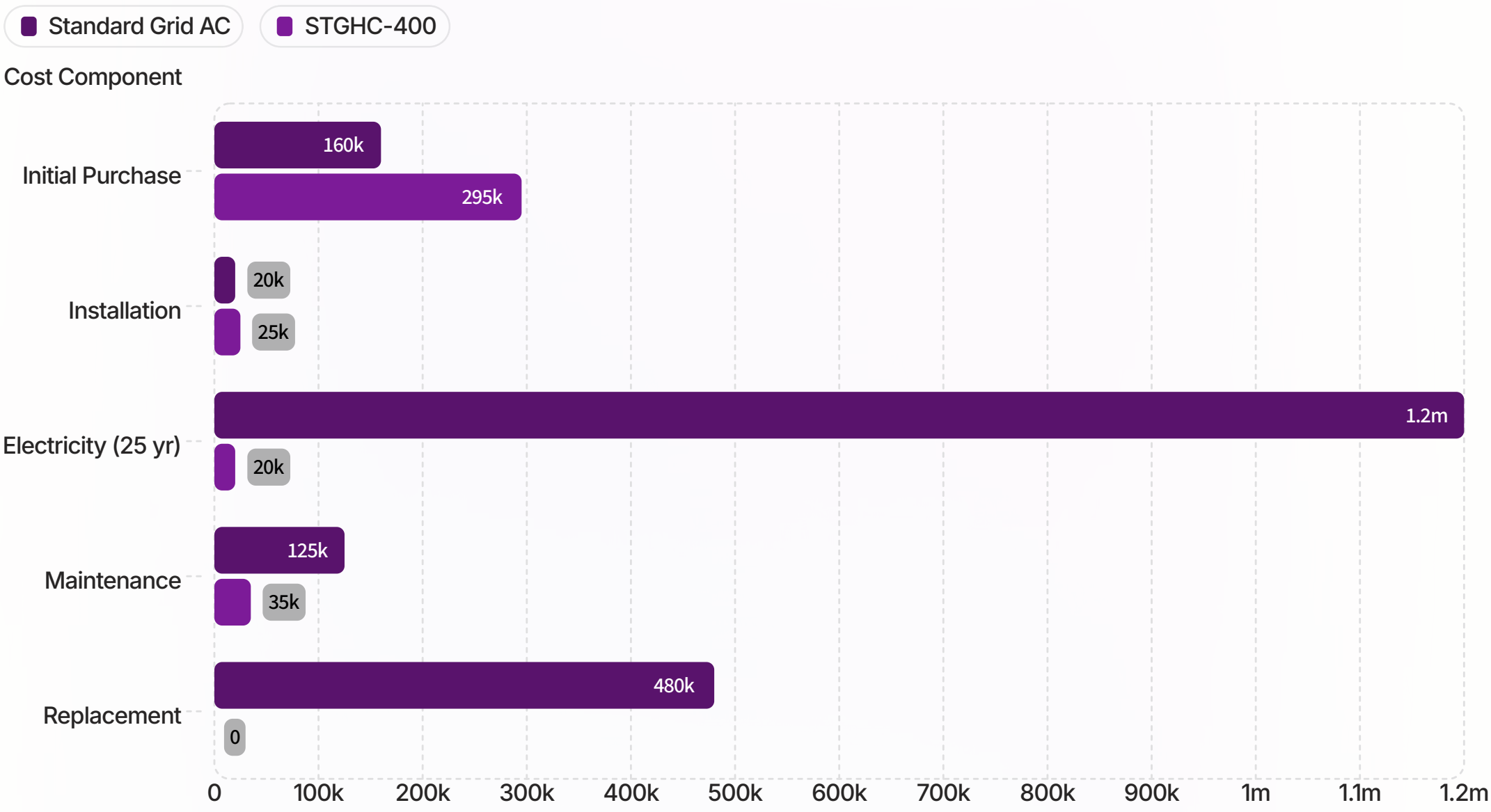
Industrial Bill of Materials

Component	Sizing	Cost (INR)
Solar Engine	14 m^2 / Dual-Axis	60,000
Kinetic Storage	4,000L / 4.5m Lift	15,000
Hydraulic Drive	125mm / 250 Bar	55,000
Central Chiller	2.0-Ton / 210cc	41,000
Distribution	120m / 250 CFM	40,000
Intelligence	ESP32 / Industrial I/O	10,000
Total COGS	**Ex-Works**	**2,21,000**



25-Year Total Cost of Ownership

Assumptions: 4-room home, 10 hrs cooling/day, 250 days/year, electricity at ₹8/unit.



₹19.85L

Grid AC Total TCO

Over 25 years

₹3.75L

STGHC-400 TCO

Over 25 years

₹16.1L

Net Savings

Over 25 years — 5x the purchase price

Investor Value Proposition

Unmatched Financial Moat

Saves homeowners over **₹16 Lakh** over its lifespan — more than 5× its initial purchase price.

Zero-Battery Advantage

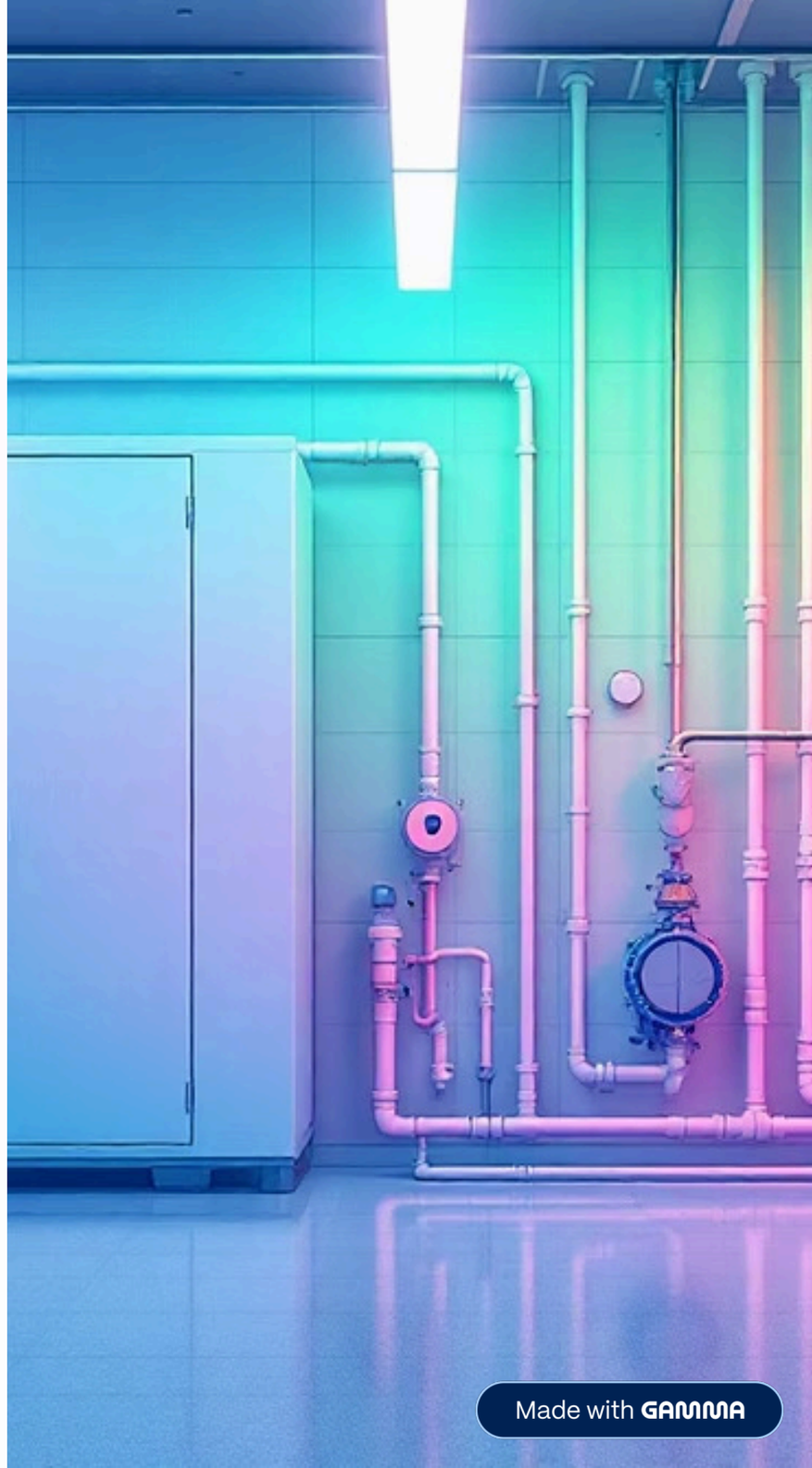
Eliminates lithium-ion batteries — the single highest failure point and environmental cost in green-tech.

Triple-Utility Synergy

One installation delivers HVAC, gravity-pressurized domestic water, and a 4,000L emergency water reserve.

Mechanical Reliability

Industrial-grade hydraulics and automotive compressors ensure simpler repairs and longer life than electronic inverters.



Engineering Deployment

1 Factory Modularization

The "Gravity Hub" ships as a pre-assembled unit for rapid site integration.

2 Simplified Retrofit

PEX chilled-water distribution is far easier to install in existing structures than large-diameter air ducts.

3 Standardized Parts

Leverages existing industrial supply chains — globally scalable with no "chip shortage" risk.

System at a Glance

Solar Engine

14 m^2 dual-axis parabolic array — the thermal power source.

Gravity Battery

4,000L reservoir at 4.5m lift stores energy mechanically — no chemicals.

Hydraulic Drive

125mm bore / 250 Bar cylinder converts gravity into compressor torque.

Chilled Distribution

2.0-Ton chiller with 4 FCUs and 120m PEX piping serving all zones.

The Future of Cooling is Gravity-Powered

The STGHC-400 redefines sustainable climate control — converting sunlight into stored mechanical energy, delivering 24-hour cooling with near-zero grid dependency and a 25-year service life.

2.0-Ton Capacity

7.0 kW nominal cooling

₹2,21,000 COGS

Ex-works build cost

25-Year Life

98% recyclable components

₹16.1L Saved

vs. grid AC over lifespan