

# The Icarus Sun Mill Spins Sunshine into Power, Clean Water and Heat

written by Tracy Hughes | September 16, 2025

Mark Thackeray wants the sun to do more than just shine – he wants it to **spin, cool, and cleanse**. His vision: a single device that can fuel homes and factories long after dusk by harnessing sunlight in multiple ways. Thackeray, the chairman of Icarus Groups, has been developing exactly that. The result is the **Icarus Sun Mill**, an off-grid power unit that promises round-the-clock electricity, potable water, and heating in one sculptural tower. “Icarus is a two-engine motor design,” Thackeray explained in a recent interview, describing how one engine starts the next. When the sun hits the primary “Sun Engine” and sets it in motion, it kickstarts a secondary kinetic drive that continues generating energy even when direct sunlight fades. In other words, the sun doesn’t just shine on this invention – it **makes it spin**.

*Prototype of the Icarus Sun Mill: a standalone tower that uses precision lenses to concentrate sunlight onto a kinetic generator, converting solar heat into electricity, clean water, and hot water is featured below.*



## How the Icarus Sun Mill Works

The Icarus Sun Mill combines advanced **solar and thermal engineering** in a compact unit. At its core is a lens-based solar concentrator that focuses sunlight onto a small, high-efficiency heat engine. This concentrated solar “Sun Engine” converts heat into mechanical motion, which in turn drives a **kinetic flywheel generator**. Thanks to this two-stage design, the system can achieve remarkable energy output – up to four times the electricity of traditional photovoltaic panels, according to the company. In practical terms, a single unit is rated to produce around *8,000 kWh of energy per year*, enough to power an average home or even support industrial sites.

Unlike standard solar panels that only produce power when the sun is out, the Icarus Sun Mill’s spinning flywheel and integrated battery system store energy, enabling **continuous power delivery after sundown**. The energy storage is handled by a **saltwater battery** at the base of the unit. This salt-based

battery is non-flammable and contains no toxic heavy metals, making it a safer, more recyclable alternative to lithium-ion packs. It can hold a charge for months without significant loss, ensuring reliable off-grid operation through nights and cloudy periods.

Another distinctive aspect of the design is its **water cooling and purification cycle**. When the internal temperature rises from concentrated solar heat, the system automatically draws in water to cool the engine. As that water absorbs heat, it simultaneously gets filtered to remove minerals and impurities. The outcome is twofold: the cooling process **produces clean drinking water** and yields **hot water as a byproduct**, which is routed to a storage tank. Homeowners could use this hot water for showers or radiant heating, effectively capturing waste heat for practical use. By performing multiple functions at once – generating electricity, purifying water, and providing heat – the Icarus Sun Mill turns every ray of sunshine into maximum utility.

## **Born from Setback to Prototype**

The idea for the Icarus Sun Mill was born out of adversity. Thackeray recalls a fundraising fiasco two years ago when potential backers told him and co-founder James Belden that their concept “didn’t work.” Rather than give up, the duo decided to **build it themselves from scratch**. They iterated through designs and eventually prototyped the Sun Mill as a boxy but elegant tower-like structure. The first pilot model is already up and running in an **undisclosed test location**, quietly validating the concept away from the public eye. According to Thackeray, the prototype results have been encouraging, and a full-sized production version is now “ready to rock and roll,” just awaiting final refinements.

This rapid development, from setback to working prototype, underscores the team's technical prowess and determination. *Scalability* was a key focus from the beginning. Thackeray devised a proprietary scaling formula he calls "M Powering" – essentially multiplying the device's physical dimensions by its power output – to configure the Sun Mill for different needs. In practice, this means the design can be **scaled up or down**: a smaller unit could power a single suburban bungalow, while a cluster of larger units could energize a factory or even a shipping port. "What we're doing with Icarus is future-proofing it," Thackeray says, emphasizing that the system's modular architecture will allow upgrades over time. The upcoming models (nicknamed Icarus 2 and Icarus 3 in development) are being built on a **plug-and-play principle** – their new components will retrofit into the original chassis. Early adopters won't need to buy an entirely new unit to benefit from improvements; they can simply swap in the upgraded parts. This kind of **backward compatibility** is uncommon in the solar industry and could extend the useful life of each unit dramatically.

## Key Features and Benefits

- **Round-the-Clock Power:** By pairing a solar concentrator with a kinetic flywheel and salt battery, the Icarus Sun Mill continues generating electricity even long after sunset, delivering 24/7 energy independence. A single unit can produce roughly 8,000 kWh per year, several times more output than equivalently sized solar panel setups.
- **Integrated Water Purification:** The system doubles as a water purifier. It uses water for cooling, filters out minerals, and outputs clean **drinking water** as one of its end products – a valuable feature in remote areas or during droughts.

- **On-Demand Heat:** The excess thermal energy is captured to provide **hot water for heating or domestic use**. This means the Sun Mill can supply hot water for showers, underfloor heating, or industrial processes, reducing the need for separate water heaters.
- **Modular & Scalable Design:** The Icarus Sun Mill is designed to be easily scaled and **customized to different sizes and power requirements**. Whether for a home or a large facility, multiple units can be combined. Future upgrades will be backwards-compatible – new “Icarus 2” or “3” components can be integrated into existing units to boost performance or capacity.
- **Safe, Sustainable Storage:** Instead of relying on lithium batteries, it uses a **saltwater battery** that is non-flammable and free of hazardous materials. This battery chemistry poses no fire risk, is more environmentally friendly, and can be fully recycled at end-of-life. It also holds charge for extended periods, ensuring power through nights and cloudy days.
- **Durability and Aesthetics:** Built from robust, sustainable materials like **steel, aluminum, and glass**, the Sun Mill is engineered for longevity and minimal environmental footprint. Its tower design is intended to be visually appealing – a piece of functional art – avoiding the “big, ugly” look of traditional rooftop solar panels. Thackeray notes that unlike a spread of panels bolted to a roof, an Icarus unit can blend into a property as a standout feature.

## Beating Traditional Solar on Multiple

# Fronts

Thackeray is confident that the Icarus Sun Mill can outperform conventional solar photovoltaic (PV) installations on nearly every metric. For one, it addresses the **intermittency** problem of solar by storing energy kinetically and thermally, thus delivering power at night without needing a huge battery bank. He also points out that solar panels degrade over time: *“When a panel is around nine years old, it’s probably producing only 15–18 percent of the original power output,”* he claimed, highlighting a steep drop in efficiency with age. (Typical solar panels might not lose quite that much output in nine years, but the gradual decline is a well-known issue.) In contrast, the Icarus Sun Mill’s mechanical components can be maintained or upgraded to sustain performance over decades. And where worn-out solar panels often end up in landfills due to recycling difficulties, the Icarus Sun Mill’s major components – metal, glass, and salt – are recyclable or reusable.

There’s also the matter of **appearance and installation**. Rooftop solar arrays can be bulky and visually unappealing, sometimes facing resistance from homeowners’ associations or heritage districts. *“With Icarus, it generates significantly more power, it’s attractive to look at, and it’s not a big, ugly thing on your roof,”* Thackeray said. The freestanding tower can be placed wherever it’s most effective or inconspicuous on a property, with the possibility of even serving as an architectural statement. Additionally, its integrated design means a single installation provides multiple utilities (electricity, heat, water) – you don’t have to install separate solar panels, battery banks, water purifiers, and solar water heaters; one Icarus unit does it all.

# Market Outlook and Future Plans

Investors are taking note of the Icarus Sun Mill's potential. Icarus Groups is currently in the process of raising capital to fund third-party certification and scale up production. Once financing is secured, the company has a **4–5 week testing program** lined up for certifiers to verify the system's safety and performance under various conditions. If all goes well, the timeline is ambitious: Thackeray is aiming to begin **shipping units in the first quarter of next year**. The expected price for early units is about €18,000 (roughly US \$20,000) for a standard configuration. This price could vary depending on options – for instance, customers who opt for an extended battery capacity (to store even more energy) would pay a bit more. While the upfront cost is not trivial, the Sun Mill offers a lot in one package and could pay for itself over time in energy, water, and heating savings, especially in off-grid or high-utility-cost locations.

Thackeray's ambitions don't stop at residential backyards. **"We're creating Icarus Marine,"** he revealed – a portable variant of the system designed for large yachts and even container ships. Such a unit could provide electricity and fresh water on board, reducing the need for diesel generators and water desalination equipment. The marine version would be built to withstand salt spray and constant motion, bringing the Sun Mill's multi-purpose benefits to the maritime sector. And in perhaps the most far-reaching vision, Thackeray mentions a **space-station version** on the drawing board. It may sound far-fetched, but he argues that the concept makes sense for orbital or lunar outposts: a compact system that can generate power, purify water, and regulate heat could be extremely valuable in space where resupply is limited. "You may think that's crazy... but it cleans water, heats systems to keep everyone warm, generates a lot of energy, and is easier to transport than lots

of solar panels,” he said of the space concept. In environments where every pound of cargo counts, a single unit doing the work of many could indeed be a game-changer.

When it comes to market potential, Thackeray is unabashedly optimistic. **Asked about the addressable market, he did not mince words:** *“It’s endless. It goes way beyond billions of dollars,”* he said. The world is hungry for sustainable solutions, and the Sun Mill touches on several critical needs – renewable power, clean water, and efficient heating/cooling. That broad applicability means it could find customers in remote villages, disaster relief operations, military bases, commercial shipping, luxury eco-resorts, and even future space habitats. Each of these represents a sizable market on its own.

For now, the immediate goal is more down-to-earth: **secure the funding and clear the safety tests.** Thackeray remains confident. “Once funding is secured and in place,” he told *InvestorNews*, “we’re really looking at Q1 of next year for when people can actually buy these units and have them installed.” If the Icarus Sun Mill lives up to its promises, those early buyers will be getting more than just another solar gadget – they’ll have a personal power plant, water treatment system, and heater *all in one*. Thackeray’s innovation aims to let the sun work overtime, spinning well past sundown, to power and sustain modern life in a cleaner, self-sufficient way.

**Sources:** The technical details and claims about the Icarus Sun Mill are drawn from Icarus Groups’ official materials and Thackeray’s interview statements. Key specifications – such as the lens-focused kinetic generator design, 4× output vs. solar panels, integrated water and heat output, and salt battery storage – are described on the company’s website ([icarusgroups.com](http://icarusgroups.com)). Additional context on the saltwater battery’s safety (non-flammability and lack of toxic metals)



comes from renewable energy analyses ([solarfabric.com](http://solarfabric.com)). The Icarus Sun Mill's projected energy output and scalability are based on company disclosures ([icarusgroups.com](http://icarusgroups.com)). All quotations are from Mark Thackeray, as reported in his interview with *InvestorNews*.