

Title	HyWatts: Power-Plant-in-a-Box™	09/04/2024
	by Oksana Riazantseva in Galp - Startup the Future 2024	id. 47405873
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Original Submission	09/04/2024
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Research Project / Company Name	HyWatts: Power-Plant-in-a-Box™
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APPLICANT AND TEAM INFORMATION

1 - Name	Alex Ivanenko
2 - Email contact	ai@hywatts.com
3 - Current job title	CEO
4 - Elevator pitch	Our mission is to create low-cost, zero-emission energy anywhere with our power plant in a box without relying on the grid. It works by combining solar generation with our breakthrough hydrogen-based energy storage technology which provides continuous renewable power on-site.
5 - Country of operations	US, UK
6 - Company size	1-10 employees
7 - Date of creation	8/19/2023
8 - What is the total amount of funds raised by your company to date?	1000000
9 - Could you tell us more about your funding?	We have raised \$1M to date as a pre-seed round. Significant investors include Techstars (\$220K), Aloniq (\$100K), V.C systems (family office) (\$100K), BuildTech (\$42K), and other angel investments. Additionally, we have been awarded a \$200K Phase I SBIR grant by the U.S. Department of Energy, with \$1.8M allocated for the next phase based on their budget policy.
10 - Website	www.hywatts.com

PRODUCT & TECHNOLOGY

11 - To which challenge do you wish to apply to?	Pioneering Eco-Friendly Mobility solutions & Connectivity
12 - What is your current Maturity Level (TRL)?	Prototype (5)
13 - Please describe your technology in detail	<p>How does your technology work? Which market needs are you solving?</p> <p>HyWatts' technology combines solar generation with a proprietary hydrogen-based energy storage system. Solar panels generate power during the day, and excess power is converted into hydrogen and stored on-site. When solar power is unavailable, the stored hydrogen is converted back to electricity. This system addresses the needs of power-intensive industries like EV charging stations, data centers, and manufacturing, which require reliable and low-cost energy.</p> <p>What makes your technology innovative and differentiating compared to existing ones?</p> <p>Our core innovation is a reversible fuel cell that combines the functions of an electrolyzer and a fuel cell into a single unit, enabled by a proprietary conducting polymer and high-temperature membrane. This makes our system roughly 2x cheaper than traditional hydrogen systems and significantly more efficient and durable.</p> <p>Is your technology patented?</p> <p>HyWatts has 2 provisional patents filed and plans to file 1-2 additional patents per year. We also utilize trade secrets to protect our technology.</p> <p>Please share any key scientific and economic results you achieved.</p> <p>Our system's capex is around \$40/kWh, significantly lower than other long-duration storage technologies. We have 7 LOIs worth over \$55M, with 2 already converted into paid feasibility studies. We have also secured grants, including a Phase I SBIR grant and a \$200k award from the DOE.</p>

14 - What is your expertise and experience in this domain?

Our team at HyWatts brings decades of experience and a deep understanding of hydrogen solutions and the power sector. We have successfully built and sold companies, including in the hydrogen space such as HyPoint, which was acquired by Zeroavia for a nine-digit figure.

Alex Ivanenko: An innovator and serial entrepreneur with a PhD in Electrochemistry. He founded HyPoint, a manufacturer of H₂ fuel cells for aviation, and has been recognized for his achievements at 3M and Owens Corning.

Dietmar Trees: An experienced leader with 30 years in research, project management, and supply chain management. He holds an MBA from UC Irvine and a PhD from RWTH Aachen University. Dietmar has developed disruptive technologies and managed risk and resources effectively.

Sam Ruben: A driven innovator and entrepreneur with a BA from Vassar College and an MBA/MPA from Presidio Graduate School. He is a core member of the WEF G20 Sustainability Taskforce and works towards innovative solutions for sustainability. He previously co-founded Mighty Buildings and continues to serve in an advisory capacity.

Our team is passionate about creating a positive impact through hydrogen technology, aiming for a cleaner and more sustainable future. We believe our combination of expertise, experience, and passion makes us the right founders to bring affordable hydrogen technology to the market.

15 - Who are your current competitors? Who might become competitors in a near future?

Our current competitors include companies working on cost-effective long-duration energy storage with various technologies. Notable competitors are those developing reversible fuel cells with solid oxide technology and companies like Form Energy, which is gaining attention for their iron-air batteries.

- Form Energy – they are similarly seeking to provide low-cost multi-day storage solutions. They claim that they can achieve \$20/kWh, which if true is impressive, though industry insiders indicate that they are currently over \$100/kWh and it is not clear if that will change in the near to medium term. Additionally, their system has a physical footprint and water usage that are orders of magnitude larger for the same storage capacity when compared to the HyWatts system. Both will be critical limitations to their use cases, and the water is problematic as water scarcity becomes an increasingly serious problem.

- Energy Dome – they use compressed CO₂ to store energy (as liquid CO₂ which is then expanded back into gaseous CO₂ to drive a turbine) in soft domes. They claim that a 200MWh battery requires ~12 acres (about twice the area of the Lincoln Memorial Reflecting Pool) of land, again orders of magnitude larger than an equivalent HyWatts system. There are also significant safety concerns if there were to be a failure of their dome as CO₂ is heavier than air and could create a deadly layer at ground level over a significant area.

It is important to note that a critical differentiator of HyWatts technology is the ability to provide both energy storage and green hydrogen, something that is not possible with other technologies.

16 - How does your solution stand out from the competition?

HyWatts stands out due to its unique technology that combines an electrolyzer and fuel cell into a single reversible unit, enabled by a proprietary conducting polymer and high-temperature membrane. This innovation allows for significant cost savings, making our CAPEX around \$40/kWh compared to \$100-300/kWh for other technologies like iron-air, flow, and lithium-ion batteries. Our system also offers a smaller footprint, greater temperature resilience, and lower water usage, making it suitable for diverse environments from Antarctica to Death Valley. Additionally, our focus on low-cost, zero-emission energy production and storage, combined with our ability to produce green hydrogen, sets us apart from competitors. Economically, our system is two times cheaper than traditional hydrogen systems and three times cheaper than lithium-ion batteries.

17 - What do you consider your current biggest challenges?

Our biggest challenges currently revolve around technology development and engineering risks. While we have successfully completed fundamental validation, moving to the next stages of development depends heavily on available resources and funding. This could potentially slow down our progress. However, our experienced team, which has successfully managed similar projects before, gives us confidence in overcoming these challenges

18 - What are your biggest threats?

1. Regulatory Environment: Navigating the complex regulatory landscape is crucial. Our experience with UL and the state of California has highlighted the importance of understanding and working within these regulations
2. Market Access: Ensuring we have the right strategic partnerships and investors who bring not just capital, but also strategic value is essential for market penetration
3. Technology Development: While our technology is promising, the challenge lies in its commercialization and proving its viability against competitors. Our focus is on ensuring our technology is cost-competitive and effective without relying heavily on subsidies
4. Political Risks: We are aware of potential political risks and are structuring our cap table and legal framework to mitigate these risks, including securing non-dilutive funding such as grants.
5. Customer Adoption: Particularly in risk-averse sectors like data centers, gaining customer trust and adoption for new technology can be challenging

These factors collectively represent the primary threats to our business.

19 - Do you have photos / videos of your solution?

[HyWatts_1.jpeg](#)

[HyWatts_4.jpeg](#)

[HyWatts_Render_3_White_Shadows_Off.png](#)

20 - Do you have science articles and patents describing your technology?

[2023-10-17_Filing_Receipt_19788-002USP1.pdf](#)

[2023-10-17_Filing_Receipt_19788-003USP1.pdf](#)

[IP_summary.pdf](#)

21 - Which markets and customer segments are you targeting?	<p>1. Power-Intensive Industries: These include EV charging stations, data centers, warehouses, and manufacturing. These sectors face skyrocketing energy demands and infrastructure challenges. HyWatts addresses this \$500B market by offering reliable, low-cost, zero-emission energy through on-site solar production and hydrogen-based storage. We have 7 LOIs worth \$55M, with potential contracts valued at \$3B upon success.</p> <p>2. EV Charging Stations - specifically: This is the initial focus due to available subsidies and incentives, which align with HyWatts' timelines and reduce customer risk. The TAM for Heavy-Duty Electric Vehicle Charging Infrastructure is projected to grow from USD 2.45 billion in 2022 to USD 37.10 billion by 2031.</p> <p>3. Global Markets: HyWatts sees significant opportunities in regions with underdeveloped infrastructure, such as Nigeria and South Africa, and is in discussions with local developers. We also have an LOI with Manston Airport in the UK and other European entities. These markets were chosen based on extensive customer discovery and the alignment of incentives and subsidies, ensuring a strategic and scalable approach to market entry and growth.</p>
22 - What is your business model?	<p>Our business model initially focuses on B2B equipment sales for pilot projects, leveraging incentives to offset costs for customers. As we move to full commercialization, we will transition to an energy-as-a-service model, offering 25-year fixed-price contracts with no upfront costs for customers. This approach ensures long-term recurring revenue. Our customers include EV charging stations, data centers, and warehouses, who need reliable, low-cost energy. They are willing to pay for our solution due to the significant subsidies and incentives available, which can cover up to 90% of integration costs.</p>
23 - Which scientific milestones and market traction have you reached to date?	<p>To date, HyWatts has achieved significant scientific milestones and market traction. We have completed a Phase I SBIR grant for the US Marine Corps and were recently awarded an SBIR grant by the U.S. Department of Energy to support our HTPEM Reversible Fuel Cell development. We have signed seven letters of intent (LOIs) worth \$55M, representing an additional \$3B in potential contract value upon success. Two of these LOIs have been converted into initial commercial feasibility studies worth ~\$175k. Additionally, we have filed two patents aimed at protecting our hydrogen and reversible fuel cell technologies. We are on track to deploy our first system MVP in December 2024 and test our first 5-kW prototype in January 2025.</p>

24 - What are your development plans and prospective milestones in your target markets?	Our development plans and prospective milestones are focused on several key areas. We plan to begin smaller pilot systems in late 2024/early 2025 before moving into full-scale commercialized systems in 2026. Our technology roadmap includes the deployment of our first 5-kilowatt prototype test in January 2025 and the completion of our MVP by December 2024. We are also actively securing grants to support our development program, such as the recent SBIR grant by the U.S. Department of Energy. Additionally, we are focusing on converting LOIs into paid feasibility studies and generating initial revenue. Our target markets include EV charging stations, data centers, and utility-scale storage, with significant growth opportunities anticipated in these sectors. We aim to capture a portion of the \$500B market opportunity by delivering reliable and low-cost zero-emission energy via on-site solar energy production combined with our hydrogen-based energy storage technology.
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WITH GALP

25 - What are your development needs at the moment?	At the moment, our development needs are focused on expanding our team and securing additional resources to support our ongoing projects. We are also looking for a partner to deploy our systems in Europe and it seems that GALP is an ideal candidate for that!
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We aim to grow to a 12 full-time employee company by the end of December, contingent on funding and project progress. Additionally, we are working on multiple feasibility study agreements to understand customer needs and create detailed system configurations. We are also actively pursuing non-dilutive funding, such as grants, to support our R&D efforts.

26 - What type of support would you expect from Galp?	Process and technology co-development Product co-development Industrial expertise for scaling up International development
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27 - Please elaborate on the type of collaboration you would expect	<p>We expect a multifaceted collaboration with GALP, including:</p> <ol style="list-style-type: none">1. Investment Support: GALP's investment would be crucial in accelerating our development efforts.2. Funding Pilot Projects: We anticipate GALP funding pilot projects, which are essential for validating our technology and moving towards commercialization.3. Exploring New Market Segments: This partnership would open new market segments for GALP, particularly in renewable energy and EV charging infrastructure. <p>This collaboration aligns with our strategy of leveraging partnerships to capture incentives and reduce costs for our customers, ultimately driving mutual growth and innovation.</p>
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ADDITIONAL INFORMATION

29 - Please attach a slide deck presenting your solution
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[HyWatts_Deck_Customers_Sep_2024.pdf](#)

30 - Have you
already collaborated
with a competitor of
Galp?

No

31 - How have you
known about the
STARTUP THE
FUTURE program
launched by Galp?

Hello Tomorrow Newsletter
Direct mailing from Hello Tomorrow

I agree to the Terms
& Conditions of the
challenge

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