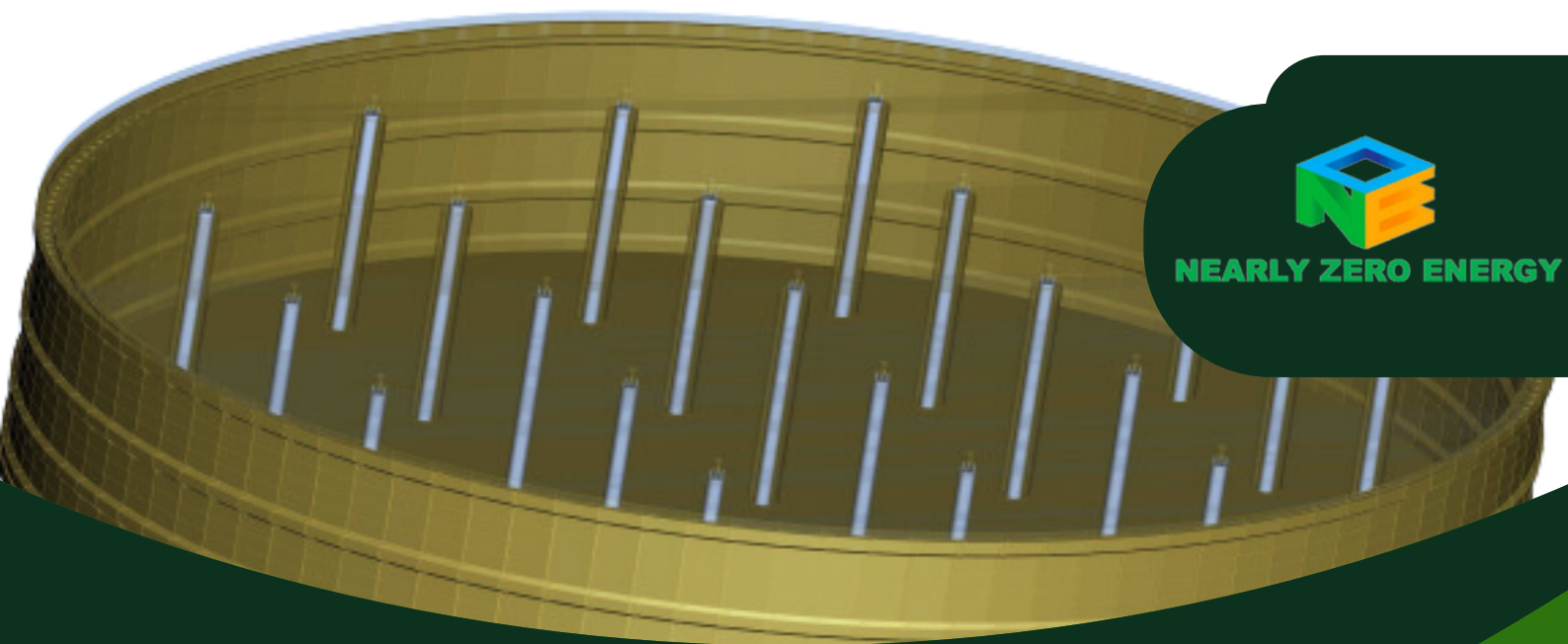


FOTA DEVELOPMENTS SAND BATTERY

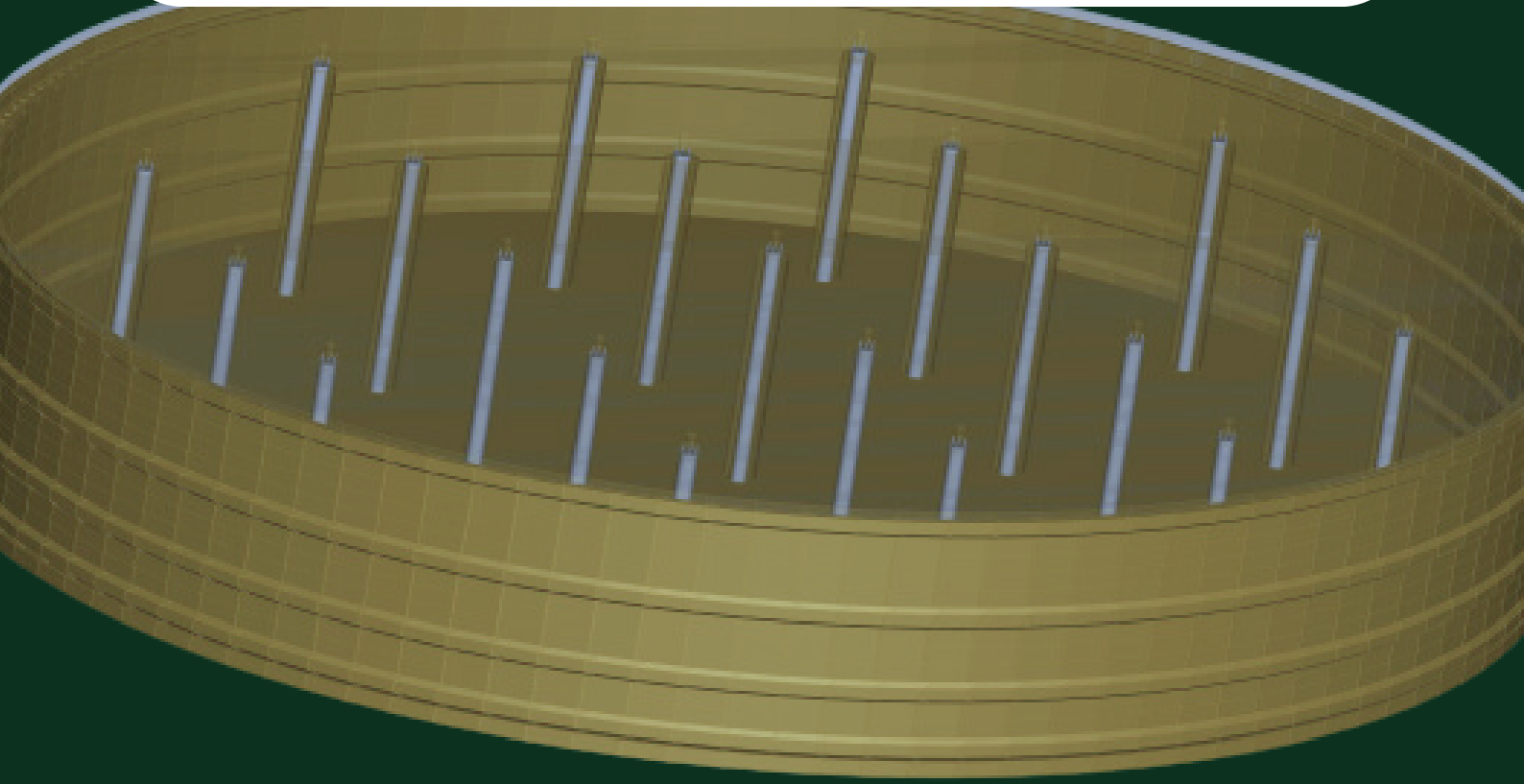
With Over 30 world-renowned patents and certificates integrated into the technology of construction and equipment for capturing and generating green energy.



Sand Battery

What is a Sand Battery?

It is a thermal energy storage device that uses sand as the storage material. It operates on the principle of sensible heat, meaning it stores and releases energy. The sand is heated to a high temperature using an energy source, typically surplus electricity from renewable sources such as wind or solar power.



Sand Battery

continued...

The NEARLY ZERO ENERGY start-up has designed and implemented an integrative technology capable of coordinating renewable energy sources (solar, wind, and biomass) with storage systems and intelligent distribution networks dedicated to capturing and preserving thermal energy.

This technology is based on the use of sand, a natural, abundant, and durable material. By integrating advanced heat storage methods into building systems or energy infrastructure, the goal is to enhance energy efficiency while reducing the carbon footprint.

With this approach, it is possible to maximize the recovery and utilization of waste heat, which not only optimizes energy consumption but also contributes to the transition toward more sustainable and renewable energy sources.

This initiative is part of a broader effort to address current energy challenges and promote a future where energy consumption is minimized while ensuring comfort and well-being for users.



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Sand Battery

continued...

Is This a New Method?

Yes and no. The concept of using sand for thermal energy storage is not new. However, our approach is innovative due to the actual construction of the highly durable storage basin, designed to withstand all extreme weather conditions the planet faces.

Additionally, it features a high degree of insulation and is integrated with renewable thermal energy sources, which are a key focus of our applied innovative study.



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Sand

A Resource Under Overexploitation

The Overexploitation of Sand

The process of storing thermal energy in sand is not without criticism: sand remains the most exploited natural resource after water. A recent UN report has warned against the excessive use of this material. While water is subject to restrictive measures, especially during periods of high temperatures, sand has faced no such limitations so far, leading to a global annual consumption of 50 billion tons.

A Sustainable Solution

NOE GREEN ENERGY proposes a smarter and more responsible use of sand. Unexploited desert areas could become potential thermal energy storage sites, offering a sustainable alternative for future energy solutions.



Green Energy

Harnessing Renewable Energy

- Sand Battery
- Solar Energy via Paraboloid Mirror
- Wind Energy via Wind Turbine
- Biomass Energy via Biomass Gasification Boiler

These four technological solutions, proposed by our company NEARLY ZERO ENERGY, align with the four interconnected pillars that play a crucial role in the success of the energy transition. By integrating them effectively, it is possible to create a more sustainable, resilient, and environmentally friendly energy system.

The Four Pillars of Energy Transition

1. Energy Efficiency
2. Renewable Energy
3. Electrification
4. Energy Flexibility and Storage



Operation

How the System Works

The Overexploitation of Sand

The principle is simple: thermal energy is supplied by three sources:

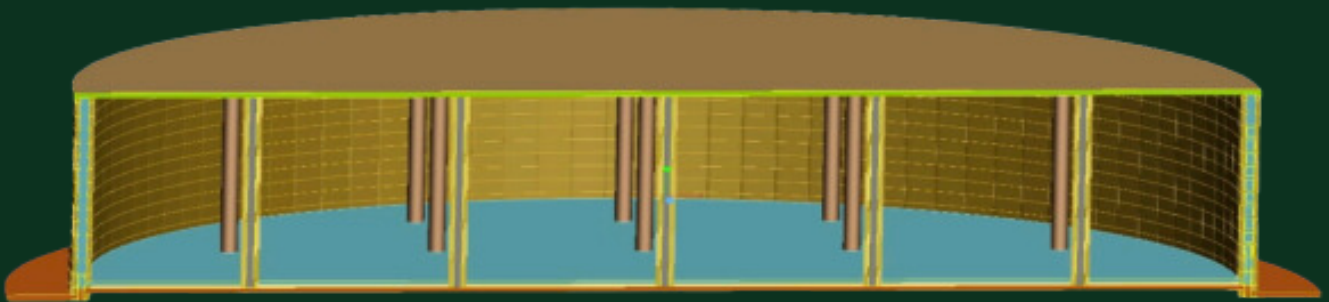
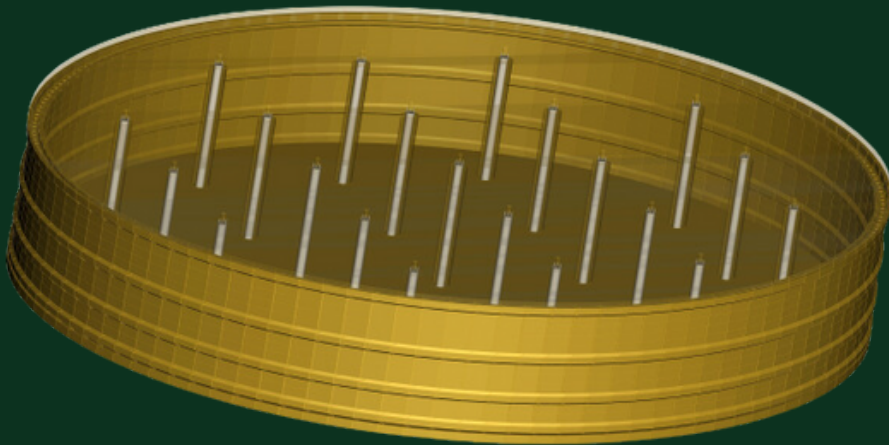
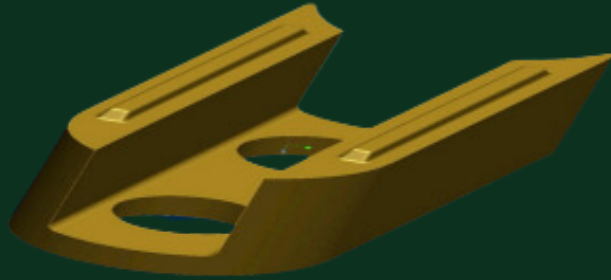
1. Paraboloid Mirror
2. Biomass Gasification Boiler (both using diathermic oil as a heat transfer fluid)
3. Wind Turbine

This thermal energy is stored as heat in a large, highly insulated reservoir designed to withstand extreme climatic conditions such as earthquakes, floods, tornadoes, and hurricanes. The reservoir contains several tons of sand, which can retain heat at extremely high temperatures (400°C – 800°C) for several months.

The three green energy capture methods are interconnected to maintain a stable temperature throughout the system's lifespan. Even if there is no sun or wind, biomass remains a reliable backup to maintain the minimum necessary temperature, ensuring efficient and continuous energy utilization.



Operation



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Advantages

Of the Sand Battery



Long-Term Renewable Energy Storage

Low cost and widely available sand enable efficient, long term heat storage.



High Energy Efficiency

Stores heat up to 600°C, making it ideal for industrial applications with minimal conversion losses.



Reduced Renewable Energy Fluctuations

Stabilizes intermittent solar, wind, and biomass energy, ensuring a reliable supply.



Low Environmental Impact

Uses no toxic chemicals or rare materials, reducing reliance on fossil fuels and greenhouse gas emissions.



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Advantages

Of the Sand Battery



Versatile Applications

Can heat buildings, power industrial processes, and integrate with power plants for stored heat conversion.



Durability and Low Maintenance

Sand is highly durable, leading to a long lifespan and minimal maintenance compared to traditional batteries.



Supports Industrial Decarbonization

Provides high-temperature heat for industries like steel and cement, reducing CO₂ emissions and fossil fuel dependency.



Non-Corrosive

PU-ICF is non-corrosive, does not degrade, rust, or react to moisture, chemicals, or air, and protects concrete and reinforcements from external elements.



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