

Layfield's HeatGard™ Geomembranes are Liners of Choice for Australian Thermal Pit Storages

By GNA Editor



With the growing demand for renewable energy and the need to transition away from fossil fuels, large-scale and long-duration energy storage solutions have become critical. RayGen, an Australian technology company, has developed an innovative, cost-effective approach that integrates solar power generation, energy storage, and re-generation to deliver reliable and flexible power on demand.

The RayGen System: Combining Solar and Thermal Storage

RayGen's system leverages mirror arrays to focus sunlight onto tower-mounted, high-efficiency photovoltaic (PV) cells. These PV cells generate electrical energy that is dispatched to the grid, while being liquid-cooled to maintain their optimal efficiency. The heat generated during this cooling process is stored in a thermal energy storage pit, known as a PTES (Pit Thermal Energy Storage).

Excess electrical energy that cannot be sent to the grid is used to chill water stored in a second PTES. During night-time or peak demand periods, the stored thermal energy—hot water and chilled water—is used to drive an Organic Rankine Cycle (ORC) engine, which converts the thermal energy back into electricity.

Advanced Geosynthetics for Thermal Pit Storage

PTES systems are highly dependent on robust, high-performance geomembranes for their operation. These geomembranes are used for:

1. **Seepage Control:** To ensure zero loss of stored liquids.
2. **Energy Retention:** Insulated floating covers prevent heat loss and evaporation.
3. **Contamination Prevention:** The covers also block biological and inorganic contamination.

Given the operating conditions, the geomembranes must endure continuous exposure to high temperatures ranging from 85°C to 95°C, which is beyond the capabilities of conventional polyolefin materials. Additionally, the floating covers require exceptional UV resistance to withstand long-term exposure to sunlight.

HeatGard®: A High-Temperature Solution

Layfield Group introduced its HeatGard® bi-modal HDPE geomembrane as the solution to meet these stringent requirements. Specifically engineered for high-temperature liquid applications, HeatGard® retains its mechanical and chemical resistance properties at elevated temperatures, ensuring durability and reliability in thermal energy storage systems.

HeatGard® underwent extensive testing before its release, including long-term immersion studies in various liquids over four years. This rigorous development process has enabled Layfield to deliver a geomembrane that not only meets but exceeds the demands of high-temperature storage.

Demonstrated Success in Australia

RayGen's new facility, incorporating 4 MW of solar generation and 2.8 MW/50 MWh (17 hours) of energy storage, utilizes Layfield's HeatGard® geomembranes for its PTES. The facility has already demonstrated the effectiveness of this combined energy storage and dispatch system, showcasing the pivotal role of high-performance geomembranes in advancing renewable energy solutions.

About Layfield Group

Headquartered in Canada, Layfield Group has a global reputation for delivering innovative geosynthetic solutions. Its HeatGard® geomembranes are now a preferred choice for Thermal Pit Storage applications, thanks to their high-

temperature durability and exceptional performance under demanding conditions.

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