

## **THE NEW STANDARD OF ENERGY STORAGE**

### **Ultra-High Density, Ultra-High Temperature, Seasonal, Transportable, and Lowest Cost**

We introduce an entirely new approach to thermal storage with temperatures, density, portability and competitive costs which exceed the capacities of present storage capability many hundred-fold. Our technology breakthrough could enable a Mississippi River Barge 90 meters long and 15 meters wide to be shipped globally, using a superstructure with the height of a container to deliver 36-gigawatts of thermal energy with a ( $\Delta T$ ) 2200°C-500°C to any location on the planet adjacent to a river, canal, seashore, lakeshore or waterway. Container ships, trucks and railroads can transport forty-foot ocean containers which store 305-megawatts or our twenty-foot ocean container that stores 122-megawatts at the same temperature. In all cases the outside temperature of our units never exceeds 71°C.

Our storage can be used to manufacture Steel, Glass, Ceramics, or Concrete, and can be used to provide energy for any high-temperature industrial process. We use externally fired technology to provide energy to any combined-cycle generating system and gas “Peakers”. Our system can replace coal fired boilers and the dozens of retiring coal-plants, nuclear, gas as well as oil-fired plants. Our Thermal Storage can be charged from the grid, alternative energy sources or the sun. It can enable marine vessels, converting their massive engines to use heated compressed air and/or heated liquid nitrogen; the resultant pressure equals that of burning fuels. As a result, the heat from the storage systems, which can be built into the vessel’s bunker fuel tanks, would allow a typical large container ship to travel over 16,000 miles without a recharge and would allow existing diesel locomotives, busses, and tractor trailer trucks to be totally zero-carbon and travel trans-continentially on a single charge, without replacing existing fleets or existing engines.

The need for such storage makes it an essential element in meeting global population growth and ever-increasing energy consumption, especially as people adopt more energy-intensive lifestyles; in addition, it is becoming increasingly essential for mitigating the weaponization of gas and oil supplies. Historically, petroleum and coal have been the major source for the planet’s energy consumption; they are used to power vehicles, heat buildings, make electricity, and manufacture hundreds of products. However, the world's dependence on these fossil fuels is at the best tenuous and at the worst destructive, since even the slightest change in prices drives inflation and since even temporary interruptions in production and supply can cause a catastrophic energy crisis. Geopolitical factors, pipeline failures, infrastructure damage from severe weather, floods, war and other unexpected accidents may cause serious interruptions to energy supplies. Presently the need to mitigate the impact of carbon in the atmosphere is predicted to cause a cascading energy crisis due to commitments to eliminating coal-fired power plants and reluctance to install new nuclear power plants, which could never be built in time to meet the impending crisis.

We need to make better use of our present energy production and reduce wasted power during periods of low demand (which may amount to as much as 54% according to the Lawrence Livermore Labs in 2009). From the power sector alone, 1042 billion kW/h is wasted in the USA alone, much of which could be captured and stored for use when the demand is high. Considering that 50% of our energy needs are thermal, seasonal storage would be a game changer, as would “levelizing” the erratic input of renewable energy; but only, if this storage is affordable and rapidly deployable where needed. R. **Buckminster Fuller** said: “There is no energy crisis, only a crisis of ignorance”. Our 12-years of expertise and experience producing high-temperature and long duration thermal storage sourced from any electrical or solar thermal source, can deliver technology to mitigate this present crisis and crises to come.