"Investigate various electrolyte/electrode systems to optimize the electrochemical performance at operating voltages at or above 5.0 V": Can it be either on cathodes or electrolytes or should it be both?

The intent of the effort is to focus on high voltage electrolytes. However, it is understood one would need to pair with a suitable cathode to demonstrate cell-level deliverables that contain electrolyte that can achieve the voltage desired.

An all-solid state battery with high-voltage cathode, LiPON electrolyte and Li- metal anode will be of interest?

The solicitation does not require a particular chemistry as long as the metrics can be achieved.

If the present objective is a High Energy, High Density power converter, would the Army consider a new technology path that is based on a Solid-State device i.e. a "Direct Energy Conversion"?

Power density estimated to be ~ 15 Kwatts/Kg. As the topic title suggests, the intent is to provide energy storage capability. The strategy to accomplish this is entirely at the discretion of the Offeror, but it is recommended the solution system as a whole provides energy storage.