Advanced photovoltaic (PV) power generation and enabling power system technologies are sought for improvements in capability and reliability of PV power generation for space exploration missions. Power levels for PV applications may reach 100s of kW. System and component technologies are sought that can deliver efficiency, cost, reliability, mass and volume improvements under various operating conditions. Compatibility with solar cells having at least 29% efficiency and flexible blankets is required.

PV technologies must enable or enhance the ability to provide low-cost, low mass and higher efficiency for power systems with particular emphasis on high power arrays to support solar electric propulsion spacecraft operating at high voltage in the deep space environment. Technologies can address recurring and non-recurring costs for flight units or development units. Examples include technologies that reduce the solar cell cost, modular panel designs, automated blanket/cell/integration and interconnects, low cost/low mass coverglass/coatings, etc.

Areas of particular emphasis for 2012 include:

- Advanced PV blanket and component technology/ designs that support very high power and high voltage (> 200 V) applications.
- PV module/ component technologies that emphasize low mass and cost reduction (in materials, fabrication and testing).
- Improvements to solar cell efficiency that are consistent with low cost, high volume fabrication techniques.
- Automated/ modular fabrication methods for PV panels/ modules on flexible blankets (includes cell laydown, interconnects, shielding and high voltage operation mitigation techniques).

Research should be conducted to demonstrate technical feasibility during Phase I and show a path toward a Phase II hardware demonstration, and when possible, deliver a demonstration unit for functional and environmental testing at the completion of the Phase II contract.
Technology Readiness Levels (TRL) of 2 to 6 or higher are sought.

Potential NASA Customers include:

- Solar Electric Propulsion Technology Demonstration Project in the Office of the Chief Technologist.
- Human Exploration and Operations Mission Directorate; Science Mission Directorate.