



Figure 1, Lunar Resources Vacuum Deposition Paver concept surface vehicle

Introduction: The indigenous resources of the Moon can be used to develop an electrical energy system for the Moon. Based on available lunar resources a lunar power system can be generated founded on the fabrication of silicon solar cells by thin film growth technology in the vacuum environment of the Moon. This can be accomplished by the deployment of a moderately-sized (~200kg) crawler/rover on the surface of the Moon with the capabilities of preparation of the lunar regolith for use as a substrate, evaporation of the appropriate semiconductor materials for the solar cell structure directly on the regolith substrate, and deposition of metallic contacts and interconnects to finish off a complete solar cell array. Raw materials for the crawler/rover will be supplied by processing the lunar regolith for extraction of silicon, aluminum and other materials of importance to the manufacturing process. The raw materials extraction will be by molten oxide electrolysis which would be staged to attain the materials quality needed for solar cell fabrication. The direct fabrication of an electric power system on the Moon would require the transportation of a much smaller mass of equipment to the Moon than would otherwise be required to install a complete electric power system brought to the Moon from the Earth and emplaced there. It would also result in an electric power system that was repairable/replaceable

through the simple fabrication of more solar cells, and that would yield an energy-rich environment for the Moon and cis-lunar space.

References:

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