

Economic impact of the International Lunar Decade

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Abstract

The overall goal of the International Lunar Decade (ILD) is to enable permanent return to the Moon through cooperative international activities initiated during the 2020-2030 timeframe. Presently announced projects by NASA, ESA, China, Japan, India and others represent an investment of more than \$40 billion in lunar exploration projects. Given a global commitment to achieve permanent return to the Moon public investment would grow and numerous opportunities will emerge for private investment. It can be expected that a significant share of such investment could be in the form of public - private partnerships but as major barriers to permanent operations on the Moon are addressed numerous commercial opportunities will emerge. Such opportunities can be significantly multiplied through creation of funding instruments such as a lunar investment fund. The greater assurance and lower risk associated with a global program like ILD is also likely to motivate significant increases in private investment. Such investment will be further encouraged by cost reductions made through the deployment of infrastructure that lowers costs and risks for participants. Of particular value we see an energy infrastructure designed to encourage ISRU and other projects that require energy supplies at predictable and declining costs. For example many ISRU projects require both reliable, moderately price electrical power and low cost launch from the lunar surface. The availability of electricity can enable electromagnetic or beam launch not requiring volatiles and that could see declining costs in coming decades.

Total investment in lunar exploration and development is likely to top \$100 billion in the 2020-2030 decade with greater returns on investment emerging as the decade proceeds. If there are credible prospects of the availability of low cost launch from the Moon and of electrical power when and where

needed on the lunar surface as could be provided by an electrical power utility, then numerous projects could start to become economically feasible serving satellite markets in Earth orbit as well as rocket launch using lunar basalt fiber for thermal barrier shields enabling upper stage return to Earth as proposed by Michael Turner [1].

In this paper we will present scenarios of lunar development and forecast economic impact for outer space markets as well as on economic prospects for the spacefaring countries involved. We will also address the issue of a policy framework for use of lunar materials.

Notes

[1] Michael Turner proposal for lunar basalt fiber production - <https://sites.google.com/view/kelah/services?authuser=&0>