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FIXING THE GLOBAL CARBON CRISIS WITH SPACE DEVELOPMENT

**Abstract**

Climate change presents an immediate threat to Earth with the potential for a planet-wide disaster. The consequences of rising temperatures will be environmental, social and financial. No aspect of human society will be unaffected. There are serious implications for health, agriculture, business and security as climate refugees are driven from their homes. The space industry will not be immune from these effects with less resources available for space development as the world is forced to divert more attention and assets to coping with climate change. Fortunately, space science and industry are ideally positioned to contribute to solving the current carbon crisis. While climate change is a complex issue, reducing the level of carbon dioxide in the atmosphere is one clear way to reverse global changes. Technology exists and is currently deployed on a small scale to achieve carbon dioxide extraction from ambient air. The challenges are to scale up this process to reduce atmospheric carbon dioxide to a safe level and decide how to process the captured gas. There is already a market for carbon dioxide in industry and agriculture but this will not be able to absorb the volume of this gas that must be removed from the atmosphere. Ultimately, to avoid having to store large amounts of carbon dioxide it will need to be processed into carbon and oxygen for reuse or storage. Conversion of carbon dioxide to its elemental components is possible in the laboratory and current research seeks the most efficient way to achieve this on a large scale. To remove the volume of carbon dioxide from the atmosphere that will reverse dangerous climate change and reduce it to elemental carbon for reuse or safe storage will require a vast amount of energy that clearly must not be derived from fossil fuels. Space-based solar power can provide the solution. An integrated approach using the energy of the Sun harvested in space to extract carbon dioxide from the air and process it to elemental carbon would demonstrate clearly the value of space technology to human society and the Earth environment. Space Pioneers advocates for this approach to solving Earth-based problems. By considering the Solar System as a whole with its vast mineral and energy resources, rather than viewing the Earth in isolation, it is possible to find solutions for the most pressing problems facing human society. The participation of the space community in this discussion is essential.