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Benefits of the algae industry to the electric ratepayer

Though not an electric generation technology, a robust algae industry would provide numerous ancillary economic, environmental, and health benefits to electric ratepayers. These benefits are described below, with a specific focus on the Imperial Valley and SGI's rationale for research, development, and manufacturing in the region.

Economic Development

Both renewable energy and biotechnology have been identified in California as growth industries with the potential to create high-wage jobs and to help meet the energy needs of the state. The algae industry is expected to contribute a variety of products including renewable fuels, renewable chemicals, and high-value nutraceuticals to boost the California economy.

The Imperial Valley has a wealth of natural resources to foster development of a competitive algae industry. Natural resource advantages include high solar radiation energy, diverse water and nutrient sources (including agricultural run-off), the absence of freezing winter conditions, and predictable and stable climate conditions during each season. In addition to enhancing the productivity of algae growth, these assets should also lower the cost of operations, relative to competing sites in other parts of the world.

The Imperial Valley is also among the areas with the country's highest unemployment rates. Investment in the algae industry provides an opportunity to create jobs and bolster educational opportunities in the Imperial Valley and other economically challenged regions in the state. The ecosystem surrounding an established algae industry would employ local materials and equipment vendors, service and maintenance workers, scientists, engineers, and technicians, and students.

Sustainability of Water Supply

Algae grow on a variety of brackish and waste water resources, and may yield two to three times the amount of biomass per unit water, compared with forage. The industry would thus divert minimal amounts of fresh water resources from competing uses.

Restoration of the Salton Sea

Both the California Governor and the California Assembly and Senate are very committed to promoting development in the Imperial Valley in conjunction with restoring the Salton Sea. Restoration of the Salton Sea would avert serious air quality problems caused by the lowering of the level of the Sea and would improve the quality of life for residents of California. The algae industry could mitigate environmental damage associated with the Salton Sea by recycling nutrients from agricultural runoff and by minimizing fresh water requirements.

Nutrient recycle: Algae farms near the Salton Sea can utilize excess nutrients from irrigation runoff that would otherwise flow to the Salton Sea, causing undesirable eutrophication. SGI plans to investigate the levels and quality of the nutrients available near its facility in order to explore immediate use of these sources for algae nutrition. Because nutrients would otherwise be supplied through a commercial medium, there are economic as well as environmental advantages to this approach.

Salinity levels: The algae industry's use of brackish or saline water sources rather than freshwater, also permits redistribution of limited water resources in the Valley and prevents further increases in the salinity of the Sea as a result of reduced water inflow from the Colorado River.

Air pollution: Air pollution effects of reduced water inflow to the Sea are significant. As the Sea retreats, parts of the seafloor, which are rich with accumulated salts and agricultural chemical residues, are exposed. As the dry seafloor is exposed to wind, these residues are picked up and carried to more populated areas, exacerbating already hazardous air quality conditions in many parts of the state.

Synergies with electric generation technologies and other industries

Both the economic viability of the algae industry and benefits to the electric ratepayer are enhanced as a result of synergistic use of resources with a variety of other industries.California already supports the following industries which are synergistic with the production of algae and which may help reduce research and manufacturing costs.

Solar: Because of its high insolation, the Imperial Valley is a natural site for solar energy installations. Centralized generation and/or distributed solar energy technologies may be used to provide low-cost power to algae companies that locate in the Imperial Valley.

Geothermal: Energy Source and other geothermal companies are already producing renewable power in the Imperial Valley. In addition to using the power produced, the local algae industry has the potential to improve the economics of operations with higher-temperature species by utilizing heat and carbon dioxide provided by local geothermal facilities.

Renewable Biogas: Manure produced from feedlots in the Imperial Valley and throughout California is used for composting, but there exists concern that composting reactivates methane release. New air quality regulations are emerging in various counties to address this concern. If the trend continues, manure to biogas pathways for onsite power generation may become prevalent and could be useful sources of renewable energy for an emerging algae industry.

SGI's business model includes pursuing partnerships with industries within the Imperial Valley, including solar and geothermal companies, to improve the economic efficiency of producing renewable energy.

Role of state funding in supporting development of the algae industry

Federal funding for algae from the Department of Energy's Biomass program focuses almost exclusively on biofuels – only one of many algal products that provide the ratepayer benefits described above. The Department of Agriculture, Department of Defense, and other federal agencies have targeted efforts focused on aquaculture, bio-based products and other relevant topics. None of the agencies has taken an integrated and comprehensive approach at improving the economics for the algae industry as a whole.Though the algae industry has attracted limitedprivate investmentto date, additional research is required to de-risk the technology to the point it will be attractive for further private sector investment.

In addition to filling a gap in available funding, state funding of the algae industry would support progress toward a number of California'senvironmental policies and initiatives. For example, the algae industry will support state climate policies and regulations by utilizing captured waste CO_2 from power plants or other local sources, therefore both reducing emissions from other industries and capturing a local and low-cost source of carbon nutrition for the algae. If market mechanisms emerge to encourage companies to buy and sell carbon credits, there will exist a natural synergy between algae companies that buy CO_2 and generation facilities and other industries capturing and selling CO_2. In fact, the Imperial Valley already has available many inexpensive sources of CO_2, including those produced by local geothermal facilities, which provide a practical and economical input for the algae industry, even in the absence of climate regulations.

The algae industry will also contribute indirectly to meeting California's Renewable Portfolio Standard. As described above, there are potential synergies between the algae industry and California's solar, geothermal, and potential biogas resources that could make production and distribution of renewable power more efficient and cost-effective.