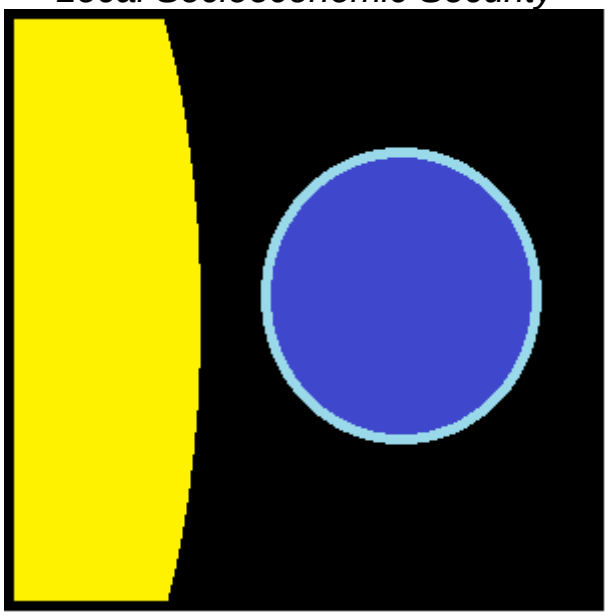
The Solar Economy Project

Local Socioeconomic Security



Global Environmental Protection

http://www.thesolareconomyproject.org/
Third Edition June 15th, 2015

Contents

1 Introduction

1.1 Description

The Solar Economy Project is a local economic development program focused on advancing sustainable socioeconomic development worldwide. The project is designed to improve living and working conditions by promoting the use of the safest and most effective technologies available today. Because favorable environmental conditions such as clean air, clean water, a healthy soil, and a stable climate can optimize the process of achieving effective socioeconomic development, all project components are compatible with a decisive reduction in environmental degradation propitious to restoring and protecting the environment. To this effect, the project endeavors to develop, on a priority basis, the economic sectors of solar power, electricity and hydrogen powered transport systems and industrial vehicles, and environmental remediation:

a. The establishment of an integrated, global, pollution-free, solar photovoltaic power generation, transmission, and distribution network forming the foundation of a balanced socioeconomic development model. This globally distributed, sustainable electric power network is to continuously satisfy the entire world's electric energy demand while considerably reducing environmental degradation, and improving living and working conditions worldwide.
b. The generalized use of solar photovoltaic (PV) electricity and hydrogen powered transport systems and industrial vehicles to further reduce environmental degradation and pollution. Hydrogen fuel for pollution-free transport systems and industrial vehicles can be produced in water electrolysis units powered by solar PV electricity. The generalized use of solar PV electricity and hydrogen powered transport systems and industrial vehicles would decrease environmental degradation by reducing the use of nuclear and fossil fuels, and considerably improve public health and safety by reducing air, soil and water pollution, and industrial accidents.
c. The establishment of an environmental remediation and natural resource conservation program aimed at reversing environmental degradation, restoring the biosphere, optimally improving public health, and enhancing economic performance.

1.2 Motivation

In an era of constant demographic growth, with economic and social instability persisting in many parts of the world, achieving balanced socioeconomic development is the most suitable policy for establishing economic security and social stability. By implementing development programs sensitive to socioeconomic imbalances between communities worldwide, and centered on the conservation of natural resources, the international community would be strengthened and protected from threats to peace and security that persist in many regions of the globe. Interacting threats such as economic insecurity, social instability, armed conflict, and environmental degradation are so serious that the full extent of human capacities is necessary to establishing socioeconomic security and stability. In particular, the reliance on nuclear and fossil fuel energy is causing unintended environmental degradation detrimental to both the stability of local economies worldwide, and to the viability of the biosphere. Stopping and reversing environmental degradation is a prerequisite to achieving sustainable socioeconomic security, and to maintaining a viable planet.

Although complete solutions to the problems resulting from unbalanced socioeconomic development continue to be out of reach for most of the world, safer energy solutions capable of stopping and reversing human-caused environmental degradation are now a reality. As a result, it is now possible to achieve a sustainable, globally balanced socioeconomic development based on resource conservation, and on the safest and most advanced energy technologies; unfortunately, however, the timid effort toward adopting these socioeconomically salutary energy

solutions remains to be widely intensified, if the objective is to bring about a balanced, sustainable socioeconomic development, and to stop and reverse environmental degradation.

2 Environmental Degradation

2.1 A Human-made Threat

Environmental degradation is a great threat to socioeconomic security. Human-made environmental degradation includes deforestation, air and water pollution, and soil contamination. Deforestation contributes to economic insecurity by causing soil erosion, reducing biodiversity, promoting desertification, and destabilizing the climate. Contributors to deforestation include agriculture, urbanization, logging, and the use of wood fuel. Air, water and soil pollution promote economic insecurity by contributing to public health problems, the loss of land and marine resources, and climate destabilization. Contributors to air, water, and soil pollution are activities involving nuclear and fossil fuel energy production and consumption facilities, including transport systems and industrial vehicles, chemicals production and consumption facilities, and industrial accidents such as land and marine chemical spills and fires, and the release of nuclear radiation and other harmful substances into the environment.

2.2 Socioeconomic Instability

Environmental degradation is a major cause of the increasingly difficult socioeconomic conditions experienced in many communities around the world. In order to reinforce global socioeconomic stability at the local level, it would be salutary to evolve sustainable, balanced socioeconomic development models that improve living and working conditions, as well as stop and reverse environmental degradation to restore the viability of the biosphere.

As economic activity shapes the world for generations, promoting a balanced socioeconomic development conducive to stopping and reversing human-made environmental degradation would not only reduce economic insecurity and armed conflict, but also improve living and working conditions, and increase the capacities of local organizations to deal with natural catastrophes. That each member of the international community takes its responsibilities is a matter of survival: taking deliberate, corrective socioeconomic development action that improves living and working conditions, stops environmental degradation, and restores and protects the biosphere, the foundation of life on earth.

At great human and material costs, constant scientific research, experimentation, and development efforts have led to safer energy technologies capable of stopping and reversing environmental degradation. Consequently, the international community is now closer than ever to simultaneously resolving two of the most difficult problems: improving living conditions around the world through sustainable, local socioeconomic development, and restoring the biosphere by stopping and reversing environmental degradation.

3 Energy Supply

3.1 Energy Insecurity

Energy consumption is fundamental to virtually all economic activity. One of the most important steps in accomplishing balanced socioeconomic development is evolving safe and sustainable methods of producing and consuming energy. Although energy is essential to all economic activity, prevalent energy production and consumption methods are not only unsustainable, but are also an obstacle to sustainable socioeconomic development, a threat to public health, and contribute to the destabilization of the biosphere: the advance of environmental degradation, driven by the pressures of demographic and economic growth, is one of the principal causes of the increasingly difficult living conditions persisting in many parts of the world.

4 Solar Energy

4.1 Energy Security

The proposed answer to the energy supply question is a globally integrated, pollution-free, solar PV power generation, transmission, and distribution network able to supply the world's entire electric power demand at all times.

Solar energy, sustainer of virtually all life, through its capacity to supply the entire global electric power demand, can enable the evolution to a sustainable, balanced socioeconomic development model that improves living and working conditions worldwide while restoring and protecting the planetary life support system.

Solar PV power generation technology is the safest and most effective solution to the energy supply problem, and to the environmental degradation resulting from the prevailing energy production and consumption practices. Solar PV power generation technology can safely and effectively supply the entire global demand by directly converting the energy of solar radiation into pollution-free, conventional electric power. In addition to achieving energy security, the generalized use of solar PV power would reduce the use of nuclear and fossil fuels, thereby stabilizing and reinforcing the global economy by considerably reducing environmental degradation, and improving public health and safety worldwide.

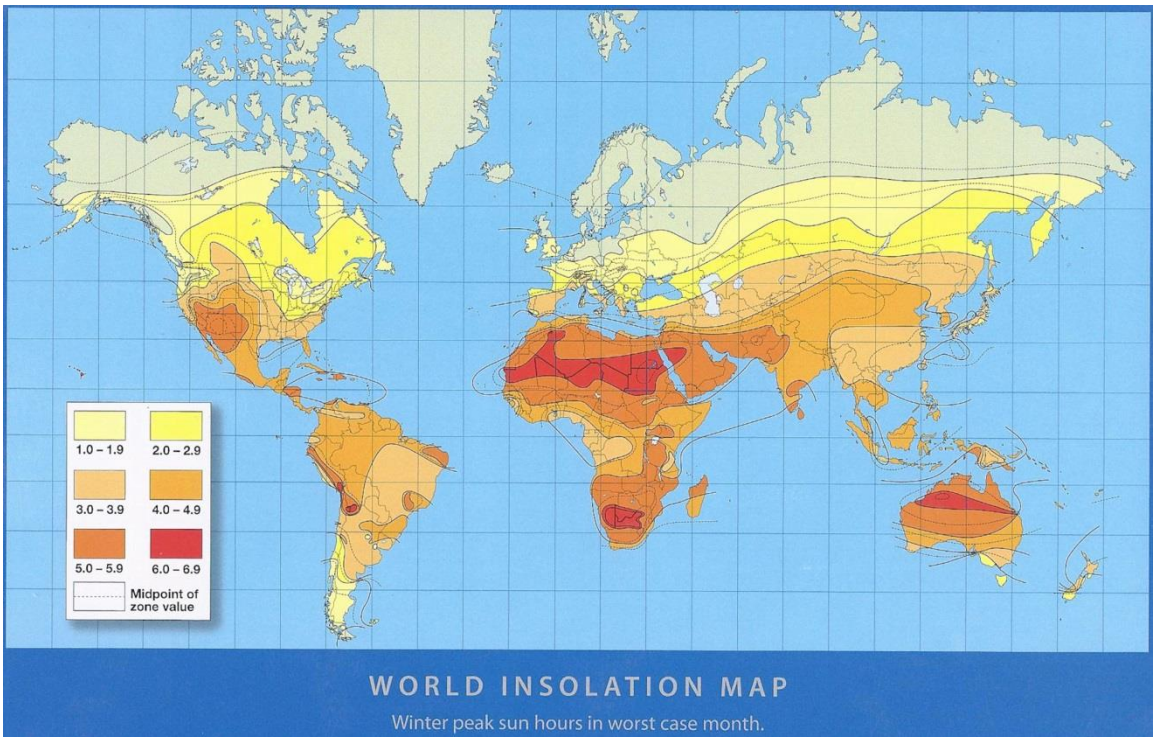


Figure 1 – Subtropical Deserts' Solar Energy Can Supply the Entire Global Electric Power Demand at All Times.

5 Advantages of Solar Power

5.1 Exceptional Advantages

Because of their static nature and the modularity of their components, solar PV power generation systems present many advantages over all other electric power technologies, including other solar and biofuel-based technologies.

One of the most remarkable advantages is that solar PV power generation is directly fueled by solar radiation, a pollution-free, abundant, virtually perpetual, and freely available source of energy. Regardless of geographic location, any space directly exposed to the sun, including the rooftop of virtually any structure, can be equipped to effectively generate solar PV electricity and supply the local electric power network.

Furthermore, as the map of **Figure 1** above suggests, the world's sparsely populated subtropical deserts can be particularly well suited to the extensive production of solar PV power. Locating solar PV power plants in subtropical deserts worldwide would not only supply the global demand, but also conserve vital resources such as forests, arable land, wetland, and protects fresh water resources and marine ecosystems.

Because of its chemically and mechanically passive nature, solar PV power generation is considerably less detrimental to public health, safety, and to the environment than all other power technologies, including other solar and biofuel-based technologies. Solar PV power technology is much less likely to cause serious industrial accidents than other power generation technologies. Additionally, waste from solar PV systems manufacturing and recycling is much more manageable than waste from nuclear and fossil fuel production and consumption processes.

Generating solar PV power does not require mining fossil fuel deposits, and neither does it require oil and gas exploration and well drilling operations, nor the ecologically disruptive damming of rivers. Solar PV power plants do not involve the risks of radioactive fuel handling, nuclear radiation containment, or nuclear waste disposal issues.

Generating solar PV power does not involve the high cost and safety risks of fossil fuels exploration, production, storage, processing and distribution. Solar PV power generation is combustion free, takes place at ambient atmospheric conditions, and does not involve the safety risks of high temperature operations. Generating solar PV power does not continuously consume atmospheric air and release waste byproducts detrimental to public health, safety, and to the environment. Additionally, solar PV power generation is not required to comply with industrial noise control regulations, because it does not contribute to workplace noise pollution.

Solar PV power generation facilities are easier to build and operate: unlike most other power production facilities, solar PV power plants do not use costly and complex equipment such as industrial boilers, and electric generators driven by rotating machinery systems including wind, water, steam, and natural gas powered turbines.

Solar PV power technology is within reach of most countries, including those with modest resources, and can be a platform for realizing economic development programs as modest or as ambitious as required. No prohibitively large resources and effort are necessary to acquire this powerful socioeconomic development tool.

These advantages not only facilitate socioeconomic development and result in considerable savings in effort and resources, but also improve living and working conditions by reducing environmental degradation, industrial accidents, and pollution related public health problems.

6 Global Solar Power Network

6.1 Pollution-free Electricity

The proposed solution to the energy security question is an integrated, globally distributed solar PV power generation, transmission, and distribution network capable of safely bringing about energy security by continuously supplying the entire global electric power demand.

Regardless of geographic location, the rooftop of virtually any structure directly exposed to the sun can be equipped to effectively generate solar PV electricity and supply the global solar PV power network. Furthermore, as the map of **Figure 1** suggests, the world's sparsely populated subtropical deserts can be particularly well suited to the extensive production of solar PV power. Small fractions of these vast, mostly desert areas can safely and sustainably produce all the electric power necessary to support the global economy.

The evolution toward a globally integrated solar PV power generation network can be flexibly implemented in phases. Sequential or simultaneous phases could first develop provincial,

national, regional, or multi-regional power generation networks before completing the globally integrated network. In the interim, multinational power networks could be interconnected to span multiple time zones, thereby meeting demand for time periods extending well beyond local daylight hours without the need for power storage, or auxiliary power generation systems.

Optionally, pollution-free auxiliary power generation units could supply power during periods of low insolation. Pollution-free, hydrogen-powered auxiliary power generation units may include hydrogen fuel cell, internal combustion engine, and gas turbine based units. Pollution-free solar PV hydrogen can be produced using solar PV electricity powered water electrolysis units. Emissions from hydrogen-powered auxiliary electricity generators consist of pollution-free water vapor.

In the ultimate phase, national and regional power networks could be unified into a globally integrated solar PV power generation, transmission, and distribution network.

The integrated global solar PV power network could supply the entire world electric power demand, day and night, without the need for electric energy storage, or auxiliary power generation systems: at any given time of day, the insolated portion of the network could supply all the power necessary to satisfy the global demand. Establishing solar PV power generation complexes in optimally selected core production time zones could ensure the continuous supply of all the energy necessary to satisfy the global demand, day and night. Core production time zones can be designated within qualified, sparsely populated, subtropical desert regions of southwestern North America, western South America, Northern Africa, Southern Africa, southwestern and central Asia, central and western Australia, and within other qualified parts of the world, as required.

The successful realization of the solar PV power network would require the establishment of a coordination process to determine the optimal geographic location of solar PV power plants. A suitable site selection methodology would take into account criteria such as site susceptibility to natural catastrophes, health and safety risks, environmental degradation risks, insolation levels, and geographic location. To positively preserve public health and safety, the highest priority must be assigned to suitable power plant sites with the lowest public health and safety risks.

7 Project Core Components

7.1 Solar Power

The global solar PV power generation, transmission, and distribution network is the first core component and foundation of the project. The real socioeconomic development and environmental protection advantages of solar PV power enable a complementary coexistence of an effective local socioeconomic development and a salutary environmental protection worldwide.

The planning, construction, operation, and maintenance of the global solar PV power network would offer considerable potential for sustainable local development in other sectors of economic activity such as education, transport, agriculture, and information technology. Cooperative economic development zones could be built within and around solar PV power generation complexes integrating industrial, commercial, and residential facilities.

7.2 Transport Systems

The generalized use of electricity and hydrogen powered transport systems and industrial vehicles is the second core component of the project. The expansion of advanced electric rail transport systems would reduce pollution, and stimulate local economic development worldwide. Similarly, the widespread development and use of electric cars would reduce pollution, and stimulate local economic development worldwide. Ongoing advances in electric energy storage technologies could make electric cars one of the principal means of transport.

To decisively reduce pollution, it is important to also develop the use of hydrogen-powered transport systems and industrial vehicles worldwide. The use of electrolytic hydrogen fuel

produced via solar energy would further reduce environmental degradation and pollution by reducing the consumption of nuclear and fossil fuels. Solar PV electricity powered water electrolysis units can produce hydrogen fuel for land, marine, air, and space transport systems, and for industrial vehicles. Emissions from hydrogen-powered vehicles consist of pollution-free water vapor.

The increased use of solar PV power and the use of electricity and hydrogen powered transport systems and industrial vehicles would conserve natural resources by reducing the use of conventional fuels. Because power plants, transport systems, and industrial vehicles are among the most important contributors to environmental degradation and pollution, the transition to solar energy can considerably improve public health and safety by decreasing pollution related public health problems, and avoid further environmental destabilization.

7.3 Environmental Remediation

Environmental remediation is the third core component of the project. Environmental remediation projects can enhance economic performance by restoring sites degraded by detrimental economic activity and industrial accidents. Remediation projects can be locally identified and prioritized based on each site's capacity to further compromise public health, safety, and the environment. Remediation projects can restore forests, wetland, arable land, water resources, and marine ecosystems.

The widespread availability of solar power would enable the global resolution of key environmental remediation-related issues such as water supply, conservation, recycling, and sanitation. To further conserve resources and protect the environment, extensive recycling programs can be established to recover resources from obsolete industrial, commercial, and residential facilities determined to be beyond rehabilitation.

The global conversion to solar PV power, the generalized use of electricity and hydrogen powered transport systems and industrial vehicles, and environmental remediation can simultaneously realize balanced, local socioeconomic development, improve living and working conditions worldwide, and decisively restore and protect the biosphere.

8 Conservation of Resources

8.1 Solar Power Conserves Resources

The compatibility of solar PV power generation facilities with most economic activity environments is a considerable advantage over other power generation methods. Solar PV power generation facilities can be designed to advantageously coexist in close proximity to residential, commercial, and industrial activity centers: integrating compatible economic activity environments, residential centers, and solar PV power generation facilities considerably increases efficiency and conserves resources.

Moreover, new urban or industrial centers do not need to be built on arable land, forested land, or wetland: urban centers could be built within solar power plant centered economic development zones located in qualified, non-agricultural, subtropical desert areas to conserve arable land, forests, and wetland, thereby favoring increased food security, and further expanding sustainable socioeconomic development and environmental protection.

9 Global Cooperation

9.1 Cooperation for the Common Interest

The prospect of securing a globally distributed source of energy that is safe, sustainable, and available to all members of the international community would be a powerful catalyst for promoting a cooperation that decisively advances the common interest: because of the unprecedented size, scope, and objectives of the project, success would require a cooperation focused on flexibly achieving sustainable, local socioeconomic security throughout the world. Central to success would be the cooperation, at the local level, in the domains of scientific and technical education, research, development, production and use of the safest and most effective technologies.

The development of worldwide industrial and environmental standards, regulations, and guidelines would facilitate the development and production of the high quality system components necessary to engineering, constructing, operating, and maintaining the solar PV power network.

The establishment and observance of global product standardization policies can result in decisive economies of scale in the production of project system components: product standardization not only avoids duplication of effort and saves resources, but also improves product quality and living conditions worldwide.

Because of its exceptional environmental protection qualities, solar PV power technology is compatible with the total participation of educational institutions in the research, development, construction, operation, and maintenance of the solar PV power network. This participation, similar to that of university hospitals in the domain of public health, would improve the quality of education, strengthen educational institutions, and advance sustainable socioeconomic development.

The worldwide establishment and maintenance of important research and development programs to further advance existing solar PV power technologies, and develop new, safer, more environmentally responsible and higher performing ones are important to maintaining the suitability of the solar PV power network to continuously meeting present and future global demand.

10 Local Development

10.1 Global Economic Security

Achieving a geographically balanced distribution of global socioeconomic development would make local industrial products, commodities, and services more accessible worldwide, thereby improving living and working conditions where improvement is needed. Moreover, the resulting increase in worldwide economic output would further strengthen socioeconomic security by reinforcing the capacities of local communities to successfully deal with emergencies and natural disasters.

The global solar PV power network could be extended to any country that would wish to participate in the realization of the project. Increased participation can advance local economic development worldwide, accelerate project realization, and reduce cost. Solar PV power technology can be a strong foundation for realizing comprehensive, scalable economic development programs, and puts sustainable development within reach of most countries, including those with modest resources. Achieving a balanced global economic development would result in each participant country acquiring the capacities of research, development, and production of the technologies, materials, processes, and systems necessary to realizing the project. Additionally, each participant country would benefit by using project experience to leverage its efforts to advance its entire national economic development program.

By deliberately joining the project, participants would affirm their commitment to improving local living and working conditions by advancing the most sustainable and balanced economic development models.

11 Knowledge-based Economy

11.1 The Power of Knowledge

As knowledge and know-how are increasingly becoming prerequisites to successful socioeconomic development, the evolution toward a solar PV power-based economy would require the total participation of local educational and research institutions. The effective formation of qualified personnel in all fields of knowledge would be essential to the successful and timely realization of the project, as well as to the advancement of educational and research institutions.

The availability of sufficient human capacities in all economic activity disciplines would not only meet the needs of the project, but would also make it possible for knowledge, innovation, and discovery to thrive worldwide, further advancing toward a balanced world economy favorable to expanding sustainable local socioeconomic development and environmental protection.

Mutually advantageous cooperation and exchange within the framework of the project would further advance scientific and technological cooperation between countries in all sectors of economic activity.

12 Sustainable Development

12.1 Socioeconomic Stability

The transition to solar PV power, the generalized use of electricity and hydrogen powered transport systems and industrial vehicles, and environmental remediation would advance sustainable economic development worldwide and conserve natural resources by solving the problems of energy production and consumption, as well as environmental degradation. Furthermore, by using the safest and most performing technologies available, the project would encourage the emergence of innovative and beneficial technologies in other key areas of economic activity. For example, the development of new, safer chemicals and chemical production processes can further advance sustainability by promoting industrial products compatible with maintaining public health and safety, conserving natural resources, and protecting the environment. Ultimately, the project would give rise to a culture of innovation that relies on solving economic problems through the application of the most benign technologies rather than through the excessive consumption of finite natural resources. The worldwide adoption of advanced, benign technologies would create strong, self-sufficient local economies based on local industrial production and natural resource conservation. Local production not only realizes considerable savings in resources, but is also more suitable for meeting local needs, preserving local cultural diversity, and further encouraging global creativity and innovation.

The Solar Economy Project can considerably advance sustainable local economic activity, resulting in a geographically balanced socioeconomic development, and improved living and working conditions worldwide.

13 Cost of Solar Energy

13.1 Safe and Cost Effective

How valuable would the transition to solar energy be? The following comparison could help answer this question: unlike conventional energy, solar energy improves living and working conditions through the freedom from the difficulties of producing and consuming nuclear and fossil fuels. Solar energy avoids pollution, public health and safety risks, and the risks of industrial accidents associated with the production and consumption of nuclear and fossil fuels. The Solar Economy Project would allow the reduction in socioeconomic disparities through the

advancement of benign technology-based, local, sustainable development worldwide. Solar energy makes possible the conservation of land and marine natural resources, and the restoration and maintenance of a viable biosphere. How valuable these vital benefits are to society will decisively influence the evolution of global socioeconomic security and stability for generations.

The clear advantages of solar PV power over all other types of power make the actual cost of the transition to a solar energy-based economy considerably lower than the actual cost of maintaining the predominantly nuclear and fossil fuel energy-based economy.

The real cost of nuclear and fossil fuel energy is much higher to the global economy than the subsidized prices established around the world: the current prices do not include the prohibitively high costs to public health and safety, the degradation of land and marine natural resources, climatic destabilization, and socioeconomic insecurity.

The Solar Economy Project offers a clear path to making a gradual transition to a salutary socioeconomic development model that can effectively stop and reverse environmental degradation and would ultimately lead to considerably improved, stable socioeconomic conditions for present and future generations.

14 Conclusion

14.1 Lasting Socioeconomic Security

The Solar Economy Project promotes socioeconomic development by advancing pollution-free solar power, electricity and hydrogen powered transport systems and industrial vehicles, and environmental remediation. To this effect, the project relies on using the most effective and benign technologies available, and the total participation of local educational and research institutions.

The successful realization of the project can raise the quality of life worldwide, conserve land and marine natural resources, and restore the biosphere by improving local socioeconomic performance and reducing environmental degradation. The resulting global socioeconomic development model would give credibility to benign, constructive technologies in their ability to effectively resolve the most decisive questions of our time, including socioeconomic security and stability, environmental protection, and natural disaster preparedness.

The project would lead to a more balanced global economic development by increasing knowledge-based, sustainable, local economic activity worldwide, and considerably improving living and working conditions, thereby reducing development disparities between communities, and favoring the establishment of more balanced, stable and civilized international relations.