

**A Concept for a
Global Open Source Initiative (GOSI)
Based in Arizona
Focusing upon Issues of Global Concern such as
Climate Change,
Alternative Energy Source Development and Integration
Biosphere Maintenance\Preservation,
and Improved Urban Dwelling Technologies
Sumner R. Andrews Jr., MBA**

Issued May 2007 Revised 2009,2015

Foreword

In 1998, my then 16-year-old daughter began a teenage tirade on the threat of Climate Change. I took her seriously enough to do some personal research and to begin a Climate Change thread on my college mail server. My concerns were not well received.

Nine years later, Climate Change is a major issue captivating a global audience. A large number of Climate Change authorities have publicly stated that if greenhouse gases are not significantly reduced within the next ten years, the warming trend will become a runaway process¹. This brings to mind Al Gore standing on a ladder in his film, “An Inconvenient Truth”, demonstrating that if the warming trend continues unabated our atmospheric temperatures could in time approach those of Venus. If these self appointed prophets are correct, my children, their peers worldwide, and future generations could perish. This can not be allowed to happen.

Cap and Trade is all the rage these days. The world is placing most of its chips on a complex legislative approach that could easily extend well out beyond the aforementioned ten year tipping point boundary. It occurred to me that the most prudent approach is to hedge those bets by also concentrating the efforts of the best minds as was done with the successful Manhattan and NASA Apollo projects. Lawrence Livermore National Laboratory Associate Director, Dr. Jane C. Long, said it best in December 2005²,

“The 'Manhattan Project' concept is used to invoke the need for an all-out, focused effort to solve an urgent problem in response to a clear and present danger. And a 'Manhattan Project' for energy is exactly what we need today...The Climate and energy problem is one of the greatest challenges ever faced by human kind...The problem connects all the people of the world like no other problem has before. No one person, no one nation, no technology can solve it. There is no parallel precedent on which to model a solution. We need a major worldwide effort on a scale never before attempted. The future of life on Earth may well depend on the outcome.”

To the credit of the United States, it bore the brunt and cost of these critically important efforts. However given the fragility of the global economy today and the immensity of the global challenges facing us, it can be said that no one nation can afford to go it alone. At its core, the Global Open Source Initiative is an international project. It would be a global NASA Man To The Moon undertaking. Its goal is to bring all the major powers and key researchers together at one location to achieve the impossible.

Sumner R. Andrews Jr.,MBA
September 2009
sumner_andrews@yahoo.com

1 See: “Warming expert: Only decade left to act in time” <http://www.msnbc.msn.com/id/14834318/http://www.guardian.co.uk/environment/2007/may/05/climatechange.climatechangeenvironment> .

2 See: “A New Manhattan Project?”, <https://e-reports-ext.llnl.gov/pdf/326051.pdf>

Global Open Source Initiative

Objective

Within the past several years a number of virtual open source initiatives have been organized to address global issues such as a flu pandemic³. The Global Open Source Initiative hereinafter known as the Initiative takes this several steps further by bringing together researchers to a central location that encourages extensive multi-disciplinary work and living collaboration on a long-term basis⁴. It is a goal of the Initiative to create an environment that not only produces important solutions to pressing global problems, but also affects the participants' work and life styles so that the impact is felt years after their involvement with the initiative.

The Initiative would be underwritten, staffed, and directed by an assemblage of leading globally-oriented universities, governments, and corporations with a demonstrated commitment to open source development and research. This group hereby will be known as the Researchers.

The Researchers would focus their efforts on providing answers to the foremost global challenges such as Climate Change; Urban Accommodation; and Biosphere Maintenance/Preservation. Their work would be guided by an Open Source Consortium which would provide a consistent framework to the Initiative. The Researchers would reside within an arcology (a large collaborative living and working environment)⁵. They would work with a large number of unique facilities currently located in Arizona such as Arcosanti, BioSphere2, and the Arizona University Complexes hereinafter known as the Facilities. The Facilities would be augmented with the most advanced collaborative and computer technologies to connect the researchers to each other and their peers worldwide. It is the presence of the Facilities and their proximity to each other that makes the state of Arizona the ideal location for the Global Open Source Initiative.

The anticipated result of the Researchers work would be the open source development of new patentable foundation technologies, processes, systems and disciplines which at a later date can be superseded by privately held work⁶. The initial solutions would be made available to any party at no or at most a nominal administrative charge⁷. This would ensure the rapid absorption of the new technologies into the global economy. More importantly, the public would immediately benefit from the researchers work. Public support of the WWII effort and America's space race with the Soviet Union proved critical to the continuous long term funding of the Manhattan and Apollo projects⁸.

3 Pandemic health Open Source Initiative , <http://www-03.ibm.com/press/us/en/pressrelease/19640.wss> .

4 A minimum of a years rotation through the program would be desirable.

5 Arcology is a term coined by Italian architect Paolo Soleri in 1959 to describe the concept of Architecture and Ecology working as an integral system. Arcology designs are fully 3-dimensional mega-structure cities which can (theoretically) achieve much greater efficiencies, and promote more social interaction than 2-dimensional cities, while using far less land and consuming fewer resources. See also the FAQ of Arcosanti [Definition by Nathan Koren]. <http://arcosanti.org/FAQ>

6 It is the nature of patents that improvements are made upon the original works leading to new advances and wealth creation. The goal of the initial set of foundation patents is to make the base technologies available for immediate implementation world wide. The technology bars can be set at levels that encourage additional private initiatives later in the life of the Initiative. Any accrued fees would be used to offset the costs of The Initiative.

7 To support further research and development.

8 Deborah D. Stine, "The Manhattan Project, The Apollo Project, and Federal Energy Technology R&D Programs: A Comparative Analysis, June 30, 2009, Congressional Research Service

Domestic and Foreign Public Support

Arizona is an optimum location for a project requiring public support ultimately resulting in a continuous and large scale stream of funding. The state is visited by millions of domestic and foreign tourists annually⁹. Its highway system allows rapid and easy South to North transportation from Tucson to the Grand Canyon. The Facilities are aligned along this route and can be augmented with entertaining and inspirational educational centers demonstrating the objectives and outcomes of the Initiative. The two publics would enjoy a meaningful encounter with the Initiative and its resources similar to that experienced during a visit to the Kennedy Space Center with its gantries on the horizon.

The Open Source Approach

The term “Open Source” is most often associated with the development and distribution of computer software¹⁰. Characteristically, a software application will be developed by a team of individuals donating their time and expertise to the project. Upon completion, the software code is made available to the public without charge in accordance with one of several well-known contracts. The Open Source approach has advanced computer adoption by making previous costly and highly restricted types of software available at no cost to any interested party. The most striking example is the Linux computer operating system developed by Linus Torvalds. It has been adopted world wide by individuals, corporations¹¹, and nations alike. Global companies such as Google, Oracle¹², Redhat¹³ and IBM¹⁴ have staked much of their fortunes on Linux and other Open Source software. The Global Open Source Initiative would function in a similar manner.

The Researchers would develop the technologies and processes for the selected challenges. The Arizona University Complexes would act both as repositories for the solutions as well as their distributor in accordance with the standards set forth by the Open Source Consortium. It is anticipated that the Initiative would seek an initial set of foundation patents for the Researchers work. The issuance of patents is critical to the success of the Initiative by avoiding the infringement of existing proprietary intellectual property and also costly legal disputes.

9 It is anticipated that tourist visits to Arizona will increase by several orders of magnitude due to the draw of the Initiative.

10 Harvard University Press, The Success of Open Source ,
<http://www.hup.harvard.edu/catalog.php?isbn=9780674018587> .

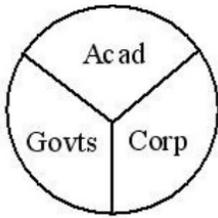
11 Linux Enterprise Website , <http://www.linux.com/> .

12 Oracle website : <http://oss.oracle.com/> .

13 Redhat Corporation , <http://www.redhat.com> .

14 IBM , <http://www-03.ibm.com/linux/opensource/> .

The Researchers



The Research group would come from academic, government and corporate sources. These entities would underwrite Initiative activities in accordance with their overall capabilities. The goal is to involve as large a group of entities as possible in order to achieve a true global representation.

Academic

Climate Change has become a worldwide academic concern as evidenced by the development of facilities such as the Center for Climate System Research of the University of Tokyo, Harvard University's Center for The Environment, the Yale Institute for Biospheric Studies¹⁵, and the Center on Global Change at Duke University. Those universities that have committed tangible resources to addressing the global challenges of our time should be invited to join the Initiative and rotate research staff through the arcology. In addition, they should be encouraged to provide tangible resources to the Global Open Source Initiative similar to their own campus efforts.

Governments

Governments that have taken direct steps to restrict greenhouse gas emissions¹⁶ and have sponsored substantial open source projects would be eligible to participate. Their involvement would determine the success of the Initiative. The Kyoto conference has shown that the absence of a major national government can seriously impair the global application of a selected plan of action, technology, or process.

Corporations

Globally-based corporations with a well-known commitment to open source development and research such as Google, IBM, Oracle, and Redhat should be encouraged to participate in the Global Open Source Initiative. Global proprietary companies that are directly involved in the problem under review and are willing to contribute to open source R & D should be strongly encouraged to join the Initiative effort. An example would be the top auto manufacturers working together to move auto transportation significantly away from petroleum-based fuels.

¹⁵ Created through a \$150 million dollar contribution from Edward P. Bass in 1990.

¹⁶ Efforts to restrict greenhouse emissions on a national basis indicates a desire to work for the global good. This attitude would carry through to other challenges undertaken by the Initiative.

Sustainable Working and Living Environment

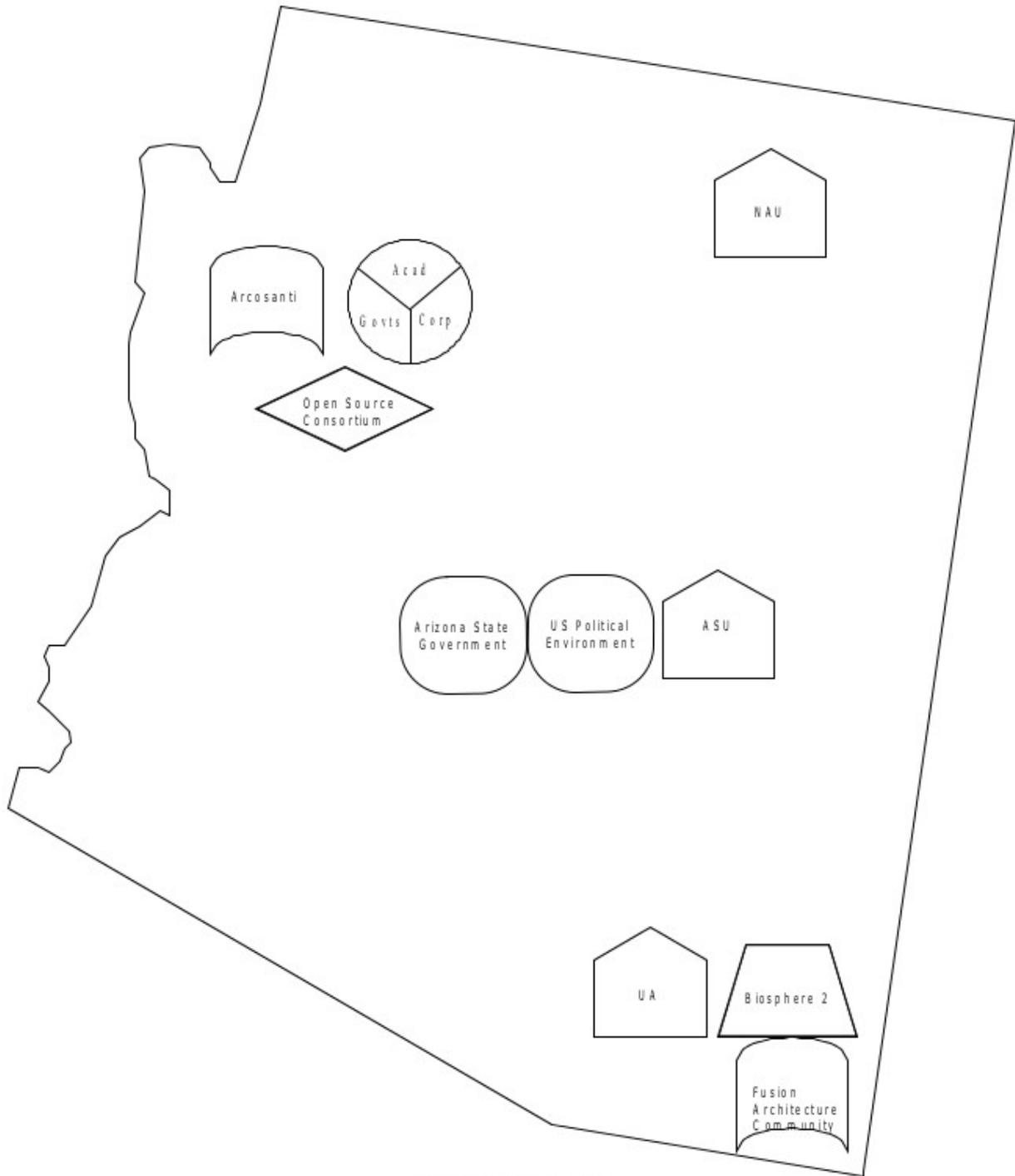
To insure widespread collaboration among the research teams, the Researchers would live in a sustainable arcology¹⁷ to be built specifically for this purpose. Currently, the prototype arcology of Arcosanti holds the promise of housing a, “community of 7,000 consisting of homes, work places, cultural centers and service facilities scattered through a cluster of small and large buildings that will cover just 30 of the 4,000 acres in the Arcosanti wilderness preserve”.

Governance

The research members will provide the Initiative governance congruent with the standards established by the Open Source Consortium. The governing structure should at a minimum consist of an Executive committee for day to day operations, a judicial group to adjudicate disputes and an advisory group to provide long term oversight. Participation in Initiative operations and governance would be evenly divided among the three memberships.

¹⁷ A second arcology could be located near Biosphere 2 to specifically address climate change and biosphere maintenance/preservation research.

Global Open Source Initiative Based in the State of Arizona

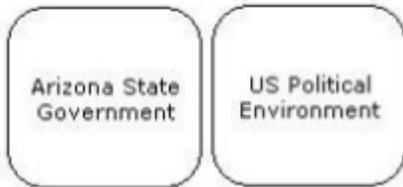


Map of the State of Arizona

The State Of Arizona

The state of Arizona provides the optimum location for a project of the magnitude of the Initiative. From border to border it is approximately 400 miles long and 310 miles wide. The interstate highway system (See Exhibit One) provides easy and rapid¹⁸ access to the Initiative's four resource locations: Tucson, Phoenix, Mid State and Flagstaff. This ensures that both the Researchers and the general public can readily access the Initiative's resources according to their needs.

Political Resources - Phoenix



Arizona State Government

Environmentalism and the control of urban growth is not a current concern of the State Government. The Sierra Club's report card issued in May 2012 rates the state's record as poor¹⁹. The Global Open Source Initiative could assist the Arizona leadership with these concerns. At the very least, the Initiative would bring international attention and resources to this problem which could lead to important breakthroughs for the state and the world population at large. Similar efforts are already underway in countries such as Dubai²⁰.

U.S. Political Environment

Due to the lack of partisanship between the U.S. Congress and the Administration, environmental, Climate Change and sustainability concerns have been eclipsed by economic and social issues. This may change given an impetus sufficient to actualize the growing public opinion that Climate Change is human caused²¹. Hurricane Sandy in October 2012 may have been the wake up call that pushes the discussion to a logical conclusion.

18 Non urban interstate highways allow speeds up to 75 MPH

19 http://arizona.sierraclub.org/political_action/pa_2012/2012%20Enviro%20Report%20Card_Final_05-16-2012.pdf .

20 Dubai Masdar Project in conjunction with MIT : search keywords "Dubai Masdar"

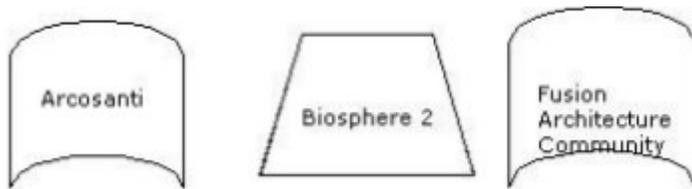
21 <http://www.skepticalscience.com/2012-election-climate-change-denial.html> .

Arizona's Senator John McCain stated at a Climate Change symposium, "Given the high stakes involved -- the future of our children and our grandchildren, not to mention the future of the planet as we inherited it -- which approach are you willing to bet on? We don't want our children to ever have to ask the question, "Did they even care?"²²

Other political Climate Change advocates such as former Vice President Al Gore who authored the documentary, "An Inconvenient Truth", produced by Laurie David, have caught the imagination of the American public. Other politically well-known entertainment personalities such as Robert Redford, with his "Greening" on the Sundance Channel,²³ and Leonard DiCaprio with his Eco-Site²⁴ have raised the bar on this and other global problems.

It is an Initiative objective to establish an office in Phoenix Arizona to serve as a non partisan political interface to work closely with the Federal and Arizona state governments, foreign governments and private parties. The office would be staffed by representatives of the aforementioned individuals and entities.

Working And Living Resources



Arcology - A Sustainable Environment – Mid State

Within the past decade, the concept of sustainable development has taken root²⁵. The challenges of negative climate change, energy shortages, overcrowding and similar issues stem from humanity's inability to create sustainable environments. This must change if humanity expects to maintain an acceptable quality of life.

22 Senator John McCain , http://files.eesi.org/mccain_061506.pdf

23 Robert Redford Greening , <http://grist.org/article/redford/> .

24 Dicaprio's Eco-Site ,

http://leonardodicaprio.com/index.php?option=com_webcontent&view=article&layout=item&cid=3&Itemid=138 .

25 United Nations For Sustainable Development: <http://www.un.org/esa/sustdev/>

Arcosanti

World renowned architect Paolo Soleri²⁶ coined the term arcology^{27, 28} to describe large, organized and human-oriented urban environments that are designed to coexist with the environment. His latest incarnation, the concept design Solare, a lean urban city, could serve as a blueprint for the Initiative arcology. Soleri's architectural framework as exemplified by central Arizona's Arcosanti²⁹ addresses the most pressing requirement of the Initiative, to provide a centralized sustainable urban human-oriented environment capable of housing a large number of Researchers in a manner that encourages maximum collaboration. Furthermore as the issues of climate, environmental degradation, and uncontrolled urban growth are addressed by the Researchers, the work and living environment should reflect the potential outcome of the problems being addressed. For example, the reduction of greenhouse gases will rely in large part upon their elimination as well as the transformation of their sources (transportation, urban/suburban sprawl, need for alternative energy sources). Arcosanti and its successor Solare (if built) could incorporate many of the Researchers sustainable development solutions as genuine proofs of concept.

Biosphere 2 - Tucson

Biosphere 2 is the largest self contained environmental research facility in the world. It is maintained in pristine condition as a University of Arizona Research Facility. As stated by FN Tubiello in a Goddard Institute for Space Studies abstract³⁰,

”The Intensive Agricultural Biome of Biosphere 2 offers unique possibilities to conduct experiments that investigate dynamics of natural and agricultural ecosystems of importance to global change. No other facility exists with as large an experimental space (1500 m² planting area, 15 m height on average). Its height allows for experiments with fast-growing tree species used in agroforestry and with tall crops. The large area available for cultivation allows for experiments with CO₂ as a function of management practices and temperature regimes, under settings that mimic field conditions better than other experimental facilities. Baseline studies are described that characterize the experimental platform, followed by temperature-CO₂ perturbation experiments to assess Biosphere 2 potential for crop research within a sustainable system.”

Biosphere 2 could become a critical the Initiative component for several reasons. By itself, the center represents one of the best experimental platforms available for Climate Change research. Secondly, Under the guidance of the University of Arizona in collaboration with the Initiative could create opportunities that can only be imagined.

26 Paolo Soleri, a leading advocate of sustainability , outlined the key principals in his treatise Arcosanti: An Urban Laboratory? (Third Edition). Mayer, AZ.: The Cosanti Press, 1993. The work behind this book began many decades prior to its publication: <http://www.arcosanti.org/node/9773>

27 Arcosanti: <http://www.arcosanti.org/Arcology> .

28 Jeff Stein, President The Cosanti Foundation, TedX presentation at The City 2.0:

<http://www.youtube.com/watch?v=XCqdvLaBx50> .

29 Arcosanti resides on private land and only houses a small group of individuals representing the preliminary stages of proposed development. It has the potential of being built out as a test bed for new Green technologies and architectural densification concepts: <http://scoop.it/t/dense-living> .

30 <http://pubs.giss.nasa.gov/abstracts/1998/Tubiello.html> .

In addition, Biosphere 2's intellectual appeal and the U of A's reputation³¹ for academic excellence could draw large amounts of funding for numerous climate change and biosphere maintenance/preservation projects. Researchers could reside in the current Biosphere 2 housing complex or in the proposed Fusion Architectural Community.

Fusion Architectural Community

The concept of a planned community near Biosphere 2 may provide a powerful resource to the Initiative. A precedent was set in 1991 with the development of the Tucson Solar Village now known as the community of Civano³². An advanced Fusion Architectural Community could be developed adjacent to Biosphere 2 that serves the needs of surrounding townships as well as the Initiative. The Fusion Architectural Community would seek to fuse evolving architectural designs developed by the Researchers and associated architects with the Biosphere 2 project vision. It could also draw upon Arizona's rich architectural heritage brought to it by Frank Lloyd Wright, and Paolo Soleri, the creator of the arcology of Arcosanti and a student of Frank Lloyd Wright³³.

31 US News 2010 college ranking: <http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-science-schools/university-of-arizona-104179> .

32 Civano , <http://www.terrain.org/unsprawl/5/> .

33 <http://www.azcentral.com/centennial/ent/articles/2011/08/19/20110819arizona-architecture-paolo-soleri-visionary.html>.

Arizona University Complexes



Arizona's three state universities are strategically located to meet the needs of the Initiative. Each institution can bring unique facilities and disciplines to bear upon the global problems that will be addressed by the Researchers. A current example of their commitment to global issues, collegiate approach and academic excellence is the Arizona Water Institute³⁴. The Arizona Water Institute is a joint effort of the three universities. Its stated purpose is to, “ position the state as a world leader in water resources management and technology. ” It is this level of commitment that will make a critical difference with the Initiative.

Northern Arizona University – Flagstaff

Northern Arizona University has established itself as an authority on ecology. It has developed a comprehensive set of related research centers and institutes that may play an important role in biosphere maintenance/preservation research³⁵. Northern Arizona University also possesses the well-respected College of Education. Future Initiative instructors and educators could be cultivated through this program.

Northern Arizona University can make a significant contribution to the area of cultural exchange training. It is becoming increasingly apparent to large global corporations that their globally separated work groups often do not work well together due to cultural differences. One such session conducted by a leading software corporation clearly demonstrated that the work and social patterns of Americans, Germans and Sub-Continent Indians are completely at odds with each other. It was shown that this can doom the prospects of a communal undertaking unless the differences are taken into account at the interpersonal level. Northern Arizona University has done ground breaking work with American Indian cultures to narrow the cultural divide between themselves and the population at large. Northern Arizona University should be called on to train the Initiative's research community in techniques of working effectively together.

Arizona State University -Phoenix

In the near future, Arizona State University may become the largest public center of higher learning in the nation. It promotes itself as a research university. Its research expenditures exceed \$200 million per year. They state, “Arizona State University is poised for the next step of its rapid and unique development as one of the nation’s premier public research universities. In its design process, Arizona

34 <http://sustainability.asu.edu/research/project/391/arizona-water-institute> .

35 Northern Arizona University research center and institute list , <http://nau.edu/research/> .

State University will address many challenges. Among them are rapid socioeconomic change in the region; cultural diversification; growing numbers of high school graduates seeking a college education; limited higher education infrastructure; and competitiveness among research universities. ”³⁶ These state of the art research facilities are located within a reasonable driving distance from the potential Researcher arcology. Cooperative arrangements could be developed allowing the Researchers access to these facilities. In addition, the \$8.9 million computer center could become a central component in the the Initiative IT infrastructure. The potential exists for large infusions of funding to augment the university's current IT environment. Furthermore there has been a call for super computer capabilities that can be used to improve climate change projections³⁷. The Arizona State University computer center could be upgraded to handle the largest and most advanced demands.

It is an Initiative objective to take full advantage of new technologies such as Social Networking, Collective Intelligence, Collaboration and Dynamic Modeling currently under development at centers such as PARC, MIT, and the Santa Fe Institute.

University of Arizona – Tucson

University of Arizona officially describes itself as, “ the state's premier research university, ranked among the top 20 of public research universities nationwide. In some areas such as optics, water research and astronomy, we are among the best in the world. Through innovative research, University of Arizona faculty are creating the next generation of knowledge and giving students unparalleled opportunities for independent research and scholarly publication.”

As the manager of Biosphere 2, The University of Arizona could play a critical role in the Initiative's climate change research. For example, the University of Arizona's Sustainability of semi-arid Hydrology and Riparian Areas (SAHRA) project encompasses far reaching goals as stated, “The vision of SAHRA is to develop an integrated, multidisciplinary understanding of the hydrology of semi-arid regions, and to build partnerships with a broad spectrum of stakeholders (both public agencies and private organizations) so that this understanding is effectively applied to the management of water resources and to the rational implementation of public policy. ”³⁸

Joint Responsibilities

In addition to their research contributions, the universities would perform the duties of archivists and distributors of the Researchers' work. To accomplish these tasks both university IT infrastructures and research capabilities would have to be significantly augmented. IBM has established the precedent of donating technologies and expertise to Open Source Initiatives as its part in the aforementioned Global Pandemic Initiative. A similar contribution could be expected from the Researcher sponsors.

36 Research at Arizona State University, <https://asuresearch.asu.edu/index.php?q=home> .

37 Climate Change Manhattan Project:

<http://www.newscientist.com/article/dn13855-climate-scientists-call-for-their-own-manhattan-project.html> .

38 SAHRA , <http://www.sahra.arizona.edu/> .

The Open Source Consortium



The Open Source Consortium would guide the Initiative through the development of standards and recommendations consistent with the Open Source philosophy. The consortium membership would be taken from leading Open Source advocacies and institutions that have experience setting standards for the Open Source Community. The standards would be binding. However, they would be developed cooperatively with the Researcher sponsors.

Funds

The Initiative would be self-sustaining based on contributions from the membership. Administrative fees might be assessed during patent use in order to maintain the Arizona University Complexes archival and distribution responsibilities.

Conclusion

The Initiative possesses the potential of becoming one of the most important 21st century undertakings designed to provide answers to key global concerns. It represents a powerful combination of a global membership, collaborative Researcher working and living communities, an Open Source operating framework, and Arizona's unique political and research environments. The Initiative outcomes would enrich the world's citizenry for decades to come.

Exhibit One

Access



Arizona is approximately 400 miles long and 310 miles wide from border to border. Distances between the Initiatives resources are as follows:

- Tucson to Phoenix - 115 miles
- Phoenix to Mid State - 77 miles
- Mid State to Flagstaff - 81 miles