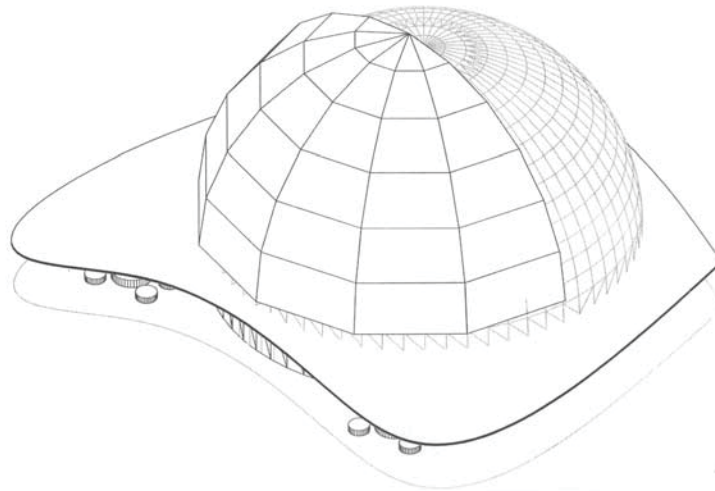


CHAPTER 12 1998

MILLENNIUM DOME™ Building-Integrated Photovoltaic Manufacturing Museum



INVENTIONS AND INNOVATIONS PROGRAM - FY 1998

Office of Energy Efficiency & Renewable Energy
Department of Energy Golden Field Office
Office of Industrial Technologies (OIT)
Inventions and Innovation Program
1617 Cole Boulevard 17-3
Golden, Colorado 80401

Jennifer Squire (303) 275-4764
Bertha Crisp (303) 275-4771
<http://www.oit.doe.gov>

PROGRAM MISSION

The Mission of this program is to develop and promote the adoption of cost-effective renewable energy efficiency technologies within the building, industrial, transportation and utility sectors for the benefit of *economic competitiveness, energy security and environmental quality of the nation*. The program funds up to \$100,000 for promising projects demonstrating both *energy-related innovation and future commercial market potential*. Formal solicitation May 1 to July 31, 1998.

ELECTRICITY®

UNIVERSITY OF CALIFORNIA, IRVINE

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ENVIRONMENTAL ANALYSIS AND DESIGN
SCHOOL OF SOCIAL ECOLOGY

IRVINE, CALIFORNIA 92717-5150
FAX: (714) 725-2056

12 May 1998

Eileen M. Smith, M.Arch.
Solar Development Cooperative
3535 E. Coast Hwy #216
Corona Del Mar CA 92625

Dear Ms. Eileen Smith,

We wish to express our sincere gratitude for giving a most interesting guest lecture to our class at UCI: E120 Elements of Environmental Design. It was very informative and extremely enjoyable. We are honored that you agreed to take time out of your extremely busy schedule to share your knowledge and expertise and answer our questions. Your kindness is much appreciated. Thank you.
Sincerely,

Sanjoy Mazumdar, B.Arch. (Hons.); M.Arch.A.S.; M.C.P.; Ph.D.
dhxems1.sm

Matt...

Castro...

Van Yette

John...

Calvin...

Benjamin...

Jesus...

Wong...

Blau...

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Thank you, I like your hair!

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PUBLIC UTILITIES CODE SECTION 3365-3367.5¹⁶⁹

3365. The authority may provide loans, utilizing up to one billion dollars (\$1,000,000,000) of the bond authority, under terms and conditions approved by the authority, to any participating party, which shall use that loan to make loans available to California consumers and businesses for all of the following purposes:
- (a) The purchase of consumer appliances and home improvements with electric and gas energy efficiency or renewable energy characteristics, as approved by the Energy Commission, the commission, or a participating local publicly owned electric utility, as applicable.
 - (b) The purchase or lease of business equipment and facility improvements with electric and gas energy efficiency or renewable energy characteristics, as approved by the Energy Commission, the commission, or a participating local publicly owned electric utility, as applicable.
 - (c) Any other electric or natural gas energy conservation program or any program for the use of renewable energy resources, as approved by the Energy Commission, the commission, or a participating local publicly owned electric utility, as applicable.
3366. As a condition of receipt of a loan pursuant to Section 3365, a participating party shall be required to conduct a comprehensive marketing program that makes consumers aware of the availability of these financial assistance programs, and to provide appropriate security for repayment of the loan, including, without limitation, a pledge to the authority of consumer and business loan repayments collected through utility bills, as applicable and a certification that the duration of a loan will not exceed the useful life of a purchase.
3367. The authority shall require that any equipment or improvement financed by a loan made pursuant to this article shall be certified as having been installed or completed.
- 3367.5. The authority may require that a participating party utilize a consumer protection plan for screening qualified contractors who serve consumers under this article.

Oil cartels and utilities don't have their equipment installed before they are provided financing. If government loan arrangements are as unreliable as the renewable rebate in California, then this program is an inducement to hardship. The way it is written one must be financially independent to initiate and install a project that is then reimbursed. It is highly prejudicial.

¹⁶⁹ *California Public Utilities Code Section 3365-3367.5*, Find-Law, 1994 to 2005
<http://caselaw.lp.findlaw.com/cacodes/puc/3365-3367.5.html>

THE MILLENNIUM DOME PROJECT

Introduction/Abstract

One of the miracles of existence is light. Scientifically speaking, light consists of vibrations in the ether, which fills all space. Our greatest source of light on earth is the sun. It sends light to earth at the rate of 186,000 miles in a single second. Further, the light of the sun is responsible for the evolution of plant, animal and human life through a variety of electro-chemical process including photosynthesis and respiration. The sun traditionally provides us with many life-giving and enhancing benefits. Many elements of the earth store the sun's energy. Uranium and coal have provided electricity as secondary sources of sunlight stored in these rocks for millions of years.

The photovoltaic effect converts the sun's light directly to electricity quietly without any moving parts or pollution. It was first discovered in 1839 when Edmund Becquerel noticed certain elements increased their charge when exposed to the sunlight. Since this discovery, we have evolved numerous uses for photovoltaics from telecommunications to satellite generators. Most photovoltaics made today are developed from refined silica or sand known as silicon. It is a sister technology to the electronics board on your computer. The most recent frontier for this semi-conductor technology is its dual-use as a building material. We believe this new *Pallet for the Scribe of Humanityⁱ* will be an important technology far beyond its mere capacity to create electricity as it converges with the building and computer industries in the next twenty years. Computers and satellite photovoltaics clearly demonstrate how a silicon industry may grow and evolve once it becomes a mainstream commodity. Now at less than .001% of the electricity consumed in America, BI-PV promises to provide economic technological benefits not yet imagined.

President Clinton endorsed the Million Solar Rooftops In USA By 2010 Program last summer. Germany completed over 2,000 installations in their 1000 PV Rooftops Program 1993-95. The European Commission has published their Million Solar Rooftops Program to include 500,000 in 3rd World Nations. We have before us the task of building at least twenty BI-PV manufacturing plants within the next three years. In 1986, Lt. Colonel Richard T. Headrick patented the Solar-Voltaic Dome™, which is the most efficient solar array in existence, today, providing over 21,000 SF of PV surface on an acre. We believe this solar configuration is a key focus for mainstream deployment of building-integrated photovoltaics as well as an ideal size for BI-PV manufacturing. Our application requests the seed resources needed to build a prototype of this unique solar array in a University industrial park that will also serve as a PV manufacturing plant and museum. Investments in BI-PV will expand in value as we enjoy clean, sustainable, aesthetic and economic photo-electricity as reliable as the sun itself.

INTRODUCTION/ABSTRACT EXECUTIVE OUTLINE

I. PROJECT/APPLICANT INFORMATION

II. STATEMENT OF THE PROBLEM

- A.** History of Electricity Industry 1900 to the Present
 - B.** History of the Building-integrated Photovoltaics Industry 1839 to 1998
 - C.** Product-Driven Versus Fuel-Driven Electricity Production
 - D.** Remote-site versus Demand-site Distributed Generation
 - E.** Issues of Scale in Deployment, Environmental Degradation & Security
 - F.** Commitment To Strategic Deployment of Renewables Technology
 - G.** National & Global Interest With Related Deployment Programs
 - H.** Consumer and Industry Groups Directly Involved and/or Concerned

III. PROPOSED SOLUTION

- A.** Mainstream Deployment of Demand-site Renewables Technology In USA
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- A.** Estimated Energy Sector Impact of Millennium Dome Project
- B.** Timeframe for Energy Impact Years 2000, 2005, 2010 & 2050
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- B.** *Stage 2: Technical Feasibility*
- C.** *Stage 3: Development*
- D.** *Stage 4: Commercial Validation or Demonstration*
- E.** *Stage 5: Full Scale Production or Deployment*

CONCLUSION

REFERENCES

APPENDIX

- A.** Million Solar Rooftops In USA 1997-2010 Program 2 kWp \$5 Watt=\$10 Billion
- B.** California Public Utilities Corporation: Rulemaking Into UDC's Role In DG
- C.** Manufacturers, System Designers & Installers Technicians: Energy Service Providers
- D.** Net Metering Contracts Balancing Service, Responsibilities & Liabilities
- E.** *Solar-Voltaic Dome™* Report for Department of Energy by Jon G. McGowan 1986

THE MILLENNIUM DOME PROJECT

Advent of the Headrick Solar-Voltaic Dome™ Power Station
208.7 FT hemi-dome solar array 21,000 SF PV surface on an acre
United States Patent Number: 4,594,470 June 10, 1986

- a. Build working prototype of most efficient solar array in existence, today.
- b. Establish solar electric building materials manufacturing/research center.
- c. Develop dual-use consumer education: *Photovoltaics Manufacturing Museum*

Project Manager:

Eileen M. Smith, M.Arch.
Founder & CEO
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www.geocities.com/Eureka/EMSPAPERS.html
www.geocities.com/Eureka/1905/LCRTHEADRICK.html

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PV GAP - Global Approval Program Stakeholder

Secretariat, c/o IEC Central Office: rk@iec.ch
3 rue de Varembe, Box 131 41-22-919-0300
Geneva, SWITZERLAND 41-22-919-0216

II. STATEMENT OF THE PROBLEM

A. History of Electricity Industry 1900 to the Present

Today, we take electricity for granted and rely on it for many of our survival, business and recreational needs. It is hard to believe that in 1900, less than one hundred brief years ago, only 3% of United States citizens enjoyed the luxury of electricity in their homes. The momentum of our electricity consumption habits nationally and globally has become an issue of serious concern due to present reliance on depleting, hazardous and damaging fuels to meet our electricity needs.

Fossil, Nuclear and hydro fuels provided 99.5% of the electricity consumed in the United States in 1975. During the twenty prime years of Earth Day amid the backdrop of public and scientific outcry regarding our depleting resources and the discovery of damage to our ozone layer all other fuels, including the use of all renewable fuels and sustainable fuels only increased 0.1% in the US.ⁱⁱ Coal consumption known for its damaging CO2 emissions associated with ozone depletion doubled in the US to provide over 55% of the electricity we consume as millions of dollars were spent on pollution research and public education.

B. A History of the Building-integrated Photovoltaics Industry 1839 to 1998¹⁷⁰

C. *Remote-site versus Demand-site (Distributed Generation) Deployment*

Vital economic differences and benefits exit in mainstream deployment of demand-site (demand-side) mid-size BI-PV distributed generation over large-scale concentrated remote-site PV electricity generation. Many claim economics and industry control issues bind large cartels from pursuing the benefits of mainstream deployment of renewables technology. We believe it is more a matter of pursuing what they already know and an unwillingness or *inability* to adapt to change. With deregulation we are finding discussions more open and accepting of timely deployment of demand-site renewables technology into mainstream marketplace.

D. *Product-driven versus Fuel-driven Deployment Economics*

When I founded my business in 1992, it was because I discovered the tremendous reduction in price of photovoltaics from \$500 watt in 1974 when I first became familiar with this technology to under \$5 watt. The question that led me to the founding of my business was simply why isn't BI-PV in every building material retail outlet? Why isn't there more access to BI-PV within the mainstream marketplace? BI-PV is comparable in cost with high-end roofing products. It is certainly within the budget of a large segment of American consumers if they choose to purchase it. Some attempts to suppress BI-PV by large energy cartels, which own BI-PV manufacturing plants include activities like abusive lawsuits and refusal to advertise BI-PV products and incentives to the public. The most serious problem in establishing the cost-effectiveness of renewables technology like BI-PV is the need to differentiate between the traditional *fuel-driven* to the *product-driven* economics of BI-PV. The use of the developer's code of *highest and best use of land* will influence related financial decisions in the construction industry.

Where the BIG THREE are *fuel-driven technologies*, true renewable technologies are demand-site and *product-driven* investments. The momentum of the electricity commodity trading post and the criteria perpetuating related investment customs influence consumer confidence effecting BI-

¹⁷⁰ Smith, Eileen M., *ElectriCity® Beyond the Curve of Deregulation featuring Neighborhood Energy Watch Solution Groups and the Ethos of Commerce*, Section I, II, 2004 [omitted from original herein to avoid repetition]

PV assimilation into the mainstream marketplace. At the 60th American Power Conference this year, we discussed how BI-PV could be integrated into the electrical commodity trading post based on manufacturing projections. A 10 MWp plant produces a tradable commodity.

E. Scale in Deployment, Environmental Degradation & Global Endangerment

During the twenty years of Earth Day, the tendency has been to elaborate on the dangers of pollution, hazardous waste and the damaging effects of the BIG THREE while various parties and groups have searched in vain for the culprits to blame for our predicament. I believe one of the reasons we have come up empty-handed in this search is simply because the problem is far more autonomous and powerful than anyone realizes. It has a life of its own. Human habit and business on a mass level simply perpetuate an out-of-control system of destructive electricity usage. Until our focus is beyond 'who dunit' to 'how to change' to renewable energy, we will not have the focus to redirect the problem reducing our quality of life, daily.

In 1940, the Kansas City Auto Show displayed forty vehicles including large industrial farm trucks. They covered less than one basketball court. In 1995, there were eight football fields of small cars and trucks. There is no one person or group of people to blame for this massive phenomenon. Everyone is forced to contribute to the problem by conforming to the limited options available. While some people may glamorize the myth they are the culprits or the saviors, the energy industry clearly has a life of its own. It will take significant and massive cooperative effort to willfully redirect this industry that has evolved our newly developed luxuries of *mobility* and *electricity* into global necessities. *The largest hurdle to overcome is to dispel the myth that we must wait for tragedy.*

Issues of scale greatly determine the need to evolve beyond the BIG THREE fuels that have thrust us into a new era of *electricity and mobility*. Perhaps we can envision the dramatic need to shift if we understand the past ninety years of electricity deployment as a booster rocket into a new era of quality living on earth. We have cleared the mass deployment goals of Edison's electricity plan. We must now convert our focus to deployment of benign renewables technology like solar electricity and fuel cell technology on a mass level. As rockets leave the earth's orbit they change fuels to adapt to new atmospheric conditions. Energy industry must change fuels to adapt to demand for electricity and mobility.

Earth Day activities and the March for Peaceful Energy are important social activities, but have not yet proven effective to influence the ongoing daily process of renewables technology deployment. Most people do not have the understanding of the industry to commit the needed resources to effect real change. Few people are willing to take the time to evolve consequential change or pay someone else to effect change simply because they don't see the immediate payback. The March for Peaceful Energy and Earth Day could deepen their impact by incorporating business activities at their events with an umbrella marketplace providing viable consulting, system design and product demonstrations of renewables technology.

Fatalists would have us believe the Utility Distribution Companies and Primary Energy Producers will remain irresponsible and become even more self-serving in a competitive energy industry as they perpetuate unregulated destructive large-scale deployment of the BIG THREE fuels for electricity to assure profits. The past fifty years electricity and mobility deployment have evolved a life of their own creating problems far beyond what humanity has ever faced before in history. While deregulation may evolve competition, it must with a clear commitment stand ready to regulate wrongful exploitation of previously closed, out-dated and dangerous

power plants Primary Energy Producers may feel tempted to utilize in a competitive industry. There is nothing in the restructuring statutes that say deregulation is an opportunity to abandon safety and environmental regulation.

BIG THREE fuels are under the most optimum circumstances only safely used in small-scale deployment. We passed the level of safe deployment of these fuels a number of years ago. While the electricity industry began from the work of a handful of people, the scale and phenomena of electricity deployment has grown to be too huge and all embracing to be controlled by any one group or nation, today. For global safety, we must establish and enforce much stronger environmental and safety policies in a competitive energy industry supported by strict peer regulation that discourages anti-trust activities and the abusive misuse of wealth to attempt to avoid important regulatory laws if we are to avert related disaster. Using the term deregulation for the development of a competitive electricity marketplace is really rather inconsistent and misleading. Restructuring the energy industry to a competitive marketplace simply opens the door to competitive involvement in electricity commerce with fair access to deployment funding and grid-connection by all healthy proponents who abide by environmental and fair commerce law. To assure safety, those who continually break safety regulatory laws and suppress renewables technology from mainstream access to the marketplace must be forced to pay for all related damages and if it continues be forced to leave the industry.

F. Commitment To Strategic Deployment of Renewables Technology

The scale and financial control of the BIG THREE before deregulation discouraged the needed commitment for strategic step-by-step deployment of sustainable and renewable technologies. Within a competitive industry, it is important to focus renewables deployment on mid-size BI-PV systems to effectively transition the industry. Primary Energy Producers may be one of the strongest partners in BI-PV deployment to reduce their overhead, alleviate dependency on other sources of energy production during down-times and to expand their technology portfolios.

Mid-size BI-PV projects like the Georgetown Intercultural Center of at least 300 kWp systems will build the deployment momentum needed to accelerate usage, establish new manufacturing centers and timely reduce the price of photovoltaics across the marketplace. Mid-size BI-PV systems will serve an important role as distribution support facilities, demonstration manufacturing plants, catalysts for large-scale investment and opportunities for community partnerships in BI-PV. A deployment plan focused on mid-size BI-PV power plants will allow financiers to deepen their involvement in BI-PV deployment. Mass production has historically proven a cost-effective deployment agenda. Mid-size BI-PV strategy partnered with research institutes provides commerce the ability to evolve the dream of electricity and mobility hand-in-hand with a new quality of existence only possible through the use of sustainable, clean and renewable demand-site solar electric building products.

The transition to renewables technology began slowly, but now stands ready to surge through the global marketplace as quickly as we can evolve the rules and manufacturing infrastructure to manage and realize it. If full support were provided from every sector, I predict it would take fifty years to integrate BI-PV within the infrastructure of our communities on a scale needed to meet 50% of our present electricity needs in the United States. This transition will come more quickly in areas developing new communities in a global marketplace.

G. National & Global Interest With Related Renewables Deployment Programs

The European Commission has also proposed a Million Solar Rooftops Program [1,000,000 PV Roofs by 2010] in their Energy for the Future; Renewable Sources of Energy.ⁱⁱⁱ

“Photovoltaics (PV) is a high technology with strong export potential in competition with Japan and the United States. There is a very motivated PV industry organizing an effort to bring domestic and export markets off the ground. The Community Strategy presented in their document is a basic framework for an action plan with full penetration of renewables technology by the year 2010. The objective is a significant increase in renewable energy consumption within the EC by 2010. An ambitious and very visible promotion campaign is needed in order to assure prices fall substantially. A 500,000 PV roofs initiative for PV village systems in developing countries and 500,000 PV roofs and facades in the domestic market will affect less than 2% of the 30 million house and non-residential units in the European Commission.”

Million Solar Roofs Implementation Plan by Solar Energy Industries Association September 22, 1997

“Solar energy is now ready to meet consumer needs for clean energy on a grand scale. However, conditions exist in the U.S. market which prevent the solar industry from competing on a level playing field with established and polluting power generation sources.^{iv} In Japan and Europe these market barriers are rapidly being eliminated. Our international competitors are creating a strong domestic market through government intervention, with the goal of building a dominant position in the fast-growing global market for solar energy products. Maintenance of current U.S. market leadership requires a U.S. solar initiative comparable in scale and scope to those underway overseas. The Million Solar Roofs Program By 2010 will preserve U.S. leadership in the world solar markets, give consumers an affordable clean energy option, create U.S. high technology jobs, and play an important role in reducing climate changing greenhouse gases as well as other air and water pollutants.^v”

NATIONAL INTERESTS AND PRIORITIES

- President Clinton announced a national commitment at a global summit to install one million solar rooftops in the United States establishing an agenda wisely met.
- Millions of United States research dollars have been spent on photovoltaics technology, yet we still have no degree programs for photovoltaic engineering.
- Building-integrated photovoltaics is a growing competitive industry worldwide.
- Photovoltaics has reduced from \$500 watt in 1972 to less than \$5 watt in 1990.
- BI-PV is the most cost-effective source of demand-site electricity in existence.
- SDC's strategy to meet national goals is to use mid-size photovoltaic arrays to timely and economically deploy clean and renewable electricity into mainstream.
- Photovoltaics is most commonly created with sand or silica refined to silicon.
- Silica represents 27% of the earth's crust.
- Silica and silicon can be recycled assuring non-depleting materials.
- Silica was mined for hundreds of years for windows and more recently for computer
- Computer-grade silicon is refined a billion-to-one selling for \$1000 kilogram.
- Photovoltaic-grade silicon is refined only a million-to-one and costs \$100 kgm.
- No one is producing photovoltaic-grade silicon at this time.
- It is our prediction computer and photovoltaic semiconductor technologies will converge in ten years creating important new technologies and conveniences.
- BI-PV will evolve globally as important technology of national security and electricity generation autonomy.

H. Consumer and Industry Groups Directly Involved and/or Concerned

The California Energy Commission is doing a wonderful job of leading the way into deregulation with a \$540 million dollar Renewables Technology Program providing consumers the choice to 'switch' to green energy. They have rightfully begun the process with a focus on remote-site generation to encourage energy cartels to produce more green energy. However, this trend must begin to strategically adapt to demand-site generation for future related programs as all energy industries around the nation transition to a competitive electricity industry. Renewable technologies are most economically deployed in demand-site applications where they further the most benefit to

investors and society. CEC allocated 88% or \$485.6 million of their \$540 million dollar Renewables Technology Program on remote-site generation applications. Only 12% or \$54 million in a four year Buydown Program for demand-site electricity was allocated to demand-site renewables technology. The remaining \$5.4 million is all that was left for industry and consumer education. For future renewables technology programs, I would recommend \$250 million or 50/50 be spent on both remote-site and demand-site deployment with \$40 million allocated to industry and consumer education to assure a quality use of renewables technology funding with a quality and reliable service industry. The Solar-Voltaic Dome™ is an important PV deployment tool because it provides a mid-size power station with 21,000 SF PV surface on acre footprint while it provides passive solar savings to interior leased rooms.

One problem we found is there are no incentives within the present Renewables Technology Program to address the mid-size demand-site BI-PV consumer. The 50% buydown program addresses systems of 10 kWp or less. Larger systems like a 300 kWp system are focused on remote-site generation and must register as an Energy Service Provider even where they are creating less electricity than the building the system is mounted on uses. The Georgetown University Intercultural Center project does not provide 100% of the buildings electricity needs. They are not producing enough electricity to sell to surrounding buildings. There is a huge potential market in mid-size BI-PV deployment. There needs to be an additional category of BI-PV deployment incentives to address mid-size demand-site projects. Pioneers in any industry provide strong leadership roles and tend to reveal needed missing policy. This was one reason the 1000 PV Rooftops Program in the German States was so important. They made numerous mistakes to reveal what is needed.

California Public Utilities Commission - Michael McNamara, Chief of Market Development in the Office of Ratepayers Advocates at the California Public Utilities Commission wrote on May 28th in response to my many letters and requests to please include demand-site consumer technology in their educational packets explaining consumer choice with deregulation mailed to electricity consumers throughout the state. His letter included a letter to President Bilas requesting an Order Instituting Rulemaking into the Utility Distribution Company's role in Distributed Generation. The Statement included indicated such proposed rulemaking is an historic milestone in the history of the electricity industry. Like many other consumers, I assumed the rules and laws were already in place. This is a clear illustration of how policy and visions for renewable and sustainable electricity production must take needed steps to catch up to daily practical functions of electricity deployment to become viable competitors effectively reducing our dependency on the BIG THREE FUELS.

Mid-size deployment of BI-PV will accelerate the need and the response needed to effectively address these rules across the marketplace. In February, I called Southern California Edison to find out how long it would take to get a BI-PV system connected to the grid. After three days of being forwarded to numerous departments, and even being asked to call the SOLAR II project in the desert to find out how to get a BI-PV system connected and a net metering contract, I realized the focus for consumer education must clearly include industry service education if consumers of these new technologies are to be effectively, realistically and timely served in the daily marketplace. In my own client differentiation, I have three primary groups of BI-PV consumers. (1) residential (2) small business and (3) commercial and multifamily residential using over 10 kWp.

III. PROPOSED SOLUTION

A. Mainstream Deployment of Demand-site Renewables Technology In USA

In the history of the BI-PV industry, we find a lack of focus on mid-size renewables technology for deployment tools. The Headrick Solar-Voltaic Dome™ Power Station provides the needed benefits to be a cost-effective investment, today. Our 1995 "See-saw Economics Plan" for the Solar-

Voltaic Dome™ illustrates how this deployment focus on the most efficient solar array in existence, today, will actually levelize the BI-PV industry after completing 100 units. *The 0-1-10-100-1000 Approach*^{vi} was also suggested for BI-PV deployment in NOVEM's book *Building With Photovoltaics* published in 1995.

To assure we bring photovoltaics out of the science laboratory and into our mainstream marketplace where it will flourish, we need to appreciate the visuals provided by a handful of projects completed by technology gurus the past twenty years as we put into place the ability for every consumer to evolve building-integrated photovoltaic or BI-PV projects.

Advancement of materials applications in the BI-PV industry will greatly advance the technology's versatility, and therefore its mainstream use. *A comprehensive approach to manufacturing with ready access to quality building materials in every community supported by a reliable service industry are the unspoken goals of the Million Solar Roofs In USA By 2010 Program.* Once we have evolved past the power struggle of the transition to this new and viable form of energy production, we will naturally discourage forestalling mainstream production and use of BI-PV because it will be the major industry growth focus. BI-PV technology combined with fuel cell technology could conceivably free humanity from destructive forms of fuels on a mass level within thirty to sixty years.

B. SOLAR DEVELOPMENT COOPERATIVE^{vii}

Lighting the Way With Creation's Original Remedy

Historic Overview of Our Efforts To Assure Mainstream Deployment of BI-PV

"Restoring and healing the earth's atmosphere and evolving healthy energy consumption habits may have an enlightening effect on humanity reducing crime and destruction in society."

1992 the Solar Development Cooperative -Lighting the Way With Creation's Original Remedy was founded to assure timely mainstream deployment of BI-PV supported by a quality service in the United States and global marketplace.

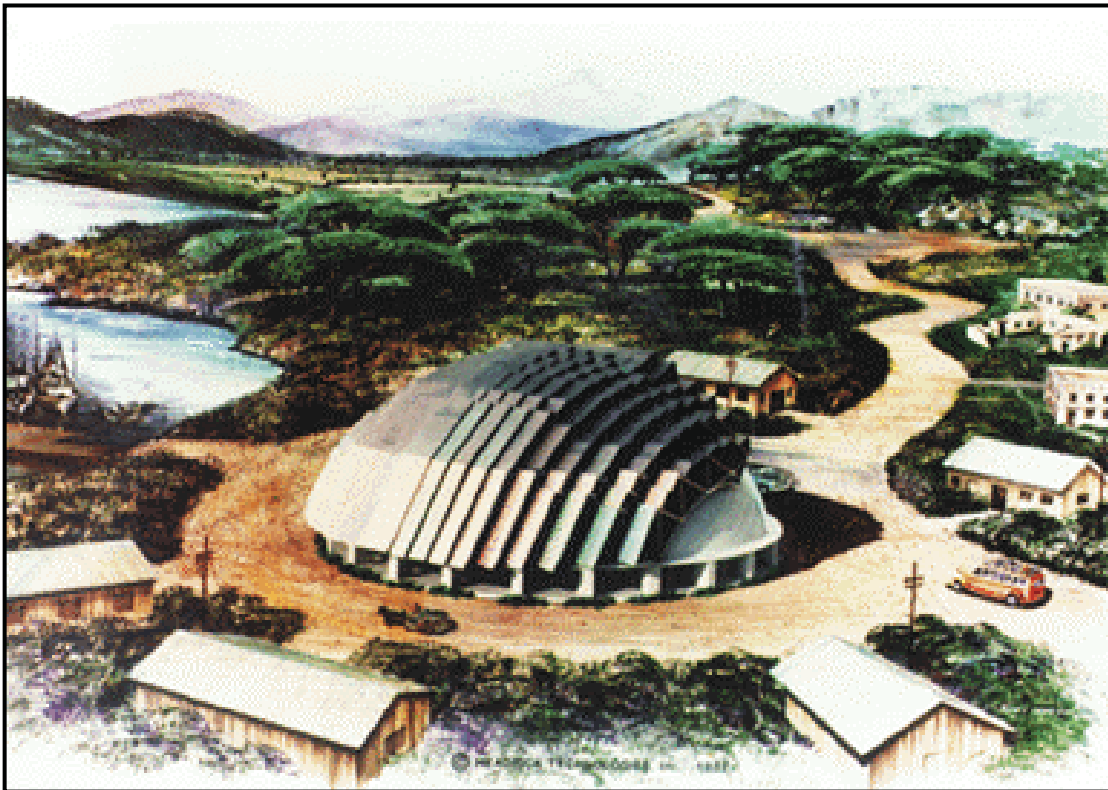
C. Headrick Solar-Voltaic Dome™ Power Station - Specifications & Benefits^{viiiix}

The Solar-Voltaic Dome™ is an important PV deployment tool. It provides a mid-size power station with 21,000 SF PV surface on acre footprint while provides passive solar savings to interior leasable.

The project scope of this proposal is to build the first Headrick Solar-Voltaic Dome™ Power Station as a manufacturing/research facility in a private industry park called the *Living Laboratory* associated with the University of California, Irvine designed as a walk-through museum of PV technology for public and professional education. *The grant would provide the needed resources to develop the important partnerships within commerce, science and community service to assure we evolve the successful project needed to serve as a model for communities throughout the nation and around the world who seek to mainstream use of BI-PV.* We first proposed idea of a BI-PV technology museum in our grant application '*Solar Solution™ for Kansas City Union Station*' to DOE in April 1994.^x

Further, international markets and World Bank associates indicate the need to build a working prototype of the *Solar-Voltaic Dome™* to provide the needed example for facilitating their use in 3rd World Nations and other industrialized nations. Our *See-Saw Economics and the Consumer Laboratory*^{xi} deployment program illustrates how the Headrick Solar-Voltaic Dome™ Power Station will levelize the price of BI-PV across the domestic and global marketplace by the time we develop even one hundred of these structures demanding 21,000 SF PV surface. In 1995, we proposed to President Clinton to build two in each state.^{xii}

Fishing Village Located In Indonesia



C. THE MILLENNIUM DOME \$18 Million Approximate Cost
 (1) Prototype of Array, (2) Research/Manufacturing BI-PV & (3) BI-PV Museum

1. Solar-Voltaic Dome™ Array - Approximate Cost \$2 Million
 - 21,000 SF PV surface on acre - Irvine, CA \$1.68 Million @ \$80 SF Installed
 - Array frame, battery system and grid connection \$320,000

Average Six Sun Hours Daily

	Electricity Income/Savings	\$.12 kWh	Daily	Yearly	20 Years
12.5 W SF=262.5 kWp X 6	= 1.57 MWh	=\$188	=\$56,400	=\$1.13 MM	
15 W SF = 315 kWp X 6	= 1.89 MWh	=\$229	=\$68,700	=\$1.34 MM	
20 W SF = 420 kWp X 6	= 2.52 MWh	=\$302	=\$90,600	=\$1.8 MM	

2. BI-PV Manufacturing/Research Facility - Approximate Cost \$16 Million
 - 1.5 Million X 10 MW = \$15 Million Equipment & Interior Finish
 - 10 MW PV Manufacturing (40 kWp 260 Days) = \$1 MM = \$20 MM
 - 60,000 SF Structural Shell \$1 Million to Build & Finish
 - 34,000 SF X Two Floors = 60,000 SF X \$3 SF = \$180,000 = \$3.6 MM
3. Museum Community Value - Included in Cost of Structure.
 - \$100 dollars day average donations = \$3,000 year

Georgetown Intercultural Center -Array & Building Approximately

- 300 kWp system installed 1984 = \$6 million taxpayer funded
- provides 70% of electricity used in structure; need BI-PV exhibit in lobby
- Georgetown University Intercultural Center in Washington DC
- 3 to 4 Average Sun Hours Day

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1850 S.E. Highway 19, Crystal River, FL 34429 e-mail: asfi@citrus.infi.net
(352) 564-0040 FAX: (352) 564-0041

APPENDIX

- A. Million Solar Rooftops In USA 1997-2010 Program 2 kWp \$5 Watt=\$10 Billion
- B. California Public Utilities Corporation: Rulemaking Into UDC's Role In DG
- C. Manufacturers, System Designers & Installation Technicians Distributed Generation Energy Service Providers
- D. Net Metering Contracts Balancing Service, Responsibilities & Liabilities
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