

SPACE-BASED SOLAR POWER (SBSP) NEGATIVE

Inherency

The United States, under President Obama's lead, has begun a project of working with India on solar energy. It is called the Kalem-NSS Initiative and could lay the basis for SBSP cooperation. There are also many other renewable energy sources that could be the subject of U.S.-India cooperation.

Better relations with India will not depend on SBSP. The Obama Administration has been working on developing a "strategic partnership" with India based on many common interests, including expanded trade and the recent nuclear agreement. The large influence of the Indian-American community in the United States will assure that our relationship remains strong. These gains are considered durable enough to survive changes in leadership of the two countries. If one area, such as SBSP, was enough to fundamentally change our relationship, then there are many more possible barriers.

Harms

Other forms of renewable energy are growing and could solve our energy dilemmas. Recent reports say that up to 80% of our energy could come from currently existing renewable energy sources by 2050. Much new research and development has been spurred by the nuclear reactor accident in Japan.

Ground-based solar cells and larger solar collectors have improved by leaps and bounds recently, making them more cost competitive and would avoid a costly space program. Utilities have been developing large ground-based solar plans adding huge amounts of solar-generation capacity. Many countries appear to be successfully working on it.

Many challenges can be made to the notion that the world faces devastating climate change. While temperatures do seem to be rising, the connection to human activity has been challenged. Development of an energy source that is 40 years away may prove too late to stem the advance of global warming.

Solvency

There are a large number of obstacles to a commercially successful SBSP program. They include international law that allocates the use of the electromagnetic spectrum. The use of microwaves could conflict with current usage of Bluetooth or other wi-fi systems. Many experts believe that microwaves won't work and that we should focus on lasers.

There are other questions about the space engineering and technology for the launch, assembly and maintenance of the SPS system; some of these technologies are not yet possible and are certainly unprecedented. The lifetime and maintenance of the satellites exposed to long-term radiation in space are other issues that have not been fully studied.

Disadvantages

Cooperation with India could isolate China and other Asian nations like Japan linking to the Rivalry DA. A program that is as important and all-encompassing as the SBSP would be large enough to trigger jealousy. Imagine a partnership between the US and another country on the world's most important supply of energy.

The number of launches required to put all the equipment in space and maintain it would certainly increase the amount of debris in space, so the Space Debris DA would link.

The affirmative plan would be a new spending program on a system where the benefits are far into the future. The spending would have to be enormous to ensure global-sized energy development. The government would have to spend money at the beginning to attract other interested parties. So it would link to the Spending DA.

People would fear the beam, even if that fear were irrational. Lobby groups from the fossil fuel and nuclear industries could also be expected to oppose the plan, making it extremely controversial in Congress, thus linking to the Politics DA.

Counterplans

One counterplan would be to have Japan build the SBSP, either by itself or in conjunction with India. Evidence suggests a lot of interest and technical capability in Japan. Japan and India have also forged a strategic dialogue of partnership over many issues. That CP would have the advantage of not linking to any of the DAs discussed above except Debris.

INHERENCY

Txchnologist, General Electric (online magazine), April 4, 2011

[<http://www.txchnologist.com/volumes/solar-power/solar-in-space>]

Moreover, (Joseph) Romm (Center for American Progress) said, space-based solar is only useful if competing forms of energy, like earth-based solar, do not progress in the coming years. But most renewables have been making huge leaps. He noted that photovoltaic solar power could get down to 15 cents per kilowatt hour by the middle of this decade (coal costs about 5 cents per kilowatt hour, though this figure does not account for its environmental effects) and concentrated solar power, which uses large mirrors to concentrate sunshine to heat liquid, can store the sun's energy overnight. To Romm, too many things have to go right for space-based solar to have a future.

Matter Network November 10, 2010

[<http://featured.matternetwork.com/2010/11/us-india-launch-space-based.cfm>]

This partnership between the two countries is likely to gain pace and strength as the United States has now removed some technology-transfer restrictions which were imposed on some scientific research organisations in India after the 1998 nuclear tests. Organisations like the ISRO and Bharat Dynamics will now have access to some sensitive and unique technology.

Matter Network November 10, 2010

[<http://featured.matternetwork.com/2010/11/us-india-launch-space-based.cfm>]

Just before President Obama started his India tour the Indian Space Research Organisation and U.S.'s National Space Society launched a joint forum to enhance partnership in harnessing solar energy through space-based solar collectors. Called the Kalam-NSS Initiative after the former Indian President Dr APJ Abdul Kalam, the forum will lay the groundwork for the space-based solar power program which could see other countries joining in as well.

INHERENCY

Christian Science Monitor November 9, 2010

[<http://www.csmonitor.com/Science/2010/1109/Satellite-to-beam-solar-power-to-Earth-a-la-Bond-movie>]

Under the Kalam-NSS plan, the United States would contribute technology, while India could take care of much of the low-cost manufacturing. "The potential of combining those two could generate a large amount of jobs in both countries," Hopkins said. India could also potentially launch the power-gathering satellite aboard one of the nation's rockets. "It is known that such a proposal can become reality only if the cost of launching satellites into outer space is made economical," said T.K. Alex, director of the Indian Space Research Organization Satellite Centre, which launches spacecraft for both communications and science. The ISRO has ramped up its space activities in recent years, notably with the launch of India's first moon satellite, Chandrayaan-1, in 2008, with a second mission under development.

Environmental News Service November 10, 2010

[<http://www.ens-newswire.com/ens/nov2010/2010-11-08-02.html>]

The concept of a joint clean energy R&D center to be located in India was first agreed during Prime Minister Singh's state visit to Washington in November 2009. During this visit a Memorandum of Understanding was signed, establishing the center. The priority areas of focus for the U.S.-India clean energy center are likely to include: solar energy, energy efficiency, biofuels, clean coal technology and an integrated gasification combined cycle project that turns coal into synthesis gas. It is the U.S. government's second joint clean energy R&D agreement, after that reached with China during President Obama's state visit to Beijing last November. To further their rapidly growing clean energy cooperation, today, the United States and India signed an agreement of cooperation in the field of shale gas that will include a shale gas resource assessment in India to be conducted by the U.S. Geological Survey, technical studies on shale gas exploration in India and training of Indian personnel in shale gas exploration and development.

INHERENCY

Environmental News Service November 10, 2010

[<http://www.ens-newswire.com/ens/nov2010/2010-11-08-02.html>]

President Obama and Prime Minister Singh agreed to scale-up joint U.S.-India civil space collaboration, including space exploration, Earth observation, and scientific education, declaring, "The possibility of cooperation between the two nations in space, to advance scientific knowledge and human welfare, are without boundaries and limits." They agreed to continue seeking ways to collaborate on future lunar missions, the International Space Station, human space flight and data sharing, and to reconvene the Civil Space Joint Working Group in early 2011.

ENERGY SUPPLY

New York Times June 3, 2011

[<http://www.nytimes.com/2011/06/03/business/energy-environment/03iht-RBOG-Kanter03.html>]

Most renewable sources are abundant, practically inexhaustible and far more climate friendly than fossil fuels. Some companies making equipment to harness these energies are growing rapidly. Last month, experts advising the United Nations said renewable sources could deliver nearly 80 percent of world's total energy demand by the middle of the century. That report, by the Intergovernmental Panel on Climate Change — the most authoritative body of experts, scientists and engineers specialized in climate change — was a welcome signal for an industry that has faltered in previous decades after government subsidies dried up and lower-cost fossil fuels made their technologies uncompetitive. The report “is a big thumbs up for an industry that’s making huge advances in lowering costs and improving efficiency,” said Maja Wessels, global head of government affairs for First Solar, one of the largest makers of solar panels. “The experts have said that reaching high renewables targets will become very achievable.”

PR Newswire May 26, 2011

[<http://www.prnewswire.com/news-releases/diversification-is-key-to-growth-in-global-renewables-markets-122647078.html>]

Countries around the world are increasingly broadening the scope of their renewable energy portfolios amid challenging market conditions, according to Ernst & Young's latest quarterly global Renewable Energy Country Attractiveness Indices. Although global events such as the Japanese tsunami and nuclear disaster and the unrest in the Middle East and North Africa continue to impact the power generation landscape, the increasing commercial viability of different technologies such as offshore wind and concentrated solar power (CSP) is also providing new opportunities for sustained growth.

ENERGY SUPPLY

Lester R. Brown, President, Earth Policy Institute, June 9, 2011

[<http://ipsnews.net/news.asp?idnews=56005>]

Solar is even more ubiquitous than wind energy and can be harnessed with both solar photovoltaics (PV) and solar thermal collectors. Solar PV - both silicon-based and thin film - converts sunlight directly into electricity. The growth in solar cell production climbed from an annual expansion of 38 percent in 2006 to an off-the-chart 89 percent in 2008, before settling back to 51 percent in 2009. At the end of 2009, there were 23,000 megawatts of PV installations worldwide, which when operating at peak power could match the output of 23 nuclear power plants. Germany, with an installed PV power generating capacity of almost 10,000 megawatts, is far and away the world leader in installations. On the manufacturing front, the early leaders - the United States, Japan, and Germany - have been overtaken by China, which produces more than twice as many solar cells annually as Japan. World PV production has roughly doubled every two years since 2001 and exceeded 20,000 megawatts in 2010. Historically, photovoltaic installations were small-scale - mostly residential rooftop installations. Now that is changing as utility- scale PV projects are being launched in several countries.

Lester R. Brown, President, Earth Policy Institute, June 9, 2011

[<http://ipsnews.net/news.asp?idnews=56005>]

The United States, for example, has under construction and development some 77 utility-scale projects, adding up to 13,200 megawatts of generating capacity. Morocco is now planning five large solar- generating projects, either photovoltaic or solar thermal or both, each ranging from 100 to 500 megawatts. More and more countries, states, and provinces are setting solar installation goals. Italy's solar industry group is projecting 15,000 megawatts of installed capacity by 2020. Japan is planning 28,000 megawatts by 2020. The state of California has set a goal of 3,000 megawatts by 2017. Solar-rich Saudi Arabia recently announced that it plans to shift from oil to solar energy to power new desalination plants that supply the country's residential water. It currently uses 1.5 million barrels of oil per day to operate some 30 desalting plants. With installations of solar PV climbing, with costs continuing to fall, and with concerns about climate change escalating, cumulative PV installations could reach 1.5 million megawatts (1,500 gigawatts) in 2020. Although this estimate may seem overly ambitious, it could in fact be conservative, because if most of the 1.5 billion people who

lack electricity today get it by 2020, it will likely be because they have installed home solar systems.

ENERGY SUPPLY

Lester R. Brown, President, Earth Policy Institute, June 9, 2011

[<http://ipsnews.net/news.asp?idnews=56005>]

Although solar thermal power has been slow to get under way, utility- scale plants are being built rapidly now, led by the United States and Spain. The United States has more than 40 solar thermal power plants operating, under construction, and under development that range from 10 to 1,200 megawatts each. Spain has 60 power plants in these same stages of development, most of which are 50 megawatts each. The American Solar Energy Society notes that solar thermal resources in the U.S. Southwest can satisfy current U.S. electricity needs nearly four times over.

Lester R. Brown, President, Earth Policy Institute, June 9, 2011

[<http://ipsnews.net/news.asp?idnews=56005>]

The pace of solar energy development is accelerating as the installation of rooftop solar water heaters - solar thermal collectors on a smaller scale - takes off. This technology is sweeping China like wildfire, with an estimated 1.9 billion square feet of rooftop solar thermal collectors installed, enough to supply 120 million Chinese households with hot water. Other developing countries such as India and Brazil may also soon see millions of households turning to this inexpensive water heating technology. Once the initial installment cost of rooftop solar water heaters is paid back, the hot water is essentially free. In Europe, where energy costs are relatively high, rooftop solar water heaters are also spreading fast. Systems typically pay for themselves in electricity savings within 10 years. In Austria, 15 percent of all households now rely on them for hot water. As in China, in some Austrian villages nearly all homes have rooftop collectors. And some two million Germans are now living in homes where water and space are both heated by rooftop solar systems.

ENERGY SUPPLY

Lester R. Brown, President, Earth Policy Institute, June 9, 2011

[<http://ipsnews.net/news.asp?idnews=56005>]

The U.S. rooftop solar water heating industry has historically concentrated on a niche market - selling and marketing 100 million square feet of solar water heaters for swimming pools between 1995 and 2005. The industry was poised to mass-market residential solar water and space heating systems when federal tax credits were introduced in 2006. Led by Hawaii, California, and Florida, annual U.S. installation of these systems has more than tripled since 2005. The state of Hawaii requires that all new single-family homes have rooftop solar water heaters. California aims to install 200,000 solar water heaters by 2017, and New York State aims to have 170,000 residential solar water systems in operation by 2020. With the cost of rooftop heating systems declining, many other countries will likely join Israel, Spain, and Portugal in mandating that all new buildings incorporate rooftop solar water heaters. Worldwide, Plan B calls for a total of 1,100 thermal gigawatts of rooftop solar water and space heating capacity by 2020.

COMPETITIVENESS

Thomas Berger, University School of Economics and Management, Stuttgart, 2009

[International Advances in Economic Research, 2009 volume 15, pp. 378-392]
Why some nations prosper and others do not has been one of the central questions in economics since the days of Adam Smith, yet there remains considerable debate as to whether nations can be deemed competitive entities in the same manner as can firms. Nations do not go out of business in the same way as firms do and do not engage in trade as a zero-sum game, such that comparative advantage rather than absolute competitive advantage is deemed by some authors as more pertinent. Others note that nations clearly engage in competitive behavior in respect of the attraction of investment and key resources. As a consequence there is little agreement as to what competitiveness actually means or how it can be conceptualized.

Thomas Berger, University School of Economics and Management, Stuttgart, 2009

[International Advances in Economic Research, 2009 volume 15, pp. 378-392]
As a consequence, there has been growing critique of the concept of national competitiveness and the rather flimsy theoretical base on which it rests. Krugman summarizes the confusion which surrounds the meaning of national competitiveness with his assertion that it is largely defined in vague and approximate terms “as the combination of favorable trade performance and something else”. This is referring to the fact that most definitions—just like the one by the OECD—refer to the ability to sell concept. This is often accompanied with a call for a strategic management on the national level, focusing on high-value added activities, exports or innovation, depending on the underlying concept. The danger here is that such rhetoric is used to justify protectionism and trade wars. Krugman goes on to argue that national competitiveness is either a new word for domestic productivity or meaningless political rhetoric. Whilst nations may compete for investments if companies seek new business locations, this represents only a minor fraction of economic activities for bigger economies. Furthermore, this is often connected with subsidies or tax reductions to attract such investments. This strategic management for the attraction of investment and the fostering of exports is, according to Krugman, little more than political rhetoric, designed to promote an image rather than secure clear and unambiguous economic dividends.

INDIA

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. i]

Since 2004, Washington and New Delhi have been pursuing a “strategic partnership” based on shared values and apparently convergent geopolitical interests. Numerous economic, security, and global initiatives, including plans for civilian nuclear cooperation, are underway. This latter initiative, first launched in 2005, reversed three decades of U.S. nonproliferation policy. Also in 2005, the United States and India signed a ten-year defense framework agreement to expanding bilateral security cooperation. The two countries now engage in numerous and unprecedented combined military exercises, and major U.S. arms sales to India are underway. The value of all bilateral trade tripled from 2004 to 2008 and continues to grow; significant two-way investment also flourishes. The influence of a large Indian-American community is reflected in Congress’s largest country-specific caucus. More than 100,000 Indian students are attending American universities.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. i]

President Barack Obama’s Administration seeks to build upon the deepened U.S. engagement with India begun by President Bill Clinton in 2000 and expanded upon during much of the past decade under President G.W. Bush. This “U.S.-India 3.0” diplomacy was most recently on display in June 2010, when a U.S.-India Strategic Dialogue session saw a large delegation of senior India officials visit Washington, D.C., to discuss a broad range of global and bilateral issues.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. i]

Bilateral initiatives are underway in all areas, although independent analysts in both countries worry that the partnership has lost momentum in recent years. Outstanding areas of bilateral friction include obstacles to bilateral trade and investment, including in the high- technology sector; outsourcing; the status of conflict in Afghanistan; climate change; and possibly stalled efforts to initiate civil nuclear cooperation.

INDIA

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 1]

The U.S.-India “strategic partnership” is based on shared values such as democracy, pluralism, and rule of law. Numerous economic, security, and global initiatives, including unprecedented plans for civilian nuclear cooperation, are underway. The two countries inked a ten-year defense framework agreement in 2005 to facilitate expanded bilateral security cooperation. In the new century, numerous, large-scale combined military exercises have taken place, and bilateral cooperation on intelligence and counterterrorism is increasing. Major U.S. arms sales to India are underway; more are anticipated. The influence of a geographically dispersed and relatively wealthy Indian-American community of some 2.7 million is reflected in Congress’s largest country-specific caucus. More than 100,000 Indian students are attending American universities, the greatest number from any foreign country. Notably, a number of Indian-Americans now occupy senior positions in the Obama Administration, Agency for International Development Administrator Rajiv Shah among them.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 4]

One senior, independent American analyst identifies three major hurdles to overcome in order for the U.S.-India partnership to become truly substantive and lasting. First among these is India’s own progress in economic expansion through opening its economy to greater competition and foreign investment. Second, New Delhi is criticized for failing as yet to articulate a coherent foreign policy vision, especially on global issues of interest to the United States. Such an overarching strategy could be considered necessary for India to break free of many of the constraints presented by its geography and unsettled region. Finally, U.S. policy makers are encouraged to maintain sensitivity to Indian concerns on issues upon which Washington and New Delhi have clear differences, including U.S. engagement with Pakistan, Afghanistan, and China, as well as climate change and arms control, among others. The successful management of looming disputes in these areas has been called essential to effective cooperation.

INDIA

Jason Kirk, Asst. Prof., Political Science, Elon University, 2010

[Asian Affairs: An American Review, volume 37, 2010, p. 161]

In a broader view, however, the U.S.-India strategic partnership has been durable enough to weather changes in leadership arising out of both countries' democratic processes, and it is likely to continue to mature as a result of shared interests revolving around stability, peace, and prosperity in Asia, in the broadest possible definition of the region—from the Persian Gulf to Central and South Asia and the Indian Ocean region, and on to Southeast and Northeast Asia—even if India's influence at both extremes of this vast region remains rather limited. In particular, both countries share interests in stable world energy markets, in maritime security, counterterrorism, and other issue areas, and the burgeoning intelligence cooperation and steady pace of joint military exercises are tangible expressions of their broadly convergent views in the security sphere. The rise of China, perhaps the most important structural process of the early twenty-first century, also draws India and the United States together, as neither desires the entrenchment of Chinese hegemony in Asia, and both are wary of Beijing's aggressive economic and resource diplomacy in Asia, Africa, and elsewhere.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 6]

Yet some observers argue that the New Delhi government acts too timidly on the global stage, and the country's regional and domestic difficulties continue to hinder its ability to exert influence on the greater geopolitical stage. Many observers view India's foreign policy establishment—its foreign service, think-tanks, public universities, and relevant media—as being too small and/or too poorly developed for India to achieve true great power status in the foreseeable future. By one substantive account, without a major modernizing and revamping of this establishment, “India's worldview will [continue to] be parochial, reactive, and increasingly dominated by business rather than by strategic or political concerns.”

INDIA

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 28]

However, many analysts and business leaders, along with U.S. government officials, point to excessive regulatory and bureaucratic structures as a hindrance to the realization of India's full economic potential. Although India has made major progress in reducing corruption, it is still perceived as a major obstacle for the economy. The high cost of capital (rooted in large government budget deficits) and an abysmal infrastructure also draw negative appraisals as obstacles to growth.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 47]

Inadequate intellectual property rights protection is a long-standing issue between the United States and India. India appears on the U.S. Special 301 "Priority Watch List" for 2010 for failing to provide an adequate level of IPR protection or enforcement, or market access for persons relying on intellectual property protection. While the United States acknowledges India's progress on enforcement, it maintains that piracy and counterfeiting, including the counterfeiting of pharmaceuticals, remains widespread. India remains critical of U.S. efforts to pressure developing nations, including India, to adopt laws and regulations governing pharmaceuticals that are overly supportive of the major pharmaceutical companies and could potentially deny poorer nations of access to important medicines.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 56]

International human rights groups echo many of these findings. According to the *2010 World Report* of Human Rights Watch, "The [Indian] government's failure to protect minorities and other vulnerable groups engenders justified grievances and contributes to militant activity around the country." Constraints on religious freedom are another matter of concern; India's Muslim and Christian minorities continue to face sometimes violent persecution. Moreover, rampant caste-based discrimination is identified as a major societal problem, as are female infanticide and feticide. "Honor killings" of couples accused of violating Hindu marriage traditions may be on the rise.

INDIA

Evan Feigenbaum, Senior Fellow, Council on Foreign Relations, March/April 2010

[www.foreignaffairs.com/articles/65995/evan-a-feigenbaum/indias-rise-americas-interest]

Still, a number of hurdles remain before the United States and India can build a more enduring, strategic, and global partnership. First, India needs to bolster its emergence as a major power -- not least by sustaining high rates of economic growth. This will require India to further open its economy to competition and investment and advance ongoing reforms aimed at relieving inequality, expanding the middle class, and strengthening the country's physical infrastructure.

Second, India's emerging global influence will be sustainable only if India develops new doctrines and diplomatic capacities. The country has moved beyond nonalignment, to be sure, but has not yet coalesced around a new foreign policy vision. And although New Delhi may ultimately settle on a strategy that is conducive to a more open and global partnership with the United States, that is not assured. Third, the United States needs to be sensitive to Indian concerns in a number of areas that directly affect Indian interests. Differences loom between Washington and New Delhi regarding U.S. policy toward Afghanistan and Pakistan, China, climate change, and other issues. Managing such disputes -- by reaching agreement or at least by mitigating the effects of disagreement -- will be vital to effective cooperation.

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 57]

The State Department's latest annual report on trafficking in persons (issued June 2010) said, "India is a source, destination, and transit country for men, women, and children subjected to trafficking in persons, specifically forced labor and commercial sexual exploitation." It placed India on the "Tier 2 Watch List" for the seventh consecutive year because "the Indian government has not demonstrated sufficient progress in its law enforcement, protection, or prevention efforts to address labor trafficking, particularly bonded labor." Moreover, State criticized the India's federal and state governments for their "weak" efforts to implement and enforce anti-trafficking laws."

INDIA

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 55-56]

Many of India's more than one billion citizens suffer from oftentimes serious human rights abuses. Some analysts are concerned that, as Washington pursues a new "strategic partnership" with New Delhi, U.S. government attention to such abuses has waned. According to the State Department's most recent *Country Report on Human Rights Practices* (released March 2010), the Indian government "generally respected the rights of its citizens and made progress in reducing incidents of communal violence, expanding efforts against human trafficking, and reducing the exploitation of indentured, bonded, and child workers, but serious problems remained": Major problems included reported extrajudicial killings of persons in custody, disappearances, and torture and rape by police and other security forces. Investigations into individual abuses and legal punishment for perpetrators occurred, but for many abuses, a lack of accountability created an atmosphere of impunity. Poor prison conditions and lengthy detentions were significant problems. Some officials used antiterrorism legislation to justify excessive use of force. Corruption existed at all levels of government and police. While there were no large-scale attacks against minorities during the year, there were reports of delays in obtaining legal redress for past incidents. Some states promulgated laws restricting religious conversion. Violence associated with caste-based discrimination occurred. Domestic violence, child marriage, dowry-related deaths, honor crimes, and female feticide remained serious problems.

Deepa Ollapally, Professor, International Affairs, GWU, 2011

[The Washington Quarterly, volume 34, number 2, p. 146]

India's capacity for autonomous action in foreign policy is of fundamental importance to nationalists. This has taken on different policy manifestations at different times, including as "non-alignment" during the Cold War and more recently as "strategic autonomy." As Foreign Minister S.M. Krishna noted in a September 2009 speech, "Our main objective is ensuring a conducive international environment for consolidating our strategic autonomy." Nationalists tend to see New Delhi as being under constant pressure to submit India's interests to those of other major powers. This usually means from the United States, though at different times it has also meant from the West in general or China. Nationalists see foreign policy as an arena of conflict, with major

powers constantly seeking to subvert India's pursuit of its national interest to force New Delhi to follow policies that are in the interests of other powers.

Deepa Ollapally, Professor, International Affairs, GWU, 2011

[The Washington Quarterly, volume 34, number 2, p. 152]

India's policy toward the United States has become increasingly contested.

Pragmatists want closer ties they see the United States as being useful to India right now while nationalists remain suspicious that the United States seeks to contain India. For the nationalists, "there is a fundamental contradiction between U.S. and Indian long-term foreign policy objectives" because while "the U.S. wants the current so-called unipolar world order to continue, India believes that the world should be multipolar, with India itself as one of the poles."

Jason Kirk, Asst. Prof., Political Science, Elon University, 2010

[Asian Affairs: An American Review, volume 37, 2010, p. 150]

As Indian journalist Manoj Joshi explained to Time magazine in 2008, "For decades India has chafed at the world's tendency to lock India into a bipolar South Asian framework with Pakistan."⁷ The old "India-Pakistan" template had never been so irritating to India as in 1998, when Washington applied economic sanctions against both countries following their tit-for-tat nuclear tests.⁸ But that tense period ultimately had provided the impetus for a sustained diplomatic dialogue between U.S. Deputy Secretary of State Strobe Talbott and Indian External Affairs Minister Jaswant Singh, which proved a key turning point.⁹ The Bush foreign policy, which took shape after September 11, 2001, built on the Clinton-era advances even as it pressed Pakistan into a resumption of its Cold War alliance with the United States. The U.S.-India nuclear agreement was the highest expression yet of the "dehyphenation," as the Bush administration plainly stated that there would be no equivalent arrangement for Pakistan. Why, then, was there an Indian tendency to obsess over U.S. regional policy as a barometer of U.S.-India relations throughout Obama's first year? Essentially, this followed from Obama's own indications that South Asia would be at the very center of his national security policy. During the campaign, Obama had consistently argued that the United States' real frontline security challenges lay at the border region of Afghanistan and Pakistan; the Iraq war had been a distraction from this necessary and just struggle.

SOLVENCY

Adam Hadhazy, Scientific American April 16, 2009

[<http://www.scientificamerican.com/article.cfm?id=will-space-based-solar-power-finally-see-the-light-of-day&page=2>]

Many other obstacles stand in the way of commercially viable SBSP. A crucial regulatory matter: getting clearance from the U.N.'s International Telecommunication Union (ITU) that allocates use of the electromagnetic spectrum. SBSP's ideal microwave frequencies are already used by wireless systems such as Bluetooth, according to Smith. "Even if we could narrow the beam [from space] down and ensure complete signal integrity in the broadcast wave area," the ITU may deem the possible interference from SBSP as too disruptive to some extant technologies, he says. Some think that SBSP efforts should zero in on lasers rather than microwave transmission to avoid this and other confounding issues. "I think an approach using microwaves is doomed," N.Y.U.'s Hoffert says. Given the necessary size of microwave transmitters and their solar arrays, "it's a huge capital investment before you get one kilowatt of power," he adds. A higher efficiency, laser-based approach would require far smaller satellites and transmitters, perhaps requiring just one launch, Hoffert notes. One proposal involves capturing sunlight in space via photovoltaics, converting the energy into a visible or an infrared laser and then beaming this concentrated light onto existing solar panel arrays in the desert around the clock. Weather can disrupt laser transmissions, however, and Hoffert says other technical hurdles remain for both microwave and laser light approaches.

International Union of Radio Science, September 2006

[White Paper on Solar Power Satellite Systems, <http://ursiweb.intec.ugent.be/> p. 3]

Microwave power transmission is an important technology for SPS systems, since its overall efficiency is one of the critical factors that determines the interest in such systems from an economic standpoint. Ideally, almost all energy transmitted from the geostationary orbit should be collected by the rectifying antennas on the ground. In that respect, an overall dc-to-microwave-to-dc power efficiency in excess of 50% is needed (see Section 2.4), which requires the development of suitable microwave power devices. Accurate control of the antenna beam is essential, and measurement and calibration are important issues. Even if these technologies can be successfully developed, there remains the challenging task of combining the outputs of thousands or even millions of elements to form a focused beam. Proper safety measures have to

be developed to be certain that the transmitted microwave beam remains within the rectenna's area. Maintenance of the space systems may be very difficult and expensive in the harsh environment of a geostationary orbit. Ensuring the long-term stability of huge structures in space in the presence of solar radiation pressure and tidal forces is an unsolved problem.

International Union of Radio Science, September 2006

[White Paper on Solar Power Satellite Systems, <http://ursiweb.intec.ugent.be/> p. 4]

There are SPS-related issues that are highly controversial. Although several space agencies have pursued SPS studies and research (see the next section), very critical papers have been published that concluded that an SPS is impractical and will never go into operation (e.g., [2]). A more pro-SPS reply to this criticism [3] was based on the economic issues raised in [2]. Among the controversial issues is the question of the space engineering and technology that are necessary for the launch, and the assembly and the maintenance of an SPS system, all of which to a great extent are not yet possible. Other heavily debated issues are related to economic justifications (in comparison with other power sources), are related to the question of whether an SPS can provide a base-load "clean" power system on a global scale, are related to military applications, and are related to public acceptance.

Joseph Rouge, Acting Director, National Security Space Office, October 10, 2007

[SPACE-BASED SOLAR POWER AS AN OPPORTUNITY FOR STRATEGY SECURITY, p. 25]

Application of the International Traffic Arms Regulations (ITAR) may constitute a major barrier to effective partnerships in SBSP and negatively impact national security. Right now ITAR greatly restricts and complicates all space-related business, as it treats all launch and satellite technologies as arms. This has had the effect of causing America's competitors to develop ITAR-free products, and had a negative impact on our domestic space industries, which can no longer compete on level ground. Many participants in the feasibility study were very vocal that including satellite and launch technology in ITAR has had a counterproductive and detrimental effect on the U.S.'s national security and competitiveness—losing control and market share, and closing our eyes and ears to the innovations of the competition while selling ourselves on a national illusion of unassailable space superiority. Effective collaboration, even with allies on something of this level, could not take place effectively without some special consideration or modification.

SOLVENCY

Joseph Rouge, Acting Director, National Security Space Office, October 10, 2007

[SPACE-BASED SOLAR POWER AS AN OPPORTUNITY FOR STRATEGY SECURITY, p. 25]

The SBSP Study Group found that although there was universal agreement that international cooperation was highly desirable and necessary, there was significant disagreement on what form the cooperation should take. There are multiple values to be balanced with respect to international cooperation. The various goods to be optimized include efficiency, speed of development, cost savings, existing alliances, new partnerships, general goodwill, American jobs and business opportunities, cooperation, safety & assurance, commercial autonomy, and freedom of action. Adding more and new partners may increase goodwill, but add additional layers of approval and slow development. Starting with established alliances and shared values fulfills some expectations and violates others. The spectrum of participation ranges from beginning with a demarche before the UN General Assembly, to privately approaching America's closest allies, to arranging multi-national corporate conferences. Many participants felt the International Space Station (ISS) overvalued cooperation for cooperation's sake, and took mutual dependency too far.

Adam Hadhazy, Scientific American April 16, 2009

[<http://www.scientificamerican.com/article.cfm?id=will-space-based-solar-power-finally-see-the-light-of-day&page=2>]

Dangers and engineering challenges abound, however: Space junk like that which recently threatened the International Space Station, for example, could collide with the skeletal space solar satellite during assembly. And keeping the satellite's huge beam and the distant rectenna reliably synced up also stands as an unsolved technical issue, says CSP's Little.

SOLVENCY

International Union of Radio Science, September 2006

[White Paper on Solar Power Satellite Systems, <http://ursiweb.intec.ugent.be/> p. 9]

Other key issues of SPS technology are lifetime and maintenance. The limited lifetime of solar cells has already been mentioned, but a long-term radiation hazard also exists for any solid-state device on the SPS, such as dc-to microwave converters, for instance. In addition, there is the problem of the long-term mechanical stability of the very large structures of the solar panels and the microwave transmitting antenna. The long-term influence of tidal effects and radiation pressure have to be examined. In principle, both effects can deform the structure as well as change its orientation. In particular, the radiation pressure exerts a force that changes continuously in direction with respect to the line joining the satellite and the rectenna. This may pose serious problems concerning the control of the orbit and the orientation of the RF beam.

DA LINKS

Christopher Twomey, Asst Prof National Security, Naval Postgraduate School, 2011

[Asia Policy, Number 11, January 2011 p. 77-8]

At the same time, the challenges posed by an increasingly multilateral and complex Asia are so high that it is imperative for the United States both to be restrained in its goals in the region and to recognize the paramount. Illustrating this “haves” perspective vividly is Michael Rühle. Analysts from the Non-Aligned Movement, for instance, would express quite a different view. asia policy importance of nonproliferation strategies, whether they come in multilateral or unilateral guises. It is important to note that the proliferation of technology—ranging from nuclear energy to more conventional weapons systems—lies at the heart of this deterioration of stability in the region, both in general and in the nuclear arena. Policymakers should utilize a broad set of tools and give high-level attention to what has at times been regarded as mundane regulatory structures in the sphere of export controls.

Christopher Twomey, Asst Prof National Security, Naval Postgraduate School, 2011

[Asia Policy, Number 11, January 2011 p. 60]

India and Pakistan are both improving their delivery systems, in the former case against multiple targets. For some time India has possessed various short-range systems in the Prithvi missile family that are capable of hitting Pakistani targets. More recently, New Delhi has successfully tested the longer-range Agni-III, capable of hitting Beijing and Shanghai, three times over the past three years, following an earlier failure in 2006. This missile system is a mobile, solid-fueled system, one that had long been under development. In August 2010, the Indian minister of defense A.K. Antony stated that the “Agni-III with a range of 3000 km is ready for induction” into the Indian military. Pakistan’s Shaheen-II, capable of reaching all of India as well as much of the Middle East, completed its first successful test launch in 2004. Its shorter-range predecessor, the Shaheen-I, is undergoing guidance improvements to increase its accuracy and was most recently tested in 2010.

DA Links

Joseph Rouge, Acting Director, National Security Space Office, October 10, 2007
[SPACE-BASED SOLAR POWER AS AN OPPORTUNITY FOR STRATEGY SECURITY, p. 3]

For the DoD specifically, beamed energy from space in quantities greater than 5 MWe has the potential to be a disruptive game changer on the battlefield. SBSP and its enabling wireless power transmission technology could facilitate extremely flexible “energy on demand” for combat units and installations across an entire theater, while significantly reducing dependence on vulnerable over-land fuel deliveries. SBSP could also enable entirely new force structures and capabilities such as ultra long-endurance airborne or terrestrial surveillance or combat systems to include the individual soldier himself.

CHINA DA LINKS

William John Cox, public interest lawyer, April 30, 2011

[Truthout, <http://www.truthout.org/race-space-solar-energy/1304186557>]

China is currently investing \$35 billion of its hard-currency reserves in the development of energy-efficient green technology and has become the world's leading producer of solar panels. In addition, China has aggressively moved into space by orbiting astronauts and by demonstrating a capability to destroy the satellites of other nations.

William John Cox, public interest lawyer, April 30, 2011

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SPACE DEBRIS DA LINKS

Lynda Williams, Physics Instructor, Santa Rosa Junior College, Spring 2010

[Peace Review: A Journal of Social Justice vol 22, no. 1 p1-4]

Since the space race began 50 years ago with the launch of Sputnik, the space environment around Earth has become overcrowded with satellites and space debris, so much so, that circumterrestrial space has become a dangerous place with an increasing risk of collision and destruction. Thousands of pieces of space junk created from launches orbit the Earth in the same orbit as satellites, putting them at risk of collision. Every time a rocket is launched, debris from the rocket stages are put into orbital space.

JAPAN COUNTERPLAN

PK Kerr, Alan Kronstadt, Analysts, Congressional Research Service October 27, 2010

[India-U.S. Relations, October 27, 2010, p. 24]

India's relations with Japan only began to blossom in the current decade after being significantly undermined by India's 1998 nuclear weapons tests. Today, leaders from both countries acknowledge numerous common values and interests. They are engaging a "strategic dialogue" formally launched in 2007, when the Indian foreign minister spoke of Japan as a "natural partner in the quest to create an arc of advantage and prosperity" in Asia. He also emphasized India's desire for economic integration in Asia and cooperative efforts to secure vital sea lanes, especially in the Indian Ocean. Japan's support for the latter initiative has included plans for unprecedented joint naval exercises. New Delhi and Tokyo also share an interest in seeing membership of the U.N. Security Council expanded; both governments aspire to permanent seats.

William John Cox, public interest lawyer, April 30, 2011

[Truthout, <http://www.truthout.org/race-space-solar-energy/1304186557>]

Over the past two years, Japan has committed \$21 billion to secure space-solar energy. By 2030, the Japan Aerospace Exploration Agency plans to "put into geostationary orbit a solar-power generator that will transmit one gigawatt of energy to Earth, equivalent to the output of a large nuclear power plant." Japanese officials estimate that, ultimately, they will be able to deliver electricity at a cost of \$0.09 per kilowatt-hour, which will be competitive with all other sources.

Adam Hadhazy, Scientific American April 16, 2009

[<http://www.scientificamerican.com/article.cfm?id=will-space-based-solar-power-finally-see-the-light-of-day&page=2>]

The Japan Aerospace Exploration Agency (JAXA) is covering all bases as Scientific American magazine reported last year. JAXA hopes to have a one-gigawatt satellite in geostationary orbit around 2030 that may use either microwaves or lasers to send its energy back home.

Japan Counterplan

Agence France-Presse April 10, 2011

[<http://www.rawstory.com/rs/2011/04/10/asias-star-burns-ever-brighter-in-space/>]

The Japanese government's Strategic Headquarters for Space Policy says a successful space programme does much to lift Japan's profile. "Our country's space technology, its achievements and human resources are truly diplomatic resources that boost our influence and position in the international community," it said in a policy report. "We will promote them as a source of our soft power."

JAPAN COUNTERPLAN

Electric Vehicle News November 7, 2009

[<http://electric-vehicles-cars-bikes.blogspot.com/2009/11/japanese-space-agency-aims-for-space.html>]

This Space Power idea is getting a real work out lately. Japan's space agency JAXA has announced it wants to collect solar power in space and zap it down to Earth, using laser beams or microwaves by 2030. The Japanese government has just picked a group of companies and a team of researchers tasked with turning the ambitious, multi-billion-dollar dream of unlimited clean energy into reality in coming decades. With few energy resources of its own and heavily reliant on oil imports, Japan has long been a leader in solar and other renewable energies and this year set ambitious greenhouse gas reduction targets. But Japan's boldest plan to date is the Space Solar Power System (SSPS), in which arrays of photovoltaic panels several square miles in size would hover in geostationary orbit outside the Earth's atmosphere.

Caroline Griesel, Aspen Environmental News Examiner, November 10, 2009

[<http://www.examiner.com/environmental-news-in-denver/japan-plans-execution-of-space-based-solar-power-system-by-2030>]

Japan's Aerospace Exploration Agency (JAXA) is moving forward with plans to harvest solar energy from space to convert to electricity for earthly use. First introduced by American scientist Peter Glaser in 1968, the system consists of satellites equipped with mile-long platforms of solar cells that collect solar light. Then microwaves are used to beam the energy to a specialized antennae that turn it into electricity. The system Japan plans to test by 2030 will produce about a gigawatt, or the same amount as a medium sized nuclear power plant. The power from the Space Solar Power System (SSPS) will cost Japanese consumers a sixth of what they pay for power now.

Caroline Griesel, Aspen Environmental News Examiner, November 10, 2009

[<http://www.examiner.com/environmental-news-in-denver/japan-plans-execution-of-space-based-solar-power-system-by-2030>]

Charles Miller of the Space Frontier Foundation told CNN, "The country that takes the lead on space solar power will be the energy-exporting country for the entire planet for the next few hundred years," and right now Japan is winning the race.

JAPAN COUNTERPLAN

David Cyranoski, Nature Magazine, November 25, 2009

[<http://www.nature.com/news/2009/091125/full/462398b.html>]

Japanese scientists are once again eyeing an off-world approach to alternative energy — collecting solar energy from satellites in orbit and beaming it down to Earth. A space-based solar-power satellite — which could gather energy without having to worry about clouds or night-time — has been a dream for decades in both the United States and Japan. But the costs of developing it has meant that support has waxed and waned over the years. Now, however, Japan has a new sense of mission. In June, it released a national space plan calling for a programme to "lead the world in space-based solar power". And earlier this month, scientists, engineers and policy-makers met at Kyoto University to lay out development plans. The government's commitment "is definitely a milestone and has given tremendous excitement to solar-power satellite researchers", says Hiroshi Matsumoto, a radio scientist and president of Kyoto University.

David Cyranoski, Nature Magazine, November 25, 2009

[<http://www.nature.com/news/2009/091125/full/462398b.html>]

Japan has been investigating solar-power satellites since the 1980s. In 1983 and again in 1993, Matsumoto, working with Kobe University's Nobuyuki Kaya, launched rockets into the ionosphere to investigate what happens to microwaves as they travel through space. In March this year, a group from Kyoto University became the first to use microwaves to send power from the air to the ground when they charged a mobile phone with microwaves transmitted from a blimp-like airship hovering some 30 metres above the ground.

David Cyranoski, Nature Magazine, November 25, 2009

[<http://www.nature.com/news/2009/091125/full/462398b.html>]

Japan looks likely to lead the way, as interest in the United States has waned, says John Mankins, who led the space solar-power programme at NASA. Most efforts in the United States are now in private companies or non-profit organizations. In April, Solaren, a company based in Manhattan Beach, California, signed a contract with San Francisco-based Pacific Gas and Electric to produce 200 megawatts of energy from a solar-power satellite starting in 2016. But Mankins, who co-founded and works at Managed Energy Technologies in Ashburn, Virginia, calls that goal "extremely challenging". Japan's effort, he says, may lead the way: "The Japanese plan is quite well formulated."