

July 2015

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Recommended Citation

Cocca, Aldo Armando (1981) "Resolving the Energy War Through International Law and Solar Technology," *Akron Law Review*: Vol. 14 : Iss. 1 , Article 2.

Available at: <https://ideaexchange.uakron.edu/akronlawreview/vol14/iss1/2>

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RESOLVING THE ENERGY WAR THROUGH INTERNATIONAL LAW AND SOLAR TECHNOLOGY*

AMBASSADOR ALDO ARMANDO COCCA**

I. LEGAL PROBLEMS ARISING FROM THE ENERGY WAR

A STRIKING FEATURE of the past decade has been a new form of war. This war, a controversy carried to extremes, apparently will not remain isolated. This conflict may be seen as a predecessor of future battles for survival, for instance a "non-renewable resources war." Such wars are not concerned with territorial boundaries; they have a much wider economic effect. They involve the entire civilized community.

The energy conflict presently has gone beyond the crisis stage. Not only is a forthcoming peace beyond the horizon, the war itself is becoming increasingly aggressive. The fact that the weapon is an exhaustible resource bound to disappear within twenty years explains the resolve of oil-producing countries to achieve economic superiority in only one generation.

How have most countries hit by the energy war reacted thus far? They have held consultations both international and regional; they have joined international organizations to protect their interests and needs; they have built up programs and counter-attacks at the domestic and international level, and they have resorted to a dangerous proliferation of nuclear reactors. These reactors, thus far peaceful, are among the solutions born of anxiety.

The industrialized countries have lacked the foresight to face up to the fast action of the oil-producing countries. The import of this economic defeat has been taken too lightly. Most damaging has been the absence of an international strategy to overcome this serious controversy considering the inter-dependence of the world today. Over and above any interim measures, a final solution ought to be born in mind. Briefly, grandeur of action has been lacking.

In a well-known study by physicist Amory Lovins, the energy problem is viewed from two standpoints, "hard" and "soft."¹ The "hard" standpoint involves the establishment of energy systems on a large scale, including breeder reactors, nuclear fusion devices (so far undesigned), and enormous space stations to collect electricity from the Sun and reflect it to Earth

*This paper is based upon an address delivered by the author to the Inter-American Symposium on the Law of Outer Space held in Miami, Florida, April 23-24, 1980.

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¹ Loving, *Energy Strategy: The Road Not Taken*, 55 FOREIGN AFF. 65 (1976).

in the form of microwaves.² The "soft" approach begins with the storing of fuels in order to gain time without resorting to more nuclear reactors while relying on renewable benign sources of energy such as solar rays and other Sun-related sources for the future.³ This "soft" approach is the antithesis of the "hard" approach presently being followed in the energy war.

Lovins' reflections, which have been the nucleus of extensive debate regarding the United States energy program, are quite correct. The only flaw in his bifurcated conception, mentally at least, is the line drawn between two modes utilizing the same energy source, the Sun. Solar energy collected terrestrially falls within the "soft" class while the same energy collected by way of space technology is included in the "hard" class. Perhaps what was worrying him as a physicist was the radiation of electricity to the Earth by means of microwaves. I voiced concern with this problem in a speech delivered to the United Nations General Assembly in 1976.⁴ On that occasion attention was drawn to the necessity of studying and determining the effects microwaves may have on aircraft and birds. Our lack of experience with these technological approaches should be considered in evaluating the environmental problems involved.

When referring to strategies for confronting the consequences of the energy war an apparent observation is the absence of Law. Lawyers are duty bound to take upon themselves an appropriate role against this break-up of international order. Their role extends to its political as well as economic aspects. Fortunately jurists deserve no reproof, for the moment at least. The United Nations Committee on the Peaceful Uses of Outer Space (COPUOS), however, is the only forum thus far that has proposed any definitive legal solutions.

Repelling one form of aggression with another, such as a food war in retaliation to the energy war, is not a solution or even the starting point for a solution. Only harmony and understanding, not confrontation, can ensure stable situations. This goal requires the restoration of a broken order, hence Law becomes necessary. Law, with the outstanding progress it has attained in the last fifteen years as a result of the peaceful exploration and use of outer space, is the measure of peace and international security. Such achievements imply a victory of common sense over the domineering ambitions of nation States.⁵ A similar victory can be had in the energy war for it is, above all, a legal problem.

² *Id.*

³ *Id.*

⁴ U.N. Doc. A/AC.105/PV.166 at 28-30 (1976).

⁵ On December 5, 1979, the United Nations General Assembly adopted Resolution 34/68 whereby the Secretary-General is requested to open the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies for signature as soon as possible. The

II. ENERGY GENERATION SYSTEMS BASED IN OUTER SPACE

The outer space conversion of solar energy into electricity for transmission to earth has been studied jointly by the United States Department of Energy (DOE) and the National Aeronautics and Space Administration (NASA).⁶ The evaluation was carried out through a joint program comprised of four functional spheres of study: (1) definition of the system; (2) evaluation of environmental, sanitary, and security aspects; (3) socio-economic questions; and (4) comparative evaluation of other energy systems.⁷

The Solar Satellite Power System (SSPS) utilizes a flat photovolt solar battery and a microwave aerial to radiate energy to a rectifying aerial on Earth and would produce 5,000 megawatts of electric power.⁸ The SSPS would be assembled in geostationary orbit with materials brought from Earth by means of a space shuttle.⁹ The materials would be taken from the low terrestrial orbit to the geostationary orbit by means of a transfer vehicle powered by an electric engine fueled by the photovoltaic solar cells.¹⁰ Recent studies have confirmed the feasibility of this project from a technical standpoint. The most important characteristics of this plan are a thirty-year life-span¹¹ and an 83% efficiency in transmission.¹² It should be noted that saturation problems resulting from the use of geostationary orbits have technically been solved.¹³ The United States is working to avoid such saturation by eliminating inactive satellites.¹⁴

Europe too, has entertained the possibility of using space technology

said resolution expresses the hope that the agreement will gain wide acceptance.

The first draft of that agreement was presented by myself, as a permanent representative, to the United Nations where for nine years the Argentine delegation has elaborated, supported, and enlarged it with subsequent proposals. Our draft on the Principles Governing the Activities of States in the Use of the Natural Resources of the Moon and Other Celestial Bodies was, in fact, the first text to use the expression "common heritage of mankind" which has now achieved universal acceptance. See U.N. Doc. A/AC.150/C.2/7.71 (1970).

By virtue of the principle of distributive justice learned from the classics, Space Law bears the distinction of having incorporated the principle of the "common heritage of mankind" into the universal positive law.

⁶ *Solar Power Satellite Research, Development, and Demonstration Program Act of 1978: Hearings on H.R. 12505 Before the Subcomm. on Energy Research and Development of the Comm. on Energy and Natural Resources, 95th Cong., 2d Sess. 26, at 29 (1978) (statement of Floyd K. Haskell) [hereinafter cited as *Hearings on SSPS*].*

⁷ *Id.*

⁸ U.N. Doc. A/AC.105/249 (1979).

⁹ *Id.*

¹⁰ *Id.*

¹¹ *Id.*

¹² "Microwave power rectification was shown to be feasible during tests in 1975 at Goldstone, California; microwaves were converted to electricity with an efficiency of 83 percent." *Hearings on SSPS, supra* note 6, at 132.

¹³ The United States recently eliminated an ATS-6 satellite from its geostationary orbit. U.N. Doc. A/AC.105/252/Add .1 at 3 (1980).

in the production of energy.¹⁵ Three major possibilities have emerged. They are: (1) the establishment of solar energy space stations; (2) the development of a risk-free transport system to launch radioactive debris towards the Sun; and (3) the construction of huge laboratories and manufacturing plants in space with a view to developing new technologies and industrial processes to enhance major technological discoveries in the field of energy.¹⁶

The most interesting solar-electric device is the photovoltaic cell, the main energy source of international communication satellites. These cells generate electricity directly from sunlight.¹⁷ They have no moving parts, do not work on fuel, and do not contaminate.¹⁸ They are long-lasting, require little upkeep and normally are made of silicium, the second most abundant element in the Earth's crust.¹⁹

Another energy option envisioned is the possibility of establishing solar power plants on the Moon.²⁰ N.N. Semenov, the Soviet Nobel Prize winner, suggests that the Moon could serve the energy requirements of the Earth.²¹ He presents the possibility of covering the surface of the Moon with highly efficient semi-conducting photo-elements to convert solar energy into electricity which would then be transmitted to Earth.²²

Another plan that should not be overlooked is the establishment of "space laboratory plants" which would circulate precisely through the radiation belt.²³ This belt, much feared by astronauts, is nothing more than an enormous packet of energy.²⁴ The space plants would convert the energy of the elementary particles stored in the Van Allen Belt for use on Earth.²⁵

In addition to energy obtained from hydrogen (which wherever captured causes international legal problems) there are many other sources in space.²⁶ In August of 1975, the British scientific satellite Ariel-5 was able to capture a cataclysm, known as "A0621 minus 0," generating energy 35,000 times more powerful than the Sun.²⁷ In a report presented by the Committee on Space Research of the International Council of Scientific Unions (COSPAR) to the United Nations in connection with the progress

¹⁵ U.N. Doc. A/AC.105/249 (1979).

¹⁶ *Id.*

¹⁷ Hayes, *La Energia en el Mundo en Desarrollo*, in *DIALOGO SOBRE LA ENERGIA* at 32.

¹⁸ *Id.*

¹⁹ *Id.*

²⁰ U.N. Doc. A/AC.105/L.91 (1976).

²¹ *Id.*

²² *Id.*

²³ Rodoreda, *La Energia en el Futuro*, in *LA ENERGIA Y SU TRANSFORMACION: PRESENTE Y FUTURA* 402 (1974).

²⁴ *Id.*

²⁵ *Id.*

²⁶ CLEAR ENERGY RESEARCH INSTITUTE, *HYDROGEN ENERGY* (1974).

²⁷ *Id.* <https://ideaexchange.uakron.edu/akronlawreview/vol14/iss1/2>

²⁷ Cocca, *El Sol ante el Derecho Internacional*, 35 *TEMIS* 36, at 329.

in space from 1978 to 1979, it was announced that the first of a series of astronomic observations for High Radiation Energy, HEAO-1, was launched on August 12, 1977 and re-entered the atmosphere on March 14, 1979,²⁸ the anniversary of Einstein's birth. This space vehicle allowed the following discoveries:

- (1) a new kind of soft X-ray emission;
- (2) an extremely precise measurement of the spectrum and the isotropy of cosmic X-rays in a given beacon;
- (3) more than one hundred sources with optic or radio elements;
- (4) X-ray source measurements from many new extra-galactic sources;
- (5) the spectrum of many binary galactic sources and extra-galactic sources;
- (6) more fast emission sources of gamma rays with spectrum and temporal variation determined with precision;
- (7) more rapid emission sources of gamma rays explaining the origin of high energy gamma rays detected from the CO5-B satellite.²⁹

After such astonishing discoveries concerning high energy sources it is surprising mankind has not yet decided to look firmly at these enormous possibilities from outer space.

Two centuries before the Christian era, Archimedes destroyed the Roman fleet by using non-transformed, concentrated solar energy.³⁰ This is possibly the first sophisticated use of the Sun. Perhaps because it was used for belligerent purposes, mankind overlooked the implications such use would have for the development of civilization. In all ages energy has meant to man "a capacity to work." If since the time of Archimedes, human thinking had been directed towards the richest and most complete of our energy resources, civilization would have followed a very different path. Accordingly, we would not bear the anathema of today, to have exhausted our natural resources so that life appears less bearable day by day. The doubts concerning the survival of man on this planet are raised precisely because of the action of man. The present generation bears the responsibility of choosing the most appropriate remedies for overcoming such enormous and repetitive mistakes. Fortunately, the use of solar energy has drawn the attention of today's scientists. Much of today's work was initiated more than half a century ago by Hermann Oberth.³¹

²⁸ U.N. Doc. A/AC.105/248 at 27-28 (1979).

²⁹ *Id.*

³⁰ The story is that he "constructed an apparatus of convex mirrors that reflected the heat of the sun and set the Roman ships on fire. . . ." 1 ENCYCLOPAEDIA BRITANNICA 1087 (15th ed. 1980).

³¹ Ehrlicke, *Space Light: Space Industrial Enhancement of Solar Option*, 6 ACTA ASTRO-NAUTICA 1515 (1976).
Published by Idea Press, 1981, U Akron, 1981.

Space technology has taken man to the threshold of controlling the magnitude of sunlight reflected to Earth. By means of orbital reflectors very diminutive areas in relation to the Earth's surface may receive valuable amounts of controlled sunlight with an intensity ranging from that of a full Moon to the luminosity of the Sun.³² The concept of redirecting sunlight to Earth by means of "space mirrors" was advanced originally by Professor Oberth.³³ The use of a variety of sub-geosynchronous orbits, particularly sun-synchronous ones, could increase the versatility and flexibility of space light.³⁴ The concept of retroreflection allows the irradiation of areas during daytime, further enhancing solar effects.³⁵ To appreciate the functional versatility of space light, consider the five systems suggested by Krafft A. Ehrlicke:

- (1) *Lunetta*—A lunar type night illumination service which would increase agricultural production (thereby providing employment in rural areas) and provide urban night lighting and illumination for regions in distress.
- (2) *Biosoletta*—A system aimed at increasing bio-production.
- (3) *Argrisoletta*—A weather modification system aimed at management of rain and wind for optimum agriculture, desalination, and crop drying.
- (4) *Powersoletta*—A power-generating system utilizing photovoltaic conversion as well as chemical and thermal energy.
- (5) *Metsoletta*—A climate management system involving the manipulation of high and low pressure areas.³⁶

As may be seen, studies are being carried out and scientists are not discouraged. An effective political commitment, however, is presently lacking. The future ought to be looked at with optimism; the defeatist attitude shown by governments left behind. The same could be said of the industrial community which short-sightedly gives priority to annual balance sheets and ignores its future. A major reason for the industrial world's neglect of solar energy is that much of its capital is invested in buildings and equipment incompatible with such a source.

It is encouraging to note that some governments have increased their annual budgets for solar energy development. For example, the United States has increased its solar energy development funding from 5 to 300 million dollars per year.³⁷ For the United States to solve its energy prob-

³² *Id.*

³³ *Id.*

³⁴ *Id.*

³⁵ *Id.*

³⁶ *Id.*

³⁷ Kidder, *Tinkering with Sunshine*, ATLANTIC, October 1977, at 71.

lem, however, an effort comparable to its mobilization during World War II is required. If such a commitment were made its energy problem would be solved and it would win the energy war by the year 2000. Other governments hit by the energy war have done very little to meet the challenge. If they would spend an amount equivalent to the increase in oil prices over one year, they too would solve their problem.

III. SOLAR ENERGY AND SPACE COMMUNICATION

The electromagnetic relationship between the converted solar power transmitted to Earth and space communication transmitted to Earth is very close.³⁸ Thus the reflection of an expert, "If space technology is used for transmission of solar energy via radiowaves careful consideration must be given to the effect this action has on the existence of space communication."³⁹

Solar energy obtainable from orbit is from six to ten times superior to that received on the Earth's surface.⁴⁰ This energy converted to microwaves would be transmitted to Earth by means of power amplifiers and antennae. The microwave energy converted to electrical power would be available on Earth at all times except seventy-two minutes during equinoxes when the SSPS would be shadowed by the Earth.⁴¹ If the cost of producing electricity can be made competitive with terrestrial power sources the SSPS would become a vital alternate energy source for the later part of this century.

The SSPS would occupy a position in a geostationary orbit and use the radio frequency spectrum to transmit energy to Earth.⁴² This allocation of an orbit-spectrum resource to the SSPS would require a sacrifice of some space communication services. The introduction of the SSPS, causing an imbalance in the geostationary orbit and the frequency spectrum, would require a re-evaluation of the criteria for determining required band widths and angular separation.⁴³ Thermal and interference noise which plays a crucial role in informational transmissions would have no effect at all upon the SSPS.⁴⁴ However, the communication services would have to be protected against SSPS interference.⁴⁵ Additionally, SSPS objectives being totally divorced from space communication objectives, organizations must be established not only to maintain and operate these systems, but also to provide technical coordination and regulation with several SSPS systems. An SSPS orbital position and frequency spectrum would have to

³⁸ S. K. Sarkar, *Space Solar Power vs. Space Communications*, 6 ACTA ASTRONAUTICA 1753.

³⁹ *Id.*

⁴⁰ *Id.*

⁴¹ *Id.*

⁴² *Id.*

⁴³ *Id.*

⁴⁴ *Id.*

⁴⁵ *Id.*

be allocated to all countries requesting an assignment even though they may never use these resources for an SSPS. Thus, there would be a serious clash of interests, nationally and internationally, among various forces. The Earth stations would have to be located in secluded, remote areas to protect the populace from microwave radiation. The effect of thermal waste and excess radiation on our total environment, especially our climate, is not yet fully understood.⁴⁶ For these reasons it appears imperative that the research in terrestrial collection of solar energy be continued.⁴⁷

IV. SOLAR ENERGY VERSUS NUCLEAR ENERGY

The number of countries believing it wise to postpone measures entailing a commitment to a nuclear "plutonic" economy is increasing. This reluctance stems from concern over the new universal scope of nuclear proliferation.

The International Nuclear Fuel Cycle Evaluation (INFCE), an institution made up of sixty-six States and several international organizations, carried out a sixteen month study on nuclear combustible systems. The organization's objective is to provide procedures for reducing the production of plutonium and uranium, both of which are usable in the production of destructive nuclear devices. At its session of February 1980 held in Vienna, it was observed that proliferation is basically a political issue; if a country decides to develop nuclear weaponry it can be done without misusing civil energy-generating facilities.⁴⁸ Yet those installations may be subject to misuse and therefore it is imperative that special attention be given to the risks of proliferation when planning future fuel cycles. The United States recognized that such risks exist in every cycle. Unfortunately, no technical solution to eliminate the risks has been discovered.

The INFCE's Vienna Conference reached the conclusion that restrictions applied to reprocessing and separating plutonium need to be strengthened. Suggestions included tracking (with special attention drawn to the necessity of putting plutonium excesses under international control), the establishment of an international authority for the storage of plutonium, and other international agreements relative to the storage of used fuel. Also, new security measures, both technical and institutional with respect to inherent proliferation risks, have been called for. Nothing any more definitive has thus far been attained.

The United States Under-Secretary of Energy Resources, John M. Deutch, stated at a congressional hearing that international studies have not yet discovered any technical or economic formula to free the development of nuclear energy from risks and that there has never been much

⁴⁶ *Id.*

⁴⁷ *Id.*

hope of such a discovery.⁴⁹ All fuel cycles have a certain risk; INFCE has helped establish lawfulness, or strictly speaking, the necessity of including the issue of anti-proliferation, when considering fuel cycle strategy.

The belief that nuclear energy will provide a cheap, clean, and sure source of energy has vanished.⁵⁰ Accounting for this faded dream are numerous technical, economic, and moral problems not easily overcome. The possibility of a nuclear disaster is clear. Should a major calamity taking many lives occur, public concern would probably lead to the closing of all nuclear power facilities. In such a circumstance a nuclear-based economy would fall to pieces. The moral issue is whether our generation has a right to endanger the health and welfare of future generations with a view to satisfying, in a partial and limited manner, its own needs.

In addition to moral and political problems, the economic feasibility of nuclear energy is now under question.⁵¹ The United States has significantly reduced its projections concerning the level of its nuclear capacity for the year 2000.⁵² Other countries have assigned a minimal portion of their future energy needs to nuclear energy. Even this minimal capacity places them in a precarious position, however, considering the negative factors brought about by the installation of reactors.

A report sponsored by the Ford Foundation states that the time required to develop nuclear weaponry would be lessened considerably if nuclear materials were already present.⁵³ Any nation faced with a crisis would find it extremely difficult to resist the temptation to irreversibly commit themselves to the construction and possible use of nuclear weapons. External control of these materials would affect the sovereignty of States. Nuclear energy could lead to a possible violation of intangible principles of international law.

Some of the permanent and reiterated criticisms in connection with nuclear energy may be summarized as follows:

- (1) Reactors free radioactive material into the atmosphere;
- (2) Reactors provoke genetic danger;
- (3) Reactors involve a constant risk of nuclear explosion;
- (4) "Light water" reactors present the risk of melting down if the

⁴⁹ *Progress in U.S. And International Nonproliferation Efforts: Hearing Before the Subcomm. on International Security and Scientific Affairs and on International Economic Policy and Trade of the Comm. on Foreign Affairs, 96th Cong., 1st Sess. 2 (1979).*

⁵⁰ BROWN, *Energia: La Proxima Transicion*, in *DIALOGO SOBRE LA ENERGIA—ENERGIA SOLAR O ENERGIA NUCLEAR* 6-7.

⁵¹ Lellouche, *International Nuclear Politics*, 58 *FOREIGN AFF.* 336 (1979-80).

⁵² *Id.*

⁵³ THE NUCLEAR ENERGY POLICY STUDY GROUP, *NUCLEAR POWER ISSUES AND CHOICES* (1977).

water cooling the core stops flowing, this would mean freeing radioactive material;

- (5) Plutonium reactors offer greater risks of explosion;
- (6) The disposal of waste is an unsolved problem;
- (7) The keeping of debris on Earth, even underground, involves a risk which in and of itself would justify the abolition of nuclear energy;
- (8) Thermic contamination, due to cooling water being unloaded in lakes, rivers and oceans, creates catastrophic consequences to aquatic life;
- (9) Nuclear energy is not economical; its cost is much higher than other sources of energy production;
- (10) It is a constant poisoning danger for the human race; a few kilograms of plutonium could, if adequately distributed, exterminate the entire world population;
- (11) Should nuclear material fall into the hands of terrorists, inhabitants of a huge city or the leaders of an entire nation could be held hostage;
- (12) As a natural consequence, protection against nuclear terrorism would require great social sacrifices including the annihilation of personal freedom. The type of police state contemplated would exercise a supervision and repression which no human society would tolerate, however fearful it may be.

The liberation of the atom has allowed man to take a formidable step towards destruction, its initial objective. This process towards the destruction of nature begins with the destruction of man's morality.

We are miles ahead of the statement by William von Arx, former Massachusetts Institute of Technology professor and advisor to the National Academy of Sciences, that nuclear energy is yet another attempt to perpetuate the perilous transgression of the "limits of natural abundance."⁵⁴ According to von Arx the ideal is to "live according to the natural regime of the Sun."⁵⁵ For us it is only an ideal, an outlet from the world energy turmoil.

Apart from increasing the possibility of a world war, the development of nuclear reactors and the production of plutonium has raised several international legal problems. The safeguards provided by the International Atomic Energy Agency represent the limit of what is tolerated by State sovereignty. The Non-proliferation Treaty constantly is challenged as limiting the right of each country to promote the development of nuclear energy for peaceful purposes. While it is true that agreements concluded

⁵⁴ Kidder, *supra* note 37, at 82.

in totally free conditions are more effective than artificial control, the real evil lies in the use of nuclear energy itself, not in the countermeasures intended to make it lawful.

The improvement of mankind's welfare through the "solar revolution," as opposed to atomic destruction, is a political value worthy of consideration since it provides an energy source independent from the virtual or effective control of governments.

Fortunately, wisdom has prevailed among some circles, most notably those which have created solar cities, such as Shenandoah outside of Atlanta, Georgia and an Argentine village in the Andean province of Jujuy.

V. THE SOLUTIONS OF LAW

Academically, solutions have been offered since 1975 when the International Institute of Space Law held a colloquium in Lisbon. At the colloquium, as its name suggests, views were exchanged on various space law topics on the agenda. Except for very rare occasions throughout the Institute's twenty-three years of international meetings, no conclusions or recommendations have been adopted.

Since the 1975 colloquium many important studies prepared by well-known jurists have emerged. At the United Nations, the issue was brought up at the Legal Subcommittee of COPUOS in May of 1976 at Geneva, and in June of that year at the plenary session of COPUOS in New York by the Argentine delegation. The import of the issue was staunchly defended by the Argentine delegation in Geneva at the sub-committee's 1978 meeting.

Even before all this academic and political movement there existed seven legal conclusions which had been adopted on August 16, 1975. They resulted from discussions held that day and evening in La Falda, Cordoba, Argentina, following the Dialogue on the International Legal Aspects of the Use of Solar Energy. Cordoba University, which had organized that meeting of experts, held a seminar on the matter the following year. The seven Cordoba conclusions were promulgated by means of a working document I submitted at Geneva and at other international academic institutions.

After further consideration the seven conclusions were expanded into the "XII Commandments of Solar Energy" and were adopted by the IV Congress at the Asociacion Argentina de Derecho Internacional in Sante Fe in September of 1976 and the Meetings on Air and Space Law IX in El Calafate, Argentina in November of 1977. The principles agreed upon between 1975 and 1977 should serve as a starting point for more intense studies and a wider development of the concepts contained therein.

They read as follows:

- (I) The principle of the "common heritage of mankind" is applicable to the Sun and its natural resources, as well as to all other energy captured in outer space and transmitted to Earth.
- (II) Solar and related energies may not be subject to national appropriation by any means in outer space, including the Moon as well as other celestial bodies; they are for the common good of all mankind.
- (III) The use of solar and related energy is to be carried out in accordance with international law, including the Charter of the United Nations, the Outer Space Treaty, the international conventions on outer space, and any specialized agencies governing such a system.
- (IV) The geostationary orbit, in addition to being a limited natural resource, is a common heritage of mankind.
- (V) Actionable damage includes that caused by solar energy systems to the environment, telecommunications, air navigation or any other type of damage occurring on the Earth's surface, atmosphere, or sea, damaging persons, States, or international organizations.
- (VI) Any entity capturing and transmitting solar or related energies shall be held strictly liable for all damages occurring on Earth, in the atmosphere, in outer space, or on a celestial body.
- (VII) A system for the prevention of damage will be ensured in capturing and transmitting solar and related energies in and from outer space taking into consideration the effects such a system may have on the Earth's ecological balance.
- (VIII) International cooperation will be considered a necessary requisite for the lawfulness of all activities in the solar and related energy fields.
- (IX) The participation of all countries, as well as technical and other assistance to those lacking the means for exploiting solar and related energies must be assured, bearing in mind, particularly, the needs and interests of countries not yet completely developed.
- (X) All States shall be on an equal basis, whether or not within the solar belt.
- (XI) The use of solar and related energies unless exclusively for peaceful purposes is prohibited.
- (XII) The management of solar and related energies shall be carried out through international machinery with sufficient capacity to ensure its rational and equitable use, and a compulsory tribunal will be established for the settlement of disputes with an efficient means of enforcing its decisions.

Those taking part in the drafting of these conclusions urge that they

achieve the status of space law principles. These accords, far from covering the entire legal system necessary to govern solar energy, may be seen as an appropriate springboard for further elucidation bearing in mind later legal achievements.⁵⁶

During the Plenary Meeting of COPUOS held in New York in August of 1976 the conclusions were introduced by Argentina and incited a brilliant debate. The Argentine effort did not receive sufficient support, however. Thus the issue does not appear as a matter of priority on the COPUOS agenda, in spite of the fact that the consequences of the energy war are increasing daily.

All the strategies resorted to thus far are both weak and improper. The adequate forum to deal with the matter is the United Nations, for Space Law, within COPUOS, will undoubtedly provide appropriate solutions.

In neither the international nor the regional arena do we have the necessary support to carry the matter through. If the States most adversely affected by the energy war would act with the same resolve as they do in their determination to develop nuclear weaponry, the energy crises could be overcome. Regrettably, not until today has the world realized that economic peace, peace in its broadest sense, will not be achieved via a nuclear explosion as in 1945. We must instead turn to the "solar revolution" which will draw the peoples of this planet together rather than separate and destroy them.

⁵⁶ One such accomplishment is the Agreement Governing the Activities of States on the Moon and Other Celestial Bodies. The provisions of the Moon Agreement should be applicable to all celestial bodies of the solar system in conformance with the original Argentine doctrine. Its most important article provides that the Moon and its natural resources are the common heritage of mankind and that an international regime, capable of governing the Moon's natural resources be established.

