Chapter 10

ISES-ITALIA Section of the International Solar Energy Society (1964-1980)

by
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Abstract

This chapter reports the story of the Italian Section of ISES from 1964 to 1980. The first part outlines the history of solar energy in Italy from before the introduction of fossil fuels, to the 1950s, when the country launched its programs for the use of nuclear energy.
The second part describes:

- the creation of the Italian Section of ISES, in 1964, on the initiative of Vittorio Storelli, an industrial engineer interested in what he called "the science of the Sun;"
- the Section's activities before and after the 1973 oil shock, when growing interest in solar energy led to a rapid expansion of the Section's role;
- the legal adoption of the by-laws of the association in 1978 and—as major Italian energy companies and agencies (including ENI and ENEL) joined—its transformation at a time when large-scale solar projects were starting up in Italy (among them the 1 MW "Eurelios" solar thermoelectric plant built in the Sicilian town of Adrano, whose construction was completed in December of 1980).

10.1 History of Solar Energy in Italy, and Solar-related Activities Until the Early 1960s

10.1.1 Solar energy before fossil fuels

Many historical sources preserved in Italy testify to interest in solar energy from the earliest times. Archaeological evidence—unique in the world—is likewise invaluable. A good description of developments in solar architecture and technologies in antiquity and during the Renaissance is available in Butti and Perlin, *A Golden Thread* (1979).

Aside from the story of Archimedes (287-212 B.C.) using mirrors to burn the Roman ships besieging Syracuse, Italy is the land of Marcus Vitruvius (90-20 B.C.), author of *De Architectura*, one of the ancient texts most studied and cited in relation to solar architecture. The remains of Pompeii, Herculaneum, and the great baths in Rome and other cities of the empire provide evidence of the important developments produced by the Romans in this field. The Romans had learned to make transparent glass and use it to capture the sun's heat for their homes, baths, and greenhouses.

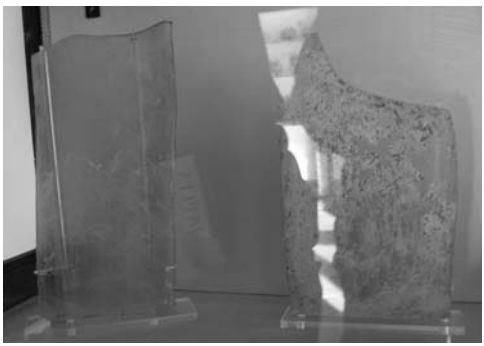

Fig. 1: Window panes from Pompei; first century A.D. (Photo Archaeological Museum, Naples)

For the first time in history, the Roman empire enacted laws regulating rights to sunlight and similar matters. In the first century A.D., for instance, the emperor Diocletian issued an edict setting prices for window glass (six or eight denarii per pound, depending on its quality).

The advances achieved by the Romans in the use of solar energy seem to have been put to fairly wide use throughout the empire from the first century A.D. on, though only among the wealthy classes. But after the fall of the empire, "for almost a thousand years, European architects virtually ignored the principles of solar orientation. Large panes of glass went out of fashion;

they were no longer available, affordable, or practical. The main urban centers were not planned for the Sun" (Butti and Perlin).

Studies and discoveries regarding the use of solar energy began again during the Renaissance, when scientific societies and academies flourished all over Italy. Descriptions of projects or experiments can be found in the writings of Leonardo da Vinci (1452–1519), who began in 1515 to build a huge mirror that would enable solar energy to be used for industrial applications; of Giovanni Magini, who used a spherical mirror to melt metals; and of the disputes among famous mathematicians and scholars, including Galileo (1564–1642), Jerome Cardano (1501–1576) and Giovanni Battista Della Porta (1540–1615), regarding the story of Archimedes and his burning mirrors.

In a treatise written in 1632, the mathematician Bonaventura Cavalieri (1598–1647), a pupil of Galileo's, devoted particular attention to the matter of burning mirrors. Like many of his contemporaries, Cavalieri tried to reconstruct Archimedes' mirror, but without success. He stressed the fact that his book, unlike Magini's, treated elliptic, hyperbolic, and parabolic mirrors as well as spherical ones (Bonetti E., 2000).

Cavalieri's successor at the University of Bologna in 1650, the astronomer, Gian Domenico Cassini (1625–1712), was the inventor of a high-quality burning mirror, one of the largest (2.7meters in diameter) ever built at the end of the seventeenth century in France, where Cassini had been living since 1668, invited by the French King Louis XIV, Le Roi Soleil, for the construction of the Paris observatory.


LO
SPECCHIO
VSTORIO
OVERO
TRATTATO
Delle Settioni Coniche.
ET ALCVNI LORO MIRABILI EFFETTI
Intorno al Lume, Calde, Freddo, Suono,
e Moto misurat.
DEDICATO
A GL'ILLVSTRISSIMI
SIGNORI SENATORI
DI BOLOGNA
Da B. Bonauentura Cauallieri Milanese Giesuato
di S. GIROLAMO
In Bologna, presso Clemente Ferroni 1632.
Con licenza de' Superiori.

Fig. 2: Cover of Bonaventura Cavalieri's book *The Burning Mirror: A Treatise on Conical Sections and Some of Their Wondrous Effects on Light, Heat, Cold, Sound and Much More* (Bologna, Clemente Ferroni, 1632)

10.1.2 From Fossil Fuels to Nuclear Energy

More investigation needs to be done in identifying and resurfacing studies done on solar energy from the 1700s to the late 1800s, when the use of coal started to grow also in Italy. Even the important experimental work on the use of sun's light and heat by Antonio Pacinotti (1841–1912), who, at a

very young age, gained his reputation as a great physicist and experimentalist for having developed the ring armature of the dynamo in 1861, has today been completely forgotten.

Pacinotti left notes, memoirs and letters about the results of his studies and experiments on photoelectricity and on using the sun's heat to power solar motors. His enthusiasm for solar energy is beautifully illustrated in several letters he wrote from 1863–7 to his father Luigi, also a physicist. Pancinotti thought that even if some results could have been obtained by collecting the sun's energy using large concentrating mirrors, the best way to tap the large solar energy potential of African deserts was to power a heat engine by exploiting temperature differences between night and day.

News of the first solar motors developed in France by Augustine Mouchot, starting in 1860, circulated in Italy but apparently stimulated no similar projects. Italy, like France a coal-poor country, bent its efforts to developing two other renewable energy sources, hydro and geothermal. In 1898, Europe's first and largest hydroelectric plant was built in Paderno d'Adda, near Como. In 1904, the feasibility of using geothermal energy to generate electricity was demonstrated for the first time ever at Lardarello, in Tuscany.

In the late nineteenth and early twentieth century, one advocate of solar energy in Italy was the world-famous chemist and physicist Giacomo Ciamician (1857–1922), founder of Bologna University's chemistry department (which still bears his name). In September 1912, Ciamician attended the eighth International Congress of Applied Chemistry, in Washington and New York, and gave an impassioned lecture on the "Photochemistry of the Future" and the benefits that humankind could gain through the use of solar energy. In his paper, distributed in four languages, Ciamician asked, "Is fossil energy the only one that may be used in modern life and civilization?" Appointed in 1910 to the Italian Senate, he argued for the use of solar energy during the proceedings of the Luiggi Commission, a body set up at the end of World War I to look into the country's energy problems.

During World War I, Italy had undergone a severe energy crisis, due to the embargo on coal imports. The price of coal had risen from 28–35 lire per ton before the war to 450 lire in 1917, with peaks at 925 lire, and the authorities hoped to find a way to avoid similar crises in the future. These same concerns led the Fascist regime to adopt policies intended to favor energy self-sufficiency, in particular by exploiting the nation's hydroelectric resources, which are plentiful in the Alpine and Apennine basins.

In 1938, on the occasion of the centennial of the first meeting of Italian

scientists (in Pisa, 1838), the Italian Society for the Progress of Science (SIPS) reviewed a century of Italian scientific progress. Regarding solar energy, Giovanni Polvani described the Italian contribution to photoelectricity and cited the dozens of scientists who had studied this phenomenon, including A. Pacinotti (1863–64), A. Righi (1888–89), A. Pochettino (1906–34) and E. Fermi (1923). Another communication, only a few lines long, noted the contributions to the development of solar motors of Mario Dornig, Alessandro Amerio, Luigi D'Amelio, Tito Romagnoli and Giovanni Andri.

Fig. 3: From left, Mario Dornig with Daniel Benedict at AFASE Symposium in Arizona in 1955 (Photo provided by Jack Duffie from ISES Archive)

Since the early decades of the twentieth century, Dornig had stood out for his interest in solar energy; he had published a number of articles in which he underlined the importance of using it in a rational and integrated way.

He was also one of the few Italians who attended the first world conference on solar energy, organized in Phoenix, Arizona, in 1955 by AFASE (the Association for Applied Solar Energy). In a two-part article published in the journal *Rivista di ingegneria* (Engineering Review), Dornig reported extensively on "Solar Energy and the Arizona Symposium," describing all the solar technologies and devoting a great deal of space to the Bell Lab's discovery of the silicon cell in 1953.

According to Dornig, the Arizona Symposium was a milestone in the scientific and technical application of solar energy for the benefit of humankind. No new principles were announced at the event, but it achieved a "grand, organic association of all the different disciplines that the human spirit has worked out over so many centuries"—geography, astronomy, climatology, physics, thermodynamics, chemistry, agronomy, physiology, gastronomy, economics, the social sciences, and others. This combination was bound to lead, he thought, to the rational use of solar energy to farm marginal land, especially in hot and dry countries, thereby increasing food production.

Italy was also represented at the exhibition of solar machinery and products, though by only one company, Ferruccio Grassi's Somor, based in Lecco. Somor displayed a solar pump consisting essentially of a flat-plate collector fitted with side mirrors, which provided a degree of concentration, and utilizing sulfur dioxide rather than steam. Dornig reported that Grassi's pump kept on operating throughout the show and aroused wide interest.

Fig. 4: Ferruccio Grassi's solar pump, exhibited at the Phoenix show in 1955 (Photo provided by Jack Duffie from ISES Archive)

Unfortunately, Dornig's encouraging news from Arizona on solar energy developments came just at the time when interest was growing in the prospects opened by discoveries in the field of nuclear energy, to which Italy had made a significant contribution through the group of Via Panisperna's physicists, led by Enrico Fermi (Fermi had built the first atomic pile in Chicago in 1942).

When U.S. President Eisenhower announced the "Atoms for Peace" initiative in December 1953, the Italian government had already started a large-scale nuclear research program conducted by the CNRN (National Center for Nuclear Research) and funded with some 35 billion lire between 1952 and 1960. At a 1958 exhibition in Geneva, Italy showed the world a whole series of important achievements: three nuclear power plants under construction, the nearly-completed synchrotron, a research reactor ready to start operating in Ispra, and the start of construction of the nation's largest nuclear research center, located at Casaccia, near Rome.

Eisenhower's choice was certainly prompted by the speed with which the Soviet Union had equipped itself with nuclear weapons. To counter these developments, Eisenhower reversed his predecessor Harry Truman's policy of keeping all knowledge related to atomic energy under wraps, and made the part regarding its peaceful uses available to any country that would undertake to refrain from using it for military purposes. Many think that Eisenhower's policy on nuclear power resulted in forgetting the solar energy program out-

lined by the Paley Commission's report to President Truman (The Promise of Technology—The Possibilities of Solar Technology), published in 1952.

Because of the widespread enthusiasm for nuclear energy, in Italy the field of solar energy was relegated to the background, as it was in other countries. In 1960, Parliament transformed CNRN in the National Nuclear Energy Committee (CNEN) and gave it the mission of encouraging the development of peaceful uses of atomic energy. The CNEN was born under the most auspicious stars. International bodies considered that Italy and Japan, the only industrialized countries lacking fossil fuel resources, would be the first to go massively nuclear. The development of nuclear energy was seen as the means whereby a country without fossil fuel could hold its own against countries rich in coal and oil. Until then, Italy had relied mainly on its hydro resources; in 1955 they met more than 80% of the nation's electricity demand.

After World War II, however, the Marshall Plan gave strong impetus to the installation of new thermoelectric plants. Between 1956 and 1965, installed capacity at coal- and oil-fired power plants began for the first time to draw ahead of installed hydroelectric capacity.

The development of nuclear energy was also a key factor leading to the nationalization of about 1,000 electric companies and utilities and the creation of ENEL, the Italian public electricity utility, in 1962.

This was the context in which the handful of Italian solar energy pioneers had to operate at the beginning of the second half of the twentieth century.

Italy was industrializing rapidly, and energy demand was likewise growing apace. Government policies were directed at meeting it by importing fossil fuels and developing nuclear energy, rather than by achieving energy self-sufficiency. In the country where nuclear energy had taken its first fundamental steps with Enrico Fermi—a country that had firmly decided to travel the road toward the use of nuclear energy—solar energy was practically ignored as a possible alternative to fossil fuels.

10.1.3 The Early '60s and the U.N. Conference on New Sources of Energy (Rome, 1961)

An event that sparked new interest in solar energy in Italy, and in renewable sources in general, was the United Nations Conference on New Energy Sources (solar, wind, geothermal), held in Rome in August 1961 at the headquarters of the U.N. Food and Agriculture Organization (FAO). The decision to organize the conference had been made in May 1956, when the U.N. Economic and Social Council recommended that "the United Nations should display the same interest in all new sources as it had in the conventional

sources of energy and in atomic energy."

The conference was attended by 447 people from 29 countries. The largest numbers came from Italy (87), the United States (63), and France (57). Two hundred and fifty papers were presented, 118 of them dealing with various aspects of solar energy. In terms of the number and quality of the participants, the Solar session was considered the most important international gathering in the field since the Arizona Symposium in 1955. The Italians presented 24 papers, including 19 on geothermal energy, a field in which Italy boasted world primacy because of its plants at Lardarello, which by then had reached a net generating capacity of 300 MW.

There were only four Italian papers on solar energy. Arnaldo Maria Angelini's was titled "Reflections on the Economic Value of Geothermal Energy, Wind Power and Solar Energy, Especially After Conversion to Electrical Energy." Giovanni Francia, a professor of analytic geometry at the University of Genoa, presented the anti-radiating honeycomb structures he had discovered in 1960, and that made it possible to retain heat in a sort of "black body"—an idea that is widely applied today in various solar technologies.

Fig. 5: Giovanni Francia behind a honeycomb structure (Photo Ansaldo Review N. 11/81)

Luigi D'Amelio, from the University of Naples, described a thermal solar motor coupled to a simple, flat, low-temperature thermal solar collector. Giorgio Nebbia, who had been doing research at Bari University since 1953

on solar stills that could be used to desalinate seawater, especially on islands and in arid areas, read a paper on the "Present Status and Future of Solar Stills."

An experimental solar heating system installed at the Swedish astrophysics station on the island of Capri was described by two participants from Sweden, Gunnar V. Pleijel and B. I. Lindström. The building had gone up the year before and the solar collectors were built right into its façade; this may have been the first system of its kind to be installed in Italy. In connection with the inauguration of the main building in 1961 a Swedish TV team visited the observatory to report about the solar energy installation.

Fig. 6: The main building of the Swedish Observatory on the Island of Capri in 1961 (Photo Y. Öhman's collection)

Somar, the Lecco company that had already exhibited at the Phoenix show in 1955, presented its solar pump once again; it was then on the market at $1,000 per kilowatt.

The 1961 conference in Rome not only enabled many Italians to share their ideas and meet colleagues from other countries; it was also an important occasion for getting to know AFASE. AFASE provided technical assistance to the U.N. on solar energy, and several of its leaders, including Farrington Daniels, were in Rome for the event.

Later that year, at a conference organized by NATO in Sounion, Greece, a group called COMPLES was formed on the initiative of a number of academics who had fled the war in Algeria, where they had worked at a solar energy research laboratory. COMPLES (Coopération méditerranéenne pour l'énergie solaire) was mainly oriented toward the French-speaking world, but representatives from Spain, Greece, Portugal, and Italy were among its founders.

After this conference, in 1962, Italy's National Research Council (CNR) set up an "Enterprise" operating under the chemistry committee and dedicated to encouraging cooperation among various institutes for studies on "Chemistry and Technology in the Field of Energy Sources."

One of the main groups working in the "Enterprise" framework on the use

of solar energy was the Milan Polytechnic Institute's technical physics department. Under the leadership of Gino Bozza, it built in the Alpine town of Cortina d'Ampezzo what was perhaps the first experimental solar station in Italy. The station included a prefabricated lab equipped for making systematic measurements of solar radiation and testing solar heating systems, including a "solar chimney."

The Milan Polytech group also experimented with solar processes designed to produce ice, and built a solar absorption refrigerator based on the use of solid ammonia and vinyl chloride compounds.

Another "Enterprise" group, headed by Giorgio Nebbia of Bari University's commerce technology department, worked on solar desalination of saltwater. Nebbia reported on these activities in the SES's "*Sun at Work*" in 1964.

Other important activities were conducted in the early '60s at the University of Genoa, where Giovanni Francia did a number of experiments using the anti-radiating honeycomb structures he had described at the Rome conference in 1961.

In 1960–61, Francia built and tested the first high-temperature solar boiler at a facility in the town of Cesana Torinese. This device was based on an anti-radiating structure made up of 2,000 thin glass tubes, and with the sun overhead it generated steam at 100 atm and 500–600°C. In 1963, in collaboration with the French scientists from COMPLES, Francia built two linear solar boilers with anti-radiating cells for steam at 100 atm and 450°C with the sun at 1,000 W/m_, the first in Genoa and the second in Marseilles. In 1965 he built the first point-shaped solar boiler, for the generation of steam at 150 atm and 500°C, at the station operated by Genoa University in the town of Sant'Ilario di Nervi, on the Riviera. These plants functioned with mirror fields moved by ingenious mechanisms that Francia himself had invented. His work was financed by the CNRS, the CNR, and NATO, and he described it in an article published in the September 1968 issue of the *Solar Energy Journa*l, "Pilot Plants of Solar Steam Generating Stations."

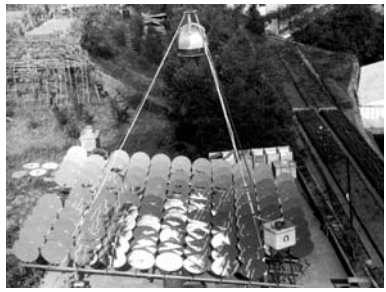

Fig. 7: The first point-shaped solar boiler, installed at Sant'Ilario di Nervi in 1965 (Photo Ansaldo Review N. 11/81)

10.2 The Italian Section's Creation and Early Activities

10.2.1 Creation of the Section

The Italian Section was founded and promoted by Vittorio Storelli, an industrial engineer who had a strong interest in what he called "Sun Science" and was attentive to developments in the sector.

Fig. 8: Vittorio Storelli, founder of the Italian Section of ISES

His work in the aircraft industry had led him to study and teach space applications of solar energy at the University of Turin.

In 1963, during a study trip to the United States, he met with the SES and, pointing out that there was already a group working in Naples in the field of solar energy, and that a number of Italian scientists and engineers had taken part in one or another of the international conferences held in the past, decided to set up an Italian section of the organization.

In creating the Section, Storelli knew he could count also on the useful advice of Giorgio Nebbia who would become the first Italian member of the board of directors of ISES from 1967–70. The Section became operational as of January 1, 1964, and was based in Naples, at Via Crispi 72. Storelli became the secretary. The creation of the Section was announced later that year in the second quarterly issue of *Sun at Work*.

The Section's first project was to publish the first issue of what was to become the *Rassegna Italiana di Eliotecnica* (Italian Solar Technology Review).

Storelli himself did the work of starting up the Section and the *Rassegna* [review]; later on, too, he could rely only occasionally on some assistance. Today, at 90, he recalls with utmost clarity and irony that only a handful of

people in Italy were interested in solar energy in the ‘60s, and that there was only one way to get the newborn Italian Section of ISES on its feet: roll up your sleeves and do it yourself!

Fig. 9: Giorgio Nebbia, second from left, with his collaborators testing a solar still at the University of Bari in the late 1950s

His determination in managing the Section (sometimes putting up money of his own) and editing the Rassegna provided an important means of information and linkage to the small and widely scattered community of Italian scientists and engineers interested in solar energy. In most cases, their work was little recognized and even unknown within the universities and research institutions where they were employed. Now the Italian Section gave them a point of reference; they could get to know each other through the pages of the Rassegna and keep up on what was being done abroad and report on activities in Italy through the *Solar Energy Journal* and *Sun at Work*.

10.2.2 Publications and Activities Prior to the Oil Shock of 1973

The cover of the first issue of the Italian Section’s *Rassegna* is dated January 1964 and flourishes the slogan “The sun toward the world, the world toward the sun.” In the foreword, Storelli underlines the journal’s purposes,

including “publicizing what has been done up to now in Italy and other countries in the field of solar energy, in terms of science, technology, experiments and applications.” Next came a message from Hal Walmsley, president of the SES, in which he welcomed the Italian Section and noted that, “If bold advances are to be made in solar energy application, the concentration of much intellectual power must be brought to bear on the problem. These intellects must be brought together in close collaboration under a concept and system of free exchange of information.”

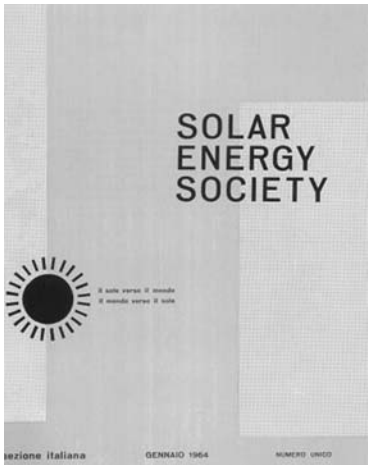

Fig. 10: The cover of the Italian Section’s first publication in January 1964

The first pages of the journal also carried an article by Farrington Daniels (translated into Italian) on the state of the art in solar energy research, where the author reviewed nearly all the methods developed for its use. Then came contributions from two Italian academics. Vincenzo Caglioti, chairman of the National Research Council's chemistry committee, reports on studies on “Chemistry and Technology in the Field of Energy Sources” (cf., section 2.3 above), and Carlo d'Amelio, of the University of Naples, on thermal solar machines.

When the next issues of the *Rassegna* would come out often depended on the Section's finances and the need to report on projects of interest to the members. Some were published with aid from the National Research Council and Banco di Napoli. The second issue came out in December of 1964, the third in December 1965, and the fourth in November 1966.

The second issue reprints the speech delivered by the chairman of the SES at the first meeting of the organization's members, in March 1965 (with the announcement of the publication of the seventh volume of the Proceedings of the UN Conference held in Rome in 1961), and includes an

article by Peter Glaser on solar energy. Other contributions came from Ambrogio Locatelli, of the Milan Polytechnic Institute, on the use of solar energy to heat water, and from Ferruccio Grassi, on solar pumps.

In 1965, the Italian Section took part in the conference on desalination in Palermo organized by the United States Information Service. In 1967, the interest aroused by its publications led the Section to organize a conference itself. It was held at the University of Naples, with Frank Edlin, secretary-general of the American SES, as the keynote speaker and a large audience of academics, engineers, entrepreneurs, and students. The event was reported in the fifth issue of the *Rassegna*, dated January 1967. Among the Italian contributions to the field, Tito Romagnoli's on the use of solar energy in agriculture (1923) received special mention for its historical importance.

Also in 1967, a meeting of specialists in solar radiation measurement was held on the island of Capri. Among the attendees was Guglielmo Righini of Florence, co-author, with Giorgio Nebbia, of a book titled *L'energia solare e le sue applicazioni* (Solar Energy and Its Applications) that Feltrinelli of Milan had brought out the year before.

The December '67 issue of the *Rassegna* is especially important because it contains a detailed description of Giovanni Francia's research at Genoa University's Sant'Ilario station (see section 1.3 above). His work was the basis for the design of the "Eurelios" solar thermoelectric plant built a decade later at Adrano in Sicily by ENEL, in collaboration with several European partners.

In 1968, Storelli took part in the annual SES meeting in Palo Alto, California, where he also met Peter Glaser. Storelli reported on research activities in Italy, including Francia's research on anti-radiating honeycomb structures in plastic and the photovoltaic cells for space utilization, manufactured by the Italian company Selenia. The results of the meeting were reported in the CNR journal *Ricerca Scientifica* of December 1968. The next year, the Italian Section took part in the SES conference in Melbourne—the first one held outside the United States—which gave Storelli an opportunity to meet Farrington Daniels and receive useful suggestions on how to organize the Italian Section.

The April 1970 issue of the *Rassegna* contained a report on other research projects of Francia's. In the *Rassegna*, Storelli dealt again the topic of how to power artificial satellites and spacecraft with solar photocells—the solution that came to be widely adopted and made it possible to build satellite-based telecommunications systems.

In 1970, the Solar Energy Society changed its name to the International

Solar Energy Society (ISES) and the Italian Section's name changed accordingly.

In 1971 Storelli attended the solar energy conference organized by NASA at the Goddard Space Flight Center, where he presented "The Solar City—Hypothesis for an Urban Structure," a project designed by Giovanni Francia and his collaborators.

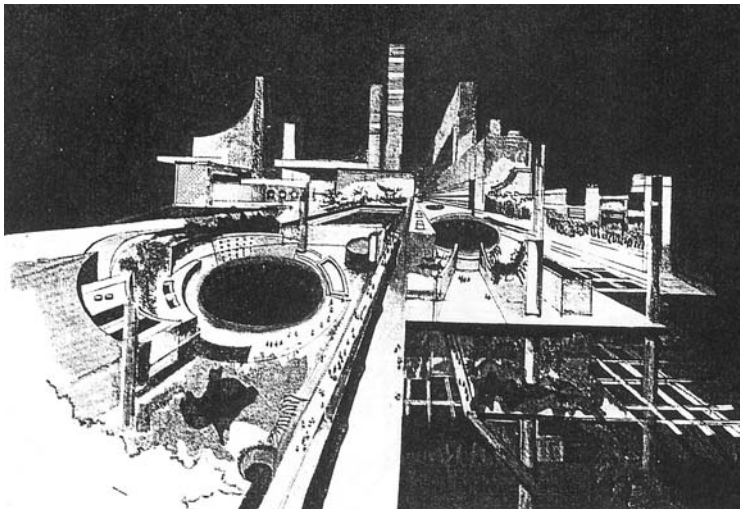

Fig. 11: View of a solar city designed by Francia and collaborators (from the 1971 scale model). The apertures of two solar ducts to bring light to lower floors can be noted (Figure, Rassegna Italiana di Eliotecnica, 1972).

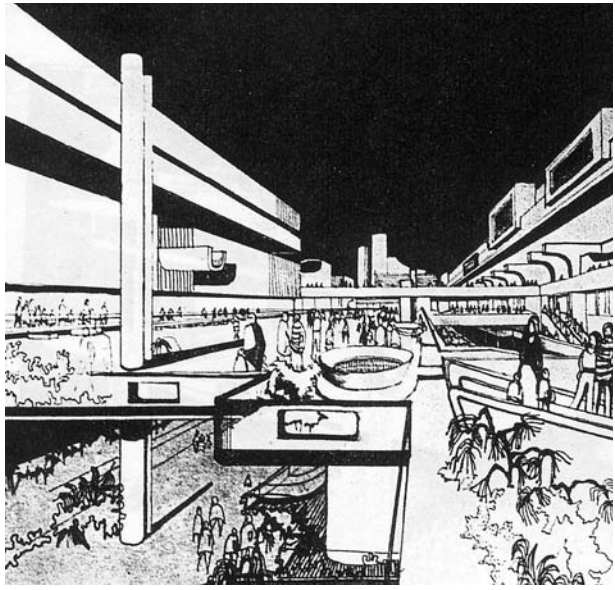

Fig. 12: Another view with a solar duct in the center (Figure, Rassegna Italiana di Eliotecnica, 1972)

In December of that year, Francia's project was presented at the Court Theater in Naples, in the presence of architect Paolo Soleri, who had immigrated to the United States and, now living in Arizona, was likewise designing a solar city. Francia's project was described in detail in the October 1972 issue of the *Rassegna*. He and his collaborators hoped to create an urban complex where a large group of people could live together without losing touch with nature, and where the essential services—lighting, heating and electricity—would be provided via solar.

Also in 1971, the Italian Section was present at the international solar energy conference in Paris, organized jointly by ISES, COMPLES, and AFEDES under the auspices of UNESCO. This was an interesting and unusual example of encounter and collaboration among specialists from different geographic and cultural areas.

In 1972–73, Mr. Storelli was invited to lecture on solar energy at the Pozzuoli Aeronautical Academy and at the American Studies Center in Naples.

10.2.3 The Italian Section after 1973

The great turning-point for solar energy around the world, and in Italy too, came in 1973, with the first oil crisis. Oil flows from Arab countries were curtailed for weeks, and from October 1973 to the end of 1974 the price of oil soared, increasing by 800%.

To save energy, the Italian government tried to cut consumption with measures such as a ban on vehicle circulation on Sundays.

The "great fear" of that year and the following ones drove scientists and engineers to look with new interest at alternative sources of energy whose supply would be less chancy than that of fossil fuels. The development of nuclear energy, at a standstill after its dazzling debut in the 60s, returned to the fore with the government's proposal, in the first national energy plan of 1974, to build 20 nuclear power plants. However, already at its launching, environmental movements started to oppose nuclear programs.

At the same time, solar energy started to be viewed with new interest. Just as the 1914–18 coal crisis had worried Italy and led people to consider alternative energy sources, so the 1973 oil crisis rekindled interest in them. And this time around, solar energy was not just the hobbyhorse of a single scientist, albeit a famous one like Ciamician; research centers and the great state-owned energy companies were pushing it too. The Italian government decided to offer incentives for the installation of solar systems, and the result was a growing commitment by researchers and private enterprise and a proliferation of manufacturers of solar panels (mainly water-heaters, the easiest technology).

This new departure confirmed the foresight of those who had laid the groundwork for it, in terms of knowledge and experimentation, and especially of ISES and its Italian Section.

The effects of the new political and economic situation soon became evident in the Italian Section's activities. The 1974 issue of the *Rassegna* opened with an article by Storelli, on "The Conquest of the Sun," that reverberated with the new technical and scientific situation, and also contained many items from new contributors. Among them was Vincenzo Balzani, from the University of Bologna, writing about the prospects of photochemistry, which had been anticipated in the early part of the century by Ciamician, his predecessor as head of Bologna's chemistry department.

That year the Italian Section was present at a number of solar-related meetings, which were starting to multiply. At the 14th International Conference on Space, held in Rome, Secretary Storelli spoke on "A New Industry of the Sun." He treated the same subject at Loyola University's Rome branch and at a round table organized in Milan by FAST (Federation of Scientific and Technical Associations), where he spoke on "The Prospects for Solar Energy."

The National Research Council (CNR) had just launched its first Targeted Energy Project, in which it was to invest nearly 50 billion lire from 1976 to 1979. The solar energy subproject had a budget of over 9 billion lire with which it funded a large number of academic and industrial research groups.

In 1975, a solar energy research group was set up at the University of Naples on the initiative of Vittorio Silvestrini, who organized a course on solar energy conversion (held on the island of Procida, just off Naples), and reported the results of the studies conducted in Naples in the September issue of the Rassegna. The Naples research on cooling by nighttime irradiation was particularly interesting. Two training courses were organized by the International College for Applied Physics, with the sponsorship of the Italian Section, the first in Nerano, in September 1975, and the second in the Sardinian city of Alghero, in 1976. In 1977 Silvestrini's group published a book titled *Il Clima quale elemento di progetto nell'edilizia* (Climate as a component in building design, published by Liguori Editore.

It should be noted that the Italian government organizations never once mentioned the existence of the Italian Section in their initiatives, for instance in the proceedings of the CNR's solar energy subproject. This goes to show that there was a disconnect between "voluntary" research and institutional projects, which in the second half of the '70s began to receive notable amounts of public funds.

In 1975 Storelli attended the ISES international congress in Los Angeles, where he reported on what was being done in Italy; and the meeting of the Italian Thermotechnics Association in Santa Margherita di Pula. In 1975–77, he lectured and gave courses at various meetings, some of them organized by the Italian Section. Through these activities, the Italian Section made it clear that the proper use of solar energy could provide opportunities for industry and employment in Italy too, and opportunities for exporting equipment and know-how, as was already happening in the United States.

In the meantime, an Italian branch of COMPLES had been formed under the direction of Roberto Visentin, of the University of Calabria. It must be said that relations between the Italian Section of ISES and COMPLES-Italy seem never to have been very lively.

Italian solar literature became richer with the publication in 1976 of a book by Aurelio Robotti, *Impieghi dell'energia solare* (Uses of Solar Energy). The book was written following the success of a previous booklet by Robotti about "The introduction of solar energy use in Italy," written in 1975 to let people know about the possibility offered by solar energy to overcome the Italian energy crisis.

In 1977, ten years after the Naples conference, the Italian Section, on the occasion of its national assembly, organized, again in Naples, a technical conference attended by some 300 people. Many Italian universities and CNR institutes participated, as well as manufacturing and energy companies, including Fiat, Montedison, and ENEL. The thirty-six papers presented at this event were enthusiastic about the growing interest in solar energy and testified to the wealth of new initiatives and projects for using solar energy in agriculture, architecture, and electricity generation. In the latter field Italy stood out for the solar thermoelectric plants designed with the consultancy of Francia and being built by ENEL, which was represented at the conference by Corrado Corvi. A paper on wind generators was also presented.

Amid the general enthusiasm there were also words of caution. Nebbia, in a paper titled "Lights and Traps in Solar Energy," warned that these forms of energy should be developed in an appropriate way, and that the great opportunities offered by solar energy should not be wasted.

The conference was followed by a round table on the Section's purposes and charter.

10.2.4 The End of the Italian Section's Pioneering Phase

The new interest in solar energy in Italy prompted changes in the organ-

ization of the Italian Section of ISES. People like Storelli and some other members who had labored for more than a decade amid the general indifference of the energy establishment thought the Section should have legal status and a charter so as to be able to respond better to the new growth prospects.

The Section's by-laws were established, and the Italian Section of ISES, as a nonprofit organization, was legally formed in April 1978, in Naples; Vittorio Storelli was named president and a board of directors was appointed. The major state-owned energy companies—ENI (oil and gas) and ENEL (electricity)—became charter members. In October, the first elections were held for the management positions; Storelli was confirmed as president, Corrado Corvi of ENEL was elected vice president.

This change was made at the time when solar-related initiatives were proliferating in Italy. ISES-Italy continued to disseminate knowledge of Italian activities, especially abroad, and to raise public awareness of the importance of solar energy, in part via TV and radio. Italian TV and radio played a role in diffusing information on the possibilities of solar energy to the general public by promoting talk shows with the participation of solar energy experts. In 1978 Storelli, still acting as secretary of the Italian Section, attended and spoke at the New Delhi conference on solar energy.

On May 3, 1978, Sun Day was celebrated in Italy too, the same day as in the United States. This event had been thought up and organized by Hayes as a way to get the message to the American people that a modern industrial society can run on solar energy. The White House's Council on Environmental Quality had stated that the goal of meeting much more than 50% of the nation's energy requirement with solar sources could be reached by 2020. This optimism reached Italy and could be found in the Italian Section of ISES, which undertook to print and distribute Sun Day pamphlets to schools of all kinds, and in June set up a stand of its own at a permanent exhibition of solar energy applications organized by the City of Rome.

The first major trade fair devoted to solar energy was held in Genoa that same year, and drew eleven government ministers from as many Mediterranean countries. Italy's industry minister pointed proudly to the results obtained by Giovanni Francia at the Sant'Ilario station. The Italian Section promoted a National Award for the best research project on solar energy.

In 1979 Storelli and Corvi attended the "jubilee" conference held in Atlanta on ISES's twenty-fifth birthday. Storelli reported on the activities of the Italian Section and the solar projects under way in Italy, including ENEL's "Eurelios" plant and the "Solar Building" designed by the Florence-based

company Nuovo Pignone. Corvi spoke about research activities at ENEL. Contacts were established between Italian and American concerns.

In 1979 photovoltaic technology was used in Italy for a 1kW power plant installed at the Mandrione Pass through the Apennine mountains, between Tuscany and Romagna. This was Italy's first fully monitored photovoltaic plant coupled to a wind generator.

By this time, the Rassegna Italiana di Eliotecnica could not suffice to keep up with developments in the solar sector; in any case, financial difficulties had compelled its suspension. In May 1979, the new management of the Italian Section proposed to replace it with a bimonthly magazine that was already registered; the publisher, PEG, would handle the business end. Under the title Energie Alternative—Habitat, Territorio, Energia (shortened to HTE) and had the subtitle "Official organ of ISES—Italian Section," the first issue came out in September 1979. On the first page was a greeting to members and readers from Vittorio Storelli, president of the Section. The magazine was sponsored by the CNR, and representatives of the great research institutions and energy companies that are members of the Section sat on its scientific committee, among them Ugo Lucio Businaro, Giancarlo Chiesa, Mario Columba, Maurizio Cumo, Alvaro Donadio, Giacomo Elias, Giovanni Francia, Mario Pavese, Luigi Paris, Giuseppe M. Sfligiotti, Giancarlo Schileo, and Mario Silvestri. HTE still comes out regularly, and was not long in establishing itself as the place to publish technical articles, policy articles, and articles for the general reader on what is happening in Italy in the field of solar energy.

Fig. 13: Front cover of the first issue of HTE, the official bimonthly magazine of the Italian Section of ISES, September/October 1979

The late 70s were the years in which the views of the anti-nuclear movement were gaining ground and more and more Italians were becoming interested in solar energy. Other reasons for moving in this direction were the second energy crisis of 1978–79 and the accident at the Three Mile Island nuclear power plant in 1979. The National Nuclear Energy Committee (CNEN), whose original mission was limited to nuclear matters began to change course, adding research, development and demonstration activities in the field of renewable energies to its nuclear programs.

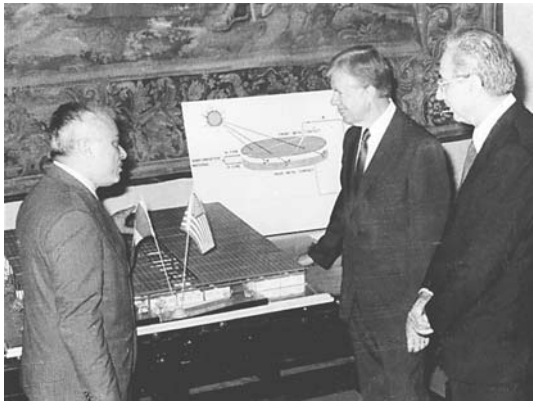

Fig. 14: Scale model of the Delphos plant, shown by Cossiga and Colombo to U.S. President Jimmy Carter in the summer of 1980 (Photo CNEN)

The change was due in good part to the influence of U.S. President Carter's "soft energy" policy; his pro-solar message came through clearly in Italy. Carter visited Italy in July 1980, and prime minister Cossiga thus had a chance to illustrate—with the aid of CNEN's new president, Umberto Colombo—Italy's commitment to the quest for clean energy sources by showing him a scale model of the 600 kWp Delphos photovoltaic power plant, which was to remain for more than a decade one of the largest pilot photovoltaic plants designed in Europe.

CNEN also started the publication of many technical scientific papers, broadening knowledge about solar energy and its applications.

1980 ended with ENEL's completing the construction of the 1 MW Eurelios plant in Adrano, Sicily, the world's largest tower-type solar thermoelectric plant connected to the national grid.

For the Italian Section, 1980 ended with a satisfactory balance sheet: 250 individual members, 50 collective members, a bi-monthly magazine averaging more than 50 pages per issue, and a board of directors on which major government agencies and institutions were represented. However, this was also the end of the pioneering activity that the Section had conducted up till that time.

10.3 Conclusions

The period from 1964 to 1980 ended with the Italian Section of ISES operating in a context entirely different from that of 1964, when it was created. Italy was no longer focused on the nuclear option to free itself from reliance on fossil fuels. Our members, by their number and the associations they represent, had made the Section one of the country's principal and best-known reference points, where research, industry, and other interests could meet and exchange ideas and projects for the future of solar energy in Italy. Our leadership, with Storelli as president, count on further contributions from Corrado Corvi of ENEL, our vice president, and from the members of the board, who represented universities, research institutions, manufacturers, and major energy corporations.

Key Developments of the Italian Section of ISES 1964–1980

December 1963	H. Walmsley, President of SES (Solar Energy Society) approves the formation of the Italian Section of SES. Vittorio Storelli is the Secretary.
January 1964	The first issue of *Rassegna Italiana di Eliotecnica* is published. Storelli is the editor. The *Rassegna* will be published in 1965, 1966, 1967, 1970, 1972, 1974, 1976.
April 1964	Official announcement by Storelli of the start of Section's activities. Section's office is in Naples in Via Crispi 72
January 1967	National conference in Naples. Among the participants: Frank E. Edlin, E. Carlevaro, R. Preti, L. D'Amelio, G. Francia, G. Nebbia, L. M. Guarino.
February 1967	Giorgio Nebbia is elected board member of SES for term March 1967-70
June 1970	Solar World Congress of SES in Australia. SES becomes ISES. Participants from Italy include Vittorio Storelli and E. Pisani. The Italian Section of SES becomes the Italian Section of ISES.
February 1977	National Conference in Naples. 300 attendees. Storelli presents a paper in which the Section's activities in the past ten years are summarized. The 34 Technical papers cover almost all aspects of solar energy utilization. Among the speakers, Giovanni Francia and Giorgio

	Nebbia
14 April 1978	The Italian Section of ISES is legally instituted as a non-profit association. Its office continues to be in Naples. Vittorio Storelli is named President. In October 1978 Vittorio Storelli is elected President and Corrado Corvi Vice President.
Sept/Oct 1979	The first number of *Habitat Terrirorio Energia* (*HTE*), as the official magazine of the Section, replacing the *Rassegna Italiana di Eliotecnica*, is published. The magazine will be published for 18 years. The last number will appear in September/October 1996.
1980	Corrado Corvi is elected board member of ISES. The Section has 250 individual members and 50 collective members.

Acknowledgements

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