



JOIN THE CENTURY OF SOLAR

A Year of Virtual Celebration

SWC50-The Century of Solar Celebration Newsletter – July 2021

This month we provide

- A brief overview of solar research and applications in the 1990's;
- A focus on Italy; and
- A special announcement about **SWC 2021**

The overview of solar in the 1990's provides some key highlights taken from the booklet:

[ISES SWC50 The Century of Solar Stories and Vision Booklet](#)

For more highlights, please refer to the booklet or the [ISES Solar Energy Museum – Past, Present and Future](#)

ISES 1990's

Significant events in the history of ISES in the 1990's include:

- In 1990, ISES held *Utility Initiative for Africa* seminars in Johannesburg, South Africa and Nairobi (co-sponsored by UNEP): both declared universal energy access a basic human right.
- In 1992, the ISES publication *Recommendations to the United Nations Conference on Environment & Development – Solar Energy Solutions for an Environmentally Sustainable World* and *ISES 2000 – Recommendations to the Commission of Sustainable Development*, not only helped to sway opinions at the Earth Summit, but also served as a major step for reshaping ISES.
- In 1992, a new *Special Service Award* was announced by ISES with Mike Nicklas being the first person to receive the award.
- In 1994, the ISES Board of Directors announced that Freiburg (Germany) would host the new ISES headquarters.
- In 1995m ISES Executive Director Burkhard Holder opened the new ISES headquarters at Villa Tannheim.
- In 1996, the first EuroSun Conference was conducted in Freiburg, Germany.

What is SWC50 – The Century of Solar?

In 1970 solar research pioneers met at the first International Solar Energy Society (ISES) Conference in Melbourne Australia. ISES commemorated in 2020 this first Solar World Conference with a special 50th Anniversary Virtual Conference, called the Solar World Congress at 50 (SWC50).

During these past 50 years solar energy has grown from being emerging technologies to a vibrant industry. The Century of Solar highlights the transformation in the global energy sector that has taken place since the first Solar World Congress in 1970 and looks forward to the next 50 years when solar energy will be a major cornerstone of the global energy system. While the focus of the Century of Solar is on the evolution of solar energy, the importance of other renewable energy sources working together to reach the 100% renewable energy world goal will be a central theme.

SWC50 - The Century of Solar is about the people: researchers, industry players, policy makers, and leaders of NGOs and Non-profit organizations who have all contributed to make solar energy the fastest growing contributor to new electricity capacity.

SWC50 Programme 2021: August 2021 Webinar on Transforming the Air, Sea and Land Freight Transport Sector.



Villa Tannheim in 2000.

ISES Presidents in the 1990's

Years	President	Country
1989-91	Doug Lorriman	Canada
1991-93	Adolf Goetzberger	Germany
1993-95	Michael Nicklas	USA
1995-97	Eduardo Oliveira de Fernandes	Portugal
1997-99	David Mills	Australia
1999-2001	Cesare Silvi	Italy

Conferences and Meetings 1990's

Year	Location	Overview
1991	Denver, USA	Theme: <i>World Solar Energy Congress</i> 1500 participants, and 100 displays
1993	Budapest, Hungary	Theme: <i>Harmony with Nature</i> 1000 participants (60 countries) 560 papers and 87 industry Exhibitors from 15 countries.
1995	Harare, Zimbabwe	Theme: <i>In Search of the Sun</i> 1,100 participants
1997	Taejon, South Korea	Theme: <i>Future Globe in the Sun</i> 1,700 participants (54 countries) 900 accepted papers, large exhibition
1999	Jerusalem, Israel	Theme: <i>Solar is Renewable</i> 700 participants (54 countries), 450 oral presentations and 150 Posters.

Photovoltaics' 1990's

During the 1990's, the market for PV shifted from off-grid systems to grid connected systems. Rooftop solar programs started in Japan and in the USA by **Sacramento Municipal Utility District (SMUD)**. **Pacific Gas and Electric** demonstrated the first large grid connect PV systems used for grid support. The **International Energy Agency Photovoltaic Power Systems (IEA-PVPS)** commenced to produce annual trend reports providing information on installed capacity, manufacturing capacity, Research and Development expenditure, pricing and the policies driving the growth of solar. In 1990's, these reports focussed just on IEA countries where much of the production and installation occurred at that time but later the annual reports expanded to cover non-IEA countries. MW started to replace kW when quoting PV installation capacity.

In accordance with the IEA-PVPS Trend reports during the 1990's:

- Annual installations grew from 26MW in 1993 to over 120MW in 1999.
- Cumulative installed capacity grew from 110MW in 1992 to approximately 520MW in 1999.
- In 1993, off grid systems represented 62% of the annual PV installations and by 1999 this had decreased to 26%.
- Off grid systems reduced from 70% of cumulative installed PV capacity in 1992 to 47% in 1999.

Significant events in the history of PV in the 1990's include:

- In 1992, the University of South Florida developed a 15.9% efficient thin-film photovoltaic cell made of cadmium telluride, breaking the 15% barrier for the first time for this technology.
- In 1993, **Pacific Gas & Electric (PG & E)** installed the first grid-supported photovoltaic system in Kerman, California. The 500-kilowatt system was the first "distributed power" project to reinforce a weak feeder. **PG&E** found that distributed systems like this have measurable benefits such as increased system reliability and peak-shaving capabilities.
- In 1994, the **National Renewable Energy Laboratory** developed a solar cell made from gallium indium phosphide and gallium arsenide that became the first one to exceed 30% conversion efficiency.
- In 1994, Japan started the "**70,000 Solar Roofs**" PV subsidy program, to increase the use of photovoltaic system in the residential sector.
- In 1996, at the **École Polytechnique Fédérale de Lausanne**, Lausanne, Switzerland Michael Grätzel achieved 11% efficient energy conversion with dye-sensitized cells that use a photoelectrochemical effect.
- In 1999, **Spectrolab, Inc.** and the **National Renewable Energy Laboratory** developed a photovoltaic solar cell that converts 32.3 % of the sunlight that hits the cell into electricity.
- In 1999, the **National Renewable Energy Laboratory** achieved a new efficiency record for thin-film photovoltaic solar cells. The measurement of 18.8 percent efficiency for the prototype solar cell topped the previous record by more than 1 percent.

Solar Thermal 1990's

Key points from the IEA SHC data:

- IEA SHC collected data from Australia, Austria, Brazil, Canada, China (1997-1999), Germany, Lebanon, The Netherlands, Sweden, Turkey, and USA. The Chinese data are only available from 1997 and 1999.
- Without that Chinese data available in 1990 the USA installs 63.3% of the recorded capacity
- When the Chinese data are included in the years 1997 to 1999, China's installs between 55.3% (1997) and 69.5% (1999) of the recorded capacity.
- The figures provided for China showed that 80% of their installed capacity was evacuated tube collectors (ETC) while in 1996 the total recorded installed ETC capacity for the Rest of World was only 1.88% compared with Flat Plate Collectors (FPC)

Other significant events in the history of Solar Thermal in the 1980's include:

- In 1991, the "Solar Energy Research Group" was founded at the University of Marburg, Germany. This was moved to the neighbouring University of Kassel in 2001.
- In 1994, the Technical committee CEN/TC 312 'Thermal solar systems and components' CEN European Committee for Standardization assigns the CEN TC312 Secretariat to Greek Standardization Body ELOT.
- In 1999, the City of Barcelona, Spain required new buildings with more than 20 dwellings to have solar water heater.
- In 1999, "**PHOTONIO**" the world's largest solar air-conditioning project with 2664m² of panels and 700kW of absorption chillers is installed in Sarantis, Greece.
- In 1999, the **China National Center for Quality Supervision and Inspection of Solar Water Heaters of China** was set up with the help of UNDP project.

CSP 1990's

Significant developments included were:

- In 1991, Luz, the company that built and operated the SEGS plants, went bankrupt when the price of natural gas fell, and certain policies expired. The SEGS plants continued to operate as the owners took over their operation.
- In 1992, SEGS 3-7, now operated by KJC Operating Company, started a 6-year O&M improvement program funded by DOE and managed by Sandia National Laboratory.

- In 1995, Solar 1 was reconfigured into Solar 2, a 10 MW molten salt tower with thermal energy storage and began operation.
- In 1998, a consortium of European companies and research centres commenced development of the Eurotrough, a parabolic trough collector, with funds from the EU.
- In 1999, Solar 2 successfully completed its tests and ceased operation.

Solar Architecture/Buildings 1990's

Significant developments included:

- In 1990, a new solar cell roofing tile combining a building material (a glass Japanese-style roof tile) and an amorphous silicon (a-Si) solar cell was developed in Japan.
- In 1994, German Architect Rolf Disch designs and builds the Heliotrope in Freiburg, Germany. The Heliotrope was the first building in the world to capture more energy than it uses, all of which is entirely renewable, emissions free and CO2 neutral. The structure physically rotates to track the sun, which allows it to harness the maximum natural sunlight and warmth possible.
- In 1998, the **Florida Solar Energy Centre** undertook a demonstration project called the "Zero Energy Home."

PV in Developing Countries 1990's

In the 1990s more multi-lateral and bi-lateral projects relating to solar are starting to be implemented in the developing countries. These were often demonstration projects and typically included subsidies for buying down the upfront cost. More businesses were opening up in some of the larger markets. New delivery models were being trialled such as micro-finance and later, fee-for-service.

In 1990, 1.5 billion people in the world did not have access to electricity, representing 28.6% of the total population. This had decreased to 1.35 billion by 1999, representing 22.4% of the total population.

Other significant developments included:

- By 1990, Enersol's program had facilitated the implementation 1000 systems in the Dominican Republic installed by local enterprises and the program was then replicated in Honduras.
- In June 1990, Neville Williams launched the **Solar Electric Light Fund (SELF)** with a mission to bring solar electric lighting to rural people in the developing world.
- In 1991 **SELF** partners with the **Sarvodaya Economic Enterprise Development Services (SEEDS)** in Sri Lanka to establish a solar fund within **SEEDS**. Dr A. T. Ariyaratne had founded **SEEDS** to provide small loans (before the term microfinance was used) to rural families.
- The Kenyan market continued to grow with more companies being formed and the **KARADEA Solar Training Facility** opening in 1993.
- In 1993, Harish Hande visits the SELF office in Washington with the aim of working for SELF and to take solar electrification to the rural people in India. **SELCO India** was co-founded by Harish Hande and Neville Williams in March 1995 and celebrated 25 years in 2020.
- In 1993, Priyantha Wijesooriya starts **RESCO** in Sri Lanka, originally supplying systems through the Sarvodaya program.
- In 1996, Neville Williams registers the **Solar Electric Light Company (SELCO)** as a for-profit business.
- In 1996, Dr. Muhammad Yunus, started **Grameen Shakti** (**shakti** meaning "energy" in Bengali) as a not-for-profit company under the **Grameen Bank**. The goal of **Grameen Shakti** is to promote and supply renewable energy technology at an affordable rate to rural households of Bangladesh.
- In 1996, Peter Varadi, after consultation with the industry, launches **PV GAP** with the objective of developing quality products standards and a quality mark for the PV industry.
- In 1998 **IEA PVPS** approves a task not focusing on member countries. **Task 9: PV in Developing Countries**, led by Bernard McNelis of IT Power, had its first meeting in October 1999 in the Netherlands. The task continued in a number of different forms until about 2018. Over the years many Recommended Practice Guides were developed, and workshops undertaken in Africa and Asia.

For more highlights, please refer to the [ISES SWC50 The Century of Solar Stories and Vision Booklet](#) or the [ISES Solar Energy Museum – Past, Present and Future](#).

Focus on Italy

Many historical sources preserved in Italy testify to interest in solar energy from the earliest times including:

- 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 Romans had learned to make transparent glass and use it to capture the sun's heat for their homes, baths, and greenhouses and for the first time in history, the Roman empire enacted laws regulating rights to sunlight and similar matters.
- In 1515, Leonardo da Vinci (1452–1519), began to build a huge mirror that would enable solar energy to be used for industrial applications.

A number of Italians attended the AFASE (the Association for Applied Solar Energy) conference in Phoenix Arizona in 1955.

At the Phoenix exhibition, the Italian company Ferruccio Grassi's 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.



*Ferruccio Grassi's solarpump, exhibited at the Phoenix show in 1955
(Source: The 50 Years History of ISES)*

Though those who attended returned to Italy with enthusiasm for encouraging solar energy in Italy it was only after the United Nations Conference on New Energy Sources (solar, wind, geothermal), held in Rome in August 1961, that the interest in solar energy grew. 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.

The Italian section of ISES 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.

In 1963, during a study trip to the United States, Mr Storelli met with the Solar Energy Society and, pointed 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. From this meeting he decided to set up an Italian section of the organization.

The Section became operational on January 1, 1964, and was based in Naples, at Via Crispi 72. Storelli became the Secretary. Over the following years, its members were active with research and the Italian sections magazine, *Rassegna*, first published in January 1964, provided the avenue for the Italian scientist to present their work.

The first national conference was held in Naples in January 1967 and in February 1967, Italian Giorgio Nebbia was elected Board Member of SES for the term March 1967-70.

The next Italian Board Member of ISES was Corrado Corvi in 1980 and he would later become ISES President. By 1980, the Italian section had 250 individual members and 50 corporate members.

ISES Presidents

Corrado Corvi was president of ISES in 1987-1989.

Cesare Silvi, was president of ISES in 1999 - 2001

Sample of Pioneers Pre-1980

Each month this newsletter will have a sample of people involved with renewable energy prior to 1980. It is impossible to cover the thousands who have contributed to the development of renewable energy prior to 1980 in this monthly newsletter. What is included in each newsletter is just a snapshot of those involved. Those included in the newsletter are either taken from, or will be included in the next edition of the SWC50 celebratory booklet: *The Century of Solar-Stories and Visions*.

Corrado Corvi

Corrado Corvi (Italy) obtained his doctorate in Electrical Engineering at Torino University and started to work in Milan in the field of electric batteries and electric power. When electricity was nationalized and ENEL was formed, he became a member of its management in Rome, where he managed the field of renewable energy. He became a member of different committees of the European Community in Brussels and of the International Energy Agency in Paris. Corrado chaired the European Community Committee in charge of the construction of "Eurelios," the solar energy power station built in Adrano (Sicily). In the speech he gave at the beginning of his term, he emphasized the importance of involving energy industry operators in the activities of all of the ISES Sections, side by side with the academic institutions and research centres.

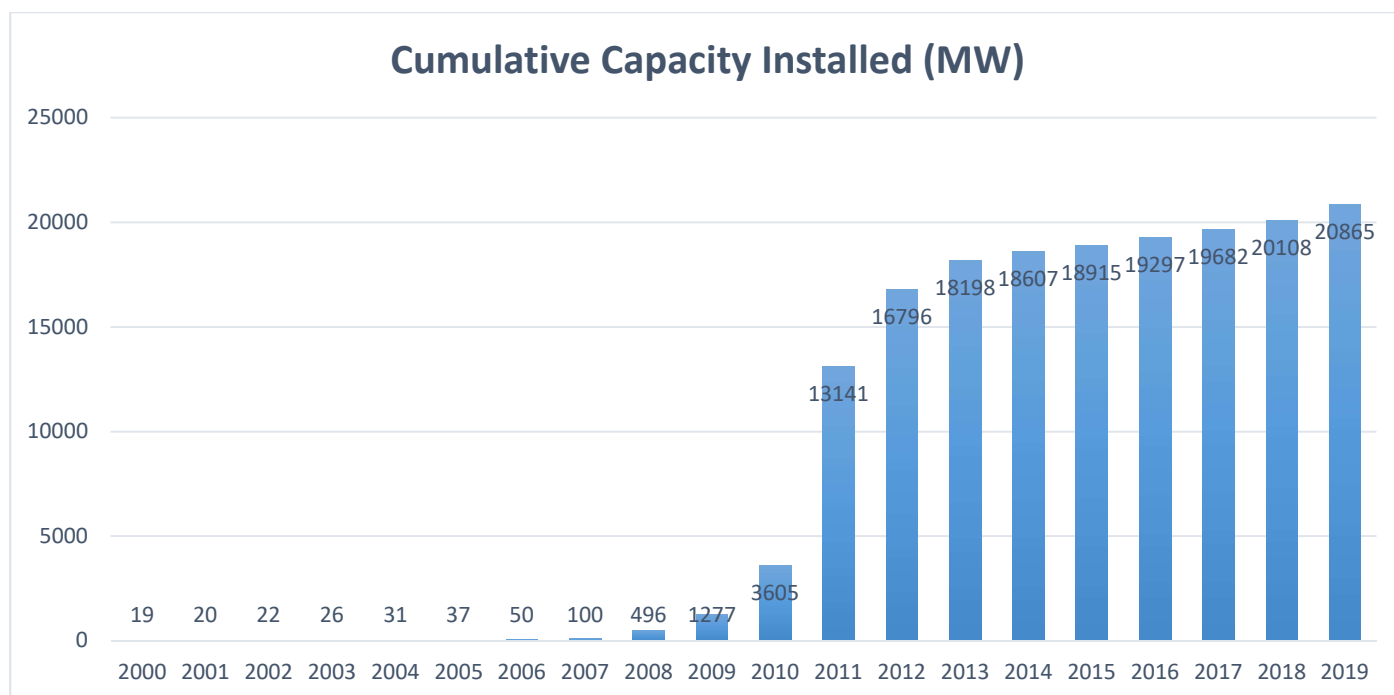
Giovanni Cimini

In the '70s two friends, Giovanni Cimini and Bruno Olivieri, at that time students, began to build artisanal amplifiers and loudspeakers for their city's music groups and some primordial electric bikes with the CRA brand so as to allow trips on weekends during the 1973 oil crisis. Following the good results obtained by their first attempts, they founded CRA Elettronica based in the Cimini's garage in 1979. In 1984, CRA Elettronica changes its name to Western CO. Promising results did not take long and during the 90's they developed an integrated solar energy production and storage system that gave rise to the well-known Leonardo System range on the market today. From that moment on and under the visionary leadership of Mr. Cimini, Western CO. is constantly dedicated to developing products for energy independence and the widespread production of energy from renewable sources.

For the current edition of the booklet others from Italy listed in the pioneer's section include:

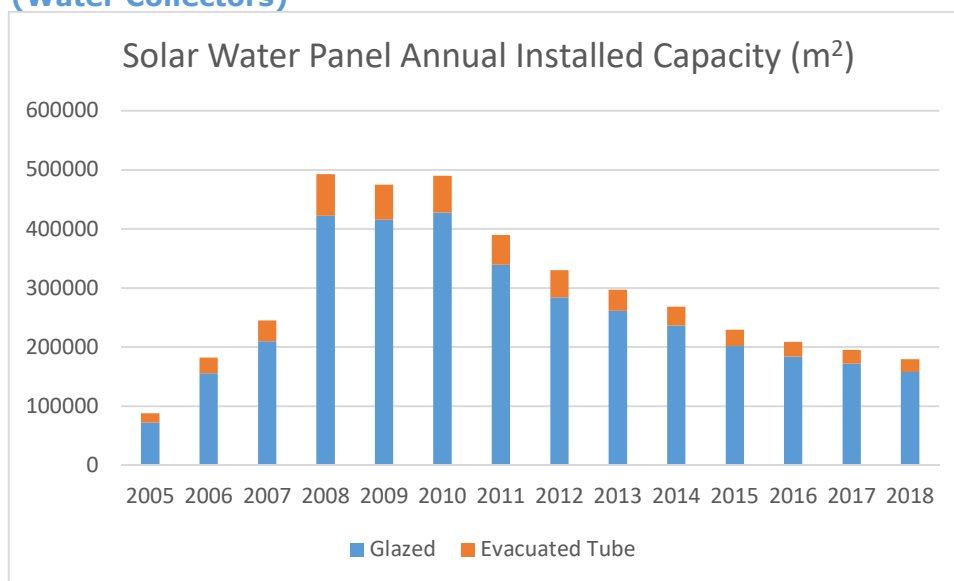
Name	Year Started	Research or Industry
Cesare Silvi	1981	Industry
Roberto Vigotti	1982	Industry
Arnulfk Jäger-Waldau	1987	Research

Growth in Solar in Italy Photovoltaics



Source- IEA PVPS Trends Report 2020

Solar Thermal (Water Collectors)



Source- IEA-SHC Annual Solar Heat Worldwide (2007-2020)

Renewable Energy Pioneers

Without the efforts of individual researchers, system designers, system installers, business leaders, policy makers and those within the donor community, the renewable energy industry would not have grown from watts to Gigawatts in the last 50 years. ISES' way of acknowledging the many people was by issuing a call for the submission of Renewable Energy Pioneers to be listed in the celebratory booklet.

ISES will be releasing an updated version of the booklet in December 2021 and therefore **ISES is re-issuing the call for submissions of the names of individuals covering the following two categories:**

1. **Research Pioneers:** Individuals who started their research in 1995 or earlier.
2. **Industry Pioneers:** Individuals who actively started working in or with the renewable energy industry in 1995 or earlier.

Names and information can be submitted [here](#). Individuals can submit on behalf of themselves or on behalf of someone else, in particular for those who might have passed away. (**Note:** If you have previously submitted and are included in the current edition of the booklet, you will be included in the updated edition and do not need to resubmit.)

Partners of SWC50

ISES acknowledges the support provided by the Platinum Partners: GSES from Australia and NREL from USA; Gold Partner: Smart Energy from Turkey.



ISES Solar World Congress 2021

From October 25-29, the [ISES Solar World Congress 2021](#) will take place as an online event and we are looking forward to this first ever virtual Solar World Congress!



Highlight your solar expertise by becoming a SWC 2021 Sponsor!

The ISES Solar World Congresses have been the leading solar congresses for over 50 years - join SWC 2021 and benefit from a truly well connected, diverse and enthusiastic solar community from all around the globe!

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- Access to international solar energy experts, including promising young professionals
- Speaking opportunity

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