



SWC50-The Century of Solar Celebration Newsletter – March 2021

This month we provide

- A brief overview of solar research and applications in the 1950's; and
- A focus on Argentina, Brazil and Chile.

The overview of solar in the 1950'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

Photovoltaics' 1950's

Two significant events in the history of PV in the 1950's include:

- On April 25th 1954 the Bell Laboratory presented the Bell Solar Battery (the modern day solar cell) to the press and Daryl Chapin, Calvin Fuller, and Gerald Pearson are given the credit for developing the silicon photovoltaic (PV) cell. The solar cell had a 4% efficiency which was increased to 6% within a few months.
- On 17th March 1958 the Vanguard I space satellite was launched and used a small 0.1W, 100 cm² solar module to power its radios. This was the first time solar was used on a satellite. The system ran continuously for 8 years.

Solar Thermal 1950's

Solar water heater development was being undertaken in a number of countries and a number of future ISES Presidents were very involved. Significant events included:

 Solar energy was identified as a technology of strategic significance to Australia and by 1954 a prototype solar water heater had been built and tested and a report on its design and construction published. An account of this work was presented by Roger Morse which was one of the first to set out the principles on which the design of solar water heaters could be based. It drew on what had previously been published, particularly Hoyt C. Hottel's work on flat plate collectors at Massachussets Institute of Technology (MIT).

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 is commemorating 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 from being grown emerging has 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: The SWC50 virtual conference was held on 3 - 4 December 2020, with two follow up webinars due in 2021.



Solar Thermal 1950's Continued

• In 1954 Farrington Daniels and John Duffie set up the **Solar Energy Laboratory** at the University of Wisconsin Madison. Bill Beckman became the Second Director of the laboratory in 1988. Over the years over 100 students in Mechanical and Chemical engineering received MS and PhD degrees from UW Solar Energy Laboratory.

Solar Architecture/Buildings

In the 1950's Solar houses were built in Tokyo, Japan; Bristol and Rickmansworth in England; Casablanca, Morocco and Nagoya, Japan. Other significant achievements included:

In 1956 Architect Frank Bridgers designed the world's first commercial office building (Bridgers-Paxton Building) in Albuquerque, New Mexico using solar water heating and passive design.

In 1957 Dr George Löf built a house in the Cherry Hills neighbourhood of Denver which used a novel method to collect and store solar heat. It was designed by architect James M. Hunter, and Löf designed a flat-plate collection system which heated air and circulated the heat to be stored in rock beds in large cardboard tubes inside the house. Löf lived in the house for more than 50 years until his death.

For more highlights, please refer to the <u>ISES SWC50 The Century of Solar Stories and Vision</u> <u>Booklet</u> or the <u>ISES Solar Energy Museum – Past, Present and Future.</u>

Focus on Argentina, Brazil and Chile

Argentina

The Asociación Argentina de Energía Solar, <u>ASADES</u> was founded in 1974 with its first meeting, with 23 members, taking place in the Observatory, in San Miguel, in November 1974. However, the Foundational Act. Of ASADES was formally constituted during the First Latin- American Congress in Solar Energy, in April 1975. Sixty-eight people attended that congress. The first president elected was Dr. Jaime Moragues. The annual meetings of ASADES started in 1975 in Vaquerías and have continued up to now, being held in different cities where research groups existed.

In 1992 the ISES chapter was formed.

In 1997 the Association changed its name to Asociación Argentina de Energías Renovables y Ambient to include a broader scope of subject, but the acronym was retained.

Today, through more than 46 years of institutional life, ASADES is solidly established as a governing entity that constitutes an example institution, with a constant search for solutions on our environment.

It currently has over 400 members representing the main institutions, universities, laboratories, environmental NGOs and companies in Argentina.

Brazil

The Brazilian Solar Energy Society (<u>ABENS</u>, Associação Brasileira de Energia Solar in Portuguese) is the official Brazilian Section of ISES, and was created on February 17, 1978 with the aim of promoting the dissemination of and carry out studies on the many areas of solar energy in Brazil.

The years of growth in solar energy research in Brazil coincide with the international oil crisis, a situation that, at the time, encouraged researchers and authorities responsible for the energy area to look for alternatives to this crisis. However, having gone through its worst phase in the second half of the 1980's, the resources available for carrying out research in the field of solar energy began to suffer a retraction, which decisively contributed to a reduction in the scientific production of researchers active in this area.

ABENS held several Annual Work Meetings throughout the 1980's, but never a scientific congress, and the association remained dormant throughout the 1990's and early 2000's. The first ABENS scientific conference CBENS (Congresso Brasileiro de Energia Solar in Portuguese) took place only in 2007, and has been held regularly ever since.

CBENS is now an established event, and usually attracts from 400 to 600 participants, mostly from Brazilian universities and research centers, as well as participants from neighbouring countries in South America, with guest speakers invited from all over the globe.

ABENS' bylaws are based on ISES' bylaws, and ABENS' governance body is composed of a President and a Vice-President, together with the 1st and 2nd Secretary and the 1st and 2nd Treasurer, which are elected by simple ballot every two years.

ABENS actively promotes gender equality, and has created a Women in Solar Energy Network to discuss gender equality issues and attract women to the field of solar energy.

Chile

At the beginning of the 20th century, the Atacama region was already known as an optimal solar location. Considering this characteristic, in 1918 the Smithsonian Astrophysical Observatory, led by Samuel Langley, installed a solar observatory in northern Chile, specifically in Calama.

In terms of institutional networking, the creation of the National Solar Energy Committee in 1957 can be considered a milestone in the early stages of solar energy development in Chile. The Committee met periodically to discuss technical aspects around publications and trends in solar science and technology in the world and Chile. Another important milestone was the Solar Energy Laboratory, funded in 1961 under the initiative of Professor Julio Hirshmann Recht, a pioneer researcher in the field of solar energy, who was its first Director until 1978. The Laboratory was located on top of the Central House tower at the Technical University Federico Santa María in Valparaiso. Julio Hirschmann was also the Director of the Chilean Association of Applied Solar Energy, ACHESA, from its creation in 1963 until 1974.

The Chilean solar community was in close contact with international organizations that were grouped around ISES, which soon added international sections. The Chilean section, chaired by Julio Hirschmann, Joined ISES in 1972 as the third international group, after Australia and New Zealand.

ISES Solar World Congresses

Chile hosted the Solar World Congress in Santiago in 2019.

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 in this monthly newsletter to cover the thousands who have contributed to the development of renewable energy prior to 1980. What is included in each newsletter is just a snapshot of those involved are taken from those included in the SWC50 celebratory booklet: *The Century of Solar-Stories and Visions*.

Roberto Roman (Chile)

Roberto Hernán Román Latorre started his solar research in 1965 and was by profession a Civil Mechanical Engineer, specialized in Solar Energy in Argentina, with postgraduate studies at the Heliophysics Department of the University of Provence, France and at the International Center for Theoretical Physics of Trieste, Italy. He was associate professor in the Department of Mechanical Engineering of the Faculty of Physical and Mathematical Sciences of the University of Chile and researcher at the Solar Energy Research Center (SERC-Chile), vice president of membership affairs of the International Solar Energy Society (ISES), and researcher and consultant in renewable energies both nationally and internationally, as well as the creator of EcoMaipo, an organization dedicated to education, training and bringing renewable energy to less favored sectors. Roberto Román entered the University of Chile in the 1960s, served as an academic at the Faculty of Physical Sciences and Mathematics until he was 74 years old. Internationally he was an ISES member since 1979 and was on the ISES board of Directors in 1991, 2010, 2012 and 2016. He also held the Vice Presidency of ISES Membership Affairs 2011-2012.

Ruben Piacentini (Argentina)

Ruben Piacentini started his research in solar energy in 1967. He is the Professor of the first postgraduated Couse on "Fundamentals of Solar Energy" in Faculty of Exact Sciences and Engineering, National University of Rosario (FESE/NUR), Argentina (1978). He is an invited professor of graduate and post-graduate courses and Researcher at different national and international Universities and Research centers (1984-present). Professor Piacentini undertakes research at CONICET, Argentina, from the Independent to Superior categories on Solar Energy, Atmospheric components that attenuate solar radiation (ozone and aerosol) and Climate change (1978-present). He is Founder and Director of the Solar Energy Group at FESE/NUR, 1977-1980. From 1981 to the present, Director of the Atmospheric Physics, Solar Radiation and Astroparticles Group, Institute of Physics Rosario, CONICET-National University of Rosario.

Hugo Grossi Gallegos (Argentina)

Hugo Grossi Gallegos started his research in 1978 and was Director of Solarimetric Network in Argentina from 1980 up to its dissolution. He was coordinator of the Subregional Solar Resource Survey Project (Organization of American States, OAS, Multinational Project for the Environment and Natural Resources) 1992-1995, and author of "Solar Radiation Charts for Argentine Republic", 1997 (Argentine territory extends from 22°S to 55°S and it mostly offers favorable conditions for the use of solar energy). Measurements of solar radiation have taken place during the last forty years, particularly since the installation of a quality-controlled pyranometer network which began operations in 1979. Hugo Grossi Gallegos has published 71 articles, 4 books, 4 chapters in books, 30 conference papers, 5 technical reports and gave 7 presentations and has directed, coordinated or acted as professor in national and international courses and delivered over 100 lectures

For the current edition of the booklet there are no others from Argentina or Chile listed in the pioneer's section, while those from Brazil include:

Name	Country	Year Started	Research or Industry
Bruno Topel	Brazil	1981	Industry
Roberto Zilles	Brazil	1985	Research
Antonia Sônia Alves Cardoso Diniz	Brazil	1988	Research
Ricardo Rüther	Brazil	1992	Research
João Tavares Pinho	Brazil	1995	Research

Growth in Solar Photovoltaics



Source: IEA 2020 Renewable Report and World Solar Council Presentation



Solar Thermal (Water Collectors)









At the end of 2018 each of the three countries had the following cumulative installed water collector capacity.

Country	Unglazed (m ²)	Glazed(m ²)	Evacuated Tube(m ²)
Argentina	18,636	20,786	49,496
Brazil	5,998,282	9,954,957	129,962
Chile	65,550	234,528	54,305

Note: The IEA-SHS annual reports had the cumulative data for Argentina at end of 2018 but did not have yearly figures prior to 2018.

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 reissuing 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 <u>here</u>. Individuals can submit on behalf of themselves or on behalf of someone else, in particular for those who might have passed away.

Partners of SWC50

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