



**JOIN THE CENTURY OF SOLAR**

A Year of Virtual Celebration

## ***SWC50-The Century of Solar Celebration Newsletter – October 2021***

This month we provide

- 2020 and the future 2020-2050 and
- A focus on Norway.

Two key outputs of the SWC50 celebration have been the: [ISES SWC50 The Century of Solar Stories and Vision Booklet](#)

and

the [ISES Solar Energy Museum – Past, Present and Future](#)

An updated version of the booklet will be released in December 2021 to mark the end of the 12-month celebration of SWC50. Pioneers that have been submitted since December 2020 will be added to the booklet.

Names and information can be submitted [here](#). Individuals can submit on behalf of themselves or on behalf of someone else or 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.)

**Closing date for renewable pioneer submissions to be included in the updated version is 15<sup>th</sup> November 2022.**

During 2022 it is proposed to undertake an upgrade to the museum for re-launch later in 2022.

### ***ISES 2020-21***

Like all organisations the Covid pandemic has affected the activities of ISES. Both the SWC50 Celebration Conference and the 2021 Solar World Congress were online events.

Like many organisations and companies, the ISES Board of Directors and Executive Committee has had to meet via Internet meetings. It would be the first time in many years (if not ever) that the board did not have a face-to-face meeting during the current board's 2-year term, hopefully that will change over the next board's term that starts January 2022.

ISES staff have continued to be busy with monthly webinars, monthly newsletter, the various conferences and other outreach activities.

[www.swc50.org](http://www.swc50.org)

[swc50@ises.org](mailto:swc50@ises.org)

[#SWC50](https://twitter.com/SWC50)

### **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.

### ISES President 2020-2023

Years	President	Country
2020-2023	Klaus Vajen	Germany

### Solar World Conferences 2020-21

Year	Location	Overview
2020	Online	SWC50: Solar World Congress at 50
2021	Online	SWC2021 25-29 October

### The Future 2020-2050

The booklet: ISES SWC50 The Century of Solar Stories and Vision Booklet, launched in December 2020 as part of the SWC50 celebrations, provides a summary of the growth of renewable energy over the past decades. The summary includes key highlights of the different technologies and applications broken into time periods. The booklet then concludes with a chapter titled "The Future".

The future provides a summary and analysis of three studies that were developed as a result of the Paris Climate Agreement. These studies are:

1. **IRENA Global Renewables Outlook Edition: 2020. Energy Transformation 2050.** International Renewable Energy Agency, April 2020. [https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Apr/IRENA\\_Global\\_Renewables\\_Outlook\\_2020.pdf](https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Apr/IRENA_Global_Renewables_Outlook_2020.pdf)
2. **Achieving the Paris Climate Agreement Goals**, Springer-Open (2019) Teske, Sven (Editor). <https://doi.org/10.1007/978-3-030-05843-2>.
3. **Global Energy System based on 100% Renewable Energy – Power, Heat, Transport and Desalination Sectors.** Study by Lappeenranta University of Technology and Energy Watch Group, Lappeenranta, Berlin, March 2019. Ram M., Bogdanov D., Aghahosseini A., Gulagi A., Oyewo A.S., Child M., Caldera U., Sadovskaia K., Farfan J., Barbosa LSNS., Fasihi M., Khalili S., Dalheimer B., Gruber G., Traber T., De Caluwe F., Fell H.-J., Breyer C.

With COP26 in Glasgow these first two weeks of November 2021 the key discussion point at the moment is what countries are making commitments to Zero Emission by 2050 (or earlier). Several international organisations have released reports/studies this year in how this could be achieved. These include:

1. **IRENA World Energy Transitions Outlook 2021.** International Renewable Energy Agency, April 2021. <https://www.irena.org/newsroom/pressreleases/2021/Jun/IRENAs-World-Energy-Transitions-Outlook-Re-Writes-Energy-Narrative-for-a-Net-Zero-World>
2. **Net Zero by 2050, A Roadmap for the Global Energy Sector.** International Energy Agency, May 2021 <https://www.iea.org/reports/net-zero-by-2050>

The following provides a summary, as shown in these two reports, of what must happen starting in 2020 and achieving zero emissions by 2050:

#### 2020 The path to net-zero emissions is narrow

*The path requires massive deployment of all available clean energy technologies – such as renewables, EVs and energy efficient building retrofits – between now and 2030.*

*For solar power, it is equivalent to installing the world's current largest solar park roughly every day.*

#### 2025 A surge in clean energy investment can bring jobs and growth

*To reach net zero emissions by 2050, annual clean energy investment worldwide will need to more than triple by 2030 to around \$4 trillion.*

*This will create millions of new jobs, significantly lift global economic growth, and achieve universal access to electricity and clean cooking worldwide by the end of the decade.*

### **2030 We need to drive huge leaps in clean energy innovation**

Most of the reductions in CO2 emissions through 2030 come from technologies already on the market today. But in 2050, almost half the reductions come from technologies that are currently at the demonstration or prototype phase.

Major innovation efforts must take place this decade in order to bring these new technologies to market in time.

### **2035 A rapid shift away from fossil fuels**

*Net zero means huge declines in the use of coal, oil and gas.*

*This requires steps such as halting sales of new internal combustion engine passenger cars by 2035 and phasing out all unabated coal and oil power plants by 2040.*

### **2040 Electricity becomes the core of the energy system**

*Electricity will play a key role across all sectors, from transport and buildings to industry. Electricity generation will need to reach net-zero emissions globally in 2040 and be well on the way to supplying almost half of total energy consumption by 2050.*

*This will require huge increases in electricity system flexibility – such as batteries, demand response, hydrogen-based fuels, hydropower and more – to ensure reliable supplies.*

### **2045 New low-emissions industries flourish**

*By 2045, new energy technologies will be widespread.*

*The vast majority of cars on the roads will be running on electricity or fuel cells, aircraft will be relying largely on advanced biofuels and synthetic fuels, and green hydrogen will become an important energy source and carrier.*

### **2050 A Clean Energy World**

*The global energy sector in 2050 will be based largely on renewables, with solar the single largest source of supply. Achieving this cleaner, healthier future will rely on a singular, unwavering focus from all governments, working closely with businesses, investors and citizens. It will also require greater international cooperation among countries to ensure that developing economies have the financing and technologies they need to reach net zero in time.*

With respect to milestones required in renewable energy the IEA reports states:

*Renewable energy technologies like solar and wind are the key to reducing emissions in the electricity sector, which is today the single largest source of CO2 emissions.*

*In our pathway to net zero, almost 90% of global electricity generation in 2050 comes from renewable sources, with solar PV and wind together accounting for nearly 70%.*

### **Focus on Norway**

Research and development in solar energy technology in Norway began in the early 1970s. In 1979 the Ministry of Petroleum and Energy formed a committee with the mandate to outline a national research programme in this field. Due to increasing scientific and technological interest in solar energy, many realized the need for a strong professional network, and the idea of an association developed.

The Scandinavian Section of ISES was founded in 1975, with members from Sweden and Denmark and a handful of Norwegians. The name of the Section was Solar Energy Association of Scandinavia, SEAS. The Secretariat was located in Stockholm. After some time, local Sections were set up in both Sweden and Denmark.

In November 1980 a Nordic seminar on "Hot air solar heating systems" was organized in Trondheim, Norway, gathering about 70 participants. A presentation of SEAS was given during the seminar that spurred significant enthusiasm for establishing a local section in Norway as well. Fritjof Salvesen,

Harald Røsvik, and Ragnar Evensen were appointed to an interim committee to prepare the founding of a national ISES section in Norway.

The interim committee lead by Mr. Salvesen called for a founding meeting, and on 23 April 1981, twenty-eight people met in Oslo to accomplish the formal founding of the Solar Energy Association of Scandinavia – Norwegian Group, (SEAS Norge) also known as the Norwegian Section of ISES.

The first board members in the section were Fritjof Salvesen (chairman); (Engineer, I/S Miljøplan, Sandvika); Øyvind Aschehoug (scientist, SINTEF, Trondheim), and Georg Parmann (journalist, Aftenposten, Oslo), Harald N. Røsvik (architect, own business, Stavanger). Architect Anne Grete Hestnes (SINTEF) was elected financial auditor. The objectives clause in the by-laws mandated that Norsk solenergiforening shall promote the rational use of solar energy in Norway by supporting research, and education, and by raising public awareness.

By November 1981 the Society had about 50 members

The Norwegian Section has served as the most important network and meeting place for academic and industry professionals in the solar energy field in the country. The Norwegian Section and its active members have provided an environment for public awareness and enthusiasm that has facilitated scientific interest and governmental funding in solar technology.

Being the home Section of Professor Anne Grete Hestnes, the Norwegian Section was proud to be the home Section of the first female president in ISES history when she took office in 2001.

Today the Norwegian Solar Energy Society is a still non-commercial organization which promotes increased knowledge and use of solar energy - both solar electricity / PV and solar heating. The organization has about 500 members, including both company/institution members and private citizens.

### *ISES Presidents from Norway*

Anne Grete Hestnes was president of ISES 2002-2003



***Anne Grete Hestne,***

### *Sample of Pioneers from Norway Pre-1980*

Each month this newsletter will have a sample of people involved with renewable energy prior to 1980. These come from the focus country for that edition of the newsletter.

It is impossible to cover the many people 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*.

## Harald N Røstvik

Since 1975 Professor Harald N Røstvik has been engaged in research, design, publication and dissemination to share information about the solar potential. He has designed solar systems or buildings in Sri Lanka, Mali, Italy, Cyprus, Sweden and Norway. He has written ten books about the transfer from between fossil fuels to solar. Written thousands of articles, spoken at numerous conferences and tutored thousands of students mostly on Master but also on Phd level. He was the first Norwegian engaging in Tour the Sol in Switzerland by creating media attention to it since 1984. He designed Europe's first modern renewable energy based solar building with state Housing bank standard at Building for the Future exhibition in Stavanger, Norway in 1988 ("Chanelle"). He designed with Peter Opsvik "Butterfly", a third world city solar taxi in 1995. His book "The Sunshine Revolution" and the video in 1992 sold in 52 countries and was read by 4 presidents of the world. He is still active at 71 years old and the university UiS just renewed his contract for teaching till 2024. Two years ago - at 69 - he won the prize of the best Master level teacher at the Faculty of Science and Technology (UiS). Selected among all students at the faculty. They claimed; "he loves his work, believes in the future and installs hope in the students to compete the "no-hope-future mentality many possess."

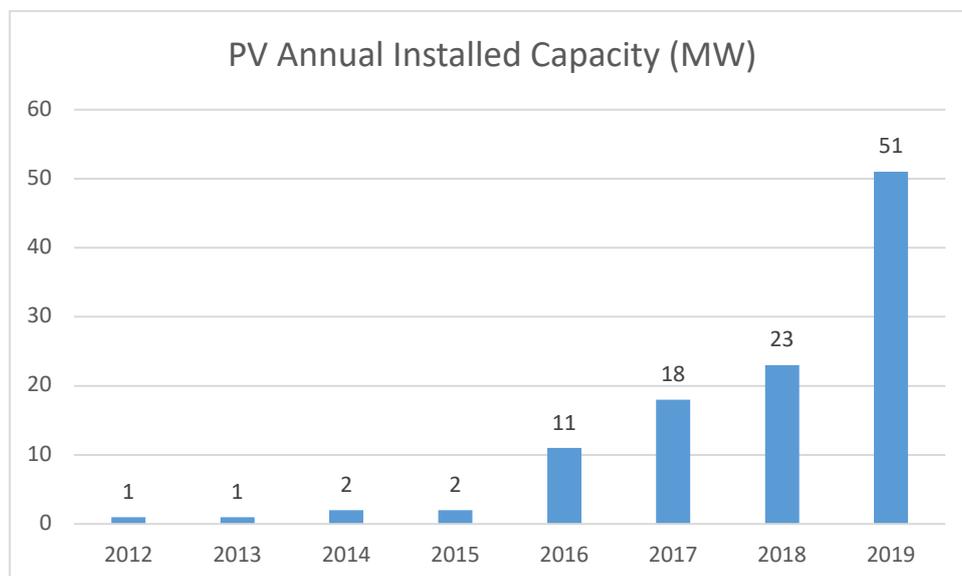
## Anne Grete Hestnes

Anne Grete Hestnes is an architect with degrees from M.I.T. and UC Berkeley. She has been full professor of building technology at the Norwegian University of Science and Technology since 1985. Anne Grete Hestnes is presently Dean of the Faculty of Architecture and Fine Art at NTNU Her main scientific interest is in the areas of energy conservation and the use of solar energy in buildings.

In 1981 she elected the first financial auditor of the newly formed Norwegian Section of ISES and in 2011 was elected President of ISES for the 2002-2003 term.

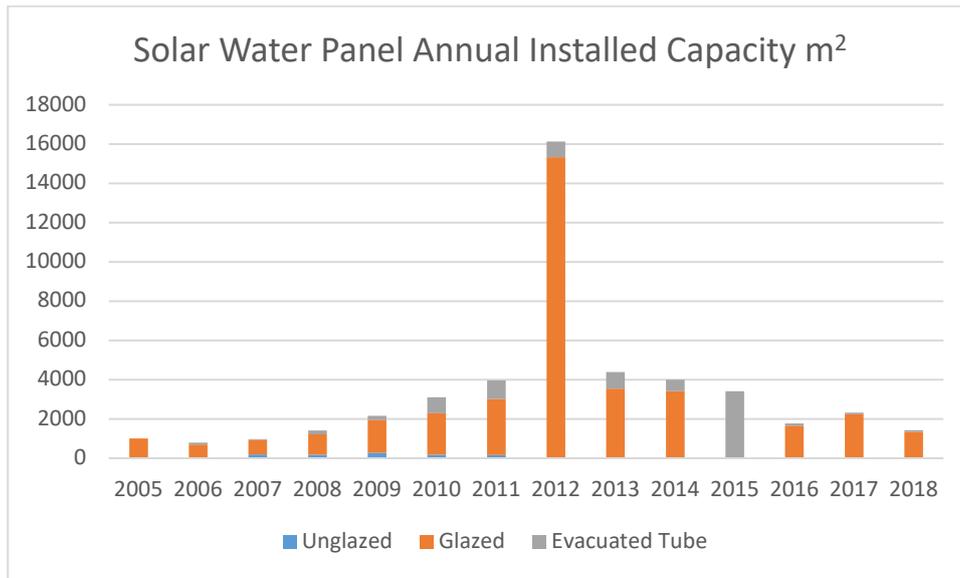
In 2005, she was awarded an honorary doctorate by Chalmers University for her work within the field of sustainable development, and in 2011 she received the Farrington Daniels Award for her contribution to the advancement and knowledge of solar energy in the built environment. During it's first three years of operation (2009-2012) she was director of the National Centre for Environment-friendly Energy Research – Zero Emission Buildings. Her areas of specialization are energy conservation and the use of solar energy systems in buildings, as well as optimization and integration of systems. Hestnes is presently Dean of the Faculty of Architecture and Fine Art at NTNU. In Norway, she is frequently consulted by the Ministry of Petroleum and Energy and by the Research Council of Norway both on scientific and on policy issues

## Growth in Solar in Norway Photovoltaics



**Note:** Prior to 2012 IEA PVPS reported 6MW installed in 2000 and 1MW in 2007  
*Source- IEA PVPS Trends Report 2020*

## Solar Thermal (Water Collectors)



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

### 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.

