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DEVELOPMENT OF PHOTOVOLTAICS FROM 1990 TO 2020

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BEGINNINGS

The 1989 PHALK 500 Mont-Soleil project was the basis for constructing the Mont-Soleil solar power plant, which was designed as a research, development and demonstration facility. Not only did the project include a future-proof technical concept, but it also provided a thorough analysis and forecast of photovoltaics as part of the Swiss energy mix. “Most experts thought that photovoltaics would only make a relatively modest contribution to overall energy production in Switzerland for the foreseeable future. Those who predicted a 5% share were among the more optimistic; yet even this prospect was worth testing out!” [1]

On April 28, 1992, the Mont-Soleil solar power plant was officially commissioned. With its rated output of 560 kW, it was Europe’s largest photovoltaic plant at the time. During his opening speech, Swiss Federal Councilor and Minister of Energy, Adolf Ogi, mentioned the importance of solar energy in Switzerland’s future energy supply if bold research efforts paid off and it became possible to harness the remarkable growth potential of solar energy. “We need to hear modern Archimedes figures shouting ‘Eureka!’ every now and then.” [2]

As early as October 27, 1992, the first results from the Mont-Soleil facility’s research were unveiled and caught international attention. It was with great satisfaction that Société Mont-Soleil jumped to the international top spot in photovoltaics, all thanks to its solar power plant. At the same time, Société Mont-Soleil was asked to remain realistic because the anticipated production costs of solar power at Mont-Soleil were around CHF 1.10/kWh, making them about 20 times higher than those for Swiss hydroelectric plants, which cover approx. 60% of Switzerland’s electricity needs. Solar power also comes with a disadvantage in that it cannot provide guaranteed or demand-based power due to a lack of storage options. This led to a number of conclusions: “Photovoltaics still require a vast amount of costly and time-consuming research and development work on an international and interdisciplinary level. The focus here should be on: reducing the costs of solar cells and infrastructure; improving efficiency; extending service life; and improving overall environmental balance. In doing so, the now favored approach of installing photovoltaics on buildings would bring considerable benefits.” [3]

IMPLEMENTATION

Société Mont-Soleil has embraced this advice from the project initiators and implemented it step by step over the years in numerous research projects, which are listed below in note form. A more complete description is available in [4].

Entreprises partenaires:

BKW Energie SA, ABB Suisse SA, AEK Energie AG, AEW Energie AG, onyx Energie Mittelland AG, Société des Forces Electriques de La Goule SA.

Partenaires affiliés:

Bourgeoisie de Saint-Imier, Municipalité de Saint-Imier.

- Long-term behavior of photovoltaic plants connected to the grid (1992–present)
- Scientific analysis of plant operation (1992–1999)
- Module tests (1993–present)
- System tests (1997–1999)
- Laboratory solar cell and solar roof tests (1998–1999)
- Open-air tests on laboratory solar cells (1999)
- MobiCat solar vessel (2000–2013)
- Yield-relevant criteria for solar modules (2002–2004)
- Safety standard for photovoltaic plants (2004)
- Research cooperation with Solar Impulse by B. Piccard et al. (2005–2015)
- IEA Photovoltaic Power Systems Programme (2006–2014)
- Plant comparison of Mont-Soleil, Stade de Suisse and Jungfraujoch (2008)
- Thermographic analysis to localize defects (2008–2013)
- Energy storage using compressed air (2010–2017)
- Shortest-term feed-in forecasts for solar electricity (2011–2014)
- Battery storage in the Mont-Soleil solar power plant (2013–2016)
- Swiss Energypark (2015–present)
- Rapid insolation changes at PV plants (2017)
- Recycling photovoltaic plants (2018)
- Winter-optimized photovoltaics (2018–2019)
- Surface design of PV modules (2019)

CONCLUSION

The photovoltaic industry has seen an enormous boom in recent decades. In 2019 alone, the PV modules produced globally had an overall rated output of 130,000 MW. That is 2,600 times more than in 1991. The costs over the same period also fell 20-fold. However, this development came at a price for some players. Many once renowned European providers vanished from the market during this time. Today, less than 5% of solar modules are produced in Europe. By contrast, China now manufactures approximately 70% of them.

Even so, solar energy has gained significant ground in the Swiss energy mix over the last thirty years, its share rising from virtually 0% to 4% in 2019. This means that the forecasts of three decades ago were actually very accurate. Generally, the original concepts proved incredibly farsighted and have undoubtedly made a significant contribution to Société Mont-Soleil's many years of success. The project initiators deserve every credit for their work.

REFERENCES

- [1] R. Minder, A. Bertschinger, «Das photovoltaische Solarkraftwerk Phalk 500 Mont-Soleil», Bulletin SEV/VSE 16/1989.
- [2] A. Ogi, Eröffnungsansprache anlässlich der Einweihung des Sonnenkraftwerks Mont-Soleil, 28.04.1992.
- [3] R. von Werdt, «Mont-Soleil – erste Bilanz und Perspektiven», Medienorientierung vom 27.10.1992.
- [4] J. Vollenweider, «PV-Forschung auf dem Mont-Soleil», Bulletin SEV/VSE 10/2019.