

FOREWORD

Events like the oil crisis in 1973, the Chernobyl catastrophic nuclear accident in 1986, but especially the awareness of the ever-increasing degradation of the environment have led to global sustainable development policies. Starting with the Kyoto Protocol, the world entered in a new developing stage with new targets covering sustainable living supported by renewable energy technologies. It already belongs to common sense that solar energy will play a major role in enhancing energy security while reducing energy-related CO₂ emissions, the only thing that remains disputed being the pace of this evolution. The current state-of-the-art in PV industry shows that the percentage of solar electricity in the energy mix will continuously increase. Day after day, small or large solar systems are connected to the grid. Sometimes, aided by favorable policies, reality exceeds the most optimistic predictions. A good example is the amazing growth of the PV installed capacity in Romania, where at 1 January 2012 the installed PV capacity was less than 2 MWp and in May 2014 the installed PV capacity in Romania has exceeded 1.1 GWp.

A challenge for the power grid operators is to synchronize at every moment the electricity production with the demand. The equilibrium is constantly changing with the fluctuation of the demand, but it is now furthermore threatened by increasing the penetration of the renewable energy sources such as wind and solar, whose inherent variability may induce significant energy fluctuation into the grid. Forecasting the energy production of the wind and solar plants is a crucial task for enabling operators to take control actions to balance the power grid.

The research on photovoltaics at the Physics Department of the West University of Timisoara, Romania, has begun in 2000 and experienced an impressive development after the commissioning of the Solar Platform in 2008 (<http://solar.physics.uvt.ro/srms/>). The main component of the Solar Platform is the Solar Radiation Monitoring Station, the first Romanian radiometric station outfitted for systematic monitoring solar radiation on tilted surfaces. Currently, the Solar Energy Research Group (<http://solar.physics.uvt.ro/>) is focused

on three well defined fields: (1) Modeling Solar Radiation at the Earth Surface; (2) Modeling the solar cells operation; (3) Forecasting the energy production of PV systems. The team consists of eight researchers. The strength of the team stems from its diversity, being formed of researchers specialized in very different domains: physics, mathematics, statistics, astrophysics and computer science.

This number of the Annals of the West University of Timisoara has an anniversary status, at ten years of operating the Solar Platform of the West University of Timisoara, 2008-2018. The Editors gratefully thank all the contributors and look forward to new and fruitful collaborative research projects in this fascinating world of solar energy.

Nicoleta Stefu
Managing Editor

Marius Paulescu
Guest Editor

Timisoara
August 21, 2018