INNOSTORAGE – USE OF INNOVATIVE THERMAL ENERGY STORAGE FOR MARKED ENERGY SAVINGS AND SIGNIFICANT LOWERING CO_2 EMISSIONS

Beneficiaries:

Partners:

D7.2 - Report on Staff Exchanges

	Name and Institution	Date
Prepared by:	John Boland University of South Australia	29/09/2017
Checked by:		
Approved by:	Prof. Dr. Luisa F. Cabeza Universitat de Lleida	15/10/2017

Contents

1 Objectives

To discuss which mathematical and statistical tools that I and my team have developed that can be applied by researchers at Universitat de Lleida for their energy storage projects.

2 Introduction

I gave a presentation that detailed a number of tools, including the BRL diffuse radiation model, short term solar forecasting, estimating solar radiation on inclined planes, and creating future weather data sets incorporating climate change impacts. This led to interest from researchers.

3 Description of work

Emanating from my description of what help I can provide, I had discussions with Dr. Álvaro De Gracia Cuesta and student Miguel Maldonado. I have provided them with the tools necessary to implement the Boland-Ridley-Lauret diffuse radiation model for estimating diffuse from global radiation. From that they will be able to estimate the Direct Normal Radiation at one minute, five minute and one hour time steps for use for their concentrating solar collector and storage optimisation work. Additionally, Dr. De Gracia is interested in my helping them to forecast electricity demand for optimising the operation of a house energy system. So, I will be provided with data for future investigations.

4 Materials and Methodology

BRL Diffuse Radiation Tool.

Statistical and Time Series Forecasting Tools.

5 Results

The principal result thus far is the dissemination of the tools listed above and supplementary knowledge on how to use them.

6 Outcomes or future work

As stated above, there will be ongoing work helping with implementation of the BRL model, plus investigation of the forecasting of building electrical demand.

7 References

Adrian Grantham, Yulia R Gel, John Boland, (2016) Nonparametric short-term probabilistic forecasting for solar radiation, *Solar Energy*, **133**, pp. 465-475.

Ridley, B., J. Boland, and P. Lauret (2010), Modelling of diffuse solar fraction with multiple predictors. *Renewable Energy*. 35(2): p. 478-483.

John Boland (2010) Generation of synthetic sequences of electricity demand with applications, *Handbook on "Uncertainty and Environmental Decision Making"*, in Springer's *International Series in Operations Research and Management Science*, F. S. Hillier (ed.), pp. 275-314.

8 Assessment

It is always valuable for me to be able to discuss common areas of interest where I can share tools that I and my team have developed, as well as learning of areas where I may be able to contribute to in the future. At the same time, I always learn of methods that others utilise that will be beneficial for my development.