Project Outline – short and long description

Personal information	
First name(s) / Surname(s)	Ilija Batas Bjelic
Organization	University of Belgrade
E-mail	batas@etf.rs
Project – short description	Serbia is planning to develop its energy potential in Pumped-storage Hydro Power Plants (PSHPP) and Wind Power Plants (WPP). Due to differences in wind production curves and demand curves an storage is desirable for better utilization. Smartgrid might be solution for balancing wind production and demand using PSHPP.

Project – long description (max. 5 pages):

Ilija Batas Bjelic

Optimal wind capacity expansion for Serbia

Structure of the document:

1. Introduction

Storage capacity is very important paradigm of smart grid technology while it allows integration of variable renewable energy sources (var-RES) such as wind and sun energy. The nature of this energy sources is hardly predictable and larger utilization depends on capacity of smartgrid to immediately receive all electrical energy produced by these sources. While might be a difference in production and consumption this energy must be stored and used later. Currently Serbia has 614MW installed in Pumped-storage Hydro Power Plants (PSHPP) with plans to raise it for another 600 MW in following years[1]. Austria has large potential in PSHPP which is around 3.5GW and (1.4 GW proposed) and has experience in demand for balancing var-RES after market liberalisation[2].

2. Aims/Objects

Which is optimal installed wind capacity that can be balanced with the proposed size PSHPP for based yearly data for Serbia?

3. Methodology

1. Wind data. In order to determine production of WPP wind data is needed first, for the proposed construction location.
2. Demand curve for electricity for Serbia must be determined.
3. Characteristics of PSHPP has to be drafted.
4. Next is definition of optimization equations.
5. Modelling of balancing and dispatching constraints.
6. Using linear programming (LP) methods to solve optimization equation.

4. Output

Scientific article.

5. Summary

Wind capacity of Serbia has to be developed by the optimal size.

[1] THE WHITE BOOK OF THE ELECTRIC POWER INDUSTRY OF SERBIA, May 2011
[2] Techno-economic review of existing and new pumped hydro energy storage plant, J.P. Deane *, B.P. O ´ Gallacho ´ ir, E.J. McKeogh