SEERC RWG 04

Convenor: Yuriy Bondarenko

cigre SEERC

10th SEERC MB Meeting
23.12.2020, Vienna, Austria

Title of the WG:

“Technical and economical features of Hydro Pumped storage power plants (HPSPPs) in power systems”

The WG applies to field of system distributed generation and real-time system operation activities (SC C6)

1st KICK-OFF-MEETING FOR REGIONAL WG 04
Location : Zagreb, Croatia

Participants:

- Branko Horvat (The velebit hydro pumped storage power plant (HPSPP) in Croatia: operating principles, control and renovations);
- Vedran Jurić (Basic Characteristics of the Pumped-Storage Power Plant Vinodol);
- Kastelan (The first pumped storage hydropower plant in Slovenia PSHPP AVČE);
- Tomislav Plavšić (Hydro Pumped Storage Power Plants perspectives in SEERC Region);
- Massimo Rebolini (Hydro Pumping in Italy);
- Svarc (Impact of the RES on the operation of HPSPP Velebit);
- Mladen Zeljko (Models for Integration of HPSP in Power System – Needs and Posibilities for PSHP Construction in Croatia)

SECOND SEERC CONFERENCE in Kyiv 2018

Report: “Hydro Pumped Storage Power Plants perspectives in SEERC Region”
Authors: T. Plavšić, V. Valentić, D. Franković
Croatian Transmission System Operator Ltd., Zagreb, Croatia;
Tehnical University Rijeka, Croatia

Technical and economic indices of PHPP and lithium-ion battery systems

№	Technical specifications	Values	
		PHPP	Lithium Ion Battery Energy Storage
1	Technical specifications		
1.1	Storage Duration, hours:		
	– during generation	4	4
	– during consumption	5	4
1.2	Capacity, MW:		
	– generation mode	4·125=500	500
	– consumption mode	4·135=540	500
1.3	Station power range:		
	– generation mode	7% to 100%	0 to 100%
	– consumption mode	18% to 100%	0 to 100%
1.4	Transient state quantity:		
	– per day	20	3
	– per year	6000	1000
1.5	Power ramp-up duration, minutes:		
1.5.1	generation mode:		
	– from standstill	1–3	Up to 1 sec
	– from hot reserve state	0,5–1	
1.5.2	consumption mode:		
	– from standstill	1–6	Up to 1 sec
	– from hot reserve state	0,5–1	
1.6	Cycle efficiency, %	78	92
1.7	Service life of equipment, years	40	10/25*
1.8	Engineering and Installation Time, years	4,5	1,0
2	Price indices		
2.1	Unit cost 1 kW, USD	1400	1900/3400
2.2	General cost, million USD	700	950/1700
2.3	Equipment disposal costs (% from general costs)	Up to 0	Up to 10

Note: the cost of lithium-ion battery systems is taken from the 2019 Energy Storage Technology Assessment. Platte River Power Authority. June 19, 2019.

* With a service life of 25 years, the batteries will be replaced with new ones on 9th year and 17th year of operation.

Scope of RWG 04 :

1. Basic characteristics of functioning HPSPPs which work in the electric energy system in the countries of south east European region (done);
2. The basic issues, which are solved by HPSPPs in the electric energy system (done);
3. Participation of HPSPPs in generation, control of power and optimization of the daily load curve (done);
4. Work of HPSPPs in the electric energy system with nuclear, wind and solar power plants (to be updated);
5. Automation of the control processes of HPSPPs and SCADA power system (to be updated);
6. Economic aspects of attraction HPSPPs to optimization of the daily load curve of the electric energy system (to be updated);
7. Regional particularities (to be discussed);
8. Report (November 2021).

Participants of RWG4 in 2020, registration in KMS:
- NC Ukraine;
- NC Austria;
- NC Croatia;
- NC Italy;
- NC Slovenia

Meeting of RWG4 March 2021 with updated materials

We will send data and information for discussion of report


Thank you!