



Mapping complementarity between solar and hydro power: Sensitivity study to glacier retreat in the Eastern Italian Alps

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High penetration of climate related energy sources (such as solar and small hydropower) might be facilitated by using their complementarity in order to increase the balance between energy load and generation. In this study we examine and map the complementarity between solar PV and run-of-the-river energy along the river network of catchments in the Eastern Italian Alps which are significantly affected by glaciers. We analyze energy sources complementarity across different temporal scales using two indicators: the standard deviation of the energy balance and the theoretical storage required for balancing generation and load (François et al., 2016). Temporal scales ranging from hours to years are assessed. By using a glacio-hydrological model able to simulate both the glacier and hydrology dynamics, we analyse the sensitivity of the obtained results with respect to different scenarios of glacier retreat.

Reference:

François, B., Hingray, B., Raynaud, D., Borga, M., Creutin, J.D., 2016: Increasing climate-related-energy penetration by integrating run-of-the river hydropower to wind/solar mix. *Renewable Energy*, 87, 686-696.