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Increasing climate-related-energy penetration by integrating run-of-the river hydropower to wind/solar mix

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Installed capacity of climate related energies (CRE), i.e. solar-power, wind-power and hydro-power is growing quickly across Europe. Their penetration rate is however potentially low as a result of the large space and time variability of their driving climatic variables. Increased penetration rates can be achieved with mixes of sources. Optimal mixes, i.e. obtained with the optimal share for each source, are being identified for a number of regions worldwide. However, they often consider wind and solar power only. Based on 33 years of daily data (1980-2012) for a set of 12 European regions, we re-estimate the optimal mix when wild run-of-the-river energy is included in the solar/wind mix. These regions have a variety of climates in Europe moving along two climatic gradients: The north-south gradient mainly explores changes from Scandinavian to Mediterranean hydro-climatic regime. The west-east gradient explores changes from oceanic to continental climate. Energy mix is found to be highly region dependent but the highest shares are often obtained for run-of-the-river, ranging from 35% to 65% in Belarus and England. High solar shares (>40%) are found in southern countries but solar shares drop to less than 15% in northern countries. Wind shares range from 10 to 35% with the exception of Norway, where it reaches 50%. These results put in perspective the optimal 60%-40% wind/solar mix currently used for Europe. For all regions, including run-of-the-river in the mix allows increasing the penetration rate of CREs (from 1 to 8 percentage points).

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Causes of delays in power transmission projects

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Power transmission (PT) is vital to development; therefore, delays in PT projects have a significant adverse effect on the socio-economic development of a country. A project is considered as delayed if it is completed beyond the contractual time. A country's PT system is the heart of power industries. Without a reliable PT system the whole power sector is incomplete. Annually multibillion dollars are invested globally for the development of PT system, but the intended benefits are partly or never realized because delays of those projects cause losses of revenue. Despite the critical nature of PT, there is no specific literature on causes of delays in PT projects implementation. This paper takes the first steps in understanding causes of delay in PT projects. A total of 74 published articles that are most closely related to PT projects were reviewed in order to identify likely potential causes of delay in PT projects implementation. As a result of this review, 82 potential causes of delay were identified and categorised into 9 major groups. These causes of delay were then analysed and ranked in terms of the frequency of each cause of delay in the articles reviewed. This paper will also provide the insights about the critical causes of delay in implementation of power generation projects, power distribution projects and other linear construction projects. Finally, this study will lay the cornerstone of future investigations on causes of time overruns in PT projects implementation.

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