

Simulation of On-Shore Wind Farm Construction Process in Lebanon

Zankoul, E., and Khoury, H.M

Abstract:

For the past thirty years, Lebanon has been experiencing cuts in electricity, thus compelled to import it and use noisy and extremely unhealthy generators. This happened at very high prices with even mediocre quality. Hence, an adequate solution to this shortage in electricity supply can be achieved through the use of renewable energies, in particular wind energy or power produced from wind farm turbines. However, the on-shore wind farm construction process can be a very complicated task due to several reasons such as the challenging topography of the rural areas and the absence of paved roads where they are typically constructed, as well as the impact of wind on the construction process. In order to address these complexities, this paper takes the initial steps and presents work targeted at efficiently designing and planning the construction process of an on-shore wind farm in the region of Falougha, Dahr El Baydar, Lebanon. The solution to the problem is described in detail using a discrete-event simulation model developed in AnyLogic. The developed work illustrates the different construction stages from rough grading, access roads construction, foundation and electrical works, to wind tower assembly and erection. The whole process is then optimized to mainly minimize the project duration. The components of the proposed model have been created and preliminary results highlighted the potential of using AnyLogic for simulating and optimizing complex construction processes offering unique challenges such as those found when constructing on-shore wind farms.