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**Reliability of effective performance coefficients in the context of turbine-wake interaction**[1] OLIVIER GAUVIN-TREMBLAY, GUY DUMAS, CFD Laboratory LMFN, Universit Laval — In the planning of turbine array deployment and for the performance prediction of its constituent turbines, the use of effective performance coefficients within simplified turbine models is found to be very useful. Instead of being based on the far field upstream velocity as conventional drag and power coefficients, the effective coefficients are based on a local velocity, representative of the local conditions experienced by each turbine in the array. It has already been shown that effective performance coefficients take inherently into account blockage effects and allow good performance predictions for confined turbines. However, because of turbine-wake interaction, the characteristics of the local flow also include different types of perturbation such as shear, large temporal fluctuations and turbulence. Through URANS tandem cross-flow turbine simulations, this study provides some physical insight into turbine-wake interactions and on the effect of flow perturbations on effective performance coefficients. Although the different types of perturbation affect significantly and differently the dimensional power of turbines, they are found to yield similar effective performance coefficients, which is quite encouraging for the future developments of simplified turbine models.

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