The dynamic performance of wind power plants is difficult to model because of the large number of turbines that operate stochastically, with little information exchanged between the wind power plants and the serving utilities. In this study, we develop a linear dynamic equivalent model for large-scale wind power plants on the basis of data obtained at the point of interconnection in simulation. The modeling technique is based on adaptive parameter estimation of an equivalent model representing the dynamic performance of the plant. The developed model is tested against a large-scale plant model to confirm the effectiveness of the proposed technique.