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Can Limits to Growth in the Renewable Energy Sector be Inferred by Curve Fitting to Historical Data?

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The contribution examines the assertion that limits to growth in the renewable energy sector can be inferred statistically from global historical data for installed capacity of solar and wind power. This claim has been made in the peer reviewed scientific literature and has been subject to considerable media coverage. If true, the harsh implication is that the substitution of fossil fuels by renewables is impossible due to Earth System constraints.
It is demonstrated here that rational selection between an exponential and a logistic growth model cannot be made from existing data for the historical evolution of global installed capacity. For global power consumption, the growth limit for a fitted logistic model is so high that the growth is indistinguishable from exponential growth for any practical purpose. It is observed that some regional data show polynomial, rather than exponential, growth. But there are no signs of levelling off to a finite limit, and it is suggested that the difference between global and regional growth patterns may be that increasing technology transfer to undeveloped areas gives an extra impetus to the global growth. If this is the case we may see slower than exponential growth in the future without a definite growth limit. These overall negative results regarding drawing definite conclusion from statistical considerations lead to the conclusion that, even though statistical methods are indispensable in energy planning, they are not a substitute for physical and economic modelling.

Reference: K. Rypdal, Earth Syst. Dynam. Discuss. https://doi.org/10.5194/esd-2017-93