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Forecasting energy needs with logistics[☆]

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ABSTRACT

The logistic function is used to forecast energy consumed worldwide and oil production in the U.S. The logistic substitution model is used to describe the energy mix since 1965 presenting a picture significantly different from the one covering the previous 100 years. In the new picture coal gently gains on oil and hydroelectric gains on natural gas even if it is three times smaller. Finally, renewables—wind, geothermal, solar, biomass, and waste—grow exclusively on the expense of nuclear, and are poised to overtake it by the late 2030s. By mid-21st century, coal, oil, and natural gas still remain the main players of comparable size. Hydroelectric has almost doubled in size. The only significant substitution is that of renewables having replaced nuclear albeit remaining at less than a $\frac{1}{4}$ the size of the other three energy sources. U.S. oil produced by fracking is forecasted to cease by mid-21st century, while oil produced by traditional methods should continue on its slowly declining trend. US oil production is likely to represent less than 1% of the oil consumed worldwide by mid-21st century.