We introduce a new toric polynomial associated to a graded Eulerian poset. This polynomial contains the same information as Stanley’s toric polynomials, but allows different algebraic manipulations. Stanley’s intertwined recurrence may be replaced by a single recurrence, in which the degree of the discarded terms is independent of the rank. We state the short toric variant of the formula by Bayer and Ehrenborg, expressing the toric h-vector in terms of the cd-index. The new formula may be stated in a rank-independent form, and it may be shown using weighted lattice path enumeration and the reflection principle. We use our techniques to derive a formula expressing the toric h-vector of a dual simplicial Eulerian poset in terms of its f-vector, thus answering a question stated by Kalai in the 1980-ties. (Received February 07, 2012)