A 1-factor of a graph is a collection of independent edges, which together are incident on all the vertices of the graph. An excessive factorization is a minimum cover of the edge-set of a graph by a set of 1-factors. If such a cover exists, we denote the cardinality by $\chi'(G)$. The excessive class of an $r$-regular graph $G$ is defined as $\text{exc}(G) = \chi'_r(G) - r$. We show that there exists a family of $r$-regular graphs of arbitrarily large excessive index for each integer $r$ greater than 3. Furthermore, we answer a question by Bonisoli and Cariolaro showing that all the positive integers can be attained as excessive classes of regular graphs. (Received September 22, 2010)