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We present a constructive proof of the existence of a regular non-atomic measure that is positive on all non-empty open sets of a locally compact non-atomic Polish space. We construct a sequence of finitely-additive set functions defined recursively on an ascending sequence of rings of subsets and obtain a measure with the desired properties as the extension of a pre-measure defined as the limit of the sequence of set functions. (Received July 31, 2017)