U.S.NRC
United States Nuclear Regulatory Commission

An Explanation of Capacity Factor

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Earlier this year, the nuclear power industry announced it had set a record for reliability in 2015. The measuring stick for this achievement is what is known as "capacity factor." But what exactly is that?

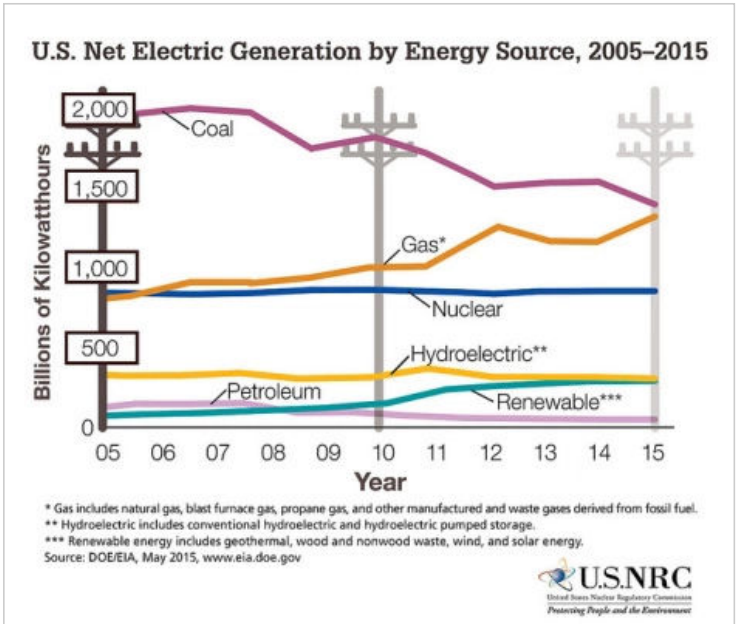
Put simply, capacity factor compares how much energy was generated against the maximum that could have been produced at continuous full-power operation during a specific period of time. It's similar to baseball's on-base percentage, which counts how many times a hitter reaches base versus the number of opportunities in the batter's box.

The Nuclear Energy Institute, the industry's trade organization, preliminarily pegged the capacity factor average for all of the nation's reactors at 91.9 percent last year. It added that this was a new record, edging out the previous one set in 2007.

An update issued by the U.S. Energy Information Administration on June 24 upped the 2015 total to 92.2 percent. EIA also lists nuclear power's capacity factor in 2014 as 91.7 percent and 2013 as 89.9 percent.

For comparison purposes, other segments of the energy production sector had the following reliability ratings in 2015 (according to the EIA): Coal – 54.6 percent; natural gas-fired combined cycle – 56.3 percent; conventional hydropower – 35.9 percent; wind – 32.5 percent; solar photovoltaic – 28.6 percent; solar thermal – 22.7 percent; landfill gas and municipal solid waste – 67.6 percent; other biomass, including wood – 52.9 percent; and geothermal – 71.7 percent.

EIA allows visitors to its website to check capacity factors dating back to 1973. A review of this data shows that reactor reliability rates started out in the upper 40s/low-to-mid-50s percent range during the U.S. commercial nuclear power fleet's early days.



Nuclear is one part of the energy generation mix in the U.S.

By 1991, the level had climbed to 70.2 percent and in 1998 to 85.3 percent. Since the start of the new millennium, the capacity factor average has been in the upper 80s/lower 90s range.

Then-NRC Chairman Nils Diaz, in congressional correspondence issued in March 2001, wrote that increases in capacity factor could be attributed to decreases in the amount of time that plants were shut down for repairs, refueling and maintenance.

For its part, the NRC focuses not on the number of operational hours for plants but rather that they remain safe whether or not they are operating. The agency does, however, track the number of unplanned shutdowns as a measure of plant performance.

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roger6t6 November 3, 2016 at 1:31 pm
Thanks Neil. One of the best explanations of capacity factors I've seen. The day after the World SEries, your baseball analogy is particularly apt.

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