Moore's law is an observation, which states that, semiconductor device density in VLSI chips doubles in every two years, approximately.

This increase in density of chips was mainly driven by the need to bring faster and better chips to market. This increase in density and equivalent decrease in size of the semiconductor devices result in better switching speed and hence faster clock speed. But, of late, this increase in clock speed is restricted by various bottlenecks such as the following:

1) Memory bottleneck: Even if we increase the clock rate of the CPU, the over all processing speed is restricted by the speed of the memory, which increases year over year, but at a much lower rate compared to the increase in speed of the CPU. So the overall speed of the system is limited by the speed of the memory, and increase in clock speed of the CPU alone is not useful.
2) $P = A * CFV^2$ is the equation governing power consumption in semiconductor devices. P is the dynamic power consumption, A is a constant, C is capacitance, F is frequency and V is the dynamic voltage swing. So if we try to increase the clock rate (frequency), power consumption also increases proportionately. This is against the needs of systems that run on batteries, as higher power consumption means lower battery life.
3) As per the above equation, power consumption is proportional to the square of dynamic voltage swing. So, traditionally, this voltage is reduced to bring down or check the increase in power consumption. But it can't be reduced below certain limits, as dynamic voltage swing has to be more than the semiconductor device switching threshold, and has to be at least one order of magnitude higher than the noise amplitude levels, to ensure error levels below acceptable values.
4) As the density increases, the device dimensions reduce, including the thickness of insulators while not switching. This causes increases in static leakage currents, leading to higher overall power consumption. So we cannot increase the device density arbitrarily.
5) As the power consumption increases, the heat generated also increases. Currently available heat dissipating mechanisms are not adequate enough for this. This results in increase of temperature and eventual melting of the chip. So we cannot allow power consumption to increase arbitrarily, even if the system does not use batteries, and has access to wall power sockets.

So, due to these reasons, the drive to increase semiconductor device density has stopped, and Moore's law ceases to be true.