Moore's Law is an observation that the number of transistors on a microchip doubles about every two years. However, as transistors get smaller in size to facilitate this, there are several physical limitations that have stopped it from continuing to be true.

Firstly, is the ‘Power Wall’ concept. Transistors consume power, which in turn emits large amounts of heat when used. This heat is problematic as it needs to be dispersed, and will otherwise destroy the chip. As transistors get smaller and chip density increases, chips need to utilise more power and heat management becomes a critical issue as the amount of heat emitted is proportional to the amount of power used. At some point, chips will simply be too difficult to cool by conventional means such as air cooling, and at a later point even sophisticated cooling systems such a liquid cooling system may not be enough.

While this has been somewhat mitigated by Dennard Scaling, which refers to the act of scaling down voltage in accordance with transistor size, there are other limitations that are now also making this mechanism infeasible. Continuously decreasing the voltage swing and thus the amount of dynamic power used by each transistor is not possible due to the necessary existence of a threshold voltage, coupled with the need for noise tolerance between transistor states. Additionally, other problems such as power leakage are amplified which are part and parcel of modern electronic systems.