Increasing hardware variability in newer IC fabrication technologies has caused corresponding power variations on a large scale. These variations are particularly exaggerated for idle power consumption, motivating the need to mitigate the effects of variability in systems whose operation is dominated by long idle state. This work describes VaRTOS, an architecture and set of OS abstractions that provide explicit treatment of idle and active power variations for tasks running in real time operating systems. We provide results regarding online learning of instance-specific sleep power, active power, and task-level power expenditure on simulated hardware with demonstrated effects for several prototypical applications.