In each source of a three-phase configuration, the voltage varies sinusoidally at an angular frequency ω, and so does the current. At what angular frequency does the power vary and why?

The power varies at 2ω. This is because power is the product of voltage and current, so power varies as $\cos(\omega t)^2$, which consists of a dc component and an ac component at $2\omega t$:

$$\cos^2(\omega t) = (1/2)(1 + \cos(2\omega t))$$