Let $P = \{p_1, \dots, p_n\}$ be a point set, and $\bar{x} = \frac{1}{n}\sum_i p_i = c(P)$ the centroid of P. A coreset $Q \subset P$ for the centroid performs $\frac{2}{\epsilon^2}$ iterations: Choose $c_1 = x_1$, let $i_t = \arg\min\langle c_t - \bar{x}, x_i - \bar{x}\rangle$, and

$$c_{t+1} = \frac{t-1}{t} c_t + \frac{1}{t} x_{i_t}$$

Let $Q_t = \{x_{i_1}, \dots, x_{i_t}\}$ denote the coreset.

$$|c(Q_{\frac{2}{\epsilon^2}}) - c(P)| \leq \epsilon$$