$$\min_{\{E_t^h, D_t\}} TCO_t^{se}(\text{hotwater}) = p_t^D . I_t^d + \sum_{t=0}^{T} \frac{p_t^E . E_t^h}{(1+\beta)^t}$$

$$\text{s.c. } 1.\ Se_t\left(E_t^h, D_{t-1}\right) = \overline{Se_t}$$

$$I_t^d(s) = D_t(s).\left[1 - \frac{\phi^s}{2}.\left(\frac{D_t(s)}{D_{t-1}(s)} - 1\right)^2\right] - [1-\delta(s)]^t . D_{t-1}(s)$$

$$Se_t(\text{hotwater}) = \left[\upsilon_{\text{hotwater}} . \left[E_t^h(\text{hotwater}).\frac{odex_t^h}{odex_{t-1}^h}\right]^{\sigma_{\text{hotwater}}}\right.$$

$$\left. + (1-\upsilon_{\text{hotwater}}) . D_{t-1}(\text{hotwater})^{\sigma_{\text{hotwater}}}\right]^{\frac{1}{\sigma_{\text{hotwater}}}}$$

TCO : total cost of ownership
I_t^d : investment in durables
E_t^h : energy consumed by the durable
Se_t : energy service (here hot water)
$\frac{odex_t^h}{odex_{t-1}^h}$: an indicator of energy efficiency

Or

$$\min_{\{E_t^h, D_t\}} TCO_t^{se}(\text{hotwater}) = p_t^D . I_t^d + p_t^E . E_t^h$$

$$\text{s.c. } 1.\ Se_t\left(E_t^h, D_{t-1}\right) = \overline{Se_t}$$