$$
\begin{aligned}
E_0(N) - E_0(\tilde{N}) \;&=\; U \sum_l n_{l,\downarrow} n_{l,\uparrow} - U \sum_l \tilde{n}_{l,\downarrow} \tilde{n}_{l,\uparrow} + \sum_{l,\sigma} \varepsilon_l n_{l,\sigma} - \sum_{l,\sigma} \varepsilon_l \tilde{n}_{l,\sigma} \\
&\overset{2.45}{=}\; \left(\varepsilon_i - \varepsilon_j\right)\left(n_{i,\sigma_i} - n_{j,\sigma_j}\right) + U \cdot \begin{cases} \left(n_{i,\uparrow} - n_{j,\uparrow}\right)\left(n_{i,\downarrow} - n_{j,\downarrow}\right) & : \sigma_i = \sigma_j \\ \left(n_{i,\uparrow} - n_{j,\downarrow}\right)\left(n_{i,\downarrow} - n_{j,\uparrow}\right) & : \sigma_i \neq \sigma_j \end{cases} \\
&=\; \left(\varepsilon_i - \varepsilon_j\right)\left(n_{i,\sigma_i} - n_{j,\sigma_j}\right) + U \left(n_{i,\sigma_i} - n_{j,\sigma_j}\right)\left(n_{i,\overline{\sigma_i}} - n_{j,\overline{\sigma_j}}\right)
\end{aligned}
$$