Day-ahead | Real-time

Electricity

$$\text{Min.}_{\Xi^D, \Xi^B_\omega} \; \mathcal{C}^D_e(\Xi^D, \hat{\lambda}^G, \lambda^c) + \mathbb{E}_\omega[\mathcal{C}^B_e(\Xi^B, \hat{\lambda}^G_\omega, \lambda^c)]$$
$$\text{s.t. } \mathcal{Q}^D_e(\Xi^D), \mathcal{Q}^B_e(\Xi^B_\omega), \; \forall \omega$$

$p^*, p^{c*}, \lambda^{c*}$
r^{+*}, r^{-*}

$$\text{Min.}_{\Xi^B_{\omega'}} \; \mathcal{C}^B_e(\Xi^B_{\omega'}, \hat{\lambda}^G_{\omega'}, \lambda^{c*})$$
$$\text{s.t. } \mathcal{Q}^B_e(\Xi^B_{\omega'})$$

Gas

p^*, p^{c*}

$$\text{Min.}_{\Phi^D} \; \mathcal{C}^D_g(\Phi^D)$$
$$\text{s.t. } \mathcal{Q}^D_g(\Phi^D, p^{c*})$$

q^*

$p^{+*}_{\omega'}, p^{-*}_{\omega'}$

$$\text{Min.}_{\Phi^B} \; \mathcal{C}^B_g(\Phi^B_{\omega'})$$
$$\text{s.t. } \mathcal{Q}^B_g(\Phi^B_{\omega'})$$