Method 1 and Method 2, representing different carbon pricing methods adopted in the paper for comparison, are presented below for your convenience.

Model of TNO (Method 1):

$$\min_{f_{ke}^{rs}, f_{kg}^{rs}} C_{\text{users}} = \sum_{a \in A_{\mathrm{R}}} (\omega t_a + \phi \varepsilon_a l_a / 10^6) x_a^{\mathrm{g}} + \sum_{a \in A_{\mathrm{R}}} \omega t_a x_a^{\mathrm{e}} + \sum_{a \in A_{\mathrm{C}}} (\omega t_a + \lambda_a^{\mathrm{M1}} E_{\mathrm{B}}) x_a^{\mathrm{e}}$$

s.t.

Cons − Flow: (1) − (3)

Cons − Time: (4)

Cons − Emission: (5)

Cons − Cost:

$$c_{ke}^{rs} = \sum_{a \in A_{\mathrm{R}}} \omega t_a \delta_{a,ke}^{rs} + \sum_{a \in A_{\mathrm{C}}} (\omega t_a + \lambda_a^{\mathrm{M1}} E_{\mathrm{B}}) \delta_{a,ke}^{rs}, \quad \forall ke \in K_{\mathrm{e}}^{rs}, \forall rs \in \Gamma \quad (6)$$

(7)

Cons − UE: (8) − (9)

Model of PDNO (Method 1):

$$\min C_{\text{PDNO}} = \sum_{j \in B} [a_j (p_j^{\mathrm{g}})^2 + b_j \cdot p_j^{\mathrm{g}}] + \kappa \sum_{j \in \pi(0)} P_{0j} + \phi \left(\sum_{j=2}^{|B|} p_j^{\mathrm{g}} \rho_j^{\mathrm{g}} + P_{0j} \rho_1^{\mathrm{g}} \right)$$

s.t.

$$P_{ij} + p_j^{\mathrm{g}} = \sum_{k \in \pi(j)} P_{jk} + p_j^{\mathrm{d}} + r_{ij} I_{ij}, \forall ij \in L \ (\lambda_j) \quad (11)$$

(12) − (16)

$$\lambda_a^{\mathrm{M1}} = \lambda_j \Omega_{a,j}$$

Model of TNO (Method 2):

$$\min_{f_{ke}^{rs}, f_{kg}^{rs}} C_{\text{users}} = \sum_{a \in A_{\mathrm{R}}} (\omega t_a + \phi \varepsilon_a l_a / 10^6) x_a^{\mathrm{g}} + \sum_{a \in A_{\mathrm{R}}} \omega t_a x_a^{\mathrm{e}} + \sum_{a \in A_{\mathrm{C}}} (\omega t_a + \lambda_a^{\mathrm{M2}} E_{\mathrm{B}}) x_a^{\mathrm{e}}$$

s.t.

Cons − Flow: (1) − (3)

Cons − Time: (4)

Cons − Emission: (5)

Cons − Cost:

$$c_{ke}^{rs} = \sum_{a \in A_{\mathrm{R}}} \omega t_a \delta_{a,ke}^{rs} + \sum_{a \in A_{\mathrm{C}}} (\omega t_a + \lambda_a^{\mathrm{M2}} E_{\mathrm{B}}) \delta_{a,ke}^{rs}, \quad \forall ke \in K_{\mathrm{e}}^{rs}, \forall rs \in \Gamma \quad (6)$$

(7)

Cons − UE: (8) − (9)

Model of PDNO (Method 2):

$$\min C_{\text{PDNO}} = \sum_{j \in B} [a_j (p_j^{\mathrm{g}})^2 + b_j \cdot p_j^{\mathrm{g}}] + \kappa \sum_{j \in \pi(0)} P_{0j}$$

s.t.

$$P_{ij} + p_j^{\mathrm{g}} = \sum_{k \in \pi(j)} P_{jk} + p_j^{\mathrm{d}} + r_{ij} I_{ij}, \forall ij \in L \ (\lambda_j) \quad (11)$$

(12) − (16)

$$\lambda_a^{\mathrm{M2,energy}} = \lambda_j \Omega_{a,j}$$

$$\bar{\rho} = \frac{1}{|B|} \sum_{1}^{|B|} \rho_j^{\mathrm{g}}$$

$$\lambda_a^{\mathrm{M2}} = \lambda_a^{\mathrm{M2,energy}} + \phi \bar{\rho}$$

($|B|$ is the number of buses with generator)