

Tier 1: Dual-Fairness Allocation

$$N_{total} = 730$$

Tier 2: Effectiveness & Equity

$$N_{free} = N_{total} - 70 \cdot k_{base}$$

Demand Ratio Weight

$$k_{ie} = k_{base} + \text{round} \left(N_{free} \cdot \frac{D_i}{\sum D_i} \right)$$

Supply-Demand Alignment

$$\text{annual_eff}_i = k_{ie} \cdot \min(d_i, d_0)$$

Final k_{ie} Allocation

$$\text{score}_i = \frac{\text{eff}_i}{D_i} - \alpha \cdot \text{unmet}_i - \beta \cdot \text{waste}_i$$

$$G = \frac{\sum \sum |score_i - score_j|}{2n^2 \text{score}}$$

$G < 0.2?$

Iterative Optimization (maximize total score)

$$k_{base} \in [5, 10]$$