=== Tuning XGBoost ===

Best Params: {'learning\_rate': 0.1, 'max\_depth': 6, 'n\_estimators': 200}

MSE: 25820808.0000

Training Time: 9.9s

=== Tuning LightGBM ===

Best Params: {'learning\_rate': 0.1, 'max\_depth': 6, 'n\_estimators': 200}

MSE: 27915802.6107

Training Time: 28.81s

=== Tuning Random Forest ===

Best Params: {'max\_depth': 6, 'n\_estimators': 200}

MSE: 61988193.8276

Training Time: 274.19s

=== Tuning HistGradientBoosting ===

Best Params: {'learning\_rate': 0.1, 'max\_depth': 6, 'max\_iter': 200}

MSE: 28248349.8421

Training Time: 10.9s

=== Tuning CatBoost ===

=== Model Performance Summary ===

MSE Time (s)

XGBoost 25820808.0 9.9

LightGBM 27915802.610687 28.81

HistGradientBoosting 28248349.842135 10.9

CatBoost 35661014.536712 47.9

Random Forest 61988193.827641 274.19