Dimensionality Reduction Summary — Scenarios

Top 10 Features by Consensus
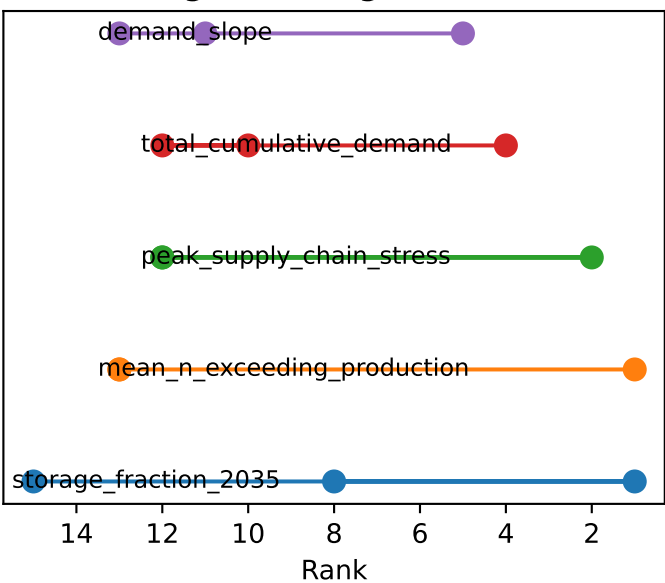
(Bar chart, Mean Importance (%), ranging 0 to 10)

- peak_supply_chain_stress
- total_cumulative_demand
- storage_fraction_2035
- supply_chain_stress
- wind_fraction_2035
- mean_ci_width
- mean_cv
- peak_demand
- mean_demand_early
- solar_fraction_2035
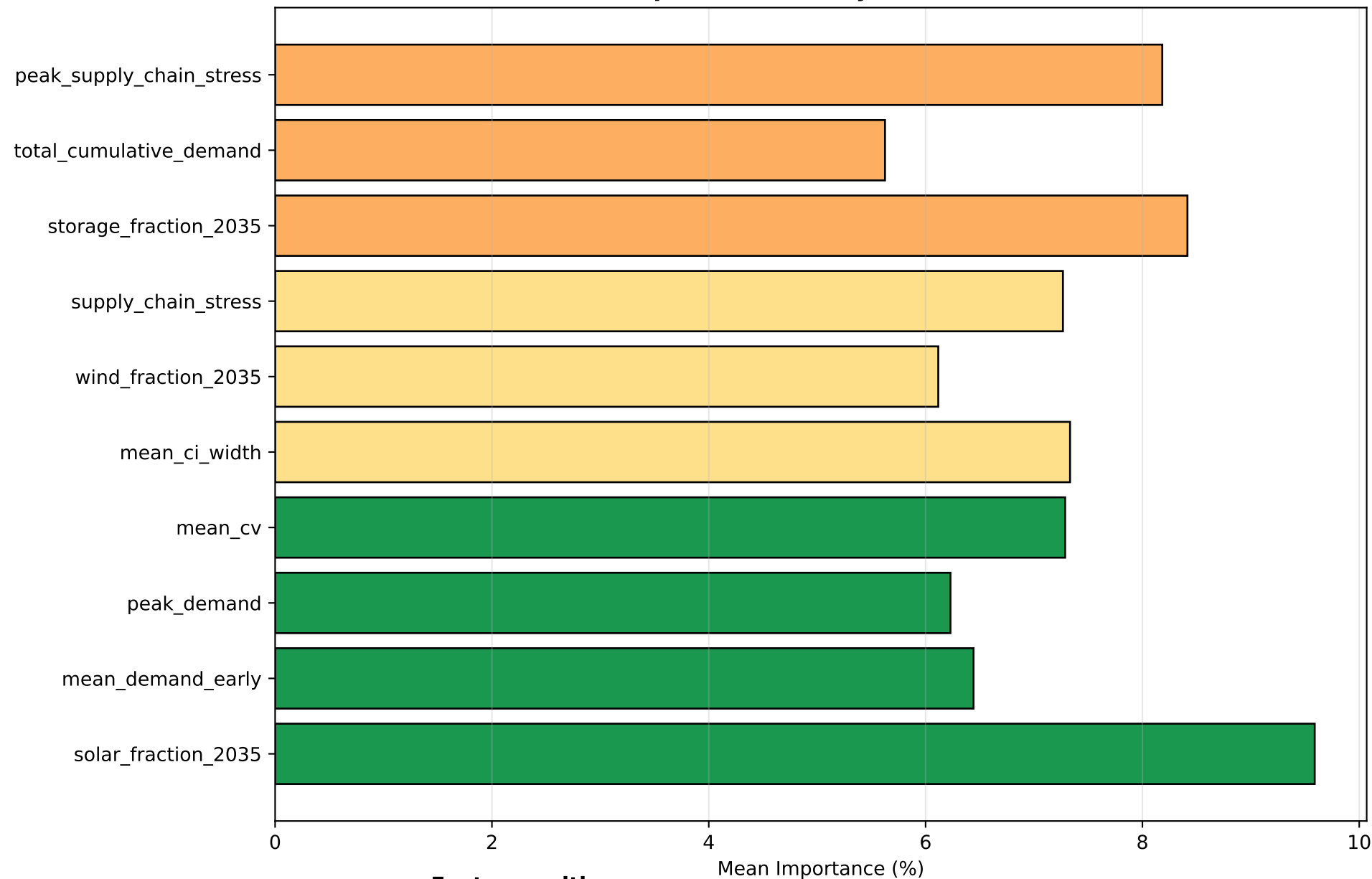
Method Agreement (Spearman ρ)

	PCA	SPCA	NMF
PCA	1.00	-0.05	0.20
SPCA	-0.05	1.00	0.25
NMF	0.20	0.25	1.00
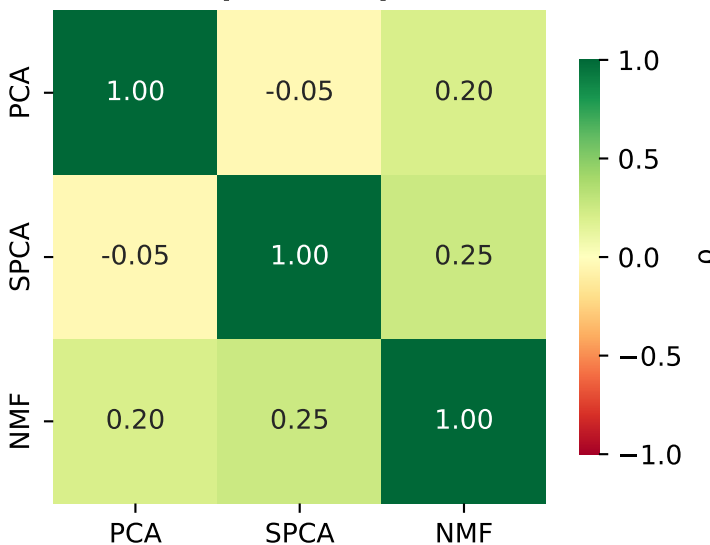
Summary Statistics

Total features: 15

Strong agreement: 2
(rank spread ≤ 3)

Top tier features: 2
(avg rank ≤ 5)

Mean correlation: 0.13

Features with Highest Disagreement

(Rank axis from 14 to 2)

- demand_slope
- total_cumulative_demand
- peak_supply_chain_stress
- mean_n_exceeding_production
- storage_fraction_2035

Method-Specific Top Features

PCA emphasizes: mean_demand_early, peak_demand, solar_fraction_2035
Sparse PCA selects: storage_fraction_2035, peak_supply_chain_stress, solar_fraction_2035
NMF identifies: mean_n_exceeding_production, solar_fraction_2035, mean_ci_width

Interpretation Guide:
• PCA: Features driving overall variance
• Sparse PCA: Essential features (others can be dropped)
• NMF: Features that co-occur in additive "parts"