**Wind Farm Transshipment Project**

**Problem Description:**

Our problem revolves around a **Transshipment Problem** concerning the distribution of Wind Farm Spare Parts. This involves a two-step shipment process: firstly, from a primary source (e.g., factories) to an intermediate stop (e.g., distribution centers), and then from there to the destination (e.g., wind farms).

**Problem Characteristics:**

* **Deterministic Demand:**
  + Demand is given and remains constant.
* **Known Distance:**
  + Distances between each source and destination are known and fixed, implying a constant cost.

**Entities Involved:**

A map of the united states

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* **Sources:**
  + Three factories (in purple color): Albuquerque, Fort Worth (Texas), Springfield (Missouri).
* **Intermediate Stops (Distribution Centers):**
  + Three distribution centers (in red color): Amarillo, Tulsa, Kansas City.
* **Destinations (Wind Farms):**
  + Eight wind farms (in green color) spread around the U.S. Midwest.

This is the data:

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**Problem Goals:**

* **Objective:**
  + Find the **lowest-cost** solution to ship spare parts from factories to distribution centers and then to wind farms.

**Solver Setup:**

1. **Objective Function:**
   * Minimize the total cost.
2. **Decision Variables:**
   * Inbound transport and outbound transport array.
3. **Solver Method:**
   * Using the Simplex method as this is a linear problem.
4. **Constraints:**
   * Ensure each city receives its demanded units.
   * Ensure each factory stays within its capacity.
   * Ensure positive (non-negative) units between factories and distribution centers and between distribution centers and customers.
   * Ensure each distribution center handles fewer items than its capacity.
   * Ensure that the conservation of flow constraints matches correctly.

**Solver Output:**

* **Optimal Solution:**
  + Achieved a total cost of **$162,413.**
* **Cost Analysis:**
  + Noted a relatively high inbound cost for transporting units from factories to distribution centers.

**Supporting Information:**

* **Data Provided:**
  + Demand for wind farms, capacity for distribution centers and factories.
  + Mileage charts with costs per mile for inbound and outbound distances.

**Solution Visuals:**

A screenshot of a computer screen

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