Optimizing Pipeline Allocation for Maximum Revenue

Analyzing and Improving Gas Distribution Efficiency

Pipeline Optimization Process:

- **Input:**
  - Upstream production volume
  - Delivery points with specific prices and capacities
  - Transportation costs

- **Optimization Goal:**
  - Maximize total revenue by optimizing the flow of gas to various delivery points.

Constraints and Capacities

- **Capacity Constraints:** Maximum amount of gas each delivery point can handle.

- **Transportation Costs:** Costs associated with transporting gas to each delivery point.

- **Demand:** Amount of gas required by each delivery point.

Example Input and Output

- **Upstream Production Volume:** 800 MMBTU
- **Delivery Points:**
  - **Delivery Point 1 (Italy):**
    - **Price:** $12 per MMBTU
    - **Capacity:** 300 MMBTU
    - **Transportation Cost:** $6 per MMBTU
  - **Delivery Point 2 (Bulgaria):**
    - **Price:** $10 per MMBTU
    - **Capacity:** 400 MMBTU
    - **Transportation Cost:** $2 per MMBTU
  - **Delivery Point 3 (Turkey):**
    - **Price:** $9 per MMBTU
    - **Capacity:** 200 MMBTU
    - **Transportation Cost:** $1 per MMBTU

Original Allocation Without Optimization

- **Delivery Point 1:** 300 MMBTU
- **Delivery Point 2:** 400 MMBTU
- **Delivery Point 3:** 100 MMBTU
- **Total Revenue Calculation:**
- **Delivery Point 1 (Italy):**
  - Flow: 300 MMBTU
  - Net Price: $12 - $6 = $6 per MMBTU
  - Revenue: 300 × $6 = $1,800
- **Delivery Point 2 (Bulgaria):**
  - Flow: 400 MMBTU
  - Net Price: $10 - $2 = $8 per MMBTU
  - Revenue: 400 × $8 = $3,200
- **Delivery Point 3 (Turkey):**
  - Flow: 100 MMBTU
  - Net Price: $9 - $1 = $8 per MMBTU
  - Revenue: 100 × $8 = $800
- **Total Revenue:** $5,800
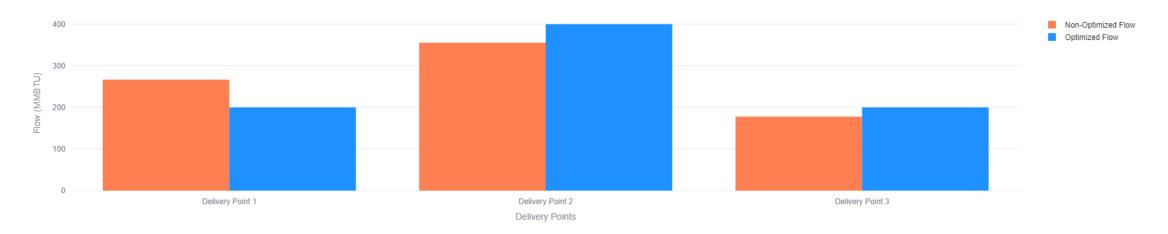
Optimized Solution using the Application

- **Optimized Allocation:**
- **Delivery Point 1 (Italy):** 200 MMBTU
- **Delivery Point 2 (Bulgaria):** 400 MMBTU
- **Delivery Point 3 (Turkey):** 200 MMBTU
- **Optimized Calculation:**
- **Delivery Point 1 (Italy):**
  - Flow: 200 MMBTU
  - Net Price: $12 - $6 = $6 per MMBTU
  - Revenue: 200 × $6 = $1,200
- **Delivery Point 2 (Bulgaria):**
  - Flow: 400 MMBTU
  - Net Price: $10 - $2 = $8 per MMBTU
  - Revenue: 400 × $8 = $3,200
- **Delivery Point 3 (Turkey):**
  - Flow: 200 MMBTU
  - Net Price: $9 - $1 = $8 per MMBTU
  - Revenue: 200 × $8 = $1,600
- **Total Optimized Revenue:** $6,000

Comparison

- **Revenue Comparison:**
- **Original Total Revenue:** $5,800
- **Optimized Total Revenue:** $6,000
- **Difference:** +$200
- **Why Optimization?**
- **Increased Revenue:** Optimized allocation results in higher revenue by adjusting distribution.
- **Efficiency Gains:** Better utilization of resources and constraints leads to improved financial outcomes.

Visual Representation

Optimized vs. Non-Optimized Flow Distribution

Summary of Optimization

Summary:

- Optimization refines allocation strategies to maximize revenue.

- Practical application typically results in better financial outcomes compared to non-optimized scenarios.

Actionable Insight:

- Apply optimization to enhance decision-making and achieve improved results in gas distribution and revenue generation.