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CASE STUDY

Inventory - Network Optimization

Ameren

PROBLEM / CHALLENGE

Power utility needed to transform its supply chain including the inventory staging branches that it uses to support emergency repairs and maintenance to its network. The current network was built through a history of acquisitions and management wanted to explore if efficiencies could be achieved by rethinking the network locations and inventory staging decisions

AMEREN NETWORK FUNCTIONALITY

Ameren used one distribution center (Tier 1), and multiple stocking locations (Tier 2) to fulfill localized operating centers (Tier 3) that were close to major infrastructure and population centers (branches). See Figure on next page. The project needed to determine the optimal Tier 2 'stocking' locations and assignments of Tier 3 operating centers to stocking locations.

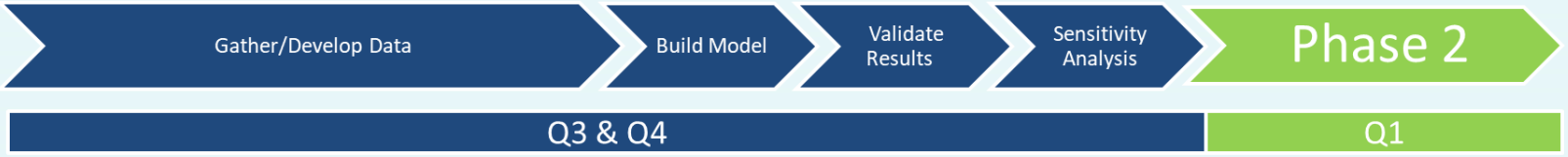
IMPLEMENTATION DETAILS

- **Mapped baseline inventory flows from Tier 1 to Tier 2 to Tier 3**
- **Gathered, consolidated and validated historical demand and transportation cost information**
  - This step required extensive analysis and validation with business leaders and operations personnel
- **Modeled optimal versus baseline network design**
  - See table at bottom of page 2
- **Modeled disaster scenarios for inventory staging policies**
  - See page 2 (Sensitivity Analysis)
- **Ran scenario analyses for various cost increases and business initiatives**
  - Results indicated MRO direct-to-tier 3 sites will not reduce costs

RESULTS

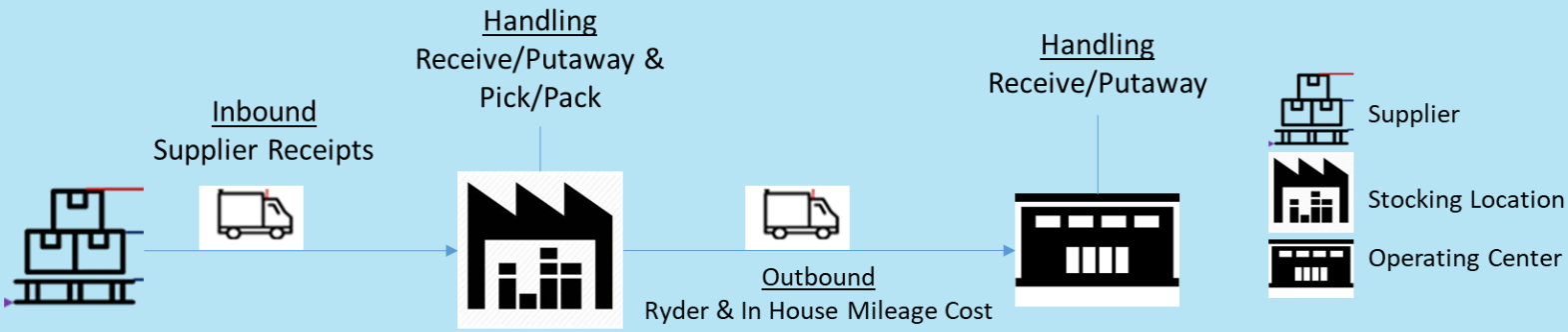
- **Identified $1.47 Million of transportation cost savings**
- **Disaster scenario modeling created optimal inventory staging policies for tornado and earthquake planning**

Project Timeline



- **Phase 1.1:** Gather data, design and program optimization model, validate initial solutions
- **Phase 1.2:** Perform sensitivity analysis to provide optimal network design and managerial insights
- **Phase 2:** Vehicle Routing given optimal network

Network Functionality



Current versus Optimal Operating Center- to - Stocking Locations

Current Stocking Locations	Baseline Demand Assigned Locations	Optimal Location	Optimal Demand Assigned Locations
MDF	22	MDF	17
Jacksonville	9	Beardstown	6
Marion	4	Marion	7
Mattoon	8	Mattoon	4
Pioneer Park	2	Pioneer Park	4
Springfield	1	Springfield	8
Total	46	Total	46

Sensitivity Analysis

- **Disaster Recovery**
  - Modeled impact of losing a Distribution Center due to natural or man-made disaster
  - Modeled impact of major transportation routes out of service (bridges & highways)
  - Created disaster 'playbooks' that are part of supply chain resiliency planning
  - Calculated impact to total costs
- **Significant Increase and Decreases in Transportation Cost**
  - New stocking locations chosen
  - Network re-allocates stocking locations to mitigate shipping cost increase

Reference: Logan Ward, Supply Chain Transformation, Lward2@ameren.com

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