

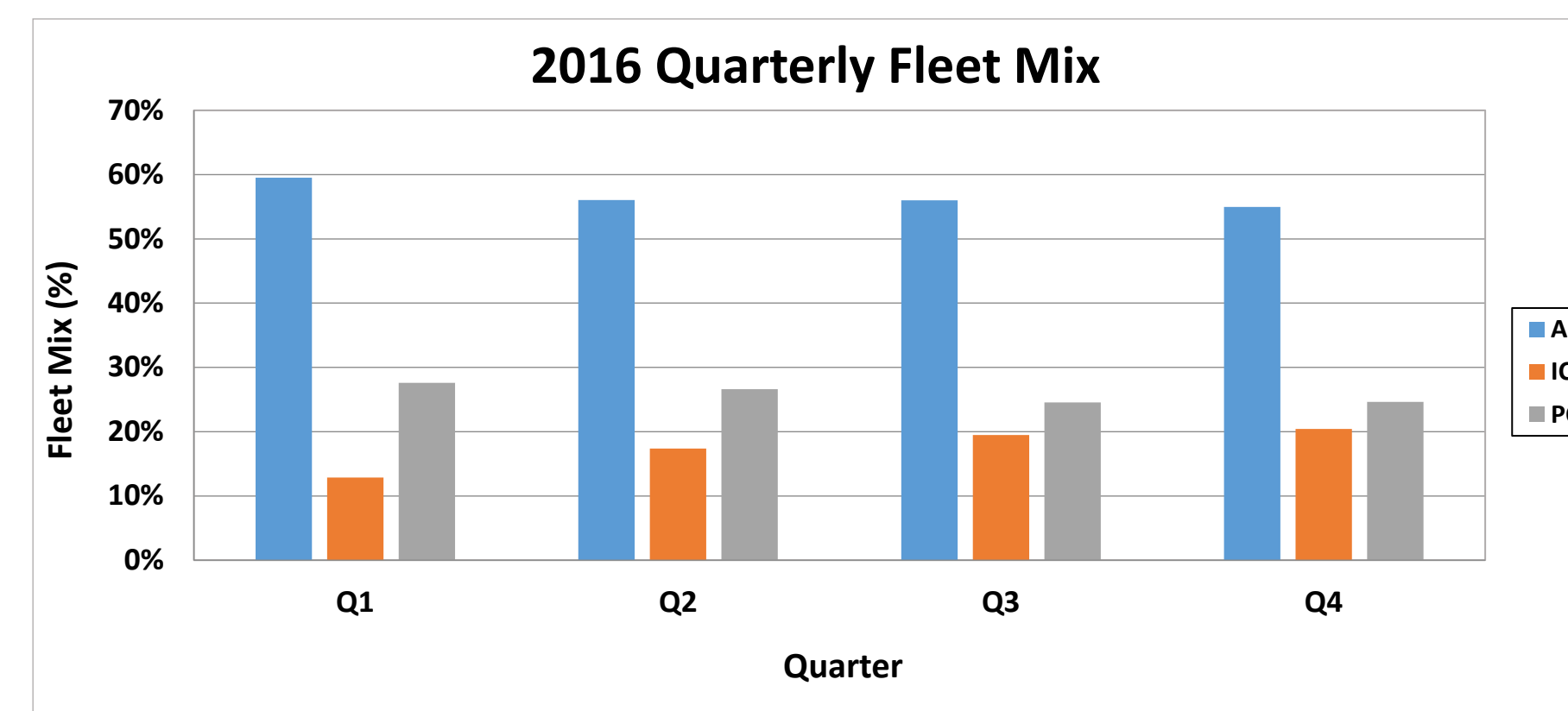
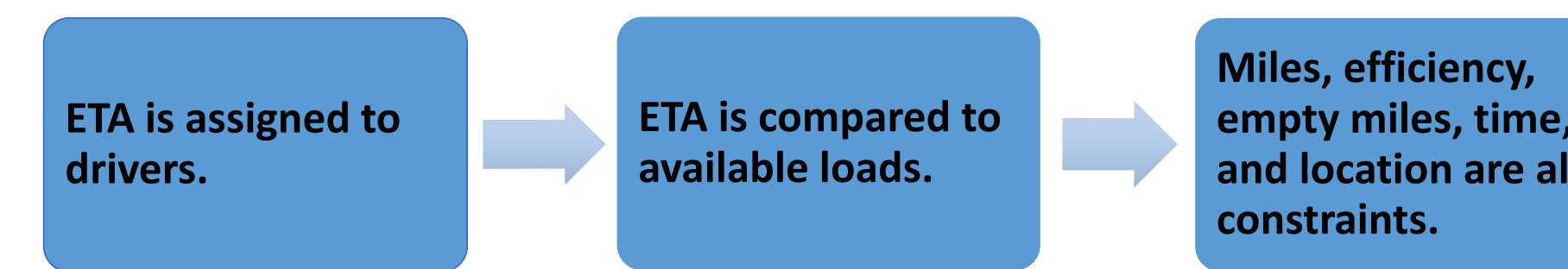
Recommending an ideal mix of asset and non-asset fleets while considering the trade-offs between cost and service.

Team Fleet Mixers: Emily May, Lujain Rawwagah, Nick Taulbee, Evan Tillman

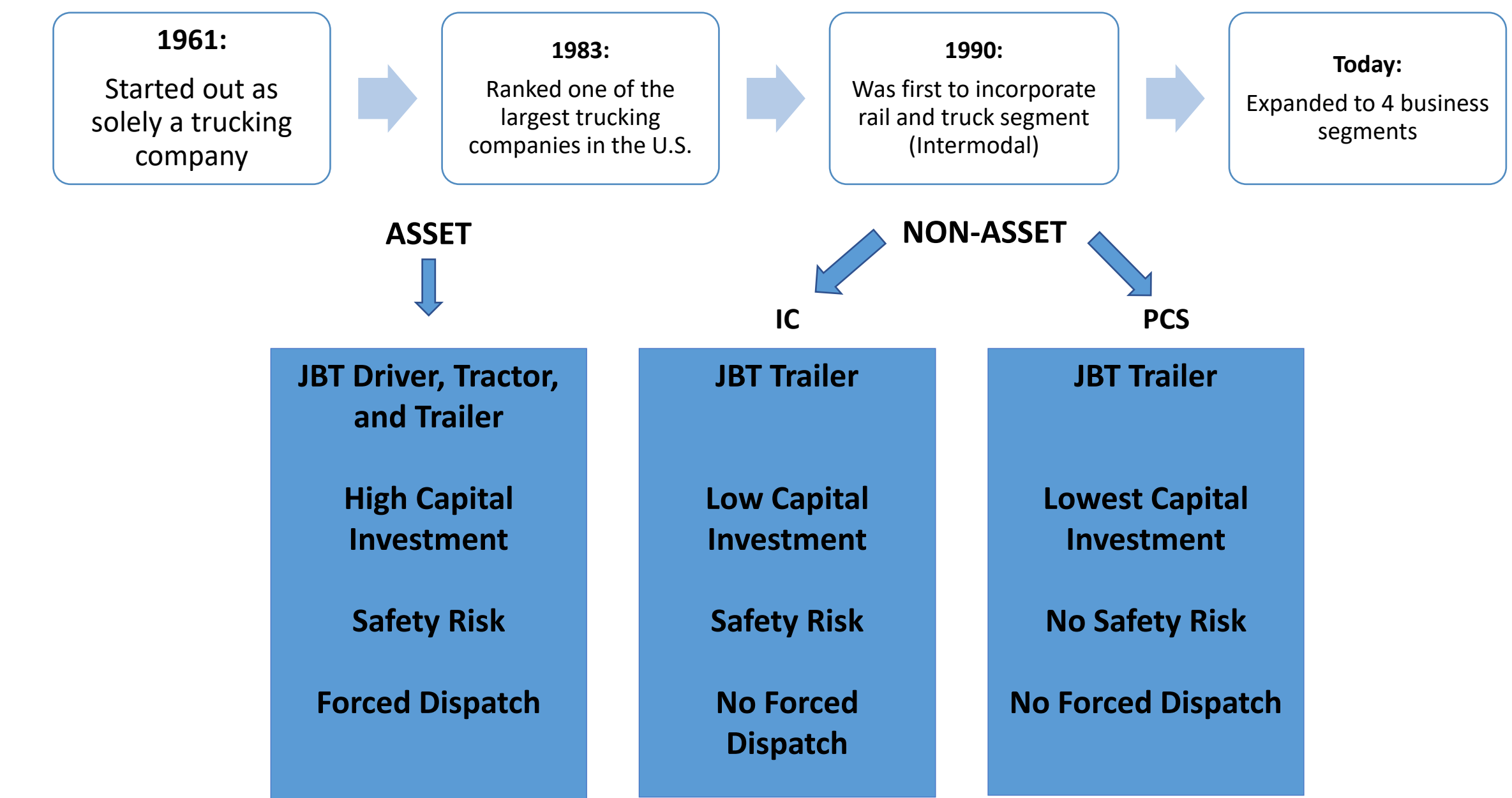


Abstract: This IE Capstone Experience project was partnered with J.B. Hunt Transport Inc. Our goal was to recommend an ideal fleet mix of asset and non-asset fleets for J.B. Hunt's Truckload business segment by minimizing cost and service failures. The significant differences between asset and non-asset fleets are an asset fleet consists of a J.B. Hunt driver, tractor, and trailer, while non-asset fleets only use a J.B. Hunt trailer. This results in a high capital investment for asset fleets because they are using J.B. Hunt equipment, and a lower capital investment for non-asset fleets. Additionally, asset fleets have forced dispatch, which means they cannot deny a load. Non-asset fleets have no forced dispatch which means they can deny a load. In addition, there are two types of non-asset fleets, independent contract (IC) and power capacity solution (PCS). After analyzing historical data, we established that a significant component of recommending a fleet mix is incorporating denied loads when measuring service failures for each fleet type. In order to account for denied loads, we developed a tool adding denied loads into the service failure calculations. This tool will allow J.B. Hunt to change input parameters as more denied load data becomes available. In addition, we created an optimization and cost tool that will allow J.B. Hunt to test several fleet mix percentage scenarios considering cost, service failures, and load demand. As J.B. Hunt's network characteristics change, these tools will allow them to make proactive decisions about what their fleet mix combination should be, as well as let leadership understand what various fleet mix scenarios would look like in terms of cost and service. Lastly, we have provided recommendations to J.B. Hunt on how to continue this project in the future with more detailed and expanded data.

Project Definition

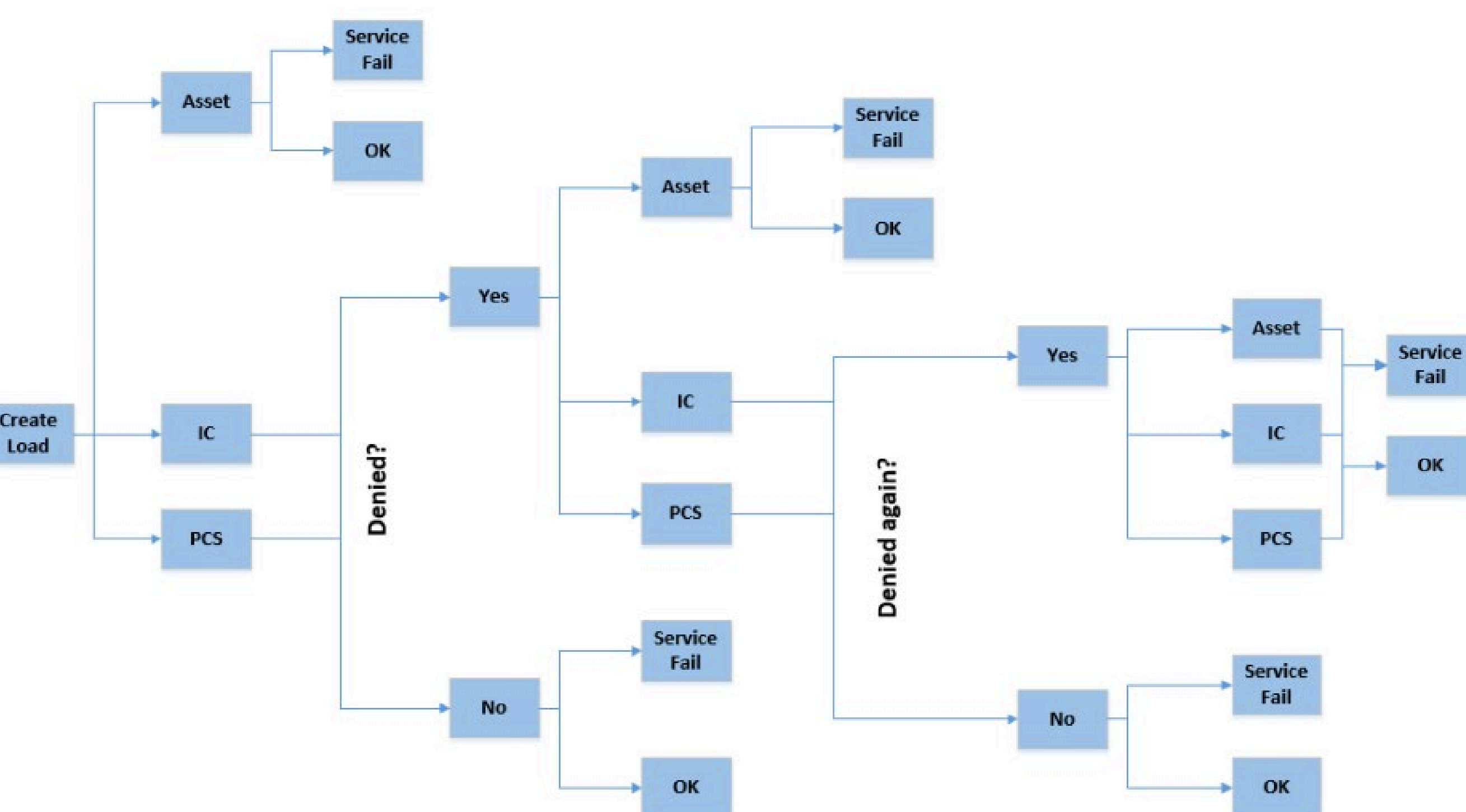


J.B. Hunt company history and fleet options.



Service Failure Tool

Incorporating denied loads into the calculation of service failures will provide more accurate service failure data.

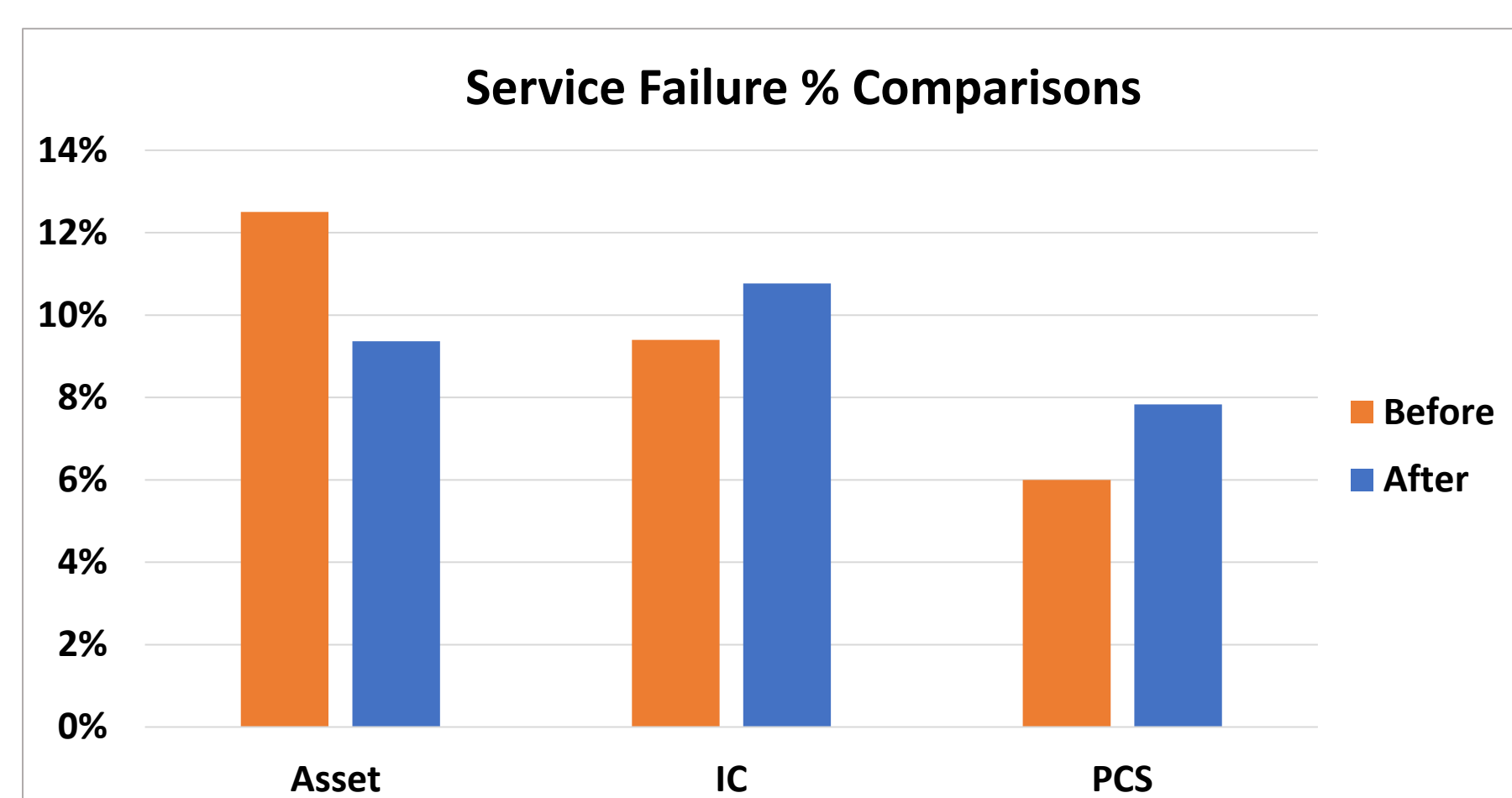


ASSET

$$\text{Asset SF \%} = \text{Recorded Asset SF \%} - \text{IC SF \% from denying loads} - \text{PCS SF \% from denying loads}$$

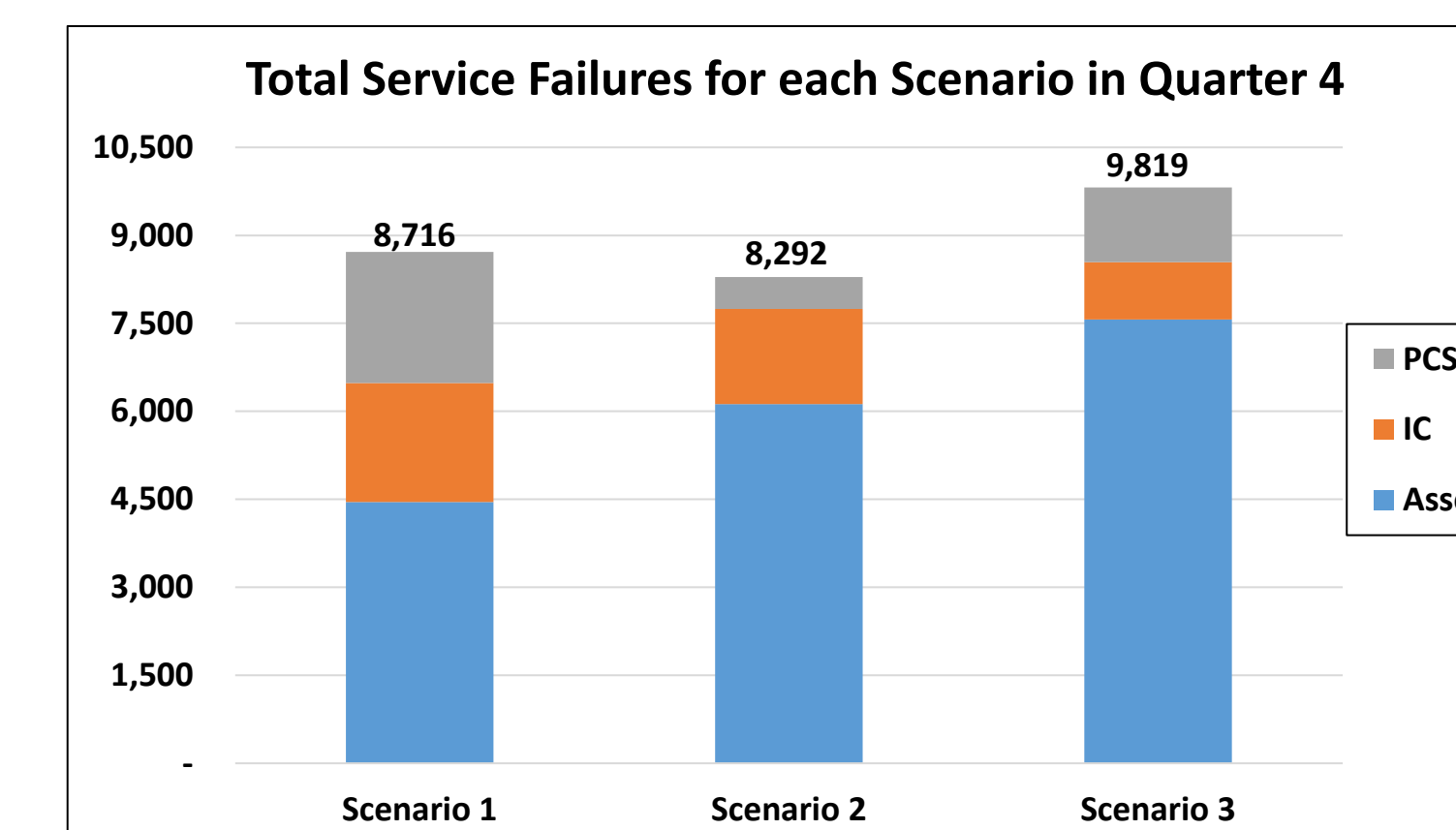
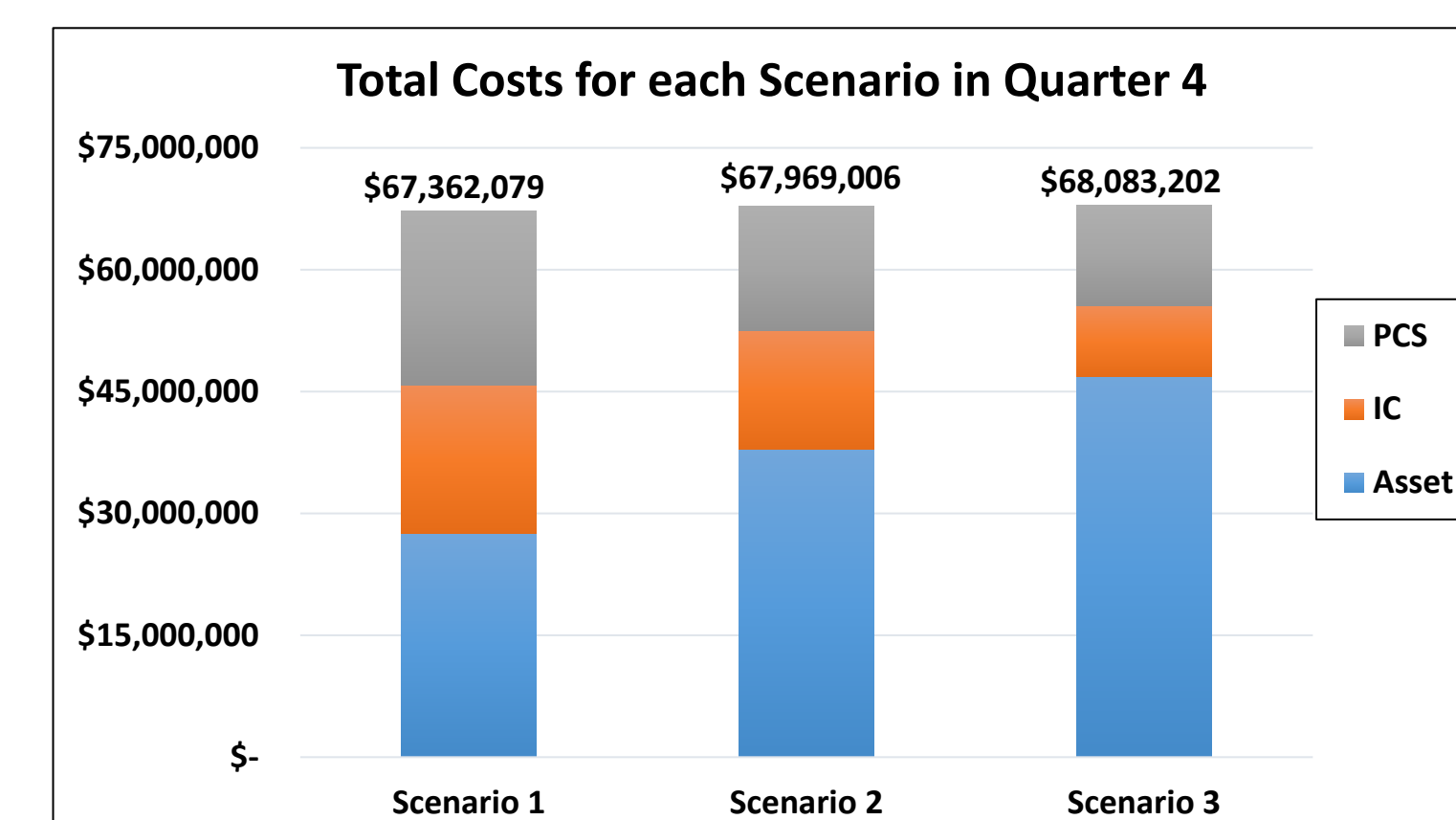
IC

$$\text{IC SF \%} = \text{Recorded IC SF \%} - \text{IC SF \% from denying loads} - \text{PCS SF \% from denying loads} + \text{IC SF \% from denying asset loads}$$

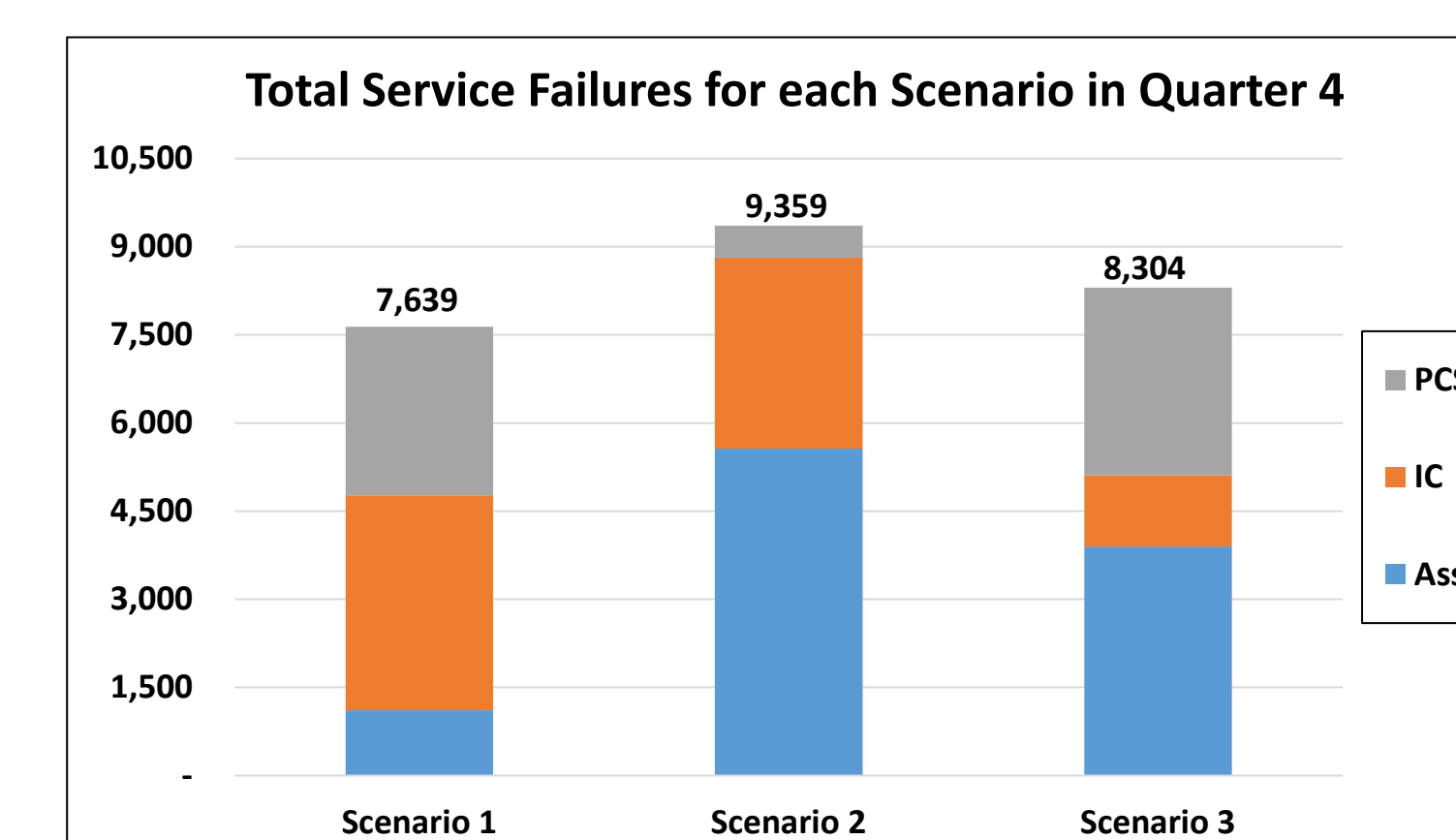
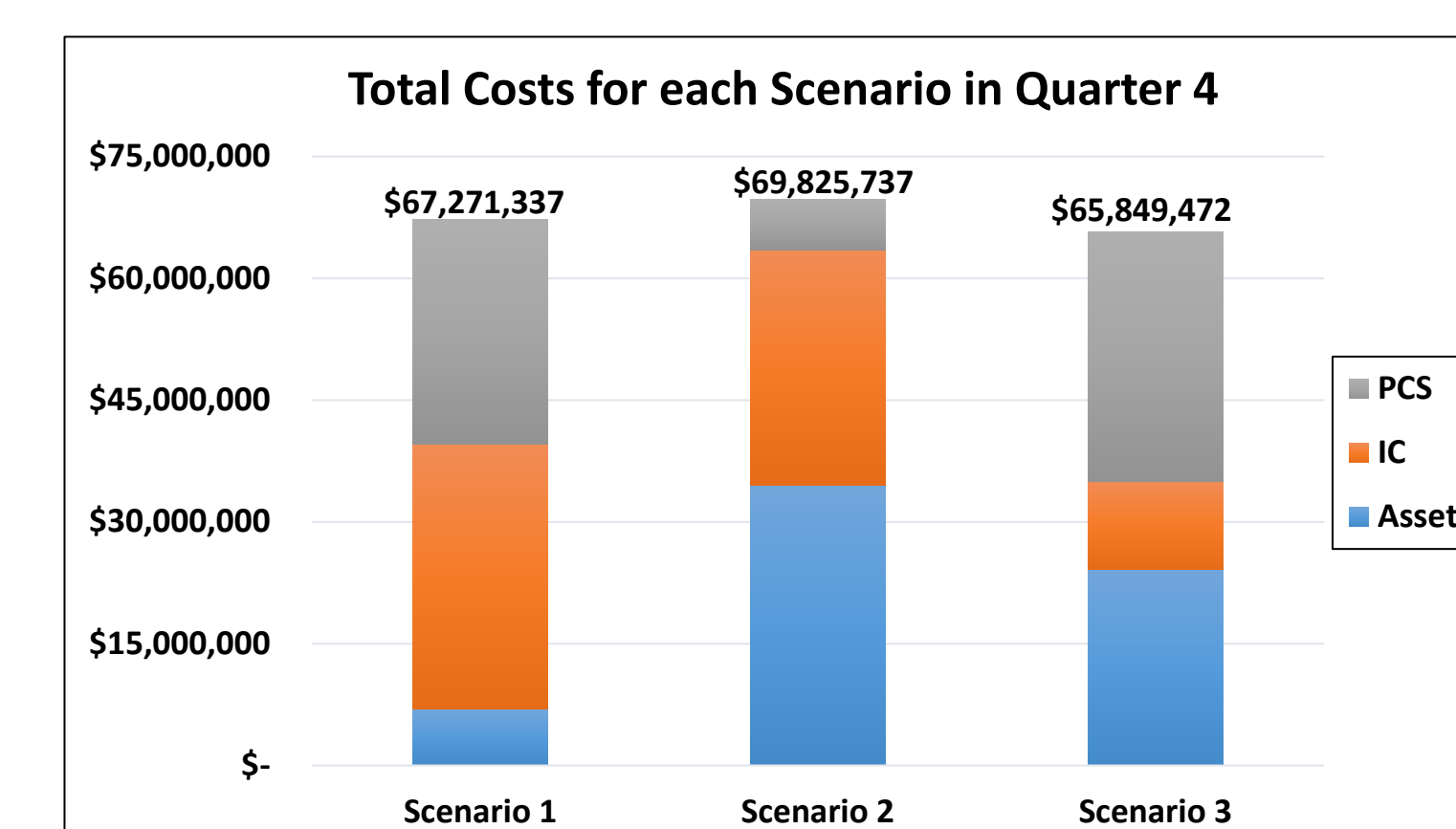


Expanded Cost Tool

Overall cost levels can be evaluated by inputting different fleet mix scenarios into our recommendation tool.



Scenario	Asset	IC	PCS
1	40%	25%	35%
2	55%	20%	25%
3	68%	12%	20%



Scenario	Asset	IC	PCS
1	10%	45%	45%
2	50%	40%	10%
3	35%	15%	50%

Optimization Tool

Objective: minimize cost and service failures



Quarter	Asset	IC	PCS
Q1	50%	0%	50%
Q2	50%	0%	50%
Q3	50%	0%	50%
Q4	50%	0%	50%

Asset

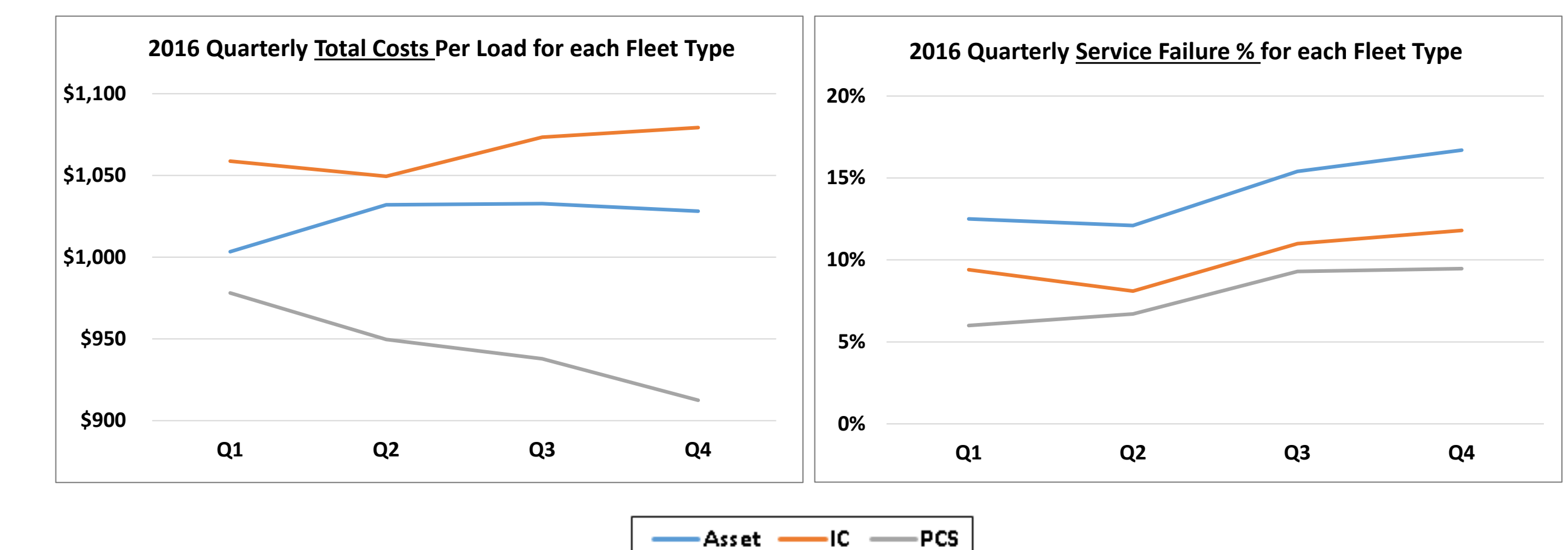
- Forced dispatch
- High capital investment
- Safety risk

IC

- Low capital investment
- No forced dispatch
- Safety risk

PCS

- Lowest capital investment
- No safety risk
- No forced dispatch
- Work for other companies



Recommendations



How our project will be used in the future:

"As our network characteristics change, this will allow us to make proactive decisions about what our fleet mix should look like, as well as letting leadership understand what various scenarios would look like in terms of cost and service." -Emily West, Logistics Engineer (primary point of contact)