

## **ES.11Appendix H**

# **Amtrak Updates to Feasibility Studies, August 2, 2010**

**From:** Hillblom, Bruce [mailto:HILL2233@amtrak.com]  
**Sent:** Monday, August 02, 2010 3:19 PM  
**To:** Weber, George E  
**Cc:** tamara.nicholson@dot.iowa.gov; Franke, Michael; Hillblom, Bruce  
**Subject:** RE: Chicago-Iowa City

George:

Attached, per your request, are the following:

**Summarized Statement of Revenue & Expense for Scenario A-6 - Between Chicago-Quad Cities-Iowa City via BNSF-IAIS**

- Summarized annual pro forma revenue and expense projections for Scenario A-6 between Chicago-Quad Cities-Iowa City are enclosed based upon 3 different dates of proposed service initiation. They are:
  1. **FY 2007** – Initial estimates presented in 2007 dollars as prepared for the *Feasibility Report on Proposed Amtrak Service for Chicago-Quad Cities* dated December 5, 2007 and the supplemental *Feasibility Study on Proposed Amtrak Service from Chicago to Iowa City Iowa via Quad Cities* dated February 25, 2008.
  2. **FY 2013** – An updated estimate, presented in 2013 dollars, reflecting projected annual results based upon the assumed operation of the proposed Chicago-Quad Cities-Iowa City service for the year 2013. Information initially prepared in 2009 for ARRA Grant purposes.
  3. **FY 2015** – An updated estimate, presented in 2015 dollars, reflecting projected annual results based upon the assumed full year 2015 operation of the proposed service.

For your convenience, I have also provided compounded annual rates of growth for the 8-year period of 2007 to 2015 reflecting the average annual rate of increase/decreased for each item presented.

**Ridership and Revenue Forecasting**

- Summary Overview of the Amtrak Corridor Rail Passenger Demand Forecasting Model
- MS PowerPoint presentation on Amtrak Best Practices Corridor Forecasting Model

**Cost Estimation**

- Summary of the Amtrak Financial Analysis Process 073010 containing identification and methodology used for major categories of cost estimation.

Please review these documents are your convenience and advise me of any questions you might have.

Sincerely,

Bruce  
Office: (312) 880-5209  
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**NATIONAL RAILROAD PASSENGER CORPORATION (AMTRAK)**

**CHICAGO - QUAD CITIES - IOWA CITY - SCENARIO A-6 VIA BNSF-IAIS - 4 HRS 58 MINS**

**ESTIMATED REVENUE & EXPENSE PERFORMANCE - (1)**

	<b>Quad Cities Report &amp; Iowa Addendum Pro Forma 2007 Operation (2)</b>	<b>ARRA 2009 Grant Application Pro Forma 2013 Operation (3)</b>	<b>2010 ARRA Grant Application Pro Forma 2015 Operation (3)</b>	<b>Compounded Annual Growth Rate FY07 - FY15 (3)</b>
<i>(In Millions of Dollars)</i>				
<b>REVENUE</b>				
Passenger Revenue	\$4.4	\$5.3	\$6.0	3.95%
Food & Beverage Revenue	0.4	0.4	0.4	0.00%
Total Revenue	\$4.8	\$5.7	\$6.4	4.91%
<b>EXPENSES</b>				
Host Railroad	\$1.3	\$2.0	\$1.9	4.86%
Fuel	1.3	2.2	1.7	3.41%
T & E Labor	1.7	2.7	2.3	3.85%
Onboard Services (4)	0.6	0.7	0.9	5.20%
Mechanical	2.5	3.6	3.3	3.53%
Stations	0.8	0.9	1.2	5.20%
Remaining Direct Costs (Incl. Yard Ops & MT)	2.6	3.6	4.6	7.39%
Total Direct Costs	\$10.8	\$15.7	\$15.9	4.95%
<b>OPERATING CONTRIBUTION/(LOSS)</b>	<b>(\$6.0)</b>	<b>(\$10.0)</b>	<b>(\$9.5)</b>	<b>5.91%</b>
Fare Box Recovery	44.4%	36.1%	40.3%	-1.23%
Total Projected Ridership	186,900	213,500	246,800	3.54%
Passenger Miles	21,780,000	33,940,000	36,060,000	8.77%
Average Ticket Revenue per Rider - Chicago - Iowa City	\$ 23.54	\$ 24.70	\$ 24.31	0.54%
<b>FOOTNOTES:</b>				
(1) Projected pro forma annual financial performance for each of the years 2007, 2013 and 2015 based upon the hypothetical start-up and 12-month operation of proposed service between Chicago-Quad Cities-Iowa City as contemplated in the Amtrak Route Feasibility Study of February 2008. All amounts presented herein are for illustrative purposes only and are subject to change due to variation in service level, service attributes, route, economic conditions and numerous other factors that may have a material effect on actual financial performance.				
(2) FY09 results per Bill Sheridan as developed for Iowa City addendum of February 25, 2008				
(3) Updated results contemplating commencement of proposed operations in 2013 or 2015 prepared by Bill Sheridan per Financial Analysis (email) dated August 2,, 2010.				
(4) Includes the projected cost of both onboard labor & support and the allocated cost of food & beverage items sold.				

## **Summary Overview of the Amtrak Corridor Passenger Rail Demand Forecasting Model**

Ridership and ticket revenue forecasts for proposed rail passenger corridor services are prepared using a “National Corridor Model” developed by AECOM for Amtrak and various states for corridor passenger rail forecasting throughout the US, including corridors in the Midwest. This “best practices” model was derived from several detailed models, surveys, and data, including:

- Northeast Corridor Model (Amtrak – NEC area)
- Amtrak/Caltrans Model (Amtrak & Caltrans)
- Chicago-Milwaukee Corridor Model (Wisconsin & Illinois)
- Southeast Corridor Model (North Carolina, Virginia, South Carolina, Georgia, and Florida)

For purposes of ridership and revenue projection, the model evaluates proposed new passenger rail services based upon a number of variables including the following key inputs:

- Total Market Size – Population, employment and income of each market served
- Station Locations – Size of potential local/regional market(s) to be served
- Mode Share – Modal distribution of the existing transportation market
- Service characteristics of competing modes – auto, air, and bus
- Passenger Rail Timetable, providing departure/arrival times by train and station and thus defining:
  - Travel Time (duration of proposed trip)
  - Frequency (proposed number of daily round trips, i.e., travel options available to a potential traveler)
  - Schedule/Scheduling Attractiveness – Proposed scheduled departure and arrival times and time-of-day slots
- Average Fares, based on observed average yields per mile in existing Amtrak markets within the Midwest

When applicable, pertinent state and/or regional information may also be supplemented by national sources such as Moody’s Economy.com in order to permit consideration of anticipated national trends in population, employment, and income.

# **Summary of Amtrak Travel Demand Forecasting Models**

**April 2010**

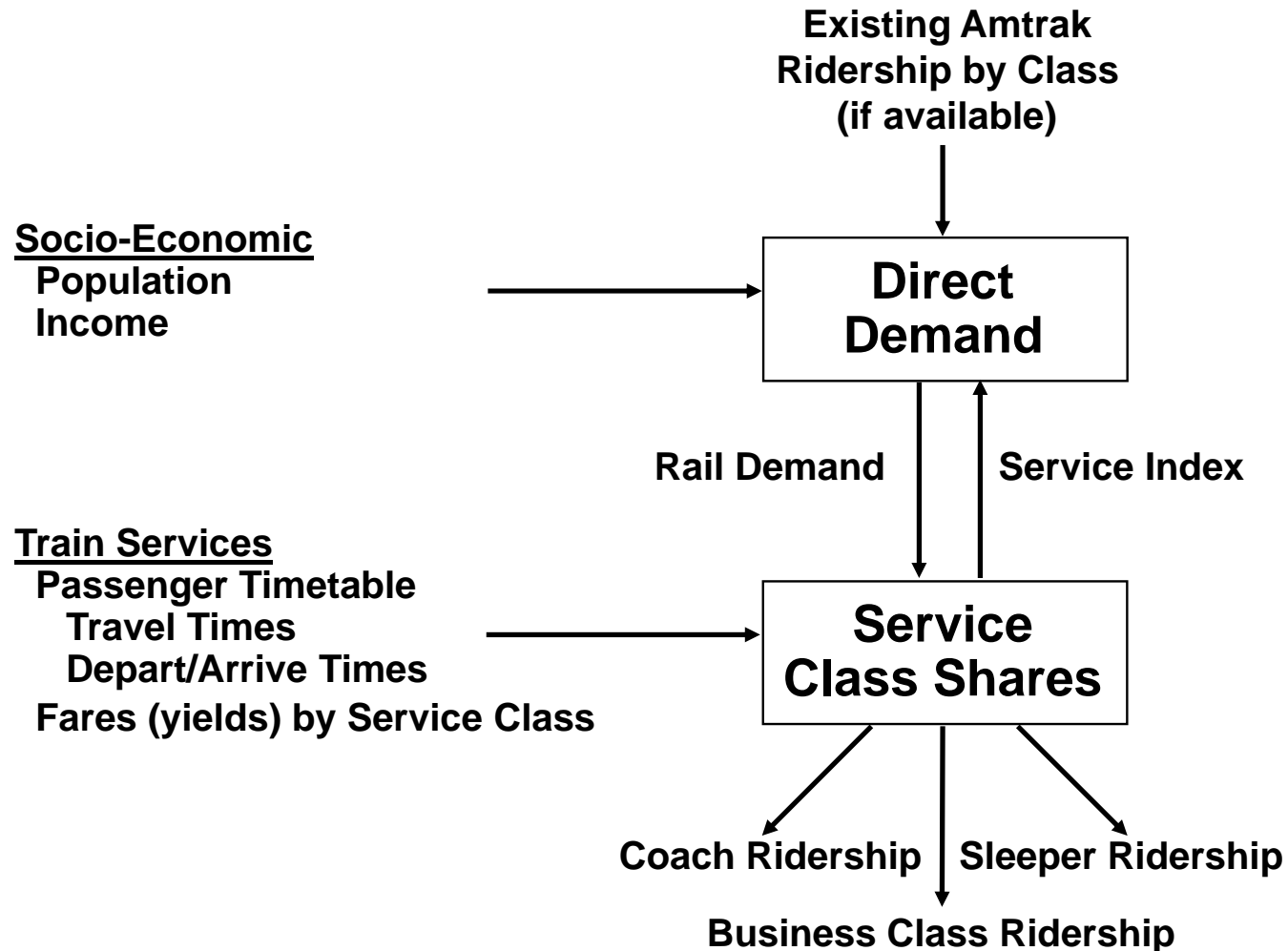
# Contents

- **Long Distance Train Model** **3**
- **Northeast Corridor (NEC) Model** **11**
- **California Intercity Rail Model** **34**
- **Best Practices Corridor Model** **63**

# **Overview of Long Distance Train Model**

**June 2005**

# Structure of the Model





# Key Drivers

- **Existing Amtrak Demand (ridership), if available**
- **Socio-Economic Data/Forecasts**
  - Total Income (Population \* Per Capita Income)
  - Per Capita Income (scales fare/price sensitivities)
- **Service Characteristics (for each train/route)**
  - Timetable
    - Frequency (daily, tri-weekly, etc.)
    - Classes of Service (coach, business, sleeper)
    - Depart/Arrive Times of Day
      - travel times
      - number of nights
      - spacing between trains
    - Mileposts
      - trip length (miles)
  - Fares (Average Yields) by Class of Service

# Highway Survey

- **Sample Size**
  - 4,638 completed mail-back surveys
- **Survey Purpose**
  - Develop an estimate of origin-destination trips by auto within the NEC
  - Used to adjust data from the random traveler telephone survey to account for under-reporting of auto trips
- **Observed Trip Data**
  - Origin and destination
  - Trip purpose
  - Group size
  - Trip duration
- **Household Demographic Data**
  - Household size, auto ownership, and income

# Model Development Process

- **Market Segmentation**
  - Business Trips
  - Non-Business Trips
- **Model Structure/Form – Nested Logit**
- **Independent Variables**
  - Level of Service
  - Travel Time (Line Haul & Access)
  - Departure Frequency & Time Slot
  - On-Time Performance (OTP)
  - Travel Cost / Income

# Model Development Process

- **Statistical analysis of Preference Surveys**
  - Trade-off/substitution behavior among available modes
  - Sensitivities to changes in key characteristics of modes
    - Travel time
    - Travel cost
    - Frequency / schedule slotting
    - On-Time Performance (OTP)
    - Transfers/Connections
  - Market segmentation – differential sensitivities by trip purpose
- **Application and Validation**
  - Current market and service characteristics
  - Actual travel volume data (ridership/revenue)
  - Adjust/calibrate model to match observed actuals

**Caltrans/Amtrak**

**California Intercity  
Rail Ridership/Revenue  
Forecasting Model**

**February 2007**

# California Demand Model

- **Model is used to address changes in ...**
  - Station stop locations
  - Train travel times
  - Train departure/arrival times/time-of-day
  - Frequency (number of trains)
  - Rail fares/yields
  - Competing auto travel time & cost
  - Future growth rates
- **Model parameters derived from ...**
  - Extensive travel survey data
  - In-depth analysis of historical data & trends
- **Key model inputs provided by ...**
  - Amtrak/Caltrans train timetables & fares
  - Statewide highway network, for access to/from stations and for competing auto travel
  - Population data & forecasts from State of California

# Model Dimensions

- **Travel market growth variable**
  - Population
  - Income
  - Employment
- **Travel Market Share Variables**
  - Travel time
    - line haul
    - access/egress
  - Travel cost
  - Frequency (number of trains & departure/arrival times-of-day)
- **Trip purpose market segments**
  - Commute, business, recreation & other
- **Each origin-destination market is analyzed with a separate set of calculations by trip purpose**

# Key Model Components

- **Model Development Steps**

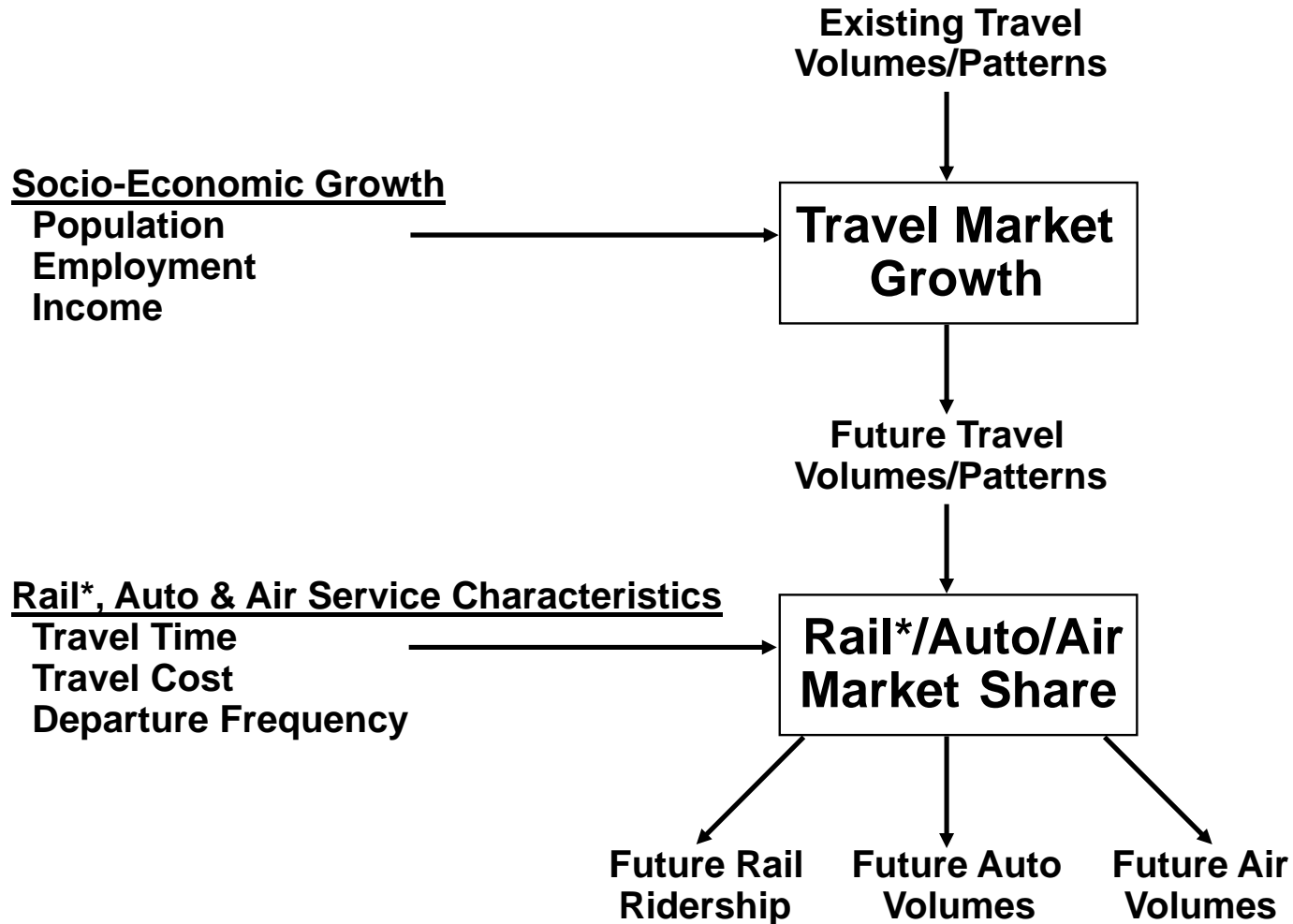
- Conduct travel surveys
- Input socio-economic data / survey data
- Develop service parameters/assumptions
- Run travel demand models

- **Key Inputs**

- Rail service characteristics
  - Train schedules
    - travel time
    - frequency (departure/arrival times-of-day)
  - Revenue yield/fares
  - Station access (highway time & cost)
- Competing auto & air service characteristics
- Socio-economic data & forecasts
  - Population from California Department of Finance
  - Employment & income from various local & state sources



# Structure of the Model



\* includes Thruway Bus

# Highway & Rail Survey Content

- **Origin & Destination**
  - Location (5-digit zip code)
  - Type/trip purpose
  - Departure/arrival times
- **Group Size / Vehicle Occupancy**
- **Trip Frequency**
- **Traveler Characteristics**
  - Age & gender
- **Household Characteristics**
  - Size
  - Number of vehicles
  - Annual income

# Supporting Market Analysis & Data

- **Other Amtrak market research & analysis**
  - Analysis of historical demand elasticities of price & frequency changes in California as well as nationwide
  - Study of parking, on-time performance & Business Class on the Pacific Surfliner
- **Amtrak ridership & ticket revenue**
  - By station pair, train & route
  - Includes connecting train & Thruway Bus riders
  - Provides a complete universe of frequencies, schedules and travel times
- **Air Passenger Data**

# Travel Market Share Drivers

- **Variables**

- Travel Time (weighted by component)
  - Line Haul
  - Access/Egress
- Travel Cost
- Frequency (departure/arrival time-of-day)

- **Trip Purpose Segments**

- Commute
- Business
- Recreation
- Other

# Schedule Time-of-Day Sensitivity

- **Initial Model Based on Daily Train Frequencies**
  - All train departures and arrivals treated equally
  - Not sensitive to changes in scheduled departure/arrival times
- **Revised Model Sensitive to Changes in Train Departure/Arrival Times**
  - Uses new time-of-day factors
    - Departure time from origin station
    - Arrival time at destination station
    - Train spacing/coverage
  - Replace daily train frequency variable
  - Travel time and fare sensitivities not affected

# Best Practices Corridor Model

**June 2003**

# Amtrak Corridor Model

- **Market Share Focus**
- **Total Market Size**
  - Existing Data/Models
    - Local Sources
    - FAA 10 percent sample
    - FRA/Volpe auto travel model
    - American Travel Survey (ATS)

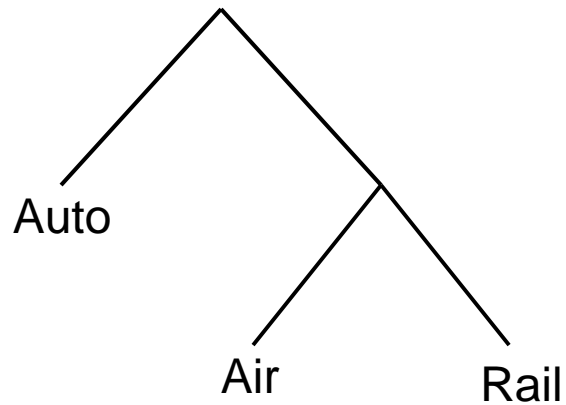
# Amtrak Corridor Model (con'd)

- **Mode Share Model**
  - Composite of Existing Corridor Models
    - Amtrak NEC
    - Southeast Corridor
    - Amtrak/Caltrans
    - Chicago-Milwaukee
    - FRA Forecasting Models
  - Key Variables
    - Travel Time (in-vehicle & out-of-vehicle)
    - Travel Cost (Fares)
    - Service Frequency
    - Trip Distance



# Amtrak Corridor Model (con'd)

- **Mode Share Model (con'd)**
  - Nested Model Structure



# Amtrak Corridor Model (con'd)

- **Mode Share Model (con'd)**
  - Development Approach
    - Review & Evaluate Existing Models
      - Structure
      - Independent Variables
      - Functional Forms
      - Implied Relationships
        - » elasticities
        - » values of times
    - Identify Preferred Model Structure & Specification
    - Establish Ranges for Parameter Values
    - Calibrate to Match Observed Shares for Selected City Pairs
    - Validate Model for different Corridor Markets

# Amtrak Corridor Model (con'd)

- **Mode Share Model (con'd)**
  - Application Approach
    - Assemble Existing Market Data
      - Travel Volumes by Mode
      - Socio-Economic Data (population, etc.)
    - Assemble Existing Service Data
      - Travel Impedances (times, costs, frequencies) by Mode
    - Adjust Model to Match Existing Conditions
      - Rail Shares/Volumes (if an existing corridor)
      - Auto/Air Shares/Volumes
    - Apply Adjusted Model to New Service Inputs
      - Future Rail Impedances (times, costs, frequencies)

# Amtrak Corridor Model (con'd)

- **Elasticity Summaries for key variables in model**

	<b>Business</b>			<b>Non Business</b>		
<b>Variable Level</b>	<b>100 Miles</b>	<b>200 Miles</b>	<b>300 Miles</b>	<b>100 Miles</b>	<b>200 Miles</b>	<b>300 Miles</b>
Total Travel Time	-1.34	-1.95	-2.66	-1.07	-1.56	-2.13
Trip Cost	-0.53	-0.60	-0.74	-0.62	-0.70	-0.86
<b>Frequency Level</b>	<b>4</b>	<b>8</b>	<b>12</b>	<b>4</b>	<b>8</b>	<b>12</b>
Trip Frequency	0.61	0.51	0.43	0.53	0.45	0.38

- **Values of Time**

- Auto      \$29/hr (business)      \$20/hr (non-business)
- Air        \$54/hr (business)      \$37/hr (non-business)
- Rail        \$31/hr (business)      \$21/hr (non-business)

## Financial Analysis Process for Proposed Service Changes

### Summary

This document summarizes the process that the Financial Analysis Department follows in calculating the expected financial impact from proposed service changes to passenger rail service provided by Amtrak.

All estimates are based on specific information describing the proposed changes. This usually includes:

- The proposed schedule,
- The required additional equipment,
- The proposed changes to service, and
- Any proposed changes to operations.

Each proposal is reviewed by Finance employees familiar with Amtrak operations and our data bases and financial systems. Each analysis is adapted to the specific intricacies of the request. Unit costs and averages used to calculate and allocate costs are specifically selected to fit the proposed service, schedule and operation.

Along with the forecasted change to riders, passenger miles, revenue, costs, net impact, and train miles, on most analyses we also provide the cost recovery statistic and the cost per train mile to help facilitate the validation and understanding of the financial analysis.

### Revenues, Riders and Passenger Miles

Forecasted ticket revenues, ridership and passenger miles are provided by the Amtrak Market Research Department.

**Food and Beverage Revenue:** We forecast food and beverage revenue based on the per rider average F&B revenue based on a comparable route. F&B revenues for first class riders, where applicable (including sleepers) are adjusted for the F&B revenue transfer, which accounts for the F&B revenue being included in the ticket revenue forecast.

### Costs

Our process utilizes information provided by other Amtrak departments as well as average unit costs provided by APT, Amtrak's cost allocation system. Costs are calculated and allocated at a detailed level. We use unit costs that are selected specifically for the targeted cost area. Costs are inflated to the targeted reporting year, using specific inflation rates at the account level (e.g., wages, salaries, fuel, etc.). The unit cost that we usually use, is listed below for each cost area.

**Host Railroad costs:** Host railroad costs are based on a per train mile rate, provided by the Amtrak Host Railroad Department. The rate includes the access charge and the incentive charge.

**Fuel Cost:** We use a fuel consumption model to estimate the required gallons. The model takes into account the weight of each car, the proposed schedule and the specific grade changes of the track. The estimated required gallons are used to determine the percent change from the current gallons (of the targeted route). That percentage is used to calculate the change in current fuel costs.

**T&E Labor Costs:** T&E labor costs are provided by the Amtrak Crew Management Department. They estimate these costs based on the specific schedule and the current or proposed crew bases.

**OBS Costs:** OBS labor costs are provided by the Amtrak Crew Management Department. They estimate these costs based on the specific schedule and the current or proposed crew bases.