

April 29, 2020

Comments upon Metrics and Minimum Standards for Intercity Passenger Rail Service

RIN: 2130-AC85

Document Number: 2020-07624

FRA Docket Number: 2019-0069-0004 & 2019-0069-0005

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Personal Work

Greetings:

Introduction

I am a licensed professional engineer who has had a part in recent Interstate Highway planning, design, and construction who now supports high-volume manufacturing after a period of designing infill buildings and sites and briefly working in utility and railroad operations. Perhaps a broader consideration of transportation financing is needed to address the rulemaking.

An amicable path forward is available to address questions of operational reliability and efficiency on the General Railway System that the proposed Metrics and Minimum Standards seek to address should federal policy be reversed to move toward a market economy. While performance based metrics can play some part in ordering goals for the public good they should not be developed using existing assumptions when competitive modes are financed under differing methods and cost recovery rates. The FRA and the USDOT could guide the metrics and minimum standards by considering the differences between infrastructure and operations in greater detail relative to other surface transportation programs.

The Financial Assumptions behind the 1973 3R Act Infrastructure Consolidation are not Durable

Discussion:

With the benefit of hindsight, it can be seen that the drastic reduction in system infrastructure route reliability that was the hallmark of various plans to reduce overall capacity in the eastern General Railway System to meet a lower marketplace demand under past observed conditions was predicated on an incorrect financial model of infrastructure investment. The United States Department of Transportation (USDOT) at its 1967 founding as an agency inherited a concept of infrastructure financing from the Department of Commerce, Bureau of Public Roads that does not actually advocate for incremental user funding of highway infrastructure, but instead promotes a little understood concept of leveraging highways as a public investment. This leveraging arises when excise taxes collected during the use of the much broader locally financed road network are devoted at the federal level through the fuel (gas) tax to intercity highways, significantly funding this type of infrastructure with minimal incremental cost recovery.

While many focus on the \$141 Billion transferred to the Highway Trust Fund (HTF) from general funds¹ by the last authorizing legislation the much larger incremental funding gap is actually this leveraging atop locally financed road assets. Governments ultimately survive on some form of excise taxation warranted for public good projects, yet marketplace distortions occur when only one mode is beneficially funded in a long-term program of consistent formulaic investment.

Net Present Value studies that I have conducted, using historic corporate bond interest rates though with no equity load nor property tax burden, show that the nationwide Interstate Highway system has only recovered around 1/8th of its direct financial long-run average costs over the last six-decades from incremental fuel taxes and fees prorated by mileage and only 1/16th for newer projects similar to those I helped organize at MDOT. The basic charts are enclosed with this comment.

Certainly, this incremental highway funding gap could be corrected by a fuel tax increase, targeted by perhaps creating a new class of chemically marked diesel fuel. However, this is politically unlikely leaving few solutions to establish a competitive infrastructure basis outside of urban areas where toll lanes could be expanded to throttle congestion.

While the USDOT as a whole should look to reform their methodologies for project justification perhaps the only option to restore the marketplace that is available solely to the Federal Railroad Administration (FRA) is to research this topic and publish data that supports a form of assignable Tax Credit for mainline General Railway System infrastructure equal to the highway leveraging per person-mile and/or intermodal freight highway container/trailer-mile converted to a train-mile basis², claimable only with operation of consumer beneficial transportation (both passenger and highway competitive intermodal freight routes) to balance the funding of intercity infrastructure. The FRA could thus advocated for a Shadow Toll of this amount.

Ultimately, it must be acknowledged that the only real solution to many of the on-time and financial metrics is for the nation to encourage the shareholder owned railroads to provide for resilient mainline infrastructure in a manner that is beneficial to their owners though there is some residual duty that such railroads have to provide for common carrier service in their partially deregulated state. While this is somewhat out of the scope of the rulemaking the FRA must ask itself how will more reliable infrastructure be funded and what can they do to through basic research to advance concepts that would serve as the foundation for legislation such as an infrastructure Tax Credit.

Proposed Addition to Rule Section II. Background – Modal Equity Rationale Statement:

Overall, incremental changes to the Amtrak route level performance and goal achievement should be evaluated using a Metric of \$17.2 per train-mile as an acceptable level of Public Good Below-the-Rail Infrastructure Investment that is not covered by incremental consumer revenue which shall be subtracted from existing costs. This investment is roughly equivalent to the gap between the incremental consumer fuel taxes and prorated fees and the long-run average financial cost of the last six-decades of nationwide Interstate Highway spending. An additional fixed amount for the Northeast Corridor infrastructure will exist in such an analysis that is justified at the federal level as the most efficient method to provide for intercity transportation capacity where no room remains for economical highway expansion.

¹ Government Accountability Office, "Funding the Nation's Surface Transportation System—High Risk Issue 2017," https://www.gao.gov/key_issues/funding_nations_surface_transportation_system/issue_summary

² Virgil G. Payne, "[Tax Credit Policy Summary](https://www.scribd.com/document/442430149/Policy-Summary-National-Railway-Infrastructure-Plan)" 2020, <https://www.scribd.com/document/442430149/Policy-Summary-National-Railway-Infrastructure-Plan>

Financial Efficiency Metrics must be Open, Consistent, and Encourage Competition

Discussion:

The metrics proposed in Section 273.9 Financial - state that *“Adding frequency variable and route variable costs to calculate avoidable operating costs (ed. as proposed by the rule) does not make any distinction between short- and long-term avoidable costs, but results in a single avoidable cost figure for a single route at a future time. This approach represents a maximum saving, or cost avoided, and may be lower depending on the specific context of each individual route”*.

As such the proposed avoidable cost metric is deficient to the original legislative intent to report avoidable loss/cost as it is not actually the avoidable cost as Congress requested in Section 207 *“Such metrics, at a minimum, shall include the percentage of avoidable and fully allocated operating costs covered by passenger revenues on each route...”*³ and lacks transparency. Further Congress has clarified elsewhere they desire to see reports including loss/cost that are on the *“short-term avoidable”* basis that have yet to be provided as required.⁴

Combining frequency variable and route variable costs together cannot work for this purpose as many physical rail lines have many routes, some even with differing state or federal sponsorship, such that the data is not parsed for determining this result. It appears that the FRA is simply using the recently developed Amtrak methods as a way to meet the statutory requirements to report these costs without performing detailed oversight of the grant to Amtrak even though the FRA previously determined that both short and long-term avoidable loss/costs were needed under the metrics determination and proceeded to report they did not have this data for a decade every quarter⁵. I take this position after filing detailed Freedom of Information Act requests with both Volpe and the FRA⁶ for any underlying data that they had developed under the original PRIIA financial metrics study funded almost a decade ago by federal spending but yet was told that neither group had such data.

At the very least the FRA should provide some discussion and analysis

I have included my own breakdown of a US private operator's information from Security and Exchange Commission (SEC) filings to show the distinctions between Above-the-rail and Below-the-rail costs in the Appendix to demonstrate why a consumer service agency must be guided by such business metrics as well as why the public good is served by such a division. Congress clearly wanted additional information similar to this analysis as many are business oriented. At the very least the FRA should require reporting much more information, including the cost recovery as both a percentage of the frequency variable cost and as a percentage of the frequency and route variable cost if no additional data analysis is budgeted.

However, a much more sensible way that the rule should adopt is to compare the revenue to the costs of only above-the-rail operations as a refined type of long-term avoidable cost as this would first be consistent with other United States modes such as highway and aviation and secondly is the path

³ [49 USC Subtitle V, Part C \(Ch. 241, §24101 -Section 207\)](#)

⁴ [49 USC Subtitle V, Part C \(Ch. 241, §24315\)](#) Reports and audits (a) Amtrak Annual Operations Report...(1) for each route on which Amtrak provided intercity rail passenger transportation during the prior fiscal year, includes information on- (A) ridership; (B) passenger-miles; (C) the short-term avoidable profit or loss for each passenger-mile; (D) the revenue-to-cost ratio; (E) revenues; (F) the United States Government subsidy; (G) the subsidy not provided by the United States Government; and (H) on-time performance.

⁵ [FRA quarterly Metrics Statement - 2010](#), <https://cms8.fra.dot.gov/elibrary/rail-service-metrics-and-performance-quarter-ended-december-31-2010-first-quarter-fiscal>

⁶ FRA FOIA Request 2020-102

increasingly taken by other western democracies as their competitive railway deregulation schemes mature and they see that infrastructure is a core government function.

This is important as Section 208 required FRA to consider “(4) the methodologies of Amtrak and major intercity rail passenger transportation service providers in other countries for determining intercity passenger rail routes and service”⁷

In these countries the highway fuel tax is around ten times that in North America, so the effects of undercharging highway users are not as pronounced as here, however the European democracies are starting to consider infrastructure funding – and not just limited to capital - to support services instead of a mixed bag of general subsidies as they are extending the funding to the track usage fee that they previously tried to recover from fares for certain intra-state connectivity services. Track usage fees are Capital Leases or in other words the long-run average costs of infrastructure (below-the-rail).

Investing in infrastructure only - though the average cost of both capital and operations - appears to be a much preferred way to accomplish governmental investment as the operator then becomes competitive in their service provisions toward the customer⁸, who then is free to provide immediate feedback through purchases and as such the Customer Service metrics proposed in this rulemaking will require less agency oversight.

In the United States highway infrastructure has such a low cost recovery rate (around 1/8th of the long-term average cost where even capital is variable with respect to use) that the division of costs between above-the-rail operations and below-the-rail infrastructure when combined with the assignable Tax Credit for infrastructure per operated train-mile would allow for beneficial modal neutrality to accomplish the USDOT’s efficiency goal below the point where commercial aviation becomes efficient which is a much longer trip than is commonly assumed when considering connecting at airports relative to overnight rail services when considering the Base Airfare to Trip Length chart in the Appendix.

I have included an analysis of Amtrak’s cost centers for existing train operations indicating that the true revenue gap is already being spent on below-the-rail infrastructure facilities such as mainline leases, terminal yards, platforms, and risk protection. Incremental additions to service away from the congested corridor regions is already equivalent to the gap seen in highway funding due to leveraging on a person-mile metrics.

Thus an amicable path forward is to expand passenger capacity and volume per train-mile by running at least two round trips a day per route, utilizing the declining cost curve with respect to volume, so that all operational costs for a quality service are accounted for above-the-rail including ultimately equipment lease/ depreciation costs – everything that the average customer sees. Notably, this distance based metric could become a refundable or assignable federal tax credit, nimbly bringing the funds forward for reconstructing the shareholder owned general railway system mainlines and publicly held commuter lines and terminals as worked out in more detail for both freight and passenger rail operations in a recent paper⁹. One can see that this method is both easily understood and can be rather easily defined by parsing the financial metrics in this rule.

⁷ [49 USC Subtitle V, Part C \(Ch. 241, §24101 -Section 208\)](#)

⁸ David Burroughs, “Subsidies could harm overnight train revival, AllRail warns,” July 18, 2019, <https://www.railjournal.com/regions/europe/subsidies-could-harm-overnight-train-revival-allrail-warns/>

⁹ Virgil G. Payne, “[National Railway Infrastructure Plan for Shareholder and Publicly Held Railways](#),” 2020, <https://www.scribd.com/document/443778048/National-Infrastructure-Plan-for-Shareholder-and-Publicly-Held-Railways>

Proposed Section 273.9 Financial Rule Revision:

Define the Financial Metrics Thus:

Short-Term Avoidable Cost = Amtrak's Frequency Variable Cost Definition

Long-Term Avoidable Cost = Above-the-Rail Operations * + Off-book Equipment Lease/Depreciation

Long-Term Infrastructure Average Cost = Below-the-Rail Infrastructure Investment*

Common System Fixed Cost = Amtrak's Common System Fixed Cost Definition

* Breakdown defined by FY2018 Amtrak Performance Tracking Cost Centers in Appendix

Operational On-Time-Percentage Metrics for Monitoring Need Simple Enforcement Boundaries

Discussion:

Preference as exists in current law perhaps might not need to be mediated through the performance based metrics proposed in Section 273.5 On-Time Performance and Train Delays - as it is rather complicated to assign corrective infrastructure or operations action. While I take no issue with the all Customer OTP metric proposed in the metrics for monitoring, perhaps the FRA should work to define in very realistic terms what minimum boundary actions exhibit preference in the current operating environment, thus would be investigative targets for enforcement should the monitoring metrics fall out of bounds. The FRA could do so by publishing a paper of best practices.

The first example might be that auto-routing of dispatching decisions authorizing train movements must be coded to create a plan of the next 90 minutes for train movements that provides a clear path assuming all goes well, continually reset against where the train is now compared to a table of pure running plus dwell time between upcoming control points. Should a train be unable to move, the established dispatching path might only be kept open for 15 minutes unless earlier consent to end it is given by the operating conductor by means of an update. Once movement is again possible the clear path decision tree test is again reinstated but it would only apply for the next future 90 minutes, starting just then. This test would not penalize a host railroad should their equipment function incorrectly or should there be interference at grade crossings but would penalize them for deficiencies in infrastructure configuration and maintenance timeliness.

The second example might be that there needs to be some type of industry wide dispatching data transfer standard to hand off this 90 minute future look countdown clock at interchanges between railroads so that each dispatching plan provides for these movements.

At some level the FRA is likely going to have to coordinate such data transfer and investigative methodology within the rule. These approaches could be easily auditable and could generate easily understood and assignable corrective action items at particular infrastructure points. The clear path could also vary, such that a railroad that meet the metrics consistently could see the 90 minutes drop to 60, while one that didn't would see the 90 minutes increase.

Proposed Section 273.5 On-Time Performance and Train Delays Addition:

Include a statement of best practices in dispatching software code in the final rule.

Appendix Charts Follow

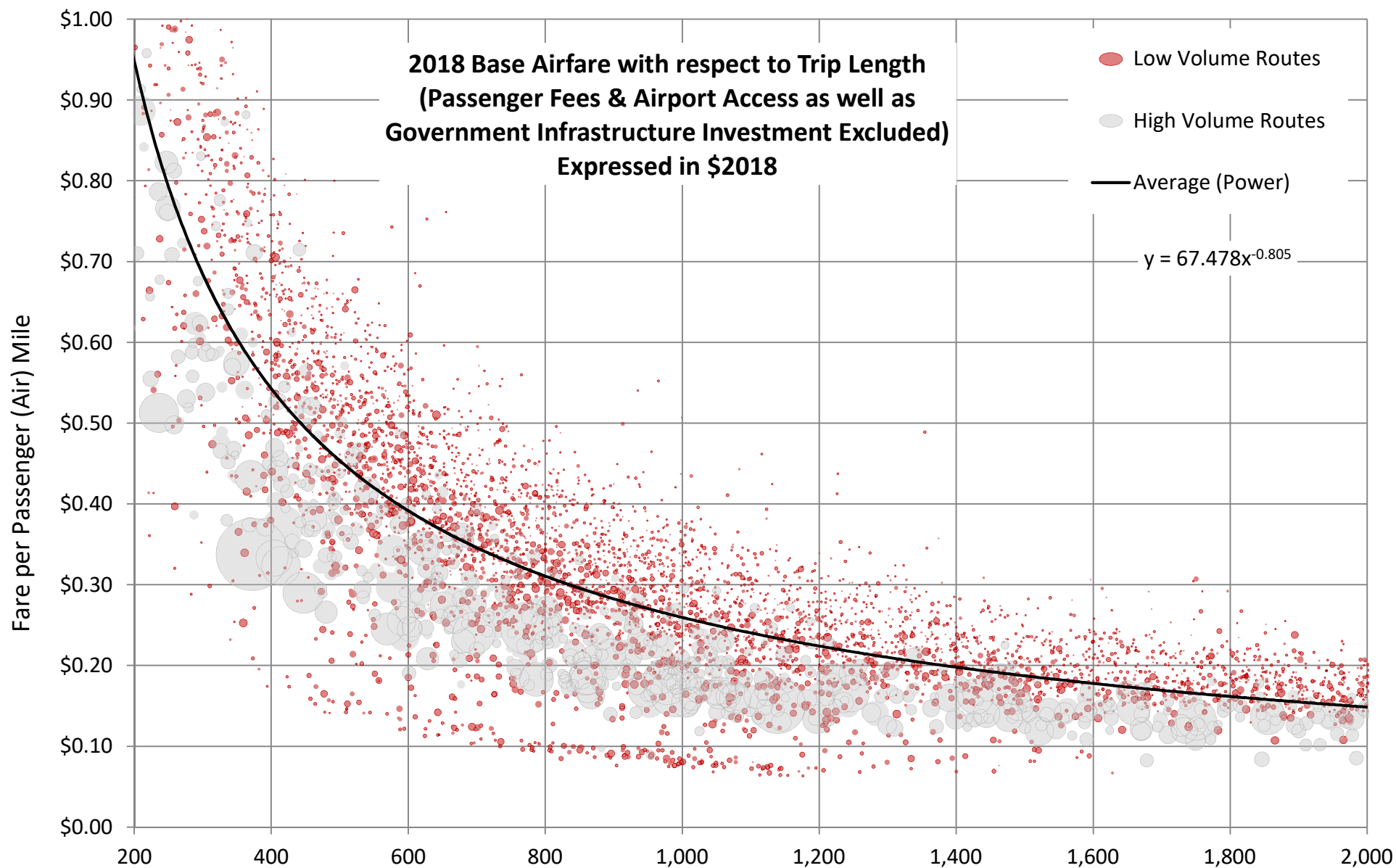
Analysis of Original Interstate Highway Long-run Average Construction and Rebuilding Costs relative to Fuel Taxes and Fees Collected for Use of System

[illegible]

Analysis of Recently Constructed Interstate Highway Long-Run Average Construction and Rebuilding Costs relative to Fuel Taxes and Fees Collected for Use of System

Year	Interstate (Millions)	Total VMT Estimated	Rural	Urban	Interstate Combo & Single Truck VMT (Millions)	Miles per Gasoline	Gallon Diesel	Federal Fee Gasoline	per Gallon Diesel	HVUT, Trailer & Truck tire fees (estimated) prorated to VMT	At 90%-10% Split Interstate Federal Capital Expenditure (Millions)	Interstate Federal Maintenance Expenditure (Millions)	Resulting Federal user fees for each year based on VMT, Federal tax, and MPG	Resulting Federal user capital repayment for each year based on VMT, Federal tax, MPG, and Fee Test Ratio	Inflation Factor	Capital Cost in 2012 Dollars	AAA Corporat e Bond Rate	1-Yr Treasury Rate	NPV AAA Corporate Bond Rate	NPV 1-YR Treasury + 1% Rate	NPV Investor WACC Rate			
2005						22.9	5.9	\$0.183	\$0.243	\$0.032			\$0	\$0	1.0000	\$0	2005	5.23%	2005	3.62%	0.0161	\$0	\$0	\$0
2006						22.5	5.9	\$0.183	\$0.243	\$0.032	\$0.006		\$0	\$6,000	1.0000	\$6,000	2006	5.59%	2006	4.94%	0.0065	\$0	\$0	\$0
2007						22.9	6.0	\$0.183	\$0.243	\$0.032	0.783		\$0	\$783,000	1.0000	\$783,000	2007	5.56%	2007	4.53%	0.0103	\$6,334	\$6,332	\$6,477
2008						23.7	6.0	\$0.183	\$0.243	\$0.032	6.683		\$0	\$6,683,000	1.0000	\$6,683,000	2008	5.63%	2008	1.83%	0.038	\$833,773	\$811,670	\$844,030
2009						24.7	6.1	\$0.183	\$0.243	\$0.032	14.116		\$0	\$14,116,000	1.0000	\$14,116,000	2009	5.31%	2009	0.47%	0.0484	\$7,915,914	\$7,604,842	\$7,991,749
2010						25.7	6.2	\$0.183	\$0.243	\$0.032	66.755		\$0	\$66,755,000	1.0000	\$66,755,000	2010	4.94%	2010	0.32%	0.0462	\$23,120,290	\$22,007,557	\$23,410,337
2011						26.7	6.3	\$0.183	\$0.243	\$0.032	24.577		\$0	\$24,577,000	1.0000	\$24,577,000	2011	4.64%	2011	0.17%	0.0447	\$94,045,504	\$89,801,079	\$95,261,482
2012						26.7	6.4	\$0.183	\$0.243	\$0.032	34.023		\$0	\$34,023,000	1.0000	\$34,023,000	2012	3.64%	2012	0.17%	0.0347	\$122,940,363	\$115,716,302	\$125,892,722
2013						26.7	6.5	\$0.183	\$0.243	\$0.032	101.622		\$0	\$101,622,000	1.0000	\$101,622,000	2013	4.27%	2013	0.13%	0.0414	\$163,665,698	\$151,431,356	\$168,573,559
2014						26.7	6.7	\$0.183	\$0.243	\$0.032	140.696		\$0	\$140,696,000	1.0000	\$140,696,000	2014	4.25%	2014	0.11%	0.0414	\$276,562,426	\$255,862,248	\$284,769,908
2015						26.7	6.7	\$0.183	\$0.243	\$0.032	88.898		\$0	\$88,898,000	1.0000	\$88,898,000	2015	4.19%	2015	0.30%	0.0389	\$434,741,554	\$401,713,506	\$448,585,725
2016						26.7	6.7	\$0.183	\$0.243	\$0.032	63.343		\$0	\$63,343,000	1.0000	\$63,343,000	2016	3.50%	2016	0.60%	0.029	\$541,966,938	\$498,461,290	\$565,110,389
2017						26.7	6.7	\$0.183	\$0.243	\$0.032	54.091		\$0	\$54,091,000	1.0000	\$54,091,000	2017	3.68%	2017	1.17%	0.0251	\$627,585,344	\$573,995,443	\$662,867,496
2018	104		13			26.7	6.7	\$0.183	\$0.243	\$0.032	36.451		\$24,870,601	\$11,580,399	1.0000	\$36,451,000	2018	3.96%	2018	2.25%	0.0171	\$708,670,727	\$648,499,252	\$760,520,894
2019	111		13			26.7	6.7	\$0.183	\$0.243	\$0.032			\$26,362,837	\$26,362,837	1.0000	\$0	2019	4.00%	2019	2.00%	0.02	\$749,061,171	\$679,882,041	\$818,427,371
2020	117		14			26.7	6.7	\$0.183	\$0.243	\$0.032			\$27,855,073	\$27,855,073	1.0000	\$0	2020	4.00%	2020	2.00%	0.02	\$751,606,268	\$673,124,780	\$839,588,406
2021	123		15			26.7	6.7	\$0.183	\$0.243	\$0.032			\$29,347,309	\$29,347,309	1.0000	\$0	2021	4.00%	2021	2.00%	0.02	\$752,701,243	\$664,627,799	\$860,437,333
2022	129		16			26.7	6.7	\$0.183	\$0.243	\$0.032			\$30,839,545	\$30,839,545	1.0000	\$0	2022	4.00%	2022	2.00%	0.02	\$752,288,091	\$654,338,904	\$880,955,426
2023	136		16			26.7	6.7	\$0.183	\$0.243	\$0.032			\$32,331,781	\$32,331,781	1.0000	\$0	2023	4.00%	2023	2.00%	0.02	\$750,306,488	\$642,204,340	\$901,122,834
2024	142		17			26.7	6.7	\$0.183	\$0.243	\$0.032			\$33,824,017	\$33,824,017	1.0000	\$0	2024	4.00%	2024	2.00%	0.02	\$746,693,695	\$628,168,736	\$920,918,516
2025	148		18			26.7	6.7	\$0.183	\$0.243	\$0.032			\$35,316,253	\$35,316,253	1.0000	\$0	2025	4.00%	2025	2.00%	0.02	\$741,384,465	\$612,175,060	\$940,320,169
2026	154		19			26.7	6.7	\$0.183	\$0.243	\$0.032			\$36,808,489	\$36,808,489	1.0000	\$0	2026	4.00%	2026	2.00%	0.02	\$734,310,940	\$594,164,571	\$959,304,151
2027	161		19			26.7	6.7	\$0.183	\$0.243	\$0.032			\$38,300,725	\$38,300,725	1.0000	\$0	2027	4.00%	2027	2.00%	0.02	\$725,402,549	\$574,076,765	\$977,845,401
2028	167		20			26.7	6.7	\$0.183	\$0.243	\$0.032			\$39,792,961	\$39,792,961	1.0000	\$0	2028	4.00%	2028	2.00%	0.02	\$714,585,897	\$551,849,320	\$995,917,356
2029	171		21			26.7	6.7	\$0.183	\$0.243	\$0.032			\$40,787,785	\$40,787,785	1.0000	\$0	2029	4.00%	2029	2.00%	0.02	\$701,784,653	\$527,418,050	\$1,013,491,859
2030	175		21			26.7	6.7	\$0.183	\$0.243	\$0.032		7.600	\$41,807,480	\$34,207,480	1.0000	\$7,600,000	2030	4.00%	2030	2.00%	0.02	\$687,436,742	\$501,229,173	\$1,031,066,318
2031	180		22			26.7	6.7	\$0.183	\$0.243	\$0.032		7.600	\$42,852,667	\$35,252,667	1.0000	\$7,600,000	2031	4.00%	2031	2.00%	0.02	\$679,358,433	\$481,032,343	\$1,056,670,368
2032	184		22			26.7	6.7	\$0.183	\$0.243	\$0.032		7.600	\$43,923,984	\$36,323,984	1.0000	\$7,600,000	2032	4.00%	2032	2.00%	0.02	\$669,869,997	\$459,153,067	\$1,082,702,763
2033	189		23			26.7	6.7	\$0.183	\$0.243	\$0.032			\$45,022,083	\$45,022,083	1.0000	\$0	2033	4.00%	2033	2.00%	0.02	\$658,887,854	\$435,513,956	\$1,109,161,506
2034	194		23			26.7	6.7	\$0.183	\$0.243	\$0.032			\$46,147,635	\$46,147,635	1.0000	\$0	2034	4.00%	2034	2.00%	0.02	\$638,420,401	\$402,206,629	\$1,127,987,789
2035	199		24			26.7	6.7	\$0.183	\$0.243	\$0.032			\$47,301,326	\$47,301,326	1.0000	\$0	2035	4.00%	2035	2.00%	0.02	\$615,963,677		

**2018 Base Airfare with respect to Trip Length
(Passenger Fees & Airport Access as well as
Government Infrastructure Investment Excluded)
Expressed in \$2018**



Trip Length in (Air) Miles - Data from Quarter 3 USDOT Bureau of Transportation Statistics

Table B-2. Fully Allocated Costs by Subfamily, Pre-Audit FY2018 Dollars (Millions)

This table provides the allocated costs of each APT Subfamily.

Family	Family Name	Subfamily Number	Subfamily Name	Operating Costs (Millions)	Percent of Amtrak Fully Allocated Costs	Operating and Capital Costs (Millions)	% of Operating and Capital
FM_MOW	Maintenance of Way	FM_101	Central Div MoW	\$19.90	0.5%	\$26.30	0.5%
		FM_102	MidAtlantic Div MoW	\$93.20	2.2%	\$150.30	2.7%
		FM_103	New England Div MoW	\$59.10	1.4%	\$85.30	1.5%
		FM_104	New York Div MoW	\$110.10	2.6%	\$140.10	2.5%
		FM_105	MoW Support	\$113.80	2.7%	\$572.60	10.4%
		FM_106	System Gangs	\$8.60	0.2%	\$114.00	2.1%
		FM_107	West Div MoW	\$11.10	0.3%	\$11.20	0.2%
		FM_108	Empire District	\$10.70	0.3%	\$14.70	0.3%
		FM_109	Michigan Line	\$10.30	0.2%	\$10.40	0.2%
FM_MOE	Maintenance of Equipment	FM_201	MoE Turnaround	\$163.00	3.9%	\$163.30	3.0%
		FM_202	MoE Loco Maintenance	\$88.30	2.1%	\$88.50	1.6%
		FM_203	MoE Car Maintenance	\$38.00	0.9%	\$38.00	0.7%
		FM_204	MoE Support	\$39.10	0.9%	\$44.00	0.8%
		FM_205	MoE Multiple	\$186.60	4.4%	\$344.00	6.2%
		FM_206	MoE HSR Maintenance	\$57.60	1.4%	\$58.20	1.1%
		FM_207	MoE Back Shop	\$18.00	0.4%	\$79.10	1.4%
		FM_208	MoE Material Control	\$10.60	0.3%	\$10.60	0.2%
FM_OPS_TRANS	Ops - Transportation	FM_301	On Board Services (OBS)	\$262.70	6.2%	\$262.70	4.8%
		FM_302	T&E	\$438.40	10.4%	\$438.40	7.9%
		FM_303	Yard	\$71.00	1.7%	\$71.20	1.3%
		FM_304	Fuel	\$128.10	3.0%	\$128.10	2.3%
		FM_305	Transportation - Multiple	\$11.50	0.3%	\$11.50	0.2%
FM_OPS_TRANS	Ops - Transportation	FM_306	Train Movement	\$86.70	2.0%	\$86.80	1.6%
		FM_307	Train Movement - Host RR	\$152.30	3.6%	\$160.10	2.9%
		FM_308	Transportation Support	\$77.60	1.8%	\$149.80	2.7%
		FM_309	Power - Electric Traction	\$81.10	1.9%	\$81.10	1.5%
		FM_310	Stations	\$196.90	4.7%	\$196.90	3.6%
FM_SALES_MKTG	Sales and Marketing	FM_401	Sales	\$10.30	0.2%	\$10.30	0.2%
		FM_402	Information & Reservations	\$73.00	1.7%	\$73.00	1.3%
		FM_403	Marketing	\$54.90	1.3%	\$77.40	1.4%
		FM_404	Station and On- Board Technology	\$5.00	0.1%	\$5.00	0.1%
FM_G_A	General and Administrative	FM_601	Corporate Administration	\$144.10	3.4%	\$190.30	3.4%
		FM_602	Centralized Services	\$237.20	5.6%	\$296.40	5.4%
		FM_603	Qualified Mgmt	\$971.50	23.0%	\$1,015.60	18.4%
		FM_604	Direct Customer (Non-NTS)	\$49.40	1.2%	\$154.10	2.8%
		FM_605	Subsidiary	\$39.20	0.9%	\$39.20	0.7%
FM_UTILITIES	Utilities	FM_801	Utilities	\$5.80	0.1%	\$5.80	0.1%
FM_POLICE_SAFETY	Police, Environmental & Safety	FM_901	Police	\$58.90	1.4%	\$60.90	1.1%
		FM_902	Emergency Mgmt & Corp Security	\$28.40	0.7%	\$34.40	0.6%
		FM_903	Environmental & Safety	\$7.40	0.2%	\$22.30	0.4%
Grand Total				\$4,229.10	100%	\$5,521.60	100%

APT Average Costs FY2018 Dollars (Millions) -
Responsibility for Infrastructure and Operations parsed per Highway and Aviation Divisions

Below-the-Rail Infrastructure Investment (Mostly Fixed with Respect to Train Movements)	Above-the-Rail Operations (Mostly Variable with Respect to Train Movements)
X \$26.30	
X \$150.30	
X \$85.30	
X \$140.10	
X \$572.60	
X \$114.00	
X \$11.20	
X \$14.70	
X \$10.40	
	X \$163.30
	X \$88.50
	X \$38.00
	X \$44.00
	X \$344.00
	X \$58.20
	X \$79.10
	X \$10.60
	X \$262.70
	X \$438.40
X \$71.20	
	X \$128.10
	X \$11.50
X \$86.80	
X \$160.10	
X \$149.80	
	X \$81.10
X \$196.90	
	X \$10.30
	X \$73.00
	X \$77.40
	X \$5.00
	X \$190.30
	X \$296.40
	X \$1,015.60
	X \$154.10
X \$39.20	
X \$5.80	
X \$60.90	
	X \$34.40
X \$22.30	
\$1,917.90	\$3,604.00

Reconciliation of APT Formula to Actual FY2018 Costs and Revenues

FY2018 Federal Government Investment after FRA withholding¹

Below-the-Rail Infrastructure Remaining to be Covered by Operations

Actual FY2018 Total Operating, Capital, Interest, Pensions, Tax, and Net Change in Cash¹

APT Formulaic Cost Above Actual FY2018 Costs

Total Above-the-Rail Operations Cost + Remaining Infrastructure Cost

Actual FY2018 Total Revenues (Tickets, State Contributions, Ancillary, and Other Core)¹

\$1,924.90

(\$7.00)

\$7.00

\$5,063.70

\$457.90

9.0%

\$ (457.90)

\$ 3,153.10

\$ 3,386.70

1. Consolidated Financial Statements National Railroad Passenger Corporation and Subsidiaries (Amtrak) for FY2018

Above-the-Rail and Below-the-Rail Financial Analysis

AAF/Brightline/Virgin SEC Data (Made Parametric)	Parametric	Benchmark
Miami to Orlando One-way Route (Miles)	235	235
Average Schedule Speed (MPH)	74.4	74.4
Utilization Miles per Hour - Full Schedule Cycle	58.9	58.9
Est. Cycles per Day	1.5	1.5
Trip Time (Hours)	3.16	3.16
Departure Terminal Dwell (Hours)	1.08	1.08
Turning Terminal Dwell (Hours)	0.58	0.58
Total Round Trip Cycle Time	8.0	8.0
Miles per Day	942	942
Train-Miles (Millions)	2.747	2.747
Train-Hours	23,329	23,329
Seats per Train-Mile	622	348
Seat-Miles (Millions)	1,708.435	955.845
Car-Miles (Millions)	32.960	19.227
Equipment Sets	10	10
Annual Train-miles per Set (Millions)	0.275	0.275
Locomotives per Set	2	2
First Class Coaches per Set	5	2
Seats per Car	50	50
Business Class Coaches per Set	6	4
Seats per Car	62	62
Café Cars per Set	1	1
Total Car per Set	12	7
Stated Total Operating Labor		\$45.9
<u>Corporate, Station, and Parking Garage Operating Expense</u>		
Est. Station and Parking Garage Operating Labor Portion	\$14.0	\$14.0
Est. Corporate Operating Labor Portion	\$10.6	\$10.6
Marketing & Advertising	\$2.2	\$2.2
Station Expense	\$3.6	\$3.6
Information Technology	\$7.9	\$7.9
Parking Garage	\$5.6	\$5.6
Other G & A	\$2.8	\$2.8
Total	\$46.7	\$46.7
<u>Above-the-Rail Operating and Maintenance Expense</u>		
Est. Rail Operations Labor	\$21.3	\$21.3
Maintenance of Equipment	\$16.4	\$11.3
Fuel	\$22.3	\$16.4
Maintenance Facility	\$3.5	\$3.5
Est. Equipment Development & Testing	\$172.5	
Est. Equipment Cost Variable wrt Pieces	\$521.5	
Est. Total Equipment Cost	\$694.0	\$549.0
Est. Equipment Lease Payment/ Depreciation / Parts	\$55.52	\$43.9
VMA - Heavy Maintenance and Parts Contract	\$24.0	\$14.0
Total	\$143.1	\$110.4
<u>Sales and Consumables Expense</u>		
Credit Card Fees	\$27.2	\$15.2
Passenger Meal Costs	\$21.4	\$12.0

Complimentary Meal Costs	\$9.1	\$5.1
Total	\$57.7	\$32.3

Below-the-Rail Infrastructure Maintenance Expense

Maintenance of Way	\$18.5	\$18.5
Insurance (Risk on Infrastructure Use)	\$7.7	\$7.7
Total	\$26.2	\$26.2

Below-the-Rail Infrastructure Capital Depreciation

Railway Track and Signal Depreciation	\$128.4	\$128.4
Land Lease - Right of Way	\$8.3	\$8.3
Total	\$136.7	\$136.7

Above-the-Rail and Common Operating Analysis (Long-run Average Cost)

Above-the-Rail Train Operating and Equipment Expense (Train-mile)	\$52.08	\$40.20
Above-the-Rail per Car-Mile	\$4.34	\$5.74
Above-the-Rail per Seat-Mile	\$0.084	\$0.116
Above-the-Rail Sales and Consumables Expense (Train-mile)	\$21.02	\$11.76
Common - Parking, Station, and Corporate Expense (Train-mile)	\$17.00	\$17.00
Total Operating (Millions Annually)	\$247.50	\$189.42
Total Operating (Train-mile)	\$90.11	\$68.96
Total Operating (Seat-mile)	\$0.145	\$0.198
Total Operating per Person-Mile at 60% Occupancy	\$0.241	\$0.330

Below-the-Rail Infrastructure Investment Analysis (Long-run Average Cost)

Below-the-Rail Infrastructure Maintenance (Train-mile)	\$9.54	\$9.54
Below-the-Rail Infrastructure Capital Depreciation (Train-mile)	\$49.75	\$49.75
Total Infrastructure Investment per Person-mile at 60% Occupancy	\$0.159	\$0.284

Proposed Below-the-Rail Tax Credits for Infrastructure Investment Equivalent to Highway Revenue Gap

Proposed Tax Credit per Passenger Train-Mile	\$17.20	\$17.20
Proposed Tax Credit per Intermodal Freight Train-Mile	\$21.00	\$21.00

Remaining Below-the-rail Infrastructure covered by Direct Consumer Revenue after Tax Credit

Below-the-Rail Infrastructure Investment Remaining (Train-mile)	\$21.09	\$21.09
Total Infrastructure Investment per Person-mile at 60% Occupancy	\$0.057	\$0.101