COMMUTER RAIL FLEET STRATEGY 2014-2020

September 2014

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EXECUTIVE SUMMARY

NJ TRANSIT's Commuter Rail Fleet Strategy reduces the size of the fleet, while at the same time increasing capacity, maintaining a state of good repair, and ultimately accommodating ridership growth to the year 2020. The centerpiece of the Strategy is the replacement of aging single-level equipment with modern, customer-friendly Multilevel railcars that have greater capacity. The Strategy increases existing train consists lengths, reduces passenger fleet shop counts, and minimizes impacts to the NJ TRANSIT Rail operating budget. The Strategy calls for repurposing equipment that had previously been acquired for service expansion – which did not materialize – to instead be used for replacement of aging railcars. This reduces demands on NJ TRANSIT's Capital Program. Importantly, the new purchases proposed under this strategy are funded in large part with federal Congestion Mitigation Air Quality (CMAQ) funds.

The Fleet Strategy is a near term approach that is driven by the current infrastructure configuration, its programmed improvements and the use of higher capacity vehicles.

The Fleet Strategy is a near term (Horizon Year 2020) approach that is driven by the current infrastructure configuration, its programmed improvements and the use of higher capacity vehicles.

Passenger Fleet

Retirement of 230 Arrow III Railcars – Aging Arrow III single level Electric Multiple Units (EMUs) will be replaced by new Multilevel coaches and Multilevel EMUs. The Arrow III fleet was acquired in the 1970s, overhauled in the late 1990s and has met its manufacturers' useful life. The last Arrow III to be retired in 2020 will be 43 years old in 2020.

Retirement of 65 Comet Railcars – The Fleet Strategy calls for the retirement of 16 Comet IIs in 2020. At that point, the vehicles will be 38 years of age having undergone an overhaul earlier in the past decade. In addition, 49 Comet IIIs will be retired from NJ TRANSIT's reserve fleet. In June 2007, NJ TRANSIT Board of Directors concurred with the recommendation not to overhaul the Comet IIIs but instead replace the 49 single-level Comet III units with 45 Multilevel coaches.

Purchase of 58 Multilevel Electric Multiple Units (EMU) Power Cars – The Fleet Strategy provides for the purchase of 58 Multilevel EMU power units to replace Arrow III power units. The new units represent an efficiency improvement in that one unit will provide sufficient power to pull two non-powered Multilevel units – effectively creating a three car sub-consist. This compares favorably with the two-car "married pair" Arrow III EMUs which have drive components in both units. This approach also allows NJ TRANSIT to use Multilevel coaches that were previously purchased to expand service, to instead serve as the second and third non-power unit in a new three car sub-consist with the added benefit of fewer cab cars. The propulsion technology to be utilized is similar to that contained in NJ TRANSIT's ALP46-A and ALP45-DP locomotives.

Purchase of 55 Multilevel Trailer Cars – NJ TRANSIT will purchase 55 Multilevel Trailer cars to replace existing aging Arrow III equipment and provide modest increases in lengths of existing trains.

Locomotives

Retirement of 20 ALP44 Electric Locomotives – In June 2009, NJ TRANSIT's Board of Directors approved the purchase of additional ALP46-A electric locomotives as an alternative to overhauling the ALP44 electric locomotive fleet. The Fleet Strategy calls for the retirement of ALP44 Electric Locomotives from the reserve fleet when they meet their 25 year useful life requirement.

Diesel Locomotives – At the end of 2010, NJ TRANSIT had 52 GP40 Diesel locomotives. The Fleet Strategy calls for the overhaul of 17 of those locomotives for continued revenue service; the conversion of 12 GP40s to work locomotives; and the retirement of 13 GP40 units. Ten existing GP40 locomotives will continue in use as protects and work trains. Thirteen F40 locomotives will also be retired.

Capacity

The Fleet Strategy calls for reducing the size of NJ TRANSIT's passenger fleet – excluding work trains – from 1,124 units in 2010 (the baseline year) to 1,050 units in 2020. At the same time, the number of seats provided for service from the fleet will increase by 5.5% as single level equipment is replaced with Multilevel equipment with more seats. Peak period seat capacity into Penn Station New York will grow 8.4% over the baseline year. Importantly, seat utilization – during the peak hours of Penn Station, New York service – will grow from 91% in baseline year 2010 to 102% in 2020.

State of Good Repair & Operational Flexibility

The Fleet Strategy maintains an average age of the passenger fleet of 15 years – consistent with a 30 year useful life of equipment. By 2020, NJ TRANSIT's Fleet Strategy calls for all equipment to be capable of navigating Amtrak phase gaps to access the Northeast Corridor. Also by 2020, NJ TRANSIT's entire fleet will be able to operate at 100 MPH, with appropriate acceleration characteristics. In 2010 baseline year, only 80% of the fleet could navigate phase gaps and operate at 100 MPH.

Customer Service, ADA, Employee Welfare

With the retirement of the Arrow III fleet, NJ TRANSIT's entire passenger fleet will be fully accessible to persons with disabilities and feature modern on-board customer communications equipment, power-end doors and enclosed control cabs to improve employee welfare. By the end of 2020, nearly 50% of the NJ TRANSIT Fleet will feature 2-2 seating, up from 29% in the 2010 baseline year. Surveys demonstrate the NJ TRANSIT's customers prefer 2-2 seating in Multilevels vs. 3-2 seating in single level railcars by a ratio of 14 to 1.

Operating Efficiency

NJ TRANSIT's Fleet Strategy calls for reducing the shop count for passenger equipment by over 12% -- even as service requirements increase. This decreases maintenance costs. The passenger fleet will also become more standardized as the number of different types of equipment is reduced. This increases efficiencies in parts and material management and reduces employee training costs. The fleet will become more energy efficient, reducing energy expenses. At the same time, increased capacity into New York will provide additional fare revenue.

Cost-Effectiveness, Capital Program

The Fleet Strategy is consistent with the state's Capital Investment Strategy, which emphasizes a state of good repair over expansion. Because the new Multilevel equipment proposed in the Fleet Strategy provides increased capacity, it is eligible to be funded by Federal Congestion Mitigation Air Quality or "CMAQ" funds – meaning the vast majority of the funding for new purchases will be federal. Further, by using equipment that had previously been purchased for service expansion that was not implemented, the Fleet Strategy effectively leverages that investment. Reducing the shop count for passenger equipment also reduces demands on the capital program by $50 million. Further, overhauling existing Arrow III equipment would reduce capacity (due to ADA requirements) and would therefore not be CMAQ eligible. The reconfigured Multilevel EMUs are less expensive than new single-level EMUs – yet provide greater capacity. NJ TRANSIT's Fleet Strategy specifically programs mid-life rehabilitations of both passenger and locomotive equipment in order to maximize the useful life and reduce lifecycle costs. Finally, the Strategy increases the number of seats in the peak hour to Penn Station, New York by the equivalent of a new train.

FACTORS TO CONSIDER

The purchase of rolling stock is one of the most critical decisions any transit agency must make. The useful life of commuter rail equipment can extend to 30 years and beyond. The capital expense is a significant investment and transit agencies must consider more than simply the needs of today's customers, but also customers 30 years into the future.

Most NJ TRANSIT commuter rail passengers work in Manhattan.

Since NJ TRANSIT began rail operations in 1983, rolling stock conditions have been addressed by purchasing new rolling stock, retiring overage equipment and overhauling the existing fleet. Purchases were made to address ridership growth and to replace aging equipment. As the opening of Secaucus Junction approached, NJ TRANSIT purchased Comet V single level coaches and began retiring its Comet I, including the "low door" coaches that could not platform at high-level stations like Secaucus. Later, NJ TRANSIT introduced Multilevel rail equipment to its system, providing additional seating capacity. NJ TRANSIT also pioneered dual power locomotive technology to allow diesel locomotives to draw power from overhead catenary wire when in electrified territory.

This Fleet Strategy is a continuation of more than 30 years of effort to invest and renew NJ TRANSIT's commuter rail fleet. The strategy addresses fleet changes through the horizon year of 2020. It presents Travel Demand Forecasts through the horizon year along with comparative analysis from the baseline year of 2010, allowing alignment of demographic information with the 2010 Census. The Fleet Strategy describes the planned procurements, retirements and rehabilitation of equipment and details the planned levels of service that fleet can support. The Strategy discussing shop requirements and reserve fleet. Finally, the Fleet Strategy presents analysis of how the plan addresses the various factors driving fleet management decisions.

The many elements that need to be considered are presented in the Vehicle and Infrastructure Characteristics table below. Under each category heading are the specific features and applications that can directly impact the vehicle's utility, customer acceptance or operation. For example, under the *Performance* category, the vehicle's acceleration can directly affect running times and its ability to make frequent station stops without compromising scheduled service. This can translate into a travel time factor which ultimately can encourage or dissuade riders from using the service.

One of the more significant drivers of the Fleet Strategy is the relationship between travel demand forecasts and the physical infrastructure constraints into New York Penn Station. The "North River Tunnels" under the Hudson River provide only a single track in and a single track out. This restriction and the configuration constraints of New York Penn Station itself limit NJ TRANSIT to a sustainable 21 NJ TRANSIT trains per hour. As a result of the constraint in the number of trains to Penn Station, New York, NJ TRANSIT's Fleet Strategy must seek other means of providing increased capacity to accommodate projected ridership growth.

Vehicle and Infrastructure Characteristics

Capacity	Performance	Customer
• Train Length • Trains per Hour • Seats per car	• Acceleration • Maximum speed • Power consumption • Number/location of vehicle doors	• Standees • 2/2 seating • Toilet cars • Amenities • Accessibility

Cost	Infrastructure		Reliability
• Vehicle purchase • Operating • Maintenance • Inventory • Infrastructure • Funding	• Clearances • Platform length • Platform height • Station spacing • Yard capacity • Yard track length • Pedestal pits	• Fueling facilities • Shop configuration • Shop capacity • Signal system • Power supply • Ownership • Local community	• Vehicle • Rehab History • Technology • Common Fleet • Spare vehicles

FORECASTED TRAVEL DEMAND

The primary method used by NJ TRANSIT for developing travel demand forecasts follows the requirements established by the Federal Transit Administration for projected future ridership. Those requirements pertain to what input data is used, the logic employed in the model's mathematical formulation, updating the data and model and calibrating the model, that is comparing the projections coming from the model to actual results[1].

...no major trans-Hudson public transit capacity increase is possible within the next six years...

The base year for the travel demand forecasts used in this plan is 2010. The horizon or future year for this forecast is 2020. The rail service being modeled is that which operated as per the most recent schedule change, March 2, 2014, with adjustments for programmed infrastructure improvements expected to be completed by 2020 such as those to the middle zone of the NEC to County Yard, the Midline Loop and a new North Brunswick Station.

For the railroad, fleet requirements are driven by a number of factors. The forecast of ridership for the services in the northern portion of New Jersey which center on services to the Penn Station New York, Hoboken Terminal and Newark Penn Station during the two peak AM hours[2] (7-9 AM) is a critical input to deciding what the fleet size and composition should be. Because of the train capacity constraint in Penn Station, New York, there is a heightened level of attention on how best to maximize the passenger capacity of each train destined for Penn Station during these two hours when passenger demand is at its most intense.

Projecting to a horizon year of 2020 for the NJ TRANSIT rail system is appropriate at this time, for two reasons: no major trans-Hudson public transit infrastructure capacity increase is possible within the next several years and second, there are at least two ongoing studies of future rail needs: the NEC Future effort, which is managed by the Federal Railroad Administration; and, the Amtrak led Gateway Project. The NEC Future Planning and Tier I Environmental Impact Statement (EIS), in which NJ TRANSIT is a participant, includes: Amtrak, the eight Northeast Corridor states, the District of Columbia and the United States Department of Transportation. The other rail operators such as Long Island Railroad and Metro North are also involved. This effort is scheduled to be completed in 2016. The Tier I EIS will set the stage for further project level work to comply with the National Environmental Policy Act. There will be a special focus on the need for added rail capacity under the Hudson River and station capacity in Midtown Manhattan as

[1] NJ TRANSIT and its consultant team take steps to validate this model. This validation process includes insuring at the major terminals and at the line level that the projected volumes are within 10-15% of actual.

[2] In recent years it has become evident that demand on the trans-Hudson transit system is intense for more than one hour as would have been the case twenty or more years ago. There are two hours when passenger demand continues at its highest levels.

part of both efforts. Amtrak's proposed Gateway Project will be a significant input to the NEC Future effort.

Forecasting Trans-Hudson Rail Demand

The forecasting process begins with inputting population and employment forecasts for the greater commuter shed, 21 counties, including counties immediately adjacent to New Jersey in neighboring states. To maintain consistency for rail planning, NJ TRANSIT has used employment and population projections obtained from Moody's in June 2013. This is the same population and employment forecast being used as the foundation for the work on the FRA managed NEC Future Planning and Tier I EIS.

The forecast model also includes pricing for all modes of transportation. This includes the Port Authority approved trans-Hudson toll increases and the New Jersey Turnpike approved toll increase covering the time period to 2020. Transit fares are included as well as factors for how customers' value their time when waiting for a transit vehicle/train and for transfers. The results are in the table below.

Seating Capacity to PSNY

	2010 Baseline	Horizon Year 2020	
	Ridership Demand	Ridership Demand	Ridership Demand Increase
Peak Hour	22,821	27,448	20%
Hour around the Peak Hour	12,308	14,803	20%
Shoulder 2 Hours	16,154	19,429	20%
Entire AM Peak	**51,283**	**61,680**	**20%**

Future Trans-Hudson

This forecast focuses on the trans-Hudson rail service into Penn Station, New York which is where the greatest challenges exist. It does not address how total rail, bus, ferry and PATH trans-Hudson demand for public transit will be accommodated. Although NJ TRANSIT has demonstrated how it will accommodate the forecasted rail travel demand through 2020, it is evident that the rail system will most likely be very strained at that point in time and will struggle to meet further increased demand to offset other trans-Hudson transit system capacity shortfalls. How to address these shortfalls will need to be the subject of a different analysis embracing all the available public transit modes.

EQUIPMENT ACQUISITIONS, REHABILITATIONS AND RETIREMENTS

NJ TRANSIT's Fleet Strategy calls for a number of actions to modernize and maintain the fleet in a state of good repair. The overall size of the passenger fleet decreases from 1,124 pieces of equipment to 1,050. Locomotives decrease slightly from 210 to 208. The following details actions to be taken.

PASSENGER FLEET

Retirement of 230 Arrow III Railcars – In 2010, NJ TRANSIT had 230 Arrow III Electric Multiple Units (EMUs) on the property. These will all be retired by 2020. With the arrival of new Multilevel coach equipment, the Arrow III fleet will be reduced to 160 units by no later than the end of 2015. With the arrival of Multilevel EMUs in 2020, the entire fleet will be retired. The Arrow III fleet was acquired in the 1970s, overhauled in the late 1990s and has met its manufacturers' useful life. The last Arrow III to be retired will be 43 years old in 2020.

Retirement of 65 Comet Railcars – In 2010, NJ TRANSIT had 160 Comet IIs, 49 Comet IIIs, 99 Comet IVs and 265 Comet Vs on the property. The Fleet Strategy calls for the retirement of 16 Comet IIs in 2020. At that point, the vehicles will be 38 years of age having undergone an overhaul earlier in the past decade. In addition, 49 Comet IIIs will be retired from NJ TRANSIT's reserve fleet. In June 2007, NJ TRANSIT Board of Directors agreed with the recommendation not to overhaul the Comet IIIs but instead replace the 49 single-level Comet III units with 45 Multilevel coaches. Comet IVs and Vs remain throughout the period.

Purchase of 58 Multilevel Electric Multiple Units (EMU) – The Fleet Strategy provides for the purchase of 58 Multilevel EMU power units to replace Arrow III power units. The new units represent an efficiency improvement in that one unit will provide sufficient power to pull two non-powered units – effectively creating a three car sub-consist. This compares favorably with the two-car "married pair" Arrow III EMUs which have drive components in both units. Instead of replacing every Arrow III with a new powered unit, NJ TRANSIT will only need to replace every third Arrow III unit with a powered unit. This approach also allows NJ TRANSIT to use Multilevel coaches that were previously purchased to expand service to instead serve as the second and third non-power unit in a new three car sub-consist. The propulsion technology to be utilized is similar to that contained in NJ TRANSIT's ALP46 and ALP45-DP locomotives.

Purchase of 55 Multilevel Trailer Cars – In 2010, NJ TRANSIT had 321 Multilevel Railcars on the property. An additional 100 units arrived in 2013 and 2014. In addition, NJ TRANSIT acquired 8 Multilevel units from the former ACES service to Atlantic City. NJ TRANSIT will purchase 55 Multilevel Trailer cars to replace existing aging Arrow III equipment and provide modest increases in consists lengths of existing trains.

Passenger Fleet

Type	Year Built	End 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Comet II	1982	160	160				160	160	160	160	160	144
Comet III	1990	49	49				0	0	0	0	0	0
Comet IV	1997	99	99				99	99	99	99	99	99
Comet V	2004	265	265				265	265	265	265	265	265
MLV I	2007	321	321		SANDY		329	329	329	329	329	329
MLV II	2014	0	0				100	100	100	100	100	100
Arrow III	1977	230	230				160	160	160	160	160	0
ML EMU	2020	0	0				0	0	0	0	0	58
MLV III	2020	0	0				0	0	0	0	0	55
Total		**1124**	**1124**				**1113**	**1113**	**1113**	**1113**	**1113**	**1050**

The implementation of the **passenger rail Fleet Strategy** has begun and to date:

- 100 Multilevel coaches have been delivered
- 70 Arrow III EMUs been removed from revenue service
- 49 Comet III coaches have been removed from revenue service

LOCOMOTIVE FLEET

Diesel Locomotives – At the end of 2010, NJ TRANSIT had 33 PL42, 52 GP40, 13 F40 and 4 P40 locomotives. NJ TRANSIT will retire all aging F40s and 13 GP40s. The Fleet Strategy calls for the overhaul of 17 GP40s for continued revenue service and the conversion of 12 GP40s to work locomotives. Four P40 and 33 PL42s remain on the property throughout the period. MetroNorth locomotives are also assumed to remain constant.

Electric Locomotives – NJ TRANIST had 32 ALP44, 29 ALP46 and 27 ALP46A electric locomotives at the end of 2010. In June 2009, NJ TRANSIT's Board of Directors approved the purchase of additional ALP46 electric locomotives as an alternative to overhauling the ALP44 electric locomotive fleet. The Fleet Strategy calls for the retirement of 20 ALP44 Electric Locomotives from the reserve fleet when they meet their 25 year useful life requirement.

Locomotives

Type	Year Built	End 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
PL42	2005	33	33				33	33	33	33	33	33
GP40	1992	42	42				17	17	17	17	17	17
F40	1987	13	13				0	0	0	0	0	0
P40	2009	4	4				4	4	4	4	4	4
MN Locomotives	-	15	15				15	15	15	15	15	15
ALP44 O/E	1990	20	20				20	0	0	0	0	0
ALP44 M	1996	12	12				12	12	12	12	12	12
ALP 45DP	2011	0	0		SANDY		35	35	35	35	35	35
ALP 46	2002	29	29				29	29	29	29	29	29
ALP 46A	2009	27	36				36	36	36	36	36	36
GP40 Protect (need railing)	1992	6	6				6	6	6	6	6	6
MP20 switchers (need railing)	2008	5	5				5	5	5	5	5	5
GP40 work trains	1967	4	4				16	16	16	16	16	16
Total Locos		**210**	**219**				**228**	**208**	**208**	**208**	**208**	**208**

The implementation of the **locomotive** strategy has begun and to date:

- Thirty-six ALP46 locomotives have been delivered
- Thirty-five ALP45 Dual Power locomotives have been delivered
- Ten GP40s have been retired and conversion of the remainder has begun.
- Eight F40 locomotives have been retired
- Thirty-two ALP44 locomotives have been removed from service.

SERVICE PLAN

The development of a service plan requires the reconciliation of multiple considerations and factors. For example, the service plan must ensure that trains are cycled to facilities where proper inspections can be performed. A Multilevel train set that started in Gladstone Yard should finish the day at a yard with pit pedestal tracks or a full Service and Inspection (S&I) facility. Gladstone Yard does not have the required infrastructure to allow for undercarriage inspections of Multilevel cars. Also, the manipulation of equipment that supports this plan ensures that each yard has the same mix of equipment types at the end of the service day as are required for the start of the next service day.

REVENUE SERVICE

In 2010, NJ TRANSIT operated 698 weekday revenue trains. Prior to Superstorm Sandy, NJ TRANSIT added two outbound Morris and Essex Line trains in the evening peak. This brought the number of weekday revenue trains to 700. The NJ TRANSIT Fleet Strategy calls for the number of weekday revenue trains into Penn Station, New York to grow by a single train by the year 2020, which is added through increased efficiency in the system.

Revenue Trains

	2010	2020
Weekday	698	701

(Note: Between 2010 and 2020, NJ TRANSIT adds an additional Morris and Essex Line weekday revenue train as a traffic mitigation measure for Pulaski Skyway reconstruction.)

Passenger Coaches Needed for Service

As can be seen on the chart below, the number of passenger cars needed for service increases from 890 in 2010 to 911 in 2020 -- an increase of 21 coaches. This is the result of modest expansion in the number of cars on existing Raritan Valley Line Trains (8) and additional equipment to improve operating efficiencies (13).

Passenger Fleet Utilization

			<<<<Pulaski Rehab>>>>								
Rail Cars	**End 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Comet II	136	136	SANDY			136	136	136	136	136	121
Comet IV	86	86				34	34	34	34	34	70
Comet V	214	214				201	201	201	201	201	214
MLV I	247	247				289	289	289	289	289	289
MLV II	0	0				88	88	88	88	88	88
Arrow III	177	177				124	124	124	124	124	0
ML EMU	0	0				0	0	0	0	0	46
MLV III	0	0				0	0	0	0	0	53
Meadowlands	30	30				30	30	30	30	30	30
Subtotal	**890**	**890**				**902**	**902**	**902**	**902**	**902**	**911**

(Note: for the time period during the reconstruction of the Pulaski Skyway, all RVL train sets have been increased to seven cars.)

Meadowlands

NJ TRANSIT's plans include 30 coaches for regular and event-driven service into the Meadowlands Sports Complex. This allows for fleet flexibility to meet the needs of next day "weekday" service. This strategy for providing extra service does not have a negative impact on the normal operations of the railroad. When Meadowland's service is not in effect, the 30 coaches remain as part of the overall spare ratio of the railroad.

Changes in Equipment Types

Between 2010 and 2020, NJ TRANSIT's Fleet Strategy also calls for changes in the type of equipment used on different lines.

- **2010 to 2015 Arrow III Retirement:** Between 2010 and 2015, NJ TRANSIT retires 70 aging Arrow III EMUs. As a result, four Arrow III train sets on the Newark Division and three Arrow III train sets on the Hoboken Division are replaced by Multilevel push pull train sets. This increases the number of locomotives required for service by seven (7).
- **2020 Arrow III retirement:** In 2020, the remaining Arrow III sets are replaced by Multilevel EMUs.

Locomotives Needed for Service

Between 2010 and 2020, the number of locomotives needed for services increases from 106 to 122 – an increase of 16. This is a result of 7 locomotives need for Arrow III retirement, as previously stated, 5 locomotives needed for regular service on the Meadowlands Rail Line, and 4 locomotives needed to increase operating efficiencies.

Locomotive Fleet Utilization

						<<<<Pulaski Rehab>>>>					
Locomotives	**End 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Diesel	58	58	SANDY			41	41	41	41	41	44
Dual Power	0	0				27	27	27	27	27	27
Electric	48	48				51	51	51	51	51	51
Subtotal	**106**	**106**				**119**	**119**	**119**	**119**	**119**	**122**
Protect/Yard/Work	15	15				27	27	27	27	27	27
Total	**121**	**121**				**146**	**146**	**146**	**146**	**146**	**149**

Infrastructure Required to Support Service

The service plan is based on the following assumptions. It should be noted that not all of these assumed infrastructure investments affect vehicle requirements, some improve operations efficiency, some improve service to our customers and some, such as the Mid Line Loop and County Yard, help limit vehicle requirements.

- County Yard expansion (parking, employee welfare and materials storage locations added)

    - Includes Service and Inspection (S&I) facility
    - Storage for 10 to 12 trains of longer length
- Midline Loop complete
- Jersey Ave Station Westbound Platform improvements as required by County Yard changes, with an eastbound platform included in the project.
- West Summit Interlocking and pocket track improvements complete
- Platform extensions at New Brunswick, Edison and Metuchen
- NEC signals addressed west of New Brunswick, but not east of New Brunswick
- No new infrastructure improvements to increase slots into PSNY by 2020.

SHOP MARGINS

NJ TRANSIT's Fleet Strategy includes a shop margin to allow for regular maintenance of vehicles and required Federal Railroad Administration (FRA) inspections. Manufacturer and Federal Requirements mandate that equipment undergo routine, periodic and major maintenance cycles, a shop margin is integral to providing service as well as meeting maintenance requirements.

The FRA requires coaches be inspected on a 180 day cycle and cab cars and locomotives to be inspected on a 92 day cycle. This often requires moving the equipment to be inspected to NJ TRANIST's Meadows Maintenance Complex. While the equipment is being inspected, it is unavailable for service.

The coach and locomotive fleet also require scheduled periodic maintenance as well as unscheduled maintenance to address equipment failures. Again, as rolling stock is being maintained or repaired, the equipment is unavailable for service. As aging equipment is retired and replaced, the number of failures generally diminish, allowing shop margins to be reduced. NJ TRANSIT also continues to refine and improve its maintenance and overhaul strategies to reduce operating and maintenance costs, needed vehicle spare ratios and out-of-service equipment.

Passenger Fleet

NJ TRANIST typically maintains a 12.5% shop margin on push pull passenger equipment and a 20% shop margin on Electric Multiple Unit (EMU) power cars. Aging Arrow III EMUs units require a higher shop margin. The Fleet Strategy calls for a decrease in the overall number of shop margins for the passenger rail fleet – even as the number of cars required for service increases. As can be seen, the number of cars need for shop (other than long term shop) decreases from 136 in 2010 to 119 in 2020, a decrease of 17 cars (or 12%).

Passenger Rail Equipment Shop Margin

						<<<<Pulaski Rehab>>>>					
Rail Cars	**End 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Comet II	15	15	SANDY			15	15	15	15	15	14
Comet IV, V	43	43				34	34	34	34	34	39
MLVs	34	34				52	52	52	52	52	54
Arrow III	44	44				36	36	36	36	36	0
ML EMU	0	0				0	0	0	0	0	12
Subtotal	**136**	**136**				**137**	**137**	**137**	**137**	**137**	**119**
Long-term Shop	40	40				20	20	20	20	20	20
Total	**176**	**176**				**157**	**157**	**157**	**157**	**157**	**139**

This reduction in shop count is a result of:

- Retiring older equipment with higher shop margins
- Reducing the number of power cars in EMU consists (power cars have a higher shop margin than trailer cars.)

The Fleet Strategy also reduces the number cars in long-term shop. NJ TRANSIT maintains a long-term shop count to allow for regular rehabilitation and overhaul of its passenger fleet. In order to achieve economies of scale and maintain cost effectiveness on ongoing overhaul programs, NJ TRANSIT requires 20 cars in long-term overhaul. This assumes 10 cars being overhauled and 10 cars in transport, either to or from the location where the work is being performed.

Locomotives

NJ TRANIST generally maintains a 20% shop margin on locomotives due to their increased inspection and maintenance requirements. The number shop locomotives (other than long term shop) increases by 15% from 27 in 2010 to 31 in 2020. This is the result of a 15% increase in the number of locomotives needed for service as Arrow III EMUs are replaced with locomotive hauled Multilevel train sets.

Locomotive Shop Margin

						<<<Pulaski Rehab>>>					
Locomotives	**End 2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Diesel	9	9	SANDY			10	10	10	10	10	11
Dual Power	6	6				7	7	7	7	7	7
Electric	12	12				13	13	13	13	13	13
Subtotal	**27**	**27**				**30**	**30**	**30**	**30**	**30**	**31**
Long-Term Shop	5	5				16	16	16	16	16	16
Total	**32**	**32**				**46**	**46**	**46**	**46**	**46**	**47**

In addition to shop count required for regular periodic inspections and maintenance, certain equipment requires a complete overhaul strategy. NJ TRANSIT increased its long-term shop count for locomotives to allow for more regular locomotive overhaul. This helps ensure the day to day reliability of the locomotives fleet. A capital reliability program is currently under way to

help maintain the 29 ALP46 locomotives. Overhaul programs are also planned for the 33 PL42 Diesel locomotives.

Non-Revenue Diesel Fleet

NJ TRANSIT requires a certain number of locomotives to be used as work trains, switchers and protects. Protect locomotives are staged at key points throughout the system to quickly rescue disabled revenue trains. Examples of work trains include; stone trains; aqua trains; and, trains to support capital projects and maintenance. The Fleet Strategy increases the number of work trains by converting older GP40 revenue trains into work trains.

EQUIPMENT AVAILABILITY VS. UTILIZATION

The chart below displays NJ TRANIST's planed passenger fleet acquisitions, rehabilitations and retirements and compares them to service and shop requirements. As can be seen, NJ TRANSIT had a remaining reserve of 58 railcars in 2010. By 2020, that reserve is consumed as the fleet is reduced to 1050 cars. Importantly, if ridership demand increases above forecasts amounts, NJ TRANIST could defer retirement of Comet II equipment or exercise options on base older Multilevel EMU and Multilevel coach equipment purchases.

Passenger Rail Equipment

	Rail Cars	Year Built	End 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Fleet	Comet II	1982	160	160	SANDY			160	160	160	160	160	144
	Comet III	1990	49	49				0	0	0	0	0	0
	Comet IV	1997	99	99				99	99	99	99	99	99
	Comet V	2004	265	265				265	265	265	265	265	265
	MLV I	2007	321	321				329	329	329	329	329	329
	MLV II	2014	0	0				100	100	100	100	100	100
	Arrow III	1977	230	230				160	160	160	160	160	0
	ML EMU	2020	0	0				0	0	0	0	0	58
	MLV III	2020	0	0				0	0	0	0	0	55
	Total		**1124**	**1124**				**1113**	**1113**	**1113**	**1113**	**1113**	**1050**

Fleet Utilization **<<<<Pulaski Rehab>>>>**

	Rail Cars	End 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Required for Service	Comet II	136	136	SANDY			136	136	136	136	136	121
	Comet IV	86	86				34	34	34	34	34	70
	Comet V	214	214				201	201	201	201	201	214
	MLV I	247	247				289	289	289	289	289	289
	MLV II	0	0				88	88	88	88	88	88
	Arrow III	177	177				124	124	124	124	124	0
	ML EMU	0	0				0	0	0	0	0	46
	MLV III	0	0				0	0	0	0	0	53
	Meadowlands	30	30				30	30	30	30	30	30
	Subtotal	**890**	**890**				**902**	**902**	**902**	**902**	**902**	**911**
Shop Margin	Comet II	15	15				15	15	15	15	15	14
	Comet IV, V	43	43				34	34	34	34	34	39
	MLVs	34	34				52	52	52	52	52	54
	Arrow III	44	44				36	36	36	36	36	0
	ML EMU	0	0				0	0	0	0	0	12
	Long-term Shop	40	40				20	20	20	20	20	20
	Subtotal	**176**	**176**				**157**	**157**	**157**	**157**	**157**	**139**
	Remaining Reserve	58	58				54	54	54	54	54	0
	Subtotal	**58**	**58**				**54**	**54**	**54**	**54**	**54**	**0**
	Total	**1124**	**1124**				**1113**	**1113**	**1113**	**1113**	**1113**	**1050**

Locomotive Fleet Composition

	Locomotives	Year Built	End 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total Fleet	PL42	2005	33	33	SANDY			33	33	33	33	33	33
	GP40	1992	42	42				17	17	17	17	17	17
	F40	1987	13	13				0	0	0	0	0	0
	P40	2009	4	4				4	4	4	4	4	4
	MN Locomotives	-	15	15				15	15	15	15	15	15
	ALP44 O/E	1990	20	20				20	0	0	0	0	0
	ALP44 M	1996	12	12				12	12	12	12	12	12
	ALP 45DP	2011	0	0				35	35	35	35	35	35
	ALP 46	2002	29	29				29	29	29	29	29	29
	ALP 46A	2009	27	36				36	36	36	36	36	36
	GP40 Protect (need railing)	1992	6	6				6	6	6	6	6	6
	MP20 switchers (need railing)	2008	5	5				5	5	5	5	5	5
	GP40 work trains	1967	4	4				16	16	16	16	16	16
	Total Locos		**210**	**219**				**228**	**208**	**208**	**208**	**208**	**208**

Fleet Utilization

<<<Pulaski Rehab>>>

	Locomotives	End 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Req'd. for service	Diesel	58	58	SANDY			41	41	41	41	41	44
	Dual Power	0	0				27	27	27	27	27	27
	Electric	48	48				51	51	51	51	51	51
	Protect/Yard/Work	15	15				27	27	27	27	27	27
	Subtotal	**121**	**121**				**146**	**146**	**146**	**146**	**146**	**149**
Shop Margin	Diesel	15	15	SANDY			10	10	10	10	10	11
	Dual Power	0	0				7	7	7	7	7	7
	Electric	12	12				13	13	13	13	13	13
	Long-Term Shop	5	5				16	16	16	16	16	16
	Subtotal	**32**	**32**				**46**	**46**	**46**	**46**	**46**	**47**
	Remaining Reserve	57	66				36	16	16	16	16	12
	Subtotal	**57**	**66**				**36**	**16**	**16**	**16**	**16**	**12**
	TOTAL	**210**	**219**				**228**	**208**	**208**	**208**	**208**	**208**

METRICS

CAPACITY

NJ TRANSIT's Fleet Strategy uses a combination of approaches to increase trans-Hudson capacity in the peak period. While demand throughout the NJ TRANSIT rail network is projected to increase by 2020, the issue is most acute on lines serving Penn Station, New York. Nearly 60% of NJ TRANSIT's rail customers are destined for Penn Station, New York. The existing 100-year old North River Tunnels beneath the Hudson River provide only two tracks between New Jersey and Penn Station, New York. This physical constraint, and the configuration of Penn Station itself, limits the ability to provide new rail capacity into New York.

The Fleet Strategy addresses this most pressing need through equipment configuration to provide a measure of short-term relief until new trans-Hudson physical infrastructure is in place. As can be seen in the diagram below, Penn Station, New York is configured with varying platform lengths. Train consist lengths are restricted to equal the length of their scheduled arrival platforms. NJ TRANSIT has regular use of tracks 1 through 12. Importantly, only tracks 5 and above are through tracks. Tracks 1 through 4 are stub end tracks, forcing trains utilizing those platforms to reverse back to New Jersey. In addition, platform configuration and the two track tunnel under the Hudson River limit NJ TRANSIT to 21 trains per hour into New York.

Given the fact that Penn Station, New York limits the number of trains per hour and the number of cars per train, the Fleet Strategy overcomes these constraints and expands capacity by increasing the number of seats in each consist. This is accomplished by replacing two types of single-level equipment with Multilevel equipment.

Push-Pull

Single level push-pull coach consists that ran in 2010 are replaced by new Multilevel railcars. As can be seen below, a nine car single level Comet IV push-pull train consist provides 1,033 seats. A nine car Multilevel push-pull consist provides1,223 seats – an increase of more than 18%.

Replace Single Level Push-Pull with Multilevel Push-Pull

Single Level Push-Pull				Multilevel Push-Pull			
	Seats per Car	Car per Set	Total Seats	Seats per Car	Cars per Set	Total Seats	Increase
Cab Car	109	1	109	127	1	127	
Trailer Car	117	6	702	142	4	568	
Toilet Car	111	2	222	132	4	528	
Total		**9**	**1,033**		**9**	**1,223**	**18.4%**

Electric Multiple Units (EMU)

Single level Arrow III EMUs are replaced by Multilevel EMUs. As seen in the chart below, a 12 car single level Arrow III EMU consist provides 1,380 seats. A 12 car Multilevel consist provides 1,522 seats – an increase of more than 10%. Importantly, while the Multilevel power unit has fewer seats than the single level power unit, it can pull two push-pull cars with significantly more seats. The result is that the Multilevel EMU consist has 10% more seats than existing Arrow III consist.

The result is that the Multilevel EMU consist has 10% more seats than existing Arrow III consist.

Replace Single Level EMUs with Multilevel EMUs

Single Level EMUs				Multilevel EMUs			
	Seats per Car	Car per Set	Total Seats	Seats per Car	Cars per Set	Total Seats	Increase
Power Car	113	6	678				
Power Car	117	6	702				
Cab Car				127	2	254	
Trailer Car				142	4	568	
Toilet Car				132	2	264	
Power Car				109	4	436	
Total		**12**	**1380**		**12**	**1522**	**10.3%**

It is important to note that replacing single level EMUs with Multilevel EMUs provides more capacity than other alternatives. The chart illustrates the how seating capacity changes relative to the vehicle type, interior layout and motive characteristics:

Seating Comparisons

Current Configuration	Considered Configurations	Seats	Compared with Arrow III # of seats lost or gained
(A) 12 Car Arrow III Configuration (Non ADA-compliant toilet)		1380	0
	(B) 12 Car Arrow III Overhaul Configuration (With ADA-compliant toilet)	1350	-30
	(C) 10 Car + 1 Loco Multilevel P/P Configuration	1360	-20
	(D) 12 Car Multilevel/EMU Mixed Configuration	**1522**	**+142**

A 12 car Arrow III consist (**A**) will lose capacity as a result of an overhaul, since when making the vehicle ADA-compliant (**B**), the larger bathroom requires the removal of seats. Additionally, the 10 car Multilevel push/pull consist (**C**), which currently operates in selected areas, has only 20 less seats per train and is ADA-compliant. Ultimately, the 12 car Multilevel consist (**D**), offers the most efficient use of space and vehicles as a significantly larger number of seats become available with no commensurate increase in the number of vehicles.

Increasing Peak Period Seating Capacity to Penn Station New York

The chart below details the overall impact on the supply of seats into New York for the A.M. peak four hours, including breakdown of the peak hour; the hour around the peak hour; and, the shoulder two hours. As can be seen, the Fleet Strategy increases peak hour seating capacity of the 21 peak hour trains by 1,654 seats – a 6.6% increase over the 2010 baseline. This is the equivalent of adding an additional train to the peak hour. In the hour around the peak hour, the Fleet Strategy provides an increase of 1,627 seats on the 17 trains that run in the hour around the peak hour – an 8.9% increase over the 2010 baseline condition.

Seating Capacity to PSNY

	2010 Baseline		2020		
	No of Trains	Seats	No of Trains	Seats	Increase
Peak Hour	21	25,165	21	26,819	6.6%
Hour around the Peak Hour	17	18,254	17	19,881	8.9%
Shoulder 2 Hours	24	24,418	25	26,658	10.0%
Entire AM Peak	**62**	**67,837**	**63**	**73,558**	**8.4%**

In the shoulder two hours, seating capacity is increased by 2,240 seats – 10% over the 2010 baseline. This is accomplished by adding an additional train to the shoulder and increasing the number of seats on existing trains through the use of Multilevel equipment. Importantly, the additional train is added without requiring the purchase of an additional train set. Instead, the

Fleet Strategy benefits from improved efficiencies in the NJ TRANSIT network to allow faster turning of trains.

In 2020, NJ TRANSIT will provide 73,558 seats into New York utilizing Multilevel equipment. This translates into an 8.4% increase over 2010 Penn Station New York seating capacity (67,837).

Projected Ridership Demand and Seat Utilization

The chart below overlays NJ TRANSIT's ridership demand projections for Penn Station, New York with seats supplied through the Fleet Strategy. As can be seen, peak hour ridership demand is expected to grow by 20% throughout the entire peak period between 2010 and 2020. The Fleet Strategy addresses this demand by increasing seating capacity by 8.4% throughout the peak period. Seat utilization increases from 76% in the baseline 2010 condition to 84% in 2020. Importantly, in the peak hour, seat utilization increases from 91% in 2010 to 102% in 2020.

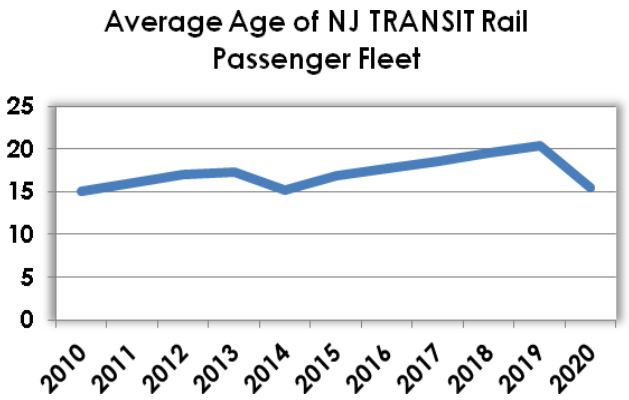
Seating Capacity to PSNY

	2010 Baseline			Horizon Year 2020			
	Seats	Ridership Demand	Seat Utilization	Seats	Ridership Demand	Seat Utilization	Ridership Demand % Increase
Peak Hour	25,165	22,821	91%	26,819	27,448	102%	20%
Hour around the Peak Hour	18,254	12,308	67%	19,881	14,803	74%	20%
Shoulder 2 Hours	24,418	16,154	66%	26,658	19,429	72%	20%
Entire AM Peak	**67,837**	**51,283**	**76%**	**73,558**	**61,680**	**84%**	**20%**

STATE OF GOOD REPAIR

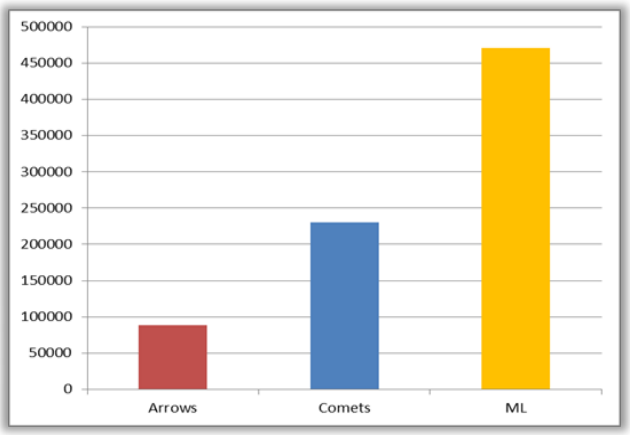
Average Age of Fleet Maintained

The Fleet Strategy allows NJ TRANSIT to maintain a State of Good Repair (SOGR) across its fleet by replacing aging equipment with new state-of-the-art Multilevel equipment. With the retirement of older Comet and Arrow equipment and the acquisition of new Multilevels, the average age of NJ TRANSIT passenger fleet increases from 15 years in 2010 but then decreases to 16 years by 2020 with the arrival of new equipment. An average fleet age of 15 years is consistent with a 30 year useful life of passenger equipment. In 2010, 80% of NJ TRANSIT's passenger fleet was at or below 30 years of age. By 2020, that figure improves to 86%.



Mean Distance Between Failures

A more modern fleet leads to reduced failures. The chart details the mean distance between failures for NJ TRANSIT's passenger fleet. As can be seen, NJ TRANSIT's Multilevel coaches – the newest members of the fleet – have the best reliability record in 2013. The MLV fleet traveled over 450,000 miles between failures in 2013. By contrast, the Arrow III fleet – the oldest passenger equipment – traveled less than 100,000 miles before failure in 2013.



State of Good Repair

	Percentage of Fleet	
	2010	2020
Passenger Fleet <30 Years of Age	80%	86%
Locomotive Fleet <30 Years of Age	100%	100%

OPERATIONAL FLEXIBILITY/AMTRAK COMPATIBILITY

Phase Gap Navigation

NJ TRANSIT seeks compatibility and flexibility in its fleets. Compatibility of components allows NJ TRANSIT to realize economies of scale in supplying maintenance parts; compatibility of systems, or interoperability and allows for equipment from different fleets or territories to be operated together. Flexibility - the ability to use a trainset in as many different environments as possible - is key to addressing changing circumstances in both short and long term scenarios.

One of the infrastructure constraints that NJ TRANSIT must contend with is the varying electrical voltage between Amtrak's NEC and NJ TRANST's electrified territory. These different voltages force NJ TRANSIT trains that access Amtrak's Northeast Corridor to have equipment that allows them to navigate the "phase gap". These access point phase gaps exist for midtown direct trains in Kearny and North Jersey Coast Line trains that access the Northeast Corridor in Rahway.

NJ TRANSIT's Arrow III fleet of EMUs is not equipped to navigate phase gaps to access or egress the NEC. This restricts their use to NEC or Hoboken Service. For example, Arrow III equipment cannot be used for Midtown Direct service. NJ TRANSIT's Fleet Strategy calls for the replacement of the Arrow III fleet. By 2020, the entire passenger fleet will be able to navigate the NEC phase gap, up from 80% in 2010.

100 MPH Operation

The Fleet Strategy gives NJ TRANSIT the flexibility to operate equipment at higher speeds on the Northeast Corridor. In 2010, only 80% of NJ TRANSIT's fleet could run at 100 MPH. By 2020, with the retirement of the Arrow III EMUs, NJ TRANSIT's entire fleet will be capable of running 100 MPH. This increases equipment scheduling flexibility because rail schedulers must plan to the slowest equipment that could be used on the line in order to ensure that trains can make schedule.

As Amtrak increases speeds on the express tracks of the NEC, the ability of NJ TRANSIT's fleet to operate at higher speed becomes even more important.

Enclosed Low-Level Boarding Traps

Another significant feature of modern fleet equipment is stair traps enclosed by the full length door. This feature improves dwell time at low level stations and allows NJ TRANSIT to meet operating schedules. On older Arrow III equipment, the door does not enclose the stairs, meaning that the trap cannot be lifted while the train is in motion without exposing the interior to the right of way. Without an enclosed door trap, crews cannot open the traps to access the stairs until the train comes to a halt. By contrast, a stair step that is enclosed by the door allows crews to prepare the train for low level boarding before the train arrives at the station. This reduces dwell time.

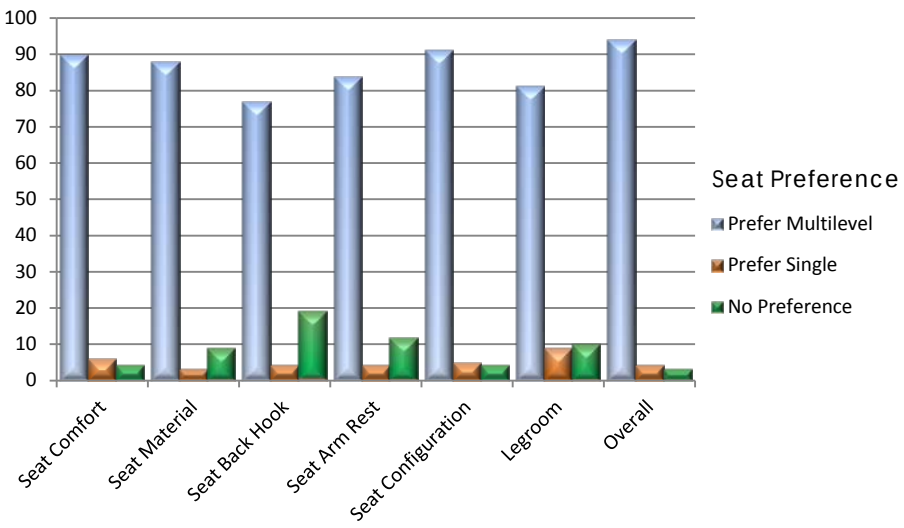
Operational Flexibility

	Percentage of Fleet	
	2010	**2020**
Navigate NEC Phase Gaps	80%	100%
100 MPH Compatible	80%	100%
Enclose low-level boarding traps	80%	100%

CUSTOMER SERVICE

2-2 Seating

NJ TRANSIT's Fleet Strategy increases the percentage of the fleet with 2-2 seating by 69%. In 2010, 29% of passenger coaches had 2-2 seating. The Fleet Strategy increases that percentage to 48% in 2020. Customer surveys indicate that NJ TRANSIT customers prefer 2-2 seating over 3-2 seating by a margin of 9 to 1.



On Board Customer Communication

The Fleet Strategy increases the percentage of passenger equipment with on board displays from 80% to 100%. The communications technology on NJ TRANSIT's Multilevel fleet not only indicate the next station and train number, they also allow for audio and visual messages to be transmitted directly to the train in the event of service disruptions. This will allow NJ TRANSIT to better communicate with customers.

Power End Doors

Another feature of modern equipment is the elimination of manual end doors. Today, only NJ TRANSIT's Arrow III fleet has manual end doors. With the retirement of the Arrow III fleet by 2020, all coaches will be equipped with powered sliding doors.

Interior Lighting

A modernized fleet will enhance the interior lighting on NJ TRANSIT passenger coaches. In 2010, less than half of NJ TRANSIT's fleet met the American Public Transit Association's voluntary standards for interior lighting. By 2020, NJ TRANSIT's Fleet Strategy will raise that percentage to 77%.

Customer Service

	Percentage of Fleet	
	2010	**2020**
2-2 Seating	29%	48%
On Board Communications Equipped	80%	100%
Power End Doors Equipped	80%	100%
Meets APTA Lighting Standards	48%	77%

Accessibility

The Fleet Strategy accomplishes a 100% ADA accessible fleet by 2020. In 2010, 80% of the passenger coach fleet had ADA seating areas and restrooms. Arrow III equipment, which entered into service in the 1970s, was not required to be accessible under the ADA unless it underwent a major overhaul after the law went into effect. NJ TRANSIT's fleet in 2020 will be equipped with ADA compliant restrooms, seating areas, signage and audible communications. ADA seating areas do not impact overall customer capacity as bench seating can be utilized if the mobility device securement area is not in use.

Standards

	Percentage of Fleet	
	2010	**2020**
ADA Accessible Bathrooms	80%	1%

EMPLOYEE WELFARE

The Fleet Strategy calls for sealed control cabs in the entire passenger car fleet. In 2010, only 80% of the passenger fleet had sealed control cars. The control cabs on the Arrow III fleet are not sealed, but instead are simply a control unit in the vestibule. The engineer sits on a stair trap, which is not sealed from the elements. Modernized Multilevel equipment features sealed operating compartments allowing the engineer a secure area to operate the train. These sealed operating compartments also feature modern lighting, HVAC, and a state-of-the-art ergonomic seat and operating console. This change will improve employee safety and comfort. The sealed cabs are also quieter, better facilitating communications with dispatch and train crews. Finally, the control cabs on Comet V and new Multilevel equipment are generally standardized, reducing training costs.

Employee Welfare

	Percentage of Fleet	
	2010	**2020**
Enclosed Cabs	80%	100%

OPERATING EFFICIENCY

Modest Growth and increased Fare Revenue

The Fleet Strategy calls for only modest growth in existing train consists. This approach helps to limit growth in future operating budgets. Capacity is provided by increasing the number of seats per train, not by increasing the number of trains where such an increase would require an additional crew. Importantly, the additional capacity will generate additional fare revenue.

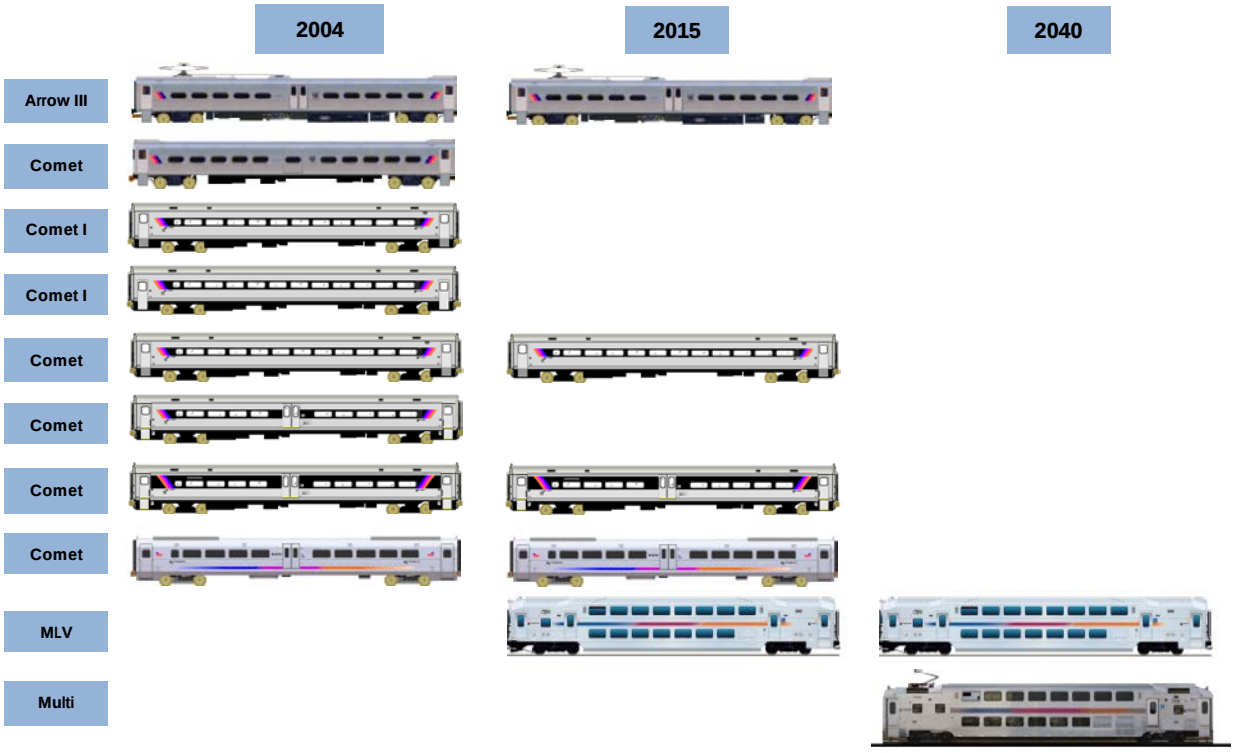
Capacity is provided by increasing the number of seats per train, not by increasing the number of trains …

Reduced Shop Count

The existing Arrow III fleet has a shop margin of over 20%. Most of these units will be replaced by non-powered push pull equipment that has a 12.5% shop margin. NJ TRANIST is reducing its overall passenger shop count by over 12%. Having fewer vehicles to maintain directly reduces maintenance costs.

Modernization and Standardization

Newer rolling stock includes warranty protection limiting NJ TRANSIT's financial obligation for repair and 'burn-in' failures. Additionally, new rolling stock will have a higher Mean Distance Between Failure rate limiting service interruptions, maintenance activities and their related costs.



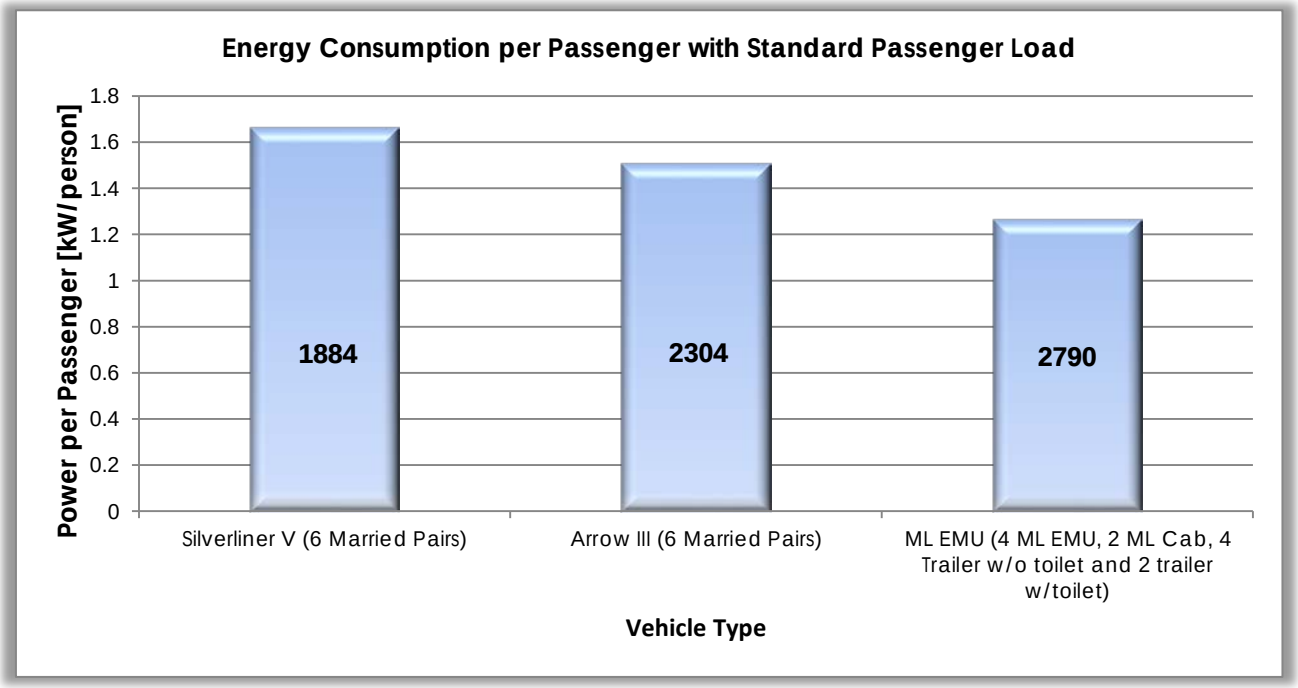
The Fleet Strategy also calls for reducing the number of different types of equipment. As can be seen in the chart, NJ TRANSIT had eight distinct types of passenger equipment in service in 2004. By 2015, that number will be reduced to five. By 2040, NJ TRANSIT's passenger fleet could consist entirely of Multilevels.

NJ TRANSIT's Fleet Strategy aims to optimize a fleet standardization scheme that will ultimately result in Locomotives and Multi-Level Passenger Rolling Stock. This scheme allows for standardization and costs savings for NJ TRANSIT. This standardization offers several advantages on NJ TRANSIT's operations, facilities, equipment and departments.

The replacement of an aging and non-standardized fleet with new state-of-the-art technology will positively impact NJ TRANSIT's current equipment maintenance capability by removing varied aging equipment and obsolete technologies from the maintenance process. For example, a 12-car EMU has six pantographs and a modernized 12-car Multilevel EMU requires only four. This savings constitutes a more efficient use of maintenance and cycle parts replacement. Standardization of parts across equipment also avoids the need for larger parts bins and inventory. For example, in order to maintain the Comet III fleet of 49 units, NJ TRANSIT must maintain a separate parts supply for the braking systems that are unique to that fleet.

Energy Costs

In developing its Fleet Strategy, NJ TRANSIT considers ways to improve the sustainability of its fleets in terms of energy consumption and pollution wherever feasible. A modernized state-of-the-art fleet enables the railroad to tailor its operations to best take advantage of electric power savings when circumstances permit. As can be seen in the chart below, by increasing seating capacity NJ TRANSIT accomplishes lower energy consumption per passenger with Multilevel Electric Power Coaches over the current aging EMUs.



CAPITAL PROGRAM

Cost Effectiveness

NJ TRANSIT Fleet Strategy is designed to minimize impact on the NJ TRANSIT capital program and maximize the benefits of capital investment. This is accomplished using a number of strategies.

Reduction in Fleet Size	The Fleet Strategy calls for a reduction in the size of the passenger fleet from 1,124 units in the 2010 baseline to 1,050 units in 2020. This fleet size reduction lowers demands on the capital program to purchase equipment. It also lowers the long term project costs associated with fleet overhauls.
Increased Passenger Capacity per Unit	The Fleet Strategy provides increased capacity by purchasing Multilevel equipment with more seats per coach. With a 10% to 18% increase over single level equipment, NJ TRANSIT avoids the cost of purchasing additional cars. Also avoided are the costs of constructing yards and facilities to maintain a larger fleet. Yard costs alone are estimated at $1 million per new vehicle.
Optimization of EMU Design	The Fleet Strategy calls for replacing the remaining 160 single-level Arrow III Electric Multiple Units (EMU) with Multilevel EMU equipment. Importantly, the Fleet Strategy reconfigures the EMU layout such that every *third* car is a power car, rather than having traction motors on *every* unit. As power cars are generally more expensive than trailer cars, this significantly reduces the cost of the Arrow III replacement. Moreover, whereas current EMU equipment included a pantograph and transformer for every other vehicle, The Fleet Strategy calls for a pantograph and slightly larger transformer for every third unit. This approach is similar to that taken by the airline industry, where four engine long-haul aircraft are increasingly being replaced by aircraft with similar range and seating capacity that are equipped with two engines that produce equal power. NJ TRANSIT's existing EMUs have a control cab in every vehicle. NJ TRANSIT's Fleet Strategy calls for only two control cabs per train set -- a six fold reduction in equipment per 12 car set.
Repurposing Equipment Previously Purchased for Service Expansion	NJ TRANSIT had purchased Multilevel coaches for service expansion prior to the 2008 economic downturn. This expanded service was never implemented. The Fleet Strategy calls for repurposing that equipment to retire aging railcars. In addition, NJ TRANSIT recently acquired eight Multilevel railcars from the former ACES services. With the reconfiguration of the Multilevel EMUs, the replacement of the 160 Arrow III EMUs power units requires the purchase of 58 Multilevel power units and 92 Multilevel trailers. However, by repurposing 66 Multilevel coaches previously acquired, NJ TRANSIT needs to purchase only 26 additional Multilevel coaches to replace the Arrow III fleet. At approximately $3 million per Multilevel unit, this approach saves NJ TRANSIT over $200 million.

Reduced Shop Count for Passenger Equipment	By reducing the number of power cars required to propel new EMU equipment, NJ TRNASIT has effectively reduced its shop count by 12% or 17 vehicles. This reduces the demands on the capital program by $50 million.
Increased Capacity at Reduced Cost	Replacing the Arrow III fleet with Multilevel EMUs is a more cost effective means to increasing capacity. The estimated cost of replacing Arrow III with single-level EMUs is $5 million per power unit. A three-car power consist would cost $15 million and provide 330 seats (less seats are provided than existing Arrow III due to requirements of the American with Disabilities Act). By contrast, a Multilevel EMU power car is estimated to cost $6.5 million — $1.5 million more than the single-level power car. However, the two Multilevel trailer cars that it can pull are estimated to cost $3 million each. The end result is that the three car consist costs $12.5 million -- $2.5 million *less* than the single-level EMUs. Further, the Multilevel EMU would have 374 seats – 44 more seats than the single-level configuration.
Cost Effectiveness Relative to Physical Infrastructure Improvements	The Fleet Strategy provides 1,277 additional seats in the peak hour to Penn Station New York – the equivalent of an additional train. Peak hour capacity to Penn Station New York is currently restricted to 21 trains per hour due to physical infrastructure. The cost of constructing additional tunnel and station capacity to increase the number of trains per hour to New York is approximately $500 million to $750 million per additional train slot. The cost of additional capacity provided by increasing the number of seats on existing trains is embedded in the cost of replacing overage equipment.
Selective Overhauls vs. Purchasing New	The Fleet Strategy calls for the overhaul of older diesel locomotives rather the purchase of new locomotives. This reduces demands on the capital program.

Taken together, these approaches provide maximum benefit to the customers in terms of capacity and comfort, while minimizing costs to NJ TRANSIT's Capital Program.

CMAQ Funding Eligibility

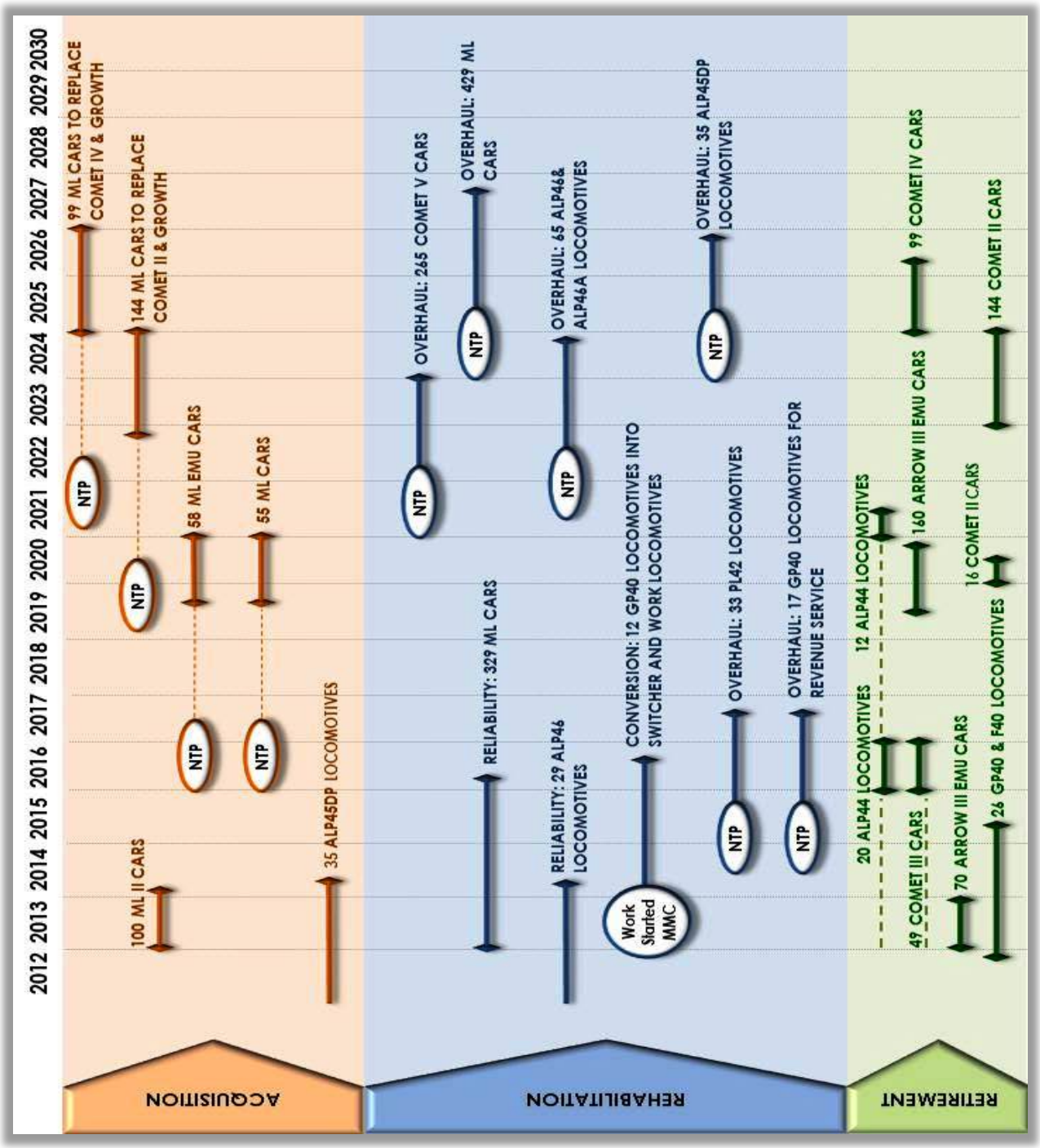
Because NJ TRANSIT"s Fleet Strategy replaces single-level equipment with Multilevel equipment that has greater seating capacity, federal Congestion Mitigation Air Quality (CMAQ) funds can be used for the new equipment. NJ TRANSIT typically receives $50 to $100 million annually from the Federal Highway Administration in CMAQ "flex" funds. There funds must be used for projects that positively impact air quality. Overhaul of existing Arrow III railcars would not qualify for CMAQ funds because the overhaul would not increase capacity. The Multilevel purchases proposed in NJ TRANSIT's Fleet Strategy are funded primarily with CMAQ funds.

Avoiding Fits and Starts

NJ TRANSIT's overall Capital Program is funded by federal and state sources that remain relatively steady over time. By regularly replacing aging equipment now, the Fleet Strategy seeks to avoid "fits and starts" in the capital program. For example, if the 160 remaining Arrow III fleet were overhauled again to extend their useful life for 10 years, the eventual replacement cost would coincide with replacement of the Comet II and IV fleets. Deferring replacement of rolling stock can create spikes in the demands on the capital program, which can lead to unnecessary bonding. With a rail fleet valued at approximately $6 billion and a useful life of 30 years, NJ TRANSIT would need to dedicate approximately $200 million (in today's dollars) of funding to rail rolling stock renewal simply to maintain the average useful life of the existing fleet at 15 years.

IMPLEMENTATION TIMELINE

The following chart highlights the schedules for equipment acquisition, rehabilitation and retirement. The strategic implementation of each phase considers the lead time when designing and/or ordering vehicles; their maintenance schedule, and, operating lifespan. This is to promote the orderly and optimum deployment, service and withdrawal of vehicles.



APPENDIX

NJ TRANSIT COMMUTER RAIL NETWORK

NJ TRANSIT Rail Operations began on January 1, 1983. Much of the rail rolling stock utilized at the start of NJ TRANSIT Rail Operations was well past its useful life. Electric multiple unit (EMU) cars used on one line were built in the early 1930's. Many of the locomotive-hauled coaches still utilized steam heat. The poor condition of the equipment was one of the reasons for NJ TRANSIT's formation.

NJ TRANSIT operates the New Jersey statewide commuter rail network. The rail system features eleven primary commuter rail lines. Ten of the lines serve three major terminals: Penn Station New York (PSNY), Hoboken, and Newark Penn Station. NJ TRANSIT also operates the Atlantic City Line in southern New Jersey which does not serve the New York City area.

Since several of the lines physically overlap, the ten North Jersey commuter rail lines have been combined into eight groupings. The two Morris and Essex (M&E) lines, Morristown (Dover/Summit) and Gladstone, are grouped together, and the Main Line and Bergen County Line are grouped together. Even though the Port Jervis line operates over some of the same tracks as the Main/Bergen County lines, it is not included in this grouping. The Port Jervis line service originates in New York State and is operated by NJ TRANSIT for Metro-North Railroad. As a result, fleet and ridership statistics for this line are separately calculated.

Most NJ TRANSIT commuter rail passengers work in Manhattan. Passengers who work in lower Manhattan take NJ TRANSIT commuter rail trains to Hoboken or Newark and transfer to ferry or PATH trains to lower Manhattan. Riders traveling to midtown Manhattan, the nation's largest central business district and NJ TRANSIT's most popular destination, generally take NJ TRANSIT commuter rail trains to PSNY either directly or via transfer at the Frank R. Lautenberg Station, Newark Penn Station or Newark Broad Street Station.

NJ TRANSIT's commuter rail lines converge at the Frank R. Lautenberg Station, and then operate either on Amtrak's Northeast Corridor (NEC) through the existing trans-Hudson North River Tunnels1 into PSNY in Midtown Manhattan, or via the NJ TRANSIT Main Line to Hoboken Terminal. Trains must be on electric power when operating through the existing tunnels into PSNY. Four of NJ TRANSIT's lines are partially or fully equipped for electric power, and provide direct service to midtown Manhattan: the NEC Line, North Jersey Coast Line (NJCL), M&E [Morristown (Dover/Summit) and Gladstone Branch], and the Montclair-Boonton Line. The remaining NJ TRANSIT commuter rail lines utilize diesel or dual power equipment. Passengers destined for Manhattan riding diesel-only services must transfer to electric service at Newark Broad Street Station, Newark Penn Station, or Frank R. Lautenberg Station. Passengers on trains operating dual power locomotives allow for one seat rides from diesel territories directly into PSNY whenever access is available.

NJ TRANSIT's morning operating plan to PSNY includes roughly 25 eastbound revenue trains (21 NJ TRANSIT and 4 Amtrak) in the AM Peak Hour, although more trains may operate in a particular 60-minute period during the AM peak. The 25 trains per hour (TPH) represent the practical maximum for sustained reliable operation over a 2-hour peak period.

The following is description of each of NJ TRANSIT's commuter rail lines:

Northeast Corridor (NEC): NEC service runs between the "Outer Zone" origination/termination of Trenton, New Jersey and PSNY, with additional "Middle Zone" originations/terminations at Jersey Avenue (County Yard, New Brunswick) and many "Inner Zone" stations also served by North Jersey Coast Line trains. NEC service is normally operated exclusively by electric trains and provides one-seat ride service to Penn Station, New York (PSNY). A branch line with shuttle service connects Princeton with Princeton Junction

North Jersey Coast Line: The NJCL operates alternately from Long Branch, New Jersey to PSNY (electric train service), and, on weekdays, from Bay Head, New Jersey to Hoboken, New Jersey (diesel train service). Diesel shuttle service operates between Long Branch and Bay Head during off-peak periods and weekends. Connections to PSNY are available at Long Branch and Newark Penn Station for riders originating south of Long Branch.

Raritan Valley Line: Raritan Valley Line diesel service operates alternately from High Bridge, New Jersey and Raritan, New Jersey to Newark Penn Station weekdays. Service operates weekends only from Raritan, New Jersey to both Newark Penn Station and Hoboken, New Jersey. A "pilot" direct service to PSNY has begun on certain trains utilizing ALP45 dual power locomotives during off-peak periods. All other trains require passengers to transfer at Newark Penn Station for service to PSNY.

Main Line/Bergen County Line: Main Line/Bergen County Line diesel service operates between Suffern, New York and Hoboken, New Jersey. The Main Line operates via Paterson, New Jersey. The Bergen County Line operates via Fair Lawn, New Jersey. The two lines split eastbound at Ridgewood, New Jersey and rejoin in Secaucus, New Jersey. There is no direct service to New York; passengers can transfer at the Frank R. Lautenberg Station for service to PSNY via the NEC.

Pascack Valley Line: The Pascack Valley Line diesel service operates between Spring Valley, New York and Hoboken, New Jersey. The Pascack Valley Line also serves three MTA

Metro-North Railroad stations in New York. There is no direct service to New York; passengers can transfer at the Frank R. Lautenberg Station for service to PSNY.

Port Jervis Line: Port Jervis Line diesel service operates from Port Jervis, New York to Hoboken, New Jersey. NJ TRANSIT operates the Port Jervis Line for Metro-North Railroad. Trains operate via the NJ TRANSIT Main Line or Bergen County Line. There is no direct service to New York; passengers can transfer at the Frank R. Lautenberg Station for service to PSNY.

Morris and Essex Lines (Gladstone-Dover/Summit): The M&E Lines provides service to Hoboken and PSNY. The Morristown Line (Hackettstown to Hoboken/PSNY via Morristown) and the Gladstone Branch (Gladstone to Hoboken/PSNY) are separate lines. The Morristown Line diesel service operates to/from stations west of Dover serving Hoboken. Electric service is provided to/from Dover and stations east to Hoboken. Direct electric service to PSNY is provided only from Dover and east, as well as from the Gladstone Branch. The Gladstone Branch also operates electric service to Hoboken. Connections to PSNY are provided at Dover, Summit, and Newark Broad Street for passengers originating at stations with limited or no direct PSNY service.

Montclair-Boonton Line: The Montclair-Boonton Line runs between Hackettstown and Hoboken/PSNY. Direct service to PSNY is provided using electric trains from Montclair State University; some electric trains in this segment also terminate at Hoboken. Diesel service is provided to/from stations west of Montclair State University (MSU) serving Hoboken. Passengers boarding west of MSU transfer at MSU or Newark Broad Street Station for service to PSNY.

Atlantic City Line: Atlantic City Line diesel service operates between Philadelphia 30th Street Station (Lower Level) and the Atlantic City Rail Terminal via Cherry Hill and Hammonton. Currently, the line does not connect with any other NJ TRANSIT commuter rail services, although SEPTA commuter rail or Amtrak can be used to make a connection between Philadelphia 30th Street Station and Trenton Station, for Northeast Corridor Line service.

EQUIPMENT CHARACTERISTICS

Single Level Coaches (Push-Pull): The single level coaches are designated by NJ TRANSIT as Comet II, IV, and V. The single level coaches (including Metro-North) have an average seating capacity of 118 passengers

Comet II

The Comet II coach fleet was built by the Bombardier Company from 1982 – 1983 and overhauled by Alstom from 2001 - 2004. The Comet II car has capacity for 130 passengers.

Technical Data

Manufacturer	Bombardier Transportation Inc.
Weight	98,000 lbs
Length	85’
Width	10’ – 6”
Height	12’ – 6”
Total Seats	130 (No toilet)

Comet IV

The Comet IV coach fleet was built by the Bombardier Company from 1996 – 1997. The cab car has a seating capacity of 104 passengers and the trailer car with a toilet has capacity for 107 passengers with the non-toilet car having capacity for 113 passengers.

Technical Data

Manufacturer	Bombardier Transportation Inc.
Weight	105,760 lbs (CAB) / 101,850 lbs (Toilet Trailer) / 99,535 lbs (Trailer)
Length	85’
Width	10’ – 6”
Height	12’ – 8”
Total Seats	104 (CAB) / 107 (Toilet Trailer) / 113 (Trailer)

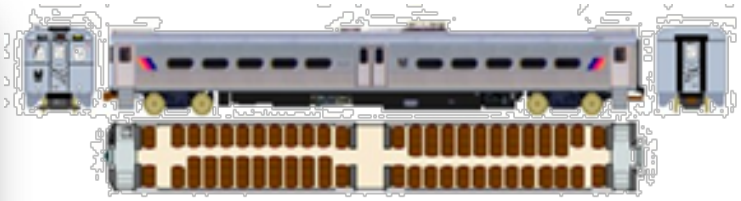
Comet V

The Comet V coach fleet was built by the Alstom Company from 2002 - 2004. The cab car has a seating capacity of 109 passengers and the trailer car with a toilet has capacity for 111 passengers with the non-toilet car having capacity for 117 passengers.

Technical Data

Manufacturer	ALSTOM Transportation
Weight	107,515 lbs (CAB) / 103,940 lbs (Toilet Trailer) / 101,840 lbs (Trailer)
Length	85’
Width	10’ – 6”
Height	13’ – .65”
Total Seats	109 (CAB) / 111 (Toilet Trailer) / 117 (Trailer)

Electric Multiple Units (Single Level): The current EMU fleet is designated by NJ TRANSIT as Arrow III. The fleet of Arrow III cars were built by the General Electric Company from 1976 – 1977. The fleet consists of "A" and "B" cars semi permanently connected as 2 unit pairs and 30 single unit cars. The "A" car has a seating capacity of 117 passengers, the "B" car has capacity for 113 passengers, and the Single car has capacity for 117 passengers. The Arrow III fleet was rehabilitated in 1989-95.



Electric Multiple Units offer distinct advantages due to their rapid acceleration. The benefits of the improved acceleration are most apparent where schedules are tight and service patterns require frequent stops. This condition exists on the Northeast Corridor for both the Middle (Jersey Avenue to Metro Park) and Inner zones (Rahway to Newark, Penn Station) as well as on the Morris & Essex lines between Summit and Newark Broad Street Station. In these territories, the frequency of stops within short distances requires that trains accelerate quickly to maintain schedules and more importantly to maximize the number of train 'slots' that can run in this territory during peak hours.

Technical Data

Manufacturer	G.E / ABB
Weight	140,000 lbs (SC) / 135,000 lbs (A Car) / 114,000 lbs (B Car)
Length	85'
Width	10' – 6"
Height	15'
Total Seats	117 (SC) / 117 (A Car) / 113 (B Car)

Multilevel Coaches (Push-Pull): Multilevel coaches provide for an average of 136 seats per coach (142 for trailers, 127 for cab cars, 132 for toilet cars). Train slots are limited and consist lengths are generally restricted to 12 cars or less (including locomotives) due to platform constraints in key terminals. Multilevels provide the significant benefit of additional seating within existing limitations. This added seating capacity, coupled with the positive customer response to the 2-2 seating, results in their being the preferred push-pull coach for system growth and for all single-level coach replacements.

Technical Data

Manufacturer	Bombardier Transportation Inc.
Weight	139,250 lbs (CAB) / 134,880 lbs (Toilet Trailer) / 132,990 lbs (Trailer)
Length	85’
Width	10’
Height	14’ – 6”
Total Seats	127 (CAB) / 132 (Toilet Trailer) / 142 (Trailer)

Locomotives

The NJ TRANSIT's locomotive fleet is comprised of electric, diesel, and dual power vehicles. The electric powered locomotives are designated by NJ TRANSIT as the ALP 46 and 46A series. The diesel locomotives are made up of GP40, F40 and PL42 series locomotives.

ALP46 & ALP46-A (Electric)

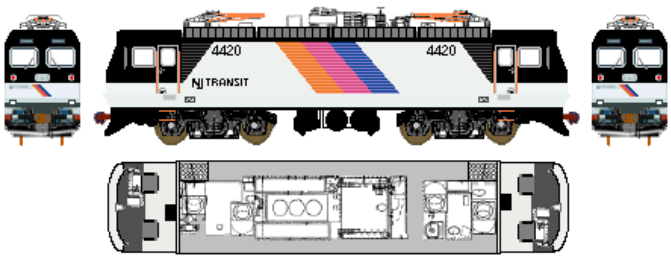
The ALP46 locomotives were built by Bombardier from 2001 – 2002. This locomotive has the highest power at 9500 HP of all of the NJ TRANSIT fleet. This locomotive also has the highest power rating of 1000kw for heating, cooling and lighting passenger cars. Delivery of the ALP46-A locomotive began in 2009. These locomotives feature the high traction capability of the ALP46, an updated propulsion system, and a spring applied – pneumatic release parking brake design.

Technical Data

Manufacturer	Bombardier Transportation Inc.
Weight	198,400 lbs (46) / 202,822 lbs (46A)
Length	64'
Width	9' - 8"
Height	14' - 8 1/2"
Starting Tractive Effort	71,000 lbs
HEP Supply	1000 kW

ALP44 (Electric)

The ALP44 Electric Locomotives were delivered from 1990 to 1996 and consisted of three models. The ALP44-O (Original) were delivered in 1990 as 4400 through 4414. The ALP44-E (Extended) were delivered in 1995 as 4415 through 4419. The ALP44-M (Microprocessor controlled) were delivered in 1996 as 4420 through 4431.



Technical Data

Manufacturer	ABB
Weight	240,000 lbs
Length	51’ – 2”
Width	10’ – 6””
Height	14’ – 10”
Starting Tractive Effort	52,000 lbs
HEP Supply	500 kW

GP40PH-2-O / GP40PH-2-A / GP40PH-2-B (Diesel)

The GP40PH-2 fleet was built by the EMD Company from 1968 - 1971. The units were overhauled from 1991 to 1994. (2-O = Original, 2-A = Light, 2-B = Light 2nd Order)

Technical Data

Manufacturer	Electro-Motive Diesel (EMD)
Weight	300,000 lbs (O) / 284,200 (A) / 286,000 (B)
Length	59' – 2"
Width	10' – 3 1/2" (O) / 10' – 4 1/2" (A/B)
Height	15' – 5 3/4"
Starting Tractive Effort	70,000 lbs
HEP Supply	425 kW

GP40 FH-2 (Diesel)

The GP40FH-2 fleet was built by the EMD Company from 1967 - 1970. The units were overhauled by M&K from 1987 to 1989.

Technical Data

Manufacturer	Electro-Motive Diesel (EMD)
Weight	282,500 lbs
Length	59’ – 2”
Width	10’ – 3 1/8”
Height	15’ – 4 3/4“
Starting Tractive Effort	70,000 lbs
HEP Supply	425 kW

40 PH-2 (Diesel Electric)

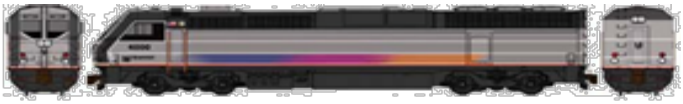
The F40 PH-2 fleet was built by the EMD Company from 1987 - 1988. The units were overhauled by Conrail from 1997 – 1998.

Technical Data

Manufacturer	Electro-Motive Diesel (EMD)
Weight	284,200 lbs
Length	56’ – 2”
Width	10’ – 8 3/4”
Height	15’ – 5 1/4“
Starting Tractive Effort	70,000 lbs
HEP Supply	425 kW

PL42AC (Diesel Electric)

The PL42AC fleet was built by the Alstom Company in 2005. This was the first locomotive purchased by NJ TRANSIT to meet the EPA's Tier I requirements.

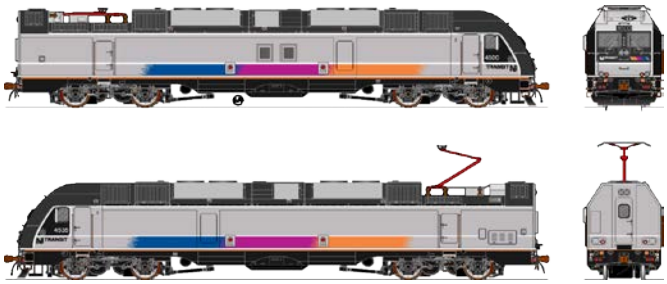


Technical Data

Manufacturer	Alstom Transportation
Weight	288,000 lbs
Length	69' – 10"
Width	10' – 8"
Height	15' – 5"
Starting Tractive Effort	70,000 lbs
HEP Supply	800 kW

ALP45-DP Dual Power (Diesel Electric)

The ALP45-DP locomotives were built by Bombardier from 2010 – 2012. This locomotive has the capability to operate in a diesel or electric mode providing a one seat ride advantage for customers as well as saving on fuel coasts. This was NJ TRANSIT's first locomotive to meet the EPA's Tier III requirements.



Technical Data

Manufacturer	Bombardier Transportation Inc.
Weight	284,000 lbs
Length	71' – 6 ¼"
Width	9' – 8.1"
Height	14' – 5 ¼"
Starting Tractive Effort	71,000 lbs
HEP Supply	1000 kW

DEFINITION OF TERMS

Cab Car: An unpowered coach equipped with a complete engineer's control stand, replicating all of the equipment and apparatus that can be found in the cab of a locomotive, which can be used to operate a push-pull train in "push" mode, with the cab car forward and locomotive at the rear.

Consist: The composition of a complete train excluding the locomotive. Usually referred to by the number of cars (i.e. 6 car consist). This can also be called a "trainset".

Diesel Electric Locomotive: A locomotive in which power developed by one or more diesel engines is converted to electrical energy and delivered to the traction motors for propulsion.

Dual Power Locomotives (DPL): A locomotive which can utilize either a diesel engine or electric power via overhead wires to provide traction power.

Dwell Time: The amount of time that a train is stopped at a station to load or unload passengers.

Electric Locomotive: A locomotive that has one or more traction motors with power derived from overhead wires via a pantograph.

Electric Multiple Unit (EMU or MU) Car: A self-propelled car generally operated in married pairs, which are powered in the same manner as an electric locomotive. It includes controls to operate the train.

Hoboken Division: The Hoboken Division includes the Morristown Line, Gladstone Branch, Montclair Line, Main Line, Bergen County Line, Pascack Valley Line, and the Southern Tier (Port Jervis) Line, which NJ TRANSIT operates on behalf of Metro-North Railroad.

Key Train: Of all trips operated by a consist in each day, the trip which experiences the highest ridership. The consist size to meet this need is the "key train", and establishes the size of the consist.

Multilevel Cars: A push-pull car with an upper and lower seating level in the middle section and an intermediate level at both ends of the car for seating, loading and unloading.

Newark Division: The Newark Division includes operations on the Amtrak Northeast Corridor Line, plus the North Jersey Coast Line, Raritan Valley Line, Princeton Branch, and Atlantic City Line.

Outlying Yard: An overnight equipment storage facility located at the opposite end of a rail line from the main terminals of Newark, New York and Hoboken. Generally, daily inspections, cleaning and minor repair work takes place at these locations.

Peak Hour: The hour in which the highest level of service is provided for the greatest number if riders. The AM peak hour is defined as arrivals at the easternmost terminal (New York, Newark, or Hoboken) from 7:30 AM to 8:30 AM.

Peak Period: A four hour period of time during a weekday when train service is utilized by the majority of riders, generally traveling to and from work. The AM peak period is defined as arrivals at the easternmost terminal (New York, Newark, or Hoboken) from 6:00 AM to 10:00 AM.

Off Peak: The remainder of the weekday not included in a peak period.

Recycling: This refers to the practice of re-using a consist during the peak period for a second peak direction trip. Where travel time is relatively low between origin and destination points, a consist that operates on an early peak period train can often be turned back to make a second peak period, peak direction trip on a later peak period train. This tends to reduce total equipment requirements.

Service Pattern: A recurring train schedule including origin and terminal points and intermediate station stops. Operations on NJ TRANSITs rail lines often require more than one service pattern.

Service Plan: A document that confirms the level of service assumptions - travel times and service frequencies between station pairs - which is used to develop the estimates of system ridership and revenue. It validates operational feasibility at the desired level of service and provides a basis for:

- Estimating the number of required train sets and overall rolling stock fleet
- Estimating infrastructure and rail network requirements
- Sizing train storage and maintenance facilities on the rail network
- Planning passenger-handling operations at stations, which can be used to help size and configure station facilities.

Shoulder of the Peak: A time period just prior to or after a peak period during which ridership is high but not at peak levels.

Push Pull Car (Coach): A car used in the operation of a passenger train consists in which the train may be controlled from the locomotive or from a cab car. A push-pull car cannot operate without the locomotive, as it has no way to generate its own motive power. When the train is in "pull" mode the locomotive is pulling, in push mode, the locomotive is pushing the train

Zones (schedule): A method of scheduling trains in which service on a line is divided into zones. Trains are scheduled to serve a specific zone and express through others.