

# **Passenger Rail Equipment Options for the Amtrak Vermont and Ethan Allen Express**

**A Report to the Vermont Legislature**



**Prepared by the Vermont Agency of Transportation  
Operations Division - Rail Section**

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### ***H.438 Section 62: Passenger Rail Equipment***

***“In consultation with the joint fiscal office, the agency shall examine the alternatives and relative costs and benefits and service implications available to the state with respect to the purchase of passenger rail equipment to be used in place of the existing Amtrak equipment employed in the Vermonter and Ethan Allen services, including the purchase of refurbished equipment. The agency shall deliver a report of its analysis to the house and senate committees on transportation on or before January 15, 2010.”***

## **Amtrak Vermonter**

### **Existing Service**

Amtrak's **Vermonter** is a 611-mile (983 km) passenger train service between St. Albans, Vermont and Washington, D.C. via New York City. One trip runs in each direction per day. On-time performance figures continue to improve and the yearly average to date is 90.0%. They achieved 98.3% OTP in FFY 2009.

Total ridership for FFY 2009 was 74,016, and FFY 2010 to date is showing an increase of 7.8%.

The tracks used by the Vermonter are owned by the New England Central Railroad (St. Albans, VT – Palmer, MA), CSX (Palmer, MA – Springfield, MA), Amtrak (Springfield, MA – New Haven, CT, and New Rochelle, NY – Washington, DC), and Metro-North Railroad (New Haven, CT – New Rochelle, NY).

The southbound Vermonter departs St. Albans, VT at 8:30 AM, and arrives in Washington, DC at 10:01 PM weekdays and 10:13 PM weekends.

The northbound Vermonter departs Washington, DC at 7:30 AM weekends, 8:10 AM weekdays, and arrives at St. Albans, VT at 9:25 PM.

North and southbound trains pass one another in Springfield, MA.

### **Existing Equipment**

Present equipment (the “trainset”) consists of 4 coach cars (one of them business class), one snack car, and two GE P42DC locomotives, one on each end. Using two locomotives allows for a reversal of direction in Palmer/Springfield, MA. The second locomotive also provides train control from either end of the trainset, as well as head-end power (HEP). These paired locomotives are used as far south as the New Haven, CT. and then from there south to Washington, DC, the prime mover locomotive is typically either an all-electric Bombardier Alstom HHP-8 or an EMD AEM-7AC. The HHP-8, Amtrak’s most powerful locomotive with 8000 HP, can pull a trainset of Amfleet II cars at up to 125 MPH on the Northeast Corridor.

## **Amtrak Ethan Allen Express**

### **Existing Service**

The present train service leaves Rutland at 7:40 AM Mon-Fri, 10:35 AM on Saturday, and 4:45 PM on Sunday and runs first to Albany and then on to New York City's Penn Station. From there connections can be made to stops along the northeast corridor. The return trip of the Ethan Allen Express departs NYC at 10:20 AM, except Friday (1:05 PM on Friday), arriving in Rutland at 9:05 PM, except Friday, when it arrives at 11:30 PM. In early January 2010, the Fair Haven stop was replaced by Castleton Depot, a move expected to increase ridership because of better station accommodations and its proximity to two colleges.

Total ridership for FFY 2009 was 46,748, an overall increase of 3.3% over the previous year, and FFY 2010 to date shows an increase of 0.3%. This can be attributed, in part to comprehensive marketing, which has boosted ridership north of Albany. This is occurring when Amtrak nationwide is feeling the effects of the present recession. A second promotion is a special \$12 in-state fare, which will continue in 2010.

On-time performance (OTP) for the Ethan Allen for FFY 2009 was 71.7%, with 82% to date in FFY 2010.

### **Existing equipment:**

Presently, the Ethan Allen Express operates with one locomotive, a GE P32ACDM, bi-powered with diesel-electric and third-rail AC electric for access to an enclosed NYPenn station. The trainset generally runs 3-4 passenger cars, one business class, plus a café car. This locomotive is very powerful, and the AC traction motors operate more efficiently than their DC equivalents. It is also equipped for Ground/Wayside power for the overnight layover in Rutland, which saves diesel fuel, as no idling occurs.

## **Equipment Options Currently Available**

The following sections outline currently known options which are available for passenger cars and locomotives.

### **Passenger cars/coaches**

Passenger cars can cost from \$300K for a road-worthy rebuilt Amfleet I car to \$5.5M for a fully-equipped modern bi-level Bombardier car.

- The Amfleet I cars, outmoded for use on the Northeast Corridor (Boston to Washington, DC) by today's high-speed standards, are still suitable for short-haul and regional use. The present Amfleet II cars, built by Budd in the '70's and '80's are aging, but sound, and are presently the coach of choice for Amtrak on the Northeast Corridor and points south. New ARRA funding allows Amtrak to upgrade their present fleet of Amfleet II cars to the next generation of coaches. We don't currently know exactly what Amfleet I or II cars may cost, the pace at which Amtrak may upgrade the fleet, the amount of refurbishment required, the potential availability, or the necessary operating maintenance requirements. As such, more research will be needed before we can think of them as a potential equipment option for Vermont.
- Another very popular car which is in service today is the Bombardier Multi-Level Vehicle. Although most commonly supplied in commuter mode, several of these have been customized by Bombardier for the ACES line, serving Atlantic City as bistro cars. Bombardier, in its next round of offerings to New Jersey Transit (NJT), will also be supplying long distance cars with larger seating and accommodations. Two desirable features of these coaches are the overall height of 14' 6" which allows them to run wherever a single-level car could run, (including the tunnel approaches to New York Penn Station), and the fact that more passengers can be carried per car, (50-85% more than single level, depending on seating layout). Bombardier Multi-Level Vehicles (at a cost of \$5.5M each) would commit Vermont to a carrying cost of \$275K annually per vehicle for twenty-years, not counting annual operational costs, maintenance and possible handling fees associated with Amtrak having to deal with "Vermont specific" equipment. Again, more research will be needed before we can think of them as a potential equipment option for Vermont.

## **Locomotives**

- The present locomotive equipment being used, GE Genesis P42DC and P32ACDM, are fully computerized locomotives, which automatically control all on-board functions, thus producing high reliability while keeping the maintenance requirements low. For example the Genesis' computers will automatically reduce the power plant's output in the event that the locomotive is overheating, due to low oil or water pressure or reduced airflow into the intakes, thus making it still operable. All Genesis units can provide head-end power (HEP) to the train with a maximum capacity of 800 kilowatts output, drawn from an alternator mounted on the main engine.

- Cabbage cars (**Cab** control and **baggage** cars), are created by Amtrak from retired EMD F40-PH locomotives. The main engine/generator set is removed from the locomotive shell and weighted to meet Federal Railroad Administration specifications, (usually with a poured concrete floor for ballast). The original controls and engineer's cabin are retained, allowing the trainset to be operated from either end. Roll-up side doors are added to facilitate the loading and unloading of baggage, bicycles, skis, etc. Sometimes a smaller generator set is installed, to provide head-end power (HEP) for the train. Other common names for these cars are powered control unit (PCU) and non-powered control units, (NPCU). These cabbage cars make especially good sense in situations at a terminus where the trainset cannot easily be turned around, or where the locomotive cannot be easily moved from one end of the train to the other. Presently, this situation occurs in Palmer, MA when the Vermonter consist moves from the CSX to NECR line, and in St. Albans, VT where it overnights. A cabbage car costs between \$450k and \$700k. A cab-control car, a specially modified coach with controls on one end, is similar to a Cabbage car. A cab-control car is expected to cost between \$750k and \$1 million.
- A more modern, highly fuel-efficient form of motive power is the Bombardier-Alstom hybrid locomotive being built for NJ Transit and Montreal Metropolitaine Transit Authority (MTA), featuring AC traction motors powered by an onboard diesel generator set, or by overhead catenary-supplied electricity. Exact pricing on this trainset, along with the option of upgraded multi-level cars with long-distance seating, is not currently known nor is Amtrak's intention regarding motive power fleet upgrades.

## **Anticipated Equipment Options**

### **Diesel Multiple Units (DMU's)**

As ridership continues to increase on both the Vermonter and the Ethan Allen Express, the idea of running a total-DMU trainset is less desirable. This is because it is generally more economical to purchase, maintain, and operate a locomotive-passenger car trainset once the ridership has gotten to the point of requiring 4 passenger cars. The present Vermonter trainset has 4-5 passenger cars, one of which is business class. The Colorado Rail Car DMU will now be produced in Ohio by US Railcar. As the movement of materials and intellectual property is taking a while to transfer, delivery dates are being quoted at 24 to 36 months with pricing at

an estimated \$4.5M per for single-level powered car, \$4M for a non-powered trailer, or \$8.5M for a bi-level power unit and \$8M for a bi-level trailer.



Figure 2. **Single-level Diesel Multiple Unit (DMU) to be manufactured by US Railcar in Ohio.**

There are a number of US and European builders speculating about building an FRA-compliant DMU, Siemens for one, but none is yet in production, nor has a price offering/unit been mentioned. Marin County in California is presently accepting bids for DMU equipment to serve in a commuter rail intercity mode, and are pushing hard to request that bidders present proposals to supply FRA compliant equipment.

Although not FRA-approved for the United States, Bombardier does produce a hybrid Diesel and Electric Multiple Unit, (D&EMU), which is currently in use in France. This single level trainset, with 3-4 units, is operated by a single person, as a bus would be. It operates at speeds of over 100 mph in Europe, and has an operator's station at either end.

### **Rail Diesel Cars (RDC's)**

Older, rebuilt or refurbished, Budd RDC's are occasionally available, with prices ranging from \$70K (retired from the Alaska RR) to ~ \$1M, totally rebuilt by Industrial Rail Services, Inc., in Moncton, New Brunswick. Amtrak, however, refuses to operate the latter RDC's, as they have yet to be rebuilt strong enough to meet full FRA safety specifications. Therefore this option is not practical for Vermont.



Figure 1: Reconstructed Budd RDC as presented by International Rail, Moncton, New Brunswick

## Summary and Conclusions

A number of equipment options exist, or are anticipated to exist in the coming years, with regards to passenger coaches and locomotives. As outlined above they come in a wide range of formats and prices. However, although equipment costs are generally known, there are many unknowns involved as well. These include annual operational costs, maintenance costs and possible handling fees associated with Amtrak having to deal with “Vermont specific” equipment. These unknowns, along with the need for the Agency to focus its efforts and rail funding on infrastructure improvements and management of the High Speed Intercity Passenger Rail stimulus funds, make further exploration of state owned equipment impractical at this time. That said we believe there will be a number of options to chose from when the time is right.