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## Section 6 CONCLUSIONS

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### 6.1 TECHNICAL AND ECONOMIC ISSUES

The availability of electrically powered locomotives or passenger rail cars in the U.S. is limited. This assessment indicates that only two new locomotive designs are currently in compliance with the new FRA Tier 1 Rules, namely NJTC's ALP-46, under development by Adtranz; and Amtrak's/MARC's High Horsepower Electric locomotive, built by Bombardier/Alstom. The first unit is currently under testing.

One older model, the GE E-60 is also available. Although the units were built in 1981, eleven units were never used and remain available. Although the purchase price of approximately \$1 million or less each may be extremely attractive, the technology is old and the locomotives are extremely heavy. Assuming that the current F-40 model could be sold for \$1.4 million, the PCJPB could end up with some \$3.45 million on hand, including the costs associated with the addition of HEP and related equipment. But business realities are not as promising.

With regard to EMUs, there are no current multi-level designs available in accordance with U.S. requirements. Developing a new car is indeed feasible -there are thousands of these cars operating in Europe and Japan- but it offers technical and economic risks. These risks may not be justifiable since there are alternatives available. To be clear, there are new single level EMU designs in the United States, but it is assumed that given passenger capacity requirements, train lengths, length of station platforms and other related operating conditions, multi-level cars would be required.

Two capital cost scenarios were evaluated, namely

- a) the replacement of diesel-electric locomotives, hauling the existing Gallery cars, and
- b) the replacement of existing cars and locomotives by multi-level EMU cars.

Under the first scenario, a capital of \$82.8 million would be required, including a credit of \$32.2 million for the sale of diesel-electric locomotives.

Under the second scenario the capital required to replace the existing fleet with multi-level EMUs would be \$ 98 million, including a credit of \$32.2 million for the locomotives and \$ 130.2 million for the sale of the cars.

Yet a third scenario could be the same as the first scenario, but assuming the purchase E-60 electric locomotives. Under this scenario, the price of purchasing 23 units at \$1 million a piece, plus the addition of HEP and other equipment at \$250,000, would total \$28,750,000 million. The price of selling 23 diesel-electric locomotives would be \$32.2 million, leaving a positive cash of \$3,450,000. This is assuming that 12 additional E-60 units can be found. However, it is important to note that commercial transactions are more complicated under this scenario, making the final outcome more uncertain.

## 6.2 PROCUREMENT ISSUES

Procurement of new rolling stock equipment is a critical factor in the deployment of new technologies. More often than not projects are late and application of technologies is complicated by a variety of factors. In many cases the problems are created by procurement approaches which are not clearly defined.

To mitigate these problems, PCJPB should start from a sound basis, including very well defined requirements and objectively written performance specifications. A demonstrated and proven product should be preferred over a new and undeveloped technology. Under this scenario potential contractors capable of offering a U.S. proven locomotive product would be limited to two, namely Adtranz and Bombardier/Alstom. However the Adtranz unit would be more suitable for PCJPB's operation, therefore an addition to the existing New Jersey contract may be the most efficient manner to procure the locomotives.

It is also recommended that a supply-maintenance contract be considered by PCJPB. This approach will likely provide greater incentives to the potential contractors as well as greater efficiencies and locomotive availability and reliability to PCJPB.

If PCJPB's decision is to replace the entire fleet of cars and locomotives with EMU equipment, the procurement process should follow the same basic steps. However the time to define full characteristics and performance requirements of the cars will likely be considerably longer, due to the fact that there are no designs currently available

From a prudent and conservative point of view, the replacement of locomotives only may be the best approach in support of PCJPB's decision to electrify the line. PCJPB would then be able to continue using Gallery cars that are proven, in excellent condition and accepted by the travelling public. Another benefit to this approach is that it would allow the PCJPB, by virtue of still having the diesel-electric locomotives available, to plan a careful introduction of the new locomotives after reasonable time for development and testing. This will minimize potential impact to revenue services.