TRB TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

May 26, 2009

Mr. Vincent Valdes
Associate Administrator for Research, Demonstration, and Innovation
Federal Transit Administration
United States Department of Transportation
1200 New Jersey Ave, SE
Washington, DC 20590

Dear Mr. Valdes:

I am pleased to transmit this letter report of the Transportation Research Board's Transit Research Analysis Committee (TRAC). This is the sixth such report since the committee was established in 2004 to advise the Federal Transit Administration (FTA) on the federal role in transit research and development (R&D) and on processes to promote this role.[1] The committee's membership includes managers of urban and rural transit properties, as well as U.S. and international experts in transit research, management, and technology drawn from academia and the private and nonprofit sectors (see enclosure).

Since our last report in June 2008, the U.S. Department of Transportation and FTA have undergone changes in leadership. We anticipate that under its new leadership FTA will remain committed to research and to seeking external input and advice on the national transit R&D program. When the transition is complete, we would welcome the opportunity to meet with FTA leadership to discuss our purpose and approach, summarize past advice, and seek suggestions on how we can be of further assistance.

[1] Electronic versions of TRAC letter reports can be found at http://www.trb.org/TRB/publications/PolicyStudyLetterReports.asp

In our last letter report, we advised FTA to

- Position itself as the national leader in transit R&D by identifying critical research needs in support of national transit goals and then ensuring that these needs are met through the use of program resources and by encouraging vital contributions from other federal agencies, state and local government, industry, and academia;

- Encourage constructive outcomes from earmarked R&D by setting forth clear research goals that inform the earmarking process and expectations for high-quality research and incentives for researchers to meet these expectations; and

- Develop and maintain a strategic plan that explicitly delineates how national transit R&D needs will be identified and prioritized; how stakeholders will be engaged in this process; and how and when FTA will act as sponsor, conductor, coordinator, and disseminator of research.

During our June and December 2008 meetings, we learned more about FTA's intentions to update its strategic planning process, which will culminate in a new strategic R&D plan during 2009. The current plan was developed in 2005. The update is intended to correct for gaps and overlaps; reflect changing needs and priorities; and link specific research projects with targets, objectives, and strategic goals.

Summary of FTA Briefings and Documents Provided to TRAC

During the June 2008 meeting, we were briefed on the status of the strategic R&D planning process. We learned that the updated plan would continue to define the agency's strategic R&D goals while specifying researchable objectives for each. The strategic research goals in the current plan are to

- Provide transit research leadership,
- Increase transit ridership,
- Improve capital and operating efficiencies,
- Improve safety and emergency preparedness, and

- Protect the environment and promote energy independence.

We learned, however, that these five goals would be condensed and reconstituted into the following three:

- Provide national transit research leadership,
- Support significant increases in transit's market share through research, and
- Identify methods to improve the condition of existing and future transit operations and systems.

The new set of strategic goals would continue to be accompanied by research objectives, but the objectives would be fewer in number and more focused. In contrast to the current plan, each of the objectives would be linked to one or more quantifiable targets. The targets would provide metrics for prioritizing research and benchmarks for measuring research progress and needs. The rationale for condensing the strategic goals from five to three was not fully explained to us, and we have generally avoided advising FTA on what its goals should be. However, we are concerned that a smaller set of general strategic goals risks becoming open-ended to the extent that each goal can be used as a justification for any initiative.

We also learned that FTA plans to group its current and planned R&D projects—including earmarked projects—into a series of research "portfolios." As shown in Figure 1, each portfolio would consist of research projects covering a common concern or mode, such as safety, planning, rail, or bus research. The targets established for each of the objectives would then become metrics for judging the progress of the research projects in each portfolio. The level of performance in attaining the targets will also indicate where more or less research effort is required. Each portfolio will be guided by a research plan that specifies the key targets and objectives; identifies the R&D projects intended to meet them; and outlines how, when, and by whom the research will be undertaken. It is our understanding that over time the portfolios will be adjusted to reflect changing priorities and needs.

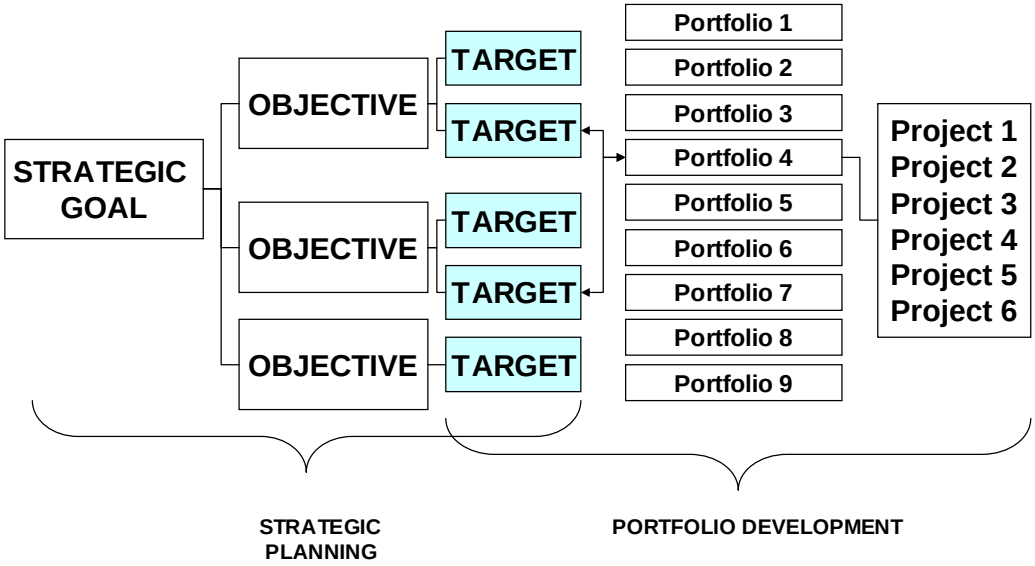

FIGURE 1 FTA's proposed strategic planning and portfolio development structure.

During our December 2008 meeting, FTA provided more details on the strategic planning process. The agency had identified a dozen researchable objectives for its three strategic research goals and intended to group its research projects as shown in Figure 2.

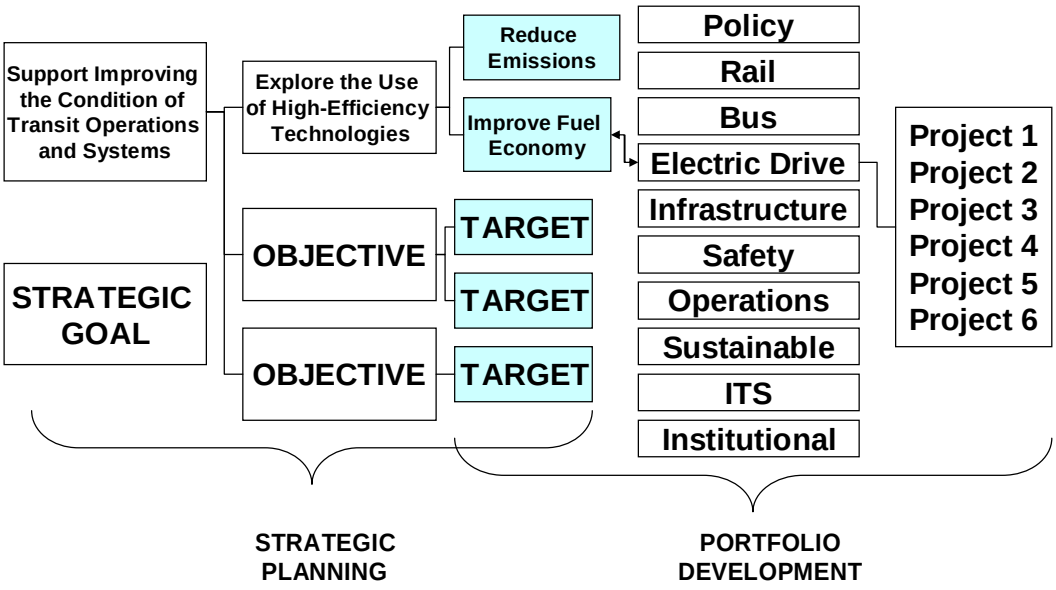

FIGURE 2 Proposed structure showing research portfolios with example objectives and targets.

We asked FTA to provide us with a draft portfolio research plan and explain how the plan was being developed and used. In response, the agency presented its electric drive strategic plan, which was further along in development than any other. The plan envisions an outcome of affordable zero- and near zero-emission transit buses available for use by agencies across the country and produced by domestic suppliers. To further this outcome over the next two decades, the plan identifies five focus areas necessary to advance electric drive bus technology. As shown in Figure 3, the plan establishes a 5-year agenda and schedule of research activities consisting of analyses, demonstrations, and deployment.

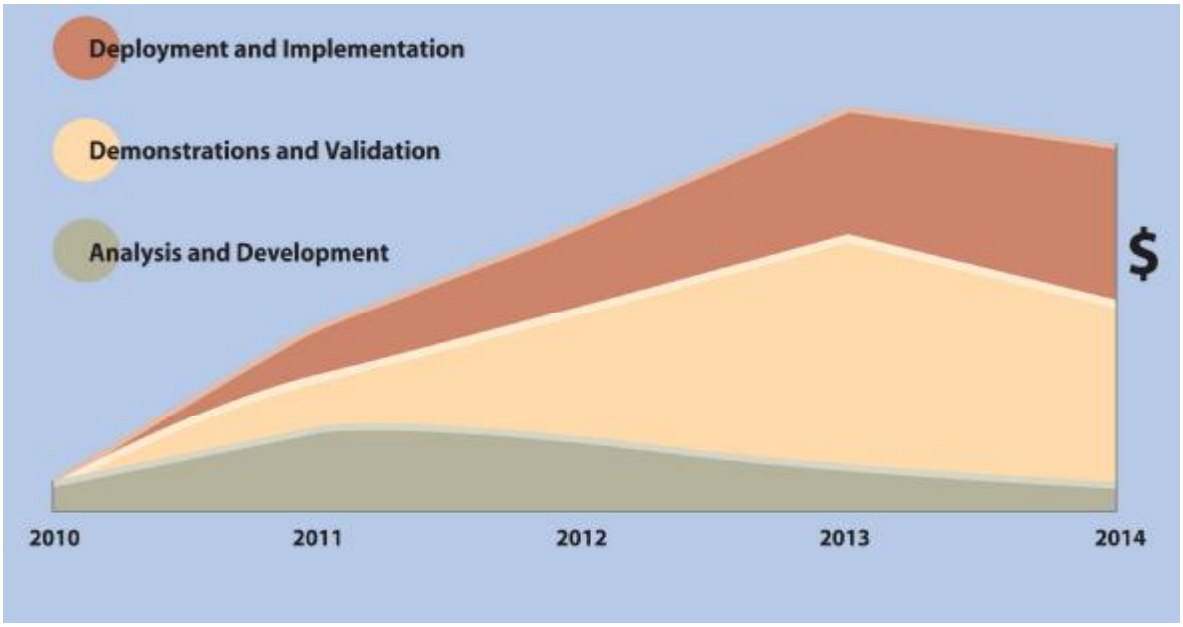

FIGURE 3 FTA electric drive strategic research plan 5-year schedule of research activities.

Progress in Responding to Advice in the 2008 TRAC Letter Report

In addition to the plans and documents described above, FTA provided us with its Multiyear Research Program Plan for 2009–2013, which gives a more detailed inventory and categorization of FTA R&D projects. This document, which is updated annually, was released in late 2008, and we comment on it briefly later in this report.

We found the briefings and supporting documents provided during our 2008 meetings to be well done and informative, indicative of FTA's renewed commitment to improve its strategic R&D planning process. To help the agency in updating its strategic plan, we intend to keep the advice in this report concise and at a high level, focused on the progress that has been made and that still needs to be made with respect to the three main topics of advice in our June 2008 letter report: national leadership in transit research, the earmarking of federal transit R&D funds, and establishment of R&D needs and priorities. We believe that each of these topics is central to the strategic planning process.

National Leadership in Transit Research

If the tone of our 2008 letter report suggested frustration, it stemmed from a concern that our earlier recommendations had prompted few substantive changes in the strategic planning process. Our meetings with FTA during 2008, however, revealed considerable progress by FTA in positioning itself as the national leader in transit R&D. We believe that FTA now fully recognizes its unique ability to provide national leadership and is intent on fulfilling this role. The updated strategic R&D plan will allow the agency to define how it intends to lead the transit and research communities in establishing and prioritizing research goals, developing quantifiable objectives and targets for furthering these goals, and marshaling the necessary resources from within and outside the federal government. As we have noted in the past, fulfillment of this role will require the identification of the major actors in the transit and research communities and well-defined strategies for engaging them so that critical research needs are addressed by the full range of public and private R&D capabilities.

We believe that the agency now envisions itself as having a broader and more active national R&D role than simply administering its own R&D resources. We thus await the updated version of the strategic R&D plan and are encouraged by signs of a reinvigorated planning process that is generally headed in the right direction.

Earmarking of Federal Transit R&D Funds

The Multiyear Research Program Plan for 2009–2013 clearly distinguishes the federal R&D resources expended on transit-relevant research from those expended on activities that involve little, if any, R&D. Most of the latter activities are earmarked in legislation, although some are programmed by FTA through use of its discretionary R&D funds. Consequently, FTA's R&D staff is burdened with the administration of numerous projects that are not transit R&D, while total resources available for research are diminishing. We have repeatedly urged such reporting transparency and commend FTA for making this information available, which is essential for informed policy making.

The strategic R&D plan should provide an even clearer context for assessing the effects of earmarking on FTA's ability to further critical R&D goals. Although we suspect that the effects have been detrimental, our suspicion is more difficult to prove absent a plan outlining how FTA would have used the resources more efficiently. We do not expect earmarks to vanish, but we believe that such a well-conceived plan would help legislators align earmarks more closely with the nation's transit research needs. To serve in this capacity, the strategic R&D plan must be clear, concise, and understandable to Congress and others responsible for allocating transit R&D resources. We assume that the more detailed portfolio plans, such as the aforementioned electric drive strategic plan, will provide the basis for many of the priorities and actions articulated in an updated strategic R&D plan, which will make for a more convincing document.

Indeed, the electric drive plan demonstrates how high-level objectives can be developed into a clear research program against which the value of earmarked projects can be assessed. FTA administers a number of earmarked electric drive R&D projects. We note, however, that the detailed electric drive strategic plan took many months to develop and has yet to be followed by plans for other portfolio subject areas. A detailed set of portfolio plans would be valuable in buttressing the updated strategic R&D plan and in informing ensuing legislation and resource allocations. Our concern is that a similar effort for other portfolios will take an unacceptably long period of several years and thereby limit the potential of the plans to influence the priorities in the updated strategic R&D plan and to inform decisions. Thus, we urge an acceleration of the portfolio plan development process. We understand the reasons for developing the electric drive plan first. To ensure timeliness, however, subsequent portfolio plans should cover the areas of highest priority first and limit the amount of detail to that needed to inform high-level decisions.

As part of the portfolio development structure set out in Figure 1, FTA intends to establish a formal project review and selection process. The process, which is diagrammed in Figure 4, is still being worked through. After we learn more about the

individual elements, we will be able to comment on the specifics of the process. We expect the process to refer to research elsewhere and to coordinate with other transit research programs such as the Transit Cooperative Research Program. We also expect that priority will be given to developing a rigorous process for project review and selection and to ensuring that earmarked projects are subject to the review along with discretionary projects. Although application of this review process to existing earmarks will not affect them, it will provide a clearer demonstration of the implications, good and bad, of earmarking in meeting national transit research goals. FTA will thus be in a better position to assist legislators in understanding how best to use earmarking to promote the national interest.

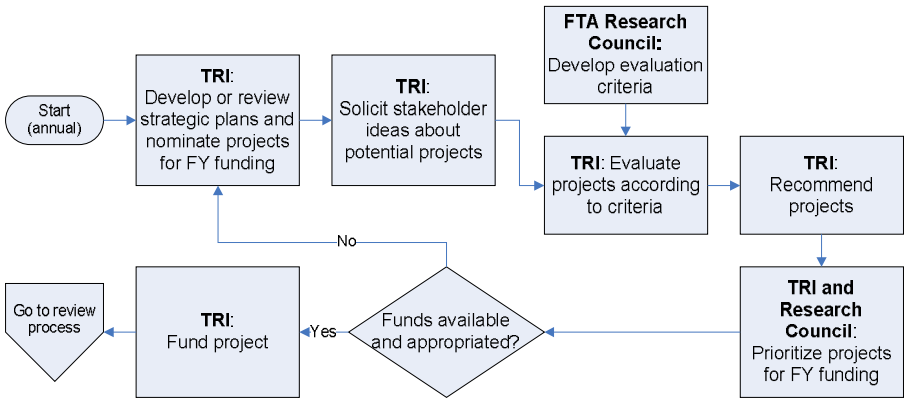

FIGURE 4 FTA's proposed R&D project selection process. [TRI (Technology, Research, and Innovation) is the abbreviation used within FTA for its R&D Office.]

Establishment of R&D Needs and Priorities

The electric drive strategic plan, combined with similar plans for other portfolio areas, will provide a clearer picture of specific research needs in relation to the goals set forth in a strategic R&D plan. A collection of portfolio plans, however, will not articulate

program priorities, the rationale for the priorities, or the means by which balance is achieved in addressing them. Inasmuch as the Multiyear Research Program Plan for 2009–2013 sets out current and proposed research tasks in relation to the strategic goals, it is a step in this direction. The elaboration of priorities, however, is a central purpose of the strategic R&D plan. We believe that the updated strategic plan should clearly indicate priorities, relate them to external research activities as well as the research supported by FTA, and connect the strategic goals and higher-level objectives to the kind of targets and tasks set forth in the portfolio plans.

Advice on Portfolio Plans

The electric drive strategic plan is the first example of an elaboration for one area of the strategic R&D plan intended to define research needs and priorities. We were thus invited to consider this plan as a prototype for the plans being developed in other portfolio areas. Having done this, we offer the following comments:

1. It is not evident to us why electric drive is one of a select number of FTA research portfolios. The plan did not try to make a convincing case that this topic deserves more attention than other technological and nontechnological means of achieving reductions in bus emissions and energy use. While electric drive may be an area of research deserving significant national attention, it is not comparable in character and scope with some of the other portfolio subjects, such as transit safety, operations, and infrastructure. These portfolios encompass broader areas of interest and cover multiple research needs and potential technology solutions. Electric drive is more aptly characterized as a technology path that fits into one or more broader subject areas such as the proposed sustainability portfolio or portfolios that might be created to address energy and environmental issues. In principle, we support the concept of grouping the scores of research projects into portfolios that have measurable targets linked to strategic goals and objectives. Careful consideration, however, must be given to establishing a logical framework. Some areas of current research, for example, do not appear among the portfolios, such as transit

security, environment, and workforce development. Other portfolios, such as those addressing sustainability and institutional issues, are poorly defined and risk becoming "catch-alls" for diverse initiatives ill-suited to targets and other means of guidance and judging performance. In addition, two of the portfolios cover the rail and bus modes, which will undoubtedly overlap with other portfolios such as infrastructure, safety, and operations. We recognize that there will always be some overlap and gaps in portfolios and that subject matter will change on the basis of changing research needs and priorities. As a general matter, we favor a more robust structuring of portfolios into broader subject areas as opposed to specific technologies, modes, and topics of interest.

2. The setting out of specific targets and estimations of potential costs and benefits of achieving them through various means are important elements of plans to prioritize research. While targets must be ambitious, they must also be realistic to attract and make good use of limited research funds. This requires estimating the costs associated with different avenues of research and the implementation of anticipated research results. For example, the electric drive strategic plan envisions commercial availability of buses having zero and near-zero emissions by 2030. Such a target may be sensible, but the information provided in the plan does not allow us to judge whether that is the case. We do not know how this vision was decided upon or whether it has been carefully assessed for cost and feasibility in relation to other conceivable outcomes such as a 50 percent reduction in emissions. This leaves us wondering whether more modest, but still ambitious, targets for emissions reductions would be more practical and achievable in a timely manner, and thus potentially more cost-effective. The information to answer this question should be in the plan. Such rigorous assessments of targets are crucial in ensuring effective use of research resources and in attracting R&D partners from industry, transit agencies, and elsewhere in government.
3. With regard to the electric drive plan, we observe a potential imbalance in the relatively early expectations for demonstration and deployment activity (see Figure 3). Demonstration projects can be expensive endeavors that should not

proceed until research and analysis indicate that such expense is warranted. The demonstrations should be viewed as part of the learning process, and thus they should be designed to inform follow-on research and subsequent decisions about deployment. An iterative process of research, analysis, and modest demonstrations may be required long before full-scale demonstration and deployment activities are warranted. In the development of all subsequent portfolio plans, research and analysis should be viewed as critical steps in the R&D process. They should not be viewed as perfunctory exercises but as vital in informing decisions about whether and how to proceed in developing technologies and perhaps staging demonstrations.

4. The electric drive strategic plan needs further elaboration with respect to the research, development, and deployment roles of universities, industry, and other federal agencies. FTA cannot support all research in this area and has even less responsibility for implementation. There is little mention in the plan concerning the engagement of these potential contributors and other stakeholders in the process. Stating that stakeholders will be engaged is not enough; the plan must define who will be engaged and in what manner. We make this observation in reference to the electric drive plan, but applying it to all research programs will help avoid duplication of effort, leverage resources and strengths, and ensure that important research needs are identified and addressed. In general, all plans should define the respective roles and responsibilities of relevant contributors in the research community and industry, including the international community. Plans must state when it is necessary to draw on experts and interests from outside the transit sector to ensure research credibility and accuracy—for example, with respect to research on how transit integrates with other modes, land use policy, and environmental impacts, which are the kind of topics one might expect in the sustainability portfolio.

Concluding Remarks

Although we have expressed concerns and offered what we believe is constructive advice in this report, we are encouraged by the progress in developing a strategic R&D

planning process. It is our impression that the strategic planning process is heading in a direction that will establish FTA as the national leader in transit R&D. The process will help ensure that the limited federal resources for R&D are used wisely and in the areas of greatest need, enabling FTA to take a more active role in informing the R&D funding allocations in legislation reauthorizing the federal transit program.

Whether the strategic planning process will yield an end product that achieves the outcomes outlined in this report in a timely manner remains to be seen, but we have high expectations. We urge FTA to consider establishing a schedule for regularly updating the strategic R&D plan and for synchronizing these updates as much as possible with the information needs of decision makers both within and outside FTA, including Congress. The schedule of updates may accommodate reauthorization of the national transit program, changes in administration, or the normal amount of time between significant changes in program priorities. To ensure that the plan remains a living, guiding document, careful consideration must be given to this schedule.

We appreciate the opportunity to comment on the strategic planning process as it proceeds and anticipate commenting on the plans of the portfolio areas as they are developed. The members of TRAC look forward to discussing this report with you and other FTA officials and to continued progress in this important area.

Sincerely,

J. Barry Barker, Chair
Transit Research Analysis Committee

cc: Matthew Welbes, Executive Director, FTA
Enclosure: committee membership

ENCLOSURE

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