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Credit-Based Value Pricing in Texas: An Examination of the Issues

Market pricing has successfully been employed in many industries to regulate the demand for goods and services during periods of peak usage. Based on the findings from a small list of implemented congestion pricing — or “value pricing” — projects in transportation, market forces also have the potential to significantly improve the efficient use of the transportation system.

The use of traveler credits is an innovative method of value pricing that could potentially solve several transportation problems, such as traffic congestion and excessive vehicle emissions, while also overcoming equity concerns. This value pricing application, termed credit-based value pricing (CBVP), would involve travelers receiving an allocation of travel credits every period. Different travel behaviors would then cost the traveler

different numbers of credits depending upon certain predetermined factors such as the level of congestion, the time of travel, the mode of travel, and/or the route chosen. Travelers frequently choosing high-cost credit trips (for example, driving alone on a congested freeway during rush hour) would find themselves short of credits prior to the next period and would need to purchase additional credits from travelers choosing

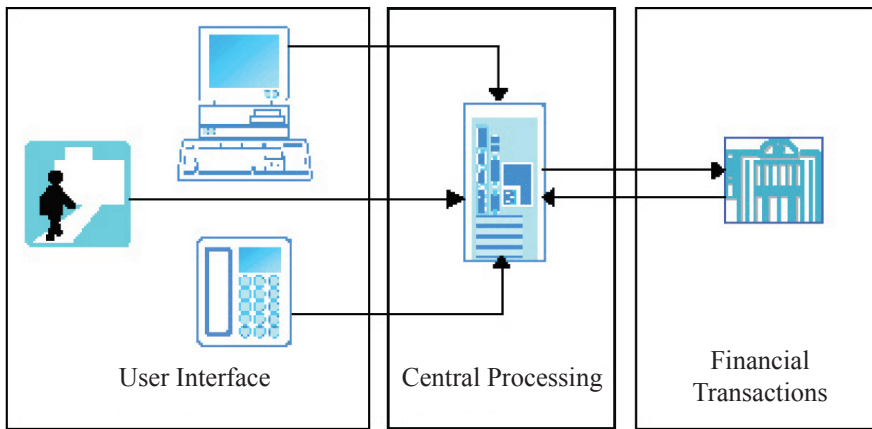
low-cost credit options (for example, transit trips).

Travelers would have several options on how to purchase credits from the toll authority in charge of the CBVP program (see transaction diagram). The system would operate in much the same way as a toll road with electronic toll collection except the cost of the credits would be set in a free market system (much like a stock



Possible Toll Display for CBVP.





Administration of a Sample CBVP Transaction.

market) by the buyers and sellers. The toll authority would have the option of operating this free market system or allowing a brokerage house to operate the system, likely for a small fee per transaction. In the example shown in [Table 1](#), the last sale — and therefore the current market price — occurred at \$0.57. Also shown is the highest bid, or the maximum someone is willing to spend to purchase credits at this moment, which is \$0.54 per credit, and that person is willing to purchase 10 credits. The lowest anyone is willing to sell a credit for is \$0.61. Therefore, no trading is occurring at this moment. For a trade to occur the highest bid must be at least as high as the lowest offer (similar to a stock exchange).

What We Did...

This project investigated the technical feasibility, political feasibility, economic issues, and administrative issues associated with implementing CBVP for different scenarios. These scenarios varied based on size of the application and the following

agency goals: congestion relief, increased person movement, emissions reduction, social equity, and construction/expansion of a highway.

Using a qualitative screening process, researchers narrowed the investigation to two scenarios with the highest likelihood of implementation:

1. Single-facility application with a goal of congestion relief: The number of credits required to travel on a congested facility would vary with the amount of congestion on the facility.
2. Single-facility application with a goal of construction/expansion: To pay for construction of a new highway or expansion of an existing highway, travelers would have to purchase credits from the toll authority (in the other scenarios the initial allocation of credits may be provided free of charge). The number of credits required for travel would likely vary in much the same way as in the congestion relief scenario.

In order to examine the feasibility of CBVP for the two most likely implementation scenarios, the research team performed the following tasks:

- reviewed tradable credit systems in the environmental industry for application to a CBVP scenario,
- explored technology options and associated costs,
- investigated administrative and operating issues and potential costs,
- analyzed the economic operational characteristics and travel behavior impacts of CBVP, and
- conducted focus groups of general travelers and interviews of politicians to assess political viability.

What We Found...

The technology exists today to implement either of the two primary scenarios. Either electronic toll collection (ETC) or global positioning systems (GPS) would provide the most logical charging and tracking mechanism. Additionally, the costs of the technologies are decreasing, and an increasing percentage of vehicles have GPS factory installed. Administratively, there are some challenging issues to overcome; however, none would be impossible. The greater the complexity of the system in terms of the stratification of



Table 1. Credits Required for Travel—Eastbound.

Time of Day	Automobile	Transit
Midnight to 7 am	3	1
7 am to 9 am	8	2
9 am to Noon	5	1
Noon to Midnight	4	1

Credit Pricing:
Last Sale: 15 credits at \$0.57
Highest Bid: 10 credits at \$0.54
Lowest Offer: 20 credits at \$0.61

credit transactions, the higher the operating costs. From an economics standpoint, this form of value pricing can be shown to increase net societal benefits and the efficient use of the highway facility.

However, this form of value pricing is unlikely to overcome opposition from travelers and politicians alike. Through input received in the focus groups, it was not surprising to find drivers were opposed to the idea of CBVP — particularly due to its complexity. The requirement that drivers buy and sell credits and therefore “think about their driving behavior” required too much effort and advanced planning. If financing methods other than the gas tax are necessary, then tolls were accepted. Even the use of variable tolls was more palatable to the focus group participants than CBVP.

The irony exists in that while creating a more complex value

pricing program capable of overcoming many of the traditional obstacles to implementation, the complexity of the scheme itself becomes an insurmountable obstacle. CBVP would require users to think about optimizing their travel behavior based on their value of time and preferred arrival and departure times. Although this approach may optimize user benefits, it also requires considerable effort on the part of each traveler — more effort than travelers are willing to spend.

The Researchers Recommend...

The radical change from current operations and, more importantly, the level of effort that would be required by travelers in terms of advanced trip planning and personal credit accounting make the CBVP scenarios examined here an idea that would be politically challenging to implement. Future CBVP

research and implementation efforts looking at a tradable credit system should devote considerable effort to exploring methods and technologies that would simplify the individual traveler’s effort in trip planning and credit accounting, and to methods for outreach and communication of the concept to political stakeholders and the general public.

A simpler version of CBVP, possibly one which would have the agency sell credits at a set price, might be more palatable to travelers. However, simpler forms of CBVP would reduce many of the societal and equity benefits derived from the CBVP scenarios examined here. Therefore, the researchers recommend focusing on more traditional forms of value pricing for use on Texas roadways — with particular attention devoted to equity concerns.



For More Details . . .

The research for this project is documented in Report 4119-1, *Examining the Feasibility of Credit-Based Value Pricing in Texas*.

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TxDOT Implementation Status—November 2003

The researchers were very thorough in investigating the feasibility of credit-based value pricing (CBVP).

Although focus groups conducted by TTI revealed significant challenges with implementing a CBVP program, TxDOT is continuing to explore its potential. Currently, TxDOT is conducting another research project (0-4634, *Application of Credit-Based Congestion Pricing in Texas: Operational Considerations and Impacts*) that will investigate optimal approaches of implementing credit-based value pricing from technological and operational perspectives. This two-year study is scheduled for completion in August 2005.

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