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Toll-managed lane pioneers: Lessons from five US states

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ABSTRACT

Toll-managed lanes have become an increasingly popular technique among transportation policymakers for managing congestion on existing highways and, in some cases, financing the construction of new lanes in congested urban corridors. Although growing in popularity, the adoption of these facilities is concentrated in five states: Texas, California, Colorado, Minnesota, and Florida. This paper examines the adoption and utilization of toll-managed lanes in these pioneer states. Using archival, case-based research, our analysis suggests that the adoption of toll-managed lanes was driven by a combination of factors, including rapid population growth, near or above average growth in vehicle miles traveled (VMT), and insufficient gas tax funding for transportation investments. Implementation was also generally similar across states but some of the pioneers delegated the management of their toll-managed lane programs to special regional highway authorities while others used state highway agencies.

1. Introduction

Toll-managed lanes are lanes which operate adjacent to the general-purpose lanes of an expressway to optimize traffic capacity, free flow speeds, and/or trip reliability (FHWA, 2012; FHWA, 2017b). Access to toll-managed lanes is usually restricted by vehicle type and/or occupancy, special lane entrances and exits (e.g. express, contraflow or reversible), and tolls/congestion charges which vary according to traffic patterns throughout the day.

Toll-managed lanes typically take one of two distinct forms. The first type utilizes tolling largely to regulate congestion rather than to finance facility expansion. This type is often the product of the conversion of existing and underutilized High Occupancy Vehicle (HOV) lanes to High Occupancy Toll (HOT) lanes. Used to primarily manage congestion, these HOT lane conversions restrict access to toll-paying motorists and high occupancy vehicles, such as carpools or buses, who received a toll discount or exemption.

The second type of toll-managed lanes are designed to raise revenue to finance lane construction as well as control congestion. These toll-managed lanes typically do not allow high-occupancy vehicles discounted or free access to the lanes. Moreover, because purpose-built managed lanes are usually very costly, private concessionaires are sometimes contracted via public-private partnerships (PPPs) to build, finance, and operate these facilities for a fixed term, usually of 30–50 years (FHWA, 2016a). In either form, toll-managed lanes that are appropriately planned and implemented can reduce congestion and deliver faster travel times.

The congestion-relief benefits of toll-managed lanes were first demonstrated in the US when the State Route (SR)-91 Express Lanes in California opened in the early 1990s. Although the concept of tolling lanes had already been around for decades, SR-91 kindled the interest in managed lanes as viable, toll-based congestion management technique. After California's legislature passed legislation in 1989 which enabled California's Department of Transportation (Caltrans) to contract with private concessionaires and collect tolls from motorists on expressways, SR-91 was built by private investors alongside and within the existing right-of-way of the SR-91 freeway. The $125 million, ten-mile facility was awarded by the State of California as a build, own, operate concession for 35 years. The original contract prohibited adding capacity to the adjacent SR-91 facility in an effort to eliminate competition. This lead to the buyout of investors by Orange County before the contract termed but the SR-91 managed lanes generated, at their peak, upwards of $40 million in revenue per year.

Since the opening of SR-91, transportation policy makers across the United States have increasingly used toll-managed lanes to improve the use of road capacity on existing expressways and/or finance the construction of new lanes in congested urban corridors (Poole, 2014; Fitch Ratings, 2018) . While only two additional managed lane projects were

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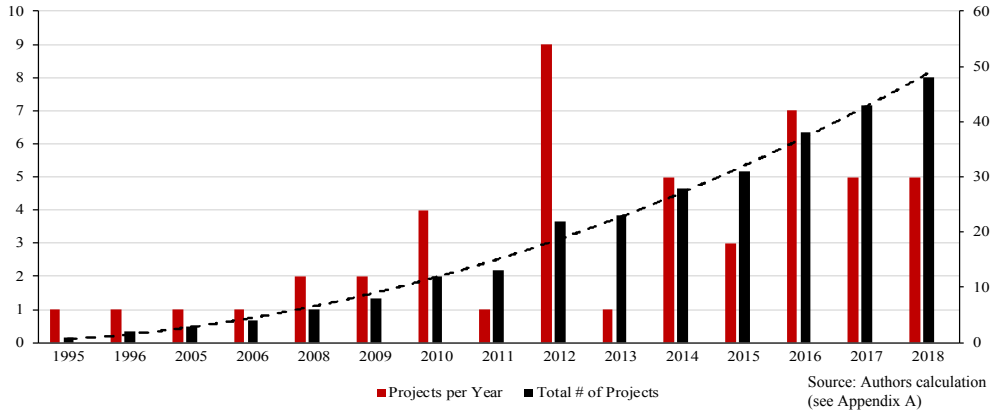

Fig. 1. HOT Lane Facility Openings in US (1995–2018).

deployed in the United States within the first ten years after the opening of SR-91, by 2010, the number in operation had increased to nine. By 2018, this number had exploded to 48 (see Fig. 1).

To date, many more projects are currently in planning or under construction (see Appendix A).

Additionally, the early adoption of managed lane facilities was primarily concentrated in five states: namely Texas, California, Colorado, Florida, and Minnesota (see e.g. TRB, 2019). As the utilization of managed lanes expands to other states, it is important to reflect on how these five pioneer states embraced the managed lane concept. In this paper, we thus aim to address the following research question:

(1) What economic, political, and social factors motivated the adoption of toll-managed lanes in these pioneer states?

In the following section, we begin with a brief history of toll-managed lanes in the United States. Next, we examine the adoption of toll-managed lanes in the five pioneer states. Finally, we provide a short discussion of the similarities and differences in toll-managed lane implementation among these states (Figs. 2–6).

2. A Brief history of toll-managed lanes

For almost a century, federal and state motor fuel taxes have been the major source of funding for highway construction and maintenance. In 1956, Congress established the Interstate and Defense Highway System, a road network of 32,000 miles to be built and maintained by the states with the inducement of federal grants to cover 90 percent of the construction cost. The grants were funded by a federal tax on fuels, and Congress prohibited the states from collecting tolls on the Interstates on the grounds that motorists had already paid for them through the federal fuels tax. The only exceptions were roughly a dozen toll roads in the East that were grandfathered into the Interstate System. At the state level, there was also popular resistance to tolling state highways that were not part of the Interstate System on similar grounds.

As traffic increased on the Interstate System, transportation policy makers began deploying HOV lanes to manage growing congestion. While HOV facilities were first deployed in World War II as part of a fuel rationing program, they did not reappear until the energy crises of the early 1970s as exclusive bus lanes (FHWA 2016b, 2017a). The pioneers included a bus-only lane on the Shirley Highway in northern Virginia and contra-flow bus lanes on the approaches to the Lincoln Tunnel between New York and New Jersey. In many cases, the bus lanes increased public transit ridership, as intended, but not enough to use more than a small fraction of the lane's vehicle carrying capacity. Motorists stuck in the congested general-purpose lanes were often angered to observe only a few buses per minute whiz by in the adjacent

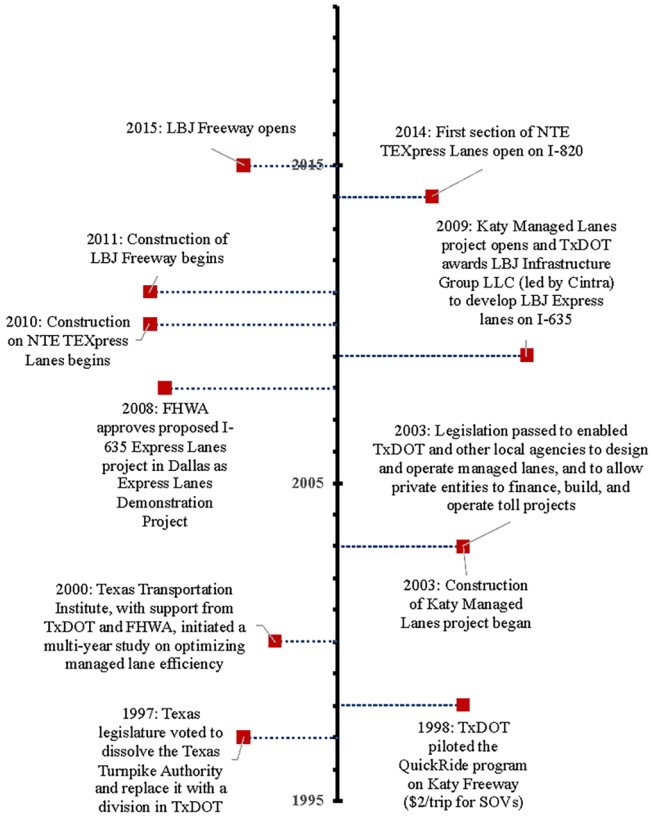

Fig. 2. Texas' Initial Managed Lane Milestones.

bus lane. To improve utilization, the bus lanes were initially opened to carpools of three or more people (HOV3+) and later, if there was still capacity, to carpools of two or more (HOV2+). These changes saw "many HOV lanes outperform adjacent general-purpose highway lanes in terms of person throughput, especially during peak hours of service" (FHWA 2017a, 1-1). However, large portions of America's 2500 lane-mile HOV network still experienced "mild to severe underutilization or overcrowding or both, depending of prevailing traffic conditions" (FHWA 2017a, 2-1).

With HOV lanes "not meet[ing] expectations about congestion relief benefits," interest in tolling revived in the 1980s and 1990s (FHWA 2017a, 1-1). By then, the Interstate System was essentially complete but state and local governments were looking for sources of revenue to fund the rehabilitation of older segments as well as the extension of expressways to areas where the original Interstate planners had not anticipated development. Anti-tax sentiment in the 1980s made it