EXAMPLE

A Traffic Thermostat for Texans

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Texas Department of Transportation

The more automated the management process for a system, the more efficient the system—that's the general rule. This even applies to your home's air conditioner, which uses a thermostat to automatically regulate the temperature in your home.

But what if the thermostat wasn't there? You'd have to actively monitor the thermometer to keep the temperature where you wanted it. While it's possible to cool your home that way, it's not very efficient. You'd likely spend a lot of time gathering input from family members before changing the temperature and paying a higher electric bill to boot. Fortunately, there's no need for that—the thermostat adjusts the system to maintain the temperature you set.

TxDOT has developed a similar kind of thermostat for regulating the operating conditions of transportation facilities. This FAQsheet will describe how agencies responsible for managing different types of facilities can use this "Traffic Thermostat" to adjust traffic as needed to meet the community's mobility goals.

"Managed lanes" is a generic term for lanes proactively operated to achieve a pre-determined level of performance; HOV lanes, HOT lanes and express toll lanes are examples of managed lanes.

High Occupancy Vehicle (HOV) lanes are primarily reserved for carpools, buses and motorcycles in Texas.

High Occupancy/Toll (HOT) lanes are HOV lanes that also allow lower occupant vehicles to use the lane for a toll.

Toll roads are open to all travelers who pay a toll to use the lanes.

What's the best way to manage facility operations?

As facilities are being designed and constructed, it's important to think about ensuring their mobility and performance goals. Some decisions, like setting toll rates, can be controversial. Moreover, facility demands are likely to change over time as traffic volumes increase. To meet performance goals, operators sometimes need to adjust facility operations. For example, say that speeds on a HOT lane drop to stop-and-go conditions in the rush hour. To restore the travel time advantage between the HOT and mainlanes, the price for traveling in the HOT lane during rush hours should rise (to reduce the volume of commuters willing to pay the higher toll). If commuters know this ahead of time and understand the benefits of a price increase, operators can meet customer needs within the policy guidelines developed with community input.

When you program the thermostat in your home, you decide what temperature you want and how much you're willing to pay to maintain it. The Traffic Thermostat helps regulate the traffic "temperature" along roadways. It uses performance goals to help facility operators determine how to ensure the best performance. Just like you set the temperature in your home, policy-makers set mobility goals for a facility based on community input.

Change is inevitable; we've built roadways in urban areas that become gridlocked during peak periods. The lesson learned is that we need to better manage and operate roadways as conditions change over time. The Traffic Thermostat helps facility operators do just that.

Why are these kinds of transportation facilities important to Texas?

Texas has used innovative transportation facilities like HOV lanes, HOT lanes, toll roads, and managed lanes to meet its mobility needs for decades. For example, Dallas-Fort Worth first initiated its toll roads with the completion of the Dallas-Fort Worth Turnpike in 1957. This facility and others — like the Central Texas Turnpike Project in the Austin area and Loop 49 in Tyler — charge the same toll for the same type of vehicle, regardless of how many people are in the vehicle or the road's congestion level. In other facilities, varying the toll rate during rush hour or for carpools, for example, provides the most people with the best service. This concept is known as "variable pricing." In addition, toll revenues can help pay for the facilities themselves.

What is performance management?

You might not realize it, but your home thermostat is a "performance management" tool. In transportation terms, performance management involves the active monitoring and adjustment of a facility's operating procedures to ensure that the facility meets its performance goals. With an increased focus on customer satisfaction and declining revenues, departments of transportation and other agencies are adopting performance management to improve the effectiveness of their operations. Used system wide and on a facility basis, performance management guides agencies in monitoring performance, and adjusting operations, if needed, to achieve the goals.

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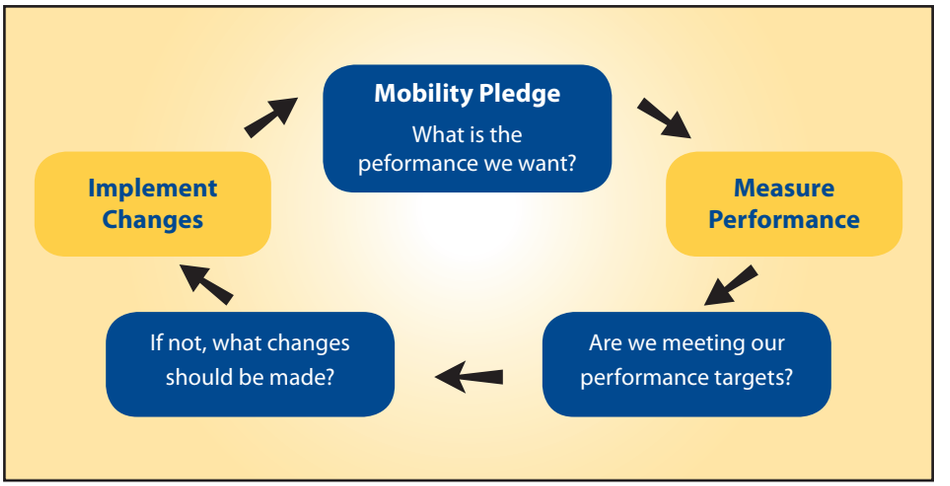
What are performance measures?

Managed transportation facilities are very complex, from both policy and operational standpoints. Understanding how these facilities function to serve their customers is important for their continuous improvement. Creating a set of standards, or "performance measures," allows operators to identify and implement opportunities for improvement. For example, projecting how increased traffic volume will affect a facility's performance can help operators achieve the community's performance goals.

Some examples of performance measures include

- the number of cars using the facility,
- the number of buses using the facility,
- the amount of toll revenue collected,
- travel time, and
- travel-time reliability.



The Traffic Thermostat empowers transportation operators to better serve Texans.

What is the purpose of the Traffic Thermostat?

Like the thermostat regulating your home, the Traffic Thermostat allows a facility to meet changing conditions while meeting the needs of customers. One advantage to using pre-established guidelines is that the process for changing the price or other operational parameters becomes more efficient and transparent, both to policy-makers and the traveling public. The Traffic Thermostat guides the decision-making process for managing transportation facilities, thereby lessening the need for a new policy discussion each time operational changes are needed.

Why are performance measures important to serving customers?

Defining the factors to measure a facility's performance and specifying what parameters trigger operational changes help policy-makers and the public anticipate how facility operations change over time. Performance indicators can help maintain long-term management strategies defined by policy-makers while guiding operators to effectively implement day-to-day changes consistent with community needs.

The Traffic Thermostat is a user-friendly tool that allows communities to use performance management techniques, such as variable pricing, to achieve better performance from their facilities.

How does the Traffic Thermostat use performance measures?

Operators establish a set of performance measures that must be met to achieve established goals. The managing agency determines what data needs collecting, how often it will be collected, and what thresholds, or triggers, should be established to alert operators to potential problems. When the facility's performance does not meet an established threshold, operators implement steps to return service to goal levels. For example, if a toll road has a goal to remain congestion free and, yet, stop-and-go traffic occurs regularly, operators will use the Traffic Thermostat to determine the appropriate solution to the problem.

What happens if a facility's performance falls below established goals?

When your house gets too warm, the thermostat turns on the air conditioning to cool it off. Likewise, if the performance of a facility drops below predetermined thresholds (or triggers) operators are alerted to the need for a solution. If an operational aspect of the facility isn't meeting its predetermined goal, operators use the Traffic Thermostat to conduct an analysis.

Solutions might include:

- increasing or decreasing price,
- changing the number of people required in a vehicle,
- changing the type of users allowed on the facility,
- increasing public outreach, and/or
- increasing enforcement.

The choices will depend on both the results of data analysis and the priority of a given goal for a facility, as determined by policy-makers and their community.

How does the Traffic Thermostat benefit me?

Conditions change. When an agency has an established performance management program and decision-making protocols in place, changes in operations are pre-planned and transparent. Customers know what to expect, policy-makers have considered the effect of changes in advance, and operators understand the community context for their actions. The Traffic Thermostat helps identify and seamlessly implement agreed-upon operational solutions to remedy problems, thereby providing smoother commutes for all Texans.