FHWA Performance Reporting
Part one of two
Final Report

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1.0 Introduction

For public agencies, the ability to connect to and communicate with the public is no longer a "good" thing to do, it is an absolute necessity if the public agency is to develop and retain the credibility that is critical to accomplishing its mission. The public may not use the same language as transportation professionals, but performance is what the public cares about. The key questions they want answered are, what is being spent and what has it bought? Has there been an improvement and is it an improvement that matters? While there are many formats for presenting answers to these questions – text, spreadsheets, graphs, even pictures – the complicated trick is getting it right. This is information design; when information design is done well, it grabs attention and educates more effectively than other approaches.

The Federal Highway Administration (FHWA) has been working for several years to prepare their organization – as well as state departments of transportation (DOT) and metropolitan planning organizations (MPO) – for transitioning to performance management of the Federal program. The FHWA is working with the American Association of State Highway and Transportation Officials (AASHTO) and its Standing Committee on Performance Management (SCOPM) in a coordinated effort to define the limited number of measures appropriate for a national performance system. The FHWA also has created a partnership with the Federal Transit Administration (FTA), the American Public Transit Association (APTA), the National Association of Regional Councils (NARC), the Association of Metropolitan Planning Organizations (AMPO), and AASHTO to host three very effective national workshops that have been used to define a performance-based planning and programming process. The partnership is now engaged in holding regional workshops to continue the process of preparing DOTs and MPOs for transitioning to a performance management system.

With Congress' recent passage of Moving Ahead for Progress in the 21st Century (MAP-21) and its numerous performance reporting requirements, one critical next step on the path of fully implementing a national performance program is to build the foundation for national performance reporting. Effective communication of performance data – engaging audiences, promoting understanding, improving decisionmaking – is essential if the reporting of performance data is to result in *improving* performance. Converting findings to action is the ultimate purpose of a performance reporting system and this foundational project starts us down that path.

FHWA has initiated the Performance Reports Project to build the foundation of a performance reporting system. A performance-driven approach focuses attention on results and puts the tools in place so that FHWA, transportation stakeholders,

elected officials and the public can determine if FHWA's stated goals of providing a safe, reliable, sustainable highway system are being met.

The Final Report for the FHWA Performance Reports is divided into two parts. In Part I (this document), the study team looks at keys to reaching an audience, summarizes audience responses to transportation performance reports, and concludes with a recommended model for performance reporting. Part II of the Final Report covers issues internal to FHWA including methods to expand performance reporting for internal purposes, an assessment of current performance reporting assets and effectiveness, and a phased performance reports implementation plan.

2.0 Keys to Effectively Reaching an Audience

This Section summarizes some of the existing research that can support FHWA performance reporting. It includes a review of audience engagement strategies, including theories of successful engagement approaches as well as a review of successful visualization techniques. Then, we look at where the general public has displayed interest in transportation. We review some of the current best practices for performance reporting in transportation, which can be used as a model or as a stepping stone for this project. Then we expand the scope of our search to include other performance reporting models in different industries. Finally, we summarize the lessons that this research provides about how best to build performance reports that fit FHWA's needs and reach a national audience.

2.1 AUDIENCE ENGAGEMENT STRATEGIES

Guiding Principles in Data Visualization

An important component of presenting data to an audience is that the graphic design and visualization of data should berelevant to its viewers. The successful engagement of varying audiences in transportation system performance will require that data is portrayed in a way that is both interesting and easily understandable. The guiding principles of data visualization, summarized by the leading figures in the field, are discussed below.

Edward Tufte

Edward Tufte is widely considered one of the leading scholars in data visualization, and is a vanguard in the field. According to Tufte, graphical displays should accomplish the following:

- Avoid distorting what the data have to say.
- Encourage the eye to compare different pieces of data
- Induce the viewer to think about the substance rather than the methodology, graphic design, or something else.

Tufte is a proponent of maximizing the "data-to-ink ratio," or ensuring that graphics are clear and concise while conveying often complex data and messages. Under this principle, Tufte argues that data graphics should draw the viewer's attention to the sense and substance of the data, not to something else. These themes are especially important to keep in mind when using more

sophisticated visualization techniques, such as the interactive graphics described later in this section.

Tufte's view of graphics is clearly utilitarian in nature: "Occasionally artfulness of design makes a graphic worthy of the Museum of Modern Art, but essentially statistical graphics are instruments to help people reason about quantitative information". While an audience engagement strategy may place certain demands on excitement or entertainment, a flashy graphic will mean nothing if it does not convey the intended message about the data.

Ben Shneiderman

Ben Shneiderman founded the Human Computer Interaction Laboratory at the University of Maryland, one of the leading centers for exploring complex data visually. Shneiderman invented treemaps, a novel style of visualization for hierarchical data. He is the author of numerous books, including *Readings in Information Visualization: Using Vision to Think*, with Stuart Card and Jock Mackinlay.

According to Shneiderman, the mantra for effective visual information discovery is:

- Overview first – provide a high-level view where you can see all the data, including outliers.
- Zoom and filter – allow rapid and dynamic filtering so you can zoom in on areas of interest.
- Details on demand – supply a detailed record so you can identify individual data points or series.

David Nelson and Bradford Hesse

David Nelson and Bradford Hesse are authors of the book *Making Data Talk: Communicating Public Health Data to the Public, Policy Makers, and the Press*. While the book focuses on relaying public health data via text and visualization, many of its premises are applicable to the transportation sector.

Making Data Talk is organized around several main themes. The most relevant of these themes are as follows:

- There needs to be an increased awareness of the many factors and complexities to be considered, and also of the possible choices, when selecting and presenting data.
- Data visualization needs to be used ethically and in such a manner as to maximize impact.
- Selecting and presenting data needs to avoid unintended consequences (e.g., audiences failing to attend to messages, becoming overly fearful or "underconcerned," or misunderstanding a storyline in some other way).

The book offers many guidelines for engaging audiences with data, some of which are detailed later in the recommendations section.

Julie Steele and Noah Iliinsky

In their book *Beautiful Visualization*, Julie Steele and Noah Iliinsky apply the theories of data visualization to practice by examining and critiquing graphics from many sources. After assessing the visual elements of classic, well-known graphics, Steele and Iliinsky conclude that while these visualizations may utilize some familiar visual elements or treatments, they surprise and delight by going beyond the mundane. Most importantly, though, "beautiful" visualizations explicitly reveal the properties and relationships that are inherent and implicit in the source data.

Two examples that the authors cite as beautiful visualizations are Mendelev's periodic table of the elements, and Harry Beck's map of the London Underground. With respect to the periodic table, Steele and Iliinsky assert that it is "absolutely informative, arguably efficient, and was a completely new approach to a problem that previously hadn't had a successful visual solution. For all of these reasons, it may be considered one of the earlier beautiful visualizations of complex data." In the case of the London Underground map, the authors argue that it strips away irrelevant information and is executed with a unique graphical style that is less bound by geography and more oriented toward the logical relationship between current location and the rest of the subway system.

Fernanda Viegas and Martin Wattenberg

Fernanda Viegas and Martin Wattenberg are experts in the field of data visualization for consumers and mass audiences. The two presently work as the co-leaders of Google's "Big Picture" data visualization group. In a recent CNN article entitled "How to make data look sexy." Viegas and Wattenberg note that "Unlike a graph in a book, visualizations on the web are social artifacts. When a visualization can be shared and discussed, it draws more interest. At the same time, a conversation can lead to a deeper understanding of the data as people ask questions and discuss interpretations."

Furthermore, Viegas and Wattenberg assert that grabbing and keeping the attention of a viewer is key to audience engagement with data visualization. They emphasize that even the clearest, most precise graphic communicates nothing if nobody looks at it. With this in mind, these two accomplished graphic designers feel that the best kind of visualization, like the best kind of story, is one you can relate to. When crafting a visualization, its creators might ask the following question: can users see themselves? Viegas and Wattenberg recall a 2009 New York Times feature which showed a graph of unemployment—including not just averages, but letting readers highlight trends by gender, age, education. The title? "The Jobless Rate for People Like You."

Nathan Yau

Nathan Yau is the creator of Flowingdata.com, an online resource for those interested in data visualization, where he assembles successful graphic examples from across the web. Yau is also the author of the book *Visualize This*, which provides a guide to creating successful visualizations.

Yau suggests using visualization as a means of telling a story from an emotional point of view, thus encouraging the viewer to reflect on the data. From his perspective, without an interesting storyline accompanying the data visualization, it is doubtful that audiences will learn from the data, and therefore are unlikely to take action based on it. Therefore it is important that the underlying data story be told, be it through accompanying text or audio.

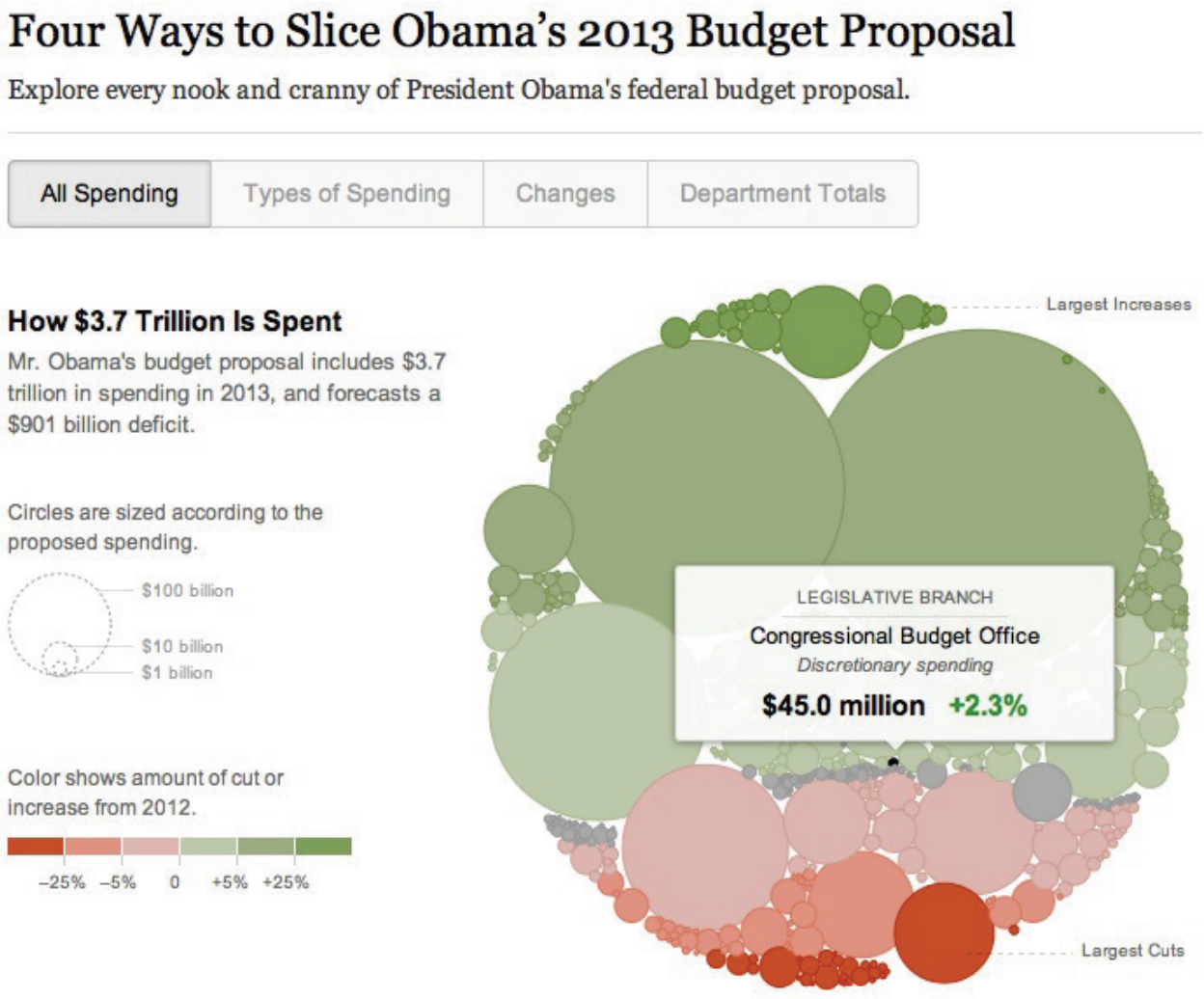
Data Visualization Examples and Resources

Among the various modes of data visualization, three modes are the most widely used: interactive graphic, video/animation, and static graphic. Depending upon the content, context, and budget, one approach might be preferable to another. Below are examples of interactive, video/animation, and static graphics.

Interactive Graphics

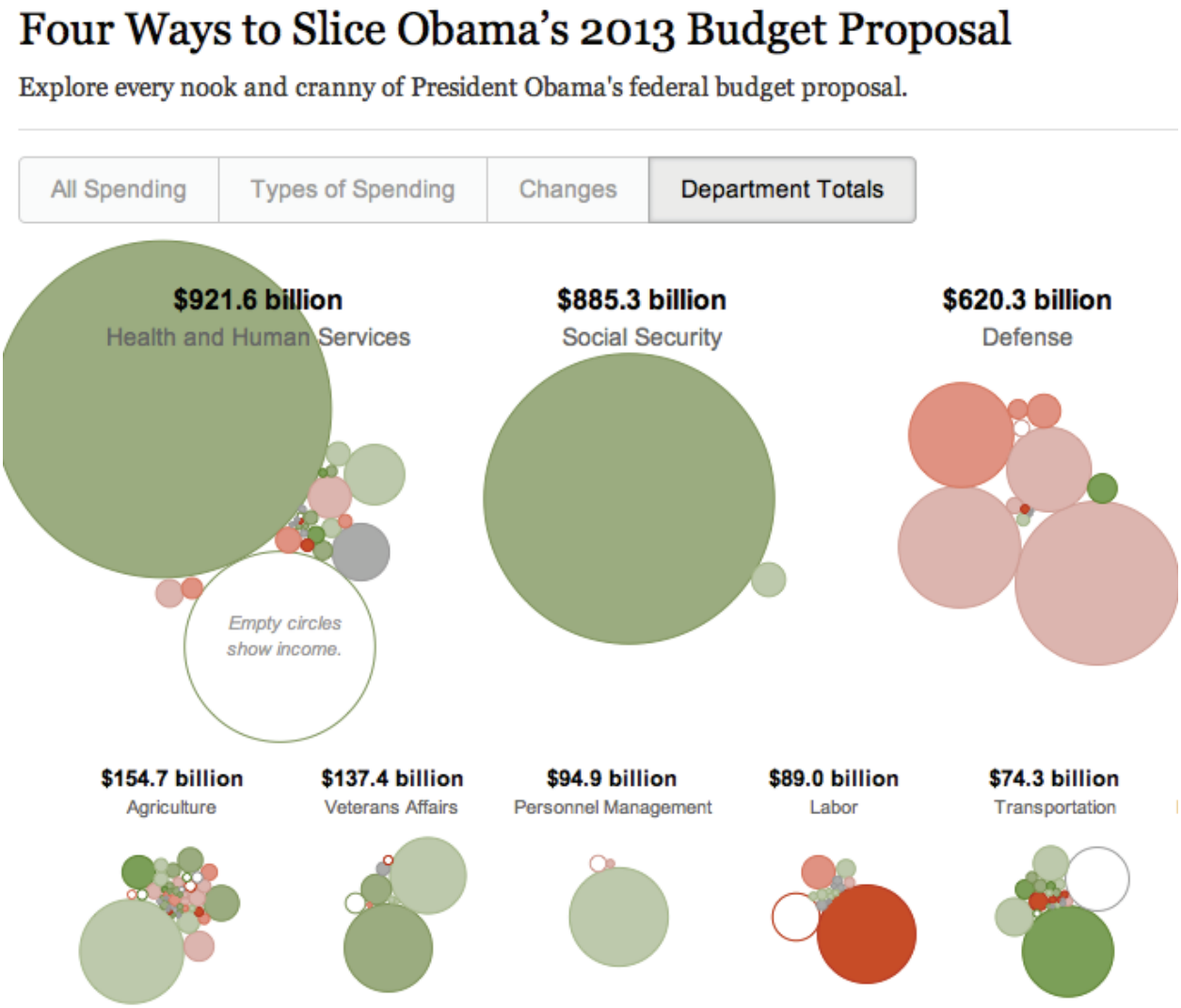
Edward Tufte and others have recognized the *New York Times* as a leader in journalism when it comes to conveying information through visualization and infographics. Many of these visualizations are interactive when accessed via the New York Times website, but also have impressive print versions as well. Below is an example of an effective interactive visualization and an example of an effective visualization that is not interactive.

Figure 2.1 From the *New York Times*, "Four Ways to Slice Obama's 2013 Budget Proposal"



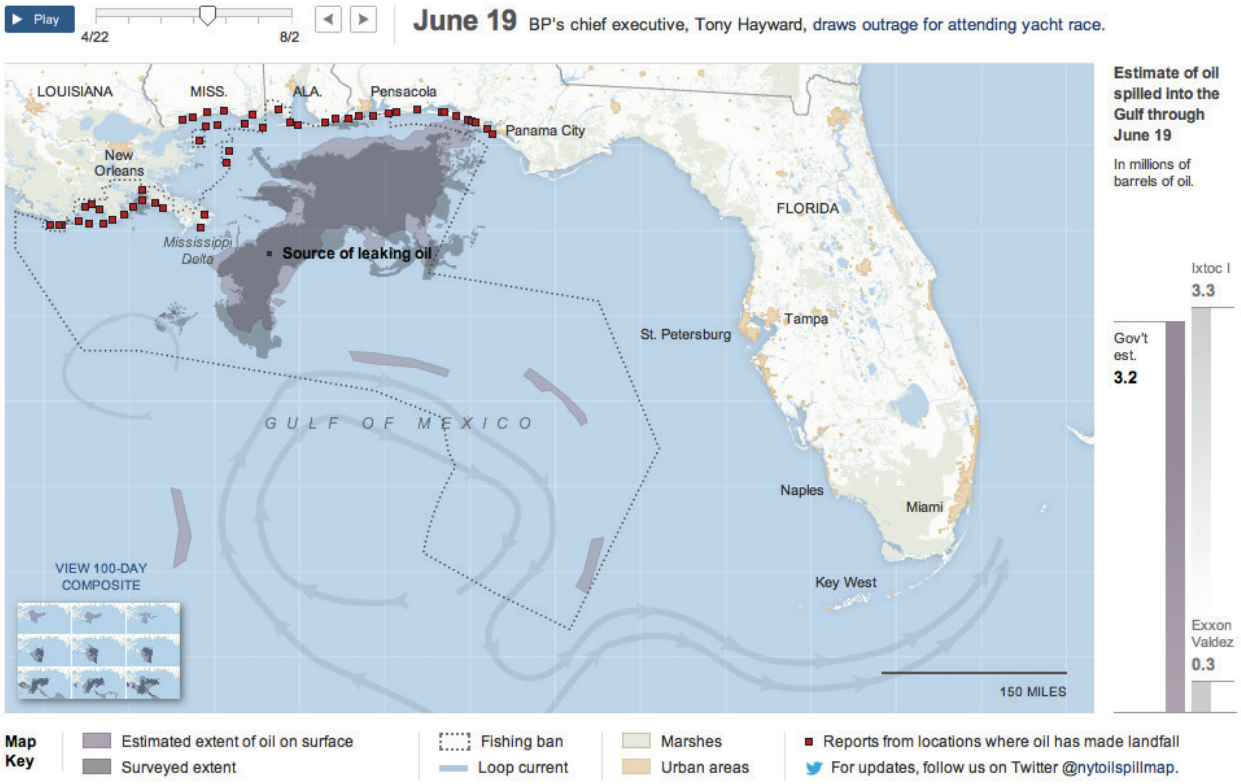
Source: nytimes.com

Figure 2.2 From the *New York Times*, "Four Ways to Slice Obama's 2013 Budget Proposal"



Source: nytimes.com

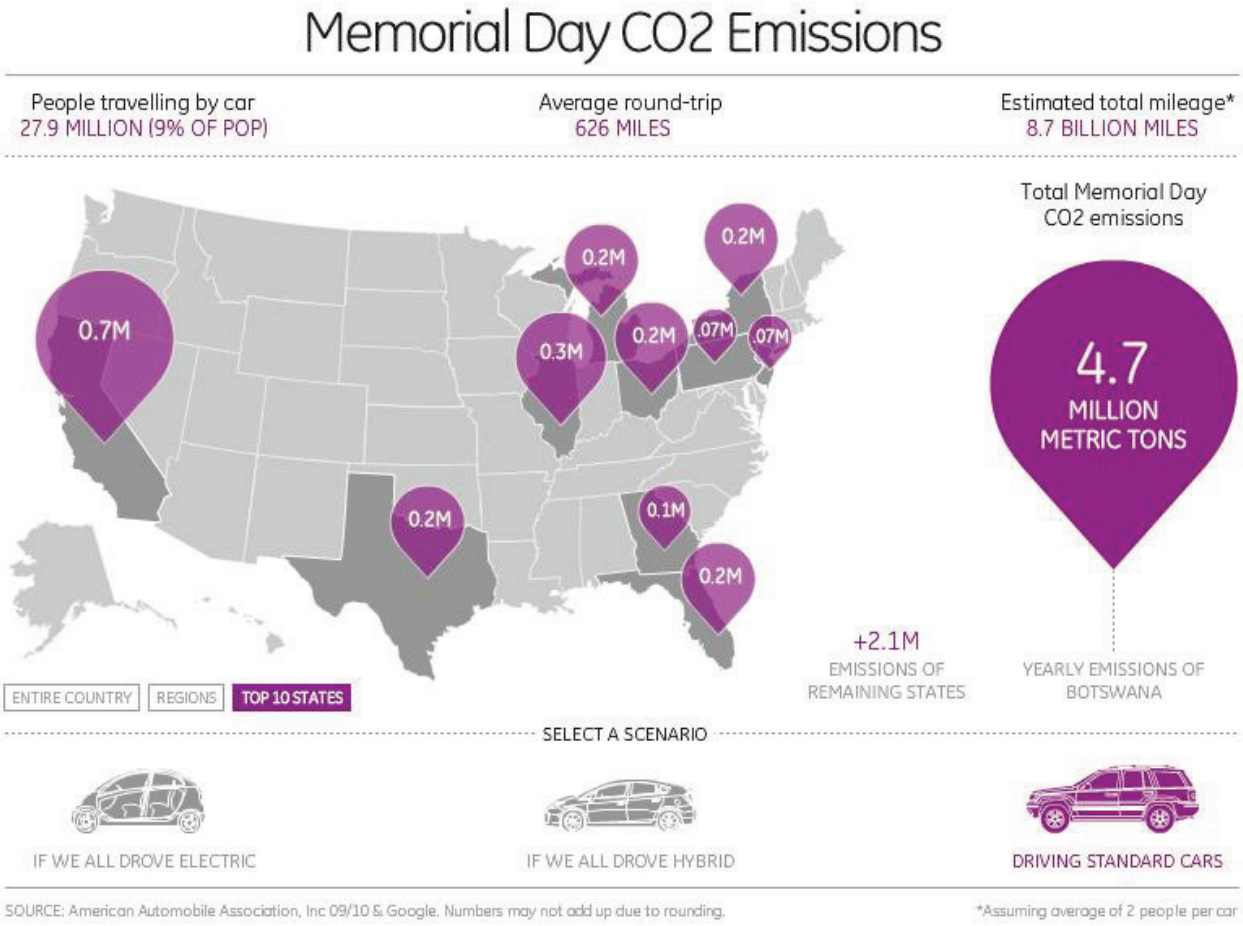
Figure 2.3 From the *New York Times*, "Tracking the Oil Spill in the Gulf"



Source: nytimes.com

General Electric's visualization blog also offers some great examples of interactive visualizations. Because they are dynamic based on what the user clicks, they are naturally engaging while not being visually overwhelming. Below is an illustration of Memorial Day carbon dioxide emissions broken down by State and scenario. Find more examples of interactive graphics at http://visualization.geblogs.com/

Figure 2.4 Memorial Day CO2 Emissions



Source: http://visualization.geblogs.com/

Figure 2.5 Screenshot from Sprint's "Now Network" Widget

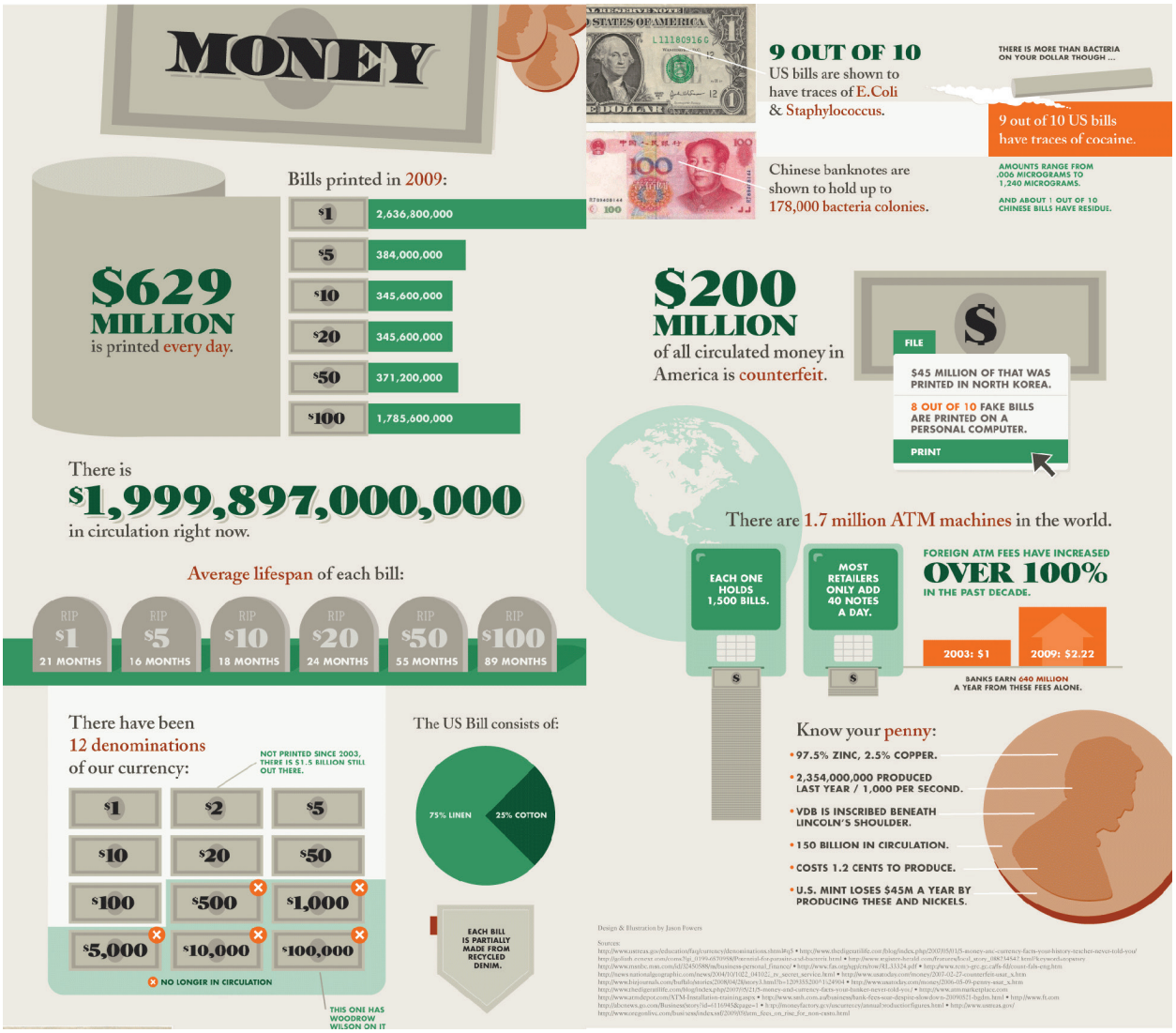
Source: http://now.sprint.com/widget

Above is another type of visualization, displayed "widget" style, developed by Sprint. Many of the individual widgets are interactive, and all are animated. While this example is aimed mostly at entertainment, the format lends itself to audience engagement in the data presented.

Infographics

Recently, a genre of data visualizations known as information graphics, or infographics, has proliferated on the web. While many graphics, such as the London Tube map and periodic table, can be included in the category, infographics today are typified by the graphical style of sources such as GOOD magazine. Infographics are generally static, but may also be interactive. Below is an example of an infographic that conveys a variety of information about U.S. bank notes. Note the simple and approachable graphic style in this example.

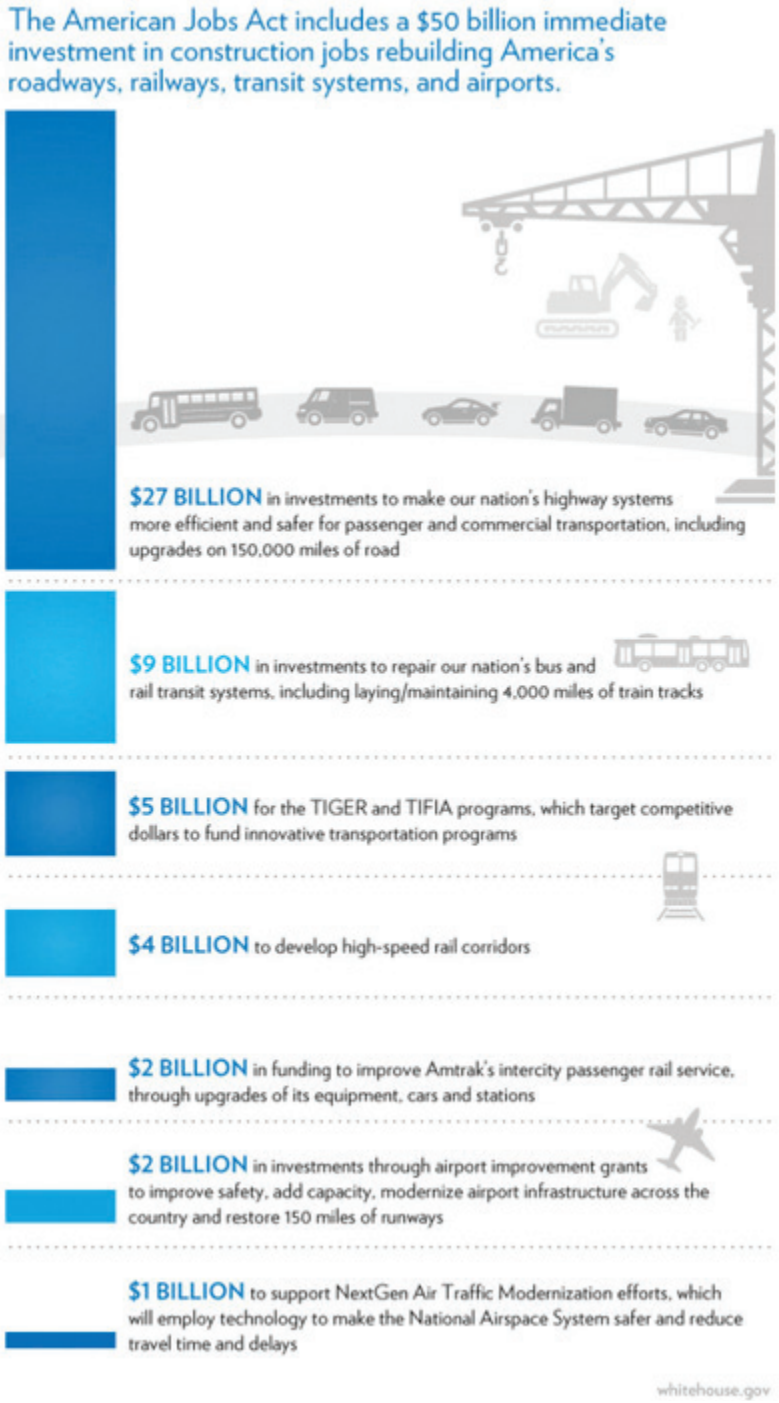
Figure 2.6 *US Money* Infographic



Source: www.richworks.in. For larger image, see http://richworks.in/wp-content/uploads/2010/04/money.gif

An infographic from whitehouse.gov, seen below, demonstrates the ways in which the American Jobs Act will benefit the nation's transportation system. This graphic uses simple drawings and proportional rectangles to enumerate the parts of the system which stand to benefit the most from the funds. This minimalist approach works well for a big-picture overview. For more information on what makes a successful infographic, visit: http://understandinggraphics.com/design/themes-for-a-good-infographic/.

Figure 2.7 Transportation Spending from the American Jobs Act



Source: whitehouse.gov

The Harper's Index, included as a regular item in *Harper's* Magazine and shown below, is a collection of random statistics arranged for thoughtful effect. The index is presented in a way that is intended to be somewhat ironic, such that the reader is encouraged to think more deeply about the given statistics after noticing their irony. Despite the lack of graphical elements, this style is entertaining and engaging, and is a great example of telling a story with statistics.

Figure 2.8 Harpers Index

HARPER'S INDEX

Percentage of the current U.S. debt that was accumulated during Republican presidential terms : 71
Portion of debt-ceiling elevations since 1960 that have been signed into law by Republican presidents : 2/3
Percentage of profits American corporations paid in taxes in 1961 : 40.6
Today : 10.5
Portion of the increase in U.S. corporate profit margins since 2001 that has come from depressed wages : 3/4
Percentage of Americans who say they did not have money to buy food at all times last year : 18.2
Percentage change in the median household wealth of white families since 2005 : –16
Of Hispanic families : –66
Number of minors sent back to Mexico by U.S. immigration authorities in 2010 : 20,438
Percentage who were sent unaccompanied by an adult : 57
Percentage of the world's population that could fit in Texas by living with the population density of New York City : 100
Estimated value of government subsidies that will go to the oil and gas industries between now and 2015 : $78,155,000,000
Average amount the tooth fairy left for a tooth in 2010, according to a survey by Visa : $3

Source: http://www.harpers.org/

Figure 2.9 *The New York Times* Print Edition, Front Page

"All the News That's Fit to Print"

The New York Times

Late Edition

VOL. CLXI . . . No. 55,824 NEW YORK, MONDAY, JULY 16, 2012 $2.50

Surveys Give Big Investors Early View From Analysts

With Special Insight on Particular Stocks, Hedge Funds Take Quick Profits

By GRETCHEN MORGENSON

Korea Experts Can See a Lot In a Hemline

By CHOE SANG-HUN

In Pawlenty, Romney Campaign May Find Down-to-Earth Appeal

By JEFF ZELENY

Latest Word On the Trail? I Take It Back

By JEREMY W. PETERS

Some Hospitals in New York Lack a Malpractice Safety Net

By ANEMONA HARTOCOLLIS

Source: nytimes.com

When considering report design, there are several things that can be learned from the layout of print newspapers. These layouts have been honed and perfected over many years, and are a great example of how the viewer's eyes can be drawn to certain information while offering greater detail should the viewer decide to peruse an article. The front page of *The New York Times* (above) is shown. This can be considered a traditional look in which article content dominates. Notice how the typography reflects the weight of each article. Some article titles are italicized, while others are not. Additionally, the article in the upper-right corner is given an additional descriptive sentence in large text below the article title.

Photos and other graphics support the content and headlines of the articles. Moreover, a very important element in allowing viewers to process information

in this format is the white space around headlines and, to some degree, around graphics and article text. At the bottom, a table of contents highlights other articles deeper within the paper, to which readers can skip at their leisure.

For report design, lessons in visual communication can also be gleaned from another type of print media: magazines. Figure 2.10 is an example of a cover from *The Economist*. One element that makes this cover powerful is the use of varying text weights. The eye is drawn to the largest text, which conveys what the editors believed was the most relevant message in this edition. The smaller text below the main article title expands upon it, and gives more clues to the reader about the article itself. In smaller font in the upper right, previews of other articles in this edition are given. Notice how few words are used. In a sense, this is a demonstration of the maximized "data-to-ink" ratio mentioned by Edward Tufte, only in written form. Readers are able to gain enough insight into the contents of the magazine to want to open it, but are not overwhelmed with text or images.

Note that the online versions of both of these resources are equally important examples for engaging an audience. We have chosen to display the print versions because the value of print media formats is often under-recognized today. Online formats are very successful in audience engagement, but it is important to note that they are often organized with the goal of generating ad revenue so they send readers to multiple pages rather than providing the information in a convenient "at a glance" format.

Figure 2.10 *The Economist* Cover Page

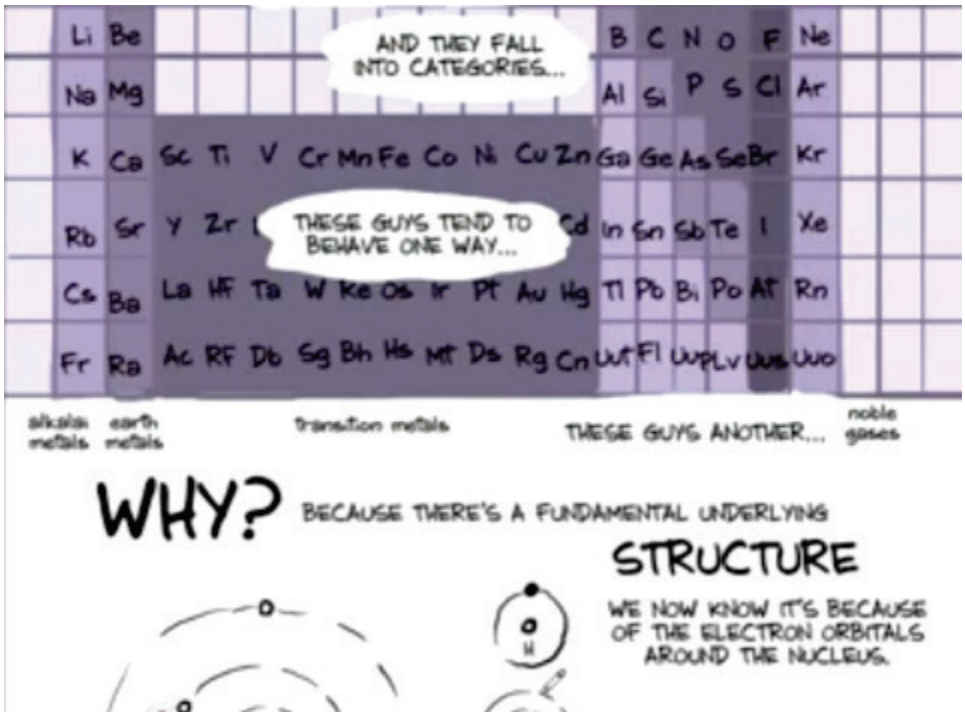
Source: economist.com

Video/Animation

The YouTube video "Higgs Boson for Dummies, sort of" demonstrates creative animated visualization to explain a complex phenomenon to the general public. By supplementing the interview voice-over with printed words and sketches, this animation successfully conveys quantum physics principles in a way that is entertaining and informative. This is a great example of telling a story through

visualization, particularly with audio and text accompaniment, as recommended above by Nathan Yau and others. Text, audio, and visuals all feed off one another in this video, allowing viewers to be engaged while duplicating and reinforcing important scientific explanations behind the Higgs Boson.

Figure 2.11 Screenshot from "Higgs Boson for Dummies, sort of"



Source: Youtube, "Higgs Boson for Dummies, sort of (PhD Comics)". (http://www.youtube.com/watch?v=limom5WPrSA)

Recommendations for Successful Audience Engagement with Data Visualization

When visualizing data, it is imperative to identify the nature of the audience so that the message is appropriately tailored. Data might be presented to an audience of transportation professionals differently than to the general public. In *Making Data Talk*, Nelson and Hesse contrast scientists—who in this case would include transportation professionals—and lay audiences.

Table 2.1 Contrasts Between Scientists and Lay Audiences

	Scientists	Lay audiences
Sources and definition of acceptable evidence	Narrow	Broad
Belief in rational decision making	Strong	Variable
Acceptance of uncertainty	High	Low
Level of interest in scientific topic	High	Medium to low
Quantitative and science literacy	High	Low
Ability and interest to review extensive amounts of data	High	Low

Source: *Making Data Talk: Communicating Public Health Data to the Public, Policy Makers, and the Press* Table 1.2, p. 14.

Biases influencing quantitative data processing among audiences should also be taken into consideration when visualizing data. From *Making Data Talk*, audience biases may include:

- Viewers tend to be "anchored" by the first number they see or have in mind; any adjustments they make are strongly influenced by that initial value or anchor.
- Individuals have a tendency to believe that if two types of data are correlated, then one causes the other.
- People may use their implicit knowledge and stereotypes about an object's category to make judgments about the object itself, ignoring subtle differences among objects within the category.

The recommendations in Table 2.2 can help to avoid these mistakes and make the visualized data audience-friendly.

Table 2.2 Tips for Presenting Audience-Friendly Data

Tip	Example/Explanation
• Avoid terms not frequently used outside of the transportation planning/policy community.	Headways, VMT, Deferred maintenance
• Avoid terms with multiple meanings.	Shipping (can refer to the movement of goods by ship OR the movement of goods between two parties)
• Avoid science and math concepts that can be misunderstood. If these terms or concepts must be used, be sure to explain them in an easy-to-understand way.	Average Daily Traffic, Proportions
• Focus on the main message instead of detailed scientific arguments or outcomes.	When making decisions, many people use heuristics (shortcuts) rather than the rational decision-making model used by most scientists.
• Explain how the data may impact audiences.	Demonstrating impact can help audiences understand why the data are relevant to them.
• Present data in a distinctive way that helps you gain the attention of your audiences.	For a majority of people in the United States, transportation issues are of moderate-to-low interest. Presenting relevant and interesting information can reduce the likelihood that people will filter it out due to lack of interest.

Source: Adapted from *Making Data Talk: Communicating Public Health Data to the Public, Policy Makers, and the Press* (http://www.cancer.gov/cancertopics/cancerlibrary/MDT-Workbook.pdf)

Additionally, quantitative literacy varies from person to person; even the most educated audiences may have only a basic or intermediate level of familiarity with mathematical concepts. Common mistakes individuals make when interpreting numbers include:

- Misunderstanding probability estimates (people may believe that a risk of 1 in 200 is greater than a risk of 1 in 25).
- Misunderstanding percentages.
- Improperly converting proportions to percentages.

With all this in mind, below are several tips that can improve communication about transportation data across a wide spectrum of groups:

- Determine whether data should be presented. Are there sufficient data to support a science-based storyline? If so, are they appropriate for presentation to intended audiences?
- Be brief and concise. Present the "bottom line" and use only a few data points to support it.
- Be complete and transparent in portraying statistics. Word choice, as well as the selection or omission of data, can be highly influential in how

audiences receive and interpret data. Avoid the implication of a causal link between variables that are only associated through correlation.

- Identify and counter mistaken transportation-related lay audience perceptions. Use messages that acknowledge the misconception, diplomatically state why it is inaccurate, and present an alternate explanation. One example of a common misconception is that the gas tax funds all transportation.
- Ensure usability. Select user-friendly formats (e.g., boxes that highlight key points, upfront summaries of information) so that audiences can process information more accurately and efficiently.
- Provide contextual information. Present individual findings within their larger context, using tools such as comparison data and short text phrases that state the key findings as appropriate.

2.2 AUDIENCE INTEREST IN TRANSPORTATION

Finding the audiences' areas of interest is critical to meaningfully connect with them. While there is no proven guidebook for presenting transportation performance data to audiences, much can be learned from the research that has been conducted, often for political advocacy purposes. FHWA is not an advocacy group and has different goals in their performance reporting, but some of the lessons available from other transportation agencies can provide guidance on how to connect performance reports with the audience.

Georgia Transportation Alliance Polling: Quality of Life polls highest

Some polling work completed for the Georgia Transportation Alliance by McLaughlin & Associates and Brilliant Corners looked at the perspective of primary voters in Georgia related to transportation in 2012. While much of it focuses on partisan issues that are not relevant to FHWA, there are some meaningful highlights. Polltakers identified quality of life as the most important reason to improve transportation, higher than business/jobs and infrastructure. Of the quality of life subcategories, safety/repair roads was highest, followed by traffic/congestion and public transportation. It is noteworthy that infrastructure scored poorly. These results may indicate that citizens are focused on the performance of the current system (especially related to safety and congestion) and less interested in learning about status of system expansion that does not impact their quality of life.

Mineta Transportation Institute Polling: What Americans will spend money on

The Mineta Transportation Institute recently polled the American public to answer this question: will Americans support Federal transportation tax options? The data from this poll reveals that certain stories resonate better than others

when it comes to engaging the public about transportation issues. For example, results from the poll show that 62 percent of respondents would support a gas tax increase of 10 cents per gallon to improve road maintenance. However, when respondents were told that revenues would be used more generally to maintain and improve the transportation system, support levels dropped to 24 percent. From this data, it is clear that the public want to know how their tax dollars are being spent on transportation and what projects will be funded, and that the public finds less appeal in less specific approaches such as transportation system improvement.

The survey also revealed that linking a transportation tax to environmental benefits strongly increases support. For example, support for a VMT tax was significantly boosted when that tax rate varied according to the level of pollution emitted by a vehicle. The poll provided insights into the public's priorities for public spending on transportation. Nearly two-thirds of poll respondents felt that governments should make maintaining streets, roads, and highways a high priority, and more than half felt that governments should prioritize reducing accidents and improving safety. In addition, nearly half of respondents felt that reducing traffic congestion and expanding public transit service should be a high priority.

From this polling data, the following generalizations can be made about audience engagements and the subjects that resonate with the public:

- Tangible and relevant examples of performance-related transportation projects and spending should be described.
- The positive environmental and public health impacts of transportation performance improvements and investments should be emphasized.
- Reducing traffic congestion is a high priority for taxpayers.
- A large portion of the public is in favor of tax dollars being spent on transit service expansion.

AASHTO's Words that Work: The New Language of Mobility

AASHTO's *The New Language of Mobility* discusses the responses and success of a variety of messages in getting the public to take interest and feel they have a stake in the transportation system. The Research was conducted in Charlotte, Denver and Orlando. The research focused on a number of strategies used to make the case for transportation projects, programs, etc.

Successful strategies involved emphasizing usage of what the report refers to as "green light language," while avoiding "red light language. Examples of each type of language are highlighted in Table 2.3.

Table 2.3 Transportation Key Words

Green Light Language	Red Light Language
Accountability, responsibility	Maintenance, fixing
Choice	Public spending, spending money
Comprehensive strategy	Washington
Economy	
Efficient traffic	
Long-term plan	
State and local controlled	
Sustainable mobility	

Source: AASHTO

Generally speaking, the research found that the public displays an interest in transportation initiatives when the focus is on the benefits of increased revenue. Voters and taxpayers do not respond to the language of tax and revenue. People may not support "raising revenue," but they are willing to pay for things they care about.

There are six general strategies transportation professionals should focus on when trying to get the public interested and invested in transportation:

- Frame the discussion around providing sustainable mobility
- Technology and modernization
- Long-term local planning
- Accountable spending
- Jobs and economic development
- Environmental impact

The report also focused on findings and recommendations as to how to get public buy-in to pay for transportation. Below is a discussion related to each of the six general strategies and how they should be discussed.

Sustainable Mobility

The idea of a transportation plan that makes people more mobile can excite them as people care about a "future of sustainable mobility." Mobility implies the freedom to choose, both between modes and between routes (for drivers). In this context, sustainable means "workable in the long term." (Note: the research found that people don't associate sustainable transportation with the environment but rather on making a transportation investment last). If technology can tell drivers what route will save time, they will become more mobile. Letting people know that a piece of legislation bill or project will give

them choices is important. Additionally, when discussing efficiency, people hear both personal

Technology and Modernization (how to provide sustainable mobility)

People view our roads as out of date, so small technological advancements are game changing to people. As a result, use of "smart" language (i.e., "smartphone") interests people. Discussions of smarter traffic networks and smarter routing systems imply more efficient movement, and enhanced mobility. Technology and modernization also plays a significant role in clearing accidents and incident management, something that is known to be important to people. A focus on smarter technology and not necessarily on big technological advancements, is most important. People don't expect flying cars.

Long-Term Local Planning

People believe the only way to create a responsible plan is to have State leaders, local officials, and the business community all represented in the decisionmaking process. People believe many improvements being made today to the transportation system are short term (new lanes, etc.) and would prefer long-term solutions. For example, people would rather have a $100 per person plan that solves problems for 20 years than a $1 per person plan that solves them for the next two. The planning process needs to focus on state and local leaders, as well as the private sector. The perception that an effort is being led by Washington could halt any project. Both the public and private sector need to be involved to check and balance each other. Private businesses and chambers of commerce are interested in economic advantage while the public sector is responsible for roads/transportation. Non-profits and environmental groups and private citizens should also participate.

Accountable Spending

You can frame the discussion perfectly, but you need to assure people that spending will be accountable and transparent. First, you need to convince people the money is dedicated to transportation. Additionally, the public does not wanted additional wasteful bureaucracy. Thus, supervision of a project selection process should sound as little like a new government entity as possible. Transparency is key, you need to show everything and be available for questions/comments. One example of how to increase transparency might be providing an innovative tool with interactive maps of projects.

Jobs and Economic Development

Discussing a transportation bill's potential to spur economic growth and create jobs is important, but the bill must stand on its own merits. The benefit of jobs and economic development needs to come in addition to other benefits. Thus, these should be supporting points. Additionally, focusing discussions on sustainable jobs, skilled jobs, and family wage jobs is important because not all jobs are created equal.

Other notes: People already know that transportation is the heart of the economy, but don't threaten with statements like "we're in danger because Russia and China are building more roads than the US." Don't compare US transportation investments to those of other countries. Economic impact analysis, knowing how much money is projected to be gained from a transportation measure, makes for a good economic argument. Avoid use of the word "stimulus"—this has become synonymous with wasteful spending.

Environmental Impact

Environmental arguments can turn people off. By and large, people don't consider roads and highways themselves to be an environmental issue. It's about the efficiency of the cars that drive on them. Don't ignore environmental considerations, but don't lead with them. Environmental considerations may be more successful in convincing the public a bill is necessary if they are personal. For example, more efficient traffic is related to a reduction in pollutants. People understand that pollutants have a negative effect on them. "Emissions" are bad in the abstract, but people don't experience them the way they do "pollutants." Emissions, greenhouse gases, etc. are politically loaded words. Avoid using this language unless talking to an environmental group.

Paying for It – Getting it to Yes

How to pay for transportation can only be discussed once the case has been made using the strategies described above. Costs, should be explained on a personal scale. People don't think in terms of "budgets in millions and billions". Think more about how this will impact a person per year. Frame this as a "usage" tax, so that the beneficiaries are the people who will pay for it. Examples:

- "A fuel tax or a miles traveled tax is the fairest way to fund transportation because the people who use the roads most are the people who will pay the most into it when they fill up."
- "A sales tax is the fairest way to fund transportation because all the products you buy wouldn't make it to the store, or your mailboxes, without roads and highways."

Frame the benefits that each audience is most interested in compared to the cost they'd be paying to get them. This takes research.

2.3 CURRENT BEST PRACTICES IN PERFORMANCE REPORTING IN TRANSPORTATION

Most State DOTs are using web tools in some capacity to build communities of interest around transportation issues. These externally oriented tools can be used for multiple purposes including reporting on project delivery, safety, and other indicators of transportation performance. One of the more common performance

reporting formats is the use of online dashboards. These tools track an agency's performance through a variety of metrics related to reliability, safety, finance, etc., using graphic displays including tables, charts (i.e., pie chart, bar chart, histogram, function graph, scatter plot), graphs and maps.

The following section includes analysis and best practices from State DOTs and public agencies, focusing first on dashboards and then presenting other reporting formats.

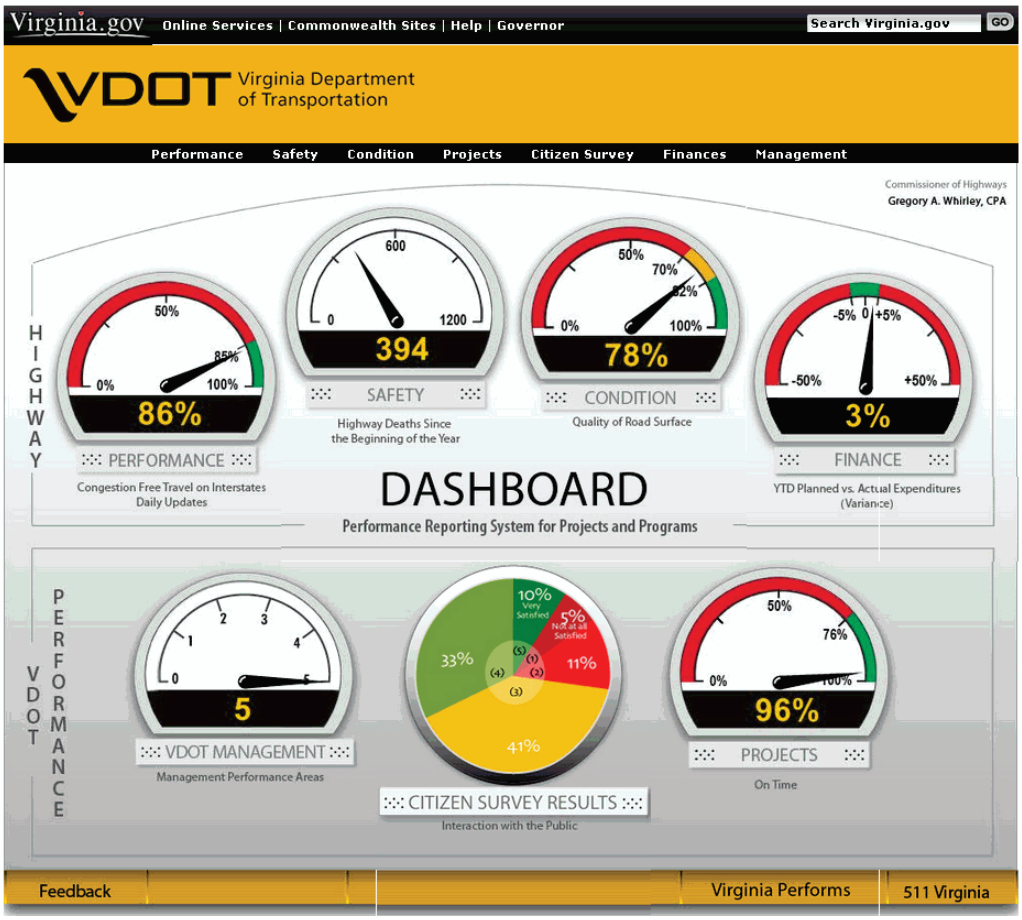
Virginia DOT

The Virginia Department of Transportation (VDOT) created an online project dashboard in 2003, to allow citizens to see which VDOT projects are on time and on budget (see http://dashboard.virginiadot.org/). Since then, the dashboard has expanded to include the following categories:

- **Performance:** Information on average historical congestion for key routes; and locations; average historical HOV lane performance; incident management.
- **Safety:** Data about highway crashes, injuries, and fatalities; workzone crashes and injuries.
- **Condition:** Information about the condition of pavement, bridges, and ride quality. Also, current year paving and contracts.
- **Finance**: Information on planned and actual expenditures.
- **Management**: Information about VDOT's management performance measures, with a link to the Commonwealth's Virginia Performs System.
- **Citizen survey**: How the public views VDOT for roadway maintenance, emergency response, and other categories.
- **Projects**: Projects developed and advertised on-time, projects delivered on-time and within budget; environmental compliance; project quality improvement.

The "dashboard" front page illustrates seven main performance categories using large font and a speedometer-like dial representing performance for a single representative measure. The dashboard uses a mouse-over capability - scrolling over a category graphic displays the name and definition of the topic. Each category provides link to additional measures, data, and targets.

Figure 2.12 VDOT Performance Measures Website, Front Page



Information within these categories includes current and previous year values and it offers the option to export data to Excel. Various queries exist within each category that allow users to access information as it relates to a specific county, district, focus area, etc. The specific performance measures provided within each category are outlined in Table 2.4.

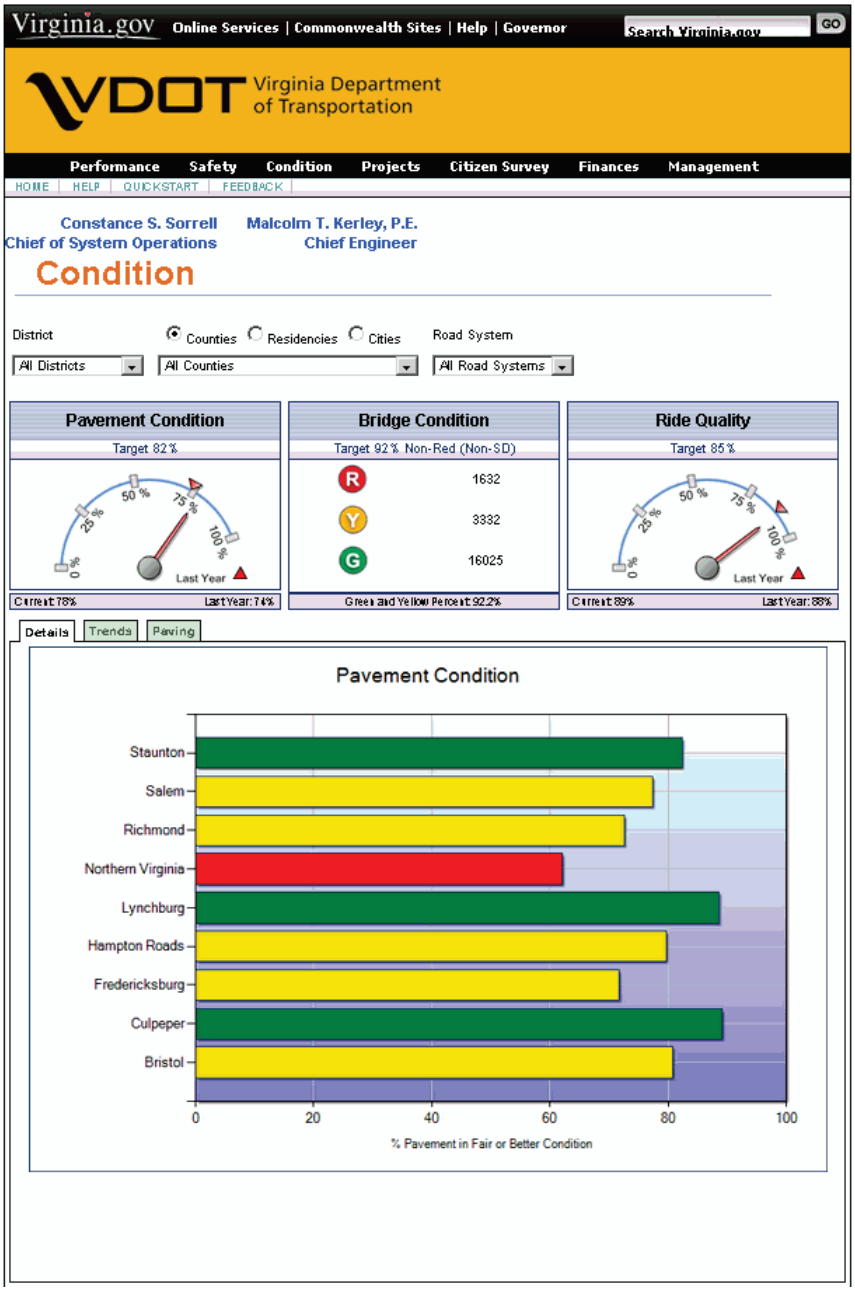
Table 2.4 VDOT Performance Reporting Measures

Category	Measures
Performance	• Congestion at various interstate locations • HOV travel speed performance • Travel time on key commuter routes • Incident duration • Hours of Delay
Safety	• Crashes • Injuries • Deaths (YTD) • Work Zone Crashes
Condition	• Pavement condition • Bridge Condition • Ride Quality
Finance	• Revenue • Expenses • Purchase Power
VDOT Management	Link to Virginia Performs provides color coded performance indicators related to: • Emergency preparedness • Financial Management • Government Procurement • Human Resources • Information Technology
Citizen Survey Results	Numerous measures related to satisfaction with VDOT including, but not limited to: • Communication • Management of Public Funds • Overall Quality of Ride • Appearance of roadsides • Planning for transportation needs
Projects	• On-time performance • On-budget performance • Environmental compliance

Category pages allow users to select specific data based on geographical and temporal constraints. The green, yellow, red traffic signal theme is carried throughout the dashboard, providing users a general sense of performance within categories. One potential critique of the dashboard is that it lacks a narrative description of methodology or how the data is used by the agency.

However, overall VDOT's performance dashboard provides a valuable example of how transportation agencies can present a wealth of data to the public using innovative graphics and an interactive online interface.

Figure 2.13 VDOT Performance Measures Website, Details Page



Georgia DOT

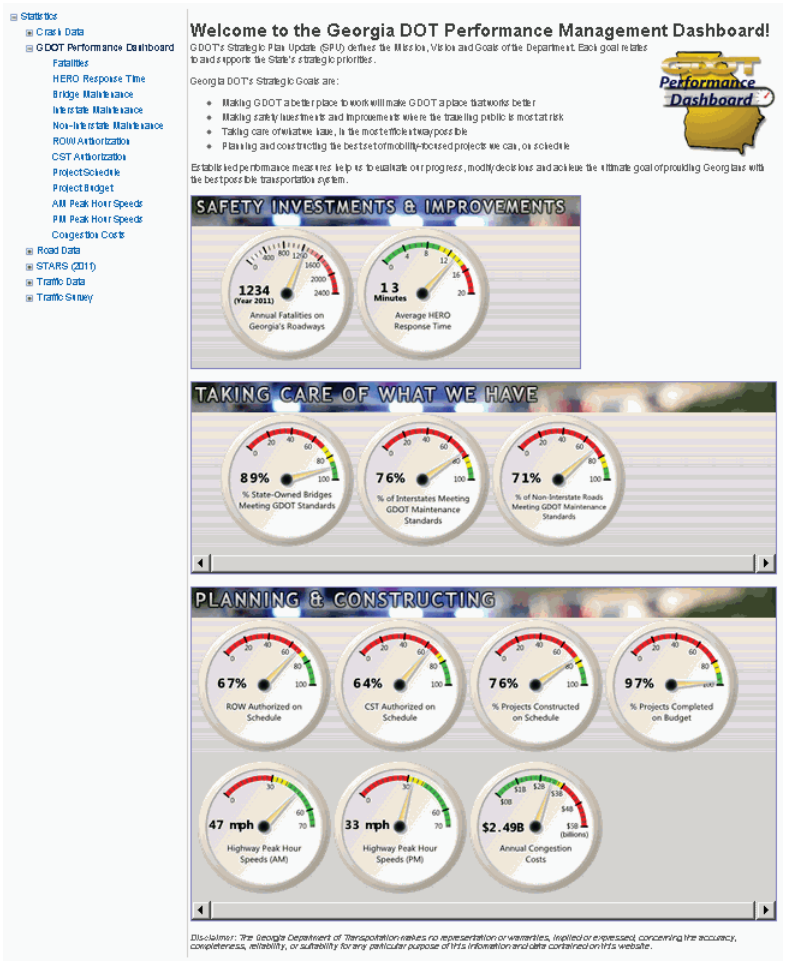
Georgia DOT's (GDOT) performance dashboard is based on the strategic goals outlined in GDOT's Strategic Plan Update:

- Making GDOT a better place to work will make GDOT a place that works better.
- Making safety investments and improvements where the traveling public is most at risk.
- Taking care of what we have, in the most efficient way possible.
- Planning and constructing the best set of mobility-focused projects we can, on schedule.

The dashboard organizes measures into three main categories on the main page based on these goals:

- Safety Investments and Improvements.
- Taking care of what we have.
- Planning and constructing.

Figure 2.14 GDOT Performance Dashboard, Front Page



The homepage provides a title, labels, and speedometer-like dial for twelve performance measures. Each dial links to a separate page that presents further data, graphics and a narrative that includes a description of what is measured, the strategic objective (target) and how GDOT expects to achieve the objective. Unlike the VDOT dashboard, Georgia's dashboard displays each category's performance measures on the front page. These are outlined in Table 2.5.

Table 2.5 GDOT Performance Reporting Measures

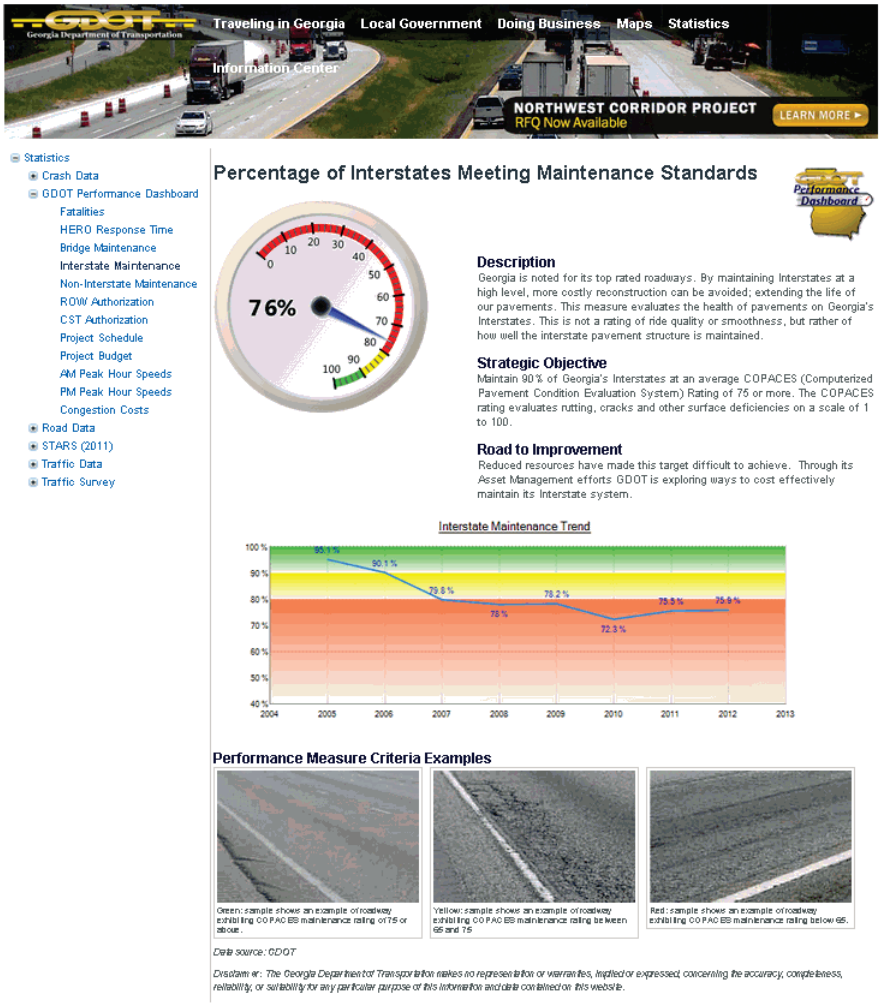
Category	Measures
Safety Investments and Improvements	• Annual fatalities on Georgia roadways • Average HERO response time
Taking Care of What We Have	• % State-owned bridges meeting GDOT standards • % of interstates meeting GDOT maintenance standards • % of non-interstate roads meeting GDOT maintenance standards
Planning and Constructing	• ROW authorized on schedule • CST authorized on schedule • % projects constructed on schedule • % projects completed on budget • Highway peak hour speeds (am) • Highway peak hour speeds (pm) • Annual congestion costs

From the homepage, users may click on a specific speedometer- like indicator to access additional information for specific measures. These detail pages provide a description of the measure, the strategic objective of the measures, and details regarding how GDOT plans to improve performance or achieve the goal(s) related to the specific measure. Accompanying this is a line graph showing historical performance of the measure. Figure 2.15 shows the design of GDOT's detail pages.

Another valuable feature of the GDOT dashboard is the table of contents on the left side of the page. This stays constant as users navigate to various detail pages. Additionally, as one holds their cursor over each speedometer-like indicator, a more thorough description of the measure being represented is provided.

GDOT does not allow for drilling down to specific geographies nor does it provide users with the ability to export data. Overall, GDOT's performance dashboard provides informative text describing methods, use and relevance of data with clear graphics and easy navigation.

Figure 2.15 GDOT Performance Dashboard, Details Page



North Carolina DOT

The North Carolina DOT (NCDOT) Organizational Performance Dashboard represents another graphic-rich and informative website that provides quick access to key data and targets. The front page of NCDOT's dashboard provides an overview of five categories related to meeting the agency's mission and goals. Unlike the previous two dashboards, NCDOT designed their front page so that each category is represented as a tab, with only one category being displayed at a time. The goals outlined by NCDOT are:

- **Fatality Rate**: Making our transportation network safer.
- **Incident Duration:** Making our transportation network move people and goods more efficiently.
- **Infrastructure Health:** Making our infrastructure last longer.

- **Delivery Rate**: Making our organization a place that works well.
- **Employee Engagement**: Making our organization a great place to work.

Figure 2.16 NCDOT Performance Dashboard – Front Page

As the front page focuses on each of these goals, a specific measure is highlighted using a speedometer-like dial similar to those used by other DOTs. Within each goal is a link to a more detailed page. Here, a user is provided with additional measures, various graphical displays, including charts and graphs, as well as historical data. Navigation tabs stay constant on the left of the page, providing easy access to other measures, without having to return to the front page.

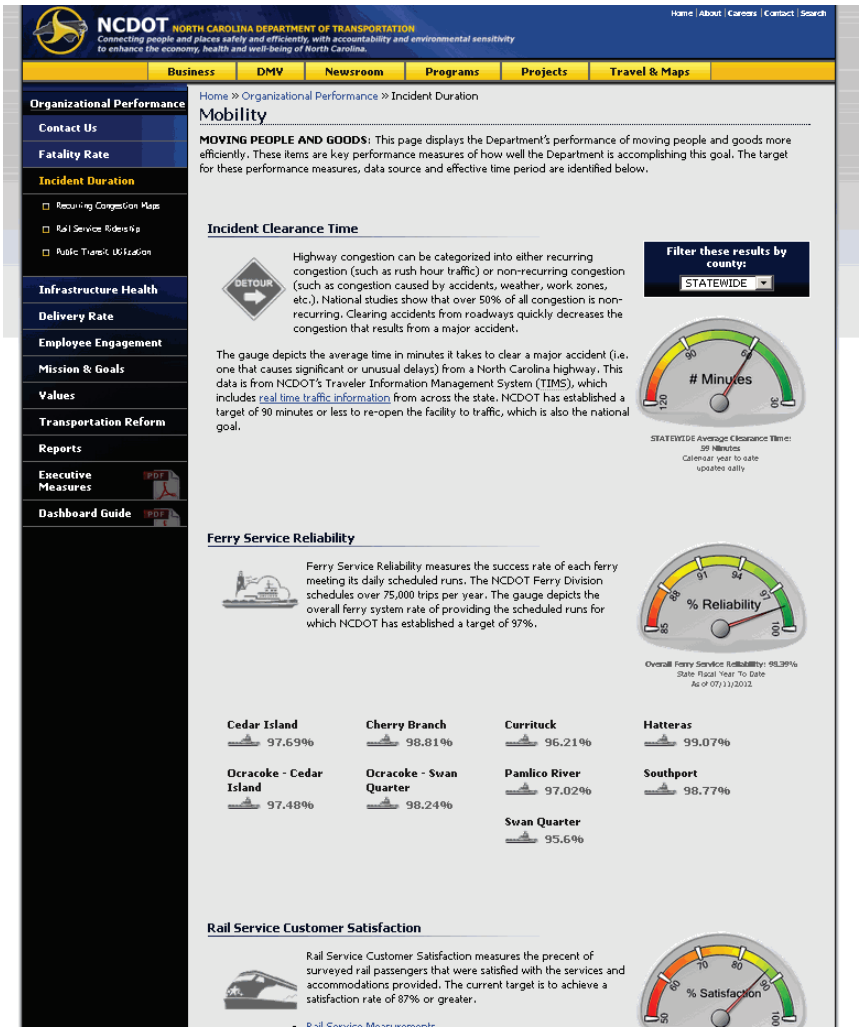
Narratives accompany each measure and explain the use of each measure and (generally) the methodology. The timeframe for measures varies, as some are "calendar to date" and updated daily, while others are annual but based on different timeframes, which can make it difficult to compare measures. Some measures provide targets in the narrative, while others are not included. Detailed measures include links to downloadable data. All reported measures are provided in Table 2.6.

Table 2.6 NCDOT Performance Reporting Measures

Category	Measures
Fatality Rate	• Crashes • Fatalities • Injuries
Incident Duration	• Incident clearance time • Ferry service reliability • Rail service customer satisfaction • Public transit utilization • Highway reliability
Infrastructure Health	• Bridge health index • Pavement condition • Roadside feature condition
Delivery Rate	TIP preconstruction measures include: • % of plans completed and bids opened on time • % of right of way plans completed on time TIP construction measures include: • % of construction projects completed on schedule • % of construction projects completed on budget Environmental measures include: • Average state environmental compliance score
Employee Engagement	• Commitment • Discretionary effort • Intent to stay

The NCDOT report provides informative data and information regarding agency performance, uses clear graphic symbols to represent scores, and provides easy-to-use page navigation. The performance measures, however, lack cohesion across the different categories, in that different timeframes are used, dates of data collection or surveys are not indicated, targets are not included, and methodologies are not clearly described. For example, a score of 68.4 percent for "pavement condition" does not indicate what went into the calculation of the percentage, nor what elements of roadways are measured. A "Dashboard Guide" is provided in PDF form that explains the annual methodology, and that the number represents the percent of lane miles in good condition, but not what that represents.

Figure 2.17 NCDOT Performance Measures Dashboard – Details Page



Examples of Non-Dashboard Reporting

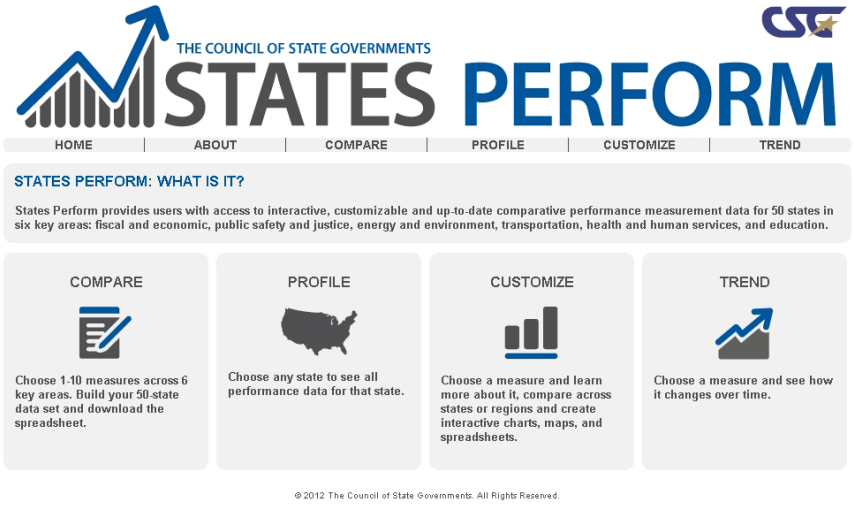
In addition to dashboards, transportation agencies relay information and performance updates to the public through other means, including social media, newsletters, and public meetings.

States Perform Website Tool

States Perform is an initiative of the Council of State Governments (CSG) aimed to measure state performance and report the data collected. The 21st Century Foundation funded the States Perform site, an interactive website focused on performance measurement. The site is designed to educate state policy makers on the approaches States are taking in measuring and managing performance, and give them the tools to implement or improve their own programs. The site provides users with access to interactive, customizable and up-to-date comparative performance measurement data for 50 States in six key areas: fiscal

and economic, public safety and justice, energy and environment, transportation, health and human services, and education.

Figure 2.18 States Perform Homepage



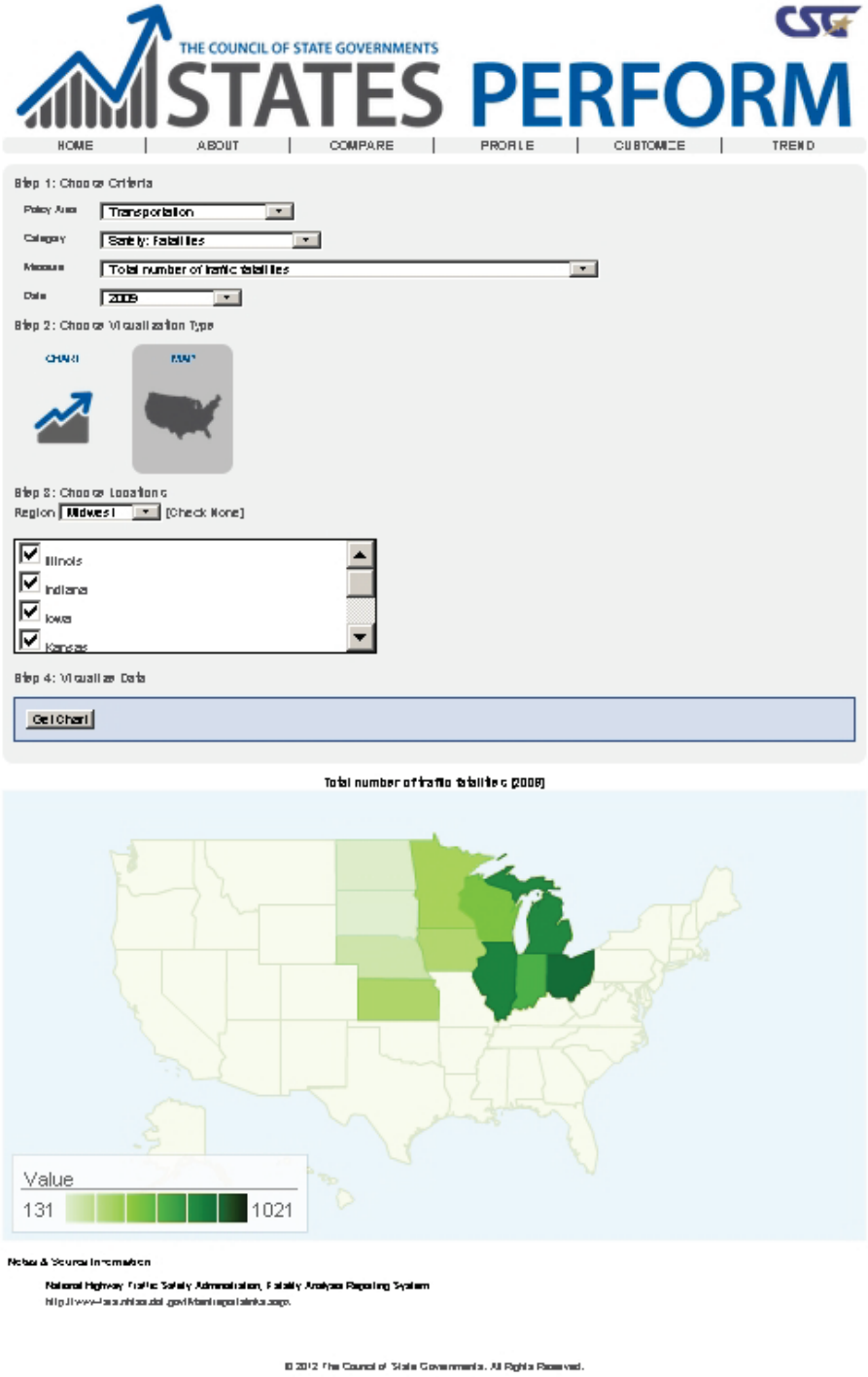
The site utilizes a Data Builder, a tool that allows users to compare a state's performance to other states, a region, or the nation. The three components to DataBuilder are:

Compare - The Compare feature allows users to compare up to 10 measures across all states or states within regions and compare a state's performance to the nation and its region.

Customize - The site allows a user to customize their analysis by providing charts and maps of a measure based on criteria entered by the user. Criteria in the Customize portal include policy area, category, measure, date (year), and location

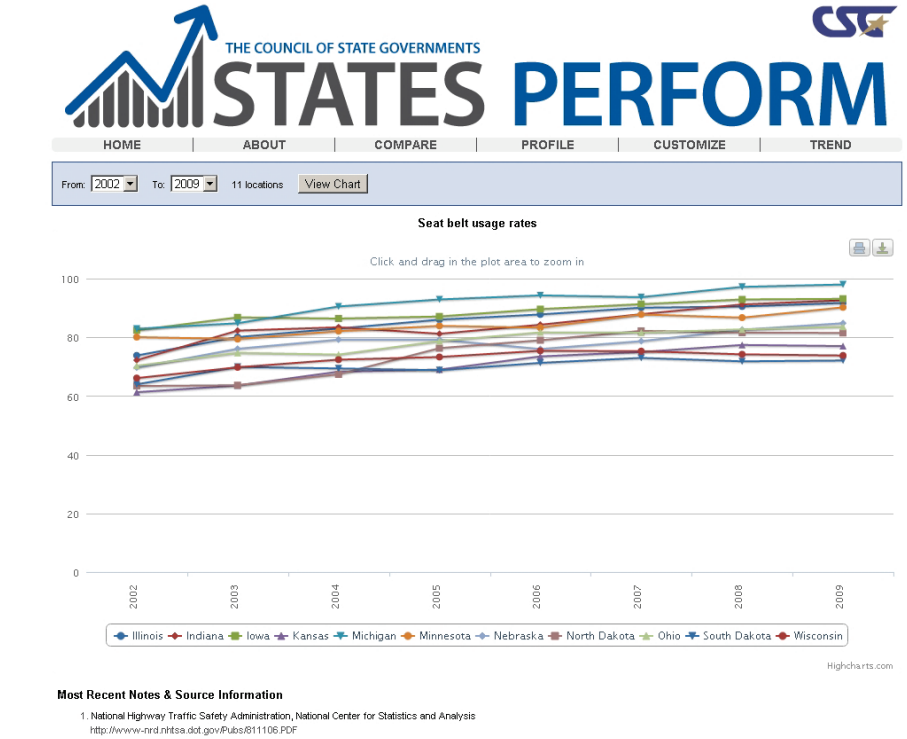
Profile - The Profile feature allows users to access all performance data for a state, with comparisons to regional and national performance..

Figure 2.19 States Perform Customize Feature Interface and Map



Performance trends are also provided based on user entered criteria and presented in chart, table, or map format. With these tools, users can create downloadable spreadsheets, charts, and maps.

Figure 2.20 States Perform Trend Feature Interface and Chart

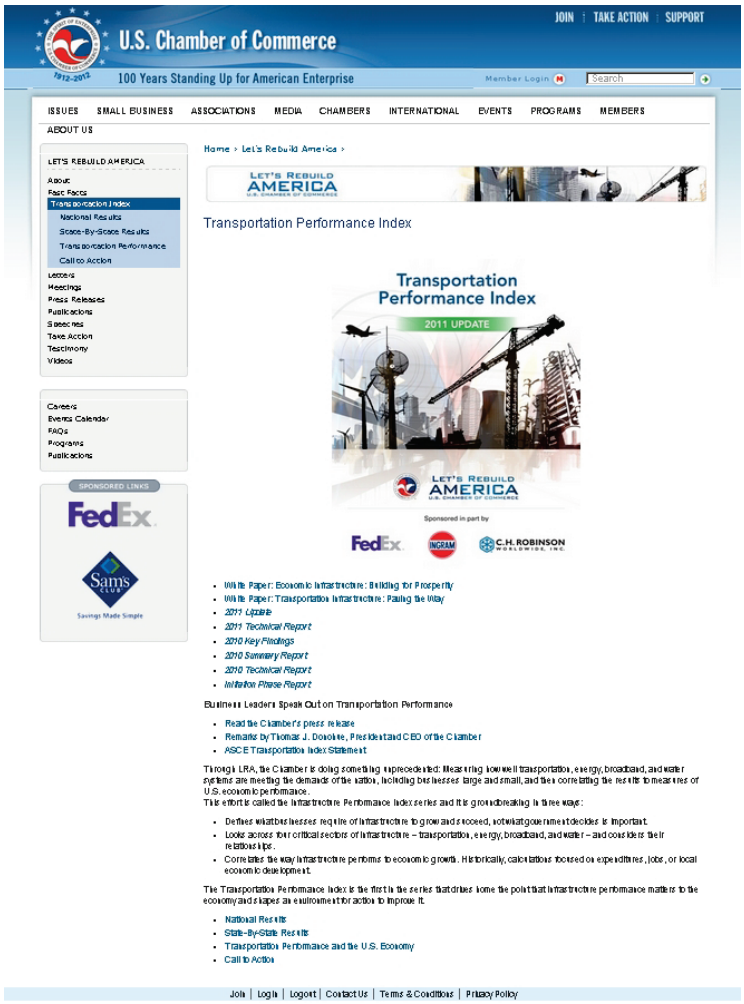


Additionally, data used to populate charts and maps are highlighted when holding a cursor over them. Data is collected from a myriad of sources with transportation measures collected from the National Highway Traffic Safety Administration and the U.S. Department of Transportation, Federal Highway Administration. The States Perform website is a simplistic and straight forward site that allows users to customize performance measurement data. The ability to download tables to spreadsheets and charts as images provides users with enhanced functionality. The simplicity of the States Perform site can assist in keeping the public informed of transportation issues and performance.

U.S. Chamber of Commerce - Transportation Performance Index

The Transportation Performance Index is part of the U.S. Chamber of Commerce's (Chamber) Let's Rebuild America initiative (LRA). LRA's mission is to ensure that America's infrastructure systems meet the demands of a diverse, robust economy and a growing population, and contribute to U.S. economic growth and global competitiveness. Through the LRA, the Chamber is measuring how infrastructure systems (transportation, energy, broadband, and water) are meeting demands of the nation and correlating the results to measures of U.S. economic performance. This is called the Infrastructure Performance Index. The Transportation Performance Index is the first in this series. The Chamber website provides brief overviews of national as well as State-by-State results as well as links to annual technical and summary reports.

Figure 2.21 US Chamber of Commerce Transportation Performance Index Homepage



According to the Chamber's website, for each single point of improvement in the transportation index, GDP would increase by 0.3 percent. The index examines the overall contribution of transportation infrastructure to economic growth. This goes beyond charting the effects of spending and creation of jobs during construction.

The index combines indicators of supply (availability), quality of service (reliability, predictability, safety), and utilization (potential for future growth) across all modes of passenger and freight transportation. This includes highway, public transportation, freight railroad, aviation, marine and multimodal.

Figure 2.22 US Chamber of Commerce Transportation Performance Index State Results

The analytical capabilities made possible through the Transportation Performance Index stem from a comprehensive set of indicators. There are 21 indicators in all, with four highlighted as driving the TPI:

- Travel time reliability – travel time index.
- Safety (transit incidents) – number of incidents per million passenger miles traveled.
- Safety (railroad incidents) – number of incidents per million train miles.
- Congestion (delays on inland waterways) – average lock delay per tow.

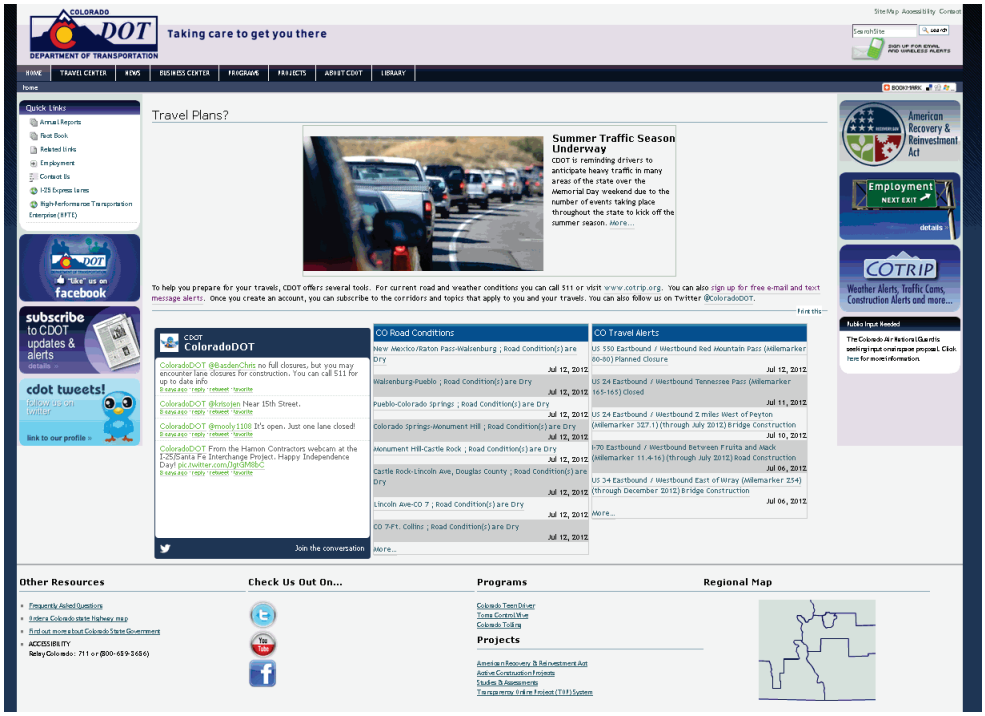
Annual TPI results are available through downloadable technical reports. While this isn't an interactive way to attract public attention and investment in

transportation, the TPI helps to document and demonstrate the need for reform and improved performance of the transportation system.

Colorado DOT

The Colorado DOT (CDOT) employs numerous "web 2.0" tools in an effort to keep the public informed. CDOT's homepage provides links to a Facebook page, Twitter page, as well as a link to subscribe to email updates from the agency. Road conditions and travel alerts are also provided on their homepage.

Figure 2.23 CDOT Homepage



Both their Facebook and Twitter pages provide traffic and construction updates to system users. For current road and weather conditions, the State has established a separate website, cotrip.org, that highlights lane closures, road conditions, traffic speeds, travel times, etc. This site also provides cameras allowing users to assess current travel conditions. Similarly, one can create a twitter account and follow the agency. The department also provides free e-mail and text message alerts.

By employing numerous web 2.0 tools, CDOT aims to keep travelers informed of current system performance. For a compilation of historical and annual data,

CDOT also produces a Fact Book every year, containing various measures related to finance, safety and system performance.[1]

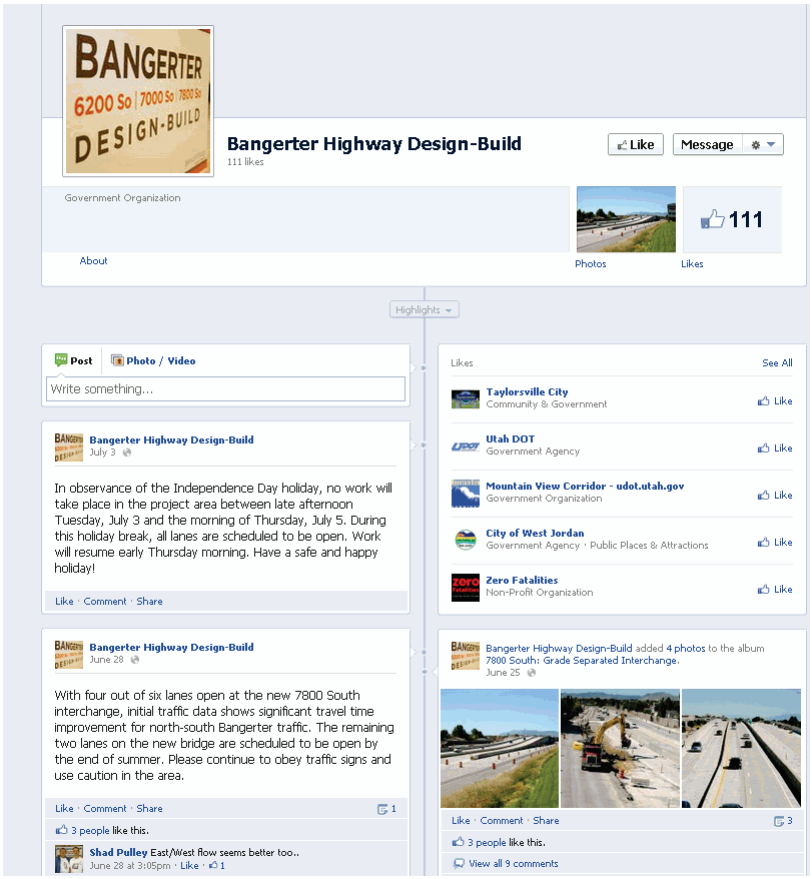
Utah DOT

Utah is another State employing a variety of web 2.0 tools to help keep the public informed of road conditions, agency performance, etc. Similar to Colorado, Utah manages Facebook, Twitter and YouTube accounts. In addition to these, UDOT has developed a smartphone application (app) available for download. This app allows users access to real time road conditions and traffic conditions.

In an effort to keep the public informed of the status of certain projects, UDOT also maintains a number of Facebook pages and Twitter accounts specific to projects. Current projects, as of this writing, include the Bangerter Highway Design-Build, I-15 Core, and the Mountain View Corridor.

[1] http://www.coloradodot.info/topcontent/FactBook

Figure 2.24 UDOT Bangerter Highway Design-Build Facebook Page



King County Accountability Center

King County Metro Transit in Seattle maintains a comprehensive Accountability Center, providing performance measures related to service, finances, and system performance. Measures are provided on an annual as well as monthly basis. Annual performance measurement categories include customer service, financial, ridership, and service provided. Monthly performance measure categories include ridership, service quality, safety and security, financial, and service effectiveness.

The Accountability Center also provides links beyond performance reporting. Other sections of the Center include:

- Highlights
- Budget (Operating and Capital)
- Transit Peer Comparisons
- Transit Planning

- Customer Research
- Park and Ride Usage
- Other Reports and Publications.

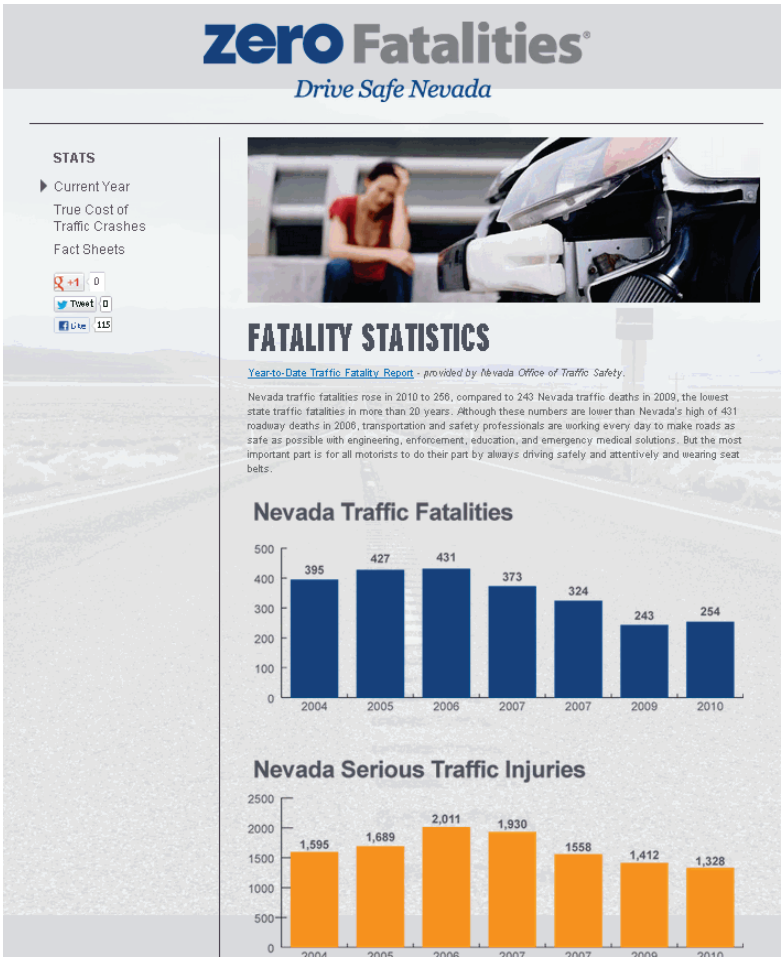
Nevada DOT – Zero Fatalities Campaign

The Zero Fatalities campaign is an effort from various states addressing the top behaviors that result in deaths on America's roadways. Within each state, various organizations contribute to this public education program. The Nevada DOT has adopted a Zero Fatalities program in which they maintain a report card on their website (zerofatalitiesnv.com) keeping track of traffic fatalities. The report card contains annual fatalities as well as a comparison to the previous year.

Figure 2.25 Nevada Zero Fatalities Homepage

In addition to this, Nevada's efforts provide statistics and educational resources regarding prevention and laws related to traffic safety as well as downloadable public service announcements. The Nevada Office of Traffic Safety provides year-to-date traffic fatality reports. These are summarized in a statistics detail page on the campaigns website.

Figure 2.26 Nevada Zero Fatalities Campaign



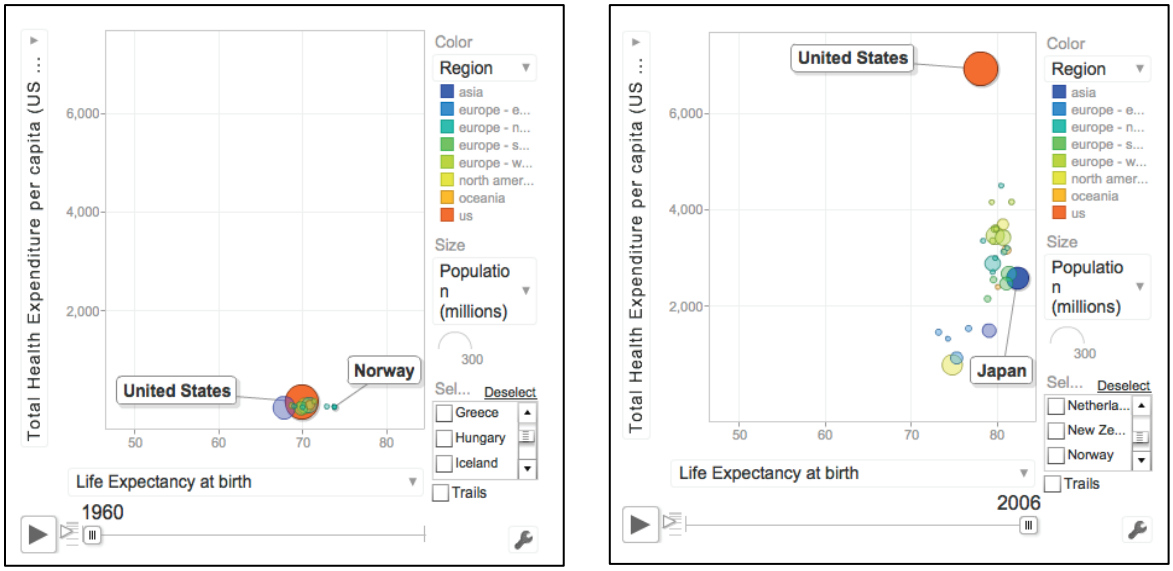
2.4 Best Practices in Performance Reporting in Other Fields

Health Industry

State of the USA

State of the USA is a nonprofit organization dedicated to providing access to key national indicators on a free website. One of the site's missions is to enable story-telling with data, and thus generate broader citizen interest in the issues covered by interactive data visualization. An example of this is an article on State of the USA which collects international health data from the Organization for Economic Co-operation and Development (OECD) and displays it on a Google Motion Chart. This type of visualization displays data attributes on both an x and y axis and through bubble size and color. The chart is also animated to allow further interactivity and emphasize change in the data over time. Using this visual tool, it is possible to unlock the dramatic stories embedded in the health care indicators. Users can compare indicators like life expectancy at birth and healthcare expenditures per person for developed countries.

Figure 2.27 State of the USA Data Visualizations for Health Indicators



Source: Organization for Economic Cooperation and Development, OECD Health Data 2008; Office of Management and Budget, Historical Tables, Budget of the United States Government, Fiscal Year 2010.

Education

The University of California – Onward California

Onward California (http://onwardcalifornia.com/) is a campaign by the University of California to illustrate the system's importance to all Californians,

not just UC grads. The website is mainly aimed at building a 5-year multimillion dollar partnership with California-friendly businesses to support undergraduate education, but is also part of a larger effort to pass a ballot initiative which will help maintain funding for the university system with taxpayer funds.

Users mainly arrive on the website from advertisements in local media outlets. The site uses interactive photographs and text to tell a story about how the University of California is a part of almost every facet of their lives. In a sense, the University of California uses the site as a means of communicating and proving their taxpayer-supported performance.

Figure 2.28 Screenshot from Onward California Website

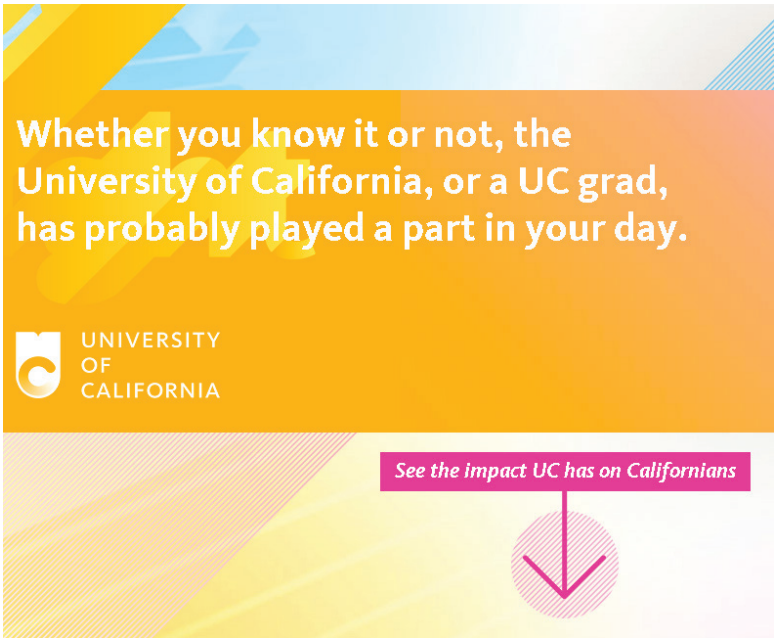
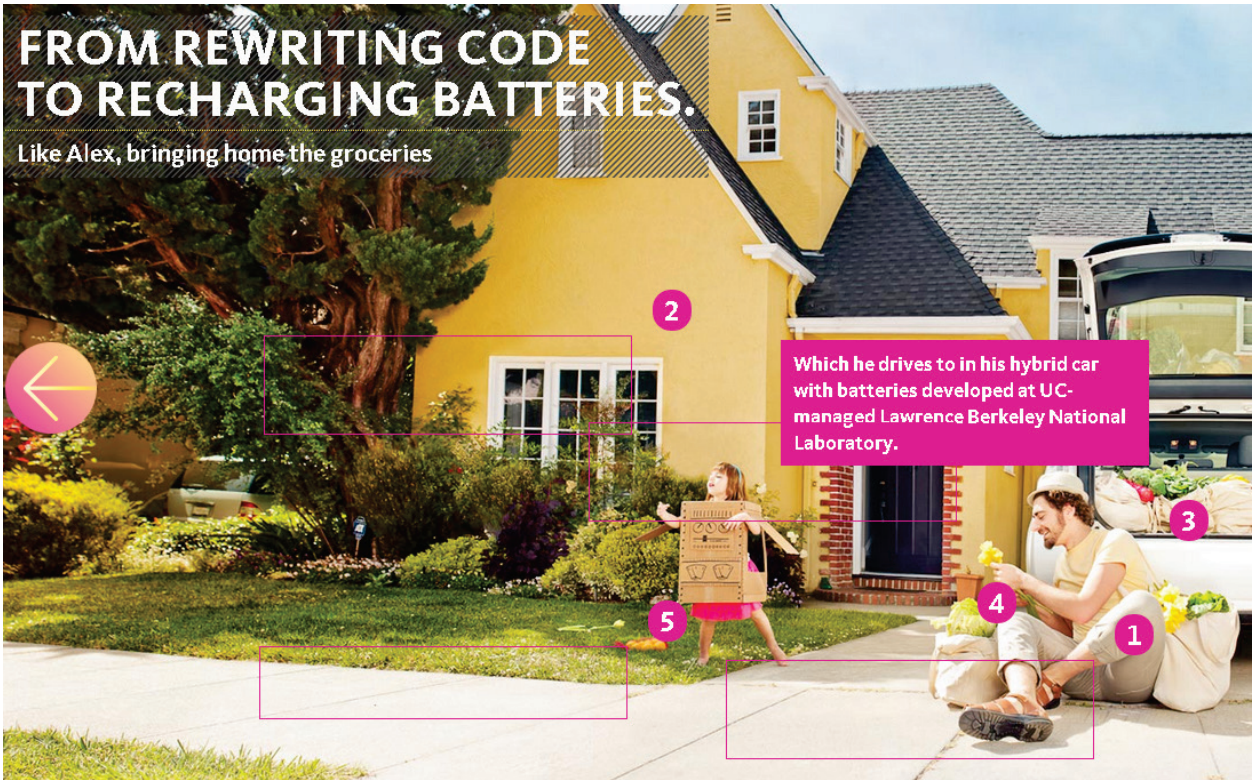


Figure 2.29 Screenshot from Onward California Website (2)



Finance

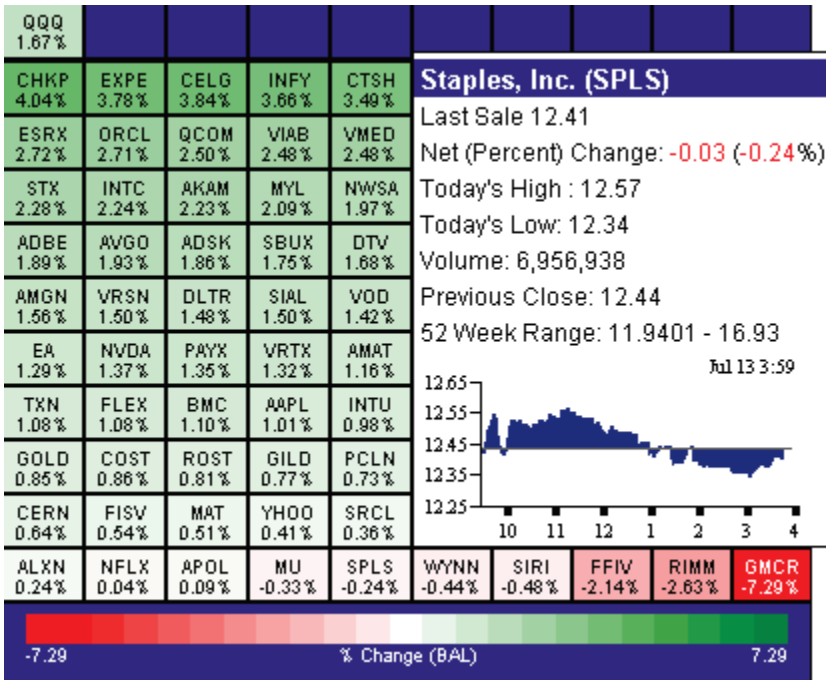
NASDAQ

Performance reporting in the securities industry is heavily based on the financial accomplishments of the companies involved. NASDAQ is a leader in making performance data for companies on its stock exchange available for public consumption. These reports, while very "data-heavy" and with limited narrative, effectively convey performance for both individual companies, among several companies, or for the 2,711 NASDAQ listings. This is demonstrated below in the NASDAQ Interactive Stock Chart for Google shares.

Figure 2.30 NASDAQ Interactive Stock Chart—Google

Source: NASDAQ.com

Figure 2.31 NASDAQ Heat Map



Source: NASDAQ.com

NASDAQ also offers a great example of up-to-date comparative performance reporting among stocks with its "heat map", seen above. This offers broad comparative data at a glance, and more in-depth performance for specific companies when hovering over individual company symbols.

Local Government

Boston About Results

Boston About Results (BAR) is an example of performance reports for municipal services. According to the BAR website, "The reports on this site are tools for city officials and residents alike to know what city agencies are doing, how well they are doing it, and where they can improve. Collecting and sharing this data helps city agencies be responsive and accountable while continuously striving to improve quality of life for all Bostonians".

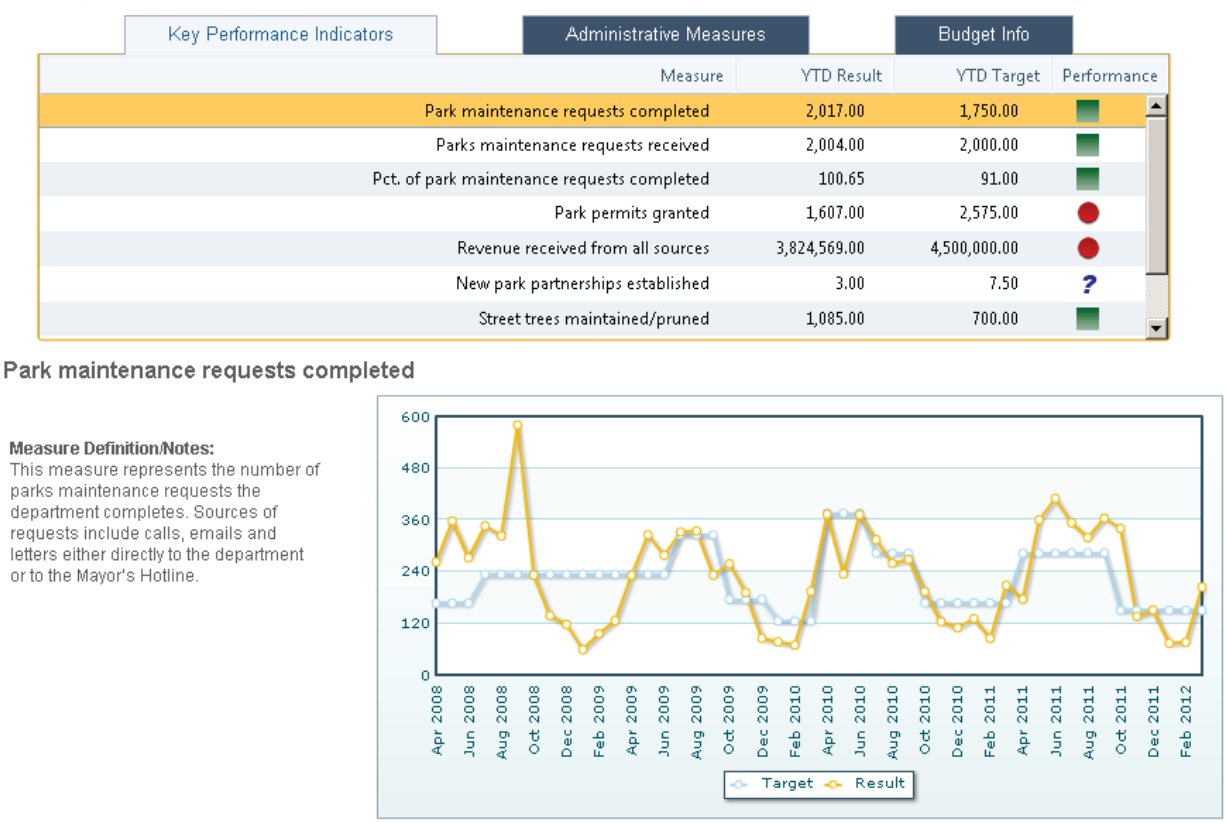
The website provides performance reports for eight different sectors within the purview of municipal government:

- Public Safety
- Basic City Services
- Energy & Environment
- Human Services

- Central Administration
- Education
- Public Health
- Neighborhood Development

For each of these sectors, BAR provides animated visualizations showing key performance indicators (for example, for the Parks Department, the targets for park maintenance requests completed vs. results), administrative measures, and budget information. Charts for these performance measures can be seen below.

Figure 2.32 BAR—Key Performance Indicators



Source: http://www.cityofboston.gov/bar/home.asp

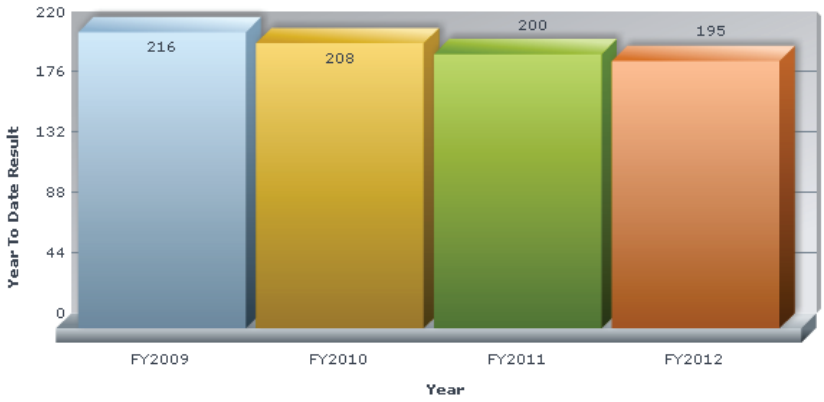
Figure 2.33 BAR—Administrative Measures

Key Performance Indicators | Administrative Measures | Budget Info

Description	FY09 YTD	FY10 YTD	FY11 YTD	FY12 YTD
A.1 Parks FTE	216.00	208.00	200.00	195.00
A.2 Parks-% of Workforce-people of color	38.00	36.00	35.50	34.20
A.3 Parks-% of Workforce-women	12.00	12.00	14.00	14.70
A.4 Parks-% of total person hours absent	5.77	5.15	4.97	4.51
A.5 Parks-Hours absent per employee	80.06	71.58	69.04	63.42
A.6 Parks - Overtime hours per FTE	78.20	64.40	82.70	90.70
A.7 Parks - Workers' Compensation payroll as a % of payroll	N/A	N/A	1.74	2.10

A.1 Parks FTE

Measure Definition/Notes:
This measure represents the number of full time equivalents in the department for each quarter. This number includes the Cemetery Division.



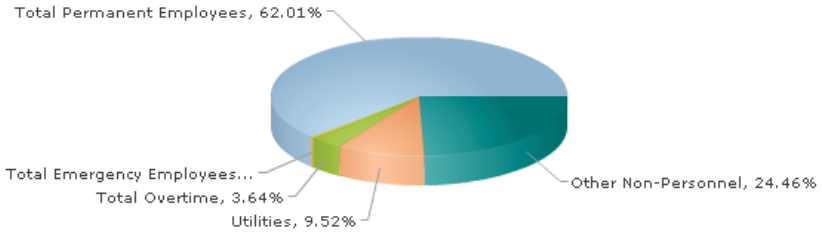
Source: http://www.cityofboston.gov/bar/home.asp

Figure 2.34 BAR—Budget Information

Key Performance Indicators | Administrative Measures | Budget Info

Description	FY09 ACT	FY10 ACT	FY11 APP	FY12 APP	Change FY11 - FY12	% Change FY11 - FY12
Total Permanent Employees	$9,495,209	$9,604,973	$9,488,215	$9,369,351	($118,864)	-1.25 %
Total Emergency Employees	$236,922	$163,729	$0	$56,086	$56,086	0.00 %
Total Overtime	$693,820	$672,515	$550,000	$550,000	$0	0.00 %
Utilities	$1,505,715	$1,357,545	$1,501,532	$1,437,854	($63,678)	-4.24 %
Other Non-Personnel	$4,205,946	$3,812,602	$3,656,464	$3,695,056	$38,592	1.06 %
Grand Total Expense	**$16,137,612**	**$15,611,364**	**$15,196,211**	**$15,108,347**	**($87,864)**	**-0.58 %**

Budget Note:
The Parks and Recreation Department budget decreases by .6% in FY12. The department has reduced costs through delayed hiring and will use recently increased fees for floodlight charges to reduce departmental utility costs.



Source: http://www.cityofboston.gov/bar/home.asp

2.5 LESSONS TO APPLY

The research conducted on reaching a national audience is helpful for several reasons.

It demonstrates a wide variety of effective models for sharing information. These models can be used as inspiration for new performance reporting templates. They can also be used as potential examples when soliciting audience feedback to learn which styles, levels of details, etc. best resonate with our key audience groups.

Much of the transportation performance measurement work collected and reviewed demonstrates goals similar to FHWA's. It seeks to engage transportation professionals, the public, and elected officials. This work can also influence the models for performance reports developed in the course of this project.

Finally, there are several key lessons that can be applied based on the principles of data visualization and design, the research collected in transportation and other fields, and the available data about what interests the audience about transportation. These lessons include the following:

- **Tell a story so the data comes alive.** Several of the formats explored emphasize leading with a storyline and delivering the data to support it.

While this may sound simple, it can be a challenge in the field of transportation performance reporting. Crafting the story requires time and analysis. It must be delivered at the right technical level for the audience and targeted on an area of interest.

- **Build in complexity as your audience becomes more selective.** The advantage to online reports is that they can engage different audiences in different ways. The front page of a website should target simple messages and easy to comprehend graphics. Several of the data visualization theories researched are heavily focused on not driving away these non-specialist (or lay) visitors. However, as the visitor shows interest in pursuing specific questions, they can be rewarded with greater data detail, interactive capabilities, and complex statistics and statistical relationships. By carefully crafting tools to speak to different audiences at different points in their visit, FHWA can satisfy multiple segments of their target audiences.
- **Focus on what the audience wants, rather than institutional and/or traditional divisions.** Some of the work of Edward Tufte highlights how much of our data presentation is driven by institutional division. It becomes clear how easy it is to fall into that pattern. In order to be effective, however, a transportation report needs to focus on how the audience experiences transportation rather than how FHWA manages it internally.
- **To keep the audience interested, avoid red light language and preconceived perceptions.** Certain phrases can detract from the message of transportation performance if they are associated in the mind of the audience with unrelated (or only marginally related) negatives. While FHWA is not an advocacy organization and this is not an attempt to "sell" a message about transportation performance, it is important to recognize and avoid the words and phrases that will detract from the message and can be easily replaced with less loaded terms of similar meaning.

3.0 Audience Reactions to Performance Reporting

This Section covers the lessons learned from a series of audience outreach meetings conducted by the project team.

3.1 OBJECTIVES

The objectives of the audience outreach component of this project are as follows:

- Gain understanding on preferred formats, delivery mechanisms, and content of transportation performance reports for the general public, legislators, and transportation professionals.
- Gain understanding on what the audience's primary areas of interest relative to transportation performance are.
- Draw upon the creative input of audiences.

In the month of August 2012, seven different audience outreach sessions were held by the project team. These included in-person meetings, webinars, and outreach through the Minnesota Department of Transportation (MinnDOT) Online Community. Most discussions were centered around a detailed presentation in which several potential performance report formats, styles, content types, and levels of detail were introduced in order to gauge the audiences' interest.

In order to get the greatest possible representation from the general public, legislators, and transportation professionals, the project team relied on relationships with stakeholder organizations. Due to the significant support and generous donation of time, meeting space, and access to their members by several organizations, this effort was very successful in learning more about the transportation performance reporting needs and preferences of all three key audience groups. The meetings included:

- National Conference of State Legislators
- Congressional Staffers
- FHWA TPM Group
- AASHTO SCOPM Subcommittee
- Illinois Chamber of Commerce and Transportation for Illinois Coalition
- Council of State Governments
- Minnesota Department of Transportation Online Community

In addition to outreach meetings, the project team developed and monitored a dedicated email address (which was shared with meeting participants who were then encouraged to pass it along) in order to collect additional feedback.

3.2 GRAPHIC SAMPLES

The following samples were provided to the audiences to gauge their responses to potential performance report mock-ups. The project team developed the graphics, aiming for a wide variety of reporting styles, formats, and topic areas. The following six examples were presented to the audience groups. Note that none of these reflect final products and should not be considered "draft performance reports." They are simply tools that were used to collect feedback.

Figure 3.1 Bridge Performance Report Sample

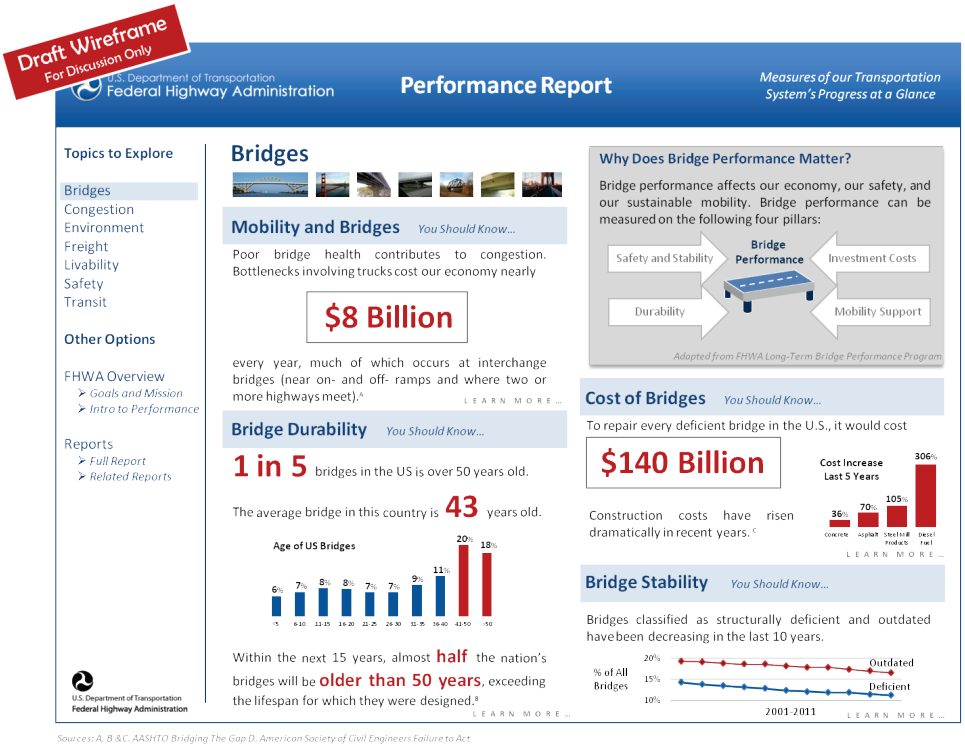
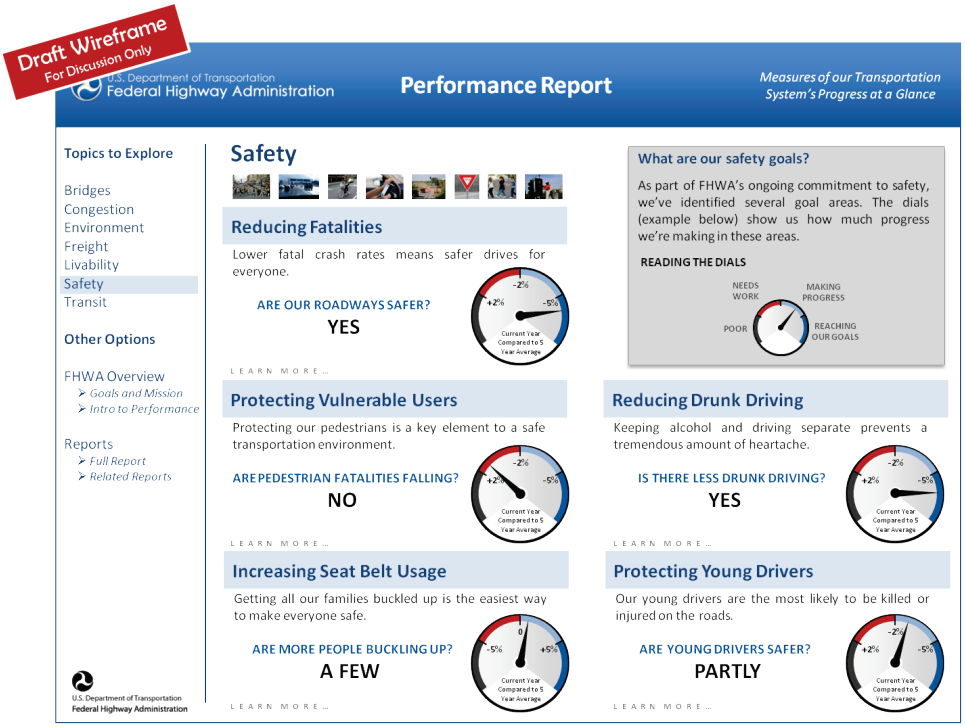


Figure 3.2 Safety Performance Report Sample



Sources: This sample is not based on real data and is for display purposes only.

Figure 3.3 Bicycle Safety Performance Report Sample

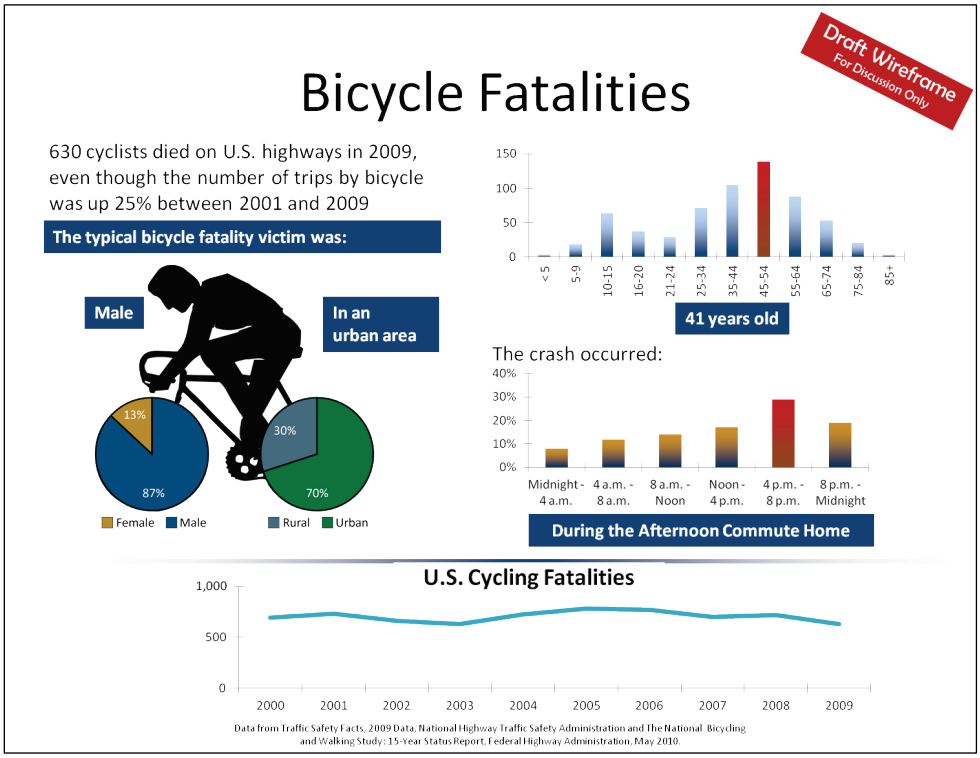


Figure 3.4 Transportation and the Economy Performance Report Test

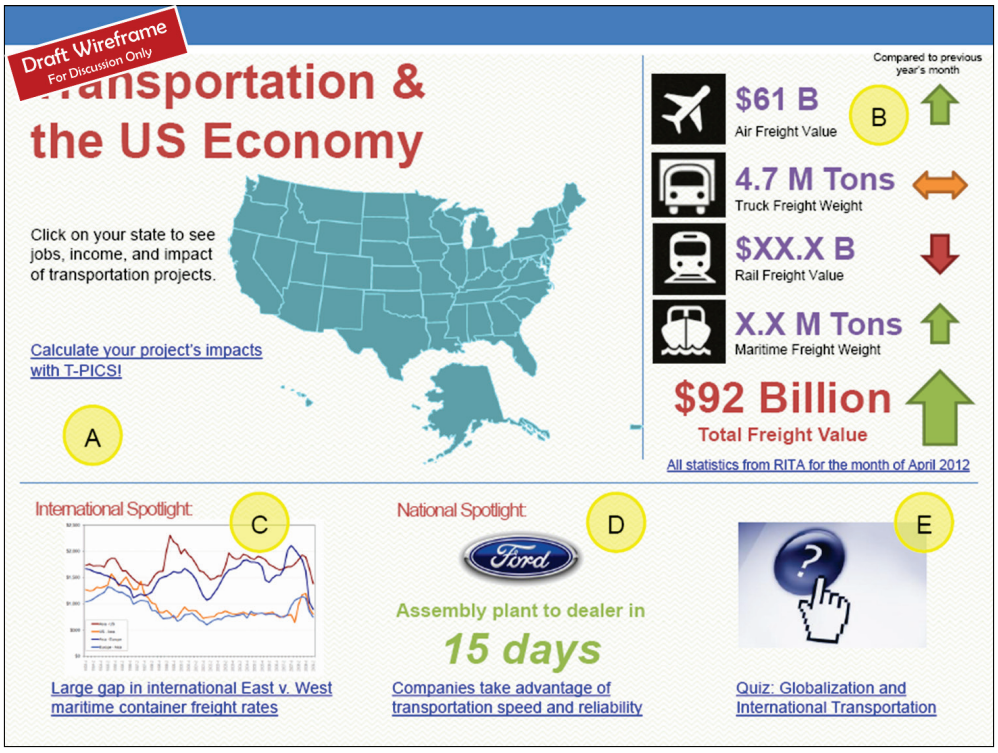
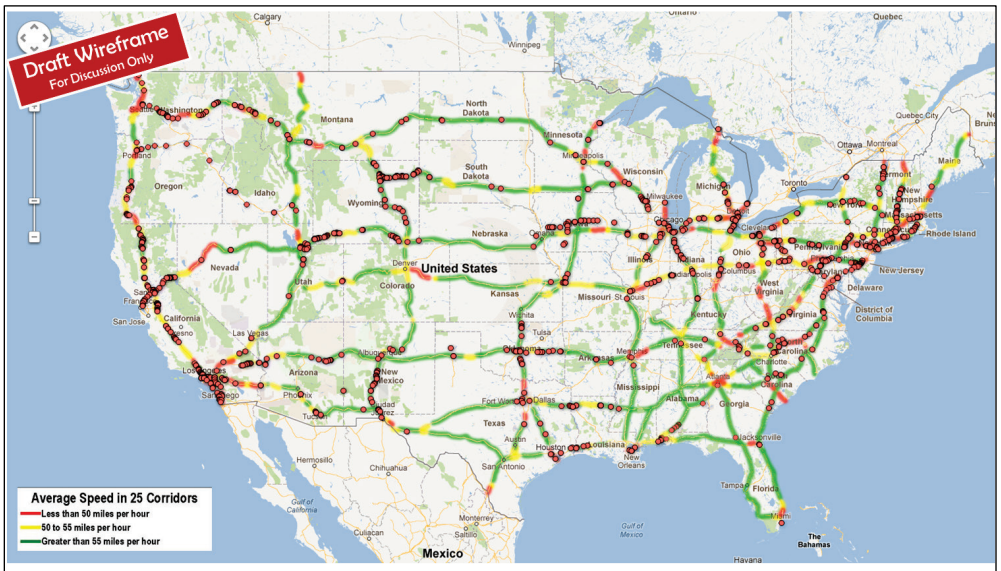


Figure 3.5 Bridge Map Performance Report Test



Structurally Deficient Bridges and Average Truck Speeds on Selected Interstate Highways

According to a 2005 FHWA study, the top ten highway interchange bottlenecks cause an average of 1.5 *million* annual truck hours of delay *each (1)*. In this map, we have overlaid bridges in need of upgrades with a novel traffic congestion map so that you can explore bridges in the most congested areas. You can zoom in and select an individual bridge to see some key information, including, in many cases, the estimated cost of improvement.

Sources: U.S. Department of Transportation, Federal Highway Administration; Average Truck Speed from Office of Freight Management and Operations, Performance Measurement Program, 2008; Structurally Deficient Bridges from National Bridge Inventory, Office of Engineering, Bridge Division, 2010.
(1) U.S. DEPARTMENT OF TRANSPORTATION (USDOT), Federal Highway Administration (FHWA). 2005a. *An Initial Assessment of Freight Bottlenecks on Highway*. Prepared by Cambridge Systematics. Washington, DC: October. Available at www.fhwa.dot.gov/policy/otps/bottlenecks/.

3.3 SUMMARY OF FINDINGS

This is a brief summary of some of the highlights of the audience feedback. For much greater detail, see the summary tables from each meeting in Appendix A.

Top Ten Takeaways

- **A single style doesn't work.** The participants felt that there is a wide variety of audiences targeted and that a single report style is unlikely to be successful. Instead, a mix of options is needed. For the general public, reports must be kept engaging but simple. Greater complexity should only be introduced for the benefit of the transportation professionals audience.
- **Personalize reports.** Reaching the audience will require reports to be as personalized and local as possible. Though data constraints may provide a challenge, local information and a story of how transportation impacts the everyday citizen is needed to spark interest. Another way to ensure a broader audience is to include both urban-oriented and rural-oriented transportation stories, recognizing the different interest areas between those audiences.
- **Snapshots are not enough.** Performance reports cannot stop with a snapshot of conditions. They also need to provide the trends, a way to mark progress or contextualize the meaning of the performance, and a link to the actions that are being taken to address and improve performance issues.
- **State-by-state comparisons matter.** Legislators and the general public are both very interested in State-by-State comparisons. This is likely to be a source of some contention as some transportation professionals often find state-by-state comparisons to be flawed. They find them lacking in the necessary detail to make them truly relevant rather than highly susceptible to misinterpretation. State-by-state comparison tools appear essential though to capturing the legislative and public audience but must be done with great care, recognizing the potential for misinterpretation.
- **Don't emphasize appearance at expense of effectiveness.** Reports need to avoid an overemphasis on appearance at the expense of effectiveness. While there was a generally low level of enthusiasm over the dashboard formats from transportation professionals, the public who provided feedback through the MinnDOT online community preferred the dashboard example they were shown. They felt it was clear, the format was easy to understand and straightforward. Transportation professionals expressed concern with the dashboards because they felt the data were being pushed into a format for the sake of consistency rather than explanatory power.
- **View of advocacy varies.** The role of advocacy was the topic of significant discussion. Several participants feel that FHWA needs to ensure that their reports do not serve as advocacy or marketing pieces. Yet many argued for the need to sell the importance of transportation investment to the general

public, private sector, and lawmakers. A successful report mechanism may need to provide education without delving into advocacy.

- **Public cares about accountability.** Agency missions, goals, and values should be included in transportation performance reports. The public is highly interested in accountability and wants to know who is making the decisions and why.
- **Public cares about quality of life.** Members of the general public indicated that they are interested in transportation topics that relate to their overall quality of life. In particular, they have a desire to learn about safety, traffic conditions, and funding. They are also interested in the ways transportation departments are being proactive and planning for future transportation needs.
- **Relevant, easy to understand graphics are likely to be shared.** Of the graphic samples provided (see Section 3.2), the general public is most likely to share the bicycle safety infographic with other people because it is easy to understand, followed closely by the transportation safety infographic because of the relevant content. The bicycle safety infographic was also met with significant approval from the legislative audience. This makes an argument for the value of "single issue, single page" graphics-heavy infographics as a valuable tool to draw in a larger audience.
- **Safety topic is of most interest.** Safety was the performance topic area that met with the most enthusiasm from all three audiences. Successful transportation performance reports need to include or feature this topic . The other topic that was universally recognized as engaging and important by all three audience groups was funding.

4.0 Performance Report Model

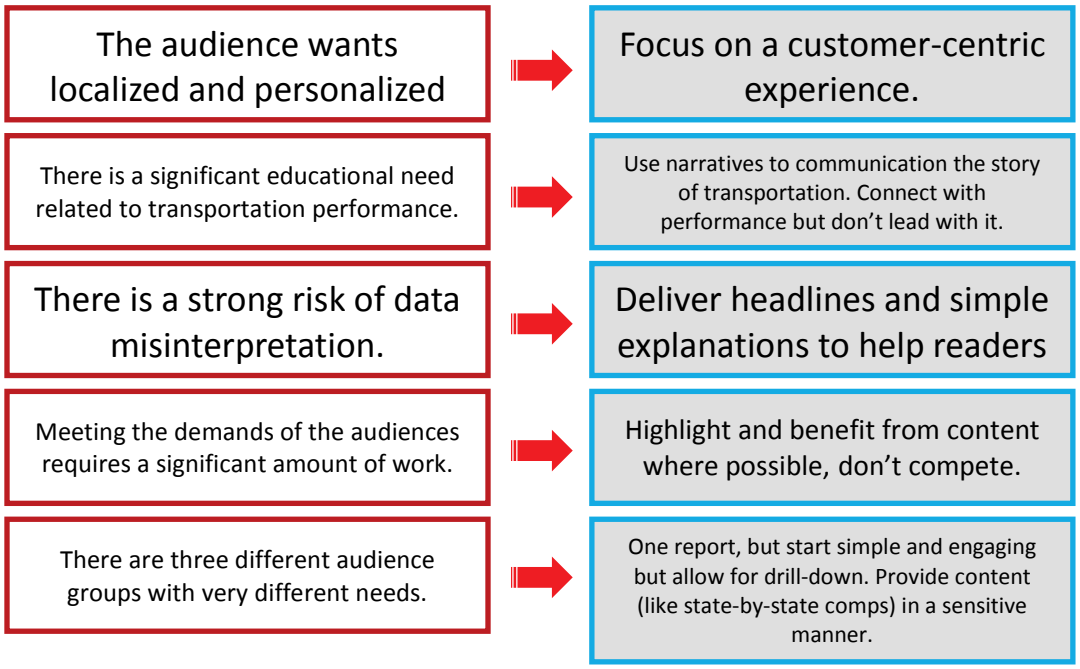
The purpose of the model performance report is to provide FHWA with a strong sample of a performance report that successfully engages key audience groups. While not fully populated, the sample report provides sufficient detail that audiences can evaluate the approach and provide usable comments on the approach.

It is the recommendation of the study team that FHWA pursue the development of a report in this style with these key elements. More detail on the necessary steps to successfully develop and implement such a report is included in the Final Report (Part II).

4.1 Performance Report Framework

One of the primary goals of the performance report was to find the best possible solution to the many significant challenges identified in the Audience Research and Feedback tasks. Figure 4.1 highlights five of the most significant problems and links them to potential solutions. While FHWA may adapt or revise the performance report sample provided in Section 4.2, staying aligned with these solutions will be very important to the overall success of performance reporting.

Figure 4.1 Addressing Problems with Solutions



Essential Elements

One of the challenges of performance reporting is that there is a limited opportunity to capture the attention of audience groups and limited amount of time to hold their attention. It is a challenge to provide the audience with enough material to clearly understand the performance measures and put them into a relevant context. The following table was developed by the study team to guide the development of the external performance report. It identifies the key elements to include in the performance report. Additional elements can be included, but these are the high priority items that much of the limited space should be devoted to.

Table 4.1 Essential Performance Reporting Elements

Content Area/Need	Description	Purpose	Notes
Header	Develop recognizable title and header	Audiences should be able to identify the report at a glance and understand it is part of a series	• Graphic design expertise creates the initial look, which would change little from issue to issue (and changes could be made without graphic designer)
Navigation Guide	Develop standardized navigation for report	Direct various audience groups easily towards their various interest areas	• Layout should be selected to accomplish two goals; capture attention and deliver clear, understandable categorization
Topic Intro	Orient the audience on the topic area of discussion	Audiences have shown a preference for reports organized around a theme and having a theme extends the issue's shelf life as people will be more likely to remember and return to it	• Functional areas (bridges, pavement, congestion, safety) work well, but need to be matched carefully with customer needs • Impact on economy is a critical topic area, either by itself or woven into all other topic areas

Content Area/Need	Description	Purpose	Notes
Targets	Explain the specific performance-based goals of the topic area	Audiences are eager for accountability and non-professionals will have limited understanding of what is "good" and "bad" without being oriented by a target, although good and bad is rarely absolute and explaining some of the nuances will be helpful to both lay and professional audiences	• Try to do this in as simple and understandable manner as possible • Summarize in text and with graphics • Address the methods for measuring targets as well as challenges/ weaknesses in measurement
Performance Snapshot	Show the current performance status	This is necessary for effective performance reporting	• Try to do this in as simple and understandable manner as possible • Summarize in text and with graphics • Online versions of the report can update performance measures when updated information is available
Performance Trend	Show the performance snapshot over time to see direction in which the performance trend is moving	Audiences need context beyond the snapshot to be able to assess progress	• Carefully choose time period • Clearly note whether trend is moving in the desired direction • Where it is not clear whether the trend is desirable, try to explain the significance • Summarize in text and with graphics

Content Area/Need	Description	Purpose	Notes
Way to Put Values into Perspective	Create linkages between stats/numbers that enable the audience to better understand the significance	Many of the statistics used regularly in transportation are difficult to comprehend given the large scale	• Several effective examples have been used to personalize stats and make them more interesting (ie. uninsured Americans) • "Explainers" (simple text/graphic explanations of transportation concepts and technical basis) can be useful for professionals trying to communicate to their customers
Factoids/Attention-Grabbers	Use brief interesting facts or mini graphics to capture the attention of the audience	Audiences respond well to brief, comprehensible, and interesting statements	• This is a staple of several successful examples ranging from Harper's Index, other magazines, newspapers ("Boring but Important") to infographics • This can also be a place to bring in some international and/or business comparisons or interesting facts
Opportunity for Audience to Manipulate Data	Provide viewers with the opportunity to review and drill down into data, combine data items to identify relationships, generate stories, and verify your conclusions	High level users have shown interest in generating their own conclusions and tailoring data to fit their own needs	• This should be done using multiple formats, maps, drill downs, comparison charts, etc.
Explanation of Organization/Process	Provide audience with understanding of the role of the organization and how decisions are made, funded, etc.	Audiences want to understand who is making decisions, who is paying for them, and how decision-makers are held accountable	• Audiences also interested in understanding institutional relationships

Content Area/Need	Description	Purpose	Notes
Explanation of Funding	Provide audience with understanding of where funding comes from and where it goes	Audience research shows that there is confusion about and interest in where the dollars come from and where they go	• Explanation of funding should be multi-dimensional using several approaches to provide information, create perspective and to give comparisons

Organizational Structure

One of the major recommendations for the performance report is that it should be organized by narrative rather than by transportation mode, functional area, or FHWA office structure. The general public does not show much interest in these divisions. They are far more interested in learning about how transportation relates to them and is relevant to their life and wellbeing. Narratives will engage the public. Transportation professionals may need to see performance data organized by functional areas, but it is important to lead with a more narrative structure for stakeholders and the public.

The study team developed three central narratives that serve the purpose of engaging the audience while providing some education related to transportation and the way it impacts their lives. Table 4.2 shows the narratives along with some different stories that can be used to help deliver the narrative to the audience.

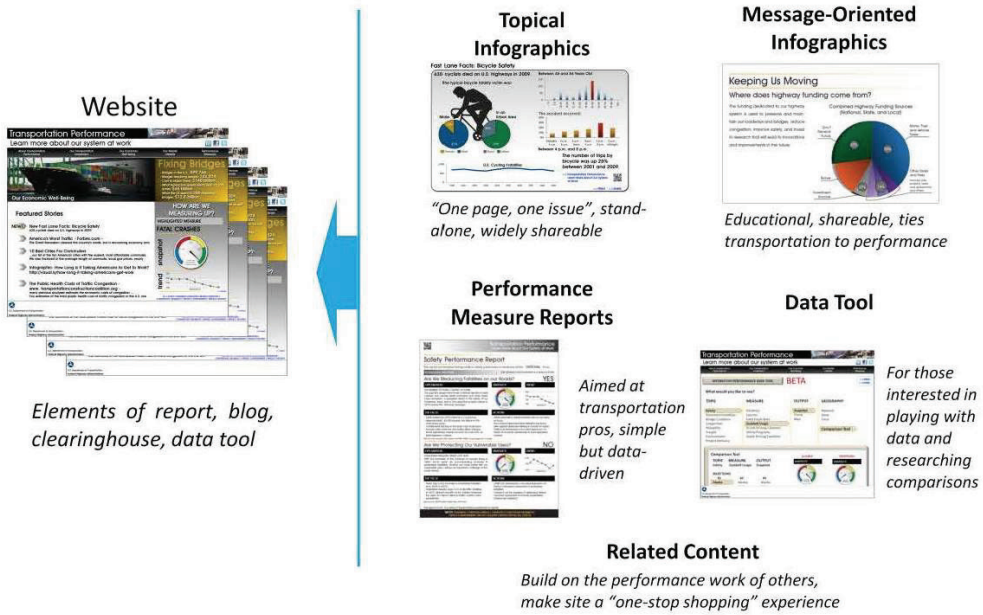
Table 4.2 Transportation Narratives

Central Narratives	Stories to Support the Narratives
Our Economic Well-Being	• The Cost of Congestion • Getting Your Stuff • Business Depends on it
Our Transportation Investment	• Keeping Us Moving • Taking Responsibility for Our Assets • Looking to Tomorrow
Our Mobile Lifestyle	• Expanding Your World • Keeping You Safe • Enhancing Community

A website was selected as the principle organizing structure for the performance report. One of the main reasons was that this platform will allow FHWA to "cast a wide net" and attract all of the major audience groups. FHWA can prepare, incorporate, and house a variety of performance reporting content in a single

location. Figure 4.2 shows a conceptual diagram of the various components that can all be fit together to make a single performance report platform.

Figure 4.2 Putting the Pieces Together



The demonstration website that incorporates these principles is shown in Section 4.2.

4.2 PERFORMANCE REPORT WEBSITE MOCK-UP

A performance reporting website was established to provide a sample of how to communicate performance reports to transportation professionals, the general public, and elected officials. The purpose of the demonstration website was to solicit reaction and to gather input. The demonstration site was shown to different audiences in FHWA as well as the AASHTO Standing Committee on Performance Management. Feedback was collected through discussion and via an established email address.

When sharing the website, it was carefully noted that this project began before the passage of Moving Ahead for Progress in the 21st Century Act (MAP-21). While this project relates to performance reporting, its purpose is not to get ahead of MAP-21 or make any assumptions about the likely outcome of MAP-21 rulemaking but instead was designed to explore approaches for talking about transportation performance in a way that resonates with multiple audiences.

The website houses several different types of performance reporting elements that appeal to both non-technical and technical audiences. The site is organized by key messages from the perspective of the user rather than by transportation topic to better communicate with the general public. It contains detailed performance reporting but leads with the story of transportation and how it affects the individual.

While the ideal format for the sharing of the website is through a live internet browser, we have recreated the website in this report through a series of screenshots with accompanying highlighted features. The following pages are shown:

- Home Page
- Our Transportation Investment Page
- Mobile Moments Infographic Page
- Performance Measures Page
- Data Tool Page

The Home Page has the purpose of orienting the visitor, providing a preview of website content, and enticing the visitor to explore. It includes the following elements:

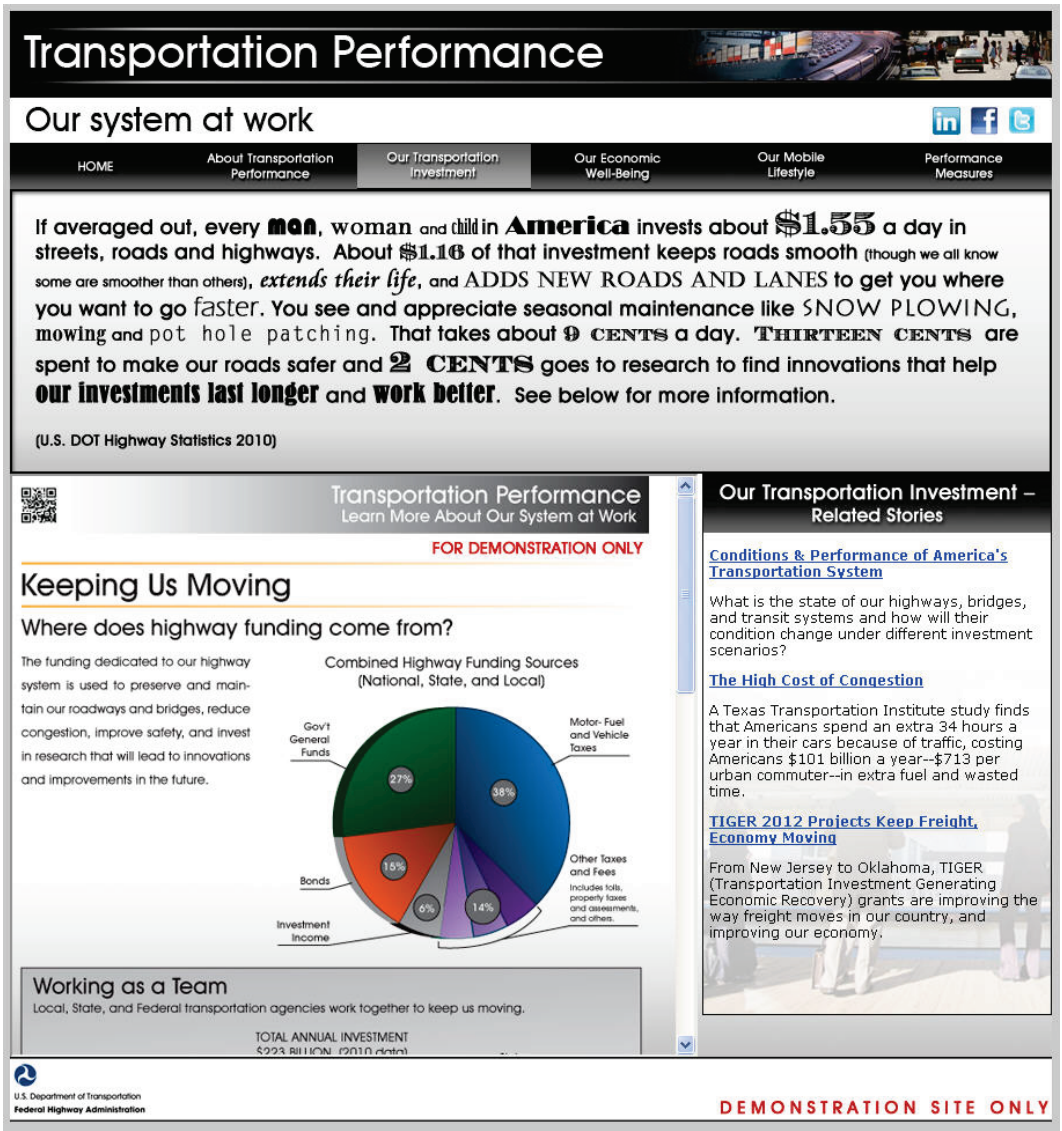
- Simple navigation and branding (note that the website information is primarily organized under three narratives, which reflects the principle of containing technical performance measurement content, but leading with transportation stories from a customer-centric perspective).
- A rotating banner which highlights the transportation stories as well as featured content (in this image, the banner shows the "Our Mobile Lifestyle" leader).
- The "Boring But Important" fact box which is intended to interest both transportation and non-transportation audiences.
- A robust, constantly changing "In the Spotlight" section which highlights performance-related material in order to facilitate a "one-stop shopping" experience.
- The "How Are We Measuring Up?" preview panel, which highlights a single performance measure and invites the visitor to explore more detailed and/or technical performance measure content if interested.

Figure 4.3 Home Page Snapshot

The Our Transportation Investment Page is an example of how a transportation narrative can be shaped, largely for the benefit of non-transportation professionals. This Page contains:

- Eye-catching leader text, including playful fonts, to draw the visitor in and outlines a customer-centric story about what transportation investment means to them.
- An infographic describing where transportation funding comes from and where it goes (note: this is included in part because of a strong interest in transportation funding education and an emphasis on accountability that surfaced during the audience feedback portion of this project).
- A panel for highlighting related content to facilitate further exploration and understanding of the narrative.

Figure 4.4 Our Transportation Investment Page Snapshot

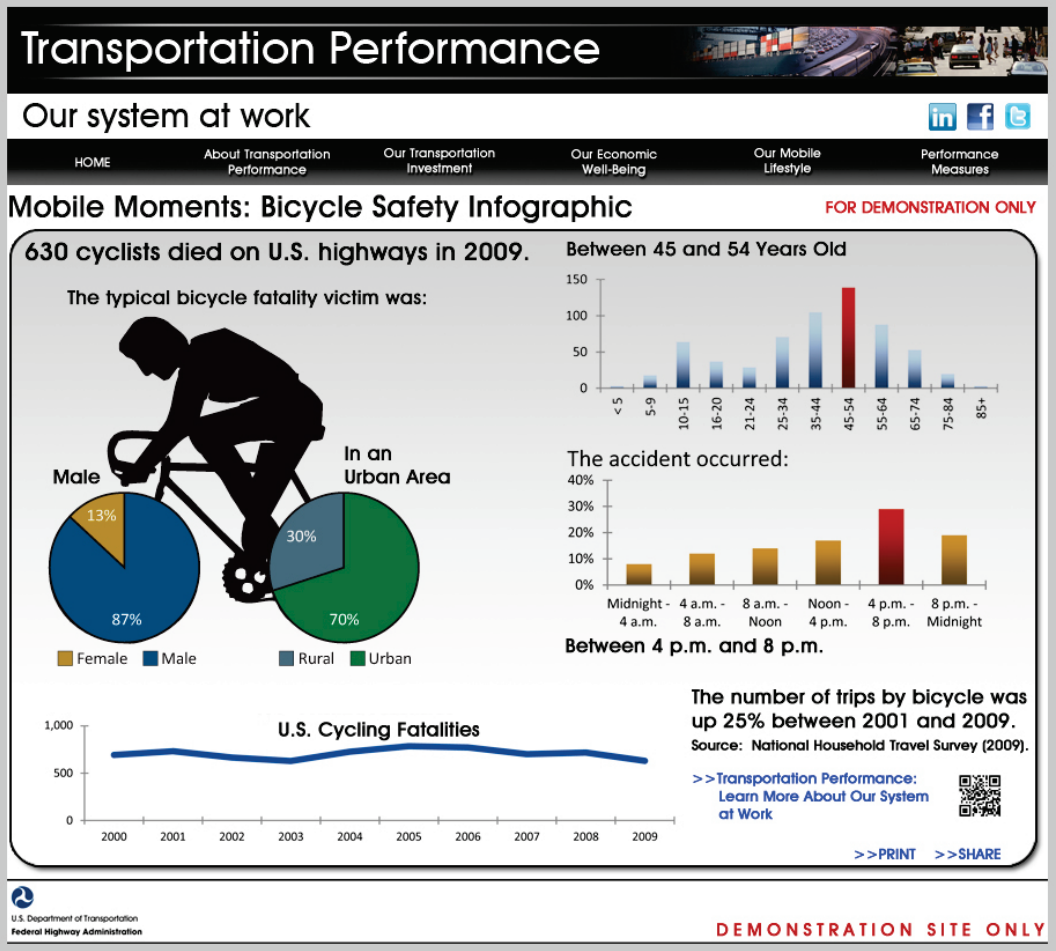


The Mobile Moments Infographic Page shows the recommended mechanism for including and sharing "single page, single topic" infographics such as the one on bicycle safety shown. It is designed to be attractive, interesting, and easily shareable. It includes a scannable QR code. It is hoped that this type of infographic would be widely distributed across the internet through social media and other outlets. This Page is included in part because of the strong response from audiences to the "single page, single topic" format.

Mobile Moments is used as a branding concept here. A series of Mobile Moments infographics could be developed and shared, to the point where a niche audience may be developed, consisting of users who regularly ask for and receive Mobile Moments updates and/or regularly visit the site to see if there have been updates. For example you might see Mobile Moments: Pedestrian Needs, Mobile

Moments: Heavy Truck Safety, or Mobile Moments: What Are Drivers Doing Besides Driving?

Figure 4.5 Mobile Moments Infographic Page Snapshot



The Performance Measures Page is the important technical core of the demonstration website. This is the most clear and concise way to display performance measures that are understandable to all three audience groups. It includes several important elements including:

- A report viewing space (the bulk of the Page) which showcases technical transportation performance reports (note that the reports can be as long as needed and include anywhere from 1-12 questions).
- Technical transportation performance reports, which are designed to include:
    - A simple, direct question related to a specific transportation performance measure (i.e., Are We Reducing Fatalities on Our Roads? Are Our Roads Smooth and in Good Condition? Is the Condition of Our Bridges Improving?).

  - A direct answer to that question (i.e., Yes, No, Somewhat, In Part).
  - An explanation of the results of the performance measure which includes a simple headline.
  - A snapshot of the performance measure versus any relevant targets (shown in dial format).
  - A graph showing the trend in the performance measure over the past few years.
  - A statement of related facts which would help readers put the results into context and provide some support for researchers or media looking for talking points.
  - A statement of the actions being taken to improve performance.
- Navigation to allow for the selection of different technical transportation performance reports (on the left-hand side), including:
  - Ability to select different report types which could include national level, State level, and potentially a local (MSA) level. This feature allows for comparison between States, a controversial area but one the audiences expressed significant interest in. Consideration could be given to displaying state level information in the same format as the national level information for ease of understanding and comparison and so State's can put their data in perspective.
  - Ability to select from different performance measure focus areas, in this case for demonstration purposes we've identified the seven areas mentioned in MAP-21.
- A link to a data analysis tool for transportation professionals with interest in further exploration of the data

The technical transportation performance report shown in the Snapshot (in part and then again in Figure 4.7) is a national report that covers all performance measures. When all measures are chosen, the Report can begin with "highlighted measures" which may be identified as national priorities as part of the ongoing rule-making process. So the report may begin with seven measures (one for each potential national priority) as an example.

The model of the technical transportation performance report could potentially be a guide for the development and shaping of transportation performance reports in the future. The key principles are asking-answering a question and providing as much context as possible so that the results are not viewed in isolation. This model may support State by State reporting because if States follow a similar template, it will allow for comparisons while not removing the context that makes each Sstate unique.

Figure 4.6 Performance Measures Page Snapshot

Figure 4.7 shows the full example of a technical performance report developed for this sample website. The sample includes full treatment of three performance measure areas.

Figure 4.7 Technical Transportation Performance Report

FOR DEMONSTRATION ONLY

Transportation Performance Report

This report summarizes transportation performance measures at the NATIONAL level.

HIGHLIGHTED MEASURES — These measures are recommended as a National Priority.

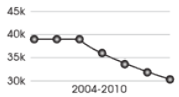
Are We Reducing Fatalities on our Roads? YES

EXPLANATION

THE NUMBER OF FATAL CRASHES IS DOWN.
The past five years have shown a steady decline in fatal crashes, but certain driver behaviors and crash types have remained a persistent threat to the safety of our roadways. There was a 19% reduction in fatal crashes in 2010 (versus the five-year average).

SNAPSHOT

TREND



Data Sources: Annual Fatal Crashes from FARS.

THE FACTS

- Fatal crashes in 2010 were at a 15-year low.
- Approximately 40,000 people are killed on the road every year.
- Seatbelt usage has shown an increasing trend since 1994. In 1994 usage was at 58%. In 2011 usage was 84%.[1] Studies have found seatbelts to be 56% effective at reducing fatalities.[2]
- Road departure crashes account for over 50% of fatal highway crashes.

[1] Governor's Highway Safety Associations.
[2] "Effectiveness of Seatbelts in Reducing Injuries" by Sunanda Dissanayaki and Inkike Ratnayaki June 2007.

ACTIONS

- FHWA and state DOT's have developed a focused approach to safety through the adoption of State Highway Safety Plans which establish strategic goals and include evaluation processes.
- Since the 1990's states have enacted graduated drivers licensing laws for teen drivers.
- Forty-eight states and D.C. have restricted nighttime driving and 45 states and D.C. have passenger restrictions.[3]
- Click it or Ticket mobilizations have been effective at increasing seatbelt usage.[4]

[3] Governor's Highway Safety Association.
[4] 6th edition of Counter Measures that Work.

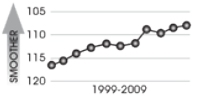
Are Our Roads Smooth and in Good Condition? YES

EXPLANATION

PAVEMENT CONDITION IS IMPROVING.
During the first decade of the 21st century, pavement roughness on the National Highway System progressively improved, giving drivers a smoother and safer ride. In 2009, pavement conditions were 3% better than the 10-year average.

SNAPSHOT

TREND



Data Sources: FHWA HPMS.

THE FACTS

- Today, on average, every mile of Interstate highway sees 10,500 trucks a day. Trucks have a significant impact on pavement condition.
- Approximately half of the nation's major roads are considered to be in good condition.
- Rural roads are smoother and in better condition than urban roads.

ACTIONS

- FHWA and state DOTs invest in maintenance as maintaining a road in good condition is easier and less expensive than repairing one in poor condition.
- FHWA's Turner-Fairbank Highway Research Center is exploring new materials and preservation tools.
- Advances in pavement data collection support identifying and prioritizing pavement needs.

Data Sources: FHWA Highway Statistics 1999-2009, AASHTO's *Rough Roads Ahead*.

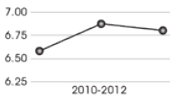
Is the Condition of Our Bridges Improving? YES

EXPLANATION

BRIDGE CONDITIONS ARE UP FROM 2010.
Bridge conditions have improved in recent years. This is likely due to recent increases in bridge construction and maintenance investment. However, many of the nation's bridges are approaching the end of the standard 50-year lifespan.

SNAPSHOT

TREND



Data Sources: National Bridge Inventory 2010-2012.

THE FACTS

- Nearly half of the nation's bridges will surpass 50 years of age within the next 15 years, exceeding the life span for which they were designed.
- While safe to travel on, about one in four bridges is either structurally deficient and in need of repair.
- Bridge construction costs continue to rise, especially with recent increases in the price of oil.

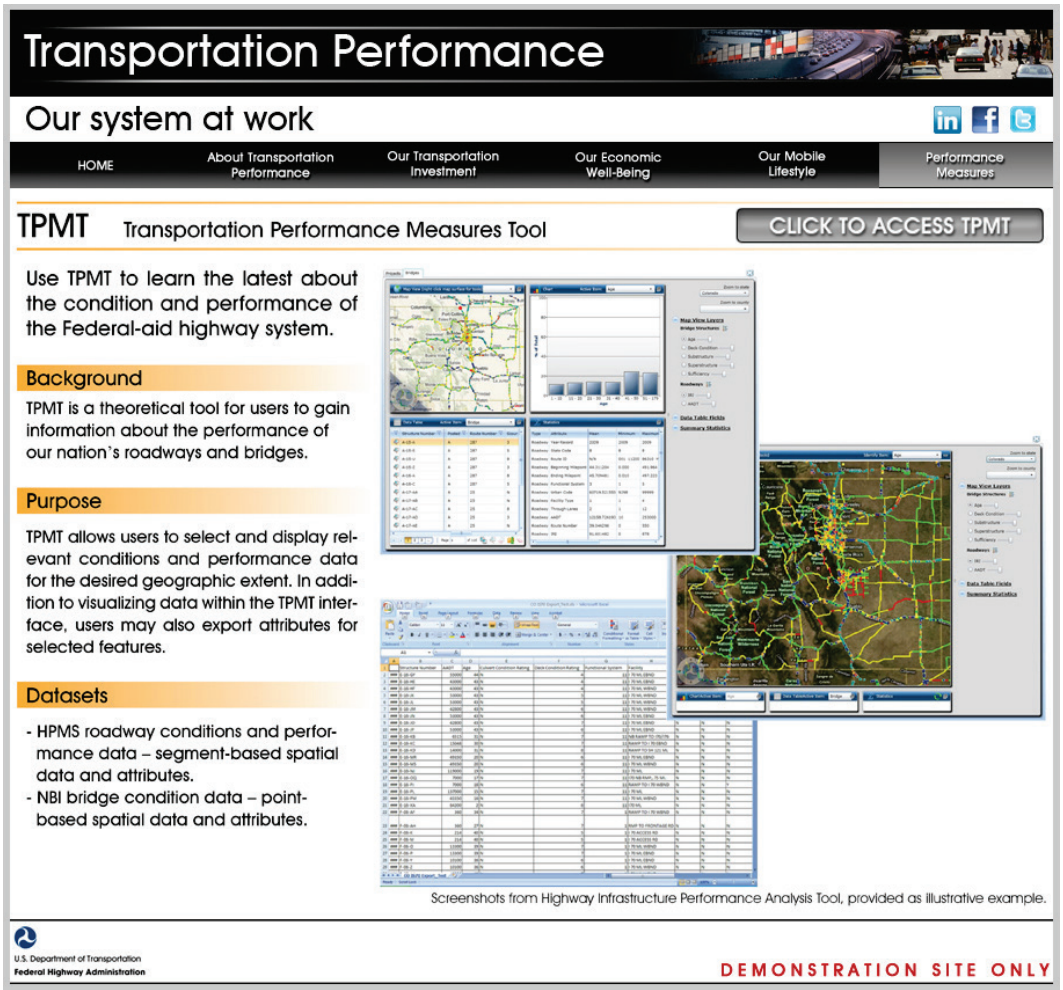
ACTIONS

- FHWA encourages accelerated bridge construction techniques to improve bridges quickly while reducing traffic impacts.
- FHWA and partners support increased investment and additional financing options to preserve the condition and safety of our nation's bridges.
- Advances in design and materials that extend the life of new and repaired bridges are being explored.

Data Sources: ASCE's *Bridging the Gap*.

The Data Tool Page is linked from the Performance Measures Page and would offer detailed analysis capabilities. We have included a display and entry page to a hypothetical Transportation Performance Measures Tool. This Tool draws heavily on the early design concepts of the Highway Infrastructure Performance Analysis Tool (HIPAT) under development by FHWA. The hypothetical tool would allow a map-based (geographic) search and display for high levels of detailed on specific individual or combinations of performance measures.

Figure 4.8 Data Tool Page Snapshot



4.3 PERFORMANCE REPORT WEBSITE NEXT STEPS

The demonstration site was shown to different audiences in FHWA as well as the AASHTO Standing Committee on Performance Management and to members of the Office of the Secretary and the Federal Transit Administration. Feedback was collected through discussion and while an email address was established for

those who wished to provide feedback that way, no comments were received through the email address.

Feedback was very positive. Those who saw the presentation and commented liked the customer-centric , narrative approach that was employed and expressed agreement with the decision to prepare one report for the three primary audiences and to do that through a web-based report . A number of comments indicated that they thought it was very important that the site be robust with frequently changing content. Many who saw the presentation at the AASHTO Standing Committee on Performance Management indicated that just seeing the demonstration site helped them to imagine what the performance reporting might look like and they indicated that was very valuable to them.

4.4 PERFORMANCE REPORT RECOMMENDATIONS

It is recommended that FHWA proceed with the development of a performance report modeled after the sample presented in Section 4.2. The report will evolve as more detail is added to the rule-making for performance measures as part of MAP-21. Establishing a framework for performance reporting that is customer-centric will be helpful in shaping the future of performance reporting to ensure it is satisfying the important goals of increasing transparency and accountability. Part II of this Final Report introduces a phased implementation plan for the performance report.

A. Detailed Comments from Audience Feedback Sessions

This Appendix includes the summary tables from audience feedback sessions, presented in chronological order.

Outreach Group	National Conference of State Legislatures (NCSL)
Format/Details	Informal Meeting as part of NCSL National Conference (8/8)
Target Audiences Covered	Legislators, Transportation Professionals
Notes	• Limited opportunity for conversation with limited participation • Discussion indicated enthusiasm for transportation performance reporting

Outreach Group	Congressional Staffers
Format/Details	Meeting with Congressional Staffers (8/21), 6 participants
Target Audiences Covered	Legislators
Notes	• This information can help provide evidence in a digestible form as to how effective the investments are and thus begin the conversation that will educate as to future reforms/changes/evolving legislation. • When this kind of information (i.e., how well the system is performing in terms of all the characteristics, including condition) is presented at hearings, members show great interest. • Legislators are unlikely to go to the dashboard or web themselves, but if movement of the needle (or not) starts a buzz across the community, they WILL hear about it. • Trying to provide one thing for different types of people will not work. 'Geeks' will want the detailed data and to do it on their own. Most lay people will not be interested. Not sure it's worth trying to do something involved that people will not look at. Definitely should 'put data out there.' • Keep it lean and mean. Get their interest, let them delve deeper "geek out." • People care about safety, maybe bridges (because of I-35W). Terminology scares people.

Need to be careful what gets put out.

- Pavement is not an issue that resonates with the public.
- The WashDOT Grey Notebook is an example of a report that is too detailed for the public and legislators; good material but too much to use.
- People care about the full macro view then the micro view and not in between the two.
- Data visualization tell a better story but the 'build your own' generally do not work or require too much time to find something meaningful. FHWA needs to do the work, not just let people play with the data, data visualization is a good in between, not too dumbed-down.
- Some tools are useful to generate key talking points for Hill staff, but they find what they need anyway and should not be the real target audience.
- Debate over format, some argued that it cannot be a single page format, but still must not be too busy.
- Absolutely need to be able to compare States, that's what MAP-21 was all about; legislators want a map of the United States that allows you to drill down on key issues (like fatalities) and find out why is my State better or worse.
- Legislative audience has no need for non-aggregated data (below State level).
- Change over time is important; need to show current performance and a trend.
- National statistics are somewhat useful and get put into floor speeches, but politicians/staff care more about State by State and district by district look; very limited number of things relevant at the national level.
- National stuff will be useful in the 'are we investing our resources in the right program' discussion.
- What you need to convey the State by State message is different than the national policy message.
- Related to the economy, people do not believe the jobs multipliers or the economic impact stories, so focus should be on how to improve performance.
- Critical to limit the amount of information put on a single page.
- Any condition information should connect to the state's plans to fix the deficiencies
- Would be interesting to create 40 stories maybe around mega projects where you can click and get specifics or maybe they rotate and they make points considered useful or important or show how not fixing them is a drag on the economy. This illustrates that metrics for professionals vs. metrics/or the words chosen to represent them for layman can and should be different. Stories are the way to go—they allow you to expand on the technically correct and

	move to the "what does it mean." • Strong positive reaction to the bicycle infographic example, very neat and user friendly. • Concern over the danger of emphasizing marketing over performance reporting.

Outreach Group	FHWA TPM Group
Format/Details	Webinar (8/22) with 8 participants
Target Audiences Covered	Transportation Professionals
Notes	• "Maintenance" as red light language is interesting, would have thought people would want maintenance over big new projects while current infrastructure falls into disrepair, from a prioritization standpoint. • Would like to see national implications to local decisions reflected in reporting if possible. • Infographics can be useful for tracking money spent from sources, at a single point in time or over a trend. • Some good work has been done by the TRB Public Involvement Committee looking for good communication examples and finding creative solutions like comic books, simulation games, etc. • In response to question (Is this an opportunity to educate?), group felt yes there is an obligation to educate the public, particularly about how their money is being used. • Need to link between performance and actions, very critical from FHWA perspective and also important to general public, public wants to know what was done with the money. • Maine has an effective statewide economic report. • See long range local planning as a clearly important need to address. • This project concept started before MAP-21, but with MAP-21 there is an opportunity to tell more parts of the story, we want to hear what is good to communicate and what is not good to communicate, think about what we'll have available, what would be useful and what would be detrimental. • A lot of organizations are looking for information, when the reports stand alone and share good information, they are likely to be picked up and used. • In response to question of whether we should target the media, it was discussed at FHWA but the media does not often get into that level of detail at the national level; at the local level, media is a very important stakeholder. • When considering the media, need to recognize there is a lot of fear about the media reporting negative findings and reluctance to putting out good information on system performance

	because of this; this makes one argument for narrative based reporting. • States can point out flaws and lobby for more funding, for example in Atlanta some visualization might be helpful in making the case for additional funds. • One good example is the Washington State Gray Notebook which tells bad news and good news and gains credibility for that reason. • Another good example of tying actions in is an FTA report where every page had a promise, was a powerful way of capturing the audience, focus on actions. • Would be great to promote understanding of how stakeholders fit into to larger system, how regional impacts State impacts Nation, helps actors identify specific activities to improve overall numbers/picture.

Outreach Group	AASHTO SCOPM Subcommittee
Format/Details	Webinar (8/28) with 33 participants
Target Audiences Covered	Transportation Professionals
Notes	• Interested in seeing results of effort. • Interested in what the frequency of update will be, is this an annual report? • Surprised to see that Safety wasn't one of the stories that resonate with audiences from example. • Also surprised to not see System Condition as a story that resonates. • Need to find the "right balance" between providing people with enough data and boring them. • Dashboards can often be disappointing. While the simplicity of "gauges" is appealing, their significance is often lost. It is not always clear what the importance of moving the dial is. • Infographics with multiple perspectives on one topic work well. There is "something for everyone". They intrigue readers to dig deeper on certain topics. • Need to make sure proper context is used for comparisons. For example, comparing State-by-State pavement expenditures is useless unless the figures are per mile. • Another valuable resource is Dr. Frank Lunz' *Words That Work, It's Not What You Say It's What People Hear*. • Need to think about both urban and rural transportation stories. • Need to personalize the message. Every American is part of the transportation story. • Liked the use of clear questions with stated responses (see example of Safety graphic: Are Our Roadways Getting Safer? Yes). It communicates a clear answer without miscommunication and piques the interest of the reader to see the reasoning and data behind the answer. • Problem with some performance reporting is overemphasis on appearance at the expense of

	effectiveness. So much attention is placed on attractive and consistent graphics (pie charts/bar graphs/etc) that the information that needs to be communicated is lost, misunderstood, or easily confused. Need to choose effectiveness over appearance in reporting. • One of the keys to efficient performance management is to allow the sates to focus on lowering risk and focus on efficient investment. States need to have the freedom to avoid funding worst-first strategies. • Need to look carefully at measures being reported (and those emphasized in MAP-21) to ensure they can allow for a focus on risk. • Need to ensure that performance-based systems do not require decisions that are counterproductive and are inconsistent with customer desires and safety. • Implementing performance management requires a collaborative and cautious approach.

Outreach Group	Illinois Chamber of Commerce and Transportation for Illinois Coalition
Format/Details	In-Person Meeting (8/29), 14 participants
Target Audiences Covered	Private Sector, Legislators, Transportation Professionals
Notes	• Other important language the group expected to see under "green light" includes: Innovation, Needs (what are the transportation needs and how do we track them), Congestion (and congestion pricing), Financing/Tolling/Alternative Funding Issues, Context-Sensitive Solutions, Intermodal, Systemic. • Agree strongly that public is interested in learning more about where funding comes from and how it is used. • When considering the general public, need to consider the differences in interest between urban (transit/ped/bike) and rural (highway) users. • Safety is always a compelling story and was clearly recognized in MAP-21. • Think the format for reaching audiences varies by audience; Infographics work well for the general public, there is the possibility of them going viral and being widely shared. • Interested in the idea of interactive training/modeling programs, similar to SimCity, which teach the audience about tradeoffs and help in prioritizing needs. • Need to consider the scale of numbers; helpful to have multiple layers of data analysis available (see example of Obama budget infographic which allows for national/State/regional comparisons); at the appropriate scale accountability becomes easier to communicate. • Need to communicate the depth of the transportation problem to the general public and the impact of a do nothing scenario.

- Narrated video format would be great for education; verbal element would help.
- Need to emphasize trends, not just snapshots.
- Easy to give the viewer the Who/What/Where, harder to give them the Why/How.
- General Public will respond to headlines.
- FHWA's TIGER dashboard was a compelling example.
- Stories need to be localized and personalized.
- Chicago Tribune has a good story on congestion that was focused on the individual (what is the impact of Chicago's congestion on you?); this is effective in getting people talking.
- Funding is the greatest area of interest to the public; need to relate performance to funding and focus on local impacts and how efficiently it is being used.
- Building on other agencies' work such as ASCE and TTI may lend credence to FHWA data.
- State-to-State comparisons are important.
- Need to refresh data and reporting regularly, if it is on a longer update cycle than quarterly, audience will lose interest (the tech savvy people know where the refresh button is and want frequent updates).

Outreach Group	Council of State Governments
Format/Details	Webinar (8/30), 25 participants
Target Audiences Covered	Legislators, Transportation Professionals

Notes	• Surprised to see maintenance as a red light word. • When measuring safety, need to distinguish between DOTs and State Police responsibilities. • Agency missions, goals, and values should be included in performance reports. • Transportation sector has not done a great job in telling our story, need to tell story in order to argue for funding. • Need to show multiple levels such as national and state but lack of county and local data will make it a challenge to go below the state level. • Average citizen does not know what the National Highway System is; their main concern is the local roads.

Outreach Group	Minnesota Department of Transportation Online Community
Format/Details	Presentation shared through online community, Discussion broken into two parts with 212 participants in Part I and 191 participants in Part II (significant overlap expected, so assumption is 212 total participants)
Target Audiences Covered	General Public (Transportation Enthusiasts)
Notes	• MinnDOT customers indicate they are interested in transportation topics that relate to their overall quality of life. In particular, they have a desire to learn about safety, traffic conditions, and budgetary funding. • In addition, customers are also interested in the ways transportation departments are being proactive and planning for future transportation needs. • Transportation information is of the most interest when it applies to local news and facts – alternatively, interest in transportation information diminishes as it becomes less local. • Although all of the examples are criticized for various reasons and could be improved, when asked to choose residents are most likely to share with other people the bicycle safety infographic because it is easy to understand, followed closely by the transportation safety infographic because of the relevant content. • The Bike Safety infographic is the clear favorite for being easiest to understand and for containing the most information residents want to know about the topic. It is also the infographic most likely to be forwarded to someone. Criticisms include that one of the charts is confusing and the initial context paragraph lacks a point of comparison. • Both the Transportation Safety and Bridge Performance infographics are also quite easy to understand and rate well for containing relevant information. Criticisms include that they can seem cluttered or confusing with contradicting statements or lack information on future repairs (Bridge Performance) or distracted driving (Transportation Safety). • The Bridge data tool infographic is less likely to be easily understood due to a lack of clarity around what the red dots signify or what the correlation is between the bridge and speed

information.

- The Transportation & the Economy infographic is praised for its interactive features but is least likely to be viewed as easy to understand or containing the information residents most want. Not surprisingly, it is also least likely to be rated as information residents would share with others.
- The Non-Transportation information layouts that are the most well received by residents are clear and easy to understand from a visual standpoint.
- The preferred layout for receiving all the infographics is via a webpage or an electronic newsletter.

Note: Special thanks to Minn/DOT and partner Communispace for support in allowing use of customer portal, formatting and adapting discussion to portal, and helping summarize comments.