Envisioning Better State of Good Repair Performance Measures

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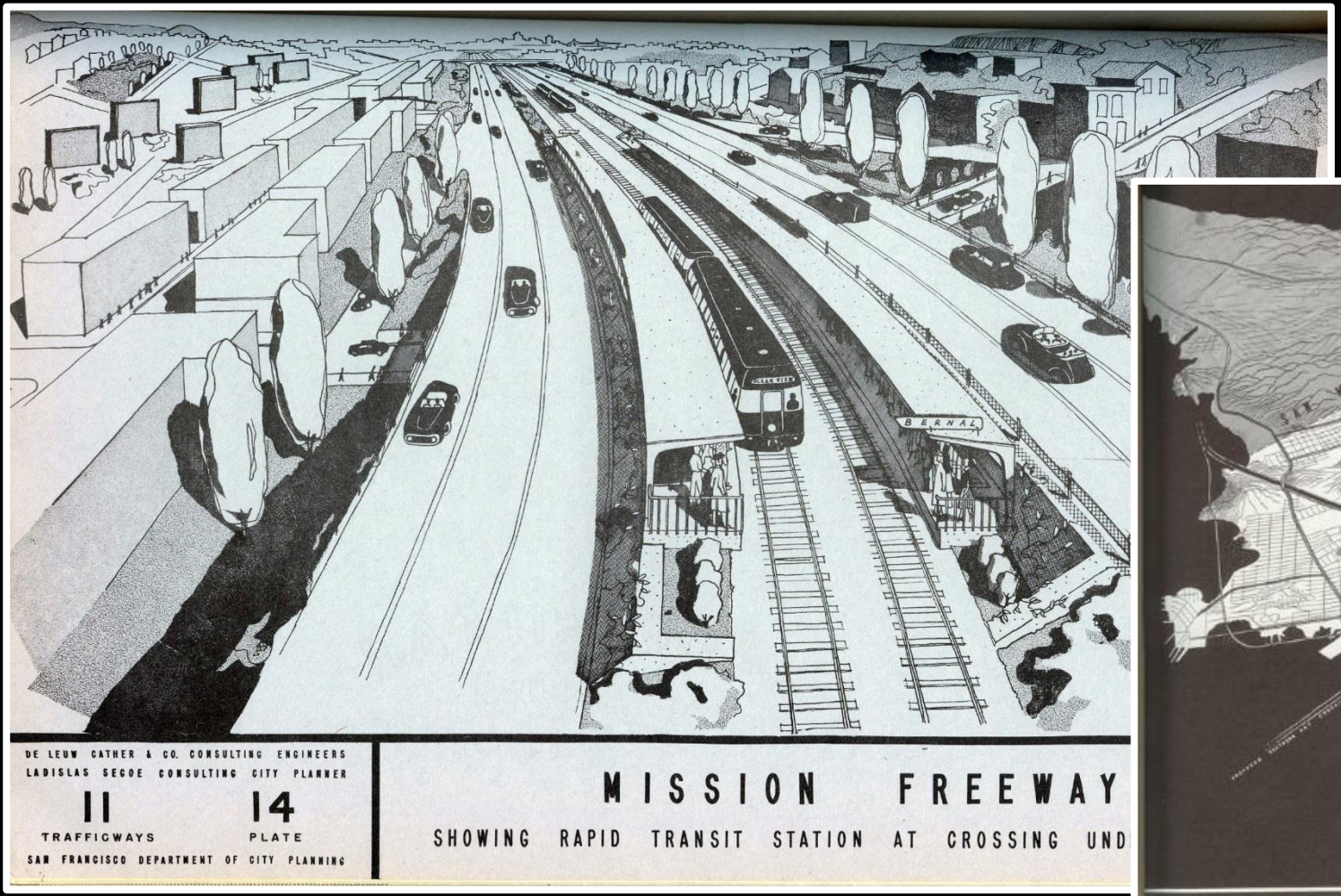
Image Source: https://www.flickr.com/photos/mwichary/2484891102

In mature metro areas, expansion has taken a back seat to preservation of our existing transportation systems.



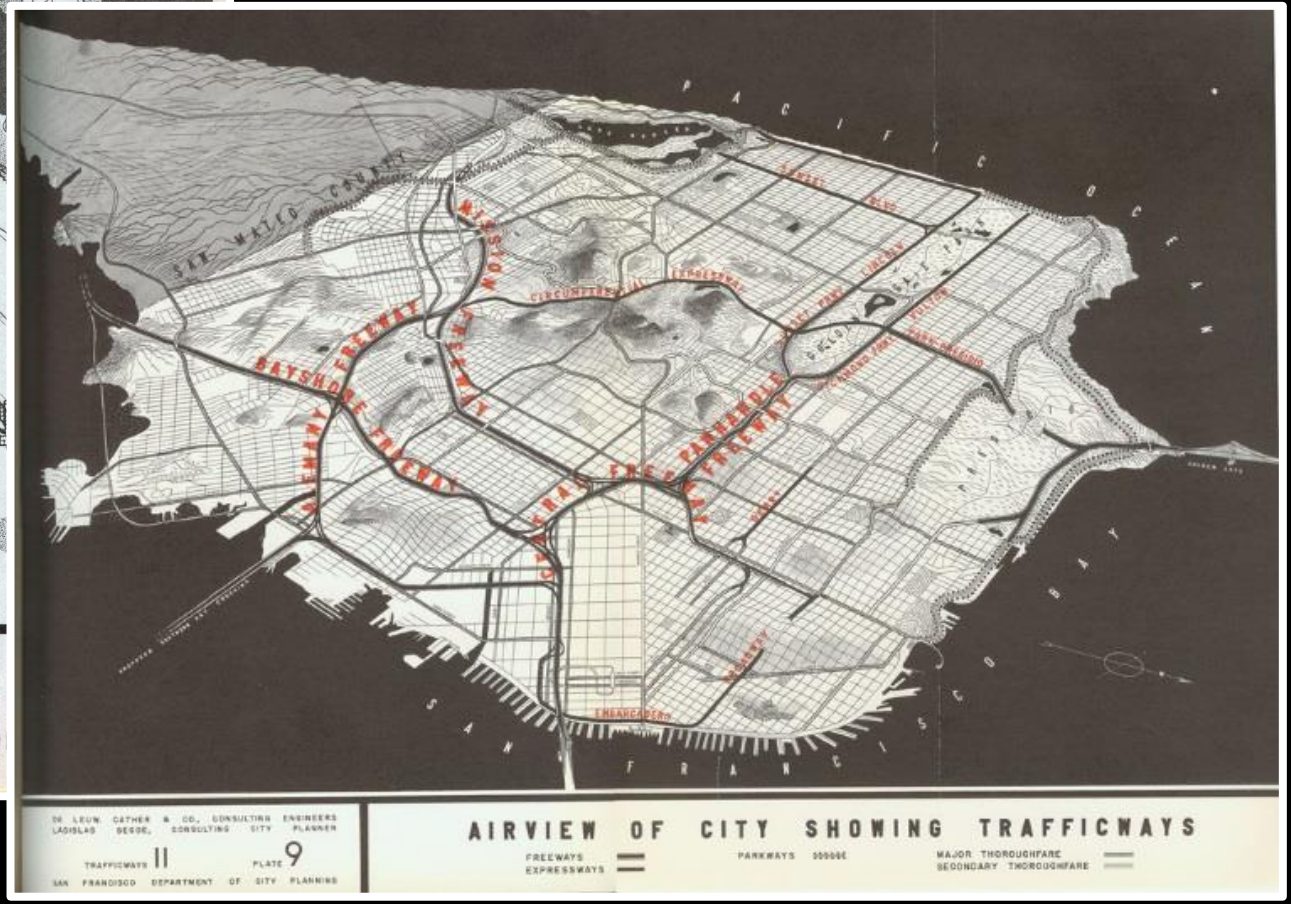
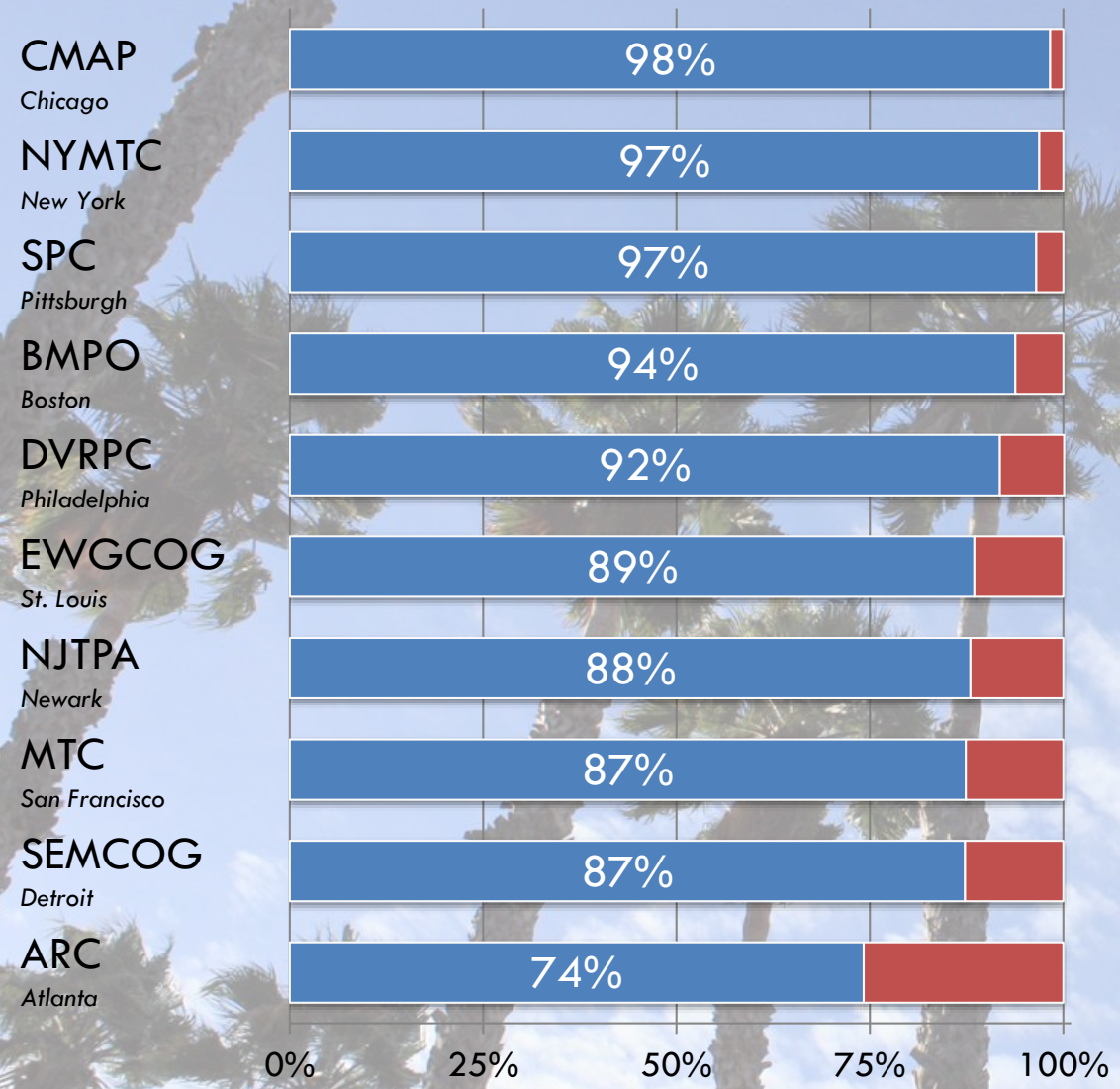


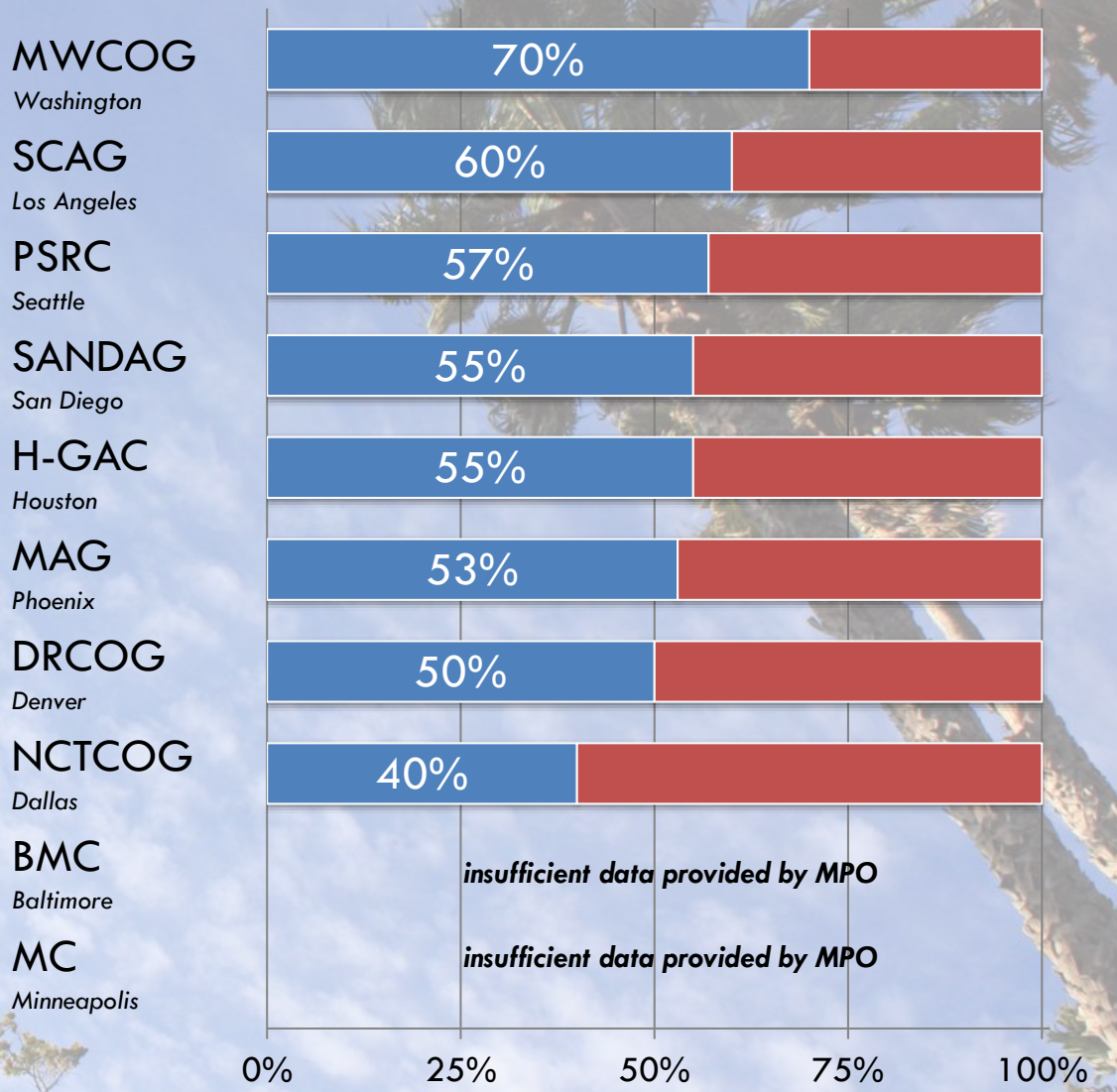
Image Sources: https://www.flickr.com/photos/walkingsf/3890830634; https://www.flickr.com/photos/walkingsf/3889457711

State of good repair affects the general public every day.

Image Source: https://www.flickr.com/photos/nathan_y/2824325481/

Most major metro areas are spending the vast majority of funds operating and maintaining existing systems.





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Performance measures can help us communicate those impacts in terms the public can actually understand.

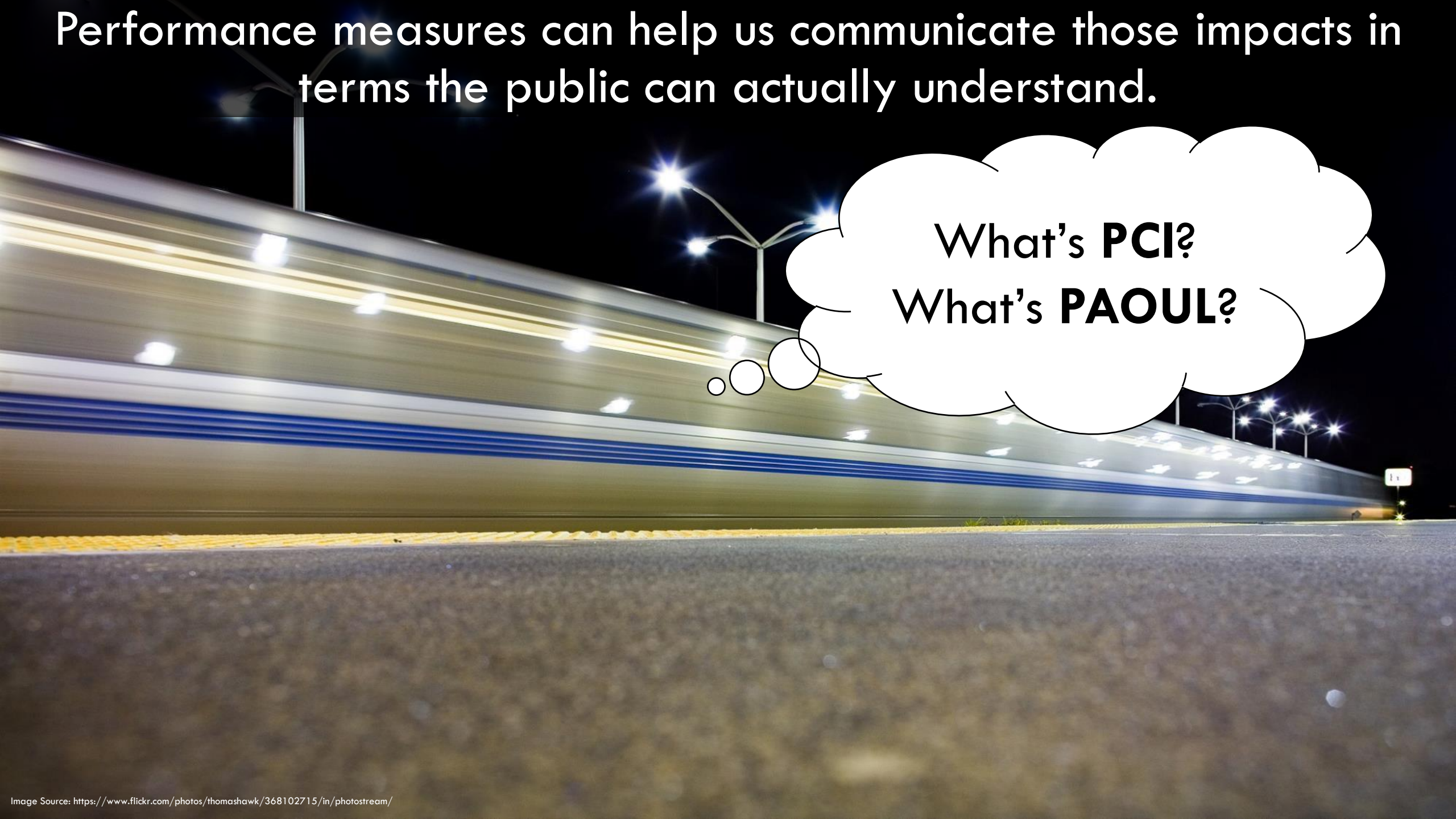


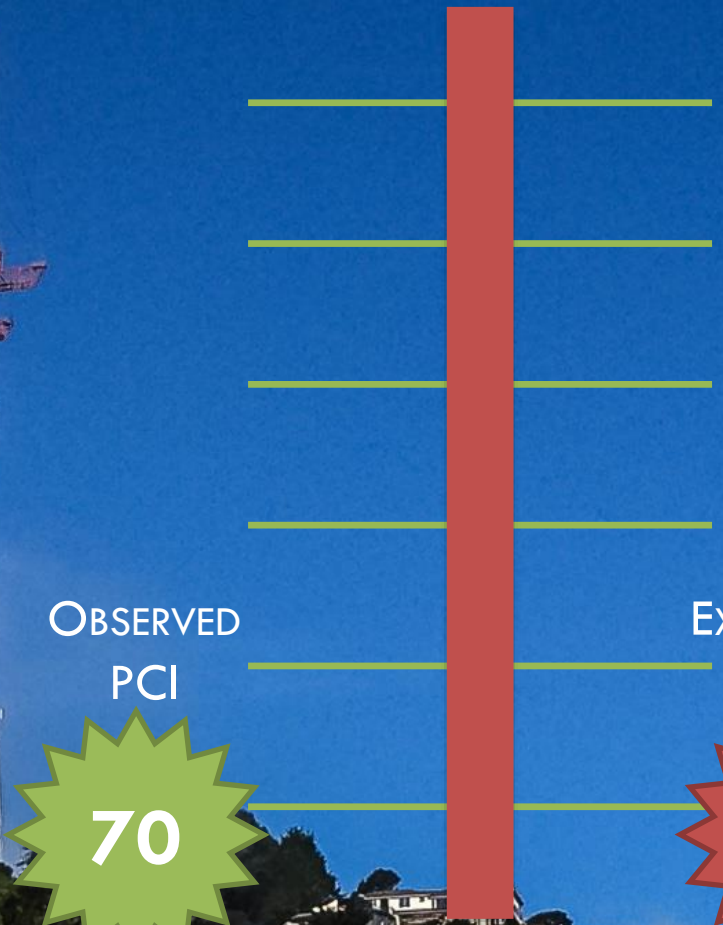
Image Source: https://www.flickr.com/photos/thomashawk/368102715/in/photostream/

In addition, we need performance measures that recognize that not every lane-mile is equally important.

Image Source: https://www.flickr.com/photos/tomchance/4503195546

Image Source: http://www.flickr.com/photos/rao_anirudh/8732828358/sizes/o

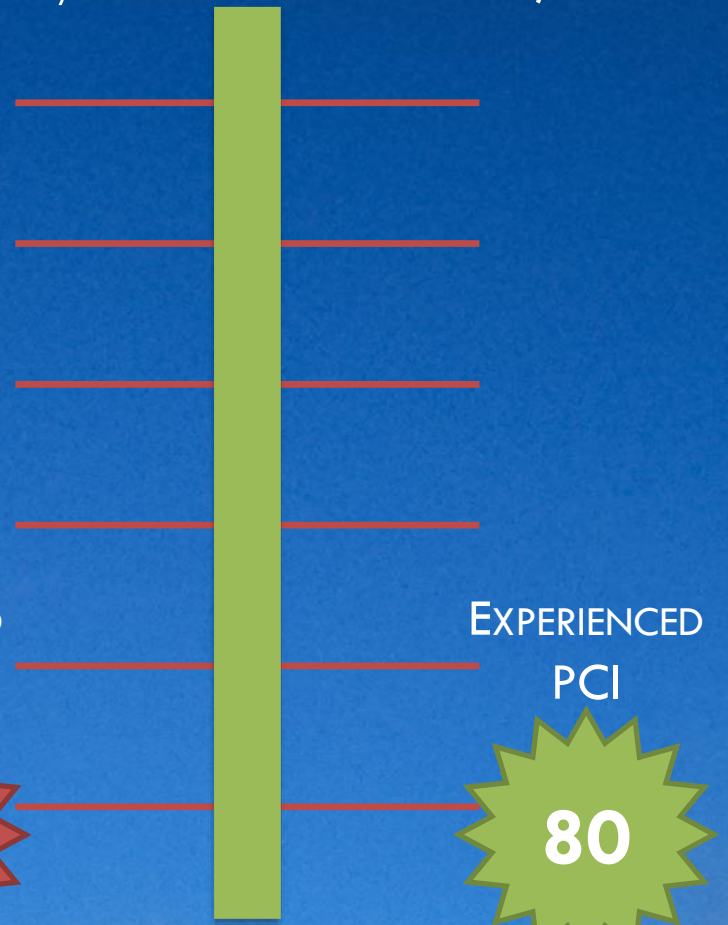
Example City:
PCI Maximization



Observed PCI: 70

Experienced PCI: 20

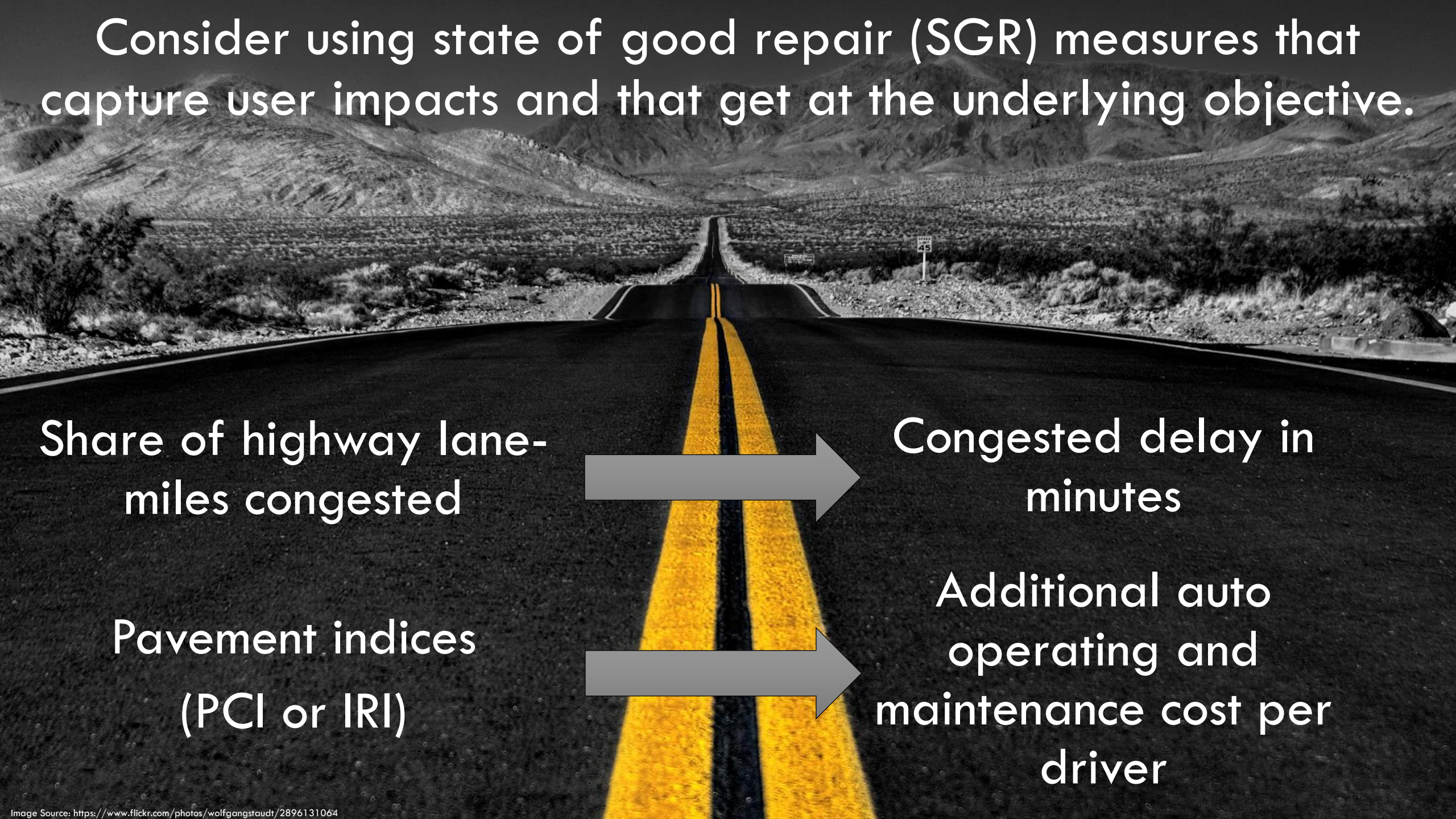
Example City:
Operating Cost Minimization (or B/C Ratio Maximization)



Observed PCI: 30

Experienced PCI: 80

Consider using state of good repair (SGR) measures that capture user impacts and that get at the underlying objective.



Share of highway lane-miles congested → Congested delay in minutes

Pavement indices (PCI or IRI) → Additional auto operating and maintenance cost per driver

Image Source: https://www.flickr.com/photos/wolfgangstaudt/2896131064

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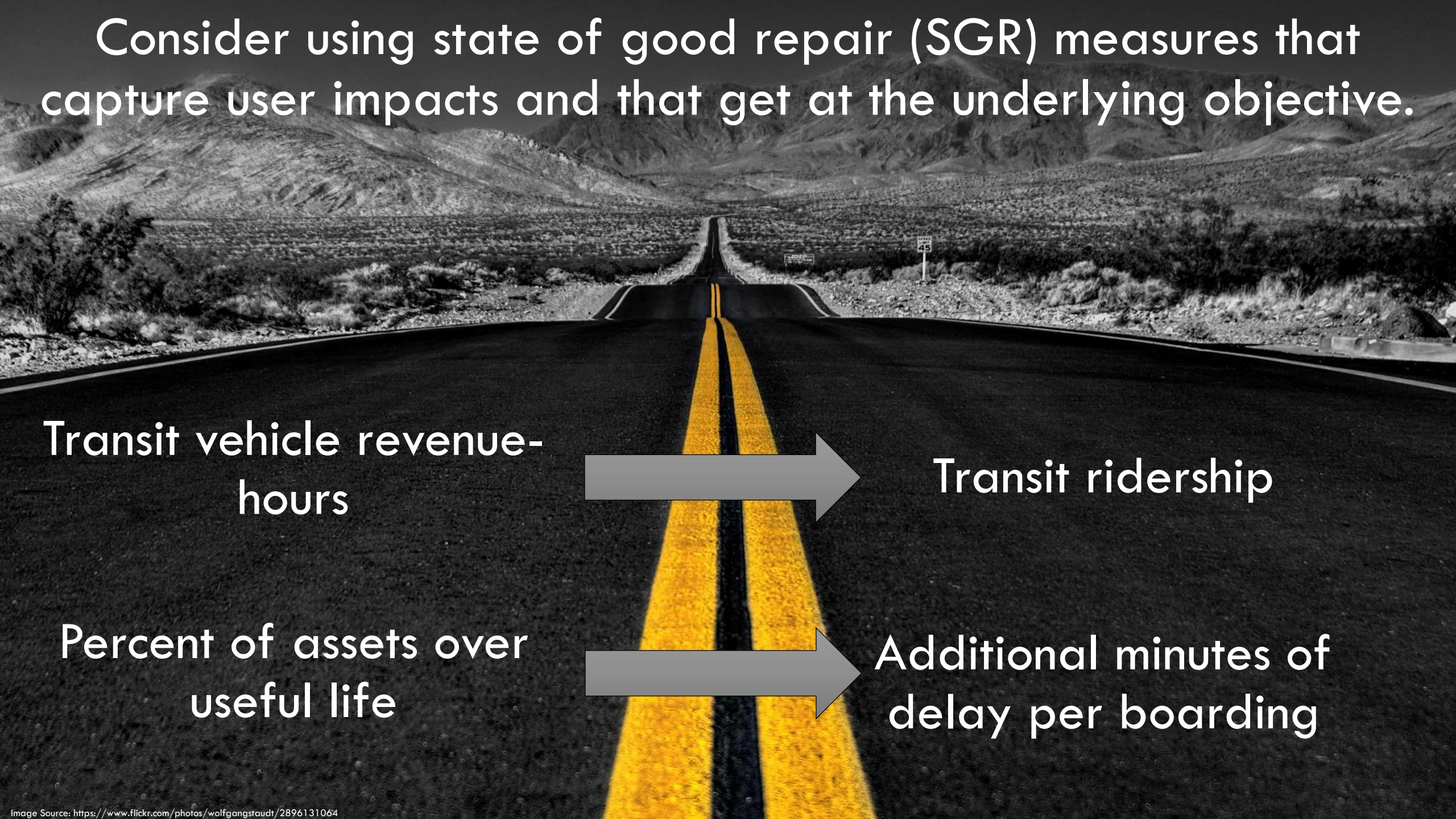


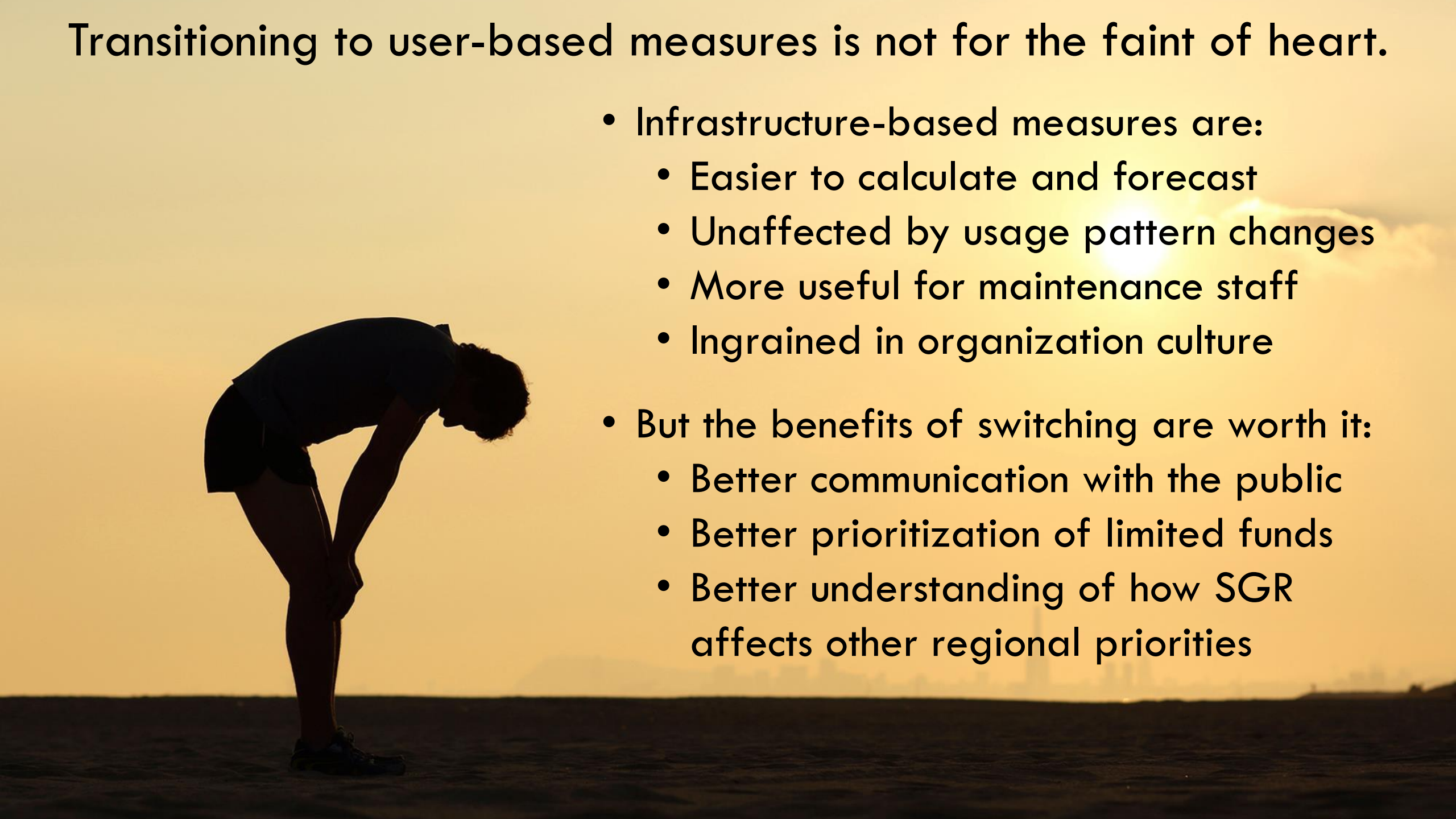
Image Source: https://www.flickr.com/photos/wolfgangstaudt/2896131064

Making this paradigm shift is easier said than done.

MAP-21 includes SGR performance measures – but they don't directly reflect the benefits to system users.

Image Source: http://upload.wikimedia.org/wikipedia/commons/6/64/Capitol_at_Dusk_2.jpg

Transitioning to user-based measures is not for the faint of heart.

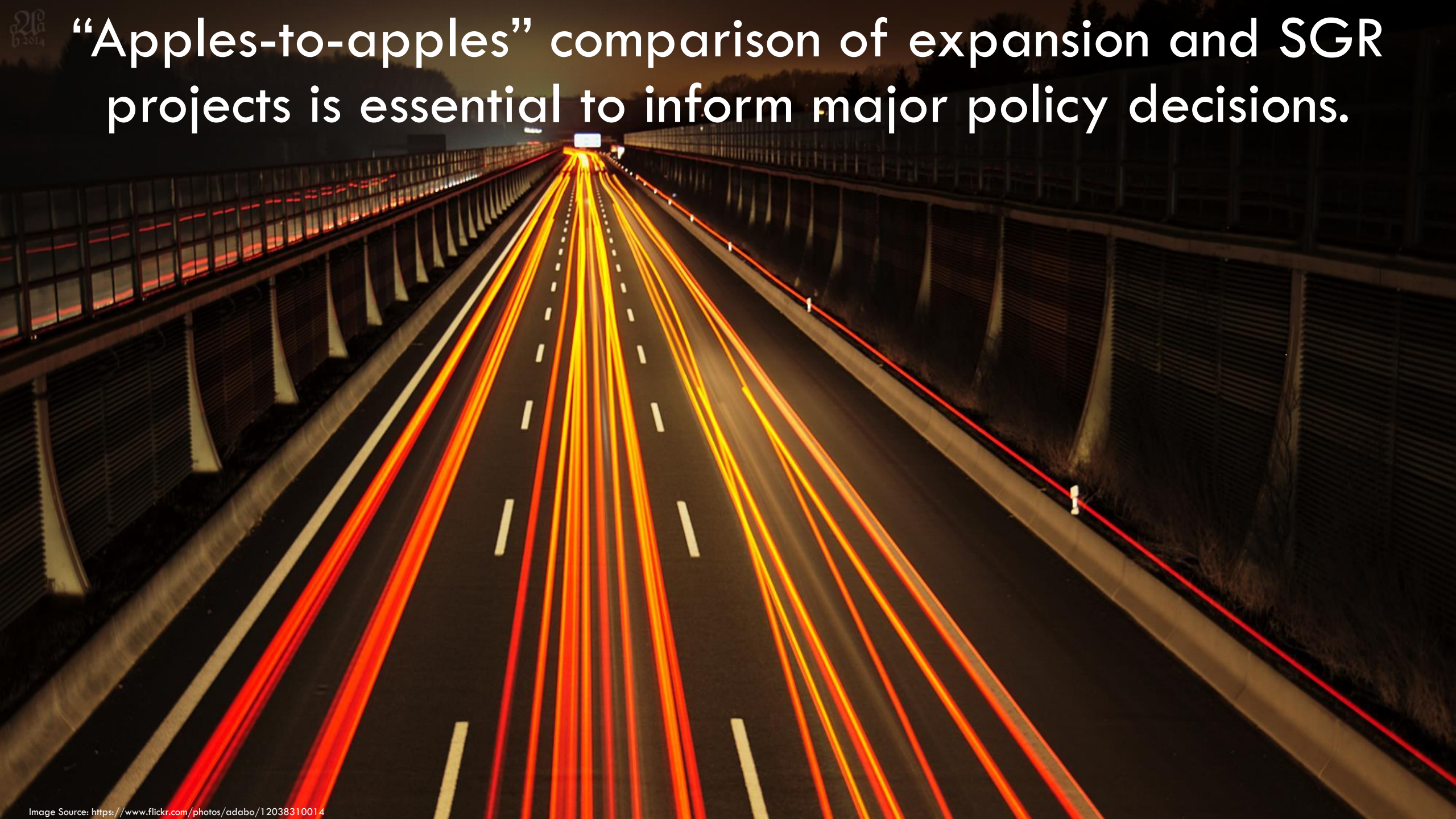


- Infrastructure-based measures are:
  - Easier to calculate and forecast
  - Unaffected by usage pattern changes
  - More useful for maintenance staff
  - Ingrained in organization culture
- But the benefits of switching are worth it:
  - Better communication with the public
  - Better prioritization of limited funds
  - Better understanding of how SGR affects other regional priorities

It's about more just measures – it's critical to quantify the broader impacts of SGR on the regional system.

Image Source: https://www.flickr.com/photos/34186459@N00/5412578628

“Apples-to-apples” comparison of expansion and SGR projects is essential to inform major policy decisions.



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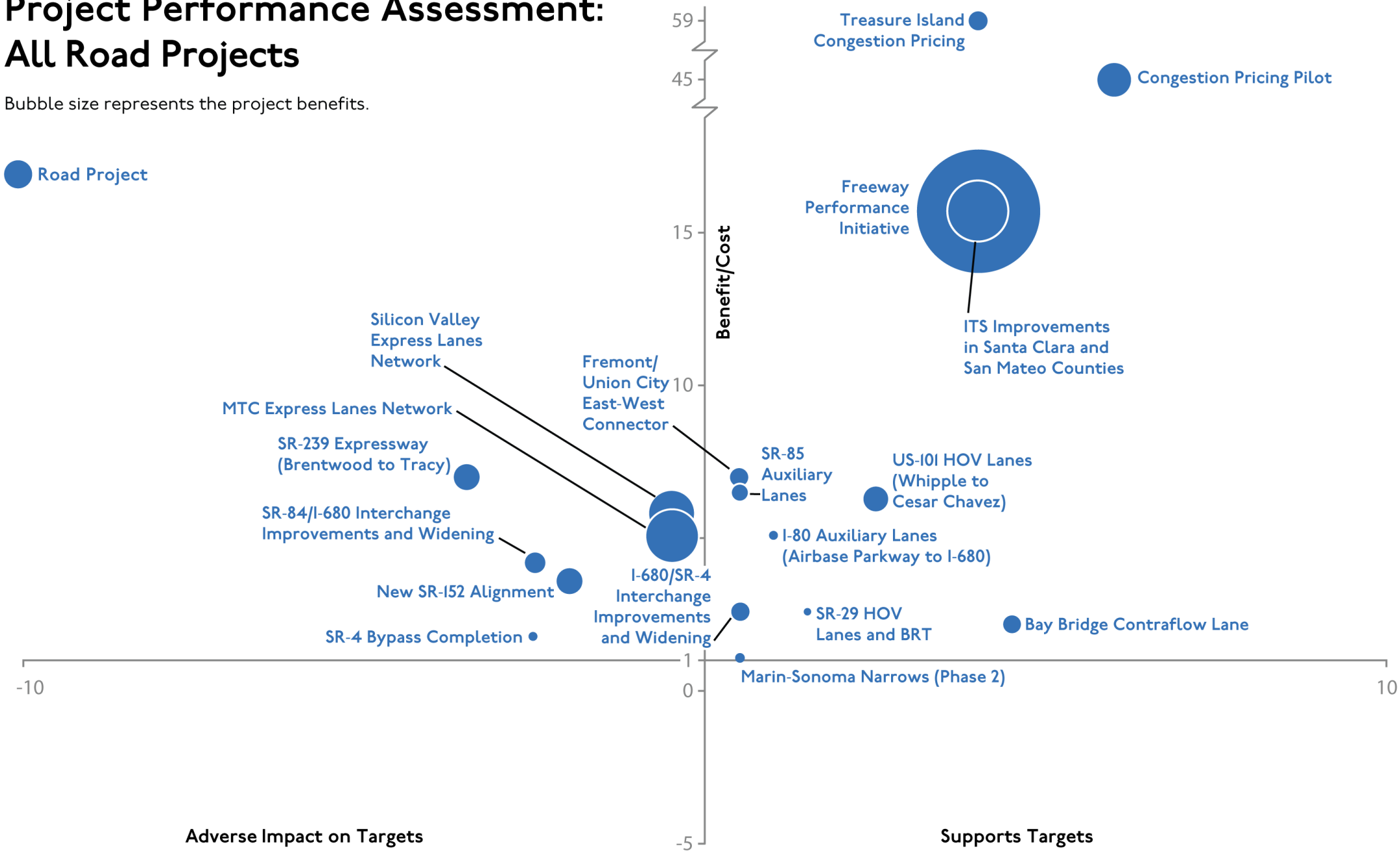
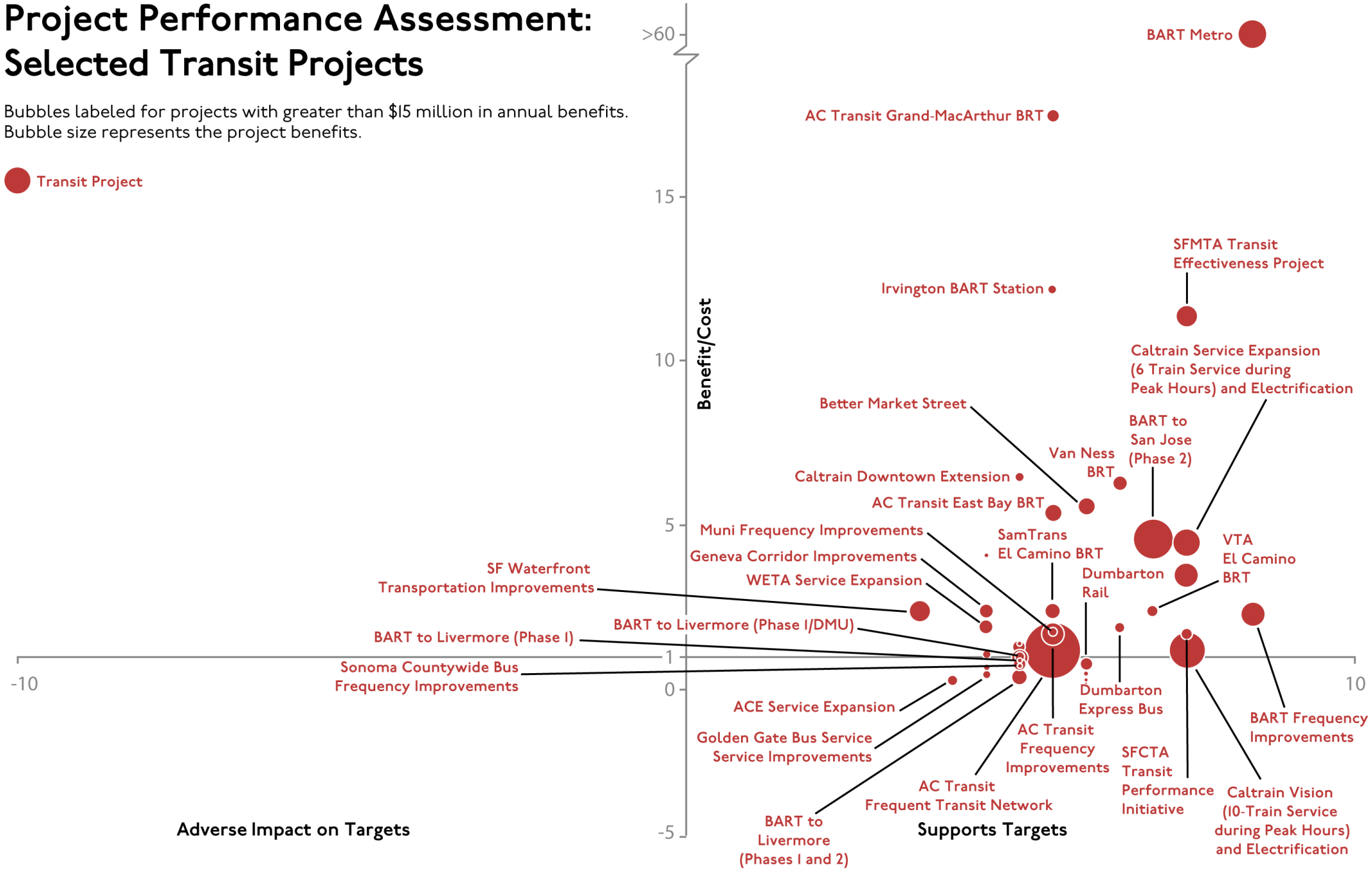
Project Performance Assessment: All Road Projects

Bubble size represents the project benefits.



Project Performance Assessment: Selected Transit Projects

Bubbles labeled for projects with greater than $15 million in annual benefits.
Bubble size represents the project benefits.



StreetSaver

- Input: Funding scenarios
- Output: Pavement condition by jurisdiction or segment

NCHRP Report 720 Models

- Input: Pavement condition by jurisdiction or segment
- Output: Vehicle operating costs for all vehicle types

Travel Model One

- Input: Vehicle operating costs for all vehicle types
- Output: Consistent set of benefits (time/GHG/etc.)

FTA TERM-Lite

- Input: Funding scenarios
- Output: Asset ages by type and operator

TCRP 157 Age Decay Models

- Input: Asset ages by type and operator
- Output: Failure rates for all asset types

TCRP/MTC Delay Models

- Input: Failure rates for all asset types
- Output: Delay impacts by system for frequency and in-vehicle time

Travel Model One

- Input: Delay impacts by system for frequency and in-vehicle time
- Output: Consistent set of benefits (time/GHG/etc.)

Image Source: http://www.flickr.com/photos/fritography/5162434063/sizes/l/

VOC Benefits: **$981** million

VOC Benefits: **$300** per household per year*

All Other Benefits: **-$689** million

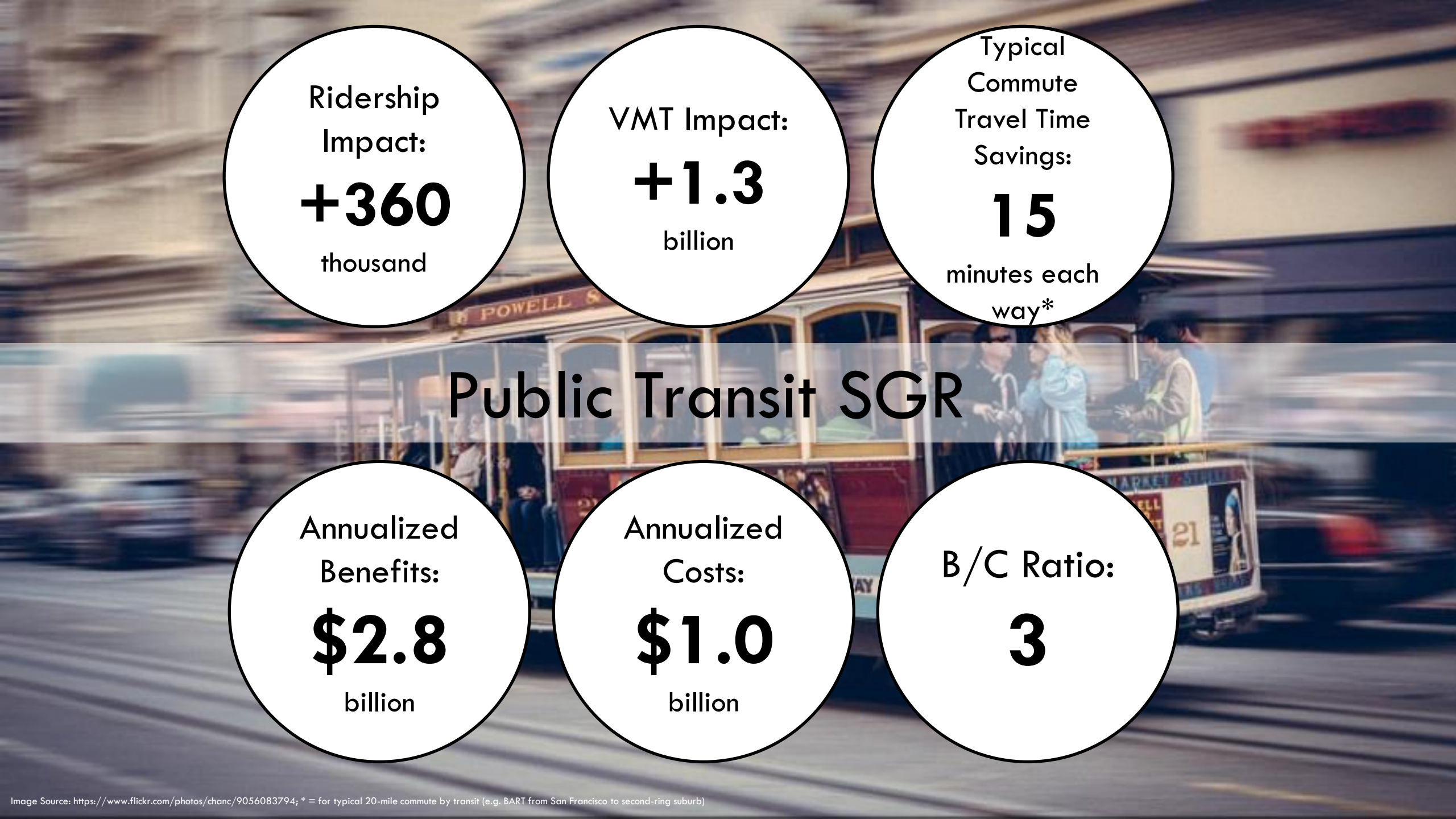
Local Streets and Roads SGR

Annualized Benefits: **$292** million

Annualized Costs: **$341** million

B/C Ratio: **1**

Image Source: https://www.flickr.com/photos/proimos/7581215472; * = number rounded for simplicity



Public Transit SGR

Ridership Impact:
+360
thousand

VMT Impact:
+1.3
billion

Typical Commute Travel Time Savings:
15
minutes each way*

Annualized Benefits:
$2.8
billion

Annualized Costs:
$1.0
billion

B/C Ratio:
3

Image Source: https://www.flickr.com/photos/chanc/9056083794; * = for typical 20-mile commute by transit (e.g. BART from San Francisco to second-ring suburb)

Better performance measures – combined with consistent project evaluations across funding silos – can lead to a more efficient allocation of limited dollars.

Image Source: https://www.flickr.com/photos/wwworks/2712986388

Questions?

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Metropolitan Transportation Commission

For reference:
Road SGR - TRB Paper No. 15-1206
Transit SGR - TRB Paper No. 15-1207

Image Source: https://www.flickr.com/photos/jimnix/4618068605