

## Highway Cost Allocation Study

### The Oregon Highway Cost Allocation Study

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## Highway Cost Allocation in Oregon

- First study in 1937; 17 studies so far
- Since 1999, State Constitution has required a study every two years, and adjustment of revenue sources if found necessary
- Are the shares of revenues paid by light and heavy vehicles fair and proportionate to their shares of costs?

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2

## Highway Cost Allocation in Oregon

- Study Review Team reviews methods, data, and results, and discusses issues
  - Eleven members, chaired by State Economist
    - Doug Anderson, Metro
    - Doug Benzon, Idaho Department of Transportation
    - Jerri Bohard, Oregon Department of Transportation
    - John Gallup, Portland State University
    - Mazen Malik, Oregon Legislative Revenue Office
    - Mike McArthur, Association of Oregon Counties
    - Timothy Morgan, AAA Oregon
    - Don Negri, Willamette University
    - Jon Oshel, Association of Oregon Counties
    - Tom Potiowsky, Chair, State Economist
    - Bob Russell, Oregon Trucking Associations

## What is Highway Cost Allocation?

Do various classes of highway users pay user fees in proportion to the costs they impose on the highway system?

- Define user classes
- Allocate costs to user classes
- Attribute revenues to user classes
- Calculate equity ratios
  - Share of revenue / Share of cost

## Two approaches for 2011

- Traditional approach
  - Budgeted expenditures are assumed to represent costs and are allocated out to vehicle classes
- Efficient-fee approach
  - Costs imposed by each vehicle class are estimated directly—not tied to expenditures in any particular biennium
- Revenue attribution is the same

## Oregon's Traditional Approach

- Costs to allocate are expenditures over upcoming biennium
- Expenditures of federal funds are included (because they are interchangeable)
- Expenditures by local governments of state funds are included
- Expenditures by local governments of federal and some own-source funds also are included (interchangeability and accountability)
- Chapter 2 of Traditional Report describes structure

## Efficient-Fee Approach

- Wear and tear charges based on vehicle weight and configuration and on the characteristics of roads and bridges
- Congestion charges based on amount of cost imposed on other users
  - Vary by road segment and time of day
- Emissions charges based on amount of emissions
  - Vary with weight, speed, fuel, and location

## Results of 2011 Studies

- Traditional approach
  - Light vehicle equity ratio: 0.9954
  - Heavy vehicle equity ratio: 1.0089
- Efficient-fee approach
  - Light vehicle equity ratio: 0.9873
  - Heavy vehicle equity ratio: 1.0253

## Heavy Vehicles

- Vehicles between 10,001 and 26,000 pounds are overpaying
- Most vehicles between 26,001 and 78,000 pounds are underpaying
- Vehicles between 78,001 and 80,000 pounds are overpaying (1.26 equity ratio). This class accounts for 44% of heavy vehicle miles traveled.
- Most vehicles over 80,000 pounds are underpaying
- Road Use Assessment Fee Vehicles are underpaying (0.48 equity ratio)
- Full details are provided in Chapter 6 of Traditional Report

## Recommendations

- No changes to rates are necessary for light-heavy fairness and proportionality
- Chapter 7 of Traditional Report describes revenue-neutral changes to rate structures that would improve equity within heavy vehicles.
  - Flatter Table “A” rate structure (28,000 lbs go from 4.98 to 10.26 cents per mile; 80,000 lbs go from 16.38 to 11.91 cents per mile)
  - Higher Table “B” rates (for example, 105,500 lbs, 7 axles go from 18.11 to 29.39 cents per mile)
  - Higher Road Use Assessment Fees (7.1 to 14.8 cents per ESAL-mile)

## 2011 Efficient-Fee Study

- Each vehicle would pay a fee for each mile it travels
- Fee consists of five components
  - Congestion charge based on cost of delay imposed on others
  - Wear and tear charge for roads
  - Wear and tear charge for bridges
  - Emissions charge
  - Charge for administrative and other costs
- We estimate the share of efficient-fee charges that would be paid by each vehicle class and call that their share of costs
- We then compare those shares of costs to shares of revenue under current-law instruments and rates

## Efficient Congestion Charge

- Determined by cost of delay imposed on others
- Varies with volume and capacity; we assume dynamic pricing
- Since the fee won't actually be charged, we use current volumes to determine shares of cost
- We scale congestion-fee revenues to add up to revenue that would be generated if efficient fees were charged
- Congestion charge would generate \$209.5 million of annual revenue (13.4% of total)
- Light vehicles would pay 96% of the congestion charges

## Efficient Wear and Tear Charge

- Determined by cost of preservation and maintenance imposed on system
- Varies with weight and configuration of vehicle and with strength and condition of road or bridge
- Wear and tear charges would generate \$453.0 million for roads and \$163.3 million for bridges, or \$616.3 million of annual revenue (39.5% of total)
- Light vehicles would pay 34.2% of road charges and 44.8% of bridge charges, or 37.0% of all wear and tear charges

## Efficient Emissions Charge

- Determined by cost that emissions impose on everyone
- Best charged per unit of fuel, rather than per mile
- Emissions charges would generate \$493.6 million of annual revenue (31.7% of total)
- Light vehicles would pay 66.6% of emissions charges
- Emissions charges paid by highway users could be used to offset administrative and other costs; we assume that they will be. Remaining administrative and other costs require additional annual revenue of \$239.3 million (15.4% of total)
- Light vehicles would pay 93% of a VMT charge to recover remaining administrative and other costs

## Getting to an Efficient System

- Charge vehicles for the costs they impose at the times and places they travel
  - Highway users will adjust their behavior to best meet their own needs given the costs they impose on everyone
  - When each vehicle is paying for the costs it imposes, there will be no more need for highway cost allocation studies
- Optimal investment in capacity, preservation, and maintenance
  - Highway agencies will adjust their behavior to best meet the needs of highway users
  - Where cost-effective, capacity may be provided by investing in alternative modes
- First step is better data. Need many more functioning traffic counters in Oregon.



| 2011 Traditional |            | Equity Ratios       |                           | Annual VMT            |                       |                    | Annual VMT Shares |               |                 |
|------------------|------------|---------------------|---------------------------|-----------------------|-----------------------|--------------------|-------------------|---------------|-----------------|
| Declared Weight  |            | Full-Fee Unadjusted | Full-Fee Subsidy-Adjusted | All                   | Full-Fee              | Alternative Fee    | All               | Full-Fee      | Alternative Fee |
| 1                | to 10,000  | 1.0029              | <b>0.9954</b>             | 35,416,749,479        | 34,756,643,957        | 660,105,523        | 93.0%             | 93.5%         | 73.2%           |
| 10,001           | to 26,000  | 1.2313              | <b>1.2439</b>             | 622,014,193           | 488,807,967           | 133,206,226        | 1.6%              | 1.3%          | 14.8%           |
| 26,001           | to 78,000  | 0.8190              | <b>0.8301</b>             | 373,366,522           | 275,369,501           | 97,997,022         | 1.0%              | 0.7%          | 10.9%           |
| 78,001           | to 80,000  | 1.2453              | <b>1.2630</b>             | 1,169,779,027         | 1,164,919,723         | 4,859,304          | 3.1%              | 3.1%          | 0.5%            |
| 80,001           | to 104,000 | 0.7004              | <b>0.7114</b>             | 232,111,779           | 230,498,180           | 1,613,599          | 0.6%              | 0.6%          | 0.2%            |
| 104,001          | to 105,500 | 0.6706              | <b>0.6813</b>             | 266,176,184           | 262,743,054           | 3,433,130          | 0.7%              | 0.7%          | 0.4%            |
| 105,501          | and up     | 0.4693              | <b>0.4776</b>             | 3,234,030             | 3,234,030             | 0                  | 0.0%              | 0.0%          | 0.0%            |
| <b>Total</b>     |            | <b>1.0000</b>       | <b>1.0000</b>             | <b>38,083,431,215</b> | <b>37,182,216,412</b> | <b>901,214,803</b> | <b>100.0%</b>     | <b>100.0%</b> | <b>100.0%</b>   |
| 10,001           | and up     | 0.9944              | <b>1.0089</b>             | 2,666,681,736         | 2,425,572,455         | 241,109,281        | 7.0%              | 6.5%          | 26.8%           |
| 26,001           | to 80,000  | 1.1737              | <b>1.1903</b>             | 1,543,145,549         | 1,440,289,224         | 102,856,326        | 4.1%              | 3.9%          | 11.4%           |
| 80,001           | to 105,500 | 0.6836              | <b>0.6945</b>             | 498,287,963           | 493,241,234           | 5,046,729          | 1.3%              | 1.3%          | 0.6%            |
| 26,001           | to 105,500 | 0.9788              | <b>0.9934</b>             | 2,041,433,513         | 1,933,530,458         | 107,903,055        | 5.4%              | 5.2%          | 12.0%           |
| 26,001           | and up     | 0.9712              | <b>0.9857</b>             | 2,044,667,543         | 1,936,764,488         | 107,903,055        | 5.4%              | 5.2%          | 12.0%           |

| Annual Cost Responsibility |            |                    |                    |                    | Cost Responsibility Shares |               |               |               |               |
|----------------------------|------------|--------------------|--------------------|--------------------|----------------------------|---------------|---------------|---------------|---------------|
| Declared Weight            |            | State              | Federal            | Local              | Full-Fee Cost              | State         | Federal       | Local         | Full-Fee Cost |
| 1                          | to 10,000  | 558,874,196        | 228,517,708        | 283,403,850        | 1,050,838,017              | 68.4%         | 56.0%         | 65.4%         | 65.5%         |
| 10,001                     | to 26,000  | 24,060,248         | 17,850,314         | 23,583,720         | 49,365,286                 | 2.9%          | 4.4%          | 5.4%          | 3.1%          |
| 26,001                     | to 78,000  | 26,857,404         | 15,455,291         | 23,490,371         | 50,139,813                 | 3.3%          | 3.8%          | 5.4%          | 3.1%          |
| 78,001                     | to 80,000  | 120,377,520        | 77,570,214         | 51,592,914         | 248,504,047                | 14.7%         | 19.0%         | 11.9%         | 15.5%         |
| 80,001                     | to 104,000 | 39,145,584         | 29,634,837         | 17,875,788         | 86,037,571                 | 4.8%          | 7.3%          | 4.1%          | 5.4%          |
| 104,001                    | to 105,500 | 45,840,269         | 37,668,104         | 29,042,405         | 111,032,142                | 5.6%          | 9.2%          | 6.7%          | 6.9%          |
| 105,501                    | and up     | 1,564,832          | 1,436,491          | 4,542,529          | 7,541,801                  | 0.2%          | 0.4%          | 1.0%          | 0.5%          |
| <b>Total</b>               |            | <b>816,720,053</b> | <b>408,132,959</b> | <b>433,531,577</b> | <b>1,603,458,677</b>       | <b>100.0%</b> | <b>100.0%</b> | <b>100.0%</b> | <b>100.0%</b> |
| 10,001                     | and up     | 257,845,857        | 179,615,251        | 150,127,727        | 552,620,660                | 31.6%         | 44.0%         | 34.6%         | 34.5%         |
| 26,001                     | to 80,000  | 147,234,924        | 93,025,506         | 75,083,285         | 298,643,860                | 18.0%         | 22.8%         | 17.3%         | 18.6%         |
| 80,001                     | to 105,500 | 84,985,853         | 67,302,941         | 46,918,193         | 197,069,713                | 10.4%         | 16.5%         | 10.8%         | 12.3%         |
| 26,001                     | to 105,500 | 232,220,777        | 160,328,447        | 122,001,478        | 495,713,573                | 28.4%         | 39.3%         | 28.1%         | 30.9%         |
| 26,001                     | and up     | 233,785,609        | 161,764,938        | 126,544,007        | 503,255,374                | 28.6%         | 39.6%         | 29.2%         | 31.4%         |

| Annual User Fees |            |                      |                      |                   | User Fee Shares   |               |               |               |                   |
|------------------|------------|----------------------|----------------------|-------------------|-------------------|---------------|---------------|---------------|-------------------|
| Declared Weight  |            | All                  | Full-Fee             | Subsidy           | Allocated Subsidy | All           | Full-Fee      | Subsidy       | Allocated Subsidy |
| 1                | to 10,000  | 742,409,718          | 734,078,259          | 5,610,310         | 26,879,031        | 65.9%         | 65.7%         | 19.5%         | 93.5%             |
| 10,001           | to 26,000  | 45,644,216           | 42,339,113           | 9,257,294         | 378,019           | 4.1%          | 3.8%          | 32.2%         | 1.3%              |
| 26,001           | to 78,000  | 27,297,061           | 28,601,158           | 11,067,345        | 212,957           | 2.4%          | 2.6%          | 38.5%         | 0.7%              |
| 78,001           | to 80,000  | 215,170,591          | 215,543,485          | 1,272,004         | 900,890           | 19.1%         | 19.3%         | 4.4%          | 3.1%              |
| 80,001           | to 104,000 | 41,798,995           | 41,971,100           | 466,894           | 178,256           | 3.7%          | 3.8%          | 1.6%          | 0.6%              |
| 104,001          | to 105,500 | 51,446,130           | 51,860,017           | 1,080,998         | 203,192           | 4.6%          | 4.6%          | 3.8%          | 0.7%              |
| 105,501          | and up     | 2,465,528            | 2,465,528            | 0                 | 2,501             | 0.2%          | 0.2%          | 0.0%          | 0.0%              |
| <b>Total</b>     |            | <b>1,126,232,238</b> | <b>1,116,858,658</b> | <b>28,754,846</b> | <b>28,754,846</b> | <b>100.0%</b> | <b>100.0%</b> | <b>100.0%</b> | <b>100.0%</b>     |
| 10,001           | and up     | 383,822,520          | 382,780,399          | 23,144,535        | 1,875,815         | 34.1%         | 34.3%         | 80.5%         | 6.5%              |
| 26,001           | to 80,000  | 242,467,652          | 244,144,642          | 12,339,350        | 1,113,847         | 21.5%         | 21.9%         | 42.9%         | 3.9%              |
| 80,001           | to 105,500 | 93,245,125           | 93,831,117           | 1,547,892         | 381,448           | 8.3%          | 8.4%          | 5.4%          | 1.3%              |
| 26,001           | to 105,500 | 335,712,777          | 337,975,759          | 13,887,241        | 1,495,295         | 29.8%         | 30.3%         | 48.3%         | 5.2%              |
| 26,001           | and up     | 338,178,304          | 340,441,287          | 13,887,241        | 1,497,796         | 30.0%         | 30.5%         | 48.3%         | 5.2%              |

| 2011 Efficient Fee |            | Annual Congestion Fee | Annual Pavement Fee | Annual Bridge Fee  | Annual Common Charge | Annual Emissions Fee | Total Efficient Fees |
|--------------------|------------|-----------------------|---------------------|--------------------|----------------------|----------------------|----------------------|
| 1                  | to 10,000  | 201,183,857           | 155,074,838         | 73,174,737         | 222,587,300          | 385,604,702          | 1,037,625,434        |
| 10,001             | to 26,000  | 2,422,408             | 29,989,173          | 10,812,875         | 3,909,236            | 16,268,270           | 63,401,962           |
| 26,001             | to 78,000  | 1,321,276             | 29,107,058          | 7,648,970          | 2,346,283            | 14,306,089           | 54,729,675           |
| 78,001             | to 80,000  | 3,038,427             | 137,023,626         | 25,543,554         | 7,351,826            | 53,171,052           | 226,128,485          |
| 80,001             | to 104,000 | 659,452               | 39,133,692          | 20,618,738         | 1,458,771            | 10,993,183           | 72,863,836           |
| 104,001            | to 105,500 | 836,472               | 55,160,057          | 25,214,789         | 1,672,864            | 13,085,118           | 95,969,300           |
| 105,501            | and up     | 21,026                | 7,521,108           | 325,068            | 20,313               | 176,313              | 8,063,829            |
| <b>Total</b>       |            | <b>209,482,918</b>    | <b>453,009,552</b>  | <b>163,338,731</b> | <b>239,346,592</b>   | <b>493,604,728</b>   | <b>1,558,782,521</b> |

|        |            |           |             |            |            |             |             |
|--------|------------|-----------|-------------|------------|------------|-------------|-------------|
| 10,001 | and up     | 8,299,061 | 297,934,714 | 90,163,995 | 16,759,292 | 108,000,025 | 521,157,087 |
| 26,001 | to 80,000  | 4,359,704 | 166,130,683 | 33,192,524 | 9,698,108  | 67,477,141  | 280,858,160 |
| 80,001 | to 105,500 | 1,495,924 | 94,293,749  | 45,833,527 | 3,131,635  | 24,078,301  | 168,833,136 |
| 26,001 | to 105,500 | 5,855,627 | 260,424,432 | 79,026,051 | 12,829,743 | 91,555,442  | 449,691,296 |
| 26,001 | and up     | 5,876,654 | 267,945,540 | 79,351,120 | 12,850,056 | 91,731,755  | 457,755,125 |

| Declared Weight    | Congestion Fee Shares | Pavement Fee Shares | Bridge Fee Shares | Common Shares | Emissions Fee Shares | Share of Total Efficient Fees | Share of Full-Fee Revenues | Equity Ratio |
|--------------------|-----------------------|---------------------|-------------------|---------------|----------------------|-------------------------------|----------------------------|--------------|
| 1 to 10,000        | 96.0%                 | 34.2%               | 44.8%             | 93.0%         | 78.1%                | 66.6%                         | 65.7%                      | 0.9873       |
| 10,001 to 26,000   | 1.2%                  | 6.6%                | 6.6%              | 1.6%          | 3.3%                 | 4.1%                          | 3.8%                       | 0.9320       |
| 26,001 to 78,000   | 0.6%                  | 6.4%                | 4.7%              | 1.0%          | 2.9%                 | 3.5%                          | 2.6%                       | 0.7293       |
| 78,001 to 80,000   | 1.5%                  | 30.2%               | 15.6%             | 3.1%          | 10.8%                | 14.5%                         | 19.3%                      | 1.3302       |
| 80,001 to 104,000  | 0.3%                  | 8.6%                | 12.6%             | 0.6%          | 2.2%                 | 4.7%                          | 3.8%                       | 0.8065       |
| 104,001 to 105,500 | 0.4%                  | 12.2%               | 15.4%             | 0.7%          | 2.7%                 | 6.2%                          | 4.6%                       | 0.7537       |
| 105,501 and up     | 0.0%                  | 1.7%                | 0.2%              | 0.0%          | 0.0%                 | 0.5%                          | 0.2%                       | 0.4267       |
| 10,001 and up      | 4.0%                  | 65.8%               | 55.2%             | 7.0%          | 21.9%                | 33.4%                         | 34.3%                      | 1.0253       |
| 26,001 to 80,000   | 2.1%                  | 36.7%               | 20.3%             | 4.1%          | 13.7%                | 18.0%                         | 21.9%                      | 1.2131       |
| 80,001 to 105,500  | 0.7%                  | 20.8%               | 28.1%             | 1.3%          | 4.9%                 | 10.8%                         | 8.4%                       | 0.7765       |
| 26,001 to 105,500  | 2.8%                  | 57.5%               | 48.4%             | 5.4%          | 18.5%                | 28.8%                         | 30.3%                      | 1.0492       |
| 26,001 and up      | 2.8%                  | 59.1%               | 48.6%             | 5.4%          | 18.6%                | 29.4%                         | 30.5%                      | 1.0382       |

| Cents per Mile Declared Weight | Average Congestion Fee | Average Pavement Fee | Average Bridge Fee | Average Common Charge | Average Emissions Fee | Average Efficient Fees |
|--------------------------------|------------------------|----------------------|--------------------|-----------------------|-----------------------|------------------------|
| 1 to 10,000                    | 0.57                   | 0.44                 | 0.21               | 0.63                  | 1.09                  | 2.93                   |
| 10,001 to 26,000               | 0.39                   | 4.82                 | 1.74               | 0.63                  | 2.62                  | 10.19                  |
| 26,001 to 78,000               | 0.35                   | 7.80                 | 2.05               | 0.63                  | 3.83                  | 14.66                  |
| 78,001 to 80,000               | 0.26                   | 11.71                | 2.18               | 0.63                  | 4.55                  | 19.33                  |
| 80,001 to 104,000              | 0.28                   | 16.86                | 8.88               | 0.63                  | 4.74                  | 31.39                  |
| 104,001 to 105,500             | 0.31                   | 20.72                | 9.47               | 0.63                  | 4.92                  | 36.05                  |
| 105,501 and up                 | 0.65                   | 232.70               | 10.06              | 0.63                  | 5.46                  | 249.49                 |
| <b>All</b>                     | <b>0.55</b>            | <b>1.19</b>          | <b>0.43</b>        | <b>0.63</b>           | <b>1.30</b>           | <b>4.09</b>            |