

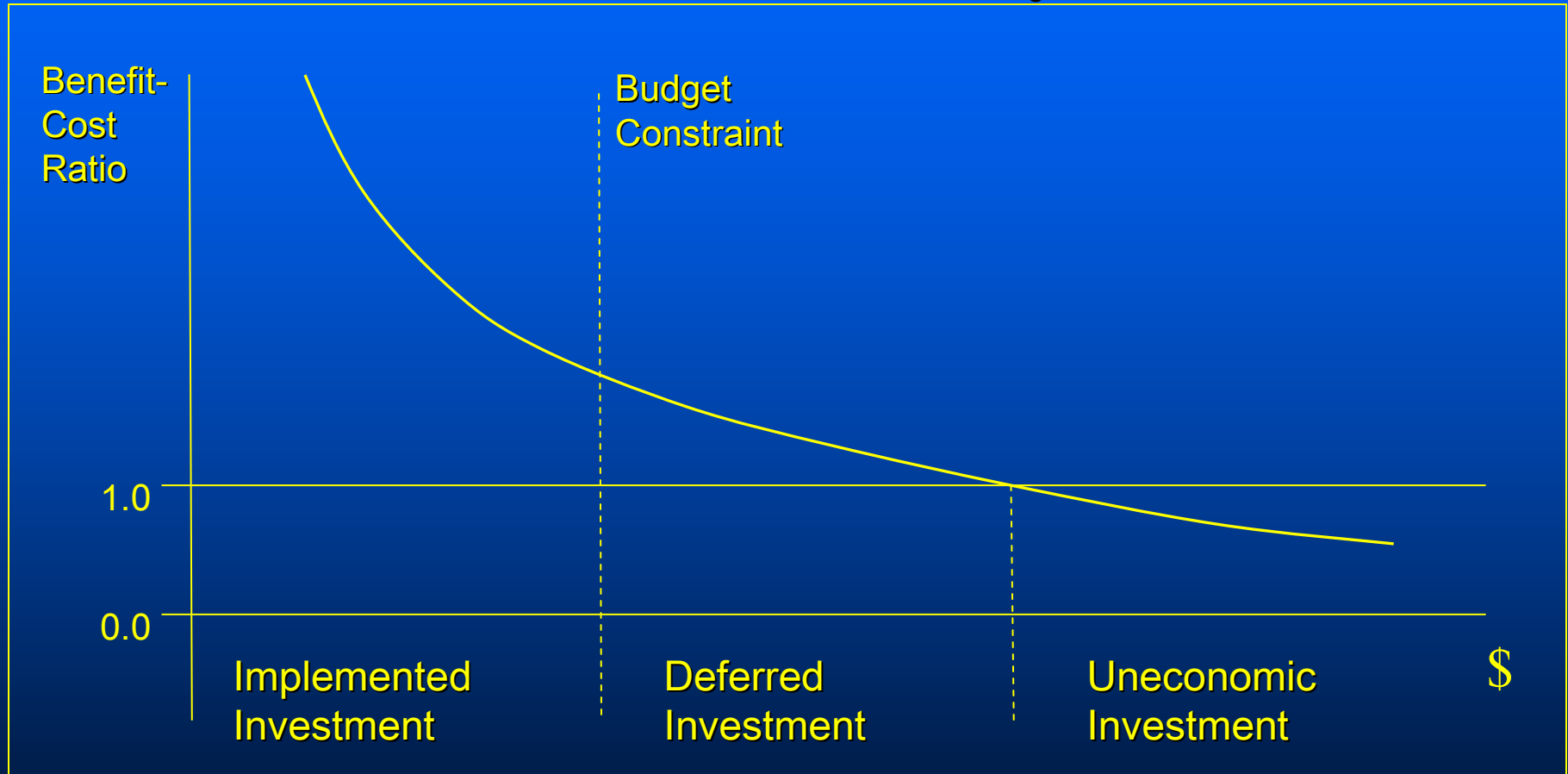
**Highway Investment  
Scenario Estimates**

**Impacts of Analytical Assumptions**

**Briefing for the  
National Surface Transportation Revenue  
and Policy Study Commission**

**July 25, 2006**

# The Economic Approach to Investment Analysis



# Capital Investment Scenarios

## Maximum Economic Investment Level for Highways and Bridges: \$131.7 billion (\$2004)

- Average annual investment from 2005-2024 to eliminate bridge economic backlog by 2024 and implement all cost-beneficial highway improvements.
- Represents an “investment ceiling” above which one shouldn’t invest, even assuming unlimited funding availability
- Higher than estimate in 2004 C&P report (\$118.9 billion)
- Reflects investment on all roads (non just Federal-aid highways)
- Assumptions impact results

# Capital Investment Scenarios

## Average Annual Cost to Maintain Highways and Bridges: \$78.8 billion (\$2004) for 2005-2024

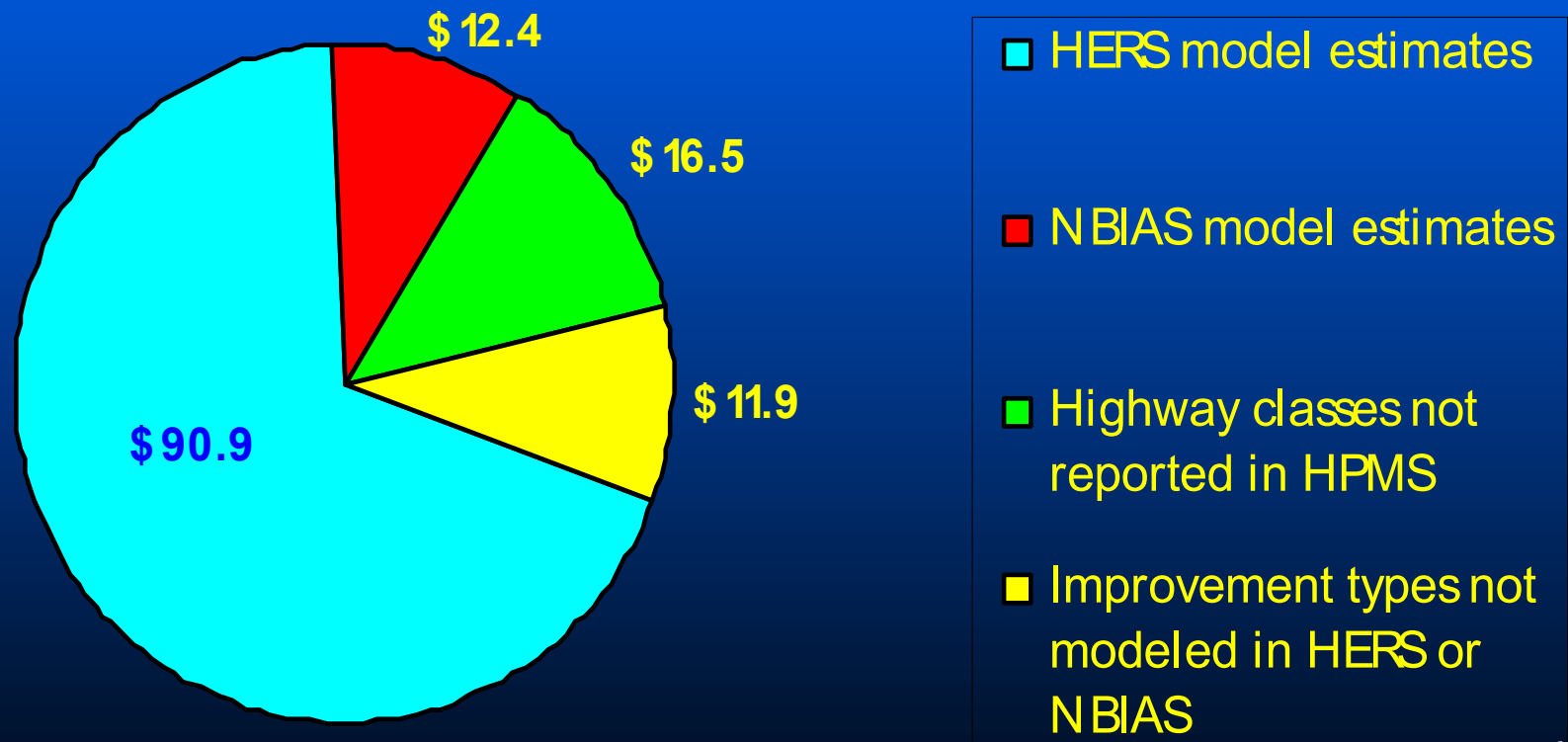
- Cost to maintain current bridge preservation backlog and maintain conditions and performance such that average highway user costs in 2024 equal 2004 levels.
- Higher than what was reported in the 2004 C&P report (\$73.8 billion), mostly due to inflation.
- Reflects investment on all roads (not just Federal-aid highways)
- Assumes retention of current financing structure

# Investment Scenario Estimates Compared with Current Spending



# Sources of Highway Investment Scenario Estimates

Maximum Economic Investment  
for Highways and Bridges



# Operations Strategies and ITS

- Technologies and Strategies Modeled
  - Ramp metering
  - Electronic monitoring and traffic management centers
  - Incident detection, verification, and response
  - Variable message signs
  - Upgraded signal control
- Future Deployment
  - Assume continuation of existing trends

# Alternative Assumptions - Operations

- If Operations/ITS Deployment were to Accelerate...
  - Cost to Maintain
    - \$76.9B (Down 2.4%) assuming Aggressive Deployment.
    - \$73.6B (Down 6.6%) assuming Universal Deployment.
  - Maximum Economic Investment level down slightly, but performance of system much better.
    - By 2024, users save \$10B annually assuming aggressive deployment or \$27B per year assuming full deployment.



# Benefits Considered in HERS

- Benefits expressed as reductions in
  - User costs
    - Travel time costs
    - Vehicle operating costs
    - Crash costs
  - Maintenance costs
  - Emissions costs
  - Work zone delay costs
- Benefits are not tied to specific condition and performance measures

## Other Items Not Fully Considered

- Other Impacts
  - Environmental (e.g., noise)
  - Productivity and Economic Development
- Network Effects
- Multimodal Analysis
- Other Items Documented in Part V of 2004 C&P report

# Potential Additions to the C&P Investment Requirements Analysis

- Other Highway Expenditures (Not Counted)
  - Planning
  - Maintenance and Operations
- Other Capital Improvements (Partially Counted)
  - Interchanges
  - Intermodal Connectors
  - New Construction (e.g. for New roads intended to promote Economic Development)
  - Highway-Rail Grade Crossings

## Sensitivity Analysis – Construction Costs

- If highway construction costs were to rise 25%....
  - Cost to Maintain up by comparable percentage
    - (\$19B to \$20B higher than baseline)
  - Maximum Economic Investment level \$146.4B
    - Up only 11.2% from baseline level.
    - Some marginal projects no longer cost-beneficial
- Not just a hypothetical scenario
  - Data through 9 months of 2005 shows sharp jump in highway construction costs of roughly this size, but index is highly volatile.

# Investment Analysis and Financing Mechanisms

- Increasing investment levels would require additional funds from some source (Federal, State, local, private)
  - Impact on investment analysis depends on the type of financing mechanism used to raise revenues
- If revenues were raised from general taxpayers (e.g., sales taxes, property taxes, general funds): no impact on travel
- If revenues were raised from additional user fees: would affect travel demand and thus investment requirements
  - Impact depends on the structure of the user fee
    - » Non-usage-based fees (e.g., registration fees, etc.)
    - » Fixed usage-based fees (e.g., VMT tax, fuel tax)
    - » Variable usage-based fees (e.g. congestion pricing)

# Sensitivity Analysis - Pricing

- Baseline scenarios assume current financing structure
- If Universal Congestion Pricing Implemented...
  - Cost to Maintain \$57.2B (down 27.5%)
    - This is well below current spending level.
  - Max. Econ. Investment Level \$110.8B (down 15.9%)
- Caveats
  - Ignores start-up and administrative costs of new toll system
  - Assumes perfect knowledge on part of highway agencies and drivers, so that economically efficient toll could always be imposed, and drivers would respond in most effective manner.