Decision-Making for Major Infrastructure Investments: Measuring Feasibility in the US

Erik cempel, PE
research associate
the korea transport institute

May 22, 2007
CONTENTS

• Overview & Legal Framework
• Basic Planning Process/Requirements
• Feasibility Guidelines
• Cases & Comparison to Korea
• Lessons
Many names:
- Feasibility Studies
- Alternatives Analyses
- Major Investment Studies
- Corridor Studies

Name, content depends on:
- Who is doing the study
- What the final goal of the study is
- Where money will come from to pay for study
LEGAL FRAMEWORK

Generally:
• Difference in government structure
  – Weaker central government
  – More defined roles for states, counties, cities
  – To receive federal funding, states/agencies must comply
  – The US Federal government does NOT build, own, or operate transportation infrastructure

Specifically:
• National Environmental Policy Act (NEPA) (1969)
• Clean Air Act (1970)
LEGAL FRAMEWORK

• Formula funds given to the states, some (not many) strings attached
• Some funds specifically requested for a project
  – NEPA environmental review required
  – If New Starts transit funds, alternatives analysis with New Starts criteria also required
• Basically, not many specific analysis procedures
  – Consistent with other regional plans
  – Well-documented
  – Reasonable, accepted standards
• Mostly process requirements
• Env. Impact Statement has specific content
• Transit Alternatives Analyses has specific MOEs
Improving Public Investment Management for Large-Scale Government Projects:
Focusing on the Feasibility Studies

• Overview & Legal Framework
• Basic Planning Process/Requirements
• Feasibility Guidelines
• Cases & Comparison to Korea
• Lessons
Improving Public Investment Management for Large-Scale Government Projects: Focusing on the Feasibility Studies

Source: FHWA
Improving Public Investment Management for Large-Scale Government Projects: Focusing on the Feasibility Studies

SELECT LOCALLY PREFERRED ALTERNATIVE; DEVELOP NEW STARTS CRITERIA

PRELIMINARY ENGINEERING (INCLUDES NEPA, EIS)

FINAL DESIGN

CONSTRUCTION

Source: FTA
**TIPs**

**Short Range Programming of Projects:**
- Estimated total cost;
- Estimated federal funds required per year;
- Estimated sources of non-federal funds;
- Agencies who will undertake the project;
- Mode of the project;
- Termini, approximate length, and general alignment;
- Number of lanes or tracks; and
- Degree of grade separation and access control.
EIS

Requirements:

- Purpose and need
- Environment, Economic, Social, Human impacts, etc.
- Forecasting for transportation impacts
- Cost
- Basic Design
- Public Involvement
- Evaluation of Alternatives

Some items can be done as part of preceding feasibility studies
**NEW STARTS CRITERIA**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Measure(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobility Improvements</td>
<td>- Hours of Transportation System User Benefits</td>
</tr>
<tr>
<td></td>
<td>- Low-Income Households Served</td>
</tr>
<tr>
<td></td>
<td>- Employment Near Stations</td>
</tr>
<tr>
<td>Environmental Benefits</td>
<td>- Change in Regional Pollutant Emissions</td>
</tr>
<tr>
<td></td>
<td>- Change in Regional Energy Consumption</td>
</tr>
<tr>
<td></td>
<td>- EPA Air Quality Designation</td>
</tr>
<tr>
<td>Operating Efficiencies</td>
<td>- Operating Cost per Passenger Mile</td>
</tr>
<tr>
<td>Cost Effectiveness</td>
<td>- Incremental Cost per Hour of Transportation System User Benefit</td>
</tr>
<tr>
<td>Transit Supportive Land Use and Future Patterns</td>
<td>- Existing Land Use</td>
</tr>
<tr>
<td></td>
<td>- Transit Supportive Plans and Policies</td>
</tr>
<tr>
<td></td>
<td>- Performance and Impacts of Policies</td>
</tr>
<tr>
<td></td>
<td>- Other Land Use Considerations</td>
</tr>
<tr>
<td>Other Factors</td>
<td>- Project benefits not reflected by other New Starts criteria</td>
</tr>
</tbody>
</table>

Source: FTA
Improving Public Investment Management for Large-Scale Government Projects:
Focusing on the Feasibility Studies

STATE EXAMPLE

California (Initiated by District)

**Preliminary Studies**
- ID Needs/Begin Prelim. Studies
- District Approves Project Study Report/Other Project Initiation Studies
- Initiate Environmental Studies
- Public Hearing/Agency Review
- Approve Initiation of Plans, Specs., & Est.

**Plans, Specifications, & Estimates**

**Detailed Design**
Improving Public Investment Management for Large-Scale Government Projects:
Focusing on the Feasibility Studies

• Overview & Legal Framework
• Basic Planning Process/Requirements
• Feasibility Guidelines
• Cases & Comparison to Korea
• Lessons
FEASIBILITY SUGGESTIONS

1. Existing conditions, history of previous studies/input, commitments by elected officials, relevant legislation
2. Documentation of analysis procedures
3. Evaluation of alternative modes, management strategies, design levels and locations
4. Travel Forecasts, design and environmental considerations, and cost estimates
5. Economic study of the benefits; preliminary economic justification and financial feasibility
6. Terminate the study OR engineering and environmental feasibility
FEASIBILITY SUGGESTIONS

Office of Management & Budget B/C guidance:

- Recommended discount rates (~3% real)
- Interactive, international, and transfer payment effects
- Dealing with inflation
- Inframarginal measures vs. Indirect measures
- Uncertainty through expected values, sensitivity
Improving Public Investment Management for Large-Scale Government Projects:
Focusing on the Feasibility Studies

• Overview & Legal Framework
• Basic Planning Process/Requirements
• Feasibility Guidelines
• Cases & Comparison to Korea
• Lessons
## SURVEY OF STUDIES

<table>
<thead>
<tr>
<th>Selected Studies</th>
<th>Key Components</th>
</tr>
</thead>
</table>
| **Columbia Pike Transit Alternatives Analysis** | - Public Involvement  
- Purpose & Need  
- Alts. Screening  
- Prelim. Design/Ops for Alts.  
- Capital/O&M Costs  
- New Starts Criteria  
- Model & Simulation Development/Forecasting  
- Development/Analysis of MOEs  
- Environmental Impacts  
- Select Preferred Alt. |
| **Cross Harbor Freight Movement MIS** | - Public Involvement  
- Alts. Screening  
- Engineering Feasibility  
- Model Development/Forecasting  
- Market Analysis  
- Capital/O&M Costs  
- Revenue Analysis  
- B/C Analysis |
| **Feasibility Study: I-74**        | - Public Involvement  
- Purpose & Need  
- Forecasting of Volumes/LOS  
- Capital Costs  
- Fatal Flaw Env. Screen |
| **Grand Avenue MIS Phase II**      | - Public Involvement  
- Purpose & Need  
- Forecasting  
- Broad Costs  
- Funding/Implementation Plan  
- Recommended Alts. |
SURVEY OF STUDIES

Among 10 Planning Studies Surveyed, Almost All Had:

• Public Involvement
• Project Scale
• Forecasting (with or without model)
• Alternatives
  – EIS: alignment/design differences
  – MIS/other: mode, corridor, concept differences
• Estimated Costs
• Policy Analysis
### Minimum Requirements (US)

<table>
<thead>
<tr>
<th>Basic Design/Feasibility Study</th>
<th>Preliminary Feasibility Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIS (implicit)</td>
<td>Determination of Project Scale/Scope</td>
</tr>
<tr>
<td>EIS</td>
<td>Forecasting</td>
</tr>
<tr>
<td>EIS (implicit)</td>
<td>Alternate Corridors/Alignments</td>
</tr>
<tr>
<td>EIS (implicit)</td>
<td>Capacity</td>
</tr>
<tr>
<td>LRP; TIP; EIS</td>
<td>Interchanges</td>
</tr>
<tr>
<td>Not explicit</td>
<td>Estimated Costs/Benefits</td>
</tr>
<tr>
<td>Not explicit (except EJ)</td>
<td>Economic Analysis</td>
</tr>
<tr>
<td>EIS</td>
<td>Policy Analysis</td>
</tr>
<tr>
<td>LRP; TIP; EIS</td>
<td>Determination of Best Alternative</td>
</tr>
<tr>
<td></td>
<td>Investment Plan</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Detailed Design

- Forecast Reconfirmation/Supplement
- Route Determination/Survey
- Environmental Impacts
- Agency/Citizen Hearings
- Finalization of Basic Design; Notification
Improving Public Investment Management for Large-Scale Government Projects:
Focusing on the Feasibility Studies

• Overview & Legal Framework
• Basic Planning Process/Requirements
• Feasibility Guidelines
• Cases & Comparison to Korea
• Lessons
THE GOOD...

• Comprehensive, continuous, multimodal, and intermodal
• More rational project selection processes
• Includes all levels of government and stakeholders
• Plans can be seen as real tools for decision-makers, not just rubber stamp
• Flexible based on needs, area, etc.
• Analysis may include useful, non-traditional items
THE BAD...

• Complex web of explicit and implicit requirements
• What is suggested, required, or at an one’s discretion?
• Have to consider federal, state, local regulations
• Regulations continuously updated
• Resources sometimes wasted, projects redone
...AND THE UGLY

• The Congress makes the laws

• Congress can bypass the methodical public investment screening process with earmarks
THANK YOU FOR YOUR TIME

email: eec@koti.re.kr