

Diagnosing the Marine Transportation System: Measuring Performance and Targeting Improvement

Evaluating Return on Infrastructure Investment

Vijay Perincherry, HDR Inc.

June 26, 2012

Infrastructure Investment Analysis



“Never mind these cost-benefit analyses. All we want to know is what’s the cost . . . and what’s the benefit.”

Time for Public Confession!

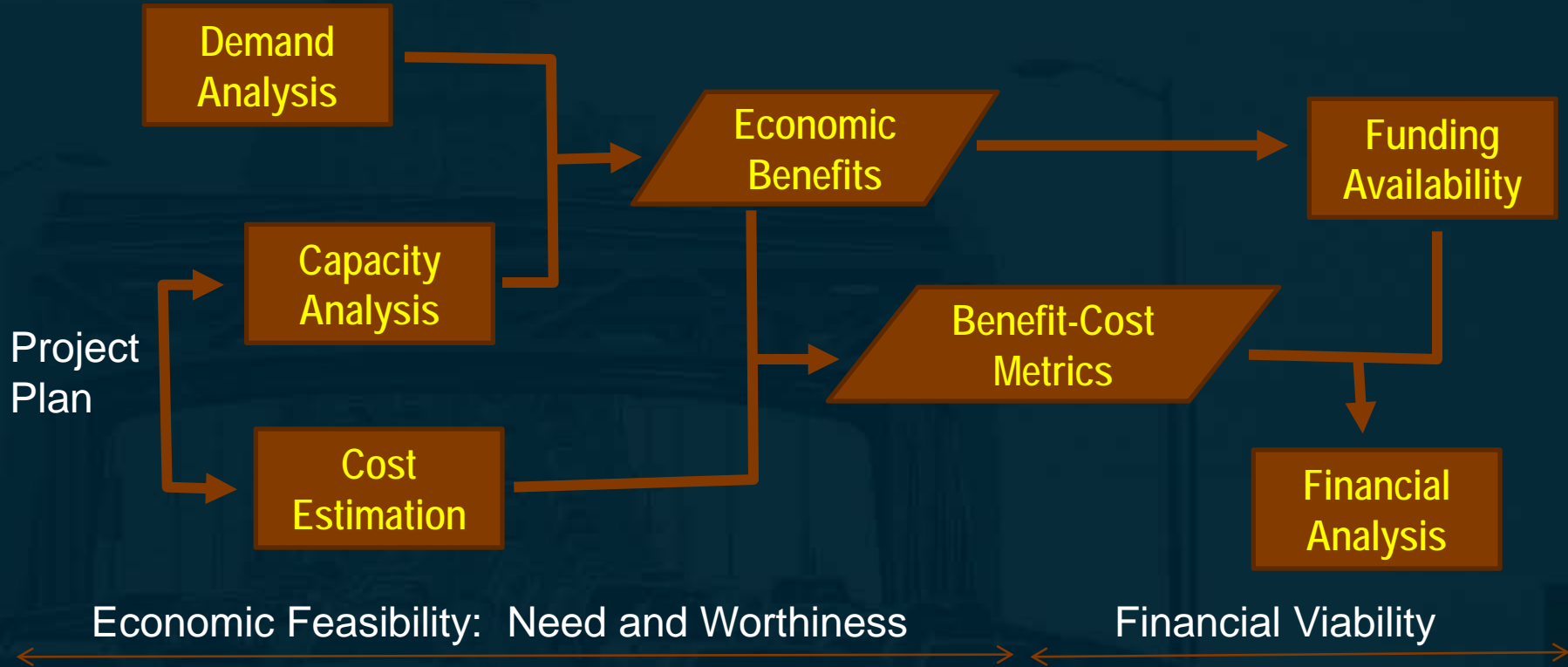
- When assessing a project's worthiness, a comprehensive assessment of factors is rarely performed.
- Over 40% ⁽¹⁾ of infrastructure projects exceed their budget and/or their schedule, mainly due to unexpected events (risks).
- Over 80% ⁽²⁾ of investments miss their forecasts because they don't account for future variability



(1) Flyvbjerg 2003

(2) Standard and Poor 2002
and 2003 studies

Infrastructure Investment Analysis Process

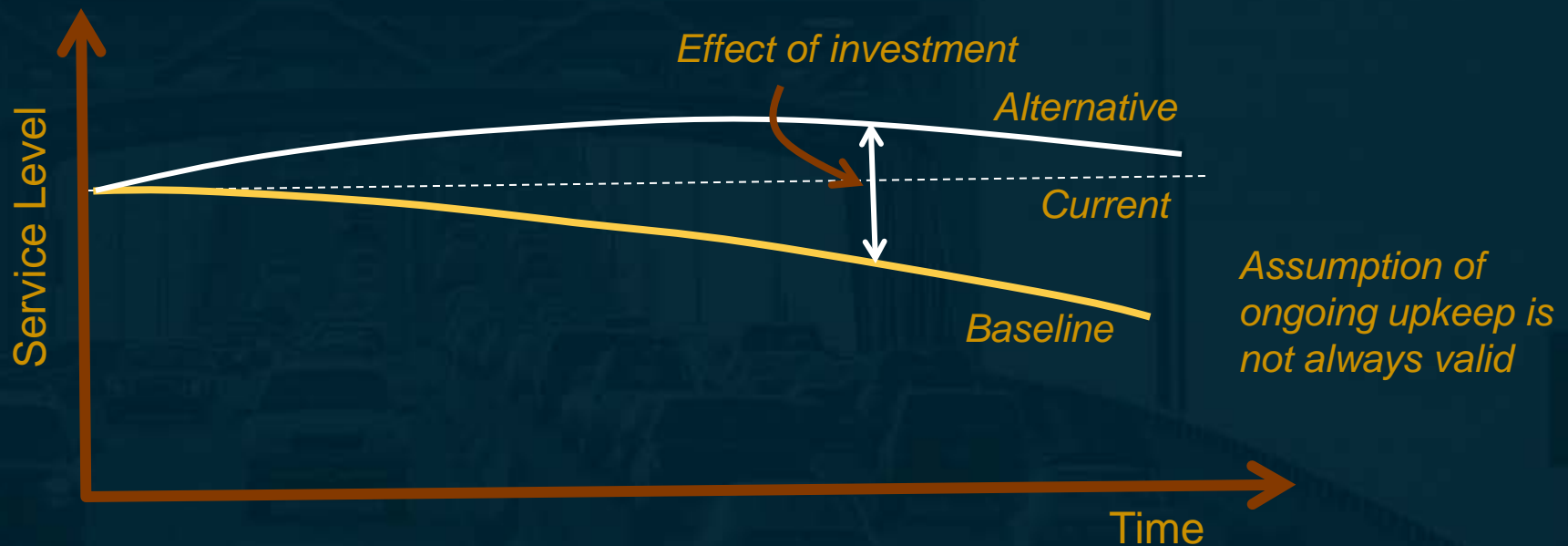


Key Principles to Follow

- **Specify the right baseline**
fully understand the future effects of NOT making the investment
- **Think long-term, but don't ignore short-term**
evaluate the stream of impacts including immediate impacts
- **Monetize outcomes**
try to define the dollar value of outcomes as much as you can
- **Incorporate uncertainty**
Recognize what you don't know

Representing the Baseline

- Baseline for investment analysis is NOT what it is today, it is what WILL BE tomorrow
 - Include effects of long-term deterioration in service quality and performance indicators



Long-Term Goals and Short-Term Impacts

- Majority of the costs and negative impacts are incurred upfront, benefits accrue over time
- Unless measures to mitigate short-term disruptions are in place, it can lead to loss of support



Monetizing Outcomes

Direct User Benefits

Improved throughput
Reduced delays
Increased capacity



Generalized cost of transportation (\$/ton)
Cost of inventory (\$/ton)

Indirect Benefits

Reduced congestion
Better safety
Reduced pollution



Monetary value of reliability (\$ per capita)
EV of accidents (\$ per event)
Monetary value of emissions (\$ / gram)

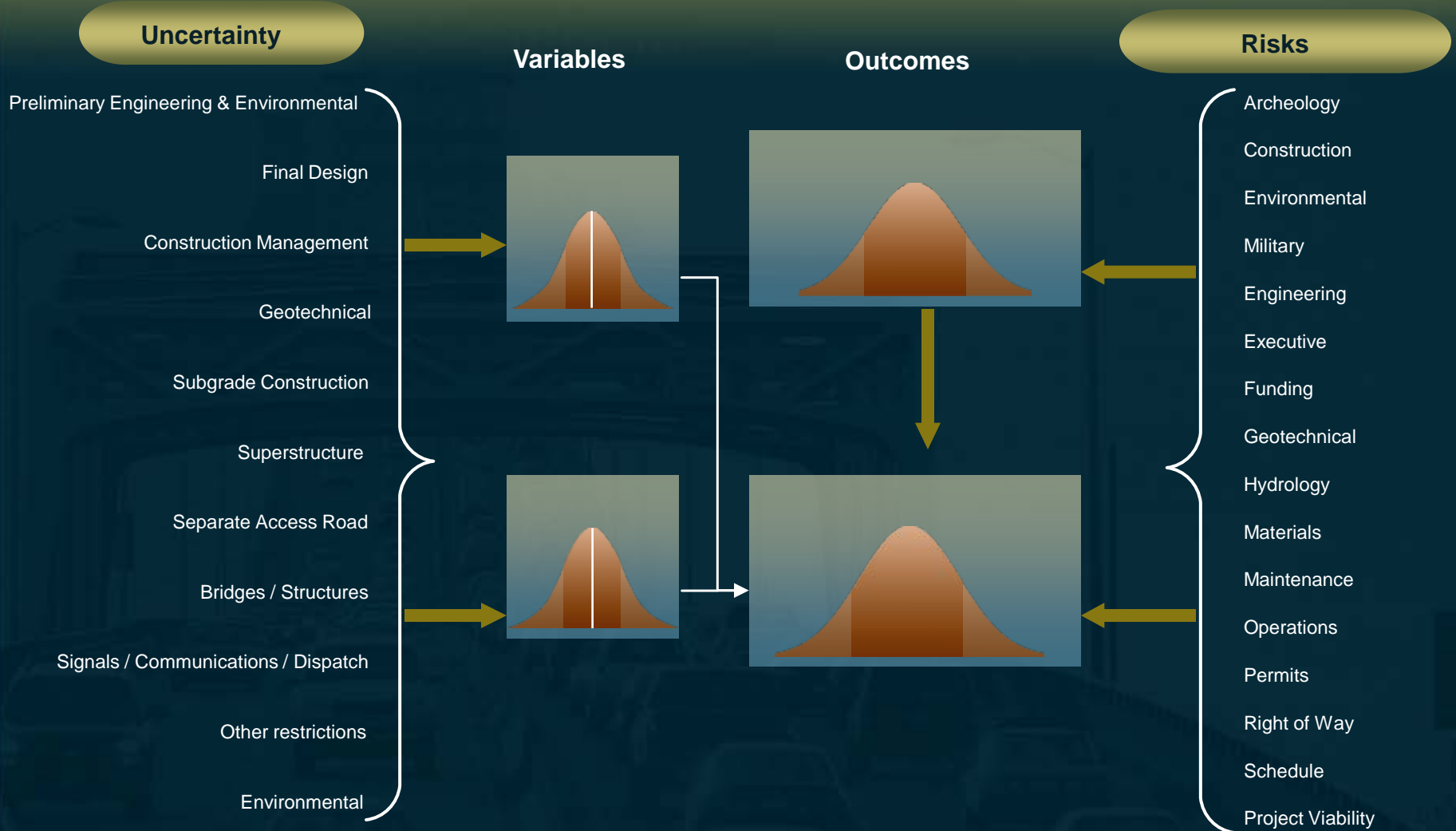
Wider Economic Benefits

Potential development
Job creation
Regional connectivity

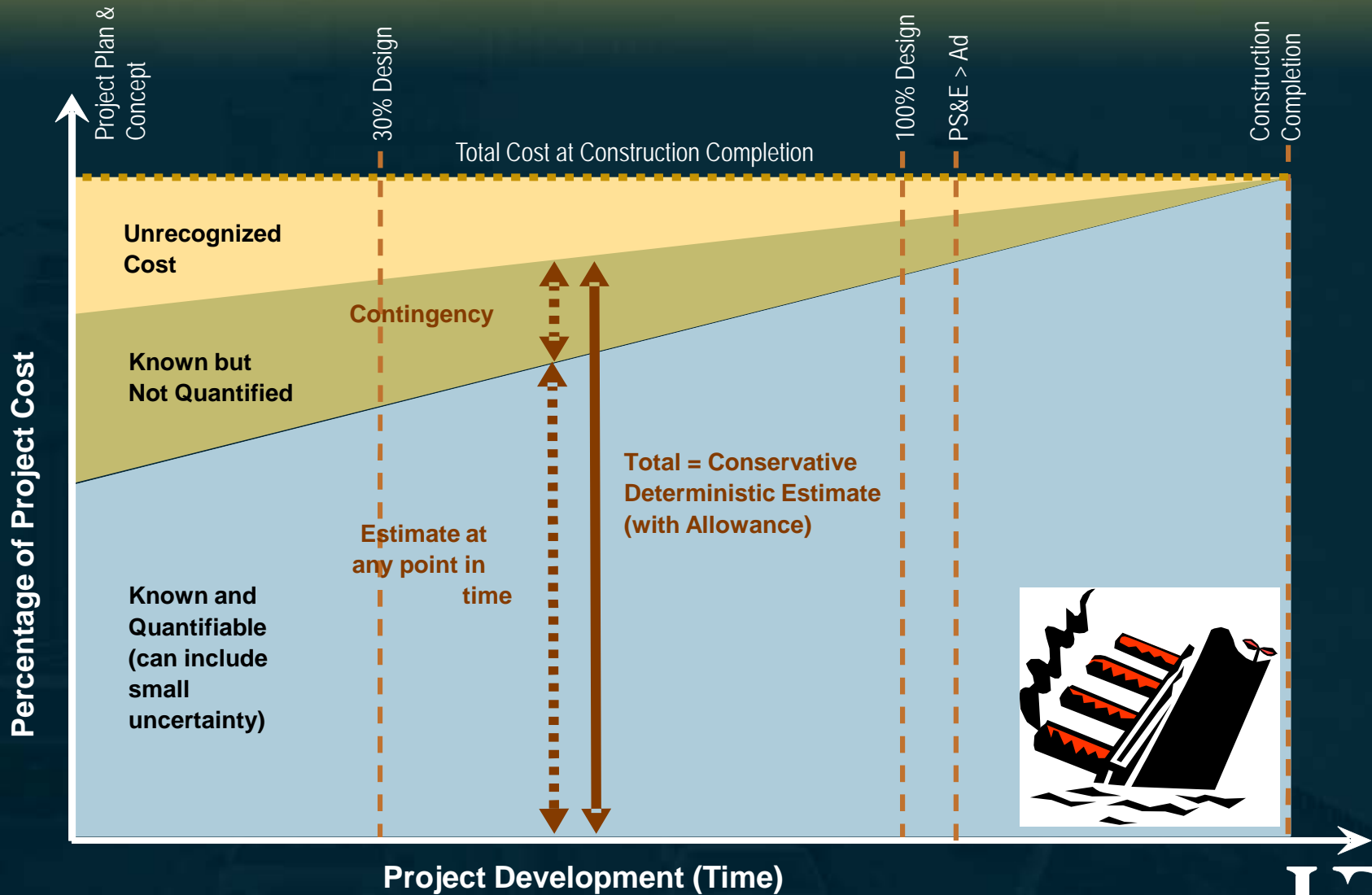


Increase in land value not captured (\$ per parcel)
Potential tax revenues (regional)

Incorporating Uncertainty



Uncertainty in Project Cost



Key Investment Considerations

Whether to Invest

Discounted NPV
Benefit-Cost Ratio (BCR)
Internal Rate of Return (IRR)

When to Invest

First Year NPV
Economies of Scale
System Level Impact

Funding and Financing

Budget availability
Potential for value capture
Level of risk

Summary

A good infrastructure investment plan:

- Has well established need
- Is well-timed
- Is supported by a favorable BCA
- Estimates distribution of benefits among beneficiaries
- Contains solid risk analysis and risk management plan

