Funding and Project Delivery of Managed Lanes: An Illustrative Evaluation

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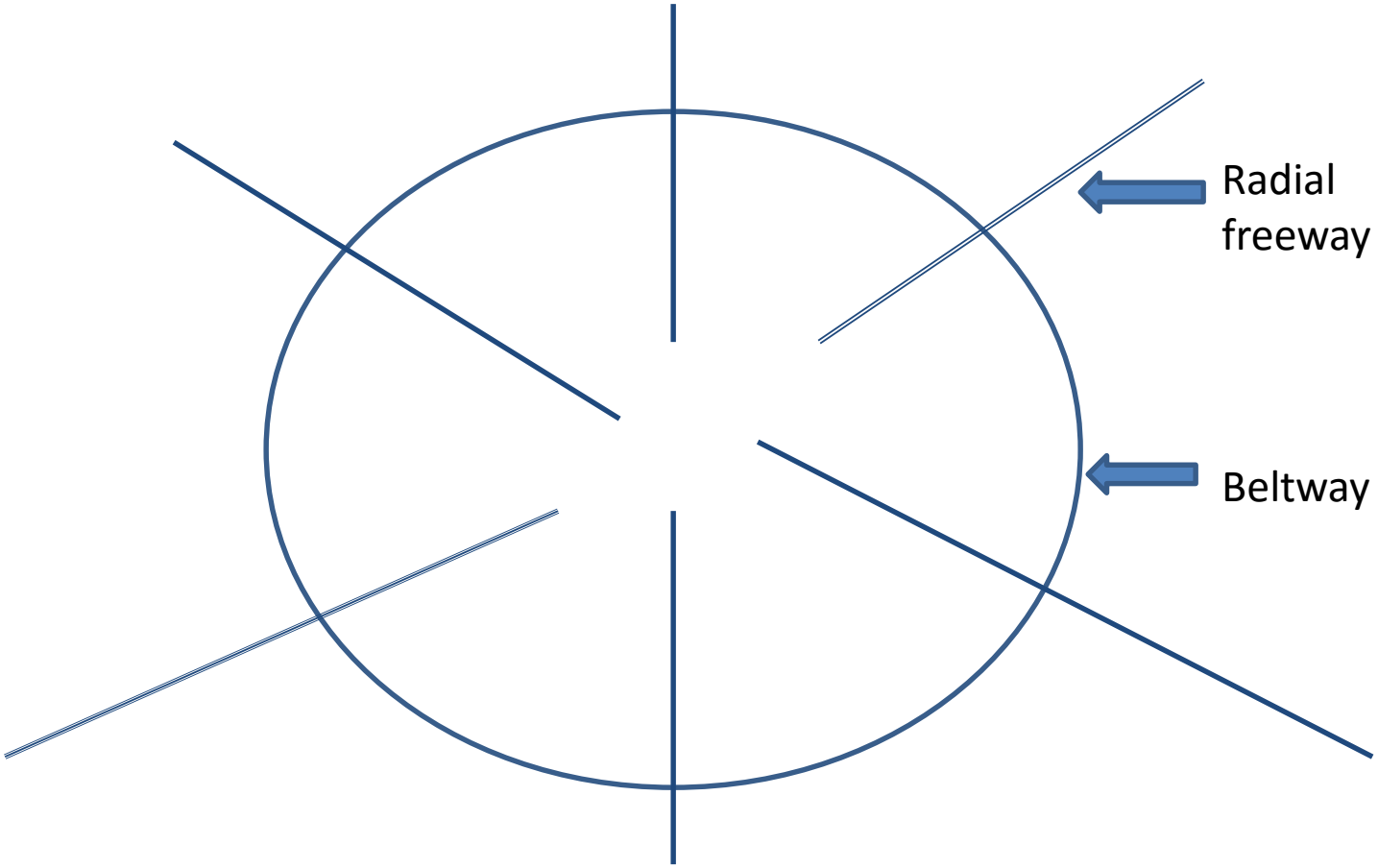
Presentation Outline

- **Illustrative Project**
  - Scope and Funding Options
  - Project Delivery Options
- **Evaluation Process**
  - Focus on economic efficiency
  - Uses FHWA's P3-VALUE 2.0 analytical tool
- **Evaluation Results**
  - Key model inputs
  - Costs and benefits of funding and project delivery options

Part 1: Project Background and Funding and Delivery Options

Illustrative Project in Watopia, Pennorado

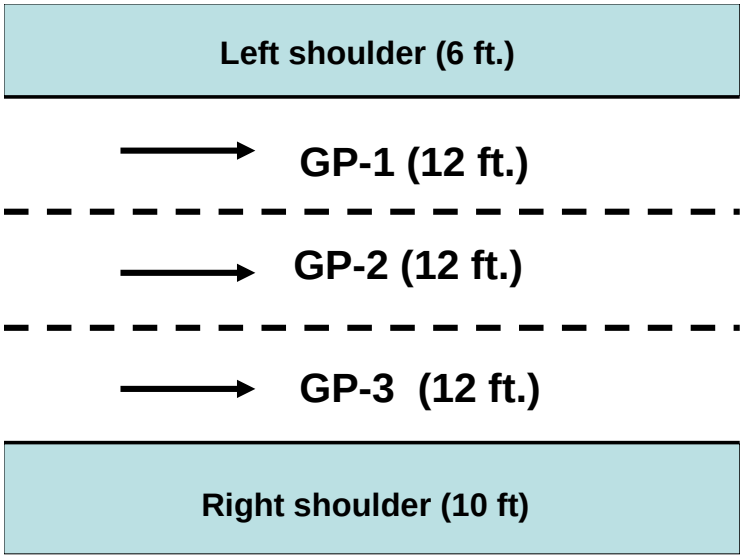
- Freeway system needs reconstruction



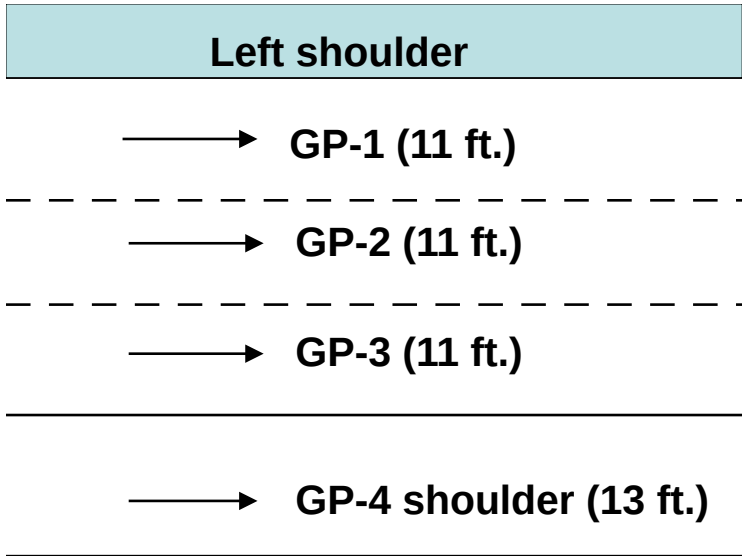
Dynamic Shoulder Travel Lane

Reconstruct and add Dynamic Shoulder Lane

Existing freeway configuration

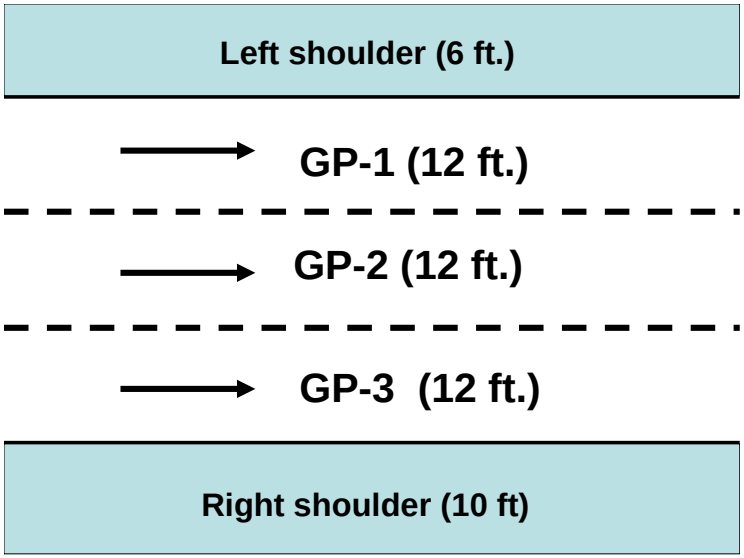


New freeway configuration

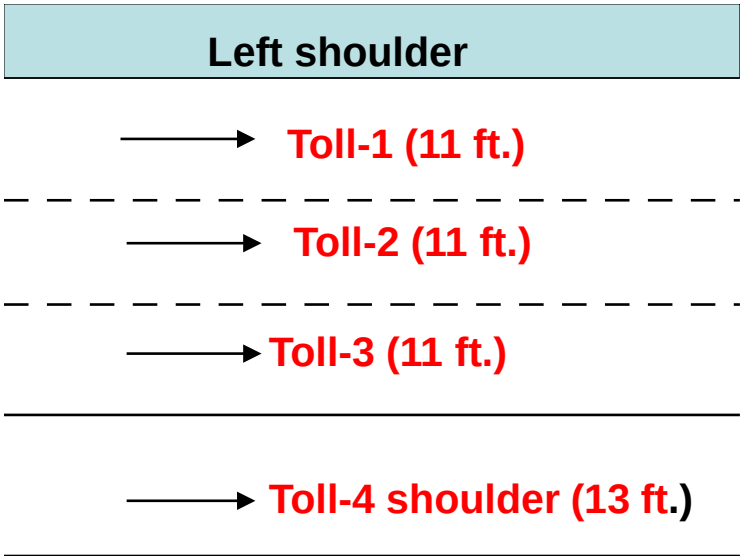


Funding Option 1: Rush Hour Tolls

Existing freeway configuration

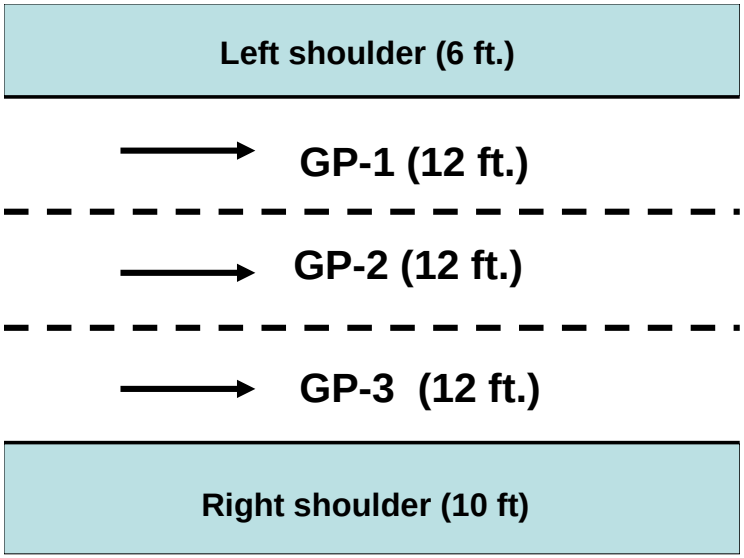


New freeway configuration

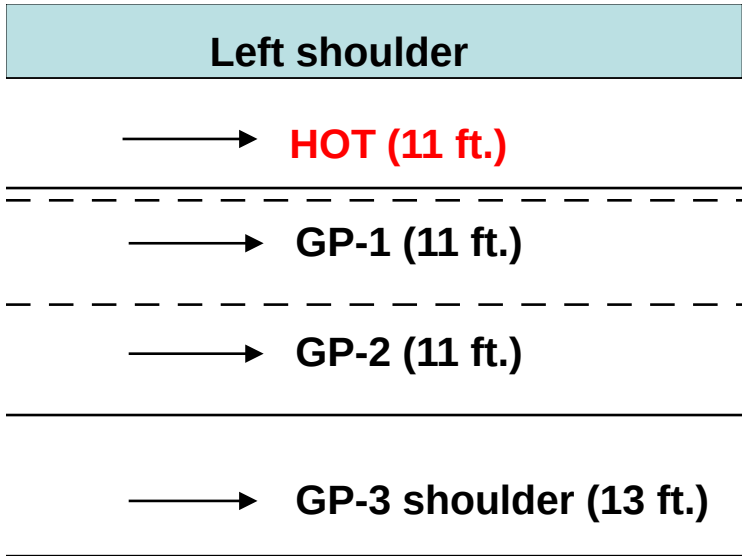


Funding Option 2: HOT lane

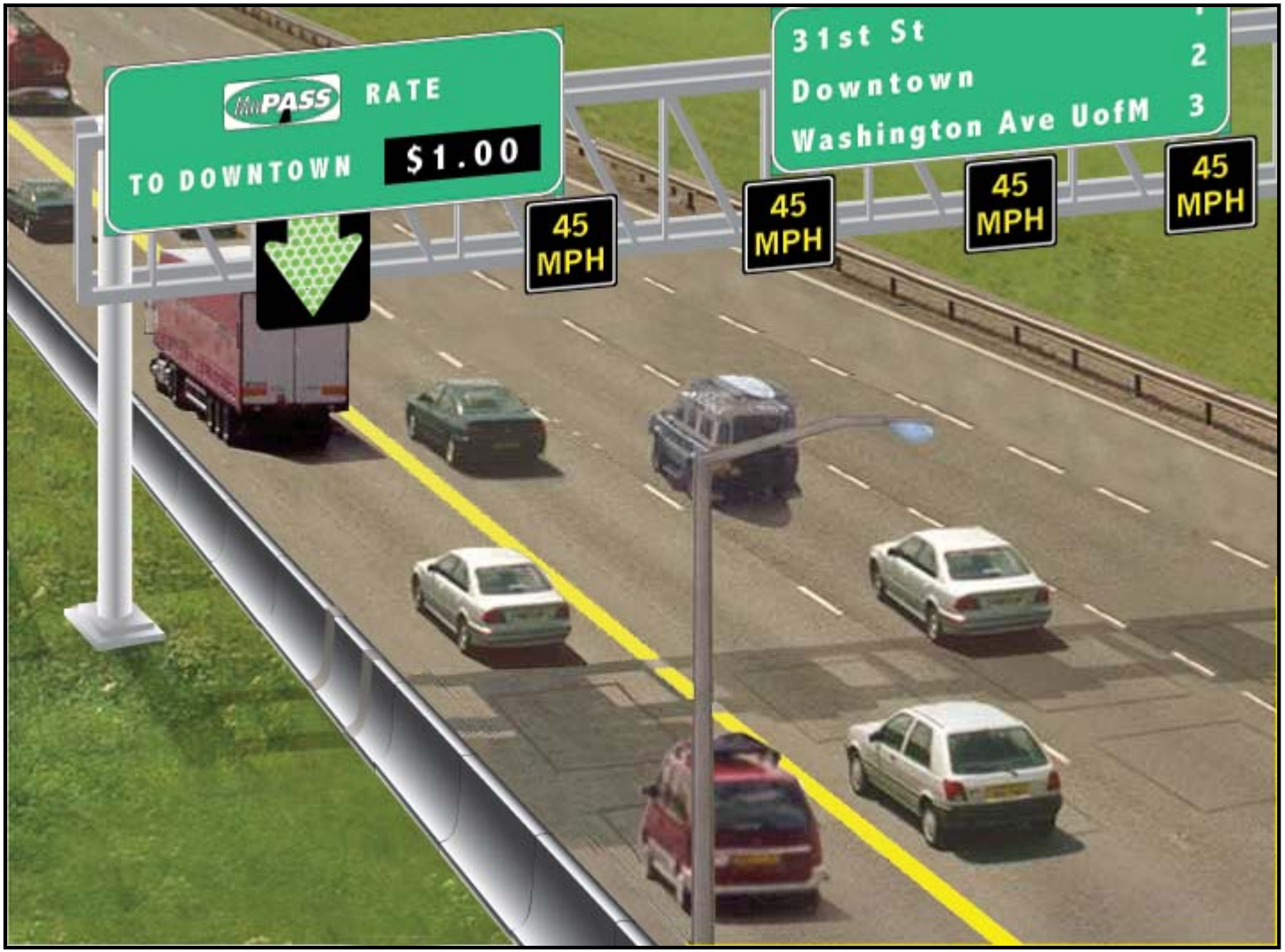
Existing freeway configuration



New freeway configuration

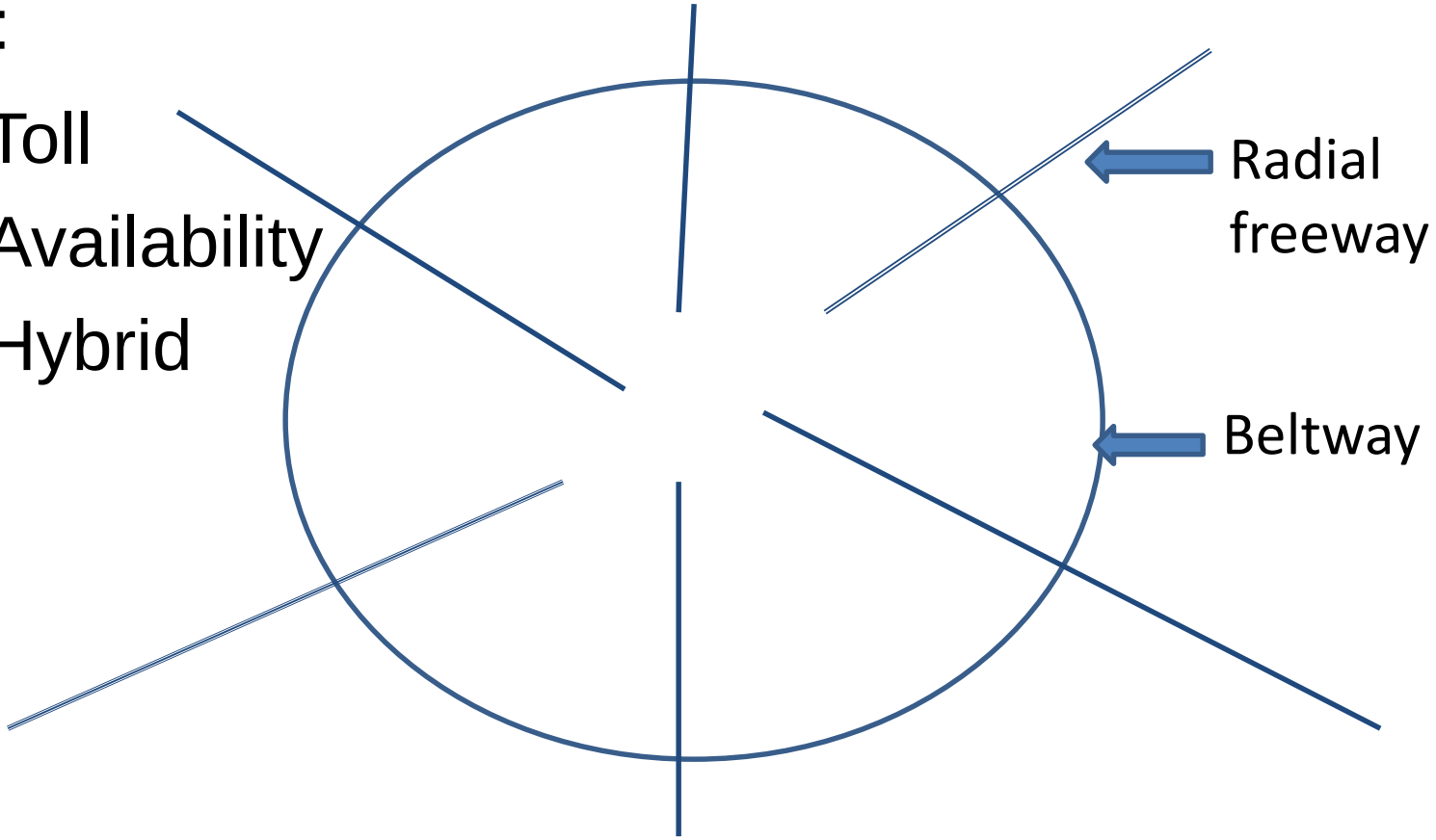


HOT Lane: Rush Hour Operation



Project Delivery Options

- Conventional delivery – with 5-year delay
- P3:
  - Toll
  - Availability
  - Hybrid



Basic P3 Concession Types: AP and Toll

- For Demand Elasticity = -0.5

	Throughput-maximizing (**Availability Payment**)	Revenue-maximizing (**with Toll Concession**)	Percent change
Toll rate	$1.00	$1.50	**+50%**
Traffic	1,600	1,200	**-25%**
Revenue	**$1,600**	**$ 1,800**	**+12.5%**

A New Option: Hybrid AP/Shadow Toll P3

- **Concessionaire compensated with two part payment:**
  1. Availability payment based on debt service and O&M cost
  2. Shadow tolls to provide return on equity – payment per person or per vehicle served at required minimum speed
- **Real toll rates set by concessionaire**
  - Rates will be set to maximize person or vehicle throughput
  - All toll revenues will go to public agency, as in an availability payment P3

Part 2: Evaluation Process

Economic Efficiency Evaluation Questions

- **Funding Options**
  - Do alternatives provide net benefits compared to No Build?
  - Which funding alternative provides the most net benefits?
- **Project Delivery Options**
  - Will delivery now provide net benefits relative to delaying it by 5 years?
  - Will P3 delivery provide more net benefits compared to conventional delivery?
  - Which P3 alternative will provide the most net benefits?

Economic Efficiency Evaluation Steps

Step 1

Project Scope & Funding Evaluation

- Compare Build alternatives to No Build
- Timing is based on P3 time frame
- Conventional delivery

Step 2

Delivery Delay Impact Evaluation

- Compare selected Build alternative to same alternative with a 5-year delay
- Conventional delivery

Step 3

P3 Delivery Impact Evaluation

- Compare the three P3 alternatives to conventional delivery of same project in the same time frame

Project Scope & Funding Alternatives

Step 1

Project Scope & Funding Evaluation

Conventional Delivery

- No Build (base case)

COMPARED TO:

1. Reconstruct and add shoulder lane
2. Reconstruct, add shoulder lane, **and price all lanes during rush hours**
3. Reconstruct, add shoulder lane, **and convert left lane to HOT lane**

Project Timing Alternatives

Step 2

Delivery Delay Impact Evaluation

Conventional Delivery

- Reconstruct, add shoulder lane and convert left lane to HOT lane, **in the same time frame as P3** (base case)

COMPARED TO:

- Reconstruct, add shoulder lane and convert left lane to HOT lane, **delayed by 5 years**

Project Delivery Alternatives

Step 3

P3 Delivery Impact Evaluation

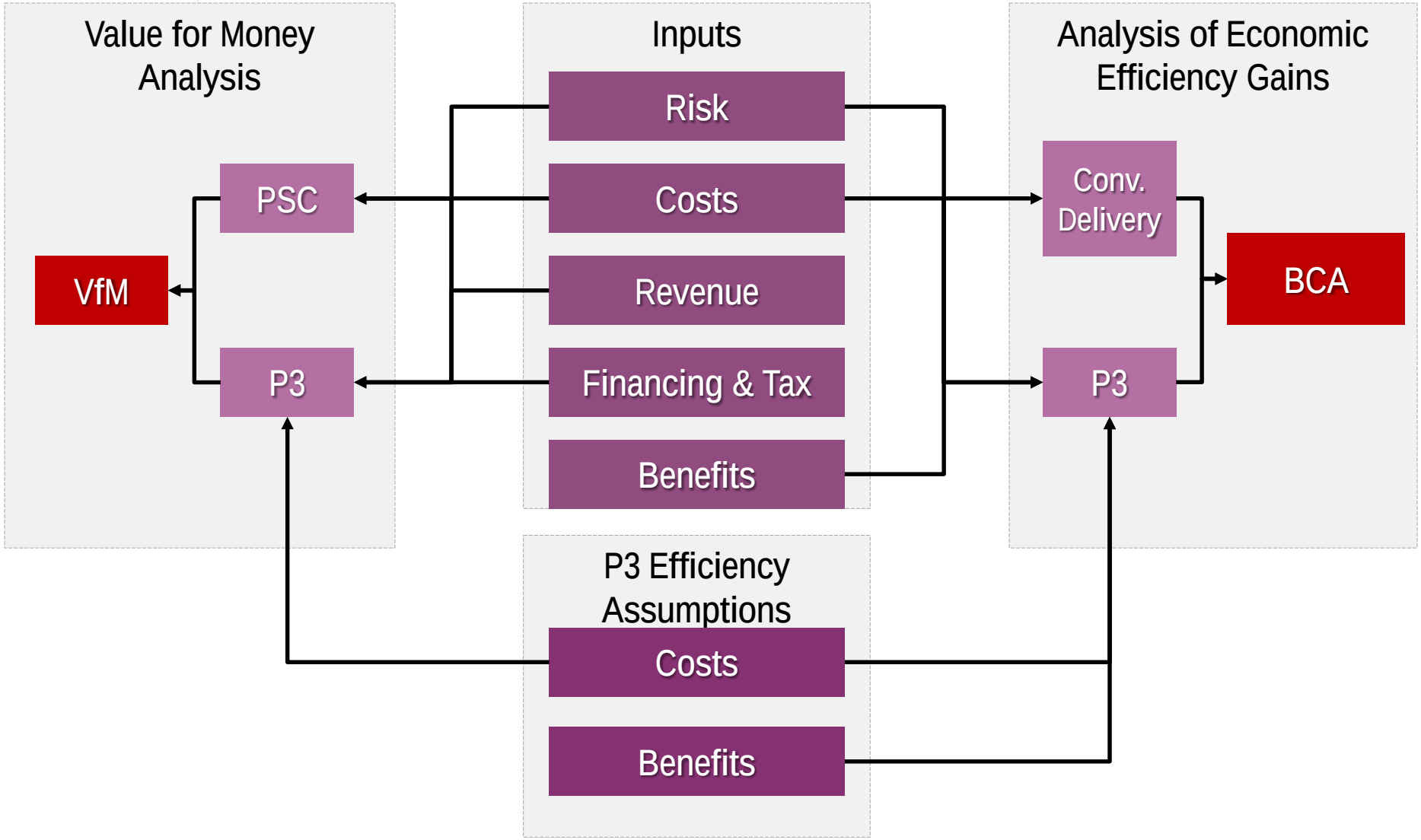
P3 vs. Conventional Delivery

- Reconstruct, add shoulder lane and convert left lane to HOT lane in the same time frame as P3, **with conventional delivery**

COMPARED TO:

1. Reconstruct, add shoulder lane and convert left lane to HOT lane **using P3 toll concession**
2. Reconstruct, add shoulder lane and convert left lane to HOT lane **using Availability Payment P3 concession**
3. Reconstruct, add shoulder lane and convert left lane to HOT lane, **using hybrid Availability Payment/ Shadow Toll P3 concession**

FHWA's P3-VALUE 2.0



Part 3: Evaluation Results

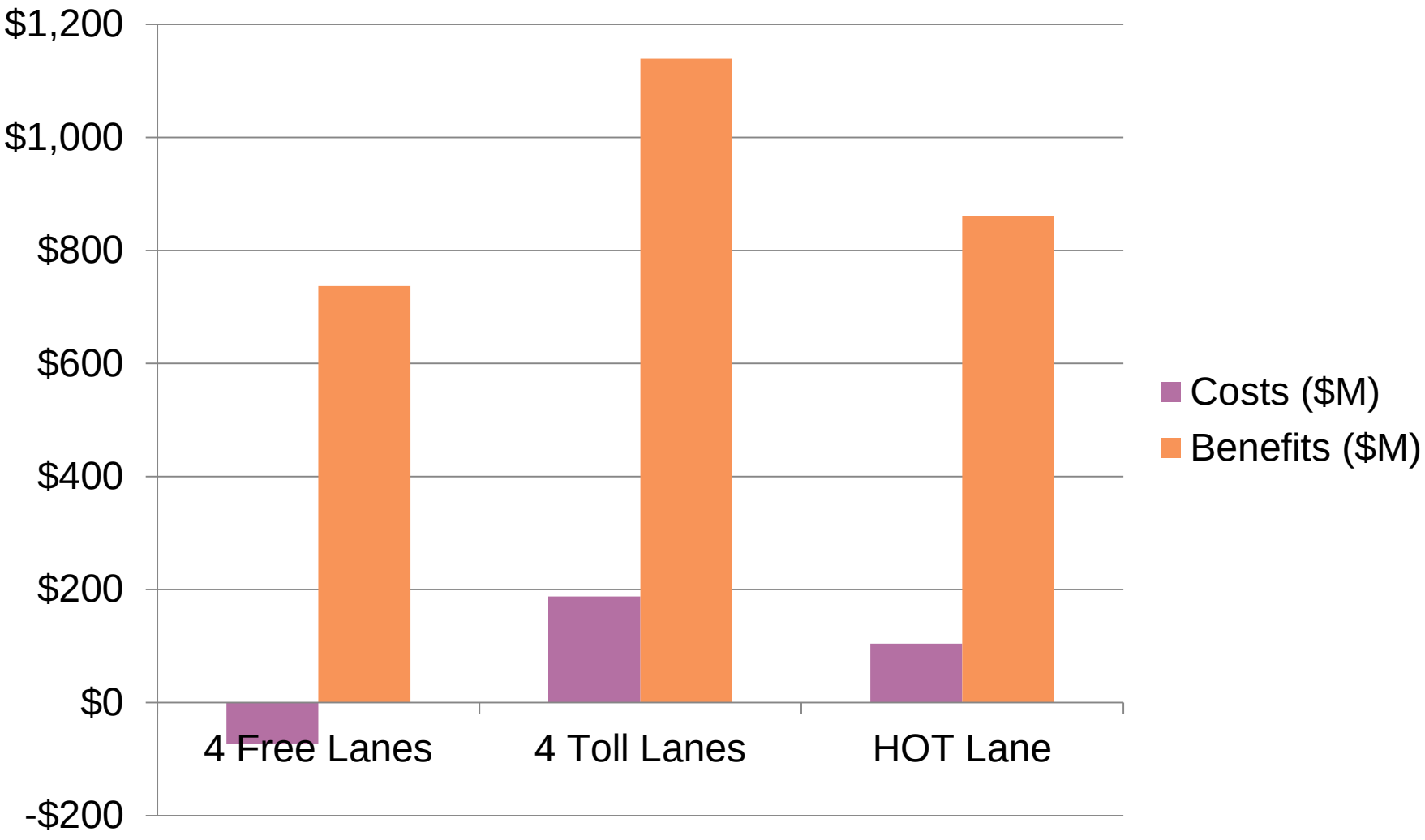
Key Model Assumptions

- **Travel characteristics**
  - Peak period traffic volumes on average (over 20-mile segment) will be at capacity on free lanes
  - Volumes on priced lanes will depend on pricing strategy
    - Revenue maximization
    - Throughput maximization
  - 6 peak hours on 250 weekdays

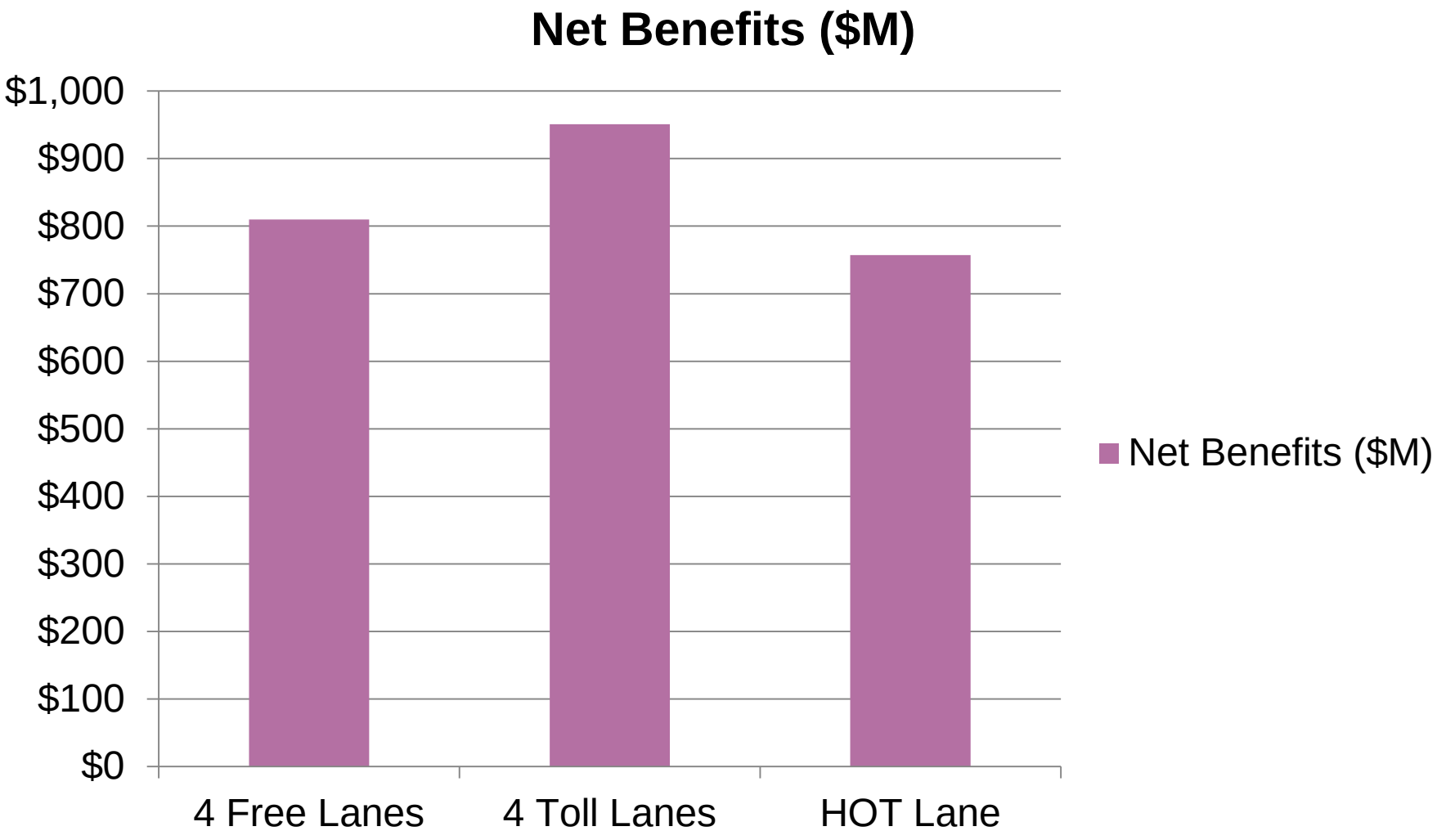
Key Model Assumptions

- **Costs**
  - Design-Build cost = $1.1 billion, about 5% annualized O&M cost
  - P3 efficiency assumed to reduce costs by 10%
  - No Build O&M costs assumed to be twice as much as O&M costs for Build options

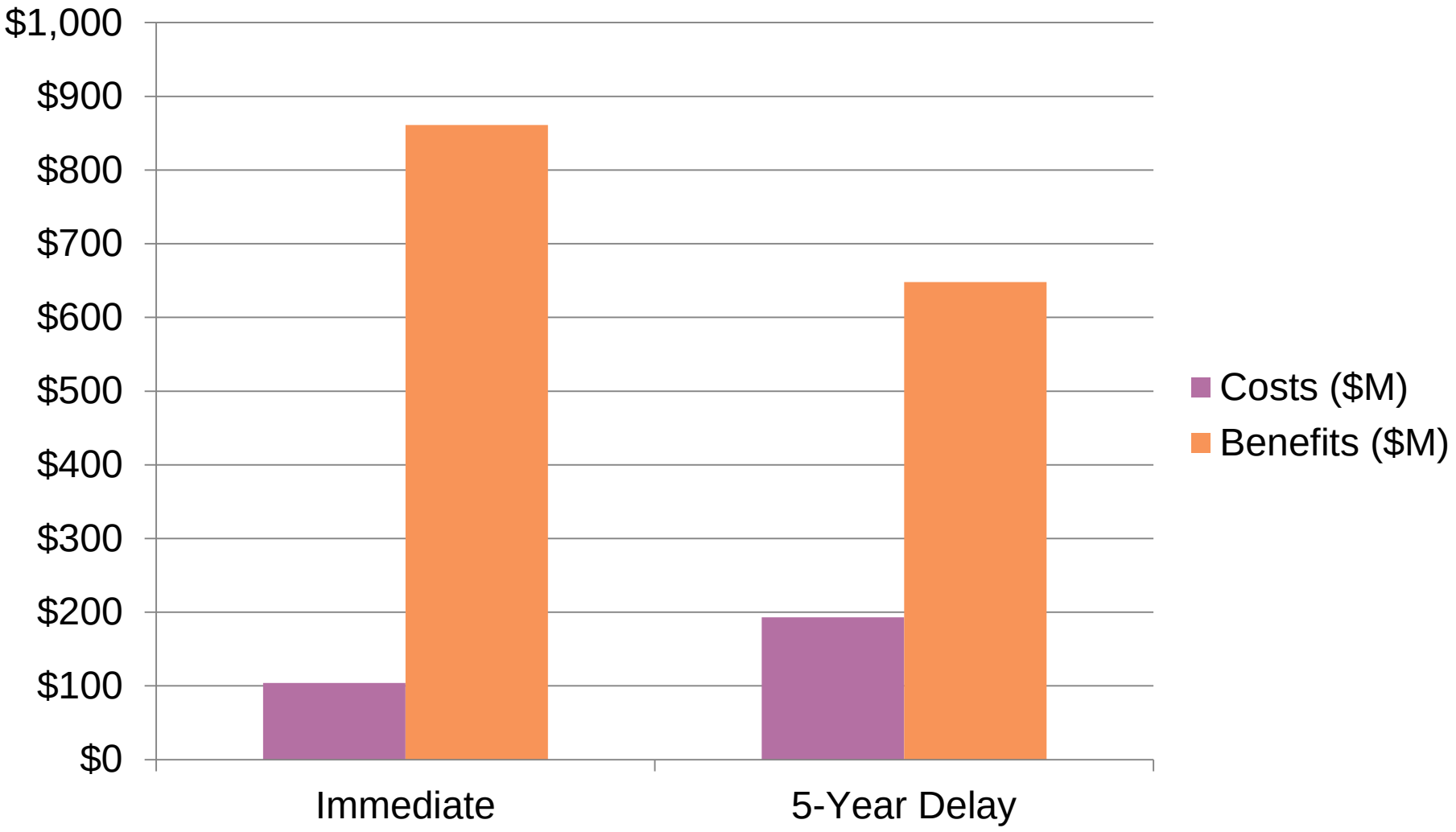
Funding Options: Costs vs. Benefits



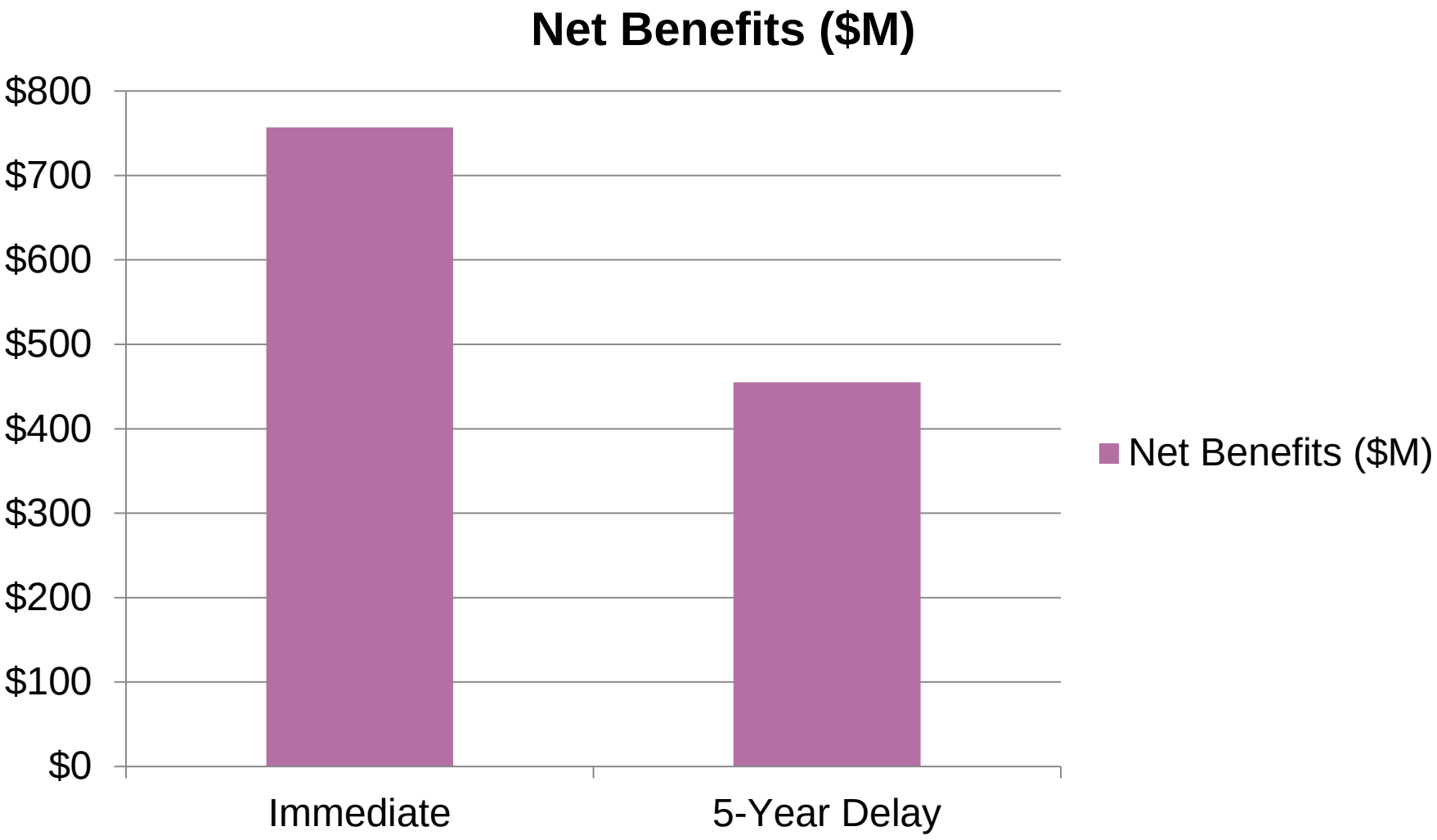
Funding Options: Net Benefits



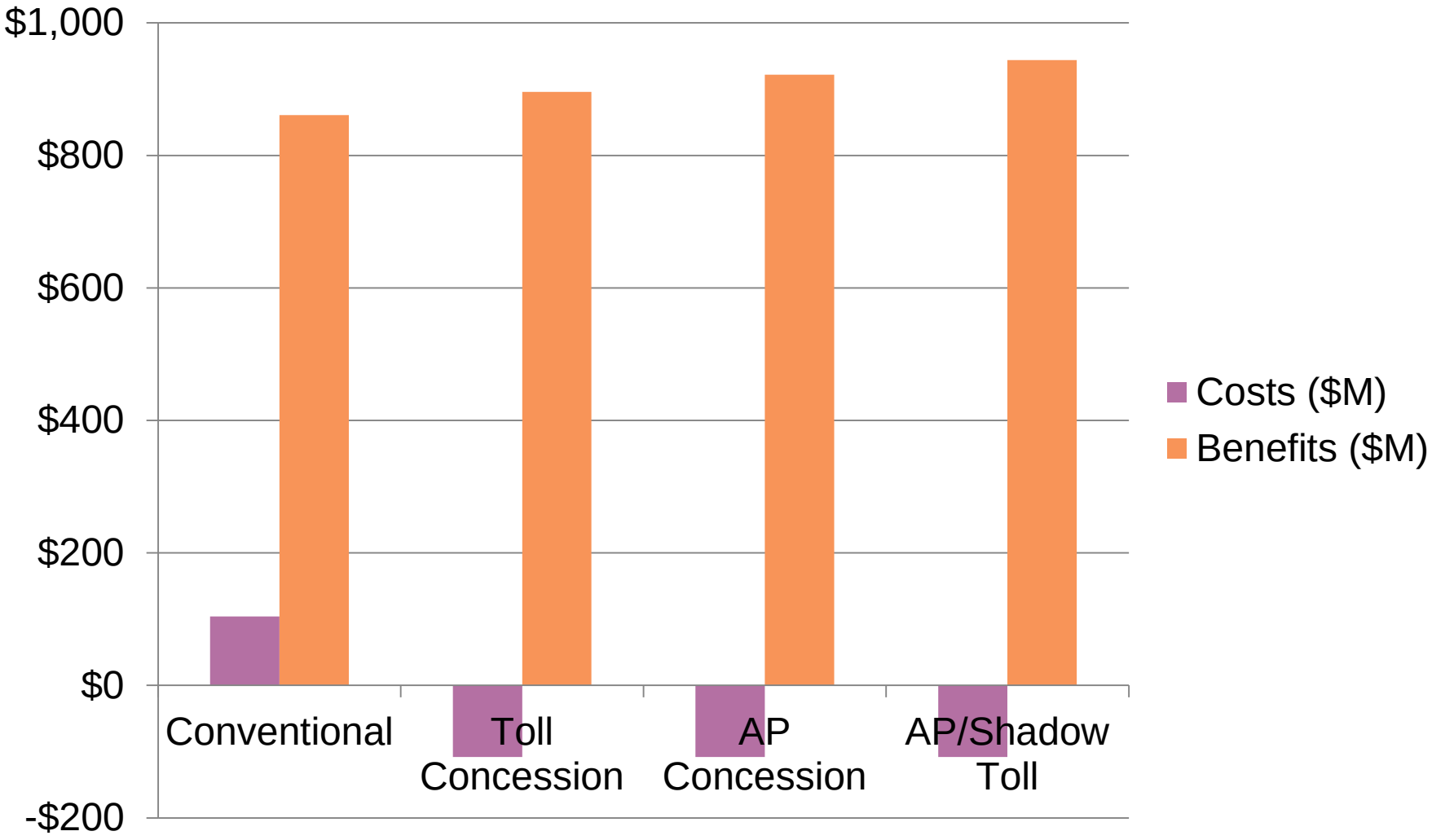
Delivery Timing: Costs vs. Benefits



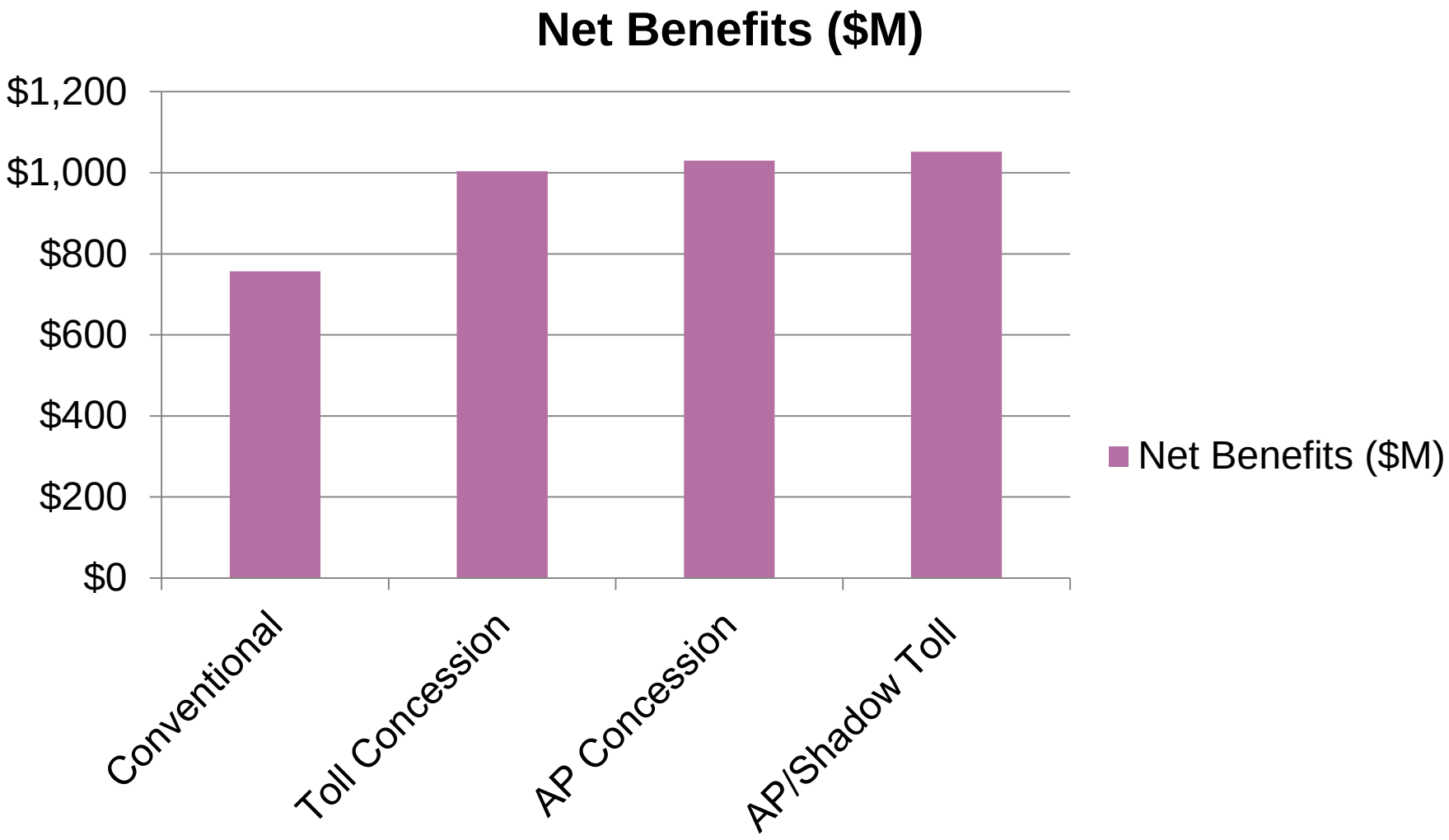
Delivery Timing: Net Benefits



Project Delivery Options: Costs vs. Benefits



Project Delivery Options: Net Benefits



Summary

- **P3-VALUE 2.0** may be used to undertake screening level evaluation of the economic efficiency of project funding and delivery options:
  - Quality of inputs is key
- **Limitations**
  - Higher value of time on HOT lanes is not considered
  - Benefits & costs of mode shifts are not accounted for

- **P3-VALUE 2.0 may be downloaded from FHWA's P3 Website**: http://www.fhwa.dot.gov/ipd/p3/

Contact Information

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