

BENEFIT-COST ANALYSIS OF PARK & RIDE/INTERMODAL STRATEGIES (Cal-B/C PnR)

INTRODUCTION

This spreadsheet tool provides a method for preparing simple economic analyses for park-and-ride lot projects. Given required input data for a project, the model calculates its lifecycle costs, lifecycle benefits, net present value, benefit/cost ratio, internal rate of return, and payback period. Annual benefits are also calculated.

The model is arranged by worksheets and contains the following information, data, and results:

<u>Worksheets</u>	<u>Contents</u>
Instructions	General model description and assumptions
1) Project Information	Project input data
2) Results	Summary of analysis results
Travel Time	Calculation of travel time impacts
Vehicle Operating Costs	Calculation of changes in highway vehicle operating costs and out-of-pocket costs
Accidents	Calculation of changes in highway crash costs
Emissions	Calculation of changes in highway emissions
Final Calculations	Calculation of net present value, internal rate of return, and payback period
Parameters	Economic assumptions, lookup tables, and other model parameters consistent

The model is designed so that the user generally needs to insert data only in the **green boxes** on the Project Information worksheet. Summary results are shown in Results worksheet. The remaining worksheets are provided for the user to see, but the model performs calculations automatically.

In the process of economic analysis, some generally accepted economic assumptions are necessary. These assumptions include the real and nominal discount rates, unit user costs (e.g., value of time), consumption rates (e.g., fuel consumption and vehicle emissions), and crash rates. These assumptions are given in the Parameters worksheet and should not be changed by the user.

After reading the instructions in this worksheet, the user should proceed to the Project Information worksheet and input data for the specific project in the **green boxes** (light gray when printed). The model provides default values in the **red boxes** (medium gray when printed). These values can be changed by the user, if information specific to the project is available. The model calculates some values based on relationships or assumptions, with results shown in the **blue boxes** (dark gray when printed). These values can be changed by the user.

INSTRUCTIONS

The user can analyze most projects simply by inserting limited data on the Project Information sheet and getting results on the Results page.

PROJECT DATA (Box 1A)

This section provides general information about the park-and-ride lot project. At the top of the sheet, the user can insert information about the project, such as the project name, Caltrans District, and funding information.

Type of Project

- 1 Please select the appropriate type of park-and-ride lot project from the pull-down menu. The menu appears if user clicks on the green box next to the project type.

Project Location

- 2 Insert a 1, 2, or 3 for the appropriate region of California. This information is used to estimate the emissions benefits.

Length of Construction Period

- 3 Insert the number of construction years before benefits begin. This must be a whole number (round to the next higher integer).

PARK-AND-RIDE LOT INFORMATION (Box 1B)

This section provides project specific information about the park-and-ride lot. If the project is constructing a new lot, no information should be entered in the no build case.

Lot Design

- 4 Insert the number of marked parking spaces provided for the build and no build cases. If the project is expanding an existing lot, the difference between the build and no build should equal the number of new spaces.

Park-and-Ride Demand

- 5 Insert the typical percent of lot capacity expected to be used for current year (no build) and opening year (build).
- 6 Insert the estimated number of years until the lot reaches capacity for build and no build cases.
- 7 If the lot will be located next to residential uses that could supply bicycle or walk-up users, insert the estimated number of bicycle/pedestrian users for the build and no build.
- 8 Insert the average vehicle occupancy (average number of people per vehicle) of vehicles driven to the lot in build and no build cases. Model assumes 1 person per vehicle if no information is entered.

DESTINATION INFORMATION (Box 1C)

This section allows users to enter information about the final destinations of park-and-ride lot users. Information can be entered for up to three potential destinations. Additional destinations can be entered later with the use of a macro (see Next Steps at the end of the instructions). Each lot must have at least one destination.

Destination Description

- 9 Insert the name of the destination. This information is for information purposes only.
- 10 Insert the distance in miles from the park-and-ride lot to the destination.
- 11 If the park-and-ride lot is being built near an existing lot and may attract users from the other lot, insert the distance from the park-and-ride lot to the next lot in miles. The tool assumes that users drive a short distance to the new lot.
- 12 Insert the average daily cost for parking at the destination. If free parking is provided, insert zero. If parking is typically purchased monthly, divide the monthly cost by 21 workdays per month.

Demand for Travel to Destination

- 13 Insert the percent of park-and-ride users (from vehicles, bicycles, and pedestrians) that travel to this destination. The sum of the percentages for the three destinations must total to 100%.
- 14 Insert the percent of users to each destination that are new transit riders. New transit riders are former single occupant vehicle (SOV) drivers who switch to express transit service made available in conjunction with a new park-and-ride lot.
- 15 Insert the percent of users to each destination that are existing transit riders. Existing transit riders switch to express transit service when it is made available in conjunction with a new lot.
- 16 Insert the percent of users to each destination that are new carpoolers. New carpoolers are former SOV drivers who switch to carpooling as a result of a new lot.
- 17 Insert the percentage of users to each destination that are existing carpoolers. Existing carpoolers are carpoolers who switch to the new lot for convenience.

Highway Travel to Destination

- 18 Insert the travel time for high occupancy vehicles (HOVs) to each destination in minutes. If HOV lanes are available for the entire trip, this should be the travel time on the HOV lanes. If carpoolers must use a combination of HOV and non-HOV lanes, this travel time should include travel on non-HOV lanes where HOV lanes are not available.
- 19 Insert the travel time to each destination in minutes using non-HOV lanes.
- 20 Insert the appropriate crash rate and percent fatal and injury crashes for travel from the park-and-ride lot to each destination. This crash rate can be calculated across highway segments or using a county-wide average.

Transit Travel to Destination

- 21 Insert the average transit travel time in minutes for express bus riders.
- 22 Insert the average fare paid by express bus transit riders. If monthly transit passes are available, this should be the cost of a pass divided by 21 workdays per month.
- 23 Insert the express bus headway (time between buses) in minutes. The tool estimates that riders wait on average one half of the headway time, but no more than 10 minutes.

- 24 Insert the average transit travel time in minutes for local bus riders.
- 25 Insert the average fare paid by local bus transit riders. If monthly transit passes are available, this should be the cost of a pass divided by 21 workdays per month.

Carpool/Vanpool Travel to Destination

- 26 Insert the average size (people per vehicle) of carpools to each destination.
- 27 Insert the average time in minutes that people wait for carpools.

PROJECT COSTS (Box 1D)

Net project costs should be inserted in the years they are expected to occur. Costs should be inserted for construction period and for a twenty-year operating period after construction completion. Construction Year 1 is the first year that cost are incurred. All costs should be inserted in thousands of dollars.

Destination Description

- 28 Insert project's initial costs in constant (Year 2011) dollars for project development, right-of-way, and construction. The number of construction years with costs should equal the length of the construction period (Box 1A, Input 3).
- 29 Insert estimated future incremental maintenance/operating and rehabilitation costs in constant (Year 2011) dollars. These figures should be entered for all years after the project opens.
- 30 Insert any estimated mitigation costs or transit agency cost savings in constant (Year 2011) dollars during construction and for 20 years after construction completion.
- 31 Insert any other costs not already included.
- 32 Insert the residual value of the park-and-ride lot that remains after the 20-year project lifecycle. The tool automatically calculates this value as the sum of the right-of-way costs. This value can be overridden by the user. Any lot improvements that remain after the 20-year lifecycle should also be included in the residual value. The residual value is included as a project benefit.

NEXT STEPS

The model includes a macro that allows the user to enter additional destinations into the model. This macro should be used only after all information has been entered through Box 1D. Also, the user should save a copy of the model prior to using the macro. By using the macro, the user can enter up to nine destinations in the model (by running the macro twice).

- 33 To enter information for the next set of up to three destinations, click button on Project Information page after data have been entered through Box 1D and the model is saved. Enter data for the second set of destinations in Box 1C. Model prompts user to save interim version of analysis before proceeding.
- 34 Summary results are available immediately in the Results worksheet.