**The Glory Mountain State Ski Area**

**Inputs:** When building spreadsheet models, it is good modeling practice to identify all of the data that you will be inputting into the model and isolate it in a separate worksheet or at the top of the worksheet where you intend to build your analytical model. The inputs for the Glory Mountain State Ski Area case are shown in the Excel excerpts below. To tie the inputs to each of the questions in the case, the input data for each question is in a separate spreadsheet excerpt and labeled to show the problems the data relates to.















**Question 1** asks you to prepare a *base budget* for Glory Mountain and a *flexible budget* (Chapter 3) showing the impact of a 5% reduction in the number of skier days. Glory's revenues come from four sources: Lift-ticket sales, ski lessons, food sales and a fixed state subsidy of $2,000,000 per fiscal year. Revenue and expenses are calculated as follows:

*Revenue Calculations*

* Weekend tickets = # of total skiers x % on weekends x average ticket price

variable revenue

* Midweek tickets = # of total skiers x % midweek x average ticket price

variable revenue

* Lessons = # of total skiers x % taking lessons x average lesson price

variable revenue

* Food sales = # of total skiers x average food purchase

variable revenue

* State Subsidy = $2,000,000 per fiscal year

fixed revenue

*Expense Calculations*

Salaries & Benefits

* Management Salaries = $1,800,000

fixed cost

* Instructors & Patrol = # of employees x days worked x hours per day x hourly wage

variable cost

* Lifts & Grooming = # of employees x days worked x hours per day x hourly wage

fixed cost

* Kitchen Staff = # of employees x days worked x hours per day x hourly wage

fixed cost

* All employees earn benefits
* Benefit expense = total salaries x benefit %

Other Operating Expenses

* Fuel & Equipment = pieces of Equipment x days used x hours x hourly cost

fixed cost

* Energy = $2,240,000

fixed cost

* Insurance = daily insurance rate x days of operation

fixed cost

* Food Costs = food revenue x cost of food percentage

variable cost

The spreadsheet excerpt below shows the base and flexible budgets.



***Question 2*** is a *net present value* question (Chapter 5). You were asked whether Glory could justify installing a wind turbine on solely financial grounds. To make this decision, you need to identify the cash outflows - Turbine acquisition at a coat of $4,100,000 in period zero, which is by convention the start of any capital-budgeting analysis and turbine maintenance at a cost of $750,000 at the end of year seven. Cash inflows come from energy savings of $560,000 per year for 15 years. Glory's discount rate is 8%. That is all you need to do the net present value calculations.

Depreciation never enters into capital budgeting calculations. Remember that all capital budgeting analyses are based on cash inflows and outflows not accrual expenses. We will use information about the turbine's depreciable life and Glory's method of depreciation when we calculate a revised budget for **Question 6**. Note that the depreciable life for the turbine is different from its useful life. That is not unusual. depreciable lives are based on IRS conventions while useful lives are based on engineering data and organizational practice.

The *net present value* calculation for the wind turbine decision is shown in the spreadsheet below.



With an NPV of $255,690, Glory should install the wind turbine. It pays for itself including the 8% cost of capital.

**Question 3** asks you to choose between two alternative ways of replacing Glory's aging snowmaking equipment. Unlike the wind-turbine decision, replacing the snowmaking machines will not have any impact on Glory's cash inflows. The decision is complicated by the fact that each of the alternatives has a different useful life. To do this analysis, you need to calculate the *annualized cost* of each alternative (Chapter 5). As you will remember, finding an *annualized cost* involves calculating the *net present cost* of each alternative and annualizing the *net present cost* over each alternative's *useful life*. To do that we need the cash outflows related to each alternative, the respective useful lives and Glory's cost of capital.

The annualized cost calculations for the snowmaking equipment decision are shown in the spreadsheet below.



Based solely on financial considerations, Glory should buy the Big Mouth System. It has the lower annualized cost.

**Questions 4 and 5** ask you to evaluate the feasibility of adding a day-care center at Glory Mountain. The first issue (**Question 4**) is how many children will have to be enrolled at the center on an average day for it to *break even* (Chapter 4). The second (**Question 5**) is what the impact operating the center would have on an annual basis. To answer that question, you will need to prepare a *special purpose budget* for the center (Chapter 2).

**Question 4**: In a standard break-even analysis we calculate the break-even quantity by dividing the fixed costs by the *contribution margin* (variable revenue - variable expenses) This case is complicated by the introduction of *step-fixed costs*. Every time the center adds ten children, they need to hire an additional instructor/day-care specialist at a cost of $200 (8 hours x $25 per hour).

Given that, we will need to look at the Center's *break-even* level in increments of 10 children. At each of these levels, fixed costs will be the cost of the Center Director $78,000 ($60,000 base salary plus 30% benefits or $18,000) spread over the planned 130 days of operation. That works out to $600 per day. To that we add $200 for each ten children at the center and find the *break-even* for each of those levels of operation using the standard formula.

The Centers *contribution margin* is equal to $50 per child day. It is calculated by subtracting the variable cost of food ($10) and the variable supply cost of $10 from the $70 per day it charges for each child at the Center.

The spreadsheet below shows those calculations for attendance levels of between 30 and 50 children per day. We do not need to look at a wider range of possible operating levels because the Center reaches its break-even level at 24 children and breaks even at higher levels of operation. The issue for Glory's management is whether this is an attainable level of utilization. If it is, they should add the child-care service. If not, they shouldn't.



In **Question 5**, you were asked to prepare a *special-purpose budget* for the Center but to exclude the lift-ticket revenue from additional skier days from that budget. This budget will ask what contribution the Center might be expected to make to Glory's profitability on a stand-alone basis. Adding in lift-ticket revenue would in effect subsidize the Center's operations with lift-ticket revenue and not answer the question that has been posed. However, we will base expected attendance at the Center on the revised number of skier days (base skier days 292,500 x (1 + 6% additional skiers) or 310,500. Glory expects 10% of those skiers to have children between 3 and 7 (a total of 31,005 skier days) and for each of those skiers to register .25 children at the Center for a total of 7,751 child-days at the Center.

Revenue and expenses for that budget are calculated as follows:

*Revenues*

* Child Care revenue = total child days x daily rate of $70

*Expenses*

* Center Director - $60,000 plus $18,000 in benefits
* Child Care Workers = average number (6) x $200 per day x 130 days = $156,000
* Since Child-care worker expenses include benefits we will need to divide that total by 1 + the benefit rate of 30% to get the base salaries of $120,000.
* Food & Supplies = child days x marginal cost of $20 per child per day.

The spreadsheet below shows the special purpose budget for the Kid's Center. At projected operating levels, the Center is expected to add $153,563 to Glory's profitability. Notice that the special purpose budget format mirrors Glory's overall budget. that will make it easier to include the impact of the Center in the overall budget when the time comes.



**Question 6** asked you to pull all of this together and prepare a revised budget. Budget revision are the norm in most organizations. It is one of the reasons everyone should build spreadsheets with an eye toward using them many times (Chapter 2).

Revenue and expense calculations for the revised budget mirror what you did for the base budget with a few exceptions:

Budget Changes

* Because of the introduction of the Kid's center, Management expects skier volume to be 6% higher. That means lift-ticket revenue, ski lessons and food sales will all increase by 6%.
* That same increase in volume will result in a 6% increased food costs which will still be equal to 40% of food revenue. We have assumed that there would be sufficient instructor and ski-patrol capacity to handle the increased volume but a conservative analyst might have increased those costs as well.
* We will need to add the revenue from the Kid's center. We get that from the *special-purpose* budget.
* We will need to add the salary ($180,000) and benefits ($54,000) from the Kid's center to the revised budget. Just as we added the center as a separate revenue line item, we added the Kid's Center wage expenses as a separate item. Benefits for Center workers are included in the total-benefits line.
* Energy costs have been reduced by the expected $560,000 annual energy savings from the installation of the wind turbine.
* We added the expected cost of supplies for the Kid's Center. That expense comes directly from the *special-purpose* budget.
* We also need to add *depreciation* expenses for the wind turbine. Depreciation for the Wind Turbine is equal to the original cost of the equipment ($4,100,000) divided by its 10-year depreciable life for a total of $410,000 in the first year. Note that the cost of the anticipated maintenance in the seventh year has not been included. *Amortization* of the refurbishing costs will be added in the year the work is done.
* We will add a *depreciation* expense for the Big-Mouth snowmaking equipment as well. That will be equal to the cost of the equipment ($850,000) less the 5% residual of $42,500. That leaves a depreciable base of 807,500. Dividing that by the equipments 10-tear life, we get an annual straight-line depreciation expense of $80,750.
* Since the decision was to purchase the Big-Mouth equipment, there was no change in Fuel and Equipment costs.
* To finance the equipment and meet other operating needs, Glory issued a $6,000,000 bond on the first day of its fiscal year. The terms of the bond call for Glory to pay interest twice each year based on a 5% coupon rate. That will add $300,000 of interest expenses ($3,000,000 x 5%) to Glory's budget. Note that the timing of the payment does not matter when determining Glory's interest cost. Under accrual accounting expenses are recognized when the resources are used. Since Glory would be using the proceeds from the bond offering, they would accrue a full year's interest expense regardless of the timing of payments.
* The remainder of the budget is the same as in the base case.

The revised budget is shown in the spreadsheet below.



**Question 7** asks you to calculate the lift-ticket revenue variance for the fiscal year based on the inputs below and the revised operating budget. To do that, we need to identity the budgeted and actual Volume (days of operation), Quantity (skiers per day of operation) and rate (the average lift-ticket price). Actual is straightforward. It is given in the question as: Volume - 115 days of operation, Quantity - 2,600 skiers per day on average and rate - an average of $50.50 per lift ticket. Budgeted volume is also given as 130 days of operation. To find the budgeted quantity we will have to divide the total revised number of skier days from the budget (310,050) by the planned days of operation (130) to get an average of 2,385 skiers per day. Similarly, we can calculate the average lift-ticket price by dividing total forecasted lift-ticket revenue in the budget ($16,045,088) by the expected total number of skier days (310,050) to get an expected average lift-ticket price of $51.75. Given that information we can apply the standard variance analysis model. the results of that analysis is shown in the spreadsheet below.

The solution to the variance analysis shown below uses a spreadsheet variation on the methodology shown in the text. . The numbers shown in **bold** are actual volume, quantity and cost/rate numbers. The ones shown in regular type are budgeted values. The formulas used to calculate each of the variance are shown in the column next to those calculations. Each calculation is based on the differences between the total in each column that is indicated. Those total equal volume \* quantity \* cost /rate.



Overall, Glory had an Unfavorable lift-ticket-revenue *variance* of $945,588. The bulk of the variance was due to the weather (days of operation were down). That was partially offset by an increase in the average number of skiers per day which was in turn offset by lower than expected average lift-ticket revenues. Management would want to find out why that occurred.

Notice that total variance appears twice in the spreadsheet solution. The first total-variance calculation is based on the difference between the total budgeted lift-ticket expense and the actual. The second calculation shows the sum of the Volume, Quantity and Cost/Rate variances. The second total variance calculation is meant as a check on the flexible variance calculations. These two numbers must be equal. If they are not, there is a mistake in your analysis.