Creating an Excel-Based Budget You'll Really Use

By Jason Porter and Teresa Stephenson, CMA

Budgeting. For some, the word brings up images of days spent tracking down data and working with spreadsheets. For others, it suggests long arguments with various managers about estimates and assumptions. Others see a carefully crafted document stuck in a filing cabinet or a drawer after only a cursory review. But that isn't what we originally learned about budgeting in our cost accounting classes. At that time we were shown budgeting as what it really can be: a formal written plan used to allocate scarce resources and to evaluate our success with performance goals. If only we could create a budget that would allow us to avoid the negative stigma often associated with budgeting, perhaps then we could see the benefits that come from our efforts.

One of us had the opportunity to create such a budget. At the time, budgeting wasn't really part of Teresa's job description, and it certainly wasn't part of the company culture. The business was small, and the managers and supervisors who had provided information for previous budgets considered it an opportunity to manipulate senior management. They would pad their estimates to make sure they received enough resources, or they would lowball their estimates so they would get a better bonus after the year-end analysis. Either way, the resulting budget was relatively useless. In an attempt to simplify the budgeting process, Teresa stumbled on a powerful budgeting method that not only sped things up but allowed managers to see how their estimates and assumptions

affected the pro forma financial statements the company used to seek financing. Finally, after years of thinking that their budget manipulations "weren't hurting anyone," these managers and supervisors had a chance to see how rounding up unit costs by even one penny could eliminate the projected profit of the company. For most of them, including the accounting staff, it was a real wake-up call.

The secret is to create a linked Master Budget in Excel, or other spreadsheet program, that allows each supervisor to change only his or her assumptions and estimates. Since the supervisors can't change the equations or any other estimates, the carefully prepared pro forma financial statements will show the results of their changes. This six-part series of articles will help you create a budget that you can use in this way. The current article discusses the Data Input Sheet and the Sales Budget. Future articles will continue with how the budget flows through the produc-

tion cycle; the direct materials, direct labor, and manufacturing overhead requirements; administrative overhead; and cash flows. We'll then walk you through the steps to create a set of pro forma financial statements: an Income Statement, Balance Sheet, and Statement of Cash Flows. You can use these statements for internal discussions and as projections for potential investors. In our final article, we'll also discuss the ethics of budgeting and how to use the Master Budget in the decision-making process, making it more likely to garner support from all of the managers who have helped put the budget together.

Because these articles are about budgeting, not Excel basics, we won't give detailed instructions as to how to put specific formulas in place. But we'll provide some

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examples of our Excel equations throughout the series. The most important thing to remember is that most of the formulas used to create this type of budget are repeated, so the judicious use of absolute references can save a lot of time. Of course, the first draft of an Excel-based Master Budget takes a great deal of time, even using shortcuts with some of the equations. Yet once you've developed the budget for your company, you'll have a template that can be used for many years to come, making it worthwhile to invest the time.

Let's get started.

Creating the Data Input Sheet

The first step in creating a multiproduct, multiperiod, spreadsheet-based budget is setting up a clear and understandable Data Input Sheet. This sheet will summarize the assumptions and estimates for the entire budget. By putting them in one place, you make it easy for nonac-

Figure 1: Data Input Sheet

Bob's Bicycles - Master Budget 2010 - Microsoft Excel

Budget - Data Input Sheet

Sales Informatio[n]

Sales Growth Assumptions: 2% per quarter for the basic model (mature life stage)
5% per quarter for the deluxe model (growth stage)

Sales in units:		2010					2011		2009 Ending Inventory	Selling Price
	Q1	Q2	Q3	Q4	Year total	Q1	Q2		
Basic	4,000	4,080	4,162	4,245	16,486	4,330	4,416	807	$150
Deluxe	2,000	2,100	2,205	2,315	8,620	2,431	2,553	98	$350

Collection Information:

Credit Policy: Cash Sales | Credit Sale | In same Quarter | In next Quarter | In third Quarter | In fourth Quarter | Bad Debt
| | 30% | 70% | | | | | |
| Collection Policy | | | 60% | 30% | 9% | 0% | 1% |

Sales / Inventory / Credit/Collections / Purchasing / Accounting / Production

Collections from prior year:

	Prior Year	Actual Sales	Actual Collected	Budgeted Receipts in Current Year				
				Q1	Q2	Q3	Q4	Year
	Q3	$779,800	$725,214	$49,127	$0	$0	$0	$49,127
	Q4	$901,350	$648,900	$189,284	$56,785	$0	$0	$246,069
				$238,411	$56,785	$0	$0	$295,196

Manufacturing Information:

Direct Materials Ending Inventory	15%	of next quarter's production needs
Basic Bicycle Ending Inventory	20%	of next quarter's sales needs
Deluxe Bicycle Ending Inventory	5%	of next quarter's sales needs

Direct Material Information:

Basic Bike	Units Needed	Cost per Unit	Cost per Bike	2009 Ending Inventory
Steel	2	$15.00	$30.00	1295
Rubber Handles	2	$2.00	$4.00	1286
Seat	1	$4.00	$4.00	640
Chain	1	$6.00	$6.00	652
Tires	2	$10.00	$20.00	1275
Gear Shift	1	$8.00	$8.00	609
Brake Unit	1	$6.00	$6.00	658

Deluxe Bike				
Steel	3.5	$15.00	$52.50	*
Special Handles	2	$5.00	$10.00	32
Specialty Seat	1	$14.00	$14.00	26
Chain	1	$6.00	$6.00	*
Tires	2	$10.00	$20.00	*
Expanded Shift	1	$25.00	$25.00	34
Brake Unit	1	$6.00	$6.00	*

* inventory for standard items is used for both bikes but only shown here for the Basic Bike

Direct Labor Information:

Hours of DL per Normal bike:	2
Hours of DL per Specialty bike:	5
Wages per Hour:	$14

Manufacturing OH Information:

Variable OH Allocation per DL hr:	$1.75
Fixed OH per year:	$250,000
Amount of Fixed OH from Depr:	25%

Standard Cost:
| Basic Bike | 116 |
| Deluxe Bike | 229 |

A/P Purchase Payment Policy

| Payments made in current Q | 75.0% |
| Payments made in next Q | 25.0% |

Prior year purchases	Actual Total Purch	Actual Paid	Budgeted Payments in Current Year				
			Q1	Q2	Q3	Q4	Year
	$452,650	$338,700	$113,950	$0	$0	$0	$113,950

Selling and Administrative Expense Information:

| Variable S&A for Normal bikes: | $15 |
| Variable S&A for Specialty bikes: | $20 |

Fixed S&A Expenses per year:

Advertising	$125,000
Executive Salaries	$65,000
Property Taxes	$7,800
Office Rent	$12,000
Cleaning Fees	$6,000
R&D Costs	$18,500

Cash Flow and Investment Information:

Requirements
| Minimum Cash Balance: | $30,000 |

Dividends
| Required Dividend Payment each Qtr: | $10,000 |

Planned Expansion (Purchase of Equipment)

Budgeted Purchases in Current Year				
Q1	Q2	Q3	Q4	Year
$50,000	$75,000	$40,000	$22,000	$187,000

Debt Information:

Amount owed on bond	$997,600
Interest rate on bond	5%
Line of Credit Max:	$2,000,000
Interest Rate on LofC:	12%

Common Stock information:

| Shares of stock outstanding: | 100,000 | at | $10 | per share |

Miscellaneous Information:

The company's tax rate is:	30%
Last year the company paid taxes of:	$108,500
Amount of last year's tax to pay this year:	105%
Total tax to prepay this year:	$113,925
Payment due each quarter:	$28,481

Sheet tabs: **Basic Information** / Sales Budget / Production Budget / DM Budget / DL Budget / OH Budget / Ending Inv Budget / S&A Budget / Cash Budg[et]

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countants to get into the budget and change their assumptions. It also makes it easy to adjust the budget based on management discussions (what would happen if?), to create best- and worst-case scenarios, and to perform variance analyses at the end of the period. Figure 1 is an example of what a Data Input Sheet should look like. We'll be using the Master Budget from Bob's Bicycles, a fictional bicycle manufacturer that makes standard and deluxe model bikes, for our example. Although we've used a quarterly budget to keep our example calculations and figures less complex, adjusting to a monthly budget is relatively simple.

The first thing most people, especially other managers,

notice when looking at the Data Input Sheet is just how much information is there. All of the highlighted squares are assumptions or estimate inputs. When creating your own budget, you should collect all of this information and have it arranged logically in one place. The specific details of how you create the Data Input Sheet are up to you and to those who'll be inputting the data, but there are a few tips that will make things easier later in the budgeting process. Notice that when we show data for different periods of time, such as the quarterly sales forecasts, it's horizontal rather than vertical. Other data, such as the list of raw materials needed for a product, will be easier to use when it's set up vertically. Following these

Figure 2: Sales Information Formulas

	A	B	C	D	E	F	G	H	I	J	K
1											
2				Budget - Data Input Sheet							
3	Sales Information:										
4	Sales Growth Assum			0.02		per quarter for the basic model (mature life stage)					
5				0.05		per quarter for the deluxe model (growth stage)					
6										=+E7-1	
7		Sales in units:		2010				=+E7+1		Ending	Selling
8			Q1	Q2	Q3	Q4	Year total	Q1	Q2	Inventory	Price
9		Basic	4000	=+C9*(1+$D$4)	=+D9*(1+$D$4)	=+E9*(1+$D$4)	=SUM(C9:F9)	=+F9*(1+$D$4)	=+H9*(1+$D$4)	807	150
10		Deluxe	2000	=+C10*(1+$D$5)	=+D10*(1+$D$5)	=+E10*(1+$D$5)	=SUM(C10:F10)	=+F10*(1+$D$5)	=+H10*(1+$D$5)	98	350

basic formatting structures will make it much easier to link your data in later budgets.

As for the actual data, we recommend starting with the sales information since that's the foundation for the other information in the budget. The accounting staff should input the actual results from the last two periods when they finalize the year-end financial numbers; until then, last year's budget numbers or best projections can be used. The sales manager will then add his or her estimated growth percentages, the first-quarter projected sales, and the average budgeted selling prices for each product. After that, the formulas take care of the rest. This basic information will flow through to the Sales Budget automatically. Although space won't permit us to look at all the formulas in the Data Input Sheet, it may be helpful and informative to look at a few. Here are the ones for the sales information.

We start our data collection with the projected Quarter 1 (Q1) sales and multiply it by the estimated growth rate to get our Q2 sales estimates, as shown in Figure 2. Then we take the projected Q2 sales just calculated and multiply it by the estimated growth rate to get our Q3 sales estimates, etc. This process simplifies the creation of the budget and reduces the number of specific estimates that the sales manager has to make. This can be especially important when he or she feels that budgeting isn't the best use of time. You'll notice, too, that we've made the input cells for the sales manager green. This makes it easy for the sales manager to know exactly which numbers he or she is responsible for, and it makes it easier for the accountant to lock the spreadsheet so that each manager can only put in information for his/her own department. We'll discuss how that's done in a later article.

Looking back at the rest of the input sheet in Figure 1, you can see the credit manager's estimate of how much of sales was cash vs. credit and the rate at which accounts

Figure 3: Beginning Balance Sheet

	V	W	X	Y	Z	AA
1						
2			Bob's Bicycles			
3			Balance Sheet			
4			As of December 31, 2009			
5						
6						
7			Assets			
8						
9		Current Assets				
10			Cash		$30,176	
11			Accounts Receivable		$295,196	
12			Direct Materials Inventory		$51,413	
13			Finished Good Inventory		$116,060	
14		Total Current Assets				$492,845
15						
16		Property, Plant, and Equipment				
17						
18			Building		$1,500,000	
19			Equipment		$1,500,000	
20			Accumulated Depr - Equipment		($875,000)	
21		Total PPE				$2,125,000
22						
23		Total Assets				$2,617,845
24						
25						
26			Liabilities and Stock Holder's Equity			
27						
28		Liabilities				
29			Accounts Payable		$113,950	
30			Bonds Payables		$997,600	
31		Total Liabilities				$1,111,550
32						
33		Stockholder's Equity				
34			Common Stock (100,000 shares ou		$1,000,000	
35			Retained Earnings		$506,295	
36		Total Stockholder's Equity				$1,506,295
37						
38		Total Liabilities and Stockholder's Equity				$2,617,845
39						

receivable collections occur. Prior-year sales and the portion collected are again entered by the accountant, but the cash receipts' cash flow projection would be a function of both the prior-year data and the credit manager's

estimate of how much is collected in each period. The production or operations manager would provide the estimates regarding how many raw materials and finished goods should be kept on hand, the standard direct labor hours for production, and how fixed and variable manufacturing overhead are applied. Similarly, the purchasing department would provide the current standard cost of the parts and the number of units needed to produce each unit of finished goods. The accounting department or purchasing department (depending on company policy) would provide the accounts payable payment policy. Sales or accounting would provide the selling and administrative expenses. The accounting department can also input pro forma prior-year ending inventory balances until the actual year-end results are available. The controller would review minimum cash requirements, dividend policies, planned capital expenses, debt and stock information, and tax rates and estimated tax data.

As with the sales information, we've highlighted each set of assumptions in a different color so that each manager knows which numbers he or she is responsible to provide. Any cell not highlighted is formulaic, using the information from the input cells. For example, at the very end, the total tax budgeted for this year is the amount of last year's taxes times the percent needed to avoid penalties. (We chose 105% as a conservative estimate. IRC §6655 requires corporations to make estimated payments equal to 100% of last year's tax liability or 100% of the current year's liability. The regulations regarding "safe harbor" rules for estimated tax payments can be found at 26 CFR Part 1 Income Tax; Safe Harbor for Certain Installments of Corporate Estimated Tax Due [T.D. 8132] 52 FR 10049.) We can base our sales prices and materials cost on our current prices, projected prices based on vendor information, inflation, or market research. Using a spreadsheet-based budget means that the manager can input his or her best guess and can also provide other possible prices for planning purposes.

Finally, the Data Input Sheet also includes the prior-year's Balance Sheet, shown in Figure 3, since we'll need the numbers from the Balance Sheet for many of our calculations as we move forward. As with the other estimates, we can use pro forma numbers until the actual numbers become available. Once actual results are input, the information will simply flow through and update the entire budget. Taking time to update past information from projected to actual will allow the best variance analysis to be done in subsequent periods. Be sure that in the budget for, say, 2010, the only "actuals" you input are

from 2009. This ensures that the budget is a projection that can then be used for variance analysis at the end of the period. If you want to keep track of actual results throughout the year, make a special copy of the budget for that specific purpose.

At the bottom of the input sheet shown in Figure 1 is one more important characteristic of this budget. In the lower-left corner are the spreadsheet tabs in Excel. Notice that the Data Input Sheet is just the first of many tabs

that you'll use to create the full Master Budget. By keeping each piece of the budget on a separate tab, we create a simple look for our budget that makes it easier for nonaccountants to use. It also makes it much easier to format the budget for printing, an important issue if you want to provide these results to investors or lenders.

Creating the Sales Budget and Schedule of Cash Collections

The last thing we'll look at in this month's article is the first component of the Master Budget: the Sales Budget. Along with the Sales Budget, we'll also include a Schedule of Cash Collections from those sales (see Figure 4). All of the numbers on the Sales Budget flow through from the basic information sheet. To see an example of what these formulas look like, examine the Q2 formulas in Figure 5. For example, if you review the input sheet (Figure 1), you'll see that Bob's Bicycles has 30% cash sales, and the rest are on credit. Some of the credit sales are collected in the same quarter, some in the next quarter, and some in the quarter after that. Additionally, Bob's knows that his-

torically about 1% of their credit sales are uncollectible, and they use that to book an immediate bad debt expense.

The Schedule of Cash Collections, which you can see at the bottom of Figure 4, provides a timetable for when to expect the cash inflows from your sales. It also gives a breakdown of bad debt expense for each period. Both pieces of information are essential for making credit and sales business decisions, but they also play an important role in creating budgets. For example, the cash inflow

information is an essential part of the Cash Budget, which shows cash collected and cash disbursed and is used to track cash availability from one period to the next and to determine short-term borrowing and investing needs.

Similarly, the bad debt expense will flow through to the pro forma Income Statement and Balance Sheet. In column I there's a "check figure" that typically won't be included in a formal budget but that we've provided here

Figure 4: Sales Budget and Schedule of Cash Collections

	A	B	C	D	E	F	G	H	I
1				Sales Budget					
2									
3				2010				2011	
4		Q1	Q2	Q3	Q4	Year	Q1	Q2	
5									
6	Basic Bicycle	$ 600,000	$ 612,000	$ 624,240	$ 636,725	$2,472,965	$ 649,459	$ 662,448	
7	Deluxe Bicycle	$ 700,000	$ 735,000	$ 771,750	$ 810,338	$3,017,088	$ 850,854	$ 893,397	
8	Total Sales Revenue	$1,300,000	$1,347,000	$1,395,990	$1,447,062	$5,490,052	$ 1,500,314	$ 1,555,846	
9									
10									
11				Schedule of Cash Collections					
12				Quarter			Collected during		
13		Q1	Q2	Q3	Q4	Bad Debt	Year	Remaining A/R	Check figure
14	Collections from 2009	$238,411	$56,785	$0	$0		$295,196		
15	Q1	$936,000	$273,000	$81,900	$0	$9,100	$1,290,900	$0	$1,300,000
16	Q2		$969,840	$282,870	$84,861	$9,429	$1,337,571	$0	$1,347,000
17	Q3			$1,005,113	$293,158	$9,772	$1,298,271	$87,947	$1,395,990
18	Q4				$1,041,885	$10,129	$1,041,885	$395,048	$1,447,062
19		$1,174,411	$1,299,625	$1,369,883	$1,419,904	$38,430	$5,263,823	$482,995	$5,490,052
20									

Basic Information | **Sales Budget** | Production Budget | DM Budget | DL Budget | OH Budget | Ending Inv Budget | S&A

Figure 5: Sales Budget Formulas

	A	B	C	D	E	F	G	H	I
1				Sales Budget					
2									
3		=+'Basic Information'!E7						=+'Basic Information'!H7	
4		Q1	Q2	Q3	Q4	Year	Q1	Q2	
5									
6	Basic Bicycle	=+'Basic Informatio	=+'Basic Information'!D9*'Basic Information'!$K$9	=+'Basic Informatio	=+'Basic Informatio	=+'Basic Informatio	=+'Basic Information	=+'Basic Informatio	
7	Deluxe Bicycle	=+'Basic Informatio	=+'Basic Information'!D10*'Basic Information'!$K$10	=+'Basic Informatio	=+'Basic Informatio	=+'Basic Informatio	=+'Basic Information	=+'Basic Informatio	
8	Total Sales Revenue	=+B6+B7	=+C6+C7	=+D6+D7	=+E6+E7	=+F6+F7	=+G6+G7	=+H6+H7	
9									
10									
11				Schedule of Cash Collections					
12				Quarter			Collected during		
13		Q1	Q2	Q3	Q4	Bad Debt	Year	Remaining A/R	Check figure
14	Collections from 2009	=+'Basic Informatio	=+'Basic Information'!F23	=+'Basic Informatio	=+'Basic Informatio		=SUM(B14:E14)		
15	Q1	=+$B$8*('Basic Inf	=+$B$8*('Basic Information'!$D$14*'Basic Information'!F15)	=+$B$8*('Basic Inf	=+$B$8*('Basic Inf	=+$B$8*('Basic Inf	=+B15+C15+D15+E0	0	=+F15+G15+H15
16	Q2		=+$C$8*(+'Basic Information'!$C$14+('Basic Information'!$D$14*'Basic Information'!E15))	=+$C$8*('Basic Inf	=+$C$8*('Basic Inf	=+$C$8*('Basic Inf	=SUM(B16:E16)	0	=+F16+G16+H16
17	Q3			=+$D$8*('Basic Inf	=+$D$8*('Basic Inf	=+$D$8*('Basic Inf	=SUM(B17:E17)	=+D8*('Basic Inforn	=+F17+G17+H17
18	Q4				=+$E$8*('Basic Inf	=+E8*('Basic Inforn	=SUM(B18:E18)	=+E8*('Basic Inforn	=+F18+G18+H18
19		=SUM(B14:B18)	=SUM(C14:C18)	=SUM(D14:D18)	=SUM(E14:E18)	=SUM(F14:F18)	=SUM(G14:G18)	=SUM(H14:H18)	=SUM(I14:I18)
20									
21									
22									
23									
24									

Basic Information | **Sales Budget** | Production Budget | DM Budget | DL Budget | OH Budget | Ending Inv Budget | S&A Budget | Cash Budget | Pro Forma Income Statement

for illustration purposes. Notice that, for Q1, you expect to receive $936,000 (from both cash sales and collections on credit sales) from your total sales in that quarter. You'll collect the rest of the Q1 sales in Q2 ($273,000) and Q3 ($81,900), based on the estimates given by Bob's collections or credit manager. Adding the estimated $9,100 bad debt expense to those three numbers gives you the total $1.3 million in sales for Q1. We use the same process to estimate collections of the Q2 sales. By the time we start estimating collections for Q3 and Q4, however, Bob's won't be able to collect all of the sales during the current year. The last portion of the Q3 sales won't be collected until Q1 of next year, and some of the Q4 sales will be collected in Q1 and Q2 of the next year. These amounts to be collected in future years become accounts receivable and will be used in the pro forma balance and in next year's Schedule of Cash Collections. In fact, you can see that the first line of the collections schedule for 2010 includes collections from 2009.

Participative Budgeting

Future installments of this budgeting series will include a brief discussion of each of the budgets used in a Master Budget: production, including direct materials, direct labor, and manufacturing overhead budgets; ending inventory budgets; selling and administrative budgets; a cash budget; and pro forma financial statements, including a Balance Sheet, Income Statement, and Statement of Cash Flows. We'll also discuss how to use the Master Budget to investigate how changes in company policy or economic indicators will affect your business.

In addition to these technical budgeting issues, we'll spend time in the last installment discussing the many ethical issues that surround the creation of a Master Budget. These issues include budget smoothing, padding, and lowballing, among others. Although no one article or series can eliminate these difficult challenges, we'll offer some ideas about the negative consequences associated with these challenges that can be shared within the accounting department and with other departments to reduce these problems and improve the overall budgeting process.

Creating your own spreadsheet-based budget can be a challenge the first year, but once you've produced the basic format, you can use it for many years with only minor modifications. Budgets are powerful tools, and this one is even more so. By creating a spreadsheet-style budget that allows you to immediately see the overall effect of proposed changes, you can show other managers just how valuable a budget really can be. By controlling how much information they can actually change, you maintain authority and authorship over the budget. This is participative budgeting at its finest! In our next segment we'll discuss the heart of the budget: production. Until then, happy budgeting! **SF**

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Note: *A copy of the example spreadsheet, including all the formulas, is available from either author.*