

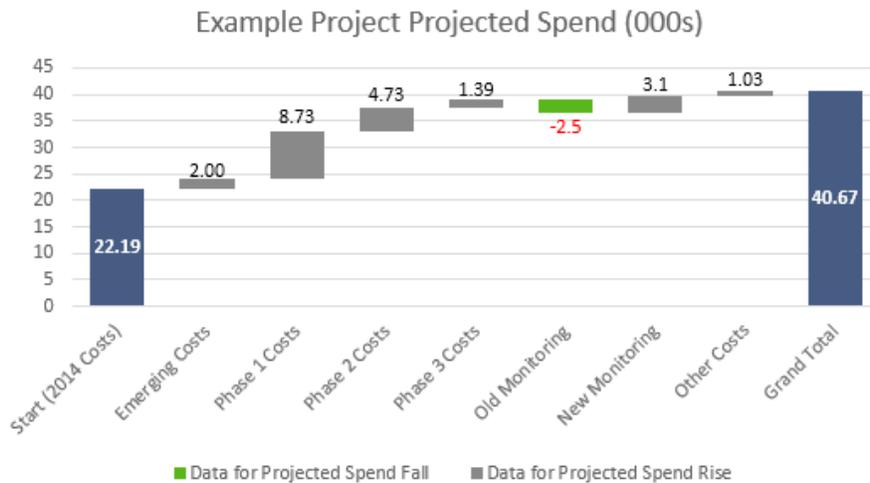
July 27, 2015

BUILDING A WATERFALL CHART IN EXCEL

Also known as a 'bridge' chart

INTRODUCTION

A Waterfall chart is a special type of Excel column chart which is utilized to highlight how a value starting position either increases or decreases through a series of changes to reach an end value. It is also commonly referred to as a 'bridge chart' since the floating columns create a bridge-like



view connecting the endpoints.

The first and last columns in a typical waterfall chart represent total values. The intermediate columns appear to float and show positive/negative change from one period to another, ending at the final total value. As a suggestion through waterfall creation, columns are color-coded for distinguishing start, end, and positive/negative columns.

These charts are quite useful for analytical purposes. If you ever need to evaluate a company profit or product earnings, highlight budget changes within a project, make an inventory or sales analysis, or just show value updates through a period of time, creating a waterfall chart can be extremely valuable to clients.

The below article will walk you through the process of creating your own, but if you just want examples and starting templates, click this link on SharePoint here: [Excel Sample File](#)

HOW TO BUILD

The main problem with creating your own waterfall chart is that there is no built-in chart creation template within Excel. However, the foundation of a waterfall chart can be manipulated from the Stacked Column chart type. All you need to do is carefully organize your data, and you'll be on your way!

For this Waterfall chart example, we'll use some fake project spend data which includes positive and negative values to show how trending data could start at one figure and work its way to an end point. Our data could look like the example below:

Data for Projected Spend	
	Costs (in 000s)
Start (2014 Costs)	22.19
Emerging Costs	0.35
Phase 1 Costs	8.73
Phase 2 Costs	4.73
Phase 3 Costs	1.39
Old Monitoring	-2.5
New Monitoring	3.1
Other Costs	1.03
Grand Total	

STEP 1 – REARRANGE YOUR DATA

Simply plugging the above data into a Stacked Column chart type in Excel is not going to provide much value. To create the new picture, start by adding three additional columns to your data. The **Base** column will be a calculated amount used as a starting point for the **Fall** and **Rise** series in the chart. All the negative numbers from the Sales Flow column will be placed in the **Fall** column, and all the positive values will be in the **Rise** column.

Don't forget to add a row for End (Grand Total) data to help illustrate the end point of your data, which we will fill in in subsequent sections.

Data for Projected Spend				
	Base	Fall	Rise	Costs (in 000s)
Start (2014 Costs)				22.19
Emerging Costs				0.35
Phase 1 Costs				8.73
Phase 2 Costs				4.73
Phase 3 Costs				1.39
Old Monitoring				-2.5
New Monitoring				3.1
Other Costs				1.03
Grand Total				

STEP 2 – INSERT FORMULAS

It is time to fill content in our newly created columns based on the Costs column.

1. Within the first cell of the **Fall** column, enter the following formula: **=IF(F6<=0,-F6,0)** and copy it down to the rest of the rows. This formula says that if a value in F6 is less than or equal to 0, the negative number will be shown as positive, and the positive number will be shown as 0. With our example below, we should only see one data point appear in this column.

Data for Projected Spend				
	Base	Fall	Rise	Costs (in 000s)
Start (2014 Costs)		0		22.19
Emerging Costs		0		0.35
Phase 1 Costs		0		8.73
Phase 2 Costs		0		4.73
Phase 3 Costs		0		1.39
Old Monitoring		2.5		-2.5
New Monitoring		0		3.1
Other Costs		0		1.03

2. Within the first cell of the **Rise** column, enter the next formula: **=IF(F6>0,F6,0)** and copy it down to the rest of the rows. This formula states that if a value in F6 is greater than 0, display the number as a positive number, and leave the rest as a 0.

Data for Projected Spend				
	Base	Fall	Rise	Costs (in 000s)
Start (2014 Costs)		0	22.19	22.19
Emerging Costs		0	0.35	0.35
Phase 1 Costs		0	8.73	8.73
Phase 2 Costs		0	4.73	4.73

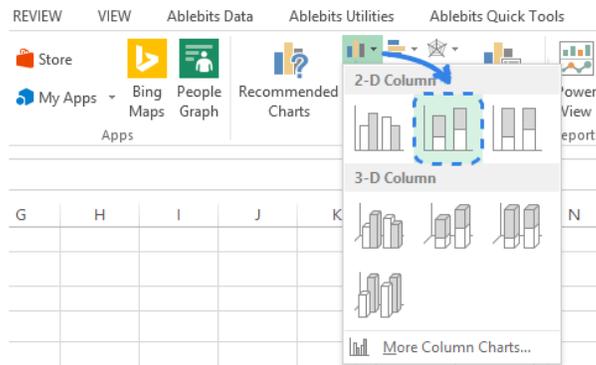
3. Then insert the final formula **=C4+E4-D5** into the *second* cell of the Base column, and copy it down. This time, drag it over the End row as well. Copying this formula exactly is very important. Each base value should be the base of the row before any rise, and then a subtraction of any fall immediately next to it. Once copying, you should now have a full picture of data.

Data for Projected Spend				
	Base	Fall	Rise	Costs (in 000s)
Start (2014 Costs)		0	22.19	22.19
Emerging Costs	22.19	0	2	2
Phase 1 Costs	24.19	0	8.73	8.73
Phase 2 Costs	32.92	0	4.73	4.73
Phase 3 Costs	37.65	0	1.39	1.39
Old Monitoring	36.54	2.5	0	-2.5
New Monitoring	36.54	0	3.1	3.1
Other Costs	39.64	0	1.03	1.03
Grand Total	40.67	0	0	

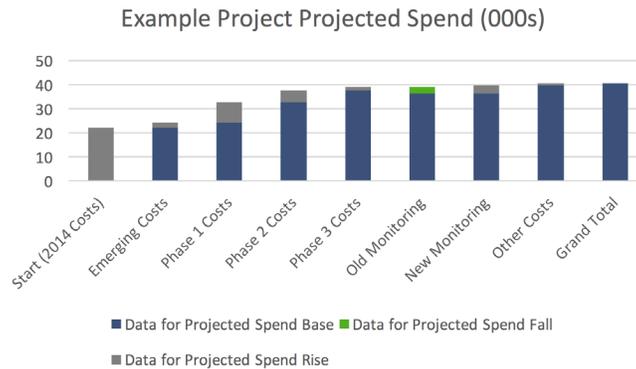
STEP 3 – CREATE A STANDARD STACKED COLUMN CHART

We are now ready to build our chart and all we need to do is select one of the built-in Excel templates.

1. Select your new populated data (columns B through E, the titles through Rise), *but exclude the your Costs column* as it is now reflected in your rearranged data
2. Go the Charts group on the Insert tab
3. Click on the Insert Column Chart icon and choose Stacked Column from the drop-down list



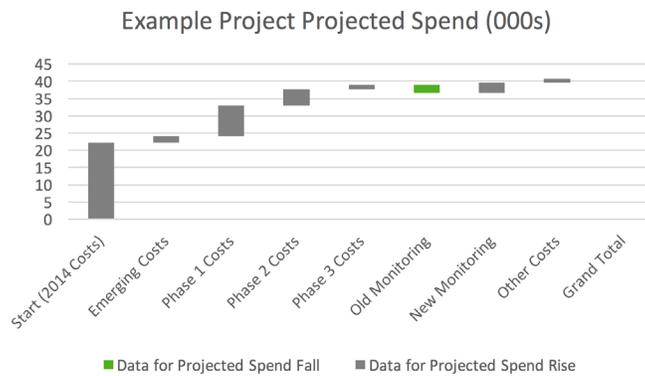
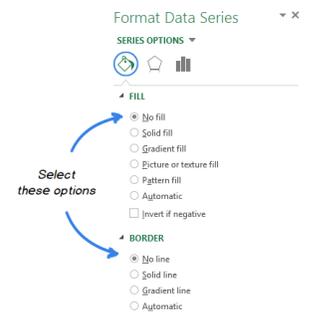
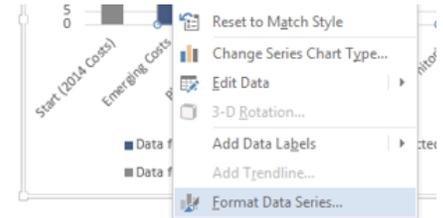
We now have the base graph, but it still needs be formatted.



STEP 4 – TRANSFORM THE STACKED COLUMN CHART TO A WATERFALL CHART

To transform the Stacked Column chart to a Waterfall chart, all you need to do is make the **Base** series invisible.

1. Click on the Base series to select them all, right click, and select the Format Data Series option from the context menu.
2. When the Format Data Series pane appears to the right of your worksheet, click on the Fill & Line icon
3. Select No fill in the Fill section and No line in the Border section.
4. The dark blue columns are about to become invisible, which creates the ‘bridge’ effect in the alternative title of the chart. Once they are invisible, simply delete the Base legend data point to completely remove all trace of the Base series.

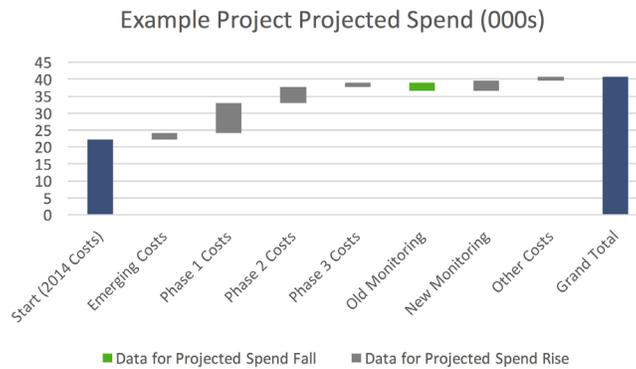


STEP 5 – FORMAT THE WATERFALL CHART

Now you can format the chart to any client specifications.

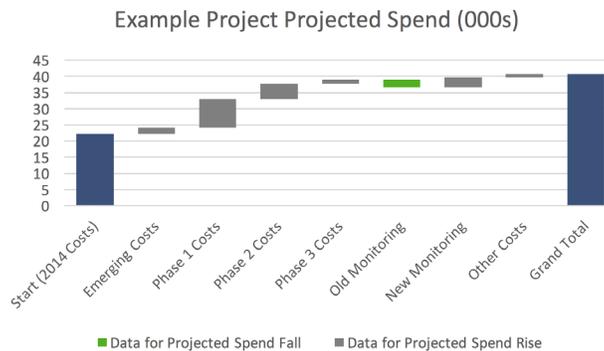
Chart coloring:

- By clicking on an entire series of data, such as Fall (Green) or Rise (Gray), you can update all flying bricks at one time
- You can also click on a single brick and highlight each as a different color. For this example, the Start and End chart values are called out with a different color



Space Gaps:

- It is also easy to remove excess white space between columns to make them stand closer to one another
- Double click on any of the chart columns to bring up the Format Data Series pane
- Change the Gap Width to something smaller, like 60-65%



Format Data Point

SERIES OPTIONS

Plot Series On

Primary Axis

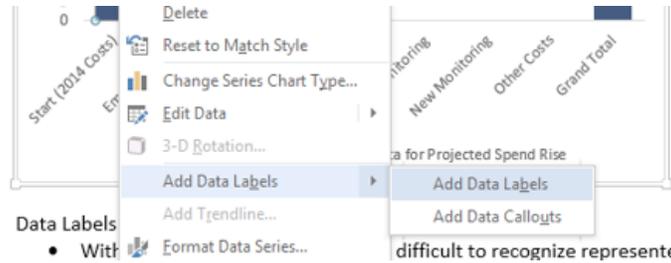
Secondary Axis

Series Overlap: 100%

Gap Width: 15%

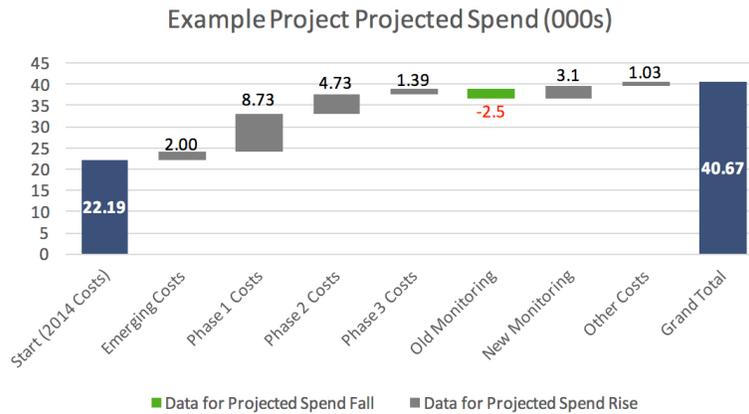
Data Labels:

- Without data labels, it's sometimes difficult to recognize represented values on the chart that differ from one another
- By clicking on a series of data, you can easily add Data Labels from the context menus



Ultimately, you can also add or remove legends and titles, update the x or y-axis, remove 0 values, move data labels above or below column bricks, and anything else the client requires.

My end Waterfall chart is shown below.



CONCLUSION AND REFERENCE MATERIALS

Through this tutorial, we've went through quite a process to create a chart that is pretty different from the built-in Excel templates, but demonstrates easily-viewable chart value for your client. In short, by manipulating your base data in Excel and modifying existing excel templates, you have created something not many clients will receive on a daily basis.

There are many examples of what the end Waterfall chart could be, and by playing with initial data, you can create all kinds of useful graphical representations.

As a reminder, you can find an Excel spreadsheet with several examples below:

[Excel Sample File](#)



This TIP was written by Jay DeLuna, an associate serving in program execution/solution delivery. Jay welcomes comments and discussion on this topic and can be reached at jay.deluna@trexin.com.