

# Project Cost Management



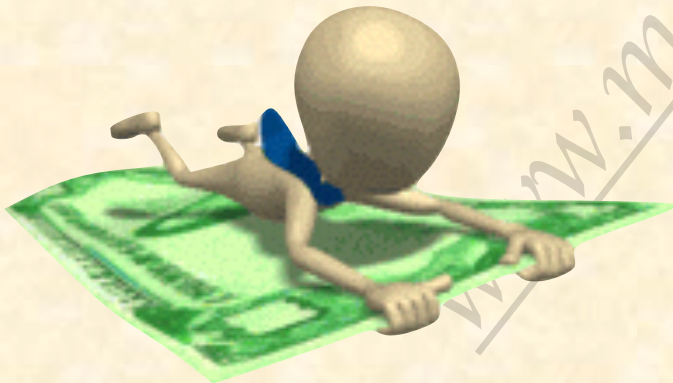
*Management & Customers are always concerned with:  
How much a project is going to cost?*

*(In relation to) .....*

*Every Project boils down to Vitamin "M"*

*- with more of this, i.e., with a bigger budget, a project manager could avail more/experienced (albeit expensive) resources and probably deliver faster and more.....*

**Chapter 7 in the *PMBOK*® Guide  
5<sup>th</sup> Edition**



# Rationale for Project Cost Management

(Evaluating the cost of resources needed to complete project activities)

Some potential culprits of project cost management:  
Poor estimates. Unrealistic budgets. ROI falling short of expectations.  
Just plain "poor financial management".  
Does this sound familiar somehow? You will definitely need .....  
..... to know how to execute this process!



- Cost is a resource sacrificed or foregone to achieve a specific objective or something given up in exchange for something desirable or necessary
  - Costs are usually measured in monetary units like dollars or local currency
- Management & Customers are always concerned with:
  - ..... to cost?
  - (In relation to) how much the project is going to .....
- This concern is addressed via the discipline of Project Cost Management which is:
  - The management of cost related activities achieved by ....., & reporting cost information
  - This information will be used for ....., ....., ....., and monitoring project costs
  - The ability to influence cost is greatest at the early stages of the project, making early scope definition critical
    - Project managers must ..... besides having a realistic budget that they were involved in approving
- The project team may also want to consider:
  - The "time value of money" in today's context
  - The effect of project decisions on the subsequent cost of using, maintaining, & supporting the product, service or result of the project – "lifecycle costing"
    - Life Cycle Costing includes acquisition, operating, maintenance, and disposal costs





# Handy Hints For Project Cost Management...

- Importantly document ..... about costs for the project
  - E.g., If you assume that particular resources will be available or that a ..... will be available for large ....., you should note those assumptions
  - When the project sponsor reviews your budget, he/she can review the ..... and clarify or challenge any ..... that might be ..... or unacceptable
- All plans are based on ...../...../..... / ..... factors including accidents, etc.,
  - This is why plans should be ..... during completion of the work
  - Corrective actions should be taken when ....., (....., ..... and .....) problems occur
- If change requests are not accompanied by associated budgetary increases, **some other ..... will become necessary – ask for it!**
  - Determine whether ..... expenses .....
  - Monitor and control instances of .....
  - Gain special approvals for ..... expenses
  - ..... expense payments and invoice approvals
  - Keep project and ..... plans up-to-date



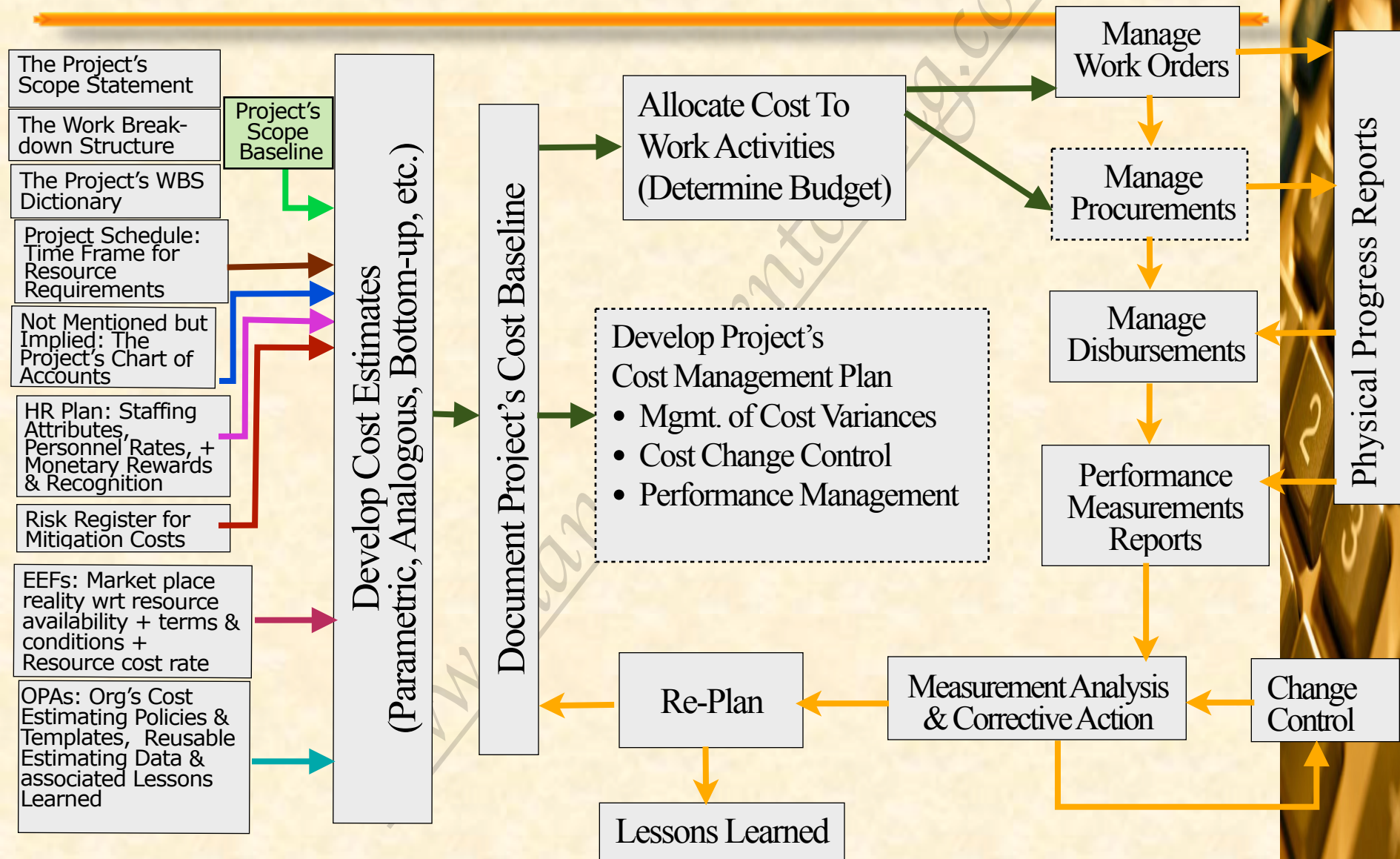
# Different Categories Of Costs For A Project

1. **Direct Costs** – are costs directly attributable to producing the products and services of the project (e.g., material, supplies, hardware, labor, travel, communication) and include:
  - A. **Fixed Costs** – are costs that remain constant for the duration of the project (e.g., rental on a piece of equipment required) - Pay ..... and use as .....
  - B. **Variable Costs** – are costs that vary depending on conditions that are applied in the project (e.g., demand & supply of material) - Pay .....
2. **Indirect Costs or overheads** – are costs that are not directly related to the products or services of the project, but are indirectly related to .....
  - These are typically representative of expenses that must be ..... and therefore ..... proportionately by more than one project (e.g., ....., etc.)

Most PMs are normally expected to accumulate four categories of cost data:

1. Labor
  2. Material
  3. Other direct charges
  4. ....
- Project managers can maintain reasonable control over ....., material, and other direct charges
  - ....., on the other hand, are calculated yearly or monthly and applied retroactively to all applicable programs
  - ..... reserves are often used to ..... the effects of adverse changes in ..... rates

# Simplified Cost Management





# Background To Cost Estimating

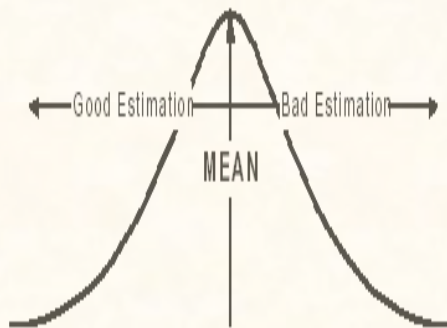
- Estimating software and formulas from books may produce "black box" estimates that lack qualification of one or many issues:
  - What does the estimate include (prep-work, indirect expenses, clean-up, etc.)?
  - What project conditions are being assumed (controlled environment, outdoors, etc)?
  - What methodology (tools, equipment, procedure) is assumed?
  - What labor proficiency (productivity) is assumed?
- In these cases, estimating becomes more of an art than a science
- Normally, there are discrepancies between conceptual cost estimates & project schedules - which are planned for later
- The variance between these 2 different cost figures could have serious consequences:
  - If the estimate is too high:
    - You could lose the bid (or budgetary approval)
    - You could wind up wasting money (Parkinson's law: **"work will expand to fill the time allowed!"**)
  - If the estimate is too low:
    - You could lose money on a hard dollar contract
    - You risk overrunning the budget
- In an ideal situation, cost estimating and project planning must match up in a one to one relationship
- The only way to achieve this consistently is to actually base cost estimates upon **detailed plans & schedules**
- WBS and level of cost collection should consider not only the natural division of work but also consider future use of cost information
  - Future proposals
  - Comparative cost analysis - "best method of performance"
- Strive for consistency between the Estimating and Accounting "Chart of Accounts"
  - Finance relates the WBS Code of Accounts Identifier with this Chart of Accounts - FYI
- Important to discern what level of cost detail is necessary and sufficient?



# Clarifying Some Cost Estimating Techniques

## 5. Three point Estimates

- METHODOLOGY involves collecting 3 probable estimates for each task
  - This method has a dual benefit of arriving at an expected cost and clarifying the range of uncertainty around the expected estimate
    - Which potentially helps to improve the accuracy of a single value estimate
- Owners for project WBS work packages need to specify 3 estimates minimally for their project (justifications should ideally be provided too!)



- Most Likely Estimate (MLE)**  
This estimate should be correct 50% of the time, i.e., half the time the estimate is either too large or too small
- Optimistic Estimate (OE)**  
This estimate should be correct 15% of the time because project activities rarely go as well as planned/hoped
- Pessimistic Estimate (PE)**  
This estimate should be correct 85% of the time because the pessimistic estimate generally cannot completely factor in or cover all possibilities

- The overall work package estimate can then be derived using either the Triangular or Beta Distribution formulas

- Triangular Distribution Formula:**

$$\text{Mean} = [\text{MLE} + \text{OE} + \text{PE}] / 3$$

- Beta Distribution Formula :**

$$\text{Mean} = [(\text{MLE} * 4) + \text{OE} + \text{PE}] / 6$$

- This mean is the starting point of the estimate
- The normal distribution curve is shown in figure alongside  
The "mean" represents the probability 50% which means that this estimate may be correct only 50% of the time  
To increase the probability of correctness, the mean estimate should be padded



# Creating The Cost Budget

The overall project budget is the sum (or aggregation of ) of all of the bottom-up costs associated with project activities plus any project-level expenses for team acquisition, overhead, or other indirect costs allocated to the project.

The project budget also includes any budget reserve that the team were able to establish during ..... planning.

For longer projects, the PM may also need to consider factors such as ..... changes, contract ....., and the effects of .....

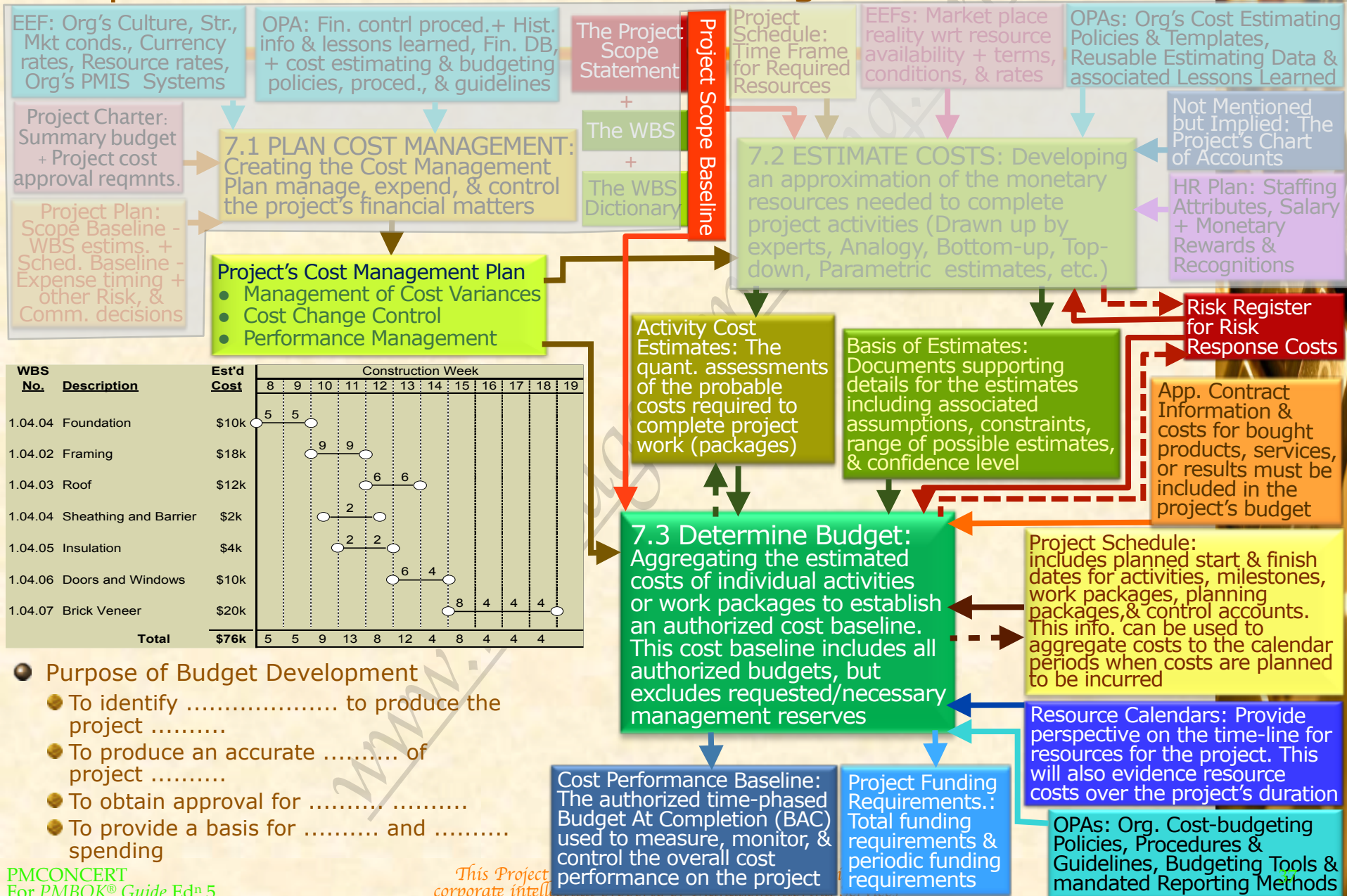
The total of all these project costs forecast the project Budget At Completion (BAC) or the Project's Official & Approved Budget.

- **Project activity resource estimating** and **cost estimating**, which are central to project plan development, **form the basis for the project's cost budget** which should be:
  - .....
  - Attainable, and
  - Based on ..... and the .....
- This process is performed after the Define Activities, Estimate Durations & the Estimate Resources processes are completed, because the Project Budget typically maps back to scheduled activities
  - May experience an upgrade after the Develop Schedule and Integrated Change Control processes and essentially follows the Estimate Costs Process
- The project planning team must accumulate all activity-related expenses for labor (based on ..... and appropriate .....), outsourcing, ....., materials, software, travel, support, ....., communication, services, and other non-....., industry specific expenses required for the project





# Implementation Of The Cost Management Processes



- Purpose of Budget Development**
- To identify ..... to produce the project .....
  - To produce an accurate ..... of project .....
  - To obtain approval for .....
  - To provide a basis for ..... and .....

# Background To Project Cost Control

- Cost control is equally important to all companies, regardless of size
  - Small companies generally have tighter monetary controls because .....
  - Large companies may have the luxury to spread project losses ....., and may be able to afford popular ..... to assist with the discipline of better project cost control - but all losses hurt organizations!
- Cost control is not only "monitoring" costs and recording data, but also ..... the data in order to ..... before it is too late
  - Cost control should be performed by all personnel who incur costs, not merely the project office
- Cost control implies good cost management, which must include:
  - Cost estimating
  - Cost accounting
  - Project cash flow
  - Company cash flow
  - Direct labor costing
  - Overhead rate costing
  - Other tactics, such as incentives, penalties, and profit-sharing
- Cost control is central to project plan execution
  - It follows ..... in the project-tracking cycle
  - It is necessary in any cycle where ..... measurements exceed ..... limits



# Earned Value Management (Evm)

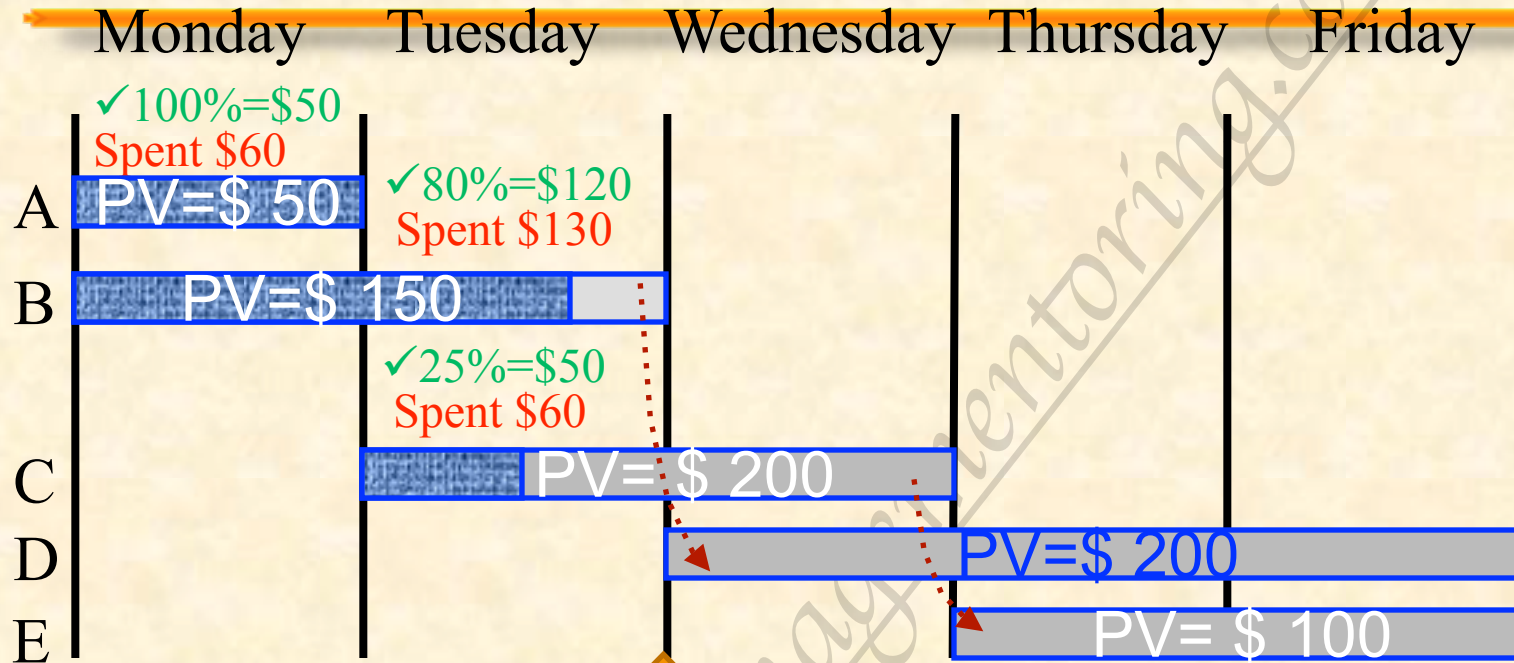
(Compares What You Got For What You Spent)


- EVM is a tool that allows both Buyer & Seller (contractor) PMs visibility into cost & schedule planning, versus associated performance, as the project is progresses
  - This visibility not only provides insight to project performance, (at current point of time), but also provides ..... probable ..... project completion cost
  - The implementation of an EVMS is a recognized function of good program/project management today 😊!
- It ensures that ....., and ..... aspects of the project are truly integrated and:
  - Relates time-phased budgets to specific contract tasks and/or the SOW
  - Indicates .....
  - Properly relates cost, schedule and technical accomplishment
  - Is valid, timely, and facilitates necessary ..... and ..... of data
  - Allows for statistical estimation of ..... costs
  - Supplies ..... with information at a practical level of .....
  - Is derived from the same EVMS used by the ..... to manage the contract





# Assessing A Project's Earned Value Analysis



 Indicates completed work or value earned

S  
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s

Should Complete PV = \$ 50+150+100 = \$ 300

Actually Complete EV = \$ 50+120+50 = \$ 220

Actually Spent AC = \$ 60+130+60 = \$ 250

**OUR ASSESSMENT OF THE SITUATION REVEALS:**

Cost Variance (CV) = EV-AC = 220-250 = -ve \$30 (over budget)

Sched. Variance (SV) = EV-PV = 220-300 = -ve \$80 (behind schedule)

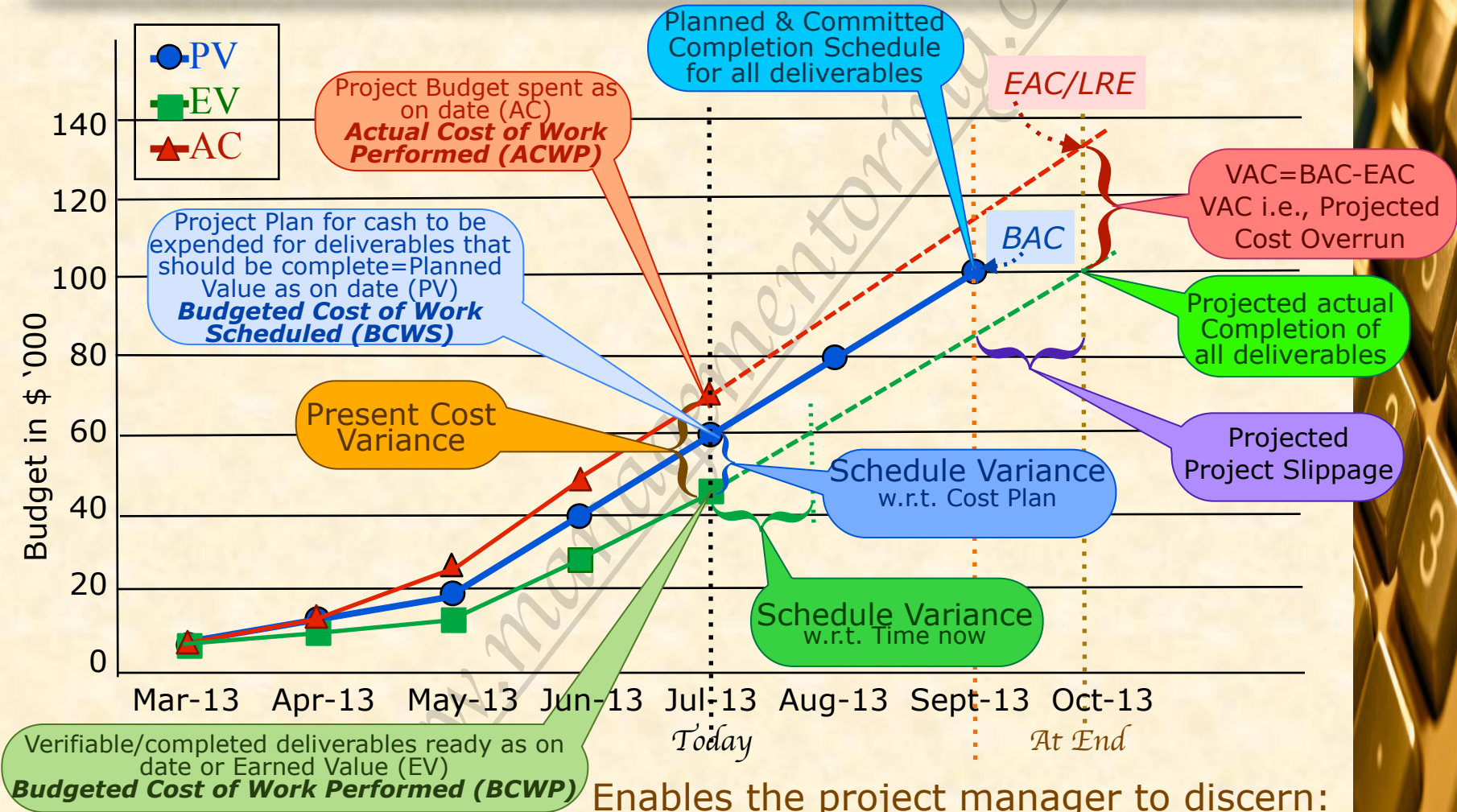
Cost Perf. Index (CPI) = EV/AC = 220/250 = .88

~ 88 Cents per \$ spent

Sched. Perf. Index (SPI) = EV/PV = 220/300 = .733

~ Progress @ 73% per hour worked

# Earned Value Analysis



*EAC = Estimate At Completion*  
*LRE = Latest Revised Estimate*

Enables the project manager to discern:

1. \_\_\_\_\_ completed
2. \_\_\_\_\_ work

# Ev Sample Problem – Solved!

We are over the budget by \$ 9,000 at this point in time

This is a (bad/-ve) Schedule overrun situation

Productivity is 87% of the plan

This project is (~10%) off the planned schedule

What this project is going to cost at its end, at this Work/Spend Rate

This is the project's funding requirement to complete the remaining work at this Work/Spend rate

Refer to PMBOK® Guide Section 7.3.2.2 for more clarity on EAC

Work Unit	Completion Date	Approved Budget (\$ '000) <b>PV</b>	Work Performed (\$'000) <b>EV</b>	Actual Cost (\$'000) <b>AC</b>
A	15th Mar	9	13	16
B	1st Mar	15	12	14
C	1st Apr	14	10	14
D	15th Apr	9	13	11
E	1st May	22	14	16
		Σ = 69	Σ = 62	Σ = 71
	<b>BAC</b>	<b>200</b>		

1.  $CV = EV - AC$   
 $(62 - 71 = -9)$
2.  $SV = EV - PV$   
 $(62 - 69 = -7)$
3.  $CPI = EV/AC$   
 $(62/71 = .873)$
4.  $SPI = EV/PV$   
 $(62/69 = .898)$
5.  $EAC = BAC/CPI$   
(If the same trend continues)  
 $(200/.87 = 229.88)$
6.  $EAC = AC + ETC$   
 $ETC = EAC - AC$   
 $(230 - 71 = 159)$

7. Percent Complete? =  $EV/BAC$  ( $62/200 = 31\%$ )
8. Percent Spent? =  $AC/BAC$  ( $71/200 = 36\%$ )
9. What can be inferred about this project?  
**Over cost and a little behind schedule**

Remember to .....

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