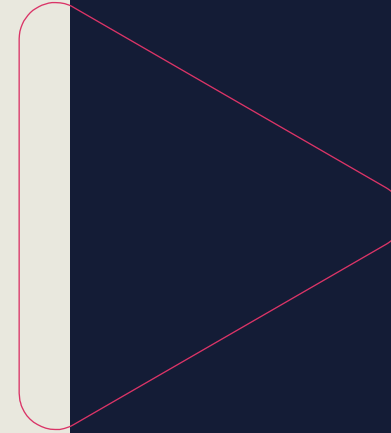




# PROJECT MANAGEMENT FUNDAMENTALS BOOTCAMP **Session 4**



Instructor: Barb Waters, MBA, PMP

**Class will begin at 11am EDT**

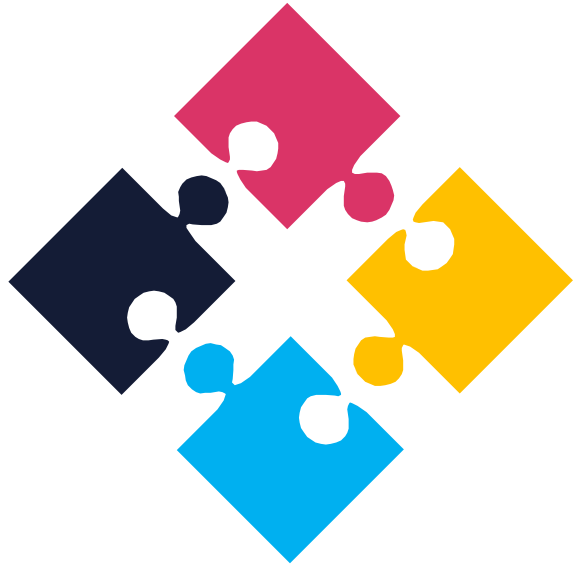
# PLAN PROCUREMENT MANAGEMENT

## Terminology



The buyer is the Project Manager, project team, or internal organization

The seller is the vendor or provider and is external to the project organization



# MAKE OR BUY ANALYSIS

**Availability of resources**

**Cost**

**Other factors**

- Risk
- Competencies
- Ethics

# MAKE OR BUY ANALYSIS

- Assumes equal ability to perform the work
- Assumes no ethical issues with prospective vendor
- Based on pricing

**Make = in house**



**Buy = obtain externally**



# MAKE OR BUY ANALYSIS

You are analyzing the recruitment of a position in your organization.  
Variable = X (How many days?)

## EXAMPLE

### Make (do it yourself)

Cost is \$5,000 initial investment, then \$25 per day to maintain  
 $5,000 + 25x$

### Buy (use a third party)

Cost is \$2,000 plus \$100 per day  
 $2,000 + 100x$

Break Even Point

Buy = Make

$$2,000 + 100x = 5,000 + 25x$$

# MAKE OR BUY ANALYSIS

## Step 1

Bring all x's to one side

$$2,000 + 100x - 25x = 5,000 + 25x - 25x$$

$$2,000 + 75x = 5,000$$

## Step 2

Bring all whole numbers to one side

$$2,000 + 75x = 5,000$$

$$2,000 - 2,000 + 75x = 5,000 - 2,000$$

$$75x = 3,000$$

## Step 3

Isolate "x"

$$75x/75 = 3,000/75$$

$$x = 40$$

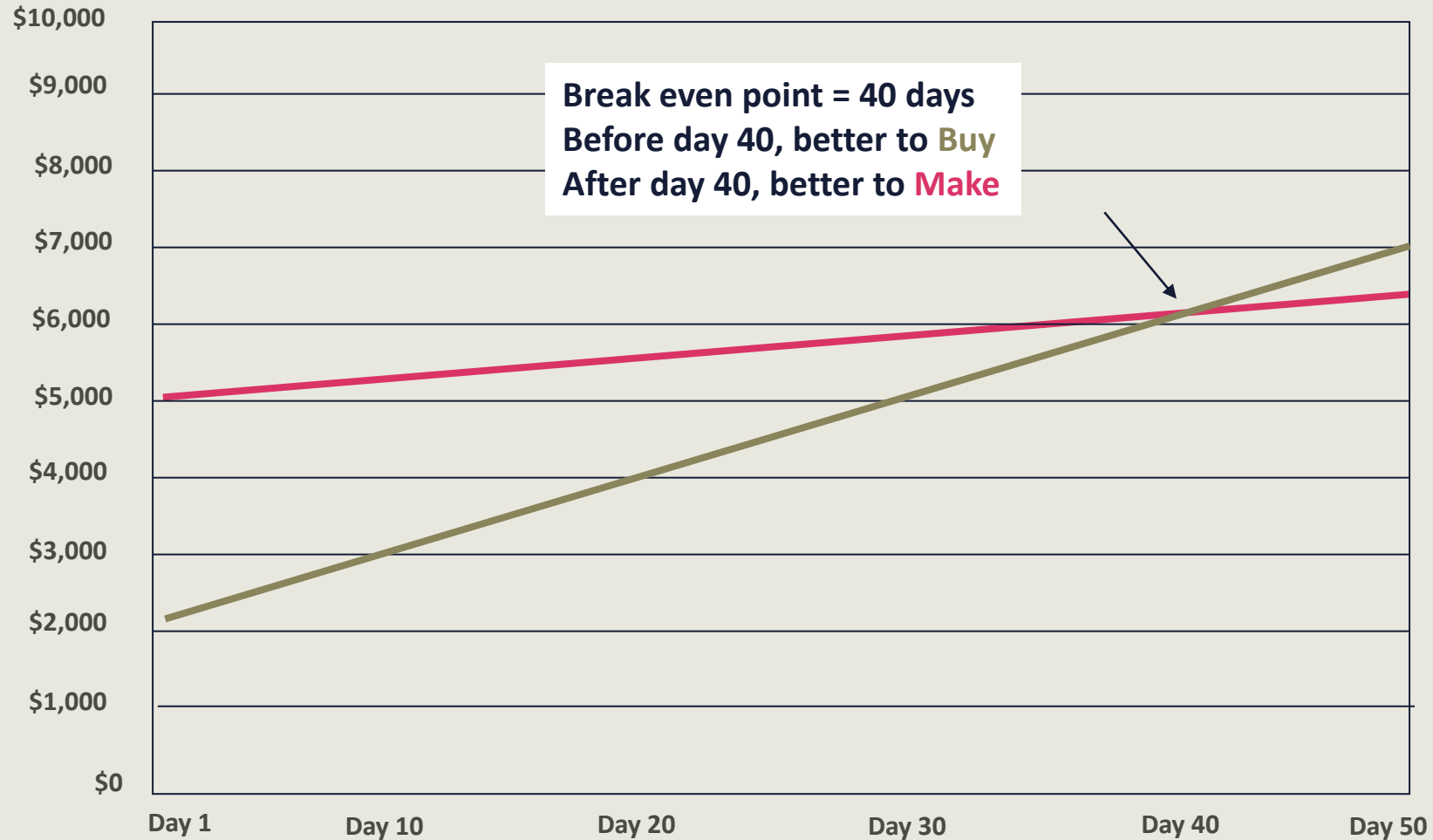
**Break Even Point**

**Buy = Make**

$$2,000 + 100x = 5,000 + 25x$$

# MAKE OR BUY ANALYSIS

Make vs. Buy/Lease



## Break Even Point

$$2,000 + 100x = 5,000 + 25x$$

|        | Buy/Lease | Make     |
|--------|-----------|----------|
| Day 1  | \$2,100   | \$5,025  |
| Day 5  | \$2,500   | \$5,125  |
| Day 10 | \$3,000   | \$5,250  |
| Day 15 | \$3,500   | \$5,375  |
| Day 20 | \$4,000   | \$5,500  |
| Day 25 | \$4,500   | \$5,625  |
| Day 30 | \$5,000   | \$5,750  |
| Day 35 | \$5,500   | \$5, 875 |
| Day 40 | \$6,000   | \$6,000  |
| Day 45 | \$6,500   | \$6,125  |
| Day 50 | \$7,000   | \$6,250  |

# PLANNING FOR PROCUREMENT



## Fixed-price contracts

- Defined scope
- May incorporate financial incentives
- Seller is obligated to complete the work
- Protects the buyer



## Cost-reimbursable contracts

- Flexible scope
- May incorporate financial incentives
- Risky for the buyer



## Time and Materials contracts (T&M)

- Contains aspects of both contract types
- Unit labor or material rates are used
- Not to exceed value may be included



# CONTRACT CONSIDERATIONS

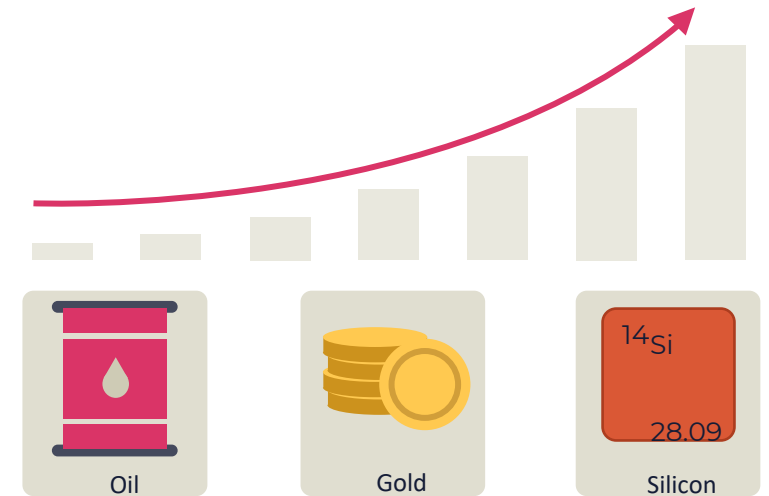
## Incentive fees



## Awards



## Economic price adjustments



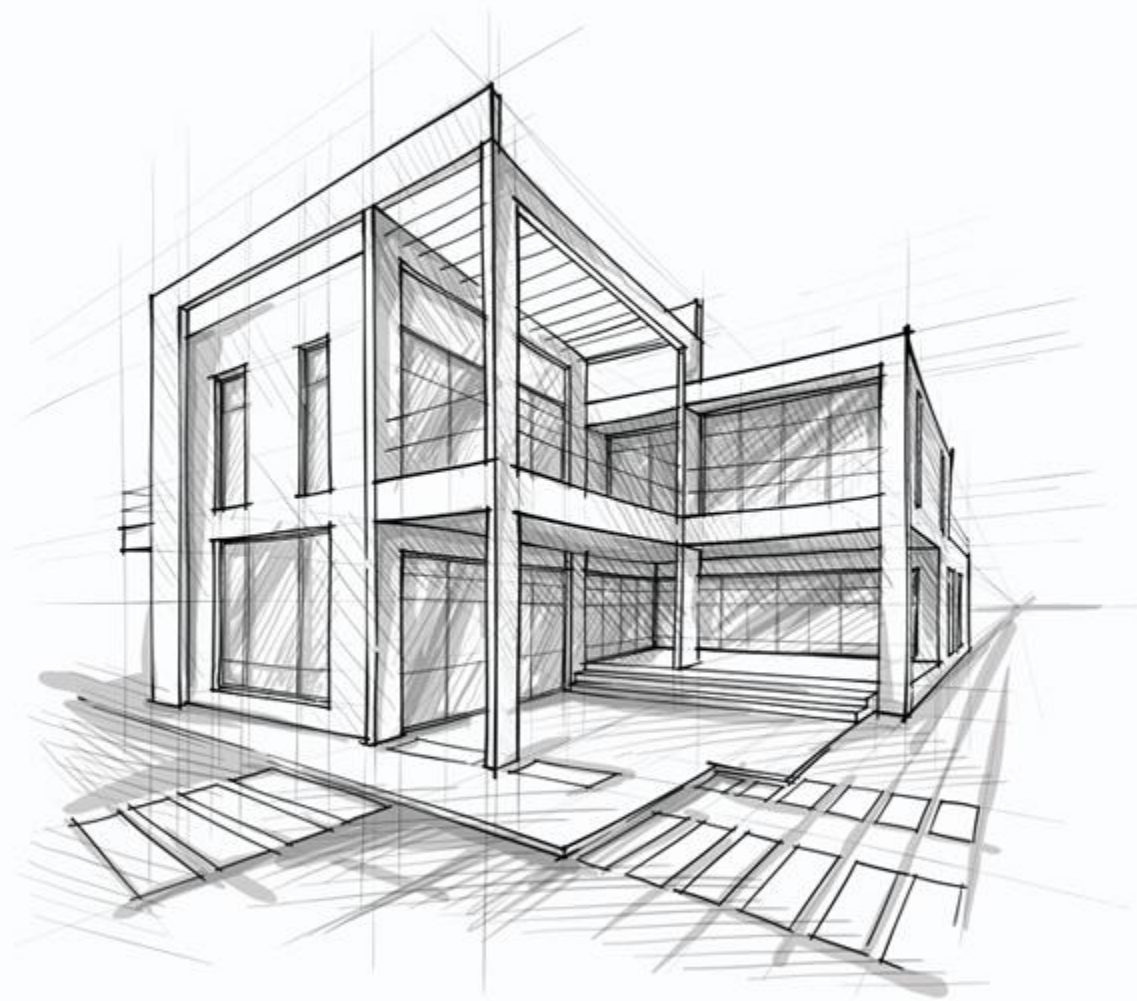
Protects both Buyer and Seller

# **FIXED-PRICE** CONTRACT

**Scope is well-defined**

**Easily describe the product/service**

**Define the exact price**



100

Price and scope are agreed upon in the beginning.  
Scope does not change without renegotiating the contract.

**“We need to create social media accounts and link them to our website. What type of contract should we use?”**

**Create specific social media accounts and link to website**  
**Price: \$50,000**



100

- Create specific social media accounts and link to website**  
**Price: \$50,000**  
**Incentive: \$10,000 for early delivery**



# FIXED PRICE INCENTIVE FEE SCENARIOS

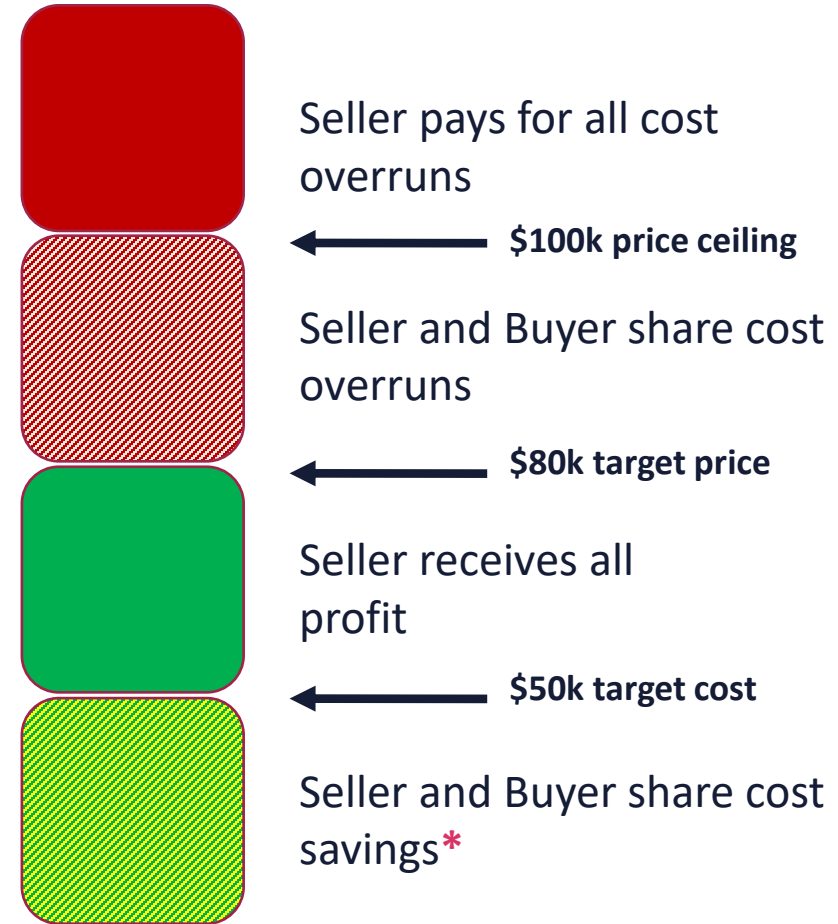
Fixed Price Incentive Fee (FPIF)  
There are 4 possible scenarios



*Ratio of share is determined in advance*

# FIXED PRICE INCENTIVE FEE SCENARIOS

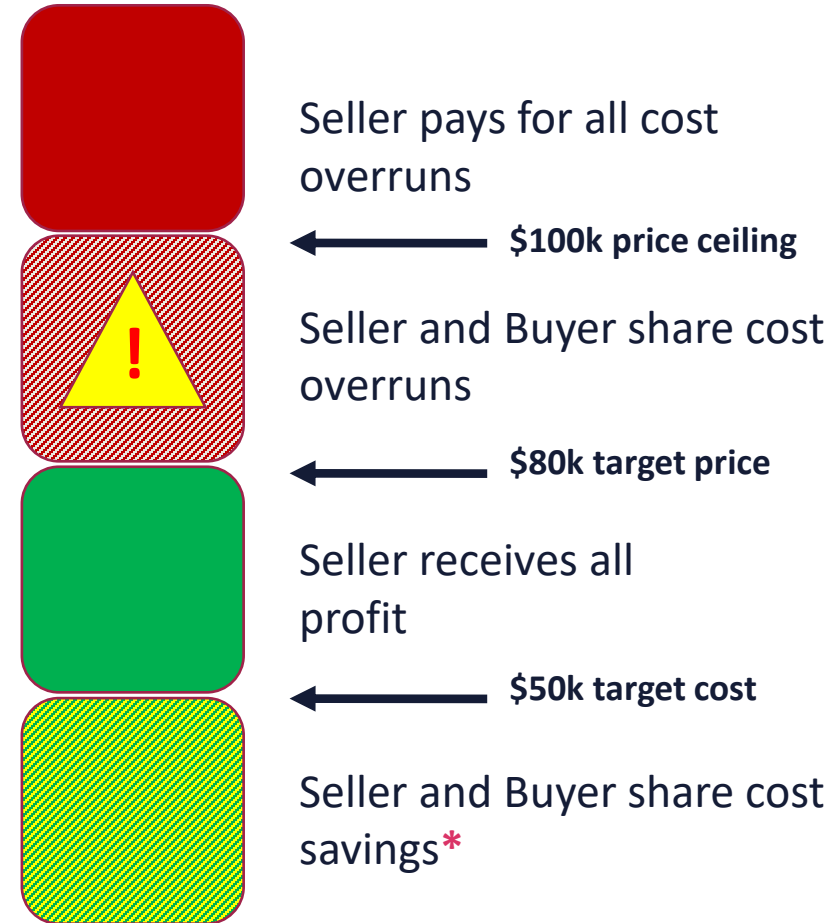
Fixed Price Incentive Fee (FPIF)  
There are 4 possible scenarios



\* Ratio of share is determined in advance

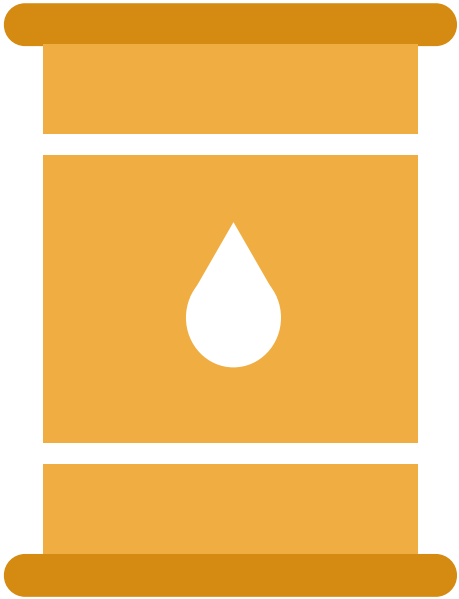
# FIXED PRICE INCENTIVE FEE SCENARIOS

**Risk Trigger**  
**“Point of Total Assumption”**  
**(PTA)**



\* Ratio of share is determined in advance

# FIXED PRICE WITH ECONOMIC PRICE ADJUSTMENT (FP-EPA)



- Best for contracts that span a number of years
- Volatile economic conditions outside of the contractor's control
- Price adjustments due to changes in economic conditions
- Protects buyers and sellers

**“We rely on oil quite a bit. If the price changes much over the next few years we need to be protected.”**





# **COST-REIMBURSABLE CONTRACT**

Scope is not well-defined

Easy to describe the desired outcome, but difficult to describe the “how”

# COST PLUS FIXED FEE (CPFF)

- The seller is reimbursed for all **allowable costs** and receives a fixed fee payment calculated as a **percentage of the initial estimated costs**.
- Fee is only paid for completed work
- Fee doesn't change based on seller's performance
- Fee amounts do not change unless Scope of Work changes

“We need to prepare for the next release of this cell phone app while customer demand is changing. I can't give the vendor a defined scope. How can our contract reflect that?”



Cell Phone App

Seller's Costs: (\$100,000 est.)  
+  
Fixed Fee: 10% of the initial  
estimated costs (\$10,000)

# COST PLUS INCENTIVE FEE (CPIF)



“We need to prepare for the next release of this cell phone app while customer demand is changing. I can’t give the vendor a defined scope. Once we have the requirements we have to move quickly, and this contract is cost sensitive. How can our contract reflect this?”

Cell Phone App

Seller’s Costs:  
(\$100,000 est.)

+

Fixed Fee: 10% of the initial estimated costs  
(\$10,000)

+

Incentive Fee: 5% of the estimated costs  
(\$5,000)

# COST PLUS AWARD FEE (CPAF)

- The seller is reimbursed for all allowable costs plus a pre-determined fee that is only awarded based on satisfying subjective performance criteria written into the contract.
- The awarding of the fee is based on the determination of the buyer and generally not subject to appeals

**“We can provide additional incentive ‘if they do an exceptional job’ – we’ll see what the results are and make that determination”**



|              |           |
|--------------|-----------|
| Target Cost: | \$100,000 |
| Base Fee:    | \$20,000  |
| Award (TBD*) | \$50,000  |

---

|                    |           |
|--------------------|-----------|
| Target Price       | \$170,000 |
| * \$50,000 maximum |           |

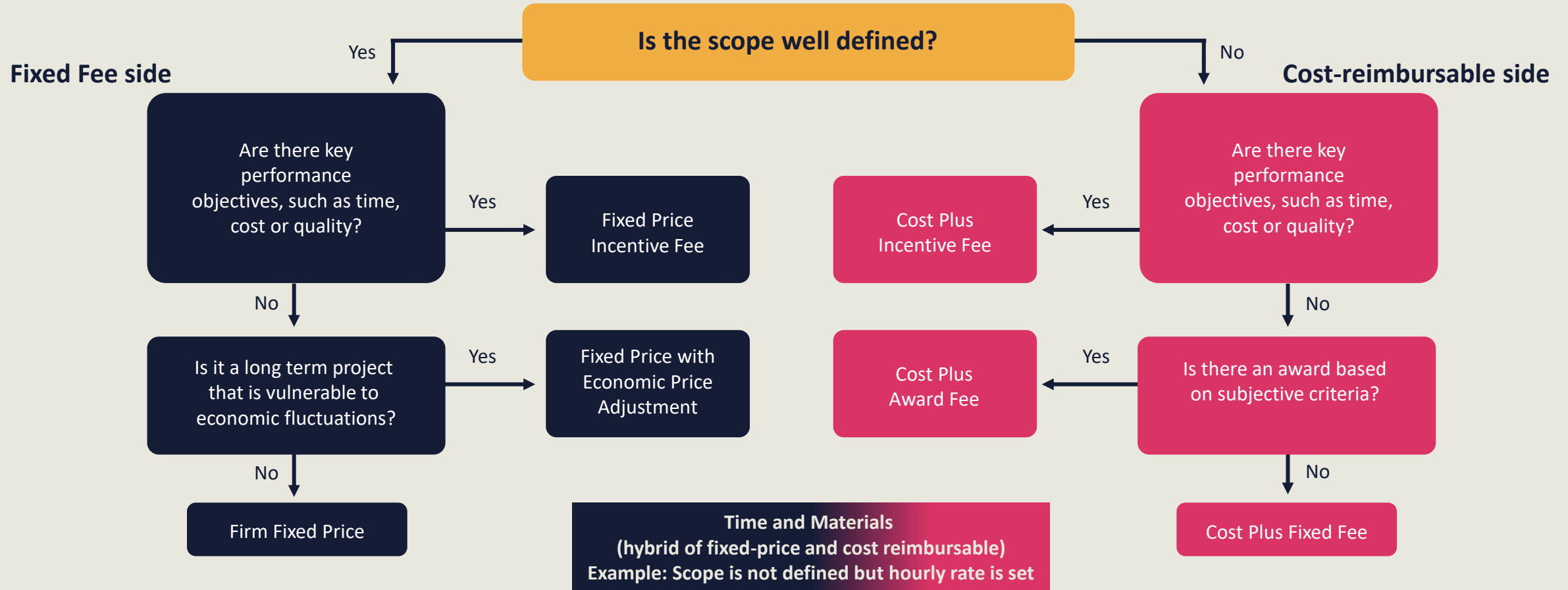
# TIME AND MATERIALS (T&M)

- Hybrid of fixed price and cost-reimbursable
- Labor or materials rates are agreed upon
- Can be open ended
- Time limits or “not to exceed” may be specified



# CONTRACT TYPE FLOW CHART

Procurement Scenarios – Which Contract Type Should I Use?





# PROCUREMENT MANAGEMENT PLAN

- Types of contracts to be used
- Risk management
- Whether independent estimates are needed
- Actions necessary by the team in procurement
- How to manage multiple suppliers
- Coordinating procurement with scheduling and performance reporting
- Constraints/Assumptions
- Lead times for deliveries
- Requirements for performance bonds or insurance
- Contractual WBS needs
- How statements of work will be formatted
- Identifying pre-qualified sellers
- Metrics for performance



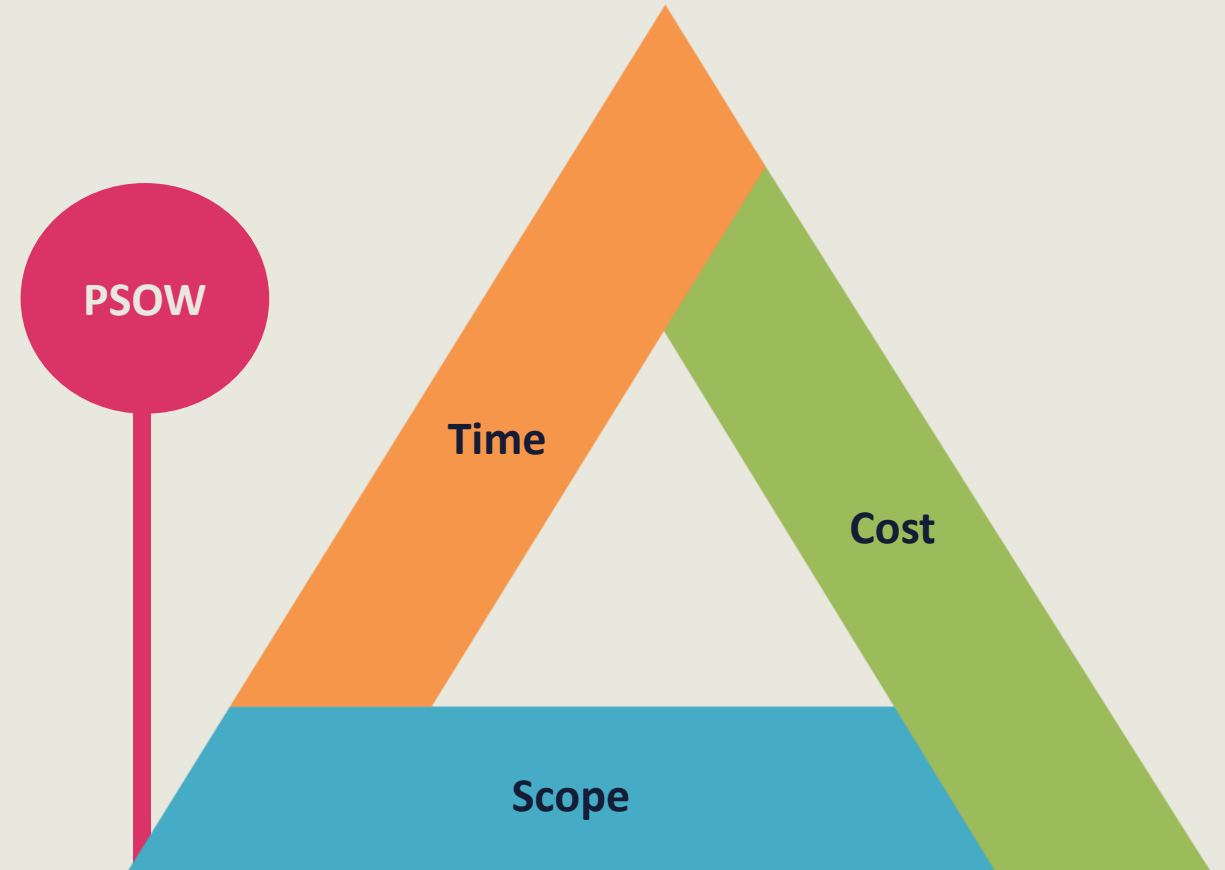
# PROCUREMENT STATEMENT OF WORK (PSOW)

Description of the product, service, or result

Selected from scope baseline

Level of detail

- Product requirements
- Supply requirements
- Reporting requirements





# PROCUREMENT BID DOCUMENTS

- Used to solicit proposals from prospective sellers
- Specific terminology and types may depend on industry and location
- Bids, quotes, and tenders are based on price
- Proposals are based on additional factors
  - Capability
  - Technical approach
- Procurement terminology varies by industry



## Request for Information (RFI)

- Need information about the goods and services
- Usually precedes RFQ or RFP

## Request for Quotation (RFQ)

- How vendor will satisfy requirements
- Includes more information about costs
- Also called Invitation for Bid (IFB)

## Request for Proposal (RFP)

- The solution is not clear
- Includes how the vendor will approach the work
- Most formal of the requests

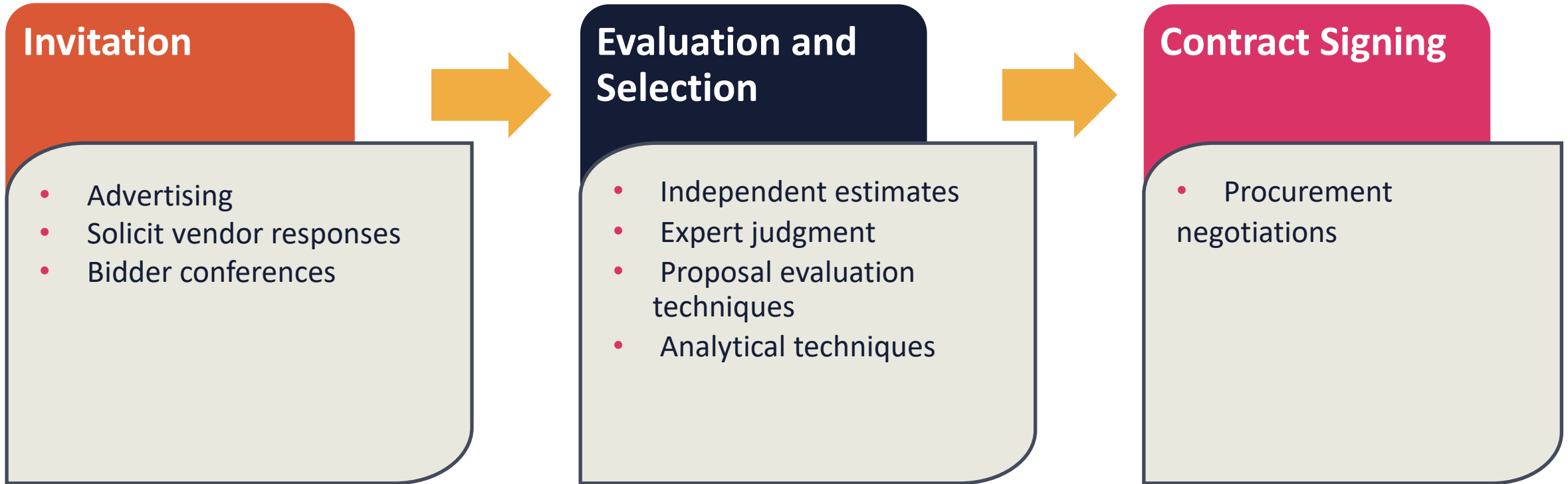
# SOURCE SELECTION CRITERIA

- Included in the procurement documents
- Criteria used to rate or score seller proposals
- May be limited to purchase price including costs and ancillary expenses

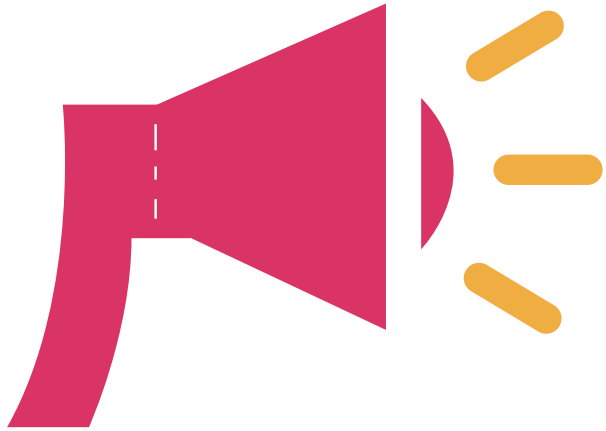
## Other Criteria:

- ✓ Understanding of need
- ✓ Technical capability
- ✓ Risk
- ✓ Management Approach
- ✓ Warranty
- ✓ Past performance
- ✓ References
- ✓ Proprietary right or intellectual property rights

# SELLER SELECTION PROCESS



# INVITATION STAGE



**Advertising**

**Solicit vendor responses**

**Bidder conferences**

# EVALUATION AND SELECTION STAGE

- Independent assessment
- Compare bids
- Expert judgment
- Evaluation techniques

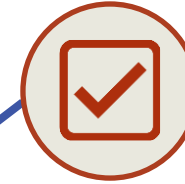
|                         | Technical capability | Technical approach | Past performance | Understanding of need | Overall cost | Total |
|-------------------------|----------------------|--------------------|------------------|-----------------------|--------------|-------|
| Weighting Factors (1-5) | 5                    | 4                  | 4                | 3                     | 4            |       |
| Seller 1                |                      |                    |                  |                       |              |       |
| Raw score               | 5                    | 3                  | 3                | 2                     | 2            |       |
| Score                   | 25                   | 12                 | 12               | 6                     | 8            | 63    |
| Seller 2                |                      |                    |                  |                       |              |       |
| Raw score               | 3                    | 5                  | 4                | 4                     | 3            |       |
| Score                   | 15                   | 20                 | 16               | 12                    | 12           | 75    |
| Seller 3                |                      |                    |                  |                       |              |       |
| Raw score               | 3                    | 3                  | 3                | 3                     | 4            |       |
| Score                   | 15                   | 12                 | 12               | 9                     | 16           | 64    |

# PROCUREMENT DOCUMENTS



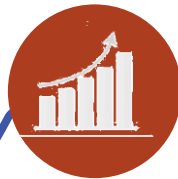
## Nondisclosure agreement (NDA)

protects sensitive information and trade secrets



## Memorandum of Understanding

outlines performance criteria when a contract cannot be enforced (government inter-agency agreements)



## Service Level Agreement (SLA)

outlines performance expectations and metrics

## Purchase Order (PO)

outlines description, quantities, and price of goods being purchased



## Warranty

a guarantee that a product will perform as stated for a minimum period of time



## Cease-and-Desist

one party informs the other to stop an activity they are doing and warns them not to do it again



## Letter of Intent

documents the intent to move forward with contract negotiations

# CONTRACT SIGNING

## STAGE

Letter of intent

Memorandum of understanding

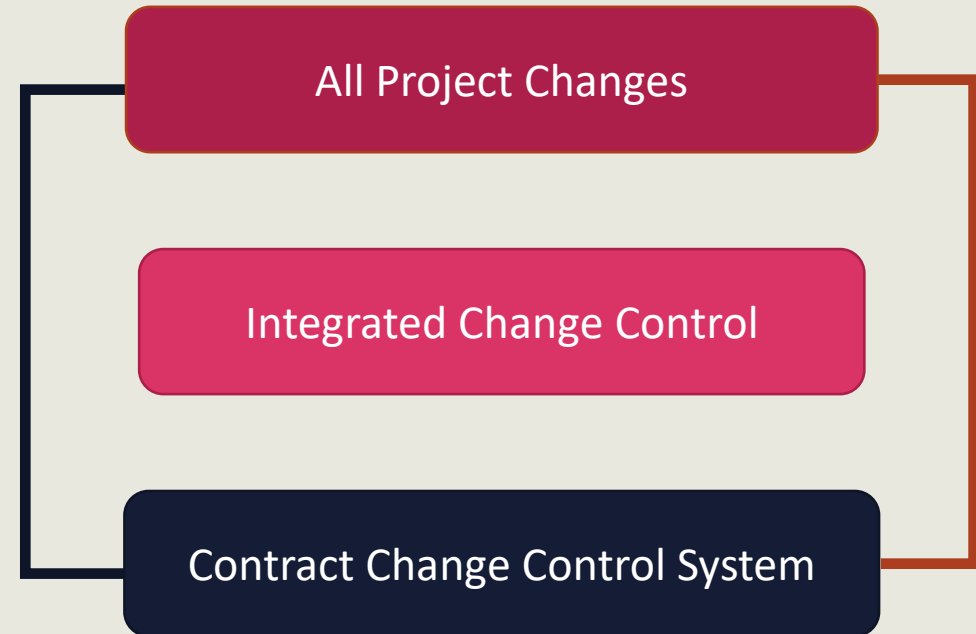
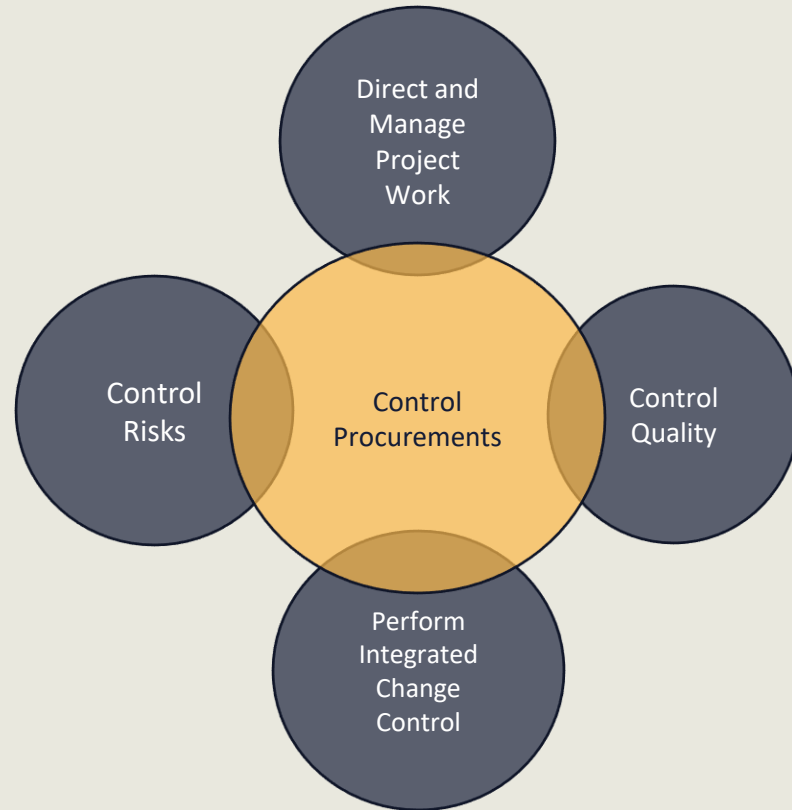
Procurement negotiations

Agreements about key items

- procurement statement of work
- authority to make changes
- terms and conditions
- service level agreements
- warranties
- legal ramifications
- nondisclosures & information privacy
- financing
- property rights
- schedule
- price



# CONTROL PROCUREMENTS



Procurement processes interact and overlap with processes being conducted by the project team and other vendors. These processes should be integrated, including incorporating contract change control with integrated change control.



# PROCUREMENT PERFORMANCE REVIEW



- Structured review of seller's progress against the Procurement Statement of Work (PSOW)
- Identify successes and challenges
- Inspections and audits
  - Required by the buyer and supported by the seller
  - **Inspections** evaluate the deliverables
  - **Audits** evaluate the processes

# PROCUREMENT TERMINOLOGY

## **Breach of Contract**

Can occur on either the buyer or seller side

Does not mean either work or payment is voided

Litigation is the least desirable result

The project manager has an ethical responsibility to make sure breach doesn't occur

**Material Breach** is egregious and may result in damages collected and all work or payments stopped

**Claims Administration** occurs when a disagreement occurs and an agreement can't be reached

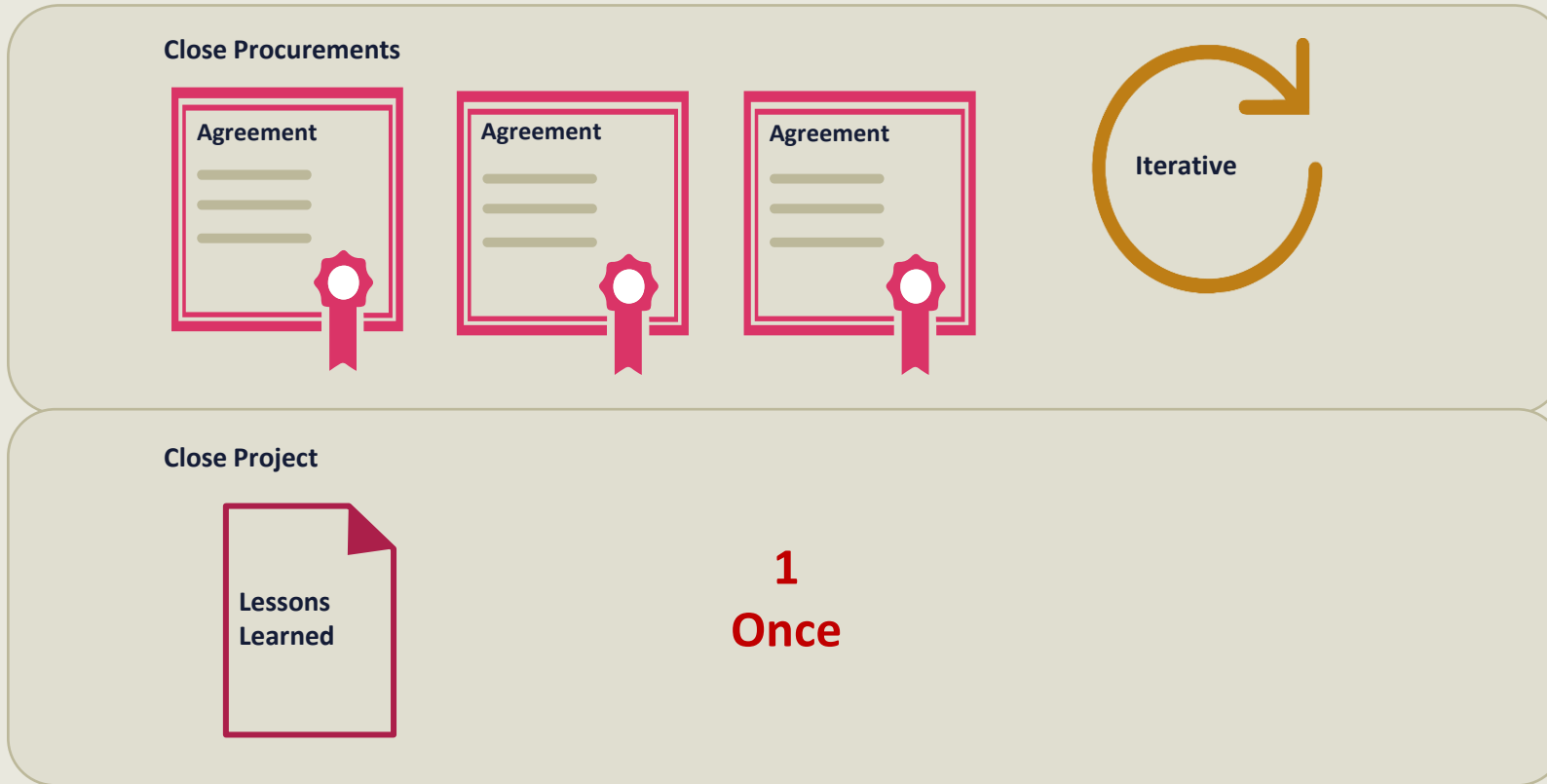
Process is often pre-determined in the contract

Alternative dispute resolution (ADR) may be necessary

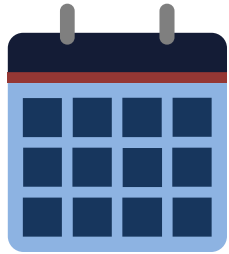
Negotiation is the preferred method



# CLOSING PROCUREMENTS



All procurements must be closed before a project or phase can be closed.



# CONTROL PROCUREMENTS: DELIVERABLES

## Project Documents Updates

### Documentation and Lessons Learned

- OPA updates
- Correspondence
- Payment schedule and requests
- Seller performance evaluation documents
- Helps with future procurements and vendor selection

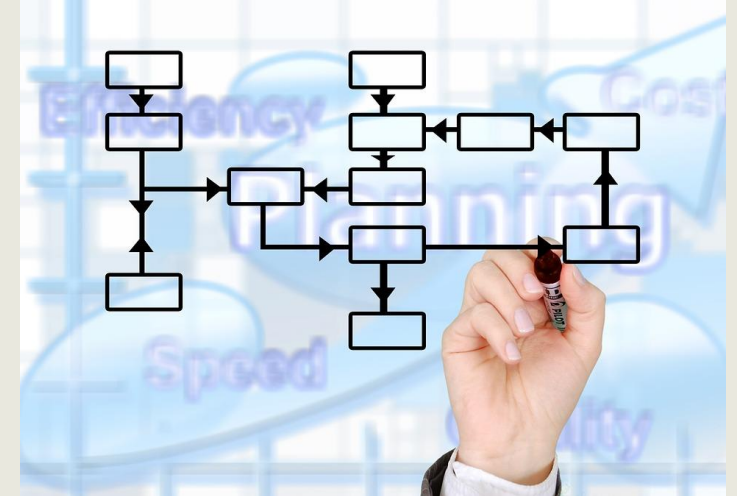
# MANAGE PROJECT KNOWLEDGE

## Purpose

- Leverage knowledge
- Improve project outcomes
- Share knowledge

## Types of Knowledge

- Explicit
  - easy to share
  - obtained through words, pictures, or numbers
  - examples: a math formula, or step-by-step instructions for doing something
- Tacit
  - difficult to share
  - obtained through unique experiences, expertise, thoughts, and insights
  - Examples: learning to drive or learning to play an instrument

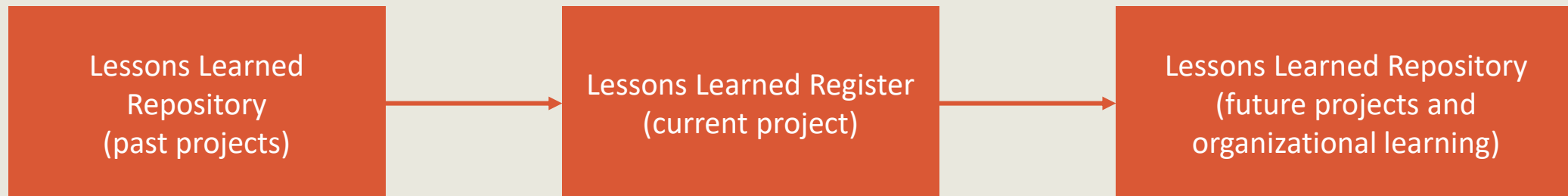


# LESSONS LEARNED

Knowledge gained during the project which is used during the current project and stored for use in future projects.

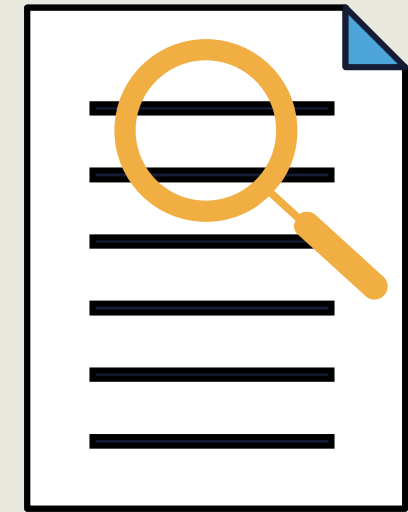
Lessons Learned Register: used to record knowledge during the **current** project

Lessons Learned Repository: historical information that records knowledge from **past** projects and is updated for use in **future** projects



# MONITORING AND CONTROLLING PROJECT WORK

- Monitoring and Controlling includes:
- Determining whether deliverables meet requirements and adhere to product acceptance criteria
- Collecting, measuring, and inspecting
- Identifying variance from the three baselines
  - Scope
  - Schedule
  - Budget
- Assessing trends
- Reporting performance information
- Realigning performance to the plan, or adjusting the plan



# WORK PERFORMANCE DATA

- Raw observations and measurements identified during activities being performed.

|                                |          |
|--------------------------------|----------|
| Number of completed activities | 8        |
| Actual costs                   | \$12,500 |
| Number of defects              | 3        |
| Stakeholder issues             | 6        |



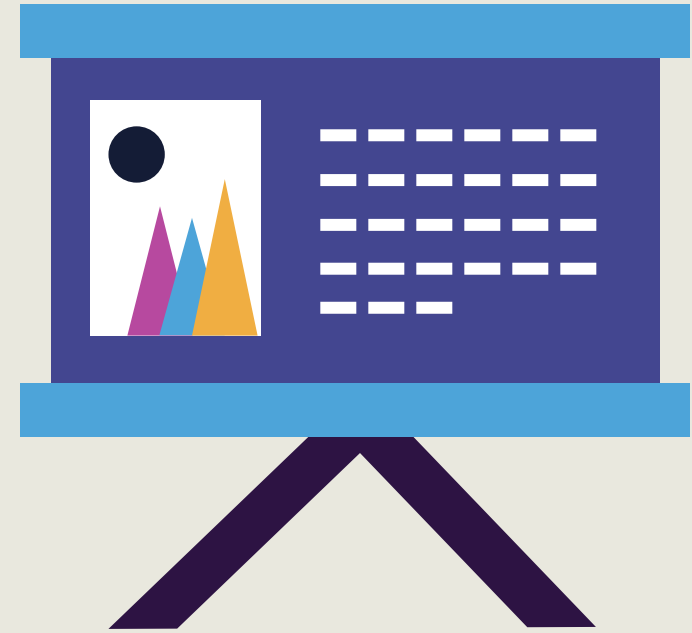
# WORK PERFORMANCE INFORMATION

|                                | Actual   | Plan     | Variance | Requirements |
|--------------------------------|----------|----------|----------|--------------|
| Number of completed activities | 8        | 7        | +1       | Met          |
| Actual costs                   | \$12,500 | \$11,000 | +\$1,500 | Not met      |
| Number of defects              | 3        | 5        | -2       | Met          |
| Stakeholder issues             | 6        | 3        | +3       | Not met      |

# WORK PERFORMANCE REPORTS

Effective performance reporting

- Accurate
- Complete
- Timely
- Easy to understand



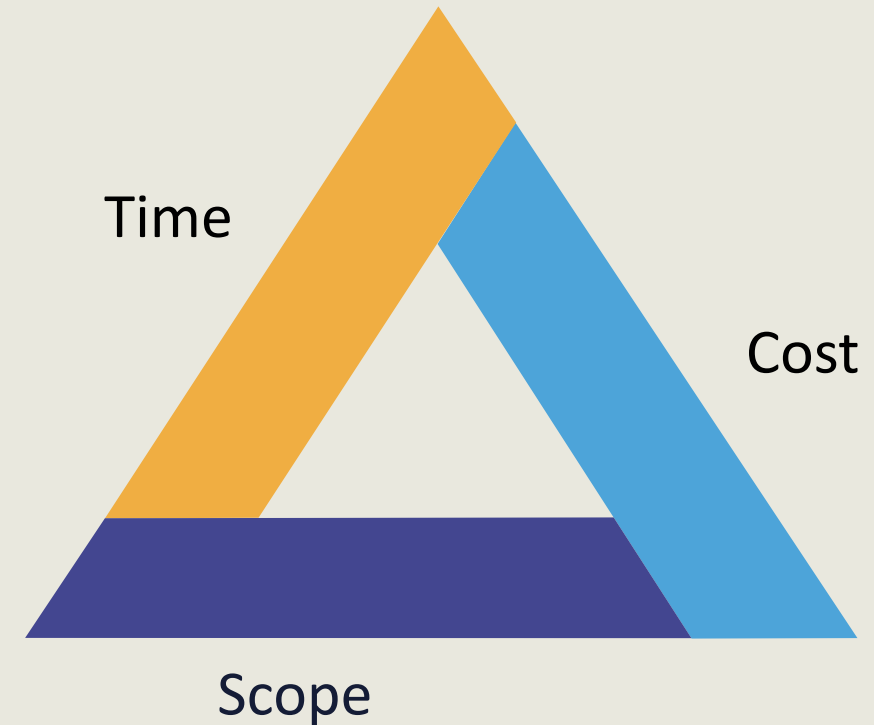
# CHANGE REQUESTS

## May originate from

New rules and regulations  
Organizational changes  
Customer request  
Project team request  
Project needs

## • May affect

- Project management plan or subsidiary plans
- Resources
  - Addition of members
  - Replacement of members
  - Outsourcing
- Budget, schedule, or scope baselines
- Quality metrics or standards
- Management reserves



# CONTROL SCHEDULE

- Compare plan against actual
- Earned value management
- Manage changes to the schedule baseline
- Look for variances
- Determine corrective or preventative actions
- Recognize trends





# CONTROL COSTS

## Earned Value Management

- Compare actual performance to the plan (baselines)
- Identify variance
- Make adjustments to realign performance to the plan

# EARNED VALUE MANAGEMENT (EVM)

A technique for measuring project performance

**Project Budget = \$100,000**

“Budget at Completion (BAC)”

**Project Schedule = 1 year**



**Budget at Completion**, or **BAC**, is the total planned cost for the project. It is the total approved budget for completing all scheduled activities.



### EXAMPLE

**Project Schedule = 1 year**

**Project Budget = \$100,000**

## BUDGET AT COMPLETION (BAC)

# PLANNED VALUE (PV)

**Planned Value, or PV,** is the amount of the budget allocated to the work that was planned to be completed by a specific point in time. It is the Budget at Completion multiplied by the percentage of time that has passed in the project schedule.



$$\text{Planned Value (PV)} = \text{Budget at Completion (BAC)} * \text{Percent of Time Passed}$$



# PLANNED VALUE (PV)

## EXAMPLE

Project Schedule = 1 year

Project Budget = \$100,000

3 months = 25%

6 months = 50%

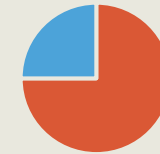
9 months = 75%



= \$25,000



= \$50,000



= \$75,000

*Planned Value (PV) = Budget at Completion (BAC) \* Percent of Time Passed*

# EARNED VALUE (EV)

The actual value of the work that has been completed so far, based on the budgeted funds assigned to that work. It is the Budget at Completion multiplied by the percentage of work actually completed.

**Earned Value (EV) = BAC \* Percent of Work Completed**



# EARNED VALUE (EV)

## EXAMPLE

Project Schedule = 1 year

Project Budget = \$100,000



After 4 months, you have completed 60% of the work.  
What is the earned value?

$$\text{\$100,000} \times 60\% = \text{\$60,000}$$

*Earned Value (EV) = Budget at Completion (BAC) \* Percent of Work Completed*

# EARNED VALUE (EV)

## EXAMPLE

Project Schedule = 1 year

Project Budget = \$100,000



After 6 months, you have completed 40% of the work.  
What is the earned value?

$$\text{\$100,000} \times 40\% = \text{\$40,000}$$

*Earned Value (EV) = Budget at Completion (BAC) \* Percent of Work Completed*

# SCHEDULE VARIANCE (SV)

*Schedule Variance (SV) = Earned Value (EV) – Planned Value (PV)*

Compare Earned Value (EV) to Planned Value (PV)

- ✓ No variance means “on time”
- ✓ Positive variance means “early”, or ahead of schedule
- × Negative variance means “late”, or behind schedule



# SCHEDULE VARIANCE (SV)

Project Schedule = 1 year

Project Budget = \$100,000

## EXAMPLE

| Time Passed | Earned Value | Planned Value | Schedule Variance    |
|-------------|--------------|---------------|----------------------|
| 3 Months    | \$22,500     | \$25,000      | -\$2,500 <b>LATE</b> |
| 6 Months    | \$55,500     | \$50,000      | \$5,500 <b>EARLY</b> |
| 9 Months    | \$73,000     | \$75,000      | -\$2,000 <b>LATE</b> |

*Schedule Variance (SV) = Earned Value (EV) – Planned Value (PV)*

# SCHEDULE PERFORMANCE INDEX (SPI)

$$\text{Schedule Performance Index (SPI)} = \text{Earned Value (EV)} / \text{Planned Value (PV)}$$

- ✓ SPI = 1 means “on time”
- ✓ SPI > 1 means “early”
- × SPI < 1 means “late”

$$1.2 = \$60,000 / \$50,000$$

## EXAMPLE

$$\text{EV} = \$60,000$$

$$\text{PV} = \$50,000$$

An SPI of 1.2 means “early”

*Note: An SPI value **greater than one** indicates that a project is ahead of schedule. A value **less than one** indicates the project is behind schedule. For example, an SPI of 1.2 indicates that a project is 20% ahead of schedule.*

# ACTUAL COST (AC)

Actual cost, or AC, is the total cost incurred up to a specific time





# COST VARIANCE (CV)

**Cost Variance**, or **CV**, is the difference between what a project has earned to date and what it has cost. It is the earned value minus the actual cost. This tells you how well the project is performing in terms of costs.

$$\text{Cost Variance (CV)} = \text{Earned Value (EV)} - \text{Actual Cost (AC)}$$

- ✓ No variance means “on budget”
- ✓ Positive variance means “under budget”
- × Negative variance means “over budget”

*Note: a **negative CV** shows that the project has earned less than has been spent. A **positive value** means the project's cost performance is better than expected – for each dollar of value earned, less than a dollar was spent.*

# COST VARIANCE (CV)

Project Schedule = 1 year

Project Budget = \$100,000

## EXAMPLE

| Time Passed | Earned Value | Actual Cost | Cost Variance |
|-------------|--------------|-------------|---------------|
| 3 Months    | \$22,500     | \$22,500    | 0             |
| 6 Months    | \$55,000     | \$50,000    | \$5,000       |
| 9 Months    | \$72,500     | \$77,500    | - \$5,000     |

“on budget”

“under budget”

“over budget”

**Cost Variance (CV) = Earned Value (EV) – Actual Cost (AC)**

# COST PERFORMANCE INDEX (CPI)



EV = \$75,000

AC = \$70,000

*Cost Performance Index (CPI) = Earned Value (EV)/Actual Cost (AC)*

- ✓ CPI = 1 means “on budget”
- ✓ CPI > 1 means “under budget”
- × CPI < 1 means “over budget”

**1.07 = \$75,000/\$70,000**

**A CPI of 1.07 means “under budget”**

# DETERMINING PROJECT PERFORMANCE (EXAMPLE 1)

You have a budget of \$20,000 to hire and train 10 new employees. Your schedule baseline is eight weeks. Four weeks have passed and you have completely onboarded 4 employees. You have \$13,500 left of your original budget.

$$\text{BAC} = \$20,000$$

$$\text{EV} = \$20,000 * .40 = \$8,000$$

$$\text{PV} = \$20,000 * .50 = \$10,000$$

$$\text{AC} = \$6,500$$

$$\text{SV} = \$8,000 - \$10,000 = -\$2,000$$

$$\text{SPI} = \frac{\$8,000}{\$10,000} = .80$$

$$\text{CV} = \$8,000 - \$6,500 = \$1,500$$

$$\text{CPI} = \frac{\$8,000}{\$6,500} = 1.23$$

Is the project:

- a) Ahead of schedule, under budget
- b) Ahead of schedule, over budget
- c) Behind schedule, under budget
- d) Behind schedule, over budget

c) Behind schedule, under budget

# Determining Project Performance (Example 2)

You have \$10,000 left of your budget of \$14,000 for the creation of a new employee handbook and video. The employee handbook will be 25 pages. You have completed 25% of the work and 20% of your scheduled time has passed.

$$\text{BAC} = \$14,000$$

$$\text{EV} = \$14,000 * .25 = \$3,500$$

$$\text{PV} = \$14,000 * .20 = \$2,800$$

$$\text{AC} = \$4,000$$

$$\text{SV} = \$3,500 - \$2,800 = \$700$$

$$\text{SPI} = \frac{\$3,500}{\$2,800} = 1.25$$

$$\text{CV} = \$3,500 - \$4,000 = - \$500$$

$$\text{CPI} = \frac{\$3,500}{\$4,000} = .88$$

Is the project:

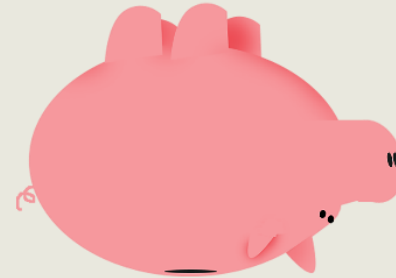
- a) Ahead of schedule, under budget
- b) Ahead of schedule, over budget
- c) Behind schedule, under budget
- d) Behind schedule, over budget

b) Ahead schedule, over budget

# SCENARIOS AND SOLUTIONS



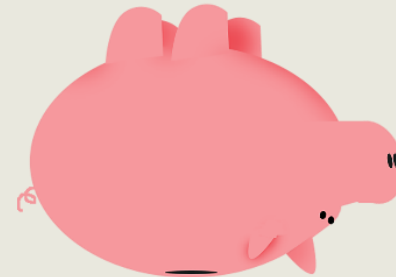
No Change



Resource Optimization: Smoothing or Levelling



Schedule Compression: Crashing or Fast Tracking



Re-evaluate viability of the project  
Possibly reduce the scope

# ESTIMATE AT COMPLETION (EAC)

*Budget at Completion (BAC) = The planned project budget*

*Estimate at Completion (EAC) = The new forecasted budget*

**Forecasting** – As the project progresses, the project team may develop a forecast for the Estimate at Completion (EAC) which may differ from the Budget at Completion (BAC) based on the project performance.

What if our original BAC was flawed?

What if an EEF change affects many of our work packages?

What if we experience an unexpected risk event?

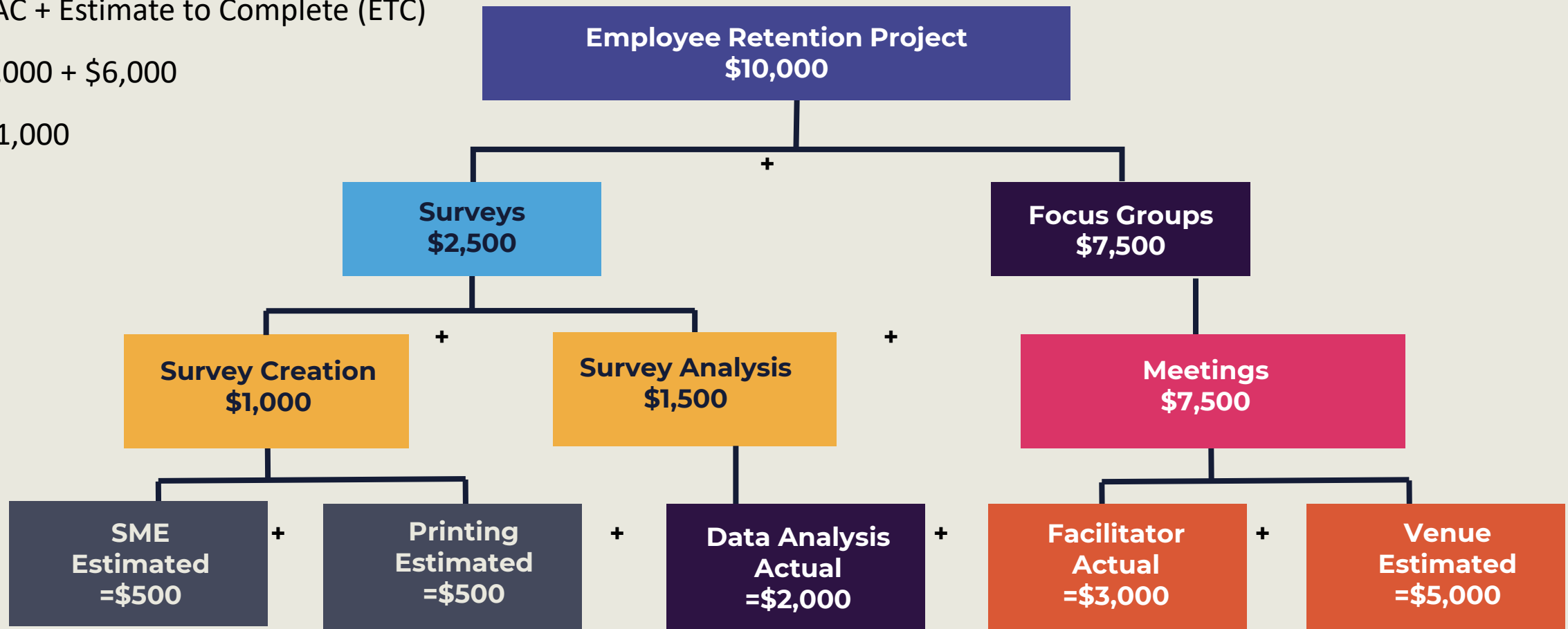


# ORIGINAL BAC WAS FLAWED


EAC = AC + Estimate to Complete (ETC)

= \$5,000 + \$6,000

= \$11,000







We are pretty close to our cost estimates.  
I think we can assume this will continue.

Earned Value = \$750,000  
Actual Cost = \$700,000  
CPI = 1.07

## ESTIMATE AT COMPLETION

Project Budget \$1,000,000

Project Schedule = 1 year

# ESTIMATE AT COMPLETION



Scenario: Assumes the same rate of spending will continue.

Budget = \$1,000,000

Schedule = 1 year

CPI = 1.07



Estimate at Completion (EAC) =

Budget at Completion (BAC)

Cost Performance Index (CPI)

$$\text{\$934,579} = \frac{\text{\$1,000,000}}{1.07}$$

What if the CPI had been .89 instead?

# ESTIMATE AT COMPLETION



Scenario: Assumes the same rate of spending will continue.


Budget = \$1,000,000

Schedule = 1 year

CPI = .89

$$\text{Estimate at Completion (EAC)} = \frac{\text{Budget at Completion (BAC)}}{\text{Cost Performance Index (CPI)}}$$

$$\text{\$1,123,596} = \frac{\text{\$1,000,000}}{.89}$$



Earned Value = \$625,000  
Actual Cost = \$700,000  
CPI = 0.89

It's too bad about that hurricane. If it wasn't for the extra supply costs we would be on budget. Good thing we are back on track now.

# ESTIMATE AT COMPLETION

Project Budget \$1,000,000

Project Schedule = 1 year

# ESTIMATE AT COMPLETION



Scenario: Assumes we deviated from the budget, but it was an isolated incident and now we are back to normal spending.

Budget = \$1,000,000

Schedule = 1 year

CPI = .89

Event: Hurricane

Schedule = 1 year

Cost Variance = -\$75,000

Estimate at Completion (EAC) = AC + (BAC – EV)

Estimate at Completion (EAC) = BAC – CV

**\$1,075,000** = \$1,000,000 – (-\$75,000)





Uh-Oh

It's a tough situation. We have no hope of meeting our original budget and the deadline is firm.

CPI = 0.79  
SPI = 0.92  
AC = \$700,000  
EV = \$550,000

## ESTIMATE AT COMPLETION

Project Budget \$1,000,000

Project Schedule = 1 year

# ESTIMATE AT COMPLETION

Scenario: Assumes poor cost performance and a firm completion deadline

Budget = \$1,000,000

Schedule = 1 year

CPI = .79

SPI = .92

AC = \$700,000

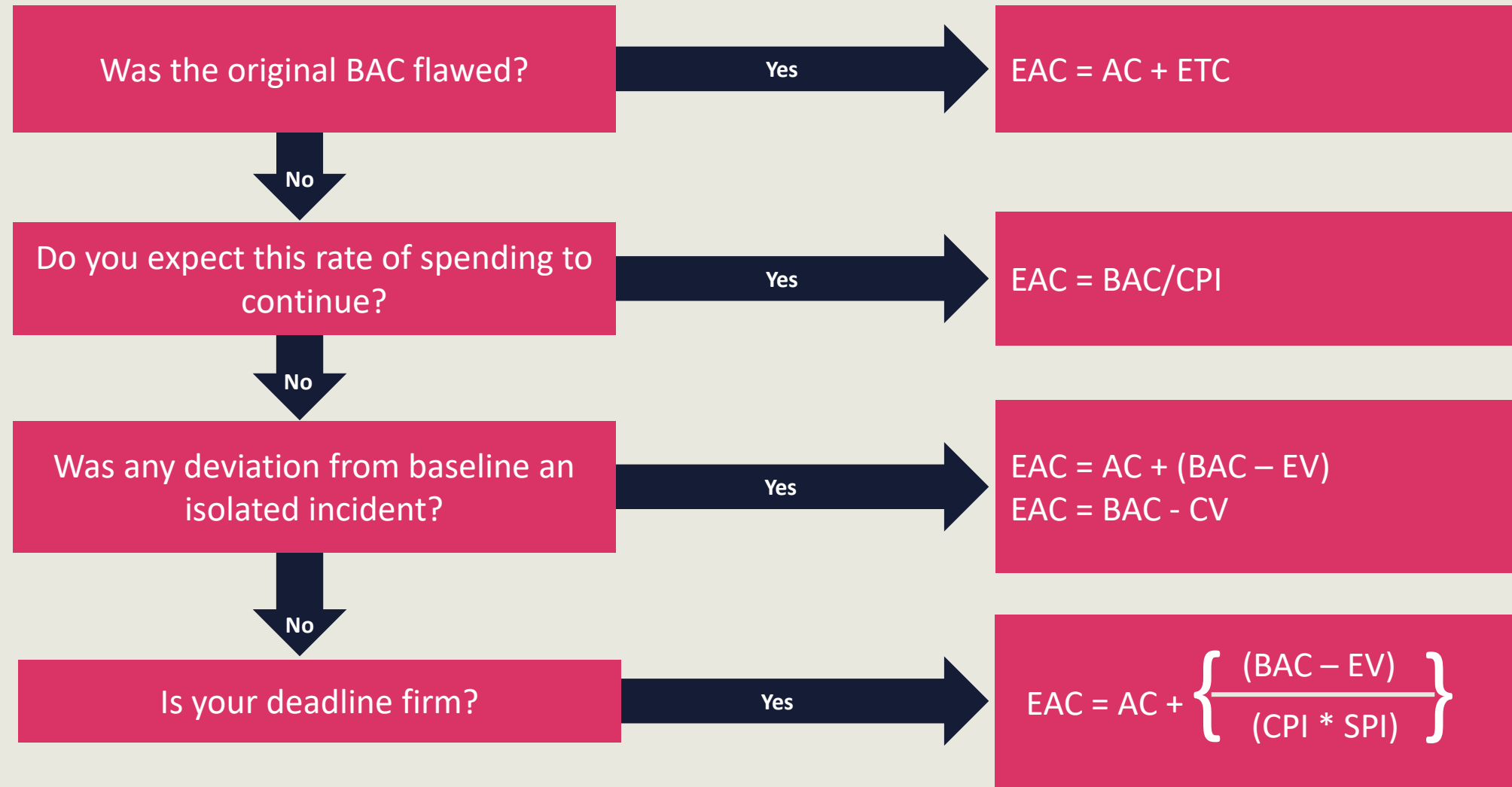
EV = \$550,000

$$\text{Estimate at Completion (EAC)} = \text{AC} + \left\{ \frac{(\text{BAC} - \text{EV})}{(\text{CPI} * \text{SPI})} \right\}$$

$$\text{\textcolor{red}{\$1,319,152}} = \$700,000 + \left\{ \frac{(\$1,000,000 - \$550,000)}{(0.79 * 0.92)} \right\}$$

BAC – EV can also be described as “Work Left”

# EAC FLOW CHART

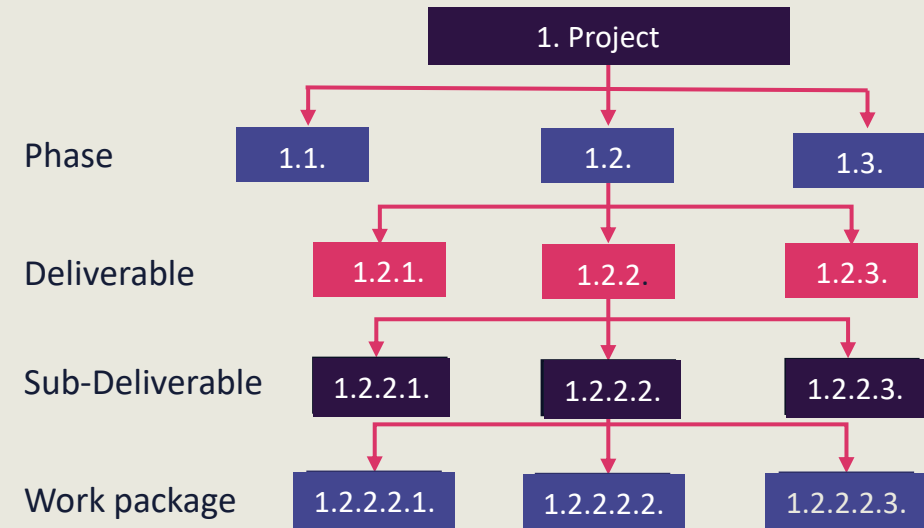
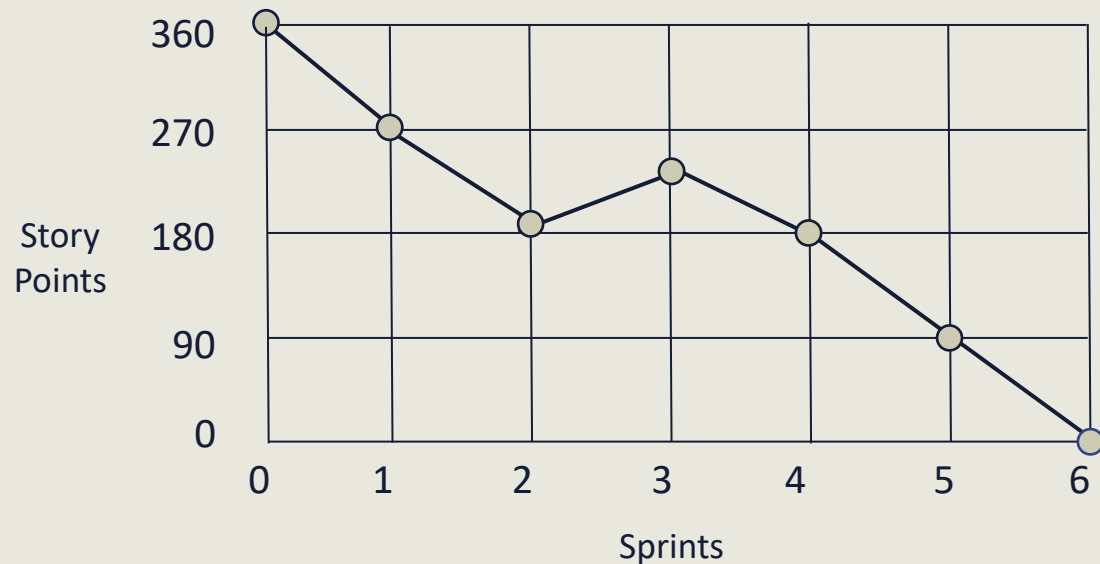




# ESTIMATE TO COMPLETE (ETC)

Estimate to Complete (ETC) – The expected cost to finish all the remaining project work.

What information can we use to determine the ETC?



In Agile projects, a burndown chart is used to show the remaining work.

# ESTIMATE TO COMPLETE (ETC)



EAC = \$934,579  
AC = \$700,000

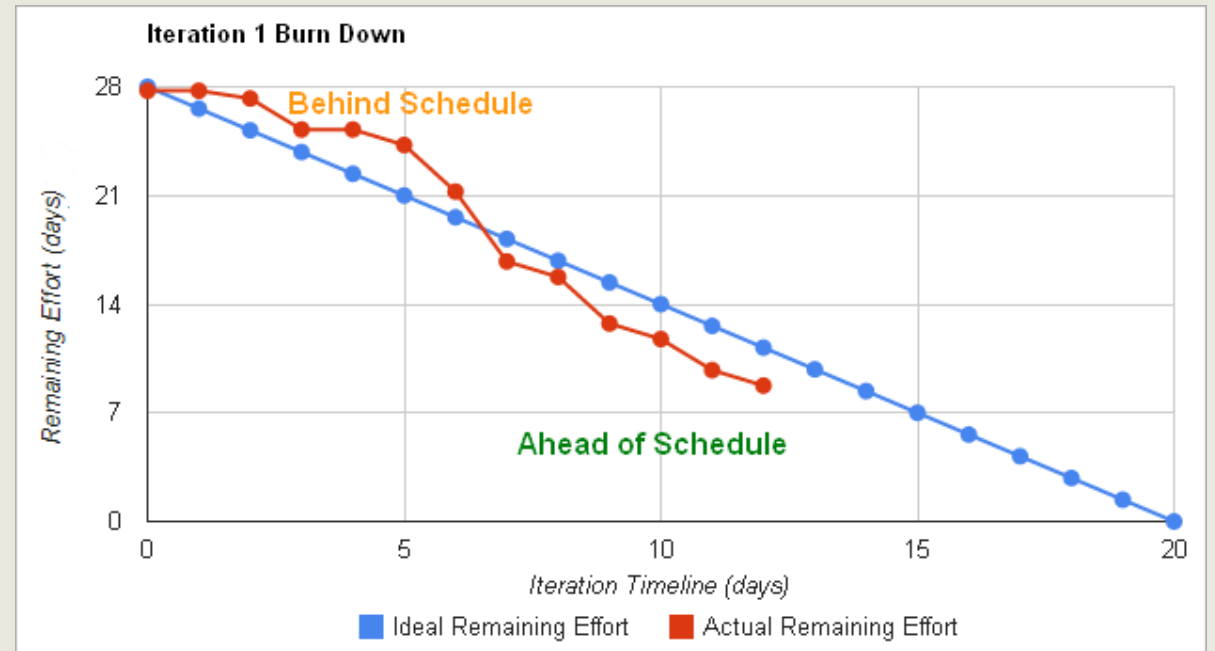
Estimate to Complete (ETC) = EAC - AC

**\$234,579** = \$934,579 - \$700,000

# BURN RATE

The **burn rate** is the rate at which you are spending money. This can help you determine if you will stay within your budget.

Example = You have a 10-month project with a \$25,000 budget. Your burn rate is \$3,000 per month. What does this mean?



# VARIANCE AT COMPLETION (VAC)



BAC = \$1,000,000  
EAC = \$934,579

**Variance at Completion (VAC) = BAC - EAC**

**\$65,421 = \$1,000,000 - \$934,579**

A positive variance at completion means the project will come in under budget

# TO COMPLETE PERFORMANCE INDEX (TCPI)

Scenario #1 Original budget can be achieved.



BAC = \$1,000,000

EV = \$750,000

AC = \$700,000

$$\text{To Complete Performance Index (TCPI)} = \frac{(BAC - EV)}{(BAC - AC)} \quad \frac{\text{"work left"}}{\text{"money left"}}$$

> 1 is bad

**WORK**

money

= 1 is on budget

work

money

< 1 is good

work

**MONEY**

Greater than one means you will have to spend more efficiently going forward

# TO COMPLETE PERFORMANCE INDEX (TCPI)

Scenario #1 Original budget can be achieved.



BAC = \$1,000,000

EV = \$750,000

AC = \$700,000

$$\begin{aligned} \text{To Complete Performance Index (TCPI)} &= \frac{(BAC - EV)}{(BAC - AC)} && \frac{\text{"work left"}}{\text{"money left"}} \\ & && < 1 \text{ is good} \\ .83 &= \frac{(\$1,000,000 - \$750,000)}{(\$1,000,000 - \$700,000)} && \checkmark \quad \frac{\text{work}}{\text{MONEY}} \end{aligned}$$

Greater than one means you will have to spend more efficiently going forward

# TO COMPLETE PERFORMANCE INDEX (TCPI)

Scenario #2 Assumes original budget cannot be achieved.



BAC = \$1,000,000

EAC = \$1,075,000

EV = \$700,000

AC = \$775,000

$$\text{To Complete Performance Index (TCPI)} = \frac{(BAC - EV)}{(EAC - AC)} \quad \frac{\text{"work left"}}{\text{"money left"}}$$

> 1 is bad

**WORK**

money

= 1 is on budget

work

money

< 1 is good

work

**MONEY**

# TO COMPLETE PERFORMANCE INDEX (TCPI)

Scenario #2 Assumes original budget cannot be achieved.



BAC = \$1,000,000

EAC = \$1,075,000

EV = \$700,000

AC = \$775,000

$$\text{To Complete Performance Index (TCPI)} = \frac{(BAC - EV)}{(EAC - AC)} \quad \frac{\text{"work left"}}{\text{"money left"}}$$

$$1 = \frac{(\$1,000,000 - \$700,000)}{(\$1,075,000 - \$775,000)}$$



# CLOSING THE PROJECT OR PHASE

Close Project or Phase



Hand off completed product and satisfy completion or exit criteria



Solicit feedback from the customer



Complete Final performance reporting and update lessons learned, release resources

Performing Organization



Delivered

Customer

# CLOSING THE PROJECT OR PHASE

## OPA Updates

- Project documents
- Operational and support documents
  - Necessary to maintain or support the deliverable
- Project or phase closure documents
  - Confirm completion of the project
  - Customer acceptance documentation
  - Reasons for termination if project not completed
- Lessons learned repository
  - For use by future projects



Contracts



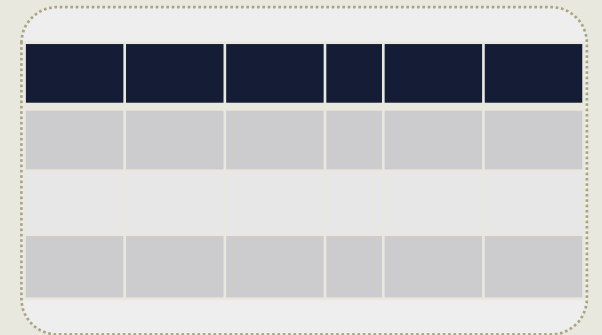
Invoices



Archived communications



Schedules



Past project documents



# FINAL REPORT

Summary of project or phase

Project objectives

- Criteria used for evaluation
- Verification that criteria were met
- Evaluation of unmet criteria

Confirmation that deliverables achieved the business needs or will meet needs in the future

Summary of risks encountered during the project

# ETHICS IN CLOSING

- Ensure deliverables have been completed based on documented and agreed-upon requirements
- Protect the organization from additional costs or charges after completion
- Communicate transparently with stakeholders regarding lessons learned in final project report
- Contribute to the development and growth of other project professionals through the capture of comprehensive lessons learned EEF and OPA updates
- Evaluate customer and end-user satisfaction and enhance future relationships
- Formally close the project or phase



# DAILY BOOTCAMP SURVEY

Please share your thoughts.

At the end of each Bootcamp session please let us know how we are doing. Your feedback helps us to offer the best possible Bootcamp experience.

Thank you for attending Session 4!