



# How to Resource Effectively as an AEC PM

Speaker:  
Lindsay Madsen, PE | *Assistant Vice President*






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## EMI QUALITY ASSURANCE

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## Purpose and Objectives:



### Purpose:

The purpose of this session is to provide AEC project managers with practical knowledge and strategies for effective resource management, helping them optimize project performance while minimizing waste and inefficiency.

- Learn how to develop and implement resource allocation plans that align with project goals and timelines.
- Understand key challenges in resource management specific to AEC projects and explore solutions.
- Gain insights into balancing resource availability with project demands to avoid bottlenecks and delays.
- Explore tools and techniques for tracking and adjusting resource usage to maximize efficiency and project outcomes.

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## Speaker: Lindsay Madsen, PE



- 24 Years Industry Experience in Public & Private sectors (Design, Inspection, Project Management)
- Graduated: Iowa State University, BS Civil Engineering
- Hometown: Shorewood, WI

### Fun Facts:

- **Married to an engineer**
- **Two kids, ages 15 and 18**
- **Small herd of cattle**
- **Lifetime Girl Scout**



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## COST – QUALITY – SCHEDULE




You can't have all three ... get it done quickly and of high quality – that'll cost ya!

Or can you?

Resource planning is a process used to meet a project scope on time, on budget, and with quality. It's the small overlap in the middle that hits all three elements of the triangular.

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## WHAT IS **RESOURCE PLANNING**?

Resource planning is the process of determining what resources are required to deliver a project within the confines of the scope, the budget, and the schedule.

Resource planning involves:

- Schedule
- Cost
- Resources

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# Contracting




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## CONTRACTING

### CONTRACT TYPES:



Different contracting types will affect how the resource plan comes together.

- Lump Sum
- Hourly Rates
- Cost Plus Fixed Fee
- Cost X Multiplier

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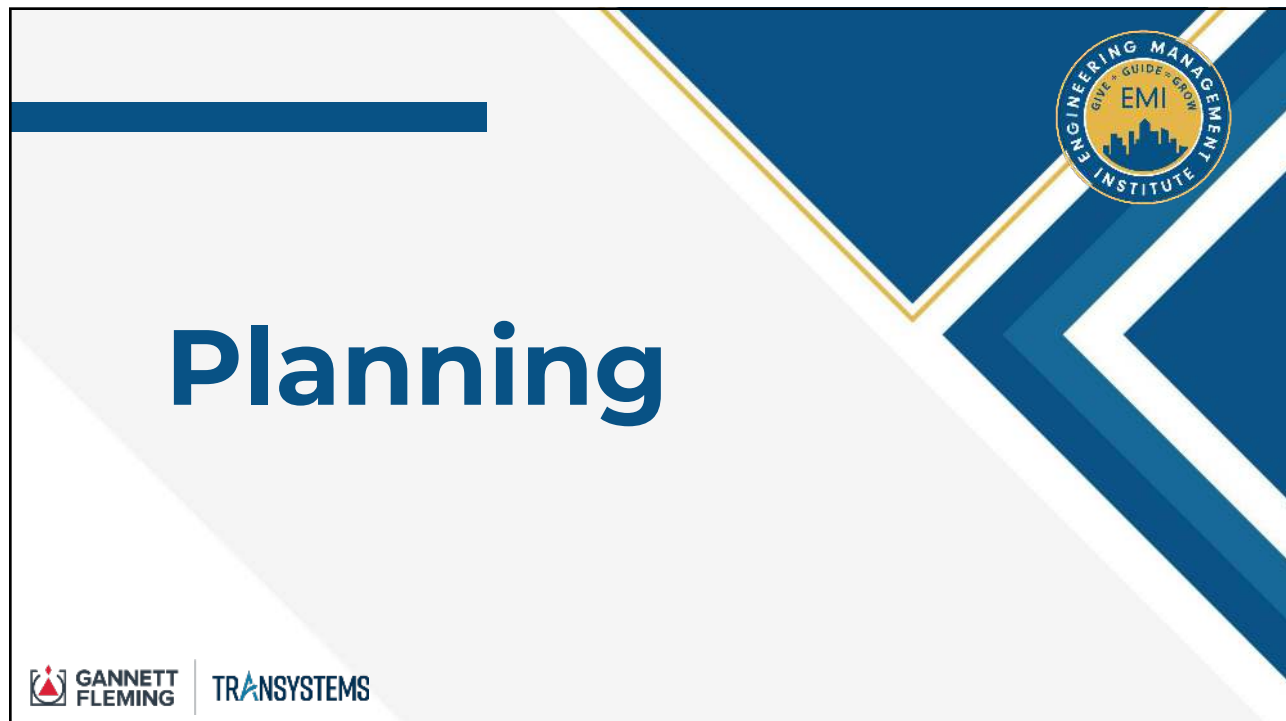
## CONTRACTING

LUMP SUM	HOURLY RATES	COST X MULTIPLIER	COST + FIXED FEE
<ul style="list-style-type: none"> <li>One contract amount, no detail</li> <li>Potential for higher profit margin</li> <li>Invoicing can be simple</li> <li>Scope needs to be specific</li> </ul>	<ul style="list-style-type: none"> <li>Contract bills every hour spent</li> <li>Profit margin ranges for each employee</li> <li>Invoicing is often detailed with hourly breakdowns</li> <li>Rates are updated annually to account for raises</li> </ul>	<ul style="list-style-type: none"> <li>Contract bills every hour spent X a negotiated multiplier</li> <li>Invoicing can be detailed with hourly breakdowns</li> <li>Rates are updated annually to account for raises</li> </ul>	<ul style="list-style-type: none"> <li>Contract set up with a profit based on total contract value</li> <li>Direct labor, direct expenses, fixed fee</li> <li>Invoicing is often very detailed with hourly breakdowns, equipment costs, overhead</li> <li>Fixed fee for profit is negotiated with the client</li> </ul>

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## PLANNING

**During the project pursuit**

- Determine contract type
- Estimate effort
- Develop preferred team

**During project negotiation**

- Defining the scope
- Determine the schedule
- Develop/update the preferred team

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## PLANNING

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### CASE STUDY:

Given a set of employees and rates, determine the more advantageous contract type for fee negotiation.

Review lump sum, hourly, cost+FF

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### Basic Scope: Trail Extension

A multi-use trail is to be extended across a main arterial route. The trail will need a plan and profile; it will cross a creek that will require local environmental permitting. The trail will cross the street requiring a signal.

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### Basic Schedule



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## PLANNING



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### Concept

- Enviro.: 3 days
- Trail: 5 days
- Bridge: 6 days
- Traffic: 4 days

### Preliminary

- Enviro.: 5 days
- Trail: 10 days
- Bridge: 10 days
- Traffic: 8 days

### Final

- Enviro.: 10 days
- Trail: 20 days
- Bridge: 30 days
- Traffic: 10 days

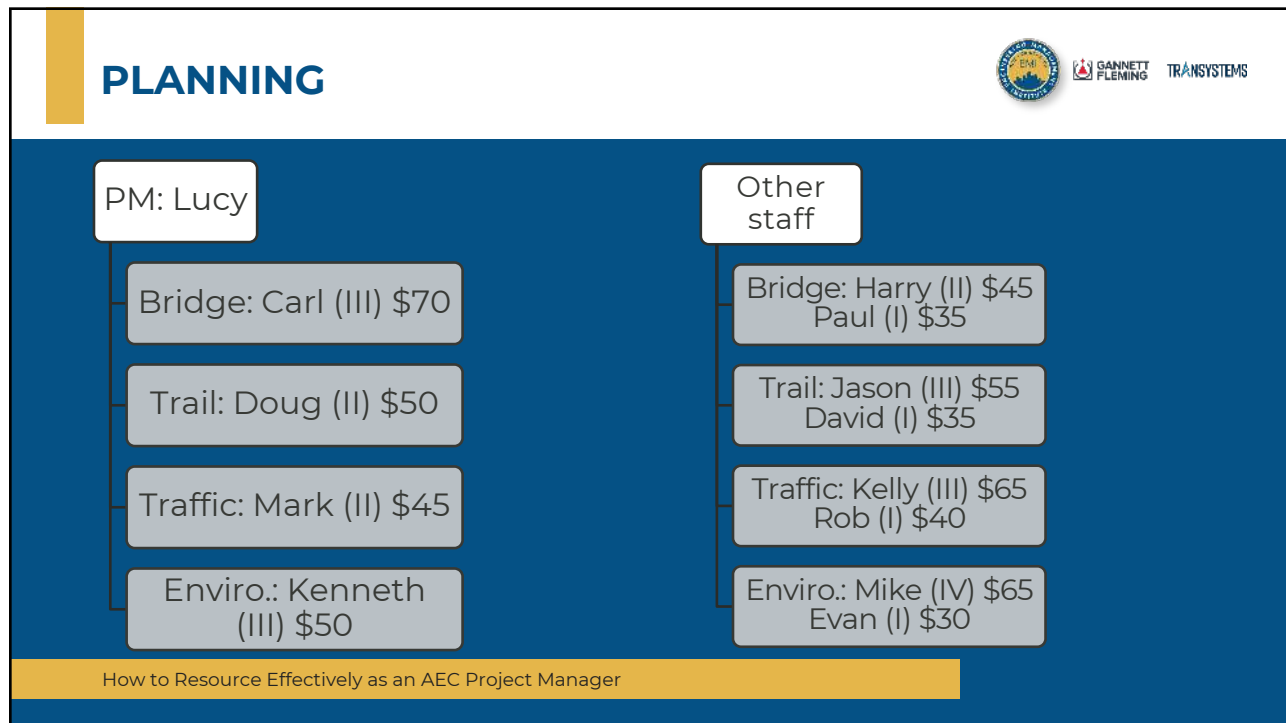
### Bid Docs

- Enviro.: 5 days
- Trail: 10 days
- Bridge: 10 days
- Traffic: 5 days

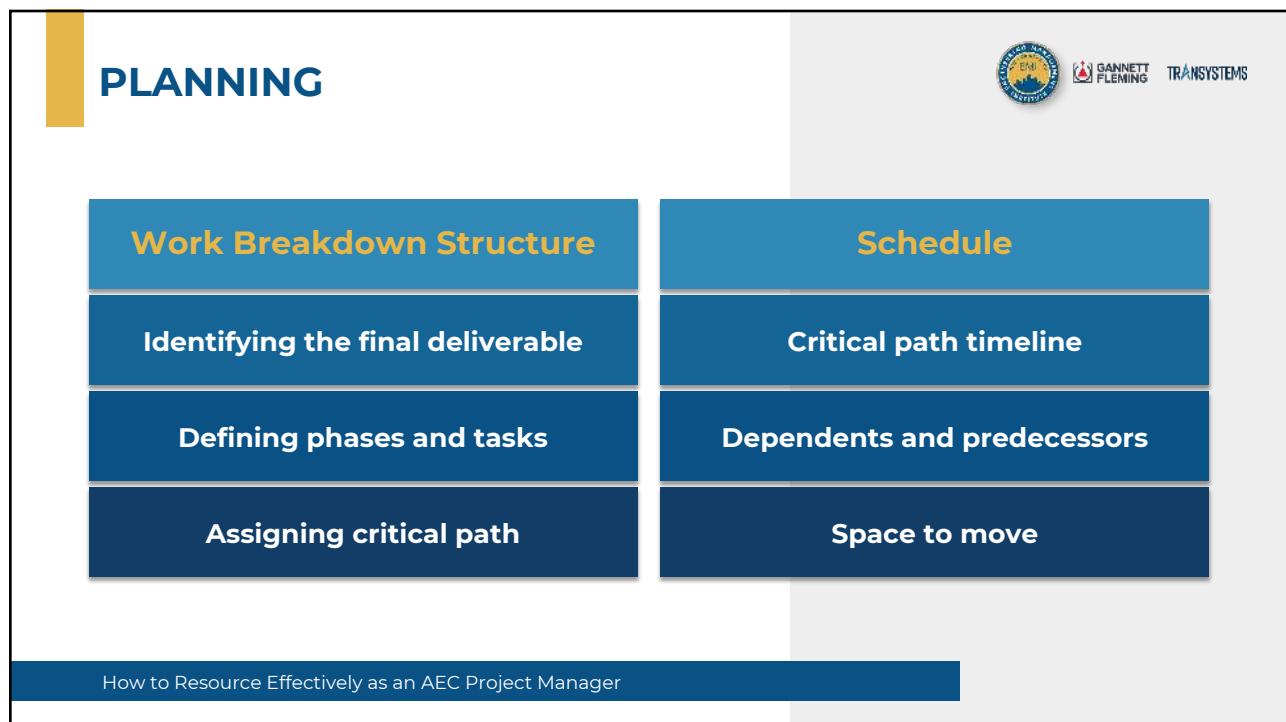
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## PLANNING



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### Assigning the team

- Task effort
- Individual effort
- E1 vs E4

### Project kick-off

- Communication
- Schedule
- Budget
- Quality control

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**Execution**

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## PROJECT EXECUTION

### GANTT CHARTS

- 1 Shows tasks and critical path
- 2 Based on hours show completion
- 3 How to manipulate

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## GANTT CHART EXAMPLE

### The Best Darn Project

#### Project Schedule

Description	Duration	Start	Finish	Feb-23	Mar-23	Apr-23	May- 23	Jun-23	Jul-23	Aug-23	Sep-23
Gather Field Data	10 days	2/12/23	2/25/23								
Preliminary Design	45 days	2/26/23	4/28/23								
Preliminary Cost Estimate	5 days	4/29/23	5/5/23								
QA/QC Review	6 days	5/6/23	5/13/23								
Client Review	10 days	5/14/23	5/27/23								
Final Design	30 days	5/28/23	7/8/23								
Specifications	30 days	5/28/23	7/8/23								
Final Cost Estimate	6 days	7/9/23	7/16/23								
QA/QC Review	6 days	7/19/23	7/26/23								
Client Review	10 days	7/27/23	8/9/23								
State Submittal	1 day	8/10/23	8/10/23								
Bidding	30 days	8/11/23	9/21/23								
Project Management	159 days	2/12/23	9/21/23								
Project Meetings	159 days	2/12/23	9/21/23								

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## PROJECT EXECUTION



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### CASE STUDY

The key staff has been pulled off to an emergency project. Based on milestone dates, the project must go on.

How to make adjustments in swapping out different employees with different pay rates and skill/pace.

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## PROJECT EXECUTION



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PM: Lucy

Bridge: Carl (III) \$70

Trail: Doug (II) \$50

Traffic: Mark (II) \$45

Enviro.: Kenneth (III) \$50

Other staff

Bridge: Harry (II) \$45  
Paul (I) \$35

Trail: Jason (III) \$55  
David (I) \$35

Traffic: Kelly (III) \$65  
Rob (I) \$40

Enviro.: Mike (IV) \$65  
Evan (I) \$30

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## PROJECT EXECUTION



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### Bi-weekly Staffing Meetings

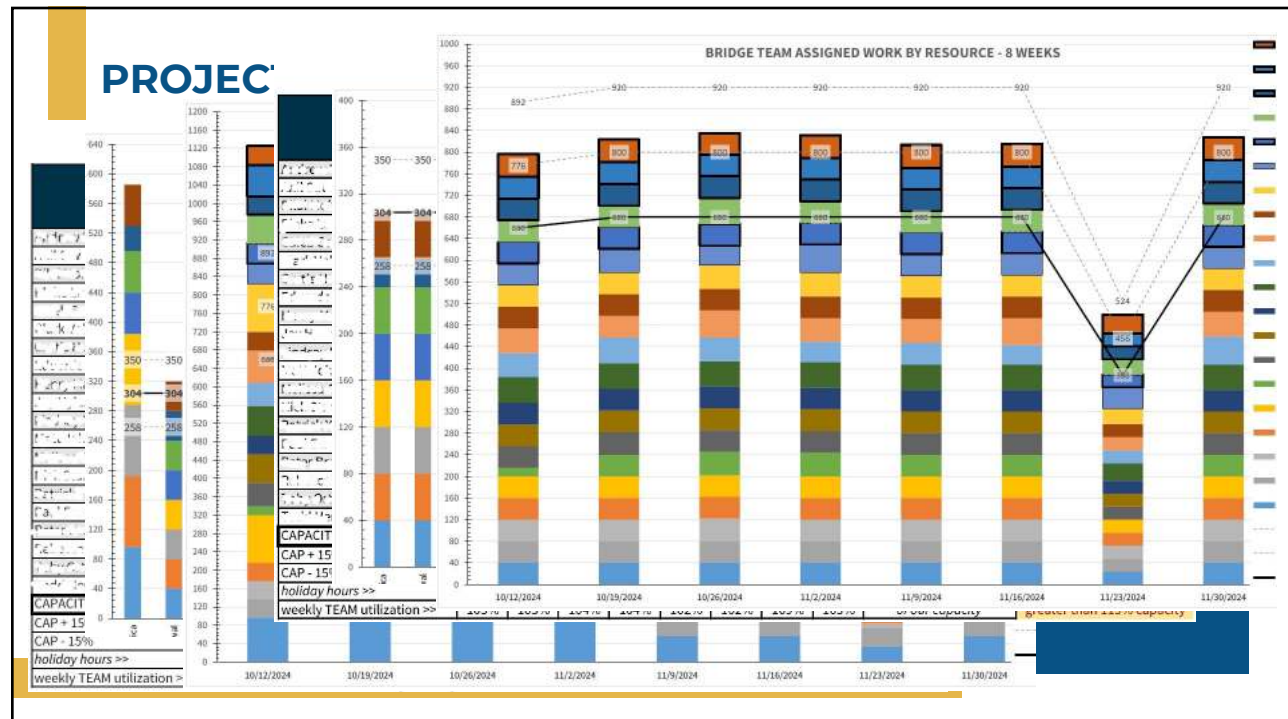
PM make adjustments to their project staffing plans, hours assigned, schedules

Download the data and create charts

Horse trading!

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## PROJECT EXECUTION



### Challenges

- Can't get the right people
- Can't get enough people
- Schedule demands
- Budget demands
- Other project demands
- EXAMPLES (employee cost too high, employee level too high, schedule)

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# Tracking



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## TRACKING

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### Earned Value Management

- Start from the beginning
- Plot the plan in an S-Curve ... this is the ideal
- Plot each week the contract value spent and contract scope complete
- Visual of the schedule and budget compared to the plan

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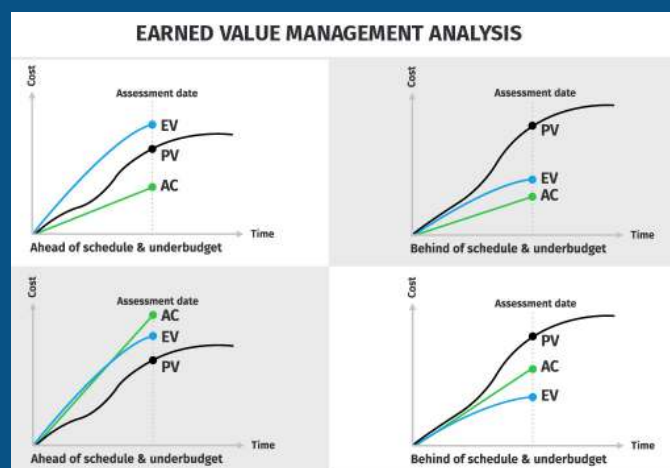
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## TRACKING

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- Planned Value
- Earned Value
- Actual Cost
- Schedule Variance
- Budget Variance



Source: cleopatraenterprise.com

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## TRACKING



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### Net Service Revenue

The total dollar amount gained from gross revenue after accounting for project related expenses, which are usually operation in nature.

Measures performance by calculating how much you earn for ever dollar spent on direct labor.

$$\text{NRM} = [\text{Contract Value} - \text{Subs} - \text{Expenses}] / \text{Labor Budget}$$

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## TRACKING



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### Advanced & Deferred Billing

#### Advanced

- Earned Revenue is less than the Billing
- Billing multiplier is higher than the budgeted multiplier
- Earning revenue slower than we're billing

#### Deferred

- Earned Revenue is greater than the Billing
- Billing multiplier is lower than the budgeted multiplier
- Earning revenue faster than we're billing

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**TRACKING**



- 1**  
Desired outcomes & variables
- 2**  
S-Curve ... earned value
- 3**  
Net Service Revenue
- 4**  
Proactive vs Reactive
- 5**  
Documentation

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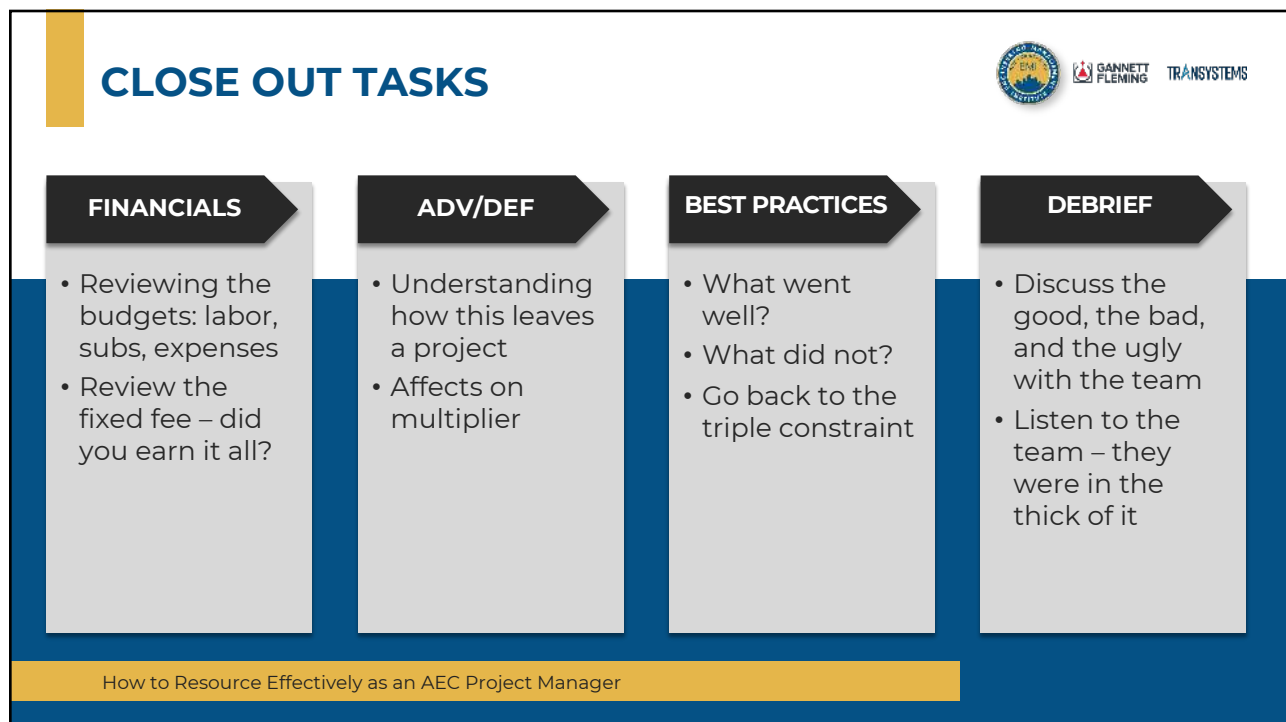
# Closing the Project



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# Questions?

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## Discussion:

- What would an effective project resourcing process look like for you?
- What challenges stand in the way of you achieving this?
- What tools or strategies can help you overcome those challenges and realize your goal?




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