



Week 8 Application Exercise - Wind-farm Construction



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Instructions:

You must **collaborate with your team** members on a **Microsoft Teams call** in your **group work channel**, then join the lecture live stream afterwards.

You can fill this in to request a demonstrator to join your meeting: <https://forms.office.com/r/6YRXXBGjG5>

The quiz will occur on **InteDashboard**, All Individual members need to be active and participating for the duration of the quiz on InteDashboard to receive the mark. All members will receive the same mark. Attendance is marked based on your MS Teams meeting.

Only one person - 'The Team Reporter', can answer questions, they must *SAVE* their answers then **SUBMIT TEST BEFORE the timer ends**. InteDashboard will tell you if you are the team reporter, you can choose to assign a different person in your team as reporter as well.



You are the team reporter



Assign others as reporter

IMPORTANT!

- Click '**SUBMIT TEST**' **BEFORE the timer ends**, otherwise your saved answers will not submit
- If your team misses submission before the timer ends, we cannot allow submission, **this will result in a 0 mark.**
- Click "**SAVE MY ANSWER**" after completing or changing your answer for every question & "**SUBMIT TEST**" after you're done with the quiz.
- Once you click **SUBMIT TEST**, **you cannot modify your answers.**
- We will be marking your attendance through Microsoft Teams meeting in your channel.

Please note - It is your team's responsibility to "Save" your answers AND hit the "Submit test" button BEFORE timer ends

Microsoft Forms

forms.office.com

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Case Study:

ConstructCo has won the contract to build a major windfarm consisting of 33 x 3MW wind turbines (i.e. 99MW total output) for PowerCo. You are ConstructCo's PM for this project. Schedule is critical to the customer due to PowerCo having signed

power supply agreements that contain damage payments if power supply is not delivered to the grid by a specified date. So ConstructCo agreed to include Damages for Delay penalties in their contract to win the project.

Major Contract Provisions:

Contract Price: \$200M

ConstructCo Contract Profit Margin: 10%

Schedule: 12 months

Damages for Delay: \$5M per month or part thereof - for delays beyond scheduled finish date (with a 2-week grace period where damages payable will be waived if delay is kept under 2 weeks)

Project Contingency Budget: ConstructCo Management have approved a contingency reserve of 5% of Contract Price available to the PM before requiring further approval.

Current Status: The project to date has run successfully to be ahead of time and under budget (see Appendix 1 attached for Progress Report at end Month 8). The project is currently at last day of Month 9. Your Accounts Dept has sent you Month 9 Earned Value project data for you to prepare an updated Project Progress Report for Month 9:

Earned Value = \$ 20M

Actual Costs = \$ 21M

Planned Value = \$ 21 M

As you start to prepare your Project Progress Report, the phone rings with bad news. The main electrical transformer has sustained major damage in a traffic accident whilst being transported to site from the port. Under the contract, all transport

is the responsibility of ConstructCo.

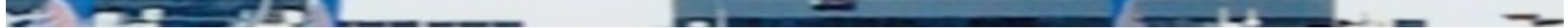


The transformer is on the critical path as it is a major component for transmitting power from the windfarm to the grid. Wind farm commissioning and testing cannot proceed without it. Given this, you determine that you must make a decision on remedial action today and include any attached net costs in this Month 9's accounts.

You determine that your options are as follows:

1. Ship the transformer back to original Supplier for repair – Cost \$2M; Schedule Delay: 6 Months
2. Order replacement transformer from Original Supplier – Cost \$4M; Schedule Delay: 4 Months
3. Order In-stock new transformer from Alternative Overseas Supplier and transport via Antonov Heavy Lift Air Transport: Cost \$13M; Schedule Delay: 1 week (i.e., 0.25 Months)
4. Repair Transformer at Local Workshop: Cost \$5M; Schedule Delay: 1 Month





Question 1:

Complete Earned Value Analysis for each option and indicate which option is likely to have a cost variance at completion within your allowable Project Contingency Budget.

a) Option (1)

b) Option (2)

c) Option (3)

d) Option (4)

Question 2:

Looking at the CPI value you have calculated for Option (2) at end of Month 9, it indicates:

a) Option (2) would put the project over budget

b) Option (2) would put the project under budget

c) Option (2) would put the project over budget at completion

d) Option (2) would put the project ahead of schedule

Question 3:

Looking at the SPI value you have calculated for Option (3) at end of Month 9, it indicates:

- a) The project would be ahead of schedule under Option 3
 - b) The project would be behind schedule under Option 3
 - c) The project will finish ahead of schedule under option 3
 - d) Nothing accurate regarding the effects of option (3) on schedule. You would need to assess a Tracking Gantt chart to assess likely schedule impacts of Option (3)
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Question 4:

Looking at your EV analysis for each option, which of the following parameters would you use to choose the course of action to deliver an optimum project outcome for ConstructCo of the options:

- a) The Option with highest CV
 - b) The Option with the highest SPI
 - c) The Option with the least negative Forecast Variance at Completion
 - d) The Option with the highest combined CPI + SPI
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ConstructCo's CEO advises you that, following pressure from PowerCo management, ConstructCo needs to weigh up the costs of losing its reputation for reliability with MineCo, given it has ongoing business with PowerCo valued at over \$50M per year; against the financial outcome on a single project. Before making a final decision in this regard, your CEO asks you to provide information on how much extra it will cost ConstructCo to execute the option with least delay over the option that gives the best result for the project. You advise back:

- a) -\$10,588,235
- b) -\$7,700,535
- c) -\$2,887,700
- d) -\$28,887,005

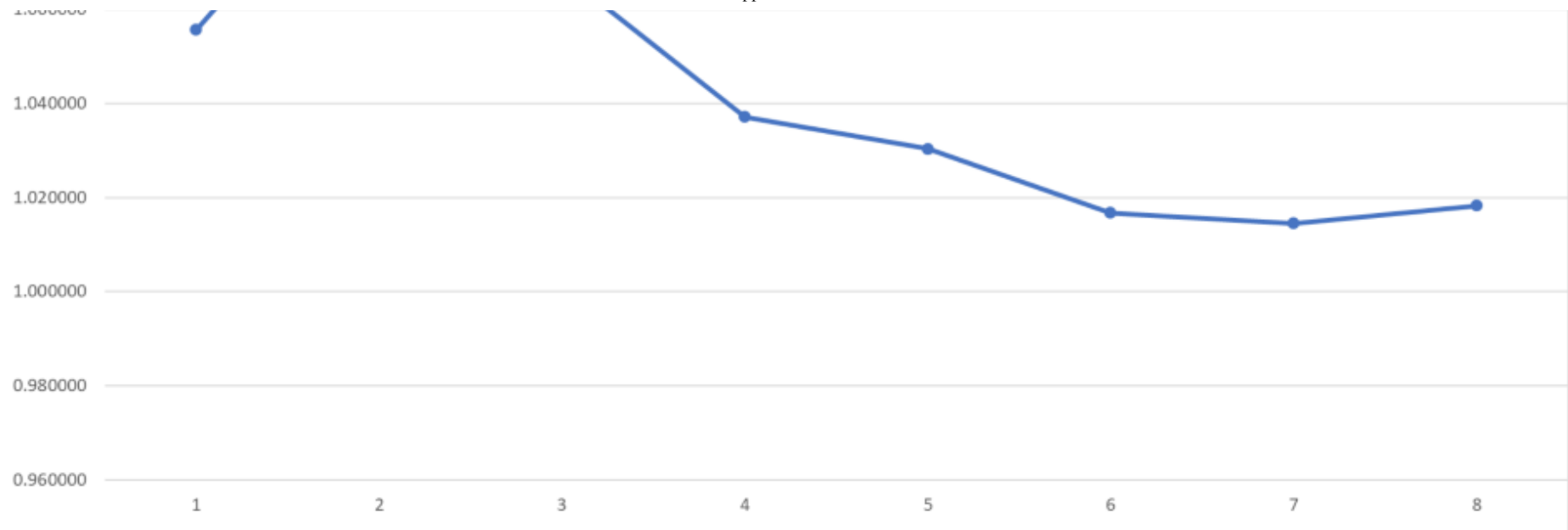
End of Questions

Appendix - Month 8 – EV Analysis Report

[illegible]

| MONTH | Authorised current budget (BAC) | Earned Value (EV) for Month | EV Cumulative | Actual Cost (AC) for month | Cummulative AC | Value (PV) (assessed) for month | PV (assessed) Cumulative | SV | CV | CPI at end of month | SPI at end of Month | Cost to Complete (ETC) | Forecast costs at Completion (EAC) | Forecast Cost Variance at Completion |
|-------|---------------------------------|-----------------------------|---------------|----------------------------|----------------|---------------------------------|--------------------------|--------------|-------------|---------------------|---------------------|------------------------|------------------------------------|--------------------------------------|
| 1 | \$180,000,000 | \$19,000,000 | \$19,000,000 | \$18,000,000 | \$18,000,000 | \$19,000,000 | \$19,000,000 | \$0 | \$1,000,000 | 1.055556 | 1.000000 | \$152,526,316 | \$170,526,316 | \$9,473,684 |
| 2 | \$180,000,000 | \$25,000,000 | \$44,000,000 | \$22,000,000 | \$40,000,000 | \$28,000,000 | \$47,000,000 | -\$3,000,000 | \$4,000,000 | 1.100000 | 0.936170 | \$123,636,364 | \$163,636,364 | \$16,363,636 |
| 3 | \$180,000,000 | \$19,000,000 | \$63,000,000 | \$19,000,000 | \$59,000,000 | \$19,000,000 | \$66,000,000 | -\$3,000,000 | \$4,000,000 | 1.067797 | 0.954545 | \$109,571,429 | \$168,571,429 | \$11,428,571 |
| 4 | \$180,000,000 | \$21,000,000 | \$84,000,000 | \$22,000,000 | \$81,000,000 | \$22,000,000 | \$88,000,000 | -\$4,000,000 | \$3,000,000 | 1.037037 | 0.954545 | \$92,571,429 | \$173,571,429 | \$6,428,571 |
| 5 | \$180,000,000 | \$18,000,000 | \$102,000,000 | \$18,000,000 | \$99,000,000 | \$18,000,000 | \$106,000,000 | -\$4,000,000 | \$3,000,000 | 1.030303 | 0.962264 | \$75,705,882 | \$174,705,882 | \$5,294,118 |
| 6 | \$180,000,000 | \$20,000,000 | \$122,000,000 | \$21,000,000 | \$120,000,000 | \$17,000,000 | \$123,000,000 | -\$1,000,000 | \$2,000,000 | 1.016667 | 0.991870 | \$57,049,180 | \$177,049,180 | \$2,950,820 |
| 7 | \$180,000,000 | \$18,000,000 | \$140,000,000 | \$18,000,000 | \$138,000,000 | \$18,000,000 | \$141,000,000 | -\$1,000,000 | \$2,000,000 | 1.014493 | 0.992908 | \$39,428,571 | \$177,428,571 | \$2,571,429 |
| 8 | \$180,000,000 | \$27,000,000 | \$167,000,000 | \$26,000,000 | \$164,000,000 | \$24,000,000 | \$165,000,000 | \$2,000,000 | \$3,000,000 | 1.018293 | 1.012121 | \$12,766,467 | \$176,766,467 | \$3,233,533 |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |





SPI

