OR-AS Operations Research Applications and Solutions	Case Name: **Sea Electricity**	Sector	Construction (Industrial)
	OR-AS Operations Research - Applications and Solutions www.or-as.be info@or-as.be	Baseline Schedule	Schedule with resources Schedule with costs
		Risk Analysis	Random simulation One of nine std. scenarios User defined distributions
Submitted by	Tom Valcke		
Date	December 20, 2012	Project Control	Automatic tracking Tracking based on user input
File Name	C2012-08 Sea Electricity.p2x		

1. Project description

Project authenticity

The Sea Electricity consortium plans to install twenty-four offshore wind turbines on the Thornton Bank in the North Sea, just off the Belgian coast.

The project consists of activity, resource and cost data that were created by the user.

2. Project properties

2.1. Baseline Schedule

General	
# Activities	437
Planned Duration (PD)	468 days*
Budget At Completion (BAC)	139,062,144 €
Renewable Resources	27
Consumable Resources	-

Network topology	
Serial/Parallel (SP)	8%
Activity Distribution (AD)	40%
Length of Arcs (LA)	0%
Topological Float (TF)	41%

* standard eight-hour working days

2.2. Risk Analysis

Use of all predefined distribution profiles: symmetrical, skewed (all to the right) and risk-free.

	Cost sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	6.4	7.1	1.8
CRI-rho	18.8	18.5	0.9
CRI-tau	36.7	36.5	1.0

	Resource sensitivity		
	avg [%]	std dev [%]	skew [-]
CRI-r	23.7	24.4	1.3
CRI-rho	26.7	24.0	1.0
CRI-tau	23.2	28.1	1.7

	Time sensitivity		
	avg [%]	std dev [%]	skew [-]
CI	9.0	27.3	3.0
SI	25.1	36.3	1.1
SSI	1.2	5.7	8.5
CRI-r	8.0	7.4	2.2
CRI-rho	12.3	13.5	2.0
CRI-tau	23.8	25.9	2.1

2.3. Project Control

2.3.1. Simulated forecasting accuracy

The accuracy of time and cost forecasting methods has been evaluated based on Monte Carlo simulation runs using the risk profiles described in section “2.2. Risk Analysis”. Based on these risk profiles, the Mean Absolute Percentage Error (MAPE) and Mean Percentage Error (MPE) has been calculated to evaluate the expected accuracy of the time and cost predictions, EAC(t) and EAC, respectively.

Simulated EAC(t) accuracy		
method - PF	MAPE [%]	MPE [%]
PV - 1	21.4	-20.3
PV - SPI	26.0	-12.4
PV - SCI	25.3	-11.5
ED - 1	27.5	-27.5
ED - SPI	26.0	-12.4
ED - SCI	25.8	-12.0
ES - 1	19.4	-19.4
ES - SPI(t)	19.0	0.2
ES - SCI(t)	18.9	0.4

Simulated EAC accuracy		
method (PF)	MAPE [%]	MPE [%]
1	0.7	-0.7
CPI	0.6	-0.6
SPI	5.6	5.3
SPI(t)	7.0	7.0
SCI	5.6	5.4
SCI(t)	7.1	7.1
0.8 CPI + 0.2 SPI	2.0	1.5
0.8 CPI + 0.2 SPI(t)	2.3	2.0

According to the MAPE values[1] the best performance for time forecasting can be expected from the Earned Schedule methods. For cost forecasting the unweighted and CPI-weighted methods should yield the best results.

2.3.2. Tracking description

The user has not performed any project control and therefore no tracking periods have been defined. Tracking periods can now be generated automatically by ProTrack or by manually inputting tracking data period by period.

[1] The MAPE gives the best indication for the forecast accuracy (the lower the MAPE, the more accurate the method) since all deviations from the targeted real duration (real cost) are cumulated, whereas for the MPE underestimates can be compensated by overestimates and vice versa, possibly leading to an overly positive evaluation of a certain method. However, the MPE can provide useful information about the nature of the deviations, i.e. does the method rather underestimate or overestimate the real duration (real cost)?