



College of Performance Management

EVM World 2012 Conference

PS-13: Commercial Sector EVM Implementation in Europe at Fabricom

Case Study

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EVM Europe Association

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Fabricom, a GDF Suez Company



GDF SUEZ



GDF SUEZ

ENERGY SERVICES



FABRICOM
GDF SUEZ

- 5.444 active people on the pay-roll
- 645 new appointments in 2011
- 860 M€ Turn Over 2011

...active in most of today's key sectors



ENERGY

High Voltage
Distribution networks
Power Plants
Nuclear
Renewable
Waste to Energy
Maintenance Services



INDUSTRY

E&I
P&M
Process Solutions
Maintenance &
Specialized Services



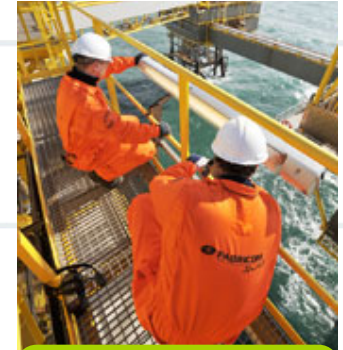
INFRA STRUCTURE

High Voltage
Distribution networks
Underground
Rails, Roads,
Waterways, Ports,
Airports
Environment
Maintenance services



TERTIARY

Electricity
Communications &
Networks Integration
Data Centers
Security
Distribution
Maintenance Services



OIL, GAS & POWER

E&I
P&M
Onshore & Offshore
Power Plants
Tanks
Bending & Prefab
Maintenance Services

Agenda



- **Background**
- Introducing EVM Principles @ Fabricom
- Current Developments
- Future Developments

Fabricom Project Management School

- End 2007: Launch of “Fabricom’s P.M. School”
 - Called “ION”
 - Aim: to define a project management training program
- Analysing project portfolio
 - Need for 2 different training programs

ION	Portfolio	Small / Medium Sized Projects	Large / Complex Projects
Avg. Nrs. Of Projects / Year	500	450	50
	100%	90%	10%
Contribution to Turn Over	100%	25%	75%

Training Programs

Training Program		
Type	Small / Medium Projects National Alignment	Large / Complex Projects International Alignment
Reference	Basic P.M. 6 Days / 2 Modules	Advanced P.M. 11 Days / 3 Modules
Language	Dutch / French	English
EVM Related	Basic EVM	Advanced EVM
ION Certificates	M1 Hard Skills: 465 M2 Soft Skills: 499	M1 PM Awareness: 121 M2 Triple Constraint: 270 M3 Advanced PM: 252

EVM Roadmap

- Step 1: Introducing EVM
 - Focus on cost control
 - Status: implemented
- Step 2: Current Developments
 - Focus on time control / Earned Schedule
 - Status: being implemented on large / complex projects
- Step 3: Future Developments
 - Advanced applications
 - Status: ad hoc applications

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Extract Procedure Fabricom

3.8 INGAVE ETC (ESTIMATE TO COMPLETE).

Op geregelde tijdstippen moet de Project Manager een inschatting maken van de kosten en opbrengsten (nog te factureren) die nog nodig zijn om het project af te werken. Deze inschattingen noemt men de ETC waarden (Estimate to Complete).



Het is heel belangrijk dat de Project Manager zo juist mogelijke schattingen geeft van de ETC waarden, omdat deze een rechtstreekse invloed hebben op het resultaat.

Uitgaande van de FES waarden wordt namelijk per project het resultaat berekend dat rechtstreeks in de Profit & Loss rekeningen wordt opgenomen.

Daarom worden bij elke ETC oefening de resultaten besproken door de Business Controller, de Project Manager en zijn operationele hiërarchie.

- P.M. provides on a regular way a ETC
- ETC has to be:
 - “As good as possible” (direct influence on Profit / loss reports)
 - Periodically discussed with B.C. / P.M. / Steering Committee

How we implement this

						
		P.M.	B.C.	P.M.	B.C.	Director
Input	EV	% Compl		X		
	PV	X		X		
Status	AC		X	X	X	
	ETC	X		X		
Performance	xPI		X	X	X	
Forecast	EAC		X	X	X	
	Evaluate	X	X	X	X	X
Review		Bi Monthly		Monthly		

Review: use of evaluation rules

- Once a contract is more than 15-20% complete, the final overrun will be worse than the present overrun *(Christensen/Wilson 1992)*

$$CV_{\text{final}} - CV_{20\%} < 0$$

- Once a contract is over 20% complete, the CPI does not change by more than 10%, and in most cases it worsens *(Christensen/Heise 1993)*

$$| CPI_{\text{final}} - CPI_{20\%} | \leq 0,10$$

- Calculate a range of outcomes:

CPI-based EAC is a floor to final cost *(Christensen, 1996)*

SCI-based EAC is often the most accurate estimate *(Fleming & Koppelman 2000, Humphreys & Associates 2002)*

$$EAC_{\text{cpi}} < EAC < EAC_{\text{SCI}}$$

Review: experiences

- Once a contract is more than 15-20% complete, the final overrun will be worse than the present overrun

ION Give attention to detailed planning in early stages
Strict planning / control in the early stages is needed

- Once a contract is over 20% complete, the CPI does not change by more than 10%, and in most cases it worsens

ION CPI shows more variability during early & middle stage
Compare TCPI & CPI

- Calculate a range of outcomes: CPI-based EAC is a floor to final cost, SCI-based EAC is often the most accurate estimate

ION CPI -EAC is a lower bound, SPI - EAC is an upper bound
For critical projects, a cost simulation exercise is done

Real Life Application – Status Month 5

PROJECT INFO @ M5			
Budget at Completion	BAC		2.875
Actual Cost	AC	from B.C.	1.562
Progress	% Compl	from PM	51%
Estimate to Complete	ETC	from PM	1.458
STATUS			
EV		EV = %Compl x BAC	1.466
% SPENT		% Spent = AC / BAC	54%
PERFORMANCE			
Cost Variance	CV	CV = EV - AC	-96
Cost Performance Index	CPI	CPI = EV / AC	0,94
FORECAST			
Estimate at Completion	EAC	EAC = AC + ETC	3.020

To be analysed

Real Life Application – Evaluate EAC

FORECAST EVALUATION @ M5

Iteration 1: EAC = 3.020 (given by PM)

Rule 1:	VAC > CV	overrun increases from 96 --> 145	ok
Rule 2:	TCPI < CPI	TCPI = 0,97 > CPI = 0,94	not ok
Rule 3:	EACcpi < EACpm < EACsci	3.020 < 3.063 < 3.440	not ok

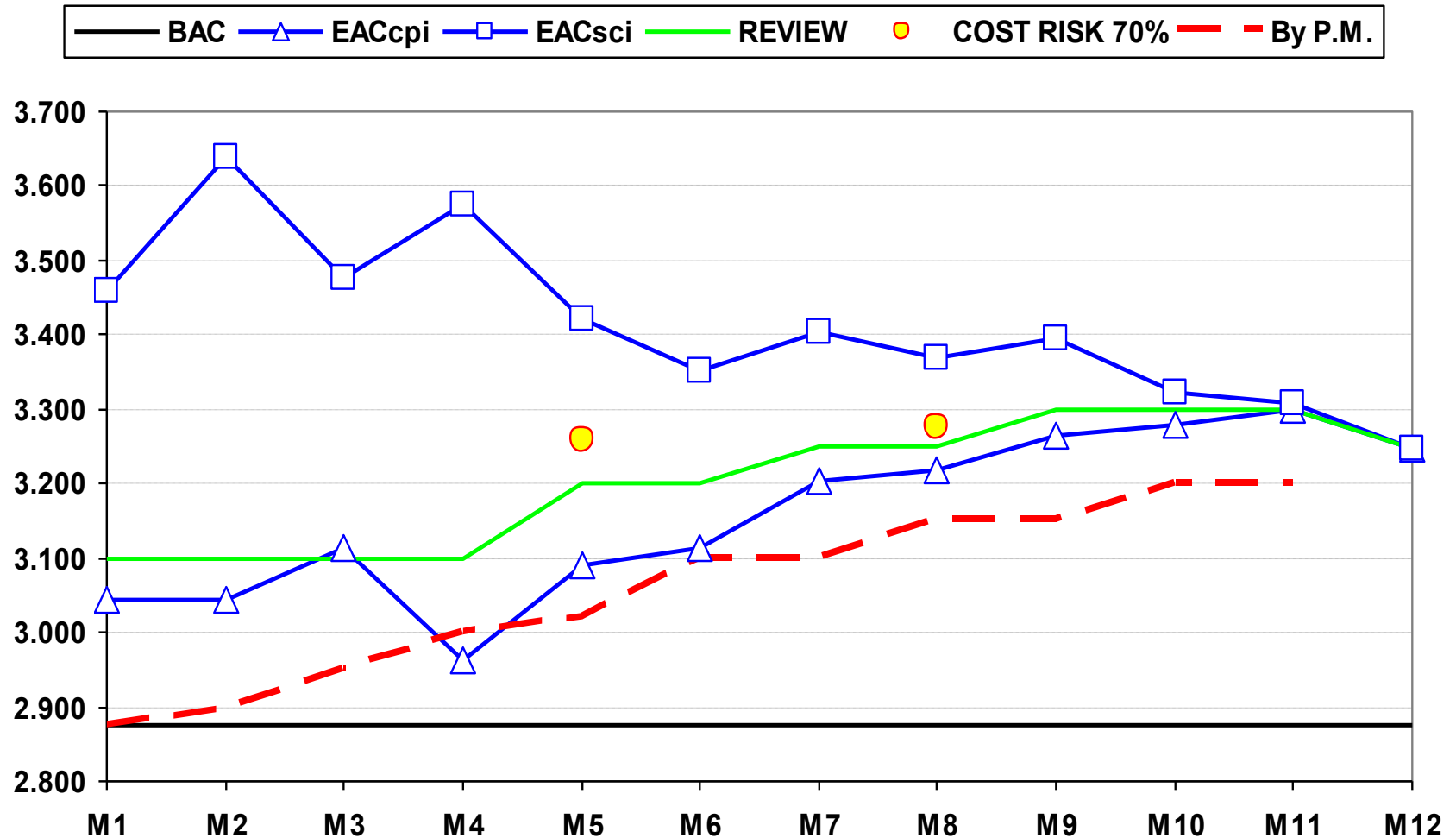
Iteration 2: EAC = 3.150 (done by B.C.) (TFA = Total Funds Available = BAC + MR)

Rule 1:	VAC > CV	overrun increases from 96 --> 275	ok
Rule 2:	TCPI < CPI	TCPI = 0,89 < CPI = 0,94	ok but...
Rule 3:	EACcpi < EACpm < EACsci	3.063 < 3.150 < 3.440	ok

Iteration 3: EAC = 3.200 (decided during review)

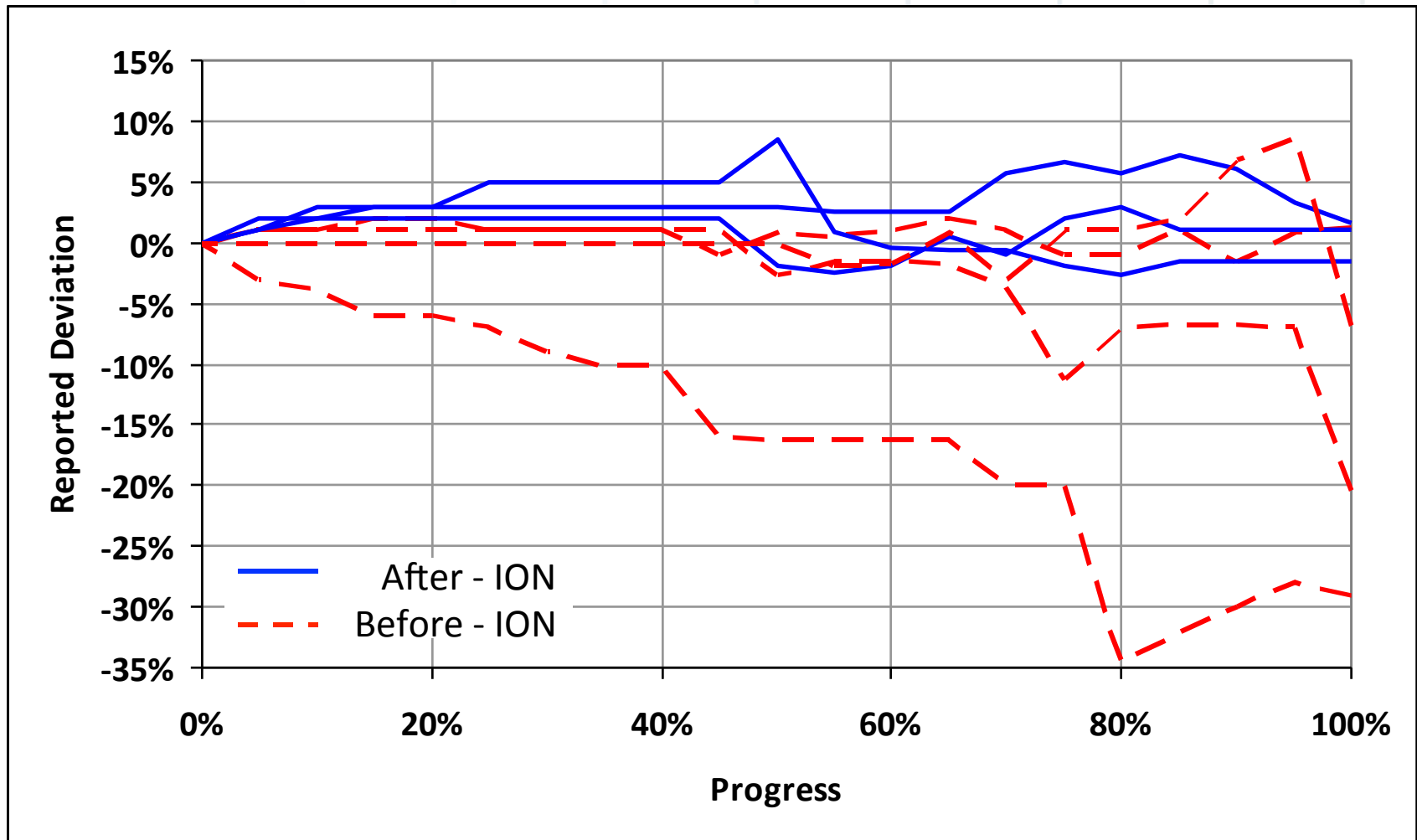
Rule 1:	VAC > CV	overrun increases from 96 --> 325	ok
Rule 2:	TCPI < CPI	TCPI = 0,86 < CPI = 0,94	ok
Rule 3:	EACcpi < EACpm < EACsci	3.063 < 3.200 < 3.440	ok

Real Life Application



- P.M.'s tend to forecast too optimistic!

First Implementation Results



Experiences

- ION trainings program increased project management maturity level
- Findings on project level:
 - Cost forecasts are more reliable and stable
 - Early visibility of potential cost overruns
 - P.M.'s tend to estimate too optimistic
- Findings on portfolio level:
 - Cashflow profile has been reversed into positive (over 3 years)

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The Need for ES

- Costs are better managed...and thus under control
- But Project delays are becoming an issue
- Making a sound schedule is a difficult job
 - In most cases there is no dedicated “scheduler”
 - Updating schedules is very difficult
- So we are currently implementing Earned Schedule for large / complex projects

connectION
TRAINING PROGRAMME

Experiences

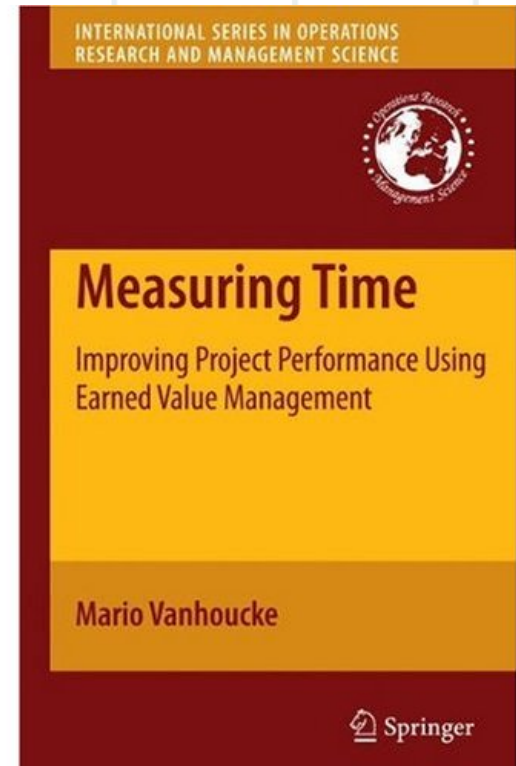
Chapter 3

- Describes 3 real life cases
- Discusses the use of ES versus EV methods

ES indicators / forecasts are reliable

A healthy baseline is needed

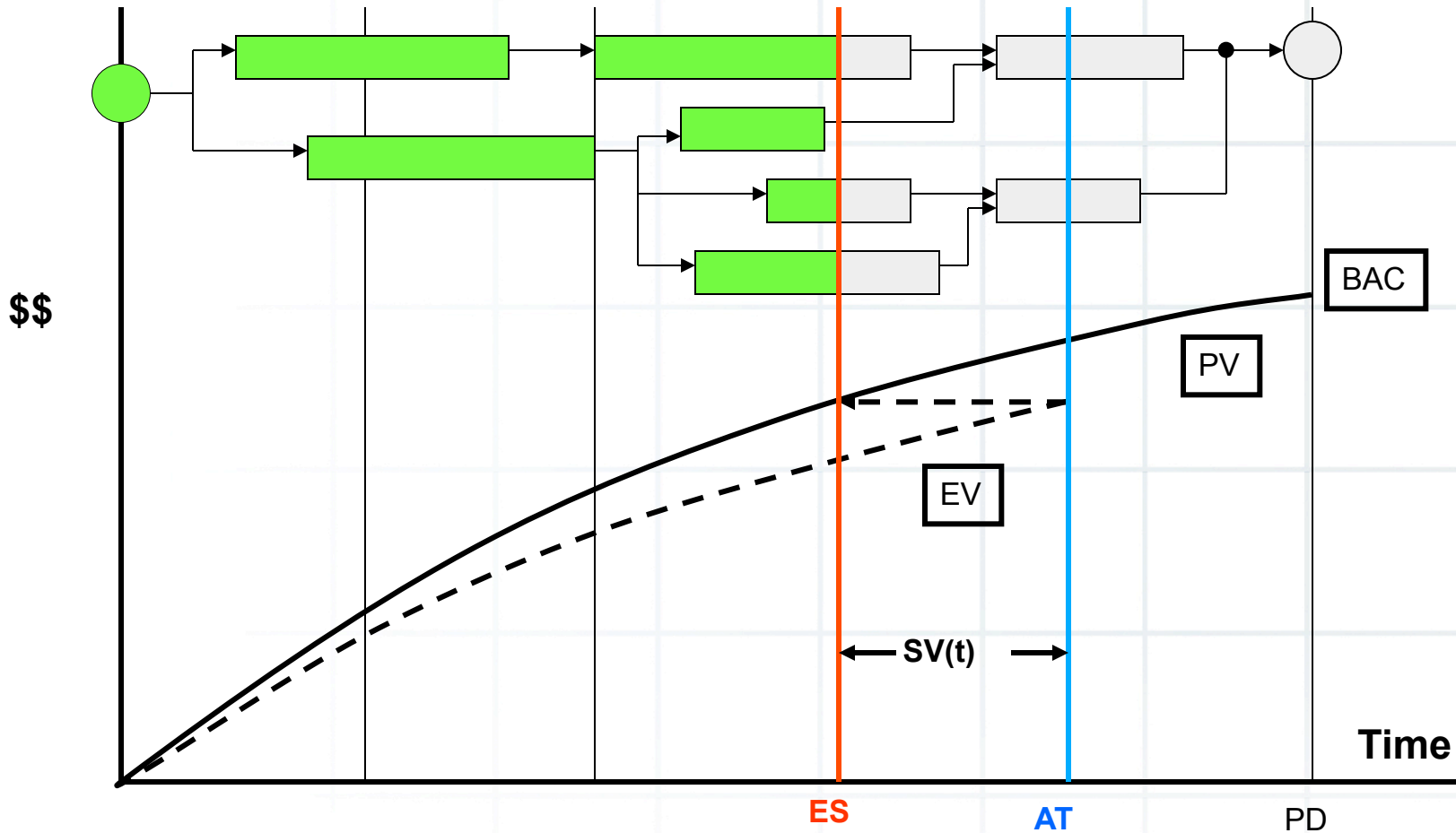
ES to be used in conjunction with a schedule



Agenda

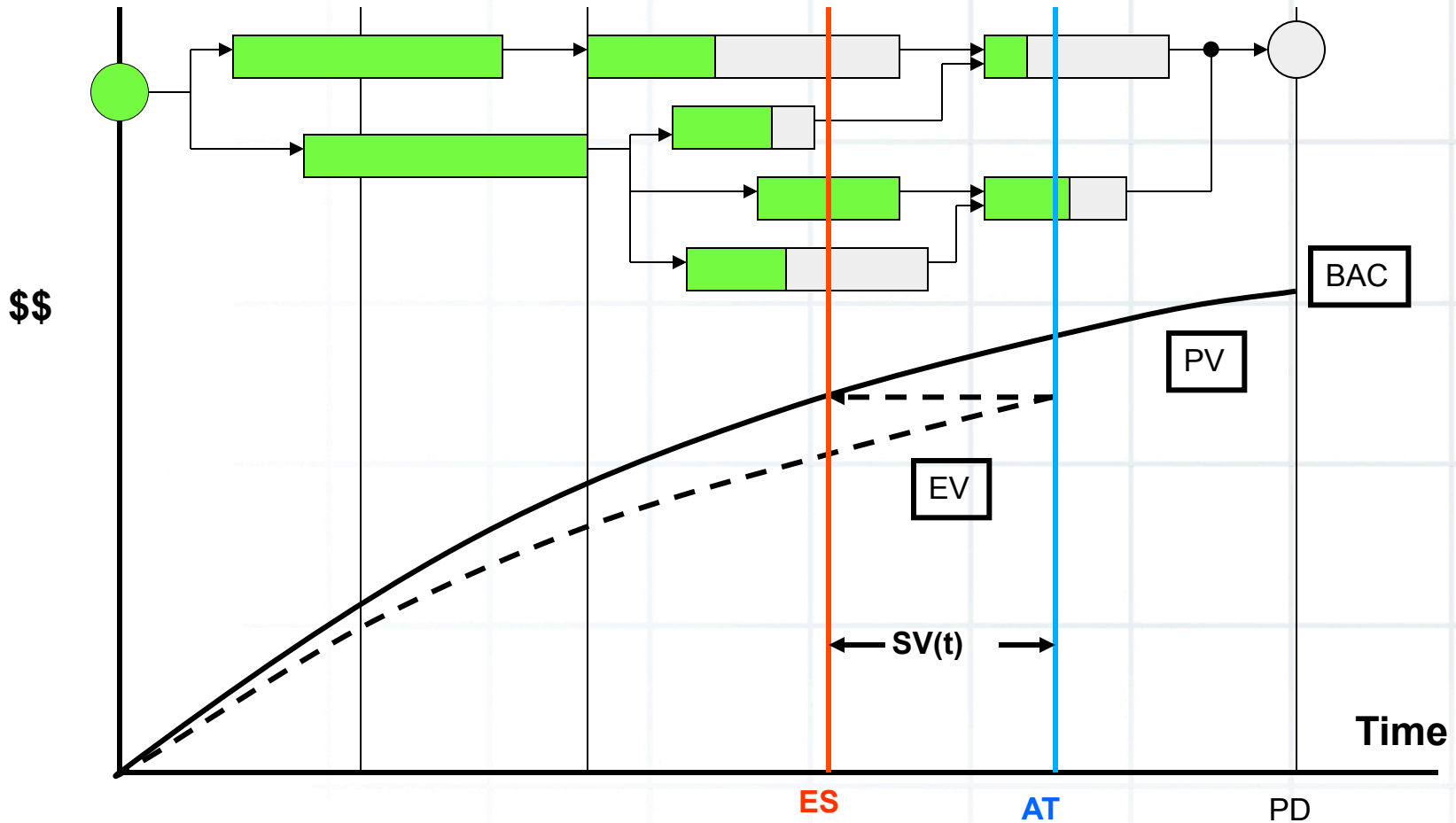
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Earned Schedule



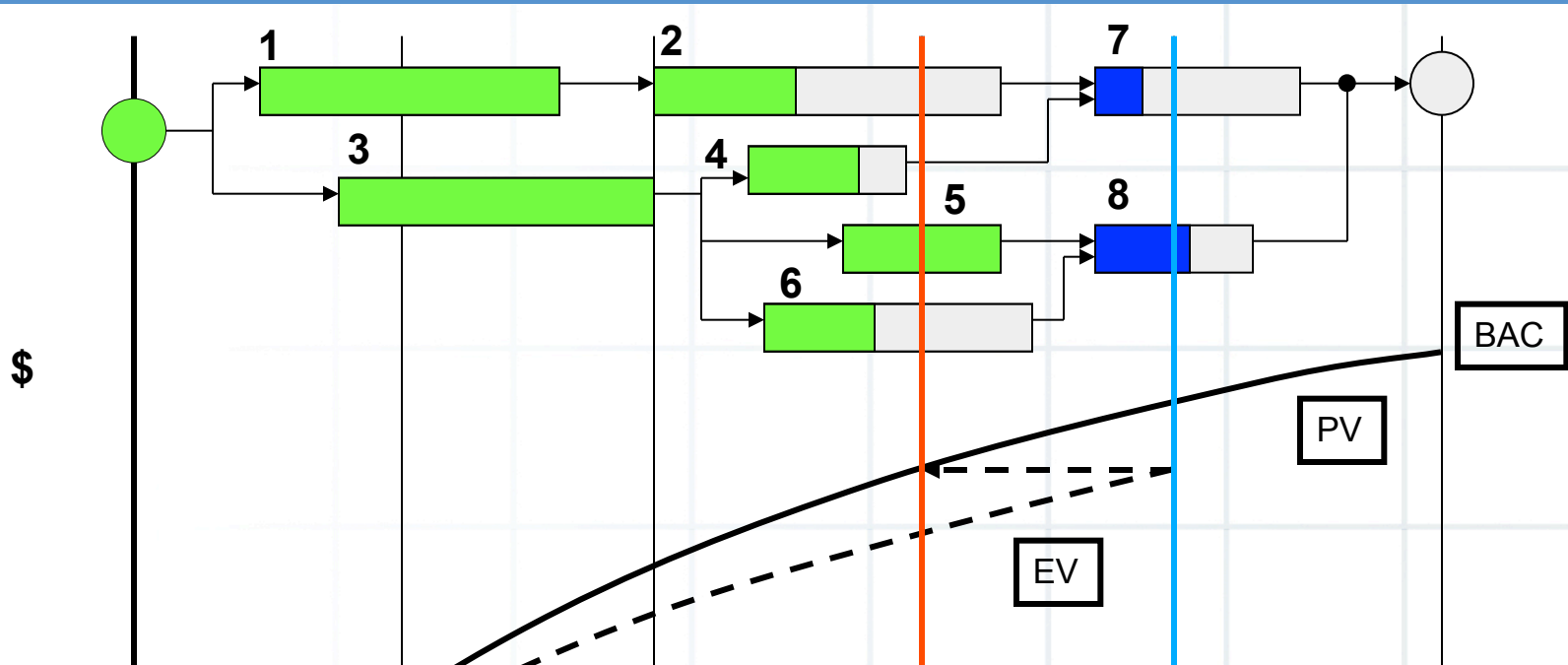
For a claimed amount of EV at a status point AT, the amount of work which should be accomplished is identified by PV at ES

What really happens....



It is more likely performance is not synchronous with the schedule, the EV has a different distribution

ES Provides Schedule Information

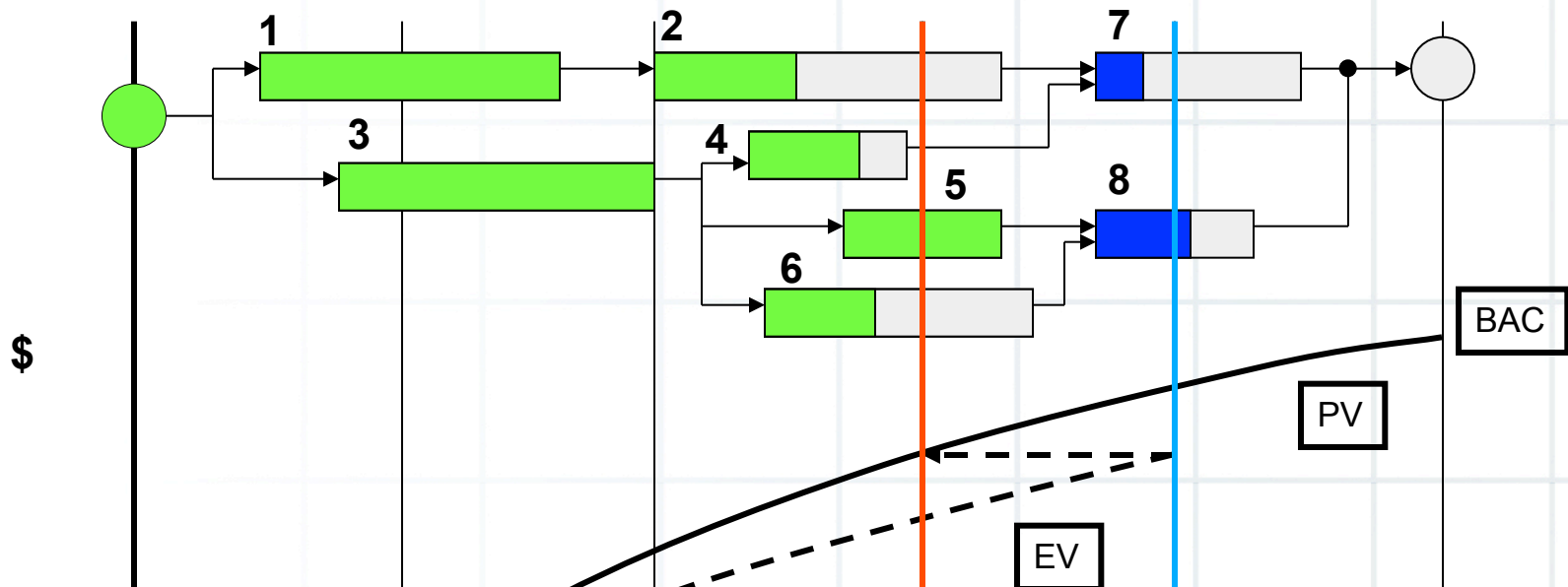


ES allows for detecting tasks done “out of schedule”:

Tasks behind: indicates the possibility of constraints (ex. Tasks 2, 4, 6)

Tasks ahead: indicates the possibility of future rework (ex. 7,8)

Schedule Adherence



Schedule adherence (P-Factor):

$$\text{P-Factor} = (\text{EV according to plan}) / (\text{Total Claimed EV})$$

A measure how well the scheduling process is being followed

Value between 0 (out of sequence) and 1 (according to schedule)

Effective Earned Value

- **$EV = EV(p) + EV(r)$**

$$EV(p) = P \times EV$$

portion of EV according to plan

$$EV(r) = (1 - P) \times EV$$

portion of EV not to plan, at risk

high likely a source of rework

- **$EV(r) = EV(r1) + EV(r2)$**

$EV(r1)$ = usable portion of $EV(r)$

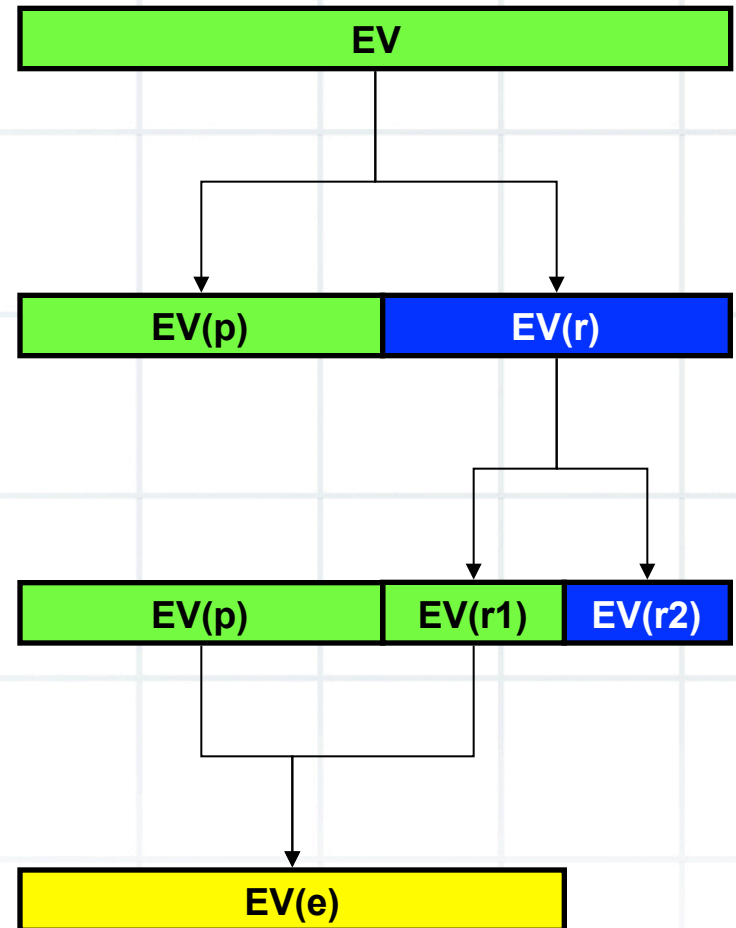
$EV(r2)$ = unusable portion of $EV(r)$

- **$EV(e) = \text{Effective Earned Value}$**

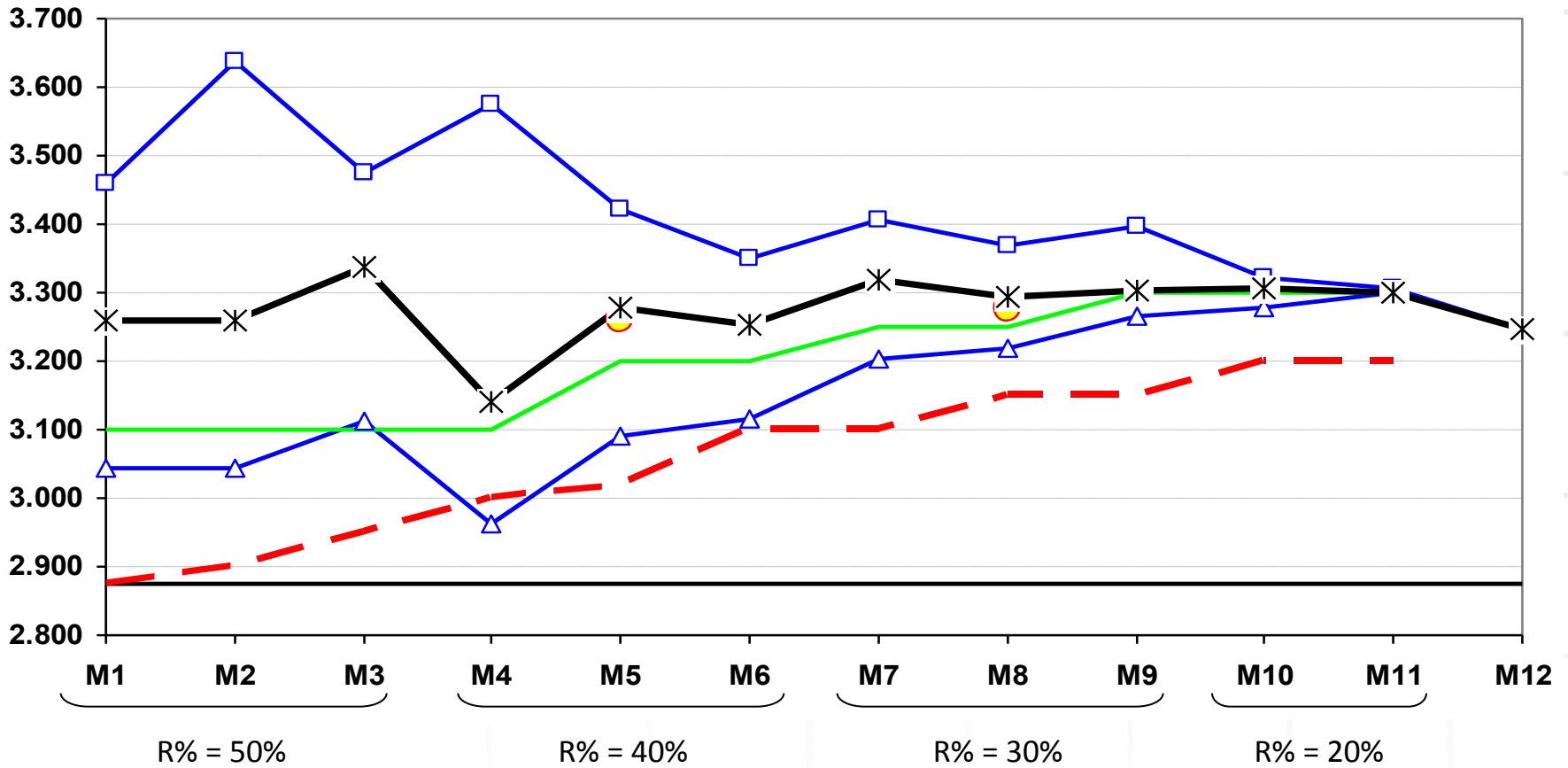
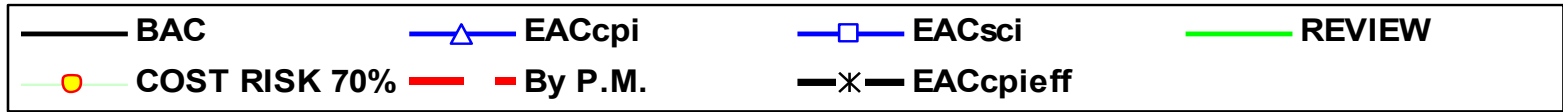
$$EV(e) = EV(p) + EV(r1)$$

$$= f(P, \% R) \times EV$$

$$= a \times EV$$

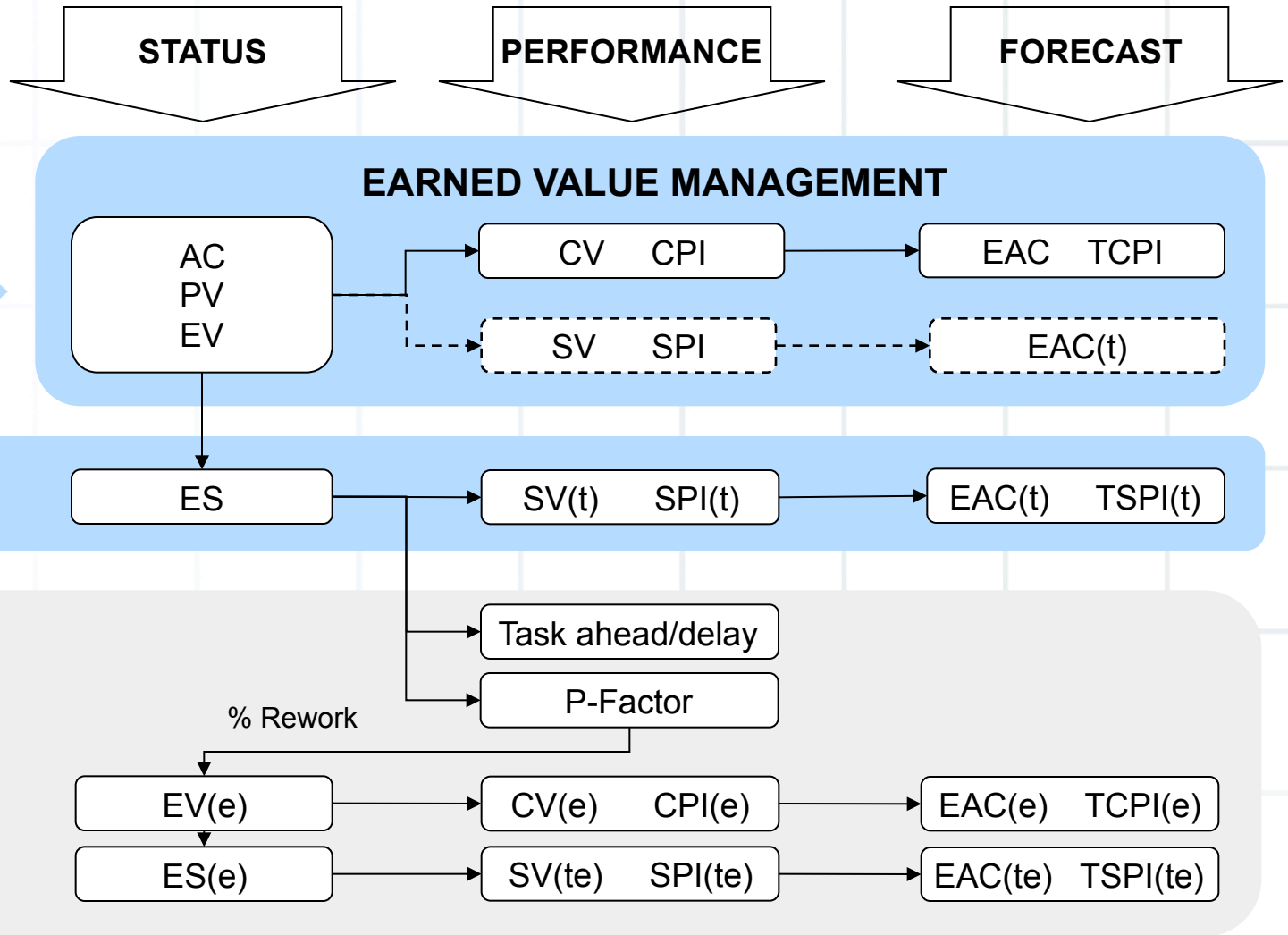


Further Extensions - Application



As progress advances → more information available → %Rework decreases

EV/ES Model



Final Notes

- EVM / ES:
 - Training / assistance is needed → requires an investment
 - R.O.I. :
 - More accurate and reliable cost / duration forecasts
 - Better cashflow management
 - Project orientated organisation → may be makes it easier
- ES Extensions:
 - Use of P-Factor → leads to more accurate / stable EAC predictions
 - Looks very promising

QUESTIONS?