PMGlobal Project Governance & Controls Symposium
6-7 May 2014
Canberra
Platinum Sponsor
UNSW AUSTRALIA
Canberra

COMMERCIAL SECTOR EVM IMPLEMENTATION IN EUROPE

CASE STUDY

Ing. Stephan Vandevoorde
Manager Airport Systems, CofelyFabricom
Director, EVM Europe Association

Cofely Fabricom, a GDF SUEZ Company

GDF SUEZ

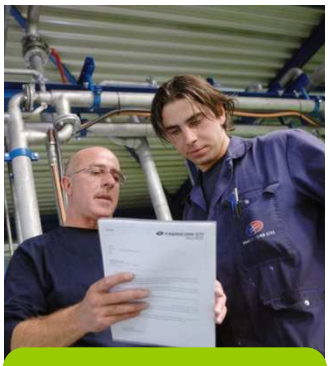
GDF SUEZ | ENERGY SERVICES

COFELY FABRICOM
GDF SUEZ

….active in most of today's key sectors

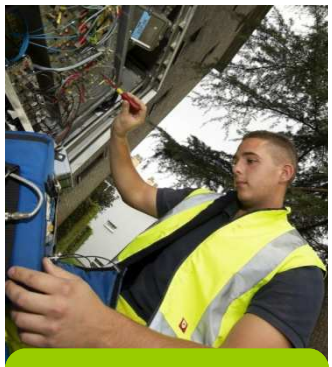
ENERGY

- 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

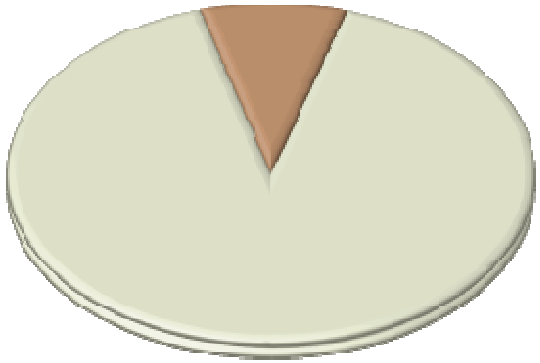
TERTIARY

- Electricity
- Communications & Networks Integration
- Data Centers
- Security
- Distribution
- Maintenance Services

OIL, GAS & POWER

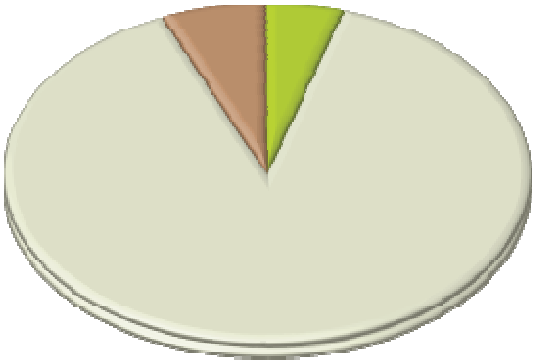
- E&I
- P&M
- Onshore & Offshore
- Power Plants
- Tanks
- Bending & Prefab
- Maintenance Services

… 2013 key figures



Turnover 894 MEUR

- Belgian Operations 88%
- International Operations 12%



Workforce 5160

- Belgian Operations 4558
- International Operations 352
- Central Services 250

Background

- 2002 – 2009: 3 major re-organisations

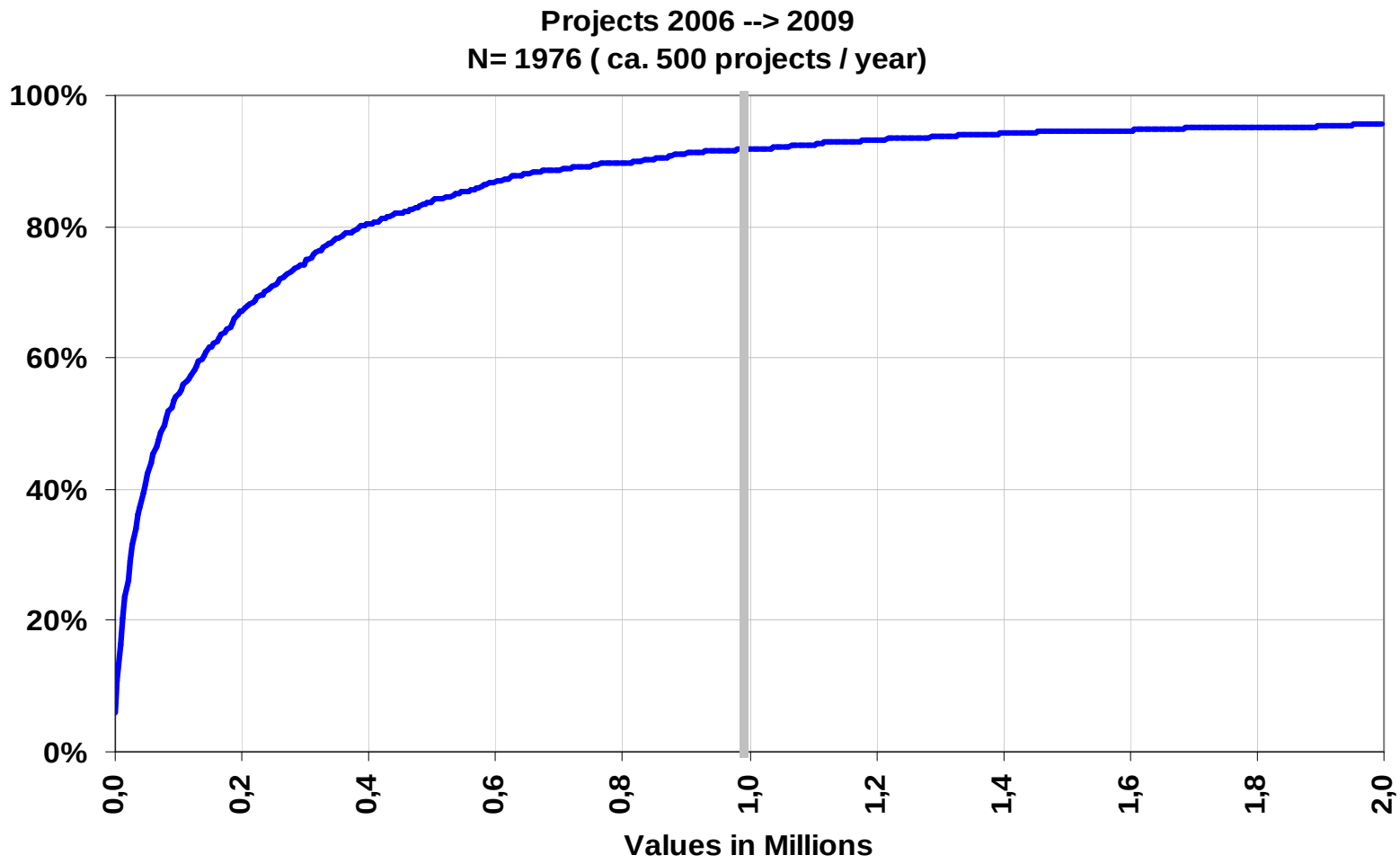
  - lot of people movements
  - loss of maturity
  - “troubled” projects

Background

- How to define a project management training program?
  - Launch of a working group

  - Analysing project portfolio

Project landscape



Project landscape

	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%

ION	fusION TRAINING PROGRAMME	Small & Medium Sized Projects
	connectION TRAINING PROGRAMME	Large & Complex Projects

ION Training Program

Training Program	fusION TRAINING PROGRAMME	connectION TRAINING PROGRAMME
Type	Small / Medium Projects National Allignment	Large / Complex Projects International Allignment
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 Principles

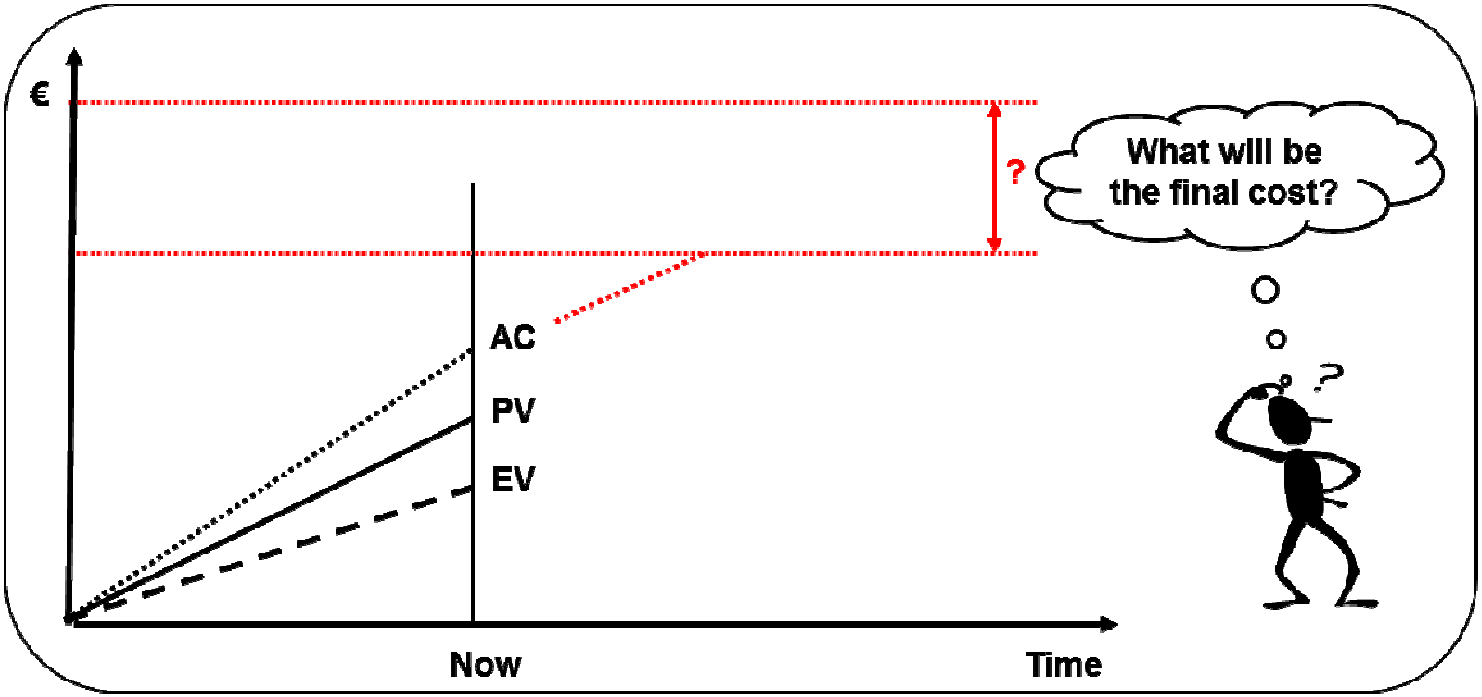
  Focus on cost control
  Status: implemented

- Step 2: Current Developments

  Focus on time control / Earned Schedule
  Status: being implemented on selected large / complex projects

  Advanced applications: p-factor
  Status: ad hoc applications

Step 1: Cost Focus - Implemented



Extract ETC procedure

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

		fusION TRAINING PROGRAMME		connectION TRAINING PROGRAMME		
		P.M.	B.C.	P.M.	B.C.	Director
Input Status	EV	% Compl		X		
	PV	X		X		
	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		

Based on D.O.D. evaluation rules

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

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

- 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)

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

- 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)

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

Our experiences

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

Give attention to deatiled 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 (Christensen/Heise 1993)

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

- Calculate a range of outcomes:

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

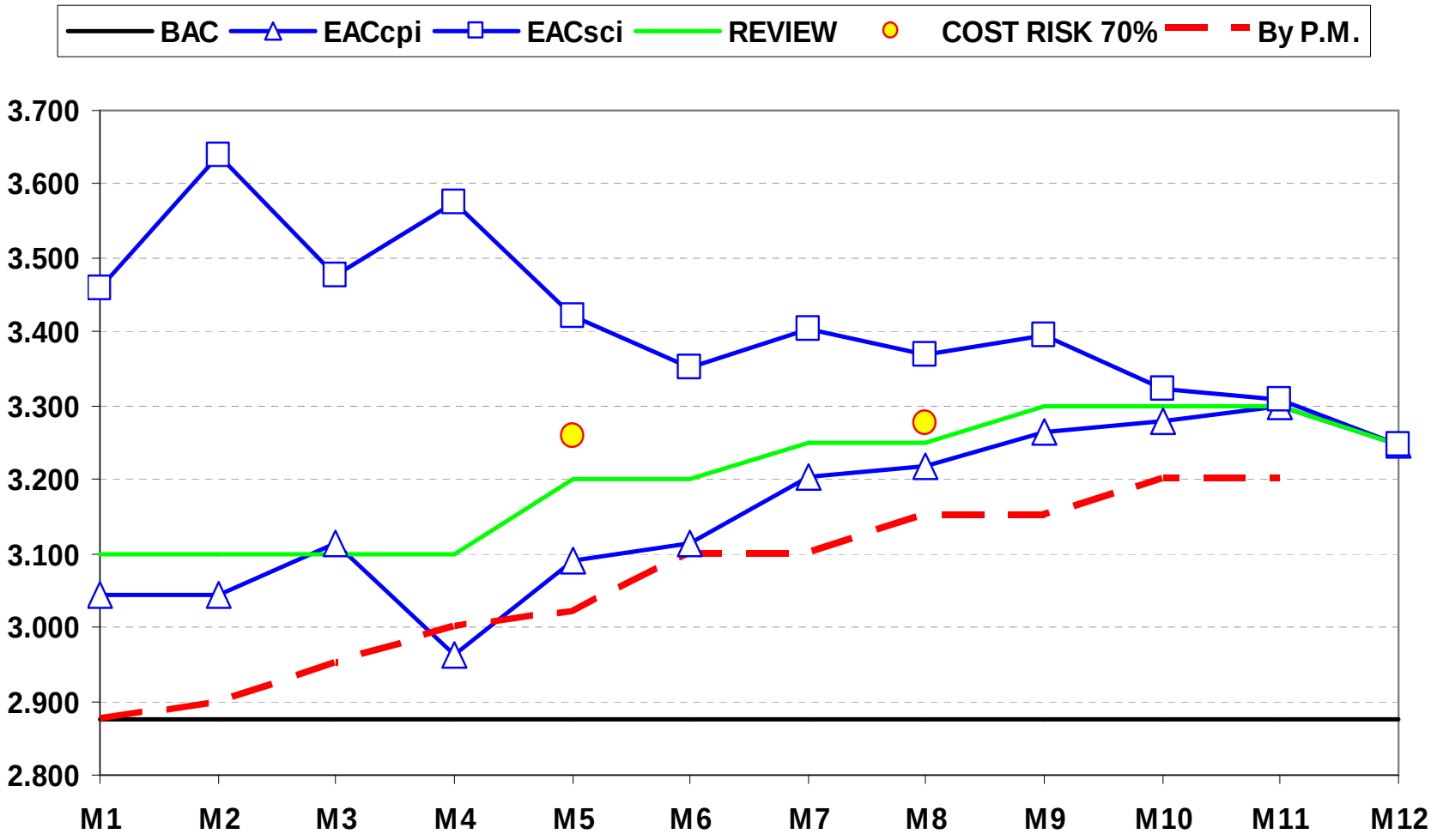
Real life application – evaluation month 5

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**

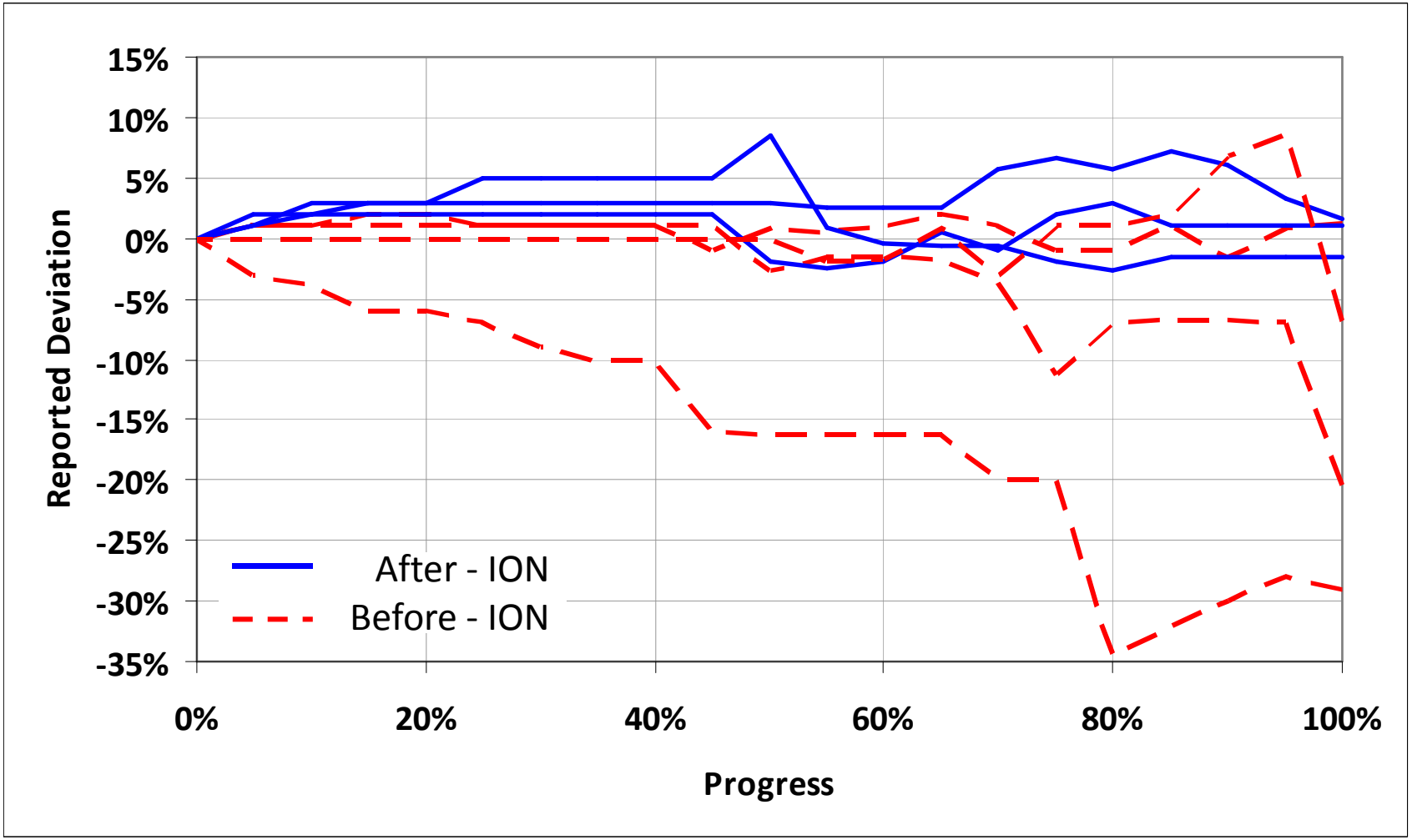
Iteration 2: EAC = 3.150 (done by B.C.) (TFA = Total Funds Available = BAC + MR)			
Rule 1:	VAC > CV	overrun increases from 96 --> 275	ok
Rule 2:	TCPI < CPI	**TCPI = 0,89** < CPI = 0,94	**ok but…**
Rule 3:	EACcpi < EACpm < EACsci	3.063 < **3.150** < 3.440	ok

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



EVM application results



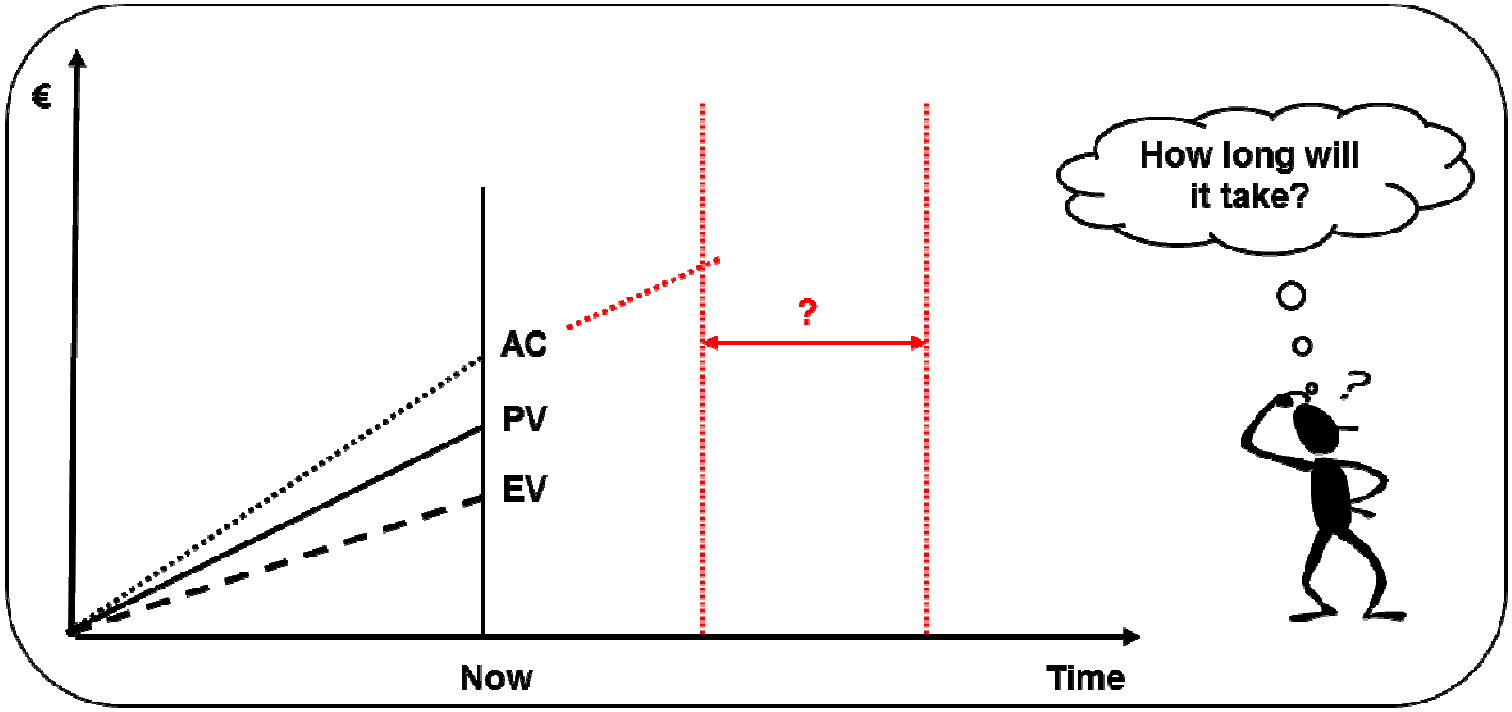
Findings

- ION trainings program increased project management maturity level

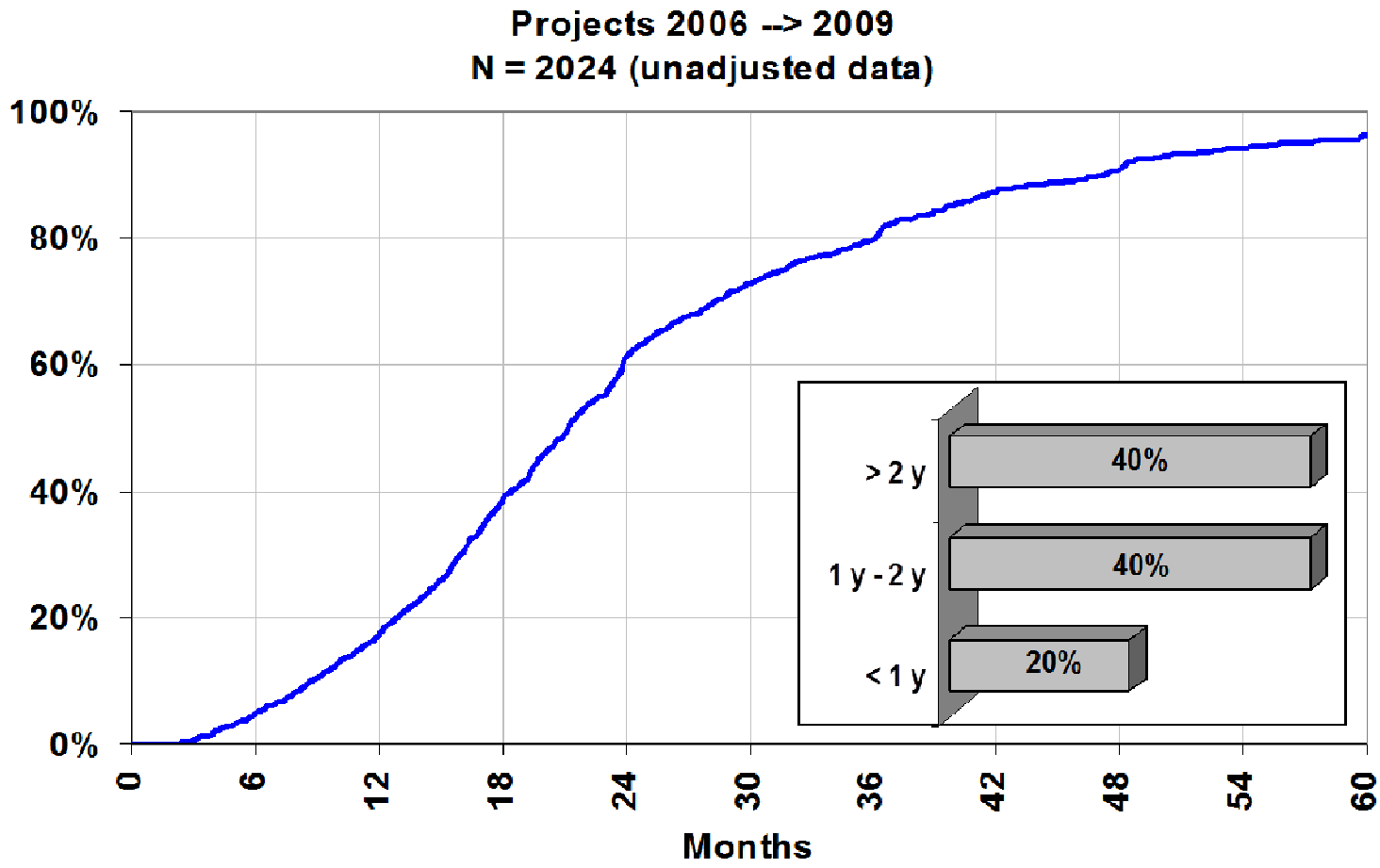
- Findings on project level:
  - Cost forecasts are more reliable and stable
  - Early visibility of potential cost overruns
  - P.M.'s tend to estimate too optimistic
  - A healthy baseline is needed, more effort needed during planning phase

- Findings on portfolio level:
  - Cashflow profile has been reversed into positive (over 3 years)

Step 2: Focus on Time - selected projects



Projects landscape -time

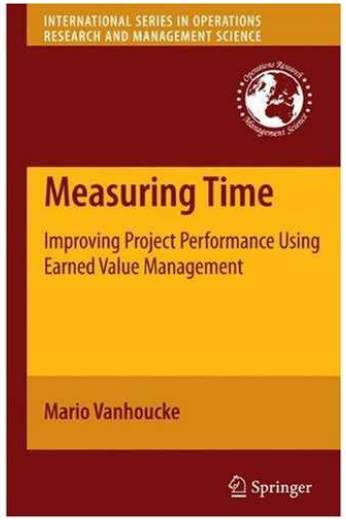


The need for ES

- 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

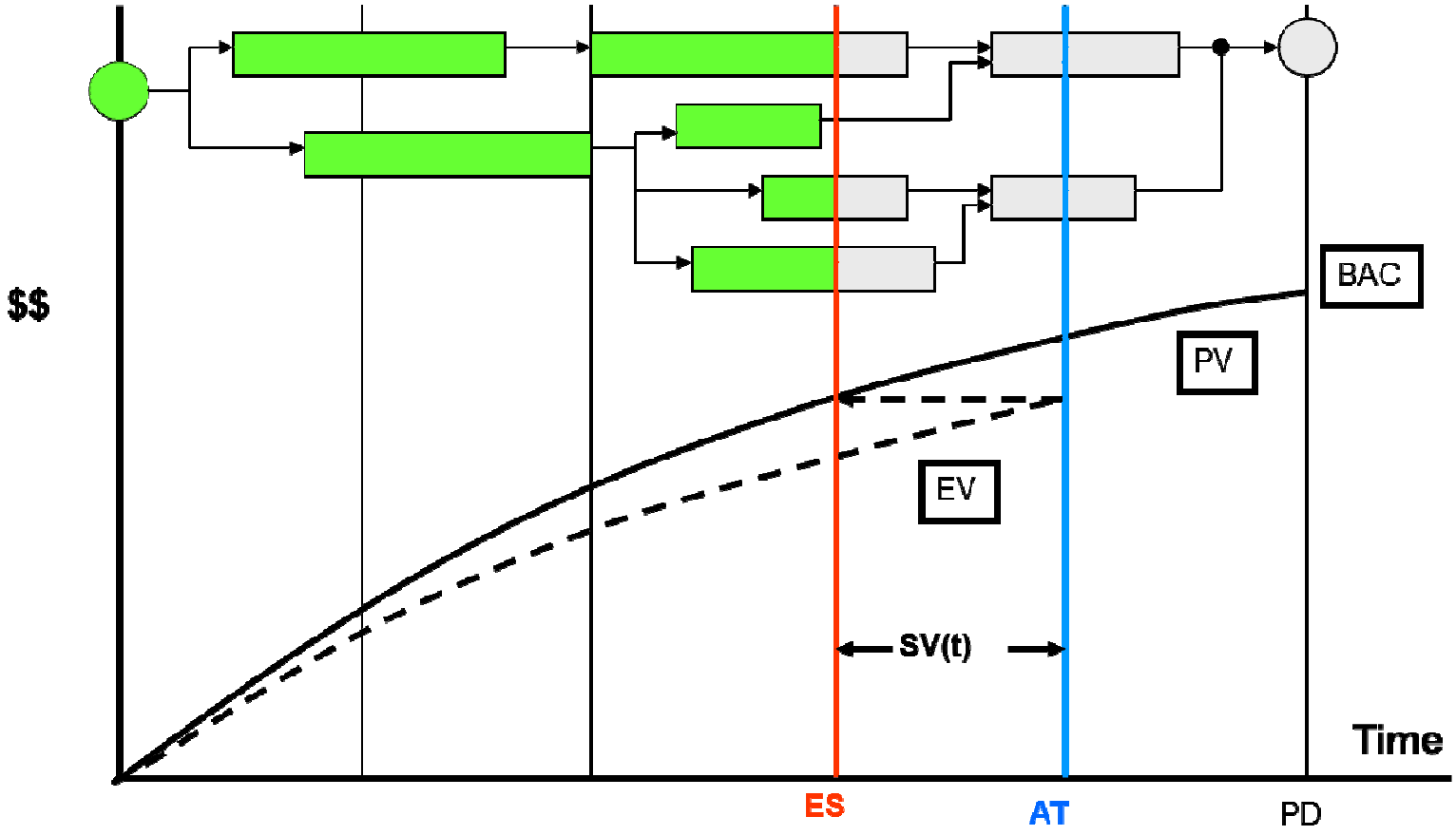
The need for ES

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



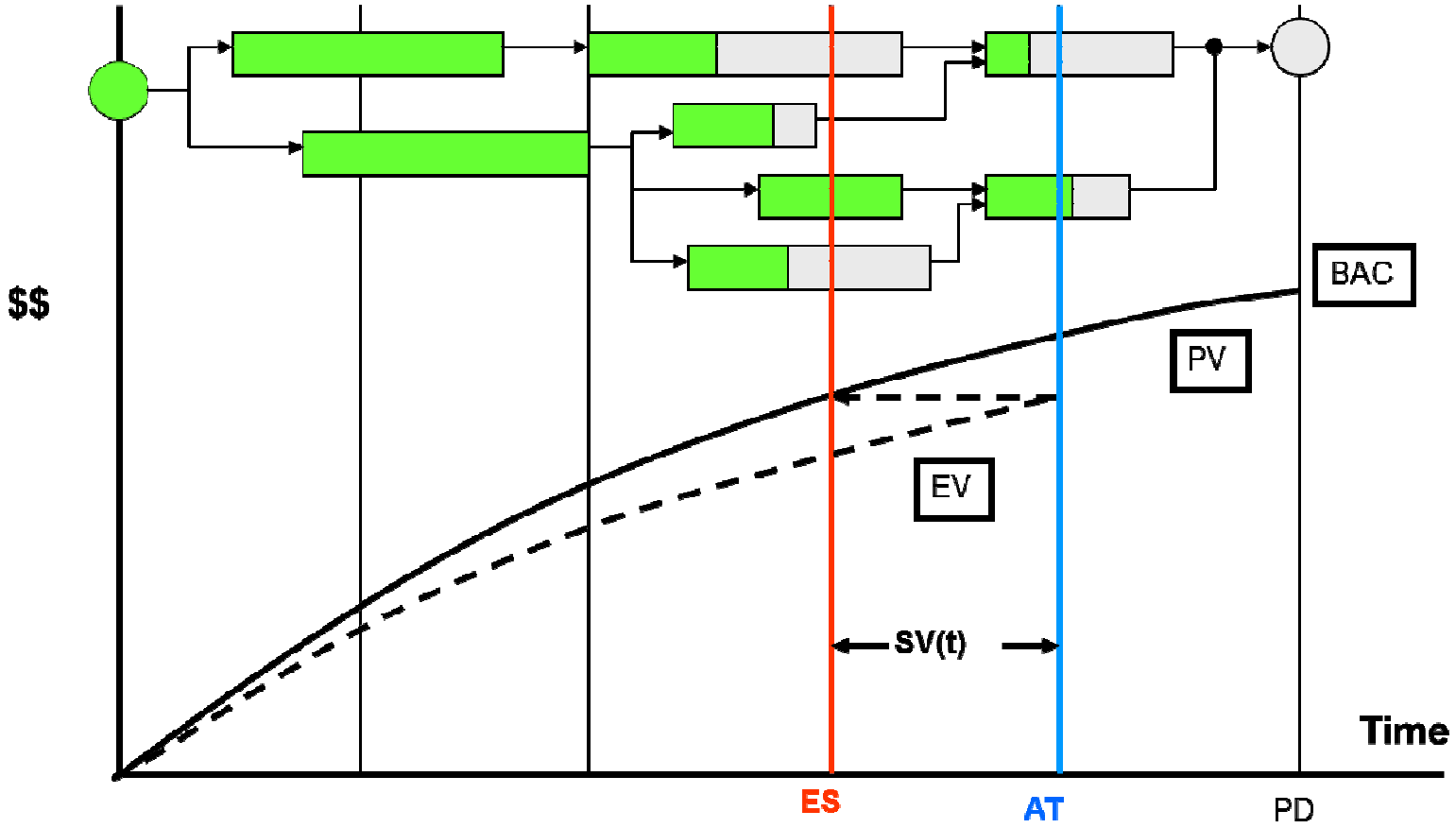
- ES indicators / forecasts are reliable
- A healthy baseline is needed
- ES to be used in conjunction with a schedule

There is more with ES



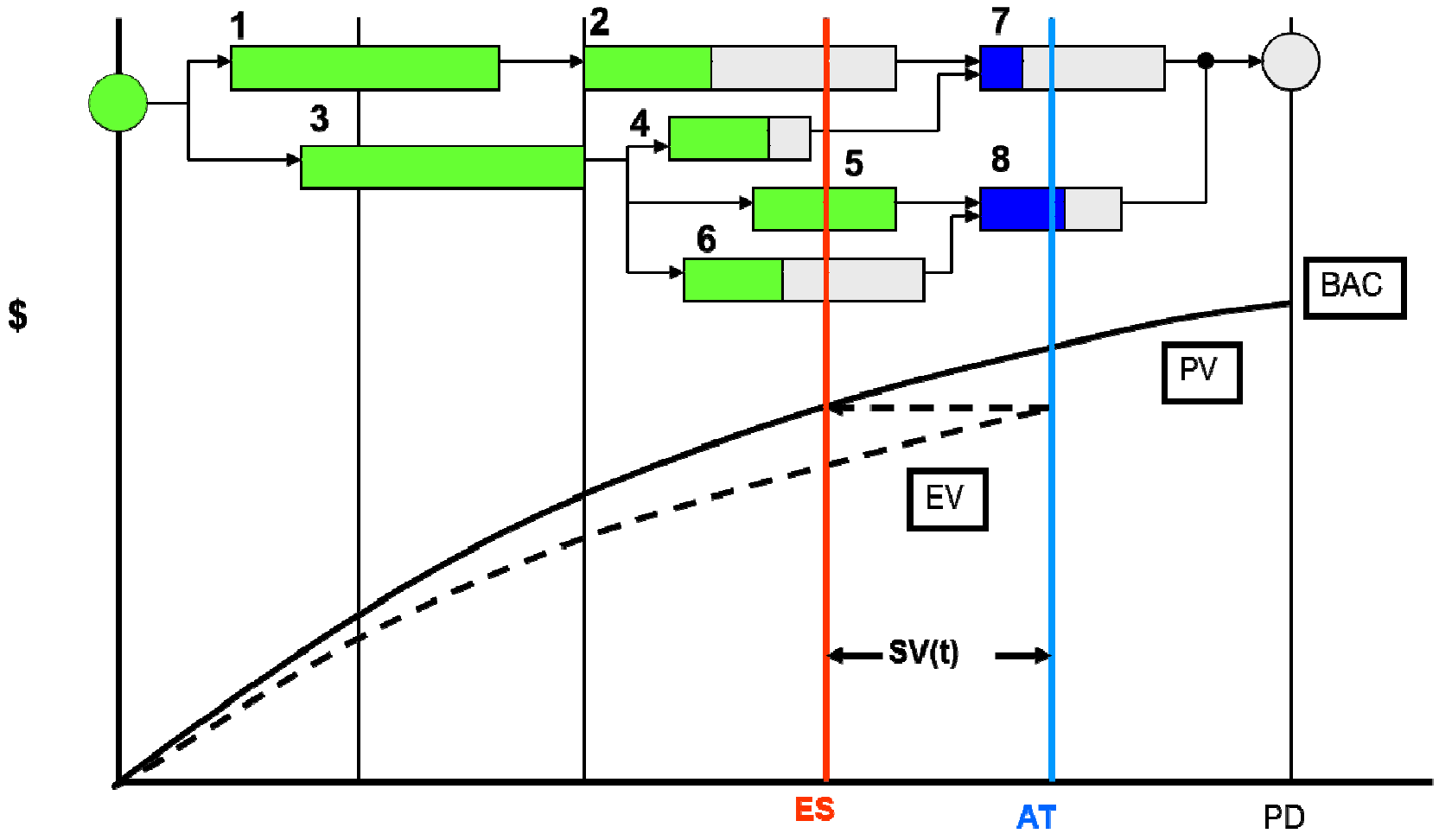
For a claimed amount of EV at a status point AT, the amount of work which should be accomplished is identified by PV at ES

What really happens

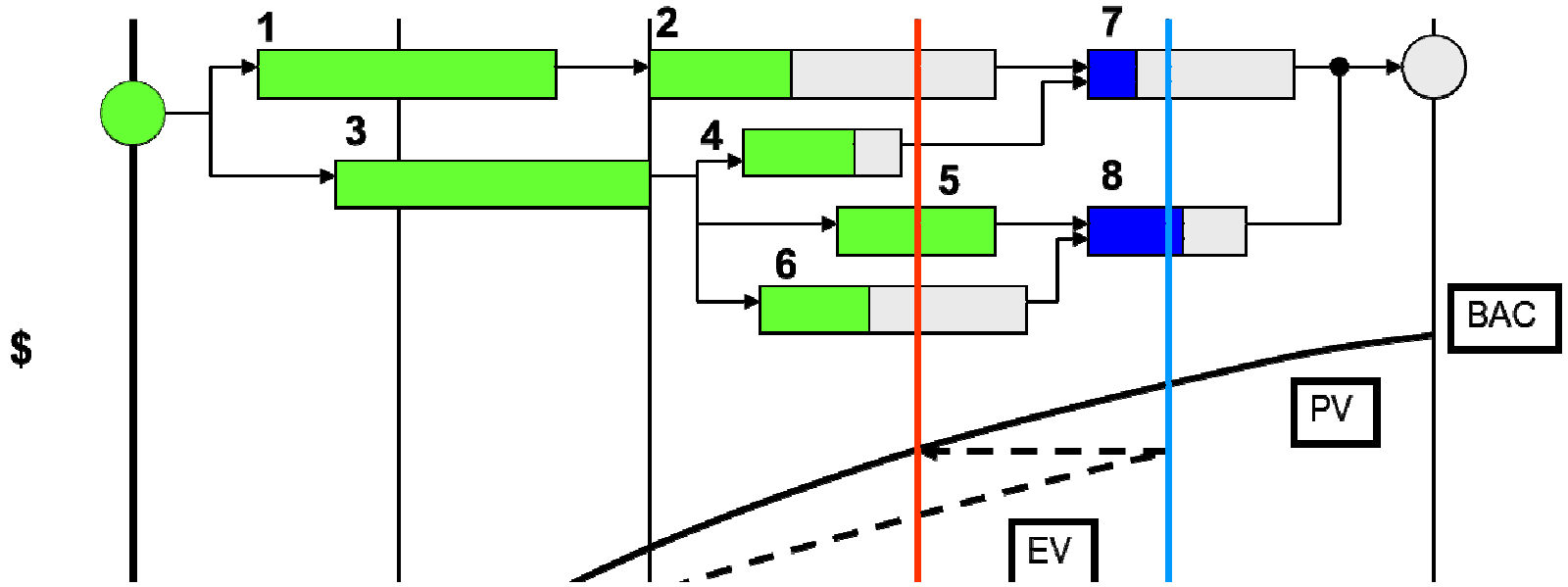


It is more likely performance is not synchronous with the schedule, the EV has a different distribution

ES provides schedule information



Schedule adherence = p-factor

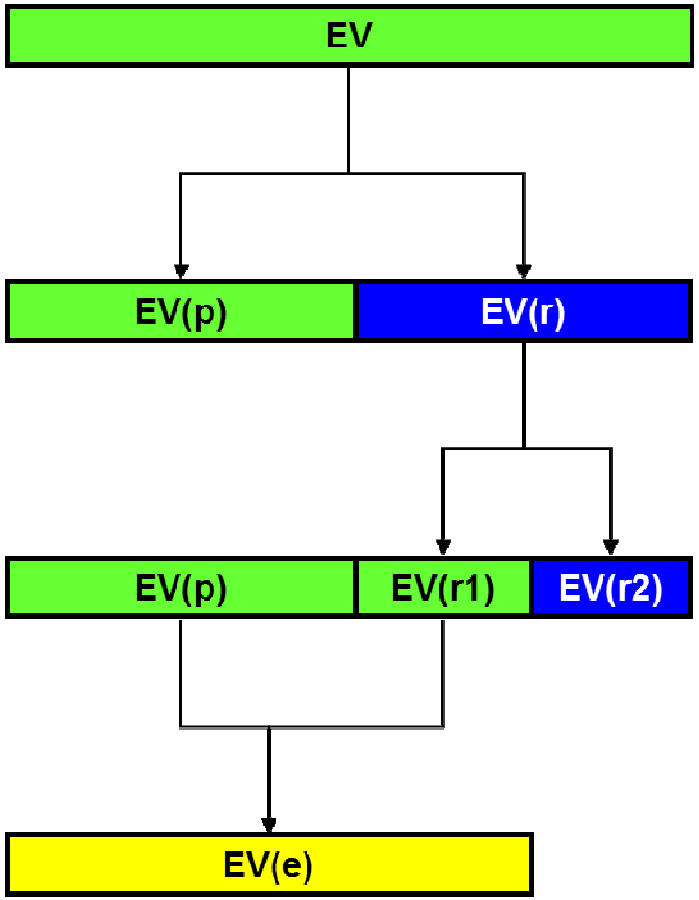


Schedule adherance (P-Factor):

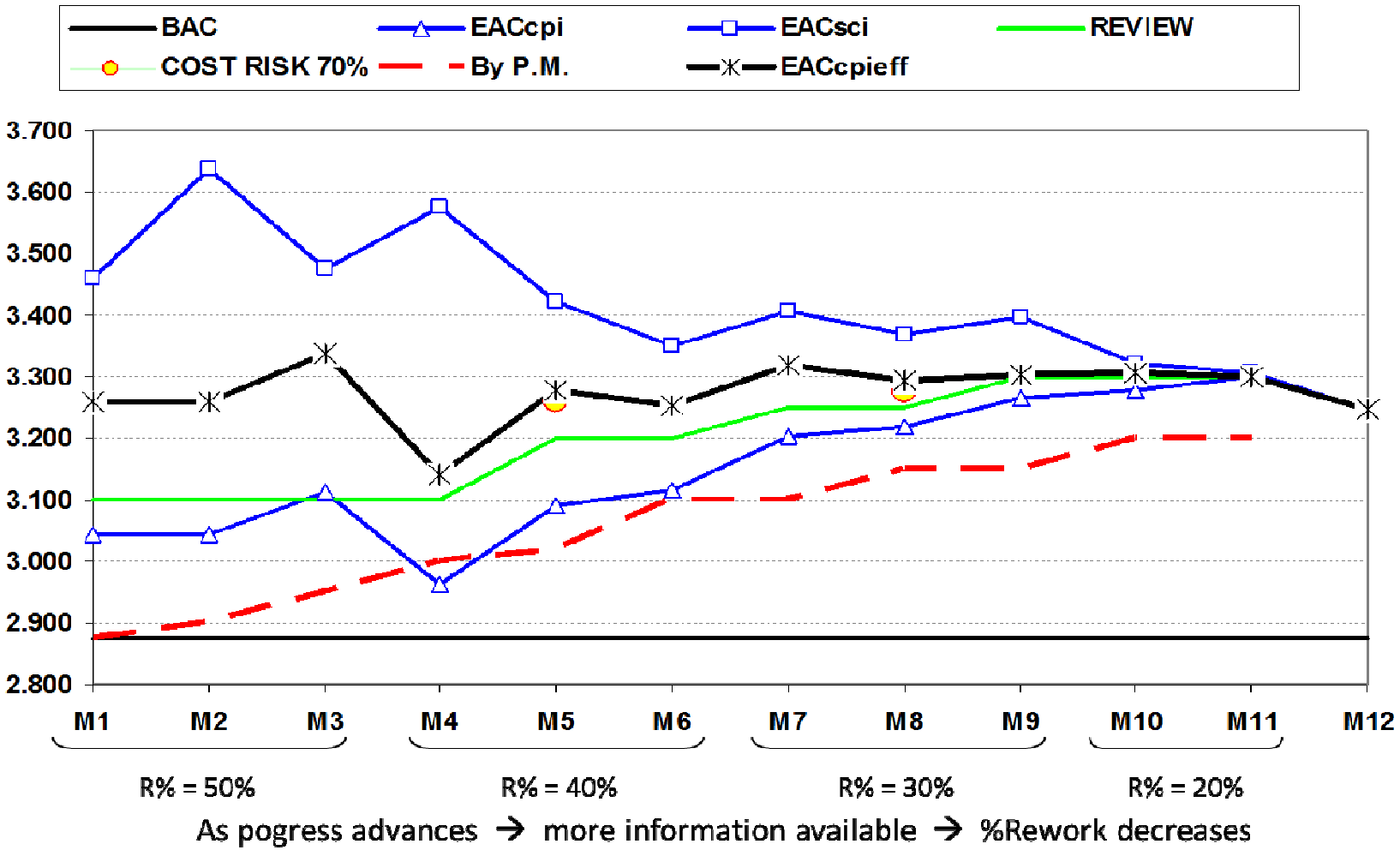
P-Factor = (EV according to plan) / (Total Claimed EV)
A measure how well the scheduling process is being followed
Value between 0 (out of sequence) and 1 (according to schedule)

Effective earned value

- **EV = EV(p) + EV(r)**
  - EV(p) = P x EV
    - portion of EV according to plan
  - EV(r) = (1 – P) x 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) = Effective Earned Value**
  - EV(e) = EV(p) + EV(r1)
    - = f (P, % R) x EV
    - = a x EV



Effective earned value



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
  - Give attention during bplanning phase: a sound baseline is needed

- ES Extensions:
  - Use of P-Factor → leads to more accurate / stable EAC predictions
  - Looks very promising

Thanks

QUESTIONS?