



**Project Controls**  
E X P O

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**Project Controls Expo – 17<sup>th</sup> Nov 2017**  
**Emirates Stadium, London**

**Managing the risk of change**

Simon White – Risk Management Consultant  
Trigo White Ltd, UK

# About the Speaker

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## **Simon White – Risk Management Consultant, Trigo White Ltd, UK**

- ❑ Over 20 years' experience in helping organisations to understand and manage risk to projects' schedule and cost.
- ❑ Wide variety of industries and major projects; UK Risk Analyst for ConocoPhillips, before which Senior Consultant and trainer for Pertmaster, Primavera and Oracle.
- ❑ Methods help ensure risk assessments are reasonable representations of reality, and that they add value by setting and justifying reasonable expectation and positive management action.
- ❑ Designed and built commercial risk software (including as a contributing architect to Primavera Risk Analysis / Pertmaster), and continues to develop tools for more practical valuable project and business risk management.
- ❑ <https://uk.linkedin.com/in/simonwhiterisk>

# About the Topic

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## Topic Outline

- Change is ...
- Managing the risk of change
- Managing the risk of no change
- Example: Major change programme

# Key concepts

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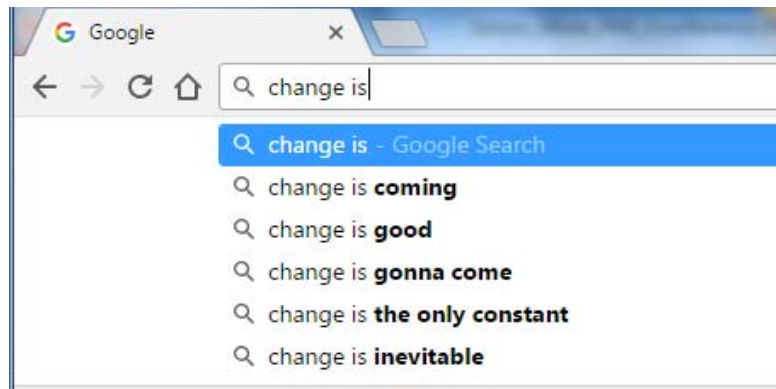
- probability
- three-point estimate
- impact
- exposure
- contingency
- mitigation
- probability distribution
- P10, P50, P90

# Change is ...

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# Change is ...

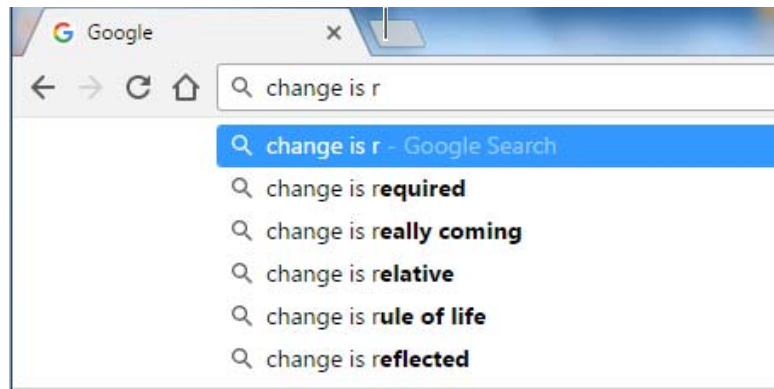
□ My Google says:



- inevitable
- good
- risky?

# Change is ...

□ My Google says:

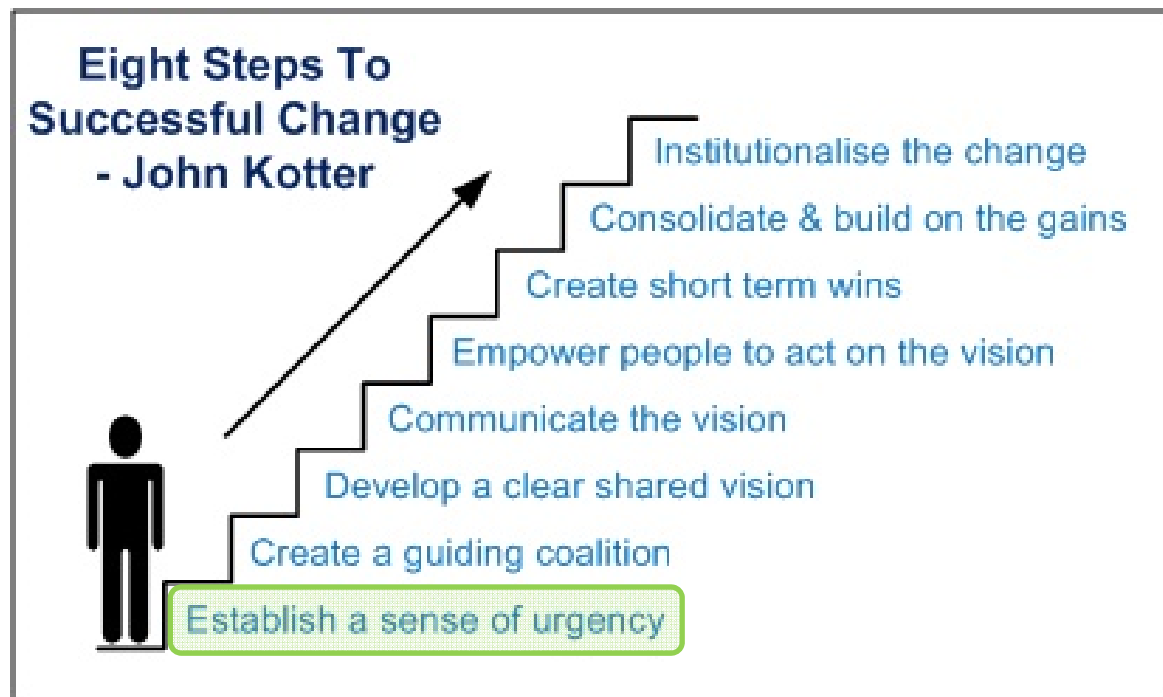


- inevitable
- good
- risky?

# Focus on benefits

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- “Articulate a powerful rationale and business case for the change”







## Project Management vs. Change Management: Which Should Lead?

**Presented by Jon Weinstein,  
President of Line of Sight  
to the PMI Washington DC Chapter**

**October 23, 2012**

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**Project Controls**  
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# Prepare and reinforce



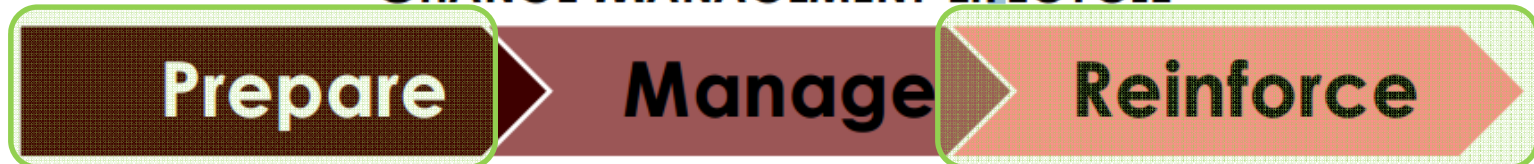
## INTEGRATING THE DISCIPLINES: LIFECYCLE PHASES



### PROJECT MANAGEMENT LIFECYCLE



### CHANGE MANAGEMENT LIFECYCLE



# Analysis, assessment, action orientation



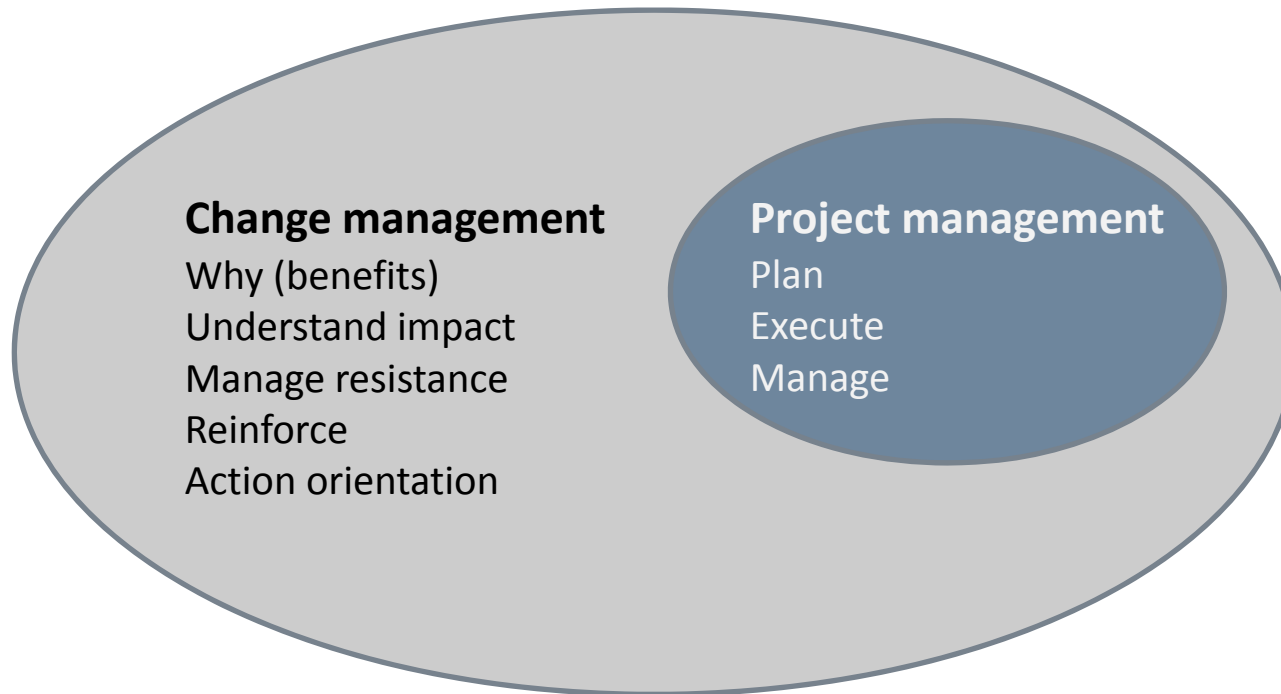
## ALIGNING THE DISCIPLINES: COMPETENCIES

What project managers do	What change managers do	What program managers do
<b>Similar Competencies</b>		
Leadership	Leadership	Project/program organization and management (leadership)
Stakeholder management	Stakeholder management	Understanding clients objectives/managing client interface
Planning	Planning	Approach and strategy for the project/program (planning)
Team selection/ team development	Team development	People and resource management/ team selection
Communication	Communication	
Decision-making and problem-solving/Strategic decisions	Decision making and problem solving	
	Cultural skills	Cultural awareness
<b>Different competencies</b>		
Administration	Analysis and assessment	Risk management
Monitoring and controlling	Training and education	Scope management
Closing	Creative and challenging	Commercial awareness
Technical performance	Initiative	
Organization structure	Facilitation and presentation	
Project definition	Action orientation	
	Process design	

# Change is ...

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- Change Management is:
  - wider than project management, and includes consideration of benefits as well as costs.



# Managing the risk of change

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# Risk of change

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- Risk may **prevent the promised benefits** from being realised.
- Risk may **add unanticipated costs**, delays or other problems.
- Risk may **prevent the change from being accepted** by the wider organisation.

# Risk matrix

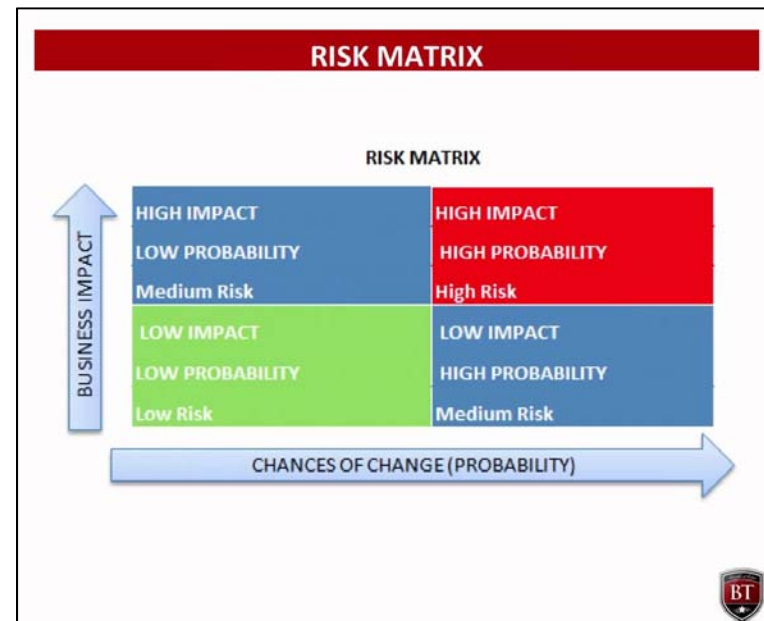
- Assess risks as:
  - Likelihood (probability)
  - Consequences (impact)

STRATEGIC OBJECTIVE	RISK EVENT	OUTCOMES	RISK INDICATORS	LIKELIHOOD/ CONSEQUENCES	MANAGEMENT CONTROLS	ACCOUNTABLE MANAGER
Guarantee reliable and competitive supplier-to-manufacturer processes	Interruption of deliveries	Overtime Emergency freight Quality problems Production losses	Critical items report Late deliveries Incoming defects Incorrect component shipments	<p>5 4 3 2 1</p> <p>1 2 3 4 5</p>	Hold daily supply chain meeting with logistics, purchasing, and QA  Monitor suppliers' tooling to detect deterioration  Risk mitigation initiative: Upgrade suppliers' tooling  Risk mitigation initiative: Identify the key supply chain executive at each critical supplier	Mr. O. Manuel, director of manufacturing logistics

Kaplan and Mikes, Harvard Business Review - <https://hbr.org/2012/06/managing-risks-a-new-framework>, <https://goo.gl/images/2UQgGQ>

# Risk matrix

- Assess risks as:
  - Likelihood (probability)
  - Consequences (impact)



<http://businesstraining.com>



# Risk matrix

- Assess risks as:
  - Likelihood (probability)
  - Consequences (impact)

**IT Change Management - Risk Assessment**

To assess the risk associated with technology or configuration changes, complete the following assessment and save to a PDF file for submission to your team leader and attachment to the Applix change request record.

The button to save as a PDF file is below the Risk Matrix chart.

Service or Application:	Data Network - Configuration change for IP Phones
Description of Change:	IP Phone Pilot Project requires configuration change to core network switches and addition of new 3V DC power injectors in data comm closets 301A and 611C.
Change Number:	2015/112
Person Evaluating Risk:	George Thompson
Proposed Change Date:	8/13/2015
Date Evaluated:	7/31/2015

The Risk Matrix chart plots Probability on the vertical axis and Impact on the horizontal axis. The chart is divided into three risk levels: Low Risk (green), Medium Risk (yellow), and High Risk (red). A blue circle labeled 'Risk' is placed in the Medium Risk area.

HealthTech Advisors - <http://www.healthtechadvisors.com/cm-risk-assessment/>

# Risk matrix

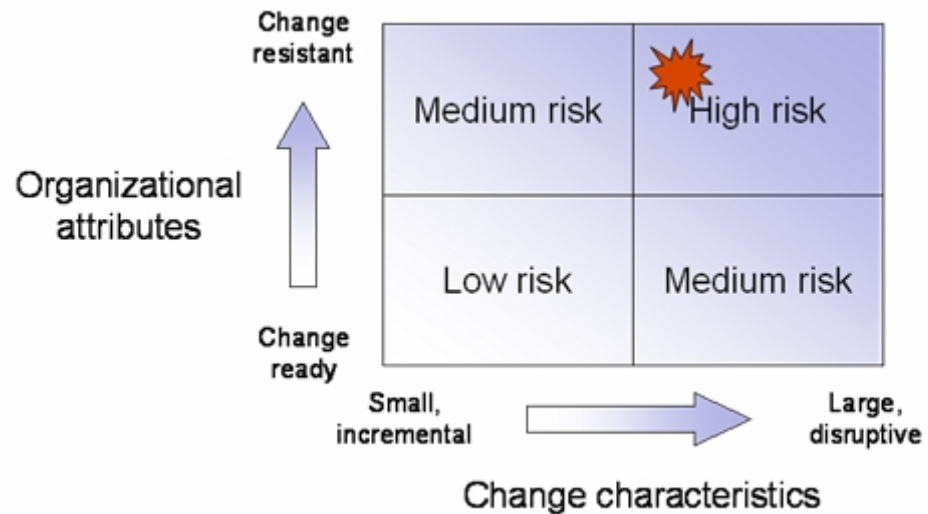
- Assess risks as:
  - Likelihood (probability)
  - Consequences (impact)

LIKELIHOOD	CONSEQUENCES				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A Almost Certain	Medium	High	High	Very High	Very High
B Likely	Medium	Medium	High	High	Very High
C Possible	Low	Medium	High	High	High
D Unlikely	Low	Low	Medium	Medium	High
E Rare	Low	Low	Medium	Medium	High

<b>Key:</b>	Very High Risk	Do something to control the risk
	High Risk	immediately
	Medium Risk	Do something about these risks
	Low Risk	Does not need immediate attention

# Risk matrix

- Also in other ways



Prosci Change Management Learning Centre - <http://www.change-management.com/>

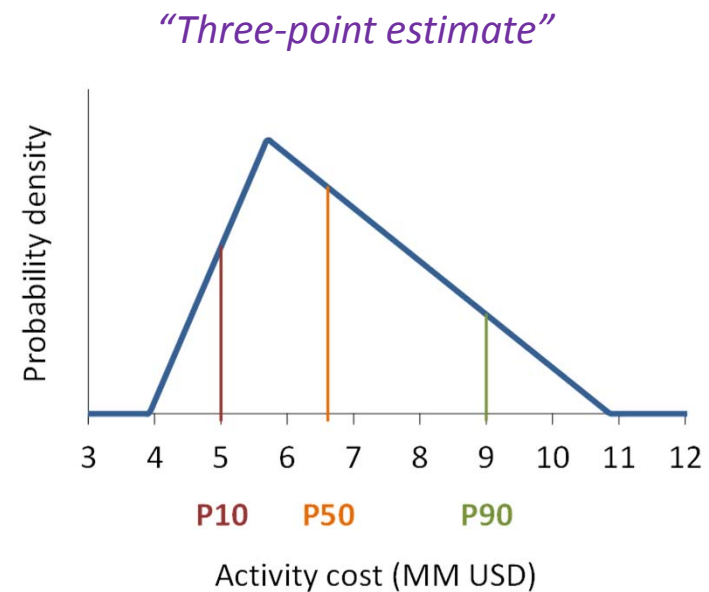
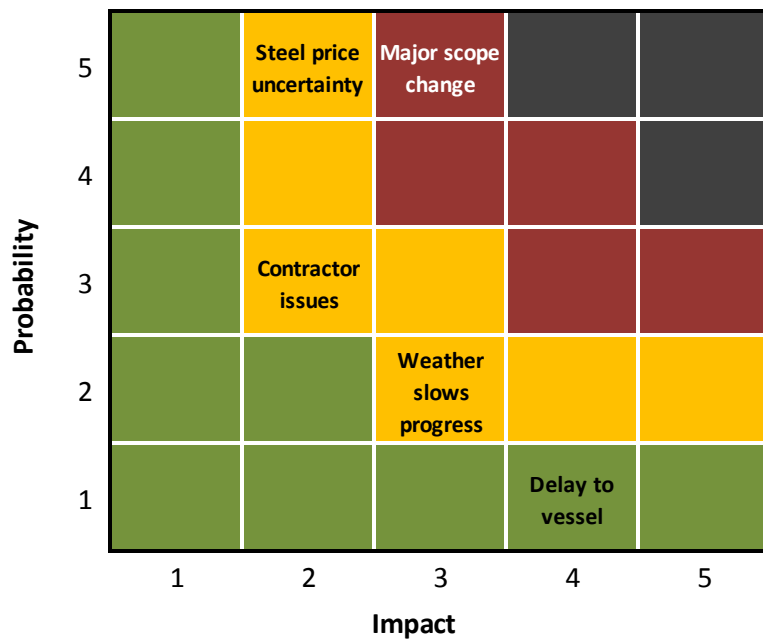
# Risk ...

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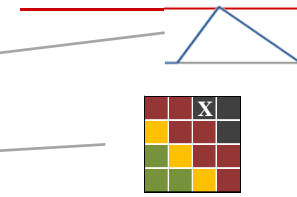
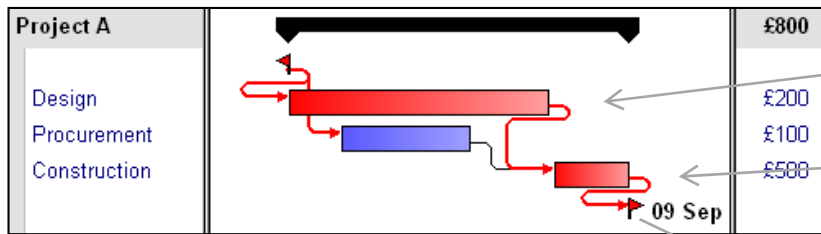
- Assessment
  - Beliefs: what do we believe about the risk?
  
- Analysis
  - Effects: what does it mean to the overall project?
  
- Awareness
  - Actions: what should we do about it?

# Risk assessment

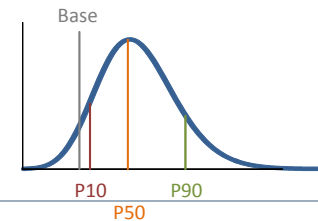
- Two popular ways of expressing risk:
  - Probability and impact (risk register)
  - Three-point estimate



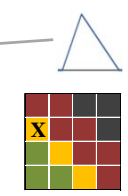
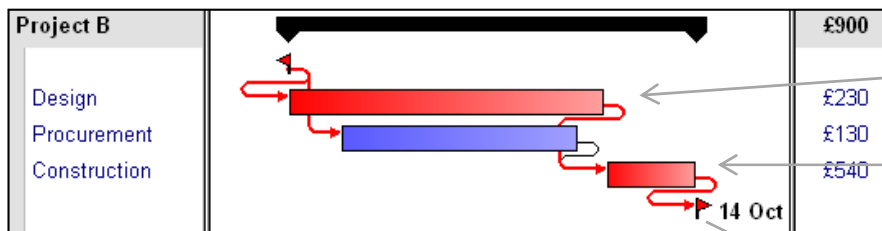
# Risk assessment



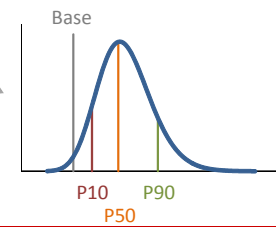
- Never been done before
- Challenging conditions
- Uncertain regulations
- Early phase



- **“Cheaper but more risky”**



- Been done before
- Easy conditions
- Established regulations
- Mid-execution



- **“More expensive, less risky”**

# Risk assessment

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- Base cost estimate (CBS)
  - Around 20-50 high-level cost elements
  - Allowances / contingency identified
  
- Optionally: Base schedule (WBS)
  - Around 50-300 activities
  - Allowances / contingency identified
  - “Forward-driven” logic
  - Can use existing schedule, or create in a workshop
  
- Any risks already identified

# Risk assessment

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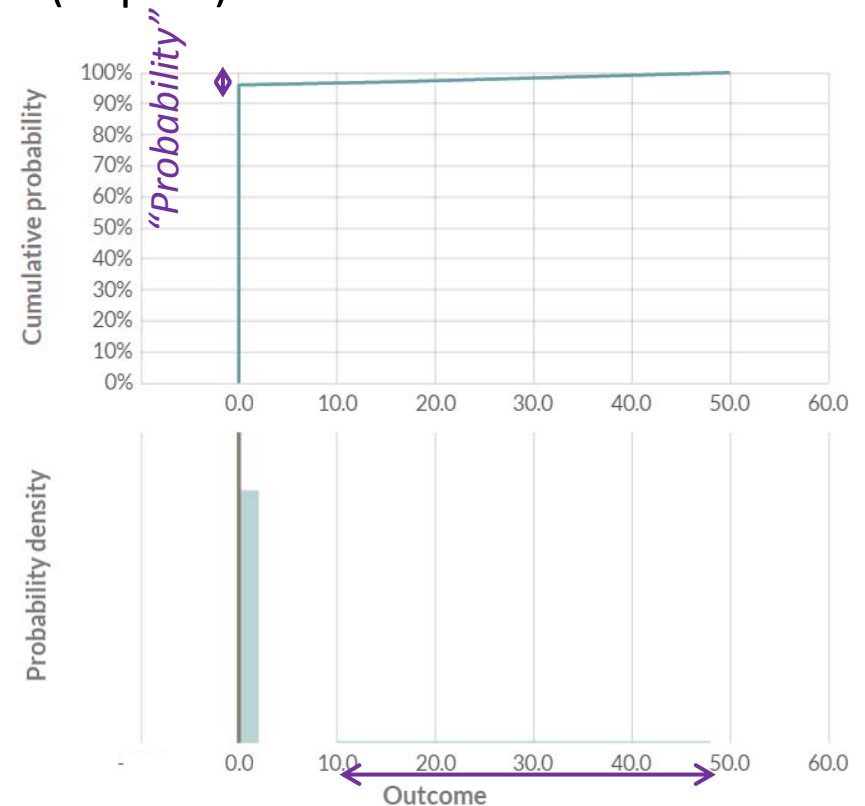
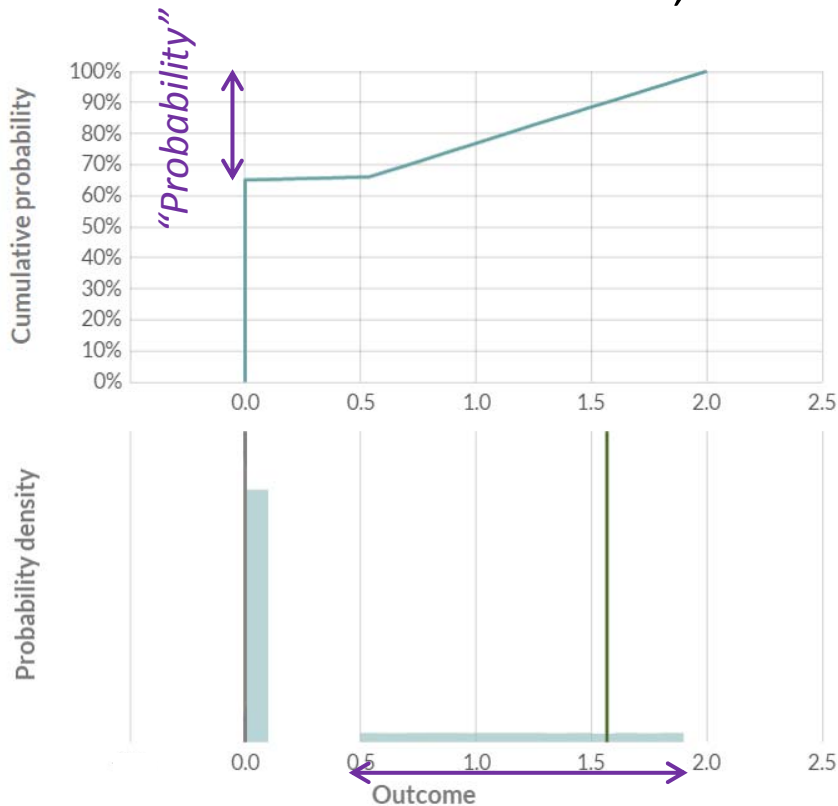
- Quantify significant risks
  - Probability (%)
  - Cost impact in £: P10, P50 and P90 (if it occurs)
  - Schedule impact in days: P10, P50 and P90 (if it occurs)
  
- Associate the risks with the schedule activities (WBS)
  - E.g. “Delay to lift vessel arrival”
  - will impact installation activities
  
- Associate the risks with the cost elements (CBS)
  - E.g. “Delay to lift vessel arrival”
  - will impact topsides cost

} (optional)



# Risk assessment

- May or may not happen (probability)
- Deviation from base, if it happens (impact)

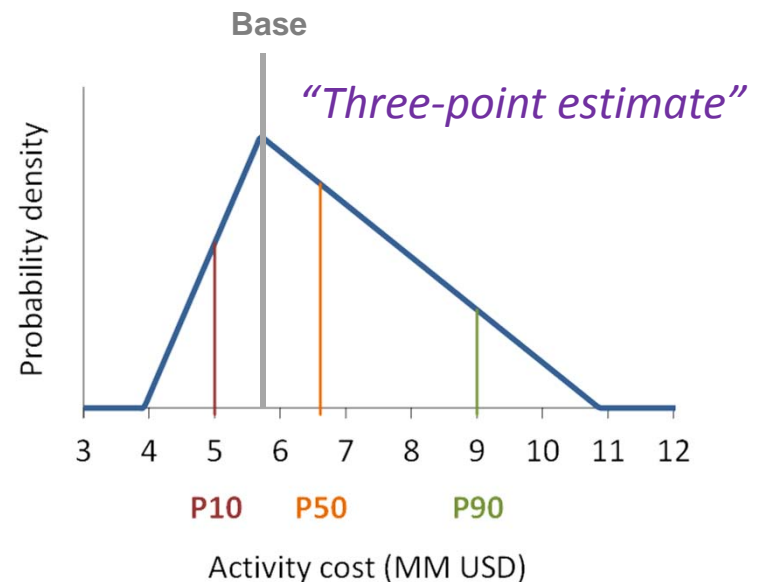


# Risk assessment

- Further quantitative assessments
  - Cost variance (-5% / +10% for jacket fabrication cost)
  - Schedule variance (-10% / +30% for engineering activities)

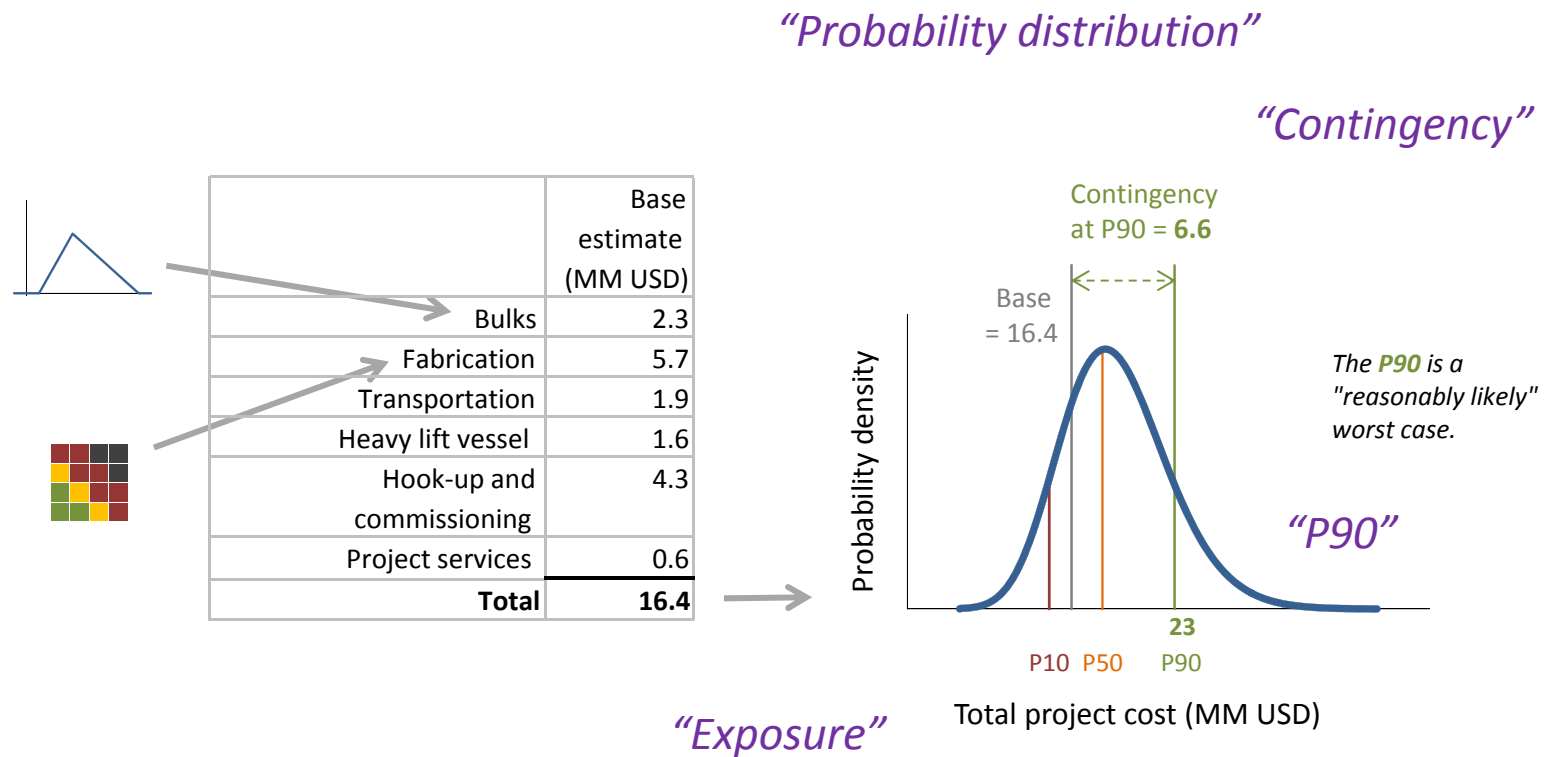
- Variance accounts for:
  - Estimating uncertainty
  - Risks not specifically modelled
  - Deviation from base

- Correlation  
(e.g. all fabrication costs are uncertain because of common causes)



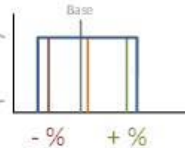
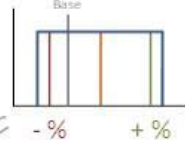
# Risk analysis

- The risk model shows the effect of the risk assessment, on the overall project

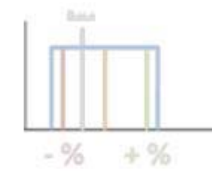


# Risk awareness

	Base (MM USD)
Bulks	2.3
Fabrication	5.7
Transportation	1.9
Heavy lift vessel	1.6
Hook-up and commissioning	4.3
Project services	0.6
<b>Total</b>	<b>16.4</b>

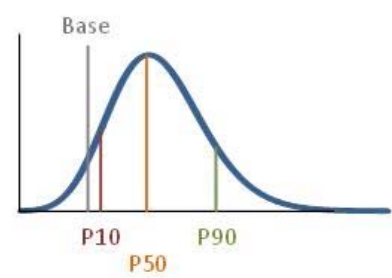


Mitigate →

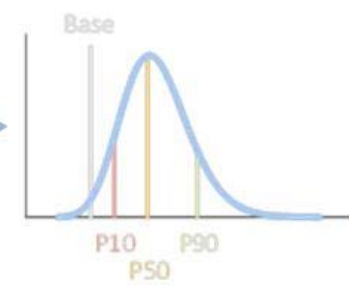


*“Response / mitigation”*

Mitigate →



Mitigate →

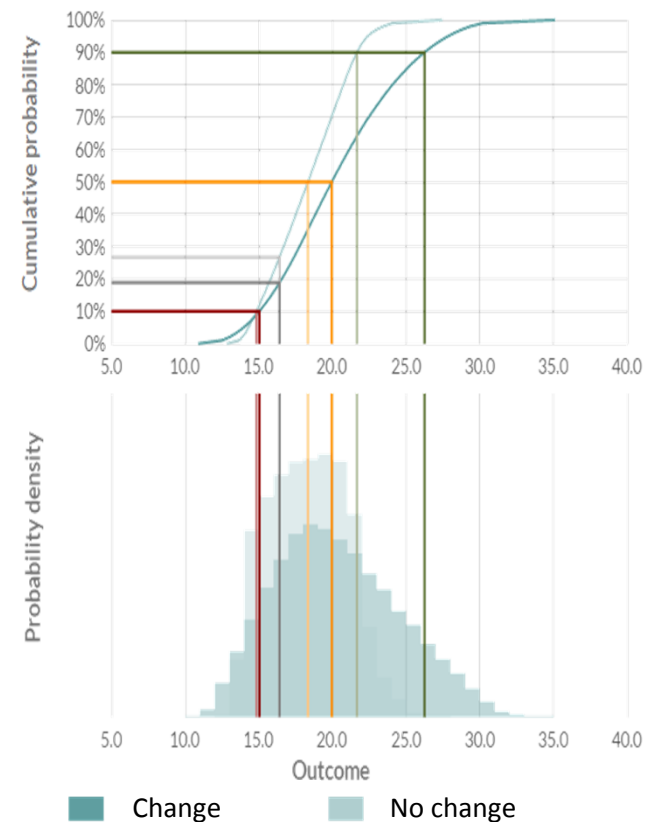


# Managing the risk of no change

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# The risk of no change

- Use traditional project risk assessment techniques on the wider change programme
  - Risk-based benefits vs cost analysis
  - Full risk assessment on value (NPV, IRR)



# Example: Major business transformation programme

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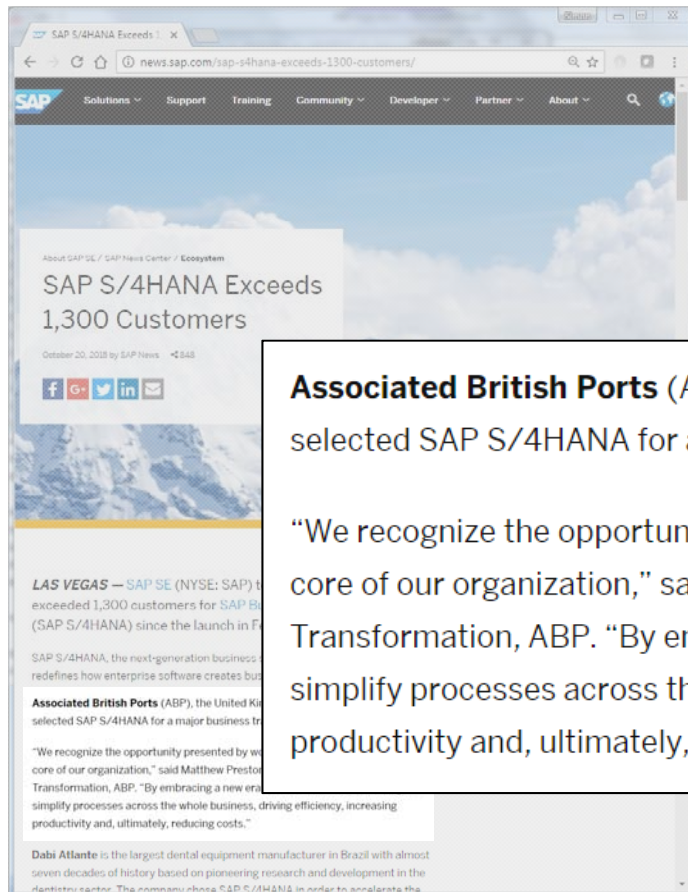
# ABP Change Project

- Associated British Ports – 21 ports throughout the UK
- Massive change programme:
  - BTP – nation-wide SAP implementation and reorganisation; hundreds of legacy systems
  - GtG – associated policy and procedures, associated behavioural change





# Major business transformation programme



**Associated British Ports** (ABP), the United Kingdom's largest ports group, selected SAP S/4HANA for a major business transformation program.

"We recognize the opportunity presented by working with SAP to transform the core of our organization," said Matthew Preston, head of Business Transformation, ABP. "By embracing a new era of innovation, we are looking to simplify processes across the whole business, driving efficiency, increasing productivity and, ultimately, reducing costs."

31 October 2016

# “From Good to Great”



**Continually improving the operations and services we provide**

**Creating a great place to work**

**Putting customers first**

**Working safely and sustainably**

**Being good neighbours**

**Providing effective infrastructure and equipment**



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# My involvement

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## □ Client:

- Ruth Murray-Webster – Director, Change Portfolio at Associated British Ports

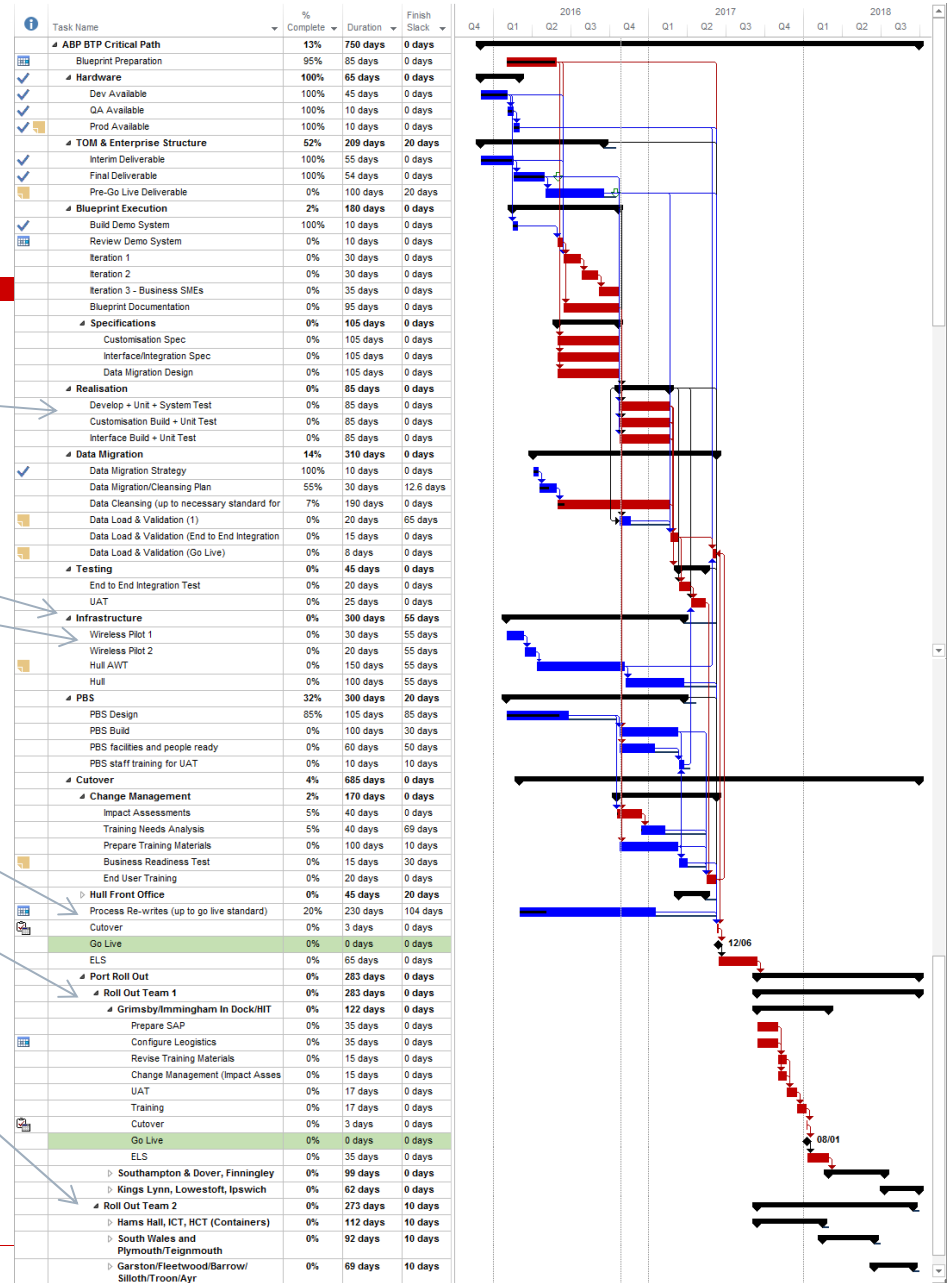


## □ Role:

- Quantitative risk modelling
- Given base costs, benefits and timing
- Given variances and risks, to costs, benefits and timing
- Produce risk-based profit, NPV and IRR



- Data migration, validation
- Infrastructure
- Pilot office
- Cutover, Go Live
  
- Region 1 roll-out (3 regions)
- Region 2 roll-out (3 regions)



# Example: a simplified change risk assessment

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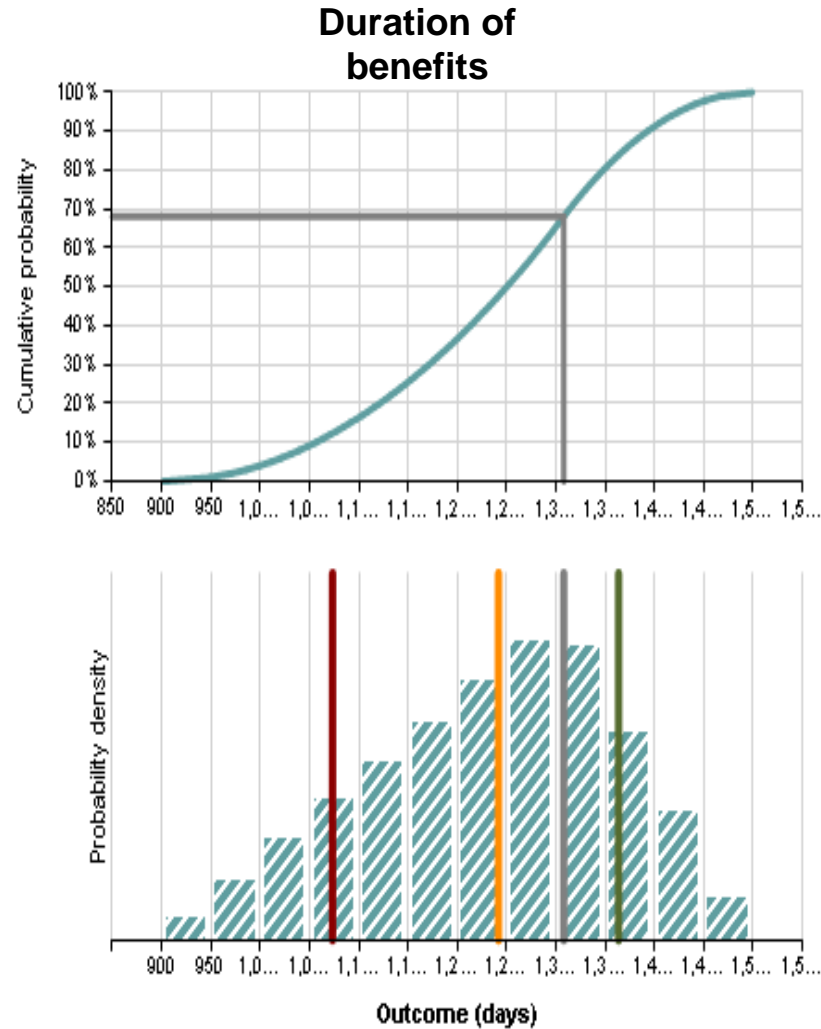
- Base estimates
  - Base costs and schedule
  - Base benefits and schedule
- Risk assessments
  - Risks to costs and schedule
  - Risks to benefits and schedule
- Results – risked forecasts
  - Risked overall cost and go live date, and phasing
  - Risked benefits and phasing
  - Risked profit NPV and IRR

# Very simple

						Risks		
	Base cost	2016	2017	2018	2019	2020	Financial	Schedule
Spend	-£20m						Variance: -20% / +30%	Variance: -18% / +25%
Benefits	£60m						Variance: -10% / +40%	Risk R1 - Major technical issues (prob 30%): 90d - 180d
Profit	£40m							Variance: -31% / +15%

# Very simple

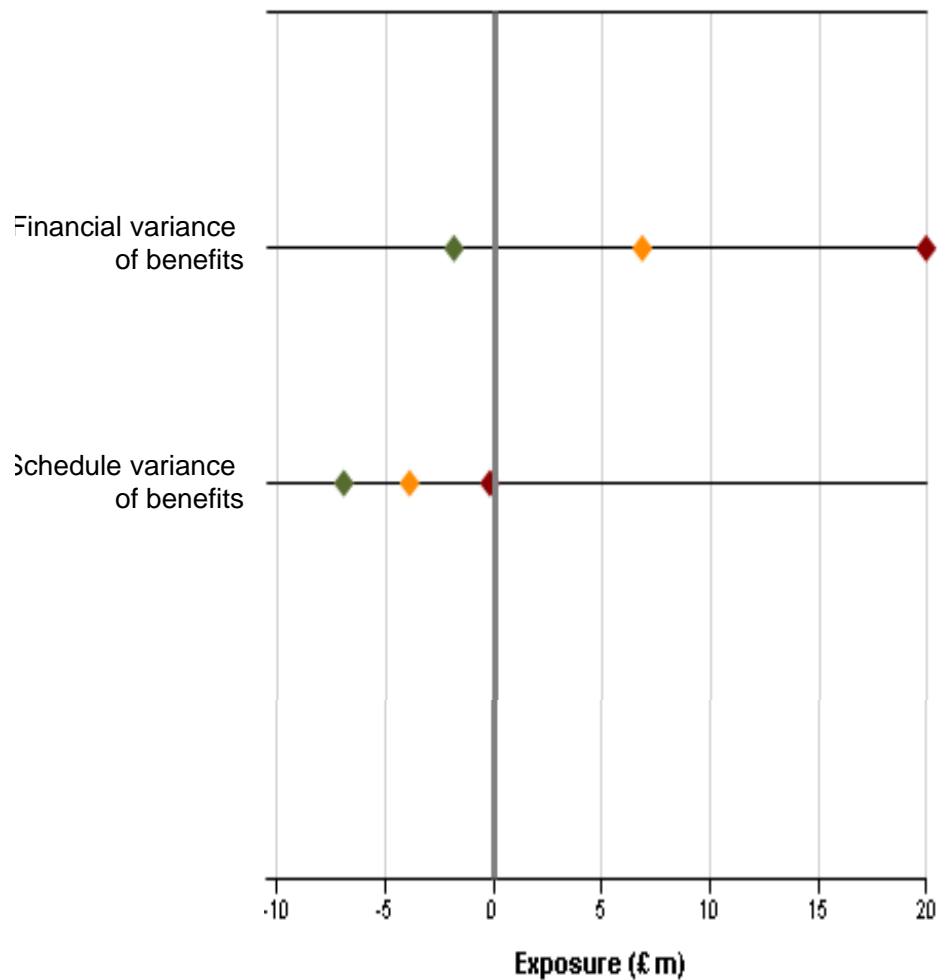
	Base cost
Spend	-£20m
Benefits	£60m
Profit	£40m



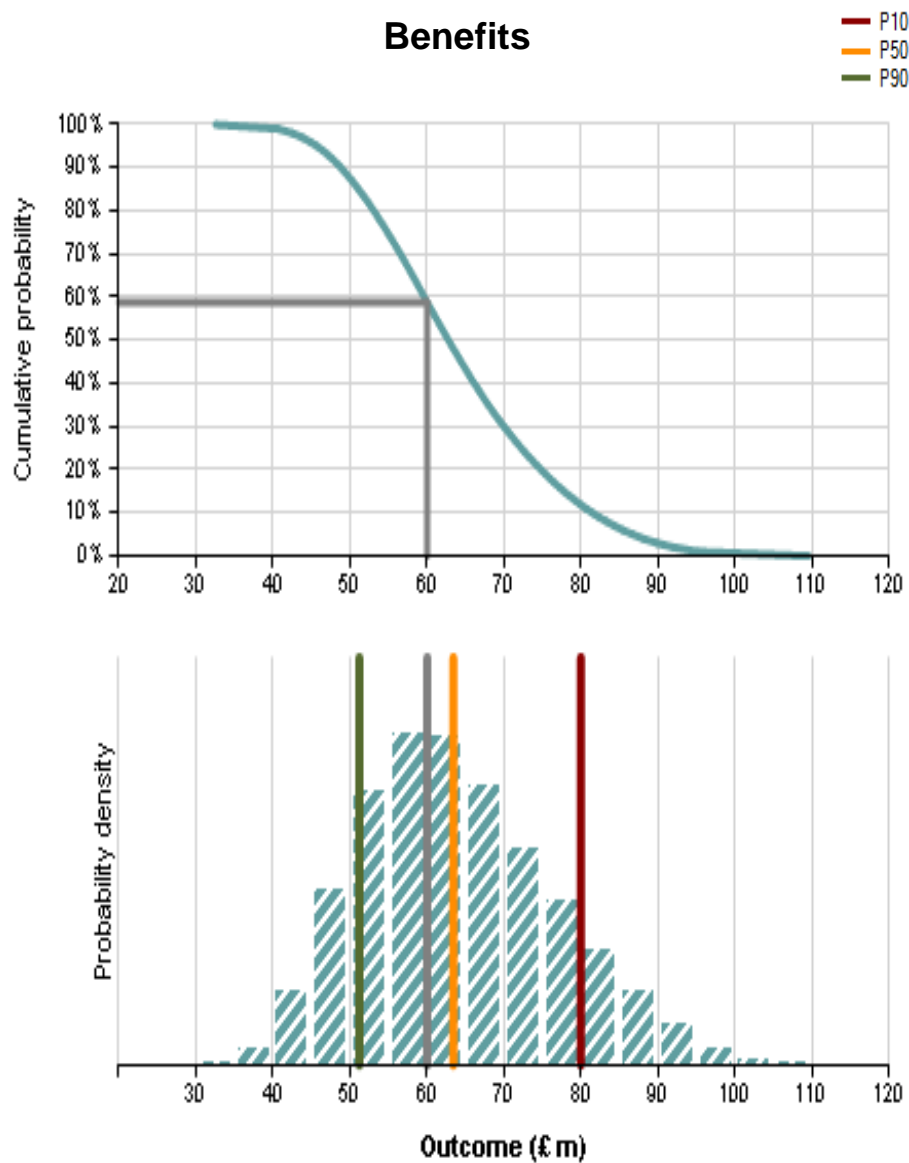
Risks	
	Schedule
6	Variance: -18% / +25%
	Risk R1 - Major technical issues (prob 30%): 90d - 180d
6	Variance: -31% / +15%



### Top risks to benefits

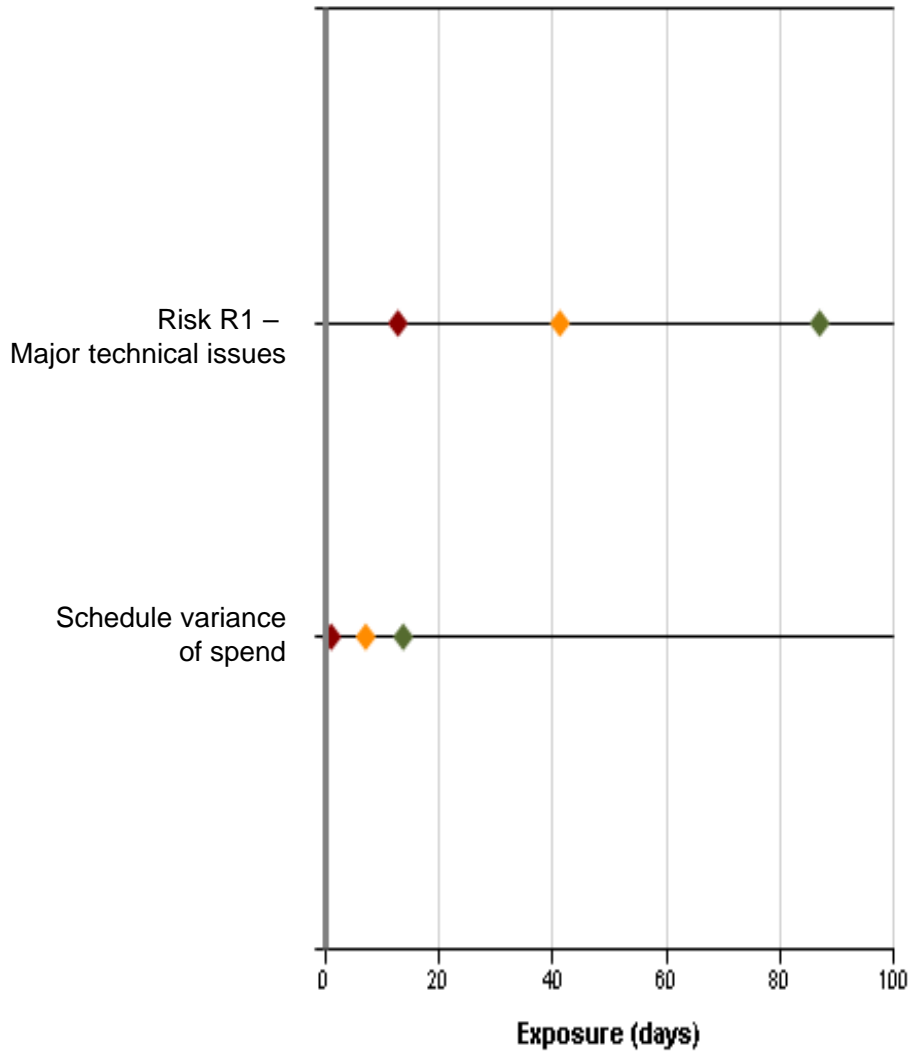


### Benefits

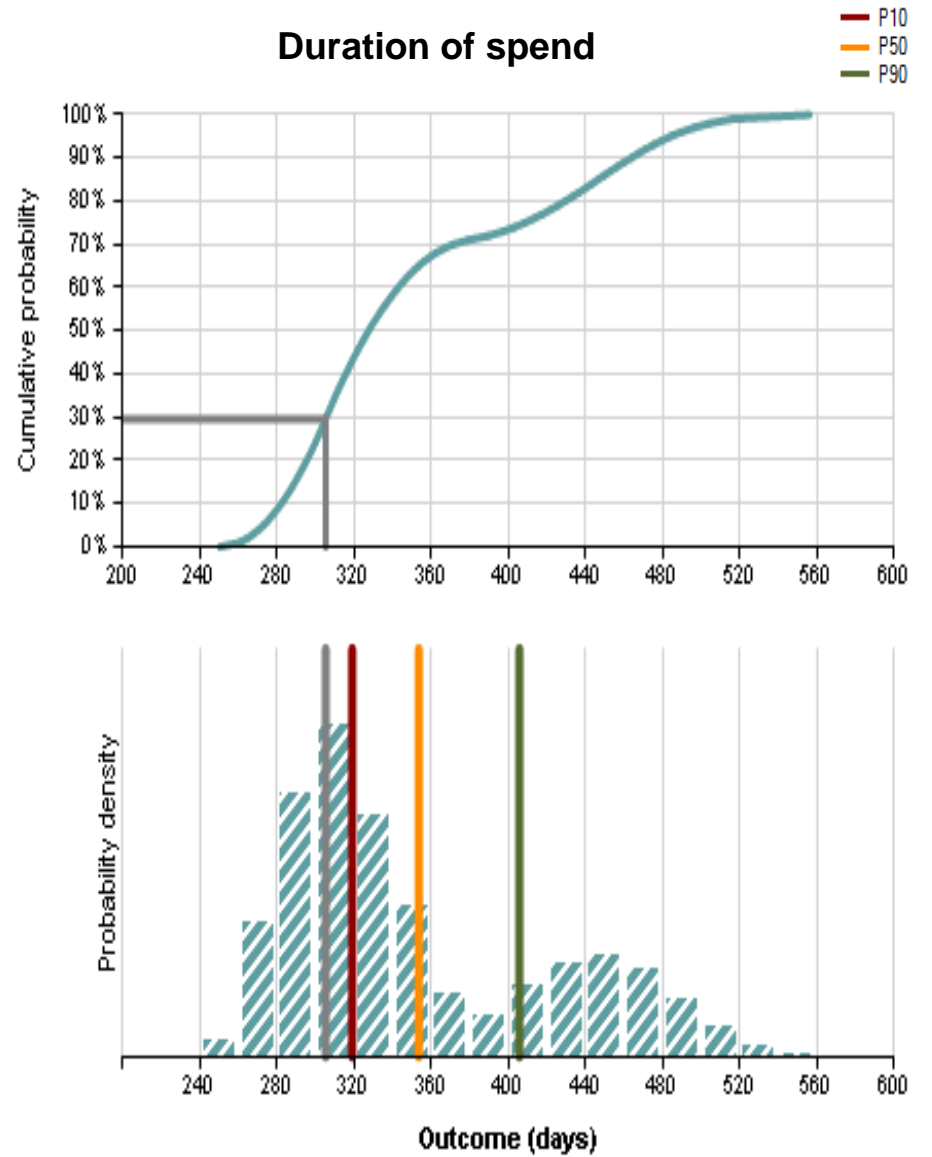




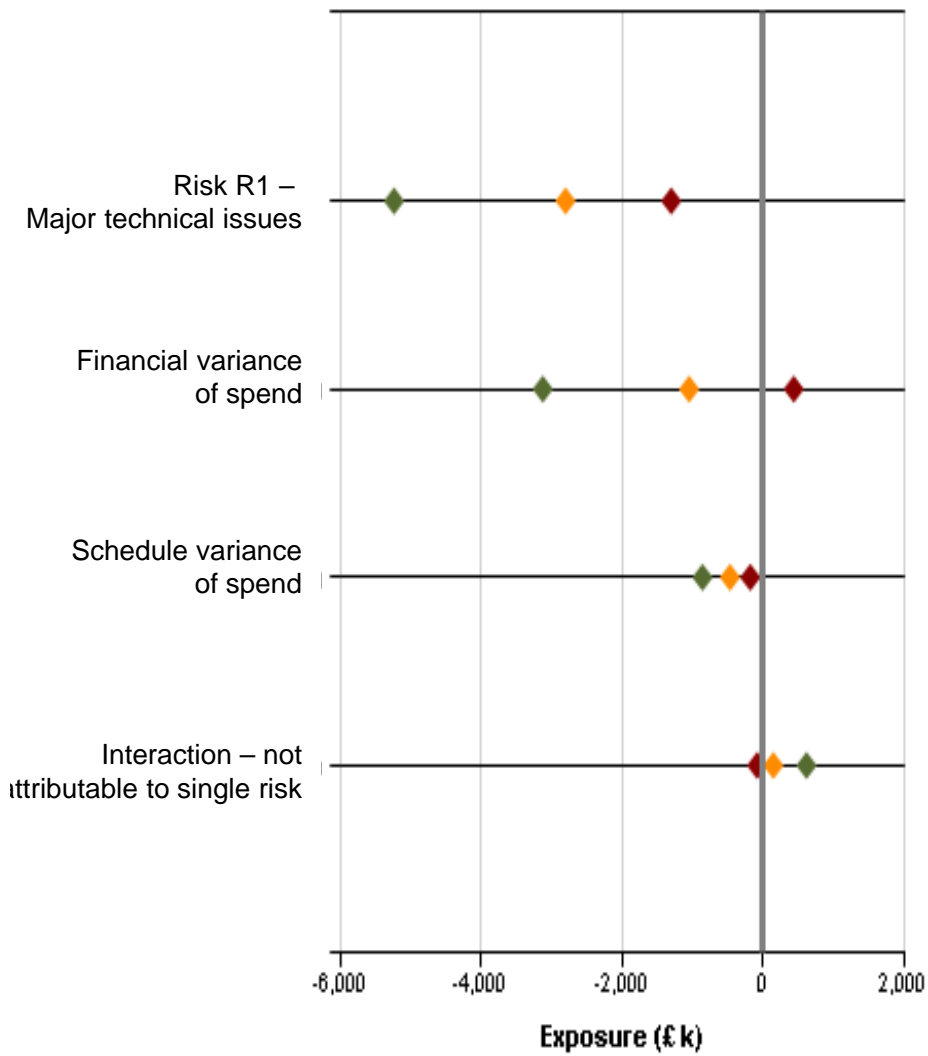
### Top risks to duration of spend



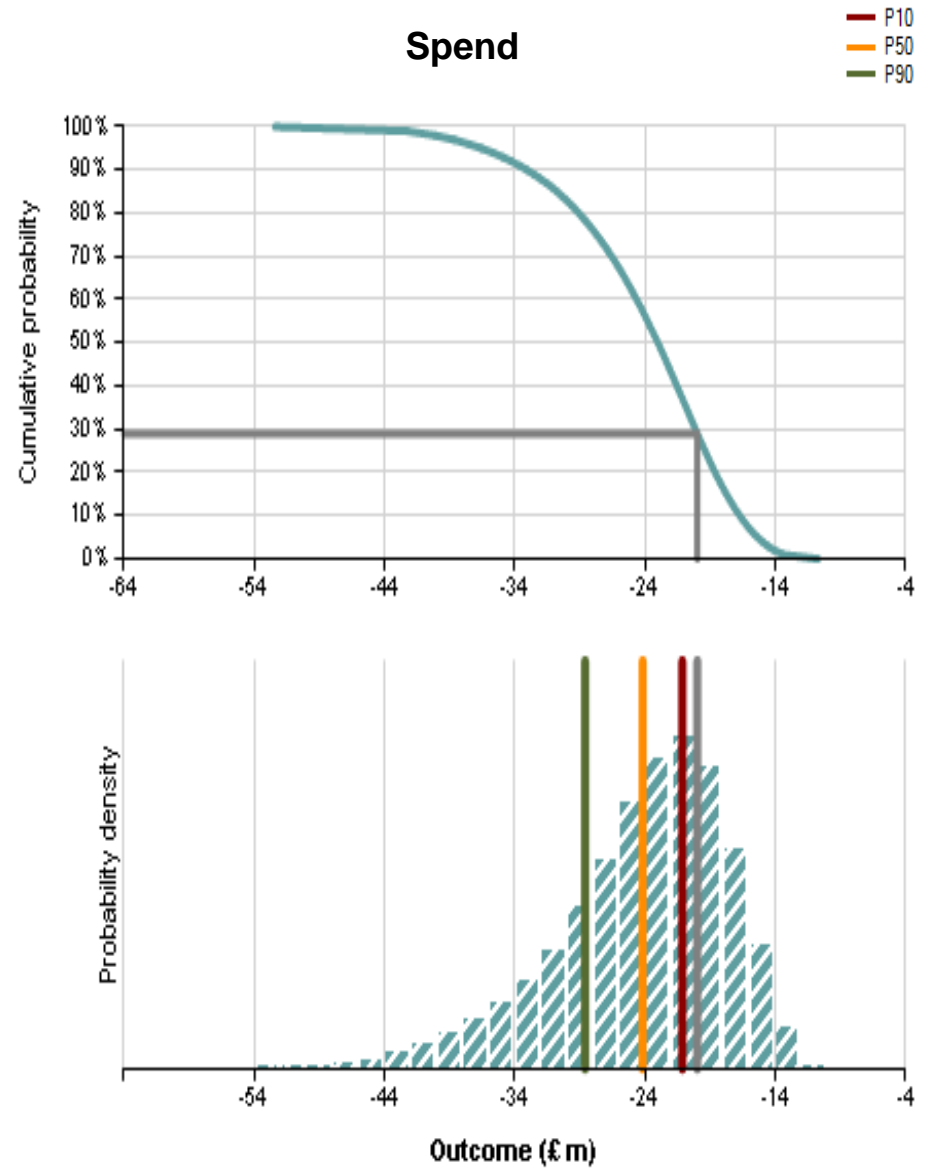
### Duration of spend



### Top risks to spend

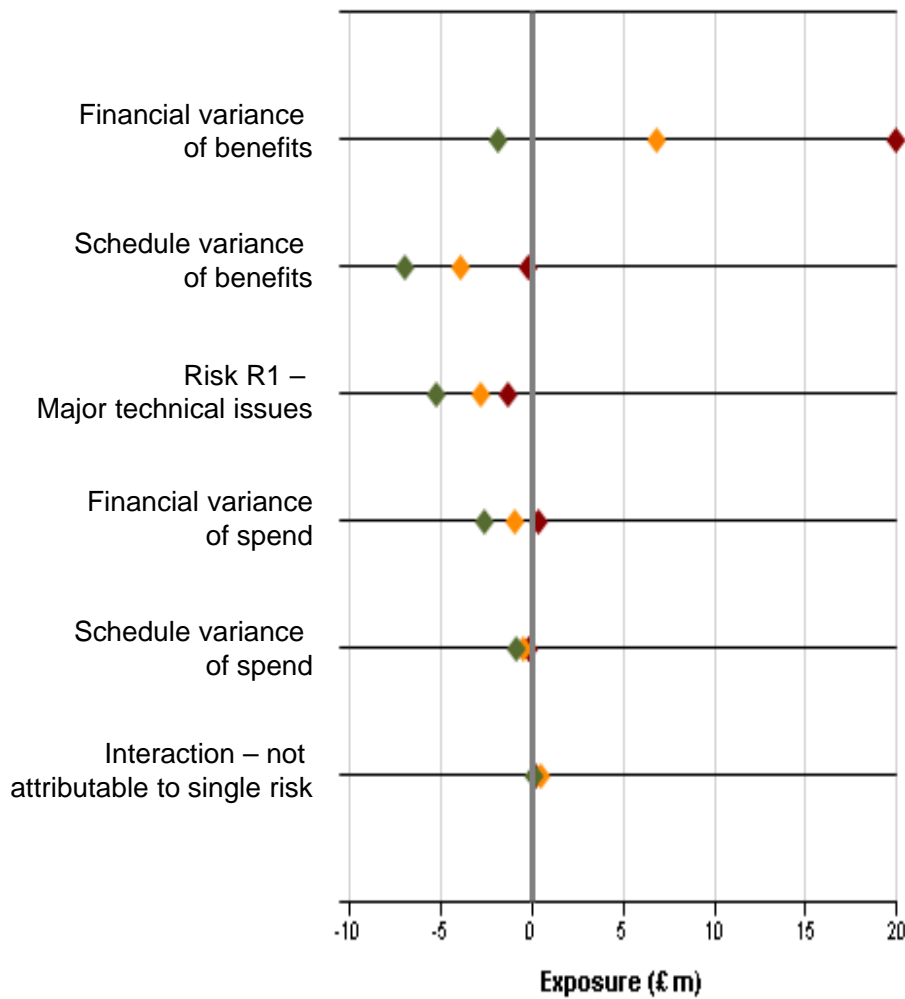


### Spend

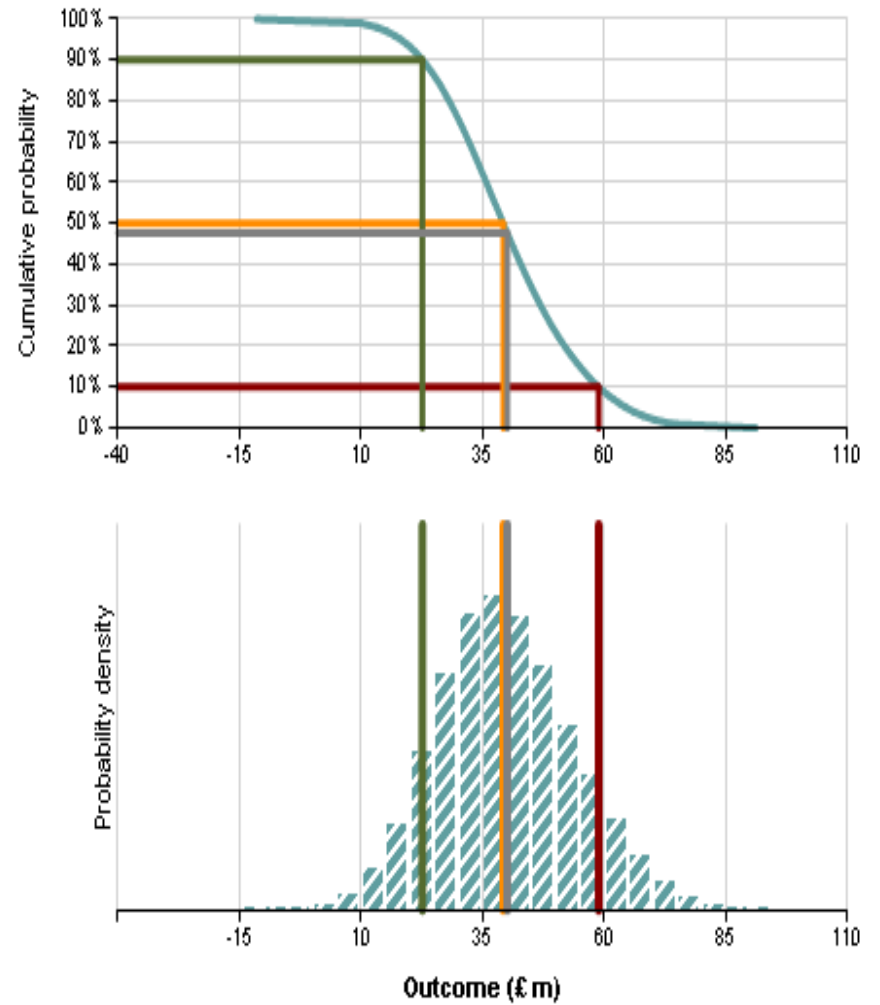


— Base	£40 m
Mean	£40 m = £43.8 k decrease from base (-0.1 %)
■ P10	£58.8 m = £18.8 m increase on base (47.0 %)
■ P50	£39.2 m = £817.3 k decrease from base (-2.0 %)
■ P90	£22.6 m = £17.4 m decrease from base (-43.6 %)

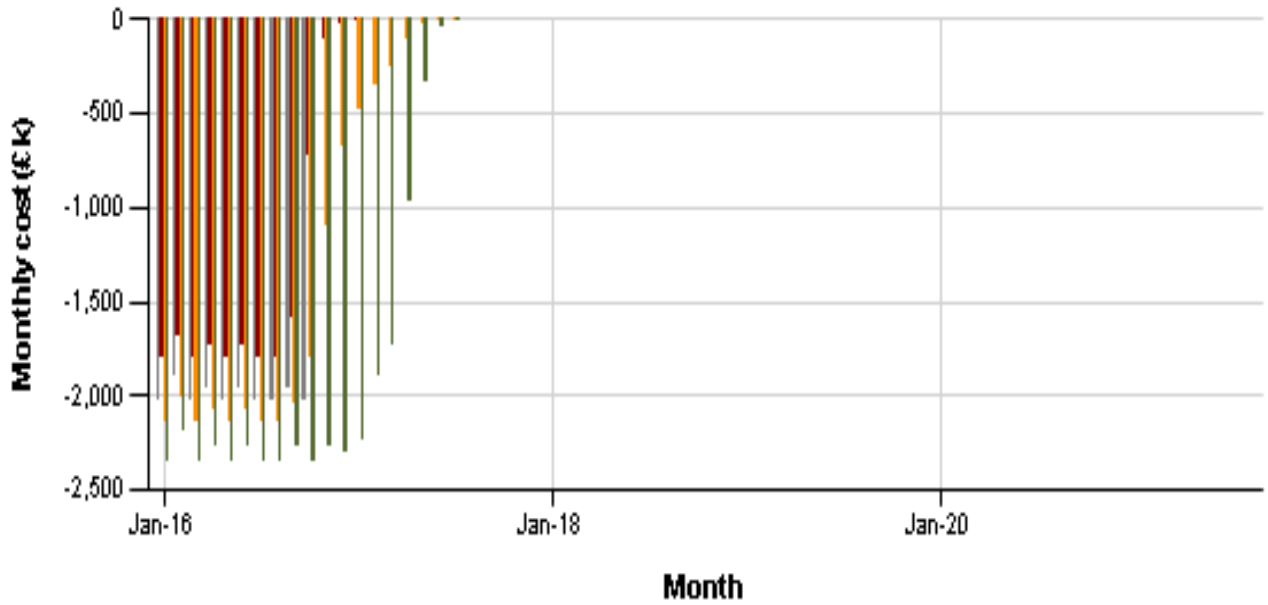
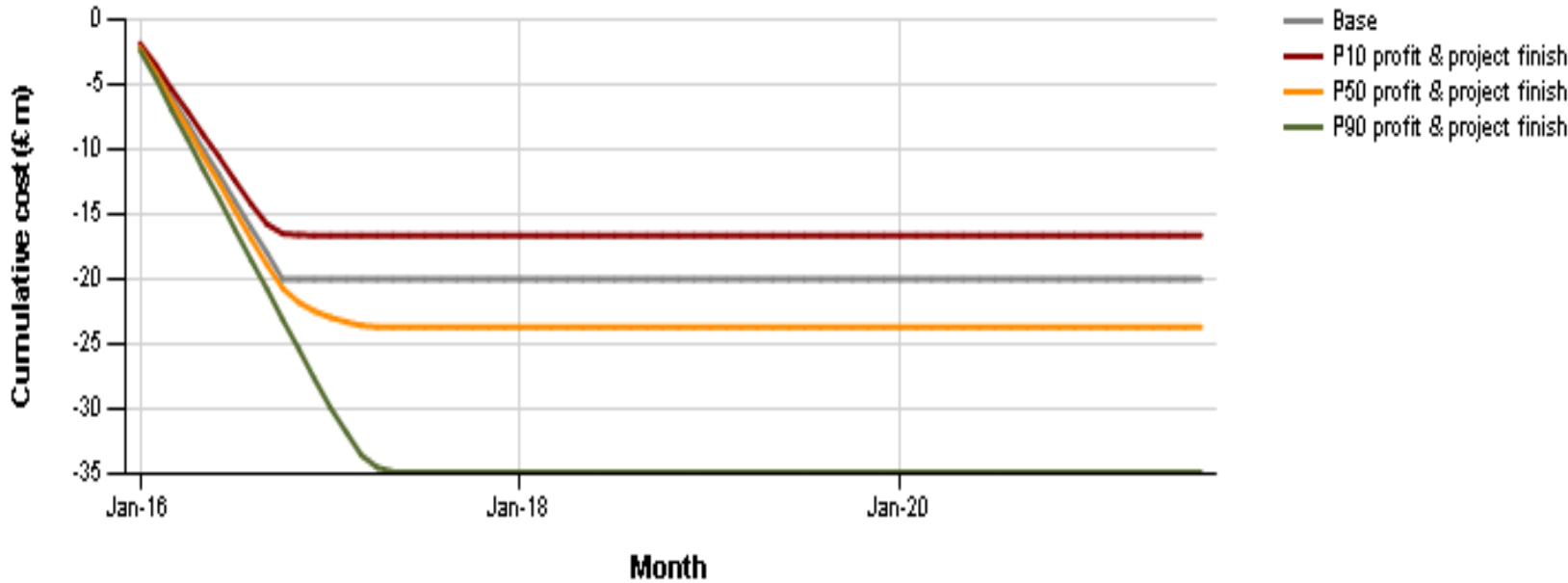
Top risks to profit



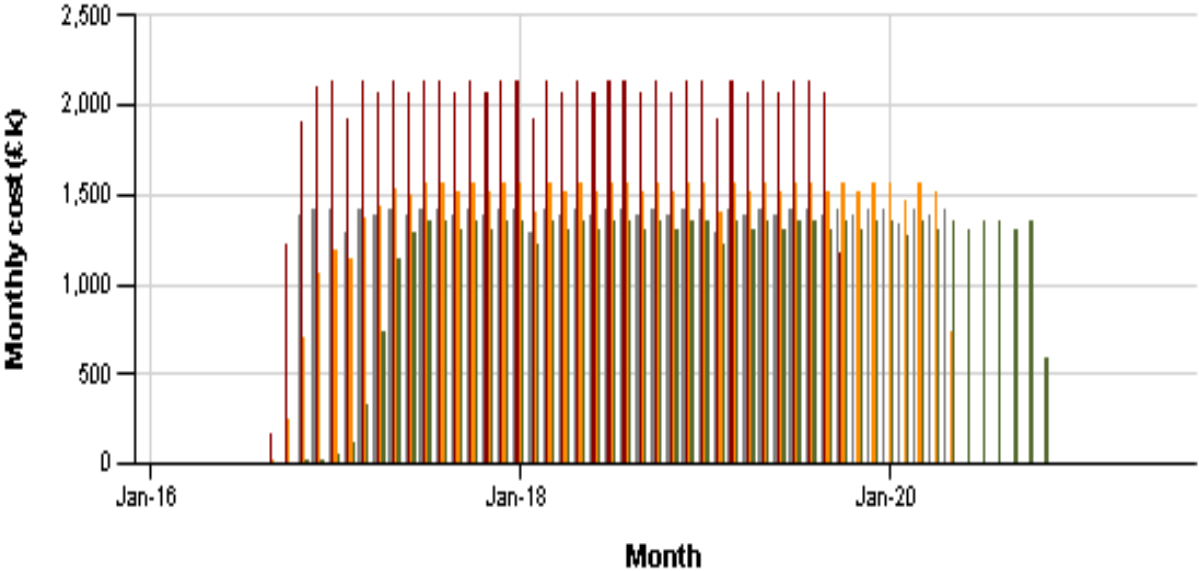
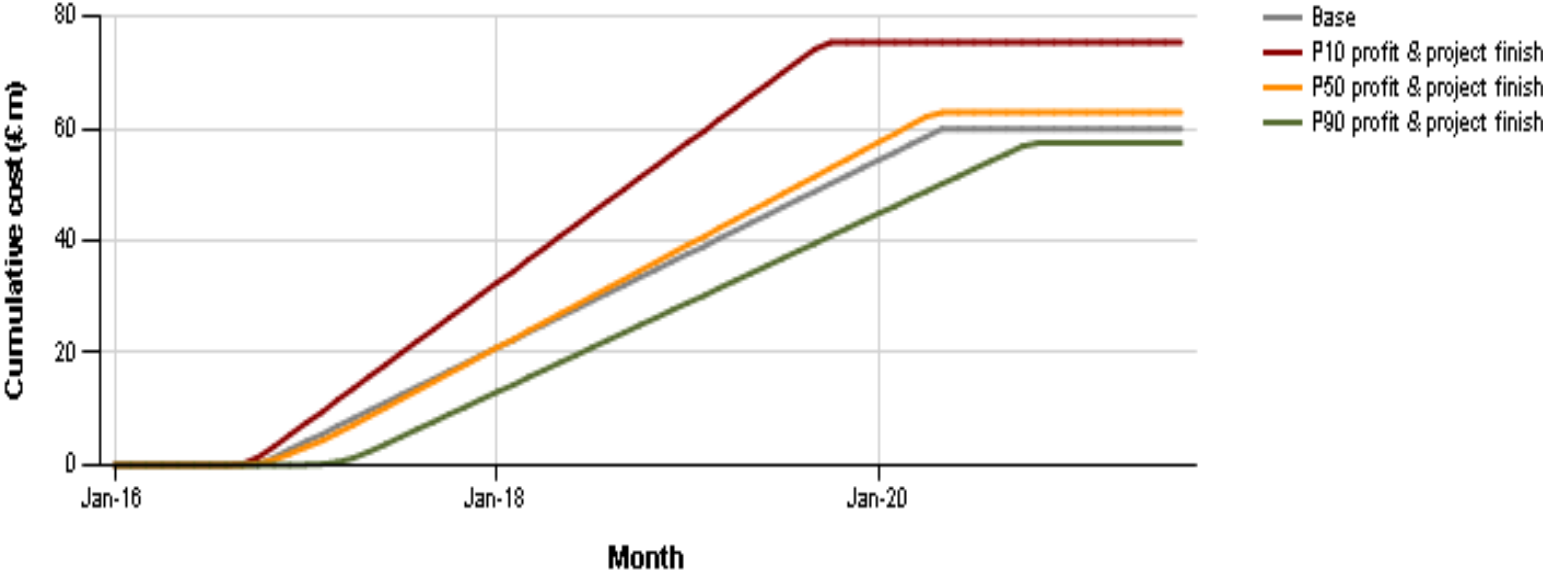
Profit



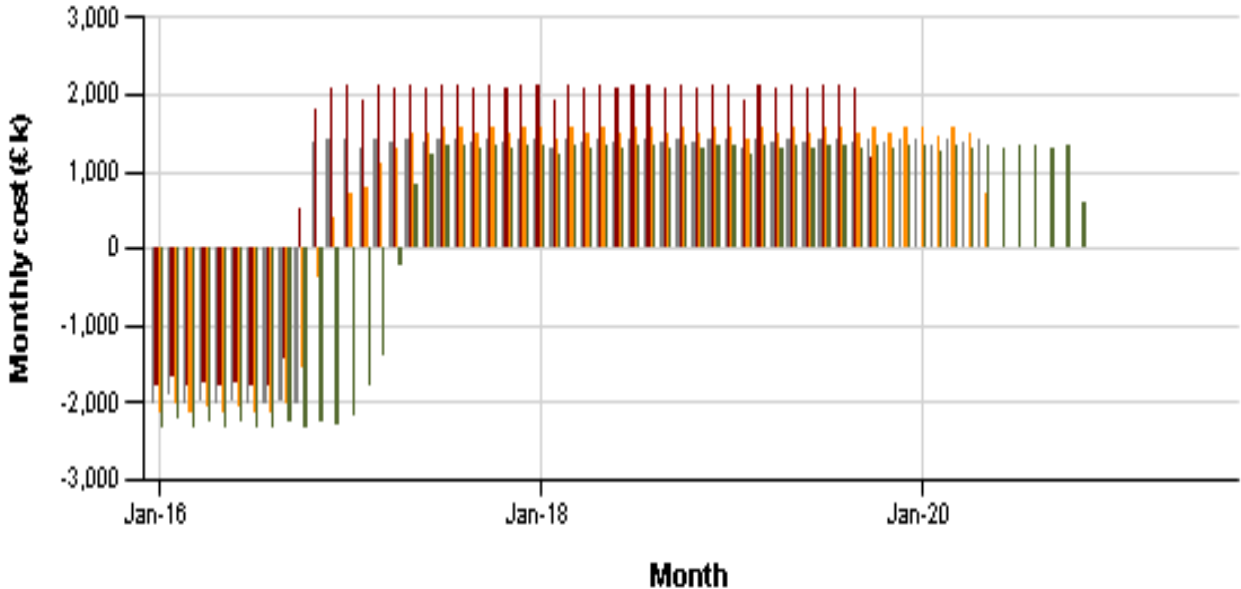
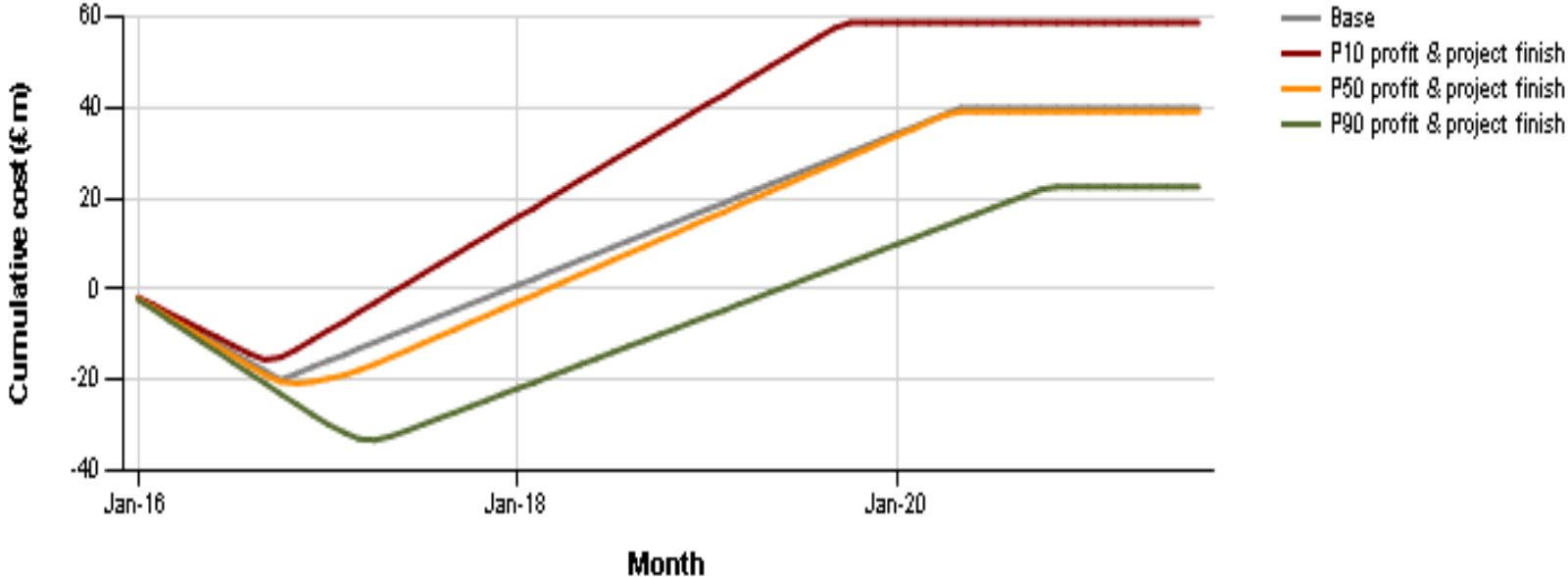
### Phasing of spend



### Phasing of benefits



### Phasing of profit

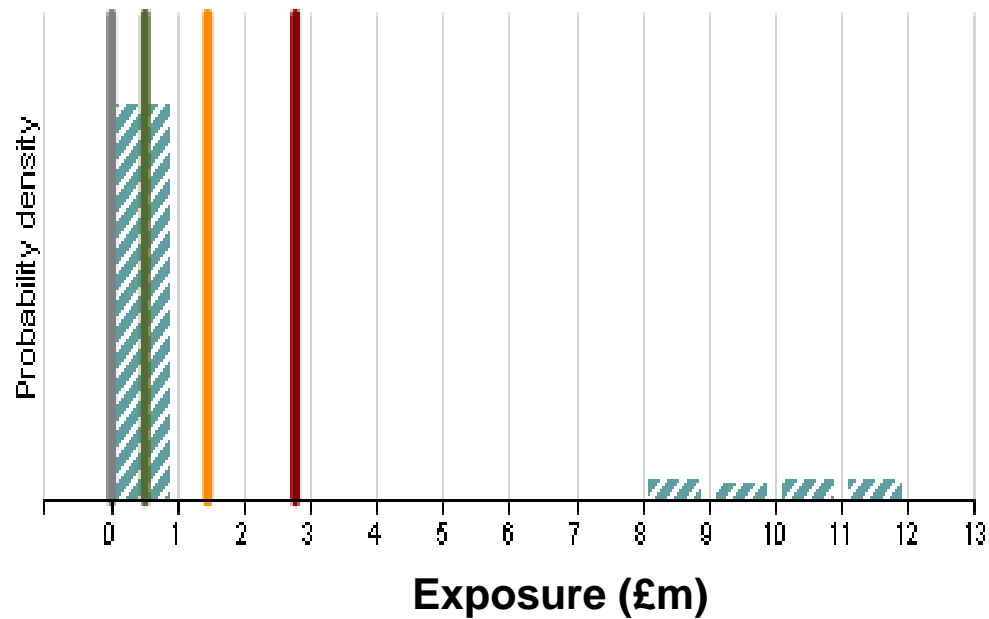
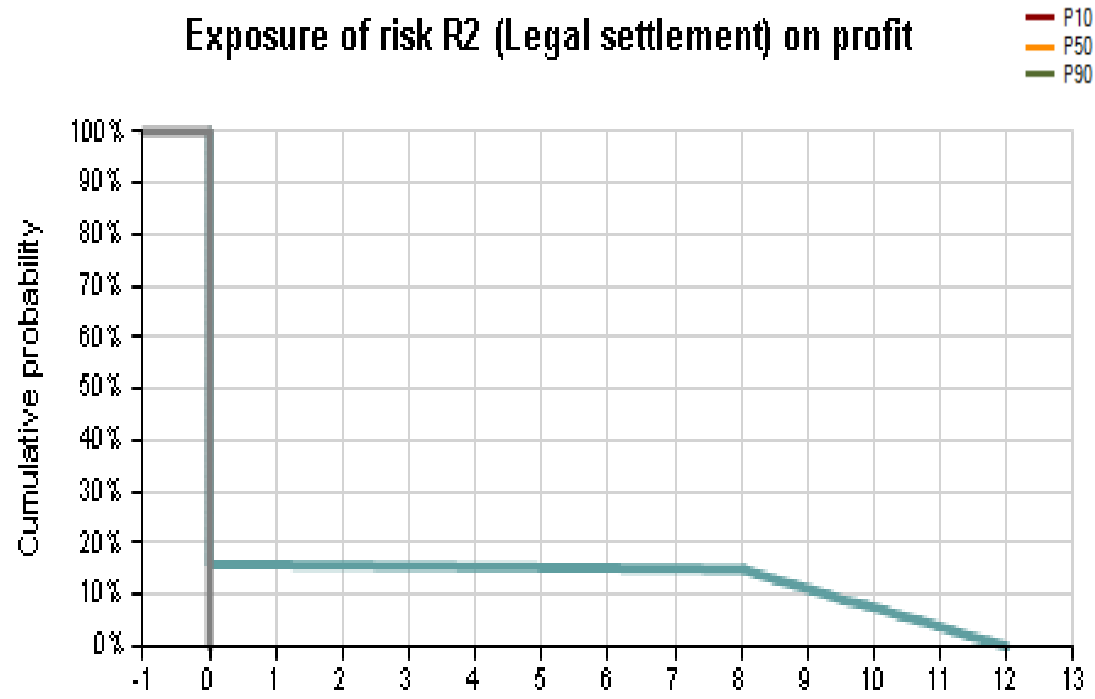


# With a “positive risk”

							Risks	
	Base cost	2016	2017	2018	2019	2020	Financial	Schedule
Spend	-£20m						Variance: -20% / +30%	Variance: -18% / +25%
Benefits	£60m						Variance: -10% / +40%	Risk R1 - Major technical issues (prob 30%): 90d - 180d
Potential legal settlement							Risk R2 - Legal settlement (prob 15%): £8m - £12m	
Profit	£40m							

	Base cost
Spend	-£20m
Benefits	£60m
Potential legal settlement	
Profit	£40m

### Exposure of risk R2 (Legal settlement) on profit

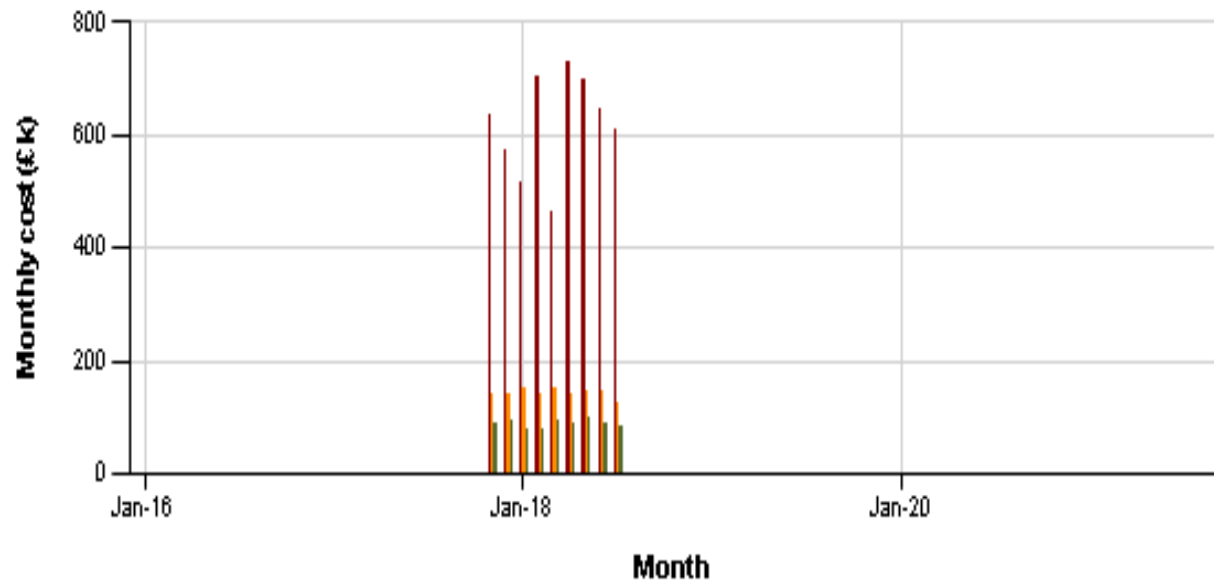
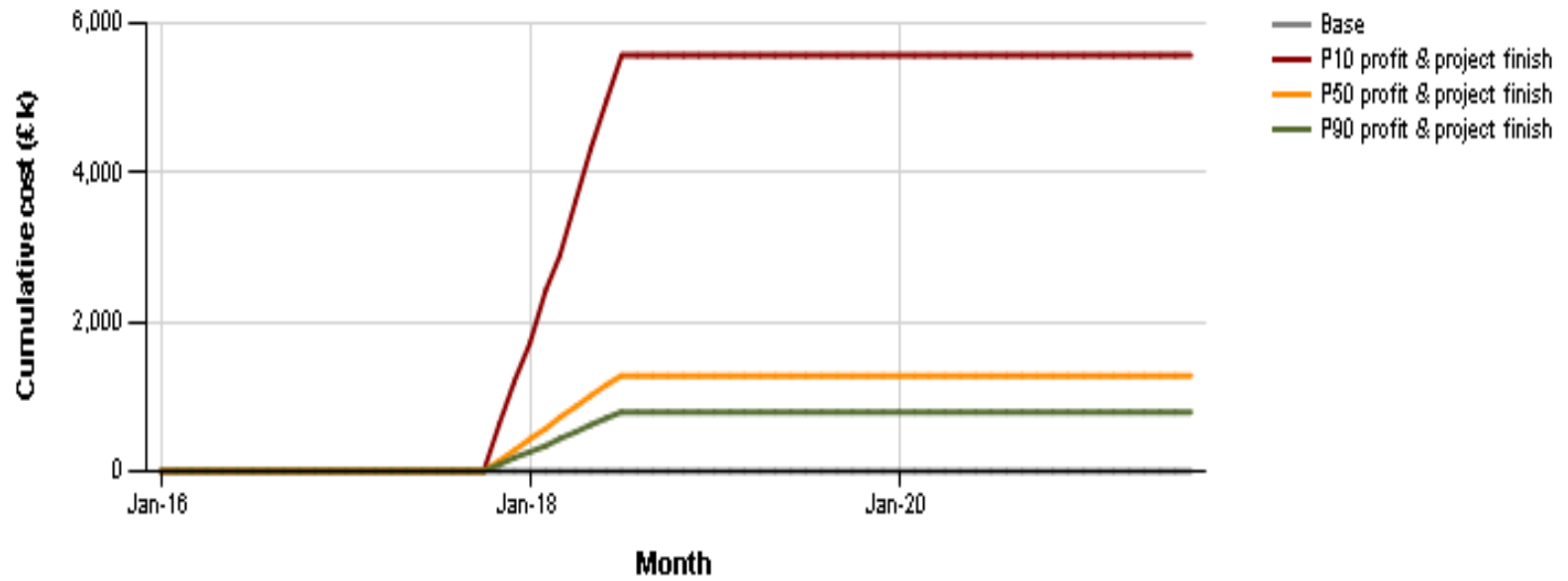


3%
Technical issues (prob 30%): 90d - 180d
3%
m

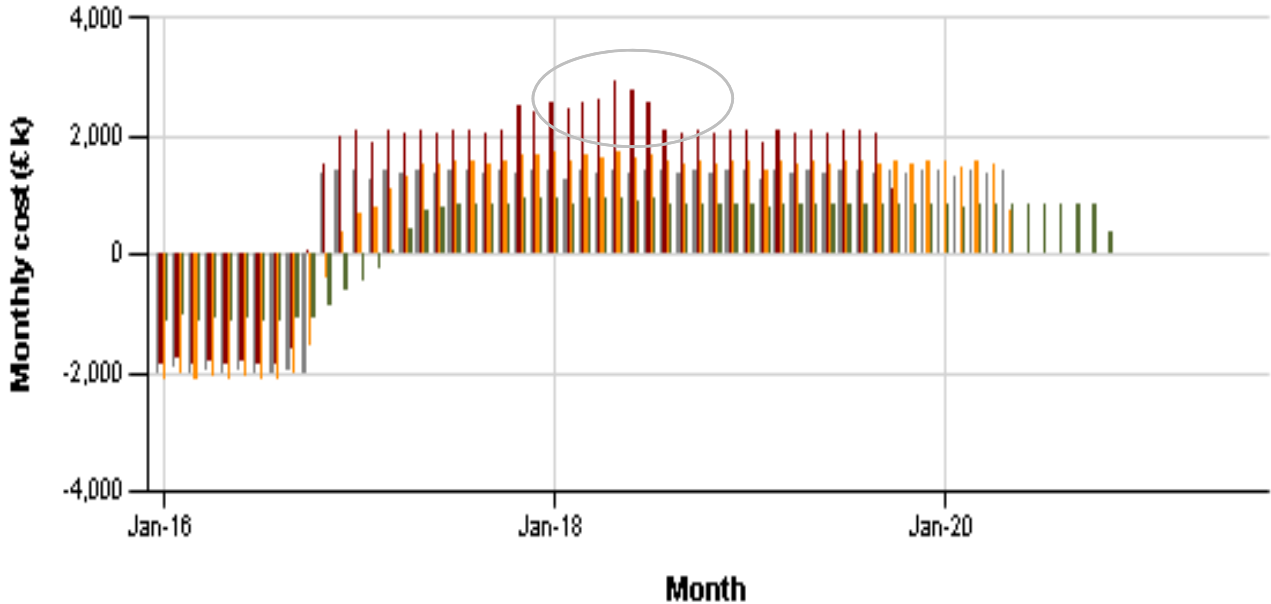
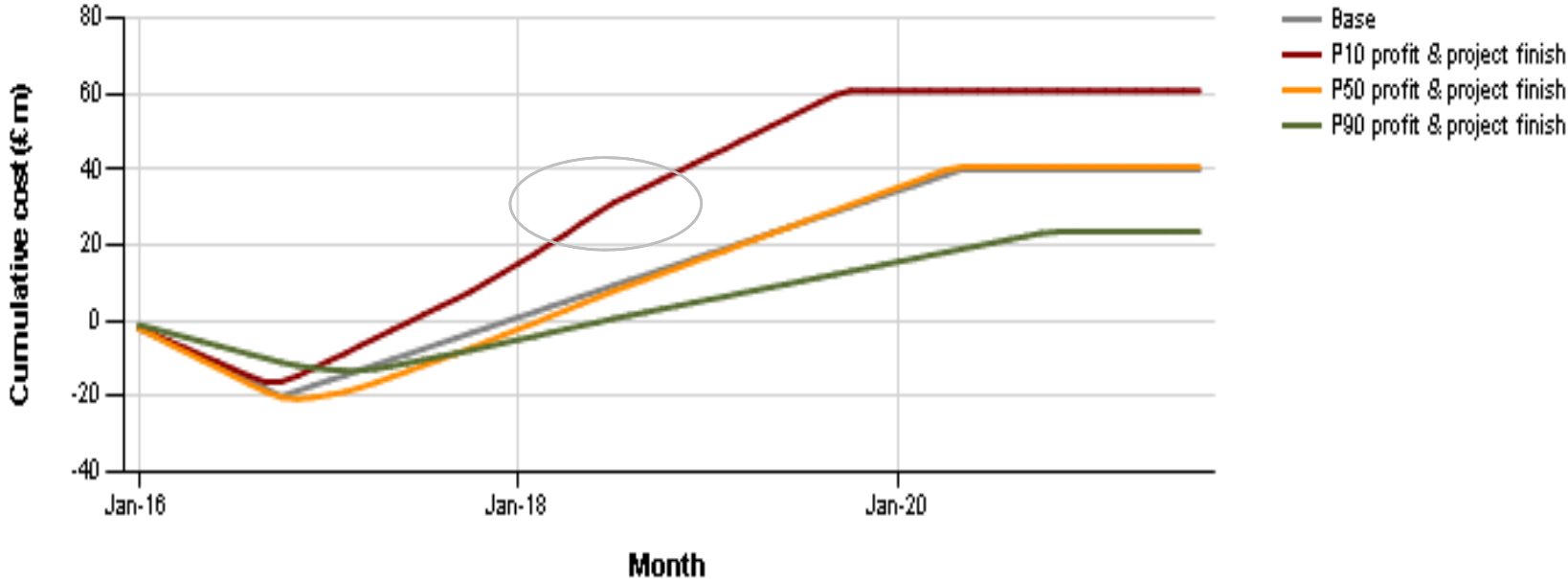


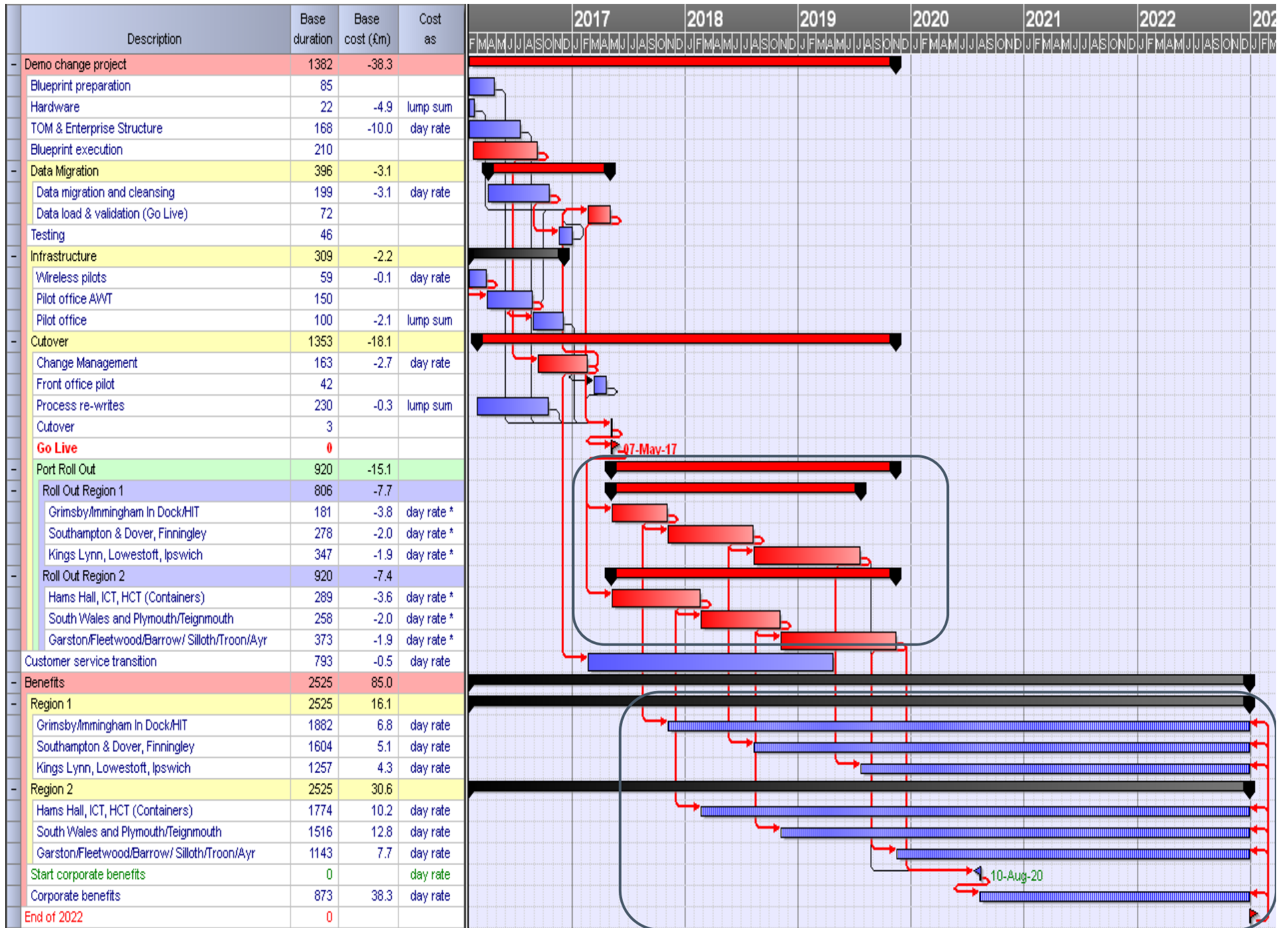


### Phasing of cost impact of legal settlement



### Phasing of profit





Activity	Base start	Base duration	Base finish	Base cost	Risks
2 Blueprint preparation	01-Feb-16	85	26-Apr-16		Variance: -20% / +40% (Trigen) Risk R01 - Subcontractor failure (orob 10%): 80d - 120d (Uniform) Risk R06 - Subcontract
3 Hardware	01-Jan-16	22	23-Jan-16	-£4.9m	Variance: -18% / +41% Risk R01 - Subcontract
7 TOM & Enterprise Structure	01-Jan-16	168	17-Jun-16	-£10.m	Variance: -20% / +40% Risk R07 - Validity of de
11 Blueprint execution	15-Feb-16	210	12-Sep-16		Variance: -20% / +40% Risk R01 - Subcontract
27 Data migration and cleansing	04-Apr-16	199	20-Oct-16	-£3.1m	Variance: -20% / +40% Risk R02 - Data quality
32 Data load & validation (Go Live)	22-Feb-17	72	05-May-17		Variance: -19% / +40% Risk R04 - User accepta
33 Testing	19-Nov-16	46	04-Jan-17		Variance: -20% / +39% Risk R08 - Re-work (prc
37 Wireless pilots	01-Jan-16	59	29-Feb-16	-£0.1m	Variance: -20% / +41% Risk R06 - Subcontract
39 Pilot office AWT	29-Feb-16	150	28-Jul-16		Variance: -20% / +40% Risk R06 - Subcontract
40 Pilot office	28-Jul-16	100	05-Nov-16	-£2.1m	Variance: -20% / +40% Risk R07 - Validity of de
47 Change Management	12-Sep-16	163	22-Feb-17	-£2.7m	Variance: -20% / +40% Risk R03 - Retention of
53 Front office pilot	13-Mar-17	42	24-Apr-17		Variance: -19% / +40% Risk R05 - Stability of s
58 Process re-writes	01-Mar-16	230	17-Oct-16	-£0.3m	Variance: -20% / +40% Risk R09 - Major failure
59 Cutover	05-May-17	3	08-May-17		Variance: -33% / +33% Risk R09 - Major failure
60 Go Live	08-May-17	0	08-May-17		Risk R10 - Customer ad
64 Grimsby/Immingham In Dock/HIT	08-May-17	181	05-Nov-17	-£3.8m	Variance: -20% / +40% Risk R03 - Retention of Risk R05 - Stability of s Risk R09 - Major failure
74 Southampton & Dover, Fittingley	05-Nov-17	278	10-Aug-18	-£2.m	Variance: -20% / +40% Risk R03 - Retention of Risk R10 - Customer ad
84 Kings Lynn, Lowestoft, Ipswich	10-Aug-18	347	23-Jul-19	-£1.9m	Variance: -20% / +40% Risk R03 - Retention of Risk R10 - Customer ad
95 Hams Hall, ICT, HCT (Containers)	08-May-17	289	21-Feb-18	-£3.6m	Variance: -20% / +40% Risk R03 - Retention of Risk R05 - Stability of s Risk R09 - Major failure
105 South Wales and Plymouth/Teignmouth	21-Feb-18	258	06-Nov-18	-£2.m	Variance: -20% / +40% (Trigen) Risk R03 - Retention of key business staff (prob 20%): 10d - 20d (Uniform) Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
115 Garston/Fleetwood/Barrow/Silloth/Troon/Ayr	06-Nov-18	373	14-Nov-19	-£1.9m	Variance: -20% / +40% (Trigen) Risk R03 - Retention of key business staff (prob 20%): 10d - 20d (Uniform) Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
130 Customer service transition	22-Feb-17	793	26-Apr-19	-£0.5m	Variance: -20% / +40% (Trigen) Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
220 Grimsby/Immingham In Dock/HIT	05-Nov-17	0	31-Dec-22	£6.8m	
230 Southampton & Dover, Fittingley	10-Aug-18	0	31-Dec-22	£5.1m	
240 Kings Lynn, Lowestoft, Ipswich	23-Jul-19	0	31-Dec-22	£4.2m	
260 Hams Hall, ICT, HCT (Containers)	21-Feb-18	0	31-Dec-22	£10.2m	
270 South Wales and Plymouth/Teignmouth	06-Nov-18	0	31-Dec-22	£12.7m	
280 Garston/Fleetwood/Barrow/Silloth/	14-Nov-19	0	31-Dec-22	£7.7m	
290 Corporate benefits	10-Aug-20	0	31-Dec-22	£38.3m	
310 Start corporate benefits	10-Aug-20	0	10-Aug-20	£0.m	Risk R11 - Corporate adoption (prob 5%): £-8.00m - £-5.00m (Uniform)
340 Finish rollouts	14-Nov-19				
330 In-service rework	13-Nov-20	1	14-Nov-20	£0.m	Risk R12 - In-service re-work (prob 20%): £-50.00m - £-30.00m (Uniform)

Cost line	Base cost	Risks
C1 Training	-£2.5m	Variance: -5% / +5% (Trigen)
C2 Restructure	-£10.m	Variance: -5% / +20% (Trigen)
C3 Hardware	-£7.m	Variance: -5% / +5% (Trigen)
C4 Roll-out	-£15.5m	Variance: -5% / +5% (Trigen)

Cost line	Base cost	Risks
C1 Training	-£2.5m	Variance: -5% / +5% (Trigen)
C2 Restructure	-£10.m	Variance: -5% / +20% (Trigen)
C3 Hardware	-£7.m	Variance: -5% / +5% (Trigen)
C4 Roll-out	-£15.5m	Variance: -5% / +5% (Trigen)
C5 Change leadership	-£2.5m	Variance: -5% / +5% (Trigen)
C6 Customer service transformation	-£0.5m	Variance: -5% / +5% (Trigen)
C7 Communications and engagement	-£0.8m	Variance: -5% / +5% (Trigen)
B1 Salary	£30.m	Variance: -2% / +20% (Trigen)
B2 Travel, subsistence logistics	£20.m	Variance: -7% / +20% (Trigen)
B3 Third party costs	£10.m	Variance: -5% / +5% (Trigen)
B4 Legacy IT costs	£25.m	Variance: -20% / +40% (Trigen)

**Total profit**

**£46.2m**

Total profit

£46.2m

Activity	Base start	Base duration	Base finish	Base cost	Risks
2 Blueprint preparation	01-Feb-16	85	26-Apr-16		Variance: -20% / +40% (Trigen) Risk R01 - Subcontractor failure (prob 10%): 80d - 120d (Uniform) Risk R06 - Subcontractor reliability (prob 20%): 20d - 40d (Uniform)
3 Hardware	01-Jan-16	22	23-Jan-16	-£4.9m	Variance: -18% / +41% (Trigen)
7 TOM & Enterprise Structure	01-Jan-16	168	17-Jun-16	-£10.m	Variance: -20% / +40% (Trigen)

Cost line	Base cost	Risks
C1 Training	-£2.5m	Variance: -5% / +5% (Trigen)
C2 Restructure	-£10.m	Variance: -5% / +20% (Trigen)
C3 Hardware	-£7.m	Variance: -5% / +5% (Trigen)
C4 Roll-out	-£15.5m	Variance: -5% / +5% (Trigen)
C5 Change leadership	-£2.5m	Variance: -5% / +5% (Trigen)
C6 Customer service transformation	-£0.5m	Variance: -5% / +5% (Trigen)
C7 Communications and engagement	-£0.8m	Variance: -5% / +5% (Trigen)
B1 Salary	£30.m	Variance: -2% / +20% (Trigen)

						Risk R09 - Major failure of solution (prob 2%): £-5.00m - £-3.00m (Uniform)
						Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
105 South Wales and Plymouth/Teignmouth	21-Feb-18	258	06-Nov-18	-£2.m		Variance: -20% / +40% (Trigen)
						Risk R03 - Retention of key business staff (prob 20%): 10d - 20d (Uniform)
						Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
115 Garston/Fleetwood/Barrow/Silloth/Troon/Ayr	06-Nov-18	373	14-Nov-19	-£1.9m		Variance: -20% / +40% (Trigen)
						Risk R03 - Retention of key business staff (prob 20%): 10d - 20d (Uniform)
						Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
130 Customer service transition	22-Feb-17	793	26-Apr-19	-£0.5m		Variance: -20% / +40% (Trigen)
						Risk R10 - Customer adoption (prob 10%): 60d - 180d (Uniform)
220 Grimsby/Immingham In Dock/HIT	05-Nov-17	0	31-Dec-22	£6.8m		
230 Southampton & Dover, Fingleton	10-Aug-18	0	31-Dec-22	£5.1m		
240 Kings Lynn, Lowestoft, Ipswich	23-Jul-19	0	31-Dec-22	£4.2m		
260 Hams Hall, ICT, HCT (Containers)	21-Feb-18	0	31-Dec-22	£10.2m		
270 South Wales and Plymouth/Teignmouth	06-Nov-18	0	31-Dec-22	£12.7m		
280 Garston/Fleetwood/Barrow/Silloth/Troon/Ayr	14-Nov-19	0	31-Dec-22	£7.7m		
290 Corporate benefits	10-Aug-20	0	31-Dec-22	£38.3m		
310 Start corporate benefits	10-Aug-20	0	10-Aug-20	£0.m		Risk R11 - Corporate adoption (prob 5%): £-8.00m - £-5.00m (Uniform)
340 Finish rollouts			14-Nov-19			
330 In-service rework	13-Nov-20	1	14-Nov-20	£0.m		Risk R12 - In-service re-work (prob 20%): £-50.00m - £-30.00m (Uniform)

**Total profit**

**£46.2m**

240 Kings Lynn, Lowestoft, Ipswich	23-Jul-19	0	31-Dec-22	£4.2m	
260 Hams Hall, ICT, HCT (Containers)	21-Feb-18	0	31-Dec-22	£10.2m	
270 South Wales and Plymouth/Teignmouth	06-Nov-18	0	31-Dec-22	£12.7m	
280 Garston/Fleetwood/Barrow/Silloth/Troon/Ayr	14-Nov-19	0	31-Dec-22	£7.7m	
290 Corporate benefits	10-Aug-20	0	31-Dec-22	£38.3m	
310 Start corporate benefits	10-Aug-20	0	10-Aug-20	£0.m	Risk R11 - Corporate adoption (prob 5%): £-8.00m - £-5.00m (Uniform)
340 Finish rollouts			14-Nov-19		
330 In-service rework	13-Nov-20	1	14-Nov-20	£0.m	Risk R12 - In-service re-work (prob 20%): £-50.00m - £-30.00m (Uniform)

Total profit

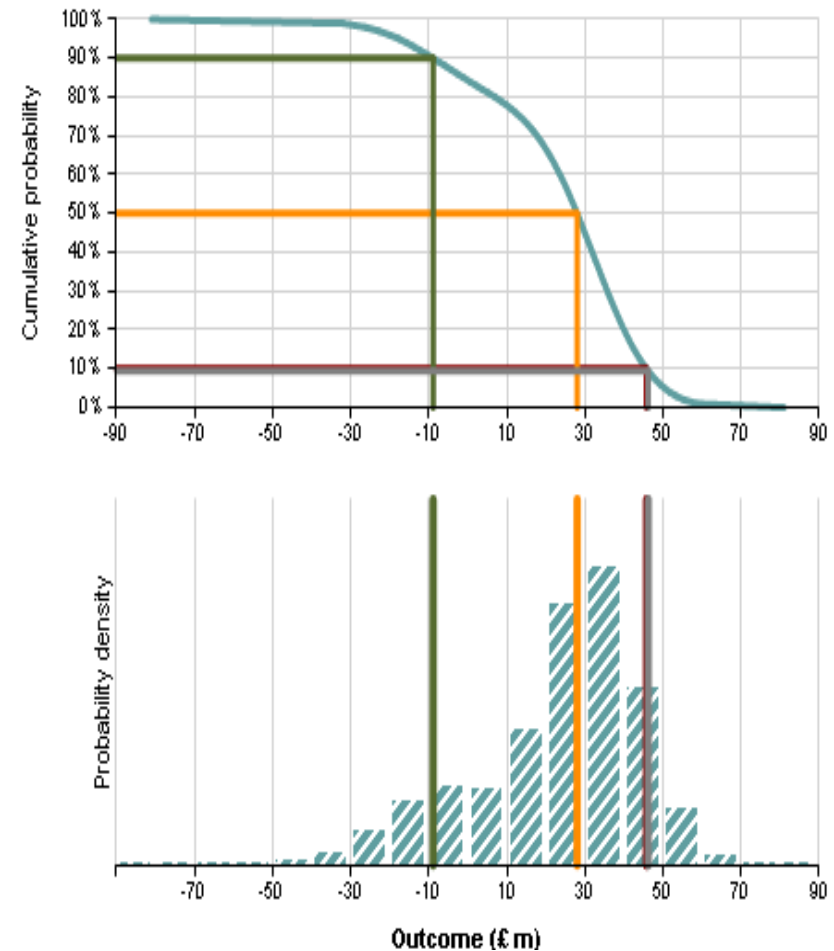
£46.2m

— Base	£46.2 m
Mean	£23.5 m = £22.7 m decrease from base (-49.2 %)
— P10	£45.8 m = £433.1 k decrease from base (-0.9 %)
— P50	£28 m = £18.2 m decrease from base (-39.4 %)
— P90	£-8,904.8 k = £55.1 m decrease from base (-119.3 %)

### Top risks to profit

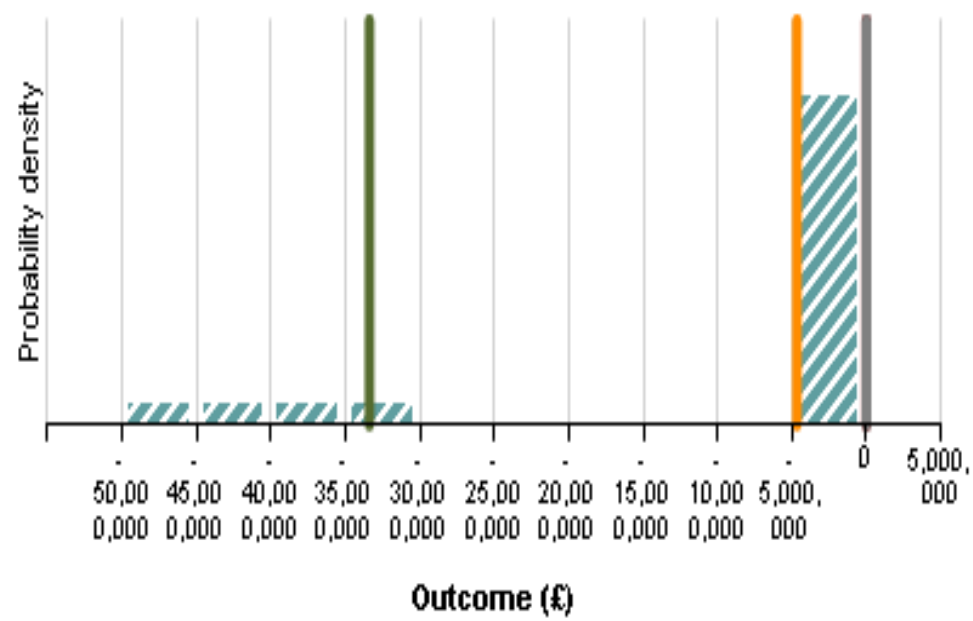
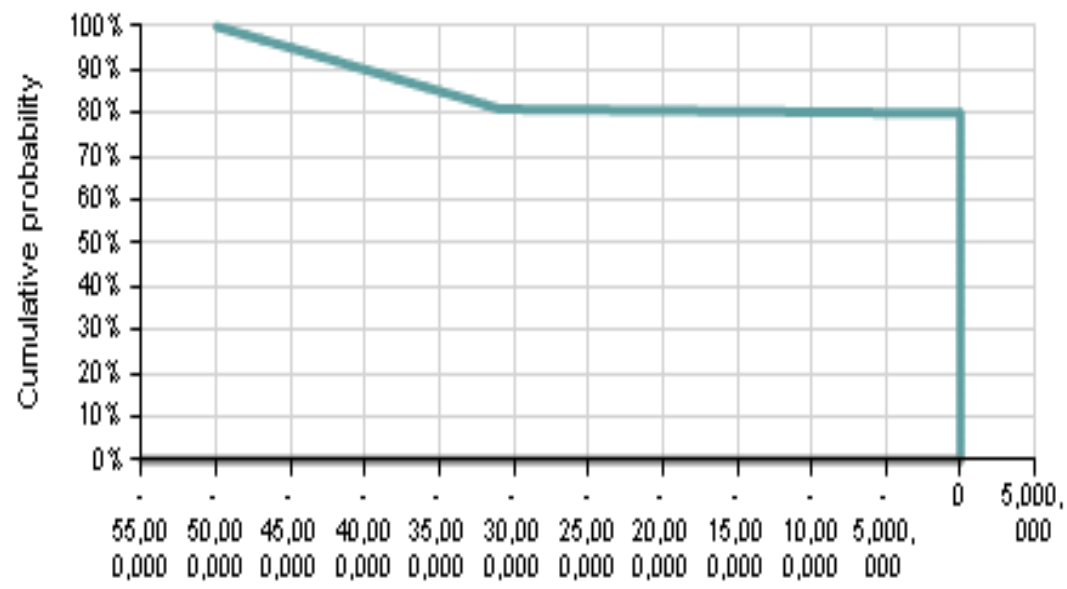


### Profit

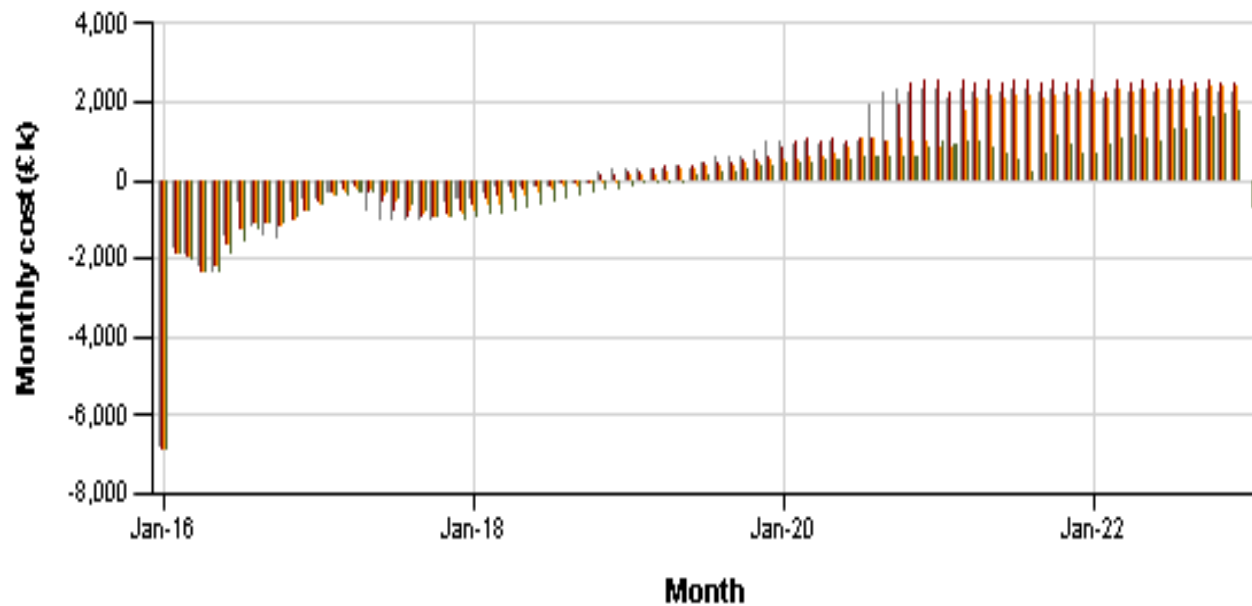
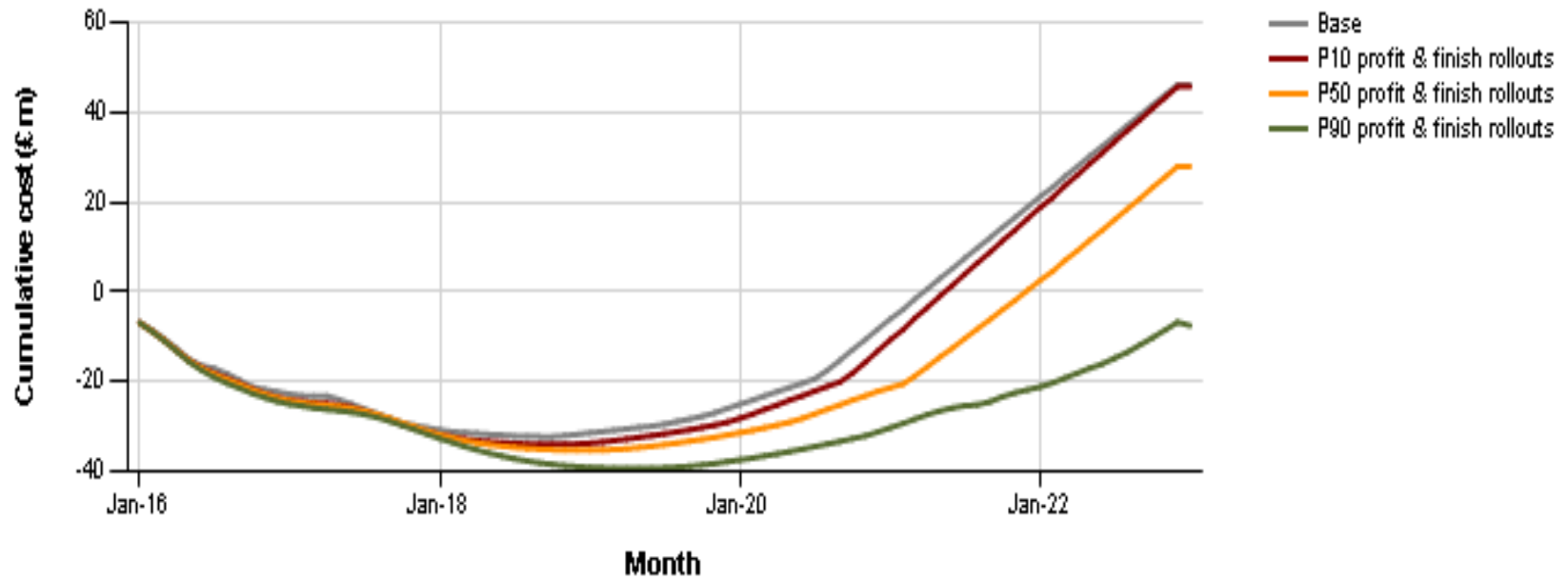


## Cost impact of In-service re-work

- P10
- P50
- P90



## Phasing of profit

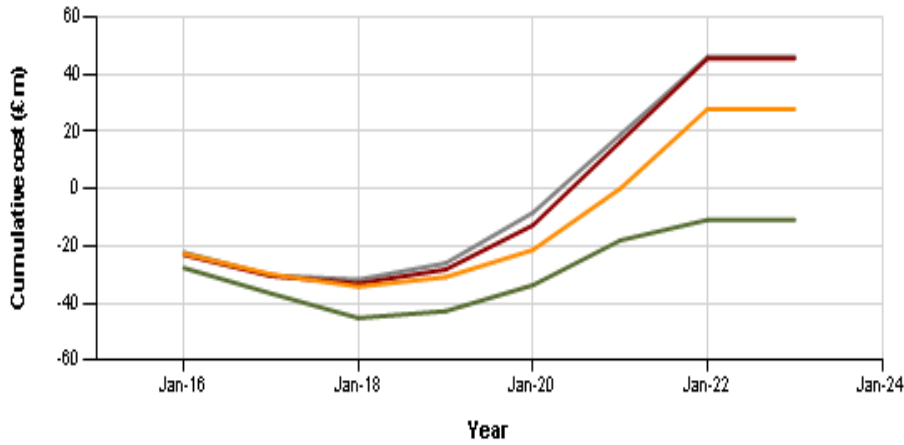




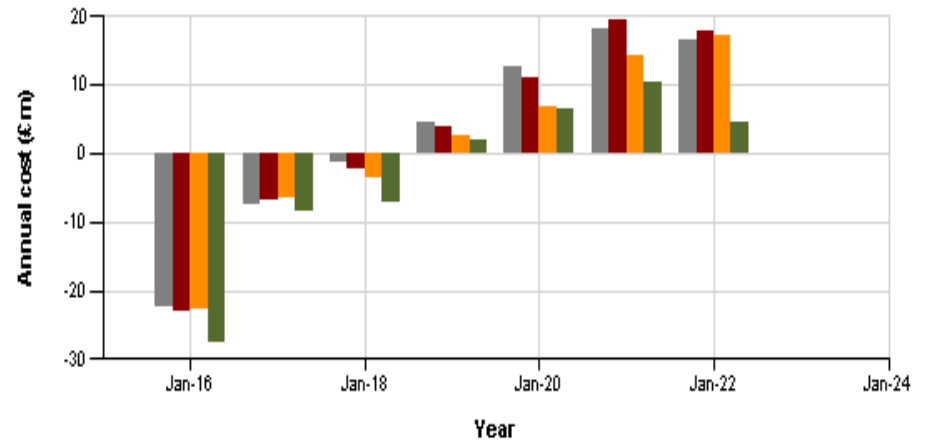
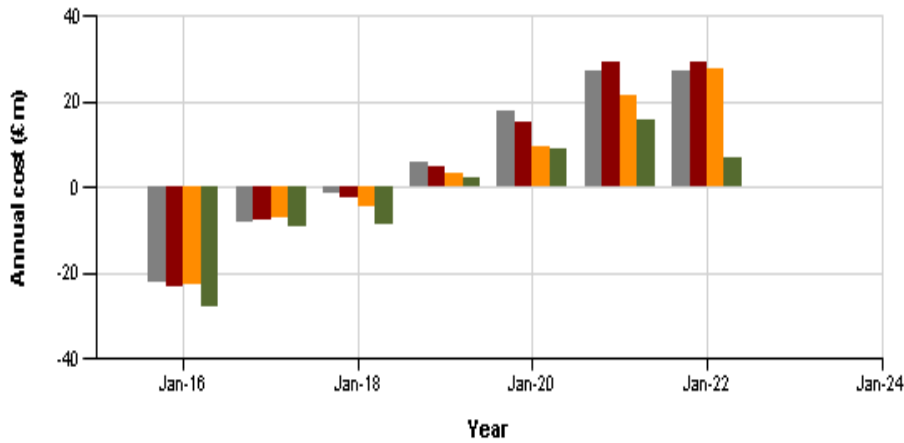
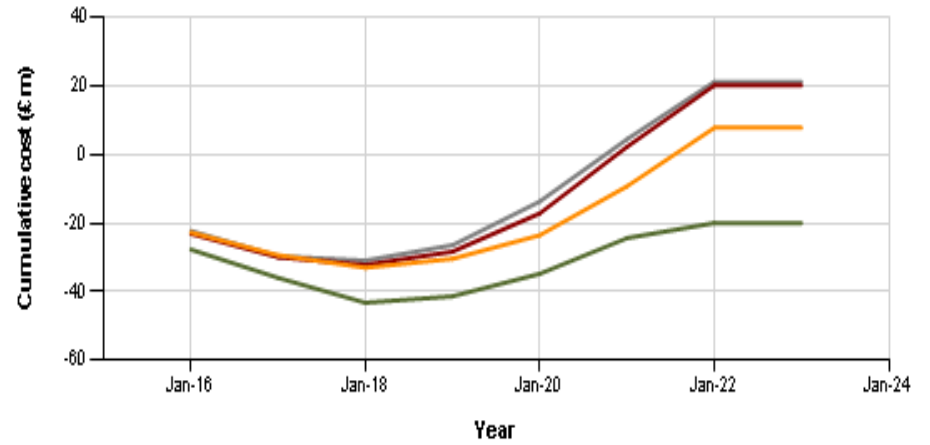
— Base  
— P10 profit & finish rollouts  
— P50 profit & finish rollouts  
— P90 profit & finish rollouts

Discounted at 8.5% per year (except first period)

Phasing of profit



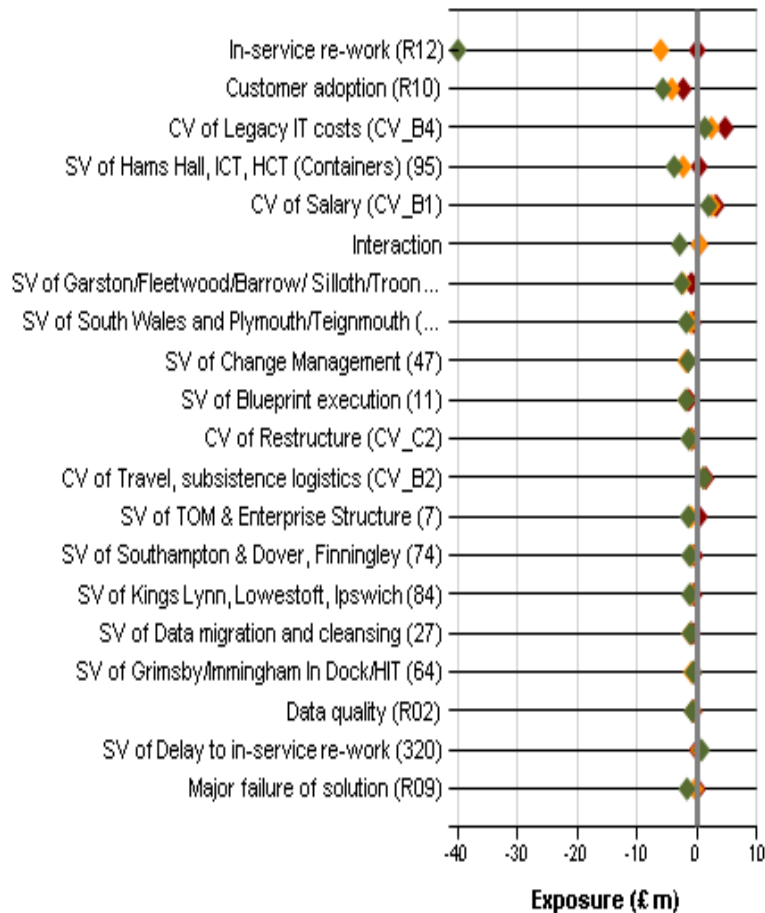
Discounted phasing of profit



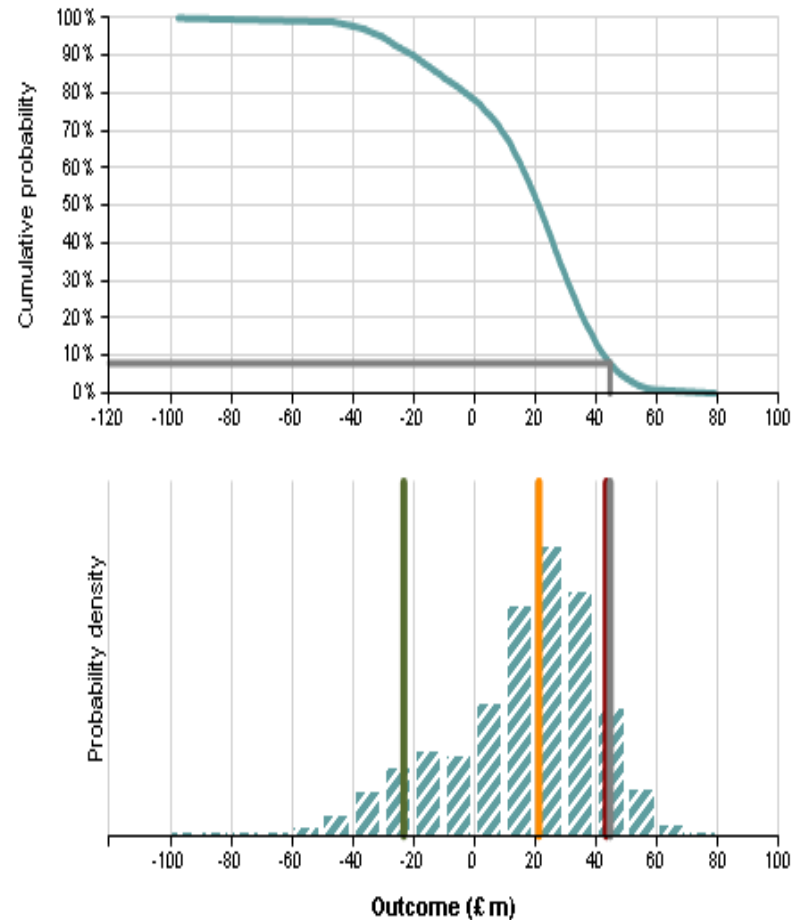
—	Base	£44.5 m
	Mean	£16.3 m = £28.2 m decrease from base (-63.3 %)
—	P10	£43.3 m = £1,212.5 k decrease from base (-2.7 %)
—	P50	£21.1 m = £23.4 m decrease from base (-52.5 %)
—	P90	£-23.3 m = £67.8 m decrease from base (-152.4 %)

○ as percentiles ● of profit

### Top risks to NPV



### NPV



Thank you!  
Questions?

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