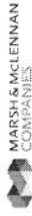


WIDP Monte Carlo Simulation Model

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Read Me

This sheet explains the working of the Waste Capacity Forecast Model, including the use of Monte Carlo simulation methods. A separate report is available which goes into greater detail.

Values in yellow are user inputs. These define the distribution of the random variables and allow entry of historical data.

Values in blue are calculations - please do not edit.

Values in pale green are links to other cells or sheets - please do not edit.

WIDP Monte Carlo Simulation Model

Objectives

The objective of this model is to provide WIDP with a forecast of the waste infrastructure capacity operational by 2020. Diversion capacity is needed by 2020 in order to ensure that England meets its EU Directive target for the diversion of biodegradable municipal solid waste (BMW) from landfill.

Methods Used

- 1 An estimate of the municipal solid waste (MSW) arising in 2020 is provided by Defra colleagues. From this, the assumed tonnage of recycling is deducted giving the residual MSW arising. The BMW % of MSW is specified. This gives the residual BMW arising.
A forecast of BMW diversion capacity is then deducted from this, to give a figure for BMW consigned to landfill. This is compared to the 2020 target to give a surplus/(deficit) of diversion capacity.
- 2 An alternative method is also used to forecast surplus/(deficit) capacity. This method can be updated each year using actual outturn data. The most recent year when data is available is selected. Arisings in that year are compared to the BMW consigned to landfill to give an implied BMW diversion capacity. Diversion capacity in 2020 is calculated as implied diversion in base year + expected future additions. This is compared to forecast arisings in 2020 to calculate surplus/(deficit) capacity.

Monte Carlo Simulation

NERA Economic Consulting were commissioned to adapt the model to allow random simulation of likely outcomes. This simulation is referred to as a "Monte Carlo" model. Examining the result of this simulation will allow Defra to understand the probability of achieving the 2020 target, *conditional* on no further action being taken to develop infrastructure. Random simulation of different inputs also allows Defra to examine the sensitivity of surplus/deficit capacity to certain inputs.

Using The Model

Using the Monte Carlo features of this model requires the Excel add-in @Risk. This add-in allows the simple manipulation of random variables and simulation runs.

Using Excel 2010, @Risk appears as a separate ribbon. Toggle between static (i.e. mean) and random values by clicking the "dice" icon.

To run the model, and examine the likely values of the outputs in 2020, select a cell containing =RiskOutput() and click "Start Simulation".

To examine changes to input variables, vary the mean and range of the random variables, all highlighted in yellow.

To alter the distribution of a random variable, click it and select "Define Distribution" from the @Risk ribbon.

Different random variables are likely to be correlated, for example waste arising from households and C&I. These correlations may be varied between -1/1.

Date	Change
22/11/2012	BMW content to landfill changed from 11.38 to 12.22MT
26/11/2012	LA waste arisings forecasts updated (central = mean of model A and model B)
26/11/2012	C&I waste arisings forecasts updated
26/11/2012	Ranges for LA and C&I updated
26/11/2012	Correlation changed to zero for "arising to projects" and "projects to projects"
27/11/2012	LA ranges extended to include Model A+1s.d. and Model B-1s.d.
27/11/2012	Household recycling rate updated to reflect latest data
27/11/2012	C&I recycling rate updated to use 2009 figure of 52%
27/11/2012	Positive shocks to arisings given a probability of 20%
28/11/2012	C&I recycling rate updated to use 2010 estimate of 62%
29/11/2012	C&I min and max updated to draw from MSW% variable
29/11/2012	LA recycling rate: mean 51.4% from LAWRRD model, min and max 5% either side
29/11/2012	MSW% of industrial to 4% either side of mean
29/11/2012	MSW% of commercial to 5% either side of mean
29/11/2012	BMBT to EfW changed to 40-60%
29/11/2012	LFMBT efficiency min to 50%
29/11/2012	MT to EfW range introduced of 70-90%
29/11/2012	Outages to 100% (to avoid double counting of adjustments made elsewhere)
30/11/2012	Project inclusion switches added for 4 non-closed PFI projects
30/11/2012	Correlation assumptions changed for recycling-arising for household (15%) and C&I (35%)
05/12/2012	C&I max forecast increased to use (3,2,1) forecast
05/12/2012	Correlation assumptions changed for recycling-arising for household (0%) and C&I (0%)
05/12/2012	BMW % changed to range of 55% to 75% with mid of 68%
05/12/2012	Utilisation rates for technologies other than EfW all given max of 100% as based on throughput estimates
06/12/2012	Updated C&I forecasts to use final published OBR growth determinants (makes no difference)
07/12/2012	C&I recycling rate range increased to 8 percentage point either side of centre
10/12/2012	DARs reverted to original rates, except for operational projects which are 100% because outages are captured by utilisation rates
13/12/2012	Red DAR for merchants changed to 3%
13/12/2012	Programme level risk introduced at uniform 90-100% DAR
13/12/2012	Formula for programme level risk under method 2 amended in output sheet
14/12/2012	Distribution for BMW waste amended
21/12/2012	DAR Option changed from 5% to 0% for projects yet to close
03/01/2013	Mean, 10th percentile and 90th percentile output boxes added

changes from IMAG meeting 29/11/12

changes following Chief-Econ meet 4/12

Modelling

The following worksheets are used to perform the modelling.

No.	Name	Description
1	Outputs	This is where all the outputs that are affected by the Monte Carlo process are affected.
2	Inputs	This is where all the input assumptions that are randomised by the Monte Carlo process are defined.
3	Correlations	This sheet contains a covariance matrix for certain random variables which are model inputs. Please do not edit this sheet manually.
4	Empirical Correlations	This sheet contains a covariance matrix for modeled outputs. This sheet demonstrates the consequence of the input assumptions made on correlations.

Outputs

This sheet summarizes the only user input Simulation Result

Method 1	Method 2	2011	Mt
Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	=D9 =D10 =D11 =D12 =D13 =RiskOutput("Diversion Capacity - Method 2")+VLOOKUP(\$F\$7,Output!\$E\$4:\$E\$19,6) =RiskOutput("BMW to Landfill - Method 2")+F12:F14 =RiskOutput("Surplus/(deficit) capacity - Method 2")+F13:F15	Mt

Simulation Results

Mean	Maximum	Minimum	Standard Deviation	Probability of hitting target
=RiskMean(D16)	=RiskMax(\$D\$16)	=RiskMin(\$D\$16)	=RiskStdDev(\$D\$16)	=1-RiskTarget(D16,0)
Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	=RiskMean(D9) =RiskMean(D10) =RiskMean(D11) =RiskMean(D12) =RiskMean(D13) =RiskMean(D14) =RiskMean(D15) =RiskMean(D16)	=RiskMean(D9) =RiskMean(D10) =RiskMean(D11) =RiskMean(D12) =RiskMean(D13) =RiskMean(D14) =RiskMean(D15) =RiskMean(D16)	=RiskMean(F9) =RiskMean(F10) =RiskMean(F11) =RiskMean(F12) =RiskMean(F13) =RiskMean(F14) =RiskMean(F15) =RiskMean(F16)
90th Percentile				
Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	=RiskPercentile(D9,0.9) =RiskPercentile(D10,0.9) =RiskPercentile(D11,0.9) =RiskPercentile(D12,0.9) =RiskPercentile(D13,0.9) =RiskPercentile(D14,0.9) =RiskPercentile(D15,0.9) =RiskPercentile(D16,0.9)	=RiskPercentile(F9,0.9) =RiskPercentile(F10,0.9) =RiskPercentile(F11,0.9) =RiskPercentile(F12,0.9) =RiskPercentile(F13,0.9) =RiskPercentile(F14,0.9) =RiskPercentile(F15,0.9) =RiskPercentile(F16,0.9)	
10th Percentile				
Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	Waste Arising Waste Recycled Residual Waste Residual BMW Landfill Target Diversion Capacity BMW to Landfill Surplus/(deficit) capacity	=RiskPercentile(D9,0.1) =RiskPercentile(D10,0.1) =RiskPercentile(D11,0.1) =RiskPercentile(D12,0.1) =RiskPercentile(D13,0.1) =RiskPercentile(D14,0.1) =RiskPercentile(D15,0.1) =RiskPercentile(D16,0.1)	=RiskPercentile(F9,0.1) =RiskPercentile(F10,0.1) =RiskPercentile(F11,0.1) =RiskPercentile(F12,0.1) =RiskPercentile(F13,0.1) =RiskPercentile(F14,0.1) =RiskPercentile(F15,0.1) =RiskPercentile(F16,0.1)	

END

This sheet defines the parameter values and TRUNCATE to remove the random content to ensure the random content is UNIFORM. All values are in the correct format.

Forecast Inputs

Waste Arisings	Baseline	2020	Distribution	Static Value	Parameter 1	Parameter 2
LA Arisng (Central)	=ForecastE10	=RiskTriangJ10	Triangular	0.30	Min. 0	Max. 0
CAI Arisng (Central)	=ForecastE11	=RiskTriangJ11	Triangular	0.10	Min. 0	Max. 0
LA Arisng (Alternative)	=ForecastE12	=RiskTriangJ12	Triangular	0.11	Min. 0	Max. 0
CAI Arisng (Alternative)	=ForecastE13	=RiskTriangJ13	Triangular	0.12	Min. 0	Max. 0
Model Selection	=ForecastE14	=RiskTriangJ14	Triangular	0.13	Min. 0	Max. 0
LA Arisng (Model Shock)	=ForecastE15	=RiskTriangJ15	Triangular	0.14	Min. 0	Max. 0
CAI Arisng (Model Shock)	=ForecastE16	=RiskTriangJ16	Triangular	0.15	Min. 0	Max. 0
LA Arisng (Peak Shock)	=ForecastE17	=RiskTriangJ17	Triangular	0.16	Min. 0	Max. 0
CAI Arisng (Peak Shock)	=ForecastE18	=RiskTriangJ18	Triangular	0.17	Min. 0	Max. 0

Input Parameters

Recycling Rates	Baseline	2020	Distribution	Static Value	Parameter 1	Parameter 2
LA Recycling Rate	=VLOOKUP(Outputs!\$F\$7:Outputs!\$F\$21,\$A\$3:\$C\$3,1)	=RiskTriangJ21	Triangular	0.51	Min. 0.54	Max. 0.7
CAI Recycling Rate	=VLOOKUP(Outputs!\$F\$7:Outputs!\$F\$21,\$A\$3:\$C\$3,2)	=RiskTriangJ22	Triangular	0.62	Min. 0.54	Max. 0.7
BMW Content	0.68	=RiskTriangJ23	Triangular	0.68	Min. 0.55	Max. 0.75
MSW Content	0.1009	=RiskTriangJ24	Triangular	0.24	Min. 0.24	Max. 0.24
MSW % of Industrial Waste	0.8432	=RiskTriangJ25	Triangular	0.27	Min. 0.27	Max. 0.27
MSW % of Commercial Waste	0.8432	=RiskTriangJ26	Triangular	0.27	Min. 0.27	Max. 0.27

Plant Level Assumptions

Utilization Rates	Baseline	2020	Distribution	Static Value	Parameter 1	Parameter 2
BMST Utilization	0.8	=RiskTriangJ27	Triangular	0.31	Min. 0.35	Max. 1
EW Utilization	0.8	=RiskTriangJ28	Triangular	0.32	Min. 0.35	Max. 1
LFMBT Utilization	0.8	=RiskTriangJ29	Triangular	0.33	Min. 0.35	Max. 1
MT Utilization	0.8	=RiskTriangJ30	Triangular	0.34	Min. 0.35	Max. 1
Diversion Efficiency	1	=RiskTriangJ31	Triangular	0.35	Min. 0.35	Max. 1
BMST Efficiency	=DiversioEfficiency*0.26	=RiskTriangJ32	Triangular	0.36	Min. 0.35	Max. 0.9
EW Efficiency	=DiversioEfficiency*0.37	=RiskTriangJ33	Triangular	0.37	Min. 0.35	Max. 0.9
LFMBT Efficiency	=DiversioEfficiency*0.37	=RiskTriangJ34	Triangular	0.38	Min. 0.35	Max. 0.9
MT Efficiency	0	=RiskTriangJ35	Triangular	0.39	Min. 0	Max. 0
Formes to EW	0.5	=RiskTriangJ36	Triangular	0.40	Min. 0.4	Max. 0.6
EW to EW	0	=RiskTriangJ37	Triangular	0.41	Min. 0	Max. 0
LFMBT to EW	0	=RiskTriangJ38	Triangular	0.42	Min. 0	Max. 0
MT to EW	0.85	=RiskTriangJ39	Triangular	0.43	Min. 0	Max. 0.9
Programme Contingency	0.95	=RiskTriangJ40	Triangular	0.44	Min. 0.7	Max. 0.9

Correlation Between Inputs

LA Arisings and CAI Arisings	Coefficient
LA Recycling and CAI Recycling	0.25
LA Arisng and LA Recycling	0.25
CAI Arisng and CAI Recycling	0
Arisngs and Project Delivery	0
Between Different Projects	0

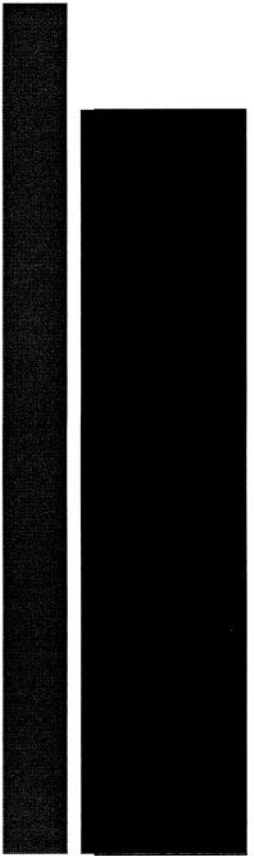
Forecast Shocks

Shock to LA Arisings	Probability	Magnitude (%)	Random Draw	Effect
Positive shock	0.2		=RiskUniform(0.1, RiskName("Positive LA Arisng Shock"))	=FF5P-D66-1,1-E69
Negative shock	0.2		=RiskUniform(0.1, RiskName("Negative LA Arisng Shock"))	=FF5P-D66-1,1-E69
Shock to CAI Arisings	0.2		=RiskUniform(0.1, RiskName("Positive CAI Arisng Shock"))	=FF5P-D68-1,1-E69
Positive shock	0.2		=RiskUniform(0.1, RiskName("Positive CAI Arisng Shock"))	=FF5P-D68-1,1-E69
Negative shock	0.2		=RiskUniform(0.1, RiskName("Negative CAI Arisng Shock"))	=FF5P-D68-1,1-E69

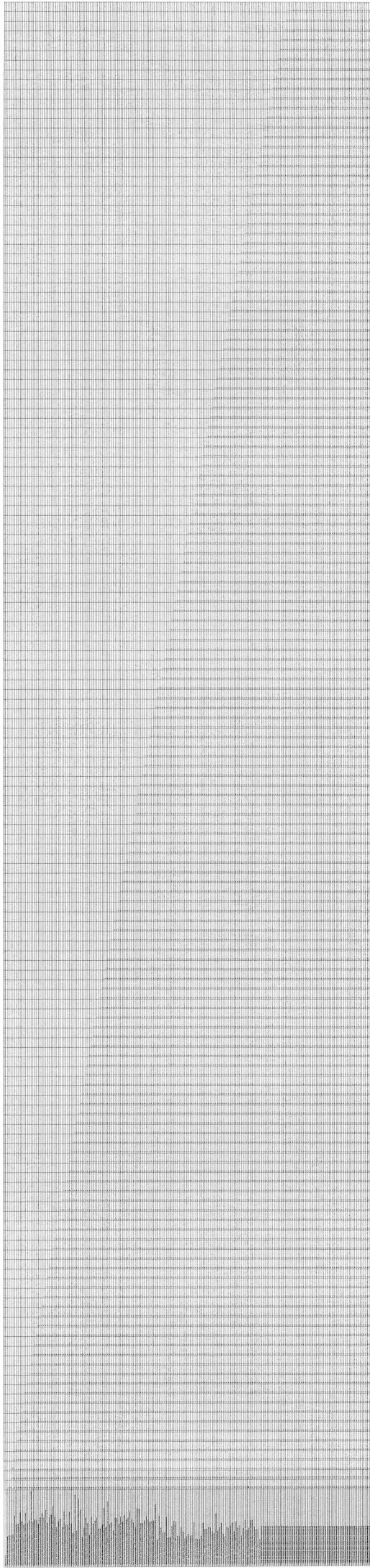
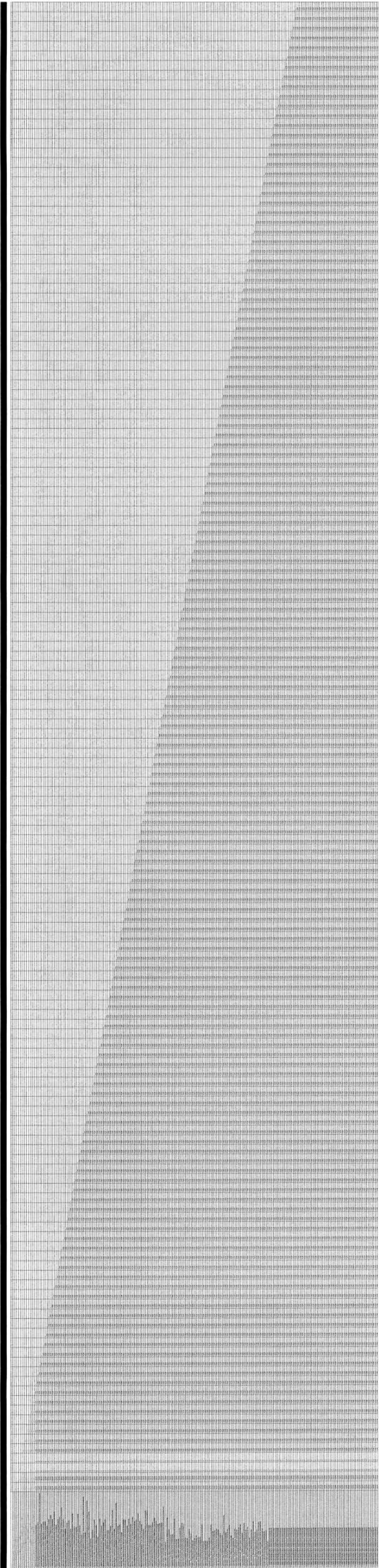
Model Risk

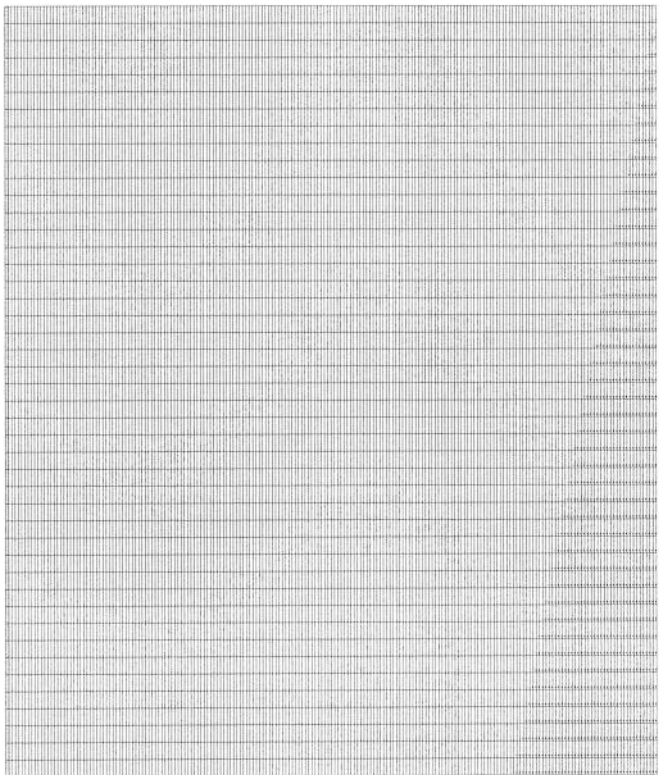
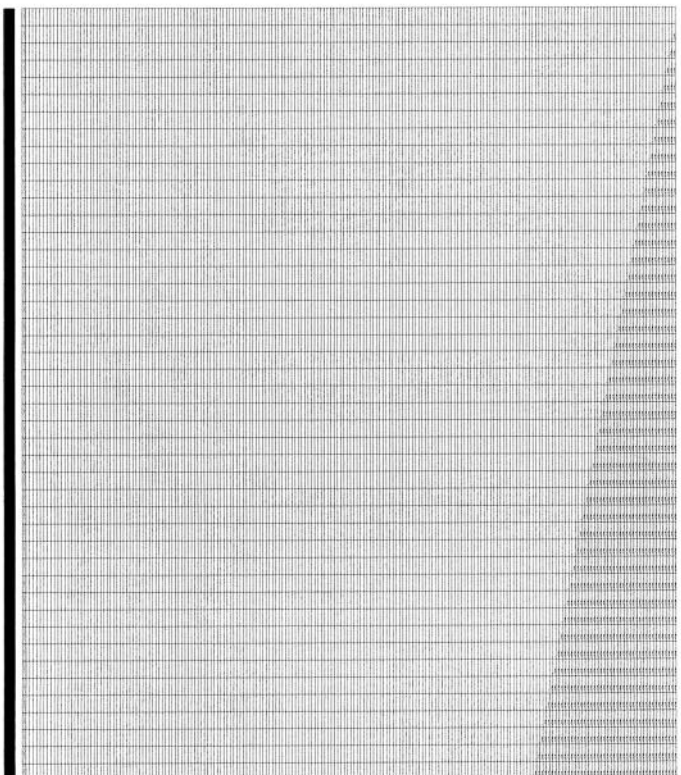
Weight on central forecast	Weight	Indicator
LA Arisngs	1	=RiskUniform(0.1, RiskName("LA Model Risk"))
CAI Arisngs	1	=RiskUniform(0.1, RiskName("CAI Model Risk"))

END



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= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$172)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$173)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$174)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$175)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$176)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$177)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$178)	= \$C\$16	0	0
= "INSERT NEW PROJECT HERE in "RCCELL("address",Projects)\$P\$179)	= \$C\$16	0	0





Method 1	Waste Arising	Waste Recycled	Residual Waste	Residual BMW	Diversion Capacity	BMW to Landfill	Surplus/(deficit) capacity
Waste Arising	=RiskCorrel(Outputs!D\$9,Outputs!D\$9,1)						
Waste Recycled	=RiskCorrel(Outputs!D\$9,Outputs!D10,1)	=RiskCorrel(Outputs!D\$10,Outputs!D10,1)					
Residual Waste	=RiskCorrel(Outputs!D\$9,Outputs!D11,1)	=RiskCorrel(Outputs!D\$10,Outputs!D11,1)	=RiskCorrel(Outputs!D\$11,Outputs!D11,1)				
Residual BMW	=RiskCorrel(Outputs!D\$9,Outputs!D12,1)	=RiskCorrel(Outputs!D\$10,Outputs!D12,1)	=RiskCorrel(Outputs!D\$11,Outputs!D12,1)	=RiskCorrel(Outputs!D\$12,Outputs!D12,1)			
Diversion Capacity	=RiskCorrel(Outputs!D\$9,Outputs!D14,1)	=RiskCorrel(Outputs!D\$10,Outputs!D14,1)	=RiskCorrel(Outputs!D\$11,Outputs!D14,1)	=RiskCorrel(Outputs!D\$12,Outputs!D14,1)	=RiskCorrel(Outputs!D\$14,Outputs!D14,1)		
BMW to Landfill	=RiskCorrel(Outputs!D\$9,Outputs!D15,1)	=RiskCorrel(Outputs!D\$10,Outputs!D15,1)	=RiskCorrel(Outputs!D\$11,Outputs!D15,1)	=RiskCorrel(Outputs!D\$12,Outputs!D15,1)	=RiskCorrel(Outputs!D\$14,Outputs!D15,1)	=RiskCorrel(Outputs!D\$15,Outputs!D15,1)	
Surplus/(deficit) capacity	=RiskCorrel(Outputs!D\$9,Outputs!D16,1)	=RiskCorrel(Outputs!D\$10,Outputs!D16,1)	=RiskCorrel(Outputs!D\$11,Outputs!D16,1)	=RiskCorrel(Outputs!D\$12,Outputs!D16,1)	=RiskCorrel(Outputs!D\$14,Outputs!D16,1)	=RiskCorrel(Outputs!D\$15,Outputs!D16,1)	=RiskCorrel(Outputs!D\$16,Outputs!D16,1)

Method 2	Waste Arising	Waste Recycled	Residual Waste	Residual BMW	Diversion Capacity	BMW to Landfill	Surplus/(deficit) capacity
Waste Arising	=RiskCorrel(Outputs!D\$9,Outputs!D\$9,1)						
Waste Recycled	=RiskCorrel(Outputs!D\$9,Outputs!D10,1)	=RiskCorrel(Outputs!D\$10,Outputs!D10,1)					
Residual Waste	=RiskCorrel(Outputs!D\$9,Outputs!D11,1)	=RiskCorrel(Outputs!D\$10,Outputs!D11,1)	=RiskCorrel(Outputs!D\$11,Outputs!D11,1)				
Residual BMW	=RiskCorrel(Outputs!D\$9,Outputs!D12,1)	=RiskCorrel(Outputs!D\$10,Outputs!D12,1)	=RiskCorrel(Outputs!D\$11,Outputs!D12,1)	=RiskCorrel(Outputs!D\$12,Outputs!D12,1)			
Diversion Capacity	=RiskCorrel(Outputs!D\$9,Outputs!F14,1)	=RiskCorrel(Outputs!D\$10,Outputs!F14,1)	=RiskCorrel(Outputs!D\$11,Outputs!F14,1)	=RiskCorrel(Outputs!D\$12,Outputs!F14,1)	=RiskCorrel(Outputs!F\$14,Outputs!F14,1)		
BMW to Landfill	=RiskCorrel(Outputs!D\$9,Outputs!F15,1)	=RiskCorrel(Outputs!D\$10,Outputs!F15,1)	=RiskCorrel(Outputs!D\$11,Outputs!F15,1)	=RiskCorrel(Outputs!D\$12,Outputs!F15,1)	=RiskCorrel(Outputs!F\$14,Outputs!F15,1)	=RiskCorrel(Outputs!F\$15,Outputs!F15,1)	
Surplus/(deficit) capacity	=RiskCorrel(Outputs!D\$9,Outputs!F16,1)	=RiskCorrel(Outputs!D\$10,Outputs!F16,1)	=RiskCorrel(Outputs!D\$11,Outputs!F16,1)	=RiskCorrel(Outputs!D\$12,Outputs!F16,1)	=RiskCorrel(Outputs!F\$14,Outputs!F16,1)	=RiskCorrel(Outputs!F\$15,Outputs!F16,1)	=RiskCorrel(Outputs!F\$16,Outputs!F16,1)

Infrastructure

The following worksheets all deal with infrastructure.

No.	Name	Description
1	Projects	Lists the waste diversion infrastructure that is already installed or is projected to come online. Edit project risk, delivery date, operational capacity and plant type here.
2	Diversion Efficiency	Calculates the diversion efficiency of BMBT and LFMBT plants. Edit moisture loss, recycling, residues to landfill etc. here.
3	Delivery Adjustment	Lists the delivery adjustment for different types of project, by stage of completion. Edit adjustment rates here.
4	Sum Capacity	Calculates the sum of infrastructure capacity in different years. No user entry.

Diversion Assumptions for residual waste technologies

Technology Classification	Utilisation Rate %	Tonnes to ENV	Diversion Efficiency	Technology Example
BMBT	-inputs/E31	-inputs/E41	-inputs/E36	Bio drying MBT e.g. ELWA
EW	-inputs/E32	-inputs/E42	-inputs/E37	EW
WMBT	-inputs/E33	-inputs/E43	-inputs/E38	LFW MBT e.g. Lancs, Camba
MT	-inputs/E34	-inputs/E44	-inputs/E39	Mechanical treatment

Comments
The MBT and MT technologies generally do not operate at the reported operational capacity - hence 80% assumed
It is assumed that for BMBT and MT processes the out put (t/df) is not consigned to landfill

BMBT type generic process - bio-drying - Ecodeco type

Waste input	BMW %	Comment
Moisture loss plus some carbon loss	100	Typical value for this type of process - Source
Recycling (metals,paper,platics) residues to landfill	25	Typical value for this type of process - Source
RDF	15	Typical value for this type of process - Source
BMW diversion efficiency	50	Typical value for this type of process - Source

LFWMBT type generic process - compost like output to landfill - Lancs,camba type

BMW of treated waste	BMW	Comment
Waste input	0.35	Typical value for this type of process - Source
Moisture loss plus carbon loss	100	Typical value for this type of process - Source
Recycling (metals,paper,platics) residues to landfill	45	Typical value for this type of process - Source
CLO	15	Typical value for this type of process - Source
BMW diversion efficiency	30	Typical value for this type of process - Source

Delivery Adjustment

This sheet outlines the project delivery adjustment rates that are used in the model.

Note that the values used seem slightly uninituitive - this is because a 0.95 adjustment for project outages has been applied.

	PFI	PPP	M	Project Status
B	100%	100%	100%	Fully operational
G	90%	90%	90%	Commissioning
AG	80%	80%	80%	Financial close, with planning
A	70%	70%	40%	Financial close, no planning
AR	60%	60%	20%	In procurement, no planning
R	20%	20%	3%	Unlikely to go live by 2020
n/a	0%	0%	0%	Cancelled Project

END

Arisings

The following worksheets all deal with arisings and the factors that influence them.

No.	Name	Description
1	Forecasts	Collects the most recent forecast values of LA and C&I waste arisings. Historical values can be entered when forecasts are updated.
2	Outturn	Collects historical data on BMW to landfill and recycling rates. Update as new data become available.

This sheet collects
Entering values into
Landfill data is for

BMW to Landfill

Date	FY (End)	EA Reported BMW to Landfill (mt)	Residual BMW (mt)	BMW Diversion Implied (mt)
31-Mar-10	2010	=13456/1000	=IF(F8=0,0,(IF(Inputs!\$F74=1,H22*Forecast!E9,Forecast!E24*H22)+IF(Inputs!\$F75=1,I22*Forecast!F9,I22*Forecast!F24))*Inputs!\$E\$24)	=G8-F8
31-Mar-11	2011	12.222	=IF(F9=0,0,(IF(Inputs!\$F74=1,H23*Forecast!E10,Forecast!E25*H23)+IF(Inputs!\$F75=1,I23*Forecast!F10,I23*Forecast!F25))*Inputs!\$E\$24)	=G9-F9
31-Mar-12	2012		=IF(F10=0,0,(IF(Inputs!\$F74=1,H24*Forecast!E11,Forecast!E26*H24)+IF(Inputs!\$F75=1,I24*Forecast!F11,I24*Forecast!F26))*Inputs!\$E\$24)	=G10-F10
31-Mar-13	2013		=IF(F11=0,0,(IF(Inputs!\$F74=1,H25*Forecast!E12,Forecast!E27*H25)+IF(Inputs!\$F75=1,I25*Forecast!F12,I25*Forecast!F27))*Inputs!\$E\$24)	=G11-F11
31-Mar-14	2014		=IF(F12=0,0,(IF(Inputs!\$F74=1,H26*Forecast!E13,Forecast!E28*H26)+IF(Inputs!\$F75=1,I26*Forecast!F13,I26*Forecast!F28))*Inputs!\$E\$24)	=G12-F12
31-Mar-15	2015		=IF(F13=0,0,(IF(Inputs!\$F74=1,H27*Forecast!E14,Forecast!E29*H27)+IF(Inputs!\$F75=1,I27*Forecast!F14,I27*Forecast!F29))*Inputs!\$E\$24)	=G13-F13
31-Mar-16	2016		=IF(F14=0,0,(IF(Inputs!\$F74=1,H28*Forecast!E15,Forecast!E30*H28)+IF(Inputs!\$F75=1,I28*Forecast!F15,I28*Forecast!F30))*Inputs!\$E\$24)	=G14-F14
31-Mar-17	2017		=IF(F15=0,0,(IF(Inputs!\$F74=1,H29*Forecast!E16,Forecast!E31*H29)+IF(Inputs!\$F75=1,I29*Forecast!F16,I29*Forecast!F31))*Inputs!\$E\$24)	=G15-F15
31-Mar-18	2018		=IF(F16=0,0,(IF(Inputs!\$F74=1,H30*Forecast!E17,Forecast!E32*H30)+IF(Inputs!\$F75=1,I30*Forecast!F17,I30*Forecast!F32))*Inputs!\$E\$24)	=G16-F16
31-Mar-19	2019		=IF(F17=0,0,(IF(Inputs!\$F74=1,H31*Forecast!E18,Forecast!E33*H31)+IF(Inputs!\$F75=1,I31*Forecast!F18,I31*Forecast!F33))*Inputs!\$E\$24)	=G17-F17
31-Mar-20	2020		=IF(F18=0,0,(IF(Inputs!\$F74=1,H32*Forecast!E19,Forecast!E34*H32)+IF(Inputs!\$F75=1,I32*Forecast!F19,I32*Forecast!F34))*Inputs!\$E\$24)	=G18-F18

Recycling Rates

Date	FY (End)	Household	C&I	Household (forecast)	C&I (forecast)
31-Mar-10	2010			=H23	=I23
31-Mar-11	2011	0.397099743467013	=G23	=IF(F23=0,F23,H22,\$F\$33)	=IF(G23=0,G23,I22,\$G\$33)
31-Mar-12	2012	0.414584660876121	0.62	=IF(F24=0,F24,H23,\$F\$33)	=IF(G24=0,G24,I23,\$G\$33)
31-Mar-13	2013	0.429973015357884		=IF(F25=0,F25,H24,\$F\$33)	=IF(G25=0,G25,I24,\$G\$33)
31-Mar-14	2014			=IF(F26=0,F26,H25,\$F\$33)	=IF(G26=0,G26,I25,\$G\$33)
31-Mar-15	2015			=IF(F27=0,F27,H26,\$F\$33)	=IF(G27=0,G27,I26,\$G\$33)
31-Mar-16	2016			=IF(F28=0,F28,H27,\$F\$33)	=IF(G28=0,G28,I27,\$G\$33)
31-Mar-17	2017			=IF(F29=0,F29,H28,\$F\$33)	=IF(G29=0,G29,I28,\$G\$33)
31-Mar-18	2018			=IF(F30=0,F30,H29,\$F\$33)	=IF(G30=0,G30,I29,\$G\$33)
31-Mar-19	2019			=IF(F31=0,F31,H30,\$F\$33)	=IF(G31=0,G31,I30,\$G\$33)
31-Mar-20	2020			=IF(F32=0,F32,H31,\$F\$33)	=IF(G32=0,G32,I31,\$G\$33)
P.p. change/ye					