

Attachment J.1

Worked Examples of Proposed Form of Control

SA Water
**Regulatory Business
Proposal 2013**



Contents

Example 1: Variable demand outcomes 3

Example 2: Consistently high demand outcomes 5

Example 3: Consistently low demand outcomes..... 7

Example 1: Variable demand outcomes

This example is based on the following assumptions:

- All financial values are in real dollars (i.e. exclude the impact of inflation);
- Regulatory period is 2013-14 to 2015-16;
- Forecast maximum allowable revenue is \$1,000M per annum;
- Forecast demand is 180GL per annum;
- Avoidable cost (or short run marginal cost) is \$0.3M/GL per annum;
- Marginal revenue is ten times the short run marginal cost, i.e. \$3M/GL per annum;
- Actual demand is 170GL in 2013-14, 189GL in 2014-15 and 183GL in 2015-16.

Table J.1 details the resultant variation in demand and revenue arising from this scenario.

Table J.1: Variation in demand and revenue where actual demand outcomes are variable

Yearly calculation	Notation	Unit	2013-14	2014-15	2015-16
Forecast allowable revenue	R_f	\$'M	\$1,000M	\$1,000M	\$1,000M
Marginal revenue per GL	R_m	\$'M/GL	\$3M	\$3M	\$3M
Forecast demand	D_f	GL	180GL	180GL	180GL
Actual demand	D_a	GL	170GL	189GL	183GL
Variation in demand	$R_\Delta = D_a - D_f$	GL	-10GL	9GL	3GL
Actual revenue	$R_a = R_f + (R_\Delta \times R_m)$	\$'M	\$970M	\$1,027M	\$1,009M
Variation in revenue	$R_a - R_f$	\$'M	-\$30M	\$27M	\$9M

In 2013-14, actual demand (D_a , 170GL) is 10GL less than forecast demand (D_f , 180GL). The resultant revenue impact is a \$30M shortfall in actual revenue compared to forecast allowable revenue. However, in 2014-15 and 2015-16 actual demand exceeds forecast demand, offsetting the revenue shortfall from 2013-14. The net impact of these variations in revenue during the 3 year period is that actual revenue exceeds forecast allowable revenue by \$6M.

Table J.2 details operation of the proposed banking mechanism.

Table J.2: Operation of banking mechanism where actual demand outcomes are variable

Banking calculation	Notation	Unit	2013-14	2014-15	2015-16
Variation in demand	$R_\Delta = D_a - D_f$	GL	-10GL	9GL	3GL
Variation in revenue	$R_a - R_f$	\$'M	-\$30M	\$27M	\$9M
Bank threshold (1%)	$R_f \times 1\%$	\$'M	±\$10M	±\$10M	±\$10M
Banked variation in revenue	R_b	\$'M	-\$30M	\$27M	nil

Table J.2 indicates that the bank threshold (1% of forecast revenue) is satisfied in 2013-14 and 2014-15, but not in 2015-16. The bank balance at the end of the regulatory period is -\$3M, at which point a further test is applied to determine whether the proposed carryover mechanism will result in a revenue adjustment for the subsequent regulatory period.

Table J.3 details operation of the proposed carryover mechanism.

Table J.3: Operation of carryover mechanism where actual demand outcomes are variable

Carryover calculation	Notation	Unit	Amount
Bank balance (end of period)	$\sum_{x=1}^3 R_{bx}$ Where x represents each year in the period	\$'M	-\$3M
Carryover threshold (1%)	$\sum_{x=1}^3 (R_{fx} \times 1\%)$ Where x represents each year in the period	\$'M	±\$30M
Carryover amount		\$'M	nil

Table J.3 indicates that the carryover threshold (1% of total forecast allowable revenue) is not satisfied, and therefore there is no carryover into the next regulatory period.

Example 2: Consistently high demand outcomes

This example is based on the following assumptions:

- All financial values are in real dollars (i.e. exclude the impact of inflation);
- Regulatory period 1 is 2013-14 to 2015-16;
- Forecast allowable revenue is \$1,000M per annum;
- Forecast demand is 160GL per annum;
- Avoidable cost (or short run marginal cost) is \$0.3M per annum;
- Marginal revenue is ten times the short run marginal cost, i.e. \$3M/GL per annum;
- Actual demand is 170GL in 2013-14, 189GL in 2014-15 and 183GL in 2015-16.

Table J.4 details the resultant variation in demand and revenue arising from this scenario.

Table J.4: Variation in demand and revenue where actual demand outcomes are consistently very high

Yearly calculation	Notation	Unit	2013-14	2014-15	2015-16
Forecast allowable revenue	R_f	\$'M	\$1,000M	\$1,000M	\$1,000M
Marginal revenue per GL	R_m	\$'M/GL	\$3M	\$3M	\$3M
Forecast demand	D_f	GL	160GL	160GL	160GL
Actual demand	D_a	GL	170GL	189GL	183GL
Variation in demand	$R_\Delta = D_a - D_f$	GL	10GL	29GL	23GL
Actual revenue	$R_a = R_f + (R_\Delta \times R_m)$	\$'M	\$1,030M	\$1,087M	\$1,069M
Variation in revenue	$R_a - R_f$	\$'M	\$30M	\$87M	\$69M

In 2013-14, actual demand (D_a , 170GL) is 10GL more than forecast demand (D_f , 160GL). The resultant revenue impact is a \$30M increase in actual revenue compared to forecast allowable revenue. Similar outcomes occur in 2014-15 and 2015-16, with the net impact of these variations in revenue during the 3 year period being that actual revenue exceeds forecast allowable revenue by \$186M.

Table J.5 details operation of the proposed banking mechanism.

Table J.5: Operation of banking mechanism where actual demand outcomes are consistently very high

Banking calculation	Notation	Unit	2013-14	2014-15	2015-16
Variation in demand	$R_\Delta = D_a - D_f$	GL	10GL	29GL	23GL
Variation in revenue	$R_a - R_f$	\$'M	\$30M	\$87M	\$69M
Bank threshold (1%)	$R_f \times 1\%$	\$'M	±\$10M	±\$10M	±\$10M
Banked variation in revenue	R_b	\$'M	\$30M	\$87M	\$69M

Table J.5 indicates that the bank threshold (1% of forecast revenue) is satisfied in each year of the period. The bank balance at the end of the regulatory period is \$186M, at which point a further test is applied to determine whether the proposed carryover mechanism will result in a revenue adjustment for the subsequent regulatory period.

Table J.6 details operation of the proposed carryover mechanism.

Table J.6: Operation of carryover mechanism where actual demand outcomes are consistently very high

Carryover calculation	Notation	Unit	Amount
Bank balance (end of period)	$B = \sum_{x=1}^3 R_{bx}$ Where x represents each year in the period	\$'M	\$186M
Carryover threshold (1%)	$\sum_{x=1}^3 (R_{fx} \times 1\%)$ Where x represents each year in the period	\$'M	±\$30M
Adjustment for marginal costs	$SRMC_{\Delta} = \sum_{x=1}^3 (D_{ax} - D_{fx}) \times SRMC$ Where x represents each year in the period	\$'M	\$18.6M
Carryover amount	$C = B - SRMC_{\Delta}$	\$'M	\$167.4M

Table J.6 indicates that the carryover threshold (1% of total forecast allowable revenue) is satisfied, and therefore there is a carryover into the next regulatory period. The carryover amount is adjusted to reflect the change in marginal costs borne by SA Water (due to high demand which necessitated additional water treatment and pumping costs).

The carryover amount (which represents additional revenue recovered by SA Water during the current period, and which will be returned to customers during the subsequent regulatory control period) is \$167.4M.

It is assumed that this return of revenue to customers would be spread over the next regulatory period, resulting in reductions in revenue of about \$42m per annum.

Example 3: Consistently low demand outcomes

This example is based on the following assumptions:

- All financial values are in real dollars (i.e. exclude the impact of inflation);
- Regulatory period is 2013-14 to 2015-16;
- Forecast allowable revenue is \$1,000M per annum;
- Forecast demand is 200GL per annum;
- Avoidable cost (or short run marginal cost) is \$0.3M per annum;
- Marginal revenue is ten times the short run marginal cost, i.e. \$3M/GL per annum;
- Actual demand is 170GL in 2013-14, 189GL in 2014-15 and 183GL in 2015-16.

Table J.7 details the resultant variation in demand and revenue arising from this scenario.

Table J.7: Variation in demand and revenue where actual demand outcomes are consistently very low

Yearly calculation	Notation	Unit	2013-14	2014-15	2015-16
Forecast allowable revenue	R_f	\$'M	\$1,000M	\$1,000M	\$1,000M
Marginal revenue per GL	R_m	\$'M/GL	\$3M	\$3M	\$3M
Forecast demand	D_f	GL	200GL	200GL	200GL
Actual demand	D_a	GL	170GL	189GL	183GL
Variation in demand	$R_\Delta = D_a - D_f$	GL	-30GL	-11GL	-17GL
Actual revenue	$R_a = R_f + (R_\Delta \times R_m)$	\$'M	\$910M	\$967M	\$949M
Variation in revenue	$R_a - R_f$	\$'M	-\$90M	-\$33M	-\$51M

In 2013-14, actual demand (170GL) is 30GL less than forecast demand (200GL). The resultant revenue impact is a \$90M shortfall in actual revenue compared to forecast allowable revenue. Similar outcomes occur in 2014-15 and 2015-16, with the net impact of these variations in revenue during the 3 year period being that actual revenue falls below forecast allowable revenue by \$174M.

Table J.8 details operation of the proposed banking mechanism.

Table J.8: Operation of banking mechanism where actual demand outcomes are consistently very low

Banking calculation	Notation	Unit	2013-14	2014-15	2015-16
Variation in demand	$R_\Delta = D_a - D_f$	GL	-30GL	-11GL	-17GL
Variation in revenue	$R_a - R_f$	\$'M	-\$90M	-\$33M	-\$51M
Bank threshold (1%)	$R_f \times 1\%$	\$'M	±\$10M	±\$10M	±\$10M
Banked variation in revenue	R_b	\$'M	-\$90M	-\$33M	-\$51M

Table J.8 indicates that the bank threshold (1% of forecast revenue) is satisfied in each year of the period. The bank balance at the end of the regulatory period is -\$174M, at which point a further test is applied to determine whether the proposed carryover mechanism will result in a revenue adjustment for the subsequent regulatory period.

Table J.9 details operation of the proposed carryover mechanism.

Table J.9: Operation of carryover mechanism where actual demand outcomes are consistently very low

Carryover calculation	Notation	Unit	Amount
Bank balance (end of period)	$B = \sum_{x=1}^3 R_{bx}$ Where x represents each year in the period	\$'M	-\$174M
Carryover threshold (1%)	$\sum_{x=1}^3 (R_{fx} \times 1\%)$ Where x represents each year in the period	\$'M	±\$30M
Adjustment for marginal costs	$SRMC_{\Delta} = \sum_{x=1}^3 (D_{ax} - D_{fx}) \times SRMC$ Where x represents each year in the period	\$'M	-\$17.4M
Carryover amount	$C = B - SRMC_{\Delta}$	\$'M	-\$156.6M

Table J.9 indicates that the carryover threshold (1% of total forecast allowable revenue) is satisfied, and therefore there is a carryover into the next regulatory period. The carryover amount is adjusted to reflect the change in marginal costs avoided by SA Water (due to low demand which necessitated less water treatment and pumping costs).

The carryover amount (which represents a shortfall in revenue recovered by SA Water during the current period, and which will be recovered from customers during the subsequent regulatory control period) is \$156.6M.

It is assumed that recovery of this additional revenue would be spread over the next regulatory period, resulting in additional revenue of about \$39M per annum.