



# Hunter River Salinity Trading Scheme Credit Auction

*2014 auction report*

## Summary

On 5 May 2014, the NSW Environment Protection Authority (EPA) held the sixth auction of 200 credits under the Hunter River Salinity Trading Scheme (HRSTS). For the first time, the auction used a web-based program. The credits have a 10-year life that began on 1 July 2014 and ends on 30 June 2024. These credits replace the 200 credits that expired on 30 June 2014.

The next auction will be held in 2016.

## About the auction

The EPA commissioned the University of Melbourne – Centre for Market Design to develop a web-based auction program. The 2014 auction was run for the first time using an independent, web-based auction program. A training day was held on 28 April 2014 for participants who wanted to learn more about the web-based program.

The auction was conducted in accordance with the rules detailed in the *Hunter River Salinity Trading Scheme Credit Auction – Process and Rules*. This document was updated by the EPA in consultation with the University of Melbourne – Centre for Market Design prior to the training day. Bids were lodged online with the website address and password provided to auction participants on registration.

The auction was run over a nine-hour period from 9:00am until 18:00pm.

Twelve bidders representing mining and power generation facilities registered for the auction. All bidders represented organisations that were already participating in the HRSTS. There were no registrations from non-industry bidders.

## Results

All 200 credits were allocated and distributed between 10 companies. The credit allocation and cost to each organisation is shown in the table below.

The auction raised \$166,037 (including GST) which is lower than previous years. The reduction in revenue is related to the bid allocation process and also some bidder timidity associated with the first time this auction format had been used by participants. Unlike previous auctions, the maximum bid price is not necessarily paid by bidders, rather the 'highest losing' bid is paid. Further explanation is provided below.

A number of credits were sold at the reserve price (\$250) as the total number of credits sought was only marginally over the 200 credits available.

Bidder's organisation	Credits allocated	Total cost
Macquarie Generation	70	\$37,534
Coal and Allied Operations Pty Ltd	41	\$30,284
Ravensworth Operations	35	\$28,784
Liddell Coal Operations Pty Ltd	20	\$25,034
Bulga Coal Management Pty Ltd	10	\$13,057
Hunter Valley Energy Coal Pty Ltd	7	\$9,142
Wambo Coal Pty Ltd	6	\$7,836
Mt Owen Pty Ltd	5	\$6,530
Bengalla Mining Company Pty Ltd	3	\$3,918
Anglo Coal (Dartbrook Management) Pty Ltd	3	\$3,918
<b>Total</b>	<b>200</b>	<b>\$166,037</b>

## Auction and bid allocation process

The total number of credits available at auction was 200.

Each registered bidder was able to submit one 'bid schedule' which comprised a number of groups of credits with a specific bid price per credit. For example, Bidder 103 seeks 17 credits and submits a bid schedule consisting of three credits valued at \$13,983 each, seven credits valued at \$13,523 each, three credits valued at \$6,460 and four credits valued at \$2,925. This indicates that Bidder 103 was willing to pay \$167,690 for 17 credits.

At the close of the auction, the auction program breaks down each bid schedule and individual credit bids are

ranked from the highest value to the lowest value. The 201st highest credit bid is known as the 'highest losing bid' meaning that the bid value allocated to this credit is the starting value actually paid by successful bidders. It will usually be less than the bid price submitted by the successful bidder. Each bidder is then allocated a proportion of the 200 credits until all 200 credits are allocated.

A worked example is provided at the end of this report focusing on the bid schedule of Bidder 103. In the worked example, Bidder 103 was allocated 13 credits paying a total of \$34,410 which is much less than they were willing to pay.

## Revenue and costs

Net revenue from the 2014 auction (\$166,037, including GST of \$16,603) will be used to offset the costs of the HRSTS. Any shortfalls in funding the operation of the scheme are raised by the EPA by invoicing the scheme's participants.

## Objectives achieved

The HRSTS auction process was designed to:

- distribute credits to those who value them most
- provide equal access for all bidders, including new entrants to the market
- clear all 200 credits (so the NSW Government, as much as possible, is not left with any credits at the end of the auction).

To ensure these objectives are met, the auction process:

- operates in a single-bid, web-based auction environment
- has been designed to maintain bidder confidentiality
- includes safeguards against anti-competitive behaviour.

Against these objectives the EPA can report that:

- The auction achieved a distribution of credits to the companies who were willing to bid enough to secure credits.
- The auction was advertised in local and state newspapers and on the EPA website.
- 200 credits were allocated to the successful bidders and became active on 1 July 2014.

## Feedback received

Participants requested a more detailed explanation of how bid allocation process worked. This is provided in the Appendix to this report.

## Appendix: Worked example of credit allocation process for online auction

### Bid schedules

Table 1 provides fictional bid schedules for an example HRSTS credit auction.

Bidder ID	Quantity	Maximum \$ per unit	Total number of bids sought	Total \$ amount willing to pay
101	3	10,861.00		
101	7	6,294.00	10	76,641.00
102	5	7,857.00		
102	6	2,387.00	11	53,607.00
103	3	13,983.00		
103	7	13,523.00		
103	3	6,460.00		
103	4	2,925.00	17	167,690.00
104	5	11,591.00		
104	11	6,049.00	16	124,494.00
105	5	14,021.00		
105	6	13,379.00		
105	2	12,126.00		
105	8	11,304.00		
105	3	10,607.00		
105	2	8,629.00		
105	7	6,586.00		
105	5	5,793.00		
105	5	2,319.00		
105	6	1,663.00	49	410,782.00
106	10	13,596.00		
106	9	13,596.00		
106	6	13,355.00		
106	4	11,676.00		
106	2	10,425.00		
106	5	10,300.00		
106	10	9,384.00		
106	2	7,305.00		
106	10	4,989.00		
106	7	3,879.00		
106	3	3,084.00	68	652,253.00
107	6	8,867.00		
107	4	8,652.00		
107	7	6,260.00		
107	5	5,798.00	22	160,620.00

108	5	13,571.00		
108	11	12,472.00		
108	4	9,579.00		
108	2	9,307.00		
108	4	8,446.00		
108	4	8,054.00		
108	2	4,620.00	32	337,217.00
Total			<b>225</b>	<b>1,983,304.00</b>

Note: The total number of credits sought marginally exceeded the total number of credits available.

### Ordering of individual bid values

**Table 2** shows the individual bid values in order from highest value to lowest. It also indicates where the 'highest losing bid' occurs.

Credit bid	Bidder ID	Maximum \$ per unit
1	105	14,021.00
2	105	14,021.00
3	105	14,021.00
4	105	14,021.00
5	105	14,021.00
6	103	13,983.00
7	103	13,983.00
8	103	13,983.00
9	106	13,596.00
10	106	13,596.00
11	106	13,596.00
12	106	13,596.00
13	106	13,596.00
14	106	13,596.00
15	106	13,596.00
16	106	13,596.00
17	106	13,596.00
18	106	13,596.00
19	106	13,596.00
20	106	13,596.00
21	106	13,596.00
22	106	13,596.00
23	106	13,596.00
24	106	13,596.00
25	106	13,596.00
26	106	13,596.00
27	106	13,596.00
28	108	13,571.00
29	108	13,571.00
30	108	13,571.00
31	108	13,571.00
32	108	13,571.00

33	103	13,523.00
34	103	13,523.00
35	103	13,523.00
36	103	13,523.00
37	103	13,523.00
38	103	13,523.00
39	103	13,523.00
40	105	13,379.00
41	105	13,379.00
42	105	13,379.00
43	105	13,379.00
44	105	13,379.00
45	105	13,379.00
46	106	13,355.00
47	106	13,355.00
48	106	13,355.00
49	106	13,355.00
50	106	13,355.00
51	106	13,355.00
52	108	12,472.00
53	108	12,472.00
54	108	12,472.00
55	108	12,472.00
56	108	12,472.00
57	108	12,472.00
58	108	12,472.00
59	108	12,472.00
60	108	12,472.00
61	108	12,472.00
62	108	12,472.00
63	105	12,126.00
64	105	12,126.00
65	106	11,676.00
66	106	11,676.00
67	106	11,676.00
68	106	11,676.00
69	104	11,591.00
70	104	11,591.00
71	104	11,591.00
72	104	11,591.00
73	104	11,591.00
74	105	11,304.00
75	105	11,304.00
76	105	11,304.00
77	105	11,304.00
78	105	11,304.00
79	105	11,304.00
80	105	11,304.00

81	105	11,304.00
82	101	10,861.00
83	101	10,861.00
84	101	10,861.00
85	105	10,607.00
86	105	10,607.00
87	105	10,607.00
88	106	10,425.00
89	106	10,425.00
90	106	10,300.00
91	106	10,300.00
92	106	10,300.00
93	106	10,300.00
94	106	10,300.00
95	108	9,579.00
96	108	9,579.00
97	108	9,579.00
98	108	9,579.00
99	106	9,384.00
100	106	9,384.00
101	106	9,384.00
102	106	9,384.00
103	106	9,384.00
104	106	9,384.00
105	106	9,384.00
106	106	9,384.00
107	106	9,384.00
108	106	9,384.00
109	108	9,307.00
110	108	9,307.00
111	107	8,867.00
112	107	8,867.00
113	107	8,867.00
114	107	8,867.00
115	107	8,867.00
116	107	8,867.00
117	107	8,652.00
118	107	8,652.00
119	107	8,652.00
120	107	8,652.00
121	105	8,629.00
122	105	8,629.00
123	108	8,446.00
124	108	8,446.00
125	108	8,446.00
126	108	8,446.00
127	108	8,054.00
128	108	8,054.00

129	108	8,054.00
130	108	8,054.00
131	102	7,857.00
132	102	7,857.00
133	102	7,857.00
134	102	7,857.00
135	102	7,857.00
136	106	7,305.00
137	106	7,305.00
138	105	6,586.00
139	105	6,586.00
140	105	6,586.00
141	105	6,586.00
142	105	6,586.00
143	105	6,586.00
144	105	6,586.00
145	103	6,460.00
146	103	6,460.00
147	103	6,460.00
148	101	6,294.00
149	101	6,294.00
150	101	6,294.00
151	101	6,294.00
152	101	6,294.00
153	101	6,294.00
154	101	6,294.00
155	107	6,260.00
156	107	6,260.00
157	107	6,260.00
158	107	6,260.00
159	107	6,260.00
160	107	6,260.00
161	107	6,260.00
162	104	6,049.00
163	104	6,049.00
164	104	6,049.00
165	104	6,049.00
166	104	6,049.00
167	104	6,049.00
168	104	6,049.00
169	104	6,049.00
170	104	6,049.00
171	104	6,049.00
172	104	6,049.00
173	107	5,798.00
174	107	5,798.00
175	107	5,798.00
176	107	5,798.00
177	107	5,798.00



178	105	5,793.00
179	105	5,793.00
180	105	5,793.00
181	105	5,793.00
182	105	5,793.00
183	106	4,989.00
184	106	4,989.00
185	106	4,989.00
186	106	4,989.00
187	106	4,989.00
188	106	4,989.00
189	106	4,989.00
190	106	4,989.00
191	106	4,989.00
192	106	4,989.00
193	108	4,620.00
194	108	4,620.00
195	106	3,879.00
196	106	3,879.00
197	106	3,879.00
198	106	3,879.00
199	106	3,879.00
200	106	3,879.00
201	<b>106</b>	<b>Highest losing bid 3,879.00</b>
202	106	3,084.00
203	106	3,084.00
204	106	3,084.00
205	103	2,925.00
206	103	2,925.00
207	103	2,925.00
208	103	2,925.00
209	102	2,387.00
210	102	2,387.00
211	102	2,387.00
212	102	2,387.00
213	102	2,387.00
214	102	2,387.00
215	105	2,319.00
216	105	2,319.00
217	105	2,319.00
218	105	2,319.00
219	105	2,319.00
220	105	1,663.00
221	105	1,663.00
222	105	1,663.00
223	105	1,663.00
224	105	1,663.00
225	105	1,663.00

## Example allocations and payment calculations

**Table 3** identifies the allocation and associated payment for two bidders.

Bidder 103 was allocated 13 credits through this auction even though it bid for 17. As highlighted in blue, Bidder 103 offered to buy 13 credits at values above the highest losing bid. To calculate the amount to be paid, proceed to the highest losing bid in Table 3 and sum the bid values from credit bid 201 onwards, excluding any bids made by Bidder 103 (shown as ~~strike through~~) for the price calculation. The amount to be paid is the sum of the values shown as **bolded blue** (i.e. credit bids 201–204 inclusive and 209–217 inclusive). Hence, Bidder 103 is allocated 13 credits for the total price of \$34,410.

Bidder 105 was allocated 38 credits for the total price of \$45,153. The allocation is carried out in the same manner. However, the difference is that for some of the credits, the reserve price is applied. In this example auction, the reserve price is set at \$250. So Bidder 105 obtained 14 credits at bid prices set for credit bids 201–214 inclusive (\$39,153) and the remaining 24 credits (to make up 38 successful bid values) were paid at reserve price of \$250 per credit (\$6,000).

Credit bid	Bidder ID	Maximum \$ per unit
1	105	14,021.00
2	105	14,021.00
3	105	14,021.00
4	105	14,021.00
5	105	14,021.00
6	103	13,983.00
7	103	13,983.00
8	103	13,983.00
9	106	13,596.00
10	106	13,596.00
11	106	13,596.00
12	106	13,596.00
13	106	13,596.00
14	106	13,596.00
15	106	13,596.00
16	106	13,596.00
17	106	13,596.00
18	106	13,596.00
19	106	13,596.00
20	106	13,596.00
21	106	13,596.00
22	106	13,596.00
23	106	13,596.00
24	106	13,596.00
25	106	13,596.00
26	106	13,596.00
27	106	13,596.00
28	108	13,571.00
29	108	13,571.00
30	108	13,571.00
31	108	13,571.00
32	108	13,571.00
33	103	13,523.00
34	103	13,523.00
35	103	13,523.00

36	103	13,523.00
37	103	13,523.00
38	103	13,523.00
39	103	13,523.00
40	105	13,379.00
41	105	13,379.00
42	105	13,379.00
43	105	13,379.00
44	105	13,379.00
45	105	13,379.00
46	106	13,355.00
47	106	13,355.00
48	106	13,355.00
49	106	13,355.00
50	106	13,355.00
51	106	13,355.00
52	108	12,472.00
53	108	12,472.00
54	108	12,472.00
55	108	12,472.00
56	108	12,472.00
57	108	12,472.00
58	108	12,472.00
59	108	12,472.00
60	108	12,472.00
61	108	12,472.00
62	108	12,472.00
63	105	12,126.00
64	105	12,126.00
65	106	11,676.00
66	106	11,676.00
67	106	11,676.00
68	106	11,676.00
69	104	11,591.00
70	104	11,591.00
71	104	11,591.00
72	104	11,591.00
73	104	11,591.00
74	105	11,304.00
75	105	11,304.00
76	105	11,304.00
77	105	11,304.00
78	105	11,304.00
79	105	11,304.00
80	105	11,304.00
81	105	11,304.00

82	101	10,861.00
83	101	10,861.00
84	101	10,861.00
85	105	10,607.00
86	105	10,607.00
87	105	10,607.00
88	106	10,425.00
89	106	10,425.00
90	106	10,300.00
91	106	10,300.00
92	106	10,300.00
93	106	10,300.00
94	106	10,300.00
95	108	9,579.00
96	108	9,579.00
97	108	9,579.00
98	108	9,579.00
99	106	9,384.00
100	106	9,384.00
101	106	9,384.00
102	106	9,384.00
103	106	9,384.00
104	106	9,384.00
105	106	9,384.00
106	106	9,384.00
107	106	9,384.00
108	106	9,384.00
109	108	9,307.00
110	108	9,307.00
111	107	8,867.00
112	107	8,867.00
113	107	8,867.00
114	107	8,867.00
115	107	8,867.00
116	107	8,867.00
117	107	8,652.00
118	107	8,652.00
119	107	8,652.00
120	107	8,652.00
121	105	8,629.00
122	105	8,629.00
123	108	8,446.00
124	108	8,446.00
125	108	8,446.00
126	108	8,446.00
127	108	8,054.00
128	108	8,054.00
129	108	8,054.00

130	108	8,054.00
131	102	7,857.00
132	102	7,857.00
133	102	7,857.00
134	102	7,857.00
135	102	7,857.00
136	106	7,305.00
137	106	7,305.00
138	105	6,586.00
139	105	6,586.00
140	105	6,586.00
141	105	6,586.00
142	105	6,586.00
143	105	6,586.00
144	105	6,586.00
145	103	6,460.00
146	103	6,460.00
147	103	6,460.00
148	101	6,294.00
149	101	6,294.00
150	101	6,294.00
151	101	6,294.00
152	101	6,294.00
153	101	6,294.00
154	101	6,294.00
155	107	6,260.00
156	107	6,260.00
157	107	6,260.00
158	107	6,260.00
159	107	6,260.00
160	107	6,260.00
161	107	6,260.00
162	104	6,049.00
163	104	6,049.00
164	104	6,049.00
165	104	6,049.00
166	104	6,049.00
167	104	6,049.00
168	104	6,049.00
169	104	6,049.00
170	104	6,049.00
171	104	6,049.00
172	104	6,049.00
173	107	5,798.00
174	107	5,798.00
175	107	5,798.00
176	107	5,798.00
177	107	5,798.00

178	105	5,793.00
179	105	5,793.00
180	105	5,793.00
181	105	5,793.00
182	105	5,793.00
183	106	4,989.00
184	106	4,989.00
185	106	4,989.00
186	106	4,989.00
187	106	4,989.00
188	106	4,989.00
189	106	4,989.00
190	106	4,989.00
191	106	4,989.00
192	106	4,989.00
193	108	4,620.00
194	108	4,620.00
195	106	3,879.00
196	106	3,879.00
197	106	3,879.00
198	106	3,879.00
199	106	3,879.00
200	106	3,879.00
<b>201</b>	<b>106</b>	<b>Highest losing bid 3,879.00</b>
<b>202</b>	<b>106</b>	<b>3,084.00</b>
<b>203</b>	<b>106</b>	<b>3,084.00</b>
<b>204</b>	<b>106</b>	<b>3,084.00</b>
205	<del>403</del>	<del>2,925.00</del>
206	<del>403</del>	<del>2,925.00</del>
207	<del>403</del>	<del>2,925.00</del>
208	<del>403</del>	<del>2,925.00</del>
<b>209</b>	<b>102</b>	<b>2,387.00</b>
<b>210</b>	<b>102</b>	<b>2,387.00</b>
<b>211</b>	<b>102</b>	<b>2,387.00</b>
<b>212</b>	<b>102</b>	<b>2,387.00</b>
<b>213</b>	<b>102</b>	<b>2,387.00</b>
<b>214</b>	<b>102</b>	<b>2,387.00</b>
<b>215</b>	<b>405</b>	<b>2,349.00</b>
<b>216</b>	<b>405</b>	<b>2,349.00</b>
<b>217</b>	<b>405</b>	<b>2,349.00</b>
218	405	2,349.00
219	405	2,349.00
220	405	1,663.00
221	405	1,663.00
222	405	1,663.00
223	405	1,663.00
224	405	1,663.00
225	405	1,663.00

226	<b>Reserve</b>	<b>1,000</b>
227	<b>Reserve</b>	<b>1,000</b>
228	<b>Reserve</b>	<b>1,000</b>
229	<b>Reserve</b>	<b>1,000</b>
230	<b>Reserve</b>	<b>1,000</b>
231	<b>Reserve</b>	<b>1,000</b>
232	<b>Reserve</b>	<b>1,000</b>
233	<b>Reserve</b>	<b>1,000</b>
234	<b>Reserve</b>	<b>1,000</b>

## Overall example auction outcome summary

Table 4 gives the allocations for all eight bidders in the example auction.

Three bidders had some of their units allocated at the reserve bid price, because the available losing bids were exhausted before all of their units to be allocated could be priced.

**Table 4**

Bidder ID	Number of units allocated	Total payment amount (\$)	Amount paid at the minimum (or reserve) bid price (\$250/credit)
101	10	29,605	0
102	5	16,056	0
103	13	34,410	0
104	16	43,791	0
105	38	39,153	6,000
106	64	47,595	10,750
107	22	55,737	0
108	32	60,726	1,750
<b>TOTAL</b>	<b>200</b>	<b>327,073</b>	<b>18,500</b>

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Speak and listen users: phone 1300 555 727, then ask for 131 555

Email: [info@environment.nsw.gov.au](mailto:info@environment.nsw.gov.au)

Website: [www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)

### Report pollution and environmental incidents

Environment Line: 131 555 (NSW only) or [info@environment.nsw.gov.au](mailto:info@environment.nsw.gov.au)

See also [www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)

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