

Scotland's Renewable Energy Routemap and Electricity Generation Policy Statement

CONSULTATION RESPONSE BY STUART YOUNG

"ELECTRICITY GENERATION POLICY STATEMENT EXECUTIVE SUMMARY

4.

The Scottish Government's policy on electricity generation is that Scotland's generation mix should deliver:

- a secure source of electricity supply;
- at an affordable cost to consumers; “

I have read no further. The Scottish Government's commitment to generating the equivalent of 100% of Scottish electricity demand, or more, by 2020 is incompatible with having both “a secure source of electricity supply” and “at an affordable cost to consumers”.

Secure source of supply

Please refer to my report¹ “Analysis of UK Wind Power Generation November 2008 to December 2010”. Please note that my report is simply a presentation of generation data obtained from National Grid which can be verified by anyone with an internet connection.

Amongst other things, I found that:

“2. There were 124 separate occasions from November 2008 till December 2010 when total generation from the windfarms metered by National Grid was less than 20MW. (Average capacity over the period was in excess of 1600MW).

3. The average frequency and duration of a low wind event of 20MW or less between November 2008 and December 2010 was once every 6.38 days for a period of 4.93 hours.”

The total wind generation capacity metered by National Grid² is currently 4686MW, of which 2819MW is Scottish onshore from Orkney to the Borders and from Skye to Aberdeen, 162MW is Scottish offshore at Robin Rigg in the Solway Firth, and 1867MW English offshore from Cumbria to Lincolnshire and the Thames Estuary.

Whilst this expansion and greater spread of wind generators since my report was published just over a year ago has certainly lessened the frequency of extreme low output events, low output events of 10% of capacity are frequent³ and as recently as 24th May 2012 the 4686MW capacity which National Grid meters generated an average of only 6MW over one five minute period.⁴

This demonstrates beyond all doubt that UK has to retain non-wind generation capacity to meet maximum demand and also to meet the Strategic Operational Reserve Requirement. If Scotland were ever to be electrically independent, then the same requirement would apply.

This non-wind generation capacity has to be paid for. Under the present circumstances, wind generation takes precedence on the grid (unless for operational reasons it has to be constrained off at blackmail prices). As more wind generation is connected, more conventional generation is displaced and the conventional generators' unit costs will increase to the point where it will be necessary to subsidise conventional generators to be available when needed to supply electricity when wind can't.

The ROCs and FITS regimes already make wind generation more expensive than conventional generation (even without the massive grid reinforcement needed because of it). Less use of conventional plant will increase the cost of electricity generated by it, and combined with external sources of gas and oil etc price rises, conventional electricity generation costs might well equal or overtake the present cost of wind generation.

It is however naïve in the extreme to believe that wind generators will be happy with current revenues when others are commanding higher prices, and the cost to the consumer of wind generated electricity will inevitably rise to be only marginally less than that of conventionally generated electricity.

CONCLUSION

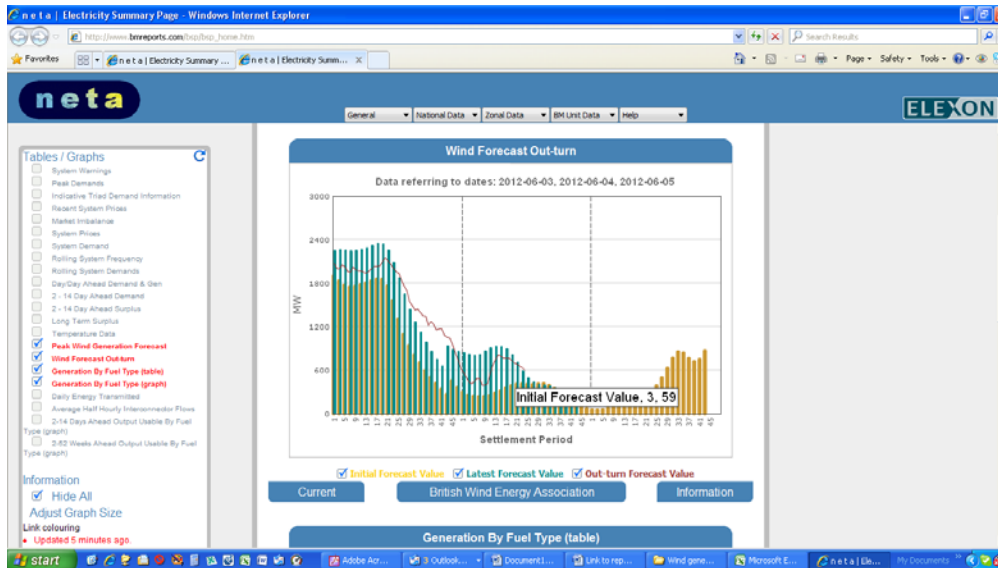
It is possible to provide security of supply by maintaining sufficient conventional generation to cover maximum demand plus operational reserve, but it is not possible to do so at an affordable cost to consumers when wind generation forms any significant portion of the generation mix. An SEA which is founded on the belief that the two objectives are possible is a house built on sand.

Stuart Young
4th June 2012

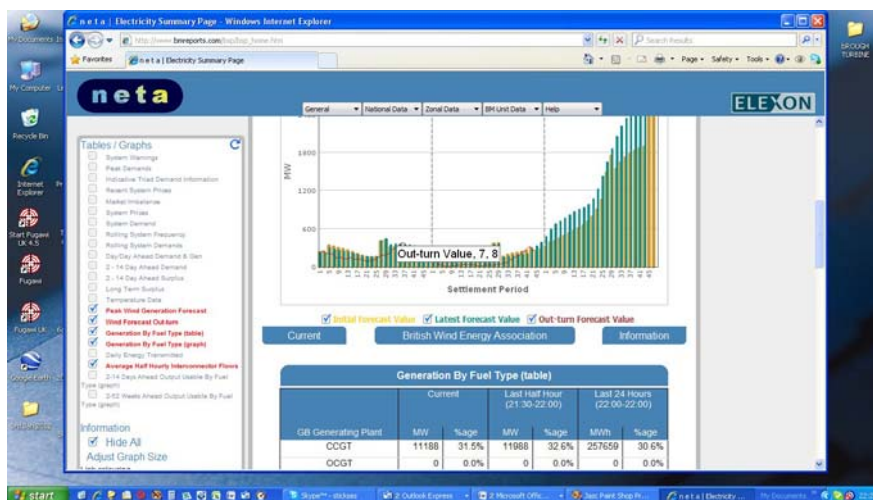
References.

- 1. Analysis of UK Wind Power Generation November 2008 to December 2010**
http://www.jmt.org/assets/pdf/Report_Analysis%20UK%20Wind_SYoung.pdf

2. http://www.bmreports.com/bsp/bsp_home.htm
Scroll to Peak “Wind Generation Forecast” and click on “Power Park Modules Spreadsheet”. Version current at 4th June 2012 is attached.
3. http://www.bmreports.com/bsp/bsp_home.htm
Scroll to “Wind Forecast out turn”. The screenshot current at the time of writing this follows. Note that National Grid at this time is forecasting a wind generation level from 4686MW connected capacity of 59MW or 1.26%.



4. http://www.bmreports.com/bsp/bsp_home.htm
Scroll to “Generation by Fuel Type Table” and click on “24H Instant.Data”. This leads to a rolling 24hour record of generation shown on the table in five minute period averages. A spreadsheet which includes the period in question is attached. Column 9 is wind. The period of low generation of less than 100MW is highlighted. A screen shot showing this follows:



END

POWER PARK MODULES AT ATH JUNE 2012.

Settlement BMU name	GEN_NAME	GEN_FULL_NAME	MaxMW	
	ACHYW-1	Achary	37	
	AKGLW-1	Akingall	47	
T_ANSUW-1	ANSUW-1	An Suidhe	20	
T_ARCHW-1	ARCHW-1	Arecleoch	114	
E_BETHW-1	BETHW-1	Beinn Tharsuinn	28	
	BGLAW-1	Beinn Ghlas	9	
T_BLLA-1	BLLA-1	Black Law	122	
	BNAKW-1	Ben Aketil	28	
	BOULW-1	Boulfruich / Houstry	13	
T_BOWLW-1	BOWLW-1	Barrow Offshore	82	x 82
	BOYNW-1	Boyndie Airfield	16	
E_BRDUW-1	BRDUW-1	Braes of Doune	71	
	BTUIW-1	Beinn an Tuirc	29	
E_BTUIW-2	BTUIW-2	Beinn an Tuirc extension	0	
E_BURBO	BURBW-1	Burbo Bank	90	x 90
	CAIRW-1	Cairn Uish	52	
	CAUSW-1	Causeymire	49	
T_CLDCW-1	CLDCW-1	Clyde Central	105	
T_CLDNW-1	CLDNW-1	Clyde North	0	
T_CLDSW-1	CLDSW-1	Clyde South	120	
E_CLFLW-1	CLFLW-1	Clachan Flats	15	
	CRAW-1	Craigengelt	20	
	CRMHW-1	Cruach Mhor	30	
	CRYRW-1	Crystal Rig 1	54	
T_CRYRW-2	CRYRW-2	Crystal Rig 2	138	
E_DALSW-1	DALSW-1	Dalswinton	31	
	DEUCW-1	Deucheran Hill	13	
T_DNLWW-1	DNLWW-1	Dun Law	29	
	DRDGW-1	Drumderg	32	
	DUMMW-1	Insch / Dummies / Dummuie	13	
	EARBW-1	Earlsburn	35	
T_EDINW-1	EDINW-1	Edinbane	42	
T_FARR-1	FAARW-1	Farr 1	45	
T_FARR-2	FAARW-2	Farr 2	47	
	FRBRW-1	Fairburn	41	
E_GLOFW-1	GLOFW-1	Glens of Foudland	25	
E_GNFSW-1	GNFSW-1	Gunfleet Sands 1	99	x 99
E_GNFSW-2	GNFSW-2	Gunfleet Sands 2	58	x 58
T_GORDW-1	GORDW-1	Gordonbush	68	
T_GRGBW-1	GRGBW-1	Greater Gabbard	0	x 0
T_GRGBW-2	GRGBW-2	Greater Gabbard 2	162	x 162
T_GRGBW-3	GRGBW-3	Greater Gabbard 3	142	x 142
T_GRIFW-1	GRIFW-1	Griffin 1	77	
T_GRIFW-2	GRIFW-2	Griffin 2	78	
	GRKNW-1	Green Knowes	27	
T_HADHW-1	HADHW-1	Hadyard Hill	119	
	HAWFW-1	Hagshaw Hill	10	
E_HLTWW-1	HLTWW-1	Hill of Towie	36	
	INNDW-1	Inner Dowsing	91	x 91
T_KILBW-1	KILBW-1	Kilbraur (Strathbrora)	68	
T_LARYW-1	LARYW-1	London Array 1	0	x 0
T_LARYW-2	LARYW-2	London Array 2	0	x 0
T_LARYW-3	LARYW-3	London Array 3	0	x 0
T_LARYW-4	LARYW-4	London Array 4	0	x 0
	LGPKW-1	Long Park	39	

724

T_LNCSW-3	LNCSW-3	Lincs	0	x	0
	LYNNW-1	Lynn	90	x	90
T_MILWW-1	MILWW-1	Millennium (Glenmoriston)	65		
E_MINSW-1	MINSW-1	Minsca	35		
T_MKHLW-1	MKHLW-1	Mark Hill	55		
	NHOYW-1	North Hoyle	61	x	61
	NORHW-1	North Rhins	16		
	NOVAW-1	Novar / Meall an Tuirc (Highlands)	18		
	NOVAW-2	Novar Extension	17		
	OMNDW-1	Ormonde	145	x	145
	PAUHW-1	Pauls Hill	64		
	RHYFW-1	Rhyl Flats	90	x	90
T_RREW-1	RREW-1	Robin Rigg East	77	0	0
T_RRWW-1	RRWW-1	Robin Rigg West	85	0	0
	SANDW-1	Sanday, Spurness, Orkneys	0		
E_SHRSW-1	SHRSW-1	Sheringham Shoal 1	95	x	95
E_SHRSW-2	SHRSW-2	Sheringham Shoal 2	17	x	17
	TANGW-1	Tangy	18		
T_TDBNW-1	TDBNW-1	Toddleburn	28		
E_THNTW-1	THNTW-1	Thanet 1	149	x	149
E_THNTW-2	THNTW-2	Thanet 2	142	x	142
	TULWW-1	Tullo	17		
	WETHW-1	Wether Hill	18		
T_WHILW-1	WHILW-1	Whitelee, Eaglesham Moor	314		
T_WHILW-2	WHILW-2	Whitelee Extension	0		
T_WLNYW-1	WLNYW-1	Walney 1	178	x	178
	WLNYW-2	Walney 2	176	x	176

TOTAL (MW)

4686

1867

TOTAL

4686

Deduct ENGLISH OFFSHORE

1867

2819 MW.

Deduct SCOTTISH OFFSHORE

162

2657 MW

162

SCOTTISH ONSHORE	-	2819 MW.
" OFFSHORE	-	162 MW
ENGLISH OFFSHORE	-	1867 MW.

HDR INSTANTANEOUS GENERATION BY FUEL TYPE DATA

FUELINS	20120523	45	2.01E+13	10439	0	15082	8241	227	523	168	0	45	997	0	838
FUELINS	20120523	45	2.01E+13	10310	0	14980	8237	221	387	168	0	45	997	0	839
FUELINS	20120523	45	2.01E+13	10133	0	14945	8233	217	233	168	0	45	997	0	837
FUELINS	20120523	45	2.01E+13	10047	0	14815	8232	211	133	169	0	45	997	0	838
FUELINS	20120523	45	2.01E+13	9786	0	14645	8234	206	107	168	0	45	996	0	837
FUELINS	20120523	45	2.01E+13	9574	0	14542	8233	205	0	165	0	45	997	0	838
FUELINS	20120523	46	2.01E+13	9440	0	14389	8238	207	0	152	0	44	996	0	838
FUELINS	20120523	46	2.01E+13	9280	0	14189	8241	207	0	152	0	45	996	0	839
FUELINS	20120523	46	2.01E+13	9103	0	13977	8241	223	0	152	0	44	996	0	839
FUELINS	20120523	46	2.01E+13	8951	0	13798	8244	222	0	152	0	45	996	0	807
FUELINS	20120523	46	2.01E+13	8725	0	13660	8245	207	0	151	0	45	996	0	800
FUELINS	20120523	46	2.01E+13	8522	0	13515	8250	188	0	129	0	44	996	0	895
FUELINS	20120523	47	2.01E+13	8260	0	13318	8252	180	0	102	0	44	996	0	994
FUELINS	20120523	47	2.01E+13	7951	0	13248	8244	165	0	102	0	44	996	0	995
FUELINS	20120523	47	2.01E+13	7547	0	13230	8245	149	0	102	0	44	996	0	995
FUELINS	20120523	47	2.01E+13	7224	0	13140	8245	133	0	102	0	45	996	0	995
FUELINS	20120523	47	2.01E+13	7003	0	12902	8254	131	0	102	0	44	996	0	995
FUELINS	20120523	47	2.01E+13	6833	0	12749	8249	127	0	98	0	44	996	0	995
FUELINS	20120523	48	2.01E+13	6699	0	12717	8248	115	0	85	0	45	996	0	994
FUELINS	20120523	48	2.01E+13	6517	0	12630	8255	106	0	83	0	44	996	0	995
FUELINS	20120523	48	2.01E+13	6325	0	12689	8250	99	0	82	0	44	996	0	995
FUELINS	20120523	48	2.01E+13	6156	0	12543	8250	100	0	82	0	45	996	0	995
FUELINS	20120523	48	2.01E+13	6012	0	12466	8252	108	0	82	0	44	996	0	994
FUELINS	20120523	48	2.01E+13	5849	0	12397	8254	112	0	80	0	44	996	0	994
FUELINS	20120524	1	2.01E+13	5852	0	12370	8247	115	0	68	0	44	996	0	995
FUELINS	20120524	1	2.01E+13	5836	0	12368	8249	119	0	67	0	44	996	0	995
FUELINS	20120524	1	2.01E+13	5794	0	12291	8251	117	0	69	0	44	997	0	994
FUELINS	20120524	1	2.01E+13	5817	0	12321	8250	117	0	69	0	44	997	0	995
FUELINS	20120524	1	2.01E+13	5795	0	12170	8255	118	0	69	0	44	996	0	995
FUELINS	20120524	1	2.01E+13	5807	0	12151	8252	116	0	68	0	44	996	0	995
FUELINS	20120524	2	2.01E+13	5831	0	12153	8255	112	0	69	0	44	997	0	995
FUELINS	20120524	2	2.01E+13	5872	0	11972	8252	109	0	69	0	43	997	0	995
FUELINS	20120524	2	2.01E+13	5857	0	11823	8253	107	0	66	0	43	997	0	994
FUELINS	20120524	2	2.01E+13	5844	0	11504	8248	96	0	66	0	43	997	0	995
FUELINS	20120524	2	2.01E+13	5787	0	11361	8240	96	0	65	0	43	996	0	994
FUELINS	20120524	2	2.01E+13	5786	0	11318	8242	100	0	65	0	44	996	0	994
FUELINS	20120524	3	2.01E+13	5873	0	11583	8246	94	0	65	0	43	997	0	994
FUELINS	20120524	3	2.01E+13	5932	0	11603	8248	84	0	66	0	43	997	0	994
FUELINS	20120524	3	2.01E+13	5910	0	11659	8248	73	0	66	0	44	996	0	995
FUELINS	20120524	3	2.01E+13	5942	0	11598	8252	63	0	66	0	44	997	0	995
FUELINS	20120524	3	2.01E+13	5941	0	11418	8247	51	0	66	0	43	996	0	995
FUELINS	20120524	3	2.01E+13	5948	0	11384	8249	43	0	66	0	44	997	0	994
FUELINS	20120524	4	2.01E+13	6006	0	11481	8248	43	0	65	0	44	996	0	995
FUELINS	20120524	4	2.01E+13	5999	0	11519	8244	45	0	66	0	43	996	0	995
FUELINS	20120524	4	2.01E+13	5972	0	11530	8243	43	0	65	0	44	996	0	994
FUELINS	20120524	4	2.01E+13	5871	0	11497	8254	32	0	66	0	44	997	0	994
FUELINS	20120524	4	2.01E+13	5808	0	11281	8255	31	0	66	0	44	996	0	994
FUELINS	20120524	4	2.01E+13	5756	0	11132	8254	26	0	65	0	44	997	0	993

FUELINS ^c	20120524	5	2.01E+13	5761	0	11195	8257	23	0	65	0	44	996	0	994
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FUELINS ^c	20120524	6	2.01E+13	5736	0	10989	8253	13	0	66	0	44	997	0	994
FUELINS ^c	20120524	6	2.01E+13	5722	0	10943	8256	11	0	65	0	44	996	0	996
FUELINS ^c	20120524	6	2.01E+13	5728	0	10804	8259	10	0	65	0	44	997	0	994
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FUELINS ^c	20120524	9	2.01E+13	6099	0	10099	8258	18	0	72	0	44	995	0	786
FUELINS ^c	20120524	10	2.01E+13	6114	0	10018	8256	17	0	80	0	44	998	0	722
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FUELINS ^c	20120524	10	2.01E+13	6053	0	9538	8256	14	0	80	0	44	998	0	889
FUELINS ^c	20120524	10	2.01E+13	6045	0	9349	8262	20	0	80	0	43	998	0	994
FUELINS ^c	20120524	10	2.01E+13	6061	0	9429	8255	19	0	84	0	44	998	0	798
FUELINS ^c	20120524	10	2.01E+13	6095	0	9793	8260	24	0	96	0	44	983	0	315
FUELINS ^c	20120524	11	2.01E+13	6106	0	10532	8262	25	0	96	0	44	632	0	0
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FUELINS ^c	20120524	11	2.01E+13	6104	0	11341	8256	22	0	96	0	44	0	0	0
FUELINS ^c	20120524	11	2.01E+13	6088	0	11334	8259	19	0	97	0	44	0	0	0
FUELINS ^c	20120524	11	2.01E+13	6096	0	11405	8253	23	0	97	0	44	0	0	0
FUELINS ^c	20120524	11	2.01E+13	6095	0	11486	8248	23	0	97	0	43	0	0	0
FUELINS ^c	20120524	12	2.01E+13	6144	0	11615	8247	25	0	97	0	43	0	0	0
FUELINS ^c	20120524	12	2.01E+13	6179	0	11742	8245	31	0	97	0	44	0	0	0
FUELINS ^c	20120524	12	2.01E+13	6184	0	11725	8249	32	0	97	0	45	8	0	0
FUELINS ^c	20120524	12	2.01E+13	6162	0	11666	8248	30	0	96	0	45	114	0	0
FUELINS ^c	20120524	12	2.01E+13	6306	0	11491	8246	30	0	96	0	45	213	0	0
FUELINS ^c	20120524	12	2.01E+13	6422	0	11410	8247	28	0	96	0	45	271	0	0
FUELINS ^c	20120524	13	2.01E+13	6522	0	11767	8251	27	0	96	0	45	271	0	0

FUELINS ^c	20120524	13	2.01E+13	6700	0	12430	8246	24	0	97	0	45	271	0	0
FUELINS ^c	20120524	13	2.01E+13	6889	0	12659	8247	26	33	96	0	44	271	0	0
FUELINS ^c	20120524	13	2.01E+13	7132	0	12800	8252	34	0	96	0	44	271	0	0
FUELINS ^c	20120524	13	2.01E+13	7409	0	13006	8250	40	0	96	0	44	257	0	0
FUELINS ^c	20120524	13	2.01E+13	7744	0	13088	8250	45	0	96	0	44	256	0	0
FUELINS ^c	20120524	14	2.01E+13	8089	0	13289	8248	46	0	96	0	44	256	0	0
FUELINS ^c	20120524	14	2.01E+13	8344	0	13557	8247	45	0	96	0	44	256	0	0
FUELINS ^c	20120524	14	2.01E+13	8630	0	13736	8250	46	0	96	0	43	256	0	0
FUELINS ^c	20120524	14	2.01E+13	8977	0	13869	8252	41	0	96	0	44	256	0	0
FUELINS ^c	20120524	14	2.01E+13	9413	0	14051	8257	44	0	97	0	44	256	0	0
FUELINS ^c	20120524	14	2.01E+13	9710	0	14082	8253	41	0	121	0	44	311	0	0
FUELINS ^c	20120524	15	2.01E+13	9882	0	13984	8249	39	56	146	0	44	608	0	95
FUELINS ^c	20120524	15	2.01E+13	10368	0	14274	8254	45	109	146	0	44	628	0	183
FUELINS ^c	20120524	15	2.01E+13	10465	0	14590	8255	44	230	146	0	44	628	0	216
FUELINS ^c	20120524	15	2.01E+13	10750	0	14928	8254	49	304	147	0	44	629	0	172
FUELINS ^c	20120524	15	2.01E+13	10902	0	15202	8255	44	343	147	0	44	629	0	172
FUELINS ^c	20120524	15	2.01E+13	11122	0	15345	8252	41	352	147	0	44	629	0	172
FUELINS ^c	20120524	16	2.01E+13	11361	0	15469	8252	41	315	147	0	44	629	0	172
FUELINS ^c	20120524	16	2.01E+13	11579	0	15509	8248	39	329	147	0	44	629	0	172
FUELINS ^c	20120524	16	2.01E+13	11714	0	15635	8248	35	327	147	0	43	629	0	171
FUELINS ^c	20120524	16	2.01E+13	11934	0	15682	8251	36	340	147	0	44	623	0	172
FUELINS ^c	20120524	16	2.01E+13	12277	0	15639	8247	36	344	147	0	44	623	0	172
FUELINS ^c	20120524	16	2.01E+13	12544	0	15624	8250	33	329	147	0	44	622	0	172
FUELINS ^c	20120524	17	2.01E+13	12681	0	15566	8251	36	295	146	0	44	841	0	305
FUELINS ^c	20120524	17	2.01E+13	12610	0	15535	8253	36	293	146	0	44	980	0	624
FUELINS ^c	20120524	17	2.01E+13	12644	0	15555	8256	37	293	146	0	44	981	0	739
FUELINS ^c	20120524	17	2.01E+13	12830	0	15607	8248	40	316	146	0	44	981	0	570
FUELINS ^c	20120524	17	2.01E+13	12954	0	15617	8254	41	296	146	0	43	981	0	569
FUELINS ^c	20120524	17	2.01E+13	13031	0	15583	8251	41	298	146	0	44	981	0	569
FUELINS ^c	20120524	18	2.01E+13	13125	0	15515	8247	40	289	146	0	44	965	0	569
FUELINS ^c	20120524	18	2.01E+13	13198	0	15495	8246	36	293	147	0	44	959	0	569
FUELINS ^c	20120524	18	2.01E+13	13162	0	15545	8244	32	289	146	0	44	959	0	569
FUELINS ^c	20120524	18	2.01E+13	13225	0	15583	8245	32	324	146	0	44	958	0	450
FUELINS ^c	20120524	18	2.01E+13	13256	0	15553	8240	34	377	147	0	44	959	0	453
FUELINS ^c	20120524	18	2.01E+13	13135	0	15528	8245	36	301	224	0	44	959	0	768
FUELINS ^c	20120524	19	2.01E+13	13139	0	15524	8248	33	289	292	0	45	990	0	959
FUELINS ^c	20120524	19	2.01E+13	13279	0	15534	8250	31	285	295	0	44	998	0	959
FUELINS ^c	20120524	19	2.01E+13	13333	0	15499	8250	26	333	296	0	44	998	0	959
FUELINS ^c	20120524	19	2.01E+13	13450	0	15398	8247	28	422	299	0	45	998	0	959
FUELINS ^c	20120524	19	2.01E+13	13491	0	15340	8250	27	504	303	0	44	998	0	959
FUELINS ^c	20120524	19	2.01E+13	13528	0	15271	8246	26	537	304	0	44	998	0	958
FUELINS ^c	20120524	20	2.01E+13	13564	0	15292	8246	22	477	327	0	44	997	0	960
FUELINS ^c	20120524	20	2.01E+13	13543	0	15272	8241	19	641	377	0	44	997	0	959
FUELINS ^c	20120524	20	2.01E+13	13524	0	15312	8243	17	658	378	0	44	997	0	959
FUELINS ^c	20120524	20	2.01E+13	13577	0	15349	8242	16	607	379	0	44	997	0	955
FUELINS ^c	20120524	20	2.01E+13	13594	0	15395	8243	15	589	378	0	44	996	0	954
FUELINS ^c	20120524	20	2.01E+13	13606	0	15402	8245	15	514	378	0	44	997	0	969
FUELINS ^c	20120524	21	2.01E+13	13542	0	15436	8249	16	449	378	0	44	997	0	984
FUELINS ^c	20120524	21	2.01E+13	13524	0	15416	8254	17	443	377	0	44	997	0	983

FUELINS ^c	20120524	21	2.01E+13	13543	0	15380	8252	18	448	378	0	43	997	0	984
FUELINS ^c	20120524	21	2.01E+13	13610	0	15356	8258	20	491	378	0	44	997	0	983
FUELINS ^c	20120524	21	2.01E+13	13587	0	15355	8260	23	598	378	0	44	996	0	983
FUELINS ^c	20120524	21	2.01E+13	13661	0	15352	8258	24	602	378	0	43	997	0	983
FUELINS ^c	20120524	22	2.01E+13	13660	0	15290	8256	22	677	381	0	44	997	0	983
FUELINS ^c	20120524	22	2.01E+13	13591	0	15180	8251	21	828	379	0	44	997	0	983
FUELINS ^c	20120524	22	2.01E+13	13515	0	15228	8246	22	842	378	0	44	997	0	984
FUELINS ^c	20120524	22	2.01E+13	13496	0	15277	8251	22	820	378	0	43	997	0	980
FUELINS ^c	20120524	22	2.01E+13	13561	0	15328	8253	25	723	378	0	45	996	0	982
FUELINS ^c	20120524	22	2.01E+13	13555	0	15375	8249	29	679	378	0	44	997	0	987
FUELINS ^c	20120524	23	2.01E+13	13482	0	15325	8246	30	798	377	0	44	997	0	995
FUELINS ^c	20120524	23	2.01E+13	13589	0	15348	8253	30	626	378	0	43	996	0	995
FUELINS ^c	20120524	23	2.01E+13	13612	0	15399	8257	29	595	378	0	44	996	0	995
FUELINS ^c	20120524	23	2.01E+13	13634	0	15428	8259	28	586	377	0	44	996	0	995
FUELINS ^c	20120524	23	2.01E+13	13663	0	15421	8257	29	584	374	0	44	996	0	995
FUELINS ^c	20120524	23	2.01E+13	13691	0	15378	8260	30	610	375	0	44	996	0	995
FUELINS ^c	20120524	24	2.01E+13	13664	0	15351	8260	27	721	377	0	44	997	0	995
FUELINS ^c	20120524	24	2.01E+13	13634	0	15369	8260	30	751	376	0	44	997	0	995
FUELINS ^c	20120524	24	2.01E+13	13531	0	15397	8262	29	794	376	0	44	997	0	994
FUELINS ^c	20120524	24	2.01E+13	13462	0	15382	8258	24	894	374	0	44	996	0	995
FUELINS ^c	20120524	24	2.01E+13	13487	0	15373	8255	21	908	362	0	43	997	0	995
FUELINS ^c	20120524	24	2.01E+13	13568	0	15376	8254	23	886	352	0	43	997	0	995
FUELINS ^c	20120524	25	2.01E+13	13775	0	15413	8262	29	710	289	0	43	997	0	942
FUELINS ^c	20120524	25	2.01E+13	13845	0	15465	8262	31	612	287	0	43	996	0	854
FUELINS ^c	20120524	25	2.01E+13	13821	0	15525	8260	29	607	287	0	43	997	0	851
FUELINS ^c	20120524	25	2.01E+13	13814	0	15551	8262	23	598	287	0	43	997	0	879
FUELINS ^c	20120524	25	2.01E+13	13754	0	15577	8261	23	589	287	0	43	997	0	878
FUELINS ^c	20120524	25	2.01E+13	13686	0	15591	8262	23	585	285	0	43	996	0	878
FUELINS ^c	20120524	26	2.01E+13	13680	0	15583	8259	26	592	285	0	44	996	0	879
FUELINS ^c	20120524	26	2.01E+13	13650	0	15524	8260	25	597	286	0	44	996	0	879
FUELINS ^c	20120524	26	2.01E+13	13662	0	15508	8251	27	608	286	0	44	996	0	880
FUELINS ^c	20120524	26	2.01E+13	13665	0	15440	8256	26	598	287	0	44	996	0	878
FUELINS ^c	20120524	26	2.01E+13	13706	0	15407	8257	26	610	287	0	44	996	0	879
FUELINS ^c	20120524	26	2.01E+13	13763	0	15298	8253	29	619	270	0	44	996	0	878
FUELINS ^c	20120524	27	2.01E+13	14025	0	15307	8258	28	590	217	0	44	997	0	743
FUELINS ^c	20120524	27	2.01E+13	14266	0	15275	8261	29	590	215	0	44	996	0	489
FUELINS ^c	20120524	27	2.01E+13	14238	0	15187	8258	31	589	214	0	44	996	0	480
FUELINS ^c	20120524	27	2.01E+13	14075	0	15198	8257	33	589	214	0	44	997	0	559
FUELINS ^c	20120524	27	2.01E+13	13980	0	15223	8258	34	589	214	0	44	997	0	559
FUELINS ^c	20120524	27	2.01E+13	14048	0	15025	8259	33	616	214	0	43	996	0	560
FUELINS ^c	20120524	28	2.01E+13	14258	0	14769	8256	35	769	217	0	44	996	0	559
FUELINS ^c	20120524	28	2.01E+13	14214	0	14797	8246	35	825	216	0	44	997	0	560
FUELINS ^c	20120524	28	2.01E+13	14176	0	14800	8242	41	795	188	0	44	996	0	560
FUELINS ^c	20120524	28	2.01E+13	14102	0	14764	8251	41	759	227	0	44	997	0	630
FUELINS ^c	20120524	28	2.01E+13	14076	0	14768	8246	38	736	227	0	44	996	0	637
FUELINS ^c	20120524	28	2.01E+13	14137	0	14842	8248	36	763	220	0	43	996	0	439
FUELINS ^c	20120524	29	2.01E+13	14137	0	14862	8261	36	880	230	0	43	996	0	304
FUELINS ^c	20120524	29	2.01E+13	14112	0	14901	8255	42	936	277	0	44	996	0	303
FUELINS ^c	20120524	29	2.01E+13	14106	0	14951	8257	47	804	278	0	44	996	0	303

FUELINS ^c	20120524	29	2.01E+13	14133	0	15004	8255	51	693	279	0	44	997	0	303
FUELINS ^c	20120524	29	2.01E+13	14044	0	15017	8253	48	690	278	0	43	996	0	303
FUELINS ^c	20120524	29	2.01E+13	14012	0	15101	8255	47	619	277	0	44	996	0	303
FUELINS ^c	20120524	30	2.01E+13	13784	0	15152	8257	46	791	276	0	44	996	0	303
FUELINS ^c	20120524	30	2.01E+13	13622	0	15144	8252	47	826	276	0	44	996	0	303
FUELINS ^c	20120524	30	2.01E+13	13600	0	15143	8246	51	952	277	0	44	996	0	304
FUELINS ^c	20120524	30	2.01E+13	13617	0	15136	8244	52	991	282	0	44	996	0	340
FUELINS ^c	20120524	30	2.01E+13	13687	0	15168	8245	52	770	280	0	43	997	0	343
FUELINS ^c	20120524	30	2.01E+13	13775	0	15190	8251	53	718	256	0	43	996	0	242
FUELINS ^c	20120524	31	2.01E+13	13838	0	15215	8247	53	811	135	0	44	996	0	172
FUELINS ^c	20120524	31	2.01E+13	13858	0	15205	8252	53	821	132	0	44	997	0	171
FUELINS ^c	20120524	31	2.01E+13	13881	0	15220	8251	54	708	131	0	44	996	0	171
FUELINS ^c	20120524	31	2.01E+13	13969	0	15196	8252	54	633	131	0	44	996	0	172
FUELINS ^c	20120524	31	2.01E+13	13915	0	15165	8251	55	680	132	0	44	997	0	172
FUELINS ^c	20120524	31	2.01E+13	13983	0	15157	8253	57	607	134	0	44	996	0	172
FUELINS ^c	20120524	32	2.01E+13	14059	0	15056	8256	61	688	142	0	44	996	0	172
FUELINS ^c	20120524	32	2.01E+13	14155	0	15046	8255	64	666	142	0	43	996	0	171
FUELINS ^c	20120524	32	2.01E+13	14217	0	15075	8249	64	709	142	0	44	996	0	171
FUELINS ^c	20120524	32	2.01E+13	14437	0	15077	8248	66	714	142	0	43	996	0	172
FUELINS ^c	20120524	32	2.01E+13	14396	0	15138	8257	70	827	141	0	43	996	0	172
FUELINS ^c	20120524	32	2.01E+13	14389	0	15188	8261	74	858	169	0	43	996	0	172
FUELINS ^c	20120524	33	2.01E+13	14366	0	15176	8263	77	766	204	0	43	996	0	219
FUELINS ^c	20120524	33	2.01E+13	14333	0	15181	8269	80	737	205	0	44	996	0	330
FUELINS ^c	20120524	33	2.01E+13	14461	0	15189	8264	79	641	206	0	44	996	0	369
FUELINS ^c	20120524	33	2.01E+13	14656	0	15111	8259	87	657	206	0	44	996	0	310
FUELINS ^c	20120524	33	2.01E+13	14576	0	15169	8257	97	711	205	0	44	996	0	310
FUELINS ^c	20120524	33	2.01E+13	14569	0	15217	8257	100	737	214	0	43	996	0	310
FUELINS ^c	20120524	34	2.01E+13	14598	0	15253	8256	106	609	266	0	44	996	0	310
FUELINS ^c	20120524	34	2.01E+13	14676	0	15229	8259	111	630	281	0	44	996	0	310
FUELINS ^c	20120524	34	2.01E+13	14623	0	15186	8253	119	839	281	0	44	997	0	310
FUELINS ^c	20120524	34	2.01E+13	14739	0	15209	8254	119	812	281	0	44	996	0	202
FUELINS ^c	20120524	34	2.01E+13	14728	0	15175	8253	121	878	281	0	44	996	0	214
FUELINS ^c	20120524	34	2.01E+13	14688	0	15163	8257	121	706	287	0	43	997	0	484
FUELINS ^c	20120524	35	2.01E+13	14514	0	15133	8253	126	598	281	0	43	997	0	823
FUELINS ^c	20120524	35	2.01E+13	14248	0	15195	8250	131	586	232	0	44	997	0	996
FUELINS ^c	20120524	35	2.01E+13	14247	0	15345	8257	136	375	221	0	44	996	0	995
FUELINS ^c	20120524	35	2.01E+13	14290	0	15289	8254	136	340	222	0	43	997	0	989
FUELINS ^c	20120524	35	2.01E+13	14211	0	15290	8250	139	341	221	0	44	996	0	980
FUELINS ^c	20120524	35	2.01E+13	14061	0	15399	8254	134	294	221	0	44	996	0	979
FUELINS ^c	20120524	36	2.01E+13	13821	0	15538	8256	134	286	220	0	44	997	0	982
FUELINS ^c	20120524	36	2.01E+13	13598	0	15589	8260	143	286	221	0	44	996	0	983
FUELINS ^c	20120524	36	2.01E+13	13394	0	15658	8262	153	286	221	0	44	997	0	983
FUELINS ^c	20120524	36	2.01E+13	13254	0	15651	8262	166	286	221	0	44	996	0	983
FUELINS ^c	20120524	36	2.01E+13	13068	0	15667	8265	172	304	222	0	44	996	0	983
FUELINS ^c	20120524	36	2.01E+13	12879	0	15673	8264	169	313	228	0	44	996	0	983
FUELINS ^c	20120524	37	2.01E+13	12892	0	15695	8264	165	331	220	0	44	975	0	946
FUELINS ^c	20120524	37	2.01E+13	12801	0	15708	8255	172	331	218	0	44	969	0	880
FUELINS ^c	20120524	37	2.01E+13	12679	0	15686	8259	175	335	218	0	44	969	0	879
FUELINS ^c	20120524	37	2.01E+13	12544	0	15653	8250	186	363	217	0	44	969	0	899

FUELINS ^c	20120524	37	2.01E+13	12434	0	15557	8252	202	447	218	0	44	969	0	899
FUELINS ^c	20120524	37	2.01E+13	12218	0	15439	8256	207	694	217	0	45	969	0	899
FUELINS ^c	20120524	38	2.01E+13	12276	0	15353	8260	202	702	217	0	44	969	0	899
FUELINS ^c	20120524	38	2.01E+13	12490	0	15097	8262	194	686	217	0	44	969	0	899
FUELINS ^c	20120524	38	2.01E+13	12612	0	14967	8264	191	599	217	0	44	969	0	899
FUELINS ^c	20120524	38	2.01E+13	12874	0	14838	8267	193	403	218	0	44	969	0	870
FUELINS ^c	20120524	38	2.01E+13	12951	0	14706	8260	198	393	217	0	44	969	0	874
FUELINS ^c	20120524	38	2.01E+13	12891	0	14621	8258	206	347	220	0	45	974	0	947
FUELINS ^c	20120524	39	2.01E+13	12872	0	14513	8265	221	275	203	0	44	997	0	993
FUELINS ^c	20120524	39	2.01E+13	12781	0	14448	8262	231	281	202	0	44	996	0	994
FUELINS ^c	20120524	39	2.01E+13	12708	0	14391	8258	236	285	202	0	44	996	0	994
FUELINS ^c	20120524	39	2.01E+13	12595	0	14317	8256	233	287	202	0	44	996	0	995
FUELINS ^c	20120524	39	2.01E+13	12443	0	14199	8252	245	282	202	0	44	996	0	994
FUELINS ^c	20120524	39	2.01E+13	12388	0	14089	8262	244	282	202	0	44	996	0	995
FUELINS ^c	20120524	40	2.01E+13	12492	0	14011	8263	245	375	188	0	44	996	0	995
FUELINS ^c	20120524	40	2.01E+13	12545	0	13904	8262	253	314	187	0	44	996	0	995
FUELINS ^c	20120524	40	2.01E+13	12387	0	13876	8259	257	312	187	0	44	996	0	993
FUELINS ^c	20120524	40	2.01E+13	12063	0	13816	8259	254	595	187	0	44	996	0	995
FUELINS ^c	20120524	40	2.01E+13	11893	0	13749	8250	259	595	187	0	44	996	0	995
FUELINS ^c	20120524	40	2.01E+13	11948	0	13670	8246	261	643	182	0	44	997	0	995
FUELINS ^c	20120524	41	2.01E+13	12022	0	13553	8245	269	758	172	0	44	996	0	993
FUELINS ^c	20120524	41	2.01E+13	12004	0	13529	8245	280	605	172	0	44	996	0	993
FUELINS ^c	20120524	41	2.01E+13	11905	0	13435	8250	290	584	172	0	44	996	0	993
FUELINS ^c	20120524	41	2.01E+13	11766	0	13373	8249	289	582	172	0	44	996	0	993
FUELINS ^c	20120524	41	2.01E+13	11590	0	13374	8257	300	589	172	0	44	996	0	993
FUELINS ^c	20120524	41	2.01E+13	11497	0	13404	8261	316	670	172	0	44	996	0	995
FUELINS ^c	20120524	42	2.01E+13	11636	0	13368	8260	326	612	172	0	44	996	0	995
FUELINS ^c	20120524	42	2.01E+13	11670	0	13377	8247	324	460	172	0	43	996	0	994
FUELINS ^c	20120524	42	2.01E+13	11680	0	13401	8253	332	301	172	0	43	996	0	994
FUELINS ^c	20120524	42	2.01E+13	11690	0	13437	8245	326	341	172	0	44	996	0	993
FUELINS ^c	20120524	42	2.01E+13	11517	0	13429	8247	317	284	172	0	44	996	0	993
FUELINS ^c	20120524	42	2.01E+13	11492	0	13449	8245	308	343	152	0	44	996	0	994
FUELINS ^c	20120524	43	2.01E+13	11786	0	13444	8250	300	477	138	0	44	996	0	994
FUELINS ^c	20120524	43	2.01E+13	11861	0	13468	8255	301	299	137	0	44	996	0	994
FUELINS ^c	20120524	43	2.01E+13	11846	0	13442	8254	306	286	138	0	44	996	0	995
FUELINS ^c	20120524	43	2.01E+13	11958	0	13469	8253	291	387	138	0	44	996	0	995
FUELINS ^c	20120524	43	2.01E+13	12004	0	13453	8243	282	482	138	0	44	996	0	995
FUELINS ^c	20120524	43	2.01E+13	12083	0	13487	8240	274	457	138	0	43	996	0	994
FUELINS ^c	20120524	44	2.01E+13	12118	0	13538	8237	266	581	138	0	44	996	0	995
FUELINS ^c	20120524	44	2.01E+13	11974	0	13543	8243	255	638	138	0	44	996	0	995
FUELINS ^c	20120524	44	2.01E+13	11937	0	13539	8242	253	470	138	0	44	996	0	995
FUELINS ^c	20120524	44	2.01E+13	12027	0	13557	8243	260	458	138	0	44	996	0	994
FUELINS ^c	20120524	44	2.01E+13	11882	0	13541	8245	266	437	138	0	44	996	0	994
FUELINS ^c	20120524	44	2.01E+13	11644	0	13536	8252	255	478	137	0	44	996	0	994