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Future trends of excess mercury in Asia in response to Minamata Convention on Mercury

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Online Resource

Table S1 Mercury supply and demand and excess mercury in China

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Zinc smelting - China									
Total Hg recovered from smelting in China	200	221	244	269	297	315	315	315	315
% LZS w/Hg controls	0%	50%	100%	100%	100%	100%	100%	100%	100%
Hg captured LZS w/controls (93% recovery)	0	103	227	250	276	293	293	293	293
Other smelting adds +25%	0	26	57	63	69	73	73	73	73
Total Hg recovered from smelting in China	0	128	283	313	345	366	366	366	366
Usage of mercury in China									
Batteries	140	63	31	24	19	14	11	9	7
Dental applications	51	47	23	18	14	11	8	6	5
Measuring and control devices	227	124	62	48	37	29	22	17	13
Lamps	198	56	28	22	17	13	10	8	6
Electrical and electronic equipment	29	18	9	7	5	4	3	2	2
Other	73	67	60	46	36	28	22	17	13
Uses of products	718	374	214	165	128	99	77	59	46
VCM	780	585	390	195	0	0	0	0	0
ASGM	445	333	222	172	133	103	80	62	48
Chlor-alkali	3	2	1	0	0	0	0	0	0
Total uses	1946	1294	827	532	261	202	156	121	94
Sources of Hg in China									
Product recycling (% of consumption)	5%	7.5%	10%	13.8%	17.5%	21.3%	25%	25%	25%
Product recycling (ton of Hg)	36	28	21	23	22	21	19	15	11
VCM recycling	367	275	183	92	0	0	0	0	0
Chlor-alkali decommissioning	0	54	54	54	0	0	0	0	0
By-product zinc & other smelting	0	128	283	313	345	366	366	366	366
Formal Hg mining (t)	1600	1142	767	393	18	0	0	0	0
Total sources	2003	1574	1256	820	386	387	385	381	378
China annual excess mercury (t)	57	279	429	288	125	185	229	260	284
Storage in China (t)	57	892	2781	4563	5519	6316	7379	8620	9995

Table S2 Mercury supply and demand and excess mercury in Asia (excl.China)

	2010	2015	2020	2025	2030	2035	2040	2045	2050
Zinc and other smelting -mercury source									
Hg recovered from Japanese non-ferrous metal industry	36	36	36	36	36	36	36	36	36
Hg available in large zinc smelters (LZS)(All -Asia excl. Japan & China)	24	29	33	38	42	42	42	42	42
% LZS w/Hg controls	0%	50%	100%	100%	100%	100%	100%	100%	100%
Hg captured LZS w/controls (93% recovery)	0	13	31	35	39	39	39	39	39
Other smelting adds +25%	0	3	8	9	10	10	10	10	10
Total Hg recovered by Asian LZS excl. Japan & China	0	17	39	44	49	49	49	49	49
Total Hg recovered by Asian smelting excl. China	36	53	75	80	85	85	85	85	85
Use of mercury (all Asia excl. china)									
Batteries	63	25	13	0	0	0	0	0	0
Dental applications	51	47	24	18	14	11	8	7	5
Measuring and control devices	49	28	14	0	0	0	0	0	0
Lamps	41	36	18	14	11	8	6	5	4
Electrical and electronic equipment	33	20	10	8	6	5	4	3	2
Other	55	50	45	35	27	21	16	12	10
VCM	0	0	0	0	0	0	0	0	0
ASGM	287	215	143	111	86	66	51	40	31
Chlor-alkali E. Asia and S. E. Asia excl. China.	3	2	1	0	0	0	0	0	0
Chlor-alkali India	6	3	0	0	0	0	0	0	0
Chlor-alkali S. Asia excl. India	8	8	8	0	0	0	0	0	0
Total uses	596	434	276	186	198	111	86	67	52
Total uses excl. Japan	588	428	271	183	196	110	84	65	50
Total uses excl. Japan &ASGM	301	213	128	71	110	43	33	25	19
Supply sources of mercury (all-Asia excl. China)									
Product recycling -Japan (ton-Hg)	8	6	5	3	2	2	2	2	2
Product recycling others (% of consumption)	5%	7.5%	10%	13.8%	17.5%	21.3%	25%	25%	25%
Product recycling others (ton-Hg)	15	15	12	10	10	10	9	7	5
VCM recycling	0	0	0	0	0	0	0	0	0
Chlor-alkali decommissioning E.Asia and S.E. Asia excl. China	0	47	47	47	0	0	0	0	0
Chlor-alkali decommissioning India	0	188	188	0	0	0	0	0	0
Chlor-alkali decommissioning S. Asia excl. India	0	0	0	66	0	0	0	0	0
Total Hg removed from smelting excl. China	36	53	75	80	85	85	85	85	85
Formal Hg mining	0	0	0	0	0	0	0	0	0

Total supply	59	75	92	93	97	96	95	93	92
Total supply excl Japan	15	32	51	54	59	59	58	56	54
All Asia (excl. China) annual excess	-537	-395	-184	-92	-47	-15	9	27	40
All Asia annual excess excl. China &Japan (t)	-573	-180	-220	-128	-83	-51	-27	-9	4
All Asia annual excess excl. China &Japan &ASGM (t)	-286	-180	-77	-17	3	15	25	31	35
China annual excess mercury (t)	57	279	429	288	125	185	229	260	284
All Asia annual excess (t)	-480	-80	245	195	78	170	238	287	324
Annual excess mercury from chlor-alkali decommissioning（t)	0	235	235	113	0	0	0	0	0
Storage in all Asia (excl. China) (t)	0	235	471	584	584	584	599	699	875
Storage in all Asia (t)	0	289	1152	2390	3025	3687	4750	6092	7643

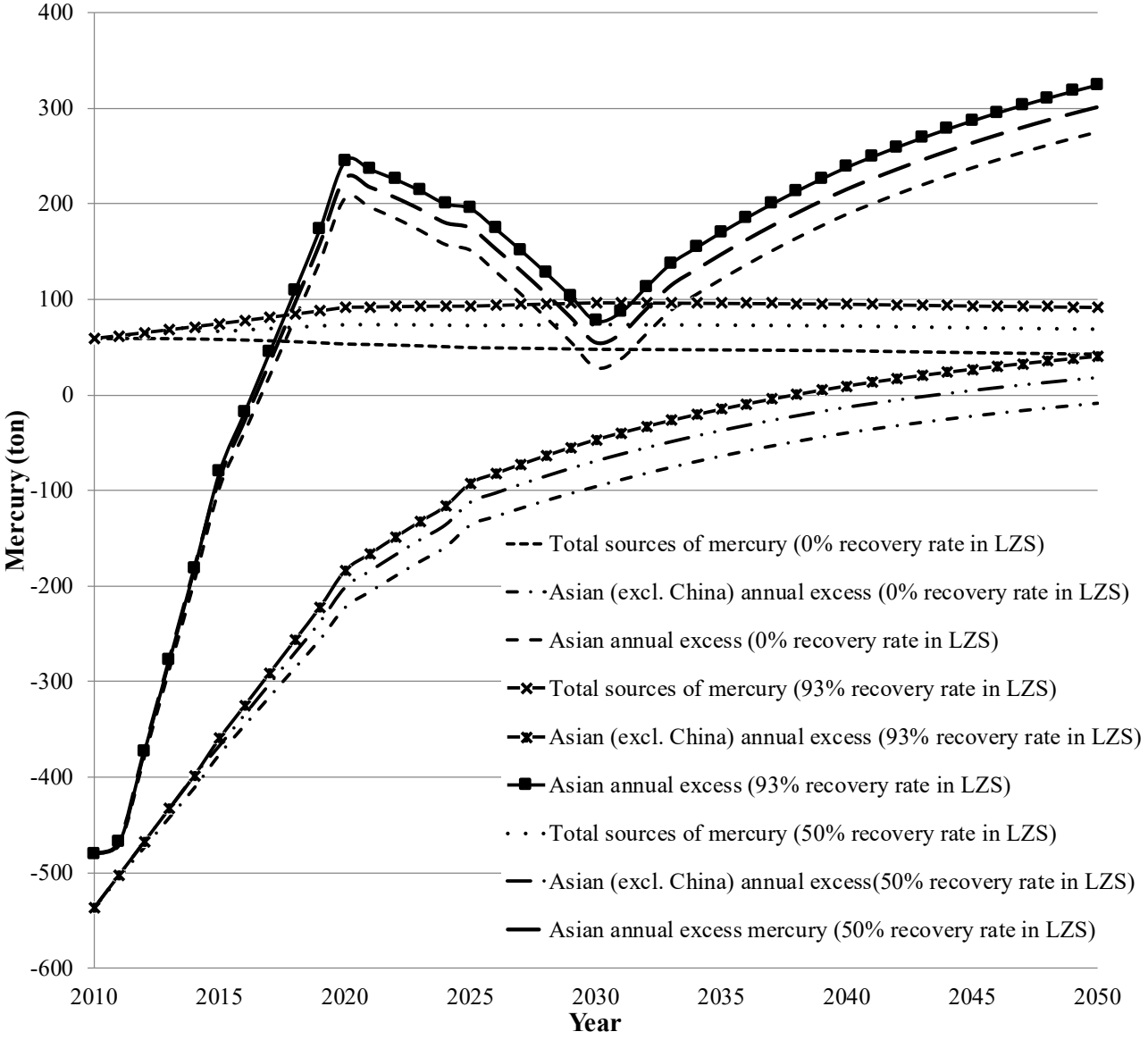

Fig.S1 Total sources and excess mercury in three scenarios

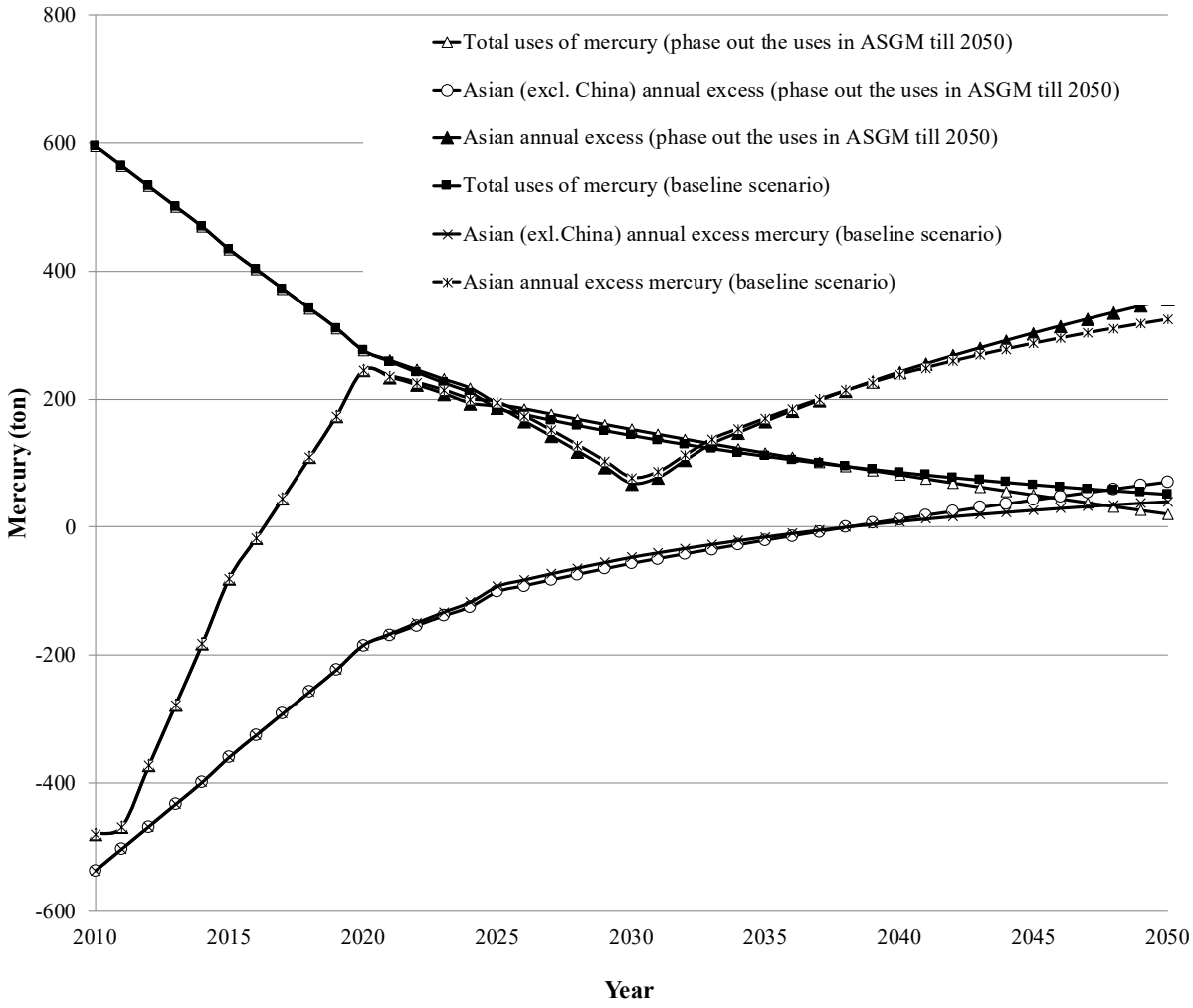

Fig.S2 Total uses and Asian excess mercury in two scenarios

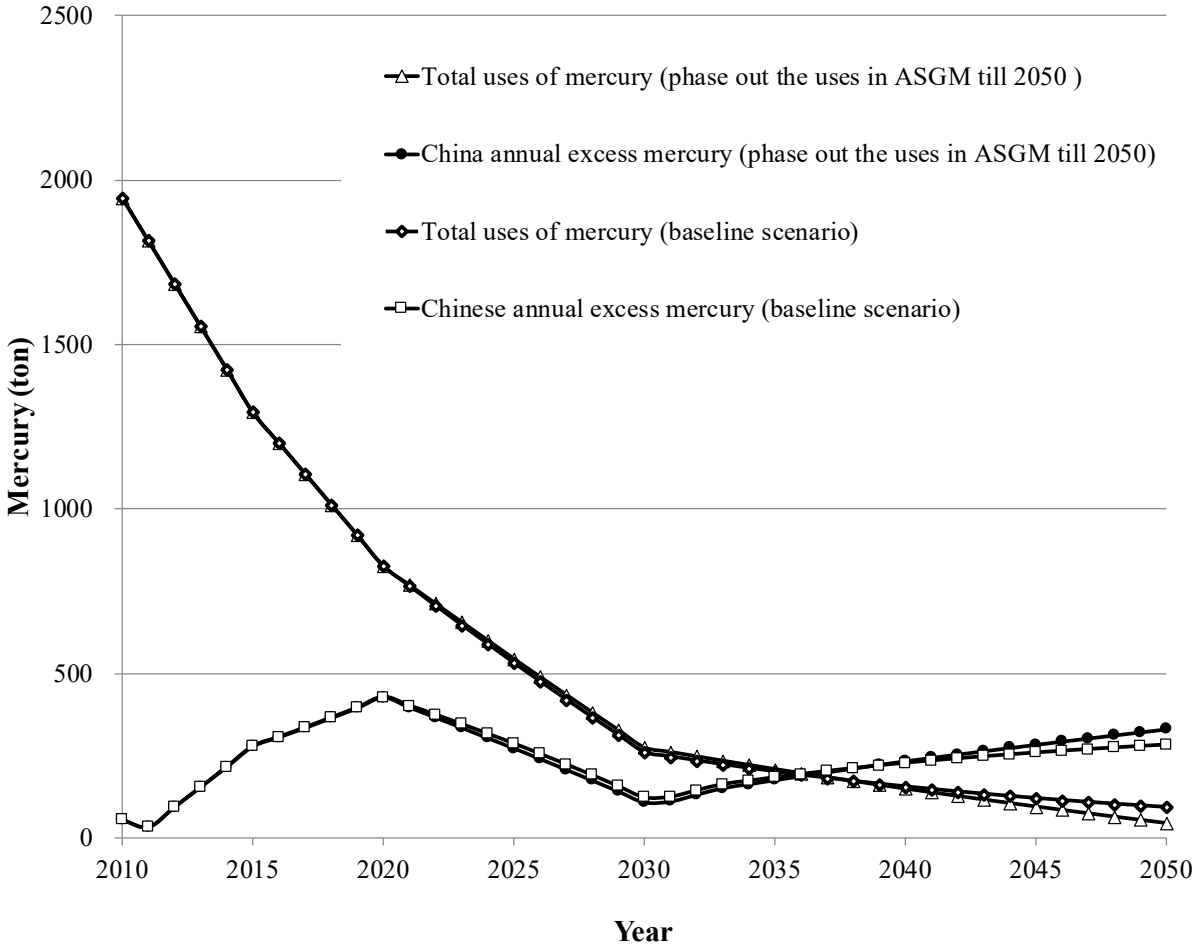

Fig.S3 Total uses and Chinese excess mercury in two scenarios