

## Emissions Trading Schemes in China: the transition from experimental pilots to a national ETS

On 10<sup>th</sup> December 2014, after several months of wait, the National Development and Reform Commission (NDRC) released the first legal elements of a national ETS that will be implemented from 2016. The NDRC's communication provides the basic rules of this national system: coverage of six greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, HFCs, PFCs, SF<sub>6</sub> and N<sub>2</sub>O), the definition of a national emission cap and its breakdown among the 33 Chinese provinces, and the principles governing the Monitoring Reporting Verification (MRV) system.

This announcement raises two fundamental and intrinsically linked issues: firstly, the definition of its final design and secondly, the necessary transition between the pilot ETSs and the future national ETS. The launch of the national ETS is the second stage of the Chinese initiative that began with an experimentation phase during which seven pilot markets were launched between 2013 and 2014 in five cities (Chongqing, Beijing, Shanghai, Shenzhen and Tianjin) and two provinces (Guangdong and Hubei). The political choice to use this economic instrument dates from the year 2011. The ETS system has been mentioned as a tool for reducing greenhouse gas emissions for the first time in the 12<sup>th</sup> Chinese five-year plan (2011-2015). This plan also determined for the first time a reduction target for CO<sub>2</sub> emissions intensity.

Many discussions within the NDRC and Chinese provinces demonstrate the complex nature of the topic and multiple choice solutions. The primary purpose of the Chinese experimentation was to learn lessons from the ETS pilot operation so as to facilitate the development of a national-scale system.

A brief review of the operation of these pilot ETSs is useful at this stage so as to ensure the functioning of the future national ETS. The first months or the first year of the pilots' implementation raises some questions that need to be resolved before the launch of a national ETS. A lack of transparency in the regulations has been perceived in all pilots concerning the calculation of the cap-setting, the initial allocation of allowances and finally, the methodologies for calculating GHG emissions. The pilot ETSs suffer from low liquidity, although the liquidity has been facilitated by governments through the establishment of an auction system. In the final design of the national ETS's future legislation, three scenarios can be envisaged.

- The first "top-down" scenario would be an application of the national market for all Chinese provinces. The coverage rules, the allocation methodology and compliance tools would be the same throughout the country.
- The second scenario follows a "bottom-up" approach. The rules laid down by the national authority only cover provinces without pilot ETS. Those provinces with a functioning ETS will later keep their own designs.
- Finally, a third, more "flexible" option, would set uniform rules at the national level for fundamental sectors such as energy and industrial sectors. However, pilot ETS could preserve some of their characteristics such as a broader scope than the one proposed at the national level, and get some flexibility.

In addition to this discussion, is the question of the transition between the pilot ETSs and the national system. Some difficulties may arise during the process. Among these questions: Is the NDRC considering a national registry or the pilot ETSs registries be harmonized? Can banked allowances during the experimental phase be used in the national ETS? In the case of a more restrictive coverage than those pilots, what will allowances from outgoing sectors of the national scope become?

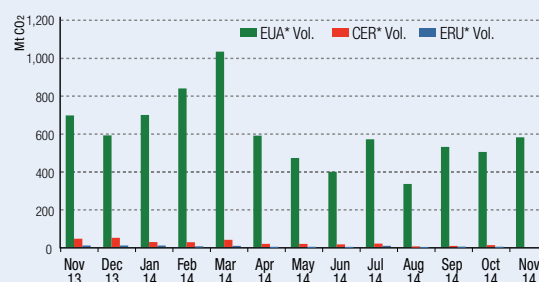
Whatever the architecture of the future national ETS, the choice to start with a period of experimentation is unique and offers an approach that may be attractive for all new countries willing to set up an ETS. This approach provides significant flexibility in the development of a system to the most appropriate modalities for the establishment of an emissions trading system on a larger scale.

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## Key points

- **EU ETS – MSR debate:** The ENVI Committee has published a provisional report supporting the implementation of the mechanism and arguing for increased flexibility. The Parliament's ITRE Commission suggested adjustments to the mechanism in order to protect industrial competitiveness on 17<sup>th</sup> November.
- **EU ETS – MSR timetable:** the ITRE Committee will hold an opinion vote on 21<sup>st</sup> January 2015, while the ENVI Committee will vote on 23<sup>rd</sup> and 24<sup>th</sup> February 2015
- **2030 Climate & Energy Package:** the European Energy and Climate Commissioner supports increasing the energy-efficiency target to 30%.

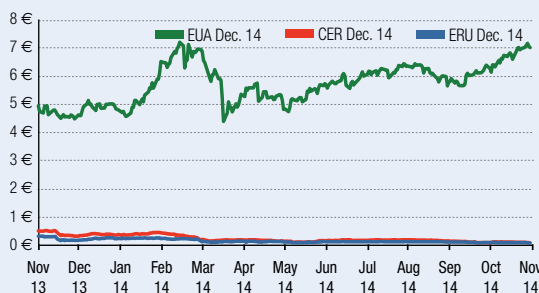
### Trading volumes: EUA +15.4%, CER +54.7% ERU +3.4%



\* Spot & futures, exchanges & OTC cleared

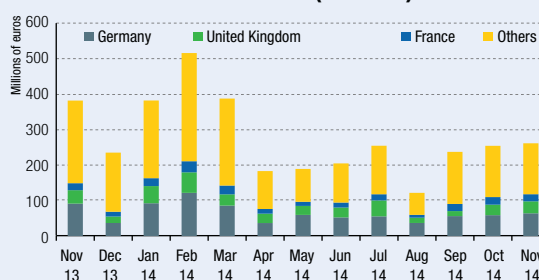
Source: CDC Climat Research calculation, based on data from EEX, ICE Futures Europe, NYMEX, Nasdaq OMX, and LCH Clearnet

### Dec 14 contract price: EUA +13.5%



Source: CDC Climat Research, ICE Futures Europe

### Monthly proceeds from Phase 3 auctions: 261 M€ in November 2014 (+2.80%)



Source: CDC Climat Research based on data from ICE Futures Europe, EEX

# Energy

## Primary energy prices and electricity prices

		Nov. 2014	
Coal	API # 2 CIF ARA (First month in USD/t)	73.2 ▲	
Natural gas	NBP (spot in €/MWh)	23.7 ▲	
	TTF (spot in €/MWh)	23.0 ▲	
Crude oil	Brent (First month in USD/b)	79.6 ▼	
Electricity	Germany (€/MWh)	Spot	39.8 ▲
		Calendar	35.0 ▲
	United Kingdom (€/MWh)	Spot	61.1 ▲
		Next summer	60.9 ▼
		Next winter	67.0 ▼

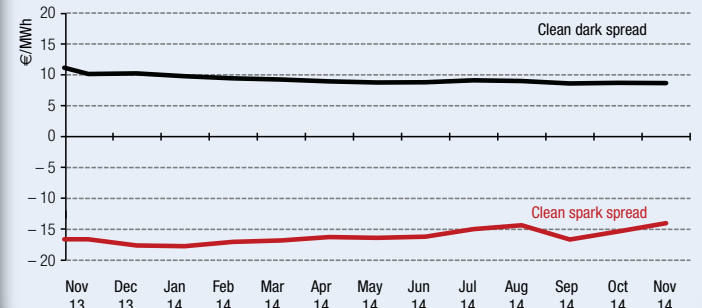
Sources: CDC Climat Research, Thomson Reuters

## Clean dark, clean spark spreads and switching price

	Clean spark (€/MWh)		Clean dark (€/MWh)		Switching Price (€/tCO <sub>2</sub> )	
	spot	futures	spot	futures	spot	futures
Germany*	-8.7	-14.0	13.2	8.7	43.9	45.5
United Kingdom*	20.6	12.2	33.8	34.0	46.1	43.3

\* Germany, 2015 calendar contract, United Kingdom, summer 2015 contract.

### German baseload – monthly average of Cal. 2015 clean dark and clean spark spreads



Sources: CDC Climat Research, Thomson Reuters

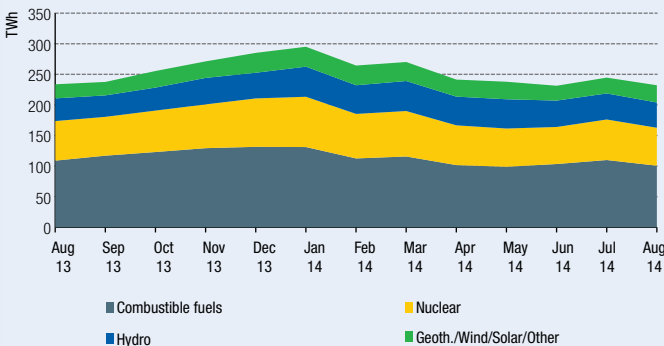
The downward trend in the average monthly price of Brent Crude accelerated in November 2014, when the price fell by 9.5% to an average of US\$79.60 per barrel over the month. This fall was due to weak demand prospects, and to surplus supply, which is set to continue due to OPEC's decision to maintain production quotas at their current levels. Gas prices continued on their upward trend in November: spot NBP prices rose by 8.7% to €23.70 per MWh, while spot TTF prices rose by 8% to €23 per MWh. The increase in prices can be attributed to the fall in recorded temperatures, a decrease in Norwegian production, and to the longer term uncertainty relating to the Russia-Ukraine crisis, despite the agreement between Kiev and Moscow. In the electricity sector, German spot prices rose by 6.2% due to the fall in temperature, despite a good supply of nuclear and hydraulic power, while forward 2015 prices rose by 2.2%. Lastly, the German clean dark price rose on the spot markets, while the clean spark price fell on the spot markets, and increased on the futures markets. The theoretical price of the CO<sub>2</sub> switch was estimated at €43.90 per tCO<sub>2</sub>eq on the German spot market, and at €46.10 per tCO<sub>2</sub>eq on the United Kingdom spot market.

# Production

## Electricity generation (TWh)

EU 20 (in TWh)	Aug. 14	Cumulative from Jan. 14	Year-on-Year (% change)
Production	231.1	2,015.0	-2.8%
of which - Combustible fuels	103.2	872.7	-9.7%
- Nuclear	60.5	545.3	0.0%
- Hydro	43.1	366.5	1.2%
- Geoth./Wind/Solar/Other	24.3	230.5	15.2%

\* Gas, coal, oil.

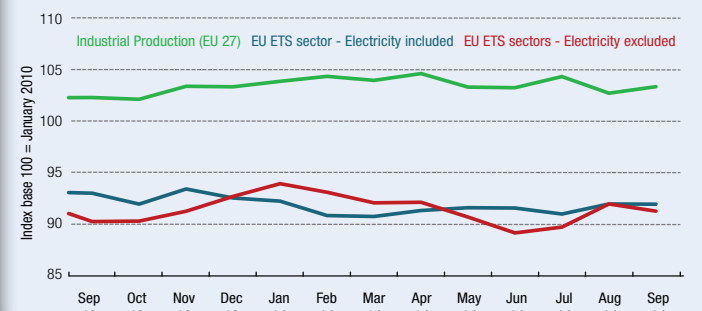


Sources: CDC Climat Research, from IEA data

## Production indices (Index base year 2010)

EU 27	Sep. 14	Last month (pts)	Year-on-Year (pts)
Indust. Prod (excl. construction)	103.3	0.6	1.1
EU ETS sectors production* (incl. electricity)	91.9	0.0	-1.1
EU ETS sectors production* (excl. electricity)	91.3	-0.7	1.0
Electricity, gas and heating	92.3	0.3	-2.2
Cement	79.6	-0.4	1.9
Metallurgy	100.0	-2.7	1.0
Oil refinery	92.2	1.3	1.0

\* Index weighted by EU ETS sectors's weight in average total allocation over 2008-2012

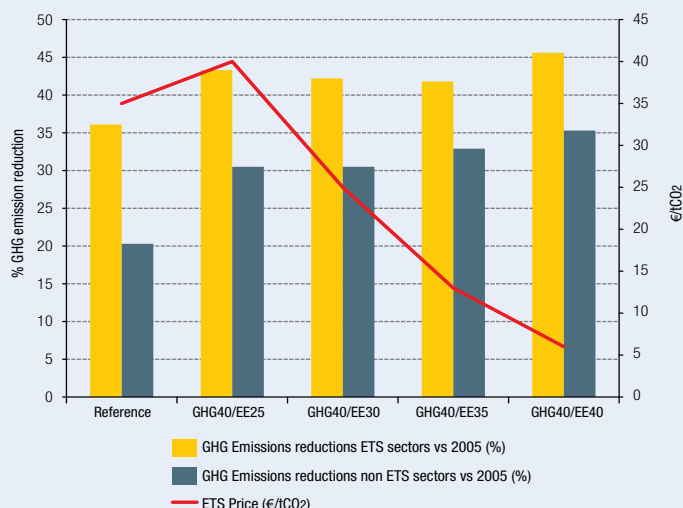
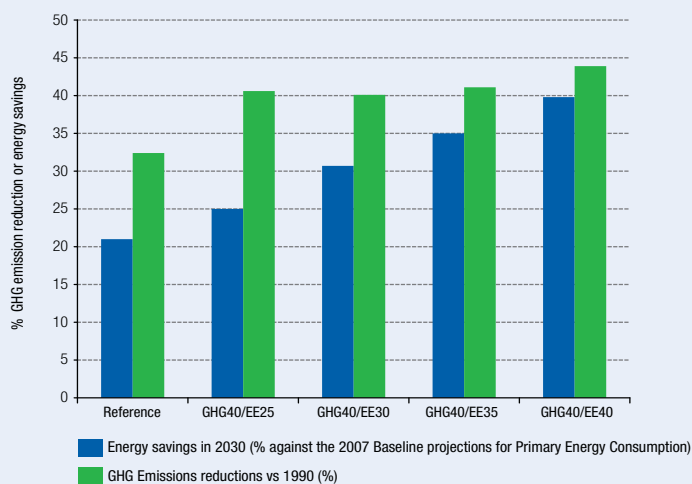


Sources: CDC Climat Research, from Eurostat data

Industrial production in the EU-27 countries increased by 0.6% in September 2014 compared with the previous month, and was up 1.1% compared with September 2013. The month-on-month 0.6% increase in industrial production was due to a 2.4% increase in the production of capital goods, and to a 0.3% rise in energy production. The sharpest increases in industrial production were recorded in Croatia (+4.6%), the Czech Republic (+4.5%), and Ireland (+4.1%), while the steepest falls were recorded in Denmark (-5.6%), Portugal (-4.1%) and the Netherlands (-2.0%). Our EU ETS production index (including electricity) decreased slightly to 91.9 pts, while the index excluding electricity decreased by 0.7% to 91.3 pts. Power generation in the EU-20 countries in August amounted to 231.1 TWh, a decrease of 5.1% compared with July 2014, and of 2.8% compared with 2013. We recorded a 2.9% fall in hydropower generation, a 9.4% fall in nuclear power generation, and an 8.8% increase in renewable power generation compared with July 2014.

# Coordination of CO<sub>2</sub>, EE and RES policies

## Impact of energy efficiency target on the GHG emissions and the price of CO<sub>2</sub>



Note: Reference refers to the scenario with no additional climate and energy policies on the trajectory of the 2020 objectives; EE 25, 30, 35, 40 refer to the scenario with a 40% GHG target, a 27% EU level renewable energy target, and energy savings of respectively 25%, 30%, 35%, 40% in 2030 compared to the 2007 Baseline projections for Primary Energy Consumption. Source: European Commission, Impact Assessment, Energy efficiency and its contribution to energy security and the 2030 Framework for Climate and energy policy, 2014

On 11<sup>th</sup> November, the EU Energy and Climate Commissioner, Miguel Arias Cañete, commented on the European Council's recent conclusions regarding the 2030 Energy & Climate Package. The Commission supports a more ambitious energy-efficiency target and is favourable to activating the clause aimed at reviewing the target mentioned, in order to raise that target to 27%, compared with the target of 30% for 2030 proposed by the Council. The Commission also underlined the need to accelerate the roll-out of CO<sub>2</sub> capture and storage technologies, and undertook to restart the discussions regarding reducing the transport sector's emissions before summer 2015. Where the EU ETS was concerned, the Commission confirmed its support for implementing the stability reserve mechanism, and the need to reach an agreement on the mechanism during the first quarter of 2015. On 26<sup>th</sup> November, Jean-Claude Juncker, the President of the Commission, presented the €315 billion investment plan aimed at reinvigorating the European economy. Energy-efficiency and renewable energy were among the strategic sectors identified.

## Institutional environment

### Phase 3 supply balance table

	2013	2014*
<b>Auctions (MtCO<sub>2</sub>)</b>	<b>804</b>	<b>290.6*</b>
<b>Free allocation (MtCO<sub>2</sub>)</b>	<b>843</b>	<b>767</b>

\*till May 2014

### Free allocation status table

EU Member State	2013	2014
France	82	81
Germany	169	163
United Kingdom	66	64
Others	526	459
<b>TOTAL</b>	<b>843</b>	<b>767</b>

Sources: CDC Climat Research, European Commission, ICE Futures Europe, EEX

### CER and ERU supply

	Nov. 14	Last month change
<b>Number of CDM projects</b>	<b>12.260</b>	<b>+7.0</b>
<i>of which - registered</i>	7.579	+10.0
<i>with - CER issued</i>	2.695	+16.0
<b>Cumulative volume of CER issued (Mt)</b>	<b>1.512</b>	<b>+13.1</b>
<b>Number of JI projects</b>	<b>788</b>	<b>0.0</b>
<i>of which - registered</i>	604	0.0
<b>Cumulative volume of ERU issued (Mt)</b>	<b>849.9</b>	<b>0.0</b>
<i>via - Track 1</i>	824.5	0.0
<i>via - Track 2</i>	25.4	0.0

Sources: CDC Climat, UNEP-DTU

The ENVI Commission published its provisional report on the stability reserve mechanism (MSR) on 13<sup>th</sup> November. This report fully supports the European Commission's proposal, as well as the proposed 2021 implementation date. The direct transfer of the back-loading allowances to the reserve in 2020, rather than auctioning them on the primary market, was considered necessary in order to avoid market distortions. Furthermore, greater flexibility would enable the mechanism to become more responsive to fluctuations in market fundamentals. The initial discussions about the MSR within the European Parliament's ENVI Commission were subsequently held on 17<sup>th</sup> November: according to the rapporteur, the mechanism must not increase the pressure on industrial companies, and some adjustments will be required in order to protect European competitiveness, including the waiver of the cross sectorial correction factor, which reduces the amount of free allowances allocated in accordance with the established benchmarks. There was also a proposal to alter the excess thresholds on the market that result in the triggering of the mechanism. In the Parliament, the ITRE Committee will hold an opinion vote on 21<sup>st</sup> January 2015, while the ENVI Committee will vote on 23<sup>rd</sup> and 24<sup>th</sup> February 2015.

# Carbon markets dashboard

## Primary market - EUA auctions in Phase 3

		Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14
Common Auction Platform + United Kingdom & Germany	Price (€/t)	4.51	4.62	5.00	6.45	6.35	7.35	5.03	5.54	5.91	6.23	5.96	5.99	6.78
	Volume (Mt)	84.53	50.90	76.31	80.33	60.98	35.22	37.72	37.02	43.28	19.52	39.79	42.05	38.56
Auction Revenues (M€)	Germany	91.29	36.66	92.28	121.62	85.73	36.53	59.46	52.45	55.37	36.75	56.07	58.71	63.97
	United Kingdom	37.87	18.27	48.43	57.88	31.69	26.48	25.35	27.82	44.97	14.93	14.13	29.65	33.78
	France	19.65	13.43	22.21	31.21	24.78	13.13	11.65	14.01	17.35	7.90	20.14	21.35	20.03
	Others	232.84	166.63	218.98	304.96	245.15	106.82	92.56	110.32	136.70	62.03	146.78	144.45	143.52
	Total	381.64	235.00	381.89	515.66	387.35	182.96	189.02	204.60	254.39	121.61	237.13	254.15	261.30

Sources: EEX, ICE Futures Europe

## Primary market - CER and ERU issued (MtCO<sub>2</sub>)

		Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14
Cumulative volume of CER issued UNEP-DTU (Mt)		1,409	1,419	1,428	1,433	1,440	1,451	1,457	1,466	1,472	1,480	1,491	1,504	1,512
Cumulative volume of ERU issued (Mt)	Track 1 (Mt)	803.5	803.7	803.8	809.6	816.1	824	824.1	824	824.1	824.4	824.4	824.4	824.5
	Track 2 (Mt)	25.4	25.4	25.4	25.4	25.4	25	25.4	25.4	25.4	25.4	25.4	25.4	25.4

Sources: UNEP-DTU, CDC Climat Research

## Secondary market - Prices (€/t) and volumes: EUA, CER (ktCO<sub>2</sub>)

			Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14
ICE Futures Europe	Daily spot	Price EUA phase 3	4.53	4.79	4.98	6.51	6.11	5.22	5.11	5.52	5.96	6.26	6.01	6.09	6.91
		Volume EUA phase 3	7,136	14,965	14,405	21,075	35,324	49,429	19,271	20,937	11,897	5,173	17,953	5,530	7,793
		Price CER	0.42	0.36	0.39	0.36	0.19	0.17	0.12	0.14	0.16	0.17	0.15	0.13	0.08
		Volume CER	47	1,204	80	375	1,028	2,998	745	167	1,530	1	242	255	319
	Dec.14	Price EUA	4.69	4.92	5.07	6.61	6.19	5.28	5.50	5.62	6.00	6.29	6.04	6.10	6.92
		Volume EUA	163,545	240,590	450,338	527,394	640,679	360,681	469,397	254,497	336,379	210,539	315,678	291,844	328,676
		Price CER	0.41	0.35	0.37	0.36	0.18	0.16	0.23	0.12	0.16	0.17	0.14	0.11	0.08
		Volume CER	16,224	20,287	15,305	13,092	20,681	8,006	15,527	6,058	10,426	1,353	3,818	4,614	7,276
	Dec.15	Price EUA	4.89	5.10	5.26	6.91	6.41	5.46	5.50	5.80	6.16	6.44	6.16	6.21	7.03
		Volume EUA	55,672	57,784	102,312	116,329	120,993	60,524	467,135	56,911	114,684	64,504	94,922	119,746	140,392
		Price CER	0.48	0.45	0.48	0.52	0.48	0.41	0.23	0.29	0.40	0.40	0.39	0.38	0.52
		Volume CER	4,158	10,987	8,766	7,711	11,991	2,012	15,510	3,454	3,951	1,636	1,535	3,644	3,724
	Dec.16	Price EUA	5.12	5.32	5.49	7.26	6.76	5.7	5.50	6.02	6.35	6.62	6.30	6.34	7.17
		Volume EUA	16,416	17,398	36,721	62,380	101,196	45,597	466,631	33,286	61,189	28,171	47,533	40,921	40,926
		Price CER	0.50	0.46	0.50	0.55	0.49	0.42	0.33	0.29	0.40	0.41	0.39	0.38	0.52
		Volume CER	10	0	689	245	982	164	800	0	0	10	50	850	500

Sources: ICE Futures Europe

## Emission-to-cap by EU ETS sector and country: difference between distributed allocations of allowances and verified emissions

	2008	2009	2010	2011	2012
Combustion	-253.1	-113.5	-125.8	-76.9	-42.4
Oil refining	-1.4	7.6	14.3	16.0	20.2
Coking plants	1.5	6.8	2.9	3.1	5.7
Metal ores	4.3	11.0	8.8	8.9	9.7
Steel production	51.6	89.3	71.4	72.8	73.9
Cement	20.9	61.4	61.0	62.8	70.3
Glass	2.5	6.1	5.5	5.4	5.0
Ceramic products	5.3	10.0	10.2	9.6	9.2
Paper	6.9	11.3	10.0	11.1	11.6
Other activities	0.2	4.3	1.3	-0.7	1.4
<b>Total (Mt)</b>	<b>-161.3</b>	<b>94.2</b>	<b>59.8</b>	<b>112.1</b>	<b>164.5</b>

Source: CTL

	2008	2009	2010	2011	2012
Germany	-84.0	-36.6	-54.4	-49.5	-28.6
United Kingdom	-50.8	-15.0	-16.8	2.5	-2.5
Italy	-8.5	24.1	8.5	5.3	12.2
Poland	-3.1	10.8	5.9	4.2	15.6
Spain	-9.6	13.7	29.5	18.4	17.0
France	5.5	17.5	23.4	33.9	25.2
Czech Republic	5.2	12.2	10.6	12.2	17.1
The Netherlands	-6.8	2.8	0.1	8.9	10.5
Romania	7.7	24.9	27.7	23.6	25.8
Others	-17.0	39.8	25.3	52.7	72.3
<b>Total (Mt)</b>	<b>-161.3</b>	<b>94.2</b>	<b>59.8</b>	<b>112.1</b>	<b>164.5</b>

Source: CTL