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Climate and energy policies in the EU: a major role in reducing CO₂ emissions from the energy and industry sectors

This month, the European Environmental Agency revealed that the European Union had reduced emissions between 1990 and 2012 by approximately 18%, close to the 20% emissions reduction target by 2020. On May 15th 2013, the European Commission had already announced that the verified CO₂ emissions generated by installations covered by the EU ETS amounted to 1,867 MtCO₂ in 2012, a 2% decline compared with 2011. In total, by excluding the aviation sector and on a like-for-like basis¹, the EU ETS' CO₂ emissions decreased by 12.3% between 2005 and 2012. Should we applaud this fall in CO₂ emissions? In other words, is this a structural decrease encouraged by climate and energy policies, or a circumstantial decrease triggered solely by the economic downturn?

CO₂ emissions decreased in all EU Member States and across all economic sectors between 2008 and 2012. The top scores were achieved by Denmark (-31.3%), Romania (-31.2%) and Portugal (-30.8%), while CO₂ emissions fell by 4.7% in Germany, by 4.4% in the United Kingdom, and by 21.8% in France. CO₂ emissions also trended downwards across all economic sectors, with falls of between 9.3% for power generation and co-generation and 46% for the ceramics sector.

What are the factors for this decline? To answer to this question, we have established a "business-as-usual" scenario over the period from 2005 to 2011 - in which there would be no economic crisis, the deployment of renewable energy and any improvements in energy intensity would be in line with the trend of the previous decades, the price of carbon would be zero and the price of coal and gas remained at the 2005 level. In total, we estimate that approximately 1.2 GtCO₂ was avoided by the EU ETS installations between 2005 and 2011. The aggregate reduction over the first phase (2005-2007) was relatively limited, and amounted to 200 to 220 Mt, while the reduction in the second phase (2008-2011) is estimated to have been between 950 and 1,000 Mt with an exceptional fall of around 300 Mt in 2009.

According to our baseline scenario, it appears that approximately 50-60 % of the decrease of CO₂ emissions result from the deployment of renewable energy and improvements in energy intensity, which accounted for 40 to 50% and 10 to 20% respectively. The economic crisis has played a significant but not dominant role in reducing CO₂ emissions in the EU ETS, estimated at 300 Mt, i.e. between 20 and 30%. The fuel substitution effect between coal and gas driven by the price of CO₂, seem to have reduced CO₂ emissions by 200 Mt or about 10 to 20%.

Do these results mean that the carbon price has been for nothing? No, for two reasons. First, beyond the EU ETS sectors, the price of carbon has led to a reduction of 1,048 MtCO₂ between 2008 and 2012 through the use of carbon credits from CDM and JI mechanisms projects. Second, if the price of CO₂ - weakened by the economic crisis, the deployment of renewable energy and the new energy efficiency directive - does not seem to have been the main driver of domestic reductions, it has allowed reductions emissions at a lower cost than those obtained by the deployment of renewable energies - around 5-60 times less expensive than CO₂ emissions reductions from wind or solar. If achieving the environmental objective seems assured, the goal of cost-effectiveness has yet to be fully assessed. But these early results suggest a high need to better align the objectives of the EU ETS and renewable energy in the next climate and energy package in 2030.

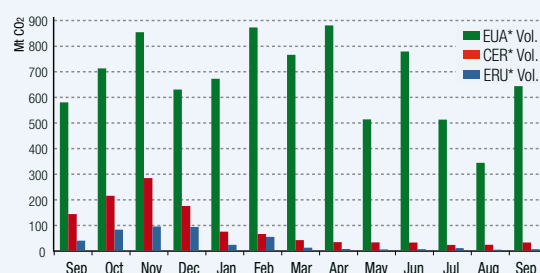
Émilie Alberola and Olivier Gloaguen
CDC Climat Research

1. Excluding Bulgaria, Romania, Iceland and Norway, who joined the ETS after 2005.

Key points

- **Backloading and reforms of the EU ETS:** the Commission specified that further structural reform proposals would not be put forward till the EU agrees on backloading plans.
- **2030 climate and energy package:** the Commission will release a communication before the end of the year but there are little expectations for legislative proposals before the EU elections in May 2014.
- **Rise in EUA prices and volumes:** the EUA price averaged €5.19 in September, rising above €5 for the first time since April 2013. Total traded volumes of carbon credits (EUA, CER and ERU) increased by 84.4% in September to 677.8 million.

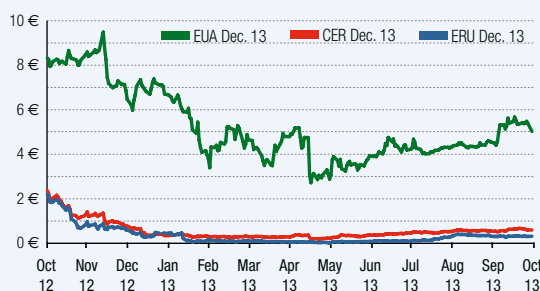
Trading volumes: EUA +88.0%, CER +40.0% ERU +64.0%



* Spot & futures, exchanges & OTC cleared

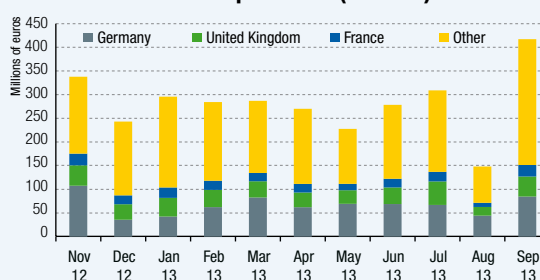
Source: CDC Climat Research calculation, based on data from BlueNext, EEX, ICE Futures Europe, NYMEX, Nasdaq OMX, and LCH Clearnet

Price of the Dec. 13 contract: EUA +18%



Source: CDC Climat Research, ICE Futures Europe

Income from Phase 3 auctions: €417.1 million in September (+181%)



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

Energy

Primary energy prices and electricity prices

			Sep. 2013
Coal	API # 2 CIF ARA (First month in USD/t)		77.1 ▲
Natural gas	NBP (spot in €/MWh)		26.7 ▲
	TTF (spot in €/MWh)		26.5 ▲
Crude oil	Brent (First month in USD/b)		111.3 ▲
Electricity	Germany (€/MWh)	Spot	46.5 ▲
		Calendar	38.8 ▲
	United Kingdom (€/MWh)	Spot	59.2 ▲
		Next summer	58.8 ▲
		Next winter	65.8 ▲

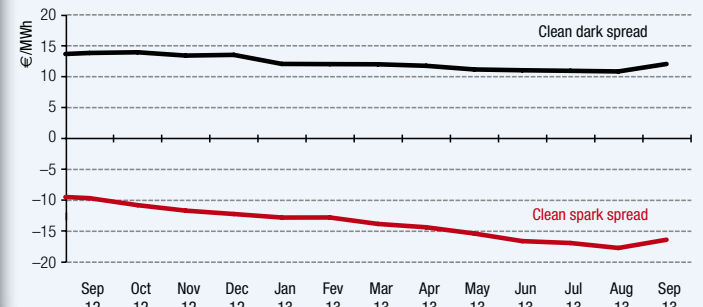
Sources: CDC Climat Research, Thomson Reuters

Clean dark, clean spark spreads and switching price

	Clean spark (€/MWh)		Clean dark (€/MWh)		Switching Price (€/tCO ₂)	
	spot	futures	spot	futures	spot	futures
Germany*	-8.4	-16.4	21.8	12.1	32.9	31.9
United Kingdom*	9.6	4.0	33.8	31.7	32.6	30.5

* Germany, 2014 calendar contract, United Kingdom, summer 2014 contract.

German baseload – monthly average of Cal. 2014 clean dark and clean spark spreads



Sources: CDC Climat Research, Thomson Reuters

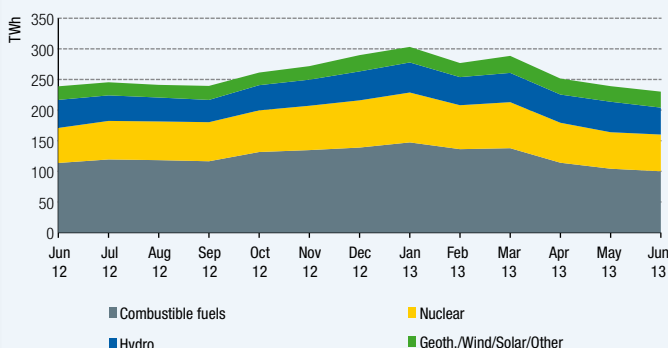
After having reached USD 116 per barrel in early September, the price of Brent crude fell at the end of the month due to easing concerns over Syria, decreasing tensions between the US and Iran as well as increased production in Iraq and South Sudan. The price of gas increased over concerns of tight supply ahead of high winter demand: TTF spot prices increased by 3.5% and NBP spot prices increased by 3.9%. Unexpected nuclear plant outages in France and falling wind and solar renewable energy output in Germany propped up electricity prices in September, which also pushed coal prices up. Thus, in Germany, spot prices increased by 17.4% to €46.5 per MWh and forward prices (calculated by the cal. 2014 contract) increased by 5.9% to €38.8 per MWh, while in the UK, spot prices rose by 8% to €59.2 per MWh and Winter 2014 prices increased by 2.2% to €65.8 per MWh. As a result, clean dark and spark prices in Germany increased on the spot and forward markets. In the UK, clean dark and spark spreads increased on the spot market but remained the same on the forward market. The CO₂ price that would trigger a fuel switch was calculated at around €32 per tonne.

Production

Electricity generation (TWh)

EU 20 (in TWh)	Jun. 13	Jan.-Jun. 13	Year-on-Year (% change)
Production	231.0	1,595.2	-1.2%
of which - Combustible fuels	100.5	742.5	-6.7%
- Nuclear	60.2	414.8	-1.2%
- Hydro	44.1	283.7	9.4%
- Geoth./Wind/Solar/Other	26.2	154.3	10.2%

* Gas, coal, oil.

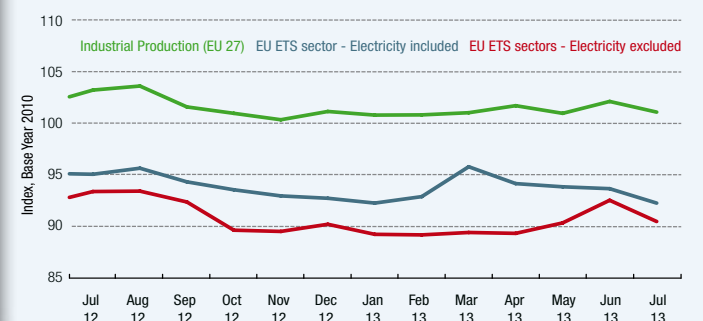


Source: CDC Climat Research, from IEA data

Production indices (Index base year 2010)

EU 27	Jul. 13	Last month (pts)	Year-on-Year (pts)
Indust. Prod. (excl. construction)	101.1	-1.0	-0.5
EU ETS sectors production* (incl. electricity)	92.3	-1.4	-1.7
EU ETS sectors production* (excl. electricity)	90.5	-2.0	-0.4
Electricity, gas and heating	93.2	-1.1	-2.5
Cement	79.1	-3.0	0.1
Metallurgy	97.1	-0.6	0.3
Oil refinery	99.1	0.8	3.6

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

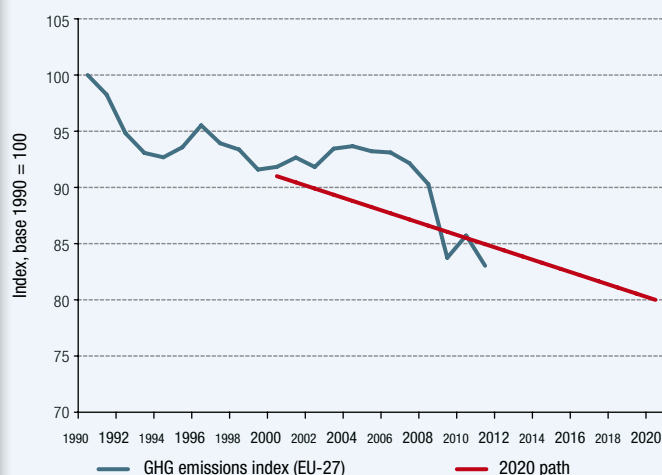


Source: CDC Climat Research from Eurostat data

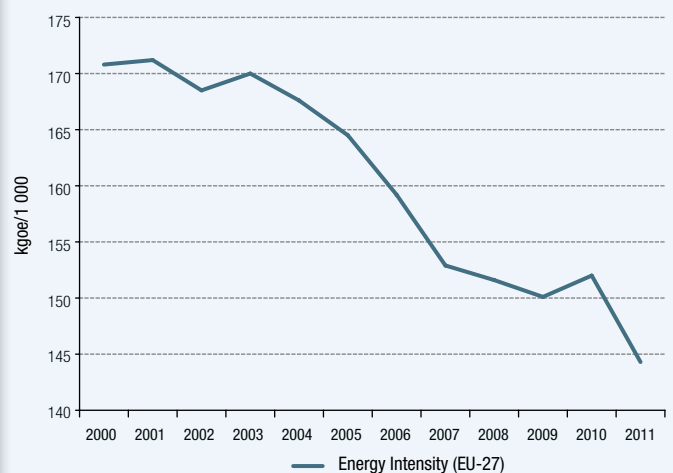
The macroeconomic outlook for Europe looks to be more positive after Eurostat announced that GDP rose by 0.4% in the EU27 during the second quarter of 2013, compared with the previous quarter. This increased consumer confidence was reflected in the composite eurozone PMI, as it reached a 27 month high of 52.2 points in September. The EU-27 business climate index, on the other hand, remained at the same level in September. Our EU ETS sector index contracted by 1.4 pt in July primarily due to a 3 pt contraction in the cement sector. After an increase of +0.9 % in June, output in the manufacturing sector (EU27) also recorded a decrease of 1 pt. Industrial production dropped by 2.1% in the euro area and by 1.7% in the EU27 in July 2013 compared to July 2012. The cumulative power generation for EU-27 countries between January and June 2013 stood at 1,595.2 TWh, which represents a 1.2% decrease over the same period last year. This decrease in cumulative electricity generation was accompanied by an increase in renewable energy (+10.2%) and hydroelectric energy (+9.4%) and a decline in the use of fossil fuels (-6.7%) and nuclear energy (-1.2%).

Coordination with the 20-20-20 policies

GHG emission reduction trend in EU-27



Energy intensity in EU-27



During the informal meeting of the EU Energy Ministers in September about the 2030 energy and climate package, a consensus emerged that the principles of sustainability, competitiveness and security of supply should continue to govern the new framework. The ministers supported a headline GHG target but were more measured regarding objectives for renewables and for energy efficiency. Regarding the implementation of the 2020 package, the EC has formally requested seven Member States (Austria, Cyprus, Estonia, Lithuania, Luxembourg, Hungary and the UK) in September to adopt national measures on energy efficiency in buildings as stipulated by EU legislation (Directive 2010/31/EU). If the Member States do not comply with their obligation to establish and apply minimum energy performance requirements for buildings within two months, the EC may decide to refer them to the Court of Justice. Regarding renewable energy, Italy and Spain were called upon to comply with the EU renewable energy rules. Furthermore, the Commission has opened a public consultation until 30 November on the evaluation of the Energy Labeling Directive and certain aspects of the Ecodesign Directive.

Institutional environment

Phase 2 balance

	2008	2009	2010	2011	2012	Total
Free allowances (A)	1,958	1,974	1,998	2,016	2,049	9,996
Auctioned allowances (E)	44	78	92	93	99	407
Verified emissions (VE)	2,120	1,880	1,939	1,904	1,867	9,709
Compliance position (A + E - VE)	-117	172	152	205	282	694
Allowance /credits surrendered						
EUA (R)	2,010	1,839	1,793	1,637	1,383	8,662
URCE	84	77	117	178	214	670
URE	0	3	20	76	279	378
EUA excess (+) or shortfall (-) (A + E - R)	-7	213	297	472	766	1,742

Sources: CDC Climat Research based on EUTL, ICE Futures Europe, EEX

CER and ERU supply

	Sep. 13	Last month change
Number of CDM projects	11,037	+21
<i>of which - registered</i>	7,289	+72
<i>with - CER issued</i>	2,466	+25
Cumulative volume of CER issued (Mt)	1,388	+19
CERs available until 2015, EU ETS eligible - CDC Climat Research estimate (Mt)*	2,080	-35
Number of JI projects	786	+0
<i>of which - registered</i>	601	+0
Cumulative volume of ERU issued (Mt)	826.6	+17
<i>via - Track 1</i>	801.5	+16
<i>via - Track 2</i>	25.1	+0.4

* CDC Climat Research's model: <http://www.cdcclimat.com/The-risks-of-CDM-projects-how-did-only-30-of-expected-credits-come-through,900.html?lang=fr>

Sources: CDC Climat Research, UNEP Risoe

After the EU Parliament's vote on July 3rd in favour of backloading, the EU Council postponed its decision on September 11th. The recent German election could accelerate the "trilogue" between the Parliament and the Council. Regarding structural reforms, the EU Commission hosted a panel of experts on 2nd October to discuss technical aspects related to a flexible supply mechanism. The Commission has specified that there would be no reform proposals for the EU ETS till the backloading plan was agreed on and will disclose a communication before the end of the year on the definition of the new 2030 energy and climate package. However there are little expectations that legislative proposals would be put forward before the EU elections in May 2014. On October 4th, the International Civil Aviation Organization has delivered a clear mandate to define a global market-based mechanism to reduce GHG emissions agreed in 2016 and in force by 2020. The EU Commission will now assess the ICAO decision before deciding on the next steps with respect to the EU ETS. Following the "stop and clock" decision, operators have returned 102 Mt of allowances.

Carbon markets dashboard

Primary market - EUA auctions in Phase 3

		Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
Common Auction Platform + United Kingdom & Germany	Price (€/t)	-	7.54	7.01	6.31	5.05	4.37	4.06	3.85	3.40	4.23	4.16	4.40	5.19
	Volume (Mt)	-	3.00	48.19	38.51	59.63	65.03	70.61	70.19	66.45	65.89	76.65	33.65	80.33
Auction Revenues (M€)	Germany	-	22.62	107.67	35.89	42.61	62.46	82.86	62.31	69.46	68.98	67.09	44.50	84.82
	United Kingdom	-	-	43.03	32.71	39.40	36.38	34.23	31.05	28.69	35.06	49.65	18.30	42.33
	France	-	-	24.73	18.73	21.97	19.37	17.50	18.14	13.58	18.29	20.16	8.76	24.28
	Others	-	-	162.35	155.78	191.70	166.09	152.26	158.58	116.04	156.10	172.06	76.64	265.65
	Total	-	22.62	337.79	243.11	295.68	284.30	286.86	270.07	227.66	278.43	308.96	148.20	417.08

Sources: EEX, ICE Futures Europe

Primary market - CER and ERU issued (MtCO₂)

		Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
Cumulative volume of CER issued UNEP-Risoe (Mt)		1,009	1,036	1,094	1,155	1,198	1,208	1,271	1,308	1,335	1,353	1,362	1,369	1,388
Cumulative volume of ERU issued (Mt)	Track 1 (Mt)	214.0	232.7	233.2	385.7	564.6	600.0	651.3	651.3	714.5	757.0	757.0	785.1	801.5
	Track 2 (Mt)	19.1	19.4	20.0	363.8	22.6	22.7	22.9	22.9	23.9	24.4	24.6	24.7	25.1

Sources: UNEP-Risoe, CDC Climat Research

Secondary market - Prices (€/t) and volumes: EUA, CER, ERU (ktCO₂)

			Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13
ICE Futures Europe	Daily spot	Price EUA phase 3	-	-	-	6.79	5.19	4.59	4.09	3.88	3.51	4.25	4.22	4.42	5.22
		Volume EUA phase 3	-	-	-	59	322	1,579	6,023	78,306	10,801	28,962	24,076	5,564	14,672
		Price CER	2.10	1.49	0.89	0.40	0.17	0.15	0.17	0.09	0.39	0.44	0.53	0.62	0.65
		Volume CER	-	-	-	-	327	1,099	1,541	1,901	0	112	0	57	170
	Dec.13	Price EUA	8.18	8.24	7.78	6.88	5.35	4.71	4.18	3.94	3.56	4.29	4.25	4.44	5.25
		Volume EUA	125,361	172,430	200,276	189,911	418,524	577,206	443,144	494,819	321,897	416,664	316,457	180,625	382,486
		Price CER	2.35	1.68	1.07	0.52	0.38	0.34	0.33	0.32	0.36	0.45	0.54	0.61	0.64
		Volume CER	26,805	38,256	34,684	52,279	41,549	26,190	21,420	20,693	21,014	15,073	10,629	14,912	14,377
		Price ERU	2.17	1.46	0.76	0.44	0.25	0.14	0.13	0.09	0.11	0.14	0.22	0.41	0.36
		Volume ERU	5,343	12,815	18,506	24,314	9,407	7,344	1,425	4,804	2,940	5,062	8,984	2,234	5,095
	Dec.14	Price EUA	8.71	8.69	8.20	7.22	5.61	4.94	4.37	4.11	3.72	4.46	4.39	4.58	5.38
		Volume EUA	37,884	59,562	69,731	42,296	70,721	78,927	79,675	112,934	59,334	95,104	48,690	74,289	93,620
		Price CER	2.51	1.78	1.15	0.59	0.43	0.38	0.37	0.35	0.39	0.48	0.56	0.62	0.62
		Volume CER	5,157	11,757	7,128	3,505	5,883	4,361	2,089	3,885	1,949	8,891	7,134	6,505	12,753
	Dec.15	Price EUA	9.20	9.08	8.61	7.57	5.87	5.15	4.55	4.28	3.88	4.67	4.55	4.75	5.59
		Volume EUA	16,553	21,338	24,491	28,890	41,647	57,190	49,718	61,556	34,689	91,861	41,204	20,176	46,207
		Price CER	2.62	1.89	1.23	0.68	0.51	0.43	0.41	0.38	0.46	0.55	0.64	0.70	0.71
		Volume CER	2,520	5,030	4,094	2,738	2,281	2,767	710	1,706	4,087	6,792	2,617	620	3,184

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	-40.6
Oil refining	-1.4	7.6	14.3	16.0	24.2
Coking plants	1.5	6.8	2.9	3.1	5.7
Metal ores	4.3	11.0	8.8	8.9	9.8
Steel production	51.6	89.3	71.4	72.8	74.0
Cement	20.9	61.4	61.0	62.8	74.1
Glass	2.5	6.1	5.5	5.4	6.4
Ceramic products	5.3	10.0	10.2	9.6	10.4
Paper	6.9	11.3	10.0	11.1	12.9
Other activities	0.2	4.3	1.3	-0.7	6.2
Total (Mt)	-161.3	94.2	59.8	112.1	183.2

Source: CCTL

	2008	2009	2010	2011	2012
Germany	-84.0	-36.6	-54.4	-49.5	-27.8
United Kingdom	-50.8	-15.0	-16.8	2.5	-2.2
Italy	-8.5	24.1	8.5	5.3	12.8
Poland	-3.1	10.8	5.9	4.2	16.1
Spain	-9.6	13.7	29.5	18.4	17.4
France	5.5	17.5	23.4	33.9	35.8
Czech Republic	5.2	12.2	10.6	12.2	17.1
The Netherlands	-6.8	2.8	0.1	8.9	10.6
Romania	7.7	24.9	27.7	23.6	26.9
Others	-17.0	39.8	25.3	52.7	76.6
Total (Mt)	-161.3	94.2	59.8	112.1	183.2

Source: CCTL