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**The EU Emission Trading System
and the Polish Economy
- how to assess the impact**



Plan of the presentation

- What this presentation is about
- From Brundtland Commission to EU Energy-Climate Package
- What is going to happen in the III trading period of ETS (2013-2020)
- Dilemmas of measuring the impact of the EU ETS

What this presentation is about

The European Union Greenhouse Gas Emission Trading System (EU ETS)

GHG gases

- Carbon dioxide (CO₂);
- Methane (CH₄);
- Nitrous oxide (N₂O);
- Other gases - Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), and Sulphur hexafluoride (SF₆)

GWP weighting factors (examples)

	Greenhouse gases		
	CO ₂	N ₂ O	CH ₄
GWP	1	310	21

From Brundtland to EU Energy-Climate Package

On the way to reduce greenhouse gas emissions

Milestones of global actions

- ☺ Brundtland (1986)
- ☺ Rio FCCC (1992)
- ☺ Kyoto (1997)
- ☹ Copenhagen (2009)

Milestones of EU actions

- ☺ The European Emissions Trading Scheme (2003)
- ☺ Statement for Copenhagen (2007)
- ☺ 20-20-20 Package (2009)

From Brundtland to EU Energy-Climate Package

Koto Protocol reduction targets

Annex I Parties ^a	Emission limitation or reduction (expressed in relation to total GHG emissions in the base year or period inscribed in Annex B to the Kyoto Protocol) ^b
EU-15*, Bulgaria, Czech Republic, Estonia, Latvia, Liechtenstein, Lithuania, Monaco, Romania, Slovakia, Slovenia, Switzerland	-8%
US ^c	-7%
Canada, Hungary, Japan, Poland	-6%
Croatia	-5%
New Zealand, Russian Federation, Ukraine	0
Norway	+1%
Australia	+8%
Iceland	+10%

a At the time of publication of this manual, the amendment to the Kyoto Protocol that contains an emissions target for Belarus (-8%) had not been ratified by a sufficient number of Parties for it to enter into force.

b Countries with economies in transition have flexibility in the choice of base year.

c Country which has declared its intention not to ratify the Kyoto Protocol.

Source: UNFCCC 2008.

From Brundtland to EU Energy-Climate Package

Kyoto targets for the European countries

Countries	Kyoto target	Year				
		2008	2005	2000	1995	1990
EU (15 countries)	92.0	93.1	97.2	96.5	97.0	99.5
Belgium	92.5	91.4	97.1	99.3	102.6	98.4
Bulgaria	92.0	55.4	53.3	52.2	67.0	88.5
Czech Republic	92.0	72.8	74.8	75.9	79.0	100.5
Denmark	79.0	92.1	92.1	98.5	110.1	99.4
Germany	79.0	77.7	79.3	83.1	89.4	99.9
Estonia	92.0	47.5	45.5	42.7	49.0	95.8
Ireland	113.0	121.3	123.8	121.8	105.2	98.6
Greece	125.0	118.6	124.2	116.7	100.8	96.5
Spain	115.0	140.0	150.2	131.4	108.7	98.4
France	100.0	93.5	98.7	98.8	98.8	99.9
Italy	93.5	104.8	110.8	106.4	102.4	100.0
Latvia	92.0	45.9	43.8	39.4	48.6	103.4
Lithuania	92.0	49.2	46.5	39.2	44.3	100.6
Luxembourg	72.0	94.9	100.8	75.2	78.7	99.6
Hungary	94.0	63.4	69.2	66.8	68.2	84.4
Netherlands	94.0	97.1	99.7	100.7	105.4	99.5
Austria	87.0	109.6	117.5	101.6	101.0	98.9
Poland	94.0	70.2	69.2	69.3	78.1	80.5

From Brundtland to EU Energy-Climate Package

Kyoto targets for the European countries

Countries	Kyoto target	Year				
		2008	2005	2000	1995	1990
Lithuania	92.0	49.2	46.5	39.2	44.3	100.6
Luxembourg	72.0	94.9	100.8	75.2	78.7	99.6
Hungary	94.0	63.4	69.2	66.8	68.2	84.4
Netherlands	94.0	97.1	99.7	100.7	105.4	99.5
Austria	87.0	109.6	117.5	101.6	101.0	98.9
Poland	94.0	70.2	69.2	69.3	78.1	80.5
Portugal	127.0	130.3	144.0	135.2	116.3	98.6
Romania	92.0	52.4	53.7	49.0	64.9	87.0
Slovenia	92.0	104.6	99.3	92.5	90.7	90.8
Slovakia	92.0	67.8	69.5	68.3	74.0	102.6
Finland	100.0	98.8	96.4	97.3	99.7	99.1
Sweden	104.0	88.7	93.8	95.4	102.9	100.4
United Kingdom	87.5	80.9	84.3	86.6	91.7	99.4
Iceland	110.0	144.9	110.6	111.8	95.1	101.4
Liechtenstein	92.0	114.8	118.2	111.0	102.6	100.0
Norway	101.0	108.2	108.0	107.4	100.2	100.3
Switzerland	92.0	100.8	102.3	98.3	97.1	100.3

From Brundtland to EU Energy-Climate Package

The Kyoto Protocol covers the period 2008-2012
...and what beyond...



For the European Union, the answer is

20-20-20 Package

From Brundtland to EU Energy-Climate Package

20-20-20 Package

Tragets

1. the reduction in GHG by 20% compared to 1990
2. the increase of share of renewable fuels in energy mix to 20%
3. improving energy efficiency by 20%

Key Tools

EU ETS Directive (covers power and energy intensive sectors)

target: 21% GHG reduction in 2020, compared to 2005

non-ETS Directive (for sectors not covered by the ETS)

target: 10% GHG reduction in 2020, compared to 2005

What is going to happen in the III trading period

ETS Directive amendments

- Full auctioning for power sector but...
- Derogation for electricity production
- Industries exposed to the carbon leakage
- Transitional system for energy intensive sectors
- Reserve (for new entrants)
- New gases (nitrous oxide, perfluorocarbons), and sectors (for ex. aluminium, non-ferrous metals, some product of chemical industry - mineral wool, soda, ammonia, some acids (nitric)..., air transport.

What is going to happen in the III trading period

Quantity of allowances (mln. of CO₂e)

Year	European Union		
	Allowances	Reserve	Allowances (after deduction of reserve)
2010	2 033		
2013	1 927	96.34	1 831
2014	1 892	94.58	1 797
2015	1 856	92.81	1 763
2016	1 821	91.04	1 730
2017	1 785	89.27	1 696
2018	1 750	87.50	1 663
2019	1 715	85.73	1 629
2020	1 679	83.96	1 595

Poland		
Allowances	Reserve	Allowances (after deduction of reserve)
208.5		
197.6	9.9	187.7
194.0	9.7	184.3
190.4	9.5	180.8
186.7	9.3	177.4
183.1	9.2	173.9
179.5	9.0	170.5
175.8	8.8	167.1
172.2	8.6	163.6

What is going to happen in the III trading period

Free allowances – parameters (1)

Year	Shares of free allowances for sectors not exposed to carbon leakage			Dregation (Poland)
	Share (directive)	Annual change	Share	
2013	0.8000	 	0.8000	70%
2014	 	-0.0714	0.7286	60%
2015	 		0.6571	50%
2016	 		0.5857	40%
2017	 		0.5143	30%
2018	 		0.4429	20%
2019	 	 	0.3714	10%
2020	0.3000	 	0.3000	0%
2021	 	-0.0429	0.2571	
2022	 		0.2143	
2023	 		0.1714	
2024	 		0.1286	
2025	 		0.0857	
2026	 		0.0429	
2027	0.0000	 	0.0000	

What is going to happen in the III trading period

Free allowances – parameters (2)

Distribution of CO₂ emissions between sectors covered by ETS in EU and Poland

Region	Year	Unit	Total emissions	Electricity production	Exposure of the sector to carbon leakage				
					no			yes	
					district heating (100%)	industrial heating (25%)	industry (25%)	industrial heating (75%)	industry (75%)
EU	2005	mln. t. of CO ₂	2 122.82	1 144.48	195.38	50.38	145.36	151.15	436.07
		share	100.0%	53.9%	9.2%	2.4%	6.9%	7.1%	20.5%
Poland	2008	mln. t. of CO ₂	204.11	124.37	22.94	3.66	10.55	10.96	31.63
		share	100.0%	60.9%	11.2%	1.8%	5.2%	5.4%	15.5%

What is going to happen in the III trading period

Free allowances – parameters (3)

Benchmarks for free allocation in EU and Poland

Region	Activity / method		Ex-ante benchmark	Share in production	Average benchmark
EU	Heat production	cogeneration	0.8333	84%	0.7988
		district heating	0.6176	16%	
	Industry		0.7468	100%	0.7468
Poland	Heat production	cogeneration	0.7778	63%	0.6843
		district heating	0.5250	37%	
	Industry		0.7468	100%	0.7468

What is going to happen in the III trading period

Quantity of free allowances

Free allocation in EU and Poland

Region	Year	Total quantity of allowances (after deduction of reserve)	Free allocation							total
			derogation	exposure of sector to carbon leakage					total	
			Electricity production	no			yes			
				district heating	industrial heating	industry	industrial heating	industry		
EU	2013	1 830.5		107.6	104.1	280.8	27.7	74.9	595.2	?
	2014	1 796.9		96.2	102.2	275.6	24.8	67.0	565.8	
	2015	1 763.3	sum of member countries' derogations	85.2	100.3	270.5	21.9	59.3	537.1	
	2016	1 729.7		74.5	98.4	265.3	19.2	51.8	509.2	
	2017	1 696.1		64.1	96.5	260.2	16.5	44.6	481.9	
	2018	1 662.5		54.1	94.6	255.0	13.9	37.7	455.3	
	2019	1 628.9		44.5	92.6	249.9	11.5	31.0	429.4	
	2020	1 595.3		35.2	90.7	244.7	9.1	24.5	404.2	
Poland	2013	186.8		81.0	11.5	6.9	21.6	1.8	5.8	47.6
	2014	183.4	69.4	10.3	6.7	21.2	1.6	5.2	45.0	114.5
	2015	180.0	57.9	9.1	6.6	20.8	1.4	4.6	42.6	100.4
	2016	176.6	46.3	8.0	6.5	20.4	1.3	4.0	40.1	86.4
	2017	173.1	34.7	6.8	6.4	20.0	1.1	3.4	37.8	72.5
	2018	169.7	23.1	5.8	6.2	19.6	0.9	2.9	35.5	58.6
	2019	166.3	11.6	4.7	6.1	19.2	0.8	2.4	33.2	44.8
	2020	162.8	0.0	3.8	6.0	18.8	0.6	1.9	31.1	31.1

What is going to happen in the III trading period

The allocation of allowances to be auctioned (88-10-2 rule)

Distribution of allowances for auctioning in 2013

Country	Share in total emission (max 2005-2007)	Preliminary distribution	Redistribution according to the 88-10-2 rule						Quantity for auctioning	Countries' share in total quantity
			share 88%	solidarity 10%		early efforts 2%				
			basic quantity	increase of basic (%)	new quantity		share	quantity		
				before correction	after correction					
Austria	1.55%	19.1	16.9	0	0.00	0.00	0	0.00	16.85	1.4%
Belgium	2.57%	31.7	27.9	10%	2.79	2.74	0	0.00	30.67	2.5%
Bulgaria	1.82%	22.5	19.8	53%	10.49	10.27	15%	3.71	33.76	2.7%
Cyprus	0.24%	3.0	2.6	0.2	0.52	0.51	0	0.00	3.12	0.3%
Czech Republic	3.93%	48.6	42.7	31%	13.24	12.97	0.04	0.99	56.68	4.6%
Denmark	1.40%	17.3	15.2	0%	0.00	0.00	0%	0.00	15.22	1.2%
Estonia	0.62%	7.7	6.7	0.42	2.83	2.77	0.06	1.48	10.99	0.9%
Finland	1.86%	23.0	20.2	0%	0.00	0.00	0	0.00	20.22	1.6%
France	6.09%	75.2	66.2	0%	0.00	0.00	0%	0.00	66.21	5.4%
Germany	22.28%	275.2	242.2	0	0.00	0.00	0	0.00	242.21	19.6%
Greece	3.31%	40.9	36.0	17%	6.12	5.99	0	0.00	41.97	3.4%
Hungary	1.22%	15.1	13.3	28%	3.71	3.64	5%	1.24	18.13	1.5%
Ireland	1.04%	12.8	11.3	0	0.00	0.00	0	0.00	11.31	0.9%
Italy	10.52%	130.0	114.4	2%	2.29	2.24	0	0.00	116.61	9.4%
Latvia	0.13%	1.6	1.4	56%	0.79	0.77	4%	0.99	3.18	0.3%
Lithuania	0.31%	3.8	3.4	0.46	1.55	1.52	0.07	1.73	6.62	0.5%
Luxembourg	0.12%	1.5	1.3	10%	0.13	0.13	0	0.00	1.43	0.1%
Malta	0.09%	1.1	1.0	23%	0.23	0.22	0%	0.00	1.20	0.1%
Netherlands	3.73%	46.1	40.6	0	0.00	0.00	0	0.00	40.55	3.3%
Poland	9.63%	119.0	104.7	39%	40.83	39.97	0.27	6.67	151.33	12.2%
Portugal	1.69%	20.9	18.4	16%	2.94	2.88	0%	0.00	21.25	1.7%

What is going to happen in the III trading period

The allocation of allowances to be auctioned (88-10-2 rule)

Distribution of allowances for auctioning in 2013 (cont.)

Country	Share in total emission (max 2005-2007)	Preliminary distribution	Redistribution according to the 88-10-2 rule						Quantity for auctioning	Countries' share in total quantity
			share 88%	solidarity 10%		early efforts 2%				
			basic quantity	increase of basic (%)	new quantity		share	quantity		
				before correction	after correction					
Germany	22.28%	275.2	242.2	0	0.00	0.00	0	0.00	242.21	19.6%
Grece	3.31%	40.9	36.0	17%	6.12	5.99	0	0.00	41.97	3.4%
Hungary	1.22%	15.1	13.3	28%	3.71	3.64	5%	1.24	18.13	1.5%
Ireland	1.04%	12.8	11.3	0	0.00	0.00	0	0.00	11.31	0.9%
Italy	10.52%	130.0	114.4	2%	2.29	2.24	0	0.00	116.61	9.4%
Latvia	0.13%	1.6	1.4	56%	0.79	0.77	4%	0.99	3.18	0.3%
Lithuania	0.31%	3.8	3.4	0.46	1.55	1.52	0.07	1.73	6.62	0.5%
Luxembourg	0.12%	1.5	1.3	10%	0.13	0.13	0	0.00	1.43	0.1%
Malta	0.09%	1.1	1.0	23%	0.23	0.22	0%	0.00	1.20	0.1%
Netherlands	3.73%	46.1	40.6	0	0.00	0.00	0	0.00	40.55	3.3%
Poland	9.63%	119.0	104.7	39%	40.83	39.97	0.27	6.67	151.33	12.2%
Portugal	1.69%	20.9	18.4	16%	2.94	2.88	0%	0.00	21.25	1.7%
Romania	3.23%	39.9	35.1	0.53	18.61	18.22	0.29	7.17	60.50	4.9%
Slovakia	1.17%	14.5	12.7	41%	5.21	5.11	0.03	0.74	18.57	1.5%
Slovenia	0.41%	5.1	4.5	20%	0.89	0.87	0%	0.00	5.33	0.4%
Spain	8.52%	105.3	92.6	0.13	12.04	11.79	0	0.00	104.41	8.5%
Sweden	0.90%	11.1	9.8	10%	0.98	0.96	0	0.00	10.74	0.9%
Great Britain	11.62%	143.6	126.3	0%	0.00	0.00	0%	0.00	126.32	10.2%
EU27	100.00%	1 235.4	1 087.1	X	126.20	123.54	100%	24.71	1 235.38	100.0%

What is going to happen in the III trading period

The allocation of allowances to be auctioned (88-10-2 rule)

Distribution of allowances for auctioning in the period 2013-2020

Year	EU				Poland						
	Total	'share'	'solid.'	'early efforts'	'share'	'solidarity'		'early efforts'	Total 88-10-20 rule	Dreogation	Auctioning
						before corr.	after corr.				
2013	1 235.4	1 087.1	123.5	24.7	104.7	40.8	40.0	6.7	151.3	81.0	70.3
2014	1 231.1	1 083.4	123.1	24.6	104.3	40.7	39.8	6.6	150.8	69.4	81.4
2015	1 226.2	1 079.0	122.6	24.5	103.9	40.5	39.7	6.6	150.2	57.9	92.3
2016	1 220.6	1 074.1	122.1	24.4	103.4	40.3	39.5	6.6	149.5	46.3	103.2
2017	1 214.2	1 068.5	121.4	24.3	102.9	40.1	39.3	6.6	148.7	34.7	114.0
2018	1 207.2	1 062.4	120.7	24.1	102.3	39.9	39.1	6.5	147.9	23.1	124.7
2019	1 199.5	1 055.6	120.0	24.0	101.7	39.6	38.8	6.5	146.9	11.6	135.4
2020	1 191.1	1 048.2	119.1	23.8	100.9	39.4	38.5	6.4	145.9	0.0	145.9

What is going to happen in the III trading period

Distribution of allowances within EU ETS

Year	EU	Poland				
		total	Reserve	Auctioning	Free allocation	
					derogation	exposure
2013	1 927	208.8	9.8	70.3	81.0	47.6
2014	1 892	205.5	9.7	81.4	69.4	45.0
2015	1 856	202.2	9.5	92.3	57.9	42.6
2016	1 821	198.9	9.3	103.2	46.3	40.1
2017	1 785	195.6	9.1	114.0	34.7	37.8
2018	1 750	192.3	8.9	124.7	23.1	35.5
2019	1 715	188.9	8.8	135.4	11.6	33.2
2020	1 679	185.6	8.6	145.9	0.0	31.1

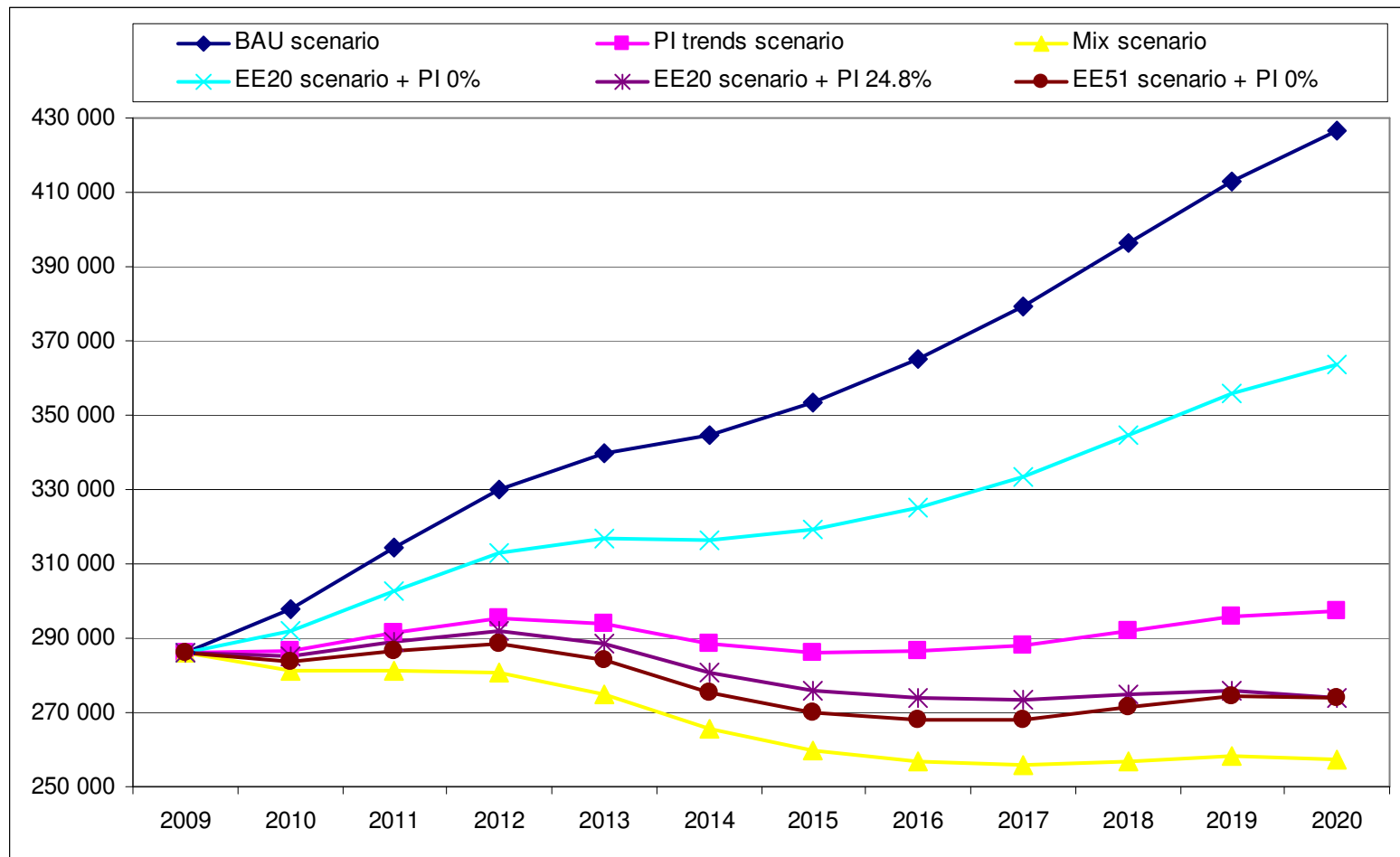
Dilemmas of measuring the impact of the EU ETS

What can happen (results of simulations) – a naive approach

- **BAU** base scenario (business as usual)
- **EE20** assumes achieving target 3 by 2020 by gradual improving energy efficiency
- **PI trends** assumes that pollution intensity (measured as GHG emissions per unit of energy) follows negative trends observed in Poland from 1990)
- **Mix** scenario, which combines the two previously mentioned scenarios.

Dilemmas of measuring the impact of the EU ETS

What can happen (results of simulations) – a naive approach



Dilemmas of measuring the impact of the EU ETS

Questions to answer

- What opportunities the ETS sectors have to reduce emissions, how expensive the opportunities are, and what will be their results for the reduction (marginal abatement cost curve)?
 - Price of allowances at primary and secondary market (currently EUR 12-15, forecasts varies from 15 to EUR 65 in 2016)
 - Increase of prices in the ETS sectors
 - Changes in emission coefficients
 - Changes in energy intensity in all sectors (input-output coefficients)
- Possible use of the proceeds from auctions (primary market)
- Assumptions of base scenario influence price of CO₂ allowances