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Energy market integration and the EU Emissions Trading System: electricity leakage

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Leakage and EU ETS

- > Many theoretical papers suggest leakage is problematic
- > Empirics are less clear
- > Strong policy recognition **BUT** no E-leakage discussion
- > 11.500 KV cables into EU ETS
- > Russia, Belarus, Ukraine, Moldova, Turkey, Morocco
- > At which allowance price is E-leakage possible?



In a nutshell...

$$mc_{CO_2} = (g_{nEU} + \sum_i F_{trans} + \sum_i F_{cap}) - g_{EU} / spec$$

g_{nEU} (Euro/MWh) energy gen. costs (Mold., Ukraine, Morocco)

F_{trans} (Euro/MWh) energy transport fees

F_{cap} (Euro/MWh) energy cross border (transmission) fees

g_{EU} electricity generation costs (D, IT, PL, FR, ES)

$spec$ CO₂ emissions in tons per MWh (plant efficiency)



Assumptions + Data

- > Assumption: substitution of baseload capacity => peak demand transfer prices are not paid.
- > Eastern: Energy gen. costs: Ukraine and Moldova
High: 49,79 €/MWh Low: 38 €/MWh
- > Southern: Energy gen. costs: Morocco
High: 49,79 €/MWh Low: 32 €/MWh
- > Wholesale market prices (average baseload prices) D:
37,79; IT 62,99; PL 36,65; ES 44,25; FR 46,94 €/MWh
- > Average transport costs (ENTSO-E)
- > Cross boarder capacity transmission (constant base load)



Eastern border findings

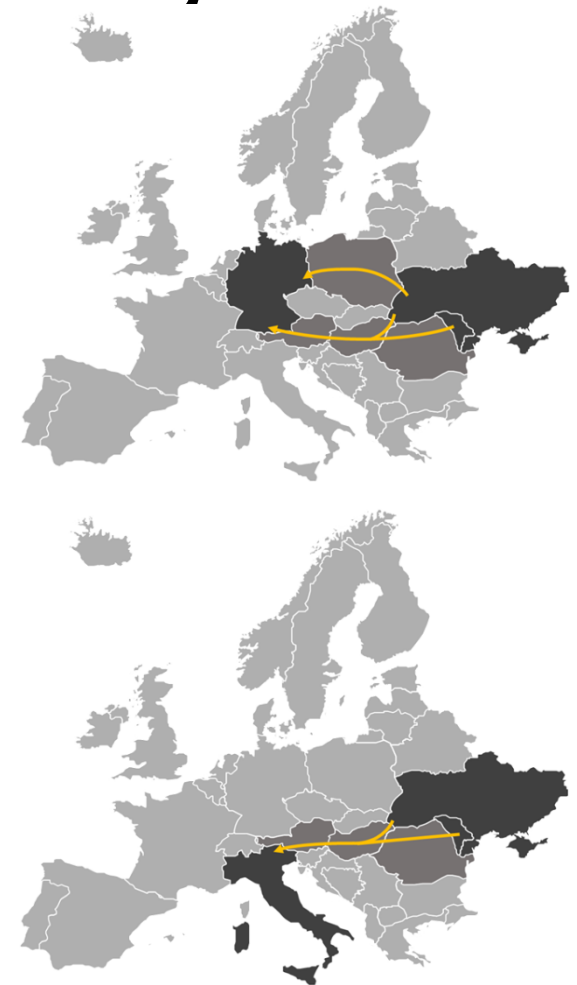
			CO ₂ price Euro/t		
			(standard efficiency)		
Scen.	Trading pattern	Energy source	Efficiency η	Plant costs	Plant costs
				Ukraine/Moldova 49,79 Euro per MWh	Ukraine/Moldova 38,00 Euros per MWh
1 a)	UA – PL – DE	Coal	42%	30,73	16,19
		Lignite	40%	24,21	12,73
1 b)	UA – HU – AU – DE	Coal	42%	30,65	16,09
		Lignite	40%	24,14	12,66
1 c)	MD – ROM – HU – AU – DE	Coal	42%	46,19	31,64
		Lignite	40%	36,38	24,88
2 a)	UA – HU – AU – IT	Gas	55%	44,54	14,55
2 b)	MD – ROM – HU – AU – IT	Gas	55%	76,58	46,59
3)	UA – PL	Coal	33%	12,88	1,32





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Southern border findings

Scen.	Trading pattern	Energy source	(standard efficiency)		
			Efficiency η	Plant costs Morocco 49,79 Euro per MWh	Plant costs Morocco 32,26 Euros per MWh
4)	MAR-ES	Gas	55%	8,058	-12,31
5)	MAR-FR	Nucl	n/a	16,91 to 23,91	-3,47 to 3,54





On-going developments

- › Mitigating element for E-leakage:
 - Energy Community Treaty: Environmental standards (SO_x, IPPC) will increase in Ukraine and Moldova
 - Association Agreements: Energy sector reform, safety standards

YET: Belarus still resists EU charm...



Exacerbating elements

› Energy sector reforms

=> Cross border transmission fees earmarked as being of common European interest => Reg. 347/2013 (9.1 billion)

=> Transmission costs and capacity costs will fall

Examples:

- North-South electricity interconnection in Central Eastern and South Eastern Europe, Iberian peninsula => interconnection and internal power lines
- Baltic Energy Market Interconnection Plan in Electricity => internal grid infrastructure



Concluding remarks

- > **Energy market integration runs counter EU ETS =>**
no policy tools / solutions for E-leakage because focus
not on Energy!!
- > Already at **current prices E-leakage** is an issue in
border MS and 'soon' also for more central MS =>
Stranded costs!!
- > **Electricity generators can import electricity to
avoid CO2 costs => so can industry**

Caveats:

Generation costs in 3rd countries

Market structure + demand in receiving countries (RES policies)