

# Navigating various flexibility mechanisms under European burden-sharing

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# Aims of this paper

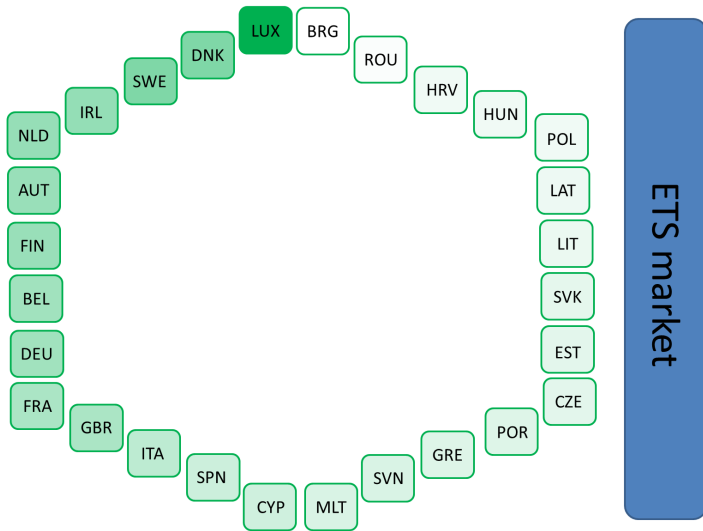
- Evaluate the new 2030 EU burden sharing
- Analyse the economic impacts of various flexibility mechanisms
- Overall GHG emissions target in 2030: -40% with respect to 1990 levels
  - ETS emissions: -43% with respect to 2005 levels
  - ESD emissions: -30% with respect to 2005 levels

Table: Effort Sharing Decision based on GDP per capita in % of 2005 levels

Bulgaria	0%	Cyprus	-24%
Roumania	-2%	Spain	-26%
Croatia	-7%	Italy	-33%
Hungary	-7%	United Kingdom	-36%
Poland	-7%	France	-36%
Latvia	-6%	Germany	-37%
Lithuania	-9%	Belgium	-38%
Slovakia	-12%	Finland	-39%
Estonia	-13%	Austria	-39%
Czech Republic	-14%	Netherlands	-39%
Portugal	-17%	Ireland	-39%
Greece	-16%	Sweedeen	-40%
Slovenia	-15%	Denmark	-40%
Malta	-19%	Luxembourg	-40%

- Standard computable general equilibrium model
- EU version: 28 European countries + China + Rest of the World
- 11 goods/sectors:
  - 3 ETS sectors: Refineries, electricity generation, energy intensive sectors
  - ESD sectors: agriculture, transport, other goods and services + households
- Database: GTAP 9
- Consider CO<sub>2</sub> emissions from energy combustion
- Reference scenario 2011-2030 calibrated from “EU reference scenario 2016” done with PRIMES

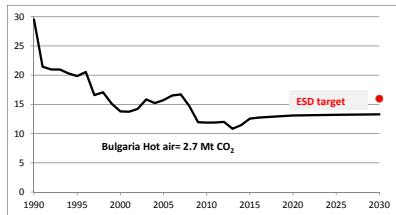
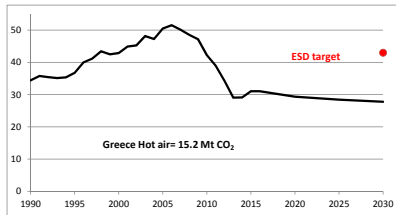
# EU Architecture scenario → 29 markets, 29 CO<sub>2</sub> prices



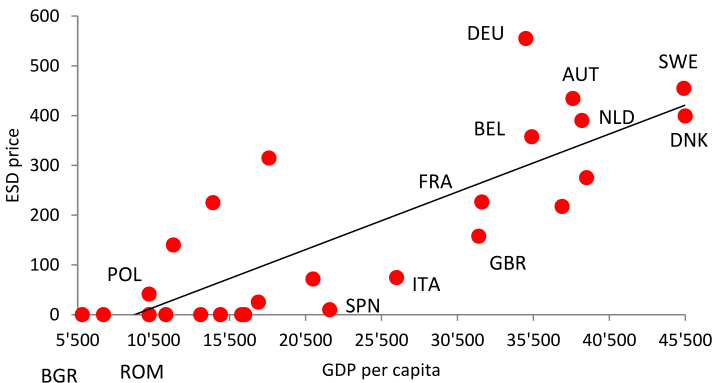
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# “Hot air” within ESD emissions in 2030

Study	Countries with “hot air”	Emissions covered	Amount in Mt CO <sub>2</sub> -eq
GEMINI-E3	Bulgaria, Croatia, Czech Republic, Greece, Hungary, Latvia, Portugal, Romania, Slovakia	CO <sub>2</sub> from energy combustion	29.8
European Commission (2016a)	Bulgaria, Croatia, Czech Republic, Greece, Hungary, Latvia, Lithuania, Portugal, Romania, Slovakia, Slovenia	GHG	50.8
Sartor et al. (2015)	Bulgaria, Croatia, Greece, Hungary, Portugal, Romania	GHG	24.5

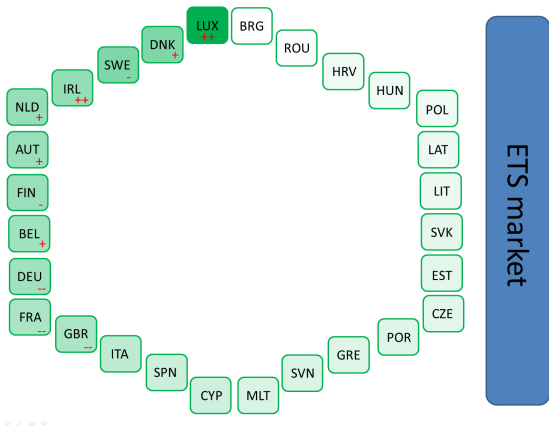


# EU architecture scenario: ESD CO<sub>2</sub> prices in € - Year 2030



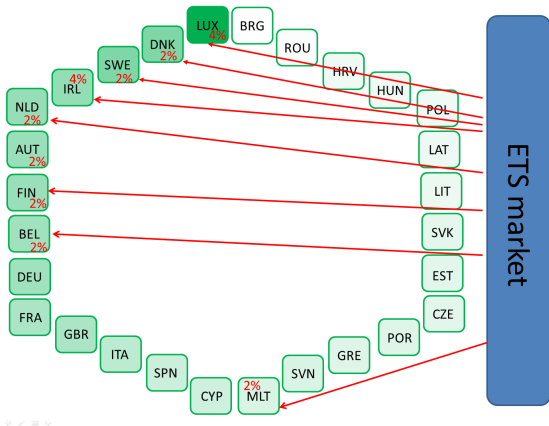
- ESD CO<sub>2</sub> average price = 209 €
- 9 ESD CO<sub>2</sub> prices = 0 → Hot Air  $\simeq$  30 Mt CO<sub>2</sub> in 2030
- ETS CO<sub>2</sub> price = 45 €

# Target adjustment: Option T3



- Only high income Member States: AUT, BEL, DEU, DNK, FIN, FRA, IRL, LUX, NLD, SWE
- $-2\% \leq \text{target adjustment} \leq +13\%$

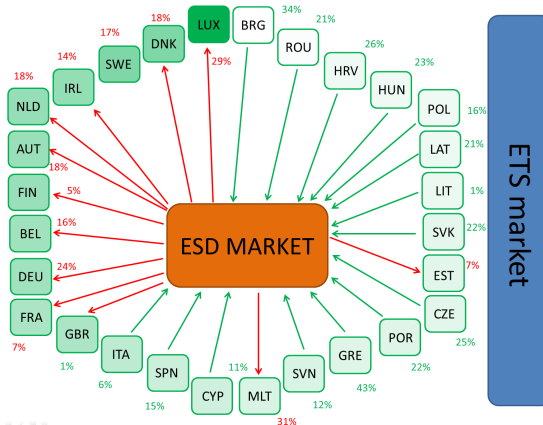
# One-off flexibility between ETS and non-ETS: Option O2



- Only high income Member State: AUT, BEL, DEU, DNK, FIN, FRA, IRL, LUX, NLD, MLT, SWE
- $2\% \leq \text{access limit} \leq +8\%$

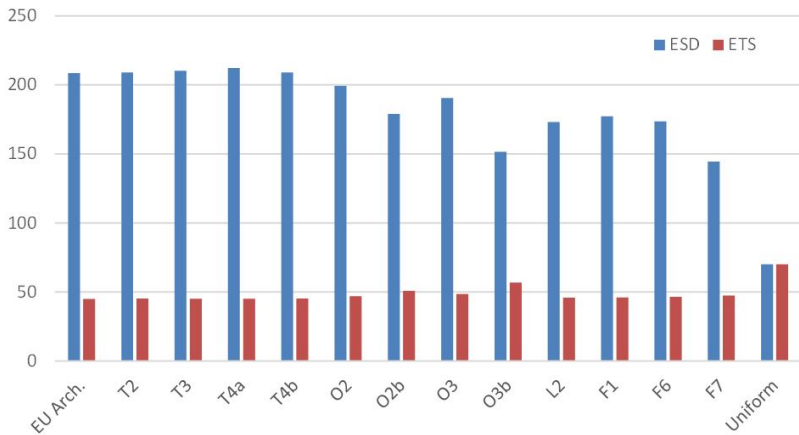


# Inter-Member State flexibility: Option F7

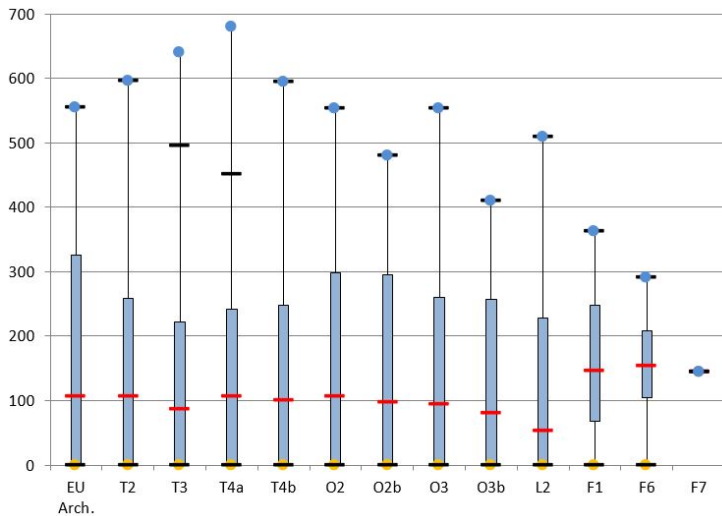


- F1=5% trade limit, F6=10% and F7=no limit

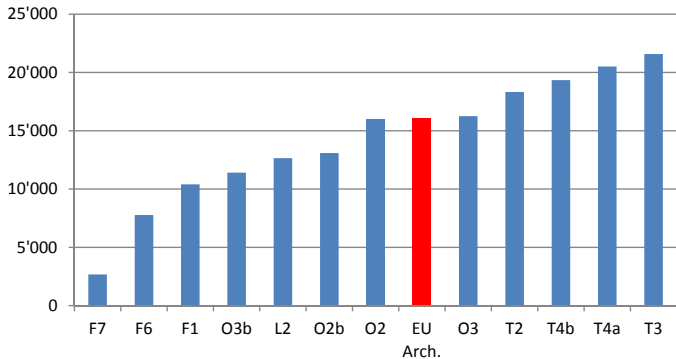
# ETS and average ESD CO<sub>2</sub> prices in € - Year 2030



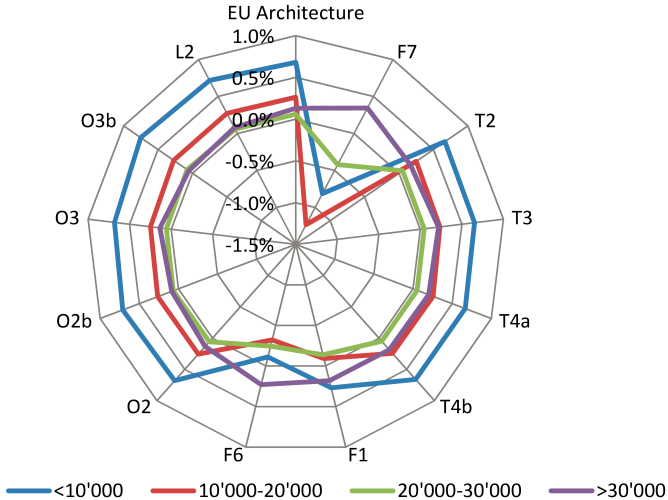
# Flexibility options and ESD CO<sub>2</sub> prices in € - Year 2030



# Flexibility options and EU Welfare cost in billion €



# Flexibility options and EU Welfare cost in % of household consumption per Member State income levels (GDP per capita)



- The new EU burden sharing is highly questionable with respect to
  - Environmental effectiveness ← “Hot air”
  - Cost-efficiency
- The EU partly acknowledges these points by proposing several flexibility mechanisms
- Target adjustment options fail to reintroduce flexibility
- One-off flexibility options between ETS and non-ETS are too limited
- Only inter-Member state flexibility options is the most attractive:
  - It tend to equalizing ESD prices → reduce overall EU welfare cost
  - Increase the welfare of low-income Member States through selling of quotas
  - But must be extended in term of % of allocations that are allowed to be traded
- The forthcoming EU burden sharing should consider additional criteria: existing situation (grandfathering) and cost-efficiency