

# Navigating various flexibility mechanisms under European burden-sharing

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# Aims of this paper

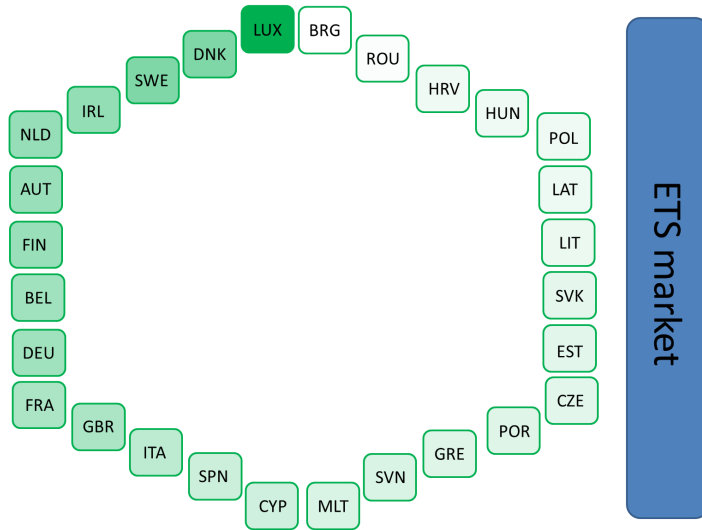
- Evaluate the new 2030 EU burden sharing
- Analyse the economic impacts of various flexibility mechanisms
- Overall GHG emissions target in 2030: -40% with respect to 1990 levels
  - ETS emissions: -43% with respect to 2005 levels
  - ESD emissions: -30% with respect to 2005 levels

**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% |

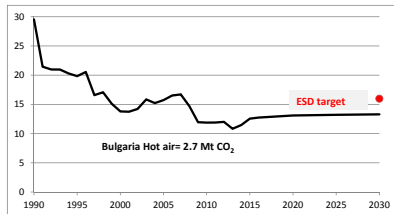
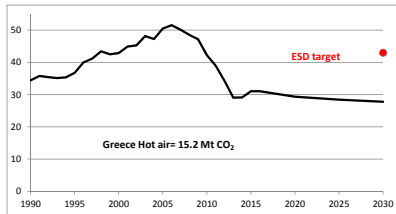
- Standard computable general equilibrium model
- EU version: 28 European countries + China + Rest of the World
- 11 goods/sectors:
  - 3 ETS sectors: Refineries, electricity generation, energy intensive sectors
  - ESD sectors: agriculture, transport, other goods and services + households
- Database: 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

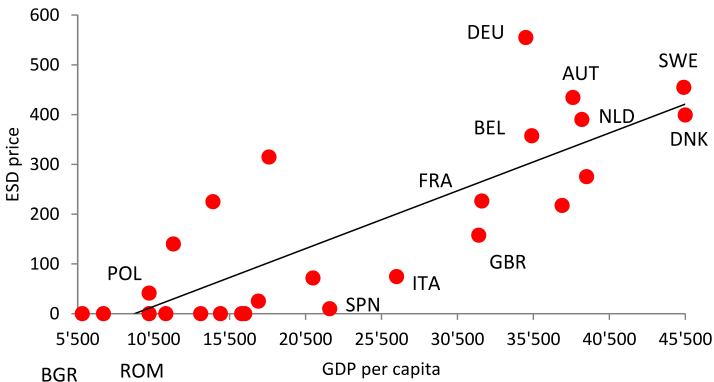


# “Hot air” within ESD emissions in 2030

| 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                             |

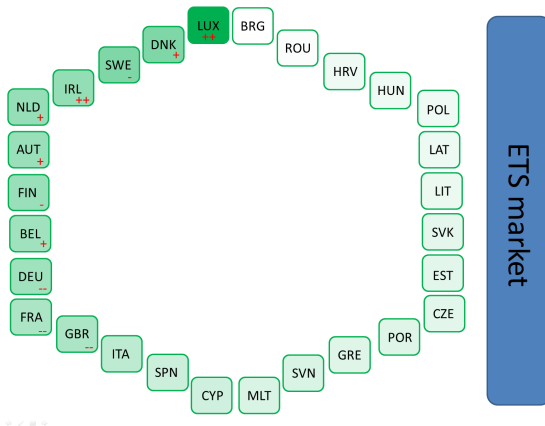


# EU architecture scenario: ESD CO<sub>2</sub> prices in € - Year 2030



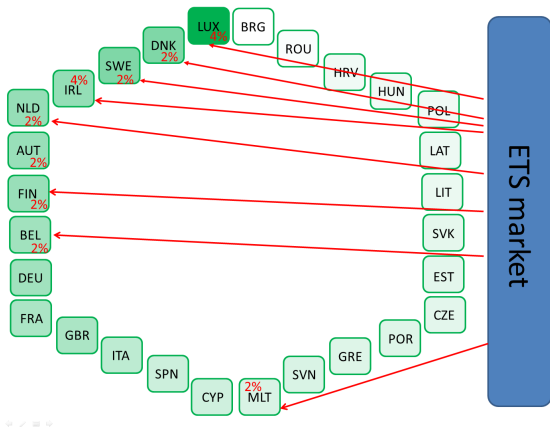
- ESD CO<sub>2</sub> average price = 209 €
- 9 ESD CO<sub>2</sub> prices = 0 → Hot Air  $\simeq$  30 Mt CO<sub>2</sub> in 2030
- ETS CO<sub>2</sub> price = 45 €

# Target adjustment: Option T3



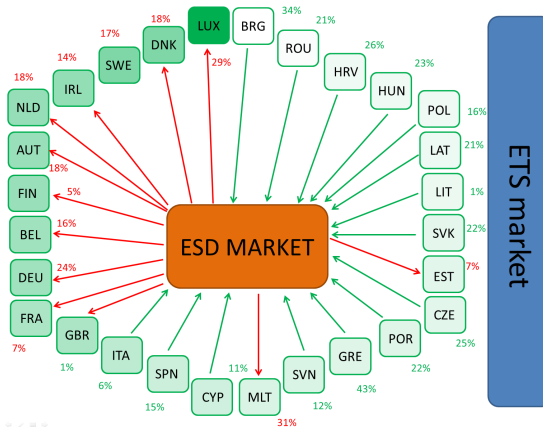
- Only high income Member States: AUT,BEL,DEU,DNK,FIN,FRA, IRL,LUX,NLD,SWE
- $-2\% \leq \text{target adjustment} \leq +13\%$

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



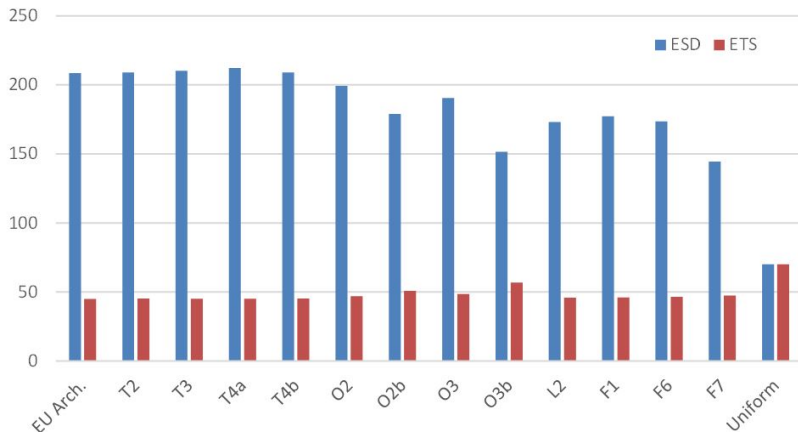
- Only high income Member State: AUT,BEL,DEU,DNK,FIN,FRA, IRL,LUX,NLD,MLT,SWE
- $2\% \leq \text{access limit} \leq +8\%$

# Inter-Member State flexibility: Option F7

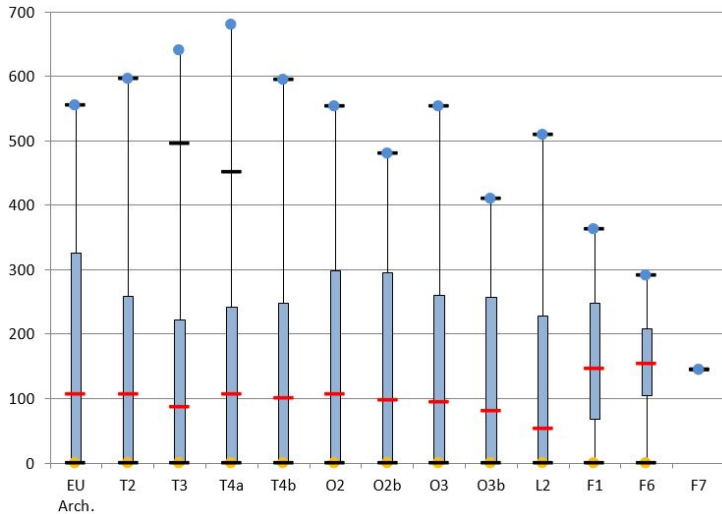


- F1=5% trade limit, F6=10% and F7=no limit

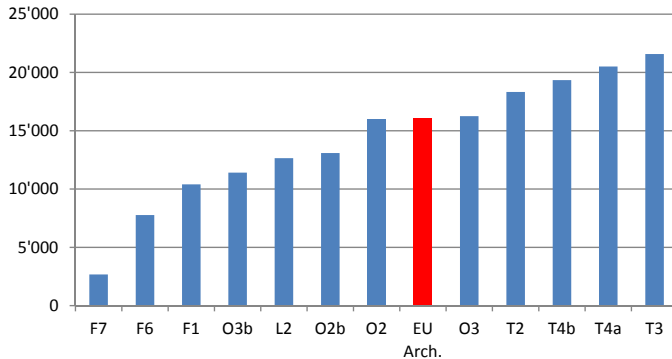
# ETS and average ESD CO<sub>2</sub> prices in € - Year 2030



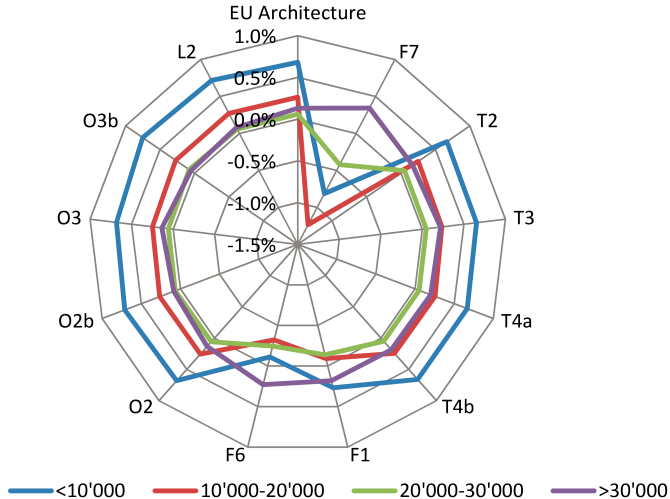
# Flexibility options and ESD CO<sub>2</sub> prices in € - Year 2030



# 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)



# Conclusion

- 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