

# Linking regionally and globally motivated emission control strategies in Europe

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# Approach

- Construct scenarios, so far for potential emission trading regimes in Europe until 2020, using the general equilibrium model GRACE
- Transfer of energy data from GRACE to activity data RAINS
- Calculation of emissions of SO<sub>2</sub> and NO<sub>x</sub> and acidification eutrophication using RAINS

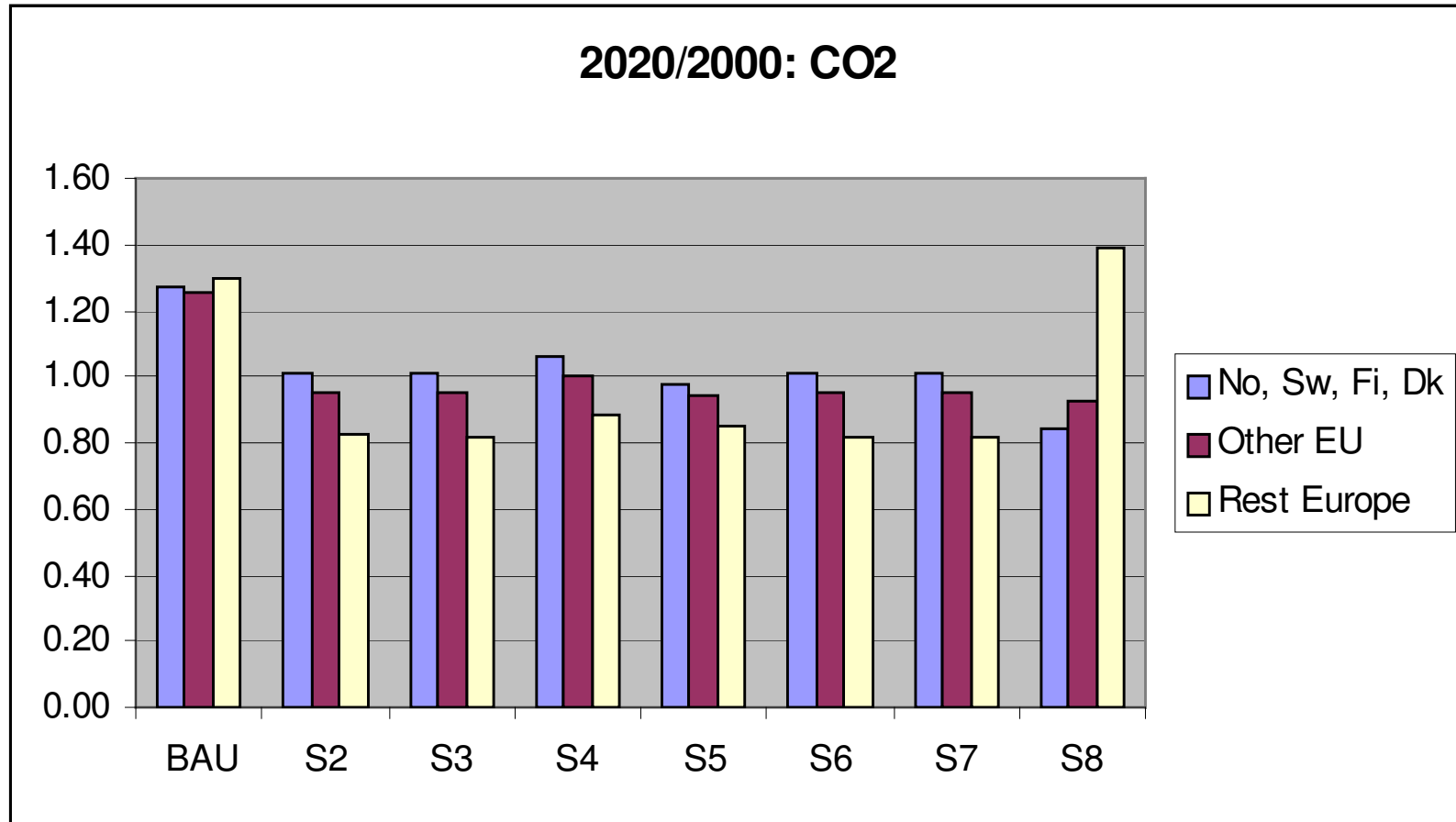
# Scenarios

Variable	Option 1	Option 2	Option 3	Option 4
<b>Hot air sale in KP</b>	<i>Hot air sellers (POL, BAL, REE, RUS) restrict supply to maximize revenue</i>	No hot air is allowed.		
<b>Post-2012 Emissions for EU-15 regions</b>	<i>After KP, emissions are reduced at a rate of 1% year-on-year</i>	After KP, emissions are held constant at KP level through to 2020		
<b>Post-2012 Emissions for hot air sellers</b>	<i>After KP, emissions are reduced by 10 and 20% of BAU in 2015 and 2020 respectively</i>	After KP, emissions follow the BAU, and no abatement or ETS involvement takes place		
<b>Sectoral Inclusion in ETS (for KP and beyond)</b>	Current ETS only	<i>Expanded ETS</i>	Expanded ETS, plus “Extra” sectors join for 2015 and 2020	Expanded ETS, plus “Extra” and Transport sectors join for 2015 and 2020

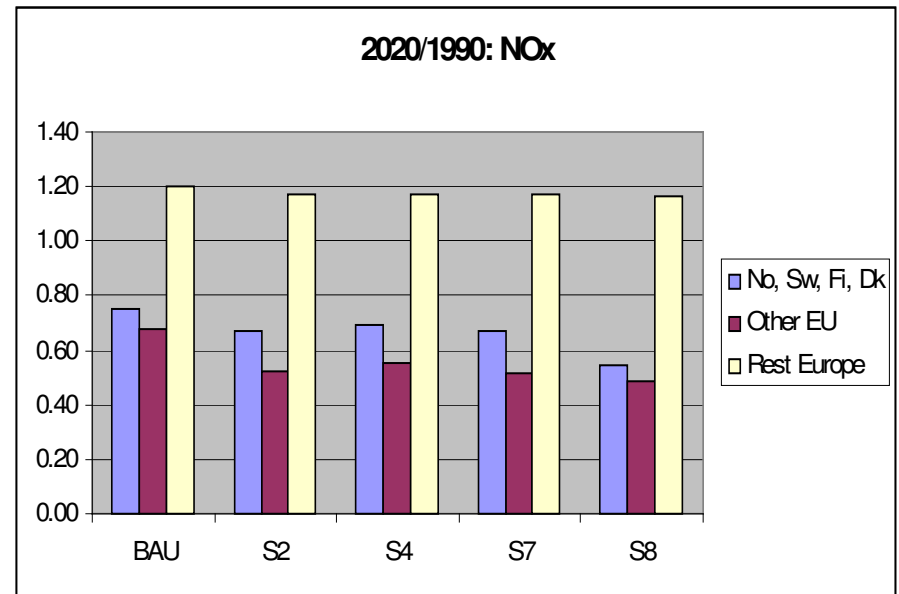
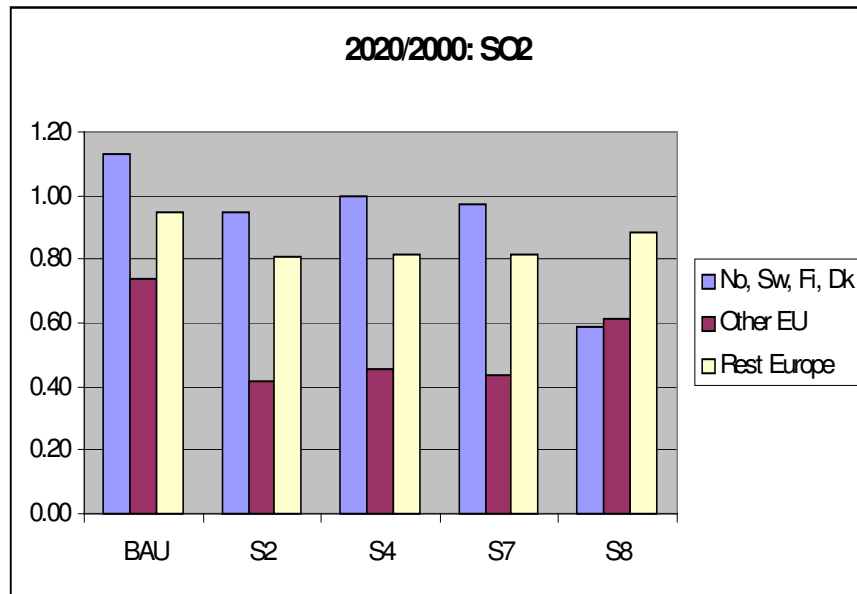
# Scenarios

Scenario Number	Scenario Name	Hot air sale in KP	Post-2012 Emissions for EU-15 regions	Post-2012 Emissions for hot air sellers	Sectoral Inclusion in ETS (for KP and beyond)
1	BAU	n/a	n/a	n/a	n/a
2	Expected Policy	1	1	1	2
3	No Hot Air	2	1	1	2
4	KP Forever	1	2	1	2
5	Current ETS only	1	1	1	1
6	Extra ETS sectors	1	1	1	3
7	Extra+Trans ETS	1	1	1	4
8	NoEE&RUS	1	1	2	2

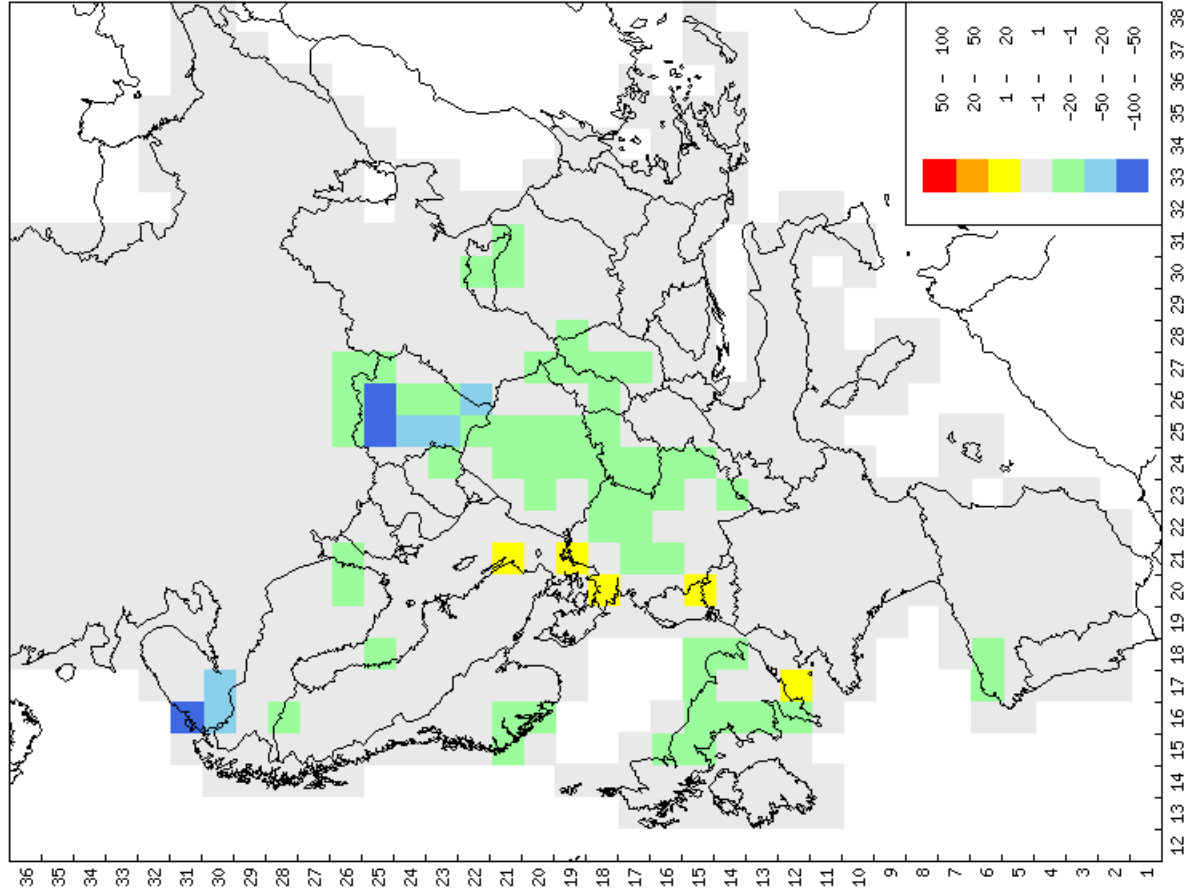
# Preliminary results



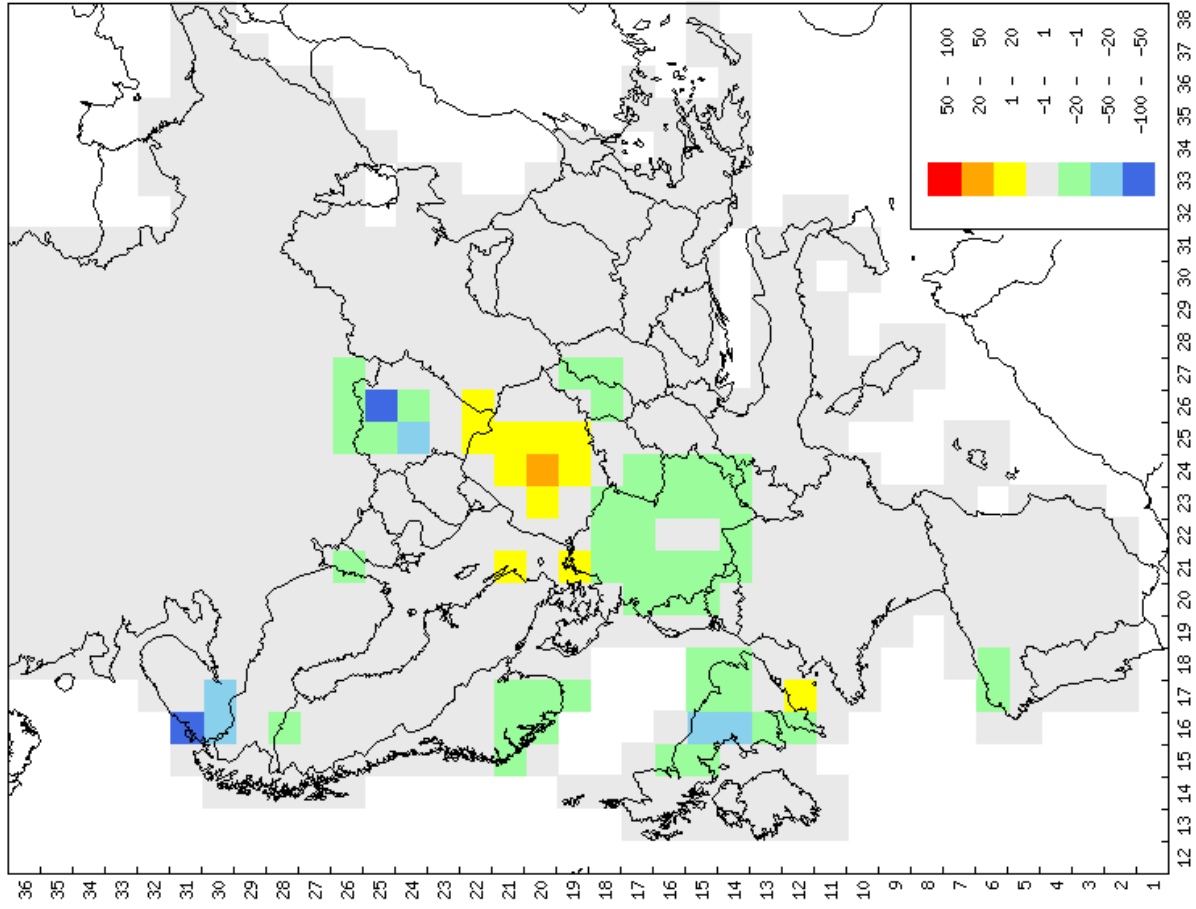
# Preliminary results



Delta Ecosystem protection (acidity), % unprotected ecosystems  
nmrsc7\_20 - NEC



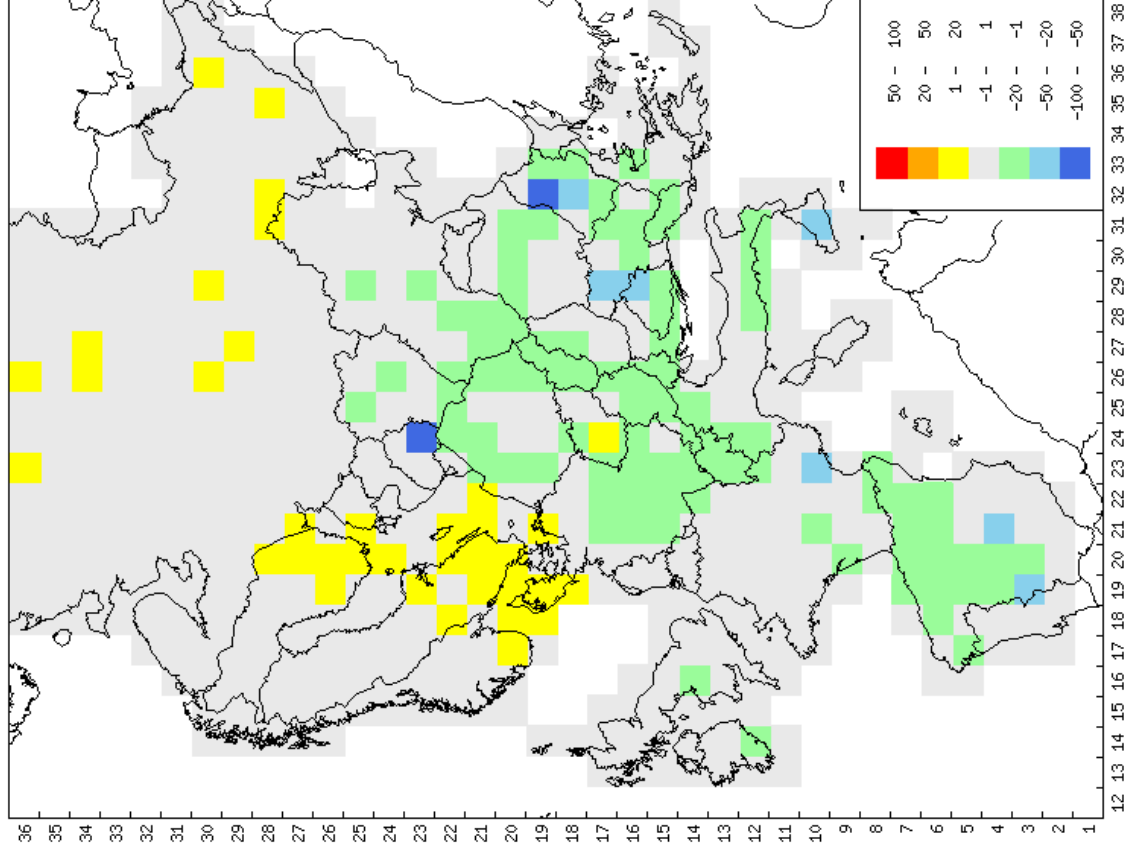
Delta Ecosystem protection (acidity), % unprotected ecosystems  
nmrsc8\_20 - NEC



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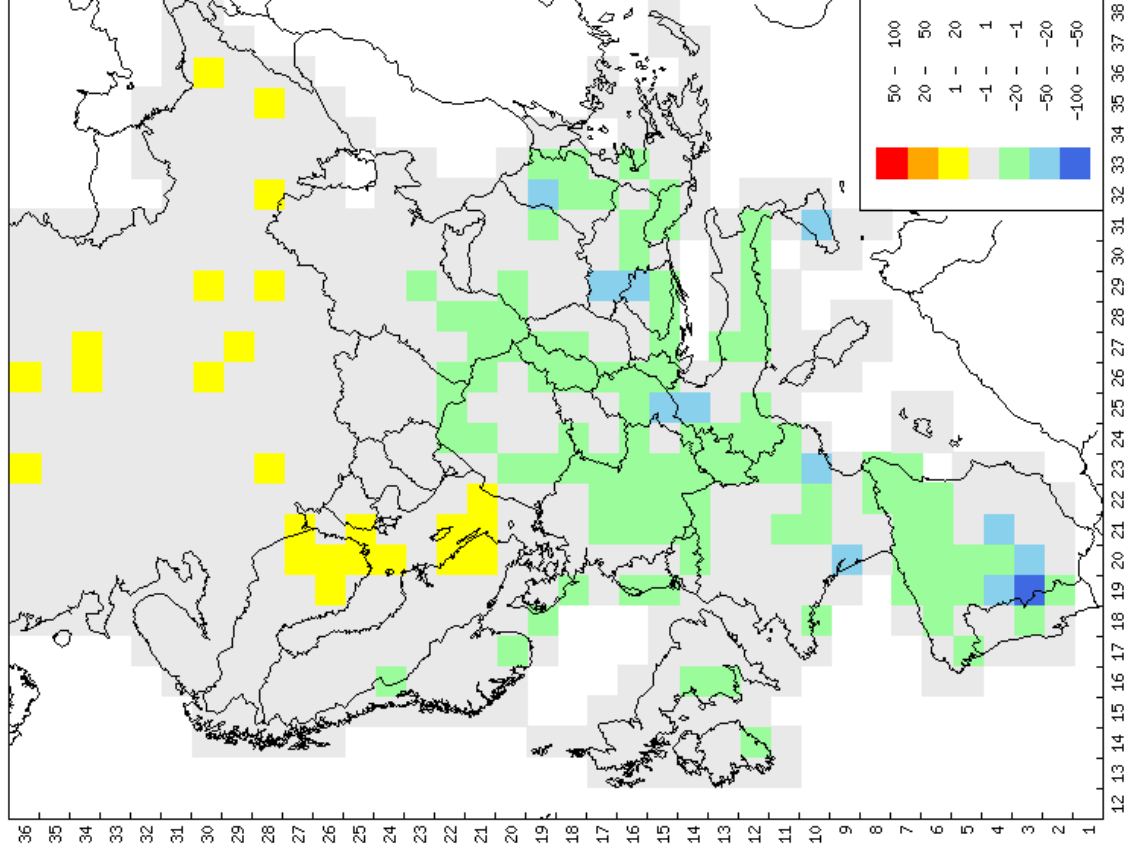
Delta Ecosystem protection (nutrient N), % unprotected ecosystems

nmrsc7\_20 - NEC



Delta Ecosystem protection (nutrient N), % unprotected ecosystems

nmrsc8\_20 - NEC





# Continued work...

- For prioritisation
  - Other scenarios reflecting structural changes in the energy system
  - Changes in costs and redistribution of costs
  - Benefits and damages- PM and ozone