

# FAIR 2.0 - Framework to Assess International Regimes for differentiation of future commitments

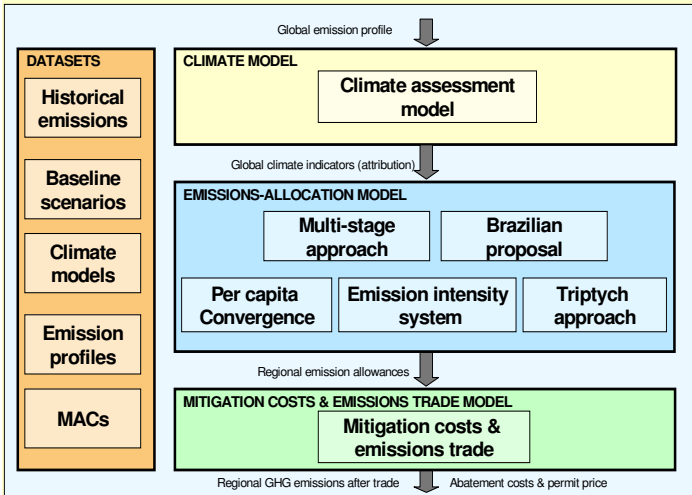
## The decision-support tool FAIR 2.0 aims:

- To evaluate regimes for differentiating future commitments under the Climate Change Convention (post-Kyoto) in the context of stabilising GHG concentrations (Article 2), and also:
  - To evaluate the Kyoto Protocol for environmental effectiveness and economic costs
  - To support the dialogue between scientists, NGOs and policy makers
- In this way FAIR is an interactive simulation tool with a graphic interface allowing for interactive changing and viewing of model input and output.

## Sub-models function as:

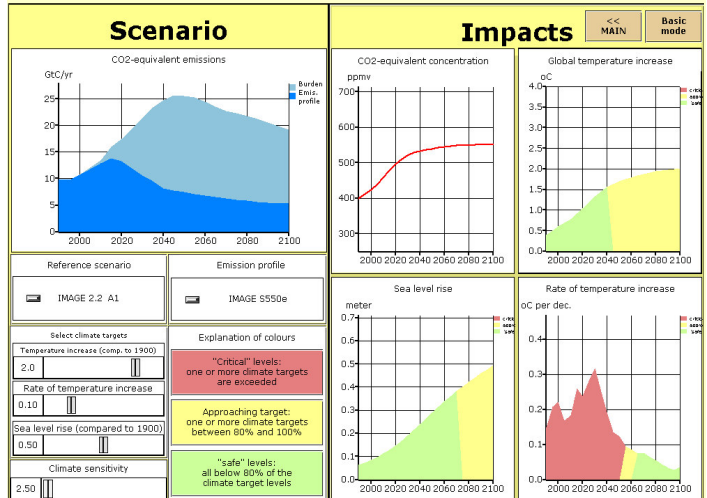
- Climate model:** to construct / evaluate the climate impacts of global emission profiles and calculate the regional contributions to climate change.
- Emissions-allocation model:** to explore and evaluate emission allowances for climate regimes for differentiation of future commitments.
- Mitigation costs & emissions trade model:** to calculate mitigation costs, permit price and emissions reductions after emissions trade; to calculate buyers and sellers on the market and to distribute the emission reduction over different regions, sectors and gases following a least-cost approach.

## Model structure



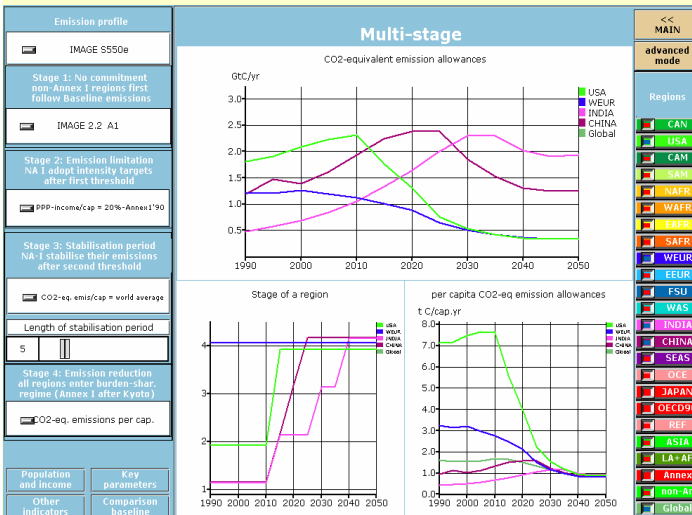
**Datasets:** CDIAC and EDGAR/Hyde historical emissions, IMAGE IPCC SRES scenarios, IMAGE S550e, S650e, S750e and WRE profiles, various MAC curves (CO<sub>2</sub> & non-CO<sub>2</sub>).  
**Climate model:** IMAGE, UNFCCC and other climate models and climate attribution model  
**Emissions allocation model:** 5 basic & 4 alternative regimes (top-down & bottom-up)  
**Emissions trade & cost model:** uses the methodology of demand & supply curves from aggregated MAC curves for 17 regions, 6 greenhouse gases and 23 sectors.

## Evaluation of emission profile



**IMAGE S550e global greenhouse gas emission profile** corresponds to a stabilisation of the CO<sub>2</sub> equivalent concentration at 550 ppmv.  
 > Emissions peak before 2020 and return to 1990 levels around 2030.  
 > Profile could meet the EU temperature target of 2°C, for medium to low climate sensitivity.  
 > Rate of temperature increase remains above 0.1°C per 10 years until mid-century.  
 > Sea level rise is about 0.5 m at the end of the century and is still increasing.

## An example of a climate regime: multi-stage

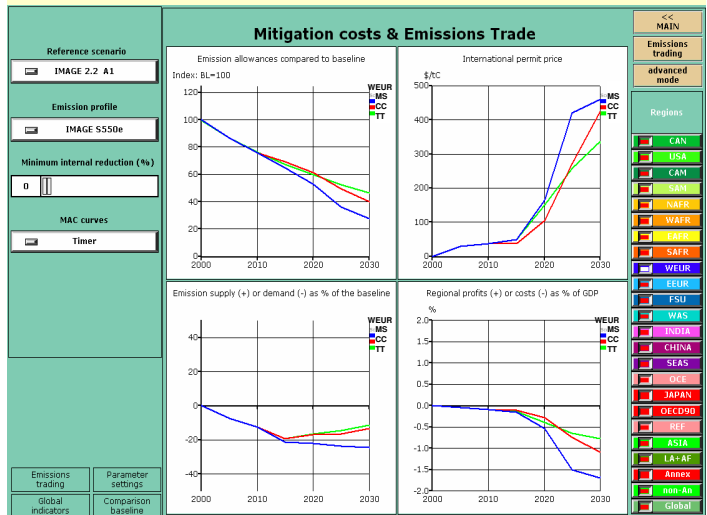


**Multi-stage:** number of parties involved and their level of commitment gradually increase according to participation & differentiation rules. Takes place in 4 stages: 1) no commitment; 2) emission-limitation (intensity) targets; 3) stabilisation; 4) emission reduction targets.  
 > For the EU temperature target (S550e profile), Annex I regions need to reduce their emissions by 30-50% compared to 1990 levels in 2025.  
 > Participation of major non-Annex I countries in the reductions is needed before 2025 and under significant lower per capita income levels than for Annex I under the Kyoto Protocol.

## FAIR 2.0 policy applications from 1999-2003:

- Evaluation of the Brazilian Proposal and other regimes
- Interactive use in international dialogue between scientists & policy makers (COOL project)
- Analysis of post-Kyoto climate regimes for differentiating future commitments for the Netherlands National Environmental Outlook
- Evaluation of Kyoto Protocol under the Bonn and Marrakech agreements

## Evaluation of costs of climate regimes



**Indicator framework:** for the evaluation of the economic costs of various climate regimes for differentiation of future commitments (Figure: MS: multi-stage; CC: contraction & convergence; TT: triptych).  
 > The regional effort rate (mitigation costs as % of GDP) depends on the emissions allocation resulting from the future commitment regime and can differ largely between regions.  
 > Gains from emissions trading can make early participation attractive for non-Annex I regions  
 > Difference in effort rates may indicate problems of acceptability of regime proposals

- UNFCCC project 'Assessment of Contributions to Climate Change' (ACCC)
- Analysis of multi-gas mitigation scenarios (EMF)
- Evaluation of climate regimes for differentiating future commitments (Dutch Ministry of Environment, EU commission, etc.)
- Educational use (Open University UK and universities in the Netherlands)