Strategic Analysis Center

The shadow price of carbon in France

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Carbone et Prospective

The French context

- Previous shadow price used in the evaluation of socio-economic profitability of public investment (issued from Marcel Boiteux 2001 commission named « transport choice of investment and cost of harmful effects ») : 27 €/tCO_2 (100 €/ton of carbon)

- The vast concertation process in France named « Grenelle de l'Environnement », was concluded by the President of Republic following announce :

« From now on, all public projets and public decisions will be taken considering their climate cost (…) »

The need for an up-dating 2001 value

- Scientific and political awareness of the climate question has changed :
  - IPCC work
  - National and international committments : the shadow price must be in line with European objectives for 2020 and 2050
- ETS has partly introduced a carbon price in the economy
- The economic modelling has progressed, and offers a basis for the determination of a price in line with new committments regarding CO2 emissions

The process for up-dating the carbon shadow-price in France

- The Prime Minister asked for a revised value, in order to better enlighten public investment choices (in line with new expectations concerning climate change).

- An *ad hoc* commission chaired by Alain QUINET was created in the framework of the Center for Strategic Analysis (CAS) :
  - Among them : members of administration (directorate for energy, for roads, for environment, etc.), economists (French universities, OECD, IEA), representatives of the economic and social partners, environmental NGOes, associations of workers, public institutions, Caisse des dépôts et Consignations.

Methodological choices (1/2)

The « Cost-advantage » approach : (Stern-like report)

The CAS commission pointed out 2 difficulties linked to this approach :

- The difficulty in evaluating the dammage
- The discount-rate appears as key element

- **The « Cost-effectiveness » approach**

The CAS commission chose this approach, considering that, in a more pragmatic way, it leads to determine a chronic for carbon price enabling to meet european committments

But the CAS commission wished a « dialogue » between the 2 approaches (complementary)

Methodological choices (2/2)

- A sensible use of economic models : 3 specific models : GEMINI E3, POLES, IMACLIM-R, and a model of optimal control of scarce resource

➢The shadow price recommended (and its evolution over time) :

  ➢is not the result of models as such

  ➢Is the result of a compromise between the members of the CAS commission, enlightened by economic modelisation

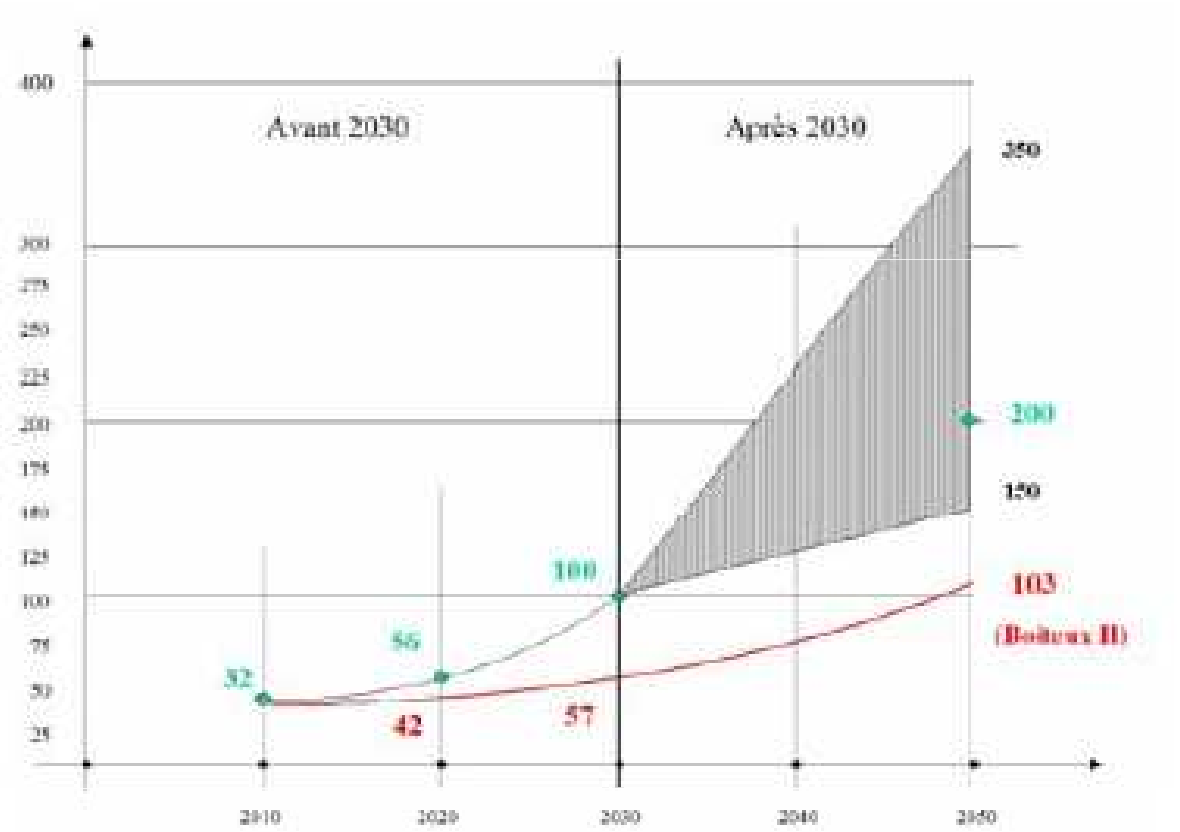
A shadow carbon price increasing continuously over time up to 2050

- 3 main points on the carbon trajectory :
  - Shadow price : 100 € per ton CO2 in 2030
  - After 2030, the price increases by 4% per year (public discount rate)
  - from 2010 to 2030, 2 options were considered :

- Hotelling rule (4% increase per year),
- a linear increase from the previous « Boiteux » shadow price (27€) to the pivot value of 100 € in 2030

The second option was chosen for better acceptability

The CO2 shadow price recommended



- *After 2030 : uncertainty is represented by the range of prices in the grey area*
- *The red curve is the result for 2001 Boiteux Commission (previous value recommended by CAS)*

Results : the shadow price of a ton of CO2 (€ 2008)

	2010	2020	2030	2050
New Recommended value (Quinet CAS Commission)	32	56	100	200 (150-350)
Previous value (2001 Boiteux CAS commission)	32	43	58	104

Specific comments

- No mecanic link between the carbon shadow price and oil price (the price proposed is considered to remain valid for an oil price ranging from 50 to 100 € per barrel, and for coal price from 60 to 120 € per ton), but a revision could become necessary out of these ranges.

- Significant uncertainty remains in the carbon shadow price recommended to be used (as a long term price) : the 2050 price to be considered varies in the range (150 € / 350 €).

- The uncertainty is supposed to be reduced over time : the commission has recommended a re-evaluation at least every 5 years, but also on various occasions (result of multi-lateral negociations, new committments, better appraisal of climate damage)

Various uses of the shadow carbon price

- Various uses of this shadow price :

- in order to lead to a low carbon economy
  - through relevant choices in public infrastructure investment (better enlightened thanks to proper evaluation of climate cost)
  - through economic incentives (proper calibration)

- in order to better appraise public policies and regulation as regards their climate change impact

- in order to send a mid-term signal price to private and public actors