

*Are energy efficiency strategies in Air
Transport a matter of social contestability?*

François Metrot

CEMI - EHESS

Presentation of the communication

- Result of the Survey
- Analysis using the Contestable Management Model (Hommel & Godard)

Research Work

- Analyse the implementation of Energy Efficiency Strategies (EES) among the Air Transport Industry at two level :
 - *Sectoral Level*: Implementation of EES as a matter of institutional change in controversial situation.
 - *Organizational level*: Implementation of EES as a matter of investment decision under uncertainty.

- Object of the study:

Environmental strategies of the firm show great variations in their implementation.

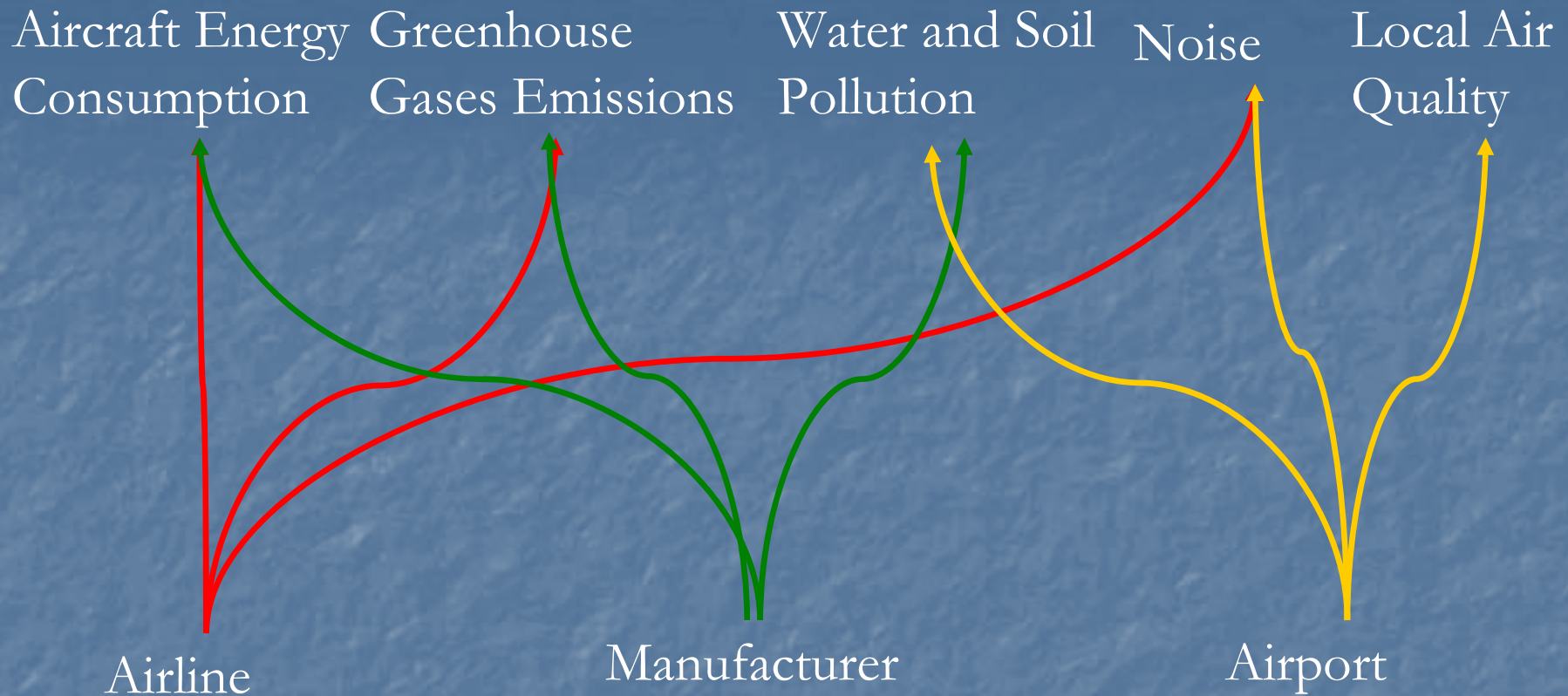
- Variable that can explain this heterogeneity:
 - Variations in institutional formal constraints (rules)
 - Variations in informal constraints (conventions or mimetic pressure)
 - Variations in profitability of the investment
 - Variations in organizational learning process
 - Variations in social contestability of firms

Stakeholders represented in the Survey

Airlines	12	5 FSC / 6 Regional / 1 LCC
Airports	9	2 Regional Airport 6 National Airports 1 Major Hubs
Manufacturers	4	2 Aircraft Manufacturers 2 equipment manufacturers

Environmental Strategies

- We have first studied the implementation of the global environmental policy of firms.
- Objectives: show variations between the different environmental issues following the activities of the firms.



Each stakeholder considers an environmental concern as a strategic issue if it implies its direct responsibilities and if it is necessary for its future growth.

Implementation of Environmental Strategy

	More advanced environmental policies
Airports	Noise, Local Air Quality and Water and Soil Pollution
Airlines	Noise, Aircraft Energy Consumption and Greenhouse Gases Emissions.
Manufacturers	Water and soil pollution Matter Consumption and Waste recycling

Environmental Assets

- Airports seem to invest more in environmental policies than Airlines and Manufacturer:
 - Their environmental department have more budget and more people
 - Environmental Certification systems are more developed (EMAS and ISO 14001)
 - External and Internal environmental auditing
 - But Airlines communicate more than airports (the airlines' environmental plan are publicly available)

Environmental Reporting

- Noise is the environmental issue that is the most taken into account by all the stakeholders
- Airlines report their Aircraft Energy Consumption and their GHG emissions
- Local Air Quality and Water and Soil Pollution are the main items of reporting for airport

Impact of Institutional constraints

- Binding agreements required by law do exist for Noise, Local Air Quality and Water and Soil Pollution.
- Thus policies in those domains can be interpreted as an adaptation of the firm to its institutional framework. It explains why those issues are more generally developed.
- On the contrary, Aircraft Energy Consumption and GHG emissions are not framed by institutional constraints. But policies on those issues do exist. It is a matter of voluntary agreement.

- There is a segmented approach of environmental policies.
- Each stakeholder integrates issues that are in their corporate responsibility perimeter:
 - The issue that is the more broadly taken into account is Noise (because of stringent regulation)
 - Local issues (local air quality, water and soil pollution) are treated by airports.
 - Global Issues (Greenhouse gases and aircraft consumption) are treated by airlines and manufacturer.

Results on the Energy Efficiency Strategies

Energy Efficiency Strategy

- Energy Efficiency Strategies aim at reducing the consumption of energy, thus reducing the pollutant gases.
- In that sense, EES may help to reduce:
 - Aircraft Energy Consumption
 - Greenhouse Gases Emissions
 - Local Air Pollution

■ Q46 : Well defined and implemented

■ Q46 : could be more precisely defined (no quantitative objectives defined)

■ Q46 : could be more efficiently implemented (lack of guidance material, lack of employees training, lack of efficient equipment)

EES are variously implemented among the air transport industry:

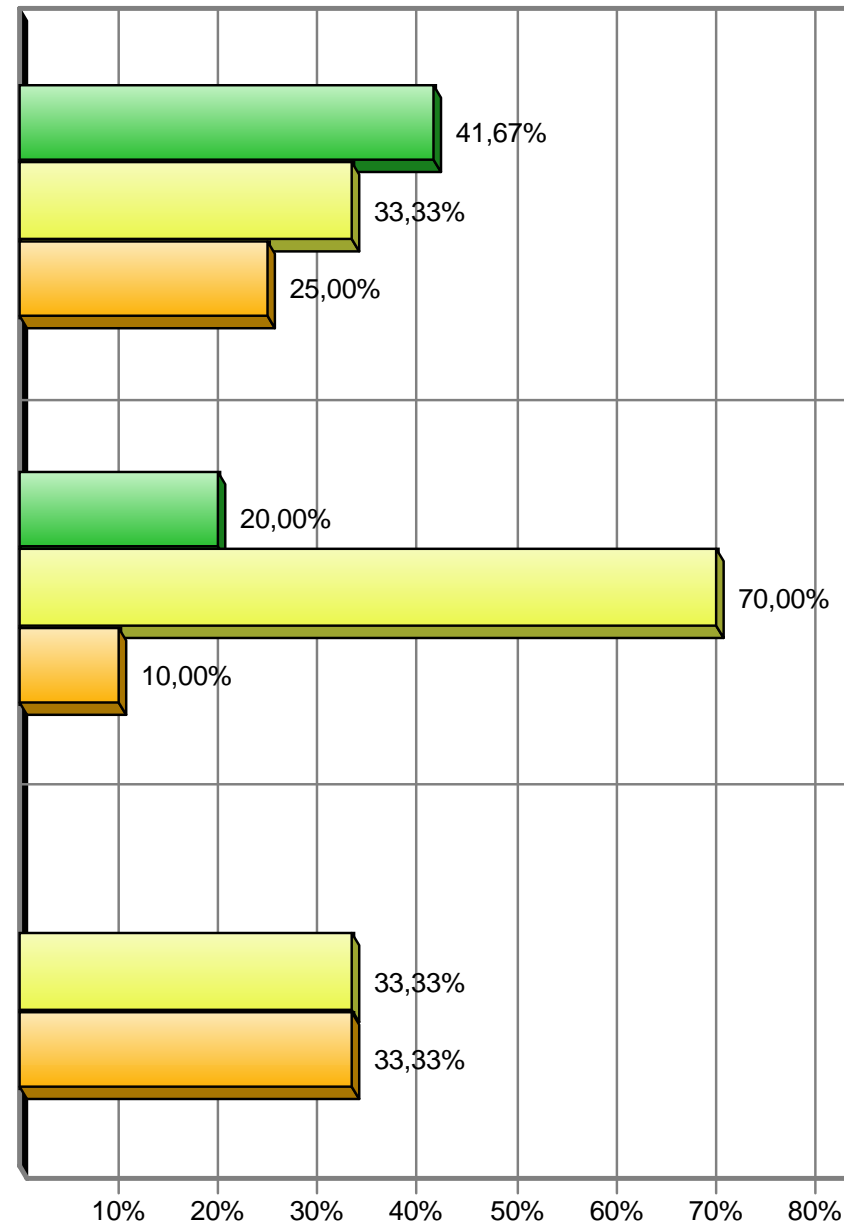
-Airlines seem to be more advanced.

-Airports estimate that their strategy could be more precisely defined

Q110 : Compagnie aérienne

Q110 : Aéroport

Q110 : Motoriste / Constructeur



Drivers to investment in EES



Stakeholder	EES Specific Drivers
Airports	Preparation for potential institutional constraints Institutional standards on Energy
Airlines	Support of Growth (quality competition) Cost Reduction Objectives (Cost competition) Care for Society (corporate social responsibility)
Manufacturer	Preparation for potential institutional constraints

Barriers to investment in EES

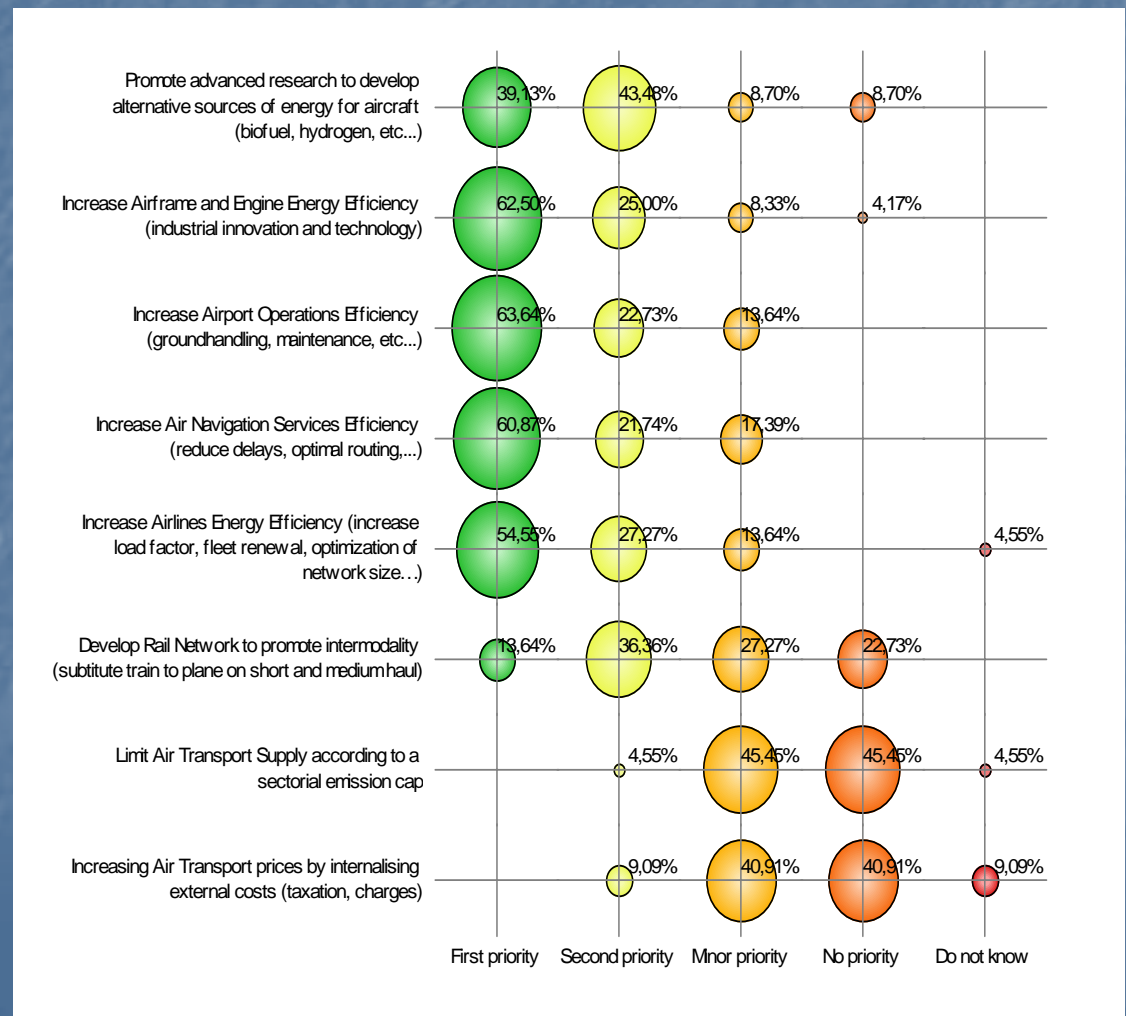
Common Barriers to implement EES:

- Too many uncertainties surrounding Climate Change Issue
- Low rate of return on investment for emissions and energy reduction aims
- Lack of coordination between actors

Stakeholder	EES Specific Barriers
Airport	<p>Pricing structure passes the benefit onto the customer (no direct profit)</p> <p>Lack of institutional constraints</p> <p>Not directly concerned by Climate Change</p>
Airline	<p>Lack of adequate guidance material and management about EES</p> <p>Lack of energy efficiency technologies available on the market</p> <p>Insufficient funds</p>
Manufacturer	<p>Lack of internal suitable knowledge</p> <p>Insufficient Fund</p>

Policy Options

- Technological and organisational policies are preferred
- Policies that could reduce the traffic growth are rejected



Institutional Tools

Technical norms on engine consumption

Technical norms on engine emission

Quotas on noise level

Quotas on greenhouse gas emission level

Traffic cap (European scale)

Traffic cap (National or local scale)

Value added taxes on Air Transport services

Kerosene taxes

Global Social Cost taxes (related to the

Airport Charges (Landing and Take Off

Route charges (flight length)

Global Pollution charges (Greenhouse gas

Local Pollution charges (such as Nox, CO or

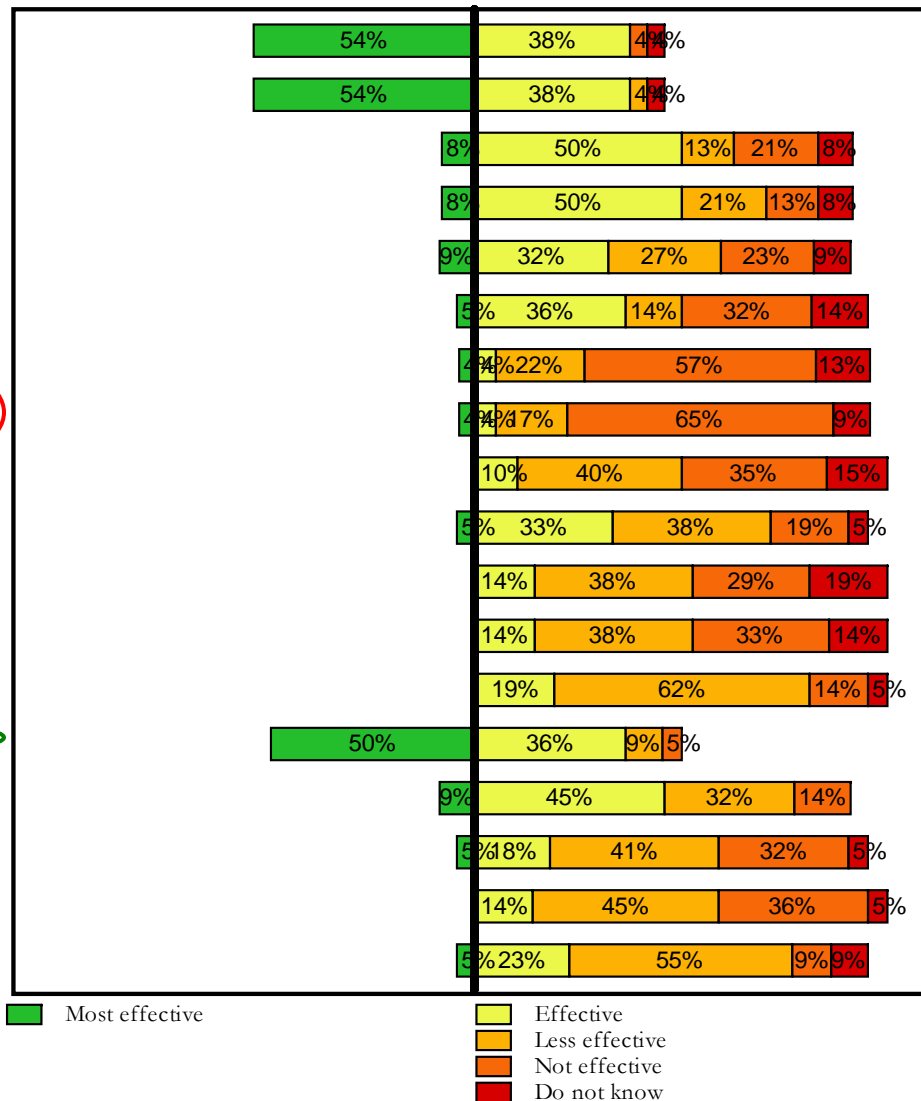
Open Emission Trading Scheme (Global

Open Emission Trading Scheme (European

Sectoral Emission Trading Scheme (Global

Sectoral Emission Trading Scheme

Sectoral Voluntarily Agreement



- EES are implemented variously among the air transport industry.
- EES are implemented in order to deal with different externalities:
 - Airports invest to reduce facilities energy consumption and local air pollution.
 - Airlines invest to reduce aircraft energy consumption and greenhouse gases emissions induced by their activities.
 - Manufacturer invest in order to reduce the consumption of their industrial processes and to adapt their product to a changing demand.

- Nowadays, EES are implemented mainly for competitive purpose:
 - Reduce Cost (cost competition)
 - Corporate Responsibility (quality competition)
- The many uncertainties that surround Climate Change and Oil Depletion, and the low return on EES investment are two major barriers to further progress.
- The lack of institutional framework on greenhouse gases emissions and aircraft consumption is slowing the change.

*Analysis using the Contestable
Management Model*

Implementation of EES is taking place in controversial situation :

The contribution of aviation to a global environmental issue (Climate change) is still in debate. The uncertainty is also strong on oil depletion.

Air Transport stakeholders do not homogeneously perceived the need for change.

The institutional framework to deal with aviation and Climate Change is not yet determined. The objectives are still under negotiation.

Moreover, the type of investment needed to implement the EES is not perfectly known and easily accessible.

	Stabilized situation	Controversial situation
Type of environmental externality	Noise	Climate Change
Type of treatment Mode	Mitigation measures (minimize the impact of noise)	Prevention Measure (minimize emission)
Stakeholder engaged in the social choice	Local externality Clearly delimited (noise exposure zone defined by administrative institution). The residents represent their interest forming a specific association.	Global externality (atmosphere is a Common good) Each Human being is engaged but in various degrees. There is no representation for the future generation (even if NGOs can be admitted as partial representative) Environmental impacts vary following the geographical area. Stakeholders have also asymmetric means of representation and adaptation.
Measure of the externality	Instruments of noise exposure do exist. Levels of exposure are defined at a global level and at local level.	Instrument of emissions calculation do exists but are still under elaboration. No level of emission is defined for carbon dioxide (but they do exist for Nox)
Social Cost	Difficult to evaluate (use of stated or revealed preferences)	Impossible to evaluate
Mitigation means	Do exist	Unknown
Degree of irreversibility	None	Strong
Degree of scientific uncertainty	Weak (the uncertainty is upon the non acoustic factor of noise annoyance)	Strong Each greenhouse gases have different radiative forcing impacts, with a level of uncertainty. Altitude of emissions can also have an effect on the radiative forcing.

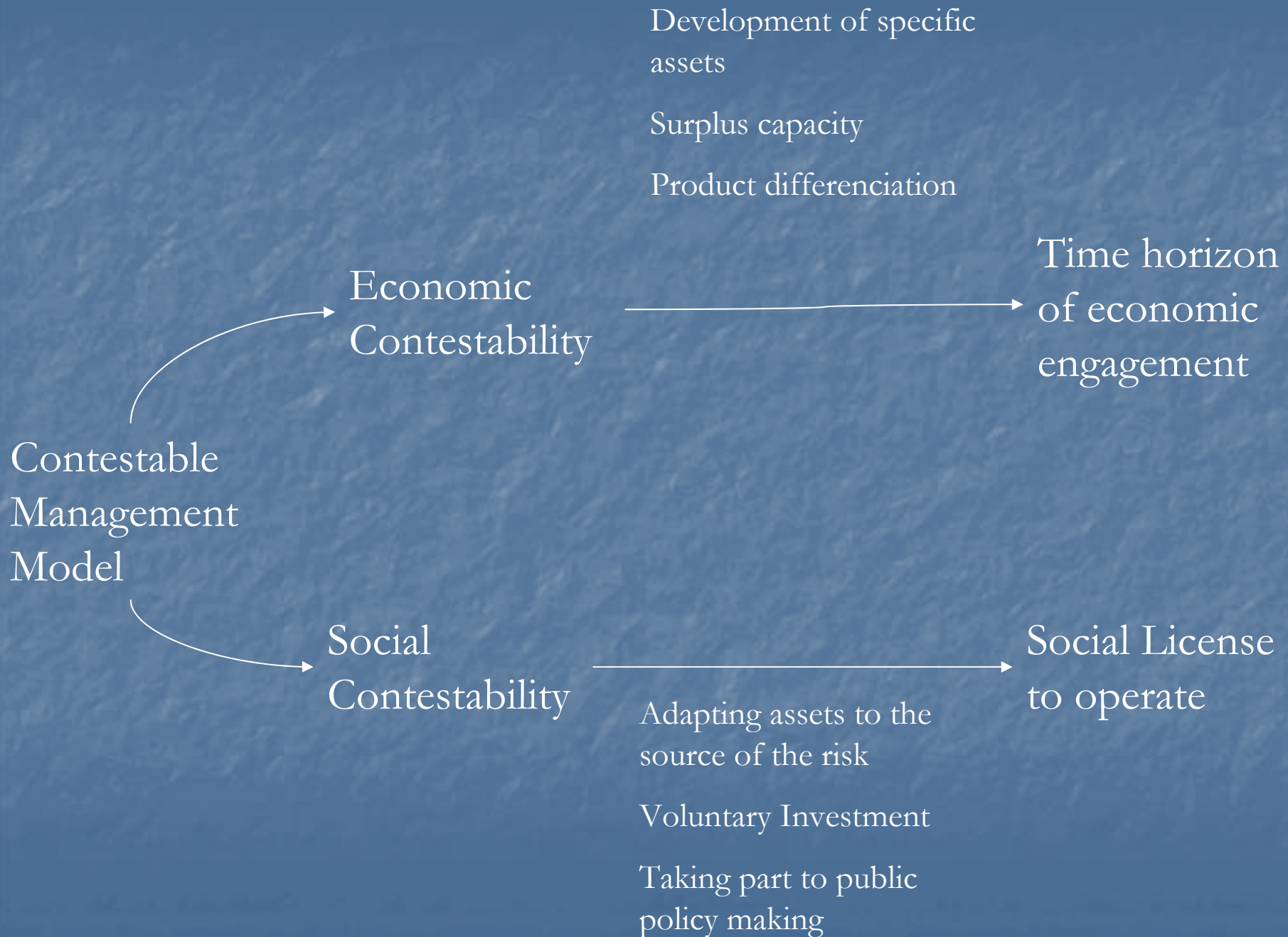
- Because EES are implemented in controversial situation, neoclassical economics cannot give an appropriate framework to analyze variation in implementation of energy efficiency

- Uncertainties around the subject are the sources of numerous failures of the neoclassical theoretic framework:
 - Risk of irreveribility
 - Externalities ? Valuation of those Externalities ?
 - Mode of treatment of these externalities ?
 - Economic instruments or control and command approach

The contestable management model deal with firms that are exposed to a social contestation threat

- the contestation is upon the firm's business, its products, the techniques it uses, or even what the firm represents in terms of the field of activity (for instance, weapons manufacturing) or size (for instance a large multinational corporation).

- Realisation of this kind of threat can take various forms:
 - legal (i.e. court action).
 - economic (defection).
 - collective action : prompting social protest using modern means of communication to besmirch the company's legitimacy, lobbying public authorities so that they implement a moratorium or other prohibitive measures, or perhaps even requesting a total boycott on the part of consumers (e.g. GMO)



	Airport	FSC	Low Cost and Regional carrier
Economic contestability	Low	Medium	High
Time horizon of economic engagement	Natural monopoly Long term High specificity of their assets	Dominant carrier Medium term specificity of their assets and irrecoverable costs (such as communication and loyalty program)	New entrant Short to medium term Possible “hit and run” strategies
Risk of Social contestation	High	Medium Brand visible by the opinion	Low
Type of contestation	Local vigilance NIMBY protest Noise and local air quality	Generalizing social contestation on Climate Change Issue Not many critics as other transport modes pollute more	
Degrees of environmental investment	High More developed on noise and local air quality	Medium More developed on noise and energy efficiency	Low Only developed where there are known

Airlines seem to invest less in their environmental strategies than airport because they are more constrained by economic contestability. Thus Environmental strategy is implemented as a specific assets in order to reduce economic contestability (product differentiation and brand loyalty).

Airport must produce some compromises with their social stakeholder in order to protect their social license to operate. Therefore, airports have anticipated and elaborated environmental strategies in order to reduce social contestation that could curb their future development.

- if airlines are more concerned by the energy efficiency issues, it is for three major reasons:
 - there exists some complementarities between economic competition and reduction of energy consumption, EES is a way to increase the cost competitiveness of their activities.
 - Being efficient is perceived as a performance indicator and a way to enhance quality of their products. This environmental differentiation is also a way to reduce the economic contestability of their activities
 - There is a risk of a generalized social criticism upon the environmental impact of airlines activities (whereas airports are more criticized for local environmental issues). To avoid the intensification of these risks, airlines must adapt their economical strategies, thus showing that they are still legitimate to operate.

Thank You !

Stakeholders	Objectives of Partneship
Airport	Share best Practices and adopt a common policy Increase operational coordinations Avoid stringent regulations
Airline	Share best Practices and adopt a common policy Information on the economic impacts of Climate Change Develop Industrial Partneship