Economic theory and electrical public utilities organization in the first part of the twentieth century: French and US experiences

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- The purpose of this communication is to highlight the role of economists in the building of the regulatory framework of the electricity sector.

- Both in the USA at the beginning of the 20th century and in France after the 2nd World War, they have a significant influence on the regulation's construction not only by their theoretical works but also by their direct commitment.

- The interests of the study
  - Actual liberalization process relies partially on economic theories, which criticize the prescriptions of these works
  - Why and how economists have intervened, last century, in the institutional debates ?

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- **The electricity sector is characterized by market failures (natural monopoly, public good, externalities)**
- **Market process does not allow to spontaneously obtain adequate price signals and then optimal investment decisions.**

- **A public intervention appears as necessary to correct such failures : 2 different responses in USA in 1907 and in France from 1946**
  - **USA : the legacy of John Rodger Commons (the Wisconsin Public Utilities Regulation).**
  - **France : the Allaisian theoretical framework (EDF economic model).**

The US Model **Regulated private firms**	**The French Model** **Nationalized monopoly**
Institutional economics as theoretical framework	The theory of the social return of Maurice Allais (Nobel Price) upgraded by the works realized in house on investment choice methodology or optimal pricing with constraints
Legacies of the US pragmatism (Peirce, Dewey) and of the German Historical School	Neoclassical tradition in economics
Public interest is the product of a compromise obtained between the different stakeholders	The general interest is defined by economic models, which define optimal and unchallengeable choices
Commission of Regulation	Public firm as regulator
Reasonable compromise between social interests	An omniscient, omnipotent and benevolent state engineer who replaces the market invisible hand for maximizing the collective economic welfare

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Structure of the presentation

I – The institutional economics tradition and the US regulation's model of public utilities.

II – French engineer-economists and the EDF Model

III – Lessons from history for current European regulatory debates

I – The US Case

- An underlying economic theory influenced by pragmatism and by the German Historical School
- Institutions are the products of social interactions but not the fruits of a conscious design
- It is impossible to define and to implement an optimal institutional framework
- Institutions derive from a selection process driven by the resolution of conflicts of interests and especially by the settlement of legal litigations
- Public intervention must rely on a Checks and Balances approach, which favors the emergence of reasonable compromises e.g. of efficient institutions
- A specific legal and historical context in the USA at the end of the 19th century
    - Social gospel movement (against the laisser-faire)
    - Legal realism and Sociological jurisprudence

- How making the US Common Law less conservative in economic matters ?
  - The Supreme Court had a very restrictive approach of the due process of law principle since1868 (protection of property rights and contracting freedom)
  - The decisions must be coherent with social experience and not with the principles derived from the rule of precedent
  - The legal inflexion by the Supreme Court
    - Public utility principle (Munn v. Illinois – 1877)
    - Regulation of tariffs (Minnesota Rate – 1890)
    - Essential facility doctrine (Terminal Railroad – 1912)
  - The intervention of economists in the building of regulation

How Wisconsin Regulates her Public-Utilities ?

The Wisconsin Public Utilities Law

Commons – American Economic Review (1907 and 1910)

- 1907 : the new governor of Wisconsin decided to extent the regulation of railways (1905) to the other public utilities
- Intervention of Commons
- Constitution of several regulation commissions
- The Commission monitors the reasonability of the tariffs and the profitability of the firms
- No direct intervention for setting tariffs or investment choices
- A checks and balances approach
- A search for a reasonable consensus, which must be readjusted according to the circumstances (a transitory equilibrium between social interests)
- A method inspired by the prescriptions of Commons for the industrial relations

- The situation of the US electricity sector at the beginning of the last century
  - A regime of non exclusive concession contracts since 1885
  - 5 firms in Duluth (1885)….45 in Chicago (1907)
  - The commission of regulation model allows having exclusive concessions, monitoring tariffs and profitability
- Is the regulation made for the competitors ?
  - The public choice hypothesis : The regulation protects firms against competitors, no commercial risk, cost reimbursement plus fee, no risk of entry
  - But a general movement in the USA (New York and Wisconsin in 1907) : the abuses of market powers by firms to the detriment of consumers
  - A common insight of the Firms in the USA (NELA, 1898) and in France (Detoeuf, 1936), the free competition is compromised… especially in the electricity sector

II – The EDF Model and the Allaisian Theory

- Economic theory is not the explicative variable of the nationalization
- It was the inability of the private firms to realize the investments needed for the Reconstruction
- Economic theory is the shield used by the firm in order to protect its decisions on tariffs and investments against political interferences
- A theoretical basis : The theory of social return of Maurice Allais (1942)
- Some bridges from theory to practice
  - The arrival of Marcel Boiteux in EDF 1949 (Chief economist in 1958, Director in 1967 and lastly CEO)
  - The seminar of Econometrics of the CNRS

- The Allaisian model : some insights
    - Two economic sectors : differentiated / not differentiated
    - A public intervention for the second in order to implement an optimal marginal cost pricing
  - The State must nationalize, subsidize or set Ramsey-Boiteux tariffs in order to give price signal based on marginal cost of development (and not short term ones – cf *le paradoxe du voyageur de Calais*)
  - Tariffs must provide incentives to consumers for orientating the consumption in the sense of the collective interest

- The upgrading of the Allaisian model by the management of EDF: the investment-tariff loop
  - The tariff model is, mathematically speaking, the dual of the investment choice one
  - The tariff is based on the long term development cost which depends on the optimal generation park (and by the way the current investment decisions)
  - Two convergent dynamics within the firm in order to comfort theoretically its choices against political controversies
    - Boiteux : tarifs jaune et vert (the marginal cost pricing in order to avoid social or local considerations)
    - Massé, Gaspard et Gibrat : la note bleue (a rational criterion for choosing between generation technologies)

- Why a rational criterion had to be discovered?
  - A public debates on the technologies of generation privileged by EDF
  - La note bleue is a method of comparison between the different technologies on the basis of a benchmark (a thermal power plant).
  - It confronts the discounted net cash flows on the whole economic life of the generation unit.
  - The selected discount rate (4%) favors long term considerations and by the way hydroelectricity…
  - Economic theory as a path to managerial independence : the “contractualisation“(1968)
  - Some risks induced by the cost reimbursement scheme and by the internal coherence of the model (tariff-investment loop)
    - Averch-Johnson effect
    - Performative hypothesis (or framing effect) : the price signal depends on the firm decisions on investments

III – Perspectives

- The institutional legacy
  - The European Commission has a more comprehensive regulation for new capacities, long term contracting or new interconnection infrastructures (see its proposals of September 2007)
  - No mandatory unbundling, no obligation to open access granted to the thirds
  - In this case the respect of property rights is considered as necessary to preserve investment incentives

- The validity of the Allaisian model : a public intervention is still necessary in liberalized electricity markets
  - Renewable energies
  - Generation adequacy procedures

- The limits of the Allaisian model
  - Incentives theory / Government Failures
  - New Network Economics / Unbundling
  - The need for regulation (re-regulation, not de-regulation)

- The actuality of the institutional framework
  - The place of the stakeholders in the decision process
  - The institutions' building dynamic : searching for a reasonable compromise between social interests (by consensus or by legal litigations)
  - The role of case law in the construction of the new regulatory framework of electricity markets : the legal-economic nexus of Commons.