Coloquio

ENERGÍA, REFORMAS INSTITUCIONALES Y DESARROLLO EN AMÉRICA LATINA

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LISTA Y RESÚMENES DE TRABAJOS PRESENTADOS
Résumés-Abstracts

Sesión A. La energía en la globalización: ¿cambio tecnológico versus recursos naturales?

Jean-Marie Martin-Amouroux (Université PMF de Grenoble), « La restructuration des industries de l'énergie dans la mondialisation économique ».

« The energy industries restructuring amid globalization »

Thirty years ago, many people thought the world would run short of oil before the end of the century. In 2003, oil, coal and natural gas are abundant and relatively cheap. Price mechanisms alone don't fully explain this change. Following Joseph Schumpeter's advice, we attempt to understand how global capitalism has transformed the structure of energy industries. For oil, coal, natural gas, electricity and end-use energy industries, we find very similar sequences: industrial reorganization, technological change, market internationalization and new industrial organizations. These structural transformations have been generated by strong growth in energy consumption during the sixties. But this economic cause wouldn't be sufficient without two great institutional ruptures: the vertical de-integration of oil companies brought on by the independence of producer countries; the breakdown in nuclear technology and the liberalization of the electric industries due to ecological concerns. Finally, the process has been fostered by economic globalization.

Jesús Mora Contreras (Departamento de Economía, Universidad de Los Andes, Mérida, Venezuela), "Recursos naturales y desarrollo: El caso venezolano. Revisión de la literatura".

"Natural ressources and development: the Venezuelan case"

One of the most surprising aspects of the elite of the Venezuelan contemporary society is: the better he knows the abundant endowment of natural resources, e.g., oil and gas, the worst are the economic and political problems that arise to take advantage of them! On the contrary, when in the past, the elite considered the resources depletable: the country showed high rates of economic growth. These two periods of the recent Venezuelan economic development synthesize perfectly the two theoretical visions that sustain academic, political and institutionally, that the endowment of natural resources is or a blessing or a curse. This paper intends to show, reviewing the literature that both visions are correct, but also both visions suffer of a common defect. They put their emphasis in a mono-causal explanation (the abundance or the shortage of resources), when multi-causal explanation seems to be much more useful to explain how the resources affect the development of the nations.

Sesión B. Libre acceso a los recursos y privatización: ¿vía única de modernización de las industrias petroleras?

Carlos Guillermo Álvarez (Universidad Nacional de Colombia, Sede Medellín), "La situación internacional y el petróleo en Colombia".

> "The internacional situation and the Colombian oil"
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> This paper reviews the core of the Colombian Natural Resources Policy during the past decade; the work takes some basic elements from prior works of the author in order to insist on the main qualities of the Colombian energy policies: the privatization of the national energetic rents.
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> After a relatively short introduction about certain economic fundamentals, a reflection about geopolitics and world oil economics is made in order to design a framework to examine the Colombian policy. The strategic condition and it exhaustibility of energy will be underlined mainly in face of shortness supply in the next few years. This condition will be strongest for the world big consumers who happen to be the principal military powers, fighting over the major oil sources.
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> The article also underlines the meaning of the big physical variables which command the international geopolitics and suggests that the unbalance between demand and supply is likely to be "solved" through a violent redistribution of the known oil reserves. It will be summarized some actions about oil policy taken by the past Colombian administrations, to conclude the antipatriotic character of those measures.
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> As a conclusion it will be emphasized a combined criteria policy (economical, ecological and political) for the resources policy in opposition to the short economical framework dominant today

Jean-Pierre Favennec (Directeur du Centre Economie et Gestion, Institut français du pétrole), « Réorganisation des industries pétrolières et gazières. Impacts économiques et géopolitiques »

Pierre Noël (Centre Français sur les Etats-Unis, Institut Français des Relations Internationales), « The United States and Latin American Oil. A Case Study in Normative International Economic Policy ».

Angel de la Vega Navarro (Facultad Economía – UNAM), "La industria petrolera mexicana en el marco de las tendencias globales del cambio institucional, organizacional y tecnológico"

> "The Mexican oil industry in the global framework of institutional, organizational and technological trends"
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> In the international oil industry new rules are coming into play, particularly in E&P, and technical progress is changing the way things are done. There are also new types of interaction between technologies and the forms of industrial organization that seek to present a *"single best way"*: free access to resources and the instauration of a free market, openings to private capital and privatization of state oil companies.
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> Mexico has maintained its oil industry closed to foreign investment as a result of historical and institutional factors. If the industry remains closed, will it be able to keep up with technical progress, continue to play a role in the international oil

market and efficiently supply an economy which is becoming more integrated into global markets? In facing these challenges, both from the point of view of property rights and of the effects of technical changes, it has to be taken into account that oil –and everything related to it, regardless of its meaning in economic and energy terms– is still a key element of social and institutional cohesion in Mexico. It is against this background that the country's energy industry has to reorganize and adapt.

As the environment becomes more competitive, it is conceivable that there will soon be three main players in the Mexican oil industry: PEMEX, service companies and the international oil companies. It is essential, in this light, to clarify the new regulatory framework in which PEMEX will work, because many things will obviously change from the legal, fiscal and regulatory points of view. Rather than drastic changes, gradual ones are more likely to take place, separating clearly what has to do with a more efficient management of PEMEX –a priority task which has to do with the nature of its relationship with the state– and with openings to foreign investment. If the industry is opened up without simultaneous, profound changes occurring in PEMEX's relationship with the state, this could be very damaging to the national oil company.

Sesión C. ¿Qué nuevas estructuras de gobierno para empresas petroleras eficaces ?

Jaime Aboites Aguilar (UAM Xochimilco), Tomás Beltrán Oviedo (IMP), Patricia Pérez Romo (IMP), Manuel Soria López (UAM Xochimilco), "Transformaciones de las relaciones entre Pemex y el IMP. La experiencia de innovación tecnológica de los catalizadores".

An institucional inflection – that took place at the end of the nineties, has reestructured the framework of the relationships between the Federal Government, the Instituto Mexicano del Petróleo (IMP) and Petróleos Mexicanos. It implied a change in the way of conceiving the research activities and inventive capacity as well as the commercialization of catalyst innovations. The context of this transformation is the North American Free Trade Agreement (NAFTA).

The aim of this essay is to analyse how the changing institucional factors of the bond between IMP and Federal Government have influenced or modified the techonological relationship –organized to produce fuel refining catalysts, between PEMEX Refining and the IMP.

Federal Government has promoted more public functions, a relative fiscal autonomy and new forms of government in the organization of the IMP. PEMEX Refining has historically been the main source of financing for catalyst research and developement at IMP. But, a period of institucional transition has innitiated and public research organizations are now being set up with an orientation towards the market. Lately, PEMEX Refining has diminished not only the financing but also the demand of catalysts designed and developed by IMP.

Juan Carlos Boué (Oxford Institute for Energy Studies), "¿Eficiencia o ingreso fiscal? el verdadero desafío para las grandes empresas petroleras estatales".

This paper sets out to quantify the key factors that set national oil companies (NOCs) from large oil exporting countries apart from private oil companies, in

terms of resource endowment, production economics and revenue generation capability. It goes on to identify what are the relevant criteria for assessing the performance of NOCs: fiscal or entrepreneurial. It concludes that private oil companies cannot compete with NOCs in generating tax revenues for large oil exporting countries. Although the slack in operations of many NOCs is very high, noticeable improvements are possible with even modest efforts. In contrast, the taxation faced by NOCs is so high that it is inconceivable that any private party would accept to pay comparable rates, meaning that changes in the institutional framework in countries like Mexico or Saudi Arabia will inevitably lead to lower fiscal revenue per barrel produced. So although huge sums of money are dissipated by the inefficient operations of NOCs, these sums are much smaller than those that oil exporting countries stand to lose if they scrap their NOCS in order to adopt flexible and investor friendly fiscal regimes (if the ratio of fiscal take to gross income in Mexico fell by only 4 percentage points, the fiscal loss would be greater than the total losses declared by PEMEX Refining). Moreover, it has been empirically proven that even if private investment leads to a higher short–term output, governments will be unable to compensate for the lower per barrel taxation because production increases by a large producer elicits a similar response from other producers that affects the international price of oil very negatively.

André Tosi Furtado (Department of Science and Technology Policy, Institute of Geosciences-UNICAMP), "Institutional changes and innovation in the Brazilian petroleum industry".

The institutional change that has taken place in the legislation regarding petroleum, which has brought Petrobras' position as a monopoly to an end, has also brought with it important connotations in the dynamics of the sectoral system of Brazilian innovation in the petroleum industry. During the phase of monopoly (Phase I), the institutional set-up guaranteed that a certain convergence would be reached among the different functions in the sectoral system of innovation, for Petrobras financed, coordinated, carried out and made use of the new knowledge. At the same time, this system had certain limiting factors, seeing as it was a network dominated by one sole player. With the breakdown of the monopoly (Phase II) the number of actors involved in this system increased, as did the problems of coordination among them. This study aims to analyze some of these problems regarding coordination, shedding more light on CTPetro, whose function is to provide funds to foster the efforts in R&D and to define and link together the strategies of the actors in the sectoral system of innovation. Evidence has pointed towards a tendency in the re-appearance of a "supply side" logic, despite governmental policies that seek to link universities/research institutes to companies.

Catherine Locatelli et Dominique Finon (EPE-LEPII (ex-IEPE),CNRS/Université de Grenoble), « Privatisation pétrolière et environnement institutionnel : l'exemple russe »

Privatisation is at the heart of the structural reforms for economies in transition. In theory, the main aim of privatisation is to change the structures of corporate governance in order to improve the efficiency of the enterprises. The adoption of formal market institutions would be sufficient to secure the new property rights. In Russia that didn't happen. The paper discusses the narrowed vision of institutional

change, without consideration of the previous environment of formal and informal institutions. It offers explanations of the "unexpected" results of the reforms in a capital-intensive natural resource industry, namely the hydrocarbons industry characterized by the opportunity of rent extraction by the exportation. It demonstrates right holders' interest for the weakness of the "rule of law". The institutional environment in which the hydrocarbons industry was privatised has created insecurity with regard to the ownership of industrial assets, for two reasons: the doubtful legitimacy of the privatisation process and the manipulation of the law on bankruptcy, which it was believed would have to ensure consolidation of ownership rights. Central government as regions question also the attribution of rights to explore and extract. The incompatibility of these institutions with the initial informal and formal institutions has led to adaptations that are strongly path-dependent, under the need to preserve a minimum of inter-industrial coherence.

Sesión D. Desregulación y privatización de las compañías eléctricas: ¿han estado los resultados a la altura de las expectativas?

O. Sarahí Ángeles Cornejo (Instituto de Investigaciones Económicas- UNAM), "Los efectos del TLCAN en los cambios de la organización de la industria eléctrica en México".

"The Effects of the NAFTA on the Mexican Electric Industry Reorganization"

The Mexican electric industry went through important changes as a consequence of signing the North American Free Trade Agreement (NAFTA) with Canada and the United States. Significantly, since August 1992, when the negotiations of the NAFTA finalized, this industry in Mexico changed its model of Vertically Integrated Monopoly to the model of "Single Buyer".

The document of the NAFTA (point 5b of the annex 602.3, chapter 6) establishes the investment opportunities in Mexico for electricity generating facilities. These facilities are classified as own-use, co-generation and independent power production (IPP). This clause specifies that companies of Canada and the US can operate, establish or acquire any type of the aforementioned electricity generating facilities. All these companies must sell their energy to CFE (the Federal Electricity Company of Mexico): the IPP companies all their production, the co-generating and own-use companies only their surplus. The CFE must purchase the energy to a company at prices and conditions previously agreed by CFE and the company. The NAFTA also establishes that the cross-border trade of energy between an IPP company located in Mexico and a public utility company on either Canadian or American territory must be negotiated between the company and CFE.

The mexican electric law was also amended on 1992 to reflect in its 3rd article the NAFTA's mechanisms by which private investors can participate in energy production. The modified law reduced Public Service because of excluded of that Service the NAFTA categories: a) generation of electricity at small scale, for own supply or for co-generation, b) generation of energy intended to be sold to CFE by independent producers, c) generation of energy intended for exportation by independent producers, co-generators or small producers, d) importation of electricity for own use by persons or corporations, and e) generation of electricity for emergency use as a result of blackouts.

The liberalization of the electrical generation sector in Mexico as stipulated in the

NAFTA violates the Mexican Constitution, however Mexican government introduced institutional changes to stimulate that liberalization, some of these changes was the reorganization of state-owned electrical companies and the ministry of energy, and the creation of the Electrical Regulatory Commission (ERC). All of these institutions have promoted the every increasing participation of foreign enterprises (i.e., the permits granted as of August 2002 represented more than half the existing electrical capacity in 2001), and try to complete the liberalization of the electric industry, following the policies proposed by international financial organizations such as the World Bank. This institution has authored a global electrical reform such as that was proposed by the Zedillo administration in 1999, and the reform proposed by the Fox administration. Actually Fox reform is a Wholesale Market Model to take away the most profitable sector of the industry from the state-own companies and hand it to multinational enterprises of electric generation, they will sell to large consumers and distribution companies.

In this paper we support the idea that the neoliberal reform introduced by the NAFTA is part of US strategy of continental energy integration, particularly the electrical industry. We discuss the big asymmetry in the electrical industry among the member countries of the NAFTA and show how this asymmetry is very much unfavorable to Mexico. Finally, we argue that if Mexico continues subordinated to the US initiative of continental energy integration, it will go exhausting its natural resources, becoming a pollution dump and handing over the electrical industry, at least the most profitable sector of this industry, to foreign electrical enterprises.

Beno Ruchansky (Instituto de Ingeniería Mecánica y Producción Industrial de la Universidad de la República, Uruguay), **Daniel Bouille** (Fundación Bariloche, Argentina), "Los sistemas eléctricos de Argentina y Uruguay: dos senderos diferentes en la búsqueda de la sustentabilidad".

"The Power Systems of Argentina and Uruguay, two different paths in the look for Sustainability" (abridged version, the entire abstract is with the paper).

The last 15 years saw deep regulatory and institutional changes within the electric systems of most Latin America and Caribbean nations, changes that were part of a general context of State reforms promoted from the start by the IMF and the multilateral credit organizations, and presented as a solution to the recurring economic crises affecting these nations. In fact, all countries in the region initiated State reform processes to a higher or lesser extent. As regards State-owned companies, particularly within the electricity sector, Argentina and Uruguay represent two opposites in the range of options adopted by the countries in the region. While Argentina privatized nearly all its State-owned companies and assigned a key role to the market, the Uruguayan State did not privatize its companies and maintained its prevailing role in the public policy decision making and implementation process. Hence, while the Argentine electricity sector experienced a radical transformation (introduction of competition, vertical and horizontal disintegration, privatization), the Uruguayan electricity sector held in essence the State monopoly on the supply of electricity.

Being aware of the significant differences existing between both nations as to the availability of natural resources, their size, and their effect on scale economies, as well as in relation to their political cultures, the authors does not bring forward

normative or even contrastive conclusions but proposes instead to contribute with elements that may help understand the causes that led the electricity sectors of both nations along such different paths, while at the same time aiming at evaluating the performance of the sectors in the light of the different sustainability dimensions (economic, social, environmental, political).

Jacinto Viqueira Landa (Facultad de Ingeniería, UNAM), « ¿Reorganización o desorganización de la industria eléctrica mexicana?

"Reorganization or disorganization of the mexican electric industry?"

In the last decade of the 20th Century, the Mexican electricity industry, that had developed in the previous thirty years as part of the state industry, faced several change intents motivated by the economic globalization process. The design was to introduce market forces and the private participation, supposedly to improve its operation and attract foreign investment for its expansion.

This work highlights the Mexican electric industry characteristics and analyses the changes introduced in the public electric service law during the term of president Carlos Salinas, brought about by the North American Free Trade Treaty.

The de-integration and privatization project of said industry put forward by president Ernesto Zedillo, that was rejected by the legislative branch, is described, and the proposal of president Vicente Fox is analyzed, pointing out its inconveniences and dangers that its approval would entail.

Finally, heeding the lessons from the failure of the deregulation of the United States´ electric systems, a possible course of action for the future development of the Mexican electric industry is presented.

Sesión E. ¿Cómo adaptar las reformas a las especificidades de cada país?

Helder Queiroz Pinto Jr. *(*Energy Group of Instituto de Economia / Universidade Federal do Rio de Janeiro*),* "Institutional Designs and Regulatory Reforms in the Energy Industries".

During the 1990s more than one hundred countries promoted institutional and structural changes in the organization of energy industries. These reforms reduced the barriers of entry and raised an impressive movement towards revision of the regulatory frameworks. The debate over energy regulation today focuses on the appropriate level for regulatory institutional designs as a consequence of the variety of regulatory functions from country to country. Notwithstanding the importance and the specificity of the juridical and institutional context of each country, the lessons from those experiences can be held as a complementary element for regulatory decision-making process in the energy sector.

In this paper we are concerned with the variety of regulatory frameworks in the energy sector. What are the principal elements to understand this variety? To what extent does an energy regulatory agency also deal with competition (or antitrust) matters? How are the governments defining competences among ministries, regulatory bodies and competition authorities?

We attempt to draw a comparative approach to deal with these key issues and to better understand the energy reforms in different countries. We consider that the set of regulatory attributions may vary according three particular issues: the institutional arrangements, the market structures and the regulatory instruments.

We propose a typology from a sample of twenty (20) energy regulatory frameworks

in order to identify different aspects that could be helpful to understand the variety of institutional designs. The last section concludes the paper.

It seems that the main problems raised from the new regulatory framework in the energy industries design are related to the convergence of network industries. Despite the variety of regulatory frameworks and types of reforms in the energy sector, it has been observed that the main difficulties are related to regulate competitive energy markets. The problems of antitrust legislation emerge as new and important issue in the agenda of specialized regulatory bodies. It requires a high degree of coordination to deal with elements inter-institutional relationship with the antitrust regulation agencies and with the Executive, Legislative and Judiciary.

Patrick Plane (Université de Clermont-Ferrand 1, France), « Les réformes économiques et institutionnelles dans les réseaux d'électricité d'Afrique de l'Ouest : une évaluation critique »,

María Teresa Sánchez Salazar, José María Casado Izquierdo, Eva Saavedra Silva, (Instituto de Geografía, UNAM), "La inversión extranjera en el sector eléctrico en México: antecedentes, características y estructura territorial".

This article analyzes the opening process to private investment (national and foreign) in the Mexican electric sector, a process that has been taking place during the last three administrations (Salinas de Gortari, Zedillo and Fox) within the structural changes agreed with IMF and in the context of globalization. We describe existing forms of private investment allowed by law (independent production, small-scale production, co-generation, self-supply, importation and exportation) and discuss their relative importance within the national electric industry and their uneven growth and territorial expansion. Other issues discussed are the technology of generation of electricity, the economic sectors involved and the nationality of foreign capital.

Gerardo Serrato Ángeles (División de Postgrado, Facultad de Ingeniería - UNAM) "Inercia institucional y reorganización industrial: el caso de la industria eléctrica en Francia y México"

Tanto en México como en Francia, la industria eléctrica se ha caracterizado por la presencia de una empresa pública en monopolio a todo lo largo del territorio nacional, por un particular interés por la noción de servicio público y un grado elevado de intervención del Estado en la administración de las empresas públicas, además de una reticencia histórica a la participación de actores privados. Si bien las actuales motivaciones de reforma son particulares a cada de uno de esos países (presiones financieras en el caso de México e imposición de una directiva europea en el caso de Francia), se constatan similitudes en la redefinición de las normas de funcionamiento en el nuevo contexto liberalizado. La premisa de no-privatización de las empresas públicas, así como la convicción de mantener una presencia fuerte del estado, afín de paliar las deficiencias de los mecanismos de mercado en materia de planificación coordinada de las inversiones, dirigen igualmente el rumbo de la reforma eléctrica en ambos países. Aunado a esto, se encuentran signos comparables de inercia institucional que determinan el alcance de dichas reformas.

En la primera parte se analizan los factores que históricamente han dado legitimidad

a las empresas públicas tanto en Francia como en México y que hoy dan forma a la evolución de la industria eléctrica en los dos países. En la segunda parte se estudian los principales aspectos que motivan la redefinición actual de la estructura organizacional e institucional en ambos países. En el caso de México se hace énfasis en la incapacidad financiera del modelo actual para hacer frente al crecimiento de la demanda futura de electricidad. En el caso francés se analiza la Directiva Europea que da origen a la reestructuración de la industria eléctrica francesa. En la tercera parte se estudia la respuesta del Gobierno francés y se exponen los principales retos tanto organizacionales como institucionales de dicha reforma. En la cuarta parte se cuestiona la fortaleza de las instituciones reguladoras mexicanas como principal reto de una reforma a la francesa en México.

Sesión F. ¿Qué incitaciones a la inversión en las industrias desreguladas?

Dominique Finon (LEPII-EPE, CNRS et Université de Grenoble), « Les incitations à l'investissement dans les industries électriques libéralisées du Nord et du Sud : La nécessité d'arrangements institutionnels adéquats »

The stake of investments is all too often underplayed in deregulation reforms focused on market rules and de-integration measures.

1/ The presentation criticises first the optimistic approach of the theory of investment incentives through market signals when it is applied to deregulated electricity industries. The greater part of the investment in base-load and peak equipment should be made profitable by income from very high price during peak and extreme peak periods. Next, there is a problem of political acceptability, as the wholesale prices may reach extremely high and often unexpected levels and the system may face risk of shortage in the period of needs of new capacities.

2/ The problem is then addressed in the context of the mature electricity industries in North countries. Given the maturity market, a number of corrective solutions of the pure market model could be envisaged to enforce the incentives to invest, but none of them is a perfect one. The main way is to focus on adaptation of market rules on the supply of power at peaks and extreme peaks by considering "capacity adequacy" as a public good (with three solutions: capacity payment, reserve obligations, centralized procurement by auctioning for peak capacity). The observation of reforms suggests also the validity of some other solutions based on a limitation of the competition by allowance for long-term contracts and vertical integration between production and supply. The Transaction Cost Theory gives a justification of the recourse to these ones. Observation suggests also another solution in opposition with the canonical approach of the competition, the regulatory tolerance for horizontal integration and smooth market power exercise, which implies a specific political culture to tolerate it.

3/ Finally the question is extended to the specific problem of developing countries characterized by irregular growth. It is argued that reforms must be designed in view of the importance of the investment stake through long-term co-ordination and reduction of investment risks. Indeed experiences of Latin American liberalised industries show that they have to include a number of competition-based imperfections and to allow ongoing exercise of market power in order to allow prices to rise above competition prices. The Single Buyer model or some variants of it appears to be a good alternative if one wishes to avoid the twists and turns of the

competition paradigm. The difficulty with this model raises from the institutional conditions to make it efficient and not overcostly.

Clarice Ferraz, Franco Romerio (Centre Universitaire d'Etude des Problèmes de l'Energie, Université de Genève), « Réorganisation des marchés, sécurité des approvisionnements et ressources hydrauliques. Comparaison de l'expérience brésilienne et norvégienne ».

This article analyses the electric security supply's problem, in particular the investment in the reserve margin and the diversification of investments in generation. It discusses the impact on security of the opening of electricity markets to competition. It examines the problems currently emerging with competition, as well as those which existed previously with monopoly. It shows that security represents a public good, contrary to electricity which is a private good. This feature requires the adoption of regulatory or incentive measures assuring an adequate investment in the reserve margin, as well as investment diversification, such as the "security supply obligations" and the "capacity requirement or payment". The demand side management's measures should also play an important role. The article includes a conceptual analysis and two case studies on Brazil and Norway. These countries allow us to illustrate and to compare the specific problems that we find in the South, on the one hand, and in the North, on the other, in the field of electric supply. Furthermore, they provide the opportunity to analyse the advantages and disadvantages of hydropower, in particular its flexibility and its climate dependence.

Jorge Islas (Centro de Investigación en Energía, UNAM), **Philippe Menanteau** (Departement d´Economie et Politique de l´Energie, LEPII-EPE, Université Pierre Mendès France), « La production distribuée d´électricité au Mexique et en Argentine : quelles sont les nouvelles perspectives associées aux réformes institutionnelles du secteur électrique ».

Historically, the electricity systems were formed from the aggregation of small scale local networks to profit from an abundant electrical demand and economies of scale in production that allow the great interconnected systems. Currently this logic seems to show certain limits from a visible exhaustion of benefits related to the size of production units, increasing difficulties to develop new electricity transmission infrastructure and a fast progression in the performance of modular production technologies under the effects of the electricity sector liberalization and the emission reduction policies of greenhouse gases. In the middle-term these factors make possible that electricity distributed generation play a very important part on the electricity supply beside the great production units. Certainly, factors that influence on the development of distributed generation technologies can change in a great way from one country to another, but it finds, however, to a different degree some constants such as the researching of a bigger reliability on electricity supply, the setting up of prevention policy on climatic change or the liberalization of electricity sector. In this paper the influence of these factors will be analyzed insisting particularly on the consequences of the electricity sector liberalization, starting from an analysis on the international experience, and afterwards examining the cases of México and Argentina.

Nicole Jestin-Fleury (Commissariat à l'Energie Atomique, France), Prise en compte du risque dans les décisions d'investissement électriques en régime dérégulé.

Sesión G. La formación de los mercados del gas natural: ¿una indispensable integración regional?

Alberto Elizalde Baltierra, (Petróleos Mexicanos, PEMEX), « Le marché nord-américain du gaz naturel: l'articulation du Mexique ».

> The idea of creating an integrated energy market in North America was born some years ago in the United States of America (US). Since the arrival of George W. Bush to the US Presidency in 2000, this idea that involves energy security matters was reinforced. Canada is today for Americans a reliable oil and natural gas supplier, and Mexico a certain source of oil. The US wishes not only to reinforce these links, but also to encourage the international electricity trade between the three countries, and natural gas with Mexico. This country is rich in terms of natural gas reserves, but strong budgetary constraints limit the domestic production. Thus, its role in the North America scene becomes uncertain. On the one hand, the Mexican Administration seeks to secure its national supply by means of domestic production and complementary imports. On the other, Bush desires that Mexico becomes for the US an important and reliable supplier of natural gas. The budgetary constraints are the key to these two divergent issues. If restrictions persist, Mexico will continue to import natural gas in order to satisfy its rising indigenous consumption. If they are relaxed, this country will turn out to be a net gas exporter for the US. The articulation of Mexico into the North American natural gas market is in all cases a central issue to be considered in the creation of an integrated energy market in the region.
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> In this work, we analyze the main elements of the articulation of Mexico into the dynamics of competition of the American and Canadian gas markets. This articulation is defined as the process that will allow to create a unique gas marketplace in North America where competition and its dynamics will be global instead local or national.

Edmar Luiz Fagundes de Almeida, Nicholas Trebat (Instituto de Economia – UFRJ), "Drivers and barriers to cross-border gas trade in the Southern Cone".

> This paper analyzes the main drivers and barriers to the expansion of the gas market in the Southern Cone. The paper shows that in addition to possessing large gas reserves and a relatively developed international transmission infrastructure, the Southern Cone countries complement one another well in terms of gas supply and demand. Brazil is a major potential importer of natural gas, while Argentina and especially Bolivia have significant potential as exporters. In addition to these factors, perhaps the most important element of the regional gas market in terms of promoting cross-border trade is the presence of large multinational oil and gas companies, equipped with the capital and the know-how needed to invest in gas integration. This factor is all the more crucial today as states in the region have lost their capacity to undertake large-scale investment projects.
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> Despite the seeming political will to take advantage of these drivers, three obstacles

stand in the way of regional gas market growth: macro-economic instability, regulatory asymmetries and poor inter-governmental coordination. Overcoming these difficulties will require not only increased coordination among public officials, but more creativity on the part of private agents through the introduction of more flexible contracts.

Edmilson Moutinho dos Santos (Graduate Energy Program – University of Sao Paulo, Brazil), "Natural Gas Pipeline Regulation in Brazil: Difficult balance between competition and market development".

The focus of this paper is Brazilian South/Southeast/Midwest gas system, which is under the influence of the large Bolivia-Brazil gas pipeline – *Gasbol*. The major assumption here is that Brazilian gas demand is growing much slower than supply capacities. Huge gas discoveries in the South Cone of South America, including countries such as Argentina, Bolivia, Peru and Brazil, created an oversupply situation. Producers must find market for their gas and Brazilian consumers seem to be the only reachable option for the moment. As a consequence, all players must get access to this market and open access regulation in existing pipelines became essential.

The expansion of high-pressure transportation facilities in Brazil has been driven mainly by political reasons, before any real demand had been proven. For example, the *Gasbol* has been operating systematically with large idle capacities, creating important short-term inefficiencies in the use of infrastructure. Regulators are expected to promote efficiency through more competition. The establishment of stronger competition by regulation is believed to reduce costs, increase short-term efficiency in the use of pipelines and expand gas demand. However, important issues can be raised regarding Brazil's gas regulation.

First, it is important to explore the difficulties related to the different levels of regulation in Brazilian gas system as well as their different regulatory goals. The Federal government regulates high-pressure facilities, while the low-and-middle-pressure distribution networks are under the control of local states' regulation. There are antagonisms between those two levels of regulatory agencies with distinct objectives and approaches towards competition and market development. The ability of middle-and-low-pressure gas distribution facilities to bring the gas to final consumers is limited and the target of expanding such downstream infrastructure seems to be in conflict with the Federal government's strategy of inciting more competition primarily in the high pressure transportation system.

Second, the conflicts between different perspectives of efficiency must also be considered. Anticipating competition in existing high-pressure transportation system, aiming to improve short-term efficiency in the use of infrastructure, in an infant gas market with low gas demand, may not incite new investments in the future, or may induce investors to build up new pipelines with smaller capacity, lowering, therefore, long-term efficiency.

Finally, the regulation towards competition has also been introduced as a mechanism to reduce the monopoly of state-owned *Petrobras* in the growing gas industry. However, this decision seems also to be in disagreement with other instruments of public policy. *Petrobras* is believed to have the role of gas developer in Brazil. It accepts interference from political forces aiming to boost the

construction of large gas projects, including *Gasbol*, regardless the lack of demand. This creates difficulties for regulation to deter dominant position from the state-owned company, who is investing in advance, where private capital would not take the risk, expanding infrastructure and waiting for the demand to catch up. At same time, regulators also have problems to prevent opportunistic behaviors from other companies trying to break into the market through the idle capacities built by *Petrobras*. Such an antagonism is again mixed up with public policy since the newcomers are international companies, global gas players, very often considered with skepticism by the government and the population, while *Petrobras* is often seen as the national champion.

This paper invites readers to analyze whether Brazil is really ready for a more competitive gas industry or should it alternatively look for other forms of market organization. The difficult balance between competition and demand/infrastructure development is a typical problem in infant industries, particularly in less developed countries. The conflicts between regulation and other instruments of public policy as well as among different levels of regulatory agencies also reflect the immaturity of the system, where the goals and roles of the agents are not clearly defined. The answer for those challenges must take into account the role expected from the state in terms of development strategy.

Sesión H. ¿Tienen todavía los Estados un papel qué jugar en materia de desarrollo energético?

João Lizardo Rodrigues Hermes de Araújo, Adilson de Oliveira (Instituto de Economia – UFRJ), "Política Energética Brasileira: Mudança de Rumo?"

"Brazilian Energy Policy: Changing Course?"

This paper compares the Brazilian Energy Policy in the last decade with that followed after the second world war. We contend that the energy policies followed since the fifties showed certain continuity and allowed the energy sector to respond with remarkable efficiency to the challenges posed by the Brazilian economy for over a quarter of century, at least until the middle seventies. We assume that, from the eighties onwards, the energy policies till then adopted lost their effectiveness. As a consequence, several impasses appeared which led administrations during the nineties to adopt radical changes in the organisation of energy industries, which were aimed at creating conditions for a profound reorientation of energy policy. The results obtained by the new course have been far inferior to those reached in the previous phase. This paper purports to identify the main explanatory factors of this outcome.

The work is structured in two sections. The first sections analyses the energy policy in the period from 1945 to 1990. In it we show that energy policy was centred on developing the supply infrastructure for oil products and electricity, aiming at fast growth of population access and geographical coverage of energy supply. This development was defined and implemented by state enterprises, which used state guarantees to leverage third party resources, supplemented by significant amounts of fiscal and quasi-fiscal resources as well as by fiscal renunciation.

The second section analyses the profound inflection in energy policy that took place in the nineties. Infrastructure development was left to market forces, and the space of state enterprises in formulating and implementing energy policy was drastically reduced. Fiscal and quasi-fiscal resources for the energy sector were eliminated, and the Treasure became a voracious demander of taxes from energy firms. These have been forced to find other

sources of funds, which have to be private given the straits of public finance. Alongside with this, both the fossil fuel and the power sectors underwent a profound restructuring and ceased to be operated by monopolies. The government further signalled the will to promote the use of natural gas, until then a source playing a very minor role in the Brazilian energy balance. The outcomes were different in the hydrocarbons and the electricity industry, partly because of distinct treatments of Petrobrás and Eletrobrás by the new policies, and partly for specific factors of each industry.

The paper ends with an analysis of prospects for the energy industries as the result of policy change as existing in October 2003, and in consequence does not discuss the new model for the power sector in detail.

Sergio Hernando Lopera Castro (Universidad Nacional de Colombia), "Es posible implementar un modelo de producción de petróleo que permita lograr una política energética sostenible?".

El objetivo de esta ponencia es mostrar que es posible implementar una explotación de petróleo que sea consecuente con una política energética sostenible[1] dado que en el proceso de extracción de petróleo, tal y como se hace hoy, se interpreta la sostenibilidad sólo desde la perspectiva de protección del medio ambiente. Sin embargo, el agotamiento de reservas no es tomado en cuenta. Esto es debido a que según la economía liberal el mercado traerá el desarrollo tecnológico necesario para la creación de sustitutos energéticos. Sin embargo, la evidencia empírica muestra que el mercado por si solo no garantiza un uso racional de los recursos agotables.

Nosotros mostramos que una política energética sostenible puede ser lograda si parte de la renta petrolera se invierte en: La sustitución de reservas de petróleo agotadas por una fuente energética renovable, el pago de los impactos causados sobre la atmósfera por gases producto de la combustión de derivados del petróleo, el pago de otros impactos ambientales diferentes de la contaminación por emisión de gases, el pago de la protección del capital natural crítico y el pago de los impactos sobre el bienestar humano.

Para lograr esto proponemos un indicador de sostenibilidad para el caso de la producción de petróleo en un yacimiento. Este indicador se inscribe en la tradición Neoclásica que propone una gestión de los recursos no renovables según los preceptos de la llamada ley de Hartwitch. Este indicador calcula la sostenibilidad como la diferencia entre el ahorro y las depreciaciones de los capitales manufacturado y natural. Nosotros consideramos cuatro tipos distintos de ahorro, un primer componente del ahorro en reservas bajo tierra un segundo en fuentes de energía renovable, un tercero en un fondo de capital y un cuarto tipo de ahorro en capital humano.

1 En el caso de recursos agotables el concepto de sostenibilidad no aplica para un recurso en particular, sino que debe pensarse la sostenibilidad en un sentido más amplio del recurso y sus substitutos. Así para el caso del petróleo sería más conveniente hablar del rol que puede jugar el petróleo en un esquema de sostenibilidad energética, tal como lo proponemos en el titulo de este trabajo.

Para calcular la depreciación del petróleo extraído, usamos el concepto de costo de uso propuesto por El serafy (1989). Para el cálculo de esta variable utilizamos la tasa de valoración del presente en vez de tasa de interés. En este sentido, el avance hacia una política energética sostenible en estos países implica invertir parte de la renta que ahorran en los fondos de capital (creados en principio para evitar la Enfermedad Holandesa) en fuentes de energía renovable que sustituyan las reservas de petróleo agotadas.

Víctor Rodríguez Padilla (División de Estudios de Posgrado, Facultad de Ingeniería, UNAM), "Política energética en los países en desarrollo ¿qué finalidades y modalidades de

la intervención de los poderes públicos en economías cada vez más liberalizadas y globalizadas?

El objetivo de este artículo es discutir las dificultades que enfrenta el Estado en los países en desarrollo para definir y poner en práctica una política energética que atienda el interés general, en el contexto del liberalismo económico. Se pone en evidencia nuevas preocupaciones, prioridades y restricciones en el uso de los instrumentos de política. Se presenta una serie de problemas ante los cuales el Estado ha vuelto a intervenir con instrumentos más directos que la regulación, sin que ello signifique necesariamente el regreso generalizado del intervensionismo.

Juan José Verdesio (Facultad de Agronomía y Medicina Veterinaria-Universidad de Brasilia), "Brasil Políticas públicas para la difusión de las Nuevas Energías Renovables en Brasil".

In this article they will be analyzed in a comparative way, the public policies that were applied in the last decades in Brazil, relative to the development of the NRE (new renewable energies), in a context of regulatory and organizational changes in the electric industries. The approach is centered in the obstacles that the public policies NRE face for their biggest diffusion, keeping in mind the specificities that present the underdeveloped countries and particularly Brazil.

The sustained development concept will be adopted in a wide sense, incorporating the dimensions politics, economic, social and environmental. The theoretical boarding has to adopt it will be that of the evolutionary currents in economy, showing the necessity to adopt public policies that considers that the technological systems are very inertial and that to change them he needs to be faced a constructive dialogue among the diverse involved actors. The single adoption of political of liberalization of markets of the electric industries, doesn't reach for the achievement of the objectives looked for in these topics tried by this article.

Until half-filled of the decade of the 90 the diverse sectors energy Brazilian were organized around public corporations monopolies that were taken charge of the necessary investments for the development of the different sub-sectors in energy industries. The strategic planning of the sector was carried out through public strongly centralized in decisions taken by the Executive Power. Based on the directives of the Executive Power of the time, as answer to first oil shock of 1973, Brazil believes the PROALCOOL in 1975 to increase its energy independence in fuels. The PROCEL, programs national of electric energy conservation (in fact program of elimination of the electricity waste) he is born in 1985. In 1995 the PRODEEM is believed to universalize the access to the electricity of the 20 millions of having excluded and that they live in remote towns. In 1995 Brazil it begins to change their model privatizing the systems of electricity distribution without defining a regulatory system neither a politics for the transfer of public property. Several publics policies are adopted even this way for: to foment the energy efficiency, a bigger diffusion of the NRE as well as the research and development in these fields.

In this article it is analyzed the results of all the public policies adopted in Brazil for the promotion and the technological research of NER's.

The conclusions are that to eliminate the present obstacles, besides the economic instruments, they have to be adopted sociological instruments that energize the dialogue and the interaction among the actors involved with the technological system. Finally in the article it is intends to suggest that changes would be necessary in the energy public policies for a development.