Production of the Knowledge and Superior Formation on the basis of scientific research inside of Programs supported for Brazilian Public Policies of R&D

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Abstract

The objective of this work is more specifically to present the dynamics in the scientific research in the scope of the Energy Industry and inside of the Productive Chain of the Natural Gas and the Biofuels, its links within the value chain and the inherent regulation and environment. For this the human resources program, PRH-ANP/04 (prh4), in progress in the IEE/USP (Energy and Electrotechnic Institute of São Paulo University) is considered. The prh4 is supported with scholarships of Scientific Initiation, Master Degree and Doctorate degree from founds of available resources managed by the ANP (National Oil, Natural Gas and Biofuels Agency) indoors of the IEE/USP and is synergic either to the PIPGE/USP (Postgraduate Energy Program o São Paulo University). Having published many papers and formed masters and doctors, it counts with a organic, academic and consolidated research basis of sustentation to coherently answer the goals of the ANP always. The program (prh4) has established its methodology of internal production and identified the ways and institutions through which it interacts with the market. Firming its performance, in the case of the scientific initiation with the EPUSP (Polytechnic School of São Paulo University) and FEA/USP (Economics and Administration Faculty), and in the case of the MSc & PhD degree with the PIPGE/USP.

1. Introduction

The research in Brazil is worked with a focus on knowledge, innovation and development of the country. In this sense there are many institutions, agencies, researches centers and government agencies involved in the promotion of research (direct and / or indirectly), even private companies (whether by agreement concession and / or no matter). Petrobras is the most important example because their investment in research and innovation, on a consistent and synergistic development of the country, occurs beyond Brazilian's law. And there are still government institutions like a CAPES , CNPq , sector funds (CTPetro , CTEnerg , etc), FAPESP (São Paulo State's agency), emphasizing that the majority of Brazilian states units have to encourage the search like this one, and others funds bound to ministries such as MCT (Ministry of Science and Technology) which financing many kind of researches. It should be emphasized that the private sector, there are the funds coupled to concession contracts, operated by agencies such as ANEEL , ANP etc.

On this framework Brazil has a specific Research and Development (R&D) Program which the target is to preparer human resources for the energy sector, that called PRH-ANP/MME/MCT , and the ANP manages these resources within the defined funds from the Oil industry. The PRH designed scholarships and a technical reserve to educational institutions, where there is a unit of the program. Currently, there are 36 units of PRH distributed in 20 Brazilian States.

It's important to explain that PRH-ANP was started when the Brazilian economic policy was main concerning a competitive market and less involvement of government as entrepreneur. In this sense the regulatory framework of the oil sector in Brazil, was established between 1996 and 1999 (such as the Petroleum Law of 1997) came to facilitate the industry in its operational aspects, ensuring the continuation of exploration and technological successes of Petrobras and increasing their capacity and autonomy of action, considering the importance of creating and promoting a

national industry suppliers, and also admit that part of the payments industry to collect the national treasury in terms of its operations and results would be dedicated to supporting endogenous research and technological development and training of specialized professionals.

Brazil, the largest producer and consumer in the region, self-sufficient in oil since 2006, presents a recent development of important operational and exploration successes, including remains of a diversified energy matrix because the country has a diversified energy supply from others sources than hydrocarbons. Should seek to use their precious natural resources (oil, gas, hydroelectric, biofuels and others) for them to add value and make the byproduct, secondary or final products, resulting in economic development and employment.

It is an ongoing challenge to tackle the issue of training of human resources and professionally appropriate to the present state and future of the industry. Provide specialized training for all levels must to be national policy. The cooperation of investors and traders from all industries, especially those involving complex technologies, particularly economic development and local environmental and social impacts of a region or country, should be maintaining throughout the process.

The government participation in the training of skilled labor-specialized should occur on a scheduled and continuously, because this action could be means the guarantee of the sustainable jobs. For it is necessary that the budget collected in the energy sector, from royalties and other oil and gas specifics taxes, is applied in this purpose, as provided in the Petroleum Law.

The basis of the Human Resources Program of the National Oil Agency (PRH-ANP) has foundation in the philosophy governing the laws and regulations of consolidated oil and gas sectors in the world. Almost ten years after its creation, items such as quality, optimization of resources and academic organization of high level reached maturity. It possible can say that the PRH is a very well established. As to the PRH, and in fact the industry has been gradually placing greater confidence in the quality of these professionals. Each of the programs and their universities (or other superior educational entities) has shown good and satisfactory results. And trough this results, we can to conclude that their get excellence in the scientific-technical, administrative efficiency and academic scope. The companies in this sector gradually trust the quality of the professionals qualified by the PRH, and its can be considered such as return and / or results to the program.

But the PRH-ANP/04 is a basis of this paper to show the specific specialty or field of research that promotes ANP. It's important to explain that when the PRH was started, in 1999, the research's focus was, and still is, the oil production chain, but until de beginning the natural gas was incorporated (as was initially assumed in Brazil as part of the oil). Later and with a well knowledge basis, it is possible that the natural gas can be established, as well it has been life itself and then works in the natural gas production chain. More recently, both by circumstances related to the development of the country, as the circumstances of global problems linked to global warming, the ANP includes biofuels (ANP is now the National Agency of Oil, Natural Gas of Biofuels).

In this sense, the specialty that is initially assumed prh4 the end uses of natural gas, and regulation is inherent, then, is set to natural gas production chain and its links to value. We should emphasize here, that the prh4 and a program geared to the beginning of the end in energy (environment and development). So now the prh4 sets as its field of expertise within the universe of ANP such as: Production Chain (and value) of Natural Gas and Biofuels and regulation inherent.

2. Issues from the research inherent to PRH

The prh4 develops its activities within the Agreement signed between the USP and ANP since 2000. This program, the prh4 in essence seeks training / training of human resources within the context of ANP to induce the training and expertise of students, Master and PhD students interested in working in the oil sector, gas and biofuels. These facts occurs trough the granting of scholarships awarded by the ANP which includes the main prh4 of managers, the COO

(Coordinator) and PV (Visiting Researcher). Emphasizing that one of the targets is to ensure (the host institution, in this case the IEE / USP) grade curriculum in their courses and disciplines with emphasis on oil and gas sector and, more recently, biofuels.

In this sense it is important to explain that until the beginning the fraction belonging to post-graduate and ME DO (master and doctorate) had complete response and the synergistic PPGE / USP (Post Graduate Program in Energy USP) also based in the IEE.

Chronologically, only since 2004, incorporating up pockets of IC (Scientific Initiation), which is when the prh4 start (or complete) the full chain of search within the USP , which has pockets of HF, and ME DO. Accordingly, having resolved the question as to PPGE OF ME and, as mentioned above, the thing is not so simple with the CI, because in fact the IC Scholarships are for graduate and there isn't graduation in IEE. Therefore, the prh4 faces the problem of having to find other units than the IEE in USP to meet this demand. Thus, to implement this arrangement that allows the ANP providing regular exchanges of research for IC, the prh4 has been enjoying a bit of the structure of PPGE, which in addition to being the IEE Inter with FEA / USP , EPUSP (POLI) and IF / USP (all 3 with graduation). If and to facilitate adherence due to the proposed prh4, the IC of ANP scholarships are only available for the graduation of the FEA and POLI today (2007 and seems to be still in 2009).

In the first instance, is a conflict inherent in the day-day of prh4, that is fundamentally linked to issues of graduation for those calls attention to these issues are seen to facilitate the IEE and optimize the management of prh4 (as well defined the agreement USP - ANP) in the scale graduation. What is not discussed in the management of such scholarships or even the administration of these grants IC ANP, as prh4 the interior of the IEE has the capacity for this (because the very same PRH-ANP provides that it is).

As an example of development in the practice of prh4 in program on human resources related to research, it is interesting to note that (for graduation), the problem is the basic situation of uncomfortable IEE / USP to make good (and better) use Resources available from the ANP (agreement through USP-ANP) to graduate from USP that has prh4. This mainly due to the IEE for graduation have not "own" distributes these resources (in the case of scholarships through and support the development of it) between the students and the FEA EPUSP. As one of the factors or requirements to implement these features is that the students involved have a good performance and final product of work on conducting research related to work at the end of regular course (graduation project, which ultimately determines the specialty that granted by the ANP prh4). Conversely, in prh4, it is understood that working with other units of the universe is good, and USP is our goal, including expanding the careers of many other USP (within the production chain and regulation of natural gas and biofuels, in the scope of energy, development and environment).

3. The performance field of prh4 (PRH-ANP/04)

In spite of global crisis off in 2008, you can still say that Brazil is currently experiencing an economic growth generated mainly due to increased exports in the last 6 years. To sustain this growth it is necessary that the country is to be able to supply the energy needs that are demanded by the industries or sectors and services. That is, there must be a policy for future planning to study ways to cheap, quality and efficient production of new energy sources and uses of energy. With increased demand and the discovery of new reserves in Brazilian territory, natural gas appears as a great new source of energy in the country, moreover, that potential is already among one of the sources that most increased in the automotive sector, also due to high prices of gasoline.

There are thousands of applications for natural gas, and other simply application could be developing, but investments in researches are necessaries. So for all this promising market to be successful it required an application of labor, preferably specialized in order that the skills most required by the industry that works with natural gas.

In Brazil, 2005 is characterized as a year in which it confirms that natural gas is here to stay, since the main link in infrastructure such as Gasbol , reaches saturation levels (25 million cubic meters per day in August of this year) of

capacity. Where the producer gas that flows in Gasbol, the new law regulating the oil (which provides 50% of taxes on production), with strong political institutional crisis, which requires the MME further. That is, strategies are necessary internal and that the round 7 of the ANP bids (for areas of oil exploration), was devoted to natural gas, that the recommendation of the CNPE (National Energy Policy Council) and government. It is interesting to note that in 2005, Petrobras realign its business plan from 2006 to 2010 (from within known as PN 2015), and apply more investment in the pipeline infrastructure, advance the commercial production of gas in the Santos Basin, and 50% of future supply of NG (about 100 million cubic meters per day in 2010) would be committed to electricity generation.

However in 2006, there were new directions in regional energy policy, Bolivia nationalized the natural gas and this means that Brazil is aware of the need for other sources of supply of this input. Showing obvious possibilities in relation to LNG (the new business plan of Petrobras in the Brazilian coast includes LNG) and gas reserves of Venezuela through a pipeline of about 8,000 kilometers up to Argentina. Another relevant factor in the Natural Gas Industry in Brazil is the Law of Gas.

The volume of gas sold in Brazil still rising compared with previous years. The distribution of the input in the national territory is gradually spreading. Thus, in the Northeast region, the distribution network grew by 65% from 2003 until December 2006 (about 1867 kilometers) in the Southeast region that concentrates the largest natural gas distribution in the State of São Paulo, has the distribution network more extensive with 10,818 kilometers (growth since 2003, 55%) in the Center-West the growth of 100.3% is aceleradíssimo in just three years, growth in the South and less noticeable around 5% in the last two years (with 1,559 km of pipelines). The distribution of NG in the short term signal about 5 thousand kilometers of distribution network to more, with: 68.4% in the Southeast, 16.9% in the Northeast, 4.9% in the Midwest, and 9.8 % in the South

Noting the Brazilian industry of natural gas (NG) in the mid 90's participation in the NG energy matrix of the country was only 3.1% of the input for 2007 exceeded 9.0%. In this sense, Brazil in 2007 accounted for a proven reserve of 365 trillion m3, a production of 49.73 million m3/dia; had a net domestic production of 29.73 million m3/day (ie production discounted after reinjection, burn, own consumption and losses in production and transport and includes own consumption of Petrobras), an import of 28.3 million m3/dia; an infrastructure for transportation of 5,488 km with transmission capacity of 71 , 5 million m3/dia, and sales in distributing natural gas to 41.5 million m3/dia, 80% in the markets of industrial and electric generation.

2008 may be recognized as peculiar year for the natural gas in Brazil, since despite the escalation of global prices of oil (around to 150 U.S. $ / bbl), and in this situation we have tree most important cases like as the arrival of the first liquefied natural gas into Brazil, the Natural Gas Law and the Pre-salt discoveries. With investments that should surpass US$ 28 billion by 2012 the gas industry has become attractive business opportunity in the country. The great pre-salt discoveries are responsible to get up and raising the oil and gas industry and energy sector, such that since preliminary data indicate that the Brazilian reserves are closer to those of Saudi Arabia and Iraq.

The first LNG plant in Brazil has the capacity to store up to 129 thousand m_ of LNG and regasification 7 million m_ / day of gas and its primary focus the thermoelectric power plants. The increase in supply (for import or local production) to 134 million cubic meters in 2012 is set by the strategic plan of Petrobras to energy security.

And as already mentioned, in Brazil in 2008 is the year of consolidation of the Gas Act (passed in the Senate and House), leaving only the penalty for 2009 Presidential. The focus of the new regulatory framework is suitable for transmission capacity to the production capacity and demand. In actual law draws attention to grant the regime established for the construction and operation of pipeline transport.

The Energy Research Company (EPE) provides that in 2015 will be used daily 71.9 million cubic meters, according to EPE, this term supply and demand for gas will be fully compatible.

The concern with the limitation inherent in non-renewable resources, especially the reserves of oil, drive the search technology across the globe in search of the efficient, economic and sustainable development of renewable energy sources and biofuels demonstrated experience involving technical and economic feasibility of its use. In Brazil, Law No. 11097 of 2005 sets out the biofuel as a fuel derived from renewable biomass for use in internal combustion engines or as rules for other types of power generation, which can partially or fully replace fossil fuels.

The Brazilian experience in biofuels can be classified as alternatives to fossil fuels. Brazil is the owner if the accumulated knowledge in this important area, especially in the use of ethanol from sugar cane as automotive fuel. This along with the Brazilian energy matrix is one of the cleanest in the world and, currently, over 45% of all energy consumed in Brazil comes from renewable sources. This is beneficial in the overall context of energy security and environment in the global decision to seek alternatives to fossil fuels and implement initiatives to reduce their emissions of GEE.

Another thrust of technological nature and diversification of the energy matrix is given as the government's decision to introduce biodiesel in the energy matrix, mainly for transport. Renewable fuel produced from oil such as soybean, castor, sunflower and palm oil, biodiesel has been approved for commercial use in Brazil in December 2004, initially to the 2% mixture of diesel oil.

Currently, the ANP is beyond the oil, so the acronym now means the National Agency of Oil, Natural Gas and Biofuels. In this sense, including the need to improve adherence prh4 with the host entity (the IEE / USP working with energy as a whole), it introduces the field of biofuels as a focus of expertise prh4. This is formally established, as already mentioned, the main area of expertise prh4 (PRH-ANP/04) is the supply chain and value of natural gas and biofuels and regulation inherent. With everything we conclude that the ANP also seeks to meet demand for skilled professionals in these areas through its 36 PRHs.

4. Characterization of prh4 as a Consolidate Program

In Brazil the Human Resources Program of ANP for Oil and Gas Sector, was developed with a partner program by de Ministers of Energy and Mines (MME) and Science and Technology (MCT). The program was launched at 3/15/1999, when it pass to integrated the National Plan of Science and Technology for Petroleum and Natural Gas (CTPetro), to finance by royalties of the oil Sector. Therefore the ANP, make available scholarships for the 36 PRH actually running in Brazil, because there is a demand by specialized professionals of oil and gas sector in the Hole Country. The duration of these scholarships is 24 months for Graduation and Master Degrees. For Doctor Degrees the limit of term is 48 months. The scholarships for Coordination and Visitor Researcher also have the limit of 48 months (be able to extend). The Objectives of the coordination scholarship are: improve the research by human resources demand on specialization area of program or the class and for pull-in ex-scholarships on Labor economics. The scholarships for Visitor Researcher wants to stimulate the new technologies researches in Oil and Gas Sector, for identify the corrections needs of curriculums or new opportunities for training for human resources to sector.

All financial resources of PRH-ANP as above mentioned, are originate by installment of oil royalties destined to Minister of Science and Technology - MCT, according to the article 49 of Law No 9478 of 1997 august. The corresponding installment of mention royalties is transfer, like the determination of Act No 2.851 of 1998 November changed for Act No 3.318 of 1999 December, to National Fund of Scientific and Technology Development - FNDCT - Under the management of Studies and Projects Financier - FINEP, established with Executive Secretary, and applied by agreement of General Guidelines and Pluriannual Investment Plan of National Program Plan for Science and Technology Oil and Natural Gas Sector - CTPETRO. Financial Resources was send from CTPETRO/FINEP to ANP by agreement established between the parts.

To fix the specialty of one those PRH-ANP, like the prh4 must be also mention above, indicate what means about it. Then prh4 (PRH_ANP/04) means: Human Resources Program of National Oil, Natural Gas and Biofuels Agency

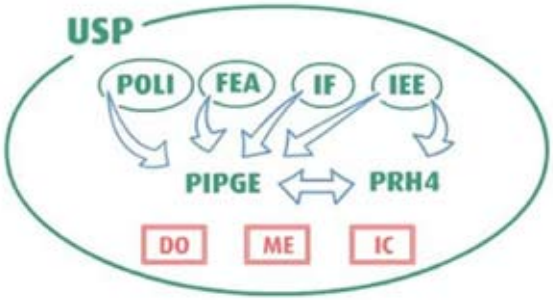
number 4, acronyms are used, like PRH-ANP/04 (prh4). The entity prh4 is developed joint with the Energy Post-graduate Program of University of São Paulo (PPGE/USP known as PIPGE/USP until 2008) it has as Management Unity with all prerogatives the Eletrotechnic and Energy Institute of USP. All of this occurs inside the USP the major and extremely comprehensive institution in the Brazil and Latin-American.

There must to be clear that PPGE/USP has had strongly relationship with: EPUSP (Politechnic School of University of São Paulo) also know as POLI, and FEA (Faculty of Administration and Economics of USP) and the IF (Physics Institute of USP). All of this must be seen on Figure 1.

The fundamentals of prh4 are: Analyze, evaluate and structure works under the intrinsic, qualitative and quantitative aspects of Productive Chain and the regulation of Natural Gas and Biofuels.

The main targets of prh4 are: (1) prh4 looking for the engagement of its researches' activities inside de oil industry as a hole, focusing Natural Gas Industry; (2) prh4 main goal is the productive chain of natural gas and biofuels, including its regulation; (3) prh4 researches issues seeking to provide means in order to use Rational and Strategic Natural Gas and Biofuels (as energy and non-energy).

Figure1.Schematic Diagram from Performance of prh4



The major fields for research and Knowledge of prh4 are characterizer such that: (1) Energy Economics / Regulation - to analyze the energy economics and production, transport & distribution of Natural Gas and Biofuels regulation; (2) Infrastructure / Development – This issue study the development of the expansion of reserves, transportation and distribution of Natural Gas and Biofuels; (3) Natural Gas / Biofuels – Related to the use of Natural Gas and Biofuels as Primary Energy, Secondary Energy End-uses and Raw Material; (4) Environment and Energy – To scientific and applied research of energy and environment, including natural gas and biofuels production chain life cycle.

Nonetheless, as part of some characteristics of prh4 claim to the project development of research projects with the scholarships researches on program. Some of these projects are: (1) New energy regional planning tools looking for the Sustainable Development (Financed by FAPESP); (2) Modeling of systemic, sustainable and viable uses of Bolivian Natural Gas including the use on Brazil (Financed by FAPESP); (3) Professional Skills Upgrades on these themes: Water Heating - Electric Systems vs. Natural Gas on Residential Buildings (Financed by CSPE/ Comgás); (4) The Petrobras action on thermoelectric sector for energy production on Natural Gas in Brazil around the years 1995 - 2005, Balance and Perspectives (Financed by Petrobras); (5) Development of Energy Studies and upgrade of Natural Gas uses and Renewable energy on Energy Matrix of Rio Grande do Norte State(Financed by Petrobras); (6)) Agreement with USP to create a Post Graduate Program(USP/UMSS)

5. Final Considerations and Conclusions

In almost 10 year activity, prh4 consolidates the scope of skilling researches (graduate and postgraduate) through the agreement between USP-ANP. However, being IEE responsibility and synergic to the PPGE (former PIPGE), that is inside of the universe of the energy and development, provide and with emphasis in strategical analyses that it subsidizes the policies (public and private) capable to promote the inclusion of natural gas and biofuels sustainability

to increment both in the Brazilian matrix energy and the Brazilian production system.

As for the focus of the program performance, this core essentially is in the most including areas of: Oil, Gas Natural and Biofuels Regulation & Policy; and, Natural Gas and Biofuels Uses. In this way, the range of prh4 is demarcated with the formal inclusion of the biofuels, however with the same graduate degrees and specializations in progress. In the PPGE (former PIPGE) in the case of the post-graduation, and, the FEA and the EPUSP in the case of the under-graduation.

But to make it explicit clearly, it is good to know that the qualifications what characterize the profile of the formed professionals in prh4 unit place in the context of the productive chain and inherent regulation of the natural gas and the biofuels. This profile aims the insertion in the market with knowledge of the energy problematic and the capacity to take care of the Oil, the Natural Gas and the Biofuels as strategy resources, energy or non-energy, for the socio-economic and sustainable development.

More that above mentioned, not only the industry of natural gas and biofuels, which is dedicated to the conquest and development of its markets, can benefit from the professionals trained by prh4, but all the socioeconomic activity that needs of staff with the judicious use of natural resources.

The employability, especially in relation to ex-masters degree and ex-doctorate degree graduates from the start of the ANP program of scholarships, are developing activities in the professional market, research and / or academic, acceding to the proposed formation of prh4.

Another aspect which deserves reference is the amount of projects approved relevant to the proposals of prh4, that contributing to a research environment complimentary to researchers activities.

With the new scholarships each year, the prh4 can keep and / or enlarge the conditions of strictly complying with the purpose of PRH-ANP to induce the training and expertise of students, Master and doctoral students, interested in working in the sector of Oil and Gas and more recently of biofuels, specifically with regard to tasks of prh4, basic for the proposals of studies relevant to the production chain of Natural Gas and Biofuels and its inherent regulation.

The Natural Gas in the State of São Paulo either for the consolidation of the Bolivia-Brazil pipeline either for the inclusion of the reserves of the Santos Basin and the Pre-Salt, requires an addressed effort on strategic analysis to support the determination of policies able to promoting the sustainable inclusion (that means efficient, rational and environmentally correct use in the whole production chain) of natural gas and biofuels in the energy matrix and in the Brazilian productive system.

In the next years the energy market will be expanding and should provide great opportunities for professionals with good basic education and several degrees of expertise. Some of the skills that characterize the professional profile of the desired area of oil and gas, especially in the context of the production chain of natural gas and biofuels (like established by prh4), among others are defined as follows: Wide knowledge of sector legislation and regulation of concession agrements; Knowledge and ease of relationships with professionals working in the energy area; Clarity on the concepts of market regulation and the utilities; Ability to negotiate with the sector entities Ability to define strategies with long-term vision; Knowledge of technical and financial solutions of the projects, of the pricing structure and sector taxation and of the mechanisms of product pricing; Knowledge of production, transport and distribution costs; Knowledge of the concepts of network energy (natural gas and electricity); Knowledge of the logistics of natural gas transportation; Knowledge of techniques and technologies of CNG and LNG (virtual pipeline); Knowledge of the production chain of natural gas and its commercial application; Knowledge in techniques and technologies for natural gas processing (and GTL GTM); Knowledge of technologies for biofuels processing; Knowledge of the logistics of transport biofuels; and Knowledge of the technologies for exploitation of energy resources for rational and sustainable use.

The industry of natural gas and biofuels is dedicated to the market conquest and development, in this sense also demands professionals with expertise in the area of energy as a whole, with the capacity to analyze weigh against the different and several energy technologies in terms of socio-environmental and market impacts. Being the elements above mentioned, fundamentals in the looking for adherent studies corresponding to the Natural Gas and Biofuels productive chain and regulation inherent.

Acknowledgments

To the ANP (National Agency of Oil, Natural Gas and Biofuels), FINEP (Studies and Research Financier) and of the MCT (Ministry of Science and Technology) through the PRH-ANP/04 (Program of Human Resources of ANP number 4).

References

01. Petrobras - Petróleo Brasileiro S / A, is a Brazilian state, mixed economy, that operates in 27 countries in the energy sector, primarily in the areas of exploration, production, refining, marketing and transportation of oil and its derivatives in Brazil and Abroad, based in Rio de Janeiro.
02. CAPES - Higher Education Improvement Coordination. is an agency to promote the Brazilian research that works in the expansion and consolidation of post-graduation stricto sensu (master and doctorate) in all states of Brazil.
03. CNPq - National Council for Scientific and Technological Development, is an organ attached to the Ministry of Science and Technology (MCT) to stimulate research in Brazil.
04. CT-Petro - Fund of the Oil and Natural Gas Sector. Its goal is to stimulate innovation in the productive chain of the sector of oil and gas, training and qualification of human resources and development projects in partnership between businesses and universities, higher education institutions and research centers. As their source of funding: 25% of the value of the royalties that exceed 5% of the production of oil and natural gas.
05. CT-Energ - Power Sector Fund is to finance programs and projects in the area of energy, especially in the area of energy efficiency in end use. As their source of funding: 0.75% to 1% on net sales of companies for generation, transmission and distribution of electric energy.
06. FAPESP - The State of São Paulo Research Foundation, is a public institution to promote the active search in the State of São Paulo. Is joined to the Department of Higher Education of the Government of the State of São Paulo.
07. ANEEL - National Electric Energy Agency, is a special autarquic entity (Regulatory Agency), linked to the Ministry of Mines and Energy, with headquarters and jurisdiction in the Federal District, in order to regulate and supervise the production, transmission and marketing of energy electric, in accordance with the Policies and Guidelines of the Federal Government.
08. ANP - National Agency of Petroleum, Natural Gas and Biofuels, is the regulator of the activities that integrate the industry of petroleum and natural gas and biofuels in Brazil. Federal authority, linked to the Ministry of Mines and Energy, the NPA is responsible for implementing the national policy for the energy sector from oil, natural gas and biofuels, with the function to regulate, supervise and hire the economic activities of the Brazilian oil sector.
09. PRH-ANP/MME/MCT - Human Resources Program of the National Oil Natural Gas and Biofuels Agency / Ministry of Mines and Energy / Ministry of Science and Technology.
10. prh4 - Human Resources Program of the National, Oil, Natural Gas and Biofuels Agency Number 4 (formerly known by the acronym PRH_ANP/04) is a program that operates in the IEE definition of a signed agreement between the ANP and the USP and is developed cooperatively by PPGE (Energy Postgraduate Programn at the University of São Paulo).
11. In Brazil, the project about the Natural Gas Law, has been started 8 years ago, and only in end of 2008, its has been approved in the Chamber of Deputies and Senate. In this way, the Natural Gas Law could be sanctioned in this year (2009) by the President of the Brazil, Luiz Inácio Lula da Silva, and in the sequence its start to works.

The steps such as transport, processing, storage, liquefaction, regasification and commercialization of natural gas are included in this Law.

12. IEE / USP - Institute of Electrotechnic and Energy, University of São Paulo.
13. PPGE – Energy Postgraduate Program at the University of São Paulo (PPGE / USP).
14. USP - University of São Paulo.
15. FEA / USP - Faculty of Economics and Administration, University of São Paulo.
16. EPUSP - Polytechnic School of São Paulo University (also known as polytechnic and POLI-USP).
17. IF / USP - Institute of Physics of USP
18. Gasbol: Pipeline between Bolivia and Brazil, which transportation capacity is 34m3/d and 1500 km long.