LUND UNIVERSITY INTERNATIONAL MASTER'S PROGRAMME IN ENVIRONMENTAL STUDIES AND SUSTAINABILITY SCIENCE

The Camisea gas Project in the Peruvian Amazon

The promises and perils of hydrocarbon exploitation

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1 Introduction

1.1 Problem definition

In 1990, the Peruvian government organized the National System of Natural Protected Areas –(SINAMPE), followed in 1997 by the Law of Natural Reserve Areas. Together, these organized existing and newly created Natural Protected Areas – (NPA) in 10 categories, based on levels of protection and conditions for natural resources use[1] (Ministry of the Environment – MINAM, 2009: 16-18). In the Peruvian Amazon, there are 34 Natural Protected Areas - NPA, totalling 15 million hectares, nearly 20 percent of the region. (Benavides M., 2009: pg 2-3).

The government's conservation initiatives have often been in conflict with the landholdings of indigenous groups, today occupying 13.4 million hectares,17% of the Peruvian Amazon (IBC, 2009:6). Sixty percent of this territory is insecure because it is only granted as "Session of use" and they can revert to the State (Servindi, 2009). Additionally, the area actually needed for indigenous peoples would be about 24 million hectares, if it is taken into account proposed territorial reserves for Isolated peoples, expansion of territories of titled native communities and those waiting for legal recognition, and riverside mixed ethnicity groups composed by indigenous and mestizo populations (ibid, 2009).

In contrast, the area assigned to hydrocarbon exploration and exploitation in the Amazon, represented 41 percent of the Peruvian Amazon. If considering Perupetro's proposed contracts for the bidding round 2010, this rises to cover about 72 percent[2] of the region, See Figure (Finer et al, 2010: pg4 ; IBC, 2009:pg 6). The number of contracts for oil and gas exploitation increased dramatically between 2005 and 2009, peaking in this latter year with 52 active concessions (Finer et al, 2010; pg 4). At the moment, most part of the projects are still in exploration phase. Seven are in exploitation phase, among them the Camisea Gas project.

This rapidly growing oil and gas conssesioned area, extend over 17% of natural protected areas , 55% of the titled indigenous land, more than half of the territories of natives communities waiting for tittles, and more than 60% of the proposed land for indigenous peoples in voluntary isolation (Finer et al, 2010: pg 7 ; IBC, 2010). Additionally, hydrocarbon concessions compromises more than 80% of the Abanico del Pastaza wetlands complex, considered of international importance within the Ramsar Convention for wetlands conservation (Finer et al, 2010: pg 7).

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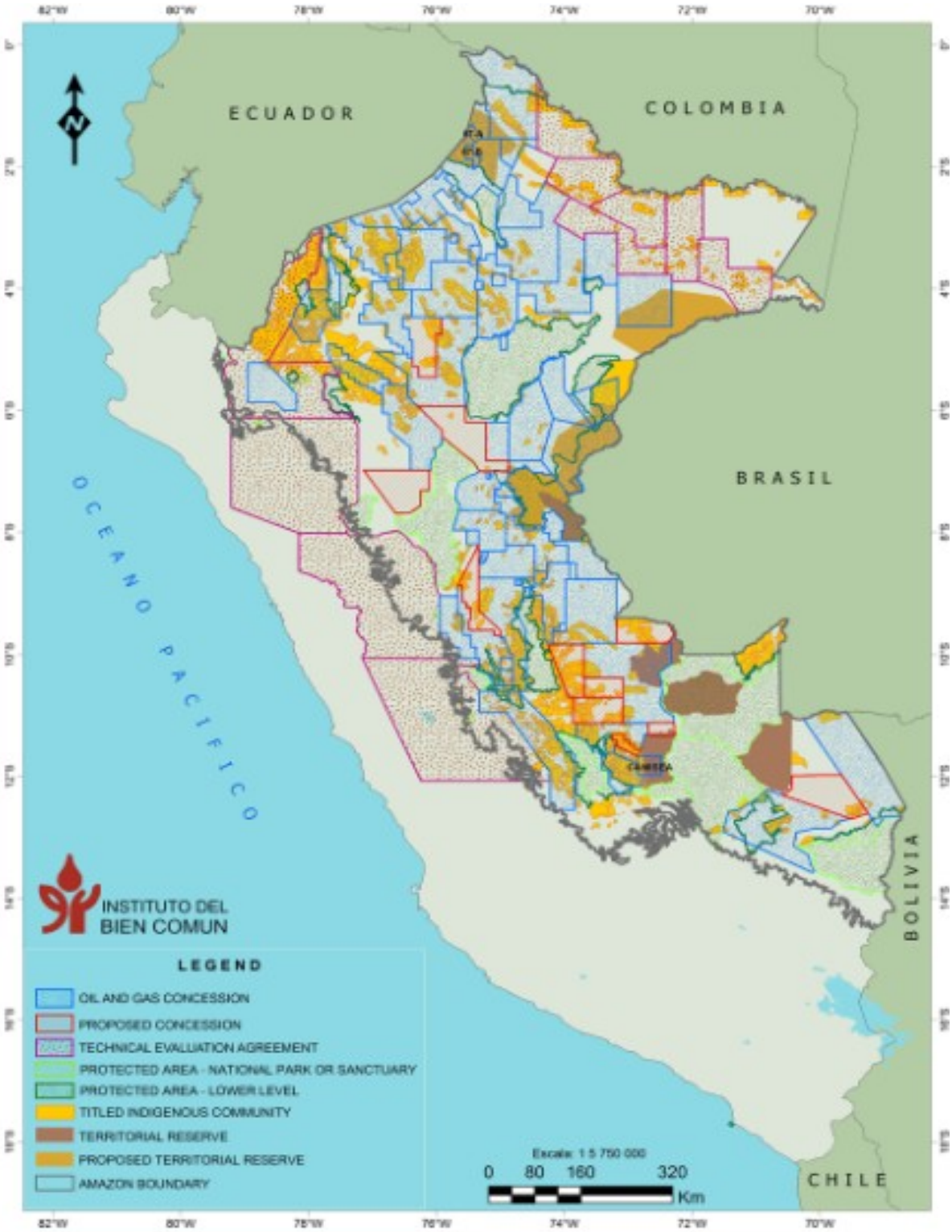
[1] It established as well the basis for private and regional protected areas. Currently, there are at national level 64 NPA (administrated by SINANPE), 16 private and 5 regional protected areas (Ministry of the Environment – MINAM, 2009: pg. 16-18)

[2] "Concessions plus technical evaluation agreements and proposedconcessions" (Finer et al, 2010; IBC, 2009:pg 6)

Figure 1: Oil and gas Conssession in the Peruvian Amazon, NPA and indigenous territories (IBC/SICNA, 2009)



1.1.1 Purpose and aim

The initiative of the state to actively promote and support hydrocarbon activities, raises questions related to what extend the outcomes and implications of these projects could be considered of national benefit, specially taking into account they overlap sensitive areas, in terms of biological and cultural diversity, in the Amazon. These study will explore specifically issues related to the distribution of risks and benefits with an geographical spatial emphasis, therefore among the regions and social groups affected, in order to visualize otherwise unnoticed tensions and inequalities between them.

I will look closer to the effects and process of Camisea Gas project, focussing on distributional issues of this specific gas exploitation project, in order to provide a richer understanding of the dynamics of the socio-enviornmental systems and political interventions. Consequently, I will draw implications and insights that are useful to make relevant connections at higher levels of analysis.

1.1.2 Research questions

This research focuses on one main research questions, suported by three sub-research questions:

Main research questions:

- How the risks and benefits have been distributed, in economic and socio-ecological terms in Camisea gas project among regions and social grousp involved? How the state policies in the sector has organize these distribution?

- How hydrocarbon exploration projects, such Camisea, can distribute risks and benefits among the regions and groups of actors?

Sub-research questions:

- To what extend the role of the state in Camisea Gas project ilustrates te Neoliberaliation?
- What are the contradiction between the discourse of camisea and the material reality of the project?
- How the internal dynamics of the local economies has been affected by Camisea?

2 Background

2.1 Extractivism & Neoliberal reforms

From colonial times, Latin America has provided the global economy with primary products and remained trapped in the resource periphery since then. Examples of extractivism modalities came across as early as the mid 1500 in Peru and Bolivia, with the Spanish settlements based for silver and gold extraction. This resource-based development strategy, revitalized by the Neoliberal supporters, has been rather damaging to economy, the environment and the society, and have materialized in what many regard as "the resource curse" (Murray, 1999; 128-130).

In Peru, it can be consider that neoliberal period started during the 1990s, when President Fujimori, seeking to incorporate the country in the international market, carried out political and economic restructurings under the most orthodox neoliberal principles. This measures included the opening of all economic sectors to Foreign private investment, steady long-term rate of taxation at the same level as national companies, privatization of various sectors, removal of barriers to profit repatriation, royalties among other favorable conditions to international companies(Bury, 2005:222).

Moore (2010, 390) recognizes Neoliberalism as a distinctive phase of capitalism history and indicates that like previous phases of capitalism, has redistributed wealth. Harvey (2007:22) defines Neoliberalism as a theory of political economic practices that regards human well-being as a consequence of the maximization of entrepreneurial freedoms, while the role of the state is to create and maintain such conditions.

2.2 Amazon changing patterns

The Amazon basin is an area of a vast cultural and natural wealth., it is home to rare and highly biodiverse habitats and wildlife, , abundant natural resources and complex yet fragile ecosystems, that support and allow such a richness to exist and sustain human well being (UNEP-ACTO: 2009), such a plentifulness has made the amazon very attractive to various types of resource exploitation, including myriad "booms" of intensive extraction of resources that expose its ecological cycles to a heavy burden and important changes in socio-ecological relations.

The quinine commercial trade with Europe, extracted in the eighteenth century in the Andes due to its medicinal properties, directed interest of "plant extraction" toward amazon lands. It set the basis for the following rubber commercial boom (Zarate, 2001: pg 19 -20, 35 -39). In the 1800s, the rubber trade, spurred by the industrial use of latex, opened lands before isolated from external markets with the help of steam navigation. For over 70 years, the rubber commercial boom, at different intensities reached every Amazonian country. (UNEP-ACTO: 2009: Pg 52 - 54). Indeed, extraction cycles of wood, animals, skins and oil followed during the twentieth century (Bunker 1984: pg 1237, 1254 Zarate, 2001: pg 17; Napolitano, 518-520).

These extractive commercial activities relied not only on nature but also, on labor, with indigenous workforce slavery[3], and other exploitative conditions, that

[3] At least until the first decades of the 20th century

additionally unchained migration processes and with them the expansion of the Amazonian agricultural frontier. Overall, many of these processes pushed ecological cycles beyond regeneration capacity causing environmental impoverishment (Bunker 1984: pg 1223-1225; UNEP-ACTO, 2009: pg 26-27, 49). While other degradation processes might have passed temporarily unnoticed, as Meybeck points out, "important changes have been happening with a relative magnitude and a neutral appreciation" because these processes come about in a medium (10-50 year) and large time scale (more than 50 years) in comparison to human time scale (ibid. 2003). Currently, the most alarming factor is the accelerating pace at which present-day pressures on the Amazon are taking place. Deforestation, expanding infrastructure, mining and hydrocarbon exploitation among other activities are rapidly growing in this region. (RAISGN-Red Amazonica de Informacion Socioambinetl Georeferenciada 2009; UNEP-ACTO, 2009)

Despite the abundance of resources and the long history of economic activities associated with them, the inhabitants in these areas are commonly at a level of poverty that is well below the national level (UNEP-ACTO: 2009). In the case of the Peruvian Amazon, in 2008, 41% of the amazonian population was poor, in contrast to the average national level of 36%.The Andean region has the highest share with 56% (INEI, 2009:pg15). However, when comparing extreme poverty, the contrast between regions is more evident. Extreme poverty ranged 27% in the Andean region and 15% in the Amazon, whereas the extreme poor are 2% in the coast (INEI, 2009:pg 19).

Additionally, the initiative of the state to promote hydrocarbon mining exploration and exploitation, appeared to have intensified in many cases already existing conflicts of interest between indigenous people, local communities and advocates of Reserve Natural areas on one side, and mining, oil and gas exploration enterprises on the other (Finer et al. 2008, 2009; Cabello, 2009; IBC,2009; RAISG, 2009).

From the beginning of the 90s, mining activities significantly expanded over the country, in both the traditionally "mining" counties and in previously non-mined areas (CEPES-Centro Peruano de Estudios Sociales, 2001). Further encouraged by the bonanza of high mineral prices (Scurrah M., 2010; CONACAMI, 2009: pg 2), mining concessions, especially in the Andes, reached as high as 14% of the national territory (18 million hectares) in 2009 (CONACAMI, 2009: pg 2). According to De Echave, 3126 rural communities would be in the area of influence of mining activities (CEPES, 2001). Likewise, Finer et al. (2009), argues that in recent years, what appears to be the beginning of a second hydrocarbon exploration boom has unfolded in the Peruvian Amazon. The first and hydrocarbon boom would have taken place in the midst of the 1970 decade,.

2.3 Native and Rural Communities

In Peru, renewable and non-renewable natural resources are patrimony of the nation[4], therefore the state has the responsibility to bestow and regulate their use. In legal terms natural resources are any thing obtained from nature, water, land, subsoil, minerals, natural diversity among others, that can be used to satisfy human needs and have a current or potential value in the market (Castañeda, 2009:pg 61-62). Thus, basic needs related natural resources such as water and land are owned by the nation, but not

[4] The state owns the resources, but the land is owned privately

individually. And there is no explicit reference as people basic rights.

The right to water and food are not explicitly considered as human rights in the current 1993 constitution, rather they are recognized so through interpretation and in compliance with the International human rights agreements signed by Peru (Castañeda, 2009). In the case of the right to land, it is not fully acknowledged as a human right. This happens because its patrimonial character is guaranteed. This means that the constitution protects "the proprietor", once a person owns the land. However, it does not take into account those who do not have access to land, have too little to supply basic needs, or have it without recognized property rights. In other words, it dismisses the right to access land. Additionally, the proprietor owns the land but not the natural resources on and under it (Castañeda, 2009: pg 61 -64).

In the particular case of indigenous peoples and voluntary isolated people' territories, their rights are legally supported by the International agreements such as the United Nation declaration of indigenous rights. in 1978 and the Convention Nº169 "Over the indigenous people and independent tribal territories of the Work International Organization - WIO ratified by the Peruvian government in 1994. The Convenio applies to rural communities, [comunidades campesinas*]* on the coast and Andes, and *[comunidades nativas]* in the jungle and voluntary Isolated groups[5] (National Coordinator of Human Rights - CNDH, 2009: pg 152-154;Castañeda, 2009: pg 65 -67). However, according to the National Coordinator of Human Rights – CNDR (2008), compliance with these agreements has not been fully reached and it is rather unsatisfactory

The normalization of communal land still proves to be difficult in comparison to individual titling, [parcelacion*],* that currently counts on assigned budgets and simplified procedures for the same land (CNDR, 2008: pg 154). In 2008, the Formalization of the Informal property organization-COFOPRI states that at the national level there are 6024 *comunidades campesinas* and 1440 *comunidades nativas,* from which 935 campesinas and 182 nativas are waiting for demarcation and titling. According to the IBC (2009) there are 1509 natives communities and 277 waiting to be legally recognized. COFOPRIs goal, for the period 2008-2011, is to register and title 195 communities and slightly over 336 000 individual rural properties.(COFOPRI, 2008: pg 15-16, 49).

It can be said that the initiatives to address the issues over indigenous peoples territories are not taking place in the desired direction:measures aim rather to reduce their participation over decisions that affect their rights over land and natural resources. Communities are going through the minimization of their role as "representative territorial institutions in defense against third parties and nowadays against the state as promoter of the Private investment" (Del Castillo et al, 2004 pg 52; CNDH, 2008: pg 154). At the moment, the right of consultation is limited to give an opinion about activities to be carried out by private companies, which does not entail the right of veto or an obligation to reformulate proposals neither from the state nor from the enterprises (CNDH, 2008: pg 154-155).

[5] There are various semantic issues related the term used to refers this groups. In this text this term refers to "nomadic, semi nomadic and recently settled groups" that have chose to avoid or maintain little contact with outsiders (Ross C, 2008;pg 10).

3 Research Design

3.1 Conceptual framework: Political Ecology

In order to address distributional issues I will make use of key concepts of Political Ecology, based on common concern with the applied research in this field, for socioeconomic, political and ideological structures and their interplay with socio-ecological relations (Schmink, 1999). Back in the 70s, since "Political Ecology" emerged, from the need to integrate land-use practices into political economy, and as a reaction to the politicization of the environment, the field frontier has considerably expanded and taken new directions with the engagement of varied scholarship[6] (Peet & Watts, 1993).

One of the ways of understanding Political Ecology is as the study of ecological distribution conflicts. Related as well to ecological economics that focuses in the compatibility between the ecosystems and the human economic in the long run(Martinez-Allier, 1997: 26-27). Thus, What do ecological distributional conflicts refer to?. They refer to the "social, spatial and temporal asymmetries in the use of environmental resources and services by humans" (Martinez-Allier, 1997). Ecological, unlike economic distribution deals with ecological and cultural dimensions. Therefore, It implies the access and control over natural resources along with the burden of environmental degradation (Escobar, 2006).

Commonly countered theme of debate, it is how to approach the apparently invisible value of environmental degradation and social and cultural aspects associated in the production processes. Since most environmental services and resources are taken as a free gift from nature, and are outside of the market economy, they are referred as externalities. Among conventional economics, the widely spread approach is the inclusions of such externatilities in the pricing economic system. However, this vision is challenged by the fact that values are determined by the social perception of externalities, therefore regarded as market prices, their value would be dependent on " [the endowment] of property rights and distribution of income, [and also} on the environmental movements and the distribution of power" (Martinez-Allier, 1997: 27). According to Escobar (2006:8) "Under conditions of unequal distribution of wealth, economic growth, and production entail the negation of ecological integrity".

When talking about extractive economies there are arguments that contest staple theory of growth[7], authoritative standing among neo-liberals, and strength the theory of underdevelopment as a consequence of unequal ecological trade. Time scale and material requirements of ecological processes and capitalistic production are different. Therefore, unequal exchange results not only of the undervaluation of poor people's labor, and progressive deterioration of trade in terms of prices. It also develops from the mentioned differences between capital production time scales that compromise regeneration of ecological cycles (Martinez-Allier, 1997: 39). Bunker (1984: 1054) indicates three additional inequalities associated to the international exchange of

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[6] "Within and between political economy, poststructuralism, discourse theory, poststructuralism, disco and ecological science itself" (Peet & Watts, 1993).

[7] Theory that explains the economic growth based on the central role of exports

natural resources. First, the transfer of “the natural value” in the resource (unlaboured, nature labor instead), second the “full realization of value” in the productive center rather than in the region of extraction, and finally, in the case of non-renewable resources the “loss of the resource” in the periphery.

O'Connor (2003:10) defines as Uneven development such “exploitative relationship between town and country (center/periphery, developed/underdeveloped country) as the basis for reproduction of global capitalism as a whole”. Bunker (1984) emphasize the spatial dimension of unequal exchange, pointing out the differences in the internal dynamics of productive and extractive economies. He argues that Unequal exchange is not a sufficient explanation of the progressive underdevelopment of extractive regions, which it is rather better understood as a result of external relations coupled to internal dynamics. In order to define this processes Such

Though, Bunker (1984) underscores the temporary nature of extractive enterprises and the fact that, since they are generally located in a different geographical region that the productive systems, he argues, it is likely that the external relations built an unequal exchange that generates demographic dislocation, disrupt the balance of ecological cycles and configure the immediate environment in a manner that limit the following forces of production.

3.2 Methodological approach

3.2.1 Ontological and Epistemological approach

The present research involves the revision of different documents, reports and arguments coming from diffrent groups and sectors of society. It collects the different perspectives related to the distribution in the particular context of Camisea, under the assumption that such phenomena results from evolving social interactions between the socio-ecological systems and the political and cultural structures. Therefore, the ontological approach of the study aligns with constructivism, which according to Bryman (2008: 19) suggest that the observed occurences and their significance actively realized by social actors, thefore, it challenges the existance of pre-existeing categories that appear as unchageble and external realities to the actors.

From a epistemological perspective, the study is developed under the umbrella of Critical Realism, in the sense, that it recognizes the provisonal character of the catetgories used in the knowledge creation process. In order to explain the observed events and interactions, I make use of abstractions such us " Neoliberalims", "Unequal ecological Exhcange" or "Uneven Development" . From a critical Realism point of view "generative mechanism", that are "hipotetical entities that account for regularities in the social order", are useful and acceptable because they are connected to observable effects, thus they help to identify the structures that bring into existence the events and discouses in the social world. Critical realist argue that it is only possible to understand and change the world if we acknowledge the structures at work (Bryman, 2008: 14-15).

3.2.2 Research Strategy

In order to examine in detail the distributional issues in Camisea Project, the selected research strategy is a typical holistic single case study. Based on the fact that a case study emplies an analysis in depth of a particular case (Bryman, 2008: 53) and it is the preferred approach when analyzing contemporary situations where behaviors can not be controlled (Yin, 2003:8). The advantage of the holistic modality is based on the convenience of choosing a single Unit of Analysis when the theory behind the analysis is an holistic approach as well (Yin, 2003:45). In the present research the unit of analysis is "The country-town relationship" in the context of exploitation of Camisea gas reserves.

It is known that events similar to the gas exploitation in Camisea are occurring in other geographical areas in the world, however the particularities of the case (ethnic human groups, level of contact with the western world, the amazonian environment, among others) makes of the context, more than a plain expression of the global patterns Therefore, the case "may be unique but it is not singular". Thus, "the geographical differences matters not only on its own sake but also because it has *Constitutive* effects on processes, rules and regularities that have stretch over over wide spans of space and time" Castree (2005: 541).

The need to carry out a intensive examination and the constructivist ontological position, regarded as features of qualitative research, (Bryman, 2008:365, 53), supported the selection of qualitative methods in the Camisea case study. Whereas, the direction of empirical inquiry followed a deductive approach. Bryman (2008: 57) argues that even it is frequent to use an inductive approach in a qualitative case study, there is no reason for not using a deductive connection between research and theory. Researchers has become more interested in theory testing Bryman (2008: 373).

3.2.3 Methods

For the empirical inquiry I made use of qualitative methods that were organized in a deductive process with the objective of testing midd-range theories such the "Uneven development theory of Political ecology", "Neoliberalization". Therefore, previously to the data collection I formulate hypothesis that I traslated to operational terms. For the collection of data I employed three sources of evidence. Documents, archival records and Interviews, in order to triangulate data. According to Yin (2003: 98), the use of multiple sources of evidence allows ¨to the investigator address a broader historical, attitudinal and behavioral issues {And most importantly} the development of converging lines of inquiry¨ .

Archival records: I revised and scrutinized primary data of official Institutions MINEM[8], Osinergmin[9] IDB[10], Defensoria del Pueblo[11]. Records such as progress and final reports related to the construction and operation of Camisea, statistics, workshop records with participants opinion.

[8] Ministry of Energy and Mining
[9] Supervisor organism of Mining and energy
[10] Interamerican Back of Development
[11] Population defense board

Documents: I collected empirical evidence from secondary sources such as newpapers on line and printed versions (El comercio, Gestion, la Republica< Servindi), NGOs publications and reports and Scientific articles and publications.

Interview: I carried out 5 semi-structure interviews with informants (2 NGOs representatives that accompany the project and work with the directly affected community, the supervisor of Security and environment of Osinergmin, a company representative of TGP and an environmental monitor of the community the kirigueti in the lower Urubamba)

The deductive process involved the analysis of the collected data, generated the reformulation of initial hypothesis that were contested with the selected concepts and theories (section3.2). The analysis covered the role of the state in Camisea on the relationship between the town (Lima and the cost) and the country (Camisea and affected communites, where the gas is extracted and the pipline sof the project cut through), consequently, the influence on the economic and ecological distribution of the risk and benefit generated.

4 The Case Study: Camisea project

4.1 Project description

The Camisea Project covers the exploitation, transport and distribution of Natural Gas-NG and associated liquids of Natural Gas – (referred to from now on as LNG) from theCamisea Gas Fields, the largest gas reserve in Peru, with a volume "in situ" (Block 56 and 88) of 17.4 trillions of cubic feet (TCF), from which 13 TCF are recoverable[12] (MINEM,2010). The development of the Camisea Project was basically put forward with the objective of achieving energy security and changing the current energy matrix of the country as an oil importer (Davila et al, 2010).

The Camisea fields are located in the Urubamba valley, district of Echarate in Cusco, where the production phase takes place. It includes gas extraction from blocks 88 and 56(the latter included later in the project) and gas processing in the Malvinas plant on the Urubamba riverside, where natural gas and liquids are separated and water and impurities eliminated. The process of separation includes a gas reinjection[13] system that helps to maximize the extraction of liquids (Supervisory Body of Investment in Energy and Mining - Osinergmin, 2004:21). Once, natural gas and liquids of natural gas are separated, they are transported in two separate pipelines from the Malvinas plant passing through rainforest, over Andeanhighlands , ending in two facilities in thecoastal region (Pluspetrol 2010). The Liquids of Natural Gas are transported to the Loberia fractionation Plant in Pisco, Ica (located 290 Km from Lima) . The Natural gas is piped north along the coast (A total of 710 km) to City Gate in Lurin (Lima)

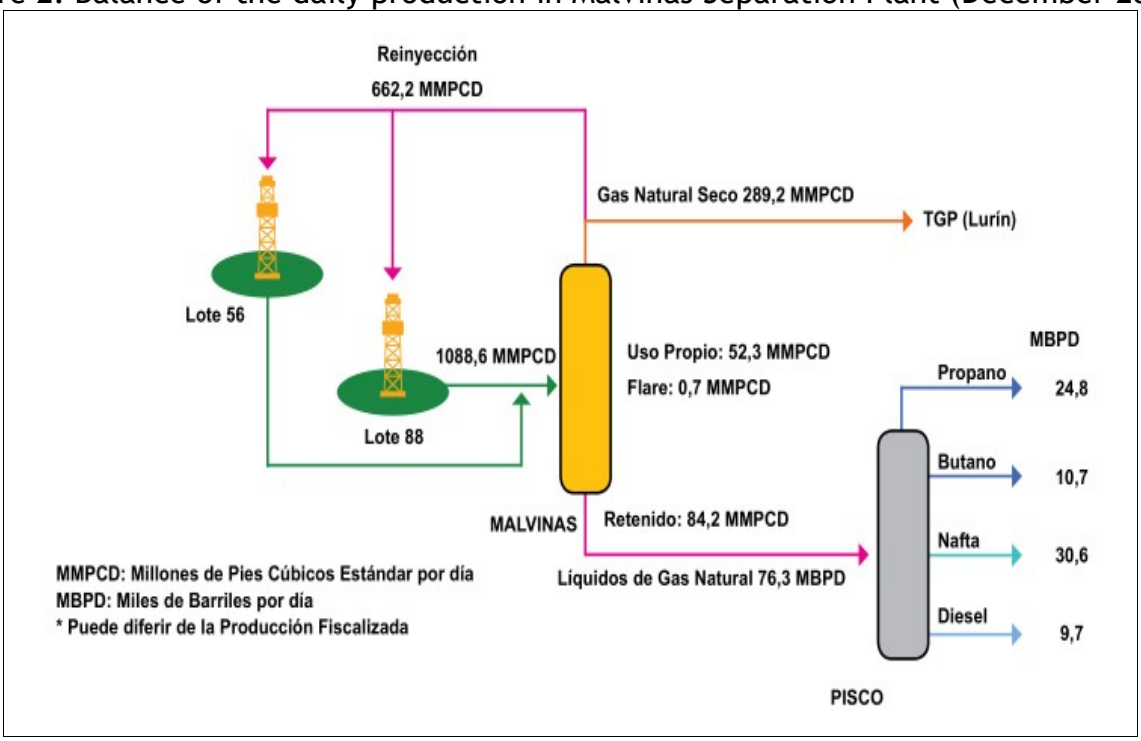
The last component of the project covers commercialization and distribution. The

[12] It considers 78% recovery factor

[13] Gas reinyection ease commercialization of natural gas, then if the demand of natural gas is under the proyected demand, it is possible to continue producing liquids of natural gas (Osinergmin, 2004)

products obtained from LNG in the fractionation plant in Pisco, are commercialized in trucks and ships for both the internal and external market. The Natural gas that arrives toCity gate[14] in Limais sold and distributed through a pipeline network for electricity production, residential and industrial uses. In 2009, the whole project facilities reached 94% of their capacity, with a daily production of about 300 MMPCD[15] of natural gas and 80 MMPCD of liquids of natural gas (Osignermin, 2009:15). An overview of the process and volumes transported in November 2009 are shown in Figure 2.

Figure 2: Balance of the daily production in Malvinas Separation Plant (December 2009)



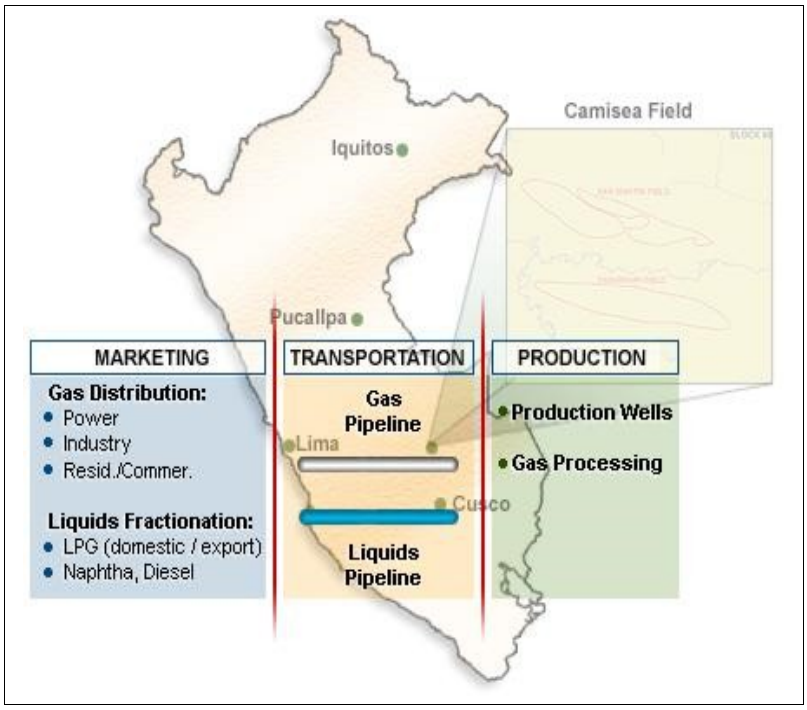
Source: Natural Gas Informative Brochure (Osignermin, 2009: 13)
MMPCD: Daily Million Cubic feet

4.1.1 Unbundling

Unbundling is "the process of separating natural gas services and supply into components with each component is priced separately, [which are considered fundamental for] efficient and cost-reflecting pricing". (EIA, 2000). In the case of Camisea, the separation of the activities (see Figure 3 & 4) in the Natural gas Industrial sector was legally set up in 1999 (Osinergmin, 2008: pg 130) on the premise that anti-competition practices are more likely to arise from a vertical integration among companies in the natural gas chain (Dammert , 2006:pg 22). According to Osinergmin (2009a:pg 53) the separation reduces the power of transport and distribution components in the Natural Gas chain which are characterized as "natural monopolies" [16]. In 2000, the Peruvian government through a public bidding process granted the exploitation rights to thrre companies.

[14] Substation where the gas is divided to another company
[15] Daily Million Cubic feet
[16] A natural monopoly is necessary and whose existance is justified to develop new technologies Usually, even the government supporters of the free market tolerate monopolies when they can regulate them

Figure 3 : Stages of Camisea Project: Production, Transportation and Commercialization.

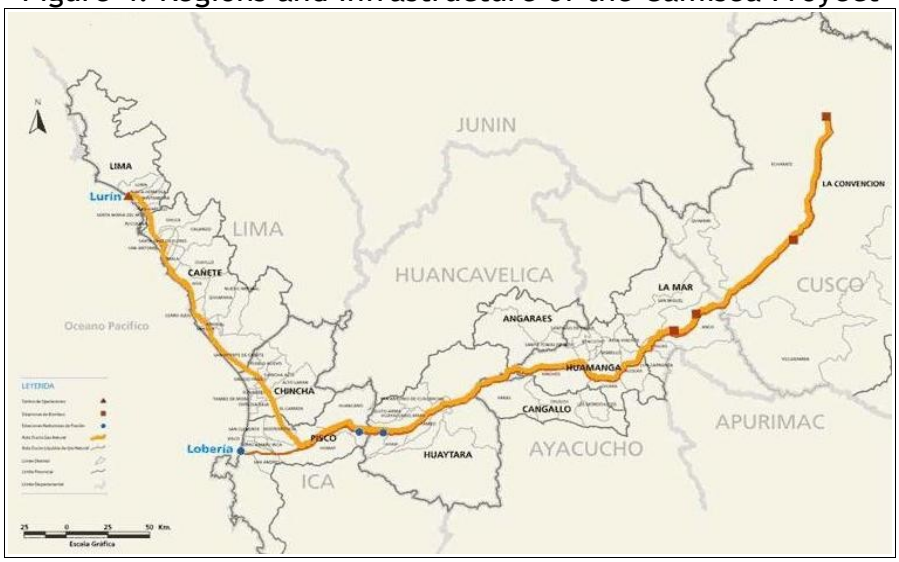


Source: Pluspetrol 2010

Upstream Component

It considers the production phase in the Camisea fields and the facilities for fractionation of LNG in Pisco (Ica), including the maritime terminal for distribution and commercialization of LNG products (IBD, 2007: pg 12), such as GLP (butane and propane) that represents 40% , gasoline (50%) diesel and kerosene (10%). In 2000 the license of the upstream component was granted for a period of 40 years to the consortium lead by the Argentinian company Pluspetrol Peru corporation S.A, (See Table 1). The selection was based on the highest royalty offered which was agreed on 37%. This component involves an investment of U$ 730 Million (Osignermin, 2009a).

Figure 4: Regions and Infrastructure of the Camisea Proyect



Source: TGP online.

Table 1: Ownership of the components of Camisea Project

Company	Origin	Pluspetrol Peru Coorporation (Pluspetrol)	Transportadora de Gas del Peru (TGP)	Gas Natural de Lima y Callao (GNLC)	Camisea II
		Exploitation	Transport	Distribution	Exportation
Hunt Oil	EE.UU.	25%	22%	-	50%
Tecpetrol/Tecgas	Italy	10%	24%		
Pluspetrol	Argentine	27%	12%		
Sonatrach	Algeria	10%	21%	-	
Tractebel*	Belgium	-	8%	100%	
SK	South Korea	18%	11%		20%
Graña y Montero	Peru	-	1%	-	
Repsol YPF	Spain/Argentine	10%	-		20%
Marubeni	Japan				10%%
Operator		**Pluspetrol**	**Techint**	**Tractebel**	**LNG del Peru**

Source: (Apoyo & Asociados, 2007)

Downtream Component

This component consists of the transport of NG and LNG from Malvinas plant to Lima and Pisco respectively. The criteria for the public bidding of the downstream component and the distribution in Lima and Callao, considered 33 years concession period and lowest price of the service. Tecgas N.V.[17], obtained the concession with the participation national and international partners, formed the private firm Transportadora de Gas del Peru – TGP and in 2002, signed the contracts known as BOOT (Built, Operate, Own and Transfer) with the Peruvian government (Pluspetrol, 2010).

Additionally, this component required the compliance of social and environmental conditions given by Interamerica Development Bank (TGP online) and CAF, that partially finance the transport phase, which required in total an investment of approximately of US$ 820 million .The social and environmental conditions were also extended to Pluspetrol (Pluspetrol 2010).

Distribution Component

In 2002, TGP selected the Peruvian company Calidda, as operator of the project Natural Gas for Lima and Callao (Gas Natural de Lima y Callao -GNLC), created for constructing and operating the distribution network of natural gas supply in Lima and Callao (Pluspetrol online) that compromised an investment of US $70 millions (The Inter-American Development Bank -IDB, 2007a).

[17] 100% property of Technit Group

4.2 Development of the Natural gas Market

4.2.1 State's Promotion

Overall, the state has had an active role supporting the start-up of Camisea and the development of a previously non-existing domestic gas market with the objective of changing the current "energy matrix',replacing other fossil fuels for natural gas (Osinergmin, 2009c). However, the initiative of unbundling reduces the attractiveness of transport and distribution activities, due to an increased risk for investment recovering.

Therefore, according to Osinergmin (2009a; pg 118-119), the government was challenged to design a regulatory framework that could attract investors even with an insufficient natural gas demand. The state freed the exploitation activities, setting a maximum price at “head well” and took part with regulation policies for transport and distribution (Dammert, 2006a: pg 10 -11). Osinergmin, would act as the auditing body of all actors in the natural gas market[18], and as regulator for all of them except the exploration and exploitation activities.

The Peruvian government turned to secure a market for Camisea and eliminate the risks associated to the market creation., It agreed on "take and pay" contracts and established the Main Network Guarantee - GRP (Initials in Spanish) mechanism, framed in the Law Nº 27133, "law of Promotion of Natural Gas Industry Development".

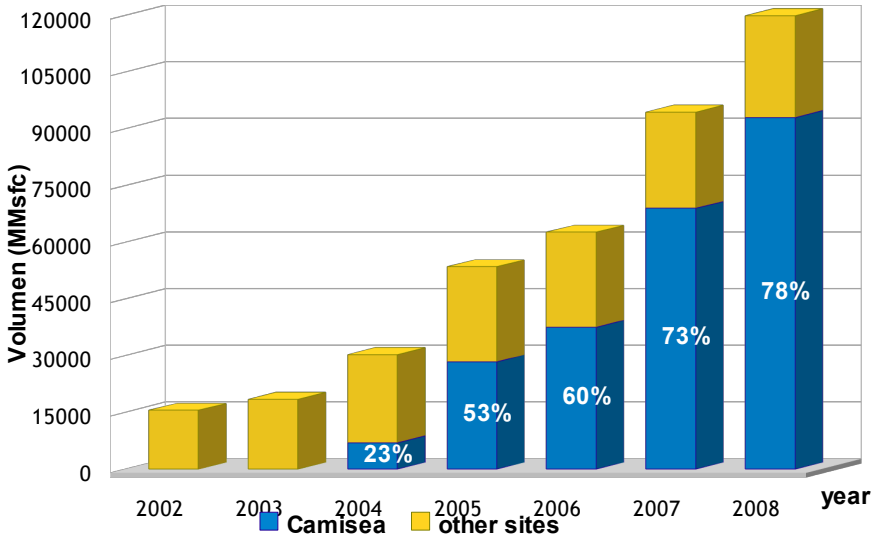
In simple termsthe “Take or pay” implies a payment from the industrial user for the right of consumption of a certain volume of natural gas, consumed or not, then it could guarantee a certain level of demand. Along with other six private enterprises (Initial clients), the state-owned energy company Electroperu signed a "take and pay" contract with the consortium, which later on, it transferred to Etevensa, a private electric company (DGE- Dirección General de Electricidad Ministerio de Energía y Minas, 2004: pg. 1)

4.2.2 Production

As it is presented in Figure 5 an 80% of Peru's natural gas is produced by Camisea. With a rapidly growing market of natural gas in Lima and Callao, in 2009, four years earlier than estimated, the natural gas demand exceeded the transport capacity of TGP, with 300 millions daily cubic feet of natural gas.(Figure 6). The production of Liquids of natural gas (Figure 7) has experienced similar growth with an annual production of 3.8 million barrels in 2004 to 14.9 in 2008 (MINEM, 2008)

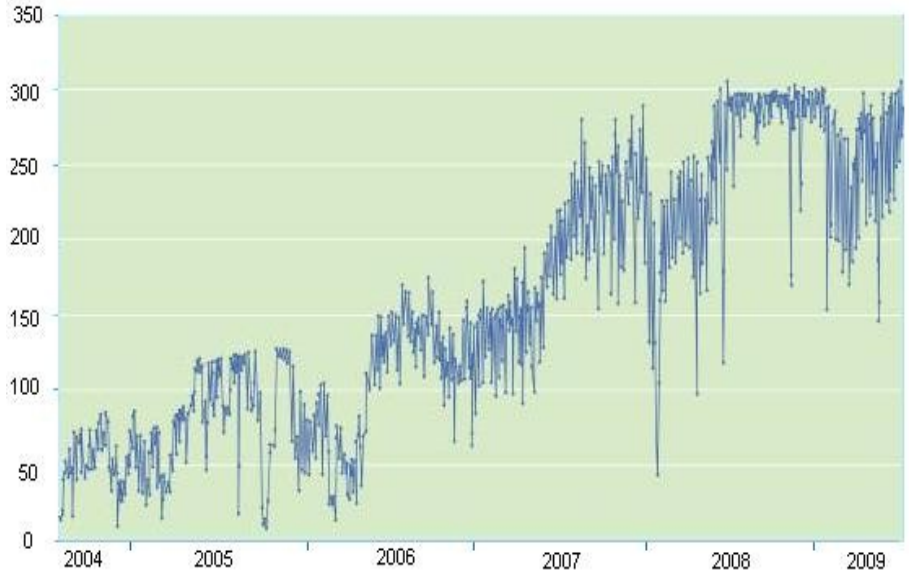
[18] Exploration and exploitation, transport, distribution and commercialization

Figure 5: National and Camisea natural gas production 2002-2008.



Source: Statistics 2008 PeruPetro – MINEN 35

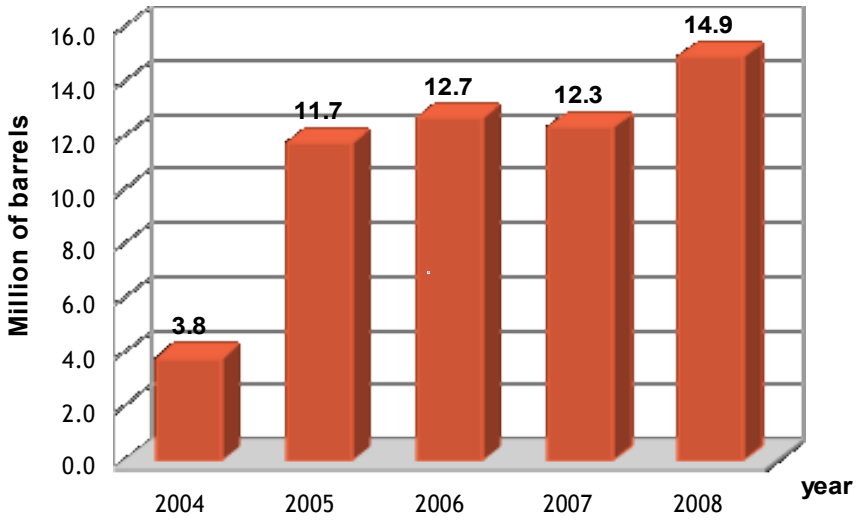
Figure 6: Daily transport of Natural Gas volume by TGP (MMSFC[19]) August 2004 - July 2009



Source: PeruPetro – MINEN 35

[19] Million cubic feet

Figure 7: Production of liquids of natural gas of Camisea during 2004 -2008



Source: Osinergmin, (2009b: pg 13)

4.2.3 Expansions: Export of liquified Natural gas vs Regional pipelines

The expansion of Camisea considered different alternatives, including regional pipelines (Figure 4). Among them, the export of Liquified Natural Gas[20], also known as Camisea II, was carried through. Operated by LNG Peru, Camisea II targets international markets like Mexico and possibly The United States. Operations are expected to start in 2010 and represents a total investment cost of 3.8 billion US$ (IDB, 2006). The decision process has been criticized, due to the existence of unsatisfied national demand of natural gas (Davila et al., 2010). Furthermore, It required the modification of contracts that protected the internal supply[21], calculated in 6,06 TCF over a period of 20 years (Marticorena, 2007; Campodonico: 2009).

4.2.4 Area of Influence: Indigenous territories & Natural Protected Areas Overlap

Overall, Camisea directly affects five counties, in the three different regions. If we limit the concessioned area of Camisea[22] in its exploitation phase (see Figure 8) in the Urubamba region (Jungle), Camisea overlaps with the Kugapakori Nahua Nanti - KNN Territorial Reserve[23] for voluntary isolated groups, 75% of block 88 is within the Reserve (Napolitano et al, 2007: pg 6); blocks 88 and 56 extend over 10 native communities (Osinerg, 2003; Pluspetrol, 2004). Likewise, both rural individual

[20] The project includes the construction of Mechorita liquifying plant (169 km from Lima) and facilities expansion including the pipeline that will connect TGP Natural gas pipeline.

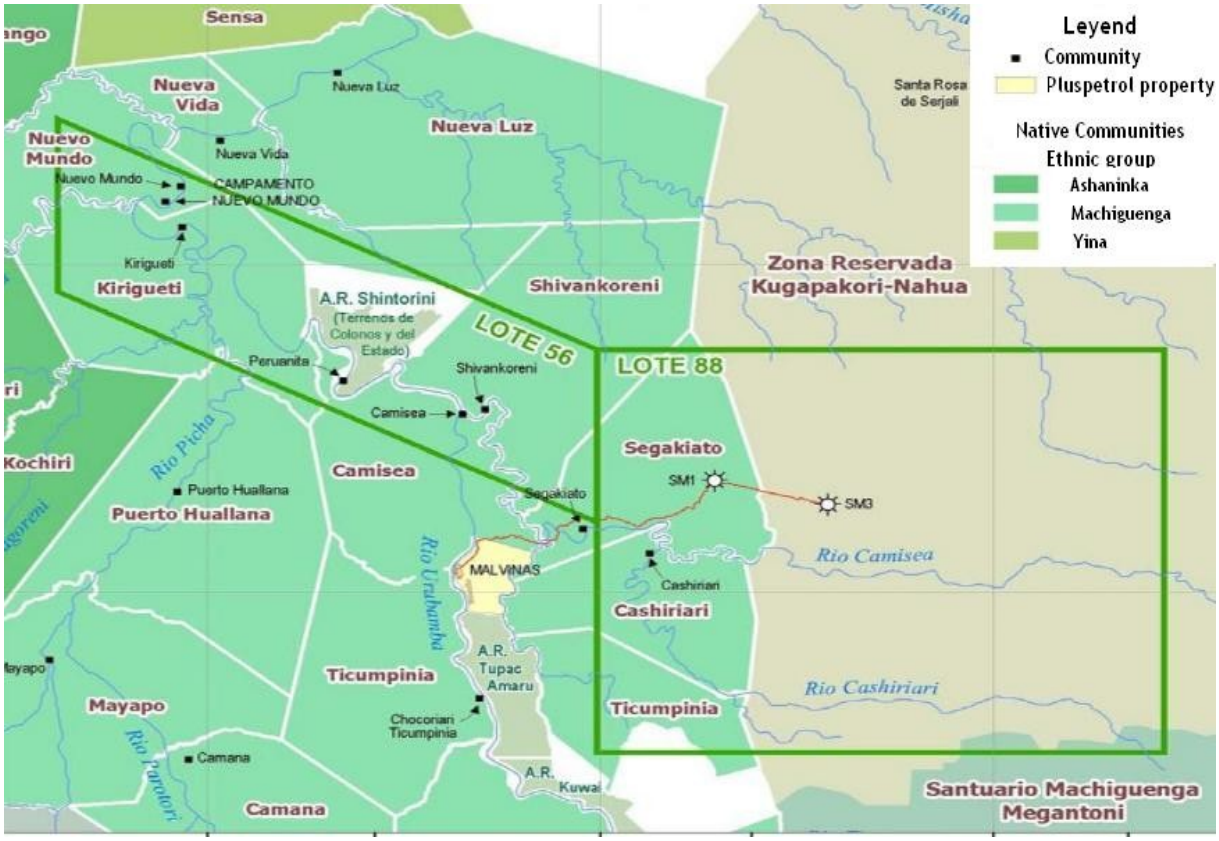
[21] It was required to modify the legislation to make possible the exportation of Camisea natural gas.

[22] The conssesioned area of camisea includes blocks 56 and 88, the pipeline and the assignated to the facilities.

[23] This was the first "Territorial Reserve" for "isolated people. The official name is State Territorial Reserve for the ethnic groups in voluntary isolation and initial contact Kugapakori, Nahua, Nanti and others (Napolitano et al, 2007: pg 2). Created in 1990, little was known about it till 2003/2004 with NGO Shinai started a project to "defend and srenghten it" (Napolitano, 2007: pg 520).

properties (*parcelas)* and collective properties *comunidades nativas,* are indirectly affected by fluvial traffic or/and cut through/transected by the pipelines, specially Machiguenga groups (WWF Macroeconomic Program Office - MPO, 2005: pg 3: IBC, 2009).

Figure 8: Camisea fields. Block 56 and 88 and indigenous territories overlap.



Source: (Carrillo, 2009)

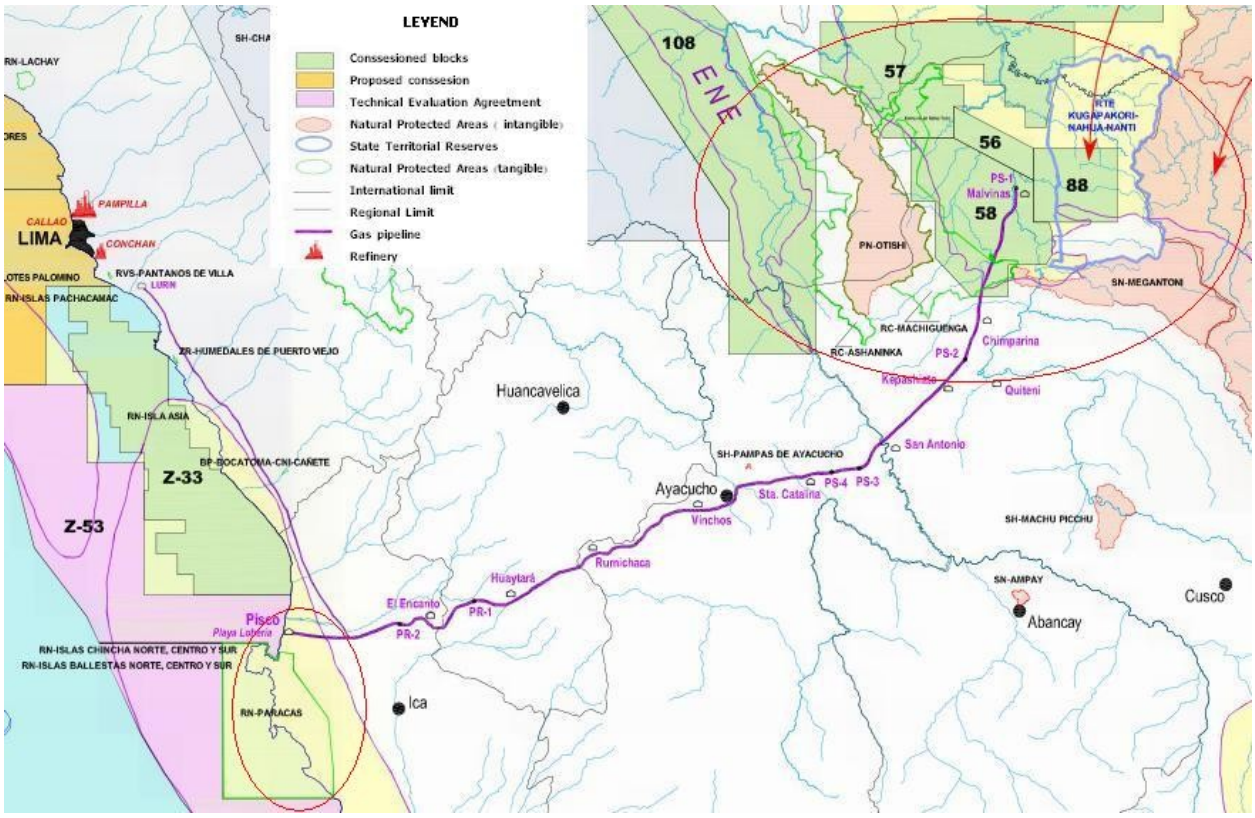
It should be noted that these are areas of high sensitivity. They are home to **various** ethnic groups such as Ashaninka, the Piro, the Machiguenga that is the most numerous (10 000 people), *colonos* settlements, nomadic, semi-nomadic groups among others. Likewise, the Lowland Urubamba and the Vilcabamba regions[24] (Otishi National Park) are considered for many organizations as prioritized areas for conservation (WWF -M/P/O, 2005, pg 2-3; Ross C, 2008: pg 203-204). The Vilcabamba range is recognized as one of 25 world biodiversity hotspots due to its "high species richness, endemism, number and diversity of habitat and bio-geographic and evolutionary processes" (WWF -MPO, 2005, pg 3: Caffrey, 2002:30-32).

The pipelines, transporting NG and LNG, extend over a 20 -30 meters wide strip passing through *comunidades campesinas* and *parcelas* (See Figure 9). In the Andean it affects the largely poor counties of Ayacucho and Huancavelica, two of the poorest counties with 60% and 80% of poverty respectively. In the coast, agricultural valley, urban and periurban coastal areas are affected by the pipelines to finally arrive to City gate in Lima and Loberia plant, located in the buffer zone of the Paracas Natural reserve (Ica). The population directly impacted by the ROW (right of way) for the

[24] Due to its high level of endemism, some Scientiests have proposed them could have been "pleistocenic refuges" referencing the pleistocenic refuges Theory (Ross C, 2008: pg 203).

transport system is estimated at 15 000 people (TGP, 2002: 26).[25]

Figure 9: Area of influence of Camisea, Natural protected areas and Indigenous territories



Source: Petupetro, 2008)

4.3 Environmental Impacts

A central problem for determining the impacts of Camisea is that it did not count on a good initial baseline study, especially in terms of biological biodiversity, particularly important for determining changes in the ecosystems over time, (Ross, 2008: 212, Caffrey).

4.3.1 Deforestation & Soil erosion

In order to minimize the use of roads, the consortium selected for the exploitation phase an *Off-land, in-land* strategy (TGP, 2009). However, it required forest deforestation anyway that included **primary forest** (old forest), which consequently resulted in the fragmentation and degradation of critical habitats that support wildlife and biological biodiversity (Caffrey, 2002). Deforestation includes clearing tracks for facilites like heliports and campsites in the exploration phase (Napolitano, 2007); while, extraction and transport requires area for construction of facilities, platforms, wells and pipelines.

[25] for instance, within the compromises with IDB, the area of influence of Camisea includes as well 5 NPAs: The National Park (NP) Otishi; the Communal Reserves (CR) Machiguenga and Ashaninka; the Megatoni National Sanctuary, created by the state to comply with compromise of providing sufficient resources for supporting the KNN and implementing management plans for these NPA. And Paracas Reserve, the only marine Reserve for its proximity to the Fractionation plant in Pisco, Ica (DAR, 2008).

Primary forest represents 90% of block 88 and 117 km along the pipelines. Overall, it cleared almost twice the estimated area in the Environmental Impact Assestment (WWF-MPO, 2005).

The construction of the NG and LNG pipelines affected soil stability. Frequent landslides and soil erosion incidents, especially in the lowlands and uplands of the Urubamba region, showed evidence of an ineffective monitoring control. For the construction of the pipelines, vegetation was cleared and soil was eroded especially during the rainy season. Global Village engineers reported in 2003 that some segments of the soil along the pipelines had been eroded up to 2 meters deep, which resulted in about 100 tones of soil and vegetation per meter of pipeline had been lost to rivers, which were likely to have serious impact on aquatic ecosystems that could be irreversible(Ross, 2008: 213, 234; WWF/MPO, 2005). For instance, Ortega et al. (2004) point out that heavy rain that carries out big quantities of solids to the rivers, significantly impacts the flow and turbity of the rivers, causing mortality of big fish due to solids accumulated in the fish gills that prevent them from normal respiration.

4.3.2 Water and Soil Pollution

During construction of the pipelines, sources of clean water collapsed and landslides made water turbid, affecting communities not only in Cusco but also in Andean communities (DdP, 2006; Ross, 2008). Overall, populations would point out declining water quality of rivers and watercourses (MINSA, 2003:79; ADISEP/COMARU, 2003). MINSA in (2003:162) reported deficiencies of sewage treatment systems in campsites (Urubamba), that resulted in discharge levels of coliforms that exceeded the established national and IBD levels, that could eventually affect inhabitants downriver. The "Social and Environmental Supervision Report" of Camisea prepared for IDB, indicates that the operation of the wastewater treatment repeatedly could not meet the required quality standard[26], therefore could not comply with the IDB condition of 95% success in operation performance. The report also, indicates that because of the dilution power of the large volume flow in the receiver water bodies, there was no biological pollution except from Kiteni river (Matrix, 2007).

In the case of total suspended solid in the water, that is used as indicator for controlling erosion, TGP three-month period monitoring report (2009) indicated that 60% of the of the ravines tested were within the established range. Other impacts are related to spills of Natural Gas Liquids, over which many controversies and doubts arose about the technical designe and material quality of the pipelines, the transparency related to the severity of the impacts caused, for what population and official version differed importantly. During the first years of operation (2004-2007), there were six incidents of the LNG pipeline, all of them along the first 200 km pipeline (BID, 2007). The LNG spills caused the pollution of soil, ravines and rivers, loss of crops and houses, fish and livestock that affected more than thousand people, including two people seriously injured in a fire (Davila et al, 2010: 81-86). Davila et al (2010) argue that the impacted population has not been adequately compensated for their losses to these events. For instance, PMAC reported in June 2008 that the Shintorini community has not received so far a compensation for the spill of LNG of 2004.

[26] The variation between the concentration of suspended solids upriver and downriver in selected locations fro sampling should be less than 10% (IDB, 2006).

4.3.3 Other Impacts: Fluvial traffic, noise pollution and waste generation

Although the *Off-land* strategy was chosen for the exploitation activities in order to minimize the impacts related to the construction of roads, it maximizes fluvial and air transport instead. Fluvial traffic in the Urubamba and Camisea rivers has been significantlyincreased. Fluvial traffic varies considerably, depending on time of day or location. This importantly increased sediment movement and swells that scare away fish (MINSA 2003) and as Ortega et al. (2004) indicate it concerns the locals that transport in less stable canoes. According to MINSA (2003) in the construction phase, vessels would be passing every 10 minutes. During operations in March-July 2008, the average number of boats ranged between 7.5 and 50[27] per day (PMAC, 2008). In the case of air traffic this was considerably higher during seismic activities and construction, in 2002 there were 75 heliports and an estimated flying time of 6.5 – 7.5 hours daily over the area. These increased traffic of vessels and helicopters and machinery operation in general have raised levels of noise and likely had an effect on the presence of wild animals (MINSA , 2003).

The generation of solid waste is associated with industrial facilities, machinery and campsites along the three components of the project. It is segregated and disposed of according to its characteristics. Organic waste it is disposed of in situ, which is a problem since most of the municipalities do not count on adequatelandfills, consequently the consortium had to established agreements with municipalities to facilitate the management of solid waste. In the case of recyclable and hazardous waste these were transported to Lima to be commercialized for the former and disposed in authorized landfills for the latter (Pluspetrol, 2004).

4.4 Social Impacts

The high dependency of these populations on their environment and natural resources made them very vulnerable to the environmental changes that were brought about by exploration activities, constructions and operation phases of Camisea. However many of the social impacts, especially the indirect ones, were not sufficiently taken into account in the socio-environmental plans of the initial Environmental Impact Assessment – EIA of Camisea (Ross c, 2008). This aggravated the situation, especially to the local communities. Indirect social effects, especially(or particularly) considering long-term consequences such as population growth, consumption patterns and intense resourceexploitation are likely to cause further pressures on the ecosystems in the area.

4.4.1 Forced contact, Introduced diseases and health

4.4.1.1 Impacts on People in voluntary Isolation and Initial contact

Voluntary Isolated people, are the nomadic, semi-nomadic and recently settled groups that have chose to avoid or maintain little contact with outsiders. These groups are

[27] Between every 36 to every 15 minutes if we considered 12 working hours per day.

vulnerable due to their high sensitivity even to common diseases and to their reduced demographic scale (Ross C, 2008: 209; MINSA, 2003:36). Historically, many of the people in the Urubamba region suffered high levels of morbidity and mortality derived from their successive encounters with outsiders, from the times of the rubber boom, that eventually forced them to move further away to the headwaters areas in the region (Napolitano et al, 2007: pg 1-2). Many Machiguengas were captured in the slavery raids, were killed and died from malaria and pockmark epidemics. In the 80s, mortality raised again in the context of timber/hydrocarbon exploration (Condor C, 2009: pg 62), when particularly Nanti and Nahua groups would "most often be living side by side with settlers, loggers, miners and/or oil/gas workers", with death tolls estimated as high as 40-60% within the first 20 years of contact (Condor C, 2009: pg 62).

The exploration phase of Camisea took place during these years. When Shell discovered Camisea fields in the beginning of the 80s, corporative obligations did not take responsibility for environmental or social impacts at all. Negative impacts occured. Shell admitted that it did not take care of controlled contact between its workers and the indigenous groups. Deficiencies in issues regarding the local acceptance of the project and various impositions on locals were reported. Later on Shell compromised itself for developing better social and environmental terms, however withdrew from the exploitation phase, with no clarified reason, after having invested 256 $ million dollars (Ross C, 2008; pg 205-207).

During the construction and operation phase, carried out by the Consortium Pluspetrol, Amazon Watch reported unexpected contact between people in isolation and workers. A report elaborated by the Peruvian Ministry of Heath – MINSA in 2003, points out significant evidence of an overall deteriorated nutritional state, the increased rate of child mortality (for instance, 50% of the children die before 7 years old and 75% before the 12 years old in the Nanti population) and level of diseases outbreaks (Acute Diarrhea Diseases and Acute Respiratory Infections) among the inhabitants in the KNN reserve, influenced by the exploitation activities in the area (MINSA, 2003).

Some were probably contact-related deaths, some were reported to the local authorities without an adequate response to identify the transmission routes, as in the case of nine children in the KNN reserve in 2002 (Ross C, 2008: pg 211), and (number?) adult deaths in Montetoni in 2006, among other specific findings presented by Napolitano (2007), MINSA (2003) and (Beier 2007a). Additionally, some forced relocation was reported, as in the case of families alleged as not absolutely isolated, "because they knew some members of local natives communities" alleged the consortium (Napolitano et al , 2007: pg 7).

4.4.2 Exacerbated disputes for territory: Displacement and relocation

As aforementioned, the concessioned area for the facilities and transport system of Camisea, extend over land of natives and rural communities, many of them already legally recognized. These cases of superposition of territories is solved, granting the easement rights to the concessionaire through *Servitude contracts*. However, the servitude does not imply acceptance or rejection of the servitude from the grantors, but it is imposed[28] and limited to an agreement on an economic compensation, through a

[28]The servitude contract provides the concessionaire with the right to negotiate with the government an amount and impose the servitude, in case an agreement has not been reached with the owner after 30

negotiation process (Defensoria del pueblo- DdP, pg 33-35).

Without clear information, **professional or state institution** assistance and with limited time to acknowledge or reject the valuation procedures used , the *communities* or *communeros (individual owners)* were in a strong power asymmetry in relation to concessionaire, to negotiate an adequate compensation scheme. This resulted in inadequate compensations in "Take it or leave it" agreements, especially in the case of TGP (Defensoria del pueblo- DPP, pg 33-35). The servitude implies a limitation of the property that the owner will have to bear for the entire period of the concession (Davila et al, 2010: 110-111).

For the native communities of Urubamba, the struggle to secure their land, has been intensified with the construction of the pipelines, that opened up the way between the lower and upper Urubamba to loggers and colonists. In the case of the Lower Urubamba region 24 communities, (TGP, 2002), most native communities are titled and belong to Machiguenga people. However, the situation in the upper Urubamba (15 communities) is more critical, where land rights are still less clear and inhabitants face the intrusion of the colonist in their communal territories who eventually establish in the area, and are able to individually acquire rights, over untitled but traditionally communal land of the natives (WWF-MPO, 2008).

For example in the lower Urabamba, the machiguenga living in Shimma unsuccessfully demanded to the consortium a deviation of the transportation system in order to avoid having their land cut through the by pipelines (ADISEP/COMARU 2003). Additional problems include that there is not an established procedure for economic valuation, limited time for negotiations and any observation from the owners, once they accept the compensation, can only be made through the judicial system (DdP, 2006: 32-36).

4.4.3 Loss of properties, sources of food and drinking water

In the process of construction of facilities and pipelines, property of the communities of individuals were damaged including crops, water infrastructure and houses. In addition to impacts on their forest, decreased flora and fauna resources, livestock deaths and damage to sources of water occured(DDP, 2006: 32-33; COMARU/ADISEP, 2003). Additionally, spills of LNG according to Napolitano (2007) would have left inhabitants without fish for months . Towns in Cuzco along with the cities of Huancavelica and Ayacucho reported these events to the DdP, demanding a compensation or the return to the initial situation under the responsibility of the consortium (DDP, 2006: 32-33).

In the Urubamba region, in contrast to the monitoring reports of the companies, that show no perturbation in the amount and diversity of hidrobiologic resources, the local population state a progressive reduction of the fish in the rivers (IBC, 2009b; PMAC, 2009; Ross, 2008, ADISEP/COMARU, 2003). Additionally, there is a generalized perception that the reduction is due to increased fluvial traffic, noise, spill of natural gas liquids and overfishing, activities considered related in some way to Camisea. The

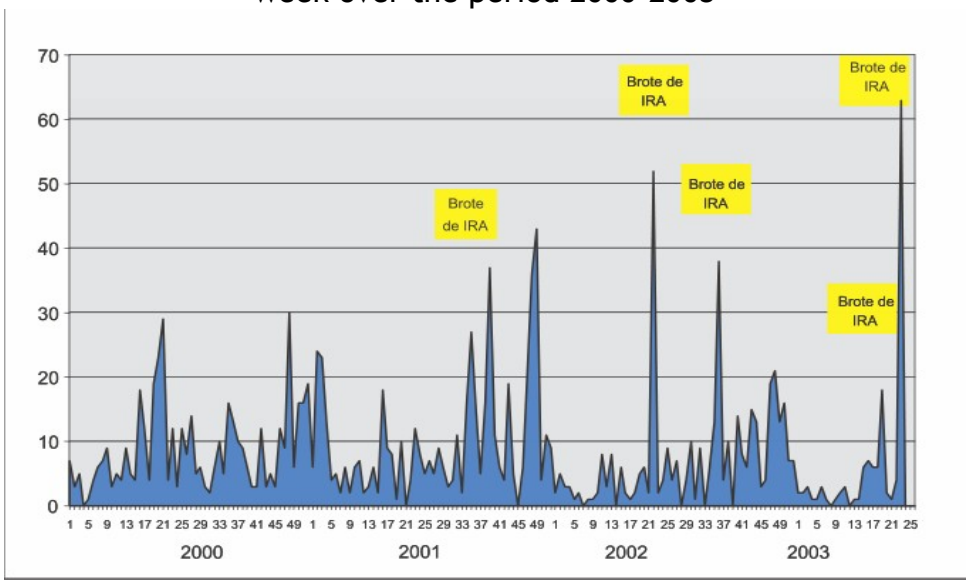
days (DDP, 2006: 32)

IBC study , shows 95% of people indicates the reasons aforementioned causes (IBC, 2009b:11), MINSA (2003: 78) 100% attribute the reduction to fluvial traffic and 33% to occasional spill of fuel. A similar situation is reported for wildlife, also important as a source of protein to these communities (WWF MPO, 2005; ADISEP/COMARU, 2003; MINSA, 2003). For instance, MINSA (2003) refers to the heavier air traffic and disturbances in the food chain as a caused of reduction of birds and other animals, increasing the difficulty of hunting and fishing, which would be even more critical in times of disease outbreaks (MINSA, 2003; Defensoria del Pueblo – DDP, 2006: 6).

4.4.4 Health issues

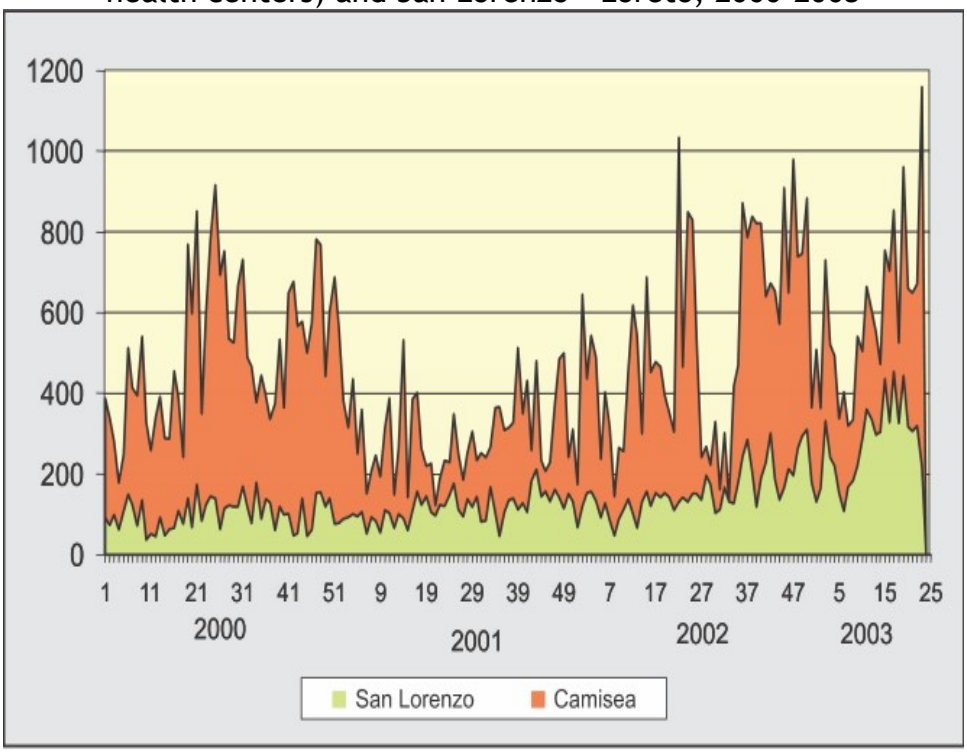
According to MINSA (2003), the reduction of natural resources, especially fish, as first source protein in the diet of riverine population, coupled with water treatment problems of effluents that would increase coliformes specially downriver in the lower Urubamba, represent a threat to health quality the communities in the Urubamba. MINSA (2003:162) documented the level of respiratory infections and chronic dysentery diarrhea IRA and DEA in the Camisea Health Network (11 centers) and compared it to another Peruvian amazonian area with similar characteristics. They concluded that the incidence was significantly lower than in the Camisea area (See Figure 10, 11 and 12). Additionally, the populations reports "New diseases", (faints and dizziness, skin problems) that they associate to small explosions and smoke in the exploitation well nearby their communities (ADISEP/COMARU).

Figure 10: Historic curve of Acute Respiratory infections - ARI in the Camisea River per week over the period 2000-2003



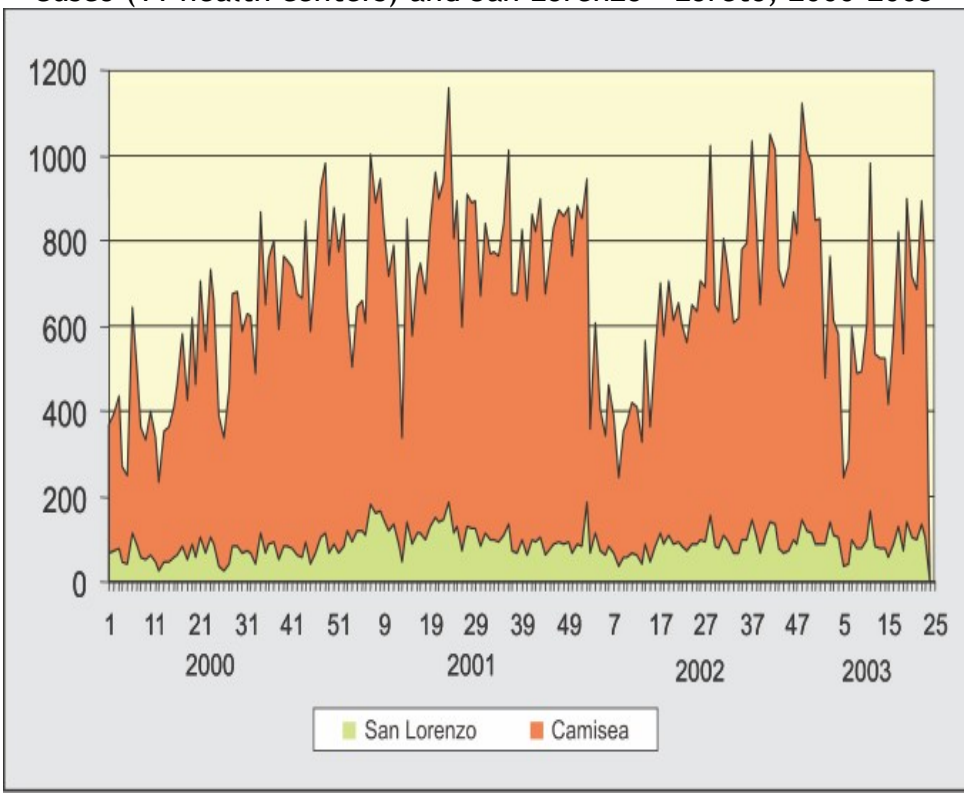
Source: Micro Red Camisea; MINSA (2003)

Figure 11: Comparison of Level of ARI incidence between the Camisea net in Cusco (11 health centers) and San Lorenzo - Loreto, 2000-2003



Source: OGE, MINSA 2003

Figure 12: Comparison of Level of Acute EDA incidence between the Camisea net in Cusco (11 health centers) and San Lorenzo - Loreto, 2000-2003



Source: OGE, MINSA 2003

4.4.5 Conflicts on Valuation Schemes

Without an established evaluation procedure, TGP and Pluspetrol applied significantly different schemes to sign *servitude contracts* to compensate the affected population. This suggests inconsistencies of the criteria used and how effectively they evaluate the lots and damages caused to properties. For instance, the economic compensation given to the Andean communities of Cochas (Anco) and Patibamba (San Miguel), to which TGP paid about 40 000 US$ for 10 km for the servitude for the former, while making a payment of 250 000 US$ for 4 km for the latter. This situation created discomfort among the inhabitants of the different of the villages (Davila et al, 2010: 106).

Additionally, a high number of complaints of the communities, especially for the case of TGP were reported due to a failure to comply with the contracts and occasional verbal agreements made to the communities (DDP, 2006; MatrixBID, 2007).

Loyola (2004) argues that evaluation methods applied in the compensation programs have a number of conceptual problems. For instance, Loyola points out in the scheme used, that it is questionable to consider the economic aspects that the job offer created as a positive impact because it also benefits the company; the assumption that the loss of economic value has a linear relationship to the proportion of the physical damage; the use of economic values from different years and places that were not updated to year of calculation (See Table 2), and were not contrasted with reality, and there was also likely double accounting of the impacts.

Table 2: Group of Environmental factors and economic value used in Pluspetrol valuation scheme and the corrected values by Loyola (2004)

Group of Environmental Factors	Value used (US $)	Unit	Date	Value Updated at 14,5% (US$)*	Increase percentage**
1. Geology and Geomorphology	165.93	Hectare/year	2001	165.93	100%
2. Soils	4.45	Hectare/year	1995	10.03	225%
3. Atmosphere and Air	4120	Hectare/year	2000	4717.4	115%
4. Surface water resources	34.32	family/year	2000	39.3	115%
5. Ground water resources	70	Hectare/year	1994	180.61	258%
6. Flora	6330	Hectare/year	2000	7247.85	115%
7. Wild life	1000	Hectare/year	2000	1145	115%
8. Landscape	200	Tourist/year	2000	229	115%
9. Population	126.51	family/year	1994	326.41	258%

* = Corrected value by Loyola (2004) with 14.5% discount rate used by Pluspetrol to calculate future value of the calculated compensations
** = In relation to the value used used by pluspetrol in the scheme.

In the case of Pluspetrol, DpP states that total compensation represents US$ 10'248 788 for the period of 42 years . However, it is important to consider the high discount rate 14.5% (contrary to interest rate) applied to the compensation amount over the period of concession, in order to translate the amount into its Present Net Value (PNV). (DpP, 2006; Loyola, 2003) Therefore, "the economic value of US$ 645 090 in the year 0, becomes US$ 10'248 788 in 42 years" (DpP 2006: 40). In may 2004, Pluspetrol had paid to the direct and indirectly affected communities in block 88, US$1 579 531, with still US$ 476,992 to pay (TGP, Web site).

In the case of TGP, the economic evaluations were made by third parties for a

larger number of communities and individual properties not only in Urubamba region, but in the Andes and and in the coast. According to DpP (2006) the evaluation scheme only considered the short impact in the properties.

4.4.6 Changes in production and consumption

In the Urubamba region, one of the important indirect effects of Camisea, it is the fact that "It has started processes of colonization and local economic change" (WWF/ MPO) that are increasing the pressure on the ecosystem and resource exploitation. This situation was earlier faced in the 60s (Condor C, 2009: pg 62), and intensified in the 80s with Andean and Pucallpa migrants that live nowadays in the colonos settlements. Currently, the pipeline has open access to Alto Uruabamba (WWF/ MPO). However, the massive arrival of colonists with expectations of employment has been discouragedto a certain extent due to the Pluspetrol strategy of local employment and hiring people in distant cities (MINSA, 2003; Matrix, 2007).

On the other hand, ADISEP and COMARU (indigenous people association) reported that migrations of these Machiguenga population were taking place to remoter and more risky areas (soil stability), as it is declared, due to the **higher pressures** experienced on their livelihoods. "The local population worries about loss of traditional ways and culture but at the same time they want to benefits from development" (Napolitano et al, 2003; Caffrey, 2002)

Inhabitants are experiencing changes in their local dynamics: the introduction of salaries; increased trading activities, replacement of artesanal by manufactured goods, therefore new types of waste; increased paid work among dwellers, which also impacts communal activities such building houses as some inhabitants want to be paid for them (PMAC– Community based Environmental surveillance program, 2008)

Figure 13: Changes in the pattern (relations, design and materials) of house construction

Source: PMAC (2009)

4.4.7 Job creation expectations

According to Apoyo consulting (2007) during the construction phase between 2001 and 2004, Camisea, 5000 workers were employed yearly on average. From this total, 90% were Peruvian workers and 60% of these jobs were taken by locals of the rural and native communities (Dammert et al, 2006). In the specific case of Urubamba region

455 jobs (9%) were created during this phase. For the operation phase, in the case of TGP this number represents an average of 1900 direct jobs in 2005 and 2006. And in the case of Pluspetrol, about 500 worker yearly for 2006 and 2007 (Apoyo, 2007). In 2009, this number averages 160 employees, working for Pluspetrol. The majority are unskilled jobs[29]such as guardians and boat drivers. Some have been trained to participate as monitors for instance in the PMAC– Community based Environmental surveillance program[30] (PMAC, 2009).

4.5 Economic Impacts

At the macro level the economic positive effects calculated for the project include GDP growth, increments in the government revenue due mainly to taxes and royalties, economic savings for natural gas and electricity users, and the positive effects in the national hydrocarbons trade balance, The latter mostly due to the reduction in the imports of other more expensive fuels, like diesel, oil and GLP (Apoyo, 2007). For the period 2000-2006, the GDP increase due to the project was calculated in 4000 Million US$[31].

Consultoria Apoyo (2007), in its report for the Inter-American Development Bank estimated the monetary value for different stages of Camisea (see Table 3), including the total economic impact over the entire concession period (2000-2033)[32]. For the whole period the annual average GDP increase represents 0.8%, totalizing 15371 Million US$.

4.5.1 Distribution of Natural Gas

As Figure 14 shows, natural gas is mostly consumed in the electricity generation and industrial sector, with share of 61% and 38%, respectively, while residential and vehicules run by gas (GNV) accounted for about 1% (Apoyo, 2007: 28-29). Overall, the number of users in all sectors has grown. In 2009, the total number of vehicles converted to natural gas reached 81 000 (75% are taxi); the natural gas network had about 16 500 residential users, about 300 industrial and 700 commercial businesses (Osignermin, 2009: 18).

4.5.2 Types of Clients and Tariffs

The natural gas market is set up with a differentiated tariff structure according to cosumer categories for which different prices apply (See Table 4).There are three main categories of clients: The "initial" users[33]; the "independent" users, and the “regulated” users. Independent users are required to consume 30 000 standard cubic meters (sm3/day) of gas daily gas. Independent and initial users negotiate conditions and price directly with the producer Pluspetrol and TGP, and connect directly to the “main transport” pipeline. The "regulated" customers that use less than 30 000 sm3/day (Calidda, 2008).

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29 That also work for other companies in the exploration phase

30 They work in shift of 6 hours, earning about 450 Nuevos soles (about 150 US$) (Osignermin super Soc88 feb, 2004)

31 Value expressed in 2007 US$.

32 All the values expresses in 2007 US$

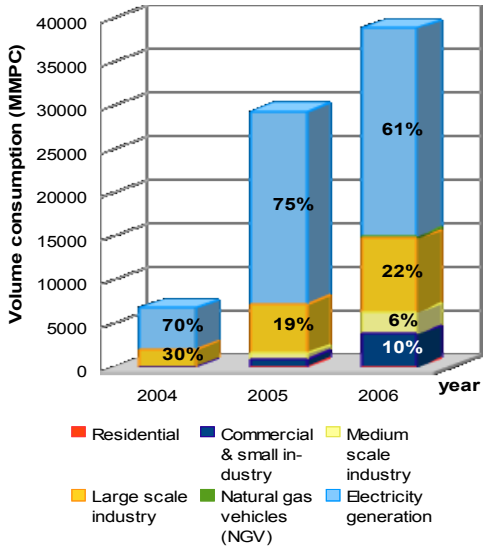
33 Seven enterprises that signed 'take or pay" contracts before 2004

Table 3: Calculated Present Value of the impacts of Camisea project 1/(In 2007 US$ Million)

	OPERATIONS			
	Historical 2000-2006	**Mid-term 2007-2010**	**Long term 2007-2033**	**Total 2000-2033**
TOTAL ESTIMATED IMPACT	7461	5825	16118	23378
1. Economic Activity (GNP)	4294	3669	11078	15371
GNP annual average increase (%)	0.60%	0.90%	0.80%	0.80%
2. Energy savings	3167	2155	5040	8207
A. Electric tariffs 2/	2962	1620	3657	6618
B. Natural gas users	205	535	1383	1588
Residential	-3	-9	17	14
Minor industry and commercial	38	144	332	370
Mid and Large industry	171	326	831	1001
Natural Gas Vehicles Drivers	-1	74	204	203
OTHER IMPACTS				
1. Fiscal accounts	806	1283	3696	4502
Royalties	610	1096	3153	3763
Rent tax	166	408	1184	1349
Customs	115	4	4	119
Selective consumption tax	-43	-132	-423	-466
General sales tax	-42	-94	-222	-264
2. Hydrocarbons Trade balance 3/	1156	2468	7193	8348

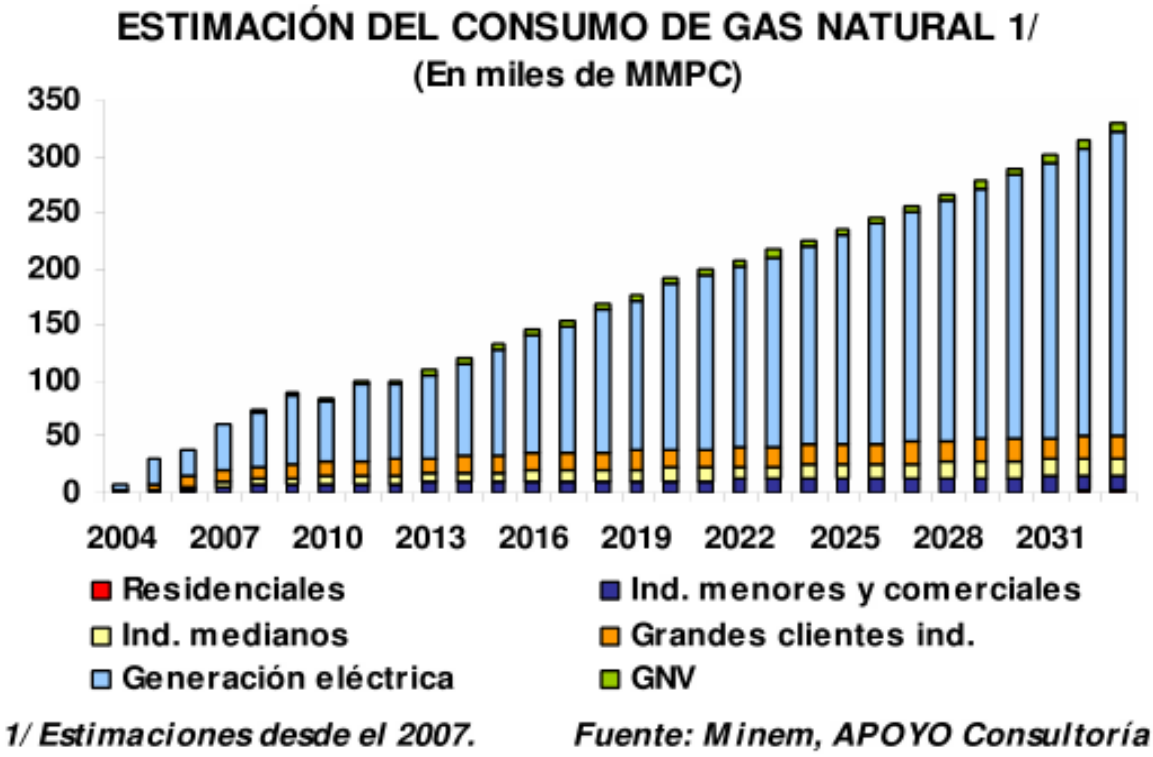
1/ Discounted at a real annual rate of 12%. It includes the expansion of blocks 58 and lot 56.
2/ It express the reduction of the basic price of energy (tariff) and the of main network guarantee payment.
3/ It express the deficit reduction. For the period 2000-2006 it considers the current registred value.
Source: Apoyo Consultoria (2007)

Figure 14: Distribution of the consumption of natural gas for the period 2004 -2006



Source: Apoyo (2007).

Figure 15: Estimation of natural gas consumption in the period 2004 -2031*.



Source: Apoyo (2007). *Estimation from 2007 onwards.

The price of natural gas at "well-head" considers a maximum base price, at which an updating factor associated to the **PPI**[34], is applied to obtain a final price (Dammert et al, 2006a:13-14). This base price is set for power plants at a lower level than non-power plants users. According to Osinergmin, the criteria of the distribution tariff aims to bring to each user category the same savings with respect to the energy substitute, and in a

[34] PPI: Price Product Index This factor was initially associated to the industry of oil, and from 2007 is related to the industry of gas

way that the tariff be reduced with larger volume (Osignermin, 2008: pg 173).

Table 4: Average tariff by category in 2006

Users Categories	Consumption	Natural gas at "well-head"	Transport (Main network)	Distribution (Main and others network)	Total tariff 2006 ($/MMBTU)
Initial/Independent		**2006**			
Power plants		1.37	0.80	0,13	**2.29**
Other large scale industries*	>30 000 sm3/day	2.08	1.04	0,21	**3.32**
Regulados					
Residential **(A)**	< 300 sm3/m	0.83	1.03	4,79	**6.65**
Commercial **(B)**	301 -17 500 sm3/m	2.22	1.01	1.72	**4.94**
Small scale industry **(C)**	17501 –300 000 sm3	2.22	1.03	0.73	**3.98**
Medium scale industry **(D)**	> 300 000 sm3/n	2,22	1.04	0.52	**3.78**
Price to the public at filling stations		-	-	-	**9,35**

Source: Apoyo (2007:pg 81) for the year 2006
*Tariff for filling stations that supply Natural Gas vehicles.

4.5.2.1 Incentive and barriers to connect the NG network

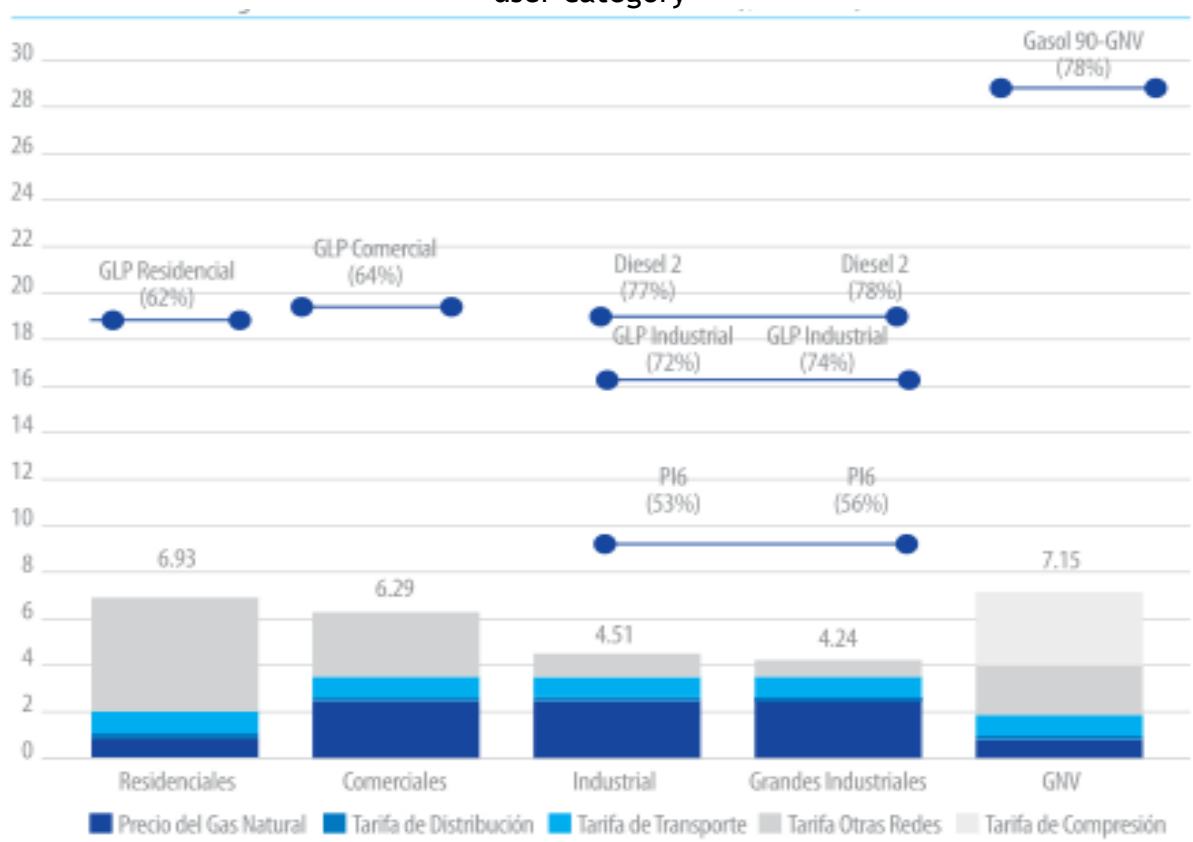
It can be observed that even/although? the residential tariff is the lowest , when adding transportation and distribution, the final price becomes the second highest. Even though the number of residential users increased, it did so to a lesser extent than expected, due the relatively high initial connection cost and the long period (over four years) to recover the investment. These costs are 45% higher than the average monthly salary of U$$ 448 in the Lima center.

In the case of commercial users (restaurants, schools i.e.), tariffs are about 50% and 100% higher than large scale industry and power plants respectively. Commercial businesses face similar contraints to residential users, added to a lack of information of accessing the natural gas network (Apoyo, 2007: pg 29 -36). In turn, natural gas use has expanded rapidly in the industrial sector, this mostly due to a shorter time of investment recovery, generally less than two years. The demand for natural gas has increased in various industrial areas in Lima that are not yet accounted for on the NG distribuion network, especially for small and medium scale industries. Within the sector in 2006, the tariff structure implies for small scale industry a price 20% higher than for large scale industries and 70% higher than power plants.

4.5.2.2 Savings in energy expenditure for using Natural Gas

The proportion of economic savings for changing to natural gas, are estimated to be between 50 and 80% depending on the alternative fuels to be replaced (Calidda, 2008; see Figure 16). The total savings, considering conection costs, have represented **205$** for natural gas users ove**r period 2004-2006** (Table 1). These have been delivered among large scale industries, which mostly replaced diesel, GLP and residual oils with 42% of the total; medium size industries (21% savings), NG vehicles users (13%), small scale industries and comercial bussiness (23% together), users that changed from GLP and diesel; finally residential users took up 1% of the savings (Apoyo, 2007:52-54).

Figure 16: Level of economic savings of replacing alternative savings for natural gas by user category



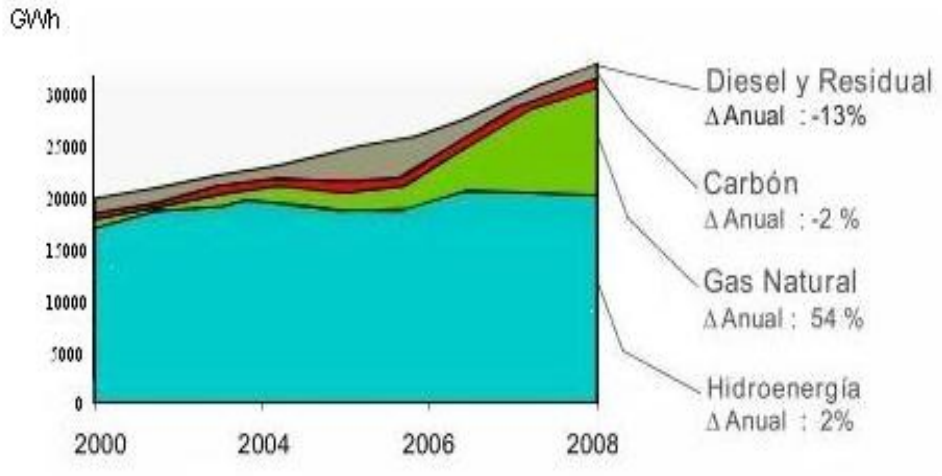
Source: (Calidda 2008: pg 45)

4.5.3 Monetary savings associated to electricity

4.5.3.1 Increase of installed capacity and electricity generation with natural gas

The Electricity sector, is by far the biggest user of natural gas. As it can seen in Table 4, power plants benefit not only from a lower price at "head-well" but also from a lower "main network" transport tariff. The reasoning behind this is the replacement of other fossil fuels for natural gas in the electricity sector, which has actually happened to a certain extent and eventually benefit electricity users with a lower electricity price. With an annual growth of 54%, electricity produced in natural gas power stations reached 37% of the total electric energy produced in 2009 (see Figure 17).

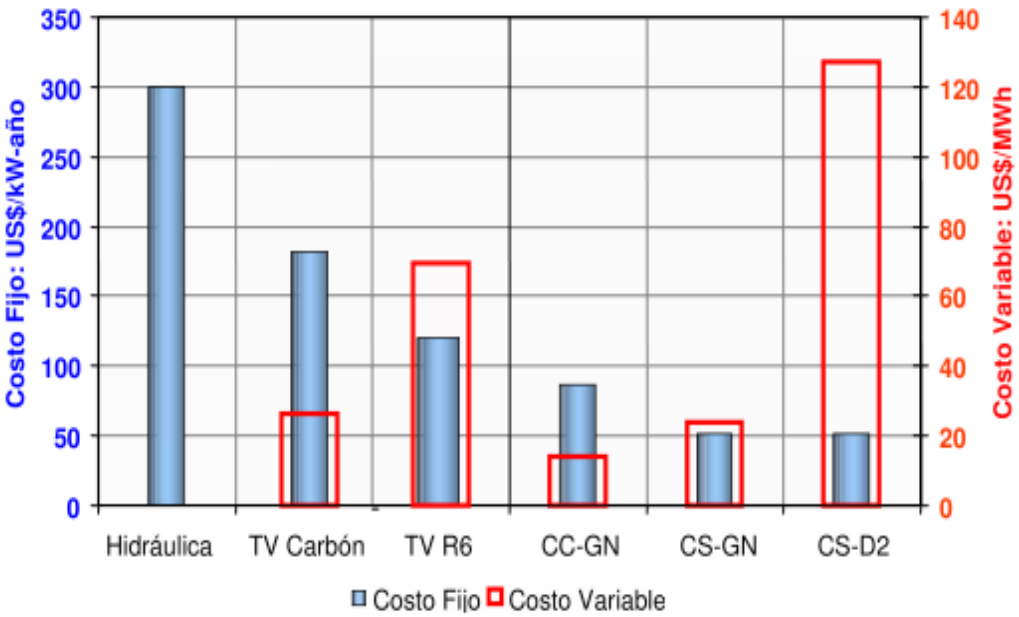
Figure 17: National electricity production by energy source over the period 2004 – 2008.



Source DGE- MINEMb, 2009: pg. 25-26):

The incentives unfold by the low prices of natural gas in comparison with other fuels have created an incentive for construction of power plants run with the new fuel, examples of this are found in Chilca (Lima) and Kallpa (Ica) (La Republica, 2007; Apoyo, 2007). By 2009, there were eight power plants projects in Lima and two in Ica, that count on authorization of construction (DGE -MINEMb, 2009: 25-26) Thermal installed capacity represents 51% at national level. While, powerhouses run by Camisea natural gas account for 31% (COES, 2009: 9,96).

Figure 18: Fix and variable cost of electricity production by technology



Source: (Mendoza 2009: 5)

The fix costs (facilities, etc) for building natural gas power stations, is already lower than coal, residual oil and Hydro-electrical power plants. Thus, with low prices given

for natural gas, the variable costs (It includes fuel costs) are 17 US$ and 27 US$/Megawatt (MWh) for Simple and Combined cycle (CC[35]) respectively. Which is cheaper than any other electricity generation technology (See Figure 19)(Osinergmin, 2008: pg 111)

4.5.3.2 Electricity prices with Camisea

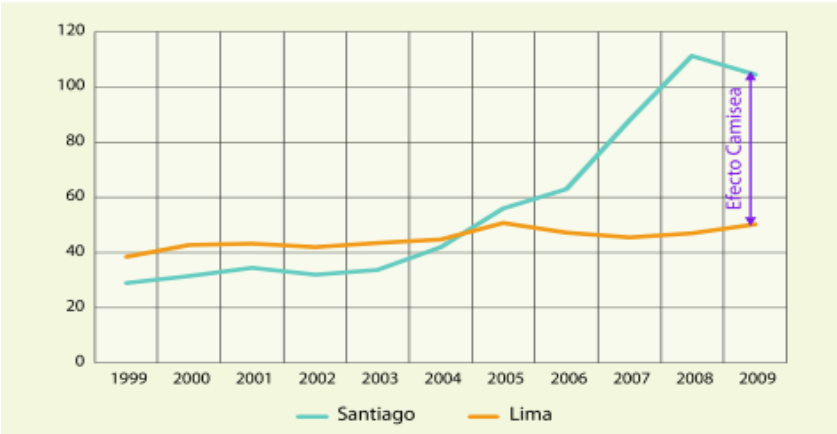
It is clear that the thermal electric generation is incorporating strongly in the sector. The support given to Camisea natural gas, implied the reduction electricity prices, which was initially announced by the state and media as a 30% reduction of the electricity tariffs. However, such a expected reduction is mostly based on a not increase of the electric energy tariff (Osinergmin 2009c: pg 10; Gestion, 2010;). In comparison to what would have been the scenario without natural gas, then the use of now more expensive fuels like diesel or residual, the tariff could be higher. The similarities between the Chilean and Peruvian electricity sectors, are presented as the possible scenario of the sector. (Osinergmin 2009c: pg 10-11; see Figure 19).

4.5.3.3 The Main Network Guarantee (GRP)

This mechanism, entails that the electricity users, make a payment as part of their electricity bill, added to the electricity transmission costs, to guarantee the efficient recovery of the investment, operation cost and maintenance of the investors (TGP and Calidda), in the case the transport infrastructure is not used at maximum capacity.

The fiction of “full pipeline” (Osinergmin 2009a, pg:119) is useful to explain the logic of the GRP mechanism. If the pipeline is used to full capacity, maximum demand, the total costs are divided up between more users, then the cost are "diluted" and the price of each unit of transported gas is necessarily lower than if the pipeline is not full. At high (full pipeline)) or very low demand (empty), the investment cost of the transport infrastructure are the same and the operation and maintenance vary slightly (Osinergmin 2009a, pg:118-119).

Figure 19: Comparison of prices of electricity generation in Lima and Santiago de Chile.



Source: Osinergmin (2009c: pg12)

[35] The natural gas combined cycle CS has 55% of thermal efficiency against the 34% of the Simple cycle technology (Osinergmin 2008:pg 115-116)

To guarantee NG at low price for power plants, and secure their demand, the government chose to give them an "full pipeline" price, even though, in the reality the pipeline would not be being used at maximum capacity. Thus, The GRP is calculated to make up for the "missing" income, not paid by the electricity generation industry, which is needed to complete the guaranteed revenue to the investor when the pipeline is not used at maximum capacity. Consequently, once the infrastructure is used at full capacity the GRP would be zero[36] (Osinergmin 2009a, :118-119, see Figure 20).

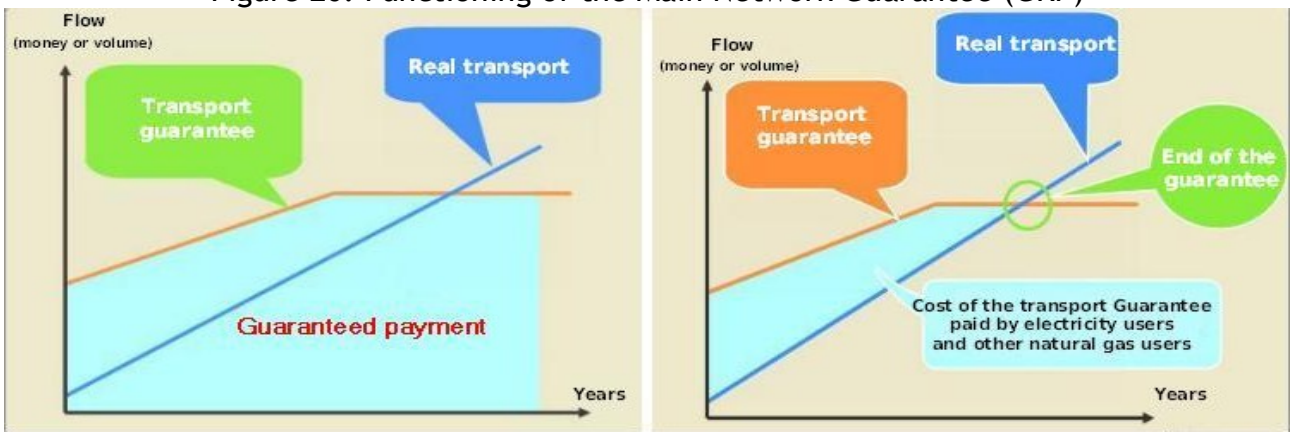
Table 5: Payment received by TGP and CALIDDA with the Main Network Guarantee - GRP

GRP collection period	Amount (Million US$)		
	TGP	CALIDDA	Total
2002-03*	47.2	4.5	51.7
2004	76.5	7.3	83.8
2005	97.2	8.2	105.4
2006	83.1	5.8	88.9
2007	65.9	3.4	69.2
2008**	26.8	1.3	29.7
Total GRP	**397**	**31**	**429**

Source: Osinergmin website (2008)
* = GRP Collection before Camisea stased operations
** = Osinergmng 2008 annual statistics.

The annual guaranteed capacity for TGP is 380 MMSFD [37]) till 2011, from then onwards 450 MMSFD. For Calidda this guaranteed capacityis 225 MMSFD for the entire period (BOOT contract, 42 present precio en barra 42). As showed in Table 5 and Figure 21, the amount paid by users under the GRP mechanism total 430 Million US$ till 2008. The GRP started to be collected before the beginning of Camisea operations, peaked in 2005 and then started to decreased.

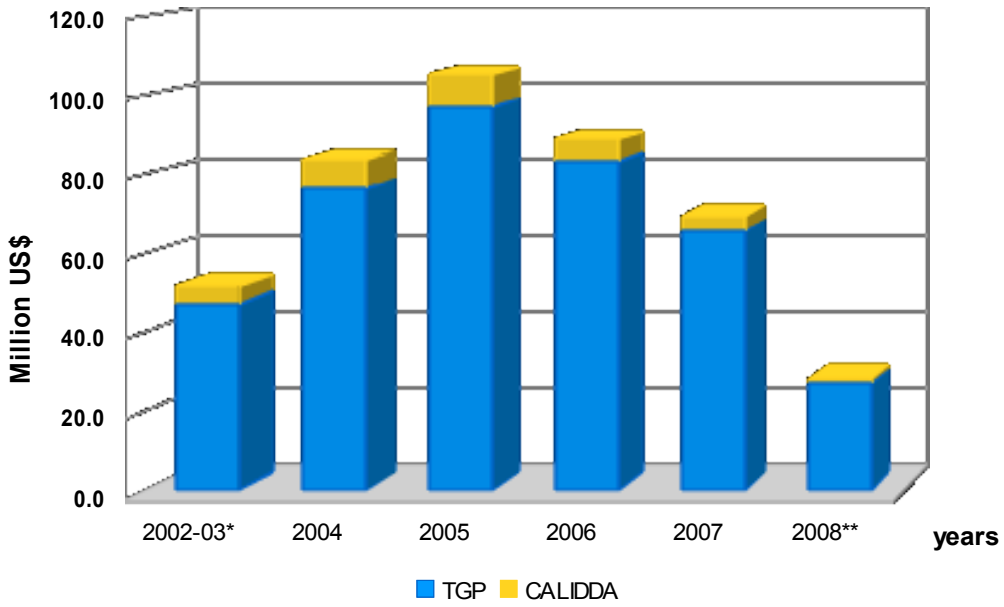
Figure 20: Functioning of the Main Network Guarantee (GRP)



Source: Osinergmin (2008: pg 122).

[36] If was staed in case the GRP would not work, or would be eliminated in the future, the amount should be paid by te state.(Osignermin, 2008: pg 137).
[37] Million cubic feet per day

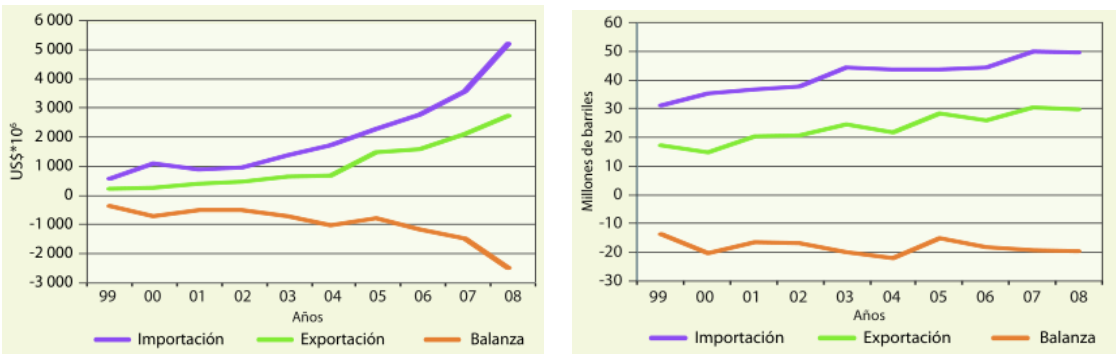
Figure 21: GRP Collection from 2002 to 2008.



Source: Own elaboration based on data from Table 5

Figure 22: Balance of trade of Hydrocarbons (a) millions US$ and (b) Million of barrels from 1990 and 2008

a b



Source: (Osignermin, 2009c)

4.5.3.4 State Policy Intervention: Fuel Price stabilization Fund

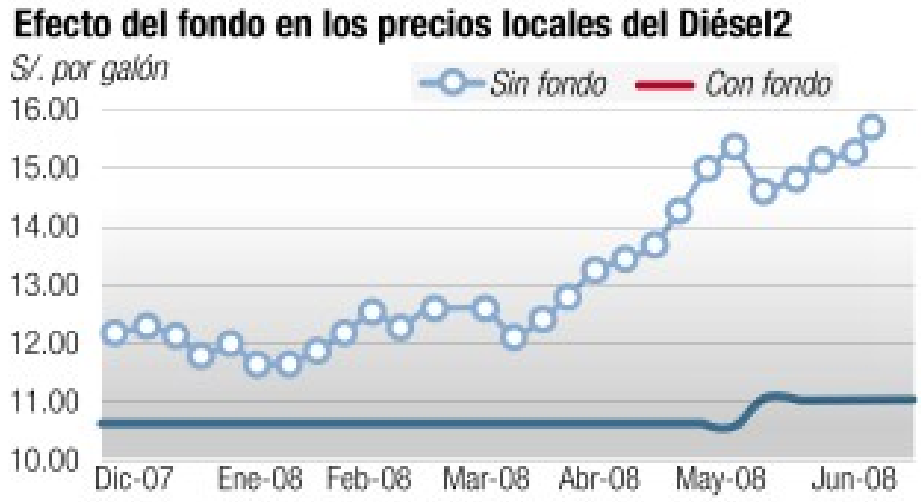
This fund guranteed by the state was created in 2004 with objetive to avoid the price volatility of the international fuel market, that significantly affect the internal fuel market. It is meant to collect contributions and discounts that producers (refineries) and importers of fuels would apply to their products prices. In this fashion, if the products prices are higher than a referencial toll, the refineries and importers withdraw from the fund instead of translating the higher price to the users. In turn, if the prices are lower the producers contribute to the fund intead (Macroconsult, 2008; SNMPE, 2003). However, in practice, with the higher international prices, it has worked

as compensation to refineries, importers of fuels and indirectly to intensive consumers, From its creation to 2009, the fund compromised a total contribution of about 1200 million US$ (Mariluz, 2010; Reyes, 2008)

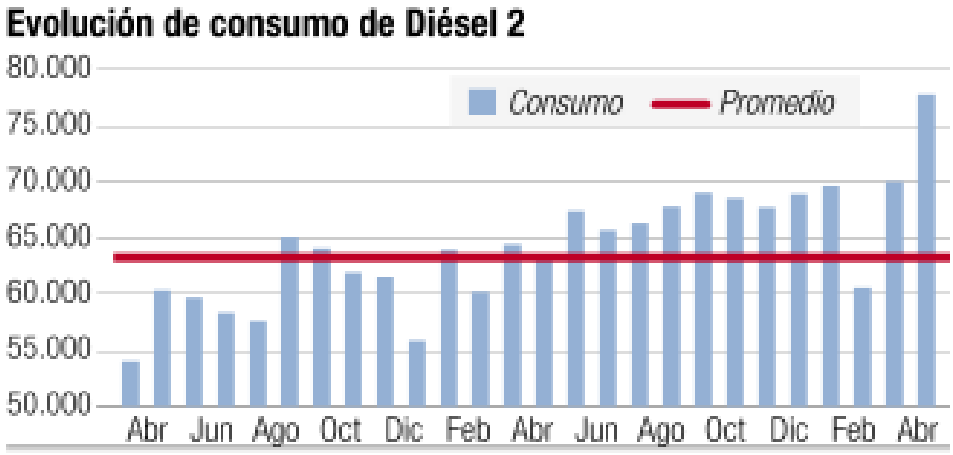
The effort to develop the natural gas market, making available the natural gas an affordable and competitive fuel against other fuels, appeared till certain contradicted by the initiative of the state to guarantee the Fuel price stabilization Fund. Expensive alternative fuels of Natural gas like diesel, with the highest share, and GLP are in operational terms subsided and have increased their use (see Figure 23 a & b).

Figure 23: Effects of subsidies (fuel price stabilization fund) on Diesel price (a) and use (b)

a



b



5 Analysis and Discussion

Having outlined and approached in detail the economic and socio-environmental impacts in section 4, in this section the general features, relationships and tendencies of the two systems of the Camisea Project, extractive and productive are analyzed and discussed. Along with this characterization, I explain ecological and economic distribution processes.

Following Bunker (1994) the capital fixed at the sites of extraction (Exploration, exploitation, transport infrastruture) and the related andean and native comunities along the pipeline and in the Urubamba region represent the "extractive system". Gas consuming capital and individuals at the sites of distribution, at cities of Lima and Ica, and gas importing international locations represent the "productive system".

5.1 Ecological Distribution and the Role of the State

In this section will discuss two movements of the extractive and productive systems dynamics in the Camisea Project: Access and use of the resources extracted or disrupted in the former, and the responsibility for the effects of the extraction process, both with special attention to how the State articulates to them.

5.1.1 Access and Use of Natural Resources

Martinez Allier (2000: 40) argues that “Economic time in the newly incorporated territories is quicker than biological times, at least for a while and people who follow the rhythm are disposed in the process". This statement, appears to be true in the Camisea extractive system since natural gas is removed in some decades from the place where it took millenia of geological proceses to be produced. Therefore the resource is lost for the present and older generations in the extractive region that do not have access to it, this constitutes one of the inequalities pointed out by Bunker: the actual dissapearance of non-renewables in the periphery (1994:1054).

Two other inequalities addressed by Bunker (1994:1054), are the transfer of nature labor embedded in the natural resource and the full realization of the value of the extracted resources in the productive system. A first occurrence of this the latter is when the value of liquids of natural gas (LNG) is realized in the productive system (Ica) for the industrial process to obtention GLP, kerosene and diesel, that are sold at higher prices to different regions

The next occurrrence is when the value of natural gas extracted is realized as a cleaner source of energy in the productive system (Lima), with less pollutant emissions than other fossil fuels, like coal and diesel (Rodriguez et al., 2010:462; Xianqiang et al., 2005:308). In the productive system, the natural gas consumption (section 4.5.1) is mostly accessed by the large scale industries (80%). Massification of natural gas consumption is still limited among residential users and comercial business due to economic and information constraints. Growing small-scale and medium business demand is unsatisfied due to lack of distribution networks and competition with the international expansion of the productive system with exports starting July 2010.

Natural gas, cleaner and more affordable, is not available to the societies related to the extractive system, where energy consumption is based on non-commercial fuels like firewood and commercial ones like diesel, oil or GLP. They do not produce these and therefore need to buy from refineries and importers. For instance, in the Cusco region, firewood and kerosene are the most used fuels for cooking and lighting in rural areas. Cities use mostly electricity (hydro mainly), kerosene and GLP. In the transport, industrial, and electricity generation sectors the most commonly used are GLP (it comes from the plant in Pisco that processes Camisea LNG), diesel and gasoline (MINEM, 2005:29-32)(appendice 1)

After the hydrocarbon extractive enterprise, in real terms, the accessibility and the effective ownership (in the customary sense) of the resources by the locals have decreased. This regarding natural resources both over and under the land (legally owned by the state) and the land itself. This reduction occurred following the expansion of the hydrocarbon frontier eased by state, that bestowed the resources to the private company and favored individual over communal land property rights. First, the natural gas under the soil is granted for exploitation. Second, the servitude of the land for gas extraction is imposed upon the local owners for 33 years, thus limiting its use over the entire period of time. And third, the grant of individual property rights by the state to immigrants over communal property. This last point refers specially to the upper Urubamba, where colonizers, workers have arrived after the opening of frontiers by the new infrastructure.

5.1.2 Environmental and Social effects: Externalities

From a human rights perspective, the rights of people in the extractive region are violated from the very beginning of the exploration activities when easement rights are granted over the same land already owned (legally or customary) by indigenous people. Additionally, the affected communities were minimized in the consultation and participation processes. This loss of rights reveals the rolling back of the state in the protection of citizens, communal property and environmental protection, taking into account the international agreements on indigenous people rights, which the country has to comply with. This is comparable to what Harvey (2003:148) explains as “the new wave of 'enclosing the commons'”, where the states power is used to privatize public assets without public consent. This situation is exacerbated in the case of groups in voluntary isolation because their human rights are being disregarded by forced contact, even with the mere act of consultation (Napolitano & Ryan, 2007:7).

The burden of direct and indirect social effects, health deterioration and even the risk of death among voluntary isolated groups is an additional pressure on the extractive system (rural area, especially in the area of direct impact). This is also true for the risk of environmental pollution and ecosystem disturbances: soil erosion, deforestation, likely declining quantities of sources of food and quality of water resources. Ecological imbalances are fueled further by immigration, accompanied by the opening of exploitation of other natural resources. Studies like Bunker (1984: 1036-1037, 1052) in the rubber boom in the Brazilian amazon, and Napolitano & Ryan (2007) in the Urubamba, point out the increased livelihood vulnerability of the populations after trade and ecological disturbances causing major imbalances in their mixed extractive and agricultural economies.

Consequently, these negative externalities are assumed by society in the extractive system. An internalization of externalities through monetary compensation was adopted by the companies' consortium that extracts the gas. However, its top-down negotiation and implementation resulted in value conflicts with some of the communities, that eventually lead to increase the economic compensations. Moreover, some advances have been originated from Camisea that have supported some joint initiative with communities as part of social responsibility, and the official recognition of protected areas nearby Camisea.

In other stance the companies argue that the responsibility for indirect socio-environmental impacts falls on the state (WWF MPO 2005: 5). However, following this rationale, if the negative direct externalities are to be assumed by the consortium in the extractive system, then those receiving the positive indirect externalities in the productive system would pay for the benefits like cleaner air, derived from the use of natural gas.

In this respect, the role of the state is limited to provide an official institution to mediate the elaboration of an environmental scheme, practically reduced to a general criterion. However it is up to the consortium to decide what economic valuation to use and to what extent assume the costs. This is related to the level of discount applied (section 4.4.5) in the valuation scheme that places the communities in a disadvantageous position, where thhe company has the power to decide if it will pay the most or the least. For Wallerstein (2004), this comes back to a historical process of "externalization of costs", referred as the major mechanism that has made possible the transfer of costs from the entrepreneurs to others."

Martinez Alier argues that "there is no "ecologically correct prices", although there might be "ecologically corrected prices" (2000: 36-37). Thus, even if there were more than one valuation scheme, in operational terms the economic value paid by the consortium was, as Martinez Alier (2000: 23, 36-39) argues, the reflection of the social perception of these externalities, the asymmetry of power and the social movement of the communities who expressed their opposition. Bebbington et al, (2008) in his analysis of Peruvian social movements in the Andes, argues that the state position in mining conflicts, depends on the company's importance to the national income and the effectiveness of anti or pro-mining lobbies.

5.2 The role of the State and Economic Distribution

The extractive and productive systems in Camisea are shaped differently in terms of environmental and social effects, which were the main reasons for opposition of civil society. Nevertheless, the importance and support of Camisea relies on its contribution to the countries economy (section 4.5), the creation of jobs and improvement of living standards.

5.2.1 Configuration of the Extractive-Productive System

I turn now to highlight relevant economic aspects of Camisea that can be related to the

distinct economic growth in the regions[38] (Figure 16). In the extractive system the creation of jobs is mostly related to the un-skilled workers communities in the plants and in the PMAC[39], many of these workers have been trained by the company and their salaries comply with legal minimum wage. Thus, skilled workers come from other areas to the extractive systems, while the productive system provides itself the industries installed in Lima and Ica. During the construction phase workers came from other countries to assist the technological requirements of the project.

Regarding the royalties, the amount was a total of 1200 million US$ in four years of operations (2004-2008), 62.5 % of which was directed to the extractive system (50% Cusco, 12.5% other affected regions). This rapid increase in the region expenditure has been mostly directed to infrastructure such as roads, school buildings and irrigation projects. However, the transparency and public participation in some areas is still limited. There is also a concern among the population for the aparent dismiss of agricultural activities and changes in cultural and social relations (OXFAM, 2009: 121-131).

Two other gains of Camisea are lower price of natural gas in comparison to other fuels and cheaper electricity prices (appendix 2). In the first case such savings are only released in the productive system associated with distribution infrastructure. The distribution of the total economic gain is mainly directed to large-scale industry which pays the lowest prices and captures 42%, in contrast to natural gas vehicles (13%) and residential users with 1%. Whereas, in the case of electricity the benefit can be only taken up by those who are connected to the electricity network, that is already cheaper in the productive system. Overall, the rationale in the use of natural gas is directed to cater the lowest price to the highest rate of consumption, that is a reproduction of the tariff system used in the electricity generation.

In general, the configuration of the extractive system has been changed rapidly to adapt to the new demands, and in general the economic revenues are directed to make up for the historic deficit of public infrastructure. Bunker (1984: 646, 1057-1059) argues that the extractive system tends to reorganize its environment around extractive enterprises, rather than other productive activities, developing infrastructure that loses its utility once the resources are exhausted. In comparison to productive systems that are more stable, count on shared labor pools and can develop more lateral linkages than the extractive ones.

6 The Role of the State: Redistribution

Overall, the state has played an important role in ease the redistribution of risks and benefits in the extractive and productive systems, that can be linked with the ideal-typical characteristics indicated byCastree, (2008:142) as constitutive of Neoliberalism:

- **"Privatization",** that implies the assignment of property rights to social or environmental phenomena that before belong to no one, to the state or was commonly owned was mediated by the state

[38] While Cusco reaches a GDP increment of 7.2%, Ayacucho 9.2% and Huancavelica 2.8%, Lima and Ica experiences rates of 10% and 22% (INEI, 2009b)

[39] Community based Environmental surveillance program

- **“Marketization”** The assignment of prices to phenomena previously protected from commercial exchange or just unpriced for various reason.
- **“Deregulation”** It refers to the roll back of the state of social and environmental life, thus actors become more self-governing
- **“Reregulation”** that refer to state policies that ease privatization and marketization
- **“Construction of flanking mechanism”** which implies that civil society groups and NGOs take responsibility for providing services that the interventionist state did

Privatization takes places in the extractive system with the privatization of the natural gas reserves and the assignment of individual titling to communal land, and in this way debilitate the community as “representative territorial institutions in defense against third parties and nowadays against the state as promoter of the Private investment” (Del Castillo et al, 2004: 52). The marketization of nature and environmental services accompanied by deregulation of social impacts related to public health, disease and assistance in the negotiations of valuation schemes, eased the dispossession of populations in the extractive system, The construction of flanking mechanism that took the responsibility for supporting indigenous people in the defense of their rights .

Finally, three crucial policy instruments are touched upon to improve the picture of economic distribution. First, the GRP mechanism (section 4.5.2.3) that in practice, made electricity consumers bear the risk of the gas transport system, finance its expansion (430 million dollars until/by 2008), and at the same time pay for power plants to have a lower transport tariff. Second, the existence of the fuel Stabilization fund in practice subsidizes the producers and importers of the natural gas dreived products, including GLP produced by Pluspetrol. Third and last, the consent of the state in the first place to allow exportation of cheap energy like natural gas again in exchange for oil purchased at higher and rising prices in the international market. This is also true at the national level between the productive and extractive regions, core and periphery.

7 Conclusion

The development of the Camisea Project in the Amazon despicts the complexity of the struggles for land and resources, the conflicting interests between different social groups and territories, and the importance of the role of the state to organize economic and ecological distribution. Camisea represents a significant capital inyection into Peru's economy, and this happens to both ends of the extractive-productive relationship in the exploitation of energy. However, the already existing differences in power, level of inmersion in the economic system, provision of health, education among other public services, coupled to the ongoing rolling back and re-regulatory and de-regulatory actions of the state (Castree, 2008:142) in favor of the private sectors, generate, not only the imbalanced distribution of economic and social assets but also inequities in the distribution of environmental burden, the access and use of resources. Another outcome from analysing the Camisea case, is that it signifies a precedent of intensifying environmental pressures and conflicts likely to arise from, adding effects of future intervention in the Peruvian Amazon, considering the scale of the current hydrocarbon exploration activities that are taking place.

8 References

Amazonía 2009 Áreas Protegidas e Territórios Indígenas | RAISG. Available at: http://raisg.socioambiental.org/node/106 [Accedido Mayo 24, 2010].

Merriam-Webster Dictionary online. Available at: http://www.merriam-webster.com/dictionary/servitude [Accedido Mayo 24, 2010].

Apoyo Consultoria, 2007. Camisea Project Impact on the natural gas market and economic benefits estimation. Elaborated for Inter-American Development Bank . Available at: http://www.iadb.org/IDBDocs.cfm?docnum=1162192.

Bebbington, A. et al., 2008. Mining and Social Movements: Struggles Over Livelihood and Rural Territorial Development in the Andes. *World development.*, 36(12), 2888.

Benavides, M., 2009. Mapa Amazonia 2009. Amazonia Peruana. Available at: http://www.raisg.socioambiental.org/system/files/Amazonia_Peruana.pdf [Accedido Abril 12, 2010].

Bury, J., 2005. Mining mountains: neoliberalism, land tenure, livelihoods, and the new Peruvian mining industry in Cajamarca. *Environment & planning A.*, 37(2), 221-240.

Cabello, J., 2009. An indigenous Rubicon . *Red Pepper august*. Available at: http://www.redpepper.org.uk/An-indigenous-Rubicon [Accedido Abril 12, 2010].

Calidda, 2008. Memoria Anual 2008. Available at: http://www.calidda.com.pe/descarga/Memoria_2008.zip [Accedido Abril 12, 2010].

Campodonico, H., 2009. Camisea: así fue la cosa | LaRepublica.pe. *La republica 22/06*. Available at: http://www.larepublica.pe/cristal-de-mira/22/06/2009/camisea-asi-fue-la-cosa [Accedido Mayo 10, 2010].

Carrillo , H., El monitoreo Ambiental y Social Comunitario en la Cuenca del Bajo Urubamba. Available at: http://www.etechinternational.org/2009Cusco/dia2_17abril09-manana/HemrryGutierrez_ProNaturaleza_pmac09cusco.pd [Accedido Mayo 24, 2010].

Castañeda, P., 2009. El derecho a la tierra y los acuerdos internacionales - Buscar con Google. Available at: http://www.cepes.org.pe/apc-aa/archivos-aa/a01e3bc3e44a89cf3cd03d717396a20e/El_Derecho_a_la_tierra.pdf [Accedido Abril 8, 2010].

Castree, N., 2008. Neoliberalising nature: the logics of deregulation and reregulation. *Environment & planning A.*, 40(1), 131-152.

Castree, N., 2005. The epistemology of particulars: Human geography, case studies and €˜context€™. *GEOFORUM*, 36(5), 541-544.

CEPES, 2001. Agro y minería : ¿hay alternativas? *La Revista Agraria*, (29), 9.

COES SINAC - Operations Comite of the National interconected electric System, 2008. Estadística Anual 2008. Available at: http://www.coes.org.pe/DataWeb2/2009/STR/estadistica/ANUAL/anual.htm [Accedido Abril 12, 2010].

COFOPRI, Plan Estratégico Institucional 2008-2011. Available at: http://www.cofopri.gob.pe/pdf/PE-2008-2011.pdf [Accedido Abril 8, 2010].

CONACAMI - Confederacion Nacional de Comunidades afectadas por la mineria, 2009. Expansión de las Concesiones Mineras en el Centro de Perú. Available at: http://www.conacami.org/site/index.php?option=com_content&view=article&id=119:expansion-de-las-concesiones-mineras-en-el-centro-de-peru&catid=47:publicaciones&Itemid=87 [Accedido Abril 11, 2010].

Cóndor C., E., 2009. *Estado de la relación entre justicia indígena y justicia estatal en los países andinos : estudio de casos en Colombia, Perú, Ecuador y Bolivia*, Lima: Comisión Andina de Juristas.

Dammert, A., García, R. & Vásquez A., Los Efectos Económicos del Proyecto Camisea en el Perú, 2005-2014. Documento de Trabajo Nº 14 . Available at: http://www.osinerg.gob.pe/newweb/uploads/Estudios_Economicos/DT14_OSINERG.pdf [Accedido Marzo 10, 2010].

Dammert, A. & Molinelli F., 2006. ¿Qué significa el Proyecto Camisea?. Documento de Trabjado Nº 23. Available at: http://www.osinerg.gob.pe/newweb/uploads/Estudios_Economicos/DT23_OSINERG.pdf.

Dávila J. & Gamboa C., 2010. *Análisis Legal de los Contratos de Transporte del Gas de Camisea*, Derecho Ambiente y Recursos Naturales DAR. Available at: http://www.dar.org.pe/hidrocarburos/libro_tgp.pdf [Accedido Abril 22, 2010].

Defensoría del Pueblo, 2006. INFORME DEFENSORIAL Nº 103: "El Proyecto Camisea y sus efectos en los derechos de las personas" . Available at: http://www.defensoria.gob.pe/modules/Downloads/informes/defensoriales/informe_103.zip [Accedido Abril 22, 2010].

Del Castillo L. Castillo, M., Monge, C. & Bustamante M., 2004. Las Comunidades Campesinas en el siglo XXI. Situación actual y cambios normativos . Available at: http://www.landcoalition.org/pdf/05_ALLPA_Comunidades_Campesinas_en_siglo_XXI.pdf [Accedido Abril 9, 2010].

DGE - Dirección General de Electricidad Ministerio de Energía y Minas, 2004. El Gas Natural en El Mercado Eléctrico y sus Perspectivas . *Informativo DGE* , (8). Available at: http://www.minem.gob.pe/minem/archivos/file/Electricidad/promocion electrica/informativo8.pdf [Accedido Abril 12, 2010].

DGE MINEM - Direccion General de Electricidad Ministerio de Energia y Minas., Peru Sector Electrico 2009. Documento Promotor. Available at: http://www.minem.gob.pe/publicacion.php?idSector=6&idPublicacion=52 [Accedido Abril 12, 2010].

Escobar, A., 2006. Difference and Conflict in the Struggle Over Natural Resources: A political ecology framework. *Development*, 49(3), 6-13.

Finer, M. et al., 2008. Oil and Gas Projects in the Western Amazon: Threats to Wilderness, Biodiversity, and Indigenous Peoples. *PLoS ONE*, 3(8), e2932.

Finer, M. & Orta-Martinez, M., 2010. A second hydrocarbon boom threatens the Peruvian Amazon: trends, projections, and policy implications. *Environmental Research letters*, 5(1). Available

at: http://iopscience.iop.org/1748-9326/5/1/014012 [Accedido Abril 12, 2010].

Gestion, 2010. MEM: El gas natural redujo el costo de la electricidad en 30%. *Gestion*. Available at: http://gestion.pe/noticia/421974/mem-gas-natural-redujo-costo-electricidad-30 [Accedido Abril 12, 2010].

Greig, A., Hulme, D. & Turner, M., 2007. *Challenging global inequality : development theory and practice in the 21st century*, Basingstoke [England]; New York: Palgrave Macmillan.

Grupo de trabajo sobre pueblos indigenas., 2009. Situación de pueblos indígenas en 2008. Available at: http://www.cepes.org.pe/pdf/observatorio_tierras/situacion_pueblos_indigenas_2008_peru.pdf [Accedido Abril 8, 2010].

Guha, R. & Martínez Alier, J., 1997. *Varieties of environmentalism : essays North and South*, London: Earthscan Publications.

Harvey, D., 2007. Neoliberalism as creative destruction. *Peace research abstracts journal.*, 44(3), 21.

Harvey, D., 2003. *The new imperialism*, Oxford; New York: Oxford University Press.

IBC, 2010. Hidrocarburos amenazan Amazonía. *Noticias marzo*. Available at: http://www.ibcperu.org/noticias/detalle-noticia.php?codigo=00134 [Accedido Abril 12, 2010].

IBC, 2009. Lanzamiento de dos mapas inéditos: Amazonía global y Amazonía peruana. Nota de prensa. Available at: http://www.ibcperu.org/mapas/pdf/nota_prensa_presentacion_mapas.pdf [Accedido Abril 12, 2010].

IBC/SICNA, 2009. Mapa del Peru con lotes Petroleros, comunidades y areas Naturales protegidas. Available at: http://www.ibcperu.org/servicios/images/mapa_02.png [Accedido Abril 12, 2010].

IDB - Inter-American Development Bank . Sec, 2006. Peru LNG. Project Abstract. Available at: http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1317763 [Accedido Mayo 10, 2010].

IDB - Inter-American Development Bank . Sec, 2007. Summarizing Performance of Environmental and Social commiments in the Camisea Project

. Available at: http://www.iadb.org/idbdocs.cfm?docnum=1044695 [Accedido Abril 12, 2010].

IDB -Inter-American Development Bank, 2007. Camisea Project Fact Sheet & Benefits . Available at: http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=894941 [Accedido Abril 7, 2010].

INEI, 2009. Situación de la pobreza en el 2008 . Available at: http://censos.inei.gob.pe/ [Accedido Abril 12, 2010].

International Energy Agency, 2000. *Regulatory Reform - European gas*, Available at: https://www.oilmarketreport.org/textbase/nppdf/free/2000/refgas2000.pdf [Accedido Abril 12, 2010].

La República, 2007. García: Perú necesita más electricidad para continuar desarrollo. *25/07*. Available at: http://www.larepublica.pe/archive/all/larepublica/20070725/pasadas/14/38481

[Accedido Abril 12, 2010].

Mariluz, O., 2010. Saludan propuesta del MEF para modificar Fondo de Combustibles. *La República 06/02*. Available at: http://www.larepublica.pe/archive/all/larepublica/20100206/11/node/248404/todos/14 [Accedido Abril 12, 2010].

Marticorena, M., 2007. Camisea II. *El Comercio 17/11*. Available at: http://elcomercio.pe/edicionimpresa/Html/2007-12-17/camisea-ii.html [Accedido Mayo 10, 2010].

Martínez-Alier, J., 1991. Ecology and the poor : a neglected dimension of Latin American history. *Journal of Latin American studies.*, 23(3), 621-639.

Matrix Solution, 2007. Informe de Supervision Ambiental y Social del Proyecto Camisea DE Cuarto Trimestre 2006

. Available at: http://www.tgp.com.pe/reportes/monitoreo2006/Q4-2006_MatrixReport.pdf [Accedido Mayo 4, 2010].

Mendoza, J., 2009. "Fijación de Precios en Barra
Mayo 2009 – Abril 2010" Prepublicación de Precios
. Available at: http://www2.osinerg.gob.pe/AudPublicas/Audiencia16032009/Fita 2009 Prepublicación Precios en Barra.pdf [Accedido Abril 12, 2010].

Michel Meybeck, 2003. Global Analysis of River Systems: From Earth System Controls to Anthropocene Syndromes. *Philosophical Transactions: Biological Sciences*, 358(1440), 1935-1955.

MINAM - Ministerio del Ambiente , 2009. Mapa de Deforestación de la Amazonía Peruana 2000. Available at: http://sinia.minam.gob.pe/index.php?idElementoInformacion=155 [Accedido Abril 9, 2010].

MINEM, Ministerio de Energia y Minas - Hidrocarburos. Available at: http://www.minem.gob.pe/descripcion.php?idSector=5&idTitular=95&idMenu=sub88&idCateg=95 [Accedido Abril 7, 2010].

MINEM, 2009. Ministerio de Energia y Minas - Institucional. Available at: http://www.minem.gob.pe/descripcion.php?idSector=10&idTitular=270&idMenu=sub266&idCateg=224 [Accedido Abril 7, 2010].

Ministerio de Energia y Minas - Hidrocarburos, 2010. MEM ratifica Reservas de Gas Natural. Available at: http://www.minem.gob.pe/descripcion.php?idSector=5&idTitular=1777 [Accedido Abril 7, 2010].

MINSA. O?cina General de Epidemiología, 2003. *Pueblos en situación de extrema vulnerabilidad: El caso de los Nanti de la reserva territorial
Kugapakori Nahua Río Camisea, Cusco*
Ministerio de Salud del Perú.,

Moore, J.W., 2010. The End of the Road? Agricultural Revolutions in the Capitalist World-Ecology, 1450-2010. *Journal of Agrarian Change*, 10(3), 389-413.

Murray, W., 1999. Natural resources, the global economy and Sustainability. En *Latin America transformed : globalization and modernity.* London; New York: Arnold ; Oxford University Press.

Napolitano , D. & Aliya, R., 2007. The dilemma of contact: voluntary isolation and the impacts of

gas exploitation on health and rights in the Kugapakori Nahua Reserve, Peruvian Amazon. *Environmental Research Letters*, 2(4), 045005 (12pp).

Napolitano, D., 2007. Towards Understanding the Health Vulnerability of Indigenous Peoples Living in Voluntary Isolation in the Amazon Rainforest: Experiences from the Kugapakori Nahua Reserve, Peru. *EcoHealth*, 4(4), 515-531.

Napolitano, D. & Stephens, C., 2003. La salud de los pueblos indígenas y el Proyecto de Gas de Camisea
Informe para la AIDESEP
. Available at: http://www.lshtm.ac.uk/pehru/communities/camisea-salud.pdf [Accedido Abril 27, 2010].

O'Connor, J., 2003. Desarrollo desigual y combinado y crisis ecológica. Available at: http://redalyc.uaemex.mx/redalyc/src/inicio/ArtPdfRed.jsp?iCve=31760202.

Osignermin, Boletin Informativo de Gas Natural. Reporte Semestral de la Gerencia de Fiscalizacion 2009 I. Available at: http://www.osinerg.gob.pe/newweb/pages/GFGN/uploads/GFGN/boletin_GFGN_2009-1.pdf [Accedido Abril 12, 2010].

Osignermin, 2009. Boletin Informativo de Gas Natural. Reporte Semestral de la Gerencia de Fiscalizacion 2009 II. Available at: http://www.osinerg.gob.pe/newweb/pages/GFGN/uploads/GFGN/boletin-gas-natural-2009-II.pdf.

Osinergmin, *Impacto de la GRP de Camisea en el sector Electrico*,

Osinergmin, 2003. Informe de Supervision Y Fiscalizacion del medio Social en el Ambito de Influencia del Proyecto Camisea en el lote 88. Available at: www.osinerg.gob.pe/osinerg/camisea/informes/INFORME_SUPER_FISCA_LOTE88.pdf [Accedido Mayo 10, 2010].

Osinergmin, La Revista del Gas Natural. Available at: http://www.osinerg.gob.pe/newweb/pages/GFGN/uploads/GFGN/Revista-GN-2009.pdf.

Osinergmin, Oficina de Estudios Económicos, 2004. La Industria del Gas Natural en el Perú Documento de trabajo N1. Available at: http://www.osinerg.gob.pe/newweb/uploads/Estudios_Economicos/DT1_INDUSTRIA_GAS_OSINERGa.pdf [Accedido Abril 7, 2010].

Osinergmin. Gerencia Adjunta de Regulación Tarifaria - GART, 2008. Regulación del Gas Natural en el Perú: Estado del Arte al 2008
. Available at: http://www2.osinerg.gob.pe/Infotec/GasNatural/pdf/Regulacion_Gas_Natural_Peru.pdf [Accedido Abril 12, 2010].

Pluspetrol, Proyecto CAMISEA. Available at: http://www.camisea.pluspetrol.com.pe/ [Accedido Abril 7, 2010].

Pluspetrol, Proyecto CAMISEA. Available at: http://www.camisea.pluspetrol.com.pe/ [Accedido Mayo 10, 2010].

Pluspetrol Peru Corporation, 2004. Estudio de Impacto
Ambiental y Social Lote 56 -
Línea de Base Social. Available at: http://intranet2.minem.gob.pe/Web/archivos/camisea/estudios/pluspetrol/L56_Cap_4_Linea_Base_Social.pdf [Accedido Mayo 10, 2010].

PMAC Bajo Urubamaba, 2008. Implementacion del Programa de Monitoreo Ambiental Comunitario - Lotes 56 y 88. Marzo – Julio 2008
. Available at: http://www.pmacbu.org/ [Accedido Mayo 4, 2010].

Reyes, J., Dejarán sin subsidio al sector minero. *Edición Impresa - La República 09/08*. Available at: http://www.larepublica.pe/archive/all/larepublica/20080809/pasadas/14/161799 [Accedido Mayo 13, 2010].

Richard Peet & Michael Watts, 1993. Introduction: Development Theory and Environment in an Age of Market Triumphalism. *Economic Geography*, 69(3), 227-253.

Ross, C., 2008. El caso del proyecto Camisea: logros y limitaciones de una coalición ciudadana naciente
. En *Defendiendo derechos y promoviendo cambios : el Estado, las empresas extractivas y las comunidades locales en el Perú*. Minería y sociedad, 3. Lima [u.a.]: IEP, Instituto de Estudios Peruanos [u.a.].

Schmink, M., 1999. Conceptual framework for gender and community-based conservation. Case 1.

Scurrah M., 2010. Conflictos sociales en zonas rurales : la tendencia es al crecimiento. *La Revista Agraria*, (114), 20.

Servindi, 2009. Peru: Es falso que los pueblos amazónicos tienen 'demasiados' territorios. *Servindi 05/07*. Available at: http://www.servindi.org/actualidad/14007 [Accedido Abril 12, 2010].

Stephen G. Bunker, 1984. Modes of Extraction, Unequal Exchange, and the Progressive Underdevelopment of an Extreme Periphery: The Brazilian Amazon, 1600-1980. *American Journal of Sociology*, 89(5), 1017-1064.

TGP, 2002. Modificaciones al Estudio de Impacto Ambiental y Social de los Sistemas de transporte de Gas Natural y transporte de los liquidos de gas natural
Camisea - Lima. Resumen ejecutivo
. Available at:
http://intranet2.minem.gob.pe/Web/archivos/camisea/estudios/Sistematransporte/Volumen I EIA/Resumen Ejecutivo.pdf [Accedido Abril 24, 2010].

TGP, Reporte de Sustenibilidad Transportadrea de Gas del Peru

. Available at: http://www.tgp.com.pe/reportes/pdf/Reportedesustentabilidad.pdf [Accedido Mayo 4, 2010].

TGP, TGP Proyecto Camisea. Available at: http://www.tgp.com.pe/camisea/ [Accedido Mayo 10, 2010].

UNEP/acto, 2009. *Environmental outlook in Amazonia, GEO Amazonia*, Available at: http://www.unep.org/pdf/GEOAMAZONIA.pdf [Accedido Abril 12, 2010].

Wallerstein, I.M., 2005. After Developmentalism and Globalization, What? *Social Forces*, 83(3), 1263-1278.

WWF–Macroeconomics Program Office, 2005. Hydrocarbon Development in the lower Urubamba Region, Peru: Learning from Camisea

. Available at: http://assets.panda.org/downloads/sevaperu.pdf [Accedido Abril 14, 2010].

Zárate, C.G., 2001. *Extracción de quina : la configuración del espacio andino-amazónico de fines del siglo XIX*, Bogotá, D.C., Colombia: Universidad Nacional de Colombia, Sede Leticia, Instituto Amazónico de Investigaciones.