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Risks, the petroleum company, and the ongoing sustainable energy transition

Riscos, a empresa de petróleo e a transição energética sustentável

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ABSTRACT: This article scrutinizes oil companies' ability to manage risks through the prism of the economic, sociological, and Political Science literature, notably the concept of Risk Society. It focuses on the example of environmental risks in light of the ongoing sustainable energy transition's deep decarbonization goal, whose success hinges on shifting oil companies' risk-reward relationship to a less favorable terrain. It is shown that, while oil companies could actively shape the risk-management institutions they interacted with throughout much of the 20th century, shipping accidents and society's perception of the activity's risk forced oil companies to growingly comply with rules that are set exogenously. The rest of the article is illustrated by two examples from Brazil's E&P sector environmental management rules: first, the adoption of SEA practices, and second, a 2013 Cooperation Agreement between the Brazilian Petroleum Institute and IBAMA. It is argued that as Ecomodernism's stance growingly moved to a "weak" form, oil companies were reinvited as deliberating parties or had their demands attended by the public hand. During the 2010s, as hybrid governance mechanisms came into the fold in the environmental realm, oil companies had the possibility of reinventing their stance towards actively shaping the risk-management institutions, which they now frame in more environmentally cooperative terms. It is suggested that a renewed risk-managing ability on behalf of oil companies retards the pace of the ongoing sustainable energy transition because it does not occur at the same pace in every country of the world. Hence, the ability to manage risks in a growingly risk-prone world for oil companies not only ensures profitability during oil's phasing out but also aids these companies in repositioning themselves as carbon-neutral players in a world that growingly marches towards renewable energy.

Keywords: risk society; risk management; environmental licensing; oil & gas; Brazilian Petroleum Institute (IBP).

RESUMO: Este artigo examina a capacidade de gerenciamento de riscos das empresas de petróleo por meio do prisma das literaturas econômica, sociológica e política, notadamente o conceito de Sociedade de Risco. O artigo foca no exemplo dos riscos ambientais, à luz da transição energética sustentável ora em curso, e seu objetivo de "deep decarbonization", cujo sucesso requer a piora da relação risco-recompensa das empresas de petróleo. É mostrado que, embora as empresas petrolíferas, ao longo de boa parte do século XX, tenham tido a capacidade de moldar ativamente as instituições responsáveis pela gestão dos riscos com os quais interagem, a partir do final dos anos 1960, os acidentes marítimos e a percepção da sociedade sobre o risco da atividade forçaram as empresas petrolíferas a adaptarem-se a regras definidas exogenamente. O restante do artigo é ilustrado com exemplos da gestão ambiental do setor de E&P do Brasil: primeiro, a adoção de práticas de AAE e, segundo, um Acordo de Cooperação entre o Instituto Brasileiro de Petróleo e o IBAMA. Argumenta-se que, à medida que a postura do Ecomodernismo mudou cada vez mais para uma forma "fraca", as empresas de petróleo foram novamente convidadas a interagir como partes interessadas no processo deliberativo. Durante a década de 2010, mecanismos de governança híbridos ganharam em importância na esfera ambiental, e, com isso, as empresas de petróleo tiveram a possibilidade de reinventar sua capacidade de ativamente moldar as instituições que gerem riscos. Uma capacidade renovada de gerenciamento de risco retarda o ritmo da transição energética sustentável porque esta não ocorre no mesmo ritmo em todos os países. A capacidade de gerenciar riscos em um mundo cada vez mais hostil aos interesses petrolíferos não só assegura que essas empresas garantam lucratividade em um período de transição, mas também permite que estas reposicionem-se como ofertantes de energia limpa.

Palavras-chave: sociedade de risco; gestão de risco; licenciamento ambiental; petróleo e gás; Instituto Brasileiro de Petróleo.

1. Introduction

The world is passing through a sustainable energy transition that owes mainly to technological progress and a rapid decline in the costs of renewable energy carriers. While in the past, fossil fuels profited from their high transportability and energetic concentration, which drove down costs and led to economies of scale, alternative renewable energy sources, such as water power, had the disadvantage of being location-bound. Due to ongoing technological progress, renewable energy sources are now the energy sources that can be generated and used at will within domestic boundaries, with growingly lower economic costs. In this context,

> the shift to renewables [..] involves a deep transformation of energy systems which is likely to affect global trade patterns, blur the distinction between producers and consumers, and create new patterns of political authority along with the decentralized deployment of renewable technologies (Van der Graaf & Sovacool, 2020, p. 5-6).

One of the critical features of the ongoing energy transition is that it growingly shifts power from formerly incumbents – chiefly oil-producing companies and nations – to other actors that, from time to time, had to deal with higher prices or with supply constraints. While in the past, oil price hikes represented a significant economic risk for oil-consuming countries, the ability to domestically produce renewable energy (Mathews, 2017) growingly dislocates the burden of carrying the risks that are inherent to the business to oil-producing companies and nations.

However, the fossil fuel industry's longstanding ability to manage its political, geopolitical, and economic risks - either through business decisions or active involvement in the public policy process - is one of the main reasons it is still difficult to displace oil from the world's energy mix. Moreover, there is a perspective that a worsened risk-reward balance in the wake of a growing forced internalization of formerly non-paid environmental costs will slowly make investments in fossil fuel production a less lucrative activity. As oil companies' ability to manage risks of their core business wanes, is the way paved free for the sustainable energy transition?

To answer this question, this article scrutinizes selected moments of the Economics, Sociologic, and Political Science literatures regarding risk management by relating them to critical examples in which the oil industry had to manage environmental risks. The first section, which reviews the rise of capitalism and its intimate relation to risk-management techniques, will argue that oil companies forged the ability to actively shape institutions and policies that interacted with their risks early on. Throughout most of the 20th century, oil companies were proactive in molding the economic and geopolitical environment they operated within, either through collusion, political influence, or lobbying techniques.

The second section takes on the Risk Society thesis to argue that when society became aware of modernization's risks, oil companies were forced into a defensive mode. Because of shipping conventions, they had to growingly internalize their business costs, for example, through investments in more secure shipping methods.

The third section shows that the emergence of the ecological modernization thesis, whose weak form eventually became dominant, is connected to the encouragement of deliberative practices in shaping environmental policies. It is argued that because it embraces economic growth, it has opened more space for also considering the interests of polluters, such as oil companies, which are proactively encouraged to express their needs in the deliberative process. This moment of the literature is illustrated by the case of the adoption of the Strategic Environmental Assessment (SEA) in Brazil, whose approval has been instrumental in improving oil companies' risk management practices.

The fourth and final section looks upon hybrid environmental governance arrangements, which have gained prominence after the 2015 Paris Agreement, as traditional top-down arrangements such as multilateral agreements and traditional forms of state governance have their ability to resolve environmental problems questioned. While these novel arrangements open space for the co-production of public policies by affected populations, they have also given polluting companies degrees of liberty to influence the public policy process. This fourth section uses as an example the case of the 2013 Brazilian Petroleum Institute (IBP) - IBAMA Cooperation Agreement, where the former has assumed the role not only as an influencer but also as a producer of public policies, which serves its strategic objective of actively shaping the institutions which interact with its environmental risk management practices.

2. Capitalism, risk, and the oil company

This section relates economic, sociological, and Political Science theories about the relation of

risk, capitalism's rise, and entrepreneurship with early risk-management practices by International Oil Companies (IOCs) throughout much of the 20th century. Within capitalism, entrepreneurs have developed techniques to quantify and tame risks, making the act of conducting investment decisions much more comfortable. In the petroleum economy, risks of all kinds are a harsh reality, as oil companies operate in an environment of considerable uncertainty. Petroleum companies, therefore, have actively sought to quantify their risks and, if possible, influence or even shape the institutions that manage them.

The drive towards managing risks is one distinctive feature that differentiates the emerging capitalist economy from previous forms of economization. The citizens of traditional societies or "solar economies" believed they lived in a long-lasting eternal present. These were portrayed in static and cyclical terms, as growth was not understood as something that could not be indefinitely amplified. On the contrary, reaching the stationary state was inevitable, as continuous exponential growth was impossible (Sieferle, 2001; Bonneuil & Fressoz, 2016).

By contrast, a growing willingness to bear risks and an increasing future-orientedness are related to the creation of capitalism's particular rationality and institutions (Beckert, 2017). For Weber, one of the cornerstones of modern capitalism's development was that investment decisions were strictly rational (Weber, 1978 [1922]). In his turn, Schumpeter also looks back on Weber's formulation of capitalism as a process of rationalization that reaches every aspect of human life, from society to the economy (Roncaglia, 2019). He writes that

> capitalism develops rationality (..) [I]t exalts the monetary unit – not itself a creation of capitalism – into a unit of account. (….) Capitalist practice turns the unit of money into a tool of rational cost-profit calculations, of which the towering monument is the double-entry bookkeeping (Schumpeter, 1983, p. 123-124).

After the invention of risk-managing techniques, decisions to invest could be taken in an environment in which, if uncertainty was not wholly tamed, capitalists had a much better perspective of whether a particular investment decision was likely to be profitable or not. Schumpeter, however, divided a select class of risk-taking entrepreneurs whose inventiveness had the potential to set the transformative engine of capitalism into motion from regular risk-inverse capitalists and investors.

Like Schumpeter, Frank Knight (Knight, 2012 [1921]) also defended that different types of risk had to be treated differently. For this purpose, Knight distinguished between three types of probability. In the first case, that of lotteries or roulette, the risk calculus was straightforward because a priori probabilities of a specific event occurring could be specified. The second type of probability analysis applied to situations that occurred regularly, such as fires, in which the insurer could calculate a certain statistical probability of an event occurring based on observations from history. For Knight, a third and last type of probability was related to unique events, such as an industrialist's decision to invest a large sum of money in expanding a factory's installations. It would be challenging to determine the probability of success in such an unprecedented and business-specific investment decision. Hence, because the entrepreneur must rely on a personal opinion in such a case, it is more precise to speak of either a

judgment or an estimate. Knight thus reserved the term uncertainty for the latter situation and risk to the two formers. As Bonneuil & Fressoz put it:

> The ability to decide on a profitable course of action cannot be reduced to rationality alone. It becomes a scarce resource, unequally distributed among economic agents. It is what distinguishes skilled businessmen from inept ones, for a talent for calculating probabilities is not enough. Success in business demands judgment (2016, p. 191-192).

Keynes (2018 [1936]) also embraced Knight's view and acknowledged the fundamental uncertainty surrounding economic events, building his entire theoretical edifice around this premise. In certain uncertain economic conjectures, capitalists may postpone investment decisions and hold to more liquid assets, deeming state intervention through fiscal policy necessary to avoid recessions.

Edith Penrose had a similar view. For her, when a firm's management succeeds in efficiently using its available resources, "a truly dynamic interacting process occurs which encourages continuous growth" (Penrose, 1959, p. 5). However, a firm's management does not necessarily possess vast knowledge of the firm's environment. Because of this, the firm's immediate behavior is driven not only by objective facts but also by its expectations, which are subject to biased personal judgment. For Penrose, further, while uncertainty is related to the entrepreneur's confidence level regarding a course of action, risks refer to the calculus of the loss or the gain that might be harnessed if a given decision is made. One of the most important ways of reducing subjective uncertainty about the future course of events is to gather more information. In other words, the firm invests its resources in estimating the risks of a specific event occurring or not. However, because capabilities and resources are scarce, a point can be reached where a company believes it is unfeasible or too costly to obtain additional information, such that it may even be forced to terminate that risky prospective activity (Penrose, 1959).

Edith Penrose's work had a considerable breadth of scope and also encompassed an analysis of IOCs' strategies. Edith Penrose, early on, understood that oil companies proactively shaped the environment in which they operated to bear the risks of the activity and thus increase profitability:

> efficiency in production and distribution, in inventions and technological advance, could not account for the dominant position they achieved. Their record in finding, producing, and distributing oil and its production is indeed impressive, but efficiency in this respect would not have been enough to secure their dominance. Hence the story of the rise of the great companies deals as much with financial power, commercial and political negotiations and intrigue, with cartel agreements, marketing alliances, prince maintenance arrangements, price wars and armistices, mergers and combination, actions to avoid taxes, and the national and international political interests of governments, as it does with the economics of production and distribution (Penrose, 1964, p. 155).

The invention of petroleum companies' risk--managing techniques, along the lines described by Penrose, is attributed to John D. Rockefeller. By the early 1870s, the oil industry was close to collapsing. Speculation was intense, production and overproduction followed one another rapidly, and prices oscillated considerably (Yergin, 1991). Rockefeller's approach to risk management was to wipe away the competition, substitute it with a

cartel controlled by Standard Oil, and embark on a consolidation strategy. By extracting rebates on railway freight rates, thus lowering transportation costs much below those paid by competition, Standard Oil had a considerable pricing advantage (*ibid*). In 1882, Standard Oil vertically integrated its activities and formed a trust (Livermore, 1935; Chandler, 1990).

Risks could be easily calculated in this altered scenario, making investment decisions much more comfortable. Moreover, as a side effect, the petroleum company's economic power accumulation permitted it to achieve political power, further enhancing its ability to influence the institutions that interacted with its risk management practices. Capitalists in the petroleum business, in that sense, were no longer "adapt[ing] to given conditions but adapt[ing] conditions to their ideas and visions rather" (Elsner *et al.*, 2014, p. 338).

Although the 1911 application of the Sherman Act to Standard Oil, which dismembered it into a series of smaller companies, was a drawback, IOCs still amply dominated the world's oil business in the early 20th century. In critical moments of history, such as the breakup of the Ottoman Empire, concessional arrangements were reallocated, attending to the interests of the international petroleum companies, most of which had very tight political connections with the government (Ayres, 2014). After the establishment of the 1928 Achnacarry Agreement, which created the Seven Sisters of oil, IOCs had enormous degrees of freedom to regulate competition between the signatories until the 1973 petroleum shock (Tugendhat & Hamilton, 1975). During the 1930s, when the US petroleum industry's domestic outlook was considerably dire due to a saturated market and collapsing prices (Huber, 2013), the Roosevelt administration took over coordinating and controlling oil supply through the so-called scalar fix, implemented in 1935, which established voluntary upper bounds to state's monthly oil production. The system worked well in its mission to deliver market stability and manage oil companies' risk. Huber writes that "the pro rationing system… used active state management to produce the appearance of competition, such that ... the oil market was made to appear functional through the power of the state" (*ibid*, p. 55).

Oil companies' risk was also managed by the state through massive subsidies, for example, in the context of the Marshall Plan (Bonneuil & Fressoz, 2015). According to Helm, throughout much of the 20th century, IOCs almost always counted on government support. Instead of being an internationalized open global market, the petroleum market was "monopolistic nationalistic" (Helm, 2017, p. 189). Thus, IOCs had various economic, political, and geopolitical tools at their disposal to guarantee their dominance in the world petroleum market, facilitating their task of managing corporate risks. Companies like Shell, ExxonMobil, Chevron, and BP are still powerful enough to act as economic players and dominant influencers of the political agenda (Vatn, 2015). They frame the environmental debate and agenda, for instance, through their research funding scientists who deny climate change (O'Neill, 2007). It has been argued that the discourse of climate change denial was specifically devised to accomplish the vested interests of economic and political players from the petroleum business, like the Koch Brothers and Exxon Mobil (Dryzek & Pickering, 2018).

3. Risk society and a turn in environmental shipping regulations

However, the events from the 1960s and 1970s, which included a wave of petroleum nationalizations in the Middle East, the creation of OPEC in 1960, and the ensuing Seven Sisters cartel decline, also forced petroleum companies into a defensive mode. Because IOCs lost the bulk of their production areas, they had to compete for new exploratory areas in costly frontier areas, which led them to lose their competitive edge. Moreover, when doors were not closed to them, they were submitted to more rigorous fiscal rules (Martin, 1992). As a result, they were forced to disintegrate vertically and recur to purchases in the spot market or long-term contracts to supply their downstream division. As a result, IOCs had to adapt to a completely altered risk management scenario (*ibid*).

Developments in the environmental realm pressured IOCs even further. After WWII, increasing dependence on oil produced abroad led to the creation of a global infrastructure for oil transportation through tankers. Technological development in the shipping industry led to a larger average size of ships and dramatically reduced the unit cost of long-distance oil transportation. If, in 1950, a tanker with a capacity of 28,500 tonnes was considered a supertanker, in the early 1970s, a series of vessels with a capacity exceeding 350,000 tons met the world demand for oil (Hartsthorn, 1993). In 1970, oil accounted for 60% of the total volume of cargo transported worldwide (Mitchell, 2011). However, in its early years, the long-distance transport of oil through cargo ships was very vulnerable to disastrous accidents, resulting in relatively frequent episodes of oil pollution in the marine environment.

Simultaneously, in the 1960s and 1970s, an increasingly organized environmental movement crystallized globally. Large-scale accidents with tankers attracted civil society's attention to the problem. As the accidents grew in frequency and gravity, the environmental movement's emphasis on preserving the seas created policy momentum for altering legislation that governed oil ship transportation, both at the national level with bills, and at the international level, with shipping conventions. The Exxon Valdez oil spill in 1989 was probably the most critical triggering event for changes in environmental regulation (Kraft & Vig, 2010).

Ulrich Beck was one of the keenest interpreters of these transformations taking place in the realm of environmental policy and regulation. One entry point of his analysis was the finding that society's awareness of the risks associated with economic activity had risen markedly, particularly after World War II (WWII). This altered perception of societal and economic risks gave rise to what the author has called the Risk society (Beck, 1992). For Beck, in Risk society, the nature of humans' risks had evolved from being primarily local and less severe in consequence to potentially affecting the entire globe and entailing a much more significant danger.

The advance in science also led to the creation of new risk situations. On the one hand, science undeniably led to the progress of humankind. On the other, it has created risks that are very difficult to assess and whose potential threat is substantial (Giddens, 1990). For instance, geoengineering proposals pose a significant risk to global governance and sustainable development (Dryzek & Pickering, 2018). Thus, an entirely new relationship between

society and the risk-assessing and risk-creating institutions is created in Risk society. Because of growing environmental risks and the dangers posed by new technologies, Beck (1992) argues that humanity's confidence in scientifically based rationality, industrial production, and the ideal of technological progress is dwindling. Because of science's failed promises, civil society's engagement with perceived risk is much more stringent, giving rise to the environmental movement. In Risk society, then, reflexivity is the realization that humans cannot control nature either by acquiring more knowledge about a specific risk or by improving a formerly dangerous technology. As Drzyek *et al.* (2003, p. 169) put it, "reflexive modernization is society's resultant self-confrontation". It is the very opposite of the belief in probability calculus and risk management. The perception that the world is much too complicated for such calculi to work on a planetary scale prevails (Arnoldi, 2009).

In this context, the accidents caused by shipping within the petroleum industry created policy and political momentum for implementing radical alterations to this industry's practices. This is in conformance with the idea that Risk society tends to create policy momentum to address the threats posed by new technologies and burgeoning economic global oil shipping. With this, international conventions that govern oil shipping standards were signed, starting in the late 1960s. Table 1 below synthesizes some of the main international conventions that regulate the shipping industry.

Global shipping conventions had a very positive effect on the number of leaks in the shipping industry. This trend is shown in Figure 1 below. With MARPOL, which came into force in 1983, the annual leaks average fell from 24.5 to 9.4 during the 1980s. OPRC/90, which came into force in 1995, also had a similar effect on the average number of accidents. In the 1990s, the average number of spills

TABLE 1 – Major international shipping conventions affecting the oil industry's practices.

Year	Convention	Motivated by
1969	International Convention on Civil Liability for Oil Pollution Damage - CLC / 69	The Torrey Canyon tanker incident, which spilled 119,000 m3 of oil off the United Kingdom coast in 1967.
1973	International Convention for the Prevention of Pollution from Ships (MARPOL)	In response to a series of tanker accidents between 1976 and 1978, it was reissued in 1978. A good example was the accident with the Amoco Cadiz, which in 1978 launched some 22,000 tonnes of oil into the sea in the Atlantic Ocean, near France.
1982	U.N. Convention on the Rights of the Sea (CNDUM)	None in particular
1995	OPRC - International Convention on Oil Pollution Preparedness, Response, and Cooperation,	1989 Exxon Valdez ship accident in Alaska. Some 40,000 m³ of oil were shed at the time, and about the US$ 4.3 billion were spent on maritime and offshore cleaning and another US$ 900 million on litigation
2004	International Convention for the Control and Management of Ships' Ballast Water and Sediments	None in particular

SOURCE: Own elaboration.

fell even further, to 7.7 leaks per year. In 2000 this index fell to an average of 3.2 leaks per year and even further during the 2010s, to just 1.8 leaks on average. Another factor that led to the reduction of those accidents was the technological development of the tankers themselves, including improving navigation instruments (Taverne, 1999) and the adoption of double helmets, which guarantee more safety at the same time that cost reduction is achieved.

During the 2000s, high oil prices encouraged deep water exploitation in regions like the Arctic or offshore Brazil. The International Energy Agency 2003 (IEA, 2003) predicted that HSE (Health, Safety, and Environmental) costs would growingly become a relevant part of a project's cost, increasing its average capital costs and slowing down the pace at which projects were developed. A 2008 study by Goldman Sachs, which assessed the duration of 190 supermajor oil & gas projects, found that, in the previous decade, the average duration of the period which transcurs between the projects' approval and their effective start has doubled, chiefly owing to environmental lawsuits and affected communities' resistance (Pinto, 2019).

The 2010 Deepwater Horizon disaster in the Gulf of Mexico Macondo Field, which led to an oil spill of disastrous proportions, with 210,000 gallons of oil per day being spilled into the gulf (Rosenbaum, 2016), increased the stringentness of environmental regulation in the oil & gas sector even further. It inaugurated an era in which deepwater oil exploration permits are only issued after increasingly stringent criteria are met, leading to a significant increase in project costs (Urry, 2013).

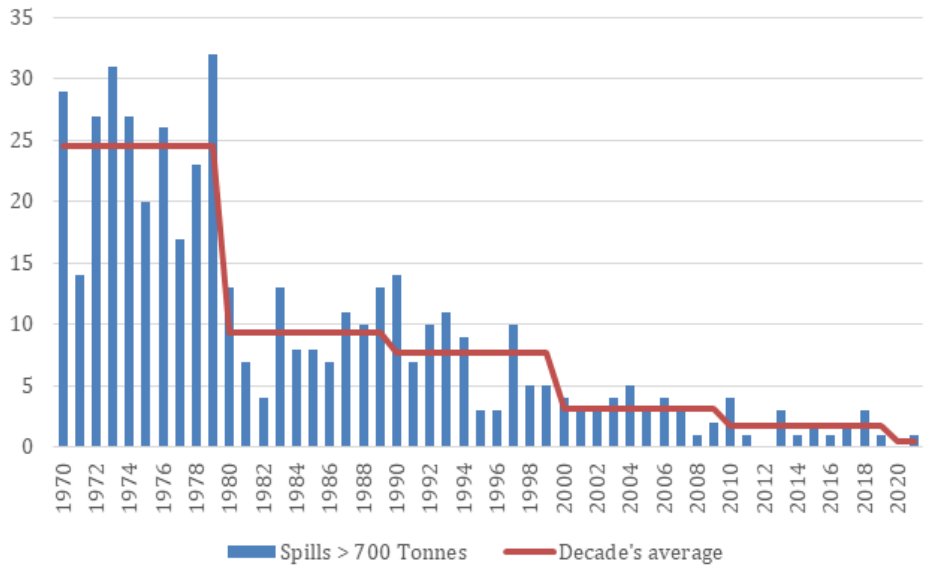

FIGURE 1 – Number of spills >700 Tonnes.
SOURCE: Own elaboration with data from ITOPF (2021).

President Obama, who initially disclaimed that his administration would impose a moratorium on offshore oil drilling permits in the Gulf of Mexico, eventually modified his policy approach toward permitting "safe and responsible" petroleum extraction (Rosenbaum, 2016). The consulting company Lux Research estimated that HSE expenses in the petroleum industry would jump from US$35 billion per year in 2011 to a US$ 56 billion figure in 2030 (Lux Research, 2013).

In the past decades, the petroleum industry has become a much more competitive business that operates in a much more uncertain business environment, a trend that the 2010s scenario of lower oil prices has reinforced. Further, as the world transitions toward renewable energy carriers, these companies face the challenge of having to reposition themselves and of deciding whether it is even profitable to produce the oil contained in their proven reserves:

> The focus of IOCs to date has been on diversification and adaptation, which seems a sensible strategy in an environment of high uncertainty about the speed of the energy transition. IOCs should ramp up on technologies where they see real opportunities and they are in a good position to exploit. However, it remains very unclear whether these investments are being pursued as part of a long-term vision or as part of an ad-hoc approach. Specifically, what is the long-term future of an IOC in a decarbonized world? Does the IOC see itself morphing into something new that will not be in the oil and gas business but where it has no clear advantage and returns are lower, or can it see a future of oil and gas that is decarbonized and where it has a greater competitive advantage but where the decarbonization technologies are not yet commercial? (West & Fattouh, 2019, p. 15).

Thus, oil exploration and production (E&P) is an activity associated with growingly high sunk costs. Because of these large initial fixed investments, IOCs are forced to bear the project's risks practically by themselves. Only a very selected number of companies have the financial capacity to embark on the exploration of the larger oil prospects (Helm, 2017). The possibility of an event like a large oil spill or a blowout occurring, which is associated with enormous financial and reputational costs, is a further complicator that has to be carefully managed. This reflects that the oil & gas sector has an elevated "degree of politicization", forcing oil majors to adopt stringent risk management practices (Pinto, 2019, p. 21). In a context of growing social awareness of the oil & gas industry's social, political, and environmental risks, oil majors find it hard to transfer or share their risks as there are typically brought to court or subjected to public scrutiny. A growing share of the oil business's high fixed cost must go into environmental disaster prevention.

Like in no other critical juncture of the petroleum industry, risk assessment analysis has become a critical process within oil companies. It concerns itself with diverse types of risk that are inherent to the oil business, such as a geological risk, a commercial risk (related to price volatility and market demand), a political risk, the HSE risk, the costs risk, and regulatory risks (Taverne, 1999; Noreng, 2006; Jahn, Cook & Graham, 2008; Hernandez-Perez, 2011; Pinto, 2019).

Oil companies have considerably increased expenditures in the business's information-gathering phase to make their investment decisions more comfortable, as investments are their "strategic variable per excellence" (Martin, 1992, p. 96). Petroleum companies have highly specialized departments that

prospect all types of sophisticated information about a specific prospect to equip the decision-makers with the highest set of uncertainty-reducing decision-making tools.

The petroleum economics literature theorizes that oil companies decide to invest when certain conditions are met and the risks related to these conditions are deemed acceptable (IEA, 2003; Fattouh & Mabro, 2006; Pinto Junior *et al.*, 2010). According to the IEA (2003), some factors encourage or block investments in E&P, which are related to the economic and financial analysis of oil projects. Hence, sufficient conditions are also appraised when certain necessary conditions are met. These are shown in Table 2 below. After the data is gathered, the petroleum company analyzes whether it will invest in a particular project. The company then performs a cash flow analysis, which considers the costs (CAPEX and OPEX), the fiscal terms, and the price of oil, which are modeled in different scenarios. The output of this cash flow analysis is an array of rates of returns and estimates – under different assumptions – of the net present value of that prospective venture, which in turn guides the business decision to invest or not. Table 3 relates the types of investment conditions with the various risk categories.

In sum, with growingly larger oil tanker leakages, the petroleum business's dangers became more noticeable to society, fundamentally altering the nature of oil business risks. Risk society produced an institutional tissue where environmental risks

TABLE 2 – Necessary and Sufficient conditions that guide decision-making concerning E&P investment.

Necessary Conditions	**Sufficient conditions**
Confidence in market demand	Profitability
Resources – quantity and quality	Acceptable risk
Access to reserves	Repeatability - the ability to sustain a profitable flow of investments
Legal and institutional framework	Compatibility with corporate strategy
The rule of law	Compatibility with asset portfolio and with current and planned projects

SOURCE: IEA (2003).

TABLE 3 – The determinants of investment and risks.

	Political	Regulatory	Commercial	HSE	Costs	Geological
Institutions and Regulation	X	X		X		
Reserves	X	X			X	X
Market Dynamics	X		X	X	X	
Technology			X	X	X	

SOURCE: Own elaboration.

started to be addressed by pollutants more seriously than before. The public awareness of risks – primarily due to large-scale shipping accidents – led civil society to demand much stricter safety rules from the petroleum industry. The oil company was then operating in an economic and political setting in which environmental risks had to be managed much more thoroughly than in the past to preserve profitability.

4. The deliberative turn: bringing the petroleum industry back to the negotiations table

This section shows that although petroleum companies lost a considerable part of their former political power and growingly have to conform to existing norms and compete for the available exploratory areas, they still hold to their former practices of attempting to shape the market rules. For this purpose, the section uses an example from Brazil's E&P sector environmental management rules, the 2012 adoption of SEA. It is shown that while reflexivity and the encouragement of democratic participation for negotiating solutions to the environmental problem help phase out polluting activities, they also open room for this proactive agency by oil companies.

For Beck, with reflexivity and the recognition of modernization's risks comes some degree of power redistribution (Beck, 1993). Because citizens ponder the appropriateness of economic growth and technological progress as tools for managing environmental crises, novel opportunities emerge for political and social transformation (Hunold & Dryzek, 2001). Civil society's acknowledgment of modernization's risks entailed transforming former technical-economic necessities - such as pollutant emissions and nuclear energy –into politically relevant variables (Beck, 1993). With reflexivity, the "non-political [also] (…) becomes political" (Beck, 1992, p. 186), alongside traditional policy tools, such as economic governance mechanisms, social security, and redistributive policies.

Reflexive modernization also entails that the state may lose a share of its former political influence and degrees of liberties to formulate and execute policies. The creation of new modalities and arenas of political participation coincides with a deliberative turn that seeks to provide an alternative to centralized top-down state bureaucracies' weak performance in the environmental field. The state is gradually substituted by sub-political arenas of political struggle and decision-making (Beck, 1999).

In this new setting, civil society cooperatively self-mobilizes to achieve environmental protection. The emphasis is set on the possibility of multiple actors participating and deliberating in environmental protection matters (Vatn, 2015). Deliberation between individuals and groups from civil society rationality permits reaching the most conscientious and just decisions (Kronsell & Bäckstrand, 2010). Even though deliberation does not guarantee societal consensus, the model of "deliberative democracy rests on a general belief in reasoned argument as the best way of resolving moral conflict" (Lövbrand & Kahn, 2010, p. 50). Thus, deliberation widens the basis of legitimate environmental policy and makes it more effective. According to Sinclair *et al.* (2015), participation is also important for achieving an optimal degree of social learning required to address the complexity of sustainable development assessments.

The deliberative turn's best practices include the effective participation of potentially affected communities with relevant knowledge and are interested in guaranteeing a thorough environmental assessment (Gibson *et al.*, 2005). Participation is important because it protects local citizens' interests and permits them to apport valuable knowledge to the assessment process, thus shaping public policy. While public authorities have limited capacity and resources, local knowledge can be a primary source of information. Furthermore, public participation brings balance and credibility to the assessment process (*ibid*).

However, the other side of the coin of the deliberative model is that it also gives incentives for the industry and business, in general, to engage themselves in those deliberative procedures. It was not only civil society that became aware that modernization's risks affect their survival. As Beck explains (1992, p. 39), "poverty is hierarchic, smog is democratic". Hence, the events that endanger biodiversity and species' survival are also considered threats to private interests. If in an earlier phase of risk society, corporations are tendentially regarded as targets of an angered and engaged civil society, in this latter deliberative phase, there are renewed degrees of liberty for industry and business to shape this debate actively.

Beck's work was an essential building block of the ecological modernization thesis, which since the early 1980s has dominated the policymaking agenda as a response to Risk society's challenges. That thesis can be traced back to Beck's reflexive modernization concept, according to which modernization can be "turned back on to itself" to resolve the problems it has created (Dryzek & Pickering, 2018, p. 46). For Hajer (1995, p. 3), ecological modernization emerged as a policy discourse seeking to merge environmental and economic principles based on the premise that "pollution prevention pays.".

Mol & Spaargaren (2000), Buttel (2000), and Mol (2003), some of the ecological modernization's forerunners, share Beck's skepticism about radical environmentalism's efficacy and pertinency. Like Beck, they believe that solving modernization's and industrialization's problems requires "more modernization, industrialization, and science" (Buttel, 2000, p. 62). Ecological Modernization's core thesis is that there is no incompatibility between environmental protection and economic growth. To accomplish both, it proposes incentivizing market forces and promoting the wide-scale adoption of sustainable technologies (Vatn, 2015).

Thus, a dispute over the terms of ecological modernization ensues. Strong ecological modernizers such as Hajer (1995) aim to ecologize economics by recognizing that the economy is a subsystem of nature (Daly, 1996), advocating for a reflexive instead of a techno-corporatist variant of ecological modernization. On the other hand, the government and industry tend to stress those aspects of ecological modernization that are most compatible with hegemonic economic priorities. In this clash of forces, ecological modernization tends to be of the weakly reflexive modality "for deliberation did not reach as far as any questioning of dominant liberal growth-centric models of development" (Dryzek & Pickering, 2018, p. 142).

In this context, the approval of SEA offers a good example of how the adoption of deliberative practices in Brazil favored a weakly reflexive ecological modernizing solution in the petroleum industry. The outcome of deliberative procedures

to negotiate a new environmental licensing process in the petroleum industry frankly favored the petroleum industry.

In Brazil, the entire production chain of the oil and gas sector is subject to control by environmental bodies. Obtaining an environmental license is mandatory in all phases of upstream oil & gas activities. Conama Resolution No. 237/97 establishes IBAMA as the environmental licensing body of offshore E&P activities and on the continental shelf for seismic activities and that other activities developed on the continent shore are under the control of the respective state environmental agencies.

The environmental licensing of oil & gas exploration and production activities was governed by the CONAMA resolution 23 of 1994. Environmental licenses were awarded not at the round's planning stage but immediately before each activity of the E&P process is conducted. In this system, the National Petroleum Agency (ANP) tenders exploratory areas before the environmental organ responsible for granting licenses manifests itself about the area's possible environmental viability (Mariano, 2007). One problem is that the exploratory phase's drilling activities' environmental licensing process commonly takes longer than 18 months. In contrast to this, the exploratory drilling phase usually averages three months (Teixeira, 2008). Delays in environmental licensing lead to higher project costs and increase uncertainties surrounding E&P investments. That model did not offer enough predictability for environmental licensing procedures or sufficient legal certainty for the industry. According to a statement by the IBP:

> in matters related to the environment, the most relevant factors for the planning of oil & gas production are the predictability and constant monitoring of the environmental licensing process. (..) Obtaining an environmental permit is complicated and time-consuming, hindering and delaying the exploration and production activities in certain areas (IBP, 2017, p. 28).

Brazilian policymakers were set to approve a SEA ordinance to solve this impasse, which had shown sound results in countries such as New Zealand, Canada, the United Kingdom, and the United States. SEA is an environmental policy instrument that helps decision-makers and stakeholders identify and evaluate the impacts of a decision on the environment (Mariano, 2007). The SEA approach to environmental licensing aims to increase the efficiency of the licensing and environmental management of the activities involved with the oil chain (Teixeira, 2008). Within the SEA approach to environmental licensing, selecting areas to be offered at the bidding rounds is made more systematically, and the mechanism and criteria that influence decisions are better clarified.

The environmental risks of a given oil basin are assessed before exploratory blocks are offered, assuring that there is sufficient time to remove from the bidding rounds areas considered highly sensitive from the point of biodiversity conservation. Within the approach, risks arising from oil and gas E&P activities are considered before exploratory blocks are granted, not during the strategic phase when investment decisions are made. This creates a more reliable regulatory environment that minimizes uncertainty and complexity surrounding governmental agencies' and society's decisions and companies' investment decisions. The adoption of SEA requires convergence between environmental and energy policy and must encourage the participation of

formerly unheard stakeholders from civil society (Teixeira, 2008). It seeks to deepen the dialogue between those who might gain and those who might lose from the oil & gas exploration activities. Greater agility and efficiency of government institutions responsible for the oil & gas licensing rounds and environment licensing are necessary to achieve the expected efficiency gains from licensing and reduce the associated costs (*ibid*).

PROMINP, created in 2003 as a mobilization forum for Brazil's goods and services industry supplying to the petroleum industry, has offered a flourishing environment for policy discussions regarding adopting SEA legislation. However, the attempts to approve a SEA ordinance in the country only gained momentum when Izabella Teixeira was appointed as the Ministry of Environment's (MMA) head in 2011, replacing Carlos Minc. Teixeira lacked her predecessors' political strength and will to take a more radical stance on environmental matters and embraced a policy stance that the environment was an ancillary topic (Viola & Franchini, 2016). In this setting, a powerful coalition between the government, state-operated enterprises, and private companies managed to push a "development-at-all--costs strategy" (Freitas & Mozine, 2015, p. 612). Thus, Izabella Teixeira had the policy space to pursue a reformist agenda that built on her doctoral thesis on the subject of SEA (Hochstetler, 2017). Her main policy recommendation is that petroleum environmental licensing should assess a whole bidding round's environmental impacts in combination instead of solely for the individual bidding blocks (Teixeira, 2008).

After a long deliberation process, in which representatives from industry and government were given ample space to present their demands and proposals, in 2012, SEA legislation was introduced in the country through MMA's and the Ministry of Energy's (MME) no. 198 Interministerial Ordinance's approval. One important characteristic of Brazil's new petroleum and gas E&P SEA legislation is that it establishes that decisions concerning the granting of an exploratory area should only be taken after all concerned government instances are consulted. Thus, alongside IBAMA, organs such as ANP, ICMBIO, MME, and MMA are consulted to decide whether or not a particular block should be offered. In principle, this permits looking at a much broader set of variables – be those of an environmental, economic, or social nature – while taking the decision.

The ordinance thus satisfies both the government's and the oil companies' interests, as it creates a stable business environment for the steady realization of biddings rounds and removes from the latter the burden of having to negotiate with local communities the social conflicts that can result from the supply of a specific block – such as fisher communities or representatives of tourist regions. Thus, if not wholly annulled, the risk of a possibly costly judicialization of the licensing process is at least considerably reduced.

5. The pitfalls of hybrid governance mechanisms

With the example of the 2013 Cooperation Agreement between the IBP and IBAMA, this section argues that while hybrid governance mechanisms are an invaluable tool to increase the reach and effectiveness of environmental policymaking, they may also create the conditions for polluting

companies to step up their engagement in the co-production of environmental public policies. The consequence is that polluting companies, such as oil companies, may increase their ability to manage risks.

The market-based instruments devised to tackle the threat of climate change, chiefly flexibility mechanisms like International Emission Trading and Clean Development Mechanisms, commonly associated with the Kyoto Agreement, are regarded as failures because of the lack of practical results (Elliott, 2020; Van der Graaf & Sovacool, 2020). Dryzek & Pickering (2018) have argued that the United Nations Framework Convention on Climate Change (UNFCCC) appeared to be "a case study in pathological path dependency" (Dryzek & Pickering, 2018, p. 39). Similarly, Depledge (2006, p. 18) characterized the UNFCCC as a regime that has passed through a process of "ossification", as it slowly lost its ability to learn.

The Paris Agreement of December 2015 was welcomed as a turning point, for it was the first treaty that reached a compromise to reduce greenhouse gas emissions between the rich and the rapidly industrializing East. It is universal and legally binds countries to devise stringent strategies to limit temperature rises. Central to the agreement are Nationally Determined Contributions (NDCs), which are unilateral, voluntary pledges that did not arise from high-level multilateral negotiations but from domestic deliberations, making climate mitigation a much more domestically driven process (Van der Graaf & Sovacool, 2020). In a context of rapidly evolving technological progress and increasing interest by civil society for environmental problems, it is expected that conceding countries' degrees of liberties to take center stage will drive up the level of action. National policies are expected to play a critical role in determining climate mitigation's fate in the decades to come (Aklin & Urpelainen, 2018).

The Paris agreement has thus consolidated an emerging trend of what Ostrom (2010) refers to as polycentric governance and Bäckstrand *et al.* (2017) to hybrid multilateralism, for it is fostering experimentation with novels forms of governance to overcome the UNFFCCC's previous approach weakness to negotiations (*ibid*). The agreement is an exercise of institutional learning that combines the traditional top-down approach of the UNFCCC negotiations with the proliferating bottom-up initiatives in climate governance. In the face of the climate regime's ossification, it was mainly outside of the formal negotiation process that learning took place (Depledge, 2006). Thus, this new kind of institutional arrangement can encompass many different actor combinations, ranging from the national to the local governments, International agencies, corporations or activists, and civil society organizations (Dryzek & Pickering, 2018). Involving market stakeholders in collaborative forms of governance aims to compensate for the state's inefficiency by introducing competition in the supply of environmental services. The inclusion of other stakeholders, such as community and marginalized populations, into environmental governance mechanisms aims to provide "time- and place-specific information that may help solve complex environmental problems" (Lemos & Agrawal, 2009, p. 80).

However, these emerging hybrids also have their limitations and weakness. Among these may be included a higher rate of natural resources, a tendency to the emergence and prevalence of power asymmetries, and the disempowerment of involved groups. For example, it has been noted that these

novel hybrid environmental governance modalities may be an aspect of a wider policy agenda that seeks to accomplish vested corporate interests (Paterson *et al.*, 2003). In a world in which many states have weak capacities, companies and supranational agencies have the power to influence and mold environmental policy with the ultimate objective of pushing through their policy agenda and preferred modes of production (Lemos & Agrawal, 2009).

In Brazil, the opportunity to participate in a novel form of governance in the environmental arena was harnessed by the IBP. In the last decades, IOCs acting in Brazil, under the spearhead of the IBP, have garnered significant institutional importance in the formatting of environmental public policy. More recently, these companies have become themselves co-producers of public policy, operating in a hybrid institutional arrangement. The decision to become a producer of public policy – and not solely a recipient – was oriented by a strategic decision on behalf of these IOCs to control one of the business's most pressing and economically costly risks: the environmental risk related to environmental licensing.

The IBP is the Brazilian oil & gas industry's representative body and has IOCs such as Exxon Mobil, Shell, Equinor (formerly Statoil), and Chevron among its members. The Institute has had prominent participation in the recent alteration of Brazil's oil & gas exploratory rules through its intense political lobbying. This concerns the pre-salt petroleum bill (12.351/2010), which was altered in 2016 through Bill of Law No. 13,365, which removed Petrobras from the sole pre-salt operator's role, with a minimum 30% share of those projects. Thus, it opened space for the entry of new foreign competitors to exploit the pre-salt, which were the primary beneficiaries of the new government's change of course (Fuser, 2017). In 2017, after a lengthy negotiation process and active lobbying by the British government and the IBP (Lima-de-Oliveira, 2019), formerly stringent local content rules were loosened.

Since the early 2000s, the IBP also started representing the industry in environmental regulation issues. For this purpose, it established interlocution channels with government bodies acting in the field, such as the MME, MMA, IBAMA, and ANP. In that decade, the Institute passed through significant restructuration phases: in 2004, a new strategic plan was approved, which led to the creation of a Social Responsibility area and the inclusion of studies in the realm of biofuels by the supply and petrochemicals Management; in 2007, IBP had its name altered to Brazilian Petroleum, Gas and Biofuels Institute. In 2008 the IBP assumed the coordination, in partnership with the MME and Petrobras, of the PROMINP's CTMA Thematic Committee on the Environment, created that year. The Institute also supported the studies that led to the publishing of ANP's Technical Regulation No. 2/2011, which regulates land ducts for the transportation of petroleum, its derivatives, and natural gas. It establishes the essential requirements and the minimum safety standards for oil & gas pipelines. The IBP's Environment Department also produced a report for the 2012 Rio+20 Sustainability Conference (CNI, 2012).

In the wake of the 2015 Paris Agreement, the IBP also sought to pass a positive message to society. The Institute acknowledged that low-carbon energy sources would take center stage with the agreement, displacing petroleum and other fossil fuels. However, the Institute declared that the oil & gas industry would still have a fundamental role in

providing basic energy access and granting energy security. The transition to a low-carbon economy should be coupled with economic growth and environmental protection, such that the transition's costs are allocated in a balanced, equitable, and predictable manner. Fundamentally, the IBP insists that the development of cleaner technologies – among which chiefly carbon capture technology (CCT) – will be a key driver of the energy transition, as it will permit to reduce the petroleum industry's total emissions (IBP, 2017).

However, IBP's most pressing concern in the environmental domain is environmental licensing in the upstream sector, because the frequent postponement of environmental licensing deadlines significantly impacts its member companies. Although the approval of the Interministerial Ordinance MMA / MME No. 198 of 2012 represented a significant improvement in Brazil's petroleum & gas sector environmental licensing regulations, four years later, some winning consortiums of the 2013 11th concession agreement bidding round have still not obtained environmental licensing even for their seismic activities, which is one of the first steps of the exploration phase (IBP, 2017). They were still being affected by the previous regulations' frailties and by resource constraints, both financial and what concerns staff, that hinder the public hand's ability to carry out environmental licensing at an appropriate pace (Bredariol & D'Avignon, 2018; Moura, 2016). From 2010 to 2017, IBAMA had only licensed 20% of the companies' projects (Coimbra, 2017). This slowness is regarded as very problematic by the IBP because unexpected delays are very costly. In the face of this problem, the IBP states that:

> The IBP believes that the licensing process environment for the oil and gas sector can be faster, can follow technical criteria, taking into account the best international practices. (..) Current intervals to obtain an environmental license may be reduced without prejudice to the quality of licensing and conservation of the environment. (..) Monitoring deadlines set for each stage of the licensing process must be carried out by a public information system that gives transparency and agility to the process. (…) Organizing information in a public system will reduce the period necessary for producing the first oil and enable faster revenue generation. (…) [The IBP] has been working with the government to improve regulation and environmental management processes to broaden the discussion and promote the licensing process's required enhancements. This partnership contributes to compliance with deadlines, both by the Industry and the government. (..) The IBP intends to continue its successful partnership with the government, to promote new improvements to the licensing process and environmental protection (IBP, 2017, p. 29).

Thus, believing that the introduction of SEA would not resolve all oil & gas environmental licensing's problems, in 2013, the IBP signed a Cooperation Agreement with IBAMA with the declared objective of improving the impact assessment process and environmental management. The Cooperation Agreement aims to enhance electronic access to information regarding licensing of E&P procedures and develop new legal instruments. Its goal is to "optimize the processes to which the operators are submitted during the pre-exploitation phase, while at the same time seeking to reduce the risks to the environment as much as possible" (IBP, 2014, p. 29).

The Cooperation Agreement covered a total of 12 projects. By 2015 ten were either completed or in progress, with their deadline agreed upon in 2018. Total disbursement of R$20 million had been inves-

ted until that point. Among the projects completed is the first phase of the Coastal Protection and Cleaning Plan (PPLC), the Marine and Coastal Equity Protection Plan (PPFMCME), the Environmental Education Program (PEA), the Waste (MRBA), the International Support Study for the Risk Analysis Guide (GAR) and the State-of-the-Art Rodolyte Study (EAR) (TNPetróleo, 2015). In addition, the PEA-BC project has been on air since 2015, and there are seven active environmental education projects from Petrobras, Shell, Chevron, Petrorio, and Statoil.

In 2016, the IBP completed PAE-Fauna, mapping the fauna and flora on the Brazilian coast. PAE-Fauna filled one of the gaps in the offshore environment oil pollution incidents National Contingency Plan. This mapping is described as a relevant tool to quickly and efficiently guide emergency response actions in the event of oil spills or other accidents with the potential to harm the Brazilian coast's fauna and flora (IBP, 2016). Another relevant project developed in 2016 was SALIC, created to follow environmental licensing processes, allowing IBP members to manage the stages of oil and gas exploration activities by visualizing the follow-up actions related to their environmental licenses. It aims to increase the effectiveness of the inspection processes' flow of information, organizing the necessary processes and requirements (compensations, environmental, social works, and environmental education programs).

However, although the Cooperation Agreement between IBP and IBAMA helped fill a relevant gap, it potentializes a problem that has historically affected Brazil's environmental agencies. These have historically lacked the political power to influence the decisions that most impact the environment. As a result, Brazil's environmental area has been traditionally exposed to a conflict of interest between private actors and the public interest (Moura, 2016)[1]. According to Zhouri (2008), who cites the example of environmental licensing of hydroelectric projects in Brazil, the dominant view within the political process that governs Brazilian environmental licensing is biased towards the projects' approval. In this sense, although negative environmental externalities and mitigating measures are typically incorporated into the projects, their scale and scope are devised to preserve the projects' budgetary balance. Similarly, Viglio *et al.* (2017) have argued that the pre-salt's environmental licensing process has not completely tackled the technological specificities of its exploitation and, consequently, has not properly addressed its environmental risks. Consequently, the pre-salt's "possible threats were supposedly quantified and probabilized," and its potential impacts were addressed by mitigation measures that were assumed to be controllable (*ibid,* p. 31).

An asymmetry of power between the productive sector and the environmental arena has also prevailed in the process that led to the approval of the 2015 Cooperation Agreement between IBP and IBAMA. If, on the one hand, it has been welcomed by the petroleum sector, it has been severely criticized by IBAMA's analysts (ASIBAMA/RJ, 2015) amidst growing worries that the overtaking of IBAMA's regulatory role by private bodies will decrease the quality of environmental licensing:

> The scenario that emerges points to a self-regulatory

[1] Often, the conflict is carried out within governmental branches and juxtaposes different public institutions (Moura, 2016).

> mechanism in which entrepreneurs and their consultants subcontracted to prepare Environmental Studies will be responsible for proposing evaluation and monitoring measures, weakening IBAMA's role (...) The decision-making that is not in line with the Technical Opinions of the teams of IBAMA analysts must be justified with the same technical rigor (..) without the recurrent attempt to relativize the socio-environmental impacts (*ibid*, p. 6).

Even though participation in deliberation is open to interested parties from the government, the private sector, and civil society, the conflict of interests frequently leads to unfavorable results from the point of view of environmental sustainability. Thus, while the cooperation agreement between IBP and IBAMA does produce public policies that are relevant from the standpoint of environmental protection, it has the side effect of increasing the sphere of influence of the oil & gas sector in the federal public policymaking agenda, to the detriment of a more stringent appraisal of the project's environmental risks and costs, and environmentally sustainable policies in the realm of renewable energy.

6. Conclusions

Unlike most economic sectors, the petroleum industry has managed to shape the environment in which it operates and tame the political, economic, and geopolitical risks inherent to its business. However, the awareness of modernity's risks has led society to demand that polluting activities take much larger precautions to reduce environmental destruction and take responsibility for their actions. Moreover, the economic costs associated with non-compliance forced the petroleum sector into a defensive mode regarding its proactive risk-managing stance. As a result, oil companies have learned to manage their risks much more carefully.

In this article, it has been argued, drawing on the examples of the 2012 adoption of SEA legislation in Brazil and a 2013 Cooperation Agreement between the IBP and IBAMA, that an environmental deliberative turn and the adoption of hybrid governance techniques have once again increased the oil companies' degrees of freedom to shape actively, first through lobbying, then through co-shaping of public policies, the environment in which they operate, with the ultimate goal of managing the risks that are inherent to their activity.

Does a renewed risk-managing ability on behalf of oil companies retard the pace of the ongoing sustainable energy transition? Although there is a long-term inexorable drive towards substituting dirty energy carriers with renewable ones, the transition does not occur at the same pace in every country of the world. Some countries face difficulties in altering their commitment to fossil fuels in the transportation segment, which oil companies will also cater to in the medium to long term. However, the ability to manage risks in a growingly risk-prone world for oil companies not only ensures profitability during that phasing-out phase but also aids these companies in repositioning themselves as carbon-neutral players in a world that growingly marches towards renewable energy.

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